

UGPH-GU 9030.SY1

Epidemiology for Global Health

Spring 2019

Instructor Information

- Dr. Glenda Lawrence, BSc (Hons I), PhD, MPH (Hons), MAppEpid
- Consultation by appointment – usually before or after class each Thursday
- gll4@nyu.edu (Please allow at least 24 hours for your instructor to respond to your emails)

Course Information

- Pre-requisite: None
- Thursdays: 9:00am – 12:00pm
- Room 301, NYU Sydney Academic Centre, Science House: 157-161 Gloucester Street, The Rocks NSW 2000

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 improve health outcomes. Consequently, epidemiology is often considered the basic science of public health. Everyone working in global health, public health and other areas of health needs to understand the basics of epidemiology to be able to understand and evaluate evidence that informs policies and programs to improve the health of populations. This course is designed to introduce students to the history, basic principles and methods of epidemiology. Topics covered in this course include 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 for disease; 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 required preparation is completed before coming to class including a weekly online quiz to check your understanding. This helps ensure that everyone is prepared and ready to actively participate in class discussions and exercises designed to provide an in-depth understanding of the topics we cover each week. 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.

Course Materials

Required Textbooks & Materials

- G Webb P, Bain C and Page A. *Essential Epidemiology* Third Edition, 2017. Cambridge University Press

It is a course expectation that you completed the essential preparation for each class, including required reading, watching required videos and completing the weekly online quiz. This will help you participate in class discussion and earn participation points.

Note: there is a useful glossary of terms at the back of the textbook (pp466-482). Also, information shown in Boxes marked with symbols including 'i' and a stethoscope icon are not required reading for class preparation but provide additional explanation and examples relevant to the topic (see pp xiii).

Additional online resources are available on NYU Class in the 'Resources' folder:

Supplemental Textbooks & Materials

(Not required to purchase; available in NYU SYDNEY Library)

- R Bonita, R Beaglehole and T Kjellström. [Basic Epidemiology](#). Second Edition, 2006. World Health Organization. (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.)
- Additional reading available on NYU Classes, which will include selected published papers.
- Videos are included as essential class preparation. Links are provided in this syllabus for each week.

Course Overview and Goals

Upon completion of this Course, students will be able 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.

Course Requirements

Short Weekly Pre-class Online Quizzes

Due 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

Active class participation by all students is an essential aspect of courses taught at NYU Sydney. In this course, students 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. *No or minimal weekly participation will result in a participation grade of F.*

Disease Fact Sheet Assignment and Presentation

Students will work in groups 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 in Week 1.

Homework Assignments

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

A multiple choice and short answer exam covering topics presented in Weeks 1 – 15 with emphasis on the topics presented in Weeks 8 – 15.

Grading of Assignments

The grade for this course will be determined according to the following formula:

Assignments/Activities	% of Final Grade	Due
Weekly Quizzes	10%	From Week 2
Class Participation	10%	Ongoing
Disease Fact Sheet and Presentation 1) Annotated Bibliography 2) Draft presentation (slides) 3) Fact Sheet Presentation 4) Final Fact Sheet	15%	1) 2pm, Fri 8 Mar 2) 2pm, Fri 12 Apr 3) 9am, Thu 16 May 4) 2pm, Fri 17 May
Homework Assignments	45%	2pm, Fri 15 Mar 2pm, Fri 19 Apr 2pm, Fri 3 May
Final Exam	20%	9-11am, Wed 22 May

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

Extra credit: Site policy does not allow grading of work outside of the assignments included in the syllabus. The final grade will only be calculated from the assessment components listed here and no other work, whether additional or substituted, is permitted.

Failure to submit or fulfill any required course component results in failure of the class

Letter Grades

Letter grades for the entire course will be assigned as follows:

Letter Grade	Explanation of 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.
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.
C	Satisfactory performance with some broad explanation and reasoning; the work will typically demonstrate an understanding of the course on a basic level.
D	Passable performance showing a general and superficial understanding of the course's topics; work lacks satisfactory insight, analysis or reasoned explanations.
F	Unsatisfactory performance in all assessed criteria. Work is unfinished or unsubmitted.

Grade Conversions

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

A	90 to 100
A-	86 to < 90
B+	82 to < 86
B	72 to < 82
B-	68 to < 72
C+	64 to < 68
C	54 to < 64
C-	50 to < 54
D+	45 to < 50
D	40 to < 45
F	0 to < 40

Course Schedule

Week 1: 7-Feb-19

- Introduction, course overview and expectations
- Consider the terms 'Epidemiology', 'Global Health' and 'Public Health'
- Introduction to the Fact Sheet Assignment
 - Allocation of groups; identifying group 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, Bain & Page Chapter 1 [**Note:** there is no online quiz this week]

Week 2: 14-Feb-19

- Measures of health and disease occurrence in populations
 - Vital statistics: birth, mortality
 - Measures of disease occurrence: incidence, prevalence, standardised rates
 - Using measures of frequency to investigate health disparities within populations
- Case study on incidence, prevalence and other measures of disease occurrence
 - Quantifying the burden of disease among Australian Aboriginal and Torres Strait Islander peoples

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 & Page: Chapter 2
 - The Summary and Introduction sections (**4 pages**) + browse graphs in the report by the Australian Institute of Health and Welfare (2014) on [Mortality and life expectancy of Indigenous Australians 2008-2012](#). (You can also download the PDF file from NYU Classes Week 2 Resources)
 - The Summary and Introduction sections (**3 pages**) of the report by the Australian Institute of Health and Welfare (2014) [Cardiovascular disease, diabetes and chronic kidney disease - Australian facts: Prevalence and incidence](#). (You can also download the PDF file from NYU Classes Week 2 Resources)
- 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: 21-Feb-19

- 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 & Page: Chapter 3; Chapter 4 pp 104-107 and 127-130 (cross-sectional and ecological studies).
 - Webb, Bain & Page: Chapter 5 pp 139-145 and pp 156-160 (measures of association, rate ratio, odds ratios – not attributable risk, we will cover this in class).

Week 4: 28-Feb-19

- Public health surveillance and infectious disease outbreaks, epidemics and clusters
 - Why investigate outbreaks?
 - Methods of investigation
- Case study: investigating a disease outbreak

Essential preparation

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

Week 5: 7-Mar-19 (start at 8.30am)

- 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 NYU 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 the field trip, read the information provided online about the [Quarantine Station](#) and review your understanding of modes of transmission infectious of diseases and methods to control and prevent their spread among people.

Assignment Due: Disease Fact Sheet Assignment Part 1 (5%) - Annotated Bibliography – 2.00pm, 8 March

Week 6: 14-Mar-19

- 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 revision 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, 15 March

Week 7: 18 – 22 Mar

SEMESTER BREAK – No Class

Week 8: 28-Mar-19

- 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 video on [cohort and case-control studies](#)
 - Read Webb, Bain & Page: Chapter 4 pp 114-126 (review pp 127-130)
 - Read Webb, Bain & Page: Chapter 6
- Review previous work on calculating and interpreting measures of association (i.e. Relative Risk and Odds Ratio)

Week 9: 4-Apr-19

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

Guest Lecture: Dr Patricia Cullen, Injury Division, George Institute for 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 video on [Randomized Controlled Trials](#)
 - Review Webb, Bain & Page: Chapter 4 pp 104-114 and pp130-134
 - Watch the video on [research ethics](#)

Week 10: 11-Apr-19

- Design Strategies & Methods in Analytic Epidemiology – III (continued)
Extended in-class exercise on an 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 & Page: Chapter 7 pp185-200 and Chapter 9 pp248-253.
 - Watch the video on [Selection Bias](#)

Disease Fact Sheet Assignment Part 2 (0%) - draft PowerPoint slides and presentations for review and feedback – due 2.00pm, 12 April

Week 11: 18-Apr-19

- 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 & Page: Chapter 7 pp200-214; Chapter 8; Chapter 9 pp253-263
 - Watch the video on [confounding](#) (after reading Chapter 8)

Homework Assignment 2 (15%) - Design of Epidemiological Studies – due 2.00pm, 19 April

Week 12: 26-Apr-19

NO CLASS ON THU 25 APR – ANZAC HOLIDAY. MAKE UP DAY IS FRI 26 APR

- Critical appraisal of a published paper describing an epidemiological study
 - Applying knowledge of Design Strategies & Methods in Analytic Epidemiology (I-IV)
 - How to read and critique a published epidemiological study
 - Assessing the impact of bias on study findings
- Case Study: How to reading and critique a published epidemiological study
- Review of study error and bias to prepare for Homework 3 assignment

Essential Preparation (no quiz)

- Read Webb, Bain & Page: 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: 2-May-19

- 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 & Page: Chapter 10 and Chapter 11

Homework Assignment 3 (15%) - Assessing Error, Bias and Confounding – due 2.00pm, 3 May

Week 14: 9-May-19

- 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 & Page: Chapter 14 pp 356-362, Chapter 15
 - Watch the video on [sensitivity and specificity of screening tests](#)

Week 15: 16-May-19

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

Due: Fact Sheet presentations (5%) – in class 16 May; and final Disease Fact Sheet (5%) – 2.00pm, 17 May

Final Exam: 22-May-19 (9-11am)

Course Policies

Submission of Work

Assignments (excluding in-class presentations and exams) must be submitted electronically via NYU Classes. It is the student's responsibility to confirm that the work has been successfully uploaded. In the unlikely event that a submission to Classes fails, students must immediately submit the work to the Academic Programs Coordinator via email before the original submission deadline accompanied by an explanation of the issue. All in-class presentations and exams must be completed during the scheduled class time. An assessment component is considered completed when the student has met all the terms for that assessment component as outlined by the instructor.

An assessment component completed after the deadline 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. Work completed beyond five weekdays after the due 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 assessment component will result in failure of

the course, it is crucial for students to complete every assignment even when it will receive a mark of 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.

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 the Academic Programs Coordinator within three days of the absence in order to be medically excused. The note must be obtained from a medical professional licensed to practise in Australia. 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 Coordinator.

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.

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. In all classes we expect that students will follow the common classroom expectations outlined here in order to support constructive and effective classroom experience.

- 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.
- Be mindful of the space you take up in class and make space for others.
- Listen actively and be engaged and present when others are speaking.
- Do not use profanities in class discussion (they may still occasionally appear in course readings and assignments where considered appropriate)
- Criticise ideas, not people (groups and individuals).
- Use 'I' statements when giving opinions. Don't try to speak for any group with which you identify.

You will be advised if there are additions to these common procedures for participation in this class

Inclusion, Diversity, Belonging 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.

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 or mosescsd@nyu.edu as soon as possible to better ensure that such accommodations are implemented in a timely fashion.

Instructor Bio

Professor Glenda Lawrence (BSc (Hons I), PhD, MPH (Hons), MAppEpid) is a University of New South Wales (UNSW) conjoint professor and 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 and has developed and taught courses in epidemiology and biostatistics as well as immunisation policy and practice at the University of New South Wales (UNSW) 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 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 Tibet. Glenda has extensive experience teaching epidemiology to public health students. She has received several awards for teaching excellence and is a member of a WHO Working Party on Education and Training in Public Health. Glenda has also supervised many Doctorate and Masters' students undertaking applied epidemiology research projects evaluating government funded public health programs.