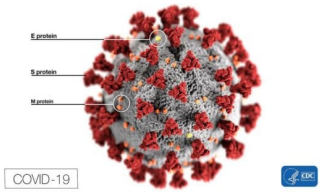
ED GUIDE TO COVID-19



Nomenclature:

Virus: SARS-CoV-2
Infection: COVID-19
Types: 1. L Type (70%) – More aggressive
2. S Type (30%) – Less aggressive
(Note: This is currently being disputed)
* Thought to originate from Bat or Pangolin

Epidemiology:

Attack rate = 30-40%
R_0 = 2.2 – 3.1 (SARS 2-5, MERS 0.3-0.8, Measles 12-18, Ebola 1.5-2.5)
Case fatality Rate = 1 – 2% (For medically attended patients)
Incubation time = 3 – 14 days (mean 5.1; outliers 19 – 27 days)
Disease Severity: 80% mild; 15% severe (hypoxic/hospitalized); 5% Critical (ICU/Ventilated)
Age: 0-14 (1%);15-49 (55%);50-64 (28%);>65 (15%).

Transmission:

Droplet and fomites. Airborne plausible; **NOT** confirmed. ? oral-fecal. 12 – 23% of transmission asymptomatic or presymptomatic. Infectious period up to 10-14 d. **NO** evidence of re-infection after recovery.

HCW risk of Infection:

China (3.5 – 7%); Italy (20%).

Disease Course:

Stage 1 (Viral Response Phase) – Viral incubation and replication. Mild Symptoms (fever, cough, malaise)
Stage 2 (Pulmonary Phase) – Adaptive immune response. Hypoxia/Dyspnea. Abnormal labs/CXR. Admission.
Stage 3 (Hyperinflammation Phase) – Disregulated cytokine storm. ARDS, DIC, multiorgan failure, Shock.
Day 1 – Fever, cough
Day 6-7 – Dyspnea
Day 9-10 – Sepsis
Day 10-12 – ARDS
Day 16 – Death
Day 26 – Recovery/discharge (severe disease)

Risk Factors for Increased Case Fatality Rate:

Age > 60, Male, HTN, DM2, CKD, CVD, CAD, COPD, Cancer, immunocompromised. (Smoker small ↑ risk).

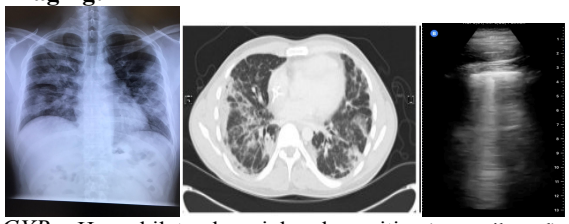
Age	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80+
Italy %	0	0	0	0.3	0.4	1.0	3.5	12.8	20.2
China %	0	0.2	0.2	0.2	0.4	1.3	3.6	8.0	14.8

Resources:
Emcrit, RebelEM, Onepageicu.com, References on request.

Symptomatology:

Severe vs Non-Severe (%): Fever (88/81), cough (71/66), fatigue (60/44), dyspnea (44/6), sputum production (38/28), SOB (36/13), myalgias (26/13), Chills (26/11), dizzy (16/12), headache (11/13), sore throat (8/10), N/V (6/6), diarrhea (6/6), rhinorrhea (3/5).
Up to 57% of patients have **NO** fever at triage.
RR can often be normal due to maintenance of lung compliance.
Consider **walk challenge** to identify exertional hypoxia.
Other symptoms include altered mentation, hemoptysis, anorexia, anosmia, aguesia.

Imaging:



CXR – Hazy, bilateral, peripheral opacities (rare unilateral)
CT – Peripheral ground glass opacities
US – B-lines, pleural thickening, consolidations.

Labs:

Labs	WBC	PMN	LMN	Plt	CRP	LDH	Trop
Results	N/↓	↑	↓	↓	↑	↑	↑
Labs	CK	Creat	Fibr	Ferr	Alb	AST/ALT	D-d
Results	↑	↑	↓	↑	↓	↑	↑

Affects T cells. Usually ↓ Lymphocytes (83%). Can have normal WBC. Neutrophil:lymphocyte ratio > 3 predicts severe illness. CRP/Ferr ↑ with severity. Troponin ↑ starting day 4(? myocardial injury). ↑CRP/LDH/D-d predictor of severity/death. DIC =(↑D-d/INR, ↓Fibr).

Diagnosis:

RT-PCR – Sensitivity ~ 75%. (Single negative test does **NOT** rule out COVID-19). Sensitivity 97% if combined with CT Chest.

Treatment:

Early identification of severe disease. Mainly supportive.
O2 – Pulse ox targets: Resp disease 88-92% (92-95% if drop below 85% on exertion). No disease 93 – 96%. If >4L O_2 consider ICU. If >6L O_2 consider intubation.
Fluids – Conservative fluid strategy. RL > NS.
Antibiotics – If septic (Ceftriaxone+Azithromycin). Avoid Vanco to ↓ AKI risk. Consider Linezolid if MRSA risk.
Pressors – Norepi (1st-line). Target MAP 60-65. Add Vasopressin - refractory. Add Dobutamine - cardiac shock.

CPR:

Defibrillation – Droplet only. *CPR* – Airborne PPE, secure airway then start CPR.

Intubation:

Negative pressure room. Airborne PPE. Most experienced intubator. Airway team ≤ 3 in room. Passive pre-oxygenation. Use VL. Viral filter. **RSI**. Ketamine (1mg/kg) or Etomidate (0.3mg/kg; avoid in septic **shock**). Rocuronium (1.5mg/kg). Early pressors (norepi). Push dose pressors ready (phenyl).

PPE:

AGMPinED (Intubation, NIPPV, BVM, CPR, nebs, open suction, ? > 6L O_2 NC) - Airborne precautions (N95/PAPR). Virus airborne for up to **60 min post intubation**. *Direct patient care* – Droplet precautions. Includes defib.

Vent Settings: ARDSnet.org (just in case)

Lung compliance maintained but atelectasis and drowning of alveoli. **ARDS** = PaO_2/FIO_2 <300. *ARDS ventilation* – AC control (paralyzed)/support (spont.). RR=continue baseline minute ventilation (RRmax <35). IFR 60-80L/min. Vt 4-8ml/kg (start 6ml/kg). I:E ratio (I duration ≤ E duration). Pplat ≤ 30cmH_2O. High PEEP. SPO_2 goal 88-96%. Consider permissive hypercapnea (pH ~ 7.15)

FiO2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
PEEP	5-14	14-16	16-20	20	20	20-22	22	24

Disposition:

1. ***Mild*** – Consider d/c: mild symptoms. Normal labs/CXR. O_2 >93%. Consider swab if risk factors. Self isolate. Other considerations: age, ADLs/supports, 3rd trimester, HCW.
2. ***Moderate*** – Consider admission: Signs of COVID19 + hypoxic (at rest or exertion). RF for ↑ CFR. Abnormal CXR (bilat patchy)/labs (↓LMN;↑N/Lratio, dd, crp, ldh, trop).
3. ***Severe*** – Consult ICU – refractory hypoxemia (4L O_2 > = 93%), resp acidosis (pH<7.2), clinical resp failure, hypotension (SBP<90). Consider intubation if 6L O_2 = <93%. Watch for myocardial injury/VT/VF. Consider appropriate care based on age, frailty scale, cognitive function, comorbidities, severity of disease, goals of care.

Pediatric Considerations:

Mild or asymptomatic (6% severe). <5y/o most vulnerable. M > F. **AVOID** intubation (use HFNC/Bipap). Consider 2° PNA. MDI for asthma. Adult size teen = Adult Treatment. Unknown low risk (?ACE2 receptor maturity vs immunity).

Return to work (BC CDC):

10 days from onset of symptoms (and asymptomatic).

Common Questions:

NSAIDS – Are **SAFE** but Acetaminophen first line anitpyretic.
ACEi/ARBs – Continue use even if COVID-19 +.
Chloroquine/Hydroxychloroquine - **NOT** recommended (yet).
Steroids – **NOT** recommended (may have role in refractory shock) unless medically necessary (asthma/copd).
IVIG – **MAY** have role in severe cases.
Safety of HFNC – **Controversial**. Likely has a role but need negative pressure room. Use supported by SSC/ANZICS/WHO.
Vertical Transmission - **NO** evidence.