


Letter re: Incremental Increase in Hospital Length of Stay Due to Complications of Surgery for Adult Spinal Deformity

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Answer to Letter to Editor:

Thank you for your letter and for your thoughtful comments regarding our recently published work, “Incremental Increase in Hospital Length of Stay Due to Complications of Surgery for Adult Spinal Deformity,” in the Global Spine Journal.

Regarding your list of factors influencing the length of stay, we agree that pre-operative psychological factors play a significant role. This has been demonstrated not only in spine surgery but also across various medical fields.^{1,2} While these factors are indeed impactful, it was not possible to include them in our study due to the retrospective nature of our analysis.

On the topics of socioeconomic status and diabetes, both of these factors are associated with an increased risk of complications, which can lead to a longer hospital stay. However, our objective was not to predict the length of stay based on potential complications—events that are inherently unexpected and not part of the treatment plan—but rather to examine the incremental effect of a complication on the length of stay when it does occur. Detailed analysis including socioeconomics and comorbidities will certainly elevate our understanding of disparities in health care which is a much-needed knowledge.

Your point regarding high-volume centers is well-taken. Additionally, the implementation of Enhanced Recovery After Surgery (ERAS) protocols has shown significant effects on reducing length of stay following spine surgery.³ The use of specialized teams dedicated to managing complex spine deformity cases, along with pathways designed to expedite recovery and prepare patients pre-operatively, has indeed demonstrated meaningful impacts on early outcomes.⁴ Those high-volume centers utilize both

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method in order to optimize early outcomes. Our dataset is somewhat representative of high volume center, however, we did find interinstitutional differences in prior studies.

Lastly, with regard to the interpretability of neural networks, we acknowledge the inherent “black box” nature associated with these models, which can make them more challenging to interpret than, for example, decision trees or multivariate regression models. In our manuscript, we supplemented the neural network model with a suite of univariate analyses to provide more interpretable results. However, the strength of neural networks lies in their ability to capture complex, non-linear relationships in data, which is particularly advantageous in health care. Although they are computationally complex, requiring computer support for calculations (as is the case for most predictive model), advancements in EMR integration and API connectivity make access to such models at the point of care increasingly feasible.^{5,6}

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