



University of Maryland School of Public Health

PHSC 426 – Climate Change and Health

Semester: Spring 2019

Section: Tuesdays/Thursdays 12:30-1:45 p.m.

Instructor: Heather Randell, PhD

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Course Description: Climate change is characterized by increasing global temperatures; a greater frequency of floods, droughts, and heat waves; more intense natural disasters; and rising sea levels. These environmental changes pose significant risks to population health in a number of direct and indirect ways. This course examines the relationship between climate change and human health, focusing on how vulnerability to climate change varies between populations by geographic, demographic, and socioeconomic characteristics. Topics covered include climate change and the transmission of malaria and other vector-borne diseases, heat stress among the poor and elderly, effects of climate change on food security and undernutrition, and the physical and mental health impacts of natural disasters. This course helps students to understand the varied mechanisms through which climate change impacts global health and inequality as well as the economic, environmental, and political challenges associated with mitigating the health effects of climate change.

Course Pre- and Co-requisites: Minimum grade of C- in MIEH300.

Course Learning Objectives:

Upon completing this course, the student will be able to:

1. Explain the impact of climate change on health, inequality, and well-being in the US and globally.
2. Characterize how organizations are planning for the health risks associated with climate change.
3. Evaluate the economic, environmental, and political challenges associated with mitigating the health effects of climate change both locally and globally.

Program Competencies Addressed in this Course:

1. **Identify** the major health-related needs and concerns of populations and **formulate** basic processes, approaches, and interventions as possible solutions.
2. **Examine** the socio-economic, behavioral, biological, environmental, and other factors that impact human health and contribute to health disparities.
3. **Illustrate** the basic concepts of public health-specific writing and communication.
4. **Interpret and synthesize** scientific knowledge to **propose** evidence-based approaches and solutions to public health problems.

Course Requirements:

Reading Responses: 25%

Midterm Exam: 20%

Final Presentation: 20%

Final Exam: 30%

Participation: 5%

***Note:** The syllabus may change slightly during the semester. What will **not** change is the assignments and their due dates.

Major Graded Assignments:

1. **Reading Responses.** Three times during the semester, you will write a 2-page double-spaced response to the week's readings and post it to the course website **by midnight the night before Tuesday's class**. You can choose which three weeks you would like to write responses for, though the responses must be completed between weeks 3 and 13 of class. The responses should briefly summarize the readings and address the following reflection questions: Which populations are most vulnerable? Which elements of social vulnerability (exposure, biological sensitivity, adaptive capacity) are relevant to these populations and why? What did you find surprising or interesting in the readings and why? The reading responses are worth 25% of your grade. All readings are on the course website, or online.
2. **Midterm Exam.** The midterm will be held during class on March 14th. The exam will cover material from through March 12th. It will include true/false, multiple choice, and short answer questions and will draw from required readings and lectures. It is worth 20% of your grade.
3. **Final Presentation.** In groups of four, students will give a 15-minute PowerPoint presentation on climate change and health in a country of your choice (outside the US). I will assign students to groups during the fourth week of class. Your country choice is due by 2/28 (posted to the course website), and each group must focus on a different country. In the presentation, you should discuss: a brief background on your country (e.g., environmental conditions, population, economic development); the recent and predicted changes in climatic conditions in the country; three health impacts of climate change in your country; and how vulnerability to those health impacts varies between different populations within the country. Lastly, you should propose a address one of the health impacts. The presentation is worth 20% of your grade.
4. **Final Exam.** The final exam will be held during finals week. The exam will be cumulative, covering material from the entire semester, with a greater focus on material covered after the midterm. It will include true/false, multiple choice, and short answer questions and will draw from required readings and lectures. It is worth 30% of your grade.
5. **Participation.** Participation is evaluated through student involvement and performance in class discussion. It is expected that students will have completed the assigned readings before class and be prepared to discuss them. Active participation is worth 5% of your grade.

Course Schedule Summary			
Week	Dates	Topic	Notes
# 1	1/29 & 1/31	Course Introduction and Climate Change Basics	
# 2	2/5 & 2/7	Climate Justice and Social Vulnerability	
# 3	2/12 & 2/14	Air Quality and Fires	Guest lecture 2/12 – Dr. Amir Sapkota
# 4	2/19 & 2/21	Food Security and Nutrition	Final presentation groups assigned
# 5	2/26 & 2/28	Food and Waterborne Diseases	2/28 – Deadline for choosing country
# 6	3/5 & 3/7	Vector-borne Diseases	
# 7	3/12 & 3/14	Climate, Gender, and Health	MIDTERM EXAM 3/14
# 8	3/19 & 3/21	SPRING BREAK	NO CLASS
# 9	3/26 & 3/28	Extreme Heat	
# 10	4/2 & 4/4	Extreme Weather Events	
# 11	4/9 & 4/11	Climate Change and Conflict	NO CLASS 4/11
# 12	4/16 & 4/18	Mental Health and Well-Being	
# 13	4/23 & 4/25	Sea-level Rise and Migration	
# 14	4/30 & 5/2	Solutions: Adaptation and Mitigation	
# 15	5/7 & 5/9	Student Presentations	
# 16	5/14	Final Exam Review Session	

Outline of Sessions	
Week 1 - Course Introduction and Climate Change Basics	January 29 & January 31
Week 2 - Climate Justice and Social Vulnerability	February 5 & February 7
<p>Required readings:</p> <ul style="list-style-type: none"> - Otto, Ilona M, et al. 2017. Social Vulnerability to Climate Change: A Review of Concepts and Evidence. <i>Regional Environmental Change</i>, 27, 1651–1662. - Bullard, Robert, et al. 2016. Climate Change and Environmental Justice: A Conversation with Dr. Robert Bullard. <i>Journal of Critical Thought and Praxis</i>, 5(2). - Doyle John T, Margaret Redsteer, and Margaret Eggers. 2013. Exploring Effects of Climate Change on Northern Plains American Indian Health. <i>Climatic Change</i>, 120(3):643–655. 	
Week 3 – Air Quality and Fires	February 12 & February 14
<p>Required readings:</p> <ul style="list-style-type: none"> - Liu, Jia Coco, et al. 2017. Who Among the Elderly Is Most Vulnerable to Exposure to and Health Risks of Fine Particulate Matter from Wildfire Smoke? <i>American Journal of Epidemiology</i>, 186(6):730–35. - Ziska, Lewis, et al. 2011. Recent Warming by Latitude Associated with Increased Length of Ragweed Pollen Season in Central North America. <i>Proceedings of the National Academies of Sciences</i> 108(10):4248–51. - Pages 69-83 of: USGCRP. 2016. Air Quality Impacts. <i>The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment</i>, Washington, DC. 	
Week 4 - Food Security and Nutrition	February 19 & February 21
<p>Required readings:</p> <ul style="list-style-type: none"> - Bakhtsiyarava, Maryia, Kathryn Grace, and Raphael Nawrotzki. 2018. Climate, Birth Weight, and Agricultural Livelihoods in Kenya and Mali. <i>American Journal of Public Health</i>, e1–e7. - Bounoua, Lahouari. Climate Change is Hitting African Farmers the Hardest. The Conversation: https://theconversation.com/climate-change-is-hitting-african-farmers-the-hardest-of-all-40845 - Smith Matthew, Christopher Golden, and Samuel Myers. 2017. Potential Rise in Iron Deficiency Due to Future Anthropogenic Carbon Dioxide Emissions. <i>GeoHealth</i>, 1: 248-257. 	
Week 5 - Food and Waterborne Diseases	February 26 & February 28
<p>Required readings:</p> <ul style="list-style-type: none"> - Carruth, Lauren. 2017. Cholera Fears Rise Following Atlantic Hurricanes: Are We Making any Progress? The Conversation: https://theconversation.com/cholera-fears-rise-following-atlantic-hurricanes-are-we-making-any-progress-83694 - Jiang, Chengsheng, et al. 2015. Climate change, Extreme Events and Increased Risk of Salmonellosis in Maryland, USA: Evidence for Coastal Vulnerability. <i>Environment International</i>, 83: 58–62. - Davies, Grace, et al. 2015. Water-borne Diseases and Extreme Weather Events in Cambodia: Review of Impacts and Implications of Climate Change. <i>International Journal of Environmental Research and Public Health</i>, 12(1):191–213. 	

Week 6 – Vector-borne Diseases	March 5 & March 7
<p>Required readings:</p> <ul style="list-style-type: none"> - Boyce, Ross, et al. 2016. Severe Flooding and Malaria Transmission in the Western Ugandan Highlands: Implications for Disease Control in an Era of Global Climate Change. <i>Journal of Infectious Diseases</i>, 214(9):1403–1410. - Pages 129-143 of: USGCRP. 2016. Vector-borne Diseases. <i>The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment</i>, Washington, DC. - Paul Parham. Hard Evidence: Will Climate Change Affect the Spread of Tropical Diseases? The Conversation: https://theconversation.com/hard-evidence-will-climate-change-affect-the-spread-of-tropical-diseases-37566 	
Week 7 – Climate, Gender, and Health --- MIDTERM EXAM	March 12 & March 14
<ul style="list-style-type: none"> - Godin, Melissa. 2018. Climate Change Is Creating a New Atmosphere of Gender Inequality for Women in Malawi. <i>Teen Vogue</i>: https://www.teenvogue.com/story/climate-change-gender-inequality-women-malawi - Sorensen, Cecilia, et al. 2018. Climate Change and Women’s Health: Impacts and Policy Directions. <i>PLoS Medicine</i>, 15(7):e1002603. - Ajibade, Idowu, Gordon McBean, and Rachel Bezner-Kerr. 2013. Urban Flooding in Lagos, Nigeria: Patterns of Vulnerability and Resilience Among Women. <i>Global Environmental Change</i>, 23(6):1714–1725. 	
Week 8 – SPRING BREAK	March 19 & March 21
Week 9 – Extreme Heat	March 26 & March 28
<p>Required readings:</p> <ul style="list-style-type: none"> - García-Trabanino, Ramón, et al. 2015. Heat Stress, Dehydration, and Kidney Function in Sugarcane Cutters in El Salvador - A Cross-Shift Study of Workers at Risk of Mesoamerican Nephropathy. <i>Environmental Research</i>, 142:746–55. - Basu, Rupa, et al. 2017. The Impact of Maternal Factors on the Association between Temperature and Preterm Delivery. <i>Environmental Research</i>, 154, pp.109–114. - Semenza, Jan, et al. 1996. Heat-Related Deaths during the July 1995 Heat Wave in Chicago. <i>New England Journal of Medicine</i>, 335 (2): 84–90. 	
Week 10 – Extreme Weather Events	April 2 & April 4
<p>Required readings:</p> <ul style="list-style-type: none"> - Pages 99-112 of: USGCRP. 2016. Impacts of Extreme Events on Human Health. <i>The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment</i>, Washington, DC. - Berggren, Ruth and Tyler Curiel. 2006. After the Storm — Health Care Infrastructure in Post-Katrina New Orleans. <i>New England Journal of Medicine</i>, 354(15), pp.1549–1552. - Paterson, David, Hugh Wright, and Patrick Harris. 2018. Health risks of Flood Disasters. <i>Clinical Infectious Diseases</i>, 67(9):1450–1454. 	

Week 11 – Climate and Conflict – NO CLASS 4/11	April 9 & April 11
<p>Required readings:</p> <ul style="list-style-type: none"> - Akresh, Richard. 2016. Climate Change, Conflict, and Children. <i>The Future of Children</i>, 26(1):51–71. - Kelley, Colin P., Shahrzad Mohtadi, Mark A. Cane, Richard Seager, and Yochanan Kushnir. 2015. Climate Change in the Fertile Crescent and Implications of the Recent Syrian Drought. <i>Proceedings of the National Academy of Sciences</i>, 112(11):3241–46. - Feitelson, Eran, and Amit Tubi. 2017. A Main Driver or an Intermediate Variable? Climate Change, Water and Security in the Middle East. <i>Global Environmental Change</i>, 44:39–48. 	
Week 12 – Mental Health and Well-Being	April 16 & April 18
<p>Required readings:</p> <ul style="list-style-type: none"> - Pages 217-228 of: USGCRP. 2016. Mental Health and Well-being. <i>The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment</i>, Washington, DC. - Paxson, Christina, Elizabeth Fussell, Jean Rhodes, and Mary Waters. 2012. Five Years Later: Recovery from Post Traumatic Stress and Psychological Distress among Low-Income Mothers Affected by Hurricane Katrina. <i>Social Science and Medicine</i>, 74(2):150–57. - Cunsolo Willox, Ashlee, et al. 2014. Examining Relationships between Climate Change and Mental Health in the Circumpolar North. <i>Regional Environmental Change</i>, 15(1):169–82. 	
Session 13 – Sea-level Rise and Migration	April 23 & April 25
<p>Required readings:</p> <ul style="list-style-type: none"> - Vineis, Paolo, Queenie Chan, and Aneire Khan. 2011. Climate Change Impacts on Water Salinity and Health. <i>Journal of Epidemiology and Global Health</i>, 1(1): 5–10. - Maldonado, Julie, et al. 2013. The Impact of Climate Change on Tribal Communities in the US: Displacement, Relocation, and Human Rights. <i>Climatic Change</i>, 120: 601–614. - Schwerdtle, Patricia, Kathryn Bowen, and Celia McMichael. 2018. The Health Impacts of Climate-related Migration. <i>BMC Medicine</i>, 16(1):1. 	
Session 14 - Solutions: Adaptation and Mitigation	April 30 & May 2
<p>Required readings:</p> <ul style="list-style-type: none"> - Berisha, Vjollca, et al. 2017. Assessing Adaptation Strategies for Extreme Heat: A Public Health Evaluation of Cooling Centers in Maricopa County, Arizona. <i>Weather Climate, and Society</i>, 9(1):71–80. - Xie Yang, et al. 2018. Co-benefits of Climate Mitigation on Air Quality and Human Health in Asian Countries. <i>Environment International</i>, 119:309–318. - Chester, Mikhail, Braden Allenby, and Samuel Markolf. What is Climate-ready Infrastructure? Some Cities are Starting to Adapt. The Conversation: https://theconversation.com/what-is-climate-ready-infrastructure-some-cities-are-starting-to-adapt-91784 	
Session 15 – Student Presentations	May 7 & May 9
Session 16 – Final Exam Review Session	May 14