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DATA_101_1002

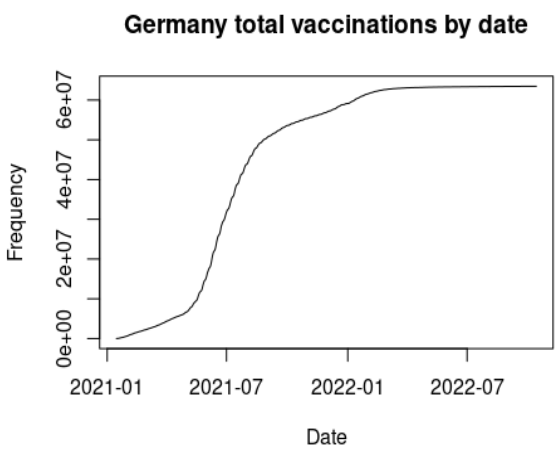
26, September 2023

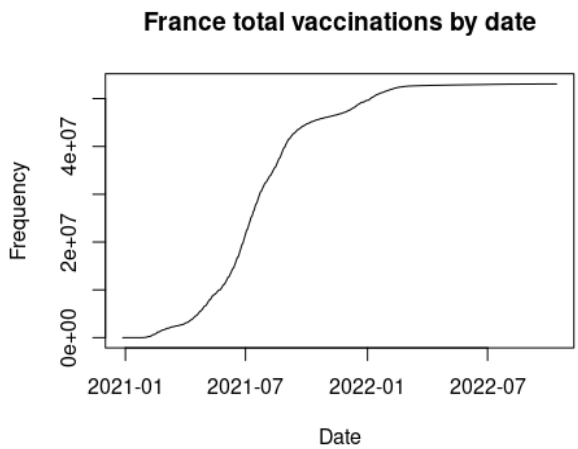
Covid Lab Report

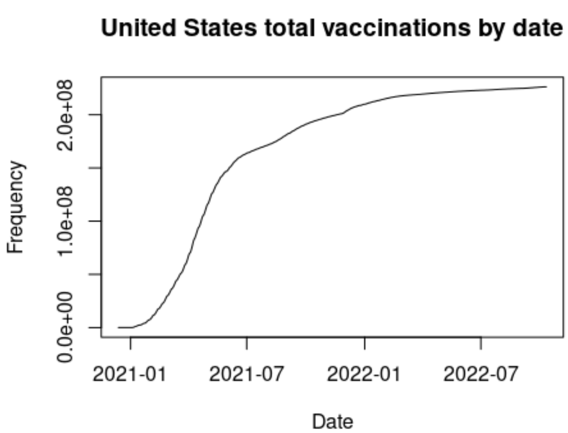
```
install.packages("readr")
install.packages("tidyr")
install.packages("dplyr")
library("readr")
library("tidyr")
library("dplyr")
covidData <- read.csv("https://abrooks.dev/src/datasets/owid-covid-
data.csv")

#Germany
DE_fullVaccData <- filter(covidData,
covidData$location=="Germany" & covidData$people_fully_vaccinated >=
0)
DE_fullVaccDate <- as.Date(DE_fullVaccData$date, format = "%m/%d/%Y")
DE_NewVaccData <- filter(covidData,
covidData$location=="Germany" & covidData$new_vaccinations >= 0)
DE_NewVaccDate <- as.Date(DE_NewVaccData$date, format = "%m/%d/%Y")
DE_boosterData <- filter(covidData,
covidData$location=="Germany" & covidData$total_boosters >= 0)
DE_boosterDate <- as.Date(DE_boosterData$date, format = "%m/%d/%Y")

#France
FR_fullVaccData <- filter(covidData,
covidData$location=="France" & covidData$people_fully_vaccinated >= 0)
FR_fullVaccDate <- as.Date(FR_fullVaccData$date, format = "%m/%d/%Y")
FR_NewVaccData <- filter(covidData,
covidData$location=="France" & covidData$new_vaccinations >= 0)
FR_NewVaccDate <- as.Date(FR_NewVaccData$date, format = "%m/%d/%Y")
FR_boosterData <- filter(covidData,
covidData$location=="France" & covidData$total_boosters >= 0)
FR_boosterDate <- as.Date(FR_boosterData$date, format = "%m/%d/%Y")

#United State
US_fullVaccData <- filter(covidData,
covidData$location=="United States" &
covidData$people_fully_vaccinated >= 0)
US_fullVaccDate <- as.Date(US_fullVaccData$date, format = "%m/%d/%Y")
US_NewVaccData <- filter(covidData,
covidData$location=="United States" & covidData$new_vaccinations >= 0)
US_NewVaccDate <- as.Date(US_NewVaccData$date, format = "%m/%d/%Y")
US_boosterData <- filter(covidData,
covidData$location=="United States" & covidData$total_boosters >= 0)
US_boosterDate <- as.Date(US_boosterData$date, format = "%m/%d/%Y")
```

Basic Plots

```r
plot(DE_fullVaccDate, DE_fullVaccData$people_fully_vaccinated,
     main="Germany total vaccinations by date",
     xlab = "Date", ylab = "Frequency", type="l")

plot(FR_fullVaccDate, FR_fullVaccData$people_fully_vaccinated,
     main="France total vaccinations by date",
     xlab = "Date", ylab = "Frequency", type="l")

plot(US_fullVaccDate, US_fullVaccData$people_fully_vaccinated,
     main="United States total vaccinations by date",
     xlab = "Date", ylab = "Frequency", type="l")
```

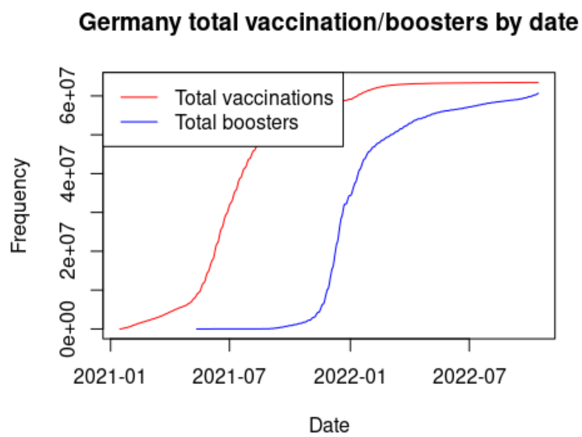


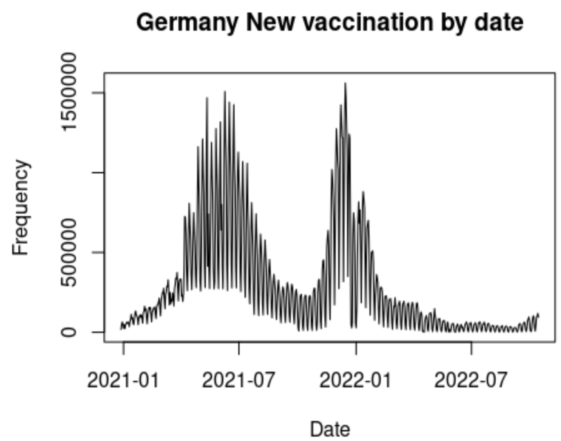




Germany

```
plot(DE_fullVaccDate, DE_fullVaccData$people_fully_vaccinated,
  main="Germany total vaccination/boosters by date", xlab = "Date",
  ylab = "Frequency", type="l", col="red")
lines(DE_boosterDate, DE_boosterData$total_boosters, col = "blue")
legend("topleft", legend = c("Total vaccinations", "Total boosters"),
  col = c("red", "blue"), lty = 1)

plot(DE_NewVaccDate, DE_NewVaccData$new_vaccinations,
  main="Germany New vaccination by date",
xlab = "Date",ylab = "Frequency", type="l")
```



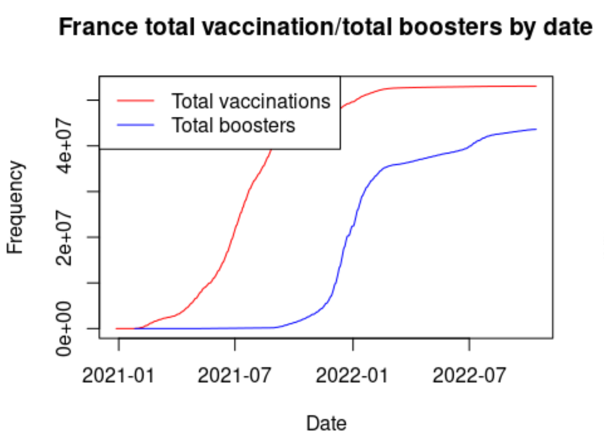


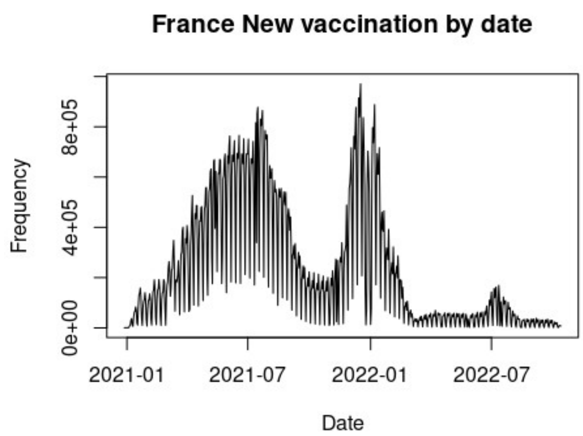
Germany Analysis

In the plots above, we observe an increase in vaccinations beginning around May 2021, reaching a peak in February 2022, and then stabilizing. It is noteworthy that the pace of vaccinations started to slow down in August 2021, just before the initial spike in boosters observed in November 2021. This could suggest that most individuals who intended to get vaccinated had already done so. Additionally, the plot for boosters shows a continual convergence towards the total vaccinations line. It would be interesting to access more recent data to assess how closely these lines converge.

France

```
plot(FR_fullVaccDate, FR_fullVaccData$people_fully_vaccinated,
  main="France total vaccination/total boosters by date",
  xlab = "Date", ylab = "Frequency", type="l", col="red")
lines(FR_boosterDate, FR_boosterData$total_boosters, col = "blue")
legend("topleft", legend = c("Total vaccinations", "Total boosters"),
  col = c("red", "blue"), lty = 1)

plot(FR_NewVaccDate, FR_NewVaccData$new_vaccinations,
     main="France New vaccination by date",
     xlab = "Date",ylab = "Frequency", type="l")
```



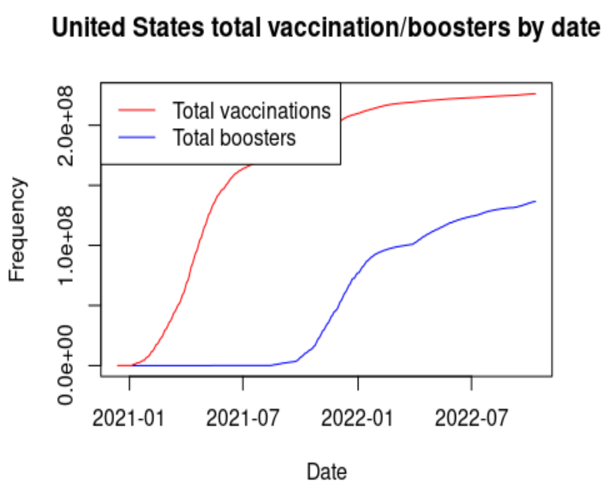


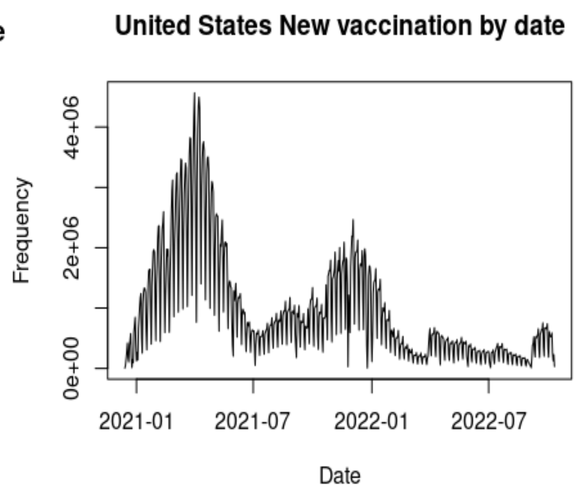
France Analysis

Our plots for France closely resemble those for Germany, but there is one significant distinction. France exhibits a notably wider gap between vaccinations and boosters, with a difference of approximately ten million boosters at the plateau point. While these two charts share a strong resemblance, it is worth highlighting that the total recorded vaccinations in these datasets differ by approximately ten million as well. A similar population gap and discrepancy between vaccinations and boosters is even more pronounced in our next example.

United States

```
plot(US_fullVaccDate, US_fullVaccData$people_fully_vaccinated,
  main="United States total vaccination/boosters by date",
  xlab = "Date", ylab = "Frequency", type="l", col="red")
lines(US_boosterDate, US_boosterData$total_boosters, col = "blue")
legend("topleft", legend = c("Total vaccinations", "Total boosters"),
  col = c("red", "blue"), lty = 1)

plot(US_NewVaccDate, US_NewVaccData$new_vaccinations,
     main="United States New vaccination by date",
     xlab = "Date",ylab = "Frequency", type="l")
```





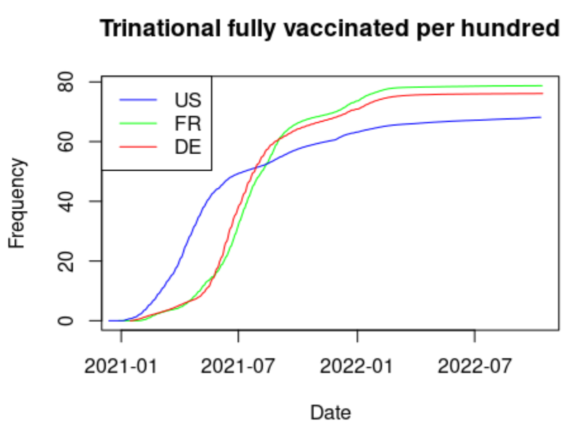
United States Analysis

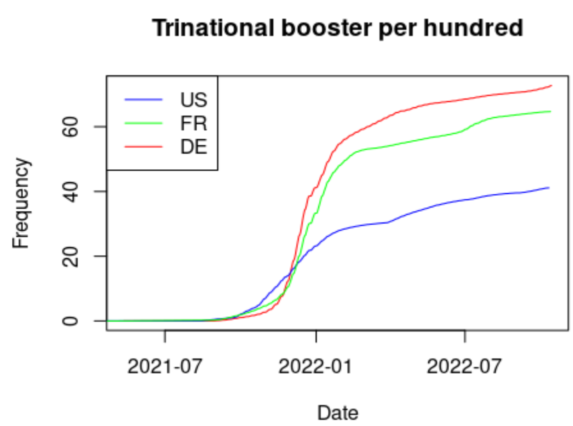
The United States stands out as an outlier in several aspects. First, when examining the total vaccinations, it becomes evident that the vaccination campaign commenced a few months earlier compared to our other two examples, beginning around February 2021, and steadily increasing throughout the year. Around June, there is a noticeable decline in frequency, followed by a plateau that extends into 2022.

Turning our attention to total boosters, we observe even more disparities. While we witness a similar initial adoption pattern, the most striking distinction lies in the significant gap between total vaccinations and boosters, amounting to approximately 150,000,000 by August 2022.

Trinational Comparison

```
plot(FR_fullVaccDate, FR_fullVaccData$people_fully_vaccinated_per_hundred,
     main="Trinational fully vaccinated per hundred",
     xlab = "Date", ylab = "Frequency", type="l", col="green")
lines(US_fullVaccDate, US_fullVaccData$people_fully_vaccinated_per_hundred,
col = "blue")
lines(DE_fullVaccDate, DE_fullVaccData$people_fully_vaccinated_per_hundred,
col = "red")
legend("topleft", legend = c("US", "FR", "DE"), col = c("blue", "green",
"red"), lty = 1)

plot(DE_boosterDate, DE_boosterData$total_boosters_per_hundred,
     main="Trinational booster per hundred",
     xlab = "Date", ylab = "Frequency", type="l", col="red")
lines(US_boosterDate, US_boosterData$total_boosters_per_hundred, col = "blue")
lines(FR_boosterDate, FR_boosterData$total_boosters_per_hundred, col =
"green")
legend("topleft", legend = c("US", "FR", "DE"), col = c("blue", "green",
"red"), lty = 1)
```





Tri-National Analysis

To gain further insights, let us compare these countries side by side. Since there is large variation in overall population, we will need to use another variable. The charts above track the fully vaccinated and boostered population per one hundred people. When examining these comparison charts, the previous insights become even more pronounced.

In the "Trinational fully vaccinated per hundred" chart, we observe the early adoption of vaccinations in the US, followed closely by our two European nations. Notably, we can clearly see the decline in the vaccination rate in the US when it reaches around 65 per 100 people, while France (FR) and Germany (DE) continue to climb, reaching levels in the high 70s.

The "Trinational booster per hundred" chart further illustrates the limited use of boosters in the US. Although the US initially led in booster usage, the European nations quickly surpassed it, with both France and Germany surpassing 60 per 100, while the US reached just under 40.