Curriculum Map, Epidemiology PhD

VCU PhD in Epidemiology Elements/Milestones

		BIOS 553	BIOS 554	EPID 649	EPID 650	EPID 651	EPID 652	EPID 690	OVPR 601/602/603 (RCR)	CITI/HIPAA training	Written Comprehensive Exam	Oral Exam	Dissertation grant application	Dissertation	Giving seminar lectures	Attending seminars	IDP	Advising meetings	Research group meetings	Professional meetings	Research Assistant	Teaching Assistant
1	**Theory and Context**																					
1. a.	Demonstrate knowledge of the physiologic processes important in understanding pathogenesis of disease.							✓			✓	✓	✓	✓					✓		✓	
1. b.	Explain epidemiologic theories of disease causation, theories of bias in epidemiologic research, as well as general framework and other theories to understand distributions of disease occurrence.				✓	✓	✓	✓			✓	✓	✓	✓					✓		✓	
1. c.	Demonstrate an in-depth understanding of at least one of the substantive theories or frameworks that form the basis for epidemiologic research.				✓	✓	✓	✓			✓	✓	✓	✓	✓				✓		✓	
1. d.	Appropriately link theoretical framework to the design, conduct, and interpretation of epidemiologic research.				✓	✓	✓	✓			✓	✓	✓	✓	✓				✓		✓	
2	**Study Design**																					
2. a.	Construct and develop novel epidemiological research questions.			✓			✓				✓	✓	✓	✓	✓				✓		✓	
2. b.	Explain conceptual definitions of determinants, outcome variables, and confounders in ways consistent with the theoretical framework guiding the research.			✓	✓		✓				✓	✓	✓	✓	✓				✓		✓	
2. c.	Create and develop key variables such that misclassification and measurement error are minimized.						✓				✓	✓	✓	✓					✓		✓	
2. d.	Demonstrate proficiency in selecting the most appropriate study designs in epidemiologic (e.g., ecological studies, randomized trials, cohort, case-control, time series, difference-in-difference) such that bias is minimized and efficiency maximized.				✓	✓					✓	✓	✓	✓	✓				✓		✓	
2. e.	Demonstrate proficiency in the construction of a primary data collection tool.													✓					✓		✓	
2. f.	Explain the impact of measurement issues (misclassification and measurement error) on validity of the study, select the most appropriate measures during the design phase, and apply correct techniques for adjustment in analysis.			✓	✓	✓	✓				✓	✓	✓	✓					✓		✓	

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2. g.	Explain what confounding is, how to identify potential confounders, strategies for prioritizing concerns regarding confounders, and ability to minimize confounding through design and analysis.			✓	✓	✓	✓				✓	✓	✓	✓					✓		✓	
2. h.	Understand selection bias in the context of cohort and case-control studies, explain ways to minimize selection bias, and recognize when correction techniques are viable and/or necessary.				✓	✓	✓				✓	✓	✓	✓					✓		✓	
2. i.	Understand required elements to estimate sample size and apply methods to provide valid estimates of parameters for sample size equations.					✓					✓	✓	✓	✓					✓		✓	
2. j.	Demonstrate knowledge of the impact of bias owing to loss of study participants and methods to minimize such bias, including the ability to devise retention strategies.				✓	✓	✓				✓	✓	✓	✓					✓		✓	
3	**Analysis**																					
3. a.	Estimate and interpret measures of disease or event frequency and to understand the inter-relationship between measures.	✓	✓	✓	✓		✓				✓			✓							✓	
3. b.	Estimate and interpret crude and model-based measures of association.	✓		✓	✓		✓				✓			✓							✓	
3. c.	Demonstrate proficiency in selecting the appropriate measure of association for the specific study.	✓	✓	✓	✓		✓				✓		✓	✓	✓						✓	
3. d.	Demonstrate understanding of statistical reasoning including distributions, probability, sampling, methods of comparing means, and approaches to estimating relationships among variables as applies to epidemiological research/data analysis.	✓	✓	✓			✓				✓		✓	✓							✓	
3. e.	Implement analytic techniques to control for confounding.	✓		✓	✓		✓				✓			✓	✓						✓	
3. f.	Parameterize regression models, evaluate diagnostics of the model and interpret model-based measures of association.	✓		✓			✓				✓			✓	✓						✓	
3. g.	Evaluate and interpret the extent to which a factor modifies the relationship between determinant and outcome under study.	✓		✓	✓		✓				✓			✓	✓						✓	
3. h.	Apply advanced statistical methods appropriate for student research needs (e.g. hierarchical modeling, mixed-effects models, categorical data analysis, analytical techniques for evaluating spatial data).		✓				✓				✓			✓							✓	
3. i.	Use techniques to estimate causal effects from non-experimental study designs.						✓				✓			✓							✓	

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3. j.	Conduct sensitivity analyses to understand the robustness of findings in light of sources of bias.				✓	✓					✓											
4	**Effective communication**																					
4. a.	Demonstrate effective communication skills across disciplines, framing questions appropriately and implementing active listening skills.	✓	✓	✓	✓	✓	✓	✓	✓			✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
4. b.	Demonstrate proficiency in scientific writing (manuscripts, review of manuscripts, rebuttals to reviewers, grant writing).			✓	✓			✓				✓	✓	✓							✓	
4. c.	Effectively deliver oral presentations (e.g., scientific presentations to professional audiences, lectures to students and other teaching) including the appropriate use of audio/visual technologies).			✓	✓	✓		✓				✓		✓	✓				✓	✓		✓
4. d.	Effectively communicate scientific information to multiple audiences (lay audiences and policy-makers) for the purpose of translating science into policy and practice.													✓	✓				✓	✓		
4. e.	Demonstrate proficiency in leading discussions (e.g. journal club, seminar, brainstorming sessions).					✓		✓							✓				✓		✓	✓
4. f.	Construct and orally pose scientific questions related to research (e.g. serving as discussant, asking questions, etc.).							✓						✓	✓	✓			✓	✓	✓	✓
5	**Data Management /Practical Research Skills**																					
5. a.	Demonstrate familiarity with the availability, structure, and appropriate procedures to access datasets for epidemiologic research.			✓					✓			✓	✓	✓					✓		✓	
5. b.	Implement methods for assessing the strengths and limitations of data sources for evaluating specific study questions.			✓							✓	✓		✓					✓		✓	
5. c.	Demonstrate expertise in the management of complex relational and hierarchical databases including merging, appending, aggregating and transposing data structures; documenting and recoding variables, and converting data across different analysis software applications.			✓										✓					✓		✓	
5. d.	Apply appropriate weighting schemes to population-based datasets			✓										✓							✓	
5. e.	Explain security issues, HIPAA practices, and other privacy regulations affecting data access and security requirements.								✓	✓		✓	✓	✓					✓		✓	

5. f.	Execute methods for processing primary data, including developing systems for data entry and validation, data cleaning and documentation (internal and external systems).													✓							✓	
5. g.	Conduct thorough searches of the medical literature.											✓	✓	✓	✓						✓	
5. h.	Effectively use citation managers, presentation software, and spreadsheets.											✓	✓	✓	✓				✓		✓	
6	**Ethical behaviors, administrative skills, and personal and professional development**																					
6. a.	Demonstrate understanding of federal regulations and guidelines regarding the conduct of research with human subjects.							✓	✓		✓	✓	✓								✓	
6. b.	Explain ethical principles and their application to public health research.							✓	✓		✓	✓	✓						✓		✓	
6. c.	Recognize potentially vulnerable populations and identify appropriate course of action for protection and advocacy on their behalf.							✓	✓		✓	✓									✓	
6. d.	Identify potential conflicts of interest and roles that may arise in research and develop strategies for addressing and managing these conflicts.							✓	✓				✓				✓	✓			✓	
6. e.	Follow guidelines for appropriate publication of findings, including issues of authorship, confidentiality, and academic freedom and provide appropriate citations and credit for the work of others.						✓	✓					✓				✓	✓			✓	
7	**Leadership skills**																					
	* Expected behavior throughout all aspects of the program.																					
7. a.	Formulate a leadership style based on self-awareness of values, strengths, and limitations, effectively differentiating between personal responsibilities and tasks for delegation.													✓		✓	✓	✓	✓		✓	✓
7. b.	Personify high standards of honesty, integrity, and compassion, executing academic decision-making consistent with the VCU Code of Conduct and Honor System http://www.assurance.vcu.edu/Policy%20Library/Honor%20System.pdf	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓			✓	✓	✓	✓	✓
7. c.	Value diverse perspectives, demonstrating equitable treatment of others and effective conflict negotiation skills.	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓			✓	✓	✓	✓	✓