

**Digital Public
Health**
Graduate Program



PREREQUISITES YOU SHOULD COMPLETE

MSc PUBLIC HEALTH DATA SCIENCE

université
de BORDEAUX



Ce travail a bénéficié d'une aide de l'État gérée par l'Agence Nationale de la Recherche au titre du Plan France 2030 portant la référence ANR-17-EURE-0019.

**BORDEAUX
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HEALTH** | Research
Center - U1219



This document is a compendium of resources about prerequisite concepts you should be familiar with before beginning the Master program in Public Health Data Science. We encourage you to read and/or train with the materials listed below.

ENGLISH LANGUAGE

As the classes are taught in English, candidates must meet the required standards:

- IELTS (Academic Test): 6.0
- TOEFL: Paper-based 550 / Computer-based 213 / Internet-based 80
- TOEIC: 900-990

Or any other document certifying a **C1 level in English** upon review (University certificates...)

BIOSTATISTICS

- **General statistical theory concepts**

Read through the 6 chapters of this interactive online book: <http://students.brown.edu/seeing-theory/>

- **Introductory statistics & basics of R programming**

Following <http://swirlstats.com/students.html> instructions, install *Rstudio*, *R* and the *swirl* package, and complete the following courses in the given order:

1. *R Programming*
2. *Exploratory Data Analysis*
3. *Getting and Cleaning Data*
4. *Statistical Inference*
5. *Regression Models*
6. *Statistical Inference*

An additional resource on *statistical hypothesis testing* can be found on the *Statistics in Action with R* website: <http://sia.webpopix.org/statisticalTests1.html>. Read through it, then play around with the Shiny application at <http://shiny.webpopix.org/sia/testMean/>.

- **Basic ideas about causality**

The article “Confounding in health research” from Greenland, S. and H. Morgenstern (in *Annual review of public health*, 2001 22(1): 189-212) gives a good overview of the

fundamental concepts of causality and confounding in health science. You can read it here:
<https://www.ncbi.nlm.nih.gov/pubmed/11274518>.

EPIDEMIOLOGY

- **Basic concepts**
- Epidemiological concepts compulsory in **basic tools**:
 - Introduction the most common types of epidemiological study designs (experimental, cross-sectional, cohort, case-control).
 - Introduction to bias (selection, information, confounding) and effect modification.
 - Differences between measures of health status (prevalence, incidence, risk) and association (risk ratio, rate ratio, odds ratio).
- **Recommended readings**
- For students with no background in epidemiology: **Rothman KJ. Epidemiology. An introduction. Oxford: Oxford University Press; 2012.**
- For students with intermediate background in epidemiology: **Szklo M, Nieto FJ. Epidemiology: beyond the basics. Burlington: Jones & Bartlett Publishers; 2014.**
- For students with advanced background in epidemiology: **Rothman KJ, Greenland S, Lash TL. Modern epidemiology (Vol. 3). Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins; 2008.**

MEDICAL INFORMATICS

- **Notions of relational database design and implementation**

Normalisation

First, Second and Third Normal Forms

Entity-relationship modelling

Relational modelling

SQL language

You can follow this course: <https://www.coursera.org/learn/database-management> or this one: <https://www.udemy.com/relational-database-design/>

- **Object-oriented programming**

Data structure and algorithm

Object-oriented design: classes and objects, inheritance, polymorphism, encapsulation

Basics of Python programming: basic instructions, introduction to Object Oriented programming with Python

Enroll in the following udeMy course (until OOP in Python section):

<https://www.udemy.com/python-masterclass-for-beginners/>

It could be completed by the following course on OpenClassRoom

<https://openclassrooms.com/fr/courses/2304731-learn-python-basics-for-data-analysis>

CONTACT

dph@u-bordeaux.fr

facebook.com/DPHgraduateprogram/