Course Overview and Summary

Time: Thursdays, 1 PM-3:50 PM

Location: Drachman Hall, Room

Instructor: Kacey C. Ernst, Assistant Professor, Drachman Hall. (kernst@email.arizona.edu)

Office Hours: by appointment

Course Description: Introduction to Infectious Disease Epidemiology. The emphasis in this course is on the key concepts and methods of infectious disease epidemiology as used in public health practice and in epidemiologic research.

Course Prerequisites: EPID 573A; P or concurrent registration; EPID 573 B; EPID 576A

Course Learning Objectives: Upon completion of this course, students should be able to identify and apply the following to epidemiologic and public health practice:

1—basic concepts of Infectious Disease Epidemiology
2—basic methods of Infectious Disease Epidemiology
3—host factors, infectious agents, transmission factors
4—basic approaches to control and prevention
5—internet-based infectious disease epidemiologic materials for control, prevention, and policy
6—develop appropriate local public health policy based on the components of infectious disease epidemiology

Competencies Addressed:

Domain 1: General Knowledge
Describes major national and international public health problems
Describes risk factors for well established health problems and the evidence in support of these factors

Domain 3: Information Skills
Retrieves and organizes literature from valid sources of the evidence base
Judges, critiques, and interprets research findings

Domain 4: Communication
Organizes and delivers oral presentations of research findings or health issues in varying professional formats
**Domain 8: Study Design**
Identifies an appropriate population and sampling strategy for testing hypotheses
Selects and defines measures and variables relevant to defined health problems
Identifies potential sources of bias and implements strategies to control bias

**Domain 10: Data Management & Quality Assurance**
Develops and maintains an electronic database
Develops and implements a plan for monitoring data as it is collected, and implements appropriate corrective actions to ensure data quality

**Domain 11: Data Analysis**
Conducts descriptive analyses and tests hypotheses for basic statistical inference
Recognizes potential sources of bias and applies appropriate analytic techniques to assess and adjust for these biases
Calculates and interprets fundamental measures of association (OR, RR, AR, etc.)

**Domain 12: Data Interpretation**
Makes relevant inferences from data analyses
Understands and applies the principles of causality
Identifies areas of further research

**Course Materials and Notes:** Course materials, notes and required readings will be posted on D2L. Materials include: syllabus, schedule, readings, and exercises. In addition, lecture PowerPoint notes and other materials will be provided online at D2L before each session.

**Required Texts:** There are two required texts for this course.


   **And one highly recommended text**
3. Modern Infectious Disease Epidemiology: Concepts, Methods, Mathematical Models, and Public Health (Statistics for Biology and Health) Kramer; 2010

**Course Requirements:** Exercises, Class participation, Quizzes and Final Paper. See Homework Sheets.

**Grading/Student Evaluation:**

Exercises (6) 5 points: 30 points
Class Participation: 20 points
Quizzes (5) 4 points: 20 points
Final Paper: 30 points

Standard grading will be used to assign letter grades (90% and above) A, (80 – 89.9%) B, (70 – 79.9%) C, 60 – 69.9% D, below 60% F.

**Exercises:** There are 6 assignments over the course of the term. Each is worth 5 points.
Class Attendance/Participation: Class attendance and participation is required. Participation will be graded based on preparation to act as the discussion leader for the article/outbreak case-study during the week assigned (5 points) and 1 point for questions (at least 2 from the article and 2 from the outbreak investigation) submitted by noon the day before each class session to be used in the discussion. The noon cutoff will be strictly observed to allow the discussion leaders an opportunity to assimilate and organize questions. Any student with more than 2 unexcused absences will lose a point for each subsequent absence i.e. for 3 unexcused absences you lose 1 point, for 4 you lose 2 points total etc. All holidays or special events observed by organized religions will be honored for those students who show affiliation with that particular religion. Absences pre-approved by the UA Dean of Students (or Dean’s designee) will be honored.

Quizzes: Quizzes will be administered in class for those participating in the Thursday 1-3:50 section at the beginning of the class period. Students should arrive promptly on quiz days as quizzes will be distributed and students allowed a maximum of 15 minutes to complete them. Make-up quizzes will be allowed if notice of absence is given prior to class OR if there are extenuating circumstances. Quizzes will cover main concepts from lectures.

Final Paper: The final paper is a review of evidence on an infectious disease topic of choice. A review is a cohesive argument to examine the strength of the relationship and to identify gaps in knowledge it is not merely a summary of the literature. It should provide the basis for directions of future research to fill the gaps that are identified. Topics should be on links that are still not clearly established (i.e. do not research things like HPV and cervical cancer). Approximately 15-25 references should be included. There are due dates throughout the term to ensure review and feedback throughout the writing process. Example topics are listed below. Any topic not on the list can be chosen but must be approved by the instructor. Be sure to keep Hill’s causal criteria in mind as you evaluate linkages (not applicable to some topics).

- Temporal Sequence
- Strength of Association
- Dose-response relationship
- Consistency
- Plausibility
- Alternate explanations
- Experiment
- Specificity
- Coherence

Links between environmental changes and infectious diseases:
- Climate change and …… (malaria, dengue, diarrheal diseases, etc.)
- Impact of water storage on vector-borne disease
- Irrigation systems and malaria, schistosomiasis etc.
- Dam construction and river blindness, schistosomiasis, malaria etc.

Nutrition and Infectious Diseases
- Nutrition and dengue/malaria severity

Infectious causes of chronic disease
Malaria and cancer (liver or brain cancer)
Bornavirus and behavioral problems

Review utility of new methods in infectious disease research
Ex. Use of social networks (Facebook, My Space etc.) to model and track infectious diseases

Impact of co-infections on morbidity and mortality
Malaria and pneumonia
Malaria and schistosomiasis

Effectiveness of Novel Control Strategies
Use of mosquito life shortening bacteria to prevent malaria/dengue transmission
Internet advertising to reduce sexually transmitted diseases
Insecticide treated wall liners for malaria control
Online monitoring of tuberculosis treatment

New distribution of disease
The expansion of drug resistance bacteria in resource-poor countries and the impact of:
pharmaceutical regulations on development of resistance
HIV/AIDS and drug resistance

Incremental Tasks for Final Paper:
Final Paper Topic: Identify an area of interest and write a couple of paragraphs about what you want to assess in your review. Include the major hypothesis or major proposed benefit underlying the association or method you are proposing to write about.

Final Paper Literature List: Conduct a literature search to identify 15-25 initial references. This may change throughout the term but I want you to get started on the lit search.

Final Paper Outline: To ensure proper organization of your paper an outline will be due for your paper. This will just be a skeleton. I want to help you with flow and content.

Final Paper Draft: This should be a full draft of your final paper including references. It should be no more than 20 pages double-spaced. Be concise, cite appropriately and be sure to summarize and integrate findings. Do not just list result after result. I will read over it carefully and give you feedback on things that you need to change.

Late policy: A hardcopy of each assigned exercise is due during class time on its due date. Each day that the homework assignment is late will result in a 1 point deduction from the homework grade. Students are allowed one (1) week long extension on a homework assignment during the course. This extension must be requested prior to the due date of the homework assignment except in cases of emergency. If the extended homework is not submitted within the seven day period a 1 point deduction will be made for every day past the 7 day extension.

Academic Integrity: Students are expected to abide by the University of Arizona Code of Academic Integrity found at http://w3.arizona.edu/~studpubs/policies/cacaint.htm.
**Classroom Behavior:** There will be no cellphone use, no activity other than the classroom lectures, assignments, discussions; no reading of any material not assigned for in-class reading for the session, no internet browsing, etc. All classroom behavior will be professional and respectful of all others in the classroom. **If a student is sleeping or browsing the internet they will be asked to leave the classroom as these activities are better done on your own time.** Students are expected to be familiar with the UA Policy on Disruptive Behavior in an Instructional Setting found at [http://hr2.hr.arizona.edu/dos/pol_disrupt.htm](http://hr2.hr.arizona.edu/dos/pol_disrupt.htm) and the Policy on Threatening Behavior by Students found at [http://hr2.hr.arizona.edu/dos/pol_threat.htm](http://hr2.hr.arizona.edu/dos/pol_threat.htm).

**Grievance Policy:** [http://grad.arizona.edu/Current_Students/Policies/Grievance_Policy.php](http://grad.arizona.edu/Current_Students/Policies/Grievance_Policy.php)

**Disability Accommodation:** Students who are registered with the Disability Resource Center must submit appropriate documentation to the instructor if they are requesting reasonable accommodations: [http://drc.arizona.edu/instructor/syllabus-statement.shtml](http://drc.arizona.edu/instructor/syllabus-statement.shtml)

**Syllabus Changes:** Information contained in the course syllabus, other than the grade and absence policies, may be subject to change with reasonable advance notice, as deemed necessary and appropriate by Professor Ernst.

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**Course Schedule and Readings:**

*January 12th - Introduction to class*

**Lecture (Ernst):** History of Infectious Disease Epidemiology and Introductory Concepts  
**Video:** RX for Survival  
**Readings:** Kramer Ch. 1,2 and 4. WHO Infectious Disease Report – Intro (posted)

*January 19th*

**Lecture:** Key Concepts cont. and Study Design  
**Readings:** Kramer Ch. 5, Fine (posted)

*January 26th*

**Lecture:** Outbreak Investigations  
**Guest Lecture:** Kristen Pogreba-Brown: EIS outbreak exercise  
**Readings:** Dworkin Ch. 1 and Kramer Ch. 9, Blossom et al. (posted)  
**Due:** Exercise 1 Journal Critique; Paper topic idea and summary  
**Quiz 1.**

*February 2nd*

**Lecture:** Fecal – Oral Transmission
Video: Modern Meat
Readings: Kramer Ch. 17, Dworkin Ch. 3, Bates et. al. (posted)
Due: Final Paper Reference List Due

February 9th
Lecture: Infectious Disease Surveillance Systems
Guest lecturer: Orion McCotter – Border Infectious Disease Surveillance System
Readings: Dworkin Ch. 4, Kramer Ch. 8, Carneiro (posted)
**Quiz 2

*February 16th
Lecture: Immunology Basics
Guest lecturer: Donna Wolk: Molecular Epidemiology
Readings: Kramer Ch. 7 and 13 and 22, Dworkin Ch. 7, Saunders et al. (posted)
Due: Exercise 2 due (Surveillance Systems)

February 23rd
Lecture: Zoonotic Diseases
Guest: TBA
Readings: Dworkin Ch. 17, Murphy et al. (posted)
Due: Final Paper outline due

March 1st
Lecture: HIV/AIDS Epidemiology
Video: The Age of AIDS
Readings: Kramer Ch. 18, Dworkin Ch. 6, Coovadia et al (posted)
Due: Exercise 3 due (Outbreak Listserve)
**Quiz 3

March 8th
Lecture: Vectorborne Transmission
Guest Lecture: Heidi Brown: TBA
Readings: Kramer Ch. 21, Dworkin Ch. 19, Ndao et al. (posted)

March 22nd
Lecture: Sexual Transmission
Guest lecture: PCHD CDI: Tracing Sexual Networks
Readings: Kramer Ch. 19 & 20, Dworkin Ch. 15, Perisse et al. (posted)
Due: Final paper draft due

March 29th
Lecture: Respiratory Transmission
Guest: Jennifer Simpson: TBA
Readings: Kramer Ch. 16, Dworkin Ch. 18, Vázquez-Gallardo et al. (posted)
Due: Exercise 4 due (CDC Outbreak Investigation Module)
**Quiz 4

April 5th
Lecture: Geographic Information Systems in Infectious Disease Research
Guest Lecturer: Babs Johnson: PCHD use of GIS
Readings: Kramer Ch. 10, Kho, Riley (posted)

April 12th
Lecture: Vaccine Preventable Diseases
Guest Lecture: PCHD
Readings: Kramer Ch. 14, Dworkin Ch. 20, Omer et al. (posted)
Exercise 5 due (Case study)

April 19th
Lecture: Chronic Diseases and Infection
Guest Lecture: Robin Harris: The Link of HPV and Cervical Cancer
Readings: Kramer Ch. 23, O’Connor, Ngoungou, Herrera (posted)

April 26th
Lecture: Emerging Infections and Environmental Change and Infectious Disease Transmission
Video: Hot Zones
Readings: Kramer Ch. 3, Eisenberg, Gushulak, Jones et al. (posted)
Due: Exercise 6 due (Transmission dynamics and control)
**Quiz 5.

Final Paper Due no later than May 3rd 5pm.