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## To solve our new emergency care crisis, let's start with the old one

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While the COVID-19 pandemic has generated many new challenges for emergency departments (EDs) across the country, it has also created potential opportunities for the improvement of emergency care delivery, both during the pandemic and going forward. Certainly, in some hospitals, the lack of built-in reserve capacity that had previously led to chronic overcrowding and ED boarding resulted in even more unsafe crowding conditions during surges of COVID-19 patients [1]. However, in other hospitals, like ours, a fundamental shift in operations allowed for markedly improved ED flow despite a markedly increased volume of high acuity patients. As EDs across the country continue to face decreased overall volumes (with the associated financial pressures that result), the actions of health system leaders and policy makers will determine whether we learn from the initial COVID-19 surge and improve our emergency care capabilities, or return to a status quo that could worsen emergency capacity even as we face a potential second COVID-19 wave.

In the last decade, overcrowding has become almost ubiquitous in EDs across the United States with many documented negative effects on both patients and healthcare workers [2]. In the pre-COVID-19 era, providing high acuity care in hallway stretchers and chairs was the norm in our own ED, and patients routinely waited many hours before receiving inpatient beds. Despite treating more COVID-19 patients than any other hospital in a state with one of the highest numbers of cases nationally [3], patient flow through our ED and hospital in the past three months has, in fact, been better than at any time in recent memory. We intubated 3–4 times more patients than usual every day during peak COVID-19 volumes, and our total number of ED-to-hospital admissions remained similar to pre-COVID-19 levels, yet patients needing inpatient beds received them almost immediately and our hallway stretchers remained largely empty. Brisk ED outflow allowed us to safely manage our COVID-19 patient volumes in a manner that would have been previously impossible.

This marked improvement in ED flow was made possible by major changes in usual hospital operations, most importantly a large expansion in functional hospital capacity and bed-use flexibility. Through

the diligent work of our Hospital Incident Command Structure, aided by a robust disaster preparedness infrastructure, inpatient floors and PACUs were rapidly converted to COVID-19 units and ICUs, guided by sophisticated modeling to predict our capacity needs. Our leaders also had the foresight to cancel elective surgeries and admissions beginning early in the crisis, ensuring all beds could be deployed to accommodate non-scheduled admissions. Operations research and queuing theory suggest that when a system with variable input (like a hospital) routinely utilizes more than 80% of available capacity, it becomes susceptible to exponentially lengthening wait times during volume peaks [4]. Before COVID-19, our 7 am inpatient occupancy was commonly greater than 95%, explaining our frequently long ED boarding times. Throughout peak COVID-19 volumes, our 7 am hospital inpatient occupancy was 70–85%, leaving enough reserve capacity to accommodate daily surges. The creation of excess capacity for both general care and ICU patients is what allowed flow through our ED to remain fluid.

Meaningful changes to government policies and payment structures have already been – and will continue to be – necessary for maintaining the reserve capacity required for optimizing ED outflow. Before COVID-19, hospitals could not survive financially without maximizing daily occupancy, but this was an artificial state imposed by our nation's particular reimbursement policies. While entirely ceasing elective procedures and admissions is neither desirable nor sustainable, returning to a status quo where beds fill with elective cases while patients with emergencies wait in ED hallways is also unacceptable, and would leave us susceptible to unsafe conditions during the continuing COVID-19 pandemic as well as any future pandemics. We recommend two steps for promoting and preserving improvements to ED flow to advance both patient safety and our national disaster resilience:

- 1) Health care systems should be incentivized to maintain reserve capacity, including government funding for – and verification of – the maintenance of excess bed capacity in hospitals.
- 2) State and federal payment reform should harmonize reimbursement between elective procedures and the treatment of medical conditions common among patients admitted from EDs.

The ability to handle a disaster – or a particularly high volume of everyday health emergencies – is a public good. Without policy change, many hospitals will soon be at risk of financial ruin and closure, which would only worsen our system's capacity. If this is allowed to happen, we may well fare worse in subsequent COVID-19 waves than we have

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in the first. Developing infrastructure to adeptly handle the everyday variability in emergency care needed by patients in non-pandemic times would also prepare us well for whatever other challenges lie ahead.

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