Epidemiology for Global Health

Class code
UGPH-GU 9030 – 001

Instructor Details
Associate Professor Glenda Lawrence BSc (Hons I), PhD, MPH (Hons), MAppEpid
Email: gll4@nyu.edu
NOTE: please put « UG EPI » in the subject line of your email
Office Hour: Consultation by Appointment
Please allow at least 24 hours for your instructor to respond to your emails.

Class Details
Spring 2015

Epidemiology for Global Health

Thursday 3:00 – 6:00pm
February 5 to May 14
Room 202
NYU Sydney Academic Centre

Prerequisites
None

Class Description
Epidemiology is the study of the distribution and determinants of health and illness in human populations and the application of methods that seek to describe and ultimately, improve health outcomes. Consequently, epidemiology is often considered the basic science of public health. This course is designed to introduce students to the history, basic principles and methods of epidemiology.

Topics covered in this course are the history and background of epidemiology; measures of disease frequency; measures of association; epidemiologic study designs; screening; outbreak investigations; and assessment of causality. In addition, students will develop skills to critically read, interpret and evaluate health information from published epidemiological studies and mass media sources.

The course will be delivered in one 3 hour session each week which will comprise an interactive lecture, group exercises and discussions. Students need to attend every session and be prepared to actively engage in exercises and discussions. There will also be homework readings and exercises that are designed to provide a more in-depth understanding of topics
covered. To be successful in all assessment components for the course, students are also encouraged to review homework assignments from the previous week. These are an integral part of the course and have been developed to provide students with examples of practical applications of concepts and theories.

By the end of this course students will develop the ability to:

- Understand the evolution and current role of epidemiology as an approach to assessing public health problems over time and across populations.
- Describe epidemiological approaches to defining and measuring health problems to understand the distribution of health-related states or events in human populations worldwide and the persistence of health inequities across regions and groups.
- Understand how epidemiologic studies are designed, implemented and analysed.
- Understand the concepts of measurement of test performance and be able to apply these concepts of testing and screening.
- Recognise epidemiological criteria needed to establish cause and effect relationships.
- Recognise key ethical issues in the conduct of epidemiological and other scientific investigations in communities and populations.
- Conduct library research to find information on diseases and other health conditions.
- Critically read and understand health information in different formats and contexts.

**Assessment Components**

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Homework Assignments (4 x 10%)</td>
<td>40%</td>
</tr>
<tr>
<td>Disease Fact Sheet Assignment and Presentation</td>
<td>15%</td>
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<tr>
<td>Midterm Exam</td>
<td>15%</td>
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<tr>
<td>Final Exam</td>
<td>20%</td>
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<tr>
<td>Class Participation</td>
<td>10%</td>
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**Homework Assignments:**

**Due Dates** - 13 March (Session 6); 23 April (S. 11); 30 April (S. 12); 7 May (S. 13)

Homework assignment questions will be provided 1 week before topic is scheduled to be taught. Completed assignments are due on the dates noted in the course schedule. They are to be handed in at the beginning of class (except for Homework 1) and all are to be submitted electronically on NYU Classes.

**Disease Fact Sheet & Presentation:**

**Due Dates** – 5 March (Session 5); 2 April (Session 8); 14 May (Session 14)

Students will work in groups of 3 to prepare an annotated bibliography, oral presentation and final report summarizing key information on a disease or health condition selected from a list provided at the beginning of the semester. See the Fact Sheet assignment for further information, and read the assignment before coming to class on 5 February.

**Midterm Exam: 26 March (Session 7)** - One hour plus 10 minutes pre-reading time

A multiple choice and short answer exam covering materials presented in Sessions 1 – 6.
Final Exam: Exam Week - Wednesday 20 May 12-2pm
A multiple choice and short answer exam covering materials presented in Sessions 1 – 14 with emphasis on the material presented in Sessions 7-14.

Failure to submit or fulfil any required course component will result in failure of the class.

Assessment Expectations

**Grade A:** Excellent performance showing a thorough knowledge and understanding of the topics of the course; all work includes clear, logical explanations, insight, and original thought and reasoning.

**Grade B:** Good performance with general knowledge and understanding of the topics; all work includes general analysis and coherent explanations showing some independent reasoning, reading and research.

**Grade C:** Satisfactory performance with some broad explanation and reasoning; the work will typically demonstrate an understanding of the course on a basic level.

**Grade D:** Passable performance showing a general and superficial understanding of the course’s topics; work lacks satisfactory insight, analysis or reasoned explanations.

**Grade F:** Unsatisfactory performance in all assessed criteria. Work is weak, unfinished or unsubmitted.

Grade Conversions

For this course your total numerical score, calculated from the components listed above, correspond to the following letter grades:

<table>
<thead>
<tr>
<th>Total Percent Score</th>
<th>A</th>
<th>A-</th>
<th>B+</th>
<th>B</th>
<th>B-</th>
<th>C+</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>at least:</td>
<td>90</td>
<td>86</td>
<td>82</td>
<td>72</td>
<td>68</td>
<td>64</td>
<td>54</td>
<td>40</td>
</tr>
<tr>
<td>then you will receive a grade no lower than:</td>
<td>A</td>
<td>A-</td>
<td>B+</td>
<td>B</td>
<td>B-</td>
<td>C+</td>
<td>C</td>
<td>D</td>
</tr>
</tbody>
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Late Submission of Work

Written work due in class must be submitted to your instructor during class time.

Late work should be submitted in person to the Academic Programs Coordinator during regular office hours (9:00am-5:00pm, Monday-Friday). In the absence of the Academic Programs Coordinator, another member of the administrative staff can accept the work in person. The NYUS staff will mark down the date and time of submission in the presence of the student. Students must also submit an electronic copy of late written work to Turnitin within 24 hours.

Work submitted after the submission time without an agreed extension receives a penalty of 2 points on the 100-point scale (for the assignment) for each day the work is late.

Written work submitted beyond five (5) weekdays after the submission date without an
agreed extension fails and is given a zero.

**Plagiarism Policy**

The academic standards of New York University apply to all coursework at NYU Sydney. NYU Sydney policies are in accordance with New York University’s plagiarism policy. The presentation of another person’s words, ideas, judgment, images or data as though they were your own, whether intentionally or unintentionally, constitutes an act of plagiarism.

Penalties for confirmed cases of plagiarism are severe and are dealt with by the Director, NYU Sydney, not your instructor. Your home school will be notified and you will be dealt with according to the standards of that school. The codes of conduct and academic standards for NYU’s various schools and colleges are outlined in the respective school’s academic resources.

**Attendance Policy**

Study abroad at Global Academic Centres is an academically intensive and immersive experience, in which students from a wide range of backgrounds exchange ideas in discussion-based seminars. Learning in such an environment depends on the active participation of all students. And since classes typically meet once or twice a week, even a single absence can cause a student to miss a significant portion of a course. **To ensure the integrity of this academic experience, class attendance at the centres is mandatory, and unexcused absences will be penalised with a two percent deduction from the student’s final course grade for every week of classes missed.**

The class roster will be marked in the first five minutes of class and anyone who arrives after this time will be considered absent. Students are responsible for making up any work missed due to absence. Repeated absences will result in harsher penalties, including failure.

**Classroom Expectations**

This is a seminar subject and requires the active participation of all students. It also requires engaged discussion, including listening to and respecting other points of view. Your behaviour in class should respect your classmates’ desire to learn. It is important for you to focus your full attention on the class, for the entire class period.

- Arrive to class on time.
- Once you are in class, you are expected to stay until class ends. Leaving to make or take phone calls, to meet with classmates, or to go to an interview, is not acceptable behaviour.
- Phones, digital music players, and any other communications or sound devices are not to be used during class. That means no phone calls, no texting, no social media, no email, and no internet browsing at any time during class.
- Laptop computers and tablets are not to be used during class except in rare instances for specific class-related activity expressly approved by your instructor.
- The only material you should be reading in class is material assigned for that class. Reading anything else, such as newspapers or magazines, or doing work from another class, is not acceptable.
- Class may not be recorded in any fashion – audio, video, or otherwise – without permission in writing from the instructor.
Required Texts

- Merrill R. *Introduction to Epidemiology* Sixth Edition, 2012 (preferred) *OR*
- ERIC Notebook. URL: http://cphp.sph.unc.edu/trainingpackages/ERIC/index.htm. This is a set of epidemiology easy-to-read notes published by the University of North Carolina.

Additional Required Readings

Additional required readings will be posted to NYU Classes and will include selected published papers.

Supplemental Texts

You will find that taking a course in epidemiology involves learning a whole new vocabulary. The following dictionary has proven useful to many in ensuring the correct use of terms:


Session 1

Thursday 5 February

- Introduction and course description
  - Class introductions; course expectations
- Introduction to Fact Sheet Assignment
  - Groups for Disease Fact Sheet Assignment allocated
- Overview of Epidemiology: history and applications
  - Finding and using epidemiological information
  - Conducting scientific literature searches

Required Reading

- Fact Sheet Assignment (located in Resources on the NYU Classes site)
- Merrill: Chapter 1 pp 1-6 & Chapter 2 *OR* Friis and Sellers: Chapters 1 & 16

Session 2

Thursday 12 February

**Guest Lecture:** Ms Anni Cameron - Foundations of epidemiology and practical disease concepts, host factors, risk factors, natural history, prevention

- Disease Fact Sheet groups will meet to work on annotated bibliographies

Required Reading

- Merrill: Chapter 1 pp 6-21 & Chapter 3 *OR*
- Friis & Sellers: Chapter 2 & Chapter 12 pp 491 – 505
Session 3
Thursday 19 February

**Guest Lecture:** Measuring the burden of disease among Australian Aboriginal and Torres Strait Islander peoples: Vanessa Lee, Faculty of Health Sciences, University of Sydney

- Measures of health and disease in populations
  - Vital statistics: birth, mortality
  - Measures of disease frequency: rates, proportions, incidence, prevalence, standardisation
  - Using measures of frequency to investigate health disparities within populations

- Case study on incidence and prevalence

**Required Reading**
- Merrill: Chapter 6 & Chapter 4 pp 94-110 OR Friis and Sellers: Chapters 3 & 5

**Recommended Reading**
- More detailed reading of AIHW reports above

Session 4
Thursday 26 February

- Descriptive Epidemiology: person, place and time
  - Concepts of risk
  - Introduction to study designs: investigating patterns and risk of disease in populations
  - Cross-sectional and ecologic study designs

**Required Reading**
- Merrill: Chapter 4 pp 87-93 & Chapter 5 OR Friis & Sellers: Chapter 3 & Chapter 6 pgs 279-302
- ERIC Notebook: *Ecologic Studies*
- ERIC Notebook: *Cross Sectional Studies*

Session 5
Thursday 5 March

- Infectious disease outbreaks
  - Why investigate?
Methods of investigation

- Determining the source of infection

- Outbreak Investigation case study

**Required Reading**

- Merrill: Chapter 12 & Appendix 1 Case Study II pp 355-64 (plus review Chapter 3 pp56-66) _OR_
- Friis & Sellers: Chapter 12, pgs 506 – 542 (plus review pgs 491-505)

**Assignment Due: Disease Fact Sheet Assignment Part 1 - Annotated Bibliography**

**Session 6**

*Thursday 12 March*

-Continue Outbreak Investigation case study

- Mid-term review

*Homework Assignment 1 Due: Outbreak investigation to be submitted online by 5pm Friday 13 March*

**NB Spring Semester Break 16-20 March**

**Session 7**

*Thursday 26 March*

**Part 1**

- Mid-term Exam (15%) (60 minutes plus 10 minutes pre-reading time)

**Part 2**

- Design Strategies & Methods in Analytic Epidemiology - I
  - Using analytical study designs to investigate how and why disease occurs
  - Overview of study types - design, applications, advantages and disadvantages
  - Research questions, study factors and outcome factors
  - Measures of association (effect) – rate ratio, relative risk, odds ratio

**Required Reading**

- Merrill: Chapter 7 pp179-81 +190-1 & Chapter 8 pp203-4 +Table 8.1 _OR_
- Friis & Sellers Chapter 6 – review pages 279-287
- ERIC Notebook: Case control studies
- ERIC Notebook: Cohort studies
- ERIC Notebook: Randomized trials

**Session 8**

*Thursday 2 April*

**Part 1:**

- Brief review of exam (20 minutes)

**Part 2:**

- Design Strategies & Methods in Analytic Epidemiology - II
Case control and cohort studies (in-depth)
- Using observational analytical studies to investigate the epidemiology of, and risk factors associated with, motor traffic accidents

- **Guest Lecture**: Associate Professor Lisa Keay, Injury Division, George Institute of Global Health – practical applications using epidemiological studies to investigate the distribution and determinants of injury.

**Required Reading**
- Merrill: Chapter 7 OR Friis & Sellers: Chapter 6 pg 303-319 & Chapter 7
- ERIC Notebook: Case control studies (review)
- ERIC Notebook: Cohort studies (review)

*Due: Disease Fact Sheet Assignment Part 2 - draft PowerPoint slides and talks for review and feedback*

**Session 9**

**Thursday 9 April**
- Design Strategies & Methods in Analytic Epidemiology - III
  - Experimental studies
    - Methods, advantages and disadvantages
  - Ethical considerations in epidemiological research

**Required Reading**
- Merrill Chapter 8 OR Friis & Sellers: Chapter 8
- ERIC Notebook: Randomized trials (review)
- NYU Committee on Activities Involving Human Subjects website: [http://www.nyu.edu/ucaihs/tutorial/](http://www.nyu.edu/ucaihs/tutorial/)
  - Read the Introduction plus Chapters 1, 2 and 11 (also Chapters 12, 14, 16 if you have time). You are not required to take the quizzes for each chapter.

**Session 10**

**Thursday 16 April**
- Design Strategies & Methods in Analytic Epidemiology - IV
  - The basics of study bias and its impact on study validity
  - Selection bias, information bias and confounding

**Required Reading**
- ERIC Notebook: Selection bias
- ERIC Notebook: Information bias
- ERIC Notebook: Confounding part 1 and part 2

**Additional (optional) Reading**
- Merrill: revise relevant sections in Chapters 8 & 9 OR Friis & Sellers: Chapter 9

**Session 11**

**Thursday 23 April**
• How to read and critique a published epidemiological study
  o assessing the impact of bias on study findings
• Case Study: Reading and critiquing a paper

Required Reading
• To be confirmed

Due: Homework Assignment 2 - Study Design

Session 12
Thursday 30 April
• Screening for disease
  o Type of screening
  o Essential characteristics of screening tests and programs
  o Ethical considerations of screening

Required Reading
• Merrill: Chapter 11 pp297-303 OR Friis & Sellers: Chapter 11
• ERIC Notebook: screening

Due: Homework Assignment 3 - Assessing Bias

Session 13
Thursday 7 May
• Causal Inference and Synthesis of Evidence: does exposure X really cause disease Y in population P?
  o Understanding the role of chance, bias and confounding in study results
  o Bradford Hill criteria of causation
  o Systematic review of evidence

Required Reading
• Merrill: Chapter 9 pp 221-31 OR Friis & Sellers: Ch. 9, pgs 423-432
• ERIC Notebook: Causality

Due: Homework Assignment 4 - Screening

Session 14
Thursday 14 May
• Disease Fact Sheet Assignment – final presentation (15 minutes per group, including 10 minute presentation)
• End of term review – 1 hour

**Due: Fact Sheet presentations slides & final Fact Sheet report**

Final Exam: Wednesday 20 May 12-2pm (during Exam Week)

**Your Instructor**

Associate Professor Glenda Lawrence has qualifications and experience in nursing, virology and public health. She has worked in health, government and academic settings in research and teaching over many years. She currently teaches epidemiology and immunisation program design and evaluation at the University of New South Wales and previously was employed as a senior epidemiologist at the National Centre for Immunisation Research and Surveillance where she designed and conducted a large number of research studies to monitor and evaluate national immunisation programs in Australia. Her international public health experience includes leading a WHO outbreak investigation team in Sri Lanka and supervising a project to inform measles control strategies in rural China. She has extensive experience in teaching epidemiology to public health students and has supervised PhD and Masters’ students undertaking applied epidemiology research projects at several universities.