MPH Environmental Health

Following are detailed competencies which are addressed to various extents in coursework, field training and the integrative project.

Biostatistics

- Describe the roles biostatistics serves in the discipline of public health.
- Describe basic concepts of probability, random variation and commonly used statistical probability distributions.
- Describe preferred methodological alternatives to commonly used statistical methods when assumptions are not met.
- Distinguish among the different measurement scales and the implications for selection of statistical methods to be used based on these distinctions.
- Apply descriptive techniques commonly used to summarize public health data.
- Apply common statistical methods for inference.
- Apply descriptive and inferential methodologies according to the type of study design for answering a particular research question.
- Interpret results of statistical analyses found in public health studies.
- Develop written and oral presentations based on statistical analyses for both public health professionals and educated lay audiences.
- Plan, perform and report basic statistical calculations and analyses and critically read public health and medical care journal articles.
- Conduct data analyses applicable to community health and health behavior research and/or monitoring and evaluation of public health interventions.

Environmental Health Sciences

- Specify current environmental risk assessment methods
- Specify approaches for assessing, preventing and controlling environmental hazards that pose risks to human health and safety
- Describe federal and state regulator programs, guidelines and authorities that control environmental health issues
- Discuss various risk management and risk communication approaches in relation to issues of environmental justice and equity
- Describe the direct and indirect human, ecological, and safety effects of major environmental and occupational agents
- Describe genetic, physiologic, and psychosocial factors that affect susceptibility to adverse health outcomes following exposure to environmental hazards
- Explain the general mechanisms of toxicity in eliciting a toxic response to various environmental exposures
- Develop a testable model of environmental insult
- Describe the activity and impact of biological, chemical and physical hazards on the human body, including the role of genetic factors, pathways and routes of exposure, fate within the body and adverse health effects.
- Describe and apply epidemiologic principles and methods to investigation of the relationships between environmental agents and adverse health outcomes.
- Interpret and read critically scientific literature in the environmental health sciences, including epidemiology, toxicology and relevant topics in biology, chemistry and medicine.
- Integrate the environmental health competencies above to analyze environmental health problems in specific population groups, including magnitude and distribution of exposures and adverse health outcomes, the role of contributing biological, psychological, sociocultural,

economic and political factors as appropriate, and development and testing of hypotheses to link environmental hazards with adverse health outcomes.

Communicate results of scientific analysis of environmental health problems to appropriate organizations and stakeholders, including the public, legislative bodies, government agencies, industry, advocacy organizations and academia, to inform development and implementation of strategies for preventing and controlling those problems.

Epidemiology

Identify key sources of data for epidemiologic purposes.

Identify the principles and limitations of public health screening programs.

Describe a public health problem in terms of magnitude, person, time and place.

Explain the importance of epidemiology for informing scientific, ethical, economic and political discussion of health issues.

Comprehend basic ethical and legal principles pertaining to the collection, maintenance, use and dissemination of epidemiologic data.

Apply the basic terminology and definitions of epidemiologic methods

Calculate basic epidemiology measures.

Communicate epidemiologic information in the context of lay and professional audiences.

Draw appropriate inferences from epidemiologic data.

Evaluate the strengths and limitations of epidemiologic reports.

Describe the full range of epidemiologic practice, including surveillance, screening, etiologic investigations, emergency response and interventions.

Explain how bias, confounding, effect modification, and random error may affect the results of epidemiologic investigations and how they may be prevented or controlled.

Describe basic approaches for the collection of primary data, the use of secondary data, and the assessment of the quality of data collection and measurements

Apply knowledge of human subjects protections, informed consent, and confidentiality to research activities.

Communicate, in written and oral formats, the background, description and results of an epidemiologic study (to professional and lay audiences).

Describe a surveillance system

Describe different principles of investigation for acute outbreaks versus chronic conditions or other adverse outcomes in populations

Formulate a statement of the research problem, the null and alternative hypotheses.

Undertake hypothesis testing using basic computational approaches

Describe and apply epidemiologic principles and methods to investigation of the relationships between environmental agents and adverse health outcomes.

Health Policy and Management

Identify the main components and issues of the organization, financing and delivery of health services and public health systems in the US.

Describe the legal and ethical bases for public health and health services.

Explain methods of ensuring community health, safety and preparedness.

Discuss the policy process for improving the health status of populations.

Apply the principles of program planning, development, budgeting, management and evaluation in organizational and community initiatives.

Apply principles of strategic planning and marketing to public health.

Apply quality and performance improvement concepts to address organizational performance issues.

Apply "systems thinking" for resolving organizational problems.

Communicate health policy and management issues using appropriate channels and technologies.
Demonstrate leadership skills for building partnerships.
Recognize and address legal and ethical issues in the context of delivery of public health and health services

Social and Behavioral Sciences

Identify basic theories, concepts and models from a range of social and behavioral disciplines that are used in public health research & practice.
Identify the causes of social and behavioral factors that affect health of individuals and populations.
Identify individual, organizational and community concerns, assets, resources and deficits for social and behavioral science interventions.
Identify/involve critical stakeholders for the planning, implementation and evaluation of public health programs, policies and interventions.
Describe steps and procedures for the planning, implementation and evaluation of public health programs, policies and interventions.
Describe the role of social and community factors in both the onset and solution of public health problems.
Describe the merits of social and behavioral science interventions and policies.
Apply evidence-based approaches in the development and evaluation of social and behavioral science interventions.
Apply ethical principles to public health program planning, implementation and evaluation.
Specify multiple targets and levels of intervention for social and behavioral science programs and/or policies.
Demonstrate broad knowledge of the interactions between community and behavioral, biological, cultural, environmental, healthcare, policy, and socioeconomic factors as influences on public health.

Communication and Informatics

Describe how societal, organizational, and individual factors influence or are influenced by public health communications
Discuss the influences of social, organizational and individual factors on the use of information technology by end users.
Apply theory and strategy-based communication principles across different settings and audiences
Apply legal and ethical principles to the use of information technology and resources in public health settings.
Demonstrate effective written skills for communicating with different audiences in the context of professional public health activities.
Use information technology to access, evaluate and interpret public health data.
Use informatics methods and resources as strategic tools to promote public health.

Diversity and Culture

Describe the roles of history, power, privilege, and structural inequality in producing health disparities
Explain why cultural competence alone cannot address health disparity.
Discuss the importance and characteristics of a sustainable diverse public health workforce.
Apply the principles of community-based participatory research to improve health in diverse populations.

Differentiate among availability, acceptability, and accessibility of health care across diverse populations.

Leadership

Describe the attributes of leadership in public health
Describe alternative strategies for collaboration and partnership among organizations, focused on public health goals
Articulate an achievable mission, set of core values and vision.
Engage in dialogue and learning from others to advance public health goals
Demonstrate team building, negotiation, and conflict management skills.
Demonstrate transparency, integrity and honesty in all actions.
Use collaborative methods for achieving organizational and community health goals.
Develop strategies to motivate others for collaborative problem solving, decision-making, and evaluation.

Public Health Biology

Specify the role of the immune system in population health.
Describe how behavior alters human biology.
Identify the ethical, social and legal issues implied by public health biology.
Explain the biological and molecular basis of public health.
Explain the role of biology in the ecological model of population-based health.
Integrate general biological and molecular concepts into public health.
Explain how genetics and genomics affect disease processes and public health policy and practice.
Articulate how biological, chemical, and physical agents affect human health
Apply biological principles to the development and implementation of disease prevention, control, or management programs.
Apply evidence-based biological and molecular concepts to inform public health laws, policies, and regulations.

Professionalism

Discuss sentinel events in the history and development of the public health profession and their relevance for practice in the field.
Apply basic principles of ethical analysis (e.g. the Public Health Code of Ethics, human rights framework, other moral theories) to issues of public health practice and policy.
Apply evidence-based principles and the scientific knowledge base to critical evaluation and decision-making in public health.
Apply the core functions of assessment, policy development, and assurance in the analysis of public health problems and their solutions.
Promote high standards of personal and organizational integrity, compassion, honesty and respect for all people.
Analyze determinants of health and disease using an ecological framework.
Analyze the potential impacts of legal and regulatory environments on the conduct of ethical public health research and practice.
Distinguish between population and individual ethical considerations in relation to the benefits, costs, and burdens of public health programs.
Embrace a definition of public health that captures the unique characteristics of the field (e.g., population-focused, community-oriented, prevention-motivated and rooted in social justice) and how these contribute to professional practice.

Appreciate the importance of working collaboratively with diverse communities and constituencies (e.g., individual clients, practitioners, agencies, organizations and researchers).

Program Planning

Describe how social, behavioral, environmental, and biological factors contribute to specific individual and community health outcomes.
Explain how the findings of a program evaluation can be used.
Explain the contribution of logic models in program development, implementation, and evaluation.
Differentiate among goals, measurable objectives, related activities, and expected outcomes for a public health program.
Describe the tasks necessary to assure that program implementation occurs as intended.
Differentiate between qualitative and quantitative evaluation methods in relation to their strengths, limitations, and appropriate uses, and emphases on reliability and validity.
Prepare a program budget with justification.
In collaboration with others, prioritize individual, organizational, and community concerns and resources for public health programs.

Systems Thinking

Identify characteristics of a system.
Identify unintended consequences produced by changes made to a public health system.
Provide examples of feedback loops and "stocks and flows" within a public health system.
Explain how systems (e.g. individuals, social networks, organizations, and communities) may be viewed as systems within systems in the analysis of public health problems.
Explain how the contexts of gender, race, poverty, history, migration, and culture are important in the design of interventions within public health systems.
Analyze inter-relationships among systems that influence the quality of life of people in their communities.

Other Competencies

Demonstrate integration by identifying linkages between the specifics of the project topic and public health disciplines and applying methods and techniques acquired in the program to the specific topic; demonstrate integration of preceding coursework by identifying linkages between the specific approaches used to address the health problem and the principles, methods and knowledge base acquired in the program. This is demonstrated both in execution of the project and in the final written and oral presentations by:

- Application of core epidemiologic, biostatistical, environmental health, health behavior, or health services administration methods, data, or knowledge as appropriate to the topic.
- Application of principles, methods, and knowledge from environmental health concentration required and elective courses as appropriate to the topic.

Integrate and apply principles, methods and knowledge from preceding courses to address a specific environmental health problem of public health significance
Identify and describe ethical, economic, and political implications derived from the project.
Demonstrate effective written skills for communicating with different audiences in the context of professional public health activities.

- This will be demonstrated by writing a logical, sound, evidence informed, organized, and well-written paper.
- It will also be demonstrated by a well-prepared oral presentation.