

Course Description

Risk Assessment for Environmental Health Hazards

Autumn 2016

3/4 credits

ENVH 577, CEE 560, PUBPOL 589

Elaine M. Faustman, Ph.D.



Risk Assessment is a lens through which you will learn to explore and tackle environmental and public health sciences problems and characterize risk within a broad public health context.

Risk Assessment is a transdisciplinary, multifaceted approach to solving public and environmental health science problems because it combines the key principles of exposure sciences (through assessment of exposure), toxicology (through hazard identification), and modeling (through dose-response assessment) to characterize risks from biological, chemical, or physical agents and public health situations. Risk management includes delineating options, making decisions, and taking actions to address the risks identified. Making decisions in the face of significant uncertainty is a key challenge to which risk assessment and risk management approaches can be applied. Risk communication identifies approaches to exchange information about risks to stakeholder groups.

Course Description

ENVH 577 “Risk Assessment for Environmental Health Hazards” is a graduate course that introduces students to the fundamentals of environmental risk assessment through a series lectures, case examples, readings, assignments, and the final group project. Students learn to identify, characterize and predict environmental health risk for a spectrum of public and environmental health science problems. Prediction methods are taught and students will have an opportunity to use these approaches. Methods for evaluating uncertainty in such predictions are presented. Approaches for preventing and controlling such potential risks are also included in the course content and this will involve discussion of legislative and regulatory options as well as risk communication techniques. Students will prepare a risk assessment within a group project.

Since risk assessment practice requires a transdisciplinary understanding across technical and social sciences, this course has transdisciplinary student participation which is exemplified by its listing in three schools. It is designed for students in public health in all of the 5 core disciplines. In addition, students in engineering and environmental disciplines (civil and systems) are key participants. It is also designed for students in law, policy, and risk management.

Through the use of case examples in all lectures and in the group project, students will become familiar with examples of chemical, physical and biological agents and will be able to understand the sources of such risks within the community. For example, media-specific (air, water, soil) as well as context-specific (food, occupational, medicine, etc.) factors will be included. Natural as well

as man-made risks will be assessed. Lectures and student exercises will emphasize the significance of integrating information from core public health disciplines of environmental health, epidemiology, health policy management and social and behavioral sciences.

Credit Options: 3-credit option: Students seeking 3 credits in this course are required to attend the regular lecture sessions (Tuesdays and Thursdays 9:00-10:20am) and complete all required assignments and the group project. 4-credit option: Students seeking 4 credits also participate in the early morning lecture sessions (8-9am).

Course Objectives and Evaluation

Course Objectives

The course objectives include:

1. Identifying hazards and understanding the methodologies and types of data generated by public health studies (epidemiology, toxicology, etc)
2. Define risk assessment, describe the what, why and how of risk assessment, i.e., describing and differentiating the public health risks, benefits and costs of a particular action or chemical and thereby developing a framework for decision-making in environmental health and safety.
3. Characterizing the public health risks of a specific hazard by accounting for variables, differing sensitivities and uncertainties of analysis.
4. Identifying factors that contribute to the diversity of the response of human populations to environmental toxicants.
5. Prepare and present a group risk assessment project that identifies, characterizes, and manages an environmental, ecological, or occupational risk.
6. Define risk management and identify means to control risk including intervention as well as use of legislative and regulatory guidelines.
7. Effectively communicate environmental and public health risks and prevention strategies to potentially affected communities including culturally diverse populations.

Course Competencies

Upon completion of this course students shall be able to:

1. Describe and distinguish between risk assessment and management approaches.
2. Describe how risk information from core public health disciplines is integrated to identify potential health risks.
3. Describe and apply both qualitative and quantitative approaches to characterize the magnitude of environmental and public health risks.
4. Predict potential for human health risks using the risk assessment framework.
5. Identify key areas of uncertainty in risk predictions.
6. Describe risk management approaches for addressing (controlling and preventing) predicted risks including identifying legislative, regulatory and risk communication options.
7. Perform an environmental and public health risk assessment.

Course Evaluation

<u>Graded Assignments</u>	<u>Percentage of Grade</u>
Final Exam	25%
Student Project	50%
Oral Presentation and Student Project Critique (20%) Paper (30%)	
Memo to the Governor	20%
<u>Credit/No Credit assignments</u> *	
Short Term and Biomarker Assay Review	2.5%
Quantitative Worksheet examples	2.5%
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	100%

Text Books/Reading Materials

Required

1. ENVH 577 Readings (On Canvas site)
2. Harr, J., A Civil Action. Vintage Press, 1996 (on reserve at HS Library)

In some cases you will be asked to select from 1 or more from a group of reading options, and the selected reading are considered required assigned reading. However, in other cases readings listed are specified as optional or supplemental and are not considered required. Unless otherwise noted, readings listed serve as suggested readings that the student may wish to read if desired.

RISK ASSESSMENT FOR ENVIRONMENTAL HEALTH HAZARDS

SYLLABUS

Autumn Quarter, 2016

ENVH 577, PUBPOL 589, CEE 560

Elaine M. Faustman, PhD

Items to be discussed include:

1. Course Description
2. Class Schedule
3. Extra Credit Class Schedule
4. Description for Course Assignments
 - A. Memo to the Governor
 - B. Short Term Assays
 - C. Group Project Topics: Case Studies
5. Readings Table of Contents
6. Assignment and Reading Schedule

Risk Assessment
ENVH 577, PUBPOL 589, CEE 560
Autumn Quarter 2016
Tuesday/Thursday from 9:00am-10:20 AM
Room: More Hall (MOR) 234

<u>Date</u>	<u>Schedule</u>	<u>Session Leader</u>
September 29 th Thursday	Introduction Perceptions of Risk	Faustman
October 4 th Tuesday	Course Requirements – Review and Discussion Q & A with Rachel Shaffer Role of Non-Governmental Organizations (NGOs) Due: Choose short term essay to review Due: Review Risk Assessment Group Project Choices	Shaffer
October 6 th Thursday	Identification of Hazard I: Chronic Bioassay Due: Choose Risk Assessment Group Project	Faustman Shaffer
October 11 th Tuesday	Identification of Hazard II: Short Term and In Vitro Assays Assign Group Projects DUE: Short term essay assignment	Faustman
October 13 th Thursday	Ecological Risk Assessment: Practical Approaches to Ecosystems Assessment Lessons Learned from the U.S. EPA	Garry
October 18 th Tuesday	Identification of Hazard III: Epidemiological Principles	Faustman
October 20 th Thursday	Exposure Assessment	Faustman
October 25 th Tuesday	Quantitative Risk Characterization I: Dose Response Assessment and Extrapolation to Low Dose Can Risk Assessment modeling be used for predicting public health impacts? Opportunities for Probabilistic Risk Assessment Modeling	Faustman
October 27 th Thursday	Quantitative Risk Characterization II: Approaches for Evaluating Uncertainty and Variability for Public Health	Faustman
November 1 st Tuesday	Pharmaceutical Risk Assessment Approaches: Balancing Risk and Benefits in Patients	Sprugel
November 3 rd Thursday	Approaches for Microbial Risk Assessment of Zoonoses and Vectorborne Disease	Meschke

November 8 th Tuesday	Broadening our Concepts of Public & Environmental Health: Well-being, One Health and Sustainability	Faustman
November 10 th Thursday	Case Studies in Risk Assessment: Issues in WA State	Whittaker Grimsted Laflamme
November 15 th Tuesday	Civil Action TCE Case Study: Clash of the Titans Science vs. Regulation in the Courtroom Due: Memo to the Governor	Lewandowski
November 17 th Thursday	Student Presentation	Faustman
November 22 nd Tuesday	Student Presentation	Faustman
November 24 th Thursday	Thanksgiving Holiday	
November 29 th Tuesday	Student Presentation	Faustman
December 1 st Thursday	Student Presentation	Faustman
December 6 th Tuesday	Putting Risk Assessment and Risk Management into Context: What have we learned? Need to learn? Thinking about Risk Management as Critical Infrastructure Due: Student Group Risk Assessment Project Papers	Faustman
December 8 th Thursday	Class Review	Shaffer
December 13 th Tuesday	Final Exam 10:30am-12:20, MORE Hall 234	

Instructor: Dr. Elaine M. Faustman
Office Hours: By appointment
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Office Hours: By appointment
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Academic Integrity (<http://sph.washington.edu/students/academicintegrity>)

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.

UW Disability Statement (<http://depts.washington.edu/uwdrs/faculty-resources/syllabus-statement>)

Access and Accommodations: Your experience in this class is important to me. If you have already established accommodations with Disability Resources for Students (DRS), please communicate your approved accommodations to me at your earliest convenience so we can discuss your needs in this course. If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations (conditions 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 or disability.uw.edu. 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. It is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law.

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Autumn Quarter 2016
Extra Credit Sessions for students seeking 4 credits
8:00-9:00am - More Hall (MOR) 234

<u>Date</u>	<u>Schedule</u>	<u>Session Leader</u>
September 29 th Thursday	Engaging Stakeholders and Building Consensus: What does this mean? How is this done?	Faustman
October 11 th Tuesday	Risk Communication: Practical Approaches for Learning Who, What, Where, and When	Faustman
October 13 th Thursday	Using the Children's Safe Product Act Data for Chemical Prioritization	Smith
October 18 th Tuesday	Context for Communication Frames that Facilitate Transparency and Decision Making	Faustman
October 20 th Thursday	Integrating and using Data Sources: How to Accomplish and How to Validate	Faustman
October 25 th Tuesday	Radiation Models/RESRAD Demonstration Sampling Design and Determining How Clean is Clean: Tackling the Issues of Levels of Detection and Brownfields	Griffith
October 27 th Thursday	Benchmark Dose Modeling (BMD) Demo	Shaffer
November 8 th Tuesday	Climate Risk Assessment Translating the Message Case Examples	Shaffer
November 10 th Thursday	Hazard Ranking Approaches for Complex Decision Making	Faustman
November 17 th Thursday	Approaches for Harmonization of International Risk Assessment Methods and Approaches vs. Sovereignty Learns Learned from WTO – What's working and what's not?	Faustman
November 29 th Tuesday	Decision Analysis Techniques and Philosophy	Faustman

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