

WORK ORGANIZATION EPIDEMIOLOGY

PH 2998/ 1498

3 credits

Time: Thursdays 3 pm to 6 pm

Room: E - 605

Course Instructor:

Benjamin C. Amick III, PhD

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Focus and Objectives of Course

Work organization determines the distribution of three important sets of risk factors - psychological work conditions, social work conditions and biomechanical work conditions. This course will introduce students to various approaches to understanding the psychological/social and biomechanical risk factors with special emphasis on cardiovascular disease, musculoskeletal injuries and quality of working life.

The course will provide students with the opportunity to be involved in the collection and analysis of work organization risk factor data. Students will be required to state hypotheses and test the hypothesis using data. Students will be required to present the results.

Learning Objectives

A. Cognitive Competencies:

1. Ability to critically read and comment on work organization research articles.
2. Ability to integrate knowledge about the social, psychological aspects of work and the physical aspects of work into a broader concept of work organization.
3. Ability to integrate knowledge about work organization epidemiology into occupational and environmental public health practice.
4. Ability to understand the research process from asking questions to making formal presentations.

B. Skill Competencies:

1. Ability to apply a social and behavioral science perspective to analyze an occupational or environmental health issue.

2. Ability to make oral presentations.
3. Ability to develop a work organization survey.
4. Ability to work on a team-based task to complete a project.
5. Ability to conduct a risk analysis
6. Ability to work in STATA
7. Ability to conduct a reliability analysis
8. Ability to conduct an ergonomic analysis of an office job
9. Ability to prepare a Committee for the Protection of Human Subjects (CPHS) application

Course Organization, Format, and Requirements

The course is a lecture format with individual presentations. Each session will be 3 hours with a 15-minute break. The majority of the classes will be divided equally between lecture and group discussion. The course requirements are:

1. Regular class attendance, familiarity with reading assignments, and class participation demonstrating knowledge of readings.
2. Completion of all homework assignments.
3. Participation in class research project. Students will develop a research paper describing a research hypothesis with a literature review supporting the hypothesis. The paper should focus on a specific exposure and present background information on the relationship of the exposure to musculoskeletal injury, how the exposure is measured, the reliability and validity of the measurements. A risk analysis should be presented by using the data collected in a survey designed by the class.
4. Students will be required to make several presentations summarizing their research findings.
5. Grades will be determined as follows:
 - Class Participation: 20%
 - Class Presentations and Homework Assignments: 20%
 - Research Project: 40%
 - Presentation: 20%

REQUIRED TEXTBOOKS

1. Thomas W. Mangione, Mail Surveys/Improving the Quality (Applied Social Research Methods, Vol. 40), Sage Publications (October 1995) ISBN: 0803946635
2. Thomas D. Cook, Donald T. Campbell, Quasi-Experimentation – Design & Analysis Issues for Field Settings, Rand McNally College Publishing Company, Chicago (1979) ISBN 528-62053-3
3. Berggren, C. Alternatives to Lean Production – Work Organization in the Swedish Auto Industry, ILR Press: Ithaca, NY, 1992, ISBN 0-87546-193-X

4. Ben Hamper, Rivethed - Tales from the Assembly Line, Warner Books, ISBN 0-446-39400-9

BOOKS ON RESERVE

1. Berggren, C. Alternatives to Lean Production – Work Organization in the Swedish Auto Industry, ILR Press: Ithaca, NY, 1992, ISBN 0-87546-193-X
2. Ben Hamper, Rivethed - Tales from the Assembly Line, Warner Books, ISBN 0-446-39400-9
3. S. D. Moon and S. L. Sauter, Beyond Biomechanics – Psychological aspects of musculoskeletal disorders in the office work, Taylor & Francis (1996) ISBN 0-7484-0322-1
4. Don A. Dillman, Mail and Internet Surveys – The Tailored Design Method, Second Edition, John Wiley & Sons, Inc (2000) ISBN 0-471-32354-3
5. National Research Council, Institute of Medicine, Musculoskeletal disorders and the work place – Low Back and upper extremities

NOTE: All articles are either available online or are on reserve in the library.

COURSE OUTLINE

FALL:

Aug 29 - Class 1: Introduction and Course Review

Lecturer: Ben Amick

In the first half of this class, we will review the course outline and discuss the basic design and purpose of the course. In the second half of the class, Dr. Amick will present the prior students' presentations to the Dean and Dr. Emery to provide a vision of the goal of the course.

Sep 5 - NO CLASS

Sep 12 - Class 2: What is Work Organization?

Lecturer: Ben Amick

The purpose of this class is to begin to conceptualize work organization as a phenomenon of study. You will be exposed to current state-of-art thinking from the National Institute of Occupational Safety and Health (NIOSH) regarding priority work organization research areas. In addition, you will read non-epidemiological materials on work organization to broaden your conceptualization of exposures and ways to think about exposure.

Required Readings:

NIOSH NORA paper- *The changing organization of work and the safety and health of working people – Knowledge gaps and research directions*, Department of Health and

Human Services, Centers for disease control and prevention, National Institute of Occupational Safety and Health, DHHS (NIOSH) Publication No. 2002-116

Available online at <http://www.cdc.gov/niosh/pdfs/02-116.pdf>

One of the following books:

1. Berggren, C. Alternatives to Lean Production – Work Organization in the Swedish Auto Industry, ILR Press: Ithaca, NY, 1992, ISBN 0-87546-193-X
2. Ben Hamper, Rivthead - Tales from the Assembly Line, Warner Books, ISBN 0-446-39400-9

Assignment:

Choose one of the two books listed above that talk about work organization. Read the book and come prepared to class to answer the following questions.

1. How do you define work organization?
2. What are the key elements of work organization that may affect health?
3. How might you measure work organization exposures?
4. What are the public health implications of studying work organization?
5. Thinking about the ‘new economy’, is there anything missing about work organization from your book that you think is important to public health? Why?
6. Draw a picture of what you think is important about work organization in affecting health status.

Collect the answers to these questions in a 5 – 7 page book review. You may use the NIOSH NORA work organization paper in support of your review.

Sep 18 - Class 3: Work Organization in Epidemiology: Historical perspectives (*Please note that the class meets on Wednesday, Sep. 18; no class on Thursday, Sep. 19*)

Lecturer: Ben Amick

Required Readings:

Benjamin C. Amick III and Olov Östberg **Office Automation, Occupational Stress and Health – A literature analysis with specific attention to expert systems** *Office Technology and People*, 3 (1987) 191- 209

Chapter 1 (Pages 1 to 15) Introduction and Theory from **Job Demands and Worker Health – Main effects and occupational differences** US Department of Health, Education, and Welfare, Public Health Service, Center for Disease Control, National Institute for Occupational Safety and Health (NIOSH) April 1975 DHEW (NIOSH) Publication No. 75-160

Michael J. Smith and Dennis B. Beringer, Chapter 7.1 Human Factors in Occupational Injury Evaluation and Control from Handbook of Human Factors, Edited by Gavriel Salvendy , Wiley-Interscience, ISBN: 0 471-88015-9

Benjamin C. Amick III and David D. Celentano **Human factors Epidemiology: An integrated approach to the study of health issues in office work** *Human Aspects of Office Automation*, edited by B.G.F. Cohen Elsevier Science Publishers B.V., Amsterdam – Printed in the Netherlands ISBN 0-444-42327-3

James S. House and James A. Wells, Chapter 1. Occupational Stress and Health. NIOSH Proceedings, Reducing Occupational Stress US Department of health, education and welfare. DHEW (NIOSH) Publication No. 78-140

Sep 26 - Class 4: Models of Work Organization and Health

Lecturer: Ben Amick

In the previous class, we confronted a broad notion of work organization. However, not all aspects of work organization may be relevant to health. In this class, we begin to decompose work organization into constituent elements and examine how they are related to health. The lecture will illustrate the effect of technological change on work organization and health. During this class, we will start our research teams for the ongoing investigation of UT-HSC worker health and safety.

Required Readings:

Grant D. Huang, Michael Feurstein and Steven L. Sauter, 2002 Occupational Stress and Work- Related Upper Extremity Disorders: Concepts and Models, *American Journal of Industrial Medicine* 41: 298- 314. Available online.

S. D. Moon and S. L. Sauter, Beyond Biomechanics – Psychological aspects of musculoskeletal disorders in the office work, Taylor & Francis (1996) ISBN 0-7484-0322-1 Chapters 1, 2 and 4

Chapter 1: S.L. Sauter and N.G. Swanson, *An Ecological Model of Musculoskeletal Disorders in Office Work*, Page 3-23

Chapter 2: M.J. Smith and P. Carayon, *Work Organization, Stress, and Cumulative Trauma Disorders*, Page 23-43

Chapter 4: T.Theorell, *Possible Mechanisms Behind the Relationship Between the Demand-Control-Support Model and Disorders of the Locomotor System*, Page 65-75

Recommended Readings:

Benjamin C. Amick III & David D. Celentano (1991), Structural determinants of the psychosocial work environment: introducing technology in the work framework, *Ergonomics*, Vol. 34. No. 5, 625-646

Class Assignment:

During class, we will identify the work organization exposures each person will be responsible for, throughout the course. Responsibilities include:

1. Writing a 5 page paper with
 - a) A review of the literature on the exposure of interest.
 - b) A series of hypotheses you will test in collecting data for UTHSC employees.
 - c) Information on the measurement properties of the exposure (e.g. reliability, validity, sensitivity, specificity).
2. Making sure the appropriate questions are asked in the survey.
3. Creating exposure measures and doing analysis of data.
4. Making presentation to Dr. Emery and his staff and the Dean's office
5. Completing the Committee for the Protection of Human Subjects (CPHS) application.

Oct 3 - Class 5: Asking questions – How to build a survey?

Lecturer: Ben Amick

In this class, we will go over the issues of asking questions and designing surveys. Our goal is to develop specific knowledge about how best to ask questions and design a web-based survey. You are expected to use this knowledge in the development of the survey of UT-HSC workers.

Required Reading:

Thomas W. Mangione, *Mail Surveys/Improving the Quality* (Applied Social Research Methods, Vol. 40), Sage Publications (October 1995) ISBN: 0803946635

Recommended Reading:

Don A. Dillman, *Mail and Internet Surveys – The Tailored Design Method*, Second Edition, John Wiley & Sons, Inc (2000) ISBN 0-471-32354-3

Class Assignment:

Using the survey from last year, critique it from the perspective of:

1. How to ask questions (e.g., question wording and responses and how to design a questionnaire)
2. How to design a web-based survey (e.g. white space, question order)
3. How to provide informed consent

Come prepared to class to discuss your comments. Mark up a hard copy of the questionnaire with your comments that you hand in.

Oct 10 - Class 6: Issues of Validity

Lecturer: Ben Amick

In this class, we will discuss issues of construct validity, concurrent validity, and predictive validity and discriminant validity.

Required readings:

Chapter 2 - *Validity*, Page 39 – 95 from Thomas D. Cook, Donald T. Campbell, Quasi-Experimentation – Design & Analysis Issues for Field Settings, Rand McNally College Publishing Company, Chicago (1979) ISBN 528-62053-3

Homework Assignment:

For the specific exposure you have elected to focus on, review the literature on validity of the exposure. In reviewing the literature, please attend to information on differences between self-report and observational exposure assessment. In addition, consider exposure intensity and duration with respect to initiating pathological changes

This paper should be 3-5 pages long with additional pages for references.

Oct 17 - Class 7: Issues of Reliability

Lecturer: Ben Amick

Required Reading:

Title: Alpha – Cronbach's alpha Pages 19 – 24 from STATA Manual, Stata Corporation, ISBN 1-881228-48-7

Homework Assignment:

For the specific exposure you have elected to focus on, review the literature on the reliability of the exposure assessment methodology. Pay particular attention to internal consistency and test – retest reliability. Write 1-2 pages with additional pages for references.

In addition, using the data collected by students two years ago, conduct a reliability analysis of the specific exposure. If your exposure is new then choose another scale. Attached is an example of a reliability analysis done in STATA. You are expected to hand in a STATA log as evidence of completing the assignment. In this log, you should include comments on what you conclude about the scale's reliability.

Oct 24 - Class 8: Psychosocial work organization exposures, Karasek Demand/Control, Siegrist Effort/Reward

Lecturer: Ben Amick

In this class, we review the two dominant models for understanding psychosocial work organization: The Karasek Demand/Control model and the Siegrist Effort/Reward model.

Required Readings:

Bosma H, Peter R, Siegrist J, Marmot MG (1998). Two Alternative job stress models and the risk of coronary artery disease. *American Journal of Public Health* 1998; 52:540-7

Theorell, T., & Karasek R.A. (1996). Current Issues Relating to Psychosocial Job Strain and Cardiovascular Disease Research, *Journal of Occupational Health Psychology* 1, 9-26

Siegrist, J. (1996). Adverse health effects of high-effort/low reward conditions. *Journal of Occupational Health Psychology* 1, 27-41

Recommended Readings:

Siegrist J, Peter R, Junge A, Cremer P, Seidel D. Low status control, high effort at work and ischemic heart disease: prospective evidence from blue-collar men. *Soc Sci Med* 1990; 31: 1127 – 34

Karasek R.A (1979). Job demands, job decision latitude and mental strain: Implications for job redesign. *Administrative Science Quarterly*, 24, 285-308

Theorell T, Karasek R. The demand-control- support model and CVD. In: Schnall PL, Belkic K, Landsbergis P, Baker D, eds. *The Workplace and Cardiovascular disease*. Occupational Medicine. Philadelphia: Hanley & Belfus, 2000

Stanislav V. Kasl (1996), The Influence of the Work Environment on Cardiovascular Health: A Historical, Conceptual, and Methodological Perspective, *Journal of Occupational Health Psychology*, Vol., No. 1, 42-56

Class Assignment:

Come prepared to class to discuss how the demand-control-support model and the effort / reward model contribute to our understanding of work organization. Specifically,

1. What elements of work organization are measured?
2. What is missing?
3. Are these measures of work or the individual?

You may refer to the recommended readings to help in understanding the models.

Homework Assignment:

Hand in your first draft of the paper describing your research question. Include a figure similar to the one you did for Class 2, but now focused on your specific exposure and outcome. It is imperative that you have a clear and testable hypothesis. Furthermore, make sure that you describe how the exposure “gets under the skin” or at least “into the mind”. Also, use the information from the materials you prepared for the validity and reliability classes to discuss your exposure measure.

Oct 31 - Class 9: Psychosocial exposures – Main effects or effect modifiers

Lecturer: Ben Amick

Required readings:

Hallqvist J, Diderichsen F, Thorell T, Reuterwall C, Ahlbom A, SHEEP study group. Is the effect of job strain on myocardial infarction due to interaction between high psychological demands and low decision latitude? Results from the Stockholm Heart Epidemiology Program (SHEEP). *Soc Sci Med* 1998; 46: 1405 – 15

Steven L. Sauter, Joseph J. Hurrell Jr., and Cary Cooper, Job Control and Worker Health, John Wiley & Sons (1989) ISBN 0-471-92355-9 Chapters 1 and 8

Chapter 1: Daniel C. Ganster, Worker Control and Well-being: A Review of Research in the Workplace, Page 3-25

Chapter 8: Stanislav V. Kasl, An Epidemiological Perspective on the Role of Control in Health, Page 161-191

Homework Assignment:

Conduct the following analysis of the dataset (www.....com)

1. Do a logistic regression estimating the main effects of job demands and job control on work related musculoskeletal injuries. Include VDT exposure as a main effect. Calculate odds ratio.
2. Do a logistic regression estimating the interaction of job demands and job control along with the main effects. Calculate odds ratio likelihood rate.
3. Do an effect modification analysis for job control modifying the effect of job demands. Calculate an odds ratio and synergy index.
4. Same as above, but use VDT instead of job demands.
5. Do this in STATA and bring the log to class to hand in.
6. Bring the completed CPHS document to class for review and signatures.

Nov 6 - Class 10: NIOSH lifting standard (*Please note that the class meets on Wednesday, Nov.6*)

Lecturer: Lawrence Schultz

You will be handed the CPHS document for the prior class, student responsibilities to get this done for our current survey.

Assignment: Take IRB exam. Please visit <http://oac.hsc.uth.tmc.edu/orsc/cphs.htm>

Nov 14 - Class 11: Biomechanical exposures

Lecturer: Ben Amick

Required Readings:

J. Steven Moore (2002) Biomechanical Models for the Pathogenesis of Specific Distal Upper Extremity Disorders, *American Journal of Industrial Medicine Supplement 2:1- 18* (2002). Available online.

National Research Council, Institute of Medicine, Musculoskeletal disorders and the work place – Low Back and upper extremities, Page 85 - 286

Nov 21 - Class 12: Biomechanical Exposures continued

Lecturer: Ben Amick

Nov 28 - NO CLASS – THANKSGIVING

Dec 5 - Class 13: RULA and CPHS talk by Paula Knudson

Lecturers: Ben Amick

Paula Knudson

Homework: All students must bring to class their IRB certificates to show Ms. Knudson. Be prepared to respond to Ms. Knudson's question about the research protocol the class submitted to CPHS

SPRING:

Jan 16 - Class 14: Office Ergonomics. RULA

Lecturer: Ben Amick

Jan 23 – Class 15: Psychosocial exposures in offices and musculoskeletal injuries

Lecturers: Ben Amick

Cindy Bihm

In this class, we focus our attention on psychosocial work organization and musculoskeletal injuries. We do this to set the stage for integrating psychosocial and biomechanical work organization exposures. In addition, since our survey is primarily about office workers, this is an appropriate focus.

In class, we will discuss our CPHS application and the work that needs to be done to complete it.

Required Readings:

Paulien M. Bongers, Anja M. Kremer and Jolanda ter Laak (2002) Are psychological risk factors for symptoms and signs of the shoulder, elbow, or hand / wrist: A review of the epidemiological literature, *American Journal of Industrial Medicine Supplement 2:1 – 28*. Available online.

Recommended Readings:

Fredric Gerr, Michele Marcus, Cindy Ensor, David Kleinbaum, Susan, Cohen, Alicia, Edwards, Eileen Gentry, Daniel J. Ortiz and Carolyn Monteilh (2002) A Prospective Study of Computer Users: I. Study Design and Incidence of Musculoskeletal symptoms and disorders. *American Journal of Industrial medicine* 41:221 – 235 (2002) Available online.

Chapter 16 - *Cumulative Trauma Disorder Research: Methodological Issues and Illustrative Findings from the Perspective of Psychosocial Epidemiology* by Kasl Stanislav and B.C. Amick from S. D. Moon and S. L. Sauter, Beyond Biomechanics – Psychological aspects of musculoskeletal disorders in the office work, Taylor & Francis (1996) ISBN 0-7484-0322-1S.V

Homework Assignment:

Come prepared to discuss the role of psychosocial exposures in musculoskeletal injuries. In particular, determine how much you agree with each of the following statements

1. Psychosocial exposures act as effect modifiers of main biomechanical exposures and don't cause musculoskeletal injuries
2. Psychosocial exposures are main effects causing musculoskeletal injuries

Be prepared to support your argument with evidence. You may wish to read Kasl and Amick (Chapter 16, Moon and Sauter) as well as the Marcus paper.

Jan 30 - Class 16: Social relationships in health

Required readings:

J. S. House, D. Umberson, K. R. Landis, Structures and Processes of Social Support *Annual Review of Sociology*, Vol. 14. (1988), pp. 293-318.
Available online

Feb 6 - Class 17: Harassment in the work place

Lecturer: Ben Amick

In this class, we will review forms of workplace harassment and their relationship to health outcomes.

Required readings:

Rospenda K.M. (2002) Workplace Harassment, Services Utilization, and Drinking Outcomes. *Journal of Occupational Health Psychology*, 7, 141-155

Feb 13 - Class 18: Putting it all together for office work

Lecturer: Ben Amick

In this class, we will try to consider both psychological and biomechanical exposures and how they combine to create work organization exposures. We will focus on office work since this is where we will collect data.

Required Readings:

Fredric Gerr, Michele Marcus, Cindy Ensor, David Kleinbaum, Susan, Cohen, Alicia, Edwards, Eileen Gentry, Daniel J. Ortiz and Carolyn Monteilh (2002) A Prospective Study of Computer Users: I. Study Design and Incidence of Musculoskeletal symptoms and disorders. *American Journal of Industrial medicine* 41:221 – 235. Available online

Feb 20 - Class 19: Putting it all together for manufacturing work

Required readings:

Kerr MS. Frank JW. Shannon HS. Norman RW. Wells RP. Neumann WP. Bombardier C. Ontario Universities Back Pain Study Group. Biomechanical and psychosocial risk factors for low back pain at work. *American Journal of Public Health*. 91(7): 1069-75, 2001 Jul.

Feb 27 - Class 20: Data Management in STATA

Mar 6 - No class – SPRING BREAK

Mar 13 - Class 21: Reliability Assessment / Factor Analysis

Homework: Complete reliability assessment for measures used in the Survey.

Mar 20- Class 22: Class time used for group to work together.

Mar 27 - Class 23: Exposure Outcome Assessment

Apr 3 - Class 24: Estimating risk or assessing cost

Apr 10 - Class 25: Class time for continued questions and answers.

Apr 17 - Class 26: Practice Presentation

Apr 24 - Class 27: Presentation to Dr. Emery

In this class, students will make a presentation to Dr. Emery, Director of Environmental Health and Safety for UTH-HSC and his staff.

May 1 - Class 28: Presentation to the Dean

In this class, students will make a presentation to the Dean of SPH