

PUBHLTH 5015
Public Health Data Analytics I
Fall 2025

Instructor	Grzegorz A. Rempala, Ph.D. D.Sc. (degrees details: BGSU 1996, Statistics; Warsaw Tech University 2007, Applied Prob.) Email: grempala@cph.osu.edu Office: 380E Cunz Hall
Office Hours (zoom)	Tue 3:30-4:30pm (link: https://osu.zoom.us/j/91744847582?pwd=chR849A1GAKaXIiopE0BBBsS64wea.1&from=addon passwd: 557958)
Feedback Response Time	Grading: You can generally expect feedback within 7 days. E-mail: I will reply to e-mails (sent via Carmen) within 24 hours on school days.
Lectures	Tu/Thr 11:15am-12:30pm, 180 Pomerane Hall
Course Webpage	Carmen: http://carmen.osu.edu Login with OSU internet username (name.#) and password, then go to the course name.
Course Notes	Posted on the course website prior to or soon after the lectures as appropriate.
Textbook	No primary textbook. We will rely on student's lecture notes.
Supplemental Text	<i>An Introduction to Statistical Learning with Applications in R</i> by James, G., Witten, D., Hastie, T., Tibshirani, R., Taylor, J. & Grosse, R. Published by Springer (2023); available free online at https://www.statlearning.com/
Required Software	R Software; available free online at http://www.r-project.org/
Prerequisites	PUBHBIO 2210, STAT 3202, 3470, or 5301; or permission of instructor.
Course Description	This course provides a broad introduction to the principles and applications of data analytics in public health. Students will explore foundational concepts and methods used to collect, analyze, and interpret data in order to address current and emerging issues in population health and healthcare delivery. Particular emphasis will be placed on understanding how data-driven approaches inform the design of studies, the evaluation of interventions, and the development of evidence-based policies. The course also covers analytical frameworks and basic tools used to critically assess data and support decision-making in diverse public health settings.

Class Format	Mode of delivery: This course meets 100% in class and in person. Credit hours and work expectations: This is a 3-credit-hour course. According to Ohio State policy (go.osu.edu/credithours), students should expect around 3 hours per week of time spent on direct instruction (e.g., [examples here]) in addition to 6 hours of homework/active learning activities (e.g., homework, coding, and project assignments) to receive an average grade of C. Attendance and participation requirements: Students are expected to attend lectures and participate in all classroom activities.						
Course Tech Requirements	Basic computer programming and web-browsing skills						
Tech Equipment	Computer: Current Mac (Mac OSX) or PC (Windows 10+) with high-speed internet connection						
Homework	There will be approximately 4–5 homework assignments throughout the semester. Late homework will NOT be accepted without a reasonable cause and advance notice. Students are permitted (indeed encouraged) to work together on homework, but submitted assignments must be written independently.						
Exam	There will be two take home 24-hours long midterm exams. Second exam is based on the students' group project.						
Project	The project in this course will account for a significant portion (20%) of the grade and will showcase students understanding of methods in advanced epidemic analysis. Each student will be required to write a short project report and be prepared to give a 20-minute in-class presentation towards the end of the term.						
Grading	Final class grade will be determined as follows: <table> <tr> <td>50%</td><td>Homework</td></tr> <tr> <td>40%</td><td>Midterm exams</td></tr> <tr> <td>10%</td><td>Project presentation</td></tr> </table> Grading Scale: 90-100 A, 78-89 B, 66-77 C, 50-65 D. ("+" for exceeding mid-range, no "-")	50%	Homework	40%	Midterm exams	10%	Project presentation
50%	Homework						
40%	Midterm exams						
10%	Project presentation						

Learning Objectives

Upon successful completion of the course, students will have the knowledge, comprehension and/or skills to be able to use and apply commonly used statistical methods for analyzing univariate and multivariate epidemic data. Particularly, the students will be able to

- Identify commonly used methods for quantitative analysis of public health data.
- Evaluate the strengths and limitations of specific analytical methods in relation to a given dataset and scientific hypothesis.
- Demonstrate a broad understanding of terminology and the basic mechanics of data analytics methods in public health.
- Describe best practices for sharing data and software to ensure transparency and facilitate reproducibility of research results.

- Recognize the social, political, ethical, and scientific considerations that shape data analytics in public health.

Graduate Student Competencies (OSU CPH)

- (Foundational Knowledge 3) Explain the role of quantitative and qualitative methods and sciences in describing and assessing a population's health.
- (Foundational Knowledge 6) Explain the critical importance of evidence in advancing public health knowledge.
- (Foundational Competency 2) Select quantitative and qualitative data collection methods appropriate for a given public health context.
- (Foundational Competency 3) Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate.
- (Foundational Competency 22) Apply systems thinking tools to visually represent a public health issue in a format other than standard narrative.

Undergraduate Student Competencies (OSU CPH)

- (Foundational Domain 2) The basic concepts, methods and tools of public health data collection, use and analysis and why evidence-based approaches are an essential part of public health practice.
- (Foundational Competency 1) Communicate public health information, in both oral and written forms, through a variety of media and to diverse audiences.
- (Foundational Competency 2) Locate, use, evaluate and synthesize public health information.

Disability Statement

Any student who feels s/he may need an accommodation based on the impact of a disability should contact me privately to discuss specific needs. Please contact the Office for Disability Services at 614-292-3307 (TDD: 614-292-0901) in room 098 Baker Hall, 113 W. 12th Ave., to coordinate reasonable accommodations for students with documented disabilities. <http://www.slds.osu.edu/>.

Student Support Students experiencing personal problems or situational crises during the semester are encouraged to contact OSU Counseling and Consultation Services (292-5766; <http://www.ccs.ohio-state.edu>) for assistance, support and advocacy. This service is free to students and is confidential.

Academic Integrity It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct <http://studentlife.osu.edu/csc/>.

AI Usage

There has been a significant increase in the popularity and availability of a variety of generative artificial intelligence (AI) tools, including ChatGPT, Sudowrite and others. These tools will help shape the future of work, research and technology but when used in the wrong way, they can stand in conflict with academic integrity at Ohio State.

All students have important obligations under the Code of Student Conduct to complete all academic and scholarly activities with fairness and honesty. Our professional students also have the responsibility to uphold the professional and ethical standards found in their respective academic honor codes.

To maintain a culture of integrity and respect, **the generative AI tools should not be used in the completion of course assignments unless an instructor specifically authorizes their use.**

Grievances and Solving Problems

A student who encounters a problem related to his/her educational program has a variety of avenues available to seek resolution. According to University Policies, if you have a problem with this class, you should seek to resolve the grievance concerning a grade or academic practice by speaking first with the instructor or professor. Then, if necessary, you may take your case to the department chairperson. Specific procedures are outlined in Faculty Rule 3335-8-23, the CPH Graduate Student Handbook, and the CPH Undergraduate Student Handbook. Grievances against graduate, research, and teaching assistants should be submitted first to the supervising instructor, then to the chairperson of the assistant's department.

Course Summary

Week	Dates	Topic	Comments
1	8/26–8/31	Intro	HMWK1
2	9/1–9/7	Statistical Learning 1	
3	9/8–9/14	Statistical Learning 2	
4	9/15–9/21	ODEs	
5	9/22–9/28	Intro to Bayesian Methods	HMWK2
6	9/29–10/5	Topological Data Analysis 1	HMWK3
7	10/6–10/12	Topological Data Analysis 2	
8	10/13–10/19	Survival Analysis & Epidemiological Models	
9	10/20–10/26	Network Models for Infectious Disease	Midterm
10	10/27–11/2	Stat Learning 3 (Trees, RF, Boosting)	HMWK4
11	11/3–11/9	Deep Learning and AI Applications in Health	
12	11/10–11/16	Causal Inference in Public Health	
13	11/17–11/23	Reproducibility & Open Science Practices	Project Proposal Due
14	11/24–11/30	Student Presentations / Case Studies	Final
15	12/1–12/7	Course Review & Final Exam / Project Due	

Alignment of Competencies with Assessments

Graduate Competencies	Homework	Midterm Test	Final Data Project	Final Presentation
(FK 3) Explain the role of quantitative and qualitative methods and sciences in describing and assessing a population's health	X	X		
(FK 6) Explain the critical importance of evidence in advancing public health knowledge		X	X	
(FC 2) Select quantitative and qualitative data collection methods appropriate for a given public health context	X		X	
(FC 3) Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software	X		X	
(FC 22) Apply systems thinking tools to visually represent a public health issue in a format other than standard narrative			X	X

Undergraduate Competencies	Homework	Midterm Test	Final Data Project	Final Presentation
(FD 2) The basic concepts, methods and tools of public health data collection, use and analysis, and why evidence-based approaches are essential	X	X		
(FC 1) Communicate public health information, in both oral and written forms, through a variety of media and to diverse audiences				X
(FC 2) Locate, use, evaluate and synthesize public health information	X		X	