



# The first wave: lessons learned from the initial surge of general medicine inpatients during the SARS-CoV-2 pandemic

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## Introduction

As inpatient leaders at a 1,000-bed academic medical center located in a hotspot experiencing a surge of COVID-19 cases, we saw an abrupt and significant increase in patients with SARS-CoV-2 infection admitted to the hospital. Prior to the pandemic, the general medicine services cared for an average of approximately 275 inpatients per day. The first known cases presented in early March 2020 and COVID-19 volume peaked in late April; our daily COVID-19 inpatient volume reached a maximum of 345 patients, 145 of whom required ventilatory support. At that time, we had an additional 68 patients who were persons under investigation (PUIs) for SARS-CoV-2 in addition to our non-COVID general medical volume, which was approximately 150 patients at that time, resulting in an excess of approximately 140 general medicine patients. While the number of patients with COVID-19 increased quickly over 6 weeks, the decline was slower, lasting 10 weeks. Key lessons from our experience may serve as a model for others facing a similar influx of patients. As new outbreaks occur across the country and hospitals face increases in inpatient volume due to SARS-CoV-2, it is important to disseminate best practices quickly and develop effective methods to communicate to stakeholders, schedule optimal physician staffing, provide team education and efficiently utilize beds to ensure safe and appropriate patient care during a surge (*Table 1*).

## Communication

Clear, accurate and timely communication is an essential component of an effective emergency response as it allows

for informed decision-making, effective collaboration and cooperation (1). Once it became clear that our hospital would receive a large number of patients requiring hospitalization for COVID disease, frequent and targeted communication across hospital departments and between leaders in inpatient medicine became essential to ensuring a well-coordinated effort. At the peak of the surge, leaders attended twice daily meetings of the hospital incident command center to receive updates on key components of the response and share potential challenges. Common topics addressed at this meeting included: census numbers and projections, personal protective equipment (PPE) availability and protocols for utilization, testing strategies and capacity.

On a departmental level, there was at least one meeting per day for inpatient medicine leaders from the following areas: internal medicine residency, cardiology, oncology, hospital medicine, intensive care, and palliative care. Information from hospital leadership was shared and concerns from clinicians on the front lines were addressed. Staffing challenges and the most effective ways to deploy staff were discussed. For example, as the general care units sustained more days with a high volume of patients compared to the intensive care unit (ICU), it was important to collaborate between divisions to determine which staff should be moved from ICU care responsibilities to general care, and when. As COVID volume decreased, determining how and when reassigned physicians and advanced practice clinicians (APCs) could be returned to their pre-COVID roles required careful coordination and discussion.

Finally, front line staff received daily updates during a 15–30-minute huddle via video conference. All clinicians including nursing staff, physicians, and APCs caring for

**Table 1** Framework of communication, education, staffing and bed utilization strategies

## Communication

1. Twice daily hospital command center meetings
2. Daily department of medicine clinical leadership meeting
3. Huddle held each morning via video conference for all clinical staff

## Staffing

1. Traditional general medical inpatient physicians and APCs
2. Medical physicians and APCs with internal medicine training
3. Non-medical physicians and APCs embedded within traditional teams to expand team capacity

## Education

1. Orientation video conference
2. Clinical pearls document updated regularly and published online
3. Online manual for managing common inpatient medical conditions
4. Daily clinical and logistical video conference updates
5. On the ground and virtual support and consultation

## Bed utilization

1. Utilize single beds for PUI patients, cohort as COVID tests return
2. Adapt cohorting strategies to align with testing strategies
3. Liberalize placement guidelines to increase number of patients placed on non-medicine services
4. Prepare units in advance for COVID-19 patients using a standardized checklist

patients with COVID had the opportunity to receive updates and ask questions of experts leading the response. Because the clinical environment evolved rapidly, this was a key component to keep the front-line staff updated on best practices.

### Staffing

Inpatient staffing required thoughtful planning as the number of patients quickly exceeded the capacity of traditional inpatient medicine teams. Contingency planning for staff illness and quarantine was necessary, and inefficiencies had to be factored into staffing ratios for physicians caring for patients during the pandemic - specifically the increased time spent caring for patients with SARS-CoV-2 related to donning and doffing of PPE, severity of illness and time needed for providers to learn best practices.

We developed a three-phase strategy to deploy staff during the surge. First, to increase inpatient clinician staffing, hospital medicine physicians and APCs voluntarily worked additional shifts above their clinical commitment;

residents were switched from elective and ambulatory rotations to inpatient services. As volume increased, other physicians within the department of medicine were re-deployed to inpatient medicine. These included cardiologists and oncologists (who staffed a total of 2 units each holding 36 patients), primary care doctors and physicians from primarily outpatient specialties. Lastly, physicians from non-medicine specialties were asked to work alongside internists, increasing their capacity to care for more patients. At the peak of the surge, approximately one-third of patients were cared for by traditional inpatient physicians, a third were cared for by other medicine trained physicians, and a third received care from physicians from other specialties. A key component of staffing was hybridizing teams so that physicians who were not familiar with inpatient medicine were paired with physicians who were experienced, either within a team or across a floor. For example, residents from outside the department of medicine received oversight from general medicine attendings.

Staffing plans were coordinated by a small group familiar with inpatient services and who also had ties to the hospital's

capacity center. This team was tasked with communicating with surge physicians about timing and responsibilities of shifts, recruiting new physicians and developing a plan for phasing out redeployed clinicians.

Physicians unable to provide direct patient care due quarantine, but feeling well, were assigned roles that could be performed remotely like giving on-demand advice to physicians less accustomed to inpatient medicine, remotely updating online clinical documentation (e.g., hospital course summaries), developing staffing schedules and preparing educational material.

## Education

Given that physicians with limited inpatient experience were redeployed to manage the increased volume of patients, it was essential to provide education and on the ground support. One member of the operations team led a group of clinicians who created a comprehensive educational program that consisted of:

- (I) A 1-hour onboarding video conference for providers new to the inpatient service;
- (II) A clinical and logistical pearls document providing up-to-date information on managing patients with COVID disease;
- (III) A manual for managing common medical problems geared to an audience of physicians less accustomed to inpatient medicine.

This program dove-tailed with the daily video-conference updates and at the elbow support. A hospital medicine physician staffed a virtual pager 24/7 to assist any inpatient clinician with questions related to inpatient care. Another experienced hospitalist or APC was always available by page to come to the bedside to help troubleshoot challenges in real time. Finally, given the complexities of PPE training and evolving guidelines for usage, we also designated a PPE champion.

## Bed utilization

In addition to providing physician staffing to care for patients, inpatient medicine leaders worked closely with the hospital operations, capacity and admitting teams to ensure efficient utilization of resources. Units able to accommodate patients with COVID disease were selected based on competing demands for beds, availability of staffing and physical characteristics of the unit. At the peak of the surge, elective patient care ceased, and 12 units were designated

for patients with COVID disease or PUI for SARS-CoV-2; 64 general care beds were converted to ICU beds.

Infection control considerations were a critical consideration in allocating beds. Initially, patients with COVID disease were cohorted on specific floors to focus staff training and resources. Like many hospitals, our hospital has both private [471] and semi-private [271] rooms. Units with only private rooms were designated to care for patients whose infection status was not yet determined, to avoid blocking a bed in a double room. Patients were moved to other units and cohorted in shared rooms when their infection status was determined. Although this increased transitions between teams, it allowed for optimal use of beds during an unprecedented increase in volume. SARS-CoV-2 assay turn-around time (TAT) contributed to challenges in efficient bed assignment and cohorting. Collaboration with leaders in infection control, infectious disease and emergency medicine was critical to streamline this process as TAT shortened and criteria for second tests evolved.

To minimize restrictions on patient placement and thereby maximize bed use, pre-COVID patient placement guidelines were adjusted for the pandemic. This allowed non-medicine inpatient services to care for patients traditionally assigned to the medicine service, freeing up medicine beds and teams to care for patients with COVID disease. For example, a patient with non-operative hand cellulitis would traditionally be assigned to medicine, however during the surge the plastic surgical team provided care. Initially, all patients with or under investigation for COVID disease were cared for by medicine. As the COVID/PUI volume increased, and non-medicine clinicians gained comfort caring for patients with SARS-CoV-2, patients were matched to a service based on their primary need rather than infection status.

Lastly, hospital leadership shared predictions of patient inflow providing time to anticipate staffing and bed allocation needs. When it was anticipated that an additional care unit would be needed to care for patients with COVID disease, a team consisting of medical, nursing and environmental services gathered to prepare the unit for the transition. A checklist was developed to ensure that all steps were implemented prior to transitioning a new unit.

## Conclusions

Caring for a large surge of general medicine inpatients during the COVID-19 pandemic required careful

consideration of methods for communicating, staffing, educating and utilizing beds, without having to resort to crisis standards of care. Championing inter- and within department collaboration was critical to ensuring that each patient presenting to our hospital had a hospital bed and a team to care for them. The lessons learned from our experience may help guide others to effectively respond when faced with similar challenges. While we hope not to face another surge in the future, the framework developed during our first experience will undoubtedly serve as a model for additional increases in patient volume and will allow for safe, effective and efficient care for patients in the future.

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