Weekly Oxford Worldwide

DEPARTMENT FOR CONTINUING EDUCATION

UNIVERSITY OF OXFORD

Infectious Disease Modelling: Applied Methods in R

Dr Emma L Davis

Seminar Week 1

Week 1: Introduction to R

- Introductions
- How are these seminars going to work?
- Before we get started: some R basics
- Pair coding task

DEPARTMENT FOR CONTINUING EDUCATION

UNIVERSITY OF OXFORD

Who am I?

Trail runner

Mathematician by training

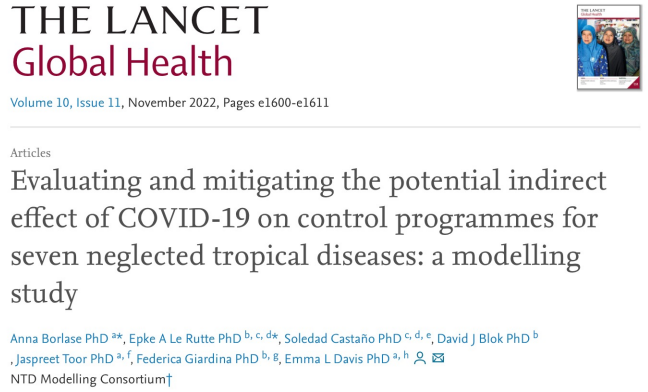
WMS Warwick Maths Society

Emma Davis

EPI WITH EMMA

maths made simple

YouTube Outreach



Researcher in infectious disease modelling

Lecturer (Mathematical Biology)

My academic journey…

DEPARTMENT FOR CONTINUING EDUCATION

UNIVERSITY OF OXFORD

MMath
Dissertation: Modelling soil-transmitted worms
University of Warwick

Research Masters
Epidemiology, evolution and control of infectious diseases
Imperial College London

UKRI Medical Research Council

EPSRC Pioneering research and skills

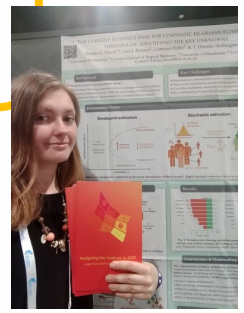
MathSys CDT
Taught masters + PhD
Modelling NTDs
University of Warwick

Emma Davis

Bill & Melinda Gates foundation

NTD MODELLING CONSORTIUM

Postdoc
Neglected Tropical Disease Modelling Consortium
University of Oxford



JUNIPER

Postdoc
COVID-19
UKRI
University of Oxford

Junior Fellow
Wolfson College
University of Oxford

Lecturer
Mathematical modelling of diseases
University of Warwick

Coursework

Project proposal (unassessed):

- Summary of data, research question and chosen model structure
- Guideline 1-2 pages
- Due: 5pm (UK time) Friday, Week 6

Final project (100% of module):

- Assessed via report (structured: Introduction, Methods, Results, Conclusions)
- Strong focus on policy conclusions
- Guideline 5 pages
- Due: 5pm (UK time) Friday, Week 12 (two weeks after the end of the course)

Reading

Key resources (free access):

- Intro 2 R: https://intro2r.com
- Plus Magazine: https://plus.maths.org/content/
- R for Graduate Students: https://bookdown.org/yih_huynh/Guide-to-R-Book/
- RECON (R Epidemics Consortium) Learn: https://www.reconlearn.org
- The Epidemiologist R Handbook: https://epirhandbook.com/en/

Suggested additional reading

Using R

- The Book of R: A First Course in Programming and Statistics by Davies
- R in Action by Kabacoff

A deeper look into the mathematics of infectious disease modelling (advanced)

- Mathematical Tools for Understanding Infectious Disease Dynamics by Diekmann, Heesterbeek and Britton

Introductions

- Name
- Where you're calling in from
- Background in maths/science
- Why did you sign up for this course?

How are these seminars going to work?

- 5 mins: Welcome, any questions on that week's Lecture content
- 10 mins: Coding demonstration
- 5 mins: Outline of pair coding task
- 30 mins: Pair coding task in breakout rooms
- 10 mins: Re-group and debrief

Before we get started

Some R basics:

- R is **case sensitive**, i.e. *A* is not the same as *a*
- Anything following a # symbol is a “comment” and ignored by R
- Separate commands / tasks using a new line
- All brackets must be closed
  - If your code chunk hasn’t been completed correctly then you will see the continuation prompt: +
- Use spaces to make your code readable

Demonstration

- Script versus console: a tour of R Studio
- Using objects
  - Difference between a function and other objects
- Getting help with functions in R

Pair coding task

1. Install tidyverse using the command:
   `install.packages("tidyverse")`
2. Create a new R project and R markdown file, load tidyverse in the setup
   `library("tidyverse")`
3. Download `firstwave_London.csv` from Canvas (contains case data for the first two months of the COVID-19 pandemic in London) and save this in your Project folder
4. Use the `read_csv()` function in your markdown file to import the data into R
   Remember to give it a name using the assignment operator: `<-`
5. Explore the data using the key functions covered in the lecture