

D4. MPH & DrPH Concentration Competencies

The school defines at least five distinct competencies for each concentration or generalist degree at each degree level in addition to those listed in Criterion D2 or D3.

The school documents at least one specific, required assessment activity (eg, component of existing course, paper, presentation, test) for each defined competency, during which faculty or other qualified individuals (e.g., preceptors) validate the student's ability to perform the competency.

If the school intends to prepare students for a specific credential (e.g., CHES/MCHES) that has defined competencies, the school documents coverage and assessment of those competencies throughout the curriculum.

- 1) Provide a matrix, in the format of Template D4-1, that lists at least five competencies in addition to those defined in Criterion D2 or D3 for each MPH or DrPH concentration or generalist degree, including combined degree options, and indicates at least one assessment activity for each of the listed competencies. Typically, the school will present a separate matrix for each concentration.

Competency	Course number(s) and name(s)	Specific assignment(s) that allow assessment
1. Apply standard probability distributions to public health outcomes	PHC 6053 Regression Methods for the Health and Life Sciences	Interpretation Assignment 3: Students use histogram and QQ plot of residuals to determine if the residuals for a linear regression model are reasonably normally distributed. Interpretation Project: Students interpret GLM model fits with Binomial errors (i.e. logistic regression models)
	PHC 6059 Introduction to Applied Survival Analysis	Midterm Exam: Students interpret the model fits for parametric survival regression models such as a Weibull regression model.
2. Apply and interpret common statistical descriptive and inferential methods, including confidence intervals and hypothesis tests in one-sample, two-sample, and multivariable regression settings	PHC 6053 Regression Methods for the Health and Life Sciences	Using statistical software output, students interpret the results of hypothesis tests for regression coefficients in multiple linear regression and multiple logistic regression models. Students also calculate and interpret confidence intervals for regression slopes in multiple linear regression models and odds ratios in multiple logistic regression models.

Table D4-1.1: Assessment of Competencies for MPH in Biostatistics Concentration

Competency	Course number(s) and name(s)	Specific assignment(s) that allow assessment
<p>2. Apply and interpret common statistical descriptive and inferential methods, including confidence intervals and hypothesis tests in one-sample, two-sample, and multivariable regression settings</p>	<p>PHC 6089 Public Health Computing</p>	<p>R Project: Students select a real dataset, perform some light data cleaning, exploratory data analysis and answer proposed research questions using standard statistical methods such as chi-square tests, t-test, linear or logistic regression. Results are presented in a statistical analysis report created using RMarkdown.</p>
	<p>PHC 6059 Introduction to Applied Survival Analysis</p>	<p>Midterm Exam: Students apply the Kaplan-Meier method to estimate a survival probability in the presence of right censored data.</p>
<p>3. Conduct predictive modeling, for example in order to relate risk factors to an outcome</p>	<p>PHC 6053 Regression Methods for the Health and Life Sciences</p>	<p>Final Regression Project, Q6. From a full linear regression model, students calculate and interpret the effect of a 10-year increase in age among males and its confidence interval and to provide the p-value for testing whether this value is statistically significant.</p>
		<p>Final Regression Project, Q11. From a full logistic regression model, students calculate and interpret the odds ratio for a 10-year increase in age among males and its confidence interval and to provide the p-value for testing whether this value is statistically significant.</p>
		<p>Final Regression Project, Q12. For both linear regression and logistic regression models, students are provided with the effect of 10-year increase in age among females, and are asked to explain and illustrate how to find both of these estimates and confidence intervals using only the information provided in the parameter estimates table.</p>
<p>3. Conduct predictive modeling, for example in order to relate risk factors to an outcome</p>	<p>PHC 6053 Regression Methods for the Health and Life Sciences</p>	<p>Final Regression Project, Q13. Students calculate the predicted mean (for linear regression) or predicted probability (for logistic regression) for each of the three individuals provided using the full models.</p>
	<p>PHC 6059 Introduction to Applied Survival Analysis</p>	<p>See PHC 6059 Final Exam (Question 2.4-2.8) in ERF D4.</p>
<p>4. Build and interpret appropriate multivariate regression models to analyze public health data</p>	<p>PHC 6053 Regression Methods for the</p>	<p>Software Assignments 3-6 – Students use statistical software to fit multiple linear and logistic regression models and generate diagnostic output.</p>

Table D4-1.1: Assessment of Competencies for MPH in Biostatistics Concentration

Competency	Course number(s) and name(s)	Specific assignment(s) that allow assessment
	Health and Life Sciences	Students use statistical software output to interpret multiple linear and logistic regression model fits, which can include quantitative and categorical variables and possibly interaction terms. Students assess the assumptions of linear regression using residual diagnostic plots.
		Students use statistical software output for several multiple linear and logistic regression models, interpret the output in context, assess model assumptions and compare models fits using model comparison measures such as R-squared, AIC, and ROC curves/AUC.
	PHC 6059 Introduction to Applied Survival Analysis	Midterm Exam 2 – Students apply a Cox proportional hazards model to real data, interpret hazard ratios from the fitted model, and calculate test statistics and confidence intervals for regression coefficients.
5. Develop practical skills in using statistical software packages for data management and analysis of public health data	PHC 6053 Regression Methods for the Health and Life Sciences	Software Assignments 1-6 – Students read and manipulate data using SAS, and then to produce graphical and numerical summaries, and fit multiple linear and logistic regression models.
	PHC 6059 Introduction to Applied Survival Analysis	Take Home Final Exam – Students use R to produce a plot of the Kaplan-Meier Estimator and fit a Cox proportional Hazards model.
5. Develop practical skills in using statistical software packages for data management and analysis of public health data	PHC 6089 Public Health Computing	Lab/in class group activities, Homeworks 1-6, R project, and SAS project – Students use SAS/R to import data, perform standard data management tasks such as merging datasets, renaming variables, translating categorical variables, etc., produce graphical and numerical summaries, and output for standard statistical methods such as t-test, one way ANOVA, correlation, chi-square tests, linear regression, logistic regression, and Poisson regression.
6. Develop written reports based on statistical analyses	PHC 6089 Public Health Computing	R project – Students use a real dataset to construct a statistical analysis report using RMarkdown and the tidyverse. Students import a real dataset(s), perform light data cleaning, produce graphical and numerical summaries of key variables, produce output using appropriate statistical methods to answer research questions of their own interest related to their chosen dataset, and write up the whole process in a report using RMarkdown. (Note code is shown for the purposes of grading instead of being hidden or moved to an appendix.)

Table D4-1.2: Assessment of Competencies for MPH in Environmental Health Concentration		
Competency	Course number(s) and name(s)	Specific assignment(s) that allow assessment
1. Examine the direct and indirect human and ecological health effects of major environmental agents	PHC 6018 Environmental Ecology of Human Pathogens	Students prepare and deliver a presentation that examines factors governing human infection and/or disease by major environmental pathogens.
	PHC 6304 Environmental toxicology Applications in Public Health	After being assigned a chemical contamination event, students research and present how the disaster happened, associated chemicals, impact mechanisms of the chemicals, and population affected. In addition, students assess corresponding cleanup and/or mitigation strategies and lead an in-class discussion on future preparedness under a similar scenario.
2. Develop a quantitative risk assessment framework for environmental hazards	PHC 6424 Environmental Policy and Risk Management in Public Health	Students are separated into groups and given a specific spill scenario for which they develop a risk assessment. Each group is given data about the site, including measurements of concentrations, at risk populations, and other details. From these data, students perform a hazard characterization, develop a conceptual frame work, perform an exposure assessment and effects assessment, and characterize the potential risk.
3. Evaluate and advocate for current environmental policies	PHC 6424 Environmental Policy and Risk Management in Public Health	For each policy brief, students are assigned an emerging environmental health issue and review the options for developing a new policy or changing an existing policy that addresses the environmental health issue. Policy brief 1 is an "objective brief." For the objective brief, students consider multiple policy options but do not advocate one policy over another. Policy brief 2 is an "advocacy brief." For the advocacy brief, students are asked to consider multiple policy options with the requirement that they advocate one policy over another (or others).
4. Apply approaches for assessing environmental exposures, including exposure assessment design and methods	PHC 6702 Environmental Monitoring and Exposure Assessment	Students select an environmental exposure problem or scenario and provide a formal review of scientific literature related to the exposure scenario including exposure measurement techniques and assessment methods. Student are then expected to provide a description of how they would conduct an exposure assessment for their selected problem, including methods used and justification for the study design.

Table D4-1.2: Assessment of Competencies for MPH in Environmental Health Concentration		
Competency	Course number(s) and name(s)	Specific assignment(s) that allow assessment
5. Demonstrate cultural sensitivity and appropriate communication when engaged in public health practice and research	PHC 6764 Global Health and Development I	Students are assigned a global health issue and are asked to perform an analysis using secondary or original data, critiquing literature and developing potential inventions with an emphasis on public health practice and cultural contexts. The students are required to deliver an in-class presentation of their analyses and participate in a discussion.

Table D4-1.3: Assessment of Competencies for MPH in Epidemiology Concentration		
Competency	Course number(s) and name(s)	Specific assignment(s) that allow assessment
1. Calculate and interpret measures of association for different study designs	PHC 6000 Epidemiology Methods I	Measures of Association: Given data from different study designs, students calculate and interpret the appropriate measure of association.
2. Assess potential confounders in epidemiology studies.	PHC 6000 Epidemiology Research Methods I	Confounding exercise: Given data from a study, students use stratification to assess a potential confounder, check whether stratum-specific estimations are homogeneous or heterogeneous, and compare the crude estimate with the stratum-specific estimates. They then draw conclusions from their comparison.
3. Evaluate interaction, effect modification and mediation in epidemiology studies.	PHC 6000 Epidemiology Research Methods I	Interaction exercise: Students calculate the OR for stratified epidemiology data and evaluate the data for the presence and type of effect modification

Table D4-1.3: Assessment of Competencies for MPH in Epidemiology Concentration

Competency	Course number(s) and name(s)	Specific assignment(s) that allow assessment
	PHC 6003 Epidemiology and Prevention of Chronic Diseases	<p>After reading carefully the paper: “Association of Clinical and Social Factors With Excess Hypertension Risk in Black Compared With White US Adults” and looking at Figure 2, students answer the following questions:</p> <ol style="list-style-type: none"> 1. What is the definition of a confounder and the definition of the mediator? What’s the difference between a mediator and a confounder? 2. What factor most strongly mediates the risk of hypertension in Black adults compared to White adults? Are there differences between men and women? 3. What other factors contribute to the percentage of mediation of the Black-White disparity in incident hypertension. Are there differences between men and women? 4. If you are the health commissioner, what three things would you do to reduce Black-White disparities?
4. Evaluate the multifactorial etiology and pathophysiology of chronic diseases	PHC 6003 Epidemiology and Prevention of Chronic Diseases	<p>In the article by Stein et al., the authors state: “In recent analyses that compared the longevity of the American working class with their counterparts in other high-income nations, only the American White working class has had an epidemic of premature death.”</p> <p>Students review the Stein et al. article and provide a commentary (one page, single spaced) to this statement by addressing several issues:</p> <ol style="list-style-type: none"> 1. Is this statement true? Defend your answer. 2. Which causes of death may account for this? 3. Of the five domains affecting health of populations (genetic, behavioral, social, environment, health care), which factors are most likely to explain the data? Which factors are less likely to explain the data?
5. Apply criteria for identification, prevention and control of infectious agents.	PHC 6002 Epidemiology of Infectious Diseases	Students are given a case study, “A Multistate Outbreak of Cyclosporiasis”, and are asked to examine modes of transmission and incubation periods and to interpret the results and criteria for causation.

Table D4-1.3: Assessment of Competencies for MPH in Epidemiology Concentration		
Competency	Course number(s) and name(s)	Specific assignment(s) that allow assessment
6. Manage, analyze and interpret large-scale epidemiologic data	PHC 6011 Epidemiology Research Methods II	Using the 2017-18 NHANES data, students access the existing large scale data set and are asked to carry out data processing and variable recoding, conducting bivariate analysis using a t-test, chi-square test and correlation to explore risk factors, and use multivariate linear, logistic, Cox and Poisson regression to confirm bivariate results by controlling significant covariates/confounders.

Table D4-1.4: Assessment of Competencies for MPH in Population Health Management Concentration		
Competency	Course number(s) and name(s)	Specific assignment(s) that allow assessment
1. Utilize systems thinking and analytical methods of strategic organization to evaluate public health contexts	PHC 6103 Systems Thinking for Public Health	On behalf of the Florida Department of Economic Opportunity, Department of Education, Department of Health, Agency for Health Care Administration, and Division of Emergency Management, and local governments, students create a COVID-19 reopening plan for the assigned four county region. Special emphasis needs to focus on limiting the spread of COVID-19 in medically underserved populations in the region. The report will be forwarded to applicable legislators and governmental staff. The recommendations for the proposed plan build on the team assignments and reflect integration of Systems Thinking Theory as well as previous courses in the MPH program. This presentation is graded on how it provides an integrative and evidence based approach for next level stakeholders.

**Table D4-1.4: Assessment of Competencies for MPH in
Population Health Management Concentration**

Competency	Course number(s) and name(s)	Specific assignment(s) that allow assessment
2. Create an evaluation plan for a public health initiative	PHC 6104 Evidence-Based Management of Public Health Programs	Students create an evaluation plan for Florida Medicaid reform. This includes creating an evaluation framework, evaluating implementation objectives, evaluating participant outcome objectives-procedures and methods and developing procedures for managing and monitoring the evaluation.
3. Apply principles and theory of budget preparation, managerial accounting and financial management to organizations in the health sector	HSA 7759: Quality and Outcomes in Health Services Research	Assignment 2 Paper – Students evaluate health outcomes through cost-benefit, cost-effectiveness and cost-utility analysis in practice and compare the three methods. The assignment requires the application of appropriate economic evaluation for the organizations and quality outcomes.
4. Compose evaluation questions that examine the impact of policy upon key public health issues	PHC 6104 Evidence-Based Management of Public Health Programs	Project of Hernando County – Students compose evaluation questions regarding a Federal Qualified Health Center located in Hernando County that analyze the impact of policy upon health outcomes. After reviewing the background information on FQHCs at the HRSA website and Hernando County’s proposal (especially the text on needs assessment), students develop three policy questions, which the proposed implementation of this FQHC might address in Hernando County. Students are asked to justify, based on the background materials, why these are indeed policy questions. The policy questions must be outcome/impact-oriented and not related to implementation processes.
5. Develop a survey instrument that validly examines public health research questions and produces data that addresses health implications and their relationship to policy and contexts	PHC 6716 Survey Research Methods	Final paper and presentation – Students use diverse survey research methods taught in the class and present findings based upon scientific test methods (e.g., application of questionnaire, sampling frames, factor analysis and principal components, etc.). Students are expected to provide a sophisticated awareness of strengths and limitations of findings and address the implications of the results in health-related policy context.

Table D4-1.4: Assessment of Competencies for MPH in Population Health Management Concentration		
Competency	Course number(s) and name(s)	Specific assignment(s) that allow assessment
6. Conduct an economic analysis of a major health policy issue	HSA 6436 Health Economics	For the semester project, students choose a health policy issue that is of interest to them. They do background reading and literature review and then apply at least three economic concepts, principles, theories, etc., learned in class that apply to their chosen topic. They then prepare either a 5-8 minute PowerPoint slide show or a 3-5 page written report that presents their health policy issue and the application of the economic concepts they identified to analyze the health policy topic they chose.

Table D4-1.5: Assessment of Competencies for MPH in Social and Behavioral Sciences Concentration		
Competency	Course number(s) and name(s)	Specific assignment(s) that allow assessment
1. Evaluate public health social and behavioral science research so that research decisions, strengths and limitations are addressed	PHC 6700 Social and Behavioral Research Methods	Research evaluation presentation – Students evaluate a published public health research article in the area of social and behavioral science (provided by the instructor) by developing a narrated PowerPoint or video recording that includes the following components: Introduction: A section describing the research problem and evaluating the construct definitions used in the study Research Question/Methods Alignment: A section describing the study's research question(s) and an evaluation of whether the study research methods/design are aligned with these questions Sampling: A section describing the sampling methods used, and how they align with the research design/question and circumstances of the study. Results: A section describing the study results, and whether the results were described/interpreted adequately. Discussion: A section discussing the strengths and limitations of the study, including an evaluation of the implications suggested by the authors.

Table D4-1.5: Assessment of Competencies for MPH in Social and Behavioral Sciences Concentration

Competency	Course number(s) and name(s)	Specific assignment(s) that allow assessment
2. Integrate social and behavioral science theories and concepts in the development of interventions/solutions to public health problems.	PHC 6405 Theoretical Foundations of Public Health	Using health communication and behavior change theories, students compose an op-ed style essay on a public health issue of their choosing that is written for a general/lay audience. Students are expected to include a description of the problem and a proposed solution that is informed by theory. In addition to the op-ed piece, students attach a reaction paper describing the health communication and health behavior change theories/models they relied on during the writing of their op-ed essay and a rationale for how these best informed the solution.
2. Integrate social and behavioral science theories and concepts in the development of interventions/solutions to public health problems.	PHC 6405 Theoretical Foundations of Public Health	<p>Week 4 Memo-Discussion: Students address the following: Moving from Intention to Behavior: Students identify a health behavior-related intervention that they would like to develop to address something they are interested in changing in public health. This could be smoking, cyberbullying, opioid drug abuse, gun violence, adolescent sleep deprivation – anything that they see as an important issue in public health that is tied to health-related behaviors. Students are expected to describe the following:</p> <ul style="list-style-type: none"> - What health-related behavior does the intervention target? - Why is it important? - Who is the target group for the intervention? - What intervention would they like to implement? <p>Fully describe what the intervention would involve. Students also describe how key theories or models such as the HBM, TPB/TRA, etc. (chapters 4-6 in Glanz) connect to the development of their intervention and how these models could/should inform the implementation of the intervention. For the selected target behavior, students use the public health research literature to describe strategies/interventions to move someone from intention to behavior. They also describe: how social disparities might represent a potential barrier in the implementation of the intervention; how cognitive dissonance might play a role; what strategies might be put in place to minimize these potential barriers; and what research literature supports their strategies.</p>
3. Characterize the needs of a community or population	PHC 6251 Assessment and Surveillance in Public Health	Final Project Paper: Students design and complete a community needs assessment and compose a paper that outlines the steps of the assessment, including how members of the community/key stakeholders are included in the project design, a rationale for the selection of the target community, implications or

Table D4-1.5: Assessment of Competencies for MPH in Social and Behavioral Sciences Concentration		
Competency	Course number(s) and name(s)	Specific assignment(s) that allow assessment
		links to the community needs, and communications with stakeholders.
4. Design, implement and evaluate a public health intervention	PHC 6146 Public Health Program Planning and Evaluation	Course Project Presentation: Students design, implement and evaluate a public health intervention project that is grounded in a theoretical framework. The presentation must include a background to the problem, description of the theoretical framework and how it informs the intervention, methods section, evaluation results, conclusions and implications of findings, and lessons learned.
5. Design and develop effective communication products that convey health information to diverse audiences that increase recipients' knowledge and positively impact attitudes, beliefs and behaviors.	PHC 6195 Health Information for Diverse Populations: Theory and Methods	Final Project: Students develop three communication/information products (poster, infographic and public service announcement) that are informed by focus group sessions that students conduct and are also informed by scientific literature. Products are assessed based upon ease of use, the effectiveness of the product to grab attention, adherence to design principles and organization.

- 2) **For degrees that allow students to tailor competencies at an individual level in consultation with an advisor, the school must present evidence, including policies and sample documents, that demonstrate that each student and advisor create a matrix in the format of Template D4-1 for the plan of study. Include a description of policies in the self-study document and at least five sample matrices in the electronic resource file.**

Students in the Public Health Practice concentration work with their faculty advisors to develop a set of core competencies for their individualized plans of study. These competencies are linked to core competencies in the other concentrations, and thus have specific assessments of competence built in.

- 3) **Include the most recent syllabus for each course listed in Template D4-1, or written guidelines for any required elements listed in Template D4-1 that do not have a syllabus.**

The following can be found in ERF D4-3:

- Syllabi
- PHC 6000 Confounding Assignment
- PHC 6000 Measures of Association Assignment
- PHC 6002 A Multistate Outbreak of Cyclosporiasis
- PHC 6059 Final Exam
- PHC 6146 Course Project Presentation Rubric
- PHC 6251 Final Project Paper Rubric

4) If applicable, assess strengths and weaknesses related to this criterion and plans for improvement in this area.

Strengths:

- Each MPH concentration has a defined set of at least five competencies that go beyond foundational competencies and articulate the depth of knowledge and skill expected of graduates from each concentration.
- Concentration-specific competencies are covered in concentration core courses. For each competency at least one, but usually multiple, assessments are conducted as part of the corresponding course.

Weaknesses:

- None identified

Plans for improvement:

- None. The college will continue to monitor concentration core courses to assure that competencies and assessments align as courses are updated over time.