COVID-19 Level-Loading: Transferring Emergency Department Patients to a Partner Academic Medical Center Within a Healthcare System

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Abstract
COVID-19 continues to challenge bed capacity and the ability of hospitals to provide quality care for patients around the country. However, the COVID-19 pandemic at a given point in time does not impact all hospitals equally—even within a single healthcare system, one hospital may be caring for patients in the hallways, while another has available inpatient beds. Here, we demonstrate a program to level-load COVID-19 patients between 2 academic medical centers in a healthcare system by transferring patients at the time of admission from the emergency department of one institution directly to an inpatient bed of the other institution. Over 42 days, 50 patients were transferred which saved 432 bed-days at the home academic medical center without any adverse events during transfer or upgrades to the ICU within the first 24 hours of admission. Programs like this can expand a healthcare system's ability to allocate personnel and resources efficiently for patients and maximize the quality of care delivered even during a pandemic.

Keywords
COVID-19, emergency department, healthcare quality improvement, hospital capacity, patient flow

Introduction
Surges in COVID-19 hospitalizations strain inpatient bed capacity, which in turn prolongs boarding times in the emergency department (ED) and can lead to worse outcomes.1,2 In response, EDs around the country have rapidly deployed programs such as surge clinics,3 home hospital programs,4 and hospital transfers.5

During the initial wave of COVID-19 hospitalizations between March and May 2020, we observed an uneven impact of the pandemic on various academic medical centers (AMC) in our health network. Our home AMC admitted more patients with COVID-19 compared to our partner AMC. In anticipation of an increase in COVID-19 cases over the winter months, we planned and implemented a level-loading program to transfer COVID-19 patients between partner AMCs at the time of ED admission. Our objective was to prevent any one AMC from being disproportionately overwhelmed and to maximize capacity and quality of care in our health system.

Planning and Infrastructure
Leadership at both AMCs collaborated to develop this transfer program. ED patients with COVID-19 requiring admission at our AMC could be directly transferred to an inpatient bed at our partner AMC. We developed a team of nonclinical transfer coordinators who were stationed in the home AMC ED 24/7 and trained to assist ED clinicians in obtaining patient consent for the transfer (an EMTALA requirement). The transfer coordinators also maintained communication lines between the admitting services at both hospitals. Patients eligible for transfer needed to have a confirmed diagnosis of COVID-19 in the ED and meet indications for admission to the Medicine floor or ICU. The two sites are both quaternary and Level 1 trauma centers and patients were transported across the 4-mile distance between the hospitals by ambulance. This program was announced to ED clinicians.
by email with daily reminders to identify possible patients for transfer. When an ED clinician identified a patient requiring hospitalization for COVID-19, the ED clinician would alert the transfer coordinator, who would assist with consent and facilitate the transfer process. Whether the partner AMC had capacity for transfers was communicated to the transfer coordinator and displayed on a dashboard in the electronic medical record.

### Assessing Impact of Patient Transfers

This program occurred from November 23, 2020 to December 29, 2020, which is when the level-loading effort was paused. At that point in time, COVID-19 patients were appropriately distributed within the healthcare system. 109 COVID-19 patients were considered for interfacility transfer, of which 94 were approached by our team of transfer coordinators, and 62 consented to the transfer (Figure). Of the 32 patients who declined transfer, 17 did so because they usually obtained care at the home AMC, 5 declined due to distance from their home, 4 because they preferred the current hospital, and 6 for undisclosed reasons. Of the 62 patients who consented, 50 (81%) were successfully transferred, of which 9 were transferred to the ICU and 41 were transferred to the floor. No adverse events

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**Figure.** Partner academic medical center (AMC) transfer process.

| Patients referred for AMC Transfer (N = 109) |
|---------------------------------------------|
| Patients approached by Transfer Coordinator (N = 94) |
| Patients consent to transfer (N = 62) |
| Patients successfully transferred (N = 50) |
| 9 to the ICU |
| 41 to the Floor |

| Patients not approached (N = 15) |
| AMC closed to transfers (7) |
| Ready bed at home AMC (6) |
| Declined by ED Provider (2) |

| Patients declined transfer (N = 32) |
| Usually gets care at home AMC (17) |
| Too far away (5) |
| Prefers current hospital (4) |
| Other (6) |

| Transfer was cancelled (N = 12) |
| Change in clinical status (5) |
| Bed not available at partner AMC (3) |
| Partner AMC declined (2) |
| Other (2) |
were identified to have occurred during the ambulance transport process. No patients initially admitted to the floor were transferred to the ICU within the first 24 hours. By the end of the data collection period on January 3, 2021, 43 patients were discharged, 6 remained hospitalized, and 1 was deceased. In just 42 days, 50 patients had been transferred for a total 432 bed-days saved at the home AMC, which is significant for a hospital usually operating at 98% to 99% bed occupancy at the daily 7:30 AM morning census.

**Broader Adoption and Takeaways**

Overall, the COVID-19 AMC transfer program was successful in level-loading the distribution of COVID-19 patients across our health system. Factors helpful in its success included a specific disease indication that simplified the inclusion criteria, transfer coordinators who offloaded logistical tasks from the clinical team, similar capabilities and available consultative services at both hospitals, and buy-in from leadership on the health system and hospital level.

This transfer program can be expanded across cities and states, as the pandemic challenges capacity differently at each hospital. In addition, even after the COVID-19 pandemic, a transfer mechanism like this should continue as ED boarding and hospital capacity challenges will remain.

**Acknowledgments**

We acknowledge the work of the Mass General Brigham Capacity Team in creating and operating this transfer program.

**Conflicts of Interest**

The authors have no conflicts of interest to disclose.

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