

## Human Health Risk Assessment

VME6607  
Section 8312  
Fall 2008  
4 credits

CEHT Seminar Room Wednesday 12:50-2:45 and Friday 12:50 -2:45

### Instructors

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### Risk Assessor

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### Guests

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### Course Description

The purpose of this course is to introduce students to the concepts, data sources and methodologies used in the field of human risk assessment and to provide the students with an understanding of current issues in this field. Conceptually, the components of risk assessment include hazard identification, dose-response assessment, exposure assessment, and risk characterization. All of these areas will be covered in the course. The course will include presentations by faculty and guest lecturers, homework assignments, and student lead discussions. Students will obtain enough hands-on experience to be able to successfully conduct a risk assessment.

### Course Objectives.

Upon successful completion of the course, students will be able to:

1. Identify and use data sources for hazard assessment
2. Demonstrate ability to read and use toxicological reports for dose-response assessments
3. Use EPA documents to conduct exposure assessments
4. Demonstrate familiarity with a range of risk models
5. Conduct a risk assessment
6. Demonstrate an understanding of how risk assessments are used and the impact of risk assessments on public policy and public health issues.

**Course Materials.**

There is no text book in this course. The primary readings will be from the EPA Risk Assessment Guidelines for Superfund Sites (RAGs) which can be found in the class website or obtained from the EPA website. Additional readings and handouts will be provided, materials and relevant websites will also be posted on the class website (<http://lss.at.ufl.edu>). There are many web-based resources and sites that you will be using. These include guidance documents and modeling software found on [www.epa.gov](http://www.epa.gov), and the following sites:

1. EPA Integrated Risk Information System (IRIS) <http://www.epa.gov/IRIS/>
2. ATSDR toxicological profiles <http://www.atsdr.cdc.gov/toxprofiles/>
3. International Agency for Research on Cancer (IARC) <http://www.iarc.fr/ENG/Databases/index.php>
4. CalEPA Toxicity Criteria Data Base <http://www.oehha.ca.gov/risk/ChemicalDB/index.asp>
5. Risk Assessment Information System (RAIS) <http://rais.ornl.gov/tox/>
6. TOXNET (access to multiple data bases) <http://toxnet.nlm.nih.gov/>

**Course expectations and grading.**

It is expected that students will come prepared for class. This includes having a lap top computer for some classroom activities and homework modeling and being prepared to discuss assigned readings.

A list of Florida Superfund sites will be provided. Each student will adopt two sites. Specific topics related to the risk assessment process as related to these sites will be discussed in class based on the research the students have done on the sites. Students will be expected to participate in classroom discussions.

Homework assignments will in most cases involve calculations and completed assignments will be due one week after given.

The mid-term and final exams will not include calculations, but will focus on concepts and information obtained from lectures and readings.

Grading

Class participation	10%
Homework assignments	50%
Mid-term exam	20%
Final exam	20%

Date	Topics/assignments
August 27	Intro to Course Reading journal articles Florida Superfund sites Assignment 1. Superfund site characteristics
August 29	Intro to Risk Assessment and Regulatory Framework Causality Article: Rothman, 2005. Causation and causal inference in

	epidemiology. <i>American Journal of Public Health</i> 95: S144-S150 Selection of superfund sites due Reading: chapters 1 & 2 RAGs
September 3	Hazard Identification Epidemiological and Toxicity studies WOE Readings: chapter 3 RAGs Article: Gray et al, 2004. Weight of the evidence evaluation of low-dose reproductive and developmental effects of Bisphenol A. <i>Human and Ecological Risk Assessment</i> 10: 875-921 Assignment 2. WOE and Hazard identification
September 5	Toxicology data sources Discussion: Superfund sites Readings: chapter 7 RAGs
September 10	Dose-response analysis, reference doses NOAELS/LOAELS Non-cancer endpoints/ Hazard quotient Assignment 3. Hazard quotients
September 12	Article 2: L. Morford et al, 2004. Hazard identification and predictability of children's health risk from animal data. <i>Environmental Health Perspectives</i> 112: 266-271. Readings: chapter 5 RAGS
September 17	Uncertainty factors Benchmark dose/ point of departure Assignment 4. BMDS/PODs
September 19	Article: W. Slikker et al, 2004. Dose-dependent transitions in mechanisms of toxicity. <i>Toxicology and Applied Pharmacology</i> 201: 203-235.
September 24	Carcinogen classification and guidelines (EPA/IARC/DHHS) Cancer Endpoints Excess cancer risk/hazard index Assignment 5. Excess cancer risk
September 26	Article: Gaylor, DW 2000. New issues in cancer risk assessment. <i>Drug Metabolism Reviews</i> 32: 187-192. Discussion: Superfund sites : Cancer endpoints
October 1	Exposure measurement Readings: chapter 6 RAGs Assignment 6. Exposure assessment
October 3	Exposure models Readings: EPA Guidelines Exposure Assessment
October 8	Chemical mixtures Mode of action Discussion: Superfund sites: chemical mixtures
October 10	<b>Midterm Exam</b>
October 15	Clean up standards Assignment 7. Soil clean up standards

October 17	Article: R. Maddalena et al, 2004. Standardized approach for developing probabilistic exposure factor distributions. <i>Risk Analysis</i> 24: 1185-1199 Readings: chapter 8 RAGs
October 22	Probabilistic RA models Monte Carlo simulations Assignment 8. Monte Carlo analysis
October 24	No class Homecoming
October 29	Lead risk assessment Assignment 9. IEUBK lead model
October 31	Discussion: Superfund sites Risk models
November 5	Vapor Intrusion Modeling Article: Hers et al, 2003. Evaluation of the Johnson and Ettinger model for prediction of indoor air quality. <i>Ground Water Monitoring and Remediation</i> 23: 62-76. Assignment 10. Vapor intrusion model
November 7	Risk characterization Article: Article: RW Setzer and C. Kimmel, 2003. Use of NOAEL, benchmark dose, and other models for human risk assessment of hormonally active substances. <i>Pure and Applied Chemistry</i> 75: 2151-2158. Homework 11. Risk Characterization
November 12	Florida Superfund sites – Risk characterization
November 14	Biomonitoring Article: Castorina et al, 2003. Cumulative organophosphate pesticide exposure and risk assessment among pregnant women living in an agricultural community: a case study from the CHAMACOS Cohort. <i>EHP</i> 111: 1640-1648.
November 19	PBPK modeling Article: J. Dorne and A. Renwick, 2005. The refinement of uncertainty/safety factors in risk assessments by the incorporation of data on toxicokinetic variability in humans. <i>Toxicological Sciences</i> 86: 20-26. Readings: chapter 4 RAGs
November 21	Microbial RA
November 26-28	No class - Thanksgiving
December 3	Risk Communication Application of RA to Risk Management Readings: Chapter 9 RAGs
December 14	<b>Final Exam</b>