

**WWS 585a – Population, Health and Environment**  
**Fall Term, 2004**  
**Instructor: Burton Singer**

**Monday: 1-4PM**

## **OBJECTIVES & SYLLABUS**

The purpose of this course is to investigate the interrelationships between human and animal health and the physical and social environments within which health dynamics operates. The first half of the course will be devoted to infectious diseases. We discuss the evolutionary origins of bacteria, viruses, and parasites, their biology, modes of transmission, and ecological conditions that either promote or inhibit different levels of endemicity in human and animal populations. Disease prevention and control are discussed in the context of health systems that serve the needs of local populations. Macro-economic and political factors that influence human health are discussed in both historical and contemporary terms. Policy issues, with emphasis on resource poor countries are thoroughly integrated with the scientific discussion.

The second half of the course will emphasize mental health, the impact of neurobiology on psychiatry and on the development of wellness programs. Recent knowledge about the mechanisms of communication among the brain, immune system, neuroendocrine system, and autonomic nervous system will be reviewed and applied to understand how social environments influence individual and community-level health status. Particular attention will be given to the inter-relationships between genetics and social environments and their joint impact on mental and physical health. Policy issues pertaining to pharmacological interventions and the tension between medicine and public health will be emphasized.

### **Week 1 –**

Definitions of ‘health’ and ‘environment’. Communities of organisms from cellular to human and their evolutionary histories. Infectious diseases, the origin of epidemics and their consequences. Historical case studies involving plague, measles, influenza, tuberculosis, malaria, and smallpox.

### **Week 2 –**

Political economy, colonialism, and the management of infectious diseases. Drugs, vaccines, and prevention strategies: the historical tensions between medicine and public health. Long-term trends in mortality and disease morbidity: what are the driving forces? Case studies on: (i) malaria control and British colonialism: (ii) introduction of the rinderpest virus and linkages to ecosystem transformations and outbreaks of African Trypanosomiasis; (iii) tuberculosis in South Africa from the 1880s to the 1960s and the modern period of HIV/AIDS in that country.

### **Week 3 –**

Major outbreaks and associated control and eradication programs. Case studies of: (i) the smallpox eradication campaign; (ii) measles and pertussis vaccination programs and their impact on transmission dynamics; (iii) controlling BSE and rinderpest in animals; (iv) tuberculosis control via antibiotics and DOTS.

### **Week 4 –**

Health system solutions; illustrations of effective programs and their broader implications. Case studies of: (i) Tanzania Essential Health Intervention Program (TEHIP); (ii) the Dar es Salaam Urban Health Project; (iii) Community health in Pondicherry, India and in Kerala state; (iv) Health systems on the Amazon frontier (Brazil). What are the lessons from these initiatives that carry over to other settings? What are the idiosyncratic features of these programs?

### **Week 5 –**

Migration, urbanization, and health. Health problems induced by major migrations and their mitigation: Case studies of colonization projects on the Amazon frontier (Brazil), transmigration in Indonesia, rural-urban migration and the growth of Dar es Salaam, Tanzania, and the Japanese occupation of Micronesia (1920-1945). Commonalities and idiosyncrasies of these examples and their implications for the health of contemporary migrant populations.

### **Week 6 –**

Chemical and biological weapons: infectious agents and health consequences. Case studies of anthrax in Sverdlovsk and Agent Orange in Vietnam. Detection of outbreaks and prediction of consequences. Discriminating between ‘natural’ disease transmission and attacks. The complex evidential basis for supporting or refuting claims of chemical and biological weapons attacks.

### **Week 7 –**

Diagnostic Criteria for Mental Illnesses: Depression, Schizophrenia, Bipolar disorder, Dementia, Alzheimer’s disease. History of mental illness in Europe and America and comparisons with China and India. The World Mental Health Survey and contemporary mental illness rates. History of psychiatry and psychoanalysis and the influence of neuroscience on them.

### **Week 8 –**

Neurobiology of depression, schizophrenia, bipolar disorder, and Alzheimer’s disease. Recent discoveries about neurogenesis and their implications for positive mental health. Implications for the future of psychiatry.

**Week 9 –**

Communication between the brain, immune system, neuroendocrine system and autonomic nervous system. The biology of both resilience and vulnerability and linkages to social environments. Stressful experience and its mitigation.

**Week 10 –**

Well-being: definitions, operationalizations, and connections to human health. Affective neuroscience and the biology of emotion. Genetics-environment relationships and their linkage to dimensions of personality. Case studies of neuroticism.

**Week 11 –**

Drug addiction: what is it? What is known about the biology of heroin addiction, cocaine addiction, and alcoholism? Case studies illuminating the natural history of heroin addiction and alcoholism. Case studies of treatment and prevention programs.

**Week 12 –**

Oral presentation of student projects. Discussion of their linkages to different parts of the course.

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**READING MATERIALS**

Required Text: Barondes, Samuel (1999) *Molecules and Mental Illness*. New York: Scientific American (revised paperback edition).

Weekly readings will be posted on the course Blackboard.

**REQUIREMENTS**

1. Weekly brief (2-3 pages) responses to specific questions that will be posed about the topic for the week.
2. Two papers (approximately 20 pages each: one paper on infectious disease and the second paper on mental health. Specific topics for the papers are based on discussion between the instructor and each student individually. The papers are designed to mesh well with specific interests of each student.