THE OHIO STATE UNIVERSITY
COLLEGE OF PUBLIC HEALTH

PUBHBIO 7225 – Survey Sampling Methods
3 credits – Autumn 2025
230 Cunz Hall, Wed/Fri 11:10am-12:30pm (in-person)

Course Instructor

Rebecca Andridge, PhD (Biostatistics, University of Michigan, 2009)
Office: 242 Cunz Hall, 614-247-7912
Email: andridge.1@osu.edu

Instructor's Office Hours

Tuesdays 11am-12pm ET via Zoom (link on Carmen)
Wednesdays 12:30-1:30pm ET in-person (right after class) (242 Cunz Hall)
Or by appointment

Faculty Feedback & Response Time:

The following gives you an idea of my intended availability during the course:

- **Grading:** You can generally expect feedback within 7 days.
- **E-mail:** I will reply to e-mails sent through Carmen within 24 hours on school days.
- **Discussion board:** I will check and reply to messages in the discussion boards at least every 24 hours on school days, but responses to posts will often be much quicker than 24 hours.

Course Description

Sampling from finite populations, simple random, stratified, systematic and cluster sampling design, ratio and regression estimates, non-sampling errors, models.

Prerequisites

PUBHBIO 6211 or STAT 5301, or equiv.

Course Learning Objectives

- Identify and explain different sources of errors in surveys
- Describe the elements of typical sampling designs (SRS, Stratified, Cluster) and compare the statistica features and advantages/disadvantages of each
- Explain the design-based approach to survey sampling
- Construct and interpret appropriate finite-sample estimators for typical sampling designs
- Explain the impact of nonresponse on conclusions drawn from survey data and explain methods for mitigating its impact
- Communicate statistical concepts effectively through multiple mediums (orally, visually, in writing)

Text/Readings:

There is no required text for this class. Lecture notes and required readings will be posted on Carmen.

Carmen

There is a Carmen site for this course: https://carmen.osu.edu. All course materials are available via Carmen.

You will need to use BuckeyePass (buckeyepass.osu.edu) multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you take the following steps:

- Register multiple devices in case something happens to your primary device. Visit the BuckeyePass - Adding a Device help article for step-by-step instructions (https://admin.resources.osu.edu/buckeyepass/adding-a-device)
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click **Enter a Passcode** and then click the **Text me new codes** button that appears. This will text you ten passcodes good for 365 days that can each be used once.
- Download the Duo Mobile application (https://admin.resources.osu.edu/buckeyepass/installing-the-duo-mobile-application) to all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at 614-688-4357(HELP) and IT support staff will work out a solution with you.

Class Format: How this course works

- **Mode of delivery:** This is a 100% in-person course.
- **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 (in-class lecture and activities) in addition to 6 hours of out of class work (online quizzes, homework, readings, etc.) to receive a grade of (C) average.
- **Attendance and participation requirements:** Attendance is not strictly required for this course; however, each class period will involve one or more in-class activities that must be completed and submitted for credit. Many of these will involve collaboration with the entire class. Thus, it is in your best interest to attend all class sessions in-person.

Course Technology

This is an in-person class, but we will do in-class activities in **every class period** that will require the use of a computer (either to log in to Carmen, and/or to complete worksheets, and/or to run statistical analyses). Our classroom is a computer lab, and the necessary software (both Stata and R) is installed on the PCs. You may also bring your own laptop if desired.

Technology skills needed for this course

- Basic computer and web-browsing skills
- Navigating Carmen (go.osu.edu/canvasstudent)
- CarmenZoom virtual meetings (go.osu.edu/zoom-meetings)
- Familiarity with the statistical software package STATA or R

Required equipment

- **Computer:** current Mac (Mac OSX) or PC (Windows 10+) with high-speed internet connection
- **Other:** a mobile device (smartphone or tablet) to use for BuckeyePass authentication

Optional equipment (for participation in optional Zoom office hours)

- **Webcam:** built-in or external webcam, fully installed and tested
- **Microphone:** built-in laptop or tablet mic or external microphone

Required software

- **Microsoft 365 Copilot (formerly Office 365)**
  All Ohio State students are now eligible for free Microsoft 365 Copilot (formerly Office 365). Full instructions can be found at go.osu.edu/office365help.
- **Stata or R**
  - The software used in this class will be Stata and/or R and students may choose which one of these they prefer. One of these two must be used on assignments (in-class activities, problem sets). Alternative software (e.g., SAS) may be used on the projects.
  - R is freely available. Details on how to purchase Stata (and the associated costs) are available on the course website. You can also use Stata on the PCs in the Cunz Hall computer lab (room 230), though please note that this room is also used for classes and may not be available for your use at the time(s) you desire.

Technology support

For help with your password, university email, Carmen, or any other technology issues, questions, or requests, contact the Ohio State IT Service Desk. Standard support hours are available at and support for urgent issues is available 24/7.

- **Self-Service and Chat support:** http://it.osu.edu/help
- **Phone:** 614-688-4357(HELP)
- **Email:** servicedesk@osu.edu

Assignments/Assessments

In-class Activities: 15% of final course grade

This course will make extensive use of hands-on activities in the classroom. These active learning activities are designed to facilitate your understanding of concepts. To ensure that you get the most out of these activities, a selection of activities will be designated as "required" and you will need to submit proof of completion of the activity (usually an electronic worksheet). The submitted activities will each be graded on an S/U basis.

- **Collaboration with others:** Permitted (encouraged)
- **Use of Generative AI:** Permitted (though unlikely to be useful in most cases)

Problem Sets: 20% of final course grade

Individual problem sets will be due approximately every other week (exact dates noted on Carmen) and consist of short answer questions (often requiring calculations) and short data analyses. The length of these assignments will vary. However, each problem set is weighted equally, regardless of length.

Although I encourage you to work together in solving the problems, your submission should be your own and should demonstrate your personal understanding of the problems. Please feel free to ask me for help after you have attempted to solve the problems.

- **Collaboration with others:** Permitted (encouraged)
- **Use of Generative AI:** Permitted with attribution (i.e., state when and how you used GenAI). However, all written text responses must be your own original work.

Quizzes: 15% of final course grade

Short, online, low-stakes multiple choice quizzes will be due approximately every other week (exact dates noted on Carmen) on weeks when there is not a problem set due. These quizzes are intended to serve as **retrieval practice**, that is, to encourage you to review materials from the previous week(s) and self-assess your understanding of key concepts. These quizzes will not involve lengthy calculations but will focus on important concepts.

As the purpose of these quizzes is retrieval practice, you will have **unlimited attempts at each quiz**; the highest quiz score will be kept. Please note that quiz questions will likely be slightly different on different attempts. You cannot stop a quiz, logout/login and resume later. Quizzes must be completed without the help of other individuals, but books and notes are permitted.

- **Collaboration with others:** Not Permitted
- **Use of Generative AI:** Not Permitted

Group Project: 30% of final course grade

To solidify the concepts covered in class, you (as part of a small group) will analyze data from a publicly available survey in a statistically sound manner, present your results via a short presentation to the class, and produce a written report. Groups will also be required to submit "progress reports" at various points during the semester (specific instructions will be provided). Detailed grading rubrics will be available on Carmen for the presentation and written report.

I am asking you to complete this project in small groups for several reasons. First, I hope that you will learn from each other as you discuss various choices you must make to complete the project. Second, statistics doesn't happen in a vacuum. Working as a part of a team is an essential skill that this project will help you develop. Third, the broad array of learning and retention benefits that result from collaborative work is well documented.

- **Collaboration with others:** Required
- **Use of Generative AI:** Permitted with attribution (i.e., state when and how you used GenAI). However, all written text responses must be your group's original work.

Individual Project: 10% of final course grade

Survey sampling is an incredibly broad and diverse field. This course can only cover the tip of the iceberg! For the individual project in this course, you will select a survey sampling topic of your choosing that is not covered in this course and prepare a short teaching activity designed to introduce the topic to your classmates. This activity could be a tutorial, a worksheet, a (short!) recorded lecture, a set of lecture notes -- creativity is encouraged! Topics will be approved by the instructor to ensure they are of appropriate scope (i.e., not too broad a topic). Examples of potential topics will be provided, along with more detailed instructions for submissions and the grading rubric.

- **Collaboration with others:** Not Permitted
- **Use of Generative AI:** Permitted with attribution (i.e., state when and how you used GenAI). However, all written text responses must be your own original work.

Peer Assessment: 10% of final course grade

As part of this class, you will engage with your classmates by participating in peer assessment activities. Specifically, you will peer-grade (anonymously) problem sets using a provided answer key and rubric, and you will provide peer feedback on both the group presentations and the individual projects. Detailed instructions for each peer assessment activity will be provided.

Participation in peer assessment activities is required and will count toward your final grade in the course. Your peer assessment activities score will be based on two components: the amount of required peer reviews you complete and the quality of your peer reviews. The specific grading rubric that will be used is available on Carmen.

- **Collaboration with others:** Permitted (but unlikely to be useful)
- **Use of Generative AI:** Not Permitted

Grading

Your final class score will be calculated using the following weighting scheme, and a letter grade assigned using the scale shown below:

- In-class Activities: 15%
- Problem Sets: 20%
- Quizzes: 15%
- Group Project: 30% total
    - Progress Reports: 5%
    - Presentation: 10%
    - Paper: 15%
- Individual Project (Teaching Tool): 10%
- Peer Assessment Activities: 10%

Grading Scale

A	**93 to 100**	Outstanding work that reflects mastery of the material and the ability to apply it
A-	**90 to <93**	Excellent work that reflects mastery of the material
B+	**87 to <90**	Good work that reflects mastery of most of the material
B	**83 to <87**	Good work that reflects mastery of some of the material
B-	**80 to <83**	Good work that reflects mastery of a few aspects of the material
C+	**77 to <80**	Mediocre work that reflects familiarity with, but not mastery of the material
C	**73 to <77**	Mediocre work that reflects familiarity with most of the material
C-	**70 to <73**	Mediocre work that reflects little familiarity with the material
D+	**67 to <70**	
D	**60 to <67**	
E	**Below 60**	

Class Policies

This course meets in a computer lab and students will be actively using a computer for large portions of the class period. Please respect the learning environment and keep distractions such as cell phones, pagers, and non-course-related web sites/computer use to a minimum.

Copyright Statement

This syllabus and all course materials (e.g., homework assignments, solution keys, course materials) are under copyright by the instructor and cannot be posted elsewhere without written permission.

Generative AI Policy

The learning goals of this class include areas in which the use of generative artificial intelligence (GenAI) may be useful, for example, in getting assistance in coding. Students are permitted to use GenAI on many assignments, with specific details provided in the description of each assignment on this syllabus. Note that GenAI is explicitly not permitted for the following assignments: Quizzes, Peer Assessment Activities.

If I suspect that you have used GenAI on an assignment for which it is prohibited, I will ask you to explain your process for completing the assignment in question. Submission of GenAI-generated content as your own original work is considered a violation of Ohio State's Academic Integrity policy and Code of Student Conduct because the work is not your own. The unauthorized use of GenAI tools will result in referral to the Committee on Academic Misconduct.

Office of Student Life: Disability Services

The university strives to maintain a healthy and accessible environment to support student learning in and out of the classroom. If you anticipate or experience academic barriers based on your disability (including mental health, chronic, or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with

Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion.

If you are ill and need to miss class, including if you are staying home and away from others while experiencing symptoms of a viral infection or fever, please let me know immediately. In cases where illness interacts with an underlying medical condition, please consult with Student Life Disability Services to request reasonable accommodations. You can connect with them at slds@osu.edu; 614-292-3307; or slds.osu.edu.

Mental Health Services

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614-292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at 614-292-5766 and 24 hour emergency help is also available 24/7 by dialing 988 to reach the Suicide and Crisis Lifeline.

Religious Beliefs or Practices Accommodations

Ohio State has had a longstanding practice of making reasonable academic accommodations for students' religious beliefs and practices in accordance with applicable law. In 2023, Ohio State updated its practice to align with new state legislation. Under this new provision, students must be in early communication with their instructors regarding any known accommodation requests for religious beliefs and practices, providing notice of specific dates for which they request alternative accommodations within 14 days after the first instructional day of the course. Instructors in turn shall not question the sincerity of a student's religious or spiritual belief system in reviewing such requests and shall keep requests for accommodations confidential.

With sufficient notice, instructors will provide students with reasonable alternative accommodations with regard to examinations and other academic requirements with respect to students' sincerely held religious beliefs and practices by allowing up to three absences each semester for the student to attend or participate in religious activities. Examples of religious accommodations can include, but are not limited to, rescheduling an exam, altering the time of a student's presentation, allowing make-up assignments to substitute for missed class work, or flexibility in due dates or research responsibilities. If concerns arise about a requested accommodation, instructors are to consult their tenure initiating unit head for assistance.

A student's request for time off shall be provided if the student's sincerely held religious belief or practice severely affects the student's ability to take an exam or meet an academic requirement and the student has notified their instructor, in writing during the first 14 days after the course begins, of the date of each absence. Although students are required to provide notice within the first 14 days after a course begins, instructors are strongly encouraged to work with the student to provide a reasonable accommodation if a request is made outside the notice period. A student may not be penalized for an absence approved under this policy.

If students have questions or disputes related to academic accommodations, they should contact their course instructor, and then their department or college office. For questions or to report discrimination or

harassment based on religion, individuals should contact the Civil Rights Compliance Office. (Policy: Religious Holidays, Holy Days and Observances)

Academic Misconduct

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 3335-5-48.7 (B)). For additional information, see the Code of Student Conduct.

Intellectual Diversity

Ohio State is committed to fostering a culture of open inquiry and intellectual diversity within the classroom. This course will cover a range of information and may include discussions or debates about controversial issues, beliefs, or policies. Any such discussions and debates are intended to support understanding of the approved curriculum and relevant course objectives rather than promote any specific point of view. Students will be assessed on principles applicable to the field of study and the content covered in the course. Preparing students for citizenship includes helping them develop critical thinking skills that will allow them to reach their own conclusions regarding complex or controversial matters.

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.

Creating an Environment Free from Harassment, Discrimination, and Sexual Misconduct

The Ohio State University is committed to building and maintaining a community to reflect diversity and to improve opportunities for all. All Buckeyes have the right to be free from harassment, discrimination, and sexual misconduct. Ohio State does not discriminate on the basis of age, ancestry, color, disability, ethnicity, gender, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, pregnancy (childbirth, false pregnancy, termination of pregnancy, or recovery therefrom), race, religion, sex, sexual orientation, or protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment. Members of the university community also have the right to be free from all forms of sexual misconduct: sexual harassment, sexual assault, relationship violence, stalking, and sexual exploitation.

To report harassment, discrimination, sexual misconduct, or retaliation and/or seek confidential and non-confidential resources and supportive measures, contact the Civil Rights Compliance Office:

Online reporting form at http://civilrights.osu.edu/,
Call 614-247-5838 or TTY 614-688-8605,
Or Email civilrights@osu.edu

The university is committed to stopping sexual misconduct, preventing its recurrence, eliminating any hostile environment, and remedying its discriminatory effects. All university employees have reporting responsibilities to the Civil Rights Compliance Office to ensure the university can take appropriate action:

- All university employees, except those exempted by legal privilege of confidentiality or expressly identified as a confidential reporter, have an obligation to report incidents of sexual assault immediately.
- The following employees have an obligation to report all other forms of sexual misconduct as soon as practicable but at most within five workdays of becoming aware of such information: 1. Any human resource professional (HRP); 2. Anyone who supervises faculty, staff, students, or volunteers; 3. Chair/director; and 4. Faculty member.

Course Outline

Week	Day	Date	Topic	Weekly Assignment(s)*
1	W	8/27/25	Vocabulary of Sampling	
	F	8/29/25	Survey Modes & Total Survey Error Framework	
2	W	9/3/25	Sampling Distributions	Problem Set 1
	F	9/5/25	Simple Random Sampling	
3	W	9/10/25	Simple Random Sampling – Software	Quiz 1
	F	9/12/25	Stratified Sampling	Peer Eval of Problem Set 1
4	W	9/17/25	Stratified Sampling – Allocation Methods	Problem Set 2
	F	9/19/25	Stratified Sampling – Software	
5	W	9/24/25	Stratified Sampling – Sample Size and DEFF	Quiz 2
	F	9/26/25	Poststratification	Peer Eval of Problem Set 2 Group Progress Report 1
6	W	10/1/25	Cluster Sampling – One-Stage	Problem Set 3
	F	10/3/25	Cluster Sampling – One-Stage Unequal Size	
7	W	10/8/25	Cluster Sampling – Two-Stage	Quiz 3
	F	10/10/25	Probability Proportional to Size Sampling	Peer Eval of Problem Set 3 Group Progress Report 2
8	W	10/15/25	Complex Designs	
	F	10/17/25	*NO CLASS – Fall break*	
9	W	10/22/25	Domain Estimation	Problem Set 4
	F	10/24/25	Nonresponse – Intro to Missing Data	
10	W	10/29/25	Nonresponse – Weighting Adjustments	Quiz 4
	F	10/31/25	Nonresponse – Imputation	Peer Eval of Problem Set 4
11	W	11/5/25	Catch-up / Buffer / Group Work Time	Group Progress Report 3
	F	11/7/25	Linear Regression with Survey Data	
12	W	11/12/25	Binary Outcome Regression with Survey Data	Problem Set 5
	F	11/14/25	Graphing Survey Data	
13	W	11/19/25	Miscellaneous Topics in Sampling	Quiz 5
	F	11/21/25	Miscellaneous Topics in Sampling	
14	W	11/26/25	*NO CLASS – Thanksgiving*	
	F	11/28/25	*NO CLASS – Thanksgiving*	
15	W	12/3/25	Group Presentations	Group Slides
	F	12/5/25	Group Presentations	
16	W	12/10/25	Group Presentations	Individual Project
17			(Finals week)	Group Paper** Peer Evals of Individual Project**

*Specific due dates for each assignment are posted in Carmen. Peer evaluations of problem sets are due on Tuesdays; Problem Sets, Quizzes, and Group Progress Reports are due on Thursdays.

**The group paper and peer evaluations of the individual project will be due on Thursday 12/18, which is the scheduled final exam date set by the registrar. There is no final exam for this course.

Degree Program Competencies and Alignment with Course Assessments:

	Quizzes	Problem Sets	In-Class Activities	Group Project	Individual Project
Foundational MPH Competencies					
Select quantitative and qualitative data collection methods appropriate for a given public health context (2)	X				
Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate (3)		X	X	X	
Interpret results of data analysis for public health research, policy or practice (4)	X	X	X	X	
MPH-Biostatistics Specialization Competencies					
Address problems arising in public health and medicine through appropriate statements of hypotheses, study design, data collection, data management, statistical analysis, and interpretation of results (1)	X	X	X	X	X
Recognize strengths and weaknesses of study designs and data sources commonly encountered in public health (2)	X	X	X	X	X
Identify strengths and weaknesses of standard analytic methods (3)	X	X	X		
Use computational methods to effectively analyze complex public health and medical data (5)		X	X	X	
MS-Biostatistics Specialization Competencies					
Address problems arising in public health and medicine through appropriate statements of hypotheses, study design, data collection, data management, statistical analysis, and interpretation of results (7)	X	X	X	X	X
Recognize strengths and weaknesses of study designs, data sources, and analytic methods (8)	X	X	X	X	X
Use computational methods to effectively analyze complex public health and medical data (10)		X	X	x	
PhD in Biostatistics Program Learning Goals					
Understand the theoretical foundations of statistical methods (1)	X	X	X		
Work effectively and collaboratively in a team on a biological or health-related scientific question (3)				X	
Effectively communicate the results of statistical analyses to statistical and non-statistical audiences (5)				X	X

A complete list of College of Public Health Competencies is located on the College of Public Health website: https://cph.osu.edu/students/competencies.