College of Charleston

BIOSTATISTICS

Fall 2015

Course Information

HEAL 395	3 credits
Section 01	
CRN No.	11716
Johnson	206
TR	9:25-10:40
Section 02	
CRN No.	12255
Johnson	207
TR	3:05-4:20

Instructor:

Dr. Leslie Hart

Email: hartlb@cofc.edu

Phone: (843) 953-5191

Preferred method of contact is email.

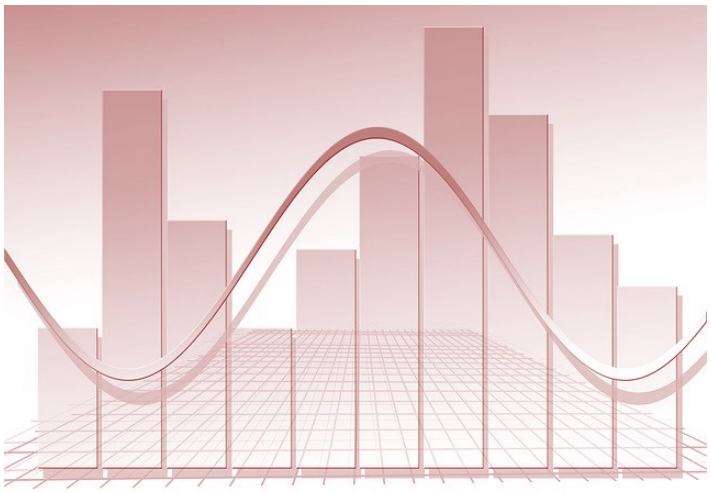
Office Hours:

MW 10am—12pm

Office Location:

Silcox 316

Learning Objectives



1. Describe the distinct yet complementary roles of biostatistics and epidemiology.
2. Apply epidemiologic and biostatistical techniques to describe the distribution of the determinants of health and disease.
3. Utilize probability concepts to evaluate measures of association between outcomes and exposures related to health and disease.
4. Perform hypothesis testing to answer research questions related to public health.
5. Identify and apply appropriate study designs to answer research questions related to public health.
6. Interpret the results of linear and logistic regression as well as survival analyses as applied to public health.
7. Discuss causal theory and determine the difference between evidence of association and evidence of causation.

Course Catalog Description

This course introduces the basic theory of probability and statistics with practical applications using biological data. Subject matter includes fundamentals of probability, distribution theory, sampling models, data analysis, basics of experimental design, statistical inference, interval estimation and hypothesis testing.

August 2015

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25 Introduction	26	27 Biostats & Epi for Public Health	28	29
30	31					

September 2015

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1 Types of Data	2	3 Summarizing & Describing Data with Stats *(Extra Credit Due)*	4	5
6	7	8 Presenting & Graphing Categorical Data	9	10 Presenting & Graphing ContinuousData *(Prob Set 1 Due)*	11	12
13	14	15 Standardizing Rates—Why & How	16	17 Direct vs. Indirect Standardization	18	19
20	21	22 Probability I	23	24 Probability II *(Prob Set 2 Due)*	25	26
27	28	29 Probability Distributions I	30			

October 2015

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1 Probability Distributions II	2 **Jump Rope for Heart** **(Silcox Gym 9-1)**	2
4	5	6 Epi Study Designs & Measures of Association I	7	8 Epi Designs & Association II ***(Prob Set 3 Due)***	9	10
11	12	13 Midterm Review	14	15 **Midterm Exam**	16	17
18	19 Fall Break	20 Fall Break	21	22 Estimation & Hypothesis Testing I	23	24
25	26	27 Estimation & Hypothesis Testing II	28	29 Flex Class	30	31

November 2015

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3 Sample Size I	4	5 Sample Size II ***(Prob Set 4 Due)***	6	7
8	9	10 Linear Regression	11	12 Logistic Regression	13	14
15	16	16 Survival Analysis I	18	19 Survival Analysis II ***(Prob Set 5 Due)***	20	21
22	23	24 **Group Presentations**	25	26 Thanksgiving	27	28
29	30					

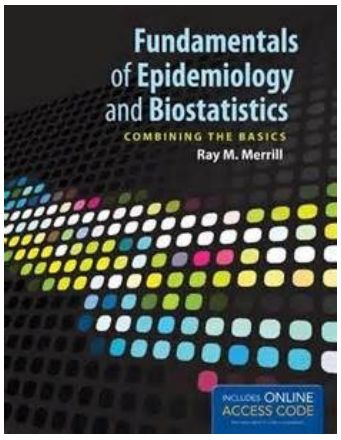
December 2015

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1 Causation vs. Association	2	3 Course Eval Final Exam Review	4	5
6	7	8	9	10 (4-7pm) **Final Exam (Section 02)**	11	12 (8-11am) **Final Exam (Section 02)**
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

Course Materials

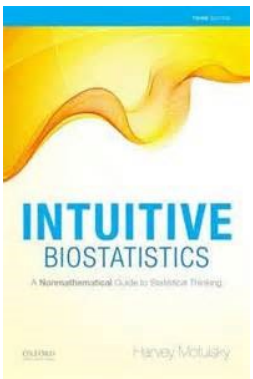
Required Text:

Fundamentals of Epidemiology and Biostatistics by Ray M. Merrill (2013)



Recommended Text:

Intuitive Biostatistics, 3rd edition by Harvey Motulsky (2014)



Other reading materials as assigned

Reading Assignments by Topic

Topic	Merril	Motulsky
Intro to Biostatistics	Chapter 1	
Biostatistics & Epidemiology for Public Health Practices	Chapter 1	
Types of Data	Chapter 2	Chapter 8
Summarizing and Describing Data	Chapter 2 (Tables 2.1, 2.8, 2.9; pgs. 44-50)	Chapter 7, 9
Presenting & Graphing Categorical Data	Chapter 4 (Table 2.1)	
Presenting & Graphing Continuous Data	Chapter 4 (Table 2.1)	Chapter 7
Standardizing Rates—Why & How	Chapter 3; (Tables 2.3, 2.4, 2.5)	
Indirect vs. Direct Standardization	Chapter 3	
Probability	Chapter 6	Chapter 1, 2
Probability Distributions	Chapter 7	Chapter 4, 6, 10
Epi Study Designs and Measures of Association	Chapter 5, 12, 13	Chapter 28
Estimation & Hypothesis Testing	Chapter 8	Chapter 12-13, 15-18, 30-31
Sample Size	Chapter 9	Chapter 20, 26
Linear Regression	Chapter 11	Chapter 33-34, 39
Logistic Regression	Chapter 11	Chapter 38
Survival Analysis	Chapter 5, 13	Chapter 29
Causation vs. Association	Chapter 14	Chapter 45

Evaluation Measures

Assignment	Date	Point Value
Attendance & Participation	Each Class	30
Instructor for a Day	Throughout Semester	50
Problem Set (x5)	Various (see calendar)	100
Midterm Exam	October 15	120
Group Project	November 24	50
Final Exam	Section 01—December 12	150

Assignment Descriptions

500 Total Point Value

Participation in Class (30)

Students can earn up to 30 points for participating in class. I will develop lectures designed to engage and foster student interaction, therefore, participation points will be based on degree of interaction during class. We both have a lot to learn from each other; therefore, student engagement will be critical to the success of this course. I encourage and expect each student to ask questions throughout the lectures and participate in discussions of topics presented inside and outside of the classroom. IF YOU HAVE QUESTIONS ABOUT THE MATERIAL, PLEASE DO NOT HESITATE TO ASK.

Instructor for a Day (50)

Your task for this assignment is to take an unfamiliar topic from the textbook and figure out a way to teach it to the class. The goal is to use a variety of learning and teaching styles to help everyone better understand statistical concepts. Each student will be randomly assigned a date to present a concept (of your choice!) from the textbook to the class. Please prepare a brief lesson (no more than 10 minutes in length) to help your fellow students better understand a statistical concept presented in the associated chapter for your presentation date. You will be evaluated on your lesson, as well as feedback provided using the OAKS discussion boards for the associated date. **Each of you will be required to: 1) present a topic to the class; 2) provide feedback (i.e. what you liked, what could be improved, if you learned something new, etc.) on *20* of your peers' presentations.** Topic assignments are posted on OAKS in Contents.

These presentations will occur daily, with sometimes 2 students presenting on a given day. Please see the OAKS website for assignment date. ***Slides must be uploaded to OAKS before class on your presentation date.*** If you need to reschedule your presentation, please contact Dr. Hart ASAP.

Midterm Exam (120)

The midterm exam will cover information presented through October 8. You will be allowed to use a non-cellular phone calculator and up to **two** sheets of paper (8.5x11" or smaller) on which you may write anything related to the course materials (front and back). Please write your name on the sheets as they will be turned in with your exam. No other materials will be allowed. ***If you will be absent from class on October 15 (excused absences only), please make arrangements with Dr. Hart (hartlb@cofc.edu) to take your mid-term at an earlier date.***

Problem Sets (100)

The best way to learn Biostatistics is to practice, practice, practice. Five problem sets will be posted throughout the semester to help each of you understand and master concepts, as well as prepare you for the Midterm and Final Exams. Problems will be in the form of calculations, multiple choice, and short answer. If necessary, you are permitted to work with other students in the class on these problem sets; however, I encourage you try them on your own first. ***The Problem Sets will be posted to OAKS. Please bring your completed Problem Sets to class on the specified due date. If you will not be in class on the specified due date, please make arrangements with Dr. Hart to turn in the assignment PRIOR to the due date. Late submissions will result in 10% deduction per day. Remember to show your work for partial credit!***

Extra Credit Assignment (*DUE SEPTEMBER 3 – POST TO OAKS DISCUSSION BOARD)* – Find one health-related infographic that demonstrates the use of biostatistics to convey information on the distribution or determinants of a health-related state or event. There may NOT be any duplicate posts of the same infographic, so make sure you check out previous posts by your classmates to ensure that you are not duplicating a previous post. When you post the infographic or the link to the infographic, you must include a brief comment as to why you chose the particular infographic (i.e. **what statistics it shows**).

Group Project (50)

The objective of this assignment is to critically evaluate the statistics used for public health research in a peer-reviewed publication. Each group will be expected to present an article to the class and discuss the research question presented in the article, type of data collected, statistical methods used to answer or address the research question, and interpretation of the results. Each presentation should be approximately **10 minutes in length** and each group is expected to complete the Journal Review Form (see template on OAKS). Presentations should cover the information covered by the Journal Review Form. Student evaluations will be based on components of the presentation, presentation time allotment, journal review form, and group participation (based on peer evaluations). ***Please post the completed Journal Review Form (one per group) to the appropriate Dropbox on the assignment due date listed on the syllabus. Slides for the in-class***

Final Exam (150)

The final exam will cover information presented over the entire semester. You will be allowed to use a non-cellular phone calculator and up to **three** sheets of paper (8.5x11" or smaller) on which you may write anything related to the course materials (front and back). No other materials will be allowed. ***The exam must be taken on the assigned date unless prior arrangements have been made with appropriate documentation stating the reason why the exam must be taken at a different time.***

Assignment Descriptions

500 Total Point Value

Important Policies

Contacting Dr. Hart regarding Questions or Assignments

I will be available for any questions or discussions in person during my **office hours (Mondays and Wednesdays 10am-12pm)**. Otherwise, please make an appointment to meet with me. If you need to contact me outside those hours, please submit questions or comments by **email (hartlb@cofc.edu)**. I will try to be available by email; however, I cannot promise that I will be able to answer questions about assignments or exams after 5pm on the day prior to the assignment due date or examination date.

Grading Scale

Letter Grade	Total Points	Percentage
A	450+	90-100%
A-	440-449	88-89%
B+	425-439	85-87%
B	400-424	80-84%
B-	390-399	78-79%
C+	375-389	75-77%
C	350-374	70-74%
C-	340-349	68-69%
D+	330-339	66-67%
D	320-329	64-65%
D-	310-319	62-63%
F	309 or fewer	61% and below

Attendance Policy

Attendance is mandatory. Failure to attend class will reflect poorly on your attendance and participation grade. Attendance will be taken for each class. ***More than 3 unexcused absences will result in a deduction of 10 points from your final grade, 5+ absences will result in a deduction of 50 points. Ten or more unexcused absences will warrant consideration for course withdrawal.*** Excused absences must come from the College of Charleston Absence Notification System. If you wish to contest a documented absence, you must contact Dr. Hart within 48 hours of the absence.

Submission of Assignments

Assignments must be submitted on time, which means either at the beginning of class on the date listed in the syllabus, or by the date listed on OAKS for assignments posted to Dropbox. Late work will only be accepted on a case-by-case basis, subject to approval by Dr. Hart, and a percentage of points will likely be deducted. ***If you have to miss class (due to an excused absence - e.g. planned college activity, religious observation, doctor's appointment, or other planned event) on the date on which an assignment is due, please make every effort to submit the assignment prior to the missed class.*** If you have an unplanned absence on an assignment due date, please contact Dr. Hart regarding approval for the absence and to make arrangements for assignment submission.

You may work with other individuals in the class on Problem Sets; however I encourage each of you to attempt the problems by yourself first. You will not be permitted to work with other individuals on the exams, so it will be critical for you to be able to complete the problems independently.

Technology in the Classroom

The use of laptops and tablets are encouraged to take notes; however, the use of smartphones and other cellular devices is prohibited as they can be disruptive to the instructor and your classmates. Use of these electronic devices will result in being asked to put the device away or dismissal from class. ***Please put all mobile devices on silent PRIOR to the beginning of each class.***

Plagiarism

Plagiarism, or the use of another's thoughts, data, or information as your own, is **prohibited** in this class. **Plagiarism will not be tolerated**. If you present information that is NOT your own, appropriate citation of the source is expected.

Plagiarism definitions according to the CofC Handbook:

6.1. The verbatim repetition, without acknowledgement, of the writings of another author. All significant phrases,clauses, or passages, taken directly from source material must be enclosed in quotation marks and acknowledged in the text itself and/or in footnotes/endnotes.

6.2. Borrowing without acknowledging the source.

6.3. Paraphrasing the thoughts of another writer without acknowledgement.

6.4. Allowing any other person or organization to prepare work which one then submits as his/her own.

Important Policies

Important Resources

Honor Code & Code of Conduct

The Honor Code specifically forbids lying, cheating, attempted cheating, stealing, attempted stealing and plagiarism. Students at the College are bound by honor and by their acceptance of admission to the College to abide by the code and to report violations.

As members of the College community, students are expected to evidence a high standard of personal conduct and to respect the rights of other students, faculty, staff members, community neighbors and visitors on campus. Students are also expected to adhere to all federal, state and local laws. Violations of the Honor Code or Code of Conduct will be reported to the Office of the Dean of Students 843.953.5522.

Center for Disability Services / SNAP

If there is a student in this class who has a documented disability and has been approved to receive accommodations through the Center for Disability Services/SNAP (Students Needing Access Parity), please come and discuss this with me during my office hours.

For more information on the Center for Disability Services, visit: http://disabilityservices.cofc.edu/

Center for Student Learning

I encourage you to utilize the Center for Student Learning's (CSL) academic support services for assistance in study strategies, speaking & writing strategies, and course content. They offer tutoring, Supplemental Instruction, study strategy appointments, and workshops. Students of all abilities have become more successful using these programs throughout their academic career and the services are available to you at no additional cost. For more information regarding these services please visit the CSL website at http://csl.cofc.edu or call (843) 953-5635.

Online Course Evaluations

Students will be able to fill out online course evaluations during class (see schedule). Evaluations can be accessed through My Charleston. ***Please let Dr. Hart know in advance if you will need access to a laptop for this purpose.***

CEPH and CHES Competencies

The Council on Education for Public Health (CEPH) publishes guidelines regarding the knowledge and skills that should be presented to students enrolled in public health courses. These guidelines focus on outcomes, or competencies, that are linked to workforce needs as defined by employers and the public health profession as a whole. Each course in the College of Charleston Public Health program covers one or more of these competencies. As courses advance from introductory to more advanced, the competencies covered by these courses must also progress. That is, what you learn in higher level courses should build on, and extend beyond, what you learned in lower level courses. The following CEPH competency is covered by HEAL 395:

> 3. Explain principles of epidemiology necessary to understand health and impairments of health including the uses of rates, the meaning of causation, and the evaluation of the effectiveness of interventions. Apply principles of epidemiology to reading research articles including case-control, cohort studies and randomized clinical trials.

For more information, please visit http://ceph.org/constituents/programs-baccalaureate-level/.

In addition to pursuing the general public health competencies set forth by CEPH, some students may be interested in pursuing certification as a Certified Health Education Specialist (CHES). This certification requires the individual to sit for – and pass – an exam offered by the National Commission for Health Education Credentialing, Inc. In order to qualify to sit for the CHES exam, the individual must complete coursework covering a variety of competencies and sub-competencies. The following competencies and sub-competencies are covered by HEAL 395:

1. Assess needs, assets, and capacity for health education (Competency 1)
   - **1.2** Access existing information and data related to health.
   - **1.2.1** Identify sources of data related to health.
   - **1.2.2** Critique sources of health information using theory and evidence from the literature.
   - **1.2.3** Select valid sources of information about health.
   - **1.2.6** Conduct searches of existing databases for specific health-related data.
   - **1.3** Collect quantitative and/or qualitative data related to health.
   - **1.3.1** Collect primary and/or secondary data.
   - **1.3.2** Integrate primary data with secondary data.
   - **1.3.3** Identify data collection instruments and methods.
   - **1.3.4** Develop data collection instruments and methods.
   - **1.3.5** Train personnel and stakeholders regarding data collection.
   - **1.3.6** Use data collection instruments and methods.
   - **1.3.7** Employ ethical standards when collecting data.

2. Implement health education (Competency 3)
   - **3.1** Implement a plan of action.
   - **3.1.2** Collect baseline data

3. Conduct evaluation and research related to health education (Competency 4)
   - **4.1** Develop evaluation/research plan.
   - **4.1.13** Developing data analysis plan for research.
   - **4.3** Collect and analyze evaluation/research data.
   - **4.3.1** Collect data based on the evaluation/research plan.
   - **4.3.2** Monitor data collection and management.
   - **4.3.3** Analyze data using descriptive statistics.
   - **4.3.4** Analyze data using inferential and/or other advanced statistical methods.
   - **4.3.6** Apply ethical standards in collecting and analyzing data.

For more information, please visit http://www.nchec.org/.

Going Above and Beyond

Instructor:

Dr. Leslie Hart

Email:
hartlb@cofc.edu

Phone: (843) 953-5191

Preferred method of contact is email.

Office Hours:

MW 10am—12pm

Office Location:

Silcox 316

Please Note:

Class lectures, assignment due dates, and other policies listed in this syllabus are subject to change at Dr. Hart's discretion, with fair notice provided to students.

A Little Bit about Me

I earned my B.S in Biology and Environmental Studies from the College of William and Mary, my M.S. in Environmental Studies from the College of Charleston, and my Ph.D. in Epidemiology from the Medical University of South Carolina. My dissertation was titled, "*The Use of Longitudinal and Cross-Sectional Photographic Data to Study Skin Disease in Wild Bottlenose Dolphins.*" I have been an adjunct professor in HEHP and Environmental Studies and taught a graduate core seminar in the Masters of Environmental Studies Program. I was most recently employed as a wildlife and environmental epidemiologist with a private contractor for the National Oceanic and Atmospheric Administration (NOAA). In this role, I studied the impact of environmental and anthropogenic stressors on the health of wild bottlenose dolphin populations.