

VIBS 413

Introductory Epidemiology

Instructor

Sarah A. Hamer, MS, PhD, DVM, Dipl ACVPM
Associate Professor, Dept. Veterinary Integrative Biosciences
shamer@cvm.tamu.edu; (979) 847-5693
Office: 276 Vet Med Research Bldg.
Office Hours: By appointment

Overview

The interconnections among human health, domestic animal health, wildlife, and the environment are increasingly recognized in this ‘one health’ era. Epidemiology is the study of the distribution and determinants of disease in populations and is distinguished from other medical disciplines in its focus at the population-level, and not individual-level. Epidemiological principles guide the collection of data in the field and clinic, diagnostic laboratory protocols, statistical analyses, medical surveillance, and disease reporting. Epidemiology is the key science that guides public health policy and interventions. This course will train students to understand the concepts of epidemiology and fundamental tools used by epidemiologists, and how this field blends with other disciplines (ecology, human and veterinary clinical medicine, statistics, genetics, wildlife biology and more) to address some of society’s more pressing stressors.

Learning Outcomes

- Explain methods of disease transmission using appropriate terminology.
- Calculate disease occurrence using epidemiological metrics.
- Explain and calculate diagnostic/screening test accuracy and precision.
- Identify study designs and ways to correct them design and/or analysis.
- Understand the principles of causal inference and risk analysis.
- Understand health and disease in an ecological context.
- Gain experience with field and lab protocols used in epi research.
- Synthesize concepts through case study and outbreak investigations.

Spring 2018; 3 credit hours

Tu/Th 9:35-10:50

Room: VMTH 101

Stacked with VIBS 607

Teaching Assistant

Italo Zecca MPH
PhD student, VIBS Department
IBZecca@cvm.tamu.edu
Office: 175 Vet Med Research Bldg.
Office Hours: By appointment

Materials

Course Website: An E-campus website will be used for quizzes, grades, and course management.

Required Text: Gordis, Leon. Epidemiology, Fifth Edition. 2014. Elsevier Saunders, PA.

Also available as an e-book (Kindle, PDF, VitalSource, or ePub).

Prerequisites

Graduate classification

Evaluation

A total of 400 points are available:

- Exams 1-3 (66.7 pts each; 200 total)
- Top 10 of 11 quizzes (100 pts)
- Attendance/participation (50 pts)
- Disease Detective project (50 pts)
- A = 90 -100%
B = 80 – 89%
C = 70 – 79%
D = 60 – 69%
F = Below 60%

Quizzes

Eleven weekly quizzes will be administered through the E-campus website to be taken outside of class. Quizzes will be posted following the Thursday lecture, and will cover topics from the Tuesday and Thursday lectures of that week. Quizzes must be completed by midnight Sunday. The top ten scores will be used in calculating the course grade. Quizzes will not be given on during exam weeks.

Disease Detective Course Project

Throughout the semester, students should track infectious disease emergence in human and animal populations in real time through the Program for Monitoring Emerging Diseases (ProMED) organization of the International Society of Infectious Diseases (<http://www.promedmail.org/>). Students may subscribe to email posts: (<http://ww4.isid.org/promedmail/subscribe.php>). By mid-semester, students should select one disease outbreak to study in detail, and I will approve the topic. Due to class size, students will work in small groups. Historic outbreaks can also be presented. Students will develop an 8-minute presentation to deliver to the class to characterize the disease outbreak and its epidemiological investigation. Further instructions will be provided.

Field Research Experience

To contribute to the process of standardized epidemiological data collection and gain an appreciation for population-level sampling, students will participate in an ongoing wildlife epidemiology field research project. One lecture period will be used to meet at a local field site for the activity. Opportunity is available for student volunteers to meet the evening before at the field site to set out traps. More information will be provided as the date approaches.

Laboratory Research Experience

To better understand some laboratory equipment and methods used in molecular epidemiology, students will participate in a demonstration in research laboratory on campus. Students will gain practical skills in molecular diagnostics of field-collected samples from wildlife populations, and will gain a better understanding of lecture topics including assay sensitivity and specificity.

'Epi in Action' Guest Lectures

A series of guest lectures are planned in which epidemiologists will provide case studies of the ways in which they practice epidemiology. These lectures are intended to emphasize epidemiological concepts presented earlier in class and show their utility in the real world. Invited speakers will be asked to share their educational background and career path.

Case Studies

Students will participate in interactive exercises in a series of epidemiology case studies compiled by the Centers for Disease Control and Prevention (<https://www.cdc.gov/epicasesstudies/index.html>) focused on food-borne diseases, water-borne diseases, and an outbreak simulation. Case studies require students to apply epi knowledge to problems confronted by public health practitioners at the local, state, and national level every day.

Attendance

Both the university and I view class attendance as an individual student responsibility and I expect you to attend class regularly. Your grade will be based in part by attendance and discussion participation. Make-up examinations must be scheduled ahead and will be made available for excused absences in accordance with TAMU Student Rule #7 (<http://student-rules.tamu.edu/rule07>).

ADA Policy Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 979-845-1637. For additional information, visit <http://disability.tamu.edu>.

Academic Integrity Statement

"An Aggie does not lie, cheat or steal, or tolerate those who do." For additional information, please visit <http://aggiehonor.tamu.edu>.

Student Resources

A variety of student resources focused on health and safety are available to you should you need them:
<https://wfsc.tamu.edu/additional-info/student-support-resources/>

SCHEDULE IS SUBJECT TO CHANGE

Week	Date	Topic	Quiz	Readings	
1	Tu, Jan 16	UNIVERSITY CLOSED- CLASS CANCELLED	1		
1	Th, Jan 18	Intro to course; Dynamics of disease transmission		Gordis Ch. 1- 2	
2	Tu, Jan 23	Measures of disease frequency	2	Gordis Ch. 3-4	
2	Th, Jan 25	TA lecture (Italo Zecca MPH): Infectious disease epidemiology I: Zoonoses		Daszak (2000) Science 287: 443-449 CASE STUDY #1- Infectious Disease	
3	Tu, Jan 30	Infectious disease epidemiology II: Herd immunity, basic reproductive number	3	John and Samuel (2000) European J Epi.	
3	Th, Feb 1	Public Health Surveillance Systems		Google ‘epidemiology apps’ to get a feel for available tools	
4	Tu, Feb 6	Study designs I: Cohort, case-control and cross sectional	4	Gordis Ch. 9, 10, 13	
4	Th, Feb 8	Study designs I, continued			
5	Tu, Feb 13	EXAM I	none	none	
5	Th, Feb 15	Study designs II: Controlled trials		Gordis Ch. 7-8	
6	Tu, Feb 20	Diagnostic tests: sensitivity, specificity and other metrics	5	Gordis Ch. 5	
6	Th, Feb 22	Estimating Risk: Relative risk, odds ratios, attributable risk		Gordis Ch. 11-12	
7	Tu, Feb 27	Association, Causation, and Biases	6	Gordis Ch. 14-15; Weaver (2010). Nature Sena et al. (2010) PLoS One	
7	Th, Mar 1	‘Epi in Action’ guest lecture: Dr. Keri Norman Food-borne disease and antimicrobial resistance Mid-term class evaluation		CASE STUDY #2- Food-borne diseases	
8	Tu, Mar 6	‘Epi in Action’ guest lecture: Dr. Carolyn Hodo	7		
8	Th, Mar 8	Eco-epidemiology: Natural nidality of disease, environmental determinants of disease		Wilson, Mark L. 2001. Ecology and Infectious Disease chapter	
9	Tu, Mar 13	SPRING BREAK			
9	Th, Mar 15	SPRING BREAK			
10	Tu, Mar 20	TA lecture (Italo Zecca MPH): Vector-borne disease epidemiology / Chagas disease research highlights	8	Reisen (2002) Epi of Vector-borne diseases	
10	Th, Mar 22	‘Epi in Action’ guest lecture: Dr. Christine Budke Neglected Tropical Diseases		Hotez (2009) Lancet; Hotez (2012) British Medical Journal	
11	Tu, Mar 27	EXAM 2	none	none	

11	Th, Mar 29	'Epi in Action' guest lecture: Dr. Jen Horney Outbreak Investigations		CASE STUDY #3- Outbreak simulation
12	Tu, Apr 3	'Epi in Action' guest lecture: Dr. Jillian Wormington Epidemiological Modeling	9	
12	Th, Apr 5	Epi Lab Experience: 261 VMR. Closed-toe shoes and pants required. Molecular epidemiology		Ambrosone (1997)
13	Tu Apr 10	'Epi in Action' guest lecture: Dr. Gabriel Hamer Spatial epidemiology: Geographic information systems, risk models	10	Ostfeld et al. 2005. Spatial epidemiology; Kitron et al. 1998 Landscape epi
13	Th, Apr 12	Epi Field Experience: Meet at Biodiversity Research and Teaching Collections		
14	Tu, Apr 17	Career Opportunities in Epidemiology. Disease Detective Presentations	11	
14	Th, Apr 19	Disease Detective Presentations		None
15	Tu, Apr 24	Disease Detective Presentations. Course Evaluations.	None	None
15	Th, Apr 26	LAST CLASS. EXAM 3		None
16	Tu, May 1	Redefined Day (Attend Friday Classes)		

There will be NO FINAL EXAM during finals week for VIBS 413