

**PROGRAM IN PUBLIC HEALTH**  
**Health Analytics Concentration Competencies**

**Course Key**

**HPH 534:** Spatial Analysis: Health Applications

**HPH 559:** Advanced Research Methods

**HPH 560:** Advanced Biostatistics

<b>Legend</b>		Primary Source of Learning Experience		Secondary Source of Learning Experience
<b>Concentration Competencies</b>		<b>Concentration Courses</b>		
<b>1. Analytical Thinking:</b> Applying analytical and conceptual models for public health				
		<b>HPH 534</b>	<b>HPH 559</b>	<b>HPH 560</b>
<b>Learning Experiences:</b>				
a.	Describe theory using path diagrams or other models.			
b.	Identify independent variables (including mediating and moderating variables) and dependent variables, causal mechanisms, and direction of relationship.			
c.	Interpret results and be able to communicate the study's findings, strengths, and weaknesses.			
d.	Discuss cartographic choices involved in map-making.			
e.	Compare benefits and limitations of using individual point locations compared with data aggregated within regions.			
<b>2. Synthesis:</b> Assess current evidence base on a topic through a literature review, synthesizing information, identifying gaps, and critiquing study limitations.				
		<b>HPH 534</b>	<b>HPH 559</b>	<b>HPH 560</b>
<b>Learning Experiences:</b>				
a.	Summarize the published literature related to a research question using the recognized sources of population health literature including PubMed and the Cochrane Collaboration.			
b.	Apply new knowledge base to critique existing literature on spatial analysis of public health data.			
c.	Evaluate appropriateness of statistical methods used in public health studies.			
<b>3. Posing a Question:</b> Formulate a scientific question based on review of scientific literature.				
		<b>HPH 534</b>	<b>HPH 559</b>	<b>HPH 560</b>
<b>Learning Experiences:</b>				
a.	Formulate a quantitative research question to address a gap identified in existing literature.			
b.	Develop a research proposal to answer the research question.			

<b>4. Data and Software:</b> Identify and use data sources to analyze population health and well-being and become familiar with emerging and widely-used software and technologies to analyze data sets.	<b>HPH 534</b>	<b>HPH 559</b>	<b>HPH 560</b>
<b>Learning Experiences:</b>			
a. Become familiar with and be able to download and utilize publicly available secondary datasets (eg, NHANES, NHIS, DHS, Add Health, etc.)			
b. Become familiar with software used for quantitative analysis (e.g., SAS, Stata).			
c. Become familiar with types of health data appropriate for spatial analyses.			
d. Become familiar with software used for spatial analysis (e.g., SaTScan, ArcGIS)			
<b>5. Methods:</b> Utilize a suite of methods appropriate for analyzing public health data.			
<b>Learning Experiences:</b>	<b>HPH 534</b>	<b>HPH 559</b>	<b>HPH 560</b>
a. Identify differences between descriptive versus causal research, correlation versus causation, the scientific method, and the need for data to confirm theory.			
b. Describe different sampling techniques and implications for methodological approach and analysis.			
c. Apply bivariate and multivariate methods, including linear and logistic regression methods and survival analysis.			
d. Articulate limitations of statistical approach, including but not limited to sample utilized, unobserved confounders, generalizability, correlation v. causation, and statistically v. practically significant results.			
e. Discuss and apply methods of spatial analysis including smoothing, cluster analysis, and spatial regression.			
<b>6. Project:</b> Conduct a research project related to population health.			
<b>Learning Experiences:</b>	<b>HPH 534</b>	<b>HPH 559</b>	<b>HPH 560</b>
a. Identify a testable population health-related research question that has not been previously asked or fully developed.			
b. Develop an analysis plan to answer a research question.			
c. Clean, manage, and prepare data for analysis related to a research question.			
d. Apply appropriate statistical methods based on data available.			
<b>7. Present Findings:</b> Develop written and oral presentations based on statistical analyses for both public health professionals and educated lay audiences.			
<b>Learning Experiences:</b>	<b>HPH 534</b>	<b>HPH 559</b>	<b>HPH 560</b>
a. Develop written reports based on statistical analyses for class.			
b. Orally present work based on statistical analyses to classmates.			
c. Present results from statistical analyses in the form of a poster or oral presentation to the public.			

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