



McGill

Department of Epidemiology, Biostatistics and Occupational Health
Département d'épidémiologie, biostatistique et santé au travail

EPIB 603-001 Intermediate Epidemiology (Winter Session 2020)

DESCRIPTION: This is a second level epidemiologic methods course with an emphasis on critical thinking, research design, quantitative analysis, and reproducible research methods. Topics covered include study design, statistical inference, causality, confounding, effect measure modification, analysis of biases, and regression modeling. Course content will be presented through a combination of lectures and computer laboratory sessions. Recommended statistical software is R.

INSTRUCTOR:

Dr. James Brophy (james.brophy@mcgill.ca)
Office location: MUHC (CORE) 5252 Boul. de
Maisonneuve West Room 2B.37
Office hours (TBD confirm by email)
Website: <https://www.brophyj.com>
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TEACHING ASSISTANTS (TAs):

Stephen Kutcher Stephen.kutcher@mail.mcgill.ca
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DAY/TIME:

Lectures: Tuesday/Thursday (11:35 – 12:55)
Labs: Mondays (8:30 – 10:00)

LOCATION:

Lectures: Education 129
Labs: Education 211 / 624
The purpose of the lab is to provide hands-on experience in coding and to introduce reproducible analyses of epidemiologic data. Active participation in the lab is crucial for your success in the course and most importantly in reaching your long-term career objectives. To facilitate teaching, the class will be divided into 2 lab sessions (same time). You must stay in the same lab sessions for the whole semester.

OFFICE HOURS:

Each TA will hold one office hour per week. Days and times will be posted on myCourses. The TAs are your first point of contact for questions regarding course material. Dr. Brophy is available immediately following class or by appointment.

SUGGESTED TEXTBOOKS:

There is no one official textbook that covers all the material for this course. The following text, used by many other institutions as their “go to” intermediate epidemiology book, does cover most of the topics that will be covered (notable exceptions being causal inference and quantitative bias analysis).
SzkloM, Nieto FJ. *Epidemiology: Beyond the Basics* (4th edition). Burlington, Mass: Jones & Bartlett, 2018.

Additional readings providing more depth in certain areas will be regularly posted on the course website on MyCourses. For example, “*Applying quantitative bias analysis to epidemiological data*” by Lash and colleagues will supplement the corresponding lecture. NB. Both these books are available in electronic formats from the library.

LEARNING OBJECTIVES:

The purpose of this course is to allow students to develop their skill set as both consumers and producers of the epidemiologic literature. “Intermediate” epidemiology means we will delve deeper into many of the concepts introduced to you in your introductory epidemiology course. In keeping with the philosophy of “life-long learning”, in addition to mastering the structured formal lectures and laboratory assignments, you are encouraged to be self-directed learners deepening your knowledge base as required by your personal needs.

By the end of the course students can expect to:

- Understand and critically evaluate basic study designs and statistical inferences in epidemiology
- Understand, identify, and quantitatively evaluate sources of bias in epidemiologic studies
- Master quantitative techniques for visualizing, cleaning, analyzing and interpreting epidemiologic data, including descriptive analyses, stratified analyses, regression analyses and meta-analyses.



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STUDENT ASSESSMENT:

- **Homework: 60%** There will be 6 homework assignments, each handed out one week prior to the due date. Submit Lab exercise in groups of 2 using R Markdown in RStudio.
- **Mid-term Exam: 20%** The mid-term exam will be given on Tuesday, February 25. The exam will be a mixture of short answer and multiple choice.
- **Final Exam: 20%** The final exam will be given on the last day of classes, Thursday, April 11. The exam is cumulative (though most of the emphasis will be on the latter half of the course) and will be a mixture of short answer and multiple choice.

EXPECTATIONS REGARDING COMMUNICATION

This is a large course and providing individual attention can be challenging. While we will do our best to answer individual email questions, this may sometimes not be the most efficient procedure. For this reason, you are strongly encouraged to attend office hours to ask questions in person. Responses to frequently asked questions may be posted on the myCourses discussion board and teaching assistants may direct you to that resource.

The instructor and teaching assistants will make every effort to respond to emails within 48 hours of receipt. Emails received after 5:00pm and on weekends will be treated as through received on the following business day.

NOTICE REGARDING ACADEMIC INTEGRITY AND PLAGIARISM

McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see www.mcgill.ca/students/srr/honest/ for more information).

L'université McGill attache une haute importance à l'honnêteté académique. Il incombe par conséquent à tous les étudiants de comprendre ce que l'on entend par tricherie, plagiat et autres infractions académiques, ainsi que les conséquences que peuvent avoir de telles actions, selon le Code de conduite de l'étudiant et des procédures disciplinaires (pour de plus amples renseignements, veuillez consulter le site www.mcgill.ca/students/srr/honest/)

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Lecture schedule (TENTATIVE)

Date	Lecture #	Topic
Tues, Jan 07	1	Intro/course overview
Thurs, Jan 9	2	Reproducible research: Avoiding research waste
Tues, Jan 14	3	Exploratory Data Analysis - data visualization
Thurs, Jan 16	4	Non-experimental designs & incidence measures
Tues, Jan 21	5	Statistical inference - part 1
Thurs, Jan 23	6	Statistical inference - part 2
Tues, Jan 28	7	Measures of association & attributable risk
Thurs, Jan 30	8	Causal inference
Tues, Feb 4	9	Confounding
Thurs, Feb 06	10	Effect Measure Modification & interaction (1)
Tues, Feb 11	11	Effect Measure Modification & interaction (2)
Thurs, Feb 13	12	Stratification & adjustment
Tues, Feb 18	13	Overview of biases (selection and information)
Thurs, Feb 20	14	Quantitative bias analysis
Tues, Feb 25	15	MID TERM EXAM
Thurs, Feb 27	16	Poisson regression
Tues, Mar 03		READING WEEK
Thurs, Mar 05		READING WEEK
Tues, Mar 10	17	Survival analysis
Thurs, Mar 12	18	Propensity Scores
Tues, Mar 17	19	Instrumental variables
Thurs, Mar 19	20	Meta-analysis
Tues, Mar 24	21	Randomized clinical trials
Thurs, Mar 26	22	Randomized clinical trials (part 2) NI & novel designs
Tues, Mar 31	23	Pharmacoepidemiology
Thurs, Apr 02	24	Evidence based medicine / Guidelines
Tues, Apr 7	25	Health economics / ethics
Thurs, Apr 9	26	FINAL EXAM



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Homework schedule (TENTATIVE)

Homework	Date assigned	Date due	Assessments
#1	Jan 13 2020	Jan 20 2020	Data manipulation & visualization
#2	Jan 20 2020	Jan 27 2020	Introduction for Contingency Tables & Epi packages
#3	Feb 10 2020	Feb 17 2020	Confounding / Attributable Risk
#4	Feb 24 2020	Mar 10 2020	Poisson regression
#5	Mar 16 2020	Mar 23 2020	Survival analysis
#6	Mar 23 2020	Mar 30 2020	Meta-analysis

Laboratory schedule (TENTATIVE)

Session	Date	Topic
1	Jan 13 2020	Data manipulation / visualization
2	Jan 20 2020	Contingency Tables
3	Jan 27 2020	EpiR package / AR
4	Feb 3 2020	Confounding
5	Feb 10 2020	Effect measure modification
6	Feb 17 2020	Bias correction
7	Feb 24 2020	Poisson
	READING WEEK	
8	Mar 9 2020	Survival
9	Mar 16 2020	Propensity
10	Mar 23 2020	Meta-analysis
11	Mar 30 2020	IV / mediation
12	Apr 6 2020	Review