



Department of Health Administration and Policy

College of Public Health

HI 719 Syllabus, Spring 2026			
Course Information	HI 719: Advanced Statistics in Health Services Research Tuesdays, 430-710 PM, Peterson 3904		
Instructor	James A Shine, Ph.D. Office Hours: By appointment. Please send email to jshine@gmu.edu		
Course Description	Covers principles and methods of statistical data analysis and inference. Examines topics such as ANOVA, linear and logistic regression, model building, analysis of categorical data and nonparametric methods. Emphasizes analyses of health related data sets and interpretation of statistical outputs.		
Course Objectives	<p>Upon completion of the course, students will be able to:</p> <ul style="list-style-type: none"> • Prepare data obtained from Electronic Health Records (EHRs) and other sources for statistical analysis • Analyze data from EHRs and other sources using regression, ANOVA and other statistical techniques. • Verify assumptions of regression models • Impute medical history data not reported in EHRs. • Describe interactions among variables in high dimensional data • Analyze massive data using ordinary regression • Analyze massive data using logistic regression • Interpret statistical outputs • Prepare statistical reports • Present findings from statistical analysis 		
Schedule of Topics	Week	Date	Topic
	1	20 Jan	Introduction
	2	27 Jan	Data and Software
	3	3 Feb	Probability
	4	10 Feb	Distributions
	5	17 Feb	Analysis of Variance
	6	24 Feb	Analysis of Covariance
	7	3 March	Midterm
	March 10 is Spring Break		

	8 17 March Regression: Assumptions 9 24 March Regression: Missing Values 10 31 March Regression: Model Building 11 7 April Exercises 12 14 April Logistic Regression 1 13 21 April Logistic Regression 2 14 28 April Special Topics (final project, final exam review) 5-9 May Final Exam
Course Methodology	<p>The class format will combine reading, lectures, presentations, and other learning tools. The class will be interactive and require every student to be engaged in the classroom discussion and assignments. In addition to the lectures, screencasts and timely completion of assignments, every student will be expected to help present an individual or group project. We rely on the premise that students best learn when they do it and teach it to others.</p> <p>Students may use large language models including ChatGPT, Claude, etc as long as such usage is accurately attributed.</p>

Textbook(s) and/or materials	<p>No mandatory textbooks. Students may find the following references useful:</p> <ul style="list-style-type: none"> • OpenIntroStatistics (OIS), free download at https://www.openintro.org/book/stat/ • Alemi, F., Big Data in Healthcare: Statistical Analysis of the Electronic Health Record, First Edition, AUPHA/HAP Books, 2020.
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Course Grading	<p>Listed below are grades and academic standards for each grade awarded.</p> <p>A = 96% and above Clearly stands out as excellent work. An "A" grade work could be used as a model for other students to emulate. Shows excellent grasp of subject matter, conceptual integration, and excellent skills.</p> <p>A- = 90-95% Represents high quality performance. Shows excellent grasp of subject matter and conceptual integration. Shows a high level of thinking, analysis, application, and very good skills.</p> <p>B+ = 86-89% Represents very good work. Shows thorough grasp of subject matter and effective application. Shows good thinking, analysis, and good skills.</p> <p>B = 80-85% Represents satisfactory work. Shows adequate level of thinking, analysis, and satisfactory skills.</p> <p>B- = 76-79% Work is below graduate level expectations; skills are below expectation.</p> <p>C = 70-75% Work is clearly unsatisfactory.</p> <p>F = 70% and below Fails to meet minimum acceptable standards.</p>
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<p>Computer Requirements</p>	<p>This is a computing intensive course, and all students are required to complete assignments and projects using computer software. Health informatics professionals should know their computers well.</p> <p>Minimum computer (laptop or desktop) system requirements: Multicore (preferable Intel VT/AMD-V), 8GB RAM, at least 512 GB storage (and 200GB+ free), webcam, speakers, good internet connection.</p> <p>Mac computers are allowed, but students need to do additional configuration – some assignments require Windows. Mac users should be able to use Windows through VPN software. Students must be able to install software and configure their computers, configure security settings, firewall, etc.</p> <p>Students are strongly encouraged to back up all contents of their computers on a regular basis. Loss of data cannot be used as an excuse for late or unsubmitted assignments or projects.</p> <p>The class does not require students to purchase any specialized software.</p> <p>Students are responsible for assigned readings, class content and materials. Students are also responsible for finding the right computer equipment to access the course materials online and completing all computing exercises, as well as checking email and Canvas on a regular basis.</p>
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<p>Mason Honor Code</p>	<p>To promote a stronger sense of mutual responsibility, respect, trust, and fairness among all members of the George Mason University community and with the desire for greater academic and personal achievement, we, the student members of the university community, have set forth this honor code: Student members of the George Mason University community pledge not to cheat, plagiarize, steal, or lie in matters related to academic work.</p> <p>Assisting each other in classes is encouraged in this course and is not considered cheating. Copying and pasting someone else’s work is considered cheating.</p> <p>https://oai.gmu.edu/mason-honor-code/full-honor-code-document/</p>
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<p>Individuals with Disabilities</p>	<p>The university is committed to providing equal access to employment and educational opportunities for people with disabilities.</p> <p>Mason recognizes that individuals with disabilities may need reasonable accommodations to have equally effective opportunities to participate in or benefit from the university educational programs, services, and activities, and have equal employment opportunities. The university will adhere to all applicable federal and state laws, regulations, and guidelines with respect to providing reasonable accommodations as necessary to afford equal employment opportunity and equal access to programs for qualified people with disabilities.</p> <p>Applicants for admission and students requesting reasonable accommodations for a</p>
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	<p>disability should call the Office of Disability Services at 703-993-2474. Employees and applicants for employment should call the Office of Equity and Diversity Services at 703-993-8730. Questions regarding reasonable accommodations and discrimination on the basis of disability should be directed to the Americans with Disabilities Act (ADA) coordinator in the Office of Equity and Diversity Services.</p> <p><i>(From the 2017-18 Catalog – catalog.gmu.edu)</i></p>
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E-Mail Policy	<p>Web: mail.gmu.edu</p> <p>Mason uses electronic mail to provide official information to students. Examples include notices from the library, notices about academic standing, financial aid information, class materials, assignments, questions, and instructor feedback.</p> <p>Students are responsible for the content of university communication sent to their Mason e-mail account and are required to activate that account and check it regularly.</p> <p>Students are also expected to maintain an active and accurate mailing address in order to receive communications sent through the United States Postal Service.</p> <p><i>(From the GMU Student Rights and Responsibilities</i> https://catalog.gmu.edu/policies/student-rights-responsibilities/)</p>
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STATISTICAL SOFTWARE	<ol style="list-style-type: none"> 1. All assignments will be done in R, which can be freely downloaded at https://www.r-project.org/. Many students who use R prefer to use the RStudio GUI which is built on top of R; it is available at https://posit.co/download/rstudio-desktop/. Note that RStudio will only run if there is also a basic R installation on the same computer. 2. We will give some instructions over the first two weeks to help those who primarily use Stata or other systems. 3. It is OK to use ChatGPT in your assignments if properly attributed.
Assignments – 25%	Each week's assignments are required to be uploaded to Canvas. Assignments are due by the Friday after class, 5 PM ET, unless otherwise stated.
Group Project 25%	1. Each student will participate in a semester-long group or individual project. You will choose a data set and analyze it throughout the semester using the tools taught in the course.

Midterm 25% and Final Exam 25%	<p>Instructions</p> <p>Exams are in class or at monitored online sessions, open book, open access to ChatGPT or other AI services, and open internet. Exams are timed.</p>
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