

# Programming Assignment Instructions

**Deadline: submit assignment by Monday 28th November 2022, 12 noon BST**

## Background

Unintentional injury is one of the leading causes of death in children and young adults. The elderly are also more vulnerable, and it is a common cause of emergency hospital admission in people of all ages. Many injuries may be preventable, and through the collection and analysis of data, patterns can be explored, and evidence gathered, helping to inform policy makers and the public so that useful evidence-based prevention strategies can be developed.

In this project you will be exploring the **Unintentional Injuries** datasets (admissions and deaths) from the Public Health Scotland open data platform. The datasets include information on admissions and deaths relating to injuries and assaults in Scotland.

## Data

Three data files are provided for your analysis:

- `ui_admissions_2022.csv`
- `ui_deaths_2022.csv`
- `hb_lookup.csv`

These are in CSV format and can be downloaded from the following link:

- <https://github.com/Health-Data-Science-course/Resources/tree/main/Programming%20Main%20Assessment>

Here is a link with more information on the variables in the dataset:

- <https://www.opendata.nhs.scot/dataset/unintentional-injuries>

A few points to note about the dataset:

- Many of the rows contain aggregated data, due to each variable including categories such as “All”. You will need to decide what to do with this aggregate level data.
- The variable “HBR” refers to Health Board Region codes which is the variable to match if joining with the Health Boards look-up. Be sure to check for aggregate level codes in the Health Board look-up as well.

## Assignment

The purpose of this assignment is to explore the injuries datasets and answer the questions below. To answer the questions you must use the datasets provided. The R code used in all aspects of loading, processing, analysis and reporting must be visible in your final submission. You are encouraged to include tables and figures to illustrate your report. You can use any R packages of your choosing to create this report; you are not restricted to those discussed in the course.

To help you get started we have included an example of a basic script which shows code for reading in the data plus some basic cleaning, plotting, and a table too. Please feel free to write your own code if you prefer,

or to change and build on the provided starting point. All files related to the assignment, including the R Markdown file (`assignment_helper.Rmd`) and the example output from this file (`assignment_helper.pdf`) can be accessed [here](#).

Alternatively, right click on the link below and click **Save link as...** to download the example R Markdown file directly to your own computer:

- `assignment_helper.Rmd`

## Report Questions

In your report, you must explore the following questions:

- What types of injuries are most common and for which demographic (the data include age and sex)?
- What is the rate of death in admissions of these injuries?

Your report should be written as if it were to be read by government advisor who might be responsible for producing policies or guidance to help cut down on the number of injuries. You only need to provide the evidence, you do not need to include recommendations or guidance on this.

We are not looking for one specific analysis. It is up to you to decide how to operationalise the two research questions. As you work with the data, feel free to make decisions on whether you want to focus on a specific demographic or location(s) if that makes your message clearer and analysis more sound.

## Requirements

To carry out this assignment, you will need:

- access to **RStudio** - this is where you will carry out your analysis and produce your report in R Markdown. If you are unable to use RStudio on your personal device, you will be able to complete the assignment using **Noteable**.
- to make sure the following packages are installed:
  - **rmarkdown** and **knitr** – for compiling the R Markdown document
  - **tidyverse** - for access to data wrangling and plotting functions you have learned in this course
  - **kableExtra** - for creating tables
  - Optional: **janitor** - for cleaning up the variable names as they are read in from the CSV file

If you have followed the course material you should already have most of these set up and ready to go.

## Document Layout

You are required to submit a PDF document as your report. This document must be: the direct result of “Knit to PDF” from R Markdown in RStudio. You must not apply any edits or modifications to your report outwith RStudio.

Your report must include the following sections:

- **Title:** should be informative and about the analysis in the report.
- **Overview:** located directly below the title, should include a brief summary of your analysis.
- **Data Processing:** should include descriptive text and code to show how the dataset was loaded into R and processed. All processing must happen inside the document, starting with the raw CSV file. You must not edit the CSV directly using Excel or similar.

- **Results:** this is where you present your findings.

Other sections are allowed but not required.

In addition, you must ensure the following:

- **Figures:** there should be at least one plot and one table in your report and a maximum of 3 figures (plot + table = 2 figures). The use of multiple plots in one figure is permitted (e.g. faceted/related plots).
- **Code:** All R code must be shown (`echo = TRUE` ensures this and is set as default)

When you come to writing reports on your own data, you will often choose not to show your code but just the final text and figures. For the purpose of this assessment all code is required, and it needs to appear in your Knitted report, not submitted separately.

There is a maximum **10 page** limit.

## Submission

Below are instructions concerning the submission of your programming assignment to Turnitin along with some further help videos for finding your way around Turnitin.

- Your submission should be anonymous. Please include your **exam number** at the start of the Title box when asked for a **Title** after uploading your report in Turnitin.
- Click on the link **here** to upload and submit your PDF report to Turnitin. Alternatively, you will find the same link at the top of the Programming Assignment page in Learn.

Help videos for finding your way around Turnitin:

- For a quick-start overview of Turnitin please refer to **this guide**.
- For a more detailed demonstration of the system, **this video should help**.

## Help

If you have any issues or questions relating to the assignment, please post on the **Questions about Assessments** discussion board on the course website in Learn.

## Marking Criteria

[25%] **Report presentation:** Demonstrates features of R Markdown, e.g., YAML, Markdown, chunk options, adheres to structure, figure guidelines, answering of questions

[20%] **Intellectual contribution:** Demonstrates understanding of R and R Markdown, uses initiative through intellectual contribution and added value to answer the research questions

[25%] **Data visualisation:** Produces effective code to create plots (e.g., ggplot2) and tables (e.g., gt) clarity of presented information

[15%] **Wrangling:** Produces effective code to deal with data wrangling and tidying (e.g., dplyr, tidyr), clarity of process documentation

[15%] **Demonstrating reproducibility:** Report rendering, commenting, code readability, object naming, use of raw data