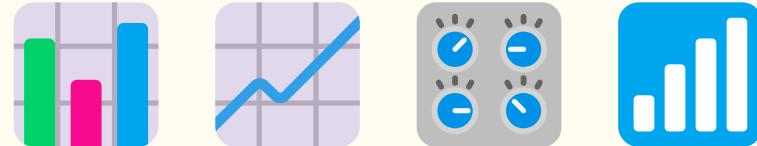




Introduction to Quarto Dashboards



Jeremy Selva [in](#)

@JauntyJJS [GitHub](#) [X](#) [LinkedIn](#) [Medium](#)

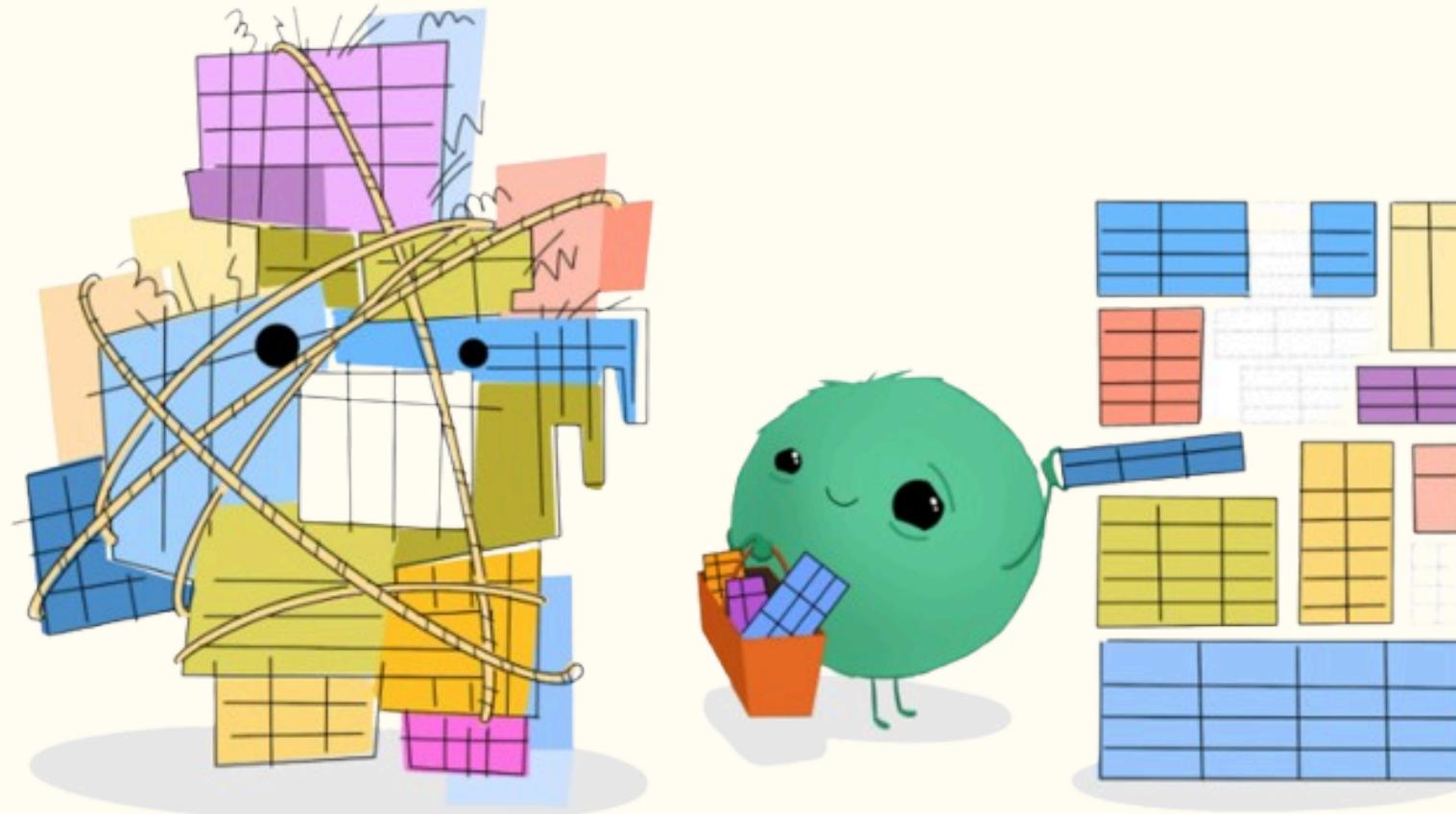
<https://jeremy-selva.netlify.app> [🔗](#)

For R User Group Singapore (RUGS) Meetup [📍](#)

29th November 2024

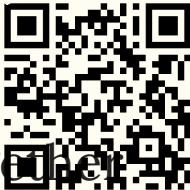
whoami

Research Officer from [National Heart Centre Singapore](#) who collects, cleans and harmonises clinical data.

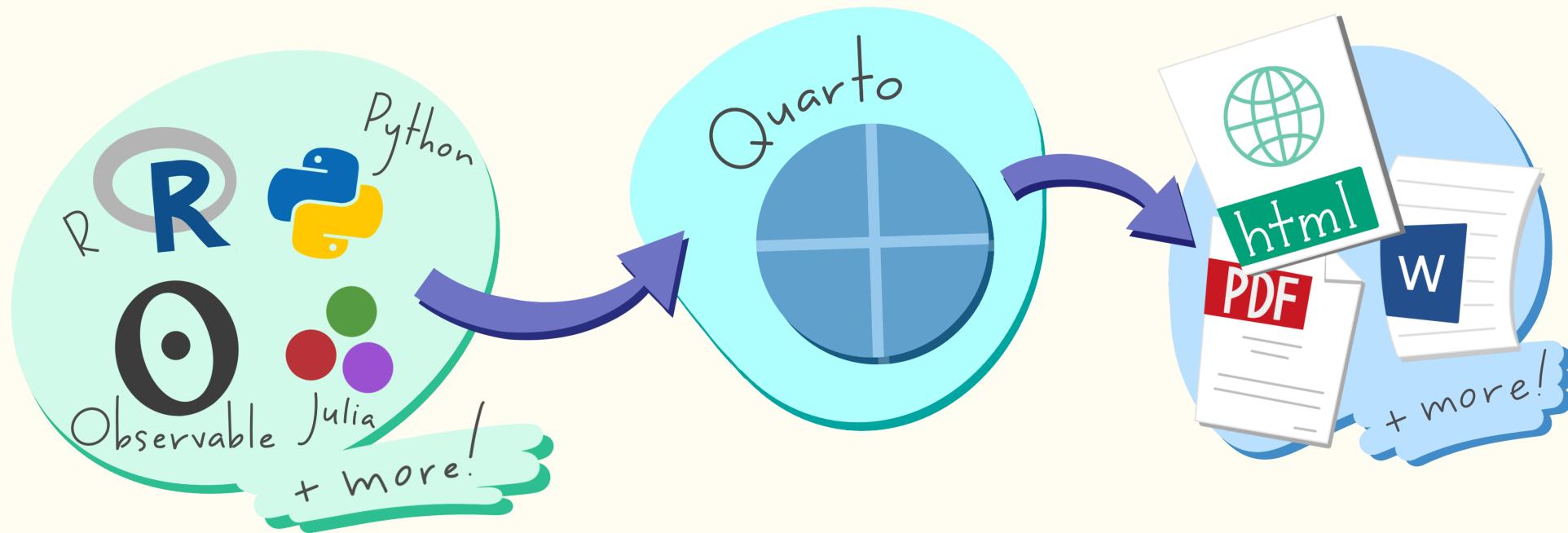


Taming the Data Beast from “[Cleaning Medical Data with R](#)” workshop by Shannon Pileggi, Crystal Lewis and Petter Higgins presented at R/Medicine 2023. Illustrated by [Allison Horst](#).

Quarto



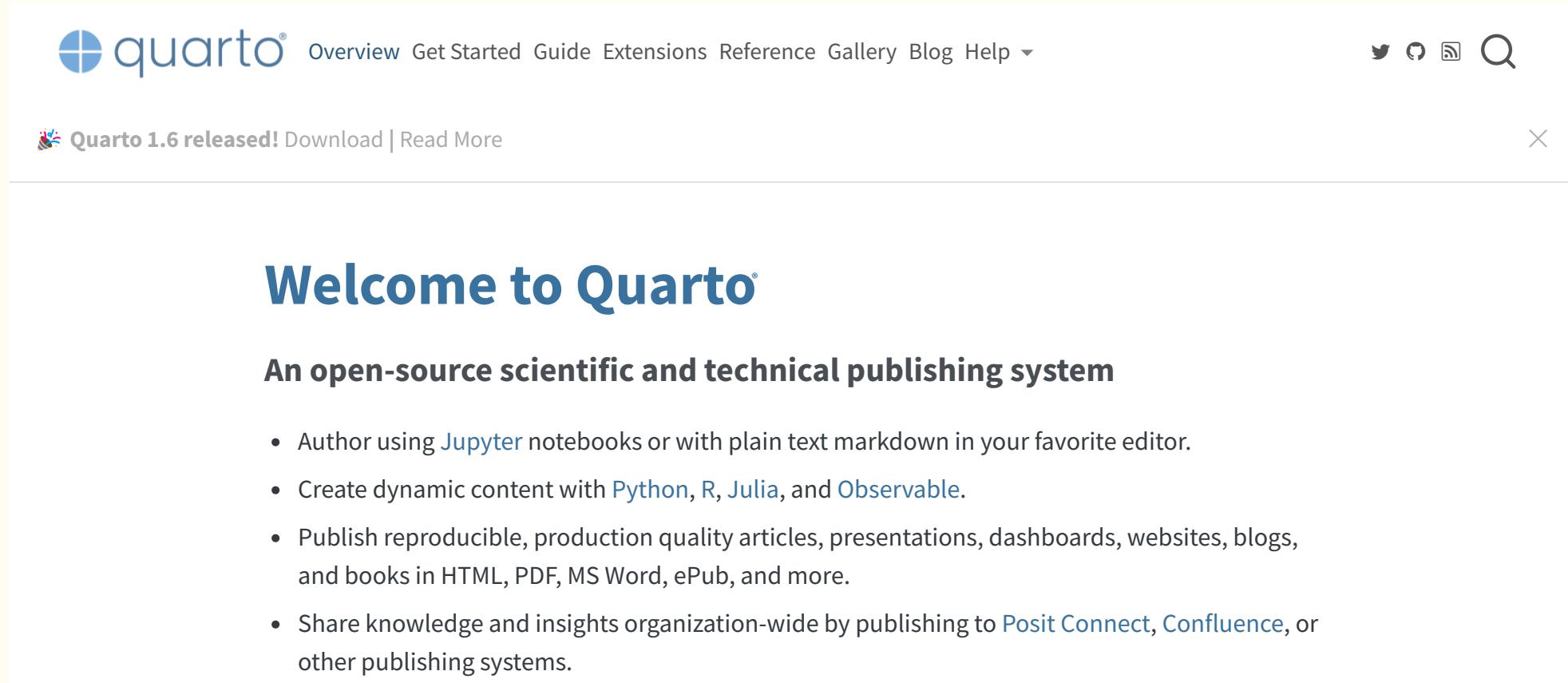
Quarto is an open-source software that weaves narrative and programming code together to produce elegantly formatted output as documents (in HTML, Word, PDF), presentations, books, web pages, and more.



Artwork from “Hello, Quarto” keynote by Julia Lowndes and Mine Çetinkaya-Rundel, presented at RStudio Conference 2022. Illustrated by Allison Horst.

Quarto

<https://quarto.org/>



The screenshot shows the Quarto website homepage. At the top, there is a navigation bar with the Quarto logo, followed by links for Overview, Get Started, Guide, Extensions, Reference, Gallery, Blog, and Help. To the right of the navigation are social media icons for Twitter, GitHub, RSS, and a search icon. A banner at the top announces "Quarto 1.6 released! Download | Read More". Below the banner, the main title "Welcome to Quarto®" is displayed in large blue text. Underneath it, the subtitle "An open-source scientific and technical publishing system" is shown in bold black text. A bulleted list follows, detailing the system's capabilities:

- Author using [Jupyter](#) notebooks or with plain text markdown in your favorite editor.
- Create dynamic content with [Python](#), [R](#), [Julia](#), and [Observable](#).
- Publish reproducible, production quality articles, presentations, dashboards, websites, blogs, and books in HTML, PDF, MS Word, ePub, and more.
- Share knowledge and insights organization-wide by publishing to [Posit Connect](#), [Confluence](#), or other publishing systems.

Quarto Dashboards (Released in Quarto 1.4)



A simple way to quickly creating dashboards from Quarto scripts using R, Python, Julia and Observable

Publish groups of visualizations, tables, text together. See examples in
<https://quarto.org/docs/gallery/index.html#dashboards>

Dashboards

[Stock Explorer Python](#) </>

Stock Tracker Ty Coen

BA — The Boeing Company — <https://www.boeing.com>

Current Price \$ 179.69 Change ↑ \$0.60 Percent Change % 0.34

Price History

Last Close: 2023-10-27

Open	\$180.00
High	\$182.33
Low	\$179.01
Close	\$179.69
Volume	4,601,300

export to plotly »

[Gapminder Python](#) </>

Worldwide Development Gapminder Analytics Indicators Data

GDP and Life Expectancy

Population

Life Expectancy

Reason for churn by quarter

Churn by contract type and days since purchase

Purchase characteristics

Index	Contract type	Churn	Average purchase	Total transactions	Days since last purchase
2	Month-to-month	Old notchurn	\$0.14	19	138
5	Month-to-month	Churned	\$0.81	16	294
8	One-year	Old notchurn	\$0.85	2	125
11	One-year	Churned	\$0.15	2	280

[Customer Churn Python](#) </>

Customer Churn Churn (Standard) Data

Churn rate 2022

17%

Current churn rate

14%

Churn rate goal

10%

Reason for churn by quarter

Churn by contract type and days since purchase

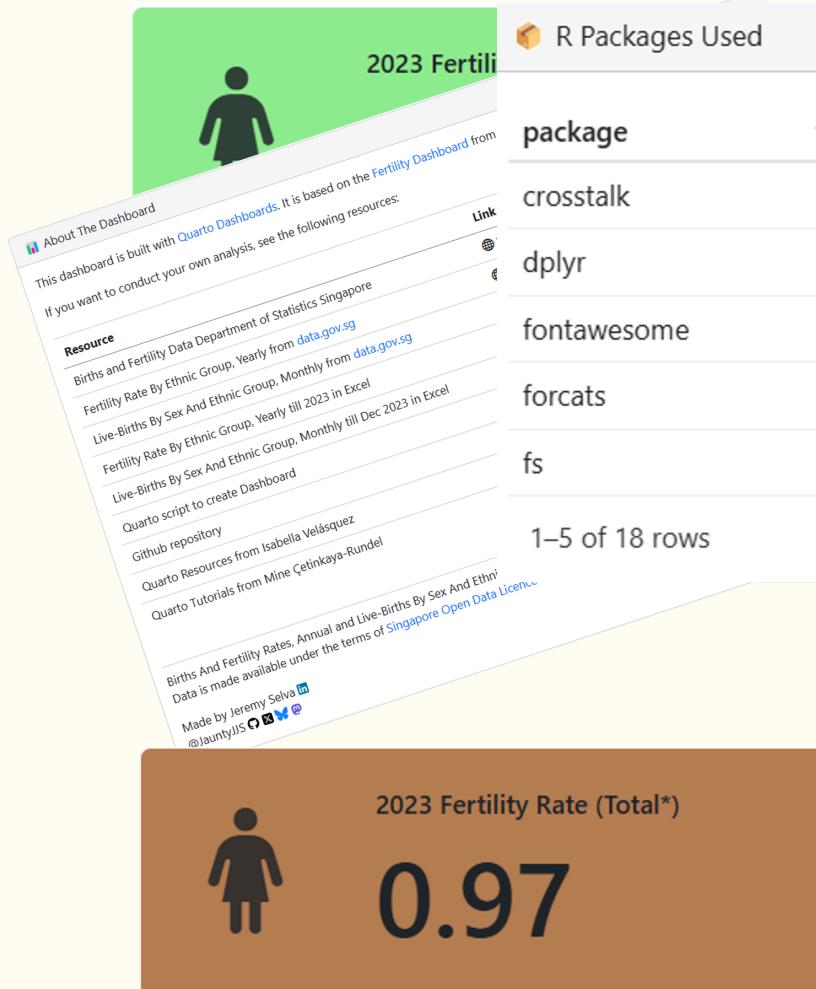
Purchase characteristics

Index	Contract type	Churn	Average purchase	Total transactions	Days since last purchase
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11	One-year	Churned	\$0.15	2	280

Dashboard Basics



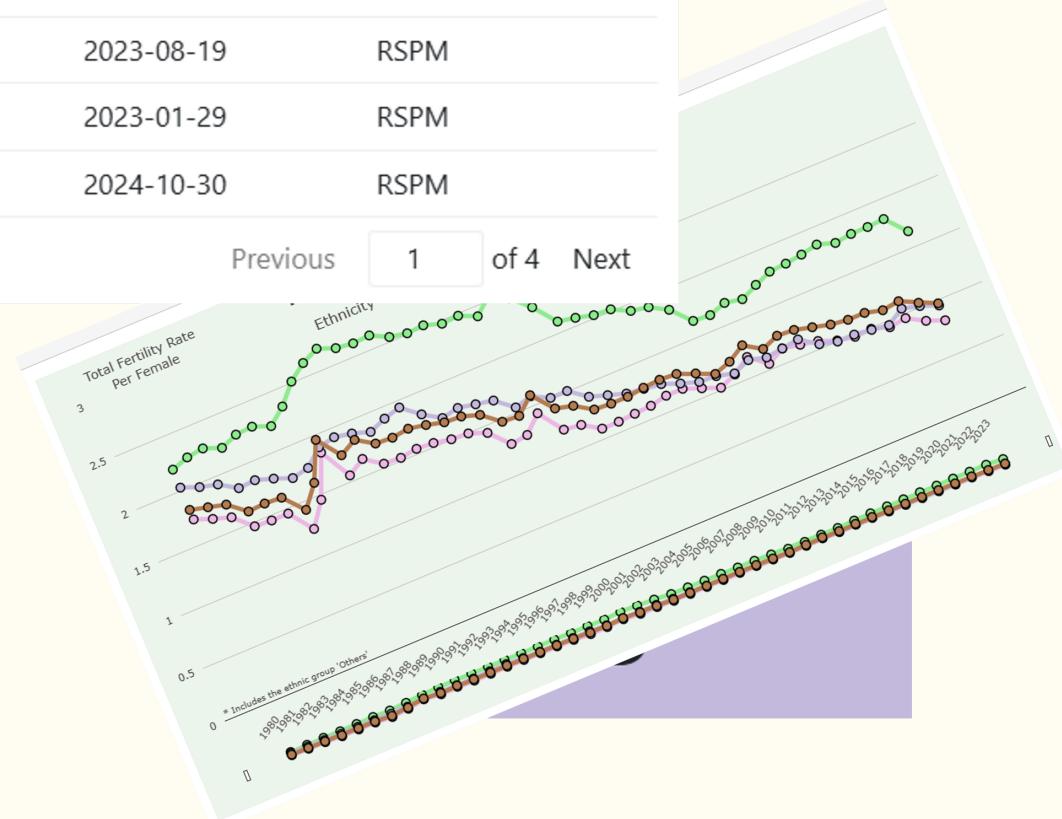
Dashboards are composed of cards of text, plot and tables in pages



R Packages Used

package	version	date	source
crosstalk	1.2.1	2023-11-23	RSPM
dplyr	1.1.4	2023-11-17	RSPM
fontawesome	0.5.2	2023-08-19	RSPM
forcats	1.0.0	2023-01-29	RSPM
fs	1.6.5	2024-10-30	RSPM

1–5 of 18 rows



Dashboard Basics



Dashboards are composed of **cards** of text, plot and tables in **pages** that need to be arranged neatly into rows and columns.

About

Total_Fertility

About The Dashboard

This dashboard is built with [Quarto Dashboards](#). It is based on the [Fertility Dashboard](#) from [Department of Statistics Singapore](#).

If you want to conduct your own analysis, see the following resources:

Resource	Link
Births and Fertility Data from Department of Statistics Singapore	Website
Fertility Rate By Ethnic Group, Yearly till 2023 in Excel	Fertility Rate By Ethnic Group, Yearly.xlsx
Live-Births By Sex And Ethnic Group, Monthly till Dec 2023 in Excel	Live-Births By Sex And Ethnic Group, Monthly.xlsx
Quarto script to create Dashboard	Quarto Script
Github repository	Source code
Quarto Resources from Isabella Velásquez	Resources

Made by Jeremy Selva
@JauntyJJS
<https://jeremy-selva.netlify.app>

R Packages Used

package	version	date	source
crosstalk	1.2.1	2023-11-23	RSPM
dplyr	1.1.4	2023-11-17	RSPM
fontawesome	0.5.2	2023-08-19	RSPM
forcats	1.0.0	2023-01-29	RSPM
fs	1.6.5	2024-10-30	RSPM

1–5 of 18 rows Previous 1 of 4 Next

R Session Info

setting	value
version	R version 4.4.1 (2024-06-14 ucrt)
os	Windows 11 x64 (build 22631)
system	x86_64, mingw32
ui	RTerm
language	(EN)

1–5 of 12 rows Previous 1 of 3 Next

Motivation

CNA reported that Singapore's total fertility rate was below 1 for the first time.



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Top Stories Latest News Asia East Asia Singapore Commentary Insider TODAY Lifestyle Watch Listen + All Sections

Singapore

Singapore's total fertility rate falls to historic low of 0.97

While Singapore's total fertility rate has been on a decline for many years, this is the first time it has fallen below 1.0.



Natasha Ganesan

28 Feb 2024 04:09PM
(Updated: 09 Mar 2024 07:47AM)



Motivation

Data is downloaded from [Department Of Statistics Singapore](#)



The screenshot shows a web browser window with the URL singstat.gov.sg/find-data/search-by-theme/population/births-and-fertility/latest-data. The page title is "Detailed Statistical Time Series". A blue navigation bar at the top contains links for "Latest data", "Publications and Methodology", "Visualising Data", "Related Info", and "External Sources". Below this, a pink header reads "Detailed Statistical Time Series". A blue sidebar on the left lists "Births and Fertility" items: "Births And Fertility Rates, Annual", "Live-Births By Sex and Ethnic Group, Monthly", "Live-Births By Birth Order, Quarterly", and "Live-Births By Birth Order, Annual".

Latest data Publications and Methodology Visualising Data Related Info External Sources

Detailed Statistical Time Series

Births and Fertility

- Births And Fertility Rates, Annual
- Live-Births By Sex and Ethnic Group, Monthly
- Live-Births By Birth Order, Quarterly
- Live-Births By Birth Order, Annual

Motivation



Alternatively, it can be downloaded from <https://data.gov.sg/>

Fertility Rate

Live Birth

https://data.gov.sg/datasets/d_e39eeaeadb571c0d0725ef1eec48d166/view

A Singapore Government Agency Website [How to identify](#) ▾



Try keywords like: 'school' or 'weather'

Help ▾

Feedback

Login



Births And Fertility Rates, Annual

Data from Jan 1960 to Dec 2023 • Updated 21 days ago

[SINGSTAT \(Singapore Department of Statistics\)](#)

Source: SINGAPORE DEPARTMENT OF STATISTICS, IMMIGRATION AND CHECKPOINTS AUTHORITY

Data Last Updated: 06/06/2024

Update Frequency: Annual

Adapted from: <https://tablebuilder.singstat.gov.sg/table/TS/M810091>

Download CSV (8.1 KB)

Subscribe



Motivation



A preview of the dataset.

```
1 birth_data <- readxl::read_excel(  
2   path = here::here(  
3     "data",  
4     "Live-Births By Sex And Ethnic Group, Monthly.xlsx"  
5   )  
6 )
```

```
1 fertility_rate_data <- readxl::read_excel(  
2   path = here::here(  
3     "data",  
4     "Fertility Rate By Ethnic Group, Yearly.xlsx"  
5   )  
6 )
```

Ethnicity	Gender	2023Dec	2023Nov	2023Oct
Malays	All	608	622	679
Chinese	All	1496	1643	1867
Indians	All	310	328	316
Others	All	230	269	305
Malays	Male	321	304	331
Chinese	Male	764	841	987
Indians	Male	150	168	174
Others	Male	122	144	169

Ethnicity	2023	2022	2021
Chinese (Per Female)	0.81	0.87	0.96
Malays (Per Female)	1.65	1.83	1.82
Indians (Per Female)	0.95	1.01	1.05
All (Per Female)	0.97	1.04	1.12

◀ ▶

1–8 of 12 rows

Previous

1

of 2

Next

Motivation

Can Quarto Dashboard create something similar to the [Fertility Dashboard](#) from Department of Statistics Singapore ?



DEPARTMENT OF STATISTICS SINGAPORE —Empowering You with Trusted Data—

What's New Find Data Publications Our Services, Tools & Surveys Standards Who We Are Careers 🔍

Fertility Dashboard

Fertility
Births and Fertility Rate
Ethnic Differentials in Fertility
Age-Specific Fertility Rate
Births by Birth Order
Number of Children Born

Resident Total Fertility Rate by Ethnic Group

Year	Total*	Chinese	Malays	Indians
1990	1.9	1.6	2.6	1.9
1995	1.7	1.5	2.5	1.8
2000	2.5	1.4	2.6	1.7
2005	1.3	1.1	2.1	1.3
2010	1.2	1.0	1.6	1.1
2015	1.1	1.0	1.7	1.1
2020	1.0	0.9	1.7	1.0
2023	1.0	0.8	1.6	1.0

* Includes the ethnic group 'Others'

For more information, please refer to the [Population Trends](#) publication.

Microsoft Power BI

81%

Open A Quarto Document



Create a Quarto document

The screenshot shows the RStudio interface with the 'fertility_dashboard - main - RStudio' tab active. In the top menu bar, under 'File', the 'New File' option is selected, revealing a dropdown menu with 'R Script' and 'Quarto Document...'. The 'Quarto Document...' option is highlighted. Below this, a 'New Quarto Document' dialog box is open. It contains fields for 'Title' (set to 'SG Fertility Dashboard') and 'Author' (set to '(optional)'). Under the 'Format' section, the 'HTML' radio button is selected, with a note that it is the recommended format. There are also options for 'PDF' and 'Word'. The 'Engine' dropdown is set to 'Knitr'. A checkbox for 'Use visual markdown editor' is present, which is unchecked. At the bottom of the dialog are 'Create' and 'Cancel' buttons.

The screenshot shows the RStudio interface with the 'Untitled1' document open. The preview pane displays a Quarto document with the following content:

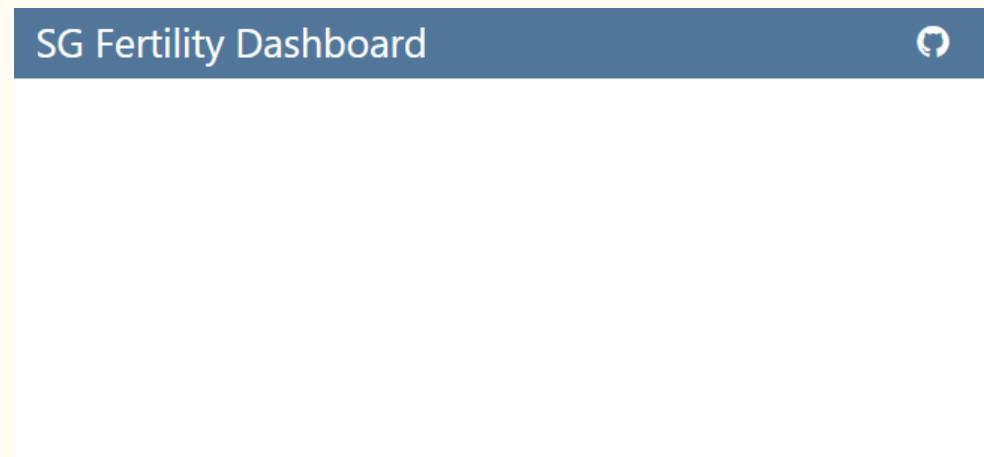
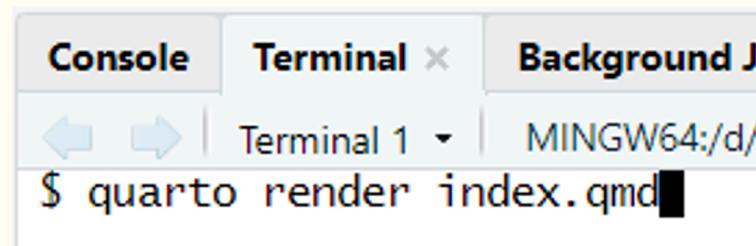
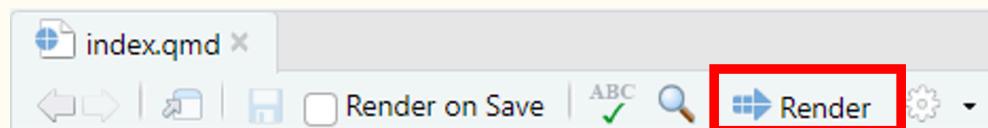
```
---  
title: "SG Fertility Dashboard"  
format: html  
---  
## Quarto  
Quarto enables you to weave together content and executable code into a finished document. To learn more about Quarto see <https://quarto.org>.  
## Running Code  
When you click the **Render** button a document will be generated that includes both content and the output of embedded code. You can embed code like this:  
```{r}  
1 + 1
```  
You can add options to executable code like this  
```{r echo: false}  
2 * 2
```  
The `echo: false` option disables the printing of code (only output is displayed).
```

Open A Quarto Document

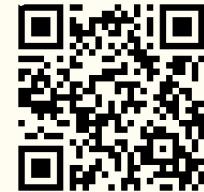


Clear everything in file and type the following **yaml** header (surrounded by **---**) and click "Render"

```
index.qmd
1 ---
2 title: "SG Fertility Dashboard"
3 format:
4   dashboard:
5     nav-buttons: [github]
6     github: https://github.com/JauntyJJS/fertility_dashboard
7 ---
```



Code Chunks



R codes are to be placed in between the ````{r}` and ````` code chunks.

R code

In code chunk

```
1 library(here) # A Simpler Way to Find Your Files Posit RPSM v1.0.1
2 library(readxl) # Read Excel Files Posit RPSM v1.4.3
3 library(tibble) # Simple Data Frames Posit RPSM v3.2.1
4 library(fs) # Cross-Platform File System Operations Based on 'libuv' Posit RPSM v1.6.5
5 library(rmarkdown) # Dynamic Documents for R Posit RPSM v2.28
6 library(yaml) # Methods to Convert R Data to YAML and Back Posit RPSM v2.3.10
7 library(quarto) # R Interface to 'Quarto' Markdown Publishing System Posit RPSM v1.4.4
8 library(sessioninfo) # R Session Information Posit RPSM v1.2.2
9 library(dplyr) # A Grammar of Data Manipulation Posit RPSM v1.1.4
10 library(tidyr) # Tidy Messy Data Posit RPSM v1.3.1
11 library(forcats) # Tools for Working with Categorical Variables (Factors) Posit RPSM v1.0.0
12 library(glue) # Interpreted String Literals Posit RPSM v1.8.0
13 library(plotly) # Create Interactive Web Graphics via 'plotly.js' Posit RPSM v4.10.4
14 library(htmltools) # Tools for HTML Posit RPSM v0.5.8.1
15 library(reactable) # Interactive Data Tables for R Posit RPSM v0.4.4
16 library(crosstalk) # Inter-Widget Interactivity for HTML Widgets Posit RPSM v1.2.1
17 library(fontawesome) # Easily Work with 'Font Awesome' Icons Posit RPSM v0.5.2
```

Pages



The text of the level 1 headings `#{Page Title}` helps to create pages in the navigation bar.

index.qmd

```
1 ---
2 title: "SG Fertility Dashboard"
3 format:
4   dashboard:
5     nav-buttons: [github]
6     github: https://github.com/JauntyJJS/fertility_dashboard
7 ---
8
9 # Fertility Rate {orientation="rows" scrolling="true"}
10
11 # Live Birth {orientation="rows" scrolling="true"}
12
13 # About {orientation="columns" scrolling="true"}
```

SG Fertility Dashboard

Fertility Rate

Live Birth

About



Layout for About



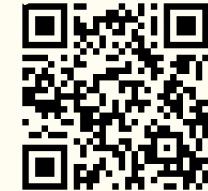
The `orientation="columns"` settings ensures cards are first laid out by columns and then by rows. Column space can be allocated using level 2 headings `## Column`

index.qmd

```
1 # About {orientation="columns" scrolling="true"}  
2  
3 ## Column {width="60%"}  
4  
5 ## Column {width="40%"}
```

`## Column {width="60%"}
Column {width="40%"}`

Cards for About



To create cards that has text or markdown, it is better to use the `::: {.card title="Your title"}` block.

```
index.qmd
1 # About {orientation="columns" scrolling="true"}
2
3 ## Column - About the Dashboard {width="60%"}
4
5 ::: {.card title="📊 About The Dashboard"}
6
7 Your markdown text here
8
9 :::
10
11 ## Column - R Session and Packages Used {width="40%"}
```

The screenshot shows a dashboard header with tabs for "SG Fertility Dashboard", "Fertility Rate", "Live Birth", and "About". The "About" tab is active. Below the header, there is a card titled "📊 About The Dashboard" containing the text "Your markdown text here".

Cards for About



 Code

Output

To create cards that uses R codes, use ````{r}` code chunks.

```
index.qmd
1 # About {orientation="columns" scrolling="true"}
2
3 ## Column - About the Dashboard {width="60%"}
4
5 :::: {.card title="📊 About The Dashboard"}
6
7 Your markdown text here
8
9 ::::
10
11 ## Column - R Session and Packages Used {width="40%"}
12
13 ```{r}
14 #| label: R Package Used
15 #| title: "R Packages Used"
16
17 head(sessioninfo::package_info())
18
19
20
21 ```{r}
22 #| label: R Session Info
```

Cards for About



 Code

Output

Here are the contents to create the About the dashboard chunks.

index.qmd

```
1 # About {orientation="columns" scrolling="true"}  
2  
3 ## Column - About the Dashboard {width="60%"}  
4  
5 :::: {.card title="📊 About The Dashboard"}  
6  
7 This dashboard is built with [Quarto Dashboards](https://quarto.org/docs/dashboards/){target="_blank"}. It is based on the [Fertility Data](https://www.singstat.gov.sg/find-data) from the [Department of Statistics Singapore](https://www.singstat.gov.sg/find-data).  
8  
9 If you want to conduct your own analysis, see the following resources:  
10  
11 +-----+  
12 | Resource | Link  
13 +=====+  
14 | Births and Fertility Data | [<i class='bi bi-globe' style='color:#000000;'></i> Website](https://www.singstat.gov.sg/find-data)  
15 | Department of Statistics Singapore |  
16 +-----+  
17 | Fertility Rate By Ethnic Group, Yearly from [data.gov.sg](https://data.gov.sg/)| [<i class='bi bi-globe' style='color:#000000;'></i> Website](https://data.gov.sg/datasets/d_e39)  
18 | [data.gov.sg](https://data.gov.sg/)|  
19 +-----+  
20 | Live-Births By Sex And Ethnic Group, Monthly from [data.gov.sg](https://data.gov.sg/)| [<i class='bi bi-globe' style='color:#000000;'></i> Website](https://data.gov.sg/datasets/d_d05)
```

Layout and Cards for Fertility Rate



The `orientation="rows"` settings ensures cards are first laid out by rows and then by columns.

Indicating `#| content: valuebox` in the R code chunk will give out a value box.

```
index.qmd
1 # Fertility Rate {orientation="rows" scrolling="true"}
2
3 ## Row - 2023 Fertility Value Boxes
4
5 ````{r}
6 #| label: Value Box 1
7 #| content: valuebox
8 #| title: "2023 Fertility Rate (Total*)"
9
10 list(
11   icon = "person-standing-dress",
12   color = "#b67e54",
13   value = "A Value"
14 )
15
16 ````{r}
17 #| label: Value Box 2
18 #| content: valuebox
19 #| title: "2023 Fertility Rate (Chinese)"
20
21 ````{r}
22 #| label: Value Box 3
23 #| content: valuebox
24 #| title: "2023 Fertility Rate (Malays)"
```

The dashboard features a header with tabs for "SG Fertility Dashboard", "Fertility Rate", "Live Birth", and "About". Below the header are four cards, each representing a different ethnic group's fertility rate:

- 2023 Fertility Rate (Total*)**: A brown card with a female icon and the placeholder value "A Value".
- 2023 Fertility Rate (Chinese)**: A pink card with a female icon and the placeholder value "A Value".
- 2023 Fertility Rate (Malays)**: A green card with a female icon and the placeholder value "A Value".
- 2023 Fertility Rate (Indians)**: A purple card with a female icon and the placeholder value "A Value".

At the bottom of the dashboard, there are two sections containing R code output:

- A white box on the left contains the text "[1] "a plot"".
- A white box on the right contains the text "[1] "a table"" and a small chart icon labeled "Total Fertility Rate Data".

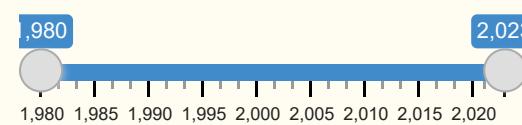
Tables and Plots for Fertility Rate Page

[Table](#)[Source](#)

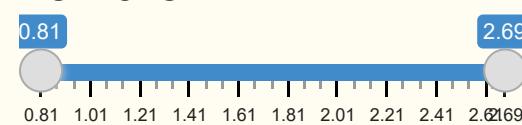
Ethnicity



Year



Fertility Rate Per Female



Ethnicity

Year

Fertility Rate Per Female

| Ethnicity | Year | Fertility Rate Per Female |
|-----------|------|---------------------------|
| Chinese | 2023 | 0.81 |
| Chinese | 2022 | 0.87 |
| Chinese | 2021 | 0.96 |
| Chinese | 2020 | 0.94 |
| Chinese | 2019 | 0.99 |
| Chinese | 2018 | 0.98 |
| Chinese | 2017 | 1.01 |
| Chinese | 2016 | 1.07 |
| Chinese | 2015 | 1.1 |
| Chinese | 2014 | 1.13 |

1-10 of 176 rows

Previous 1 of 18 Next

[Download as CSV](#)

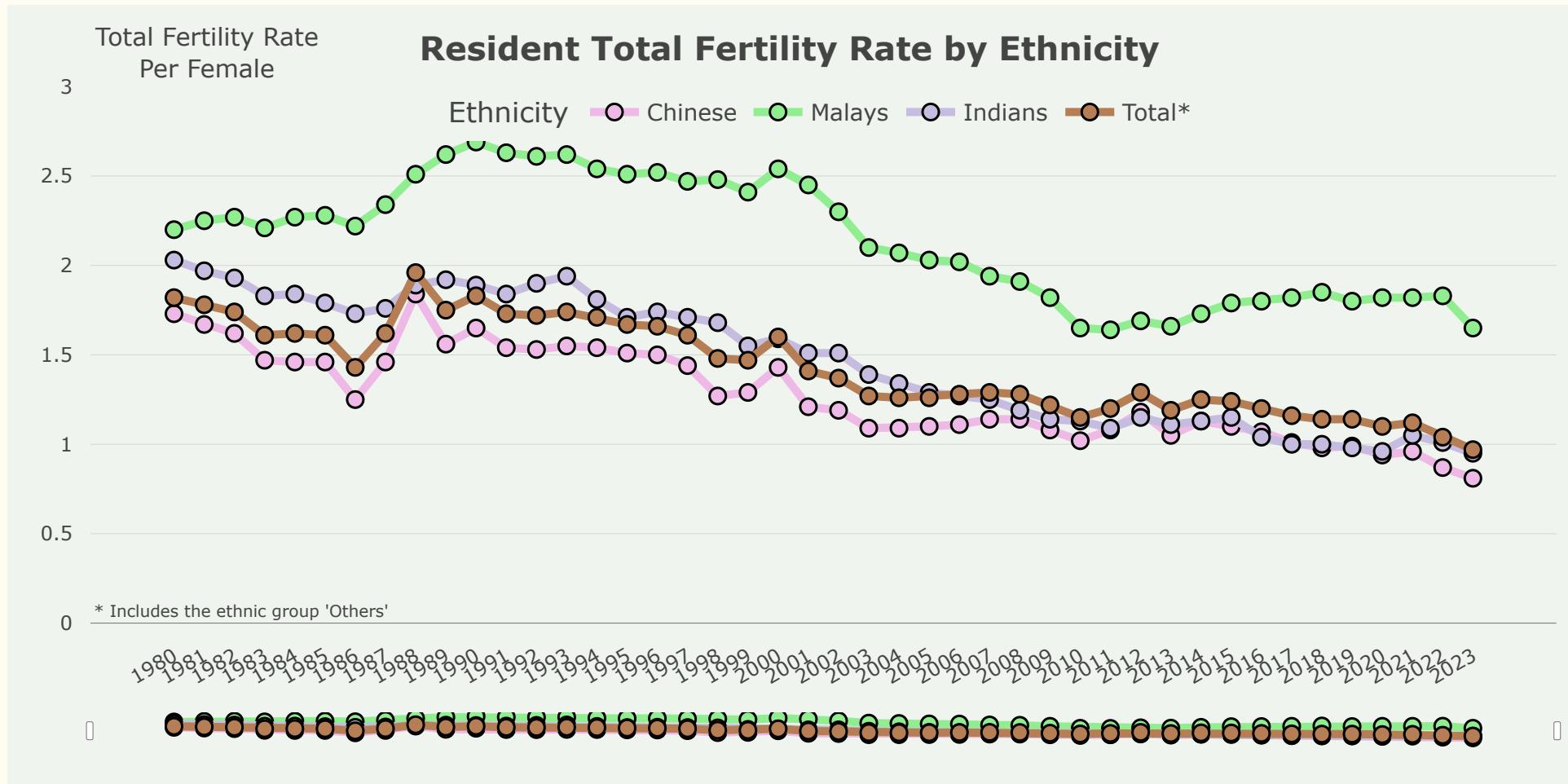


Tables and Plots for Fertility Rate Page



Plot

Source



Layout and Cards for Live Birth



The `{.tabset}` settings allow cards to have tabs to provide multiple views of data.

index.qmd

```
1 # Live Birth {orientation="rows" scrolling="true"}
2
3 ## Row - Live Birth Plot and Table
4
5 ### Column - Live Birth Plot {.tabset}
6
7   ``{r}
8   #| label: Total Live Birth by Ethnicity Plot
9   #| title: ">All"
10
11 print("a plot for all gender")
12
13
14
15   ``{r}
16   #| label: Total Male Live Birth by Ethnicity Plot
17   #| title: "Male"
18
19 print("a plot for male")
20
21
22
```

SG Fertility Dashboard Fertility Rate Live Birth About

>All Male Female

[1] "a plot for all gender"

Total Birth Data

[1] "a table"

Tables and Plots for Live Birth

[Table](#)[Source](#)

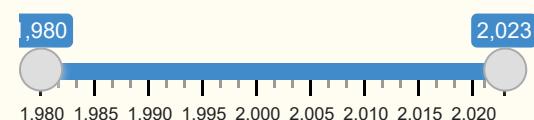
Ethnicity



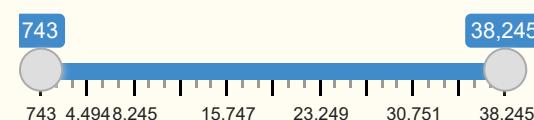
Gender

- All
- Female
- Male

Year



Total Live Birth



| Ethnicity | Gender | Year | Total Live Birth |
|-----------|--------|------|------------------|
| Malays | All | 2023 | 7212 |
| Malays | All | 2022 | 7958 |
| Malays | All | 2021 | 7852 |
| Malays | All | 2020 | 7814 |
| Malays | All | 2019 | 7615 |
| Malays | All | 2018 | 7592 |
| Malays | All | 2017 | 7315 |
| Malays | All | 2016 | 7143 |
| Malays | All | 2015 | 6961 |
| Malays | All | 2014 | 6468 |

1–10 of 528 rows

Previous

1

of 53 Next

[Download as CSV](#)

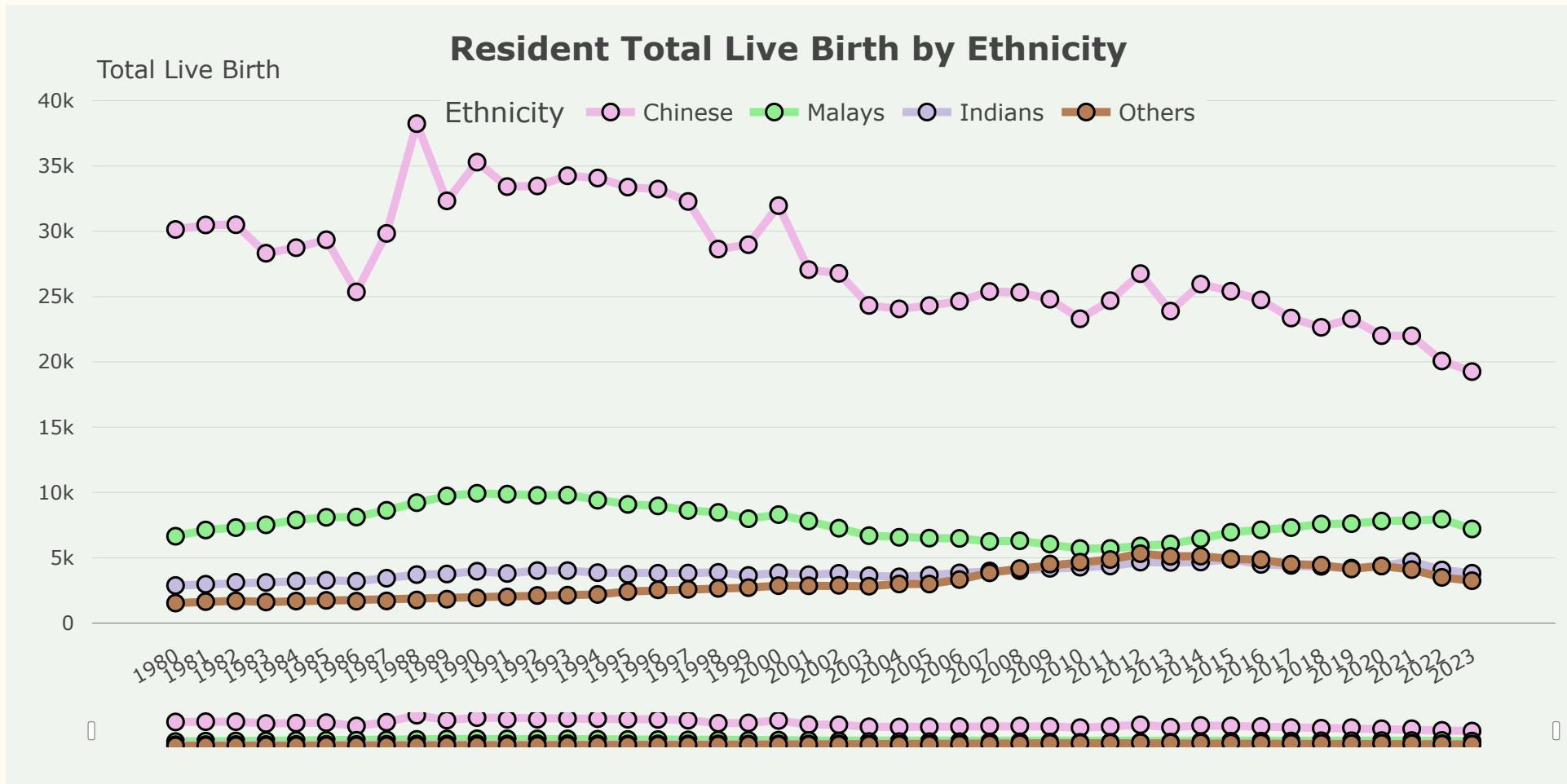


Tables and Plots for Live Birth



Plots

Source

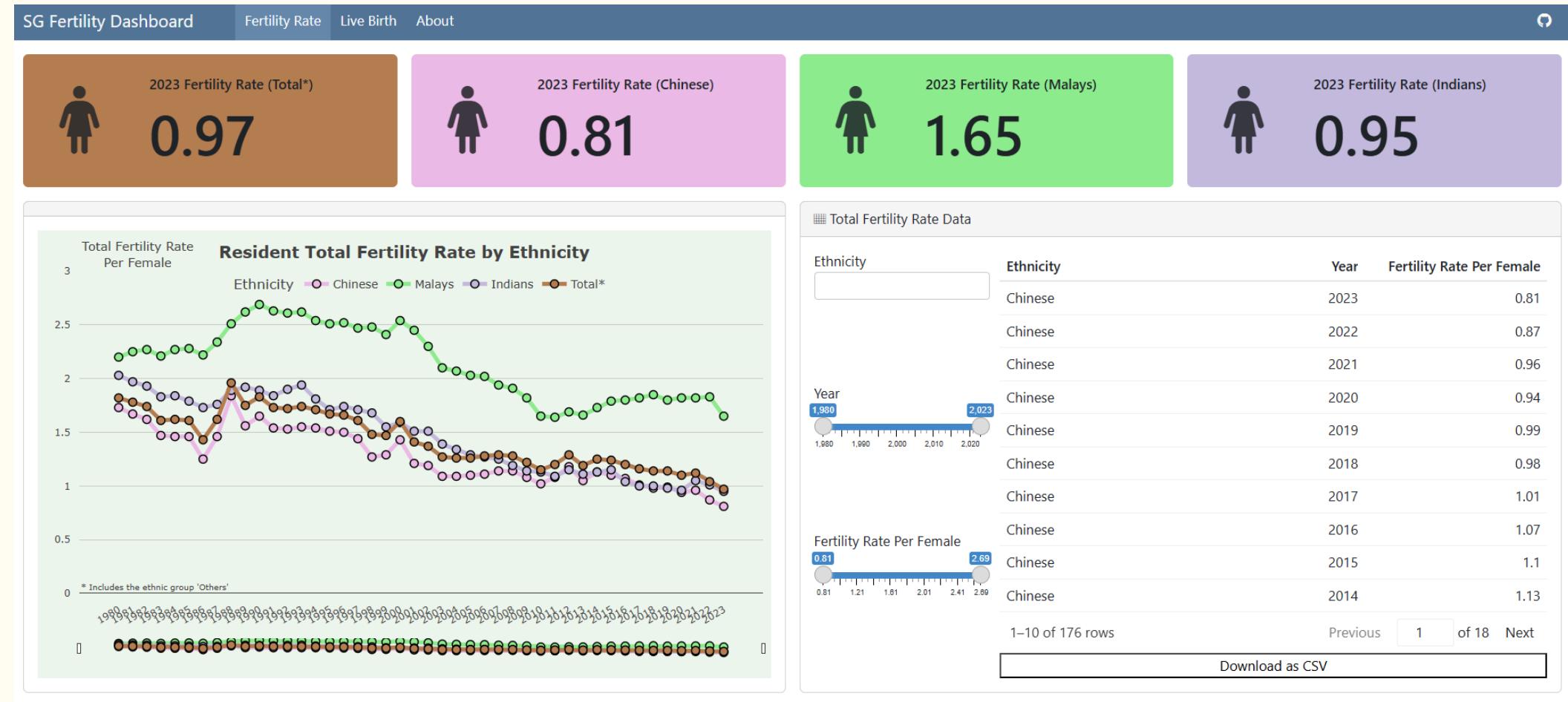


Current Output



Deploy using [Github pages](#)

- https://jauntyjjs.github.io/fertility_dashboard/

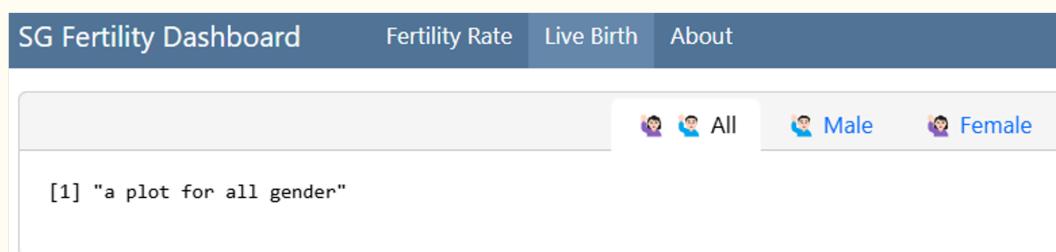


Summary



This introduction has covered

- Navigation Bar and Pages
- Card Layout using Rows, Columns and Tabs
- Data display using plots, tables and value boxes



The "About The Dashboard" page contains the following information:

This dashboard is built with [Quarto Dashboards](#). It is based on the [Fertility Dashboard](#) from [Department of Statistics Singapore](#).

If you want to conduct your own analysis, see the following resources:

| Resource | Link |
|---|--|
| Births and Fertility Data Department of Statistics Singapore | Website |
| Fertility Rate By Ethnic Group, Yearly from data.gov.sg | Website |
| Live-Births By Sex And Ethnic Group, Monthly from data.gov.sg | Website |
| Fertility Rate By Ethnic Group, Yearly till 2023 in Excel | Fertility Rate By Ethnic Group, Yearly.xlsx |
| Live-Births By Sex And Ethnic Group, Monthly till Dec 2023 in Excel | Live-Births By Sex And Ethnic Group, Monthly.xlsx |
| Quarto script to create Dashboard | Quarto Script |
| Github repository | Source code |
| Quarto Resources from Isabella Velásquez | Resources |
| Quarto Tutorials from Mine Çetinkaya-Rundel | 1: Hello, Dashboards!
2: Components
3: Theming and Styling |

Births And Fertility Rates, Annual and Live-Births By Sex And Ethnic Group data were accessed on 25 November 2024 from <https://data.gov.sg/>. Data is made available under the terms of [Singapore Open Data Licence version 1.0](#).

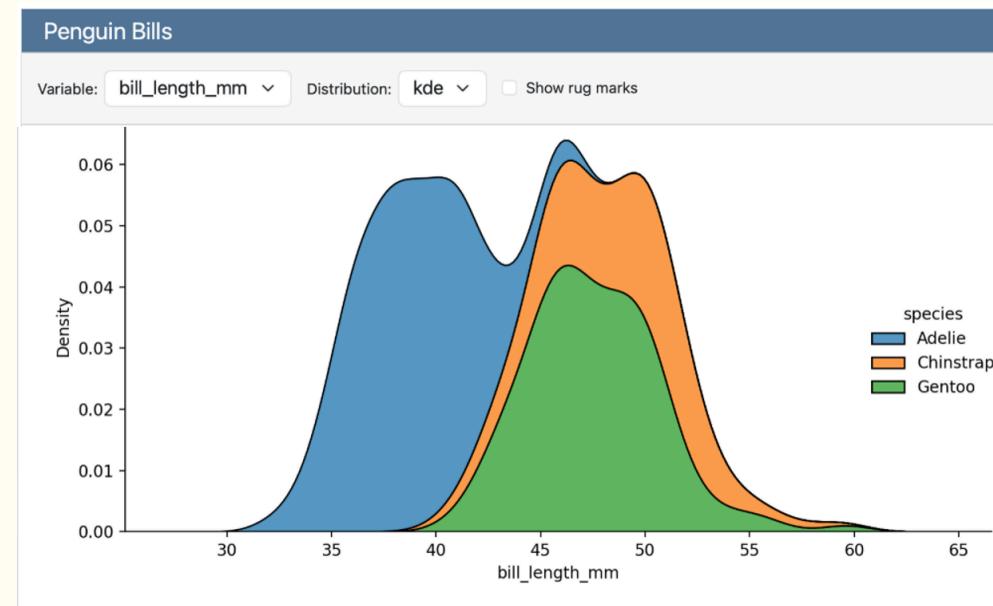
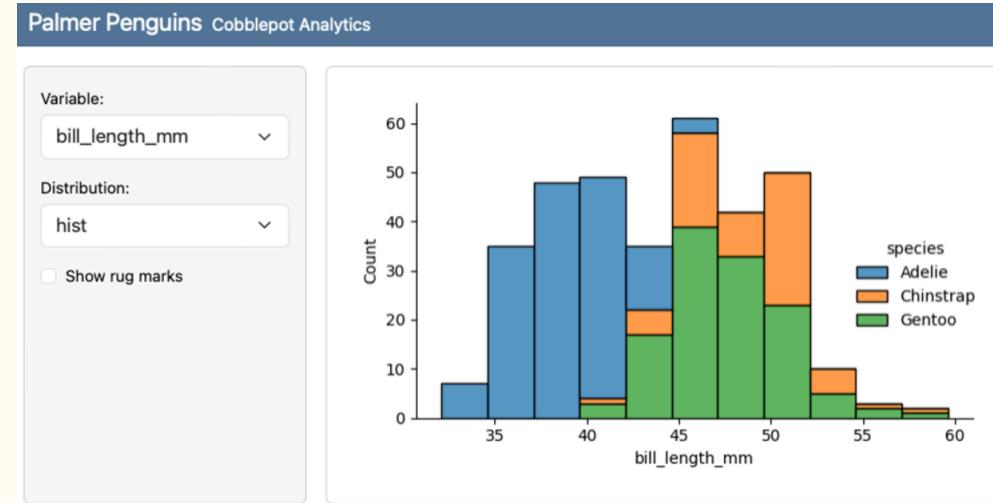
Made by Jeremy Selva [In](#)
@JauntyJS [G](#) [X](#) [T](#) [E](#)

Summary



Other features (not covered)

- Other forms of data display like Shiny component: `bslib`
- Sidebar and Toolbar
- Theming and customization
- Deployment



Learn more



- Quarto Dashboard Documentation 
- Quarto Resources from Isabella Velásquez 
- Quarto Dashboard Tutorial Videos from Mine Çetinkaya-Rundel
 - 1: Hello, Dashboards! 
 - 2: Components 
 - 3: Theming and Styling 
- Spotify dashboard for 2024 Posit Table Contest submission using Quarto from Melissa Van Bussel
 - Walkthrough 
 - Source Code 
 - Spotify Dashboard 