

# COVID-19 affects Ryan White facility utilization in South US: Place visitation analysis

S. Qiao<sup>1,2</sup>, Z. Li<sup>2,3,4</sup>, J. Zhang<sup>2,3,5</sup>, X. Sun<sup>5</sup>, X. Li<sup>1,2,3</sup>



<sup>1</sup> Department of Health Promotion Education and Behavior, University of South Carolina Arnold School of Public Health, Columbia, United States, <sup>2</sup> South Carolina SmartState Center for Healthcare Quality (CHQ), University of South Carolina Arnold School of Public Health, Columbia, United States, <sup>3</sup> The Big Data Health Science Center, University of South Carolina, Columbia, United States, <sup>4</sup> Department of geography, University of South Carolina, Columbia, United States, <sup>5</sup> Department of Epidemiology and Biostatistics, University of South Carolina Arnold School of Public Health, Columbia, United States.

## Background

COVID-19 outbreak has interrupted HIV health care delivery and access in the US. However, few empirical studies on HIV services utilization interruption in South which endures double epidemic of HIV and COVID.

Using mobile device-based place visitation data of Ryan White (RW) facilities in 8 South states (3/13/2019-6/30/2021) we aim to explore spatiotemporal pattern of the HIV-related health utilization since the pandemic and identify factors contributing to RW facility utilization change.

## Method

The location of all RW facilities in the 8 states (i.e., Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Texas) were retrieved from the Health Resources and Services Administration (HRSA) dataset.

The place visitation data of all RW facilities (i.e., how many people visit a certain clinic [given a location address] in a particular timepoint) were obtained from SafeGraph. We calculated the daily (and 7-day smoothed) visitation change rate (VCR) for 2020 and 2021 using 2019 as the baseline with the same day of the week for both years.

The VCR trajectories for each state represents temporal pattern of RW facility visitation change. The potential factors contribute to VCR (e.g., COVID and HIV prevalence, social determinants of health) was examined using mixed regression models.

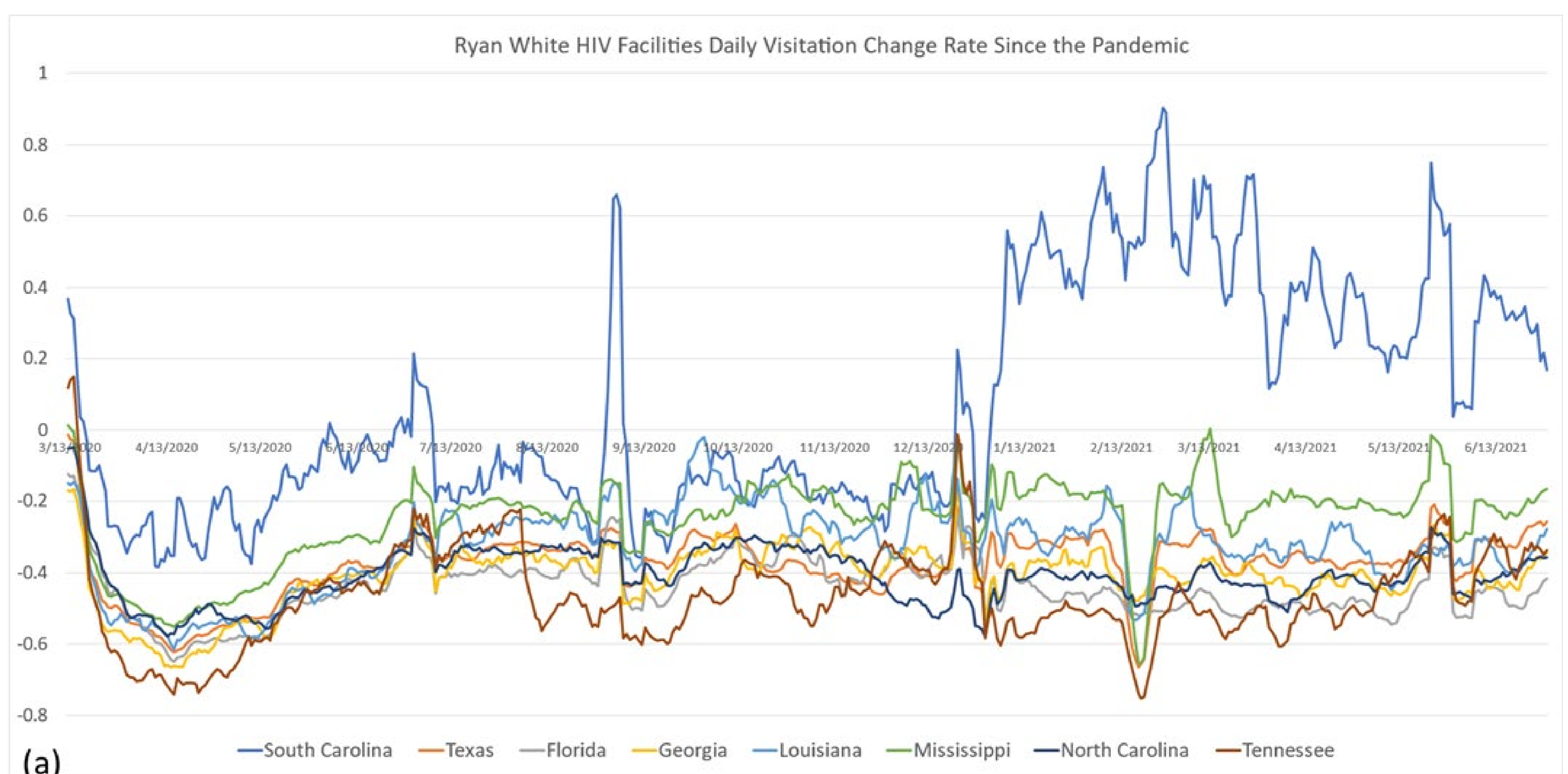
This study was supported by the NIH/FIC grant R01AI127203-5S1. For more information of this study, please contact Shan Qiao ([shanqiao@mailbox.sc.edu](mailto:shanqiao@mailbox.sc.edu))

## Results

The RW facility visitation volume in majority of states (except SC) remained at relatively low level and did not achieve the level prior to the pandemic compared with 2019 baseline with the state VCR ranging -28.3% to -48.3% in 2020 and -21.2% to -48.8% in 2021.

The VCR trajectories suggest that RW facility visitation kept declining since WHO declared COVID-19 a global pandemic (3/13/2020) to April for most of states and then stably increased till the end of June 2020. However, the recovery of visitation volume was significantly interrupted in 2020-2021 winter (from December to February). The trajectories then climbed up in 2021. RW facility visitation in South Carolina, as an exception, showed a mild interruption by COVID-19 and a stable increasing trend in 2021.

COVID-19 case rate ( $\beta=-1.04$ ,  $p=.002$ ), percentage of Black population in PLWH in state ( $\beta=-1.86$ ,  $p<.0001$ ), and percentage of uninsured population ( $\beta=-1.21$ ,  $p=.002$ ) was negatively associated with the VCR. The larger number of RW facilities per capita ( $\beta=1.51$ ,  $p<.0001$ ) and higher GINI coefficient ( $\beta=3.84$ ,  $p<.0001$ ) predicted an increasing RW facility visitation volume.



## Conclusion

Based on mobile device-based place visitation data, our study suggests that RW facility utilization in the South has been severely affected by COVID-19 and not yet recovered for most of states. Given RW facilities cover HIV care services for over half of people living with HIV in South, our findings are important for estimating the general interruption of HIV-related care service utilization in these states. The temporal pattern is aligned with the evolution of COVID pandemic in US and mitigation policies and measures. The geospatial variance by states may be explained by existing HIV epidemic, HIV-related health infrastructure, policy, and structural level factors (SDOH). Policy makers and health organizations need to pay attention to the profound and long-term impact of the pandemic on HIV service utilization in South US.