

MB 385: Emerging Infectious Disease and Epidemics 2019 DRAFT
3 credits, WIC course

Lectures: Tuesdays/Thursdays, 12:00-1:20
Instructor: Dr. Kate Field
432 Nash Hall; 737-1837; kate.field@oregonstate.edu
Teaching Assistant: TBA
Office Hours: Wednesday 2 pm, Thursday 10 am, or (best) email for an appointment
Prerequisites: BI 211, 212 and 213, or equivalent.

WIC: This class is a Writing Intensive Curriculum (WIC) course and satisfies the requirement for a WIC course in BI and BHS majors. *You are responsible for checking with your adviser to see if this class will satisfy the WIC requirement in your major if it is not BI or BHS.*

Introduction:

The rate of disease emergence has increased rapidly within the last 50 years. Some of these diseases, like SARS, AIDS, and West Nile virus infection, appear to be new to humans. Others, such as Zika, malaria and tuberculosis, have emerged as new threats because they have developed drug-resistant forms, or changed their range, severity or incidence. As the recent Ebola and Zika outbreaks demonstrate, **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, what makes a microbe a pathogen, 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, war and poverty, international travel and transportation). We will also have guest lectures on EIDs. We will end by comparing the emergence of diseases in history with their emergence today.

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

Learning Resources: Required textbook (free downloadable PDF): **Microbial Threats to Health: Emergence, Detection, and Response**, Mark S. Smolinski, Margaret A. Hamburg, and Joshua Lederberg, Editors, Committee on Emerging Microbial Threats to Health in the 21st Century. ISBN: 0-309-50730-8, 398 pages, 6 x 9, (2003). Available from the National Academies Press at: <http://www.nap.edu/catalog/10636.html>. To download, set up a free guest account.

Other readings will be on Canvas, or handed out in class. Also, the scientific journal **Emerging Infectious Disease**, published by the Center for Disease Control, is available online (<http://wwwnc.cdc.gov/eid/>) and has a great deal of current information. Finally, I will put study questions on Canvas after each class.

Grammar/writing help: online quizzes: http://grammar.ccc.commnet.edu/grammar/quiz_list.htm. Quizzes available on common grammar problems. If you make a specific error a lot, and it affects your paper grade, I may assign you some of these quizzes and allow you to correct the paper.

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. Demonstrate your understanding of the scientific method (acquisition and integration of knowledge through observation and experimentation, the use of evidence, controls, and hypothesis testing) by proposing and critically evaluating research or experiments.
3. Discuss, with specific examples, important factors causing the emergence of diseases.
4. Use evidence to defend your evaluation of the threats they pose.
5. Locate and critically assess sources of scientific information, and differentiate among primary and secondary sources.
6. Read and analyze scientific papers, press releases and case reports, and identify the structures of these forms of scientific communication.
7. Demonstrate competence in several genres of writing useful to health-related professions, using logical, connected thoughts and supporting them with evidence.

OSU WIC Learning Outcomes:

8. Develop and articulate content knowledge and critical thinking in the discipline through frequent practice of informal and formal writing.
9. Demonstrate knowledge/understanding of audience expectations, genres, and conventions appropriate to communicating in the discipline.
10. Demonstrate the ability to compose a document of at least 2000 words through multiple aspects of writing, including brainstorming, drafting, using sources appropriately, and revising comprehensively after receiving feedback on a draft.

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

Homework Assignments:

1. Visit and utilize the Writing Studio for one first draft	3
2. Library assignment	4
3. Assess web sites	3
4. Hand in a complete first draft of each paper: 3 pts each	9
5. Paper 1: Write a press release based on a historic paper	10
6. Paper 2: Case Report	10
7. Zika project	10
8. Proposal pre-write	3
9. Paper 3: Grant proposal prospectus	10

In-class assignments (2 pts each)

Press release	
Read a scientific paper	
Table of pathogens	
Case report	
Assess the validity of a web site	
Peer review of grant prospectus	

Random in-class writing: 6

Midterm 10

Final Exam 10

Total 100

94.0 and above: A	90.0 to 93.9: A-	
87.0 to 89.9: B+	84.0 to 86.9: B	80.0 to 83.9: B-
77.0 to 79.9: C+	74.0 to 76.9: C	70.0 to 73.9: C-
67.0 to 69.9: D+	64.0 to 66.9: D	60.0 to 63.9: D-

Description of Assignments and Papers: Students will choose an Emerging/ Reemerging Disease in which they are interested, and base all assignments except for the first paper on their chosen disease. Assignments have suggested page lengths; longer is not necessarily better. Page length does *not* count references (required). References must be formatted exactly the way references are formatted in *either* the journal Emerging Infectious Diseases, or another science journal (*as long as you list what journal you are using for format*). Detailed assignments will be handed out in class and posted on Canvas.

- Writing Studio:** For at least one of the **first drafts** (your choice), utilize either the Undergraduate Research and Writing Studio or the Online Writing Lab and consult a writing assistant. Go to <http://writingcenter.oregonstate.edu/> for information about both, including hours, location, how to submit online. *Bring a copy of the assignment*, along with your draft, for the writing assistant to read. Hand in the signed slip or email acknowledgement 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. Only use a first draft, not the final!
- Hand in a complete first draft of each paper:** You must turn in a first draft of each paper. It must *follow the assignment, be complete, and show effort*. It is worth 3 points *as long as it is complete*. We will make comments on it and return it to you; your final draft will be due one week after you get it back. See schedule for due dates. *Please hand in your first draft again* stapled to the back of your final draft.
- Paper 1: Write a press release based on a historic paper.** Students will be divided into groups in class, and each group will be given a short historic paper (from the 1800's or early 1900's) to read. The assignment is to turn the historic paper into a press release. After in-class discussion within your group, each student will be responsible for completing the assignment individually at home and handing it in. *1-2 double-spaced pages (300-600 words)*.
- Paper 2: 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. *1-2 double-spaced pages*.
- Paper 3: 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/ Design and Evaluation, and Outcomes/Impact. *2 single-spaced pages*.
- Zika project:** Students will work in teams on specific aspects of the Zika virus. Each team will be responsible for preparing an information sheet on their topic, and giving a short in-class presentation. Topics will include, for example: the origin, history and geography of Zika; the virus and its life cycle; mode of infection and pathogenesis; treatment and prevention; mutations; relationship to Gillain Barré; relationship to microencephaly; enhancement by Dengue antibodies.

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

Academic Integrity: The following is a condensed version of the Student Conduct Code on Academic Dishonesty. For the entire text, see:

http://studentlife.oregonstate.edu/sites/studentlife.oregonstate.edu/files/student_conduct_code_1.pdf

Academic or Scholarly Dishonesty is defined as an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student's own efforts or the efforts of another. It includes:

- (A) CHEATING - use or attempted use of unauthorized materials, information or study aids, or an act of deceit by which a Student attempts to misrepresent mastery of academic effort or information.
- (B) FABRICATION - falsification or invention of any information including but not limited to falsifying research, inventing or exaggerating data, or listing incorrect or fictitious references.
- (C) ASSISTING - helping another commit an act of academic dishonesty.
- (D) TAMPERING - altering or interfering with evaluation instruments or documents.
- (E) PLAGIARISM - representing the words or ideas of another person or presenting someone else's words, ideas, artistry or data as one's own, or using one's own previously submitted work. Plagiarism includes but is not limited to copying another person's work (including unpublished material) without appropriate referencing, presenting someone else's opinions and theories as one's own, or working jointly on a project and then submitting it as one's own.

IF YOU HAVE A QUESTION ABOUT USE OF SOURCES, HOW TO CITE, OR ANYTHING ELSE, CONSULT THE INSTRUCTOR. The instructor and TA will check written assignments for plagiarism.

Student behavior:

People must treat each other with dignity and respect in order for scholarship to thrive. Expectations for Student Conduct:

http://studentlife.oregonstate.edu/sites/studentlife.oregonstate.edu/files/student_conduct_code_1.pdf

Students with Disabilities:

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at <http://ds.oregonstate.edu>. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

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
“Highly Pathogenic Avian Influenza (HPAI)” currently circulating in Europe (H5N8)
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 (vCJD, “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
White nose disease (bats)
Zika virus

Diseases of the homeless: typical diseases of poverty, war, and living in unsanitary conditions, which 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, measles, diphtheria)

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

MB 385 EMERGING INFECTIOUS DISEASE AND EPIDEMICS: 2018 SCHEDULE

<u>DATE</u>	<u>ASSIGNMENT DUE</u>	<u>IN CLASS</u>	<u>HAND OUT</u>
Week 1 Tues Jan 9		Introduction to class. Requirements. 1. What should we know to assess the threat from emerging infectious disease? Science: hypotheses, predictions, tests.	Syllabus Press release assignment
Thurs Jan 11	Due: Writing Survey. Reading: Textbook Executive Summary pp. 1-7. Read the Press Release assignment and handouts	2. Germ theory of disease. Re-writing a historic paper as a press release: in-class discussion/press release assignment.	Historic papers
Week 2 Tues Jan 16	Paper Due: Turn a historic paper into a press release (first draft)	3. Germ theory cont'd. Epidemiology: Snow. In-class assignment: Pathogens Table	
Thurs Jan 18	Reading TBA	4. Evolution of disease 1: Epidemiology, Human history, zoonoses, and crowd diseases. Examples.	Press release drafts returned. Handout on terminology
Week 3 Tues Jan 23	Reading TBA	5. Evolution of disease 2: how do pathogens become pathogens? Reading a scientific paper. IMRAD. In-class assignment.	Examples of journal articles: papers from the journal <i>Emerging Infectious Disease</i> .
Thurs Jan 25		Library Tutorial. Class meets in library, Autzen Classroom. In-class library assignment.	Library assignment
Week 4 Tues Jan 30	Paper Due: Turn a historic paper into a press release (final). Read handouts	6. Evolution of disease 3: The immune response.	
Thurs Feb 1		7. Evolution of disease 4: Past emergence of epidemic diseases. Example: Plague. The case report: in class assignment	Case report examples.
Week 5 Tues Feb 6	Paper due: EID Case report (draft)	8. Evolution of disease 5: Past emergence of epidemic diseases. Examples: cholera.	

MB 385 EMERGING INFECTIOUS DISEASE AND EPIDEMICS: SCHEDULE

<u>DATE</u>	<u>ASSIGNMENT DUE</u>	<u>IN CLASS</u>	<u>HAND OUT</u>
Thurs Feb 8		MIDTERM	Return Case Report drafts Handouts
Week 6 Tues Feb 13	Reading TBA	9. Introduction to viruses, Viral hemorrhagic fevers 1	
Thurs Feb 15	Paper due: EID Case report (final)	10. Viral Hemorrhagic fevers cont'd: Ebola, Work in groups to plan Zika project.	
Week 7 Tues Feb 20	Reading TBA	11. Viral Hemorrhagic fevers cont'd: Hanta, Dengue Discuss grant prospectus assignment.	
Thurs Feb 22	Project due	In-class presentations on Zika (6)	
Week 8 Tues Feb 27		In-class presentations on Zika (2) In-class: How to assess whether a website is reliable	
Thurs Mar 1	Assessing Website homework due Proposal Pre-write due	Antibiotic resistance: Guest Lecture by Dr. Martin Schuster	
Week 9 Tues Mar 6	Paper Due: EID Grant Proposal Prospectus draft.	In class: peer review of grant prospectuses	
Thurs Mar 8	Reading TBA	SARS and MERS	Return Grant Proposal Prospectus draft
Week 10 Tues Mar 13		Prions and other weird infectious agents	
Thurs Mar 15	Paper Due: Final Grant Prospectus	In Class: the Index Case Catch-up.	

FINAL EXAM MONDAY March 19 12-2