

COURSE EPIB 671: CANCER EPIDEMIOLOGY AND PREVENTION - 2018

Department of Epidemiology, Biostatistics, and Occupational Health, McGill University

COORDINATOR: Eduardo L. Franco (<http://tinyurl.com/McGill-EFranco>)

Dr Franco is James McGill Professor and Chairman, Gerald Bronfman Department of Oncology, and Director, Division of Cancer Epidemiology, Departments of Epidemiology & Biostatistics and Oncology, McGill University

CONTACT HIM AT: Email: eduardo.franco@mcgill.ca, Office phone: 514-398-6032. His office is at the address below, room 720A.

SCHEDULE FOR 2018: June 11, 13, 15, 18, 20, 22 (Mon/Wed/Fri), 26, 27, 28, 29 (Tue/Wed/Thu/Fri), 1:00 pm to 5:00 pm (Note: no class on June 25 because of the extended St-Jean Baptiste/Fete Nationale Day)

LOCATION: Seminar Room 740A (7th floor), Gerald Bronfman Department of Oncology, 5100 Maisonneuve Blvd West. This is the building immediately to the east of the Vendome Metro Station (same side of the street). Mapping directions here: <http://tinyurl.com/McGillOncology>

COURSE HISTORY

EPIB 671 is one of the longest running courses in the Faculty of Medicine, if not at McGill. It began as the cancer epidemiology component taught by Dr Franco in course 513-639 (Substantive Epidemiology) in 1989. It then became an independent 1-credit course in 1992 under the EPIB 641 rubric. In 2004, it was expanded into a 2-credit course as the rubric it retains today, EPIB 671. A further expansion to a 3-credit course was approved in 2017 for implementation on 2018. In 1997, two guest lecturers joined the course: Dr Mark Goldberg and Dr Parviz Ghadirian. They covered the topics of environment and occupation (Goldberg) and nutrition (Ghadirian) as cancer causes. Their lectures were given every year until 2011. Dr Franco continued as single lecturer in 2012-17 and is joined in 2018 by Drs. Laurent Azoulay, Scott Weichenthal, Claudie Laprise, Talía Malagón, and Michel Wissing as guest lecturers in the new 3-credit version of the course.

OBJECTIVES

- 1) To review key concepts concerning carcinogenic mechanisms with a view to formulating hypotheses for epidemiologic studies of cancer etiology and prognosis.
- 2) To review the knowledge on the occurrence and the causes of human cancers and the means for preventing them.
- 3) To examine the role of epidemiology in the study of cancer causes and in the evaluation of preventive strategies.

COURSE DESCRIPTION

The last five decades have witnessed enormous progress in the fight against cancer, much of which stemming from direct contributions from epidemiology. Since the advent of the case-control and cohort study designs in the 1950s and of the methods of regression modeling that provided the framework for population risk assessment in the 1970s and 1980s, cancer epidemiologists have provided much of the evidence for contemporary prevention strategies. These include the control of tobacco smoking globally and public and professional education concerning alcohol drinking, dietary practices, occupational and environmental exposures, and prevention of cancer-causing infections. In the 1980's, epidemiologic investigations that unveiled the protective role of specific dietary habits, such as fruit and vegetable consumption, have provided the rationale for large randomized intervention trials of chemopreventive strategies. Epidemiologists have also played a key role in the design and conduct of intervention trials and prospective studies of novel cancer screening tools, which helped to launch the era of evidence-based medicine.

The course will provide an overview of the common epidemiologic approaches to studying etiologic relations in carcinogenesis and for assessing the efficacy of cancer prevention interventions.

This course is intended for graduate students in epidemiology, oncology residents and fellows, and other health professionals who need an overview of the substantive and methodological contributions of epidemiology in cancer etiology and prevention.

PREREQUISITE: An introductory epidemiology or preventive medicine course at the graduate level or permission of the instructor.

CREDITS: Academic: 3, Continuing Medical Education (CME)/Continuing Professional Development (CPD): 39

COURSE FORMAT: Interactive lectures, student presentations, and discussion of articles via journal club style; exams with multiple-choice and essay-type questions.

GRADING: 10% for assiduity in attendance and in-class participation, 50% for the student presentation, 15% for mid-term exam, and 25% for the final exam.

TOPICS TO BE COVERED

- **Molecular and cellular basis of carcinogenesis**
- **Descriptive epidemiology:**
 - Burden of cancer: worldwide and Canada
 - International variations
 - Time trends in North America
- **Epidemiology vs. other approaches for evaluating carcinogenicity**
 - Experimental and epidemiologic approaches
 - Defining causality: the perspective of regulatory agencies
 - Corroboration of epidemiologic findings
 - Study designs (ecological, case-control, cohort, randomized controlled trial)
 - Measures of association (risk ratios, risk differences)
 - Attributable fraction
 - Common framework for identifying causes and prognostic factors
 - Causal inference (Bradford Hill's criteria, counterfactual)
 - Precision vs validity
 - Biases (confusion, information, selection)
 - Statistical testing & regression models
 - Interaction
 - Mediation
 - External validity
- **Causes of cancer: Paradigms and murky areas**
 - Lifestyle: Tobacco smoking
 - Dietary influences
 - Biological environment: infections
 - Carcinogenic effects of drugs, pharmacoepidemiology
 - Occupational and environmental exposures
- **Cancer prevention**
 - Primary: reducing the impact of risk factors; key studies
 - Secondary: the role of screening; interpreting biases
 - Tertiary: epidemiology helping to understand prognostic factors of survival

COURSE LECTURERS

Eduardo L. Franco: Course Coordinator and Main Instructor
Claudie Laprise: Lecturer (Methods 1)
Talía Malagón: Lecturer (Methods 2)
Michel Wissing: Lecturer (Causal paradigms 1)
Laurent Azoulay: Lecturer (Causal paradigms 2)
Scott Weichenthal: Lecturer (Causal paradigms 3)

BIBLIOGRAPHY (not compulsory but some entries are available freely in the Internet or in the course Dropbox folder)

General overviews:

- Canadian Cancer Society: Canadian Cancer Statistics 2018, Toronto, Canada, (and previous ones, all accessible as PDF documents from the Canadian Cancer Society's website): <http://www.cancer.ca/~media/cancer.ca/CW/cancer%20information/cancer%20101/Canadian%20cancer%20statistics/Canadian-Cancer-Statistics-2017-EN.pdf?la=en>
- Forman D, Bray F, Brewster DH, Gombe Mbalawa C, Kohler B, Piñeros M, Steliarova-Foucher E, Swaminathan R and Ferlay J eds (2013) Cancer Incidence in Five Continents, Vol. X (electronic version) Lyon, IARC (accessible as series of PDF files and custom statistics at the IARC website: <http://ci5.iarc.fr>).
- Bray F, Colombet M, Mery L, Piñeros M, Znaor A, Zanetti R and Ferlay J, editors (2017) Cancer Incidence in Five Continents, Vol. XI (electronic version). Lyon: International Agency for Research on Cancer. (accessible as series of PDF files and custom statistics at the IARC website: <http://ci5.iarc.fr>).
- Doll R, Peto R. The causes of cancer: Quantitative estimates of avoidable risks of cancer in the United States today. J. Nat. Cancer Inst. 66: 1191-1308, 1981. (historical reference; one of the most influential publications on cancer epidemiology)
- Doll R. Development of the epidemiology of cancer. In: Holland WW, Olsen J, Florey CV (Eds.). The development of modern epidemiology. Oxford University Press, 2007. ISBN-13: 9780198569541
- Franco EL, Duarte-Franco E, Rohan TE. Evidence-based policy recommendations on cancer screening and prevention. Cancer Detection and Prevention 26: 350-361, 2002.
- Franco EL, Rohan TE (eds.) Cancer Precursors: Epidemiology, Detection, and Prevention. Springer-Verlag, New York, 2002, 430 pages, ISBN 0-387-95188-1
- Franco EL. Epidemiology in the study of cancer. In: Bertino JR et al. (eds.), Encyclopedia of Cancer, Vol. 1. Academic Press, San Diego, 1997 (pp. 621-641).
- Franco EL, Correa P, Santella RM, Wu X, Goodman SN, Petersen GM. Role and limitations of epidemiology in establishing a causal association. Semin Cancer Biol. 2004;14:413-26.
- Schottenfeld D, Fraumeni J (Eds.). Cancer epidemiology and prevention. 3rd edition, Oxford University Press, New York, 2006.
- World Cancer Research Fund / American Institute for Cancer Research. Food, Nutrition, Physical Activity, and the Prevention of Cancer: a Global Perspective. Washington DC: AICR, 2007 (continued as the 'Continuous Update Project findings & reports' at <https://www.wcrf.org/int/continuous-update-project/continuous-update-project-findings-reports>)

Websites that provide descriptive cancer epidemiology information used in the course:

International Agency for Research on Cancer: <http://www-dep.iarc.fr/>

US National Cancer Institute's Surveillance Epidemiology and End Results: <http://seer.cancer.gov/>

American Cancer Society: http://www.cancer.org/docroot/stt/stt_0.asp

North American Association of Central Cancer Registries: <http://www.naaccr.org/DataandPublications/CINAPubs.aspx>

Canadian Cancer Society Statistics: <http://www.cancer.ca/en/cancer-information/cancer-101/canadian-cancer-statistics-publication/?region=qc>

ARTICLES FOR JOURNAL CLUB DISCUSSION IN CLASS WITH RESPECTIVE TOPICS TO BE ILLUSTRATED:

The dilemmas of the epidemiologic approach:

Taubes G. Epidemiology faces its limits. Science 1995;269:164-169 (and letters to the editor that followed) (although it appeared more than 20 years ago this article captures well the perceptions that the public and other biomedical scientists have about epidemiologic research; many of the issues that are discussed refer to cancer epidemiology dilemmas) (if you are interested in further writings from this author read his NY Times essay at: <http://www.nytimes.com/2007/09/16/magazine/16epidemiology-t.html?scp=1&sq=Gary+Taubes&st=nyt>)

Using mediated analysis to infer causal and prognostic relations:

Schiffman MH, Bauer HM, Hoover RN, et al. Epidemiologic evidence showing that human papillomavirus infection causes most cervical intraepithelial neoplasia. *JNCI* 1993;85:958-64.

Du M, Kraft P, Eliassen AH, Giovannucci E, Hankinson SE, De Vivo I. Physical activity and risk of endometrial adenocarcinoma in the Nurses' Health Study. *Int J Cancer*. 2014;134(11):2707-16.

Hybrid studies using ecologic level variables:

Gorey KM, Holowaty EJ, Fehringer G, Laukkanen E, Moskowitz A, Webster DJ, Richter NL. An international comparison of cancer survival: Toronto, Ontario, and Detroit, Michigan, metropolitan areas. *Am J Pub Hlth* 1997; 87:1156-1163. (a study guide is available in the course materials)

Confounding effects:

Farvid MS, Cho E, Chen WY, Eliassen AH, Willett WC. Dietary protein sources in early adulthood and breast cancer incidence: prospective cohort study. *BMJ*. 2014 Jun 10;348:g3437. doi: 10.1136/bmj.g3437

Effect modification:

Han J, Colditz GA, Hunter DJ. Risk factors for skin cancers: a nested case-control study within the Nurses' Health Study. *Int J Epidemiol*. 2006 Dec;35(6):1514-21.

COURSE HANDOUTS

Feel free to download course handouts (reading materials, slides sets, study guides) in the course link below. Visit this folder frequently to get updates and new added by the instructors:

https://www.dropbox.com/sh/t1xuricsxx6d1hy/AADS7uJBrZ1DDQw_gcSZJe0Na?dl=0

STUDENT PRESENTATIONS:

One session will be devoted to the student presentations. Please heed the following rules for the choice of topic and style of presentations:

1) Presentations must be in the theme of "cancer epidemiology and prevention". Examples of acceptable topics include: geographical or temporal variation and determinants of cancer burden, overview of a particular proven or proposed etiologic factor (or of classes of related factors, e.g., diet, occupation, infections, etc.); overview of the technology for screening of any given cancer; overview of preventive strategies; methodological issues on general interest. It would be acceptable to present on one's own work or research if it fits into this topic.

2) It must be an overview of a pertinent topic or a particular problem that can use epidemiologic approaches. If in doubt, check with the course coordinator to verify the appropriateness of the theme.

3) It must NOT be a presentation of a single article, as in a typical journal club. However, it would be acceptable to present on a particular problem raised by one or more studies, provided that the presentation will elaborate in more depth about the problem or state of controversy;

4) It must NOT be about cancer therapy only;

5) The presentation should be viewed as if the student had been invited to give an authoritative talk on the chosen theme to an audience of peers at a national or international conference;

6) Presentations must be done in the allotted time (10 minutes but it could vary depending on the class size) with an extra 2-5 minutes allowed for questions;

7) Golden rule: not more than one slide per minute; a typical 10 minute presentation should have 10 slides or less, not counting the cover slide and the acknowledgments or bibliography slide at the end;

8) Credit the source in every slide that shows content that was copied or transcribed from a scientific article or website. Adding a bibliography at the end is useful but does not replace the need for placing credits (references to articles or websites) in individual slides. Make sure the audience sees the difference between content that is your contribution and that which came from others;

9) PowerPoint slide sets must be emailed to the instructor at least 24 hs before the presentation day so that he may make suggestions for revisions; the final version will need to be uploaded to the computer ahead of time.

MID-TERM AND FINAL EXAMS:

The mid-term exam will include several exclusively multiple-choice questions. The final exam will have two parts: a selection of multiple choice questions and a take-home essay of 500 words that is supposed to be returned by email within 7 days of the last day of class.

MCGILL UNIVERSITY'S POLICIES AND STATEMENTS

On language of instruction and evaluation:

"In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded." "Conformément à la Charte des droits de l'étudiant de l'Université McGill, chaque étudiant a le droit de soumettre en français ou en anglais tout travail écrit devant être noté. »

On academic integrity:

"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 <http://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/) »

Please keep in mind the above when preparing your presentations. You must give credit to the sources of illustrations and data, citations to previous work, or statements that you make in your presentation slides and when writing the exam.

On course materials:

"Instructor-generated course materials (e.g., handouts, notes, summaries, exam questions, etc.) are protected by law and may not be copied or distributed in any form or in any medium without explicit permission of the instructor."

On physical and other disabilities:

"If you have a disability please contact the instructor to arrange a time to discuss your situation. It would be helpful if you contact the Office for Students with Disabilities at 514-398-6009 before you do this."

Other rights of students:

Additional policies governing academic issues which affect students can be found in the McGill Charter of Student's Rights and Responsibilities (on-line at <http://www.mcgill.ca/deanofstudents/rights/>).

On course evaluations:

"End-of-course evaluations are one of the ways that McGill works towards maintaining and improving the quality of courses and the student's learning experience. You will be notified by e-mail when the evaluations are available. Please note that a minimum number of responses must be received for results to be available to students."

On a historical note:

"McGill University is on land which has long served as a site of meeting and exchange amongst Indigenous peoples, including the Haudenosaunee and Anishinabeg nations. We acknowledge and thank the diverse Indigenous people whose footsteps have marked this territory on which peoples of the world now gather." « L'Université McGill est sur un emplacement qui a longtemps servi de lieu de rencontre et d'échange entre les peuples autochtones, y compris les nations Haudenosaunee et Anishinabeg. Nous reconnaissons et remercions les divers peuples autochtones dont les pas ont marqué ce territoire sur lequel les peuples du monde entier se réunissent maintenant. »