**UW COVID-19 REFERENCE GUIDE**

**MANAGEMENT:**
- I/Os: Conservative fluid strategy, LR preferred. Use vasoactives more than fluids, Echo pm.
- ABX: Use w/superinfection (high procal), shock or sepsis or for severe resp failure / bacterial pneumonia.
- DVT Prophylaxis – In all pts. Consider enhanced dosing, e.g. enoxaparin 40 mg qd/30 mg BID or weight-based dosing.
- Therapeutic dosing in confirmed VTE. Hematology consultation if high suspicion of VTE & unable to obtain confirmatory imaging.
- Pregnancy: Likely only postpartum transmission. Watch pregnancy drug classes and call Access Center for MFM triage.

**DIAGNOSIS & LABORATORY WORK-UP:**
- Baseline EKG @ admission recommended (even if single/multi-lead). Lactate, ScvO2 and physical exam (e.g. cap refill) can help dx & NT-pro-BNP often high & may indicate CHF/myocardial injury.
- Severe Illness: D-dimer, ΔCoags, ΔLactate & ΔNeutrophils, ΔLFTs (AST>100 or bump after 7-days) and ΔNLR

**IMAGING**
- CXR: hazy, bilateral, peripheral opacities, gravitational
- TTE: RV strain can occur d/t lung disease (TAPSE <1.8). Follow for viral cardiomyopathy (LV or BIV failure).
- Lung US: Changes precede deterioration & increase with severity. May be more sensitive than CT in early reports.
- Clean THE ECHO! Caviwipe (2min wet time) in room before doffing, wash hands, N95, eye/face shield, gloves over gown, sanitize gloves before removing & doff in room/designated area and sanitize again. Be CAUTIOUS!

**CLINICAL COURSE**
- Rapid deterioration (NC to ET in <24h) –7-10 days from onset.
- Timing after onset: Sepsis (~9d), cytokine storm & cardiac complications (~10-15d), ARDS (~12d), AKI (~15d), 2o Infection (~17d, unclear)

**RESOURCES**
- Crowdsourced Summary Document: https://coronavirustechhandbook.com/doctors

**PATIENTS AT RISK OF POOR OUTCOME**
- >60 yrs of age, immune deficient, DM, HTN, CAD, obesity
- Lab markers (D-Dimer, Coagulopathy, ALI, Lactate, NLR; see left).

**OXGEN THERAPY/INTUBATION**
- NC up to 6 l/min, then HFNC, Venti-Mask or NRN. Avoid non-invasive ventilation unless co-morbid indication. HFNC 15 l/min or NIV – negative pressure room advised.
- BE AWARE: Higher FiO2 is needed to avoid hypoxemia & ARDS.

**ANTICIPATE NEED FOR INTUBATION**
- Emergencies put the team at risk. If requires NRN or pt demonstrates increased WOB on any O2: start HFNC/NIV (noting risk of aerosolization) & consult crit care.
- Must skilled operator available should perform (non-learning) – First pass success keeps the team safe.
- True RSI (no BMV, high dose paralytic) and VL to maintain face distance. Move quickly between attempts to avoid BMV.
- Avoid bag-mask d/t risk of aerosolization + viral filter. Consider keeping backup supplies outside of room.

**MECHANICAL VENTILATION & RESPIRATORY SUPPORT**
- Use ARDSnet guidelines. Target driving pressure <17. Allow permissive hypercapnia. Generally prone when severe. Some centers use higher PEEP but watch for ventilator induced lung injury. Limited, early reports suggested benefit w/APRV.
- Prone for mod-sev ARDS, extending prone time to 12-16h. Consider prone position in awake patients with hypoxia.
- Gentle recruitment recommended in mod-sev ARDS (SCCM).
- Use PF-Ratio, driving pressure or lung US to monitor progress.
- Avoid cough/dyssynchrony: use targeted sedation, narcotics, muscle relaxants.
- Consider prone position for mod-sev ARDS, extending prone time to 12-16h.
- Avoid bag-mask for respiratory support: Minimize people in the room.

**LIFE THREATENING COMPLICATIONS**
- Myocardial injury & CHF – Can be severe, occurring at onset of illness, or late - even after recovery respiratory.
- Dysrhythmias – more likely if myocardial isch/injury, shock, abn lytes or QT-prolonging meds. Follow standard ACLS.
- Cytokine Storm reported & can occur late (trend IL-6, ferritin, LDH, D-dimer, ESR & CRP). Consider Tocilizumab / steroids as above.
- Sepsis, ARDS & 2o Infections (e.g. 2a Bact PNA).
- AKI (trend BMP), and Viral rhodambolysis (trend CK).
- Hypokalemia (can be severe/refractory, use high IV supps). Consider spironolactone/epelhoreno if BP/GFR stable. Likely continue ACE-I’s (controversial due hypok and/ or CHF).

**PRECAUTIONS:**
- Assume COVID-19 in any pt with fever & resp symptoms. Incubation period of ~5-days (1-14d, most 3-7d)
- Typical Symptoms: Fever, cough/SOB, fatigue, diarrhea, N/V. Can present with NICM (CHF, Arrhythmias, ACS), viral rhodambolysis & AKI.
- PPE: Wash hands, N95, eye/face shield, gloves over gown, sanitize gloves before removing & doff in room/designated area and sanitize again. Be CAUTIOUS!

**DIAGNOSIS & LABORATORY WORK-UP:**
- NP swab (not OP): UW COVID-19 PCR estimated sensitivity >98%. Re-test only if clear evidence of improper collection technique.
- Send Resp Virus Panel (co-infection with influenza/other viruses possible).
- CBC/diff + baseline coagulation studies. Freq lymphopenia w/normal WBC. Neutrophil-to-Lymphocyte Ratio (NLR, neutrophils/lymphocytes) may predict severity, generally >3.1 is more severe.
- CMP – viral rhodambolysis common
- Troponin/EKG – Troponin can help dx myocardial injury but doesn’t change management. Only draw if concerned for ACS. BNP & NT-pro-BNP often high & may indicate CHF/myocardial injury. Baseline EKG @ admission recommended (even if single/multi-lead). Lactate, Svo2 and physical exam (e.g. cap refill) can help dx shock.
- Procalcitonin (typically low, if high/rising suspect co-infection)
- Pregnancy test for females of reproductive age
- Trend for cytokone storm: CRP, LDH, Ferritin, D-Dimer

**THERAPIES TO CONSIDER:**
- Convalescent plasma – Consider as part of “Expanded Access” program. Check inclusion criteria. Follow institutional/trial guidelines.
- Remdesivir – Clinical trials only. Compassionate use reserved for critically ill age ≤ 18 or pregnant – see Gilead website
- Tocilizumab – Some centers administer if strong suspicion of cytokine storm; check contraindications, incl. hx TB exposure immunossupression, etc – review with pharmacy.
- Steroids: Avoid in clinically stable pts – may increase viral replication & risk superinfections. Some centers are giving steroids for cytokine storm and/or ARDS (both are controversial).
- Antimalarials – Not recommended pending further data.

**SARS-CoV-2 is a NEW infection with NO proven therapies to date. Numerous RCT’s are underway. Use of the following is at clinician discretion. Ethically, pt/family should be informed of unproven efficacy & data collected for follow-up. Enroll in RCT’s when feasible. In any individual patient, review contraindications and potential for harmful adverse effects.”

**MECHANICAL VENTILATION & RESPIRATORY SUPPORT**
- Avoid the following
  - Nebulized Rx’s (bronchodilators, hypertonic saline)
  - Chest PT of any kind; induced sputum samples;
  - Bronchoscopy – only use if truly required (non-learning)
- True RSI (no BMV, high dose paralytic) and VL to maintain face distance. Move quickly between attempts to avoid BMV.
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- VV-ECMO is rarely needed w/proning (www.elso.org/covid19).
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