



## **SPPH 520 (Section 002 in-person) - Control of Communicable Diseases January – April 2024**

**TIME:** Mondays 9 AM – 12 PM beginning Jan 8, 2024  
**LOCATION:** SPPH Room 143

### **INSTRUCTORS:**

Dr. Abdulla Mamun  
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Dr. Mark Gilbert  
[Mark.gilbert@ubc.ca](mailto:Mark.gilbert@ubc.ca)

### **OFFICE HOURS:**

Mark: Monday afternoons (on campus at SPPH) - email to arrange time to meet.  
Abdullah: email to arrange time to meet.

### **TEACHING ASSISTANT:**

Ash Larnder  
[Ashley.Larnder@ubc.ca](mailto:Ashley.Larnder@ubc.ca)

### **COURSE OBJECTIVES:**

- Understand and apply the unique features of infectious disease epidemiology
- Demonstrate an approach to investigation of outbreaks and epidemics
- Understand and apply interventions to mitigate outbreaks and epidemics
- Learn and apply program design for containing or eliminating infectious diseases.
- Understand how social and structural determinants of health affect infectious disease epidemiology and control

### **PREREQUISITES:**

- SPPH 502 or a similar course in introductory epidemiology
- SPPH 400 or a similar course in introductory statistics
- Students will require some University level background in the biological or health sciences



**TEXTBOOKS:**

Nelson et al Editors, Infectious Diseases Epidemiology, Theory and Practice, (3rd edition or later) James & Bartlett Publishers, Boston; ISBN: 0763728799 2014.

Communicable Disease Control Manual. David Heymann Ed. 21<sup>th</sup> Edition. American Public Health Association. (Requested online copy for UBC Library).

Note: We have requested e-book copies of both texts for UBC Library, as well as copies of the Heymann CD Control Manual for the UBC bookstore, and will discuss options for viewing recommended chapters for reading. We would not recommend purchasing a copy of the Nelson Infectious Disease Epidemiology textbook as the available version was published in 2013/14 and a next version is being published in April 2024 (if you're going to buy it for personal use – better to get the more updated version!).

**COURSE NOTES:**

Course material will be accessed through UBC CANVAS. Be sure to keep an eye on checklists of activities.

**COURSE EVALUATION (REVIEW AND UPDATE):**

This is a participatory course. The major components of evaluation:

- Contribution to Discussions / Exercises 10%
- Assignments 20% (2 assignments at 10% each)
- Mid-Term 20%
- Seminar Presentation 15%
- Term Paper 35%

Using ChatGPT:

The use of Chat GPT or other generative AI tools is permitted in this course. If you use generative AI to get ideas and/or partial answers for an assignment and/or to generate any text for a draft or final version of any part of an assignment, you must declare that you have used it. You must also add a couple sentences describing the extent to which it was used, and you must save any generated text from this tool in case it is requested. A TA or the instructor may ask you to provide the generated text in order to help with grading decisions.

Respectful environments

UBC and all Members of the UBC Community share responsibility for ensuring and maintaining an environment that is free from Discrimination. UBC regards Discrimination as a serious offence that is subject to a wide range of remedial or disciplinary measures, including dismissal or expulsion from UBC. (<https://universitycounsel.ubc.ca/policies/discrimination-policy/>)

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of



sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions.

SPPH is committed to providing a positive education experience free from discrimination. If you have had an experience in this course where you feel unsafe, have been mistreated or have witnessed mistreatment, please let us know. If you want to raise this beyond the course instructor the School recommends the following. You may contact your academic supervisor, the education manager for your program or the Associate Director-Education. You may also report your concerns to the Faculty of Medicine Office of Respectful Environments, Equity, Diversity & Inclusion (REDI) at <https://mistreatmenthelp.med.ubc.ca/>. Both SPPH and the REDI Office have procedures in place for recording and acting on reports of mistreatment in the educational environment.



Schedule Winter 2024 (Subject to Change)		
<b>Monday January 8</b>	<ul style="list-style-type: none"> <li>➤ Introduction of Students and Faculty</li> <li>➤ Overview of Course</li> <li>➤ History of CD Control</li> <li>➤ Biological Foundations of CD Control</li> </ul> <p><b>January Assignment Distributed</b></p>	Mark Gilbert Abdullah Mamun
<b>Monday January 15</b>	<ul style="list-style-type: none"> <li>➤ Overview of Infectious Disease Epidemiology</li> <li>➤ Introduction to Outbreak Investigation</li> <li>➤ Discussion on Infectious Disease Epidemiology</li> <li>➤ Using Dependency, Reproductive Number, Epidemiological Triangle</li> </ul>	Abdullah Mamun
<b>Monday January 22</b>	<ul style="list-style-type: none"> <li>➤ Using the Public Health Lab for CD Control (Discussion)</li> <li>➤ Surveillance of CD's – principles and virtues of integration with laboratory data</li> </ul>	Inna Sekirov  David Roth
<b>Monday January 29</b>	<ul style="list-style-type: none"> <li>➤ Community Control Measures &amp; Herd Immunity – Workshop</li> <li>➤ Mathematical Modeling in Infectious Disease Epidemiology</li> </ul> <p><b>February assignment distributed</b></p>	Mark Gilbert/Abdullah Mamun  Mike Irvine
<b>Monday February 5</b>	<ul style="list-style-type: none"> <li>➤ Outbreak Investigation Workshop</li> </ul> <p><b>January Assignment Due</b></p>	Marsha Taylor
<b>Monday February 12</b>	<ul style="list-style-type: none"> <li>➤ Case Management Workshop (Heymann Needed)</li> <li>➤ Review for Mid-Term</li> </ul> <p><b>Term Paper Outline is Due</b></p>	Mark Gilbert/Abdullah Mamun
<b>Monday February 19</b>	<b>BC Family Day and UBC Reading Week (NO CLASS)</b>	
<b>Monday February 26</b>	<p><b>Mid-Term Examination (1 Hour)</b></p> <ul style="list-style-type: none"> <li>➤ Pathogens Transmitted Through Blood and Body Fluids</li> </ul>	Mark Gilbert/Abdullah Mamun  Sofia Bartlett
<b>Monday March 4</b>	<ul style="list-style-type: none"> <li>➤ A Framework for Evaluating Possible Vaccine Programs – Workshop</li> <li>➤ Tuberculosis</li> </ul>	Abdullah Mamun  Jay Johnston



	<b>February Assignment Due</b>	
<b>Monday March 11</b>	<ul style="list-style-type: none"> <li>➤ Vaccine Preventable Disease and Immunization Epidemiology</li> <li>➤ STIs</li> </ul>	Monika Naus  Mark Gilbert
	<b>Term Paper Draft is Due</b>	
<b>Monday March 18</b>	<ul style="list-style-type: none"> <li>➤ Vector Borne Diseases and Zoonoses</li> <li>➤ Antimicrobial resistance</li> </ul>	Mayank Singal  Abdullah Mamun
<b>Monday March 25</b>	➤ Student Seminars	Students
<b>Monday April 1</b>	➤ Student Seminars	Students
<b>Monday April 8</b>	<b>Easter Monday (NO CLASS)</b>	
<b>Monday April 15</b>	<b>Final Term Paper Due</b>	



## Session Specific Objectives and Activities for SPPH 520

### January 8, 2024– Orientation and Introduction (Come Having Read for This Week)

#### Objectives

- Get oriented to course activities and assignments
- Review the History of CD Control
- Review what you should know about biological basis of CD Control
  - Host Defenses
  - Microbial Virulence Factors
  - Environmental Contributors to Infectious Disease
- Get Introduced to the Epidemiological Triangle of Host Agent and Environment

#### Activities

- Introduction of Students and Faculty
- Overview of Course
- Term Paper / Seminar Organization and Sign Up
- Discussion on History and Directions in CD Control
- Discussions on Biological Aspects of CD Control
- Demonstration of the Use of the Epidemiological Triangle – *Host Agent and Environment*
- January Assignment Distributed

**Readings:** Nelson 3<sup>rd</sup> edition chapters 1, 8, 10

### January 15, 2024– Introduction to Infectious Disease Epidemiology

#### Objectives

- Learn the many implications of “Dependency” in Infectious Diseases
- Understand Key Concepts Related to Distribution of Person Place and Time in Infectious Disease Epidemiology
- Further apply the Host/Agent/Environment Conceptual Framework for CD Control
- Gain an understanding of the elements of an outbreak investigation
- Review the application of basic epidemiological principles (eg. Causality) to CD questions

#### Activities

- Lectures and discussion – *Infectious Disease Epidemiology* and *Introduction to Outbreak investigation*
- Chapter topic for the term paper has been chosen and indicated on sign-up sheet

**Readings:** Nelson 3<sup>rd</sup> edition chapters 2, 3, 5



## January 22, 2024– Using the Laboratory and Essential Elements of Communicable Disease Surveillance

### Objectives

- Understand the methods used by laboratories to diagnose infectious diseases
- Understand the role of performance characteristics of diagnostic tests in epidemiology
- Understand the role of pathogen typing in clarifying outbreak epidemiology
- Understand the role of whole genome sequencing in outbreak investigations and reconstruction of transmission networks
- Review the importance of clear case definitions and the importance of the laboratory in confirming them
- Discuss the power of linking laboratory and epidemiological data
- Define the essential components of a CD Surveillance system
- Understand the surveillance cycle in the context of CD Control

### Activities

- *Lecture or Exercise on Lab Tools for CD Epidemiology*
- *Lecture or Exercise on Principle of CD Surveillance*

**Readings:** Nelson 3<sup>rd</sup> edition chapter 9; Review chapter 8

## January 29, 2024– Community Control Measures and an Introduction to Mathematical Modeling

### Objectives

- Review Modes of Transmission of CD and Infection Control Measures Applicable to Each
- Understand the meaning of the Case Reproduction Number ( $R_0$ )
- Understand the concept of herd immunity and its mathematical link to  $R_0$
- Understand how social distancing measures may effect  $R_0$  and the networks of social connection through which pathogens travel
- Understand the difference between quarantine and isolation and some examples of settings where these methods may be employed
- Understand practical issues with employing these above concepts in a real-world pandemic
- Understand the structure of basic mathematical models
- Understand the role of mathematical modeling in planning and modifying communicable disease control activities.

### Activities

- Discussion around content from the video lecture - *Community Measures and Herd Immunity*
- Lecture and discussion – *Mathematical Modeling in Infectious Diseases*
- February assignment distributed



**Readings:** Nelson 3<sup>rd</sup> edition chapters 4, 6, 12, 13

### February 5, 2024– Diarrheal Disease, Outbreak Exercise, Midterm Review

#### Objectives

- Learn the major agents causing diarrhea and enteric disease morbidity
- Review general approaches to controlling diarrheal disease at population level
- Gain Practical Experience with OB Investigation
- Get messy. Make mistakes.

#### Activities

- In Class Exercise – *Managing an Outbreak of Diarrheal Disease*
- January Assignment is Due

**Readings:** Nelson 3<sup>rd</sup> edition chapter 20; Review chapter 5

### February 12, 2024– Practical Case Management and Mid-Term Review

#### Objectives

- Work through several problems with case management in CD control
- Gain fluency with using guidance as found in Heymann
- Identify the relevant linkages between individual case management and population health / resource impact
- Review for Mid-Term

#### Activities

- In Class Exercise – *Case Management of Cases and Cluster of CD*
- *Review Discussion for Mid-Term*
- Term Paper Outline is Due

**Reading:** Browse your **Heymann guide** and get familiar with the layout of case management advice. Come prepared to work through some problems together using the guide as a resource.

### February 19, 2024– Reading Week

### February 26, 2024– Mid-Term Exam and Agents Transmitted by Blood-Borne Pathogens

#### Objectives

- Consolidate your learning of core concepts from first half of course
- Overview common blood-borne agents and causes of viral hepatitis
- Learn Prevention Approaches for Blood Borne Transmission
- Discuss the roll of harm reduction, immunization and curative treatment strategies





### Activities

- Mid-term exam – First Half
- Lecture and Discussion - *Control of Infections Transmitted by Blood and Body Fluids*

**Readings:** Nelson 3<sup>rd</sup> edition chapters 21, 22, 23

### March 4, 2024– Tuberculosis Control; Evaluating Vaccines

#### Objectives

- Understand the implications of a difference between airborne and droplet transmission
- Understand and apply knowledge of latent and active disease states to disease control
- Learn about the structure of TB control services in BC and globally
- To discuss the application of epidemiology to the evaluation of immunization program effectiveness, vaccine uptake and vaccine safety

#### Activities

- *Workshop/Discussion on Evaluating Immunization Programs*
- Lecture and Discussion - *TB Control*
- February Assignment is Due

**Readings:** Nelson 3<sup>rd</sup> edition chapters 11, 16, 17, 18; Review chapter 10  
Heymann on Tuberculosis

### March 11, 2024– Vaccine preventable epidemiology; sexually-transmitted diseases

#### Objectives

- To understand the key features of vaccines as these relate to prevention of vaccine preventable disease
- Review the unique biology of sexual transmission
- Conceptual models for STD control
- Review examples of STD's and Control Strategies
- Learn how Sexual Networks may determine the course of epidemics
- Review Health Promotion as it applies to Sexual Behavior

#### Activities

- Lecture and Discussion - *Vaccine Preventable Diseases and Immunization Programming*
- Lecture and Discussion - *Sexually Transmitted Diseases*
- Term Paper Draft is Due

**Readings:** Nelson 3<sup>rd</sup> edition chapters 22, 24; Review chapters 11, 16, 17  
Heymann on Chlamydia, Gonorrhea, Genital herpes, Syphilis, Chancroid, HIV and Human Papillomavirus



## March 18, 2024– Vector-borne and Zoonotic Disease

### Activities

- Discussion and Lecture – *Vector-borne and Zoonotic Disease*
- Student Seminars and Discussions

### Readings:

Nelson 3<sup>rd</sup> edition chapter 25, 26, 27  
Heymann on Malaria, West Nile, Lyme  
Heymann on Rabies, Tularemia, Anthrax

Read around the upcoming seminars so you can contribute informed questions and feedback.

## March 25, 2024– Student Seminars

### Objectives

- Consolidate your learning by group discussion and problem-solving

### Activities

- Student Seminars and Discussions

**Readings:** Read around the upcoming seminars so you can contribute informed questions and feedback.

## April 1, 2024– Student Seminars

### Objectives

- Consolidate your learning by group discussion and problem-solving

### Activities

- Student Seminars and Discussions

**Readings:** Read around the upcoming seminars so you can contribute informed questions and feedback.

## April 8, 2024- Easter Monday

## April 15, 2024

- Final Term Papers Due