MB 385/BI 385: Emerging Infectious Disease and Epidemics
3 credits, WIC course

Lectures: Tuesdays/Thursdays, Cordley 2113.

Instructor: Dr. Kate Field
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Office Hours: Wednesday and Thursday 10 am, or email for an appointment

Prerequisites: BI 211-213 or equivalent.

WIC: This class is a Writing Intensive Curriculum (WIC) course and satisfies the requirement for a WIC course in Biology and General Science. However, other majors may require specific courses; for example, if you are a Microbiology student, you are required to take MB 311. You are responsible for checking with your adviser to see if this class will satisfy the WIC requirement in your major.

Introduction:
The last fifty years have seen a sharp rise in the rates at which infectious diseases new to humans, such as SARS, AIDS, and West Nile virus infection, emerge, and at which older diseases, such as malaria and tuberculosis, reemerge as new threats. Furthermore, the “golden age” of belief that infectious disease had been conquered by antibiotics is rapidly fading as more infectious agents evolve resistance to drug treatments. Emerging and reemerging infectious diseases (EIDs) greatly concern the scientific, medical, and public health communities and the general public, are inextricably linked to national and global politics, and arouse controversy, fear, superstition, and blame.

The goal of this course is to understand EIDs and be able to make a realistic evaluation of their threat. The first half of the class will cover the germ theory of infectious diseases, history of humans and human diseases, infectious agents, microbial pathogenesis, how pathogens evolve and from where, and the immune system. We will look at examples of historic plagues and pandemics to understand the factors that led to their emergence. During the second half of the class, we will cover specific EIDs, addressing emergence due to alterations in the pathogen (microbial adaptation and evolution), alterations in the environment (deforestation, changing land use, climate change), and alterations in the host population (demographics, behavior, immune status, technology and industry, international travel and transportation). We will also have noted scientists visit and give guest lectures on EIDs. We will end by comparing the emergence of diseases in history with their emergence today.

This class will also learn and practice forms of writing important to scientists and health professionals, including scientific research papers, case studies, and grant proposals. Each student will choose an EID of interest, and base several assignments on the chosen disease.

Learning Resources: Required textbook: Magner, Lois N. 2009. A History of Infectious Diseases and the Microbial World. Praeger Publishers. Other readings will be on Blackboard or handed out in class. Also, the scientific journal Emerging Infectious Disease, published by the Center for Disease Control, is available online and has a great deal of current information. Finally, I will put study questions on Blackboard after each class.

Learning Outcomes: At the end of this course, you will be able to:
1. Explain the germ theory of disease and the discovery of infectious agents.
2. Understand the scientific method, including acquisition and integration of knowledge through observation and experimentation, the use of evidence, controls, and hypothesis testing.
3. Discuss, with specific examples, important factors causing the emergence of diseases.
4. Demonstrate knowledge of the field of emerging infectious disease, and defend your evaluation of the threats they pose.
5. Locate and assess sources of scientific information, and differentiate among primary and secondary sources.
6. Read and analyze scientific papers and case reports, and identify the structures of these two forms of scientific communication.
7. Demonstrate competence in several formats of writing, using logical, connected thoughts and supporting them with evidence.

Assessment of Learning Outcomes: Learning outcomes will be assessed via in-class and homework assignments and short papers, a midterm and final exam (multiple-choice and short-answer questions). A graduate teaching assistant will help grade the papers. Grading rubrics will be provided.

In-class assignments (3+3+4) 10
Midterm 12
Final Exam 12
Assignments:
1. Turn a historic paper into a modern scientific paper 11
2. Visit and utilize the Writing Center 6
3. Hand in first drafts of each paper: 2 points each 8
Assignments based on your chosen emerging disease:
4. List of references 8
5. Case study 11
6. Contemporary issues paper 11
7. Grant proposal prospectus 11

Total 100
94 and above: A 90 to 93: A–
87 to 89: B+ 84 to 86: B 80 to 83: B–
77 to 79: C+ 74 to 76: C 70 to 73: C–
67 to 69: D+ 64 to 66: D 60 to 63: D–

Short Description of Assignments and Papers: Students will choose an Emerging/Reemerging Disease that they are particularly interested in, and base assignments 4 through 7 on their chosen disease. Assignments have suggested page lengths; longer is not necessarily better. Page length does not count references (required). Detailed assignments will be handed out and posted on Blackboard.

1. **Turn a historic paper into a modern scientific paper:** Students will be divided into groups in class, and each group will be given a short historic paper about history of infectious disease, from the 1800’s or early 1900’s. The assignment is to rewrite the historic paper into a modern science journal article (IMRAD format). After in-class discussion within your group, each student will be responsible for completing the assignment individually at home and handing it in. **3-4 double-spaced pages.**

2. **List of references:** Attend an in-class presentation by a reference librarian, then prepare a list of 6 references pertaining to your chosen disease, using the reference format of the journal *Emerging Infectious Disease*. Also hand in a library assignment.

3. **Case study:** Look up material about patients with your chosen disease, and, following a case study format (provided), prepare a case study of an imaginary patient. **2-3 double-spaced pages.**

4. **Contemporary issues paper:** Identify a controversial issue concerning your chosen disease, or use one of the suggestions provided, to write a well-reasoned paper presenting the controversy, taking a position, and providing evidence to support your position. **2-3 double-spaced pages.**

5. **Grant proposal prospectus:** Identify a problem or need related to your chosen Emerging Infectious Disease, and write a prospectus for a grant proposal, based on this problem or need. Your prospectus...
will include: Proposal Summary, Problem Statement, Project Objectives, Project Methods or Design, Project Evaluation, and Outcomes/Impact. 2 single-spaced pages.

6. **Writing Center:** For at least one of the above short papers (your choice), visit the Writing Center and utilize the services of a writing assistant. Bring a copy of the paper assignment, along with your draft, for the writing assistant to read; otherwise they will not be able to help you. Hand in the signed slip documenting your visit along with your paper. Hint: to get the most benefit, do this in time to get some real help (not the day before it’s due), and do it for one of the early assignments.

7. **Hand in a first draft of at least one paper:** You must turn in a first draft of at least one of the papers. The first draft must be complete and contain all the required parts. It is due on the regular due date for the paper, and is worth 5 points as long as it is complete. We will make comments on it and return it to you within a few days; your final draft will be due one week after you get it back. **You are welcome to hand in first drafts of all the papers** (but you only get the 5 points once).

**Grammar/writing help and tutorials:** The Penguin Handbook Common Errors Workbook (http://wps.ablongman.com/long_faigley_penguinhb_1/7/1976/505968.cw/index.html) has exercises to help you learn to identify and correct common grammatical errors. If you frequently make certain writing mistakes, you can do the relevant exercises and learn the grammar rules. If we find that you make the same mistake over and over on an assignment, we will assign you exercises from this website and allow you to correct your paper to raise your grade.

**In-class Expectations:** Students are expected to attend class and participate in all discussion and assignments. During class, students may not use cell phones or send text messages. Students may not use computers for any other purpose than to take notes for this class. Students may not do work for other classes in this class.

**Academic Integrity:** “Students are expected to be honest and ethical in their academic work. Academic dishonesty is defined as an intentional act of deception in one of the following areas:
* cheating- use or attempted use of unauthorized materials, information or study aids
* fabrication- falsification or invention of any information
* assisting- helping another commit an act of academic dishonesty
* tampering- altering or interfering with evaluation instruments and documents
* plagiarism- representing the words or ideas of another person as one's own”

**If you have a question about use of sources or anything else, consult the instructor.** The instructor will check written assignments for plagiarism from the Web. The University has a student conduct web site, http://www.orst.edu/admin/stucon/achon.htm, which explains academic dishonesty.

**Student behavior:**
People must treat each other with dignity and respect in order for scholarship to thrive. Expectations for Student Conduct: http://oregonstate.edu/admin/stucon/achon.htm

**Students with Disabilities:**
Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at (541) 737-4098.
Some Examples of Emerging or Reemerging Infectious Diseases or Disease Agents

AIDS/ HIV
Babesiosis
Chikungunya fever
Crimean–Congo hemorrhagic fever
Cryptosporidiosis
Cyclosporiasis
Dengue Fever
Drug-resistant Malaria
Drug-resistant *Streptococcus pneumoniae*
*E. coli* O157:H7
Ebola Hemorrhagic Fever
Ehrlichiosis
H1N1 Influenza
H5N1 Avian Influenza
Hantavirus (both Old World renal syndrome viruses, and New World Hanta Pulmonary Syndrome viruses)
Hendra virus
Hepatitis C
Lassa Fever
Legionnaire’s Disease
Lyme Disease
Marburg Hemorrhagic Fever
Nipah virus
Omsk hemorrhagic fever
Prion diseases: V-Creutzfeld-Jakob Disease (“mad cow disease” in humans), transmissible spongiform encephalopathy (in deer and relatives), and other transmissible spongiform encephalopathies
Rift Valley Fever
SARS
TB: Multidrug Resistant Tuberculosis (MDR-TB), Extremely Drug Resistant tuberculosis (XDR-TB)
Typhoid Fever
Vancomycin-resistant enterococci
Vancomycin-resistant *Staphylococcus aureus*
Venezuelan hemorrhagic fever (or Argentinian, or Bolivian, or Brazilian)
West Nile Virus

Diseases of the homeless that are typical diseases of poverty, war, and living in unsanitary conditions, but are “reemergent” from the point of view of western society (example: Trench Fever, typhoid)

Diseases that were formerly well controlled by vaccines, but are reemerging in places where the vaccination rate has fallen due to political change or anti-vaccination movements (examples: Pertussis, diphtheria)

Diseases that were formerly well controlled by antibiotics, but may reemerge due to the evolution of drug resistance (plague?)