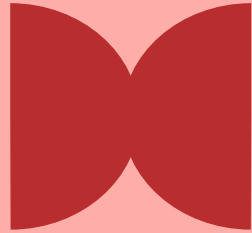


# PHP 2510

## Principles of Biostatistics & Data Analysis

### Week 1: Intros & Motivation



# Today's Plan

1

Introductions

Professor Lipman

TAs

2

Course Expectations

Shopping

Syllabus Review

R/RStudio

3

Class Activity

Data Generation

4

Biostatistics in Practice

Article Highlights

Professor



Peter J Lipman, PhD

peter\_lipman@brown.edu

121 S Main St; Room 725

After a career in industry, I'm excited to get back in the classroom in a teaching-focused role. I look forward to helping diverse students and working professionals understand statistical concepts and appropriately analyze biomedical data.

#### Area of expertise

Survey Design & Analysis; Experimental Design; Causal Inference

#### Academic background

PhD Biostatistics; BA Mathematics

#### Previous roles

- 11 years at Google as a **Data Scientist** (Ads + Play Store)
- 2 years at Takeda as a **Clinical Trial Statistician** (Oncology)

#### Office Hours

Th@2-3pm, in-person

## Teaching Assistants



Aristofanis Rontogiannis

This is my second year as a PhD student in the department of Biostatistics. I am from Greece, and I completed my undergraduate studies at Athens University of Economics and Business, at the department of Statistics (I do not hold a Masters degree). Currently, I am working with Dr. Youjin Lee, focusing mainly on causally interpretable meta-analysis. I am glad to be one of your TAs for this semester!

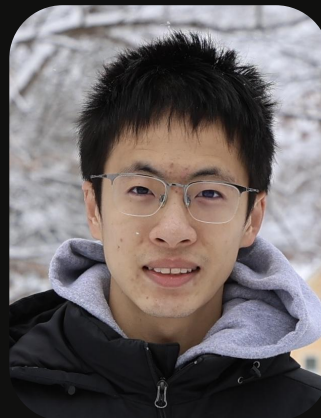
[aristofanis\\_rontogiannis@brown.edu](mailto:aristofanis_rontogiannis@brown.edu)



Jina Yang

I am a third-year Ph.D. student in Biostatistics with an undergraduate degree in Statistics. My research interest is in leveraging mediation analysis to address challenges related to informative observation in electronic health record (EHR) data. Outside of my academic work, I enjoy watching musicals, and my favorite productions include *Frankenstein* and *Rebecca*.

[jina\\_yang@brown.edu](mailto:jina_yang@brown.edu)



Mo Zhou

I'm a second-year master student in Biostatistics department of School of Public Health. Beside taking classes, I'm involved with some statistical methodology research in causal inference. I hold a BS in quantitative science and a BA in Spanish from Emory University, and I play tennis competitively.

[mo\\_zhou1@brown.edu](mailto:mo_zhou1@brown.edu)



Weijing Yin

I'm a second-year Master's student in Biostatistics. I hold a BS in Mathematics and Physics, and my interests focus on applying statistical models and computational techniques to pharmaceutical statistics. Outside of academics, I enjoy listening to pop music, reading and writing novels, and playing video and card games.

[weijing\\_yin@brown.edu](mailto:weijing_yin@brown.edu)

## Program Staff



Keviner Asigi

Keviner Asigi is a Quantitative Academic Support Specialist at the Brown University School of Public Health and an alumna of the Master of Science in Biostatistics program. She supports students in developing a strong foundation in statistical software and data analysis. Her approach emphasizes a supportive, collaborative learning environment that helps students build both confidence and technical proficiency. You can schedule an appointment with Keviner [here](#)!

keviner\_asigi@brown.edu

# Course Capacity

I will implement a 60-person class maximum

Priority for overrides in the following order:

1. Graduate students at SPH
2. Undergrad - Stats or Public Health concentrators
3. Graduate Students → Seniors → Juniors → Sophomores → Freshman

If you fall into (1) or (2), you *\*will\** get in

Undergrads: consider PHP1501

Grads: consider PHP2507 (pre-test will help you decide)

[UNDERGRADS] If you love this course and want to continue your academic career in public health and/or biostatistics, consider SPH's:

- 5th year MPH ([link](#)) ← 2510 satisfies a degree requirement
- 5th year AM, Biostatistics ([link](#)) ← talk to Stavroula Chrysanthopoulou or Alice Paul

# Course Expectations

## R & RStudio

## Labs (starting 9/12)

Mon 3–4 pm, 121 S Main St, Rm 251  
 Fri 9–10 am, 121 S Main St, Rm 251  
 Fri 10–11 am, 121 S Main St, Rm 251

## Syllabus Details

Learning Objectives  
 Assessments & Grading  
 AI Policy

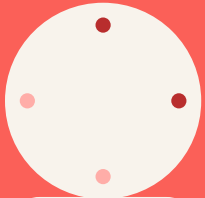
Week	Dates	Topic	Assessments
1	9/4	Introductions & Motivation	
2	9/9; 9/11	Intro to R & Basic Probability	
3	9/16; 9/18	Random Variables	
4	9/23; 9/25	Manipulating Data with R	
5	9/30; 10/2	Exploratory Data Analysis	Assignment #1 Due
6	10/7; 10/9	Sampling Distributions	
7	10/14; 10/16	Hypothesis Testing	Exam #1 Administered
8	10/21; 10/23	Confidence Intervals	
9	10/28; 10/30	Confidence Intervals & Hypothesis Testing (cont.)	
10	11/4; 11/6	Non-Parametric Testing	Assignment #2 Due
11	11/11; 11/13	Categorical Data Comparisons	
12	11/18; 11/20	Simple Linear Regression	Exam #2 Administered
13-14	11/25; 12/2; 12/4	Multiple Linear Regression	
15	12/9; 12/11	Retrospective / Spillover	Assignment #3 Due
16	12/12-12/20	Finals Period	FINAL: 12/13 @ 9am EG5



# OUTCOMES

After today's class, along with the required readings (CHIHARA Chapter 1), you should be able to:

- Distinguish between descriptive and inferential statistics
- Classify variables into different types
- Distinguish between a population and a sample
- Recognize importance of course content thru real world examples



WEEK 1

Take a note card

Write down a number 1–5



## Data Collection & Variation

[illegible]

	Truth	Number of Guesses	Avg Guess	Min Error	Max Error	Avg Abs Error
Picture 1						
Picture 2						
Picture 3						
Picture 4						
Picture 5						

# Biostatistics in Practice

Article [Open access](#) Published: 01 July 2025

## Immune hist the omicron

[Hiam Chemaitelly](#) [✉](#), [H](#)

[Hasan](#), [Hadi M. Yassine](#)

[Anvar Hassan Kaleeck](#)

[K. Nasrallah](#), [Mohamed](#)

[Khal](#), [Roberto Bertolini](#)

[Communications Medic](#)

514 Accesses | 5 Alt

## Abstract

### Background

Past immunological e  
protection. This stud  
coronavirus 2 (SARS-  
without vaccination,

Article [Open access](#) Pub

## Sexually trans US holidays

[Michael Mohseni](#) [✉](#), [Jessica](#)

[Sheele](#)

[Scientific Reports](#) 15, Article

339 Accesses | [Metrics](#)

## Abstract

Few investigations exist o  
with holidays, special eve  
predominance to STIs, bu  
examine the rates of gonc  
birthdays, and other majo

Article [Open access](#) Published: 21 J

## Heatwaves amplify ai Africa

[Egide Kalisa](#) [✉](#) & [Andrew Sudmant](#)

[Scientific Reports](#) 15, Article number: 2

## Abstract

Mounting evidence demonstrates th  
substantial impacts on public health  
Saharan African contexts. In this stu  
relationship between extreme heat e  
(PM<sub>2.5</sub>), nitrogen dioxide (NO<sub>2</sub>), and  
for dense spatiotemporal coverage,  
significantly during 6 heatwave even

Article [Open access](#) Published: 21 July 2025

## Polygenic prediction of body mass index and obesity through the life course and across ancestries

[Roelof A. J. Smit](#), [Kaitlin H. Wade](#), [Qin Hui](#), [Joshua D. Arias](#), [Xianrong Yin](#), [Malene R. Christiansen](#), [Loic](#)

[Yengo](#), [Michael H. Preuss](#), [Mariam Nakabuye](#), [Ghislain Rocheleau](#), [Sarah E. Graham](#), [Victoria L.](#)

[Buchanan](#), [Geetha Chittoor](#), [Marielisa Graff](#), [Marta Guindo-Martínez](#), [Yingchang Lu](#), [Eirini Marouli](#), [Saori](#)

[Sakaue](#), [Cassandra N. Spracklen](#), [Sailaja Vedantam](#), [Emma P. Wilson](#), [Shyh-Huei Chen](#), [Teresa Ferreira](#),

[Yingjie Ji](#), [23andMe Research Team](#), [DiscovEHR \(DiscovEHR and MyCode Community Health Initiative\)](#),

[eMERGE \(Electronic Medical Records and Genomics Network\)](#), [GPC-UGR](#), [The PRACTICAL Consortium](#),

[Understanding Society Scientific Group](#), [VA Million Veteran Program](#), ... [Ruth J. F. Loos](#) [✉](#)

[+ Show authors](#)

[Nature Medicine](#) (2025) | [Cite this article](#)

400 Altmetric | [Metrics](#)

## Abstract

Polygenic scores (PGSs) for body mass index (BMI) may guide early prevention and targeted  
treatment of obesity. Using genetic data from up to 5.1 million people (4.6% African ancestry,  
14.4% American ancestry, 8.4% East Asian ancestry, 71.1% European ancestry and 1.5% South

# Biostatistics in Practice

Article | [Open access](#) | Published: 17 July 2025

## Evaluation of activation in Paralympic

[Joilson Alves de Souza Neto](#), [Breno Guilherme Badicu](#) ✉, [Fatma Hilal Alghannam](#)

[Scientific Reports](#) 15,

692 Accesses | 9 A

### Abstract

Paralympic Powerlifting demonstrated great  
This study aimed to  
(ET) methods on M

Article | [Open access](#) | Published: 16 July 2025

## Evaluating the ef secondary school knowledge and a

[Batool Zeidabadi](#), [Mahsa Khodabadi](#)

[Scientific Reports](#) 15, Article number

466 Accesses | 1 Altmetric |

### Abstract

Enhancing the mental health  
social harm within society. The  
mental health literacy program  
consisting of six modules (1)  
mental illness, (3) Information  
illness, (5) seeking and recei

Article | Published: 16 July 2025

## Identification of med that affect gut infect

[Aman Kumar](#), [Ruizheng Sun](#), [Bettina He](#)

[Ivaylo I. Ivanov](#), [Robyn Tamblyn](#) & [Andre](#)

[Nature](#) (2025) | [Cite this article](#)

2408 Accesses | 1 Citations | 80 A

### Abstract

Most people in the USA manage the  
drugs classified as non-antibiotics c  
intestinal homeostasis<sup>1,2</sup>. Here we i  
risk of gastrointestinal infections ac  
individuals monitored over 15 years

Article | [Open access](#) | Published: 11 July 2025

## Childhood predictors of social support and intimate friends in a Cross-National analysis of the global flourishing study

[James L. Ritchie-Dunham](#) ✉, [George Yancey](#), [Shunsuke Managi](#), [Caroline Bartel](#), [Rebecca Bonhag](#), [R. Noah Padgett](#), [Koichiro Shiba](#), [Byron R. Johnson](#) & [Tyler J. VanderWeele](#)

[Scientific Reports](#) 15, Article number: 25068 (2025) | [Cite this article](#)

464 Accesses | [Metrics](#)

### Abstract

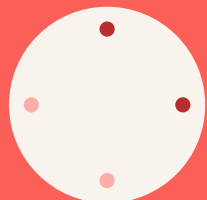
An extensive research literature describes how close social connections (CSC) comprising both intimate friends and relatives and friends who help when in trouble are one of the most significant predictors of improved well-being outcomes, approximately equivalent to a 5-fold increase in income, in some contexts. However, less is known about childhood predictors of adulthood CSC, including what childhood factors have potency across diverse cultural

# Topics & Applications

- Policy Evaluation
- Drug Safety & Effectiveness
- Medical Devices
- Disease Progression
- Big Data Analytics
- Climate Change
- Mental Health
- Nutrition
- Clean Water; Air Quality
- Product Safety Testing
- Health Disparities



# OUTCOMES



WEEK 1

After today's class, along with the required readings (CHIHARA Chapter 1), you should be able to:

- Distinguish between descriptive and inferential statistics
- Classify variables into different types
- Distinguish between a population and a sample
- Recognize importance of course content thru real world examples

# Next Week

Intro to R & Probability

