

Assessing the Impact of COVID-19 on U.S. International Travel

INFO 2201
Summer 2025

Lucy Wade
Aubrey Leneweaver

01 - Main Idea

02 - Data Collection

03 - Data Cleaning

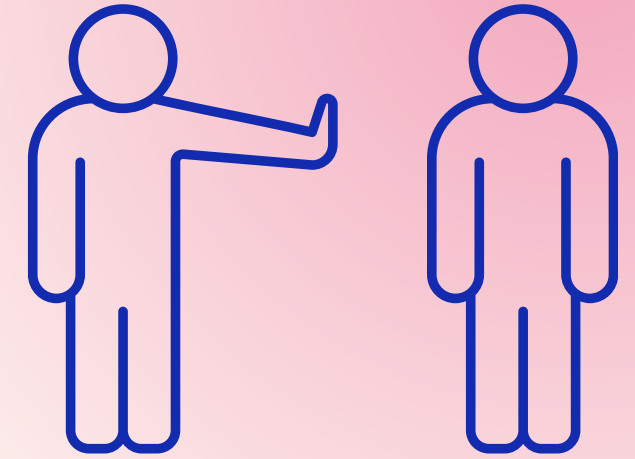
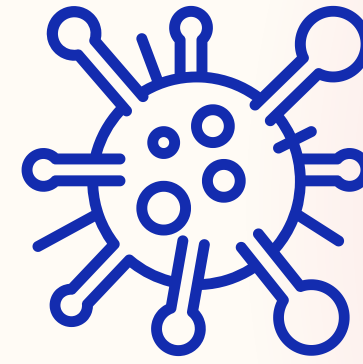
04 - What We'll Do

05 - Restrictions

06 - Visualizations

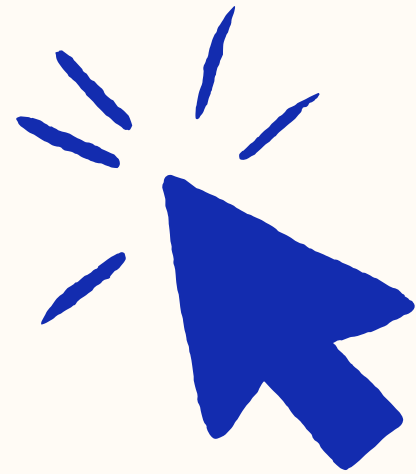
07 - Important Takeaways

O1 - Main Idea



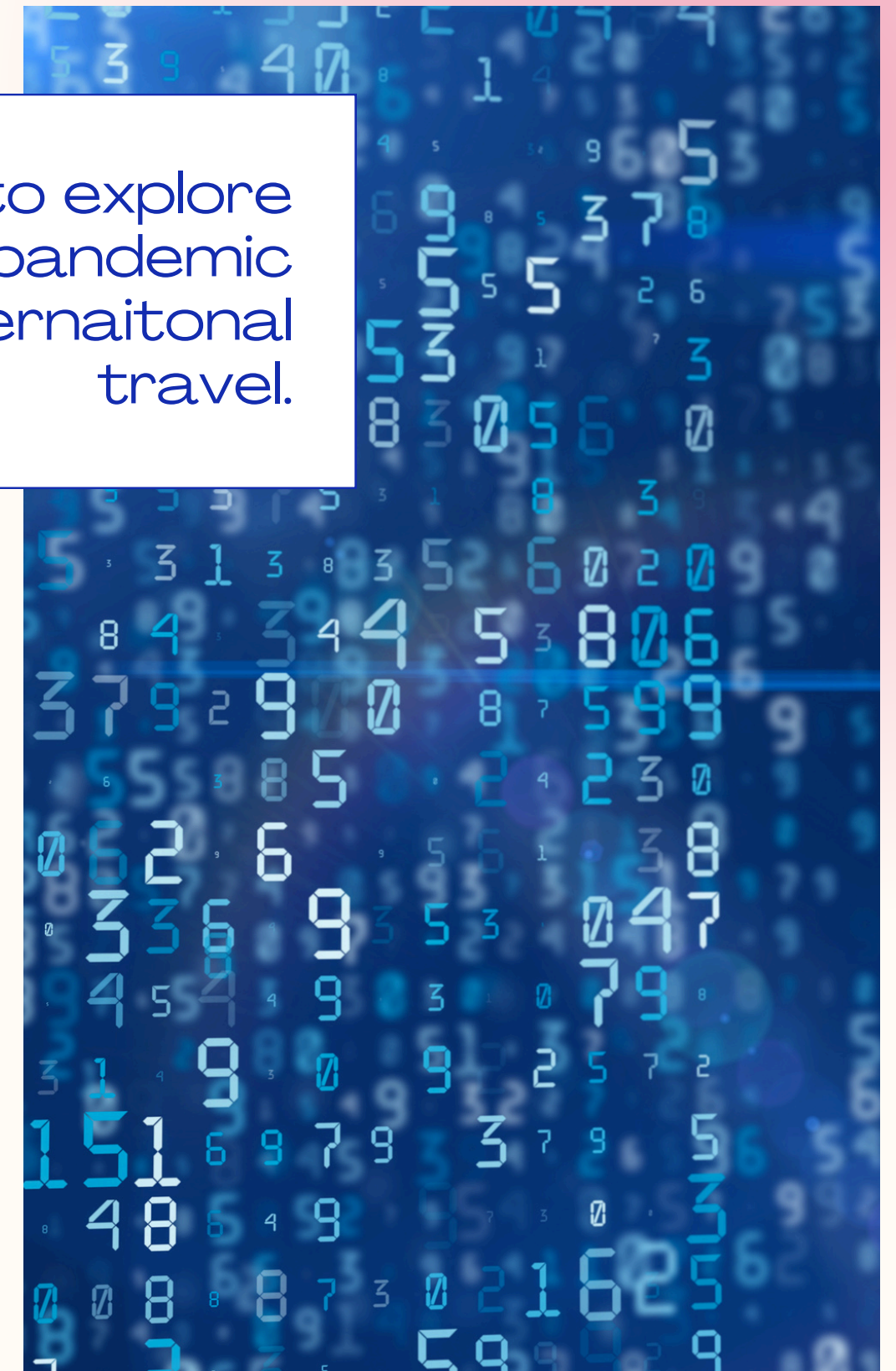
Our objective in this project was to analyze how international travel trends (for both US and foreign citizens) shifted during and after the COVID-19 pandemic and how these changes related to US COVID-19 case rates.

02 - Data Collection



Using data to explore how a global pandemic reshaped international travel.

To analyze how travel in and out of the United States was impacted by COVID-19 cases in the country, we utilized two key datasets: WHO COVID-19 Global Daily Data and U.S. International Air Travel Statistics. When looking for data, we prioritized finding information from reliable sources that covered the minimum timespan we were looking for (January 2020 through December 2024).





02 - Data Collection

*WHO COVID-19
Global Daily Data*

- Source: World Health Organization (WHO)
- Timeframe: January 2020-June 2025
- Scope: Daily COVID-19 reports by country
 - New cases, cumulative cases, new deaths, cumulative deaths

This dataset was perfect for our project as it includes consistent, detailed records on the progression of COVID-19 both in the US and abroad.

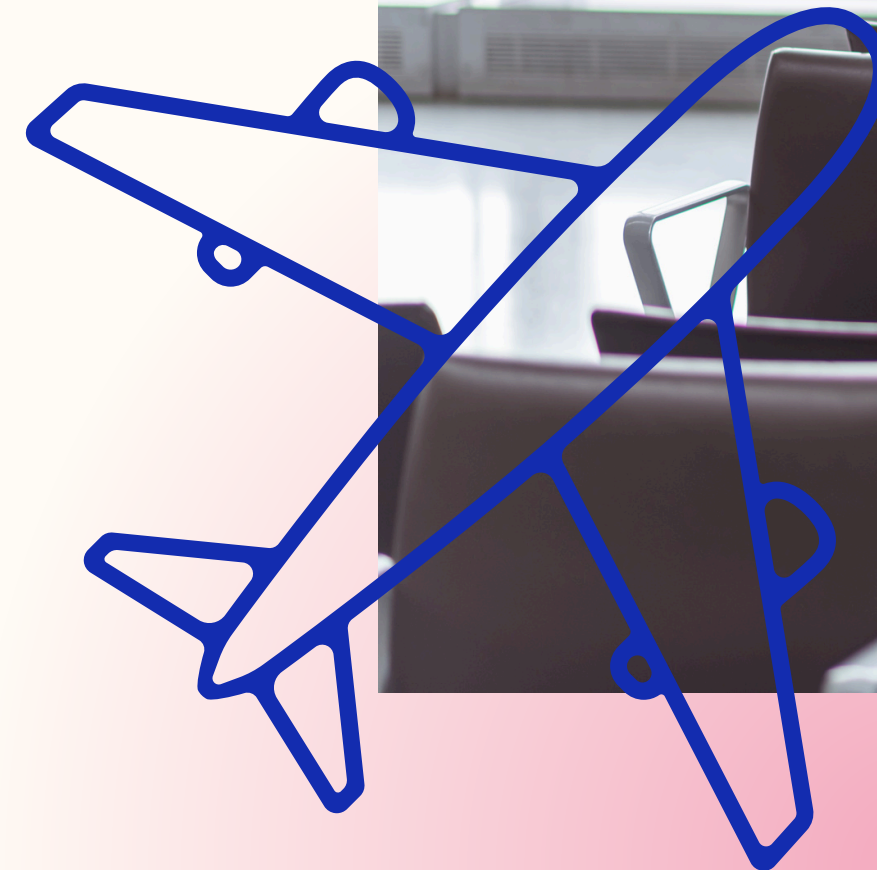


02 - Data Collection

- Source: U.S. Department of Commerce – Office of the International Trade Administration
- Timeframe: January 2019-May 2025
- Scope: Monthly counts of international entries and exits to/from the U.S.
 - Tracks both U.S. and foreign citizens

This dataset provided insight into movement across the U.S. border during the same period as the pandemic, making it useful for assessing how travel behavior changed in light of COVID-19.

*U.S. International Air
Travel Statistics*



03 - Data Cleaning

```
USCovidData = covidDataDF[covidDataDF['Country'] == 'United States of America'].copy()

USCovidData['Date_reported'] = pd.to_datetime(USCovidData['Date_reported'])

USCovidData['Month_number'] = USCovidData['Date_reported'].dt.month
USCovidData['Month'] = USCovidData['Date_reported'].dt.month_name()
USCovidData['Year'] = USCovidData['Date_reported'].dt.year.astype(str)
```

- We filtered the data in the WHO COVID-19 dataset to only include U.S. entries, then extracted the Month, Year, and Month_number into their own columns. We grouped the data by month and year, summing new cases/deaths and taking the last value of the month for cumulative totals.
- For the U.S. travel dataset, we renamed columns to match the naming conventions of the WHO data and sorted the data by Year, Month_number, and Month.
- We then merged the two datasets on these shared columns, created a Timestamp column for easier analysis, and exported the cleaned, combined dataset to a new CSV file for visualization.

```
USMonthlyCovidData = USDataByMonth.agg({
    'New_cases': 'sum',
    'Cumulative_cases': 'last',
    'New_deaths': 'sum',
    'Cumulative_deaths': 'last'
})
```

04 - What We'll Do

Research Focus:

COVID-19's Impact on International Travel to/from the US (2020-2024)

Key Research Questions:

- Does higher COVID case count correlate with reduced travel volume?
- Does lower COVID case count correlate with increased travel volume?
- How did Americans vs. foreigners adjust travel habits differently?

Travel Groups:

- Americans traveling abroad
- Foreign visitors to the US

Pandemic Phases:

- Beginning (2020)
- Major outbreaks (2020-2021)
- Recovery period (2022-2024)

Baseline: 2019 travel data as pre-pandemic reference

Ultimate Goal:

Determine if COVID-19 permanently altered international travel patterns or if travel has returned to pre-pandemic "normal" levels

05 - Restrictions

Factors that we won't include:

- Travel restrictions and border controls
- Quarantine requirements
- Vaccine mandates
- Country-specific regulations
- Economic Factors
- Flight cancellations and reduced capacity
- Increased travel costs
- Economic impact on the travel industry

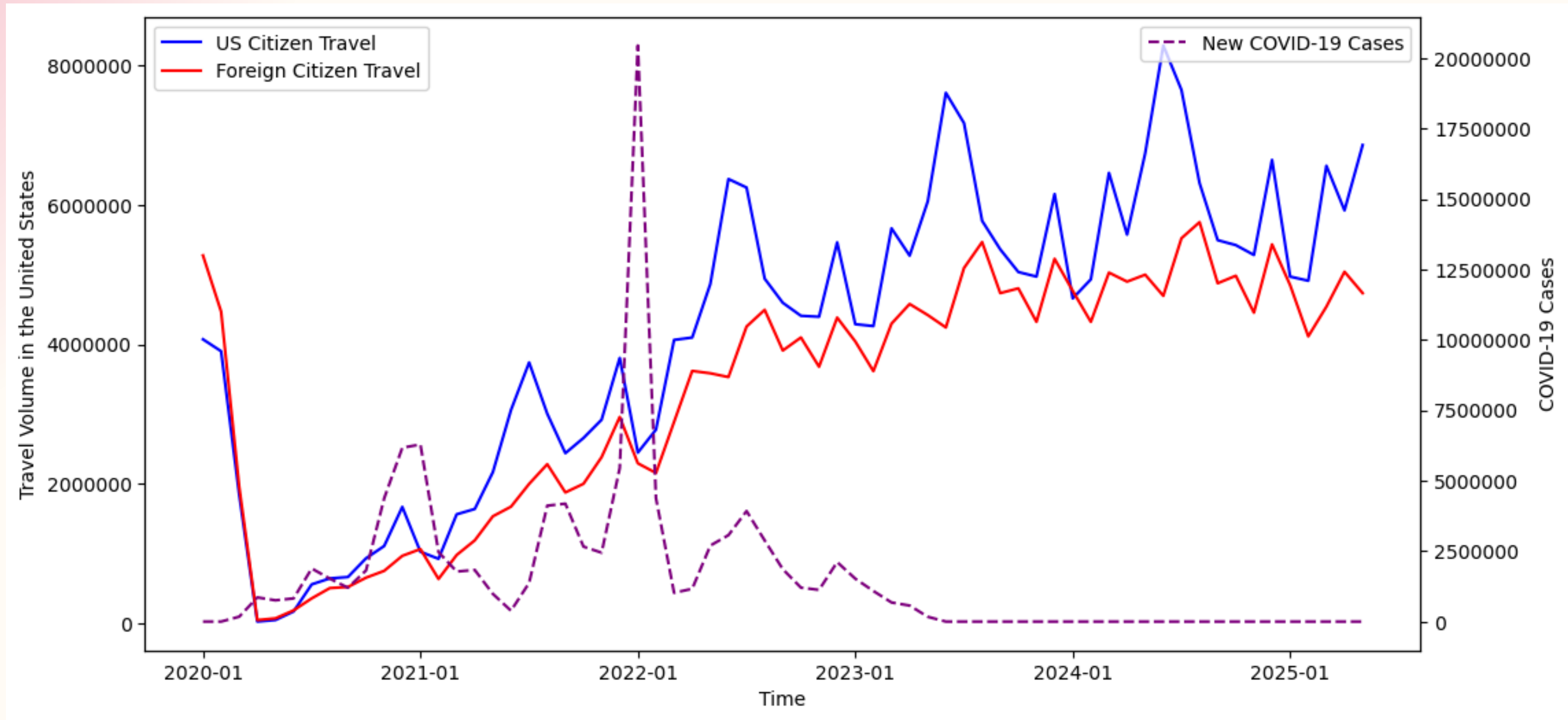


These excluded factors changed frequently and varied significantly by location, making them difficult to standardize across our analysis.

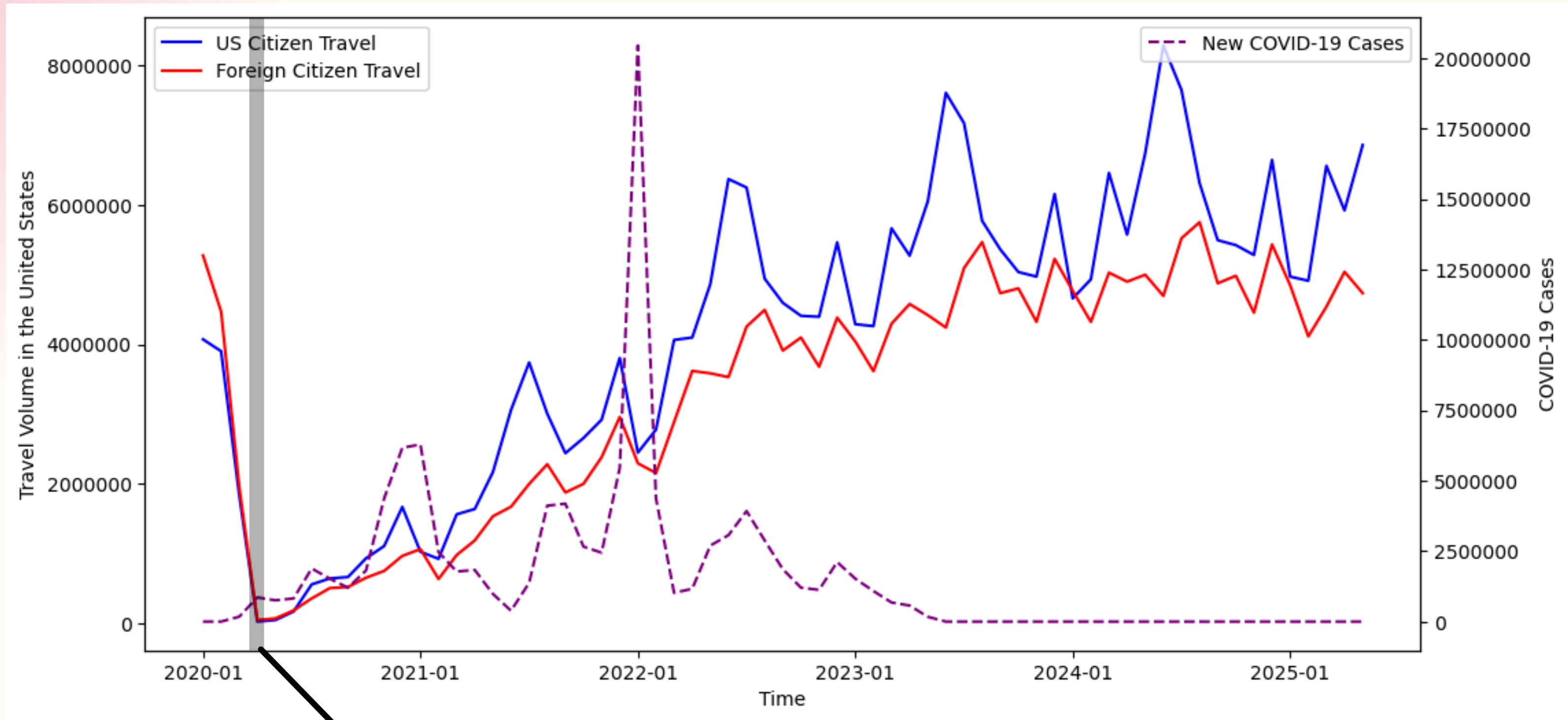
06

Visualizations

U.S. International Air Travel vs. New COVID-19 Cases

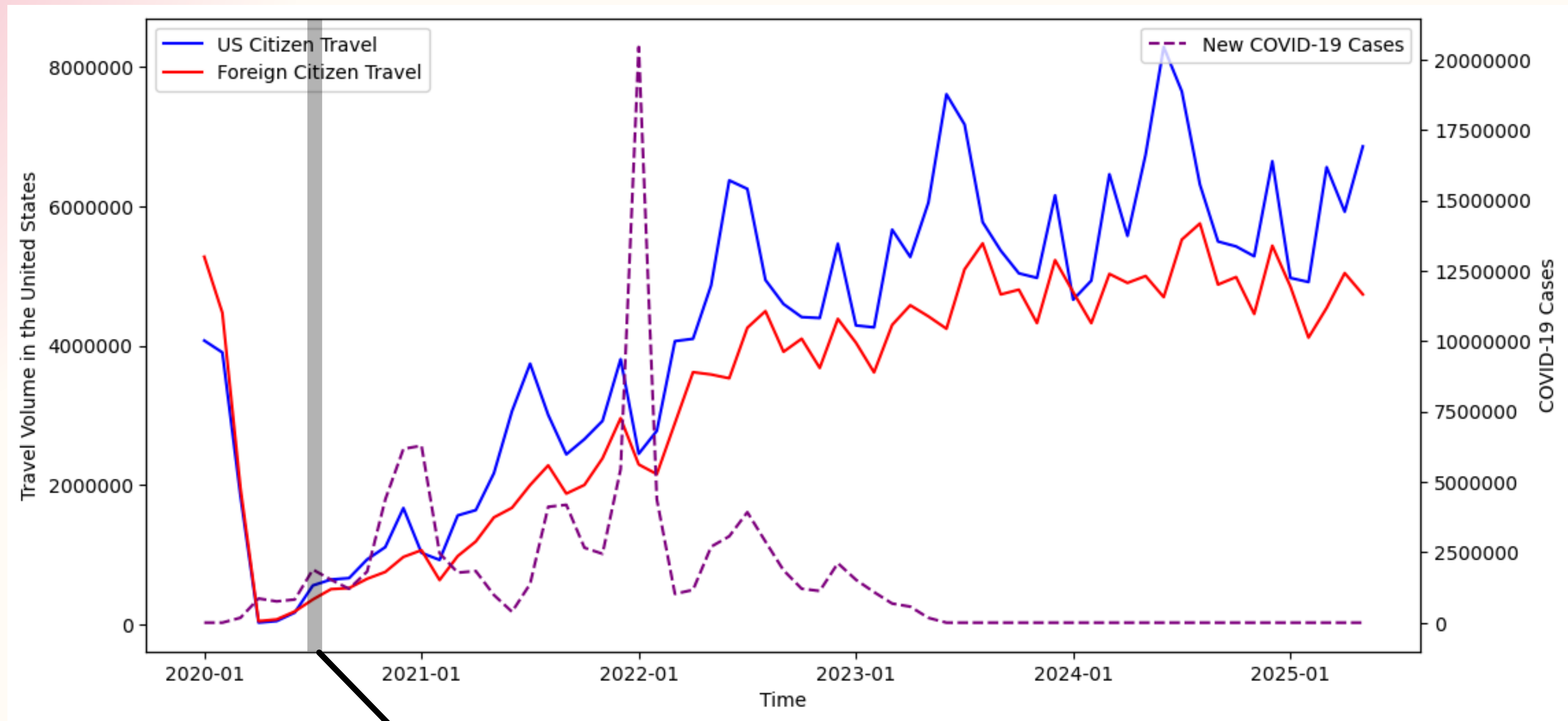


U.S. International Air Travel vs. New COVID-19 Cases



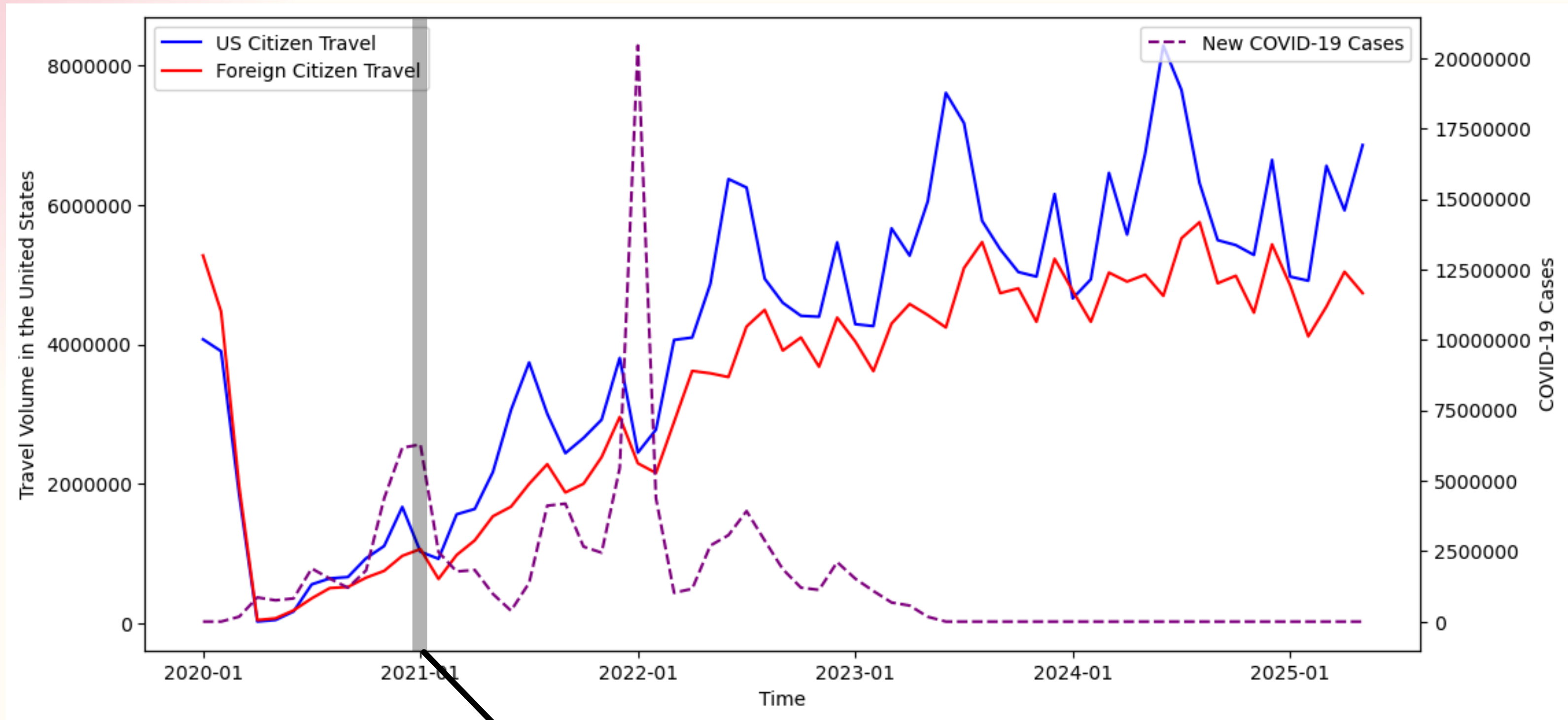
Non-essential international travel to/from the United States is restricted and many states issue stay-at-home orders

U.S. International Air Travel vs. New COVID-19 Cases



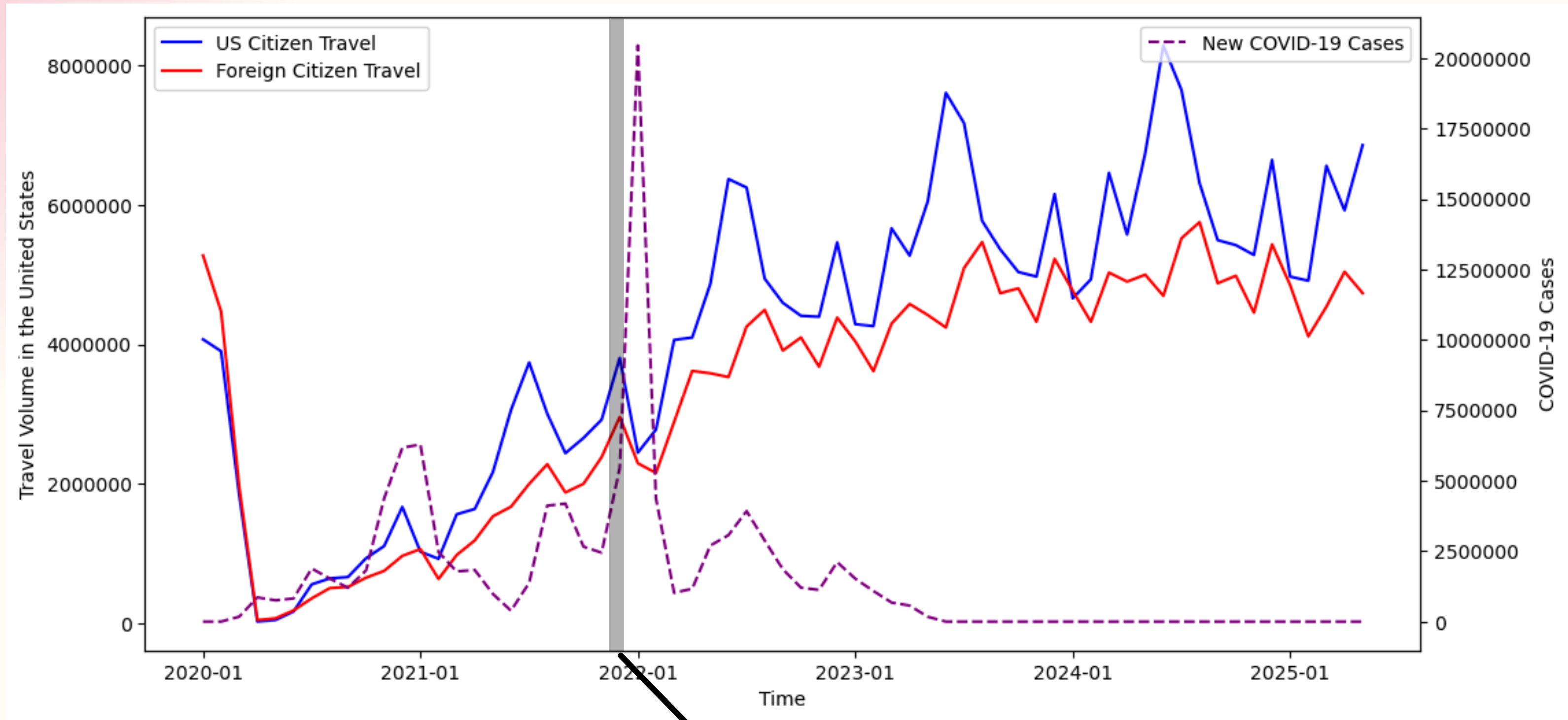
Stay-at-home orders begin to lift across the country

U.S. International Air Travel vs. New COVID-19 Cases



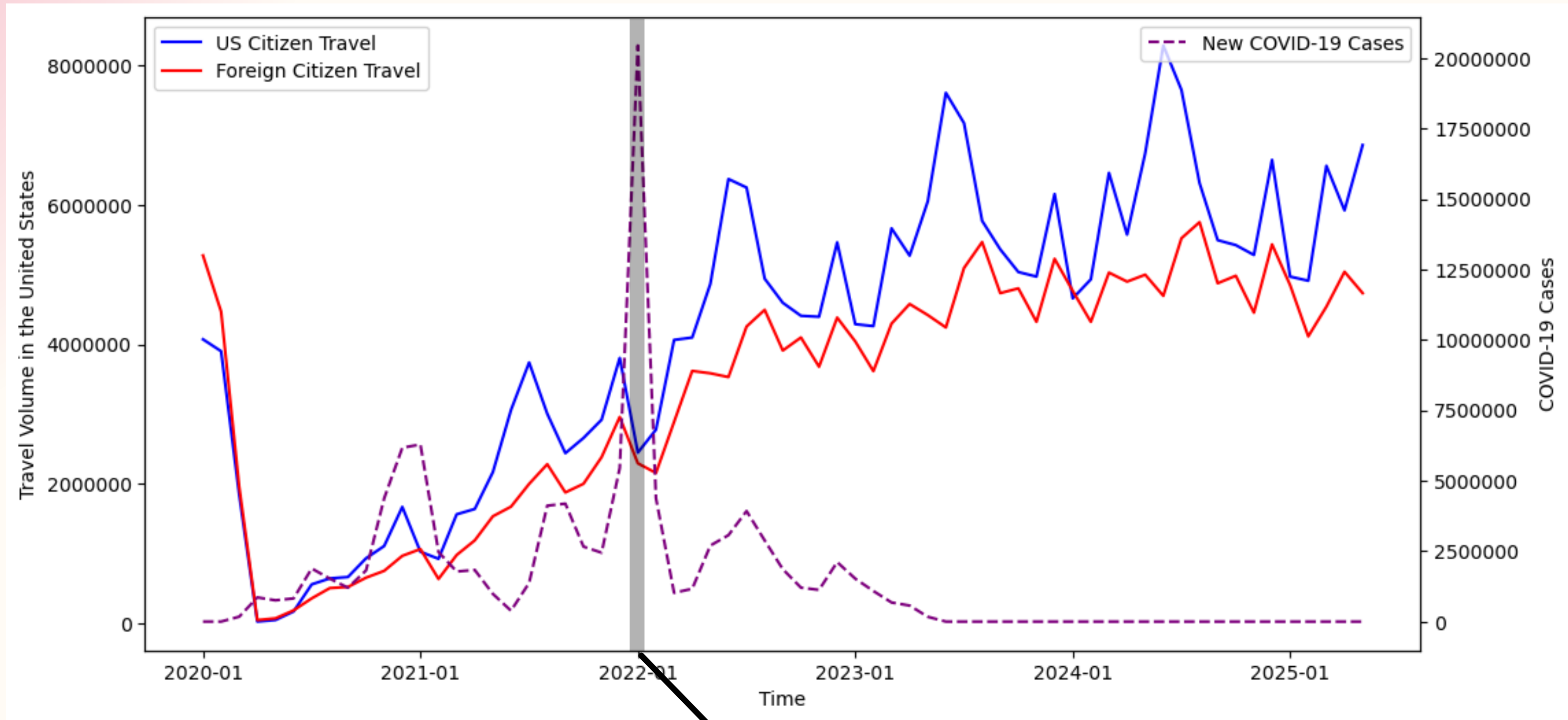
Vaccinations begin in America and new variants of COVID-19 are reported around the globe

U.S. International Air Travel vs. New COVID-19 Cases



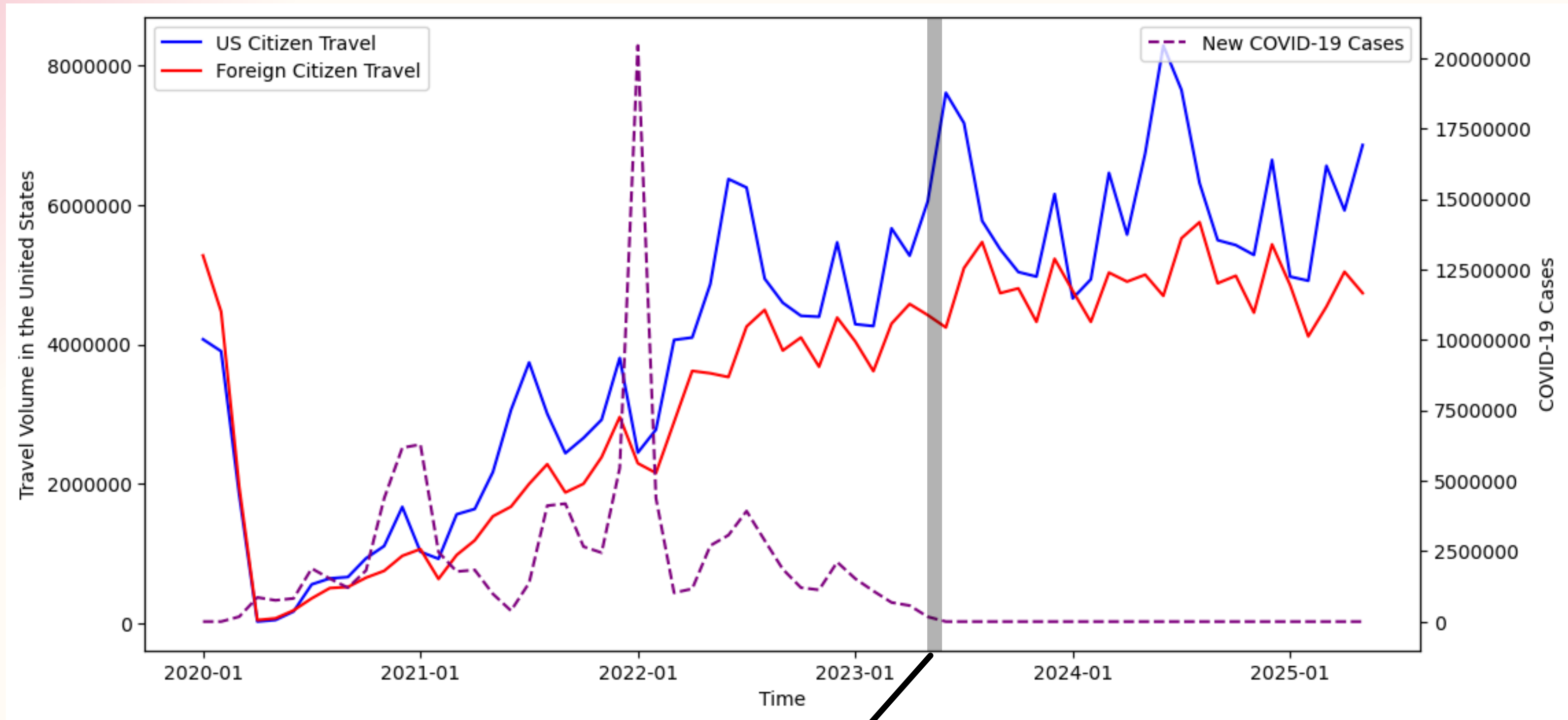
US lifts pandemic travel ban on many foreign countries

U.S. International Air Travel vs. New COVID-19 Cases



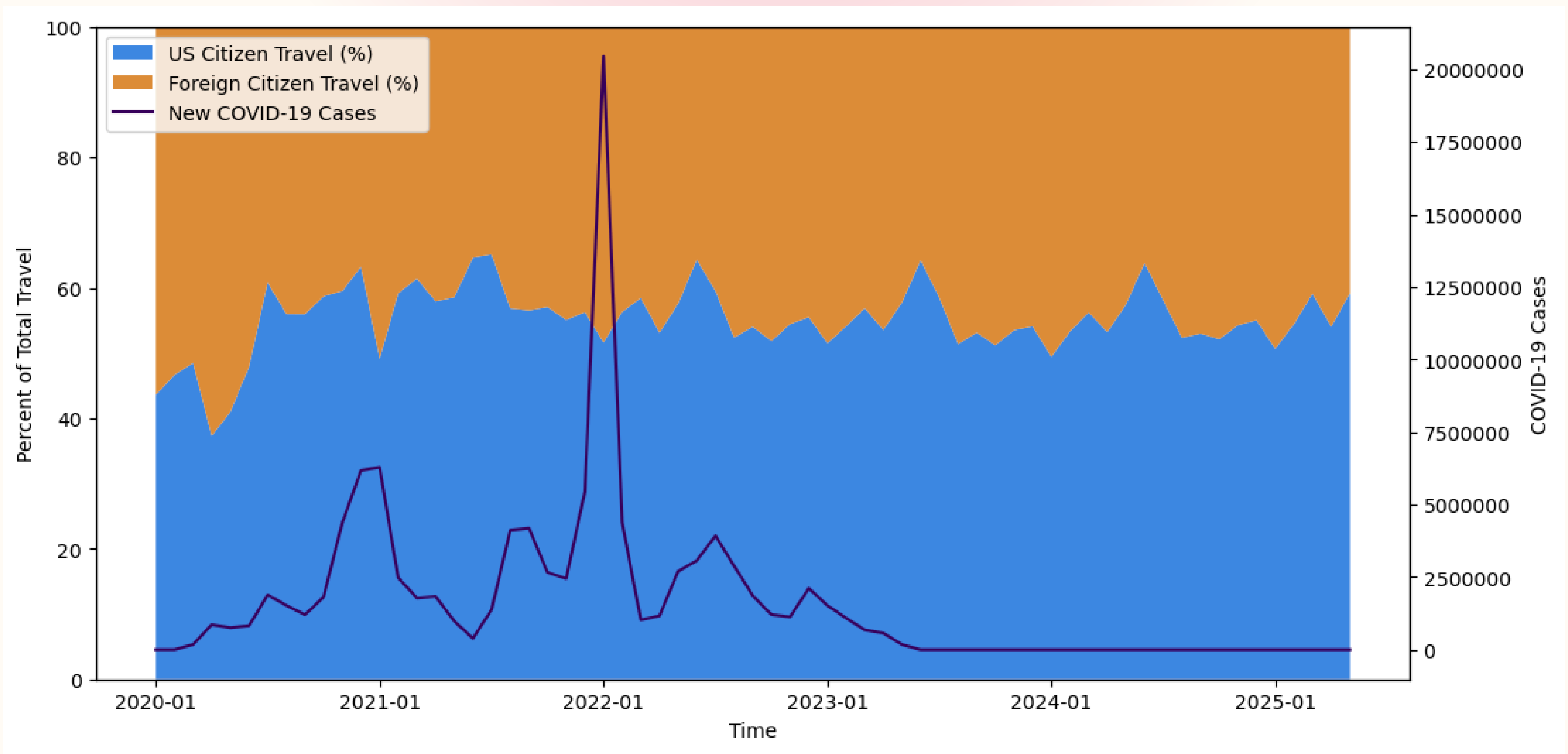
Omicron variant surges in the U.S.

U.S. International Air Travel vs. New COVID-19 Cases

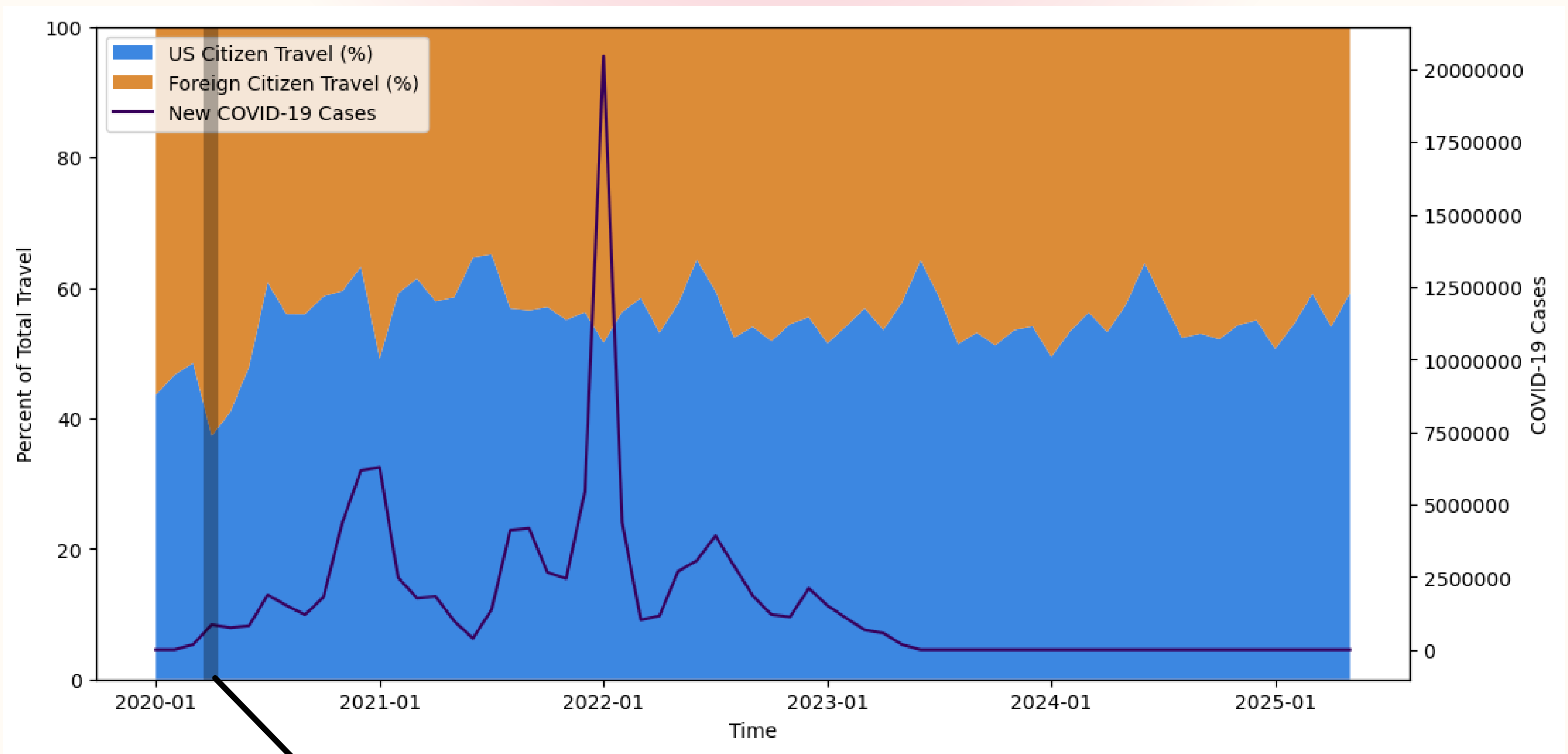


WHO declares an end to the public health emergency of international concern and ceases global daily COVID-19 data reports

International Travel Composition and U.S. Covid Cases Over Time

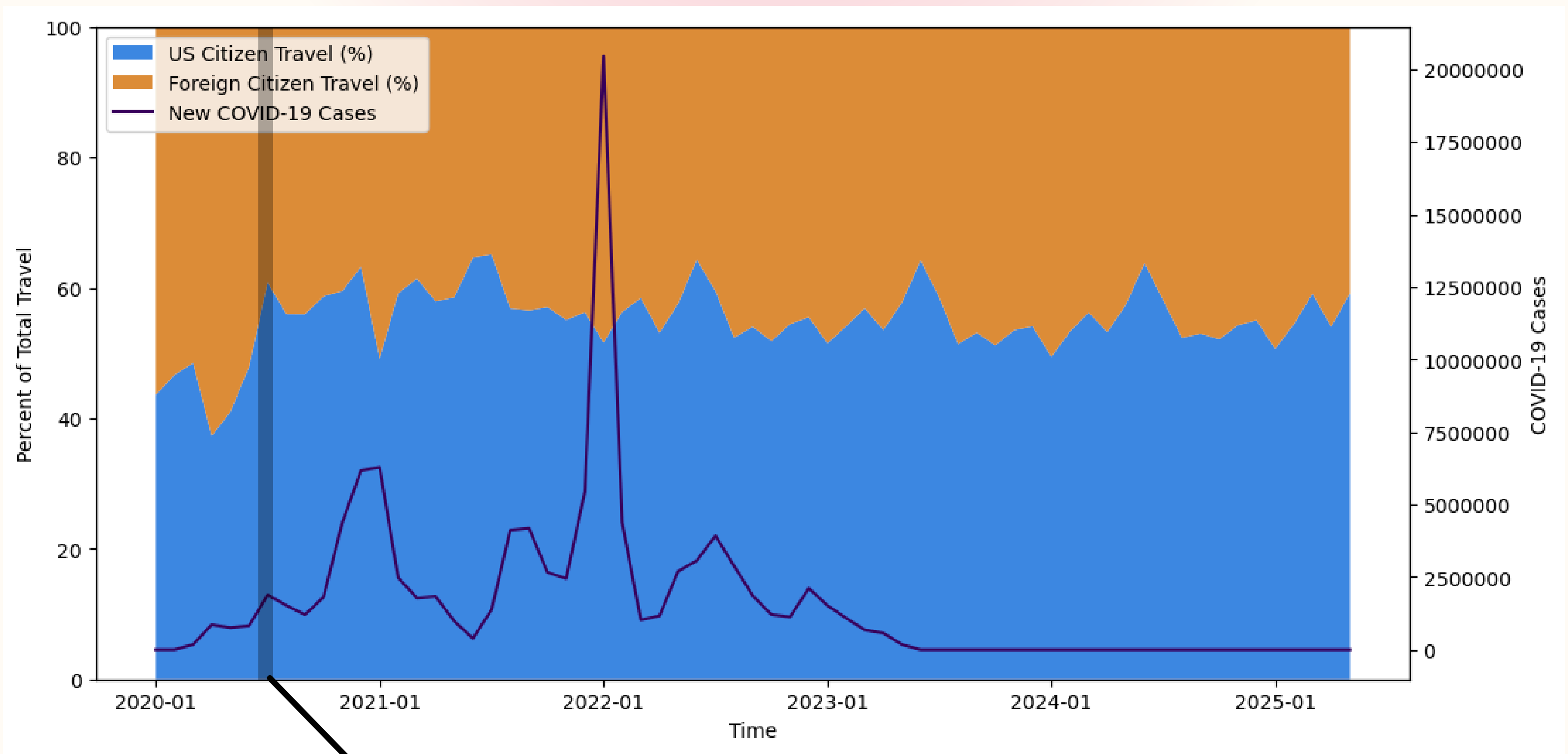


International Travel Composition and U.S. Covid Cases Over Time



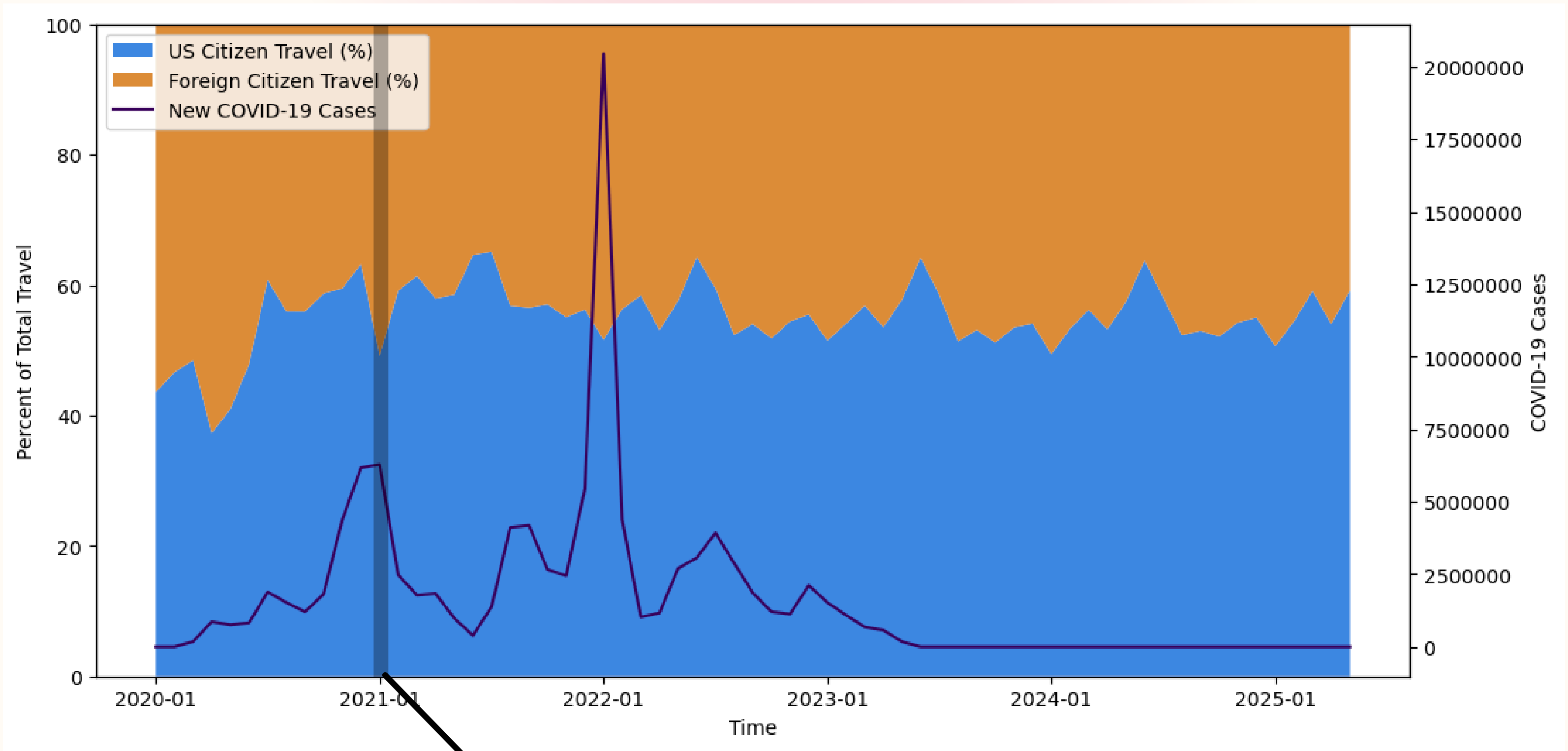
Non-essential international travel to/from the United States is restricted and many states issue stay-at-home orders

International Travel Composition and U.S. Covid Cases Over Time



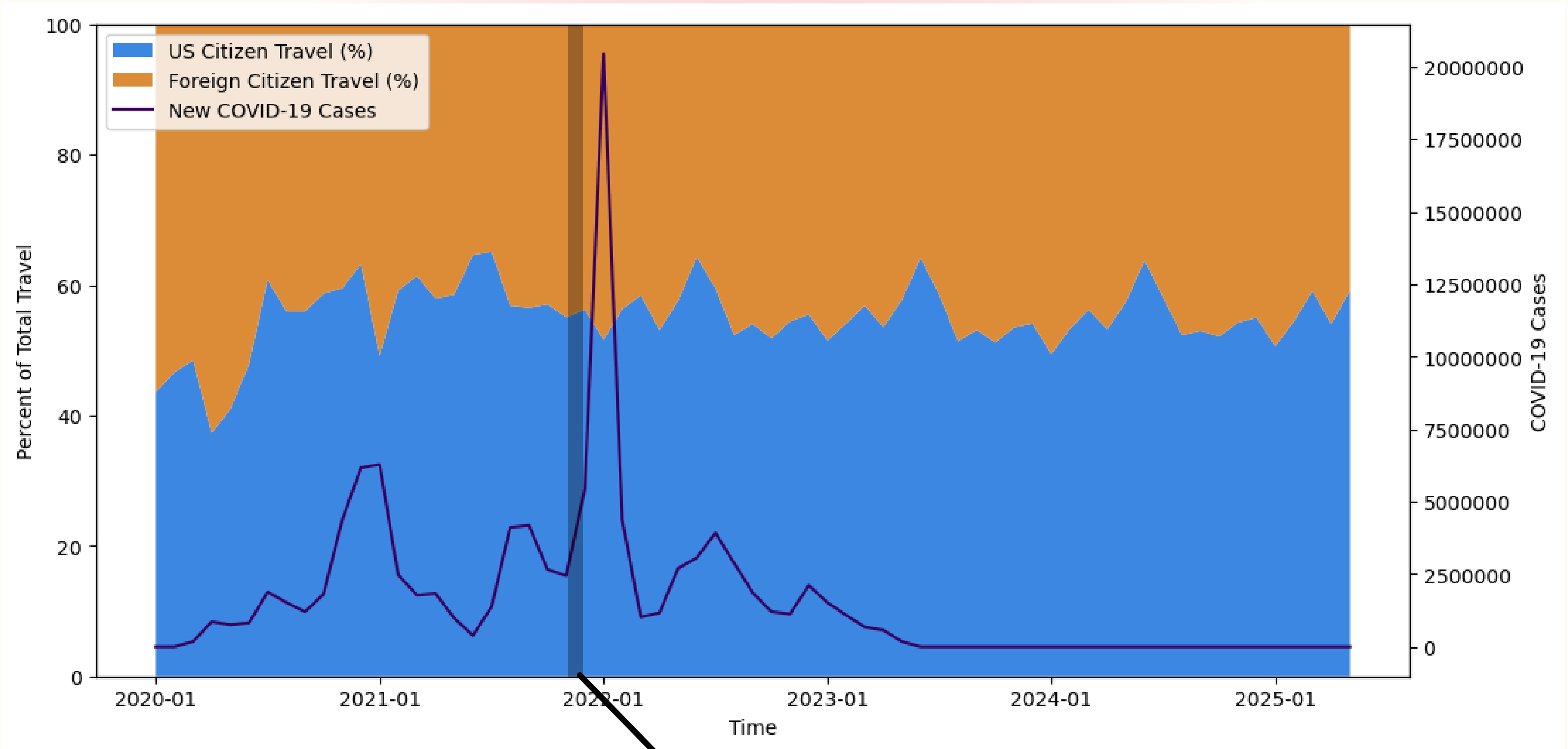
Stay-at-home orders begin to lift across the country

International Travel Composition and U.S. Covid Cases Over Time



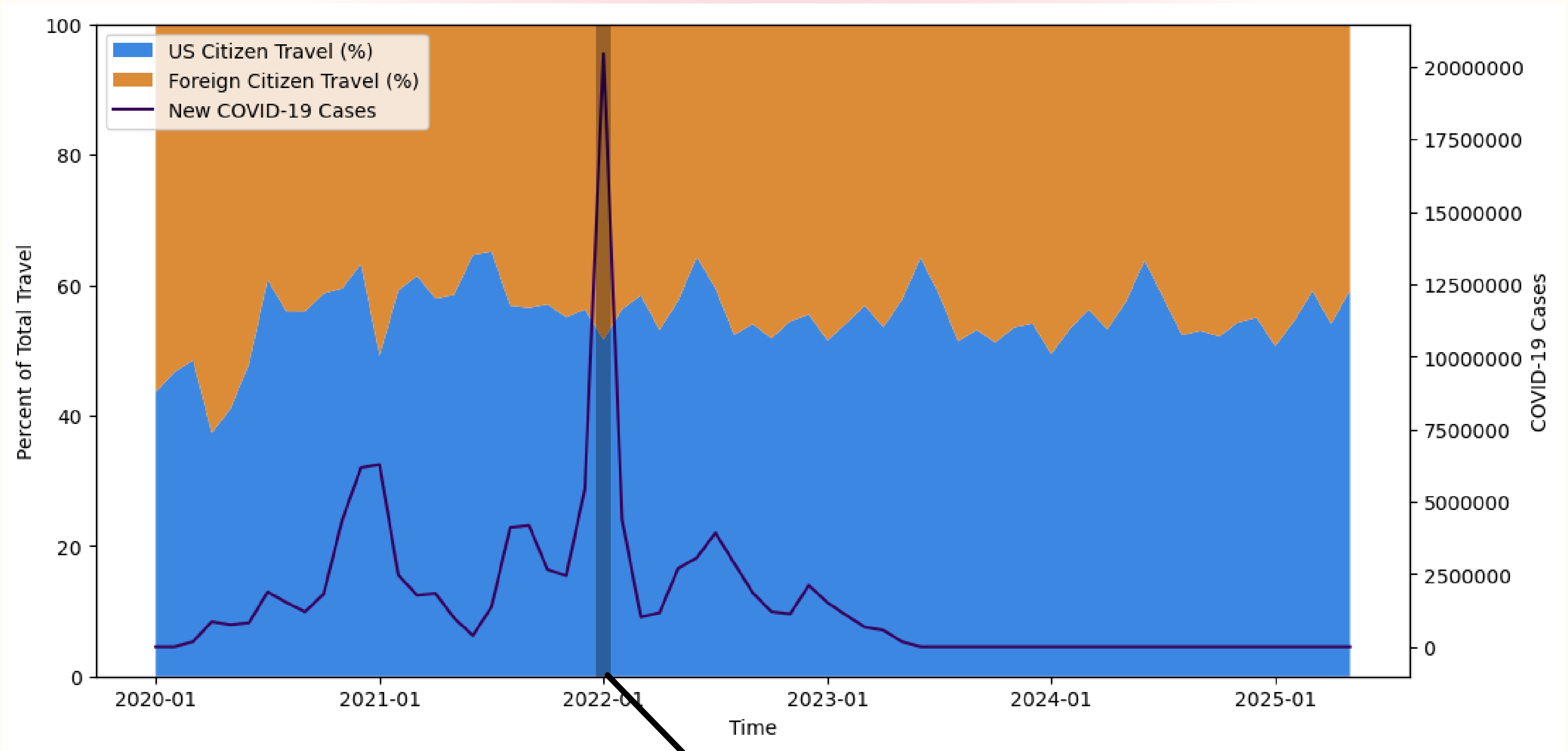
Vaccinations begin in America and new variants of COVID-19 are reported around the globe

International Travel Composition and U.S. Covid Cases Over Time



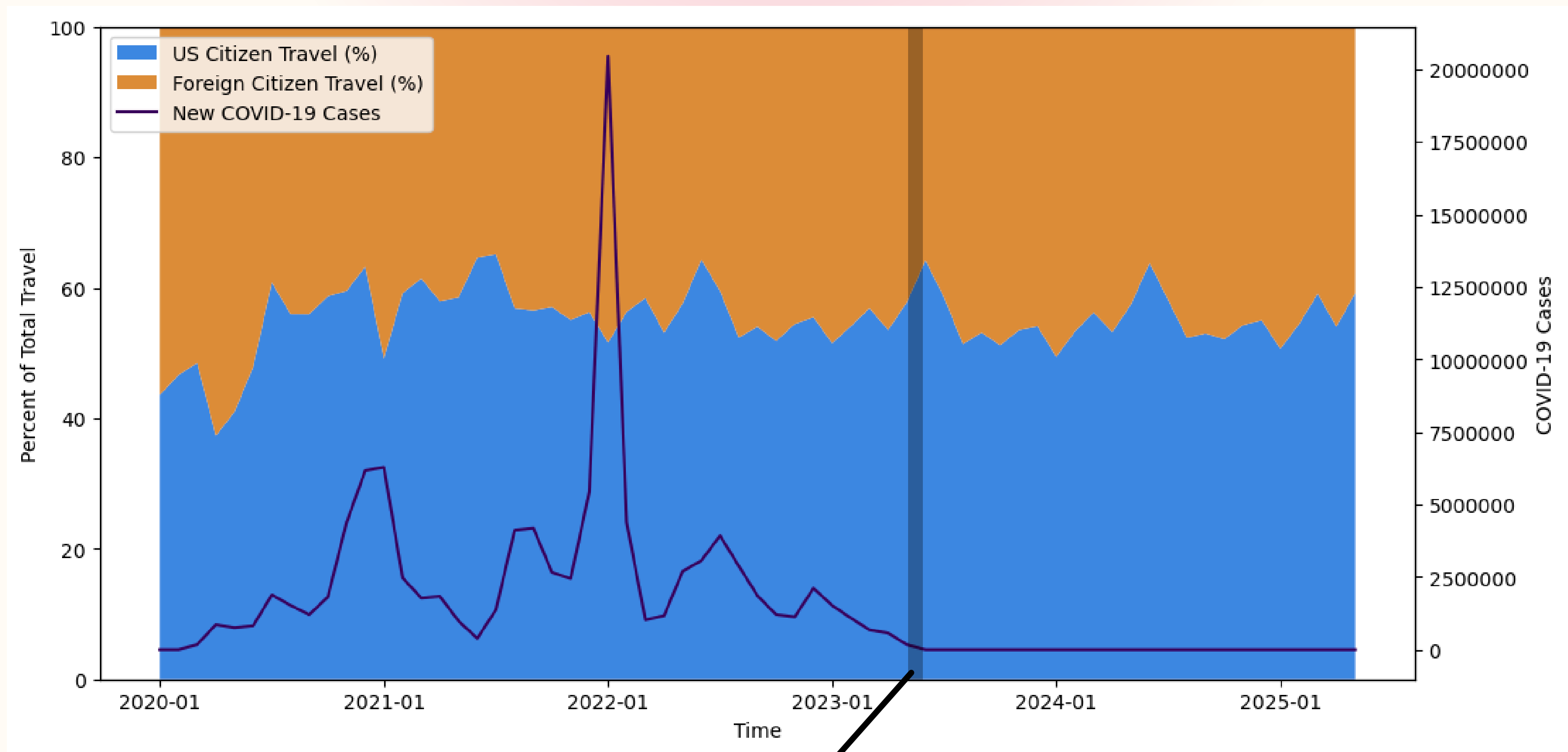
US lifts pandemic travel ban on many foreign countries

International Travel Composition and U.S. Covid Cases Over Time



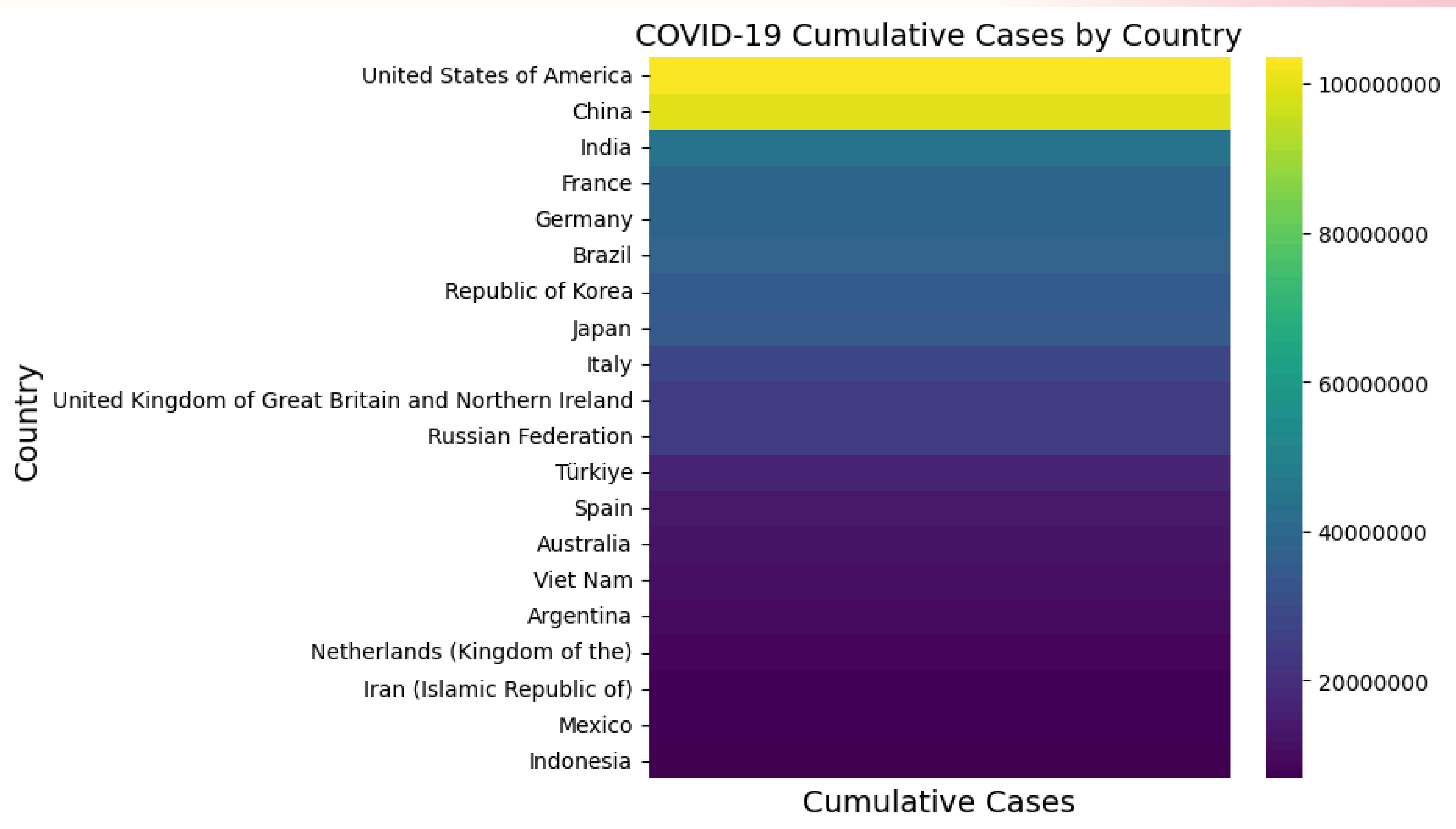
Omicron variant surges in the U.S.

International Travel Composition and U.S. Covid Cases Over Time

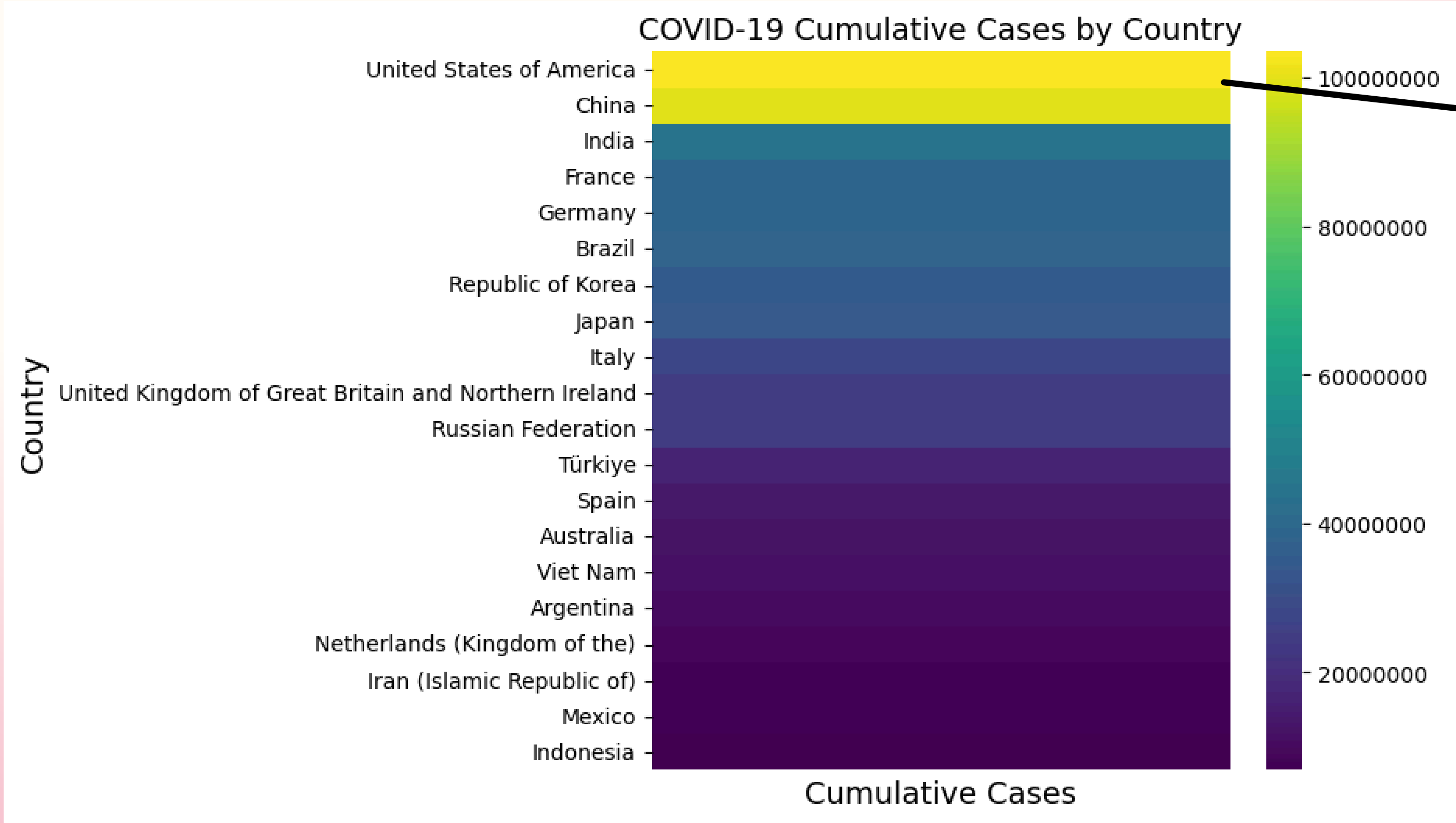


WHO declares an end to the public health emergency of international concern and ceases global daily COVID-19 data reports

COVID-19 Cumulative Cases For Top 20 Countries

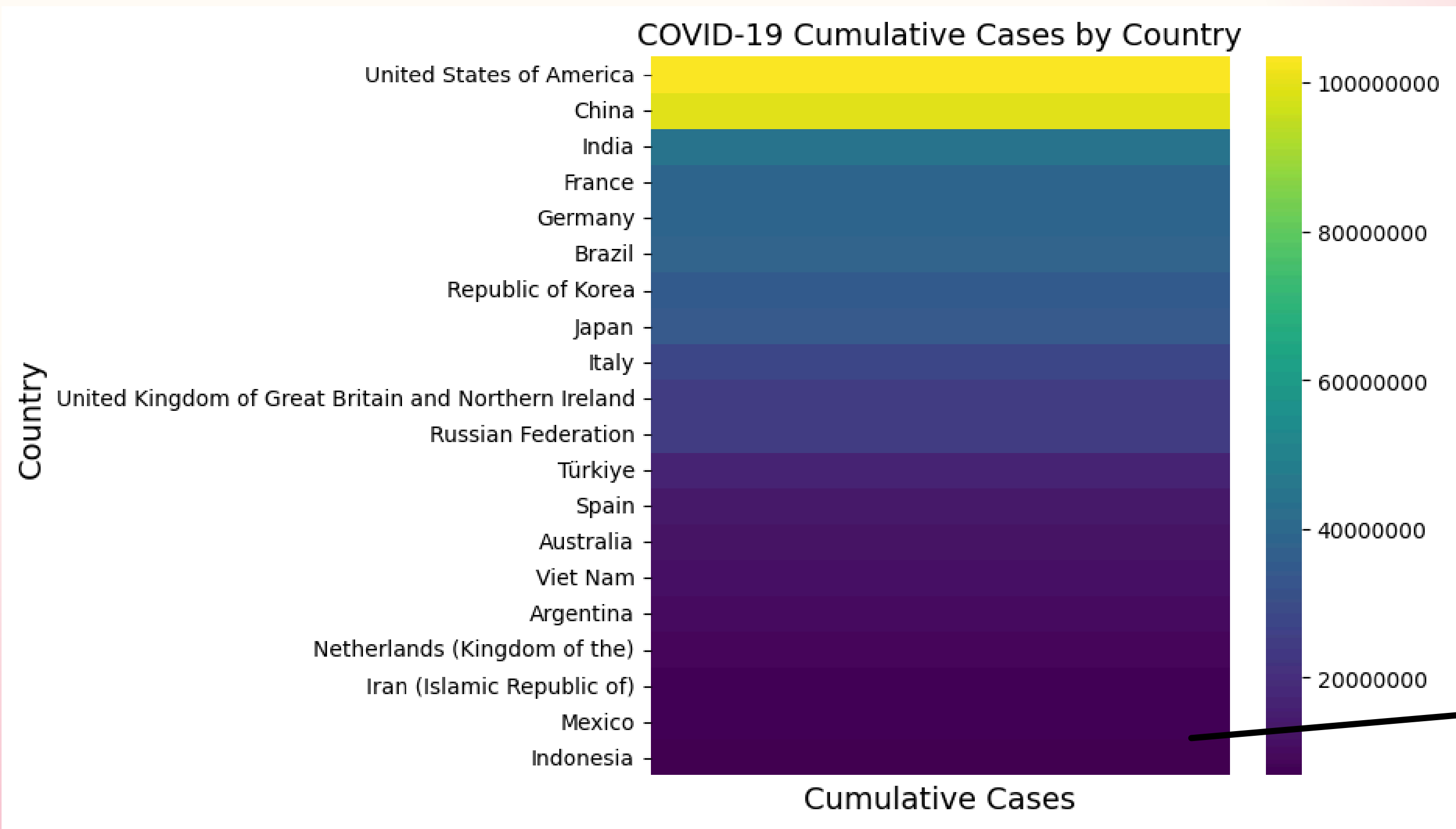


COVID-19 Cumulative Cases For Top 20 Countries



USA: 340 Million
China: 1.411 Billion
India: 1.438 Billion

COVID-19 Cumulative Cases For Top 20 Countries



Iran: 90.61 Million
Mexico: 129.7 Million
Indonesia: 281.2 Million

07

Takeaways

2019 vs 2024 U.S. International Travel

2019

254,881,500
Total Passengers

130,988,519
Total Foreign Citizens

123,892,981
Total U.S. Citizens

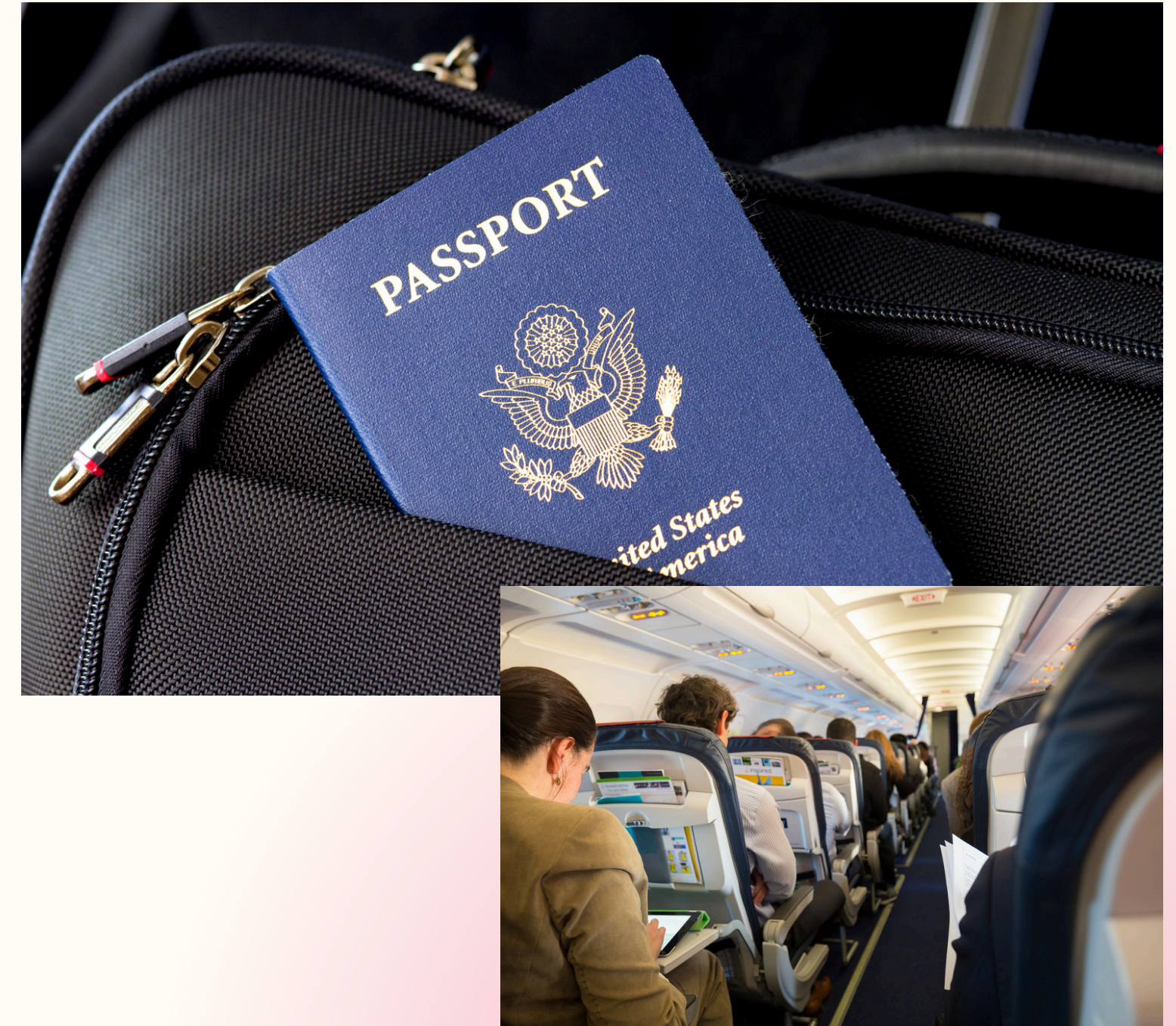
2024

269,334,998
Total Passengers

120,234,813
Total Foreign Citizens

149,100,185
Total U.S. Citizens

- Travel behavior seems to be closely correlated with COVID-19 case trends.
 - International travel volume dropped during major U.S. COVID-19 waves
 - Changes in travel behaviors often lagged behind case surges, which suggests that travelers may be responding more to perceived risk than actual case numbers
- U.S. and foreign citizens exhibited different travel patterns
 - U.S. citizens returned to international travel sooner than foreign citizens arriving in the U.S.
- 2024 travel patterns differ from those of 2019, despite recovery
 - Though 2024 surpassed 2019 in total travel volume, the number of foreign citizens arriving in the U.S. remained lower than pre-COVID levels.



07 - Important Takeaways

Thanks



Sources

The Associated Press. “The U.S. Lifts the Pandemic Travel Ban and Opens the Doors to International Visitors.” NPR, NPR, 8 Nov. 2021, www.npr.org/2021/11/08/1053434232/the-u-s-lifts-the-pandemic-travel-ban-and-opens-the-doors-to-international-visit.

“CDC Museum Covid-19 Timeline.” Centers for Disease Control and Prevention, Centers for Disease Control and Prevention, 8 July 2024, www.cdc.gov/museum/timeline/covid19.html.

Northwestern Medicine. “When Did the Pandemic Start and End?” Northwestern Medicine, www.nm.org/healthbeat/medical-advances/new-therapies-and-drug-trials/covid-19-pandemic-timeline. Accessed 21 July 2025.

“Pandas - How to Access Aggregate Functions Values in Python - Stack Overflow.” Stack Overflow, stackoverflow.com/questions/67390069/how-to-access-aggregate-functions-values-in-python. Accessed 21 July 2025.

“Python - Second Y-Axis Time Series - Stack Overflow.” Stack Overflow, stackoverflow.com/questions/47591650/second-y-axis-time-series. Accessed 21 July 2025.