COVID-19 Dashboard: Visual Exploration of the Regional Pandemic Trend

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Introduction

The fast spread of Coronavirus Disease 2019 (COVID-19), caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has led to a worldwide pandemic and health crisis since December 2019. To facilitate the COVID-19 trend tracking, we developed dashboard since early 2020 and kept improving the design and metrics to better understand the region pandemic.

Due to the rapid evolution of the COVID-19 pandemic, the needs for data analysis are however continuously changing over time. Existing dashboards are designed for more complex analytical needs. It is therefore challenging for casual users to easily interpret such dashboards, particularly in terms of determining the overall trend of the pandemic from a multivariate perspective.

To address these challenges, we therefore propose to use customized metrics and visual analytic to explore the regional trends.

Metrics: CrRW status

To capture the regional pandemic trend for analysis and comparison between different regions, we propose using 7-day smoothed case rate per 100k capita (Cr7d100k) and Cr7d100k ratio to describe the pandemic status. The Cr7d100k measures the increase in new cases in the last 7 days and reflects the short-term trend of the pandemic:

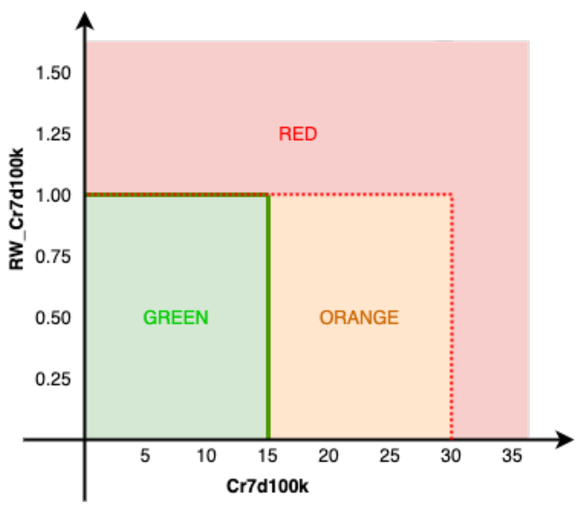
$$Cr7d100k_d = \frac{1}{7} \times \frac{100{,}000}{Population} \times \sum_{i=d-7}^{d} n_i$$

Based on Cr7d100k, we propose using the ratio of two Cr7d100k from two adjacent weeks to measure the trend of COVID-19 in recent two weeks, namely RW_Cr7d100k. By combining Cr7d100k and RW Cr7d100k, we define the **CrRW status** to represent the current epidemic status of the pandemic as well as recent trends with the following thresholds:

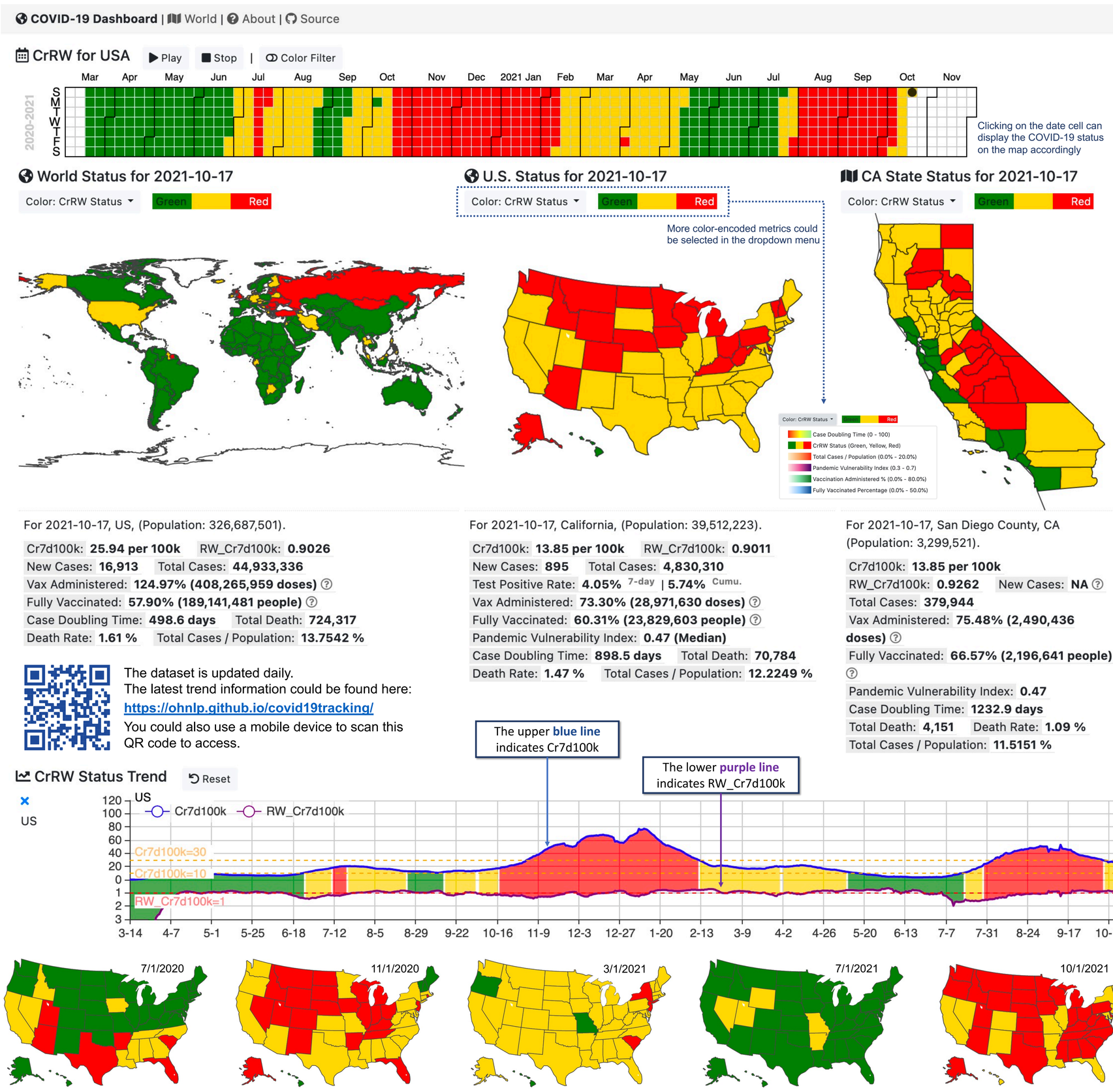
GREEN: for the past seven days, Cr7d100k < 15 and RW_Cr7d100k < 1.

RED: for the past seven days, Cr7d100k > 30, or Cr7d100k > 15 and RW_Cr7d100k > 1.

ORANGE: covers all other cases



Visual Design



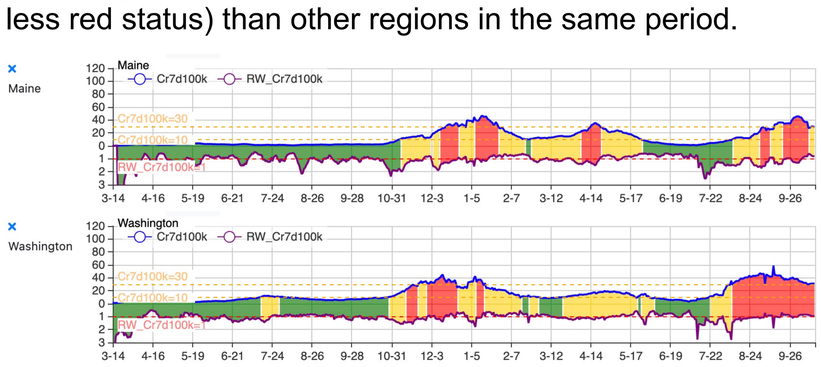
As the COVID-19 pandemic spreads, we could identify the geographical trends shown in our dashboard.

As the large-scale vaccination since January 2021, the CrRW status of more and more regions became green.

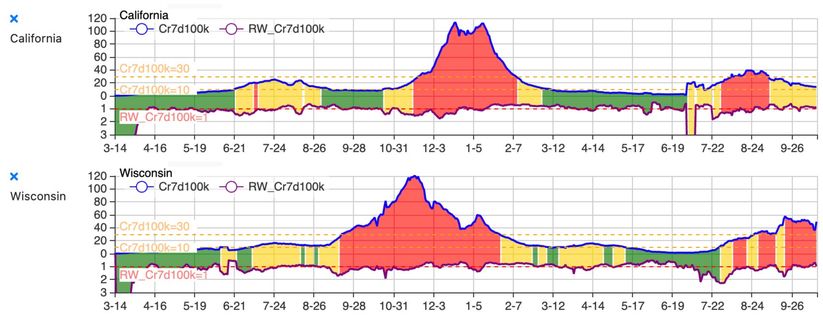
At present, the daily new cases increase again.

Regional Temporal Patterns

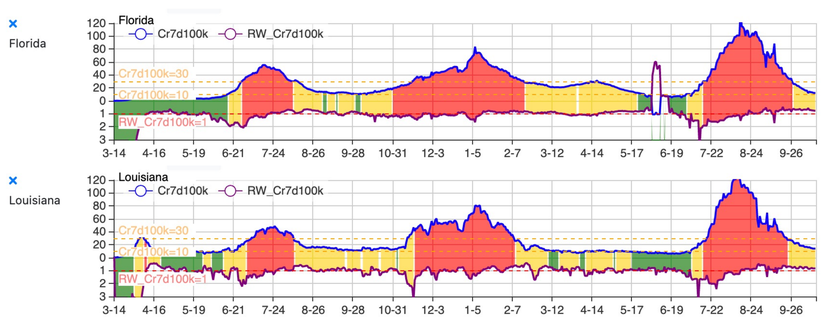
A few regions show relative stable trend (lower peaks and less red status) than other regions in the same period.



Some regions show one large peak at the end of 2020 with different duration and peak center.



Most regions show two peaks in 2020, and the third peak has shown since August 2021 due to the new variants.



Conclusion

As the COVID-19 pandemic situation changes, we could observe the trends by using this dashboard. We found that selecting appropriate indicators is important to capture the pandemic status accurately, especially when the pandemic varies from region to region. Although the outbreak has been significantly controlled by the non-pharmacological interventions and the massive vaccination, it is still not completely over. We will keep tracking the pandemic and adding new data such as new variants reports when dataset is available.