

**M19-512 Intermediate Biostatistics for Clinical Research (3 credit)**

Fall 2020

Mondays and Wednesdays, 9:00 to noon

Location: Anywhere with Canvas Zoom available

**INSTRUCTORS:** Yan Yan, MD, MA, MHS, Ph.D  
Professor of Surgery (Clinical epidemiology) and Biostatistics

**TEACHING ASSISTANT:** Nicole Ackermann, MPH.

**OFFICE HOURS:** By appointment with zoom meeting

**PREREQUISITES:** M19-511 or consent by instructor

**TARGET AUDIENCE:** medical students, clinicians, clinical and population health researchers

**COURSE DESCRIPTION & OBJECTIVES:** This course is a continuation of the introductory course (M19-511). The topics include basic statistical concepts and methods for various types of clinical data (continuous, categorical, count, and time-to-event outcome data). Through lectures, SAS labs, homework assignments, and final project, students will learn the concepts and methods for those types of clinical outcome data, and will develop certain computing skills using SAS software.

**COMPETENCIES:** After completing the course, students should (1) understand the basic statistical concepts and methods for the four types of clinical outcome data, (2) be able to address clinical research questions using these concepts and methods, (3) be able to perform data analyses on these types of data with SAS software, and (4) be able to interpret the results in the context of clinical research.

**GRADING**

Your grade will be based on:

- Class participation (10%)
- HW 1 – HW 6: (50% total, each assignment 1/6\*50%)
- Final project (40%)

**Grading Scale :**

A+: 97-100; A: 93-96; A-: 90-92; B+: 87-89; B: 83-86; B-: 80-82; C+: 77-79; C: 73-76; C-: 70-72

**ATTENDANCE AND PARTICIPATION**

Zoom class meeting is required. More than two unexcused absence from Zoom class meeting result in 0 point from class participation.

**POLICY ON LATE ASSIGNMENTS**

Late assignments will result in a deduction of 20% of the assignment for each day late (including weekends) unless prior approval is obtained from the instructor or a compelling situation prevents prior approval (i.e. documented health issues or family emergencies).

### ASSIGNMENTS & DUE DATES

Class	Date	Topics	Assignment Due	Readings
1	10/19	Course overview and simple linear regression (HW1 distributed on 10/14)		DiMa: chap 13.1-13.3 D&E: chap 7.3 SAS: Proc GLM, REG
2	10/21	Multiple linear regression HW2		DiMa: chap 13.4-13.5, 14.6 D&E: chap 8.1-8.4 SAS: Proc GLM, REG
3	10/26	Diagnostics for linear regression model		DiMa: chap 41.1-14.5 D&E chap 8.5 SAS: Proc GLM, REG
4	10/28	Binomial distribution, maximum likelihood estimation, and simple logistic regression HW3	HW1	K&K: chap 4 SAS: Proc logistic
5	11/2	Multiple logistic regression		K&K: chap 3. SAS: Proc logistic
6	11/4	Assessing binary logistic regression models HW4	HW2	D&E: chap 9.4 K&K: chap 9, 10 SAS: Proc logistic
7	11/9	Logistic regression for case-control and matched designs		DiMa: chap 9.1, 9.2, 9.7 D&E: chap 9.5 SAS: Proc logistic
8	11/11	Logistic regression for nominal outcome HW5	HW3	K&K: chap 12 SAS: Proc logistic
9	11/16	Logistic regression for ordinal outcome		K&K: chap 13 SAS: Proc logistic
10	11/18	Poisson distribution, Poisson regression, over-dispersion HW6 / Final project		D&E: chap 10.3.1, 10.5 SAS: Proc Genmod
11	11/23	Zero-inflated Poisson model	HW4	Ref papers SAS proc Genmod
12	11/25	Introduction to survival analysis, KM method		D&E: chap 15.1-15.3 SAS: Proc lifetest
13	11/30	Cox's PHM	HW5	D&E: chap 16.2.1, 16.2.2 SAS: Proc phreg
14	12/2	Assessing Cox's PHM		D&E: chap 16.2.3, 16.2.4 SAS: Proc phreg
15	12/7	Q and A for final project	HW6	
16	12/9		Final project	

**Reference texts:**

1. Der, G., Everitt, B.S., Applied Medical Statistics using SAS, CRC Press, 2013. **(D&E)**
2. DiMaggio, C., SAS for Epidemiologists: Applications and Methods, Springer, New York, 2013. **(DiMa)**
3. Kleinbaum, D.G., Klein, M., Logistic Regression: A Self-Learning Text, 3<sup>rd</sup> edition, Springer, New York, 2010. **(K&K)**
4. SAS help documents in SAS software system.  
The first three books are E-books from Becker library.

**DROP DATES**

You may drop for any reason during the course of the semester. However, you may only receive a partial or no tuition reimbursement depending upon how far into the semester you drop the course. See the [MPHS Student Handbook](#). Late withdrawals will appear on your transcript as a withdrawal.

**MPHS Academic Policy Guidelines:**

Guidelines regarding MPHS course registration and enrollment, grades, tuition obligation, and academic leave are consolidated in the [MPHS Student Handbook](#). Please review this document.

**MPHS Guidelines for Academic and Non-Academic Transgressions:**

By registering for this course you have agreed to the terms of the **MPHS Academic Integrity Policy, outlined below and in more detail in the [MPHS Student Handbook](#)**. Please review this policy before submitting your first graded assignment.

**Academic Integrity/Plagiarism Policy:**

- Academic dishonesty is a serious offense that may lead to probation, suspension, or dismissal from the University. Academic dishonesty includes plagiarism (the use of someone else's ideas, statements, or approaches without proper citation). Academic dishonesty also includes copying information from another student, submitting work from a previous class for a new grade without prior approval from your instructor, cheating on exams, etc. You are responsible for reviewing [WashU's academic integrity resources](#) to become aware of all the actions that constitute academic dishonesty.
- All instances of academic dishonesty will be reported to the Office of the Registrar for investigation and potential disciplinary action. In addition, the instructor will make an independent decision about the student's grade on any assignment in question. The MPHS process regarding academic dishonesty is described in the [MPHS Student Handbook](#)

**DISABILITY RESOURCES**

It is the goal of Washington University to assist students with disabilities in removing the barriers their disabilities may pose and provide support in facing the challenge of pursuing an education at Washington University.

Washington University recognizes and accepts its professional, legal and moral responsibility to avoid discrimination in the acceptance and education of qualified students with disabilities and to provide reasonable accommodations to such students consistent with the principles embodied in the law. These guidelines apply to students seeking admittance as well as to those who become disabled while they are enrolled.

Washington University makes every effort to insure that all qualified applicants and students can participate in and take full advantage of all programs and opportunities offered within the university. Washington University encourages and gives full consideration to all applicants for admission. Washington University does not discriminate in access to its programs and activities on the basis of age, sex, sexual orientation, race, disability, religion, color or national origin.

To learn more about services provided to students with disabilities, initiate the process of formal documentation and/or to arrange for accommodations, please review the [Disability Resources](#) for the Med School at the start of the course.

### **MENTAL HEALTH RESOURCES**

Mental Health Services' professional staff members work with students to resolve personal and interpersonal difficulties, many of which can affect the academic experience. These include conflicts with or worry about friends or family, concerns about eating or drinking patterns, and feelings of anxiety and depression. See: [shs.wustl.edu/MentalHealth](https://shs.wustl.edu/MentalHealth).

### **SEXUAL ASSAULT RESOURCES**

You can also speak confidentially and learn about available resources by contacting [Dr. Gladys Smith, PhD](#), Sexual Violence Prevention Therapist and Licensed Psychologist at the Medical Campus, (314) 362-2404. Additionally, you can report incidents to the Office of Student Affairs or by contacting WUSM Protective Services 314-362-4357 or your local law enforcement agency.

### **BIAS RESOURCES**

The University has a process through which students and staff who have experienced or witnessed bias, prejudice or discrimination against a student can report their experiences to the University's Bias Report and Support System (BRSS) team. For details see: [diversityinclusion.wustl.edu/brss/](https://diversityinclusion.wustl.edu/brss/).

### **Office of the Associate Vice Chancellor for Diversity, Equity and Inclusion (DEI)**

**The DEI Training Team** designs, facilitates and leads diversity education programming for faculty, staff and students on a wide range of topics including: creating a climate of respect, the value of diversity and the role of biases in our day-to-day lives.  
[diversity.med.wustl.edu/training/](https://diversity.med.wustl.edu/training/)

**The Office of Diversity Programs** promotes diversity among and prepares medical students to lead in a global society. A priority for the Office of Diversity Programs is to cultivate and foster a supportive campus climate for students of all backgrounds, cultures and identities.  
[mddiversity.wustl.edu/](https://mddiversity.wustl.edu/)

**The Diversity and Inclusion Student Council** promotes an inclusive campus environment for all School of Medicine students.  
[sites.wustl.edu/disc/](https://sites.wustl.edu/disc/)

**The Office for International Students and Scholars** embraces the university's mission of welcoming promising students from around the world.  
[wumma.wustl.edu/](https://wumma.wustl.edu/)