Emergency Care Management of COVID-19

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July 20, 2020 (v. 2.7)

WHAT HAS CHANGED IN THIS UPDATE COMPARED TO VERSION 1.0?

Major updates

- **ED Self-proning guideline included**
- **Updated therapeutics (Including corticosteroid recommendations)**

Minor updates

- Change title for the COVID Stress test →COVID exercise tolerance test

Recommendations apply to three groups of patients (please reference current guidelines for additional descriptions):

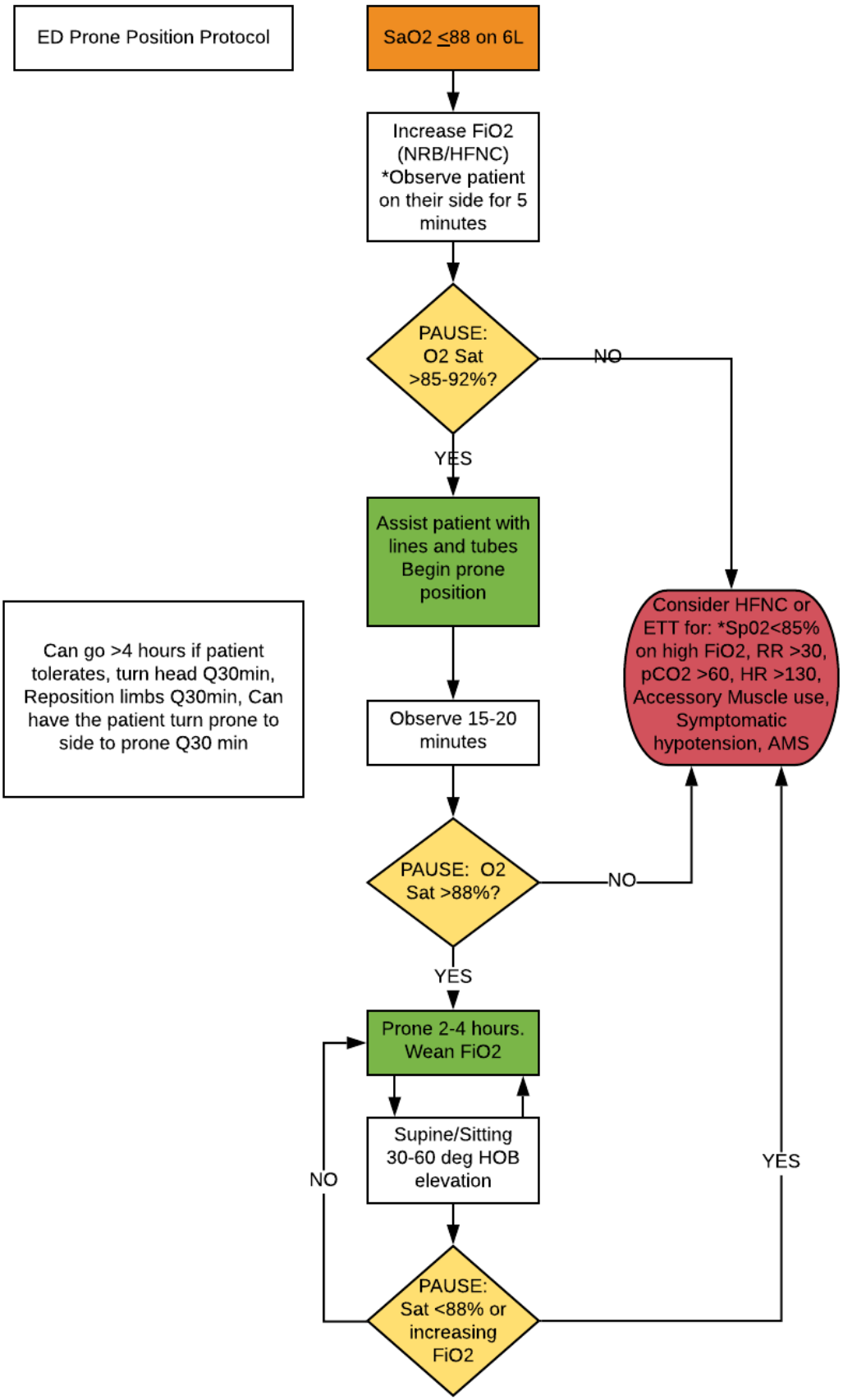
1) *Confirmed COVID-19 case*
2) *Person Under Investigation (PUI) with "high risk*:" Patient planned for SARS-CoV-2 testing or awaiting test results and who clinician believes has a "high" risk of having COVID-19.
3) *"Other" risk:* Includes (1) PUI patients with SARS-CoV-2 testing pending but who have "low risk" of COVID-19 based on clinician judgement and (2) patients with syndromes consistent with COVID-19 still undergoing workup to determine need for SARS-CoV-2 testing.

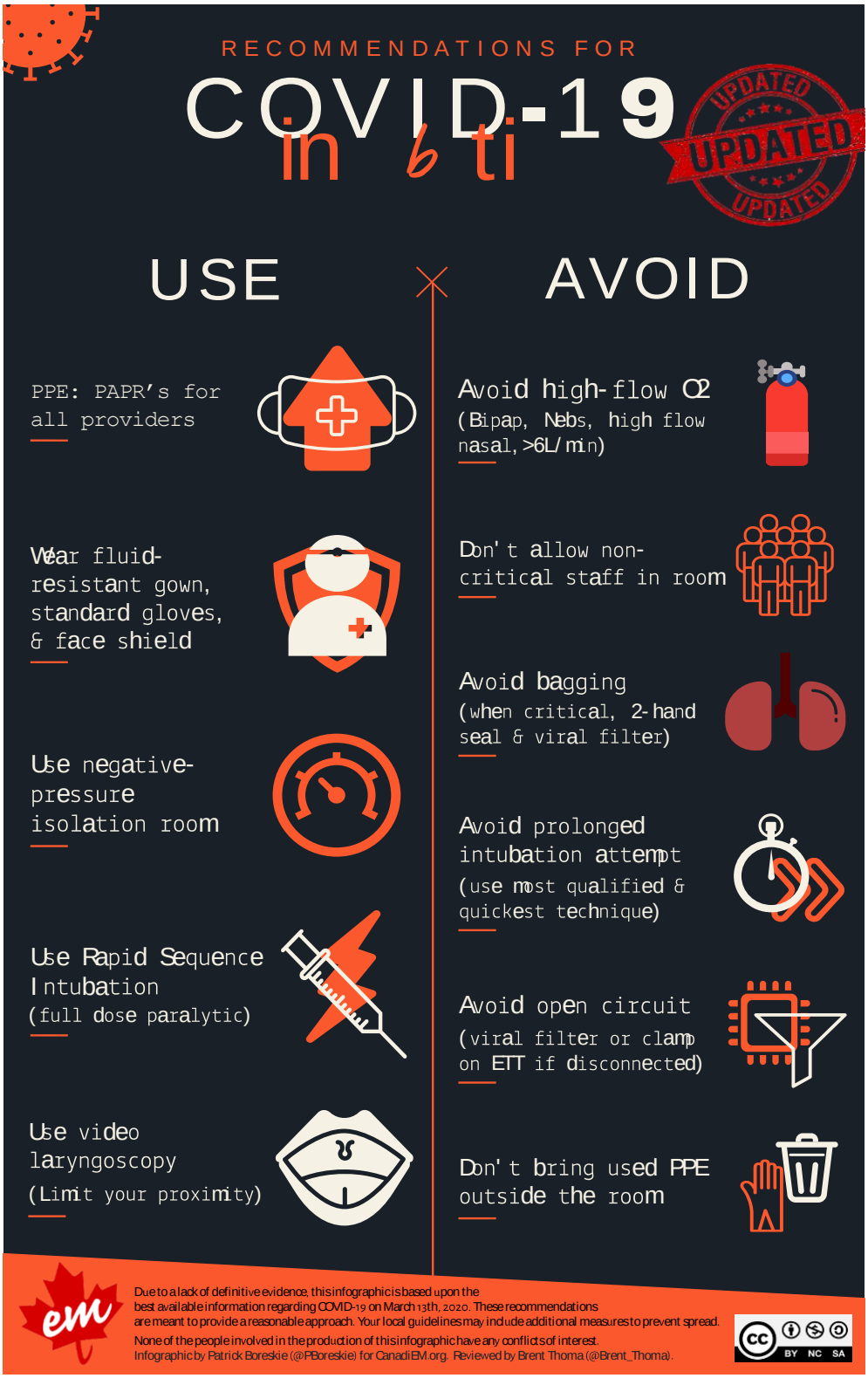
Recommendations below supplement standard ED care. Key recommendations are marked with an asterisk (*). Evidence and recommendations regarding the care of patients with potential, suspected, or confirmed COVID-19 is expected to evolve very rapidly in coming months. Clinicians treating COVID-19 patients should review CDC's updated recommendations frequently and consult with ED leadership and/or infectious disease specialists as needed.

Issue	COVID-19 suspicion			Recommendation
	Confirmed COVID-19	High-risk PUI	Other risk	
GENERAL CARE, STAFFING, & PPE				
Room placement*	X	X	X	Standard room with door closed.
	COVID+ *All* PUI			Negative pressure room if available and patient is unstable, has impending respiratory failure, or ongoing or impending aerosolizing procedures. Cohort COVID-19 patients in ED's according to surge plan.
Level of care				ED physician assessment of patient condition and social determinants[t] will influence level of care.
Mild disease	X	X	X	**DC home** if: "Well appearing", and Room air SpO2 ≥90% at rest and negative COVID Stress Test with special consideration for presence of ^co-morbidities (list below). DC home with strict return precautions
Moderate disease	X	X	X	**Admit to the floor** if: "Ill appearing", and any one of: Hypoxia requiring up to 6L oxygen NC/simple FM to maintain SpO2 ≥90% OR ^co-morbidities. (facemask covering oxygen delivery mechanism)
Severe Disease	X	X	X	**Admit to the ICU** if: "Toxic or in distress" OR Severe hypoxia (>6L NC/FM to keep SpO2 ≥90%), OR clinical judgment ICU is needed with special consideration for presence of ^co-morbidities and age>60.
COVID Exercise Tolerance Test*				Patient briskly walks or jogs in place or one minute sit-to-stand in room for 1 minute with closed door (or with facemask in curtained rooms) while wearing pulse oximeter and **any SpO2 <90% or dyspnea causing a failure to complete the test qualifies as positive**
^Co-Morbidities:				Diabetes, HTN, CHF, CAD, COPD/asthma (or any chronic or severe lung disease), CKD w HD, chronic liver disease, cancer, immunosuppression, pregnancy
[t]Social Determinants				Resident of SNF or long-term care facility or other residential density, social isolation, homeless, cognitive delay, disability, etc.
Goals of care	X	X	X	For patients with severe disease discuss goals of care with appropriate referral to **hospice**
PPE*	X	X	X	Airborne (PAPR) plus gown/gloves for any aerosolizing procedure. If N95 used, add full face shield.
	COVID+ / *all* PUI			Gown, gloves, procedural mask, & eye shield if no aerosolizing procedure. Please don and doff appropriate PPE (eg. gowns and gloves) between patient encounters.
Communication	X	X	X	Utilize patient's personal phones or in-room phones to aid communication.
Telemedicine	X	X	X	Early involvement to reduce HCW exposure & optimize resource use.
Crisis/Care Mgmt	X	X	X	Standard care. Limit exposure. Consider Telemedicine contact with patient.
Personal clothing & equipment	X	X	X	Use disposable stethoscopes (if using personal stethoscopes disinfect after each patient encounter)
	X	X	X	Clean communication devices (e.g. phone) often with germicidal wipes.
	X	X	X	During shift, wear scrubs. Change to clean clothes before leaving hospital.
CLINICAL EVALUATION				
Bedside imaging & testing	X	X	X	Consider utility of bedside & other imaging/diagnostic studies in context of personnel exposure and potential for equipment contamination.
	X	X	X	Portable single view CXR preferred.
	X	X	X	Very carefully clean any equipment (e.g. ultrasound) brought into room.
CT scans	X	X	X	Routine Chest CT scans **unnecessary**. If considering PE, use iCentra PE decision support tools.
Laboratory testing		X	X	COVID-19 testing guided through iCentra quick orders.

Issue	COVID-19 suspicion			Recommendation
	Confirmed COVID-19	High-risk PUI	Other risk	
	X	X	X	CBC w/auto diff, CMP
	X			Possible prognostication aids: CRP, Ferritin, Troponin-I, D-dimer.
	X	X	X	Low procalcitonin does not rule out bacterial pneumonia and elevated level does not rule out COVID-19 (or other viral pneumonia).
RESPIRATORY SUPPORT FOR NON-INTUBATED PATIENTS*				
Method of oxygenation support*	X	X	X	O_2 <6L/min nasal cannula. Oxymizer or simple mask ≤10L/min OK if clinically stable. Up to NRB 15L/min OK for transport.
	X	X	X	**A trial of HFNC (40-50L, goal FiO2 ≤60%) is appropriate in stable, non-distressed hypoxic patients. Reassess all patients on HFNC frequently.**
	X	X	X	NIPPV trial may be warranted if patient would have clear reason for NIPPV in absence of COVID-19 rule out (e.g. COPD exacerbation).
	X	X	X	HFNC and NIPPV require airborne precautions in negative pressure room.
Self proning	X	X	X	Recommend self-proning trial in appropriately mentating awake patients on higher FiO2 *see protocol in appendix below (supporting data)
Timing of endotracheal intubation*	X	X	X	**Use lower threshold to intubate if rapidly declining patient.**
	X	X		**Most patients on >10L oxymizer & nearly all on >60% FiO2 need intubation.**
	X	X		Proceed with early intubation if rapidly deteriorating respiratory, hemodynamic , or mental status to avoid increased patient & HCW risk of emergent procedure.
	X	X	X	Consider patient-specific risks for harm from intubation or invasive ventilation (e.g. pulm HTN) when selecting intubation threshold.
INTUBATION* - "Given the high mortality associated with mechanically ventilated patients, ensure that every effort has been made to give patients the opportunity to speak with family and have a meaningful conversation prior to intubation if possible."				
Staff, location, & PPE*	X	X	X	Intubation by most experienced available operator (options will vary).
	X	X	X	Perform intubation in negative pressure room if available.
	X	X	X	Minimize number of staff in the room (RT, RN, ED provider only) but consider having a qualified backup physician outside the room (or via local telemedicine desktop) to assist and aid global overview.
	X	X	X	Wear PAPR, gown, and [long] gloves that extend over gown cuffs for all providers in the room.
Technique	X	X	X	Use RSI approach. Avoid BVM. Elevate the HOB to >30 rebelem.com
Induction agents	X	X	X	Higher dose NMB (1.5mg/kg Rocuronium) Ketamine 1.5 mg/kg, Fentanyl 1 mcg/kg to aid rapid onset, avoid cough. Have push dose pressors prepared at the bedside.
Preparation & preoxygenation*	X	X	X	Maximize pre-oxygenation with NC, simple face mask, or non-rebreather.
				Avoid preoxygenation with BVM, HFNC, and especially NIPPV if possible. • If unavoidable, preoxygenate with HFNC in neg pressure/airborne room. • If BVM unavoidable during intubation, use small tidal volumes, two-person technique to achieve tight mask seal, and ensure filter in place. See below. • BVM Set up: Mask / ET tube: HEPA filter : ETCO2 detector : BVM with PEEP valve / vent tubing
	X	X	X	Apply apneic oxygenation with 6L NC. (Higher flow rates risk aerosolization)
	X	X	X	Perform pre-intubation timeout prior to entering room and donning PPE. **Clear communication of roles, airway plan, and back-up plan is essential.**
Equipment	X	X	X	**Prefer video laryngoscopy with independent screen (e.g GlideScope).**

Issue	COVID-19 suspicion			Recommendation
	Confirmed COVID-19	High-risk PUI	Other risk	
	X	X	X	Keep airway cart, surgical airway kit and extra supplies **outside the room**.
	X	X	X	**Ensure BVM & vent have appropriate filter.**
	X	X	X	Ensure cleaning/transport protocol followed for reusable dirty equipment.
Circuit disconnects	X	X		Minimize disconnects, consider safely clamping ETT for disconnects.
VENTILATOR MANAGEMENT				
Ventilator management	X	X	X	Initiate all patients *immediately* on lung protective/low-tidal volume ventilation (6ml/kg), Use RT Intermountain Computerized ventilator protocols. APRV is NOT INDICATED.
FLUID/VOLUME MANAGEMENT				
Fluid resuscitation	X	X	X	Use multimodal assessment strategy to guide judicious fluid resuscitation if hypotensive or clinically volume depleted.
PHARMACOLOGIC TREATMENT				
Treatment of bacterial pneumonia	X	X	X	Imaging appearance, symptoms, or exam findings consistent with bacterial PNA should be treated per ePneumonia CarePathway
Ibuprofen	X	X	X	No evidence of harm
Cough medicine				No indications for narcotic based cough medicine.
Bronchodilators	X	X		Use only for patients with known Asthma/COPD/RAD. Give small volume nebulizer first, with MDI only if improvement. Consider IM epinephrine (0.3mg) in place of albuterol
COVID Drug therapies*				For specific drug prescribing guidance visit Intermountain Therapeutics
Dexamethasone	X			Admitted with FiO2 > 40% (includes > 6 L NC), HFNC, NIPPV, or mechanical ventilation
Remdesivir	X			Admitted with new, increasing oxygen requirement of at least 4 L nasal cannula and not intubated.
Hydroxychloroquine	X			No ED role outside of clinical trial, Consider Intermountain's HyAzOUT trial
Other drugs	X			Refer to Intermountain off-label treatment guide. Current RCT's





Mask : HEPA filter : ETCO2 detector : BVM with PEEP valve attached

From www.emcrit.org

2 — Hand Mask Seal Technique:

TELEMEDICINE PROCESS:

1. Restart computer at the beginning of your shift
2. Open skype first
3. Open TeleHealth
4. Launch iCentra
5. Include standardized phrases to document TeleED utilization (;;telecovid phrase)
6. Make sure face to face evaluation takes place once during the encounter
7. At the end of your shift--logout of Skype first (it does not automatically log you out when you logoff of Icentra)

COVID Emergency Department CPR Guidelines

*Updated April 24, 2020
This document is intended to function as a guide to pre-hospital and cardiac arrest management during the COVID pandemic (SARS-CoV2 virus). SARS-CoV2 is highly infectious, easily transmissible and poses significant risk of morbidity and mortality. These guidelines balance the acute need for high-quality CPR with a focus on healthcare worker protection.

There is little evidence published on the topic however a recent review paper in CIRCULATION [(1)] provides a comprehensive framework that can be universally deployed. This document is supported by the American Heart Associated in collaboration with multiple other medical societies.

This is intended to be inclusive and universal for all age groups (adult, pediatric and neonatal) with suspected or confirmed SARS-CoV2 infection and is applicable for both pre-hospital and emergency department cardiac arrests.

Key Points:

*PPE is paramount to protect healthcare workers (HCW's) and vigilance must be maintained **before, during and after** an arrest to minimize and lapse of infection-control practices

○ Viral particles can remain suspended in the air for up to 1 hour

*Prioritize early endotracheal tube placement to lower aerosolization risk

○ Refer to airway algorithm for strategies and additional information

*Communication strategies are paramount to minimize provider exposure

- No non-essential team members in the room
- Clearly defined pre-assigned roles

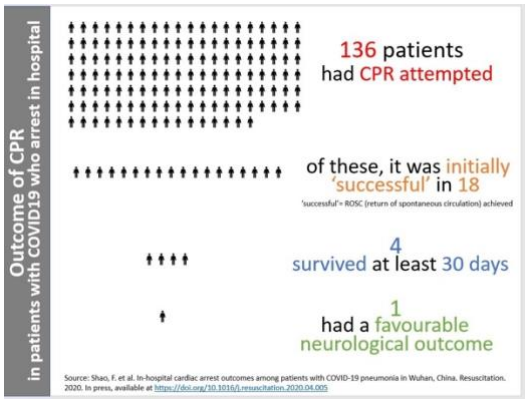
*Clarify DNR/DNI early and consider appropriateness of starting and/or continuing CPR

- Refer to Palliative care document for additional information

A recent publication from China provides some perspective of the **overall poor outcomes of COVID + patients**(2) Retrospective Review of 136pts
Most Common Initial Rhythm =

Resp Etiology = 87.5%

- Asystole 89.7%
- ROSC = 13.2%
- 30d Survival = 2.9%
- **Good Neuro Outcome = 0.7%**



CONVENTONAL CARE

Pre-Hospital Arrest

Follow current protocols for field codes and terminate based on medical direction guidelines
Special Attention to:

- Unwitnessed arrest
- No shockable rhythm in field
- Age>80
- Associated comorbidities
- Preceding COVID-19 like illness

- Establish “Hot Zone” where all staff are in full aerosolization PPE prior to patient arrival

- Utilize negative pressure rooms when available

- Utilize medical control for questionable transports

- If ROSC not achieved after appropriate resuscitative measures in the field, low utility of transport
- * In rare cases under current prevalence of disease in Utah, a patient may be transported to ED despite prolonged field arrest. If strong suspicion for COVID-related arrest, *consider* physician evaluation in the ED Ambulance Bay to determine on-going resuscitative efforts to minimize staff exposure and preserve PPE/resources

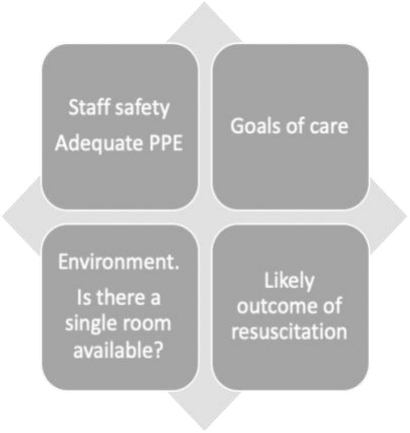
Emergency Department Arrest

- Address Goals of Care early with patient or proxy
- If signs of deterioration, proactively move patient to negative pressure room/unit when available

Resuscitation Optimization

- A staff member should be specifically assigned to ensure safe PPE use.

Specific attention should be paid to mask fit and to supervise don/doffing



- No compressions until aerosolization PPE in place (N95 or PAPR)
- Early identification of potentially reversible causes (H's & T's)
- Rapid rhythm assessment and defibrillation if indicated

- Early ET tube placement with compressions held

- Follow ED Guideline Document airway algorithm to optimize airway and avoid particle spray

- Minimize patient contact and PPE use
- Mechanical CPR devices utilized when/where available
    - 2nd physician should be via TeleHealth (IMED/McKay) or TeleCritical Care (smaller ED's)
    - Timing and charting all done outside the room
    - Single IV/IO access unless otherwise needed
    - Pharmacy to stay outside of room
    - Dedicated runner for additional supplies
    - Utilize facetime, speaker phone, iPad or other forms of communication from inside the room to those outside
- Avoid unnecessary invasive procedures
- Consider barrier/plastic sheet over patient for compressions if grossly contaminated

CONTINGENCY CARE

- As community spread increases, all critically ill patients should be assumed to be infected with SARS-CoV2
- Increased utilization of palliative care services for all dying patients and family
- If no readily identifiable reversible causes identified and non-shockable rhythm, early termination of resuscitation is indicated

CRISIS CARE

- No transfer of EMS patients unless shockable rhythm in field and presumed primary cardiac or other clearly reversible etiology
    - If STEMI identified or ROSC obtained, early Cardiology consult to discuss Cath-Lab utilization
    - Consider rapid SARS-CoV2 testing where applicable
- For coding patients in the ED, recommend full PPE and precautions as above. If after one round of compressions and defib shows non-shockable rhythm, recommend early code termination based on physician discretion of cause of code

- Recommend two physicians & CTO involved in these cases when able –

Consider DNR status for presumed COVID-19 patients

- Additionally, recommend early PSA to the public regarding any changes should this arise as we have seen in other cities
- Follow guidance of Crisis Triage Officer for questionable cases

Special Populations

Neonatal Resuscitation

- Aerosolization PPE recommended
- Early activation for mom/baby resources (OB, newborn nursery team, LifeFlight)
- Routine neonatal care (drying, stimulation warming)
- Suction NOT indicated in most deliveries (+ aerosolization)
- Avoid endotracheal administration of meds with uncuffed ET tube
- Low-lying umbilical venous catheter preferred access site

Maternal Cardiac Arrest

- Full aerosolization PPE
- Tenets of care for perimortem arrest arrest are unchanged including early activation of OB team and resuscitative hysterotomy [4]

Hydroxychloroquine Toxicity

- Toxicity can be within 30 min if taken in excess
- Mechanism: Na-Channel blocker w/ quinidine-like (Class 1a) toxicity

  Negative chronotropy (bradycardia), Crosses BBB (+ CNS effects)

- Presentation: Generalized weakness, seizure, arrhythmia, cardiac arrest
- ECG: Wide QRS & QTc prolongation
- Labs: HypoKalemia, HypoPhosphatemia
- Treatment: Consider activated charcoal if < 1 hr and mental status/airway intact
    - Potassium, Magnesium and Phosphate Repletion
    - Sodium Bicarb push and gtt for wide QRS (goal QRS < 100 ms)
    - Epinephrine gtt if cardiogenic shock
    - Diazepam for seizure and CNS toxicity, propofol ok if intubated
    - CanNOT be dialyzed
    - AVOID other Na-Channel Blockers (Lidocaine, Keppra, Phenytoin)

Sources:

1. *Edelson et al.: Interi Guidance for Life Support for COVID-19. CIRCULATION (2020)*
2. *Shao F, Xu S, Ma X, Xu Z, Lyu J, Ng M, Cui H, Yu C, Zhang Q, Sun P, Tang Z, In-hospital cardiac arrest outcomes among patients with COVID-19 pneumonia in Wuhan, China, Resuscitation (2020)*
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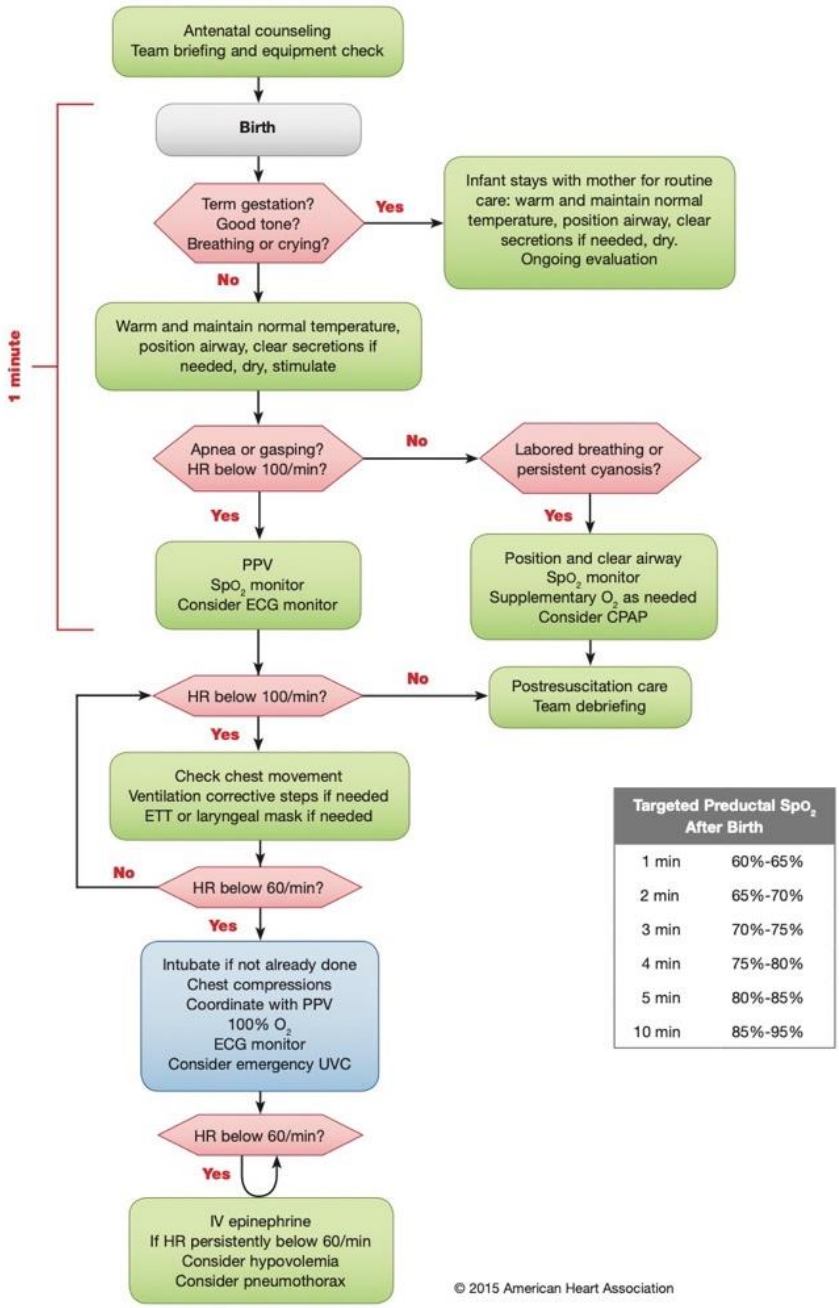
Neonatal Resuscitation Algorithm—2015 Update



Targeted Preductal SpO_2 After Birth	
1 min	60%-65%
2 min	65%-70%
3 min	70%-75%
4 min	75%-80%
5 min	80%-85%
10 min	85%-95%

In-Room Personnel:

1. Tech/Compressor
2. Lead Nurse
3. Physician
4. Respiratory Therapist or Second Nurse

Out-of-Room Personnel:

1. Recorder: Charge RN or House Supervisor
2. Pharmacist or RN to obtain medications
3. Runner: obtain additional materials quickly
4. Extra Compressors: ready with appropriate PPE
5. Second Physician if available as backup

ED Quick Guide

Staff In PPE	Critical Actions
0	Resuscitation should
1	- Place simple face mask or NRB @ 15 L/m - Compression-only CPR *Apply barrier/tarp if patient grossly contaminated
2	- Apply defib pads with early rhythm determination *shock if indicated - Obtain IV/IO access
3	- Early Endotracheal Intubation with Inline Viral Filter - Hold Compressions for ETT placement - LMA w/filter as rescue, consider risk/benefit before FONA
4	Team Leader, Cycle Compressor, Meds, Place on Vent

Strategies for Communication:

- Maximize pre-brief time if available (ie pre-hospital)
- Utilize tele-health capabilities where available including within the ED and tele-critical services in smaller facilities
- Utilize interpreter ipads, in-room phones on “speaker” or use of facetime or other equivalent to communicate between *in-room* and *out-of-room* teams to minimize door opening/exposure

InstaCare Risk Stratification and Triage Guidelines:

General Guidelines:

1. ED Guidelines can serve as a guide to care in the InstaCare as well, concepts are the same with regards to PPE and testing.
2. For asymptomatic or minimally symptomatic patients who are stable and want to get tested or need testing should be referred to a local non-emergency department testing site. This is to decrease unnecessary patient volumes in the emergency department (ED).
3. Prior to sending patients to the ED with known COVID-19, PUI, or high-risk, please contact the ED to make sure that they will be able to prepare for arrival including directing EMS to an appropriate COVID assessment area of the ED.

Presenting Symptoms:

- Patients with uncomplicated upper respiratory tract viral infection, may have non-specific symptoms such as fever, fatigue, cough (with or without sputum production), anorexia, malaise, muscle pain, sore throat, dyspnea, nasal congestion, or headache. Rarely, patients may also present with diarrhea, nausea and vomiting.
- The elderly and immunosuppressed may present with atypical symptoms. Symptoms due to physiologic adaptations of pregnancy or adverse pregnancy events, such as e.g. dyspnea, fever, GI-symptoms or fatigue, may overlap with COVID-19 symptoms.

Risk Category	Clinical Presentation
Consider DC with home monitoring.	Symptomatic patient, PLUS, • Clinically well appearing, and, • Resting O2 Sat ≥92% on room air, and, • Negative *COVID Stress Test, and, • No tachypnea, RR <20. *COVID Stress Test = Patient briskly walks or jogs in place in room for 1 minute with closed door (or with facemask in curtained rooms) while wearing pulse oximeter and **any SpO2 <90% or dyspnea causing a failure to complete the test qualifies as positive.**
Consider transfer to ED consider ALS ambulance	Symptomatic patient, PLUS, • Patient appears toxic and in distress, or, • Resting O2 sat ≤ 91% on room air, or desaturation on ambulation, or, • Patients requiring bronchodilator treatment OR, Any two (or even one criterion based on clinical presentation): • Age >60 • Existing conditions such as Diabetes Mellitus, HTN, CHF, CAD, COPD (or any chronic or severe lung disease), CKD, Cancer, Immunosuppression • Change in mentation • Respiratory Rate >20/min • Pulse >120 bpm • Systolic BP<90mmHg, Diastolic BP<60mmHg

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