

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

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**Introduction:** The fast spread of the coronavirus disease 2019 (COVID-19) has led to a worldwide pandemic and health crisis since December 2019 <sup>1</sup>. To address the urgent needs of tracking the regional trends of the COVID-19 outbreak, many organizations collected datasets from multiple sources and developed interactive dashboards to show the situation <sup>2</sup>. However, due to the complexity of pandemic, it is challenging to explore and compare how the COVID-19 outbreak evolves in different regions. To address this challenge, we therefore present the COVID-19 dashboard to explore both the geographical and temporal patterns of the COVID-19 pandemic and update it daily.

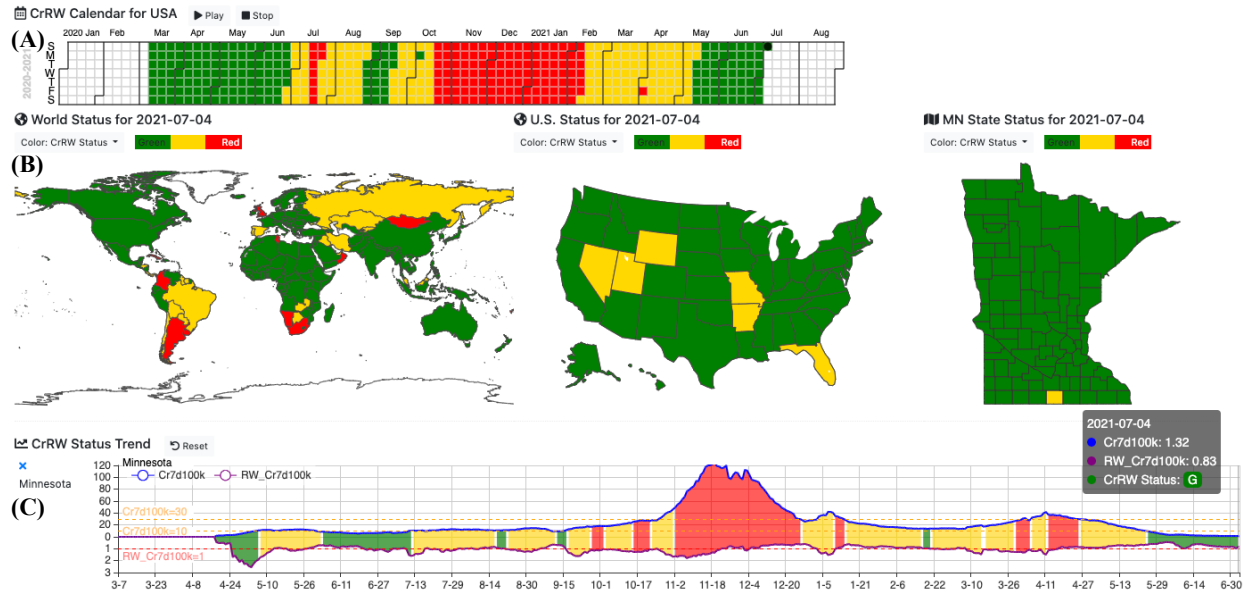


Figure 1. The screenshot of the COVID-19 dashboard. Online demo is available at <https://ohnlp.github.io/covid19tracking/>

**System and Visual Design:** To compare the regional pandemic difference intuitively, we proposed a new indicator, namely CrRW status, which is defined by combining the 7-day smoothed average case rate per 100k capita (Cr7d100k) and Cr7d100k ratio (i.e., the ratio of today Cr7d100k to 7 days ago) with the following empirical thresholds in the past seven days: the GREEN status, if  $Cr7d100k < 15$  and  $RW\_Cr7d100k < 1$ ; the RED status, if  $Cr7d100k > 30$ , or if  $Cr7d100k > 15$  and  $RW\_Cr7d100k > 1.1$ ; and the ORANGE status for everything else. To ensure that the dashboard could be updated continuously and automatically, we developed a data pipeline to collect data from public data sources (e.g., USAFacts, John Hopkins Coronavirus Resource Center, etc.) and calculate the indicators such as positive test rate, vaccinated percentage, as well as our proposed CrRW status for each region. We collaborated with domain experts from our clinic and developed the COVID-19 dashboard. As shown in Fig.1 (A), we designed a calendar-based heatmap to show the overall CrRW status changes. Users could click on the date cell to check the pandemic status of a specific date and the maps on different levels will be updated accordingly (Fig.1 (B)). We designed a novel trend chart to show how the pandemic changes overtime (Fig.1 (C)).

**Discussion:** 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.

## References

1. R. Muhareb and R. Giacaman. Tracking COVID-19 responsibly. The Lancet. (March 2020)
2. Dong, Ensheng, Hongru Du, and Lauren Gardner. An Interactive Web-Based Dashboard to Track COVID-19 in Real Time. The Lancet. Infectious Diseases 20, no. 5 (May 2020): 533–34.