A Seattle Intensivist’s One-pager on COVID-19

**Nomenclature**
*Infection: Coronavirus Disease 2019 a.k.a. COVID-19*
*Virus: SARS-CoV-2, 2019 Novel Coronavirus*
*NOT “Wuhan Virus”*

**Biology**
- 30 kbp, +ssRNA, enveloped coronavirus
- Likely zoonotic infection; source/reservoir unclear (Bats? / Pangolins? → people)
- Now spread primarily *person to person*;
  - Can be spread by asymptomatic carriers!
- Viral particles enter into lungs via **droplets**
- Viral S spike binds to ACE2 on type two pneumocytes
- Effect of ACE/ARB is unclear; ACE vs ARBs may even have opposite effects
- Other routes of infection (contact, enteric) possible but unclear if these are significant means of spread

**Epidemiology**
- Attack rate = 30-40%
- *R*<sub>0</sub> = 2-4 (similar to influenza)
- CFR = 3.4% (worldwide numbers)
- Incubation time = 4-14 days typically (up to 24 days)

**Timeline:**
- China notifies WHO 2019-12-31
- First US case in Seattle 2020-1-15
- WHO Declared pandemic 2020-3-11
- National emergency 2020-3-12

**Disease clusters:** SNFs, Conferences, other
**Strategies:** contact tracing, screening, social distancing

# FlattenTheCurve - same AUC but distributed over a longer time, ensuring that hospitals don’t exceed capacity

**Diagnosis/Presentation**

**Symptoms**
- 65-80% **cough**
- 45% **febrile** on presentation (85% febrile during illness)
- 20-40% **dyspnea**
- 15% **URI symptoms**
- 10% **GI symptoms**

**Labs**
- CBC: Leukopenia & **lymphopenia** (80%+)
- BMP: ↑BUN/Cr
- LFTs: ↑AST/ALT/Tbili
- ↑D-dimer,
- ↑CRP,
- ↑LDH
- ↑IL-6,
- ↑Ferritin
- ↓Procalcitonin
*PCT may be high w/ bacterial superinfxn*

**Imagery**
- CXR: hazy **bilateral, peripheral** opacities
- CT: **ground glass opacities** (GGO), crazy paving, consolidation, *rarely may be unilateral*
- POCUS: numerous B-lines, pleural line thickening, consolidations w/ air bronchogram

**Isolation**
- Phone call is the best isolation (e.g. move to teledmed)
- Place patient in mask, single room, limit/restrict visitors

**Precautions**
- **STANDARD + CONTACT** (double glove) +
- Either **AIRBORNE** (for aerosolizing procedures: intubation, extubation, NIPPV, suctioning, etc) or **DROPLET** (for everything else)
- N95 masks must be fit tested; wear eye protection
- PPE should be donned/doffed with trained observer
- Hand hygiene: 20+ seconds w/ soap/water or alcohol containing hand gel

**Treatment**
- Isolate & send PCR test early (may take *days* to result)
- GOC discussion / triage
- Notify DOH, CDC, etc
- **Fluid sparing** resuscitation
- ↑empirc antibiotics
- Intubate early under controlled conditions if possible
- Avoid HFNC or NIPPV (aerosolizes virus) unless individualized reasons exist (e.g. COPD, DNI status, etc); consider **helmet mask** interface (if available) if using NIPPV
- **Mechanical ventilation** for ARDS
  - LPV per ARDSnet protocol
  - 7 P’s for good care of ARDS patients: e.g. **PEEP/Paralytics/Proning/inhaled Prostacyclins**, etc
  - ? High PEEP ladder may be better
  - ? ECMO in select cases (unclear who)
- Consider using POCUS to monitor/evaluate lungs
- **Investigational therapies:**
  - Remdesivir → block RNA dependent polymerase
  - Chloroquine → blocks viral entry in endosome
  - Tocilizumab → block IL-6
  - Corticosteroids → reduce inflammation
- None of these investigational therapies are proven, but literature is evolving quickly.

**Prognosis**
- **Age** and **comorbidities** (DM, COPD, CVD) are significant predictors of poor clinical outcome; admission **SOFA** score also predicts mortality.
- Lab findings also predict mortality
  - ↑D-dimer,
  - ↑Ferritin
  - ↑Troponin
  - ↑Cardiac myoglobin
- Expect prolonged MV
- Watch for complications:
  - Secondary infection (VAP), Stress CM, etc

**Mortality (%)**

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