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 COVID19, SNF resident, pending test

LABS

- CBC with diff, CMP, procalcitonin, Ferritin, CPK, CRP, LDH, ESR, D-Dimer, Quantiferon, IL-6, **blood type**, troponin
- Look for leukopenia, lymphopenia, and transaminitis

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: Risk Factors For Severe COVID-19 Disease

Demographics	Vital Signs	Labs
Age >50	Respiratory Rate >24 breaths/min	Absolute lymphocyte count <0.8
Pre-existing pulmonary disease	Heart rate > 125 beats/min	CRP >100 mg/L
Chronic kidney disease	Sp02 <94% on room air	LDH >245 units/L
Diabetes with A1c >7.6%	Pa02/Fi02 <300mmHg	CPK > twice upper limit of normal
History of hypertension or cardiovascular disease		Elevated troponin
Obesity (BMI > 30)		Ferritin >500 ug/L
Pregnancy		D-dimer >1000 ng/ml *elevated D-dimer does NOT always correlate to having Pulmonary Embolism so Do NOT get CT based on D dimer alone*
History of transplant or other immunosuppression*		
Use of biologics *		
All patients with HIV (regardless of CD4)*		

Adapted from Version 7 11/13/20 Massachusetts General Hospital COVID-19 Treatment Guidance * Not yet proven as risk factors for progression, inferred from other infections.

Table 2: Suggested Experimental Treatment Algorithm Based On Clinical Severity

All Experimental and off label use of treatments should be done in the setting of a Clinical Trial, or if not available, then local or collaborative registries to systematically evaluate the efficacy and safety of drugs to contribute to the knowledge base.

Clinical Situation	Recommendation*	Notes/Considerations
All hospitalized patients	Statins: Continue if already prescribed. Consider starting a statin if no contraindication and for those who have a guideline indication.	Cardiovascular disease is a major risk factor for disease severity. If CPK> 500 unit/L, consider not starting a statin. Avoid Statins if ALT >3x upper limit of normal.
Mild disease with Sp02 >90%, Upper respiratory tract infection (URTI), no risk factors	Supportive Care	See Table 1 for Risk Factors
Mild disease with Sp02 >90% with risk factors for severe disease	Supportive care with very close monitoring	No longer recommend convalescent plasma
Moderate or severe disease requiring supplemental 02	-Dexamethasone 6mg q 24 + famotidine **if ≥ 2L** -Remdesivir (RDV) if available & **>2L NC**	Remdesivir supply can be limited base on supply and demand nationwide. Ensure pt meets criteria for use prior to ordering

Continued next page →

Clinical Situation	Recommendation	Notes/Considerations
For patients with severe disease and/or evidence of cytokine release syndrome	With ID approval, Tocilizumab can be considered in addition to other therapies for moderate or severe disease above	-Must have IL-6 and quantiferon collected before giving Tocilizumab. - Not often used due to concern of severe immunosuppression when giving both tocilizumab and steroids
OTHER CONTROVERSIAL MEDICATIONS		
Renin angiotensin system blockers (ACE and ARBS)	The virus that causes COVID-19 uses the angiotensin-converting enzyme (ACE) 2 receptor to enter cells. Hypothetical harm: can increase the expression of ACE2, there is concern that these medications may facilitate viral entry into cells. Hypothetical benefit: may have protective effect against lung damage or may have paradoxical effect in terms of virus binding.	Currently, there is no clinical or epidemiological data to support this. Consider continuing if patient was on PRIOR to admission and patient is not hypotensive
NSAIDS	Avoid in hospitalized patients.	Controversial.

Adapted from Version 1 3/17/20 Massachusetts General Hospital COVID-19 Treatment Guidance

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 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. Due to immunosuppression, tocilizumab is not routinely considered.

Step 1: LABS. Obtain the following labs: CBC with diff, CMP, procalcitonin, Ferritin, CPK, CRP, LDH, ESR, D-Dimer, Quantiferon, IL-6, 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 >=6lpm.

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 Dexamethasone. 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

Step 4: PLASMA
No longer recommending as there is insufficient data to support the use

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. If patient receiving dexamethasone, then likely not a good candidate for further immunosuppression with tocilizumab.
- **Dexamethasone and famotidine duration is 10 days maximum, or until discharge, whichever is first.**

Step 6: REMDESIVIR/TOCILIZUMAB.
Refer to Table 3 for criteria for remdesivir and consider discussion with attending prior to ordering.
- If treatment is indicated, and patient meets above criteria, can order the medication. This drug is NO LONGER RESTRICTED, and does not need ID MD or ID Pharmacist approval.
- Check with pharmacy about supply issues. If limited supply and multiple candidates, discuss with scarce resource committee
- For now, tocilizumab is not routinely being used, and is not being given in conjunction with steroids except for special circumstances.

Step 7: DVT PROPHYLAXIS. See Hem/Onc recs on page 17.http://hospitals.vchca.org/images/medical_staff/Department_Pearls_2020_8_17.pdf

Step 8: 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.

Step 9: 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: - hospitalized with confirmed COVID who are symptomatic **- requiring > 2 Liters per minute O2 nasal cannula to maintain Sp02 >93%** - Duration of symptoms ≤ 14 days from onset - CrCl > 30mL/min. Not safe in HD Now FDA approved for use in COVID-19. Patient does NOT need to sign consent in order to use. **- Patient must meet above Criteria, NO LONGER REQUIRES ID APPROVAL**	Increased liver enzymes Hypotension during infusion Nausea/vomiting Reversible kidney injury Potential for drug-drug interactions. Do NOT use if ALT ≥ 5x Upper limit of normal prior to start Do NOT use if CrCl < 30 or HD/PD	200 mg IV on day 1 then 100 mg IV daily X 5 days total May consider up to 10 days total if intubated Consider daily LFTS while on therapy to monitor for adverse effects
Dexamethasone	Reduces inflammation	Based on preliminary 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.
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

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
Tocilizumab (Actemra)	IL-6 receptor antagonist. IL-6 level can be greatly elevated in severe COVID-19 infections. No antiviral activity	**NOT ROUTINELY USED** Patients with severe/critical illness with rapidly worsening respiratory gas exchange and excessive inflammatory May be considered for ICU patients if all criteria met: 1. confirmed or high suspicion for covid 2. ARDS or ARDS or Sp02 <90% on 4L or 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 >1 mcg/L - CRP >35 mg/L - Ferritin >500-600 ng/mL - Neutrophil-lymphocyte ratio >4 - IL 6 >10 pg/mL 3.Patient is NOT pregnant 4. ID approval required 5. Informed consent obtained by patient or family member and is is documented in Cerner 6. Order IL6 & quantiferon prior to administration. If positive weigh risks/benefits.	GI perforation Anaphylaxis Hepatic failure Tuberculosis reactivation	400 mg IV X1 If patient getting dexamethasone then likely not candidate for Tocilizumab.
Convalescent Plasma		**NOT RECOMMENDED** -With new information from randomized controlled trials, there is insufficient data for use in COVID-19 as of 11/25/2020		
Bamlanivimab	Monoclonal antibody	**NOT RECOMMENDED** - Not for inpatient use - Emergency Use Authorization for outpatient use only in high risk patients. However, this therapy is NOT RECOMMENDED for use yet, due to insufficient data	Hypersensitivity reactions	700mg IV over 1 hour infusion

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
Aerosolizing procedures: avoid if possible	• 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, non-rebreather (NRB) (note: NRB may be used but higher flow rates have more chance of aerosolization (consider low flow rates ~ 6 liters per minute if possible)) • 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 • NOT considered high risk for aerosolization: closed suctioning from endotracheal tube, nebulizer in-line with vent • 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

Oxygen therapy: Goals	• Goal oxygen saturation (SpO2) per World Health Organization is:
	  ○ During initial resuscitation: >=94%
	  ○ Once stable: >90% in most, 92-95% in pregnant women
	• Hyperoxia should be avoided
	• Weaning is reasonable in stable patients (those without tachypnea, increased work of breathing or subjective shortness of breath)

High Flow Nasal Cannula (HFNC)	• HFNC has high potential to aerosolize, but is considered a mainstay of therapy to reduce morbidity and mortality:
	  ○ 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
	  ○ The patient should have a surgical mask on as much as tolerated and always with others in the room to reduce aerosolization, particularly for the duration of time needed for a full air exchange (45 minutes negative pressure room, 3.5 hours at VCMC or 1.5 hours at SPH)
	  ○ As low flow as possible (lowest = 15 liters/minute) for theoretical decreased risk of aerosolization
	• Should be abandoned if the patient is progressively not improving (short trials only)
	• Strongly recommend HFNC to be used in ICU-1 ICU-2 and ICU-3 only

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
	  ○ 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
	  ▪ 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

* 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
Adjunctive Respiratory Therapy Modalities (continued)	• 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); use only if wheeze present • 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 the 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.
Non-invasive positive pressure ventilation (NIPPV): BiPap / CPAP	• ICU consult required for initiation of Non-Invasive Positive Pressure Ventilation (NIPPV): BiPap/ CPAP • It is **strongly recommended** to **avoid NIPPV** (BiPap/CPAP) in COVID suspected or confirmed infected due to both clinical worsening from positive pressure and inevitable leak around mask → aerosolization. • Initiation of NIPPV in patients with progressive respiratory failure is discouraged o Despite transient improvement that may be seen, NIPPV leads to inevitable progression of respiratory failure • Rare exceptions to consider initiation of BiPap or CPAP in COVID suspected or confirmed infected include: o Patients with a DNI order who have an acute indication for NIPPV o Patients who use NIPPV chronically (e.g. obesity/hypoventilation, obstructive sleep apnea) o Patients who present w/COPD or CHF exacerbation that are expected to be rapidly reversible (e.g. 2 hour trial) o Rarely extubation to NIPPV in patients at high risk for reintubation • If using NIPPV: o CPAP favored over Bipap if choosing to use NIPPV: less likely to aerosolize and high BiPap failure rate o Must use non-invasive mode on Servo-i ventilator (dedicated exhalation limb that can be filtered) and not V-60 (no exhalation limb, exhalation out the mask→aerosolization) o Must be in negative pressure room if available, with all staff in full PPE* o Short trial (e.g. 6-8 hours only) w/plan to intubate patients unable to transition back to high flow nasal cannula
ICU Admission Criteria (updated 12/7/2020)	• Admit to ICU for: FiO2>=75%, flow >=40 liters per minute (high flow nasal cannula), persistent tachypnea >=35, persistent increased work of breathing or shortness of breath not improved by prone positioning, OR need for NIPPV for progressive respiratory failure (NIPPV for OSA does not need to be ICU level if no other ICU criteria) • DNI patients do not need ICU level of care if there is no non-respiratory critical care need (i.e. pressors = ICU admit) • ICU consultation required for need for high flow nasal cannula • See step down recommendations page 12

* 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 • 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 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 ○ Due to risk of aerosolizing, Safe Airway Society of Australia/New Zealand recommends no non-rebreather pre-oxygenation and no nasal cannula during intubation (less of an issue with full 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)

Prone Positioning

- 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	- Less kinking of ET tube when prone - 3 staff needed for proning/supining - 'Therapy settings' allow frequent position changes when prone/supine	- Cost of bed rental - Limited availability - Transportation delays - Possible skin breakdown	- Requires IUR - Requires Biomed bed inspection prior to deployment
Manual Proning	- 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)	- ET tube position when prone often leads to kinking - Minimum 6 staff needed for proning/supining - ET tube clamped during proning/ supining	- Anesthesiology sometimes present for proning/ supining to manage head and ET tube - Full recommendations pending from prone committee

- 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/required if tube clamped-prevents re-expansion pulmonary edema
  - 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

Tracheostomy

- May be considered in consultation with ENT at or after day 21 of intubation

Hematology Considerations (See VCMC Hematology guideline via Med Staff Office website for more details)

- 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
  - Hospitalized, not in ICU: standard pharmacologic VTE prophylaxis
  - ICU-level patients: higher prophylactic dose is off-label but reasonable consensus amongst specialists and other hospital protocols; higher dose should be continued for entire hospitalization even if stepped down

ICU Patient VTE Prophylaxis Dosing	VTE Dosing Weight Adjustment	CrCl >= 30 mL/ min	CrCl < 30 mL/min
	Standard	Enoxaparin 40 mg BID	UFH 7,500 units q 8 hours
	Obese (>= 120 kg or BMI >= 35)	Enoxaparin 0.5 mg/kg BID (max dose 100 mg BID)	UFH 10,000 units q 8 hours
	Low Body Weight (< 60 kg)	Enoxaparin 30 mg BID	UFH 7,500 units q 8 hours

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

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<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 mostly droplet precautions other than high risk situations (see top of table on page 7 for aerosol generating procedures)
Maintain airborne precautions: intubated patients (in case of accidental disconnection, filter changes, etc.)
Discontinue droplet precautions + contact precautions only after patient considered to be non-infectious

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, 48 hours steel, 24 hours cardboard, 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:
	  ○ 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	• All discharges 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**)
	• 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 11

References:

1. **Medical Journal of Australia preprint: Consensus statement: Safe Airway Society principles of airway management and tracheal intubation specific to the COVID-19 adult patient group.**
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10. **Additional references listed on the following documents:**
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