# Africa CDC R training

## Module outline

This module aims to teach some of the key fundamental concepts in using R for epidemiological analysis. The course is pitched at beginners, starting with instructions on how to install R, and works through to providing participants with the skills to use data to inform decision-making.

The course is based on the [Epidemiologist R handbook](https://epirhandbook.com/index.html), a resource developed by epidemiologists working across the world. The handbook is in invaluable resource for all levels of R users but the focus for this course will be on the early learning concepts most frequently used by epidemiologists.

The course has been designed in collaboration with colleagues at Africa CDC to ensure the topics covered could be implemented in the participants daily/weekly workflows. The data used during this course is from xxxx and includes confirmed cases notifications for COVID-19 from xxx countries in Africa.

**Topic: 1. Intro to R**

**Aim: Provide an introduction to R, RStudio and elementary R concepts**

**Intended Learning Outcomes:**

**At the end of the session a successful student will be able to:**

* **Discuss the benefits of using R over other software for epidemiological analysis**
* **Understand how to install R, RStudio and R packages**
* **Use the readxl package to import an Excel dataset to R**

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| **Time (minutes)** | **Phase** | **Lecturer** | **Students** | **Resources** | **Assessment** |
| **5** | Course structure |  |  |  |  |
| **5** | Why R? |  |  |  |  |
| **10** | Installing R |  |  |  |  |
| **10** | Setting up files/folders |  |  |  |  |
| **5** | R packages |  |  |  |  |
| **10** | Importing data |  |  |  |  |
| **5** | Useful resources |  |  |  |  |

**Topic: 2. Data management**

**Aim: To outline key concepts and “best practice” for working with data in R**

**Intended Learning Outcomes:**

**At the end of the session a successful student will be able to:**

* **Understand the principle behind “object-oriented programming”**
* **Compare and contrast the different types of data in R**
* **Describe the components of “tidy data” and its advantages**

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| **Time (minutes)** | **Phase** | **Lecturer** | **Students** | **Resources** | **Assessment** |
| **5** | Objects |  |  |  |  |
| 15 | Data types |  |  |  |  |
| 5 | Dates |  |  |  |  |
| 10 | Working with data |  |  |  |  |
| **15** | The tidyverse |  |  |  |  |
| **10** | Best practice coding |  |  |  |  |

**Topic: 3. Analysing data**

**Aim: To provide examples of commonly used workflows for anlaysis data in R**

**Intended Learning Outcomes:**

**At the end of the session a successful student will be able to:**

* **X**
* **X**

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| **Time** | **Phase** | **Lecturer** | **Students** | **Resources** | **Assessment** |
| **5** | Looking at your data |  |  |  |  |
| 5 | Building an analysis dataset |  |  |  |  |
| 20 | Answering questions with data |  |  |  |  |
| 5 | Missing data |  |  |  |  |
| **5** | Grouping and pivoting data |  |  |  |  |
| **5** | Filtering data |  |  |  |  |
| **15** | Additional questions and workflows |  |  |  |  |

**Topic: 4. Presenting your data**

**Aim: To develop skills and processes to present your data**

**Intended Learning Outcomes:**

**At the end of the session a successful student will be able to:**

* **Build presentation-ready tables using R**
* **Understand the key concepts behind making graphs with ggplot**
* **Create maps from data**

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| **Time** | **Phase** | **Lecturer** | **Students** | **Resources** | **Assessment** |
| **10** | Presenting results in a table |  |  |  |  |
| 10 | ggplot: an introduction |  |  |  |  |
| 10 | ggplot: types of graph |  |  |  |  |
| **10** | ggplot: customising graphs |  |  |  |  |
| **10** | ggplot: mapping data |  |  |  |  |
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**Topic: 5.**

**Aim:**

**Intended Learning Outcomes:**

**At the end of the session a successful student will be able to:**

* **X**
* **X**
* **X**

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| **Time** | **Phase** | **Lecturer** | **Students** | **Resources** | **Assessment** |
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**Topic: 6.**

**Aim:**

**Intended Learning Outcomes:**

**At the end of the session a successful student will be able to:**

* **X**
* **X**
* **X**

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| **Time** | **Phase** | **Lecturer** | **Students** | **Resources** | **Assessment** |
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