PM 529 (Class #41117D)
ENVIRONMENTAL HEALTH
An Epidemiologic Approach
(SPRING SEMESTER, 2013)

Instructors: Md. Towhid Salam (msalam@usc.edu)

Teaching assistants: Anne Dee (adee@usc.edu)

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2001 N Soto Street,
Second Floor (Division of Environmental Health)
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Fax: (323) 442-3272

Class location: SSB 115AB

Time: Mondays, 9:00 am to 12:30 pm

Office hours: Mondays 3-5PM or by appointment

Course Description

This course will help students develop a broad understanding of environmental health. The format includes lectures, and case studies and critique of literature conducted as class exercises. An introductory overview of the principles of exposure assessment and toxicology will be provided within the context of specific hazards considered in the course. Exposure pathways will be reviewed, focusing on the role of air as a route of exposure. Environmental illness associated with selected exposures, including common air pollutants, heavy metals, persistent organic pollutants, pesticides, environmental endocrine disruptors and obesogens, and radiation and other environmental carcinogens will be discussed. These topics have been selected to illustrate the application of epidemiologic methods to environmental outbreak evaluation and management, to screening for environmental illness, and to evaluation of current controversies regarding the true health risks of environmental hazards. Students will learn the accepted approaches to management of known environmental hazards, such as lead, that should be part of any comprehensive public health program. There will be a review of anthropogenic climate change associated with greenhouse gases, as illustrative of newly recognized environmental hazards that have largely unknown but potentially catastrophic long term consequences for public health. The course will also introduce students to the tools for managing environmental health risks, including the use of risk assessment, the “precautionary principle”, regulatory and legal instruments.

PREREQUISITE: PM 512 or equivalent.
Learning Objectives

Students should:

1) Demonstrate an understanding of the basic principles of toxicology, epidemiology, and exposure assessment, using examples specific to environmental hazards examined in the course;
2) Be able to describe the potential health effects and alternative methods of control for the major environmental hazards to public health; and
3) Demonstrate an ability to think critically about controversial issues in environmental health

Requirements

Students will be expected to have completed and to come prepared to discuss the assigned reading for each class.

Students will be expected to check the Blackboard (https://blackboard.usc.edu/) regularly for homework and reading assignments, as well as for other postings.

Students should buy the course textbook:


Other readings will be posted on Blackboard or distributed in class.

GRADING

Students will be evaluated on their understanding of material in the classroom lectures and exercises, and the assigned readings. Grading will be on a curve. There will be regular quizzes at the beginning of class, a midterm and final examinations. No make-up or late quizzes will be given. The lowest quiz grade will be dropped.

Course grade will be determined as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Class participation/article review</td>
<td>5%</td>
</tr>
<tr>
<td>Journal article critique</td>
<td>10%</td>
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<tr>
<td>Quizzes:</td>
<td>15%</td>
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<tr>
<td>Midterm:</td>
<td>35%</td>
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<tr>
<td>Final (NOT cumulative):</td>
<td>35%</td>
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CLASS PARTICIPATION (5% OF COURSE GRADE)

Students are expected to contribute to the development of a positive learning environment and to demonstrate their learning through written and oral assignments and through active class participation. Class participation should consist of meaningful, thoughtful, and respectful participation based on having completed course units and required readings and assignments prior to class. When in class, students should demonstrate their understanding of the material and
be prepared to offer comments or reflections about the material, or alternatively, to have a set of thoughtful questions about the material. Failure to meet these expectations will result in the reduction of grades. Class participation is worth 5 points of the final grade.

POLICY ON LATE OR MAKE-UP WORK

Papers, homework and quiz are due on the day and time specified. Extensions will be granted only for extenuating circumstances. If the submission is late without permission, the grade will be affected.

POLICY ON CHANGES TO THE SYLLABUS AND/OR COURSE REQUIREMENTS

It may be necessary to make some adjustments in the syllabus during the semester in order to respond to unforeseen or extenuating circumstances.

ATTENDANCE POLICY

Students are expected to attend every class and for the duration of the class. Failure to attend class, arriving late or lack of active participation may impact your ability to achieve course objectives which could affect your course grade. Students are expected to notify the instructor by email of any anticipated absence or reason for tardiness.

University of Southern California policy permits students to be excused from class, without penalty, for the observance of religious holy days. This policy also covers scheduled final examinations which conflict with students’ observance of a holy day. Students must make arrangements in advance to complete class work which will be missed, or to reschedule an examination, due to holy days observance. Please refer to Scampus on attendance policies. In consideration of classmates and the instructor, students are asked to keep external distractions that might interfere with class to a minimum.

STATEMENT FOR STUDENTS WITH DISABILITIES

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to one of the course instructor (or to the TA) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.

STATEMENT ON ACADEMIC INTEGRITY

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one’s own academic work from misuse by others as well as to avoid using another’s work as one’s own. All students are expected to understand and abide by these principles. Scampus, the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A:
Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: [http://www.usc.edu/student-affairs/SJACS/](http://www.usc.edu/student-affairs/SJACS/).

### APPENDIX

**MPH Environmental Health Competencies addressed by this course**

- Describe the direct and indirect human, ecological and safety effects of major environmental and occupational agents.
- Describe genetic, physiologic and psychosocial factors that affect susceptibility to adverse health outcomes following exposure to environmental hazards.
- Describe federal and state regulatory programs, guidelines and authorities that control environmental health issues.
- Specify current environmental risk assessment methods.
- Specify approaches for assessing, preventing and controlling environmental hazards that pose risks to human health and safety.
- Explain the general mechanisms of toxicity in eliciting a toxic response to various environmental exposures.
- Discuss various risk management and risk communication approaches in relation to issues of environmental justice and equity.
- Develop a testable model of environmental insult.

**MPH General Public Health Competencies addressed by the course**

- Identify and prioritize the key dimensions of a public health problem by critically assessing public health literature – both quantitative and qualitative sources.
- Assess programs and policies designed to protect and promote environmental and occupational health by applying sound biological, chemical and physical science standards.
- In planning community-based programs and/or program changes, demonstrate an appreciation of the interactive nature of the political, organizational and economic context of public health programs; of funding patterns and priorities; and the possibility of multiple agendas and conflicting goals.

**MPH Biostatistics/Epidemiology Track Competencies addressed by the course**

- Advise fellow investigators on the design, conduct and data analysis for studies in the health sciences.
- Describe and discuss the important risk factors for major chronic and infectious diseases.
- Determine the appropriate study design to analyze a community health problem.
- Interpret the results of research reports that focus on public health and/or policy implications.
• Identify potential bias in research reports and evaluate the likelihood that these potential biases actually explain the findings
• Identify behavioral/social/cultural and epidemiological factors in a particular setting/problem and analyze how these factors affect disease

**MPH Child and Family Health Track Competencies addressed by the course**

• Discuss key issues in pediatric health and disease and their implications for public health, including the major domestic and international causes of mortality and morbidity for children and adolescents.

**MPH Global Health Leadership Track Competencies addressed by the course**

• Describe how globalization, rising infectious and chronic diseases, and natural and manmade disasters make the health and wellbeing of people of the world increasingly interdependent
• Appreciate the increasing influence of determinants arising in foreign countries to any country’s health and safety

**MPH Public Health Policy Track Competencies addressed by the course**

• Explain methods of ensuring community health safety and preparedness.
• Discuss the policy process for improving the health status of populations.
### Lecture Schedule, Topic, and Reading Material for Environmental Health Course PM529, Spring 2013

**NOTE THAT THE READING ASSIGNMENTS ARE PROVISIONAL, SO ALWAYS CHECK THE ASSIGNMENT AND READINGS POSTED TO BLACKBOARD THE WEEK PRECEDING EACH LECTURE**

<table>
<thead>
<tr>
<th>DATE</th>
<th>Lecture # and Topic</th>
<th>Material to be covered. Unless stated otherwise, <em>Chapters</em> refer to McCally M. Life support: The environment and human health. Cambridge, MA. MIT Press, 2002. <strong>For learning objectives for each lecture and updated reading assignments, refer to Blackboard.</strong></th>
<th>Lecturer(s)</th>
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</table>
| 01/14/13   | 1. Introduction and overview  
2. Global warming                                                                     | - Chapter 6: Haines et al. Global climate change and health (pages 99-118);  
- Chapter 7: Chivian E. Species loss and ecosystem disruption. (pages 119-134)  
- Chapter 16: War (pages 273-284)                                                                                                   | Towhid Salam |
| 01/28/13   | 3. Exposure assessment: A challenge in environmental health science                 | - Chapter 1 McCally: Environment, Health and Risk (pages 1-14)  
- London Smog Exercise                                                                                                               | Towhid Salam |
| 02/04/13   | 4. Air pollution and health                                                          | - Chapter 2. Christiani and Woodin: Urban and Transboundary Air Pollution (pages 15-38)  
- Air quality index health advisories: http://www.epa.gov/airnow/airnow/index.html  
- http://www.arb.ca.gov/html/aqi.htm  
- Literature critique exercise (article posted to Blackboard).                                                                           | Towhid Salam |
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| 02/11/13   | 5. Introduction to environmental toxicology; pesticides | • Chapter 2, Toxicology (pages 14-32), in Moeller DW, Environmental Health. 1998 Harvard University Press (posted to Blackboard)  
• Trubo, R., Endocrine-disrupting chemicals probed as potential pathways to illness. JAMA, 2005. 294(3): p. 291-93  
• Literature critique exercise (article posted to Blackboard). | Towhid Salam               |
| 02/18/13   | Presidents' day holiday (no class)                       |                                                                                                                                                                                                  |                           |
| 02/25/13   | 6. Epidemiologic surveillance in environmental and occupational health; environmental outbreak investigations | • Chapter 4: Hu H. Human health and heavy metals exposure (pages 65-82)  
• Review the principles of epidemiologic surveillance and screening from PM 512  
• Guidelines for investigating clusters of health events. MMWR 1990: 39;1-16: [http://www.cdc.gov/epo/mmwr/preview/mmwrhtml/00001797.htm](http://www.cdc.gov/epo/mmwr/preview/mmwrhtml/00001797.htm)  
• Group exercise: Asthma in Barcelona | Guest lecturer:  
Rob McConnell  
Towhid Salam   |
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• Literature critique exercise (Bonner et al. Radon, secondhand smoke, glutathione-S-transferase M1 and lung cancer among women. *International Journal of Cancer* 2006;119:1462-1467) | Towhid Salam |
| 03/11/13   | MIDTERM                                 | • Review all material  
• No additional readings                                                                                                                                   | Towhid Salam |
| 03/18/13   | Spring recess (no class)                |                                                                                                                                           |             |
| 03/25/13   | 8. Environmental endocrine disruptors (continued); Community outreach and environmental education (including Community-Based Health Research and Health Impact Assessments) | • Chapter 9: Solomon and Schettler. Environmental endocrine disruption (pages 147-62)  
• Chapter 10: Thornton et al. Body burden of industrial chemicals (p 163-200)  
Towhid Salam |
| 04/01/13   | 9. Radiation today                      | • Chapter 12: Hatch M and McCally M: Radiation and health. (pages 211-229);  
• Chapter 8, de Gruijl FR and van der Leun JC: Ozone depletion and ultraviolet radiation (pages 135-146)  
• Literature critique exercise (article posted to Blackboard).  | Guest lecturer: Frank Gilliland  
Towhid Salam |
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| 04/08/13   | 10. Monitoring environmental hazards – setting standards: The air pollution example  | - The California Story (http://www.arb.ca.gov/html/brochure/history.htm)  
- Blumm MC. A primer on environmental law and some directions for the future. Virginia Environmental Law J 1992;11(3):381-99. Summary slides of key aspects of this article are also posted on Blackboard.  
- Literature critique exercise (article posted to Blackboard). | Guest lecturer:  
Ed Avol  
Towhid Salam |
| 04/15/13   | 11. Time series study design; Obesity, the built environment, and environmental endocrine disruptors | - Chapter 11: Clapp R. Cancer and the Environment (pages 201-210)  
- Literature critique exercise (article posted to Blackboard). | Guest lecturer:  
Kiros Berhane  
Towhid Salam |
| 04/22/13   | 12. Water: water treatment and water quality                                        | - Chapter 3: Balbus J Water quality and water resources. (pages 39-64)  
- Literature critique exercise (article posted to Blackboard). | Guest lecturer:  
Scott Fruin  
Towhid Salam |
| 04/29/13   | 13. Putting risk into perspective: Risks are not equal                               | - Chapter 13: Bailar and Bailer. The science of risk assessment. (pages 231-238)  
- Chapter 14: Schettler et al. The precautionary principle (pages 239-256)  
- Literature critique exercise (article posted to blackboard). | Towhid Salam        |
| May 4-7: Study Days |                                                                                     |                                                                                                                                          |                      |
| TBD (May 8-15) | 14. FINAL EXAM                                                                    | Review all material discussed after the Midterm + Basic Epidemiology/Biostatistics concepts. No new readings.                                                                                           | Towhid Salam        |