Program in Public Health (PPH) Competencies

D1. Graduate-Level Professional Foundational Public Health Knowledge (MPH, MSB, MSE)

D1.1. Explain public health history, philosophy and values
D1.2. Identify the core functions of public health and the 10 Essential Services
D1.3. Explain the role of quantitative and qualitative methods and sciences in describing and assessing a population's health
D1.4. List major causes and trends of morbidity and mortality in the US or other communities relevant to the school or program, with attention to disparities among populations, e.g., socioeconomic, ethnic, gender, racial, etc.
D1.5. Discuss the science of primary, secondary & tertiary prevention in population health, including health promotion, screening, etc
D1.6. Explain the critical importance of evidence in advancing public health knowledge
D1.7. Explain effects of environmental factors on a population's health
D1.8. Explain biological and genetic factors that affect a population's health
D1.9. Explain behavioral and psychological factors that affect a population's health
D1.10. Explain the cultural, social, political and economic determinants of health and how the determinants relate to population health and health inequities
D1.11. Explain how globalization affects global burdens of disease
D1.12. Explain an ecological perspective on the connections among human health, animal health and ecosystem health (eg, One Health)

D2. MPH Foundational Competencies

D2.1. Apply epidemiological methods to the breadth of settings and situations in public health practice
D2.2. Select quantitative and qualitative data collection methods appropriate for a given public health context
D2.3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate
D2.4. Interpret results of data analysis for public health research, policy or practice
D2.5. Compare the organization, structure and function of health care, public health and regulatory systems across national and international settings
D2.6. Discuss the means by which structural bias, social inequities and racism undermine health and create challenges to achieving health equity at organizational, community and societal levels
D2.7. Assess population needs, assets and capacities that affect communities' health
D2.8. Apply awareness of cultural values and practices to the design, implementation, or critique of public health policies or programs
D2.9. Design a population-based policy, program, project or intervention
D2.10. Explain basic principles and tools of budget and resource management
D2.11. Select methods to evaluate public health programs
D2.12. Discuss the policy-making process, including the roles of ethics and evidence
D2.13. Propose strategies to identify relevant communities and individuals and coalitions and partnerships for influencing public health outcomes
D2.14. Advocate for political, social or economic policies and programs that will improve health in diverse populations
D2.15. Evaluate policies for their impact on public health and health equity
D2.16. Apply leadership and/or management principles to address a relevant issue
D2.17. Apply negotiation and mediation skills to address organizational or community challenges
D2.18. Select communication strategies for different audiences and sectors
D2.19. Communicate audience-appropriate public health content, both in writing and through oral presentation to a non-academic, non-peer audience with attention to factors such as literacy and health literacy.
D2.20. Describe the importance of cultural humility in communicating public health content
D2.21. Integrate perspectives from other sectors and/or professions to promote and advance population health
D2.22. Apply a systems thinking tool to visually represent a public health issue in a format other than standard narrative

MPH Concentration Competencies

Program in Public Health (PPH) Competencies

Community Health Research & Evaluation Concentration
CHRE1. Describe the factors that influence the health and wellbeing of communities.
CHRE2. Engage communities as partners in health research, intervention, and evaluation.
CHRE3. Apply relevant theories and methods to conduct community health research.
CHRE4. Design, implement, and evaluate evidence-based community health interventions.
CHRE5. Translate and disseminate research findings in collaboration with communities.
CHRE6. Optimize health equity across communities through centering minoritized voices.

Data Science Concentration
DS1. Critically Evaluate quantitative data and methodology in public health communications.
DS2. Achieve proficiency in the use of a software package that promotes sharing of data, analysis, and methods.
DS3. Use data to create and test hypotheses relevant to public health.
DS4. Formulate tests of health disparities in data related to public health.
DS5. Explain ethical challenges in the interpretation of data related to public health.

Epidemiology Concentration
EPI1. Critique the feasibility of study design as it pertains to sampling, data collection, and resource requirements
EPI2. Assess biological mechanisms of disease by applying knowledge of behavioral sciences and human and environmental biology
EPI3. Critique the validity of epidemiologic data, findings, and publications by applying knowledge of epidemiologic principles and methods.
EPI4. Describe molecular techniques commonly used in epidemiologic studies
EPI5. Formulate and apply plans for data cleaning and management using statistical analysis software

Global Health Concentration
GLO1. Critique major global public health priorities and the reasons for their prioritization
GLO 2. Apply demographic, epidemiologic and anthropologic methods to assess health disparities at local and global levels.
GLO 3. Develop systems to monitor progress toward targets, objectives, and goals and evaluate programs and their operational components.
GLO 4. Operate in partnership with local, national and international organizations engaged in the health and social sectors.
GLO 5. Apply systems thinking to promote integrative global health across different disciplinary domains and organizational levels.

Generalist Concentration (Students in this concentration choose 5 competencies from this list)
CHRE1. Describe the factors that influence the health and wellbeing of communities.
CHRE2. Engage communities as partners in health research, intervention, and evaluation.
CHRE3. Apply relevant theories and methods to conduct community health research.
CHRE4. Design, implement, and evaluate evidence-based community health interventions.
CHRE5. Translate and disseminate research findings in collaboration with communities.
CHRE6. Optimize health equity across communities through centering minoritized voices.
DS1. Critically Evaluate quantitative data and methodology in public health communications.
DS2. Achieve proficiency in the use of a software package that promotes sharing of data, analysis, and methods.
DS3. Use data to create and test hypotheses relevant to public health.
DS4. Formulate tests of health disparities in data related to public health.
DS5. Explain ethical challenges in the interpretation of data related to public health.
EPI1. Describe molecular techniques and laboratory resources commonly used in epidemiologic studies
EPI2. Evaluate current knowledge of causes of disease to guide epidemiologic practice
EPI3. Assess biological mechanisms of disease by applying knowledge of behavioral sciences and human and environmental biology.

EPI4. Critique the validity of epidemiologic data, findings, and publications by applying knowledge of epidemiologic principles and methods
EPI5. Formulate and apply plans for data cleaning and management using statistical analysis software
GLO1. Critique major global public health priorities and the reasons for their prioritization
GLO2. Apply demographic, epidemiologic and anthropologic methods to assess health disparities at local and global levels.
GLO 3. Develop systems to monitor progress toward targets, objectives, and goals and evaluate programs and their operational components.
GLO4. Operate in partnership with local, national and international organizations engaged in the health and social sectors.
GLO5. Apply systems thinking to promote integrative global health across different disciplinary domains and organizational levels.
IMPSCI1. Describe the field of implementation science and its unique role in addressing gaps in health research and practice.
IMPSCI2. Design rigorous studies and comprehensive evaluation plans for implementation research and practice.
IMPSCI3. Apply appropriate theories, models, and frameworks for implementation research and practice.
IMPSCI4. Design context-specific implementation strategies through the integration of multiple forms of evidence.
IMPSCI5. Apply interdisciplinary approaches and methods to implementation research and practice.
MCH1. Determine how different strengths, needs, values and practices of diverse cultural, racial, ethnic, and socioeconomic groups affect health status, health behaviors and program design.
MCH2. Evaluate theories and principles of individual and family growth and development from an intergenerational and lifespan perspective.
MCH3. Apply appropriate research methods to the evaluation of MCH program and practices.
MCH4. Evaluate evidence-based methods that contribute to the translation of research into MCH programming and practice.
MCH5. Recognize and apply principles of ethical conduct in program management, research and data collection and storage
MSB2. Use computer-based statistical analysis package(s) to manage data;
MSB3. Develop visualized data using computer-based statistical analysis package(s);
MSB4. Analyze data employing computer-based statistical analysis package(s);
MSB5. Implement sample size and power calculations for a range of experimental designs;
MSB8. Calculate epidemiological measures of association between risk factors and disease;
MSB11. Apply ethical and regulatory standards to human subjects research.

Implementation Science Concentration
IMPSCI1. Describe the field of implementation science and its unique role in addressing gaps in health research and practice.
IMPSCI2. Design rigorous studies and comprehensive evaluation plans for implementation research and practice.
IMPSCI3. Apply appropriate theories, models, and frameworks for implementation research and practice.
IMPSCI4. Design context-specific implementation strategies through the integration of multiple forms of evidence.
IMPSCI5. Apply interdisciplinary approaches and methods to implementation research and practice.

Maternal Child Health Concentration
MCH1. Determine how different strengths, needs, values and practices of diverse cultural, racial, ethnic, and socioeconomic groups affect health status, health behaviors and program design.
MCH2. Evaluate theories and principles of individual and family growth and development from an intergenerational and lifespan perspective.
MCH3. Apply appropriate research methods to the evaluation of MCH program and practices.
MCH4. Evaluate evidence-based methods that contribute to the translation of research into MCH programming

and practice.
MCH5. Recognize and apply principles of ethical conduct in program management, research and data collection and storage.

MPH Joint Degree Competencies

MD/MPH Joint Degree (Students in this dual degree choose 5 competencies from this list)
CHRE2. Engage communities as partners in health research, intervention, and evaluation.
CHRE4. Design, implement, and evaluate evidence-based community health interventions.
CHRE6. Optimize health equity across communities through centering minoritized voices.
DS1. Critically evaluate quantitative data and methodology in public health communications.
DS2. Achieve proficiency in the use of a software package that promotes sharing of data, analysis, and methods.
DS3. Use data to create and test hypotheses relevant to public health.
EPI5. Formulate and apply plans for data cleaning and management using statistical analysis software.
GLO1. Critique major global public health priorities and the reasons for their prioritization.
MSB1. Use computer-based statistical analysis package(s) to manage data.
MSB3. Analyze data employing computer-based statistical analysis package(s).
MSB5. Calculate epidemiological measures of association between risk factors and disease.
MSB6. Apply ethical and regulatory standards to human subjects' research.

DPT/MPH Joint Degree (Students in this dual degree choose 5 competencies from this list)
CHRE1. Describe the factors that influence the health and wellbeing of communities.
CHRE2. Engage communities as partners in health research, intervention, and evaluation.
CHRE3. Apply relevant theories and methods to conduct community health research.
CHRE4. Design, implement, and evaluate evidence-based community health interventions.
CHRE5. Translate and disseminate research findings in collaboration with communities.
CHRE6. Optimize health equity across communities through centering minoritized voices.
DS1. Critically evaluate quantitative data and methodology in public health communications.
DS2. Achieve proficiency in the use of a software package that promotes sharing of data, analysis, and methods.
DS3. Use data to create and test hypotheses relevant to public health.
DS5. Explain ethical challenges in the interpretation of data related to public health.
EPI1. Describe molecular techniques and laboratory resources commonly used in epidemiologic studies.
EPI2. Evaluate current knowledge of causes of disease to guide epidemiologic practice.
EPI3. Assess biological mechanisms of disease by applying knowledge of behavioral sciences and human and environmental biology.
EPI4. Critique the validity of epidemiologic data, findings, and publications by applying knowledge of epidemiologic principles and methods.
EPI5. Formulate and apply plans for data cleaning and management using statistical analysis software.
GLO1. Critique major global public health priorities and the reasons for their prioritization.
GLO2. Apply demographic, epidemiologic and anthropologic methods to assess health disparities at local and global levels.
GLO3. Develop systems to monitor progress toward targets, objectives, and goals and evaluate programs and their operational components.
GLO5. Apply systems thinking to promote integrative global health across different disciplinary domains and organizational levels.
IMPSCI1. Describe the field of implementation science and its unique role in addressing gaps in health research and practice.
IMPSCI2. Design rigorous studies and comprehensive evaluation plans for implementation research and practice.
IMPSCI3. Apply appropriate theories, models, and frameworks for implementation research and practice.
IMPSCI4. Design context-specific implementation strategies through the integration of multiple forms of evidence.

IMPSCI5. Apply interdisciplinary approaches and methods to implementation research and practice.
MCH1. Determine how different strengths, needs, values and practices of diverse cultural, racial, ethnic, and socioeconomic groups affect health status, health behaviors and program design.
MCH2. Evaluate theories and principles of individual and family growth and development from an intergenerational and lifespan perspective.
MCH3. Apply appropriate research methods to the evaluation of MCH program and practices.
MCH4. Evaluate evidence-based methods that contribute to the translation of research into MCH programming and practice.
MCH5. Recognize and apply principles of ethical conduct in program management, research and data collection and storage
MSB1. Use computer-based statistical analysis package(s) to manage data.
MSB2. Develop visualized data using computer-based statistical package(s).
MSB3. Analyze data employing computer-based statistical analysis package(s).
MSB4. Implement sample size and power calculations for a range of experimental designs.
MSB5. Calculate epidemiological measures of association between risk factors and disease.
MSB6. Apply ethical and regulatory standards to human subjects' research.

MS in Biostatistics Competencies

MSB1. Apply classic methods for continuous and categorical data analysis, including regression and other appropriate statistical approaches;
MSB2. Use computer-based statistical analysis package(s) to manage data;
MSB3. Develop visualized data using computer-based statistical analysis package(s);
MSB4. Analyze data employing computer-based statistical analysis package(s);
MSB5. Implement sample size and power calculations for a range of experimental designs;
MSB6. Interpret results of a health research study, including the relation to findings from other studies, potential biological or social mechanisms, study limitations, and public health implications;
MSB7. Communicate written and oral findings in a scientifically sound manner;
MSB8. Calculate epidemiological measures of association between risk factors and disease;
MSB9. Apply methods and strategies to evaluate and reduce bias in health research;
MSB10. Use criteria to distinguish between association and causality; and
MSB11. Apply ethical and regulatory standards to human subjects research.

MSB Concentration Competencies

Concentration in Population Health Analytics

PHA1. Design an epidemiologic study to address a question of interest;
PHA2. Describe practical considerations for the conduct of health research studies;
PHA3. Access publicly available data resources for population health research;
PHA4. Critically review the scientific literature, synthesize findings across studies, and make appropriate recommendations based on current knowledge; and
PHA5. Develop a clear description of the rationale, methods, results, and overall interpretation of an epidemiologic investigation.

Concentration in Statistical Bioinformatics

SB1. Develop computer files of high-dimensional data for analysis using high performance computing data management techniques;
SB2. Determine and execute appropriate statistical analyses, in particular techniques relevant to bioinformatics, to address a study question;
SB3. Access publicly available databases for bioinformatics research;
SB4. Develop statistical and bioinformatics analysis results in written, graphical and verbal format in response to an analysis request; and

SB5. Identify theoretical underpinnings of advanced statistical models.

Concentration in Statistical Methods and Practice:
SMP1. Develop computer files of raw data for analysis using data management and statistical analysis software.
SMP2. Execute appropriate statistical analyses to address a study question;
SMP3. Apply classic methods for the analysis of time-to-event and clinical trial data;
SMP4. Develop statistical analysis results in written and verbal format in response to an analysis request; and
SMP5. Identify theoretical underpinnings of advanced statistical models.

MS in Epidemiology Competencies

EP1. Evaluate the strengths and limitations of study designs by selecting appropriate measures of association and identifying potential sources of error in epidemiologic research.
EP2. Implement principles of epidemiology, particularly social epidemiology, to understand the underlying structural causes of health disparities.
EP3. Discuss the role and impact of bias, confounding, and effect modification in data interpretation.
EP4. Conduct epidemiologic analyses, including logistic, Poisson, and linear regression, multilevel modeling, and survival analysis.
EP5. Critically review the scientific literature, synthesize findings across studies, and make appropriate recommendations based on current knowledge.
EP6. Apply ethical and regulatory requirements for epidemiologic research.
EP7. Communicate epidemiologic findings clearly and effectively to community members and academic audiences, using culturally appropriate and scientifically rigorous methods.