

## **Medical Geography (Geog. 496)**

Aynalem Adujna

Mondays 10PM -12PM

**Course description:** Knowledge of the close links between the nature of places and human health goes back to the time of Hippocrates (460 BC). In 1855 a physician named John Snow made a dot map of cholera incidences in London. Dense concentration of dots around a water pump helped establish the direct link between cholera and water contamination. Removal of the handle on the pump saved many lives. The field of Medical Geography came into existence a century later, and GIS is revolutionizing our understanding of direct and indirect links between spatial processes and human, animal, and plant diseases.

Medical Geography is a spatial analysis of health and diseases, disease diffusion processes, social and political ecology, as well as health service delivery systems. The course proceeds from a definition of health as a continuous property and focuses on contagious infectious diseases, vectored diseases, and newly emerging diseases. Medical Geography also studies the health consequences of economic development, rapid urbanization, epidemic transformations in mobility, and the impacts of changes in health service delivery systems.

At the end of the course students are expected to be able to (a) explain the differences between a geographical approaches to studying health and disease, and other approaches (b) identify and describe disease patterns on maps (c) prepare sketch maps of disease distribution by hand or on the computer (d) explain in detail the pathways of disease spread in a population and the role of health institutions in altering the course of disease diffusion.

**Text:** Medical Geography (2<sup>nd</sup> edition)

Melinda S. Mead and Robert Earickson

Guilford Press (2000)

I chose this book because it is the standard text for this course.

### **Strengths:**

Very comprehensive

Many vignettes

Lots of illustrations

### **Problems:**

Tables and figures more suitable for graduate level courses

Not well sequenced

Most terms and concepts are not appropriate for an entry-level (2-unit) course like this one

### **Instructions (strategies) on use of text**

- Select sections/pages that directly relate to classroom lectures (focus on pages specified in the course outline)
- Skip the long (full page and double-page) tables.
- It would be sufficient to know and remember common names of major diseases; those that affect millions (not thousands) of humans.
- Do not worry about technical terms such as names of rare diseases and scientific names of agents and vectors.

### **Attendance plus other rules to remember**

- 1- Quizzes will be given before each lecture (1 point each) for a total of 10 points.
- 2- Since this class is given once a week one absence counts as two
- 3- Students will be asked to write a paper on a health topic of their choice (10 points).
- 4- There will be two mid-term exams (20 points and 30 points) and a final exam (30 points)
- 5- The best way to reach Dr. Aynalem on days other than Mondays is by e-mail.

## **Course Outline**

### **Lesson 1 Introduction (Text p. 1-16)**

- Medical Geography Defined
- Geographical Approaches to Health and Disease
- Sub-Branches
- Disease categories
- Outline History of Infectious Diseases

### **Lesson 2. Medical Geographical Approaches (Text P. 21-42, 59-94 skip tables, 466-468)**

- Disease ecology approach
- Landscape epidemiology
- Spatial epidemiology
- Medical Geography and GIS
- The role of diseases in human history

### **Lesson 3. About Disease and Health (Text p. 3-6, online chapter)**

- More key terms in medical geography
- The geographies of major infectious **agents**
- Emerging infectious diseases
- The role of three infectious diseases past and present

## **Mid-term I (20 points)**

### **Submission of topic(s) for term-paper**

#### **Lesson 4 and 5. Data sources, Disease Diffusion, Spatial Analysis, and Geographic Visualization**

(Text 263-286 and 401-425)

- Sources of Data, Data type, and Geographic Visualization
- Medical Geographic Data Sources
- Analytical Methods
- Types of Maps
- Rates and Ratios
- Age Standardization
- Modeling Disease Diffusion
- Diffusion of the AIDS Pandemics

### **Deadline for submission of final topic and a paragraph entry on hypothesis, methodology, and data.**

#### **Lesson 6. Climate and Weather: Influences on Health (Text p. 209-232)**

- Direct Biometerological Influences
- The Influence of the Weather
- Seasonality of Births and Deaths
- How Climate Change is Likely to Affect Health and Disease

#### **Lessons 7, 8 and 9. Major Vected and Non-vected Diseases: Mortality/Morbidity Impacts and Trends (online chapter)**

- Major Vected and Non-vected Diseases:
- Malaria
- Tuberculosis
- HIV/AIDS
- Humanity's response to the three major killers
  - Global Fund to Fight Malaria, Tuberculosis and AIDS

- Roll Back Malaria partnership (RBM)
  - (US)President's Emergency Fund For AIDS Relief (PEPFAR)
- Other Infectious Diseases of Global Significance
- Dengue Fever and Dengue Hemorrhagic Fever (DHF)
- Yellow fever
- Schistosomiasis (Bilharziasis)
- Leishmaniasis
- African Trypanosomiasis and Chagas Disease
- Onchocerciasis
- Lymphatic Elephantiasis
- Hepatitis
- Diarrheal diseases
- Sexually transmitted diseases (other than HIV/AIDS)
- US A vectored diseases (encephalitis)
- =====
- Protein energy malnutrition and micronutrient deficiency

## Mid-term II (30 points)

### Lesson/Week 10: Ecology of Non-communicable Diseases (text p. 283-329)

- Disease Ecology: Cancer
- Disease Ecology: Cardiovascular Diseases
- Other Non-Communicable Diseases
- Population Ageing

### Lesson/Week 11: Environment and Health: A Global Perspective

- What is the "Environment" in the Context of Health?
- What is Meant by the "Attributable Fraction" of A Risk Factor?
- Estimates Of The Environmental Attributable Fraction, by Disease
- Chemical and biological pollution of water, air, and soil

### Lesson 12. Neighborhoods and Health (p. 339-347)

Neighborhood Characteristics

Property value as a predictor variable (King County, Washington State)  
Education, Occupation and Home Ownership as Predictor Variables (Alameda County)  
Income as a Predictor Variable (Bexar County, Texas)

## **Submission of completed paper**

### **Lesson 13. Distribution of Health Services and Equity of Coverage (online chapter)**

- World Summary
- International Migration of Health Care Workers
- Case Study: Sub Saharan Africa
- Global Trends (WHO 2008 report)
- Health Care Utilization and Inequities
- Preventive Medical Services
- USA
- Health Care Expenditures
- Health Insurance
- Health Care Technologies
- Federally Regulated Laboratories
- Prescription Drugs

## **Final Exam (30 points)**