



THE UNIVERSITY OF ARIZONA

Mel & Enid Zuckerman
College of Public Health

**Mel and Enid Zuckerman College of Public Health
University of Arizona**

EPID 573C Advanced Epidemiology

Catalog Description: An advanced course in quantitative issues that arise in the planning, analysis, and interpretation of epidemiologic research studies. Students must also know how to use a statistical software package (eg. STATA). (3 units)

Course Topics:

- Causality and Hypothesis
- Study Design
- Measures of Disease Occurrence
- Measures for Association
- Causal Diagrams
- Statistical Analysis
- Quality Assurance and Control
- Dissemination of Research Findings
- Epidemiologic Evidence
- Quantitative Bias Analysis (QBA)
- Systemic Review and Meta-analysis

Course Objectives: During this course, students will:

- Improve their understanding on the importance of high quality epidemiologic research for public health and the development of policy and clinical guidelines.
- Learn how to select and use different epidemiologic methods to reduce or control for selection bias, information bias, and confounding as well as conduct quantitative bias analysis in epidemiologic research.
- Become familiar with the process and gain skills for identifying research questions and forming hypotheses which can be tested through planned data analysis.
- Learn how to better use epidemiologic principles to guide statistical analysis and interpretation of research findings.
- Gain experience and skills for effective communications of research findings.

Learning Outcomes (Competencies Obtained): Upon completion of this course students will be able to:

1. Search, describe and summarize findings from the scientific literature to synthesize and critique studies and to identify research gaps in public health and clinical studies
2. Compare the relative strengths and weaknesses of epidemiological study designs, and choose the most appropriate design to address research questions and to test hypotheses
3. Identify potential biases, confounding, and effect modification that can affect the quality of epidemiological studies and analyses
4. Conduct descriptive and analytic analyses, including strategies to assess bias, confounding and effect modification methods, to make statistical inferences
5. Interpret study findings with good understanding of the integrity, comparability and limitation of the data and the research
6. Organize and deliver clear presentation of research findings to diverse audiences
7. Calculate and interpret appropriate measures of disease frequency and excess risk across multiple

study designs

8. Assess and identify strategies to minimize bias in analytic, along with assessing effect modification and confounding, then stratifying or adjusting as appropriate in analyses
9. Interpret these epidemiological analyses in the context of published literature and communicate key findings to various audiences
10. Select appropriate study design for assessing the association between a given exposure and an outcome, and then understanding advantages and limitations of these approaches
11. Critique and synthesize appropriate literature and research findings to address a research question
12. Develop research questions to address health problems by appraising and identifying gaps in the current scientific literature
13. Design appropriate studies using causal inference principles for testing hypotheses in specific populations, after evaluating specific design advantages and limitations
14. Evaluate the integrity, comparability, and limitations of data to make inferences related to analyses and results