Supplement to Effect of COVID-19 burden on changes in HPV vaccination coverage among females between 2019 and 2022

# Table of contents

* Project structure and content
* Country characteristic details
* Additional analyses

# Project structure and content

This project follows the following folder structure. See the readme files in each folder for more details.

* The assets folder is a place holder for any files that do not belong in the data, code, results, or products folders. These items are not generated by code.
* The code folder contains all coding files required for the project. This folder includes 3 sub-folders that do different parts of an analysis: exploratory data analysis (EDA), processing, and analysis. See the readme files in those folders for details.
* The data folder contains all data files required for the project. There are 2 sub-folders: raw-data contains raw data files downloaded from their online sources and processed-data contains the cleaned and edited data sets, including a final merged project data set (project\_data.rds). All files are saved as .rds files.
* The products folder contains a subfolder for the manuscript,
  + The manuscript subfolder contains a subfolder for a supplementary material file.
* The results folder contains code generated output and includes subfolders for figures and tables. All figures are saved as .png files. Most tables are saved as .png and .rds files. Rds files can be used to reference specific values, while the png files will be displayed in the body of the manuscript since Quarto is currently unable to knit tables to Word. All content in these folders are automatically generated by code.
* There are multiple special files in the repo.
  + readme.md: this file contains instructions and/or details about the folder it is located in. The information you are reading now is covered in the project-level README.md file. There is a readme in almost every folder.
  + data-analysis-template.Rproj is a file that tells RStudio that this is the main folder for a project.
  + a few “hidden” files and folders (they start with a . and depending on how your OS is configured, you might not see them). Those are for R/RStudio and Git/GitHub and you can ignore them.

## Steps for reproducing the project

To fully reproduce all steps of the project, the code should be run in the following order:

1. processing-code/processing-code.qmd
2. eda-code/eda\_for\_manuscript.qmd
3. analysis-code/statistical-analysis.R
4. products/manuscript/Manuscript.qmd
5. products/manuscript/supplement/Supplementary-Material.qmd

Note: Because all data, figures, and tables are saved in the relevant subfolders, the manuscript can be produced by simply running the Manuscript.qmd file.

# Country characteristic details

The following list provides additional details for each country-level characteristics, including data source - World Health Organization (WHO) or United Nations (UN)

* HPV vaccination coverage (WHO)
  + HPV vaccination coverage in 2022
  + HPV vaccination coverage in 2019
* HPV vaccination program characteristics (WHO)
  + WHO region
  + World Bank country income level
  + Indicator for whether HPV vaccine is offered through a national recommendation
  + Year of HPV vaccine program introduction
  + Primary HPV vaccine delivery strategy (school-based, clinic-based, varies)
  + Indicator for gender neutral vaccination (female-only vaccination or females and males)
  + Recommended number of doses (1 or 2)
* United Nations country demographic data (UN)
  + Total Population, as of 1 July (thousands)
  + Population Density, as of 1 July (persons per square km)
  + Median Age, as of 1 July (years)
  + Population Growth Rate (percentage)
  + Total Fertility Rate (live births per woman)
  + Crude Death Rate (deaths per 1,000 population)
  + Life Expectancy at Birth, both sexes (years)
  + Net Migration Rate (per 1,000 population)
* COVID burden through Dec. 31, 2022 (WHO)
  + Cumulative number of COVID cases per 100,000 persons
  + Cumulative number of COVID deaths per 100,000 persons

# Additional Analyses

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| Figure 1: Scatterplot of difference in HPV vaccination coverage between 2022 and 2019 and cumulative COVID deaths per 100,000 persons |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table 1: Parameter estimates for median age adjusted linear regression   | term | estimate | std.error | statistic | p.value | | --- | --- | --- | --- | --- | | (Intercept) | -39.0680653 | 9.3303322 | -4.1872105 | 0.0000631 | | Cumulative\_case\_rate | -0.0001824 | 0.0004832 | -0.3774436 | 0.7066859 | | median\_age | 1.1126973 | 0.3613828 | 3.0789991 | 0.0027154 | |