Epidemiology for Global Health

Class code: UGPH-GU 9030 – 002

Instructor Details:
Professor Glenda Lawrence BSc (Hons I), PhD, MPH (Hons), MAppEpid
gll4@nyu.edu
Office Hour: Consultation by Appointment
Please allow at least 24 hours for your instructor to respond to your emails.

Class Details: Spring 2017

Epidemiology for Global Health

Wednesday 9:00-12:00pm
February 1 to May 10
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. Everyone working in global health, public health or any other area of health needs to understand the basics of epidemiology to be able to understand and evaluate evidence that informs policies and programs aimed at improving the population’s 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; methods used to measure disease frequency and the association between exposures or risk factors and health outcomes; epidemiological study designs and sources of study error and bias; screening; outbreak investigation; 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 group exercises and discussions supported by interactive lectures. Students need to attend every session and be prepared to actively engage in exercises and discussions. It is essential that pre-reading and other required preparation is completed before coming to class including a
weekly online quiz about the preparation work to check your understanding. This helps ensure that everyone is prepared and ready to participate in class discussions and exercises designed to provide in-depth understanding of the topics. To be successful in all assessment components for the course, students are encouraged to review homework assignments, online quizzes and class exercises. These are integral to the course and have been developed to provide students with examples of practical applications of epidemiological concepts and methods.

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 and disease 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.
- Apply epidemiological knowledge and skills to Australian, US and global public health problems.

### Assessment Components

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<thead>
<tr>
<th>Component</th>
<th>Weight (% of total)</th>
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<tbody>
<tr>
<td>Homework Assignments (3 x 15%)</td>
<td>45%</td>
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<tr>
<td>Disease Fact Sheet Assignment and Presentation</td>
<td>15%</td>
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<tr>
<td>Final Exam</td>
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<tr>
<td>Class Participation</td>
<td>10%</td>
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<tr>
<td>Short weekly pre-class online quizzes</td>
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**Short weekly pre-class online quizzes - Weeks 2, 3, 4, 6, 8, 9, 10, 11, 13, 14**

Brief multiple choice online quizzes on the essential pre-reading, to be completed before attending class. This is to ensure that class preparation has been completed to permit class time to be used for discussion and collaborative learning.

**Class Participation – Weeks 2-6; 8-15**

Class participation by all students is an essential aspect of courses taught at NYU Sydney. In this course, students will have opportunities to gain participation points through active engagement in class discussions, in-class group exercises, and a discussion forum on relevant topical epidemiological and public health issues identified from news and other media. Marking criteria for participation will be posted on NYU Classes (Resources) and discussed in class in Week 1.
Disease Fact Sheet & Presentation:
Due Dates – 3 March (Week 5); 7 April (Week 10); 10 May (Week 15)
Students will work in groups of 3 to prepare an annotated bibliography, an oral presentation and a final fact sheet summarizing key information about 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 1 February.

Homework Assignments:
Due Dates – 10 March (Week 6); 14 April (Week 11); 28 April (Week 13)
Homework assignment questions will be provided before the topic is scheduled to be taught. Completed assignments are due at 2.00pm on the Friday of the week noted in the course schedule. All assignments are to be submitted to NYU Classes.

Final Exam: Exam Week (Wednesday 17 May, 9:00-11:00am)
A multiple choice and short answer exam covering topics presented in Weeks 1 – 15 with emphasis on the topics presented in Weeks 8 – 15.

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

For this course your total numerical score, calculated from the components listed above, is converted to a letter grade without rounding.

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:
Submission of Work

Should work be submitted as a hard copy, or electronically?
Unless otherwise specified, all written work must be submitted as a hard copy. The majority of written assignments must also be submitted electronically via NYU Classes. All in-class presentations must be completed during class time.

Who may submit a student’s work?
Each student’s assigned work must be handed in personally by that student. The student may not nominate another person to act on his/her behalf.

When and where should the work be submitted?
The hard copy of any written work must be submitted to the instructor at the beginning of class on the date the work is due. If the assignment due date falls outside of class time, work must be submitted to the Staff Member on duty in Room 2.04 during prescribed Office Hours (11:30am-12:30pm and 2:30-3:30pm Mon-Thu), or by appointment with the Academic Programs Coordinator. Each submitted item of work received in Room 2.04 will be date and time stamped in the presence of the student. Work submitted in Room 2.04 will not be considered “received” unless formally stamped.

What is the Process for Late Submission of Work?
After the due date, work may only be submitted under the following conditions:

- Late work, even if an extension has been granted, must be submitted in person by appointment with the Academic Programs Coordinator. Each submitted item of work must be date and time stamped in order to be considered “received”.

- 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 weekdays after the submission date without an agreed extension receives a mark of zero, and the student is not entitled to feedback for that piece of work.

- Because failure to submit or fulfil any required course component will result in failure
of the course, it is crucial for students to submit every assignment even when it will receive a mark of zero. Early departure from the program therefore places the student at risk of failing the course.

**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.

It is a serious academic offense to use the work of others (written, printed or in any other form) without acknowledgement. Cases of plagiarism are not dealt with by your instructor. They are referred to the Director, who will determine the appropriate penalty (up to and including failure in the course as a whole) taking into account the codes of conduct and academic standards for NYU’s various schools and colleges.

**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 affect students’ semester grades. The class roster will be marked at the beginning 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.

For courses that meet once a week, one unexcused absence will be penalised by a two percent deduction from the student’s final course grade. For courses that meet two or more times a week, the same penalty will apply to two unexcused absences. Repeated absences in a course may result in failure.

Faculty cannot excuse an absence. Requests for absences to be excused must be directed to the Academic Programs Coordinator. Students must provide appropriate documentation for their absence. In the case of illness, students must contact the Academic Programs Coordinator on the day of absence. They must provide medical documentation to Academic Programs Coordinator within three days of the absence in order to be medically excused. The note must include a medical judgement indicating that the student was unfit to attend class/work on the specific day or dates of the absence. Faculty will be informed of excused absences by the Academic Programs staff.

**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.

Diversity, Inclusion and Equity

NYU is committed to building a culture that respects and embraces diversity, inclusion, and equity, believing that these values – in all their facets – are, as President Andrew Hamilton has said, “...not only important to cherish for their own sake, but because they are also vital for advancing knowledge, sparking innovation, and creating sustainable communities.” At NYU Sydney we are committed to creating a learning environment that:
• fosters intellectual inquiry, research, and artistic practices that respectfully and rigorously take account of a wide range of opinions, perspectives, and experiences; and
• promotes an inclusive community in which diversity is valued and every member feels they have a rightful place, is welcome and respected, and is supported in their endeavours.

Religious Observance

Students observing a religious holiday during regularly scheduled class time are entitled to miss class without any penalty to their grade. This is for the holiday only and does not include the days of travel that may come before and/or after the holiday. Students must notify their professor and the Academic Programs Coordinator in writing via email one week in advance before being absent for this purpose.

Provisions to students with Disabilities

Students with disabilities who believe that they may need accommodations in a class are encouraged to contact the Moses Centre for Students with Disabilities at (212) 998-4980 as soon as possible to better ensure that such accommodations are implemented in a timely fashion. For more information, see Study Away and Disability.
Required Text

It is a course expectation that you have done the required reading and have prepared sufficiently to discuss in class.


**Note:** there is a useful glossary of terms at the back of the textbook. Also, information shown in Boxes marked with the symbol ‘i’in the textbook not required reading for class preparation but provide additional explanation and examples relevant to the topic.

It is a course expectation that you have completed the required reading and have prepared sufficiently to participate in class discussion.

Additional Required Readings

- Additional required readings and other resources will be posted to NYU Classes and will include selected published papers.
- Videos are included as essential class preparation. Links are provided in this syllabus for each week.

Supplemental Texts


Developed by the WHO, this textbook provides excellent summary explanations of many key epidemiological concepts. It is available online. You may find it a useful additional resource.

Week 1

**Wednesday 1 February**

- Introduction and course overview
  - Class introductions and expectations
- Overview of Epidemiology:
  - History and applications
- Introduction to the Disease Fact Sheet Assignment
  - Allocation of groups; identifying group disease topic
  - How to conduct a scientific literature search using the Pubmed database
  - Preparing an annotated bibliography and correct referencing.

Essential preparation

- Read: Fact Sheet Assignment (located in Resources on the NYU Classes site)
- Read: Webb and Bain: Chapter 1  [Note: there is no online quiz this week]
Week 2

Wednesday 8 February

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

- **Guest Lecture**: The burden of disease among Australian Aboriginal and Torres Strait Islander peoples:
  Dr Vanessa Lee, School of Health Sciences, University of Sydney (TBC)

- Case study on incidence and prevalence

**Essential preparation**

- Before coming to class, answer the short online quiz in NYU Classes to check your understanding of the following 3 readings.
  - Webb & Bain: Chapter 2

- Recall and reflect on what you have learned since arriving in Australia about the history of Aboriginal and Torres Strait Islander peoples and the impact of European settlement.

Week 3

Wednesday 15 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

- Introduction to analytical epidemiology and measures of association

**Essential preparation**

- Before coming to class, answer the short online quiz in NYU Classes to check your understanding of the following readings.
  - Webb & Bain: Chapter 5 pp 125-129 and pp 143-146 (measures of association, rate ratio, odds ratios)
Week 4

Wednesday 22 February

- Infectious disease outbreaks
  - Why investigate?
  - Methods of investigation
- Outbreak Investigation case study

Essential preparation
- Before coming to class, answer the short online quiz in NYU Classes to check your understanding of the following.
  - Read Webb & Bain: Chapters 12 and 13
  - Review information from Week 3 on calculating and interpreting relative risk and odds ratio

Week 5

Wednesday 1 March (8.30am – 12.00pm)

- Field trip to the Quarantine Station, North Head Scenic Drive, Manly.
  - The Quarantine Station operated between 1834 and 1984.
- Arrangements
  - Travel to Manly to the Quarantine Station via water taxi; 2 hour educational tour on public health and infectious diseases; return to city centre by approximately 12pm. There is an option to stay in Manly after the tour finishes and return via public transport at your own expense.

Essential Preparation
- Before joining field trip, read the information provided online about the Quarantine Station and review your understanding of modes of infectious disease transmissions and methods to control and prevent spread.

Assignment Due: Disease Fact Sheet Assignment Part 1 (5%) - Annotated Bibliography – 2.00pm, 3 March

Week 6

Wednesday 8 March

- Continue Outbreak Investigation case study
- Review of measures of association
- Review topics taught in Weeks 1-6; overview of Weeks 8-14

Essential preparation for mid-term review Quiz
- Notes and readings on infectious diseases and outbreak investigation from Week 4 class
- Revision of terminology and calculations taught in Weeks 1, 2 and 3.

Homework Assignment 1 (15%): Outbreak investigation – due 2.00pm, 10 March
**SPRING BREAK 13 – 17 March (Week 7)**

**Week 8**

**Wednesday 22 March**

- Design Strategies & Methods in Analytic Epidemiology - I
  - Using analytical study designs to investigate how and why disease occurs
  - Overview of study types - design, applications, hierarchy of evidence
  - Research questions, exposure and outcome factors, study populations

- Design Strategies & Methods in Analytic Epidemiology - II
  - Analytical observational studies - case control and cohort studies

**Essential Preparation**

- Before coming to class, answer the short online quiz in NYU Classes to check your understanding of the following.
  - Watch the following video on cohort and case-control studies: [https://www.youtube.com/watch?v=sGfIKmKMRdg&index=3&list=UUYFwBiKVpEMICGSOtw69VSw](https://www.youtube.com/watch?v=sGfIKmKMRdg&index=3&list=UUYFwBiKVpEMICGSOtw69VSw)
  - Read Webb & Bain: Chapter 4 pp94-112 and Chapter 6
  - Review previous work on calculating and interpreting measures of association (Relative Risk and Odds Ratio)

**Week 9**

**Wednesday 29 March**

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

**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 in Australia and several developing countries.

**Essential preparation**

- Before coming to class, answer the short online quiz in NYU Classes to check your understanding of the following.
  - Watch the following video on Randomized Controlled Trials: [https://www.youtube.com/watch?v=553TxUhtEbk&index=2&list=UUYFwBiKVpEMICGSOtw69VSw](https://www.youtube.com/watch?v=553TxUhtEbk&index=2&list=UUYFwBiKVpEMICGSOtw69VSw)
  - Review Webb & Bain: Chapter 4 pp 112-122
  - Go to the 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.
**Week 10**

**Wednesday 5 April**

- Design Strategies & Methods in Analytic Epidemiology – III (continued)
  - Extended in-class exercise on intervention study
- Design Strategies & Methods in Analytic Epidemiology - IV
  - The basics of study bias and its impact on study validity
  - Selection bias

**Essential preparation**
- Before coming to class, answer the short **online quiz** in NYU Classes to check your understanding of the following.
  - Read Webb & Bain: Chapter 7 pp167-181
  - Watch the following video on Selection Bias:
    [https://www.youtube.com/watch?v=iSKerlu3Pr0&index=1&list=UUYFwBiKVpEMICGSOtw69VSw](https://www.youtube.com/watch?v=iSKerlu3Pr0&index=1&list=UUYFwBiKVpEMICGSOtw69VSw)

**Due: Disease Fact Sheet Assignment Part 2 (0%) - draft PowerPoint slides and talks for review and feedback**

**Week 11**

**Wednesday 12 April**

- Design Strategies & Methods in Analytic Epidemiology - IV (continued)
  - measurement bias
  - confounding

**Essential preparation**
- Before coming to class, answer the short **online quiz** in NYU Classes to check your understanding of the following.
  - Read Webb & Bain: Chapter 7 and Chapter 8
  - Watch the following video on confounding (after reading Chapter 8)
    [https://www.youtube.com/watch?v=4s_QTi2AJ4k](https://www.youtube.com/watch?v=4s_QTi2AJ4k)

**Due: Homework Assignment 2 (15%) - Design of Epidemiological Studies – 2.00pm, 14 April**

**Week 12**

**Wednesday 19 April**

- Critical appraisal of a published paper
  - Applying knowledge of Design Strategies & Methods in Analytic Epidemiology
  - How to read and critique a published epidemiological study
  - Assessing the impact of bias on study findings
- Case Study: Reading and critiquing a paper
- Review of study error and bias to prepare for Homework 3 assignment
Essential Preparation (no quiz)

- Read Webb & Bain: Chapter 9
- Read the paper provided in the resources section of NYU Classes that we will critique in class. It is a study on low birth weight in rural Ethiopia.

Week 13

Wednesday 26 April

- Causal Inference and Synthesis of Evidence: does exposure X really cause disease Y in population P?
  - Understanding the role of chance, bias and confounding in study results
  - Bradford Hill criteria of causation; Systematic review of evidence

Essential Preparation

- Before coming to class, answer the short online quiz in NYU Classes to check your understanding of the following.
  - Read Webb & Bain: Chapter 10 and Chapter 11

Due: Homework Assignment 3 (15%) - Assessing Error, Bias and Confounding – due 2.00pm, 28 April

Week 14

Wednesday 3 May

- Screening for disease
  - Essential characteristics of screening tests and programs
  - Calculating and interpreting test sensitivity and specificity, and positive and negative predictive value
  - Ethical considerations of screening

Essential Preparation

- Before coming to class, answer the short online quiz in NYU Classes to check your understanding of the following.
  - Read Webb & Bain: Chapter 15
  - Watch the following video on sensitivity and specificity of screening tests: https://www.youtube.com/watch?v=Zsw2J29DV0s
  - Chapter 14 provides useful context on prevention of disease but is not essential.

Week 15

Wednesday 10 May

- Disease Fact Sheet Assignment – final presentation (15 minutes per group, including 10 minute presentation and questions from the class)
- End of term course review and wrap-up – ~1 hour

Due: Fact Sheet presentations (5%) – in class 10 May; and final Disease Fact Sheet (5%) – 2.00pm, 12 May

Final Exam (20%): Wednesday 17 May, 9:00 – 11:00am
Your Instructor

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 has developed and taught courses in epidemiology and biostatistics as well as immunisation policy and practice at the University of New South Wales and Sydney University. Glenda has also worked 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 is a current member of the WHO Working Party on Education and Training in Public Health. Glenda has extensive experience teaching epidemiology to public health students and has supervised PhD and Masters’ students undertaking applied epidemiology research projects evaluating a range of government public health programs.