ASPR TRACIE Technical Assistance Request

Request Receipt Date (by ASPR TRACIE): 2 April 2020
Response Date: 28 April 2020
Updated Date: 17 July 2020
Type of TA Request: Complex

Request:

ASPR TRACIE received a request for information on clinical presentation, disease progression, and related information from clinicians in the field treating COVID-19 patients.

Response:

This document is a compilation of early reports and findings from published articles and clinical rounds presentations, webinars, and news articles **through July 17, 2020**.

Please refer to the Centers for Disease Control and Prevention's Coronavirus Disease 2019 webpage for the most up-to-date information on COVID-19 outbreak management. Please refer to the National Institutes of Health COVID-19 Treatment Guidelines webpage for up to date clinical management information.

This technical assistance response documents findings and reports from clinicians treating COVID-19 patients in the U.S. We synthesized information on clinical presentation, disease progression, predictive findings, treatment pearls, and other clinical management practices that seemed consistent with other information available.

Clinical Aspects/Clinical Progression

- Patients represent all age groups, ethnicities, and states of health. The CDC COVID-19 Data Tracker provides up to date COVID-19 demographics.
    - Providers interviewed or who conducted sharing sessions reported that there are many more young, healthy patients than anticipated
        - Age 50-64 see the most cases, among the age bracket break downs (23.2%),
        - Age 85+ see the highest fatalities (32.5%)
        - 95% of fatalities occur in those over the age of 50
        - Ages 18-49 account for 52% of cases
        - Under 18 years of age accounts for 6% of cases
    - More female cases than male. More male deaths than female.
- Between 12 and 25% of COVID-19 hospital admissions progressed to the intensive care unit (ICU)
- Between 5 and 25% of those admitted to the ICU die

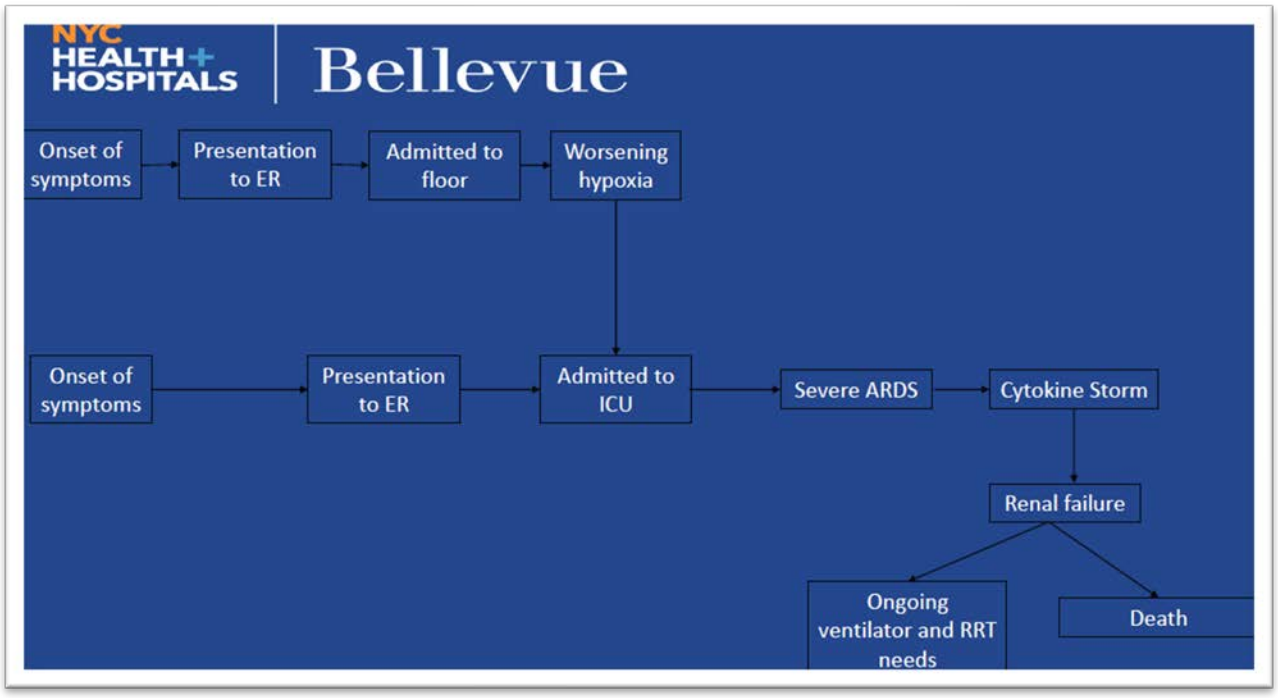
- A variety of comorbidities are correlated with negative outcomes, including hypertension, asthma, post-transplant, heart failure, coronary artery disease, morbid obesity, admission lab values with elevated troponin and D-dimer
- Earlier in the initial pandemic outbreaks across the world and in the US, between 90 and 97% of ICU patients required intubation, anecdotally, this rate has decreased due to the use of high flow nasal cannula and proning.

Presentation

- Initially most patients presented to the emergency department or to emergency medical services (EMS) with fever, chills, headache, cough, shortness of breath. Over the course of the last few months, CDC has expanded the list of symptoms to also include presentation at primary care locations.
    - Fever or chills
    - Cough
    - Shortness of breath or difficulty breathing
    - Fatigue
    - Muscle or body aches
    - Headache
    - New loss of taste or smell
    - Sore throat
    - Congestion or runny nose
    - Nausea or vomiting
    - Diarrhea

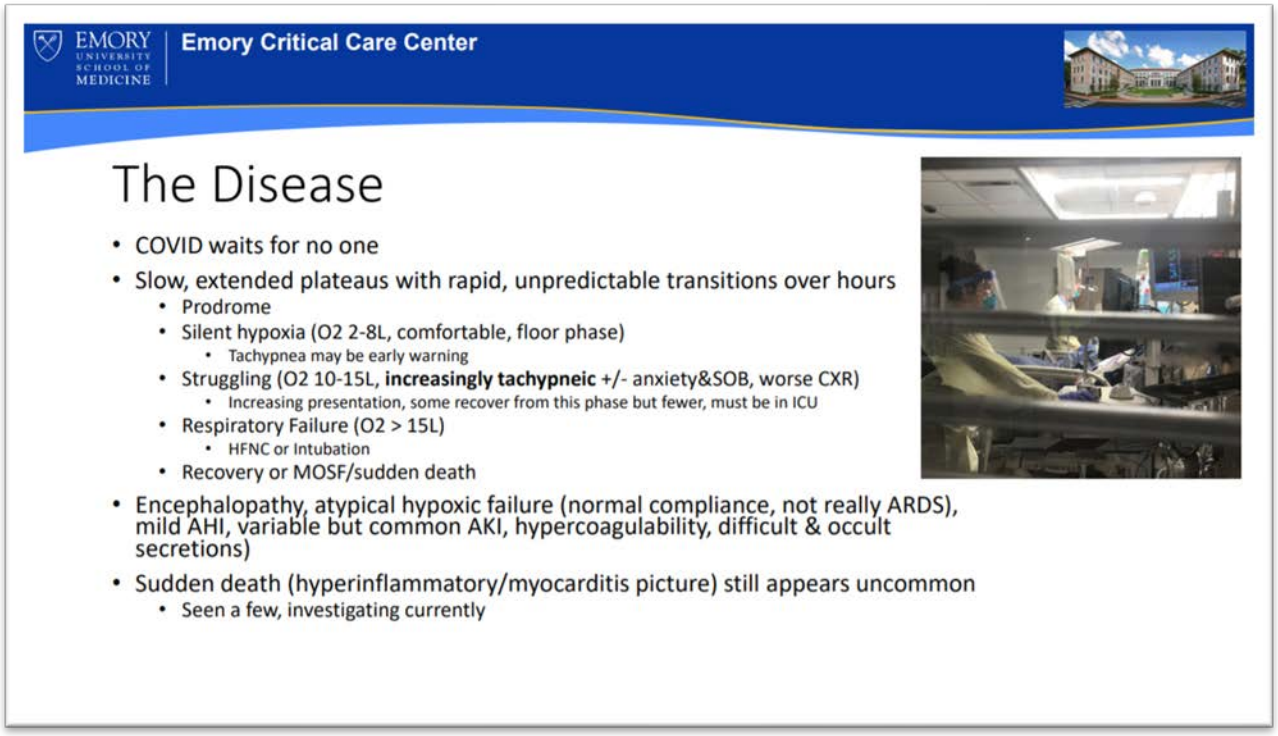
- Less frequent symptoms include loss of smell or taste, nausea, vomiting, diarrhea, runny nose, sore throat, and other symptoms. Observational data indicate that nearly 50% of patients have taste /smell abnormality. (ASPR TRACIE SME comment)
- Patients requiring ICU care are presenting with very, very low pulse oximetry readings (<80%), and are still conscious, coherent, and conversant (described colloquially as “happy hypoxia”). Deterioration in these patients can be swift. The majority of patients, however, do not present like this, so exertional pulse oximetry must be performed. These patients can be fine at rest and while admitted to the floor, do not need ICU care, but can also suddenly deteriorate. This has occurred across all age groups.
- The presence of coagulopathy and renal failure is also serious problem as described in Figure 1.

Figure 1. Bellevue Perspective of Disease Progression



This slide from Bellevue's (NY) presentation during Project ECHO COVID-19 clinical rounds, dated March 31, 2020, illustrates two general pathways for patients. They either come in mildly ill and progress to critical or they present critically ill. Patients in other facilities experienced a different pathway once admitted to the ICU; they experienced respiratory failure classified as either "typical ARDS" or a normal compliance severe viral pneumonia. (ASPR TRACIE SME Comment)

Figure 2. Emory University Perspective of Disease Progression



This slide from Emory University's (GA) presentation during Project ECHO COVID-19 clinical rounds, dated April 7, 2020, illustrates how they have "bucketed" their patients' progression. The sudden cardiac failure can occur as patients improve or after discharge.

Recent Clinical Findings

Patients are developing hypercoagulability. The next two slides from Emory University's presentation during Project ECHO clinical rounds dated April 7, 2020, discuss these findings and their new treatment guidelines. Acute kidney injury is also occurring in many COVID-19 patients but appears to be as a result of the disease process. Managing coagulopathy may be key to stopping cascading lung damage and multi organ system failure, but experts are not in agreement on a single treatment approach.

Figure 3. Hypercoagulabilty Guidelines for COVID-19 (Emory University Slide)

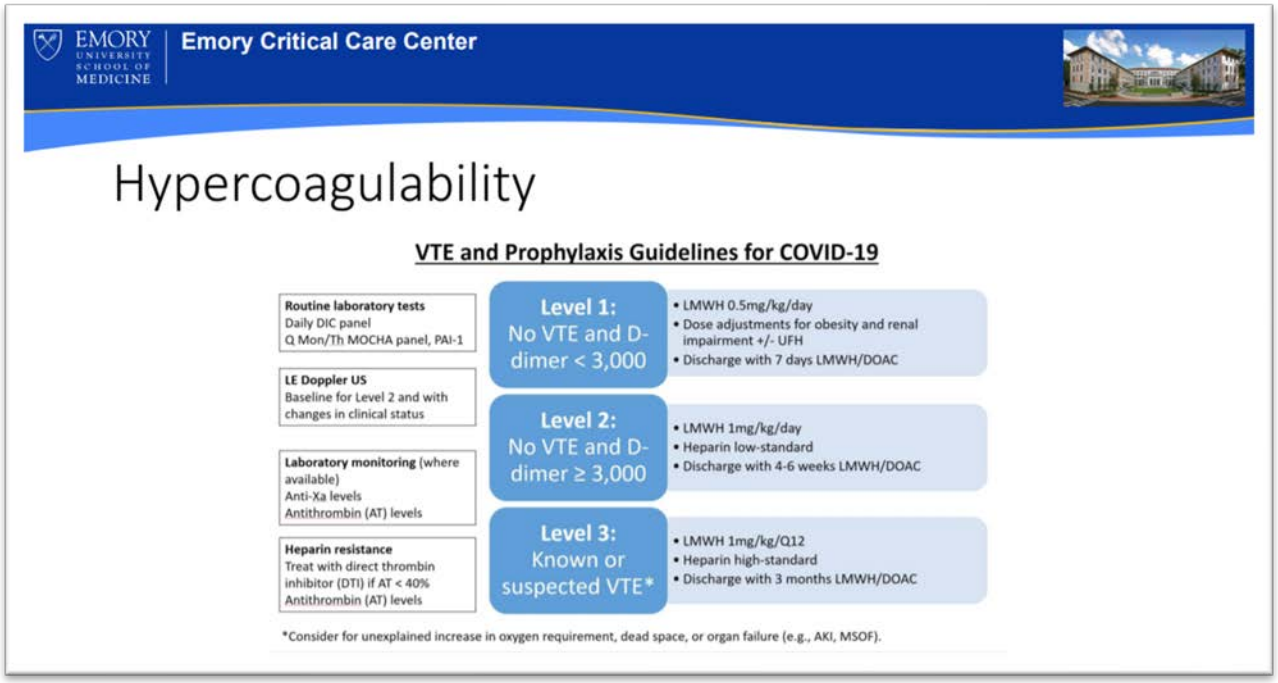
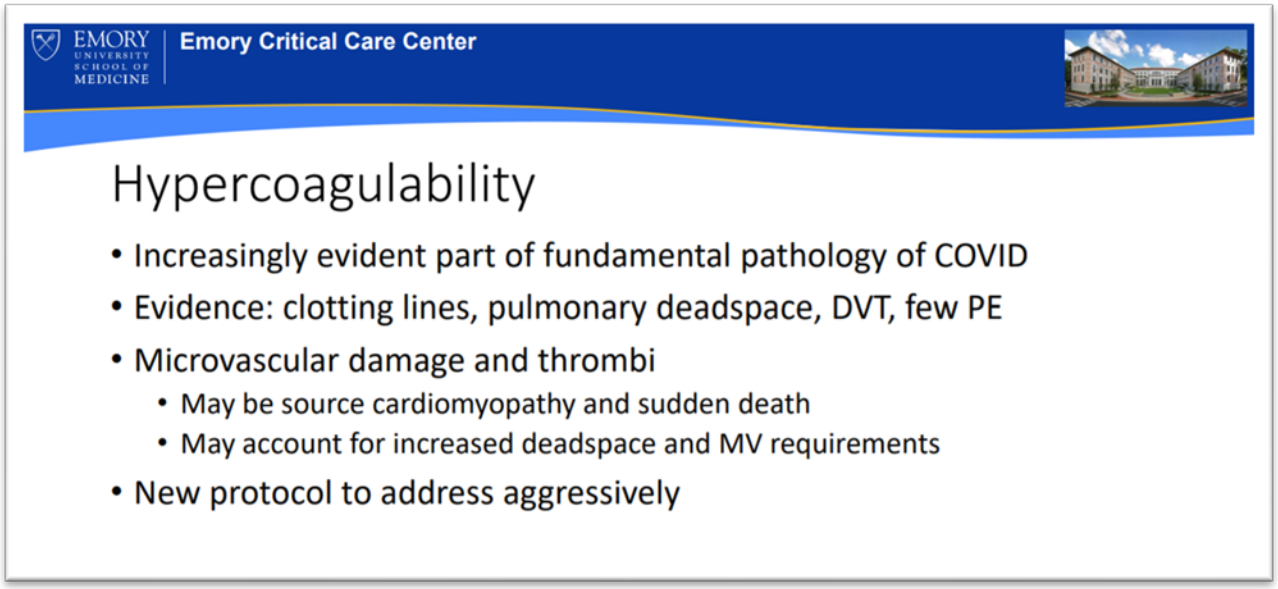


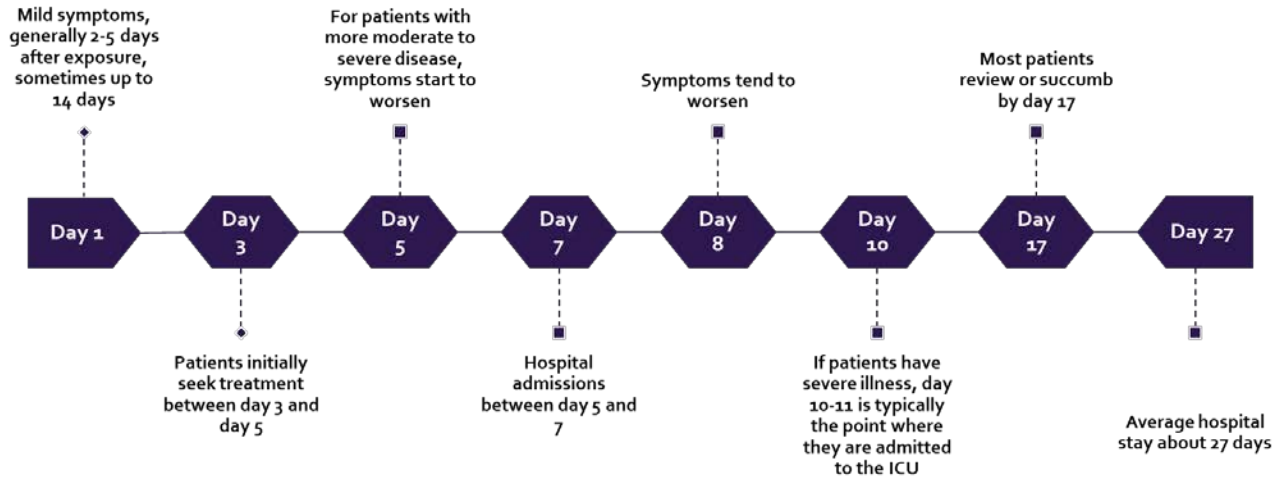
Figure 4. Hypercoagulabilty in COVID-19 Patients (Emory University Slide)



Timeline of Disease Progression

ASPR TRACIE created this timeline of COVID-19 progression based on a review of multiple reports (e.g., anecdotal physician experiences, webinars, journal articles, and news articles).

Figure 5. Timeline of COVID-19 Disease Progression



This timeline shows an approximation of disease progression for COVID-19 patients who admitted to the hospital between day 5 and 7. Patients with milder symptom presentation follow a similar path in terms of length of illness, but obviously do not progress to critical illness. COVID-19 patients can rapidly progress to death over several days versus weeks when placed on a ventilator. After initial infection subsides additional COVID associated syndromes have been identified that extend the length of recovery.

Additional Clinical Findings (Updated July 17, 2020)

Two additional clinical presentations have appeared within the last several weeks tied to COVID-19.

Multisystem Inflammatory Syndrome in Children (MIS-C) Associated with COVID-19

A number of states in the United States and other countries are reporting cases of a syndrome similar to Kawasaki Disease affecting children who have had COVID-19 infection. From the CDC's Health Alert Network Advisory, "patients presented with a persistent fever and a constellation of symptoms including hypotension, multiorgan (e.g., cardiac, gastrointestinal, renal, hematologic, dermatologic and neurologic) involvement, and elevated inflammatory markers. Respiratory symptoms were not present in all cases."

Large Vessel Stroke in Younger Patients

Possibly tied to the earlier discussion of hypercoagulability in COVID-19 patients, there have been recent studies published discussing large vessel strokes in younger patients[1,2], for several of these patients, the stroke was the reason for seeking care and not previous COVID-19 symptoms.

COVID-19 Related Neurological Syndrome

Numerous case reports have emerged in the last several weeks, as outlined in this paper published in the journal Brain. The neurological affects are bucketed into the following categories 1) encephalopathies, 2) inflammatory central nervous system syndromes, 3) ischemic strokes (discussed above), 4) peripheral neurological disorders, 5) and other neurological symptoms that don't fit the previous categories, but are consistently present.

Post-COVID-19 Syndrome

Numerous cases are being reported of a persistent sequalae in patients who have recovered from the initial COVID-19 infection, many confirmed with negative tests. Symptoms range from fatigue, dyspnea, joint pain, and chest pain. In an Italian study 87.4% of patients experienced at least one of those persistent symptoms up to 60 days post active infection.

Treatment Pearls for Hospitalized Patients (Updated July 17, 2020)

Please see the NIH COVID-19 Treatment Protocols for current recommendations for critical care/general supportive management, antiviral treatments, immune-based therapy, antithrombotic therapy, and concomitant medications.

- Tachypnea may lead to hypoxic decompensation – growing pulmonary dead space
- There was disagreement as to a preference for oxygenation and ventilation, including early intubation
    - Some clinicians and healthcare facilities initially followed existing protocols for early intubation on the assumption that patients decompensate very quickly.
    - There is now growing consensus to delay intubation by attempting high flow nasal cannula, continuous positive airway pressure (CPAP), and bilevel positive airway pressure (BiPAP). These measures are also being combined with awake proning and a process to teach patients to prone on their own, while conscious and physically capable.
- Proning patients (both conscious and alert patients and sedated patients) has been recognized as a method to increase patient oxygenation. Awake and alert patients can be guided to prone themselves and reminded, by use of bedside charts and verbal reminders, to change positions. Proning teams and proning protocols for intubated, sedated patients are also being put into place.
- Minimize patient-ventilator dyssynchrony with encephalopathy
    - Want patients to breathe variably at high flow rate
    - Consider pressure-controlled ventilation (PCV) or airway pressure release ventilation (APRV), where can vary own flow rate and tidal volumes with higher positive end-expiratory pressure (PEEP)
- Prepare protocols for anticoagulation, as appropriate.

[1] https://www.nejm.org/doi/full/10.1056/NEJMc2009787
[2] https://www.stroke.org/en/life-after-stroke/covid19-stroke-podcast-series-for-patients-and-caregivers/episode-1-stroke-and-the-impact-of-covid19

    - At a minimum, consider initial prophylactic dosages for all patients and full anticoagulation protocols as clinically appropriate
- Consider IL-6 Antagonist, if IL-6 is elevated, clinical trials are underway.
- Lasix may be helpful for hypoxic normotensive patients. Ultimately, COVID-19 patients who require fluid resuscitation or hemodynamic management of shock should be treated and managed identically to those with septic shock.[1] COVID-19 patients who require fluid resuscitation or hemodynamic management of shock should be treated and managed for septic shock in accordance with other published guidelines, with the following exceptions.
- Prepare for acute kidney injury
- Extracorporeal membrane oxygenation (ECMO) may be beneficial for selective patient population
- Based on the results of a clinical study, NIH is now recommending the follow criteria for the use of **dexamethasone**:
    - The COVID-19 Treatment Guidelines Panel (the Panel) recommends using dexamethasone (at a dose of 6 mg per day for up to 10 days) in patients with COVID-19 who are mechanically ventilated **(AI)** and in patients with COVID-19 who require supplemental oxygen but who are not mechanically ventilated **(BI)**.
    - The Panel **recommends against** using dexamethasone in patients with COVID-19 who do not require supplemental oxygen **(AI)**.
- On June 15, the FDA revoked the emergency use authorization for chloroquine and hydroxychloroquine. These medications are no longer recommended in the treatment of COVID-19 patients.
- Based on current data, NIH recommends the following use of remdesivir under an emergency use authorization.
    - *Recommendations for Hospitalized Patients with Severe COVID-19:*
        - The Panel recommends the investigational antiviral agent remdesivir for treatment of COVID-19 in hospitalized patients with SpO2 ≤94% on ambient air (at sea level) or those who require supplemental oxygen (AI).
        - The Panel recommends remdesivir for treatment of COVID-19 in patients who are on mechanical ventilation or extracorporeal membrane oxygenation (ECMO) (BI).
    - *Recommendation for Duration of Therapy in Patients with Severe COVID-19 Who Are Not Intubated:*
        - The Panel recommends that hospitalized patients with severe COVID-19 who are not intubated receive 5 days of remdesivir (AI).
    - *Recommendation for Duration of Therapy for Mechanically Ventilated Patients, Patients on ECMO, or Patients Who Have Not Shown Adequate Improvement After 5 Days of Therapy:*
        - There are insufficient data on the optimal duration of therapy for mechanically ventilated patients, patients on ECMO, or patients who have not shown adequate improvement after 5 days of therapy. In these groups, some experts extend the total remdesivir treatment duration to up to 10 days (CIII).

- *Recommendation for Patients with Mild or Moderate COVID-19:*
  - There are insufficient data for the Panel to recommend for or against remdesivir for the treatment of patients with mild or moderate COVID-19.

Predictive Labs

Taken from What's Working for COVID-19 Patients, NIH Clinical Treatment Protocols: Laboratory Diagnosis, and validated by numerous subject matter experts, articles, and presentations:

- **CBC with differential:** The white blood count is usually normal, lymphopenia is very frequent, and mild thrombocytopenia is common. (https://bit.ly/2UQO8CT)
- **CMP with magnesium and phosphorus**: Liver function tests (ALT, AST) commonly elevated
- **Coagulation studies with D-dimer**: PT/PTT/INR is usually normal on initial presentation. Some develop DIC. The D-dimer is commonly elevated and severe elevations are associated with poor outcomes.
- **COVID PCR**: (RVP if you suspect alternate viral etiology, though coinfection is possible.) False-negative COVID testing found in 10-30% percent of cases (especially if samples are collected too early or inappropriately).
- **Procalcitonin**: This is usually not increased with COVID-19. If elevated, it may indicate an alternate diagnosis or superimposed bacterial infection. Procalcitonin is not routinely elevated higher than 0.5 ng/mL in these patients (https://bit.ly/3bDobxu). It does seem to increase as disease progresses. An elevated procalcitonin in the emergency department should lead you to consider an alternative or additional diagnosis more strongly.
- **CRP** (sometimes ESR too, but difficult for some because it is often performed manually): This is elevated in COVID-19 patients, and it seems to trend upward with the progression of the disease. It may have some prognostic correlation.
- **CPK, LDH, ferritin, urine legionella, blood cultures, lactate, troponin, CK, CKMB, ABG, and G6PD**: Chloroquine causes hemolytic anemia in G6PD; these labs are helpful for inpatient teams as well.

COVID-19 Laboratory Testing (updated 5.18.20)

The FDA has published updated information on all the tests available for COVID-19 diagnostics.

The FDA has provided a list of available serological tests along with their expected performance and accuracy.

Poor Prognostic Factors

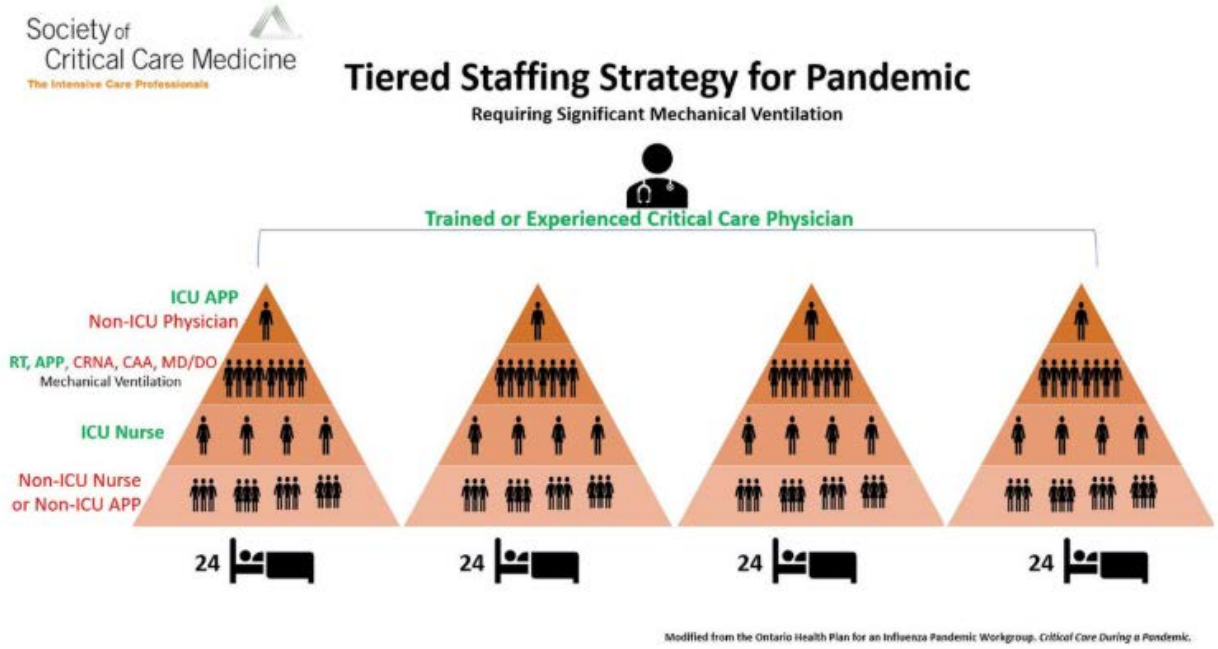
- Neutrophil to lymphocyte ratio >3.13 (https://bit.ly/3dIp8GG)
- Absolute lymphocyte count <0.8
- LDH >245 U/L
- Ferritin >300 ug/L
- CRP >100 mg/L
- D-dimer >1000 ng/mL. (https://bit.ly/3bIGQYT)

- Rising troponin, not attributed to renal insufficiency (JAMA. March 2020)

Clinical Operations Pearls

- Ensure patient's end of life wishes are known relative to prolonged intensive care and discuss relative prognosis with family.
- Cohort patients to floors or units to restrict personal protective equipment (PPE) use and optimize staff utilization and safety.
- Move IV pumps, continuous veno-venous hemofiltration (CVVH) machines, and all other equipment outside patient rooms to reduce the number of times staff need to enter the room. This enables staff to silence a pump or monitor dialysis from outside the room. Place the patient bed as close to the door/window as possible to facilitate this and determine how to increase line lengths where possible (e.g., IV line) so equipment can be kept outside patient room and managed. Lines and equipment MUST be kept off the floor, however, to decrease the risk of infection. (This would work differently in a cohort area where staff is wearing the same PPE between rooms.)
- Provide phones or tablets to patients and communicate via phone call for awake, alert, and oriented patients; focus on patient self-care.
- Reduce the items that need to be disinfected after being brought into a room. Use pre-made intubation kits in plastic bags, rather than existing boxes, because they are easier to clean and include mostly disposable items.
- Perform CPR with a Lucas device, versus sparing a staff member for compressions.
- Use a "Butterfly" or similar device for in-room sonography, since it can be easily disinfected
- Patients are requiring higher levels of sedation, to prevent self-extubating. It takes between 5 and7 minutes to get into full PPE; keeping the patient more heavily sedated decreases the risk of in-room issues for patients (although may prolong recovery).
- Prepare to treat cytokine storm – watch for high CRP, high LDL, high IL-6, high ferritin
- Central venous access is important for medication administration.
- Consider ECMO for refractory hypoxia in otherwise previously healthy patients.
- Need to plan for end of life care and reassess patient progress and prognosis regularly. Engage palliative team early; consider establishing palliative care unit.
- Plan for unanticipated shortages
    - IV pumps and tubing
    - Cooling blankets
    - CVVH machines
    - Medications
        - Fentanyl, cisatracurium, and other sedatives and paralytics

Figure 4. Tiered Staffing Strategy (Society of Critical Care Medicine)



This graphic is from the Society of Critical Care Medicine publication United States Resource Availability for COVID-19. This plan is for one physician for 96 patients, which is designed for an extremely resource constrained environment. Ideally, the ratio of critical care physician to patients is 1:24.

Using Staff

- Consider using non-ICU trained clinical staff to augment and "stretch" the ICU staff
- Orthopedic surgeons and neurosurgeons can be part of proning teams, as they prone patients frequently for their surgeries and know how to do it. Physical therapy and Occupational therapy personnel can support respiratory therapy involvement for intubated patients.
- Outpatient nurse practitioners can help support patients on CVVH.
- Anesthesia staff can be part of procedure team (airways, CVL, A-line, HD Line, OG tubes).
- Ear/Nose/Throat and /Intervention Pulmonologists can be part of the tracheostomy team.
- Use behavioral health and palliative care on the family contact team.
- Redeployment strategies should look at creating/supplementing COVID clinics/ICU/MICU expansion and other units with higher than normal census/daily intensity.
- Have medical students collect and document information to share this information with clinicians and submit peer-reviewed articles for publication.

Supporting Staff (ASPR TRACIE Subject Matter Experts)

- Have PPE safety officers (e.g., non-clinical nurse educators, administrative staff) round regularly to instruct/supervise safe PPE use. Assign "doff-icers" to ensure PPE is doffed correctly.
- Care for the caregiver is immeasurably important. Ensure staff have access to mental health support and are given information on self-care in disasters.
- Be prepared to implement "Line of Duty Death" plan when needed- can help ease the loss for family and colleagues.
- Internal communication should occur regularly and take many forms (e.g., emails, rounding, town halls). Ensure engagement and duplicate messaging with all staff and shifts.
- Tracking absenteeism can help with staff planning.
- Promoting effective technology-based patient /family interface can help alleviate stress on all parties and contribute to sense of satisfaction for staff.
- Ensure healthcare facilities are practicing social distance policies for staff not wearing PPE or not working in clinical areas of the facility.

Sources (updated July 17, 2020)

ASPR TRACIE Subject Matter Expert Reviewers

Craig DeAtley, PA-C, John Hick, MD, and Richard Hunt, MD

American Association of Critical-Care Nurses COVID-19 Update

Association of American Medical Colleges (AAMC) COVID-19 Clinical Guidance Repository

Care for Critically Ill Patients With COVID-19

CDC COCA Calls

- Guidance for Certifying Deaths Due to Coronavirus Disease 2019 (COVID-19)
- COVID-19 in the United States: Insights from Healthcare Systems
- Clinical Management of Critically Ill Adults with COVID-19
- Underlying Medical Conditions and People at Higher Risk for Coronavirus Disease 2019 (COVID-19)
- COVID-19 Update: Optimization Strategies for Healthcare Personal Protective Equipment (PPE)
- Coronavirus Disease 2019 (COVID-19) Update and Information for Long-term Care Facilities
- Coronavirus Disease 2019 (COVID-19) Update and Infection Prevention and Control Recommendations
- Coronavirus Disease 2019 (COVID-19) Update—Information for Clinicians Caring for Children and Pregnant Women
- Coronavirus Disease 2019 (COVID-19) Update—What Clinicians Need to Know to Prepare for COVID-19 in the United States
- Outbreak of 2019 Novel Coronavirus (2019-nCoV)—Interim Guidance for Clinicians

Clinical Characteristics and Outcomes of Patients Undergoing Surgeries During the Incubation Period of COVID-19 Infection

Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus–Infected Pneumonia in Wuhan, China

Coronavirus disease 2019 (COVID-19): Critical care issues

COVID-19 in Critically Ill Patients in the Seattle Region — Case Series

COVID-19 Report: 08 April 2020. International Severe Acute Respiratory and Emerging Infections Consortium (ISARIC)

Intensive Care Management of Coronavirus Disease 2019 (COVID-19): Challenges and Recommendations

Interim Clinical Guidance for Management of Patients with Confirmed Coronavirus Disease (COVID-19) (updated May 15, 2020)

JAMA Network: COVID-19

Massachusetts General Hospital COVID-19 Treatment Guidance (Page 2 Labs)

New England Journal of Medicine COVID-19 Free Resources

Project ECHO COVID-19 Clinical Rounds

Severe COVID-19

The Incubation Period of Coronavirus Disease 2019 (COVID-19) From Publicly Reported Confirmed Cases: Estimation and Application

Towards an Artificial Intelligence Framework for Data-Driven Prediction of Coronavirus Clinical Severity

What's Working for COVID-19 Patients

Clinical Training Resources (Updated July 17, 2020)

AESAR Project. (2020). COVID Activated Emergency Scaling of Anesthesiology Responsibilities (CAESAR) ICU. American Society of Anesthesiologists, Anesthesia Patient Safety Foundation, Society of Critical Care Anesthesiologists, and Society of Critical Care Medicine.

This resource page includes written and video educational materials related to managing COVID-19 patients. Resources are categorized under: ICU Ventilation and Pulmonary, ECMO, Gastrointestinal/Nutrition, Ethics, Renal/Fluids, Endocrine/Steroids, Musculoskeletal/Hematomology/Prophylaxis/ICU, Infectious Diseases, Cardiovascular, and Neurology.

Allego. (2020). Ventilator Training Alliance.

This page includes information on the Ventilator Training Alliance, a mobile app with video tutorials, instruction manuals, and other training materials provided by manufacturers to inform use of ventilators during the COVID-19 pandemic. The free app for iOS and Android may be accessed from the page.

American Academy of Medical Colleges. (2020). COVID-19 Clinical Guidance Repository.

This resource compilation includes updated clinical treatment information from government, academic, and private sector sources.

American College of Chest Physicians. (2020). COVID-19: On-Demand e-Learning.

This web page provides links to free e-learning modules relevant to COVID-19, including: Acute Respiratory Distress Syndrome (ARDS), Hypoxemic Respiratory Failure, Pneumonia, and COVID-19 Rx: Treatment Simulations.

ASPR TRACIE. (2020). COVID-19 Clinical Experiences from the Field.

This ASPR TRACIE Technical Assistance response is a compilation of early reports and findings from published articles and clinical rounds presentations, webinars, and news articles on COVID-19.

ASPR TRACIE. (2020). Healthcare Facility Onboarding Checklist.

During a pandemic or other emergency, healthcare facilities face significant challenges to quickly onboard additional healthcare providers when hospital admissions and ICU occupancy increase rapidly. This onboarding checklist can ensure new employees are compliant with administrative requirements, familiar with the mission and culture of the hospital, and understand expectations.

Defense Health Agency (DHA). (2020). DHA Antimicrobial Stewardship App.

This web app provides guidance, algorithms for triage, treatment, and updated resource protocols related to COVID-19.

Denver Health. (2007). Project XTREME Respiratory Training. Agency for Healthcare Research and Quality.

This series of videos provides training to non-respiratory therapists on basic respiratory care and ventilator management to increase healthcare surge capacity during a mass casualty incident. The videos cover topics including infection control, terms and definitions, manual and mechanical ventilation, and airway maintenance and suctioning. The training is intended for non-respiratory health care providers to be cross-trained as extenders delivering care to adult patients.

Denver Health. (2007). Project XTREME: Model for Health Professionals' Cross-Training for Mass Casualty Respiratory Needs. Agency for Healthcare Research and Quality.

This document describes a project to cross-train non-respiratory therapists to provide basic respiratory care and ventilator management to provide surge staffing capacity during mass casualty incidents. The authors reviewed the literature and legal and regulatory requirements,

identified competencies, developed a curriculum, pilot tested the training, conducted exercises, and provided recommendations.

Harvard University. (2020). Mechanical Ventilation for COVID-19. edX.

This online course prepares licensed non-intensive care unit clinicians to support hospital critical care teams. The course covers: principles and physiology of mechanical ventilation, initial ventilator setting and adjustments, troubleshooting the ventilator, and ventilating patients in special circumstances.

Matos, R., Chung, K., et al. (2020). DoD COVID-19 Practice Management Guide: Clinical Management of COVID-19. U.S. Department of Defense.

These guidelines reflect the best information available to guide decision making in the management of COVID-19 patients. Included is information on screening and triage, infection prevention, specimen collection, clinical management, treatment options, telemedicine, emergency medical services, and ethical considerations. It also includes appendices with checklists, supply lists, algorithms, and other tools.

National Emerging Special Pathogens Training and Education Center, (2020). Just In Time Training.

This collection of resources provides training and job aids for numerous critical care and infectious disease management skills that may be new or require refresher training for healthcare providers.

North Carolina Area Health Education Centers Program. (2020). COVID-19 Workforce Surge Planning Playbook for Patients Requiring Critical or ICU Care.

This toolkit provides resources to surge critical care skills to respond to COVID-19 via a team-based care approach.

Safe Airway Society. (2020). COVID-19 Resources.

This resource page includes several editable airway management infographics, a training video on tracheal intubation, and a consensus statement on airway management and tracheal intubation of adult COVID-19 patients.

Society of Critical Care Medicine. (2020). Critical Care for the Non-ICU Clinician.

These free, online modules provide training for non-intensive care unit clinicians to provide care during a surge of critically ill patients. **NOTE**: The next course is not offered until August 12, 2020, but you can register for the listserv to be notified of new offerings.

Society of Critical Care Medicine. Emergency Resources: COVID-19.

This web page includes several disaster/ emergency resources specifically for clinicians responding to disasters to include COVID-19.

U.S. Department of Health and Human Services (HHS), Office of the Assistant Secretary for Preparedness and Response (ASPR). Project ECHO COVID-19 Clinical Rounds.

> This one-page flyer provides information on the Extension for Community Health Outcomes (known as Project ECHO). HHS ASPR, in collaboration with the National Ebola and Special Pathogens Training and Education Centers (NETEC), and Project ECHO, launched a series of three COVID-19 Clinical Rounds: 1) Critical Care: Lifesaving Treatment and Clinical Operations; 2) Emergency Department: Patient Care and Clinical Operations; and 3) EMS: Patient Care and Operations. The intent of the initiative is to create peer-to-peer learning networks where clinicians who have more experience treating patients with COVID-19 can share their challenges and successes with clinicians across the U.S. and the world. **NOTE**: A link to listen to previous Clinical Rounds is located at the bottom of the flyer. In particular, the Critical Care series may be useful. Our COVID-19 Critical Care Surge Resources page also links directly to the videos to these Clinical Rounds.

Wolters Kluwer. (2020). Clinical Effectiveness COVID-19 Resources.

> This resource compilation includes information from various sources for clinicians looking for COVID-19 clinical data.