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Reply to Comments Regarding “Using Lean-Based Systems Engineering to Increase Capacity in the Emergency Department”

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## In Response to: “Using Lean-Based Systems Engineering to Increase Capacity in the Emergency Department”

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White BA, Chang Y, Grabowski B G. Using Lean-Based Systems Engineering to Increase Capacity in the Emergency Department. *West J Emerg Med.* 2014;15(7):770-776.

*To the editor:*

We read with interest the article by White et al., “Using Lean-Based Systems Engineering to Increase Capacity in the Emergency Department,” in which the authors conclude that Lean could improve emergency department (ED) throughput and capacity.

A number of other studies have also suggested that Lean is beneficial in addressing the problem of ED wait times. As in White et al., the vast majority of these studies have been conducted in single centers and/or as before-after evaluations.<sup>1-6</sup> Moreover, publication bias likely also plays a role in the consistency of these findings since positive evaluations are more likely to be published.<sup>7</sup> Although White et al. compared changes in ED length of stay with a concurrent population in their own center, it is not possible to generalize beyond this particular ED.

We recently published a large multi-center controlled study of Lean in Ontario, Canada, (<http://www.annemergmed.com/article/S0196-0644%2814%2900516-2/fulltext>) and found that while there were reductions in ED length of stay among the 36 hospitals that participated in the Lean program, similar reductions were observed among the 63 matched control hospitals over the same period. In our study, context was also important. Because Lean was part of a broader ED wait time strategy, including wait time targets, public reporting, and targeted financial incentives, it was clear that a wide array of incentives had an effect on wait times in all EDs across the region.

Our conclusion is that single-center and before-after studies do not provide rigorous or generalizable evidence that Lean is effective in reducing ED length of stay. Decisions to implement should be based on solid evidence, since Lean initiatives typically require the engagement of external consultants and/or the dedication of significant internal resources for their development and implementation.

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*In Reply:*

We very much appreciate the interest of our colleagues in this important topic, one that has yet to fully mature in the pantheon of emergency medicine literature. We also recognize and noted in our manuscript that the single-site nature of our work is a limitation. However, we disagree that this limitation makes scientific exploration and publication of this nature a fruitless endeavor as implied.

Publication bias aside, the central tenet of Lean methodologies is the elimination of waste in all forms, and thus it is an inherently generalizable tool to improve any process in which waste exists. However, by definition the specific details relating to the underlying process and the implementation of Lean are of key importance, and its potential utility needs to be weighed in each individual setting.

In addition, partly for this reason, we suggest that local processes not affected by the intervention may serve as reliable controls. We specifically used another area of our ED as a control group to avoid the recognized limitations of an analysis that was purely based on data that were obtained “before and after” the changes were implemented.

Finally, Lean methodologies do not always have to be resource intensive as our colleagues suggest. For example, no external consultants or significant internal resources were utilized for this work, and in addition we were in fact able to decrease resource utilization as is common with successful Lean interventions. We respectfully suggest that it is often in this simplicity and focus that Lean interventions, and robust scientific studies describing them, have the potential to be so powerful.

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