

Course Title: Introduction to Biostatistics

Course Number: PHCO 0504

Course Prerequisite(s): *Passed the Quantitative Skills Assessment*

Course Location: SPH Room 3A/3B

Course Date & Time: Wednesdays, 3-5pm

Course Instructor: Pamela Ohman Strickland, PhD, Associate Professor
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Office Hours: By appointment only

Course Assistant: NA

Course Website: canvas.rutgers.edu

Required Course Text: *Basic Biostatistics: Statistics for Public Health Practice*, Second Edition, B. Burt Gerstman, Jones & Bartlett Learning, © 2015, ISBN: 978-1-284-03601-5.

Additional/Supplemental Readings/Resources:

(Posted on Canvas)

Bradley EH, Curry LA, Devers KJ. Qualitative data analysis for health services research: developing taxonomy, themes, and theory." *Hlth Svcs Rsch.* 2007:1758-1772.

Colorafi KJ, Bronwynne E. Qualitative descriptive methods in health science research. *HERD.* 2016; 9(4):16-25.

Sutton J, Zubin Austin A. Qualitative research: data collection, analysis, and management. *Can Jrn Hosp Pharm.* 2015; 68 (23): 226-231.

(The following are required to complete your Research Reading and will be available from links on the course's CANVAS webpage.)

Engs RC, Hanson DJ, Diebold BA. The drinking problems and patterns of a national sample of college students, 1994. *J Alc Drug Ed.* 1997; 41:13-33.

Estruch R, Ros E, Salas-Salvado J, et al. Primary prevention of cardiovascular disease with a Mediterranean diet. *NEJM.* 2013; 368:1279-1290.

Halkitis PN, Kupprat SA, Hubbard McCree D, et al. Evaluation of the relativeness effectiveness of three HIV testing strategies targeting African American men who have sex with men (MSM) in New York City. *Ann Beh Med.* 2011; 43:361-369.

Tsui J, Hudson SV, Rubinstein EB, et al. A mixed-methods analysis of the capacity of the Patient-Centered Medical Home to implement care coordination services for cancer survivors. *Translational Behavioral Medicine.* 2018; 8:319-327.

Wells TS, LeardMann CA, Fortuna SO, et al. A prospective study of depression following combat deployment in support of wars in Iraq and Afghanistan. *AJPH.* 2010. 100(1):90-99.

Course Description: This course provides an introduction to biostatistical concepts and methods commonly encountered by public health professionals. Students are also expected to complete several computer-based exercises for this course.

Competencies Addressed: The competencies addressed in this course include:

1. Explain the role of quantitative methods and sciences in describing and assessing a population's health
2. Select quantitative data collection methods appropriate for a given public health context
3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate
4. Interpret results of data analysis for public health research, policy or practice

Course Objectives: By the completion of this course, students will be able to:

- a. Understand the relationship between research questions, designs, and statistical analysis.
- b. Identify different levels of measurement (nominal, ordinal, interval, ratio) (categorical/nominal and continuous).
- c. Create displays of public health data (e.g. contingency tables, histograms, scatter-plots, etc.) for continuous and categorical/nominal data.
- d. Explain and compute measures of central tendency and dispersion for continuous data, and recognize of the strengths and limitations of each for descriptive purposes.
- e. Build and interpret confidence intervals for means and proportions.
- f. Understand the basic principles of hypothesis testing.
- g. Choose, execute and interpret appropriate parametric and non-parametric bivariable tests of association with categorical/nominal and continuous data.
- h. Recognize bivariable parametric and non-parametric tests of association with categorical/nominal and continuous data as they are applied in public health research, and think critically about those applications.
- i. Based on the type of variables utilized (categorical/nominal and continuous), identify the type of bivariable statistical analysis appropriate for answering specific questions and tests of associations.
- j. Consider how multivariable analyses are used in public health research when the dependent variable is continuous and when it is categorical, specifically dichotomous.
- k. Analyze and report findings from a large data set using parametric and non-parametric tests of association with nominal and continuous data.
- l. Explain how to analyze qualitative data.
- m. Interpret and explain research designs and statistical reported in public health and related health journals

Competency	Learning Objectives	Lessons	Assessment(s)
1	a, f, h, m,	1, 3, 4, 10	Reading Assignments & Data Analysis Project
2	b-l	1-13	Data Analysis Project, Discussion Boards, Exams, & Final
3	c-l	2-9, 11-13	Reading Assignments, Data Analysis Paper, Discussion Boards, Exams, & Final
4	c, d, k, l, m	2-13	Reading Assignments, Exams, & Final

Course Requirements and Grading: This course will strictly adhere to School of Public Health Honor Code (See the attached policy statement at the end of this syllabus)

Complete all assignments, due dates are noted below. **Late assignments (reading assignments, quizzes, discussion board posts, etc.) will not be accepted.**

1. Class engagement (15 points):

You are expected to actively participate in all discussions and activities of this course.

You will receive points for the following activities:

- DB*: Research Studies (2 points post – By Saturday Jan 25, 1 point for 2 responses by Jan 29 3pm)
- DB: Submit Survey questions (1 point, Jan 29)
- SPSS Screenshot (0.5 point, Feb 5)
- Complete class survey (0.5 point, Feb 5)
- DB: Summarize Variables from Class Survey using SPSS (1.5 points, Feb 12)
- Screenshot of CLT results (0.5 point)
- DB: Conduct HT/CI using SPSS (3 points post – By March 11 midnight 3pm; 1 point for 2 responses by March 18 3pm)
- DB: Chi-square Testing/Correlation using SAS (3 points post by April 8; 1 point response by Apr 11)

* DB=Discussion Board on Canvas

Attendance in class is expected, although you receive no specific points for attendance. You are responsible for all material discussed in class, whether specifically written in class Powerpoint slides or verbally discussed. If you miss a class, it is your responsibility to speak with a classmate to get updates on the material.

2. Research reading assignments (15 points):

For these assignments, you will be reading and analyzing published public health research studies that demonstrate the research and analysis techniques we are studying in class. For these activities you are asked to read the research studies and then answer a set of questions pertaining to the studies. Questions are posted at Rutgers Canvas in the form of a quiz. You will have two attempts to complete this "quiz" assignment, each with a 120 minute time limit. This means that you can go in once, attempt to answer the questions, record the questions, and then return after reading the research readings a second time, if needed, to discern the correct responses.

Assignment	Due Date
1 (4 points)	2/26/20
2 (3 points)	3/25/20
3 (4 points)	4/1/20
4 (4 points)	4/22/20

There are 4 required assignments. Due dates and point assignments are shown in the adjacent table. No allowances for late submissions will be allowed.

3. Data analysis paper (20 points):

This is an individual project, which will be completed in three phases and will focus on the analysis of a data set. You will need to use SPSS and interpret findings. In each phase, you will undertake data analyses to answer a

Draft	Due Date
Draft 1	2/19/20
Draft 2	4/15/20
Draft 3 (Final Draft)	4/29/20

research question and write up the analyses in the format of a journal article, like the types we will be reading in class. The assignments will build on each other. Thus, you will pose a research question and undertake and report a set of univariate analyses for Draft 1 (Descriptive

analyses). Then you will receive feedback and edits. These edited analyses and an additional set of analyses (Bivariate analyses) will then constitute Draft 2. These drafts will be peer reviewed using a review template, with in-class discussion. The final draft (Draft 3) will include the edited version of Draft 2 plus an additional set of analyses (Multivariable analyses). The final product must be written in the style and format similar to the journal articles we have been reading and evaluating in class throughout the semester. Please see instructions posted on CANVAS for detailed instructions.

Detailed descriptions of the paper format and content to be included in each draft will be posted on Canvas. Assignments must be submitted on Canvas no later than 9AM on the due date.

You must hand in both Draft 1 and Draft 2. You will receive 2.5 points simply for handing in each draft. In addition, you will receive feedback specifically for Draft 1, which will help to improve the final draft. The final draft will be worth 15 points. Scoring for the final draft is as follows: 15 = Perfect; 14-14 = Excellent = A; 12-13 = Good = B; 10-11 = Fair = C; < 10 = Poor = D; 0 = Not Submitted or Late.

4. Midterm Examination (20 points):

There will be one midterm exam consisting of a combination of multiple choice and short answer questions in which are asked you to explain, apply, interpret, and evaluate the concepts that we have studied. This is an open book exam that will cover all the concepts up to and including t-tests and ANOVA and will include interpreting output from SPSS. This timed 2-hour Midterm will be given on Wednesday, February 26, in class. This exam should be completed independently of other students.

5. Quizzes (2 points for each):

The **timed** on-line quizzes will be due by 3pm. You will be given **one hour** to complete each, although previous classes have found the time to completion to be much shorter. These will be open-book/open-note assessments on materials covered in the assigned modules and any assigned videos. **Individuals should complete these assessments independently.** There are 8 assigned quizzes. The 3 quizzes with the lowest grades will be dropped.

6. Final Examination (20 points):

The final will consist of a set of multiple choice and short answer questions in which are asked you to explain, apply, interpret, and evaluate the concepts that we have studied. This will include interpreting output from SPSS. The final exam will cover all the concepts covered during the course. This timed 2-hour Final will be given on Wednesday, May 6. This exam should be completed independently of other students.

7. Grading

Point Allocation for Assignments:

Class Engagement	15.0 pts
Research Readings (4)	15.0 pts
Data Analysis Draft 1	2.5 pts
Data Analysis Draft 2	2.5 pts
Data Analysis Paper Final	15.0 pts
Online Quizzes	10.0 pts
Midterm Examination	20.0 pts
<u>Final Examination</u>	<u>20.0 pts</u>

Total 100 pts*

* Grades will be posted on CANVAS. Final grades will be calculated and confirmed at the end of the semester outside of CANVAS.


Grades Point Allocation:

94 – 100	A
90 – <94	A-
87 – <90	B+
84 – <87	B
80 – <84	B-
77 – <80	C+
70 – <77	C
<70	F

Please note that grades are calculated based on total number of points accrued and **are not rounded**.

Course Schedule:

Module	Date	Topic	Readings	Weekly Assignments ^{\$}	Online 30
1	Jan 22	Foundational Statistics Concepts: Introduction, Research Questions, Study Design, Measurement & Variables	Chapters 1-2	<ul style="list-style-type: none"> DB: Submit Survey questions (1 point) Access SPSS (no points) (https://software.rutgers.edu/info/login/) 	<ul style="list-style-type: none"> DB*: Research Studies (2 points by Sat, Jan 25) Post & Respond (1 point for 2 responses by Jan 29)
2	Jan 29	Summary Statistics, numerical and graphical	Chapter 3-4	<ul style="list-style-type: none"> SPSS Screenshot (0.5 point) Class survey (0.5 point) Start working on Reading Assignment 1 – Estruch et al; Wells et al 	<ul style="list-style-type: none"> WATCH Video Quiz (2 pts, covering Modules 1 & 2 & video)
3	Feb 5	Distributions, Sampling Distributions, Central Limit Theorem	Chapters 5-8	<ul style="list-style-type: none"> Reading Assignment 1 – Estruch et al; Wells et al (4 points) Start working on Data Analysis Draft #1 	<ul style="list-style-type: none"> Quiz Module 3 (2 points) DB: SPSS summarize two variables, 1 nominal & 1 semi-continuous (1.5 points)
4	Feb 12	Confidence Intervals for Means & Proportions	Chapters 10, 11 & 16	<ul style="list-style-type: none"> Data Analysis Draft #1 (2.5 points) Screenshot of CLT app results to DB (0.5 point) 	<ul style="list-style-type: none"> WATCH Video Quiz Module 4 (2 points)
5	Feb 19	Hypothesis Testing for Means & Proportions	Chapters 8-9	<ul style="list-style-type: none"> Study for Midterm 	<ul style="list-style-type: none"> WATCH Video Quiz Module 5 & Video (2 points)
	Feb 26**	Midterm (20 points)			
7	March 4	Bivariable Associations: Overview T-test & ANOVA	Chapters 12-13	<ul style="list-style-type: none"> DB: Conduct HT/Create CI (post by Saturday, March 7 midnight for 3 points; 2 responses by March 18 for 1 point) 	<ul style="list-style-type: none"> WATCH Video Quiz Module & Video 7 (2 points)

8	March 11	Chi-square Test & Odds Ratio	Chapter 18	<ul style="list-style-type: none"> • Reading Assignment 2: Halkitis et al (2011) (3 points) 	<ul style="list-style-type: none"> • WATCH Video • Quiz Module 8 & Video (2 points)
	March 18	SPRING BREAK			
9	March 25	Correlation	Chapter 14	<ul style="list-style-type: none"> • Reading Assignment 3: Engs et al (4 points) 	<ul style="list-style-type: none"> • Quiz on Module 9 (2 points)
10	April 1	Simple Linear Regression	Chapter 14	<ul style="list-style-type: none"> • DB: Chi-square Testing, Correlation (4 points) 	<ul style="list-style-type: none"> • Watch Video
11	April 8	Multiple Linear Regression	Chapter 15	<ul style="list-style-type: none"> • DB: response • Data Analysis Draft #2 (2.5 points) 	<ul style="list-style-type: none"> • Quiz Modules 10 & 11 (2 points)
12	April 15	Analysis of Qualitative Data	Bradley et al; Colorafi & Bronwynne; Sutton & Austin	<ul style="list-style-type: none"> • Reading Assignment 4: Tsui et al. (4 points) 	<ul style="list-style-type: none"> • Watch VIDEO
13	April 22	PROJECT / PEER REVIEW DISCUSSIONS		<ul style="list-style-type: none"> • Data Analysis #3 – Final Paper (15 points) 	<ul style="list-style-type: none"> • Sample Problems
14	April 29	Review		<ul style="list-style-type: none"> • Study for FINAL 	
15	May 6	FINAL (20 pts)			

§ All assignments and Online 30 activities/quizzes should be completed by the start of the next scheduled class. CANVAS will be set to accept only up until 3pm, when class starts. No late submissions will be accepted.

* DB=Discussion Board on Canvas

** Observe: March 2 is the last day to withdraw from class with a grade of “W”; after that grades will be assigned based on work completed, even if a student stops attending class

Learning Management System: Canvas will be used extensively throughout the semester for course syllabus, assignments, announcements, communication and/or other course-related activities. It is the student's responsibility to familiarize themselves with Canvas and check it regularly. If you have difficulties accessing Canvas, please inform the instructor and Canvas Support (help@canvas.rutgers.edu). Canvas is accessible at canvas.rutgers.edu.

School of Public Health Honor Code: The School of Public Health Honor Code is found in the School Catalog (sph.rutgers.edu/academics/catalog.html). Each student bears a fundamental responsibility for maintaining academic integrity and intellectual honesty in his or her graduate work. For example, all students are expected to observe the generally accepted principles of scholarly work, to submit their own rather than another's work, to refrain from falsifying data, and to refrain from receiving and/or giving aid on examinations or other assigned work requiring independent effort. In submitting written material, the writer takes full responsibility for the work as a whole and implies that, except as properly noted by use of quotation marks, footnotes, etc., both the ideas and the works used are his or her own. In addition to maintaining personal academic integrity, each student is expected to contribute to the academic integrity of the School community by not facilitating inappropriate use of her/his own work by others and by reporting acts of academic dishonesty by others to an appropriate school authority. It should be clearly understood that plagiarism, cheating, or other forms of academic dishonesty will not be tolerated and can lead to sanctions up to and including separation from the Rutgers School of Public Health.

Students with Disabilities: Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student must Apply for Services by first completing a Registration Form with the Rutgers Office of Disability Services (ODS) at ods.rutgers.edu. The student will also be required to participate in an ODS intake interview and provide documentation. If reasonable accommodations are granted, ODS will provide you with a Letter of Accommodations which should be shared with your instructors as early in your courses as possible.

Graduate Student Computer Policy: Students are required to possess a personal laptop, no older than approximately two years, that must meet minimum requirements which may be found online at: sph.rutgers.edu/student-life/computer-support.html.

Policy Concerning Use of Recording Devices and Other Electronic Communications Systems: When personally owned communication/recording devices are used by students to record lectures and/or classroom lessons, such use must be authorized by the faculty member or instructor who must give either oral or written permission prior to the start of the semester and identify restrictions, if any, on the use of mobile communications or recording devices.

Policy Concerning Use of Turnitin: Students agree that by taking this course all required papers may be subject to submission for textual similarity review to Turnitin.com (directly or via learning management system, i.e. Canvas) for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site. Students who do not agree should contact the course instructor immediately.

Withdrawal/Refund Schedule: Students who stop attending their course(s) without submitting a completed [Add/Drop Course](#) form will receive a failing grade. Furthermore, students dropping to zero credits for the semester are considered withdrawn and must submit a completed [Leave of Absence](#) form from the School of Public Health's Office of Student Affairs. The School of Public Health refunds tuition only. Administrative and technology fees are non-refundable. You may find the Withdrawal/Refund Schedule on the School of Public Health website at: sph.rutgers.edu/academics/school-calendar.html