



Table 1: Definition of mild-moderate-severe-critical COVID-19 disease and risk factors for Severe COVID

COVID-19 Definitions	Risk Factors for Severe COVID-19	Immunocompromising Conditions
Mild Disease: Any of the signs and symptoms of COVID -19 (eg. Fever, cough, sore throat, malaise, headache, muscle pain) without shortness of breath, dyspnea, or abnormal chest imaging and who do not meet criteria for moderate or severe illness.	Age ≥ 65 yrs	Currently receiving or within one year of treatment with B-cell depleting therapy (eg. Rituximab, ocrelizumab, ofatumumab, alemtuzumab)
	BMI ≥ 25	
Pregnancy		
Diabetes		
Moderate disease: Evidence of lower respiratory disease by clinical assessment or imaging and a saturation of oxygen (SpO ₂) ≥ 94% on room air at sea level.	Cardiovascular disease, hypertension or lung disease	Hematopoietic stem cell transplant within past 2 years
	Immunocompromising condition or on immunocompromising therapy (next column)	Multiple myeloma on therapy
Severe disease: Evidence of pneumonia or severe respiratory distress by clinical assessment or imaging and a saturation of oxygen (SpO ₂) < 90% on room air at sea level.	Any condition or demographic/racial/ethnic factor determined by the clinician to raise risk of progression	CLL on therapy
		Solid organ transplant on immunosuppressive medication
Critical Disease: Severe disease + ARDS, sepsis, septic shock, and/or requires life-sustaining treatment		Severe congenital immunodeficiency
		Other hematological malignancy on treatment
		Other immunosuppressive conditions on therapy
		Common Variable Immunodeficiency
		Advanced or untreated HIV/AIDS infection

Adapted from ZSFG COVID-19 Outpatient Treatment Guidelines Version 1.0 Date 1/4/2022 and WHO Living Guidance for Clinical Management of COVID-19, update 11/23/21

Table 2: Tier Priority for receipt of limited outpatient therapies

	Tier 1 – highest priority	Tier 2 – second priority	Tier 3 – lower priority
Patient Risk Factors	-Immunocompromised (see table 1) -High-risk pregnancy -Age ≥ 65 yo and not fully vaccinated per current CDC criteria	-Not fully vaccinated per current CDC criteria PLUS - At least 1 risk factor for severe COVID -Non high risk pregnancy	-Symptomatic -Mild-Moderate disease -At least 1 risk factor for severe COVID
Recommended medications (see table 3)	First line: oral paxlovid or sotrovimab Second line: Oral molnupiravir (not indicated for pregnancy)	First line: oral paxlovid or sotrovimab Second line: Oral molnupiravir (not indicated for pregnancy)	First line: oral monupiravir

Adapted from ZSFG COVID-19 Outpatient Treatment Guidelines Version 1.0 Date 1/4/2022

COVID-19 MANAGEMENT RECOMMENDATIONS AND WHEN TO CONSULT INFECTIOUS DISEASE

Consult ID for the following scenarios:

- Positive COVID-19 test and concern for secondary infections
- Positive COVID-19 test in transplant or AIDS/immunocompromised patients
- Positive COVID-19 test in severely ill pregnant patients
- Remdesivir may be considered if patient fits Criteria. **No longer requires Infectious Disease approval prior to use.**

All isolation, transport, and personal protective equipment questions to be directed to Infection Prevention (available on tiger text as Infection Prevention Team) & 805-652-3383.

Most patients with moderate to severe disease are receiving dexamethasone +/- remdesivir. 1 dose Tocilizumab may now be considered in rapidly declining patient going to ICU early in admission.

Step 1: LABS. Obtain the following labs: CBC with diff, CMP, procalcitonin, Ferritin, CPK, CRP, LDH, ESR, D-Dimer, Quantiferon, troponin. If ICU status, get ABG.

Step 2: ROOM PREP. To prepare for COVID admission. Set up room with IPAD and all other necessary material. Secure a hygienist if available. Ensure safe transport from ED to room if applicable and notify patient, RN, PT/OT that PRONING & Incentive Spirometer need to be initiated ASAP. Notify ICU if patient is requiring $\geq 75\%$ FiO₂ (see page 10 for ICU Admission Criteria).

Step 3: CONSENT: No longer need to print and sign consent forms to put in chart. However all meds should be discussed with patient and reviewed risks/benefit before ordering

Step 4: PLASMA

No longer routinely recommended for inpatients. May be considered early on as in ER visit, or if patient admitted for another reason and has COVID 19 and within 72 hours of onset of symptoms.

Patient MUST sign consent form if decision to give.

Step 5: STEROIDS. Investigate for risks of immunosuppression, h/o infection/TB/HIV. If not contraindicated, start **dexamethasone IV or PO 6mg q daily** with **famotidine IV or PO 20mg BID** for GI protection. **Dexamethasone and famotidine duration is 10 days maximum (discontinue when off oxygen or discharge, whichever is first).**

Step 6: REMDESIVIR

Refer to Table 3 for criteria for remdesivir and consider discussion with attending prior to ordering.

- If treatment is indicated, and patient meets criteria, can order the medication. This drug is NO LONGER RESTRICTED; does not need ID Physician or ID Pharmacist approval.

Step 7: TOCILIZUMAB/BARICITINIB

- Tocilizumab 1 dose can be considered in conjunction with steroids early in admission ONLY for patients with evidence of cytokine storm/rapid deterioration and requiring at least 50% FiO₂. **Must discuss with ICU ATTENDING or ID for approval**

If unavailable, sarilumab may be substituted for same indication. If both tocilizumab and sarilumab are unavailable, baricitinib may be substituted for same indication.

Step 8: DVT PROPHYLAXIS. See Hem/Onc recs on page 17. http://hospitals.vchca.org/images/medical_staff/Department_Pearls_2020_8_17.pdf

Step 9: ANTIBIOTICS. If procalcitonin >0.5 , clinical worsening + high suspicion of bacterial superinfection (such as concerning CXR), may consider azithromycin + ceftriaxone after discussion with attending. If going to ICU, obtain MRSA nares screen and sputum culture.

Step 10: FAMILY UPDATES. The most critical step is that the residents **update family members daily** since they are unable to visit their loved ones. Can use phone, ipads in room, etc

Table 3: Experimental/Restricted Medication Chart for COVID-19 positive patients in no specific order.

ALL DOSES OF MEDICATIONS REQUIRE INFORMED CONSENT TO BE SCANNED INTO CERNER PRIOR TO ADMINISTRATION

DRUG NAME	PROPOSED MECHANISM	BEST CANDIDATE	ADVERSE REACTIONS	DOSING GUIDELINES
Remdesivir	<p>Blocks RNA dependent polymerase</p> <p>FDA APPROVED for adults and children ≥ 28 days of age and older and weighing ≥ 3kg</p>	<p>Recommend for those with the following criteria: - <u>5d course</u> for hospitalized with confirmed mod-severe COVID, requiring > 2 Liters per minute O2 nasal cannula to maintain SpO2 >93%, duration of symptoms ≤ 10 days from onset <i>OR</i> - <u>3d course</u> for symptomatic Mild COVID-19 (not on O2), has at least one RF (prefer Tier I or II from table 2), duration of symptoms ≤ 7 days from onset</p> <p><u>NOTE: Okay to use in eGFR < 30ml/min and HD pts</u> Now FDA approved for use in mod-severe COVID-19. Patient does NOT need to sign consent in order to use for this indication. - Patient must meet above Criteria, NO LONGER REQUIRES ID APPROVAL</p>	<p>Increased liver enzymes Hypotension during infusion Nausea/vomiting <u>Reversible kidney injury</u> Potential for drug-drug interactions.</p>	<p>200 mg IV day 1 then 100 mg IV daily X 5 days total for Mod-Severe COVID-19</p> <p>200 mg IV on day 1 then 100mg IV daily x3 days <u>total for Mild COVID-19</u> May consider up to 10 days total if intubated Consider daily LFTS while on therapy to monitor for adverse effects, stop if ALT ≥ 10x ULN</p> <p>Do NOT use if ALT ≥ 5x Upper limit of normal prior to start</p>
Dexamethasone	<p>Reduces inflammation</p>	<p>Based on data from the Randomized Evaluation of COVID-19 Therapy (RECOVERY) trial: those on supplemental O2 had mortality benefit, with greatest benefit in those on mechanical ventilation - requiring ≥ 2 L per minute supplemental O2 by nasal cannula to maintain SpO2 > 93% - RECOVERY trial noted worse outcomes in patients who were NOT on O2. Would not use in ‘high risk’ patients at risk for worsening, unless they develop significant hypoxemia requiring at least 2L per minute O2 that is sustained (not transient hypoxemia) due to potential harm</p> <p><u>Safety and efficacy is unknown in pregnancy</u></p>	<p>- Elevated blood sugars - Reduces immune system and thus increases risk of reactivation of latent infections (e.g. hepatitis B virus, herpes viruses, strongyloidiasis, tuberculosis, others) - Moderate cytochrome p450 (CYP) 3A4 inducer with drug-drug interactions</p>	<p>6mg IV or PO daily x 10 days - Duration is 10 days, or until discharge, whichever comes first</p> <p>Note: if patient being discharged on oxygen, patient is to complete 10 days of dexamethasone at home.</p>

Table 3 (continued): Experimental/Restricted Medication Chart for COVID-19 positive patients in no specific order.

ALL DOSES OF MEDICATIONS REQUIRE INFORMED CONSENT TO BE SCANNED INTO CERNER PRIOR TO ADMINISTRATION

DRUG NAME	PROPOSED MECHANISM	BEST CANDIDATE	ADVERSE REACTIONS	DOSING GUIDELINES
<p>Famotidine (Pepcid)</p>	<p>Blocks dysfunctional mast cell activation and histamine release</p>	<p>- Recommend using simultaneously with dexamethasone for GI protection</p>	<p>Well tolerated Diarrhea or constipation in less than 5% of people</p>	<p>20 mg po or iv q12h</p>
<p>Tocilizumab (Actemra)</p>	<p>IL-6 receptor antagonist. IL-6 level can be greatly elevated in severe COVID-19 infections. No antiviral activity</p>	<p>Patients with severe/critical illness with rapidly worsening respiratory gas exchange and excessive inflammation early in hospital stay. 1 dose may be considered ONLY on admission to DOU or ICU patients if all criteria met: 1. confirmed or high suspicion for COVID-19 2. ARDS or ARDS or SpO2 <90% on heated high flow nasal cannula >=50% or NIPPV with increasing O2 requirements over 24 hours PLUS 2 or more of the following predictors for severe disease: - Elevated troponin w/out known cardiac disease - LDH > 250 U/L - D-dimer >1000 ng/mL - CRP >7.5 mg/dL - Ferritin >500 ng/mL - Neutrophil-lymphocyte ratio >4 - IL 6 >10 pg/mL 3. ID or ICU attending approval required 4. and assess risk of latent TB. If positive weigh risks/benefits. 5. On dexamethasone 6mg IVP daily for 10 days AVOID IF HISTORY OF CHRONIC INFECTIONS OR IN SEVERLY IMMUNOCOMPROMISED</p>	<p>GI perforation Anaphylaxis Hepatic failure Tuberculosis reactivation</p>	<p>400 mg IV X1 (<65 kg) 600mg IV x1 (65-90kg) 800mg IV x 1 (>90 kg) Should be given in conjunction with dexamethasone and/or remdesivir</p>

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ALL DOSES OF MEDICATIONS REQUIRE INFORMED CONSENT TO BE SCANNED INTO CERNER PRIOR TO ADMINISTRATION

DRUG NAME	PROPOSED MECHANISM	BEST CANDIDATE	ADVERSE REACTIONS	DOSING GUIDELINES
Baricitinib	JAK Inhibitor, Disease Modifying Agent in Rheumatoid Arthritis, reduces inflammatory cascade in severe COVID-19 infections.	Patients who are receiving dexamethasone and who have rapidly increasing oxygen needs and systemic inflammation, can be added to either dexamethasone alone or dexamethasone + remdesivir -NOT RECOMMENDED in patients with impaired hepatic or renal function (estimated GFR < 60 ml/min/1.73 m ²) - NOT TO BE USED CONCURRENTLY WITH TOCILIZUMAB	GI perforation Thrombosis Transaminitis CK elevation Nausea Opportunistic infection	4 mg PO daily x 14 days. Discontinue at <14 days if need for supplemental oxygen resolves.
Sotrovimab	Monoclonal antibody	<u>NO LONGER RECOMMENDED DUE TO RESISTANT VARIANTS</u>	Hypersensitivity reactions	500 mg IV over 30 minutes infusion
Bebtelovimab	Monoclonal antibody	<u>NO LONGER RECOMMENDED DUE TO RESISTANT VARIANTS</u>	Hypersensitivity reactions	
Casirivimab + imdevimab (Regen-Cov)	Monoclonal antibody	<u>NO LONGER RECOMMENDED DUE TO RESISTANT VARIANTS</u>	Headache Injection-site reaction Hypersensitivity reactions	1200 mg SQ 1X (Casirivimab 600 mg + imdevimab 600 mg)
Bamlanivimab + etesevimab	Monoclonal antibody	<u>NO LONGER RECOMMENDED DUE TO RESISTANT VARIANTS</u>	Hypersensitivity reactions	

Table 3 (continued): Experimental/Restricted Medication Chart for COVID-19 positive patients in no specific order.

ALL DOSES OF MEDICATIONS REQUIRE INFORMED CONSENT TO BE SCANNED INTO CERNER PRIOR TO ADMINISTRATION

DRUG NAME	PROPOSED MECHANISM	BEST CANDIDATE	ADVERSE REACTIONS	DOSING GUIDELINES
Molnupiravir	Antiviral, Nucleoside analog that inhibits SARS-CoV-2 replication, induces mutation	<p>Outpatient Use only: Reduced death OR hospitalization by 30% in high risk patients</p> <p>Alternative therapy for when remdesivir or Paxlovid is not available or clinically appropriate</p> <p>NEJM RCT Included: ≥18 years of age with symptoms in last 5 days, and at least one risk factor for severe illness (these were age >60 yo, active cancer, CKD, COPD, BMI >= 30, CHF, CAD, h/o cardiomyopathy, DM).</p> <p><u>Indication: treatment of mild-moderate COVID-19.</u></p>	<p>Diarrhea Nausea Dizziness Muscle aches</p> <p>- obtain negative pregnancy test before prescribing. Men should use contraception 3 months after taking it to prevent pregnancy due to fetal toxicity</p>	<p>800mg (4x 200mg capsules) PO BID x5 days</p> <p>No adjustment needed for liver or renal impairment Adults 18years and older. Not safe for children as it affects bone growth</p>
Paxlovid (Nirmatrelvir/ Ritonavir)	<p>Nirmatrelvir: SARS-CoV-2 main protease inhibitor Ritonavir: viral protease inhibitor (also HIV 1 protease inhibitor)</p> <p>does NOT induce mutation</p>	<p>Outpatient Use only: Reduced death or hospitalization by 88% in high-risk patients</p> <p>Can be in given if continuing outpatient therapy or if hospitalized with non-COVID related diagnosis</p> <p><i>Note: RCTs (EPIC-HR and EPIC-SR Trials have not been peer-reviewed or completed, respectively, yet)</i></p> <p><u>NEJM RCT Included:</u> Adults with symptoms in last 5 days, and at least one risk factor for severe illness</p> <p><u>Study excluded:</u> Active liver disease, on dialysis or mod/severe renal impairment, current/active non-COVID-19 systemic infx, HIV with VL <400, current use of CYP3A4 metabolism med, or those with SARS-CoV-2 vaccination</p> <p><u>Indication: treatment of mild-moderate COVID-19</u></p>	<p>Dysgeusia Diarrhea Myalgia Hepatotoxicity</p> <p>Has significant drug-drug interactions with CYP3A4 such as statins and blood thinners</p> <p>Unknown risk in pregnancy</p> <p>Ok to use in patients with HIV and Hep C, refer to IDSA guidelines for specific risks for these patient groups</p>	<p>Nirmatrelvir 150mg 2 tablets BID x5 days AND Ritonavir 100mg one tablet BID for 5 days</p> <p>For eGFR >30 and <60 ml/min, decrease dose to nirmatrelvir 150 mg BID x 5 days. same ritonavir dose</p> <p>-Not recommended for GFR <30 -Not recommended in severe hepatic impairment (Child-Pugh Class C) >12 years old and weight >40kg</p>

Table 3 (continued): Experimental/Restricted Medication Chart for COVID-19 positive patients in no specific order.

ALL DOSES OF MEDICATIONS REQUIRE INFORMED CONSENT TO BE SCANNED INTO CERNER PRIOR TO ADMINISTRATION

DRUG NAME	PROPOSED MECHANISM	BEST CANDIDATE	ADVERSE REACTIONS	DOSING GUIDELINES
Fluvoxamine	SSRI, anti-inflammatory, sigma-1 receptor	NO LONGER RECOMMENDED	Well known medication, GI upset Significant drug interactions such as blood thinners, statins, caffeine	100mg PO BID x10 days
Evusheld (tixagevimab/cilgavimab)	Monoclonal antibodies, directed at SARS-CoV-2 spike protein. Designed to block the virus' attachment and entry into human cells	NO LONGER RECOMMENDED DUE TO RESISTANT VARIANTS Outpatient Use only for PRE EXPOSURE PROPHYLAXIS EUA FDA approval for individuals <u>NOT</u> currently infected with SARS-CoV-2 virus & have <u>NOT</u> been recently exposed to anyone infected as a Pre-exposure medication, who meet below criteria:	Hypersensitivity including anaphylaxis during administration Headache Fatigue cough	300mg tixagevimab IM x1 AND 300mg cilgavimab IM x 1 given as 2 separate injections adults and pediatric patients > 12 years old & > 40 kg - If person has received COVID 19 vaccine, tix/cil should be given ≥2 weeks after vaccination - Effective for up to 6 months
Ivermectin	Inhibits SARS-CoV-2 in vitro; ~5000-fold reduction in viral RNA in cell culture 48 hours after a single treatment	NOT RECOMMENDED	Generally, well tolerated. GI upset	Dosage for COVID-19 is NOT established. 200-400 mcg/kg/dose PO

Table 3 (continued): Experimental/Restricted Medication Chart for COVID-19 positive patients in no specific order.

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DRUG NAME	PROPOSED MECHANISM	BEST CANDIDATE	ADVERSE REACTIONS	DOSING GUIDELINES
Vitamin C	Antioxidant, protects cells from oxidative stress	NO LONGER RECOMMENDED	Large doses can cause oxalate nephropathy	1000 mg BID to 1500 mg QID; PO preferred (IV=\$\$\$)
Vitamin D	Important role in immune function	Any patient is eligible. An expert consensus paper states that vitamin D supplements have not been shown to prevent or treat COVID-19 and strongly cautions against use of high doses of vitamin D. People with vitamin D deficiency may be at higher risk for more severe effects of COVID-19; avoidance of vitamin D deficiency is recommended	Large doses can cause hypercalciuria, hypercalcemia, nausea, vomiting, anorexia	Calcitriol 0.25 mcg oral daily
Zinc	Impairs replication of some RNA viruses	Any patient is eligible. Limited data did not show zinc as a reasonable treatment of COVID-19. Administration within 48 hours of symptoms is preferred. The Panel recommends against using zinc supplementation above the recommended dietary allowance	Bad taste, nausea Copper deficiency	zinc 11 mg daily for men, zinc 8 mg daily for nonpregnant women
Convalescent Plasma	Passive antibody therapy by infusion of convalescent plasma from patient who has already recovered from COVID-19	-NIH & IDSA recommend against the use of COVID-19 convalescent plasma for the treatment of COVID-19 in hospitalized patients without impaired humoral immunity - NIH/IDSA: Unclear if benefit in Non-hospitalized or hospitalized patients with impaired humoral immunity -Only one RCT showing actual benefit (decreased risk of hospitalization) are those within 72 hours onset of mild COVID-19 symptoms, are outpatients, and are >75 yo OR >65 yo with risk factors (NEJM 2020).	Uncommon, however can have transfusion reaction such as TRALI	Only high titer convalescent plasma should be used NOT RECOMMENDED ONLY USE IF OTHER OPTIONS FOR MILD COVID ARE UNAVAILABLE - must order BLOOD TYPE prior to ordering

Please refer to specialty specific documents on Medical Staff Office website (<http://hospitals.vchca.org/medical-staff-services>)

(Specific Link: [http://hospitals.vchca.org/images/medical_staff/Department Pearls 2020 8 17.pdf](http://hospitals.vchca.org/images/medical_staff/Department_Pearls_2020_8_17.pdf))

Emergency Department, Hospitalist and Critical Care Management

Therapy	Notes
<p>ICU Admission Criteria (updated 8/20/2021, reviewed 1/18/2022)</p>	<ul style="list-style-type: none"> • Admit to ICU for: FiO2 ≥ 90%, flow ≥ 40 liters per minute (HFNC), persistent tachypnea ≥ 35, persistent increased work of breathing or shortness of breath not improved by prone positioning, rapid escalation in FiO2 needs, or need for NIPPV for progressive respiratory failure in full code patient <ul style="list-style-type: none"> ○ Decision to admit to ICU will vary depending on nurse/bed availability and ICU physician discretion • ICU consultation required for need for high flow nasal cannula ≥ 75% FiO2/40 Liters per minute via HFNC, rapidly progressive symptoms, or need for NIPPV (CPAP or BiPap) • DNI patients do not need ICU level of care if there is no non-respiratory critical care need (i.e. pressors = ICU admit)
<p>Aerosolizing procedures: avoid if possible (i.e. choose MDI over nebulizer <i>if necessary</i> and if MDI equally effective)</p> <p>Note: Full PPE* mandatory for patients receiving these procedures</p>	<ul style="list-style-type: none"> • <u>Procedures:</u> Intubation, extubation, bronchoscopy, upper endoscopy, colonoscopy, CPR, NG tube placement (surgical mask over patient’s mouth may reduce aerosolization) • <u>Respiratory therapy treatments:</u> nebulizer treatments, CPAP/BiPap, Metaneb, EZ Pap, high flow nasal cannula (HFNC) > 15 liters per minute, sputum induction (do not induce sputum for COVID), chest physiotherapy, Venturi mask with cool aerosol humidification, Oxymask, cough assist • <u>Ventilator-related:</u> oscillatory ventilation, open suction of tracheostomy, tracheostomy change, manual ventilation (i.e. manual bag-valve mask ventilation prior to intubation), disconnecting patient from the ventilator, open suctioning of endotracheal tube, ventilator circuit manipulation • <u>Oxygen delivery methods:</u> Venturi mask with cool humidification, high flow nasal cannula > 15 liters/ minute (risk may be reduced by patient wearing surgical mask), higher flow rate on non-rebreather mask > 6 liters/ minute • NOT considered high risk for aerosolization: closed suctioning from endotracheal tube • NP swab is to be performed with patient’s mouth covered with surgical mask and provider in full PPE with N95* <ul style="list-style-type: none"> ○ Room may be cleaned 10 minutes after performing NP swab • Full air exchange rates required after aerosolizing procedure prior to room being considered safe to enter without full PPE: 45 minutes negative pressure room, 3.5 hours standard room at VCMC or 1.5 hours standard room at SPH
<p>Oxygen therapy</p>	<ul style="list-style-type: none"> • Per WHO Guidelines, goal SpO2 (oxygen saturation) > 94% in resuscitative phase, SpO2 > 90% ‘to any patient without emergency signs and hypoxaemia (i.e. stable hypoxaemic patient)’ and SpO2 92-95% in pregnant women
<p>High Flow Nasal Cannula (HFNC)</p>	<ul style="list-style-type: none"> • HFNC considered mainstay of therapy to reduce morbidity and mortality; recommended when oxygen by nasal cannula needs are >6 liters/minute. Heated high flow nasal cannula with adjustable FiO2 and flow rate preferred. <ul style="list-style-type: none"> ○ Patient recommended to be in a negative pressure room, and all staff entering the room must have full PPE*. <ul style="list-style-type: none"> ▪ Door closed at all times if not negative pressure • Should be abandoned in favor of NIPPV or intubation if the patient is progressively not improving • Strongly recommend HFNC use in ICU-1 ICU-2 and ICU-3 for closer observation, particularly if rapid worsening seen
<p>Non-invasive positive pressure ventilation (NIPPV): BiPap / CPAP</p>	<ul style="list-style-type: none"> • ICU consult required for initiation of Non-Invasive Positive Pressure Ventilation (NIPPV): BiPap/ CPAP • High Flow Nasal Cannula (HFNC) has been preferred over NIPPV (BiPap/CPAP) due to both concern of clinical worsening from overdistension from CPAP in patients with high tidal volumes as well as aerosolization. <ul style="list-style-type: none"> ○ Pre-print trial from medrxiv with some benefit of CPAP over HFNC—unclear impact on practice.

* Full PPE = bouffant cap, eye protection, N95 with face shield over mask so N95 can be reused, gown and gloves; do not place surgical mask over N95 per CDC recommendations

Emergency Department, Hospitalist and Critical Care Management (continued)

Therapy	Notes
Non-invasive positive pressure ventilation (NIPPV): BiPap / CPAP (continued)	<ul style="list-style-type: none"> • Initiation of NIPPV in patients with progressive respiratory failure may be trialed in patients requiring more oxygen or more respiratory support from a tachypnea/ work of breathing standpoint. <ul style="list-style-type: none"> ○ Despite transient improvement sometimes seen, NIPPV usually leads to progression of respiratory failure, though it has anecdotally prevented intubation in few cases • If using NIPPV, must be in negative pressure room if available, with all staff in full PPE*, with the following recs: <ul style="list-style-type: none"> ○ CPAP favored over Bipap if choosing to use NIPPV: less likely to aerosolize and high BiPap failure rate see at least early in COVID pandemic and less likely to over-distend. ○ May use non-invasive mode on Servo-i ventilator (dedicated exhalation limb that can be filtered) or V-60 (no exhalation limb, exhalation out the mask → aerosolization) as both can aerosolize ○ Short trial (e.g. 6-8 hours only) w/plan to intubate patients unable to transition back to high flow nasal cannula • Longer trials possible if patients able to have short breaks on HFNC for PO intake
Adjunctive Respiratory Therapy Modalities	<ul style="list-style-type: none"> • <u>Incentive Spirometer</u>: All patients should be encouraged to use incentive spirometer 10x/ hour while awake • <u>Self-Proning</u>: If any hypoxia, strongly promote self-proning for hypoxic patients (“adult tummy time”) on admission <ul style="list-style-type: none"> ○ Initial trial period of one hour on stomach supported by pillows ○ Encourage patient to adopt prone position as much as tolerated an able when in bed <ul style="list-style-type: none"> ▪ Goal is more time prone than supine ▪ Most patients not accustomed to sleeping on their stomach will take 48+ hours to acclimate <ul style="list-style-type: none"> • STRONGLY Consider PT and OT consultation for patients with challenges • <u>Nebulizers vs. MDIs</u>: non-intubated patients: use MDIs—nebulizer is aerosol generating and should be <u>avoided</u> intubated patients: utilize nebulizers via in-line Aerogen device (does not aerosolize) • <u>EZ Pap</u>: also likely aerosolizes, but may be considered if the following criteria are ALL met: <ul style="list-style-type: none"> ○ Patient requires pulmonary toilet in order to prevent respiratory deterioration and less-invasive methods (i.e. Incentive Spirometer) have been ineffective ○ Patient is cooperative with all aspects of treatment ○ Must be in negative pressure room if using, all staff in full PPE* ○ Mouthpiece is used with a good seal and good understanding to minimize aerosolization ○ Use only for lung expansion; the nebulizer portion of the treatment is to be avoided <ul style="list-style-type: none"> ▪ if wheeze present, consider MDIs separately ○ Utilize flow rates of 6 liters or less to minimize aerosolization ○ If employing EZPap, consider putting in-line viral filter • <u>Metanebs</u>: aerosolize and should be <u>avoided</u> in COVID suspected or confirmed infected.

* Full PPE = bouffant cap, eye protection, N95 with face shield over mask so N95 can be reused, gown and gloves; do not place surgical mask over N95 per CDC recommendations

Emergency Department, Hospitalist and Critical Care Management (continued)

Therapy	Notes
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Decision to intubate	<ul style="list-style-type: none"> • High flow nasal cannula and prone positioning (see Adjunctive Respiratory Therapy modalities above) are mainstays of therapies to reduce morbidity and mortality of intubation • NIPPV for progressive respiratory failure is a bridge to intubation; may be utilized to improve pre-oxygenation prior to intubation. Prolonged NIPPV with inability to wean to HFNC for meals likely should be intubated. • Intubation under semi-elective conditions much preferred to emergent intubation
Intubation	<ul style="list-style-type: none"> • Very high risk for aerosolization. Negative pressure room required if available, door closed if unavailable • Full PPE* and consider double-glove • Least amount of people in room. Most experienced conductor. Least amount of attempts. • Video laryngoscopy preferred. Disposable laryngoscope if needing direct laryngoscopy. • Viral filter to BVM <i>and</i> exhalation port of ventilator • Pre-oxygenate with non-rebreather (NRB): lower flow rates less likely to aerosolize • If marginal PPE, avoid bagging: Option #1: Facemask to ventilator set to CPAP; Option #2 Passive bag valve mask (BVM) with viral filter, PEEP valve, O2 flow—avoid actual bagging when patient not yet intubated if possible • Rapid Sequence Intubation (RSI) preferred; ensure that patient is fully paralyzed and cannot cough • Avoid unnecessary ETT confirmatory procedures. Calculate predicted ETT depth (MDCalc) or consider standard depths (~23inches male, ~21inches females). Ensure black line of ETT distal to cords • Inflate cuff, ensure viral filter on bag valve mask (BVM) before bagging/ connecting to ventilator
Post-Intubation Management	<ul style="list-style-type: none"> • Before disconnecting ETT: sedate & paralyze patient → pause ventilator <ul style="list-style-type: none"> ◦ Optional: Clamp ETT (plastic clamp preferred; if metal clamp, place lots of tape around the metal that will come in contact with the tube to reduce risk tube damage) • Closed circuit suction, Lukens trap to collect sputum for testing (COVID sputum to Public Health more sensitive) • Consider placing lines right after intubation to conserve PPE, reduce exposures • Consider waiting 45min for CXR to allow for adequate air exchanges and reduce aerosolized particles
Ventilator Management	<ul style="list-style-type: none"> • Ventilator management depends on “phenotype” of ARDS <ul style="list-style-type: none"> ◦ <u>L Type</u> (Low elastance, normal compliance): consider 8mL/kg PBW for TV, start lower PEEP (~10 cm H2O), high FiO2, keep Plateau pressure <30cmH2O ◦ <u>H Type</u> (High elastance, low compliance): Follow ARDSnet lung protective protocol: high PEEP, low TV 6-8mL/kg PBW, Plateau pressure <30 cm H2O, keep PaO2>55mmHg; SpO2 88-92%); Consider early APRV (Airway Pressure Release Ventilation: high mean airway pressures) for H Type • Consider early prone positioning after intubation for refractory hypoxia • Intubated patients are on ventilator prolonged time (>10 days) with high incidence of late deterioration

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Emergency Department, Hospitalist and Critical Care Management (continued)

Prone Positioning	<ul style="list-style-type: none"> • See Policy Stat, policy CC.27: Patient Prone Positioning in the ICU • Decision to utilize Rotaprone bed vs. manual proning: 			
		Pros	Cons	Notes
	Rotaprone Bed	<ul style="list-style-type: none"> - Less kinking of ET tube when prone - 3 staff needed for proning/supining - ‘Therapy settings’ allow frequent position changes when prone/supine 	<ul style="list-style-type: none"> - Cost of bed rental - Limited availability - Transportation delays - Possible skin breakdown 	<ul style="list-style-type: none"> - Requires IUR - Requires Biomed bed inspection prior to deployment
Manual Proning	<ul style="list-style-type: none"> - Always available if enough staff - Skin breakdown less than Rotaprone in limited local experience, though skin breakdown with manual position is also a risk - Less costly (no bed rental) 	<ul style="list-style-type: none"> - ET tube position when prone often leads to kinking - Minimum 6 staff needed for proning/supining - ET tube clamped during proning/ supining 	<ul style="list-style-type: none"> - ICU attending physician present for proning/ supining to manage head and ET tube - 1600 prone: 0800 supine is ideal schedule - q 4 hour head position changes 	
	<ul style="list-style-type: none"> • Duration of prone positioning <ul style="list-style-type: none"> ○ 16 hours prone followed by 8 hours supine is considered maximum duration of prone positioning ○ Longer duration 36 hours of prone positioning in small report safe and effective¹²; ICU Attending input required. • Paralytic vs. no paralytic during prone positioning <ul style="list-style-type: none"> ○ Paralysis considered during manual proning, usually not required for supine-ing ○ Patients being proned should be a RASS of -4 to -5; consider paralyzing on a case by case basis <ul style="list-style-type: none"> ▪ Favor paralysis for refractory hypoxia, patient-ventilator dyssynchrony • Discontinuation of prone positioning <ul style="list-style-type: none"> ○ No improvement seen with prone positioning -OR- ○ Patient improvement/no longer required: FiO2<=60%, PEEP <= 10 cm H2O, and driving pressure < 15 cm H2O • Tube Feeding when prone may continue at 25 ml/ hour; resume one hour after position changes; higher rate supine <ul style="list-style-type: none"> ○ Reverse Trendelenberg position when prone may help reduce aspiration • Wound consultation recommended for patients undergoing prone positioning 			
Tracheostomy	<ul style="list-style-type: none"> • May be considered in consultation with General Surgery at or after day 14 of intubation 			
Hematology Considerations (See VCMC Hematology guideline via Med Staff Office website for more details)	<ul style="list-style-type: none"> • High incidence of venous thromboembolism (VTE) in COVID-19 infection • VTE prophylaxis recommendations per VCMC/SPH Hematology Guidelines: 		http://hospitals.vchca.org/images/medical_staff/Department_Pearls_2020_8_17.pdf	
	<ul style="list-style-type: none"> ○ All hospitalized patients without evidence of VTE or other standard indication for therapeutic anticoagulation: standard pharmacologic VTE prophylaxis <ul style="list-style-type: none"> ▪ INSPIRATION trial showed no benefit for intermediate dose anticoagulation vs usual prophylactic dose in patients admitted to ICU with COVID-19 ▪ Similarly REMAP-CAP/ACTIV-4a/ATTACC investigators show therapeutic anticoagulation vs. prophylactic or intermediate dose anticoagulation in ICU pts with COVID-19 has yet to show benefit and may lead to more serious bleeding events 			

Emergency Department, Hospitalist and Critical Care Management (continued)

Therapy	Notes																									
Hematology Considerations (continued)	<ul style="list-style-type: none"> • D-Dimer elevation early considered measure of disease severity; consider avoiding early CT pulmonary angiogram for both fluid load and renal considerations <ul style="list-style-type: none"> ◦ Consider possible increased risk of late pulmonary embolism (27% incidence in a Dutch ICU study of 184 ventilated ICU patients, lower incidence reported elsewhere) • Consider precipitous increase in D-dimer differential = cytokine storm vs. DIC vs. thromboembolism • Discharge VTE prophylaxis may be considered on a case-by-case basis, per Hematology Recommendations: <ul style="list-style-type: none"> ◦ Not all discharged patients need to be on VTE prophylaxis; more data is needed. ◦ Consider the individual patient’s VTE risk factors, including reduced mobility, bleeding risk, feasibility, etc.. ◦ Utilize the modified IMPROVE score (MARINER trial) and offer post discharge outpatient VTE prophylaxis when patients have a score of 4 or more, or score of 2 to 3 with D-dimer >2x ULN during the hospitalization: <table border="1" data-bbox="495 537 1990 743"> <thead> <tr> <th data-bbox="495 537 604 743">Modified Improve Score</th> <th data-bbox="604 537 1194 570">Risk Factor</th> <th data-bbox="1194 537 1362 570">Risk Score</th> <th data-bbox="1362 537 1827 570">Risk Factor</th> <th data-bbox="1827 537 1990 570">Risk Score</th> </tr> </thead> <tbody> <tr> <td data-bbox="495 570 604 602"></td> <td data-bbox="604 570 1194 602">Previous VTE</td> <td data-bbox="1194 570 1362 602">3</td> <td data-bbox="1362 570 1827 639">ICU/CCU stay (including high flow nasal cannula)</td> <td data-bbox="1827 570 1990 639">1</td> </tr> <tr> <td data-bbox="495 602 604 634"></td> <td data-bbox="604 602 1194 634">Known thrombophilia (eg Factor V Leiden)</td> <td data-bbox="1194 602 1362 634">2</td> <td data-bbox="1362 639 1827 672"></td> <td data-bbox="1827 639 1990 672"></td> </tr> <tr> <td data-bbox="495 634 604 667"></td> <td data-bbox="604 634 1194 667">Lower limb paralysis/paresis</td> <td data-bbox="1194 634 1362 667">2</td> <td data-bbox="1362 672 1827 704">Complete immobilization >= 1 day</td> <td data-bbox="1827 672 1990 704">1</td> </tr> <tr> <td data-bbox="495 667 604 743"></td> <td data-bbox="604 667 1194 743">History of cancer within 5 years (excluding non-melanoma skin cancer)</td> <td data-bbox="1194 667 1362 743">2</td> <td data-bbox="1362 704 1827 743">Age >= 60</td> <td data-bbox="1827 704 1990 743">1</td> </tr> </tbody> </table> <ul style="list-style-type: none"> ◦ VTE prophylaxis would consist of Rivaroxaban 10mg daily 31 to 39 days 	Modified Improve Score	Risk Factor	Risk Score	Risk Factor	Risk Score		Previous VTE	3	ICU/CCU stay (including high flow nasal cannula)	1		Known thrombophilia (eg Factor V Leiden)	2				Lower limb paralysis/paresis	2	Complete immobilization >= 1 day	1		History of cancer within 5 years (excluding non-melanoma skin cancer)	2	Age >= 60	1
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	History of cancer within 5 years (excluding non-melanoma skin cancer)	2	Age >= 60	1																						
Cardiology Considerations	<ul style="list-style-type: none"> • Consider high incidence of myocardial suppression/shock • Conservative fluid strategy strongly recommended 																									
Code Blue / Palliative Care Considerations	<ul style="list-style-type: none"> • Consider early discussion regarding DNR status for shock, ARDS, intubated patients • Early Palliative Care Consult • Code blue considerations <ul style="list-style-type: none"> ◦ Minimize number of staff entering the room to only essential ◦ Consider placing ETT prior to chest compressions to avoid aerosolization • Consider plastic drape over patient’s face to minimize aerosolization during code if not yet intubated 																									
Environmental/ Isolation Precautions Considerations	<ul style="list-style-type: none"> • Considered airborne precautions + contact precautions (“enhanced respiratory precautions”) • Discontinue enhanced respiratory precautions only after patient considered to be non-infectious <ul style="list-style-type: none"> ◦ http://hospitals.vchca.org/images/medical_staff/Discontinuation_of_Transmission_2020_7_24_002.pdf ◦ Must be discussed with Infection Prevention (Tiger Text or 805 652-3383) prior to discontinuation • Surface survival times: 72 hours plastics/polyester, 48 hours steel, 24 hours cardboard/cotton, 4 hours copper 																									

Emergency Department, Hospitalist and Critical Care Management (continued)

<p>Step Down / Throughput Considerations</p>	<ul style="list-style-type: none"> • Criteria for step down from ICU status to DOU/Tele/MedSurg status (up to discretion of ICU Attending): <ul style="list-style-type: none"> ○ FiO2 60% and decreasing, AND ○ No increase in work of breathing, AND ○ Respiratory Rate <= 30 • Patients on High Flow Nasal Cannula should be in a room where they can be visualized (ICU-2, ICU-1 or ICU-3 and not on Med/Surg 1 or 3 at VCMC, ICU at Santa Paula) if bed availability permits <ul style="list-style-type: none"> ○ Note: recovering patients on nasal cannula may need to be transferred out of ICU to accommodate patients on high flow nasal cannula
<p>Discharge Considerations</p>	<ul style="list-style-type: none"> • Discharges to congregate living situations (i.e. skilled nursing, homeless shelter, etc.) are to be discussed with Public Health for clearance <i>for those still on isolation</i> (PH phone numbers : Monday - Friday, 8:00 am - 5:00 pm: (805) 981-5201, After-hours, weekends, and holidays: (805) 214-7057). Public Health does not need to be contacted if the patient is being discharged to home. • Home oxygen may be considered for patients who are otherwise improving but cannot come off of oxygen, though many patients remain hospitalized until off of oxygen <ul style="list-style-type: none"> ○ Home O2 for COVID positive patients at 4 liters per minute is possible through Inogen, but recommend discharge if on 2 liters per minute or less with good social support and with a pulse oximeter at home ○ Home Health agencies (as of 12/2/2020) seeing COVID positive patients in their homes include Livingston Memorial Visiting Nurse Association, Assisted, and Mission Home Health ○ Note that patients going to motel for homeless individuals cannot go to the motel if requiring oxygen • Discharge VTE prophylaxis may be considered on a case-by-case basis, per Hematology Recommendations, page 14

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7. **Wu, et al. Risk Factors Associated with Acute Respiratory Distress Syndrome and Death in Patients with Coronavirus Disease 2019 Pneumonia in Wuhan China. JAMA Internal Medicine. 3/13/2020 online publishing.**
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The following is based on experimental data and meant to offer guidance for COVID-19 clinical decision making and does not replace clinical judgment.

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