Mel and Enid Zuckerman College of Public Health

University of Arizona

**SYLLABUS**

**EPID/CPH 660**

# Introduction to Infectious Disease Epidemiology

# Spring Semester, 2019

###### Course Overview and Summary

**Time**: Thursdays, 1 PM-3:50 PM

**Location**: Drachman Hall, Room 116

**Instructor**: Kacey C. Ernst, Associate Professor, Drachman Hall. (kernst@email.arizona.edu), Room A246

**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**:

During this course students will:

1. Compare appropriateness of study designs to answer specific questions in infectious disease epidemiology
2. Evaluate different strategies for infectious disease surveillance
3. Distinguish among basic modes of transmission
4. Synthesize literature on a self-selected topic in infectious disease epidemiology
5. Communicate ideas about strengths and weaknesses of epidemiological study designs
6. Critique infectious disease epidemiology studies
7. Connect changing infectious disease epidemiology with significant global changes

**Competencies Addressed:**

MS Epidemiology Competencies:

(1) Select appropriate study design for assessing the association between a given exposure and an outcome, and then understanding advantages and limitations of these approaches.

(2) Critique and synthesize appropriate literature and research findings to address a research question.

(3) Identify potential sources of bias for various study designs and their impact on study quality.

(5) Describe public health surveillance systems and their underlying data sources.

(7) Organize and deliver clear presentations of research findings in varying professional formats to diverse audiences.

PhD Epidemiology Competencies

(2) Develop research questions to address health problems by appraising and identifying gaps in the current scientific literature.

(5) Lead group interactions competently, ethically, respectfully and professionally to diverse audiences.

(6) Organize and deliver clear presentations of research findings in varying professional formats to diverse audiences.

**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 is one required texts for this course.

1. Control of Communicable Disease Manual, 20th Edition. David L. Heyman Editor, Washington DC: APHA, 2014. (Free older version available here <http://www.navybmr.com/study%20material/CCDM.pdf>

**Course Requirements**: Exercises, Class participation, Mid-term, and Final. See Homework Sheets.

**Grading/Student Evaluation**:

Exercises (4) 5 points: 20 points total

Discussion Participation: (11) 1 point each session: 11 points total

Discussion Lead: (2) 4.5 points each: 9 points total

Quizzes: (4) 5 points: 20 points total

Final paper: 30 points

Final Presentation 10 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 4 assignments over the course of the term. Each is worth 5 points.

**Quizzes:** There are 4 in-class quizzes over the course of the term. Each is worth 5 points.

**Final Review Paper:** The final paper is a review of evidence on an infectious disease topic of choice. This will be done in groups of 3 students in accordance with systematic review protocols. You may also elect to carry out a scoping review. A systematic 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. Pick a narrow topic. 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 but DO NOT WRITE THE PAPER SO THAT IT JUST PROVIDE DATA FOR EACH CRITERIA (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……(any infectious disease)

 Deforestation and …..

 Dam construction and ……

 Habitat loss and ……

 Biodiversity loss and …..

 Extreme weather events and ….

 Urbanization and….

Supplements and Infectious Diseases

 Probiotics and…..

 Vitamin X and….

Genetic predispositions and infectious disease susceptibility

Infectious causes of chronic disease

 Malaria and cancer (liver or brain cancer)

 Borna disease virus and behavioral problems

Impact of co-infections on morbidity and mortality

 Malaria and pneumonia

 Malaria and schistosomias

Effectiveness of Control Strategies

 Housing construction and vector-borne diseases

Role of asymptomatic carriers on disease burden

 Any disease of interest

Factors contributing to the development of drug resistance

 Incomplete use of medication and….

 Counterfeit drugs and malaria drug resistance

Factors contributing to susceptibility of individuals to infection

 Opioid use and…..

 Forest fires and respiratory infections

Prevalence/ incidence of specific risk factors

 Misuse of bed nets for other purposes

 Vaccine refusal in regions not typically examined (SE Asia, SSA, etc.)

 Counterfeit drugs

 Non-compliance with HAART

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

Antibiotic resistance and ……..

**Incremental Tasks for Final Paper:**

**Final Paper Research Question:** Identify an area of interest and propose your research question. Provide a short paragraph of background and rationale. Include the major hypothesis or major proposed benefit underlying the association or method you are proposing to write about.

**Final Paper Literature Search Strategy and Inclusion/ Exclusion Criteria:** Develop your key word searches and search strategy, inclusion and exclusion criteria. Run your search in PubMed. Typically you would run this search in multiple search engines but for the purposes of the course, you will just use PubMed. PhD students are encouraged to run in multiple search engines.

**Final Paper Reference List Initial:** Your full list when running the search terms that you included above.

**Final Paper Reference List Final with Quality Assessment:** Your list of references when all inclusion/ exclusion criteria have been assessed for each article and the quality assessment table that includes each of the articles.

**Final Paper Outline:** Follow the recommended outline for scoping reviews and systematic reviews as outlined in the guidelines posted in D2L.

**Final Paper:** It should be **no more 3500 words.** Be concise, cite appropriately and be sure to summarize and integrate findings. Follow the PRISMA guidelines as much as possible. Do not just list result after result. I will read over it carefully and give you feedback on things that you need to change.

**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 weeks assigned (3 points each) 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. Each discussion leader report should have a review of the STROBE criteria (if applicable) for the article discussed as well as a summary of additional important observations.

The noon cutoff will be strictly observed to allow the discussion leaders an opportunity to assimilate and organize questions. Discussion leaders should submit a short one-page summary of key points discussed, to include an assessment of at least 3 STROBE criteria, during the discussion and turn it in to obtain the 3 points credit as discussion leader.

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 related to professional improvement including conferences, presentations with community partners, will be excused with prior request. Absences pre-approved by the UA Dean of Students (or Dean’s designee) will be honored.

**Late policy:** A copy of each assigned exercise is due by 11:59 pm the day of class it is due in the appropriate folder on D2L. Each day that the homework assignment is late will result in a .5 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 .5 point deduction will be made for every day past the 7 day extension.

**Required examinations, papers and projects**:

Four exercises

Participation in group discussions by posting questions on D2L

Lead discussion

Four quizzes

Final paper

Final Presentation

**Absence and Class Attendance/Participation**: (Expected attendance, participation levels)

In-person and Online courses**:** All students must attend and engage in the group discussions held each class period. All holidays or special events observed by organized religions will be honored for those students who show affiliation with that religion. Absences pre-approved by the UA Dean of Students (or Dean’s designee will be honored.)

The UA’s policy concerning class attendance, participation, and administrative drops is available at: <http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, <http://policy.arizona.edu/human-resources/religious-accommodation-policy>.

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored,

<http://deanofstudents.arizona.edu/>

**Course Schedule**: (Present the weekly/daily schedule: dates of classes, topics, assignments, readings, including examinations)

**Communications**: You are responsible for reading emails sent to your UA account from your instructor and the announcements that are placed on the course web site. Information about readings, news events, your grades, assignments and other course related topics will be communicated to you with these electronic methods. The official policy can be found at: <https://www.registrar.arizona.edu/personal-information/official-student-email-policy-use-email-official-correspondence-students>

**Accessibility and Accommodations:**

**At the University of Arizona, we strive to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, you are welcome to let me know so that we can discuss options.  You are also encouraged to contact Disability Resources (520-621-3268) to explore reasonable accommodation. If our class meets at a campus location: Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable. For additional information on Disability Resources and reasonable accommodations, please visit** [**http://drc.arizona.edu/students**](http://drc.arizona.edu/students)

**Code of Academic Integrity**

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercise must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity, available through the office of the UA Dean Students: <http://deanofstudents.arizona.edu/policies-and-codes/code-academic-integrity>

**Classroom Behavior**: (Statement of expected behavior and respectful exchange of ideas:

Present policies to foster a positive learning environment, including use of cell phones, mobile devices, etc.).

Students are expected to be familiar with the UA Policy on Disruptive Student Behavior in an Instructional Settingfound at: <http://policy.arizona.edu/education-and-student-affairs/disruptive-behavior-instructional-setting>

**Threatening Behavior Policy**: The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to one’s self, <http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>

**Nondiscrimination and Anti-Harassment Policy:**

The University of Arizona is committed to creating and maintaining an environment free of discrimination, <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

**UA Smoking and Tobacco Policy:**

The purpose of this Policy is to establish the University of Arizona’s (University) commitment to protect the health of University faculty, staff, students, and visitors on its campuses and in its vehicles,
<http://policy.arizona.edu/ethics-and-conduct/smoking-and-tobacco-policy>

**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 appropriate by the instructor.

**Plagiarism:**  What counts as plagiarism?

* Copying and pasting information from a web site or another source, and then revising it so that it sounds like your original idea.
* Doing an assignment/essay/take home test with a friend and then handing in separate assignments that contain the same ideas, language, phrases, etc.
* Quoting a passage without quotation marks or citations, so that it looks like your own.
* Paraphrasing a passage without citing it, so that it looks like your own.
* Hiring another person to do your work for you, or purchasing a paper through any of the on- or off-line sources.

**Gender Pronoun Guideline**

It is already UA policy that class rosters are provided to instructors with a student’s preferred name. Students may share their preferred name and pronoun with members of the teaching staff and fellow students, as desired, and these gender identities and gender expressions will be honored in this course. As the course includes group work and in-class discussion, it is critical to create an educational environment of inclusion and mutual respect. In this class, to be inclusive of all gender identities and expressions, students will be referred to by their first or last names, the pronoun of their choice, or by default, the pronoun “they”.”

**Content Advisory Guideline**

**Notification of Objectionable Materials** (recommended, not required):

“This course will contain material of a mature nature, which may include explicit language, depictions of nudity, sexual situations, and/or violence. The instructor will provide advance notice when such materials will be used.  Students are not automatically excused from interacting with such materials, but they are encouraged to speak with the instructor to voice concerns and to provide feedback. <http://gened.arizona.edu/content/course-syllabus-guidelines>.”

**Schedule**

**Week 1: January 10th  - Introduction to class**

**Topic (Ernst):** History of Infectious Disease Epidemiology and Introductory Concepts

**In class Exercise**

**Readings:**  WHO Global Priorities, Christian et. al.

**Week 2: January 17st**

**Topic:** Key Concepts cont. and Study Design

**Readings:** Bingham et. al., Delemater et. al.

Due: Discussion Questions (DQ) 1

**Week 3: January 24th**

**Topic:** Infectious Disease Modeling

**Guest lecturer:** Jenna Coalson

**Readings:** Karl et. al., R- website links

**Due:** NO DQ this week, Dr. Coalson will go over the readings in class with you as a group,

Homework 1 – Microcephaly and Zika

**Week 4: January 31st**

**Topic:** Immunity and Molecular Methods

**Guest lecturer:** Jean McClelland (Systematic Search Methods for Literature Review)

**Readings:** Witney et. al., Mugyia et. al.

**Due:** DQ 2, Quiz 1, Report Topic Idea

**Week 5: February 7th**

**Topic:** Infectious Disease Surveillance Systems

**Guest:** Mary Hayden

**Readings:** Camacho et. al., Benson et. al.

**Due:** DQ 3, Report Search Strategy and Inclusion/ Exclusion Criteria

**Week 6: February 14th**

**Topic:** Sexual Transmission

**Guest: TBD**

**Readings:** CDC, Sullivan et. al.

**Due:** DQ 4, Homework 2 – Surveillance Homework

**Week 7: February 21nd**

**Topic:** Vector-borne Transmission

**Guest Lecture: TBD**

**Readings:** Rosenberg et. al., Tusting et. al.

**Due:** DQ 5, Quiz 2, Final Paper Initial Reference List

**Week 8: February 28th**

**Topic:** Outbreak Investigations

**In class exercise**

**Readings:** Brown et. al, Huang et. al., WHO

**Due:** DQ 6

**Week 9: March 7th**

Spring Break! Have Fun and Stay Safe!!

**Week 10: March 14th**

**Topic:** Fecal – Oral Transmission

**Guest Lecture: Kristen Pogreba-Brown and Kerry Cooper**

**Readings:** Baker et. al., Chokshi et. al, HeimanMarshall

**Due:** DQ 7,Homework 3 – Outbreak Investigation, Final Paper Reference List Final

**Week 11: March 21nd**

**Topic:** Respiratory Infections

**Guest Lecture: TBD**

**Readings:** Hayward et. al, Lochlain et. al

**Due:** DQ 8, Quiz 3

**Week 12: March 28th**

**Topic:** Clinically-acquired infections

**Guest Lecture: Kate Ellingson – Infections during transplantation**

**Readings:** Munier et. al, Ndegwa et. al

Due**:** DQ 9, Homework 4 – Global Change,

**Week 13: April 4th**

**Topic:** Vaccine Preventable Diseases

**Readings:** Bavdekar et. al, Daley et. al.

**Due:** DQ 10, Paper Outline

**Week 14: April 11th**

**Topic:** “Chronic” diseases and infection

**Readings:** Schwille-Kjuntke et. al., Aguilar et. al.

**Due:** DQ 11, Quiz 4

**Week 15: April 18st**

**Class Presentations**

**Week 16: April 25th**

**Class presentations**

**FINAL REPORT DUE APRIL 27th at 5pm**