



Syllabus
SPHG 711: Data Analysis for Public Health
Fall 2018
2 Credits | Residential

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Course Overview

Course Description	This introductory course is part of the MPH core curriculum and focuses on the biostatistics and analysis methods commonly found in public health. Students will learn to produce, interpret, and use straightforward data analyses.
Prerequisites	None; students must be enrolled in the MPH program or have instructor's permission
Instructor(s)	Jamie Crandell, PhD Associate Professor Department of Biostatistics Room 2011 Carrington Hall (School of Nursing) Phone: 919-966-4290 Email: jcrandell@unc.edu
Teaching Assistants	Details about teaching Assistants will be posted on the course website (Sakai).
Course Website	https://sakai.unc.edu/welcome/ . Use your ONYEN and password.
Class Days, Times, Location	Section 001: Mon/Wed 9:05-9:55 AM, Rosenau 133 Section 002: Mon/Wed 10:10-11:00 AM, Michael Hooker Research Center 001 Optional Recitation/Lab: Mon 2:30-3:20, McGavran-Greenberg 2306 Wed 8:00-8:50 AM, McGavran-Greenberg 2308 Fri 11:15-12:05, McGavran-Greenberg 2306
Office Hours	Weekly office hours with the TAs are available and posted on Sakai. Periodic instructor office hours will be available.
Course Texts	Required Text: Basic Biostatistics, 2 nd ed. by B. Burt Gerstman, MPH, PhD Recommended supplementary text: OpenIntro Statistics, 3 rd ed. Is available for FREE DOWNLOAD at www.openintro.org
Course Format	The course meets twice a week for 50 minutes. The meeting time will consist of lectures teaching statistical concepts, real-data examples and in-class exercises to practice these concepts. Some classes will take a "hybrid" format, where students watch (actively) online lectures in advance of class. Class time will be spent reviewing (but not re-teaching) the material, working examples, discussing 'sticky points.' Student polls, using Poll Everywhere or Sakai, will serve as an indicator that the student is present and contributing to the class. The optional weekly lab is led by TAs, and is the students' opportunity to practice using Stata for data analysis.

Course Policies and Resources

Recognizing, Valuing and Encouraging Inclusion and Diversity in the Classroom

We share the School's [commitment to diversity](#). We are committed to ensuring that the School is a diverse, inclusive, civil and welcoming community. Diversity and inclusion are central to our mission — to improve public health, promote individual well-being and eliminate health inequities across North Carolina and around the world. Diversity and inclusion are assets that contribute to our strength, excellence and individual and institutional success. We welcome, value and learn from individual differences and perspectives. These include but are not limited to: cultural and racial/ethnic background; country of origin; gender; age; socioeconomic status; physical and learning abilities; physical appearance; religion; political perspective; sexual identity and veteran status. Diversity, inclusiveness and civility are core values we hold, as well as characteristics of the School that we intend to strengthen.

We are committed to expanding diversity and inclusiveness across the School— among faculty, staff, students, on advisory groups, and in our curricula, leadership, policies and practices. We measure diversity and inclusion not only in numbers, but also by the extent to which students, alumni, faculty and staff members perceive the School's environment as welcoming, valuing all individuals and supporting their development.”

In this class, we practice these commitments in the following ways:

- Develop classroom participation approaches that acknowledge the diversity of ways of contributing in the classroom and foster participation and engagement of *all* students.
- Structure assessment approaches that acknowledge different methods for acquiring knowledge and demonstrating proficiency.
- Encourage and solicit feedback from students to continually improve inclusive practices.

As a student in the class, you are also expected to understand and uphold the following UNC policies:

- **Diversity and Inclusion at the Gillings School of Global Public Health:**
<http://sph.unc.edu/resource-pages/diversity/>
- **UNC Non-Discrimination Policies:**
<http://policy.sites.unc.edu/files/2013/04/nondiscrim.pdf>
- **Prohibited Discrimination, Harassment, and Related Misconduct at UNC:**
<https://deanofstudents.unc.edu/incident-reporting/prohibited-harassmentsexual-misconduct>

Accessibility

UNC-CH supports all reasonable accommodations, including resources and services, for students with disabilities, chronic medical conditions, a temporary disability, or a pregnancy complication resulting in difficulties with accessing learning opportunities. All accommodations are coordinated through the UNC Office of Accessibility Resources & Services (ARS), <https://ars.unc.edu/>; phone 919-962-8300; email ars@unc.edu. Students must document/register their need for accommodations with ARS before accommodations can be implemented.

Counseling and Psychological Services

CAPS is strongly committed to addressing the mental health needs of a diverse student body through timely access to consultation and connection to clinically appropriate services, whether for short or long-term needs. Go to their website: <https://caps.unc.edu> or visit their facilities on the third floor of the Campus Health Services building for a walk-in evaluation to learn more.

UNC Honor Code

As a student at UNC-Chapel Hill, you are bound by the university's [Honor Code](#), through which UNC maintains standards of academic excellence and community values. It is your responsibility to learn about and abide by the code. All written assignments or presentations (including team projects) should be completed in a manner that demonstrates academic integrity and excellence. Work should be completed in your own words, but your ideas should be supported with well-cited evidence and theory. To ensure effective functioning of the [Honor System](#) at UNC, students are expected to:

- a. Conduct all academic work within the letter and spirit of the Honor Code, which prohibits the giving or receiving of unauthorized aid in all academic processes.
- b. Learn the recognized techniques of proper attribution of sources used in written work; and to identify allowable resource materials or aids to be used during completion of any graded work.
- c. **Sign a pledge on all graded academic work certifying that no unauthorized assistance has been received or given in the completion of the work.**
- d. Report any instance in which reasonable grounds exist to believe that a fellow student has violated the Honor Code.

Instructors are required to report suspected violations of the Honor Code, including inappropriate collaborative work or problematic use of secondary materials, to the Honor Court. Honor Court sanctions can include receiving a zero for the assignment, failing the course and/or suspension from the university. If you have any questions about [your rights and responsibilities](#), please consult the Office of Student Conduct at <https://studentconduct.unc.edu/>, or consult these other resources:

- Honor system [module](#).
- UNC library's [plagiarism tutorial](#).
- UNC Writing Center [handout on plagiarism](#).

Instructor Expectations

- Email** Email is the best way to contact the instructor, who will typically respond within 24 hours on weekdays. If you receive an out of office reply when emailing, it may take longer to receive a response. If you wish to have a phone conversation with the instructor, please use email to schedule the call.
- Grading** Assignments will be graded no more than two weeks after the due date.
- Syllabus Changes** The instructor reserves the right to make changes to the syllabus, including assignment due dates and mid-term exam date. These changes will be announced as early as possible.

Student Expectations

- Appropriate Use of Course Resources:** The materials used in this class, including, but not limited to, syllabus, exams, quizzes, and assignments are copyright protected works. Any unauthorized copying of the class materials is a violation of federal law and may result in disciplinary action against the student. Additionally, the sharing of class materials without the specific, expressed approval of the instructor may be a violation of the University's Student Honor Code and an act of academic dishonesty, which could result in further disciplinary action. This includes, among other things, uploading class materials to websites for the purpose of sharing those materials with other current or future students.
- Assignments** Submit all assignments according to the assignment instructions. Emailing assignments is not acceptable unless prior arrangements have been made. In-class polls are considered assignments and serve as the basis for the participation grade - It is the student's responsibility to be in class on time, and ready to participate including responding to the polls. In general, full participation credit will be awarded for completing at least 90% of the polls, regardless of whether responses are correct.
- Attendance/ Participation** Your attendance and active participation are an integral part of your learning experience in this course. If you are unavoidably absent, please notify the course instructor.
- Communication** You are expected to follow common courtesy in all communication, electronic and face-to-face. All electronic communications sent should follow proper English grammar rules to include complete sentences. This is a professional course, and you are expected to communicate as a professional.
- Late Work** Late work will not be accepted without prior arrangements, which will only be granted in extenuating circumstances.
- Technical support** The UNC Information Technology Services (ITS) department provides technical support 24-hours per day, seven days per week. If you need computer help, please contact the ITS Help Desk by phone at +1-919-962-HELP (919-962-4357), or by email at help@unc.edu, or by visiting their website at <http://help.unc.edu>, or by UNC Live Chat at <http://its.unc.edu/itrc/chat>.

Competencies, Learning Objectives, and Assessment

Map

Competencies taught in this course, learning objectives mapped to these competencies, and assignments that assess attainment of these competencies.

Competencies	Learning Objectives	Assessment Assignments with brief descriptions
MC 02 Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate	L1. Select statistical methods that are appropriate for different studies/different questions L2. Conduct analyses through software and other methods L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct	Part 1 Final Exam: Will contain questions addressing selecting data analysis methods and common misinterpretations Part 2 Final Exam: Will include data analysis of observation level using software and interpreting those analyses.

Course Assignments and Assessments

This course will include graded assignments and/or exams.

Assignments	Points/Percentages
COMPASS Quantitative Methods completion	2
Participation	8
Homework	20
Midterm Exam	
Part 1 Short-Format (in-class)	25
Part 2 Long-Format (take-home)	10
Final	
Part 1 Short-Format (in-class)	25
Part 2 Long-Format (take-home)	10
TOTAL	100

Grading Scale

Final course grades will be determined using the following [UNC Graduate School grading scale](#). The relative weight of each course component is shown in the table above.

H	Greater than or equal to 93	High Pass: Clear excellence
P	Greater than or equal to 80	Pass: Entirely satisfactory graduate work
L	Greater than or equal to 70	Low Pass: Inadequate graduate work
F	Less than 70	Fail

Assignment Descriptions

Descriptions of the assignments follow.

1. Assignment: COMPASS Quantitative Methods completion (2%)

Description. Completion of the Quantitative Methods material in COMPASS.

Rubric. Students who complete this COMPASS assignment will receive full credit for this assignment

2. Assignment: Participation (8%)

Description. Submission of assigned quizzes and polls during class sessions.

Rubric. Students submitting at least 90% of the required items will get full credit (10 points); students submitting at least 80% will get 9 points, at least 70% will get 8 points, etc.

3. Assignment: Homework (20%)

Description. Submission of assigned problem sets. Problem sets are assigned approximately weekly. Students are encouraged to collaborate with their classmates in solving problems and to discuss their work with TAs, but each student should independently create his/her own write-up to submit for credit. Copying answers, without independent verification, will be considered a violation of the UNC honor code.

Submission will be either via Sakai or on paper, as indicated on each problem set. The lowest-scoring problem set will be dropped when calculating the homework grade.

Rubric. Each problem set submitted for homework will be given a percent grade based on the percent of items correct, according to the rubric (answer key) for the individual problem set.

4. Assignment: Midterm Exam, In-class (25%)

Description. The focus of the in-class Midterm exam will be on interpretation and demonstrating understanding of the concepts, covering material presented prior to the exam. The questions may be multiple choice/short answer/ fill in the blank.

Students may have notes open and books available. Because the test is only 50 minutes long, students should not rely heavily on these materials. In addition to their notes and books, **students should bring a handheld calculator**. Phones/tablets and laptops are not permitted during the exam

Rubric. The In-class midterm exam will be assigned a percent grade based on the percent of items correct, according to the rubric (answer key).

5. Assignment: Midterm Exam, Take-home (10%)

Description. The take-home portion of the Midterm exam focuses on concepts such as computing or writing (interpreting results) which cannot be captured in the Part 1 50-minute test.

The take-home portion of the midterm exam will cover material presented prior to the exam. Students will have 5 days to complete and submit the exam via Sakai. Students may use their textbook, statistical software, and any written resources (online or paper) to complete the problems, but they may not

discuss the exam with anyone except the instructor or TAs until the submission deadline has passed. Collaboration with classmates on this assignment constitutes an honor code violation.

Rubric. The take-home Midterm exam will be assigned a percent grade based on the percent of items correct, according to the rubric (answer key).

6. Assignment: Final Exam, In-class (25%)

Description. The focus of the in-class Final exam will be on interpretation and demonstrating understanding of the concepts taught in the entire course, with a heavier focus on material presented after the Midterm exam. The questions may be multiple choice/short answer/ fill in the blank.

Students may have notes open and books available. Because the test is only 50 minutes long, students should not rely heavily on these materials. In addition to their notes and books, **students should bring a handheld calculator**. Phones/tablets and laptops are not permitted during the exam

Rubric. The In-class Final exam will be assigned a percent grade based on the percent of items correct, according to the rubric (answer key).

7. Assignment: Final Exam, Take-home (10%)

Description. The take-home portion of the Final exam focuses on concepts such as computing or writing (interpreting results) which cannot be captured in the Part 1 50-minute test.

The take-home portion of the Final exam will cover material presented prior to the exam. Students will have 5 days to complete and submit the exam via Sakai. Students may use their textbook, statistical software, and any written resources (online or paper) to complete the problems, but they may not discuss the exam with anyone except the instructor or TAs until the submission deadline has passed. Collaboration with anyone else on this assignment constitutes an honor code violation.

Rubric. The take-home Final exam will be assigned a percent grade based on the percent of items correct, according to the rubric (answer key).

Course-at-a-Glance

The instructor reserves the right to make changes to the syllabus, including project due dates and test dates. These changes will be announced as early as possible. Information on the course website will supercede the dates in this syllabus.

Date	Topics	Readings	Weekly Assignments/Lab content
8/22	Lecture 1.1: <ul style="list-style-type: none"> Course Overview 	.	
8/27	Lecture 1.2: <ul style="list-style-type: none"> Define and identify census and sample Define and identify statistics/statistics and parameters/populations Define SRS and contrast with other ways of data collection Identify variable types Describe distributions with respect to symmetry, skewness, shape Interpret histograms/data tables/bar charts 	Chapter 1	Lab 1: Intro to Stata Intro to Stata due 9 pm on 8/31
8/29	Lecture 1.3: <ul style="list-style-type: none"> Calculate measure of center and spread: mean, median, s.d. variance, IQR Produce boxplots 	Chapter 3-4	
9/3	NO CLASS- LABOR DAY		
9/5	Lecture 2.1: <ul style="list-style-type: none"> Define and assess probability characteristics: disjoint Calculate probabilities using basic probabilities for "and" and "or" Calculate probabilities using Venn diagrams 	Chapter 5 (5.1-5.4)	
9/10	Lecture 2.2: <ul style="list-style-type: none"> Define and assess probability characteristics: independent Calculate probabilities using conditional probability rule 	Chapter 5 (5.5)	Lab 2: Graphs in Stata
9/12	Lecture 2.3: <ul style="list-style-type: none"> Use Bayes Rule Use tree diagrams Use probability to inform decisions Calculate and use sensitivity, specificity, PPV, NPV 		HW 1 DUE by 9 pm on Friday 9/14
9/17	Lecture 3.1: <ul style="list-style-type: none"> Identify binomial distribution (count data) Calculate binomial probabilities using software Calculate and interpret the mean and variance for the binomial distribution 	Chapter 6	Lab 3: M&M HW 2 DUE by 9 pm on Friday 9/21
9/19	Lecture 3.2: <ul style="list-style-type: none"> Use normal approximation to the binomial Identify properties of standard normal, or any normal distribution Use 68/95/99.7 Rule Calculate and interpret z scores, normal probabilities and backwards normal probabilities 	Chapter 7	

9/24	Lecture 3.2 continued.		Lab 4: Normal and Binomial Distributions in Stata
9/26	Lecture 4.1: <ul style="list-style-type: none"> • Identify the difference between the distribution of the x and xbar • Paraphrase the Central Limit Theorem (assumptions and conclusion) • Calculate probabilities involving the distribution of the sample mean (xbar) • Calculate and interpret a z confidence interval • Identify many of the common misinterpretations of pvalues 	Chapter 8	HW 3 DUE by 9 pm on Friday 9/28
10/1	Lecture 4.1, continued.		Lab 5: M&M
10/3	Lecture 4.2: <ul style="list-style-type: none"> • Calculate and interpret a z confidence interval • Identify many of the common misinterpretations of pvalues • Explain the relationship between Type I, Type II error, Power. • Demonstrate the steps of a hypothesis test • Interpret a p value • Explain the relationship between a CI and p-value 	Chapter 9-10; Goodman, S. (2008) "A dirty dozen: Twelve p-value misconceptions" Seminars in Hematology, 45(3):135-140.	HW 4 DUE by 9 pm on Friday 10/5
10/8	Lecture 4.2, continued:	Wasserstein, R.L. and Lazar, N.A.(2016) The ASA's Statement on p-Values: Context, Process, and Purpose, The American Statistician, 70:2, 12 9-133	Lab 6: TA office hours for M&M and Analysis Take-home midterm due by 9 pm on Sunday 10/14
10/10	TBD		
10/15	Midterm Exam Review		No lab, Fall Break begins at 5 pm on 10/17
10/17	Midterm - In Class Test		
10/22	Lecture 5.1: <ul style="list-style-type: none"> • Compare a z distribution and t distribution and corresponding test • Conduct a one-sample t-test* • Conduct a matched pairs t-test* • Compute power, sample size, explain relationships 	Chapter 11	Lab 7: One-sample t-test No homework due.
10/24	Lecture 5.1 continued.		
10/29	Lecture 5.2: <ul style="list-style-type: none"> • Conduct a two-sample t-test* 	Chapter 12	HW 5 DUE by 9 pm on Friday 11/2 Lab 8: Two-sample t-test
10/31	Lecture 6.1: <ul style="list-style-type: none"> • Conduct a one-sample test for a single proportion* • Compute power and sample size 	Chapter 16	

11/5	Lecture 6.2: <ul style="list-style-type: none"> • Conduct a test of risk difference including a CI* • Conduct a test for risk ratio including a CI* 	Chapter 17	HW 6 DUE by 9 pm on Friday 11/9 Lab 9: M&M
11/7	Lecture 7.1: <ul style="list-style-type: none"> • Conduct a chisquare test for categorical data* • Identify marginal, conditional, and joint distribution values • Conduct a test for the Odds Ratio* 	Chapter 18	
11/12	Lecture 8.1: <ul style="list-style-type: none"> • Discuss issues with multiple comparisons in ANOVA and in general • Conduct an ANOVA test * • Perform a step down test using a Bonferroni correction 	Chapter 13	HW 7 DUE by 9 pm on Friday 11/16 Lab 10: Chi-square tests
11/14	Lecture 8.1, continued		
11/19	Lecture 8.2: <ul style="list-style-type: none"> • Describe situations when nonparametric tests may be needed • Conduct a Wilcoxon Rank Sum Test* 		No homework or lab
11/21	NO CLASS -THANKSGIVING		
11/26	Lecture 9.1: <ul style="list-style-type: none"> • Produce a ScatterPlot • Conduct a test of the (Pearson) correlation* 	Chapter 14	HW 8 DUE by 9 pm on Friday 11/30 Lab 11:M&M topic
11/28	Lecture 9.2: <ul style="list-style-type: none"> • Conduct a simple linear regression analysis* 	Chapter 15	
12/3	Lecture 10.1: <ul style="list-style-type: none"> • Ethics • Methods not covered in the course 		Take-home final exam DUE by 9 pm on TUESDAY 12/4
12/5	Lecture 10.2 <ul style="list-style-type: none"> • Review for Final Exam 		
Dec 8. 8 am			FINAL EXAM

Course Schedule

The instructor reserves the right to make changes to the syllabus, including project due dates and test dates. These changes will be announced as early as possible.

Session 1.1: 08/22	
Topic	Lecture 1.1: Course Overview
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	L1. Select statistical methods that are appropriate for different studies/different questions L2. Conduct analyses through software and other methods L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct
Required Readings	Hyatt et al. (2017) "Statistical methods used in the public health literature and implications for training of public health professionals" PLoS One, 12(6): e0179032 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5462407/

Session 1.2: 08/27	
Topic	Lecture 1.2: <ul style="list-style-type: none"> • Define and identify census and sample • Define and identify statistics/statistics and parameters/populations • Define SRS and contrast with other ways of data collection • Identify variable types • Describe distributions with respect to symmetry, skewness, shape • Interpret histograms/data tables/bar charts
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	L1. Select statistical methods that are appropriate for different studies/different questions L2. Conduct analyses through software and other methods L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct
Required Readings	Gerstman Chapter 1

Session 1.3: 08/29	
Topic	Lecture 1.3: <ul style="list-style-type: none"> • Calculate measure of center and spread: mean, median, s.d. variance, IQR • Produce boxplots

Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	L1. Select statistical methods that are appropriate for different studies/different questions L2. Conduct analyses through software and other methods L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct
Required Readings	Gerstman chapter 3-4

Session 2.1: 9/5	
Topic	Lecture 2.1: <ul style="list-style-type: none"> • Define and assess probability characteristics: disjoint • Calculate probabilities using basic probabilities for “and” and “or” • Calculate probabilities using Venn diagrams
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	L1. Select statistical methods that are appropriate for different studies/different questions L2. Conduct analyses through software and other methods L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct
Required Readings	Gerstman Chapter 5 (5.1-5.4)
Assignments/Deadlines	Intro to Stata due by 9 pm on Thursday 9/6

Session 2.2: 9/10	
Topic	Lecture 2.2: <ul style="list-style-type: none"> • Define and assess probability characteristics: independent • Calculate probabilities using conditional probability rule
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	L1. Select statistical methods that are appropriate for different studies/different questions L2. Conduct analyses through software and other methods L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct
Required Readings	Chapter 5 (5.5)

Session 2.3: 9/12	
Topic	Lecture 2.3: <ul style="list-style-type: none"> • Use Bayes Rule • Use tree diagrams • Use probability to inform decisions • Calculate and use sensitivity, specificity, PPV, NPV
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	L1. Select statistical methods that are appropriate for different studies/different questions L2. Conduct analyses through software and other methods L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct
Required Readings	Gerstman Chapter 5 (5.5)
Assignments/Deadlines	HW 1 DUE by 9 pm on Friday 9/14

Session 3.1: 9/17	
Topic	Lecture 3.1: <ul style="list-style-type: none"> • Identify binomial distribution (count data) • Calculate binomial probabilities using software • Calculate and interpret the mean and variance for the binomial distribution
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	L1. Select statistical methods that are appropriate for different studies/different questions L2. Conduct analyses through software and other methods L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct
Required Readings	Gerstman Chapter 6

Session 3.2: 9/19 and 9/24	
Topic	Lecture 3.2: <ul style="list-style-type: none"> • Use normal approximation to the binomial • Identify properties of standard normal, or any normal distribution

	<ul style="list-style-type: none"> • Use 68/95/99.7 Rule • Calculate and interpret z scores, normal probabilities and backwards normal probabilities
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	<p>L1. Select statistical methods that are appropriate for different studies/different questions</p> <p>L2. Conduct analyses through software and other methods</p> <p>L3. Interpret the results of their own analyses and those they encounter in the literature</p> <p>L4. Evaluate why common misinterpretations are not correct</p>
Required Readings	Gerstman Chapter 7
Assignments/Deadlines	HW 2 DUE by 9 pm on Friday 9/21

Session 4.1: 9/26, 10/1	
Topic	<p>Lecture 4.1:</p> <ul style="list-style-type: none"> • Identify the difference between the distribution of the x and xbar • Paraphrase the Central Limit Theorem (assumptions and conclusion) • Calculate probabilities involving the distribution of the sample mean (xbar) • Calculate and interpret a z confidence interval • Identify many of the common misinterpretations of pvalues
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	<p>L1. Select statistical methods that are appropriate for different studies/different questions</p> <p>L2. Conduct analyses through software and other methods</p> <p>L3. Interpret the results of their own analyses and those they encounter in the literature</p> <p>L4. Evaluate why common misinterpretations are not correct</p>
Required Readings	Gerstman Chapter 8
Assignments/Deadlines	HW 3 DUE by 9 pm on Friday 9/28

Session 4.2: 10/3, 10/8	
Topic	
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate

Learning Objective(s)	L1. Select statistical methods that are appropriate for different studies/different questions L2. Conduct analyses through software and other methods L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct
Required Readings	Gerstman Chapters 9-10; Goodman, S. (2008) "A dirty dozen: Twelve p-value misconceptions" Seminars in Hematology, 45(3):135-140. Wasserstein, R.L. and Lazar, N.A.(2016) The ASA's Statement on <i>p</i> -Values: Context, Process, and Purpose, The American Statistician, 70:2, 129-133
Assignments/Deadlines	HW 4 DUE by 9 pm on Friday 10/4

Midterm Exam review Session: 10/10 and 10/15	
Topic	Review course content and practice Stata.
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	L1. Select statistical methods that are appropriate for different studies/different questions L2. Conduct analyses through software and other methods L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct
Required Readings	None
Assignments/Deadlines	Take-home midterm due by 9 pm on Sunday 10/14

Session In-class Midterm exam: 10/17	
Topic	All material covered in readings and previous sessions.
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	L1. Select statistical methods that are appropriate for different studies/different questions

	L2. Conduct analyses through software and other methods L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct
Required Readings	none

Session 5.1: 10/22 and 10/24	
Topic	Lecture 5.1: <ul style="list-style-type: none"> • Compare a z distribution and t distribution and corresponding test • Conduct a one-sample t-test* • Conduct a matched pairs t-test* • Compute power, sample size, explain relationships
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	L1. Select statistical methods that are appropriate for different studies/different questions L2. Conduct analyses through software and other methods L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct
Required Readings	Gerstman Chapter 11

Session 5.2: 10/29	
Topic	Lecture 5.2: Conduct a two-sample t-test*
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	L1. Select statistical methods that are appropriate for different studies/different questions L2. Conduct analyses through software and other methods L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct
Required Readings	Gerstman Chapter 12

Session 6.1: 10/31	
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Topic	Lecture 6.1: <ul style="list-style-type: none"> • Conduct a one-sample test for a single proportion* • Compute power and sample size
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	L1. Select statistical methods that are appropriate for different studies/different questions L2. Conduct analyses through software and other methods L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct
Required Readings	Gerstman Chapter 16
Assignments/Deadlines	HW 5 DUE by 9 pm on Friday 11/2

Session 6.2: 11/5	
Topic	Lecture 6.2: <ul style="list-style-type: none"> • Conduct a test of risk difference including a CI* • Conduct a test for risk ratio including a CI*
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	L1. Select statistical methods that are appropriate for different studies/different questions L2. Conduct analyses through software and other methods L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct
Required Readings	Gerstman Chapter 17

Session 7.1: 11/7	
Topic	Lecture 7.1: <ul style="list-style-type: none"> • Conduct a chisquare test for categorical data* • Identify marginal, conditional, and joint distribution values • Conduct a test for the Odds Ratio*
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	L1. Select statistical methods that are appropriate for different studies/different questions L2. Conduct analyses through software and other methods

	L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct
Required Readings	Gerstman Chapter 18
Assignments/Deadlines	HW 6 DUE by 9 pm on Friday 11/9

Session 8.1: 11/12 and 11/14	
Topic	Lecture 8.1: <ul style="list-style-type: none"> • Discuss issues with multiple comparisons in ANOVA and in general • Conduct an ANOVA test * • Perform a step down test using a Bonferroni correction
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	L1. Select statistical methods that are appropriate for different studies/different questions L2. Conduct analyses through software and other methods L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct
Required Readings	Gerstman Chapter 13
Assignments/Deadlines	HW 7 DUE by 9 pm on Friday 11/16

Session 8.2: 11/19	
Topic	Lecture 8.2: <ul style="list-style-type: none"> • Describe situations when nonparametric tests may be needed • Conduct a Wilcoxon Rank Sum Test*
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	L1. Select statistical methods that are appropriate for different studies/different questions L2. Conduct analyses through software and other methods L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct
Required Readings	No new readings

Session 9.1: 11/26	
Topic	Lecture 9.1: <ul style="list-style-type: none"> • Produce a ScatterPlot • Conduct a test of the (Pearson) correlation*
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	L1. Select statistical methods that are appropriate for different studies/different questions L2. Conduct analyses through software and other methods L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct
Required Readings	Gerstman Chapter 14

Session 9.2: 11/28	
Topic	Lecture 9.2: <ul style="list-style-type: none"> • Conduct a simple linear regression analysis*
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	L1. Select statistical methods that are appropriate for different studies/different questions L2. Conduct analyses through software and other methods L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct
Required Readings	Gerstman Chapter 15
Assignments/Deadlines	HW 8 DUE by 9 pm on Friday 11/30

Session 10.1: 12/3	
Topic	Lecture 10.1: <ul style="list-style-type: none"> • Ethics • Methods not covered in the course
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	L1. Select statistical methods that are appropriate for different studies/different questions L2. Conduct analyses through software and other methods L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct
Required Readings	none

Assignments/Deadlines	Take-home final exam DUE by 9 pm on TUESDAY 12/4
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Session 10/2: 12/5	
Topic	Lecture 10.2 • Review for Final Exam
Competency Addressed	MC 02. Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate
Learning Objective(s)	L1. Select statistical methods that are appropriate for different studies/different questions L2. Conduct analyses through software and other methods L3. Interpret the results of their own analyses and those they encounter in the literature L4. Evaluate why common misinterpretations are not correct
Required Readings	none