MDSC 415 Introduction to Epidemiology

Course Coordinator and Instructor:

Aliya Kassam, PhD Associate Professor, Department of Community Health Sciences Cumming School of Medicine, University of Calgary <u>kassama@ucalgary.ca</u>

Office Hours/Policy on Answering Student Emails

Please book appointments by email. Email communications with the instructor and the TA are welcome. All efforts will be made to respond to emails within 48 hours. Substantive issues are to be addressed in person, either in class or during an appointment.

Teaching Assistant:

Shelly Yin MSc. Student, Population and Public Health <u>shelly.yin@ucalgary.ca</u>

Time and Location:

Tuesdays & Thursdays 3:30pm – 4:45pm Please see D2L for location Foothill Campus Please consult course schedule to confirm location of individual sessions.

Prerequisite/Co-Requisite:

Enrolment in the Bachelor of Health Science (BHSc.) program and MDSC 308 or consent from the course instructor.

Course Description:

An introduction to the basic concepts of epidemiology needed to understand and critically analyze research pertaining to health and disease in populations. Methods used in descriptive and analytic epidemiological studies, including the design, analysis, and interpretation of results for observational studies and clinical trials will be discussed. Case studies and contemporary events will be used to illustrate epidemiology in action and to highlight the social aspects of applying epidemiology in public health.

Overarching Theme

Students will be introduced to the basic principles of epidemiological research and examples of sub-disciplines within Epidemiology, which may include Social Epidemiology, Infectious Disease Epidemiology, Cancer Epidemiology and Genetic Epidemiology. This course has been designed to

provide students with opportunities to build epidemiological and research literacy and to practice and refine skill sets, including written responses and critical analysis of published research.

Global Objectives

To foster enthusiasm and interest in epidemiology in an interactive classroom environment that is positive, engaging and intellectually challenging.

Course Learning Outcomes

By the end of this course, students will be able to:

1. Illustrate the interplay between epidemiology and population and public health using examples.

2. Define and correctly use epidemiological terms and vocabulary.

3. Discuss disease causation, statistical associations, and causal inference.

4. Calculate and interpret measures of disease frequency and cite their strengths and limitations.

5. Identify sources of bias and confounding in epidemiological research.

6. Discuss the design and methodology of each of the observational study designs and identify the strengths and limitations of each.

7. Identify, estimate, and interpret the appropriate measures of association for each of the observational study types.

8. Critically analyze health research, particularly observational research on human populations.

Transferable Skill Development:

Many of the skills and abilities that you are developing in your coursework are transferable to the workforce, graduate and professional studies and other facets of life. Employers seek applicants with transferable skills because they can be an asset in the workplace, regardless of industry or sector. Transferable skills are core skills for your success in building your future career.

The work that you will do in MDSC 415 will help you build the following transferable skills:

- **Collaboration**: Work respectfully with others from different backgrounds, cultures, and countries.
- **Verbal Communication**: Learn and share information by presenting, listening, and interacting with others.
- **Critical Thinking**: Actively and skillfully conceptualize, apply, analyze, synthesize, and/or evaluate information (data, facts, observable phenomena, and research findings) to make a reasoned judgement or draw a reasonable conclusion.
- **Numeracy**: Use mathematical information such as numbers, symbols, words, and graphics to do tasks.
- Written Communication: Share ideas and information by using words, images, and symbols.

Learning Resources

Gordis, L. Epidemiology, 6th Edition. (2018). Philadelphia: Elsevier Saunders. This required textbook is available for purchase from the University of Calgary Medical Bookstore. There is also a digital version that is appropriate for this course.

The list of required reading, including links to sources beyond the textbook, will be posted on D2L.

Recommended Textbooks/Readings

A Dictionary of Epidemiology, 6th Edition. (2014). Porta, M (editor). New York, NY; Oxford University Press.

A Note regarding readings

A list of required readings will be outlined on D2L and links and documents will be made available, where possible. Required readings have been chosen carefully to inform you and enhance the lecture material. **Students are REQUIRED to complete assigned readings BEFORE each lecture.** Instructors will proceed in class on the assumption that students have read completely the assigned readings. Students should be aware that many of the readings they will be assigned may be of an unfamiliar nature and style. Students should allot sufficient time to allow for several reads of the assigned material.

Learning Technology Requirements

Brightspace (by D2L) is located on the University of Calgary server and will be used extensively for communication with students. It is the student's responsibility to ensure that they receive all posted communications and documents and that they receive emails sent by instructors or fellow students through D2L.

Only your @ucalgary.ca email address may be linked to D2L. Please ensure that you are regularly checking your @ucalgary.ca account.

A laptop, desktop, tablet or mobile device is required for D2L access. If you need help accessing or using D2L, please visit the Desire2Learn resource page for students: http://elearn.ucalgary.ca/d2l-student/.

Evaluation

The University policy on grading and related matters is described in section F of the 2023-2024 Calendar.

Evaluation Activity	Percentage of Grade	Due Date	Learning Objectives Addressed
Critical analysis assignment #1	15%	February 15, 2024	#1, #2, #4
Critical analysis assignment #2	20%	March 26, 2024	#2, #5, #6, #7, #9
Critical analysis assignment #3	20%	April 9, 2024	#2, #3, #5, #7, #8, #9
Class participation	10%	Ongoing	all
Final exam	35%	Scheduled by the Registrar	all

In determining the overall grade in the course, the following weights will be used:

A Note regarding Writing Assignments:

Writing skills are important to academic study in all disciplines. In keeping with the University of Calgary's emphasis on the importance of academic writing in student assignments (section E.2 of 2023-24 Calendar), writing is emphasized, and the grading thereof in determining a student's mark in this course. The Bachelor of Health Sciences values excellence in writing. Competence in writing entails skills in crafting logical, clear, coherent, non-redundant sentences, paragraphs, and broader arguments, as well as skills with the mechanics of writing (grammar, spelling, punctuation). Sources used in research papers must be properly documented. The University of Calgary offers instructional services through the Students' Success Centre's Writing Support Services (http://www.ucalgary.ca/writingsupport/) for students are **strongly encouraged** to take advantage of these programs.

Grading Scheme:

Letter Grade	Description	Percentage
A+	Outstanding performance	96-100
Α	Excellent performance	90-95.99
A-	Approaching excellent performance	85-89
B+	Exceeding good performance	80-84
В	Good performance	75-79
В-	Approaching good performance	70-74
C+	Exceeding satisfactory performance	65-69
С	Satisfactory performance	60-64
C-	Approaching satisfactory performance	57-59
D+	Marginal pass	54-56
D	Minimal pass	50-53
F	Does not meet course requirements	0-49

Missed Components of Term Work:

Late assignments will receive 20% grade penalty within 24 hours of the deadline, after which assignments will not be accepted and will receive a mark of zero.

As per University Calendar Section G.1.2, students who are absent from an in-class assessment will receive a mark of zero on the missed component. Students who are absent are responsible for contacting their instructor to discuss the impact of their missed assessment. The instructor may ask for supporting documentation to confirm an absence. Alternative opportunities for completing missed assessments or shifting of the assessment weight may be possible but are not guaranteed. Students who are identified as falsifying information related to missed assessments will be subject to investigation for academic misconduct.

Extensions will NOT be granted on any assignment in MDSC 415. The only exceptions to this are those in keeping with the University Calendar (debilitating illness, religious conviction, or severe domestic affliction) that are received in writing and with supporting documentation. Traffic jams and late or full buses are common events in Calgary and are NOT acceptable reasons for late arrivals to class, meetings, and examinations. Please note that while absences are permitted for religious reasons, students are responsible for providing advance notice and adhering to other guidelines on this matter, as outlined in the University Calendar (https://www.ucalgary.ca/pubs/calendar/current/e-4.html).

Course Evaluations and Student Feedback

Student feedback will be sought at the end of the course through the UCalgary Course Experience Survey and a qualitative student evaluation. Students are welcome to discuss the process and content of the course at any time with the instructor. Students may also address any concerns they may have with Dr. Fabiola Aparicio-Ting, Associate Dean (Undergraduate Health and Science Education) in the Cumming School of Medicine (feaparic@ucalgary.ca).

Attendance

It is important that you make every effort to attend all sessions since much of the learning in this course will be gained through in-class discussions. Marks for participation cannot be gained unless you are in attendance. Please notify the instructor directly via email for any extended absences.

Conduct During Lectures

The classroom should be respected as a safe place to share ideas without judgement - a community in which we can all learn from one another. Students are expected to frame their comments and questions to lecturers in respectful and appropriate language, always maintaining sensitivity towards the topic. Students, employees, and academic staff are also expected to demonstrate behaviour in class that promotes and maintains a positive and productive learning environment.

As members of the University community, students, employees and academic staff are expected to demonstrate conduct that is consistent with the University of Calgary Calendar, the Code of Conduct and Non-Academic Misconduct policy and procedures, which can be found at https://www.ucalgary.ca/student-services/student-conduct/policy.

Students are expected to take notes during class and should not rely solely on material supplied by the instructors. Instructors may or may not post lectures notes to D2L, at their individual discretion. Instructors may cover concepts or examples in class that may not be posted to D2L but may be assessed.

Use of Internet and Electronic Communication Devices in Class

The Bachelor of Health Sciences program aims to create a supportive and respectful learning environment for all students. The use of laptop and mobile devices is acceptable when used in a manner appropriate to the course and classroom activities. However, research studies have found that inappropriate/off-topic use of electronic devices in the classroom negatively affects the learning of others during class time.

Students are responsible for being aware of the University's Internet and email use policy, which can be found at https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Acceptable-Use-of-Electronic-Resources-and-Information-Policy.pdf.

Use of Artificial Intelligence Tools

Generative Artificial Intelligence (AI), and specifically foundational models that can create writing, computer code, and /or images using minimal human prompting includes not only GPT-4 (and its siblings ChatGPT and Bing), but many writing assistants that are built on this or similar AI technologies.

Students may use artificial intelligence tools, including generative AI, in **MDSC 415** as learning aids or to help produce assignments. However, **students are ultimately accountable for the work they submit.** Students may choose to use generative artificial intelligence tools as they work through the assignments in this course; this use must be documented in an appendix for each assignment. The documentation should include what tool(s) were used, how they were used, and how the results from the AI were incorporated into the submitted work. Failure to cite the use of AI generated content in an assignment/assessment will be considered a breach of academic integrity and subject to Academic Misconduct procedures.

UNIVERSITY OF CALGARY POLICIES AND SUPPORTS

Copyright

All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright (<u>https://www.ucalgary.ca/legal-services/university-policies-procedures/acceptable-use-material-protected-copyright-policy</u>) and requirements of the Copyright Act (<u>https://laws-lois.justice.gc.ca/eng/acts/C-42/index.html</u>) to ensure they are aware of the consequences of unauthorized sharing of course materials (including instructor notes, electronic versions of textbooks, etc.). Students who use material protected by copyright

in violation of this policy may be disciplined under the Non-Academic Misconduct Policy <u>https://www.ucalgary.ca/pubs/calendar/current/k.html</u>.

Instructor Intellectual Property

Course materials created by instructors (including course outlines, presentations and posted notes, labs, case studies, assignments, and exams) remain the intellectual property of the instructor. These materials may **NOT** be reproduced, redistributed, or copied without the explicit consent of the professor. **The posting of course materials to third party websites such as note-sharing sites without permission is prohibited**. Sharing of extracts of these course materials with other students enrolled in the course *at the same time* may be allowed under fair dealing.

Academic Accommodations

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The Student Accommodations policy is available at https://ucalgary.ca/student-services/access/prospective-students/academic-accommodations. Students needing an accommodation based on disability or medical concerns should contact Student Accessibility Services (SAS) in accordance with the Procedure for Accommodations for Students with Disabilities (https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf). SAS will process the request and issue letters of accommodations for students with disabilities, visit www.ucalgary.ca/access/).

Students who require an accommodation in relation to their coursework based on a protected ground other than disability should communicate this need in writing to Dr. Fabiola Aparicio-Ting (feaparic@ucalgary.ca), Associate Dean, Undergraduate Health and Science Education.

Academic Misconduct

The University of Calgary is committed to the highest standards of academic integrity and honesty. The University of Calgary has created rules to govern all its members regarding the creation of knowledge and the demonstration of knowledge having been learned.

Academic Misconduct refers to student behaviour that compromises proper assessment of a student's academic activities and includes (but is not limited to): cheating, fabrication, falsification, plagiarism, unauthorized assistance, failure to comply with an instructor's expectations regarding conduct required of students completing academic assessments in their courses, and failure to comply with exam regulations applied by the Registrar. It also includes using of third party websites/services to access past/current course material, essay/assignment writing services, or real-time assistance in completing assessments, seeking answers to assessment questions and similar, whether paid, bartered or unpaid.

For information of the Student Academic Misconduct Policy and Procedures, please visit; <u>https://www.ucalgary.ca/legal-services/university-policies-procedures/student-academic-misconduct-policy</u>.

Additional information is available on the Academic Integrity website at: <u>https://ucalgary.ca/student-services/student-success/learning/academic-integrity</u>.

Recording of Lectures

Audio or video recording of lectures (or similar) is **prohibited** except where explicit permission has been received from the instructor.

Freedom of Information and Protection of Privacy Act

Student information will be collected in accordance with typical (or usual) classroom practice. Students' assignments will be accessible only by the authorized course faculty. Private information related to the individual student is treated with the utmost regard by the faculty at the University of Calgary

Appeals

If there is a concern with the course, academic matter or a grade, first communicate with the instructor. If these concerns cannot be resolved, students can proceed with an academic appeal, as per Section I of the University Calendar. Students must follow the official reappraisal/appeal process and may contact the Student Ombuds' Office (<u>http://www.ucalgary.ca/student-services/ombuds</u>) for assistance with this and with any other academic concerns, including academic and non-academic misconduct. Students should be aware that concerns about graded term work may only be initiated **within 10 business days** of first being notified of the grade. https://www.ucalgary.ca/pubs/calendar/current/i-2.html

Sexual and Gender-Based Violence Policy

The University recognizes that all members of the University Community should be able to learn, work, teach and live in an environment where they are free from harassment, discrimination, and violence. The University of Calgary's sexual violence policy guides us in how we respond to incidents of sexual violence, including supports available to those who have experienced or witnessed sexual violence, or those who are alleged to have committed sexual violence. It provides clear response procedures and timelines, defines complex concepts, and addresses incidents that occur off-campus in certain circumstances. Please see the policy available at https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Sexual-and-Gender-Based-Violence-Policy.pdf.

Resources for Support of Student Learning, Success, Safety and Wellness

Student Success Centre	http://www.ucalgary.ca/ssc/
Student Wellness Centre	http://www.ucalgary.ca/wellnesscentre/
Student Advocacy and Wellness Hub (CSM)	https://cumming.ucalgary.ca/mdprogram/current-
students/student-advising-wellness	
Distress Centre	http://www.distresscentre.com/
Library Resources	http://library.ucalgary.ca

Wellness and Mental Health Resources

The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and

supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the excellent mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the UCalgary Wellness Centre (https://www.ucalgary.ca/wellness-services/services/mental-health-services) and the Campus Mental Health Strategy (http://www.ucalgary.ca/mentalhealth/).

Student Ombuds' Office

The Student Ombuds' Office supports and provides a safe, neutral space for students. For more information, please visit <u>www.ucalgary.ca/student-services/ombuds/</u> or email ombuds@ucalgary.ca

BHSc Student Faculty Liaison Committee (SFLC)

The BHSc SFLC, with elected representatives from all majors, serves to raise issues of interest to BHSc students to the program administration, including items pertaining to curriculum, scheduling and events. A list of current representatives can be found on the BHSc website.

Student Union (SU) Information

The SU Vice-President Academic can be reached at (403) 220-3911 or suvpaca@ucalgary.ca; the SU representatives for the Cumming School of Medicine can be reached at medrep1@su.ucalgary.ca or medrep2@su.ucalgary.ca.

Student Success Centre

The Student Success Centre provides services and programs to ensure students can make the most of their time at the University of Calgary. Our advisors, learning support staff, and writing support staff assist students in enhancing their skills and achieving their academic goals. They provide tailored learning support and advising programs, as well as one-on-one services, free of charge to all undergraduate and graduate students. For more information visit: https://www.ucalgary.ca/student-services/student-success

Emergency Evacuation/Assembly Points

As part of the University of Calgary Emergency Evacuation plan, students, faculty, and staff should locate the closest Assembly Point in case of Fire Alarm. Safety signage is posted throughout the campus showing the locations and the possible route to these locations. All students, faculty, and staff are expected to promptly make their way to the nearest Assembly Point if the Fire Alarm is activated. No one is to return into campus facilities until an all clear is given to the warden in charge of the Assembly Area. For more information, see <u>https://www.ucalgary.ca/emergencyplan/building-evacuation/assembly-points</u>

Safewalk

Campus security will escort individuals, day or night, anywhere on campus (including McMahon Stadium, Health Sciences Centre, Student Family Housing, the Alberta Children's Hospital and the University LRT station). Call 403-220-5333 or visit

http://www.ucalgary.ca/security/safewalk. Use any campus phone, emergency phone or the

yellow phone located at most parking lot pay booths. Please ensure your personal safety by taking advantage of this service.

Class Schedule

Please see the list of topics for class, associated readings, and assignment / exam due dates in the document entitled Course_Schedule_MDSC_415W24. Please note that unforeseen circumstances may cause changes to the schedule with respect to the timing of topics and readings. Students will be notified of all changes in a timely manner by way of email and D2L announcements. The assignment and exam dates are firm and will not be altered.

Important Dates:

- Winter term break: February 18-24, 2024 (no classes; no assignments due)
- First day of classes: Monday January 8; last day of classes: Tuesday, April 9
- Good Friday: March 29, 2024 (no classes)
- Easter Monday: April 1, 2024 (no classes)
- Registrar-scheduled final exam period: April 12-23, 2024

MDSC 415: Introduction to Epidemiology Course Schedule with Required Readings

The following schedule is provisional. Circumstances could give rise to scheduling changes. You will be notified at least one week in advance if the required reading for a particular session has changed.

Date & Room	Торіс	Required Readings*/Assignments
January 9, 2024	Course Overview	Course Outline -Posted on D2L
See D2L for		
location		
January 11, 2024	Historical Overview & Basic	
See D2L for location	Definitions	
January 16, 2024	Infectious Disease	Chapter 2 The Dynamics of Disease
See D2L for	Epidemiology	Chapter 2 - The Dynamics of Disease Transmission
location	Disease outbreaks I	
iocuiion	Disease outbreaks I	
January 18, 2024	Infectious Disease	Chapter 2 - The Dynamics of Disease
See D2L for	Epidemiology	Transmission
location	Disease outbreaks II	
January 23, 2024	Infectious Disease	Chapter 2 - The Dynamics of Disease
See D2L for	Epidemiology	Transmission
location	Disease outbreaks III	
January 25, 2024	Causal Thinking: Causal	Chapter 14 – From Association to Causation:
See D2L for	inference; causation versus	Deriving Inferences from Epidemiologic Studies
location	association; weighing the	Deriving inferences from Epidemiologic Studies
	evidence	
January 30, 2024	Measures of disease	Chapter 3 –Occurrence of Disease: I. Disease
See D2L for	frequency: Prevalence and	Surveillance and Measures of Morbidity
location	incidence	
	Guest Lecturer: TBD	
February 1, 2024	Indices of Mortality &	Chapter 4 - Occurrence of Disease: II.
See D2L for	Disease and Population	Mortality and Other Measures of Disease
location	Health Surveillance	Impact
	Guest Lecturer: TBD	

Date & Room	Торіс	Required Readings*/Assignments
February 6, 2024	Frameworks for	Blettner, M., Heuer, C., & Razum, O.
See D2L for	reading/analyzing published	(2001). Critical reading of epidemiological
location	research	papers: A guide. Eur J Public Health, 11(1),
		978-101.
		Posted on D2L
		Messerli, F.H. (2012). Chocolate
		consumption, cognitive function, and Nobel Laureates. <i>N Engl J Med</i> , <i>367</i> (16),
		1562-1564.
		Posted on D2L
February 8, 2024	Introduction to study design -	Chapter 7 – Assessing the Efficacy of
See D2L for	Experimental studies: Clinical	Preventive and Therapeutic Measures:
location	trials & intervention studies	Randomized Trials
February 12, 2024	Pause for Review – Prevalence	
See D2L for	and Incidence	
location		
February 15,	Observational study designs:	Chapter 8 – Cohort Studies
2024	Cohort studies - Part 1	Assignment 1 due
	Study design and Relative	
February 20,	Risks	
2024		ecture – Winter
February 22,		n Break
2024		ecture – Winter
February 27, 2024		n Break
See D2L for	Observational study designs: Cohort studies -	Chapter 8 – Cohort Studies
location	Part 1	
	Study design and Relative	
	Risks	
February 29, 2024		Chapter 12: Estimating Risk: Is There an
See D2L for	designs: Cohort studies -	Association?
location	Part 2	Pages 215-220 (end of Relative Risk section)
	Bias in cohort studies	
March 5 2024		
March 5, 2024 See D2L for	Observational study designs:	Chapter 9 – Comparing Cohort and Case-
location	Case-control studies –Part 1	control Studies
	Study design and vulnerability to bias	
1		

Date & Room	Торіс	Required Readings*/Assignments
March 7, 2024	Observational study	Chapter 12: Estimating Risk: Is There an
See D2L for	designs: Case-control	Association?
location	studies –Part 2 Measures of	Pages 220-228
	association in case-control	
	studies	
		Chapter 13: A Pause for Review:
	Pause for Review:	Comparing Cohort and Case-Control
	Bias in cohort and case-control studies	Studies.
March 12, 2024	Cross sectional & Ecological	Chapter 10 – Case-control Studies and
See D2L for	studies	Other Study Designs
location		Pages 208 -214 (start at Ecological Studies)
March 14, 2024	Confounding & Effect	Chapter 15 – More on Causal Inferences:
	Modification	Bias, Confounding, and Interaction
March 21 2024	NOLECTUDE	
March 21, 2024	NO LECTURE	
March 23, 2024	Pause for Review:	
See D2L for	Comparing study	
location	designs	
	Confounding and Effect modification	
March 26, 2024	Focus on prevention:	Chapter 13: More on Risk: Estimating the
See D2L for	Measuring attributable	Potential for Prevention
location	risk	
		Assignment 2 due
March 28, 2024	Epidemiology in Injury	Posted on D2L
See D2L for	Research	
location		
	Guest Lecturer: TBD	
April 2, 2024	Summarizing the evidence:	Ronksley, P. E., Brien, S. E., Turner, B. J.,
See D2L for location	Systematic reviews &	Mukamal, K. J., & Ghali, W. A. (2011).
iocuiion	meta- analysis	Association of alcohol consumption with selected cardiovascular disease outcomes:
		a systematic review and meta-analysis.
		<i>BMJ</i> , <i>342</i> , d671.
	D	2 of 4

Date & Room	Торіс	Required Readings*/Assignments
April 4, 2024	Molecular and Genetic	Posted on D2L
See D2L for	Epidemiology	
location		
	Guest Lecturer: TBD	
April 9, 2024	Course evaluations and wrap-up	Assignment 3 due
April 9, 2024	Course evaluations and wrap-up	Assignment 5 due

*Chapter readings refer to the course textbook: *Gordis, L. Epidemiology, 6th Edition.* (2018). Philadelphia: Elsevier Saunders.

Available for purchase from the University of Calgary Medical Bookstore.

Registrar-Scheduled Final Exam: TBD