

**BUILDING CAPACITY OF THE PUBLIC HEALTH WORKFORCE: AN  
EXAMINATION OF CHALLENGES AND OPPORTUNITIES RELATED TO  
ENHANCING INFECTION, PREVENTION, AND CONTROL EDUCATION AND  
TRAINING FOR STUDENTS**

*MPH Feasibility Study*

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**Abbreviations**

AR	Antibiotic resistance
ASPPH	Association of Schools and Programs of Public Health
CBIC	Certification Board in Infection Control
CIC	Certification in Infection Control
COPH	College of Public Health
Epi	Epidemiology
EID	Emerging Infectious Diseases
HAI	Healthcare associated infections
IC	Infection Control
ID	Infectious Disease
ILE	Integrated learning experience
IPAP	Infection preventionist academic pathway
IPC	Infection prevention and control
IP	Infection preventionist
IRB	Institutional Review Board
LLA	Lifelong Learning Academy
MPH	Master's degree in public health
MSPH	Master's of science degree in public health
PhD	Doctorate degree in Philosophy
PH	Public Health
PFL	Project Firstline
UGPHD	Undergraduate public health degree

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## Methods and Sources

Information presented in this report was collected through a multi-modal effort. Schools of public health and existing Infection Prevention and Control (IPC) academic programs were obtained through the academic program finder function available through the Association of Schools and Programs of Public Health (ASPPH).

Six (6) graduate assistants (GAs) were assigned to search for syllabi for MPH core classes from accredited schools of public health within the U.S. and Puerto Rico. Initially, GAs identified listings of core MPH classes and forward-facing syllabi for each school that are available on the internet. As a second phase, GAs sent email requests to each MPH program listing core MPH course syllabi that they were unable to identify on the internet and requesting a copy of these documents. Two (2) undergraduate student volunteers (from the IC minor) researched existing graduate programs related to IPC, listed courses, and sought syllabi for these IPC specific courses. One (1) undergraduate paid project manager served as project manager, assigning specific schools to individual GAs, tracking contact with those schools, and developing lists of collected syllabi.

As syllabi were obtained, they were coded for content areas related to IPC, HAI, and AR. On June 13<sup>th</sup> and June 15<sup>th</sup>, 2023, the USF project staff attended three hour training sessions regarding coding of collected syllabi. These in-person sessions allowed for clarification of topics that fall under the categories of IPC, HAI, and AR and ensure consistent coding among GAs and individual syllabi. Each syllabus was independently coded by two members of the project team. Coded sections were reviewed by the PI prior to inclusion in this report.

Three surveys were designed and entered in Qualtrics, reviewed by NNPHI PFL and submitted to the Institutional Review Board (IRB) for review. An IRB designation of “not human research” was obtained (see Appendix C). Targeted survey audiences were: 1) alumna from the University of South Florida’s undergraduate infection control minor; 2) graduates of accredited MPH programs within the US and Puerto Rico; 3) instructors, curriculum designers, and public health professionals. Participants were offered a discount code worth \$50 to attend any webinar on the USF College of Public Health Lifelong Learning Academy (LLA) portal. Surveys were distributed through IC minor alumna list, registrants list from the Lifelong Learning Academy, and social media. Initial plans to recruit for survey participation through mailing list and conference attendees were hampered by initial project delays that off-set the period of performance with applicable conferences. Time lags in obtaining IRB approval shortened the available time window to collect survey responses.

A literature review was conducted to identify existing publications related to IPC workforce development and education, as well as workforce trends for public health graduates. The PI was in contact with the chair for APIC’s academic pathway committee. Slides and results from APIC’s mega survey, released in December 2022, were provided and are included as Appendices D and E. These slides and results are from applicable survey questions, as determined by APIC staff, and were provided as a professional courtesy.

## Established IPC Academic Programs

There are very few existing academic IPC programs within Colleges of Public Health. Graduate level programs (certificate, MPH, MSPH, and PhD) that were identified during this effort are summarized in Figure 1. Appendix A: *ASPPH Academic Program Finder Results for Existing Programs* provides the full listing of the initial search results, as well as which programs were excluded. Programs were excluded if the required courses or content clearly did not address IPC, such as an environmental sciences program. The project team is aware of an existing program at Drexel University. However, this program was not include in the ASPPH program finder and, thus, was excluded from review.

Despite extensive searches, the project team only identified one undergraduate program related to IPC – an Infection Control undergraduate minor located at the University of South Florida, College of Public Health. That minor consists of five courses, for a total of 15 credit hours. Course titles include *Occupational Health and Safety*, *Foundations of Public Health Immunology*, *Foundations of Food Safety*, *Emerging Infectious Diseases*, and *Foundations of Infection Control*.

Figure 1: Summary of Existing Infection Prevention and Control Academic Programs

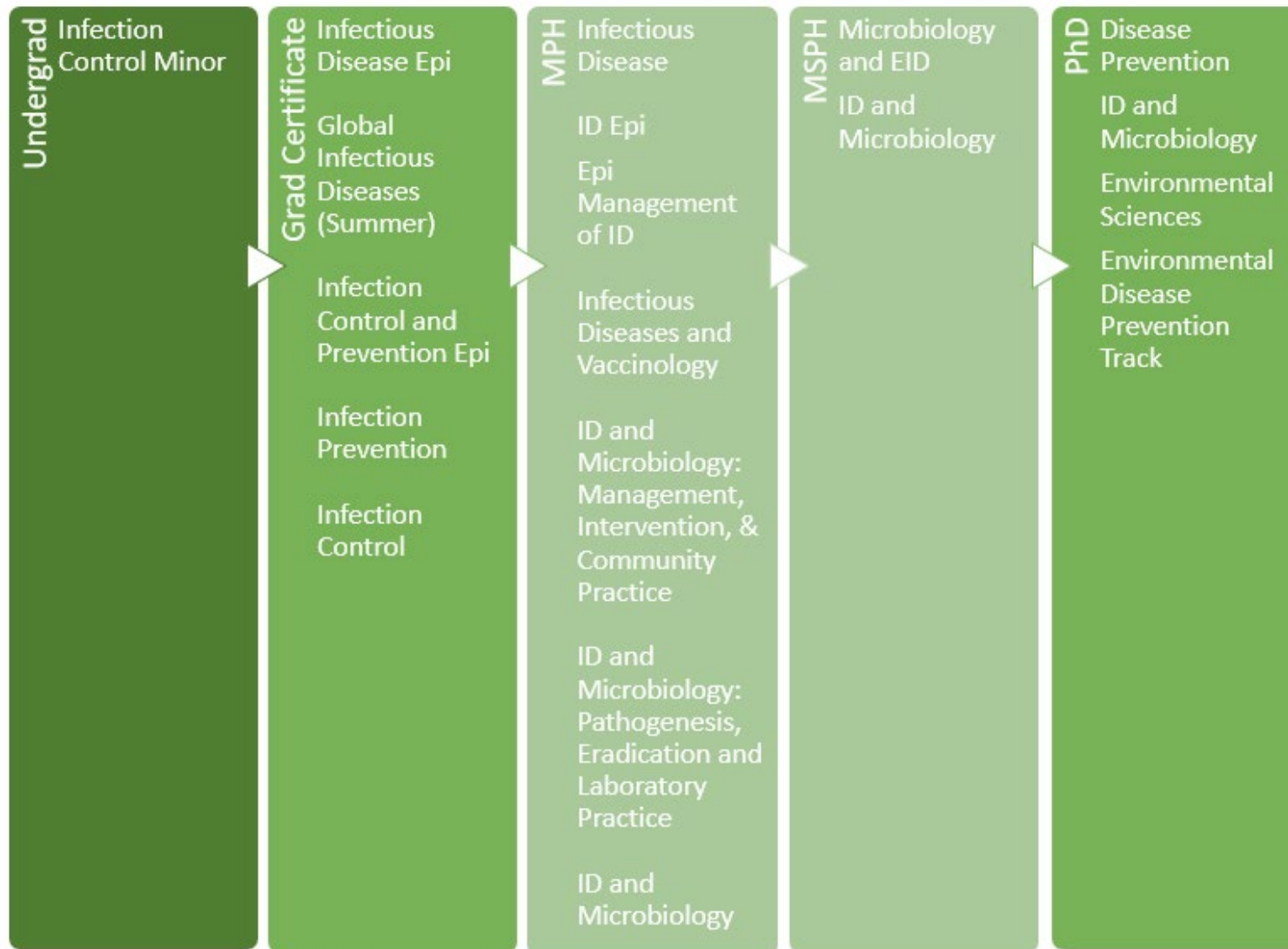


Table 1: Summary of Required Concentration Courses for Existing Graduate IPC Programs

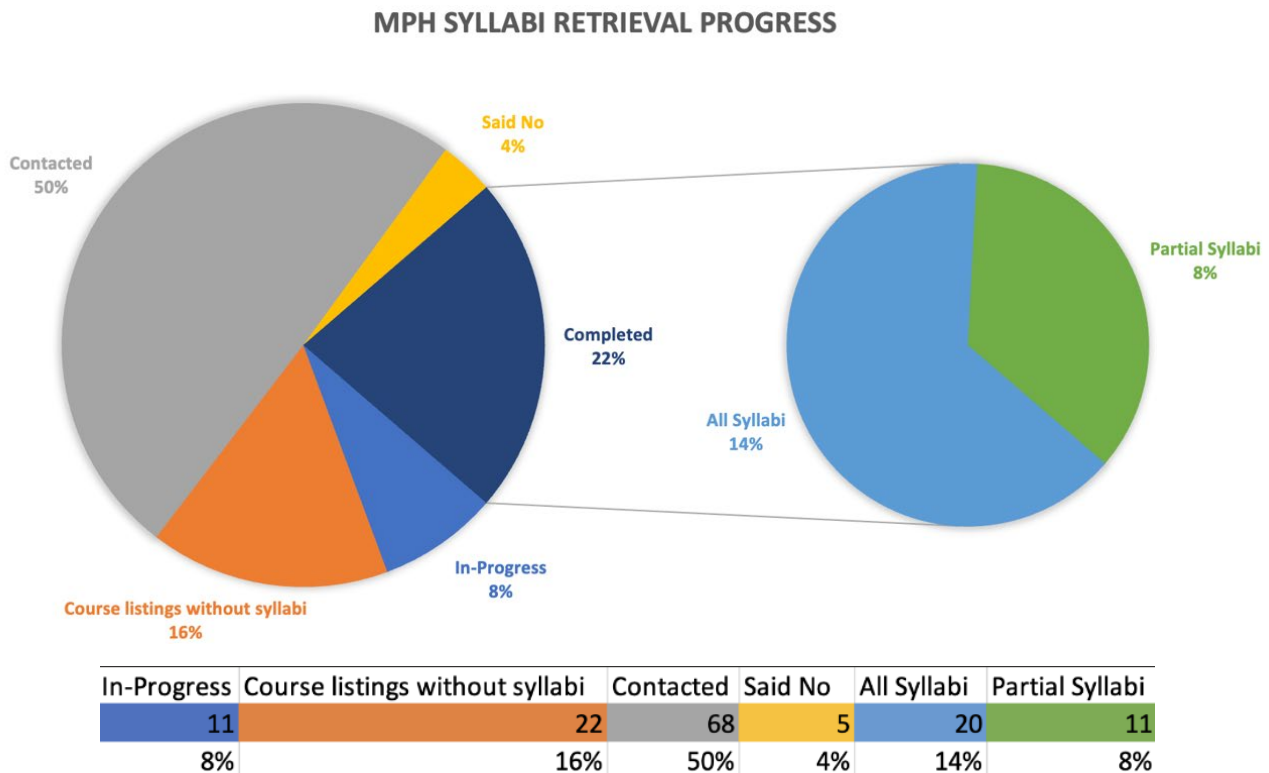
	Global Diseases, Tropical Infectious Diseases	Infectious Disease Epidemiology	Environment & Infectious Diseases	Infectious Disease & Public Health	Infectious Disease Principles	Vaccine Preventable Diseases	Transmission of Infectious Disease	Microbiology for Healthcare Workers	OneHealth	Malaria Biology & Control	AIDS/HIV Epidemiology & Control	Healthcare Epidemiology & Infection Control	Healthcare Associated Infections	Control of Infectious Diseases (General or Global)	Vector-borne/ Zoonotic Diseases	Foodborne & Waterborne Diseases	Infection Control Program Design	Immunology	Infectious Agents Associated with Cancer	Public Health Surveillance/ Surveillance Systems	Lifestyle & Infectious Diseases	Diagnostics in Infectious Diseases	Measurement Techniques in Infection Prevention	Advanced Epidemiology Course	Other Epidemiology (Reproductive Health, Disease Eradication, Neglected Tropical Diseases, Chronic Disease)	Field Placement or Practicum	
Boston University	MPH	MPH	MPH	MPH		MPH			MPH															MPH		Unk	
Cornell University				Cert						Cert														Cert		Unk	
Florida International University		MPH									MPH	MPH													MPH	Yes	
George Washington University	MSPH	MSPH									MSPH			MSPH	MSPH	MSPH		MSPH	MSPH						MSPH	Yes	
Harvard University															Cert	Cert											No
Indiana University		Cert																		Cert							No
North Dakota State University					MPH															MPH	MPH						No
University of California, Berkeley		MPH			MPH							MPH		MPH	MPH							MPH					Yes
University of California, Irvine	PhD	PhD																		PhD					PhD		Yes
University of Nevada, Las Vegas		Cert					Cert					Cert											Cert				Unk
University of Pittsburgh	MPH, MS, PhD										MPH, MS, PhD	MPH, MS, PhD															Yes
University of South Florida							Cert MPH							Cert MPH			Cert MPH										Yes - MPH No-Cert

The summary of required concentration courses for existing graduate IPC programs does not include core public health courses that comprise the academic program. Similar course titles were combined into one category even if the wording in the title was not exact. While some courses, such as *Infectious Disease Epidemiology* are shared requirements, there are many that are unique to individual programs, such as *Diagnostics in Infectious Diseases*. A portion of the courses listed have an overt relationship to the practice of IPC, while others are not as concretely linked to the anticipated knowledge base of an Infection Preventionist.

**Syllabi and Curriculum of Core MPH Courses**

Syllabi were requested and coded as described in the methods section above. Figure 2: *Core MPH Syllabi Tracking and Progress* depicts the collection rates of the syllabi, by school. The project team obtained the full set of syllabi for the core MPH classes for 14% of accredited schools of public health within the US and Puerto Rico and syllabi for a portion of the core courses in an additional eight percent (8%) of COPHs. Fifty percent (50%) of schools contacted did not respond; however, it should be noted that this request occurred during summer semester. Many colleges and universities experience decreased staffing during summer semester due to leave time or nine-month faculty appointments that exclude summer semester. Appendix B: *Schools of Public Health and Collected Syllabi* provides a listing of the course numbers and titles, categorized by school.

Figure 2: Core MPH Syllabi Tracking and Progress



During the syllabi review, course objectives, competencies, and topics relevant to IPC, AR, and HAI were identified and are listed below. Of the 127 syllabi reviewed, 44 (35%) had specific IPC content; 66 of reviewed courses (52%) had natural “inclusion points” for IPC content, and 50 courses (40%) had neither IPC content nor potential inclusion points. Courses with no IPC content or inclusion points tended to be biostatistics, health policy and management, or environmental health classes. Trends and observations from this listing were used to inform recommendations for inclusion of IPC content in graduate public health curriculum.



Existing competencies, course learning outcomes/objectives, and modules/topics related to IPC material are listed below, with the school and course identified in parenthesis.

**COMPETENCIES with IPC Content**

- Apply epidemiologic methods to assess the risk of communicable and non-communicable diseases in the community (Kent State, EPI52017 and HPM 53010)
- Assess global variation in burden of disease and its relationship to social, economic, and cultural factors (New York University, GPH-GU-2140)
- Evaluate the role of environmental and global health in the top challenges facing mankind, including overpopulation, energy, pollution, climate change, and infectious disease, to develop research directions and priorities (University of Nevada, Las Vegas, EOH710)
- Identify basic theory, concepts and models of health promotion, disease causation and prevention; analyze trends using primary and/or secondary community and health status data (University of Nevada, Las Vegas, EOH710 and EAB705)

**COURSE LEARNING OUTCOMES and OBJECTIVES with IPC Content**

- Describe the natural history of disease, i.e., disease causation, pathogenesis, and prognosis (Kent State, EPI52017)
- Calculate the measures of disease frequency, excess risk, and impact (Kent State, EPI52017)
- Understand the steps involved in an outbreak investigation (Kent State, EPI52017)
- Describe global variation in disease burden (New York University, GPH-GU-2140)
- To describe the key characteristics of an outbreak and the key steps to identifying the cause of the outbreak (New York University, GPH-GU-5106)
- Be familiar with environmental health hazards, the routes by which humans are exposed to hazards, various media in which they are found, and disease outcomes associated with exposures (Northeastern University, PTH5112)
- Explain various theories of disease causation (e.g. contagion, germ, lifestyle, environmental) and understand their historical and political context (Northeastern University, PTH6204)
- Describe those mechanisms which clarify the relationship between social factors and the distribution of disease and injury (Northeastern University, PTH6204)
- Explain an ecological perspective on the connections among human health, animal health, and ecosystem health (eg. OneHealth) (St. Catherine University, HLTH6110; Temple University, SBS5002)
- Articulate the importance of epidemiology in an outbreak investigation, disease surveillance, and public health (University of Georgia, EPIC7010)

- Articulate relevance of absolute measures of disease for targeting interventions and assessing impact of public health programs (University of Minnesota, PUBH6341)
- Identify the major routes of transmission of infectious diseases, and the environmental factors controlling them (University of Minnesota, PUBH6102)
- Discuss criteria for disease causation (University of Nevada, Las Vegas, EAB705)
- Describe the global burden of morbidity and mortality but region, social class, race/ethnicity, gender, and their intersectionalities, and identify ill/health/care patterns of inequities across communicable and non-communicable diseases (University of New Mexico, PH560)
- Discuss the area called “health security” and the effects of crisis and emergencies on both population health and health systems (pandemics, wars, habitat destruction, natural and human-made disasters, forced migration) (University of New Mexico, PH560)
- Explain how the immune system functions normally to protect against disease (University of Pittsburgh, PUBHLT2015)
- Describe how the normal functions of the immune system are enhanced by vaccine (University of Pittsburgh, PUBHLT2015)
- Identify the principles and strengths and limitations of public health programs focused outbreak investigation, surveillance, and screening (University of Pittsburgh, EPI2110)
- List, define, and calculate measures and methods used in outbreak investigation, infectious disease epidemiology, chronic disease epidemiology, disease prevention trials, and evaluation of screening tests including major measures of disease frequency used in epidemiologic research and practice and measures of association between a given risk factor and a disease or health outcome (University of Washington, PHI512)
- Describe methods to perform an investigation of disease outbreak in the community (University of Toledo, PUBH6010)
- Understand the processes of a disease outbreak investigation (Texas Tech University, GSPH5307)
- Discuss basic principles of infectious disease (Texas Tech University, GSPH5307)
- Define the terms outbreak, epidemic, and pandemic (Texas Tech University, GSPH5307)
- Perform an outbreak investigation using the gastrointestinal illness in Oswego as a case study (Texas Tech University, GSPH5307)

#### **MODULES and TOPICS with IPC Content**

- Epidemiologic approach to disease (Kent State, EPI52017)
- Foodborne outbreak (Kent State, EPI52017)

- COVID19 (New York University, GPH-GU-5175)
- Occupational Health and Safety/ Accident Theory and Prevention (New York University, GPH-GU-2153)
- Review steps in an outbreak investigation (New York University, GPH-GU-5106)
- Outbreak investigations (New York University, GPH-GU-5106 and (San Diego State University, PH601))
- Screening (New York University, GPH-GU-5106)
- The Immune System, Case Study: HIV/AIDS (New York University, GPH-GU-5190)
- Vector-borne Diseases, Case Study: Zika Virus (New York University, GPH-GU-5190)
- Respiratory Tract Diseases, Case Study: COVID-19 (New York University, GPH-GU-5190)
- Introduction to Public Health Biology: Control and Prevention of Infectious Disease (New York University, GPH-GU-2190)
- Introduction to Disease Transmission (San Diego State University, PH601)
- Introduction to Microbiology and Infectious Diseases: Prokaryotic microbes, Viruses, Fungi, Protists (New York University, GPH-GU-2190)
- Respiratory tract infections: Acute respiratory Infections: Influenza virus, pneumonia, vaccinations, tuberculosis (New York University, GPH-GU-2190)
- Vector-borne disease (Northeastern University, PHTH5112)
- Vaccination rates and behavior models (Northeastern University, PHTH6204)
- Screening and outbreak investigation (Northeastern University, PHTH5202)
- Environmental burden of disease and a Global OneHealth Approach (Ohio State University, PUBHLTH6002)
- Biology and Physiology for Public Health: Intro to Infectious Diseases (Oregon State University, H513)
- Introduction to epidemiology and biostatistics: Disease transmission measurement (St. Catherine University, HLTH6010)
- Occurrence of disease: Disease surveillance, measures of morbidity, mortality, disease impact (St. Catherine University, HLTH6010)
- Introduction to environmental health – local and global perspectives: OneHealth (St. Catherine University, HLTH6110)
- Infectious diseases (University of Florida, PHC6313)
- Water, sanitation, and hygiene (drinking water and sanitation) (University of Florida, PHC6313)
- Sources of data, disease transmission, and descriptive epi (University of Florida, PHC6001)
- Historical perspective: milestones in disease prevention and health promotion (University of Georgia, HPRB7010)
- Ecology of diseases (University of Georgia, EHSC7010)
- Environmental determinants of infectious disease (University of Minnesota, PUBH6102)
- Infectious and communicable disease (University of Nevada, Las Vegas, EOH710)
- OneHealth (University of Nevada, Las Vegas, EOH710)
- Dynamics of disease transmission (University of Nevada, Las Vegas, EAB705)
- Natural history of disease and diagnosis and screening (University of Nevada, Las Vegas, EAB705)
- The host response to infectious disease (University of Pittsburgh, PUBHLT2015)
- Vaccination and public health importance of smallpox and polio (University of Pittsburgh, PUBHLT2015)
- Emerging infectious disease I: HIV/AIDS (University of Pittsburgh, PUBHLT2015)
- Cancer: Genes, environment, cancer (University of Pittsburgh, PUBHLT2015)
- COVID-19 (University of Pittsburgh, PUBHLT2015)
- Epidemiologic approach to disease: Describing patterns of disease (University of Pittsburgh, EPI2110)

- Epidemiologic approach to disease: Assessing disease in populations (University of Pittsburgh, EPI2110)
- The infectious disease process; The dynamics of disease transmission (University of Pittsburgh, EPI2110)
- The prevention of infectious disease and outbreak investigation (University of Pittsburgh, EPI2110)
- Epidemiology in practice: Outbreak investigation (University of Pittsburgh, EPI2110)
- Identifying disease in the community: Surveillance (University of Pittsburgh, EPI2110)
- Measures of disease frequency and Mortality (University of Pittsburgh, EPI2110)
- Innovative strategies for investigating disease outbreaks (University of South Florida, PHC6757)
- Levels of prevention and screening (University of South Florida, PHC6756)
- Disease process and transmission: Screening tests and surveillance (University of South Florida, PHC6756)
- Immune system, vaccination, and risk communication (University of South Florida, PHC6756)
- Population health policies – Communicable and infectious diseases (sexually transmitted diseases, disease control and prevention policy, health inspection) (University of Texas, PHM3715)
- Discuss the dynamics of disease progression (natural history of disease) (University of Texas, PHWM2612)
- Infectious disease, epidemics, and transmission (University of Texas Medical Branch, SPPH6469)
- Emerging and re-emerging infectious diseases (University of Toledo, PUBH6090)
- Biomedical basis of public health: Infectious, chronic, and genetic diseases (Texas Tech University, GSPH5313)
- Disease surveillance and reportable diseases (University of Michigan, PUBHLTH512)

### **HAI and AR EXISTING CONTENT**

Course content specifically addressing healthcare-associated infections and antibiotic-resistance was scarce. Details of that content are listed below.

- Within an *Essentials of Public Health Biology* course, *Respiratory Tract Diseases* module, there is a section titled *Pneumonia* which has topics of *Hospital-acquired Pneumonia* and *Community-acquired Pneumonia*. (New York University, GPH-GU-2190)
- Within an *Essentials of Public Health Biology* course, *Infectious Disease Genomics* module, there is a section titled *Resistance Detection and Therapeutic Design*, there is a topic entitled *Antimicrobial Resistance*. (New York University, GPH-GU-2190)
- Within a *Fundamentals of Environmental Health Science* course, there is a topic entitled *Microbiome and Antibiotic Resistance*. (University of Georgia, EHSC7010)

### **Recommendations for Incorporation of IPC Education and Training into Existing Public Health Programs**

During the review of syllabi for core MPH courses “inclusion points” were identified where topics related to IPC, AR, HAI could reasonably be inserted without revision to the course. Fifty-two percent of reviewed courses (62 of 127) had these natural inclusion points for IPC content. Identified course objectives and topics to serve as inclusion points are listed below, with the school and course number identified in parenthesis.

**COURSE LEARNING OUTCOMES and OBJECTIVES with IPC Inclusion Points**

- Identify the principles and limitations of public health screening and evaluate the validity and reliability of screening tests (Kent State, EPI52017)
- To identify appropriate measures of morbidity and mortality used to examine the major causes and trends of morbidity and mortality in the US and other populations (New York University, GPH-GU-5106)
- Articulate the influence of social, economic, and cultural factors on the incidence and prevalence of disease and illness (New York University, GPH-GU-5140)
- Critically examine social and behavioral approaches to prevention and intervention in public health using a social-ecological perspective (New York University, GPH-GU-5190)
- Discuss the science of primary, secondary, and tertiary prevention in population health, including health promotion, screening, etc. (New York University, GPH-GU-5106; Ohio State University, PUBHLTH6002, 6003, and 6004; Oregon State University, H513; Rutgers University, PHCO0502; San Diego State University, PH604; St. Catherine University, HLTH6000; Temple University, SBS5002; University of Florida, PHC6001; University of Nevada, Las Vegas, EOH710; University of North Dakota, PH504 and 510; University of Pittsburgh PUBHLT2033, EOH2013, and PUBHLT2011; University of South Florida, PHC6757, PHC6756, and 6145; University of Maryland, SPHL601 and University of Michigan, PUBHLTH512)
- Identify and provide examples of primary, secondary, and tertiary prevention (University of Texas, PHWM2612)
- Analyze how primary, secondary, and tertiary prevention is used in the design of implementation of population health interventions (University of Washington, PHI515)
- Define the three core functions of public health and explain how each contributes to a primary, secondary, and tertiary prevention of disease in different settings (University of Washington, PHI511)
- Explain an ecological perspective on the connections among human health, animal health and ecosystem health (eg. OneHealth) (Ohio State University, PUBHLTH6002, University of Pittsburgh, PBHLT2011, and University of South Florida, PHC6145)
- Explain how globalization affects global burdens of disease (Ohio State University, PUBHLTH6002; Oregon State University, H513; Rutgers University, PHCO0505; St. Catherine University, HTLH6000; University of Florida, PHC6001; and University of Nevada, Las Vegas, EOH710; University of North Dakota, PH541; University of Pittsburgh PUBHLT2033 and PUBHLT2011; and University of South Florida, PHC6145)
- Recognize the major determinants of human health and disease, including the importance of socio-economic and behavioral factors (Ohio State University, PUBHLTH6004 and University of South Florida, PHC6756)
- Recognize and discuss major determinants of health in relation to trends of morbidity and mortality (University of Washington, PHI514)

- Articulate the role of health education/health promotion in addressing public health problems (Rutgers University, PHCO0505)
- Describe the tools that are used to analyze health impacts of environmental exposures, such as the risk assessment process, epidemiology, and industrial hygiene (Rutgers University, PHCO0503)
- Describe the main methods used to control health hazards, such as reducing or preventing exposure (Rutgers University, PHCO0503)
- List major causes and trends of morbidity and mortality in the US and around the globe (San Diego State University, PH604; University of Nevada, Las Vegas, EOH710; University of Maryland, SPHL601; and University of Memphis, PUBH7160)
- List major causes and trends of morbidity and mortality in the US and other communities relevant to the school or program (St. Catherine University, HLTH6000; Temple University, SBS5001; University of North Dakota, PH504; University of Pittsburgh, PUBHLT2015, University of South Florida, PHC6145; and University of Michigan, PUBHLTH512)
- Describe disease and mortality variation by time, place, and person (University of Toledo, PUBH6010)
- Gain an understanding of issues and challenges related to long-term care, mental health, ambulatory care, and other types of healthcare services to vulnerable or other special populations (San Diego State University, PH605)
- Apply causal theory and casual criteria to identify determinants of health related states or events (St. Catherine University, HLTH6010)
- Apply public health theories, concepts, models and practices to specific public health problems (St. Catherine University, HLTH7200)
- Describe how social and behavioral science models and theories can be used to explain, predict, and intervene on current public health issues (University of Florida, PHC6410)
- Analyze how direct and indirect human, ecological, and safety effects of major environmental and occupational agents affect human and environmental health. (University of Georgia, EHSC7010)
- Define, calculate, apply, and interpret common epidemiologic measures of disease occurrence and measures of association (University of Georgia, EPIC7010 and University of Maryland SPHL602/603)
- Discuss how intervention strategies such as education, engineering, and enforcement may be implemented to prevent or minimize environmental and occupational hazards (University of Minnesota, PUBH6102)
- Identify the links between social determinants of health; disease exposure, risk factors, and health outcomes (University of Nevada, Las Vegas, HED720)
- Understand and critically discuss definitions of health promotion/disease prevention/health protection (University of New Mexico, PH501)

- Define key concepts pertinent to screening (University of Texas, PHWM2612)
- Identify principles and critical limitation of screening programs for disease (University of Texas, PHWM2612)
- Interpret surveillance data to assess community health status and develop a community health improvement plan (University of Washington, PHI516)
- Recommend and apply prevention and control strategies in response to a public health problem (University of Washington, PHI516)
- Calculate and describe morbidity and mortality measures (University of Toledo, PUBH6010)
- Calculate measures of disease frequency and makes comparisons by person, place, and time (Texas Tech University, GSPH5307)
- Describe situations suitable for screening; evaluating validity, and reliability of screening tests (Texas Tech University, GSPH5307)
- Appreciate the use of epidemiology in Public Health and understand the epidemiologic approach to Public Health issues and data (Texas Tech University, GSPH5307)
- Describe the surveillance procedures as well as systems commonly used in Public Health (Texas Tech University, GSPH5307)
- Describe the types of state and local surveillance systems that are currently available (Texas Tech University, GSPH5307)
- Discuss environmental/macro approaches to public health, especially in the area of health promotion and disease prevention (Texas Tech University, GSPH5334)
- Define intervention and intervention components (Texas Tech University, GSPH5334)
- Define the term “OneHealth” (University of North Carolina, SPHG713)

**COURSE TOPICS and MODULES with IPC Inclusion Points**

- Measuring the extent of disease (Kent State, EPI52017)
- Measures of screening, diagnosis, and prognosis (Kent State, EPI52017)
- Understanding the social determinants through public health research: Surveillance, observation, and evaluating interventions (New York University, GPH-GU-2140)
- Analysis, reporting, and sustaining assessment plans (Kent State, HPM53010)
- Calculate key measures of morbidity and mortality (incidence and prevalence) (New York University, GPH-GU-5106)
- Compare and contrast qualitative and quantitative data collection methods to (1) select methods appropriate for a given public health context, (2) understand factors impacting the health of populations,

and (3) ensure on-going surveillance of health within and across populations (New York University, GPH-GU-5106)

- Health care quality (Northeastern University, PHTH5112)
- Planning models of health education and promotion (Northeastern University, PHTH5540)
- Measures of disease frequency (Northeastern University, PHTH5202)
- Host biology, genetics, psychological, and behavioral factors relative to environmental exposure and disease continuum (Ohio State University, PUBHLTH6002)
- Medicaid, Medicare, and long term care (Ohio State University, PUBHLTH6002)
- Occupational health policy (Oregon State University, H513)
- Occupational health (Rutgers University, PHCO0503)
- Screening and diagnostic testing (San Diego State University, PH601)
- Population and disease patterns (San Diego State University, PH605)
- Determinants of disease and health disparities (San Diego State University, PH605)
- Measuring health and global burden of disease (St. Catherine University, HLTH6000)
- Seniors and other vulnerable populations (St. Catherine University, HLTH7200)
- Solid waste management (University of Florida, PHC6313)
- Occupational health (University of Florida, PHC6313)
- Screening in public health practice (University of Florida, PHC6001)
- Primary and long-term care (University of Florida, PHC6114)
- Levels of prevention and levels of intervention (University of Georgia, HPRB7010)
- Comparing categorical data in 2x2 tables: Odds ratios and relative risks: Comparing the extent of disease between groups (University of Minnesota, PUBH6450)
- Quality of care issues in health care (University of Nevada, Las Vegas, EOH701)
- Disease control vertical programs (University of New Mexico, PH560)
- COVID-19 and the healthcare systems around the world University of New Mexico, PH560)
- Pandemics, wars, habitat destruction, natural and man-made disasters, forced migration: The future of public health (University of New Mexico, PH560)
- Overview of determinants of health and disease (University of New Mexico, PH501)
- Concepts of prevention, health promotion, disease prevention, health protection, harm reduction – different paradigms (University of New Mexico, PH501)
- Globalization and risk factors for infectious diseases (University of North Dakota, PH551)
- Health services professionals (University of North Dakota, PH541)
- Federalism; Pandemic policymaking (University of Pittsburgh, HPM2001)
- The importance of prevention (University of South Florida, PHC6145)
- Safeguarding our future health: Emergency preparedness (University of Texas, PHM3715)
- Public health surveillance (University of Washington, PHI516)
- Introduction and measures of disease frequency (University of Maryland SPHL602/603)
- Review of screening in public health practice (University of Maryland SPHL602/603)
- Health promotion and disease prevention (University of Maryland SPHL611)
- Measures of disease frequency and numerical summaries (University of Maryland SPHL603)
- Public health preparedness (University of Toledo, PUBH6090)
- The future of public health: Emergencies, achievements, challenges (Texas Tech University, GSPH5313)
- Quality of care (University of California, Berkeley, PHW200E)
- Prevention and screening (University of Michigan, PUBHLTH512)
- Quantifying disease burden and mortality University of Michigan, PUBHLTH512)
- Globalization as a determinant of health (University of North Carolina, SPHG713)



## EXAMPLES of Inclusion of IPC Content in non-IPC Modules

During the syllabus review, coders also looked for examples where readings or assignments related to IPC were included in content areas which were not IPC-specific. These examples demonstrate ways in which courses can be adapted to include IPC content. Each example is listed by the module or topic involved and then the reading, assignment, or video that was linked to IPC content. Schools and courses are identified in parenthesis.

Module: *Human Rights and Public Health*; Reading: *Frameworks matter. Ecosocial and human rights perspectives on disparities in women's health – the case of tuberculosis*<sup>1</sup> (New York University, GPH-GU-5185)

Topic: *Housing and place-based health disparities*; Reading: *Broken windows and the risk of gonorrhea*<sup>2</sup> (New York University, GPH-GU-2140)

Topic: *Social networks, social norms, and social influence processes*; Reading: *Social context, sexual networks, and racial disparities in rates of sexually transmitted infection*<sup>3</sup> (New York University, GPH-GU-2140)

Topic: *Ecological models: Multi-level and organizational theories and models*; Reading: *The diffusion of a community-level HIV intervention for women: Lessons learned and best practices*<sup>4</sup> (New York University, GPH-GU-2140)

Topic: *Ecological models: Multi-level and organizational theories and models*; Reading: *Ecosocial and psychosocial correlates of sexually transmitted infections of young adults in the United States*<sup>5</sup> (New York University, GPH-GU-2140)

Topic: *The political and normative context: National and international agendas for social determinants; Constructing and understanding conceptual frameworks*; Reading: *Establishing a holistic framework to reduce inequities in HIV, Viral Hepatitis, STDs, and Tuberculosis in the United States*<sup>6</sup> (New York University, GPH-GU-2140)

Topic: *Randomized trials*; Reading: *Diaphragm and lubricant gel for prevention of HIV acquisition in southern African women: A randomized controlled trial*<sup>7</sup> (New York University, GPH-GU-5106)

Topic: *Selection and information bias*; Reading: *High rates of HIV infection among injection drug users participating in needle exchange programs in Montreal: Results of a cohort study*<sup>8</sup> (New York University, GPH-GU-5106)

Topic: *Confounding*; Reading: *High rates of HIV infection among injection drug users participating in needle exchange programs in Montreal: Results of a cohort study*<sup>8</sup> (New York University, GPH-GU-5106)

Assignment: *Short Essay (pick one article of three)*; Reading: *The 2022 outbreak and pathobiology of the Monkeypox virus*<sup>9</sup> (New York University, GPH-GU-5106)

Topic: *Individual-level health behavior theories*; Reading: *Parents' health beliefs and HPV vaccination of their adolescent daughters*<sup>10</sup> (New York University, GPH-GU-5140)

Topic: *Screening*; Reading: *Antibody testing for COVID19: Can it be used as a screening tool in areas with low prevalence?*<sup>11</sup> (New York University, GPH-GU-5140)

Topic: *Use of PH Information Systems and Surveillance*; Sub-topic: *Use of GIS mapping as a public health tool – From Cholera to cancer* (Northeastern University, PHTH5112)

Topic: *Promoting Population Health*; Sub-topic: *Social media and vaccine hesitancy: New updates for the era of COVID-19 and globalized infectious diseases* (Northeastern University, PHTH5112)

Topic: *Public Health Program Planning*; Reading: *A closer look at the economic argument for disease prevention*<sup>12</sup> (Ohio State University, PUBHLTH6002)

Topic: *Interpersonal Level Behavior Change Theories: Social Cognitive Theory and Diffusion of Innovations*; Reading: *Designing and evaluating a Health Belief Model-based Intervention to increase intent of HPV vaccination among college males*<sup>13</sup> (Rutgers University, PHCO0505)

Topic: *Introduction to Public Health Programming*; Reading: *Practical use of program evaluation among sexually transmitted disease (STD) programs*<sup>14</sup> (Temple University, SBS5002)

Topic: *Intervention Strategies, Components, and Activities*; Reading: *Multi-level intervention to prevent influenza infections in older low income and minority adults*<sup>15</sup> (Temple University, SBS5002)

Topic: *Public Health Priorities and Interprofessional Practice*; Reading: *Achievement in public health, 1990-1999*<sup>16</sup> (Temple University, SBS5002)

Topic: *Trends in Morbidity and Mortality*; Reading: *Reductions in 2020 US life expectancy due to COVID-19 and the disproportionate impact on the Black and Latino communities*<sup>17</sup>

Topic: *Tracking Health – Surveillance*; Reading: *Opening battles: Tuberculosis and the foundations of surveillance*<sup>18</sup>

Topic: *Evidence-based Approaches to Public Health*; Assignment: *In-class exercise on Ebola outbreak* (University of Minnesota, PUBH6341)

Topic: *Evidence-based Approaches to Public Health*; Assignment: *In-class exercise on Zika outbreak* (University of Minnesota, PUBH6341)

Topic: *An Integrated Approach: Pulling it All Together (Social and Behavioral Sciences)*; Reading: *Effective interventions: HIV prevention that works*<sup>19</sup>

Course: *Social and Behavioral Sciences*; Assignment: *Psychosocial approaches to increasing flu shots among seniors* (University of Minnesota, PUBH6020)

Course: *Diffusion of Innovations and Social Marketing*; Reading: *Mass diseases, mass exposures, and mass media*<sup>20</sup> (University of Minnesota, PUBH6020)

Topic: *Managing groups*; Reading: *MSF report cites WHO's failures in ongoing Ebola outbreak*<sup>21</sup> (University of Minnesota, PUBH6751)

Topic: *Managing disasters*; Reading: *Guidelines for large-scale novel H1N1 influenza vaccination clinics*<sup>22</sup> (University of Minnesota, PUBH6020)

Topic: *Managing disasters*; Reading: *Developing an incident management system to support Ebola response – Liberia*<sup>23</sup> (University of Minnesota, PUBH6020)

Topic: *Constitution of the field of public health*; Reading: *Decolonising global health in the time of COVID-19*<sup>24</sup> (University of New Mexico, PH560)

Course: *Epidemiology I*; Assignment: *Epidemiologic investigation of Cholera – John Snow* (University of North Dakota, PH551)

Topic: *The Ecological Perspective, Prevention, and Health Promotion*; Reading: *Disparities in the population at risk of severe COVID-19 by race/ethnicity and income*<sup>25</sup> (University of Pittsburgh PUBHLT2033)

Assignment: *Case Assignment*; Assignment details: *Improved meningitis vaccine surveillance and promotion* (University of Pittsburgh PUBHLT2033)

Topic: *Behavioral and psychological factors affecting population health*; Reading: *Parental delay or refusal of vaccine doses, childhood vaccination coverage at 24 months of age, and the Health Belief Model*<sup>26</sup> (University of Pittsburgh, BCHS2509)

Topic: *Identifying stakeholders and building coalitions*; Reading: *HPV-related cancer prevention through coalition building*<sup>27</sup> (University of Pittsburgh, BCHS2509)

Topic: *Assessing evidence, alternative study designs, and introduction to implementation science*; Reading: *High-yield HIV testing, facilitated linkage to care, and prevention for female youth in Kenya (GIRLS Study): Implementation science protocol for a priority population*<sup>28</sup> (University of Washington, PHI513)

Topic: *Assessing evidence, alternative study designs, and introduction to implementation science*; Reading: *Effect of human papillomavirus (HPV) vaccination on clinical indicators of sexual behavior among adolescent girls: The Ontario Grade 8 HPV vaccine cohort study*<sup>29</sup> (University of Washington, PHI513)

Topic: *Assessing evidence, alternative study designs, and introduction to implementation science*; Reading: *Approach to optimize prevention of mother-to-child transmission of HIV using the consolidated framework for implementation research*<sup>30</sup> (University of Washington, PHI513)

Course: *Public Health Practice*; Assignment: *Case studies (total of 6), including contaminated water crisis in a resource limited setting, pandemic influenza preparedness and response, and managing a measles outbreak* (University of Washington, PHI516)

Topic: *Gender and Sexual Health*; Reading: *Application of theory of gender and power to examine HIV-related exposures, risk factors, and effective interventions for women*<sup>44</sup>

Course: *Introduction to Public Health*: Assignment: Case Study Role Play – *The Toronto Severe Acute Respiratory Syndrome II Experience* (Texas Tech University, GSPH5313)

Course: *Introduction to Public Health*: Assignment: Case Study Role Play – *Beyond Measurement: Evaluating Environmental Public Health: Assessing the Effectiveness of Food Safety Programs* (Texas Tech University, GSPH5313)

Topic: *Sustainability and Scalability*: Reading: *Diffusion of the D.A.R.E. and syringe exchange programs*<sup>45</sup> (University of Maryland, SPHL601)

Topic: *Health Disparities and Inequities*: Reading: *Structural racism in the COVID-19 pandemic: Moving forward*<sup>46</sup> (University of Maryland, SPHL601)

Topic: *The Future of Public Health*; Readings: *The critical need for a population health approach: Addressing the nation's behavioral health during the COVID-19 pandemic and beyond*<sup>47</sup> and *The COVID-19 pandemic as an opportunity to ensure a more successful future for science and public health*<sup>48</sup> (University of Maryland, SPHL601)

Topic: *The Future of Public Health*: Readings: *Operationalizing a OneHealth approach to global health challenges*<sup>49</sup> and *The OneHealth concept: 10 years old and a long road ahead*<sup>50</sup> (University of Maryland, SPHL601)

Topic: *SBS Theories in Public Health: Health Belief Model and Theory of Reasoned Action/Theory of Planned Behavior*; Reading: *Predicting human papillomavirus vaccine uptake in young adult women: Comparing the Health Belief Model and Theory of Planned Behavior*<sup>51</sup> (The University of Memphis, PUBH7160)

Topic: *Planning Promotion and Disease Prevention Programs*; Reading: *Intervention mapping as a participatory approach to developing an HIV prevention intervention in rural African American community*<sup>52</sup> (The University of Memphis, PUBH7160)

Topic: *Community-based Participatory Research Approaches to Health Promotion*; Reading: *Taking pictures to take control: Photovoice as a tool to facilitate empowerment among poor and racial/ethnic minority women with HIV/AIDS*<sup>53</sup> (The University of Memphis, PUBH7160)

Assignment: *Case Study Paper*: Topics (choose one from twelve options): *Vaccination, malaria control programs, Tuberculosis control programs, HIV/AIDS programs, Tropical diseases, Water-borne illness and water sanitation programs, COVID-19* (University of Maryland, SPHL610)

Topic: *Relevance of Diversity and Disparities to Health Programs*; Readings: *Excess deaths from COVID-19, community bereavement, and restorative justice for communities of color*<sup>54</sup> and *Health policy: Assessment of community-level disparities in Coronavirus Disease 2019*<sup>55</sup> (University of Maryland, SPHL610)

Topic: *Community Health Assessment for Program Planning*: Readings: *Promoting community malaria control in rural Myanmar through an active community participation program using participatory learning approach*<sup>56</sup> and *Strategic assessment of COVID-19 pandemic in Bangladesh: Comparative lockdown*

*scenario analysis, public perception, and management for sustainability*<sup>57</sup> (University of Maryland, SPHL610)

Topic: *Characterizing and Defining the Health Problem*; Reading (optional): *Global, regional and national estimates of the population at increased risk of severe COVID-19 due to underlying health conditions in 2010: A modelling study*<sup>58</sup> and *A role for community health promoters in tuberculosis control in the state of Chipas, Mexico*<sup>59</sup> and *Community assessment for COVID-19 prevention and control: A rapid evidence synthesis*<sup>60</sup> and *The colliding epidemics of COVID-19, Ebola, and measles in the Democratic Republic of Congo*<sup>61</sup> (University of Maryland, SPHL610)

Topic: *Program Quality and Fidelity*; Reading: *Implementation fidelity of the national malaria control program in Burkina Faso*<sup>62</sup> (University of Maryland, SPHL610)

Topic: *Implementation Evaluation: Measuring Inputs and Outputs*; Reading: *Impact evaluation of seasonal malaria chemoprevention under routine program implementation*<sup>63</sup> (University of Maryland, SPHL610)

Topic: *Quantitative Data Analysis and Interpretation*; Reading: *Low uptake of malaria testing within 24 hours of fever despite appropriate health-seeking among migrants in Myanmar: A mixed methods study*<sup>64</sup> (University of Maryland, SPHL610)

Topic: *Qualitative Methods for Planning and Evaluation*; Reading: *Knowledge and attitude towards Ebola and Marburg virus disease in Uganda using quantitative and participatory epidemiology techniques*<sup>65</sup> and *Micro-planning for polio immunization in Kaduna State, Nigeria: Lessons learnt, 2017*<sup>66</sup> and *Acceptability, feasibility and challenges of implementing an HIV prevention intervention for people living with HIV/AIDS among healthcare providers in Mozambique: Results of a qualitative study*<sup>67</sup> and *Personal protective equipment training for non-healthcare workers in the COVID-19 pandemic: Effectiveness of an evidence-based skills training framework*<sup>68</sup> (University of Maryland, SPHL610)

Topic: *Program Evaluation*; Reading: *Evaluation of treatment coverage and enhanced mass drug administration for Onchocerciasis and Lymphatic filariasis in five local government areas treating twice per year in Edo State, Nigeria*<sup>69</sup> and *Analyzing the impact of the Australian health sector emergency response plan for novel Coronavirus (COVID-19): A proposed approach*<sup>70</sup> (University of Maryland, SPHL610)

Topic: *Program Evaluation and Policy Making Process*; Reading (optional): *Public health preparedness and responses to the coronavirus disease 2019 (COVID-19) pandemic in South Asia: A situation and policy analysis*<sup>71</sup> (University of Maryland, SPHL610)

Topic: *Program Objectives and Setting Targets*; Readings: *90/90/90/50 Plan: Ending the HIV epidemic in the District of Columbia*<sup>72</sup> and *Setting targets for HIV: An evaluation of indicator quality and target achievement in National Strategic Plans*<sup>73</sup> (University of Maryland, SPHL610)

Topic: *Program Objectives and Setting Targets*; Video: *Theory of Change [example of HIV in Africa]*<sup>74</sup> (University of Maryland, SPHL610)

Topic: *Environmental Determinants of Health*; Reading: *Anti-virus built environment: Lessons learned from COVID-19 pandemic*<sup>75</sup> (University of North Carolina, SPHG713)

Topic: *Quantifying the Disease Burden Associated with Determinants*; Reading: *Estimation of excess deaths associated with the COVID-19 pandemic in the United States, March 2020*<sup>76</sup> (University of North Carolina, SPHG713)

Topic: *Intercultural Communication and Effective Engagement to Understand Public Health*; Reading: *COVID-19-Related infodemic and its impact on public health: A global social media analysis*<sup>77</sup> (University of North Carolina, SPHG713)

Practical experience: “A few examples of how students could apply their public health knowledge and skills in a practicum experience are listed below: field activities associated with monitoring, research, or surveillance of a public health issue,...assist in the development of a health intervention.” (St. Catherine University, HLTH7100/7103)

## **Conclusions and Recommendations for Development of IPC Content**

This review of content of MPH core courses identified content that aligned with principles and topics within infection prevention and control. All MPH academic programs had at least one area within the core MPH courses that could serve as “inclusion points” for IPC content. These findings support the concept that public health core competencies naturally align with the domains depicted in APIC’s Infection Preventionist competency model. These models are depicted in figures 3 and 4.

Vassallo and Boston<sup>42</sup> mapped the 2013 APIC competency self-assessment components, IP practice areas, MPH core knowledge areas or foundational competencies, and Council of Education for Public Health 2016 accreditation requirements. A summary of their findings is included as Appendix F. This review found that 78% (29/37) of IP practice areas identified in the 2013 APIC/CBIC competency self-assessment were covered by the MPH foundational competencies.<sup>42</sup> “Only 8 of the practice areas covered in the practice areas are not addressed by the typical MPH program.”<sup>42</sup>

This project team proposes an MPH-IPC Competency Framework that incorporates both the Public Health Core Competencies Model and the APIC Infection Preventionist Competency Model. This proposed framework is shown in figure 5 and be used as a tool to direct initial discussions with stakeholders about structure and organization of graduate public health IPC programs.

Figure 3: Association of Schools of Public Health Core Competency Model for the MPH Degree<sup>37</sup>

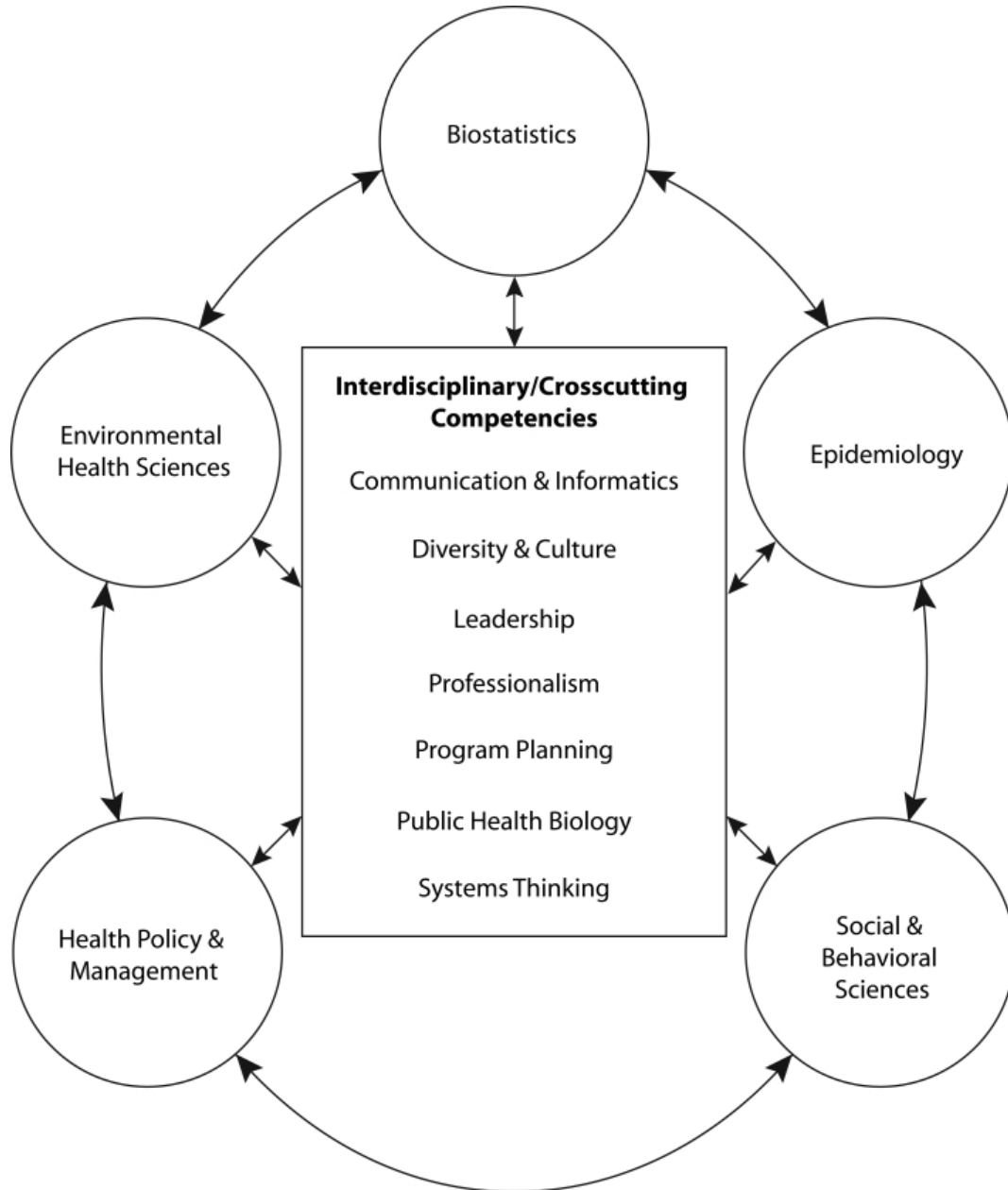
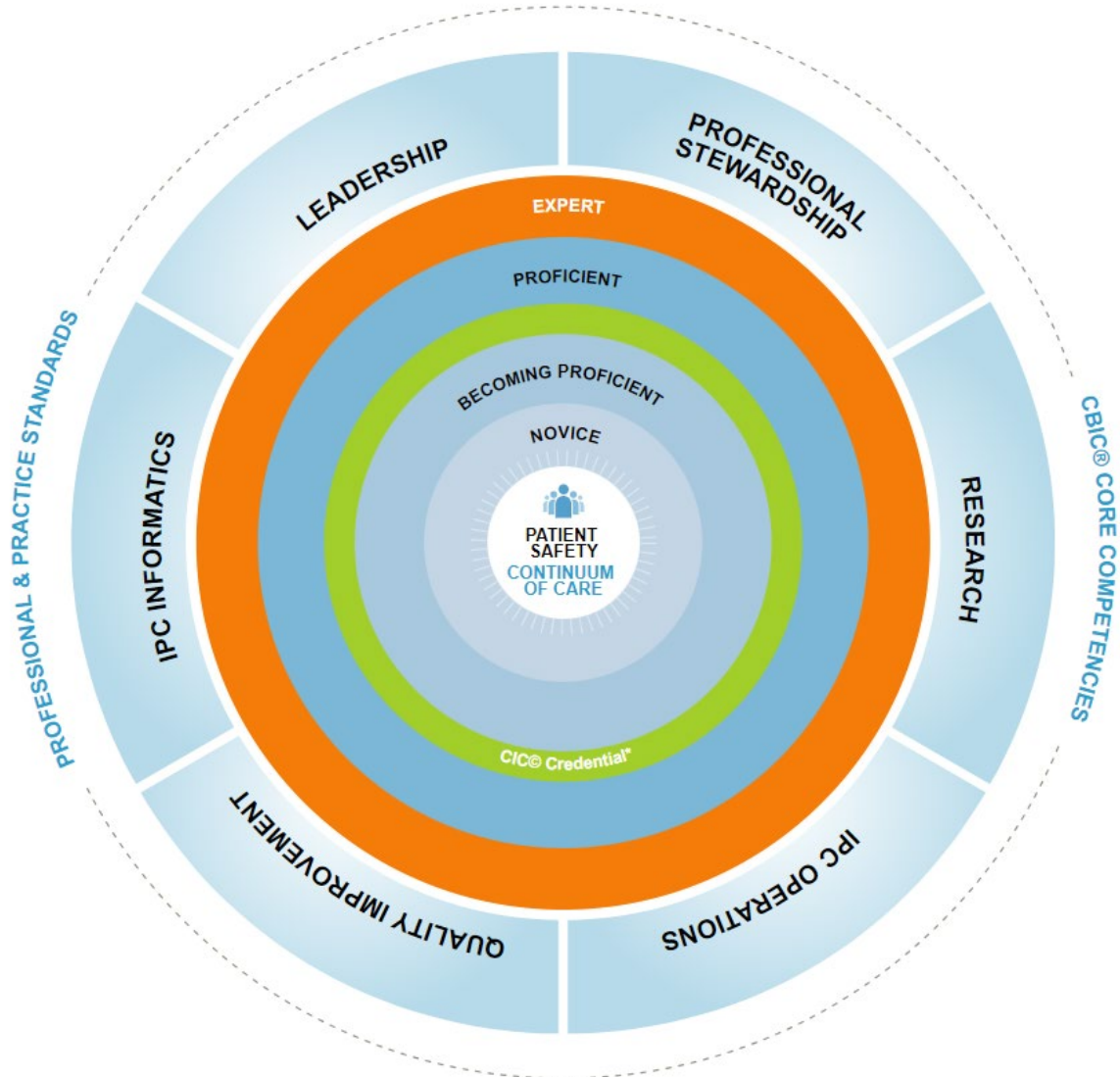


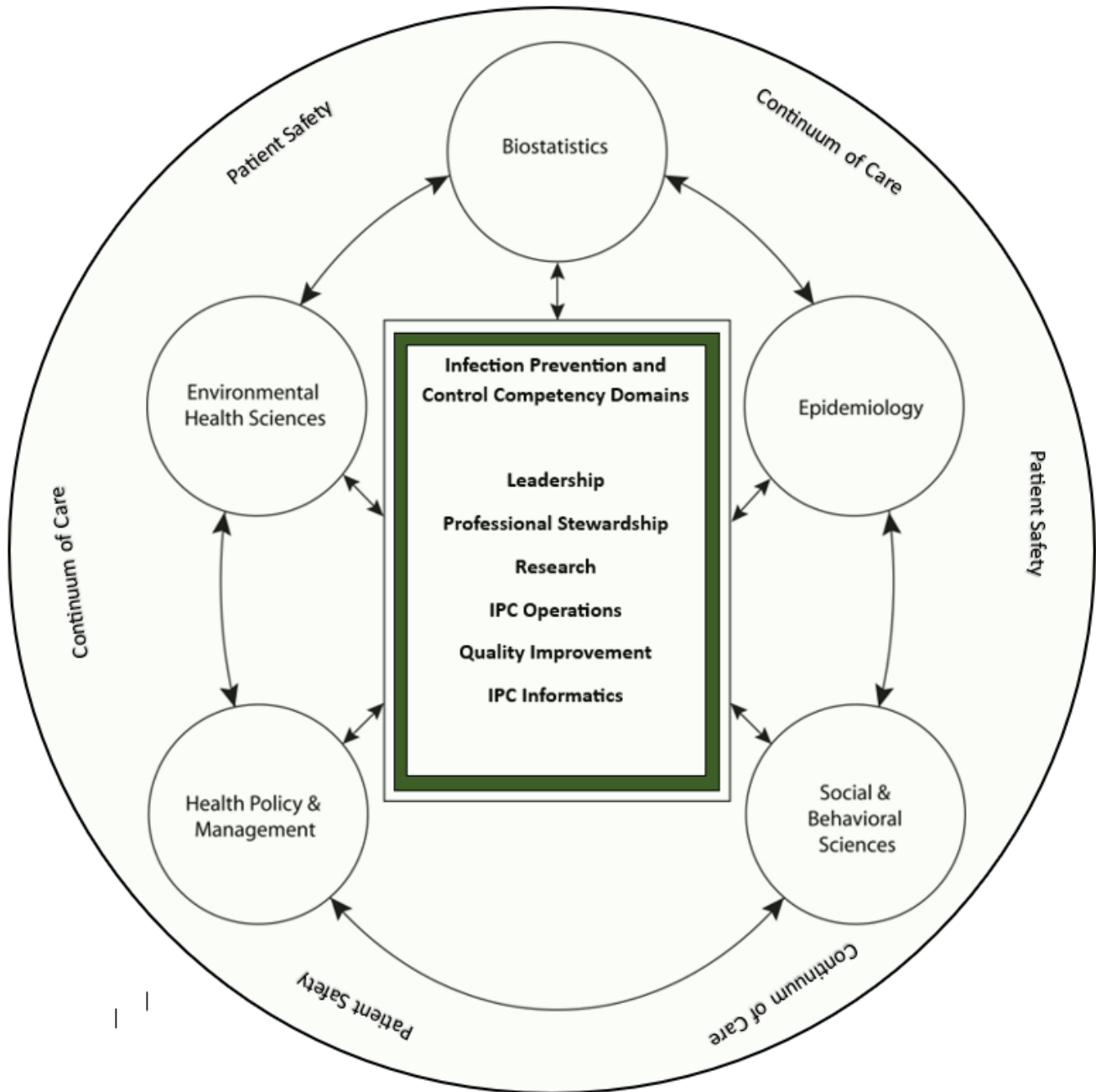
Figure 4: APIC Infection Preventionist Competency Model



Source: <https://apic.org/professional-practice/infection-preventionist-ip-competency-model/>



Figure 5: Proposed MPH-IPC Competency Framework



Efforts to create new curriculum or new degree pathways should consider the resource allotment related to accreditation, as well as established requirements for the MPH program. ASPPH’s Framing the Future Task Force proffered key consideration for a 21<sup>st</sup> century MPH degree.<sup>38</sup> Select concepts that are relevant to this current effort include:

- The MPH degree should be clearly distinguished from the BSPH and the DrPH, as the BSPH becomes an entry-level degree in the field and then DrPH emerges as a high-level degree focused on public health leadership and management.

- MPH education should be rigorous, applied, and skills-based to differentiate it from the BSPH and to ensure that graduates will be well prepared to function effectively in their chosen specializations and work settings.
- The MPH should be designed as an advanced degree focused on specialist education that is directly responsive to the needs of students and their perspective employers.
- The content delivered in MPH curricula should be regularly aligned with the knowledge, skills, and attitudes that employers expect in graduates.
- Public health is inherently interdisciplinary and interprofessional and, thus, MPH graduates must be prepared to function in increasingly interdisciplinary and interprofessional roles and settings.
- MPH education must be competency-based and competencies should be updated on a regular basis.
- The MPH degree is a professional degree, so it is important that MPH education continue to have strong connections to applied public health practice, broadly defined.

The Framing the Future Task Force also identified design features of a 21<sup>st</sup> century MPH degree.<sup>38</sup> Pertinent recommendations are:

- The MPH degree should offer in-depth education in concentration areas that are responsive to the interests of students, the strengths of the institution, and the needs of employers.
- Concentration requirements should consist of at least four courses beyond the introductory level that are appropriately sequenced and layered and that are not parts of the practicum or culminating experience.
- Concentrations may include options that are within traditional disciplines, options that cross disciplines, and options that address emerging topics and fields.
- The concentration learning objectives for a particular MPH degree should assess learning in terms of knowledge, comprehension, application, and analysis in a defined specialty area.
- Learning objectives for the practicum and the culminating experience should be linked primarily to the concentration rather than to the core, and they should be focused on higher levels of learning including analysis, synthesis, and evaluation.

This framework provided by ASPPH encourages and allows adaptation of the MPH curriculum to meet the needs of students and employers, as well as emerging topics such as infection prevention and control. It's critical that IPC PH graduate programs adhere to guidelines and recommendations from ASPPH. This will ensure development of high-quality programs which provide relevant education.

As with all public health programming, it's necessary to involve stakeholders in the planning and implementation of IPC graduate programs. Stakeholders in this effort include representatives from APIC, ASPPH, employers of IPs in various sectors, schools of public health, and IPC students.

The MPH practicum, or integrated learning experience, should be used as a component for field placement in a setting that is relevant to IPC. As APIC develops an apprenticeship model, internship/externship requirements should consider the MPH practicum requirement in order to avoid duplication of student efforts.

The syllabi review identified two opportunities or approaches for encouraging inclusion of IPC content in MPH curriculum. While identifying "inclusion points" within MPH core courses, it was noted that many learning outcomes and objectives or modules and topics were similar between schools. For example, fourteen (14) schools of public health had an established competency related to "Discuss the science of primary, secondary, and tertiary prevention in population health, including health promotion, screening, etc". Initial efforts to develop "toolkits" for inclusion of IPC content should focus on these areas of overlap between schools. A targeted effort on areas of commonality will increase the impact of the effort.

A second approach to emphasize the practicality of including IPC content in curriculum or implementing an IPC academic program involves evaluation of individual schools. In this method, core MPH syllabi for each COPH would be reviewed and a “school specific assessment” would be developed. This school specific assessment would summarize existing IPC content in core courses, as well as learning outcomes, objectives, modules, and topics that are reasonable “inclusion points” for IPC material. It is anticipated that providing a realistic view of incorporation of IPC content without significant course revision would increase the likelihood of adaptation of the recommendations.

**Table 2: Cornerstone Findings and Recommendations for Development of Graduate IPC Programs**

- MPH core courses have “inclusion” points where IPC materials can be reasonably included in course content
- Existing IPC graduate programs require a wide range of concentration courses, with little overlap. There is a need for standardization across schools and programs.
- Both the Public Health core competency model and APIC’s Infection Preventionist competency model should be used to develop the framework of graduate public health infection prevention and control programs.
- Commonalities between the Public Health core competency model and APIC’s Infection Preventionist competency model should be emphasized when discussing program development with stakeholders.
- Efforts to protect against the “substitution effect” should include task, skill, and content differentiation between different levels of academic programs.
- Development of academic pathways should adhere to MPH program recommendations from ASSPH.
- Stakeholders should be engaged in planning and implementation of Infection Prevention and Control academic pathways. These participants include representatives from APIC, ASPPH, employers of IPs, schools of public health, and IPC students.
- The MPH practicum (integrated learning experience) should be used as component for field placement relevant to IPC practice.
- Initial IPC curriculum content examples (“toolkit”) should focus on learning outcomes/objectives and modules/topics that are shared among multiple schools.
- Targeted IPC curriculum planning (“school specific assessment”) should incorporate existing data regarding core MPH courses, syllabi, and content to provide rationale about inclusion of IPC content and development of IPC academic programs.
- A proposed MPH-IPC framework should be used a tool to begin discussions with stakeholders regarding the structure and organization of MPH-IPC programs.
- Examples of inclusion of IPC-content in non-IPC topics and modules should be provided to curriculum designers and instructors to guide efforts to implement a similar approach.

## Trends in the Infection Prevention Workforce

The Association for Professionals in Infection Prevention and Epidemiology (APIC) has prioritized the retention and development of IPs during an era of increasing demand, new regulatory requirements, significant staff turn-over, and pandemic and other public health emergencies.<sup>39</sup> In 2019, APIC administered the Recruitment and Hiring Practices Survey to members of APIC to assess recruitment, hiring, retention, and development strategies. Over half (52%) of respondents from this survey estimated that one-two IPs would retire from their organization in the next five years and an additional 7% estimating three or more IP retirements.

Table 3 identifies strategies to retain and professionally develop IPs in an organization from APIC’s Recruitment and Hiring Practices Survey.<sup>39</sup> It’s important to note that 79% of respondents identified continuing education support as an incentive for IP retention.

Table 3: Recruitment and Hiring Practices Survey: Strategies to Retain and Professionally Develop IPs<sup>39</sup>

Strategies to retain and professionally develop IPs in organization	
Retention strategies (n = 445)	Total N (%)
Continuing education support	353 (79.3)
Certification support	322 (72.4)
Professional conference support	308 (69.2)
Flexible schedules	288 (64.7)
Tuition reimbursement for employee	258 (58.0)
Systems to support healthy work environments (eg. teamwork, open communication, accountability, minimize burnout)	251 (56.4)
Competitive salaries, bonuses, other benefits	229 (51.5)
Mentor for new IPs	194 (37.2)
Reward and recognition program	149 (33.5)
Systems to assess and balance workload	112 (25.2)
Career advancement ladder based on advanced knowledge/skill attainment	107 (24.0)
360 performance appraisal programs	82 (18.4)
Transportation and commute support (eg. bus passes, free parking, shuttles)	40 (9.0)
Tuition reimbursement for family members	18 (4.0)
Concierge services (eg. shopping, dry cleaning, day care)	8 (1.8)

There is a paradigm shift underway regarding classification of IP as solely a nursing role. Concurrently, there is clear evidence of the value of inclusion of MPH holders as IPs. Leaders within the field of IPC have begun to realize the value of including individuals with diverse backgrounds, such as training in laboratory sciences, public health, microbiologists, and foreign medical graduates to the traditional IPC team of registered nurses.<sup>40-42</sup>

**Table 4: Endorsements of IPs with Public Health Backgrounds**

“An IPC department with a diverse makeup of IPS may increase novel ideas and improve patient outcomes by helping to have a more robust and effective IPC program.”<sup>40</sup>

“In a perfect world, an infection prevention department would consist of multiple individuals with diverse educational backgrounds.”<sup>41</sup>

“The skill sets that MPH graduates bring to the table are an asset to any infection prevention program and complement the strong nursing and education teams that are typically present in hospitals.”<sup>42</sup>

“MPH graduates are particularly strong in the future-oriented domains of the APIC competency model: leadership and program management, IPC technology, and performance improvement/ implementation science.”<sup>42</sup>

In an assessment of novice-level IP competencies, respondents with a master’s degree or above were found to have consistently higher scores than other respondents, even those that had obtained Certification in Infection Control (CIC) through the Certification Board of infection Control.<sup>40</sup> While the IP workforce has historically been

composed of individuals with a nursing background, nurses scored significantly lower than other respondents in this same survey regarding novice-level IP competency attainment.<sup>40</sup>

A review of the APIC MegaSurvey, determined that 72% of IPs with a public health background held a graduate-level degree, compared to 28% of nurses functioning as IPs.<sup>41</sup> However, IPs with a public health background were more likely to enter the with less than 15 years experience when compared to nurses, 83% and 48%, respectively.<sup>41</sup> These statistics underline the importance of a strong IPC academic program for MPH students who will enter the IP workforce.<sup>42</sup> Without the benefit of clinical healthcare experience, PH IPs require a solid knowledge base that aligns with the competencies required to effectively and efficiently function as an IP.

Existing data demonstrates that individuals with a background in public health are successful within the field of public health. APIC's MegaSurvey found that 54% of PH IPs obtained CIC certification, while 41% of nurses earned certification.<sup>41</sup> PH IPs and IPs with laboratory backgrounds are more likely to complete job tasks related to interpretation of surveillance data, outbreak investigations, and research.

In March 2021, APIC began the IP Academy Pathway (IPAP) as an effort to link undergraduate and graduate programs in the field of IPC.<sup>43</sup> This initiative will develop core concepts needed to an IP to work successfully in the field which can be integrated into a higher institution's academic programs through undergraduate, graduate, and continuing education programs. These guidelines will not be specific to College of Public Health and have the potential for implementation in other academic settings, such as College of Nursing. To date, the IPAP does not have recommendations that are available for external viewing [personal communication, Devin Jopp]. Once the IPAP content guide is available, existing and newly emerging IPC academic programs should assess their program structure to determine the extent of alignment and plan for amendments. However, the immediate need for IPs entering the workforce is significant and efforts to strengthen existing programs or add new programs should proceed in a timely fashion.

As individuals from the public health sector enter the IP workforce, there is a need to develop a solid knowledge base during the academic pathway combined with a structured on-boarding in an appropriate healthcare/IP setting. While the practice of infection prevention and control is not clinical in nature, an understanding of the clinical provision of care and the workflow faced by hands on providers is essential.<sup>42</sup>

## **Public Health Graduates and Workforce Trends**

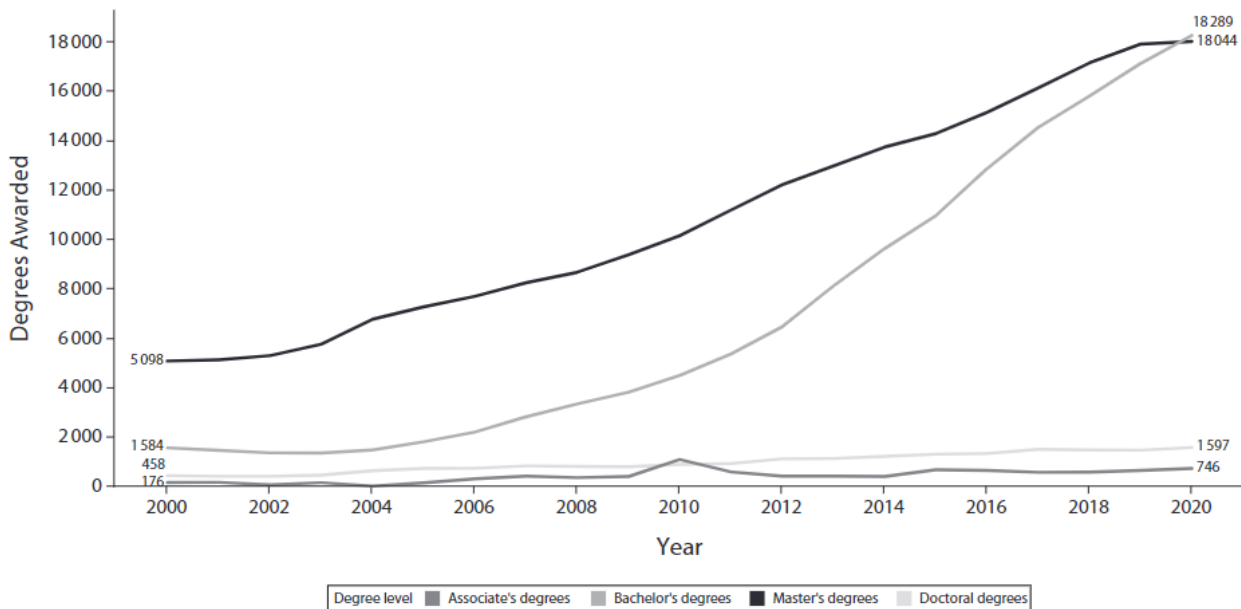
Results from the Public Health Workforce Interests and Needs Survey (PH WINS) were reviewed with findings relevant to this current effort summarized below.<sup>31</sup> PH WINS is a partnership between the de Beaumont Foundation and the Association of State and Territorial Health Officials (ASTHO) and is considered the "first and only nationally representative source of data about the governmental public health workforce."<sup>31</sup> In 2021, the web-based survey was distributed to 137,446 state and local governmental public health workers, representing 47 state health agencies, 29 big city health departments, and 259 local health departments. Thirty-one percent (31%) of respondents representing the PH governmental workforce held a Master's degree and fourteen percent (14%) had a degree specializing in public health. Issues related to longevity, historical knowledge within the workplace, and levels of experience were highlighted by data showing that half of the national public health workforce in 2021 had served at their agency for 5 years or less. PH WINS also revealed that more than a quarter of these workers are considering leaving their organization within the next year.

In a collaborative effort with the University of Minnesota School of Public Health and Johns Hopkins Bloomberg School of Public Health, the Association of Schools and Programs of Public Health (ASPPH) addressed trends in undergraduate public health degrees.<sup>32</sup> Based on 2020 data, more than 18,000 undergraduate public health

degrees are conferred each year, with 28% of alumna working in healthcare and 10% working for government agencies. Additional data indicates that most public health graduates (both at the undergraduate and graduate levels) do not enter the governmental public health workforce.<sup>33-36</sup>

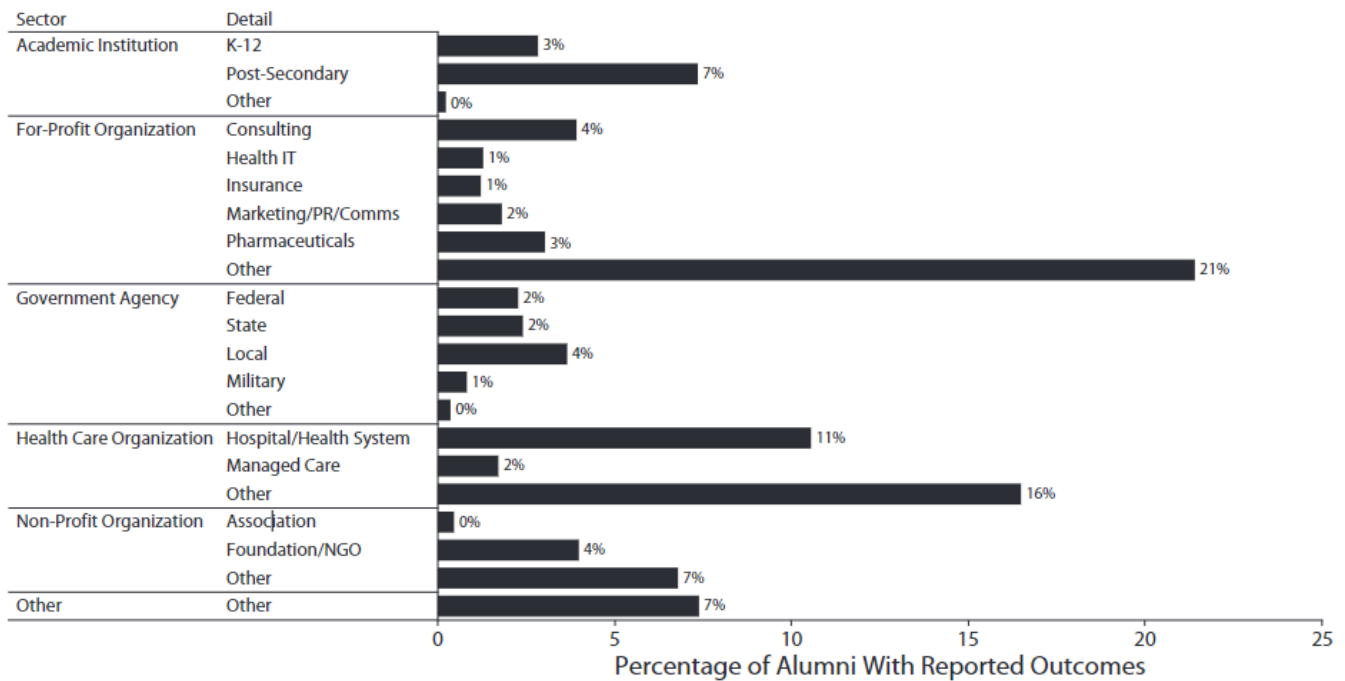
Leider, Burke, Nguyen et al. appear to present the most current and comprehensive analysis of trends in attainment of undergraduate public health degrees (UGPHDs.)<sup>36</sup> Their recent report reviewed data from the Integrated Postsecondary Education Data System (IPEDS), the College Scorecard from the National Center for Education Statistics (NCES), and the first-destination outcomes from the Association of Schools and Programs of Public Health. This analysis emphasizes that, as of 2020, UGPHDs outnumber public health master’s degrees. This growth was augmented by the increase in the number of institutions offering UGPHDs, as well as policy changes that allowed accreditation for UGPHD programs that were not associated with a CEPH-accredited graduate school of public health. Several questions are posed related to the impact of these UGPHD alumna and the existing workforce shortage for public health governmental positions. Low percentages of UGPHD graduates are entering the workforce as government employees, while larger percentages obtain employment in for-profit organizations and hospital/health systems, as shown in Figure 6.<sup>36</sup> While these trends raise concerns for staffing of the governmental public health workforce, they suggest there is an interest among UGPHD graduates for employment in the hospital and health-care settings, creating a potential to recruit for the infection preventionist workforce.

Figure 6: Trends in Public Health Degree Conferment<sup>33</sup>



Employment trends for alumni of public health graduate programs are similar, with 41% of these graduates entering the for-profit or healthcare sectors of the workforce.<sup>36</sup> The percentages of individuals entering governmental public health jobs with a graduate level public health degree are increasing slightly each year, leading Leider and colleagues to suggest that individuals with UGPHD and graduate level public health degrees are not competing for the same positions in the workforce. There is a need to avoid the “substitution effect” where UGPHD holders are preferentially hired at lower wages for the same jobs that graduate degree-holders typically filled or were recruited for.<sup>36</sup> Establishing task and skill differentiation for different levels of academic achievement can protect against development of the “substitution effect”. While this approach is presented related to the public health workforce, a similar approach would benefit the infection preventionist workforce.

*Figure 7: First-destination Employment Outcomes by Sector among Undergraduate Public Health Degree Alumni, Graduating Years 2015-2020: United States<sup>36</sup>*



Significant changes to the public health workforce are occurring in the wake of systemic and individual worker-experiences during the COVID-19 pandemic.<sup>33</sup> Large increases in voluntary separations from public health agencies have led to the use of nomenclature such as “the Great Resignation.”<sup>33</sup> This exodus from governmental public agencies may present an opportunity to recruit public health personnel into infection prevention and control positions.

**Appendix A: ASPPH Academic Program Finder Results for Existing Programs**

Search terms: “disease prevention” and “infection prevention and control”

School	Program
Boston University School of Public Health	MPH – Chronic and Non-Communicable Diseases [excluded]
	MPH – Infectious Disease
Cornell University MPH Program	MPH – GPHS/MPH 4+1 Accelerated Infectious Disease Epidemiology [excluded]
	MPH – Public Health Accelerated MD – Infectious Disease Epidemiology [excluded]
	Non-degree – Public Health – Infectious Disease Epidemiology
East Tennessee State University College of Public Health	BS – Health Sciences (?) [unable to locate/confirm]
Florida International University Robert Stempel College of Public Health and Social Work	MPH – Infectious Disease Epidemiology
George Washington University Milken Institute School of Public Health	MS – Public Health Microbiology and Emerging Infectious Diseases
Harvard T.H. Chan School of Public Health	Summer (non-degree) – Global Infectious Diseases Program
Indiana University Richard M. Fairbanks School of Public Health	Grad Certificate – Infection Control and Prevention Epidemiology
Johns Hopkins Bloomberg School of Public Health	MHS – Molecular Microbiology and Immunology [excluded]
	PhD – Molecular Microbiology and Immunology [excluded]
	ScM – Molecular Microbiology and Immunology [excluded]
North Dakota State University Department of Health	MPH – Epidemiology – Management of Infectious Diseases
University of California Berkeley School of Public Health	MPH – Infectious Diseases and Vaccinology
University of California, Irvine Program of Public Health	PhD – Disease Prevention
University of Miami Department of Public Health Sciences	MPH – Prevention Science and Community Health [excluded]
University of Nevada Las Vegas School of Public Health	Grad Cert – Infection Prevention
University of Pittsburgh School of Public Health	Acc MPH – Infectious Diseases and Microbiology: Management, Intervention, and Community Practice
	Acc MPH – Infectious Diseases and Microbiology: Pathogenesis, Eradication, and Laboratory Practice
	Acc MS – Infectious Diseases and Microbiology
	MPH – Infectious Diseases and Microbiology
	MS – Infectious Diseases and Microbiology



	PhD – Infectious Diseases and Microbiology
University of South Florida College of Public Health	Grad Certificate – Infection Control
	MPH – Infection Control
University of Texas Health Sciences Center at Houston School of Public Health	PhD – Environmental Sciences – Environmental Disease Prevention Track [excluded]
Virginia Tech Public Health Program	MPH – Master of Public Health [unable to locate/confirm]

**Appendix B: Schools of Public Health and Collected Syllabi**

School	Core Public Health Classes	Syllabi Received	Comments
Johns Hopkins University		XX	Excluded from analysis as core MPH courses differ by concentration. Atypical alignment.
Kent State University	BST 52019 Biostatistics in Public Health	XX	
	EPI 52017 Fundamentals of Public Health Epidemiology	XX	
	HPM 52016 Public Health Administration	XX	
	HPM 53010 Community Health Needs Assessment	XX	
	SBS 54634 Social Determinants of Health	XX	
New York University	GPH-GU-2106/5106 Epidemiology	XX	In-person and on-line classes have different course numbers.
	GPH-GU-2110/5100 Health Care Policy	XX	
	GPH-GU-2112/5112 Public Health Management	XX	
	GPH-GU-2140/5140 Global Issues in Social and Behavioral Health	XX	
	GPH-GU-2153/5153 Global Environmental Health	XX	
	GPH-GU-2190/5190 Essentials of Public Health Biology	XX	
	GPH-GU-2995/5995 Biostatistics for Public Health	XX	
	GPH-GU-5171 Global Health Informatics Workshop	XX	
	GPH-GU-5175 Readings in the History and Philosophy of Public Health	XX	
	GPH-GU-5180 Readings in the History and Philosophy of Public Health	XX	
	GPH-GU-5185 Readings in the History and Philosophy of Public Health	XX	
North Dakota State University	PH789 – Integrative Learning Experience	XX	

Northeastern University	PHTH5202 – Introduction to Epidemiology	XX	
	PHTH5210 – Biostatistics in Public Health	XX	
	PHTH5212 – Public Health Administration and Policy	XX	
	PHTH5214 – Environmental Health	XX	
	PHTH5540 – Health Education and Program Planning	XX	Can be substituted with PPUA6509 Techniques of Program Evaluation
	PHTH6204 – Society, Behavior, and Health	XX	
Ohio State University	PUBHTLH6001 – Methods in Quantitative Data Analysis	XX	
	PUBHTLH6002 – History, Values, and Essential Services of the US Public Health System	XX	
	PUBHTLH6003 – Methods in Public Health Planning and Evaluation	XX	
	PUBHTLH6004 – Essentials of Population Health	XX	
Oregon State University	H513 – Integrated Approach to Public Health	XX	Core consists of one 12 credit hour course. Also offered on-line as part 1 and 2
Rutgers University	PHCO0501 – Health Systems and Policy	XX	
	PHCO0502 – Principles and Methods of Epidemiology	XX	
	PHCO0503 – Introduction to Environmental Health	XX	
	PHCO0504 – Introduction to Biostatistics	XX	
	PHCO0505 – Social and Behavioral Health Sciences	XX	
	PHCO0513 – Leadership and Management Essentials	XX	
San Diego State University	PH601 Epidemiology	XX	
	PH602 Biostatistics	XX	
	PH603 Behavioral and Social Science in Public Health	XX	

	PH604 Environmental Determinants of Human Health	XX	
	PH605 Health Services Administration	XX	
St. Catherine University	HLTH6000 Critical Issues in Global Public Health	XX	
	HLTH6010 Principles of Epidemiology and Biostatistics I	XX	
	HLTH6020 Principles of Epidemiology and Biostatics II	XX	
	HLTH6040 Global Health Policy and Governance		
	HLTH6110 International Perspectives in Environmental Health Sciences	XX	
	HLTH7100 200-hour practicum	XX	
	HLTH7200 Capstone	XX	
Temple University	SBS5002 Program Planning, Theory, and Practice	XX	
	SBS5001 Fundamentals of Public Health	XX	
Texas Tech University	GSPH5307 Introduction to Epidemiology	XX	
	GSPH5313 Introduction to Public Health	XX	
	GSPH 5315 Organizational Leadership and Management	XX	
	SPPH5310 Public Health Policy	XX	
	GSPH5311 Introduction to Biostatistics	XX	
	Community Based Methods and Practice	XX	
University of California, Berkeley	PHW200E Health Policy and Management	XX	
University of Cincinnati	PH7010 Introduction to Biostatistics	XX	
University of Florida	PHC6050 Statistical Methods for Health Science I	XX	
	PHC6052 Introduction to Biostatistical Methods	XX	
	PHC6001 Principles of Epidemiology in Public Health	XX	
	I6114 Introduction to US Health Care System	XX	

	PHC6313 Environmental Health Concepts in Public Health	XX	
	PHC6410 Psychological, Behavioral, and Social Issues in Public Health	XX	
University of Georgia	BIOS7010 Introduction to Biostatistics I	XX	
	EHSC7010 Fundamentals of Environmental Health	XX	
	EPID7010 Introduction to Epidemiology I	XX	
	HPAM7010 Introduction to Health Policy and Management	XX	
	HPRB7010 Social and Behavioral Foundations of Public Health	XX	
University of Maryland	SPHL 601 – Core Concepts in Public Health	XX	
	SPHL 620 – Leadership, Teams, and Coalitions: Policy to Advocacy	XX	
	SPHL 602/603 – Foundations of Epidemiology and Biostatistics	XX	
	SPHL 611 – Public Health Ethics	XX	
	SPHL 610 – Program and Policy Planning, Implementation, and Evaluation	XX	
	SPHL 603 – Public Health Data Laboratory	XX	
University of Memphis	PUBH7160 Social and Behavioral Sciences Principles	XX	
University of Michigan	BIOS531 – Applied Statistics	XX	
	PUBHLTH512 – Principles of Epidemiology for Public Health	XX	
University of Minnesota	PUBH6020 Fundamentals of Social and Behavioral Science	XX	
	PUBH6102 Issues in Environmental and Occupational Health	XX	
	PUBH6341 Epidemiologic Methods I	XX	
	PUBH6450 Biostatistics I	XX	
	PUBH6741 Ethics in Public Health: Professional Practice and Policy	XX	

	PUBH 6751 Principles of Management in Health Services	XX	
University of Nevada, Las Vegas	EOH707 Practice of Public Health	XX	Competencies are called “Fundamental Public Health Knowledge (FPHK)”
	EOH710 Fundamentals of Public Health	XX	
	EOH740 Fundamentals of Environmental Health	XX	
	EAB705 Epidemiology and Public Health	XX	
	HCA701 US Healthcare System: Programs and Policies	XX	
	HED720 Program Planning and Grant Writing in Health Promotion	XX	
	EAB703 Biostatistical Methods for the Health Sciences	XX	
University of New Mexico	PH560- Global Health	XX	
	PH506- Environmental and Occupational Health	XX	
	PH554- Health Policy, Politics, and Social Equity	XX	
	PH538- Biostatistical Methods	XX	
	PH501- Principles of Public Health	XX	
University of North Carolina	SPHG711 Data Analysis for Public Health	XX	
	SPHG721 Conceptualizing Public Health Solutions	XX	
	SPHG713 Understanding Public Health Issues	XX	
University of North Dakota	PH504 - Planning and Management to Promote Health	XX	
	PH510 – Public Health Care Systems	XX	
	PH520 – Environmental Health		
	PH531 – Biostatistics I	XX	
	PH541 – Public Health Communication	XX	
	PH545 – Public Health Leadership Interprofessional Practice		
	PH551 – Epidemiology I	XX	
	POL552 – Health Policy	XX	
University of Pittsburgh	PUBHLT2105 – Public Health Biology	XX	
	BIOST2011 – Principles of Statistical Reasoning	XX	

	BIOST2041 – Introduction to Statistical Methods I	XX	
	EPIDEM2110 – Principles of Epidemiology	XX	
	BCHS2509 – Social and Behavioral Sciences in Public Health	XX	
	EOH2013 – Environmental Health and Disease	XX	
	HPM2001 – Health Policy and Management in Public Health	XX	
	PUBHLT2011 – Essentials of Public Health	XX	
	PUBHLT2033 – Foundations in Public Health	XX	
	PUBHLT2034 – Public Health Communications	XX	
	PUBHLT2035 – Applications in Public Health	XX	
University of South Florida	PHC6756 Population Assessment Part 1	XX	
	PHC6757 Population Assessment Part 2	XX	
	PHC6145 Translation to Public Health Practice	XX	
	PHC6588 History and Systems of Public Health	XX	
University of Texas	PHM2612 Epidemiology I	XX	
	PHM1690 Introduction to Biostatistics in Public Health	XX	
	PHM1110 Health Promotion and Behavioral Sciences in Public Health	XX	
	PHWM2110 Public Health Ecology and the Human Environment	XX	
	PHM3715 Management and Policy Concepts in Public Health	XX	
	PHM5015 Introduction to Qualitative Research in Public Health	XX	
University of Texas Medical Branch	SPPH6403 Analytical Methods in PH	XX	

	SPPH6324 Assessment, Planning, and Evaluation	XX	
	SPPH6401 Policy and Equity	XX	Also listed as SPPH6469
	SPPH6338 Applied Public Health Leadership	XX	
University of Toledo	PUBH6950 – Integrative Learning Experience	XX	Program is listed as “School of Population Health”
	PUBH6000 – Quantitative and Qualitative Data Analysis in Public Health	XX	
	PUBH6020 – Management and Leadership in Public Health	XX	
	PUBH6090 – Issues in Public Health	XX	
	PUBH6010 – Public and Occupational Health Programs	XX	
	PUBH6900 – Interprofessional Education for Public Health	XX	
	PUBH6080 – Social Determinants of Health	XX	
University of Washington	PHI511 Foundations of Public Health	XX	
	PHI512 Analytic Skills for Public Health I	XX	
	PHI513 Analytic Skills for Public Health II	XX	
	PHI514 Determinants of Health	XX	
	PHI515 Implementing Public Health Interventions	XX	
	PHI516 Public Health Practice	XX	



**Appendix C: Exemption Letter from University of South Florida Institutional Review Board**



**NOT HUMAN SUBJECTS RESEARCH DETERMINATION**

June 12, 2023

Christine McGuire-Wolfe  
13201 Bruce B. Downs  
MDC 56  
Tampa, FL 33612

Dear Dr. Christine McGuire-Wolfe:

On 6/9/2023, the IRB reviewed the following protocol:

IRB ID:	STUDY005878
Title:	Building Capacity of the Public Health Workforce: An Examination of Challenges and Opportunities Related to Enhancing Infection, Prevention, and Control Education and Training for Students

The IRB determined that the proposed activity does not constitute research involving human subjects as defined by DHHS and FDA regulations.

IRB review and approval is not required. This determination applies only to the activities described in the IRB submission. If changes are made and there are questions about whether these activities constitute human subjects research, please submit a new application to the IRB for a determination.

While not requiring IRB approval and oversight, your project activities should be conducted in a manner that is consistent with the ethical principles of your profession. If this project is program evaluation or quality improvement, do not refer to the project as research and do not include the assigned IRB ID or IRB contact information in the consent document or any resulting publications or presentations.

Sincerely,

Bhupinder Sran  
IRB Research Compliance Administrator

**Appendix D: APIC's Mega Survey Report**
**APIC MegaSurvey 2020: N = 2,030**

**Q1\_CHK** Describe your primary role in Infection prevention and control (select only one):  
 n =2030

# (%)	Code	Text	Open-End
1459 (71.9)	1	Front Line/Practicing IP	None
412 (20.3)	2	IP Administrator/Director	None
35 (1.7)	3	Educator or Researcher (Academic Role)	None
59 (2.9)	4	External Consultant (External) (i.e. Consulting is your primary role)	None
65 (3.2)	5	Public Health Practitioner (Federal/Legislative/Regulatory Agency)	None
0	6	Industry	None

**What was your primary background/discipline prior to working in Infection Prevention/Epidemiology? n = 2030**

# (%)	Code	Text	Open-End
1583 (78.0)	1	Nurse	None
96 (4.7)	2	Medical technician/Laboratory scientist	None
70 (3.5)	3	Microbiology	None
170 (8.4)	4	Public Health	None
7 (0.3)	5	Foreign medical grad	None
20 (1.0)	6	Patient Safety/Performance Improvement	None
84 (4.1)	7	Other, please specify:	


# (%)	Code	Text	Open-End
29 (44.6)	01	Acute care	None
13 (20.0)	02	Ambulatory surgical centers	None
19 (29.2)	03	Outpatient clinics	None
12 (18.5)	04	Dental practices	None
13 (20.0)	05	Dialysis	None

# (%)	Code	Text	Open-End
18 (27.7)	06	Long term care	None
19 (29.2)	07	Long term acute care	None
10 (15.4)	08	Home Health Care or Personal Care Homes	None
5 (7.7)	09	Home Infusion Care	None
34 (52.3)	10	Other, please describe:	

# (%)	Code	Text	Open-End
27 (1.4)	01	Educator	None
8 (0.4)	02	Employee Health	None
13 (0.7)	03	Epidemiologist	None
1517 (81.1)	04	Infection Prevention and Control	None
6 (0.3)	05	Infectious Disease Physician	None
3 (0.2)	06	Medical Technology	None
1 (0.1)	07	Microbiologist	None
3 (0.2)	08	Nurse Practitioner	None
95 (5.1)	09	Nursing Administrator/Executive	None
2 (0.1)	10	Public Health	None
77 (4.1)	11	Quality/Process Improvement	None
0 (0)	12	Research	None
16 (0.9)	13	Risk Management	None
4 (0.2)	14	Safety Officer	None
99 (5.3)	15	Other, please describe:	

Appendix E: APIC's Mega Survey Slides

DECEMBER 2022  
2015 vs. 2020

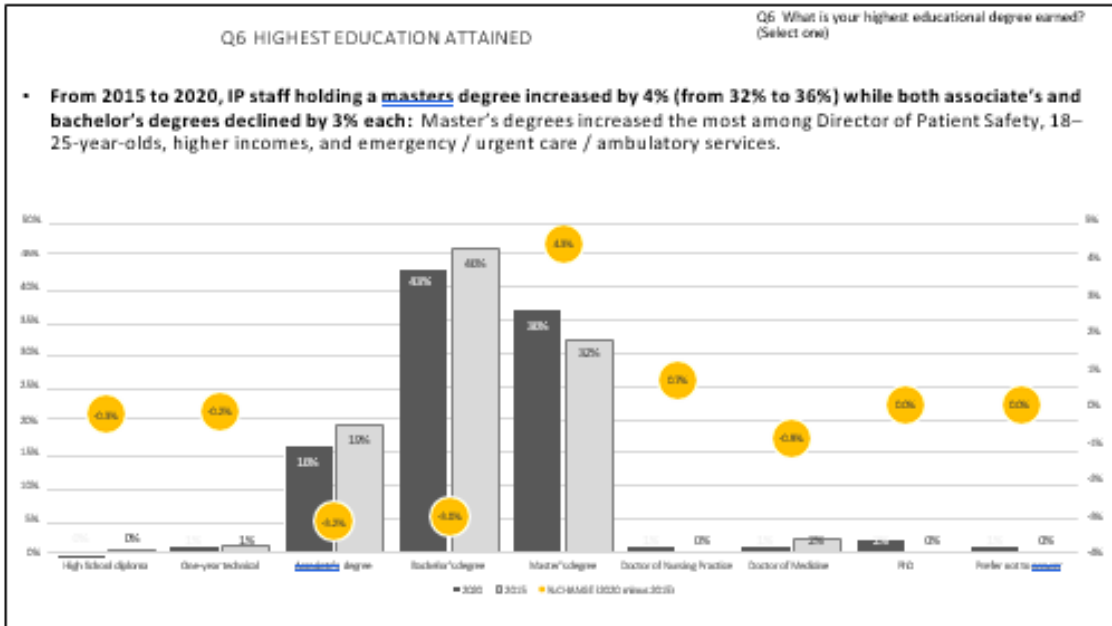


**APIC**<sup>®</sup>

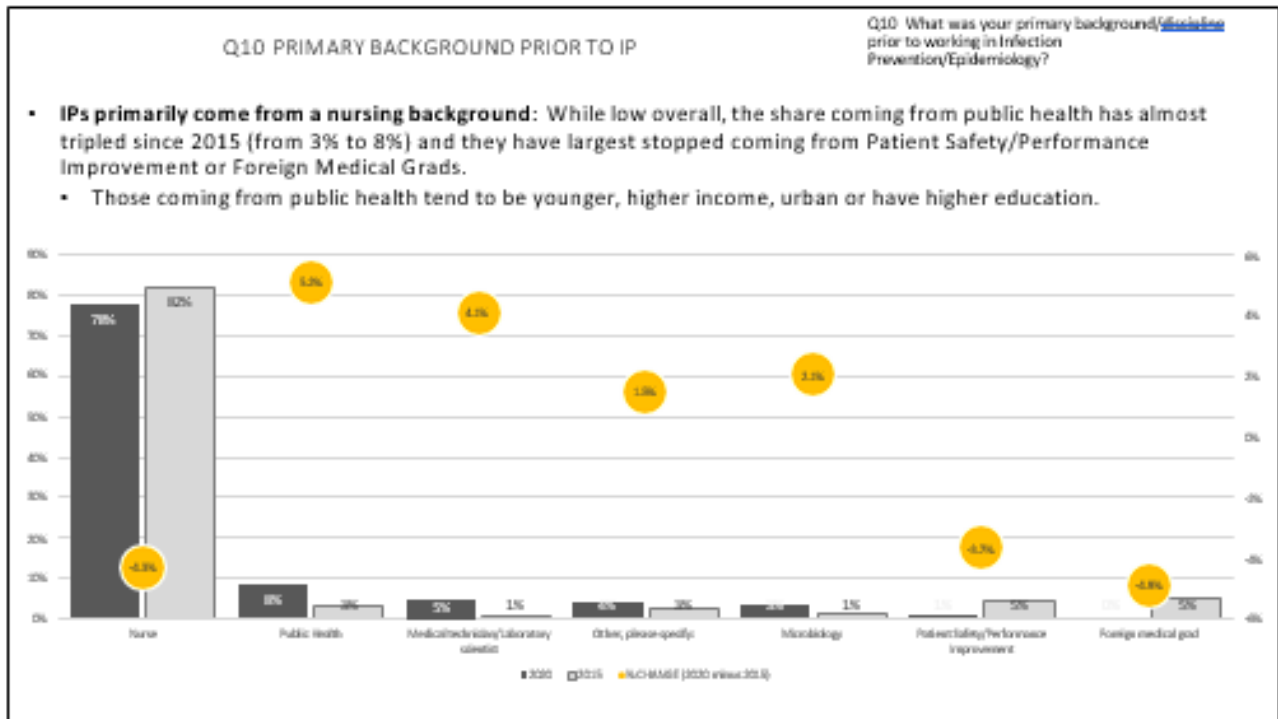
"Create a safer world through prevention of infection."

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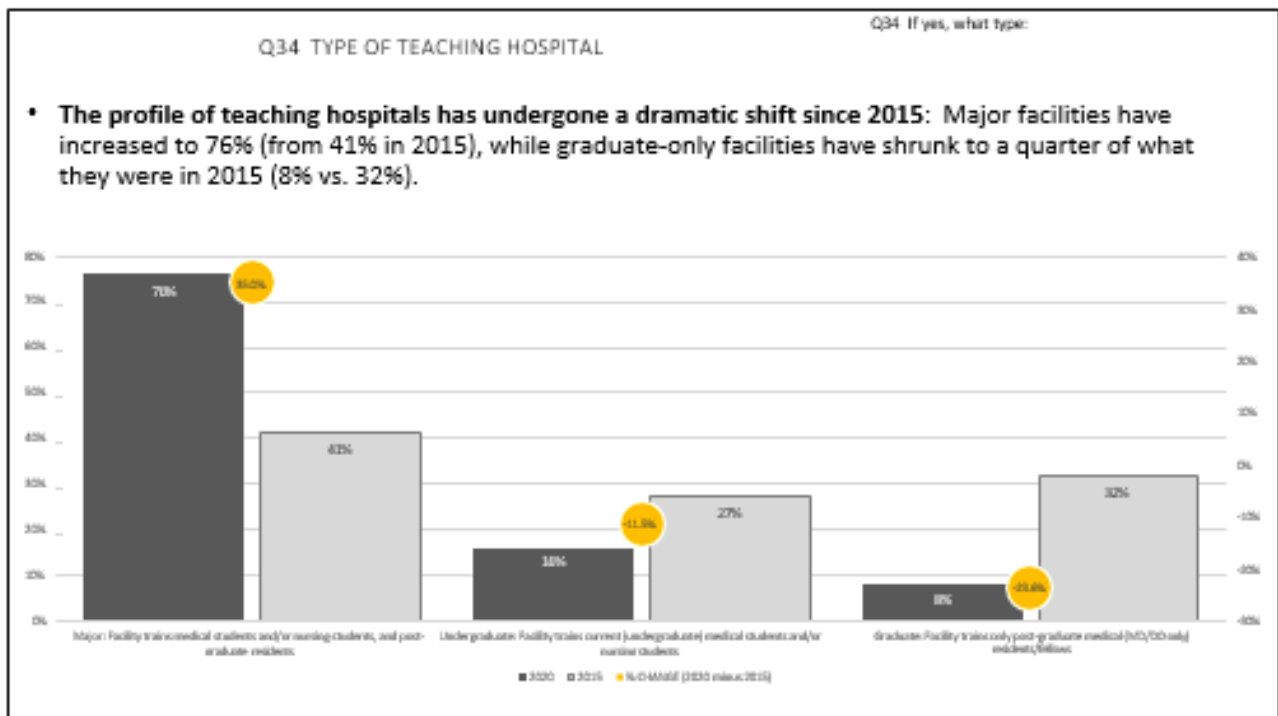
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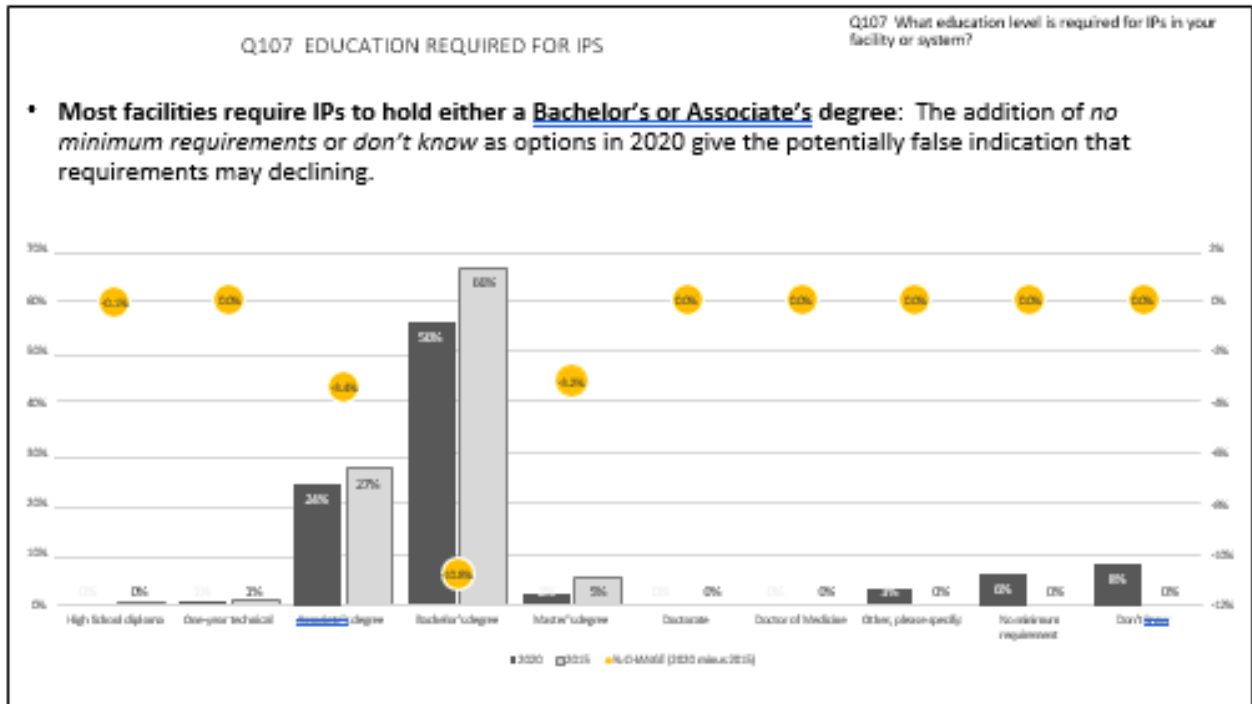
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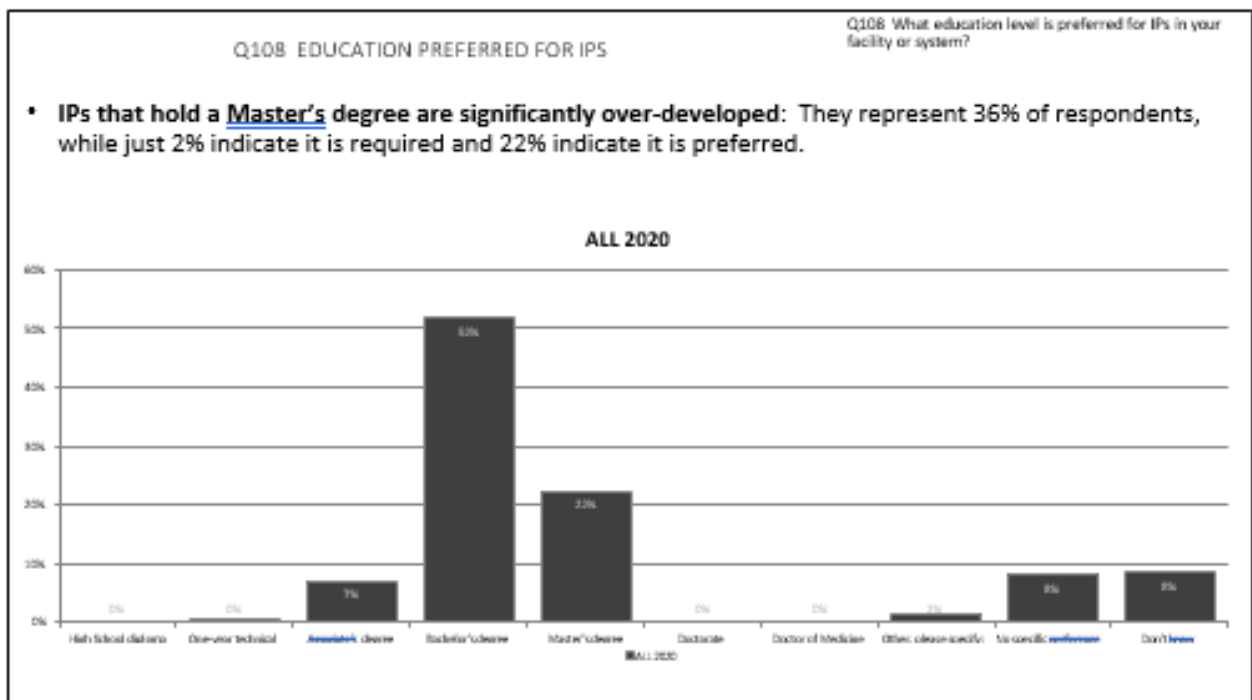
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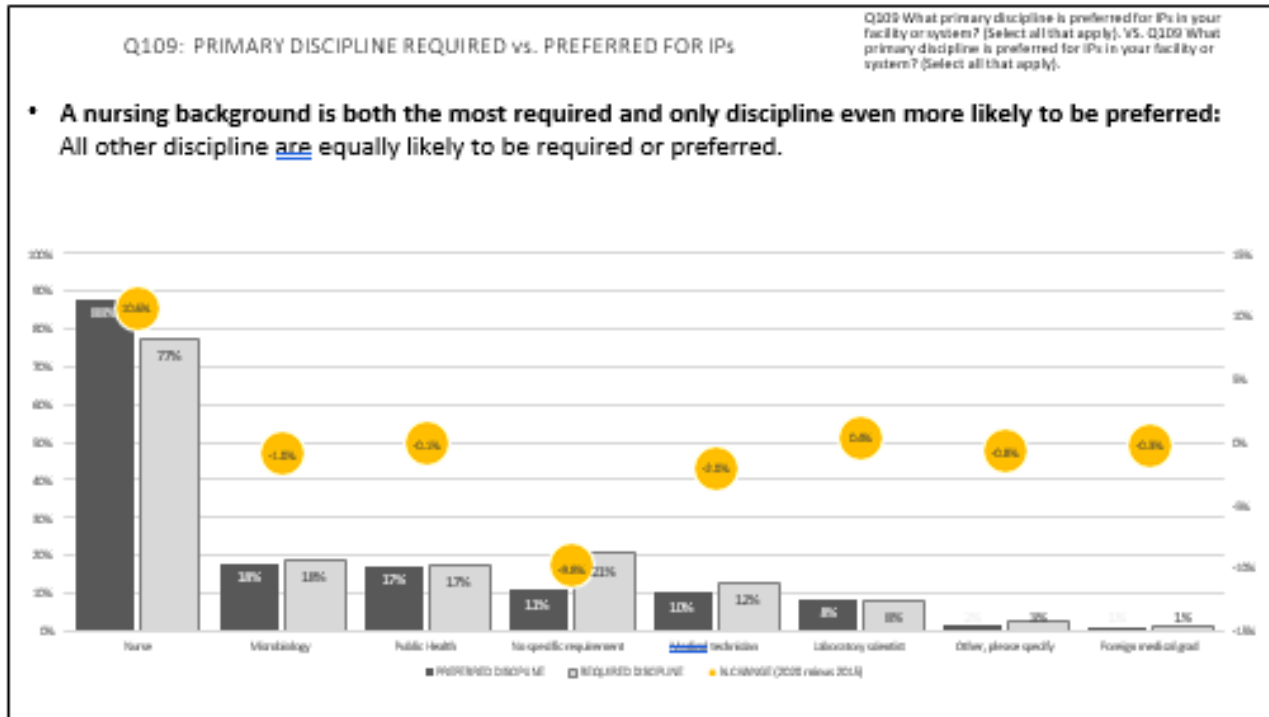
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6



## Appendix F: IP Competencies and Domains Compared with MPH Knowledge and Training<sup>42</sup>

IP competencies and domains compared with MPH knowledge and training

2013 APIC competency self-assessment <sup>22</sup> IP competency categories, integrating both the APIC and CBIC domains	IP practice areas as identified in CBIC practice analysis	Addressed by MPH core knowledge area or foundational competency?			Council on Education for Public Health 2016 accreditation requirements <sup>20</sup> MPH foundational area
		Yes	Partially addressed	No	
Identification of infectious disease processes (CBIC)	1. Differentiate among colonization, infection, and contamination		X		Epidemiology core knowledge area
	2. Identify occurrences, reservoirs, incubation periods, periods of communicability, modes of transmission, signs and symptoms, and susceptibility associated with the disease process		X		Epidemiology core knowledge area
	3. Interpret results of diagnostic/lab reports			X	Not covered
	4. Recognize limitations and advantages of types of tests used to diagnose infectious processes		X		Biostatistics core knowledge area
	5. Recognize epidemiologically significant organisms for immediate review and investigation		X		Epidemiology core knowledge area
	6. Differentiate among prophylactic, empiric, and therapeutic uses of antimicrobials			X	Not covered
	7. Identify indications for microbiologic monitoring			X	Not covered
Surveillance and epidemiologic investigation (CBIC)	1. Design of surveillance systems	X			Epidemiology foundational competencies
	2. Collection and compilation of surveillance data		X		Biostatistics core knowledge area
	3. Outbreak investigation		X		Epidemiology core knowledge area
Future-oriented domain (APIC): technical	Example: electronic surveillance systems, access to/use of electronic databases/electronic data warehouse, other related applications, algorithmic detection and reporting processes, clinical decision support, infection prevention within the electronic health record	X			Biostatistics, health services administration foundational competencies
Preventing/controlling the transmission of infectious agents (CBIC)	1. Develop and review IPC policies and procedures	X			Foundational competencies
	2. Collaborate with public health agencies in planning community responses to biologic agents		X		Epidemiology core knowledge area and foundational public health knowledge
	3. Identify and implement IPC strategies according to specific topics:	X			Foundational public health knowledge
	• Hand hygiene		X		Social and behavioral sciences core knowledge area
	• Cleaning, disinfection, and sterilization		X		Environmental health sciences core knowledge area
	• Specific direct and indirect care settings			X	Not covered
	• Therapeutic and diagnostic procedures and devices			X	Not covered
	• Product/equipment recall procedures			X	Not covered
	• Use of isolation/barrier precautions when indicated			X	Social and behavioral sciences core knowledge area
	• Patient placement, transfer, discharge			X	Health services administration core knowledge area
	• Environmental hazards	X			Environmental health sciences foundational public health knowledge
	• Use of patient care products and medical equipment			X	Not covered
	• Patient immunization programs			X	Epidemiology core knowledge area and foundational public health knowledge
• Construction and renovation	X			Environmental health sciences foundational public health knowledge	
• Influx of patients with communicable diseases			X	Epidemiology core knowledge area	



**Appendix G: Raw Tracking Form for Syllabi Review**

Schools yellowed out have provided syllabi for their entire MPH core. Courses greyed out did not have IPC content or clear inclusion points.

School	Core PH	AR	HAI	IPC	Inclusion Point for IPC	Inclusion Point under more general PH concepts
Kent State University	BST 52019 Biostatistics in Public Health					
	EPI 52017 Fundamentals of Public Health Epidemiology			XX	XX	XX
	HPM 52016 Public Health Administration					
	HPM 53010 Community Health Needs Assessment					XX
	SBS 54634 Social Determinants of Health					
New York University	GPH-GU-2106/5106 Epidemiology			XX	XX	
	GPH-GU-2110/5100 Health Care Policy					
	GPH-GU-2112/5112 Public Health Management					
	GPH-GU-2140/5140 Global Issues in Social and Behavioral Health			XX	XX	XX
	GPH-GU-2153/5153 Global Environmental Health			XX		
	GPH-GU-2190/5190 Essentials of Public Health Biology	XX	XX	XX	XX	
	GPH-GU-2995/5995 Biostatistics for Public Health					

	GPH-GU-5171 Global Health Informatics Workshop			
	GPH-GU-5175 Readings in the History and Philosophy of Public Health	XX		
	GPH-GU-5180 Readings in the History and Philosophy of Public Health			
	GPH-GU-5185 Readings in the History and Philosophy of Public Health	XX		
North Dakota State University	PH789 - Integrative Learning Experience			
Northeastern University	PHTH5202 – Introduction to Epidemiology	XX	XX	
	PHTH5210 – Biostatistics in Public Health			
	PHTH5212 – Public Health Administration and Policy		XX	XX
	PHTH5214 – Environmental Health	XX		
	PHTH5540 – Health Education and Program Planning			XX
	PHTH6204 – Society, Behavior, and Health	XX		
Ohio State University	PUBHTLH6001 – Methods in Quantitative Data Analysis			
	PUBHTLH6002 – History, Values, and Essential Services of the US Public Health System	XX	XX	
	PUBHTLH6003 – Methods in Public Health Planning and Evaluation		XX	
	PUBHTLH6004 – Essentials of Population Health			XX
Oregon State University	H513 – Integrated Approach to Public Health	XX	XX	

Rutgers University	PHCO0501 – Health Systems and Policy			
	PHCO0502 – Principles and Methods of Epidemiology		XX	
	PHCO0503 – Introduction to Environmental Health		XX	XX
	PHCO0504 – Introduction to Biostatistics			
	PHCO0505 – Social and Behavioral Health Sciences			XX
	PHCO0513 – Leadership and Management Essentials			
Texas Tech University	GSPH5307 Introduction to Epidemiology	XX	XX	
	SPPH5310 Public Health Policy			
	GSPH5311 Introduction to Biostatistics			
	GSPH 5334 Community Based Methods and Practice		XX	
	GSPH5313 Introduction to Public Health	XX	XX	
	GSPH 5315 Organizational Leadership and Management			
University of California, Berkeley	PHW200E Health Policy and Management		XX	
University of Cincinnati	PH7010 Introduction to Biostatistics			
	PHC6050 Statistical Methods for Health Science I			
University of Florida	PHC6052 Introduction to Biostatistical Methods			
	PHC6001 Principles of Epidemiology in Public Health		XX	

	I6114 Introduction to US Health Care System		
	PHC6313 Environmental Health Concepts in Public Health		XX
	PHC6410 Psychological, Behavioral, and Social Issues in Public Health	XX	XX
University of Georgia	BIOS7010 Introduction to Biostatistics I		
	EHSC7010 Fundamentals of Environmental Health		XX
	EPID7010 Introduction to Epidemiology I	XX	XX
	HPAM7010 Introduction to Health Policy and Management		
	HPRB7010 Social and Behavioral Foundations of Public Health		XX
University of Maryland	SPHL 601 – Core Concepts in Public Health	XX	XX
	SPHL 620 – Leadership, Teams, and Coalitions: Policy to Advocacy		
	SPHL 610 – Program and Policy Planning, Implementation, and Evaluation	XX	XX
	SPHL 602/603 – Foundations of Epidemiology and Biostatistics		XX
	SPHL 611 – Public Health Ethics		XX
	SPHL 603 – Public Health Data Laboratory		XX
University of Memphis	PUBH7160 Social and Behavioral Sciences Principles	XX	XX
University of Michigan	BIOS531 – Applied Statistics		
	PUBHLTH512 – Principles of Epidemiology for Public Health	XX	XX

University of Minnesota	PUBH6020 Fundamentals of Social and Behavioral Science	XX	
	PUBH6102 Issues in Environmental and Occupational Health	XX	XX
	PUBH6341 Epidemiologic Methods I	XX	
	PUBH6450 Biostatistics I		XX
	PUBH6741 Ethics in Public Health: Professional Practice and Policy		
University of Nevada, Las Vegas	PUBH 6751 Principles of Management in Health Services	XX	XX
	EOH707 Practice of Public Health		
	EOH710 Fundamentals of Public Health	XX	XX
	EOH740 Fundamentals of Environmental Health		
	EAB705 Epidemiology and Public Health	XX	XX
	HCA701 US Healthcare System: Programs and Policies		XX
	HED720 Program Planning and Grant Writing in Health Promotion		XX
	EAB703 Biostatistical Methods for the Health Sciences		
University of Toledo	PUBH6950 – Integrative Learning Experience		
	PUBH6000 – Quantitative and Qualitative Data Analysis in Public Health		
	PUBH6020 – Management and Leadership in Public Health		
	PUBH6090 – Issues in Public Health	XX	XX

	PUBH6010 – Public and Occupational Health Programs	XX	XX
	PUBH6900 – Interprofessional Education for Public Health		
	PUBH6080 – Social Determinants of Health		XX
University of New Mexico	PH560- Global Health	XX	XX
	PH506- Environmental and Occupational Health		
	PH554- Health Policy, Politics, and Social Equity		
	PH538- Biostatistical Methods		
	PH501- Principles of Public Health		XX
University of North Carolina	SPHG711 Data Analysis for Public Health		
	SPHG713 Understanding Public Health Issues	XX	XX
	SPHG721 Conceptualizing Public Health Solutions		XX
University of North Dakota	PH504 - Planning and Management to Promote Health		XX
	PH510 – Public Health Care Systems		
	PH531 – Biostatistics I		
	PH541 – Public Health Communication		XX
	PH551 – Epidemiology I	XX	XX
	POL552 – Health Policy		
University of Pittsburgh	PUBHLT2105 – Public Health Biology	XX	XX
	BIOST2011 – Principles of Statistical Reasoning		

	BIOST2041 – Introduction to Statistical Methods I		
	EPIDEM2110 – Principles of Epidemiology	XX	XX
	BCHS2509 – Social and Behavioral Sciences in Public Health	XX	
	EOH2013 – Environmental Health and Disease		XX
	HPM2001 – Health Policy and Management in Public Health		XX
	PUBHLT2011 – Essentials of Public Health		XX
	PUBHLT2033 – Foundations in Public Health	XX	XX
	PUBHLT2034 – Public Health Communications	XX	
	PUBHLT2035 – Applications in Public Health		
University of South Florida	PHC6756 Population Assessment Part 1	XX	XX
	PHC6757 Population Assessment Part 2	XX	XX
	PHC6145 Translation to Public Health Practice		XX
	PHC6588 History and Systems of Public Health		
University of Texas	PHM2612 Epidemiology I	XX	XX
	PHM1690 Introduction to Biostatistics in Public Health		
	PHM1110 Health Promotion and Behavioral Sciences in Public Health		XX

	PHWM2110 Public Health Ecology and the Human Environment		
	PHM3715 Management and Policy Concepts in Public Health	XX	XX
	PHM5015 Introduction to Qualitative Research in Public Health		
University of Texas Medical Branch	SPPH6403 Analytical Methods in PH		
	SPPH6324 Assessment, Planning, and Evaluation		
	SPPH6401/6469 Policy and Equity	XX	
	SPPH6338 Applied Public Health Leadership		XX
University of Washington	PHI511 Foundations of Public Health		XX
	PHI512 Analytic Skills for Public Health I	XX	XX
	PHI513 Analytic Skills for Public Health II	XX	XX
	PHI514 Determinants of Health		XX
	PHI515 Implementing Public Health Interventions		XX
	PHI516 Public Health Practice	XX	XX



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