

PhD in Epidemiology Competencies

1. Produce the descriptive epidemiology of a given condition, including case definition, calculation of the primary measures of disease morbidity and mortality, and appropriate comparisons by person, place and time.
2. Explain the strengths and limitations of descriptive studies.
3. Apply course work or equivalent in human physiology and pathophysiology, with special competence in the disease addressed in the student's dissertation.
4. Review and critically evaluate the literature.
5. Synthesize available information.
6. Identify meaningful gaps in knowledge.
7. Formulate an original and key hypothesis or statement of the research problem.
8. Design a study using any of the main study designs.
9. Outline the advantages and limitations of each design for addressing specific problems, as well as the practical aspects of their uses, including trade-offs. This understanding will be reflected in selecting the most appropriate and efficient design for a designated problem.
10. Calculate the requisite sample size or power.
11. Identify and minimize sources of bias; describe both the direction and magnitude of the bias and the effect of potential biases on the measures of association.
12. Apply basic population sampling methods.
13. Use methods of measurement – design data collection forms assessing both exposures and outcomes; determine the validity of the instrument; identify the presence and magnitude of measurement error; adjust for measurement error when appropriate data are available.
14. Demonstrate and monitor the conduct and progress of data collection; develop, implement and assess quality control measures.
15. Prepare data files appropriate for analysis; carry out the steps needed to create new variables, clean the data sets, etc.
16. Use statistical computer packages to calculate and display descriptive statistics, analyze categorical data, and perform multivariable regression, survival analysis, and longitudinal analysis.

17. Examine data for the presence of confounding and interaction (effect modification), identify their presence, and manage them appropriately.
18. Interpret the research results, make appropriate inferences based on results, and recognize the implications of the research results.
19. Summarize research results orally and in writing to both scientists and non-scientists (includes preparation of a manuscript suitable for publication in a scientific journal and presentation of research proposals).
20. Illustrate the concepts of human subjects protections and confidentiality, and awareness of particular issues relevant to the study of specific populations.
21. Apply this understanding as evidenced in the design and conduct of their research.
22. Demonstrate mastery of a substantive area, including knowledge and application of that knowledge in conducting original research related to a specific topic.