



# Reply to John Spry on Stay-at-Home Orders and COVID-19 Hospitalizations

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[LINK TO ABSTRACT](#)

The comment by John Spry (2020) is based on erroneous interpretations of the results of our paper (Sen, Karaca-Mandic, and Georgiou 2020), abbreviated as SKG. First, Spry reports that in three states without stay-at-home orders, cumulative COVID-19 hospitalizations do not continue to grow at the initial estimated exponential rate and uses this as the argument against any association between stay-at-home policies and hospitalizations. However, this is not the result that SKG reports. SKG shows that in all four states that enacted stay-at-home orders, the cumulative hospitalizations deviated from the initial exponential trend line (and its 95% prediction interval) at approximately 12 days—the median incubation period of COVID-19—after the order’s effective date in each state. In an unpublished analysis (not included in the JAMA article due to the space constraints), SKG show that in South Dakota, a state without a stay-at-home order, COVID-19 hospitalizations rates continued to follow an exponential growth function closely throughout the study period without any deviation like those observed for the four states reported in the SKG study. The plots in the Spry paper, specifically that of South Dakota as a control, also show this. We have included our plot below (Figure 1).

Second, the SKG paper does not claim that hospitalizations in a pandemic continue to grow exponentially for an infinite duration. Rather, exponential or sub-exponential rates are most often observed in the initial stages of a pandemic which

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1. University of Minnesota, Minneapolis, MN 55455.

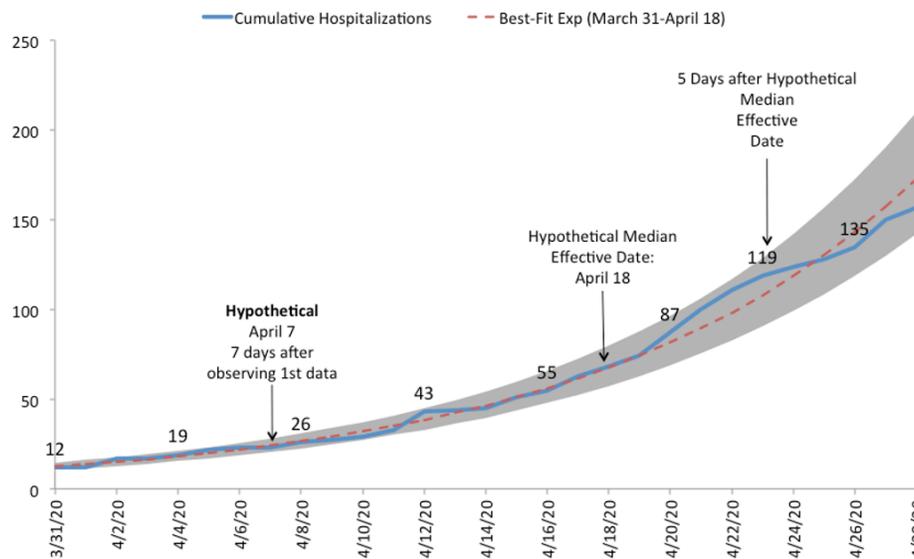
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reflects the time period of the SKG analysis. The early phase of an S-shaped growth curve shows the sharp rise and fits the early data (e.g., March) that was used in the SKG study. In contrast, the data points used in Spry’s work are primarily from April and May.

Third, as reported in SKG, the exponential function fitted the actual hospitalization numbers better than linear growth models. The main association highlighted in the SKG study is that in all four states, deviation from the initial exponential growth consistently occurred after approximately 12 days of the issuance of stay-at-home orders and remained below the initial rates thereafter. The publication also highlighted the limitation of assigning causal interpretation to this observation.

**Figure 1.** Projected vs. observed COVID-19 hospitalizations in South Dakota, hypothetical stay-at-home order on April 7, 2020



## References

- Sen, Soumya, Pinar Karaca-Mandic, and Archelle Georgiou.** 2020. Association of Stay-at-Home Orders With COVID-19 Hospitalizations in 4 States. *Journal of the American Medical Association*. 323(24): 2522–2524. [Link](#)
- Spry, John A.** 2020. Comment on Sen, Karaca-Mandic, and Georgiou on Stay-at-Home Orders and COVID-19 Hospitalizations in Four States. *Econ Journal Watch* 17(2): 270–278.

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