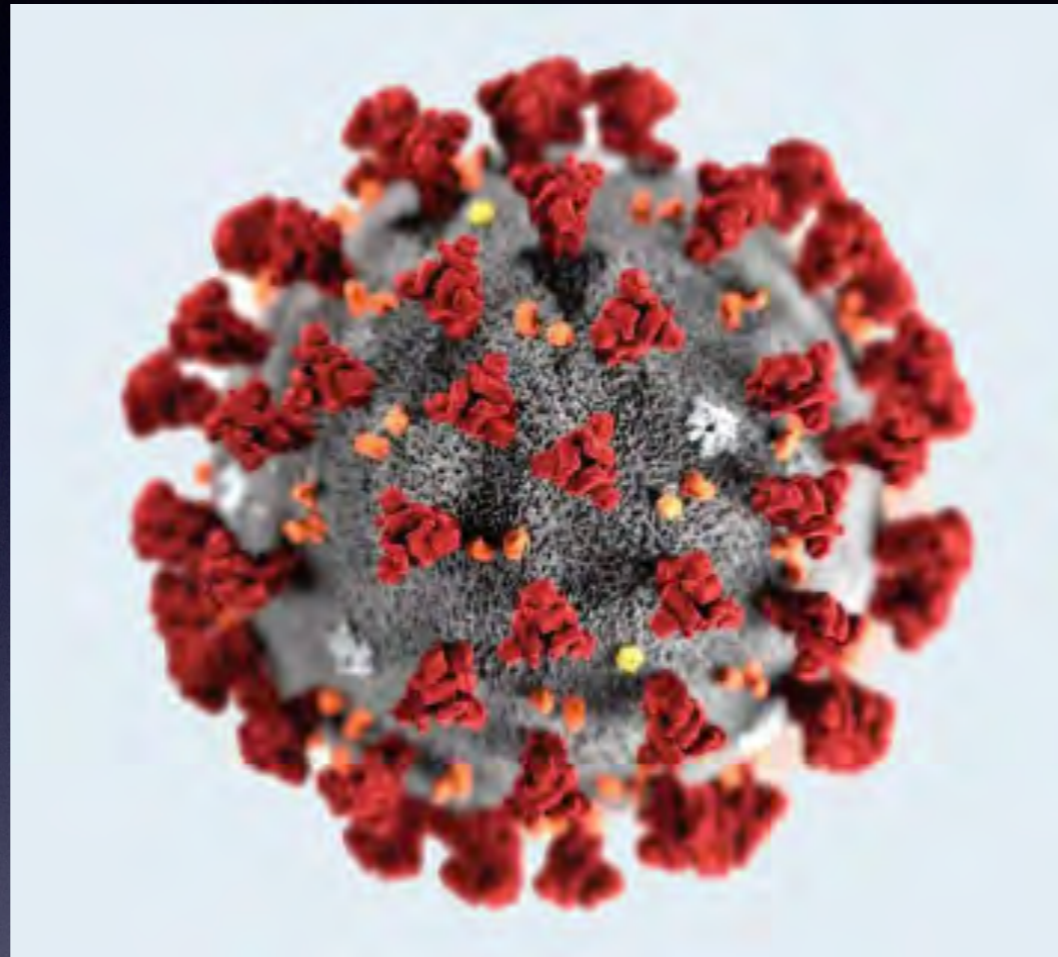


# COVID: Lessons Learned



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# Lessons Learned... and still learning!

<https://em.uw.edu/faculty/uw-department-emergency-medicine-edicu-covid-19-preparedness>

# IHME models

United States of America ▾

## Hospital resource use ⓘ

14 days until peak resource use on  
**April 15, 2020**

### Resources needed for COVID patients on peak date

All beds needed  
**220,643 beds**



Bed Shortage  
**54,046 beds**

ICU beds needed  
**32,976 beds**



ICU Bed Shortage  
**13,856 beds**

Invasive ventilators needed  
**26,381 ventilators**

<https://covid19.healthdata.org/projections>

Alaska



### Hospital resource use ⓘ

19 days until peak resource use on  
**April 20, 2020**

#### Resources needed for COVID patients on peak date

All beds needed  
**498 beds**



All beds available  
**682 beds**



Bed Shortage  
**0 beds**

ICU beds needed  
**75 beds**

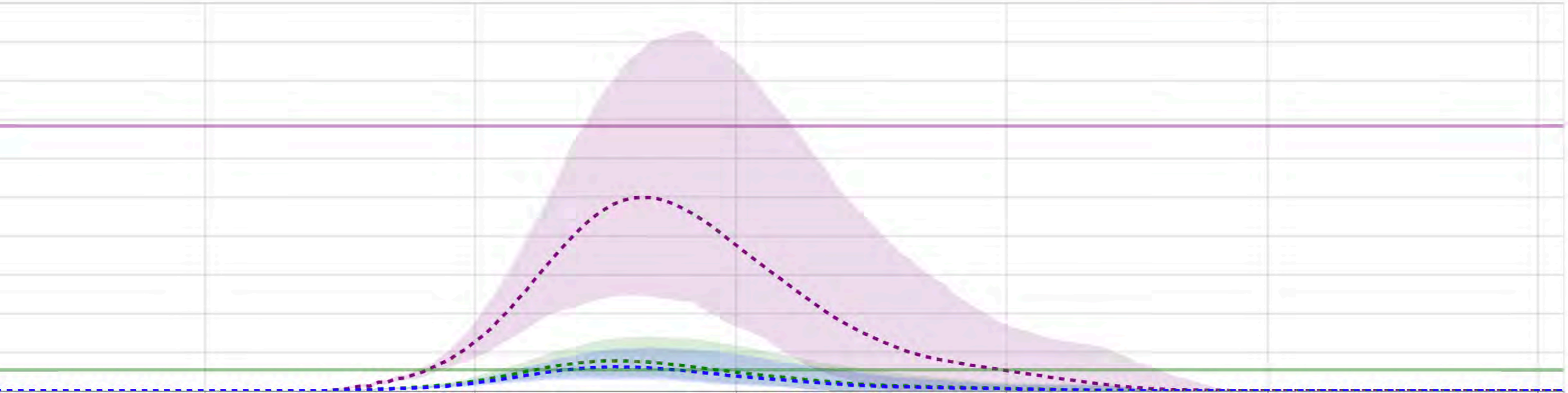


ICU beds available  
**54 beds**



ICU Bed Shortage  
**21 beds**

Invasive ventilators needed  
**60 ventilators**



Alaska

19 days until peak resource use on  
**April 20, 2020**

- United States of America
- Alabama
- Alaska**
- Arizona
- Arkansas
- California
- Colorado
- Connecticut

needed  
beds



All beds available  
**682 beds**



Bed Shortage  
**0 beds**

needed  
beds



ICU beds available  
**54 beds**



ICU Bed Shortage  
**21 beds**

Invasive ventilators needed  
**60 ventilators**

April 21, 2020

All Beds available:	682
All Beds needed (projected):	498 (244-896)
ICU beds needed (projected):	74 (36-141)
Invasive ventilators needed (projected):	59 (28-112)
ICU beds available:	54

Mar 01

Apr 01

May 01

Jun 01

Jul 01

Aug 01

# General Initial Considerations

- Command System: communication early and often between EMS, ED, ICU, hospitalist, DOH, local vulnerable populations lead: eg. homeless shelters, nursing home, jail
- Increase usual communication schedule within departments dramatically
- Establish contact tracing and isolation procedures

# Syndrome

- Clinical Presentations have varied: cc of fatigue, fever, fall, cough, sore throat, anosmia. Rapid deterioration common
- Atypical : GSW neck, heroin OD, fall with head lac, visitor for patient
- CXR: 5-95% abnormal depending....multifocal pna common
- Labs: WBC with lymphopenia, elevated d dimer, elevated LFTs, renal insufficiency, elevated Tn, elevated lactate. Consider :fibrinogen/coags, LDH,CRP, ABG

## Severe Disease Criteria

D-Dimer > 1.0 ug/ml

CPK > 2x ULN

CRP > 100

LDH >245

Hepatic Transaminase  
elevation

New Creatinine elevation

Troponin elevation

Abs lymphocyte count <0.8

Lactate > 4

Extensive bilateral and/or  
worsening pulmonary  
infiltrates



4S approach of Paul Farmer,  
Partners In Health: Staff,  
Stuff, Space and Systems

# Staff

- Identify vulnerable staff members
- Fit testing, Donning/Doffing training
- COVID hospitalist and intensivist lead
- Outreach leads
- Media communications lead
- Double back up system



Like Ebola, this is a  
disease of health  
care workers

14% of patients were  
HCW in Spain

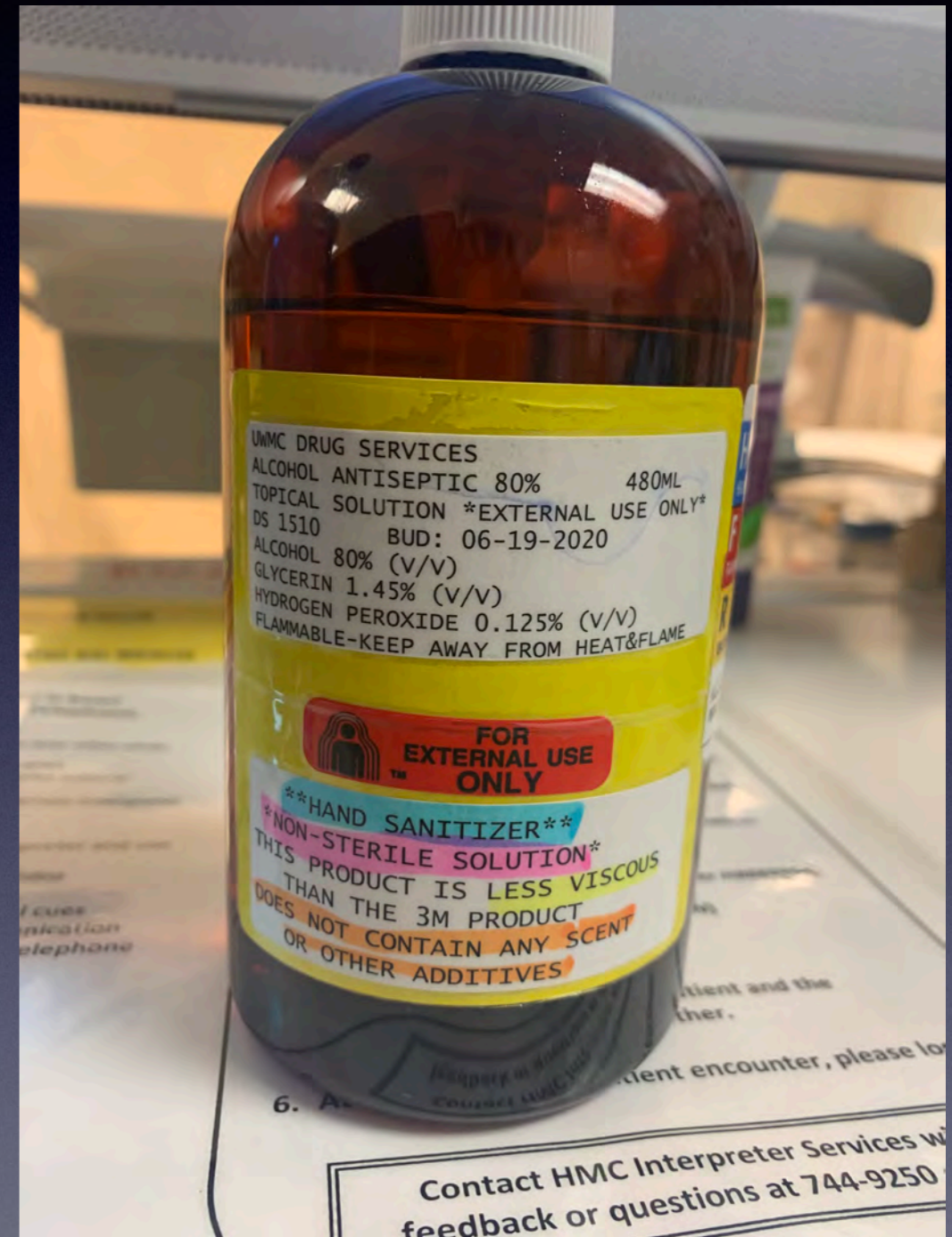


# Stuff

- PPE
  - Masks: surgical, N95/PAPR/shrouds
  - Swabs, gowns, gloves, wipes, eye protection, intubation supplies
  - Azithro/Albuterol/Hydroxychloroquine/Remdesivir/intubation/sedation meds etc.
- UW: 3D printing shields and homemade sanitizer

# Stuff (cont)

- Store all sanitizer/wipes/PPE in such a way that it can't walk off with visitors, patients, staff
- Scrubs
- Trash bins for doffing outside each space



# A word on PPE



## **ANNOUNCEMENT:**

### **Joint Commission Statement on Use of Face Masks Brought From Home**



Based on this information, it is reasonable for staff to want to wear a mask throughout the day. The value of wearing a mask throughout the day will depend upon the number of COVID-19 patients in the hospital and the community. However, for staff who are at higher risk because of their age, underlying health conditions, or caretaking obligations for high-risk family member, even a small risk of contracting COVID-19 from an asymptomatic patient may make them want to err on the side of caution. Staff in emergency departments are at particularly high risk because of the high number of patients they see who may be asymptomatic carriers of the virus and the fact that they may have to emergently intubate patients and would be at significant risk without a respirator to protect against aerosolized virus. We are aware of a number of hospitals who have gone a step farther and are actually requiring staff to wear masks throughout the day to prevent nosocomial spread from patients to staff and between staff. In addition, staff should always remember that a mask is no substitute for frequent handwashing and social distancing to extent that this is possible.

## Guidance on Preparing Workplaces for COVID-19

Employers are obligated to provide their workers with PPE needed to keep them safe while performing their jobs. The types of PPE required during a COVID-19 outbreak will be based on the risk of being infected with SARS-CoV-2 while working and job tasks that may lead to exposure.

Workers, including those who work within 6 feet of patients known to be, or suspected of being, infected with SARS-CoV-2 and those performing aerosol-generating procedures, need to use respirators:

- National Institute for Occupational Safety and Health (NIOSH)-approved, N95 filtering facepiece respirators or better must be used in the context of a comprehensive, written respiratory protection program that includes fit-testing, training, and medical exams. See OSHA's Respiratory Protection standard, 29 CFR 1910.134 at [www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.134](http://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.134).
- When disposable N95 filtering facepiece respirators are not available, consider using other respirators that provide greater protection and improve worker comfort. Other types of acceptable respirators include: a R/P95, N/R/P99, or N/R/P100 filtering facepiece respirator; an air-purifying elastomeric (e.g., half-face or full-face) respirator with appropriate filters or cartridges; powered air purifying respirator (PAPR) with high-efficiency particulate arrestance (HEPA) filter; or supplied air respirator (SAR). See CDC/NIOSH guidance for optimizing respirator supplies at: [www.cdc.gov/coronavirus/2019-ncov/hcp/respirators-strategy](http://www.cdc.gov/coronavirus/2019-ncov/hcp/respirators-strategy).

<https://www.osha.gov/Publications/OSHA3990.pdf>

# Space

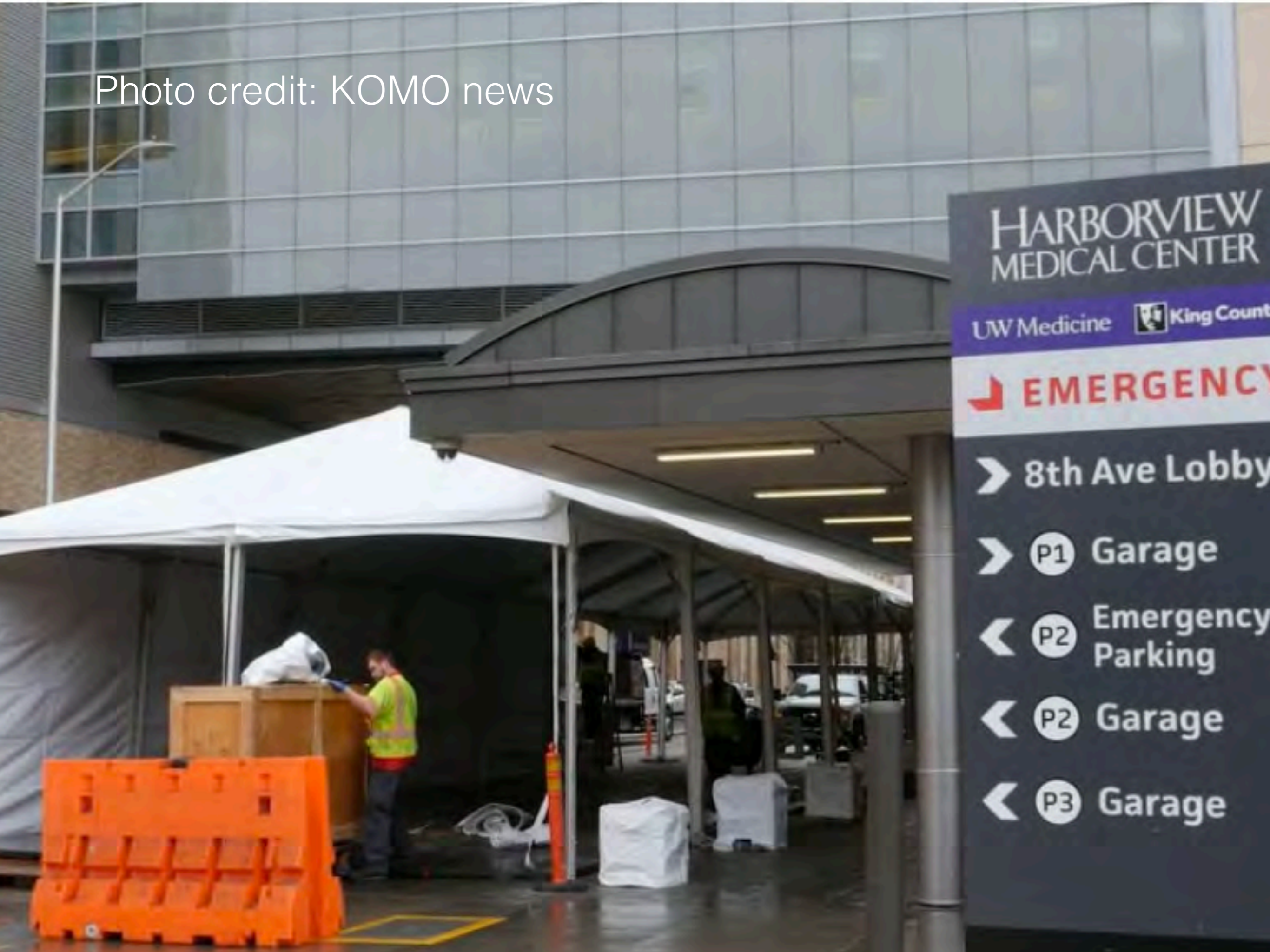
- Outdoor triage? Stop in breezeway to ask screening questions?
- Airborne rooms with negative pressure (can more be made?)?
- Droplet/Contact precautions rooms for low risk patient encounters
- Workspace : provider proximity, “cold zone” mask, wipedowns Q2hrs
- Consider routes patients will take and minimizing aerosolization along these routes
- How to terminal clean CT scan and other diagnostic equipment eg. ultrasound, ekg







Space


Photo credit: KOMO news





HARBORVIEW  
MEDICAL CENTER


UW Medicine  King County


 **EMERGENCY**

 8th Ave Lobby

 **P1** Garage

 **P2** Emergency  
Parking

 **P2** Garage

 **P3** Garage

# Systems (Patients)

- Triage for low risk COVID screening outside the hospital to be d/c to urgent care or home
- Telemedicine for outpatient services and to support “shelter in place” for small hospitals rather than transfer
- Pre-determine thresholds for transfer to higher level of care hospital (eg. no ventilator)
- COVID screening questions for all transfer patients eg. stroke, trauma
- Goals of care and palliative care discussions early in course

# Systems

- Labs: When/how to test, how do specimens get to lab, notifications
- ECMO
- Crisis standards of care
- Airway Systems and Algorithms

# Point of Care Ultrasound

Protocol: Sometimes useful for focused lung ultrasound (not specific), focused cardiac, establishing Peripheral access and volume status

Cleaning: Double wipe down with Saniwipes (2 minutes kill time for virus)

## ***BUNDLE CARE***

- Plan ahead for blood draws, EKGs, and medication administration in order to minimize trips into and out of the patient's room.
- Build kits with pre-assembled supplies to be used in isolation areas.
- Create scripts for 911 call centers to ask about COVID-19 risk factors before sending in EMS to a scene.
- Have EMS call ahead to alert ED for high risk COVID-19 patients from the field.
- Develop scripts for your transfer center to use screening questions regarding symptoms and COVID-19 status with the goal of identifying potential COVID-19 patients prior to ED arrival.
- Establish protocols for testing patients in conjunction with your lab's ability to run these tests.
- Draft outward facing documents with clear instructions for the community to call their doctor prior to coming to the ED to reduce over-crowding.

# Systems (for staff)

- Personnel: Double back up call, cancel communal food in meetings/care areas, move towards tele-education, flu shots updated, require scrubs, get rid of fomites (and beards!)
- Childcare back up for school closure to keep hospital personnel at work
- Track exposures-notify providers if tests +
- Test staff/stay at home policy/return to work policy
- Trainings: in person donning/doffing and “dofficers” on site, Train using simulation intubation in PAPR

PRICE \$8.99

APRIL 6, 2020

# THE NEW YORKER



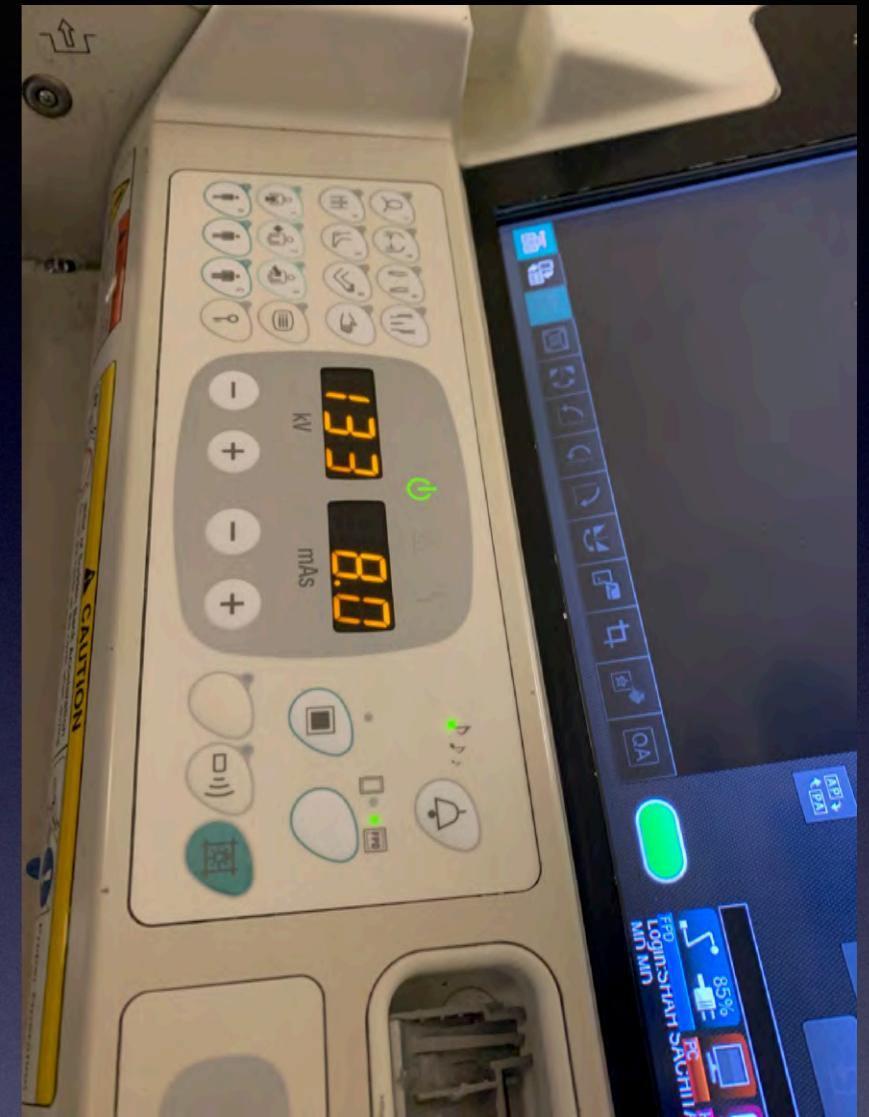
C.W.



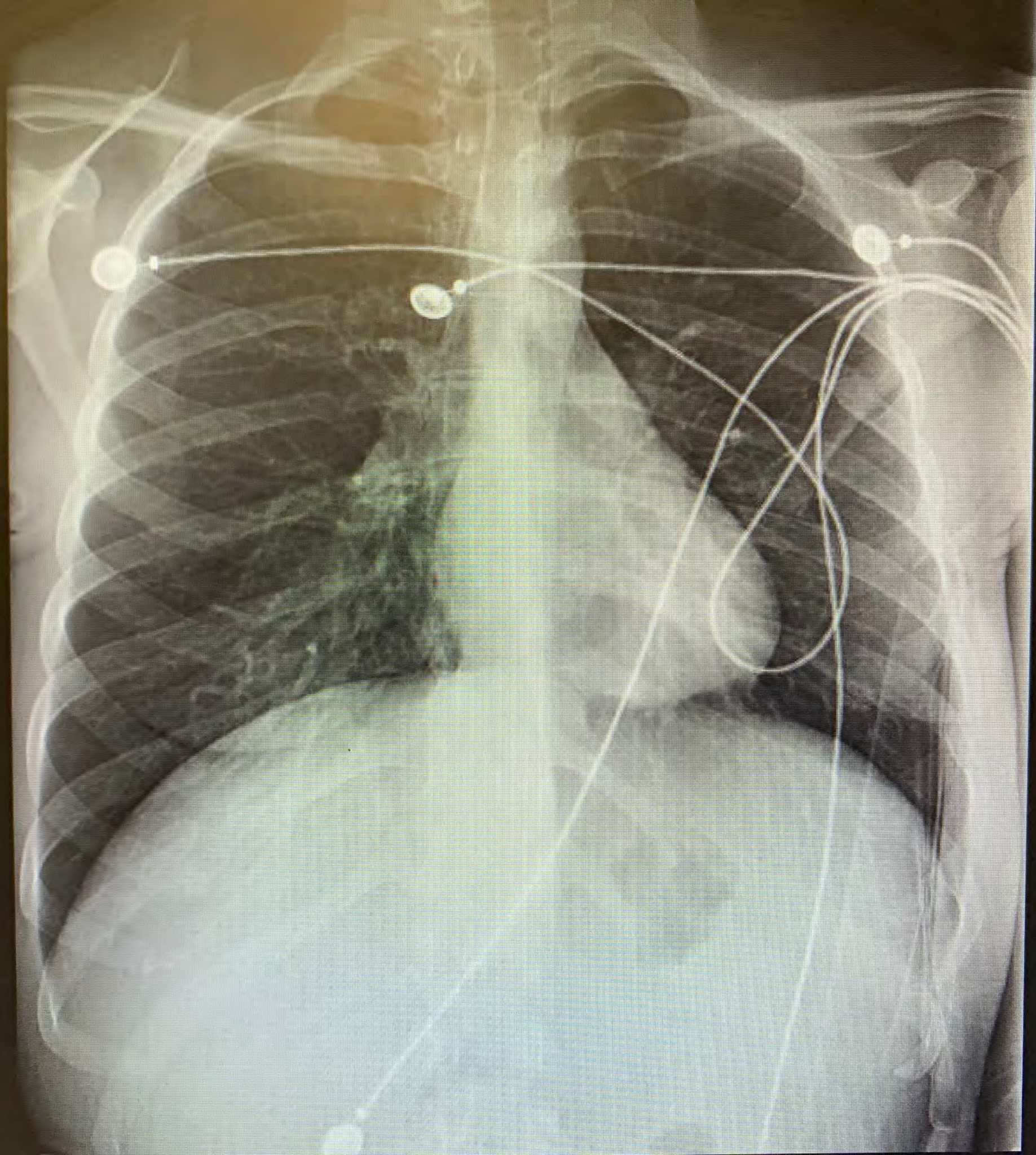
# Portable Radiography



- Camera through window of door
- Patient stands or sits straight up on stretcher close to door
- RN in room holds plate with lead shield and transfers plate to Xray staff outside the room
- Minimizes need for PPE for Xray staff or cleaning machine







RT

**AP**

**SUPINE  
Portable**



# Airway Considerations



O<sub>2</sub> < 94% as triage cut off  
for entry to ED

Max O<sub>2</sub>  
delivery  
prior to ETT is NRB

Avoid Aerosolization:  
No nebs, bipap, high flow NC

# Intubation

- RSI with rocuronium vs. succ->roc
- Minimize BVM/suction where possible
- PAPR shroud for person intubating with glidescope to maximize distance
- Airborne precautions/Neg pressure room
- 2 lines, prefer IO/PIVs
- Minimize personnel in room: 1MD, 1RN, 1RT
- Go-bag outside the room with difficult airway back up (consider supraglottic airway/, bougie)
- Simulation training





# Ventilation in Hypoxemia

2 0 <sub>2</sub>	Example
	Altitude
	HOD COPD
	asthma COPD
	cardiac surf pul edema PNA

## PEEP

- 1) BP
- 2) O<sub>2</sub> Sat



- 1) hypoxemia definition
- 2) refractory hypoxemia therapies
- 3) choose PEEP
- 4) pH & CO<sub>2</sub> goals

- 3) Compliance



- Refractory hypoxemia
- \* 1) resuscitate & cardiac output
  - 2) PEEP
  - 3) NMBS + sedation
  - (4) prone
  - 5) epo/iNO
  - 6) ECMO

0.3	0.3	0.4	0.4
5	8	8	10

# Ventilation Strategies for Hypoxemia

- Optimize cardiac output with volume/pressor
- PEEP 5->8->10
- Neuromuscular Blockade and Sedation
- Prone vs side lying to improve perfusion of “good lung”

# Triaging and Cohorting ED Patients

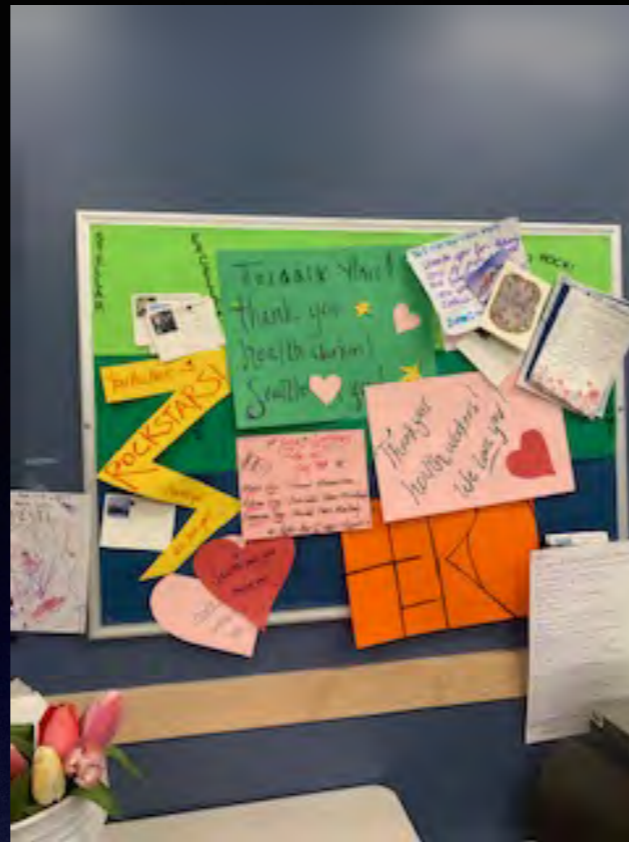
# Work in Progress: Zoned approach to conserve PPE

- **Cold zone (charting zone):** providers wear a clean surgical mask that stays in the cold zone at all times. These masks will be one per shift per person and STAY in the cold zone(s). This is to decrease HCW to HCW transmission given our lack of social distancing in work spaces, and also to minimize fomite to face transfer.
- **Warm zone (patient care for those not suspected of being infected with SARS-CoV2):** These are patients who have screened negative for respiratory symptoms (and screened negative for SARS-CoV-2 risk) at triage. Given that many patients end up screening positive after physician assessment, we recommend approaching these subsets of patients with a surgical mask and eye protection, as well as gown and gloves. A warm zone (donning/doffing area) would be present outside each room as is currently with taped areas.
- **Hot zone (patient care for those known to be, or suspected of being, infected with SARS-CoV-2):** These are high risk patients that have screened positive at triage for possible SARS-CoV-2 infection and should be universally approached with a respirator (N95s or PAPRs), gown/gloves for contact and airborne precautions.

9:41



covidsocks



# Questions?

