The coronavirus pandemic has led to tremendously increased numbers of patients requiring hospitalization, particularly in New York City, which is currently an epicenter of the disease. Mount Sinai Hospital was able to successfully plan for and accommodate patient load by taking an aggressive, proactive approach to physician deployment, which allowed them to quickly scale delivery of care for hospitalized patients. They provide a framework based on six overarching principles: (1) create an organizational structure, (2) define your need, (3) identify and optimize your pool of health care providers, (4) create surge teams, (5) prepare and deliver orientation materials, and (6) optimize working conditions for staff. They hope that this will serve as a blueprint for other institutions to optimize staffing models to continue delivery of high-quality patient care through the patient surge.

The coronavirus pandemic has upended traditional health systems, forcing administrators and physicians to swiftly transform their processes to meet changing and escalating demands for patient care. For this reason, departments of medicine, emergency medicine, and critical care are now being called upon to restructure rapidly in order to deliver the broadest and most effective possible care to patients. As viral cases surged in New York City, Mount Sinai Hospital, a tertiary academic center and the largest of eight hospitals within the Mount Sinai Health System, was able to accommodate increased numbers of hospitalized patients by focusing early on developing a robust redeployment strategy for our health care workforce. Most Covid-19 patients are treated on medicine floors. By sharing lessons learned and what we have now distilled to be best practices, we...
attempt to offer a structured primer on redeployment in an effort to aid institutions in cities where case numbers will peak in the coming weeks.

**Create an Organizational Structure**

The first step in effective deployment was for the Department of Medicine (DOM) Chair to name the decision makers and establish a command structure with formalized roles and responsibilities.\(^1\) Anticipated responsibilities were divided and delegated based upon those individuals’ strengths and networks.\(^2\) DOM Vice Chairs were delegated specific responsibilities related to the build-out of the inpatient service (Table 1), which required full-time commitment and temporary suspension of all non-Covid research and clinical activities. They, along with the Division Chief for Hospital Medicine, formed the task force, which was further supported by a strategist, program manager, and communications coordinator.\(^3\)

Additional DOM vice chairs coordinated personal protective equipment (PPE) needs with hospital administration, provided education regarding PPE use, onboarded outpatient physicians and facilitated their inpatient electronic medical record (EMR) access and training, and created teaching modules on treatment of the acutely ill Covid patient.

A daily strategy meeting via video teleconference was established for the task force team leadership in order to align initiatives and needs by site and department. By maintaining a regular cadence for communication, we were able to react more efficiently to evolving needs as an increasing number of patients required hospitalization and as we learned more about the type of care required. We later instituted a daily operations call to ensure that strategic goals were being effectively implemented. At the departmental level, we had twice-weekly update meetings with all division chiefs, to advise on streamlining their divisional activities in preparation for and in concert with deployment.

**Lessons Learned**

In the beginning, there was overlap of duties with deployment between the hospital system and the department, which led to some duplication of tasks and confusion of delineation of responsibility. Clear delineation of the vice chairs’ responsibilities allowed the DOM leads to become a system resource, and facilitated alignment with the system initiatives. In addition, collaborative communication and file-sharing platforms (e.g., Slack, Microsoft OneDrive, Microsoft Teams) were vastly superior to traditional email for the development of new protocols and coordinating efforts within the leadership team.

**Define Your Need**

One of the most important initial tasks was to anticipate the increase in patient volume.\(^4\) The deployment lead spoke daily with the hospital medicine lead to understand trends and to confirm staffing needs. Using these data, the deployment lead then met daily with the scheduling lead, program manager, and communications coordinator to provide surge staffing to meet these needs.
Using real-time admissions data for Covid-positive patients, we were able to forecast the projected number of Covid-19 admissions over the coming weeks and, therefore, anticipate the number of inpatient teams necessary to deploy to care for these patients. This was critical because if too many physicians were deployed too quickly, the available pool would be depleted when surge numbers continued to rise and the burden of unnecessarily orienting non-hospitalist physicians to the inpatient medicine service would distract from patient care. If too few were deployed, medical teams would quickly be overwhelmed with too large a census, and thus would be unable to provide optimal care.\textsuperscript{5,6}
Identify and Optimize Your Pool of Health Care Providers

Expansion of the provider pool was made possible by several early interventions. Rapid pivoting from ambulatory care to the inpatient setting was achieved by initiating and maximizing use of telehealth, cancellation of nonurgent procedures, and reducing and consolidating outpatient practices to manage only the most urgent patients. Vacations, paid time off, and travel were suspended.

To scale a relief system quickly, we identified physicians best suited to care for ill Covid-19 patients. To this end, we created a tiered structure based on anticipated physician utility (Table 2), and then asked divisional and departmental leadership to classify providers using our numbered system. The DOM Chair worked with division chiefs, other department chairs, and human resources to identify physicians available for redeployment at each phase of the expansion of the inpatient service.

Our assumption was that those with internal medicine training and board certification were likely to be more comfortable caring for patients with Covid-19 than, for example, those with surgical subspecialty training. Whenever possible, we worked to ensure balance in those deployed, so that no single group or division was disproportionately impacted. The deployed pool included providers of heterogenous gender, race, and age/experience level. Heterogeneity was feasible in our large institution located in an urban setting, but may be challenging in smaller or rural contexts. We endeavored to be transparent about clinical expectations and anticipated time commitment.

Whenever possible, we worked to ensure balance in those deployed, so that no single group or division was disproportionately impacted.

We also worked closely with our medical staffing office to ensure eligible fellows were quickly able to obtain disaster privileges as hospitalist attendings. In addition, volunteers and locum tenens providers were rapidly onboarded and integrated into teams and schedules. All remaining medicine divisions and other departments were asked to identify nurse practitioners (NPs), physician assistants (PAs), residents, and fellows eligible for deployment to the surge medical teams. The DOM worked with deployed providers from a predetermined list of departments to avoid competing deployments to Emergency Medicine and Critical Care. We were preferentially assigned specialties in which residents had completed an internal medicine preliminary year.

Table 2. Tiered Staffing System for Attendings

| Tier | Inclusion Criteria                                                                                                                                                                                                 |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Recent hospital residency or fellowship graduates (those with strong medicine knowledge and extensive clinical experience, inpatient EMR experience) Current internal medicine subspecialty fellows                                      |
| 2    | Most internists and internal medicine specialists Physicians with preliminary training year in internal medicine (i.e., radiology, ophthalmology, neurology, dermatology) Surgeons Pediatrics-trained physicians |
| 3    | Division chiefs, clinical leads, full-time researchers, associate deans                                                                                                                                             |

Abbreviations: EMR: Electronic Medical Record. Source: The authors
Family Medicine and Rehabilitation Medicine deployed independent teams to support the medicine floors. Of note, individuals considered as vulnerable — including those greater than age 65, immunosuppressed, or pregnant — were not deployed to patient-facing responsibilities. In families with two health care providers, deployments were staggered to allow for childcare and other personal commitments.

Optimization of health care providers also required an understanding of clinical needs, which we found differed between day and night shifts. During the day, attendings were expected to lead medical decision-making under the direction of a supervising hospitalist (SH). They also updated families, discussed care with consultants, decreased team exposure by examining patients, and elevated any issues that arose within the team. Frontline providers (FLPs) collected and synthesized data, wrote notes and orders, and ensured tests and studies were performed. At night, cross-coverage was best performed by non–internal medicine providers, completing tasks set forth by the day team, while internal medicine–trained providers were responsible for admitting new patients. Furthermore, we significantly increased coverage at night given the acuity of the patient population for which we were caring.

Lessons Learned

We quickly realized that our most limited resource was FLPs: medicine interns and residents, NPs, and PAs. To this end, we included all residents having completed an internal medicine preliminary year in the deployment pool. We are actively offering training in FLP skills to attending physicians in order to increase the FLP pool.

Additionally, some providers were not identified as vulnerable by their departments and we only realized they were not able to volunteer after sending a deployment announcement. We quickly realized that confirming deployment readiness was critical and assigned several members of the team to this task.

Create Surge Teams

Our normal inpatient model was composed of hospitalists caring for patients on both teaching (covered by internal medicine house staff) and non-teaching services (supported by NPs) (Figure 1).
During the first week of our transition, we created a simplified deployment structure and added non-hospitalist teams in parallel with the existing hospitalist teams. This strategy had limitations, as it was difficult to create high-quality care teams composed solely of providers without significant inpatient expertise. By the second week, we transitioned completely to a surge model in which expertise was evenly distributed across teams and geographic coverage by teams was achieved.14

“Of note, individuals considered as vulnerable — including those greater than age 65, immunosuppressed, or pregnant — were not deployed to patient-facing responsibilities. In families with two health care providers, deployments were staggered to allow for childcare and other personal commitments.”

Care teams consisted of two FLPs and an attending, with groups of three to four teams overseen by an SH. We found that blending the most experienced inpatient medicine providers (i.e., hospitalists...
and internal medicine house staff) with the least experienced inpatient providers was preferred. This model extended the reach of our hospitalists by creating a tiered structure, with an SH overseeing non-hospitalist teams (Figure 1). Fellows were our most nimble resource, as they were able to serve as either FLPs or attendings. They were also useful in the backup provider resource pool because they could fill any role on short notice if a care team member was unable to work.

We opted for conservative staffing ratios, aiming to keep the census on each medical team relatively low (10–12 patients per team). Newly deployed providers frequently came from non–internal medicine subspecialties and required time and training to re-familiarize themselves with internal medicine. A slightly lower census allowed physicians to get up to speed on care of complex Covid patients, as well as safe practices of donning and doffing PPE. In addition, creating a buffer was imperative to allow for attrition in the workforce due to sick call. Through the proactive and preemptive deployment of physicians, we were able to maintain low patient-to-physician ratios, prepare teams to be onboarded, and minimize provider stress, despite an extremely challenging environment.15

Creating an ongoing, relatively sustainable schedule was challenging. We found that the 4 days on, 4 days off, 12-hour shift model worked best in our hospital setting in order to mitigate burnout. We removed the distinction between weekdays and weekends and established each day as equal. This scheduling allowed us to sync with our advanced practice providers (APPs) and maintain consistent daily staffing. Our staffing model also needed to account for union agreements; for example, NPs and PAs generally worked 3–4 days during a week. Hospital leadership worked with union leadership to negotiate increased work hours for union members. We strived to have everyone be on the same scheduling model so that we could ensure care team consistency.

Lesson Learned

We learned that the care of Covid patients was fairly protocol driven, with routine titration of oxygen, monitoring for respiratory decompensation, and following daily labs and inflammatory markers.

We also learned that successful Covid teams included three elements: communication with patients and their families (as no visitors were allowed in the hospital), frequent checks on a patient’s clinical status (virtually, in person, and through communication with nursing staff), and command of hospital logistics (orders, discharges via the EMR). Understanding this made it easier to deploy teams of disparate medical specialties.

Prepare and Deliver Orientation Materials

Once providers were identified and stratified into care teams, it was necessary to orient all providers.16 Materials were provided via an easily accessible shared drive. This contained teaching materials, including an explanation of appropriate use and reuse of PPE, inpatient EMR note templates, instructional video on donning and doffing of PPE, and current Covid-19 treatment algorithms. We also worked to ensure that all providers had EMR access prior to their start date,
and that they would be able to bill, if possible. We asked all team members to review materials in advance of their first day and we identified point people to help answer questions about the content.

**Lessons Learned**

The importance of adequate orientation cannot be overstated.\(^{10}\) Despite access to orientation materials, on the first day of our first cycle, we noted that some non-hospitalist attendings had unanswered questions and felt unprepared. For subsequent cycles we ensured that the SH had a personal phone conversation with each of their non-hospitalist attendings the day before the cycle began. This connection allowed a more personal discussion of what to expect and any questions to be immediately answered.

> Through the proactive and preemptive deployment of physicians, we were able to maintain low patient-to-physician ratios, prepare teams to be onboarded, and minimize provider stress, despite an extremely challenging environment."

While we did our best to anticipate learning gaps in advance, during the first night of deployment, a non–internal medicine PA needed to pronounce a patient’s death, a task she had not performed previously. Subsequently, we incorporated how to manage a patient death information into our onboarding learning.

Each deployment email generated a tremendous amount of email traffic. By identifying the most frequently asked questions and concerns, we were able to incorporate answers into future iterations of the deployment email to reduce the volume of traffic.

**Optimize Working Conditions for Staff**

Geographic localization of teams (i.e., having all patients assigned to a team cohorted on a single hospital floor) was made an early priority. With an influx of new, non–internal medicine providers, eliminating the need to learn hospital navigation decreased provider stress and allowed for increased focus on patient care. It also facilitated communication with nurses and ancillary staff, who found physicians more readily available than usual. By decreasing time spent tracking down team members, more time was able to be spent at the bedside, implementing plans, and updating anxious family members. Furthermore, the ability to remain in one medical unit dramatically decreased PPE usage and increased provider safety by limiting the number of times PPE needed to be taken on and off (extended PPE).\(^{17}\)
While we did our best to anticipate learning gaps in advance, during the first night of deployment, a non–internal medicine PA needed to pronounce a patient’s death, a task she had not performed previously. Subsequently, we incorporated “how to manage a patient death” information into our onboarding learning.

While this effort required a massive one-time disruption (when patients were redistributed from existing non-geographic teams to new ward-based teams), we found that the change was universally hailed as one of the leading improvements to patient care and provider wellness. This strategy also enhanced discharge planning with social workers, case management, and nursing, ultimately doubling the hospital discharge rate.

Frequent and effective communication between leadership and deployed staff was vital to redeployment efforts. DOM leadership and the internal medicine residency program director rounded daily on all providers each morning. This enabled both formal and informal feedback loops to build connections to frontline faculty, fellows, house staff, NPs, and PAs, so that issues could be quickly escalated to members of the taskforce team. Daily internal communication briefs were emailed to all staff, including number of Covid cases, answers to FAQs, updated patient care protocols, and links to employee health, housing, and wellness websites. Members of the taskforce team also reached out frequently to deployed providers and performed daily walk rounds, in order to pulse check the situation on the wards. By keeping open lines of communication, we were able to make rapid improvements to onboarding materials, PPE availability, census, and optimization of patient centralization by geography.

Lessons Learned

All physicians need to have access to a clear point person if they should become ill or are unable to present for a shift. A jeopardy call system is essential to ensure replacement of care team members on short notice when needed.

Redeployment was a massive undertaking for our institution and may quickly become necessary for other health systems in the coming weeks as Covid-19 cases rise nationally and globally, or during future crises. Institutions will be well positioned to provide the necessary care to a large volume of patients during the peak of the pandemic while providing for the safety of their frontline providers by creating an organizational structure, defining clinical needs, identifying and optimizing an active health provider pool, creating thoughtful team structures and schedules, providing deployed staff the materials they need prior to initiation, and consistently working to improve working conditions.

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