

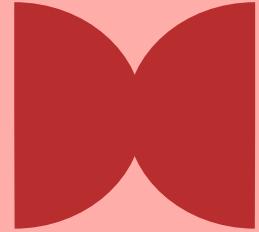
PHP 2510

Principles of

Biostatistics &

Data Analysis

Week 1: Intros
& Motivation



8

Today's Plan

1

Introductions

2

Course Expectations

3

Class Activity

4

Biostatistics in Practice

Professor Lipman

TAs

Shopping

Syllabus Review

R/RStudio

Data Generation

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!

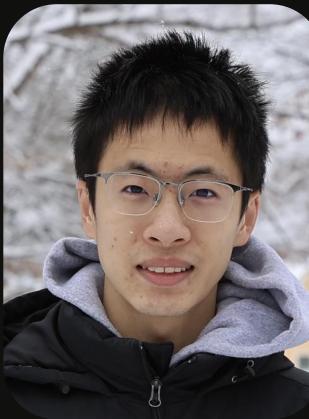
aristofanis_rontogiannis@brown.edu



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



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



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

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!](#)

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

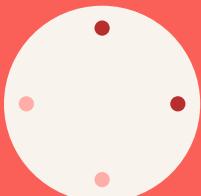
AI Policy

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

Data Collection & Variation

	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 histoty of the omicron

Hiam Chemaiteily  H

Hasan, Hadi M. Yassine

Anvar Hassan Kaleecka

K. Nasrallah, Mohamed

Khal, Roberto Bertollini

Communications Medicine

514 Accesses | 5 Alt

Abstract

Background

Past immunological evidence suggests that vaccination provides protection. This study examined the immune response to SARS-CoV-2 (SARS-CoV-2) in individuals without vaccination, and found that it was similar to those who were vaccinated.

Methods

The study included 100 individuals without vaccination, and 100 individuals who were vaccinated. The participants were recruited from a convenience sample of individuals who were willing to participate in the study.

Results

The results showed that the immune response to SARS-CoV-2 was similar in both groups, and that vaccination did not provide additional protection.

Conclusion

The results suggest that vaccination is not necessary for protection against SARS-CoV-2.

Article | [Open access](#)

Published: 21 July 2025

Sexually transmitted infections during US holidays

Michael Mohseni  , Jessica

Sheele

Scientific Reports 15, Article number: 2

339 Accesses | [Metrics](#)

Abstract

Few investigations exist on the relationship between sexual health and public health.

With the increasing prevalence of sexually transmitted infections (STIs), it is important to understand the factors that contribute to their spread.

This study examined the rates of STIs among individuals who were sexually active during the US holidays.

The results showed that the rates of STIs were significantly higher during the US holidays compared to other times of the year.

Conclusion

The results suggest that sexual health is an important factor in public health.

Conclusion

The results suggest that sexual health is an important factor in public health.

Conclusion

The results suggest that sexual health is an important factor in public health.

Article | [Open access](#)

Published: 21 July 2025

Heatwaves amplify air pollution in Africa

Egide Kalisa  & Andrew Sudmant

Scientific Reports 15, Article number: 2

Abstract

Mounting evidence demonstrates that heatwaves have substantial impacts on public health.

In this study, we investigated the relationship between extreme heat events and public health.

We found that heatwaves were associated with increased rates of hospital admissions for respiratory diseases.

Conclusion

The results suggest that heatwaves have significant impacts on public health.

Conclusion

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Conclusion

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Conclusion

The results suggest that heatwaves have significant impacts on public health.

Conclusion

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, Xianyong 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

Sakae, 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 mental health activation in Paralympic athletes

[Joilson Alves de Souza](#)

[Neto, Breno Guilherme](#)

[Badicu](#)✉, Fatma Hila

[Alghannam](#)

[Scientific Reports](#) 15

692 Accesses | 9 A

Article | [Open access](#)

| Published: 16 July 2025

Evaluating the effectiveness of a secondary school-based mental health knowledge and activation program

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

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

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

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

466 Accesses | 1 Altmetric | 1

Abstract

Enhancing the mental health of Paralympic athletes can reduce social harm within society. This study aimed to demonstrate great potential for mental health literacy programs consisting of six modules (1) mental illness, (2) information about mental illness, (3) information about mental illness, (4) seeking and receiving help, (5) seeking and receiving help, and (6) self-care.

Abstract

Paralympic Powerlifting demonstrated great potential for mental health literacy programs consisting of six modules (1) mental illness, (2) information about mental illness, (3) information about mental illness, (4) seeking and receiving help, and (5) self-care.

Identification of medications that affect gut infections

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

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

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

2408 Accesses | 1 Citations | 80 Altmetrics

Abstract

Most people in the USA manage their gut infections with antibiotics. These drugs classified as non-antibiotics can also affect gut infections. For example, intestinal homeostasis^{1,2}. Here we identify medications that affect the risk of gastrointestinal infections among 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 backgrounds.

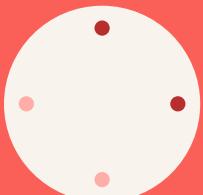
Topics & Applications

- 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

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

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- Classify variables into different types
- Distinguish between a population and a sample
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WEEK 1

Next Week

Intro to R & Probability

