

White Paper: Coronavirus Update

Update and Clinician Guide to Diagnosis, Management and Disposition

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Introduction: April 16, 2020

As the COVID-19 pandemic continues to expand across the United States, personal protective equipment (PPE) for healthcare providers is a continuing issue – particularly regarding masks and respirators. Despite efforts to obtain and produce sufficient quantities of high-filtration masks for healthcare providers, shortages are developing and, in some areas, have become severe. Our concern is the protection of healthcare providers, and by doing that, protection of our patients.

ULTRAVIOLET, H₂O₂ VAPOR AND WARM MOIST HEAT DISINFECTION/REUSE OF N95 RESPIRATORS

The reuse of disposable N95 respirators after disinfecting is an option for extending the life of the device. This has been explored extensively by the Institute of Medicine (IOM) regarding viral pandemics. Although this data focused on H1N1 and avian influenza, they are directly applicable to the SARS-CoV2 virus ([HERE](#)). Using liquid disinfectants is not recommended as they damage the mask and may present the user with residual chemicals ([HERE](#)). Investigators have studied ultraviolet radiation using disposable N95 respirators in order to extend their life and utility. A number of reputable organizations have developed protocols for using ultraviolet (UV) radiation in this manner. In addition, the utility of hydrogen peroxide vapor has been extensively explored in the context of disinfecting disposable N95 respirators for reuse. The results are generally satisfactory ([HERE](#)). The purpose of this document is to provide the clinician and facility with basic information on this process and links to relevant resources.

REUSE OF DISPOSABLE N95 RESPIRATOR PRODUCTS

The IOM, Centers for Disease Control (CDC), Occupational Safety and Health Administration (OSHA), Food and Drug Administration (FDA) and World Health Organization (WHO) all agree that it is preferable for all healthcare providers to wear and dispose of N95 respirators after a single use when dealing with pandemic viral infections. That having been said, all these organizations recognize the serious threat to healthcare providers that develops when stocks of fresh N95 respirators are in short supply or unavailable. As such, these organizations opine that under conditions of a national emergency, some form of disinfecting and reuse of N95 respirators is acceptable ([IOM](#), [CDC](#), [OSHA](#), [FDA](#), [WHO](#)).

UV Radiation

Investigations into the impact of UV radiation on disposable N95 respirators indicates that at even high cumulative radiation doses (950J/cm²) there is minimal effect on filtration and even less on flow resistance ([Lindsley](#)). The UV radiation germicidal dose for influenza virus placed on N95 respirators is around 1.8J/cm² ([Heimbuch](#)). This means that disposable N95 respirators could likely endure a number of germicidal cycles. The number of UV germicidal cycles a respirator can withstand varies with the brand. The body of the respirator (and elastic straps less so) are eventually denatured and show loss of strength with visible external deterioration. The upper limit of UV radiation exposure and reuse cycles should be determined by the amount of physical deterioration of the body of the respirator, not from changes in the filtration.

Our fraternal colleagues at the University of Nebraska have created a detailed process and procedure regarding the reuse of N95 respirators using UV radiation that can serve as an example to other facilities ([Lowe](#)). There are a number of other recommended processes available online as well as commercial UV device manufacturer recommendations. Each provider and facility should collaborate with their local environmental safety professional.

UV radiation is an acceptable means of extending the life of N95 respirators during a pandemic shortfall of the devices. The radiation dose and rate of deterioration for each N95 will vary based on the individual product.

Hydrogen Peroxide Vapor Disinfection of Disposable N95 Respirators

Another viable process for disinfecting and reusing disposable N95 respirators is through the use of hydrogen peroxide vapor. Hydrogen peroxide vapor has been used for more than a decade to decontaminate laboratory equipment and other articles in laboratories across the world. This process requires specific equipment that uses at minimum a 35% hydrogen peroxide solution that is vaporized in a confined area. Specific safety protocols and monitoring procedures are required. The equipment is not typically excessively expensive but may not be readily available to all healthcare facilities. Experimental studies have demonstrated that the N95 retains its filtering capability with up to 50 hydrogen peroxide vapor decontamination cycles (without actual clinician use). With clinician use the cycle tolerance is likely more limited, perhaps 30 according to Schwartz ([Schwartz](#)). Biomonitoring of the process indicates that germicidal levels are easily achieved with this process. The primary limiting factor is deterioration of the elastic straps rather than deterioration of the body of the mask or filtering capacity. There is also no evidence of residual vapor or noxious odors, which had been a previous concern.

Moist Heat for Disinfecting Disposable N95 Respirators

Moist heat, defined as 65°C at 85% relative humidity, resulted in a 99.99% reduction in recoverable viral particles in a test of H1N1 mask decontamination ([Heimbuch](#)). Moist heat caused minimal degradation in the filtration and fit performance of the tested N95 respirators. One limitation of the moist heat method is the uncertainty of the disinfection efficacy for various pathogens. However the overall success of this method makes it a viable alternative in pandemic N95 reuse.

CLOSING

UV radiation, hydrogen peroxide vapo, and warm moist humidity treatments are viable methods of disinfecting and reusing disposable N95 respirators. Results and number of reuse cycles will depend on a number of factors including the brand of N95, manufacturing quality of the respirators, soiling and physical wear and tear. The N95 respirator should be discarded when it shows obvious deterioration to the body or strap or when a “self-seal” test by the healthcare provider fails.

Introduction: March 30, 2020

The United States and, specifically, New York City, has become the epicenter for COVID-19 globally. On, March 26, the United States passed Italy and China in total cases and on March 29, the United States had 123,000 cases. New York City is feeling the impact of COVID-19 through increases in intensive care unit (ICU) and ventilator demand, hospital overcrowding and emergency department (ED) overflow. New York Governor Andrew Cuomo stated they need 30,000 ventilators and 140,000 hospital beds. Cases are also rising in New Jersey, California, Michigan, Washington, Massachusetts and Florida. We continue to see shortages of personal protective equipment (PPE) across the nation but very few facilities are out of stock of critical items. Hospitals in the United States are exploring every conceivable countermeasure, including ICU expansion and ventilator splitting for intensive care patients, PPE conservation measures and recycling for PPE shortages. Hospitals are working on ethics planning for end-of-life issues and rationing of healthcare resources as the virus continues to impact health systems nationally.

With this perspective, we offer the following updates to our White Paper:

1. Clinical Updates

- a. CDC Patients Under Investigation (PUI) Changes in Criteria March 24
- b. EMTALA Guidelines for COVID-19 Released March 31
- c. The Joint Commission Public Statement on PPE
- d. COVID-19 Modeling of Demand for Healthcare Resources

2. TeamHealth Guidance

- a. New Expanded PPE Guidance for TeamHealth Clinicians
- b. PPE Recycling
- c. Serologic Testing for COVID-19
- d. Weathering the Emotional Storm

CDC CLINICAL UPDATES

On March 24, the CDC updated their PUI criteria again, reflecting four priority levels for testing. Priority for testing is reserved for very ill, hospitalized patients and symptomatic healthcare workers.

PRIORITY 1

Ensure optimal care options for all hospitalized patients, lessen the risk of nosocomial infections, and maintain the integrity of the healthcare system

- Hospitalized patients
- Symptomatic healthcare workers

PRIORITY 2

Ensure that those who are at highest risk of complication of infection are rapidly identified and appropriately triaged

- Patients in long-term care facilities with symptoms
- Patients 65 years of age and older with symptoms
- Patients with underlying conditions with symptoms
- First responders with symptoms

PRIORITY 3

As resources allow, test individuals in the surrounding community of rapidly increasing hospital cases to decrease community spread, and ensure health of essential workers

- Critical infrastructure workers with symptoms
- Individuals who do not meet any of the above categories with symptoms
- Health care workers and first responders
- Individuals with mild symptoms in communities experiencing high COVID-19 hospitalizations

NON-PRIORITY

- Individuals without symptoms

EXPANDED EMTALA GUIDELINES

Centers for Medicare and Medicaid Services (CMS) released updated guidance for EMTALA and other topics related to COVID-19 on March 31. The following are some of highlights:

1. Hospitals may use telehealth equipment to perform the medical screening exam (MSE) by Qualified Medical Personnel (QMP). The QMP may be on-campus (and using telehealth to self-contain) or offsite (due to staffing shortages). Either way, the QMP must be performing within the scope of their state practice act and approved by the hospital's governing body to perform MSEs.
2. The use of telehealth to provide evaluation of individuals who have not physically presented to the hospital for treatment does not create an EMTALA liability.
3. The MSE does not have to take place in the ED. A hospital may set up alternative sites on its campus to perform MSEs, and individuals may be redirected to these sites. Whether the individual is seen at the alternate on-campus site or in the ED, they should be logged in where they are seen. Individuals do not need to present to the ED first, and if they do present to the ED, they may still be redirected to the on-campus alternative screening location for logging and subsequent screening.
4. This is a triage function and the person providing the redirection from the ED should be qualified (e.g., a Registered Nurse) to recognize individuals who are obviously in need of immediate treatment in the ED. Hospital non-clinical staff stationed at other entrances to the hospital may provide redirection to the on-campus alternative screening location for individuals seeking COVID-19 testing.
5. In the 1135 waiver for the COVID-19 pandemic, CMS approved the ability to redirect patients to an offsite location for screening, in accordance with a state emergency preparedness or pandemic plan.
6. For physician visits in skilled nursing facilities, CMS is waiving the requirement in 42 CFR 483.30 for physicians and non-physician practitioners to perform in-person visits for nursing home residents and allow visits to be conducted, as appropriate, via telehealth options.
7. For anesthesia services, CMS is waiving requirements under 42 CFR §482.52(a)(5), §485.639(c) (2), and §416.42 (b)(2) that a certified registered nurse anesthetist (CRNA) is under the supervision of a physician in paragraphs §482.52(a)(5) and §485.639(c)(2). CRNA supervision will be at the discretion of the hospital and state law. This waiver applies to hospitals, critical access hospitals (CAHs) and ambulatory surgical centers (ASCs). These waivers will allow CRNAs to function to the fullest extent of their licensure and may be implemented so long as they are not inconsistent with a state's emergency preparedness or pandemic plan.

THE JOINT COMMISSION PUBLIC STATEMENT ON PPE

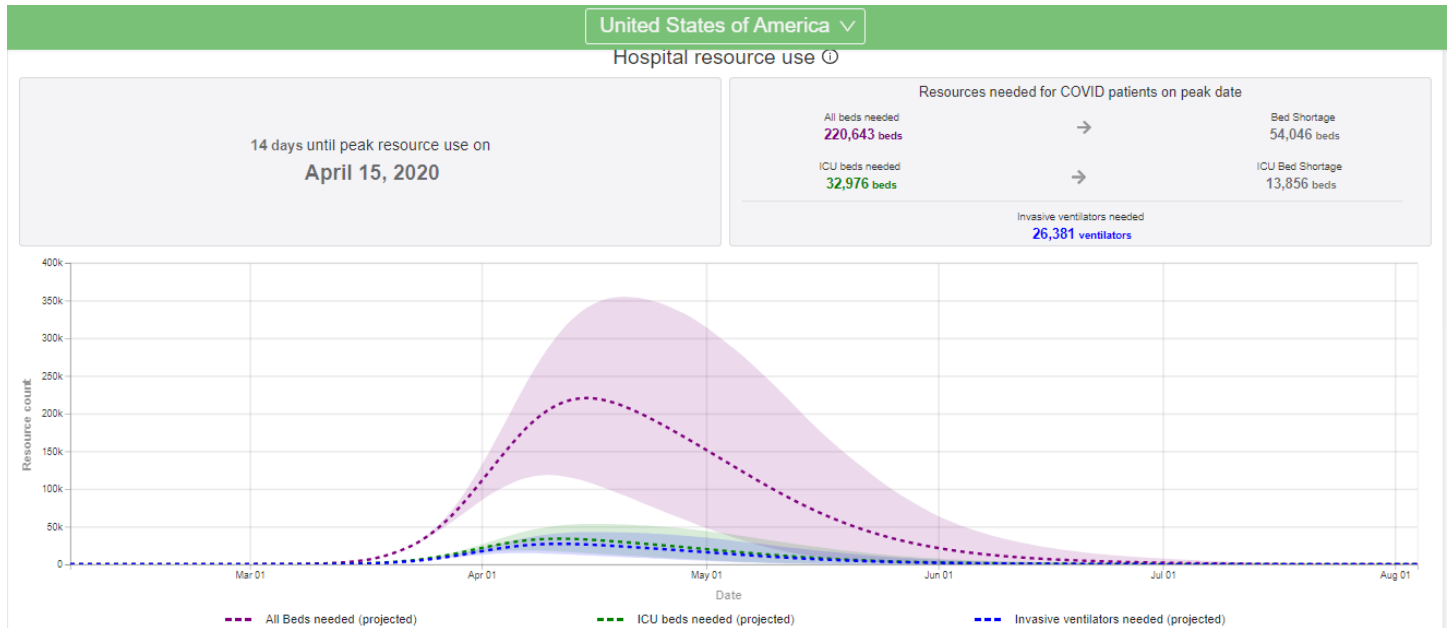
On April 1, the Joint Commission published a public statement on masks and PPE. Here are the highlights:

1. The Joint Commission supports allowing staff to bring their own standard face masks or respirators to wear at work when their healthcare organizations cannot routinely provide access to protective equipment that is commensurate with the risk to which they are exposed. The Joint Commission also emphasizes that none of our standards prohibit staff from bringing in their own PPE or wearing PPE throughout the day, nor do we know of any other organization that recommends against this.
2. Homemade masks are an extreme measure and should be used only when standard PPE of proven protective value is unavailable. In circumstances of PPE shortages, it is better to allow staff the opportunity to enhance their protection, even if the degree of that increased protection is uncertain.
3. On N95 vs surgical masks, the Joint Commission presented historical perspective regarding the CDC's flip from recommending N95 to surgical masks and cited two studies when it commented that aerosol spread could be plausible. It concluded that, "it is understandable why healthcare workers who must come in close contact with COVID-19 patients (e.g., during auscultation of the heart and chest) would have concerns about the adequacy of surgical masks," but fell short of offering a firm recommendation.
4. On wearing masks throughout the day, the Joint Commission concluded, "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.”

COVID-19 MODELING OF DEMAND FOR HEALTHCARE RESOURCES

The Institute for Health Metrics and Evaluation (IHME), an independent global health research center at the University of Washington, has developed a model for hospital resource utilization and trending of the pandemic’s impact on the United States. The model estimates the impact of COVID-19 on hospital bed utilization, ICU bed utilization and ventilator utilization.



Here are some key projections:

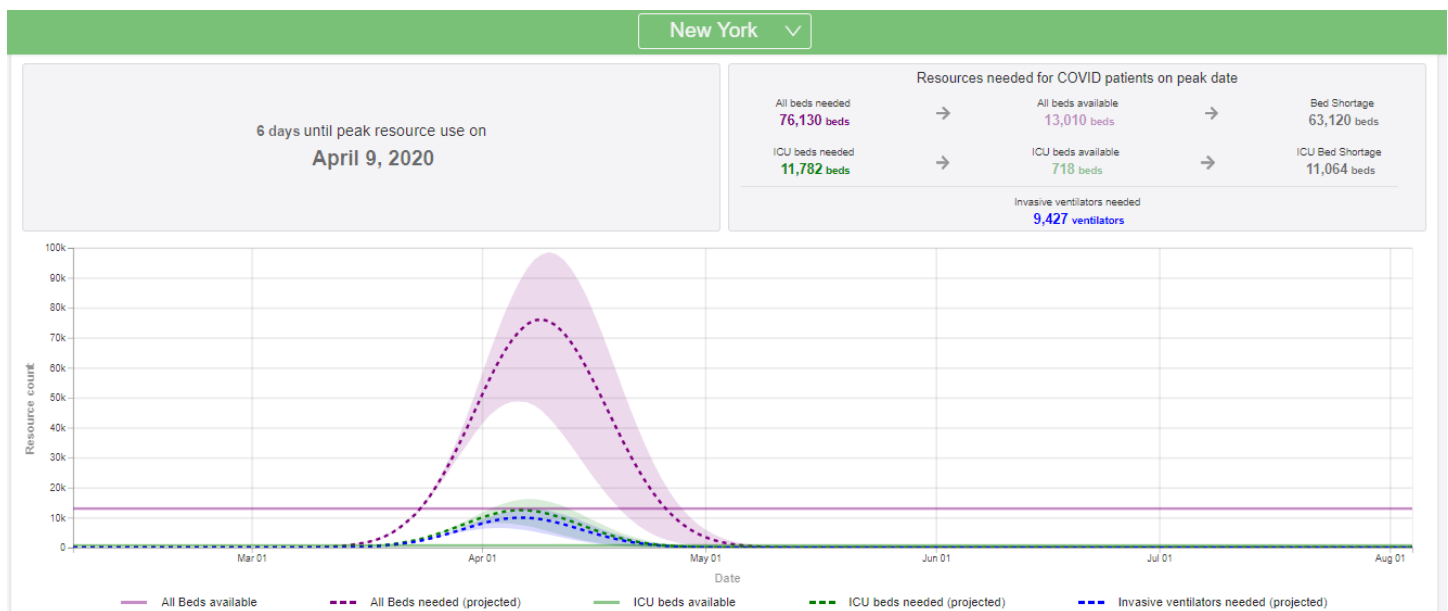
- The model currently projects our peak resource use will be on April 15, with 220,000 inpatient beds, 32,000 ICU beds and 26,000 ventilators needed.

April 15, 2020	
All Beds needed (projected):	220,643 (109,664–340,120)
ICU beds needed (projected):	32,976 (14,947–53,492)
Invasive ventilators needed (projected):	26,381 (11,970–42,783)

- The model projects the United States mortality to exceed 80,000, lagging peak projections by several weeks.



Modeling can also be tailored by state. For example, New York, the global epicenter, is projected to peak in numbers of cases on April 9 with a total of 76,000 hospital beds needed, 63,000 more than their current available bed capacity, and 11,000 ICU beds, 11,000 short of their current available capacity.



Data presented by IMHE can prove invaluable in planning for your COVID-19 response. Please check the website frequently for updated projections at <https://covid19.healthdata.org/projections>.

NEW TEAMHEALTH EXPANDED PPE GUIDELINES

Protecting our clinicians is the top priority for TeamHealth during this unprecedented global COVID-19 pandemic. Our Emerging Infectious Disease (EID) task force is working day and night to stay current on the date pertaining to spread of the disease, personal protection and preventing infection.

With more clinicians across the nation being exposed, quarantined and even ill from COVID-19, we are advising our teams to utilize PPE as recommended by the CDC, the World Health Organization (WHO), the

European Centre for Disease Prevention and Control (ECDC) and the Chinese Centers for Disease Control (CCDC). As such our organization has recommended the following:

- Wear a surgical/procedure face mask and eye protection (face shield or goggles) for all routine interactions with COVID-19 or suspected COVID-19 patients. In areas with widespread sustained transmission of the virus, it is reasonable to consider every patient is a potential COVID-19 patient.
- Wear a single mask for the entire shift unless it becomes wet, torn or soiled in an effort to preserve PPE and to prevent self-contamination as recommended by the CDC.
- Discard disposable face masks if a patient coughs or sneezes on the provider or if the clinician comes in contact with a high risk COVID-19 patient.
- Wear a higher level of PPE (e.g., an N95 respirator or greater, eye protection, gown and gloves or PAPR) for aerosol-generating procedures including, but not limited to intubation, extubation, non-invasive ventilation (NIV), nebulizer therapy, bronchoscopy, high-flow oxygen, chest tube insertion and actively coughing patients who won't tolerate a mask.
- In order to preserve N95 respirators, wear a surgical mask over the N95 mask and discarding the surgical mask after contact with high-risk patients.
- Clean plastic face shields and eye protection periodically with soap and water or standard disinfectant and reuse after cleaning.
- Wash hands before and after donning or doffing your mask/protective eyewear to prevent self-inoculation.
- TeamHealth is committed to working collaboratively with all of our clients to protect the health of client employees and our clinicians. If you feel that your organization is unable to provide PPE consistent with these recommendations, please reach out to your facility medical director, regional medical director, senior vice president, president, chief clinical officer or the chief medical officer to make sure your concerns are heard and coordinated efforts are taken to provide assistance.
- In the unlikely event that your hospital is unable to provide proper PPE as outlined above, please immediately reach out to TeamHealth leadership and take appropriate measures in order to protect yourself until the situation is resolved.
- We support the use of personally purchased PPE provided it meets minimum requirements as defined by the CDC and is approved for use at your local facility by their infection control professional and hospital leadership.
- TeamHealth will reimburse you for up to \$250 for any PPE meeting minimum CDC criteria that you purchase to protect yourself during this crisis.

Your safety is our top priority for us at TeamHealth. To that end, we have placed and continue to place orders for surgical masks, N95 respirators, gowns and eye protection that we will distribute as soon as it arrives. Please reach out to us if you have any concerns or you are having challenges collaborating with your local organization on this critical issue of PPE.

RECYCLING PPE

Ultraviolet and Hydrogen Peroxide Vapor Disinfection and Reuse of N95 Respirators

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The question of reuse of disposable N95 respirators after disinfecting has been raised as an option for extending the life of the device. This has been explored extensively by the Institute of Medicine (IOM) regarding viral pandemics. Although these data focused on H1N1 and Avian Influenza, they are directly

applicable to the SARS-CoV2 virus. Using liquid disinfectants is not recommended as they damage the mask and may present the user with residual chemicals (Lore). Investigators have studied ultraviolet radiation using disposable N95 respirators in order to extend their life and utility. A number of reputable organizations have developed protocols for using ultraviolet radiation in this manner. In addition, the utility of hydrogen peroxide vapor has been extensively explored in the context of disinfecting disposable N95 respirators for reuse. The results are generally satisfactory (Duke). The purpose of this document is to provide the clinician and facility with basic information on this process and links to relevant resources.

Reuse of Disposable N95 Respirator Products

The IOM, CDC, Occupational Safety and Health Administration (OSHA), U.S. Food and Drug Administration (FDA) and WHO all agree that it is preferable for all healthcare providers to wear and dispose of N95 respirators after a single use when dealing with pandemic viral infections. All of these organization recognize the serious threat to healthcare providers that develops when stocks of fresh N95 respirators are in short supply or unavailable. As such, these organizations opine that under conditions of a national emergency, some form of disinfecting and reuse of N95 respirators is acceptable (IOM, CDC, OSHA, FDA, WHO).

Ultraviolet Radiation

Investigations into the impact of ultraviolet radiation on disposable N95 respirators indicates that at even high cumulative radiation doses (950J/cm²), there is minimal effect on filtration and even less on flow resistance (Lindsley). The ultraviolet radiation germicidal dose for influenza virus placed on N95 respirators is around 1.8J/cm² (Heimbuch). This means that disposable N95 respirators could likely endure a number of germicidal cycles. The number of ultraviolet germicidal cycles a respirator can withstand varies with the brand. The body of the respirator (and elastic straps less so) are eventually denatured and show loss of strength with visible external deterioration. The upper limit of ultraviolet radiation exposure and reuse cycles should be determined by the amount of physical deterioration of the body of the respirator, not from changes in the filtration. Our fraternal colleagues at the University of Nebraska have created a detailed process and procedure regarding the reuse of N95 respirators using ultraviolet radiation that can serve as an example to other facilities ([Lowe available here](#)). There are a number of other recommended processes available online as well as commercial ultraviolet radiation device manufacturer recommendations. Each provider and facility should collaborate with their local environmental safety professional.

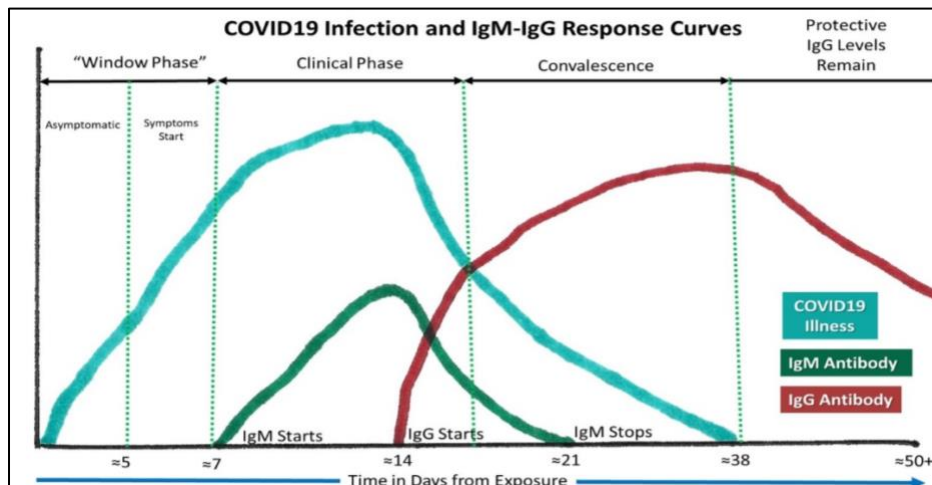
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Another viable process for disinfecting and reusing disposable N95 respirators is through the use of hydrogen peroxide vapor. Hydrogen peroxide vapor has been used for more than a decade to decontaminate laboratory equipment and other articles in laboratories across the world. This process requires specific equipment that uses at minimum a 35% hydrogen peroxide solution that is vaporized in a confined area. Specific safety protocols and monitoring procedures are required. The equipment is not typically excessively expensive but may not be readily available to all healthcare facilities. Experimental studies have demonstrated that the N95 retains its filtering capability with up to 50 hydrogen peroxide vapor decontamination cycles (without actual clinician use). With clinician use, the cycle tolerance is likely more limited – perhaps 30 according to Schwartz (Schwartz). Biomonitoring of the process indicates that germicidal levels are easily achieved with this process. The primary limiting factor is deterioration of the elastic straps rather than deterioration of the body of the mask or filtering capacity. There is also no evidence of residual vapor or noxious odors, which had been a previous concern. A review of this method is provided by Schwartz et al. in the references section.

In summary, both ultraviolet radiation and hydrogen peroxide vapor treatments are viable methods of disinfecting and reusing disposable N95 respirators. Results and number of reuse cycles will depend on a number of factors including the brand of N95, manufacturing quality of the respirators, soiling and physical wear and tear. The N95 respirator should be discarded when it shows obvious deterioration to the body or strap, or when a “self-seal” test by the healthcare provider fails. In addition, the N95 should be disposed of if there is obvious evidence of soiling or other contamination.

SEROLOGIC TESTING FOR COVID-19

The United States has been crippled by the lack of available test kits and waiting periods of several days for test results for the nasal swab, Polymerase Chain Reaction (PCR) tests. However, the newer serology tests will be able to provide results in 10 minutes in a bedside platform similar to a home pregnancy test. While access to testing is still problematic in many areas of the country, the FDA is fast-tracking testing kits and expect to have increasing numbers of tests in the coming weeks. One significant benefit of the new serologic tests is the fact that can determine whether the patient has an acute infection (IgM) or has recovered (IgG).



PCR	IgM	IgG	Interpretation of the Results
+	-	-	May be in the "Window" area of the Infection
+	+	-	May be in the early stage of Infection
+	+	+	Patient is in the Active Phase of Infection
+	-	+	May be in the Late or a Recurrent Stage of Infection
-	+	-	May be in the Early Stage of Infection: PCR may be False Negative
-	-	+	May have had a Past Infection and has Recovered
-	+	+	May be in the Recovery Stage or PCR result may be False Negative

Interpretation of IgM and IgG Results Correlated with PCR Testing

IgM become detectable after seven days of infection and rises for the next week. Disappearing a week later. IgG is detectable at day 14 and persists in the blood as a marker of patient immunity. Thus, positive IgM means you are in the early phase of the infection, positive IgM and IgG means you are in the active phase of the infection, and IgG only means you have had the infection at some point in the past and have recovered.

It is important to note that these tests have not been reviewed or validated by the FDA and are not included in the organization's emergency use category. Instead, the FDA "does not intend to object to the development and distribution by commercial manufacturers" of these tests, provided they meet a number of criteria, including qualifying the results of their reported test results with the following information:

1. This test has not been reviewed by the FDA.
2. Negative results do not rule out SARS-CoV-2 infection, particularly in those who have been in contact with the virus. Follow-up testing with a molecular diagnostic should be considered to rule out infection in these individuals.
3. Results from antibody testing should not be used as the sole basis to diagnose or exclude SARS-CoV-2 infection or to inform infection status.

4. Positive results may be due to past or present infection with non-SARS-CoV-2 coronavirus strains, such as coronavirus HKU1, NL63, OC43 or 229E.

WEATHERING THE EMOTIONAL STORM

COVID-19 has impacted our healthcare system in many ways but perhaps the most profound is the impact on our clinicians and their emotional well-being. Across the nation, we are seeing overwhelming volumes of critically ill patients, dwindling levels of personal protective equipment, concerns about patient flow and healthcare spread of infection. This has led to a wide range of emotional responses of fear, anxiety and vulnerability. This has been compounded by the inconsistent messaging from the CDC regarding levels of PPE required to protect our healthcare workers.

These natural emotions are generating a wide range of responses from our clinicians and other healthcare workers. Some are engaging in the improvement teams, disaster response teams and emergency preparedness teams locally, bolstering the coordinated response. Others are engaging nationally in teams like our Emerging Infectious Disease Taskforce (EIDT) or our operational improvement teams to help our TeamHealth family across the country. Others are taking to social media outlets such as Facebook, Twitter and LinkedIn to share best practices and innovations to help others. A small minority is choosing to take to social media to voice their frustrations, fear and anxiety or to try to impact change, working outside these traditional, formal venues for collaboration and improvement. Although social media is an excellent way for individuals to share their feelings, during an unprecedented crisis such as the one we face, individuals can often distract improvement efforts, taking precious time and energy away from the preparedness efforts. Our clinicians are often seen as the leaders of the department, and destructive messaging can impact the care being delivered at the bedside and instill fear in other staff members.

Here are some tips for coping in these difficult times:

1. If you are feeling stress, anxiety or fear about COVID-19:
 - a. Leverage your existing resources - engage your social network, emphasize time with family through video chat, reduce time on the web and get exercise.
 - b. Counseling - Reach out to your existing counselor or therapist through telehealth or telephone. Existing therapeutic relationships are always preferred. If you don't have existing relationships or you don't have access, our LiveWell resources can be accessed on the Thrive Zenith channel. You can also call 844-526-8300 24/7 to talk with a counselor on the phone or to setup a video encounter with a mental health professional at no cost.
2. If you worry about your organization's COVID-19 preparedness, availability of PPE, flow or patient safety concerns:
 - a. First, contact your facility medical director (FMD) to see how you can get involved. Also, you can volunteer your time to your hospital disaster or emergency preparedness or COVID-19 response team directly. We need your help!
 - b. If you do not feel you are being heard by either your TeamHealth or hospital leadership, please reach out to your regional medical director (RMD) or vice president of operations (VPO).
 - c. You can reach out to our national leadership team anytime if you have serious concerns about patient safety, clinician safety or hospital preparedness and you feel like your voice is not being heard. It is much better in these cases to have a coordinated response from an organization with a national perspective. We can help guide your organization and leadership team as well as provide operational support to help solve their needs in times of crisis.

Introduction: March 19, 2020

COVID-19 continues to spread at an increasing rate and increasing penetration both globally and across the United States. As of March 18, 2020, there have been 220,000 cases reported in 173 countries and all 50 states in the United States. On March 13, the President declared a National Emergency, empowering the Secretary of Health and Human Services to waive certain requirements for Medicare, Medicaid, SCHIP and HIPAA. While the impact of this is still unclear, we are starting to see temporary changes to telemedicine and guidance for the Emergency Medical Treatment and Active Labor Act (EMTALA)-related issues as it pertains to screening onsite and offsite. During the emergency declaration, the President also introduced a public-private collaboration with Roche, Quest, CVS, Walgreens, Walmart, Target and other stores with pharmacies to bring widespread testing to the United States in the form of drive through screening centers. We have yet to see this come to fruition. A travel ban was enacted on March 14 prohibiting travel to all nations of the European Union, later including Ireland and the United Kingdom. On March 16, 2020, the Centers for Disease Control and Prevention (CDC) recommended limiting group gatherings to less than 50 people. The next day, the President announced that recommendation was now groups of less than 10 people. Schools have been closed, and multiple counties in San Francisco have announced, “shelter in place” policies where residents are confined to their homes. These are truly unprecedented times.

With this perspective, we offer the following updates to our White Paper:

- 1. CDC Clinical Updates**
 - a. Patients Under Investigation – Changes in Criteria
 - b. Criteria for Return to Work for Healthcare Personnel with Confirmed or Suspected COVID-19 (Interim Guidance)
- 2. Centers for Medicare and Medicaid Services (CMS) Updates**
 - a. CMS Guidance for the Cancellation of Elective Surgeries
 - b. EMTALA
- 3. TeamHealth Guidance**
 - a. Guidance for Clinicians with Underlying Medical Conditions for COVID-19
 - b. Guidance for onsite and offsite screening areas and tents
 - c. Guidance for the use of Telemedicine for onsite patient care
 - d. Potential impact on ICU and ventilator resources based on CDC’s estimates

CDC CLINICAL UPDATES

The CDC has essentially eliminated their Persons Under Investigation (PUI) Criteria to the following statement: Clinicians should use their judgment to determine if a patient has signs and symptoms compatible with COVID-19 and whether the patient should be tested. Most patients with confirmed COVID-19 have developed fever¹ and/or symptoms of acute respiratory illness (e.g., cough, difficulty breathing). Priorities for testing may include:

1. Hospitalized patients who have signs and symptoms compatible with COVID-19 in order to inform decisions related to infection control.
2. Other symptomatic individuals such as, older adults and individuals with chronic medical conditions and/or an immunocompromised state that may put them at higher risk for poor outcomes (e.g., diabetes, heart disease, receiving immunosuppressive medications, chronic lung disease, chronic kidney disease).
3. Any persons including healthcare personnel², who within 14 days of symptom onset had close contact³ with a suspect or laboratory-confirmed⁴ COVID-19 patient, or who have a history [of travel from affected geographic areas](#) (see below) within 14 days of their symptom onset.

While the CDC's exposure categories have not changed, they have acknowledged the national shortage of PPE, specifically N95 respirators.

- Updated PPE recommendations for the care of patients with known or suspected COVID-19:
 - Based on local and regional situational analysis of PPE supplies, facemasks are an acceptable alternative when the supply chain of respirators cannot meet the demand. During this time, available respirators should be prioritized for procedures that are likely to generate respiratory aerosols, which would pose the highest exposure risk to the healthcare provider (HCP).
 - Eye protection, gown and gloves continue to be recommended. If there are shortages of gowns, they should be prioritized for aerosol-generating procedures, care activities where splashes and sprays are anticipated and high-contact patient care activities that provide opportunities for transfer of pathogens to the hands and clothing of HCP.
- Included are considerations for designating entire units within the facility, with dedicated HCP, to care for known or suspected COVID-19 patients and options for extended use of respirators, facemasks and eye protection on such units. Updated recommendations are regarding the need for an airborne infection isolation room (AIIR).
 - Patients with known or suspected COVID-19 should be cared for in a single-person room with the door closed. AIIRs (See definition in appendix) should be reserved for patients undergoing aerosol-generating procedures (See Aerosol-Generating Procedures Section)
 - There is increased emphasis on early identification and implementation of source control (i.e., putting a face mask on patients presenting with symptoms of respiratory infection).

Clinician quarantine varies widely based on local health department and individual site decisions. As the pandemic progresses, we are seeing more return to work decisions for clinicians who have a medium-risk exposure (ie. unmasked patient, masked clinician without goggles). These clinicians are being advised to self-monitor by checking temperature and symptoms twice daily and staying home if febrile or respiratory symptoms develop. In some cases, our clinicians are required to wear a mask in order to return to work. We are also seeing high variability in the issuance of quarantines as it relates to international and now domestic travel. Most are allowing all travelers to return to work with or without a mask as our workforce availability continues to be taxed. We encourage our clinicians to **avoid any unnecessary travel** as it may result in a local decision to quarantine. Please report all quarantines through our [quarantine reporting system](#) so that we can determine appropriateness and provide guidance.

The CDC has added the following guidance for healthcare worker exposure situations that represent a threat to the essential provision of care:

Facilities could consider allowing asymptomatic HCP who have had an exposure to a COVID-19 patient to continue to work after options to improve staffing have been exhausted and in consultation with their occupational health program. These HCP should still report temperature and absence of symptoms each day prior to starting work. Facilities could have the exposed HCP wear a facemask while at work for the 14 days after the exposure event if there is a sufficient supply of facemasks. If HCP develops even mild symptoms consistent with COVID-19, they must cease patient care activities, don a facemask (if not already wearing), and notify their supervisor or occupational health services prior to leaving work. This guidance can be found on [the CDC's website](#).

Criteria for Return to Work for Healthcare Personnel with Confirmed or Suspected COVID-19 (Interim Guidance)

Decisions about return to work for HCP with confirmed or suspected COVID-19 should be made in the context of local circumstances. CDC options include a test-based strategy or a non-test-based strategy (i.e., time-

since-illness-onset and time-since-recovery strategy). We have merged these into a single strategy for return to work:

HCP may return to work in healthcare settings when:

- At least three days (72 hours) have passed *since recovery* defined as resolution of fever without the use of fever-reducing medications **and** improvement in respiratory symptoms (e.g., cough, shortness of breath); **and**,
- At least seven days have passed *since symptoms first appeared* **or** two negative COVID-19 tests 24 hours apart.

If HCP were never tested for COVID-19 but have an alternate diagnosis (e.g., tested positive for influenza), criteria for return to work should be based on that diagnosis.

After returning to work, HCP should:

- Wear a facemask at all times while in the healthcare facility until all symptoms are completely resolved or until 14 days after illness onset, whichever is longer.
- Be restricted from contact with severely immunocompromised patients (e.g., transplant, hematology-oncology) until 14 days after illness onset.

Healthcare systems, healthcare facilities and the appropriate state, local, territorial and/or tribal health authorities might determine that the recommended approaches cannot be followed due to the need to mitigate HCP staffing shortages. This should be decided at the local level with the input from occupational health and other local leaders.

CMS UPDATES

CMS Guidance for the Cancellation of Elective Surgeries

The White House Task Force Press Briefing, CMS announced that all elective surgeries, non-essential medical, surgical and dental procedures be delayed during the 2019 Novel Coronavirus (COVID-19) outbreak. As more healthcare providers are increasingly being asked to assist with the COVID-19 response, it is critical that they consider whether non-essential surgeries and procedures can be delayed so they can preserve personal protective equipment (PPE), beds and ventilators. (Source: [CMS.gov](https://www.cms.gov)).

EMTALA Updates

As previously mentioned, the declaration of a national emergency by the President empowered the Secretary of HHS to waive certain requirements for Medicare, including EMTALA.

The HHS Secretary is authorized to waive certain Medicare, Medicaid and Children's Health Insurance Program (CHIP) requirements and conditions of participation under Section 1135 of the Social Security Act once the President declares an emergency through the Staff Act or National Emergency Act, and the Secretary declares a Public Health Emergency (PHE). Centers for Medicare and Medicaid Services (CMS) has activated blanket waivers and has developed a process for hospital/location specific waivers.

As an option for managing extraordinary ED surges under existing EMTALA requirements (no waiver required), CMS has stated that a hospital may set up alternative screening sites on its campus to perform medical screening exams (MSEs). The MSE does not have to take place in the ED.

An EMTALA waiver is required to allow hospitals to direct or relocate individuals who come to the emergency department (ED) to an alternative off-campus site, pursuant to a state emergency or pandemic preparedness plan, for the MSE. EMTALA waivers are not effective with respect to any action taken that discriminates among individuals on the basis of their source of payment or their ability to pay. (Source – [CMS.gov](https://www.cms.gov)).

TEAMHEALTH GUIDANCE

Guidance for Clinicians with Underlying Medical Conditions for COVID-19

As the COVID-19 pandemic progresses, we recognize that this is causing personal concern about your own risk and the risk your job may create for your family. TeamHealth clinicians with preexisting medical conditions such as CAD, uncontrolled DM, HTN, chronic respiratory disease, underlying malignancy, immunocompromised, or pregnancy, should continue to work in their normal capacity exercising the highest level hygiene and personal protection. These are the same measures that we have been recommending for all of our clinicians based on the most current CDC and WHO information. We understand the concerns some individuals may have about providing direct care to patients with known COVID-19. We suggest these individuals talk to their FMD or direct supervisor about these concerns. We recognize that these may be difficult conversations and are here to help provide support and guidance as needed. To view the full guidance, [please visit Zenith](#).

Guidance for onsite and offsite screening areas and tents

Based on increasing requests for onsite and offsite screening guidelines for COVID-19, please see the following recommendations.

Screening programs can be subdivided into two basic types – onsite and offsite – and EMTALA is treated differently in these situations.

1. Offsite screening programs are not required to follow EMTALA unless they are on the grounds of an emergency facility such as a free-standing ED. Offsite screening centers must follow specific criteria for sending a patient to the ED for admission and provide information for home quarantine and caring for family members at home.

Offsite screening programs can be staffed by nurses and other clinical team members. The screening should consist of screening for COVID-19 symptoms (fever, cough and absence of nasal symptoms, sore throat and chills) and influenza symptoms (cough, sore throat, congestion, fatigue and chills).

Ideally offsite screening programs will offer screening for influenza and COVID-19, if available. They will also provide appropriate guidance for home care, health department follow-up, if indicated, and clear indications to seek medical attention.

2. Onsite screening programs (including those in tents attached or adjacent to emergency departments) must follow EMTALA in terms of the requirement for a MSE. The update does stipulate, however, that a nurse can provide the MSE if it is within their state scope of practice. Another important consideration is the hospital's bylaws, which is considered the definitive source for defining a qualified medical provider (QMP) capable of conducting an MSE.

Because state emergency declarations vary widely on their content, it is unlikely nurses will be considered a qualified QMP to perform an MSE and may not be covered in most state emergency declarations. Therefore, facilities should consider temporarily modifying the medical staff bylaws during a disaster and should begin these conversations.

Ideally, onsite screening programs are run in the same manner as offsite screening programs. The need for a physician or advanced practice clinician (APC) will depend on federal, state and local regulations and bylaws.

Telemedicine may be applicable in the case of sites that are short-staffed due to quarantines and as an added layer of protection for providers that are onsite and to preserve personal protective equipment (PPE). From a billing point of view, this is not a separately billable service. If a patient leaves the ED after an in-person triage but before they are seen by a clinician in the main ED, the patient would be billed for an ED visit based on the documentation by the clinician in triage. However, when the triage is performed via telemedicine, they cannot be billed for an ED visit for the telemedicine triage visit. This rule may change with on-going national advocacy work, but currently Current Procedure Terminology (CPT) does not allow ED codes to be used for telemedicine, nor are there any other codes we could use for this service at this time.

In the event that a nurse can be used for the MSE, the framework and process would mirror that described in the offsite example provided above. One significant difference is the need for EMTALA training as EMTALA rules would still apply to the nurse to ensure they understand MSE and the meaning of stabilization and treating life-threatening illnesses. This nurse-centric program should be driven by COVID-19 protocols that clearly define when a patient needs to be seen by a physician or APC.

As in offsite screening programs, these nurses would be empowered to discharge patients home for outpatient follow-up. In cases where a nurse is not designated as a QMP, their main role is sorting patients into separate waiting areas based on presence or absence of respiratory symptoms.

To summarize, in order for a nurse to effectively lead an onsite screening program, they have to have:

1. Experience in triage
2. EMTALA training
3. Validation that state and federal regulations and medical staff bylaws allow them to perform this MSE function
4. Protocols approved by medical leadership

We are working on toolkits to help you implement onsite and offsite screening programs. Please reach out to Theresa Tavernero at Theresa_Tavernero@teamhealth.com if you have guidelines to contribute.

Guidance for the use of Telemedicine for onsite patient care

CMS released a statement on March 17 softening the regulations in telemedicine. In the FAQ, CMS acknowledged that while they can't waive the legislative provision that established the "established patient" provision, CMS committed not to audit for this so telehealth can be provided in the ED regardless of (1) whether the patient is present or at home (2) whether the ED is in an urban or rural environment and (3) and whether the patient is an established patient. Earlier pronouncements had waived state licensure requirements. This should open the door for practical and creative solutions to staffing. The response from commercial payers is unclear at this time as many provide their own telehealth services through their web portals.

To read the Frequently Asked Questions on this announcement [visit the CMS website](#).

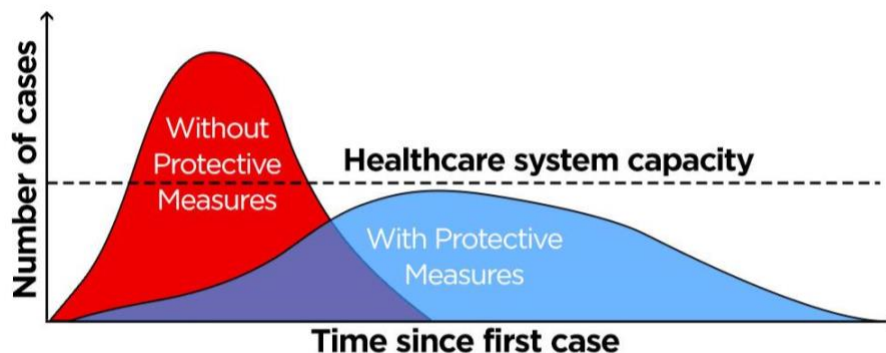
Potential impact on Emergency Department, Hospital, ICU and ventilator resources based on CDC's estimates

In late February, the CDC and global experts provided estimates on the impact of the disease on the United States. They assumed each person with the virus would infect 2-3 others, that 3% or 12% of the population would require hospitalization and either 0.25 or 1% of the population would die. The following are the key findings:

1. Between 160 million and 214 million people in the United States could be infected over a period of months to over a year.
2. Mortality could range from 200,000 to 1.7 million.
3. 2.4 million to 21 million could require hospitalization

This data was not published by the CDC, for obvious reasons, but was reported by all of the leading newspapers including the [New York Times](#).

According to the World Health Organization (WHO) report, 14% of patients will have severe disease and that 6% will require intensive care. While we don't know the actual mortality rates, most experts estimate it to be around 1% with a range of 0.5 to 2%. Working on the CDC estimate of 160 - 214 million people infected, these figures would estimate 22 - 30 million hospitalized, 9.6 -12.8 million requiring intensive care, many of these requiring ventilator support, and 800,00 - 4.2 million deaths. These actual numbers could vary widely based on many factors, including recent efforts to mitigate the disease through school closures and social distancing. These efforts attempt to flatten the curve, spreading the impact of the disease over time.



Adapted from CDC / The Economist

On March 13, the Society for Critical Care Medicine published an assessment of the current ICU resource availability based on the 2018 AHA dataset. The following bullet points summarize their findings:

1. There are 5,256 AHA-registered community hospitals in the United States. Only 2,704 deliver ICU services and have at least 10 acute care beds and one ICU bed. 74% of the hospitals with ICU capability are in metropolitan areas.
2. There are 534,964 acute care beds and 96,596 ICU beds – 68,588 adult (46,795 Med/Surg, 14,445 cardiac, 7,318 other), 5,137 pediatric and 22,901 neonatal. There are 25,157 step-down beds and 1,183 burn beds. 91% of the acute care beds and 94% of the ICU beds are in metropolitan areas.
3. Hospitals own approximately 62,000 ventilators, 98,738 older models and the strategic stockpile has an additional 8,900. When including anesthesia machines and all other available ventilators, the total approximates 200,000 ventilators in the country.
4. There are a total of 28,808 intensivists and 34,000 critical care advanced practice providers (APPs).

Table 1. Acute Care Hospitals (2018 AHA Data)

	Hospitals Combined (n = 2704)
Aggregate across all hospitals, n (%)	
Number of acute care hospital beds ^a	534,964
Number of ICU beds	96,596
Number of ICU units ^b	5039
Number of ICU beds by unit type^a	
Medical-surgical	46,795
Cardiac	14,445
Other	7318
Pediatric	5137
Neonatal	22,901
Number of burn beds ^c	1183
Number of other special care (observation, step-down, or progressive) beds ^c	25,157

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Based on the information provided which is consistent with anecdotal accounts from Italy, it is abundantly clear that we need to begin planning for intensive care capacity. The best-case scenario is that these plans will not be necessary, but if they are needed, the demand will come quickly with insufficient time for planning. The following are strong recommendations for planning:

1. Identify all available alternative sites of intensive care – identify a minimum of three locations that could be converted into intensive care units or high-acuity COVID-19 units with reverse isolation. Document the steps that would be required to convert these areas with estimated time for conversion.
2. Identify all available ventilators. Condition them now to prepare for their eventual use. Determine any parts or supplies that would be necessary to order as you will not likely have them in stock.
3. Begin training additional staff to serve vital ICU functions. This includes nurses, technicians and other staff to support basic ventilator operations and physicians, CRNAs and other APCs to manage ventilated patients.

For more information on intensive care surge capacity, please refer to our resources on the COVID-19 channel and EMcrit.org.

March 11, 2020: White Paper Introduction

COVID-19 continues to spread, impacting our hospitals and clinicians most significantly on the West Coast, but sporadically across the United States. We are hearing first-hand about the clinical and operational impacts from our physicians on the front lines in Washington state, where they have seen high volumes of COVID-19 patients. Due to the lack of availability of tests, the Centers for Disease Control and Prevention (CDC) has indicated the disease is likely severely underreported and that COVID-19 has been spreading throughout the community for several weeks. We have heard similar accounts from our clinicians across the United States of patients presenting with fever, respiratory complaints and even Acute Respiratory Distress Syndrome (ARDS). However, lack of testing capacity or approval for testing is likely impeding the accurate diagnosis of these patients. We will likely see significant increases in case numbers as the disease spreads and as more testing capacity comes online. The CDC reports that we will have the ability to test millions of patients within the coming weeks.

While we cannot control your personal choices, we strongly urge you to avoid any travel overseas, avoid cruise ships and limit or avoid travel and group gatherings in the United States as we begin to see widespread disease in parts of the country, and it is hard to predict the course of the pandemic.

With this perspective in mind, in this update, we provide:

1. CDC updates for healthcare provider exposure criteria

2. Strategies to transition to epidemic Sustained Community Transmission mitigation
3. Clinical guidance for identifying patients through history, physical exam and diagnostic testing
4. Guidance for hospital admission and discharge
5. Guidance for discharge from the emergency department, clinic or primary care office
6. Guidance for clinical management of COVID-19 patients

CDC UPDATES FOR HEALTHCARE PROVIDER EXPOSURE CRITERIA

On March 4, 2020, the CDC updated workplace exposure risk categories, emphasizing the importance of masking the patient and de-emphasizing the use of N95 respirators which are becoming scarce across the nation. This confirms the opinions of many experts that SARS-COV-2 spreads by droplet, not aerosol.

The risk categories were simplified and the importance of masking the patient. **Note that if patient is wearing a mask, all patient interactions (other than intubated and patients undergoing aerosolizing procedures) where the provider is wearing a mask (regular or N95), are considered low risk.** An important footnote covers brief interactions which is important when considering interactions at triage and other screening locations:

“HCP not using all recommended PPE who have only brief interactions with a patient regardless of whether patient was wearing a facemask are considered low-risk. Examples of brief interactions include: brief conversation at a triage desk; briefly entering a patient room but not having direct contact with the patient or the patient’s secretions/excretions; entering the patient room immediately after the patient was discharged.”

Epidemiologic risk factors	Exposure category	Recommended Monitoring for COVID-19 (until 14 days after last potential exposure)	Work Restrictions for Asymptomatic HCP
Prolonged close contact with a COVID-19 patient who was wearing a facemask (i.e., source control)			
HCP PPE: None	Medium	Active	Exclude from work for 14 days after last exposure
HCP PPE: Not wearing a facemask or respirator	Medium	Active	Exclude from work for 14 days after last exposure
HCP PPE: Not wearing eye protection	Low	Self with delegated supervision	None
HCP PPE: Not wearing gown or gloves ^a	Low	Self with delegated supervision	None
HCP PPE: Wearing all recommended PPE (except wearing a facemask instead of a respirator)	Low	Self with delegated supervision	None

Prolonged close contact with a COVID-19 patient who was not wearing a facemask (i.e., no source control)			
HCP PPE: None	High	Active	Exclude from work for 14 days after last exposure
HCP PPE: Not wearing a facemask or respirator	High	Active	Exclude from work for 14 days after last exposure
HCP PPE: Not wearing eye protection ^b	Medium	Active	Exclude from work for 14 days after last exposure
HCP PPE: Not wearing gown or gloves ^{a,b}	Low	Self with delegated supervision	None
HCP PPE: Wearing all recommended PPE (except wearing a facemask instead of a respirator) ^b	Low	Self with delegated supervision	None

(Source: [Centers for Disease Control and Prevention website](#))

STRATEGIES TO TRANSITION TO EPIDEMIC MANAGEMENT

As we transition from outbreak to epidemic/pandemic, there are some important strategies you need to make sure are in the planning phases or in execution:

1. **COVID-19 Planning and Disaster Management Team** – The facility medical director (FMD) or other designated physician onsite should participate in the planning and disaster response teams. If these teams do not currently exist, **you** should lead the efforts to establish these teams. Our teams on the West Coast have emphasized that planning and communication are the most important elements of disaster preparedness. Relationships established during these planning phases will be critical to operational success.
2. **Primary Care and Urgent Care Center Coordination of Care** – It is important that you collaborate with primary care clinicians to create care pathways. Consider mapping health system acute care sites and have a process or protocol for patient movement between each of these sites (including virtual touch points such as call center, wellness line, virtual care offerings). It is vital that they mask the patient immediately upon arrival. Criteria for admission and discharge should be reviewed with them on a regular basis so they may proactively send patients home and avoid necessary exposure of the emergency department staff and resources. Phone consultation should be offered liberally, when possible, as a way to extend the influence of the emergency clinician expertise. In areas where primary care providers have closed their offices, proactive outreach should be made soliciting assistance in providing low acuity care at the hospital.
3. **Arrival, screening, triage and sorting process** – You should have a screening and sorting mechanism at the entrance to your emergency department. Patients should initially be sorted based on presence or absence of respiratory complaints. **Any patient with respiratory complaints should immediately be required to wear a regular mask (not N95).** The waiting room should be split into respiratory and non-respiratory sides. Triage into high, medium and low risk should proceed in each of these two groups of patients. High-risk respiratory patients should be brought back to an isolation room or if none are available, a room with a door. Medium-risk patients should be together, ideally in isolation room or closed room while the undergo evaluation and treatment. Low-risk respiratory patients should be placed in a defined area of the waiting room separate from patients with non-respiratory

complaints. Alternative care locations outside of the ED are recommended by ACEP to reduce the operational and potential infectious impact to caregivers and other patients. Offsite testing similar to those employed in Italy and Washington state are strongly recommended.

4. **PPE and protecting our clinicians** – Providers should wear proper PPE as defined by the CDC. In their most recent recommendations from March 4, 2020, when patients are masked, a mask without face shield, gloves and proper hand hygiene are sufficient to remain low risk. For an unmasked patient, the provider is required to wear a mask with eye protection and gloves to remain low risk. Most experts and the World Health Organization (WHO) agree that SARS-COV-2 is spread by droplet and thus an N95 respirator is not required for close contact including clinical evaluation in patients who are masked. With intubated patients and patients undergoing aerosolizing procedures, full aerosol PPE (including N95 respirator) is required.
5. **Admission vs. discharge** – All suspected COVID-19 patients do not need to be admitted. Admission should be considered for patients with elevated respiratory rate, low pulse oximetry (PO <93), associated comorbidities that place them at higher risk (CAD, pulmonary disease, DM, cirrhosis, cancer, immunocompromised), and patients who cannot quarantine at home or for whom follow-up cannot be guaranteed. The mean duration of illness for mild COVID-19 patients is two weeks and for severe illness is three to six weeks. Relative to the normal mean hospital length of stay (LOS) of four days, admissions will certainly place a burden on already stressed inpatient units. It is imperative we attempt to limit unnecessary admission to conserve available inpatient resources and to protect our inpatient caregivers.
6. **Intensive care resources** – In coordination with hospital administration, you should immediately begin planning for expansion of intensive care resources. At a minimum, a COVID-19 planning team should designate a primary and secondary overflow area that can be converted to an ICU-like care setting. Any necessary modifications should begin immediately. You should assess the availability of ventilators and personnel and explore backup resources. Plans to cancel elective surgeries should be made with triggers for implementation in the event of saturation if ICU space and/or equipment.
7. **Use of scarce resources** – Because this disease has a rapidly progressive course, particularly in the elderly, and due to the risk of saturation of critical care resources and equipment, clinicians should be proactive in soliciting their patient's desire for intubation and resuscitation as well as power of attorney. Collaboration with your legal department and your ethics committee may be required as the impact of the COVID-19 disease tests the limits of healthcare resources. Begin conversations now as the need will present itself when the organization's resources are stretched to their limits.

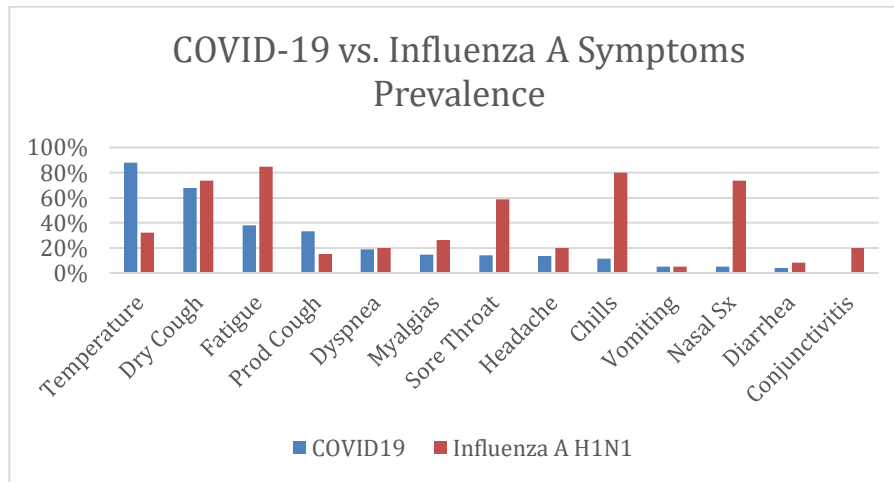
CLINICAL GUIDANCE FOR IDENTIFYING PATIENTS

History

Because COVID-19 has spread outside China and is now demonstrating sustained community transmission in multiple countries including the United States, we can no longer rely on travel history as the key epidemiologic screening determinant. Also, due to lack of testing capacity, we cannot test suspected patients in a timely manner and thus cannot rely on testing to drive our clinical decision-making. Clinical assessment therefore is the most reliable way to determine whether or not a patient is at risk for COVID-19. The following are key presenting complaints of COVID-19 patients. We present them side by side with influenza patients, as this is the most common alternative diagnosis.

COVID-19		Influenza A	
Fever	88%	Fatigue	85%
Dry Cough	68%	Chills	80%
Fatigue	38%	Nasal Symptoms	74%
Productive Cough	33%	Dry Cough	73%
Dyspnea	19%	Sore Throat	59%
Sore Throat	14%	Fever	32%
Chills	11%		
Nasal Symptoms	5%		

Thus, a reasonable approach for history, in addition to travel and known exposure, would be presence of fever and dry cough, and absence of nasal congestion, runny nose, sore throat and chills. Note that fever is present in 44% of patients on admission and documented in 88% during their hospital stay, thus repeated temperatures are recommended. Dyspnea is present in only 20% of cases but, in the context of the COVID-19 disease, would be a worrisome presenting symptom for advanced disease. The following is a graphical representation of all symptoms associated with COVID-19 and Influenza A (H1N1) compiled by Dr. David Hogan:



Based on data from the WHO China Study and relevant publications, age is an important risk factor for disease severity. The following table represents risk based on age cohorts.

Age	CFR
0-9	0*
10-39	0.2
40-49	0.4
50-59	1.3%
60-69	3.6%
70-79	8.0%
>79	14.8%

* none reported in China

Known Risk Factors – Patients with preexisting disease are more likely to have severe disease and have a higher mortality rate. The following table from the WHO represents the case fatality rate (CFR) based on comorbid disease.

Cormorbid Disease	Case Fatality Rate (CFR)
Cardiovascular disease	13%
Uncontrolled diabetes	9%
Hypertension	8%
Chronic respiratory disease	8%
Underlying malignancy	8%
Previously healthy	1%

Physical Exam and Ancillary Testing

Mild patients may appear well with cough and low-grade temperature. According to the WHO report, patients remain relatively asymptomatic for the first five to six days. The patients who progress to critical usually do so from days six to 10. The WHO defines severe cases as tachypnea (≥ 30 breaths/min), oxygen saturation $\leq 93\%$ at rest or $\text{PaO}_2/\text{FiO}_2 < 300$ mmHg. Critical cases are defined as respiratory failure requiring mechanical ventilation, shock or other organ failure requiring intensive care. About 25% of severe cases require mechanical ventilation.

Lab work usually reveals a normal white blood cell count (WBC), even in severe disease, however leukopenia ($\text{WBC} < 4,000/\text{mm}^3$) was present in 33.7% of cases. Lymphocytopenia (Lymphocytes $< 1,500/\text{mm}^3$) is the most common finding, present in 83.2% of cases. Thrombocytopenia ($\text{Plt} < 150,000/\text{mm}^3$) is present in 36.2% of cases. Hepatic function tests may be mildly elevated probably as a direct result of the viral infection. C-Reactive Protein (CRP) is elevated 60.7% of the time. The distribution of other findings is shown below.

Lab Finding	All	Mild	Severe
WBC $< 4,000/\text{mm}^3$	33.7%	28.1%	61.1%
WBC $> 10,000/\text{mm}^3$	5.9%	4.8%	11.4%
Lymphocyte $< 1500/\text{mm}^3$	83.2%	80.4%	96.1%
Platelet $< 150,000/\text{mm}^3$	36.2%	31.6%	57.7%
C-reactive protein ≥ 10 mg/L	60.7%	56.4%	81.5%
Procalcitonin ≥ 0.5 ng/ml	5.5%	3.7%	13.7%
LDH ≥ 250 U/L	41.0%	37.2%	58.1%
AST > 40 U/L	22.2%	18.2%	39.4%
ALT > 40 U/L	21.3%	19.8%	28.1%
Bilirubin > 17 $\mu\text{mol/L}$	10.5%	9.9%	13.3%
Creatinine kinase ≥ 200 U/L	13.7%	12.5%	19.0%
Creatinine ≥ 133 $\mu\text{mol/L}$	1.6%	1.0%	4.3%
D-dimer ≥ 0.5 U/L	46.4%	43.2%	59.6%

Chest X-ray (CXR) can be normal in the early stages of the disease, but most commonly (59.1%) reveals ground glass or patchy infiltrates. CT scan is not required to diagnose the disease but does show findings more commonly (86.2%) than plain radiographs (59.1%). Due to the potential cross-infection of other patients needing CT scans and the prolonged downtime for terminal cleaning, CT scanning is only recommended in cases with unexplained severe disease and a negative CXR.

Total Abnormal CXRs	59.1%	Total Abnormal Chest CTs	86.2%
Ground-glass opacity	20.1%	Ground-glass opacity	56.4%
Local patchy shadowing	28.1%	Local patchy shadowing	41.9%
Bilateral patchy shadowing	36.5%	Bilateral patchy shadowing	51.8%
Interstitial abnormalities	4.4%	Interstitial abnormalities	14.7%
No abnormality	41.9%	No abnormality	13.8%

Based on what we know about the COVID-19 disease, the data would support a COVID-19 panel consisting of CBC with manual Diff, CMP, CXR PA/LAT and rapid flu test. A CRP may be added for additional clinical information but is not routinely recommended. A CT Chest may be added for complex cases but is not routinely indicated, especially in cases with abnormal CXR or other results that point to COVID-19 as a likely diagnosis. Lactic acid and blood cultures should be added to patients with suspected sepsis. In cases without a clear diagnosis who require admission, a respiratory pathogen panel, urine testing for strep and legionella may be added, where available, while testing for SARS-COV-2 is pending.

GUIDANCE FOR HOSPITAL ADMISSION AND DISCHARGE

Admission and discharge practices will vary based on local practices and individual patient characteristics. These decisions should be made with the understanding that patients with mild disease will be sick for an average of two weeks and the duration of illness for severe cases will be between three to six weeks. Thus, preservation of inpatient resources is vital to the preservation of our healthcare delivery system. Clinicians should be proactive in soliciting the patient's desire for intubation and resuscitation as well as power of attorney.

The following are compiled guidelines for possible hospital admission for COVID-19 disease:

Guidance for Possible Admission		
WHO "Severe" Definition	WHO "Critical" Definition	Other
O2 Sat < 93%	Mechanical Ventilation	Bilateral or >50% of lung infiltrates
Tachypnea, RR >= 30	Shock	Lactate > 4 or Suspected Sepsis
PaO2/FiO2 < 300 mmHg	Organ Failure requiring ICU	Encephalopathy
		AKI with Cr > 2
		Acute Liver Damage (Bili > 2, Plt < 100, INR > 1.5)

Other considerations for admission would be the severity of the patient's specific comorbid conditions and ability to care for self at home under isolation, if indicated. According to the WHO, patients admitted to the hospital are discharged after clinical recovery based on the following criteria:

Hospital Discharge Criteria
Afebrile x 3 days, and
Resolution of symptoms, and
Radiologic improvement, and
2 negative PCR tests 24 hours apart

GUIDANCE FOR DISCHARGE FROM THE EMERGENCY DEPARTMENT, CLINIC OR PRIMARY CARE OFFICE

Patients discharged from the emergency department or clinic should follow the CDC guidelines for isolation and social distancing based on exposure risk. Clinicians should provide contacts for the health department and instructions to call their primary care physician (PCP) and the health department (local or state depending on local protocols) the next business day. Patients should be advised that the normal course of the disease begins with an asymptomatic period of five to six days of followed by symptoms lasting another week for mild cases. They should be instructed to call their PCP or return to the emergency department for rapid breathing, difficulty breathing or confusion, which may be an indication hypoxia. All clinicians should review the CDC's home isolation recommendations based on the risk level of the patient, discuss this with the patient and provide a copy of the CDC guidance.

[Interim US Guidance for Risk Assessment and Public Health Management of Persons with Potential Coronavirus Disease 2019 \(COVID-19\) Exposures: Geographic Risk and Contacts of Laboratory-confirmed Cases](#)

Specific instructions for home monitoring can be found on the CDC website and should be provided to the patient in the form of printed information or as a website reference on their discharge paperwork.

[Preventing the Spread of Coronavirus Disease 2019 in Homes and Residential Communities](#)

While the patient should follow-up with the local health department and their PCP, it may be helpful to provide CDC recommendations for when they may stop home isolation.

[Interim Guidance for Discontinuation of In-Home Isolation for Patients with COVID-19](#)

Because of the limited number of tests available, suspension of quarantine is currently difficult. As the disease becomes widespread and further outpaces our ability to provide testing, we believe more reasonable guidelines we be developed. An example would be 48 hours after resolution of fever without use of antipyretic medication and improvement in illness signs and symptoms to suspend quarantine and return to work.

CLINICAL MANAGEMENT OF COVID-19 PATIENTS

Introduction

Because SARS-CoV2 is a novel coronavirus, we have little clinical experience. Based on the available data from COVID-19 disease, SARS, MERS, influenza and other coronavirus, the following represent the best consensus recommendations from experts. ***The CDC recommends giving antibiotics for all severely ill patients within one hour of arrival, as it may be difficult or impossible to differentiate between COVID-19 and bacterial pneumonia and sepsis.***

Antiviral Therapy

There is a very weak suggestion for alpha-interferon atomization inhalation therapy b.i.d. The clinician might add lopinavir/ritonavir (KALETRA® - Abbvie Inc.) orally b.i.d. These recommendations are based on small numbers of SARS-CoV and MERS-CoV cases (1). There is marginal evidence to support these antivirals, and this support is only with early use (2). Remdesivir, (Gilead Sciences Inc) has shown activity in MERS-CoV infections. There is an initial trial starting for this agent (3). It is important to note that the use of combined antivirals currently has no scientifically valid support. Numerous studies are ongoing worldwide investigating antivirals at this time (4). Off label use is not currently indicated for these medications, but approved sites are anecdotally indicating success in patients with severe clinical disease.

Steroid Therapy

Only scant clinical information regarding steroids in coronavirus illness is available. Information from the initial SARS pandemic ranges from inconclusive to harmful. Complications of steroid therapy in coronavirus patients

includes diabetes mellitus, osteoporosis, steroid psychosis, delayed viral clearing, avascular necrosis and increased mortality (5-7). Steroid therapy is currently not recommended for the management of COVID-19 disease (8). Steroid therapy may be indicated and are being used in settings where patients have other comorbid conditions that require them.

Intensive Care Unit Management

Patients who require ICU management for COVID-19 disease should be managed in accordance with typical ICU, sepsis and ARDS protocols (1). These patients should be managed with strict droplet, airborne and aerosol precautions, including full eye protection (8, 9). Patients will also likely benefit from aggressive airway management with noninvasive ventilation or mechanical ventilation as clinically indicated (1). Earlier intubation is recommended after initial NIV failure to progress. This provides droplet control as well. Paralysis is also considered to reduce oxygen demand and to produce droplet control.

Extracorporeal life support may also be considered in some situations. Clinical experience thus far has indicated that poor outcomes and fatalities are often associated with the development of ARDS and pulmonary decompensation. As such, measures directed at the management of ARDS may be beneficial (8, 9).

Hospital Management

There is a likelihood for widespread community transmission of the SARS-CoV2 virus resulting in an influx of patients with COVID-19 disease into the United States healthcare system. The CDC and others working on the national healthcare response to COVID-19 disease consider the following as critical elements of hospital response:

- [Prevent the spread of COVID-19 within the facility](#)
- [Rapid identification and isolation of respiratory illness and possible COVID-19 cases](#)
- [Rapid communications with infection control professionals and public health authorities](#)
- [Provision of care for COVID-19 disease patients as a routine part of hospital operations](#)
- [Plan for possible escalation of patient numbers under surge capacity and disaster management](#)
- [Develop surveillance, monitoring and management processes for healthcare workers with possible COVID-19 exposure](#)

CONCLUSION

Thank you for reviewing the summary we have provided you today. Our sincere interest is to provide you with the latest information to keep you safe, keep your patients safe and help you feel confident in providing patient care in these unprecedented times. We are grateful for your steadfast effort to care for patients during these unprecedented times. Please stay safe.

Respectfully Submitted by TeamHealth Emerging Infectious Disease Taskforce and Clinical Leadership

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