SPPH 520 - Control of Communicable Diseases
January - April 2018

TIME: Mondays, 9:00AM- 12:00PM

LOCATION: Room 143, School of Population and Public Health Bldg

INSTRUCTORS: Dr. David M. Patrick and Colleagues (See Schedule)

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ASSISTANT: laura.moore@bccdc.ca

OFFICE HOURS:
Mondays are the best day for booking appointments but please plan ahead. Email or call Laura to book.

TEACHING ASSISTANT: Michael Lee

EMAIL: michaeljosephlee2@gmail.com

COURSE OBJECTIVES:
• To understand the unique features of infectious disease epidemiology
• To learn and develop approaches to investigating outbreaks and managing problems in infectious diseases 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 or SPPH 524 - Biology of Public Health Diseases
TEXTBOOK:

In addition to the above text, students will require:


COURSE NOTES:
The slides or video for each faculty lecture and student discussion will be posted by the lecturer or TA prior to each lecture. Where a video is posted, come prepared to discuss.

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

- Contribution to General Discussions 5 %
- Assignments (3 assignments) 15 %
- Term Paper (20) and Mini-Seminar (10) 30 %
- Mid-Term Exam (Objective) 20 %
- Final exam (Essay/Point Form Format) 30 %
<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture/Discussion</th>
<th>Presenter(s)</th>
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<tbody>
<tr>
<td>8 January</td>
<td>8 January • View <em>History of CD Control before the class</em> • Introduction of Students and Faculty • Overview of Course • Discussion - <em>History of CD Control</em> • Lecture - <em>Host Agent Environment</em> • January Assignment Distributed</td>
<td>David Patrick</td>
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<td>15 January</td>
<td>15 January • View <em>Infectious Disease Epidemiology and Outbreak Investigation online.</em> • Discussion on Infectious Disease Epidemiology - Using Dependency, Reproductive Number, Epidemiological Triangle</td>
<td>David Patrick</td>
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<td>22 January</td>
<td>22 January • View - <em>How to Blend Epidemiology with Lab Findings for CD Control</em> • In Class Hand-on Exercise – <em>Interrupting Transmission through Infection Control</em></td>
<td>Jennifer Gardy, Bruce Gamage</td>
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<td>29 January</td>
<td>29 January • Lecture/Discussion - <em>Community Control Measures &amp; Herd Immunity</em> • Lecture/Discussion – Mathematical Modeling • January assignment due</td>
<td>David Patrick, Michael Otterstatter</td>
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<td>5 February</td>
<td>5 February • In Class Exercise - <em>Outbreak Investigation</em> • Review for mid-term. • <em>February assignment distributed</em></td>
<td>Marsha Taylor, David Patrick</td>
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<td>12 February</td>
<td>12 February <strong>BC Family Day</strong></td>
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<td>19 February</td>
<td>19 February <strong>UBC Reading Week</strong></td>
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<td>26 February</td>
<td>26 February • Mid-term examination (1 hour) • <em>February Assignment Due</em> • Lecture/Discussion – <em>Pathogens transmitted through Blood and Body Fluids</em></td>
<td>David Patrick, TBA</td>
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<td>5 March</td>
<td>5 March Lecture/Discussion <em>STI</em> Lecture/Discussion <em>Tuberculosis</em> Student Seminars - 4 March Assignment Distributed</td>
<td>Gina Ogilvie, Jay Johnston</td>
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<td>12 March</td>
<td>12 March Lecture Discussion - <em>Vaccine Preventable</em></td>
<td>Monika Naus</td>
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<td>19 March</td>
<td>Lecture/Discussion - <em>Vector Borne Diseases and Zoonoses</em></td>
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<td>Student Mini-Seminars -4</td>
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<td>David Roth</td>
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<td>26 March</td>
<td>Influenza</td>
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<td>Student Mini-Seminars 4</td>
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<td><em>March Assignment due March 26</em></td>
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<td>Danuta Skowronski</td>
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<td>2 April</td>
<td>Easter Monday</td>
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<td>9 April</td>
<td>Final Exam this Week</td>
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Session Specific Objectives and Activities for SPPH 520

January 8, 2018 – Orientation and Introduction (Come Having Read for This Week and Watch the Lectures on History of CD Control and Host Agent Environment)

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 3rd edition chapters 1, 8, 10

January 15, 2018 - 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
- Come prepared to discuss the content of video lectures - Infectious Disease Epidemiology and Introduction to Outbreak investigation
Readings: Nelson 3rd edition chapters 2,3,5

January 22, 2018 – Lab and Infection Control Methods for Epidemiologists

Objectives
- Understand the methods used by laboratories to diagnose infectious disease
- Understand the role of molecular typing in clarifying outbreak epidemiology
- Understand the role of whole genome sequencing in discovering transmission networks
- Understand performance characteristics of diagnostic tests
- Review Modes of Transmission of CD
- Review Infection Control Measures for Each

Activities
- Come prepared to discuss the video lecture – Lab Tools for CD Epidemiology
- In Class Exercise - A Practical Introduction to Infection Control

Readings: Nelson 3rd edition chapter 9, 14 Review Chapter 8

January 29, 2018 –Community Control Measures and An Introduction to Mathematical Modeling

Objectives
- Understand the meaning of the Case Reproduction Number (Ro)
- Understand the concept of herd immunity and its mathematical link to Ro
- Understand how social distancing measures may effect Ro 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
- Discussion around - Mathematical Modeling in Infectious Diseases
- January Assignment is Due
Readings: Nelson 3rd edition chapters 4, 6, 12, 13

February 5, 2018 – 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

• Lecture and Discussion - Control of Diarrheal Disease
• In Class Exercise – Managing an Outbreak
• Mid-Term Review Tips
• February Assignment Distributed

Readings: 3rd edition chapter 20

February 12, 2015 – BC Family Day - Statutory Holiday

February 19, 2016 – Reading Week – Review for Mid-Term

February 26, 2016 – 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
• Feb Assignment is Due

Readings: Nelson 3rd edition 21, 22, 23
March 5, 2018 – Sexually Transmitted Infections and TB

Objectives
- 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
- Learn the key differences between airborne and droplet transmission
- Review implications of these for control programming
- Learn about TB control

Activities
- Discussion around Lectures on Sexually Transmitted Diseases and TB Control
- March Assignment Distributed
- Student Seminars

Readings: Nelson 3rd edition chapters 22 and 24
Heymann: Read Chlamydia, Gonorrhea, Genital herpes, Syphilis, Chancroid, HIV and Human Papillomavirus
Nelson 3rd edition chapter 18
Heymann: Read TB

March 12, 2018 – Vaccine Preventable Disease and Immunization Epidemiology

Objectives
- To understand the key features of vaccines as these relate to prevention of vaccine preventable disease
- To discuss the application of epidemiology to the evaluation of immunization program effectiveness, vaccine uptake and vaccine safety

Activities
- Lecture and Discussion - Vaccine Preventable Diseases and Immunization Programming
- Student Seminars

Readings: Nelson chapter 11; Review Nelson 10, 16 and 17
March 19, 2016 – Vector-borne and Zoonotic Disease

Objectives
- Understand the major vector-borne and zoonotic agents
- Adapt a modified Host Agent Environment Model which includes Animal and Vector to conceptualizing Control Measures
- Discuss strategies to address pseudoscience as it pertains to tick-borne diseases

Activities
- Discussion and Lecture – Vector-borne and Zoonotic Disease
- Student Seminars

Readings: Nelson chapters 3rd edition 25,26,27
Heymann on Malaria, West Nile, Lyme
Heymann on Rabies, Tularemia, Anthrax

March 26, 2018 – Influenza and Emerging Respiratory Diseases

Objectives
- Review the biology of influenza virus
- Understand how to design integrated surveillance of influenza morbidity
- Understand methods to assess vaccine effectiveness in “real time”
- Discuss key strategies for influenza control and how these might be improved in future.
- Discuss general principles for dealing with emerging respiratory infections

Activities
- Discussion and Lecture – Influenza – CD Control vs Evolutionary Biology
- Student Seminars

Readings: Nelson Chapter 15
Heymann Influenza

April 2, 2018 – Easter Monday

April 9, 2018 – Final Examination this Week
Topic/Paper Suggestions

- Epidemiology and Control of Zika Virus Infection
- Options for Addressing the Problem of Antimicrobial Resistance in India
- Addressing resurgent Syphilis Epidemics in BC and Elsewhere
- Optimizing the Prevention of Meningococcal Meningitis
- How do we Stop the Nastiest Superbugs? (CPOs and Colistin Resistant Pathogens)
- Should BC Adopt the New Shingles Vaccine?
- Is Hepatitis C Elimination Possible?
- What is the Role of Antiviral treatment in reducing the burden of illness from Influenza. Address both Seasonal and Pandemic Flu
- Controlling *C. difficile* infections in hospitals and communities
- Dealing with Resurgent Yellow Fever
- Pneumococcal Vaccine Strategies – How do we best use available tools to reduce the burden of pneumococcal disease.
- How do we get better control of HPV disease?
- Malaria – Are We Making Progress?
- Assess the Current Risk and Containment Plans for Avian Influenza
- Sepsis. Can we Lower the Global Burden of Illness?
- What is the potential for Electronic Medical Records to Enhance CD Epidemiology and Control?
- Review the Current Evidence for a Link between Gut Microbiome and One or More Chronic Diseases
- How is Communicable Disease Control Best Achieved within a First Nations World View?
- Other Topic vetted with Instructor

Deliverables for the Paper:

- Maximum 2500 words (all your own)
- Properly Referenced – Vancouver Method
- Figures and Tables Welcome
- Clearly reference and apply a conceptual model/framework (eg Host Agent and Environment, Bradford-Hill) in your work
- Provide a short summary presentation (10 slides – 10 minutes) to share with your classmates at seminar time.