

Occupational Injury Epidemiology

OEHS 7720

Instructors: Matthew S. Thiese, PhD, MSPH Office Hours by appointment 801.581.3322

Date and Time: Tuesdays, 11:00 a.m. to 12:45 p.m.

Location: RMCOEH

Pre-requisite Courses: Applied Occupational Biostatistics [OEHS](#) 6000
Occupational Epidemiology [OEHS](#) 6370
Fundamentals of Industrial Hygiene [OEHS](#) 6750
Ergonomics [MEEN](#) 6100
Or instructor consent

Required Text: **Research Methods in Occupational Epidemiology.** Second Edition. Checkoway H, Pearce N, Kriebel D (Ed). Oxford:London, 2004 ISBN 0-19-852861-2

Exposure Assessment in Occupational and Environmental Epidemiology.
Nieuwenhuijsen MJ (Ed.) Oxford:London, 2003. ISBN 0-19-509242-2

Optional Reading: **Field Epidemiology.** Second Edition. Gregg MB (Ed). Oxford:London, 2002. ISBN 0-19-514259-4

Handbook of Epidemiology. Ahrens W, Pigeot I (Eds). Springer:Bremen 2005.
ISBN 3-540-00566-8

Modern Epidemiology. Second Edition. Rothman K, Greenland S. Lippencott Williams, & Wilkins:Philadelphia 1998. ISBN 0-316-75780-2

Methods in Observational Epidemiology. 2nd Ed. Kelsy JL, Whittemore AS, Evans AS, Thompson WD. Oxford:New York, 1996. ISBN 0-19-508377-6

Goals: Acquire, integrate and apply advanced methods in occupational injury epidemiology to different types of occupational injury research problems. Gain knowledge of epidemiological principles, methods and quantitative techniques used in occupational injury studies. Refine critical analytical skills necessary to develop, maintain and refine occupational injury prevention research programs. Develop an appreciation for the strengths and limitations of occupational epidemiology studies. Over the semester, students will develop a complete research proposal, including biosketch, modular budget, hypothesis(es), research strategy and planned enrollment table, in an approved and applicable SF242 or PHS 398 format for submission after completion of the course.

Learning Objectives:

Introduction and Characterizing the Workplace Environment (Checkoway, Chapter 1-2)

1. Define Occupational Epidemiology
2. Distinguish Occupational Injuries from Occupational Diseases and Disorders
3. Recall the initial step in an investigation of possible hazards of work
4. List of the important distinctions between occupational and non-occupational epidemiological investigations
5. Critique an Occupational Injury study's methods

Overview of Study Designs & Precision and Validity in Study Design (Checkoway Chapter 3-4)

6. Differentiate respective strengths and weaknesses of epidemiologic study designs
7. Distinguish relative applications of epidemiologic study designs
8. Interpret measures of precision for different study designs
9. Able to identify and control for common types threats to epidemiologic study validity
10. Address threats to specific to each student's proposed research and study design

Occupational Injury Epidemiology: Exposure I

11. Characterize the ideal injury epidemiology exposure methods
12. Differentiate the most common exposure methods in OI studies from those of the ideal
13. Identify cumulative exposure metrics
14. Recognize that most industry studies commence with assessments of the hazards
15. Identify sources for exposure reconstructions
16. Know the steps to develop a Job Exposure Matrix (JEM)
17. Compare and contrast various job exposure methods

Cohort Studies & Introduction to Exposure Assessment (Checkoway Chapter 5, Nieuwenhuijsen Chapter 1)

18. Critique different study designs and proposals relative to exposure assessment methods
19. Compare and contrast the various screening tests discussed by the USPSTF for diseases discussed in class.
20. Be familiar with the USPSTF recommended screening programs.
21. Identify high risk populations for diseases discussed in class.
22. Recite the limitations of the screening tests.
23. Recall the most common preventable causes of disease and death in the U.S. by total population and by age group.
24. State the characteristics of a good surveillance system.
25. Know the characteristics of diseases that result in improved surveillance system performance.
26. Identify the best disease prevention strategies for different demographic groups.
27. Be able to calculate sensitivity, specificity, positive predictive value, and negative predictive value and interpret them.
28. For each "exposure" (e.g. lipids/tobacco), recall associated disorders, screening tests and interventions.
29. For categories (e. g., CAD, Infectious Diseases), know risk factors, screening tests and interventions.

Questionnaires & Personal Exposure Monitoring (Checkoway Chapter 2,5)

30. Identify the strategies to target your audience including motivators, and identifying type of decision maker
31. Demonstrate priority setting process in an environment of limited resources.

32. Know the definitions of morbidity, mortality, and compression of morbidity.
33. Identify key assumptions used in decision analysis and modeling
34. Perform Harms-Benefit decision analyses and understand the concepts of probabilities, decision tree process, number needed to treat, sensitivity analysis, utilities, and effectiveness.
35. Perform Cost-Effectiveness analyses: demonstrate an understanding of the measures of health effect such as Quality Adjusted Life Years, and know the concepts of various types of costs (i.e. opportunity, direct, indirect, incremental, total), cost effectiveness ratios, incremental cost effectiveness ratios, discounting (value of time), and cost shifting
36. Define the concept of Cost-Benefits

Occupational Health Surveillance

37. Define occupational health surveillance.
38. Select injuries, illnesses and diseases characteristics that are most ideal for the purposes of occupational health surveillance.
39. Distinguish strengths and limitations of occupational health surveillance systems compares with public health surveillance systems.
40. Compare and contrast the strengths and limitations of infectious diseases surveillance versus musculoskeletal disorders.

Special Applications of Occupational Injury Epidemiology

41. Identify key steps in meta-analyses studies.
42. Know strengths and weaknesses of risk assessment methods.

Field Investigations of Occupational Disease and Injuries

43. Reiterate communication-related key concepts involving companies, workers, unions, insurers and others.
44. Identify how access to workplaces may differ based upon the problem presented, the organization doing the investigation and jurisdictional issues.
45. Compare and contract investigations of known and unknown etiologies.
46. Identify the NIOSH published method to determination of work-relatedness of disease

Critiquing Occupational Injury Epidemiological Studies

47. Refine critical analysis skills for the review of occupational injury epidemiology studies
48. Write two critiques of occupational injury epidemiology studies.

Develop Occupational Injury Epidemiology Research Proposal Writing Skills

49. Write a precise, focused, testable occupational injury epidemiology hypothesis.
50. Draft an occupational injury epidemiology survey instrument.
51. Compose a SF242 or PHS 398 proposal, including budget, targeting the occupational injury epidemiology hypothesis.
52. Defend the study design and research plan.

**Occupational Injury Epidemiology
DFPM 7720; Spring Semester 2020**

<u>Date</u>	<u>Session and Topic</u>	<u>Readings</u>
January 19	Class Overview Introduction Characterizing the Workplace Environment Homework #1 Assigned <u>Due: Jan 26</u>	Checkoway Chapt 1-2
January 26	Literature Review and summarization Guidelines and systematic reviews Overview of Study Designs Precision and Validity in Study Design Homework #2 Assigned <u>Due: Feb 2</u> Homework #3 Assigned <u>Due: Feb 19</u>	Checkoway Chapt 3-4 Homework #1 <u>Due</u>
February 2	Cohort Studies Introduction to Exposure Assessment	Checkoway Chapt 5 Nieuwenhuijsen Chapt 1 Homework #2 <u>Due</u>
February 9	Questionnaires Personal Exposure Monitoring	Nieuwenhuijsen Chapt 2,5
February 16	Exposure and Dose Modeling Analysis and Modeling of Personal Exposure	Checkoway Chapt 10 Nieuwenhuijsen Chapt 6

February 23	Exposure methods related to Occupational Injury Epidemiology Retrospective Exposure Assessment Exposure Surrogates	Nieuwenhuijsen Chapt 7-8
March 2	Biological Monitoring Exposure Measurement Error: Consequences and Design Issues	Nieuwenhuijsen Chapt 11-12 Homework #3 <u>Due</u>
March 9	Case-Control Studies	Checkoway Chapt 6
March 16	Cross-sectional and Repeated Measures Studies	Checkoway, Chapt 7
March 23	Statistical Methods in Occupational Injury Epidemiological Studies	Checkoway, Chapt 9 Nieuwenhuijsen, Chapt 6
March 30	Occupational Injury Epidemiology Topics	
April 6	Occupational Health Surveillance Special Applications of Occupational Epidemiology	Checkoway Chapt 8,11 **Proposals Due
April 13	Allergen exposure and Occ. Asthma Particulate matter	Nieuwenhuijsen, Chapt 13-15.
April 20	Proposal Presentations and Defenses Field Investigations of Occupational Disease and Injury Pesticides in Cancer Epidemiology Radiofrequency Exposure and Cancer	Nieuwenhuijsen, Chapt 16-17. Field Epidemiology, Chapt 17 ACOEM Practice Guidelines: Determination of Work-Relatedness
April 27	FINAL EXAM	

*This is a tentative schedule that may be revised based upon various additions/ subtractions, guest lecture(s), etc.

Course Content: This course is designed to cover up-to-date material on occupational injury epidemiology. As this is a graduate course, it is expected that knowledge gained will include both that which is known as well as unknown. A major goal is the conceptualization and writing of a research proposal that incorporates methods learned in the course of this class.

Office Hours: Drs. Thiese's offices are in Suite C of the Rocky Mountain Center for Occupational and Environmental Health at 391 Chipeta Way. We welcome unannounced visits, and will promptly adjust my schedule provided I have the time at that moment. However, as things are fairly busy, you may find it preferential to set up an appointment with me before/after class. You may also e-mail me to set up an appointment at matt.thiese@hsc.utah.edu. My office phone number is 801-587-3322.

Grading: This course will be graded as follows.

- 5% Homework Assignment #1 (Journal article critique #1)
- 5% Homework Assignment #2 (Journal article critique #2)
- 10% Homework Assignment #3 (Questionnaire and Assessment Development)

- 40% Study Design Assignment—**Due April 1, 2020.** An R01 style proposal that seeks to test one focused occupational injury hypothesis. The hypothesis should be well focused, addressing a current occupational injury epidemiology problem, and should be an area of interest to the student. The subject matter should be discussed with the Course Director prior to commencing. The one page goal/hypothesis/objectives/aims should be turned into the Course Director for review by August 30 prior to writing the proposal. The proposal should follow PHS 398 guidance, such as Arial 11 font, margins requirements, etc. The expected length is 12-15 pages, but the maximum length allowable is 15 pages not including the references. A grant application from the Course Director is suggested to be used as a template.

This study design should be entered on the PHS 398 form. It should have the following organizational structure (approximate length):

1. Budget pages (one year, years 2-5 and justification)
2. Goal, Hypothesis, Objectives and Aims (1 page)
3. Background, referenced (2-3 pages)
4. Preliminary Studies (if there are data you have access to, that is great. If not, it is not required. However, at a minimum, you must then include two to three paragraphs describing what specific data you would like to have for this proposal. Note that such preliminary data are often obtained by pilot project studies.)
5. Study Design and Research Plan (minimum of 7 pages)
6. Statistical Analyses (1-3 pages)
7. Human subjects or animal studies considerations, as appropriate
8. References (length as required)
9. Questionnaire (from Assignment #3)

10% Study Design Presentations and Defense

30% Final

100%

Grading criteria are as follows:

A	94.0-100%
A-	90.0-93.9
B+	87.0-89.9
B	83.0-86.9
B-	80.0-82.9
C+	77.0-79.9
C	73.0-76.9
	etc.

**I reserve the right to adjust the scores (i.e., curve).

Course Evaluation

Evaluation methods include participation in discussions, graded examinations, and graded group assignments. Dismissal from a course and/or the college can result from unprofessional behavior. Final letter grades for the course will be based on the rubric in the DNP Student Handbook.

Americans with Disabilities Act

ADA Policy: The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in this class, reasonable prior notice need to be given to the instructor and the Center for Disability Services, (801) 581-5020 (Voice or TDD; located in 162 UNION) to make arrangements for accommodations. All written information for this course can be made available in the alternative format with prior notification. Passing the TOEFL test indicates readiness to take courses at the University of Utah.

University of Utah Student Code

All students are expected to maintain professional behavior in the classroom setting, according to the Student Code, spelled out in the Student Handbook. Students have specific rights in the classroom as detailed in Article III of the Code. The Code also specifies proscribed conduct (Article XI) that involves cheating on tests, plagiarism, and/or collusion, as well as fraud, theft, etc. Students should read the Code carefully and know they are responsible for the content. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors, and I will do so, beginning with verbal warnings and progressing to dismissal from class and a failing grade. Students have the right to appeal such action to the Student Behavior Committee.

Online Guidelines

There are unique responsibilities that come with taking a course having an online component.

Electronic or equipment failure: It is your responsibility to maintain your computer and other equipment needed to participate in online forums in a manner that enhances your experience. Equipment failures will not be an acceptable excuse for late or absent assignments or quizzes.

Classroom equivalency: Online communications, including e-mail, discussion threads, and chat rooms are equivalent to the classroom and are subject to the Student Code. Specifically:

- Posting photos or comments that would be off-topic in a classroom are still off-topic in a discussion thread.
- Off-color language is never appropriate.
- Using angry or abusive language is not acceptable.

- Do not use ALL CAPS, except for titles, since it is the equivalent of shouting online, as is overuse of certain punctuation marks such as exclamation points !!!! and question marks ?????.
 - Online communications, including e-mail in Canvas, are University property and subject to GRAMA regulations. Privacy regarding Canvas communications must not be assumed unless mutually agreed upon in advance.
 - As with assignments, instructors are required to respond to e-mails in a “reasonable” amount of time. Use the e-mail address posted in this syllabus as the preferred means of communication. Note that content may be shared with the class when there are valid teaching/learning reasons for doing so and mutual privacy agreements for the communications have not been previously made.
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