CLFS 609C: Emerging Infectious Diseases

Syllabus

Emerging infectious diseases can arise when microbes adapted for alternative hosts or environments acquire an ability to infect humans, or when changes in human behavior open new routes of disease transmission. The ecology of Earth has been dramatically impacted by the intense economic and social activities of a burgeoning human population. A long list of pathogens has arisen by exploiting rapid communications, a globalized food supply, and an intensified relationship among peoples and degraded environments. The spectrum of infectious diseases we face has dramatically changed. Recent examples in the USA include influenza, SARS, monkeypox, West Nile, hantavirus, enterohemorrhagic E. coli, HIV, tuberculosis and plethora of drug resistant community- and hospital-acquired pathogens, many of which are rapidly becoming untreatable. In developing countries these and additional challenges such as cholera, Creutzfeldt-Jacob (new variant), Ebola, dengue, and malaria frequently arrive on our shores through traffic and trade. An even wider range of exotic diseases is creeping, sometimes even running rampant across foreign lands, soon to appear here at home. Climate change opens the prospect of new microbial challenges, including devastating blights, rusts, blasts, wilts and hyperactive arthropods, which can swiftly drive millions to death. We will examine the biowarfare scenario for its ability to send more to the same place.

This course will survey a wide range of human pathogens and relate their emergence to themes based on environmental, human, and microbiological factors. Specific organisms will be studied in depth to illustrate microbial threats as well as epidemiological investigations, pathogenicity research, vaccine development, and other strategies deployed to control disease emergence and spread. Although microbiology features prominently, the human element remains the cornerstone of our struggle against infectious disease: we have a crystal ball – it’s a mirror.

Module 1  Introduction
Module 2: Escherichia coli
Module 3: Proteinaceous Infectious Particles
Module 4: Cholera
Module 5: Vaccines and Antibiotics
Module 6: Dengue & Hemorrhagic Fever Viruses
Module 7: Environmental, Economic, Agricultural
Module 8: Biowarfare
Assignments
Assignment 1: Tuberculosis
Assignment 2: Malaria
Assignment 3: Human Immunodeficiency Virus
Assignment 4: Human Immunodeficiency Virus
Assignment 5: Influenza
Assignment 6: To be determined
Assignment 7: To be determined

Grading:
Grading in this class will be based on:
  Assignments
  Research Paper
  Participation
  Module Quizzes
  Final Exam

Required Reading
Understanding Microbes: http://www3.niaid.nih.gov/topics/microbes/default.htm
Emerging Infectious Diseases: http://www3.niaid.nih.gov/topics/emerging/default.htm
Understanding Vaccines: http://www3.niaid.nih.gov/topics/vaccines/default.htm
Malaria: http://www3.niaid.nih.gov/topics/malaria/default.htm
Human Immunodeficiency Virus: http://www3.niaid.nih.gov/topics/HIVAIDS/
Influenza: http://www3.niaid.nih.gov/topics/Flu/
Tuberculosis: http://www3.niaid.nih.gov/topics/tuberculosis/default.htm

Class Text:
  Book ISBN or Item Number: 978-0-7637-5689-5 List and ASM member price: $104.95

Recommended Readings
Topics at NIH: http://www3.niaid.nih.gov/topics/
Topics at CDC: http://www.cdc.gov/ncidod/id_links.htm