PhD Biostatistics	39
PhD Epidemiology	40-41
PhD Health Services Research	42

Competencies for all MPH Graduates of the CSPH

Identifier	Core – Cross Cutting Competencies
CR-CC 1	Define, assess and report on the health status of populations, determinants of health and illness, and factors contributing to health promotion and disease prevention.
CR-CC 2	Determine uses and limitations of quantitative and qualitative methods in research and public health practice.
CR-CC 3	Communicate effectively both in writing and orally with policy makers, professionals, and the public.
CR-CC 4	Identify and address ethical issues that arise in public health practice and research.
CR-CC 5	Identify, retrieve, appraise, and apply scientific evidence relevant in the practice of public health.
CR-CC 6	Understand and utilize leadership, team building, negotiation, and conflict resolution skills to collaborate and build partnerships for the purpose of improving the public's health.
CR-CC 7	Identify organizational decision-making structures, stakeholders, style and processes.
CR-CC 8	Define a public health problem and specify an analytic approach.
CR-CC 9	Discuss sentinel events in the history and development of the public health profession and their relevance for practice in the field.
CR-CC 10	Describe and apply the concepts of the 3 core functions and 10 essential public health services to inform public health practice.
CR-CC 11	Describe steps and strategies to consider when working collaboratively in a culturally-sensitive manner with diverse groups to promote the health of communities.
CR-CC 12	Describe the roles of history, power, privilege and structural inequality in producing health disparities.
CR-CC 13	Integrate professional ethics, principles of cultural competence and accountability in all professional conduct.
CR-CC 14	Explain the importance of a diverse public health workforce.

Identifier	Core (CR) MPH Biostatistics Competencies
CR-BIOS 1	Describe the roles that biostatistics serves in the disciplines of public health research.
CR-BIOS 2	Distinguish among the different measurement scales and the implications for selection of statistical methods to be used based on these distinctions.
CR-BIOS 3	Describe basic concepts of probability, commonly used probability distributions, statistical accuracy, systematic and random variation, and statistical correlation.
CR-BIOS 4	Apply descriptive statistics and related techniques for expressing levels of confidence in estimators that are commonly used to summarize public health data, using statistical software.
CR-BIOS 5	Apply basic statistical estimation and inference methods, along with necessary assumptions, that apply to the commonly used statistical methods in public health, using statistical software.
CR-BIOS 6	Apply alternative statistical methods (e.g. nonparametric methods) when assumptions are not met completely or when working with small research data sources, using statistical software.
CR-BIOS 7	Apply basic database management principles to public health records, clinical observations or observational data to facilitate data analysis, data quality management and administrative and scientific reporting using a statistical software package.
CR-BIOS 8	Create and interpret results in summary tables (e.g., Table 1) of public health and other scientific publications.
CR-BIOS 9	Describe and interpret statistical analyses commonly done in public health studies in language and terms appropriate for both public health professionals and educated lay audiences.

Identifier	Core (CR) MPH Community and Behavioral Health Competencies
CR-CBHS 1	Identify theories, concepts and models from a range of social and behavioral disciplines used in public health research and practice.
CR-CBHS 2	Identify the social and behavioral factors that affect the health of individuals and populations.
CR-CBHS 3	Use a socio-ecological framework when identifying appropriate interventions to improve population health.
CR-CBHS 4	Identify community health needs and assets, including those at the individual, organizational, and community levels for the purpose of designing social and behavioral interventions to improve health.
CR-CBHS 5	Describe the merits and limitations of social and behavioral science programs and policies for improving population health.
CR-CBHS 6	Describe steps and methods for the planning, implementing and evaluating of evidence-based public health programs and policies.
CR-CBHS 7	Identify strategies for engaging stakeholders in planning, implementing and evaluating public health programs and policies.

Identifier	Core (CR) MPH Environmental and Occupational Health Competencies
CR-EHOH 1	Describe the direct and indirect human, ecological and safety effects of major environmental and occupational agents of regional, national, and global importance.
CR-EHOH 2	Explain the general mechanisms of toxicity in eliciting a toxic response to various environmental exposures.
CR-EHOH 3	Specify approaches for assessing, preventing and controlling environmental and occupational hazards that pose risks to human health and safety.
CR-EHOH 4	Specify current environmental exposure and risk assessment methods.
CR-EHOH 5	Discuss various risk assessment, management and risk communication approaches in relation to issues of environmental justice and equity.
CR-EHOH 6	Develop a testable model of environmental insult.
CR-EHOH 7	Describe federal and state regulatory programs, guidelines and authorities that control environmental and occupational health issues.
CR-EHOH 8	Describe genetic, physiologic and psychological factors that affect susceptibility to adverse health outcomes following exposure to environmental hazards.

Identifier	Core (CR) MPH Epidemiology Competencies
CR-EPID 1	Compare strengths and limitations of various study designs and reports to answer public health questions.
CR-EPID 2	Explain the importance of epidemiology for informing scientific, ethical, economic and political discussion of health issues.
CR-EPID 3	Describe a public health problem in terms of magnitude, person, time and place.
CR-EPID 4	Apply basic terminology and definitions of epidemiology.
CR-EPID 5	Identify key sources of data for epidemiologic purposes.
CR-EPID 6	Calculate basic epidemiology measures.
CR-EPID 7	Draw appropriate inferences from epidemiologic data.
CR-EPID 8	Comprehend basic ethical and legal principles pertaining to the collection, maintenance, use and dissemination of epidemiologic data.
CR-EPID 9	Identify the principles and limitations of public health screening and surveillance systems.

Identifier	Core (CR) MPH Health Systems Management and Policy Competencies
Health Systems and Health Economics	
CR-HSMP 1	Explain the effects of markets and political processes on the organization, financing and delivery of public and private health services in the U.S. system.
CR-HSMP 2	Describe commonly used methods for evaluating health economic policy, including the use of cost-benefit and cost-effectiveness analysis.
CR-HSMP 3	Distinguish between models used for financing and delivering healthcare.
Management and Leadership	
CR-HSMP 4	Identify key tenets of effective organizational and financial management and the strengths and limitations of different management approaches for improving population health.
CR-HSMP 5	Explain key elements of human resource management: defining roles and responsibilities; recruiting, motivating and retaining staffing; and assessing and applying measures for performance improvement.
CR-HSMP 6	Describe common quality and performance improvement tools and the appropriate times to use them in public health and healthcare settings.
CR-HSMP 7	Describe principles of budgeting and financial decision analysis in public health and healthcare settings.
CR-HSMP 8	Describe attributes of strategic leadership, including the use of vision, mission, values, goals and objectives.
Policy	
CR-HSMP 9	Identify and interpret key public health laws, regulations, and policies affecting health programs and the delivery of health services.
CR-HSMP 10	Describe commonly used frameworks for systematically and critically evaluating the policy development and implementation process at the federal, state, and local levels and outside the U.S.
CR-HSMP 11	Describe the importance of engaging stakeholders and building coalitions in the development or implementation of health policy.
CR-HSMP 12	Describe ethical considerations (such as social justice and human rights) affecting health policy and how the organization and delivery of health care in the U.S. contributes to health equity.

Identifier	MPH Applied Biostatistics Concentration (CN) Competencies
CN-BIOS 1	Select and apply appropriate biostatistical methods to support research and evaluation in the core areas of public health research and practice, including: epidemiology, environmental and occupational health, community and behavioral health, and public health systems management, policy and outcomes research.
CN-BIOS 2	Translate a study's scientific question or aims into testable statistical hypotheses and propose and apply appropriate statistical methods to test those hypotheses.
CN-BIOS 3	Test and interpret models for continuous outcome data (normal linear model), categorical outcome data (logistic and Poisson regression), and time-to-event data (Cox regression).
CN-BIOS 4	Apply the concepts of bias, error, confounding, effect modification, sampling, and generalizability in the interpretation of study results.
CN-BIOS 5	Carry out appropriate sample size and power calculations in basic situations to ensure that a study is sufficiently powered to achieve the scientific aims or address a specific research hypothesis.
CN-BIOS 6	Use computer software for data entry and data base management and for summarizing, analyzing and displaying research results.
CN-BIOS 7	Apply basic ethical concepts in collection, management, use and dissemination of biomedical and public health data.
CN-BIOS 8	Critically review and interpret basic statistical methods presented in public health and medical literature to identify strengths, weaknesses, and potential biases in these studies.
CN-BIOS 9	Apply scientific and statistical principles and methods to design basic public health and biomedical studies.
CN-BIOS 10	Use the principles of hypothesis testing and estimation of population parameters to draw inferences from quantitative data and communicate verbally and in writing those inferences and their statistical and scientific interpretation to non-statistical scientists.
CN-BIOS 11	Address a biomedical, public health or statistical research question with a basic statistical analysis (e.g. linear or logistic regression).

Identifier	MPH Community and Behavioral Health Concentration (CN) Competencies
CN-CBHS 1	Describe, select and apply appropriate theories, models, frameworks and evidence- based strategies for the development of health promotion, disease prevention, and disease management programs.
CN-CBHS 2	Describe and apply systematic approaches and methods to assess the health-related needs of communities and populations, taking into account individual, interpersonal, community and societal factors.
CN-CBHS 3	Utilize quantitative and qualitative data to identify disparities in health and inform the design and adaptation of culturally appropriate programs to promote health equity.
CN-CBHS 4	Use systematic approaches to conceive, design and implement and evaluate health promotion and disease prevention programs. Systematic approaches include the use of logic models, principles of Community Based Participatory Research, epidemiologic evidence, and evidence-based intervention strategies.
CN-CBHS 5	Identify and describe appropriate research designs for assessing program effectiveness.
CN-CBHS 6	Critically assess and select appropriate quantitative and qualitative measurement methods for assessing program reach, effectiveness, adoption, implementation, and sustainability.
CN-CBHS 7	Use clear, concise, and compelling oral, written, and visual methods for communicating program descriptions and study findings.
CN-CBHS 8	Effectively engage and collaborate with communities and stakeholders, in an equitable and ethical manner, including developing a work plan, communicating effectively and disseminating results.

Identifier	MPH Environmental and Occupational Health Concentration (CN) Competencies
CN-EHOH 1	Apply the range of epidemiologic methods in the analysis of environmentally determined health and the strengths and limitations of these methods.
CN-EHOH 2	Specify appropriate monitoring and other field methods for addressing environmental & occupational health problems.
CN-EHOH 3	Describe the dynamics of ecosystems and how they affect the movement of toxic agents in the environment and mediate related risks for human disease as well the quality of air, water, and climate.
CN-EHOH 4	Describe important current and emerging environmental health problems and variations in health risks across the global landscape.
CN-EHOH 5	Define the principles of sustainability and apply these principles in the development of solutions to environmental and occupational health problems.
CN-EHOH 6	Apply basic skills in geographic information systems (GIS) technology in the evaluation of environmental health problems.
CN-EHOH 7	Describe theoretical models and frameworks, that inform the health, safety, and wellness of workers and related systems-level environmental and policy interventions designed to protect and promote worker health.
CN-EHOH 8	Identify the uses of biomarkers in evaluating exposures, health effects and susceptibility to environmental and occupational disease.
CN-EHOH 9	Explain the scientific characteristics, including exposure and mode of action, of major biological, chemical, physical hazards that result in human health risk.
CN-EHOH 10	Describe the policy framework that shapes environmental health at the federal, state and local levels and the historic and current decision-making processes that inform this framework.

Identifier	MPH Epidemiology Concentration (CN) Competencies
CN-EPID 1	Appropriately use descriptive epidemiologic methods to describe a given condition including measures of prevalence, incidence, morbidity, mortality, demographic characteristics and risk factors.
CN-EPID 2	Select and apply appropriate quantitative and qualitative measurement and analysis methods to support research and evaluations in the core areas of public health research and practice, including: epidemiology, environmental and occupational health, community and behavioral health, and public health systems management, policy and outcomes research.
CN-EPID 3	Critically review and interpret public health and other scientific literature to identify strengths and weaknesses of individual studies, to synthesize evidence in a research area, to identify gaps in evidence and to demonstrate relevance of current knowledge to the practice of public health.
CN-EPID 4	Translate investigator ideas into answerable research questions.
CN-EPID 5	Describe and select study designs, taking into account the advantages and limitations of each for addressing specific problems, as well as the practical aspects of their uses.
CN-EPID 6	Describe best practices for design of data collection forms and protocols, instrument reliability and validity, data monitoring and quality assurance, and data archiving for analysis and use of data by other investigators.
CN-EPID 7	Use computer software for data entry, database management, and summarizing, analyzing and displaying data.
CN-EPID 8	Apply and interpret the concepts of effect modification and interaction.
CN-EPID 9	Interpret statistical results in order to make appropriate inferences.
CN-EPID 10	Evaluate threats to internal validity when critically evaluating strength of evidence.

Identifier	MPH Health Systems Management and Policy Concentration (CN) Competencies
Health Systems and Health Economics	
CN-HSMP 1	Analyze the effects of markets and political processes on the organization, financing and delivery of public and private health services in the U.S. system.
CN-HSMP 2	Apply commonly used methods for evaluating health economic policy, including the use of cost-benefit and cost-effectiveness analysis.
CN-HSMP 3	Evaluate differences between different models used for financing and delivering healthcare.
Management and Leadership	
CN-HSMP 4	Assess key tenets of effective organizational and financial management and evaluate the strengths and limitations of different management approaches for improving population health.
CN-HSMP 5	Explain key elements of human resource management: defining roles and responsibilities; recruiting, motivating and retaining staffing; and assessing and applying measures for performance improvement.
CN-HSMP 6	Apply common quality and performance improvement tools in public health and healthcare settings.
CN-HSMP 7	Apply principles of budgeting and financial decision analysis in public health and healthcare settings.
CN-HSMP 8	Examine attributes of strategic leadership, including the use of vision, mission, values, goals and objectives.
Policy	
CN-HSMP 9	Differentiate key public health laws, regulations, and policies affecting health programs and the delivery of health services
CN-HSMP 10	Investigate commonly used frameworks for systematically and critically evaluating the policy development and implementation process at the federal, state, and local levels and outside the U.S.
CN-HSMP 11	Develop a plan for engaging stakeholders and building coalitions in the development or implementation of health policy.
CN-HSMP 12	Analyze ethical considerations (such as social justice and human rights) affecting health policy and how the organization and delivery of health care in the U.S. contributes to health equity.

Identifier	**MPH Health System Management Concentration (CN) Competencies** Compared to the HSMP concentration, the HSM concentration has additional required coursework to build greater depth and breadth in management. Only competency 7 is different from HSMP.
Health Systems and Health Economics	
CN-HSM 1	Analyze the effects of markets and political processes on the organization, financing and delivery of public and private health services in the U.S. system.
CN-HSM 2	Apply commonly used methods for evaluating health economic policy, including the use of cost-benefit and cost-effectiveness analysis.
CN-HSM 3	Evaluate differences between different models used for financing and delivering healthcare.
Management and Leadership	
CN-HSM 4	Assess key tenets of effective organizational and financial management and evaluate the strengths and limitations of different management approaches for improving population health.
CN-HSM 5	Explain key elements of human resource management: defining roles and responsibilities; recruiting, motivating and retaining staffing; and assessing and applying measures for performance improvement.
CN-HSM 6	Apply common quality and performance improvement tools in public health and healthcare settings.
CN-HSM 7	Apply principles of accounting, budgeting and financial decision analysis in public health and healthcare settings.
CN-HSM 8	Examine attributes of strategic leadership, including the use of vision, mission, values, goals and objectives.
Policy	
CN-HSM 9	Differentiate key public health laws, regulations, and policies affecting health programs and the delivery of health services
CN-HSM 10	Investigate commonly used frameworks for systematically and critically evaluating the policy development and implementation process at the federal, state, and local levels and outside the U.S.
CN-HSM 11	Develop a plan for engaging stakeholders and building coalitions in the development or implementation of health policy.
CN-HSM 12	Analyze ethical considerations (such as social justice and human rights) affecting health policy and how the organization and delivery of health care in the U.S. contributes to health equity.

Identifier	MPH Health Services Research Concentration (CN) Competencies Compared to the HSMP concentration, the HSR concentration has additional required coursework to build greater depth and breadth in analytical competencies. Two additional competencies (13 and 14) address this.
Health Systems and Health Economics	
CN-HSR 1	Analyze the effects of markets and political processes on the organization, financing and delivery of public and private health services in the U.S. system.
CN-HSR 2	Apply commonly used methods for evaluating health economic policy, including the use of cost-benefit and cost-effectiveness analysis.
CN-HSR 3	Evaluate differences between different models used for financing and delivering healthcare.
Management and Leadership	
CN-HSR 4	Assess key tenets of effective organizational and financial management and evaluate the strengths and limitations of different management approaches for improving population health.
CN-HSR 5	Explain key elements of human resource management: defining roles and responsibilities; recruiting, motivating and retaining staffing; and assessing and applying measures for performance improvement.
CN-HSR 6	Apply common quality and performance improvement tools in public health and healthcare settings.
CN-HSR 7	Apply principles of budgeting and financial decision analysis in public health and healthcare settings.
CN-HSR 8	Examine attributes of strategic leadership, including the use of vision, mission, values, goals and objectives.
Policy	
CN-HSR 9	Differentiate key public health laws, regulations, and policies affecting health programs and the delivery of health services
CN-HSR 10	Investigate commonly used frameworks for systematically and critically evaluating the policy development and implementation process at the federal, state, and local levels and outside the U.S.
CN-HSR 11	Develop a plan for engaging stakeholders and building coalitions in the development or implementation of health policy.
CN-HSR 12	Analyze ethical considerations (such as social justice and human rights) affecting health policy and how the organization and delivery of health care in the U.S. contributes to health equity.
Health Services Research Methods	
CN-HSR 13	Accurately select, use and interpret commonly used statistics in health services research to test theory-driven hypotheses.
CN-HSR 14	Appropriately select healthcare databases and utilize information technologies in research.

Identifier	MPH Global Health Plus Concentration (CN) Competencies
CN-GLH 1	Describe and analyze the determinants and the globalization of health as well as the health status of a given jurisdiction using credible data sources.
CN-GLH 2	Describe contemporary and historic global health issues, programs, best practices and players.
CN-GLH 3	Apply critical thinking to the political, economic and ethical issues in global health.
CN-GLH 4	Identify and recommend public health field methods in the global arena and their correct application.

Identifier	MPH Leadership and Public Health Practice Concentration (CN) Competencies
CN-LPHP 1	Identify, interpret and implement public health laws, regulations and policies related to specific programs.
CN-LPHP 2	Advocate for public health programs and resources.
CN-LPHP 3	Articulate an achievable mission, set of core values and vision and uses these to guide action.
CN-LPHP 4	Identify internal and external issues that may impact delivery of essential public health services.
CN-LPHP 5	Listen to others in an unbiased manner, respect points of views of others and promotes the expression of diverse opinions and perspectives.
CN-LPHP 6	Effectively work with communities and stakeholders, in an equitable and ethical manner, including developing a work plan, communicating effectively and disseminating results.
CN-LPHP 7	Use the media, advanced technologies and community networks to communicate information.
CN-LPHP 8	Prepare and implement emergency response plans.
CN-LPHP 9	Establish and implement plans to investigate disease outbreaks.
CN-LPHP 10	Develop mechanisms to monitor and evaluate programs for their effectiveness and quality.
CN-LPHP 11	Apply the principles of program planning, development, budgeting, management and evaluation in organizational and community initiatives.

Identifier	MPH Maternal and Child Health Concentration (CN) Competencies
Scientific Basis of MCH Public Health Practice	
CN-MCH 1	Describe MCH problems in terms of time, magnitude, scope, location, co-occurrence and co-morbidity.
CN-MCH 2	Apply knowledge of demographic, health, familial, socio-cultural, environmental and community factors to the design of MCH programs and services.
Methodological and Analytic	
CN-MCH 3	Apply appropriate research methods including research design, sampling, descriptive and inferential statistics and validity/reliability assessment of measures.
CN-MCH 4	Articulate the strengths and limitations of qualitative and quantitative methods.
CN-MCH 5	Use appropriate data collection strategies, including surveys, focus groups and record-based information.
CN-MCH 6	Prepare, interpret and make meaningful inferences on the health of MCH populations from vital statistics, censuses, surveys and service utilization records and translate those data into information.
CN-MCH 7	Conceptualize and appropriately use data to identify problems and assets and to plan, implement and evaluate programs.
Management and Communication	
CN-MCH 8	Develop mechanisms to monitor and evaluate programs and service networks for their effectiveness and quality, including the use of performance measures.
Policy and Advocacy	
CN-MCH 9	Apply knowledge of significant past and current national MCH legislative mandates to the development and delivery of MCH services.
CN-MCH 10	Apply theories and mechanisms of MCH policy development and implementation.

Identifier	MPH Community Health Education Concentration (CN) Competencies
CN-CHE 1	Conduct needs assessment, planning, implementation and evaluation for community-based public health education/promotion programs, policies and interventions.
CN-CHE 2	Identify and apply evidence-based principles and scientific knowledge to critical evaluation and decision-making in public health.
CN-CHE 3	Identify and apply individual, group and community-level theories, models, concepts and best practices to public health practice and problem solving.
CN-CHE 4	Identify, assess and address unique characteristics that affect public health within and among communities.
CN-CHE 5	Work collaboratively to develop, adapt and utilize appropriate methods for interacting professionally and effectively with people from diverse cultural, socioeconomic, educational, racial, ethnic, age, gender, sexual orientation, faith community and professional backgrounds.
CN-CHE 6	Develop public health education/promotion programs and strategies responsive to the cultural values, beliefs and traditions of diverse communities being served.
CN-CHE 7	Demonstrate the teamwork, leadership, communication, social and interpersonal skills necessary to collaborate effectively with agencies, coalitions and networks in communities in defining and addressing public health issues.

Identifier	MPH Healthy Aging and Community Health Education Concentration (CN) Competencies
CN-HACHE 1	Conduct needs assessment, planning, implementation and evaluation for community-based public health education/promotion programs, policies and interventions.
CN-HACHE 2	Identify and apply evidence-based principles and scientific knowledge to critical evaluation and decision-making in public health.
CN-HACHE 3	Identify and apply individual, group and community-level theories, models, concepts and best practices to public health practice and problem solving.
CN-HACHE 4	Identify, assess and address unique characteristics that affect public health within and among communities.
CN-HACHE 5	Work collaboratively to develop, adapt and utilize appropriate methods for interacting professionally and effectively with people from diverse cultural, socioeconomic, educational, racial, ethnic, age, gender, sexual orientation, faith community and professional backgrounds.
CN-HACHE 6	Develop public health education/promotion programs and strategies responsive to the cultural values, beliefs and traditions of diverse communities being served.
CN-HACHE 7	Demonstrate the teamwork, leadership, communication, social and interpersonal skills necessary to collaborate effectively with agencies, coalitions and networks in communities in defining and addressing public health issues.
CN-HACHE 8	Communicate the unique developmental aspects of aging: cognitive, psychological, social and emotional.
CN-HACHE 9	Evaluate and apply theories, models, concepts and best practices for providing community programs and services for older adults.
CN-HACHE 10	Develop comprehensive health education/promotion strategies and interventions for older adults.
CN-HACHE 11	Critically evaluate policies that impact older adults.

Identifier	MPH Animals People and Environment Concentration (CN) Competencies
CN-APE 1	Assess the public health threat of emerging issues to animal and human populations and identify intervention strategies.
CN-APE 2	Incorporate the principles of safe and secure food systems into public health problem solving.
CN-APE 3	Apply basic skills of message production and delivery for a target audience, which can be employed in a communication-based public health intervention.
CN-APE 4	Analyze how social, political and cultural differences can impact public perceptions about how human, environment and animal interactions affect public health, social wellbeing and environmental health.
CN-APE 5	Compare and contrast animal and plant agriculture production systems in the United States and analyze the related public health concerns.
CN-APE 6	Analyze public health concerns that have been related to various food production systems and how animal and plant agriculture impact public health and wellbeing.
CN-APE 7	Identify ways in which agricultural and human incursion positively and adversely impact environmental and ecological health, and develop methods of minimizing negative impacts.
CN-APE 8	Analyze issues regarding awareness and communication that impact optimal collaboration between human, animal, and environmental health professionals.
CN-APE 9	Apply biostatistical and epidemiological methods to public health issues that affect human and animal populations, and the surrounding environment.
CN-APE 10	Evaluate how public health skills and knowledge benefit agriculture industries and individual producers, and how knowledge of agriculture and environmental health benefit public health professionals.
CN-APE 11	Differentiate and properly use various types of infectious disease preventive measures.

Identifier	MPH Epidemiology Concentration (CN) Competencies - CSU
CN-EPID 1	Appropriately use descriptive epidemiologic methods to describe a given condition including measures of prevalence, incidence, morbidity, mortality, demographic characteristics and risk factors.
CN-EPID 2	Select and apply appropriate quantitative and qualitative measurement and analysis methods to support research and evaluations in the core areas of public health research and practice, including: epidemiology, environmental and occupational health, community and behavioral health, and public health systems management, policy and outcomes research.
CN-EPID 3	Critically review and interpret public health and other scientific literature to identify strengths and weaknesses of individual studies, to synthesize evidence in a research area, to identify gaps in evidence and to demonstrate relevance of current knowledge to the practice of public health.
CN-EPID 4	Translate investigator ideas into answerable research questions.
CN-EPID 5	Describe study designs and understand the advantages and limitations of each for addressing specific problems, as well as the practical aspects of their uses.
CN-EPID 6	Demonstrate knowledge related to design of data collection forms and protocols, instrument reliability and validity, data monitoring and quality assurance, and data archiving for analysis and use of data by other investigators.
CN-EPID 7	Use computer software for data entry, database management, and summarizing, analyzing and displaying data.
CN-EPID 8	Understand and appropriately interpret the concepts of effect modification and interaction.
CN-EPID 9	Interpret statistical results in order to make appropriate inferences.
CN-EPID 10	Demonstrate knowledge of the threats to internal validity and when critically evaluating strength of evidence.

Identifier	MPH Global Health and Health Disparities Concentration (CN) Competencies
CN-GHHD 1	Apply social, behavioral and cultural theory to analyze determinants and correlates of global health problems and their interrelationships.
CN-GHHD 2	Assess how social, behavioral, environmental, cultural and biological factors contribute to global health outcomes.
CN-GHHD 3	Incorporate the impacts of gender, race, poverty, history, migration and culture in the design and assessment of interventions addressing health disparities.
CN-GHHD 4	Analyze the impact of global trends and interdependencies on public health related problems and systems.
CN-GHHD 5	Construct health behavior change intervention plans and evaluations tailored appropriately for ethnically, culturally and socioeconomically diverse populations.
CN-GHHD 6	Identify the role of cultural, social, economic, and behavioral factors in the accessibility, availability, acceptability and delivery of public health services locally, nationally, and internationally.
CN-GHHD 7	Apply basic skills of message production and delivery for a target audience, which can be employed in a communication-based public health intervention.

Identifier	MPH Health Communication Concentration (CN) Competencies
CN-HCOM 1	Analyze the influences of social, organizational and individual factors on the use of information technology by end users.
CN-HCOM 2	Apply theory and strategy-based communication principles across different settings.
CN-HCOM 3	Apply basic skills of message production and delivery for a target audience, which can be employed in a communication-based public health intervention.
CN-HCOM 4	Identify the fundamental properties of the intended audience for a communication based intervention, including demographic, psychological, sociological, and cultural elements at all levels from interpersonal to mass.
CN-HCOM 5	Assess the critical relationship between formative and evaluative research in the ongoing delivery of a communication based intervention.
CN-HCOM 6	Apply the broad literature of communication theory and the subset of that literature specifically about health communication to public health communication practice.
CN-HCOM 7	Apply quantitative and qualitative social science research methods to interpret published communication research; apply findings to public health communication practice.

Identifier	MPH Physical Activity and Healthy Lifestyles Concentration (CN) Competencies
CN-PAHL 1	Identify and use public health data as a tool to develop and prioritize community-based interventions to promote physical activity.
CN-PAHL 2	Utilize epidemiological methods to develop and test hypotheses pertaining to physical activity and health and disease outcomes at the population level.
CN-PAHL 3	Apply social, behavioral and environmental models in physical activity intervention planning.
CN-PAHL 4	Apply basic skills of message production and delivery for a target audience, which can be employed in a communication-based public health intervention.
CN-PAHL 5	Assess the effects of physical activity on reducing chronic disease risk factors.
CN-PAHL 6	Utilize assessment tools to determine physical, social, cultural and environmental supports and barriers to physical activity.
CN-PAHL 7	Apply program design, implementation and evaluation strategies to promote, and address barriers to, adoption of healthy lifestyle behaviors.
CN-PAHL 8	Translate appropriate scientific information and data of evidence-based strategies to recommend healthy eating and active living promotion strategies.

Identifier	MPH Public Health Nutrition Concentration (CN) Competencies
CN-PHN 1	Apply biological principles for the development and implementation of public health nutrition programs targeted at disease prevention, control, or management.
CN-PHN 2	Assess and integrate information based on nutrition needs, the study of the scientific literature, and epidemiologic data to develop short and long range nutritional priorities and programs that will have the greatest impact.
CN-PHN 3	Incorporate principles of successful human behavior change in the development of effective nutrition interventions.
CN-PHN 4	Apply principles of community engagement to develop effective interventions to improve nutritional status of specific populations.
CN-PHN 5	Assess the role of policy interventions in improving dietary quality within communities.
CN-PHN 6	Monitor and evaluate the effectiveness of nutrition interventions, and modify interventional approaches as needed to improve nutritional outcomes.

Identifier	Medical Doctor (MD)/MPH Dual Degree Competencies
D-MD/MPH 1	Integrate public health skills and knowledge into the practice of medicine.
D-MD/MPH 2	Apply biostatistical and epidemiological methods to assessing the effectiveness of medical treatments.
D-MD/MPH 3	Identify the mutual commonalities of medicine and public health and be able to facilitate the communication among professionals in both fields.
D-MD/MPH 4	Identify diseases with public health impacts and methods for minimizing their effects on populations.
D-MD/MPH 5	Facilitate the translation of medical science discoveries to the provision of public health services.

Identifier	Doctor of Veterinary Medicine(DVM)/MPH Dual Degree Competencies
D-DVM/MPH 1	Integrate public health skills into the practice of veterinary medicine.
D-DVM/MPH 2	Apply epidemiological and biostatistical methods to veterinary public health issues that affects humans, domestic animals, livestock, and wildlife species.
D-DVM/MPH 3	Assess and manage animal diseases with public health impacts.
D-DVM-MPH 4	Describe food production systems and approaches to manage food security and safety.

Identifier	Doctor of Nurse Practitioner (DNP)/MPH Dual Degree Competencies
D-DNP/MPH 1	Implement ethical, competent nursing practice with individuals, families and communities based on understanding the human experiences of health, illness, healing and dying.
D-DNP/MPH 2	Use technology and information systems to promote health, facilitate appropriate and ethical decision-making, support collaboration, and foster communication.
D-DNP/MPH 3	Promote health and safe environments of local to global populations and communities through the development, implementation and evaluation of models, programs and policies.
D-DNP/MPH 4	Manage care ethically with individuals, families and populations to achieve quality, cost effective outcomes.
D-DNP/MPH 5	Advocate for social justice initiatives that enhance access, quality, and socio-cultural acceptability of health care for all.
D-DNP/MPH 6	Provide leadership in the delivery and management of health care for diverse populations and environments across the continuum of care.
D-DNP/MPH 7	Practice relationship-centered caring based on the human experience of health, illness, healing and dying.
D-DNP/MPH 8	Practice nursing reflectively, guided by theory, based on best evidence.
D-DNP/MPH 9	Participate in generating and testing knowledge regarding nursing science, nursing practice and health care delivery.
D-DNP/MPH 10	Engage in professional stewardship to improve interdisciplinary collaboration and nursing practice, education, research, and health care delivery.

Identifier	Master of Public Affairs (MPA)/MPH Dual Degree Competencies
D-MPA/MPH 1	Apply management and budgeting expertise to public health program administration.
D-MPA-MPH 2	Apply policy development and analysis skills to public health administration.
D-MPA-MPH 3	Utilize biostatistical and epidemiological knowledge in the formation of public policy.
D-MPA-MPH 4	Consider the social and behavioral influences on health when forming public policy.

Identifier	Master of Urban and Regional Planning (MURP)/MPH Dual Degree Competencies
D-MURP/MPH 1	Integrate public health skills into urban planning.
D-MURP/MPH 2	Consider social and behavioral aspects of urban design that promote or hinder population health when designing urban space.
D-MURP/MPH 3	Apply biostatistical and epidemiological methods to determine the health implications of urban design.

Identifier	Core (CR) DrPH Competencies
CR-DrPH 1	Advocacy **-**The ability to influence decision-making regarding policies and practices that advance public health using consensus-building, analysis, communication, and scientific knowledge.
CR-DrPH 2	Communication **-**The ability to assess and use communication strategies across diverse audiences to inform and influence individual, organization, community, and policy decisions that enhance health.
CR-DrPH 3	Community/Cultural Orientation **-**The ability to communicate and interact with people across communities and cultures for service development and intervention-oriented, community-based participatory research.
CR-DrPH 4	Critical Analysis **-**The ability to develop, synthesize, interpret, and apply evidence-based research and theory from a broad range of disciplines and health-related data sources to facilitate programs, policies, and systems for promoting population health.
CR-DrPH 5	Leadership **-**The ability to inspire trust and motivate others to use evidence-based strategies to enhance essential public health services.
CR-DrPH 6	Management **-**The ability to provide fiscally responsible strategic and operational guidance for both public and private health-related organizations for the purpose of achieving individual and community health and wellness.
CR-DrPH 7	Professionalism & Ethics **-**The ability to identify and analyze an ethical issue,; balance the claims of personal liberty with concerns about population health,; and act on the ethical concepts of social justice, human rights in public health research and practice.

Identifier	DrPH Community and Behavioral Health Focus Area (FA) Competencies
DrPH-FA-CBHS 1	Apply appropriate health behavior theories, models, frameworks and evidence-based integrative strategies at multiple levels of the socio-ecological model for the development of health promotion, disease prevention, and disease management programs.
DrPH-FA-CBHS 2	Lead efforts to develop, apply and evaluate systematic approaches and methods to assess the health-related needs of communities and populations, taking into account individual, interpersonal, community and societal factors.
DrPH-FA-CBHS 3	Collect and analyze quantitative and qualitative data to identify disparities in health and inform the design of culturally appropriate programs to promote health equity.
DrPH-FA-CBHS 4	Lead collaborative efforts (e.g. researchers, community stakeholders) to utilize systematic approaches to describe, develop and evaluate health promotion and disease prevention programs. Systematic approaches include the use of logic models, principles of Community Based Participatory Research, epidemiologic evidence, and evidence-based intervention strategies.
DrPH-FA-CBHS 5	Demonstrate a high level of proficiency to identify, apply and evaluate appropriate research designs for assessing program effectiveness.
DrPH-FA-CBHS 6	Demonstrate a high level of proficiency to determine and apply appropriate designs and methods for assessing and evaluating program reach and implementation.
DrPH-FA-CBHS 7	Design, select and implement appropriate quantitative and qualitative methods of measurement for assessing program effectiveness.
DrPH-FA-CBHS 8	Identify knowledge gaps in the selected field, develop and test hypotheses by appropriate quantitative and/or qualitative methodologies to address these gaps.
DrPH-FA-CBHS 9	Demonstrate an in-depth knowledge in the candidate's chosen substantive interest area in behavioral/social science related to public health.
DrPH-FA-CBHS 10	Apply scientific writing skills to develop grant proposals to address public health problems.
DrPH-FA-CBHS 11	Apply leadership and management skills to effectively work with communities and stakeholders, in an equitable and ethical manner, including developing a work plan, communicating effectively and disseminating results.

Identifier	DrPH Environmental & Occupational Health Focus Area (FA) Competencies
DrPH-FA-EHOH 1	Critically evaluate toxicological and epidemiological data, and use it to inform and participate in risk-based decision making processes.
DrPH-FA-EHOH 2	Describe local, regional and global impact of environmental hazards on human and ecological health, and design appropriate studies to evaluate risks associated with these hazards.
DrPH-FA-EHOH 3	Apply state-of-the-art geographic, epidemiologic, and laboratory methods to evaluate contemporary environmental and occupational health issues.
DrPH-FA-EHOH 4	Design risk management and communication approaches to prevent and/or reduce environmental and occupational health risks in a community.
DrPH-FA-EHOH 5	Understand and apply the principles of survey sampling design, implementation, analysis and interpretation.
DrPH-CN-EHOH 6	Describe the attributes of an effective surveillance system and the use of surveillance in prevention of environmental and occupational disease.
DrPH-FA-EHOH 7	Demonstrate knowledge and skills in collection and management of original data in environmental and occupational research, including design of data collection forms and protocols, assessing analytical instrument reliability and validity, data monitoring and quality assurance, and data archiving for analysis and use by other investigators
DrPH-FA-EHOH 8	Demonstrate skills to identify and critically evaluate secondary data sources appropriate for answering applied research and program evaluation questions in environmental and occupational health.
DrPH-FA-EHOH 9	Develop grant proposals to conduct research to test well-conceived hypotheses and/or evaluation studies to assess impact.
DrPH-FA-EHOH 10	Demonstrate excellent written and oral communication skills to translate results of research findings to the public and other professionals.

Identifier	DrPH Epidemiology Focus Area (FA) Competencies
DrPH-FA-EPID 1	Appropriately use descriptive epidemiologic methods to describe a given condition including measures of prevalence, incidence, morbidity, mortality, demographic characteristics and risk factors.
DrPH-FA-EPID 2	Select and apply appropriate quantitative and qualitative measurement and analysis methods to support research and evaluations in the core areas of public health research and practice, including: epidemiology, environmental and occupational health, community and behavioral health, and public health systems management, policy and outcomes research.
DrPH-FA-EPID 3	Critically review and interpret public health and other scientific literature to identify strengths and weaknesses of individual studies, to synthesize evidence in a research area, to identify gaps in evidence and to demonstrate relevance of current knowledge to the practice of public health.
DrPH-FA-EPID 4	Translate investigator ideas into answerable research questions.
DrPH-FA-EPID 5	Describe study designs and understand the advantages and limitations of each for addressing specific problems, as well as the practical aspects of their uses.
DrPH-FA-EPID 6	Demonstrate knowledge related to design of data collection forms and protocols, instrument reliability and validity, data monitoring and quality assurance, and data archiving for analysis and use of data by other investigators.
DrPH-FA-EPID 7	Use computer software for data entry, database management, and summarizing, analyzing and displaying data.
DrPH-FA-EPID 8	Understand and appropriately interpret the concepts of effect modification and interaction.
DrPH-FA-EPID 9	Interpret statistical results in order to make appropriate inferences.
DrPH-FA-EPID 10	Demonstrate knowledge of the threats to internal validity and when critically evaluating strength of evidence.
DrPH-FA-EPID 11	Understand and apply basic ethical and legal principles involved in the collection, management, use and dissemination of epidemiologic data. Understand the concepts of human subjects' protections and confidentiality. Apply this understanding in the conduct of research and public health practice.
DrPH-FA-EPID 12	Be able to identify and critically evaluate secondary data sources appropriate for answering a given research question. Identify and understand limitations of secondary data sets (e.g. inclusion determinants, nonrandom allocation, measurement error, surrogate outcomes) and possible design and analytic solutions.
DrPH-FA-EPID 13	Demonstrate knowledge of external validity, especially in the context of applying prevention and control strategies and in the emerging fields of dissemination and implementation science.
DrPH-FA-EPID 14	Demonstrate mastery of a substantive area, including the application of that knowledge in conducting research related to a specific topic.

DrPH-FA-EPID 15	Communicate both verbally and in writing to non-statistical scientists, practitioners and community members.
DrPH-FA-EPID 16	Understand the principles of sampling design and implementation.
DrPH-FA-EPID 17	Demonstrate knowledge translating quantitative research questions into statistical models.
DrPH-FA-EPID 18	Describe the role of screening in disease prevention or diagnosis, under what conditions screening is justified and how to assess screening test performance and effectiveness.
DrPH-FA-EPID 19	Carry out appropriate power or precision calculations to ensure that sample size is sufficient to achieve the scientific aims or address a specific research hypothesis.
DrPH-FA-EPID 20	Describe the attributes of an effective surveillance system and the use of surveillance in outbreak investigations, chronic disease, and injury prevention.
DrPH-FA-EPID 21	Understand the global, cultural, and social context of health problems and how these influence the conduct, interpretation, and dissemination of research studies.

Identifier	MS Biostatistics Competencies
Study Development: Work collaboratively with biomedical or public health researchers and PhD biostatisticians, as necessary, to provide biostatistical expertise in the development and design of research studies.	
MS-BIOS 1	Map study aims to testable statistical hypotheses.
MS-BIOS 2	Identify the strengths and weaknesses of various clinical trial and observational study designs and the data collection methods that go with these designs.
MS-BIOS 3	Use probability and statistical theory to develop appropriate data analysis plans for study hypotheses.
Modeling and Analysis: Develop, carry out and report biostatistical modeling and analysis of biological science and public health studies.	
MS-BIOS 4	Use advanced techniques for summary and visualization of complex data for exploratory analysis and presentation.
MS-BIOS 5	Use probability and statistical theory to identify appropriate modeling and analysis methods to address study hypotheses.
MS-BIOS 6	Determine and check modeling assumptions, and verify validity of proposed analyses.
MS-BIOS 7	Carry out valid and efficient modeling, estimation, and inference to address study hypotheses, using standard statistical methods including basic one and two sample methods, general linear models including regression and anova, logistic regression, and clustered and longitudinal analysis.
MS-BIOS 8	Read biostatistical literature to determine and implement alternate methods of analysis.
MS-BIOS 9	Demonstrate statistical programming proficiency, good coding style and use of reproducible research principles in leading statistical software.
Biologic or Public Health Relevance: Show how biostatistical tools apply to and influence research and policy in the biomedical and public health arenas.	
MS-BIOS 10	Read subject specific biomedical or public health literature and synthesize issues that are important in the design, implementation, and analysis of research in the subject area.
MS-BIOS 11	Apply basic ethical concepts of public health policy and practice, ensure the quality and security of information used in a study and adhere to the principles of research ethics.
MS-BIOS 12	Develop and implement specialized study designs and analyses in biological (e.g. genetic association, genomics) or public health (e.g. epidemiological) settings.
Communication: Communicate orally and in writing biostatistical concepts and results to both biostatistical and non-biostatistical audiences.	

MS-BIOS 13	Communicate orally and in writing simple and complex statistical ideas and methods to collaborators in non-technical terms including preparation of analysis section of grant proposals and methods and results sections of manuscripts.
MS-BIOS 14	Manage the preparation of large documents (e.g. grant proposals or manuscripts).

Identifier	MS Epidemiology Competencies
MS-EPID 1	Appropriately use descriptive epidemiologic methods to describe a given condition including measures of prevalence, incidence, morbidity, mortality, demographic characteristics and risk factors.
MS-EPID 2	Select and apply appropriate quantitative and qualitative measurement and analysis methods to support research and evaluations in the core areas of public health research and practice, including: epidemiology, environmental and occupational health, community and behavioral health, and public health systems management, policy and outcomes research.
MS-EPID 3	Critically review and interpret public health and other scientific literature to identify strengths and weaknesses of individual studies, to synthesize evidence in a research area, to identify gaps in evidence and to demonstrate relevance of current knowledge to the practice of public health.
MS-EPID 4	Translate investigator ideas into answerable research questions.
MS-EPID 5	Describe study designs and understand the advantages and limitations of each for addressing specific problems, as well as the practical aspects of their uses.
MS-EPID 6	Demonstrate knowledge related to design of data collection forms and protocols, instrument reliability and validity, data monitoring and quality assurance, and data archiving for analysis and use of data by other investigators.
MS-EPID 7	Use computer software for data entry, database management, and summarizing, analyzing and displaying data.
MS-EPID 8	Understand and appropriately interpret the concepts of effect modification and interaction.
MS-EPID 9	Interpret statistical results in order to make appropriate inferences.
MS-EPID 10	Demonstrate knowledge of the threats to internal validity and when critically evaluating strength of evidence.
MS-EPID 11	Understand and apply basic ethical and legal principles involved in the collection, management, use and dissemination of epidemiologic data. Understand the concepts of human subjects' protections and confidentiality. Apply this understanding in the conduct of research and public health practice.
MS-EPID 12	Be able to identify and critically evaluate secondary data sources appropriate for answering a given research question. Identify and understand limitations of secondary data sets (e.g. inclusion determinants, nonrandom allocation, measurement error, surrogate outcomes) and possible design and analytic solutions.
MS-EPID 13	Demonstrate knowledge of external validity, especially in the context of applying prevention and control strategies and in the emerging fields of dissemination and implementation science.
MS-EPID 14	Demonstrate mastery of a substantive area, including the application of that knowledge in conducting research related to a specific topic

| MS-EPID 15 | Communicate both verbally and in writing to non-statistical scientists, practitioners and community members. |

Identifier	MS Health Services Research Competencies
Health Systems, Management and Policy	
MS-HSR 1	Identify the main components and issues of the organization, financing and delivery of health services and public health systems in the U.S.
MS-HSR 2	Discuss the policy process for improving the health status of populations.
MS-HSR 3	Apply quality, efficiency and performance improvement concepts to healthcare systems.
Health Services Research Methods	
MS-HSR 4	Identify, and measure, clinically relevant and meaningful outcomes and apply evidence-based practice principles.
MS-HSR 5	Critically appraise existing literature and evaluate manuscripts published in peer-reviewed journals.
MS-HSR 6	Demonstrate breadth of HSR theoretical and conceptual knowledge by applying alternative organizational and behavioral models from a range of relevant disciplines.
MS-HSR 7	Pose innovative and important health service research questions, informed by systematic reviews of the literature, stakeholder needs, and relevant theoretical and conceptual models.
MS-HSR 8	Select appropriate interventional, observational, or qualitative study designs to address specific health services research questions and hypotheses.
MS-HSR 9	Appropriately select healthcare databases and utilize information technologies in research.
Research Professionalism	
MS-HSR 10	Accurately select, use and interpret commonly used statistics in health services research.
MS-HSR 11	Understand and adhere to legal, ethical and regulatory issues related to clinical research.
MS-HSR 12	Effectively communicate the findings and implications of HSR through multiple modalities to technical and lay audiences.
MS-HSR 13	Write and know how to submit grant proposals to federal, state, and non-governmental organizations.
MS-HSR 14	Design and conduct research studies using HSR methods and produce research-based manuscripts suitable for publication in peer-reviewed journals.

Identifier	PhD Biostatistics Competencies
Collaboration: Work collaboratively with biomedical or public health researchers on the design, implementation, data analysis and dissemination of research studies.	
PHD-BIOS 1	Write or modify study aims so that the aims map to testable hypotheses.
PHD-BIOS 2	Develop and refine the design of studies including appropriate formulation of the study aims, parameterization of the underlying research questions, and evaluation of study information requirements (sample size). Modify and develop new study designs when existing/initial approaches are inadequate.
PHD-BIOS 3	Identify, implement, and correctly interpret appropriate data analysis approaches for study aims, and suggest new methods when existing approaches are inadequate.
PHD-BIOS 4	Obtain basic understanding of biomedical or public health subject matter for collaborative project.
PHD-BIOS 5	Establish and foster effective communication with non-statistician collaborators in written, graphical and verbal forms during the lifetime of the project.
Biostatistical Research: Develop and disseminate new biostatistical design, estimation or hypothesis testing approaches.	
PHD-BIOS 6	Read (bio) statistical literature on a subject area and synthesize the strengths and weaknesses of existing research.
PHD-BIOS 7	Use statistical theory and biological/public health knowledge to propose new statistical methods to solve statistical problems deriving out of biomedical/public health research.
PHD-BIOS 8	Use appropriate theory or design and implement appropriate simulation studies to exhibit that new methodology has sound statistical features.

Identifier	PhD Epidemiology Competencies
PHD-EPID 1	Appropriately use descriptive epidemiologic methods to describe a given condition including measures of prevalence, incidence, morbidity, mortality, demographic characteristics and risk factors.
PHD-EPID 2	Select and apply appropriate quantitative and qualitative measurement and analysis methods to support research and evaluations in the core areas of public health research and practice, including: epidemiology, environmental and occupational health, community and behavioral health, and public health systems management, policy and outcomes research.
PHD-EPID 3	Critically review and interpret public health and other scientific literature to identify strengths and weaknesses of individual studies, to synthesize evidence in a research area, to identify gaps in evidence and to demonstrate relevance of current knowledge to the practice of public health.
PHD-EPID 4	Translate investigator ideas into answerable research questions.
PHD-EPID 5	Describe study designs and understand the advantages and limitations of each for addressing specific problems, as well as the practical aspects of their uses.
PHD-EPID 6	Demonstrate knowledge related to design of data collection forms and protocols, instrument reliability and validity, data monitoring and quality assurance, and data archiving for analysis and use of data by other investigators.
PHD-EPID 7	Use computer software for data entry, database management, and summarizing, analyzing and displaying data.
PHD-EPID 8	Understand and appropriately interpret the concepts of effect modification and interaction.
PHD-EPID 9	Interpret statistical results in order to make appropriate inferences.
PHD-EPID 10	Demonstrate knowledge of the threats to internal validity and when critically evaluating strength of evidence.
PHD-EPID 11	Understand and apply basic ethical and legal principles involved in the collection, management, use and dissemination of epidemiologic data. Understand the concepts of human subjects' protections and confidentiality. Apply this understanding in the conduct of research and public health practice.
PHD-EPID 12	Be able to identify and critically evaluate secondary data sources appropriate for answering a given research question. Identify and understand limitations of secondary data sets (e.g. inclusion determinants, nonrandom allocation, measurement error, surrogate outcomes) and possible design and analytic solutions.
PHD-EPID 13	Demonstrate knowledge of external validity, especially in the context of applying prevention and control strategies and in the emerging fields of dissemination and implementation science.
PHD-EPID 14	Demonstrate mastery of a substantive area, including the application of that knowledge in conducting research related to a specific topic.

PHD-EPID 15	Communicate both verbally and in writing to non-statistical scientists, practitioners and community members.
PHD-EPID 16	Understand the principles of sampling design and implementation.
PHD-EPID 17	Demonstrate knowledge translating quantitative research questions into statistical models.
PHD-EPID 18	Describe the role of screening in disease prevention or diagnosis, under what conditions screening is justified and how to assess screening test performance and effectiveness.
PHD-EPID 19	Carry out appropriate power or precision calculations to ensure that sample size is sufficient to achieve the scientific aims or address a specific research hypothesis.
PHD-EPID 20	Describe the attributes of an effective surveillance system and the use of surveillance in outbreak investigations, chronic disease, and injury prevention.
PHD-EPID 21	Understand the global, cultural, and social context of health problems and how these influence the conduct, interpretation, and dissemination of research studies
PHD-EPID 22	Complete graduate course work in human pathophysiology or other advanced science, with special competence in the substantive area addressed in the student's dissertation.

Identifier	PhD Health Service Research Competencies
Health Systems, Management and Policy
PHD-HSR 1	Identify the main components and issues of the organization, financing and delivery of health services and public health systems in the U.S.
PHD-HSR 2	Discuss the policy process for improving the health status of populations.
PHD-HSR 3	Apply quality, efficiency and performance improvement concepts to healthcare systems.
Health Services Research Methods
PHD-HSR 4	Identify, and measure, clinically relevant and meaningful outcomes and apply evidence-based practice principles.
PHD-HSR 5	Critically appraise existing literature and evaluate manuscripts published in peer-reviewed journals.
PHD-HSR 6	Demonstrate breadth of HSR theoretical and conceptual knowledge by applying alternative organizational and behavioral models from a range of relevant disciplines.
PHD-HSR 7	Pose innovative and important health service research questions, informed by systematic reviews of the literature, stakeholder needs, and relevant theoretical and conceptual models.
PHD-HSR 8	Select appropriate interventional, observational, or qualitative study designs to address specific health services research questions and hypotheses.
PHD-HSR 9	Appropriately select healthcare databases and utilize information technologies in research.
Research Professionalism
PHD-HSR 10	Accurately select, use and interpret commonly used statistics in health services research.
PHD-HSR 11	Understand and adhere to legal, ethical and regulatory issues related to clinical research.
PHD-HSR 12	Effectively communicate the findings and implications of HSR through multiple modalities to technical and lay audiences.
PHD-HSR 13	Write and know how to submit grant proposals to federal, state, and nongovernmental organizations.
PHD-HSR 14	Independently design, conduct, and defend research studies using HSR methods and produce research-based manuscripts suitable for publication in peer-reviewed journals.
PHD-HSR 15	Participate in interdisciplinary collaboration, provide constructive reviews and feedback to colleagues, and demonstrate leadership in the appropriate application of HSR methods.