

# We Need It Now: How To Analyze COVID Data Quickly

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## Abstract

R is an open-source programming language that helps to analyze the spread and consequences of viruses such as COVID-19. In particular, epidemiologists that seek to give policy advice employ R to combine data from different sources, to create various statistics, and to visualize the degree of the outbreak. This lecture will cover how epidemiologists utilize R as a tool in assessing viral outbreaks, how publicly available data can be structured and utilized in making analyses, and how to utilize visualization tools on R to create graphs to assist with conceptualizing, forecasting and understanding the characteristics of a virus and its degree of infectiousness. To visualize and analyze the outbreak quickly is essential to guide political responses. The lecture also includes several real life case studies of COVID-19 to aid with the theoretical topics.

## Learning Objectives

After this course you should be able to:

- Understand the importance of R in large-scale data analysis
- Accumulate data from desired authorised sources to produce a customized analysis
- Explore alternative resources for COVID-19 data acquisition
- Use R to visualize COVID-19 data with graphs and maps

## Course Outline

### 1 Why R is a significant tool of choice for epidemiologists

- 1.1 Data analytics and Epidemiology
- 1.2 Role of 'r' number's in COVID-19 data collection
- 1.3 What is RECON and what do they do?
- 1.4 Web Scraping and Data Coalition
- 1.5 Case Study: Saxony, Germany

### 2 How we can acquire COVID-19 data, just like epidemiologists

- 2.1 Case Study 1: Taiwan's Proactive Control of COVID-19
- 2.2 Case Study 2: Diamond Princess Cruise Ship
- 2.3 Comparing Publicly Available Data: JHU and Wikipedia
- 2.4 Strengths of R as a statistical application for forecasting/predictions

### 3 How to support policy making with visualizations of COVID-19 data

- 3.1 Overview of plot() and ggplot()
- 3.2 Case Study 1: Visualization capabilities using plot()
- 3.3 Case Study 2: Visualization capabilities using ggplot()

## Recommended Readings

Ponce, M., Sandhel, A. (2020). covid19.analytics: An R Package to Obtain, Analyze and Visualize Data from the Corona Virus Disease Pandemic, 1–47. Retrieved from <https://arxiv.org/pdf/2009.01091.pdf>

## Literature

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## Resources for lecture notes, in-class slides and exercises

Ishikawa, A., 2020. *Aqualisa/HSF-MIBM2-COVID19*. [online] GitHub. Available at: <<https://github.com/aqualisa/HSF-MIBM2-COVID19>>.