***Developing a Public Health Workforce for the Future*:**
How MPH programs are shifting to meet emergent needs

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DISSERTATION

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DEDICATION

To my family, my friends, my colleagues, and my peers.

In your own ways, you have each pushed me, supported me, made me more aware, and through that, inspired me to do this work, and motivated me to help seed change. This has been an Olympic journey, and yet, as I arrive here, amidst a global pandemic and societal awakening to racism, systematic barriers to real equity, and the impacts of climate change, I am reminded that this is just one stepping-stone to a much greater movement.

We are change makers. This is our time to facilitate a different future.

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First, I wish to acknowledge and thank all of the women and girls in my life who have inspired me, and continue to inspire me. Without you, I would not be here. My mother, who put everything aside to care for others, helping to lift them to their fullest, including me. My aunt, who broke down barriers to support women's freedoms, helping me see that so much is possible. My grandmother, who, at 72, walked across a stage in regalia, earning a university degree, showing me that dreams can be achieved. My teammates for my last Olympic journey, who, through joy, pain, sweat, and tears, taught me grit and resilience. My friends, across my lifespan, who show me how to love, be compassionate, be brave, and be bold. My sister who listens and dreams, along with me, and shows me how the world and its systems work. And my two daughters, my heart and soul. You are what I live for. Your smiles, your minds, and your hearts. Your awareness, empathy, and courage fuel me, daily.

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I also wish to acknowledge history, and the role it is playing and will play in my life as a public health practitioner. I live at one of the apexes of the Underground Railroad and the suffrage movement, on land that was taken from the Cayuga Nation. In part through my public health

training, I am hyper-cognizant that my freedom and rights have come on the backs of others' rights and freedoms, and at a cost to others' lives. I am inspired by the bravery and boldness of the individuals and activists that saved lives and led change. We do not yet live in a country or world where reparations have been made, or equity exists across race, class, gender, religion, gender identity, or ethnicity. This is at the core of public health, the profession that found me. I recognize that I have a role in the realities of what we are experiencing now, and I commit to doing more in my personal life, and in my professional public health life. I will listen more. I will be brave. I will not be afraid to use my voice and my words to build awareness, and to be a part of change.

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LIST OF ABBREVIATIONS

ASPPH	Association of Schools and Programs of Public Health
ASTHO	Association of State and Territorial Health Officials
BScOT	Bachelor of Science, Occupational Therapy
CEPH	Council on Education for Public Health
CoL	Council on Linkages
COVID	Corona Virus
DoI	Diffusion of Innovation
IOM	Institute of Medicine
IRB	Institutional Review Board
IT	Information Technology
MPH	Master of Public Health
NACCHO	National Association of City and County Health Officials
NBPHE	National Board of Public Health Examiners
OTR	Registered Occupational Therapist
PH WINS	Public Health Workforce Interests and Needs Survey
PHAB	Public Health Accreditation Board
PHP	Public Health Program
RQ	Research Question
SOPHAS	Schools of Public Health Application Service
SPH	School of Public Health
SPPH	Schools and Programs of Public Health
U.S.	United States

SUMMARY

Interdisciplinary practitioners have been working to improve the health of people and populations for more than a century, however, in the U.S., public health needs persist, in part because the workforce is not properly equipped. Over the last 30 years, there have been multiple calls to challenge the 'business as usual' of public health education and practice to more effectively prevent disease and prolong life. These calls to action focus on expanding the reach of public health through communication, collaboration, and leadership; improving the skills and abilities of the current public health workforce; and adapting expectations of schools and programs of public health that are training the future workforce. The public health workforce of today, and that of the future, must be competent in areas of strategic leadership, adaptive management, communication, and cross-sector engagement.

Schools and programs of public health have a role to play in workforce capacity building, both through the provision of workforce-focused training, and through university-based training for the professionals of the future. In this regard, expectations of schools and programs of public health—and their graduates—have changed in the last four years, with the release of new standards for accreditation. However, dissemination of information can take time, and change within university settings can be complicated and time-consuming. As yet, there has been no systematic overview exploring: if or how schools and programs of public health are adapting curricula based on the new standards; whether the calls to action are informing instructional changes within schools and programs of public health; of if changes are being implemented to help develop strategic leaders who are able to catalyze engagement for impact, modify the critical determinants of health, and ultimately improve public health outcomes.

Using Master of Public Health (MPH) programs as the unit of analysis, this study explores whether and how schools and programs of public health are shifting their instructional design in response to these calls to action. A two-phase mixed methods single embedded exploratory case study was used to describe: whether, how, and why schools and programs of public health are shifting their MPH curriculum; what factors are influencing curriculum shifts; what outcomes are desired from the curricular shifts; and what is facilitating or limiting operationalization of curricular shifts. The goal was to identify and summarize themes, practices, and impediments.

In Phase 1 of the study, all schools and programs of public health (SPPH) with an accredited MPH program (including approved applicants) were invited to participate in a short survey. The survey gathered data related to program characteristics, curricular changes, factors that influence shifts in instructional design, and metrics of success. Some 42% of eligible MPH programs responded to the survey. Data were analyzed, with responses stratified by school or program characteristics. Phase 1 informed Phase 2 of the study, including development and application of a targeted sampling frame and the identification of *a priori* codes for qualitative data analysis.

Phase 2 of the study used a multiple case study design to allow for in-depth data collection from a sample (N=8) of SPPHs that responded to Phase 1. Thematic analysis of qualitative data (interview transcriptions and document reviews) was used to summarize themes, providing a deeper description of instructional shifts, including facilitating and/or limiting factors.

Based on the data collected between November 2019 and March 2020, it is clear that MPH programs believe that the purpose of an MPH education is to develop public health workers and leaders who are skilled and who can lead change that improves the health of communities. Based on this focus, and informed by multiple sources, MPH programs have implemented a number of

shifts since Fall 2015. They have adapted the design of MPH programs, adopted new competencies that are aligned with workforce needs; altered graduation requirements to support more field-based and applied work to bolster workforce readiness; and adapted admissions criteria to support more diverse cohorts and future workers. These changes, and others, have driven shifts in program structure (concentration areas, courses of study, certificate options) and curriculum to permit stronger focus on knowledge acquisition, skills building, and professionalism, factors program leaders recognize are critical for workforce success. To meet these learning outcomes, MPH programs have shifted to using more engaged pedagogical strategies, such as more field-based or real-work-like learning, partnerships with community, and practical assignments that mimic work they might do in practice, including team-based and collaborative work.

These findings are reassuring, four-years post-dissemination of the new MPH accreditation standards that signify the first major change in 50 years. MPH programs have embraced change, and found ways to innovate and overcome barriers. However, this evolution should not stop here. The COVID-19 pandemic, and the disproportionate effect on Black and brown Americans, has elucidated much that is at the core of what public health seeks to change. In this moment, public health leaders and educators need to double down, ensuring that as loss is realized, and systems are re-built, that education and advocacy for, and implementation of anti-racist systems occurs. So support these systems and processes, equitable public health education and workforce development is vital. MPH program leaders, universities, and national public health leaders all have an opportunity to continue to accelerate this progress through assessment, education, and advocacy.

I. BACKGROUND AND PROBLEM STATEMENT

A. Study Objectives

Over the last 30 years, there have been calls to change the way public health is taught and practiced to more effectively prevent disease and prolong life.[1-11] To support public health improvement, public health leaders have highlighted a need to better develop and support a progressive workforce that can use strategic leadership to develop collective community and policy action to address and improve the determinants of health.[3,11–13]

Schools and programs of public health (SPPH) have an important role to play in building the public health workforce capacity through university-based training for the workforce of the future.[2,12,14–16] To respond to the current and future workforce needs, in 2016, new national accreditation criteria for SPPH were released,[14,17] implementing the first major change in over 50 years. Through these criteria, MPH programs are encouraged to focus on an integrated, inter-professional, and competency-based curriculum that prioritizes field-based and experiential learning.[4,13,14,17] Before graduating, MPH students are expected to demonstrate competence and the ability to produces tangible results in practice settings.[4]

It was hypothesized that these calls to action, including the new accreditation criteria, could spur action, however, it was also recognized that change is complicated.[5,18–20] Dissemination of new information—including implementation successes and best practices—takes time, requiring interest generation, buy-in, re-training, and iterative exploration through trial and error.[21,22] Further, adoption and implementation of program innovation in a university setting can be complex due to institutional size, governance structures, faculty reward systems, and even academic freedom.[5,16,23]

Given the aforementioned importance of developing strategic leaders who are able to catalyze engagement for impact, it seemed important to explore, four years after the development and promulgation of the new accreditation standards, if and how public health education might be changing, and whether and how the calls to action and changes in accreditation standards are contributing to desired change. Thus, looking at the MPH degree-level, this two-phased mixed-methods study addresses this question by: describing what instructional shifts have been made as compared to five years ago; what reported factors are influencing shifts in curriculum design and/or delivery; what perceived forces are facilitating or limiting implementation of these shifts; and what outcomes are anticipated or being seen from these shifts.

This study is important for three key reasons: First, if changes are being made to MPH program design and delivery—and outcomes are measured and shared—progress in workforce development can be accelerated through documentation and dissemination of innovations, results, and lessons learned. Second, if changes towards measurable workforce-related outcomes are not being made within MPH programs, becoming aware of this early on can help national public health leaders consider alternative approaches to fill the looming public health workforce needs. And third, if some changes are being made, but there are barriers to growth, optimization, or institutionalization, understanding the barriers and possible facilitators may be valuable to national and institutional decision makers.

B. Background and Context

1. Complex Public Health Needs

Public health has been a public service in the United States (U.S.) for more than 150 years, with an explicit focus on detecting, preventing, and responding to public health threats, and working to keep populations and communities healthy.[11,24] As the U.S. population has

expanded, and the country has modernized and urbanized, key public health needs have evolved to include foci on infectious diseases, chronic diseases, lifestyle diseases, impacts of environmental health and climate exposure, and both physical and mental health issues.[25]

Currently, the U.S. is experiencing critical public health needs and significant inequities in health outcomes linked to race, ethnicity, gender, and class.[26,27] Average lifespans are decreasing in the U.S. for the first time in decades.[28] Infant mortality rates in the U.S. are above those of other developed countries.[29] Communities are suffering ill-effects from polluted water and air, and also the effect from climate change.[30] Some 50 percent of the U.S. population is affected by malnutrition—hunger, overweight, or obesity—and about 25% of the adult population has diabetes or prediabetes.[31–33] These chronic diseases consume some 40% of the U.S. healthcare budget while also contributing to disability—reducing years of productive life and impacting mental health and self-esteem.[32–36]

These issues are complex and are influenced by many factors, including genetics, personal behaviors, community networks, neighborhood location, environmental exposures, policies, and cultural practices.[37,38] While genetics and access to healthcare account for a small proportion of U.S. health outcomes, the majority are influenced by the *social and structural determinates of health:* social, environmental, and behavioral factors that each person encounters in their community.[39–43] Addressing the determinants of health has the greatest potential to improve public health,[36] but this requires both national-level systems change, and community-led and community-based interventions that link public health, health care, and community resources.[11,24,44,45]

The impacts of these gaps were exemplified as data collection for this study ended, The COVID-19 pandemic exploded in the U.S., both paralyzing life as we knew it, and taking more than 120,000 American lives, drastically and disproportionally affecting Black, Hispanic, and American Indian/Native American communities. The epidemiology of the pandemic placed a spotlight on the impacts of poor investment in education, housing, community development, living wages and health care access, and divestment in the county's public health system for the last decades. Simply put, our public health system was not equipped to meet the need of the intersection of this virus and decades of undermining the factors that would bring stability. Failings in national leadership during COVID19 led to a disjointed and dismissive response. The result was far too many lives and livelihoods lost and communities broken. These economic and health consequences most severely affected those who were already vulnerable due to long-term systems and structural depletion. These inequities were magnified yet again as the country has awoken to the devastating number of Black lives lost and upended due to police brutality and mass incarceration.

To support national-level systems change, and community-led and community-based interventions that link public health, health care, and community resources to address and remediate the gaps, and to improve the health of the nation, a new paradigm for public health improvement was proposed by national public health leaders in 2016 .[11,24] *Public Health 3.0* calls for cross-sector engagement and strategic leadership to develop collective community action focused on improving the determinants of health, including investing in safe and healthy communities, and development of bridges between clinical prevention methods (health care) and community-wide prevention methods (public health) so that community health at the center of community action.[11,24]

To achieve this, there is a need for public health leaders who are competent, adaptive, diverse, and engaged. "We cannot expect to achieve heath improvement in communities nationwide without strong public health agencies built on a foundation of well-trained and innovative public health practitioners."[36] Competent public health strategists—leaders with technical expertise and strategic skills—can facilitate community-led organizing for action that leverages resources to meet priority needs of the community.[3,11,24,46] To do so, these leaders require the knowledge and skills to understand and address infectious and chronic diseases, and the determinants of health, along with the ability integrate strategic skills, including systems thinking, change management, persuasive communication, data analytics, problem solving, diversity and inclusion, resource management, and policy engagement.[8,47] However, there is evidence that the current public health workforce—at least those enumerated and assessed in government public health jobs—does not feel equipped to lead or work in this way.[9,48]

2. Public Health Workforce Development: 100 Years of Adaption

The first formal U.S. public health training program was established in 1916 with aims to develop a cadre of interdisciplinary professionals able to complement physicians to prevent disease and support population health.[49] The first public health school (Johns Hopkins) emerged from recommendations submitted to the Rockefeller Foundation calling for a focus on both hygiene (areas such as bacteriology, immunology, parasitology, physiology and epidemiology) and the practice of public health (areas such as administration, leadership, and management).[49,50] Over the next century, the U.S. population grew, public health needs grew, and the number of schools and programs of public health to the grew; at the start of 2020, there are 186 accredited schools and programs of public health, with another 29 institutions

in the applicant phase.[51] Within schools and programs of public health the MPH degree is the most common degree awarded, making up 91% of graduate-level degrees conferred by the schools and programs in 2016.[52]

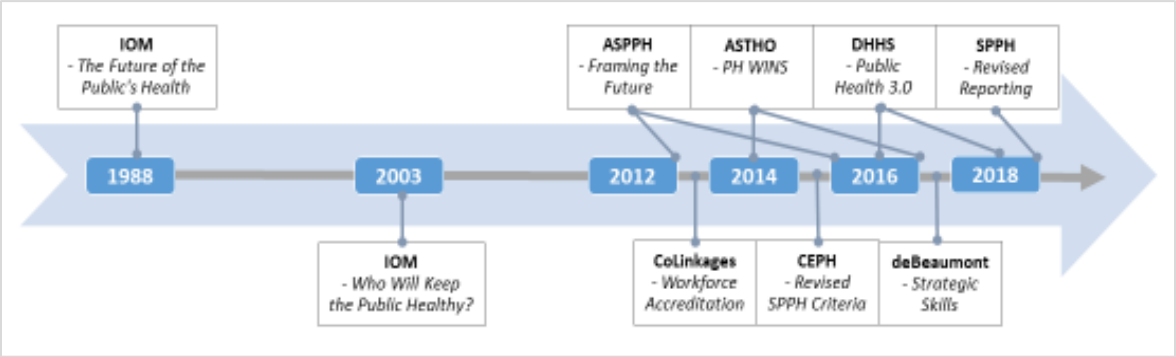
In response to changes in public health needs and growing disparities in health outcomes, the Institute of Medicine (IOM) published a report in 1988 entitled *The Future of Public Health,* and noted that the system that served to support public health was in disarray, calling for investments in and restructuring of government public health infrastructure.[53] That landmark report was followed by another two reports by the IOM in 2002 and 2003, re-imagining the public health for the 21st century, with a greater focus on population health and cross-sector collaboration, and public health education.[1,54] These reports noted competence gaps in the public health workforce and called for shifts in public health education to better link education to public health practice.[1,54] Specific recommendations included increasing integrated learning opportunities for students, recognizing and rewarding faculty scholarship related to public health practice research, and recognizing and rewarding faculty scholarship related to service activities that strengthen public health practice.[1,54]

In 2004, national public health stakeholders, convened by the Robert Wood Johnson Foundation, proposed exploring a voluntary national accreditation program for state and local public health departments as a way to standardize services and increase capacities within the existing public health workforce.[6] Following a feasibility study, the Public Health Accreditation Board (PHAB) was established to develop and pilot accreditation standards and measures.[55] A voluntary accreditation process launched in 2011 and state and local public health departments seeking accreditation needed to meet standards and present compliance in a self-study report.[56] In response to the PHAB standards, the Council on

Linkages Between Academia and Public Health Practice (Council on Linkages), a collaborative of 23 national public health organizations, developed a set of core competencies for public health practice, education, and research as a way to assess and build health department workforce capacity aligned with accreditation standards.[7] In addition to capacity-building within the existing public health workforce, these initiatives highlighted opportunities to enhance the training of the future public health workforce.

In 2010, a *Commission on the Education of Health Professionals for the 21st Century*, formed by The Lancet, published their assessment of the current state of health professionals' education, noting that models in use for public health and medical education had not kept pace with the complex and adaptive public health issues we face today, "largely because of fragmented, outdated, and static curricula that produce ill-equipped graduates."[57] As this assessment was not the first call to action to update public health education (Figure 1), in 2012, the Association of Schools and Programs of Public Health (ASPPH), an organization of all accredited schools and programs in the U.S., began to examine the need for reform.

Figure 1– Timeline of Calls to Action to Refine and Adapt Pubic Health Education



Under ASPPH leadership, some 150 experts linked to public health education and practice engaged in a process to challenge the status quo of public health education.[58] The chair of the task force suggested that this process could accelerate change and inspire innovations that would help to produce leaders "who are helping to create a healthier nation and world".[15] The resulting report, *Framing the Future (2012-2015): Public Health Trends and Redesigned Education,* called for a transformation in public health degree programs, and suggested that the MPH degree should "ground students in a rigorous, integrated, public health core; focus on specialized skill building in a defined area of expertise; and emphasize experiential learning that provides opportunities for applying and integrating concepts, skills, and interdisciplinary content."[2] Essential elements of public health education, from an employers' perspective, were defined, and the report recommended that SPPH prioritize interdisciplinary education and obligatory real-world field experience.[59]

In 2014, the Association of State and Territorial Health Officials (*ASTHO*) and de Beaumont Foundation designed and administered Public Health Workforce Interests and Needs Survey (*PH WINS)* to understand how prepared the public health workforce was for health challenges expected to emerge within the next five years. The nationally representative findings reported that 83 percent of the workforce did not have formal public health training, and that there were significant gaps in the public health workforces' abilities.[9] The PH WINS was replicated in 2017, and workers enumerated in 2014 and 2017 note that in order to meet the needs of the communities that they serve, and the expectations of their job roles, they need greater competence (skills, knowledge, ability) in 12 core areas: policy analysis and development, business management, budget and financial management, systems and strategic thinking, understanding of the social determinants of health, evidence-based public health

practice, collaborative practices and partnerships, methods to engage diverse communities to solve complex problems, developing a vision for a healthy community, change management, cultural competence, and effective communication.[9,48] Reported reasons for these gaps are numerous, including that: few people working in the field of public health have actually received formal public health training; public health agencies experience frequent turnover of staff; and where people are formally trained, they may choose other field of practice as government public health salaries are low and there are few opportunities for advancement.[60,61]

The release of Public Health 3.0 in 2016 expanded the conversation about workforce capacity needs, and thus university-based training opportunities. To fill the noted gaps within the current public health workforce, public health training and capacity building programs are encouraged to use new approaches.[4,6–9,48,62,63] "The challenge of creating a Public Health 3.0 workforce is less about subject matter expertise and the science of public health and more about building the leadership and management competencies of public health workers nationwide."[64] This was supported by the deBeaumont Foundation's call to action focused on the eight strategic skills needed by those in or entering the public health workforce, including systems thinking, change management, persuasive communication, data analytics, problem solving, diversity and inclusion, resource management, and policy engagement.[8]

3. Current State: Developing Workforce Readiness

The U.S. public health workforce comprises some 304,000 people at the local, state, and federal levels, not including those working in the private/non-governmental sector.[65,66] Findings from the 2014 and 2017 PH WINS show that a large proportion of the government public health workforce intends to leave their job or retire within the next few years, meaning

that there will be jobs to fill.[9,48] To help fill this gap, there are more than 200 schools and programs of public health in the U.S.,[51] working to train students at the bachelor, master, and doctoral level who enter many sectors of the public health workforce, including government, academia, health care, not-for-profit, and private.[67,68] For the last 20 years, the number of schools and programs of public health has increased drastically, producing some 10,000 MPH graduates, on average, per year in the last decade (17,321 MPH graduates in 2016).[52] However, per the PH WINS data, public health workforce needs persists.

As describe above, over the last 30 years, multiple agencies have outlined workforce capacity development needs. These progressive calls to action have encouraged SPPH to "transform their public health education, training, research, and practice endeavors—embracing new approaches in new settings with new partners to address current and emerging public health challenges,"[13] as the "strategies and tactics of the past are not sufficient to meet the challenges of the future."[64] A cross-cutting theme is to focus on building competence—the ability to access, integrate, and apply knowledge, skills, and values in context-specific ways.[36,69] Prioritized competence domains across multiple tiers of the current and future public health workforce include the ability to: understand inequities and the determinants of health, support community engagement, engage in inter-professional work, practice cultural competence, communicate effectively, collect/analyze/use data, apply systems thinking, engage in program planning, facilitate strategic management, and facilitate leadership.[69]

In response to these calls, the Council on Education for Public Health (CEPH)—the national accrediting body that sets the standards for program accreditation—undertook a multi-phased review of the opportunities for improvement. "In 2014, CEPH began the regular revision process with a desire to be more responsive to the needs of public health practice and under

the backdrop of the forward-looking work of several organizations and their efforts to define the necessary knowledge and skills for the future public health workforce."[14] CEPH considered input and needs data from multiple entities including the Council on Linkages; ASPPH; PH WINS; and the National Board of Public Health Examiners (NBPHE) job task analysis. Following a public comment period, CEPH released new accreditation criteria for SPPH in 2016, the first major change in accreditation standards in over 50 years.[4,17]

CEPH's goals in adapting guidance for public health education were many, including to ensure that SPPH graduates were best prepared for the workforce needs awaiting them. Based on the years of iterative data collection, triangulation, and interpretation, the new standards were developed to emphasize foundational public health knowledge, skills, and competencies, while still assuring the development of specialized, concentration area knowledge and skills.[14,17]

Under the new accreditation standards, SPPH must ensure student acquisition of foundational public health knowledge and skills, and create opportunities for students to demonstrate competence in specific areas linked to public health practice.[4] Furthermore, schools and programs must facilitate and require *integrated learning experiences* and *applied practice experiences* to support competence development, and use *authentic assessment* processes (real world activities, development of products that are of use) to assess student competence.[4] To that end, students are expected to have opportunities to demonstrate each of the foundational competencies and to integrate them in a way that produces tangible results in a practice setting.[14] Whereas the former education model emphasized developing specialists by having students learn in 'silos', taking five core courses (epidemiology, biostatistics, environmental health, health services administration, social and behavioral sciences) and then

specializing in one disciplinary area,[14] the new model prioritizes building leadership and management competencies, to help develop "a workforce that has the skills and aptitudes to address infectious diseases along with chronic disease, and social determinants of health, and to combine the traditional disciplines of public health with strategic skills."[14,47,64]

4. Diffusion and Uptake of Information for Adaptation

The numerous calls to action related to public health in the U.S. suggest a need and urgency related to workforce development, and suggest a major role for schools and program of public health in closing the gap is clear. However, given the competing priorities that academic public health leaders and faculty face operating within complex university environments, and the multitude of channels competing for attention, it is possible that these 'calls to action' have not led to a shift in approach, or yielded sufficient action.

Although many of the aforementioned initiatives—such as Framing the Future, PH WINS, and the new CEPH accreditation standards—were developed in partnership with faculty and leaders from schools and program of public health, dissemination and uptake of new information is complex and can take time, even with focused and coordinated attention. Furthermore, even with information in hand, adoption and implementation of change or innovation within an organizational setting—including a university setting—can be complex.[5,18,70] At this time, aside from the new accreditation standards, and optional capacity building webinars and conferences, there is not a roadmap to guide programs in how to develop the public health workforce of the future.[12] At this time, there has not yet been a clear depiction of how schools and programs of public health are adapting to the new challenges for workforce development, what is informing this adaptation, and what is facilitating or limiting progress. This study addresses this knowledge gap.

C. Problem Statement and Study Questions

Over the last 30 years, there have been calls to change 'business as usual' in public health to more effectively prevent disease and prolong life, including development and support of a competent workforce that can use strategic leadership to develop collective action to address and improve the determinants of health.[1,2,5,57,59,71] To do so, collaborators need a shared understanding of influencing issues, a vision for change, and the knowledge, capacity, and resources that support planning, action, and evaluation.[3,11,24,44,45] However, there is evidence that the current public health workforce still lacks capacity in these areas.[9,13,48,61,63,69]

Schools and programs of public health have an important role to play in building workforce capacity, but their curricula or instructional methods may not have kept pace with the changing professional needs of this era.[57] In response, the Council on Education for Public Health (CEPH) released new accreditation standards to guide public health education, the first major shift in 50 years.[4,14,17] To respond to the current and future workforce needs, schools and programs of public health must consider new strategies and tactics, but there is no roadmap to the future state.[12] Schools and programs of public health should be "liberated to encourage bold, new ways of imagining the MPH degree and shaping its future."[64]

Dissemination of new information is complex and can take time, and adoption and implementation of 'innovation' in a university setting can be more complex, due to multiple factors.[5,18,70] Presently, it is unclear if and how schools and programs of public health are adapting to address the existing workforce gaps—or in anticipation of future public health workforce needs—and if the calls to action and changes in expectations will be enough to

develop strategic leaders who are able to catalyze engagement for impact, to improve the publics' health, and the determinates that influence it.

This study explores and describes whether and how schools and programs of public health have shifted their mph program design to better develop the public health workforce of the future. Specifically, this study examines what reported instructional shifts have been made, as compared to five years ago; what factors are influencing these shifts; what outcomes are desired as a result of these shifts; and what is facilitating or limiting operationalization of these shifts.

1. Study Questions

This study set out to collect, compile, and synthesize data to address five key questions:

- What is the current focus and purpose of MPH education programs in the U.S.?
- Are MPH programs shifting their program design to better meet the defined focus?
    - If yes, what, specifically, are they shifting?
- What are the motivations for, and desired outcomes from, these shifts?
- What is informing and influencing MPH program shifts?

D. Leadership Implications and Relevance

There are many opportunities to improve the public health in the U.S. This will require a more concerted effort focusing on the factors that have historically created, and continue to create, inequities in the broad array of areas defined by the structural and social determinants of health.[38,72] To achieve this, actors need a shared understanding of what these determinants are, what root causes and influencing factors are, and what assets and opportunities exist to address gaps, and the ability to engage in collective and strategic problem-solving and leadership to support shifts in thinking and action.[3,24,42] Much of what public health seeks to achieve can and

should be community led, and this can be catalyzed by public health strategists.[3,24,42] However, some in the current public health workforce lack the knowledge and skill to do this.[9,48]

To meet these workforce needs, schools and programs of public health are being asked to re-center public health education on core competencies, and to incorporate applied learning into their training models.[4] Schools and programs of public health may already be adapting their curriculum to meet these needs, but may be encountering barriers. Conversely, some programs may have developed innovative and effective solutions that could be shared with peers to spur action. To develop a competent public health workforce for the future, educators and practitioners need to speak openly about what is being done to close the workforce gaps, how it is working, and what the barriers are. This study sought to facilitate this dialogue through engagement, documentation, and dissemination.

This study, informed by input from leaders within national public health leadership organizations, engaged SPPHs that offer an MPH in an exploratory mixed methods research to raise awareness, increase dialogue, and support documentation and dissemination of strategies and ideas being used to achieve defined outcomes. When shared through national organizations helping to support collective growth—such as ASPPH—this process could aligned with an organizational learning approach, considering internal and external influences, development of a shared (or developing) vision, and the sharing of strategies and capacities to address strategic needs. This type of process can support engagement, dialogue, introspection, reflection, and in doing so, help to set a stronger, more cohesive vision and strategy for the future.

Via this engagement process, this study also sought to elucidate and document what is happening within schools and programs of public health, why, and what the motivations are. The aim here was to summarize and facilitate sharing of innovative ideas, existing barriers, and solutions be tested used, helping to seed a national conversation.

This approach is consistent with the Diffusion of Innovation theory that suggests that innovation can drive action and behavior change within a social system, in this case, within the network of SPPH.[21] As per DoI theory, innovation starts within a small group of innovators, and through peer networking, story-telling, resource sharing, and data, innovations can be expanded and disseminated to shift practices within large parts of the system.[70] If changes are being made to MPH program design and delivery—and outcomes are measured and shared—progress in workforce development can be accelerated through documentation and dissemination of practices, results, and lessons learned. However, if changes towards measurable outcomes are not being made via MPH program design and delivery, this study may help to describe why, and this information may be able to help national public health leaders consider alternative approaches disseminating information and innovation, and/or considering alternative approached to fill the looming public health workforce needs.

II. CONCEPTUAL AND ANALYTICAL FRAMEWORK

As summarized in Chapter 1, The U.S. is in need of a better-equipped public health workforce to detect, prevent, and respond to the complex issues of this era.[3,5,11,13] Schools and Programs of Public Health (SPPH) have an important role to play in developing the workforce of the future, particularly with the MPH, a professional degree.[2,5,16,73] Following some 30 years of progressive calls to action, including the release of new accreditation standards, MPH programs may be considering and/or implementing changes to their program design in response.[16,73–75]

In three sections, this chapter describes literature that is relevant to this topic, and presents a conceptual framework to describe the theories underpinning this study. By considering the **purpose or focus** of MPH training programs, the first section describes possible motivations for adaptations to MPH program design and delivery, elucidating why programs may be shifting their approaches. The second section builds on this and describes possible or anticipated areas of **instructional changes**, exploring what areas of instructional design MPH programs may be investing in or shifting to better align with the purpose of MPH training. The final section describes **influencing factors** that may facilitate or inhibit change and adaptation within SPPH and MPH programs – illuminating how MPH programs may plan for or facilitate change.

A. Literature Review

1. Methods

A multi-phased literature review was conducted, using Google Scholar, to identify relevant peer-reviewed publications. Various search terms were used in combination to identify grey and white literatures, such as “MPH” and “master of public health” plus “education,” “training,” “competency-base education,” “competence development,” “public health

competence," "public health education," "public health 3.0," "public health workforce development." "curricular shifts," "curricular reform," "re-conceptualized curriculum," "educational needs," and "new curriculum model." This search was supplemented by more focused identification of grey literature, using the Google search engine, to identify and access reports, guidelines, and summaries on agency websites. Relevant resources identified via peers and advisors were also considered.

Resources were selected for review based on their applicability to the topics and questions of interest, with a specific focus on documents and information related to training public health and other health professionals at the university level. Documents were reviewed and annotated inline, and then summarized into an annotated bibliography managed in Microsoft® Word.[76] This annotation included key excerpts of relevant text. The annotation was often complemented by a researcher-generated memo to summarize what the paper noted, what themes emerged, what the relevance was (if any) for this study, and what questions/ideas/directions should be explored next. In addition, key citations listed in the identified and seminal resources were highlighted and then explored.

A basic content analysis of the annotated bibliography and memos was conducted, complemented with iterative reflection and memo writing to develop ideas related to emergent themes. This led to the development of study constructs and a conceptual framework, described in detail in this section.

2. Re-establishing the Purpose and Focus of MPH Programs – Motivations for Change

a) Background

The first formal U.S. public health training program was established in 1916 with aims to develop a cadre of interdisciplinary professionals able to prevent disease and support population health, using a curriculum focusing on both hygiene (areas such as bacteriology, immunology, parasitology, physiology and epidemiology) and the practice of public health (areas such as administration, leadership, and management).[49,50] Over the next century, as the U.S. population and public health needs grew, so too did the number of schools and programs of public health (SPPH); as the start of 2020, there are 62 accredited schools of public health and 124 accredited public health programs, with an additional 29 working towards accreditation.[51] It should be noted: MPH programs in the U.S. do not need to be accredited. Accreditation is an option that schools and programs chose for a number of reasons, including: it assures a level of compliance with national performance standards; it permits membership with ASPPH, and the MPH common application system (SOPHAS); some career pathways and credentials require being from an accredited MPH program; and students in these programs may be eligible for lower federal student loan rates. It is unclear how many U.S. MPH programs are not accredited.

In this time of rapid growth, public health training became siloed and isolated from the field of public health practice or on-the-ground work, developing graduates who, some argued, were ill-prepared to meet public health needs.[14,17,71] This was reportedly due, in part, to the university environment, where individual academic productivity and research is prioritized over teaching, community engagement, and collaboration, factors essential for public health education.[23,71] Over the last decades, universities have become

proficient in recruiting students, and in supporting the acquisition of technical knowledge and skills, but there is evidence that many graduates are not equipped with the skills and abilities needed by the current public health workforce.[5,13,14,52,61,64]

As described in Chapter 1, between 2002 and 2019, no fewer than 10 calls to action related to public health education were disseminated by leading public health groups.[1-11] This body of work called for a re-focus of public health education in the U.S., including a greater focus on workforce readiness, including links between public health education and practice, experiential learning, and competence development.[1,2,5,7–9,48,59,77]

b) <u>Organizing Frameworks</u>

Two seminal processes and publications from this time spoke specifically to the purpose of MPH training programs and provide frameworks that may be motivating or guiding changes to MPH Programs.

In 2010, a seminal medical journal, The Lancet, convened a group of 20 professional and academic leaders to examine the state of education of health professionals, globally, and to set out a vision for the 21st century.[5,71] The globally representative Independent Commission on Education of Health Professionals for the 21st Century worked over a number of months to produce a report and call to action: *Health Professionals for a New Century: transforming education to strengthen health systems in an interdependent world.* In the report, the authors, led by Julio Frenk, then dean of the Harvard School of Public Health, described the history and evolution of public health and medical education systems and structures, showed the incongruence with the current state and needs of the world, set out a vision for the future, and suggested strategies to help accelerate action.[5]

In 2012, and over a three-year period, ASPPH convened some 150 public health leaders representing academic public health training and public health practice at multiple levels of community and government, to re-envision the next century of public health education.[12,15,58] The charge of this initiative was "*Framing the Future"* of public health education in the U.S. The results of this multi-year initiative included establishment of a shared vision for public health education, a call to action to help re-envision the future of public health education, and a series of reports to help frame the future of the MPH degree, the DrPH degree, and undergraduate public health education.[2,59]

c) Purpose of MPH Training

The seminal reports mentioned above, as well as other literature published since, suggest four foci or purposes of university based MPH programs: learning, competence development, workforce readiness, and employment.[2,13,14,16,17,59] These four foci are described in the four sub-sections below.

i. (informative) Learning

University training programs are designed to ensure that students, at a minimum, acquire basic knowledge and skills, what *The Lancet Commission* described as informative learning.[5] From a public health training perspective, informative learning is important, to assure understanding of foundational knowledge in areas that cross-cut public health practice, in areas linked to the science and practice of public health, and factors that influence human health, and knowledge elements that contribute to competence development.[4] Knowledge alone, however, does not assure an ability to apply it and act.

ii. Competence Development (transformative learning)

With foundational knowledge in hand, MPH students and practitioners can begin to build competence.[5,78] Competence means having the required knowledge, skills, abilities, and values to do something successfully and efficiently given the context and scenario.[79,80] Defined competencies can be broken down into component pieces of requisite knowledge and specific skills (supported by informative learning). When complemented by learning the values that are foundational to a profession (supported by formative learning), and by building confidence in ability (supported by transformative learning), competence can be demonstrated.[5,80]

Competency-based professional training programs teach and mentor students in changing environments using scenarios that require problem solving and reflection, helping graduates become equipped to demonstrate knowledge and skills, and the ability to apply them effectively in various environments.[4,81] Competence supports long-term career success by developing stronger self-awareness (ability to improve), better understanding of how workers integrate with and serve their environment (ability to adapt to contextual needs), and commitment to ongoing self-assessment and life-long learning.[82,83] In public health practice, competence allows professionals to translate their abilities to the rapidly changing and complex challenges of contemporary public health.[3,5,9,47,48,57,61,84]

iii. Workforce readiness

MPH training programs may endeavor to develop professionals who are ready to enter and replenish the public health workforce, including the governmental public health service, healthcare sector, and/or non-profit sector.[2,5,15,59,61,71] Over the last 10 years,

numerous public health workforce needs assessments and task analyses have elucidated the skills, abilities, and competencies that are needed by public health practitioners and leaders to equip them to help create a healthier nation and world.[3,5,63,81,8,9,15,17,48,59–61] Numerous authors suggest that a "competent, adaptive, diverse, and engaged workforce [is needed as] we cannot expect to achieve heath improvement in communities nationwide without strong public health agencies built on a foundation of well-trained and innovative public health practitioners,"[36] MPH training programs should focus on competence development in focal areas highlighted by workforce needs assessments.[2,5,15,59,61,71]

iv. Employment

A final and important purpose of MPH training programs is graduate employment. As a professional training program and pipeline for the workforce, MPH training programs may endeavor to help replenish the public health workforce.[61] Furthermore, employment of graduates and/or enrollment in ongoing studies are an important factor for MPH program and school of public health accreditation.[4]

d) Summary

Over the last century, public health education has proliferated. In its current state, the training provided within schools and programs of public health may not be adequately preparing public health professionals to enter the workforce with the competencies needed to understand and address the public health needs of today. The literature reviewed in this section suggests that MPH training programs may have multiple reasons to re-envision their focus and purpose, finding ways to push beyond simply assuring

informative learning, to focus more on assuring competence development in areas identified and anticipated by the existing workforce, in support of workforce readiness and graduate employment. This study seeks to explore the extent to which these purposes, or others, are the foci of current MPH training programs.

3. Areas of Focus for Improvements or Shifts in MPH Instructional Design

a) Background

The role of a university is evolving. Whereas universities used to be vaults of information—places where people went to obtain information via courses, libraries, and faculty expertise—much information is now readily accessible to many, in many forms, via the internet.[16] In these shifting times, complemented by a greater focus on evidence-based approaches to improve engagement and learning with adults, universities are reexamining their role, and their unique ability to develop learners and leaders.[16,73–75]

Within a university setting, learning comes as a result of instructional design—how instruction is designed and implemented (curriculum and courses) and how learning and development are supported (teaching methods, assessment methods, engagement, and co-curricular activities).[5,16,19] Thus, akin with other health related professional training programs, this process of re-examination is particularly poignant when considering the proposed purpose of MPH training—transformative learning and competence development to assure workforce readiness—and the types of instructional methods that are suggested to support that type of learning.[85–87] To assure competence development, educators must build upon traditional informative learning methods such that knowledge,

skills, and expertise can be applied in various settings to help develop the values, attributes, and competencies linked to professionalism.[4,5,78,83,88,89]

Informed by the iterative calls to action, numerous authors have suggested key strategies and instructional methods for a new era of public health education.[2,4,78,83,90–93,12,13,16,17,57,59,60,71] It is suggested that this may require, or be informing, shifts in current instructional practices.[2,4,5,12,14]

b) <u>Organizing Framework</u>

As already noted in *section ii*, above, the progressive calls to action over the last 30 years may have encouraged SPPH to "transform their public health education, training, research, and practice endeavors—embracing new approaches in new settings with new partners"[13] as the "strategies and tactics of the past are not sufficient to meet the challenges of the future."[64] Two publications related to public health and medical education provide frameworks that help categorize types of instructional changes that MPH programs may be considering, and why.

In 2010, Frenk et.al., via *The Lancet Commission on Health Professionals for a New Century* suggested that there are four key elements to instructional design that support graduate outcomes: admissions, focal competencies, career pathways, and channels of instruction.[5] According to the report, admission criteria influences the type of student/learner that is in class, and thus the instructional design.[5,94] Similarly, the competencies that are defined or adopted when designing a curriculum inform the instructional design, particularly if competencies are aligned with and based on workforce needs and performance expectations.[5,95] These competencies, and criteria for

admission, should be informed by career pathways and the types of jobs that may be available to competent graduates. Each of these elements should inform the channels or methods of instruction that are used to support learning.[5]

In their 2004 paper, Iedema et.al. presented a simple, three-part framework to help inform and assess instructional shifts that universities were considering related to reforms in medical education. This framework provides a more defined set of groupings to help consider and categorize shifts in public health education.[19] The Iedema framework suggests that instructional shifts may occur related to content (what the learner needs to know), pedagogy (the modes of teaching content), and context (the locations of teaching/learning).[19] Underlying this is curriculum and instructional design.[5,16,74] This framework, complemented with Frenks' focus on instructional design, has been used to categorize and summarize the array of instructional shifts that the literature suggests may be considered or adopted in MPH programs as they re-examine their focus to support learning, competence development, and/or workforce readiness.

c) <u>Areas of Focus for Improvements or Shifts</u>

Many authors have suggested an array of instructional practices to improve public health education that may require (or have required) instructional improvements or shifts in instructional design.[12–14,16,17,73,74,80] The frameworks noted above suggest four domains where MPH programs may be monitoring benefits from shifts, or considering or applying new shifts in instructional design to deepen learning, and support competence development, workforce readiness, and employment. These are: instructional design, curriculum and course content, pedagogy, and context for learning.

These four domains are presented in four sub-sections, below, along possible areas of focus within each domain. Examples of these foci and possible shifts are provided, as elucidated from literatures related to competence-based training programs for public health, nursing, medicine, veterinary medicine, social work, and public administration.

i. Instructional Design

Instructional design is the processes of selecting and developing materials and methods to help learners achieve the desired educational outcomes. Per Frenk et.al., instructional design comprises the factors highlighted by Iedema et.al. (content, modes of teaching, context for teaching – detailed below), and also includes 'upstream' and 'downstream' considerations such as who is a part of the learning community (admissions), and how career pathways and professional opportunities inform the instructional design.[5]

Within the domain of instructional design, there are four areas where MPH programs may be focusing or shifting their approaches in support of deeper learning, competence development, workforce readiness, and/or graduate employment: a focus on competence development, meaningful consideration of career pathways, defined criteria for graduation, and criteria for admissions. For example:

1. MPH programs may adapt their instructional design to assure a focus on *competence development*, as new accreditation standards for both government health departments and accredited MPH programs have explicitly defined what competencies graduates and workers must have.[4,56]

2. The new competencies that accredited MPH programs must focus on are informed by the current public health workforce tasks and needs, as well as anticipated *career*

pathways for graduates.[14,17] However, multiple authors suggest that MPH education should be better connected to public health practice, and through that, ensure that curricular foci match the needs of the public health workforce.[2,4,12,13,59,60,90] To this end, MPH programs may be doing more to consider and engage the workforce in their instructional design.

3. This new focus on competence development may impact the flow and ordering of courses, the course content, and/or the pedagogical methods used (all described below. This focus may also inform changes in *criteria for graduation*, the elements students are required to do or show—via curricular and/or co-curricular activities—before they are certified as a graduate of an MPH program.[4,34,73,74,96]

4. Finally, for a variety of reasons including improving representativeness in the public health workforce, improving admissions rates, or better matching students to their program, MPH programs may be re-considering their *criteria for admission*. Shifts in admissions criteria may then influence instructional design decisions to help programs better meet the learners' needs.[5,94]

ii. Curriculum and Course Content

Curriculum and course content refers to the knowledge, skills, and values that a student needs to acquire over the course of a course or program.[19,78] As noted above, particularly related to public health training under the new accreditation standards, this includes all of the building blocks that allow a student to develop and demonstrate competence.[5]

Within the domain of curriculum and course content, there are five areas where MPH programs may be focusing or shifting in support of deeper learning, competence

development, workforce readiness, and/or graduate employment: foundational knowledge, competence building blocks, public health values, public health leadership, and inter-professionalism. For example:

1. There is a rich history of public health in the U.S., and much *foundational knowledge* needs to be acquired to have a basis for practice. The new accreditation standards, for example, define 12 areas of foundational knowledge that must be assured;[4]

2. This volume of knowledge, or required course/curriculum content grows exponentially when also considering the defined *public health competencies*, and how they might be operationalized.[4,5,73,78,80,96] Considering these new competencies, and what is known about knowledge and skill gaps in the workforce, MPH programs may well be shifting their curriculum and course content.[65]

3. Frenk et.al. state that competence cannot be developed without consideration of professional norms and *values*.[5] Given public health's value base of social justice and equity, the stark needs in these areas today, and the expressed needs of the current public health workforce in this area, a shift in curricular content and/or design to better support the development of values linked to public health practice may be expected.[5,9,11,48]

4. Similarly, a focus on *leadership* development is ubiquitous in the calls to action related to public health education.[2–4,8,11,12,59,60] Based on this, it may be expected that MPH programs are currently placing, or planning to place, more focus on this curricular content and/or design to enhance cognitive skills for inquiry, leadership, decision-making.[5]

5. Finally, linked to the calls for a greater link between academia and public health practice, and recognition that public health is rarely practices in a silo, there are calls to shift in curricular content and/or design to better support *inter-professionalism* in learning as a way to break down silos, to enhance relationships, and to improve ability to work in teams.[2,5,12,13,17,59,60,90] To this end, MPH programs may be focusing more on interdisciplinary teaching and learning.

iii. Pedagogy – Modes of Teaching

As previously stated, as they shift to a competence-based model, MPH programs may strive to use pedagogical strategies that can develop professionalism and values (via formative learning), and can develop strategic leaders (via transformative learning).[5,78] Formative and transformative learning occur through applied practice, critical and systematic reflection (formative learning), and through mentored problem-solving, ideally in field settings where the context is not controlled, and where active experimentation can occur (transformative learning).[3,9,11,46,48,57,97]

Clear foci of the iterative calls to action and the new accreditation standards are competence development through transformative learning; the literature suggests that this is supported when students learn by doing, and when knowledge and skills and values can be practically applied and improved in real-world settings.[4,14,78,83] Engaged and applied learning methods put students in a more active and engaged role, providing concrete experiences.[98] With reflection, formation and synthesis of abstract/new concepts based on the reflection, and active experimentation that tests the concepts in new situations, results in deeper learning.[99]

In line with this, there are numerous pedagogical approaches and teaching modalities that MPH programs may be considering or shifting to in support of deeper learning, competence development, workforce readiness, and/or graduate employment; nine sample areas (methods), developed by grouping based on the literature review, are presented below. These methods may be used in isolation or in various combination.

1. *Integrated courses and content*. In the workforce, topical knowledge and skills are rarely used in isolation. In that respect, MPH programs may be teaching core knowledge and skills in an integrated manner, rooted in professional practice, and not in the traditional five core disciplines.[2,12,17]

2. *Applied problem solving*, requires students to search, analyze, and synthesize information to inform decision-making, and apply their own ideas and theories to solve problems.[5,88] MPH programs may be doing more to focus on problem-based learning, simulations, case studies, or field-based coursework.[4,88,100,101]

3. *Engaged, field-based, practice-oriented learning.* Competence-based education encourages a shift in instructional design and/or methods to immerse students in the "unpredictable dynamics of real-world challenges"[16] by adopting and prioritizing obligatory real-world field experience,[1,5,16,19,57,59,60,91] and working to address local priorities by working with communities.[57] This includes methods such as community-based learning, community-based participatory research, community-engaged learning, field studies, internships, mentorships, and service learning.[97] MPH programs may be shifting their methods or approaches to increase these types of learning opportunities.[1]

4. *Small-group, collaborative learning*. When teams of learners work together to understand perspectives and influences, and then engage in public health problem solving, multifaceted competence development and transformative learning can occur.[5,78,83] This is further expanded when students of different professional backgrounds to learn together, and to use professionals of different backgrounds to teach public health in an interdisciplinary fashion.[2,4,5,12,13,59,60,71] In line with inter-professional and leadership learning expectations as well, MPH programs may be considering team-based learning (in a classroom, or via engagement with local communities) to help prepare students for effective, collaborative work.[1,5,59,71,91]

5. *Use of alternative assessment methods.* Competence is developed through transformative learning, which involves searching, analysis, and synthesis of information for decision making; teamwork; adaptation of diverse resources to address local priorities.[5,78,83] In that respect, and in line with applied problem solving and field-based learning, MPH programs may be considering or shifting to the use of methods to assess student competence via assessment methods that mimic real-world application, and the development of tools or materials that will help them in practice.[4,5,12,16,59,60,78,91]

6. *Use of mentoring.* Mentoring allows individuals to grow personally and professionally through applied practice, coaching, direction, and advice. As resources exist, MPH programs may be shifting to a place where students can be mentored, by practitioners, in multiple aspects of public health practice.[5,60,91]

7. *Use of I.T.* Pedagogical best practices continue to evolve, particularly with the proliferation of technology.[5] SPPH should exploit the power of different teaching modalities to support learning, including information technology.[57,60,78,91]

8. *Critical, systematic reflection* requires students to stop, thing, write, and reflect upon what is happening, what this means as compared to their current frame of reference, search for other meaning—often by looking to class-assigned readings or lectures, and come up with alternative hypotheses about factors and forces at play. This process helps shift student values, perspective, and understanding, deepening learning.[78,83,88,97,99,101]

9. *Integration of faculty with practice experience*. In support of this focus on field-based and applied public health learning and practice, MPH programs may be considering greater integration of faculty with non-academic practice experience into their teaching teams to ensure relevance of curricula, multiple perspectives, and a nuanced understating of demonstrated competence in public health practice.[4]

iv. Context for Learning

Context for learning refers to where learning happens.[19] Related to the aforementioned emphasis on field-based learning, practice-oriented learning, and inter-professional team-based learning, one might expect MPH programs to be shifting their instructional design to include a greater focus on non-classroom learning.[1,4,57,60,78,91] These types of shifts allow students to connect with and learn from the community, and experience the nuances of real world practice.[93,98,99,102]

d) Summary

The literature suggests that MPH training programs may be considering or implementing shifts in their instructional design, course content, pedagogical approaches, and/or context for learning as a way to provide improved educational opportunities such that students can develop competence in the areas enumerated by the workforce. To do so, MPH programs may be investing more in student-centered and applied, field-based pedagogy where students can learn by working to address complex issues, with mentoring and guidance. Numerous strategies and methods have been suggested by those in the fields of public health, nursing, medicine, and health administration. This study seeks to explore if MPH programs have shifted, or are shifting, their instructional design, and if so, what strategies and methods are being adopted, and why.

4. Influencing Factors – Facilitators of Change

a) Background

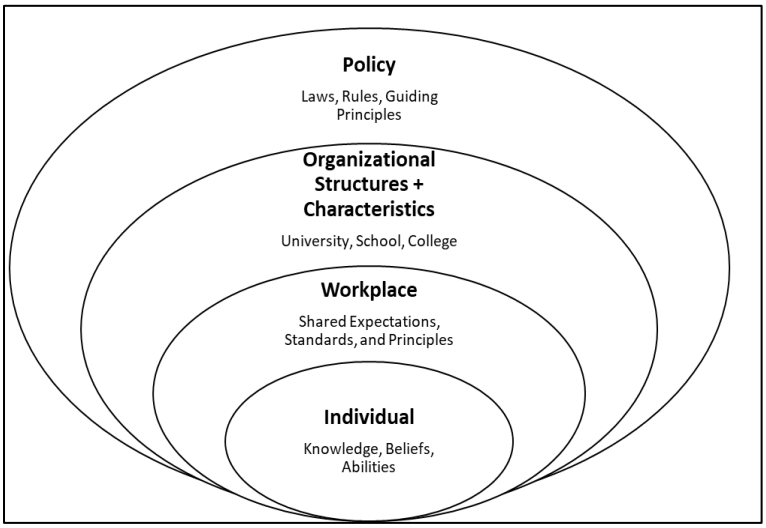
Devising of and implementing changes to policies, programs, and practices is complex, particularly in contexts where there are multiple actors, influences, and foci. Universities are such contexts, where faculty, administrators, students, alumni, and stakeholders across different fields of study may have both shared and opposing priorities and visions. Health-related professional training programs have been in a process of moderate change for the last few decades.[5,78,103,104] While some progress and successes have been seen, it is suggested that broad success has been limited by a number of factors such as curricular rigidities, professional silos, commercialization, pressures of academic medicine vs. focus on social responsibility, as well as academic freedom.[5,92,104]

b) Organizing Framework

Frenk et.al. (2010) suggest that there are two key components of a university system (where education occurs): structures and processes. The structures comprise the systems and organizational levels in which education happens (institutional design); processes comprise the way education occurs within an institution (instructional design, as already described above in *section iii.*).[57] To consider influencing factors and facilitators of change within MPH programs, this section seeks to look at the structures/institutional design, as well as the factors that influence systems change.

In 1970, Urie Bronfenbrenner presented a socioecological model to help consider the multiple forces at multiple levels that influence development, ability, and action. For example, individual faculty, staff, administrators, and students operating within a SPPH are actors that influence design of, implementation of, and outcomes measured from any shifts in in instructional practices.[5,16] These actors are influenced/motivated by their own knowledge, beliefs, and understanding, which is influenced by the information they have access to, their influencing community (department, school or program, students, prospective employers, community partners), the processes they are involved in (strategic planning, visioning, evaluation), and the policy environment that surrounds them (accreditation, publications, peer norms) at the department/unit level, the college/school level, the university level, and the national level.[5]. An adaptation of Bronfenbrenner's framework is used in this section to help conceptualize influencing factors at four levels: policy, organization, workplace, and individual (Figure 2).

Figure 2 - Categories of Factors Influencing Instructional Shifts ~ *Author Adaptation of Bronfenbrenner Socio-Ecological Model*



A secondary framework considered in this section is the Diffusion of Innovation (DoI) theory that suggests that innovation drives action and behavior change within a social system, in this case, schools and programs of public health.[21] Per DoI theory, innovation starts within a small group of "innovators", and through peer networking, story-telling, resource sharing, and data, innovations can be expand and disseminated to shift practices of large parts of the system.[21,70]

The theory posits that if *innovators* (a small proportion of a group) share information with peers via tools such as how-to manuals and information sheets, this can help engage and influence *early adopters* in decision-making. If *early adopters* and *innovators* (about 16 percent of a group) develop and share stories about the processes they used, and benefits they've seen, this can help engage/influence an *early majority* to consider, test, and/or try innovations.[22,70] From there, documenting and quantifying how many members of a group have adopted and applied innovations, and why, can help to engage and influence *late adopters* (estimated to be some 34 percent of a group).[70] And, finally, if

data from a critical mass (i.e., late adopters, early majority, early adopters, and innovators – 84 percent of a group) are compiled and shared, showing the benefits of applying innovations, this can help engage/influence laggards.[70]

c) Influencing Factors

A review of the literature related to the education of health professionals suggests a number of factors that may facilitate instructional shifts in support of transformative learning, competence development, and workforce readiness. These factors are organized and presented in four sub-sections, below, related to the socioecological model: policy, organizational, workplace, and individual.

i. Policy Environment

The policy environment comprises policies that influence what universities, schools, programs, and faculty/administrative teams must do.[5,16,73] In this case, policy is considered to be national-level factors that influence all MPH programs.

The literature suggests that instructional changes are facilitated when national accreditation processes are in place, particularly when there are also institutional policies that complement and/or reinforce accreditation standards, and when faculty, staff, and administrators understand them.[5,14,17,78] At the national level, the new CEPH accreditation standards for MPH programs, supported by well-documented workforce needs that can be addressed through university training, may be influencing factors that spur and support change.[5,13,14,16,36,73–75,78] These standards provide a framework of expectations against which MPH programs must demonstrate compliance.[4] As previously noted, these new standards build from and complement a substantial and long-term national-level

conversation and call-to-action related to re-defining and re-envisioning public health education in the U.S.[13,14,16,73,74] Participation in these conversations, or being aware of the calls-to-action may also be a national-level influence for change.

There are a few examples of how the policy environment may act as a facilitator of change. First and foremost, the majority of schools and programs of public health in the U.S. follow the CEPH accreditation standards. With the release of the new standards in 2016, SPPH have been asked to, and given freedom to, re-envision the MPH degree and instructional design, as they shift from the former model to one that supports competence development, assuring "a workforce that has the skills and aptitudes to address infectious diseases along with chronic disease, social determinants of health, and combine the traditional disciplines of public health with strategic skills."[14,17,47,64] The release of these standards may have been a catalyst for change, allowing programs to add, alter, or remove content, or consider the use of alternate strategies.

The accreditation standards also lay out a number of suggestions and expectations related to instructional design and program foci. This includes definition of the foundational competence and knowledge areas that every MPH program must teach and assess, the required use of some engaged and applied learning methods, and the prioritization of collaboration with and engagement of public health practitioners.[4] These requirements are new, as of 2016, and may be serving as a catalyst for change. Finally, within the accreditation standards, there are expectations related to annual monitoring, evaluation, and reporting activities that result in publically available data. This process may push SPPH to adapt internal policies and procedures, and cue them to do certain activities, as a way to maintain a level of social accountability with peer institutions.[4,5]

Awareness of and adoption of these new standards, and the innovations that may be facilitated or limited based on them, may be influenced by diffusion of information and innovation. While many national public health organizations, including CEPH and ASPPH, have worked to engage stakeholders in planning processes, to disseminate information, and to showcase schools and programs stories, it is unclear who actually has access to this information, how it is being interpreted, and what is being done as a result.

ii. Organizational Characteristics

Organizational characteristics are factors that influence how universities, schools, programs, and faculty/administrative teams can behave. The *Lancet Commission on Health Professionals for a New Century* suggested that institutional performance, and the ability to change, is influenced by the structure of the institution, including the type of institution (public/private/for profit), affiliations (partnerships, mission), and structures or practices within the institution (decision-making power, communication pathways).[5] These factors, in turn, influence institutional leadership, stewardship, and financing for physical resources (buildings, classrooms, technology) and human resources (including faculty, staff, and ratios between students, faculty, and staff).[5]

These characteristics translate into organizational policies that influence programs and faculty that may have a direct or indirect influence on access to and uptake of information and innovation, including limits on information flow, conference travel, professional development time, or feasibility of some of the aforementioned suggested shifts that require more resources and changes to business as usual, such as field-based teaching, smaller teaching ratios, and new pedagogical practices.[23,57]

There are some real examples of organizational characteristics that can facilitate or limit institutional change. One example relates to research pressures, and the impacts on revenue and teaching. In the U.S., post-secondary institutions are categorized into groups based on research focus and intensity.[23] Major research institutions (R1) have different priorities and expectations on faculty compared to R2 and R3 institutions, perhaps dis-incentivizing innovation in teaching and mentoring of masters-level students, and engagement with community-based projects for risk of tenure.[5,23] Conversely, universities that are a part of the national extension program (land grant institutions) may have a different type of commitment to, or expectation of, community-based engagement, research, and mentoring, thus facilitating field-based learning.[23] Other considerations might include the organizational structures and pathways within the intuition as a whole, or within a school or college of public health, such as centralization vs. decentralization of decision-making; who oversees hiring and budgets; how many people/units/degree programs are a part of the school or program of public health, and what the value that is placed on that entity.

One additional organization factor to consider is institutional involvement with national initiatives that align with, and might facilitate SPPHs' adoption of new, more applied and engaged instructional methods. These include, for example, the Campus Compact network (commitment to civic and social responsibility, "developing the next generation of citizens and leaders for our communities"),[105] and the Ashoka U network (commitment to social innovation, preparing "tomorrow's leaders and address tomorrow's problems").[106] In some cases, funding or incentives might follow these initiatives, encouraging faculty or programmatic movement in one direction or another.

iii. Workplace Culture, Standards, Principles

Policies, knowledge, and awareness influence action, but buy-in, belief, vision, and strategy support implementation and action.[107] The literature suggests that having a clear rationale for MPH training, having a clear vision of the desired outcomes from MPH training, being responsive to student and workforce needs, designing MPH training based on program strengths, and regularly realigning and updating instructional design (curriculum mapping, course content and structure, admissions criteria) are all indicators of success for instructional change.[2,4,5,16,59,73,74] These activities are supported by culture change and effective leadership processes, including the development of committees and taskforces; engagement of stakeholders at multiple levels, including leadership, students, and those within the community; and monitoring, evaluation, and information sharing processes.[2,4,91,96,100,5,16,18,23,57,74,78,80]

Some development of culture related to a new vision of public health training has been happening, at least at the national level, for the last seven years. For example, in 2012, the ASPPH united some 150 experts linked to public health education and practice to identify strategic issues and develop a shared vision to challenge the status quo of public health education;[58] the chair of the task force suggested that this process could accelerate change and inspire innovations.[15] Similarly, in 2014, in response to a national shift towards government public health department accreditation, the Council on Linkages—a collaborative of 23 national organizations including ASPPH, CEPH, and many academic representatives—formed to develop strategies to improve public health training, practice, and research, to develop a more competent workforce;[7,62,108] and ASTHO and de Beaumont Foundation (with academic collaborators) designed and administered the PH

WINS survey to explore and define training needs and strategic issues relates to the public health workforce.[3,9,13,47] These three big initiatives led to the co-development and release of the new CEPH accreditation standards in 2016, a process that included many academic collaborators.[4,14,17] At an institutional level, engagement and development of culture related to a new vision of public health training has been happening at some schools of public health, to update or shift their vision, their instructional design, and their instructional methods.[16,74]

iv. Individual

Within a university setting, faculty members, staff, and administrators are responsible for setting the vision and direction for a program.[23,57] In order to do this, they must have knowledge and understating of the influencing policy environment, and must also have the skills and abilities to design and lead innovation processes. Faculty members and instructors are also responsible for designing and delivering course content and assessments to assure student learning and competence development.[4] In order to teach content and use methods to develop and assess competence, faculty must be aware of and understand workforce needs, student development opportunities, accreditor or workforce expectations, and best practice methods or approaches; they must also have agency to implement and use new strategies.[5,16,60,78,95,103]

To support faculty engagement in shifting academic practices, faculty may need time to invest in professional development and planning/re-development related to teaching and educational innovation, helping them to understand the "art of teaching and the science of learning," and to apply it to public health teaching.[5,16,78,95,101,103] Innovation in and

attention to pedagogy and engaged teaching practices may also be supported by adapting reward structures and incentives, investment in new learning infrastructure (more room, new spaces, IT, simulation spaces), and investment in faculty/mentor/preceptor teaching time.[1,5,16,78,95,101,103]

Related to MPH programs specifically, the new accreditation standards are just four-years new. As previously noted, they were designed to spur innovation.[14] To do so, MPH program faculty and staff need to have time and resources to learn and understand, form experts and from peers. Webinars, trainings, and conferences are offered to highlight exemplars, and peer-reviewed literature related to instructional design in this new era of public health training is beginning to emerge.[16,73–75] By learning from them, and helping to disseminate their reasoning, processes, successes and failure, others will be influenced, over time, to take up and also apply innovative practices.

In short, at the individual level, understanding needs and opportunities, and feeling able and equipped to engage in instructional shifts requires knowledge, skill, ability, confidence, and perhaps, incentives. "Faculty members are the ultimate resource…agents of knowledge transmission, role models", and yet, they face multiple demands related to high demand for research productivity, heavy teaching loads, and teaching not being rewarded to the same extent as research.[5] Furthermore, many faculty have never been trained in pedagogical practices, or have had the opportunity to engage in community-based public health practice.[5]

d) Summary

Professional health-related education has been in a period of change for a quarter century, with SPPH joining the mix more recently. Success stories and lessons learned from other fields, and from some schools of public health, show that many factors can facilitate or inhibit instructional changes with institutional settings, but the literature is still sparse. This study seeks to help fill that gap. Where MPH programs are shifting their instructional methods, this study seeks to explore what factors have facilitated change. And, where MPH programs are limited in planning and/or implementing changes, this study seeks to explore what factors barriers are in place.

B. Conceptual Framework

In the U.S., there are critical public health needs and significant inequities in health outcomes linked to race, ethnicity, gender, and class.[26–36] These issues are complex, influenced by many factors, and require systems change.[11,24,37,38,44,45] A new paradigm for public health improvement has been proposed by national public health leaders, but to achieve its vision, there is a need for public health leaders with diverse competencies and strategic skills, areas where the current public health workforce does not feel equipped.[8,9,11,24,36,47,48]

Schools and Programs of Public Health have a major role in developing the public health workforce via bachelors, masters, and doctoral-level training.[2,5,74] Based on years of iterative reflection on the state of public health, a number of research-based calls to action have highlighted the needs of the current and future public health workforce.[1-11]

The Master of Public Health, a hallmark degree of public health training, focuses on the development of graduates who are prepared to enter the public health workforce as skilled

professionals.[2] Based on an understanding of current workforce needs (i.e., the gaps that new graduates can fill), the current focus of MPH education is to ensure learning, and develop and assure competence in a number of domains linked to collaborative, inter-professional, and evidence-based practice.[4,12,13,75]

New standards for MPH program accreditation were released in 2016 to support a shift in the outcomes of MPH training programs.[14,17] The standards provide guidance around the building blocks of an MPH training program, the expected outcomes of the training (knowledge, skills, values, and competencies that a new graduate can demonstrate), and some parameters related to teaching/training/mentoring methods.[4] However, the standards were developed in such a way to give SPPH freedom to design and deliver a MPH curriculum in the best way they see fit, and not a clear roadmap.[12,14]

Based on the new standards—the first major shift in 50 years—SPPH may be refining and adapting how they teach public health and assess competence.[4] Expected instructional shifts could include refining instructional design, re-designing courses and/or the curriculum to support integration and application of knowledge and skills; adopting or integrating new teaching methods, including the use of technology, and/or team-based work; assuring deeper connections with field-based public health practice for applied project work and/or student mentoring; prioritizing interdisciplinary and inter-professional teaching and learning; and developing and using authentic assessment practices that are linked to or mimic real-world project deliverables.[5,12,14,16,47,59,60,64,74,78]

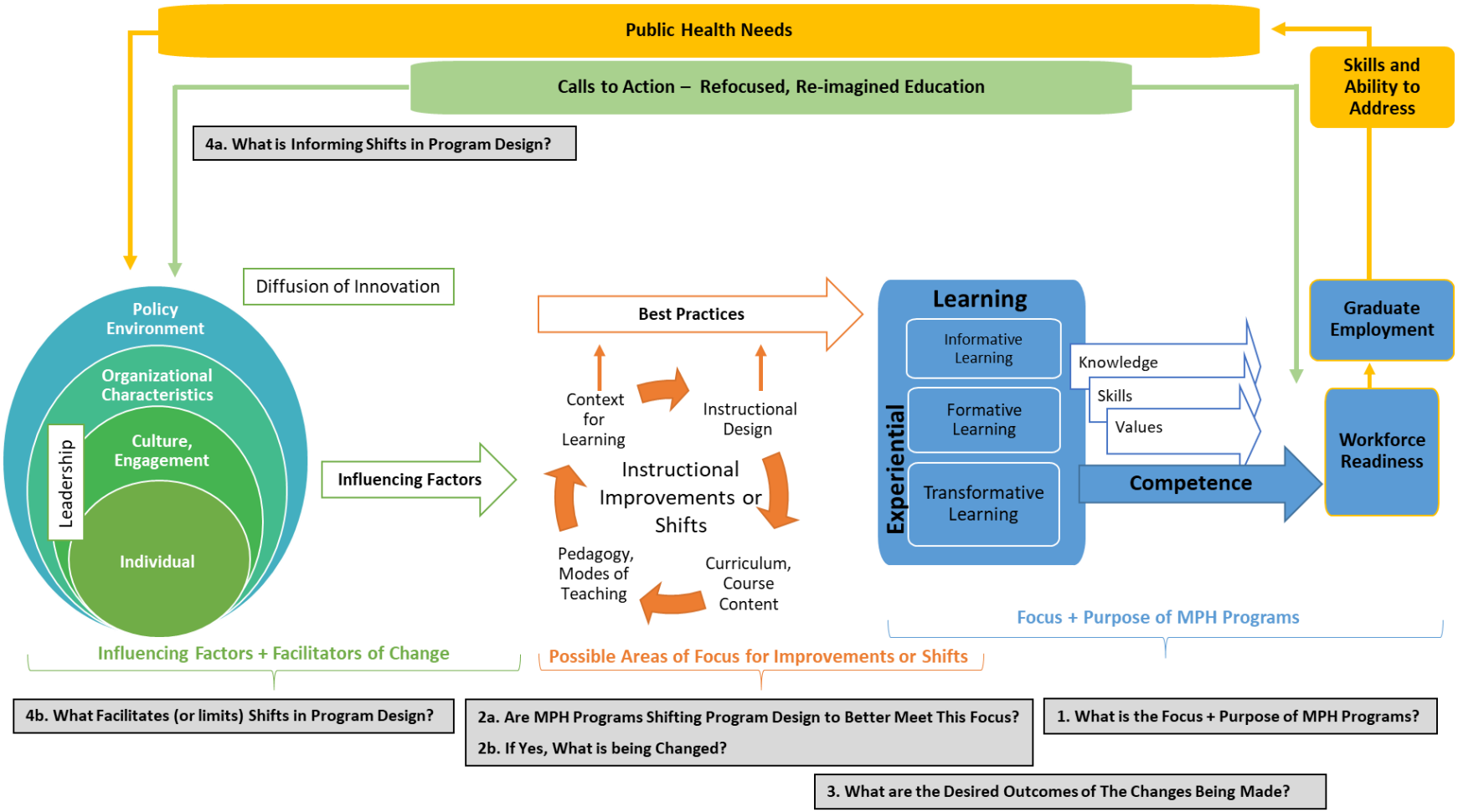
There are multiple factors at multiple levels that influence instructional design, and shifts in it. At an individual (faculty member/instructor) level, these factors include awareness and

understanding of needs, opportunities, and expectation; understanding of and ability to use best-practice methods and approaches; and ones' agency to implement to use new strategies**.** At a department or unit level, factors may include awareness and (shared) understanding of needs, opportunities, and expectations; curricular subject(s) of focus; as well as department policies, resources, and precedent. At school/ program/university level, factors may include: university mission and structure; knowledge, awareness and (shared) understanding of needs, opportunities, and expectations; stewardship and governance, including norms, policies, performance assessment, evidence for decision making, and strategic guidance; financial resources and incentives; and investment in faculty and development; and networks and partnerships that inform planning and action.[23,57] These factors related to institutional design influence the instructional environment and instructional design.[5] Finally, at a national level, influencing factors include policies, initiatives, mandates, and research disseminated by national-level public health leaders.[5]

These intersecting concepts are integrated and presented in a conceptual framework that guides this study (Figure 3).

Figure 3 – Study Conceptual Framework

Are Schools and Programs of Public Health are Shifting their MPH Program Instructional Design to Better Develop the Public Health Workforce of the Future, and if so, How?



III. STUDY DESIGN, DATA, AND METHODS

A. Study Design

This study set out to explore the perspectives and actions of schools and programs of public health in response to various calls to action to modify and adapt their instructional approaches to develop a more equipped public health workforce. This study aimed to describe: if and how schools and programs of public health (SPPH) are shifting their MPH instructional design; what factors are influencing these shifts; what outcomes are desired as a result of these shifts; and what is facilitating or limiting operationalization of these shifts. The goal of the study was to seed national conversation around what is working, and what can be one next.

Within the context of the aforementioned iterative calls to action, including new accreditation standards, accredited MPH programs were identified as the unit of analysis, both as individual cases, and collectively as a unit experiencing a shared phenomenon.[109] Specifically, this study set out to explore changes to the MPH degree level within schools and programs of public health accredited by (or on track to be accredited by) the Council on Education for Public Health.

In an attempt to develop an understanding of the breadth of shifts and influences across the U.S., methodological approaches that would permit data collection from many MPH programs was a priority. With input from national stakeholders, a short survey was proposed to encourage MPH program leadership to share their perceptions and experiences. Recognizing that a survey would not necessarily allow for in-depth and nuanced sharing of the context and situations spurring or resulting from changes, methodological approaches that would permit more a nuanced understanding were also a priority.

B. Analytical Approach

To support the study's research aims, and based on the background literature (Chapter II), six constructs were identified to help segment data collection and analysis in this study: MPH Program Demographics; MPH Training Focus and Purpose; Focal Shifts; Motivation for Change; Perceptions of Change; and Influencing Factors. A measurement table was developed to guide study design and data collection (Appendix A – Measurement Table).

A sequential explanatory mixed methods case study design was selected, as survey-based data would provide a snapshot of the national norms, and inform sampling and interviewing, and interview-based data would allow for a more in-depth understanding of changes, drivers, and anticipated or actual outcomes.[109] When integrated, both phases of data collection could provide complementarity: a breadth and depth of understanding.[110] This process is depicted in Figure 4, and described below.

This project was reviewed by the University of Illinois at Chicago Institutional Review Board, designated as exempt from human subject review (Protocol 2019-1203) (Appendix B – IRB Approval).

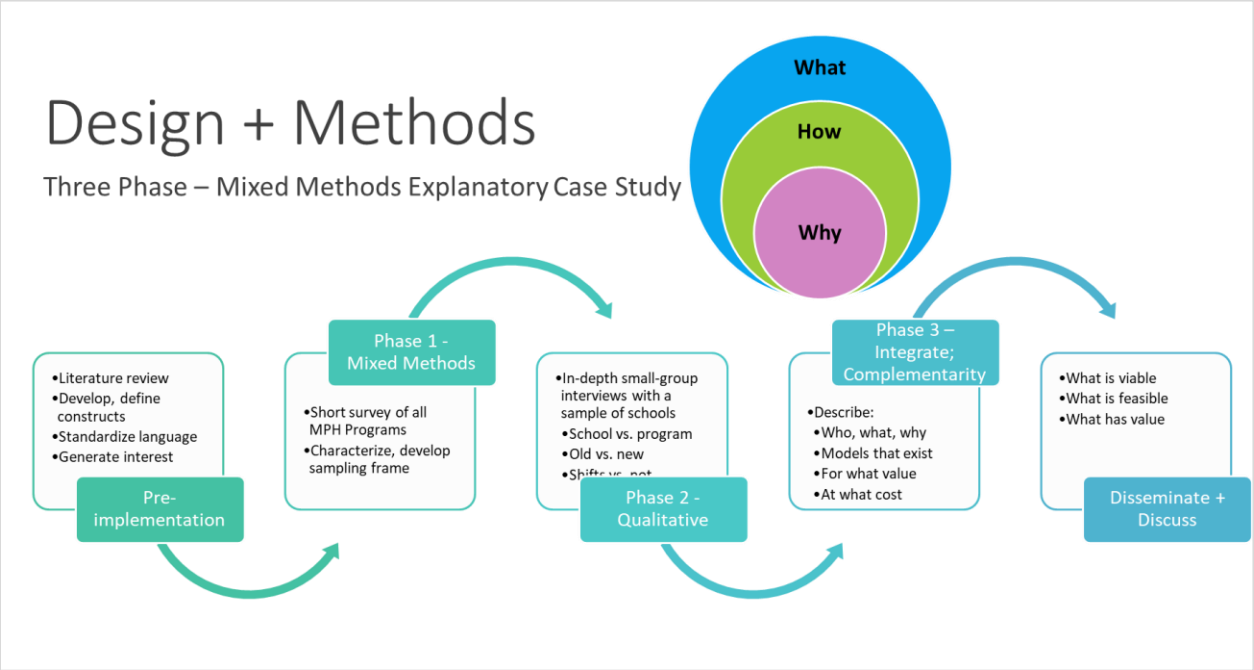
1. Phase 1

The priorities of Phase 1 were to collect data from a large number of MPH programs to be able to depict and explore trends, and to develop a sampling from which to select a sample of MPH programs, or cases, for more in-depth exploration (Phase 2). Thus, Phase 1 comprised development of a survey sampling frame, and distribution of a mixed-methods survey with closed-ended and open-ended questions. Use of a survey permitted collection of standardized data from a large number of respondents in an expedited way. Collection of categorical data

permitted data analysis and comparison by themes and groupings, and development of a purposeful Phase 2 sampling frame. Collection of open-ended qualitative date allowed for the researcher to develop a more nuanced understating of contexts and actions, thus informing Phase 2 data collection.[109]

The Phase 1 survey was distributed to 215 schools and programs of public health in the U.S., and the responses helped answer the study research questions from a national level, allowing for a point-in-time snapshot. The Phase 1 data also allowed for categorization of respondents for the Phase 2 sampling frame.[109]

Figure 4 – Proposed Analytical Approach



2. Phase 2

The priorities of Phase 2 were to select a subset of MPH programs, as representative cases, to explore and describe the various phenomena and contextual and/or influencing factors that are influencing SPPH, and the changes they are making as a result. A case study design, where in-depth analysis of programs and processes is encouraged, was used for Phase 2,

allowing for a more in-depth understanding of perceptions, experiences, and themes related to the study's "why" and "how" questions.[110,111] Phase 2 of the study comprised data collection via interviews, that was informed by document reviews, with eight MPH programs selected in a purposeful manner.

Eight MPH programs were reviewed in more depth, and interviews were conducted. This Phase 2 process provided in-depth descriptions of how MPH programs are adapting, and why, complementing the survey-based responses to the study research questions.

3. Phase 3

The priorities of Phase 3 were to integrate data from the sequential data collection phases to develop a more comprehensive depiction of trends and themes among MPH programs. This process of triangulation and complementarity allowed for improved validity of the findings, for a deeper understanding of experiences and phenomena, and for the development of summaries and recommendations for MPH programs, schools and programs of public health, and national organizations to consider. These are presented in Chapter V.

C. Data Sources, Collection, and Management

Two primary data sources were used for this study: A survey distributed to all SPPH with MPH programs accredited by (or on track for accreditation by) CEPH; and transcripts from a series of semi-structured interviews with a sample of MPH programs.

1. Survey

A survey (Appendix C - Survey) was the sole data collection method used in Phase 1 of this study. The purpose of the survey was (1) to gather consistent data from all SPPH with accredited (or soon-to-be accredited) MPH programs in order to describe the current

landscape, and (2) to identify specific MPH program characteristics to inform sampling of MPH programs for Phase 2, potentially allowing for more in-depth comparison by MPH program type.

a) <u>Survey Design</u>

To describe the current landscape of MPH programs, as it relates to this study's research questions, data related to all study constructs (Appendix A – Measurement Table) were gathered via the survey. The survey questions (Appendix C - Survey) were designed based on a review of the literature (Chapter II), and with input from peers, including faculty within MPH programs and ASPPH representatives. The survey asked respondents to help describe national perceptions of: the purpose of MPH training programs, focal shifts related to curricula and instructional design that are being considered or made, motivations for the changes, and factors that are influencing the changes. The majority of questions were categorical in nature, to reduce the response burden, however some open-ended free-text fields were presented to allow for other information to be shared.

To help stratify programs for sampling (Phase 2) and to support a comparative analysis, data related to MPH program structure and respondent demographics were also collected via the survey. More specifically, the survey invited responses related to MPH program characteristics (size, age, structure), curricular models (course of study), instructional shifts (what methods, approaches, content have changed in the last five-years, what changes are planned), factors that influenced program shifts (calls to action, CEPH requirements, workforce or alumni input), and metrics of success (what SPPH are looking for/seeing as far as outcomes). The survey also asked respondents' permission to be contacted for more information (semi-structured interviews), if sampled.

The survey comprised up to 37 questions, depending on skip patterns. The survey asked six questions related to demographics, four questions related to focus, eight questions related to shifts, six questions related to desired outcomes, and 12 questions related to influencing factors; some questions crossed two constructs. A variety of question types were used, including single answer, multiple answer, rank order, Likert-type scales, and open ended questions to allow for additional nuance and perceptions to be shared. The selection of question type was informed by the measurement table (Appendix A – Measurement Table), peer input, and beta testing.

Of note, as it related to questions on curricular shifts and pedagogical shifts, a matrix of possible responses (probes) were presented to respondents. These selections (what may have been expected) were informed by the literature review, described in Chapter 2, as well as peer input. In that respect, some of the selections were linked to defined expectations in the CEPH criteria (foundational knowledge, communication, inter-professional practice, focus on APE/ILE, use of authentic assessment); others were linked to themes suggested by Frenk et.al., Framing the Future, and PH WINS (professional values, leadership, small-group learning, mentoring, student reflection). Definitions were not given in the survey, so respondents would have used their own interpretation of what each of the questions asked.

The survey was programmed into Qualtrics© to allow for online/web-based distribution and response.[112] The survey look, feel, and flow was beta tested by nine individuals, and their input was incorporated pre-release.

b) <u>Survey Sampling</u>

In an effort provide a national snapshot of the current state, a census approach was used to distribute the web-based Qualtrics© survey to all eligible MPH programs; this included all MPH programs within schools and programs of public health in the U.S. (and Puerto Rico) that are CEPH-accredited, or those that are approved to be considered for accreditation. A master list of all applicable was developed by cross-walking MPH programs listed by ASPPH (SOPHAS website) with a list of accredited and applicant programs from CEPH. At the time of writing, there were 215 public health programs and schools. Non-accredited MPH programs were excluded because there is not a clear way to enumerate them, and they are not necessarily working within the same context and parameters as those that are accredited.

Survey distribution aimed to reach all eligible MPH programs, and the contact that would have an overarching understating of their MPH program. With input from CEPH and ASPPH, a master distribution list was generated by merging a list of MPH Program Directors (available via CEPH website) with a list of SPH-based MPH programs (available via ASPPH website) and their primary contacts generated via web searches (associate deans for curriculum, practice, and/or academic affairs). This generated a list of 248 unique individuals (74 MPH Program Directors plus 174 individuals in leadership roles at ASPPH-affiliated institutions) at 215 institutions.

c) <u>Survey Data Collection Procedures</u>

The survey was informed by CEPH and ASPPH, and reviewed by ASPPH representatives, but was distributed by the lead researcher, and not the national bodies. The survey was distributed by the researcher via a direct, personalized email to MPH

program directors and associate deans, and via one post on an ASPPH-managed list-serve that reaches members of the Practice committee (comprising associate deans for practice, or similar designees). The personalized email (Appendix D – Survey Letter) icincluded a brief introduction describing the purpose of the study, and a link to the Qualitics survey (Appendix C - Survey). To encourage a higher response rate, the survey was discussed by the lead researcher in applicable settings (ASPPH meetings, CEPH meetings), as permitted and as appropriate.

The personalized email was sent to 248 unique individuals (74 MPH Program Directors plus 174 individuals in leadership roles at ASPPH-affiliated institutions) at 215 institutions. Two rounds of personalized email invitations were sent to individuals on the SPH contact list (excluding MPH programs that had responded from the second mailing). Three rounds of email invitations were sent to stand-alone MPH programs (excluding respondent MPH programs from second and third mailings) in an effort to increase response rates. No additional specific or targeted outreach was done.

Via this sampling method, it was understood that more than one respondent from each school might respond; this risk was balanced with the benefit of having a strong response rate and good representation of MPH programs. Post-hoc analysis of the available data suggest that one of the 215 MPH programs had more than one respondent (n=2).

d) <u>Survey Response Rates</u>

The survey was open for responses from (November 21-December 20, 2019). Data were collected and stored online via the secure Qualtrics© survey database.[112] Microsoft® Excel,[113] the Real Statistics Resource Pack© software,[114] and Qualtrics©[112] were used for

categorical analysis and data visualization in the form of tables and figures. All data were stored in a secure and private Box folder.

The survey was opened by 132 individuals. Of that, 125 individuals (94.7%) consented to participate. Of that, 10 respondents did not enter data; they were thus removed, leaving a sample of 115 valid responses. Respondent characteristics were summarized and compared to national distributions; these are detailed in Chapter IV, and suggest a 43% response rate.

2. Semi-structured Small-group Interviews

Building from the baseline and contextual understanding derived from the literature review and survey data collection in Phase 1, semi-structured small-group interviews were conducted to collect data to serve as the primary data source for Phase 2 of this study. The purpose of the interview process was to explore, in more depth, perceptions related to the four primary study constructs, including what SPPHs see as the focus of a MPH training program (practice vs. research); if SPPHs shifting their instructional methods and approaches to better meet this focus (many vs. few); what is informing these shifts (CEPH vs. not)(other calls or not); and what appears to be facilitating or limiting shifts (resources, university initiatives, size/complexity). This process, guided by a semi-structured interview guide (Appendix E – Interview Guide), allowed for collection of qualitative data about perceptions, experiences, and actions, as guided by the study research questions and conceptual framework.

a) Interview Sampling

Based on responses from Phase 1, a stratified purposeful sampling approach was used to generate a list of eight specific and diverse MPH programs as cases for more in-depth data collection. The stratification strategy endeavored to achieve maximum variation between cases, helping to document both diversity and commonalities between and across MPH programs, related to structure and implementation of instructional shifts.[111]

A priori MPH program characteristics were proposed to help understand the nuances and contexts of shifts, suggesting that the sample should include:

- MPH programs within schools of public health, and stand-alone MPH programs (a);
- Old MPH programs (30+ years of history, and newer ones that applied for CEPH accreditation pre-2015), and new programs (applied for accreditation from 2016) (b);
- Large MPH programs (many students), and small programs with fewer students (c);
- MPH programs reporting many instructional changes, and programs reported few (d).

Following analysis of Phase 1 data, other factors to sample for were noted, including:

- MPH programs listing CEPH accreditation standards as a facilitator of change, and those listing them as a barrier (e);
- MPH programs listing resources as a facilitator of change, and those where resources were a barrier (f);
- MPH programs noting university initiatives as a facilitator of change (g);
- MPH programs affiliated with ASPPH (peer network) and those not affiliated (h).

To have sufficient data to help tell a story, while still maintaining maximum variability, the sampling strategy sought to develop a sample that had at least two cases representing each of the eight characteristics (a-h) noted above.

Of the 115 Phase 1 respondents, 40 consented to be included in the sampling process for Phase 2. Per the protocol, the two institutions to which the researcher has an affiliation (CU, UIC), were not to be included in the sampling frame; that left 39 MPH programs eligible for sampling.

The sample was developed in two stages. First the relevant survey responses related to characteristics a-h) from the 39 institutions were coded in a binary (yes/no) or segmented (high/medium/low or yes/maybe//no) fashion (Table I). A blinded (no institutional names) Microsoft® Excel table was developed as the sampling frame. Institutions were then randomly selected based on high and low ends of each characteristic. Characteristics that had the least variability (e: CEPH influence; f: resources; g: university initiatives) and the most segments (b: program age; c: program size) were sampled for first. As each case was sampled, the full array of characteristics (a-h) were noted in the Excel table to continually assess for complementarity and variability. When the first eight cases were sampled, stand-alone MPH programs (a), and those affiliated with ASPPH (h) were under-represented. To improve variability, two cases were swapped, seeking to maintain equal representation of previously sampled characteristics.

Once the sample was developed, the institution and contact names were un-blinded. A personalized email was sent to each contact (N=8) asking about continued interested, and inviting participation in a 45-minute interview (Appendix F – Interview Invitation). A follow-up email was sent to non-respondents one week later, and then another 10-days later. Six of eight institutions consented. There was no response from one, and another declined due to institutional changes and emergent workload. Two new institutions were sampled on matched characteristics, to the extent possible, and contacted using the

aforementioned process. One consented, and there was no response from the other. One final institution was sampled and contacted using the same process; they consented.

Table I – Distribution of MPH Programs in Sample Frame, and sample, by Characteristic (N=39)

Characteristics	**Strata showing distribution of: Sample Frame** (*Original Sample* | Final Sample)		
(a) MPH Program Type	**School**		**Stand-alone**
	13 (*3* | 4)		**26** (*5* | 4)
(b) MPH Program Age	**< 10 years**	**11-20 years**	**21+ years**
	12 (*3* | 2)	**12** (*3* | 2)	**15** (*2* | 4)
(c) MPH Program Size	**<100 students**	**100-250 stds**	**250+ students**
	25 (*5* | 5)	**8** (*2* | 2)	**6** (*1* | 1)
(d) MPH Program Changes	**Many**	**Mid**	**Few**
	11 (*3* | 3)	**18** (*3* | 3)	**10** (*2* | 2)
(e) Accreditation	**Facilitated**		**Limited**
	25 (*6* | 7)		**14** (*2* | 1)
(f) Resources	**Facilitated**	**Neutral**	**Limited**
	9 (*3* | 3)	**22** (*2* | 2)	**8** (*3* | 3)
(g) University initiative	**Facilitated**	**Neutral**	**Limited**
	14 (*3* | 2)	**22** (*3* | 3)	**4** (*2* | 3)
(h) ASPPH Affiliation	**Yes**		**No**
	25 (*5* | 6)		**14** (*3* | 2)

Once the sample was developed, the institution and contact names were un-blinded. A personalized email was sent to each contact (N=8) asking about continued interested, and inviting participation in a 45-minute interview (Appendix F – Interview Invitation). A follow-up email was sent to non-respondents one week later, and then another 10-days later. Six of eight institutions consented. There was no response from one, and another declined due to institutional changes and emergent workload. Two new institutions were sampled on matched characteristics, to the extent possible, and contacted using the aforementioned process. One consented, and there was no response from the other. One final institution was sampled and contacted using the same process; they consented.

The final sample characteristics differ only slightly from the original sample, including representation of more: schools of public health, older programs, programs noting CEPH as a facilitator, programs noting university initiatives as a limiter, and programs affiliated with ASPPH. Sample characteristics described more in Chapter IV.

b) Interview Data Collection Planning

Sampled institutions were contacted via the Phase 1 survey respondent who consented to be contacted. The primary contact was invited to a Zoom-based semi-structured in-depth interview, and was invited to include additional colleagues in the interview process in an effort to invite multiple perspectives. Two institutions set up small-group interviews; the remaining six were individual interviews. A total of 12 individuals were interviewed.

Approximately one week before the interview, participants were provided with an overview of the study (Appendix G – Study Overview), the informed consent document (Appendix H – Interview Informed Consent), and an outline of topics to be discussed study (Appendix I – Interview Brief). Some participants requested a copy of their survey responses; in this case, a pdf of their individual survey responses was printed from Qualtrics©, and shared with them via email.

c) Pre-Interview Document Review

To help prepare for the interviews, and complement the qualitative data collected via the interviews, publically available documents from each of the sampled MPH programs were reviewed to help the researcher develop a contextual understanding of the sampled program and inform interview question framing and probes. Google's search engine was used to locate the sampled MPH program websites and documents. Documents that were

considered for review included the university website, the MPH program website, the MPH program student handbook, and the CEPH Self Study.

In general, the university and MPH program websites were reviewed to get a sense of the MPH program's approach, vision, mission, and focus – the ultimate purpose of their MPH program. The website was also reviewed to get a sense of change, or changes applied to the program over the last four years, as well as their pedagogical structure and approach. Similarly, the MPH program student handbook was reviewed to get a sense of the how the MPH program describes the purpose and outcomes of their programs (to students), their pedagogical structure and approaches, and student graduation requirements.

Where available (four of eight MPH programs), segments of the CEPH accreditation self study were also reviewed because of the content that CEPH asks programs to report on: The introductory section of the self-study prompts SPPH to provide a brief description of institutional characteristics, as well as the history and evolution of the program, and the related organizational elements. Section A prompts for a description of decision-making processes, including committees and university influence. Section B asks SPPH to describe their mission, vision, goals, and values, and to present a program monitoring and evaluation framework, including a description of how evaluation data are used, and what changes are being made, and why. Section D prompts SPPH to provide details about their MPH programs, and their pedagogical approaches and methods. Section E asks SPPH to describe how practice is incorporated into the curriculum. And Section F asks SPPH to describe how the community is involved with, and incorporated into, the curriculum.

Review of these documents was done in advance of each interview, and the researcher complemented the semi-structured research guide with specific probes or examples derived from the document review. Some examples of how the pre-interview document review informed the interview include: the interviewer being aware of the institution's mission, and thus using that as a probe with interviewees to ask how that mission informed or influenced their shifts; the interviewer being aware of a specific initiative within the school so as to not be taken by surprise when mentioned in the interview (helping to build trust due to interviewer preparation); and the interviewer being able to cite examples from the student handbook to ask for more information about how that output came to be.

d) Interview Data Collection Process

Each interview was conducted via a Zoom-based video call. Participants were given a brief overview of the interview process, and were asked if they had reviewed the informed consent form, if they had any questions, and if they wanted to read through it together. Following this, permission was asked to begin to record the interview (via Zoom) to facilitate transcription for thematic analysis. All participants consented.

Each interview loosely followed the semi-structured interview guide (Appendix E – Interview Guide), giving the interviewer flexibility to delve a little deeper into some areas raised by respondents, and to alter the order of the questions to support a natural conversation. Each interview took approximately 45 minutes, and was audio-recoded via Zoom (374 minutes total, across the eight interviews). This file was then uploaded to Temi.com[115] for AI-driven transcription. Each transcription (N=8) was reviewed, quality checked, and de-identified by the researcher while listening to the audio recording. The

clean audio transcript was then exported and saved as a Microsoft® Word document,[76] and then uploaded to Dedoose[116] for coding and analysis. All data were stored in a secure and private Box folder.

e) Post Interview Memos

Following each interview, and then again after the transcription review, a memo guided by the study's conceptual framework was generated to describe general themes and ideas that emerged from the interview to help inform data coding processes (emergent codes) and shifts in researcher assumptions and perspectives.

D. Data Analysis Process

The data analysis process relied on theoretical propositions, seeking first to generate answers to the pre-defined research questions, and to then develop and explore other plausible rival explanations. Qualitative and qualitative data summary and analysis occurred in four phases, with each phase informing the next (Figure 5).

1. Phase 1

The goals of Phase 1 data analysis were: to describe who responded to the survey; to calculate and depict the summary of responses to each survey question; to describe program characteristics to inform Phase 2 sampling; and to compare responses across key program characteristics, via cross-tabulations, to assess for any significant difference in responses.

Phase 1 data were collected via a Qualtrics© survey. Survey responses that were not at least 80% complete were removed from the Qualtrics© database (N=10).

Survey questions were analyzed one by one, using the Qualtrics© report function,[112] and the cross-tabulation function. Additional analysis was done using Microsoft® Excel,[113] The per-question analysis described response rates, frequencies, and distributions; results are depicted in Appendix J – Survey Report.

For each question with categorical data, cross-tabulations were conducted to test for independence between variables: the sentiment (vision), action (shift), or influence (factors), and program characteristic (program type (within schools of public health vs. stand-alone), program size (<100 students, 100-250 students, 250+ students), program age (1-10 years, 11-20 years, and 21+ years), and program affiliation with ASPPH vs. not). This step was used to assess if there were any significant differences in the sentiments, actions, or influences between MPH programs of different types. Qualitrics© was used to generate cross-tabulation tables that were then exported to Microsoft® Excel,[113] The Real Statistics Resource Pack© software[114] was used to calculate association using Pearson's chi-square test, or Fishers Exact test if more than 20% of the cells in the cross-tabulation table contained numbers less than 5. Where data were too segmented (e.g., questions where respondents had more than three options for responses), response segments were bucketed (e.g., very strong + strong bucketed; weak + very weak bucketed) to support assessment of association. All cross-tabulations are include in Appendix K – Cross-tabulations.

Open ended survey responses were summarized for themes using Microsoft® Word. The data were exported from Qualtrics© to Microsoft® Word,[76] and then responses were cleaned, sorted, and grouped using both *a priori* codes (Appendix A – Measurement Table) and emergent themes. Specific terms and themes noted in the open-ended Phase 1 survey data (described in Chapter IV), also helped to inform Phase 2 data analysis, in that the language of

the respondents and responses helped refine the lens and language used to ask and frame Phase 2 questions, and used to interpret and summarize Phase 2 data. For example:

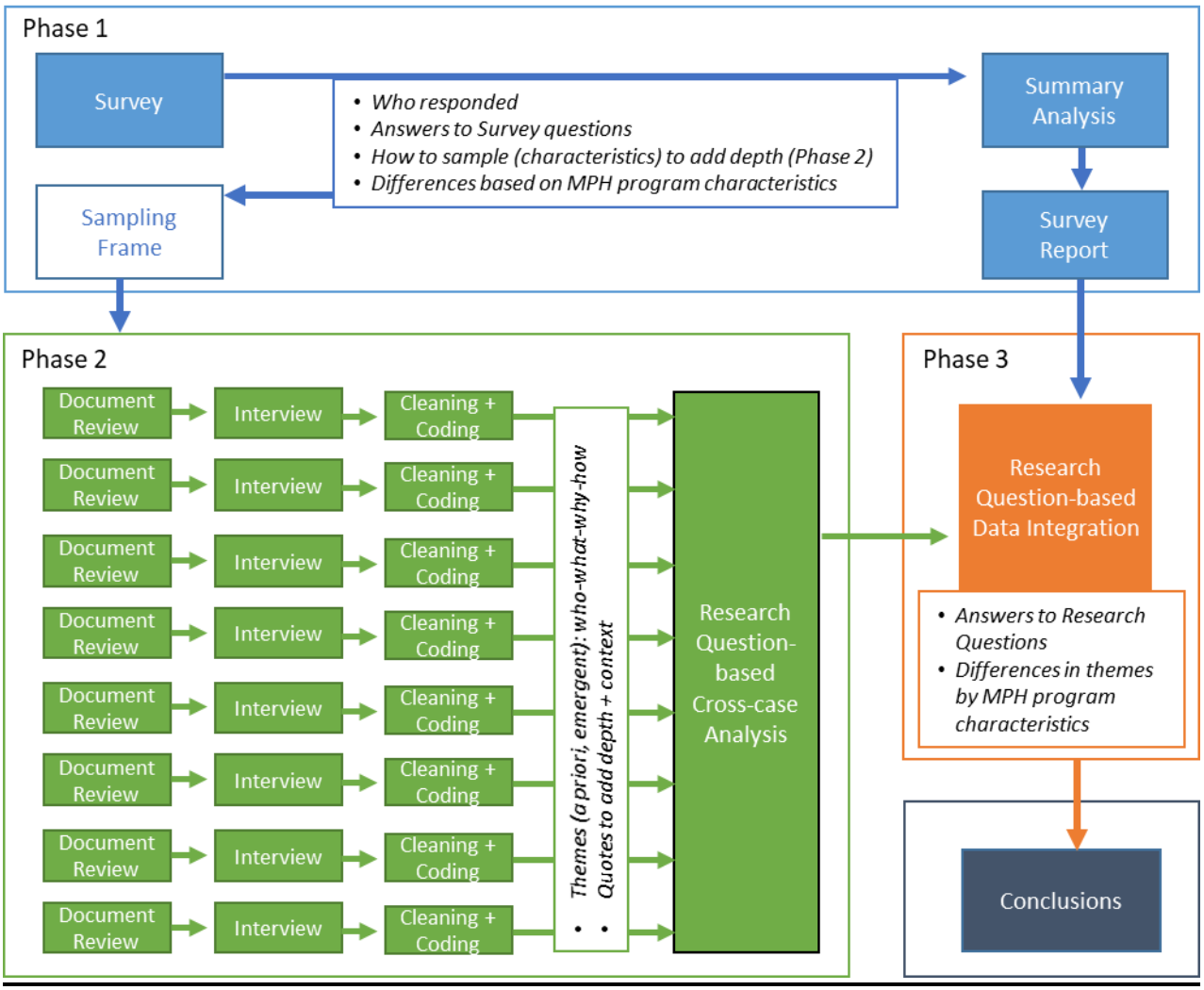
- When asked what the focus of their MPH programs is, via open ended questions, respondents noted: “to train people to tackle the world's most pressing public health issues”, and “to train students to implement/advocate for evidence-based policy and practice that impact health and social outcomes,” and to have a “practical approach, focused on cross-cutting skills development.” This helped to suggest that MPH programs are not just providing education for education sake, that there is a bigger vision within some MPH programs.

- When asked about how they focus on practice, via open-ended questions, respondents noted that their “curriculum is reviewed and informed by public health practitioners,” that they “develop specific assignment designed to mimic public health practice,” that they “work with at least two health department and get their documents, problems and data to use in our courses,” and that they “develop many collaborations with local NGOs/non-profits and others to integrate their public health needs into our programming, therefore our classes use/apply real time data and learning directly to our community.” This helped to suggest that MPH programs are working with public health practitioners, and adopting authentic assessment processes, as described by CEPH: assignments that are aligned with work expected of public health practitioners in the real world.

- When asked about what motivates their changes, and what outcomes they want to see as a result, respondents noted that they want to see their graduates “have skills that align with Public Health 3.0,” “have the ability to understand and be guided by the social

determinants of health," have a "greater focus on equity in their work," and have the "skills related to Chief Health Strategist," and the "skills to be able to have an impact." More specifically, some respondents said that they want to see graduates who are "better at critical thinking," have a "good balance of technical and soft skills," can "problem solve" and be "resilient, handle changing professional environments, and can take on new opportunities," and have a "greater connection with the community and community-based practice" and "more integration with community." This reinforced that aspirational visions are inspiring some MPH programs, and suggested examples for Phase 2 coding.

Figure 5 - Data Analysis Process



2. Phase 2

The goal of Phase 2 data analysis was to identify themes within the qualitative data collected through interviews, informed by the document review process, as a way to complement and deepen the meaning of Phase 1 data. Phase 2 data (interview transcripts), collected via interviews that were informed by survey responses and document reviews, and transcribed via Temi.com,[115] were uploaded to Dedoose[116] for qualitative data coding. Transcripts were coded using the literature driven *a priori* codes defined in the measurement table (Appendix A – Measurement Table) and code book (Appendix L - Code Book), reinforced by the Phase 1 data analysis process, described above

As described in Chapter 2, findings from a robust literature review were used to develop the study constructs, and the *a priori* codes. This process was used to develop a standard definition for the study and data analysis, recognizing that academic or non-colloquial terms might be interpreted in multiple ways by data coders and/or the study lead. These are described in detail in the measurement table (Appendix A – Measurement Table) and code book (Appendix L - Code Book), and summarized in Table II. below.

Due to the COVID-19 pandemic, and peers' involvement in the emergency response and unexpected turmoil due to illness, disrupted work life, and uncharacteristic responsibilities related to child- and elder-care, the lead researcher adapted the originally anticipated peer-coding process. Rather than having a peer code at least 10% of the data, and then compare for synergy and discordance, a peer validation process was used. This approach sought to validate and improve the coding process (approach and application of codes) and help decrease researcher bias.

Table II – *a priori* Construct and Code Definitions and Examples Where Code Could Be Applied

Construct	Parent Code + Definition	When to apply – Programs note…	Examples
MPH Focus ***WHAT*** *is the focus of MPH programs in the U.S.?*	**Learning** is the acquisition of knowledge[5]	- A focus on teaching; acquisition of knowledge and skills (informative learning)	- *We work to assure that students have knowledge in….* - *We help students build skills in….*
	Competence Dev'ment - supporting student ability to integrate and apply knowledge, skills, values to achieve outcome[2,8,14,15,17,59]	- A focus on mentoring; competence development; developing public health values (social justice, equity)(formative learning); developing leaders (transformative learning)	- *We help our students demonstrate competence in areas…* - *We help our students build abilities in areas important to the workforce* - *We help students build abilities in areas such as… (CEPH domains: systems thinking, data analytics, leadership, teams)*
	Workforce Readiness: graduates ready to enter public health workforce (gov, other) [2,14,15,17,59]	- A focus on developing professionals; job readiness; abilities needed by the workforce, possibly in areas aligned with workforce needs	- *We help our students become professionals* - *We help students develop abilities that can be transferrable across jobs* - *We help graduates be ready to work in field of public health*
	Graduate Employment[61]	- A focus on getting graduates employed - A focus on helping to fill the public health workforce needs	- *We really focus on helping our graduates get jobs* - *We have a focus on the pipeline, helping to fill existing workforce gaps*
Construct	**Parent Code + Definition**	**When to apply – Programs note shifts…**	**Examples**
MPH Program Shifts ***WHAT*** *types of changes are MPH programs making to their policies, curriculum, courses, methods to match this ideal state?*	**No shifts; status quo**	- No shifts as program is already aligned with focus; not interested in/able to change	- *We're not shifting as we are already in alignment with vision* - *We're not changing because of barriers within the college*
	Instructional Design - how instruction is designed and implemented within an MPH program[5,16,19,94,95]	- To focus on competence development; adoption of new competencies or admissions criteria or graduation criteria; Adaptation of program structure	- *We have incorporated the new CEPH competencies program* - *We have adopted new admissions criteria to…* - *We work with employers to design program changes so graduates meet employers' needs*
	Curriculum/ Course Content - knowledge, skills, and values that a student acquires via a course or program[19,78]	- To increase foundational knowledge; develop competence in areas needed, core public health values; adaptive leadership skills (engagement, communication, systems thinking, inquiry, teamwork)	- *We have added new courses that specifically focus on….* - *We have adapted courses to assure…* - *We have incorporated content/classes to better…* - *We have designed new course activities that …* - *We are working to improve student ability to work in teams*
	Pedagogy/ Modes of Teaching used to help students acquire knowledge, skills, values, and develop competence [3,5,9,11,19,46,48,57,78,97]	- Such as re-designing courses; using applied problem solving, engaged learning, team-based learning, authentic assessment, mentoring, systematic reflection	- *Our students work on real-world projects* - *We use simulations and case studies to mimic real life* - *We increased teamwork to prepare students* - *We use reflection to help students stop, think, write, reflect* - *We hire faculty with practice experience*
	Context for Learning - where learning happens	- Field-based learning, Simulations, Real-world problem solving	- *We are using field based learning to…* - *We bring the real world into the classroom by …*

Table II - *a priori* Construct and Code Definitions and Examples Where Code Could Be Applied *(continued)*

Construct	Parent Code	When to apply – Programs note shifts made to…	Examples
Desired Outcomes ***WHY*** *are MPH programs making changes to policies, curriculum, courses, methods? What are they looking to achieve?*	**Improved Learning**[5]	- Help students have better grasp on knowledge	- *We wanted our students to have a better understanding of….*
	Improved Competency Dev'ment[2,8,14,15,17,59]	- Help students develop competencies required of the workforce, develop into public health practitioners, develop public health leaders	- *We wanted to help our students be able to demonstrate…* - *We wanted our students to have confidence in their ability to…* - *We felt that students needed more …..relevant to workforce*
	Improved Workforce Readiness[2,14,15,17,59]	- Help students become professionals, have abilities needed by workforce, be ready to integrate into workforce	- *We wanted students to be able to enter workforce seamlessly* - *Our motivation was to develop graduates who are able to…* - *We want our students to be able to understand needs and….*
	Improved Graduate Employment[4,61]	- Improve graduate employment rates	- *We needed more of our graduates to be employed within …* - *We learned more about what the workforce was looking for*
	Improved Satisfaction[4]	- Improve student satisfaction, graduate satisfaction, employer/preceptor satisfaction	- *Our graduates were feeling like they left without ….* - *We want employers knocking at our door to hire our students!*
	CEPH Accreditation[4]	- Better align with new CEPH standards, assure compliance with new CEPH standards	- *We needed to make changes to be compliance with the new CEPH standards*

Construct	Parent Code	When to apply – Programs note (+) or (-) influence of:	Examples
Influencing Factors ***WHAT*** *factors are informing and influencing (positively and negatively) the changes MPH programs are making*	**Policy/Mandates** - rules to influence actions.[5,16,73,117]	- ***CEPH Accreditation Standards;*** Other policy or mandates that are informing or influencing action	- *The CEPH standards have really informed …* - *Our university expects that all units ….*
	Org/Institutional Design - type, affiliations, practices (decision-making, communication), that influence resources.[5,23,57]	- Organizational pressure for external funding, research and publication, teaching excellence, innovation, community engagement, service - Resource availability - Decision-making ability of MPH program team	- *There is pressure to bring in external funding …* - *Our institution has invested heavily in…* - *We have access to training and funding to help us improve and modernize our curriculum* - *We have support from….*
	Workplace Culture - the 'vibe' in MPH program, school, incl. collaborative leadership, committees, stakeholder engagement [2,4,5,16,18,23,57,74,78,80,91,96,100]	- Having a clear program mission/vision - Using routine CQI processes, engaged/collaborative leadership processes, stakeholder involvement in program planning, evaluation, adaptation, information sharing between team members, collaborative practices, such as shared teaching	- *We went through a process to re-imagine our mission, vision, rationale for MPH training* - *We gather and use data on a regular basis to inform our program's growth and development* - *We leverage our strengths to …* - *We engage our stakeholders a lot to…*
	Info Dissemination + Uptake - Awareness of info that that informs action; sharing info with others	- Having access to information from national organizations, academic peers, peers in practice, other sources - Sharing processes, outputs/outcomes with others	- *We were a part of ASPPH's Framing the Future* - *I've been able to access info to understand…* - *I am not really aware of ….* - *I learn a lot by…*
	Individual knowledge and understanding; self-efficacy.[5,16,60,78,95,101,103]	- Being aware of national trend, visions, mandates; program vision; university policies; Being a part of working groups; Being able to access resources	- *I understand why we are making these changes* - *I am able to go to conferences and learn* - *I don't know what our program's plan or vision is*

The lead researcher coded one full transcript by construct and by parent code, and a coding brief was prepared (Appendix M – Coding Brief). The full transcript (12.5% of data) was reviewed by the peer coder; there was disagreement on 16 of 55 coded segments, and an additional 8 segments were coded by the peer. The two coders then conferred to discuss areas of disagreement. Key feedback given was the value of coding bigger excerpts of the data, so as to no loose the context, and three parent codes were refined to provide more specificity. The coding brief (Appendix M – Coding Brief) and codebook (Appendix L – Code Book) were refined (changes denoted in red text), and a second full transcript was coded by construct and parent code. This transcript was reviewed by the peer coder; there was agreement on all coded segments.

At least three rounds of coding were done with full transcripts or segments of the transcripts. Using Dedoose,[116] a first pass coded transcripts just by construct (N=5). Across the eight interviews, a total of 272 interview excerpts were coded, with an average of 32 excerpts coded per interview (range 22-40). Dedoose visualization tools were used to explore themes, frequencies, and co-occurrences of codes across and between interviews. As depicted in Table III, each of the five constructs was coded an average of 54 times, however the range was broad with only 16 passages related to demographics noted, and 99 related to influencing factors. The next most frequent code was related to shifts made (N=79). As noted in Table IIIa, a depiction of the co-occurrence of codes within excerpts, reported shifts were noted in relation to influencing factors (N=47), and in relation to outcomes (N=25); Outcomes were also noted in relation to influencing factors (N=24).

Table III – Frequency of Construct Codes across Interview Transcripts

	Constructs (# of coded excerpts)					
Pgm	**Demogs**	**Focus**	**Shifts**	**Outcomes**	**Influences**	**Totals**
MPH_1	3	3	10	5	9	**30**
MPH_2	4	4	11	7	15	**41**
MPH_3	3	4	11	4	10	**32**
MPH_4	1	2	11	10	19	**43**
MPH_5	1	3	7	8	10	**29**
MPH_6	1	4	13	7	14	**39**
MPH_7	2	5	10	4	15	**36**
MPH_8	1	6	6	2	7	**22**
Totals	**16**	**31**	**79**	**47**	**99**	**272**

Table IIIa - Frequency of Co-occurring Construct Codes across Interview Transcripts

	Constructs (# of coded excerpts with co-occurring codes)					
	Demogs	**Focus**	**Shifts**	**Outcomes**	**Influences**	**Totals**
Demogs		2	6	4	8	**20**
Focus	2		11	14	12	**39**
Shifts	6	11		25	47	**89**
Outcomes	4	14	25		24	**67**
Influences	8	12	47	24		**91**
Totals	**20**	**39**	**89**	**67**	**91**	

Working on one research question at a time, the relevant construct-coded excepts from each interview transcript were extracted to a Microsoft® Word document. Using a matrix with coding cues (definitions and a priori codes) along with the code book, the excerpts across all transcripts were hand-coded using parent codes. The data were then segmented, by parent code. The segmented extracts were exported to a new Microsoft® Word document, one for each parent code, and then re-reviewed and coded using *a priori* child codes, and allowing for emergent codes. Exemplar quotes were also flagged for incorporation into the Chapter 4 results section. The frequency of parent and child codes across the eight interview transcripts is depicted in Table IV, as well as Appendix N – Code Frequency Table.

Once the excerpts were coded, thematic data summaries were developed in an inductive fashion, complemented by relevant quotes from the interview transcripts. More specifically, the researcher reviewed each thematically grouped set of data, and using the definitions in the measurement table, and terms from Phase 1 and Phase 2 respondents, as well as from respondent-cited frameworks identified in the literature review, such as Public Health 3.0 (e.g., health improvement, social determinants of health, leadership and strategy, partnerships and collaboration, funding, data use) and de Beaumont's Strategic Skills (e.g., systems thinking, change management, persuasive communication, data analytics, problem solving, diversity, policy engagement), braided the responses together to develop a summary of what was being suggested by the respondents. This process served to develop a summary responses to each of the interview questions.

For example, aligned with the notion that MPH programs are seeking to do more than just educate students, the following quotes (a subset) were coded under an emergent code, "adaptive/strategic leader," where respondents described students learning, having, or using 'Strategic Skills' to apply leadership, as defined by Public Health 3.0:

- *I am seeking to training future public health practitioners. The opportunity to train folks who will get out there and work in public health and ultimately make a difference and move the needle on population health. Especially the young people, who are so idealistic and so motivated… the more we can get public health thinking into other areas if work the better the workforce will be and the better the world will be.*
- *We need talented, skilled people in governmental public health… But, I also get very excited about our grad to end up in nontraditional settings. Those who end up in the for profit world who ended up in startups who end up doing social entrepreneurship. They're thinking about public health differently.*

- *A goal, is the idea of infiltrating public health into other professions… and to help them learn about upstream thinking, why it's important, what they can do it on their own. Helping them think beyond just treatment. This is kind of a step to Public Health 3.0, supporting focus on collaboration with the community… So in our class, we're teaching a lot of systems thinking tools, rich picture and very practical ways of analyzing systems so that when they're in that situation, they will have those tools in their back pocket. The whole thinking between public health core competencies was, these are the skills that people need… Certain skills, like surveillance skills and cultural competency skills and tools, and the community skills are so critical. And the communication skills on how to listen to people, how to engage and how to get others engaged. It's not always about being the leader, but getting participants to participate.*

- *I talk to my students about collaboration because public health cannot do much if we stay in silos. We need to innovate… We need to be prepared to react to new challenges. You know, in the nineties when I started, I never heard about Ebola and we didn't have SARS and I didn't know about Zika and we didn't have emergency preparedness and we didn't have climate change. And now all of these things are like daily in our world and we are not going to be able to teach all of those topics. It's impossible. We need to teach flexibility, innovation. It's like partnerships, the humility to share and to talk to other people and to lean on other experts. And informatics and health care and how to partner with clinicians, all of the health care world. We cannot possibly cover all of that in any program, but we need to be ready for it. That's what we need to prepare students for.*

- *I am looking to train people who can look through different lenses, and who have priorities around inclusiveness, collaborative leadership, because in order to address the issues that need to be really addressed, we can't keep doing the same things that we've been doing. So I want to see that in the leadership. I'd like to see that more leaders are trained in being able to manage, to facilitate those kinds of conversations. It's also recognizing that whatever area you are in in public health that you still can have an impact on these issues related to the social determinants. You've got to understand that you're not gonna solve these issues unless you understand all that goes into health. You have to have that understanding to be effective in your ability to influence.*

Table IV – Heat Map Showing Frequency of Coding in Phase 2 Interview Transcripts

Construct (F)	Parent Code (F)	Child Code (F)
Focus (31)	Learning (44)	Informative (14)
		Formative (6)
		Transformative (13)
	Competence Development (12)	Competence (12)
	Workforce Readiness (16)	(TBD) Researchers (2)
		Practitioners (16)
	Graduate Employment (9)	Researchers
		Practitioners
	Other - Change leaders (12)	
	Other - Workforce success (10)	
Shifts (79)	Instructional Design (19)	Competence development (10)
		Career pathway (7)
		Criteria for graduation (1)
		Criteria for admissions (7)
	Curriculum/Course Content (35)	Foundational knowledge (17)
		Public health competence (14)
		Public health values (8)
		Public health leadership (12)
		Inter-professionalism (8)
	Pedagogy/Teaching Method (48)	Integrated courses (7)
		Engaged, field-based, practice type teaching(23)
		Applied problem solving, auth assessment (32)
		Small-group, collaborative learning (8)
		Use of IT (6)
		Critical, systematic reflection (3)
		Integration of faculty/mentors w/practice (21)
	Other – Program Design (13)	Program focus (7)
		Program growth (4)
		Program contraction (3)
		Hiring practitioners (6)
Outcomes (47)	Learning (18)	Informative (12)
		Formative (5)
		Transformative (14)
	Competence Development (12)	Competence (12)
	Workforce Readiness (10)	Researchers
		Practitioners (10)
	Graduate Employment (10)	Researchers
		Practitioners (10)
	Satisfaction (2)	Satisfaction (2)
	Accreditation (3)	Accreditation (3)
	Other - Greater collaboration (2)	
	Other – Workplace success (8)	
	Other - Change leaders (12)	

Table IV – Heat Map Showing Frequency of Coding in Phase 2 Interview Transcripts (Cont.)

Construct (F)	Parent Code (F)	Child Code (F)
Influencing Factors (99)	Policy Environment (29)	CEPH (28)
		Other (1)
	Organization (43)	Focus – Mission + Vision (14)
		Other – Fiscal resources (15)
		Other – Time pressures (4)
		Other – Administration + leadership (17)
		Other – Hiring practitioners (13)
		Other – Campus Resources (4)
	Workplace (33)	Mission/vision (7)
		M&E/CQI (13)
		Engagement (14)
		Other – Change/Strategic Management (9)
		Other – Leadership (10)
	Individual (17)	Awareness (16)
		Engagement – peer-to-peer (13)
		Lifelong learning (6)
		Other – Time (1)
	Information (38)	CEPH (17)
		Other national organizations (8)
		Academic peers (3)
		Practice peer (5)
		Other – Workforce needs (5)
		Other – Local needs (2)

During this coding process, it was noted that many skill and abilities were listed related to the parent codes "informative learning" that encompasses knowledge and skill areas that MPH programs are teaching, and "competence development" that encompasses abilities that MPH programs are developing, and what they want to see students and graduates to be able to do. To better understand and depict this, the skills or abilities or focal areas were extracted into a unique Microsoft® Word document, and cleaned/standardized. These areas were then depicted via a word cloud (Chapter IV).

Following summarizing and documenting the collective and emergent themes for each research question, a memo related to the "so what" and "now what" of the collective answerer was developed to document shifts in researcher assumptions and perspectives, and to inform Chapter V.

3. Phase 3

The goals of Phase 3 data analysis were to integrate Phase 1 and Phase 2 data analyses to develop a summary response to each research question. Integrating data from multiple phases of data collection allows for complementarity of data and a more nuanced exploration of the proposed study constructs.[118]

Integration was done on a per-research question basis, whereby Phase 1 and Phase 2 data analyses were summarized and displayed in a side-by-side table (Appendix O – Data Integration Tables). This depiction allowed for review and identification of complementary or divergent themes, and development of an overarching summary. Where complementary themes were noted, this was stated as reinforcement. Where divergent themes were noted, more in-depth review was done, and description of potential reasons or influencing factors (MPH program characteristics or other) was noted. This data integration process is depicted and described in Chapter 4.

Following this integration process for each research question, a memo related to the "so what" and "now what" of the collective answerer was developed to document shifts in researcher assumptions and perspectives, and to inform Chapter V, which summarizes data to develop conclusions and recommendations to inform institutional and national decision-makers. To do this, data from all phases were reviewed to summarize overarching themes. These themes were contrasted against the literature-driven conceptual framework (Chapter II) that predicted what could be/might be happening related to MPH education in the U.S., and why. A new conceptual framework was defined, using "wisdom of the crowd" to reinforce existing theory, and introduce novel, rival explanations. These summary findings

will be shared with national partners, including CEPH and ASPPH, to help inform future plans, and will be translated into academic papers. This is presented as Chapter V.

E. Validity and Reliability Considerations

This study explores in vivo phenomena, and as such, there are inherent limitations to study quality due to the variable nature of the environment, the changing context, and the multiple factors that influence the work. To maximize study quality, and to support confidence in the findings such that they might inform decision-making, a number of factors related to validity and reliability were considered.

1. Validity

Validity refers to the degree to which a test measures what it is supposed to measure.[119] Three types of validity were considered during planning and implementation of this study: construct, internal, and external validly. *Construct validity* refers to the ability to actually measure the constructs of phenomena that the researcher is intending to measure. A number of processes were used to improve construct validity. First, the study's conceptual framework, constructs, and measurement table were developed based on an extensive literature review and existing frameworks (Chapter II). This process informed the development of the survey tool and the interview questions, and all questions were mapped back to the measurement table (Appendix A – Measurement Table). To complement that, the study research questions and data collection tools were shared with field experts for review and input on content before use, and the survey tool was beta tested before release. For the qualitative data processes, a peer coder was used to improve coding accuracy and validity and via the study design, multiple data sources developed and triangulated. Finally, summary

results were shared with peer experts for input, in line with member-checking and researcher-bias-checking methods.[119]

Internal validity relates to factors related to study context or participants that limit the researcher's ability to draw correct inferences from the data about cause and effect.[109] To improve interval validity, a number of strategies were used, as noted above, including use of a peer coder, triangulation of multiple data sources of data, and sharing of progressive summaries of findings and results with peer experts for input, in line with member-checking and researcher-bias-checking methods.[109] In this way, inferenced and conclusions were not being made in isolation.

Finally, external validity relates to the accuracy or the validity of the study results beyond the group studied, and the risk of the researcher drawing erroneous conclusions or generalization from the data.[109] As previously noted, the goals of this study were to assess themes and trends among U.S. MPH programs. To support the external validity, the methods emerged from literature-based conceptual frameworks suggested for the field of public health, and a national representation of respondents was sought, for both phases of data collection. One factor that was not able to be accounted for was the impact of the COVID-19 pandemic. Data collection tool place before the pandemic, and it is possible that public health needs, public health education, and education in general, may be different post-pandemic.

2. Reliability

Reliability refers to the consistency of a study—both the process used and the possible findings—during the study (internal) or at another time, possibly even by another researcher.[119] To improve internal reliability, the consistency of processes and findings

within the study, a detailed study protocol was developed and was used consistently to guide data collection and data analyses. Copious notes were taken, and records kept via calendar notes and iterative document versions. To improve external reliability, the confirmability of study results, or the ability to find consistent results if the study repeated, as noted about, a detailed study protocol and tools were developed and used to guide data collection and analysis processes.

3. Trustworthiness

As a part of mixed-methods research Ivankova (2015) also suggests the value of assessing qualitative research for trustworthiness, based on four criteria.[119] Credibility relates to how believable the results are, and how close they are to the truth. Transferability relates to how applicable the findings would be to other settings. Dependability relates to how consistent the findings would be if repeated. And confirmability related to how accurately the results depict participant views, and not researcher bias.[119] Ten strategies are suggested to increase trustworthiness, and many were used, or at least attempted to be used.[119] Triangulation of multiple data sources, and from multiple possible strata of MPH programs, was uses to seek convergence and even saturation of ideas. An audit trail was maintained to document and demonstrate the processed used to collect, analyze, and interpret the data. Researcher bias was considered and clarified through member checking and peer debriefing processes. And detailed, descriptive data were collection and shared within the study findings (Chapter V) to describe complementary descriptive stories to complement the quantitative and categorical data that depict national trends and sentiments. Finally, a negative case study approach was attempted, to understand the losses felt and negative consequences of the aforementioned calls to action. MPH programs were asked to describe limits to change in the survey, and MPH programs were sampled for Phase 2 based on few changes and reported barriers to change. Furthermore, some interviewees were asked, specifically, about negative consequences or outcomes.

IV. STUDY FINDINGS

This study set out to describe: whether, how, and why schools and programs of public health are shifting their MPH curriculum; what factors are influencing curriculum shifts; what outcomes are desired from the curricular shifts; and what is facilitating or limiting operationalization of curricular shifts. Two phases of data collection were used to identify and summarize themes, practices, and influencing factors. In Phase 1, all SPPH with an accredited MPH program (including approved applicants) were invited to participate in a short survey relating to program characteristics, curricular changes, factors that influence shifts in instructional design, and metrics of success. In Phase 2, a stratified sample of eight MPH programs that responded to the Phase 1 survey were interviewed to providing a deeper description of reported shifts, motivations, desired outcomes, and facilitating and/or limiting factors. In Phase 3, data were integrated for a summary.

As shown in Table II, study results are presented in six sections, A through F, with Section A describing whose voices and experiences are a part of the results, and Sections B to F describing the results of each of the five research questions. Within the sections, there are three sub-sections describing Phase 1 findings, Phase 2 findings, and Phase 3 findings.

Table V – Outline of Chapter 4

A. Who is Represented in this Study - Respondent Institution Characteristics
1. Phase 1 - Findings
2. Phase 2 – Findings
3. Phase 3 – Summary

B. Question 1: What is the focus of MPH programs in the U.S.?
1. Phase 1 – Findings
2. Phase 2 - Findings
3. Phase 3 – Summary

C. Question 2 - Are MPH programs shifting their instructional design to better meet their defined focus?
1. Phase 1 - Findings
2. Phase 2 - Findings
3. Phase 3 - Summary

D. Question 2a – What, specifically, are MPH programs shifting to better meet their defined focus?
1. Program Design
   a) Phase 1 – Findings; b): Phase 2 – Findings; c) Phase 3 - Summary
2. MPH Curriculum
   a) Phase 1 – Findings; b): Phase 2 – Findings; c) Phase 3 - Summary
3. Teaching Methods and Approaches
   a) Phase 1 – Findings; b): Phase 2 – Findings; c) Phase 3 - Summary

E. Question 3: What are the motivations for & desired outcomes from shifts?
1. Phase 1 - Findings
2. Phase 2 - Findings
3. Phase 3 – Summary

F. Question 4: What is informing and influencing MPH program shifts?
1. Factors Informing Change
   a) Phase 1 – Findings; b): Phase 2 – Findings; c) Phase 3 - Summary
2. Factors Influencing Change
   a) Phase 1 – Findings; b): Phase 2 – Findings; c) Phase 3 - Summary

A. Who is Represented in this Study - Respondent Institution Characteristics

In the U.S. there are currently 215 MPH programs that are accredited by CEPH, or in the application phase. Of these, 65 (30%) are located within schools of public health, and 150 (70%) are located within stand-alone public health programs. In addition, 127 (59%) of these MPH programs are members of ASPPH.

In an effort to paint a comprehensive picture of the current state of public health education in the U.S., this study sought to gather responses from a large number of MPH programs. And, as the literature reviewed in Chapter 2 suggested that instructional changes may be influenced by different institutional characteristics, effort was invested to assure recruitment of a sample roughly mirrors that of the universe of MPH programs in the U.S. Demographic data related to respondent institutions were gathered in both phases of the study.

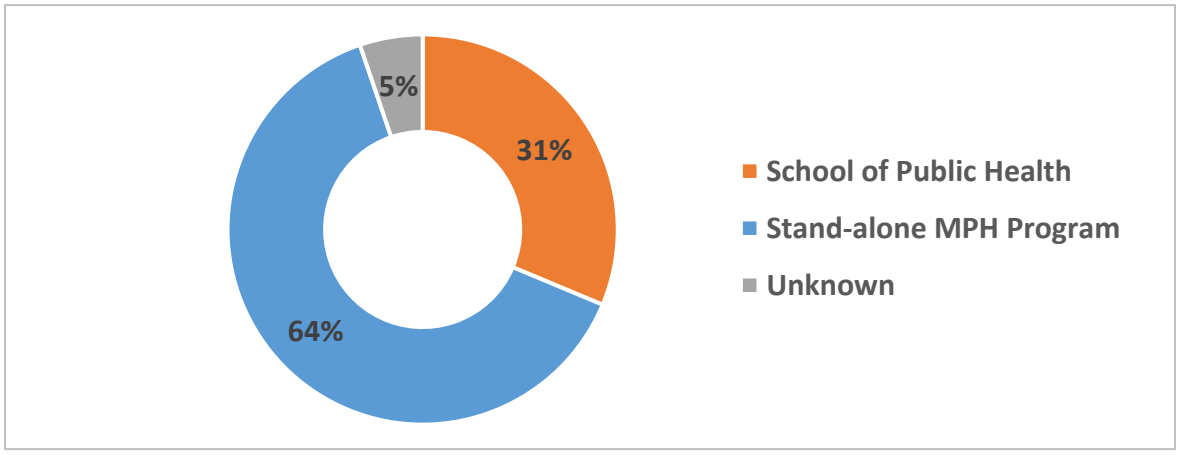
1. **Phase 1 - Findings**

To assess respondent demographics, the survey asked five questions related to MPH program location, size, age, and affiliation with ASPPH. A total of 115 individuals submitted valid responses that were a part of the analysis.

a) Type of MPH Program

Respondents were asked whether their MPH program was located with a school of public health, or if it was stand-alone. As shown in Figure 6, nearly one-third (31%, n=36) reported answers on behalf of MPH programs within school of public health and 67% (n=73) on behalf of stand-alone MPH programs. The additional six respondents did not list their affiliation. As suggested in Table III, but closely mirrors national distribution.

Figure 6 - Distribution of Respondent MPH Programs - By Type (N=115)



b) ***Representativeness of Responding MPH Programs***

While not required, respondent institutions were invited to share their institution name; 82% of the respondents did (n=94), showing that the sample included 29 uniquely named MPH programs within schools of public health, and 64 uniquely named stand-alone MPH programs (one stand-along program was listed twice). As shown in Table IV, this suggests that at least 93 unique MPH programs responded to the survey, with an overall response rate of at least 43% of eligible MPH programs, with at least 45% of MPH programs based within schools of public health, and at least 43% stand-alone MPH programs responding. The 93 unique institutions for which names were listed were compared against MPH program distribution, categorized by HRSA regions. As shown in Table VII, most of the 10 regions are well and proportionately represented in this study (at around 40%), and no geographic region was excluded.

Table VI - MPH Program Phase 1 Sample Proportional Representation by Characteristic, vs. National Proportions

MPH Program Characteristics	National		Phase 1 Resp.*	Named in Phase 1^	
	#	%		# in study +	% of Ntl +
MPH Programs	215	100%	115	93	43.2%
Programs in SPH	65	30.2%	33.0%	29	44.6%
Stand-alone MPH	150	69.8%	67.0%	64	43.3%
Total	**215**				
ASPPH members	127	59.1%	69.7%	63	49.6%
Not ASPPH	88	40.9%	30.3%	30	34.1%
Total	**215**				

* calculated based on survey responses

^ calculated from crosswalk of uniquely named respondent institutions in Phase 1 with national list

+ suggests that a greater number and greater % may be included in sample as 18% of respondents did not list their institutions' name

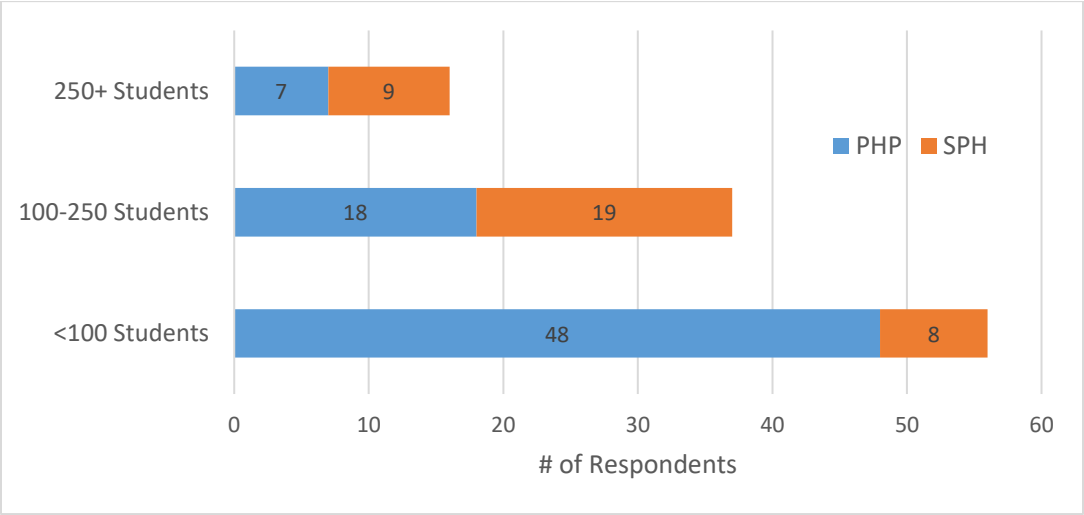
Table VII - MPH Program Phase 1 Sample Proportional Representation by Geography, vs. National Distribution by HRSA Regions

HRSA Reg	States in HRSA Region	MPH Pgms	Respondents	
		# (CEPH)	#	%
1	Maine, NH, Vermont, Massachusetts, Rhode Island, Connecticut	19	9	47%
2	New York, New Jersey	20	8	40%
3	Pennsylvania, Maryland, Delaware, Virginia, West Virginia	20	8	40%
4	Kentucky, Tennessee, NC, SC, Georgia, FL, Alabama, Mississippi	43	17	40%
5	Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio	41	16	39%
6	New Mexico, Texas, Oklahoma, Arkansas, Louisiana	17	7	41%
7	Nebraska, Kansas, Iowa, Missouri	9	8	89%
8	Montana, North Dakota, South Dakota, Wyoming, Colorado, Utah	12	4	33%
9	Nevada, California, Arizona, Hawaii	30	12	40%
10	Washington, Oregon, Idaho, Alaska	6	5	83%

c) Size of MPH Program

Respondents were asked to report the number of MPH students they have currently enrolled in their MPH programs, inclusive of all concentrations, all modes of delivery, and all years). As shown in Figure 7, about half of the respondent programs (n=56, 49%) noted having fewer than 100 MPH students currently enrolled, while about one third (n=37, 32%) noted having between 100 and 250 students and 14% noted having more than 250 students enrolled; 6 respondents did not list their program size. Cross tabulations (Appendix J – Cross-tabulations) suggest that being a larger MPH program (>100 students) is associated with being located within a school of public health ($X^2_2 = 18.41$, $P < .001$).

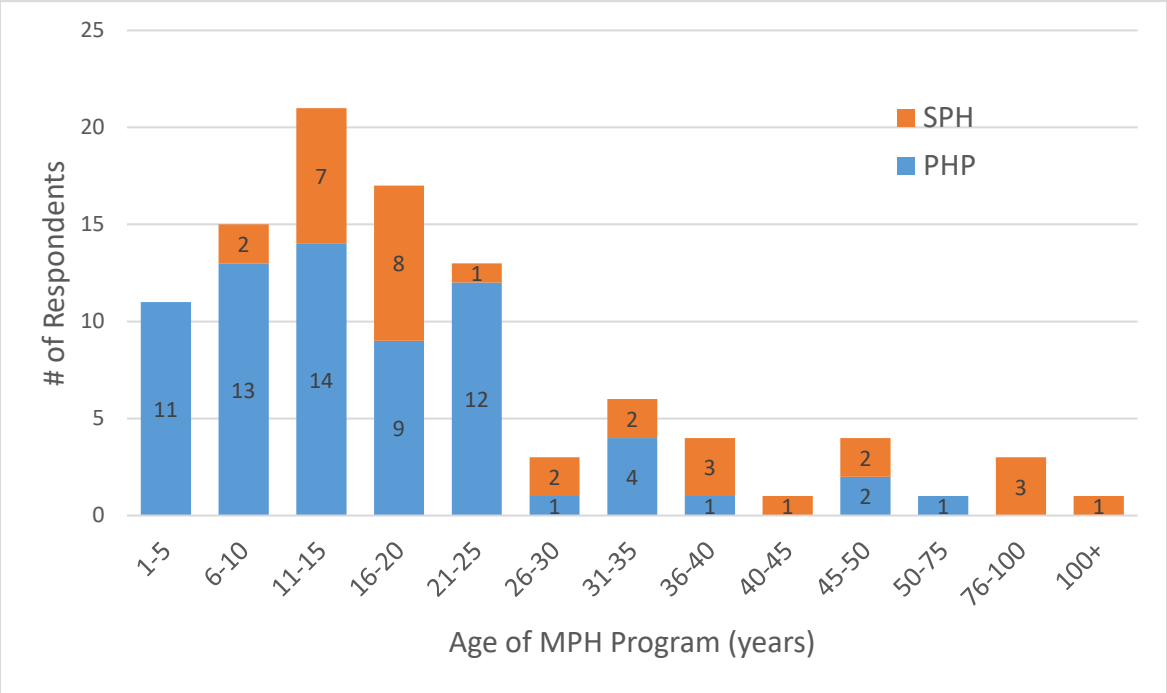
Figure 7 - Distribution of Respondent MPH Programs - By MPH Student Number and Program Type (N=109)



d) <u>Age of MPH Program</u>

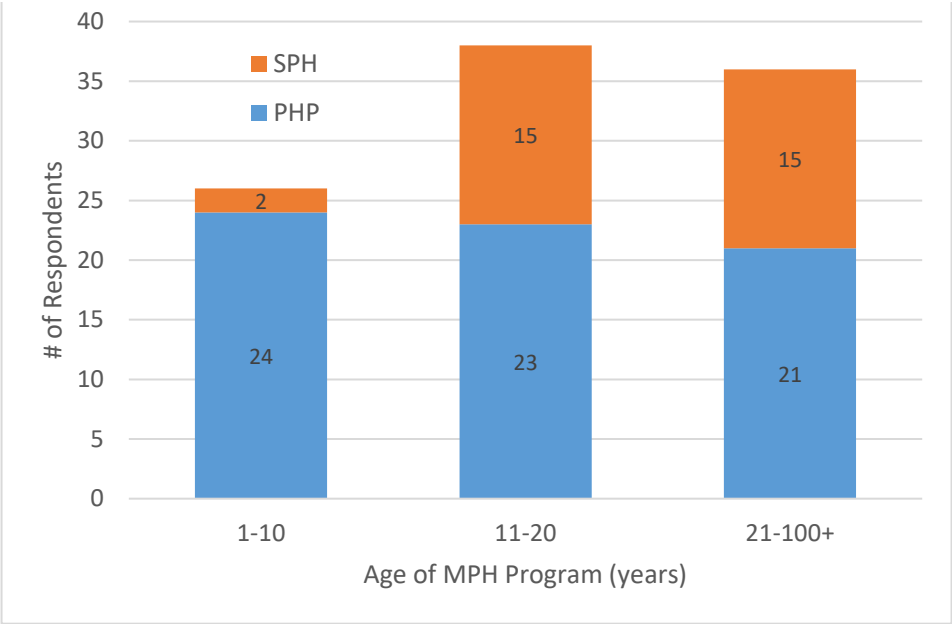
Respondents were asked to list the year their MPH program was established. Some 87% of respondents (N=100) listed a year. When converted to age of program, the mean age of programs represented in this study was calculate to be 21 years old, and the median age was found to be 16 years old. The youngest program represented is just one year new, while the oldest is 104 years old. When grouped for analysis and presentation (Figure 8), 10% of the responding MPH programs (n=11) noted being established within the last five years (in sync with the new CEPH criteria), and a further 13% (n=15) reported being 6-10 years old, while 33% (n=38) reported being 11-20 years old; 14% (n=16) reported being 21-30 years old, and 17% of respondents (n=20) noted being established more than 30 years ago; 15 respondents did not list when their program was established. As Figure 8 suggests, there has been a proliferation of MPH programs in the last 25 years, with the majority these being stand-alone MPH programs.

Figure 8 - Distribution of Respondent MPH Programs - By Age (years) and Type (N=100)



To support reasonable cell sizes for cross tabulations (Appendix J – Cross-tabulations), MPH program ages were grouped into three similar sized buckets: newer programs (1-10 years, 26% of sample); programs of median age (11-20 years, 38% of sample); and historic programs (21 years and older, 36% of sample) (Figure 9). Age of program (older) is associated with being located within a school of public health ($X^2_2 = 9.58$, $P = .008$), with having a larger number of students ($X^2_4 = 14.23$, $P = .007$).

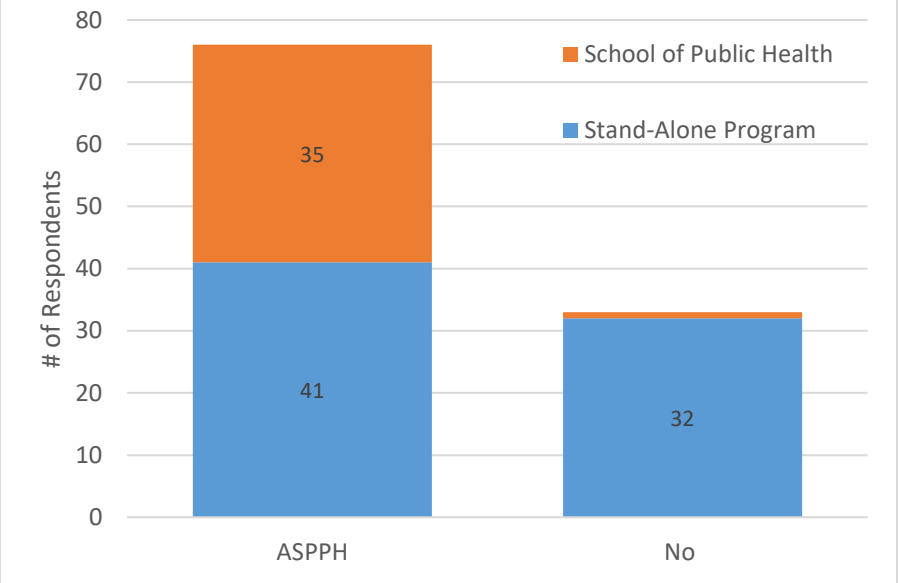
Figure 9 - Distribution of Respondent MPH Programs - By Age Groupings and Type (N=100)



e) ***MPH Program Affiliation***

When asked about MPH program affiliation with ASPPH, 76 of the respondents stated that they are affiliated with ASPPH (70%), and 33 said that they are not; 6 gave no response. As shown in Figure 10, all by one responding MPH program within a school of public health is a member of ASPPH, whereas 56% of responding MPH programs are a part of ASPPH (n=41), and 44% are not. Cross tabulations (Appendix J – Cross-tabulations) suggest that affiliation with ASPPH is associated with being within a school of public health (X^2_1 = 19.25, P < .001), and older program (X^2_2 = 13.34, P < .001), and a larger program (X^2_2 = 6.77, P = .03).

Figure 10 - Distribution of Respondent MPH Programs - By Type and ASPPH Membership (N=109)



f) ***Summary of MPH Program Characteristics Represented in Phase 1***

Comparison of the characteristics of MPH programs responding to the Phase 1 survey with characteristics of U.S.-based MPH programs that are CEPH-accredited (or applicants for accreditation) suggest that the Phase 1 sample nicely represents the distribution MPH programs. Some 33% of the respondents were from MPH programs within schools of public health, and 67% from stand-alone MPH programs, loosely national distribution, and at least 43% of MPH programs (including 45% of school-based programs and 43% of stand-alone programs) responded. Some 70% of the respondents reported being affiliated with ASPPH (vs. 59% nationally); this study may over-represent ASPPH members.

2. Phase 2 – Findings

The goal of Phase 2 data collection was to document perspectives and experiences from a sample of MPH programs to add depth to the Phase 1 categorical and short-answer survey questions. Thus, Phase 1 respondent demographics, along with other MPH program characteristics noted in Chapter 3, informed sampling for Phase 2, in an effort to mirror characteristics of MPH programs national, and those represented in the survey. Ten MPH programs were sampled (two as replacements) and eight agreed to participate in semi-structured interviews to develop a nuanced understanding of instructional change, influencing factors, and facilitators of and barriers to change.

a) Matching survey-driven Characteristics

The final sample contains both stand-alone MPH programs (50%), and MPH programs located within schools of public health (50%), and MPH programs along the age spectrum: One MPH program established in the last 5-years, one newer MPH program (6-10 years old), three older MPH programs (11-20 years), and three historic programs (20-50+ years). There is also diversity of program size, with five smaller MPH programs (<100 students), two medium–size MPH programs (100-250 students), and one large MPH programs (250+ students). Finally, 75% of the sample (n=6) represents MPH programs affiliated with ASPPH, and MPH programs from seven of the 10 HRSA/PHTC regions. As shown in Table V, the interview sample loosely mirrors characteristics of the Phase 1 sample, and thus national MPH programs accredited by CEPH, or seeking accreditation. However, the Phase 2 sample may over-represent perspectives from MPH programs in schools of public health, ASPPH members, smaller schools, and older schools.

Table VIII - MPH Program Characteristics + Phase 2 Sample Proportional Representation

MPH Program Characteristics	Phase 1 sample +^		Phase 2 sample	
	#	%	#	%
Programs in SPH	36	33.0%	4	50.0%
Stand-alone MPH	73	67.0%	4	50.0%
Total				
ASPPH members	73	69.7%	6	75.0%
Not ASPPH	33	30.3%	2	25.0%
Total				
<100 students	56	51.4%	5	62.5%
100-250 students	37	33.9%	2	25.0%
250+ students	16	14.7%	1	12.5%
1-5 years old	11	11.0%	1	12.5%
6-10 years old	15	15.0%	1	12.5%
11-20 years old	38	38.0%	3	37.5%
20+ years old	36	36.0%	3	37.5%

+ suggest that a greater number and greater % may be included in sample as 18% of respondents did not list their institutions' name

^ crosswalk of uniquely named respondent institutions in Phase 1 with national list

The sample also represents additional characteristics of interest identified in the Phase 1 survey data analysis process that will be described in subsequent sections. In the survey: three of the sampled MPH programs reported making comparatively many changes to their MPH programs, and three reported making few changes; three of the sampled MPH programs noted resources as a limiter to making changes, while four noted resources as a facilitator; and two of the sampled MPH programs noted university initiatives as a facilitator of changes, while three listed them as a barrier. Programs were sampled for these characteristics to ensure multiple perspectives.

b) <u>Other Sample Characteristics</u>

Because background research suggests that instructional changes may be influenced by different institutional characteristics, such as if an institution is public or private; the degree to which it focuses on research; the degree to which it is committed to community engagement; if it is an academic health department, etc. other characteristics of the Phase 2 sample were summarized.

As noted above, the Phase 2 sample represents a variety of geographic locations: the north-west and south-west U.S., north-central and south-central U.S., and north-east and south east U.S.. Four of the MPH programs interviewed are located within public academic institutions, and four located within private not-for-profit institutions.

To explore the possible impact of research pressures on approaches to MPH education, the Carnegie Classification of Institutions of Higher Education listings were reviewed. Three of the sampled institutions are classified as R1/Doctoral Universities: Very High Research Activity; two are classified as R2/ Doctoral Universities: High Research Activity; with the others classified as M1/Master's Colleges & Universities: Larger Programs; Special Focus Four-Year: Medical Schools & Centers; and Baccalaureate/Associate's Colleges: Mixed Baccalaureate/Associate's respectively.[120] The Carnegie Classification adds more detail related to the focus and types of graduate level instruction. Four of the sampled institutions are listed as Research Doctoral: Comprehensive programs, with medical/veterinary school; with the other four listed as Research Doctoral: Professional-dominant, Research Doctoral: STEM-dominant, Postbaccalaureate: Comprehensive program, and Postbaccalaureate: Other-dominant, with other professional programs.[121]

To consider the possible impact of institutional commitment to community engagement on approaches to public health education, four factors were reviewed. While none of the sampled institutions are identified as land grant institutions, two are identified as academic health departments.[122] And, four of the sampled institutions are noted as members of the CampusCompact coalition, institutions that seek to emphasize community engagement, and civic and social responsibility.[123] Finally, two of the eight institutions also have a "community engagement" designation via the Carnegie Classification.

c) <u>Respondent Demographics</u>

Individual respondent demographics were not explicitly collected, however, it should be noted that 50% of the survey respondents who consented to have their institutions be part of the Phase 2 sample frame were individuals who are affiliated with '*public health practice'* initiatives within their institution. This was noted via connection to the ASPPH *Public Health Practice Committee*, or titles such as associate dean or director for public health practice.

d) <u>Summary of MPH Program Characteristics Represented in Phase 2</u>

The Phase 2 sampling strategy sought ensure both diversity of MPH program characteristics (for representation), and similarity of MPH program characteristics (for comparison). The multi-step stratified sampling process yielded a sample that represents a broad array of institutional and experiential characteristics, including both diversity and similarity based on type, age, and size of MPH program; ASPPH affiliation; university research focus; university engagement focus; and public institutions vs. private institutions.

3. Phase 3 – Summary

Table VI, below, presents a summary of the data from Phase 1 and Phase 2 of the study, and overarching themes emerging as the data were integrated. More than 115 MPH program representatives are a part of this study, with 115 individuals representing their MPH program via the survey, and 12 via eight in-depth interviews. The respondents represent at least 43% of the 215 CEPH-accredited (or applicant) MPH programs in the U.S., including 45% of those located in schools of public health, 43% of stand-alone MPH programs, and 50% of programs affiliated with ASPPH.

Based on reported MPH program demographics, the survey sample represents a diversity of programs, when considered by size, age, type, ASPPH affiliation, and demographic distribution. The MPH programs sampled for in-depth interviews extend this diversity by including MPH programs that are located within both public and private not-for-profit institutions, within both research heavy and post-baccalaureate-focused institutions, and within programs that have a commitment to engagement and service learning. The interviewed MPH programs also represent a diversity of experiences, as described in the survey, including numbers of changes made to their MPH program in the last four years, and the factors that facilitated or limited the changes.

Overall, the findings reported in this study come from the experiences and perspectives of a MPH program leaders from a sample of programs that in many ways mirror the characteristics of MPH programs accredited by CEPH, or who are in the applicant phase. MPH programs affiliated with ASPPH may be over-represented, and affiliation is associated with older and larger programs, and those located within schools of public health. However, interviews over-sampled for smaller programs.

Table IX - Section A Integration of Phase 1 and Phase 2 Data

Who is Represented in this Study - Respondent Institution Characteristics	
Phase 1 - Survey Data	**Phase 2 - Interview Data**
• 1-2 people at each MPH program (N=215) invited to respond to the survey • 115 people responded - 67% from stand alone (vs. 70% ntl) - 70% from ASPPH (vs. 59% national) • Responses represent at least 93 unique MPH programs - At least 43% of institutions responded ▪ At least 45% of school-based ▪ At least 43% of stand-alone ▪ At least 50% of ASPPH members ▪ At least 34% of non-ASPPH - All 10 HRSA regions represented (mean 49% response rate, median 40%) • 49% of responses come from small MPH programs; 14% from large • Respondent program age is 1-104 yrs, with 21 yrs the mean, and 16 yrs the median • Summary: - Good representation. ASPPH members may be slightly over-represented. - ASPPH associated with SPH, older, larger programs	• 8 MPH programs (12 people) • Diversity of demographics - 50% from stand-alone (vs. 70% ntl) - 75% from ASPPH (vs. 59% national) - 70% of HRSA regions represented - 65% from small programs (vs. 49% in survey), and 12% from large (vs. 14%) - 25% from young (vs. 26% in survey), and 37% from historic (vs. 36%) - 50% public institutions; 50% private not-for-profit - 75% Research Doctorial (R1/R2); 25% Post-baccalaureate - 25% Academic health department - 50% Campus Compact • Diversity of experiences (survey responses) - 38% many changes vs. 38% few changes - 50% note resources facilitated change; 38% said lack of resources limited - 25% note university initiatives facilitated change; 38% note limited • Summary: - Sample includes similarity and difference, as measured by many criteria, to allow for representation and comparison.
Phase 3 – Data Integration	
• More than 115 MPH program representatives are a part of this study, with 115 individuals representing MPH program via survey, and 12 via eight in-depth interviews. • Responses represent at least 43% of the 215 CEPH-accredited/applicant MPH programs in the U.S., including 45% in SPH, 43% of stand-alone, and 50% ASPPH affiliates. Program demographics suggest that small and large programs, new and old programs, and national geographic regions are represented. • In addition, characteristics of MPH programs that participated in in-depth interviews suggests that there is also diversity in other demographics, such a type of institution (public/private), research focus of institution, engagement focus of institution, and experiences described in the Phase 1 survey (numbers and types of changes made, influencing or limiting factors). • ASPPH members be over-represented (associated with older and larger programs, and those within SPH), though interviews over-sampled for smaller programs.	

B. Question 1: What is the focus of MPH programs in the U.S.?

To understand the current state of MPH programs in the U.S., and the direction they are aiming for, this first research question set out to describe what MPH programs see as the focus of their education program. MPH programs have been evolving and developing in the U.S. for over 100 years, possibly resulting in various foci or perceived purposes. The literature reviewed in Chapter 2 suggests that MPH programs may focus on learning, such as the acquisition of knowledge and skills (informative learning), the development of professionalism and values (formative learning), and/or the development of strategic leaders (transformative learning).[5] MPH programs may also focus on specifically developing professionals who are ready to enter the public health workforce, noting competence development in areas highlighted by workforce needs assessments and the labor market.[2,8,14,15,17,59] One additional focus MPH program might have is to explicitly help replenish the public health workforce,[61] meaning, graduate employment or involvement in further education.[4]

To describe what MPH programs in the U.S. see as the focus and purpose, specific questions were asked of respondents in both Phase 1 and Phase 2 of this study. The questions were framed in two ways: thinking about MPH education programs in general, and thinking about the MPH program they represent.

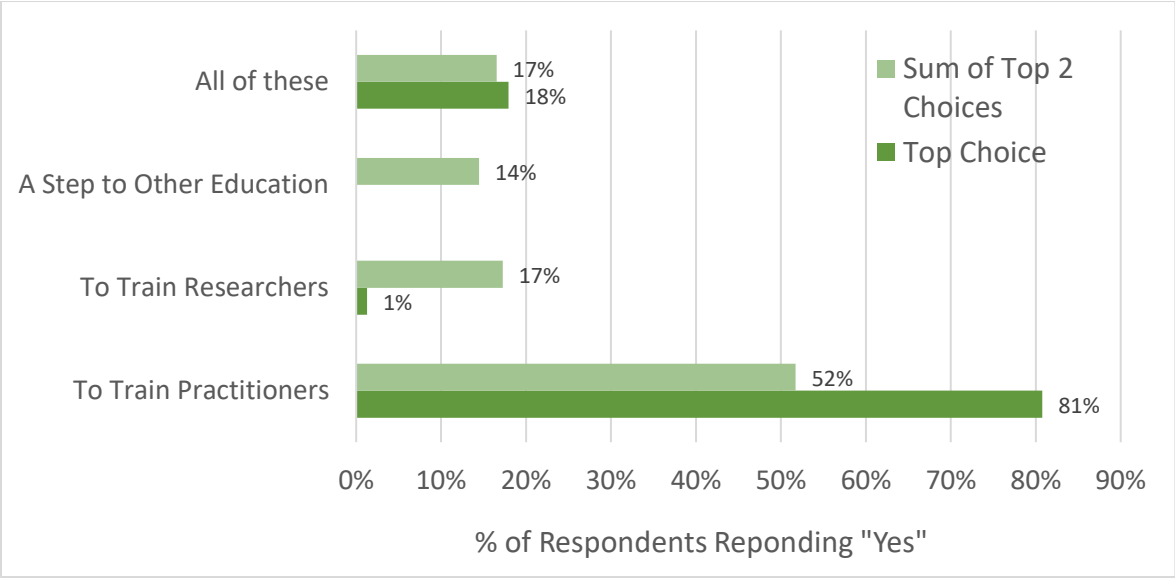
1. Phase 1 – Findings

To describe what MPH program representatives see as the purpose and focus of MPH training in the U.S., in general, two questions were presented in the survey related to current and potential focus.

a) Ideal Focus of MPH Training

Survey respondents were asked to rank what they believe the primary focus of an MPH program **should be**, considering the public health needs and opportunities they see in the U.S. and globally. Response options included: to train practitioners/leaders; to serve as a stepping stone to other education; to develop researchers; all of these; or other. A majority of respondents (81%) noted 'training practitioners/leaders' as the primary focus, with 18% responding 'all of the above', and 1% noting 'to train researchers.' When respondent's first and second choices were summed, 'training practitioners' was still the strongest focus (52% of respondents), while 'training researchers' and 'a step to other education' were also noted by 17% and 14% of respondents, respectively (Figure 11). Responses were homogeneous (not significantly different) when compared across program characteristic (MPH program type, size, age, or affiliation with ASPPH) (Appendix J – Cross-tabulations).

Figure 11 - Suggested Primary Focus of MPH Education in the U.S. (N=108)

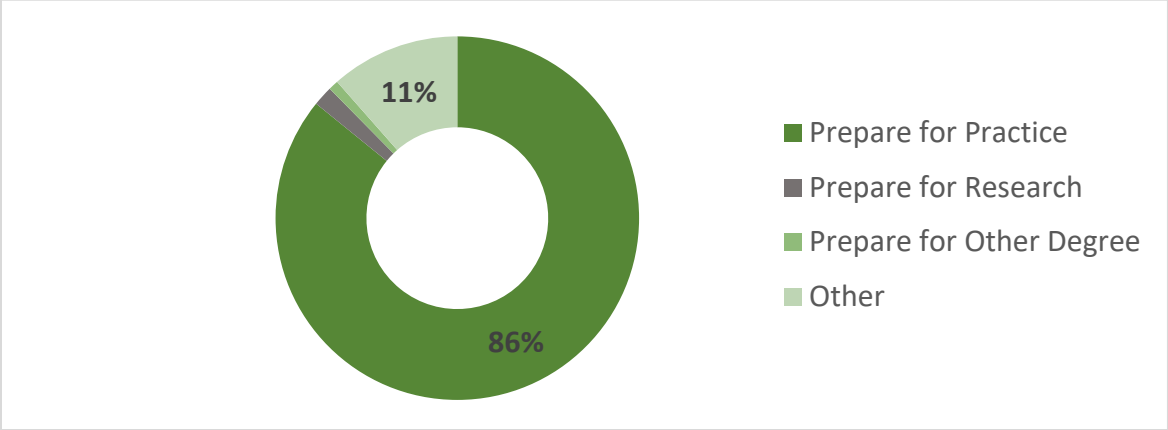


Some respondents who noted "something else" and were invited to leave comments related to what the primary foci of MPH programs should be. Responses included: training professionals that can work with others; training students to implement/advocate for evidence-based policy and practice that impact health and social outcomes; focusing on training for program management and evaluation; and enhancing training in other disciplines by combining with other professional degrees and/or complement/integrate into other training/expertise.

b) <u>Actual Focus of MPH Training</u>

These perceptions are consistent with what respondent MPH programs say they are actually primarily focusing on (Figure 12). Respondents were asked to complete the following sentence: *The primary focus of our MPH program is to prepare MPH graduates…"*. A full 86% of respondents (n=97) stated that the primary focus of their MPH program is to prepare MPH graduates for public health practice (eg., preparation for immediate employment linked to public health), while just 2% (n=3) said that the primary focus is to prepare MPH graduates for public health research (eg., preparation for a PhD program or a research fellowship). Just one respondent (0.9%) noted the focus as integrating public health with another professional degree (eg.,MD, DVM, MBA, JD, etc.). 13 respondents (12%) noted other primary foci of their program, including: both research and practice (n=3); both practice and integration with other degrees (n=1); research, practice, and integration with other degrees (n=5); developing professionals (n=1), and developing leaders to help "tackle the world's most pressing public health issues" (n=1). Responses were homogeneous (not significantly different) when compared across strata: MPH program type, size, age, or affiliation with ASPPH (Appendix J – Cross-tabulations).

Figure 12 - Current Primary Focus of Own MPH Program (N=113)



c) ***Summary of Phase 1 Findings***

The vast majority of respondent MPH program leaders believe that the focus of an MPH program in the U.S. should be to train practitioners of public health, and this is, in fact, the primary focus of the vast majority of respondent MPH programs. Besides practice, the next most important focus areas are training researchers, and being able to integrate MPH education with other education/degrees. Responses were not found to be significantly different when compared by MPH program characteristics, including MPH program type, size, age, or affiliation with ASPPH.

2. Phase 2 - Findings

Building on what was reported in the survey with regards to the focus of MPH programs in the U.S., interviews with sampled Phase 2 respondents provided greater nuance to the survey responses, and helped describe in more detail what the focus and purpose of MPH education is, and what 'preparation for public health practice' means. The *a priori* codes of learning, workforce readiness, competence development, and graduate employment were used to code the data; themes are summarized here, and supported by sample quotes (*in italics*). Note: some quotes have been edited for length, clarity, and/or protection of respondent and institution privacy.

a) ***Ensuring Learning***

MPH program focus on learning was strongly voiced by all respondents. Types of learning were coded within the three *a priori* defined learning categories: informative learning, formative learning, and transformative learning, although it is important to note that these were not terms used by any respondent; respondents talked about students learning knowledge, skills, and abilities.

i. Informative Learning

Informative learning, teaching to increase knowledge and skills, is a focus that was noted in all eight interviews, showing a clear priority to help build MPH student knowledge and skills so that they can succeed in the workforce, in their careers, and in improving public health. Responses suggest that in order to succeed as a public health practitioner, students need to have a broad education (vs. depth in an MS or PhD) and to learn basic knowledge and foundational skills related to the general tenets of public health (leadership, community health, policy, outreach, social determinants), and the structure and function of governmental public health.

> *"I describe the MPH as getting breadth in education. If someone wants to get research skills, as they want to get a PhD or [do] randomized control trials at a hospital or academic medical center, they should probably get an MS." (MPH 2)*

> *"The purpose [of MPH education] hasn't matched the needed outcome, and that's been a thing. That's what CEPH has wonderfully addressed. We tend to forget that the MPH is the practice degree. I used to see a lot of students come out of programs not getting content related to governmental public health or the foundations. I was one of the architects of the [PHAB] core competencies for public health. The thinking behind the public health core competencies was, these are the skills that people need [in the workforce] and they weren't getting those foundational skills. There seemed to be a push to get people through to PhD programs rather than focusing on making sure that students got the practical skills to flourish in the workforce. But the purpose should be to turn out practice based professionals." (MPH 7)*

It was further suggested that MPH programs should invest in helping students develop a set of practical and marketable skills that they can apply immediately and across industries (e.g., nonprofit, non-governmental, local/state/federal government, research, academic medical centers, for-profit, start-ups, social entrepreneurship). Specific skills listed by interviewees include: finding and using data, writing (e.g., basic skills, and applied writing for briefs, policy papers, memos, reports), communication (e.g., how to listen, how to become engaged, how to engage others), surveillance, and leadership (systems thinking, rich picture, situational analysis, cultural competence). Respondents suggested that this skills-building is important, even for more experienced students (e.g., those with work experience), and that these skills really help students succeed and move ahead in the work force.

> *"I think that we're orienting students towards skills-based education." (MPH 5)*

> *"[Our focus is] making sure the students are getting critical skills that they can apply immediately… We teach a lot of [tools and skills] so that when they're in that situation, they will have those tools in their back pocket.… You know, somebody needs to know how to find data or write a brief or write a policy paper or apply leadership skills. I stress that leadership is not a position. It's a state of mind, a process. Having these skills will really help you move ahead. Certain skills, like surveillance skills and cultural competency skills and tools, and the community skills are so critical. And communication skills: how to listen to people, how to engage and how to get others engaged. (MPH 7)*

ii. <u>Formative Learning</u>

A focus on formative learning, teaching to develop professional values and professionalism, was also noted in all interviews. From a public health perspective, values focus on being able to support social justice, equity, prevention, collaborative practice. In the interviews, respondents specifically noted the importance of helping students learn the values of public health, or what drives public health work, such that

they can see gaps and be inspired to act. This includes being aware of the social determinants of health, health equity, social justice, prevention, upstream approaches, and population health improvement, and being able to use that to motivate action. A series of practices related to professionalism that students must be able to apply were also highlighted: the importance of students learning: flexibility, innovation, partnership, humility, listening, confidence to ask others for input and assistance, collaboration, strategic engagement, inclusiveness, community engagement, and inter-professionalism.

> *"[A focus is on] preparing students for community health activities and helping them learn what community health is, how we can address community health, and then also how to lead. We can help the community become healthier. We need to be sure that students fully understand what public health is and they understand how policy as well as outreach efforts are a major part of public health. And the social determinants of health are not just things that we're talking about in court cases. There are a whole gamut of activities that come to create the social determinants of health." (MPH 6)*

> *"With the newer generation of younger people who, at least as far as I can tell, more naturally have a focus on equity. In some ways they won't stand for anything less. So in some ways our training is really just trying to catch up with cultural shifts and norms that I think are happening in our country and in this time." (MPH 8)*

> *A goal, in a sense, is the idea of infiltrating public health into other professions. [With our] allied health programs… we need to offer that education to them. They have to learn about upstream thinking, why it's important, what they can do in their own professions to think beyond just treatment. This is kind of a step to Public Health 3.0…. Up until now, public health workforce development has always focused on governmental public health. That was the focus of 2.0. But 3.0 is focused more on collaboration with the community, which has always been critical. I mean, anyone who works in public health knows that those partnerships and things are critical. It's not like they have to tell us. (MPH 7)*

iii. Transformative Learning

Transformative learning, learning that supports the development of leadership practices and change-makers, was also an educational focus that was noted by all interviewees. Interviewees spoke of the importance of developing leaders via investment in leadership skills and professionalism, as noted above, as well supporting the actual practice of leadership, helping students learn how to effect change via collaboration, innovation, and application of new perspectives. It was suggested numerous times that the current length of MPH programs (1-2 years, 42+ credits) is not long enough to teach all content that students may need to be able to prevent, detect, respond to public health needs, and that MPH programs should thus focus on assuring that students have the skills to learn, adapt, facilitate, innovate, collaborate, and lead as emergent needs present, helping to improve and assure community health.

> *"I talk to my students about collaboration because public health cannot do much if we stay in silos. We need to innovate. Thirty years ago there were five different areas of public health and now there is like a million and every time we turn around there is something else. So we need to be prepared to react to new challenges. We need to teach flexibility, innovation. It's like partnerships, the humility to share and to talk to other people and to lean on other experts. We cannot possibly cover all [topic areas] in an MPH program, but we need to be ready for it… That's what we need to prepare students for." (MPH 3)*

> *"It's also recognizing that whatever area you are in in public health that you still can have an impact on these issues related to the social determinants. You've got to understand that you're not gonna solve these issues unless you understand all that goes into health. And that it's not a medical model. You're not approaching it that way no matter where you are, whether you're in a hospital setting or an a public health agency, nonprofit organization, you still have to have that understanding and background to be effective in your ability to influence." (MPH 1)*

b) *Ensuring Workforce Readiness*

MPH program focus on ensuring workforce readiness of graduates was a theme evident across all interviews. Three *a priori* codes related to workforce readiness were used to help with data coding, including a focus on competence development, the development of researchers, and the development of practitioners.

i. Competence Development

Competence is the successful integration and application of knowledge, skills, and values to achieve an outcome. Using that definition, competence development was a resounding theme noted in all interviews. Respondents noted that competence, or the application of the set of skills that are needed by the workforce, is important for professional success, and that a focus of their MPH programs are to help develop transferrable skills and abilities that can be applied across professional positions.

> *"I was one of the architects of the [PHAB] core competencies for public health… The thinking behind the public health core competencies was, these are the skills that people need [in the workforce]." (MPH 7)*

> *"I always felt that the public workforce doesn't receive enough training, that we are thrown into the job and then it's like good luck to you. So when I look at the [PHAB] core competencies for public health professionals, I'm like, this is exactly where we need to be" (MPH 3)*

The focus on competence and applied ability was also described explicitly linked to two major national initiatives, including the CEPH-defined competencies that were released as a part of the 2016 accreditation standards (what students are expected to be able to do as they graduate from an MPH program), and the public health workforce competencies defined as a part of Council on Linkages initiative (what students are expected to be able to do as they enter the workforce).

"[We work] to prepare public health professionals for what may typically be considered managerial level positions in public health practice. One framework I think is useful when we talk about MPH education and public health workforce is the [PHAB]/council on linkages competency framework. Whether you agree that those are the right set of skills or not, it just provides a framework for what an MPH level grad should be able to do out there in the workplace in those eight domains. I think that competency set is a really useful frame of reference when we have these kinds of discussions." (MPH 8)

"We want our students to come out of school and be able to work [and] find jobs. I've been at this so long that it's hard to say five years in the future that things will change. But the fact that they are changing in terms of what CEPH is requiring, I think what we'll see is things getting more practice based in the future." (MPH 7)

ii. Development of Practitioners

Development of practitioners, skilled people who are able to do public health in the field, was an educational focus noted by all interviewees. This included developing professionals for managerial level positions in public health practice, including nonprofit, non-governmental, local/state/federal government, academic medical centers, for-profit, start-ups, etc. Across interviews, there was a noted focus on the need to develop professionals motivated to fill current and future public health roles in both government public health and other related public and private sector jobs, and respondents noted that the MPH degree is clearly a professional degree aiming to do this. A number of respondents also highlighted the importance and strategic value of integrating public health education into other professional fields (via dual degrees) so as to augment the public health workforce via infusion and integration of public health into a broad range of practical, clinical, or research-focused work.

"I see the degree as the entree or the professional entree. It is a professional degree. There's all kinds of positions that affect public health. So, from all those different areas, public health graduates must be trained sufficiently in all these areas to interact with others from various disciplines. And then land in a particular area that fits them." (MPH 1)

"The MPH is a professional degree. You should look to come out of the degree with a set of marketable skills that you can use across a whole range of industries. If you want to go into nonprofit or non-governmental work, if you want to go into government work, whether that be at the local, state or federal level. If you want to continue on in the research trajectory and work at academic health medical centers or increasingly, working in for-profit industry that there are increasing number of MPH positions there." (MPH 4)

iii. Development of Researchers

Development of researchers, meaning seeing MPH programs as a pathway to PhD programs, was not explicitly noted in any interview, and it was suggested that students interested in bench-type research would better benefit from an MS program as a feeder. However, as noted above, respondents noted the value of public health education being integrated into various fields via dual degrees (including potentially PhD programs), and that MPH program graduates should be able to apply their skills across many industries, including research, and academic medical centers. While not directly linked to development of researchers, one theme that emerged in subsequent sections (reported below) was the possible dilution of MPH concentration areas in biostatistics and epidemiology, because of the need to focus more credits and course hours on general public health themes and competence development. This was brought up as a concern that this trend may reduce the competitiveness and success of MPH graduates in these fields. In response, as noted below, some programs are developing advanced classes and certificates to build more in-depth quantitative ability among some students.

c) *Ensuring Graduate Employment*

MPH graduate employment considered as an *a priori* code as it is metric of success for both CEPH accreditation and ASPPH annual reporting. Via the interviews, MPH program focus on ensuring graduate employment or employment rates was not explicitly noted. However, as stated above, all respondents described the importance of preparing graduates for success in the workforce, and many spoke about building competence to support the success of graduates when in the workforce, and setting them up to be successful in the workforce, and able to facilitate public health improvement.

d) *Developing Adaptive, Strategic Leaders*

An emergent theme across the interviews, linked to what was noted and quoted above related to transformative learning, centered around developing graduates who are invested in the health of their communities, developing graduates who can facilitate change, and the value of integrating public health into other professions to facilitate that. Braiding together input from the eight respondent MPH programs—informed by Phase 1 data review, and literature such as Public Health 3.0[11]—suggest that they are looking to develop strategic thinkers who are invested in the health of their community, and adaptive leaders who are able to anticipate, prepare for, and respond to issues that come up. To do this, they hope their graduates can look through different lenses, and have priorities around inclusiveness, collaborative leadership, and innovation.

> *"I am looking [to develop] people who can look through different lenses, and have priorities around inclusiveness, collaborative leadership, because in order to address the issues that need to be really addressed, we can't keep doing the same things that you've been doing. So I want to see that in the leadership. I'd like to see that more leaders are trained in being able to manage, to facilitate those kinds of conversations." (MPH 1)*

> *"Thirty years ago there were five different areas of public health and now there is like a million and every time we turn around there is something else. So we need to be prepared to react to new challenges. You know, when I started, I never heard about Ebola and we didn't have SARS and I didn't know about Zika and we didn't have emergency preparedness and we didn't have climate change. And now all of these things are like daily in our world and we are not going to be able to teach all of those topics. It's impossible. We need to teach flexibility, innovation. It's like partnerships, the humility to share and to talk to other people and to lean on other experts. And informatics and health care and how to partner with clinicians, all of the health care world. We cannot possibly cover all of that in any program, but we need to be ready for it… That's what we need to prepare students for." (MPH 3)*

To support this, MPH program leaders spoke about the 'strategic skills'[8] needed by MPH graduates, also the value of integration of MPH abilities in areas beyond traditional government public health, helping re-double a focus on prevention, equity, really making a difference in moving the needle on population health.

> *"What keeps me committed to doing this work? Training future public health practitioners. The opportunity to train folks who will get out there and work in public health and ultimately make a difference and move the needle on population health… We need talented, skilled people in governmental public health. And we know that there are real deficits that are growing…We want and need our grads to be in those traditional settings. But, I also get very excited about our grad to end up in nontraditional settings. Those who end up in the for profit world who ended up in startups who end up doing social entrepreneurship. They're thinking about public health differently." (MPH 8)*

> *"[Our goal is to develop graduates that] will be being prepared for anything and everything that comes up in public health. And at this point, I cannot even imagine what the next challenge would be. The challenges are huge and we have to collaborate. It's almost like there has to be an MPH in every organization to really help others understand the value of recycling, healthy eating, exercising, allowing moms to have a breastfeeding room. Wouldn't that be nice to have all of these principles just happening everywhere because there is an expert there who can advise about it?" (MPH 3)*

e) Summary of Phase 2 Findings

Consistent with what was suggested in the literature, MPH programs express having a focus on ensuring student learning (n=44), competence development and workforce readiness (n=16), and graduate employment (n=9), although no explicit focus on graduate employment rates. MPH programs are investing heavily in knowledge, skill, and leadership development, and ensuring understanding of the core tenets of public health, so that graduates are able to engage with communities, understand needs, and apply their knowledge and skills to improve public health. MPH programs want graduates to be competent—meaning equipped with transferrable skills and abilities—and able to enter the workforce and work across multiple fields. A focus is squarely on developing practitioners and strategic leaders (N=31) who can fill current and future public health roles, and who will be able to anticipate and respond to the many emergent public health needs that will present. MPH programs are focusing on developing leaders who can lead change to make a difference and move the needle, addressing root causes and the social determinants of health to support health equity and social justice.

3. Phase 3 – Summary

Table VII, below, presents a summary of the data from Phase 1 and Phase 2 of the study, and overarching themes emerging as the data were integrated.

Table X - Section B Integration of Phase 1 and Phase 2 Data

Focus of MPH Programs in the U.S.	
Phase 1 - Survey Data	**Phase 2 - Interview Data**
• 81% of MPH program respondents believe that the focus of MPH education is to train practitioners - 18% note training for combination of practice, research, other ed. - Open ended: professionals, collaboration, advocacy, address social outcomes, w/other ed. • 86% of MPH program respondents state current focus of their MPH program is to prepare grads for practice - 2% said to prepare for research - 12% other: integration of practice w/research, and w/other ed. - Open ended: professionals, leaders • Summary: - Majority of MPH program leaders believe that MPH programs should train practitioners; majority are. - Besides practice, important focus areas are training researchers, and being able to integrate MPH education w/other ed. - Responses not sig. different by program characteristics.	• Focus on learning to build competence - Informative learning (knowledge + skills) was noted by all, as an imperative to becoming a successful practitioner. ▪ Tenets of public health ▪ Marketable skills (many!) - Formative learning (values + professionalism) was noted by all, meaning helping students be aware of, and moved by, the core values of public health ▪ Social determinants, equity - Transformative learning (leadership) was noted by all, meaning helping students be able to act and lead change ▪ Collaboration, innovation, new perspectives, lifelong learners • Focus on workforce readiness + success - Competence development – the abilities that students need when they graduate; the abilities that graduates need in the workforce - Skilled practitioners who can fill many different roles - Integration with other/into other degrees - More focus on soft skills, less on data/research • Focus on developing leaders - Help students be able to engage, and lead change.
Phase 3 – Data Integration	
• Vast majority of MPH program leaders believe that MPH programs should train practitioners, and the vast majority are. Besides practice, the next most important focus areas are training researchers, and being able to integrate MPH education with other education/degrees. • To do this, MPH programs are focused on building knowledge, skills, and abilities, including an understanding of the core values of public health, and helping students learn how to be professionals, and leaders of change. • MPH programs are committed to this as they want students and graduates to be successful when they enter the workforce, and want them to be able to fill multiple types of roles in government, public, and private sectors; this includes pursuing additional education and/or integration of MPH education with other degrees. Assuring graduate employment rates was not a noted theme. • An emergent theme was the focus on developing professionals (formative learning) and leaders (transformative learning) who can effect change in their communities, and do public health in a new way. So, while these weren't named themes, MPH programs are investing in informative learning (knowledge and skills) and formative learning (values and professionalism) to allow for transformative learning (leadership development) to happen.	

MPH program leaders strongly believe the primary focus of an MPH program should be to train public health professionals and leaders; this is also the current focus of existing MPH programs that responded. MPH programs describe a focus on developing professionals (formative learning) and leaders (transformative learning) who will be ready and able to work in emergent areas of need, help "tackle the world's most pressing public health issues by doing public health in a new way. MPH programs suggest these leaders should have the ability to anticipate needs and trend, unite stakeholders for collaborative approaches, and be able to consider various perspectives to investigate and understand scenarios and needs. They should further be able to apply innovative solutions to "move upstream" to prevent or reduce ill-health, and improve wellness, by considering social determinants of health, health equity, social justice. A series of abilities related to professionalism and workplace success were highlighted as important for students to learn: flexibility, innovation, partnership, humility, listening, confidence to ask others for input and assistance, collaboration, strategic engagement, inclusiveness, community engagement, and inter-professionalism.

To support development of these professionals, MPH programs are investing in the full learning spectrum (informative→ formative→ transformative learning) to assure a broad foundational knowledge and skill base that can be adapted to various contexts, grounding in core professional values, and mentoring in the application of these to advance public health. Respondents connect this focus on knowledge and skill development to public health competence: the ability to draw on and apply the knowledge, skills, and values that are needed by the workforce to support professional success.

MPH programs are invested in skills building and competence development as they believe this will help graduates succeed and excel in the workforce, and equip them to contribute to community health improvement. Respondents suggest that this current focus of MPH education will help develop professionals to fill current and future public health roles, and prepare graduates for managerial level positions in public health practice across multiple sectors including nonprofit, non-governmental, local/state/federal government, academic medical centers, for-profit, start-ups. MPH program leaders also noted that they are invested in students succeeding in further education, and in research-oriented roles. Some MPH programs are supporting this via integrating public health education into other professional fields so as to augment the public health workforce via infusion and integration of public health into a broad range of practical, clinical, or research-focused work.

C. Question 2 - Are MPH programs shifting their instructional design to better meet their defined focus?

MPH program leaders believe the primary focus of an MPH program should be to train public health professionals and leaders. Given the rich history and growth of MPH education programs in the U.S., adaptation in instructional methods and approaches could be expected, both in response to external influences, and to support improvement of outcomes and alignment with the educational focus.[2,4,5,12,14]

Instructional design comprises: how MPH programs are designed, how the educational process is designed (curriculum and courses), and how learning is supported (teaching methods, assessment methods, engagement, and co-curricular activities).[5,16,19] To develop a collective understanding of whether shifts are being made to help MPH programs better meet their program foci, specific questions were asked of respondents in both Phase 1 and Phase 2.

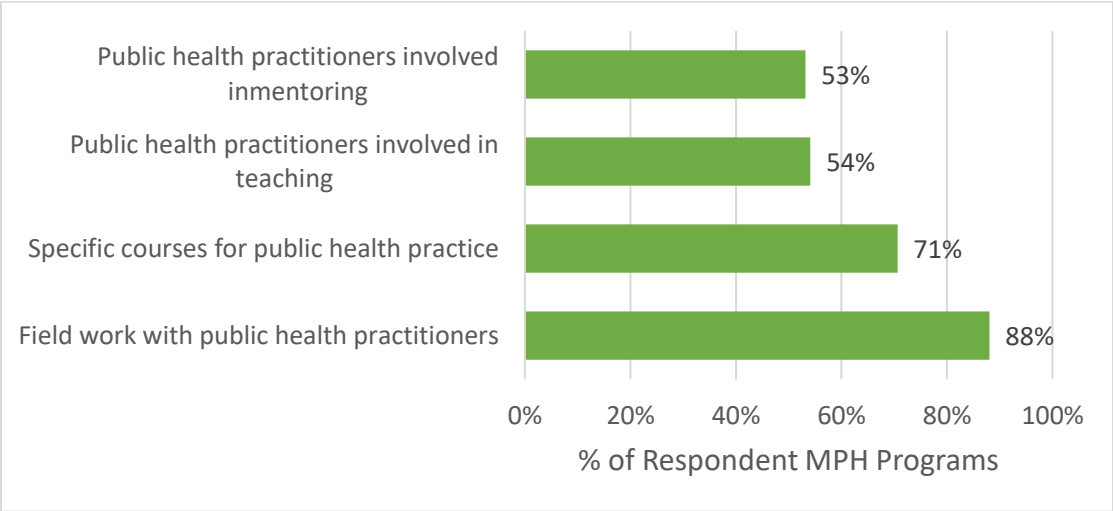
1. Phase 1 - Findings

To assess whether MPH programs are shifting their instructional design to better meet their defined focus, six questions were asked in the survey.

a) Focus on Public Health Practice

As noted above, at the time of the survey (late 2019), a majority of respondents noted that their MPH program emphasizes training students for public health practice. When asked how (multiple responses permitted), 88% (n=96) of respondent MPH programs said that they expect students to do substantial work in the field with public health practitioners; and a majority report having many public health practitioners involved in teaching (54%) and in student mentoring (53%). As shown in Figure 13, a further 71% of respondent programs (n=77) report offering specific courses for public health practice. Responses were not found to be significantly different when compared by MPH program location, type, age, or affiliation with ASPPH.

Figure 13 - Ways MPH Programs Are Emphasizing Training for Public Health Practice (N=109)

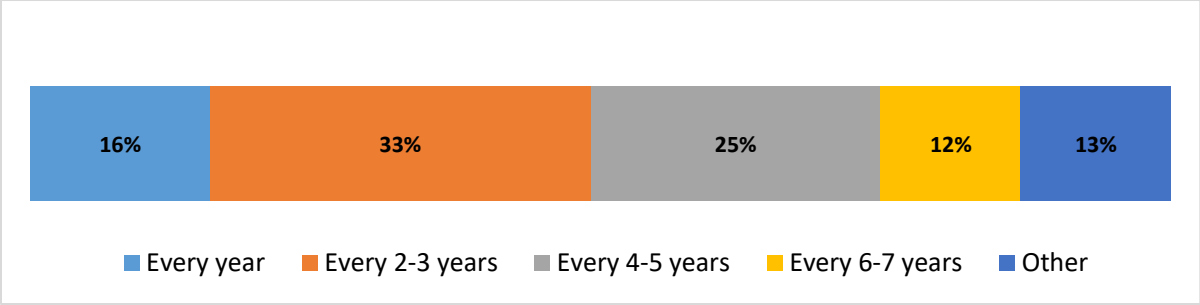


Based on open-ended responses, MPH programs incorporate service based or applied learning in courses across the curriculum; develop specific assignments to mimic public health practice; and work with health departments/local NGOs to integrate their public health needs and data into courses so that classes use/apply real time data and learning directly to the community. To understand if this focus was just the norm or the status quo, or if shifts have been made, five follow-on questions were asked.

b) <u>Frequency of Shifts</u>

First, respondents were asked how often they make changes to their MPH program design. Change appears to be common among responding MPH programs, with 16% (n=18) reporting making changes annually, 33% making changes every 2-3 years, 25% making changes every 4-5 years, and 12% making changes every 6-7 years (Figure 14). Some 13% of the responding programs selected "other" and shared open-ended responses noting that changes are made to their MPH program as needed, consistent with continuous quality improvement, but on a non-temporal basis. Examining frequency of change via program characteristic (excluding those who reported 'other'), the only factors that may indicate more frequent change is MPH program type (stand-alone MPH programs: (X^2_1 = 7.74, P = .005); no significant differences were noted by program age, size, or ASPPH affiliation (Appendix J – Cross-tabulations).

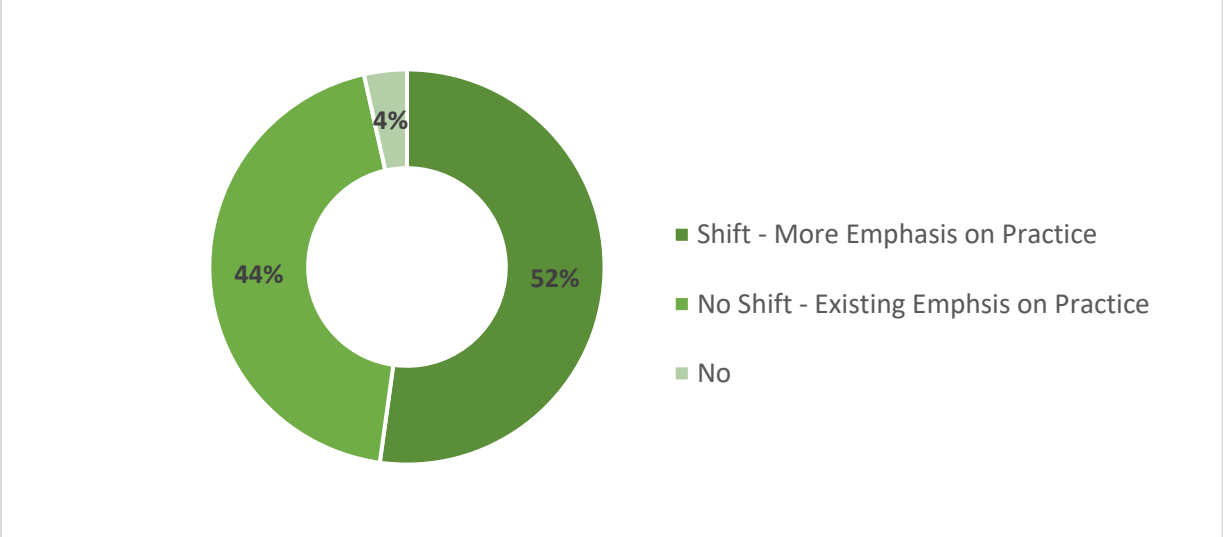
Figure 14 - Frequency of Changes to MPH Program Design



c) ***Shifts Towards Practice***

As it relates to their predominant focus of MPH education (previous section), MPH programs were asked if, other the last four years, since Fall 2015, their program has worked to put more emphasis on training students for public health practice (meaning, applied work at the community, county, state, local, or international level, in governmental or non-governmental sectors). A majority of respondents (52%) noted that they have shifted in this way, while 44% (n=50) noted that they have not put more focus in this area, as training students for public health practice was already a primary focus of their program (Figure 15). Only four programs (4%) said that no changes have been made. Responses were homogeneous (not significantly different) when compared across strata: MPH program type, size, age, or affiliation with ASPPH.

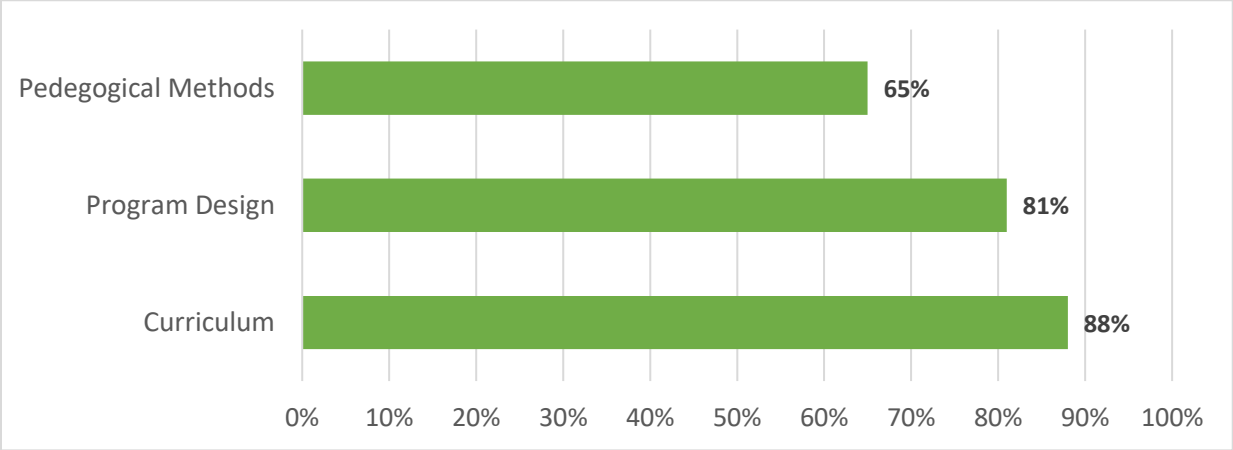
Figure 15 - Changes in MPH Program Focus on Practice - Since Fall 2015 (N=108)



To elucidate where, specifically, these changes are being made, survey respondents were invited to report on 26 areas of change linked to instructional design. As shown in Figure 16, when considering their MPH program over the last four years, 81% of respondents

(n=91) reported making changes related to at least one area of their program design; 88% (n=98) to at least one area of their curriculum; and 65% (n=69) to at least one area of their instructional methods and/or learning context.

Figure 16 - Proportion of MPH Programs Making Changes in Areas of Instructional Design - Since Fall 2015 (N=115)



d) ***Summary of Phase 1 Findings***

Over the last four academic years, more than 50% of responding MPH programs shifted their MPH program to focus more on practice; most of the others already were. The greatest number of programs report making shifts to their curriculum, followed by program design, and then teaching methods. In general, MPH programs make changes to their design every few years, with at least 49% making changes every 1-3 years. Of note, CEPH accreditation requires annual progress reports, and re-submission of accreditation self-studies every 5-7 years. This frequency of change suggests a focus on continuous quality improvement and iterative change, not just CEPH-driven change. Stand-alone MPH programs are associated with more frequent change, as compared to school-based programs.

2. Phase 2 - Findings

Consistent with all of the survey responses, all of the MPH programs interviewed described changes made to their MPH program over the last four years, even though four of the programs were sampled for having reported making fewer changes than other MPH programs, in the survey. Some programs also described changes that were made in the preceding years leading up to 2015, as they started to get a glimpse at what the 2016 CEPH criteria would ask for, and as they were a part of the PHAB/COL and CEPH development process. As the interviews focused more on the types of changes made, and the reasoning behind that, details are listed in the subsequent sections.

3. Phase 3 - Summary

Table VIII, below, presents a summary of the data from Phase 1 and Phase 2 of the study, and overarching themes emerging as the data were integrated.

MPH programs report focusing on public health practice in in many ways. Over the last four academic years, over half of the MPH programs surveyed reported shifting their MPH program to focus more on practice; most of the other who didn't report making shifts already had practice as a focus. That being said, most MPH program respondents note making changes to their curriculum and program design over the last four years to focus more on practice, and two-thirds to their teaching methods. The change process may have started before the new CEPH criteria were released, as some MPH program leaders report being part of the CEPH and/or PHAB/CoL competency definition and criteria development process.

Table XI - Section C Integration of Phase 1 and Phase 2 Data

Are MPH Programs Shifting to Have More Practice Focus	
Phase 1 - Survey Data	**Phase 2 - Interview Data**
• How focus is on practice: - 88% require substantial field work - 71% have course for practice - 54% have practitioners teach - 53% have practitioners mentor - Assignments to mimic practice, work with DoH/community • Frequency of shifts, in general - ~60% of MPH programs make changes to program as needed, or every 1-3 years - Frequency of shifts (more) is associated with w/ stand-alone programs. • Shifts to practice since Fall 2015 - 52% have shifted to more practice; 44% did not, as that was focus (not associated with any program characteristics). However, ▪ 88% of MPH programs report making changes to curriculum since 2015 ▪ 81% to program design ▪ 65% to teaching methods	• Shifts to practice since Fall 2015 - All MPH programs interviewed described changes made to their MPH program over the last four years, even though four of the programs were sampled for having reported making fewer changes than other MPH programs. - Some programs also described changes that were made in the preceding years leading up to 2015, as they started to get a glimpse at what the 2016 CEPH criteria would ask for, and as they were a part of the PHAB/COL process. - As interviews focused on the types of changes made, and the reasoning behind that, details are listed in the subsequent sections.
Phase 3 – Data Integration	
• MPH programs have many ways they focus on practice. • About half have shifted more in this direction since Fall 2015; most others were already focused there. However, most note making changes to their curriculum and program design in that time, and two-thirds to their teaching methods. • Some changes may have started before the new CEPH criteria were released, as MPH program leaders were a part of the competency definition and criteria development process.	

D. Question 2.a. – What, specifically, are MPH programs shifting to better meet their defined focus?

Data from Question 2, above, suggest that MPH programs are making shifts to their instructional design. Based on the aforementioned Frenk and Iedema frameworks, shifts in MPH program instructional design were considered and grouped in three *a priori* domains: program design; curriculum and course content; and pedagogy including the context for learning.

1. Program Design

Program design relates to how MPH programs are designed to support institutional, and/or educational goals and outcomes. Shifts in program and instructional design can include changes to have a greater focus on workforce-informed competence development; shifting criteria for admissions to alter the student body; and/or adapting graduation criteria. These *a priori* codes were used to support data collection and analysis.

a) Phase 1 Findings

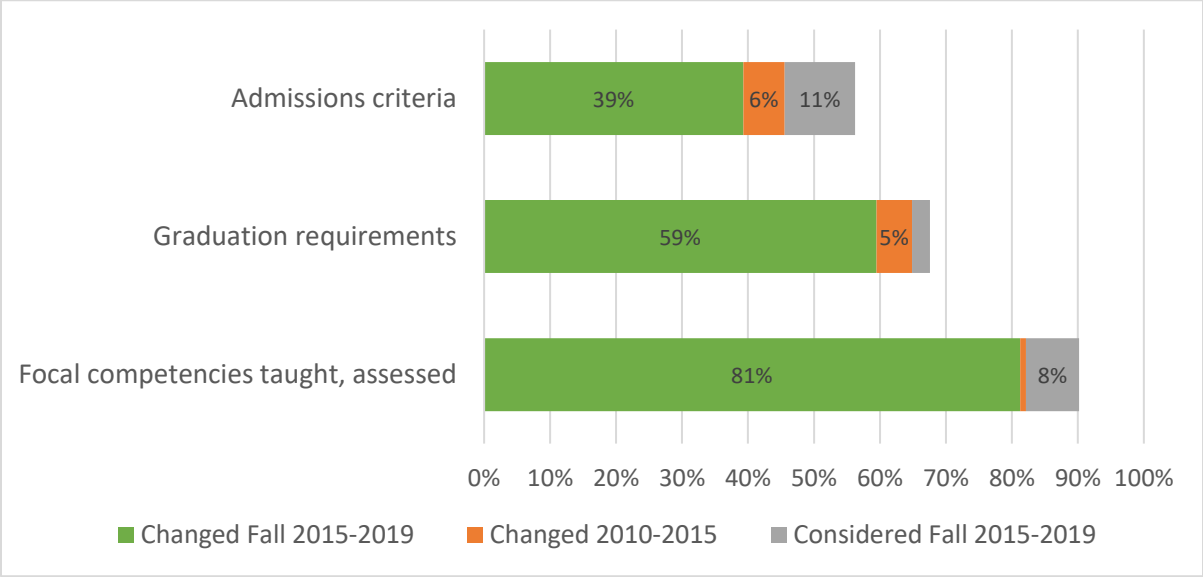
Anticipating that MPH programs may make changes to their program's design from time to time, three questions were used to elucidate input via the survey.

i. Areas of Change

Respondents were presented with three areas where change might be seen and were asked to note if they had: considered such a change in the last four years; implemented such a change in the last four years; implemented such a change in the preceding years; or if no change was needed. As shown in Figure 17, in the last four years (since the 2015-2016 academic year), 81% of responding MPH programs (n=91) implemented changes in focal competencies taught and assessed in the program; 59% (n=66) implemented changes in graduation requirements; and 39% (n=44) implemented changes in admission requirements. Some programs have considered changes in these areas but not made them, while a greater proportion (8%-43% of programs) made changes in these areas in the years before 2015. When considered by MPH program characteristic strata, changes to admission criteria in the last four years is associated with stand-alone MPH programs ($X^2_2 = 8.31$, $P = .02$); while change in graduation criteria is associated with MPH programs within schools of public health ($X^2_2 = 6.56$, $P = .04$) and having more students

(P = .03) (Appendix J – Cross-tabulations). Changes to the competencies taught were associated with larger MPH programs (P = .002) and those affiliated with ASPPH (P = 0.01).

Figure 17 - MPH Program Changes to Program and Instructional Design Considered or Implemented since 2010 (N=107)



Via open-ended survey questions, respondents noted specific program and instructional design changes that were planned but not yet implemented in areas related to <u>admissions criteria</u> (accepting students to matriculate in fall, spring, or summer semesters); <u>graduation requirements</u> (requiring portfolios of graduates; adapting and/or standardizing the ILE; adding a capstone symposia; requiring that students pass the CPH exam to graduate); and <u>program structure</u> (offering executive MPH programming, merging all public health-related programs on campus into one department, consolidating with other public health related programs such as health promotion and healthcare administration, adding new concentrations, and consolidating/reducing concentrations). Changes to focal competencies taught/assessed was not noted in these open-ended responses, presumably

because the vast majority of programs have shifted in this area in the last four years, in line with the new CEPH criteria, and in order to meet accreditation requirements. This is noted, below.

Via open-ended survey questions, respondents also noted shifts that they see peer MPH programs implementing. These include changes to: admissions criteria (improving access to the MPH degree by: making the degree more accessible to working adults, dropping the GRE requirement for admissions); program structure (shortening the program, lowering the costs, providing flexible course options, offering distance/online/part time programs, providing more focused training, specializing in what they do best, offering fewer 'traditional' concentration areas, offering more focused MPH concentrations in advanced applications (to complement BSPH programs), and providing more interdisciplinary training); and career pathways (being informed by the workforce, working with local and state-wide public health agencies to plans to meet needs, being aware of relevant and emerging trends in health, using approaches to provide students with relevant skills, and developing feeder programs that get students aligned with jobs before they graduate). Respondents also note the emergence of shorter programs with less variability due the accreditation requirements.

ii. Summary of Phase 1 Findings

MPH programs are making changes to their program and instructional design. The most frequent change has been to the focal competencies taught and assessed, followed by graduation requirements, and then admission criteria. Changes in admission criteria that respondents see or have considered focus on making the degree more accessible to prospective students (dropping GRE requirements, admitting each semester), while

changes in graduation requirements that respondents see or have considered center on expanded or re-enforced practice experiences. Related to workforce-informed competence development, respondents noted that they see peer institutions making changes that are informed by the workforce, and workforce needs, to help fill workforce gaps. Emergent themes were MPH program structure (adding or removing concentrations, changing delivery methods, shorting the program, reducing the cost), as well as institutional design, meaning merging or consolidating all public health-related programs.

b) Phase 2 Findings

Interviews with sampled Phase 2 MPH programs provided greater detail and nuance to the survey responses related to what shifts are being made to MPH program design to support a greater alignment with training for public health practice. Interview responses were analyzed by *a priori* themes: integrating workforce-informed competence development (shifts to emphasize workforce-derived competencies and workforce readiness), adapting admissions criteria and graduation criteria, as well as the Phase 1-informed themes of shifts in MPH program structure, and institutional design. Themes are summarized here, and supported by sample quotes; *quotes may be edited for clarity, brevity, and privacy*.

i. Workforce-informed Competence Development

As noted in Phase 1, more than 80% of MPH programs have made shifts in the program design to focus more on workforce-informed competence development. All eight MPH programs interviewed noted shifts in this area, specifically to align with the CEPH-defined MPH competencies released in 2016. However, all interviewees also talked about

making these shifts to better align with workforce needs that they know and see via personal experience and stakeholder input, and to meet the expectations of those mentoring students and hiring graduates. This included notation of specific skill and professionalism attributed needed in the workforce, as well as being driven by government public health worker accreditation criteria, as defined by PHAB.

> *"When the CEPH criteria were being revised, the core competence of public health were very much part of the discussion… It's been fantastic for public health practice and there's no question about it because, for one thing, there's always confusion about what people mean by practice… Too often practice simply means student practica, rather than specific skills relating to the workforce. So when the CEPH criteria came out, all of a sudden, all schools had to look at this issue, which is just so important. That was a big thing." (MPH 7)*

> *"Another example is writing. This was in that ASPPH report. I was flabbergasted about the gaps in writing. I write all the time. All I did in [my former] public health [role] was write, write. Memos, reports, proposals, justifications. I mean everything. You just sit down and write. When I started, Oh my God, I needed to do something about it." (MPH 3)*

> *"One of the first things that we learned from this advisory group is that the students who are coming out didn't have the professional skills that they thought should have. Not every student, but that was something they observed in some. A second thing was their ability to work with and in the community effectively could be improved. That was really important feedback as we want our students to be good in both of these areas. And so we thought, well, how can we better incorporate that in our curriculum?" (MPH 4)*

> *"[A focus is on] preparing students for community health activities and helping them learn what community health is, how we can address community health, and then also how to lead. We can help the community become healthier." (MPH 6)*

One respondent noted a deeper commitment to workforce development in that they explicitly recruit students who are currently working in jobs that link to public health, and whose impact could be deepened by further education and mentored application of learning.

> *We are getting excellent students but they are non-traditional public health students. We have members of the police force, people who are working in the justice department, people who are working with city or county health departments, people working with drug addiction centers….. This allows us to really think about the workforce. The emphasis is to really train people who will lead and can further contribute to their organization. So, we invest in this triad, this collaborative [between students, faculty, and their worksite] almost right from day one when they are starting their MPH. So they're already thinking about applying the curriculum that they're learning the skills, the materials to this project, and then they go and spend a full year or more working with this agency. (MPH 5)*

ii. Admissions Criteria

Admissions criteria influences who is a part of an MPH program, and shifts in these criteria can change the make-up of program cohorts and trained public health workers. As noted in Phase 1, just under 40% of responding MPH programs report making shifts in this area over the last four years, in part to make the degree more accessible. Five of the eight MPH program interviewed noted shifts that they have made to their admissions criteria, linked predominantly to the need and desire to develop a more diverse public health workforce, and thus needing to develop a more diverse student body. Two programs also noted this as a strategy to recruit more students, and the importance of this in helping bolster MPH program income. Specific changes noted to admissions criteria include: waiving work experience requirements, getting rid of GRE requirements, and doing holistic application reviews including substantial focus on statements of purpose, vision, and passion.

> *"So I told the dean that we need more than privileged white kids, because if we are addressing issues like health equity, we need a diverse student population." (MPH 2)*

> *"For accepting students, I ask for a statement of purpose. Give me an essay and tell me what you are doing, what you want to do, and how does public health connect with your personal and professional goals. I read those statements to inform admissions." (MPH 3)*

> *"One of the things that we started looking for in students is passion. Passion for public health, passion for community, passion for health equity…. GPA is important but it's not the best indicator of whether a student is going to succeed in an MPH program. Personal statements—where they're actually talking about what is public health to them, why do they want an MPH, what do they want to do with their life? I think that we care much more about that than if they got a 4.0 at whatever outstanding university." (MPH 2)*

iii. *Graduation Requirements*

Graduation requirements were only explicitly noted by one MPH program in the interviews, with the specific shift taking place before release of the 2016 CEPH accreditation criteria, but with guidance from CEPH. The noted shift was a need to reinforce investment in student applied practice, assuring that all students would complete this, regardless of prior work experience. "*It was only in 2013 that we actually required a practicum for all students. When this change happened it prompted us to heighten our practice activities even more." (MPH 5)* While not referenced in relation to changes in graduation requirements, all programs interviewed spoke about reinforcing focus on elements required for graduation, per the CEPH criteria: the Applied Practice Experience and Integrative Learning Experience. These are described in more detail in subsequent sections.

iv. *MPH Program Structure*

All of the eight MPH programs interviewed described a clear theme of changes to program structure. Three sub-themes were noted as a part of this: refining overarching focus, hiring practitioners as instructors, and adapting course structure.

Some of the changes relate to recruitment and admissions, as noted above. MPH programs report that they are recruiting a more diverse student body in different ways, including adapting program structure to be able to accept and accommodate dual-degree

students, working students, and students coming right out of undergraduate programs (some with public health experience, some without). Four MPH programs interviewed note that these shifts have resulted in changes to their student body, which has also included changes in their program design, allowing them to better meet the learning needs of their cohorts.

> *"The other thing is the growth of undergraduate public health programs and the increasingly large percentage of our incoming student body that has some public health background from their undergraduate degrees. That's changing our cohort. When we have these undergrads and then still take people from across a range of disciplines, many who have absolutely no experience or exposure to public health from a classroom kind of academic learning perspective." (MPH 4)*

Five of the MPH programs interviewed noted shifts in their overarching program focus over the last number of years, including a more explicit focus on public health practice, a more explicit focus on social justice and social determinants of health; broadening the vision of what public health is; bridging curriculum and workforce to help change approach, mindset, and development of meaningful partnerships with practice sites to better support applied learning and practice.

> *"To me that's, that's an amazing shift in that mindset that we as public health can observe and understand and if we can start to think about that and move that and make that our classroom and then move those concepts out as our students graduate, that's fantastic." (MPH 6)*

To support this focus on practice, six of the MPH programs interviewed noted that their MPH program has worked to hire more public health practitioners as a part of their faculty.

> *"There's always been this tension. I think within schools of public health and public health programs, because these are future practitioners. I mean this is a professional degree and they're being taught by faculty who are mostly researchers, PhDs, and not--most of them-- not feeling comfortable, not having public health training. I think it's been a shift [to hire practitioners]." (MPH 2)*

> *"Those who are primarily training public health graduates are not necessarily trained in the field; their training in their academic domain. So, historically, looking at the various domains of public health, you had people who were trained in epidemiology and biostats and the behavioral science, but they were trained in academic institutions and their practice experience was academic practice, not field-based public health practice… As humans, you start doing the thing that you are familiar with and then you realize, wait a minute, this is not really getting me where I need to be because I'm missing some pieces…It takes some adjustment for others to understand the practice component of this degree. So we have come up with faculty categories called practice faculty." (MPH 1)*

Aligned with this, six of the MPH programs interviewed (75%) noted that their MPH program design has, in some cases, consolidated, and in other cases, expanded. These shifts have less to do with a re-doubled focus on practice, and rather, are due to national-level standards and expectations. Contraction seems to focus on reducing the number of concentrations offered, specifically in relation to the changes in CEPH criteria that no longer require a focus on environmental health; some of this has resulted in position loss.

> *"The decision was made, especially because CEPH wasn't requiring it any longer, to not offer the MPH in environmental health, which meant that the faculty who were in that department… We had a couple who were non-tenured or non tenure track faculty, and sadly we lost those individuals." (MPH 4)*

Program expansion seems to focus on developing new concentration areas, transitioning concentrations to certificates, adaption of program options to match student experience or ability, expanded focus on dual/interdisciplinary degrees, and adaptations to course structure and/or depth. These adaptations are described more in the following section.

v. <u>*Institutional Design*</u>

One of the MPH programs interviewed reported a shift in instructional design that they experienced due—shifting of units related to their MPH program—but that was due to required university re-structuring, and not to meet a public health need.

vi. *Summary of Phase 2 Findings*

MPH programs are making shifts to their MPH program design to support a greater focus on training for public health practice. Programs are working hard to shift their program to ensure a focus on workforce-informed competence development, using the CEPH and the PHAB standards as guidance, as well as working with employers and peers to understand and respond to workforce needs and skill gaps. Recognizing the need for more people in the workforce with diverse experiences and skills—along with needing to assure program income—MPH programs are also adapting admissions criteria. This, in turn, is changing the student body, requiring changes to course of student options (part-time, dual degree), and changes in curriculum and pedagogical approaches (reported in more depth in the following sections). Programs also report placing more overarching program-wide focus on the tenets of public health, including social determinates of health and social justice. To reinforce readiness for practice, MPH programs are requiring that students have field-based practice experience before graduating, and to support this, they are hiring more public health practitioners as a part of their faculty.

c) Phase 3 - Summary

Table IX, below, presents a summary of the data from Phase 1 and Phase 2 of the study, and overarching themes emerging as the data were integrated.

Table XII - Section D1 Integration of Phase 1 and Phase 2 Data

How MPH Programs Are Shifting to Practice Focus – Program Design	
Phase 1 - Survey Data	**Phase 2 - Interview Data**
• Focal Competencies - Since Fall 2015, 81% changed - Associated w/larger programs and those affiliated with ASPPH • Graduation Requirements - Since Fall 2015, 59% changed - Associated w/larger programs, those in schools of public health - Changes being considered/made: portfolios, adapting ILE, capstone symposia, CPH exam • Admission Criteria - Since Fall 2015, 39% changed - Associated w/stand-alone programs - Changes being considered/made: accepting students in all semesters, dropping GRE • Program Structure - Changes being considered/made: adapting concentrations, consolidating MPH, executive/ distance programming, shorter program, lowering cost • Institutional Design - Changes being considered/made: consolidating all public health related programs	• Focal Competencies - All programs noted changes in this area - Changes were made to align with CEPH competencies, as well as needs of the workforce, as defined by experience, feedback, and reports. Really working to build knowledge, skill, ability needed in the workforce. • Graduation Requirements - Only explicitly noted by one of eight programs - Changes were made related to the APE/practicum, requiring it of all students. Change was made pre-2015, but to align with CEPH expectations. Others spoke about reinforcing structure and support for ILE and APE success • Admission Criteria - Five of eight noted changes in area - Changes made to recruit and develop more diverse workforce, to bolster program income. - Changes include waiving work requirements, dropping GREs, using holistic review processes. • Program Structure - All programs noted changes in this area - Changes were made to refine program focus to current public health focus areas, consolidate, expand, hire practitioners, adapt course structure and level to accommodate student ability • Institutional Design - Noted by one program, per univ. restructuring
Phase 3 – Data Integration	
• MPH program have made many shifts to Program Design. Most have changed focal competencies, in line with CEPH, but also informed by needs of the workforce, as defined by experience, feedback, and reports (ASPPH, PHAB). Really working to build knowledge, skill, ability needed in the workforce • Many have changed graduation requirements, though limited detail provided. Interviewed programs spoke about requiring APE for all, and about reinforcing focus on ILE. Survey respondents spoke of revamping ILE and requirements, portfolios, and CHP exam. • Some have changed admissions criteria, making MPH program more accessible. This includes dropping GRE and work experience, and using holistic admissions process. Some of this is to support a more diverse workforce; some is to support program income generation. • As a result of CEPH criteria, and changes to admissions criteria, some programs are also adapting their program structure. Adding or removing concentration areas, refining their focus, delivering MPH in new ways, shorting program, lowering cost, hiring practitioners, and adapting course structure and level, in part to accommodate student ability.	

Over the last four years, a majority of MPH programs have made shifts in their program design to better align with their focus on developing public health practitioners. Shifts have been made to the focal competencies taught and assessed in MPH programs to better align curricula and graduate outcomes with public health workforce needs. These shifts have been largely influenced and exemplified via adoption of the 2016 CEPH competencies, but MPH programs are also being informed by the PHAB/CoL criteria and development process, by the workforce through personal experience and peer and collaborator input (skills and abilities needed), and by being aware of relevant and emerging trends.

MPH programs have also shifted their admissions criteria to help diversify program cohorts and graduates, to make programs more accessible, and to support and ensure MPH program income. Specific shifts include dropping the GRE, admitting multiple cohorts per year, and admitting students based on more than just GPA (interest, passion, and desire to effect change). To accommodate expanded admissions and the broad learning needs of the diversified cohorts, MPH programs are shifting their program structures, such as implementing flexible course scheduling (part time, distance, online, dual degrees, executive programs, certificates), hiring more public health practitioners, and adapting course design and course delivery mechanisms (more in the following sections).

Finally, shifts have been made to MPH program graduation requirements focused on requirements and expectations related to Applied Practice Experiences and Integrative Learning Experience/capstone projects. Shifts include more preparation beforehand, standardization of expectations, decreasing the focus on research, and spreading the

requirements over more than one semester, or in other cases, concentrating the focus to just one semester. Some MPH programs are requiring students to pass the CPH exam to graduate, and others are asking graduates to develop graduation portfolios to demonstrate competence. To support these more practice focused learning needs, some programs are also hiring more practitioners (described in subsequent sections).

Although not explicitly driven by MPH programs' focus on practice, but rather the national influence to focus on practice (CEPH accreditation standards), some programs are also needing to adapt their program, due to resource constraints, to provide a more focused education. This includes offering fewer 'traditional' concentration areas, including some programs getting rid of their environmental health concentration area, so they can focus more on what they do best.

2. MPH Curriculum

Curriculum comprises the comprehensive knowledge, skills, and values that educational institutions strive to help students acquire via a series of course or a program. A curriculum comprises courses, classes, and co-curricular requirements. From a public health education standpoint, programs may change the curricular structure (courses, course flow), as well as focus. *A priori* areas where shifts in curriculum and course content may be focused included shifts to increase foundational knowledge, to build competence, to develop values, to build leadership abilities, and to increase inter-professionalism. These areas were used to guide data collection and analysis.

a) ***Phase 1 Findings***

Anticipating that MPH programs may make changes to their program's curriculum from time to time in areas such as course aims, course content, what courses are required, how courses are linked, and/or how courses are sequenced, three questions were used to elucidate input via the survey.

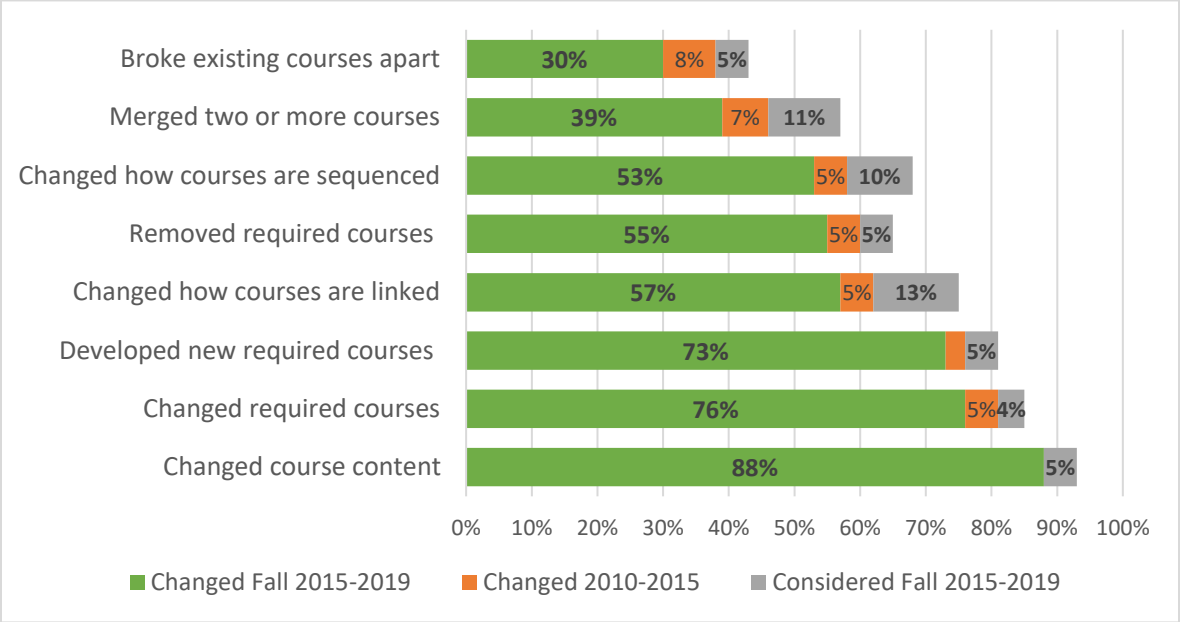
First, survey respondents were presented with 13 areas of possible curricular change. For each, they were asked to note if they had: considered such a change in the last four years, implemented such a change in the last four years, or not implemented such a change either because it was changed in the preceding years, or because no change was needed. The focus on changes over the last four years coincided with release of the new CEPH accreditation standards.

i. *Curricular Structure*

The first eight areas of curricular change focus on curricular structure, and are presented in Figure 18, showing the proportion of responding MPH programs noting that they made that change. The curricular domains where MPH programs most frequently note curricular change over the last four years include: changes in course content (88%); changes in what courses are required (76%); development of new courses required by all students (73%). Recent changes in three other areas—how courses are linked, removing required courses, and course sequence—were noted by just over 50% of the respondents, but are also areas where a number of institutions are considering changes. Breaking courses apart and/or merging two or more courses were only noted by about one-third of the respondents. To assess association, responses across the eight domains were grouped (multiple responses per person) and bucketed (changes made in last four years; changes

made before or are under consideration; no changes or unsure). Changes made to MPH curricular structure are not associated with MPH program type or ASPPH affiliation. However, MPH program size (bigger) appears to be associated with changes to curriculum ($X^2_4 = 20.43$, $P < .001$), as does age (older) ($X^2_4 = 16.97$, $P = .002$) (Appendix J – Cross-tabulations).

Figure 18 - MPH Program Changes to Curriculum Considered or Implemented since 2010 (N=115)

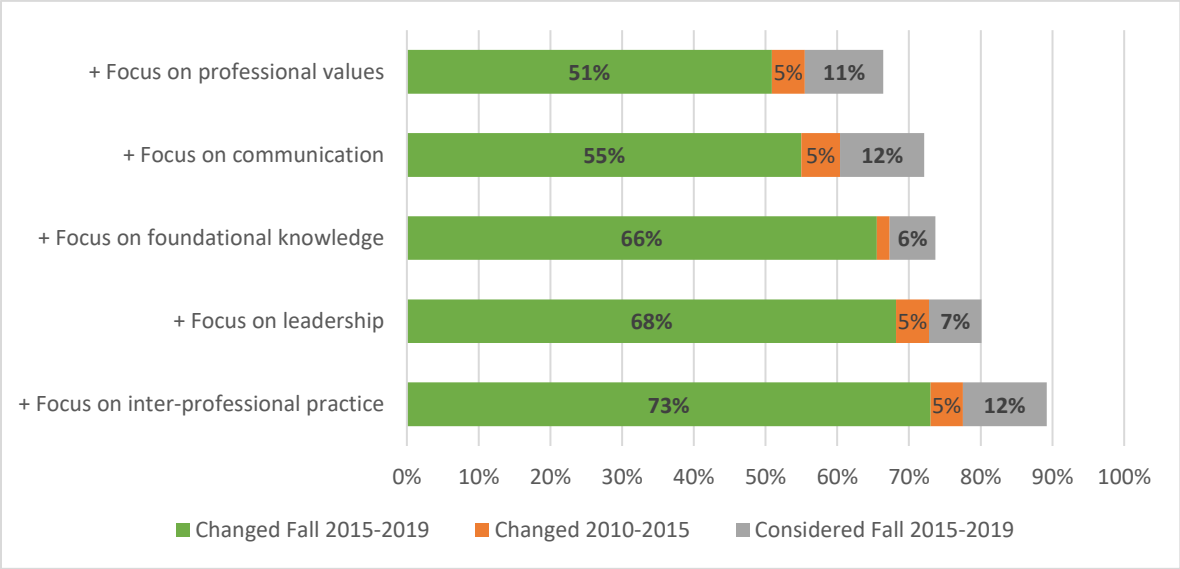


ii. *Curricular Focus*

The last five areas of curricular change focus on curricular focus, and are presented in Figure 19. More than 50% of the respondents note making changes in each of these areas since Fall 2015. The areas where MPH programs most frequently note changing their curricular focus include an increased focus on inter-professional practice (73%), leadership (68%), foundational public health knowledge (66%). These are followed by an increased focus on communication (55%) and professional values (51%). As previously noted, a number of institutions are also considering changes in these area. Again, to

assess association, responses across the five domains were grouped and bucketed (as noted above). While changes to curricular focus were noted across all strata, MPH programs not affiliated with ASPPH are associated with more change in curricular focus (X^2_2 = 6.62, P = .04) (Appendix J – Cross-tabulations).

Figure 19 - MPH Program Changes to Curriculum Focus Considered or Implemented since 2010 (N=115)



iii. *Changes Being Considered*

As shown in Figures 18 and 19, there has been substantial change in both curriculum structure and focus over the last four years, since the 2015-2016 academic year. Some institutions have considered curricular changes but had not implemented them at the time of the survey. The domains most frequently reported include: how courses are linked (13%); increased focus on inter-professional practice (12%), communication (12%), and professional values (11%); and merging two or more existing courses into one (11%). Via open-ended responses, respondents noted considering integrating courses (moving away from the five core courses to an integrated core; combining biostatistics and

epidemiology into one "analytics" course), developing new courses, and refining and improving current courses.

Via open-ended survey questions, respondents also noted curricular changes that they see peer MPH programs implementing. These include having more of an applied (vs. academic) focus, and working to build practical and cross-cutting skills and abilities such as: quality improvement skills; management skills; leadership abilities; independent thinkers; resilient leaders, able to predict and adapt to challenges; strategic thinkers who are able to gather information, interpret results, and translate big data into action.

iv. *Phase 1 Summary*

Over the last four years, MPH programs have made shifts in 13 different *a priori* areas curricular change. Almost all responding MPH programs report having changed course content, and over three quarters have changed what courses are required of students, including developing new required courses, and/or removing some required courses. Responding programs are also changing the curricular focus of courses, including about two thirds putting more curricular focus on inter-professional practice, leadership, and foundational public health knowledge, and more than a half putting more focus on communication and professional values. Some 2%-8% of programs did not make changes in these areas in the last four years, as changes were made in the preceding years, and many MPH programs are considering changes in these areas. Some proposed changes include: more course integration, course content improvement, and more applied focus to build technical and strategic skills.

b) ***Phase 2 Findings***

Interviews with sampled Phase 2 MPH programs provided greater detail and nuance to the survey responses related to what shifts are being made to MPH curriculum. Interviews were coded by literature-driven *a priori* themes of curricular shifts made, in structure and in focus, to build foundational knowledge, public health competence, public health values, public health leadership; and inter-professionalism. Themes are summarized here, supported by sample quotes in *italics*; some quotes may be edited for clarity, brevity, and/or privacy.

i. Curriculum Adaptations

Up to 88% of survey respondents noted making changes to their curriculum in the last four years, and this was reinforced via the interviews. All MPH programs interviewed described shifts made to their curriculum. The adaptations are varied and include developing new courses, adapting courses, and modifying the structure and flow of courses. For the latter, this included maintaining but complementing the traditional five core courses that used to be required by CEPH; integrating some courses to better meet learning needs and support more real-world-like application of knowledge; adapting course credit values; and developing a "common core", a standard base curriculum required of all students, regardless of concertation area. Respondents described 'getting rid of the pillars' and integrating course, specifically to help better support practical skills building.

> *"We haven't gone to an integrated core. We retain the five core courses plus this foundations course. But, we have made some fairly significant changes to those core courses so that they can fulfill not just the 12 knowledge objectives, but the 22 competencies. That's the road that we chose to take. Frankly, it was just the only realistic road for us." (MPH 8)*

> "*We went from the five pillars to thinking about how to not throw the baby out with the bath water but actually take advantage of what we have, and then restructure [to an integrated core] and bring in the new." (MPH 5)*

Most respondents specifically noted that they refined course content or structure to help meet defined knowledge areas or competency domains defined by the 2016 CEPH accreditation criteria. Specifically, programs aimed to assure coverage of the 12 defined foundational knowledge objectives; to build student competence in all key areas; to reinforce public health values (such as equity, prevention, community engagement, and evidence-based practice) so that *"these are ingrained into what students do on a day–to-day basis"*(MPH 1); and to help students develop core skills related to leadership, advocacy, policy, and inter-professionalism.

> *"We know that quantitative competencies are part of it and we have strong epi and bio statistics courses. Also a lot of social behavioral science courses and health management courses. So what we tried to do was to say: of the existing options of courses that we had, how could these map into either the foundational learning or the competencies? And we saw that indeed there were courses that could map into these. There were some courses that could not and so we took them off of our selection…" (MPH 5)*

> *"I'd say a tangible example there is that we still have an environmental health science course. It's much more policy oriented than it had been previously. This is not an innovation as you know. There are a lot of MPH programs that are doing that. It's an obvious marriage between environmental health and policy. I think the good part of that is that it keeps the environmental science piece of our MPH, which is starting to drop away from a number of MPH program for the bad, I would argue, especially in this day and age." (MPH 8)*

No respondent described developing a new curriculum from scratch, but rather emphasized a 'quality improvement process' where they took what they had, and built on it to make sure all was covered. To add or reinforce content in their curriculum, half of the MPH programs interviewed described a process of curriculum review where they used their curriculum map, and the defined CEPH knowledge areas and competence

domains, to review their existing curriculum. They noted that the review identified where their curriculum was covering content well, where content was over-covered, and where there were gaps to fill. That led to a process of course adaptation or course development to be sure that all competencies are met—and could be assessed—via the MPH curriculum.

> *"Going through that process, we were able to see that we are very heavy in those first four MPH evidence based competencies. [but there were gaps.] We have some classes that were created within the past couple of years to meet some of those other competencies that were not being covered. I mean communication. Leadership. There was no leadership in our curriculum. No advocacy." (MPH 2)*
>
> *"I think that forced everybody, including us, to take a very close look at our curriculum and really think about what we were doing, what we were doing well, what maybe we weren't doing. [This informed] what we had to shift." (MPH 4)*

ii. <u>New Courses & New Course Content</u>

A full 88% of survey respondents noted that they have changed course content over the last four years, and this was reiterated in the interviews: all of the MPH programs interviewed specifically noted developing new course content—for new courses, or to complement existing ones—to help meet CEPH-defined knowledge areas and/or competency domains (evidence-based approaches, public health and health care systems, planning and management, policy, leadership, communication, inter-professional practice, and systems thinking).

Half of the MPH programs interviewed noted that their curricular shifts have resulted in the development of at least one foundational course that every student takes at their institution, regardless of degree level or course of study. Respondents noted that this is a key criterion for Schools of Public Health, where all students, regardless of degree, must be taught the 12 CEPH-defined foundational knowledge objectives.

> *"This is a core course that all students take. It's basically the foundations of public health and goes all the way through those elements. Especially a focus on upstream thinking and prevention of issues." (MPH 7)*

> *"And then we knew that the rest of our school also had to meet those 12 foundational learning objectives. Everybody, all degrees, all students. So our school developed, for the first time ever, a course that everyone takes." (MPH 5)*

Via the interview process, MPH programs also shared specific topic areas where they have shifted courses and the curriculum to focus on. As presented in Figure 20, MPH programs are shifting to focus more on concepts (such as equity, social determinants of health, and community engagement), skills (such as professionalism, and qualitative and quantitative data collection and analysis), tools (such as systems thinking, rich picture, and needs assessment), and practices (such as leadership, communication, and advocacy).

Figure 20 - Content Areas Where MPH Programs are Reinforcing Curriculum

"Within the curriculum, I think what some would see as the traditional intro to public health, a kind of overview course, is of course that originally was titled public health and health disparities. And we want to flip that and just talk about health equity. But it is the frame around health equity and saying that in that course we really talk about the division of public health and we talk about the promise now, and how public health historically missed opportunities to address these issues. And so we're very unapologetic about the fact that we haven't always done well in terms of how we should address these issues. So that sets the tone." (MPH 1)

"Going through that process, we were able to see that we are very heavy in those first four MPH evidence based competencies. [but there were gaps.] We have some classes that were created within the past couple of years to meet some of those other competencies that were not being covered. I mean communication. Leadership. There was no leadership in our curriculum. No advocacy." (MPH 2)

"Looking at the MPH competencies and really getting the students to think about what it means to be in an environment like ours, that has its challenges related to social and structural determinants of health, and being able to be a responsible citizen in that community. So we looked at the curriculum, and we incorporated some of that in there so that the students get much more exposure to the community before their internship." (MPH 4)

"There also is the ASPPH task force survey which emphasized that a lot of students really are looking for analytics skills. These are the types of course sequences that we are trying to offer. Really, this is for our consumer. People who are doing data analysis and want to learn those skills. We try to scale this." (MPH 5)

"We have classes that are oriented towards very practical skills such as learning how to tweet as well as doing tri-folds and research briefs…. We also talk about creating evidence or policy. And so people understand the importance of science and the evidence base in moving policy forward as well as outreach efforts and getting voices from everyone with regards to health equity." (MPH 6)

Reinforcing the value of the curricular shifts, half of the respondents specifically noted that the shifts—along with their desire to focus more on professional and applied skills—has allowed them better integrate preparation for the Applied Practice Experience and Integrative Learning Experience into specific classes, better setting up students for success.

> *"So we're shifting to a model where two faculty members will be assigned to ensure internship as one of their courses for the year. It'll be part of their teaching responsibilities, not their service responsibilities…. And so we're hoping that they'll get a little bit more consistency across concentrations." (MPH 4)*

> *"We added a pre-APE course. These are sort of like community visits with groups of students. Those are about 10 hours and then 30 or so hours of classroom stuff, meant to do professional development largely in that soft skill and job and readiness domain." (MPH 8)*

iii. <u>Reduced Curricular Focus</u>

The survey asked one question about removing courses from the curriculum, and 55% of the respondents said they have. Interviewees shared more detail in this area. Six of the MPH programs interviewed noted some degree of loss in their curriculum, over the last four years, due to the multiple demands of the CEPH criteria (so many required areas to teach), and the changing make-up of MPH student cohorts. Programs described removing curricular elements from their curriculum to allow the aforementioned shifts to occur, as course credits, course hours, and/or teaching personnel were needed to focus on new elements. MPH programs note that they, in some ways, compete for students and for tuition dollars, and so adding additional credit requirements or time to degree is dis-incentivized. Specific changes that MPH programs noted include: removing courses that are no longer "necessary" or linked to CEPH-defined competencies; shifting formally required courses to elective or optional courses; developing certificate areas rather than concentration areas (fewer required courses); and reducing the number of courses required for a concentration area.

> *"We didn't want to add credits to the degree, because we have to charge tuition per credit hour. And so we didn't want to just add credits onto the degree and make our degree more expensive, and less competitive in the market in that way." (MPH 4)*

> *"I guess if we could take away the competitive issue of MPH program, we'd give a MPH over four years. But, in reality, you can go elsewhere and get it in one year. So we would all love to have more time for everything and that's great. And we'll never get that." (MPH 6)*

> *"We wanted to make sure that the students still got exposed to environmental health even though the MPH competencies don't require it. We felt like it was really important. So we thought, maybe that's one place where we can cut some credits. We also re-looked at our curriculum. We had a three credit intro course that would cover those 12 foundational knowledge areas. What we did was cut the course to two credit hours, and then put some of the foundational knowledge areas in other courses. And then the third place we cut credit hours was our ethics course. The instructors were able to recreate the course so that we didn't lose content that would be detrimental to the students. So each of those three courses went down to two credit hours and that's how we found the three credit hours." (MPH 4)*

Half of the MPH programs interviewed specifically called out how they have had to reduce their focus on environmental health, administration, and biological sciences. With the constraint on credits, and because these areas are not explicitly part of the new CEPH criteria, interviewees note it is hard not to drop these focal areas, although they are important for public health. Programs note that they have adapted to try to maintain this content by integrating core concepts into new courses, but wonder if there is a risk to long-term student success.

> *"I'm not sure I totally agree with that decision [removal of environmental health focus], and I'm not sure how long we will stay away from hard sciences in that microbiology is certainly something that we, as public health professionals, need to understand. That's a concern. That shifted us away and it made it so that any focus on biological aspects was expensive as far as curriculum, if we were going to continue to meet the income needs, and the competencies set forth for us. And similarly, from my own experience, as well as pretty much all the local folks providing info and feedback, we have a concern about the lack of administration and specifically budgeting and financial aspects. And so we wanted to devote an entire course to finance and administration and CEPH is only giving us one competency, partially goes towards that." (MPH 6)*

> *"We bring people together and help them understand what life is like in that place, which is pretty rural. This is pretty important because with the new CEPH standards, our institution did away with the environmental health course. So this course really is the one that's focused on environmental health content." (MPH 7)*

Another area where this 'dilution' of course content was noted relates to epidemiology and biostatistics, and integration of these formerly stand-alone courses into an integrated data analytics course. MPH programs interviewed noted the value of integration, to build professional and applied skills, and to meet or match the needs of the diverse student body, but, again, there are questions as to whether this dilution sets future data-driven public health practitioners up for success. MPH programs note that they have adapted to this by developing advanced-level courses that students may opt in to take.

> *"I'm a little concerned that if a student wants to go out and work as an epidemiologist at the state or local health department, I do think that there's this trade off with the methods. You know, the strength of the methods from the depth of those methods and the breadth. I mean, I think the MPH, which it should not be longer than it is, but I think it could easily be longer to make sure they're getting the strong analytical skills and the breath." (MPH 2)*

> *"We feel that we should be more efficient and we should not waste opportunities. So we add biological components into the epidemiology class so we can cover that material there. We sprinkle research throughout all the courses so that the social and behavioral class has a research component to it. And we integrate finance and administration courses where we can. We just need to do that and realize that we have the material that we're teaching. We have the core material that the course is focusing on." (MPH 6)*

iv. <u>Innovation</u>

A third area of 'dilution' that the MPH programs interviewed noted relates to the need to consider or adapt course content to accommodate the diversity of students in the classroom, including mature students, and students who are right of undergraduate studies, some with little public health experience, and others with a bachelor of science in

public health, or the like. Respondent MPH programs note that they have adapted to this by developing scaled course options (introductory-level, advanced-level) that students may opt in to.

> *"Sometimes we forget that some students come straight out of undergrad. These students tend to have very little to no experience outside the service sector. That community prep course really helped. Students are in different phases of their placements. Different stages of readiness to discuss stuff, different phases of professional development." (MPH 8)*

> *"We end up with the challenge of, particularly in that first year with those core courses, of how to regulate and set parameters so that you're both challenging and building on undergraduate education for those who have existing public health training and how you bring the rest of the cohort up to speed and lay a strong foundation so that everybody kind of graduates at the same place?" (MPH 4)*

> *"Having straight out of undergrad students, that's also heavily informed some of the changes we've made. I would say in addition to CEPH that's probably the next biggest thing that's important to curricular changes, realizing that incoming students haven't had the experience, the education and since some of the things you've kind of come down a little bit, in terms of, you know, epi methods and bio stats and we're still continuing to make changes." (MPH 2)*

> *"There also is the ASPPH task force survey which emphasized that a lot of students really are looking for analytics skills. These are the types of course sequences that we are trying to offer. Really, this is for our consumer. People who are doing data analysis and want to learn those skills. We try to scale this. Options for those with really advanced skills, and options for those who have more basic skills. For some of these areas we offer professional certificates…. I think having those pathways has been extremely valuable." (MPH 5)*

v. <u>*Phase 2 Summary*</u>

Interviewed MPH programs described many curricular changes that they have implemented to meet accreditation expectations defined by CEPH, and to set their students up for learning and professional success. Interviewees described reviewing and refining their curriculum (rather than starting *de novo*) to develop new courses, adapt courses to include new content, and modify the structure and flow of courses, in some case, integrating content from multiple courses into one. Change has focused on the

content of the courses (making sure CEPH competence domains are taught and assessed), and the process and the outcomes (reported in next sections), but has also resulted in loss of course content, and in some cases, also course depth. This reinforced the theme that change is being strongly driven by CEPH requirements. While there is focus on important CEPH-defined areas, the competitive nature of MPH education has meant that some programs are needing to limit and cut content that they deem important, including environmental health, administration, biological sciences, and more advanced epidemiology and biostatistics. Some wonder if this might have an impact on long-term graduate success in some areas, such as those wanting to be epidemiologists or biostatisticians; some programs are finding ways to accommodate via offering electives or certificates, or integrating content into other courses.

c) ***Phase 3 - Summary of Findings***

Table X, below, presents a summary of the data from Phase 1 and Phase 2, and overarching emerging themes. MPH programs in the U.S. are shifting their curriculum to meet the requirements of the new CEPH accreditation standards, and to better support student success, as students, and as employees in the workforce. Structural changes are being made to the curriculum (course flow, course structure), along with changes to specific course content to ensure foundational knowledge acquisition, and the development of competence, professional values, and leadership (including CEPH-defined areas such as systems thinking, community engagement, communication, advocacy, and teamwork). MPH programs have made a large number of curricular shifts over the last five years.

Table XIII - Section D2 Integration of Phase 1 and Phase 2 Data

How MPH Programs Are Shifting to Practice Focus – Curriculum	
Phase 1 - Survey Data	**Phase 2 - Interview Data**
• Curricular Structure. - Since Fall 2015: ▪ 88% changed course content ▪ 76% changed req. courses ▪ 73% made new req. courses ▪ 57% changed course links ▪ 55% removed req.courses ▪ 53% changed sequence ▪ 39% merged courses ▪ 30% broke courses apart - Change associated with program size (bigger) and age (older) - Changes being considered: course links, merging courses, integrating courses (integrated core, analytics) • Curricular Focus. - Since Fall 2015: ▪ 73% increased focus on IPE ▪ 68% incr. focus on leadership ▪ 66% incr. focus on foundational knowledge ▪ 55% incr. focus on comm. ▪ 51% incr. focus on values - Change associated with program size (bigger) and age (older) - Changes considered/observed: more focus on IPE, comm., values, skills, leadership, practice	• All programs noted making changes to curriculum, to align with CEPH requirements, and to build skills and abilities students need to succeed in workforce. • Curricular Structure - All MPH programs noted developing new courses, adapting courses, and modifying the structure and flow of courses. Some developed a common core curriculum, others didn't (no desire, or not feasible), but did speak to integration, and a focus on skills building. - All focused on quality improvement rather than *de novo* development. • Curriculum Content + Focus - All MPH programs described changes to course content to be sure to meet CEPH-defined knowledge areas and/or competency domains, such as policy, leadership, communication, inter-professional practice, and systems thinking). This included developing a foundational [knowledge] course required by all students, as well as removing courses or course content. - Six of eight MPH programs described removing content or courses, due to space limits and CEPH-defined requirements, or changes in cohort make-up. This resulted in tough decisions; was also informed by need for tuition income. ▪ Decreased focus on environmental health, administration, biological sciences, and epi/bio were most noted ▪ Programs are innovating to adapt to the changes that are needed and required
Phase 3 – Data Integration	
• Many MPH programs have made many changes to their curriculum since Fall 2015. • The most noted areas are changes to course content and required courses, largely driven by the CEPH accreditation standards and the need to cover all knowledge and competency areas in the curriculum. To do this, programs have adapted courses and course content, and have developed new courses to complement the existing curriculum. • Related to specific curriculum focus, aligned with CEPH competency areas, MPH programs have put more course emphasis on professionalism, leadership, foundational knowledge, communication, public health values, systems thinking, and inter-professional practice • As a result of the CEPH requirements, and/or course needs due to changing cohorts and tuition needs, some programs have had to reduce their focus on environmental health, administration, biological sciences, epidemiology, and biostatistics. To compensate, some programs are working to integrate these themes into other courses, or are offering electives or advanced certificates in these areas.	

MPH programs have adapted the content of courses to focus more explicitly on CEPH-defined *foundational knowledge objectives*, *competency development* (such as inter-professional practice, leadership, communication, advocacy, equity, prevention, community engagement, evidence-based practice, social determinants of health), *skills building* (such as professionalism, and qualitative and quantitative data collection and analysis), and *tool use* (such as systems thinking, rich picture, and needs assessment). Some MPH programs have adapted or created one or more courses that are required by all students, in the MPH program, or in the school of public health. This was most frequently noted related to the 12 CEPH-defined foundational knowledge objectives, a "common core" curriculum, and IPE.

Gaps that have resulted from CEPH's new competencies is the diminished focus on environmental health, administration, and biological sciences. Some MPH programs are adapting to teach this content by integrating core concepts into new courses, but they wonder if there is a risk to long-term student success. Some MPH programs are also adapting the content and/or level of courses related to changes in admissions criteria and/or matriculating student ability. An interesting reality was noted where, in the same cohort, MPH programs may need to accommodate students with years of work experience, students right out of undergrad, and students right out of undergrad but with a bachelors in public health. In general, respondents noted the need to dilute or lower the level of their MPH curriculum, though in some cases, more advanced content is being maintained via advanced electives or certificates.

MPH programs have adapted the structure of courses to better integrate content and to help students build skills and competence, both in the CEPH-defined areas, and to

support student success. Some changes include: integrating courses (moving away from the five core courses to an integrated core; combining biostatistics and epidemiology into one "analytics" course), and making courses more applied in nature to reinforce skills-building and competence development. MPH programs seek to build practical and cross-cutting skills and abilities such as: quality improvement, management, leadership, independent thinking, resilience, adaptability, developing strategic thinkers who are able to gather information, interpret results, and translate big data into action. MPH programs are also more formally structuring APE and ILE work, linking it to classes. More detail on teaching methods used is described in the next section.

Some MPH programs note that with the model some are using, such as integration of the two traditionally separate epidemiology and biostatistics courses into a data analytics courses, there may be a further ‘dilution’ of course content. As it relates to epidemiology and biostatistics, they note that while there is value in focusing on application of skills in real-world scenarios, there is some concern that if a student wants to go out and work as an epidemiologist or biostatistician, they may not have sufficient skills. Some programs are meeting this need by offering advanced courses or certificate programs.

MPH programs have also adapted how courses are ordered or linked to each other to support knowledge acquisition that can be applied for competence development and demonstration. One area where this is noted related to focusing more on professional and applied skills, and community engagement, earlier in the curriculum so that students are prepared for success during their Applied Practice Experience and Integrative Learning Experience. More detail on this is provided in the next section.

Finally, MPH programs note the value of curriculum review and mapping their courses and outcomes against the defined CEPH knowledge areas and competence domains, to identify where content is covered well, and where there are gaps to fill. Use of 'quality improvement processes' where MPH programs could build from their prior assets and approaches was evident. Via this process, MPH programs have needed to add courses (and hire); remove courses (and lose faculty); shift the credit value of courses; shift if courses are required or elective; shift if content is credit-bearing or co-curricular; and through those processes, re-envision how the core curriculum and concentration area curriculum are linked, and their respective credit values. In most cases, this appears to have decreased the number of credits available for concentration-specific learning, because of the minimum-credit-level set by CEPH to earn and MPH, and the reluctance to increase program-specific credit requirements due to costs to students or time to degree deterrents. The MPH 'market' is seen as competitive, and there are programmatic needs to ensure enrollment to support budget needs. This, may, in turn, influence admissions.

3. Teaching Methods and Approaches

Aligned with curricular shifts and shifts in instructional design, the literature (Chapter 2) suggests that MPH programs might also plan and implement shifts in pedagogical strategies—their approaches to teaching, and the modalities or locations used—to support deeper learning, competence development, and workforce readiness. *A priori* themes used to guide data collection and analysis included: field-based learning (including APE), applied practice (including APE, ILE, authentic assessment), small-group learning, use of IT to support learning, use of systematic reflection to support learning, and integration of faculty and mentors with practice experience to guide and mentor learning.

a) ***Phase 1 Findings***

Anticipating that MPH programs may make changes to their program's teaching methods and approaches, three questions were used to elucidate input via the survey.

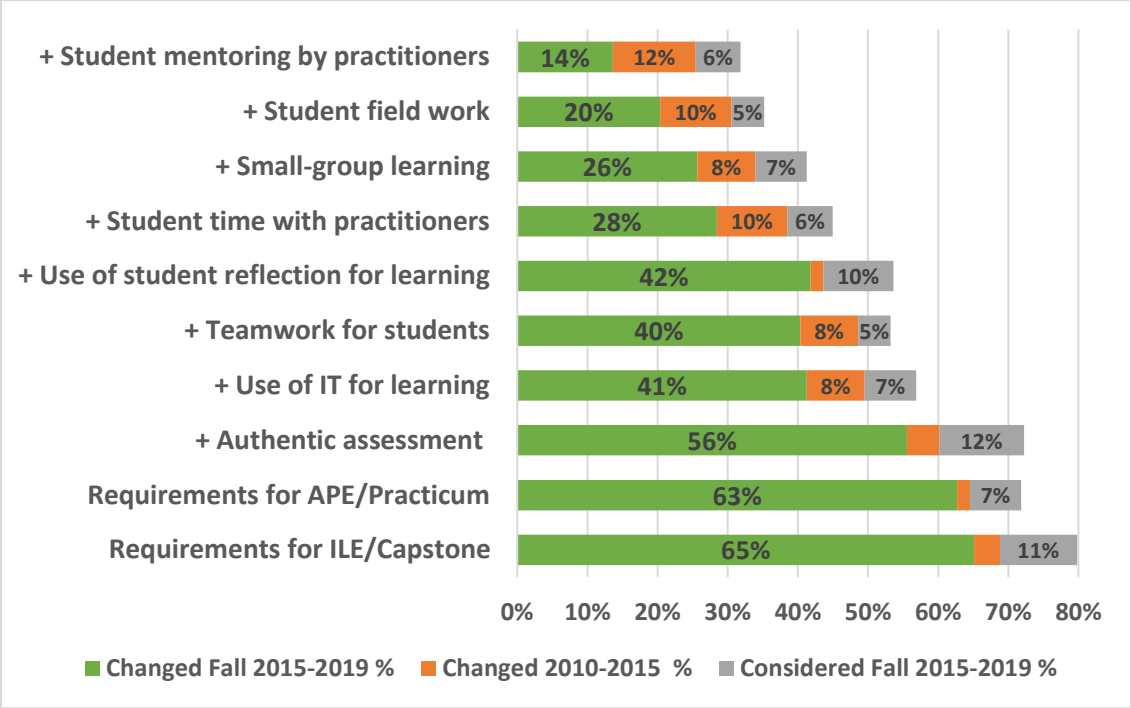
i. Areas of Change

First, survey respondents were presented with 10 possible areas of pedagogical change. For each, they were asked to note if they had: considered such a change in the last four years, implemented such a change in the last four years, or not implemented such a change either because it was changed in the preceding years, or because no change was needed. Again, the focus on changes over the last four years coincided with release of the new CEPH accreditation standards.

As presented in Figure 21, over the last four years, respondent MPH programs have implemented a number of pedagogical changes. Areas of greatest change, where more than half of respondent MPH programs have implemented pedagogical changes include: changes to the ILE (65%), changes to the APE (63%), and use of authentic assessment (56%). Approximately forty percent of respondent MPH programs have shifted to use more student reflection for learning (42%), use more IT for learning (42%), and use more teamwork for student learning (41%). Areas where fewer MPH programs have implemented change over the last four years—more student time with practitioners (28%), more student mentoring with practitioner (14%), more small-group learning (26%), and more field work (21%)—are, notably, areas where between 8% and 12% of MPH programs report making changes in the preceding years. Responses were bucketed to test for association (changes, no changes, older/or possible changes). Changes to pedagogical approaches appear to be heterogeneous when comparing stand-alone and school-based MPH programs, and by ASPPH affiliation (Appendix J – Cross-

tabulations). However, as shown changes in teaching pedagogical approaches appear to be associated with program size (bigger) (X^2_4 = 20.06, P < .001) and age (older) (X^2_4 = 21.93, P < .001).

Figure 21 - MPH Program Changes to Pedagogical Strategies Considered or Implemented since 2010 Academic Year (N=115)



A number of MPH programs noted that they have considered changes to their pedagogical strategies over the last four years that were not yet implemented. Via open-ended responses, examples included: implementing online courses, altering the approaches to their APE and ILE (integrating, standardizing, altering length, increasing emphasis on practice, decreasing the focus on research), having students spend more time at health departments and in community, and adding diversity programming.

Respondents also shared pedagogical changes they see peer MPH programs making. These include: a greater focus on collaboration and engagement such as partnering with local public health departments, working more with community partners, working with other MPH programs in their regions, providing more practicum opportunities and field experiences, and developing more direct practice experience opportunities for students. Respondents also note that they see MPH programs employing more public health practitioners as faculty.

ii. Phase 1 Summary

MPH programs have implemented changes to their pedagogical approaches, although the number of MPH programs reporting changes to pedagogical approaches is lower than the number who have implemented curricular or program changes. Areas of greatest change relate to hands on and applied learning—ILEs, APEs, and use of authentic assessment—which, of note, are also specific requirements listed in the CEPH standards. Related to the APE And ILE, programs report many changes that they are considering, including standardizing expectations, decreasing or increasing the time expectations, increasing the focus on practice, and decreasing the focus on research.

MPH programs, thought fewer in number, are also shifting to use other learning methods, such as student reflection, IT, teamwork, and work with practitioners. Respondents note that they are considering changes—and see peers making changes—are areas where comparatively less change has been made so far: having students spend more time working in the field (at health departments and in community), partnering with community partners (including health departments and other MPH programs), and providing more field-based learning experiences for students.

b) ***Phase 2 Findings***

Interviews with sampled MPH programs provided greater detail and nuance to the survey responses related to shifts being made to teaching approaches, describing both what is being done, and why, to better support competence development. Six *a priori* themes (field-based learning, applied practice, small-group learning, use of IT, use of systematic reflection, and integration of faculty and mentors with practice experience were used to code and group data. Within each of these, themes related to course-based teaching and Applied Practice Experience-related mentoring emerged.

i. Field-based Learning

Increases in field-based learning was only noted by 20% of the survey respondents, though up to 63% noted that they have changed their APE requirements, which may well involve field-based learning. However, all interviewees in Phase 2 described the importance of field-based or real-world-type learning to support competence development and applied problem solving, and shared examples of how they are doing it. All interviewees noted how they partner with health departments and/or other community-based groups to identify real community health issues, and then build course work around helping students apply knowledge and skills to solve those issues. Some specific examples given included: planning MAPP assessments; bringing court cases into the classroom; implementing policy analysis to prepare for state legislative days; and developing workplace wellness programs.

> *"We take advantage of the dual opportunities to learn and serve. Things like working with [big business] and contributing to outbreak investigations. We're helping them look at all of their processes, and interventions that can help maintain health. We're making changes in pedagogy, the changes in delivery system, and changes in opportunities, as well as the changes of expectations or requirements, so that we have the flexibility to have these opportunities as a part of our learning. Instead of viewing this as something we have to do, we're taking advantage of the opportunities. We're looking at the glass half full."* (MPH 6)

Seven of the eight interviewed MPH programs also explicitly noted how they are getting students off campus to experience real-world to support learning; the one program that did not note this is a fully on-line program. All seven of the MPH programs spoke about how they use field trips to help increase student awareness, develop contextual understanding, and to deepen the relevance of learning. Three MPH programs noted that the field trips are related to specific courses and serve to deepen learning around public health policy, the social determinants of health, health equity, environmental health, and the differences in public health needs between urban and rural environments. Two programs specifically noted how valuable these field trips are for students who are not from the geographic area where the MPH program is located.

> *"Also, many of our students are not from the area. We have a number of international students, students from other parts of the country. So, we have faculty who take the students out to give them up close and personal experiences around here. Some of the issues that you get to see and inequities in terms of from a social determinants standpoint. So they get to visualize it before they actually incorporate it in some of the coursework in terms of the practice. Meaning we embed opportunities for our students to engage in the field with various community partners in a variety of work before they actually do their field work. So they have their individual applied learning experience, but they also have a number of group applied learning experiences in the classroom that faculty have led." (MPH 1)*

Four of the interviewed MPH Programs noted the importance of field experiences in preparing students for their APE. Two of the four MPH programs spoke about new volunteer or co-curricular requirements that serve to get students off campus before their APE to build more contextual understanding.

> *"We really push community. I mean even the PhD students are required to do service of some type, and all the students and we tell the MPH students that they have to do and this--and it really is not unrealistic-- that 20 hours of service, before they do their practice experience. Most of them want to do it." (MPH 2)*

All four of these MPH programs also noted the development of required course content that integrates field trips as a way to expose students to community, and to build contextual understanding and professionalism in preparation for their APE.

> *"We now require 40 hours of community based experiential learning. This comprises about 10 hours of community visits with groups of students, and then 30 or so hours of class engagement. This also gives students an opportunity to debrief their time in the field, talk with each other, and learn from the instructors. This was the first year, and the early returns are that the students really like the community visits, the community based experience." (MPH 8)*

Community engaged learning and/or service learning is a pedagogical approach that braids service and learning, whereby faculty work with community partners to design and support learning opportunities as students work, with mentorship, on projects of community importance. Despite note being an interview probe, this pedagogical method was noted by seven of the eight interviewed MPH programs. Respondents described the value of this in terms of supporting student learning, and supporting community health improvement. One respondent noted:

> *"Recently, I went to a conference on community service learning and we were talking about the future of academic public health and that it really has to move in a direction that has that breadth, that engages community, that applies the work they're doing. It isn't just theoretical and research." (MPH 2)*

Six of the MPH programs interviewed specifically noted the value of community engaged learning to improve and deepen student learning. Particular learning domains where respondents noted that community engaged learning helps include learning about: community context, the social determinants of health, health equity, environmental health, and the differences in public health needs between urban and rural environments. Respondents also note that community engaged learning provides a contextual experience to help students build professional and soft skills.

> *"We believe in collaborative leadership, community engagement, and that experiential learning is an important part of it and social justice. So those things are really drivers for us. From a leadership standpoint, we want to see our students be able to practice public health with a real social justice lens wherever they are. Wherever students may find themselves, they'll understand that they're looking at things, a public health issue, whether it's from a data place, whether it's from a policy place, they're understanding it from a social justice issue. They're understanding the social determinants frame, the things that are really still part of anybody in public health…. So, we have faculty who take the students out to give them up close and personal experiences around here." (MPH 1)*

> *"Some other ways that we're trying to instill practices is through applied work with and for a specific community. We have some embedded research centers and so some long-term work happens there. Some of this involves field trips out to a site. Some involves students being embedded for a summer. It's really great hands-on learning." (MPH 7)*

Three of the respondent MPH programs also specifically noted the value of community engaged learning for public health improvement, meaning that their investment in this process was reinforced as they see how their work, and students' work, helps to improve community health.

> *"We're a member of the community. So part of community engagement is that we work in the community collaborative. One place we do this is in the intro class, there is a group learning course called communities and solutions. Our master's students work with the faculty on a service learning opportunity in the field." (MPH 1)*

> *"We work with agencies or organizations in which student will do their practicum and their capstone. They do all of their course work with us, and their practical work with the organization… What this is creating is triads. So it's not just that you're a student and you have a relationship with the school: you have students who have relationships with the school and the school now has a relationship with an agency. The investment in this triad, this collaborative, is almost right from day one when they are starting their MPH. So student are already thinking about applying the curriculum that they're learning—the skills, the materials—to this project." (MPH 5)*

> *"I would say that we're out in the community… We are helping local industry support community health. To me that's, that's an amazing shift in mindset… if we can start to think about that, bring that into our classroom, and then move those concepts out as our students graduate, that's fantastic." (MPH 6)*

ii. <u>Applied Practice and Authentic Assessment</u>

Increased focus on applied practice and authentic assessment was noted by 56%-65% of survey respondents. This was supported via the Phase 2 interviews, where all eight programs described how they have shifted their pedagogical approaches to adopt methods teach and build real skills, and through that and applied practice, build competence. To complement field-work, seven of the eight interviewed MPH programs explicitly noted how they develop real-world-type scenarios on campus or in their classrooms, in the form of practical exercises, simulations, and case studies. Practical experiences and simulations were noted as effective ways of brining real-life and current issues and opportunities into the classroom, and case studies were noted as an effective way to help students learn from historic cases, deepen learning, and engaged in inter-professional learning experiences.

> *"We've been intentional about how we can be much more applied in the classroom." (MPH 4)*

> *"One thing we try to do is help students see how focusing and learning from case examples here builds their skills and their thinking and kind of the lenses through which they, they see these issues. And make it explicit how this type of applied learning is transferable to other health issues, other contexts, or other geographic locations*." (MPH 4)

A clear theme was the explicit integration of focal topics into classes to build knowledge and skills, and the use of applied problem solving and practice opportunities to help students synthesize and apply knowledge and skill, emulating real public health work.

> *"We start with the foundation. We teach biostatistics and epidemiology and assessment. We introduce tools that are available and format and methods and examples. Then we present a challenge and we say, this is your community and this is a real case… You need to go to the website and then tell me, how would you go about doing a community health assessment? And we [help students] figure it out because that is what happens when you get hired to a health department. My experience is that you apply for a job, you get the job. And they said, great, you're welcome. Do it. There was nobody in your position for the last six months or two years or whatever, many years, so you need to be able to learn on the fly." (MPH 3)*

> *"Earlier we tried to have faculty develop these little practice experiences for each course. It was hit and miss. So we came to an understanding that every course doesn't need to have a field experience, but everything needs to have a practice experience. Some of the practice is sitting behind the computer working with numbers and understanding them, others are going out into various settings, working with other agencies and entities around work. So each course has a different practice can piece to it." (MPH 1)*

A specific focus on skills-building was noted by respondents, and this centered largely on CEPH competence domains, such as evidence-based approaches to public health (collecting, finding, analyzing, and interpreting qualitative and quantitative data), planning and management to promote health (community health assessment, intervention/policy planning, and evaluation), and leadership skills (systems thinking, community engagement, communication, advocacy, and teamwork). Respondents also noted that this focus helps student be more prepared for their applied, field-based practice work.

> *"One of the first things that we learned from this advisory group is that the students who are coming out didn't have the professional skills that they thought should have. Not every student, but that was something they observed in some. A second thing was their ability to work with and in the community effectively could be improved. That was really important feedback as we want our students to be good in both of these areas. And so we thought, well, how can we better incorporate that in our curriculum?" (MPH 4)*

> *"We have classes that are oriented towards very practical skills such as learning how to tweet as well as doing tri-folds and research briefs. We reinforce that research is not for academics only, it's something that we all should be doing in our jobs. You can call it evaluation, call it research, whichever you wish, but we can inform ourselves as to how we're doing. We also talk about creating evidence or policy. And so people understand the importance of science and the evidence base in moving policy forward as well as outreach efforts and getting voices from everyone with regards to health equity and other aspects." (MPH 6)*

> *"In our class, we're teaching a lot of systems thinking tools, rich picture and very practical ways of analyzing systems so that when they're in that situation, they will have those tools in their back pocket. The whole thinking between public health core competencies was, these are the skills that people need." (MPH 7)*

Authentic Assessment was an anticipated theme, given that the new CEPH competencies suggest this method as a way to assess student competence. Just over half of the MPH programs responding to the survey noted this theme. Similarly, while all interviewed MPH programs noted investment in applied learning methods, only half explicitly noted a shift towards using authentic assessment (though, this was not an interview probe). One respondent specifically noted how students want more authentic assessment opportunities; others noted that they are working with faculty to move in this direction.

> *"In the class, they need to write a proposal for the needs assessment [this is what I assess them on]. They go through everything but the intervention. The hardest thing is getting students to understand how important collaboration is in this process, especially to plan an intervention that might work." (MPH 7)*

> *"One important thing is having conversations with faculty to make sure that how they're assessing students' work, meaning competencies, is very applied, even for our PhD students. Even students tell us that. I was just reading course evaluations, and they said 'it was too philosophical, too theoretical. We need to know how to apply this.' This is what I talk to faculty about." (MPH 2)*

> *"What we're supposed to be doing is providing information and translating it so that it can be used. So I really like this move to make sure we have a very specific assessments that go along with the competency. It makes you think clearly like, well, where is it? Where's the emphasis, and how do you know you're actually developing that skill among students. Ultimately, did graduates come away with something?... The question would always come up: how does that affect me in my classroom? What do I change? I always come back to assessment. Faculty would say, I cover that in my course. And I'd ask them to show me where it is covered in their course, meaning, how they are actually assessing things. When they asked, can't I just give this essay or this exam? I said maybe; how does this show how students are meeting the required competency?" (MPH 1)*

Somewhat in line with authentic assessment, in support the inter-professionalism, an additional pedagogical element noted by five of the interviewed programs was the development and hosting of inter-professional events, such as case studies, and case competitions, to integrate inter-professionalism into course-work.

> *"The purpose of the IPE is to get these health professions students to have a much broader view of health, and to think of things in an upstream way. Things have traditionally been clinical, but now that school public health is really involved, were pushing to make sure that all these case studies that have a public health bent. AIDS, emergency preparedness, disaster response, etc. Topics that get physicians and nurses and social workers and public health and other students working together." (MPH 7)*

iii. <u>*Small-group Work*</u>

Teamwork and group work was an anticipated theme, due to the inter-professional and collaborative nature of public health, and because this is an explicit CEPH competence. About 40% of survey respondents noted shifting to a greater focus on teamwork, and fewer than that on small-group learning. Three of the MPH programs interviewed explicitly noted the use of group work for learning (this was not an interview probe).

While two of the respondents specifically noted the use of point-in-time interdisciplinary group work as a way to support and meet Inter-professional Education expectations, one program spoke of using this method for integrated and applied learning; of note, this is a fully on-line program.

> *"All of the courses have exercises and scenarios. We put them in groups, everything is done virtually. So you have a group, you have an environment where you come in and talk and exchange and post all the time. In some classes we ask them to have a zoom meeting and record it and then submit the recording of the meeting so we know what is actually happening… In this way, students bring their own skills and their own experiences and they share." (MPH 3)*

iv. <u>*Use of IT*</u>

Building on the survey data where 41% of respondents noted using more IT to support learning, use of IT was explicitly mentioned as a pedagogical method by five of the MPH programs interviewed, as a way to spur student learning, and as a way to ensure access (accommodating disparate schedules, meeting both part-time and full-time students, allowing for multiple student sections to reduce class size, etc.). IT-driven methods being used by MPH programs to: recorded lectures, Zoom meetings, interactive discussion boards (both written, voice threads, and video up-loads), on-line case studies, interactive systems-mapping software, and virtual field trips.

> *"One of the reasons we're able to say our part time and full time coursework is the same is because we use the same course management platform for both online and onsite teaching. And so it's very interchangeable." (MPH 5)*

> *"We do outreach and outbreak epidemiology as opposed to just looking at an academic version of epidemiology. We make exercises very experiential. We have also said that we need to learn to work together remotely. And so we have an online component. We've built the online courses into the on campus courses so that they can all interact face-to-face and interact as they will in the future. Remote epidemiologists. They aren't going to all travel one location to do investigations." (MPH 6)*

> *"We have in-person and distance students, so we need to think about giving them the same experiences. We record every lecture and we put it online. And for those who can't come on field trips, we develop 360-degree videos to turn into virtual reality so they can feel it." (MPH 7)*

The one interviewed MPH program that is fully on-line noted that engaged and applied learning is at the heart of their school's mission. To support this, the school asks all faculty to record lectures that no more than 10-15 minutes long, and to then ask students to do an activity. Other respondents suggested that some students prefer the on-line options.

> *"So, students are not sitting there listening to us. We give them some concepts and then they practice them." (MPH 3)*

> *"We use Panopto for our onsite courses for lecture captures. It's amazing how many students would really prefer that." (MPH 5)*

v. <u>*Systematic Reflection*</u>

Systematic reflection, a process that helps deepen learning, particularly when using field-based and community engaged learning. Adoption of this method was noted by 42% of survey respondents, but only mentioned by two of the eight MPH programs interviewed (though this was not an interview probe). Interviewees shared that they use this method related to their community engaged learning approach, to help students develop professionalism and readiness for their APE.

vi. <u>*Student Mentoring + Practitioner Involvement*</u>

All MPH eight programs interviewed in Phase 2 described the use of student mentoring strategies, and/or the incorporation of practitioners into their curriculum to support and advance student learning; a variety of methods were shared that were grouped into four categories: inviting speakers, field-based mentoring, hiring of practitioners to join the teaching team, and staff-supported mentoring. This is in contrast to the survey data that

suggest just 38% of programs have focused on adding more practitioners over the last 10 years (it is not known how many already have practitioners engaged or on faculty).

Half of the MPH programs interviewed explicitly described completing their faculty expertise with invited speakers who actively work in the field in order to help students understand various contexts and realities, appreciate the breadth of public health, and be inspired to build their skills and expertise. A variety of fields or areas of practice of these speakers were noted, including: local/regional/state health departments, environmental scientists, people impacted by public health issues, community planners, senators, state representatives, business CEOs, factory supervisors, and hospital/clinical workers.

> *"I interview a lot of public health practitioners and I record interviews. How is your job? What do you do? What are the challenges? What would you recommend to students? What would be the best way to approach this specific problem? People talk about one specific project that they have been working on, and how they have a different perspective from another department. Then I integrate these interviews into our courses." (MPH 3)*

> *"We're interested in [guest speakers'] perspectives. We want students to understand that they have an opportunity to communicate ideas to these people. We want them to understand the skill set they need to do so." (MPH 6)*

Two MPH programs explicitly described the importance of field-based practitioners mentoring their students via their internship or APE experience. Something innovative that emerged in this area was the value and importance of developing long-term relationships between MPH students, faculty, and community partners, and thus the development of "triads" that help create a context for learning, inspire learning, and allow for application of learning in the field.

> *"I would say 90% of what they do is with their community partner; they are right up the road and we have a really strong relationships with them. Students are doing an applied project with the partner, and they're doing the curriculum at the same time. They're able to look at their project from a public health perspective, and work on it kind of 1:1 with community partner mentor." (MPH 2)*

To complement this, one MPH program also noted that they are shifting to invest more faculty time to support the APE experience, to ensure a standard approach, and deeper application of competence, and to help student develop professionalism, community connection, and skills that will help them transition into the workforce.

> *"An internship is required of everybody, regardless of where you get your degree and regardless of concentration. In the past, we had internship faculty advisors who, as part of their service responsibilities, helped students identify internships. [Now] we're shifting to a model where two faculty members will be assigned to the internship for a full year. It'll be part of their teaching responsibilities, not their service responsibilities. They will be responsible for working with the students in coordination with our MPH internship coordinator to provide more feedback on the documents and deliverables, and the progress reports. We're hoping that they'll get a little bit more in depth mentoring because the internship is a really important component of the MPH experience. I think many of our graduates will say this is the biggest thing, the most important aspect of the program. And that several years down the line, student aren't likely to remember specific courses or instructors, but they will definitely remember their internships. So we want to increase the support available to students for that." (MPH 4)*

Six of the eight MPH programs interviewed spoke specifically about a trend to hire more faculty with applied public health practice experience to support and expand applied teaching that has real world relevance, including individuals who have worked at state health departments, within government agencies, within community-based organizations, and those with professional training that augments public health. Specific reasons for this are that such professionals really know what happens in practice contexts, and have the ability to devise of and support real-world type experiences in the academic and classroom setting.

> *"What I've basically done is identify people who have the practice skills and kind of created a group, and they are the ones teaching. And, the practice based people are teaching more of the core courses. That's one thing that really changed." (MPH 7)*

> *"We have a lot of faculty searches going on right now… One of the things we're really looking for is someone that talks about application or that practice piece, and values community relationships, and isn't just focused on number of publications and grant writing. We're looking for someone who is more well rounded." (MPH 2)*

Finally, four MPH programs explicitly described also engaging staff to better support and prepare students for success in public health practice. This included for writing support, and for meaningful community engagement before and during the APE experiences.

vii. Phase 2 Summary

All MPH program interviewed noted changes to their pedagogical methods, and an emphasis on teaching approaches that build student understanding of the context related to public health needs, build student skills in areas relevant to the workforce, and help students develop competence through applied practice and mentoring. The areas of primary focus appear to be a shift towards more field based learning and applied practice, and the use of faculty or practitioner mentoring to deepen student learning, and help them develop into skilled and professional public health workers. All MPH programs interviewed described incorporation of field work into their curriculum—including field-based courses, more focus on the APE, and required service hours—as well as incorporation of real-world-like learning scenarios into classes to support applied learning, thus building the skills and abilities that are needed in the real world. The interviews did not specifically probe for teaching modalities, however IT seems to be becoming more integrated into teaching—to support access for all, and to facilitate learning, collaboration, team-work. Systematic reflection, to help students deepen learning, and teamwork, to support inter-professional learning, were also noted.

c) Phase 3 – Summary of Findings

Table XI, below, presents a summary of the data from Phase 1 and Phase 2 of the study, and overarching themes emerging as the data were integrated.

Table XIV - Section D3 Integration of Phase 1 and Phase 2 Data

How MPH Programs Are Shifting to Practice Focus – Pedagogy	
Phase 1 - Survey Data	**Phase 2 - Interview Data**
• Since Fall 2015: ▪ 65% changed ILE ▪ 63% changed APE ▪ 56% added authentic assessment ▪ 41% added more IT ▪ 42% added student reflection ▪ 40% added teamwork ▪ 28% integrate more practitioners ▪ 20% added field work - Change associated with program size (bigger) and age (older) - Changes being considered/ observed: more on-line courses, adapting ILE/APE, having more time in field with health departments or community partners, having more direct practice experience, and collaborating with other MPH programs.	• All programs made changes to better align with CEPH requirements, and to help build the skills and abilities students need to succeed in the workforce. • <u>Field-based learning</u> (including APE) - All programs use this approach - Seven programs emphasize via courses or field trips - Seven programs using community engaged learning; some also require 10s of hours of service - Noted value in advancing learning and community health, and preparing students for APE • <u>Applied practice</u> (incl. APE, ILE, authentic assessment) - All programs use this approach via real-world-like learning in the classroom (scenarios, case studies) - Teach, reinforce knowledge and skills; use real projects and practice to build competence/ability • <u>Small-group learning</u> - Noted by three programs (not a probe) related to IPE and via on-line programming • <u>IT</u> - Noted by five programs, to support access and learning - Meetings, on-line case studies, collaborative problem-solving, virtual field trips • <u>Systematic reflection</u> - Noted by two programs as a way to deepen learning • <u>Faculty and mentors with practice experience</u> - All programs emphasized this: invited speakers, field-based mentoring, hiring practitioners, staff mentoring - Emphasis on value of mentoring to support student learning and long-term student success
Phase 3 – Data Integration	
• Many MPH programs have made many changes to their pedagogical approaches since Fall 2015, but fewer report doing so when compared to other areas of change. • The most noted areas of change in the survey relate to change in APE and ILE requirements, and adding more authentic assessment. • This was expanded upon in interviews where an emphasis on field-based learning and applied practice, in general, emerged. Some of this is linked to course; some is co-curricular. • Programs report using these pedagogical approaches to build skills that are needed in the workforce, by using work-like activities, and complementing this with mentoring. Programs report doing more of this course-related work with health departments and other community-based public health partners, with the dual purpose of also advancing community health. • Other modalities, such as team work, IT, and systematic reflection are each being used by ~40% of programs to help deepen learning and/or increase equity in access.	

In sum, MPH programs are making shifts to their teaching methods and approaches to focus more on skills building and professional development. They are integrating specific content into courses, are offering specific courses for public health practice, and are explicitly integrating applied practice experiences into the curriculum.

MPH programs are adopting methods that support skills building and competence development, such as field-based or real-world-type learning aligned with applied problem solving. Some MPH programs are incorporating service or community engaged learning in courses to support student learning (community context, the social determinants of health, health equity, environmental health, and urban/rural disparities), competence development (contextual experience to help students build professional and soft skills) and community impact. Other MPH programs are adopting methods such as taking field trips; using real-world-type scenarios in the form of practical exercises, simulations, and case studies; and integrating real-life and current issues into campus-based work. Systematic reflection is being used by many MPH programs to help deepen learning.

To support learning, MPH programs are developing and utilizing applied problem solving opportunities that emulate real public health work, such as asking students to collect, find, analyze, and interpret data to develop and monitor programs or policy to promote health, and apply leadership skills to engage community stakeholders, support team dynamics, and work towards a shared vision. This is being done both in the classroom and via point-in-time events such as inter-professional education case competitions. To reinforce this learning, MPH programs are also adopting specific assignments to mimic public health practice, and while some MPH programs note that it can be hard to push

MPH faculty in this direction—particularly those who have had an academic/non-field-based career—but that students appreciate this approach. Related to this, MPH programs are hiring public health practitioners for teaching and mentoring.

Some MPH programs are partnering explicitly with communities, health departments, and community-based organizations to integrate public health needs, projects, and data into courses so that classes use and apply real time data and learning to the community for public health improvement; some of these activities bridge to a student's APE or ILE. All PH programs expect students to work in the field with public health practitioners (aligned with CEPH's requirements for the APE and ILE), and many also note the benefit of getting students off campus to experience the real-world; this comes in the form of field trips, volunteer or co-curricular requirements, and longer-term community-embedded work. MPH programs note the importance of this off-campus experience in orienting students to context, and how that helps deepen learning, allowing for better translation of content to other contexts, post graduation.

And finally, information technology and instructional technology is being leveraged to support and diverse learning opportunities and needs students have. These help ensure access (accommodating disparate schedules, meeting both part-time and full-time students, allowing for multiple student sections to reduce class size, etc.) and support engagement and learning (small-group learning, collaborative problem solving). This includes recording lectures, flipping the classroom, supporting field trips, and spurring student collaboration, mimicking real life collaborative problem solving. Some suggest that some students prefer the on-line options, and others suggest that this is an effective way to meet demand.

E. Question 3: What are the motivations for & desired outcomes from shifts?

Schools and programs of public health are implementing a number of shifts to their program design, curriculum, and teaching methods and contexts. The literature suggested a number of factors that could be motivating these shifts, including specific outcomes such as improving student learning, better developing student competence, assuring workforce readiness, supporting new graduate employment, ensuring student/graduate/employer satisfaction, and ensuring CEPH accreditation. These were used as *a priori* themes to guide data collection and analysis.

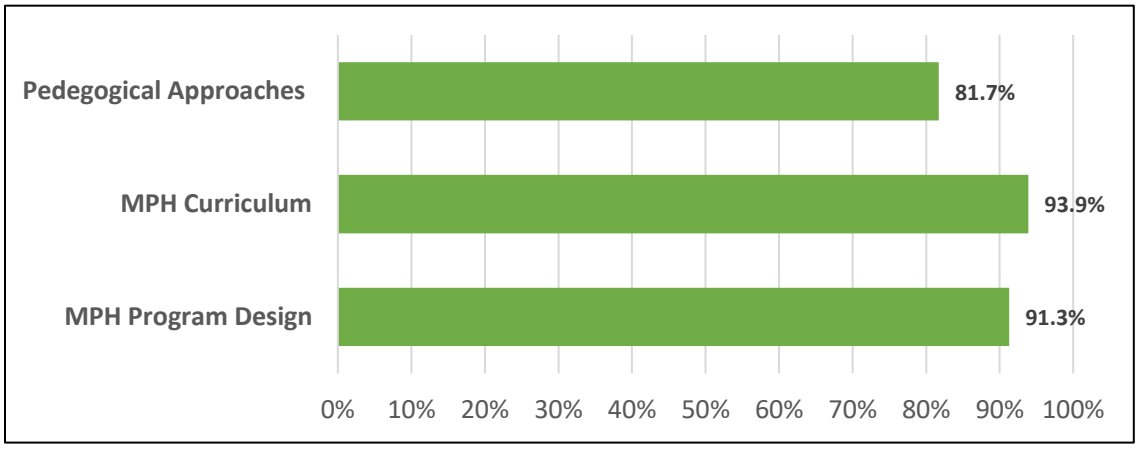
1. Phase 1 Findings

To develop an understanding of the motivations U.S.-based MPH programs have, to influence theses shifts, and the outcomes they hope to see as a result of these shifts, six questions were asked in the survey.

a) *CEPH Accreditation*

Anticipating CEPH accreditation as a motivator for and desired outcome from change, for each of the domains where shifts were assessed (MPH program design, curriculum, and pedagogical methods), respondents were ask to list why those changes were considered or implemented, and what results they hoped to see as a result of the shifts. As shown in Figure 22, CEPH accreditation is a very strong motivator: 90% of MPH programs reported that CEPH accreditation was the motivator for shifts in program design (n=104); 94% said it was the motivator for shifts in their curriculum (n=108); and 82% said it was the motivator for shifts in their pedagogical methods (n=94).

Figure 22 - Percent of Respondent MPH Programs Reporting CEPH Accreditation Requirements as Motivator for Changes in Program Design, Curriculum, and Pedagogy (N=115)



When stratified by program characteristic (type, size, ASPPH affiliation), some trends were noted (Figures 23-25), though they were not found to be significant (Appendix J – Cross-tabulations). For MPH programs within schools of public health, CEPH influenced proportionally more to make changes to instructional design than within stand-alone programs (Figure 23). When comparing MPH programs by size (Figure 24), only small MPH programs noted that CEPH did not influence changes to their curriculum or instructional design. Finally, CEPH proportionally influenced more ASPPH-affiliated MPH programs to make changes to instructional design than those not affiliated (Figure 25).

Via open-ended questions that followed, respondent MPH programs shared a number of outcomes desired as a result of the changes made. Using emergent themes, responses were grouped into three categories linked to the *a priori* codes: student outcomes (learning, competence, workforce readiness, employment) and program outcomes (graduate employment rates, satisfaction, and CEPH accreditation). An emergent code of curricular outcomes was also identified.

Figure 23 - Influence of CEPH on Program Changes, by Type of Change and by Program Type (N=109)

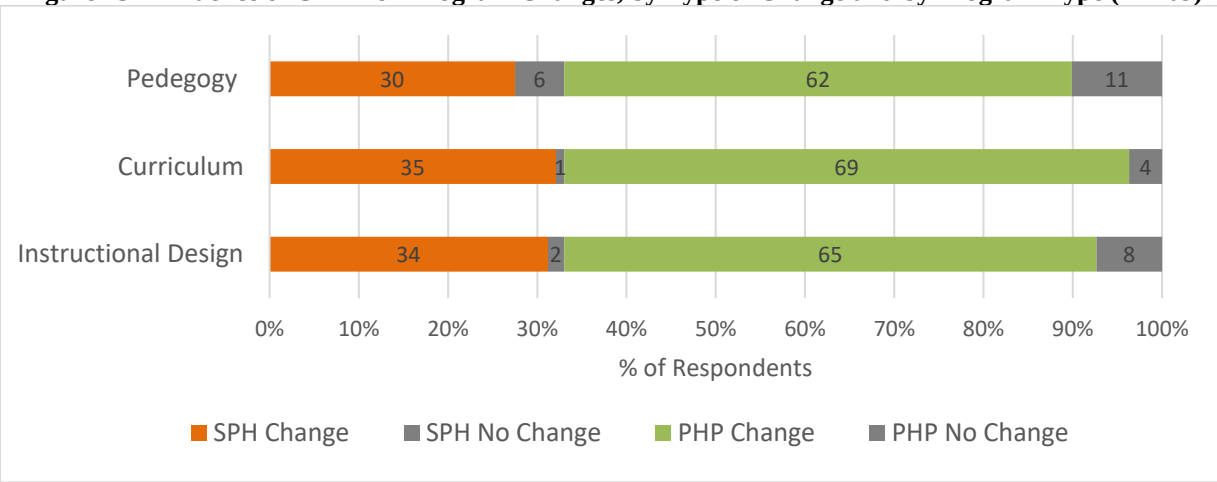


Figure 24 - Influence of CEPH on Program Changes, by Type of Change and by MPH Program Size (N=109)

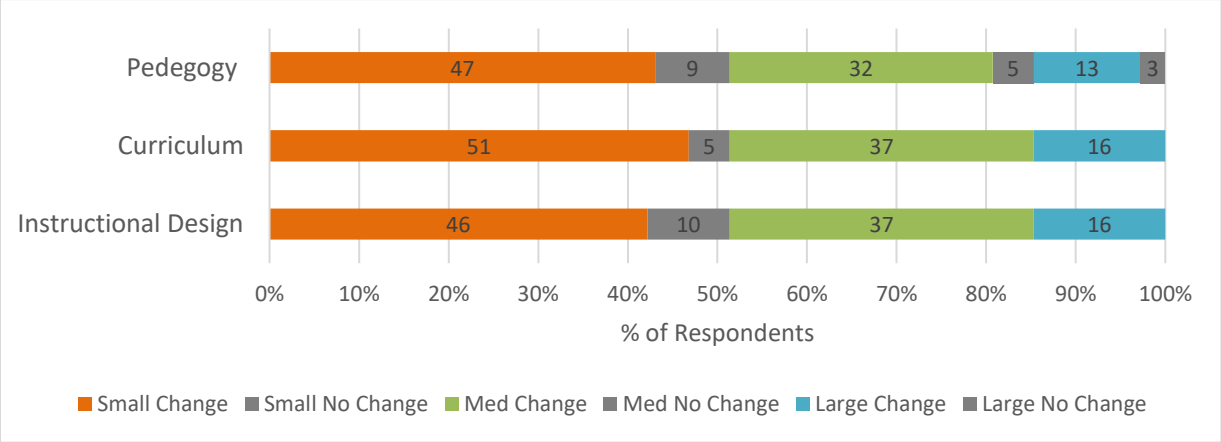
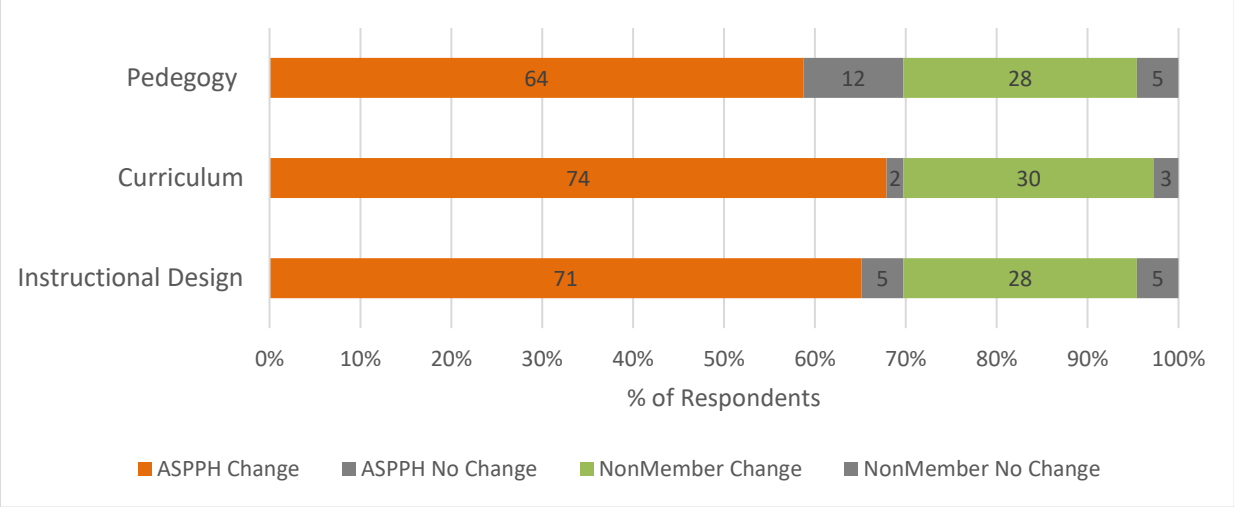


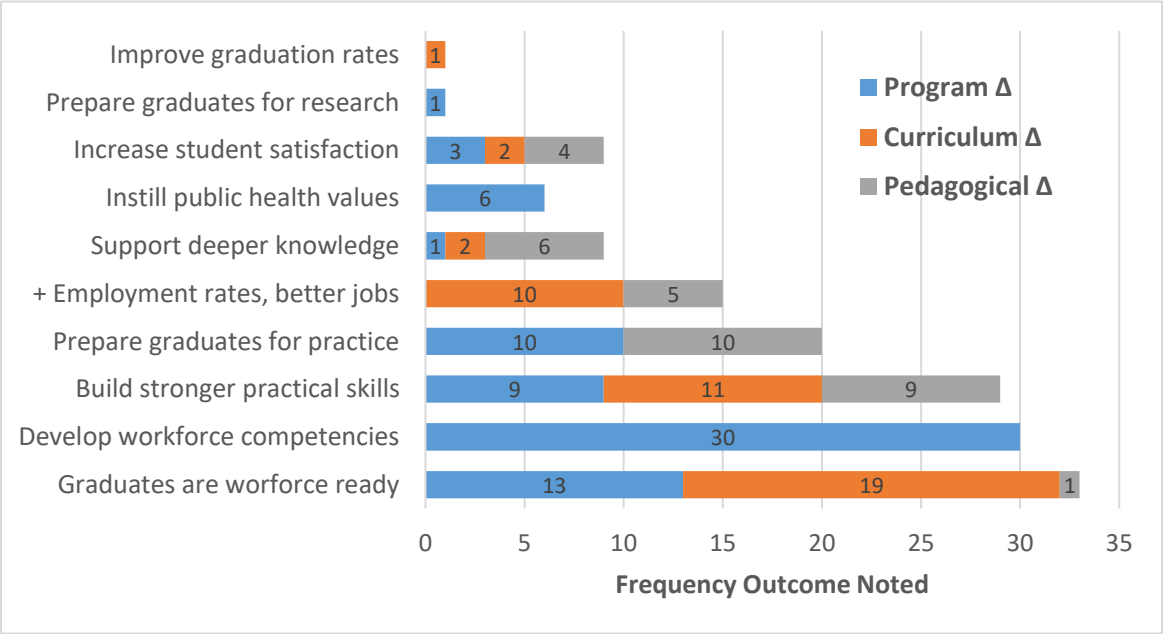
Figure 25 - Influence of CEPH on Program Changes, by Type of Change and by ASPPH Affiliation (N=109)



b) *Student outcomes*

Respondents shared 153 comments related to student outcomes they hope to see as a result of the shifts they've made or are considering. The open-ended responses were coded and grouped and are presented in Figure 26. The four most noted student-level outcomes that MPH programs hope to see as a result of shifts to program design, curriculum, and/or pedagogical methods are: to ensure graduates are workforce ready (n=33); to ensure focus on and development of the competencies required of the public health workforce (n=30); to help students develop stronger practical skills (n=29); and to prepare students to be able to translate and apply MPH-based learning to applied, real-world practice (n=20). The next most noted outcome was to increase graduate employment rates in better, more competitive jobs (n=15).

Figure 26 - Desired Student-level Outcomes from Program, Curricular, and Pedagogical Changes (N=153)



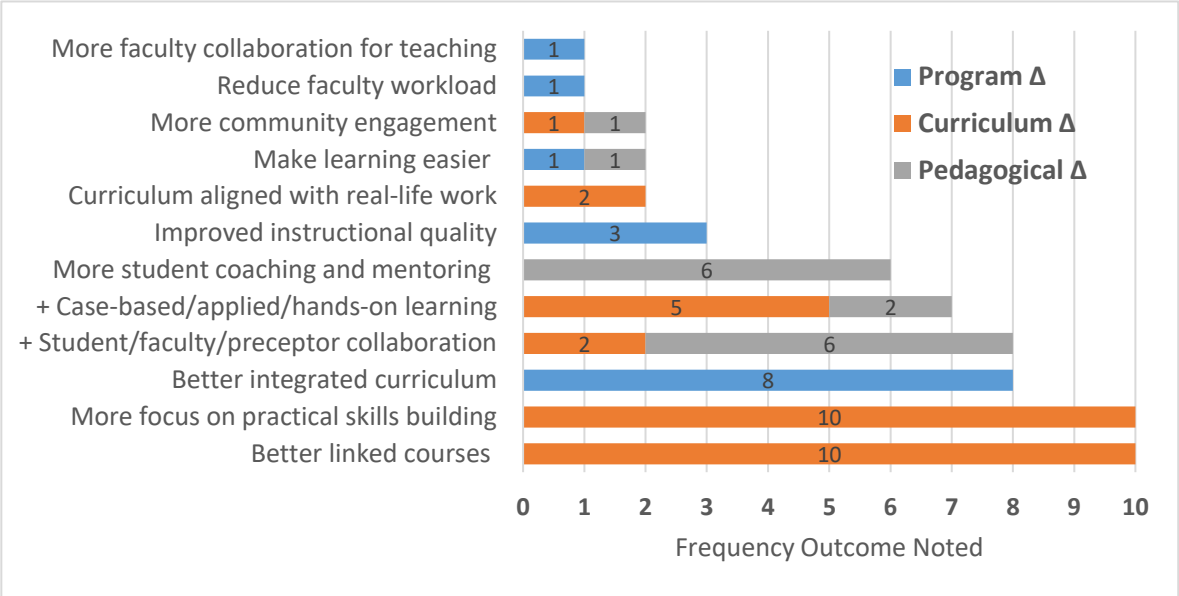
Specific skills that MPH programs hope to further build among graduates include: inter-professional collaboration, critical thinking, leadership, written and oral communication, self-directed learning, professionalism, integration of knowledge, problem solving, application of quantitative and qualitative methods, software, resilience, management and advocacy. Specific attributes related to workforce readiness that MPH programs hope to support include: understanding and being guided by the social determinants of health and health equity, being aligned with Public Health 3.0, being able to work in communities to provide meaningful service, and having the skills to serve as a Chief Health Strategist, and to support health impact.

c) <u>Curricular Outcomes</u>

Respondents shared 60 comments related to curricular-level outcomes they hope to see as a result of the shifts they've made or are considering at the program, curricular, and/or pedagogical level. The open-ended responses were coded and grouped via emergent themes. As shown in Figure 27, the three most noted outcomes that MPH programs hope to see as a result of shifts to program design and curriculum are: better integrated (n=8) and/or linked courses (n=10) that result in a more consistent, coherent, logically flowing and reinforcing curriculum that develops skills (n=10) and focuses less on theory, and more on application, practice, and performance. Respondent MPH programs also note that they seek to improve instructional quality (n=3), have a curriculum that is more aligned with real-life work (n=2), reduce faculty workload, and make learning easier. To achieve this, MPH programs envision specific pedagogy-linked outcomes including more faculty collaboration for teaching; more case-based and applied/hands-on learning (n=7);

more focus on faculty/student/preceptor collaboration; more community engagement; and more student coaching and mentoring (n=6).

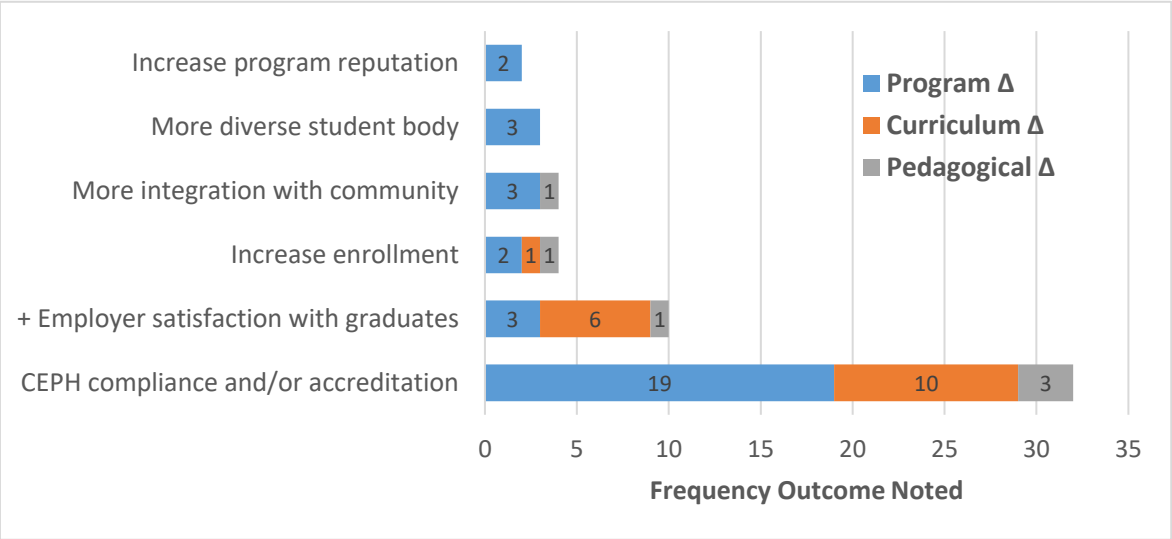
Figure 27 - Desired Curricular Outcomes from Program, Curricular, and Pedagogical Changes (N=60)



d) ***Program Outcomes***

Respondents shared 55 comments related to program-level outcomes they hope to see as a result of the shifts they've made or are considering at the program, curriculum, or pedagogical level. The open-ended responses were coded and grouped by themes and are presented in Figure 28. By far, the most noted outcome that MPH programs hope to see as a result of shifts to program design, curriculum, and/or pedagogical methods is to assure compliance with the CEPH accreditation standards and/or gain accreditation (n=32). The next most noted outcomes included seeing increased employer satisfaction with program graduates (n=10), seeing increased enrollment rates (n=4) and a more diverse student body (n=3), and changes such that more work with, or integration with, communities would be afforded (n=4).

Figure 28 - Desired Program-level Outcomes from Program, Curricular, and Pedagogical Changes (N=55)



e) ***Phase 1 Summary***

CEPH accreditation is a strong motivator of change, and a desired outcome from change, as reported by up to 94% of survey respondents. Via optional open-ended responses, respondent MPH programs shared a number of outcomes desired as a result of the changes made. Some 119 outcomes were noted related to program changes, 92 related to curricular changes, and 57 related to pedagogical changes; some of this decline is likely due to the succession of the questions, and the repetitive nature of describing why. Responses were grouped and summarized into three categories, including student outcomes, curricular outcomes, and program outcomes. Some 70% percent of the responses (n=187) were related to seven themes: MPH programs are implementing shifts: to ensure CEPH compliance and/or accreditation; help students build stronger practical skills; help students develop the competencies needed within the public health workforce; help graduates emerge from the program ready for the public health workforce; prepare

graduates to do practical public health work; and help students gain employment post-graduation in competitive jobs. Other outcomes that were noted less frequently related to increasing student and employer satisfaction; better knowledge acquisition; more hands-on and applied/real-life learning; and more collaboration between students, faculty, and preceptors; and integration of the MPH program with local communities.

2. Phase 2 Findings

Interviews with sampled Phase 2 MPH programs provided greater detail and nuance to the survey responses related to what is motivating the shifts MPH programs are making to their program design, curriculum, and instructional methods, and what outcomes they are hoping to see as a result. Interview responses were analyzed by *a priori* codes and grouped into two categories linked to the *a priori* codes: student outcomes (learning, competence, workforce readiness, employment) and program outcomes (graduate employment rates, satisfaction, and CEPH accreditation. Themes are summarized here, and supported by sample quotes (*in italics*); some quotes have been edited for length, clarity, and/or privacy.

a) Program Outcomes - CEPH Accreditation and Compliance

All MPH programs interviewed noted that they have made and are making changes to their MPH program design, curriculum, and pedagogical approaches to support and assure CEPH accreditation. However, each of the MPH programs noted that this was just one of the outcomes desired, and that the accreditation requirements may have in fact served as a motivator to rethink and re-prioritize other outcomes.

> *"We made these changes to submit our CEPH accreditation compliance report, and then we rolled it out. This year we'll make a few more tweaks." (MPH 5)*

> *"I think part of our job really is to figure out how to help our students achieve those competencies in a meaningful way as opposed to just checking all the boxes for CEPH for compliance reporting." (MPH 8)*

"If we don't do it then we don't get accreditation." (MPH 6)

b) <u>Student-level Outcomes</u>

For example, MPH programs are making shifts to improve <u>student learning</u>, and the student learning experience. MPH programs want to ensure that students gain foundational knowledge and the skills they need to "tackle public health problems, the most important public health problems" (MPH 5). This includes sifting so that the curriculum can focus more on: soft skills, technical skills, and practical skills; public health theories and concepts; skills to support collaboration and teamwork; and developing a contextual understanding of communities and their public health needs. MPH programs also note shifting course content and pedagogical approaches to help students prepare for and pass the CHP exam, and be successful in their studies (i.e., adapting it to accommodate diversity in matriculated cohorts), thus supporting <u>student satisfaction</u> with courses.

> *"I think our goal and our responsibility is to develop students and graduates that have that set of skills that are transferable across a variety of sectors."(MPH 4)*

> *"I feel strongly about is that we need to have public health theory and concepts, but we also need to have management. I have seen over the many years, professionals who are subject matter experts in their own discipline and then they get promoted to supervisory and directors. But if you don't have management skills and supervising skills, working with people and holding them accountable, it is setting you up to fail. So I thought that that was important and that's why my program has management courses in it because I want people to know how to do it." (MPH 3)*

> *"And sometimes you can only make changes so quickly. So, in the fall for example, we had a class in data management and one in biostatistics, and the latter was a nightmare. Our students who want to be public health practitioners really struggled. I mean all the students did well, but they were so overloaded. So were talking about changing that. We take student feedback, and we make adjustments." (MPH 2)*

The focus on improving student learning was not a stand-alone outcome of interest, but rather emphasized as a means to support improved student competence, and the ability to integrate and synthesize learning to apply it to a situation. Interviewed MPH programs noted that competencies are important, and are reflective of abilities that the public health workforce needs. MPH programs are making shifts to their curriculum and their pedagogical approaches to help students be able to apply their learning in real-world settings, including more collaboration with communities, and more faculty or practitioner mentoring. All MPH programs noted and referenced the CEPH competencies—and how meeting them is required for accreditation—while some also noted that they also pay attention to the PHAB competencies, as a way to ensure that their graduates are able to perform at a level expected within the accredited government public health workforce.

> *"With the students, I try to emphasize how these things are competencies and that they are important for their success in the workforce." (MPH 5)*

> *"As a program, I think have always done a good job helping students have strong analytical skills but maybe have not had strengths in some of the other areas. We've used this as an opportunity to change that, in line with national trends." (MPH 2)*

> *"When I look at the core competencies for public health professionals (PHAB), I'm like, this is exactly where we need to be looking at. So, we've tagged our curriculum to a tier two; we are training supervisors." (MPH 3)*

Interviewees focus on some [CEPH-defined] competence areas was emphasized: a focus on collaboration, community engagement, communication, and leadership to facilitate public health improvement. MPH program leaders described a desire to help students and graduates be equipped and able to collaborate on work and for problem solving, and to emerge from their MPH training able to engage, understand, and lead. This is a motivator of change related to what is being taught, and how it is being taught.

"The last meeting we had, there was a lot of discussion around wanting students to get more leadership skills and project management and budgeting and things like that. I said, that's something we're actually incorporating into MPH coursework now." (MPH 2)

"We really want to train individuals to tackle public health problems, the most important public health problems, We know that there's different ways in which you can tackle those problems. And so we really want to train individuals in the pathways that they want to go in, which are really either applied research practice or policy. And we try to have curriculum and opportunities that are available in all of those regards. We all want job placement. We want individuals who are successful in obtaining a job that meets their goals. We want them to have skills, and be able to get the job." MPH 5

"There's all kinds of positions that affect public health. So public health graduates must be trained sufficiently in all these areas to interact with others from various disciplines…. We want to see our students, from a leadership standpoint, able to practice public health with a real social justice lens wherever they are. Wherever students may find themselves… they're understanding it from a social justice issue. They're understanding the social determinants frame, the things that are really still part of anybody in public health, but we're looking for leaders who are willing to really focus on that… I am looking [to develop] people who can look through different lenses, and have priorities around inclusiveness and collaborative leadership, because in order to address the issues that need to be really addressed, we can't keep doing the same things that you've been doing." (MPH 1)

Finally, improved student learning and student competence was also emphasized as a means to support improved <u>student readiness for the workforce</u>. MPH programs want to see their graduates ready for the workforce: they want them to understand how things work, and be able to think independently, on their feet; they want their graduates to be able to enter and succeed within various fields of public health practice (governmental public health, and many other sectors), and to have the abilities needed to understand and address emergent public health issues; and they want to see their graduates to be professional, and identified as change-makers. MPH programs see a corollary outcome related to this: <u>employer and community satisfaction</u> with MPH students and graduates.

> *"We want out graduates to be able to hit the ground running…. So we've been intentional about how we can be much more applied in the classroom so that students have the ability to do that. You know, if they're going to get somebody who is MPH trained, they have certain expectations and their expectation is that you give them a project, you talk about it for the most part, they can take it on and come back to you with questions. We'll know success, if we hear from our community members that our students are better able to hit the ground running." (MPH 4)*

Graduate employment was an outcome of interest noted by all MPH programs interviewed, but more so as a motivator for investing in student learning, competence, and workforce readiness than as a stand-alone outcome. MPH programs noted the desire to have graduates employed in a variety of types of jobs (public and private sector); to help graduates be able to be successful in the areas of work or advanced study that they choose; to be able to garner recognition to be promoted; and/or to be able to translate their abilities to shift jobs.

> *"We need talented, skilled people in governmental public health. And we know that there are real deficits that are growing…We want and need our grads to be in those traditional settings. But, I also get very excited about our grad to end up in nontraditional settings. Those who end up in the for profit world who ended up in startups who end up doing social entrepreneurship. They're thinking about public health differently." (MPH 8)*

> *"I think about how we currently train the MPH students and their role in this new healthcare environment. Not to take away their important role in local, state and federal public health units and community based organizations, but maybe serving as more of a liaison between them. I see this as a real trend over the last few years, a mandate by the healthcare systems. We think about how we can do a better job of making sure that our students are aware of those opportunities… Many of our students will take that road to go into a healthcare setting." (MPH 4)*

> *"Most of our students are already working…. Then they get a higher level position. That's sort of the trend that I am seeing. Everybody gets hired to do some sort of related work, but then they have the MPH skills, so they can do more." (MPH 3)*

c) ***Phase 2 Summary***

Five key themes emerged as motivators for the shifts that MPH programs are making to their program design, curriculum, and instructional methods. The clearest motivator is CEPH compliance and accreditation. However, student outcomes were also a strong motivator for change, including devising of and implementing changes to ensure deeper student learning (so they have the knowledge and skills needed to tackle public health problems), and to ensure student competence in areas deemed important by the workforce so that they are ready to enter, and be successful in, the workforce. Again, respondents note that they want their students and graduates to be able to understand and address emergent public health issues in a professional way, and be identified as strategic leaders and change-makers envision and support collaboration and advocacy for change. MPH programs are also motivated by student, graduate, and employee satisfaction, and that graduates are able to work in, and be promoted within, multiple job sectors.

3. **Phase 3 – Summary of Findings**

Table XII, below, presents a summary of the data from Phase 1 and Phase 2 of the study, and overarching themes emerging as the data were integrated. MPH programs are implementing shifts to their MPH program design, their MPH curriculum, and the pedagogical approaches that they are using for teaching and learning. Motivations for, and desired outcomes from these shifts are many. Six *a priori* themes were identified in the literature—improve student learning, build student competence, ensure graduates' workforce readiness, support graduate employment, improve satisfaction, and support CEPH accreditation—and while there were all clear across both phases of data collection and analysis, they were not discrete outcomes, but rather linked to and reinforcing each other.

Table XV - Section E Integration of Phase 1 and Phase 2 Data

Desired Outcomes from Program Shifts	
Phase 1 - Survey Data	**Phase 2 - Interview Data**
• 94% of programs note CEPH accreditation motivates change, and a desired outcome from change. - CEPH had stronger influence on: ▪ Instructional design in SPH-based and ASPPH affiliate pgms (NS) ▪ Curriculum, instructional design in medium & large programs (NS) • Student level outcomes (N=153): - Workforce ready (n=33) - Competence development (n=30) - Stronger skills (n=29) - Translate learning to action (n=20) - Grad employment, good jobs (n=15) - *Specific skills*: inter-professional collaboration, critical thinking, leadership, management, written/oral comm., self-directed learning, professionalism, problem solving, use of quant + qual methods, software, resilience, advocacy. - *Workforce readiness*: guided by SDoH and health equity, alignment w/PH 3.0, able to work in communities to provide meaningful service, and having the skills to serve as a Chief Health Strategist and to support health impact. • Curricular outcomes (N=60): - Better course linkages (n=10), integration (n=8) - More focus on skills building (n=10) - More collaboration (n=8) - More hands-on learning (n=7) - More mentoring (n=6) • Program outcomes (N=55): - Accreditation (n=32) - Employer satisfaction (n=10) - Increased enrollment (n=4) - Increased community collaboration (n=4)	• Program outcomes: - CEPH compliance and accreditation is a strong motivator and a desired outcome. • Student-level outcomes: - Student learning and learning experience; their satisfaction. - Aim to build knowledge and skills to be able to lead change ▪ To support this, more support for knowledge, skills, abilities, success - This is linked to competence – the ability to apply knowledge and skill to do and achieve an outcome; MPH programs see competences as abilities needed by workforce ▪ To support this, more focus on application of knowledge and skill to solve problems ▪ As a part of this, programs are seeking to develop leaders, change-makers - This is linked to workforce readiness – students being able to enter and succeed in the workforce, in various governmental and other sector jobs
Phase 3 – Data Integration	
• MPH programs report that CEPH compliance and accreditation is a strong motivator for change, and a desired outcome from change. However, there are many other desired outcomes from the specific changes being made. • MPH programs also hope that changes will result in increased satisfaction (student, employer), enrollment, and collaboration with community partners, including health depts • MPH programs also hope courses and curricula are better designed to teach and reinforce knowledge and skills, and help to develop competence so that graduates are workforce ready, and get and succeed in good jobs. This includes development of change-makers and leaders.	

By and large, the most significant motivator for change at the program, curricular, and pedagogical levels was MPH programs' desire to meet CEPH complement and accreditation requirements. However, other desired outcomes were clear: wanting to improve the curriculum, wanting to improve student/graduate/employer satisfaction, wanting to increase enrollment, wanting to improve faculty/student/community partner collaboration, and most importantly, improve student knowledge, skills, and abilities, rendering them workforce ready.

To do so, MPH programs have invested in the aforementioned shifts to ensure that students acquire key and foundational knowledge and skills that can be synthesized and applied (competencies) so that they are successful in their workplace. MPH programs have made changes: to better align their curriculum with the CEPH competencies, the PHAB competencies, and the CPH exam requirements; to have more hands-on and real-world learning; to have more collaboration and mentoring; to help students build stronger practical skills; and to help students develop the competencies needed within the public health workforce. The motivations for this are to ensure that MPH graduates are "workforce ready", equipped with the tools and skills that they will need to succeed in the workforce. And, so that graduates have choice in their career pathways, so that they are employable and employed in competitive jobs, and so that they are recognized for their abilities to "hit the ground running." This is also seen as a way to improve graduate and employer satisfaction with MPH programs.

Finally, MPH programs are investing in shifts to help recruit, inspire, and deploy public health change makers. Individuals who look at public health in a new way, who are able to engage collaborators and constituents to understand opportunities and gaps, who are able to

draw on a diverse tool kit to facilitate collaboration, and who are able to invest in policy, systems, and environment change that addresses the status quo. MPH programs feel a commitment to help fill the existing gaps in the government public health system, but are also motivated to help their graduates lead change in complementary areas of public health, including healthcare settings, community-based organizations, academia, and the private sector.

F. Question 4: What is informing and influencing MPH program shifts?

Devising of and implementing changes to policies, programs, and practices is complex, particularly in contexts where there are multiple actors, influences, and foci. Universities are such contexts, where faculty, administrators, students, alumni, and stakeholders across different fields of study may have both shared and opposing priorities and visions. Frenk et.al. (2010) suggest that national policies inform change, and that university structures and processes influence change.[57] Further, Bronfenbrenner et.al. (1970) suggest that multiple forces at multiple levels that influence ability to access and interpret information, and plan and cultivate action.[5,16] To guide data collection and analysis, *a priori* codes of national, institutional, program, and individual facilitators/barriers were used.

1. Factors Informing Change

Many initiatives may be influencing change through engagement and dissemination of information via various fora. In addition to the new CEPH accreditation standards (national policy), national bodies such as CEPH and ASPPH hosts webinars, trainings, and conferences to highlight exemplars; ASPPH, de Beaumont Foundation, CEPH, and others invest in disseminating information through reports, webinars, press releases, and at conferences; and peer-reviewed literature related to instructional design in this new era of

public health training is beginning to emerge. Access to this information, and use of this information to inform change, can be influenced by university, program, and personal attributes.

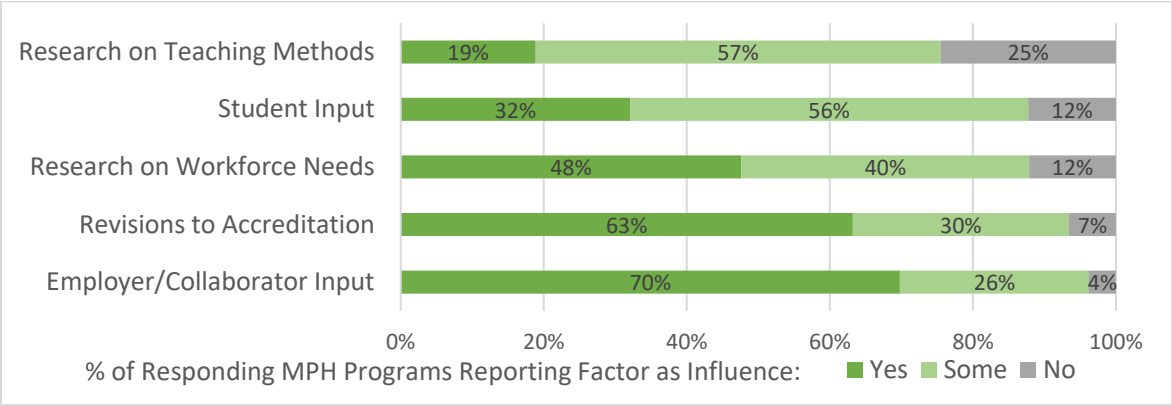
a) <u>Phase 1 Findings</u>

To understand what information sources MPH programs have access to, or are hearing, and to understand the factors that are informing shifts within MPH programs, three questions related information access at *a priori* levels (national, institutional, program, individual) were asked in the survey.

i. <u>Factors Informing Change</u>

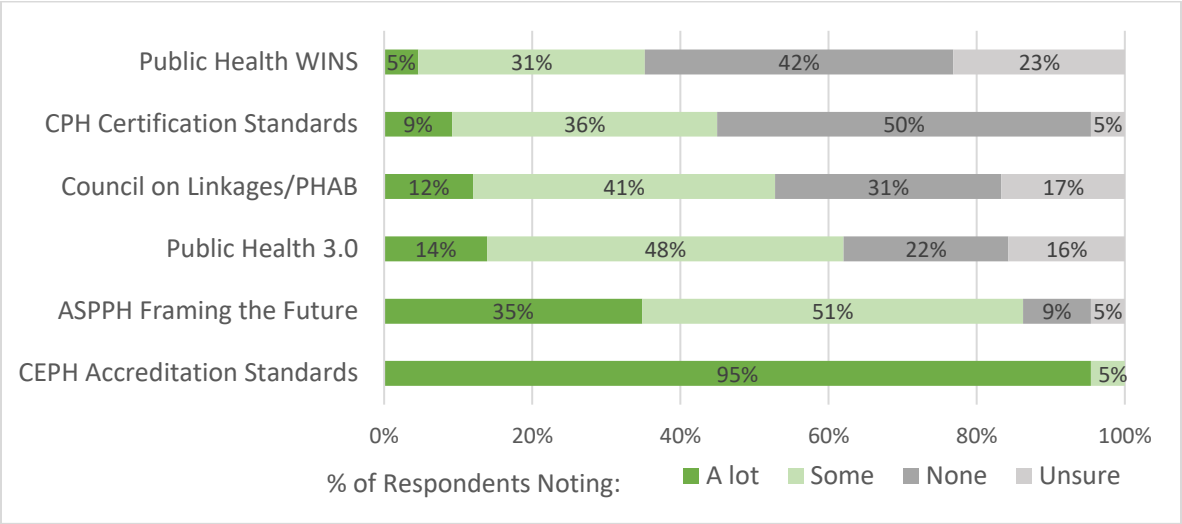
Respondents note multiple factors that are informing changes they are making to their MPH program to better emphasize training for public health practice. As shown in Figure 29, this includes: employers or collaborators input (96% report somewhat or a lot of influence); revisions to MPH Program accreditation standards (94%); research that suggest the public health workforce needs more professionals with different skills (88%); student input (88%); and pedagogical literature that suggests practice-based learning for adults and/or health professionals (76%). When responses were grouped (influence (yes, some) vs. no influence) and analyzed across strata (MPH program type, size, age, or affiliation with ASPPH), responses were not found to be significantly different, suggesting no association between strata and degree of influence (Appendix J – Cross-tabulations).

Figure 29 - Factors Influencing Shifts Towards Focus on Practice (N=109)



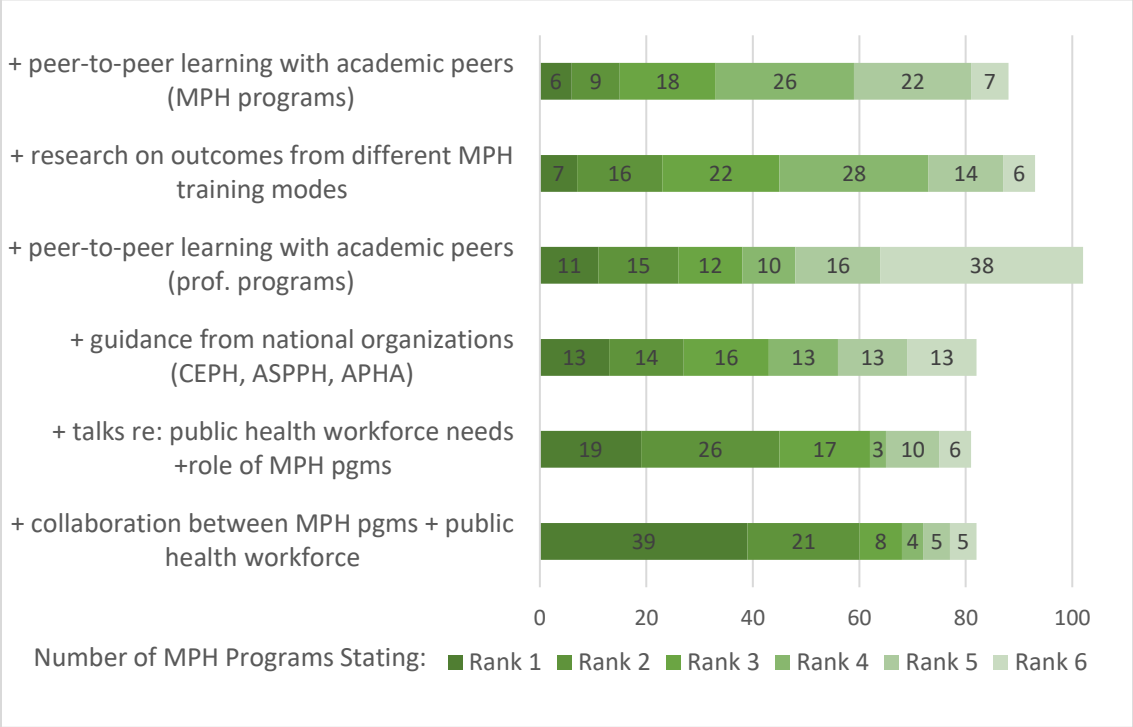
In addition, respondents are aware of, and guided by, a number of national initiatives. When asked about specific national public health initiatives and calls to action, and the influence they have on MPH program design, respondents noted that the CEPH accreditation standards have a substantial degree of influence: 95% of respondents said "a lot" (n=104) and 5% said "some" (n=5). After that, ASPPH's Framing the Future initiative seems to have the next most influence (35% a lot; 51% some), followed by Public Health 3.0 (14% a lot; 48% some), and the Council on Linkages/PHAB standards (12% a lot; 41% some). The CPH standards and PH WINS appear to have the least influence (51% and 42%, respectively, say they have no influence (Figure 30). When responses were grouped (influence (a lot, some) vs. none/unsure) and analyzed across strata (MPH program type, size, age, or affiliation with ASPPH), responses were not found to be significantly different, suggesting no association between strata and degree of influence (Appendix J – Cross-tabulations). Further analysis related to each factor suggests that there is an association between ASPPH affiliation and influence from Framing the Future (X^2_1 = 4.38, P = .04), and an association between not being affiliated with ASPPH and influence by PH WINS (X^2_1 = 6.42, P = .01).

Figure 30 Awareness of, and Degree of Influence of Various Initiatives on Changes to MPH Program Design (N=109)



Finally, MPH programs were asked to rank the importance and value of various strategies that could help inform MPH programs, allowing them to become even better equipped to develop the workforce of the future. As shown in Figure 31, between 70% and 89% of respondents provided their input for each of the six strategies. While "more peer-to-peer learning with academic peers in other professional training programs (MBA, MD, MHA, etc.)" and "in other MPH programs" received many ratings, these were ranked as the least important strategies by 54 and 29 respondents, respectively. Conversely, whether considered via rankings of 1, 1+2, or 1+2+3, "Stronger collaborations between MPH programs and the public health workforce", "More conversations around public health workforce needs data and the role MPH programs could play", and Stronger guidance from national organizations (eg. CEPH, ASPPH, APHA)" were at noted as the most valuable strategies (ranked as top 2 by 60, 45, and 27 respondents, respectively), followed by "More research on the outcomes seen from different MPH training approaches." Responses were not found to be significantly different when considered by MPH program type, size, age, or affiliation with ASPPH.

Figure 31 - Suggestions for How MPH Programs Can Become Better Equipped to Develop Future Workforce



ii. <u>Phase 1 Summary</u>

MPH program changes are being informed by multiple factors including: student input, employers/collaborators input, the revised CEPH standards, published or inferred public health workforce needs, and pedagogical literature. National initiatives, such as the new CEPH standards, ASPPH's Framing the Future initiative, Public Health 3.0, and the Council on Linkages/PHAB standards also inform change. Of note, the CPH standards and PH WINS appear to have little influence. To support a better understanding of needs, to help inform future changes, MPH programs suggest stronger collaborations between MPH programs and the public health workforce, more conversations around public health workforce needs data and the role MPH programs could play, more research on educational outcomes, and stronger guidance from national organizations (eg. CEPH, ASPPH, APHA).

b) Phase 2 Findings

The survey findings were complemented by more nuanced input gathered through Phase 2 interviews. Interviewees shared more input related to what has informed their specific MPH program, and the changes that they've made. Interview data were coded and grouped by *a priori* levels (national, institutional, program, and individual). Themes are summarized here, and supported by sample quotes (*in italics*); some quotes have been edited for length, clarity, and/or privacy

i. National Level

Similar to Phase 1 data, across the board, the CEPH accreditation standards were the most commonly cited factor informing conversations and actions related to program changes, noted numerous times by all programs. Respondents noted that the accreditation standards helped to inform what the purpose and focus of an MPH program should be—namely, a greater focus on practice—which then informed planning and action. At a macro-level, respondent programs noted that this information helped programs (re-) define their areas of expertise and their program's particular area of focus (such as concentration areas), and helped to inform the importance of hiring more practitioners, and fostering greater collaborations with community and practice partners for teaching and learning. At a curricular level, the standards helped inform what content needed to be a part of the curriculum "because we have to, to be accredited," and informed how to adjust courses to cover all requisite materials, and to incorporate methods that would help assure competence development and assessment.

> *"The voice that that informs change the most? Well, of course CEPH, and accreditation has a major impact. The 2016 competencies really made the ground level shake." (MPH 6)*

> *"…The change in the CEPH criteria for accreditation. I think that forced everybody, including us, to take a very close look at our curriculum and really think about what we were doing, what we were doing well, what maybe we weren't doing, what we had to shift how we were doing it." (MPH 4)*

Also in line with the survey data, national initiatives were explicitly noted by six of the MPH programs interviewed; these included being members of and working as a part of peer networks linked to ASPPH, the Council on Linkages, and to a lesser extent, the Society for Public Health Education and the NBE's CPH initiative. Respondents noted that these peer-to-peer learning and national organizations helped them contextualize and operationalize the accreditation standards, understand national trends, and overcome barriers. Some specific examples given include: becoming more aware of what skills are needed by graduates to succeed; developing a deeper understanding of what "practice" means; how to be a successful practitioner in an academic environment; and how to modify MPH program curricula to meet the needs of incoming student cohorts.

> *"That was the focus of a whole session at the ASPPH meeting last summer - how do you calibrate your curriculum with this challenge [integrating undergraduates with public health training into MPH cohorts]? Because even programs that don't have undergraduate public health are admitting an increasing number of students who have public health background from other institutions. I think that is forcing all of us to take a look at our curriculum." (MPH 4)*

> *"I'd say a key influence there is ASPPH. I've been active in ASPPH for some years… ASPPH and those peers are simply invaluable. And that community is just essential to doing our business. These are the other public health schools and programs in the country. And these are the people struggling with the exact same issues as we are. And there's some really tight analogs, other programs located in medical schools, roughly the same size. There are not so tight analogs, the big schools, but there's something to learn and lots to share with all of those folks." (MPH 8)*

Building on this, three of the MPH programs interviewed explicitly noted being informed by literature related to workforce needs, leadership, and pedagogical best practices. This

included reports generated by ASPPH and the CoL, research being reported in peer review journals, and 'trade-type' publications.

> *"I sign up all of the newsletters that you can imagine. Public Health Foundation, Gallup, news, Mendeley, Harvard Business Review, Emotional Intelligence posts, department of health newsletters, alumni associations, anything I can find. I read everything and I look at the new research. I spend a lot of time reading because I want to know what the new tools are, what is happening, and in what way I can incorporate in my courses." (MPH 3)*

Finally, all MPH programs interviewed noted being informed by trends that they read about, see, and experience, including collecting and using input from students, graduates, community partners, and advisory committees. This includes being aware and mindful of the types of students they are seeing in their programs, the types of jobs that they see their graduates going to (and the skills that are needed), and the skills or expertise that they hear the workforce needs, either from the literature or from their experience working with community partners.

> *"I think that the community, the public health community is a big influence on what we do, and the changes that we make in the program." (MPH 3)*

> *"I think there are two main external factors that I see driving this, keeping the pedal down for us in terms of having to do this continual review and modification…. the other thing is the growth of undergraduate public health programs and the increasingly large percentage of our incoming student body that has some public health background from their undergraduate degrees. That's changing our cohort, and what we need to do in response." (MPH 4)*

ii. Phase 2 Summary

Input from the MPH programs interviewed aligned with the survey data in that MPH programs reported being informed by the CEPH accreditation standards, national initiatives, organizational membership, program-specific input, and literature. MPH programs felt that this information has helped to re-focus the MPH on training graduates

for practice, and that the defined requirements have helped programs refine their focus. Three quarters of the interviewed MPH programs reinforced the value of being affiliated with national peer networks, such as ASPPH, the Council on Linkages, as their peers, conferences, and webinars helped them contextualize and operationalize the accreditation standards, understand national trends, and problem solve to overcome barriers. Across the board, all MPH programs interviewed talked about collecting and using input from students, graduates, community partners, and advisory committees to modify and improve their programs.

c) <u>Phase 3 Findings – Summary of What is informing MPH program shifts?</u>

Table XII, below, presents a summary of the data from Phase 1 and Phase 2 of the study, and overarching themes emerging as the data were integrated. Shifts that MPH programs are making are being informed by multiple factors. The three most cited factors include input from employers/collaborators/students, the CEPH accreditation standards, and research on workforce needs and pedagogical best practices. However, the most influential factor is the accreditation standards, as respondents see accreditation as an important factor in their program's success.

To complement the policy-driven influence of the accreditation standards, respondents are aware of and informed by national trends related to workforce needs. The new CEPH accreditation standards, along with Framing the Future, have had the most influence in respondents, followed by Public Health 3.0 and the Council on Linkages/PHAB standards. The Certified in Public Health (CPH) standards and the Public Health Workforce Interest Needs Survey (PH WINS) appear to have little influence, at least presently.

Table XVI - Section F1 Integration of Phase 1 and Phase 2 Data

Factors Informing Change	
Phase 1 - Survey Data	**Phase 2 - Interview Data**
• Information from multiple levels informs change: ▪ 96% informed by stakeholder feedback ▪ 94% informed by CEPH standards ▪ 88% informed by research/ literature ▪ 88% informed by student feedback • MPH program leadership are informed and influenced by national initiatives: ▪ 100% by CEPH standards ▪ 86% by Framing the Future ▪ 62% by Public Health 3.0 ▪ 53% by CoL/PHAB ▪ 45% by CPH ▪ 36% by PH WINS - ASPPH affiliate associated with being informed by Framing the Future - Non-ASPPH affiliate associated with being informed by PH WINS • MPH program leadership could use more information from (n=count of rank 1-3): ▪ More collaboration with workforce (n=68) ▪ More discussion re: MPH role in workforce development (n=62) ▪ More research on outcomes (n=45) ▪ More guidance from national organizations (n=43)	• All programs noted that CEPH accreditation standards inform change - More of a focus on practice - What needed to be done to get there • All programs noted use of input from students, graduates, community partners, and advisory committees, and using that to inform action. • Six of eight programs National level initiatives informed change, both the documents/reports, and involvement in the process - ASPPH, Council on Linkages, Society for Public Health Education, CPH initiatives - Respondents noted the value of learning from each other (peers). • Three programs also spoke about being informed by literature, including peer-reviewed research and calls to action.
Phase 3 – Data Integration	
• MPH programs use multiple sources of information to inform change. • Stakeholder feedback, the CEPH standards, and research were cited as important information sources by most programs, allowing programs to understand trends and needs. • Information from, and participation in, national initiatives is also important, particularly CEPH, ASPPH, Framing the Future, Public Health 3.0, PHAB/CoL, and CPH. • MPH programs feel they will be even more informed with more collaboration with the workforce, and more explicit discussions around how MPH programs can have a stronger role in workforce development. This is notable as only about one-third of survey respondents note that they are informed by PH WINS, a tools to guide workforce development.	

Part of the influence of being informed appears to be due to access to information, meaning respondents have access to key information to help them stay informed through membership with national organizations or initiatives (ASPPH, CoL, SOPHE), conference participation, and access to the literature. But, a large part of being well informed appears to be due to peer-to-peer networks and learning that happen through the national organizations. Respondents note the value of learning with and from each other, and building on successes and lessons learned, especially as many aspects of public health are in a time of flux.

To be better informed in the future, survey respondents suggest more and stronger collaborations between MPH programs and the public health workforce, and more conversations around public health workforce needs data and the role MPH programs could play. This could be well facilitated by national membership organizations. Respondents also believe that stronger guidance from national organizations (eg. CEPH, ASPPH, APHA) and more research on the outcomes seen from different MPH training approaches could facilitate this learning.

2. Factors Influencing Change

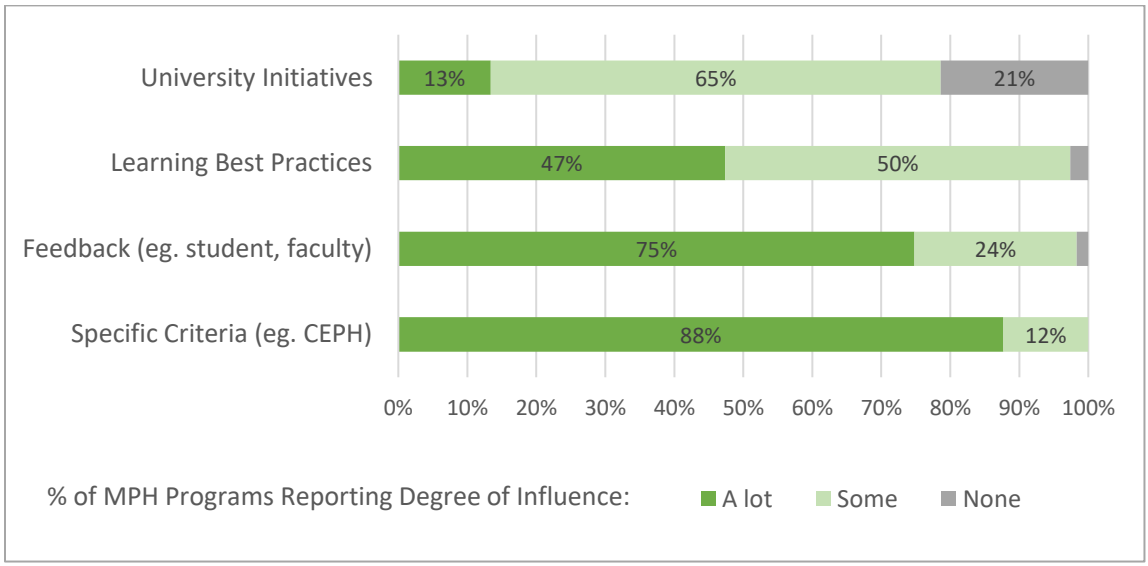
The literature suggests a number of factors that may inform and influence (facilitate or limit) shifts in support of transformative learning, competence development, and workforce readiness, including national policy and mandates, invitational and organizational characteristics, program and workplace culture, and individual understanding and motivation. These *a priori* segments were used to guide data collection and analysis.

a) Phase 1 Findings

Factors that are influencing (facilitating or limiting) shifts within MPH programs were gathered via eight questions in the survey. Overall, MPH programs report that program changes are very strongly influenced and supported by needs to meet specific criteria, such as accreditation requirements (100% note this as an influence, with 85% noting "a lot" of influence); and in response to feedback from graduates, employers, faculty, etc. (98%; 75% "a lot") (Figure 32). Changes to program design are also influenced by learning new or best practices (97%) and/or due to specific university initiatives (79%). Overall, there is an association between being a stand-alone MPH program and using input (all types) to influence change ($X^2_2 = 6.79$, $P = .03$) (Appendix J – Cross-tabulations). At a factor-specific level, stronger influence by university initiative or specific criteria were not associated with MPH program characteristic. However stronger influence by stakeholder feedback was associated with being from a stand-alone MPH program ($P < .001$) and not being affiliated with ASPPH ($P = .002$); and stronger influence by learning best practices was associated with being from a stand-alone MPH program ($P = .01$).

Further detail was elucidated by asking which factors specifically influence MPH program shifts in instructional design, curriculum, and teaching methods. Accreditation requirements appear to be the strongest influence across all categories, with 90% of respondents saying they influenced instructional shifts (n=104), 94% saying they influenced curricular shifts (n=108), and 82% saying they influenced pedagogical shifts (n=94).

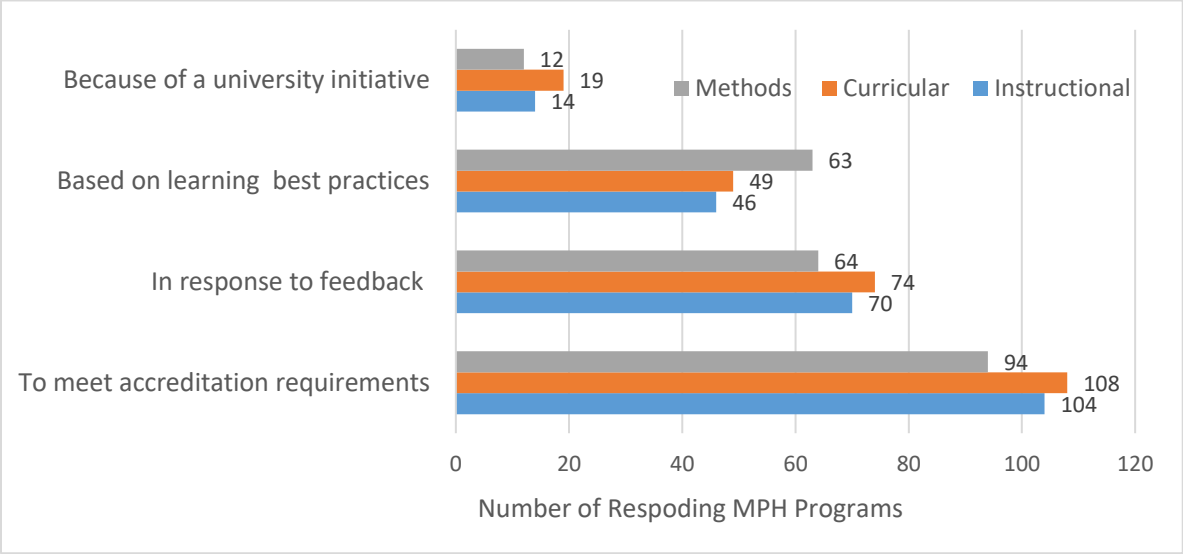
Figure 32 - Degree to Which Factors Influence Program Changes (N=109)



As shown in Figure 33, MPH programs also appear to be influenced strongly by feedback they receive, including from students, faculty, and graduate employers: 61% of respondents noted this input influenced instructional shifts (n=70), 64% noted it influenced curricular shifts (n=74), and 56% noted it influenced pedagogical shifts (n=64). Learning new or best practices influenced shifts at 40% to 55% of responding MPH programs (with the greatest influence being on pedagogical shifts), while university initiatives influenced shifts at 10%-17% of responding MPH programs.

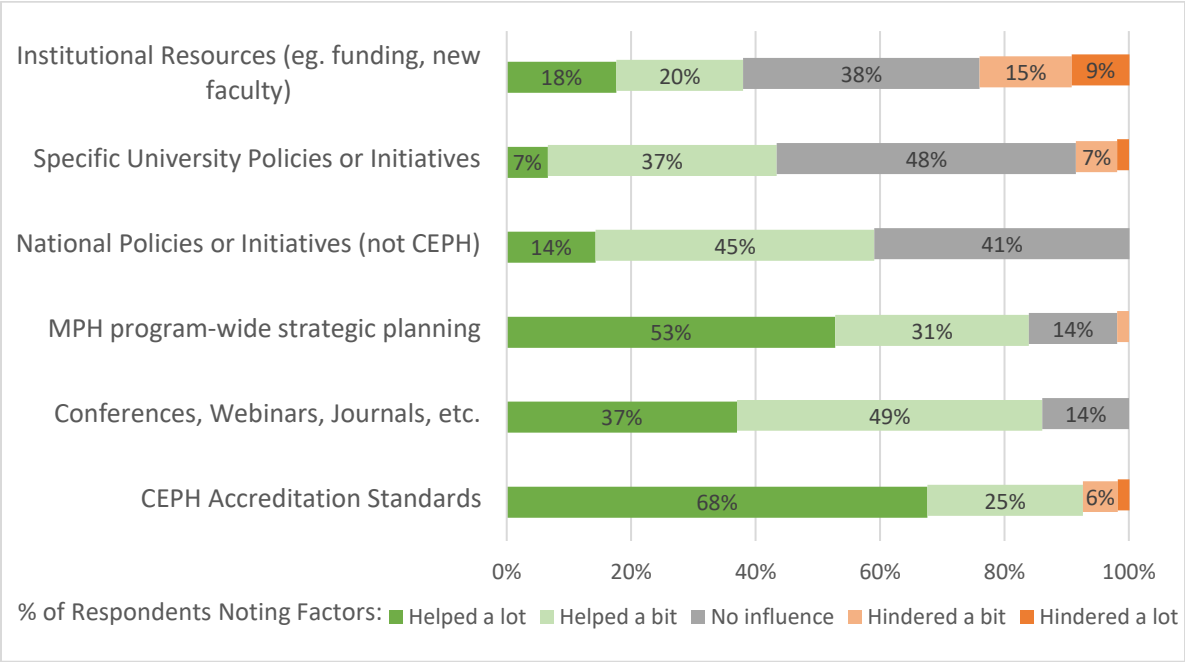
Finally, respondents were asked to note, in general, what helped them and their colleagues conceive of, plan, and/or implement the changes they noted in the survey. The three factors that had the strongest influence in facilitating change include: the CEPH accreditation standards (93% noted it helped); participating in continued development via conferences, webinars, and journals (86% helped); and MPH program-wide strategic planning (84% helped).

Figure 33 - Number of Respondents Listing Reasons Shifts are Considered or Implemented by MPH Programs, by type of change



Conversely, as shown in Figure 34, 24% of respondents noted that institutional resources, such as funding and faculty numbers, was a barrier to change. Other noted barriers were specific university policies or initiatives (reported by 9%), the new CEPH accreditation standards (reported by 8%). Responses were bucketed (helped, no influence, hindered) to test for association. While overall responses were found to be heterogeneous by program characteristic (Appendix J – Cross-tabulations), a few factor-specific associations were noted: National initiatives other than CEPH are associated with influence on change in stand-alone MPH programs (X^2_1 = 4.83, P = .03); Strategic Planning was associated with influence on change in younger MPH programs (P = .004); and Continued Education (conferences, webinars, journals) was associated with influence on change in stand-alone MPH programs (P = .006).

Figure 34 - Factors that Facilitate or Limit Change Within MPH Programs (N=108)



Via two open-ended questions, a variety of other facilitators and barriers were noted. They were segmented by *a priori* levels: national, institution, program, and individual levels.

i. *<u>National Level Facilitators</u>*

CEPH, and the new accreditation standards were noted as a facilitator of change (n=8), particularly that they served as an impetus for change that may have been overdue, or not-yet-supported by senior administration.

> *Using national accreditation requirements from CEPH as an impetus for change has been hugely beneficial (Graduate School faculty/leadership are less likely to question necessary changes); Supportive departmental/Program leadership who recognized the need for change; Size and nimbleness of our Program has made internal Program change easier; Participation in ASPPH/CEPH trainings, meetings, retreats, and webinars (Survey Response)*

One respondent also noted that a facilitator of change and program-specific innovation is an increased competition for students.

ii. *National Level Barriers*

As a barrier, CEPH, and the new accreditation standards were also noted as a barrier to change (n=10), where the requirements were seen as a burden (n=5), and where the "*prescriptive criteria limit flexibility*." This was noted in relation to not having enough space or time in a 42-credit program to meet the core curricular requirements and still have room for electives and special topics (n=2), and where publication of the new CEPH foundational competencies then required "*an almost complete overhaul of our concentration competencies*." One respondent noted that while the standards helped in some ways, they also hindered change as "many faculty were resistant to making changes based on an external mandate;" others noted the challenges or barriers to change due to the aggressive timeline that required many resources.

iii. *Institution-Level Facilitators*

One respondent recognized that being from a small program facilitates change as they are "nimble" and able to adapt. Others noted the importance of resources.

iv. *Institution-Level Barriers*

By far, the most noted barrier to change was *access to resources* (n=59), including faculty (n=20), time (n=19), funding (n=12), and support staff (n=2). Related to *faculty*, respondents noted not having enough to teach, to develop new courses, to advise, or to lead change, particularly considering the intricacies and demands of integrated, scaffolded, cohort-based curricula. Respondents also noted a need for stronger leadership and administrative support (n=8), and a desire or need for "Strategic Planning" (n=16) that can influence institutional and structural change. Respondents noted lack of support (n=4) and bureaucracy and policies limiting change (n=2); some of this due to the

placement of a professional program (MPH) in a unit where PhD training is the norm (n=4): "*there is discordance with the PhD approach*" and this limits programs' ability to "*make changes, and to obtain resources necessary*," including related to hiring. One respondent noted that their graduate school will not allow them to emphasize practice.

> *"There is a bit of a dichotomy in how public health schools/programs operate and are structured. Research (PhD) trained faculty, with depth of expertise, primarily teaching MPH students, most of whom need breadth of knowledge and APPLIED skills and do not go on to get a PhD or do research. More practice-based faculty/mentors or pracademics will be needed, but many of our research institutions are not structured to promote or reward faculty in these roles. Most Schools/Programs, largely understandably, will feel the need to protect existing faculty, rather than allocate limited resources or teaching effort to practice-based faculty/mentors. While practice-based mentors are always welcome, there often aren't resources to compensate them for their time/effort, which needs to be acknowledged and rewarded. While the 2016 CEPH accreditation criteria are a step in the right direction, many universities' primary focus on public health faculty obtaining NIH funding will need to shift." (Survey Response)*

Finally, some respondents (n=3) noted that a barrier to change is the size and complexity of the units they are a part of, where there are many options, many departments, and many silos that need to be aligned to make the new CEPH-driven changes work.

v. <u>Program Level Facilitators</u>

The most frequently noted facilitator of change was faculty, noted by 25 respondents. This includes having new faculty with new ideas and new energy (n=6); having old faculty retire (n=3); and being able to design and use processes to gain faculty buy-in (n=9) and to help them, and their input, lead the change (n=3). Respondents specifically noted the value of faculty who are invested in student success, who show interest in and engagement with competence development, and this, faculty who are willing to spend time considering and making changes in their courses. There was some recognition of how adjunct faculty add value in this respect.

Respondents also noted the value of having the right program leadership (n=6), and the value of investing in strategic planning (n=7). This included recognizing the value of leadership that has "significant practice background" (vs. a research focus) (n=3), and the ability to help administration (n=2) and program teams (n=6) both recognize the need for change, and then come up with a new vision and a new plan. One respondent shard the value of bringing in a 'change leader' consultant "who helps us work regularly on programmatic quality control and who has helped us refine and revise our vision, mission, goals, and values" while another spoke of task forces that were named to identity and lead change. As a part of this, many respondents spoke of the value of peers and partner input, including student feedback and engagement in change (n=3), community partner input (n=2), alumni input, advisory board input, and being able to get input from other MPH programs, other MPH program directors, and from ASPPH/CEPH trainings, meetings, retreats, and webinars (n=4).

vi. Program Level Barriers

As noted above, faculty resource (numbers) were seen as a barrier to change; likewise current faculty who are resistant to change act as a barrier (n=19). Resistance centered around change in general (happening too fast, too many changes, wanting to do what had always been done, and resulting in something that is too different), and also around experience as "faculty trained as academicians have more difficulty with change than faculty initially trained as practitioners." Related to time, respondents noted that changes (buy-in, preparation, monitoring, and adaptation) take a lot of time, and many feel that they are already spread thin. CEPH-driven "need to have" changes needed to be prioritized over "nice to have" changes.

Student-centered decision-making also appeared to result in barriers to change (n=9), meaning programs did not move forward with specific changes due to the effects it might have on program feel, student experience, student burden, student work load, equity in access (dual-degree and part time students), program cost, or long-term student success.

vii. Phase 1 Summary

Facilitators of and barriers to change within MPH programs are apparent at and from multiple levels within MPH programs at the national, university, program, and individual levels. National CEPH accreditation requirements are largely seen as a facilitator of change. Organizational characteristics, processes, resources, and particularly leadership both facilitate and limit change, as does the workplace culture of an MPH program, including its leadership, faculty, and practices.

b) Phase 2 Findings

These survey findings were complemented by more nuanced input gathered through Phase 2 interviews. The eight MPH programs interviewed shared a large number of barriers and facilitators across different *a priori* levels: national, institution, program, and individual. Themes are summarized here, and supported by sample quotes (*in italics*); some quotes have been edited for length, clarity, and/or privacy

i. National Level Facilitators

At the national level, the CEPH accreditation requirements were noted heavily as a facilitator of change by all MPH programs interviewed. Respondents noted that CEPH accreditation is important, especially in an environment where programs compete for students, and tuition income keeps programs afloat, as accreditation shows that programs are meeting, and will continue to meet, a set of standards.

The new accreditation requirements "*made the ground level shake*," (MPH 6) but largely, interviewed MPH programs saw the requirements as a positive catalyst for change. The standards helped define the focus and expectations, which helped with decision-making.

> *"[We] can't follow what we've been doing because the accreditation criteria have changed…. So it was a nice, nice opportunity. … If we don't do it then we don't get accreditation." (MPH 6)*
>
> *"It's CEPH. That's what has driven these changes, because we have to, It's the right thing to do. And I don't know if we would've been able to make these changes without that push." (MPH 2)*
>
> *"We may have made that change anyhow, but, the fact that we could say, CEPH really wants this or needs this or this was a real asset for us." (MPH 8)*
>
> *"[The standards] helped us when we were doing the curriculum review process, looking at how the competencies align…. [it helped] us adjust what courses cover what competencies." (MPH 2)*
>
> *"When the new CEPH criteria were released, we got right to work thinking about how wanted to transform our MPH…. We've done a lot and looking at our curriculum since we rolled out the revised MPH, we've continued to make changes." (MPH 4)*

The MPH programs interviewed described how the standards acted as both a 'carrot and a stick,' within their program, and at their university. The existence of the standards, and the importance of accreditation, facilitated change at the university level, including facilitating new course approval, new teaching methods, funding for engaged work, and hiring practitioners.

> *"CEPH and accreditation was driving this and we kind of used CEPH. I mean they're great and sometimes we use them as the Bad guy. Not so much within our programs or department, but with the graduate school. If we're creating a new course that has leadership and advocacy in it that it goes through the departmental curriculum committee, the graduate school curriculum committee, we say we have to do this for accreditation, they don't even really look at it, to be honest." (MPH 2)*

"[I was able to say, to the university], but, as far as the MPH program, we need to do some specific things for accreditation." (MPH 3)

Interviewees also noted that the standards provided an opportunity for MPH program teams to re-think their processes, and to re-envision and re-invent their approach to better align with what is needed by and wanted in the workforce. Interviewed MPH programs noted more work with an in the community, more focus on mentoring for competence development, and more curricular elements focusing on skills development and inter-professional practice.

"The accreditation standards have been a good influence, in a weird sort of way. They helped us rethink things and I think that that has been valuable." (MPH 5)

"Being able to integrate the new vision with all the things we're hearing from stakeholders, the shift that we needed to make in general, and saying, well, we're shifting the courses, why don't we just shift everything. So it wasn't a huge deal in that we wanted that change anyways. We shifted some delivery methods, we shifted some focus, as well as the way we're evaluating." (MPH 6)

Interviewed MPH programs also noted the benefit of having clear criteria to guide and inform change, though some noted that this may have been more true for a smaller or newer program.

"CEPH had a lot to do with the changes that I have been making in the program because that was my guidance. That is what I studied to design this program." (MPH 3)

"A problem I see a lot of major institutions having is that they're so stuck in the last hundred years that they aren't able to shift to the new mindset. We kind of took this perspective of everything's gone. Start over." (MPH 6)

"I would say that building a new program based on the new criteria is pretty dreamy. I would argue that's kind of the way that a lot of us would want to do it. Once you have an established program, it becomes more difficult to take this very serious left turn if you weren't already taking that fork in the road to align with the new criteria." (MPH 8)

In addition to CEPH, MPH programs interviewed also noted the value of input an guidance from other national organizations, such as ASPPH.

> *"I'd say a key influence there is ASPPH. I've been active in ASPPH for some years… ASPPH and those peers are simply invaluable. And that community is just essential to doing our business. These are the other public health schools and programs in the country. And these are the people struggling with the exact same issues as we are. And there's some really tight analogs, other programs located in medical schools, roughly the same size. There are not so tight analogs, the big schools, but there's something to learn and lots to share with all of those folks." (MPH 8)*

ii. <u>*National Level Barriers*</u>

Though largely seen as a facilitator of change, six of eight MPH programs interviewed noted that the CEPH accreditation standards and process posed some challenges: "*Everybody was talking about leaving CEPH because it was hard."(MPH 5)* The challenges largely related to the urgency of change, the resources that urgency required, and the complexity of fitting the many CEPH-defined criteria into a competitive curricular structure that is, in some ways, limited by credit counts and cost. These requirements—also complemented by regional university accreditation requirements—forced some hard decisions, including letting go of course content, courses, concentration areas, and even faculty. And, one program noted that they have concerns that needing to make big and quick decisions may have an impact on quality.

> *"We've struggled to fit everything in certain of the competencies and I know we're not alone in this. It's been really hard for us to help our students achieve the systems thinking competency for example. The interprofessional education competency, some of the leadership competencies. Those didn't live or exist in our curriculum in an obvious way previously. We're sort of forced fitting them and wedging them in, to be compliant." (MPH 8)*

> *"I remember meetings where faculty were just stumped by [the CEPH critiera] saying, "wow, that's what we have to teach students? It seems like we're washing down the depth of what we want to provide students here." There was a real reluctance to take any of the concentration courses away. In fact, it was even the opposite. It was like "we have to keep our concentration courses and maybe add even more because we feel like this other stuff is being watered down." (MPH 4)*

In general, the national influences were not as barriers to shifts, but potentially a barrier to other ideas or initiatives that had been dreamed of before. The CEPH standards drastically and quickly shifted focus to meet the requirements expected for accreditation.

iii. *Institution Level Facilitators*

At the university level, based on review of the interview transcripts, four categories of factors appear to facilitate change within MPH programs: university mission and vision, administration and leadership; campus resources; and placement of the MPH program within the university.

Five of the seven MPH programs interviewed suggested that the mission and/or vision of their university or school helped to facilitate the changes discussed. The programs noted that mission-driven focus on educational excellence, social justice, community engagement, hands-on learning, and workforce development helped support the changes needed for CEPH accreditation, and to support workforce development for public health improvement.

> *"I think our institutional mission helped. We are challenged to be engaged in research but also with a major commitment to the community and to social justice. We are committed to the community. So in terms of facilitators and champions, it's been part of the institution's mission. Even at our presidents level, we are part of the community of service. Our community partners have supported us in saying that they see this in us and they want us to continue this. And sort of giving us support and fueling us to stay in that direction." (MPH 1)*

Building from there, all MPH programs interviewed noted the role university/ administrative leadership and support played in facilitating change, particularly related to the influence on hiring, resource allocation, and program focus and flexibility. Respondents noted how administrators' own background and understanding of public health was important.

> *"About 20 years ago, we got our first associate Dean for public health practice. This is important because practice people think differently than an academic does. I think our school is now recognizing practice, not just research and education." (MPH 5)*

With supportive administrators, interviewees talked about the positive impact on strategic hiring of practitioners to complement traditional academic faculty. Within the eight MPH programs interviewed, a wide array of faculty practice experience was noted: faculty with experience working: in local government, in federal government, in DC, at nonprofit organizations, at local public health agencies, at state health departments, at federal public health agencies, as lawyers, as medical doctors, and as policy makers. Interviewees noted the value and benefit in this approach, as practice-experienced faculty bring rich, hands-on expertise that MPH students need to develop into practitioners, bring a new energy, and even help to build practice-focused understanding and ideas (for applied research or engaged teaching) among PhD-trained faculty.

> *"Much of my career was working in [various public health agencies]. I walked into this space where the vast majority of the faculty were trained to be academicians. They were very experienced in areas where they received their advanced degrees and they went straight into postdocs and then began to teach. So their interaction that public health was to support research. The faculty is a nice mix of those who've come straight through academic background, those who had a career beyond the academy. And we've helped each other and in terms of how we are successful in the academic environment, but also understanding how we are meeting the needs of the students come in." (MPH 1)*

> *"We have faculty searches going on right now. One of the things we're really looking for is someone that talks about that application or that practice piece or values community relationships and isn't just focused on number of publications and grant writing, you know, they're more well-rounded." (MPH 2)*

Two of the MPH programs interviewed noted that university administrators have worked to support this shift via adapting definitions of academic productivity so that practice experience and project-driven outcomes count as a part of faculty portfolios for tenure and promotion. One program noted that people with the DrPH come in as tenure-track faculty as their experience in community engagement and practice is values and aligned with the university priorities, particularly as it relates to supporting community impact.

> *"So long as we carve out a way to say what our research identity is going to be, the university is happy. It counts as research if you get some funds. It is also counted as a positive because we are having an impact on the larger community. We actually look at the impact our program has had on the state in terms of how much we've delivered, including research and service opportunities for our students working to completing projects." (MPH 1)*

Interviewees also talked about the positive impact supportive administrators have on faculty creativity and innovation, resulting in <u>strategic initiatives</u>. Faculty feel a sense of freedom and flexibility, allowing them to adapt courses to be responsive to community needs, to leverage current public health events; or to take advantage of field-based learning. In addition to general administrative support, three MPH programs also noted that project-specific funding from administrators and/or donors helped as a catalyst for change.

Three of the MPH programs interviewed shared specific <u>campus resources</u> that facilitated the changes they needed and wanted to make. These resources were all related to helping faculty innovate in their approaches, and do things a little bit differently. Resources

included: instructional designers; IT resources; and centers or units for teaching and learning, community engagement, and service learning. Interviewees noted that these resources helped them learn and apply approaches or techniques, and took administrative/ IT responsibilities off of their plate, allowing them to do what they do best.

> *"The school provides instructional designers to help us prepare courses. I was new to higher education, so I was really appreciative of all of those resources." (MPH 3)*

> *"Our center for teaching and learning. They were intimately involved in helping us think this entire process through. We had daylong workshops with faculty and they helped us think through that process of change, adapt our assessment processes, and help us enhance our program as we move on. They've been a hugely valuable resource to us." (MPH 4)*

> *"We have a center for teaching and learning that puts our online courses on the course management platform. That has helped us in terms of moving ahead on different types of ideas." (MPH 5)*

Finally, one MPH program noted that they believe that part of what facilitated implementing the changes they envisioned was the placement of the MPH program within the university. Specifically they noted that because their MPH program is located in a school that issues many professional degrees, practice and professionalism is a part of the schools' mission and the vision. "*There is an emphasis on hands on the practice, working with the real community, on real challenges, and stuff like that*." (MPH 3)

iv. Institution Level Barriers

Six MPH programs interviewed noted a number of barriers at the university level that limited or had an impact on the programmatic or curricular shifts that they needed or wanted to make. Barriers more-or-less mirrored the facilitators. University/administrative leadership and support was a barrier to change noted by six of the MPH programs interviewed. Mirroring facilitating factors noted in above, MPH programs suggested that

challenge comes with administrators who don't understand what an MPH program's goal is, and who don't understand what practice is. Some of this tension comes from the placement of the MPH program, and the experience of the administrators at levels above the MPH program. And, MPH programs note that this tension limits flexibility and freedom to make change, as well as the resource needed to make those changes.

> *"Our MPH program is located in a school of health and policy. So we have all sorts of health disciplines offered at the undergraduate and graduate level, but honestly I have to say it took a moment to get support to develop the program. It takes some adjustment for others to understand the practice component of this degree." (MPH 1)*

> *"One of the other tensions that we feel daily is we're within a graduate school of biomedical sciences, and their leadership is very PhD and bench focused. So the MPH is always kind of an after thought. I think the Dean really struggles. I mean, to the extent that when we were having fundraising, public health was completely left off the donor board. So it's a battle." (MPH 2)*

> *"To change a course, you couldn't get the changes until the next semester. That was a disincentive to change anything. That's not healthy for anybody because as an instructor you want to be able to say, while we have the coronavirus, let's talking about this in class, let's switch our discussion, or we have an opportunity to work with a community partner, let's do it." (MPH 6)*

> *"Being super blunt, the public health program is not a priority here. All of the other educational and training programs related to clinical professions; those are higher priority no matter what. That is a structural barrier to getting the resources that we need - our asks are typically not seen as priorities compared to asks of these other educational and training programs." (MPH 8)*

Respondents also noted that progress or change can be further limited when there are frequent changes of leadership.

> *"One thing I'll note is how people in leadership roles influence this. I led a practice institute, [and with collaborators,] we really influence a lot. But, that was under a dean who really understood practice and cared about practice. Then they left, and a new dean came in, and then they did everything in their power to make it go away, to really question everything that was being done." (MPH 7)*

> *"Over the last 12 years, we've had a fair amount of leadership change: several deans, and several program directors. So when you have that going on too, that's a little bit of a challenge. [I think I had] four deans and two department chairs in my first three years here. So, that makes change hard." (MPH 4)*

Fiscal resources and pressures was noted barrier to change by five MPH programs. This included the tensions related the need to bring in research dollars, and the need to bring in tuition dollars. The former was noted as a barrier to hiring practitioners as faculty, as they might not bring in as many research grants, and as a barrier to having time to invest in curricular innovation or teaching. Four MPH programs noted that the dependence on tuition dollars had a major impact on the changes they made. This included not being able to make desired changes as they would limit admissions or decrease their competitiveness, or being forced to make changes and touch decisions to ensure sufficient admissions and student enrollment. The places where this impact was noted included limiting 'extra' content in the curriculum, and decreasing the academic level or depth of some courses,

> *"We are a self-sustaining program, meaning, we can only spend what we make and what we make at this point is entirely from student tuition." (MPH 8)*

> *"I think it was really at the push to bring in more students. I think because of the push to bring in students, because the school is now are more reliant on tuition. There is less funding from the government, grants are more difficult. I mean there's less dollars and more competition. There's really a push to bring in more students and to try to support you just tuition dollars to support programs that were offered." (MPH 2)*

Finally, external pressures related to time and administrative expectations was a barrier to change noted by three MPH programs. These tensions related to the competing demands placed on them by university mandates that didn't necessarily align with accreditation-defined needs, and university expectations related to time allocations for research, teaching, administration, and service.

"[We want to involve the faculty more in iterative change] but we try to limit the impact on them. I know involving everyone early is ideal, but I also know it's not possible. I mean our faculty don't have any administration time. They used to have 10% for administration and service but we don't have that anymore. It's just part of your job. I mean, they're already involved in admissions, they're involved in all these other committees, and so when it comes to making these changes, it seems like a lot." (MPH 2)

v. Program Level Facilitators

At the program level, a large number of facilitators of change were noted, and via thematic coding, these were grouped into six categories: external feedback, teamwork, having a vision, capacity development, communication, with leadership crosscutting all.

All of the MPH programs interviewed noted that external feedback served as a catalyst of change. This included feedback from students, graduates, alumni, faculty, community collaborators, and employers of graduates. Interviewees spoke of using surveys to gather data, having an open-door policy for feedback to be shared, doing interviews with stakeholders, and forming and using advisory committees for input.

"Over the last couple of years, we've established an advisory group. We used to bring people in for advice on an ad-hoc basis. But now we have a regular advisory group." (MPH 4)

"We have really good relationships with the students. So they feel free to complain to us about pretty much everything. So we're taking that feedback and making the adjustment not just based on curriculum needs, but also based on what the students are telling us." (MPH 2)

"I get ad-hoc information from students and graduates. I think the best time to get feedback on what students are learning is through the practica program. If the student brings the right skills and tools to the site. And if whoever they're working for comes back with reviews saying, wow, this person did a great job. We get feedback immediately." (MPH 7)

It should be noted that none of these eight MPH programs spoke only of collecting input; they all spoke about how this input served inform and facilitate change at the course level (what is taught, and where; how to assess competence), how things are taught or mentored (how faculty and partners support student growth), and how the curriculum is structured (how much field work, what needs to be taught and assured before that, etc.). Two programs spoke explicitly about using iterative quality improvement processes.

> *"Our community partners have supported us in saying that they see this in us and they want us to continue this. And sort of giving us support and fueling us to stay in that direction. I see that kind of support that we've had. We call it our community accountability committee, so that they're looking at us and saying, are we, are we doing what we're supposed to be doing? And getting feedback from them about how we work with them. How we engage with them, get feedback around our programs. So they were very much a part of feedback even in our self study process. They've helped to validate our approach." (MPH 1)*

> *"When I was in the department of health, I prioritized quality improvement. And because of that, I am changing all the time. Every time things get adjusted. So I'm not waiting for like a year or two to make changes." (MPH 3)*

The process of implementing change was also facilitated via <u>collaboration</u> and <u>teamwork</u>. All MPH programs interviewed spoke about the importance of developing buy-in and having collaborative support to be able to achieve the changes that were wanted or needed. In some cases, this collaboration was via a single ally in their program, in some cases it was via program committees and working groups, and in other cases it was via working with large committees or boards. A theme that came up across all approaches was, as noted above, the value of diverse input, and the benefit of working together to establish a vision or process for change, and then using people on that team to help seed and support change with others, or in other units.

> *"We have a multi-member executive board that is the governing body. It includes members from each of the departments, and individuals who are in leadership positions. We spent two years, almost every meeting, talking about how to operationalize these changes given that we had a very complex curriculum to begin with, with a lot of departments and a lot of voices. It took a long time and a lot of committee work. And so what we tried to do is this, we tried to use our strengths." (MPH 5)*

> *"My colleagues have been in the school for longer than me so they already have this idea of collaboration and partnership. We worked as a team to develop the mission and vision. They are part of the strategic conversations and all of that." (MPH 3)*

Six of the eight MPH programs interviewed talked about how developing and having a shared vision helped to facilitate the changes they wanted or needed to make. As mentioned above, some programs said that the CEPH accreditation standards really pushed what that vision was; but that they were then able to use that push to "integrate the new vision with all the things we're hearing from stakeholders, the shift that we needed to make in general."(MPH 6) Also as noted above, MPH programs shared that the CEPH accreditation standards provided or necessitated opportunities for discussion with peers to identify needs, strengths, and opportunities; those conversations helped develop the shared vision and plan for going forward.

> *"This is where the team approach - the executive board from different departments worked out really well…. We had all these meetings and everyone's groaning and it was terrible in the beginning. Everybody's talking about leaving CEPH because it was hard. But once we kept doing this and the faculty in the different departments understood, meaning the ones on the executive board understood, we sent them back to their departments to talk to the faculty who were teaching and to explain how we really wanted to still offer their course to students, or a new course, but we needed to make sure that it was linked with the competencies and specified assessment. Then, we shared with other programs and units at the school. So it was really the combination of having an executive board that was faculty that went back to each of the departments and made it happen. They got the buy in so that then we were able to all share our different curricula across the programs, business could go ahead as normal." (MPH 5)*

> *"There's always this balance around power. The difficult part is that I'm a person who likes to get it done. But sometimes we need to stop for a moment and listen. And sometimes you may be on target and sometimes you may not be. I focus a lot on inclusion. Sometimes our faculty think we are too inclusive. Sometimes they think we're not, we don't include them enough." (MPH 1)*

As a part of this process, a focus on strengths-based change, complemented with organizational capacity building, was noted. All MPH programs talked about working with one or more peers to take what they had—pieces or whole—and "start to fill the gaps" (MPH 8) based on the CEPH criteria. As noted above (influencing factors) and below (individual characteristics), MPH programs in this study have a commitment to professional development, awareness raising, and peer-to-peer capacity building.

> *"In the process of completing it, we identified the things that we thought were a good opportunity, and things that we thought were our strengths, things that we wanted to improve on. Again, assessing if we were walking our talk and then how best can we do that. So when the new criteria were released, we looked at and said, okay, this really gives us an opportunity to take the lessons, even learn from ourselves." (MPH 1)*

One MPH program also noted the importance of communication, and how that helped to facilitate change: "…*consistent messaging. So no magic bullet. I think it's communicating stuff well, and having time." (MPH 4)*

The above noted facilitating factors—interest in and use of external feedback, encouraging teamwork, developing a vision, capacity development, strong communication—are key elements of effective leadership, and five of the eight MPH programs explicitly called that out. They talked about how departmental leadership or college/school leadership facilitated their change processes, by creating a sense of safety and support, by helping seed a vision and supporting hiring in that area, and by providing resources to support change.

vi. Program Level Barriers

Only four of the eight MPH programs interviewed noted program level barriers that limited or restricted change. The barriers related to people being stretched too thin to support all program needs, having individuals on faculty who were resistant to change, not having enough colleagues who understand/agree with the vision for the future, and having leaders who don't understand practice, or don't appreciate the need for a practice focus, and who operate in a silo and didn't establish buy-in.

vii. Individual Level Facilitators

All MPH programs interviewed noted factors at the individual level that influenced the changes they made within their program. The majority of factors were noted as facilitators of change, though some interviewees listed the same factors in converse, factors limiting an individual's desire or ability to change.

Somewhat aligned with the Diffusion of Innovation theory, awareness, passion, and experience was a strong facilitator of change. Interviewees within five MPH programs interviewed have substantial practice experience, and that experience and understanding of real-world practice appeared to be a strong motivator for their work, and the changes that were planned and implemented within their programs:

> *"I worked in the department of health for XX years, I know what happens." (MPH 3)*
>
> *"I think it's my personality and also my personal experience." (MPH 6)*
>
> *"This is my third career. Much of my early career was working in federal and local public health agencies. I then worked in the nonprofit arena with organizations working on public health issues. So, I brought that frame here." (MPH 1)*

As described above (what is informing change), all individuals interviewed demonstrated a commitment to awareness and understanding of the current trends, and to continuous learning. Interviewees talked about assessing and using many types of resources to augment their understanding and support their work, including accessing peer-reviewed and practice literature, and attending conferences. However, perhaps the most poignant theme was the important role that peers play in helping them stay abreast of trends, needs, opportunities, and practices. Some of this peer-to-peer learning happens within their team or university setting, some happens with community-based practitioners, and, as mentioned above, much comes from collaboration with national membership organizations and initiatives, such as ASPPH.

> *"As for my colleagues, it's the same. There are a lot of people in the faculty in the university. So I rely on my colleagues. But I also have a community. We have the advisory committee, colleagues from different places, community organizations, universities and public health. And I talk to them all the time. Also colleagues from the department of health. I'm constantly in contact with everyone, trying to learn more and then see what can I do better." (MPH 3)*

One additional individual factor that was inferred via each interview was optimism and adaptive leadership. This, of course might be expected as these individuals opted in to being interviewed on this topic. Interviewees, across the board, described challenges and set-backs in managing and leading through the changes needed for CEPH accreditation, and yet, they also descried what they did, and how, to overcome those challenges; as already presented above, many also described innovations and program improvements they were able to facilitate as a part of this.

"I also want to note that CEPH and the higher learning commission could also be seen as barriers. In some ways, faculty felt that their hands were tied in some things, like in terms of how creative we could be, and how we had to comply with requirements. We had a lot of requirements coming from two big national bodies at once, and the Center actually really helped us see these mandates as enablers rather than barriers." (MPH 4)

viii. *Individual Level Barriers*

Five of the eight MPH programs interviewed noted some individual-level barriers that limited or restricted change. While many of these barriers were coded at the Program Level based on where the influence was felt, these are also individual characteristics that limit change. These include: people being stretched too thin to support all program needs, being resistant to change, and being in a leadership position while not having an understanding or appreciation for practice, and/or not knowing how to build coalitions, facilitate development of a shared vision, and support a team to work together to effect change.

ix. *Phase 2 Summary*

Building on the influencing factors noted in the survey, the MPH programs interviewed shared many factors at the national, university, program, and individual levels that facilitated and limited their ability to implement change. At the national level, the CEPH accreditation requirements were noted heavily as a facilitator of change, as accreditation is a critical element of MPH program identify. Respondents note that the standards were both 'a carrot and a stick' and drove programs to invest in curriculum review and adaptation, some of which was already needed, and facilitated action. However, this facilitation was not without issue as the urgency of change, and the resources needed, manifest in some hard decision-making processes; some worry this will impact the quality of education.

At the university level, four categories of factors appear to facilitate change within MPH programs: university mission and vision, administration and leadership; campus resources; and placement of the MPH program within the university. The interviews suggest that this is the case when university missions are aligned with public health values (such as social justice, community engagement), and when university administration believes in this, and a workforce development focus, as this facilitates resource allocation, such as hiring and rewarding faculty with practice experience, and investing in education innovation. Institutional-level barriers mirrored the facilitators: lack of university/administrative leadership and support, limits on fiscal resources, and limits on time limited change.

At the program level, a large number of facilitators of change were noted, and were grouped into six categories: use of external feedback, team work, having a vision, investing in capacity development, having strong communication, with leadership crosscutting all. All of the MPH programs interviewed noted external feedback serving as a catalyst of change at the curricular, course, and pedagogical levels. Change also appeared to be influenced by teamwork, and having colleagues to develop a vision with, and then envision and implement plans with. Linked to this, MPH programs noted how leadership processes facilitated their change processes. Barriers at the program level were fewer, but linked to limits on time, having individuals on faculty who were resistant to change, not having enough colleagues who understand/agree with the vision for the future, and having leaders who don't understand practice, or don't appreciate the need for a practice focus.

Finally, at the individual level, all MPH programs noted factors that influenced the changes they made within their program. Somewhat aligned with the Diffusion of Innovation theory, awareness, passion, and experience was a strong facilitator of change. All individuals interviewed demonstrated a 'can-do' spirit, a commitment to awareness and understanding of the current trends, and engagement in life-long learning through working with peers and national organizations to stay abreast of trends, needs, opportunities, and practices. Noted barriers at the individual-level were fewer, but include people being stretched too thin, being resistant to change, and being in a leadership position while not having an understanding or appreciation for practice, and/or knowing how to facilitate change.

c) Phase 3 Findings

Table XIV, below, presents a summary of the data from Phase 1 and Phase 2 of the study, and overarching themes emerging as the data were integrated. Facilitators of and barriers to change within MPH programs are apparent at multiple levels within MPH programs.

National policy influences what universities, schools, programs, and faculty/administrative teams must do. Overall, MPH programs changes related to instructional design, curriculum, and teaching methods were *strongly facilitated* by the need to meet the specific CEPH accreditation requirements. By and large, these are seen as facilitators of change, particularly where programs compete for students, and where they can influence senior administration to prioritize changes. The standards helped define the competencies to be taught and assessed, define a new vision, and set expectations for applied practice experience and real-world-type assessment methods within the curriculum; these helped to influence the flow of resources, new course approval, and hiring of more practitioners to help teach and mentor students.

Table XVII - Section F2 Integration of Phase 1 and Phase 2 Data

Factors Influencing Change	
Phase 1 - Survey Data	**Phase 2 - Interview Data**
• **Many factors influence MPH programs**: - 100% note defined criteria ▪ CEPH criteria strongly influenced changes to instructional design, curriculum, and pedagogy (n=94-108) - 99% note student/stakeholder feedback ▪ Feedback influenced changes to instructional design, curriculum, and pedagogy (n=64-74) ▪ Associated with being a stand-alone MPH program, and not affiliated with ASPPH - 97% note learning best practices ▪ Learning best practices influenced changes to instructional design, curriculum, and pedagogy (n=46-63) ▪ Associated with being a stand-alone MPH program - Using all sources to guide change is associated with being a stand-alone MPH program • **Many factors facilitate change**: - 93% note CEPH criteria - 86% note learning opportunities ▪ Associated with stand-alone pgms - 84% note program strategic planning ▪ Associated with younger programs - 59% note other national initiatives ▪ Associated with stand-alone programs • **Some factors limited change**: - 24% note institutional resources - 9% note university initiatives - 8% note CEPH criteria • **Facilitators of change**: - National ▪ CEPH standards (n=8) ▪ Competition for students (n=1) - Institutional ▪ Smaller programs; nimble (n=1) ▪ Access to resources - Program ▪ Involved, engaged faculty (n=25) ▪ Leadership (n=6), change leader (n=1) ▪ Strategic planning (n=7), CQI (n=9)	• **Facilitators of change**: - National ▪ CEPH standards (n=8) • Provided direction • Supported planning, action ▪ Information from national entities; peer-learning (n=8) • Awareness, trends - Institutional ▪ Mission linked to PH (n=5) • Engagement, social justice ▪ Leadership (n=8) • Access to resource • Decision-making • Hiring practitioners • Changing policy ▪ Resources (N=6) • Funding, faculty • Technical support • Learning initiatives - Program ▪ CQI and use of feedback (n=8) • Influence focus, direction, methods ▪ Collaboration, teamwork (n=8) • Buy-in, vision, focus ▪ Shared vision (n=6) ▪ Peer capacity building (n=8) - Individual ▪ Practice experience (n=8) ▪ Access to info, awareness, peer-to-peer learning (n=8) • Aware of trends, needs ▪ Collaboration, teamwork (n=8) • Buy-in, vision, focus ▪ Shared vision (n=6) ▪ Peer capacity building (n=8) ▪ Optimism

• **Barriers to change**: - National ▪ CEPH standards/burden (n=15) ▪ Limits on flexibility (n=2) - Institutional ▪ Resources (n=59): faculty (n=20), time (n=19), funding (n=12) ▪ Stronger leadership, support (n=19) ▪ Policies (n=2) and placement (n=4) ▪ Size and complexity (n=3) - Program ▪ Faculty – resistant to change (n=19) ▪ Student-centered decisions (n=9)	• **Barriers to change**: - National ▪ CEPH standards (n=6) • Complex, urgent change • Pushed other changes aside - Institutional ▪ Leadership (n=6) • Lack of understating • Turnover ▪ Placement of MPH program • Focus, approach don't align ▪ Resources (n=5) • Funding pressures • Time pressures - Program (n=4) ▪ Too little time ▪ Faculty resistant to change ▪ No shared vision ▪ Leaders who don't understand - Individual (n=5) ▪ Too little time ▪ Faculty resistant to change ▪ Weak leadership approach ▪ Leaders who don't understand

Phase 3 – Data Integration

- There are many factors at multiple levels that facilitate or limit MPH program changes.
- The CEPH standards have facilitated substantial change, providing direction and focus, and supporting decision-making, but the standards can also be seen as a barrier due to the many requirements and the intense time-frame in which changes needed to happen
- National initiatives and organizations have facilitated change by providing information and supporting peer-to-peer learning networks
- Institutional make-up can influence MPH program change, facilitating and limiting. Where institutional mission is aligned with public health values, and where there is leadership support and understanding, adequate resources (funding, faculty, support) facilitates change. Where these are not present, change is limited. There is some indication that MPH programs that are placed in non-congruent units or schools face more challenges in change processes.
- Program make-up, approach, and culture can facilitate or limit change. Where faculty are engaged, where there is an understanding of practice, and where there are shared processes to come up with program vision and change strategies (e.g., strategic planning), change is facilitated. At the program level, change is limited when there is weak buy-in, people who are resistant to change, and limited strategic planning and leadership processes.
- Individuals, of course, play a large role in change processes. Respondents note a major commitment to continuing development and being well aware of trends and needs. This information is accessed via review of criteria, reports, and solicitation of input from peers and stakeholders. This type of information may be even more important to individuals within stand-alone MPH programs, and the latter, to programs not affiliated with ASPPH.

Barriers related to national policy (CEPH standards) were also noted as there was a sense that they were prescriptive and a burden due to their aggressive timeline; some also noted that the prescriptive nature limited the flexibility and content of their MPH degree, resulting in hard decisions and even some job loss.

Organizational characteristics, including policies, practices, and resources influence how universities, and thus schools, programs, and faculty/administrative teams operate. Respondents noted numerous *facilitators* of change from and organizational perspective. Respondents noted that the mission and/or vision of their university or school (foci on educational excellence, social justice, community engagement, hands-on learning, and workforce development) helped to facilitate change, as did the strength of leadership and administrative support. Administrators with an understanding of public health was seen to be an important facilitator, as was administrator support in general, positively influencing hiring of practitioners (including into leadership positions), resource allocation, and program focus and flexibility. With support, programs felt more able to adapt courses, to engage with community for learning and service. Campus resources in addition to funding—such as instructional designers; IT resources; and centers or units for teaching and learning, community engagement, and service learning—were also seen as a facilitator of change, helping faculty and programs innovate.

Organizational characteristics that were seen as *barriers* more-or-less mirrored the facilitators. Some programs noted the lack of university/administrative leadership and support was a barrier, putting limits on resources (faculty number, faculty type (practice focus), funding (to support faculty and/or innovation), and time (too few faculty, many demands)). These limits affect programs as they do not have enough faculty with the right

experiences to teach, to develop the new courses needed, to advise, or to lead change; and that they are forced to make decisions that will result in income generation. This was emphasized in two ways: first, with MPH programs feeling the need to make decisions based on the impact it will have on their ability to recruit and retain students (important income source), and second, procedural challenges for teaching as the new accreditation criteria foreground the need for/value of practitioners as teachers, but traditional university polices are note structured to be able to remunerate, hire, promote or reward instructors or faculty in these roles. Respondents suggest that these challenges arise when administrators don't understand what an MPH program's goal is, and who don't understand what practice is, and that some of this tension comes from the placement of the MPH program in colleges or departments where there is a miss-match of focus.

The workplace culture of an MPH program—its leadership, faculty, and practices—is an important influence on change. As suggested by the literature, investment in strategic planning, vision development, and quality improvement informed by stakeholders appears to facilitate change. Overall, respondent MPH programs report that program changes related to instructional design, curriculum, and pedagogical methods are *strongly facilitated* by—and taking action in response to—feedback from students, graduates, alumni, faculty, community collaborators, employers of graduates, advisory committees, and accountability committees. Programs that have had successful change processes note the value of strong program leadership, having leadership with practice experience, working in teams, learning with and from each other, and being able to invest in strategic planning and change management processes to build faculty buy-in, come to consensus, define a vision and strategy for the future state, and have team members able to seed and support change with others. Noted

barriers at this level included the lack of the above-noted factors (poor leadership, leaders who don't understand the MPH focus or practice, colleagues who are resistant to change, no collective vision for the future).

Finally, individual interest in and commitment to MPH training processes—including support for professional development, association membership, and peer learning—are a *facilitator* of change. As described above (what is informing change), study participants note that MPH program changes are influenced and supported by being aware of, learning, and understating trends and best practices from conferences, webinars, journals, and peer-to-peer learning, from stakeholders, as well as from peers at other MPH programs via initiatives, trainings, and meetings hosted by national organizations like the Council on Linkages, ASPPH, and CEPH. An additional factor that was inferred via the interviews was optimism and adaptive leadership. This, of course might be expected as these individuals opted in to being interviewed on this topic. Interviewees, across the board, described challenges and set-backs in managing and leading through the changes needed for CEPH accreditation, and yet, they also descried what they did, and how, to overcome those challenges; as already presented above, many also described innovations and program improvements they were able to facilitate as a part of this. *Barriers* to change from the individual level include factors already mentioned: limits on time, being uninformed, being resistant to change, and being in a leadership position while not having an understanding or appreciation for practice, and/or not knowing how to build coalitions, facilitate development of a shared vision, and support a team to work together to effect change.

V. DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

A. Discussion of the Findings

The first formal U.S. public health training program was established in 1916, and since then, the number of schools and programs of public health has grown exponentially.[49,50,51] In the U.S. there are currently 215 MPH programs that are accredited by CEPH, or that are in the application phase. Of these, 30% are located within schools of public health, and 70% are located within stand-alone public health programs, and 59% are members of ASPPH.

This study aimed to explore and describe whether and how schools and programs of public health are modifying the design of their MPH programs to address documented gaps in public health training and better prepare the public health workforce of the future. Specifically, this study sought to describe what instructional shifts have been made over the last four years, what the intention of the shifts has been, and what factors have influenced or limited the shifts. Four specific research questions guided the mixed-methods study:

- What is the current focus and purpose of MPH education programs in the U.S.?
- Are MPH programs shifting their program design to better meet the defined focus? If yes, what, specifically, are they shifting?
- What are the motivations for, and desired outcomes from, these shifts?
- What is informing and influencing MPH program shifts?

Representatives from a total of 115 MPH programs contributed to this study; their voices and perspectives are represented in the results. The sample includes perspectives from at least 43% of the 215 CEPH-accredited/applicant MPH programs, including 45% of those located in schools of public health, 43% of stand-alone MPH programs, and 50% of programs affiliated with ASPPH, and includes input from large and small and older and newer MPH programs in different parts of the U.S., with different research foci, and different engagement missions.

The following section addresses each of the research questions, providing first a review of the key elements taken from the literature that guided this study, and then assesses the results of the study in relation to those elements. Using construct-relevant segments of the original conceptual framework, areas of alignment and discordance are highlighted. Following the summary of each research theme, a revised conceptual framework is presented, describing the thrusts of MPH program adaptation, and public health workforce development. These pieces are then integrated to describe and present a revised conceptual framework in Section B.

1. Current focus and purpose of MPH education programs in the U.S.

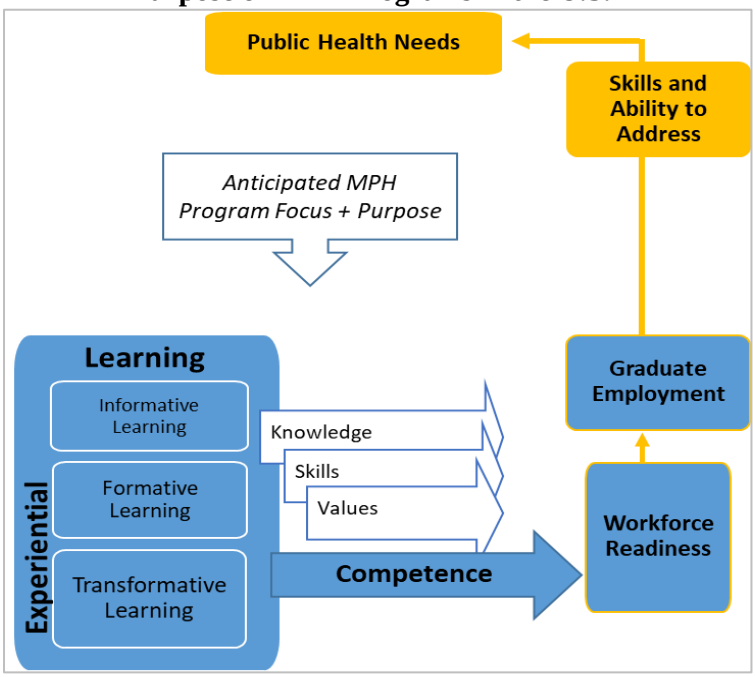
a) Literature Base

The last century has been a time of rapid growth for public health education in the U.S.; some say this has resulted in a disconnect between what graduates of MPH programs can do, and the real-world needs and expectations of on-the-ground public health jobs.[14,17,71] To counter this, more than 10 'calls to action' have been developed and disseminated by leading public health groups, calling for improved links between public health education and the workforce, and for public health education to focus on developing workforce-driven competencies.[1,2,11,48,59,77,3–10] Based on these calls to action, and particularly the release of new MPH accreditation standards, this study hypothesized that over the last four years, MPH programs may have re-envisioned their focus, purpose, and methods to support competence development in areas identified and anticipated by the workforce.[2,8,15,17,59,61]

As shown in Figure 35, below, the *a priori* conceptual framework anticipated that MPH programs would have a focus on supporting learning (to build knowledge, skills, and values), and through that, a focus on competence development to develop graduates who

are ready for the workforce—equipped with the right competencies—so they are employable, employed, and able to address public health needs.

Figure 35 - *A Priori* Conceptual Frame Depicting Focus and Purpose of MPH Programs in the U.S.



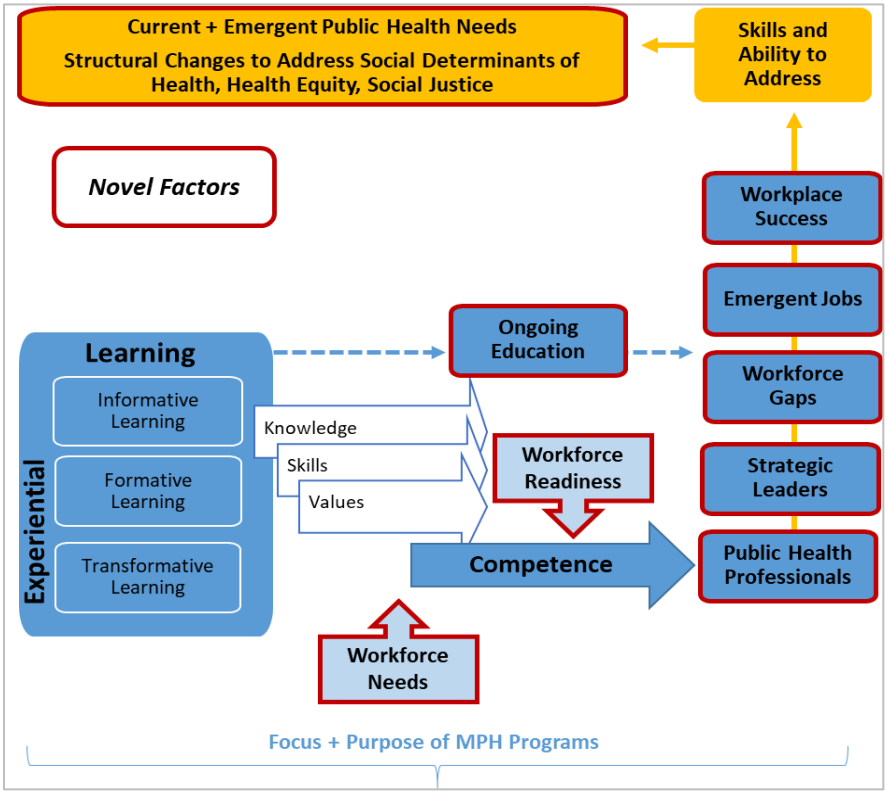
b) <u>Summary of Findings and Alignment with Literature-based Expectations</u>

Based on data collected from at least 43% of CEPH-affiliated MPH programs in the U.S. between November 2019 and March 2020, it appears that MPH programs focus and purpose aligns with the literature base—a clear focus on learning—however, as depicted in Figure 36, below, many more nuances related to this focus were elucidated by this study, including a clear focus on workforce ready public health professionals.

The literature base reviewed in Chapter II suggested that MPH programs had become siloed and had educational foci not fully aligned with the needs of the public health workforce. Perhaps spurred by the multiple calls to action over the last decades, this study found that MPH programs in the U.S. are informed by workforce needs, and are

highly invested in preparing graduates to contribute to, and succeed in the workforce. MPH program leaders were almost unanimous in stating that the primary focus of an MPH program should be to develop public health professionals and leaders, and MPH programs are not just looking to assure graduate employment, they are working to fill workforce gaps with competent graduates who are able to meet anticipated needs.

Figure 36 – *Post-hoc* Conceptual Frame Depicting Focus and Purpose of MPH Programs in the U.S.



While preparing graduates for research and/or other educational opportunities was noted as important by some, currently, the primary focus of MPH training programs is on developing practitioners of public health. Noted reasoning for this focus is that respondents want to see graduates succeed and be able to excel in the workforce, and that they want to develop graduates who can "tackle the world's most pressing public health issues," thus contributing to community health improvement.

Data collected via this study suggest that MPH programs are focused on preparing graduates for managerial level positions, and developing professionals to fill current and future public health roles, across multiple sectors, including traditional governmental public health roles, and strategic and emergent roles where they can be a part of leading change and improving health outcomes. Aligned with the focus of Public Health 3.0,[11,24] MPH programs are aiming to develop strategic thinkers and adaptive, interdisciplinary leaders who are invested in the health of their communities, and who can "think on their feet" to anticipate needs and trends, and unite stakeholders for collaborative action. Study participants were aware of current public health needs and trends, and suggested that public health graduates, and future leaders, need to be able to innovate to "move upstream" to prevent or reduce ill-health, and improve wellness, by considering social determinants of health, health equity, and social justice. As noted in later sections, MPH programs are informed and motivated to focus in this way due to national guidelines and initiatives, literature, current events, and input from peers and diverse stakeholders, including students, graduates, employers, and community collaborators.

To support development of these professionals, MPH programs are focused on developing workforce-informed competencies—as defined by CEPH, and supported by other stakeholder input. Competence development is being supported by investment in the full spectrum of learning suggested by Frenk et.al.(2010) (informative→ formative→ transformative learning)[5] to be sure that students have a solid grounding foundational knowledge and public health values, and have a transferrable skill base that can be adapted to various contexts to support professional success.

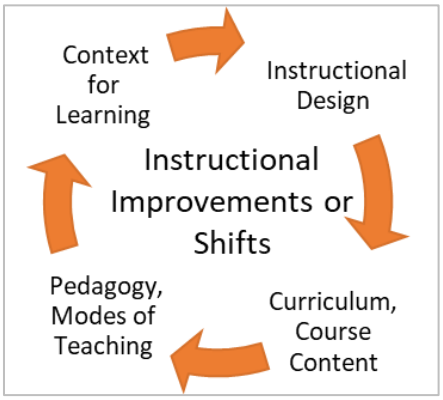
2. MPH programs are shifting their program design to better meet defined needs

a) Literature Base

Based on the aforementioned iterative calls to action—including ASPPH's Framing the Future initiative, the CoL's Public Health Workforce Competencies, and the revised CEPH accreditation standards—this study hypothesized that MPH programs would be shifting their program design to better align with their focus: to develop skills public health practitioners able to improve community health.[4,12,14] Based on the literature reviewed in Chapter II, including the calls to action and guidance given by ASPPH and CEPH, a number of shifts were anticipated, but nothing had yet been formally documented.

As depicted in Figure 37, below, the *a priori* conceptual framework anticipated that MPH programs might be shifting in four key areas, guided by Frenk et.al.(2010)[5] and Iedema et.al. (2004)[19]: instructional design, curriculum content and course design, and teaching and assessment methods, and the context for learning.[5,16,19] However, recognizing that change can be hard, particularly in complex settings such as a university,[5] this study set out to assess if changes were being made, and if so, what kinds of changes.

Figure 37- *A Priori* Conceptual Frame Depicting Potential Areas of Shifts Within MPH Programs in the U.S.



b) ***Summary of Findings and Alignment with Literature-based Expectations***

The literature base suggested that to better prepare graduates to enter the public health workforce as skilled professionals, schools and programs of public health would need to shift their approached to education. Among the areas highlighted were a shift to competence-based education (focusing on skills and application), a shift to more engaged and applied learning, and more focus on collaboration and strategic skills.[2,8,12,13,75] Authors and working groups had suggested types of change, including re-designing courses or curriculum to support integration and application of knowledge and skills; adopting new teaching methods, including the use of technology or team-based work; supporting deeper connections with field-based public health practice; and developing and using authentic assessment practices that are linked to or mimic real-word project deliverables. [12,16,47,60,74,78]

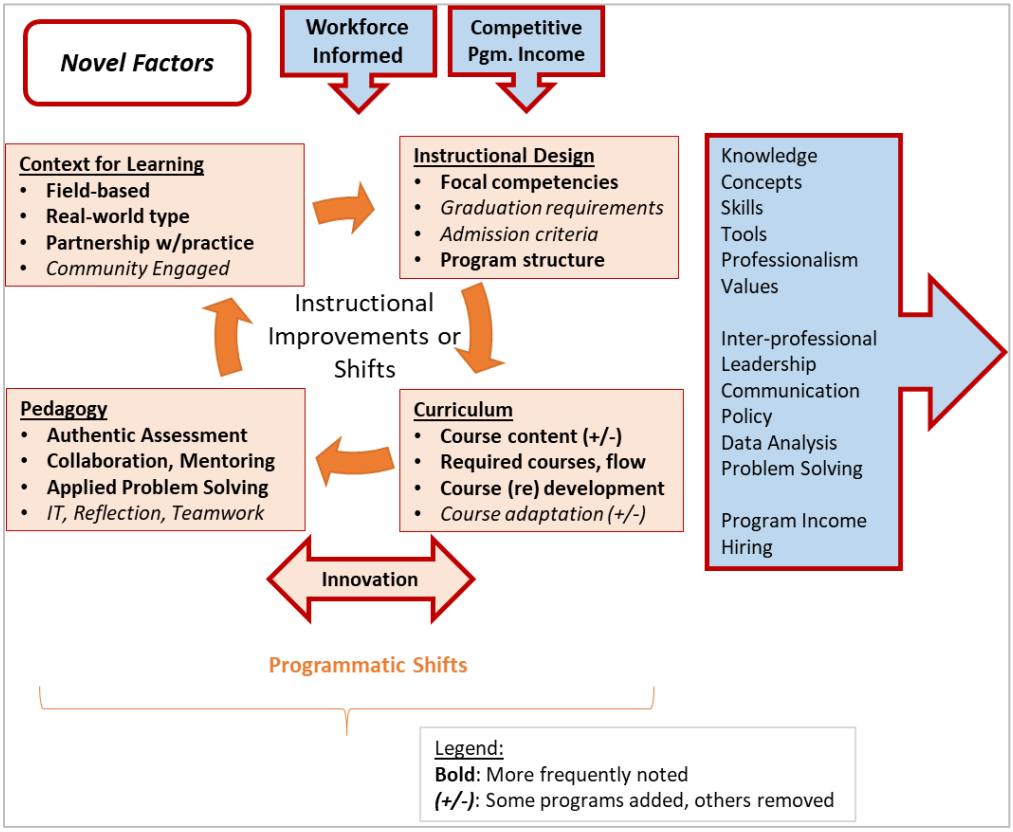
Data collected from at least 43% of MPH programs in the U.S., between November 2019 and March 2020, suggest that MPH programs have indeed made substantial changes to their program design to reflect emerging priorities. Over the last four academic years, 52% of responding MPH programs shifted their MPH program to focus more on public health practice, and for the majority of those who didn't shift in that direction (44%), it was because practice was already their primary focus.

MPH programs focus on practice in many ways, including requiring substantial field work (88%), having courses related to practice (71%), and having public health practitioners integrated as teachers or mentors (54%, 53%). To achieve this, based on the Frenk and Iedema frameworks, almost 90% of MPH programs reported making shifts to their curriculum, 80% to their instructional design, and 66% to their teaching methods.

Data from the study suggest that stand-alone MPH programs institute program changes more frequency than those in within schools, perhaps suggesting a level of nimbleness.

As shown in Figure 38, below, this study helped to elucidate the many types of shifts that programs are making; the reasons why are introduced here, and described in more depth in the next section.

Figure 38 – *Post-hoc* Conceptual Frame Depicting Potential Areas of Shifts Within MPH Programs in the U.S.



Related to instructional design, MPH programs have implemented shifts to support a greater focus on the components needed for success as a public health practitioner, and to ensure a focus on workforce-informed competence development. As detailed in Chapter IV, MPH programs have adopted new focal competencies, and have revised admissions criteria, graduation requirements, and program structures.

Shifts related to the *focal competencies* were most common, noted by 81% of responding MPH programs. MPH programs have largely centered on adoption of the 2016 CEPH MPH competencies, but MPH programs note that, generally, the CEPH competencies align with workforce needs also identified by their partners and collaborators, as well as the PHAB/CoL competencies. In addition to the CEPH competencies, MPH programs note a specific focus on knowledge and skills development, and the continued of a focus on environmental health, epidemiology and data analytics, professionalism, and writing ability. Shifts in these focal competencies were most frequent among the larger MPH programs, and those affiliated with ASPPH; the latter may be, in part, because of the peer-to-peer technical assistance that ASPPH offers member programs, and due to ASPPH's focus on re-framing MPH education, leading up to, and informing, the 2016 CEPH accreditation criteria.

Shifts in *graduation criteria* were noted by 59% of responding programs, and largely focused on integrating more field-based and practical experience while in the MPH program, have also been guided by CEPH expectations. These changes were most noted among larger MPH programs, and those placed within schools of public health. However, respondents also noted that not all students matriculate into an MPH program with the skills needed to engaged and succeed in community work, and so they are working to support student success with more structure and mentoring.

Changes to *admissions criteria*, noted by 39% of respondents, were more nuanced. Respondents note their programs are adapting criteria to be able to accept cohorts with more diverse experiences and backgrounds to help diversity the workforce so it better reflects the populations served, but are also doing so to assure program income, based, in

part, on tuition. These changes were more frequent among stand-alone MPH programs, perhaps suggesting more pressures for program income. MPH program leaders note an unintended consequence of these changes is increases variability of experience and baseline knowledge in each cohort. Thus, changes to admissions criteria are, in turn, requiring changes to program structure, curriculum, and pedagogical approaches. Some MPH programs have also needed to contract their program and offer fewer concentration areas. One place this is noted is environmental health, as the 2016 CEPH criteria no longer require a focus, core course, or concentration area in environmental health, and as a result, this is disappearing from some MPH programs; this is in contrast to the critical public health needs the world faces related to climate change.[37,71]

Related to MPH curriculum, some 88% of responding programs noted making curricular shifts. This included refining course content (88%), altering required courses (76%), and adapting the specific focus of courses (73% to focus more on inter-professional education, 68% to focus more on leadership, 66% to focus more on foundational knowledge; and 55% to focus more on communication); again, this is in large part to meet expectations of CEPH, and to set students up for professional success. Changes to the MPH curriculum were most frequently noted by older and bigger MPH programs, and those affiliated with ASPPH. The former association aligns with the literature suggesting that MPH programs, over time, had lost track of important curricular areas, but data from this study show that now, changes are indeed being made. Again, affiliation with ASPPH may help spur change via peer-to-peer learning, information dissemination, and the provision of technical assistance.

Few programs described developing a completely new curriculum, but rather reported reassessing the goals and objectives of their education, using curriculum mapping processes, and adapting and improving on what they had, in order to focus more explicitly on CEPH-defined foundational knowledge objectives and competency development. To do this, programs have used many strategies, including the exact opposite of some peers. They have developed new courses, removed course, combined courses, split course, altered course sequencing, changed course credit values, made courses more applied, and reconsidered co-curricular requirements. The curricular areas where increased focus was most include professionalism, leadership, systems thinking, community engagement, communication, advocacy, teamwork, and inter-professional practice, strategic areas that align with workforce-defined needs, as defined by PH WINS, Public Health 3.0, and the Strategic Skills for Public Health.[3,8,9]

While many respondents note the value of this focus, there are some reported unintended consequences. These include removing courses or reducing content that was deemed important, or covering content in less depth to allow for increased breadth. Some wonder if this might have an impact on long-term graduate success, at least in some areas of public health, such as epidemiology, biostatistics, environmental health, and/or health administration. This begs a follow-up question: have these shifts swung the pendulum too far in the direction of strategic skills, at least for some professional public health fields, such that workforce expertise will emerge in areas of leadership and public health strategy, but lapse in areas of technical expertise? To compensate, some MPH programs are already adapting and innovating to combine and integrate additional or advanced

concepts into courses, developing elective course options, and certificates. Others suggest a better differentiation between the MPH and other public health degrees and pathways.

Related to teaching methods and approaches, 65% of responding MPH programs have adopted at least one new strategy, particularity to focus more on skill building and professional development, including more field-based or real-world-type learning, more applied problem solving, more community partnerships, and developing assignments to mimic real public health practice. Many MPH programs report partnering with communities, health departments, and community-based organizations to integrate public health projects and data into courses so that classes use real time data and applied learning in such a way that real public health benefits accrue in the community. Changes in pedagogical practices are more frequent among older MPH programs and bigger MPH programs (which are associated with MPH programs in schools of public health and ASPPH affiliation), again, perhaps suggesting a keen response to the iterative calls to action to update older programs to meet new needs.

These approaches are being incorporated in a number of ways, including integrating applied content into courses, developing new courses for engaged learning, and explicitly integrating applied practice experiences into the curriculum. To complement this, some MPH programs are adopting other learning methods to deepen learning, such as student reflection, leveraging IT, and supporting collaborative/inter-professional learning. Some respondents note that it can be hard to get all MPH faculty to 'buy in' to these innovations—particularly those who have a strictly academic/non-field-based background. However, to advance towards this goal, many MPH programs are adding new faculty, focusing on hiring public health practitioners for teaching and mentoring.

3. MPH program shift are motivated by potential outcomes

a) Literature Base

As noted earlier, this study hypothesized that MPH programs in the U.S. would be motivated to implement MPH program shift in response to calls to action to help bolster the public health workforce with strategic public health leaders, and/or, more pragmatically, in order to assure and achieve MPH program accreditation.[14,17] Based on the literature reviewed in Chapter II, the study hypothesized that MPH programs would shift their program design to better focus on aligning student learning with contemporary demands, and assuring graduate competence, workforce readiness, and employability by developing graduates with the skills needed to address emerging public health needs, including ameliorating health equity.[8,9,11,24,36,47,48] The *a priori* conceptual framework was integrated with the framework related to focus and purpose (Figure 35, above), and anticipated that MPH programs would have a focus on supporting learning and competence development such that graduated would be workforce ready, employable, and employed, working to address our nation's public health needs.

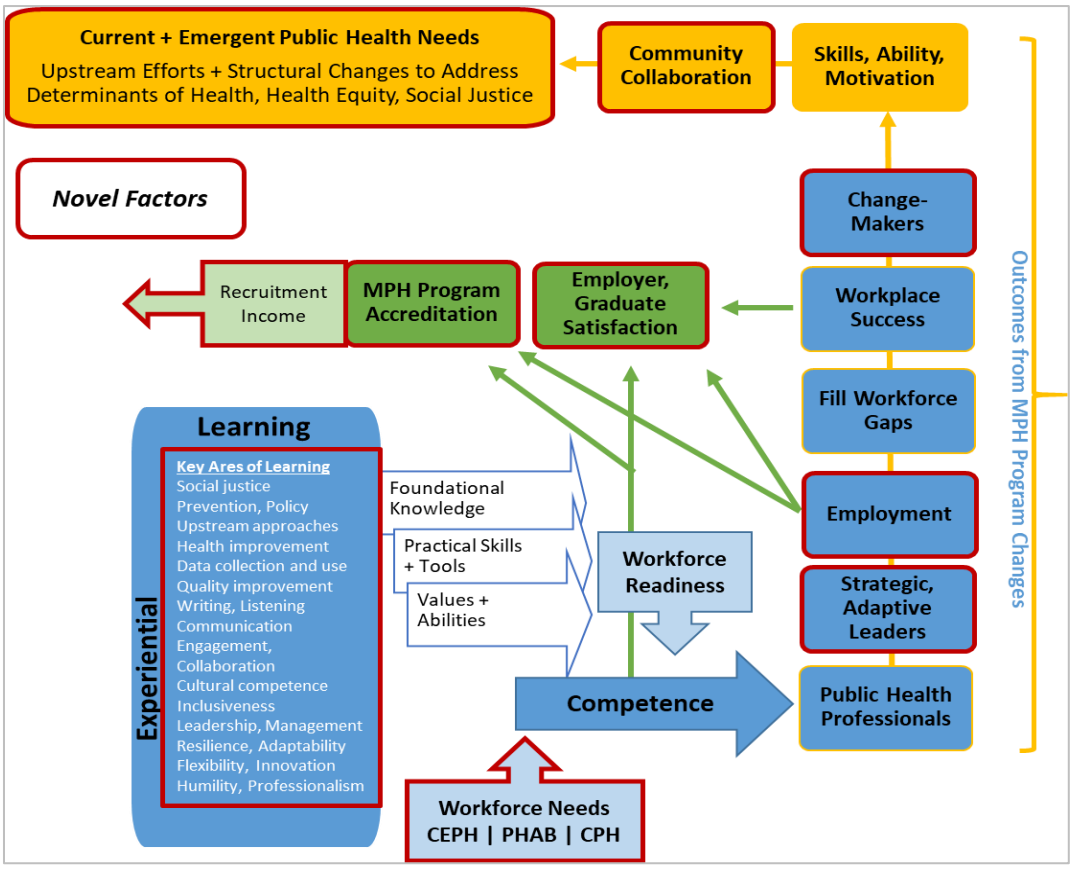
b) Summary of Findings and Alignment with Literature-based Expectations

Based on data collected between November 2019 and March 2020 from at least 43% of CEPH-affiliated MPH programs in the U.S., MPH program leaders, and the program changes they area facilitating, are motivated by multiple factors and potential outcomes. Key themes in are described, below, and depicted in Figure 39, building on the summary of what MPH programs are focusing on.

CEPH compliance and accreditation is a very strong motivator for change, and a desired outcome from the changes that MPH programs are making; this was noted by 94% of respondents. CEPH accreditation is seen as a marker of program quality, and is important in the current environment of university budget cuts, reductions in research dollars, and proliferation of MPH programs, where more programs are competing for students and tuition income.

As described in Chapter 4, CEPH accreditation, however, is not the only motivator. MPH program leaders also described bigger-picture and longer-term outcomes that they hope to see as a result of changes. These include student-level outcomes, workforce related outcomes, and community health outcomes.

Figure 39 – *Post-hoc* Conceptual Frame Depicting Motivations For and Desired Outcomes from MPH Program Shifts



Related to *student-specific outcomes*, MPH program leaders shared 153 comments, and express a commitment to ensuring student and graduate success in learning and in employment, and that graduates have choices in their career pathways. MPH program leaders are implementing aforementioned program changes so students: experience deeper learning and competence development in foundational areas such as the determinants of health, health equity, and population health improvement (n=30); develop practical cross-cutting skills and competence in areas such as data analysis, policy, communication, leadership, and professionalism (n=29); and emerge from the MPH program 'workforce ready' (n=33) with abilities to engage with others, learn as they go, and problem-solve, suggesting alignment with tenets of Public Health 3.0 and suggested methods to address the public health challenges faced.

MPH program leaders are also motivated by curricular outcomes, noted via 60 comments, including having courses that are more integrated and hands on so that skills are built, as well as program outcomes. In addition to the outcome of CEPH accreditation (n=32), program leaders suggest that if students and graduates are better prepared, particularly with the abilities needed in the workforce, employers and preceptors will be more satisfied with the MPH program (n=10), and graduates will be satisfied through their employability and their ability to succeed in the workforce (n=15).

MPH program leaders express a commitment to help fill the existing gaps in the government public health system, but are also motivated to help their graduates lead change in complementary areas of public health, including healthcare settings, community-based organizations, academia, and the private sector. As a part of this, MPH program leaders suggest that they are motivated to adapt and improve their educational

approaches so that graduates have the abilities to be change-makers and actually change the status quo of public health by being able to anticipate needs, engage and collaborate with community collaborators and technical experts, and understand and address determinants of health via systems change.

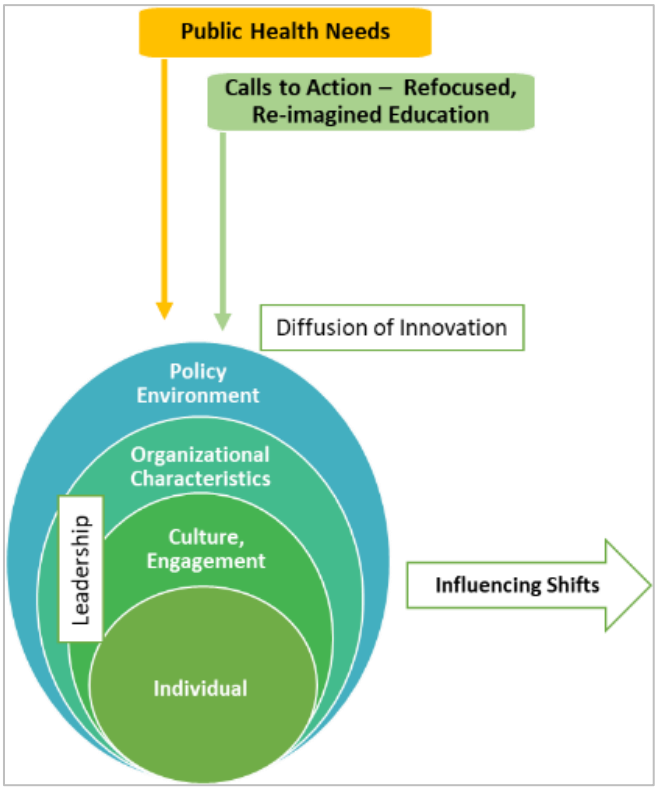
4. Many factors are informing and influencing MPH program shifts

a) Literature Base

Change is hard, particularly in contexts where there are multiple actors, influences, and foci, such as in universities, where a complex community of administrators and faculty operate according to their institutional design.[5,57,92,104] Changes to other professional education programs have been limited by factors such as curricular rigidities, professional silos, pressures of the dichotomy between academics and practitioners.[5] As the new CEPH accreditation standards were released in 2016, some similar barriers might have been expected. Building from the Diffusion of Innovation theory, and the Socio-ecological Model, this study hypothesized that changes to MPH programs would be facilitated or limited at multiple levels of the system, including through access (or lack thereof) to information and diffusion of innovations and successes.[5,16,21,70]

As shown in Figure 40, below, the *a priori* conceptual framework anticipated that MPH program shifts would be informed and influenced by public health needs and calls to action, and facilitated or limited by policy and characteristics at the national, university, program, faculty, and individual level, including access to stories of, and results from, innovations tried within other MPH programs.

Figure 40 - *A Priori* Conceptual Frame Depicting Factors Informing and Influencing Program Shifts within U.S. MPH Programs



b) <u>Summary of Findings and Alignment with Literature-based Expectations</u>

Based on data collected from at least 43% of CEPH-affiliated MPH programs in the U.S. between October 2019 and March 2020, it appears that MPH program leaders, and the programs that they are a part of, are informed and influenced by many factors, at national, institutional, program, and individual levels (Figure 41). Many of these factors seem to facilitate change if present, and or limit change if absent.

From an **<u>information</u>** standpoint, MPH program leaders report being <u>informed</u> by many factors including formal and informal feedback (96%), access to literature (88%), the CEPH standards (94%), and peers (open ended responses). MPH programs leaders show a commitment to collecting and responding to feedback from diverse stakeholders, including students, graduates, alumni, faculty, advisory committees, community

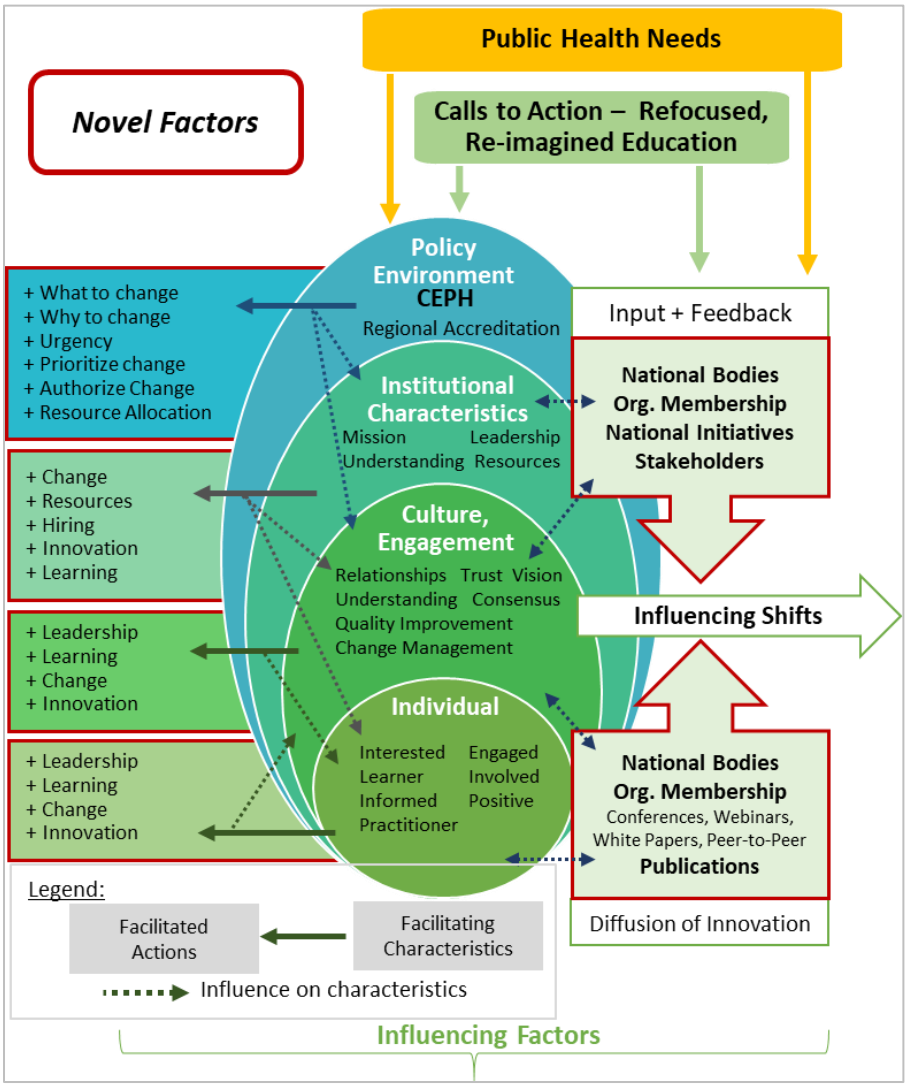
collaborators, employers, and peers. Many MPH programs have formal process to gather input, and many also described ad-hoc input that is garnered due to developing open and trusting stakeholder relationships.

In addition to this, MPH program leaders describe the value of input and learning that comes from being aware of or a part of national public health groups, such as CEPH (100%), ASPPH and their Framing the Future initiative (86%), CoL and the PHAB process (53%), or APHA (open ended responses). These groups develop and disseminate policies, guidance, and best practices, and often engage public health leaders—including MPH program faculty and staff—in their initiatives. Furthermore, they organize webinars, conferences, and working groups to help document and disseminate experiences, best practices, and outcomes seen. Stand-alone MPH programs, and those not affiliated with ASPPH, report being most influenced by external input (as compared to those within schools of public health), including stakeholder input, and learning new and best practices through literature or peer-to-peer learning, such as conferences, webinars, or working groups. This may be indicative of being a little more nimble in making changes due to not being located within a school of public health, and also not having as large of a public health oriented faculty or leadership team to inform change.

In line with **influence** suggested by Frenk et.al. (2010), MPH program leaders note that national policy, such as the CEPH accreditation standards (100%), and also regional university accreditation standards (open ended), have had a strong influence on the changes that MPH programs have implemented. MPH program leaders noted that substantial changes were guided by and facilitated by the specific requirements needed for CEPH accreditation; they also helped administrators prioritize and authorize change.

In general, MPH program leaders see the standards as a positive influence guiding what to teach and how to teach, and informing approvals, resource flow, and hiring. That being said, the requirements are also seen as a burden to some: prescriptive in nature with an aggressive timeline that resulted in some difficult decisions and outcomes, including loss of program content and jobs. Stand-alone MPH programs also more frequently noted that they are strongly influenced by other national initiatives, particularly Framing the Future for ASPPH members, and PH WINS for those not affiliated with ASPPH.

Figure 41 – Post-hoc Conceptual Frame Depicting Factors Informing and Influencing Program Shifts within U.S. MPH Programs



As reported by MPH program leaders, organizational characteristics and institutional design also appear to have facilitated or limited changes that programs wanted or needed to make, depending on the factor and the institution. When MPH programs are within institutions with missions that align with public health values and approaches (such as social justice or community engagement), or within institutions or schools were senior administrators understand public health, MPH program leaders feel supported and have been able to lead program change. This has been further facilitated by having campus resources that have helped seed or support innovation in areas such as community engagement, service learning, and both in-person and web-based teaching and learning. As a result of this support, MPH program leads noted having greater access to the resource needed, including being able to hire practitioners and invest in program and pedagogical changes.

Conversely, MPH program leaders noted being limited in their ability to implement changes when their senior leadership doesn't understand, appreciate, or prioritize public health or the CEPH requirements, and where there are limits on resources, particularly related to [practitioner] faculty hires, and when decisions needed to be made with a focus on income generation. Interestingly, some stand-alone MPH programs noted that they faced challenges in leading change due to the placement of their program, such as in a graduate school (general), or a school or department with a primary focus on biomedical or bench research; this challenge was maintained for at least one program located in an college of health professions, where many programs have a more clinical focus than public health. This tension aligns with some of the history and evolution of MPH

programs, as well as the chasm between medicine and public health that Public Health 3.0, and the CEPH competencies to some extent, seek to address.[3,13,24,52]

The culture of an MPH program, when nested inside an institution, can be a strong facilitator of change. MPH programs where respondents spoke about change in a positive way, they spoke about having productive relationships with administrators, faculty, and stakeholders; having practitioners as a part of their MPH team; having trust within their team; and using processes to re-envision their MPH program or curriculum, including building consensus, investing in strategic planning and change management, learning with and from each other, and investing in quality improvement. The important influence of investing in strategic planning was most frequently noted by new MPH programs, though in the interviews, many programs—including older MPH programs—shared the value of stakeholder input, team work, strengths-based changes, and capacity building in their change processes, factors linked to strategic management and change management. Cited barriers to change were the converse, and included having weak leadership practices related to developing a shared vision or change management, having leaders who don't understand the focus of an MPH degree or public health practice, and having colleagues who are resistant to change. These barriers limited being able to learn with and from each other, and to work as a team to envision or implement innovation and change.

While this study anticipated differences in MPH programs when compared by program characteristics, as described in Chapter IV, the majority of influences and thrusts were not significantly different when examined by characteristic (Appendix J). Areas where an association was noted by characteristic are presented in Table XVIII, below.

Table XVIII – Association between MPH Program Characteristics, Influencing Factors, and Changes Made (Summary of Chapter IV results, where significance found (Appendix J)

MPH Program Type	**MPH programs in schools of public health are associated with:** - Being bigger - Being older - Being affiliated with ASPPH - Having shifted their graduation requirements	**Stand-alone MPH programs are associated with:** - Being smaller - Being younger - Not being affiliated with ASPPH - Using input to inform and influence change - Learning from resources (peers, conferences, reports) to inform and influence change
MPH Program Age	**Older MPH programs are associated with:** - Being in a school of public health - Being bigger - Being affiliated with ASPPH - Having shifted their curriculum and pedagogical methods	**Younger MPH programs are associated with:** - Being a stand-alone program - Being smaller - Not being affiliated with ASPPH - Using strategic planning to inform and influence change
MPH Program Size	**Bigger MPH programs are associated with:** - Being in a school of public health - Being older - Being affiliated with ASPPH - Having shifted their graduation requirements, their focal competencies, and their curriculum and pedagogical methods	**Smaller MPH programs are associated with:** - Being a stand-alone program - Being smaller - Not being affiliated with ASPPH
ASPPH Affiliation	**MPH programs that are affiliated with ASPPH are associated with:** - Being in a school of public health - Being older - Being bigger - Having shifted their focal competencies, and their curriculum - Using Framing the Future to inform and influence change	**MPH programs that are not affiliated with ASPPH are associated with:** - Being a stand-alone program - Being smaller - Being younger - Using stakeholder input to inform and influence change - Using PH WINS to inform and influence change

Perhaps not surprising given the aforementioned history and evolution of MPH education in the U.S., MPH programs within schools of public health are more likely to be bigger and older and more likely to be affiliated with ASPPH. These MPH programs are more likely to have shifted their graduation requirements, the focal competencies their MPH program is focused on, and relatedly, their curriculum and pedagogical methods. They are also more likely to be influenced by ASPPH's Framing the Future initiative.

Conversely, stand-alone MPH programs are more likely to be smaller and newer, less likely to be affiliated with ASPPH. These MPH programs are more likely be using multiple sources of input to inform and influence change, including stakeholder input, and input from published resources and reports (such as PH WINS) and peers via conferences, webinars, reports, etc. They are also more likely to have used strategic planning processes to inform and lead change. This might suggest a certain nimbleness that comes from being a smaller and newer program, and the value of input from multiple stakeholders to inform action.

Finally, characteristics of individuals were also noted as facilitators or limiters of change. On one hand, MPH program leaders noted that change was limited by people who do not understand or accept the calls to action for a new approach to public health education, or believe that change is needed. These individuals may be resistant to change in their own contributions, or an impediment to program change. This includes people who don't understand what public health is, who don't have experience related to public health practice, or who don't feel that educational processes or content needs to change. Perhaps based on the history, growth, and evolution of MPH programs over the last 100 years, and evolution of the MPH program's home college, school, or department, respondents note that many public health faculty members have trained as academics, and are highly skilled scientists or clinicians, but do not necessarily appreciate the focus of a professional MPH training program, as compared to research-based graduate programs. This is in contrast, for example, to other health professions such as medicine or nursing or social work, where faculty are trained for practice and almost always have practice experience prior to assuming academic roles.

Conversely, other MPH program leaders noted that change was facilitated and inspired by individuals who understand the value of changes to public health education. Via interviews, MPH programs noted engaged and engaging processes where change has been facilitated. Common characteristics center on faculty having experience in real-world public health practice; being interested in innovation, having access critical information (through reports, conferences or webinars, or association discussions); being connected with peers for learning and exploration of trends and best practices; and being open to feedback from stakeholders.

B. Revised Conceptual Framework

a) Background

For those who work in the field of public health in the U.S., it has long been recognized that population health must be improved. Noted limits to public health include lack of investment in the determinants of health, a changing world, and lack of investment in country's public health systems, including the workforce. For the last 30 years, as a part of this, have been iterative calls to action to refine and update public health education in the U.S. to better prepare graduates to enter the workforce able to understand and address the many complex issues that are at the root of public health needs.[11,24,26–38,44,45]

These calls to action accelerated over the last 10 years, and many leaders within schools and programs of public health have contributed to major national initiatives aiming to re-shape public health education to develop graduates who are prepared to enter the public health workforce as skilled professionals and leaders with the competencies and strategic skills required of, and desired in, the workforce; these initiatives include the Lancet Commission on Health Professions for a New Century (2010), ASPPH's Framing the

Future initiative (2014), PHAB and the Council on Linkage's Public Health Workforce Accreditation Standards (2015), revision of the CEPH MPH Program Accreditation Standards (2016), development of a new vision for public health, Public Health 3.0 (2016), and the Public Health Workforce Interest and Needs Surveys (2017).[2,5,8,9,11,24,48]

As a part of this movement, new standards for MPH program accreditation were released in 2016, the first major shift in 50 years.[14,17] In response, it was hypothesized that MPH programs would be receiving information and guidance from some areas, and would refine and adapt what they teach, and how, in line with the newly defined competencies.[4] However, many factors related to this had not yet been documented from an MPH program perspective. That was the focus of this study.

Drawing on findings from educational shifts in other fields somewhat linked to public health, an *a priori* conceptual framework was defined to measure whether and how MPH programs have implemented shifts to develop the public health workforce of the future. This included building an understanding of what informs and drives program changes, what types of changes might be made at what levels of the program, and what the desired outcomes of the changes are. The aim of this study was to understand if MPH programs are actively working to help fill the workforce gaps, and to develop graduates with the capacity to help lead public health improvement, or if shifts were being made simply to meet accreditation standards. If the latter, a secondary aim was to surface that issue so that national public health leaders could be aware, informing a response.

To meet these aims, this study asked MPH programs in the U.S. to share stories and experiences of growth and change over the last four years (Fall 2015-Fall 2019), related

to: the focus of MPH programs in the U.S.; shifts in instructional design to help better meet the focus; motivations for, and desired outcomes from, these shifts; and factors that are informing and influencing (positively or negatively) these shifts. The responses were comprehensive and represented voices from a sample of MPH programs that more-or-less match those in the U.S. The findings, presented in Figure 42, show a strong response to the calls to action, aiming to close gaps, and improve public health outcomes in the U.S.

b) Detailed Description of the Revised Conceptual Framework

MPH programs in the U.S. have implemented many shifts to their programs over the last four years. *As depicted in orange, in the center of the framework,* congruent with domains suggested by Frenk et.al.(2010) and Iedema et.al.(2004), MPH programs have made changes to the overarching instructional design of their program (program structure, focal competencies taught, admissions and graduation criteria), their curriculum (courses, course content, course structure), their pedagogical approaches and methods (how they teach and mentor), and the context or location of their teaching. These shifts do not occur in isolation, but rather shifts in one area create a cascade effect. For example, changes in the focal competencies required changes to curricula, teaching methods, and context for learning, which also required innovation and novel ideas (such as how to assess competence) and hiring of or partnership with practitioners to better support hands-on learning. Another example is that MPH programs are adapting their admissions criteria to help develop a more diverse workforce (and to assure program income), which has required shifts in program structure (more options for study), refinement of course content or level, and more time in the field to help students build contextual understanding. Most MPH programs are working with communities and

public health collaborators to develop more field-based or real-word-like learning opportunities for students, with aims to improve and deepen student learning, but also with aims to contribute to community and public health improvement, and to foster a lifelong commitment for students to be able to do the same.

Shifts that MPH programs are making to their programs are being made in response to CEPH requirements, but also in response to documented gaps and needs, and feedback from stakeholders, including students, graduates, employers, and community collaborators. *These are depicted in green on at the top of the framework.* Many MPH programs are committed to gathering and responding to stakeholder feedback by adapting their course content and teaching approaches to better develop critical knowledge, understanding, skills, and professionalism.

To support this, and in line with the learning spectrum proposed by Frenk et.al.(2010), MPH programs are investing in informative, formative, and transformative learning, not simply aiming to support knowledge acquisition, but to also help instill core values of public health practice such that graduates have a focus on equity, and to help develop critical thinkers and strategic leaders who can engage with others, and translate their abilities across contexts, for public health improvement. *This is depicted in blue on the right side of the conceptual framework.*

MPH programs are motivated to do this for four key reasons: to meet the CEPH accreditation standards, but perhaps more importantly, to help students and graduates be successful in the workforce; to help meet workforce needs, in terms of abilities and interest, supporting employer satisfaction; and to help develop strategic and adaptive

leaders—change makers—who are able and motivated to collaborate and engage to change the status quo. *These motivations, and the desired outcomes from these changes, are depicted in blue on the far right of the framework, and in yellow at the top.* MPH program leaders appreciate that there are many complex public health challenges that need to be addressed now, and in the future, and they are motivated to develop adaptive leaders who are able to anticipate and address these needs via engagement, collaboration, and systems change.

MPH programs spoke about recruiting for this, and fostering passion for this understanding, advocacy, and structural change-making within their student body. MPH programs have made shifts in to their programs to do just that: modifying admissions criteria to recruit change-makers, more real-world/real-world-type applied problem solving incorporated into classes, more field-based work to affect change, and more collaborations with communities and practitioners for public health improvement.

As depicted in green at the top and bottom of the framework, MPH programs are well aware of, and informed by, the existing public health needs, as well as the competence needs within the workforce. While the CEPH accreditation standards are a key information source, MPH programs are also well attuned to trends and needs through engagement people in the workforce, and with national organizations and workforce-related initiatives, such as the PHAB/CoL and CPH. This is complemented by more nuanced understanding though peer-to-peer engagement and learning through national organizations (ASPPH), working groups (Framing the Future and CoL), publications and reports (peer reviewed, and the likes of Public Health 3.0), and conferences. *This is depicted in light green on the right of the framework.* In alignment with the Diffusion of

Innovation theory, MPH program leaders noted this peer-to-peer learning has been invaluable in supporting and accelerating the changes they've planned and made, as they have learned strategies, innovations, challenges, and outcomes from peers working in programs similar to theirs.

While all of this information is critical, and well used, MPH programs report numerous facilitators of and barriers to change at many levels of influence. *This is depicted in the far right of the conceptual framework. Solid arrows depict actions that were facilitated; dotted arrows depict a resulting influence to another level.*

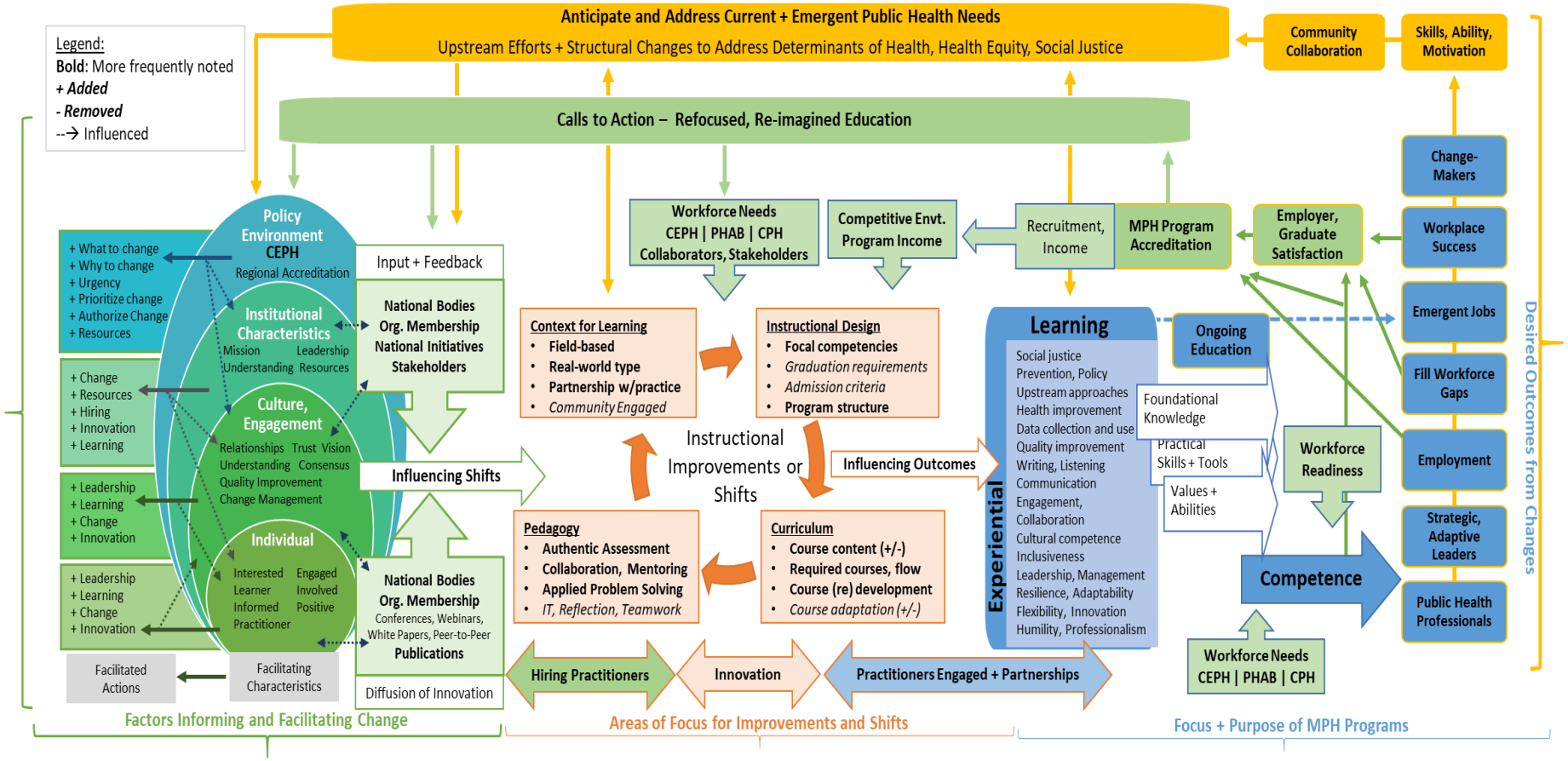
As suggested by Frenk et.al. (2010), and Bronfenbrenner (1970), change is strongly influenced and facilitated by national policy. In the case of MPH program design, the 2016 CEPH accreditation standards, as well as the planning/engagement work leading up to it, had a marked effect on change. In most cases, these standards are seen as a positive facilitator of change that should have happened anyhow. What the standards did was bring urgency and attention to the needs, and focus to help the changes happen, including helping programs come up with renewed focus and vision, but also helping facilitate university buy-in, attention, resources, and approvals. Some respondents describe the CEPH standards as both a carrot and a stick to guide change.

Institutional characteristics and design facilitate or limit change, particularly as it related to programs having the resources needed to seed and implement change. Resources, in this case, include sufficient authority, time, supports, and funding for innovation and for hiring. Factors that appear to support change are when institutional missions or priorities (including centers) align with those of public health (such as engagement, social justice,

hands-on learning), and when administration is interested in and understands public health, and the focus and purpose of this degree. Where those factors were missing, change was limited or more challenging.

Change is also influenced by the MPH program team structure and culture; this relates to the experiences and backgrounds of people within the MPH program, and the processes they use to consider and respond to input and information. When MPH program teams have an interest in working together, and a commitment to quality improvement, they are able to succeed in change process. While the new CEPH standards prompted change, some programs used them as an excuse to update and refine their focus and curriculum, to generate new partnerships and collaborations, to innovate, and to refine how they teach public health. Factors noted, related to this type of process, include having public health practitioners as a part of the team, working together to build a shared understanding of needs and opportunities, and a vision for change, and to continue to adapt and improve as changes are tried. And, core to this, is having individuals who are interested in learning and adapting, who have access to information and resources that help with individual level understanding, who have peers (local or national) to brainstorm and problem-solve with, and who have resources to support the learning process (such as ASPPH membership, going to conferences), and/or to fund hiring (of practitioners) or other learning innovation tools (IT, field trips, case studies) that help students learn in new and more engaged ways.

Figure 42 – Adapted Conceptual Framework – How and Why MPH Programs are Adapting the MPH Programs



C. Implications and Recommendations

The overarching aim of this study was to understand if, in response to calls to action, MPH programs in the U.S. are actively working to help fill the workforce gaps, and/or to develop graduates with abilities to improve community and public health. The purpose was to generate findings to help seed national conversations around what is being done, and what else can be done, to close gaps and/or measure effect and improvements.

Based on input from representatives in close to half of the MPH programs in the U.S. that are accredited, or accepted for consideration for accreditation, these study findings suggest that since Fall 2015, most schools and programs of public health have shifted multiple aspects of their MPH programs to focus more on the practice of public health. Some of these changes are to maintain or assure a competitive position and be able to ensure program income (via tuition), but a majority of changes are motivated by a desire to bolster the public health workforce with skills and abilities needed now, and anticipated for the future. This is being achieved implicitly, via alignment with the revised 2016 CEPH competencies that set out to do just that, but is also noted explicitly by dozens of respondents and their open-ended responses. However, while this study highlighted an array of changes being made, and an array of desired outcomes from these changes, the actual outcomes have not yet been measured. This will be an important next step, to assess whether academic changes impact the public health workforce and, in doing so, this may also inform how MPH programs and curricula can continue to evolve. For example, with a new investment in strategic skills, as required by the new CEPH competencies, some respondents noted concerns around technical skill development (epidemiology, biostatistics, administration), and content (environmental health, biological sciences); they wonder if this will negatively impact graduate success in some fields of work, and if more focus should be placed here.

Respondents resoundingly state that the focus and the purpose of an MPH education is to train public health practitioners and leaders who can succeed in the workforce and respond to current and emergent needs. MPH programs have adapted to achieve this purpose, and are informed and inspired by public health needs and collaborators in their communities, by peers within the workforce and other MPH programs, and by national policy, reports, and collaborative initiatives. In general, MPH programs do not appear to be making changes in isolation, and seem to be very interested in, and where possible, responsive to, stakeholder input. This reinforces the importance of documentation and dissemination of processes used, and outcomes seen, as peers are learning, and want to learn more, from each other. However, a scan of the literature from the last three years shows very few publications related to MPH programs updated curricula, and the outcomes they are seeing.

Finally, while respondents note having made many changes to their MPH programs, this has not been an easy feat. While they note that the CEPH standards helped facilitate change by providing some vision and urgency, changes were limited, in some cases, by gaps in institutional or program resources, leadership, and vision. Respondents note that the new CEPH standards reinforce the importance of field-based learning and mentoring, particularly to develop contextual understanding and leadership skills, but also note that this is more time intensive, and not always in alignment with the experience and perspectives of faculty. Some MPH programs report that they are seeking to hire more faculty, particularly public health practitioners, and other MPH programs note that they need to carve out more time for teaching or engagement, however, in some cases, that is at odds with pressures related to funding—lack thereof, or needs to generate via research focus or tuition. Study respondents note that changes are facilitated, and

resources allocated, when administrators and leaders have an understating of what public health is, and when practitioners are on the team.

The following section summarizes and contextualized the study findings from three perspectives—MPH programs, schools and programs of public health, and national public health organizations. Recommendations for next steps are provided, based on author interpretation of the study findings, and consideration of the findings against the aforementioned calls to action, as well as the current state of public health in the U.S., inclusive of police brutality, racial justice movements, and the spread and disproportionate impacts of COVID-19 on communities of color. Though this study was conducted pre-COVID, and before the nation's re-energized focus on social justice, it is important to consider the finding vis-à-vis this moment in time. Public health is in the spotlight, related to prevention, detection, and response to emergent infectious diseases, and related to the importance of addressing the structural and social determinants of health. This moment demonstrates needs and benefits, and provides renewed urgency.

1. **Public Health Education and Workforce Development**

a) ***Implications***

This study shows that MPH programs are adapting and seeking to improve the learning and experiences of their students have, better preparing them to be able to succeed at, and excel in, the work they will be expected to do in the workforce. MPH programs seek to align their curriculum and courses with areas of need, as defined by the workforce. Specifically, MPH program leadership are aware of, and responsive to, national initiatives and voices (such as CEPH, CoL/PHAB, Public Health 3.0, CPH, and PH WINS (to a lesser extent)), but are also guided by input and advice from students, graduates, alumni, community collaborators, and peers.

The study finding show that CEPH criteria are the strongest influence on curricular changes, and these align with workforce-related needs, as the CEPH competencies were developed based on national input, including a governmental public health workforce job task analysis.[17] However, these were developed at one point in time based on one set of jobs. This is in contrast to the many MPH programs that expressed seeking to help graduates succeed in job areas they choose, noted excitement with graduates taking jobs in non-traditional settings, to extend the reach of public health. While MPH program leaders hope to see their graduates working with communities to understand and address community needs in improve health outcomes, some reports suggest that few MPH graduates are actually moving into government public health roles.[10,125] This dynamic may create a mismatch of what students are learning vs. the area of work they (want to) choose, and/or, based on stakeholder input, MPH programs may begin to shift away from the define public health workforce needs, to meet the needs expressed by their constituents.

Study results suggest that MPH programs are deeply invested in student success; they also want employers and community partners to be satisfied with student and graduate ability. To that end, MPH programs are focusing heavily on competence development, pushing beyond knowledge acquisition to focus on developing a solid skill base that can be transferred across contexts. In this way, MPH program leaders state that they hope graduates will be able to be successful in multiple job settings, and will be able to anticipate and respond to emergent public health needs, not just the needs we are aware of now. As a part of this, MPH programs report adopting and incorporating more hands-on, field-based, and/or real-world-type learning, where students can observe and practice

what may be expected of them in the workforce, and receive mentoring on how to perform even better. However, MPH program leaders note that this can be time intensive, and there is not always university support for the human or fiscal resources needed.

Finally, some study participants highlighted that the general focus of the current MPH education model—the greater focus on soft skills, the standardization of competencies for all MPH students—may limit deeper education in some specific areas, due to the number of credits needed to meet the core curriculum. Some respondents note that this has resulted in some gaps in the current MPH curriculum, due to content areas and depth that needed to be cut to focus more on strategic skills and more educationally diverse cohorts. These areas include biostatistics and epidemiology, administration, and environmental health. So, while more MPH graduates are getting a stronger general public health education, this may be coming at a cost to specificity in certain areas of expertise that are important to public health.

b) <u>Recommendations</u>

There is much to be optimistic about related to the shifts being made to MPH education, and the defined focus and desired outcomes. Building from the first major shift in MPH education in 50 years, and looking at the critical focus on public health right now, the impacts of these changes should be measured, and the drivers of change should be continually updated to stay on pace with real and emergent needs. The driving forces behind some, if not all of these changes, are filling current and anticipated gaps in the public health workforce, and filling those gaps with people competent in the areas needed to succeed. However, as MPH program graduates may be moving into many different sectors, and as government public health may be under even greater pressure post-

COVID, it will be important to iteratively define what jobs and fields actually comprises the public health workforce, and to iteratively adapting the core focus of MPH education.

Based on this author's interpretations of the study findings, and consideration of the findings against the aforementioned calls to action, and the current state of public health in the U.S., four follow-on actions are suggested related to public health education for workforce development.

i. First, MPH programs assess student learning progression, the efficacy of various strategies used to support learning, and the graduate learning outcomes achieved, particularly if graduates have the right skills and abilities to do the job expected of them, and to lead and progress in their career pathway. These data will help inform internal quality assurance processes, and diffuse innovation to others, but will also help document if there are, in fact, learning gaps related to certain technical job areas based on the new CEPH criteria. Many MPH programs are already doing this, and are using these data to inform changes, but this is a critical strategy to support strong MPH education. For example, many responding MPH programs describe shifting to more engaged and applied learning approaches—working for, with, or within communities—to help deepen learning and better prepare students for the workforce, but these approaches are more resources intensive. Data on impact, value, and or gaps, may help to surface priorities and justify resource allocation.[126]

ii. Second, as a part of this, MPH programs should better track the various <u>types</u> of jobs that MPH program graduates are getting or taking, and the <u>sectors</u> they are moving into. This could also be done immediately, amidst the COVID-19 and racial justice

response, seeing where students and graduates have found a niche to help with the response. This will serve many purposes: At a program level, it will help MPH programs assess their contribution to helping fill governmental public health workforce needs, and it will help MPH programs better adapt their curriculum to meet the specific needs of their students. At a national level, these data will also inform if or how MPH programs are helping to fill governmental workforce needs, or, show a broader picture of what students are using the MPH education as a stepping stone to. This could be doubly important with the expansion of bachelor-level public health program, as these bachelor-level graduates may now be filling job roles formally filled by MPH graduates.[125,127,128]

iii. Third, the public health workforce should be defined, the various roles and fields that contribute to what public health is, and what it does. Available studies enumerate needs and gaps among government public health positions,[9,48] but participants in this study, aligned with the vision of Public Health 3.0,[3,11] spoke to the importance of interdisciplinary approaches in addressing public health, and the importance and value of MPH program graduates working in many types of positions, in the private and public sector, in clinical and allied health fields, in research, and in enterprise. Some MPH programs are already contributing to this via a stronger focus on dual degree programs. To measure the benefits of training students who can enter and succeed in the public health workforce, we need to define what that public health workforce actually entails. This need has been exemplified in the response to COVID-19, and the deep inequities and stark impacts that have become so clear. It could be valuable to

review and document now, who all has been needed to mount the response to a national public health crisis. Perhaps this is the Public Health 3.0 workforce.

iv. Fourth, position-specific gaps in the public health workforce (redefined, as noted, above) should be enumerated so there is an understanding of how many people, in what types of roles, are actually needed. Again, this could be especially timely, as the public health system and health departments are being called on like never before.

One number—250,000 people to fill the government public health workforce—is often cited, but this is a gap that is modeled off of data from 2000.[129,130] Building on this, PH WINS data suggest that many government public health workers may soon leave their jobs, possibly resulting in vacancies. However, PH WINS data also suggest that many current public health workers do not have formal public health training, and, that they plan to leave because of the work environment, and lack of opportunities for advancement.[48] Other research suggest that MPH graduates are not going to government jobs because of the salary.[125] This begs the questions: even if MPH programs are developing graduates to be able to fill workforce gaps, where are the gaps; how many graduates are actually needed; are MPH graduates—trained to enter managerial positions—the right level of staff needed; and is the workplace (salary, possibility for advancement) one that graduates would want to go. This will be even more important as the country recovers from the COVID-19 pandemic, and hopefully, begins to invest significantly in the determinants of health. More people addressing public health will be needed in new positions, but given the financial challenges governments will face, it is not clear how many of these jobs will government jobs.

2. Schools and Programs of Public Health

a) Implications

This study suggests that MPH programs are actively responding to the calls to action to help develop the public health workforce of the future. As noted above, MPH programs are contributing to—and responding to—national guidance to help drive change. To do this, schools and programs of public health report taking on new and even bold steps related to programs structure, curriculum, and pedagogy, to change the status quo.

MPH programs report that they have worked hard to re-think and re-envision their curriculum and their approaches to teaching to meet the expectations set by CEPH, and to achieve their vision for student development and workforce readiness. But, many MPH programs note that this has come at a cost—the need for more teaching resources, the need for more program income, and even cuts course and curriculum content areas deemed valuable. This, in turn, has resulted in some tough decisions where content, courses, concentration areas, and even faculty positions have been lost. Even while many programs have sought to braid content together to minimize loss, some MPH program leaders worry that these cuts may reduce graduate skill, competence, and competitiveness in some fields.

While cuts are being made in some areas, in this study, other programs note the importance of having experienced public health practitioners as a part of their faculty or teaching team, as practitioners bring excellence in experience and context, helping to guide other faculty in community-engaged learning, developing real-world-type course work, and authentic assessment. Respondents shared different models are being used to

achieve this, including integrating practitioners as guest lecturers or mentors, and hiring practitioners as adjuncts or instructors, clinical professors, and/or tenure-track faculty.

To offset these costs, or others, many MPH programs reported that they rely on student tuition. Some MPH programs spoke of the proliferation of MPH programs over the last 20 years,[52] resulting in a more competitive environment, and noted that with fewer research dollars being granted, some they feel a need to adapt their admissions criteria to ensure an adequate cohort size, and income. This, in some cases, reportadly means reducing the 'level' or difficulty of courses to accommodate more educational and experiential diversity in the classroom, and how this, in turn requires even more fieldwork, student mentoring, and resources.

b) <u>Recommendations</u>

Based on the finding of this study, it appears that MPH programs have embraced change. While this is reportedly influenced, in part, because of accreditation, many MPH programs shared a vision for change and impact that goes beyond just meeting defined criterion. However, to achieve the vision set forth by most responding MPH programs, pedagogical methods and learning contexts will need to continue to adapt to help meet learning objectives, and for this, a vision for change, and resource, are needed. To support this, based on this author's interpretations of the study findings, and consideration of the findings against the calls to action, and the current state of public health in the U.S., four follow-on actions for school and programs of public health are suggested.

i. First, this study's findings suggest that MPH programs are more successful if they have support from university or school administrators and leadership; in some cases, this must be built. To do so, MPH programs might seek input from national organization to help administrators understand what the focus and purpose of an MPH is, and the resources that are required to maintain programming, to improve curricula, to hire needed faculty/mentors, to invest in training on effective teaching, or to get students to the field. As an example, the field of public health is broad and non-credentialed, yet—with a clear focus on competence development where students are expected to acquire substantial core knowledge, and practice and develop applied skills with mentoring—is aligned with clinical-type education like medicine, nursing, or social work. However, not all institutions see it this way. Some MPH programs are placed within schools or departments that do not share this focus or approach, and a number of respondents in the study noted a conflict in this respect: faculty who are teaching in MPH programs have not had public health training or worked in public health roles. This is akin to a non-physician teaching students to be physicians. MPH programs represented in the study clearly highlighted the need for practitioner involvement in MPH training, as well as resources to support field-based training. This was more likely where programs had administrative support. In addition to seeking national partner support, MPH programs may consider summarizing the many ways their program's faculty, staff, students, and graduates are involved in the COVID-19 response, and use that as a way to build an understanding of the field.

ii. Second, based on the keys to success noted by study participants, MPH programs should seek to develop a shared understanding of the needs and opportunities that they

see, related to public health education, and develop a program vision and strategies to achieve that. This includes defining what a program graduate should be able to do, and the types of exercises and assignments that can help get a student there. In response to the new CEPH standards, many MPH programs represented in this study described the value of working together to envision the future state, and map out how to get there by building from and improve upon what they already had; this process also facilitated peer-to-peer learning, and shared capacity building. This relates to recommendation (i), above, but a program level. As an example, some MPH programs noted that it was hard to consider implementation of the CEPH competencies, particularly when many faculty were trained in bench science or used to didactic learning. However, change was envisioned and managed when teams worked together and shared perspectives, to build understanding and buy-in. At least two MPH programs spoke about specifically matching practice faculty and academic faculty to co-design courses.

iii. Third, based on reported desired and gaps they see, MPH programs should expand partnerships with public health practitioners, government public health, and community based organizations, both to support deeper, real-world-type learning, and to support coordinated and collaborative public health improvement. A number of MPH program leaders spoke of imbedded models they are using, and expressed satisfaction and pride in the outcomes seen: not only were students translating classroom-based knowledge into real-world ability, students and faculty together were partnering with community members and liaisons to learn more about the real local needs and opportunities, and were working together to apply public health approaches to improve of advance health. Some respondents described these as triads that can lead

change; others linked this approach directly to what is being called for via Public Health 3.0.[126] To support this, the academic health center model could be explored by more MPH programs, and, national membership organizations, such as ASPPH or de Beaumont Foundation, could seed and support collaborations with NACCHO and ASTHO, to better connect MPH programs with local health departments, for shared learning, collaborative field work for local public health improvement, and even workforce pipeline development. Coincidentally, it is possible that this action has been catalyzed by the urgent public health workforce and community support needs presented by the COVID-19 pandemic. Partnerships may have emerged or expanded to meet real needs; these could be documented, described, improved, and deepened.

iv. Finally, as noted in the previous section, MPH programs should document, monitor, evaluate, and disseminate the outcomes of change. Monitoring and evaluation, research, and evidence-based practice are core functions of public health, those leading change related to MPH education must commit to this. MPH program leaders seek to stay informed and aware of innovations and best practice, and note the invaluable input that peers provide related to what works, what doesn't, and what to try.

3. National Public Health Leaders and Initiatives

a) Implications

Based on data summarized in this study, national public health initiatives, including calls to action, reports, accreditation standards, and collaborative working groups, have seeded the changes that MPH programs have been implemented. As a part of that, national

public health organizations have supported the change process, including giving key guidance, helping normalize it, and giving peers a place to learn from each other.

Respondents suggest that the greatest external drivers of change within MPH programs over the last four years have been the CEPH and their accreditation standards (most influential, by far), followed by ASPPH and their Framing the Future initiative, and PHAB's partnership with the CoL to define public health workforce competencies. These initiatives are largely seen as positive by MPH program leaders.

In general, based on the study finding, the CEPH standards were a facilitator of change, and a motivator related to the outcomes of changes being made. Respondents noted that the CEPH standards set a vision for what public health education should be, a framework for what is required, and provided some direction, particularly around what might help students and graduates be successful in the workforce. A number of respondents felt that this was liberating, and that it allowed their programs to re-invent themselves, focusing on their strengths. Other programs noted that the criteria and requirements pushed or facilitated decisions that were beneficial, or needed to happen. making them stronger. However, the accolades were not unanimous. While some MPH programs found the standard liberating, others found them limiting and over-prescriptive, and while some programs found them to support innovation, others said they limited innovation. Some of the MPH programs that noted the CEPH standards as a barrier also noted that this was linked to time pressures (too much to change in too little time), and because faculty didn't want to be told what to do by an external entity.

While many of the study respondents noted that the CEPH standards or requirements helped push change that was important, or needed, and others noted that they helped administrations support decision-making processes, results of this study suggest that the standards alone do not motivate and facilitate change; it is also the process used to seed and support the change. Many MPH program leaders noted that support from CEPH and peers at other institutions helped them understand the guidance, and plan for change; others spoke about the multi-year process leading up to the new standards, and through participation, being aware of the coming shifts due to a better understanding of needs.

In addition to referencing ASPPH for their Framing the Future report—that was noted as very informative by a number of study participants—ASPPH was specifically noted as a group that supports shared understanding and peer-to-peer learning in a time of change. For example, during the Framing the Future process, ASPPH engaged multi-sector stakeholders in reflecting on the past and re-envisioning the future of public health training, which respondents say, really opened their eyes to the needs and the opportunities. Following from that, respondents note that ASPPH brings people together to review, discuss, and/or research important topics to help see what is going on, what with needed, what others are hearing, what others are doing, and what seems to be working or not. This is achieved via conferences, webinars, working groups, meetings, and publications, and responding MPH program leaders really value this approach.

b) <u>Recommendations</u>

Based on the findings of this study, to keep the change process going, and to help MPH programs have a sense of whether their efforts are leading to the types of systems change anticipated (workforce re-build, public health improves), national public health leaders

should continue to seed and support initiatives that monitor, evaluate, and communicate progress, successes and challenges, and emergent needs. To support this, based on the author's interpretation of the data, and consideration of the findings against the calls to action, and the current state of public health in the U.S., four follow-on strategies are suggested for national public health partners.

i. First, linked to recommendations described above, national public health leaders, working in this area, such as ASPPH or de Beaumont Foundation, should engage representatives from schools and programs of public health to collectively design and manage assessment, benchmarking, and monitoring and evaluation processes to (a) define what the public health workforce is (what jobs it comprises) and what the current gaps are, and (b) describe where program graduates are going, with respect to the enumerated job gaps, and any challenges are (such as hiring freezes, rates of pay, inadequate training, or too many graduates). Leadership in this initiative, from the national level, will help schools and programs see the full picture related to future workforce development, including how undergraduate programs are influencing this, and help all who are invested in this understand the dynamics and invest in process improvements. As noted above, this could be a valuable initiative now, as public health students and graduates may be working in numerous and diverse public health positions now, as the country has needed to urgently respond to the COVID-19 crisis.

ii. Second, MPH program leaders are interested in having greater connections with the public health workforce, and a deeper understanding of needs and gaps they experience. To support this, national public health leaders working in this area, such as de Beaumont Foundation and ASTHO, could redouble their efforts to create

collaborative working groups, and document and disseminate needs, priorities, and successes and lessons learned. This should include publications (journal articles, reports, white papers), as well as webinars or meetings to support discussion and the development of a shared understanding and shared priorities, as MPH program leaders value learning from each other. Again, as noted above, the COVID-response could be a catalyst for this conversation. Anecdotally, many schools and programs of public health have helped local and state health departments respond to immediate needs, and to plan for the next wave. Recognizing this and documenting this could support dialogue and engagement for longer-term partnership.

Concurrently, these national leaders may also consider relevant study findings that could seed change: In contrast to the CEPH standards and Framing the Future initiative, the CPH and the PH WINS initiatives were only moderately cited as resources informing MPH program changes. These initiatives were driven by workforce needs, and highlight specific areas for possible focus and investment, but MPH program leaders are less aware. ASPPH and the National Board of Public Health Examiners might consider re-framing and re-enforcing the purpose of the CPH exam, and might help MPH programs and/or employers consider the potential value and benefits of the CPH exam. Similarly, de Beaumont Foundation and ASTHO might consider framing communications related to the PH WINS initiative specifically to MPH program leads. PH WINS tells a comprehensive story of what the governmental public health workforce looks like and needs, and MPH programs what to contribute to this, but a minority of respondents in this study noted that their program is informed by it. Conversations around the PH WINS data could be used to

seed the aforementioned conversations between MPH programs and local health departments, in partnership with NACCHO and ASTHO.

iii. Third, MPH program leaders are invested in developing student competence using authentic approaches, and helping students developing strategic skills and adaptive leadership abilities, but also note that some faculty members and/or university leadership do not fully embrace or understand this approach, or the reasoning behind it. Building on the previous two recommendations, national public health leaders might consider designing and developing outreach and educational materials that MPH program leaders could use to help university leaders and educators understand what the focus of public health and public health education are, and what approaches are being suggested and used, and why; professional development on specific content, maybe in the form of a toolkit, might also be valuable. As an example, ASPPH, CEPH, or HRSA's Public Health Training Centers, could help MPH programs collectively describe and define what an MPH education entails, and then support engagement and capacity building training with university or program leadership, and faculty. This could include vignettes and short videos to show public health workers in action ("this is my job, this is what I do"), and could also include ideas and strategies to help institutions better incorporate applied practice, field-based work, and practitioner involvement in teaching and mentoring. There has perhaps never in my lifetime been as relevant a moment as now to mount such an effort. Public health is in the forefront of most people's minds as we deal with a national and global pandemic, and, public health goes even deeper, being able to describe the egregiously disproportionate impacts of COVID-19 on Black and brown Americans, and the

public health emergency of racism and police brutality. Public health leaders lead advocacy and change, and support needs and responses, in all of these areas; their work, and their impacts, should be in the spotlight.

iv. Finally, MPH programs note pressures related to program funding, and the need to ensure program enrollment (typically self-pay) to keep programs afloat. However, reliance student funding (family resources or student loans) may be at odds with equity initiatives that seek to engage more first generation and non-traditional students in MPH programs so that the public health workforce matches the demographics of people and communities being served. Furthermore, student loans may then deter students from taking moderately paying government public health jobs. As a key function of a healthy society, public health training and a strong workforce is needed. In line with approaches some medical schools are adopting, national public health leaders might consider advocacy for greater government or philanthropic investment in MPH education programs, reducing the fiscal burden on students, and giving more students more freedom to study and serve. Again, perhaps leveraging the vast 'humanpower' that MPH program are putting into current public health emergencies, this may be the right time to foreground public health education as a strategic investment opportunity.

D. Strengths and Limitations

1. Strengths

This study contributes to the literature base by describing how MPH programs have been adapting their MPH program design and curriculum over the last four years, and what the

drivers of change are. This is an important perspective as, in order to meet the needs of a professional workforce, educational programs must be able to be responsive to trends and needs. This study fills a gap in the literature, and shows that this can happen, and in fact is happening, within schools and programs of public health.

This study was informed by national stakeholders, envisioning that the results would help guide national level planning related to ongoing workforce development initiatives. To improve the validity and reliability of this study, data collection tools were developed based on literature-driven constructs and theories. Two phases of data collection that followed a standard protocol were used to complement each other, one providing a breadth of information from a large number of respondents from across the country, and the other providing in-depth information from a strategies and purposive sample.

Data collected via the Phase 1 survey data represent the perspectives of at least 43% of eligible institutions, with a slight over representation of MPH programs from within schools of public health, and those that are affiliated with ASPPH. This sample also showed diversity of program age, size, and geography. The complementary qualitative data collected via Phase 2 interviews more or less mirrors the characteristics on the Phase 1 survey respondents, and provides perspectives from a diversity of programs as measure by age, size, geography, research focus, engagement focus, and type of institution. While this sample has not bene tested for national representativeness, based on triangulation of descriptive characteristics, the results of this study may present a good depiction of the current state.

Data from the two phases were compared and contrasted to identify themes, and any areas of divergence. Interestingly, responses more clearly showed convergence of influences and

ideas, particularly via the interviews where the sample was selected to show divergence of ideas. Thematic analysis of the interview, supported, in part, by a peer coder, suggested saturation was met, at least at the level of questioning planned for in this study.

Finally, borrowing words from more than one study participants, (at least some) respondents found this study to be helpful in documenting and describing all that has been done, in a short time, particularly as some felt extreme pressure. Looking back on the process, and the outcomes, respondents shared a bit of pride with the progress made.

2. Limitations

While the results of this study suggest some exciting trends, there are weaknesses inherent to the results and the conclusions due to bias.

First and foremost, responses may be biased due to those who opted to respond to the survey, and opt into the interview sampling frame. The survey was sent to 248 contacts at 215 institutions, and 115 shared valid responses, representing at least 93 unique institutions. What is not known, however, is who did not respond. Given the convergence of findings, it is possible that only those who have implemented changes responded to the survey, or only those who had 'good' stories to tell opted into the interview pool. There is no reason to assume this, but it is a caveat that should be considered.

A second limitation is that the results presented in this study only present the perspectives of one or a few representatives within an MPH program. By design, the survey was sent to only those who might have an overarching understanding and view of the curriculum, and as the lead, respondents may have had their own biases related to how well processes have gone. The survey and the interview were both designed to capture limitations and barriers, and

allow for complaining. Many barriers were shared, but also solutions found. And, some complaints were shared about time pressures and resource needs, but the overarching sentiment was positive. A third limitation related to recruiting just from leadership positions is that the perspectives of or between different concentration areas was not measured. If examined at that level, greater nuances may have been noted.

A fourth limitation is that, in retrospect, the interview process could have been designed differently, both to increase diversity or perspectives, and to get to a greater depth of responses. To the first point, interviewees were sampled from those who responded to the survey, and consented to be contacted. An alternative method could have been to sample and contact those who did not respond to the survey, to explore possibly contrasting ideas. To the second point, during the data coding processes the researcher noted that while the interview questions focused on key constructs, a priori codes were not used as probes. There was some value in that approach, as interviewee-driven ideas were generated, however, the limit of that is that some child codes might be under-represented as they were not specifically probed.

Finally, it is possible that researcher bias influenced interpretation of the results, as the researcher is a part of an MPH program leadership team, and is a doctoral candidate studying public health leadership and systems change. The researcher sought to minimize this via seeking peer input at all phases of the research planning and implementation phase in order to check assumptions and assure different perspectives. The researcher was hoping to do some formal member checking before publishing results, however the COVID-19 pandemic derailed meetings and working group sessions where this could have been discussed. However, as findings are shared, there is hope that they will simply spur conversation and then follow-on assessment, evaluation, and dissemination of innovations.

E. Conclusions and Summary

Based on a series of calls to action that have accelerated over the last 10 years, this study set out to explore if MPH programs had shifted parts of their programs to refine MPH education in the U.S. to better meet enumerated public health workforce needs. Based on the data collected between November 2019 and March 2020 from representatives in at least 43% of MPH programs linked to CEPH, the answer is clear: yes.

MPH program leaders see that the purpose of an MPH education is to develop public health workers and leaders who are skilled and who can lead change that improves the health of communities. MPH programs see that the public health issues we face today are complex, and so they are seeking to develop graduates who are equipped to appreciate and address public health in new ways. Though this study was implemented just as COVID-19 was emerging, and as the U.S. public was becoming (re-)awakened to the impacts of police brutality and systemic racial injustice, participants alluded to or spoke to such issues, in example of what motivates their commitment to public health education, and to training and mentoring students. It was noted that, in this era, it is hard—or even impossible—to guess what public health need will appear next, and so a goal is to help develop thinkers and problem-solvers who can anticipate and be responsive to the needs that appear. Additionally, it was noted that health outcomes are impacted by multiple factors, linked to race, income, and the determinants of health, and that part of the education process must include helping students understand this by seeing it, experiencing it, and reflecting on what can and must change to achieve the equity.

Based on this focus—a focus that is informed by awareness of health needs and inequities, connection with public health initiatives, and accreditation standards—MPH programs have implemented a number of shifts since Fall 2015 to better meet defined needs, including those of

the workforce, and CEPH accreditation. MPH programs have adapted the design of MPH programs, adopted new competencies that are aligned with knowledge and skill gaps describe by the current public health workforce; altered graduation requirements to support more field-based and applied work to bolster workforce readiness; and adapted admissions criteria to support more diverse cohorts and future workers, including recruitment and support of traditionally under-represented groups in graduate education, and in public health roles.

These changes, and others, have driven shifts in program structure (concentration areas, courses of study, certificate options) and curriculum to permit stronger focus on knowledge acquisition, skills building, and professionalism, factors program leaders recognize are critical for workforce success. To meet these learning outcomes—and to improve understanding of context and the community-based and policy-influenced drivers of public health—MPH programs have shifted to using more engaged pedagogical strategies, such as more field-based or real-work-like learning, partnerships with community, and practical assignments that mimic work they might do in practice, including team-based and collaborative work. During this study, respondents spoke about the importance of collaborations and partnerships with public health agencies, and having the opportunity to collaborate and support public health activities, via faculty-supported technical assistance, and via student-supported implementation. Though not yet formally documented, this was further highlighted by ASPPH-led meetings and surveys. Based on observational data, one might infer that many MPH programs in the U.S. were able to pivot their approaches and leverage their relationships to be well involved in supporting the COVID-response, and are very deeply committed to an anti-racism agenda, as a part of their ASPPH membership, and integrated into their programs.

While the progress that MPH programs are making is encouraging, with evidence of progress, and with clear needs and opportunities for public health training, leadership, and service in response to the many current public health emergencies and chronic root causes, this study, alone, is not enough. MPH program leaders, universities, and national public health leaders all have an opportunity to continue to accelerate this progress, and the outcomes seen as a result, through assessment, education, and advocacy.

MPH programs are in a time of change and innovation, and they should document, monitor, evaluate, and disseminate the processes they are using within their education programs, and the outcomes that they are seeing as a result. MPH programs' ability to pivot, and their involvement in major public health emergencies of this decade—including the COVID response, or responses to racial injustice—could be a low-hanging starting point to document stories, philosophies, and impacts. Focal questions for MPH programs could include: What is being tried, and why? What is working, or not working, and why? What are the gaps in student ability or graduate success, if any, that are seen as a result of the current focus? What are the services or outcomes that are being delivered? And, are investments in more resource-intensive strategies worth it? MPH program leaders seek to stay informed and aware of innovations and best practice, and some of the most meaningful information comes from peers. While empirical, peer-reviewed studied are valuable, MPH program leads also appreciate learning from conferences, webinars, or 1:1 conversations.

As a part of this, MPH programs should track the various types of jobs that graduates are getting or taking, roles they are filling, and sectors they are moving into. Many of the calls to action to re-frame public health education have focused on developing MPH graduates to fill critical public health workforce needs. However, it is not clear that graduates are getting—or even

wanting to fill—these roles. Not only will this help MPH programs assess their contribution to helping fill governmental public health workforce needs, and it will help MPH programs better adapt their curriculum to meet the specific needs of their students.

Where MPH programs are struggling to implement changes they envision, leadership teams should consider strategic management processes to engage stakeholders to identify their areas of strength and the strategic areas of public health they'd like to address, develop a shared vision for their MPH program, and co-identify the optimal strategies to achieve this vision. Working as a team, MPH program faculty and staff can complement each other's knowledge and experience base, and learn with and from each other, to refine their program and improve outcomes.

Finally, to support educational outcomes and health impacts, MPH programs should expand partnerships with local public health practitioners, government public health units, and community based organizations involved in public health work.

Administrators at institutions with MPH programs should take time to understand what public health is, how public health education is optimized, and support MPH programs in having access to the fiscal, technical, and human resources needed to implement their educational model well. There has perhaps never been a time that this is so needed and so possible. Again, the current public health emergencies provide potential fodder to document and describe what public health is, and support this understanding. Observationally, many faculty, staff, students, and graduates of MPH programs are taking an active role in emergency response, community health support, and preparedness related to what comes next. Administrators should take notice, and they could seek to understand what facilitated programs being ready and able to respond, and what could help them have even greater reach and impact.

Using today's realities as a prime example, university leadership may be able to recognize the professional training focus of an MPH, and recognize that the competence focus is not dissimilar from clinical training in other medical and allied health professions. To do public health education well, MPH-trained faculty are needed, and students and faculty must be able to get off campus to actually do public health work. Rather than seeing this as a burden, university administrators may consider recognizing and rewarding the impacts that come from community engagement and service, helping to advance community, national, or international public health.

This could also help administrators (re)consider funding models and expectations for MPH programs, as a number of programs report the need to be self-sufficient or cost neutral, relying on student tuition, adding stress and constraints, rather that providing freedom to be able to engage and serve. The current self-funding approach that some describe has the potential to severely limit access to first generation or lower income students, including Black, brown, and indigenous Americans, precisely the types of leaders that MPH programs need to foster to be leaders in their communities, and at the national level. Finances for government public health, university education, and scholarships will likely be limited in the coming years, but investment in public health must be prioritized.

National public health leaders have the potential to seed and support these changes, and more. First and foremost, MPH programs are producing more graduates than ever, and yet these graduates may not be filling roles in the governmental public health workforce. National public health leaders could engage representatives from schools and programs of public health to collectively design and track where program graduates, specifically, are going. This could also be done more immediately considering the types of roles and activities that students and graduates have filled during the current public health emergencies. Working with other national

stakeholders, this initiative could help develop refined definition of "the public health workforce," inclusive of the various roles and fields that contribute to what public health is, and what it does. Public health has always had a critical link to clinical medicine, community-based public health, and policy work. As exemplified by the COVID-19 response, public health happens at many levels and by many types of organizations. MPH programs are likely developing graduates that fill many of these types of roles, thus developing the potential to implement a Public Health 3.0 approach, but this workforce is not yet defined, and thus measuring impact of the revitalized MPH approach is not possible.

With a renewed definition of the public health workforce, position-specific gaps should be enumerated to develop an understanding of how many people, in what types of roles, are actually needed, and what level of education is needed. This enumeration process should then be cross-walked with data related to where MPH program graduates are going. Many of the current workforce gap projections are based on data from 20 years ago, and there is evidence that MPH program graduates are not, in fact, filling the public health workforce gaps that do exist.

As a part of this, national public health leaders might consider designing and developing outreach and educational materials to describe what public health is, and how public health education works. While the CEPH competencies have served to standardize the core public health education, it is not clear that university faculty and administrators, or even incoming students, actually appreciate what public health is, and the types of work that public health graduates do. Public health has perhaps never been in the spotlight as much as it is now due to the COVID-19 pandemic, response, and disproportionate impact on Black and brown Americans, largely driven by the social and structural determinants of health, and systematic racism. This is the time for the field of public health to be recognized for its role in the health and well-being of

this country, and the world. While this information would be valuable for prospective students, it is perhaps more important for those in the academic world. Messaging, stories of impact amidst the pandemic, and even technical assistance to help administrators understand how to support MPH programs, could be valuable. This awareness raising could serve a dual role, also supporting advocacy for increased funding, as noted below.

Finally, MPH program leaders express a desire to have greater connections with the public health workforce, and a deeper understanding of needs and gaps they experience. To support this, national public health leaders could redouble their efforts to create collaborative working groups, and document and disseminate needs, priorities, and successes and lessons learned. This should include publications (journal articles, reports, white papers), as well as webinars or meetings to support discussion and the development of a shared understanding and shared priorities, as MPH program leaders value learning from each other. As an example, leaders might re-frame and re-enforce the purpose of the CPH exam, helping MPH programs and/or employers consider the potential value and benefits of the CPH exam; similarly, leaders might frame communications related to the PH WINS initiative specifically to MPH program leads. Conversations around the PH WINS data could be used to seed the aforementioned conversations between MPH programs and local health departments, in partnership with NACCHO and ASTHO.

Some 30 years ago, public health leaders started to raise an alarm that the U.S. public health system was not adapting at pace to be able to help keep the public healthy. It took about 20 years for those calls to be activated, but in the last 10 years, by many metrics, change has begun. Specific workforce needs have been elucidate, specific competences have been defined, public health education has been reformed, and a new vision for public health has been set forth. This may be the tip of the iceberg. With continued attention, and a commitment to monitoring,

evaluation, and adaptation of approaches, and advocacy, public health education has the potential to be a key driver of public health systems change and community health improvement.

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APPENDICES

APPENDIX A - MEASUREMENT TABLE

0. Respondent Demographics – Who Responded to the Survey and Interview?				
Construct **+ categories + definitions**	**Demographic Criteria**	**Measures**	**Data Sources**	**Analysis, Triangulation; Interpretation**
Demographics - **Characteristics of respondents** The characteristics and experiences of respondents at responding MPH programs may influence the approach or model an MPH program takes: Practice vs. research focus? A part of national MPH/workforce working groups?	- **Titles**: ○ *Associate Dean for Practice, Associate Dean for Curriculum, etc.* - **Roles** (ASPPH committees) ○ *Practice, Academic Affairs* - **Background**: ○ *Academic (PhD), Practice (MPH, DrPH, other)*	- Respondent title - Respondent training/ background - Respondent role - Respondent committees	Survey - Q29, Q30, Q31, Q32, Q33, Q34, Q35 Semi-structured interview - 1 Q Document review	Phase 1: - Clean data (Qualtrics) - For quantitative/categorical questions, calculate the response rate and the frequencies and run cross-tabs by program characteristics (age, size, type, ASPPH) to assess for difference in response by characteristic. - For qualitative questions, pull text responses into Word; use thematic coding using a priori codes; generate new codes as needed; collate themes in a matrix. - Summarize data per survey question (all respondents); Group data by various characteristics (e.g., school vs. program, old MPH programs vs. new MPH programs, etc.) to explore similarities and differences in responses between and among groups. Use bivariate/ multivariate analysis (cross-tabulations) if appropriate. Phase 2: - Review documents to determine characteristics Phase 3: - Merge Phase 1 and Phase 2. Develop a descriptive report related to each RQ. **Interpretation** - Develop summary report to describe the characteristics of the respondent group
Demographics - **Characteristics of School/ Program** The characteristics and context of a program, school, or university may influence the approach, model, or flexibility that an MPH program has: Small vs. large programs? Old vs. new programs? Mission/vision of institution (land grant, engaged vs. R1?); location and surrounding needs?	- **Age/History of MPH program** ○ *1-10 yrs; 11-20 yrs; 21yrs+* - **Type**: ○ *School, Program* - **Size**: ○ *# of students* - **Characteristics**: ○ Affiliation with ASPPH or not ○ *Land grant, R1, Engaged learning/co-op focus, Academic health department, etc.*	- Institution name - Institutional characteristics - Institution type - Number of students enrolled in all MPH programs each calendar year - Age of MPH program - Methods of curriculum delivery		

1. What is the Focus of MPH Programs				
Construct **+ a priori codes + definitions**	**Possible Sub-Codes**	**Measures**	**Data Sources**	**Analysis, Triangulation; Interpretation**
(a) MPH Training Focus - **Learning** The focus of a university-based training program is to ensure that ***learning*** occurs, such as the acquisition of knowledge and skills[5] **(a) MPH Training Focus** - **Competence Development** The focus of a MPH training program is to develop professionals who are ready to enter the public health workforce.[2,14,15,17,59] To this end, this professional training should focus on ***competence development*** in focal areas highlighted in workforce needs assessments.[2,8,14,15,17,59] **(a) MPH Training Focus** - **Workforce Readiness** The focus of a MPH training program is to develop professionals who are ready to enter the public health workforce, including the governmental public health service, healthcare sector, and/or non-profit sector.[2,14,15,17,59] **(a) MPH Training Focus** - **Graduate Employment** MPH training programs should help to replenish the public health workforce,[61] meaning, ***graduates of MPH programs should be employed***. **(a) MPH Training Focus** - **Other** Other foci may emerge from data collection, such as ensuring student/graduate satisfaction, employer satisfaction, or sufficient revenue; CEPH accreditation requires data collection and routine reporting on these areas.[4]	- **Informative learning** ○ *Focus of MPH programs is to increase Knowledge, Skills, Expertise* - **Formative learning** ○ *Focus of MPH programs is to increase Professional Values, Professionalism* - **Transformative learning** ○ *Focus of MPH programs is to develop Leadership, Change-makers, Systems thinkers, Team players* - **Competence development** ○ *Focus of MPH programs is to increase professional abilities in areas such as Systems thinking, Critical thinking, Problem solving, Analytics, Innovation, Leadership, Collaboration, Engagement, Change management, Facilitation, Negotiation, Teamwork* - **Developed researchers** ○ *Focus of MPH programs is to develop researchers* - **Developed practitioners** ○ *Focus of MPH programs is to develop skilled people to do public health in the field* - **Employed researchers** ○ *Focus of MPH programs is to assure graduates are employed as, or continuing studies to become, a researcher* - **Employed practitioners** ○ *Focus of MPH programs is to assure graduates are employed doing public health work*	- MPH program **purpose** ○ *Ideal* ○ *Actual (alignment with ideal)* - MPH program **goals** ○ *Actual* - MPH program **foci** (eg. research vs. practice vs. service) ○ *Ideal* ○ *Actual (alignment with ideal)* - MPH program **outcomes**/ measures of success ○ *Ideal* ○ *Actual (alignment with ideal)*	Survey - Q1, Q2, Q4, Q25 Semi-structured interview - 3Qs Document review	Phase 1: - Clean data (Qualtrics) - For categorical questions, calculate the response rate and frequencies and run cross-tabs by program characteristics (age, size, type, ASPPH) to assess for difference in response by characteristic. - For qualitative questions, pull text responses into Word; use thematic coding using a priori codes; generate new codes as needed; collate themes in matrix. - Summarize data per survey question (all respondents); Group data by various characteristics (e.g., school vs. program, old MPH programs vs. new MPH programs, etc.) to explore similarities and differences in responses between and among groups. Use bivariate/ multivariate analysis (cross-tabulations) if appropriate. Phase 2: - Pull transcribed data into Dedoose; code using constrict codes. Extract data by construct code, and code using parent codes. Extract data by parent code, and code using child codes. - Develop summaries by child and emergent themes. Incorporate quotes. - Integrate thematic summaries to respond to research questions. Phase 3: - Merge Phase 1 and Phase 2. Develop a descriptive report related to research question that shows convergence or divergence of responses. **Interpretation** - Develop summary report and recommendations.

2. Are SPPH shifting their instructional methods and approaches to better meet this focus? If so, how?				
Construct **+ a priori codes + dfns**	**Working Code Definitions; Possible Sub-Codes**	**Measures**	**Data Sources**	**Analysis, Triangulation; Interpretation**

(a) Possible Shifts
- **No shifts; status quo**
	- **Already aligned with focus**
	- **Not interested in/able to change**
		- **<u>Characteristics of instructional design</u>**
		  ○ Design
		  ○ Curriculum content
		  ○ Modes of teaching
		  ○ Context for learning
		
		- **<u>Timing</u>** of last change:
		  ○ *MPH program instructional change*
		  ○ *university change*
		
		- **<u>Types</u>** of changes:
		  ○ *Actual*
		  ○ *Desired/ suggested*
			<u>Survey</u>
			- Q2, Q2, Q7, Q11, Q15, Q22 Q23 Q26 Q27
			
			<u>Semi-structured interview</u>
			- 3Qs
			
			<u>Document review</u>
				<u>Phase 1:</u>
				- Clean data (Qualtrics)
				- For categorical questions, calculate the response rate and the frequencies and run cross-tabs by program characteristics (age, size, type, ASPPH) to assess for difference in response by characteristic.
				- For qualitative questions, pull text responses into Word; use thematic coding using a priori codes; generate new codes as needed; collate themes in a matrix.
				- Summarize data per survey question (all respondents); Group data by various characteristics (e.g., school vs. program, old MPH programs vs. new MPH programs, etc.) to explore similarities and differences in responses between and among groups. Use bivariate/ multivariate analysis (cross-tabulations) if appropriate.
				
				<u>Phase 2:</u>
				- Pull transcribed data into Dedoose; code using constrict codes. Extract data by construct code, and code using parent codes. Extract data by parent code, and code using child codes.
				- Develop summaries by child and emergent code themes. Incorporate quotes.
				- Integrate thematic summaries to respond to research questions.
				
				<u>Phase 3:</u>
				- Merge Phase 1 and Phase 2. Develop a descriptive report related to research

(a) Possible Shifts
- **Instructional Design** Instruction and learning are influenced by ***<u>instructional design</u>***: how instruction is designed and implemented;[5,16,19] this is informed by four key factors:[5,16,19,94,95]
	- **Competence development**
	  ○ *Shifts to focus on <u>Competence development</u>.*[4,56]
	- **Career Pathways**
	  ○ *Shifts to align with <u>career pathways</u>; engage the workforce in their instructional design.*[2,4,12,13,59,60,90]
	- **Criteria for Graduation**
	  ○ *Shifts in <u>criteria for graduation</u> - curricular and/or co-curricular activities.*[4,34,73,74,96]
	- **Criteria for admissions**
	  ○ *Shifts in <u>criteria for admissions</u> to recruit candidates that can help support/ improve/fill gaps in workforce.*[5,94]			

(a) Possible Shifts
- **Curriculum/ Course Content** Curriculum and course content refers to the ***<u>comprehensive knowledge, skills, and values that a student needs to acquire over the course of a course or program</u>***.[19,78] This includes all of the building blocks that allow a student to develop and demonstrate competence.[5] There are five areas where shifts in curriculum and course content may be focused.
	- **Foundational knowledge**
	  ○ *Adapting courses or curricula to be sure that graduates have the knowledge needed for practice. The new accreditation standards, for example, define 12 areas of foundational knowledge that must be assured.*[4]
	- **Public health competence**
	  ○ *Adapting courses to be sure that graduates have the ability to apply knowledge and skills aligned with workforce needs.*[65] *The new accreditation standards define 22 areas of competence to be assured.*[4]
	- **Public health values**
	  ○ *Adapting courses or curricula to assure the development of public health values, including a focus on social justice and equity.*[5,9,11,48]
	- **Public health leadership**
	  ○ *Adapting courses or curricula to assure the development of skills for inquiry, leadership, decision-making.*[5]
	- **Inter-professionalism**
	  ○ *Adapting courses/curricula to break down professional silos, to enhance relationships, and to improve ability to work in teams.*[2,5,12,13,17,59,60,90]			

(a) Possible Shifts				

- **Pedagogy/ Modes of Teaching, including context for learning** As they shift to a competence-based model, MPH programs may strive to use ***pedagogical strategies*** that develop professionalism and values, and strategic leaders.[5,78] This learning occur through many methods, including applied practice, critical and systematic reflection, and mentored problem-solving, ideally in field settings where the context is not controlled.[3,9,11,46,48,57,97]
 	
There are numerous pedagogical approaches that MPH programs may be considering or shifting to in support of deeper learning, competence development, workforce readiness, and/or graduate employment, including where learning happens.[19]
	- **Integrated courses and content**
	  ○ *Teaching core knowledge and skills in an integrated manner, rooted in professional practice,*.[2,12,17]
	- **Engaged, field-based, practice-oriented learning**
	  ○ *Respondents note a shift in instructional design/ methods to immerse students in the "unpredictable dynamics of real-world challenges"*[16] *obligatory real-world field experience,*[1,5,16,19,57,59,60,91]
	  ○ *Respondents note taking classes into non-academic settings to support learning.*
	  ○ *Respondents note students learning, in the field, under the guidance of a mentor*
	- **Applied problem solving, alternative assessment**
	  ○ *Respondents note use of applied problem solving methods, such as problem-based learning, simulations, case studies, or field-based coursework.*[4,88,100,101]
	  ○ *Respondents note use of assessments that mimic real-word application, and the development of tools or materials that will help them in practice.*[4,5,12,16,59,60,78,91]
	- **Small-group, collaborative learning**
	  ○ *Respondents note use of team-based learning (in a classroom, or via engagement with local communities) to help prepare students for effective, collaborative work.*[1,5,59,71,91]
	- **Use of IT**
	  ○ *Respondents note use of information technology to support learning.*[57,60,78,91]
	- **Critical, systematic reflection**
	  ○ *Respondents note use of reflection to help students stop, think, write, and reflect upon what is happening, what this means, helping students shift values, perspectives, understanding, deepening learning.*[78,83,88,97,99,101]
	- **Integration of faculty and mentors with practice experience**
	  ○ *Respondents note greater integration of faculty with practice experience to support a focus on field-based and applied public health learning and practice*[4]
	  ○ *Respondents note use of applied practice, coaching, direction, and advice; model where students are mentored, by practitioners, in multiple aspects of public health practice.*[5,60,91]
				question that shows convergence or divergence of responses.
				
				<u>Interpretation</u>
				- Develop summary report and recommendations..

3. What are the motivations for, and desired outcomes from these changes?				
Construct **+ a priori codes + dfns**	**Working Code Definitions; Possible Sub-Codes**	**Measures**	**Data Sources**	**Analysis, Triangulation; Interpretation**

- **Outcomes**
Schools and programs of public health may consider and implement shifts to their curriculum or instructional methods for a number of reasons linked to the focus of their MPH program (***enumerated in question 1***):
	- **To improve learning**[5]
	  - *Respondents note that changes were made to ensure better **learning**: acquisition of knowledge and skills (informative learning); the development of professionalism and values (formative learning), and strategic leaders (transformative learning)*[5]
	- **To build graduate competence**[2,8,14,15,17,59]
	  - *Respondents note that changes were made to develop professionals who are ready to enter the public health workforce with the **competencies** highlighted in workforce needs assessments.*[2,8,14,15,17,59]
	- **To assure workforce readiness**[2,14,15,17,59]
	  - *Respondents note that changes were made to assure workforce readiness,*[2,14,15,17,59] *as informed by the labor market and needs.*[5]
	- **To ensure graduate employment**[4,61]
	  - *Respondents note that changes were made to assure graduate employment.*[4]
	- **To ensure student/graduate/ employer satisfaction**[4]
	  - *Respondents note that changes were made to ensure graduate and employer satisfaction.*[4]
	- **To ensure CEPH accreditation**[4]
	  - *Respondents note that changes were made to support or assure accreditaion.*[4]
		- **Ideal outcomes** from shifts
		- **Limits** related to shifts
		- **Measures of success** of shifts
			Survey
			- Q8, Q9, Q12, Q13, Q16, Q17
			Semi-structured interview
			- 4Qs
			Document review
				Phase 1:
				- Clean data (Qualtrics)
				- For categorical questions, calculate the response rate and the frequencies and run cross-tabs by program characteristics (age, size, type, ASPPH) to assess for difference in response by characteristic.
				- For qualitative questions, pull text responses into Word; use thematic coding using a priori codes; generate new codes as needed; collate themes in a matrix.
				- Summarize data per survey question (all respondents); Group data by various characteristics (e.g., school vs. program, old MPH programs vs. new MPH programs, etc.) to explore similarities and differences in responses between and among groups. Use bivariate/ multivariate analysis (cross-tabulations) if appropriate.
				Phase 2:
				- Pull transcribed data into Dedoose; code using constrict codes. Extract data by construct code, and code using parent codes. Extract data by parent code, and code using child codes.
				- Develop summaries by child and emergent code themes. Incorporate quotes.
				- Integrate thematic summaries to respond to research questions.
				Phase 3:
				- Merge Phase 1 and Phase 2. Develop a descriptive report related to research question that shows convergence or divergence of responses.
				Interpretation
				- Develop summary report and recommendations.

4. What is informing and influencing (facilitating or limiting) shifts within SPPH?				
Construct **+ a priori codes + definitions**	**Working Code Definitions; Possible Sub-Codes**	**Measures**	**Data Sources**	**Analysis, Triangulation; Interpretation**

(a) Influencing Factors
- **Policy Environment/ Mandates** Influences what universities, schools, programs, and administrative teams must do.[5,16,73] Mandates or policies facilitate change.[117] National accreditation processes assure social accountability, helping direct education to meet priority needs.[117]
	- **CEPH Accreditation Standards**
	  ○ *Influenced by CEPH Accreditation Standards.*[4]
	- **Other**
	  ○ *Influenced by other policy/mandate*
		- **National initiatives**
		  ○ *Awareness*
		  ○ *Participation*
		- **Institutional characteristics**
		  ○ *Awareness*
		  ○ *Participation*
		- **University/ Program initiatives**
		  ○ *Awareness*
		  ○ *Participation*
		- **Strategic Management**
		  ○ *Strategic plan*
		  ○ *Mission*
		  ○ *Vision*
		  ○ *Strategy*
		  ○ *Use of data (M&E, graduate, employer)*
		- **Knowledge and Awareness** of calls to action
		- **Information sharing**
		  ○ *Training*
		  ○ *Capacity Building*
			Survey
			- Q3, Q6, Q8, Q12, Q16, Q19, Q20, Q21, Q23, Q24, Q26 Q28
			Semi-structured interview
			- 5 Qs
			Document review
				Phase 1:
				- Clean data (Qualtrics)
				- For categorical questions, calculate the response rate and the frequencies and run cross-tabs by program characteristics (age, size, type, ASPPH) to assess for difference in response by characteristic.
				- For qualitative questions, pull text responses into Word; use thematic coding using a priori codes; generate new codes as needed; collate themes in a matrix.
				- Summarize data per survey question (all respondents); Group data by various characteristics (e.g., school vs. program, old MPH programs vs. new MPH programs, etc.) to explore similarities and differences in responses between and among groups. Use bivariate/ multivariate analysis (cross-tabulations) if appropriate.
				Phase 2:
				- Pull transcribed data into Dedoose; code using constrict codes. Extract data by construct code, and code using parent codes. Extract

(a) Influencing Factors
- **Organizational Characteristics/ Institutional Design** The design of an institution influences action.[57] This includes the type of institution, its affiliations, and the practices within the institution (decision-making, communication), as these influence institutional leadership, stewardship, and financing for physical resources (buildings, classrooms, technology) and human resources (faculty, staff, and ratios between students, faculty, and staff);[5] and policies that influence access to and uptake of information and innovation.[23,57]
	- **Research pressures/focus**
	  ○ *Focus on research rather than teaching and practice.*[5,23]
	- **Teaching focus**
	  ○ *Focus on teaching, service, engagement, including access to funding for professional development and innovation.*[5,23]
	- **Engagement/service focus**
	  ○ *Institutional focus on engagement, service (land-grant, mission).*[23,105,106]
	- **Other**
	  ○ *budget limitation, lack of decision-making ability, lack of access to information and training, etc.*[5,23,57]			

(a) Influencing Factors
Workplace Culture/ Standards
- Instructional change and innovation are supported by having a clear rationale for MPH training, a vision of desired outcomes, being responsive to student and workforce needs, designing program on strengths, and regularly realigning and updating instructional design.[2,4,5,16,59,73,74] These activities are supported by culture change and effective leadership processes, including the development of committees and
	- **Program mission/vision/rationale**
	  ○ *Shared mission, vision, rationale for MPH training program*
	- **Use of routine M&E/CQI Processes**
	  ○ *Using routine M&E/CQI processes to improve and adapt program*
	- **Program improvement processes**
	  ○ *Adapting program periodically, to respond to gaps/build on strengths*
	- **Engaged process**
	  ○ *Working as a team to assess, improve, adapt MPH program*
	- **Stakeholder involvement**			

taskforces; engagement of stakeholders at multiple levels; and monitoring, evaluation, and information sharing processes.[2,4,91,96,100,5,16,18,23,57,74,78,80]	○ *Engaging external stakeholders in assessment, adaptation processes* - **Information Sharing**			data by parent code, and code using child codes. - Develop summaries by child and emergent code themes. Incorporate quotes. - Integrate thematic summaries to respond to research questions. <u>Phase 3:</u> - Merge Phase 1 and Phase 2. Develop a descriptive report related to research question that shows convergence or divergence of responses. <u>**Interpretation**</u> - Develop summary report and recommendations.
(a) Influencing Factors - **Individual Understanding/motivation** Faculty, staff, and administrators set the vision and direction for an MPH program.[23,57] Individuals must have knowledge and understating of the influencing policy, and skills and abilities to lead innovation processes.[5,16,60,78,95,103] This includes time to invest in professional development and planning/re-development related to teaching and innovation.[5,16,78,95,101,103]	- **Awareness of national vision/mandate** ○ *Respondents note not/being aware of, understanding national policies, calls to action* - **Contributed to national vision/mandate** ○ *Respondents note not/helping to develop national policies, calls to action* - **Ability to learn, innovate** ○ *Respondents note not/being able to access resources (funding, time) to be able to invest in learning and collaboration for innovation*			
(b) Informing Factors - **Information Dissemination + Uptake** Change can be supported by information dissemination.[70] Uptake of information can drive innovation, and information sharing between peers can influence more individuals to consider, test, and/or try innovations.[70] New accreditation standards for MPH education may be influencing instructional shift, directly or indirectly through peer-to-peer exchange, if information is being disseminated and accessed.	- **Access to information – National Organizations** ○ *Respondents note not/being aware of national accreditation standards, other calls to action, via engaging with CEPH, ASPPH, etc.* - **Access to information – Academic Peers** ○ *Respondents note not/accessing information related to instructional shifts via academic peers (papers, publications, conference talks, committee work, etc.)* - **Access to information – Practice Peers** ○ *Respondents note not/accessing information related to instructional shifts via practitioner peers (collaboration, shared work, etc.)*			

APPENDIX B - IRB APPROVAL

Exemption Granted

November 1, 2019

Genevive Meredith
Doctor of Public Health in Leadership

RE: **Protocol # 2019-1203**
"Developing the Public Health Workforce of the Future: How Schools and Programs of Public Health are Adapting and Shifting Instructional Methods to Meet Emergent Needs"

Dear Genevive Meredith:

Your application was reviewed on **November 1, 2019** and it was determined that your research meets the criteria for exemption as defined in the U.S. Department of Health and Human Services Regulations for the Protection of Human Subjects [45 CFR 46.104(d)]. You may now begin your research.

Exemption Granted Date: November 1, 2019
Funding Source: None

The specific exemption category under 45 CFR 46.104(d) is: 2

You are reminded that investigators whose research involving human subjects is determined to be exempt from the federal regulations for the protection of human subjects still have responsibilities for the ethical conduct of the research under state law and UIC policy.

Please remember to:

- → Use your research protocol number (2019-1203) on any documents or correspondence with the IRB concerning your research protocol.
- → Review and comply with the policies of the UIC Human Subjects Protection Program (HSPP) and the guidance ***Investigator Responsibilities***.

We wish you the best as you conduct your research. If you have any questions or need further help, please contact me at (312) 355-2908 or the OPRS office at (312) 996-1711. Please send any correspondence about this protocol to OPRS via OPRS Live.

Sincerely,
Charles W. Hoehne
Assistant Director, IRB #7
Office for the Protection of Research Subjects

cc: Patrick Lenihan
Elizabeth Jarpe-Ratner

Page 1 of 1

UNIVERSITY OF ILLINOIS AT CHICAGO
Office for the Protection of Research Subjects
201 AOB (MC 672)
1737 West Polk Street
Chicago, Illinois 60612
Phone (312) 996-1711

Exemption Determination
Amendment to Claim of Exemption
UIC Amendment # 1

February 4, 2020

Genevive Meredith
Doctor of Public Health in Leadership

RE: **Protocol # 2019-1203**
Developing the Public Health Workforce of the Future: How Schools and Programs of Public Health are Adapting and Shifting Instructional Methods to Meet Emergent Needs

Dear Mx. Meredith:

The amendment to your research has been reviewed. Your research continues to meet the criteria for exemption as defined in the U. S. Department of Health and Human Services Regulations for the Protection of Human Subjects [(45 CFR 46.104(d)].

The specific exemption category under 45 CFR 46.104(d) is: (2)

You may now implement the amendment in your research.

Please note that this protocol will continue to accept submissions (amendments and Final Report) made using the Quick/Determination option on OPRSLive as the Claim of Exemption packet for this protocol was erroneously submitted and accepted using the Quick/Determination and this can no longer be changed in the OPRSLive portal.
In future, however, new protocols (Initial Review applications or Claims of Exemption) submitted using the Quick/Determination submission process on OPRSLive will be rejected without review as they are not eligible for review as Quick/Determination submissions.

Please note the following information about your approved amendment:

Amendment Approval Date: February 4, 2020
Amendment:
Summary: UIC Amendment #1, dated, and submitted 30 January 2020 and accepted 31 January 2020, is an investigator-initiated amendment revising data analysis procedures to utilize an external transcription service in lieu of transcription of the data by the Principal Investigator and/or other approved key research personnel (Claim of Exemption, 1/30/2020).

You are reminded that investigators whose research involving human subjects is determined to be exempt from the federal regulations for the protection of human subjects still have responsibilities for the ethical conduct of the research under state law and UIC policy.

UNIVERSITY OF ILLINOIS AT CHICAGO
Office for the Protection of Research Subjects
201 AOB (MC 672)
1737 West Polk Street
Chicago, Illinois 60612
Phone (312) 996-1711

Please remember to:

- → Use your research protocol number (2019-1203) on any documents or correspondence with the IRB concerning your research protocol.
- → Review and comply with the policies of the UIC Human Subjects Protection Program (HSPP) and the guidance ***Investigator Responsibilities***.

We wish you the best as you conduct your research. If you have any questions or need further help, please contact me at (312) 996-2014 or the OPRS office at (312) 996-1711. Please send any correspondence about this protocol to OPRS via OPRS Live.

Sincerely,

Sandra Costello
Assistant Director, IRB # 7
Office for the Protection of Research Subjects

cc: Lisa Powell, Health Policy and Administration, M/C 923
Elizabeth Jarpe-Ratner (faculty advisor), Health Policy and Administration, M/C 923

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Office for the Protection of Research Subjects
201 AOB (MC 672)
1737 West Polk Street
Chicago, Illinois 60612
Phone (312) 996-1711

UIC Amendment #2
Exemption Granted

March 24, 2020

Genevive Meredith
Doctor of Public Health in Leadership

RE: **Protocol # 2019-1203**
"Developing the Public Health Workforce of the Future: How Schools and Programs of Public Health are Adapting and Shifting Instructional Methods to Meet Emergent Needs"

Consistent with institutional mandates regarding COVID-19 precautions, an administrative hold has been placed on all UIC human subjects research meeting the following criteria:

1. The research is not designed for therapeutic benefit; and
2. The research involves in-person interactions with investigators or the public.

If your research meets the criteria for an administrative hold, no in-person research activities may take place until normal operations resume at UIC. Investigators may still conduct activities that can be completed remotely (i.e., by phone or online), as appropriate to the research.

For further updates, please refer to the following sources:

UIC Coronavirus Update page:
https://today.uic.edu/coronavirus?utm_source=homepage&utm_medium=website&utm_campaign=covid-19

UIC OPRS Homepage: https://research.uic.edu/human-subjects-irbs/

Please direct questions regarding the administrative hold to OPRS: uicirb@uic.edu

Dear Genevive Meredith:

The amendment to your research was reviewed on **March 24, 2020** and it 200

Exemption Granted Date: March 24, 2020
Sponsor: None

The specific exemption category under 45 CFR 46.104(d) is: 2
Amendment Summary: UIC Amendment #2: Addition of Erin McCarville as key research personnel to serve as a peer/secondary coder for the data analysis process.

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Office for the Protection of Research Subjects
201 AOB (MC 672)
1737 West Polk Street
Chicago, Illinois 60612
Phone (312) 996-1711

You are reminded that investigators whose research involving human subjects is determined to be exempt from the federal regulations for the protection of human subjects still have responsibilities for the ethical conduct of the research under state law and UIC policy.

Please remember to:

- → Use your research protocol number (2019-1203) on any documents or correspondence with the IRB concerning your research protocol.
- → Review and comply with the policies of the UIC Human Subjects Protection Program (HSPP) and the guidance ***Investigator Responsibilities***.

We wish you the best as you conduct your research. If you have any questions or need further help, please contact me at (312) 355-2908 or the OPRS office at (312) 996-1711. Please send any correspondence about this protocol to OPRS via OPRS Live.

Sincerely,
Charles W. Hoehne, B.S., C.I.P.
Assistant Director, IRB #7
Office for the Protection of Research Subjects

cc: Patrick Lenihan
Elizabeth Jarpe-Ratner

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APPENDIX C – SURVEY

Survey Preamble (Qualtrics)

Since the early 2000s, there have been multiple 'calls to action' to re-think and re-frame public health education in this U.S. This survey seeks to collect input from ASPPH- and CEPH-affiliated MPH programs across the U.S. to help (1) Explore perspectives on the state of public health, and the calls to action; (2) Describe how MPH programs are shifting their approach in designing and/or delivering the MPH; and (4) Describe factors that seem to be facilitating or limiting changes. A summary of these findings may be presented in various fora, including the 2020 ASPPH Annual Meeting and the 2020 APHA conference, and will be used to fulfill DrPH dissertation requirements for Gen Meredith, DrPH Candidate (UIC).

This survey is designed to be short and gather information from as many accredited or soon-to-be-accredited MPH programs as possible. As such, this survey is being sent to all those affiliated with ASPPH's Public Health Practice group, and ASPPH's Academic Affairs group, and all CEPH-affiliated MPH Program Directors.

If you help to guide and/or deliver MPH training at your school, please know that your input is very important to us. Please take 15 minutes to answer this survey!

Survey Instructions

This survey has no more than 37 questions, depending on your responses and some pre-programmed skip patterns. The majority of questions are single-answer, requiring just a click or two. There are some open-ended free-text sections where you are invited to add more details, if you want.

Your input is important! Please consider sharing! All told, this survey should take about 15 minutes to complete.

There are no right or wrong answers for this survey. Please reply based on your knowledge, experience, and perceptions.

In follow-up to this survey, we will be conducting interviews with a sample of MPH programs. If you are willing to be contacted for a 45-minute interview, you will be prompted to provide your personal contact information (name, phone number, email address) at the end of the survey. **This is not required**.

Participants for interviews will be solicited from a sample of survey respondents representing different types of MPH programs. **You will only be contacted if you give permission to do so**.

Thank you, in advance, for your participation. If you have any questions, or any challenges accessing, completing, or submitting the survey, please contact Gen Meredith at gmered2@UIC.edu.

Survey Consent

This survey seeks to understand your perceptions and perspectives related to public health training needs, and how your MPH program helps to, or could help to, address those needs.

Data collected via this survey will be kept confidential. Individual responses will not be shared in a manner that compromises your privacy.

Unless you opt in to be considered as an exemplar MPH program (final question in the survey), any analysis and presentation of findings will only be shown in the aggregate or an anonymized format so as to assure both privacy and maintain confidentiality.

Thank you, in advance, for your participation. If you have any questions, or any challenges accessing, completing, or submitting the survey, please contact Gen Meredith at gmered2@UIC.edu.

0. **Do you consent to participate in the survey?**
    - Yes, I consent to participate
    - No, I don't consent to participate

Section I – Your MPH Program's Focus

We are interested in learning more about the focus or overarching purpose of MPH programs across the U.S. These next few questions ask about the focus of your MPH program. Please respond to the best of your ability, based on your experiences.

1. **How would you describe the primary focus of your MPH program? Complete the following sentence: "The primary focus of our MPH program is to prepare MPH graduates…":**
    - For public health research (eg., preparation for a PhD program or a research fellowship)
    - For public health practice (eg., preparation for immediate employment linked to public health)
    - To integrate public health with another professional degree (eg.,MD, DVM, MBA, JD, etc.)
    - Other: (list)

2. **In your opinion, over the last four years (since Fall 2015), has your MPH program put more emphasis on training students for public health practice?** *(By public health practice, we mean applied work at the community, county, state, local, or international level, in governmental or non-governmental sectors*)
    - Yes
    - No* (skip to Q5)
    - No, because that was already a primary focus of our program

3. **What are your program's main reasons are for putting emphasis on training students for public health practice?** (select all that apply)
    - Students are asking for it
    - Employers/collaborators are asking for it
    - The public health workforce needs more well-trained professionals
    - The public health literature suggests there is a need for this
    - Accreditation standards expect this
    - Other: (list)

4. **How has your program put emphasis on training students for public health practice?** (select all that apply)
    - We developed and offer specific courses
    - We expect students to do a lot of work in the field, with public health practitioners
    - We have many people with public health practice experience involved in teaching
    - We have many people with public health practice experience involved in mentoring
    - Other: (list)

Section II – Your MPH Program's Instructional Design

This next section of the survey focuses on how you help students achieve the primary focus of your MPH program via your program's instructional design.

For this survey, "***Instructional Design"*** comprises things like: admissions criteria, graduation criteria, and the focal competencies of your program.

5. **About how often do you make changes to your MPH program's Instructional Design?**
    - Every year
    - Every 2-3 years
    - Every 4-5 years
    - Every 6-7 years
    - Other: (list)

6. **From your perspective, what typically informs or spurs changes to your MPH program's instructional design?** (select all that apply)
    - In response to feedback (from graduates, employers, faculty, etc.)
    - In relation to a university initiative (eg., a greater focus on community engagement, etc.)
    - Based on learning new or best practices
    - To meet CEPH accreditation requirements
    - Other: (list)

7. **From what you recall, since the 2015-2016 academic year, has your MPH program considered or implemented any of the following changes?**

	Yes – Considered	Yes – Implemented	No* – Already done	No* – No interest
a) Changes in admissions requirements				
b) Changes in graduation requirements				
c) Changes in focal competencies taught and assessed in the program				

* If all no, skip to question 11.

8. **Why were those changes considered or implemented?** (check all that apply)
   - In response to feedback (from graduates, employers, faculty, etc.)
   - In relation to a university initiative (eg., a greater focus on community engagement, etc.)
   - Based on learning new or best practices
   - To meet CEPH accreditation requirements
   - Other: (list)

9. **What did you hope or intend to see as a result of those changes?** _____

10. **If you have a planned process to measure the effect or benefit of those changes, please describe it here:** _____

The next four questions focus specifically on your "***MPH Curriculum***", including the content of courses and how course are linked to each other to prepare a student to graduate.

11. **From what you recall, since the 2015-2016 academic year, has your MPH program considered or implemented any of the following changes related to curriculum and course content?**

	Yes – Considered	**Yes – Implemented**	**No* – Already done**	**No* – No interest**
a) Changes in course content				
b) Changes in how courses are linked to each other				
c) Changes in how courses are sequenced				
d) Merged two or more existing courses into one				
e) Broke existing courses into new courses				
f) Developed new courses required of all students				
g) Removed courses from course of study				
h) Increased/reinforced curricular focus on foundational knowledge				
i) Increased/reinforced curricular focus on professional values				
j) Increased/reinforced curricular focus on leadership				
k) Increased/reinforced curricular focus on inter-professional practice				

* If all no, skip to question 15

12. **Why were those changes considered of implemented?** (check all that apply)
    - In response to feedback (from graduates, employers, faculty, etc.)
    - In relation to a university initiative (eg., a greater focus on community engagement, etc.)
    - Based on learning new or best practices
    - To meet CEPH accreditation requirements
    - Other: (list)

13. **What did you hope or intend to see as a result of those changes?** _____

14. **If you have a planned process to measure the effect or benefit of those changes, please describe it here:** _____

The next four questions focus specifically on the "***teaching methods and approaches"*** used in your MPH program to support student learning.

15. **From what you recall, since the 2015-2016 academic year, has your MPH program considered or implemented any of the following changes related to teaching methods and approaches?**

	Yes – Considered	**Yes – Implemented**	**No* – Already done**	**No* – No interest**
a) Changes in requirements related to APE/Practicum				
b) Changes in requirements related to ILE/Capstone				
c) Increased student field work expectations				
d) Use of more authentic assessment methods				
e) Increased use of small-group learning				
f) Increased teamwork expectations of students				
g) Increased use of student mentoring				
h) Increased student contact time with practitioners				
i) Increased use of IT to support learning				
j) Increased use of student reflection to support learning				

* If all no, skip to question 19

16. **In your opinion, why were those changes considered or implemented?** (check all that apply)
    - In response to feedback (from graduates, employers, faculty, etc.)
    - In relation to a university initiative (eg., a greater focus on community engagement, etc.)
    - Based on learning new or best practices
    - To meet CEPH accreditation requirements
    - Other: (list)

17. **What did you hope or intend to see as a result of those changes?** _____

18. **If you have a planned process to measure the effect or benefit of those changes, please describe it here:** _____

*** If 'no' was reported to all parts of Questions 7 and 11 and 15, skip questions 19-22*

Section III – Drivers of Change

In the previous section, you noted one or more changes that your MPH program has considered and/or implemented in the last four years. This section asks questions related what has helped you and your colleagues ***conceive of, plan, and/or implement these changes.***

19. **Above you noted planning for or making changes to your MPH program's curriculum. What factors, if any, helped facilitate these changes?** Please rate the factors on a scale of 1-5, where 1 is "not at all" and 5 is "a lot"

	1 – Not at All	2	3 - Somewhat	4	5 – A lot	Unsure
National policies or initiatives – CEPH standards						
National policies or initiatives – other, not CEPH						
Institutional policies or initiatives – eg. focus on engaged learning, teaching excellence, etc.						
Institutional resources – eg. funding, faculty, continuing ed., etc.						
Program-wide planning – eg. developing mission, vision, strategy, plans, etc.						
Shared learning – eg. going to conferences, participation in webinars, time to read papers, etc.						

20. **If there are other factors that had a substantial influence, helping facilitate change, please list them here:** _____

21. **Above you noted planning for or making changes to your MPH program's curriculum. What factors, if any, got in the way or delayed these changes?** Please rate the factors on a scale of 1-5, where 1 is "not at all" and 5 is "a lot"

	1 – Not at All	2	3 - Somewhat	4	5 – A lot	Unsure
National policies or initiatives – CEPH standards						
National policies or initiatives – other, not CEPH						
Institutional policies or initiatives – e.g., focus on research rather than teaching, etc.						
Institutional resources – eg. not enough funding, limited faculty, no funds for continuing ed., etc.						
Program-wide planning – eg. mission, vision, strategy, plans, etc. not yet developed						
Shared learning – eg. no time or resources to go to conferences, participate in webinars, read papers, understand current themes, etc.						

22. **If there are other factors that limited progress, please list them here:** _____

23. **Thinking back over the last few years, were there any changes that you and your colleagues considered, related to your MPH Program, that you didn't implement? If so, please share a little more. What was the proposed change, and why you didn't implement it?** _____

24. **Which of these, if any, informs how your MPH program designs and delivers curriculum?** (check all that apply)
    - CEPH Accreditation Standards
    - Public Health 3.0
    - Public Health WINS
    - ASPPH Framing the Future initiative
    - Council on Linkeges/PHAB accreditation initiative
    - CPH Certification Standards
    - Other: (list)

Section IV – MPH Training in the Future

This last set of questions focuses on how MPH training could potentially be in the future. Remember, there are no right or wrong answers. We are just interested in your opinion and perspectives.

25. **Based on the public health needs and opportunities that you see in the U.S. and globally, what do you think the primary focus of an MPH program should be?**
    - Train practitioners/leaders
    - Act as a stepping stone to other education
    - Train researchers
    - All of the above
    - Something else: (list)

26. **Based on the public health needs and opportunities that you see in the U.S. and globally, and what you know of MPH training in the U.S., what do you believe MPH programs could or should be doing more of?** (check all that apply)
    - Placing more emphasis on developing skills linked to leadership and professionalism
    - Placing more emphasis on developing research skills to inform and build evidence
    - Becoming more linked and integrated with other degree or training programs, helping to generalize public health skills
    - Becoming more specialized, heling to develop a more skilled and unique professional field
    - Other: (list)

Some public health literature related to workforce development suggests that there are areas where the current public health workforce could be better equipped; this has helped to inform some MPH program design and adaptation to prepare future graduates to fill these gaps.

27. **How do you see MPH programs adapting their MPH programs in response to the public health workforce gaps?** _____

28. **What do you think could help MPH programs become even better equipped to develop the workforce of the future? (rank 1-6)**
    - Stronger guidance from national organizations (eg. CEPH, ASPPH, APHA)
    - Stronger collaborations between MPH programs and the public health workforce
    - More conversations around public health workforce needs data, and the role MPH programs could play
    - More research on the outcomes seen from different MPH training approaches
    - More peer-to-peer learning with academic peers at other MPH programs (eg. success stories, lessons learned)
    - More peer-to-peer learning with academic peers in other professional training programs (MBA, MD, MHA, etc.)

Section V – About You and Your MPH Program

Please tell us a little bit about yourself. These data will be kept confidential. Individual responses will not be shared in a manner that compromises your privacy. Unless you opt in to be considered as an exemplar MPH program (final question in the survey), any analysis and presentation of findings will only be shown in the aggregate or an anonymized format so as to assure both privacy and maintain confidentiality.

29. **What degrees do you have?** (check all that apply)
    - MPH
    - PhD
    - DrPH
    - Other professional degree (MD, DVM, RN, OT, PT, SW, etc.)
    - Other degree

30. **Where is your MPH program located? Within a…**
    - School of Public Health
    - Public Health Program

31. **How many students are enrolled in your MPH programs each year?** (total enrollment, inclusive of all concentrations, all modes of delivery, all years)
    - Fewer than 100 students
    - 100-250 students
    - More than 250 students

32. **When did your MPH program welcome its first cohort?**
    - More than 10 years ago - before 2009
    - Sometime between 2009 and 2014
    - Within the last four years – since 2015

33. **Is your school or program of public health a member of ASPPH?**
    - Yes
    - No
    - I am not sure

34. **Are you accredited by, or on track to be accredited by CEPH?**
    - Yes
    - No (skip to Q36)
    - I am not sure (skip to Q36)

35. **When was/is your first CEPH Accreditation Visit with the new 2016 standards?**
    - It was in 2018/early 2019
    - It will be in late 2019/2020
    - It will be in 2021, or later
    - I am not sure

In follow-up to this survey, interviews will be conducted with a sample of MPH programs. The interviews will be 45-minutes in length, and ideally, will be with a group of three colleagues from your MPH program. The purpose of the interview will be to learn more about the changes that you have planned or made to your instructional design, and to learn more about the drivers of (or barriers to) these changes.

36. **If sampled, are you willing to be contacted for a 45-minute interview? If you select yes, you will be prompted to provide your personal contact information, including your name, phone number, and email address.**
    - Yes, I am willing to be contacted
    - No, I am not interested in being contacted** (end survey)

37. **Please list your contact details so we may contact you for an interview, if sampled:**
    - Name
    - Phone number
    - Email

Thank you for your time and participation in this survey!

We look forward to sharing the survey findings with you in 2020! If you have any questions or concerns, in the meantime, please do not hesitate to contact Gen Meredith: gmered2@UIC.edu

APPENDIX D - SURVEY LETTER

Email Title: Quick Survey - How Are You Adapting Your MPH Program and Curriculum?

Dear (name),

Since the early 2000s, there have been multiple 'calls to action' to re-think and re-frame public health education in this U.S., including ASPPH's *Frame the Future of Public Health Education*, and CEPH's revised accreditation standards. The evolution of MPH training is of interest to me, and is the focus of **my DrPH dissertation**.

I would be grateful if you or a colleague could **participate in this short survey** to help collate data about how we, together, are transforming public health education. **This survey** will take approximately 15 minutes. Topics include: the purpose of MPH-level training, the types of changes you've considered or made, the reasons for the changes, and facilitating or limiting factors.

- If you feel that someone else within your MPH program could better answer these questions, you may forward this email and survey link to them.

Your input will be summarized to show national themes. No identifiers will be linked to the analyzed data, and no institutions or respondents will be named. I hope to share these data will all schools and programs affiliated with CEPH in 2020.

You may **access the survey here**. Your participation is voluntary, and very much appreciated!

If you have any questions, please do not hesitate to contact me.

Sincerely,

Gen
Genevive R. Meredith DrPH(c), OTR, MPH
DrPH Candidate, University of Illinois at Chicago (gmered2@UIC.edu)
Associate Director, Cornell University Master of Public Health Program (grm79@cornell.edu)

APPENDIX E - INTERVIEW GUIDE

Institution Name: _____
Sampling Strata: _(Old/New)(School/Program)(Changes/No Changes)
Participant Names, Titles:

1.
2.
3.

MPH Program Changes – Guided Interview

Introduction

Thank you for taking the time to speak with me today. I am interested in learning more about how your MPH program has been considering and/or shifting processes and practices to help develop the public health workforce of the future.

I have reviewed your responses to the survey I administered in November, and I have reviewed publically available materials from your website to help me understand your program. Today, I would like to learn more about what led up to some of the changes you've made, why those changes were considered and/or applied, and what facilitated or limited changes. I am interested in both things that worked, and things that didn't work!

Informed Consent

Over the next 45 minutes, I will ask you some questions to facilitate a conversation to learn about your individual and collective thoughts, perceptions, and experiences related to MPH training at Northwestern University, and nationally. There are no right or wrong answers.

Your MPH program was sampled because of certain characteristics (public health program, mid-sized, not 'new'). I hope to learn more from you, and share those learnings–both successes and lessons learned—with others. While your names and institution may be named via this interview, I will not use any person's name or institution name in any analysis or summary or reporting.

I anticipate that the risks associated with participation in this interview and study to be minimal. You may feel uncomfortable answering one or more of the interview questions. That is not my intent! You may skip any questions you do not wish to answer.

Do you have any questions as of now?

As previously discussed, I would like to audio record our conversation to assist with transcription and data analysis. I will use the function linked to the call we are on (Zoom). The recording will be stored in my password-protected account. I will delete the file once my dissertation is defended. I will also use the audio files to transcribe our conversations. All names will be redacted from the transcriptions, and thus, from the analysis.

Do you have any questions? May I press record and get us started?

MPH Focus

1. How would you describe the purpose of an MPH training program in the U.S.? What are the ideal outcomes, or measures of success, of an MPH training program?

2. How does your program align with that focus and those outcomes?
    a. Has your program always had this focus?
    b. What changes have you implemented in the last few years to help better align with that focus or those outcomes?

Changes

Via your survey responses/based on a review of your website, I noted some MPH-related changes that you've made (list). I'd like to know more about these changes, and others that might come to mind.

3. Can you tell me the story of how these changes were considered, and how they came to be?

4. What informed those changes?

5. As of now, how have those changes played out?
    a. What outcomes are you seeing?
    b. Are you satisfied? What changes might come next?

Influences

6. Were there any initiatives or changes at the university level in this time period that helped spur (or limit) any of the efforts you just noted?

7. Was there specific input from students, faculty, employers, or stakeholders that in this time period that helped spur (or limit) any of the efforts you just noted?

8. Are there any characteristics unique to your school/ program that influences how your curriculum is designed or delivered?

9. How much are you—individually and collectively—influenced by national conversation re: public health workforce development? Things like PH WINS, PH 3.0, ASPPH/Framing the Future, Council on Linkages, etc.?

10. How do you describe your training/professional background(s)?
    a. Do you think your (respective) backgrounds has an influence on how your curriculum is designed or delivered?

11. You are all in leadership roles at your institution. What informs and facilitates the mission and vision that you have for the program?
    a. What are the facilitators or barriers that you experience in trying to get your team aligned with this vision?

APPENDIX F - INTERVIEW INVITATION

Email Title: **MPH Program Changes – Short Interview Request**

Dear (*Survey Respondent*),

Over the last four years, as I have helped develop Cornell University's new MPH program, I have also been pursuing my Doctor of Public Health (DrPH) at the University of Illinois at Chicago. Being in these two roles has led me to my dissertation topic, a question I am exploring with U.S.-based MPH programs.

Using an single case study approach with multiple embedded units, my dissertation explores *if Schools and Programs of Public Health (SPPH) are shifting their instructional methods and approaches to help develop the public health workforce of the future, and if so, how*. The literature suggests that this has been a topic of discussion for at least 17 years, but there is little describing what SPPH are doing, why, and what outcomes are expected from these shifts. I hope to change this! From this research, I aim to develop (a) a summary report of changes and perspectives from all SPPH (based on survey responses); (b) a profile of select MPH programs based on interviews and publically available documents (N=8); and (c) a final case analysis based on all collected data that will be presented in two papers.

Based on responses to the Title survey that I co-administered with ASPPH in September, and stratification for a purposeful sample, I would like to learn more from you and/or your colleagues as one of eight embedded units to be profiled. Your MPH program was selected as it represents an MPH program that is a part of a relatively (*new or mature*) (*school of public health, or a public health program*) that (*has or has not*) implemented changes to instructional methods or approaches in the last four years.

If representatives of your MPH program are willing and able to participate, I seek to host a semi-structured interview to profile your program.

- I'd like to schedule the interview between now and *December 15, 2019*.
- The interview will take between 30 and 45 minutes.
- The interview will be hosted using Zoom (web-based video and audio meeting service), and audio recorded (with permission) to assist with data collection and transcription.
- I would invite up to three MPH program representatives to participate in the interview, including the *Associate Dean of Academic Affairs*, the *Associate Dean of Practice*, and you or another designee of your choosing.

The questions that I will ask your program respondents will help me (1) Explore perspectives on the state of public health, and the calls to action, including what needs to happen to improve public health outcomes, and the role of MPH programs; (2) Summarize what SPPH are hearing and interpreting, including how are mandates being interpreted; (3) Describe how SPPH are shifting their approach in designing and/or delivering the MPH, including aspects such as the curriculum design and delivery, partnership models, graduation requirements, and/or institutional policies; and (4) Describe factors that seem to be facilitating or limiting changes within SPPH.

The profile that I develop about your MPH program—based on survey responses, this interview, and other publically available documents—will be shared with you for review and validation before I present any findings. Furthermore, you and your team will be acknowledged in any resulting publications.

I look forward to hearing if you and/or your colleagues will participate in this work!

Thank you, in advance.

APPENDIX G - STUDY OVERVIEW

You are invited to participate in a DrPH dissertation research study

Developing the Public Health Workforce of the Future: How schools and programs of public health are adapting and shifting to meet emergent needs

About this study

You are invited to participate a research study titled "Developing the Public Health Workforce of the Future: How schools and programs of public health are adapting and shifting to meet emergent needs". This document describes the study, the potential risks and benefits, how your privacy and confidentiality will be protected, and who to contact with any questions or concerns.

Who is leading this study

Gen Meredith is leading this study. Gen is a DrPH candidate at the University of Illinois at Chicago, and Associate Director of Cornell's MPH program. This research will help fulfill Gen's DrPH dissertation requirements under the supervision and mentoring of Dr. Elizabeth Jarpe-Ratner, PhD, MPH, MST, Clinical Assistant Professor, Division of Health Policy and Administration, UIC School of Public Health.

What this study is about

The overarching goal of this research is to describe how schools and programs of public health are adapting and shifting to meet emergent public health needs. Specifically, through a national survey of leadership within U.S. schools and programs of public health, and in-depth interviews with a sample of schools, this study seeks to: (1) explore perspectives on the state and focus of MPH training programs; (2) describe if and how SPPH are shifting their methods to better meet this focus; (3) explore what information or themes are informing these shifts; and (4) describe factors that seem to be facilitating or limiting changes. The findings of the study (anonymous – no institution or respondent named) will be shared with national stakeholders—including ASPPH, its members and CEPH—to inform discussion, reflection, and future planning.

APPENDIX H - INTERVIEW INFORMED CONSENT

What your involvement entails

In Phase 1 of the study, you are invited to respond to an online survey. The survey invites you to share your perceptions and perspectives related to public health training needs, and how MPH programs (the one you are affiliated with, and others) are addressing those needs. You are invited to share your institution's name, though this is not required. You are also invited to share your contact details if you are interested in being a part of Phase 2. All identifying data will be kept confidential and in a separate file from the data to be analyzed.

In Phase 2, a sample of Phase 1 respondents who consent to Phase 2 participation of the study will be invited to participate in a small-group interview—with up to two peers at their institution—to gather input on perceptions and experiences related MPH training methods and approaches, and the processes that school or program uses to update and adapt their MPH curriculum and instructional methods. The purpose of these interviews is to provide more depth and context to the national survey data from Phase 1. With participant consent, the interviews will be recorded using a web-based conference service, Zoom, to allow for data transcription for accurate analysis. Any identifying data collected via the recording will be redacted from the transcription file, and thus, from the data to be analyzed. You will be asked for verbal permission to record the interview it starts. You may still participate in this study if you are not willing to have the interview recorded.

Privacy/Confidentiality

The data collected via this study should not place you at risk of criminal or civil liability, or be damaging to your financial standing, employability, educational advancement, or reputation. However, your privacy and the confidentiality of your input are paramount. To that end: limited identifying data will be collected, and you may choose to skip these questions; any identifiers will be kept separate from the data under analysis; only the lead researcher (Gen Meredith) will have access to the identifiable information, and this will be kept in a private password protected file; audio recording will be retained in Zoom's password-protected storage and destroyed post-dissertation defense; an artificial intelligence-driven transcription service (Temi) will be used to transcribe the interviews (Gen will be the only human to have access to the recordings); any identifying information in the transcripts will be redacted during the quality assurance process so the interview transcripts will not contain identifying information; audio files will be permanently deleted from Temi post-transcription; analysis will occur on de-identified data; and no identifying information (respondents or institutions) will be shared in any project report, presentation, or publication.

Risks and discomforts

The risks associated with participation in this study are minimal. For the online survey, your participation involves risks similar to a person's everyday use of the Internet, and confidentiality during the survey will be maintained to the degree permitted by the technology used. During the survey or the interview, you may feel uncomfortable answering one or more of the questions. That is not by design! You may skip any questions you do not wish to answer. And, although you may list your institution and/or your contact details on the survey or for the interview process, your name and your institution will be redacted and protected and not used during analysis or reporting.

Benefits
There are no anticipated direct benefits to you from participating in this study. However, the questions or conversation may be of interest to you and your colleagues, and, the information summarized and shared via this work (no people or institutions named) may benefit the field of public health education by identifying opportunities or supports to facilitate building a well-equipped public health workforce for the future.

Compensation for participation
There is no payment or compensation for taking part in this study.

Taking part is voluntary
Participation in this study is voluntary. You may stop participating at any point during the survey, before the interview, during the interview, or after the interview. You may skip any questions you do not wish to answer with no penalty or effect. Deciding to participate or not participate will have no impact on your current or future relations with me.

If you have questions or concerns - Please do not hesitate to contact the study lead or supervisor:

- **Study Lead: Gen Meredith, DrPH(c), MPH, OTR** gmered2@uic.edu **(607-220-3864)**
- **Supervisor: Elizabeth Jarpe-Ratner, PhD, MPH, MST** ejarpe2@uic.edu **(312-355-5295)**

If you have any questions or concerns regarding your rights as a subject in this study, you may contact the UIC Institutional Review Board (IRB) for Human Participants. All concerns will be addressed in a manner that maintains anonymity.

- **Associate Director for Research Compliance (312-413-7323)**
- **University Ethics Officer (866-758-2146)**
- **Online Form:** https://research.uic.edu/human-subjects-irbs/reporting-human-subject-concerns/

APPENDIX I - INTERVIEW BRIEF

Dear (Name(s)),

I look forward to speaking with you on (date)

To connect to the call, you may:

- Connect via your computer: (zoom link)
- Connect via your cellphone (one tap mobile): (zoom number)
- Dial by phone: (zoom number)

** If all else fails, please call my cell! XXXXXXX

Attached is ab overview of the study, the Informed Consent document, and Question Themes

- Please feel free to review in advance!

Thank you!

Background

This study explores *if Schools and Programs of Public Health are shifting their instructional methods and approaches to help develop the public health workforce of the future, and if so, how*. The literature suggests that this has been a topic of discussion for at least 17 years, but there is little describing what schools and programs of public health are doing, why, and what outcomes are expected from these shifts.

In late 2019, almost 50% of eligible MPH programs in the U.S. responded to a survey on changes. To provide more context to the survey response (learning more about how and why, not just what), I seek to interview representatives from eight MPH programs. Thank you for agreeing to be a part of this!

- The interview will take approximately 45 minutes.
- The interview will be hosted using Zoom (web-based video and audio meeting service), and audio recorded (with permission) to assist with data collection and transcription.
- Three MPH program representatives are invited to participate in the interview, to allow for a discussion, including you and another designees of your choosing.

The questions that I will ask in the interview will focus on how and why you are (or not!) shifting your MPH program or curriculum design and methods, and what factors seem to be facilitating or limiting these changes. Following the interview with you and your colleagues, I will develop a summary report that I will share with you to assure accuracy. Beyond that, any details that I compile into my final dissertation or reports will be anonymized. You and your institution will not be named.

A detailed summary of this study, risks and benefits, and how your privacy and confidentiality will be protected is **available for review here**.

MPH Program Type

MPH Enrollement	Total	<100 students	100-250 students	>250 students
School	36	8	19	9
StandAlone	73	48	18	7

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
109	2	3	2	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	18.4101504	0.000100528	5.991464547	yes	0.410975014

ASPPH Affiliation	Total	Yes	No
School	36	35	1
StandAlone	73	41	32

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
109	2	2	1	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*	*Odds Ratio*
Pearson's	19.25380169	1.14442E-05	3.841458821	yes	0.420286072	27.31707317

MPH Program Age	Total	1-10	11-20	21-50+
School	32	2	15	15
StandAlone	68	24	23	21

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
100	2	3	2	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	9.58133633	0.008306905	5.991464547	yes	0.309537337

Size of MPH Program

MPH Program Type	Total	SPH	PHP
< 100 students	56	8	48
100-250 students	37	19	18
>250 students	16	9	7

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
109	3	2	2	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	18.4101504	0.000100528	5.9914645	yes	0.410975014

ASPPH Affiliation	Total	Yes	No
< 100 students	56	33	23
100-250 students	37	31	6
>250 students	16	12	4

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
109	3	2	2	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	6.767507874	0.033919882	5.9914645	yes	0.249173089

MPH Program Age	Total	1-10	11-20	21-50+
< 100 students	50	18	15	17
100-250 students	34	5	20	9
>250 students	16	3	3	10

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
100	3	3	4	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	14.23102723	0.00659307	9.487729	yes	0.266749201

Program Age (Years)

	MPH Location		
Years	**Total**	SPH	PHP
1-10	26	2	24
11-20	38	15	23
21-50+	36	15	21

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
100	3	2	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	9.58133633	0.008306905	5.991464547	yes	0.309537337

	MPH Enrollment			
Years	**Total**	<100 students	100-250 students	>250 students
1-10	26	18	5	3
11-20	38	15	20	3
21-50+	36	17	9	10

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
100	3	3	4		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	14.23102723	0.00659307	9.487729037	yes	0.266749201

	ASPPH		
Years	**Total**	Yes	No
1-10	26	10	16
11-20	38	28	10
21-50+	36	29	7

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
100	3	2	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	13.33715018	0.001270207	5.991464547	yes	0.365200632

ASPPH Affiliation

MPH Program Type

	Total	SPH	PHP
Yes	76	35	41
No	33	1	32

SUMMARY		Alpha	0.05
Count	*Rows*	*Cols*	*df*
109	2	2	1

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*	*Odds Ratio*
Pearson's	19.25380169	1.14442E-05	3.841458821	yes	0.420286072	27.31707317

MPH Program Enrollment

	Total	<than 100 stude	100-250 student	>250 students
Yes	76	33	31	12
No	33	23	6	4

SUMMARY		Alpha	0.05
Count	*Rows*	*Cols*	*df*
109	2	3	2

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	6.767507874	0.033919882	5.991464547	yes	0.249173089

MPH Program Age

	Total	1-10	11-20	21-50+
Yes	67	10	28	29
No	33	16	10	7

SUMMARY		Alpha	0.05
Count	*Rows*	*Cols*	*df*
100	2	3	2

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	13.33715018	0.001270207	5.991464547	yes	0.365200632

Ideal Focus of MPH Program

MPH Program Type	Total	SPH	PHP
≤ 2 (Train practitioners/leaders)	78	27	51
≤ 2 (Step to Other Ed)	22	9	13
≤ 2 (Train researchers)	27	8	19
≤ 2 (All of these)	24	4	20

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
151	4	2	3		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	3.720524209	0.293266821	7.814727903	no	0.156968892

MPH Program Size	Total	<100 students	100-250 students	>250 students
≤ 2 (Train practitioners/leaders)	78	38	26	14
≤ 2 (Step to Other Ed)	22	10	8	4
≤ 2 (Train researchers)	27	13	9	5
≤ 2 (All of these)	24	14	7	3

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
151	4	3	6		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	1.025654607	0.984621065	12.59158724	no	0.058276988

Q33a - Program Age	Total	1-10	11-20	21-50+
≤ 2 (Train practitioners/leaders)	73	18	24	31
≤ 2 (Step to Other Ed)	19	4	7	8
≤ 2 (Train researchers)	23	7	8	8
≤ 2 (All of these)	23	7	7	9

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
138	4	3	6		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.999576069	0.985628387	12.59158724	no	0.060180166

Q34: Is your school or program of public health a member of ASPPH?	Total	Yes	No
≤ 2 (Train practitioners/leaders)	78	58	20
≤ 2 (Step to Other Ed)	22	17	5
≤ 2 (Train researchers)	27	18	9
≤ 2 (All of these)	24	15	9

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
151	4	2	3		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	1.937081697	0.585567773	7.814727903	no	0.113262331

Actual MPH Program Focus

MPH Program Type

	Total	SPH	PHP
public health research	2	2	0
public health practice	93	32	61
integrate with other degree	1	0	1

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
96	3	2	2	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	4.236763176	0.120226046	5.991464547	no	0.210078437
Fisher Exact Test		0.123026316			

MPH Program Enrollemnt

	Total	<100 students	100-250 students	>250 students
public health research	2	1	0	1
public health practice	93	50	29	14
integrate with other degree	1	1	0	0

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
96	3	3	4	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	3.020678246	0.554370928	9.487729037	no	0.125430057
Fisher Exact Test		0.56739455			

Q33a - Program Age

	Total	1-10	11-20	21-50+
public health research	1	0	0	1
public health practice	87	23	32	32
integrate with other degree	1	1	0	0

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
64	2	2	1	
Fisher Exact Test		p-value	1	

Q34: Is your school or program of public health a member of ASPPH?

	Total	Yes	No
public health research	2	2	0
public health practice	93	61	32
integrate with other degree	1	1	0

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
96	3	2	2	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	1.548387097	0.461075466	5.991464547	no	0.127000127
Fisher Exact Test		0.698992161			

How Practice Emphasized (Multiple Answer)

MPH Program Type	Total	SPH	PHP
specific courses	75	22	53
work in field with practitioners	91	33	58
practitioners teaching	55	18	37
practitioners mentoring	55	16	39

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
276	4	2	3	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	1.219994517	0.748212903	7.814727903	no	0.066485111

MPH Program Size	Total	<100 students	100-250 students	>250 students
specific courses	75	38	24	13
work in field with practitioners	91	48	28	15
practitioners teaching	55	25	18	12
practitioners mentoring	55	24	20	11

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
276	4	3	6	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	1.759350749	0.940447943	12.59158724	no	0.056455554

ASPPH Affiliation	Total	Yes	No
specific courses	75	48	27
work in field with practitioners	91	65	26
practitioners teaching	55	37	18
practitioners mentoring	55	36	19

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
276	4	2	3	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	1.161710376	0.762201619	7.814727903	no	0.064877543

Frequency of Program Change

MPH Program Type

	Total	SPH	PHP
Every 1-3 years	53	12	41
Every 4-7 years	42	21	21

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
95	2	2	1	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*	*Odds Ratio*
Pearson's	7.736194876	0.005412474	3.841458821	yes	0.285365783	0.292682927

MPH Program Size

	Total	<100 students	100-250 students	>250 students
Every 1-3 years	53	31	13	9
Every 4-7 years	42	17	20	5

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
95	2	3	2	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	5.511245128	0.063569431	5.991464547	no	0.240859101

MPH Program Age

	Total	1-10	11-20	21-50+
Every 1-3 years	52	14	19	19
Every 4-7 years	36	7	15	14

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
88	2	3	2	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.67471091	0.713655123	5.991464547	no	0.087562375

ASPPH Affiliation

	Total	Yes	No
Every 1-3 years	53	38	15
Every 4-7 years	42	28	14

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
95	2	2	1	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*	*Odds Ratio*
Pearson's	0.279700058	0.596897876	3.841458821	no	0.054260586	1.266666667

Greater Emphasis on Practice over Last 4-years

MPH Program Type

	Total	SPH	PHP
Yes	57	21	36
No	4	1	3
Already Focus	47	14	33

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
108	3	2	2	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.70674692	0.702314858	5.991464547	no	0.080894703
Fisher Exact Test		0.813052903			

MPH Program Size

	Total	<100 students	100-250 students	>250 students
Yes	57	29	18	10
No	4	1	3	0
Already Focus	47	26	15	6

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
108	3	3	4	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	3.852283635	0.426366042	9.487729037	no	0.133546421
Fisher Exact Test		0.55789599			

ASPPH Affiliation

	Total	Yes	No
Yes	57	38	19
No	4	4	0
Already Focus	47	33	14

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
108	3	2	2	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	1.980348162	0.371512012	5.991464547	no	0.135412544
Fisher Exact Test		0.497817878			

MPH Program Age

	Total	1-10	11-20	21-50+
Yes	52	13	20	19
No	2	0	1	1
Already Focus	45	13	16	16

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
99	3	3	4	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.92737064	0.920601634	9.487729037	no	0.06843749
Fisher Exact Test		0.981895373			

Change in Instructional Design - Admissions

MPH Program Type	Total	SPH	PHP
Changed in last 4 years	41	7	34
Changed earlier/may change	19	9	10
No change, or unsure	47	20	27

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
107	3	2	2	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	8.316957679	0.015631318	5.991464547	yes	0.278798451

MPH Program Size	Total	<100 students	100-250 students	>250 students
Changed in last 4 years	41	22	14	5
Changed earlier/may change	19	6	7	6
No change, or unsure	47	26	16	5

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
107	3	3	4	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	5.985388859	0.200242103	9.487729037	no	0.167239669

MPH Program Age	Total	1-10	11-20	21-50+
Changed in last 4 years	41	13	16	12
Changed earlier/may change	17	2	8	7
No change, or unsure	40	9	14	17

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
98	3	3	4	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	3.584787718	0.465103826	9.487729037	no	0.13523954

ASPPH Affiliation	Total	Yes	No
Changed in last 4 years	41	25	16
Changed earlier/may change	19	17	2
No change, or unsure	47	34	13

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
107	3	2	2	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	5.194157753	0.074490858	5.991464547	no	0.220325964

Change in Instructional Design - Graduation

MPH Program Type

	Total	SPH	PHP
Changed in last 4 years	62	27	35
Changed earlier/may change	9	1	8
No change, or unsure	35	8	27

SUMMARY		Alpha			0.05
Count	*Rows*	*Cols*	*df*		
106	3	2	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	6.56027219	0.037623136	5.991464547	yes	0.248775723

MPH Program Size

	Total	<100 students	100-250 students	>250 students
Changed in last 4 years	62	25	23	14
Changed earlier/may change	9	4	4	1
No change, or unsure	35	24	10	1

SUMMARY		Alpha			0.05
Count	*Rows*	*Cols*	*df*		
106	3	3	4		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	10.22226443	0.03684556	9.487729037	yes	0.219586494
Fisher Exact Test		0.025097953			

MPH Program Age

	Total	1-10	11-20	21-50+
Changed in last 4 years	58	16	21	21
Changed earlier/may change	9	1	3	5
No change, or unsure	30	6	14	10

SUMMARY		Alpha			0.05
Count	*Rows*	*Cols*	*df*		
97	3	3	4		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	2.73590634	0.602946247	9.487729037	no	0.11875441
Fisher Exact Test		0.663510702			

ASPPH Affiliation

	Total	Yes	No
Changed in last 4 years	62	46	16
Changed earlier/may change	9	7	2
No change, or unsure	35	23	12

SUMMARY		Alpha			0.05
Count	*Rows*	*Cols*	*df*		
106	3	2	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.971797594	0.615144058	5.991464547	no	0.095749161

Change in Instructional Design - Competencies

MPH Program Type

	Total	SPH	PHP
Changed in last 4 years	87	32	55
Changed earlier/may change	9	2	7
No change, or unsure	11	2	9

SUMMARY		Alpha	0.05
Count	*Rows*	*Cols*	*df*
107	3	2	2

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson	2.087544268	0.352123915	5.9914645	no	0.139677341
Fisher Exact Test		0.427863657			

MPH Program Size

	Total	<100 students	100-250 students	>250 students
Changed in last 4 years	87	36	35	16
Changed earlier/may change	9	7	2	0
No change, or unsure	11	11	0	0

SUMMARY		Alpha	0.05
Count	*Rows*	*Cols*	*df*
107	3	3	4

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson	16.78421717	0.002128711	9.487729	yes	0.280055211
Fisher Exact Test		0.001463213			

MPH Program Age

	Total	1-10	11-20	21-50+
Changed in last 4 years	82	16	34	32
Changed earlier/may change	8	4	2	2
No change, or unsure	8	4	2	2

SUMMARY		Alpha	0.05
Count	*Rows*	*Cols*	*df*
98	3	3	4

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson	6.733918129	0.150635516	9.487729	no	0.185355672
Fisher Exact Test		0.173916766			

ASPPH Affiliation

	Total	Yes	No
Changed in last 4 years	87	67	20
Changed earlier/may change	9	4	5
No change, or unsure	11	5	6

SUMMARY		Alpha	0.05
Count	*Rows*	*Cols*	*df*
107	3	2	2

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson	8.100302539	0.017419739	5.9914645	yes	0.275143166
Fisher Exact Test		0.012456596			

Change in Curriculum - Structure - Multiple Response

MPH Program Type

	Total	SPH	PHP
Changed in last 4 years	493	158	335
Changed earlier/may change	102	43	59
No change, or unsure	253	87	166

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
848	3	2	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	3.879287449	0.143755157	5.991464547	no	0.067636022

MPH Program Size

	Total	<100 students	100-250 students	>250 students
Changed in last 4 years	493	236	167	90
Changed earlier/may change	102	46	35	21
No change, or unsure	253	142	94	17

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
848	3	3	4		
CHI-SQUARE					
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	20.42355661	0.000411866	9.487729037	yes	0.109736919

MPH Program Age

	Total	1-10	11-20	21-50+
Changed in last 4 years	462	103	170	189
Changed earlier/may change	94	15	39	40
No change, or unsure	220	66	95	59

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
776	3	3	4		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	16.96713484	0.001961576	9.487729037	yes	0.104558272

ASPPH Affiliation

	Total	Yes	No
Changed in last 4 years	493	349	144
Changed earlier/may change	102	72	30
No change, or unsure	253	184	69

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
848	3	2	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.339012865	0.844081325	5.991464547	no	0.019994482

Change in Curriculum - Focus - Multiple Response

MPH Program Type	Total	SPH	PHP
Changed in last 4 years	326	110	216
Changed earlier/may change	76	28	48
No change, or unsure	130	42	88

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
532	3	2	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.44369471	0.801037629	5.991464547	no	0.028879277

MPH Program Size	Total	<100 students	100-250 students	>250 students
Changed in last 4 years	326	155	115	56
Changed earlier/may change	76	44	21	11
No change, or unsure	130	68	49	13

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
532	3	3	4		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	6.129170517	0.189707181	9.487729037	no	0.075897949

MPH Program Age	Total	1-10	11-20	21-50+
Changed in last 4 years	305	68	134	103
Changed earlier/may change	70	17	22	31
No change, or unsure	112	32	34	46

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
487	3	3	4		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	8.79000546	0.066568111	9.487729037	no	0.094998138

ASPPH Affiliation	Total	Yes	No
Changed in last 4 years	326	231	95
Changed earlier/may change	76	47	29
No change, or unsure	130	102	28

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
532	3	2	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	6.624978143	0.036425395	5.991464547	yes	0.11159286

Change in Teaching Methods - Multiple Response

MPH Program Type

	Total	SPH	PHP
Changed in last 4 years	418	147	271
Changed earlier/may change	159	53	106
No change, or unsure	484	160	324

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
1,061	3	2	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.475004578	0.788595086	5.991464547	no	0.021158808

MPH Program Size

	Total	<100 students	100-250 students	>250 students
Changed in last 4 years	418	194	154	70
Changed earlier/may change	159	85	38	36
No change, or unsure	484	252	178	54

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
1,061	3	3	4		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	20.06397499	0.000485084	9.487729037	yes	0.097237951

MPH Program Age

	Total	1-10	11-20	21-50+
Changed in last 4 years	393	80	179	134
Changed earlier/may change	151	27	54	70
No change, or unsure	427	126	145	156

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
971	3	3	4		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	21.9345375	0.000206524	9.487729037	yes	0.106277084

ASPPH Affiliation

	Total	Yes	No
Changed in last 4 years	418	287	131
Changed earlier/may change	159	116	43
No change, or unsure	484	356	128

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
1,061	3	2	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	2.822821886	0.243799054	5.991464547	no	0.051580322

Degree of Influence of CEPH on Specific Changes - Multiple Response

MPH Program Type

Areas of Change	**Total Yes**	SPH	PHP
Instructional Design	99	34	65
Curriculum	104	35	69
Pedegogy	92	30	62

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
295	3	2	2	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.065002852	0.968021069	5.991464547	no	0.014844145

MPH Program Size

Areas of Change	**Total Yes**	<100 students	100-250 students	>250 students
Instructional Design	99	46	37	16
Curriculum	104	51	37	16
Pedegogy	92	47	32	13

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
295	3	3	4	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.435892156	0.97943424	9.487729037	no	0.02718088

ASPPH Affiliation

Areas of Change	**Total Yes**	Yes	No
Instructional Design	99	71	28
Curriculum	104	74	30
Pedegogy	92	64	28

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
295	3	2	2	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.114219769	0.944490279	5.991464547	no	0.019677034

Factors Influencing Focus on Practice - Multiple Response

MPH Program Type

	Total	SPH	PHP
Influence	444	152	292
No Influence	62	22	40

SUMMARY		Alpha	0.05
Count	*Rows*	*Cols*	*df*
506	2	2	1

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*	*Odds Ratio*
Pearson's	0.037653505	0.84614056	3.841458821	no	0.008626357	0.946450809

MPH Program Size

	Total	<100 students	100-250 students	>250 students
Influence	444	229	144	71
No Influence	62	33	20	9

SUMMARY		Alpha	0.05
Count	*Rows*	*Cols*	*df*
506	2	3	2

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.103937848	0.949358369	5.991464547	no	0.014332158

ASPPH Affiliation

	Total	Yes	No
Influence	444	302	142
No Influence	62	42	20

SUMMARY		Alpha	0.05
Count	*Rows*	*Cols*	*df*
506	2	2	1

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*	*Odds Ratio*
Pearson's	0.001905152	0.965184954	3.841458821	no	0.001940392	1.012743125

MPH Program Age

	Total	1-10	11-20	21-50+
Influence	414	106	161	147
No Influence	57	17	19	21

SUMMARY		Alpha	0.05
Count	*Rows*	*Cols*	*df*
471	2	3	2

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.77143172	0.679963703	5.991464547	no	0.040470474

Do Factors Influence Program Design (Multiple Answers)

MPH Program Type

	Total	SPH	PHP
Yes	414	132	282
No	237	84	153

SUMMARY		Alpha	0.05
Count	*Rows*	*Cols*	*df*
651	2	2	1

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*	*Odds Ratio*
Pearson's	0.861068622	0.353439818	3.841458821	no	0.036368751	0.852583587

MPH Program Size

	Total	<100 students	100-250 students	>250 students
Yes	414	217	136	61
No	237	116	86	35

SUMMARY		Alpha	0.05
Count	*Rows*	*Cols*	*df*
651	2	3	2

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.876966322	0.645014062	5.991464547	no	0.036702949

ASPPH Affiliation

	Total	Yes	No
Yes	414	279	135
No	237	177	60

SUMMARY		Alpha	0.05
Count	*Rows*	*Cols*	*df*
651	2	2	1

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*	*Odds Ratio*
Pearson's	3.819901142	0.050647226	3.841458821	no	0.076601199	0.700564972

MPH Program Age

	Total	1-10	11-20	21-50+
Yes	381	102	151	128
No	216	51	77	88

SUMMARY		Alpha	0.05
Count	*Rows*	*Cols*	*df*
597	2	3	2

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	3.055323029	0.217042625	5.991464547	no	0.071538759

Factors Influencing Program Design

	ASPPH Affiliation		
PH WINS	**Total**	Yes	No
Yes	38	21	17
No/I don't know	70	55	15

SUMMARY		Alpha		0.05			
Count		*Rows*	*Cols*	*df*			
108		2	2	1			
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*	*Odds Ratio*	
Pearson's	6.41744163	0.011300484	3.841458821	yes	0.24376373	0.336898396	

	ASPPH Affiliation		
Framing the Future	**Total**	Yes	No
Yes	94	69	25
No/I don't know	15	7	8

SUMMARY		Alpha		0.05			
Count		*Rows*	*Cols*	*df*			
109		2	2	1			
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*	*Odds Ratio*	
Pearson's	4.380892067	0.036343971	3.841458821	yes	0.2004786	3.154285714	

How Do Factors Influence Change (Multiple Answer)

MPH Program Type			
Factors that have:	**Total**	SPH	PHP
Positive Influence	431	133	298
No Influence	165	66	99
Negative Influence	45	17	28

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
641	3	2	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	4.823662878	0.089650954	5.991464547	no	0.086747998

MPH Program Size				
Factors that have:	**Total**	<100 students	100-250 students	>250 students
Positive Influence	431	223	140	68
No Influence	165	78	65	22
Negative Influence	45	26	13	6

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
641	3	3	4		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	3.51293767	0.475913872	9.487729037	no	0.052346929

ASPPH Affiliation			
Factors that have:	**Total**	Yes	No
Positive Influence	431	303	128
No Influence	165	121	44
Negative Influence	45	31	14

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
641	3	2	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.63548005	0.727791971	5.991464547	no	0.031486323

MPH Program Age				
Factors that have:	**Total**	1-10	11-20	21-50+
Positive Influence	388	98	149	141
No Influence	157	39	59	59
Negative Influence	42	10	16	16

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
587	3	3	4		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.122459184	0.998200258	9.487729037	no	0.010213195

Factors Influencing Change - CEPH

MPH Program Type

	Total	SPH	PHP
Yes	100	32	68
No Influence	8	4	4

SUMMARY		Alpha	0.05
Count	*Rows*	*Cols*	*df*
108	2	2	1

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*	*Odds Ratio*
Pearson's	1.08	0.298697556	3.841458821	no	0.1	0.470588235
Fisher Exact Test		0.436603134				

MPH Program Size

	Total	<100 students	100-250 students	>250 students
Yes	100	52	34	14
No Influence	8	3	3	2

SUMMARY		Alpha	0.05
Count	*Rows*	*Cols*	*df*
108	2	3	2

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.937304668	0.62584513	5.991464547	no	0.0931598
Fisher Exact Test		0.541284045			

ASPPH Affiliation

	Total	Yes	No
Yes	100	70	30
No Influence	8	6	2

SUMMARY		Alpha	0.05
Count	*Rows*	*Cols*	*df*
108	2	2	1

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*	*Odds Ratio*
Pearson's	0.088815789	0.765688067	3.841458821	no	0.028677	0.777777778

MPH Program Age

	Total	1-10	11-20	21-50+
Yes	91	23	36	32
No Influence	8	2	2	4

SUMMARY		Alpha	0.05
Count	*Rows*	*Cols*	*df*
99	2	3	2

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.851434355	0.653301084	5.991464547	no	0.0927381
Fisher Exact Test		0.736000603	5.991464547		

Factors Influencing Change - National Policy

MPH Program Type

	Total	SPH	PHP
Yes	62	16	46
No Influence	43	20	23

SUMMARY		Alpha		0.05		
Count	*Rows*	*Cols*	*df*			
105	2	2	1			
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*	*Odds Ratio*
Pearson's	4.831207802	0.027949044	3.841458821	yes	0.21450292	0.4

MPH Program Size

	Total	<100 students	100-250 students	>250 students
Yes	62	32	19	11
No Influence	43	22	16	5

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
105	2	3	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.952073956	0.62124051	5.991464547	no	0.09522274

ASPPH Affiliation

	Total	Yes	No
Yes	62	41	21
No Influence	43	34	9

SUMMARY		Alpha		0.05		
Count	*Rows*	*Cols*	*df*			
105	2	2	1			
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*	*Odds Ratio*
Pearson's	2.083458365	0.148902479	3.841458821	no	0.14086327	0.51680672

MPH Program Age

	Total	1-10	11-20	21-50+
Yes	55	12	19	24
No Influence	41	12	17	12

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
96	2	3	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	2.114412417	0.347425089	5.991464547	no	0.14840866

Factors Influencing Change - University Initiatives

MPH Program Type	Total	SPH	PHP
Yes	46	18	28
No Influence	51	16	35
Hindered	9	2	7

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
106	3	2	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	1.253417953	0.53434746	5.991464547	no	0.108741426

MPH Program Size	Total	<100 students	100-250 students	>250 students
Yes	46	22	18	6
No Influence	51	26	16	9
Hindered	9	6	2	1

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
106	3	3	4		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	1.795199078	0.773360594	9.487729037	no	0.092021303
Fisher Exact Test		0.828212713			

ASPPH Affiliation	Total	Yes	No
Yes	46	37	9
No Influence	51	35	16
Hindered	9	4	5

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
106	3	2	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	5.261647049	0.072019128	5.991464547	no	0.222796274
Fisher Exact Test		0.071796078			

MPH Program Age	Total	1-10	11-20	21-50+
Yes	40	7	17	16
No Influence	49	15	17	17
Hindered	8	2	3	3

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
97	3	3	4		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	2.05072413	0.726429688	9.487729037	no	0.102814118
Fisher Exact Test		0.71450348			

Factors Influencing Change - Resources

MPH Program Type

	Total	SPH	PHP
Yes	41	14	27
No Influence	41	12	29
Hindered	26	10	16

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
108	3	2	2	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.624765478	0.731701424	5.991464547	no	0.076058304

MPH Program Size

	Total	<100 students	100-250 students	>250 students
Yes	41	22	12	7
No Influence	41	18	17	6
Hindered	26	15	8	3

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
108	3	3	4	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	2.033115023	0.72966799	9.487729037	no	0.097018398

ASPPH

	Total	Yes	No
Yes	41	29	12
No Influence	41	27	14
Hindered	26	20	6

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
108	3	2	2	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.939147823	0.625268631	5.991464547	no	0.093251344

MPH Program Age

	Total	1-10	11-20	21-50+
Yes	36	9	13	14
No Influence	39	11	15	13
Hindered	24	5	10	9

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
99	3	3	4	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.607183423	0.96226211	9.487729037	no	0.055376737

Factors Influencing Change - Strategic Planning

MPH Program Type	Total	SPH	PHP
Yes	89	27	62
No Influence	15	8	7
Hindered	2	1	1

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
106	3	2	2	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	3.260503537	0.195880251	5.991464547	no	0.175383772
Fisher Exact Test		0.183701624			

MPH Program Size	Total	<100 students	100-250 students	>250 students
Yes	89	44	30	15
No Influence	15	8	6	1
Hindered	2	2	0	0

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
106	3	3	4	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	3.033402691	0.552251185	9.487729037	no	0.119618156
Fisher Exact Test		0.752427999			

ASPPH Affiliation	Total	Yes	No
Yes	89	62	27
No Influence	15	13	2
Hindered	2	1	1

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
106	3	2	2	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	2.30196005	0.316326609	5.991464547	no	0.147365546
Fisher Exact Test		0.234546687			

MPH Program Age	Total	1-10	11-20	21-50+
Yes	80	23	32	25
No Influence	15	0	4	11
Hindered	2	1	1	0

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
97	3	3	4	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	12.19585054	0.015952771	9.487729037	yes	0.250729354
Fisher Exact Test		0.0038544			

Factors Influencing Change - Continued Learning

MPH Program Type

	Total	SPH	PHP
Yes	93	26	67
No Influence	15	10	5

SUMMARY		Alpha		0.05		
Count	*Rows*	*Cols*	*df*			
108	2	2	1			
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*	*Odds Ratio*
Pearson's	8.709677419	0.003165252	3.841458821	yes	0.283980917	0.194029851
Fisher Exact Test		0.006178959				

MPH Program Size

	Total	<100 students	100-250 students	>250 students
Yes	93	51	27	15
No Influence	15	4	10	1

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
108	2	3	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	8.133683126	0.017131412	5.991464547	yes	0.274430102
Fisher Exact Test		0.026211267			

ASPPH Affiliation

	Total	Yes	No
Yes	93	64	29
No Influence	15	12	3

SUMMARY		Alpha		0.05		
Count	*Rows*	*Cols*	*df*			
108	2	2	1			
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*	*Odds Ratio*
Pearson's	0.774702886	0.378766097	3.841458821	no	0.084694598	0.551724138
Fisher Exact Test		0.545310554				

MPH Program Age

	Total	1-10	11-20	21-50+
Yes	86	24	32	30
No Influence	13	1	6	6

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
99	2	3	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	2.457243197	0.292695752	5.991464547	no	0.157545671
Fisher Exact Test		0.305516393			

Impact of Input to Drive Change (Multiple Answers)

MPH Program Type			
	Total	SPH	PHP
A Lot	239	67	172
Somewhat	166	64	102
Not at all	29	13	16

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
434	3	2	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	6.792317339	0.033501714	5.991464547	yes	0.125101962

MPH Program Size				
	Total	<100 students	100-250 students	>250 students
A Lot	239	132	77	30
Somewhat	166	77	58	31
Not at all	29	14	12	3

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
434	3	3	4		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	5.179650216	0.269355928	9.487729037	no	0.077248553

ASPPH Affiliation			
	Total	Yes	No
A Lot	239	160	79
Somewhat	166	121	45
Not at all	29	22	7

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
434	3	2	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	2.182593052	0.335780863	5.991464547	no	0.070915557

MPH Program Age				
	Total	1-10	11-20	21-50+
A Lot	218	57	87	74
Somewhat	152	40	55	57
Not at all	28	6	9	13

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
398	3	3	4		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	2.012699518	0.733422952	9.487729037	no	0.050284361

Degree of Influence on Change - Feedback

MPH Program Type

	Total	SPH	PHP
Not at all	2	2	0
Somewhat	27	15	12
A Lot	80	19	61

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
109	3	2	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	13.36352581	0.001253566	5.991464547	yes	0.350144476
Fisher Exact Test		0.000837734			

MPH Program Size

	Total	<100 students	100-250 students	>250 students
Not at all	2	0	2	0
Somewhat	27	11	11	5
A Lot	80	45	24	11

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
109	3	3	4		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	5.908538337	0.206083599	9.487729037	no	0.164631063
Fisher Exact Test		0.20800899			

ASPPH Affiliation

	Total	Yes	No
Not at all	2	2	0
Somewhat	27	25	2
A Lot	80	49	31

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
109	3	2	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	10.27897155	0.005860703	5.991464547	yes	0.307087107
Fisher Exact Test		0.001938743			

MPH Program Age

	Total	1-10	11-20	21-50+
Not at all	2	0	1	1
Somewhat	23	5	8	10
A Lot	75	21	29	25

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
100	3	3	4		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	1.557534211	0.816403453	9.487729037	no	0.088247782
Fisher Exact Test		0.904750414			

Degree of Influence on Change - University Initiatives

MPH Program Type

	Total	SPH	PHP
Not at all	24	8	16
Somewhat	70	24	46
A Lot	13	4	9

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
107	3	2	2	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.062072721	0.969440323	5.991464547	no	0.024085657

MPH Program Size

	Total	<100 students	100-250 students	>250 students
Not at all	24	14	8	2
Somewhat	70	32	24	14
A Lot	13	9	4	0

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
107	3	3	4	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	5.349549663	0.253274102	9.487729037	no	0.158107228
Fisher Exact Test		0.29286048			

ASPPH Affiliation

	Total	Yes	No
Not at all	24	17	7
Somewhat	70	48	22
A Lot	13	10	3

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
107	3	2	2	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.372887324	0.829905316	5.991464547	no	0.059033281

MPH Program Age

	Total	1-10	11-20	21-50+
Not at all	23	6	7	10
Somewhat	65	18	24	23
A Lot	10	1	6	3

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
98	3	3	4	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	3.156804343	0.531935904	9.487729037	no	0.126909986
Fisher Exact Test		0.588089355			

Degree of Influence on Change - Learning

MPH Program Type

	Total	SPH	PHP
Not at all	3	3	0
Somewhat	55	21	34
A Lot	51	12	39

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
109	3	2	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	8.823961615	0.012131125	5.991464547	yes	0.284523771
Fisher Exact Test		0.012851339			

MPH Program Size

	Total	<100 students	100-250 students	>250 students
Not at all	3	0	2	1
Somewhat	55	26	20	9
A Lot	51	30	15	6

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
109	3	3	4		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	4.73453723	0.315635662	9.487729037	no	0.147370488
Fisher Exact Test		0.223790601			

ASPPH Affiliation

	Total	Yes	No
Not at all	3	3	0
Somewhat	55	40	15
A Lot	51	33	18

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
109	3	2	2		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	2.146086534	0.341966238	5.991464547	no	0.140317024
Fisher Exact Test		0.444858135			

MPH Program Age

	Total	1-10	11-20	21-50+
Not at all	3	0	1	2
Somewhat	50	13	18	19
A Lot	47	13	19	15

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
100	3	3	4		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	2.029509353	0.730331136	9.487729037	no	0.100735032
Fisher Exact Test		0.842163029			

Degree of Influence on Change - Criteria

MPH Program Type

	Total	SPH	PHP
Somewhat	14	4	10
A Lot	95	32	63

SUMMARY		Alpha		0.05			
	Count	*Rows*	*Cols*	*df*			
	109	2	2	1			
		chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*	*Odds Ratio*
Pearson's		0.144200684	0.704140168	3.841458821	no	0.03637227	0.7875
Fisher Exact Test			1				

MPH Program Size

	Total	<100 students	100-250 students	>250 students
Somewhat	14	8	3	3
A Lot	95	48	34	13

SUMMARY		Alpha		0.05		
	Count	*Rows*	*Cols*	*df*		
	109	2	3	2		
		chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's		1.343850517	0.510724354	5.991464547	no	0.111035597
Fisher Exact Test			0.485108055			

ASPPH Affiliation

	Total	Yes	No
Somewhat	14	8	6
A Lot	95	68	27

SUMMARY		Alpha		0.05			
	Count	*Rows*	*Cols*	*df*			
	109	2	2	1			
		chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*	*Odds Ratio*
Pearson's		1.204619204	0.272400399	3.841458821	no	0.105126364	0.529411765

MPH Program Age

	Total	1-10	11-20	21-50+
Somewhat	14	4	5	5
A Lot	86	22	33	31

SUMMARY		Alpha		0.05		
	Count	*Rows*	*Cols*	*df*		
	100	2	3	2		
		chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's		0.064151135	0.968433397	5.991464547	no	0.025328074
Fisher Exact Test			1			

Reason for Changes - General (Multiple Responses)

MPH Program Type			
Reason	**Total Yes**	SPH	PHP
Learning new/best practices	152	43	109
Because of a university initiative	43	21	22
In response to feedback	199	66	133
CEPH accreditation requirements	295	99	196

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
689	4	2	3		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	6.407009827	0.093402837	7.814727903	no	0.096431314

MPH Program Size				
Reason	**Total Yes**	<100 students	100-250 students	>250 students
Learning new/best practices	152	75	52	25
Because of a university initiative	43	14	24	5
In response to feedback	199	95	70	34
CEPH accreditation requirements	295	144	106	45

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
689	4	3	6		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	7.733049672	0.258320381	12.59158724	no	0.074911896

ASPPH Affiliation			
Reason	**Total Yes**	Yes	No
Learning new/best practices	152	101	51
Because of a university initiative	43	35	8
In response to feedback	199	132	67
CEPH accreditation requirements	295	209	86

SUMMARY		Alpha		0.05	
Count	*Rows*	*Cols*	*df*		
689	4	2	3		
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	4.687028879	0.196202211	7.814727903	no	0.082478206

Reason for Changes - Instructional Design (Multiple Responses)

MPH Program Type			
Reason	**Total Yes**	SPH	PHP
Learning new/best practices	65	17	48
Because of a university initiative	14	7	7
In response to feedback	43	12	31
CEPH accreditation requirements	99	34	65

SUMMARY		Alpha		0.05		
Count	*Rows*	*Cols*	*df*			
221	4	2	3			
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*	
Pearson's	3.695711281	0.296251918	7.814727903	no	0.129316184	

MPH Program Size				
Reason	**Total Yes**	<100 students	100-250 students	>250 students
Learning new/best practices	65	35	20	10
Because of a university initiative	14	5	6	3
In response to feedback	43	19	17	7
CEPH accreditation requirements	99	46	37	16

SUMMARY		Alpha		0.05		
Count	*Rows*	*Cols*	*df*			
221	4	3	6			
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*	
Pearson's	2.213430767	0.899060185	12.59158724	no	0.070765542	

ASPPH Affiliation			
Reason	**Total Yes**	Yes	No
Learning new/best practices	65	42	23
Because of a university initiative	14	11	3
In response to feedback	43	27	16
CEPH accreditation requirements	99	71	28

SUMMARY		Alpha		0.05		
Count	*Rows*	*Cols*	*df*			
221	4	2	3			
	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*	
Pearson's	2.227432717	0.526565213	7.814727903	no	0.100393631	

Reason for Changes - Curriculum (Multiple Responses)

MPH Program Type			
Reason	**Total Yes**	SPH	PHP
Learning new/best practices	71	23	48
Because of a university initiative	18	7	11
In response to feedback	48	11	37
CEPH accreditation requirements	104	35	69

SUMMARY		Alpha		0.05		
	Count	*Rows*	*Cols*	*df*		
	241	4	2	3		
		chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's		2.342697392	0.504390604	7.814727903	no	0.098593793

MPH Program Size				
Reason	**Total Yes**	<100 students	100-250 students	>250 students
Learning new/best practices	71	35	25	11
Because of a university initiative	18	6	10	2
In response to feedback	48	26	16	6
CEPH accreditation requirements	104	51	37	16

SUMMARY		Alpha		0.05		
	Count	*Rows*	*Cols*	*df*		
	241	4	3	6		
		chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's		3.522307561	0.740999445	12.59158724	no	0.08548504

ASPPH Affiliation			
Reason	**Total Yes**	Yes	No
Learning new/best practices	71	46	25
Because of a university initiative	18	15	3
In response to feedback	48	31	17
CEPH accreditation requirements	104	74	30

SUMMARY		Alpha		0.05		
	Count	*Rows*	*Cols*	*df*		
	241	4	2	3		
		chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's		2.972848815	0.395830327	7.814727903	no	0.111065171

Reason for Changes - General (Multiple Responses)

MPH Program Type			
Reason	**Total Yes**	SPH	PHP
Learning new/best practices	63	26	37
Because of a university initiative	11	7	4
In response to feedback	61	20	41
CEPH accreditation requirements	92	30	62

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
227	4	2	3	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	5.073021032	0.166527611	7.814727903	no	0.149492844

MPH Program Size				
Reason	**Total Yes**	<100 students	100-250 students	>250 students
Learning new/best practices	63	25	25	13
Because of a university initiative	11	3	8	0
In response to feedback	61	30	19	12
CEPH accreditation requirements	92	47	32	13

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
227	4	3	6	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	9.726055416	0.136672616	12.59158724	no	0.146366081

ASPPH Affiliation			
Reason	**Total Yes**	Yes	No
Learning new/best practices	63	44	19
Because of a university initiative	11	9	2
In response to feedback	61	43	18
CEPH accreditation requirements	92	64	28

SUMMARY		Alpha		0.05
Count	*Rows*	*Cols*	*df*	
227	4	2	3	

	chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's	0.729093231	0.866340521	7.814727903	no	0.056673313

Rank of Ways to Help MPH Programs Better Develop Workorce

MPH Program Type

	Total	SPH	PHP
High Range	196	65	131
Mid Range	177	63	114
Low Range	155	57	98

SUMMARY		Alpha		0.05		
	Count	*Rows*	*Cols*	*df*		
	528	3	2	2		
		chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's		0.531892139	0.766480463	5.991464547	no	0.031739116

MPH Program Size

	Total	<100 students	100-250 students	>250 students
High Range	196	100	68	28
Mid Range	177	89	59	29
Low Range	155	77	51	27

SUMMARY		Alpha		0.05		
	Count	*Rows*	*Cols*	*df*		
	528	3	3	4		
		chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's		0.697142946	0.951680786	9.487729037	no	0.025693837

ASPPH Affiliation

	Total	Yes	No
High Range	196	139	57
Mid Range	177	129	48
Low Range	155	110	45

SUMMARY		Alpha		0.05		
	Count	*Rows*	*Cols*	*df*		
	528	3	2	2		
		chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's		0.218108065	0.896681966	5.991464547	no	0.020324455

MPH Program Age

	Total	1-10	11-20	21-50+
High Range	180	47	68	65
Mid Range	162	42	59	61
Low Range	145	37	54	54

SUMMARY		Alpha		0.05		
	Count	*Rows*	*Cols*	*df*		
	487	3	3	4		
		chi-sq	*p-value*	*x-crit*	*sig*	*Cramer V*
Pearson's		0.113163766	0.998458366	9.487729037	no	0.010778894

Phase 1 Survey Report

MPH Program Shifts

QID4 - Do you consent to participate in the survey?

#	Answer	%	Count
1	Yes	100.00%	115
2	No	0.00%	0
	Total	100%	115

Q1 - How would you describe the primary focus of your MPH program? Complete the following sentence: "The primary focus of our MPH program is to prepare MPH graduates…":

#	Answer	%	Count
1	…for public health research (eg., preparation for a PhD program or a research fellowship)	1.77%	2
2	…for public health practice (eg., preparation for immediate employment linked to public health)	85.84%	97
3	…to integrate public health with another professional degree (eg.,MD, DVM, MBA, JD, etc.)	0.88%	1
4	Other	11.50%	13
	Total	100%	113

Q2 - In your opinion, over the last four years (since Fall 2015), has your MPH program put more emphasis on training students for public health practice? (meaning, applied work at the community, county, state, local, or international level, in governmental or non-governmental sectors)

#	Answer	%	Count
1	Yes	52.21%	59
2	No	3.54%	4
3	No, because that was already a primary focus of our program	44.25%	50
	Total	100%	113

Q3 - Your program may have many reasons for putting emphasis on public health practice. To what extent have these factors influenced your program's focus on practice?

#	Question	Not at all		Somewhat		A lot		Total
1	Student input	12.26%	13	55.66%	59	32.08%	34	106
5	Revisions to MPH accreditation standards	6.60%	7	30.19%	32	63.21%	67	106
4	Research on teaching methods for adults/health professionals	24.53%	26	56.60%	60	18.87%	20	106
3	Research on public health workforce needs	12.15%	13	40.19%	43	47.66%	51	107
2	Employer/collaborator input	3.77%	4	26.42%	28	69.81%	74	106

Q4 - How does your program put emphasis on training students for public health practice? (select all that apply)

#	Answer	%	Count
1	We developed and offer specific courses for public health practice	25.67%	77
2	We expect students to do substantial work in the field, with public health practitioners	32.00%	96
3	We have many public health practitioners involved in teaching	19.67%	59
4	We have many public health practitioners involved in student mentoring	19.33%	58
	Total	100%	300

Q5 - About how often do you make changes to your MPH program's design?

#	Answer	%	Count
1	Every year	15.79%	18
2	Every 2-3 years	33.33%	38
3	Every 4-5 years	25.44%	29
4	Every 6-7 years	12.28%	14
5	Other	13.16%	15
	Total	100%	114

Q6 - How much do these factors inform or spur changes to your MPH program's design?

#	Question	Not at all		Somewhat		A lot		Total
1	Feedback from graduates, employers, faculty, etc.	1.7%	2	23.5%	27	74.8%	86	115
2	Specific university initiatives (eg., a focus on civic responsibility)	21.4%	24	65.2%	73	13.4%	15	112
3	Learning new or best practices	2.6%	3	50.0%	57	47.4%	54	114
4	Specific criteria, such as accreditation requirements	0.0%	0	12.3%	14	87.7%	100	114

Q7 - From what you recall, since the 2015-2016 academic year, has your MPH program considered or implemented any of the following changes?

#	Question	Yes: Considered since 2015		Yes: Implemented since 2015		No: Changed 2010-2015		No changes for now		I'm not sure		Total
1	Changes in admissions criteria	10.71%	12	39.29%	44	6.25%	7	36.61%	41	7.14%	8	112
2	Changes in graduation requirements	2.70%	3	59.46%	66	5.41%	6	28.83%	32	3.60%	4	111
3	Changes in focal competencies taught and assessed	8.04%	9	81.25%	91	0.89%	1	7.14%	8	2.68%	3	112

Q8 - Why were those changes considered or implemented? (check all that apply)

#	Answer	%	Count
1	In response to feedback from graduates, employers, faculty, etc.	28.81%	70
2	Because of a university initiative	5.76%	14
3	Based on learning new or best practices	18.93%	46
4	To meet CEPH accreditation requirements	42.80%	104
5	Other	3.70%	9
	Total	100%	243

Q9 - (optional) What did you hope or intend to see as a result of these changes to MPH program design? *(open ended question removed)*

Q10 - (optional) How will you measure the effects of these changes to MPH program design? *(open ended question removed)*

Q11 - From what you recall, since the 2015-2016 academic year, has your MPH program considered or implemented any of the following changes related to curriculum and course content?

#	Question	Yes: Considered since 2015		Yes: Implemented since 2015		No: Changed 2010-2015		No changes for now		I'm not sure		Total
1	Changed course content	4.50%	5	88.29%	98	0.00%	0	4.50%	5	2.70%	3	111
2	Changed required courses	3.64%	4	76.36%	84	4.55%	5	12.73%	14	2.73%	3	110
3	Changed how courses are linked	12.73%	14	57.27%	63	4.55%	5	20.91%	23	4.55%	5	110
4	Changed how courses are sequenced	10.00%	11	52.73%	58	5.45%	6	28.18%	31	3.64%	4	110
5	Merged two or more courses	10.91%	12	39.09%	43	7.27%	8	35.45%	39	7.27%	8	110
6	Broke existing courses into new courses	4.59%	5	30.28%	33	8.26%	9	50.46%	55	6.42%	7	109
7	Developed new courses required of all students	5.45%	6	72.73%	80	2.73%	3	16.36%	18	2.73%	3	110
8	Removed courses from required course of study	4.55%	5	54.55%	60	4.55%	5	32.73%	36	3.64%	4	110
9	Increased focus on foundational knowledge	6.36%	7	65.45%	72	1.82%	2	24.55%	27	1.82%	2	110
10	Increased focus on professional values	10.91%	12	50.91%	56	4.55%	5	28.18%	31	5.45%	6	110
11	Increased focus on leadership	7.27%	8	68.18%	75	4.55%	5	16.36%	18	3.64%	4	110
12	Increased focus on communication	11.71%	13	54.95%	61	5.41%	6	23.42%	26	4.50%	5	111
13	Increased focus on inter-professional practice	11.71%	13	72.97%	81	4.50%	5	8.11%	9	2.70%	3	111

Q12 - Why were those changes considered or implemented? (check all that apply)

#	Answer	%	Count
1	In response to feedback from graduates, employers, faculty, etc.	28.79%	74
2	Because of a university initiative	7.39%	19
3	Based on learning new or best practices	19.07%	49
4	To meet CEPH accreditation requirements	42.02%	108
5	Other	2.72%	7
	Total	100%	257

Q13 - (optional) What did you hope to see as a result of these changes to MPH curriculum? *(open ended question removed)*

Q14 - (optional) How will you measure the effects of these changes to MPH curriculum? *(open ended question removed)*

Q15 - From what you recall, since the 2015-2016 academic year, has your MPH program considered or implemented any of the following changes related to teaching methods and approaches?

#	Question	Yes: Considered since 2015		Yes: Implemented since 2015		No: Changed 2010-2015		No changes for now		I'm not sure		Total
1	Requirements for APE/Practicum	7.27%	8	62.73%	69	1.82%	2	21.82%	24	6.36%	7	110
2	Requirements for ILE/Capstone	11.01%	12	65.14%	71	3.67%	4	15.60%	17	4.59%	5	109
3	More student field work	4.63%	5	20.37%	22	10.19%	11	61.11%	66	3.70%	4	108
4	More authentic assessment methods	12.04%	13	55.56%	60	4.63%	5	16.67%	18	11.11%	12	108
5	More small-group learning	7.34%	8	25.69%	28	8.26%	9	51.38%	56	7.34%	8	109
6	More teamwork for students	4.59%	5	40.37%	44	8.26%	9	39.45%	43	7.34%	8	109
7	More student contact time with practitioners	6.42%	7	28.44%	31	10.09%	11	50.46%	55	4.59%	5	109
8	More mentoring by practitioners	6.36%	7	13.64%	15	11.82%	13	62.73%	69	5.45%	6	110
9	More use of IT for learning	7.34%	8	41.28%	45	8.26%	9	35.78%	39	7.34%	8	109
10	More use of student reflection for learning	10.00%	11	41.82%	46	1.82%	2	38.18%	42	8.18%	9	110

Q16 - Why were those changes considered or implemented? (check all that apply)

#	Answer	%	Count
1	In response to feedback from graduates, employers, faculty, etc.	26.23%	64
2	Because of a university initiative	4.92%	12
3	Based on learning new or best practices	25.82%	63
4	To meet CEPH accreditation requirements	38.52%	94
5	Other	4.51%	11
	Total	100%	244

Q17 - (optional) What did you hope to see as a result of these changes in teaching methods? *(open ended question removed)*

Q18 - (optional) How will you measure the effects of these changes in teaching methods? *(open ended question removed)*

Q19 - Above you noted planning for or making changes to your MPH program's curriculum. How much did each of these factors help or hinder these changes?

#	Question	Helped a lot		Helped a bit		No influence		Hindered a bit		Hindered a lot		Total
1	CEPH accreditation standards	67.6%	73	25.0%	27	0.0%	0	5.6%	6	1.9%	2	108
2	National policies or initiatives (not CEPH)	14.3%	15	44.8%	47	41.0%	43	0.0%	0	0.0%	0	105
3	Specific university policies or initiatives	6.6%	7	36.8%	39	48.1%	51	6.6%	7	1.9%	2	106
4	Institutional resources (funding, new faculty, cont. ed., etc.)	17.6%	19	20.4%	22	38.0%	41	14.8%	16	9.3%	10	108
5	MPH program-wide/ strategic planning	52.8%	56	31.1%	33	14.2%	15	1.9%	2	0.0%	0	106
6	Going to conferences, participation in webinars, time to read papers, etc.	37.0%	40	49.1%	53	13.9%	15	0.0%	0	0.0%	0	108

Q20 - Are there any other factors that helped facilitate change?
(open ended question removed)

Q21 - Are there any other factors that limited change?
(open ended question removed)

Q22 - Thinking back over the last few years, were there any changes that your MPH program considered but didn't implement?

#	Answer	%	Count
1	Yes	50.96%	53
2	No	49.04%	51
	Total	100%	104

Q23 - What were the proposed changes, and why didn't you implement them?
(open ended question removed)

Q24 - How much of an influence do each of these have on your MPH program design?

#	Question	No influence		Some influence		A lot of influence		I don't know		Total
1	CEPH Accreditation Standards	0.00%	0	4.59%	5	95.41%	104	0.00%	0	109
2	Public Health 3.0	22.22%	24	48.15%	52	13.89%	15	15.74%	17	108
3	Public Health WINS	41.67%	45	30.56%	33	4.63%	5	23.15%	25	108
4	ASPPH's Framing the Future initiative	9.17%	10	51.38%	56	34.86%	38	4.59%	5	109
5	Council on Linkages/PHAB accreditation initiative	30.56%	33	40.74%	44	12.04%	13	16.67%	18	108
6	CPH Certification Standards	50.46%	55	35.78%	39	9.17%	10	4.59%	5	109

Q25 - Based on the public health needs and opportunities that you see in the U.S. and globally, what do you think the primary focus of an MPH program should be? (please rank order your choices, with 1 = most important and 5 = least important)

#	Train practitioners/leaders	Mean
1	Train practitioners/leaders	1.67
2	Act as a stepping stone to other education	3.34
3	Train researchers	3.00
4	All of these	3.05
5	Something else	3.22

Q26 - Based on the public health needs and opportunities that you see, and based on what you know of MPH training in the U.S., what should MPH programs do more or less of?

#	Question	Much more		A bit more		About the same		A bit less		A lot less		Total
5	Use strategies to build a diverse workforce	48.15%	52	37.04%	40	12.96%	14	1.85%	2	0.00%	0	108
4	Specialize to develop a more skilled professional field	16.82%	18	36.45%	39	39.25%	42	7.48%	8	0.00%	0	107
3	Link and integrate MPH training with other degree programs	15.74%	17	47.22%	51	34.26%	37	2.78%	3	0.00%	0	108
6	Engage with communities for learning and research	51.40%	55	36.45%	39	12.15%	13	0.00%	0	0.00%	0	107
7	Engage in public health advocacy and policy change	49.53%	53	35.51%	38	13.08%	14	0.93%	1	0.93%	1	107
1	Develop skills linked to leadership and professionalism	35.51%	38	50.47%	54	13.08%	14	0.93%	1	0.00%	0	107
2	Develop research skills to inform and build evidence	18.69%	20	38.32%	41	37.38%	40	5.61%	6	0.00%	0	107

Q27 - How do you see MPH programs adapting their MPH programs in response to reported public health workforce gaps? *(open ended question removed)*

Q28 - What do you think could help MPH programs become even better equipped to develop the workforce of the future? (Please rank, with 1 = Most Important and 6 = Least Important)

#	Question	1		2		3		4		5		6		Total
1	Stronger guidance from national orgs eg. CEPH, ASPPH,APHA	15.85%	13	17.07%	14	19.51%	16	15.85%	13	15.85%	13	15.85%	13	82
2	Stronger collab b/w MPH programs and the public health workforce	47.56%	39	25.61%	21	9.76%	8	4.88%	4	6.10%	5	6.10%	5	82
3	More conversation around public health workforce needs data, and the role MPH programs could play	23.46%	19	32.10%	26	20.99%	17	3.70%	3	12.35%	10	7.41%	6	81
4	More research on the outcomes seen from different MPH training approaches	7.53%	7	17.20%	16	23.66%	22	30.11%	28	15.05%	14	6.45%	6	93
5	More peer-to-peer learning with academic peers at other MPH programs (eg. success stories, lessons learned)	6.82%	6	10.23%	9	20.45%	18	29.55%	26	25.00%	22	7.95%	7	88
6	More peer-to-peer learning with academic peers in other professional training programs (MBA, MD, MHA, etc.)	10.78%	11	14.71%	15	11.76%	12	9.80%	10	15.69%	16	37.25%	38	102

Q29 - What institution are you from? *(open ended question removed)*

Q31 - Where is your MPH program located? Within a…

#	Answer	%	Count
1	A School of Public Health	33.03%	36
2	A Public Health Program	66.97%	73
	Total	100%	109

Q32 - About how many students are enrolled in your MPH programs each year? (total enrollment, inclusive of all concentrations, all modes of delivery, all years)

#	Answer	%	Count
1	Fewer than 100 students	51.38%	56
2	100-250 students	33.94%	37
3	More than 250 students	14.68%	16
	Total	100%	109

Q33 - Program Age

#	Answer	%	Count
1	11-20	38.00%	38
2	21-50+	36.00%	36
3	1-10	26.00%	26
	Total	100%	100

Q34 - Is your school or program of public health a member of ASPPH?

#	Answer	%	Count
1	Yes	69.72%	76
2	No	30.28%	33
3	I'm not sure	0.00%	0
	Total	100%	109

Q35 - Are you accredited by, or on track to be accredited by CEPH?

#	Answer	%	Count
1	Yes	100.00%	109
2	No	0.00%	0
3	I'm not sure	0.00%	0
	Total	100%	109

Q37 - If sampled, would you be willing to be contacted for a 45-minute interview? If you select yes, you will be prompted to provide your personal contact information, including your name and email address.

#	Answer	%	Count
1	Yes, I am willing to be contacted	36.36%	40
2	No, I am not interested in being contacted	63.64%	70
	Total	100%	110

APPENDIX L - CODE BOOK

Parent Code	Child Code	Definition	When to apply:	Examples
MPH Focus ***WHAT*** *is the ideal state of MPH programs in the U.S.?*	**Learning**	Learning is the acquisition of knowledge.	Programs note: - A focus on ***teaching*** - A focus on acquisition of ***knowledge*** and ***skills*** (informative learning)	- *We focus on teaching students….* - *We work to assure that students have knowledge in….* - *We help students build skills in….*
	Competence Development	Competence comprises the ability to integrate and apply knowledge, skills, and values effectively to perform an action or achieve an outcome.	Programs note: - A focus on ***mentoring*** - A focus on ***competence development*** - A focus on developing ***public health values*** (formative learning) - A focus on developing ***leaders*** (transformative learning)	- *We help our students be able to demonstrate competence in areas such as….* - *We help our students build abilities in areas important to the workforce* - *We help students build abilities in areas such as… (systems thinking, problem solving, data analytics, leadership, collaboration, change management, facilitation, negotiation, teamwork)*
	Workforce Readiness	Graduates who are ready to enter the public health workforce, including the governmental public health service, healthcare sector, and/or non-profit sector.	Programs note: - A focus on developing ***professionals*** - A focus on developing ***job readiness*** - A focus on developing the ***abilities*** needed by the workforce, possibly in areas aligned with ***workforce needs***	- *We help our students become professionals ready to enter the workforce* - *We help students develop abilities that can be transferrable across jobs* - *We help graduates be ready to work in the field of public health*
	Graduate Employment	MPH program graduates are able to gain employment.	Programs note: - A focus on getting ***graduates employed*** - A focus on helping to ***fill the public health workforce needs***	- *We really focus on helping our graduates get jobs* - *We have a focus on the pipeline, helping to fill existing workforce gaps*
	Other	Other foci that emerge	Programs note: - Other focuses of their MPH program not already captured	

Parent Code	Child Code	Definition	When to apply:	Examples
MPH Program Shifts ***WHAT*** *types of changes are MPH programs making to their policies, curriculum, courses, methods to match this ideal state?*	**No shifts; status quo**	No shifts in MPH program curriculum or instructional methods	Programs note: - No shifts as their program is already aligned with their focus - No shifts as they are not interested in/able to change	- *We are not considering or implementing any shifts to our program as we are already well in alignment with our vision* - *We're not changing because of structural barriers within the college*
	Instructional Design	How instruction is designed and implemented within an MPH program, at a macro/ programmatic level	Programs note programmatic shift, such as: - A focus on ***competence development*** - Adoption of ***new competencies*** (i.e., CEPH competencies) - Adoption of new program ***admissions criteria*** - Adoption of new program ***graduation criteria*** - Adaptation of program structure and processes to improve ***workforce readiness***	- *We have incorporated the new CEPH competencies program* - *We have adopted new admissions criteria to decrease barriers to application* - *We work with employers to help design our program so that our graduates meet employers' needs* - *We have implemented a portfolio process where students must demonstrate comprehensive competence to graduate*
	Curriculum / Course Content	The comprehensive knowledge, skills, and values that a student acquires via a course or program	Programs note shifts in curriculum in order to: - Increase acquisition of ***foundational public health knowledge*** - Develop and ***build student competence*** in areas needed by the workforce and/or prescribed by CEPH - Help students develop ***core public health values***, such as a focus on social justice and equity - Help students develop ***adaptive leadership skills*** (engagement, communication, systems thinking, inquiry…) - Prepare students to work in ***inter-professional teams***	- *We have added new courses that specifically focus on….* - *We have adapted courses to assure competence assessment* - *We have incorporated content/classes to better focus on the core values of public health* - *We have designed new course activities that model and support inter-professional practice* - *We are explicitly working to break down professional silos, to enhance relationships, and to improve student ability to work in teams*

	Pedagogy/ Modes of Teaching	Methods used to help students acquire knowledge, skills, values, and develop competence; HOW learning happens	Programs note shifts in teaching methods, such as: - Giving lectures - ***Re-designing courses*** to better integrate content - Focusing on ***applied problem solving*** - Adopting engaged, ***practice-oriented learning*** - Supporting small-group/collaborative/***team-based learning*** - Using assessment methods that mimic ***real-word scenarios*** - Using ***mentoring/coaching by practitioners*** to build competence - Adoption of ***IT to support/facilitate learning*** - Use of ***critical or systematic reflection*** as a learning process - Integration of ***faculty with practice experience*** into the program	- *We developed a new course to teach all foundational* - *We developed an Integrated Core that all MPH students take* - *Our students work on real-world projects and real-world problems so that what they are learning has real-world relevance* - *We use simulations and case studies to mimic real life* - *We increased teamwork to prepare students for collaborative work* - *We use reflection to help students stop, think, write, and reflect upon what is happening, what this means, helping shift values, perspectives, understanding, and deepening learning* - *We prioritize hiring faculty with practice experience*
	Context for Learning	Where learning happens	Programs note shifts in where teaching/learning happens, such as: - ***Field-based learning*** - ***Simulations*** - ***Real-world problem solving***	- *We are doubling down on field based learning, and are investing heavily in mentored practicums/applied practice experiences* - *We bring the real world into the classroom by working with practitioners, and having them mentor students as they work on real-world projects*
	Other	Other shifts that emerge	Programs note: - Other shifts the MPH program made not already captured	

Parent Code	Child Code	Definition	When to apply:	Examples
Desired Outcomes ***WHY*** *are MPH programs making changes to their policies, curriculum, courses, methods? What are they looking to achieve?*	**Improved Learning**	Program shifts made to improve what students learn	Programs note that shifts were made to: - Help students have a better grasp on key ***knowledge***	- *We wanted our students to have a better understanding of….* - *We felt that we needed students to have a deeper understanding of….*
	Improved Competence Development	Program shifts made to better support the development and demonstration of student competence	Programs note that shifts were made to: - Help students better develop the ***competencies required of the workforce*** - Help students develop into ***public health practitioners*** - Help student become ***public health leaders***	- *We wanted to help our students be able to demonstrate competence in areas such as….* - *We wanted our students to have confidence in their ability to…* - *We felt that our students need more applied skills and abilities, really relevant to the workforce*
	Improved Workforce Readiness	Program shifts made to better prepare students for the skills and abilities needed by today's public health workforce	Programs note that shifts were made to: - Help students become ***public health professionals*** - Help students have all of the ***abilities*** needed by the workforce - Help students be ready to ***integrate into the workforce***	- *We wanted our students to be able to enter the workforce seamlessly* - *Our motivation was to develop graduates who are able to hit the ground running* - *We want our students to be able to understand the current public health context and be ready to lead change*
	Improved Graduate Employment	Program shifts made to improve the employability of graduates	Programs note that shifts were made to: - Improve ***graduate employment rates***	- *We needed more of our graduates to be employed within 6-months of graduation* - *We learned more about what the workforce was looking for*
	Improved Student/ Graduate/Employer Satisfaction	Program shifts made to improve the satisfaction of stakeholders	Programs note that shifts were made to: - Improve ***student satisfaction*** - Improve ***graduate satisfaction*** - Improve ***employer/preceptor satisfaction***	- *Our graduates were feeling like they left without all of the skills they needed; we wanted to change that* - *We want employers knocking at our door to hire our students!*
	CEPH Accreditation	Program shifts made as a part of/ to ensure CEPH accreditation	Programs note that shifts were made to: - Better ***align with new CEPH standards*** - Assure ***compliance with new CEPH standards***	- *We needed to make changes to be compliance with the new CEPH standards*
	Other	Other outcomes/motivators that emerge	Programs note: - Other desired outcomes not already captured	

Parent Code	Child Code	Definition	When to apply:	Examples
Influencing Factors ***WHAT*** *factors are informing and influencing (positively and negatively) the changes MPH programs are making*	**Policy Environment/ Mandates**	Policies and mandates are rules (including national accreditation) that influence what universities, schools, programs must do.	Programs note positive (+) or negative (-) influence of: - ***CEPH Accreditation Standards*** - Other policy or mandates that are informing or influencing action	- *The new CEPH accreditation standards have really informed what we are now doing* - *Our university expects that all units are involved in…., and that really shifted our program methods.*
	Organizational Characteristics / Institutional Design	The design and characteristics of an institution, including type, affiliations, and practices within the institution (decision-making, communication), as these influence institutional leadership, financing, resources, etc.	Programs note positive (+) or negative (-) influence of: - Organizational pressure for external funding - Organizational pressure for research and publication - Organizational pressure for teaching excellence, innovation - Organizational pressure for community engagement, service - Resource availability - Decision-making ability of MPH program team	- *There is pressure to bring in external research funding and to publish; this is at odds with public health practice* - *Our institution has invested heavily in engaged learning approaches and encourage us to use them* - *We have access to training and funding to help us improve and modernize our curriculum* - *Resources (funding, faculty lines) is a real barrier to change*
	Workplace Culture/ Standards	The 'vibe' within the MPH program, school, and/or university, including collaborative leadership processes, use of committees, stakeholder engagement at multiple levels, information sharing processes.	Programs note positive (+) or negative (-) influence of: - Having a clear program mission/vision/rationale - Using routine CQI processes to build on strengths/fill gaps - Engaged/collaborative leadership processes - Stakeholder involvement in program planning, evaluation, adaptation - Information sharing between and among team members - Collaborative practices, such as shared teaching	- *We went through a process to re-imagine our mission, vision, rationale for MPH training program* - *We gather and use data on a regular basis to inform our program's growth and development* - *We leverage our strengths to build a better program* - *We have a great team* - *We engage our stakeholders a lot to inform our next steps*

	Information Dissemination + Uptake	Awareness of information that that can or does inform action, such as national needs, national trends, national policies, institutional initiatives, local opportunities; as well as sharing finding with others	Respondents note positive (+) or negative (-) influence of: - Having access to information from national organizations - Having access to information from academic peers - Having access to information from peers in practice - Having access to information from other sources - Sharing processes and outputs/outcomes with others	- *We were a part of ASPPH's Framing the Future initiative* - *I have been able to access information to understand the CEPH changes* - *I am not really aware of PH WINS* - *I learn a lot by going to conferences, reading journals, etc.* - *I love sharing the work I do with others*
	Individual Understanding/ Motivation	Individual knowledge and understanding of influencing factors and environments, and the ability to use this for action (self-efficacy)	Respondents note positive (+) or negative (-) influence of: - Being aware of national trend, visions, mandates - Being a part of working groups that inform calls to action - Being aware of program vision and/or mandate - Being aware of university policies and mandates - Being able to access resources (funding, time) to support learning and collaboration for innovation - Being encouraged to learn and innovate	- *I really understand why we are making these changes* - *I think that MPH programs are going in the right direction* - *I am able to go to conferences and learn what I need to* - *My leadership is supportive and listens to my/our ideas* - *I don't really know what our program's plan or vision is* - *I've appreciated the strategic planning that we've done* - *I don't really know how to access resources around here* - *I don't even feel like trying any more*
	Other	Other influencing factors that emerge	Programs note: - Other influencing factors not already captured	

APPENDIX M - CODING BRIEF

Parent Code	Child Code	Definition
MPH Focus ***WHAT*** *is the ideal state of MPH programs in the U.S.?*	**Learning**	Focus on teaching; acquisition of knowledge; skills
	Competence Development	Ability to integrate and apply knowledge, skills, and values effectively to perform an action or achieve an outcome - *A focus on developing leaders*
	Workforce Readiness	Graduates who are ready to enter the public health workforce - *A focus on developing professionals*
	Graduate Employment	MPH program graduates are able to gain employment; filling workforce needs
	Other	PhD
MPH Program Shifts ***WHAT*** *types of changes are MPH programs making to their policies, curriculum, courses, methods to match this ideal state?*	**No shifts; status quo**	No shifts in MPH program curriculum or instructional methods
	Instructional Design	How instruction is designed and implemented within an MPH program, at a macro/ programmatic level: - *Focus on competence; admissions criteria; graduation criteria; built around workforce readiness*
	Curriculum/ Course Content	The comprehensive knowledge, skills, and values that a student acquires via a course or program: - *Foundational knowledge; CEPH competence areas; core values; leadership; interprofessional teams*
	Pedagogy/ Modes of Teaching	How learning happens - Methods used to help students acquire knowledge, skills, values, and develop competence: - *Course design; applied; problem-based; team-based; real-world; mentoring; reflection; IT; practice faculty*
	Context for Learning	Where learning happens - *Field-based; simulations; real-world*
	Other	Partnerships; Alumni connections
Desired Outcomes ***WHY*** *are MPH programs making changes to their policies, curriculum, courses, methods? What are they looking to achieve?*	**Improved Learning**	Program shifts made to improve what students learn: knowledge; skills
	Competence Development	Program shifts made to better support the development and demonstration of student competence - *Have, can apply CEPH competencies; become leaders*
	Workforce Readiness	Program shifts made to better prepare students for the skills and abilities needed by today's public health workforce - *Become practitioners; integrate well into the workforce*
	Graduate Employment	Program shifts made to improve the employability of graduates – *employment rates*
	Satisfaction	Program shifts made to improve the satisfaction of stakeholders **Student/ Graduate/ Employer**
	CEPH Accreditation	Program shifts made as a part of/ to ensure CEPH accreditation
	Other	Tackle public health problems; Adaptive leadership; Connection; make a difference/change-makers; continued education
Influencing Factors ***WHAT*** *factors are informing and influencing (positively and negatively) the changes MPH programs are making* *+ facilitate | - limit*	**Policy Environment**	Policies and mandates are rules (incl. national accreditation) that influence what universities, schools, programs must do.
	Organizational Characteristics	The design and characteristics of an institution, including type, affiliations, and practices within the institution (decision-making, communication), as these influence institutional leadership, financing, resources, etc.
	Workplace Culture/ Standards	The 'vibe' within the MPH program, school, and/or university, including collaborative leadership processes, use of committees, stakeholder engagement at multiple levels, program leadership
	Information Dissemination/Uptake	Information sharing processes and access: Awareness of information that that can or does inform action, such as national needs, national trends, national policies, institutional initiatives, local opportunities; as well as sharing finding with others
	Individual Understdg/ Motivation	Individual knowledge and understanding of influencing factors and environments, and the ability to use this for action (self-efficacy)
	Other	

APPENDIX N - CODE FREQUENCY TABLE

Construct (F)	Parent Code (F)	Child Code (F)
Focus (31)	Learning (44)	Informative (14)
		Formative (6)
		Transformative (13)
	Competence Development (12)	Competence (12)
	Workforce Readiness (16)	(TBD) Researchers (2)
		Practitioners (16)
	Graduate Employment (9)	Researchers
		Practitioners
	Other - Change leaders (12)	
	Other - Workforce success (10)	
Shifts (79)	Instructional Design (19)	Competence development (10)
		Career pathway (7)
		Criteria for graduation (1)
		Criteria for admissions (7)
	Curriculum/ Course Content (35)	Foundational knowledge (17)
		Public health competence (14)
		Public health values (8)
		Public health leadership (12)
		Inter-professionalism (8)
	Pedagogy/ Modes of Teaching (48)	Integrated courses (7)
		Engaged, field-based, practice-oriented learning (23)
		Applied problem solving, alternative assessment (32)
		Small-group, collaborative learning (8)
		Use of IT (6)
		Critical, systematic reflection (3)
		Integration of faculty/mentors w/practice (21)
	Other – Program Design (13)	Program focus (7)
		Program growth (4)
		Program contraction (3)
		Hiring practitioners (6)

Construct (F)	Parent Code (F)	Child Code (F)
Outcomes (47)	Learning (18)	Informative (12)
		Formative (5)
		Transformative (14)
	Competence Development (12)	Competence (12)
	Workforce Readiness (10)	Researchers
		Practitioners (10)
	Graduate Employment (10)	Researchers
		Practitioners (10)
	Satisfaction (2)	Satisfaction (2)
	Accreditation (3)	Accreditation (3)
	Other - Greater collaboration (2)	
	Other – Workplace success (8)	
	Other - Change leaders (12)	
	Other - Pass CPH exam (1)	
Influencing Factors (99)	Policy Environment (29)	CEPH (28)
		Other (1)
	Organization (43)	Focus – Mission + Vision (14)
		Other – Fiscal resources (15)
		Other – Time pressures (4)
		Other – Administration + leadership (17)
		Other – Hiring practitioners (13)
		Other – Campus Resources (4)
	Workplace (33)	Mission/vision (7)
		M&E/CQI (13)
		Engagement (14)
		Other – Change/Strategic Management (9)
		Other – Leadership (10)
	Individual (17)	Awareness (16)
		Engagement – peer-to-peer (13)
		Lifelong learning (6)
		Other – Time (1)
	Information (38)	CEPH (17)
		Other national organizations (8)
		Academic peers (3)
		Practice peer (5)
		Other – Workforce needs (5)
		Other – Local needs (2)

APPENDIX O - DATA INTEGRATION TABLES

Who is Represented in this Study - Respondent Institution Characteristics	
Phase 1 - Survey Data	**Phase 2 - Interview Data**
• 1-2 people at each MPH program (N=215) invited to respond to the survey • 115 people responded - 67% from stand alone (vs. 70% ntl) - 70% from ASPPH (vs. 59% national) • Responses represent at least 93 unique MPH programs - At least 43% of institutions responded ▪ At least 45% of school-based ▪ At least 43% of stand-alone ▪ At least 50% of ASPPH members ▪ At least 34% of non-ASPPH - All 10 HRSA regions represented (mean 49% response rate, median 40%) • 49% of responses come from small MPH programs; 14% from large • Respondent program age is 1-104 yrs, with 21 yrs the mean, and 16 yrs the median • Summary: - Good representation. ASPPH members may be slightly over-represented. - ASPPH associated with SPH, older, larger programs	• 8 MPH programs (12 people) • Diversity of demographics - 50% from stand-alone (vs. 70% ntl) - 75% from ASPPH (vs. 59% national) - 70% of HRSA regions represented - 65% from small programs (vs. 49% in survey), and 12% from large (vs. 14%) - 25% from young (vs. 26% in survey), and 37% from historic (vs. 36%) - 50% public institutions; 50% private not-for-profit - 75% Research Doctorial (R1/R2); 25% Post-baccalaureate - 25% Academic health department - 50% Campus Compact • Diversity of experiences (survey responses) - 38% many changes vs. 38% few changes - 50% note resources facilitated change; 38% said lack of resources limited - 25% note university initiatives facilitated change; 38% note limited • Summary: - Sample includes similarity and difference, as measured by many criteria, to allow for representation and comparison.
Phase 3 – Data Integration	
• More than 115 MPH program representatives are a part of this study, with 115 individuals representing MPH program via survey, and 12 via eight in-depth interviews. • Responses represent at least 43% of the 215 CEPH-accredited/applicant MPH programs in the U.S., including 45% in SPH, 43% of stand-alone, and 50% ASPPH affiliates. Program demographics suggest that small and large programs, new and old programs, and national geographic regions are represented. • In addition, characteristics of MPH programs that participated in in-depth interviews suggests that there is also diversity in other demographics, such a type of institution (public/private), research focus of institution, engagement focus of institution, and experiences described in the Phase 1 survey (numbers and types of changes made, influencing or limiting factors). • Overall, the findings reported in this study come from the experiences and perspectives of a MPH program leaders from a sample of programs that in many ways mirror the characteristics of MPH programs accredited by CEPH, or who are in the applicant phase. MPH programs affiliated with ASPPH may be over-represented, and affiliation is associated with older and larger programs, and those located within schools of public health. However, interviews over-sampled for smaller programs.	

Focus of MPH Programs in the U.S.	
Phase 1 - Survey Data	**Phase 2 - Interview Data**
• 81% of MPH program respondents believe that the focus of MPH education is to train practitioners - 18% note training for combination of practice, research, other ed. - Open ended: professionals, collaboration, advocacy, address social outcomes, w/other ed. • 86% of MPH program respondents state current focus of their MPH program is to prepare grads for practice - 2% said to prepare for research - 12% other: integration of practice w/research, and w/other ed. - Open ended: professionals, leaders • Summary: - Majority of MPH program leaders believe that MPH programs should train practitioners; majority are. - Besides practice, important focus areas are training researchers, and being able to integrate MPH education w/other ed. - Responses not sig. different by program characteristics.	• Focus on learning to build competence - Informative learning (knowledge + skills) was noted by all, as an imperative to becoming a successful practitioner. ▪ Tenets of public health ▪ Marketable skills (many!) - Formative learning (values + professionalism) was noted by all, meaning helping students be aware of, and moved by, the core values of public health ▪ Social determinants, equity - Transformative learning (leadership) was noted by all, meaning helping students be able to act and lead change ▪ Collaboration, innovation, new perspectives, lifelong learners • Focus on workforce readiness + success - Competence development – the abilities that students need when they graduate; the abilities that graduates need in the workforce - Skilled practitioners who can fill many different roles - Integration with other/into other degrees - More focus on soft skills, less on data/research • Focus on developing leaders - Help students be able to engage, and lead change.
Phase 3 – Data Integration	
• Vast majority of MPH program leaders believe that MPH programs should train practitioners, and the vast majority are. Besides practice, the next most important focus areas are training researchers, and being able to integrate MPH education with other education/degrees. • To do this, MPH programs are focused on building knowledge, skills, and abilities, including an understanding of the core values of public health, and helping students learn how to be professionals, and leaders of change. • MPH programs are committed to this as they want students and graduates to be successful when they enter the workforce, and want them to be able to fill multiple types of roles in government, public, and private sectors; this includes pursuing additional education and/or integration of MPH education with other degrees. Assuring graduate employment rates was not a noted theme. • An emergent theme was the focus on developing professionals (formative learning) and leaders (transformative learning) who can effect change in their communities, and do public health in a new way. So, while these weren't named themes, MPH programs are investing in informative learning (knowledge and skills) and formative learning (values and professionalism) to allow for transformative learning (leadership development) to happen.	

Are MPH Programs Shifting to Have More Practice Focus	
Phase 1 - Survey Data	**Phase 2 - Interview Data**
• How focus is on practice: - 88% require substantial field work - 71% have course for practice - 54% have practitioners teach - 53% have practitioners mentor - Assignments to mimic practice, work with DoH/community • Frequency of shifts, in general - ~60% of MPH programs make changes to program as needed, or every 1-3 years - Frequency of shifts (more) is associated with w/ stand-alone programs. • Shifts to practice since Fall 2015 - 52% have shifted to more practice; 44% did not, as that was focus (not associated with any program characteristics). However, ▪ 88% of MPH programs report making changes to curriculum since 2015 ▪ 81% to program design ▪ 65% to teaching methods	• Shifts to practice since Fall 2015 - All MPH programs interviewed described changes made to their MPH program over the last four years, even though four of the programs were sampled for having reported making fewer changes than other MPH programs. - Some programs also described changes that were made in the preceding years leading up to 2015, as they started to get a glimpse at what the 2016 CEPH criteria would ask for, and as they were a part of the PHAB/COL process. - As interviews focused on the types of changes made, and the reasoning behind that, details are listed in the subsequent sections.
Phase 3 – Data Integration	
• MPH programs have many ways they focus on practice. • About half have shifted more in this direction since Fall 2015; most others were already focused there. However, most note making changes to their curriculum and program design in that time, and two-thirds to their teaching methods. • Some changes may have started before the new CEPH criteria were released, as MPH program leaders were a part of the competency definition and criteria development process.	

How MPH Programs Are Shifting to Practice Focus – Curriculum	
Phase 1 - Survey Data	**Phase 2 - Interview Data**
• Curricular Structure. - Since Fall 2015: ▪ 88% changed course content ▪ 76% changed req. courses ▪ 73% made new req. courses ▪ 57% changed course links ▪ 55% removed req.courses ▪ 53% changed sequence ▪ 39% merged courses ▪ 30% broke courses apart - Change associated with program size (bigger) and age (older) - Changes being considered: course links, merging courses, integrating courses (integrated core, analytics) • Curricular Focus. - Since Fall 2015: ▪ 73% increased focus on IPE ▪ 68% incr. focus on leadership ▪ 66% incr. focus on foundational knowledge ▪ 55% incr. focus on comm. ▪ 51% incr. focus on values - Change associated with program size (bigger) and age (older) - Changes considered/observed: more focus on IPE, comm., values, skills, leadership, practice	• All programs noted making changes to curriculum, to align with CEPH requirements, and to build skills and abilities students need to succeed in workforce. • Curricular Structure - All MPH programs noted developing new courses, adapting courses, and modifying the structure and flow of courses. Some developed a common core curriculum, others didn't (no desire, or not feasible), but did speak to integration, and a focus on skills building. - All focused on quality improvement rather than *de novo* development. • Curriculum Content + Focus - All MPH programs described changes to course content to be sure to meet CEPH-defined knowledge areas and/or competency domains, such as policy, leadership, communication, inter-professional practice, and systems thinking). This included developing a foundational [knowledge] course required by all students, as well as removing courses or course content. - Six of eight MPH programs described removing content or courses, due to space limits and CEPH-defined requirements, or changes in cohort make-up. This resulted in tough decisions; was also informed by need for tuition income. ▪ Decreased focus on environmental health, administration, biological sciences, and epi/bio were most noted ▪ Programs are innovating to adapt to the changes that are needed and required
Phase 3 – Data Integration	
• Many MPH programs have made many changes to their curriculum since Fall 2015. • The most noted areas are changes to course content and required courses, largely driven by the CEPH accreditation standards and the need to cover all knowledge and competency areas in the curriculum. To do this, programs have adapted courses and course content, and have developed new courses to complement the existing curriculum. • Related to specific curriculum focus, aligned with CEPH competency areas, MPH programs have put more course emphasis on professionalism, leadership, foundational knowledge, communication, public health values, systems thinking, and inter-professional practice • As a result of the CEPH requirements, and/or course needs due to changing cohorts and tuition needs, some programs have had to reduce their focus on environmental health, administration, biological sciences, epidemiology, and biostatistics. To compensate, some programs are working to integrate these themes into other courses, or are offering electives or advanced certificates in these areas.	

How MPH Programs Are Shifting to Practice Focus – Pedagogy	
Phase 1 - Survey Data	**Phase 2 - Interview Data**
• Since Fall 2015: ▪ 65% changed ILE ▪ 63% changed APE ▪ 56% added authentic assessment ▪ 41% added more IT ▪ 42% added student reflection ▪ 40% added teamwork ▪ 28% integrate more practitioners ▪ 20% added field work - Change associated with program size (bigger) and age (older) - Changes being considered/ observed: more on-line courses, adapting ILE/APE, having more time in field with health departments or community partners, having more direct practice experience, and collaborating with other MPH programs.	• All programs made changes to better align with CEPH requirements, and to help build the skills and abilities students need to succeed in the workforce. • <u>Field-based learning</u> (including APE) - All programs use this approach - Seven programs emphasize via courses or field trips - Seven programs using community engaged learning; some also require 10s of hours of service - Noted value in advancing learning and community health, and preparing students for APE • <u>Applied practice</u> (incl. APE, ILE, authentic assessment) - All programs use this approach via real-world-like learning in the classroom (scenarios, case studies) - Teach, reinforce knowledge and skills; use real projects and practice to build competence/ability • <u>Small-group learning</u> - Noted by three programs (not a probe) related to IPE and via on-line programming • <u>IT</u> - Noted by five programs, to support access and learning - Meetings, on-line case studies, collaborative problem-solving, virtual field trips • <u>Systematic reflection</u> - Noted by two programs as a way to deepen learning • <u>Faculty and mentors with practice experience</u> - All programs emphasized this: invited speakers, field-based mentoring, hiring practitioners, staff mentoring - Emphasis on value of mentoring to support student learning and long-term student success
Phase 3 – Data Integration	
• Many MPH programs have made many changes to their pedagogical approaches since Fall 2015, but fewer report doing so when compared to other areas of change. • The most noted areas of change in the survey relate to change in APE and ILE requirements, and adding more authentic assessment. • This was expanded upon in interviews where an emphasis on field-based learning and applied practice, in general, emerged. Some of this is linked to course; some is co-curricular. • Programs report using these pedagogical approaches to build skills that are needed in the workforce, by using work-like activities, and complementing this with mentoring. Programs report doing more of this course-related work with health departments and other community-based public health partners, with the dual purpose of also advancing community health. • Other modalities, such as team work, IT, and systematic reflection are each being used by ~40% of programs to help deepen learning and/or increase equity in access.	

Desired Outcomes from Program Shifts	
Phase 1 - Survey Data	**Phase 2 - Interview Data**
• 94% of programs note CEPH accreditation motivates change, and a desired outcome from change. - CEPH had stronger influence on: ▪ Instructional design in SPH-based and ASPPH affiliate pgms (NS) ▪ Curriculum, instructional design in medium & large programs (NS) • Student level outcomes (N=153): - Workforce ready (n=33) - Competence development (n=30) - Stronger skills (n=29) - Translate learning to action (n=20) - Grad employment, good jobs (n=15) - *Specific skills*: inter-professional collaboration, critical thinking, leadership, management, written/oral comm., self-directed learning, professionalism, problem solving, use of quant + qual methods, software, resilience, advocacy. - *Workforce readiness*: guided by SDoH and health equity, alignment w/PH 3.0, able to work in communities to provide meaningful service, and having the skills to serve as a Chief Health Strategist and to support health impact. • Curricular outcomes (N=60): - Better course linkages (n=10), integration (n=8) - More focus on skills building (n=10) - More collaboration (n=8) - More hands-on learning (n=7) - More mentoring (n=6) • Program outcomes (N=55): - Accreditation (n=32) - Employer satisfaction (n=10) - Increased enrollment (n=4) - Increased community collaboration (n=4)	• Program outcomes: - CEPH compliance and accreditation is a strong motivator and a desired outcome. • Student-level outcomes: - Student learning and learning experience; their satisfaction. - Aim to build knowledge and skills to be able to lead change ▪ To support this, more support for knowledge, skills, abilities, success - This is linked to competence – the ability to apply knowledge and skill to do and achieve an outcome; MPH programs see competences as abilities needed by workforce ▪ To support this, more focus on application of knowledge and skill to solve problems ▪ As a part of this, programs are seeking to develop leaders, change-makers - This is linked to workforce readiness – students being able to enter and succeed in the workforce, in various governmental and other sector jobs
Phase 3 – Data Integration	
• MPH programs report that CEPH compliance and accreditation is a strong motivator for change, and a desired outcome from change. However, there are many other desired outcomes from the specific changes being made. • MPH programs also hope that changes will result in increased satisfaction (student, employer), enrollment, and collaboration with community partners, including health depts. • MPH programs also hope courses and curricula are better designed to teach and reinforce knowledge and skills, and help to develop competence so that graduates are workforce ready, and get and succeed in good jobs. This includes development of change-makers and leaders.	

<table>
<tr><th colspan="2">Factors Informing Change</th></tr>
<tr><th>Phase 1 - Survey Data</th><th>Phase 2 - Interview Data</th></tr>
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- Information from multiple levels informs change:
  - 96% informed by stakeholder feedback
  - 94% informed by CEPH standards
  - 88% informed by research/ literature
  - 88% informed by student feedback
- MPH program leadership are informed and influenced by national initiatives:
  - 100% by CEPH standards
  - 86% by Framing the Future
  - 62% by Public Health 3.0
  - 53% by CoL/PHAB
  - 45% by CPH
  - 36% by PH WINS
  - ASPPH affiliate associated with being informed by Framing the Future
  - Non-ASPPH affiliate associated with being informed by PH WINS
- MPH program leadership could use more information from (n=count of rank 1-3):
  - More collaboration with workforce (n=68)
  - More discussion re: MPH role in workforce development (n=62)
  - More research on outcomes (n=45)
  - More guidance from national organizations (n=43)

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- All programs noted that CEPH accreditation standards inform change
  - More of a focus on practice
  - What needed to be done to get there
- All programs noted use of input from students, graduates, community partners, and advisory committees, and using that to inform action.
- Six of eight programs National level initiatives informed change, both the documents/reports, and involvement in the process
  - ASPPH, Council on Linkages, Society for Public Health Education, CPH initiatives
  - Respondents noted the value of learning from each other (peers).
- Three programs also spoke about being informed by literature, including peer-reviewed research and calls to action.

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<tr><th colspan="2">Phase 3 – Data Integration</th></tr>
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- MPH programs use multiple sources of information to inform change.
- Stakeholder feedback, the CEPH standards, and research were cited as important information sources by most programs, allowing programs to understand trends and needs.
- Information from, and participation in, national initiatives is also important, particularly CEPH, ASPPH, Framing the Future, Public Health 3.0, PHAB/CoL, and CPH.
- MPH programs feel they will be even more informed with more collaboration with the workforce, and more explicit discussions around how MPH programs can have a stronger role in workforce development. This is notable as only about one-third of survey respondents note that they are informed by PH WINS, a tools to guide workforce development.

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Factors Influencing Change	
Phase 1 - Survey Data	**Phase 2 - Interview Data**
• Many factors influence MPH programs: - 100% note defined criteria ▪ CEPH criteria strongly influenced changes to instructional design, curriculum, and pedagogy (n=94-108) - 99% note student/stakeholder feedback ▪ Feedback influenced changes to instructional design, curriculum, and pedagogy (n=64-74) ▪ Associated with being a stand-alone MPH program, and not affiliated with ASPPH - 97% note learning best practices ▪ Learning best practices influenced changes to instructional design, curriculum, and pedagogy (n=46-63) ▪ Associated with being a stand-alone MPH program - Using all sources to guide change is associated with being a stand-alone MPH program • Many factors facilitated change: - 93% note CEPH criteria - 86% note learning opportunities ▪ Associated with stand-alone pgms - 84% note program strategic planning ▪ Associated with younger programs - 59% note other national initiatives ▪ Associated with stand-alone programs • Some factors limited change: - 24% note institutional resources - 9% note university initiatives - 8% note CEPH criteria • Facilitators of change: - National ▪ CEPH standards (n=8) ▪ Competition for students (n=1) - Institutional ▪ Smaller programs; nimble (n=1) ▪ Access to resources - Program ▪ Involved, engaged faculty (n=25) ▪ Leadership (n=6), change leader (n=1) ▪ Strategic planning (n=7), CQI (n=9) • Barriers to change: - National	• Facilitators of change: - National ▪ CEPH standards (n=8) • Provided direction • Supported planning, action ▪ Information from national entities; peer-learning (n=8) • Awareness, trends - Institutional ▪ Mission linked to PH (n=5) • Engagement, social justice ▪ Leadership (n=8) • Access to resource • Decision-making • Hiring practitioners • Changing policy ▪ Resources (N=6) • Funding, faculty • Technical support • Learning initiatives - Program ▪ CQI and use of feedback (n=8) • Influence focus, direction, methods ▪ Collaboration, teamwork (n=8) • Buy-in, vision, focus ▪ Shared vision (n=6) ▪ Peer capacity building (n=8) - Individual ▪ Practice experience (n=8) ▪ Access to info, awareness, peer-to-peer learning (n=8) • Aware of trends, needs ▪ Collaboration, teamwork (n=8) • Buy-in, vision, focus ▪ Shared vision (n=6) ▪ Peer capacity building (n=8) ▪ Optimism • Barriers to change: - National ▪ CEPH standards (n=6) • Complex, urgent change • Pushed other changes aside - Institutional ▪ Leadership (n=6) • Lack of understating • Turnover

▪ CEPH standards/burden (n=15) ▪ Limits on flexibility (n=2) - Institutional ▪ Resources (n=59): faculty (n=20), time (n=19), funding (n=12) ▪ Stronger leadership, support (n=19) ▪ Policies (n=2) and placement (n=4) ▪ Size and complexity (n=3) - Program ▪ Faculty – resistant to change (n=19) ▪ Student-centered decisions (n=9)	▪ Placement of MPH program • Focus, approach don't align ▪ Resources (n=5) • Funding pressures • Time pressures - Program (n=4) ▪ Too little time ▪ Faculty resistant to change ▪ No shared vision ▪ Leaders who don't understand - Individual (n=5) ▪ Too little time ▪ Faculty resistant to change ▪ Weak leadership approach ▪ Leaders who don't understand

Phase 3 – Data Integration

- There are many factors at multiple levels that facilitate or limit MPH program changes.
- The CEPH standards have facilitated substantial change, providing direction and focus, and supporting decision-making, but the standards can also be seen as a barrier due to the many requirements and the intense time-frame in which changes needed to happen
- National initiatives and organizations have facilitated change by providing information and supporting peer-to-peer learning networks
- Institutional make-up can influence MPH program change, facilitating and limiting. Where institutional mission is aligned with public health values, and where there is leadership support and understanding, adequate resources (funding, faculty, support) facilitates change. Where these are not present, change is limited. There is some indication that MPH programs that are placed in non-congruent units or schools face more challenges in change processes.
- Program make-up, approach, and culture can facilitate or limit change. Where faculty are engaged, where there is an understanding of practice, and where there are shared processes to come up with program vision and change strategies (e.g., strategic planning), change is facilitated. At the program level, change is limited when there is weak buy-in, people who are resistant to change, and limited strategic planning and leadership processes.
- Individuals, of course, play a large role in change processes. Respondents note a major commitment to continuing development and being well aware of trends and needs. This information is accessed via review of criteria, reports, and solicitation of input from peers and stakeholders. This type of information may be even more important to individuals within stand-alone MPH programs, and the latter, to programs not affiliated with ASPPH.

APPENDIX P - CV

Genevive Meredith, DrPH$_{(c)}$, OTR, MPH

EDUCATION + CERTIFICATIONS

Doctor of Public Health Candidate (expected 2020) University of Illinois School of Public Health

Board Certified Occupational Therapist (2007) National Board for Certification in Occupational Therapy

Master of Public Health (2004) University of Massachusetts School of Public Health
- Community Health Education and Epidemiology
- One-year leave-of-absence to compete for the Canadian rowing team at the 2002 and 2004 Rowing World Championships, the 2003 Pan American Games, and the 2004 Olympic Games

Bachelor of Science, Occupational Therapy (2001) McGill University School of Medicine (Canada)
- Equivalent to now-offered Master of Occupational Therapy
- Two-year leave-of-absence to compete for the Canadian rowing team at the 1999 Rowing World Championships and the 2000 Olympic Games

Spanish Language Immersion (1995) (Mexico)

Diplôme d'Éducation Collégial (1994) John Abbott College (Quebec, Canada)
- Health Sciences and Pure and Applied Sciences

Languages: English and French: Fluent; Spanish: Conversational and Reading

PROFESSIONAL EXPERIENCE

Cornell University *2015+*
- Associate Director, Cornell University Master of Public Health Program (7/2015-present)
- Associate Director, College of Veterinary Medicine International Programs (7/2015-1/2018)
- Fellow, Atkinson Center for Sustainable Future (1/2016-present)
- Fellow, Engaged Cornell (8/2017-present)
- Trainer, Northeast Center of Excellence for Food Safety (3/2016-present)
- Lecturer, Population Medicine and Diagnostic Sciences (6/2016-present)

- **National Alliance of State and Territorial AIDS Directors Global Program** ***2006-2015***
  - Director (6/2014-6/2015)
  - Associate Director (1/2011-5/2014)
  - Senior Program Manager (12/2008-12/2010)
  - Consultant (2/2006-11/2008)

- **State of Maine Center for Disease Control and Prevention HIV, STD and VH Pgm** ***2006-2008***
  - Director (11/2007-11/2008)
  - Program Manager (1/2006-10/2007)

- **Riverside Community Care Mental Health Rehabilitation Services** ***2004-2005***
  - Assistant Program Director (8/2004-12/2005)

- **Canadian National Team Rower (funded)** ***1999-2005***
  - Volunteer Public Health Consultant

- **Graduate Assistant, University of Massachusetts** ***2001-2002***

- **Research Assistant + OT Intern, McGill University** ***1995-1999***

REFEREED PUBLICATIONS

1. **Meredith, G.**, Patchen, A., Baker, A. (2020). Community Engaged Teaching, Research and Practice - a Catalyst for Public Health Improvement through Workforce Development and Collective Action? *Michigan Journal of Community Service Learning. Accepted: January 2020 publication.*

2. **Meredith, G.**, Rakow, D., Sachs, N., Eldermire, E., Madsen, C., Shelley, S. (2019). What is the Minimum Time Dose in Nature to Positively Impact the Mental Wellbeing of College-Aged Students: A Systematic Scoping Review. *Frontiers in Psychology*. *Accepted: December 2019/January 2020 publication.*

3. Patchen, A.K., **Meredith, G.** The Healthy Choice is Not Always the Easy Choice: Facilitators of and Barriers to Making Nature a Routine Part of the K-5 School Day. *Under development*.

4. Patchen, A.K., **Meredith, G**. Layers of Influence: Who Can Change What to Increase Outdoor Learning Opportunities in K-5 Education. *Under development.*

5. Patchen, A.K., **Meredith, G**. Choose Your Own Intervention: Strategies to Address Changing Barriers to Taking K-5 Students Outside During School Time. *Under development.*

6. **Meredith, G.**, Delcher, C., Griswold, M., Zaidi, I., Marsden, B. (2016). (*pending CDC clearance*). Designing a Data System to Support Use of Patient-level Data for Case-based Surveillance of HIV in Haiti. *U.S. Centers for Disease Control and Prevention*.

7. **Meredith, G.**, Delcher, C., Griswold, M., Zaidi, I., Marsden, B. (2016). (*pending CDC clearance*). Developing a Process to Use Patient-level Data for Case-based Surveillance of HIV in Haiti. *U.S. Centers for Disease Control and Prevention*.

8. Noel, E., Delcher, C., Griswold, M., **Meredith, G**. et.al. (2013). Attrition From HIV Testing to Antiretroviral Therapy Initiation Among Patients Newly Diagnosed With HIV in Haiti. *Journal of Acquired Immune Deficiency Syndrome*; 62:3.

9. Delcher, C., **Meredith, G.**, Griswold, M., Roussel, B., Duval, N., Louissaint, E., Joseph, P. (2012). Lost to Follow-Up But Perhaps Not Lost in the Health System. *Journal of Acquired Immune Deficiency Syndrome*; 61:e75-e77.

10. Burn, L; Amanzi, P; Chilemu, K; Daka, D; Chisumpa, V; Banda, A; Nikisi, J; **Meredith, G**. et.al. (2011). Global problems: Developing sustainable epidemiology capacity among public health field workers in Zambia, results of a pilot training. *J Epidemiol Community Health;65:A326-A327.*

TECHNICAL PUBLICATIONS and POLICY DEVELOPMENT

1. **Policy Analysis: Options to Increase Student Time In Nature to Improve School-based Outcomes** *(Cornell, 2019)*
   Co-lead author; policy analysis for state education department, district board of education, and school leadership considerations.

2. **Cornell Master of Public Health Program: Council on Education for Public Health Accreditation Self-Study** *(Cornell, 2019)*
   Co-lead author; 350+ page self-study inclusive of program design, program policies, curriculum design, course design, demonstrating compliance with CEPH criteria.

3. **Cornell Master of Public Health Program Student Handbook** *(Cornell, 2017; 2018; 2019)*
   Co-lead author: policy and guidance manual to guide student success and compliance.

4. **Cornell Master of Public Health Program Policies** *(Cornell, 2018)*
   Co-lead author: admissions, advisory committee, curriculum committee, continuing education, student funding, student travel, accelerated degree, collaborative degree.

5. **Cornell Master of Public Health Program Proposal: Application for Master of Public Health Program Accreditation from the Council on Education for Public Health** *(Cornell, 2017)*
   Lead author; 100+ page application inclusive of program design, curriculum design, course design, demonstrating compliance with CEPH criteria.

6. **The State University of New York – New Program Proposal: Graduate Degree Program. Cornell University Master of Public Health Program** *(Cornell, 2016)*
   Lead author; 100+ page program proposal for new degree program, inclusive of program design, curriculum design, course design, demonstrating compliance with New York State Education Department criteria.

7. **Case-based Surveillance of HIV: A Toolkit to Support Planning, Implementation, and Quality Improvement in Low-resource Settings** (*NASTAD, 2015)*
   Lead author; developed with the U.S. CDC. 400+ page resource to teach and guide case-based surveillance system design and implementation in developing countries.

8. **Biological and Behavioral Surveillance of Key Populations: A Toolkit to Support Planning and Implementation in Low-resource Settings** (*NASTAD, 2014)*
   Co-author: 100+ page resource to teach and guide biological and behavioral surveillance study design and implementation in developing countries.

9. **Haiti Manuel de Protocol de Surveillance des cas de VIH/SIDA** (*NASTAD, 2011)*
   Lead author: 100 page national system standard operations and procedures manual

10. **Haiti HIV Case Notification Policy and Mandate** (*NASTAD/MSPP*, 2009)
    Co-lead author: 15 page national policy document

11. **Haiti Manuel de Normes et Procédures pour la Surveillance Epidémiologique** (*MSPP*, 2009)
    Co-lead author: 100+ page national policy and procedures document

12. **Haiti HIV/AIDS Epidemiologic Profile,** (*NASTAD, 2008)*
    Lead author: 80 page descriptive report of the HIV epidemic and health outcomes in Haiti.

13. **Maine CDC, Division of Infectious Disease Annual Report** (*State of Maine*, 2008) Co-author

14. **Maine's HIV Service Guide** (*State of Maine*, 2008) Co-author

15. **AIDS Drug Assistance Program State Rules** (*State of Maine*, 2008) Lead author

16. **Maine's HIV Transmission Prevention Policy** (*State of Maine*, 2007) Co-author

17. **Insurance Guide for PLWHA in Maine** (*State of Maine*, 2006) Lead Author

18. **Maine AIDS Drug Assistance Program Policy** (*State of Maine*, 2006) Lead Author

REFEREED CONFERENCE PRESENTATIONS

1. **Meredith, G**., Baker, A., Travis, A. (2019). "Investing in the Public Health of the Future: Prioritizing Planetary Health in Public Health Education." *Planetary Health Alliance Annual Meeting, 2019.* Palo Alto, CA.

2. Patchen, A., Rakow, D., Safford, M., Wells, N., Whitlock, J., Hillson, S., **Meredith, G**. (2019). "Healthy Kids, Healthy Planet: Supporting health and the environment through nature in." *Planetary Health Alliance Annual Meeting, 2019.* Palo Alto, CA.

3. **Meredith, G**. (2019). "Building Collective Competence for Public Health Impact." *Consortium of Universities for Global Health, Annual Conference, 2019.* Chicago, IL.

4. Patchen A, Rakow D, Safford M, Wells N, Whitlock J, Hillson S, **Meredith G**. (2018). Healthy Kids, Healthy Planet: Growing for the Future with Nature-based Engagement. *Cornell University Public Health Symposium, 2018.* Ithaca, NY.

5. Finney Stable A, Thielen Martin A, Madsen S, **Meredith G**. (2018). Comprehensive Assessment of the Cuban Diet and its Impact on Health. *Cornell University Public Health Symposium, 2018.* Ithaca, NY.

6. **Meredith, G**. et.al. (2017). Developing Novel Competency-driven Professional Curricula in the US and Globally. *2017 Consortium of Universities for Global Health, Annual Meeting.* Washington, D.C.

7. Duval N, **Meredith G**, Delcher C, Roussel B. (2012). Uniting and unifying existing HIV/AIDS case data to profile patient duplication, mobility and access to treatment and care services (6560). *2012 International AIDS Conference*; Washington DC. International AIDS Society.

8. Griswold M, Roussel B, Duval N, Louissaint E, Diallo N, **Meredith, G**. (2012). Establishment of HIV/AIDS case surveillance in Haiti through use of an innovative collaborative process (6539). *2012 International AIDS Conference*; Washington DC. International AIDS Society.

9. Hyppolite E, Griswold M, Roussel B, Pessoa-Brandao L, Louissaint E, **Meredith G**. (2012). Creating a monitoring and evaluation system for HIV case surveillance in Haiti (6571). *2012 International AIDS Conference*; Washington DC. International AIDS Society.

10. **Meredith, G.** et.al., (2011). Building an HIV/AIDS Case Surveillance System. *2011 Caribbean HIV/AIDS Conference*. Nassau, Bahamas.

11. **Meredith, G.** et.al., (2010). Developing and implementing national policy in Haiti for improved patient privacy and HIV case reporting. *2010 International AIDS Conference*. Austria.

12. **Meredith, G.** et.al., (2010). Assessment of available HIV case data to determine the ability of the Haiti national HIV case notification system to estimate disease burden. *2010 International AIDS Conference*. Austria.

13. **Meredith, G.** et.al., (2010). Enabling the Use of Public Health Data for Local, Regional, and National Decision Making. 2010 *Unite for Site Global Health & Innovation Conference,* New Haven, CT.

14. **Meredith, Gen** et.al., (2009). HIV Case Surveillance in Developing Countries: Designing, Testing, and Implementing a National System. *2009 UNAIDS/Global Fund/PEPFAR Implementers Meeting.* Namibia.

15. **Meredith, G.** et.al., (2008). Intensive Outreach Case Manager: Connecting to Care. *2008 Ryan White All Titles Conference*. Washington, DC.

16. **Meredith, G.** et.al., (2008). Workshop: "Implementing a Statewide Data and Evaluation System" *2008 Ryan White All Titles Conference*. Washington, DC.

17. **Meredith, G.** et.al., (2007). The Quirks of ADAP Management. *2007 National ADAP Technical Assistance Conference*. Washington, DC.

18. **Meredith, G.** et.al., (2007). All About ADAP: ADAP 101. *2007 National ADAP Technical Assistance Conference*. Washington, DC.

19. **Meredith, G.** et.al., (2007). Mission Statements to Guide Your Work. *2007 National ADAP Technical Assistance Conference*. Washington, DC.

20. **Meredith, G.** et.al., (2006). Increasing Access to Health Care – Options for PLWAH in Maine. *2006 Ryan White All Titles Conference*. Washington, DC.

21. **Meredith, G.** et.al., (2006). ADAPs and Medicare Part D. *2006 Ryan White All Titles Conference*. Washington, DC.

22. **Meredith, G.** et.al., (2006). Is Quality Management Possible in Low Resource Environments? *2006 Ryan White All Titles Conference*. Washington, DC.

INVITED TALKS – Regional/National/International

1. **Meredith, G**. 2019. "Integration of Public Health Practice and Community Engagement: Strategies to Develop Public Health Competence." *Association of Schools and Programs of Public Health.* June, 2019.

2. **Meredith, G.** 2019. "Translating Community Engaged Learning Theory into Global Health Education and Practice." *Consortium of Universities for Global Health – Education Subcommittee; Consortium of Universities for Global Health.* March, 2019.

3. **Meredith, G**. 2019. "A New Paradigm for Public Health". *Wells College*. February 2019.

4. **Meredith, G.** 2018. "Schools Advancing the Health of Our Communities." *Rural School Association of New York.* December, 2018.

5. **Meredith, G**. 2018. "Building a Master of Public Health Program with Planetary Health at the Core." *Planetary Health Alliance.* November, 2018.

6. **Meredith, G**. 2018. "A New Paradigm for Public Health". *Wells College*. February 2018.

7. **Meredith, G**. 2017. "Food Insecurity: Global and Local Impact". *Continuing Medical Education, Cayuga Medical Center.* November 2017.

8. **Meredith, G**. 2017. "What Universities Globally Are Doing to Advance Planetary Health". *Planetary Health Alliance Conference. Harvard University*. May 2017.

9. **Meredith, G**. 2016. "Committing to Make Change in Global Health – Taking a Systems Approach". *David Rogers Health Policy Colloquium. Weill Cornell Medicine*. March, 2016.

10. **Meredith, G.** et.al., 2014. "Evidence-based Capacity Building Approaches to Strengthen Health Systems". *U.S. Government Inter-agency Task Team for Health Systems Strengthening under the President's Emergency Plan for AIDS Relief (PEPFAR).* September, 2014.

11. **Meredith, G**. 2013. "Enabling the Use of Public Health Data for Local, Regional, and National Decision Making". *U.S. Centers for Disease Control and Prevention*. September, 2013.

12. **Meredith, G**. 2014. "Collecting and Using Data to Drive Change – The Joy of Disease Surveillance". *NASTAD*. May, 2014.

13. **Meredith, G**. 2013. "Data Quality Assurance and Improvement". *NASTAD*. September, 2013.

14. **Meredith, G**. 2012. "Leveraging Existing Data Sources to Develop an HIV Case Surveillance System". *U.S. Centers for Disease Control and Prevention*. September, 2012.

15. **Meredith, G**. 2010. "Enabling the Use of Public Health Data for Local, Regional, and National Decision Making". *Emory University*. January, 2010.

INVITED TALKS - Local

1. **Meredith, G**. 2020. "Pathways in Public Health Education" *Cornell University Black Biomedical and Technical Association Annual Conference – Reforming Healthcare.* February, 2020.

2. **Meredith, G**. 2019. "Pathways in Public Health Education" *Cornell University Global and Public Health Program.* December, 2019.

3. **Meredith, G**. 2019. "Health Equity and Culturally Responsive Care" *Ithaca City School District.* Oct. 2019.

4. **Meredith, G**. 2019. "Public Health Training and Impacts at Cornell University" *Cornell University College of Veterinary Medicine Advisory Council Meeting.* October, 2019.

5. **Meredith, G**. 2019. "Recruiting for Inclusivity" *Cornell University College of Veterinary Medicine Many Voices One College Meeting.* August, 2019.

6. **Meredith, G**. 2019. "Public Scholarship and Community Engaged Teaching: What's the Connection?" *Engaged Learning Workshop. Cornell University.* April, 2019.

7. **Meredith, G**. 2019. "Professional development for leadership educators". *Student Leadership Educators Network. Cornell University.* March, 2019.

8. **Meredith, G.** 2018. "Leveraging Cornell University Expertise to Train Public Health Leaders of the Future." *Trustee-Council Annual Meeting.* November, 2018.

9. Rakow, D. & **Meredith, G.** 2018. "Health Benefits of Time in Nature." *Alice Cook House. Cornell University.* October, 2018.

10. **Meredith, G.** 2018. "Public Health and the Social Sciences: An Inextricable Link." *Institute for the Social Sciences. Cornell University.* April, 2018.

11. **Meredith, G.** 2018. "Healthy People in Healthy Communities." *Rotary International. Tompkins County, NY.* April, 2018.

12. **Meredith, G**. 2018. "A New Paradigm for Public Health Training at Cornell". *Bronfenbrenner Center for Translational Research, Talks at Twelve. Cornell University*. February 2018.

13. **Meredith, G**. 2017. "Community Engagement: Collaborative Partnerships Addressing Complex Social Issues". *Cornell University 67th Trustee Council Annual Meeting. Cornell University.* Oct 2017.

14. **Meredith, G**. 2017. "Community Engagement to Augment Teaching an Student Learning". *Faculty Institute for Community Engaged Learning and Teaching. Cornell University.* May 2017.

15. **Meredith, G**. 2016. "Lessons Learned Along the Path to the Olympics, and Life Beyond". *Alice Cook House, Cornell University*. November, 2016.

16. Kerber, C. and **Meredith, G**. 2016. "Fostering Your Passion to Win in Life – Tales from our Road to the Olympics, and Beyond". *Alice Cook House, Cornell University*. February, 2016.

17. **Meredith, G**. 2016. "Committing to Make Change – Taking a Systems Approach to Impact Global Health". *Cornell University Global Health Gala: The Future of Global Health. GlobeMed and Cornell Health International*. February, 2016.
18. **Meredith, G**. 2015. "Driving Public Health Impact – Leading from Within; Engaging Beyond". *Cornell Health International Global Health Conference*. November, 2015.
19. **Meredith, G**. 2015. Moderator: Graduate School Panel. *Global Health and Development Alumni Network.* October, 2015.
20. **Meredith, G**. 2015. Expert Panel on Followership. *Big Red Leadership Institute's Leadership in Athletics Conference*. August, 2015.

CURRENT FUNDING SUPPORT

Atkinson Center Academic Venture Fund – Opening the Door to Nature - Healthy Kids. Healthy Planet.
$145,277 to lead an applied research project in two school districts in New York State. Role: PI

Funded Projects

- Scoping Review**: Minimum Time Dose in Nature to Positively Impact Mental Health of College-Aged Students** (2017-2018)
- Research**: Elucidation of Barriers Limiting Young People's Time in Nature as a Stepping Stone to Health, Wellness, and Sustainable Environments** (2018-present).
- Action Research**: Strategies to Overcome Barriers Limiting Young People's Time in Nature as a Stepping Stone to Health, Wellness, and Sustainable Environments** (2019-present).

Engaged Cornell – Opening the Door to Nature - Healthy Kids. Healthy Planet.
$10,000 to supplement an applied research project in two school districts in New York State. Role: PI

Funded Projects

- Policy Analysis**: Strategies to Overcome Barriers Limiting Young People's Time in Nature as a Stepping Stone to Health, Wellness, and Sustainable Environments** (2019-present).

Engaged Cornell - Translating Community Engaged Learning to Public Health Education + Practice
$5,000 to support meetings and travel to present and publish. Role: PI

Funded Projects

- Action Research**: Community Engaged Learning Models for Competence Development and Public Health Impact** (2018-present)

Engaged Cornell – Community Development and Empowerment Through Evaluation.
$5,000 to support a community-engaged evaluation project. Role: PI

Funded Projects

- Action Research**: Community Engaged Learning Models for Competence Development and Public Health Impact** (2018-present)
- Assessment: **Tompkins County Community Health Assessment** (2018-present). Role: Co-investigator

Northeast Regional Foodborne Illness Centers of Excellence (CoE).
$250,790 for multiple services, WGS, AMR surveillance, and CoE integration with Cornell MPH Program
Role: Collaborator ($10,849); Advisor for CoE and DoH Collaborations, including:

- Hiro Togo: **How can we improve investigation and surveillance of foodborne diseases? A case study in New York State**
- Steven Shelley: **The Association of International Travel to Nalidixic Acid Resistance in Salmonella enterica Serotype Enteritidis Infections and Other Antibiotic Resistance Characteristics in 2017 NYS Salmonella Cases**

USDA NIFA Higher Education Challenge. Multidisciplinary, Problem-Based Lessons on Antimicrobial Resistance for Seamless Integration Into Veterinary Curricula. Role: Collaborator

Egg Nutrition Center: Formative Assessment of the Cuban Diet and its Impact on Health Indices.
$25,000 for a formative assessment with the possibility of follow-on collaborative research. Role: PI

Funded Projects:

- Formative Assessment: **Cuban Diet and its Impact on Health Indices** (2018)
- Policy Brief: **Cuba's Health System: An Exemplar of Public Health 3.0?** (2019-present)

Engaged Cornell Curriculum Planning Grant: *"Food Systems for Health".*
$140,000 to support MPH curriculum development and community engagement. Role: PI

Funded Projects:

- Research: **Impact of Fruit and Vegetable Prescription Program on Diabetes Morbidity** (2018-present)
- Research: **Community Collaboration for Collective Impact: Strategies to Reduce Food Insecurity and Increase Health Outcomes in Youth** (2017-present)
- Assessment: **Training Needs Assessment: Northeast Regional Vector borne Disease Center of Excellence** (2017).

PAST FUNDING SUPPORT

Engaged Cornell Curriculum Development Grant: *"Food Systems Approach to Food Safety".* (2016-2018)
$140,000 to support the development of a course for the MPH program cohort. Role: Collaborator.

U.S. CDC CoAg: *Peer-to-Peer Capacity Building in the Public Sector to Support Management, Leadership and Sustainability of HIV Programs in PEPFAR Countries.* ($20,000,000: 2015-2020)
Awarded to NASTAD.
Role: Lead Author of Proposal.

Funded Projects:

- Government capacity building projects in 15 developing countries to ensure effective transition and institutionalization of sustainable evidence-based public health programs in support of an AIDS-free generation. Specific focus on: leadership and management practices, data collection and use to guide practice, and disease surveillance system development.

U.S. CDC CoAg: *Peer to Peer Capacity Building of Ministries of Health in Public Sector HIV Programs.*
$25,000,000: 2009-2015. Role: Lead Author; Project Director; PI/Co-PI for research projects

Funded Projects:

- Design, implementation, and evaluation projects to 1) Strengthen the capacity of partner ministries of health to plan, manage and evaluate public sector HIV prevention, care and treatment programs at national and local levels; 2) Strengthen the capacity of partner ministries of health to support the delivery and local public sector HIV programs; and 3) Strengthen sustainability of national and local HIV programs. Work implemented in Haiti, Botswana, Ethiopia, Zambia, Uganda, Mozambique, Guyana, Trinidad and Tobago, Jamaica, and Barbados. Specific Assessment/Evaluation/Research under the award:
    - **Feasibility Study and Proof-of-Concept to Inform the Use of Case-based HIV Surveillance in Ethiopia CBS – Will Linking Existing Data Work?** (2015) Ethiopia. Role: Co-PI
    - **Formative Assessment to Inform a Biological and Behavioral Surveillance Study and Size Estimation Study among Female Sex Workers in Trinidad and Tobago.** (2015) Trinidad and Tobago. Role: Co-PI
    - **Biological and Behavioral Surveillance Study and Size Estimation Study among Men-Who-Have-Sex-With-Men in The Bahamas.** (2015) The Bahamas. Funded by CDC. Role: Co-PI
    - **Linking Expanded Data Sets from Multiple Patient Data Sources to Implement Expanded Surveillance and Outcomes Assessment of People with HIV in Haiti.** (2014) Haiti. Role: Co-PI
    - **Gap Assessment of Systems, Structures, and Resources in Guyana to Support National Scale-up of Case-based Surveillance.** (2014) Guyana. Role: Co-PI
    - **Formative Assessment to Inform a Biological and Behavioral Surveillance Study and Size Estimation Study among Men-Who-Have-Sex-With-Men in The Bahamas.** (2014) The Bahamas. Role: Co-PI
    - **Biological and Behavioral Surveillance Study and Size Estimation Study among Men-Who-Have-Sex-With-Men in Trinidad and Tobago.** (2014) Trinidad and Tobago. Co-PI
    - **Formative Assessment to Inform a Biological and Behavioral Surveillance Study and Size Estimation Study among Men-Who-Have-Sex-With-Men in Trinidad and Tobago.** (2013) Trinidad and Tobago. Role: Co-PI
    - **Secondary Data Review to Inform the Design of Biological and Behavioral Surveillance Studies among High-risk Populations in The Bahamas.** (2012) The Bahamas. Role: Co-PI
    - **Secondary Data Review to Inform the Design of Biological and Behavioral Surveillance Studies among High-risk Populations in Trinidad and Tobago.** (2011) Trinidad and Tobago. Role: Co-PI
    - **Gap Assessment of Systems, Structures, and Resources in Haiti to Support National Scale-up of Case-based Surveillance.** (2010) Haiti. Role: Co-PI
    - **Impact and Opportunity Evaluation: University of Zambia's Center of Excellence in Monitoring and Evaluation Course Offerings.** (2010) Zambia. Role: Co-PI

U.S. CDC CoAg: ***HIV/AIDS Surveillance and Service Data Analysis in the Republic of Haiti under PEPFAR.*** $5,000,000: 2009-2014. Role: Lead Author; Project Director; PI/Co-PI - Funded Projects:

- Training and mentoring of Haiti Ministry of Health to develop and implement a two-arm study to examine HIV prevalence among pregnant women in Haiti using a traditional ANC sero-prevalence study method, and evaluate existing prevention-of-mother-to-child-transmission data for possible future use as an indicator of HIV prevalence in the population. Assessment/Evaluation/Research under the award:

- **Antenatal Sero-sruveillance Study of HIV, Syphilis, and Hepatitis B among Pregnant Women in Haiti.** (2012) Haiti. Role: Co-PI
- **Utility of Routinely Collected Prevention of Mother to Child Transmission Data to Effectively Estimate the Sero-prevalence of HIV and Syphilis among Pregnant Women in Haiti.** (2012) Haiti. Role: Co-PI

U.S. CDC CoAg: "*Implementation of HIV Care and Support Program in the Republic of South Africa".*
$7,000,000: 2009-2015. Role: Collaborator

Funded Projects:

- Capacity building of multiple levels of government health workers to develop, institutionalize and standardize implementation of the I ACT program to promote retention to HIV care, through early recruitment of newly diagnosed people.

U.S. CDC CoAg: *"Improvement of Integrated HIV Clinical Based Services in Haiti".*

$270,000: 2011-2014. Role: Lead author; Co-investigator

Funded Projects:

- Curriculum development and delivery for Queskiya MPH Program; Data quality improvement training and mentoring to networked healthcare facility staff

U.S. HRSA CoAg: *"Ryan White Part B – HIV Services in the State of Maine"* + U.S. HRSA CoAg" "Minority AIDS Initiative" $1,500,000 to Maine, annually, 2005-2009. Role: Lead author; Co-investigator

Funded Projects:

- Provision of free or low-cost HIV treatment and care services to people with HIV; Funding to pilot new HIV service provision model to improve rates of linkage to and retention in care. Funded Evaluation:
  - **Maine: Statewide Comprehensive Statement of Need.** (2009) State of Maine. Funded by HRSA. Role: PI
  - **Ryan White Title II Comprehensive Plan.** (2006) State of Maine. Funded by HRSA. Role: PI

CURRICULUM DEVELOPMENT and TEACHING

Cornell University, Master of Public Health Program Teaching (Fall 2019-Spring 2020)

- Public Health Practice II – Planning (co-lead instructor - 3 credit methods course). Responsible for:
  - *Overall course design*
  - *Identification of and coordination of community collaborative projects*
  - *8 x 75-minute lectures, with substantial hands-on active learning exercises*
  - *14 x 75-minute tutor group/active learning session*
  - *Grading assignments for 30% of the class (14 students)*
- Public Health Leadership and Ethics (lead instructor - 3 credit course). Responsible for:
  - *Overall course design*
  - *14 x 60-minute lectures, with substantial hands-on active learning exercises*
  - *14 x 100-minute lectures, with substantial hands-on active learning exercises*
  - *Grading assignments for the full class (40 students)*

- Public Health Practicum (co-lead instructor - 3 credit practice course). Responsible for:
  - *Overall course design*
  - *Bi-weekly seminar course design with peer-review and coaching activities*
  - *Grading assignments for 2/3 of class assignments (est. 2 hours per week)*
- Public Health Integrated Learning Experience (lead inductor (Fall); mentor (Fall, Spring). Responsible for:
  - *Overall course design*
  - *Bi-weekly seminar planning and facilitation*
  - *Bi-weekly meetings with mentees (Fall, Spring)*
  - *Review and grading of assignments (est. 2 hours per week)*
- Food Systems Approach to Food Safely (co-instructor – 2 credit methods course). Responsible for:
  - *Input on course design*
  - *2 x 90-min lectures*
  - *Review and grading of two assignments worth 60% of final grade (est. 1 hour per week)*
- Public Health Foundations I (guest instructor - 3 credit survey course).
  - *5 x 75-minute lectures*

Cornell University, Master of Public Health Program Teaching (Fall 2017-Spring 2019)

- Public Health Foundations I (co-instructor - 3 credit survey course). Responsible for:
  - *Course oversight and coordination of speakers*
  - *8 x 75-minute lectures Grading 10 assignments, worth 50% of course grade (est. 3 hours per week)*
- Public Health Practice II – Planning (co-lead instructor - 2 credit methods course). Responsible for:
  - *Overall course design*
  - *Identification of and coordination of community collaborative projects*
  - *10 x 120-minute lectures, with substantial hands-on active learning exercises*
  - *Grading assignments for 50% of the class (est. 3 hours per week)*
- Professionalism and Ethics in Public Health (lead instructor - 3 credit course). Responsible for:
  - *Overall course design*
  - *14 x 120-minute lectures, with substantial hands-on active learning exercises*
  - *Grading assignments for the full class (est. 4 hours per week)*
- Public Health Practicum (co-lead instructor - 3 credit practice course). Responsible for:
  - *Overall course design*
  - *Bi-weekly seminar course design with peer-review and coaching activities*
  - *Grading assignments for the full class (est. 2 hours per week)*
- Public Health Integrated Learning Experience (mentor). Responsible for:
  - *Bi-weekly meetings with mentees*
  - *Review and grading of assignments (est. 2 hours per week)*
- Food Systems Approach to Food Safely (co-instructor – 2 credit methods course). Responsible for:
  - *Input on course design; 2 x 90-min lectures*
  - *Review and grading of two assignments worth 60% of final grade (est. 1 hour per week)*

Cornell University, Guest Lecturer, (2017-present)

- Political-Economic Perspectives of Global Health (DNS/CHE) – 75-minutes of contact time
- Policy Analysis for Public Health (HD/CHE) - 180-minutes of contact time

- NatureRx (SIPS/CALS) – 60-minutes of contact time
- Planetary Health, One Health, and Public Health (SIPS/CALS) – 60-minutes of contact time
- Catalyzing Collaboration for Collective Impact for Public Health (DNS/CHE) – 60-minutes of contact time
- Introduction to Public Health (DNS/CHE) – 60-minutes of contact time

Cornell University, Master of Public Health Program: Syllabi and Content Developer (2016)

- Public Health Foundations I and II (two, 3-credit survey courses)
- Food Systems + Health (3 credit survey course)
- Public Health Practice: I – Assessment; II – Planning; and III – M&E and CQI (6 cr\methods course)
- Professionalism and Ethics in Public Health (2 credit course)
- Public Health Practicum: I and II (7 credit practice course)
- Public Health Capstone: Oral and Written (4 credit practice and presentation course)

New York State Food Safety Center of Excellence: Trainer (2016, 2017)

- EpiCore Foodborne Disease Outbreak Investigations (16 course hours)

Cornell University, DVM Program: Content Developer, Guest Lecturer, (2016)

- The Role of Veterinarians in Public Health (1.5 course hours)

NASTAD Global Program (for CDC Global HIV/AIDS Bureau): **Content Developer, Lead Trainer,** (2008-15)

Multi-session Curriculum Development and Delivery

- Designing and Developing Case-based Surveillance Systems: 30-hour curriculum targeting senior level ministry of health leaders and epidemiologists in developing countries. (42 countries in Africa, Asia, the Caribbean, and Central America)
- Applied Epi Surveillance: 20-hour curriculum targeting field-level surveillance and clinical staff (Haiti)
- Applied Epidemiologic Data Use Training: 30-hour curriculum targeting mid-level epidemiologists and health program managers (Haiti, Zambia)
- Designing and Implementing Surveillance Systems for Populations at Greatest Risk for HIV: 15-hour curriculum targeting all levels of Ministry of Health and Implementing Partner staff mobilized to implement biological and behavioral epidemiologic surveillance surveys (Bahamas, Trinidad and Tobago)
- Designing and Implementing Antenatal Sero-surveillance Studies: 8-hour curriculum targeting all levels of Ministry of Health and Implementing Partner staff mobilized to implement a national survey (Haiti)
- CDC Cooperative Agreement Management – Tools for Success: 12-hour curriculum targeting program staff receiving and managing CDC funds (U.S., Ethiopia, Zambia, Haiti, South Africa, Botswana)
- Applied Public Health Program Management Training: Set of modules designed to be adapted and delivered to address to specific needs addressed in and by partner Ministry of Health staff (Haiti, Guyana)

Class Development and Delivery

- Managing and Growing Effective Field Offices from Afar
- Data Collection Methods for the Field
- Data Sources to Quantify the HIV Epidemic and Related Health Needs
- Simple Data Utilization and Visualization to Support Program and Policy Action
- Introduction to Medicare and Medicaid Systems in the U.S.
- Overview of the President's Emergency Plan for AIDS Relief
- Introduction to Public Health
- Basics of Disease Surveillance
- Developing People and Programs to Ensure Sustainable Systems
- Cultural Sensitivity

University of Wisconsin, School of Medicine and Public Health, MPH Preceptor (2011-2013)

Queskiya University/Cornell/GHESKIO (Haiti) MPH: Content Developer; Lecturer (2011-2013)

- Applied Public Health Surveillance and Epidemiology (10 course hours)
- Epidemiologic Data Use for Program Planning (10 course hours)

National HIV Quality Center: Trainer (2006-2014)

- Program Monitoring and Evaluation and Quality Improvement (12 course hours)

PROFESSIONAL and COMMUNITY SERVICE – Regional/National/International

Program Governance

- Ithaca City School District Farm to Table Program *Steering Committee (2018+)*
- Ithaca Children's Garden *Board Member (2018+)*
- Northeast Regional Center of Excellence for Food Safety *Governance Team (2017+)*
- Tompkins County Childhood Nutrition Collaborative *Steering Committee Member (2016+)*
- NASTAD Global Program Advisory Committee *Member (2015-2019)*
- HIV National Quality Center. *Steering Committee (2007-2009)*
- AIDS Director Associate of Botswana *Board Member (2013-2015)*
- NASTAD Haiti *Board Member (2009-2015)*
- National Alliance of State and Territorial AIDS Directors *Voting Member (2008)*
- Ryan White Part B/ADAP Advisory Committee *Chair (2007-2008)*
- Portland Community Rowing Association *Board Member (2006-2010)*

Working Groups and Advisory Committees

- deBeaumont Foud. Ntl Consortium - Public Health Workforce Dev.*Leadership Committee (2019+)*
- Polson Research Working Group on Rural Revitalization *Working Group Member (2019+)*
- Tompkins County Child-friendly Play & Mobility Environments *Working Group Member (2019+)*
- Tompkins Country Community Health Improvement Plan *Working Group Member (2019+)*
- Tompkins Country Community Health Assessment *Working Group Member (2018+)*
- Association of Schools and Programs of Public Health *Academic Practice Com. (2018+)*
- Planetary Health Alliance MPH Committee *Competency Wkg Group (2018+)*
- Groton Community School District Health Meals Program *Advisor (2018)*
- Consortium of Universities for Global Health *Education Committee (2016+)*
- Cornell Child Care Center Advisory Committee *Co-Chair (2009-2010)*

Reviewer

- American Journal of Public Health — *Journal reviewer (2019+)*
- ACSF Postdoc Fellowship Program — *Grant reviewer (2018+)*
- CCHEq Conference — *Abstract reviewer (2018)*
- ASCF Academic Venture Fund Program — *Grant reviewer (2017+)*
- Journal of Acquired Immune Deficiency Syndromes — *Journal reviewer (2016+)*
- PLOS ONE — *Journal reviewer (2016+)*

Meeting and Conference Leadership

- Beyond the Academy | co-production of sust. science — *Workshop Co-facilitator (2019)*
- Zoobiquiy — *Conference Committee (2016)*
- Maine Annual HIV Prevention and Care Conference — *Chair (2007-2008)*

PROFESSIONAL and COMMUNITY SERVICE - Local

Academic Program Leadership

- Cornell Master of Public Health Program — *Associate Director (2016+)*
- Cornell Master of Public Health Program — *Admissions Committee (2017+)*
- Cornell Master of Public Health Program — *Curriculum Committee (2017+)*
- Cornell Master of Public Health Program — *Leadership Team (2018+)*
- Cornell Master of Public Health Program — *Council (2019+)*
- College of Veterinary Medicine International Programs — *Associate Director (2016-2018)*

Academic Program Governance

- Cornell MPH Program Advisory Committee — *Co-leader (2016+)*

Academic Committee Service

- Cornell CVM COVID-19 Reopening Committee, Health + Safety — *Co-Lead (2020)*
- Cornell ACSF One Health Working Group — *Co-Lead (2019+)*
- Search Committee – CVM Web Instructional Designer — *Committee Member (2019+)*
- Search Committee – CVM Financial Management Faculty — *Committee Member (2019+)*
- Search Committee – MPH Assistant Director — *Committee Member (2019)*
- Search Committee Chair – MPH Lecturer – IDE Section — *Chair (2019)*
- Search Committee Chair – MPH Lecturer – FSH Section — *Chair (2019)*
- Cornell ACSF Sustainable Food Systems Working Group — *Member (2018+)*
- College of Veterinary Medicine Ed Tech Committee — *Committee Member (2018+)*
- Dual Career and Engagement Program Onboarding Team — *Committee Member (2018+)*
- Search Committee Chair – MPH Lecturer – Core Section — *Chair (2017)*
- Search Committee Chair – MPH Lecturer – IDE Section — *Chair (2017)*
- Search Committee Chair – MPH Program Manager — *Chair (2017)*
- Search Committee Chair – MPH Accreditation Manager — *Chair (2017)*
- College of Veterinary Medicine Strategic Planning — *Contributor (2017+)*

Mentoring

- NASPAA-Batten Student Leadership Competition — *Judge (2018)*
- Cornell Animal Health Hackathon — *Advisor (2018+)*
- Alice Cook House — *Faculty Fellow (2016-2018)*
- Cornell University Global Health Case Competition — *Judge (2014+)*

Advising

- Academic Advising - MPH Students – 10 advisees *Academic Advisor (2017+)*
- Applied Practice + Integrated Learning – 10 advisees *Practice Advisor (2018+)*
  - *Pranoti Pradhan, MPH (2018)*
  - *Cecelia Madsen, MPH (2019)*
  - *Andreana Martin, MPH (2019)*
  - *Emily McGraw, MPH (2019)*
  - *Tatiana Thomas, MPH (2019)*
  - *Qin Yuan, MPH (2019)*
  - *Tushar Chaturvedi MPH (2020)*
  - *Keane Leitch MPH (2020)*
  - *Alicia Musk MPH (2020)*
  - *Maura Benner*
  - *Christina Hannah*
  - *Boya Zhang*
  - *Ruimin Zhang*
- Cornell MS Committee Member *Committee Member (2018+)*
  - *Gloria Blaise*

Meeting and Conference Leadership

- Cornell One Health | Public Health | Planetary Health *Symposium Co-Lead (2019)*
- Cornell One Health | Public Health | Planetary Health *Symposium Lead (2018)*
- Cornell One Health | Public Health | Planetary Health *Symposium Lead (2016)*

PROFESSIONAL DEVELOPMENT

- EPHIC Training: Inter-professional Learning Delivery *University of Toronto/Ithaca College (2020)*
- Fellowship in Community Engaged Learning *Cornell University (2017-2019)*
- Fellowship in Public Health Workforce Development *University of Illinois at Chicago (2018)*
- Human Subjects Training (CITI) *Renewed (2019)*
- Creating a Culture of Respect *Cornell University (2017)*
- Global Health Media Training *Pulitzer Center (2016)*
- Flipping the Classroom *Cornell CTE (2016)*
- EpiCore Foodborne Disease Outbreak Investigation *NEHA (2016)*
- Supporting Increased Student Participation in the Classroom *Cornell CTE (2016)*
- HIPPA and Data Sharing *HRSA (2008)*
- Leadership Summit on Women and HIV/AIDS *Physicians for Human Rights (2008)*
- Health, Culture and Literacy *MaineHealth (2007)*
- HIV Quality Management Training of Trainer *HIV National Quality Center (2007)*
- Managing in State Government Training *State of Maine (2007)*
- Leader Effectiveness Training *State of Maine (2007)*
- Contract Requirements and Cost Sharing Settlements *State of Maine (2007)*
- Leading Effective Meetings *University of Southern Maine (2006)*
- Plain Language – Writing for the Public *University of New England (2006)*
- Advanced Database Design *University of Southern Maine (2006)*