PhD course:
Quantitative exposure assessment in occupational epidemiology

Aim
The objective of this PhD course is to familiarise participants to modern statistical methods for analyses of exposure data, in order to improve exposure effect analyses in occupational and environmental epidemiological studies. The teaching goal is to train the participants, so they are able to evaluate literature on the topic and to perform basal analyses themselves after the course

Time and place
Sunday 18 June 2023 17.00 PM - Friday 23 June 2023 14.00 PM. The Sandbjerg Estate - Aarhus University Conference Centre, Sandbjergvej 102, 6400 Sønderborg, Denmark

Lectures
- Vivi Schlünssen (VS), Department of Public Health, Aarhus University, DK
- Prof Alex Burdorf (AB), Department of Public Health, Erasmus MC, Rotterdam, NL
- Dr Susan Peters (SP), Institute for Risk Assessment Sciences, Utrecht University, NL
- Ass. prof Annett Dalbøge (AD), Department of Occupational Medicine, Aarhus University Hospital, DK
- Prof Henrik Kolstad (HK), Department of Occupational Medicine, Aarhus University Hospital, DK Prof
- Prof Esben Budtz-Jørgensen (EBJ), Department of Public Health Science, Copenhagen University, DK
- Researchers working within the field from Danish Ramazzini Centre: www.ramazzini.dk

Participants
Participants who have followed the basic PhD course in epidemiology or a similar course. It is expected that participants are familiar with logistic and linear regression analysis and are familiar with STATA.

Course director
Vivi Schlünssen and Annett Dalbøge

After the course, the participants will be able to:

- Understand basic concept of exposure and exposure variability
- Understand the theory of bias and random error, within and between person variability, and attenuation of exposure-response
- Perform random effect analyses to estimate determinants of exposure and understand implications for within and between person variability
- Understand the construction and applications of Job Exposure Matrices for exposure assessment
- Based on the above skills, be able to design exposure assessment strategies for different types of exposure in occupational and environmental studies
- Evaluate advantages and drawbacks for different exposure metrics in epidemiological studies

Literature and software

- Burdorf A. Identification of determinants of exposure: consequences for measurement and control strategies. Occup Environ Med. 2005 May; 62(5):344-50. Review
- Peters S. Although a valuable method in occupational epidemiology, job-exposure matrices are no magic fix. Scand J Work Environ Health 2020; 46(3):231-234. Editorial
- Nieuwenhuijsen, MJ, editor. Exposure assessment in occupational and environmental epidemiology. Oxford University Press 2003, ISBN 0-19-852861-2
- We will use STATA version 14. All syntax/code will be presented in STATA. 14 days before the course we provide the participants with the commands we use

Form and Language

The course is interactive with substantial student participation in lectures, participants' presentation of own projects, groups exercises and recaps every morning. The course language is English.

Fee and how to apply

Course fee: **DKK** 2,719.00 is for:

- PhD students enrolled at partner universities of the Nordoc collaboration
- PhD students from other institutions in the open market agreement for PhD courses Non-PhD students
- Participation in the course is **without cost** for: PhD students, Research Year students and Research Honors Programme students from Aarhus University

Application deadline: 10 April 2023

Application: https://au.phd-courses.dk

Program for 18 June – 23 June 2023

DAY 1, 18 JUNE: ARRIVAL

17.00 - 17.45 Arrival, registration
18.00 - 19.30 Dinner
20.00 - 20.15 Informal get together
20.15 - 21.00 Presentation and discussion of participants own projects

DAY 2, 19 JUNE: BASICS

09.00 - 09.30 Welcome and introduction to the course (VS)
09.30 - 10.00 An example: What you will be able to do after the course (AB)
Presentation of the dataset to be used during the whole course (VS)
10.00 - 10.45 Concepts and definitions of exposure (dose, exposure, exposure windows, and exposure variability) (SP)
11.00 - 11.30 Exposure metrics (e.g. current, average, cumulative, and peak exposure) (AD)
12.00 - 13.00 Lunch
13.30 - 14.30 Exposure assessment concepts, from simple questionnaires, through JEMs to individual profiles in epidemiological studies (SP)
14.30 - 16.30 Group exercise 1: Concepts and definitions
18.00 - 19.30 Dinner
20.00 - 21.00 Presentation and discussion of participants own projects

DAY 3, 20 JUNE: EXPOSURE VARIABILITY AND JEMS

08.30 - 09.30 Recap and presentation of results from group exercise 1
09.30 - 10.30 Variance components (within worker, between worker, and between group) (AB)
10.45 - 11.30 Examples from real life: Quantitative JEMs: various agents - various health outcomes (VS)
12.00 - 13.00 Lunch
13.30 - 14.30 How to judge a JEM? (EBJ)
14.30 - 16.15 Group exercise 2: How to make you own JEM
16.30 - 17.30 Presentation and discussion of participants' own proj*ect*
18.00 - 19.30 Dinner

DAY 4, 21 JUNE: GROUP BASED EXPOSURE ASSESSMENT; RANDOM AND MIXED EFFECT MODELS

08.30 - 09.30 Recap and presentation of results from group exercise 2
09.30 - 10.45 Individual and group based exposure assessment: Classical vs. Berkson error (AB)
11.00 - 12.00 Group exercise 3: Statistical tools in exposure assessment - Part 1
12.00 - 13.00 Lunch
13.30 - 14.30 Introduction to mixed effect exposure models (SP)
14.30 - 16.30 Group exercise 3: Statistical tools in exposure assessment - Part 2
18.00 - 19.30 Dinner
20.00 - 21.00 Presentation and discussion of participants' own project

DAY 5, 22 JUNE: EXPOSURE IN HEALTH STUDIES

08.30 - 09.30 Recap and presentation of results from group exercise 3
09.30 - 10.15 Epidemiological designs: an example (AD)
10.30 - 11.30 Epidemiological designs: an example (HK)
12.00 - 13.00 Lunch
13.30 - 14.15 Exposure assessment in different epidemiological designs for various outcomes (VS)
14.15 - 15.45 Group exercise 4: Exposure in health studies
16.00 - 22.00 Social event and dinner

DAY 6, 23 JUNE: EXPOSURE ASSESSMENT IN THE FUTURE

08.30 - 09.30 Recap and presentation of results from group exercise 4, recap for exercises 1-3 Short
09.30 - 10.15 Presentations of participants own projects - implementation of course input Exposure assessment - further perspectives - Part 1
10.30 - 11.30 Presentations of participants own projects - implementation of course input Exposure assessment - further perspectives - Part 2
12.00 - 13.00 Lunch
13.00 - 14.00 Summary and evaluation including course examination and departure