

CLINICAL DECISIONS

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Elective Surgery during the Covid-19 Pandemic

This interactive feature addresses the approach to a clinical issue. A case vignette is followed by specific options, none of which can be considered either correct or incorrect. In short essays, experts in the field then argue for each of the options. Readers can participate in forming community opinion by choosing one of the options and, if they like, providing their reasons.

CASE VIGNETTE

A Committee Deciding Policy on Elective Surgery during the Covid-19 Pandemic

Ken Wu, M.B., B.S.

You are a physician leader on a senior committee that is responsible for your hospital's Covid-19 response. For the past week, the hospital census has been over 90% of capacity, and almost all usual intensive care unit (ICU) beds have been occupied, more than half with patients who have Covid-19. You are using 10% of the ICU surge capacity created by your hospital to accommodate patients with Covid-19. The hospital has limited personal protective equipment (PPE) available, although supplies are adequate for current use. The 7-day average for daily new cases of Covid-19 in your region is 30 cases per 100,000 people; the rate is rising but has fluctuated for the past week. Hospitals in neighboring regions have similar capacities and limited availability to accept transfers of patients with Covid-19 from other hospitals. The local government has mandated that people wear face masks in public, but there is no stay-at-home order.

Your committee must decide whether elective surgical procedures should be deferred. In determining your recommendation to the committee,

you will have to consider the effect that deferring these procedures will have on hospital revenue, as well as the potential negative health consequences to patients whose surgery will be delayed; however, you must also consider the effect that proceeding with these surgeries will have on bed capacity, staffing (since physicians and nurses may need to be redeployed if Covid-19 cases continue to rise), the limited supplies of PPE, and patients' risk of contracting or transmitting Covid-19 while they are in the hospital for the elective procedure.

TREATMENT OPTIONS

Which one of the following approaches would you take? Base your choice on the published literature, your own experience, published guidelines, and other information sources.

1. Continue to schedule elective surgical procedures.
2. Defer all elective surgical procedures.
3. Proceed with scheduled elective surgical procedures but defer new cases.

To aid in your decision making, each of these approaches is defended in a short essay by an expert in the field. Given your knowledge of the issue and the points made by the experts, which approach would you choose?

OPTION 1

Continue to Schedule Elective Surgical Procedures

Craig R. Smith, M.D.

In the scenario described in the vignette, it is perfectly reasonable to continue scheduling elective surgical procedures. The vignette states that the rate of new Covid-19 cases is 30 cases per day

per 100,000 people, expressed as a 7-day average. This describes the situation in many regions in the United States, except New York City at its peak in April 2020, when the rate was more than twice as high.¹ The description of the 7-day average for daily new cases as "fluctuating" for the past week implies a slowing of the rate of increase in new cases, even if the number of cases is still rising. The effect of these new cases on

hospital resources depends on the population the hospital serves and on regional factors, such as population density and the macroenvironment, which in this scenario is not locked down. A high rate of new cases is also less worrisome for a hospital that is large for its regional population, as might be the case for a tertiary referral center.

The hospital in this scenario has been dealing with the Covid-19 pandemic long enough to have built substantial surge capacity, which suggests that the rate of new cases is several weeks mature and close to a manageable plateau. As a point of reference, New York–Presbyterian Hospital required almost 3 weeks to create substantial surge capacity.² The vignette specifies that the burden of the pandemic to date has filled only half the hospital's existing ICU beds with patients who are positive for Covid-19, and 90% of the surge capacity remains unused. Supplies of PPE are said to be limited, but that is a universal truth, and they have been declared adequate for current use in this scenario. In addition, bed capacity and supply of PPE are easily monitored.

For persons with nonacute elective cases, such as those defined as low-acuity by the Elective Surgery Acuity Scale (ESAS) used by the American College of Surgeons,³ the risk of nosocomial coronavirus infection is important to consider. Columbia University Irving Medical Center of the New York–Presbyterian Hospital studied the incidence of nosocomial Covid-19 infection from March 1 through April 27, 2020, in two patient-care units restricted to Covid-19–negative patients (a cardiothoracic ICU and a regular floor unit). Health care–associated transmission and infection with SARS-CoV-2 occurred in 0 to 2% of 311 patients.^{4,5} The units studied were surrounded by units — adjacent, above, and below — filled with Covid-19–positive patients. The study period also encompassed the worst of the Covid-19 surge and plateau in New York City, and mitigation of infection was seriously compromised, at least in March, by shortages of PPE. Despite these factors, the risk of nosocomial infection was found to be notably low.

Finally, continuing or resuming the scheduling of elective surgical procedures in this scenario is reasonable because canceling them later, if necessary, poses little difficulty. Whereas cancellation of emergency surgery may cause patients harm, an abrupt change of course causing cancellation of elective procedures imposes inconve-

nience but no serious risk to patients. Most patients undergoing elective surgical procedures do not need ICU beds and intensive nursing support, and the rapid turnover of elective surgery cases also minimizes the extra pressure on resources. Nevertheless, daily monitoring of all relevant factors is essential if any type of surgery is allowed to continue. In addition to new case rates and the associated burden on the hospital and ICU, hospital staffing is another weak link. We can't assume that staff can be driven through elective schedules the way they drove themselves through an extraordinary crisis.

Disclosure forms provided by the author are available with the full text of this article at [NEJM.org](https://www.nejm.org).

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OPTION 2

Defer All Elective Surgical Procedures

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Throughout the Covid-19 pandemic, professional societies and national organizations in the United States have offered guidance related to elective procedures, initially calling for their cancellation and later issuing guidance for their resumption.⁶ In addition, the Centers for Disease Control and Prevention (CDC) has offered guidance on optimizing the use of personal protective equipment (PPE) on the basis of anticipated inventory and demand.⁷ The CDC also offers strong guidance to the public about ways to protect against Covid-19 and to health care providers about ways to safely care for patients who do not have Covid-19 and prevent the further spread of the disease.^{8,9} When applied to this case scenario, these guidelines support the decision to defer elective surgeries.

First, let's define elective procedures. The American College of Surgeons (ACS) supports the use of the ESAS,³ which defines low- and intermediate-acuity procedures as those that can be safely delayed without substantial risk to the patient. High-acuity cases should not be postponed. If we assume that the elective procedures in this case scenario are of low or intermediate acuity according to the ESAS, guidance provided by the ACS supports deferring them as long as the assessment is in alignment with clinical judgment.

Next, we should recognize that elective procedures involve the use of a substantial amount of PPE, as well as hospital resources such as beds and staff, and increase the risk of exposure for other patients and staff. In the vignette, PPE is described as limited and cases in the community are rising. The hospital is nearing total capacity, especially in the ICU, and surge capacity is already being utilized. The guidelines mentioned above, when applied to factors such as PPE, case counts, hospital and staff capacity, and patient and staff exposures, help inform the decision to defer elective surgeries.

Deferring elective procedures will ensure that our frontline providers have adequate PPE, since supplies are limited. We anticipate shortages of this equipment as cases of Covid-19 continue to rise. To conserve PPE, we should follow the CDC contingency capacity guidelines, which call for the cancellation of elective cases.⁷ The American College of Surgeons, American Society of Anesthesiologists, Association of periOperative Registered Nurses, and American Hospital Association call for a sustained reduction in cases for 14 days before resumption of elective surgeries.⁶ In the vignette, the community case counts are described as still rising. The hospital is near capacity and anticipates further demands. Ensuring adequate bed capacity is another reason that CDC guidelines call for deferral of elective procedures.⁹ With the prevalence of Covid-19 rising, we should minimize the risk of exposure for patients and staff. We need to emphasize safe behaviors, which include adhering to disciplined social distancing and minimizing the need for in-person services.^{8,9} Deferring elective procedures protects both patients and staff from unnecessary exposure to Covid-19 and risk of illness.

We must be able to care for the urgent needs of our community and provide adequate resources to our health care providers before scheduling procedures that can be safely delayed. This means ensuring adequate PPE, adequate staffing, and adequate beds. It also means minimizing unnecessary risks of exposure. Deferring elective surgeries will increase the likelihood that we can meet those demands while keeping our patients, staff, and communities safe.

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OPTION 3

Proceed with Scheduled Elective Surgical Procedures but Defer New Cases

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In March 2020, the American College of Surgeons recommended the cancellation of elective surgical procedures to ensure the availability of beds for patients with Covid-19, conserve PPE, and allow staff reallocation.³ Since then, the adverse outcomes in patients whose care was deferred and the financial implications for hospitals have become evident.¹⁰ As many institutions prepared to resume elective procedures in May 2020, a second Covid-19 surge occurred in the United States, affecting various regions differently. Institutions now face the burden of deciding how to proceed with surgical procedures in the absence of a unified national public health policy to mandate mask use and social distancing and with a poorly designed contact-tracing program.

The vignette describes a hospital at 90% capacity, with high occupancy in the ICU, in a community with 30 new Covid-19 cases per 100,000 people per day. As of August 27, cumulative data from the CDC show that there were 1769 cases of Covid-19 per 100,000 people, with a hospitalization rate of 156.8 per 100,000 people, which implies that 8.9% of cases result in hospitalization.^{11,12} Although these are national data, institutions can use their regional Covid-19 data as a basic model for the expected effect on their hospitals. Calculations that use data from the CDC show that for the hospital in the vignette, 2.61 cases per day will result in hospitalization. Guidelines from the European Society of Intensive Care Medicine recommend planning for 20% of hospitalized adult patients with Covid-19 to be admitted to the ICU, with an average stay of 7 days.¹³ Therefore, assuming that 0.52 patients per day will need ICU care for 7 days, this hospital will typically need 3.64 (0.52 new patients per day times 7 days) ICU beds each day for patients with Covid-19 per 100,000 population. Data from 2009 show that there were 34.7 ICU beds per 100,000 U.S. population, albeit with considerable regional variability.¹⁴

Postponing elective surgeries that have already been scheduled could result in considerably worse

outcomes for the community. Hospitals have a duty to their communities, trainees, and employees in addition to their responsibility to the patients. Establishing a new normal that is clinically appropriate and fiscally responsible also allows hospitals to maintain financial viability. This “two-in-one” health system — one for Covid-19 and one for non-Covid-19 — that was developed during the surge should remain for the duration of the pandemic. New elective surgeries should be considered only when the rates of new cases of Covid-19 flatten and decline.

For elective procedures that have already been scheduled, priority should be given to cases for which a short length of stay is anticipated, cases that have same-day discharges, or time-sensitive surgeries in which patients are likely to have adverse outcomes from further delays. Scheduling surgeries at atypical times (e.g., on weekends) and expediting throughput and efficiency (e.g., using a dedicated discharge team) are critical to maintaining adequate operating room and ICU capacity. Since the number of admissions may fluctuate, models that can predict the number of admissions for Covid-19 and non-Covid-19 illness and can anticipate use of PPE are essential to the strategy.

At my institution in Miami, we test all patients with a reverse-transcriptase–polymerase-chain-reaction assay for Covid-19 on admission and separate patients into Covid-19 and non-Covid-19 floors. All wards are capable of generating negative room pressure, as recommended by the CDC in their guidelines for health care personnel on Covid-19 infection prevention and control.¹⁵ This ensures flexibility between medical–surgical and ICU use for each unit. The surgical schedule is modified according to models that predict the number of new patients with Covid-19 who require admission. The Covid-19 surge described in the vignette is more favorable than the situation we faced in Miami in June and July 2020.¹⁶

Continuing scheduled elective surgeries but deferring new cases achieves the core goal of health care institutions — providing high quality, safe care to all patients regardless of their Covid-19 status. Achieving this goal requires a well-designed, comprehensive surge plan and a reliable model to predict demand and supply.

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