

CORRESPONDENCE

COVID-19 NOTES

To rapidly communicate short reports of innovative responses to Covid-19 around the world, along with a range of current thinking on policy and strategy relevant to the pandemic, the Journal has initiated the Covid-19 Notes series.

Transforming ORs into ICUs

Treating patients in New York City, the global epicenter of the Covid-19 pandemic — where there have been more than 15,000 deaths attributed to Covid-19 to date (www1.nyc.gov/site/doh/covid/covid-19-data.page) — has required innovative solutions to problems of limited resources. In late March, demand for intensive care unit (ICU) beds and mechanical ventilation exceeded baseline capacity at New York–Presbyterian Weill Cornell Medical Center. At the same time, many of our operating rooms (ORs) and postanesthesia care units (PACUs) were not in use because elective procedures had been postponed.

To increase our critical care capacity, we rapidly converted ORs and PACUs to ICUs wherever feasible. This process involved repurposing every available anesthesia machine, given the shortage of traditional ventilators. As a result of these efforts, we were able to configure an additional 60 beds for critically ill ventilator-dependent patients, thereby increasing our hospital's critical care capacity by 52% from baseline. The first beds were ready for use within 3 days after we initiated this process.

We selected ORs and PACUs best suited for conversion to ICUs on the basis of their size, location, and available infrastructure, while preserving some ORs for emergency surgeries. The capacity of pressurized medical gas lines and power supplies were limiting factors. In one perioperative area, for example, the power infrastructure was not sufficient to reliably run all the necessary critical care equipment.

To reduce exposure risks for staff and conserve personal protective equipment (PPE), we converted ORs to negative-pressure environments by reversing the airflow in certain ventilation systems and installing high-efficiency particulate air filters over former exhaust vents. In PACUs,

where “open” beds surrounded a central nursing station, we built walls to create distinct negative-pressure areas for groups of two to six individually ventilated patients and installed plexiglass windows to allow clinicians to maintain a direct view of patients. We reconfigured data ports to connect anesthesia machines to central monitors in all the new nursing stations. Although most OR equipment was cleared and stored, we repurposed some items (such as suction canisters, mayo stands, and storage carts) to serve critical care needs, and we used our institution's existing medical ICU inventory lists to fill shelves and medication-dispensing systems with the necessary supplies and medications. These changes required rapid work by pharmacists, facilities staff, biomedical engineers, information-technology teams, and countless others.

In most of our new “OR-ICUs,” a clean-core area serves as both a workspace and a place to store supplies. Providers don PPE in this area before entering an OR-ICU to care for a patient. Later, they doff their PPE and exit through the main OR doors, where scrub sinks for performing hand hygiene are located. In the PACU-ICUs, clinician workflows are similar to those used in standard ICUs.

We have not been immune to staffing shortages. We retrained all available perioperative staff and redeployed them to these newly configured areas, and we have adapted staffing ratios to optimize care, imitating our current ICU models when possible. Certified registered nurse anesthetists, who are familiar with anesthesia machines, now serve as respiratory therapists, and anesthesia intensivists supervise these units.

This transformation of ORs and PACUs to ICUs has allowed us to support the needs of our surrounding community while also permitting an

influx of patients from other hospitals in New York City that were operating over capacity. For hospitals anticipating surges of patients with Covid-19, clear plans for expanding critical care capacity are essential and must include multidisciplinary support. ORs and perioperative areas have proven to be readily adaptable spaces for providing critical care using otherwise idle anesthesia machines during these unprecedented times.

Alexander W. Peters, M.D., M.P.H.

Kashmira S. Chawla, M.D.

Zachary A. Turnbull, M.D., M.B.A.

New York–Presbyterian Weill Cornell Medical Center
New York, NY

Disclosure forms provided by the authors are available with the full text of this note at NEJM.org.

This note was published on April 24, 2020, at NEJM.org.

DOI: 10.1056/NEJMc2010853

Correspondence Copyright © 2020 Massachusetts Medical Society.