

**Course Title:** Introduction to Biostatistics  
**Course Number:** PHCO 0504J 033 (Spring 2023)  
**Course Prerequisite(s):** Passed the Quantitative Skills Assessment  
**Course Location:** [Join Zoom Meeting](#)  
[Zoom PHCO 0504J 033 \(Spring 2023\)](#)

Meeting ID: 953 5855 3309  
Password: 493233  
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**Course Date & Time:** Wednesdays, 3:00PM-5:00PM EST  
**Course Instructor:** Vincent Amoruccio, PhD, MS, MA  
Adjunct Instructor  
**Email:** VIA CANVAS (Preferred) or [vincent.amoruccio@rutgers.edu](mailto:vincent.amoruccio@rutgers.edu)

**Office Hours:** *By appointment only.*

**Course Assistant:** TBD

**Course Website :** [Canvas.rutgers.edu](https://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.

Rutgers Library now has an electronic copy of the course textbook. Students can access the e-book from the library using their netid.

- Go to <https://www.libraries.rutgers.edu/>
- Type “basic biostatistics” in the quick search rectangular box.
- The Basic Biostatistics book by Burt Gerstman will appear as one of the results.
- Click “view online” to read the book online using netid.

**Additional/Supplemental Readings/Resources:** (Will be posted on Canvas)

- a) Estruch R, Ros E, Salas-Salvado J, et al. Primary prevention of cardiovascular disease with a Mediterranean diet. *NEJM*. 2013; 368:1279-1290.
- b) Glanz, K et al. Measures of sun exposure and sun protection practices for behavioral and epidemiologic research." *Arch Derm*, 2008; 144 217-222.
- c) 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.
- d) 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.
- e) Halkitis PN, Manasse A, McCready K Illicit drug use in a community-based sample of heteosexually- identified emerging adults. *J Ch Adol Sub Use*. 2010; 19:300-308.
- f) 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.
- g) DeLongis A, Folkman S, Lazarus R. The impact of daily stress on health and mood; psychological and social resources as mediators. *J Pers Soc Psych*. 1988; 54:486-495.
- h) Palamar, JJ, Kiang MV, Halkitis PN. Predictors of stigmatization towards use of various illicit drugs among emerging adults. *J Psych Drugs*. 2012; 44:243-251.

- i) Bradley EH, Curry LA, Devers KJ. Qualitative data analysis for health services research: developing taxonomy, themes, and theory. *Hlth Svcs Rsch.* 2007;1758-1772.
- j) Colorafi KJ, Bronwynne E. Qualitative descriptive methods in health science research. *HERD.* 2016; 9(4):16-25.
- k) Sutton J, Zubin Austin A. Qualitative research: data collection, analysis, and management. *Can Jrn Hosp Pharm.* 2015; 68 (23): 226-231.
- l) <https://www.cdc.gov/eis/field-epi-manual/chapters/collecting-data.html>
- m) Soucie MJ. Public health surveillance and data collection: general principles and impact on hemophilia care. *Hemat.* 2012; 17: s144-s146.
- n) Rothman N et al. A multi-stage genome-wide association study of bladder cancer identifies multiple susceptibility loci. *Nature Genetics*, 2010; 42:978-984.
- o) Garcia-Closas M et al. NAT2 slow acetylation and GSTM1 null genotypes increase bladder cancer risk: results from the Spanish Bladder Cancer Study and meta analysis. *The Lancet*, 2005; 366:649-659.
- p) Kricker A et al. MC1R genotype may modify the effect of sun exposure on melanoma risk in the GEM study. *Cancer Causes Control*, 2010; 21:2137-2147.

### **Online 30:**

Each week a video pertaining to the week's topics will be posted for review. These videos will target data analysis concepts (mostly in SPSS) to help with the assignments and other, relevant topics in biostatistics (e.g. clinical trials).

### **Course Description:**

This course introduces 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:**

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:**

- 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	Homework; Data Analysis Project
2	b-l	1-13	Homework; Exam 1, 2, and Final
3	c-l	2-9, 11-13	Homework; Data Analysis Project; Exams 1, 2, & Final
4	c, d, k, l, m	2-13	Homework; Exams 1, 2, & Final

**Course Requirements and Grading/Assessments:**

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. All these assignments will count towards your final grade.

**!! Late assignments will not be accepted !!**

1. Class Engagement:

You are expected to attend and actively participate in all class sessions and activities of this course. Class engagement consists of online attendance and online discussions related to the week.

- Missing a class may impact your performance on assignments. You are expected to come to class on time to prevent disrupting the lecture and classroom activities. One point will be earned for attending the course weekly and for actively contributing to the weekly discussion.
- In discussions, you will be reading, analyzing, and discussing published public health research studies that demonstrate the research and statistical techniques we are studying in class. For these activities you are asked to read the research studies and then answer, as briefly as possible, the discussion question(s) pertaining to the studies. You will not be able to respond to others until you post your comment first. Points will be awarded for posting to the discussion as well as responding to other discussions from students in the class.

2. Online 30:

For most weeks, not all (as applicable), you will complete an Online 30 activity, which involves viewing a video demonstrating analytical concepts or describing statistical concepts and answering some questions included in the middle of or at the end of the video. This may be a single video or it may be broken up into several short videos for ease of engagement. The total duration of the videos will be approximately 30 minutes.

3. Homework:

For these assignments, you will answer questions related to materials from the topics covered in class.

**Assignments must be submitted on Canvas by no later than 3 p.m. on the due date.** There will be approximately 10-11 required homework assignments. Due dates are shown in the adjacent table. **Late assignments will not be allowed.**

4. Data analysis paper:

This is a group assignment, which will be completed in 3 phases and will focus on the analysis of a dataset. Each group will consist of 4 to 6 students. Each group will complete a data analysis and prepare a report that includes a set of tables, figures and a summary based on precise instructions. This project will be completed in 3 phases. In each phase, each group will undertake specific data analysis task to answer a set of questions and write up the analyses in the format of a journal article, like the types you will read during the course.

You will submit the **first draft** (Descriptive analyses). You will receive feedback and edits. These edited materials and an additional set of analyses (bivariate analyses) will then constitute the **second draft**. After draft two, you will again receive feedback and edits. The **final draft** of your project will include the edited version of draft two plus any additional set of analyses.

The final product must be written in the style and format of the journal articles you will read throughout the semester.

You can conduct your data analysis using SPSS, the R programming language, or any other statistical software package of your choice.

Detailed descriptions of the data analysis summary format and content to be included in each draft will be posted on Canvas. **Data analysis assignments must be submitted on Canvas for the entire group no later than 3:00 p.m. on the due date.**

You must hand in both Draft 1 and Draft 2. In addition, you will receive feedback on each draft, which will help to improve the final draft.

*At the completion of the project, each student will rate their own and others' contributions to the project using items (Likert scale 1-5) across several aspects of participation. Any one receiving average scores  $\leq 3.0$  by their peers will receive a proportionally reduced grade for the final group project.*

5. Examination 1: This will be an **online exam (aka "take home exam")**. The exam will consist of a set of short answer questions in which are asked you to explain, apply, interpret, and evaluate the concepts that you have studied. This also will include interpreting output from data analyses. The first exam will cover all the concepts up to and including Session 4. Two (2) hours will be provided for Exam 1. You have the entire week to take the exam; however, once your start the exam you must finish it in the allotted time.

6. Examination 2: This will also be a **online exam (aka "take home exam")**. The exam will consist of a set of short answer questions in which are asked you to explain, apply, interpret, and evaluate the concepts that you have studied. This also will include interpreting output from data analyses. This exam will cover all the concepts up to and including Session 9. Three (3) hours will be provided for Exam 2. You have the entire week to take the exam; however, once your start the exam you must finish it in the allotted time.

7. Examination 3 – Finals: The final exam will also be a **online exam (aka "take home exam")**. The exam will consist of a set of 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 data analyses. The final exam will cover all the concepts covered during the course with a particular emphasis on the material we studied after Exams 1 and 2. Four (4) hours will be provided for the final exam. You have the entire week to take the exam; however, once your start the exam you must finish it in the allotted time.

**Grade Assessment:**

Class Engagement	5 %
Online 30	5 %
Homework	40 %
Data Analysis Draft 1	2.5 %
Data Analysis Draft 2	2.5 %
Data Analysis Final Summary	10 %
Examination 1	10 %
Examination 2	10 %
Examination 3	15 %
Total	100 %

**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:**

Session	Date	Topic	Reading from Text Book	Assignment Due
1	January 18, 2023	Study Design, Measurement of Variables & Data Collection for Public Health	Chapters 1-2	
2	January 25, 2023	Summary Statistics and Introduction to Distributions	Chapters 3-4	
3	February 01, 2023	Central Limit Theorem , Introduction to Hypothesis Testing, One Sample Z-Test	Chapters 8-9	Homework 1 and 2
4	February 08, 2023	One Sample Z-Test and Confidence Intervals for one sample means and proportions.	Chapters 10, 11, 16	Homework 3
5	February 15, 2023	Bivariable associations	Chapter 12	Homework 4 + Data Analysis Draft 1
<b>Exam 1 (Covering sessions 1- 4) released after class on February 15 &amp; due on Canvas by 3 p.m. February 22</b>				
6	February 22, 2023	t-test	Chapter 12	-
7	March 01, 2023	One-way ANOVA	Chapter 13	Homework 5
8	March 08, 2023	One-way ANOVA: Post-hoc associations	Chapter 13	Homework 6
<b>Rutgers Spring Recess March 11-19</b>				
9	March 22, 2023	Chi-Square Test & Odds Ratio	Chapter 18	Homework 7
10	March 29, 2023	Correlation	Chapters 14.1-14.3	Homework 8 + Data Analysis Draft 2
<b>Exam 2 (Covering session 1-9) released after class on March 29 &amp; due on Canvas by 3 p.m. on April 05, 2023</b>				
11	April 05, 2023	Simple linear regression	Chapter 14-15	-
12	April 12, 2023	Multivariable regression	Chapter 14-15	Homework 9
13	April 19, 2023	Logistic regression and Introduction to Survival Analysis	Lecture Slides	Homework 10

Session	Date	Topic	Reading from Text Book	Assignment Due
14	April 26, 2023	Putting it together – overview of hypothesis test and regression	-	
<b>Final exam released after class on April 26 &amp; due on Canvas by 3 p.m. on May 03</b> <b>Data Analysis Project is Due by May 03</b>				

Students are reminded free expression in an academic community is essential to the mission of providing the highest caliber of education possible. Provocative ideas respectfully presented are an expected result. An enlightened academic community, however, connects freedom with responsibility. Rutgers School of Public Health encourages civil discourse, reasoned thought, sustained discussion, and constructive engagement without degrading, abusing, harassing, or silencing others. The teachers for this course are committed to maintaining an environment that opens doors, opens hearts, and opens minds.

**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](mailto:help@canvas.rutgers.edu)). Canvas is accessible at [canvas.rutgers.edu](https://canvas.rutgers.edu).

**School of Public Health Honor Code:**

The School of Public Health Honor Code is found in the student bulletin ([sph.rutgers.edu/academics/catalog/index.html](https://sph.rutgers.edu/academics/catalog/index.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](https://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.



### **Commitment to Safe Learning Environment:**

The Rutgers School of Public Health is committed to helping create a safe learning environment for all students and for the School as a whole. Free expression in an academic community is essential to the mission of providing the highest caliber of education possible. The School encourages civil discourse, reasoned thought, sustained discussion, and constructive engagement. Provocative ideas respectfully presented are an expected result. An enlightened academic community, however, connects freedom with responsibility. The School encourages all students to disclose any situations where you may feel unsafe, discriminated against, or harassed. Harassment or discrimination of any kind will be not tolerated and violations may lead to disciplinary actions.

### **Reporting Discrimination or Harassment:**

If you experience any form of gender or sex-based discrimination or harassment, including sexual assault, sexual harassment, relationship violence, or stalking, know that help and support are available. You may report such incidents to the [RBHS Title IX Office](#) or to the School of Public Health's [Office of Student Affairs](#). Rutgers University has staff members trained to support survivors in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, and more. If you experience any other form of discrimination or harassment, including racial, ethnic, religious, political, or academic, please report any such incidents to the School's [Office of Student Affairs](#). The School strongly encourages all students to report any incidents of discrimination or harassment to the School. Please be aware that all Rutgers employees (other than those designated as confidential resources such as advocates, counselors, clergy and healthcare providers as listed in Appendix A to [Policy 10.3.12](#)) are required to report information about such discrimination and harassment to the School and potentially the University. For example, if you tell a faculty or staff member about a situation of sexual harassment or sexual violence, or other related misconduct, the faculty or staff member must share that information with the [RBHS Title IX Coordinator](#). If you wish to speak to a confidential employee who does not have this reporting responsibility, you can find a list of resources in Appendix A to University [Policy 10.3.12](#). For more information about your options at Rutgers, please visit [Rutgers Violence Prevention and Victim Assistance](#).

### **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\\_requirements.html](http://sph.rutgers.edu/student_life/computer_requirements.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 processing an [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/registration/school\\_calendars.html](http://sph.rutgers.edu/academics/registration/school_calendars.html)

### **Student Well-Being:**

The School of Public Health recognizes that students may experience stressors or challenges that can impact both their academic experience and their personal well-being. If the source of your stressors or challenges is academic, students are encouraged to discuss these challenges and circumstances with their instructor, if they feel they may need additional support or temporary accommodations at the beginning or during this course. The course instructor may consider making reasonable temporary adjustments depending on the student's situation. For personal concerns or if additional support is needed, students may reach out to the [Office of Student Affairs](#) ([studentaffairs@sph.rutgers.edu](mailto:studentaffairs@sph.rutgers.edu)) or any of the appropriate referral resources listed on the [SPH Student Connect Canvas page](#).

### **Overview of School Policies:**

Academic and non-academic policies and procedures, such Auditing a Course, Retaking Courses, Grade Grievance and others that cover registration, courses and grading, academic standing and progress, student rights and responsibilities, graduation and more may be found under [Policies](#) on the School of Public Health website. Below are select specific policies; however, students are responsible for keeping informed about academic and non-academic policies and procedures beyond those noted on this syllabus.