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Title: Increasing Hospital Capacity

This research note looks at methods for increasing the treatment capacity of existing hospitals.

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Issue Summary

What are the most effective ways of increasing treatment capacity in the United States?

Keywords

Patient Safety
Hospital Treatment Capacity
Pandemic

At the time of this writing, the United States is in the beginning stages of the COVID-19 pandemic. We have no vaccine and no treatment. Not enough testing kits have made it to the field to allow surveillance testing so in fact we have no idea how many people are already infected. As a result, the goal of public health officials is to "flatten the curve". In other words, the goal is to slow the spread to the extent that the number of people requiring hospitalization at any one point in time is less than the healthcare system's capacity to treat the population. Congress' in-house doctor told Capitol Hill staffers at a close-door meeting this week that he expects 70-150 million people in the U.S. — roughly a third of the country — to contract the coronavirus. Twenty percent (14-30 million) will require hospitalization and there are only 924,000 staffed hospital beds in the United States. It is expected that Italian hospitals will soon stop treating patients over 60 years of age and Italy has more hospital beds per capita than the US. It is too late to increase the permanent system treatment capacity. We will no doubt build temporary facilities that will provide some relief but they too will be overwhelmed.

We need to think past COVID-19 to the next novel virus that will undoubtedly be in our future. The question becomes what are the best ways to keep the number of people requiring hospitalization below the healthcare system's capacity.

First, we should learn from the Asian countries that have been on the front line. For example, in many Chinese hospitals there is a separate "fever entrance" where patients are met by staff in full PPE and isolated from the other hospital patients. Patients that test positive are not allowed to self-quarantine at home with their families. They have found that 75 to 80% of the spread is within families. If a patient is waiting for test results, they are not allowed to return to their home but rather are isolated in a separate facility. There are undoubtedly many other lessons we can learn.



Second, we need to look at how we can increase capacity of the existing facilities. Data on the number of patients that are sufficiently harmed by preventable medical error that they require additional treatment is scarce. Ashbec LLC has received guesses from knowledgeable sources that the percentage of admitted patients that are harmed is in the range of 20% to 40%. In some cases, the harm will be treated while the patient is in the hospital for their initial stay. In other cases, they become readmissions. In either case, hospital resources are required to treat the accidental harm. If we can eliminate the preventable medical errors, we can get those resources back and increase treatment capacity.

Treatment Optimization for Patient Safety (TOPS)®

Ashbec LLC designed and patented a system and method called Treatment Optimization for Patient Safety (TOPS)®. TOPS is an application of lean techniques to the central transformation process in hospitals. Like other lean methods, TOPS requires a well defined process with identifiable steps to treat the patient. Standardized order sets are becoming more common and physicians are using these order sets as templates to customize a patient's individual treatment plan. TOPS provides tools to communicate the treatment plan to the healthcare provider team and give them the opportunity to suggest adjustments to the plan as needed. To our knowledge, TOPS is the only system that automatically tracks the execution of the treatment plan. Deviation from the plan is a primary source of preventable medical error. Analysis of these deviations allows the identification of the causes of medical error and is the first step toward elimination.

Benefits & Timing

Is it possible to increase capacity by 40% in each hospital? Probably not, but 20% might be possible. Given that there are approximately 35 million admissions annually, that would result in an increase in hospital capacity of 7 million patients. In a pandemic, that could save a lot of lives and make it easier to "flatten the curve". TOPS was originally designed as a stand-alone system but it has not been implemented. A full implementation of the original design would take years. However, it is quite possible that the key system and methods could be implemented on top of a widely used EMR system such as those from Epic or Cerner in a much timelier fashion. Ashbec LLC would be more than willing to work with any organization that wanted to assist in that research.