

**Epidemiology and Biostatistics 3330b: Medical Epidemiology**  
**Course Outline – Winter 2010**

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**Classes:** Tuesday 3:30 – 5:30  
 Room K103 Kresge Building

**Required Textbooks:**

Gordis, Leon (2009), *Epidemiology, 4th Edition*, Philadelphia: Elsevier Saunders

Custom Course Material (available at the U.W.O. Bookstore)

**Useful Resource:**

Porta, Miguel (ed). (2009) *A Dictionary of Epidemiology, 5<sup>th</sup> Edition*, New York: Oxford University Press. Taylor Desk 2 hr. [WA13.D553 2008](#) Brescia No Loan [RA651.D55 2008](#)

Date		Topics and Readings (Gordis)	Lab weeks and Assignments (DUE IN CLASS)
Jan.	5	Introduction to Epidemiology; Causation; Disease Transmission ( <i>Chapters 1 &amp; 2</i> )	
	12	Measuring Occurrence of Disease; Natural History of Disease ( <i>Chapters 3, 4 &amp; 6</i> ) <i>Note: Direct and indirect age adjustment (pg. 70-74) – optional/for background only.</i> <b>*Assignment #1 posted on WebCT</b>	Lab #1 week
	19	Cohort, Case-Control and Cross-Sectional Studies ( <i>Chapters 9 &amp; 10</i> )	<b>Assignment #1 DUE</b>
	26	Estimating Risk ( <i>Chapter 11</i> ) <b>*Assignment #2 posted on WebCT</b>	Lab #2 week
Feb.	2	Estimating the Potential for Prevention ( <i>Chapter 12</i> ) Review, and Cohort vs. Case-Control Studies ( <i>Chapter 13</i> )	<b>Assignment #2 DUE</b>
	9	<b>Mid-Term Exam (In Class)</b>	
	16	<i>CONFERENCE WEEK</i>	
	23	Bias, Confounding and Interaction ( <i>Chapter 15</i> ) <b>*Assignment #3 posted on WebCT</b>	Lab #3 week
Mar.	2	From Association to Causation ( <i>Chapter 14</i> )	<b>Assignment #3 DUE</b>
	9	Assessing the Validity and Reliability of Diagnostic and Screening Tests ( <i>Chapter 5 &amp; 18</i> ) <b>*Assignment #4 posted on WebCT</b>	Lab #4 week
	16	Randomized Trials ( <i>Chapters 7 &amp; 8</i> )	<b>Assignment #4 DUE</b>
	23	Special Topics and Applications <b>*Assignment #5 posted on WebCT</b>	Lab #5 week
	30	Course Review	<b>Assignment #5 DUE</b>

**Notes will be posted on WebCT before each lecture.**

**Evaluation:**

**5 Assignments** (each worth 5%) 25%

- 4% for submitted assignment
- 1% for lab attendance

**Mid-term exam\*** (multiple choice/short answer) 35%

**Final exam\*** (multiple choice, cumulative over course) 40%

\* Bring a calculator. You are allowed one sheet of formulae which must be handed in.

**Labs:**

Location: Educational Resource Centre, Medical Sciences Building M150

**Section 003:** Thursdays, 9:30 a.m. – 11:30 a.m.

**Section 002:** Fridays, 10:30 a.m. – 12:30 p.m.

Please bring your course text & custom course material to each lab.

*Note: the last half hour of each lab will serve as the T.A.'s office hours for those weeks. On non-lab weeks, T.A. office hours will be by appointment only.*

Lab	Date	Relevant Readings (Text and Custom Course Material)	Topics
1	Jan. 14 Jan. 15	Chapter 3 & White et al. (1999) <b>*Bring assignment #1</b>	Prevalence, 95% CI's, Sample Size, Precision
2	Jan. 28 Jan. 29	Chapter 11 & Tinetti et al. (1988) <b>*Bring assignment #2</b>	Odds Ratios, Risk Ratios, 95% CI's
3	Feb. 25 Feb. 26	Yun & Choi (1990) & Yun & Choi (1998) <b>*Bring assignment #3</b>	Stratified Analysis & Test for Trend
4	Mar. 11 Mar. 12	Chapter 15 & Bell et al. (2001) <b>*Bring assignment #4</b>	Confounding & Interaction
5	Mar. 25 Mar. 26	Chapter 5 <b>*Bring assignment #5</b>	Sensitivity & Specificity, Likelihood Ratios

**Assignments:**

- All assignments will be posted on WebCT: <http://webct.uwo.ca>
- Assignments are due at the **BEGINNING** of class on the date specified.
- 10% penalty if handed in by **4:00pm Tuesday** to a staff member in the main office, Department of Epidemiology & Biostatistics, Room K201, Kresge Building.
- 20% penalty if handed in by **4:00pm Wednesday** (follow the above procedure).
- **Assignments will receive a mark of zero after 4:00 pm Wednesday of week due.**

**PLEASE READ THE FOLLOWING IMPORTANT POLICIES:**

**ACADEMIC DISHONESTY:** *The submission of a fraudulent assignment is a Scholastic Offence as outlined in Senate Regulations in the Western Academic Calendar. The submitted assignment must be the student's independent work (you must complete the assignment by yourself in your own words). This does not preclude discussions or clarification on problems with the professor, teaching assistant, or fellow classmates. If in doubt, please ask.*

**MISSED EXAMINATIONS:** *Senate policies must be followed before arrangements for make-up examinations will be considered.*

## **A note from the Professor: What is epidemiology? What will I get from the course?**

Formal definitions abound, and will be discussed in class. My informal working definition of Epidemiology is ‘*the branch of medical science that discovers the factors that i) keep us healthy, ii) make us sick, and iii) help us get better again*’. Factors in i) are also studied under the general heading of ‘health promotion’; the study of ii) is often called ‘etiologic’ research, while iii) is ‘therapeutic’ research.

The study of factors responsible for human health and disease is inherently multidisciplinary, and epidemiology operated this way long before it became fashionable. Practitioners come mostly from backgrounds in behavioural, biological and social sciences, basic medical sciences, health professions, and statistics. It can be a challenge for people from such varied backgrounds to learn a new terminology and unfamiliar statistical methods. The payoff is that people who have formally studied epidemiology tend to ‘think like epidemiologists’ when they approach any given question pertaining to human health. For example, one mantra you will learn is to ask “Who is in the denominator?” whenever you read a percentage figure. If you master the course content you will be equipped to critically appraise research findings using a sophisticated set of skills, and you will never read a newspaper story about the latest health hazard or health fad the same way again.

Epidemiology has emerged as an influential science underlying health policy. The findings of epidemiologic research are partly responsible for massive changes in human behaviours over the past 50 years. Much of what we know about risks to human health due to diet, tobacco use, physical inactivity, occupational exposures, sexual behaviours, etc. come from the application of epidemiologic methods to human populations. If in your day to day life you engage in (or avoid) certain behaviours because you believe they will affect your health, the chances are good that you are applying findings discovered using epidemiologic methods.

Sometimes the claim is made that epidemiology cannot discover true causes. I think this is a mistaken view because it confuses the identification of potentially causal *factors* with the elucidation of causal *mechanisms*. No one today seriously disputes that heavy long-term cigarette smoking increases the risk of lung cancer, even though the causal mechanisms weren’t well understood in 1950 when the first epidemiologic studies were published. Epidemiologists identify ‘what’ (risk and protective factors), while basic medical scientists figure out ‘how’ (causal mechanisms). The applied and basic health scientists depend on each other.

There are many other examples where a risk factor was first discovered using the methods of epidemiology: in the early 1980s, two small epidemiology studies implicated aspirin given to children with a viral illness as a possible cause of Reye’s Syndrome. Based on these studies, warnings were put on aspirin packaging. As physicians and parents gradually stopped giving aspirin to children with viral illnesses, the number of cases of Reye’s syndrome (U.S. data) went from 555 (1980) to 100 (1986) to 2 (1997). (*Arch Intern Med.* 2002;162:249-254). A reasonable interpretation is that aspirin is a true cause of Reye’s syndrome, even though over a quarter of a century later, we still do not have a good understanding of the causal mechanism.

The point is that if an epidemiologic finding is correct and we fail to act out of scientific prejudice, we will miss an opportunity to prevent needless illnesses and deaths, for each day we fail to act. However, not all factors turn out to be causal, and we will be wrong from time to time. This requires us to think carefully about both the positive and negative consequences if we act on a factor that isn’t a true cause, versus if we fail to act on one that is.

Epidemiology requires an understanding of the scientific method applied to human populations as they actually live. This demands a larger tolerance for uncertainty than you may find among some laboratory-trained scientists. At the same time it requires a firmer commitment to the scientific method, and to logic and reason, than you may find among some other approaches to the study of human health. If you can find that balance, you will discover a science that has played and continues to play a huge role in improving the health of human populations.