Effects of the COVID-19 Stay-at-home Orders on the Trend of Emergency Department Visits for Traumatic Brain Injuries

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Introduction

Traumatic brain injury (TBI) is a leading cause of injury-related mortality and morbidity.

The purpose of this study was to evaluate the changes in the Kentucky statewide trends for TBI emergency department (ED) visits in relation with the Kentucky COVID-19-related stay-at-home orders.

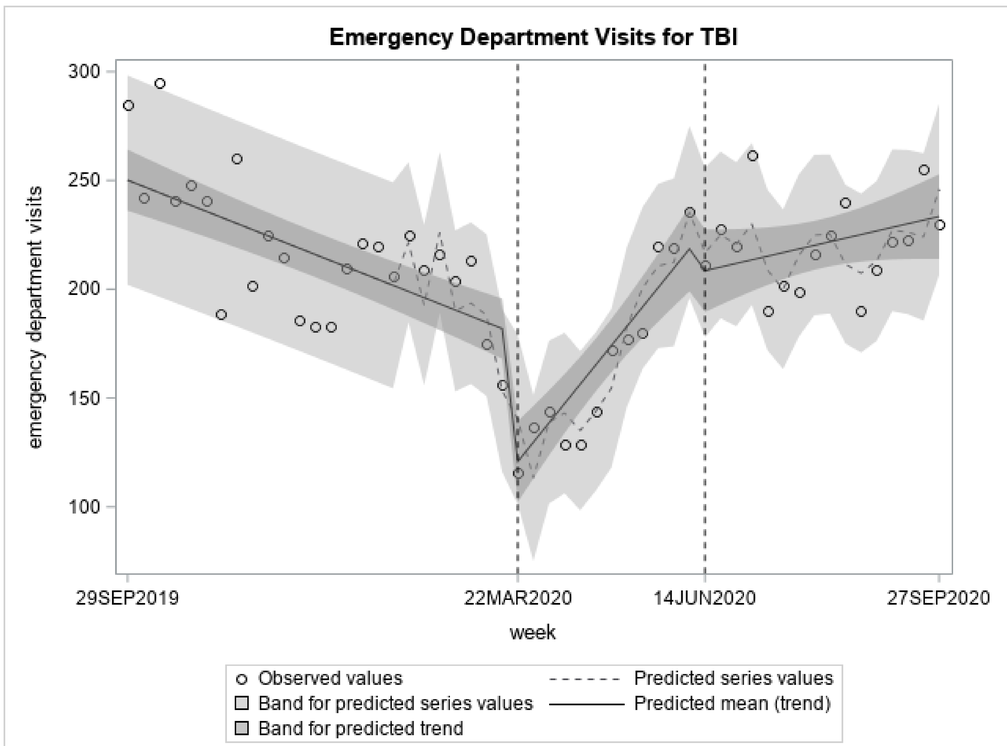
Key Findings

The COVID-19-related executive orders in Kentucky interrupted the established pre-COVID-19 trends in ED TBI visits. With the re-opening of businesses, the statewide trend for ED TBI visits returned to the pre-COVID-19 levels.

Methods

We utilized interrupted time series design and segmented regression model to evaluate the impact of the Kentucky executive order to close non-essential businesses (effective March 26, 2020) and to re-open them (May-June, 2020) on the statewide trend for TBI ED visits.

The case selection was based on the Council of State and Territorial Epidemiologists Injury Surveillance Toolkit. Weekly Kentucky ED TBI visits were calculated from October 2019 to September 2020 by the Kentucky Injury Prevention and Research Center, using Kentucky outpatient billing data.



	Parameter Estimates	P-value
Pre-COVID Period Intercept	250.11	<.0001
Pre-COVID Period slope	-2.84	<.0001
COVID-19 Period 1 intercept change	-69.98	<.0001
COVID-19 Period 1 slope change	11.72	<.0001
COVID-19 Period 2 intercept change	-11.64	0.414
COVID-19 Period 2 slope change	-7.23	<.0001

Fig. 1. Trends in Kentucky Emergency Department Weekly visits for Traumatic Brain injuries from September 29, 2019 to September 27, 2020. The dashed vertical lines indicate the first change point (week of March 22, 2020) and the second change point (week of Jun 14, 2020 respectively).

Results

We identified three distinct segments in the study period. There were estimated 250.11 weekly ED TBI visits at the beginning of Pre-COVID-19 period with a statistically significant decrease of 2.84 visits per week. The estimated weekly ED TBI visits increased significantly by 8.88 per week during the COVID-19 Phase 1. But the weekly increase slowed significantly by 7.22 during the COVID-19 Phase 2 compared with Phase 1. By the end of the study period, the estimated weekly number of ED TBI visits returned to the pre-COVID-19 levels.

Conclusions

The state stay-at-home order for COVID-19 significantly affected the trends of ED visits for TBI in Kentucky.

In-depth studies are needed to investigate whether the changes in the trend reflected a true decrease in TBI injuries in the initial COVID-19 period and if people did not seek proper TBI care due to closures of health care facilities or concerns for COVID-19 exposure in EDs.

Acknowledgments

We acknowledge the support for this study from the Kentucky Injury Prevention and Research Center, University of Kentucky College of Public Health.

References

1. Maas AIR, et al. . Traumatic brain injury: integrated approaches to improve prevention, clinical care, and research. Lancet Neurol 2017;16:987–1048.