COMPONENTS OF MODEL COURSE SYLLABI

A NOTE TO THE FACULTY:
The purpose of this “model syllabus” is to assist faculty who are proposing to submit a new course to the curriculum committee to provide complete information that is requested in the “New Course Proposal Form.” This model syllabus is intended to be a guide as you create your own syllabus. The letters that appear in the model syllabus correspond to the new course proposal form.

A. Epidemiology of Vaccine-Preventable Diseases

Instructor: Barbara Mahon, MD, MPH, Assistant Professor of Epidemiology

Prerequisites: EP711 or EP712

4 credits

B. Course’s goals, rationale, and teaching methods

The goal of this course is for the student to develop a thorough understanding of current issues in the control of vaccine-preventable diseases, including both epidemiologic methods used in the field and current challenges in developing and maintaining successful vaccination programs. Vaccine testing, efficacy measurement, impact, safety, adverse reactions, cost-benefit analysis, delivery programs, and public acceptability are examples of some of the important topics that will be taught utilizing different case studies, discussions, writings, critical readings, and designing studies.

After completing this course, the student will be able to:

- Calculate vaccine efficacy from data collected in clinical trials or outbreaks.
- Compare and contrast different types of surveillance systems for vaccine-preventable diseases, vaccine coverage, and adverse reactions and discuss the strengths and weaknesses of the data they collect.
- Explain the strengths and weaknesses of different epidemiologic methods for studying vaccine-related adverse events.
- Evaluate how vaccination programs change the epidemiology of vaccine-preventable diseases and thereby change their own programmatic goals.
- Find, read, and synthesize the epidemiologic literature related to a vaccine-preventable disease.
- Design an epidemiologic study related to a current issue in vaccine-preventable disease epidemiology.

C. **Required texts or other materials**

Course reader of assigned articles

D. **Course Requirements and Student Evaluation**

**Assignments**

For each class session after the first one, several original papers from the epidemiologic literature will be assigned for reading, and a worksheet with a series of written questions related to these papers will be distributed. Discussion of these questions will be the focus of the next class session. Other related readings will also be assigned. Students are required to read the papers and to complete the worksheets before class. Reading and worksheets will not be assigned for the two sessions when the papers are due.

Each student will write two typed, double-spaced, 6- to 8-page (not including references) papers. These papers will be responses to a focused question about a current issue in vaccine-preventable disease control. (An example of the kind of question that will be posed is attached to this syllabus.) The first paper will be a summary and synthesis of the relevant epidemiologic literature on the question and should reflect and reference an in-depth reading of the literature. The second paper will be a description of the design of an epidemiologic study to address the issue raised by the question. Students will draw on the course material as well as their previous courses and experience in epidemiology to write these papers. Guidelines for preparing these papers will be distributed in class. The first paper will be due during the 8th week of the course, and the second will be due during the 15th week.

**Grading**

50% Papers (25% for each of the two papers)  
50% Class preparation and participation

For each class session after the first one, the instructor will score each student’s preparation and participation using the following scoring system. The point of grading preparation and participation is to encourage students to prepare and participate! The point is not to compare students to each other; every student can achieve a grade of 3, if they earn it by coming to class thoroughly prepared and by participating insightfully in the discussion. For the two case studies (sessions 8 and 15), reading and worksheets are not assigned; for these sessions the student’s grade will be based on participation alone.

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<thead>
<tr>
<th>Points</th>
<th>Preparation and Participation</th>
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<tbody>
<tr>
<td>3</td>
<td>Worksheet completed, evidence by participation that student carefully</td>
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read and critically evaluated papers, active and insightful participant in discussion, good mastery of material.

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<thead>
<tr>
<th>Grade</th>
<th>Description</th>
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<tr>
<td>2</td>
<td>Attempt made at completing worksheet, evidence by participation that student read the papers, participant in discussion, some understanding of material but with some areas of weakness.</td>
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<tr>
<td>1</td>
<td>Worksheet not completed, no evidence of preparation, inactive participant, no understanding of material.</td>
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<td>0</td>
<td>Absent from class</td>
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E. (Below are examples of two class sessions as they appear on the syllabus)

Session 14. Vaccines and bioterrorism. The terrorist attacks of September 11, 2001 and the subsequent intentional release of anthrax have led to an increased national awareness of the possibility of bioterrorism and the importance of public health preparedness. Vaccines exist for several potential bioter agents; the role of these vaccines has been widely debated. In this session, we will discuss the controversy over the best strategy for preparedness for a possible smallpox attack, focusing on what is known and not known about the risk of adverse reactions to vaccinia (the smallpox vaccine virus) and the risk of transmission of vaccinia to contacts of vaccinees.

Objectives:
Utilizing a combination of approaches, such as lecture, discussion, and video testimonials, students will be able to achieve the following objectives after this session:

- Evaluate the strengths and limitations of current epidemiologic data regarding adverse reactions to smallpox vaccination among vaccinees and their contacts.
- Summarize the arguments for and against various strategies for smallpox vaccination in the United States.
- Analyze the clinical and epidemiologic features of smallpox and…
- Relate these features to issues in readiness for or response to a smallpox bioterror attack.

Readings for Worksheet Questions (refer to the criteria for grading section):

- Neff JM, Lane JM, Fulginiti VA, Henderson DA. Contact vaccinia--transmission of vaccinia from smallpox vaccination. JAMA 2002;288:1901-5.

Other Readings:


Session 15. Case study—“A measles epidemic in a highly vaccinated population (measles in Burundi)”. This case study, developed for students by CDC, describes a real field investigation conducted in Burundi in 1988-1989. It illustrates concepts that have been discussed throughout this course. In this session, the class will work through the field investigation together, as done for the first case study. Students will be broken into small groups for part of the session to address a specific concern in the Burundi case study. The rationale for this session is for students gain practical experiences needed in “real world.”

Objectives:
After this session, the student should be able to:
- Compare and contrasts the methods for estimating vaccination coverage.
- Analyze the sampling method used in WHO-EPI surveys.
- Calculate and interpret the vaccine efficacy data from this outbreak.
- Interpret the effect on measured vaccine efficacy of varying the case definition.

No readings are assigned for this session.
Paper 2 is due.
Here is an example of another faculty member's description of teaching methods and presentation of weekly outlines, which was taken from the SB822 syllabus.

Teaching Methods
Over my years as a teacher, I’ve learned four important teaching principles. First, students learn in different ways; only a minority of students will thrive on three hour lectures. Second, in order to learn how to do something, students need to apply their knowledge to “real world” examples. Third, students apply concepts better when they can process information with their peers and instructors. Lastly, students learn better in a supportive, co-learning environment.

These principles underlie my teaching philosophy and how I’ve developed this course. I use a mix of teaching methods – ranging from more traditional “mini” power point lectures, large group discussion, small group exercises, demonstrations, and materials posted on Course Info. All homework, in-class exercises, final evaluation proposal, and the mid-term exam encourage students to apply evaluation concepts to “real world” public health interventions. Students are paired with a peer to consult on the final evaluation proposal and are encouraged to meet individually and in groups with me and the teaching assistant.
3. September 21

**Topics**
- Formative evaluation
- Qualitative data

**Learning Objectives**
- Describe functions of formative evaluation within program planning and evaluation contexts.
- Identify formative evaluation questions.
- Explain why qualitative data are useful for formative evaluations.
- Describe three qualitative data collection strategies.

**Readings**

Hudelson, PM (’994) *Qualitative Research for Health Programmes* (pp. 1-38) Geneva, Switzerland: Division of Mental Health, World Health Organization (WHO/MNH/PSF/94.3)


**Assignments**
Homework Exercise #2: Stay on Top of It Logic Model due

**Reflection Questions**
- When is a formative evaluation warranted?
- How can formative evaluation improve program planning?
- Why is qualitative data useful for formative evaluation?

**Teaching Activities**
- Large group discussion: Why conduct formative evaluations? Summarize main points and post on course info.
- Mini-power point lecture: Qualitative methods for formative and process evaluation.
- Small group activity: Develop a formative evaluation for the child passenger seat program.
- Real life example: Present a formative evaluation developed for a clinical intervention designed to prevent osteoporosis.
5. October 5

Topics
- Logic of causal inference
- Internal validity
- Evaluation questions/hypotheses
- Evaluation designs
- Randomized control trials

Learning Objectives
- Describe three criteria for inferring causality.
- Define internal validity.
- Identify outcome evaluation questions.

Readings
Grembowski, Chapter 3 (pp. 52-63)

Grembowski, Chapter 4 (pp. 67-70)

Assignments
Homework Exercise #4: Family Advocacy Program process evaluation due

Reflection Questions
- Where do impact/outcome evaluation questions come from?
- What is the relationship between program objectives and dependent variables?
- How does an evaluator infer whether an intervention makes a change in a desired outcome?
- Describe key features of randomized control trials.
- Explain why random allocation and control groups provide greater evidence for inferring causality.

Teaching Activities
- Mini-power point lecture: Summarize formative and process evaluation and introduce outcome evaluation.
- Large group discussion: How do we know something?
- Demonstration: How do we infer causality?
- Large group discussion: What are key elements of RCT and why does it provide strong evidence for inferring causality? Summarize main points and post on Course Info.
- Small group activity: Develop a RCT design to evaluate the child passenger seat program.
8. November 2

**Topics**
- External validity
- Target population
- Sampling

**Learning objectives**
- Define external validity, target population, sampling frame, and sample.
- Compare and contrast internal and external validity.
- Compare and contrast random and non-random sampling.
- Explain strengths and weaknesses of random and non-random sampling.
- Distinguish between random sampling and random allocation.
- Distinguish between selection bias as a threat to internal and external validity.

**Readings**
Grembowski, Chapter 7 (pp. 169-185)


**Assignments**
Homework Exercise #7: Threats to internal validity and QED due
Homework Exercise # 8: Sampling (NOT GRADED)

**Reflection Questions**
- Why sample?
- How does selection bias affect both external and internal validity?
- Why does random sampling generally increase a sample’s representativeness of the target population?

**Teaching Activities**
- Mini-power point lecture: Key sampling concepts
- Small group activity: Develop a sampling design for the child passenger safety program.
- Small group activity: Diagram flow chart to synthesize evaluation and sampling designs.