



# Managing COVID-19 from the epicenter: adaptations and suggestions based on experience

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Received: 12 August 2020 / Accepted: 19 September 2020 / Published online: 1 October 2020

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## Abstract

In March 2020, the New York City metropolitan area became the epicenter of the United States' SARS-CoV-2 pandemic and the surge of new cases threatened to overwhelm the area's hospital systems. This article describes how an anesthesiology department at a large urban academic hospital rapidly adapted and deployed to meet the threat head-on. Topics included preparatory efforts, development of a team-based staffing model, and a new strategy for resource management. While still maintaining a fully functioning operating theater, discrete teams were deployed to both COVID-19 and non-COVID-19 intensive care units, rapid response/airway management team, the difficult airway response team, and labor and delivery. Additional topics include the creation of a temporary 'pop-up' anesthesiology-run COVID-19 intensive care unit utilizing anesthesia machines for monitoring and ventilatory support as well as the development of a simulation and innovation team that was instrumental in the rapid prototyping of a controlled split-ventilation system and conversion of readily available BIPAP units into emergency ventilators. As the course of the disease is uncertain, the goal of this article is to assist others in preparation for what may come next with COVID-19 as well as potential future pandemics.

**Keywords** COVID-19 · Critical care · Practice management

## Introduction

The coronavirus disease (COVID-19) caused by SARS-CoV-2 became a worldwide pandemic in 2020 and New York City became an epicenter in March 2020 [1]. Just as in China and Italy before [2, 3], the hospital systems of New York City were stressed due to the volume and acuity of COVID-19 patients. In June 2020, New York City was

accountable for approximately 10.8% of all cases and 19.8% of deaths due to COVID-19 in the United States [4].

As a specialty, anesthesiologists are uniquely qualified to quickly adapt and manage COVID-19 patients. Anesthesiologists have a wide breadth of clinical knowledge and technical skills which are particularly relevant to COVID-19's impact on the respiratory, cardiovascular, and hematologic systems.

In this article, we describe the experiences in how an anesthesiology department at a large urban academic hospital prepared for and continue to overcome this pandemic. We present staff redeployment strategies, specialized teams, as well as special initiatives in simulation education and innovation research. It is our goal for this to be a framework for departments of anesthesiology preparing for those departments currently experiencing a peak, a potential second wave of COVID-19, or for potential future pandemics.

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**Electronic supplementary material** The online version of this article (<https://doi.org/10.1007/s00540-020-02860-1>) contains supplementary material, which is available to authorized users.

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## Staffing: overarching strategy

The Department of Anesthesiology, Perioperative & Pain Medicine at the Mount Sinai Hospital of the Icahn School of Medicine employs 83 full-time equivalent attending anesthesiologists, 123 trainees (104 residents, 19 fellows), 18 certified-registered nurse anesthetists, and 4 physician assistants at the main campus. Before the pandemic, the department was responsible for managing 64 operating and procedure rooms as well as staffing 2 cardiothoracic intensive care units (ICUs) and several office-based sites. By mid-March 2020, the scale of the pandemic became clearer and New York State suspended all elective procedures [5]. As a result, many anesthesiologists were available to be utilized throughout the hospital to massively upscale the hospital's clinical capacity.

Departmental leadership devised a strategy of “divide and conquer” to slow the spread of the virus within the department. Teams were built based on expertise and utilized a “team captain” to report on current deployment and resource needs in daily leadership virtual meetings. See Table 1 for a list of areas of deployment. Although there were staff who became ill following this division into teams, the isolated team approach appeared to limit cross-infection to other teams.

## Redeployment of faculty

In early March, anesthesiology faculty dual-boarded in critical care were transitioned to full-time critical care duties. It soon became evident that this would not be

sufficient support and the remaining attending anesthesiologists were divided into teams as previously mentioned. All faculty were given the opportunity to opt-out and self-isolate without divulging any personal medical information.

The bulk of reassignments went towards supporting the Institute of Critical Care Medicine (ICCM). The largest post-anesthesia care unit (PACU) was transformed into the COVID negative medical/surgical ICU and was staffed by faculty from the anesthesiology PACU team. A smaller PACU was transformed into the Transplant ICU and was managed primarily by liver transplantation anesthesiologists. A team of 14 faculty members was tasked with building a new “pop-up” ICU in a medicine unit utilizing anesthesia machines as ventilators given the impending ICU ventilator shortage.

Labor and delivery (L&D) was staffed by obstetric anesthesiologists as well as dual-boarded pain management anesthesiologists, as the pain management practice volume was significantly reduced.

The airway management team was initially voluntarily staffed by a group of anesthesiologists who had recovered from COVID-19, with the hope of reducing the risk of exposure to colleagues. However, as the pandemic progressed and more ICU beds were built, they were reassigned to COVID-19 critical care coverage.

The general operating room staffing was covered by a smaller group of faculty than prior to COVID-19. This was possible because only emergency procedures were performed and general operating room volume was reduced by up to 90%.

**Table 1** Deployment locations and teams

Teams	Number of deployed faculty FTEs	Number of deployed trainee FTEs	Number of deployed CRNA/PA FTEs
General operating rooms	22	14	0
Labor and delivery	10	15	0
COVID intensive care units	3	7	9
Pop-up COVID intensive care unit—primary	7	12	3
Pop-up COVID intensive care unit—surge and line service	9	3	0
Medical intensive care unit (non-COVID)	3	18	4
Transplant intensive care unit (non-COVID)	8	11	0
Cardiothoracic ICU (non-COVID)	8	3	0
Airway management team	1	5	4
Difficult airway response team (DART)	+	++	0
Simulation and innovation team	3	++	0
Total	74	88	20

FTE Full Time Equivalent

+ Covered by on service general OR faculty

++ Covered by off-service rapid response team residents

## Redeployment of advanced practice nurses and physician assistants

The staff certified nurse anesthetists (CRNAs) were redeployed to intensive care units and airway management teams. CRNAs were critical in the expansion of the intensive care units given that they previously worked as ICU nurses prior to their anesthesiology training.

The PACU physician assistants were deployed to the PACU-based medical ICU in order to increase capacity. Their familiarity with the space allowed for easier integration of others who were re-assigned to the unfamiliar territory.

## Redeployment of resident and fellow trainees

Upon declaration of a “State of Emergency” by state and local government in New York and New York City [6], our institutional Graduate Medical Education leadership requested permission by the American Council for Graduate Medical Education (ACGME) to declare a Pandemic Emergency Status Stage 3 for all trainees [7]. This status suspended all program requirements, allowing our department to redeploy trainees to necessary clinical care environments.

Residents and fellows were assigned to the clinical teams previously mentioned but were most needed in COVID-19 and non-COVID-19 ICUs. Ultimately, over 50% of residents were allocated to critical care units. Cardiothoracic, liver transplant and pain management fellows were distributed to COVID-19 and non-COVID-19 ICUs.

The airway management team was the next priority. This accounted for another 20% of resident deployment. Overstaffing these teams was important due to high exposure rates; backup and reserve calls were built in should residents become ill or overwhelmed.

L&D and general operating room made up the remaining 20% of resident deployment. Obstetrical anesthesiology fellows remained on the L&D floor while regional and acute pain medicine fellows staffed the general operating room.

Constant communication was maintained between the program directors and departmental leadership with the residents and chief residents to help navigate the movement of staff between services, call changes, and clinical and emotional needs.

## Specific clinical deployment teams

Outlined below are the details of the specific team-based deployment. The goal is to provide a framework for other practices to rapidly expand as they see fit.



**Fig. 1** Telemetry room converted to a negative pressure environment using an extractor fan with HEPA filter to a board covering an exterior window to create a temporary ICU room

## Critical care expansion team

All existing physical ICU locations were converted to COVID-19 units by hospital administration. As mentioned above, the medical and liver transplant ICUs were relocated to two PACUs to isolate these susceptible patients from viral exposure. Even with large scale preparations underway, the surge of illness threatened to overwhelm the system prior to completion of the COVID-19 conversion projects. In collaboration with the ICCM and our institution, our department worked to find additional temporary ICU space. While some institutions utilized operating rooms for such a task, the department decided to pursue other options given the spread-out nature of the operating rooms making coverage by a single centralized team difficult. Instead, a telemetry unit with the capacity for 28 vented patients was chosen for a temporary ‘pop-up’ COVID-19 ICU. Highlighted here are critical steps and decisions that can be utilized elsewhere to accomplish a similar task.

Medical floors are designed quite differently from intensive care units. While most ICUs are open spaces with glass doors for patient visibility and centralized monitoring units, medicine floors often have private rooms for comfort and quiet as well as fewer patient monitors inside rooms. Each patient room was converted to a negative pressure environment by replacing the window with a board containing an opening for an extractor fan unit (Air Shield 550 HEPA AIR Scrubber, AER Industries, Irwindale, CA) containing

a HEPA filter (see Fig. 1). Plans for windows to be placed in the doors for improved patient visualization were halted as the new unit filled before construction could take place. Instead, remote audio and video systems (AvaSys Telesitter camera monitor, Avasure, Belmont, MI) were deployed which allowed for constant observation.

Due to an expected shortage of mechanical ventilators, anesthesia workstations (Aisys Carestation, GE Healthcare, Waukesha, WI) were used for all patients requiring mechanical ventilation in one unit. Because respiratory therapists and nurses were not familiar with anesthesia ventilators, ventilator rounds were built into the anesthesiology team's workflow. Guidelines for repurposing ventilators were released and revised by the American Society of Anesthesiology and the Anesthesia Patient Safety Foundation (APSF) were useful in the role-out and upscale of the model [8], though much of the machine workflow was developed in real-time and the need for troubleshooting pushed the team to build a schedule with 24 h in house faculty coverage. One major benefit of utilizing the anesthesia machines on this new unit was the ability to connect the physiologic monitor component of the workstation (GE CAREscape, GE Healthcare, Waukesha, WI) to the dedicated telemetry network. This allowed for continuous monitoring of patient vital signs from the nursing station. Integration required close co-operation with our institutional IT team to activate network ports and run temporary ethernet cabling to connect the monitors to the monitoring network.

To create order out of a rapidly developing ICU and improve patient safety, the team built a stockroom with familiar supplies that could be stocked and managed by anesthesia technicians. The family waiting room was used for this purpose, as it was nearby and unused due to the restriction on visitors. The 'workroom' was stocked with a locked anesthesia cart as well as 2 storage carts; one for with anesthesia workstation ventilator supplies and one with invasive access and airway management supplies. Departmental equipment such as two ultrasounds and a video laryngoscope was also stored here.

The staffing for this temporary COVID-19 ICU utilized a tiered system [9] to care for up to 28 patients. A critical care physician and an infectious disease specialist were always available for oversight, while at least two anesthesiology attending physicians were present each day to manage patient care. A team of anesthesiology residents, fellows, and CRNAs worked seamlessly together. This tiered technique allowed for more patients to be cared for with sufficient oversight from subspecialists who regularly managed patients in the critical care setting. See Fig. 2 for an example schedule for this unit.

Given the expectation that more capacity for critical care would be needed and that qualified staff could become a scarce resource, a dynamic staffing model was developed to

Example Daily "Pop Up" ICU Schedule	
<b>7:00 AM:</b>	Sign-out rounds
<b>8:00 AM:</b>	Ventilator and Working Rounds <ul style="list-style-type: none"> <li>• Performed in pairs: first person enters room to examine, second person to supply necessary equipment</li> <li>• Coordinated with RN to minimize room entries</li> <li>• Anesthesia ventilator rounds: machine settings and functions checked, circuit/spirometry/end-tidal CO<sub>2</sub> changed for built up moisture, CO<sub>2</sub> absorber changed if FiCO<sub>2</sub> ≥ 3 or excessive colorimetric change</li> </ul>
<b>9:15 AM:</b>	Formal Rounds <ul style="list-style-type: none"> <li>• Critical care and infectious disease faculty with bedside RN present with anesthesiology team</li> <li>• Socially distanced</li> <li>• To do list written on dry erase board on patient's door</li> </ul>
<b>3:00 PM:</b>	Working Rounds <ul style="list-style-type: none"> <li>• Same structure as 8:00 working rounds</li> <li>• Laboratory, imaging, and sub-specialty consultation follow up</li> <li>• Reviewed with anesthesiology, critical care, and infectious disease faculty</li> </ul>
<b>7:00 PM:</b>	Sign-out rounds
<b>8:00 PM:</b>	Ventilator and Working Rounds <ul style="list-style-type: none"> <li>• Same structure as 8:00 AM rounds</li> </ul>

Fig. 2 Example daily "pop up" ICU Schedule

shift small teams of extra staff to assist any unit that needed temporary help. This was accomplished at first by creating a team of anesthesia fellows and faculty who could be reached via a "surge pager" day or night to rapidly deploy and provide assistance either with a deteriorating patient or multiple simultaneous admissions. This also led to a backup system in which ICUs could 'lend' each other staff temporarily to support each other.

Despite being rapidly developed, the 'pop-up' ICU functioned well with a team of anesthesiology faculty and trainees working closely with critical care and infectious disease specialists. Although the physical location of the 'pop-up' ICU did not have the architecture of a typical ICU and anesthesia workstations were utilized as ICU ventilators, patient outcomes were deemed to be similar to standard ICUs in terms of ICU discharge and mortality rates.

### Critical care invasive access team

The majority of COVID-19 patients in our intensive care units required invasive venous and arterial access for

hemodynamic support, monitoring, and renal replacement therapy. To support and offset the ICU's workload, a multi-disciplinary team composed of anesthesiologists, cardiologists, interventional radiologists, and vascular surgeons was assembled. This team utilized a rolling cart of supplies and ultrasound to stay mobile and allow assistance throughout the hospital.

### Labor and delivery team

Unlike the other clinical areas of the hospital where patient volumes and surgeries decreased, the number of patients presenting to L&D remained constant. The labor floor consists of 3 triage bays, 4 antepartum rooms, 14 labor rooms, 3 operating rooms and a 5 bed PACU. Only one labor room and no operating rooms were able to be converted to negative pressure.

While only a handful of patients presenting to L&D were symptomatic with COVID-19, at the peak of NYC's surge 15.5% of all patients and 9.6% of support persons screened positive via nasal swab PCR upon arrival [10]. Unlike other units in the hospital that could be split into COVID-19 or non-COVID-19, L&D remained a 'mixed unit' which required increased vigilance and personal protective equipment (PPE) supplies. All patients were treated as persons under investigation (PUI) with full precautions until the COVID-19 test resulted.

Another unique challenge on the labor floor was handling the COVID-19 status of a parturient's partner. At first, partners were denied access to protect them and the staff from the risk of transmission, but this policy changed due to the New York Governor's Executive Orders regarding partners in the L&D room [11]. Once allowed, the workflow was built around testing partners for COVID-19 in advance of scheduled delivery or at admission for unscheduled deliveries. All patients and partners remained in their rooms with masks on at all times.

Prior to COVID-19, the core group of obstetric anesthesiologists was supported by a large pool of faculty who took L&D call. Once COVID-19 began to surge and the department moved to a team-based system, all shifts were covered by a team of 10 faculty members. As a unit, the team met virtually regularly and built policies, guidelines, and protocols on how to manage L&D safely in the face of a pandemic. Once policies were complete, each was put through a low-fidelity simulation whereby the clinical team mentally and physically walked through each step of the policy. To conserve supplies, kits were not opened, nor was PPE donned or doffed; however, team members went through the physical motions of these processes to get a gauge of how much time the policies and procedures would take in a "live scenario".

The primary goal was to minimize viral exposure to patients and staff while providing safe and timely care. To this end, remote pre-anesthetic interviews that could be performed via telephone or video chat were encouraged. To minimize the ingress and egress and reduce wasted equipment, all supplies and equipment were prepared prior to entering the room. For known COVID-19 patients, only the most experienced anesthesia practitioner entered the room to perform a neuraxial procedure. An interdisciplinary huddle for each COVID-19 positive admission took place to streamline communication and planning. The early epidural placement was encouraged to reduce the risk of emergent cesarean under general anesthesia which necessitates endotracheal intubation. To further reduce this risk, dural puncture epidurals and combined spinal epidurals were encouraged for all laboring patients and cesarean deliveries respectively.

With only three operating rooms, it was impossible to designate a strictly COVID positive operating room. Instead, one room was designated confirmed COVID negative and remained fully stocked. The remaining two operating rooms were designated as PUI with all equipment removed to reduce cross-contamination between patients. To keep these bare operating rooms functional for emergencies, a series of 'go packs' were designed and built into the workflow. A basic OR 'go pack' contained everything needed for cesarean delivery while an airway 'go pack' contained airway management tools and a hemorrhage 'go pack' contained equipment for arterial line placement and massive transfusion. A list of included L&D 'go pack' components can be found in the supplementary material.

### Airway management team

As the number of critically ill patients with COVID-19 rapidly increased in mid-March, it was quickly realized that the pre-existing structure for non-operating room airway interventions required alteration during the COVID-19 crisis. Prior to the pandemic, a rapid response team led by critical care physicians managed intubations on admitted patients and the intensivists in each ICU were the first line for intubations in the units. When additional assistance was needed, a Difficult Airway Response Team (DART) consisting of an intensivist, a senior anesthesiology resident, anesthesiology attending, and otolaryngologist was available. During the COVID-19 crisis, a dedicated airway management team was deployed to increase the rapid response team's intubation capacity for admitted COVID-19 positive patients.

Hospital-wide COVID-19 airway management guidelines were developed with multi-disciplinary input. Guidelines were based on the recommendations published in early March from the APSF [12] and were adapted for local practice. The guidelines included a recommendation



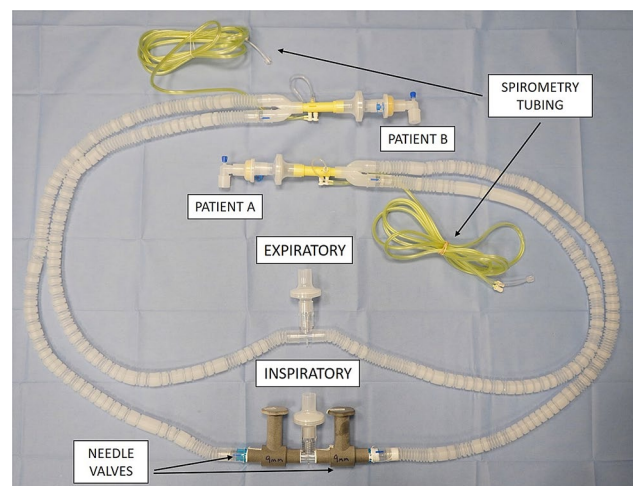
for two experienced airway management providers to be present for COVID-19 intubations. In mid-late March this was staffed by anesthesiology attending and a critical care attending. However, the need for the redeployment of the anesthesiology attendings grew with the exponentially increasing volume of COVID-19 patients, prompting a change in staffing of the airway management team. This included a dedicated group of senior anesthesiology residents and experienced CRNAs who covered 12 h shifts and joined the critical care attending for intubations. An anesthesiology attending was always available for additional support. Staffing was dynamic with back-up staff in place to fill in when necessary. The Difficult Airway Response Team remained in place and available for anticipated or unanticipated difficult airway management.

Airway management “go packs” were developed and were maintained by our anesthesia technicians. These included supplies for both airway management and PPE. A list of supplies is contained in the supplementary material.

### General operating room team

As increasing numbers of faculty, CRNAs, and trainees were diverted to enhance ICU coverage, it became critical to rethink general OR staffing. To that end, part-time status was temporarily revoked and the commitments to the OR, as in the ICUs, were reframed as a need for 24 h coverage daily. A call system of selective clinical protection was created to shield individuals at higher risk from known or suspected COVID-19 patients. High-risk providers were assigned remote areas or indirect patient care responsibilities to unburden other colleagues on the front line while those managing the front line anesthetics received extra days off around scheduled overnight calls.

Novel policies were devised and rapidly implemented to enable anesthesiologists to safely care for patients of all varieties: those with known and current COVID-19 illness, those with a recently-tested COVID-negative status, and those whose operative urgency demanded that the case begins prior to testing results. To accommodate and protect patients and staff from viral exposure, the operating rooms were split into 3 groups as well. The first, a COVID cluster of 3 operating rooms with supplies in the room to be considered always contaminated. The second, a cluster for PUIs in which nasal swab results were not yet available; these ORs were stripped bare of equipment and supplies to prevent contamination and a runner was stationed outside to provide necessary equipment or supplies. The remaining operating rooms were unaltered for COVID-19 negative patients.



**Fig. 3** Respiratory circuit prototype for split ventilation of two patients using one ventilator. The inspiratory box represents the inspiratory outlet of the ventilator and the expiratory box represents the expiratory outlet of the ventilator. Needle valves allow for individual titration of ventilation for each patient

### Simulation and innovation team

Over the past two decades, the simulation team based out of the Mount Sinai Department of Anesthesiology’s Human Emulation, Education and Evaluation Lab for Patient Safety and Professional Study (HELPS) has developed and conducted innovative simulation-based education and assessment programs. The pandemic leads to the lab becoming a critical component of the departmental and hospital-wide response.

Early in the preparation for the pandemic, the simulation team was focused on education and simulation for all providers. Education focused on PPE donning and doffing, COVID-19 specific advanced cardiac life support and airway management, and patient proning. In collaboration with the ICCM, lectures and high-fidelity simulations were administered for all hospital providers who were reassigned to care for COVID-19 patients, many of whom were inexperienced in an inpatient or critical care settings. During these education sessions, limits on the number of attendees and wearing of PPE was required.

Additionally, a small group of attending and resident physicians worked to create innovative solutions for the management of COVID-19 patients. One major concern throughout the world was the shortage of ventilators required to manage the acute respiratory failure associated with severe COVID-19 infection [13].

One group explored finding a safe method for splitting a ventilator between two patients. Using a rapid bench-to bedside approach, a needle valve was developed that allows for titratable ventilation of each patient sharing a ventilator

(see Fig. 3). The valves were first tested using two high-fidelity human patient simulator mannequins (HPS Anesthesia Simulator Mannequin Systems, CAE Healthcare, Sarasota, FL) and then after obtaining institutional approval and consent from the legally authorized representatives of four COVID-19 patients, tested under real-world conditions using a carefully developed protocol [14].

Another group, in collaboration with the ICCM and Department of Sleep Medicine, developed a protocol for using a ready-made BIPAP machine as an invasive bilevel ventilator. This BIPAP ventilator was tested in our department's simulation center as described above and following an emergency use authorization [15] and informed consent, was successfully tested on five medical ICU patients requiring mechanical ventilation [16].

Finally, because of the HELPS lab's unique ability to rapidly evaluate emergency ventilators using high-fidelity simulation, numerous prototypes were sent to us by outside companies for testing, including a collaboration with NASA/Jet Propulsion Laboratory [17]. Portable ventilators and automated manual self-inflating resuscitation bag ventilators were trialed. Concerns and suggestions were provided and further testing took place to improve on the function of these devices.

Ultimately, while none of these innovative designs ended up being required for clinical use during this pandemic, the insights gained and the protocols and devices developed remain as potential solutions to ventilator shortages throughout the world as the pandemic continues.

## Conclusion

Medical policies, plans, and guidelines are often constructed, trialed, revised, and finally implemented over months to years. The response of the medical community to NYC's March COVID-19 surge did not have the luxury of time. The incredibly rapid increase in COVID-19 cases necessitated an abrupt and massive shift from "business as usual" to a disaster response plan. Anesthesiologists are uniquely qualified to address these challenges as their training goes beyond lifesaving knowledge and skills but also focuses on triage, resource management, and communication under pressure. This paper describes one department's methods to increase the capacity to optimally treat each patient through an adaptive and nimble response. While each institution may have varying amounts of resources and staff, it is our hope that our experiences and policies may provide a blueprint that can be individually tailored to improve institutional responses to this pandemic as well as potential future threats.

The key elements discussed here focus on deploying discrete teams to minimize viral spread, building task-oriented 'go packs' to reduce waste and cost while preserving vital

equipment that was likely to go on the shortage, and utilizing in-situ simulation for rapid testing of guidelines and protocols and rolling out hospital-wide educational programs. See Fig. 4 for a summary of our recommendations.

None of these plans would have worked without buy-in from departmental staff that hinged on two approaches: The first was an active focus on individual wellness and mental health. All front line providers faced emotional trauma from the influx of critical illness and death as well as fears of personal exposure and the danger of bringing the virus home to their loved ones. Patient visitation was drastically limited and thus physicians, nurses, and support staff had to be even more present with their patients, supporting them through recovery or for their last moments. Therefore, a strategy of wellness was implemented early on that included providing adequate time off between shifts, appointing a 'wellness officer' to be a contact for those requiring assistance, implementing mindfulness rounds and a network of peer to peer support. Furthermore, staff under investigation for or diagnosed with COVID-19 were quarantined at home and offered support through peer support. The second element was a clear leadership and communication structure

Suggestions Based on the COVID-19 Surge Experience
Given their technical skills and knowledge base, anesthesiologists are well suited to tackle a host of roles during the COVID pandemic including upscaling critical care capacity, supporting rapid response and emergency airway teams, resource management and interdisciplinary education
Designing and implementing a model of discrete goal oriented teams allows for an organized response in the face of a changing situation while isolating against viral spread
"Pop up" ICUs utilizing anesthesia machines are feasible on medical floors or operating rooms but require a high level of vigilance, resources and buy-in from all teams involved
Interdisciplinary collaboration with real time updates to guidelines allows for quick adaptations to workflow
Delineate a clear leadership and communication structure with both a top down and bottom up approach to managing challenges as they arise
Use of a low-fidelity simulation of new guidelines and procedures allows for rapid cycles of improvement of workflow and safety
Building a resource management system such as 'go bags' allows for providing critical equipment while preserving stock and reducing waste
Wellness initiatives are paramount for both the physical and mental health of front line providers and requires buy in and prioritization from departmental and hospital leadership early-on in the response

Fig. 4 Suggestions based on the COVID-19 surge experience

that gave every member of the department a voice. Leaders from each unit team met virtually daily to discuss progress and review needs. Team members were encouraged to identify challenges and provide solutions in real-time with the knowledge that leadership would work with them and support efforts to improve care and wellness. Additionally, daily briefing communications were sent from our departmental chair which highlighted hospital census, major clinical guidelines or recommendations, staff deployment changes, and occasional words of wisdom to promote optimism and comradery.

It has now been 7 months since the COVID-19 surge hit like a tidal wave, testing the limits of NYC's hospital systems. General and ICU admissions from the virus are down and our practice is returning to normal as NYC resumed elective surgeries in early June 2020. Despite a return to normalcy, various parts of the United States and the world continue to face a surge of COVID-19 patients and a second wave in NYC is possible. We hope this article provides guidance through these difficult times.

## Compliance with ethical standards

**Conflict of interest** Garrett W. Burnett M.D., Daniel Katz M.D., Chang Park M.D., Jaime Hyman M.D., Elisha Dickstein M.D., Alan Sim M.D., Benjamin Salter M.D., Robert M. Owen M.D., Andrew B. Leibowitz M.D., Joshua Hamburger M.D. have no conflicts of interest. Matthew Levin—Dr. Levin reports having received publication fees from the McMahon Group and consultant fees from ASA PM 2020, and has filed a provisional patent for the split ventilation circuit design with the Stryker Corporation. Dr. Levin received no fee or equity interest from Stryker Corporation.

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