Clinical Biostatistics and Statistical Genetics

1. Instructors

Name	Position	Department	Contact Information
TAKAHASHI Kunihiko	Chief Instructor / Professor	Department of Biostatistics	kunihikot.dsc@tmd.ac.jp

2. Classroom/Lab Lecture Location
Online video

3. Course Purpose and Outline
Course Purpose:

This course introduces the basic techniques important for analyzing data from epidemiological, biomedical and other public health related research. Statistical reasoning will be emphasized through problem solving and practical applications.

Outline:

Biostatistics is the application of statistical methods to data in biological, biomedical and health sciences. It is a key technique for the collection, analysis, and presentation of data especially in quantitative studies including epidemiological studies. Throughout the seminar, we will review the broad field of statistical data analysis and the range of issues that arise when analyzing health data. We will read and discuss selected chapters from a textbook and apply statistical methods to wide range of quantitative study questions.

4. Course Objectives
By the end of this course, students will be able to:
-   Interpret basic statistical terminologies.
-   Explain assumptions and conditions for basic statistical techniques, and judge which statistical technique to use in a given situation.
-   Conduct basic statistical techniques both by hand and using a statistical software, and present results using publication quality tables.
-   Describe results of statistical analysis using standard statistical expressions.

5. Format
This course will consist of lectures and optional laboratory sessions (online video). Q&A system on webclass or some optional hours will be prepared. There will be some homework assignments, and examination/reports. (Details will be announced later.)

6. Course Details

No.	Topics
1	Lecture: Introduction to Biostatistics (1)
2	Lecture: Data presentation; Numerical summary measures (1)
3	Lecture: Data presentation; Numerical summary measures (2)
4	Lecture: Probability and Theoretical probability distributions (1)
5	Lecture: Probability and Theoretical probability distributions (2)
6	Lecture: Estimation
7	Lecture: Comparing groups - continuous data (1)
8	Lecture: Comparing groups - continuous data (2)
9	Lecture: Comparing groups - categorical data
10	Lecture: Analysis of Variance; Multiple comparison
11	Lecture: Correlation; linear regression
12	Lecture: Multivariate analysis (1)
13	Lecture: Multivariate analysis (2)
14	Lecture: Multivariate analysis (3)
15	Lecture: Survival analysis
16	Final Exam

7. Assessment

Grades will be based on the following elements:
Participation 20%
Homework exercise 30%
Final examination/report 50%

8. Prerequisite Reading

Reading materials will be available online through the course webpage. Students are expected to have worked thorough the materials before attending the corresponding class.

9. Reference Materials

Pagano M, Gauvreau K. Principles of Biostatistics. 2nd ed. Belmont: Brooks/Cole; 2000.
Rosner B. Fundamentals of Biostatistics. 8th ed. Brooks/Cole; 2015.
Altman DG. Practical Statistics for Medical Research. Chapman & Hall; 1991.
Armitage P. Statistical Methods in Medical Research. 4th ed. Blackwell Science Ltd; 2002.

10. Language Used

All classes are conducted in English.

11. Important Course Requirements

Chief instructor's permission is required before registering to the course.
Also, students are required to have TOEFL iBT with a minimum score of 80 or IELTS with a minimum score of 6.5.

12. Office Hours

Please contact Prof. Takahashi at kunihikot.dsc@tmd.ac.jp

13. Note(s) to Students

Online Q&A system is available during the course, and a Realtime Q&A session (optional, June 8,2023, 14:00-, via zoom) is prepared.

This course uses the Stata statistical software. Stata is available for each student during the course. Students are expected to perform basic algebra, including logarithms and exponentials, by hand or using calculator.