Anthropological Sciences 179, Human Biology 179
Environmental Change and Emerging Infectious Disease

Fall 2007

Instructors:

William H. Durham
Department of Anthropology
Office: Building 50, Room 51C
phone: 3-0867
e-mail: eb.whd@stanford.edu
Office Hours: Wednesdays 2:00-4:00, or by appointment

James Holland Jones
Department of Anthropology
Office: Building 50, Room 52S
phone: 3-4824
e-mail: jhj1@stanford.edu
Office Hours: Fridays 1:15-3:15, or by appointment

Teaching Assistants:

Yana Hoy
e-mail: ehoy@stanford.edu

Yi-Ching Ong
e-mail: ongyc@stanford.edu

Sarah Robinson
e-mail: sarahr1@stanford.edu

Course Description:

This is a lecture course on the changing epidemiological environment, with particular attention to the ways in which human-induced environmental changes are altering the ecology of infectious disease transmission, thereby promoting their re-emergence as a major global public health threat. Organized by case studies of environmental change at (roughly) local to global scales, we focus on the role that environmental changes (such as deforestation and land-use conversion, urbanization, human migration, international commerce, and global warming) play in contemporary disease transmission. The diseases affected by these environmental changes include SARS, Avian Flu, Malaria, Dengue Fever, Chagas disease, Lyme, Influenza, Cholera, Hantavirus, BSE/vCJD, and West Nile Virus.
Expectations:

Attendance at lecture and discussion sections is mandatory. There is a take-home midterm and in-class final, for the 3-unit option, and the same midterm plus a 15-page research paper for the 5 unit option. The research paper may be on any related topic that is approved by the instructors. Paper proposals will be due during week 5 of the course (details TBA). Collaborative papers are welcome, subject to the requirement of roughly 15 pages per author.

Prerequisites:

One of the following: HUMBIO 2A & 2B, the Bio Core, the Earth Systems Core, or permission of the instructors.

Sections:

Discussion sections will meet for one hour weekly starting the second week of the course. Locations TBA. Sections are a required part of the class.

Grading:

Grades for 5-unit enrollment will be based on midterm (30%), section (10%), and the 15-page paper (60%). Grades for 3-unit enrollment will be based on midterm (30%), section (10%), and final (60%).

Readings:

There are four required texts for this class:


We will supplement these books with readings from the primary scientific literature throughout the quarter. All articles will be available on coursework.
Course Outline (Provisional)

Lectures are on Tuesday and Thursday from 11-12:30 in Building 200, room 002.

Week 1. Introduction: What EIDs are and $R_0$

09.25 SARS & Avian Flu: A Taste of the Future? (Jones)
Readings: Olsen et al. (2006); Optional: Mills et al. (2007); Gauthier-Clerc et al. (2007)

09.27 Epidemiology Meets Ecology: Some Tools (Jones)
Readings: Holt & Dobson, Ch. 2 in CR; Jones Lecture Notes: “On $R_0$ ”

Week 2. Local Deforestation and Disease: Frontier Malaria in Rondônia

10.02 Colonization in Rondônia: How not to Change $R_0$ (Durham)
Readings: Vittor at al. (2006); Singer & Castro (2001), 184-222, skimming 210-212; Optional: Guerra et al. (2006)

10.04 Vectors of Change and Vectorial Capacity (Durham)
Readings: Yasuoka & Levins (2007)

Week 3. When Disease Means Business, Agribusiness

10.09 Greasing Palms and Palm Oil: Mosquitoes and Malaria in Southeast Asia (Jones)
Readings: Rejmánková et al., Ch. 7 in CR; Chang et al. (1997); Optional: Fryauff et al. (1998); Yasuoka et al. (2006)

10.11 Run(s) for Your Life: Agricultural Conversion in Ecuador (Levy)
Readings: Eisenberg et al. (2006);

Week 4. Regional Plagues: Haunted by Hantavirus

10.16 Death in the Southwest: Hantavirus Pulmonary Syndrome (Jones)
Readings: Engelthaler et al. (1999); Garrett, ch. 15;

10.18 Hantavirus in Latin America (Durham)

Week 5. The Challenge of Chagas: Who’s the Guinea Pig?

10.23 American Trypanosomiasis: Disease of Poverty (Durham)
Readings: Miles et al 2003, Aufderheide et al 2004

10.25 The Political Ecology of Landscape Transformation and $R_0$ (Durham)
Readings: Cohen and Gürtler (2001)
Week 6. Disruption of Community Processes and Disease Emergence

10.30 Changes in the Land: Deflected Succession and the Emergence of Lyme Disease in New England (Jones)
Readings: Ostfeld et al., Ch. 3 in CR; LoGiudice et al. (2003); Jones Lecture Notes: “Patterns of Species Diversity”

11.01 Bubonic Plague and the Structure of Small Mammal Communities
Readings: Ray & Collinge, Ch. 14 in CR; Duplantier et al. (2005)

Week 7. Bound by the Food Chain: Prions

11.06 Careful What You Eat: The Tragic Case of Kuru (Durham)
Readings: Yam (2003), Durham (forthcoming)
Paper Topic Proposals Due (5-unit option only)

11.08 How Now Mad Cow: Environmental Influences on the TSE’s (Durham)
Take-home Midterm Exam Passed Out

Week 8. Global Environmental Change: Climate and Cholera

11.13 Environment and Endemism in South Asia: The Case of Cholera
Guest Lecture: Gary K. Schoolnik
Readings: Cottingham & Butzler, Ch. 8 in CR; Garrett, ch.16
Take home Midterm Exam Due

11.15 Coping with Copepods & El Niño: The Peruvian Cholera Epidemic (Durham)

11.20-11.22 Thanksgiving


11.27 Paper or Plastic? Climate Change and Urban Refuse as Drivers of Epidemic Dengue Fever (Jones)
Readings: Patz et al. (2000); Favier et al. (2006)

11.29 Dropping Like Crows: West Nile Virus in North America (Durham)

Week 10. Wrap-Up: Humanity’s Changing Epidemiological Environments


12.06 Concluding Remarks (Durham, Jones)
Readings:


