

**SAINT LOUIS UNIVERSITY  
SCHOOL OF PUBLIC HEALTH  
DEPARTMENT OF COMMUNITY HEALTH  
DIVISION OF EPIDEMIOLOGY**



**EPIC-601-01  
ADVANCED EPIDEMIOLOGY METHODS  
Summer Semester 2006**

**Syllabus**

**Meeting Dates and Times:**

May 2, 9, 16, 23, 30, June 7, 14, 21, 28, July 11, 18 (8:30 a.m. - noon)  
May 4 (9:00-11:00 a.m.) for students selecting cancer research projects

**Location:**

Salus Center, Classroom 1501

**Instructors:**

Terry Leet, PhD  
Associate Professor  
3545 Lafayette Ave.  
Room 475  
St. Louis, MO 63104  
Office: 314-977-8126  
Fax: 314-977-3234  
Email: LEETTL@SLU.EDU

Anjali Deshpande, PhD  
Assistant Professor  
3545 Lafayette Ave.  
Room 479  
St. Louis, MO 63104  
314-977-4352  
314-977-3234  
DESHPAAD@SLU.EDU

**Office Hours:**

After class and by appointment

## **Course Overview**

Introduction: This course is the third part of the three-semester sequence of introductory epidemiology methods courses required of students pursuing a graduate degree with a concentration in epidemiology at Saint Louis University. This course provides students with the opportunity to evaluate perinatal and cancer research questions by completing an epidemiologic study. During the 12-week course, students will complete 1) a literature review, 2) a research study proposal, 3) the web-based education module for Institutional Review Board (IRB) and Health Insurance Portability and Accountability Act (HIPAA) awareness training, and 4) an original epidemiologic study. Prerequisites for the course include the successful completion of EPIC-501 (Epidemiology Methods I), EPIC-502 (Epidemiology Methods II), BSTC-500 (Principles of Biostatistics) and BSTC-510 (Introduction to General Linear Models).

Purpose: The purpose of this course is 1) to apply epidemiologic and biostatistic skills for designing and analyzing epidemiologic studies, 2) to gain skills by working effectively with others as team members, and 3) to gain skills by presenting study results orally and in writing.

## **Course Description**

Course Format: Each student will complete an original epidemiologic study for the course. Students will work together to evaluate the potential risks for adverse pregnancy outcomes or specific cancers. Each student team will design and analyze a population-based cohort, case-control, or cross-sectional study using data from linked Missouri birth-death certificate or national Surveillance Epidemiology, and End Results (SEER) files. Each student will sign a confidentiality agreement before obtaining the required data for their student project. Students who choose to publish their work must obtain IRB and HIPAA approval from Saint Louis University and/or Washington University before submitting their manuscript and must submit their manuscript for publication within one year of completing the course. Student not complying with these requirements will forfeit primary authorship.

Each student team will select a topic from the list of hypotheses (Appendix A) provided by clinicians and public health professionals at Saint Louis University and Washington University. Each team should select alternative topics since a specific topic may be the first choice for more than one team. The student with the lowest number selected randomly during the first class will have first choice of topics in the event of multiple interests.

After completing the literature review and formulating the hypothesis for the study, the team will be given a SPSS file containing data for specific covariates from one of the following files:

- Missouri linked birth-death certificate files for years 1990 – 2004
- Missouri birth defects registry for years 1993 – 2004

- Missouri maternally-linked cohort for years 1978 – 1997
- SEER files for years 1973-2003

Students will use Mantel-Haenszel stratified analysis and logistic regression to analyze their data. Each team will present their study results as an oral presentation and a written report in the form of a journal article. All written assignments must be typewritten and double-spaced, using times new roman font 12 and one-inch margins. Since the duration of the course is only 12 weeks, a schedule denoting the due dates for specific components of your project is provided (Appendix B). In the past, students have reported spending 20-30 hours per week to complete course assignments. The instructors will be available for assistance during scheduled class times and by appointment.

#### Student Expectations and Requirements:

- It is very important that you attend all classes. The information needed to master the course objectives will be presented and discussed in class. Students who miss more than one class will be asked to re-take the course at a later time.
- It is very important that you complete the assigned readings before or shortly after each lecture. The readings have been selected to complement the lectures and will provide additional examples for applying basic epidemiologic and biostatistic methods.

#### Instructor Expectations and Requirements:

- We will come to class prepared, organized, and enthusiastic.
- We will critique all weekly assignment and give you our comments at the beginning of each class session.
- We will be available during normal business hours to answer any questions that you may have about the course. If your schedule precludes you from meeting with us during normal business hours, we will make every effort to meet with you at times that may be more convenient for you. Please feel free to contact us by telephone or the Internet to discuss any issues concerning the course.
- We retain the right to change the order of the lectures and the content of the class to meet the needs of the majority of students enrolled in the course.

**Grading Determination and Policy:** The final grade for each team will be based on timely completion of weekly assignments (50 points total) and the overall quality of the in-class oral presentation (50 points) and final report (50 points) for the team's research project. Assignments and reports completed individually or submitted after assigned due dates will not be accepted. Final grades will be given in accordance with guidelines from the Graduate School.

<u>Grades</u>	<u>Total Points</u>	<u>Grades</u>	<u>Total Points</u>
A	140-150	B-	120-124
B+	135-139	C	110-119
B	125-134	F	<110

**Academic Integrity Policy:** Consistent with the decision reached by the Department of Community Health faculty in spring 2001, all students enrolled in MPH or PhD program courses are expected to abide by and uphold the Saint Louis University Graduate School's Policy on Academic Integrity and Ethics. This policy is reprinted below:

*The University is a community of learning; its effectiveness requires an environment of mutual trust and integrity. As members of this community, students share with Faculty and Administrators the responsibility to maintain this environment. Academic integrity is violated by any dishonesty in submitting for evaluation assignments, tests, research, reports, etc., required to validate the student's learning. In a case of clear indication of such dishonesty, the Faculty member or Administrator has the responsibility to apply sanctions to protect the environment of integrity necessary for learning.*

*Although not all forms of academic dishonesty can here be listed, the instances listed below should be seen as actions that not only violate the mutual trust necessary between Faculty and students, but they also undermine the validity of the University's evaluation of students and take unfair advantage of fellow students. Soliciting, receiving, or providing any unauthorized assistance in the completion of any work submitted toward academic credit is dishonest.*

*Examples of academic dishonesty would be copying from another student, copying from a book or class notes during a closed-book exam, submitting materials authored by or editorially revised by another person but presented as the student's own work, copying a passage or text directly from a published source without appropriately citing/recognizing that source, taking a test or doing an assignment or other academic work for another student, or securing or supplying in advance a copy of an examination without the knowledge or consent of the Instructor.*

*Any clear violation of academic integrity will be met with sanctions. In a case of dishonesty within a course, the Instructor may assign an appropriate grade and/or recommend further sanctions to the Dean. The Dean may, in a clearly serious instance of apparent or alleged academic dishonesty, appoint and ad hoc committees to hear, judge, render an opinion, and, if warranted, recommend sanctions. The Dean is responsible for the final decision and notifications of all associated parties.*



## ADVANCED EPIDEMIOLOGY METHODS

### Appendix A EPIC-601 Topics

---

#### Perinatal Epidemiology

1. Some labor and delivery specialists believe that the number of deliveries and obstetric complications are influenced by certain phases of the lunar cycle. Specific obstetric complications include premature rupture of membranes, breech presentations, preterm deliveries, and cesarean sections. Determine if there is a relationship between the lunar cycle and the incidence of specific obstetric complications for Missouri residents.
2. Obese women have a higher risk of developing preeclampsia than leaner women. Women who gain excessive gestational weight during their pregnancy are also more likely to develop preeclampsia. What are the neonatal risks for obese and leaner women who develop preeclampsia?
3. Intrauterine growth retardation (IUGR) occurs ten times more frequently in twin than singleton infants. Twins are also more likely to be born preterm. Does the different combination of twins with IUGR, i.e., both twins IUGR, only one IUGR, and neither IUGR, affect their risk of preterm labor?
4. Some women with prior pregnancy complications are at greater risk for the same complications in subsequent pregnancies. Is the same true for women who deliver twins in a prior pregnancy? Are they more likely to have higher complication risks due to malpresentation, intrauterine growth restriction, post-partum hemorrhage, operative delivery, or preterm delivery in their subsequent pregnancy?
5. Some investigators believe that women who delivery more than one infant during their teenage years have higher infant mortality rates. Are infant mortality rates truly higher for women who deliver more than one infant as teenagers compared to other age groups?
6. Previous studies have shown a relationship between maternal body size, race/ethnicity and infant birth weight over time. Has there been an increase in birth weights for Missouri infants during the past 15 years?

7. Induction of labor is a common procedure for pregnant women. Nulliparous women with induction of labor appear to have higher risks for specific pregnancy-related complications compared to women with spontaneous onset of labor. Do multiparous women with induction of labor have similar risks?
8. Patients with prolapse often ask if they are at increased risk for this condition if there is a history of prolapse in their family. Determine if there is an association between family history and the risk of developing prolapse.
9. About 15% of women who develop preeclampsia during their first pregnancy will experience the same condition during their second pregnancy. Prior research has shown that the risk of recurrent preeclampsia is dependent upon maternal body size and gestational weight gain. Does change in maternal body size between pregnancies affect the recurrent preeclampsia risk?
10. Some women with prior pregnancy complications are at greater risk for the same complications in subsequent pregnancies. For example, the risk of preterm delivery among multiparous women is influenced by whether her prior births were both preterm, both full term, or a combination of each. Is the risk of preeclampsia among multiparous women also influenced by similar combinations of prior events?
11. The Institute of Medicine (IOM) recommends that overweight woman gain 25-35 pounds during her pregnancy to lower their risk of having a low birth weight or intrauterine growth retarded infant. However, only 40% of overweight women comply with these recommendations. Does total gestational weight gain affect the risk of adverse pregnancy outcomes for overweight women?
12. Underweight women are at greater risk than normal weight women of having a low birth weight or intrauterine growth retarded infants. The current IOM recommendation for total gestational weight gain is 28-40 pounds for underweight women. Does total gestational weight gain affect the risk of adverse pregnancy outcomes for underweight women?
13. The independent effects of cigarette smoking and obesity on the incidence of low birth weight (LBW) infants are well documented. Studies examining the joint effect of cigarette smoking and obesity have reported an increased risk of LBW infants for cigarette smokers among leaner and obese women. Is the association between cigarette smoking and LBW influenced by gestational weight gain for these two populations of pregnant women?

### **Cancer Epidemiology**

1. Among women with multiple myeloma, what is the incidence and median age at diagnosis of uterine corpus (endometrial) cancer? Does it differ from that of the general population?
2. Among women with endometrial cancer, what is the frequency of hereditary non-polyposis colorectal cancer (HNPCC) -related and non-HNPCC-related malignancies? How could this affect the absolute potential number of women who could benefit from prophylactic surgery (as recently recommended by K. Lu's group, see NEJM 2006; 354: 261-9).
3. What differences are there in the use of breast-conserving surgery and mastectomy among African Americans relative to whites for contralateral relative to first primary breast cancer?
4. African Americans tend to have lower referral rates and higher refusal rates for surgical treatment for early stage non-small cell lung cancer (NSCLC). Using SEER data, what are the rates for African Americans versus whites and is there effect modification by county-level racial composition or income (geographic variation)?
5. Prostate cancer is the leading type of new cancer cases and the second leading type of cancer deaths among African American men. In the United States for the period 1997-2001, the mortality rate for African American men with prostate cancer was 2.4 times higher than the rate for White men. There is evidence that African American men are diagnosed at a later stage of disease or that they have a more aggressive form of cancer. Others have suggested that perhaps African American men with prostate cancer are "sicker" overall than their White counterparts. Are African American men who die with prostate cancer more likely to have comorbid conditions, that may contribute to their death, than White men with prostate cancer?
6. Five year survival rates for women with cervical cancer are highest for women with localized stage at diagnosis, lower for regional stage and lowest for distant stage. Among the cervical cancer patients treated at BJC Healthcare, does comorbidity status modify the association between stage at diagnosis and five year survival?
7. Is there a difference in lung cancer survival rates, treatment or tumor characteristics (histology, stage at diagnosis, etc.) by geographic region (tobacco versus non-tobacco states or rural versus urban areas)?
8. Women with stage 4 breast cancer generally do not receive surgical treatment. However, there is some suggestion that surgery may actually improve their survival. What do the survival distributions look like for women with stage 4 cancer that have had surgery versus those without surgery?

What do other outcomes, such as contralateral breast cancer occurrence, look like in these groups?

9. What are the tumor and patient characteristics associated with receiving surgery for women with stage 4 breast cancer?
10. What are the characteristics of women with advanced cervical cancer, or the SEER registries they are captured within, who received treatment according to the National Cancer Institute treatment guidelines for advanced cervical cancer versus those who did not?



## ADVANCED EPIDEMIOLOGY METHODS

### Appendix B Schedule

---

<u>Date</u>	<u>Topic</u>	<u>Readings*</u>
05/02/06	Course overview	handout
05/04/06*	Obstetrics <u>or</u> cancer overview*	
	<b><u>Due May 9:</u></b> Meet with clinical mentor	
05/09/06	Research proposal <ul style="list-style-type: none"> <li>• Introduction</li> </ul> Literature review <ul style="list-style-type: none"> <li>• Medline/Pubmed demonstration</li> </ul>	handout
	<b><u>Due May 16:</u></b> Submit preliminary research proposal (introduction & literature review spreadsheet)	
05/16/06	Research proposal <ul style="list-style-type: none"> <li>• Methods</li> </ul>	KW:14&15
	<b><u>Due May 23:</u></b> Submit preliminary research proposal (introduction & methods)	
05/23/06	Research proposal <ul style="list-style-type: none"> <li>• Methods</li> </ul>	KW:14&15
	<b><u>Due May 30:</u></b> Submit preliminary research proposal (introduction & methods)	
05/30/06	IRB & HIPAA	handout
	<b><u>Due June 2:</u></b> Submit final research proposal.	
	<b><u>Due June 6:</u></b> Complete IRB & HIPAA training	

06/06/06	Data management <ul style="list-style-type: none"> <li>• data editing</li> <li>• recoding</li> <li>• univariate analysis</li> </ul>	handout
	<b><u>Due June 13:</u></b> Submit preliminary report & table 1	
06/13/06	Stratified analysis <ul style="list-style-type: none"> <li>• confounding &amp; effect modification</li> </ul>	KW:11, PG:14&15
	<b><u>Due June 20:</u></b> Submit preliminary report & tables 1 & 2	
06/20/06	Logistic regression <ul style="list-style-type: none"> <li>• confounding</li> </ul>	K:3,6
	<b><u>Due June 27:</u></b> Submit preliminary report & tables 1 & 3	
06/27/06	Logistic regression <ul style="list-style-type: none"> <li>• effect modification</li> </ul>	K:7
	<b><u>Due July 5:</u></b> Submit preliminary report & tables 1 & 4	
	<b><u>Due July 11:</u></b> Submit abstract	
07/11/05	Presentation of study results <ul style="list-style-type: none"> <li>• guidelines for oral presentations</li> <li>• guidelines for written presentations</li> </ul>	handout
	Student evaluations	
	<b><u>Due July 14:</u></b> Submit revised abstract	
07/18/05	Oral presentations	
	<b><u>Due July 31:</u></b> Submit final report	

---

\*Kleinbaum (K), Koepsell & Weiss (KW), Pagano & Gauvreau. (PG): chapters

### Recommended Texts

- Kleinbaum DG. *Logistic Regression: A Self-Learning Text*, second edition. Springer-Verlag, Inc., 2003 ISBN: 0-387-94142-8
- Koepsell TD and Weiss NS. *Epidemiologic Methods: Studying the Occurrence of Illness*. Oxford University Press, 2003. ISBN: 0-19-515078-3
- Pagano M and Gauvreau K. *Principles of Biostatistics*, second edition. Duxbury Thomas Learning, 2000. ISBN: 0-534-22902-6