

Clinical Manifestations

- Fever 44-94% (less common earlier in course)
- Cough 68-83%
- Anosmia and/or ageusia ~70%
- Myalgias 11-15%
- Shortness of breath 11-40%
- URI symptoms 5-25%
- GI symptoms 3-17%

High Risk Groups

- Demographics: older age, male
- Comorbidities: cardiovascular disease, HTN, obesity, pulmonary disease, diabetes, malignancy, immunosuppression

Clinical Course

Duration of Symptoms ([Zhou et al, Lancet, 2020](#); [Young et al, JAMA, 2020](#))

- Fever, median 4-12 days
- Dyspnea, median 13 days
- Cough, median 19 days

Timing of Complications from symptom onset ([Zhou et al, Lancet, 2020](#))

- Sepsis, median 9 days
- ARDS, median 12 days
- Acute cardiac injury, median 15 days
- AKI, median 15 days
- Secondary bacterial infection, median 17 days

Testing Guidelines

All hospitalized patients should receive COVID-19 testing

- Santa Clara County Health Department testing guidelines found [here](#) (5/2/20)
- California Health Department guidelines found [here](#) (5/1/20)
- SHC interventional platform testing criteria and protocols for procedures and surgeries found [here](#) (6/1/20)

Initial Work-Up for Suspected COVID-19

COVID-19 Testing

- Obtain nasopharyngeal swab for non-rapid COVID-19 (LABSARSCOV2) or rapid (LABSTATCOV2) or test*

OPTIONAL: Respiratory Pathogen PCR panel (can be ordered as add-on to COVID swab)

Labs

- CBC with diff
- CMP
- Procalcitonin
- Ferritin
- D-dimer
- CRP
- LDH
- PT/INR
- PTT
- Thrombin time
- Fibrinogen
- Type and screen

Additional labs

- Tnl/pro-BNP IF cardiac symptoms or volume overload
- Blood cultures x2 and sputum gram stain and culture IF concern for bacterial superinfection

Studies/Imaging

- Portable CXR (optional)
 - EKG IF cardiac symptoms of volume overload
- Usually NOT Necessary:
- CT Chest
 - CXR PA/Lateral

Lab and Imaging Results in COVID-19

Labs

- CBC with lymphopenia* (35-83%) and variable white blood cell count
 - Elevated AST/ALT* (28-38%)
 - Elevated CRP*
 - Elevated d-dimer*
 - Elevated troponin*
 - Normal procalcitonin (though can be elevated in those requiring ICU care)
- *Potential marker of disease severity

Studies

- CXR – variable, bilateral patchy opacities most common
- CT – ground glass opacification with or without consolidative abnormalities; more likely bilateral with peripheral distribution

+If no alternative diagnosis and high suspicion for COVID-19 despite negative test, continue isolation and repeat NP swab in 2-4 days

Respiratory Management

- [SHC COVID-19 Oxygen Support Guidelines](#) (5/26/20)
- PUI or COVID-19-positive patients receiving oxygen via nasal prongs should have a surgical mask that covers their nose and mouth when any provider is in the room
- Switch to a non-rebreather (NRB) mask if > 6 LPM of oxygen is required
- High Flow Nasal Cannula may be considered in the ICU setting if the patient is on 15LPM via NRB and PO2 < 65 or SaO2 < 92%.
- NIPPV (CPAP or BIPAP) may be used in select patients only.
- Consider trial of awake proning in patients with respiratory symptoms or requiring supplemental oxygen following these [SHC Guidelines](#)

Monitoring Labs/Studies

- Daily or QOD (based on clinical judgment): CBC with differential and CMP
- Trend DIC panel every 3 days if stable (increase to daily if abnormal)

When to Call the ICU

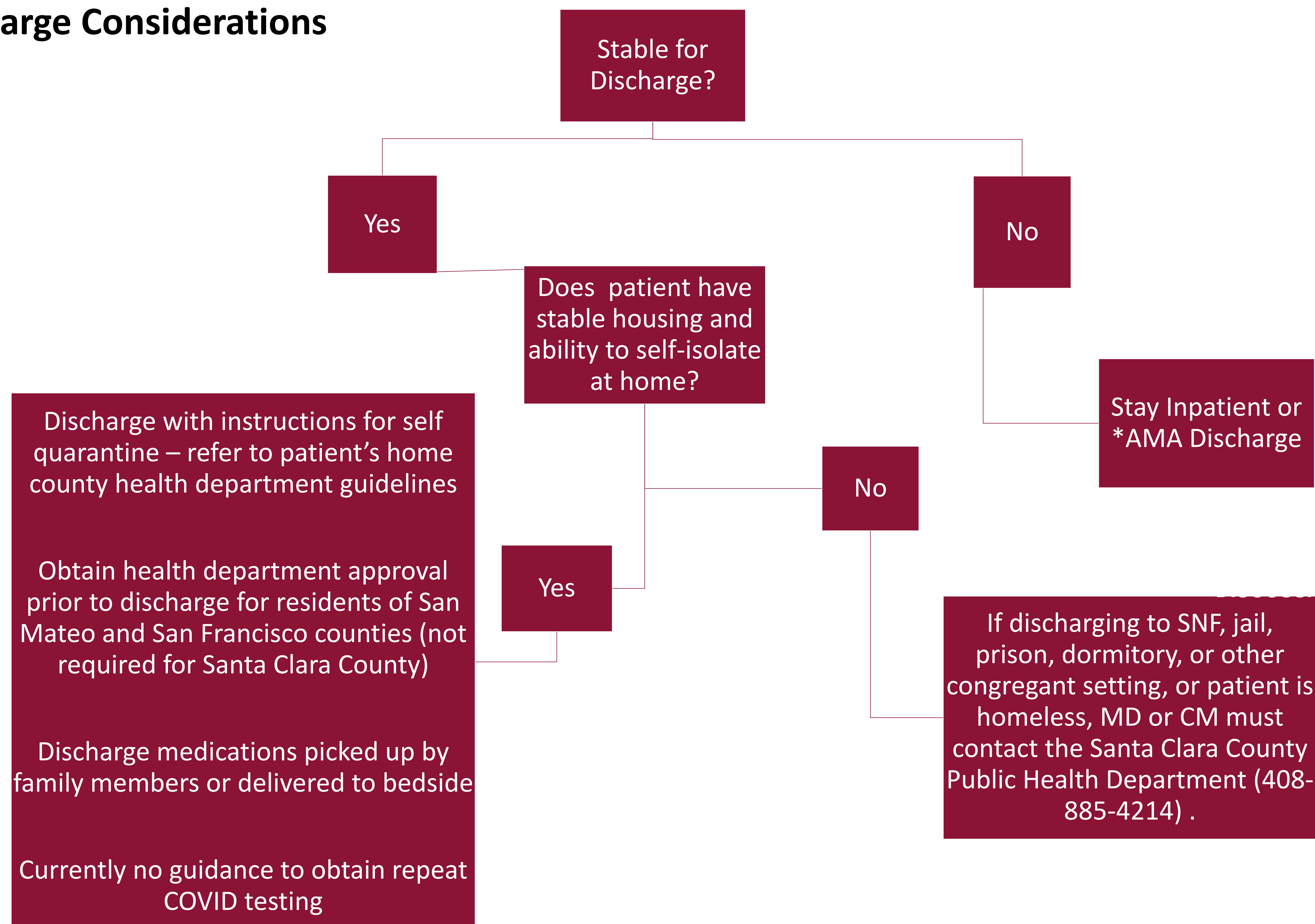
- Provider Concern
- Respiratory Distress (needing > 4L NC to maintain Spo2 >92% or PaO2 > 65, rapid escalation of O2 requirement, or significant work of breathing)
- Hemodynamic instability after initial conservative fluid resuscitation
- Severe comorbid illness or high concern for deterioration

COVID-19 and PUI Decedent Care (SHC Guidelines 4/12/20)

For all COVID/PUI deaths:

- Provider immediately contacts coroner: 408-793-1900, ext. 2
- If coroner releases the case, approach family for Consent for Autopsy at Stanford
- Infection Prevention and Control to notify Public Health Department of patient's county of residence
- For cause of death, list <cause A,B,C> due to COVID-19; if PUI do not mention COVID-19 (Decedent Care Chaplain will amend if positive)
- Questions? Contact decedent care chaplain via Voalte or pager 25683

Discharge Considerations



*AMA Discharges (SHC Guidelines 3/22/20)

Patients who have capacity and who want to refuse medical treatment or hospitalization have the legal right to do so.

- For concerns about capacity, page Ethics (#16230) or Voalte the on-call Ethics consultant
- Discuss with the patient the risks of leaving and document discussion in the chart including the reason the patient wants to leave.
- Notify the patient that we are required to contact the Public Health Department and document this
- Request that the patient sign the AMA form and scan form into EPIC. If the patient refuses to sign, document their refusal in the chart.
- Contact Santa Clara County Public Health Department. Phone: (408) 885-4214
Email: disease@phd.sccgov.org

COVID-19 Supportive Treatment

For a literature review of experimental therapies, click [here](#).

IV fluids

Use *conservative* fluid management to mitigate risk of progression of respiratory failure

Antibiotics

• Only use if concern for superinfection – use procalcitonin for guidance

Refer to [CAP](#) guidelines

Anti-pyretics

• ACE2 receptor which SARS-CoV-2 binds to is upregulated by NSAIDs

• WHO does NOT recommend against using NSAIDs
• Can use acetaminophen as needed (check LFTs)

Bronchodilators

• Increased risk of aerosolization with nebulizers compared to MDI

• Use MDI over nebulizers

Anticoagulation (adapted from Stanford Hematology)

• Initiate SCDs and prophylactic anticoagulation unless contraindication
• Treatment dose anticoagulation NOT recommended by Stanford Hematology at this time in the absence of confirmed or strongly suspected thrombosis
• DOACs are not first choice due to drug-drug interactions with antivirals and interference with anti-Xa monitoring

VTE prophylaxis for non-ICU patients:

Weight	CrCl > 30	CrCl < 30
< 50 kg	Enoxaparin 30 mg daily	Unfractionated heparin 5000 units BID
50-100 kg	Enoxaparin 40 mg daily	Enoxaparin 30 mg daily if CrCl 15-30 (preferred) or unfractionated heparin 5000 units TID
> 100 kg or BMI > 40	Enoxaparin 40 mg BID or 0.5 mg/kg daily	Unfractionated heparin 7500 units TID

• Post-discharge VTE prophylaxis

• Consider in patients with additional VTE risk factors such as older age, obesity, active cancer, or immobilization. Bleeding risk must be taken into consideration.

• Reasonable post-discharge VTE prophylaxis regimens:

- Rivaroxaban 10 mg daily for 31-39 days (MAGELLAN trial)
- Enoxaparin 40 mg daily x 2-4 weeks

VTE prophylaxis for ICU patients:

Weight	CrCl > 30	CrCl < 30
< 60 kg	Enoxaparin 30 mg BID	Unfractionated heparin 5000 units BID-TID
60-100 kg	Enoxaparin 40 mg BID	Unfractionated heparin 10000 units BID
> 100 kg or BMI > 40	Enoxaparin 0.5 mg/kg BID	Unfractionated heparin 10000 units TID

Therapeutic anticoagulation:

Goal platelet count > 50 K, if less, consult Hematology.

Discuss dosing with pharmacy if CrCl 30-60. Use UFH if CrCl < 30.

Weight	Enoxaparin (CrCl > 60)
40-150 kg	1 mg/kg every 12 hours
> 150 kg	0.75 mg/kg every 12 hours

If contraindication to enoxaparin, use UFH
Follow heparin protocol based on and adjust for goal anti-Xa 0.3-0.7 units/mL

Mucolytics

• Infection can lead to thick secretions/mucous plugs but airway clearance treatment can increase aerosolization

• Do NOT use flutter valve and cough assist devices without Pulmonary consult

COVID-19 Chronic Medication Management

ACEi/ARB

- ACE2 receptor which SARS-CoV-2 binds to is upregulated by ACEi/ARB

- Per the ACC/AHA/HFSA → do NOT discontinue ACEi/ARB in patients who are already taking them

Statins

- Per the ACC, continue statin if already on one (unless acute rhabdomyolysis)
- Unclear data on initiating a statin as novel therapy, but currently no harm shown

COVID 19 Organ System Involvement

Pulmonary

- Dry cough (59%)
- Dyspnea (31%) → if not a presenting symptoms, develops at 5-8 days after admission
- Sputum production (27%)
- Pneumonia with bilateral patchy infiltrates
- ARDS (20%) → about 8-12 days after diagnosis
- Acute hypoxic respiratory failure → rapid progression to intubation (12-24 hours)

Cardiac

- Acute cardiac injury in 7-22% of hospitalized patients
 - ACS
 - Stress cardiomyopathy/heart failure
 - Demand ischemia
 - Viral myocarditis
- Arrhythmia (17%)
- Shock was rarely a presenting sign and usually presented after days of critical illness

Renal

- AKI in 2-29% of patients
 - Etiology primarily ATN due to direct cellular injury from virus or shock
- Proteinuria (44%)
- Hematuria (26.9%)
- Renal replacement therapy needed in 1-5% of hospitalized patients and associated with worse outcomes

Hematologic

- Cytokine storm and secondary HLH
- Increased risk of VTE
- DIC (median 4 days from hospitalization)
- Microthrombi in pulmonary vasculature
- Lymphopenia, ↑ LDH, ↑ ferritin, ↑ D-Dimer

GI

- GI symptoms (nausea/diarrhea) manifested before respiratory symptoms about 10% of the time
- Diarrhea (2-10%) → COVID+ stool test
- Elevated ALT or AST (53%)

ENT

- Loss of smell or taste

COVID-19 Adult Quick Clinical Guide: References

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