## UCSF Adult COVID-19 Management Guidelines

<table>
<thead>
<tr>
<th>Category</th>
<th>Symptoms (constitutional, respiratory, GI or other)</th>
<th>Lower respiratory infection (clinical OR radiographic)</th>
<th>Hypoxia</th>
<th>Recommendations</th>
</tr>
</thead>
</table>
| Outpatient, asymptomatic                      | No                                                  | No                                                   | No      | ● Supportive care  
  ● Recommend against steroids               |
| Outpatient, symptomatic                       | Yes                                                 | Yes or No                                            | Yes or No | ● Supportive care for most  
  ● Prioritize clinical trials if eligible  
  ● High-risk for progression: Consider EUA monoclonal antibodies (mAbs)  
  ● Recommend against steroids           |
| Inpatient, asymptomatic or mild symptoms and hospitalized for non-COVID-19 reason | No                                                  | No                                                   | No      | ● Supportive care  
  ● Can consider mAbs if admitted for alternative diagnosis and otherwise qualifies  
  ● Recommend against steroids          |
| Inpatient, mild disease, hospitalized for COVID-19 | Yes                                                 | No                                                   | No      | ● High-risk for progression: Remdesivir x 5 days  
  ● <72h from symptom onset and high-risk for progression (see below): Consider CCP  
  ● Recommend against steroids      |
| Inpatient, moderate disease                   | Yes                                                 | Yes                                                  | No      | ● Remdesivir x 5 days  
  ● <72h from symptom onset and high-risk for progression (see below): Consider CCP  
  ● Recommend against steroids    |
| Inpatient, severe disease                     | Yes                                                 | Yes                                                  | Yes     | ● Remdesivir x 5 days  
  ● Steroids if: Persistent hypoxia requiring ≥ 3-4L O₂, OR trajectory suggests increasing severity of disease  
  ● Consider adding baricitinib to steroids if clinically worsening          |
| Inpatient, critical disease                   | Yes                                                 | Yes                                                  | Yes     | ● Remdesivir x 5 days; can consider extension to 10 days if ongoing severe illness at day 5  
  ● Steroids recommended  
  ● Consider baricitinib for patients on high flow oxygen or non-invasive ventilation.  
  ● Use tocilizumab instead of baricitinib if hospitalized < 3 days AND in ICU < 24 h AND rapidly progressing with imminent mechanical ventilation.  
  ● Do not administer baricitinib and tocilizumab together          |

Table 1. Diagnostic testing for patients with confirmed or suspected COVID

<table>
<thead>
<tr>
<th>Testing for COVID-19.</th>
<th>Repeat PCR testing:</th>
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</thead>
<tbody>
<tr>
<td><strong>Initial testing for symptomatic patients:</strong></td>
<td>If negative initial PCR and very high suspicion:</td>
</tr>
<tr>
<td>COVID-19 PCR (collection method based on swab availability)</td>
<td>o  Tracheal aspirate COVID-19 PCR in mechanically ventilated patients</td>
</tr>
<tr>
<td>1. Flocked swab Nasopharyngeal (NP) plus Oropharyngeal (OP)</td>
<td>o  Repeat NP or MNT + OP testing if not mechanically ventilated</td>
</tr>
<tr>
<td>2. Flocked swab Mid-Turbinate (MNT) plus OP</td>
<td>Certain COVID-19 confirmed patients may require additional testing for disposition;</td>
</tr>
<tr>
<td>3. Synthetic swab MNT plus OP</td>
<td>consult ID to discuss next steps</td>
</tr>
<tr>
<td><em>Anterior nares swab acceptable if contraindication to deeper sample or patient refusal</em></td>
<td>Retesting of previously negatively tested patients should be done if:</td>
</tr>
<tr>
<td></td>
<td>o  New compatible symptoms</td>
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<tr>
<td></td>
<td>o  Exposure investigation</td>
</tr>
<tr>
<td></td>
<td>o  Planned or continuous aerosol-generating procedure (every 7 days)</td>
</tr>
<tr>
<td></td>
<td>o  Shared room (Monday and Thursday)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Serologic testing, clinical indications:</th>
<th><strong>Routine monitoring:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>o  Confirmation of infection if high clinical suspicion, negative PCR testing, and symptoms &gt; 7 days</td>
<td>CBC with differential, BMP, Mg</td>
</tr>
<tr>
<td>o  Documentation of serological response prior to convalescent plasma donation</td>
<td>Trend LFTs Q48h-72h if abnormal at baseline (&gt; 2 x ULN) or receiving remdesivir therapy</td>
</tr>
<tr>
<td>o  Utility for determining immunity uncertain</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Laboratory testing</th>
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<tbody>
<tr>
<td><strong>On admission</strong></td>
<td><strong>Routine monitoring:</strong></td>
</tr>
<tr>
<td><em>All patients</em>¹</td>
<td>CBC with differential, BMP, Mg</td>
</tr>
<tr>
<td>o  CBC with differential, BMP, LFTs, coagulation studies</td>
<td>Trend LFTs Q48h-72h if abnormal at baseline (&gt; 2 x ULN) or receiving remdesivir therapy</td>
</tr>
<tr>
<td>o  Send RVP if during flu season (declared by HEIP and executive leadership based on Bay Area flu incidence)</td>
<td></td>
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</tbody>
</table>
If clinically indicated:
- Procalcitonin, troponin, BNP, lactate, ABG
- If concern for bacterial infection (prior to starting empirical antibiotics): blood cultures (2 sets), sputum bacterial culture
- Hepatitis B and C serologies if elevated liver biochemistries
- Consider to estimate risk for severe disease: fibrin d-dimer, CRP, LDH and CPK.

These may not be required on a daily basis, consider decrease in frequency depending on clinical condition

If clinical deterioration:
- Repeat sputum and blood cultures (tracheal aspirate culture if intubated)

Do not obtain unless clinical suspicion for a specific diagnosis (e.g. HLH)
- Ferritin, soluble IL-2-receptor-alpha, NK cell activity

Do not obtain:
- IL-6 levels

**Imaging**

<table>
<thead>
<tr>
<th>Chest radiograph:</th>
<th>Chest CT:</th>
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<tbody>
<tr>
<td>- Baseline AP CXR on admission</td>
<td>- Limited role in diagnosis of COVID-19 (PCR test of choice)</td>
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<tr>
<td>- Monitoring for complications (pneumothorax, atelectasis) at interval deemed appropriate by clinical team</td>
<td>- Primary role is evaluation of superimposed processes such as pulmonary embolism or aortic dissection.</td>
</tr>
</tbody>
</table>

**Table 2. Therapeutics**

**Therapies**
- Multiple clinical trials continue to enroll inpatients and outpatients
- Clinical trial teams will screen inpatients for eligibility and offer enrollment
- Experimental therapeutics should only be offered in the context of a clinical trial

**Antibiotics**
- Bacterial co-infection on initial presentation to the hospital for COVID-19 is uncommon. Use antibacterials sparingly in this population, and if started, deescalate rapidly for negative cultures.
- For patients admitted with severe and critical COVID-19, hospital-acquired infections may occur with both bacterial and fungal pathogens. Decisions to initiate therapy should be based on clinical data.
Recent studies of JAK inhibitors, including baricitinib, have demonstrated reduced disease progression and decreased mortality in patients requiring significant oxygen support. Other studies of IL-6 inhibitors, including tocilizumab, show improved clinical outcomes and decreased mortality, especially in recently admitted patients in the ICU requiring intubation. Updated NIH guidance recommends “using either baricitinib (BIIa) or tocilizumab (BIIa) (listed alphabetically) in combination with dexamethasone alone or dexamethasone plus remdesivir for the treatment of COVID-19 in hospitalized patients on high-flow oxygen or noninvasive ventilation who have evidence of clinical progression or increased markers of inflammation.” The NIH Panel could not reach consensus on a recommendation for use of either medication for patients with signs of systemic inflammation and rapidly increasing oxygen needs while on steroids but not requiring non-invasive ventilation or high flow oxygen. The NIH panel did not comment on their prior recommendation to use tocilizumab in recently admitted patients requiring ICU care < 24h and mechanical ventilation.

In consideration of these NIH recommendations, and new baricitinib clinical trial data, our updated guidance:

- Consider **baricitinib** if the following criteria are met:
  - Use with steroids (preferred):
    - Severe or critical disease and meets criteria for steroids
    - Escalating oxygen via nasal cannula requirements OR
    - Requiring high flow oxygen or non-invasive ventilation
  - Use in place of steroids:
    - Meets criteria for steroids AND
    - Has a contraindication to steroids

- **Baricitinib dosing:**
  - 4 mg PO once daily
  - Adjust dosing for renal failure as follows:
    - CrCl 30-59 mL/min: 2 mg PO once daily
    - CrCl 15-29 mL/min: 1 mg PO once daily
### Contraindications:
- CrCl < 15 mL/min
- Use with caution in immunocompromised patients
- Discontinue if absolute lymphocyte count < 200 cells/ml or ANC < 500 cells/ml. Can restart once above these thresholds.
- Interrupt treatment if drug-induced liver injury is suspected or if ALT and/or AST rises to > 10x upper limit of normal

#### Use tocilizumab as an alternative to baricitinib if hospitalized < 3 days AND in ICU < 24 hours AND rapid disease progression with imminent requirement for mechanical ventilation.
  - Administer with steroids.

#### Tocilizumab dosing:
- 8 mg/kg IV x 1 dose (maximum dose: 800 mg)

- Contraindications:
  - Serious concomitant infection
  - Use with caution in immunocompromised patients, especially if recent immunomodulating drugs
  - Lab abnormalities: ANC < 500, platelets < 50, ALT > 5x ULN

- Do not administer baricitinib and tocilizumab together
- ID consultation recommended for use of both baricitinib and tocilizumab.
- Both agents require ID approval for this indication

<table>
<thead>
<tr>
<th>Casirivimab and Imdevimab</th>
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<tbody>
<tr>
<td>The FDA has now issued an EUA for the use of several neutralizing monoclonal antibodies (mAbs) that bind the receptor-binding domain of the SARS-CoV-2 spike protein for the treatment of outpatients with mild to moderate COVID-19. Published and unpublished data suggest that antibodies may help to augment decline in viral load and prevent a proportion of ED visits and hospitalizations. Current EUAs allows for the treatment of COVID-19 in ambulatory adults and children ≥ 12 year-old with mild to moderate disease.</td>
</tr>
<tr>
<td>Consider use in high-risk outpatients</td>
</tr>
<tr>
<td>Dosing: Casirivimab 600 mg and imdevimab 600 mg as a single IV infusion</td>
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</tbody>
</table>
**Contraindications:**
- Hospitalized for COVID-19
- New O2 requirement
- Worsening O2 requirement in those on home supplemental O2
- Inpatient use requires ID approval

**Convalescent plasma**
- Available via EUA. Blood bank will prioritize high-titer units.
- Outside of clinical trial, may consider for use if:
  - Severe immunocompromise not expected to mount an antibody response (e.g. recent solid organ transplant or stem cell transplant)
  - Or meets the following criteria:
    - <72 hours from symptom onset
    - Non-severe/non-critical disease
    - High-risk for progression
      - Age ≥ 75 or
      - Age ≥ 65 AND one of the following:
        - Body mass index (BMI) ≥ 35
        - DM with poor control or requiring medical treatment
        - Hypertension with poor control or requiring medical treatment
        - COPD on medical therapy
        - Coronary heart disease
        - Hemorrhagic or ischemic stroke
        - Heart failure with ejection fraction < 40%
        - ≥ stage 3b chronic kidney disease (eGFR < 45 mL/min per 1.73 m²)
    - Exclusion: Patients who have received monoclonal antibodies for treatment of COVID-19 in prior 90 days
- Use caution if concern for volume overload (e.g. severe liver disease, heart failure, renal failure not yet on renal replacement)
  Requires ID approval
### Remdesivir

Initial data suggest some benefit in time to recovery and possibly in mortality. FDA approved

- Treatment should be administered to hospitalized patients with evidence of lower respiratory tract infection (e.g. hypoxia, abnormal chest radiograph)
- **Dosing:** 200mg IV x 1, then 100mg IV q24h for 4 additional days; may consider 10 days on a case-by-case basis if not responding to initial course
- Vehicle contains cyclodextrin, which can accumulate in renal failure. Not well studied in renal replacement therapy (including intermittent hemodialysis), though likely to be safe given short duration of therapy. Dose adjustment is not required.
- **Contraindications:**
  - ALT/AST > 10 times the upper limit of normal
  - Allergy
- Requires ID approval (initial overnight dose is unrestricted)

### Steroids

Initial data suggests mortality benefit in those with severe or critical disease. No benefit (and trend towards harm) seen in those who do not require supplemental oxygen. Off-label use.

- **Dosing:** Dexamethasone 6 mg IV or PO qday (or equivalent) up to 10 days while in the hospital. Administer PO if able to take oral medication.
- **Populations:**
  - Patients undergoing mechanical ventilation, non-invasive ventilation, or high-flow nasal cannula: Most patients should be treated with steroids
  - Patients on nasal cannula: Consider steroids in those with persistently low oxygen saturation and requiring substantial supplemental oxygen (e.g. ≥ 3-4L O2) or whose trajectory suggests increasing severity of disease

**Contraindications:**
- Patients who do not require supplemental oxygen should not get steroids for the indication of COVID-19

**Factors to consider in determination of whether to withhold (or stop) steroids:**
- Uncontrolled invasive fungal infections
- Uncontrolled hyperglycemia
- Existing delirium
- Other immunosuppressive medications
• Pregnancy (dexamethasone crosses the placenta and should be discussed with OB/Maternal-Fetal Medicine before administration)

Consult ID for patients with any of the above factors to discuss relative risk/benefit of steroid administration

Tocilizumab
See “baricitinib and tocilizumab” section

Anticoagulation

o Prophylactic enoxaparin (standard dosing, 40 mg SQ QD; 40 mg SQ BID if > 120 kg or BMI > 40) is recommended for all patients with COVID-19 except those receiving full dose anticoagulation or with contraindications (e.g. active CNS bleed, severe thrombocytopenia with platelet count < 25,000).
  o Therapeutic anticoagulation can be considered in a subgroup of patients as outlined here.
  o If CrCl 15-30 mL/min, use enoxaparin 30 mg SQ Qdaily. If CrCl < 15 mL/min, use UFH 5000 units SQ q8 hours
  o Enoxaparin: If baseline elevated aPTT, obese, underweight, or CrCl<30, check peak anti-Xa level 4-6 hours after 3rd-4th dose to ensure appropriate dose (goal 0.2-0.5)
  o If persistent clotting of lines and/or worsening clinical course, therapeutic anticoagulation may be considered via multidisciplinary discussion.

Immunosuppression

o In immunosuppressed patients without COVID-19, do not make anticipatory adjustment to current immunosuppressive drugs or dosages
  o In immunosuppressed patients with COVID-19, consider reducing levels of immunosuppression if possible

Other

o Renin-angiotensin system (RAS) blockers
  ▪ Theoretical concerns have been raised as some RAS blockers may increase expression of ACE2, which may facilitate viral entry into cells. However, currently there is not clinical or epidemiological data to support this concern. Patients who routinely take ACE inhibitors or ARB medications should generally continue these medications.

o Nonsteroidal anti-inflammatory drugs
  ▪ Concerns have been raised that NSAIDs may worsen COVID-19 disease. However, to date, there is no scientific evidence connecting the use of NSAIDS with worsening COVID-19 symptoms or outcomes.

**Table 3: Critical Care**
# Respiratory and Ventilator Management

Only essential providers in the room during intubation or other aerosol generating procedures.

## Nebulizer therapy:
- Nebulizer therapy is an aerosol generating procedure and should be avoided except:
  - ICU-level care due to respiratory status
  - Requiring high-flow nasal oxygen or non-rebreather mask
  - Inability to follow commands (altered mental status, severe cognitive impairment)
  - Mechanically ventilated and can be delivered in-line with circuit.

## Non-invasive respiratory support:
- High flow nasal oxygen (HFNO) should be considered for use in hypoxemic patients but caution with higher flows (e.g. >25 LPM) in order to avoid emergent intubation. Close monitoring of respiratory status is essential.
- Non-invasive ventilation (NIV, e.g CPAP or BiPAP) should only be used in selected patients with respiratory failure or known obstructive sleep apnea.
- Both HFNO and NIV are aerosol generating procedures and require airborne precautions.
- Patients receiving either HFNO or NIV should be cared for in a monitored setting by personnel capable of performing endotracheal intubation.

## Intubation:
- Emergent intubations are to be avoided given the prolonged time to apply PPE and increased risk of infection to the person performing the intubation.
- Only experienced providers should perform intubation.
- Consider video laryngoscopy as preferential airway equipment.
- Once intubated, minimize circuit disconnects and use in-line suction.

## Mechanical Ventilation and Advanced Respiratory Care:
- Lung protective ventilation is the mainstay of care: preferred mode is volume controlled ventilation with low tidal volume (6 mL/kg predicted bodyweight) with a plateau airway pressure of less than 30 cm H2O.
- For severe hypoxemia (P/F ratio < 150) consider:
  - Moderate-high PEEP
  - Recruitment maneuvers (monitor hemodynamics and discontinue if patient develops hypotension or no improvement in driving pressure or oxygenation)
  - Deep sedation +/- neuromuscular blockade, especially with ventilator asynchrony.
- Early use of manual proning

### Extracorporeal Membrane Oxygenation (ECMO) Considerations
ECMO (VA or VV, as appropriate) will be considered per criteria established by Critical Care Medicine and Cardiac Surgery

### Continuous Renal Replacement Therapy (CRRT)
- For patients with acute kidney injury (AKI), consider delaying CRRT until significant metabolic complications arise ($K > 5.5 \text{ mmol/L}$) or until significant positive fluid balance despite high-dose diuretics or unable to achieve lung protective ventilation due to severe metabolic acidosis
- For ESRD patients, CRRT should be used to avoid markedly positive fluid balance, which may exacerbate hypoxemia

**Table 4: Palliative Care**

#### Palliative Care (PC) best practices
- For primary teams:
  - Perform a Goals of Care discussion within 48hrs of admission and offer age- and comorbidity-specific prognostic information
  - Use the comfort care order set for actively dying patients (consult PCS only if there are questions or additional support is needed)

#### Indications for Palliative Care Consultation unique to patients with COVID-19
- All patients with COVID-19 in the ICU
- Emotional, spiritual and symptomatic support at the end of life for patient/family
- Ethical decision making

### Caring for the Caregiver
- The Caring for the Caregiver Program is dedicated to providing support to faculty, staff and trainees experiencing emotional distress related to the clinical care of patients
- Please contact caringforthecaregiver@ucsf.edu anytime to request support for yourself or a peer (can also coordinate group debriefings)

**Table 5: Discontinuation of isolation and discharge considerations**

### Discontinuation of Isolation at UCSF Health
See COVID-19 Guidelines for Discontinuing of Isolation

<table>
<thead>
<tr>
<th>Discharge considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Discharge coordination for hospitalized patients with COVID-19 requires advanced planning and close coordination between multiple disciplines in the hospital including clinicians, infection control, and case management, particularly for discharge to congregate settings</td>
</tr>
<tr>
<td>o Coordination with local departments of public health is mandatory for all patients. DPH COVID Discharge Hotline: 415-554-2830</td>
</tr>
<tr>
<td>o Explicit guidance and return precautions for evaluation of concerning symptoms after discharge must be provided (utilize prepared communications tools with anticipatory guidance)</td>
</tr>
<tr>
<td>o Inpatient discharge dot-phrases:</td>
</tr>
<tr>
<td>o .COVIDPOSINPTDCED</td>
</tr>
<tr>
<td>o .COVIDPOSINPTDCEDES (Spanish)</td>
</tr>
<tr>
<td>o Outpatient discharge dot-phrase:</td>
</tr>
<tr>
<td>o .COVIDDISCHARGEADULT</td>
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<table>
<thead>
<tr>
<th>Self-discharge:</th>
</tr>
</thead>
<tbody>
<tr>
<td>o All Patients</td>
</tr>
<tr>
<td>o Notify attending and DPH COVID-19 Containment Call Center 628-652-2810 if patient:</td>
</tr>
<tr>
<td>▪ SEEMS to want to leave the hospital against medical advice</td>
</tr>
<tr>
<td>▪ HAS left against medical advice; or</td>
</tr>
<tr>
<td>▪ Declines Isolation and Quarantine</td>
</tr>
<tr>
<td>o Complete SFDPH COVID Case Report Form CMR 043020 on ALL COVID+/PUI patients; fax to number on form</td>
</tr>
<tr>
<td>o Homeless patients</td>
</tr>
<tr>
<td>o Email DPH AMA recovery at <a href="mailto:covid19AMArecovery@sfdph.org">covid19AMArecovery@sfdph.org</a> (24/7, 7 days a week) and/or call 415-608-1515 (M-F 8am-8PM)</td>
</tr>
<tr>
<td>o Include information:</td>
</tr>
<tr>
<td>▪ name</td>
</tr>
<tr>
<td>▪ date of birth</td>
</tr>
<tr>
<td>▪ time they departed</td>
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<tr>
<td>▪ whether they are a PUI or Covid Positive</td>
</tr>
<tr>
<td>▪ Information about where they may have gone/phone number</td>
</tr>
</tbody>
</table>
Discharge to Skilled Nursing Facilities
Patients can be discharged to SNF and LTAC at this time while still on precautions if the accepting SNF has adequate PPE supply/training and:

- Improvement in respiratory symptoms; AND
- At least 24 hours fever-free without use of anti-pyretic

Discharge to Group Settings
- If the patient has the ability to isolate after discharge, they are able to return to RCFE/Group setting.

Reviewed by representatives from:
- Care Delivery Committee
- Hospital Medicine
- Critical Care Medicine
- Infectious Diseases
- Pharmacy
- Nephrology
- Case Management

References:


