

American Society of Anesthesiologists and Anesthesia Patient Safety Foundation Joint Statement on Elective Surgery/Procedures and Anesthesia for Patients after COVID-19 Infection

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Since hospitals are able to continue to perform elective surgeries while the COVID-19 pandemic continues, determining the optimal timing of procedures for patients who have recovered from COVID-19 infection and the appropriate level of preoperative evaluation are challenging given the current lack of evidence or precedent. The following guidance is intended to aid hospitals, surgeons, anesthesiologists, and proceduralists in evaluating and scheduling these patients. The updated recommendations detailed in this document are based upon new evidence that has come to light over the past year. The recommendations will be subject to continued evolution as new evidence emerges.



Elective surgeries should be performed for patients who have recovered from COVID-19 infection only when the anesthesiologist and surgeon or proceduralist agree jointly to proceed. The decision for surgery/procedure is centered on two factors: 1. Is the patient still infectious? and 2. For patients that are no longer infectious what is the appropriate length of time to wait between recovery from COVID and surgery/procedure in terms of risk to the patient.

What determines when a patient confirmed to have COVID-19 is no longer infectious?

The Centers for Disease Control and Prevention (CDC) provides guidance for physicians to decide when transmission-based precautions (e.g., isolation, use of personal protective equipment and engineering controls) may be discontinued for hospitalized patients, or home isolation may be discontinued for outpatients.¹

Patients infected with SARS-CoV-2, as confirmed by reverse transcriptase-polymerase chain reaction (RT-PCR) testing of respiratory secretions, may be asymptomatic or symptomatic. The National Institutes of Health has recently updated the categories of SARS-CoV-2 infection into the following phenotypic expressions of COVID severity.² (see Appendix I for full description).

- *Asymptomatic or Presymptomatic Infection*
- *Mild Illness.*
- *Moderate Illness*
- *Severe Illness*
- *Critical Illness*

Severely immunocompromised patients, whether suffering from asymptomatic or symptomatic COVID-19, are considered separately.

Current data indicate that, in patients with mild to moderate COVID-19, repeat RT-PCR testing may detect SARS-CoV-2 RNA for a prolonged period after symptoms first appear. According to the Centers for Disease Control and Prevention (CDC), it is rare to recover replication-competent virus after **10 days**

from onset of symptoms, except in people who have severe COVID-19 or who are moderately or severely immunocompromised.

Considering this information, the CDC recommends that physicians use a time- and symptom-based strategy to decide when patients with COVID-19 are no longer infectious.

For patients with confirmed COVID-19 infection the CDC recommends discontinuing isolation and other transmission-based precautions per the following:¹

- **Children and adults with mild, symptomatic COVID-19:** Isolation can end at least 5 days after symptom onset and after fever ends for 24 hours (without the use of fever-reducing medication) and symptoms are improving, if these people can continue to properly wear a well-fitted mask around others for 5 more days after the 5-day isolation period. Day 0 is the first day of symptoms.
- **People who are infected but asymptomatic (never develop symptoms):** Isolation can end at least 5 days after the first positive test (with day 0 being the date their specimen was collected for the positive test), if these people can continue to wear a properly well-fitted mask around others for 5 more days after the 5-day isolation period. However, if symptoms develop after a positive test, their 5-day isolation period should start over (day 0 changes to the first day of symptoms)*
- **People who have moderate COVID-19 illness:** Isolate for 10 days.
- **People who are severely ill (i.e., requiring hospitalization, intensive care, or ventilation support):** Extending the duration of isolation and precautions to at least 10 days and up to 20 days after symptom onset, and after fever ends (without the use of fever-reducing medication) and symptoms are improving, may be warranted.
- **People who are moderately or severely immunocompromised might have a longer infectious period:** Extend isolation to 20 or more days (day 0 is the first day of symptoms or a positive viral test). Use a test-based strategy and consult with an infectious disease specialist to determine the appropriate duration of isolation and precautions.

*The additional 5-day isolation period with masking for asymptomatic and mildly symptomatic patients has no practical implication in anesthesia care. Patients in these categories should be considered infectious for anesthesia care purposes for the full 10 days.

Consultation with infection control experts is strongly advised prior to discontinuing precautions for patients with severe to critical illness or who are severely immunocompromised. Clinical judgment ultimately prevails when deciding whether a patient remains infectious. Maintaining transmission-based precautions and repeat RT-PCR testing may be appropriate if clinical suspicion of ongoing infection exists.

If a patient suspected of having SARS-CoV-2 infection is never tested, the decision to discontinue transmission-based precautions can be made using the symptom-based strategy described above.

Other factors, such as advanced age, diabetes mellitus, or end-stage renal disease, may pose a much lower degree of immunocompromise; their effect upon the duration of infectivity for a given patient is not known.

Ultimately, the degree of immunocompromise for the patient is determined by the treating provider, and preventive actions are tailored to each individual and situation.

What is the appropriate length of time between recovery from COVID-19 and surgery/procedure with respect to minimizing postoperative complications?

Currently there is a backlog of surgical procedures that have been delayed but are necessary to improve the health and quality of life of our patients. Although there is increasing information to address the timing of surgery after COVID-19 infection, studies continue to lag behind the emerging variants and the likelihood that vaccinated patients have a lower a risk of postoperative complications as compared to unvaccinated patients.³ Almost all available data come from study periods with zero to low prevalence of vaccination.

The preoperative preparation of a surgical patient who is recovering from COVID-19 involves evaluation and optimization of the patient's medical conditions and physiologic status. Since COVID-19 can impact virtually all major organ systems, the timing of surgery after a COVID-19 diagnosis is important when considering the risk of postoperative complications. Heretofore, protocols have been based on limited data specific to SARS-CoV-2, expert opinion, and previous data from other post-viral syndromes.

An early limited study of 122 patients found a significantly higher risk of pulmonary complications within the first four weeks after SARS-CoV-2 diagnosis.⁴ A Brazilian study of 49 patients who underwent surgery with a median delay of 25 days after asymptomatic COVID-19 did not have increased complications when compared to a cohort of patients with a negative SARS-CoV-2 test.⁵

Subsequently, a multi-country (116 countries), multi-center (1674 hospitals) study, in a mixture of high income and low/middle income countries, followed more than 140,000 patients with 3,127 having COVID-19 infections before surgery. Data were collected from surgery **in October 2020**, meaning that none of these patients had received even one vaccination. They reported increased risks of mortality and morbidity—especially with pulmonary complications--up to 7 weeks post COVID diagnosis, although the confidence interval for patients in the 5-6 week cohort suggests that there may not be a true difference in this group.⁶ This data found increased risks to be present at 5-6 weeks regardless of being asymptomatic or symptomatic, older or younger than 70, having major or minor surgery, or undergoing elective or emergency surgery. Mortality data is summarized in the table below. Finally, patients with ongoing symptoms at ≥ 7 weeks were at increased risk for complications versus patients without symptoms.

Interval Between COVID Diagnosis and Surgery	30-day Mortality Rate for Elective Patients (% , CI)**
No COVID Diagnosis	0.62 (0.57-0.67)
0-2 weeks	3.09 (1.64-4.54)
3-4 weeks	2.29 (1.06-3.53)
5-6 weeks	2.39 (0.87-3.91)
≥ 7 weeks	0.64 (0.20-1.07)

**With a sensitivity analysis.

A second U.S. study covering a timeline of patients with a COVID-19 diagnosis and surgery up to May 31, 2021 reviewed 5479 surgical patients following COVID-19 infection. Immunization status was not given but the study period ranged from a time of zero vaccination until a period when about 30% of the US adult population had received at least one vaccination. The results corroborate the above findings and report higher postop complications of pneumonia and respiratory failure at 0-4 weeks and continued higher postoperative pneumonia complications 4-8 weeks post PCR diagnosis.⁷

Of note, a consensus-based statement from the United Kingdom recommends “delaying surgery, whenever feasible for a minimum of 7 weeks after known SARS-CoV-2 infection.”⁸

To date, there are no robust data on patients recovering from more recent Delta and Omicron variants. According to the CDC, the Omicron variant causes less severe disease,⁹ and is more likely to reside in the oro- and nasopharynx without infiltration and damage to the lungs. It should also be noted that severity likely varies by vaccination status. Some have extrapolated these facts to a conclusion that risk in patients who are vaccinated and are recovering from Omicron should be less. However plausible, such a conclusion remains unproven. SARS-CoV-2 affects other organ systems beyond the pulmonary system (e.g., thromboembolic events including stroke, myocarditis, renal failure).

RECOMMENDATIONS

1. Elective surgery should be delayed for 7 weeks after a SARS-CoV-2 infection in unvaccinated patients that are asymptomatic at the time of surgery.
2. The evidence is insufficient to make recommendations for those who become infected after COVID vaccination. Although there is evidence that, in general, vaccination reduces post-infection morbidity, the effect of vaccination on the appropriate length of time between infection and surgery/procedure is unknown.
3. Any delay in surgery needs to be weighed against the time-sensitive needs of the individual patient.
4. If surgery is deemed necessary during a period of likely increased risk, those potential risks should be included in the informed consent and shared decision-making with the patient.
5. Extending the above delay should be considered if the patient has continued symptomatology not exclusive of pulmonary symptoms.
6. Any decision to proceed with surgery should consider:
 - The severity of the initial infection
 - The potential risk of ongoing symptoms
 - Comorbidities and frailty status
 - Complexity of surgery

Residual symptoms such as fatigue, shortness of breath, and chest pain are common in patients who have had COVID-19 ^(10,11). These symptoms can be present more than 60 days after diagnosis ⁽¹¹⁾. In addition, COVID-19 may have long term deleterious effects on myocardial anatomy and function ⁽¹²⁾. A more thorough preoperative evaluation, scheduled further in advance of surgery with special attention given to the cardiopulmonary systems, should be considered in patients who have recovered from COVID-19 and especially those with residual symptoms.

Is repeat SARS-CoV-2 testing needed?

At present, the CDC does not recommend re-testing for COVID-19 within 90 days of symptom onset ⁽¹³⁾. Repeat PCR testing in asymptomatic patients is strongly discouraged since persistent or recurrent positive PCR tests are common after recovery. However, if a patient presents within 90 days and has recurrence of symptoms, re-testing and consultation with an infectious disease expert should be considered. Once the 90-day recovery period has ended, the patient should undergo one pre-operative nasopharyngeal PCR test ideally \leq three days prior to the procedure.

These recommendations are under continuous review and will be updated as additional evidence becomes available.

References:

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Appendix I

- *Asymptomatic or Presymptomatic Infection: Individuals who test positive for SARS-CoV-2 using a virologic test (i.e., a nucleic acid amplification test [NAAT] or an antigen test) but who have no symptoms that are consistent with COVID-19.*
- *Mild Illness: Individuals who have any of the various signs and symptoms of COVID-19 (e.g., fever, cough, sore throat, malaise, headache, muscle pain, nausea, vomiting, diarrhea, loss of taste and smell) but who do not have shortness of breath, dyspnea, or abnormal chest imaging.*
- *Moderate Illness: Individuals who show evidence of lower respiratory disease during clinical assessment or imaging and who have an oxygen saturation (SpO_2) $\geq 94\%$ on room air at sea level.*
- *Severe Illness: Individuals who have $SpO_2 < 94\%$ on room air at sea level, a ratio of arterial partial pressure of oxygen to fraction of inspired oxygen (PaO_2/FiO_2) < 300 mm Hg, a respiratory rate > 30 breaths/min, or lung infiltrates $> 50\%$.*
- *Critical Illness: Individuals who have respiratory failure, septic shock, and/or multiple organ dysfunction.*