### 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 (including HTN), pulmonary disease, diabetes, malignancy, immunosuppression, coronary artery disease

### Initial Work-Up for Suspected COVID-19

**COVID-19 Testing**
- Obtain nasopharyngeal swab for non-rapid COVID-19 (LABSARSCOV2) or rapid (LABSTATGOV2) or test*
  - OPTIONAL: Respiratory Pathogen PCR panel

**Labs**
- CBC with diff
- CMP
- Procalcitonin
- Ferritin
- D-dimer
- CRP
- LDH
- PTT
- INR
- Fibrinogen

**Additional labs**
- TnI/pro-BNP IF ICU OR volume overload PLUS one of the following (a) anginal chest pain or (b) SOB
- Blood cultures x2 and sputum gram stain and culture IF concern for bacterial superinfection

**Studies/Imaging**
- Portable CXR (optional)
- EKG IF TnI/pro-BNP abnormal

*Indications for Rapid COVID-19 found here: SHC guidelines 4/30/20

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

### 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](4/30/20)

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

Discharge with instructions for self quarantine per county guidelines: Santa Clara, San Mateo, San Francisco

Obtain health department approval prior to discharge for residents of San Mateo and San Francisco counties (not required for Santa Clara County)

Discharge medications picked up by family members or delivered to bedside

Currently no guidance to obtain repeat COVID testing

Stable for Discharge?

Yes

Does patient have stable housing and ability to self-isolate at home?

Yes

Stay Inpatient or *AMA Discharge

No

No

If discharging to SNF, jail, prison, dormitory, or other congregate setting, or patient is homeless, MD or CM must contact the Santa Clara County Public Health Department (408-885-4214).

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

*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

Respiratory Management

- Non-invasive ventilation (BiPAP, CPAP), Humidified Venturi Masks, and nebulizers all increase aerosolization and should not be used in caring for PUI or COVID-19 patients.
- High Flow Nasal Canula (HFNC) can be considered in selected patients based on these SHC Guidelines
- If COVID+ or PUI requires oxygen beyond nasal cannula consider non-rebreather or intubation
- Consider trial of awake proning in patients with respiratory symptoms or requiring supplemental oxygen following these SHC Guidelines
- If a low-suspicion PUI has another reason for NIPPV (e.g. chronic nocturnal BiPAP), consult ICU to discuss (SHC Guidelines 3/28/20)

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)

COVID-19 Adult Quick Clinical Guide: Inpatient Management

Respiratory Management

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# COVID-19 Supportive Treatment

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

<table>
<thead>
<tr>
<th><strong>IV fluids</strong></th>
<th>Use <em>conservative</em> fluid management to mitigate risk of progression of respiratory failure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antibiotics</strong></td>
<td>Refer to <a href="#">CAP</a> guidelines</td>
</tr>
<tr>
<td>• Only use if concern for superinfection – can use procalcitonin for guidance</td>
<td>If flu +, treat with oseltamivir 75 mg BID x 5 days</td>
</tr>
<tr>
<td>• Check patients for flu co-infection</td>
<td><strong>Anti-pyretics</strong></td>
</tr>
<tr>
<td></td>
<td>• WHO does NOT recommend against using NSAIDs</td>
</tr>
<tr>
<td></td>
<td>• Can use acetaminophen as needed (check LFTs)</td>
</tr>
<tr>
<td><strong>Bronchodilators</strong></td>
<td>• Use MDI over nebulizers</td>
</tr>
<tr>
<td>• Increased risk of aerosolization with nebulizers compared to MDI</td>
<td><strong>Anticoagulation</strong></td>
</tr>
<tr>
<td></td>
<td>• If CrCl &gt; 30, use enoxaparin 40 mg SQ daily (if body weight &gt; 100 kg, use enoxaparin 60 mg SQ daily)</td>
</tr>
<tr>
<td></td>
<td>• If CrCl &lt; 30, use enoxaparin 30 mg SQ daily (or heparin 5000 units SQ BID or TID, but prefer enoxaparin to minimize nursing burden)</td>
</tr>
<tr>
<td></td>
<td>• If platelets &lt; 30 or bleeding, use SCDs</td>
</tr>
<tr>
<td></td>
<td>• If chronically on anticoagulation, reassess indication for anticoagulation and if therapeutic dosing indicated, switch to enoxaparin 1 mg/kg BID to decrease drug-drug interactions, decrease monitoring, and ease drug reversal</td>
</tr>
</tbody>
</table>

**Transfusion goals for DIC or significant bleeding**

| Transfuse cryoprecipitate if fibrinogen < 100 mg/dL |
| Transfuse 1 unit of platelets if platelets < 50 K/uL |
| Transfuse FFP if INR > 2 and fibrinogen < 100 |
| Consider Hematology consult for [ISTH DIC](#) ≥ 5 |
| • Moderate increase in D-dimer 500-5000 ng/mL |
| • Severe increase in D-dimer > 5000 ng/mL |

| **Mucolytics** | • Do NOT use flutter valve and cough assist devices without Pulmonary consult |
| • Infection can lead to thick secretions/mucous plugs but airway clearance treatment can increase aerosolization |
# COVID-19 Adult Quick Clinical Guide: Chronic Medications and Organ System Involvement

## COVID-19 Chronic Medication Management

<table>
<thead>
<tr>
<th>Medication</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACEi/ARB</td>
<td>Do not discontinue ACEi/ARB in patients who are already taking them.</td>
</tr>
<tr>
<td>Statins</td>
<td>Continue statin if already on one (unless acute rhabdomyolysis). Unclear data on initiating a statin as novel therapy, but currently no harm shown.</td>
</tr>
</tbody>
</table>

## 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

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*Saloni Kumar, MD, Julia Caton, MD, Neera Ahuja, MD, Meghan Ramsey, MD, Shanthi Kappagoda, MD, Lisa Shieh, MD, Stanford University Department of Medicine; Updated 5/5/20*