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**SYLLABUS**

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**Managing the health risks of climate change  
GH/ENV H 418/518 (3 credits)  
Lectures Mondays / Wednesdays 2:30 – 3:50pm  
Online**

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**Instructor:**

Kristie L. Ebi, PhD, MPH  
Professor, Departments of Global Health, and of Environmental and Occupational Health  
Sciences  
[krisebi@uw.edu](mailto:krisebi@uw.edu)

**Teaching assistant:** Chris Boyer [choyer10@uw.edu](mailto:choyer10@uw.edu)

**Office hours** will be held by appointment.

**Requirements:** None. This is a broad course open to students without specific training in the areas of climate change, environmental sciences, and/or public health.

**Course description**

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Climate change is causing injuries, illnesses, and deaths, with increases in global temperature projected to further increase morbidity and mortality from most climate-sensitive health outcomes if actions are not taken to rapidly increase adaptation and reduce greenhouse gas emissions. Of particular concern are heat-related morbidity and mortality and ozone-related mortality if emissions needed for ozone formation remain high. Urban heat islands often amplify the impacts of heatwaves in cities.

Risks for some vector-borne diseases, such as malaria and dengue fever, are projected to increase with warming from 1.5°C to 2°C, including potential shifts in their geographic range and changes in their seasonal distribution. Undernutrition is projected to increase with additional warming. Separately, increasing concentrations of carbon dioxide are expected to reduce the nutritional quality of significant cereal crops. Other potentially large risks are insufficiently quantified, such as the impacts of climate variability and change on a range of climate-sensitive health outcomes, such as diarrheal diseases, occupational heat stress, mental health, and migration and displacement. Vulnerable populations and regions will be differentially affected, with the potential to increase poverty and inequities.

Adaptation (adjustments in response to actual or expected climatic shifts) and mitigation (efforts to reduce to the likelihood of dangerous climate change by limiting greenhouse gas emissions) are the primary policy responses to address the health risks of climate change. Health adaptation can reduce the current and projected burdens of climate-sensitive health outcomes over the short term in many countries, but the extent to which it could do so past mid-century will depend on emission and development pathways. Under high emission scenarios, climate change will be rapid and extensive, leading to fundamental shifts in the burden of climate-sensitive health outcomes that will be challenging for many countries to manage. Unmanaged disease burdens could erode gains made in public health, economic development, and living standards worldwide. Sustainable development pathways could delay but not eliminate associated health burdens.

Students in this course will gain foundational knowledge in the health effects of climate change, methods for quantifying climate change health effects, adaptation needs and strategies, and health benefits of mitigation activities.

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### Overall learning objectives

Students will be able to:

- Identify the major health risks of climate variability and change, including the sources of vulnerability to those risks
- Analyze the methods and tools for assessing risks for specified populations domestically and in several international settings
- Enumerate key issues in implementing, monitoring, evaluating, learning from, and continuously updating, adaptation policies and programs
- Outline the health co-benefits of mitigation policies to reduce greenhouse gas emissions
- **Graduate student only** - Evaluate policy options to address the health risks of climate variability and change

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### Expectations of students

Students are expected to prepare for and participate in class discussions via Zoom, demonstrate knowledge of assigned readings, and demonstrate teamwork/professionalism. Students are also expected to complete two partner assignments and one final paper (individually) on a relevant topic chosen between the student and the instructors. (see Grades)

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### Grades

- 25% Political context assignment
- 25% Risk communication assignment
- 50% Final paper

We will use the UW's grading guidelines, available at <http://depts.washington.edu/grading/practices/guidelines.html>.

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### Assignments

Required readings will be posted on Canvas and will include:

- IPCC Summary for Policy Makers for the Special Report on Warming of 1.5°C (2018)
- USGCRP 2018 *4<sup>th</sup> US National Climate Assessment: Human Health chapter*
- Watts et al. 2020 *Lancet Countdown on Health and Climate Change*

Students also will be assigned readings from the recent literature.

Students will be asked to complete two partner assignments and one final paper:

**Assignment 1: Political Context:** Students will work in pairs to develop a policy brief or podcast on an aspect of the national or international political context for managing the health risks of climate variability and change. Written policy briefs should be no more than 1,000 words, excluding references and podcast policy briefs should be approximately 10 minutes. Both should contain at least five references from peer-reviewed or gray literature but may include more. A written bibliography should also be included with the podcast.

Grading will be based on a clear statement of the issue(s) chosen, a description of the background and arguments to support a particular perspective, and the group's assessment of the validity and robustness of the chosen issue. The political context policy brief or podcast will be due **February 8<sup>th</sup> by midnight** (submitted on Canvas, one submission per pair).

**Assignment 2: Risk Communication** Students will work in pairs to develop a poster, podcast, or video on an aspect of communicating the health risks of climate change and options to manage these risks within the context of a local or national case study. The goal of this assignment is to utilize aspects of risk communication and think creatively about how best to present this information. Posters should be developed and formatted for submission to a scientific conference. Podcasts should be approximately 10 minutes long and videos should be approximately 5 minutes long. Both should include information from at least five sources, which can include references from peer-reviewed or gray literature. A written bibliography should also be included with the podcast or video.

Grading will be based on a clear statement of the case study chosen and why, a description of how the case study is an example of best practice or an example of where communication could improve understanding or action on managing the risks of climate change, and a discussion of specific approaches to improve communication, with an evaluation of their likely effectiveness. The risk communication media will be due **March 3rd by midnight** (submitted on Canvas, one submission per pair).

**Final Paper (undergraduate student only):** Each student will develop an individual paper on some aspect of managing the health risks of climate variability and change. This can be a subject covered by the readings or some other aspect of climate change that is of particular interest. A one-paragraph summary of the topic for the individual project will be due **February 10th at midnight**. The paper will be 6-10 double-spaced pages and contain a minimum of 5 references that are peer-reviewed, scholarly articles found in scientific journals. The paper will be due **March 12th at midnight**. Please include your last name in the file name.

**Final Paper (graduate student only):** Each student will develop an individual paper on some aspect of managing the health risks of climate variability and change. This can be a subject covered by the readings or some other aspect of climate change that is of particular interest. A one-paragraph summary of the topic for the individual project will be due **February 10th at midnight**. The paper will be 10-15 double-spaced pages and contain a minimum of 10 references that are peer-reviewed, scholarly articles found in scientific journals. In addition to the added length and number of references, it is expected that this paper reflects a level of thought and analysis reflective of a graduate student. In addition, graduate students will give one slide lightning talks on their paper topics (less than 5 minutes with questions). Lightning talks will take place on **March 10th during class**. The paper will be due **March 12th at midnight**. Please include your last name in the file name.

**UW Writing and Research Center.** The Odegaard Writing & Research Center (OWRC) offers free, one-to-one, 45-minute tutoring sessions for undergraduate, graduate, and professional writers in all fields at the UW. We will work with writers on any writing or research project, as well as personal projects such as applications or personal statements. Our tutors and librarians collaborate with writers at any stage of the writing and research process, from brainstorming and identifying sources to drafting and making final revisions. For more information or to schedule an appointment, please see our website (<http://depts.washington.edu/owrc>).

**Microsoft Word.** It is beneficial in this course for students to have access to Microsoft Word. The Microsoft Office suite is available for free to all UW students and can be downloaded from this [online site](#). If you have additional questions, please contact the TA.

**[UW Disability Statement](#)**

**Access and Accommodations:** Your experience in this class is important to us, and it is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law. If you experience barriers based on a disability or temporary health condition, please seek a meeting with DRS to discuss and address them. If you have already established accommodations with DRS, please communicate your approved accommodations to your instructor at your earliest convenience so we can discuss your needs in this course.

Disability Resources for Students (DRS) offers resources and coordinates reasonable accommodations for students with disabilities and/or temporary health conditions. Reasonable accommodations are established through an interactive process between you, your instructor(s) and DRS. If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations (this can include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), you are welcome to contact DRS at 206-543-8924 or [uwdrs@uw.edu](mailto:uwdrs@uw.edu) or [disability.uw.edu](http://disability.uw.edu)

### **Academic Integrity Statement**

Students at the University of Washington (UW) are expected to maintain the highest standards of academic conduct, professional honesty, and personal integrity. The UW School of Public Health (SPH) is committed to upholding standards of academic integrity consistent with the academic and professional communities of which it is a part. Plagiarism, cheating, and other misconduct are serious violations of the University of Washington Student Conduct Code (WAC 478-120). We expect you to know and follow the university's policies on cheating and plagiarism, and the [SPH Academic Integrity Policy](#). Any suspected cases of academic misconduct will be handled according to University of Washington regulations. For more information, see the University of Washington Community Standards and Student Conduct website.

### **Religious Accommodation Statement**

Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW's policy, including more information about how to request an accommodation, is available at [Religious Accommodations Policy](#). Accommodations must be requested within the first two weeks of this course using the [Religious Accommodations Request form](#).

### **Email Policy**

Emails received after 5 pm will be answered within 24 hours whenever possible, and not before 9 am the following morning.

### **Classroom Climate**

The UW School of Public Health seeks to ensure all students are fully included in each course. We strive to create an environment that reflects community and mutual caring. We encourage students with concerns about the classroom climate to talk to your instructor, your advisor, a member of the departmental or SPH Diversity Committee and/or the program director. [vg@uw.edu](mailto:vg@uw.edu) is a resource for students with classroom climate concerns.

### ***Commitment to Diversity & Classroom Climate***

We seek to ensure all students are fully included in this course. We strive to overcome systemic racism and power imbalances by creating an environment that reflects community and mutual caring, while we ally with others in combating all forms of social oppression. This is a work in progress, as transformation is rarely a fully-completed project. In this course, we will look for opportunities to improve our performance as we seek to break down institutional racism. This

can include course readings, class interactions, faculty performance, and/or the institutional environment.

Diverse backgrounds, embodiments and experiences are essential to the critical thinking endeavor at the heart of University education. In this course, instructors and students are expected:

1. To respect individual differences, which may include, but are not limited to, age, cultural background, disability, ethnicity, family status, gender, immigration status, national origin, race, religion, sex, sexual orientation, socioeconomic status and veteran status.
2. To engage respectfully in the discussion of diverse worldviews and ideologies embedded in course readings, presentations and artifacts, including those course materials that are at odds with personal beliefs and values.

On our first day of class, we will create ground rules together to follow in promoting a productive learning environment for all members of the class. I am committed to making this class an equitable learning environment. Please talk with me right away if you experience disrespect in this class from other students and/or from me, and I will work to address it in an educational manner.

**Reporting Learning Environment Concerns**

The School of Public Health (SPH) Office of the Dean has a [student concern policy](#), a faculty concern policy and standard HR procedures for staff concerns. Students are encouraged to report concerns in any of the following ways:

- Report the incident to someone you feel comfortable with, including teaching staff, an advisor or department staff;
- Contact Department of Global Health (DGH) leadership:
  - DGH Associate Chair for Academic Programs Susan Graham at [grahamsm@uw.edu](mailto:grahamsm@uw.edu)
  - The DGH Diversity, Equity & Inclusion (DEI) Committee and DEI director at [dgheicomm@uw.edu](mailto:dgheicomm@uw.edu)
- Contact School of Public Health (SPH) leadership:
  - SPH Assistant Dean for Equity, Diversity & Inclusion Dr. Victoria Gardner at [vg@uw.edu](mailto:vg@uw.edu)
  - Email [dcinfo@uw.edu](mailto:dcinfo@uw.edu) to file a non-anonymous, confidential report (tracked by Director for Student & Academic Services and Assistant Dean for Equity, Diversity & Inclusion)
  - Send an anonymous and confidential report using the bias concern form [here](#). Report is received by the Assistant Dean for EDI and the Director for Student & Academic Services and tracked for investigation and/or resolution. Reporter can remain completely anonymous but will not receive a response.

**Course session schedule:**

Class	Instructor	Topic	Assigned Readings
WEEK 1 Class 1 MON 1/4	Ebi	Introduction and overview	<a href="#">USGCRP 4<sup>th</sup> National Climate Assessment: Human Health chapter</a>

<b>WEEK 1</b> Class 2 WED 1/6	Ebi	Political context for climate policy	<ul style="list-style-type: none"> <li>• <a href="#">Watts et al. 2020 Lancet Countdown</a></li> <li>• <a href="#">US Lancet Countdown Policy Brief</a></li> <li>• <a href="#">Background on the Paris Agreement</a></li> </ul>
<b>WEEK 2</b> Class 3 MON 1/11	Bond	Weather, climate, climate variability, and climate change	<ul style="list-style-type: none"> <li>• IPCC AR5 SPM Working Group I</li> <li>• USCRP <i>Executive Summary Climate Science Special Report</i></li> </ul>
<b>WEEK 2</b> Class 4 WED 1/13	Boyer	Framework for understanding and managing risks; vulnerability and adaptation assessments	<ul style="list-style-type: none"> <li>• Berry et al. 2018 (international)</li> <li>• Ebi and Villalobos 2015 (guidance)</li> <li>• Ebi et al. 2018 (indicators)</li> <li>• Levison et al. 2018 (local adaptation)</li> <li>• Ebi et al. 2016 (using climate information)</li> <li>• WHO 2015 (climate-resilient health systems)</li> <li>• Bowen 2013 (governance)</li> </ul>
<b>WEEK 3</b> MON 1/18	<b><i>Martin Luther King Day</i></b>	No class	No reading assignments
<b>WEEK 3</b> Class 5 WED 1/20	Ebi	Mitigation and health co-benefits	<ul style="list-style-type: none"> <li>• Hess et al. 2020</li> <li>• Chang et al. 2017</li> <li>• IPCC AR5 WGIII SPM</li> </ul>
<b>WEEK 4</b> Class 6 MON 1/25	Ebi	Risk communication	<ul style="list-style-type: none"> <li>• Jang_CC_Frames_Twitter 2014</li> <li>• <a href="#">MacIntyre et al. 2019</a></li> <li>• Six Americas</li> </ul>
<b>WEEK 4</b> Class 7 WED 1/27	Ebi	Methods for assessing current and projecting health risks of climate change	<ul style="list-style-type: none"> <li>• Ebi et al. 2018</li> <li>• <a href="#">Lo et al. 2019</a></li> <li>• <a href="#">Ogden et al. 2018</a></li> <li>• Paull et al. 2017</li> <li>• <a href="#">Shindell et al. 2020</a></li> <li>• <a href="#">Yang et al. 2019</a></li> </ul>
<b>WEEK 5</b> Class 8 MON 2/1	Mendez	Environmental Justice	Reading assignments: TBD

<b>WEEK 5</b> Class 9 WED 2/3	Ebi	Food Security	<ul style="list-style-type: none"> <li>• <a href="#">Beach et al. 2019</a></li> <li>• <a href="#">Lancet EAT Commission</a></li> <li>• <a href="#">IPCC Special Report on Climate Change and Land SPM</a></li> <li>• <a href="#">Akseer et al. 2020 (COVID-19)</a></li> </ul>
<b>WEEK 6</b> Class 10 MON 2/8	Ebi	Extreme weather and climate events and their health impacts / disaster risk management	<ul style="list-style-type: none"> <li>• <a href="#">Ebi et al. 2020 (detection and attribution)</a></li> <li>• McGregor &amp; Ebi 2018 (ENSO)</li> <li>• <a href="#">Pei et al. 2020 (hurricanes)</a></li> <li>• Sampson et al. 2018 (floods)</li> <li>• <a href="#">Schultz et al. 2020 (mental health)</a></li> <li>• <a href="#">Yang et al. 2020 (economics)</a></li> <li>• Yusa et al. 2015 (drought)</li> </ul>
		<b>Political Context Assignment Due</b>	<b>Policy briefs or podcast submitted on Canvas by Midnight</b>
<b>WEEK 6</b> Class 11 WED 2/10	Morin	Infectious disease	
		<b>Final Paper topic due</b>	<b>Short description of final paper topic submitted on Canvas by Midnight</b>
<b>WEEK 7</b> MON 2/15	<i>President's Day</i>	No class	No reading assignments
<b>WEEK 7</b> Class 12 WED 2/17	Busch-Isaksen	Wildfires and practice-based research	Reading assignments: TBD
<b>WEEK 8</b> Class 13 MON 2/22	Ebi	Oceans or SDGs	Fleming et al. 2019 Fostering human health through ocean sustainability in the 21st century
<b>WEEK 8</b> Class 14 WED 2/24	Sellers	Demographics and climate change	Reading assignments: TBD
<b>WEEK 9</b> Class 15 MON 3/1	Hess	Biodiversity loss or thermal extremes and their health impacts	<ul style="list-style-type: none"> <li>• Arbutnott et al. 2016</li> <li>• Bunker et al. 2016</li> <li>• Gasparrini et al. 2015</li> <li>• Sanderson et al. 2017</li> </ul>

			<ul style="list-style-type: none"> <li>Hess &amp; Ebi 2016 (heat early warning systems)</li> </ul>
<b>WEEK 9</b> Class 16 WED 3/3	Ranadive	Health care / health system and climate change  <b>Risk Communication Assignment Due</b>	Reading assignments: TBD  <b>Risk communication media submitted on Canvas by Midnight</b>
<b>WEEK 10</b> Class 17 MON 3/8	Student panel	Students working on climate and health	No reading assignments
<b>WEEK 10</b> Class 18 WED 3/10	Ebi	Lighting talks for 518 students	No reading assignments
<b>NO Final Exam – Final Paper due March 12 by Midnight</b>			