Refer to COVID checklist in the Covid Cerner Powerplan and on Med Staff Office Website

Consider COVID-19 in patients with:

- Fever
- Cough, Shortness of breath (SOB)
- Sore Throat, Loss of smell/taste
- Myalgias, Fatigue, Diarrhea, Abdominal Pain
- Exposure to COVID-19, SNF resident, pending test

LABS

- CBC with diff, CMP, procalcitonin, Ferritin, CPK, CRP, LDH, ESR, D-Dimer
- Look for leukopenia, lymphopenia, and transaminitis
- Consider Quantiferon, troponin.

MICROBIOLOGY

- Check Flu if in season, RSV, Respiratory viral panel if available
- Consider blood cultures
- Obtain NP swab. If patient very sick also obtain expectorated sputum culture, endotracheal aspirate, or bronchoalveolar lavage if possible.
  - DO NOT induce sputum

IMAGING/OTHER

- Portable CXR. AVOID unnecessary CT imaging.
- Point of Care Ultrasound (POCUS)
- EKG for concern for myocardial involvement

CLINICAL SIGNS/SYMPTOMS

- Fever in >75% of hospitalized cases at some point.
  - Almost 50% afebrile on admission
- Cough 60-80% dry/productive
- SOB 20-40%
- URI (HA, sore throat, rhinorrhea 4%)
- GI symptoms (diarrhea, nausea/vomiting) in <10%
  - Can be seen prior to respiratory symptoms
- Early symptoms: loss of taste and smell

LABS AND BIOMARKERS

- Median WBC 4.7, leukopenia in 30-45%
- Lymphopenia (absolute lymphocyte count <0.8)
- Platelets normal (slight decrease in 35%)
- AST/ALT increase in 4-22%
- CRP increase in 61-86%, ESR increase in up to 85%
- LDH >245 units/L
- Hgb decrease in 41-50%, Albumin decrease in 50-98%
- Procalcitonin: ≥ 0.5 in 5% overall, (14% if severe, 24% if ICU)
- Ferritin >300 ug/L
- D Dimer >1000ng/ml

MICROBIOLOGY

- Co-infection rates with other viruses and bacteria are unknown and reports vary.

IMAGING/OTHER

- CXR abnormal in 60% (77% if severe)
- Chest CT abnormal in 86% (95% if severe)
- Unilateral findings on CXR or CT in 14-25% (more so if mild or early)
- Most common: Bilateral ground glass opacities, patchy consolidations >50%, peripheral distribution >50%
- Nodules, cystic changes, effusions in <10%

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	
	Cardiovascular disease, hypertension or lung disease	Hematopoietic stem cell transplant within past 2 years
Moderate disease: Evidence of lower respiratory disease by clinical assessment or imaging and a saturation of oxygen (SpO2) ≥ 94% on room air at sea level.	Immunocompromising condition or on immunocompromising therapy (next column)	Multiple myeloma on therapy
		CLL on therapy
		Solid organ transplant on immunosuppressive medication
Severe disease: Evidence of pneumonia or severe respiratory distress by clinical assessment or imaging and a saturation of oxygen (SpO2) < 90% on room air at sea level.	Any condition or demographic/racial/ ethnic factor determined by the clinician to raise risk of progression	Severe congenital immunodeficiency
		Other hematological malignancy on treatment
Critical Disease: Severe disease + ARDS, sepsis, septic shock, and/or requires life-sustaining 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 >=75% FiO2 (see page 10 for ICU Admission Criteria).

Step 3: CONSENT. English and Spanish consent forms found at http://hospitals.vchca.org/medical-staff-services under inpatient clinical resources. Print out 2 copies of consent forms based on language request. 1 to give patient to read to stay in room (will be contaminated) and 1 to keep outside of room (clean copy) for physician and witness to sign if consent obtained (**NEED 2 PEOPLE TO SIGN CONSENT FORM)**. Patient to be consented for Tocilizumab if decision to use. Remdesivir is now FDA approved and therefore is no longer on consent form but recommend discussing with patient per usual protocol before starting any FDA approved medication.

ALL PAGES OF CONSENT FORMS MUST BE SCANNED INTO CERNER OR VIA CERNER CAPTURE BEFORE PROCEEDING WITH BELOW THERAPIES

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.
- Check with pharmacy about supply issues. If limited supply and multiple candidates, discuss with scarce resource committee

Step 7: TOCILIZUMAB
- 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 or ID for approval & patient MUST sign consent form if decision to given**. 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	Blocks RNA dependent polymerase **FDA APPROVED** for adults and children 12 years of age and older and ≥ 40kg	Recommend for those with the following criteria: - 5d course for hospitalized with confirmed mod-severe COVID, **requiring > 2 Liters per minute O2 nasal cannula to maintain Sp02 >93%**, duration of symptoms ≤ 14 days from onset *OR* - 3d course 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 **NOTE**: CrCl > 30mL/min. Not safe in HD 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** **- Consent needed for use in mild COVID-19 infection**	Increased liver enzymes Hypotension during infusion Nausea/vomiting Reversible kidney injury Potential for drug-drug interactions.	200 mg IV on day 1 then 100 mg IV daily X 5 days total for Mod-Severe COVID-19 200 mg IV on day 1 then 100mg IV daily x3 days total for Mild COVID-19 May consider up to 10 days total if intubated Consider daily LFTS while on therapy to monitor for adverse effects Do NOT use if ALT ≥ 5x Upper limit of normal prior to start Do NOT use if CrCl < 30 or HD/PD
Dexamethasone	Reduces inflammation	Based on data from the Randomized Evaluation of COVID-19 Therapy (RECOVERY) trial: those on supplemental 02 had mortality benefit, with greatest benefit in those on mechanical ventilation **- requiring ≥ 2 L per minute supplemental 02 by nasal cannula to maintain Sp02 > 93%** - RECOVERY trial noted **worse** outcomes in patients who were NOT on 02. 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 Safety and efficacy is unknown in pregnancy	- 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	6mg IV or PO daily x 10 days - Duration is 10 days, or until discharge, whichever comes first Note: if patient being discharged on oxygen, patient is to complete 10 days of dexamethasone at home.

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
Famotidine (Pepcid)	Blocks dysfunctional mast cell activation and histamine release	- Recommend using simultaneously with dexamethasone for GI protection	Well tolerated Diarrhea or constipation in less than 5% of people	20 mg po or iv q12h
Tocilizumab (Actemra)	IL-6 receptor antagonist. IL-6 level can be greatly elevated in severe COVID-19 infections. No antiviral activity	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 Sp02 <90% on heated high flow nasal cannula >=50% or NIPPV with increasing 02 requirements over 24 hours PLUS 2 or more of the following predictors for severe disease: - Elevated troponin w/out known cardiac disease - LDH > 200 U/L - D-dimer >1000 ng/mL - CRP >7.5 mg/dL - Ferritin >500-600 ng/mL - Neutrophil-lymphocyte ratio >4 - IL 6 >10 pg/mL 3. Patient is NOT pregnant 4. ID or ICU attending approval required 5. Informed consent obtained by patient or family member and is documented in Cerner 6. Order quantiferon prior to administration and assess risk of latent TB. If positive weigh risks/benefits. **AVOID IF HISTORY OF CHRONIC INFECTIONS**	GI perforation Anaphylaxis Hepatic failure Tuberculosis reactivation	400 mg IV X1 (<65 kg) 600mg IV x1 (65-90kg) 800mg IV x 1 (>90 kg) Can be Given in conjunction with dexamethasone and remdesivir

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
Sarilumab (Kevzara)	IL-6 receptor antagonist. IL-6 level can be greatly elevated in COVID-19 infections. No antiviral activity	SAME INDICATION AS TOCILIZUMAB **USE IF TOCILIZUMAB IS NOT AVAILABLE** (8/25/2021 NIH guidelines)	Neutropenia ALT/AST elevation. GI perforation Infection Tuberculosis reactivation	400 mg IV X1
Baricitinib	JAK Inhibitor, Disease Modifying Agent in Rheumatoid Arthritis, reduces inflammatory cascade in severe COVID-19 infections.	- May be used in place of dexamethasone when dexamethasone is unable to be used for some reason (rare occurrence) - As of NIH guidelines updated July 8, 2021, 'for patients who were recently hospitalized with 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) - Would be a second-line option if tocilizumab unavailable for same indication as tocilizumab - 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	- Treatment of mild-to-moderate Covid-19 in patients at high risk for progression to severe Covid-19. **IS EFFECTIVE AGAINST OMICRON VARIANT.** **Outpatient only.**	Hypersensitivity reactions Anaphylaxis Limited data on pregnancy/fertility. generally considered safe	500 mg IV over 30 minutes infusion -Limited supply and limited outpatient locations have it
Casirivimab + imdevimab (Regen-Cov)	Monoclonal antibodies	- Non-infected patients at high risk for developing severe Covid-19 after exposure to infected persons. **Outpatient only.** - Treatment of mild-to-moderate Covid-19 in patients at high risk for progression to severe Covid-19. **Outpatient only.** **NOT RECOMMENDED AGAINST OMICRON VARIANT**	Headache Injection-site reaction Hypersensitivity reactions	1200 mg SQ 1X (Casirivimab 600 mg + imdevimab 600 mg)
Bamlanivimab + etesevimab	Monoclonal antibodies	Treatment of mild-to-moderate Covid-19 in patients at high risk for progression to severe Covid-19. **Outpatient only.** **NOT RECOMMENDED AGAINST OMICRON VARIANT.**	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	**For Outpatient Use: Reduced death OR hospitalization by 30% in high risk patients** 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). Indication: treatment of mild-moderate COVID-19. **Outpatient only.**	Diarrhea Nausea Dizziness Muscle aches - obtain negative pregnancy test before prescribing. Men should use contraception 3 months after taking it to prevent pregnancy due to fetal toxicity	**800mg (4x 200mg capsules)** **PO BID x5 days** No adjustment needed for liver or renal impairment Adults 18years and older. Not safe for children as it affects bone growth LIMITED SUPPLY, RECOMMEND USING FOR HIGH RISK ONLY
Paxlovid (Nirmatrelvir/ Ritonavir)	Nirmatrelvir: SARS-CoV-2 main protease inhibitor Ritonavir: viral protease inhibitor (also HIV 1 protease inhibitor) does NOT induce mutation	**For Outpatient Use: Reduced death or hospitalization by 88% in high-risk patients** *Note: RCTs (EPIC-HR and EPIC-SR Trials have not been peer-reviewed or completed, respectively, yet)* NEJM RCT Included: Adults with symptoms in last 5 days, and at least one risk factor for severe illness Study excluded: 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 Indication: treatment of mild-moderate COVID-19. **Outpatient only.**	Dysgeusia Diarrhea Myalgia Hepatotoxicity Has significant drug-drug interactions with CYP3A4 such as statins and blood thinners Unknown risk in pregnancy Ok to use in patients with HIV and Hep C, refer to IDSA guidelines for specific risks for these patient groups	**Nirmatrelvir 150mg 2 tablets BID x5 days AND Ritonovir 100mg one tablet BID for 5 days** For eGFR >30 and <60 ml/min, decrease dose to nirmatrelvir 150 mg BID x 5 days. same ritonavir dose -Not recommended for GFR <30 -Not recommended in severe hepatic impairment (Child-Pugh Class C) **>12 years old and weight >40kg** LIMITED SUPPLY, RECOMMEND USING FOR HIGH RISK ONLY

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	**For Outpatient Use: Reduced hospitalization/death by 26% in high-risk patients** Lancet RCT Included: Adults with symptoms in last 7 days, >1 risk factor for severe illness (age >50 yo, DM, HTN on >/= 1 med, h/o CV disease, h/o Sx'ic lung dz including h/o asthma on maint therapy, smoking, BMI >/= 30, h/o transplant, stage IV CKD or on HD, immunosuppression (including chronic prednisone or other immunosuppressant use), h/o cancer, SARS-CoV-2 unvaccinated Study excluded: dyspnea 2/2 other causes, current use of SSRI (use of other serotonin reuptake inhibitors were not excluded), uncontrolled psych disorder or SI, or those with SARS-CoV-2 vaccination Indication: treatment of mild-moderate COVID-19, **Outpatient only.**	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	EUA FDA approval for individuals NOT currently infected with SARS-CoV-2 virus & have NOT been recently exposed to anyone infected as a Pre-exposure prophylaxis who meet below criteria: 1- moderate to severely compromised immune systems due to medical condition or taking immunosuppressed & may not mount an adequate immune response to COVID-19 vaccination, OR 2- history of severe adverse reactions to a COVID-19 vaccine and/or component(s) of those vaccines, therefore vaccination with an available COVID-19 vaccine, according to the approved or authorized schedule, is not recommended **For Outpatient use only**	Hypersensitivity including anaphylaxis during administration Headache Fatigue cough	150mg tixagevimab IM x1 AND 150mg cilgavimab IM x 1 given as 2 separate injections adults and pediatric patients > 12 years old and weigh > 40 kg -Effective for up to 6 months LIMITED SUPPLY, RECOMMEND USING FOR HIGH RISK ONLY
Ivermectin	Inhibits SARS-CoV-2 in vitro; ~5000-fold reduction in viral RNA in cell culture 48 hours after a single treatment	**NOT RECOMMENDED** NIH & IDSA guidelines state there is insufficient data to support use but further studies are in progress. Will wait for more data.	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.

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
Vitamin C	Antioxidant, protects cells from oxidative stress	Any patient is eligible. Clinical trials in Italy and China are ongoing No data as to efficacy in COVID-19	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. No data on use of zinc for treatment of COVID-19. Administration within 48 hours of symptoms is preferred.	Bad taste, nausea Copper deficiency	220 mg daily x 5 days
Melatonin	Hormone that regulates day/night cycles	Any patient is eligible. No data on use of melatonin for treatment of COVID-19 May have anti-viral and anti-inflammatory effects; Improves sleep quality	Well-tolerated Dizziness, headache, nausea can occur	Optimal dose not established; usual dose 5-10 mg QHS
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 ROUTINELY 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)

Emergency Department, Hospitalist and Critical Care Management

Therapy	Notes
ICU Admission Criteria (updated 8/20/2021, reviewed 1/18/2022)	• 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 ○ 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)
Aerosolizing procedures: avoid if possible (i.e. choose MDI over nebulizer *if necessary* and if MDI equally effective) Note: Full PPE* mandatory for patients receiving these procedures	• Procedures: Intubation, extubation, bronchoscopy, upper endoscopy, colonoscopy, CPR, NG tube placement (surgical mask over patient's mouth may reduce aerosolization) • Respiratory therapy treatments: 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 • Ventilator-related: 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 • Oxygen delivery methods: 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* ○ 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
Oxygen therapy	• 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

High Flow Nasal Cannula (HFNC)	• 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.
	  ○ Patient recommended to be in a negative pressure room, and all staff entering the room must have full PPE*.
	  ▪ 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

Non-invasive positive pressure ventilation (NIPPV): BiPap / CPAP	• 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. ○ 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)	• 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.
	  o 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:
	  o 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.
	  o 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
	  o 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	• Incentive Spirometer: All patients should be encouraged to use incentive spirometer 10x/ hour while awake
	• Self-Proning: If any hypoxia, strongly promote self-proning for hypoxic patients ("adult tummy time") on admission
	  o Initial trial period of one hour on stomach supported by pillows
	  o Encourage patient to adopt prone position as much as tolerated an able when in bed
	  ▪ Goal is more time prone than supine
	  ▪ Most patients not accustomed to sleeping on their stomach will take 48+ hours to acclimate
	  • STRONGLY Consider PT and OT consultation for patients with challenges
	• Nebulizers vs. MDIs: non-intubated patients: use MDIs—nebulizer is aerosol generating and should be avoided intubated patients: utilize nebulizers via in-line Aerogen device (does not aerosolize)
	• EZ Pap: also likely aerosolizes, but may be considered if the following criteria are ALL met:
	  o Patient requires pulmonary toilet in order to prevent respiratory deterioration and less-invasive methods (i.e. Incentive Spirometer) have been ineffective
	  o Patient is cooperative with all aspects of treatment
	  o Must be in negative pressure room if using, all staff in full PPE*
	  o Mouthpiece is used with a good seal and good understanding to minimize aerosolization
	  o Use only for lung expansion; the nebulizer portion of the treatment is to be avoided
	  ▪ if wheeze present, consider MDIs separately
	  o Utilize flow rates of 6 liters or less to minimize aerosolization
	  o If employing EZPap, consider putting in-line viral filter
	• Metanebs: aerosolize and should be avoided 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
Decision to intubate	• 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	• 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 *and* 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	• Before disconnecting ETT: sedate & paralyze patient → pause ventilator ○ 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	• Ventilator management depends on "phenotype" of ARDS
	  ○ L Type (Low elastance, normal compliance): consider 8mL/kg PBW for TV, start lower PEEP (~10 cm H2O), high Fi02, keep Plateau pressure <30cmH20
	  ○ H Type (High elastance, low compliance): Follow ARDSnet lung protective protocol: high PEEP, low TV 6-8mL/kg PBW, Plateau pressure <30 cm H20, keep PaO2>55mmHg; Sp02 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

* 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)

<table>
<tr><td>Prone Positioning</td><td>

See Policy Stat, policy CC.27: Patient Prone Positioning in the ICU
Decision to utilize Rotaprone bed vs. manual proning:

<table>
<tr><th></th><th>Pros</th><th>Cons</th><th>Notes</th></tr>
<tr><td>Rotaprone Bed</td><td>- Less kinking of ET tube when prone
- 3 staff needed for proning/supining
- ‘Therapy settings’ allow frequent position changes when prone/supine</td><td>- Cost of bed rental
- Limited availability
- Transportation delays
- Possible skin breakdown</td><td>- Requires IUR
- Requires Biomed bed inspection prior to deployment</td></tr>
<tr><td>Manual Proning</td><td>- 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)</td><td>- ET tube position when prone often leads to kinking
- Minimum 6 staff needed for proning/supining
- ET tube clamped during proning/ supining</td><td>- 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</td></tr>
</table>

Duration of prone positioning

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 effective[12]; ICU Attending input required.

Paralytic vs. no paralytic during prone positioning

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

Favor paralysis for refractory hypoxia, patient-ventilator dyssynchrony

Discontinuation of prone positioning

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

Reverse Trendelenberg position when prone may help reduce aspiration

Wound consultation recommended for patients undergoing prone positioning

</td></tr>
<tr><td>Tracheostomy</td><td>

May be considered in consultation with General Surgery at or after day 14 of intubation

</td></tr>
<tr><td>Hematology Considerations
(See VCMC Hematology guideline via Med Staff Office website for more details)</td><td>

High incidence of venous thromboembolism (VTE) in COVID-19 infection
VTE prophylaxis recommendations per VCMC/SPH Hematology Guidelines:

All hospitalized patients without evidence of VTE or other standard indication for therapeutic anticoagulation: standard pharmacologic VTE prophylaxis

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

http://hospitals.vchca.org/images/medical_staff/Department_Pearls_2020_8_17.pdf
</td></tr>
</table>

Emergency Department, Hospitalist and Critical Care Management (continued)

<table>
<tr><th>Therapy</th><th>Notes</th></tr>
<tr><td>Hematology Considerations (continued)</td><td>

D-Dimer elevation early considered measure of disease severity; consider avoiding early CT pulmonary angiogram for both fluid load and renal considerations

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:

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>
<tr><td rowspan="5">Modified Improve Score</td><td>Risk Factor</td><td>Risk Score</td><td>Risk Factor</td><td>Risk Score</td></tr>
<tr><td>Previous VTE</td><td>3</td><td rowspan="2">ICU/CCU stay (including high flow nasal cannula)</td><td rowspan="2">1</td></tr>
<tr><td>Known thrombophilia (eg Factor V Leiden)</td><td>2</td></tr>
<tr><td>Lower limb paralysis/paresis</td><td>2</td><td>Complete immobilization >= 1 day</td><td>1</td></tr>
<tr><td>History of cancer within 5 years (excluding non-melanoma skin cancer)</td><td>2</td><td>Age >= 60</td><td>1</td></tr>
</table>

VTE prophylaxis would consist of Rivaroxaban 10mg daily 31 to 39 days

</td></tr>
<tr><td>Cardiology Considerations</td><td>

Consider high incidence of myocardial suppression/shock
Conservative fluid strategy strongly recommended

</td></tr>
<tr><td>Code Blue / Palliative Care Considerations</td><td>

Consider early discussion regarding DNR status for shock, ARDS, intubated patients
Early Palliative Care Consult
Code blue considerations

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

</td></tr>
<tr><td>Environmental/ Isolation Precautions Considerations</td><td>

Considered airborne precautions + contact precautions ("enhanced respiratory precautions")
Discontinue enhanced respiratory precautions only after patient considered to be non-infectious

pending link to updated guideline to isolation duration with antigen testing implications
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

</td></tr>
</table>

Emergency Department, Hospitalist and Critical Care Management (continued)

Step Down / Throughput Considerations	• Criteria for step down from ICU status to DOU/Tele/MedSurg status (up to discretion of ICU Attending):
	  ○ 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
	  ○ Note: recovering patients on nasal cannula may need to be transferred out of ICU to accommodate patients on high flow nasal cannula

Discharge Considerations	• Discharges to congregate living situations (i.e. skilled nursing, homeless shelter, etc.) are to be discussed with Public Health for clearance *for those still on isolation* (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, though efforts should be made by discharging provider to assure that the patient can remain isolated from susceptible and high risk individuals in the home until the patient is out of isolation/ no considered no longer infectious.
	• 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
	  ○ 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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5. **UW Medicine Interim Treatment Guidelines for SARS-CoV-2 Infection/COVID 19 Version 1.3, Update 7/8/21**
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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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10. **https://www.covid19treatmentguidelines.nih.gov**
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12. **The Medical Letter on Drugs and Therapeutics, Treatments Considered for COVID-19. Updated 2/17/21**
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19. **Molnupiravir Fact Sheet for Healthcare Providers, Paxlovid Fact Sheet for Healthcare Providers, Pfizer, Paxlovid Press Release, accessed 12/13/21, Sotrovomab Fact Sheet for Healthcare Providers**