COVID-19 training for healthcare workers

A free online course on training healthcare workers to care for patients with COVID-19, as elaborated by Matthew Strehlow and Jennifer Jones

AFREHealth has partnered with Stanford University to disseminate a free online course on the identification and management of patients with COVID-19. Over 100,000 learners globally have taken the 5-hour, self-directed course to date. Approximately 10% of course enrollees reside in Africa. Healthcare workers can enroll in the course on Coursera or edX, or download it for offline access from Stanford's Digital MEdIC app, available on ios or Google Play. Both Coursera and Digital MEdIC have agreed to waive course participation and certificate fees, while edX has dramatically reduced the cost. The course is currently offered in English, Spanish, and Hindi. AFREHealth is collaborating with Stanford to develop Portuguese and French versions to broaden the course's reach to healthcare workers throughout Africa. Course information is presented in short, discrete modules of approximately 10 minutes each. The modules focus on the key evidence pertinent to physicians, nurses, and other healthcare workers practicing clinically.

Key clinical features

COVID-19 is spread by respiratory droplets produced when patients cough, sneeze, talk and breathe. These droplets can travel up to two metres and can remain in the air or land on surfaces. Individuals typically become infected by inhaling COVID-19 viral particles. However, it is also possible, for example, to become infected by touching a contaminated surface, such as a door handle, the side of a gurney, or a keyboard, and then touching the nose, eyes or other mucous membranes.

Importantly, COVID-19 disease can be spread by asymptomatic patients. R0, the basic reproduction number that defines how many people the average infected person will spread the disease to, is estimated to be 2 to 3. This means that one person will likely infect two to three other people. COVID-19's R0 is significantly higher than seasonal influenza which explains its rapid spread. Variants of concern, including the quickly spreading B.1.167 first identified in India, are potentially more transmissible, with an even higher R0. Proven public health interventions to reduce the spread of disease include wearing masks, hand washing, and vaccination.[1]

Up to 50% of infected individuals may be asymptomatic. In those patients who become

symptomatic, incubation can take as long as 14 days, though most patients (81%) develop symptoms approximately four days after exposure. In addition to common influenza-like symptoms like fever and cough, the loss of taste and/or smell is a hallmark feature in a minority of patients. Approximately 14% of patients develop severe illness around day nine, which commonly manifest as pneumonia with greater than 50% lung involvement. Dramatic hypoxia and rapid breathing can be incongruent with a patient's mild shortness of breath. Currently no validated scoring systems to identify those at highest risk for death exist, although many risk scoring systems have been developed and are being used.[2] The recovery period for mild cases averages two weeks, while severe cases can take two months or more to fully improve.
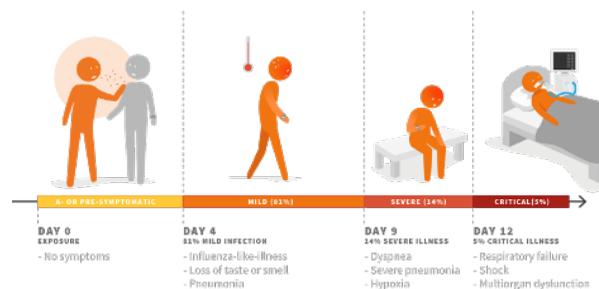

Typical timeline of symptomatic COVID-19 infection

Other complications of COVID-19 disease involve the cardiovascular and neurologic systems. Deep venous thrombosis, heart injury, arrythmia, and encephalopathy are commonly reported in intensive care unit patients. While secondary bacterial infections can occur, they are not common. It is also uncommon for children to become severely ill, though delayed presentation of multisystem inflammatory syndrome (MIS) associated with COVID-19 is well documented in the literature.[3]

Diagnosing COVID-19

PCR testing for the RNA of SARS-CoV2 particles, the virus that causes COVID-19, is the mainstay of diagnostic testing. The available tests vary by manufacturer but are generally very specific for COVID-19 and if positive, COVID-19 infection can be presumed. Nasopharyngeal and oral swabs have been approved and the choice of method depends on local protocols. Regardless, proper technique for obtaining samples is imperative. While awaiting test results,

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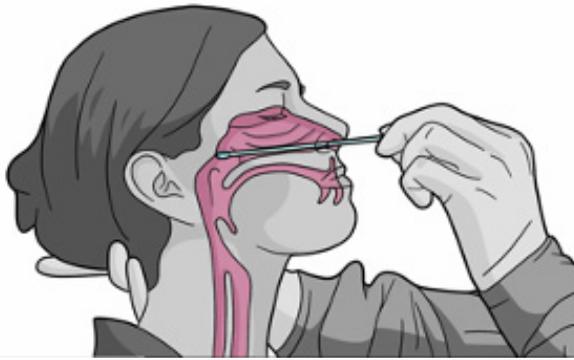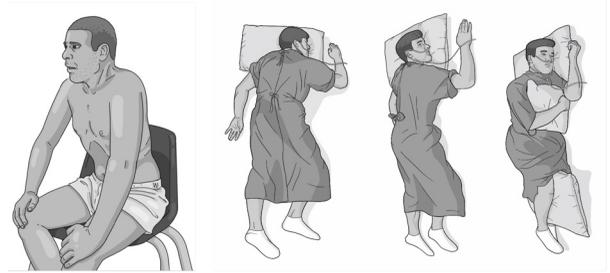
Nasopharyngeal sample acquisition technique

Upright and prone positioning in COVID-19 patients with difficulty breathing

patients are asked to self-isolate. Antigen tests that detect viral proteins exist and can be easily performed at home. While an important part of the public health strategy, antigen tests are less sensitive than PCR tests, with a higher false negative rate.

Numerous other laboratory and radiographic tests can suggest COVID-19 illness or help predict the severity of disease or the risk of complications. In general, inflammatory markers are highly elevated (e.g. ferritin) while the absolute lymphocyte count is low. Chest radiographs may demonstrate diffuse pulmonary opacities that can progress rapidly as a patient's clinical status worsens. Bedside ultrasound has been demonstrated to be as effective as chest radiograph in identifying pulmonary lesions due to COVID-19 illness. Ultrasound findings progress on a continuum from discrete focal B-lines to coalescing B-lines and subpleural consolidations.[4]

Treatment for symptomatic patients
For patients with significant respiratory symptoms, positioning is a critically important intervention that is free-of-cost. Traditionally, a patient with respiratory compromise is placed in the upright seated position which allows maximisation of lung volume and air exchange. In patients with COVID-19, however, prone positioning is frequently beneficial. Prior research has demonstrated that prone positioning, lying face down, leads to decreased rates of intubation and improved outcomes in patients with Acute Respiratory Distress Syndrome (ARDS). Patients with COVID-19 are showing

similar improvement in outcomes. To implement prone positioning, patients rotate through a series of different positions every 30 to 120 minutes.[5]

Oxygen therapy is imperative for patients with COVID-19. Patients can be started on simple nasal cannula with a goal oxygen saturation level >90% for most adults and >92%-95% for pregnant women. If the respiratory rate remains elevated or the oxygen saturation falls below these levels, oxygen support should be advanced in a stepwise fashion to provide higher levels of support: face mask > non-rebreather face mask (NRFM) > NRFM in combination with nasal cannula > non-invasive positive pressure ventilation or high flow nasal cannula > intubation and mechanical ventilation. If patients are rapidly decompensating, this stepwise approach to oxygen delivery may not be feasible and providers should advance to higher levels of support immediately.[6] During oxygen administration, aerosolization of viral particles can occur and healthcare workers must take appropriate precautions to limit their own exposure.

In addition to respiratory support, the cornerstone of COVID-19 patient management, other medications have demonstrated varying levels of efficacy. The most well-supported treatment is systemic corticosteroids for patients requiring supplemental oxygen or mechanical ventilation.[7] The exact dosing of systemic corticosteroids and the benefits of inhaled budesonide are still being determined. IL-6 inhibitors, like remdesivir, and monoclonal antibodies may have more narrow indications with less well-established clinical outcome benefits. Convalescent plasma and hydroxychloroquine have not shown benefit and are not recommended.[1]
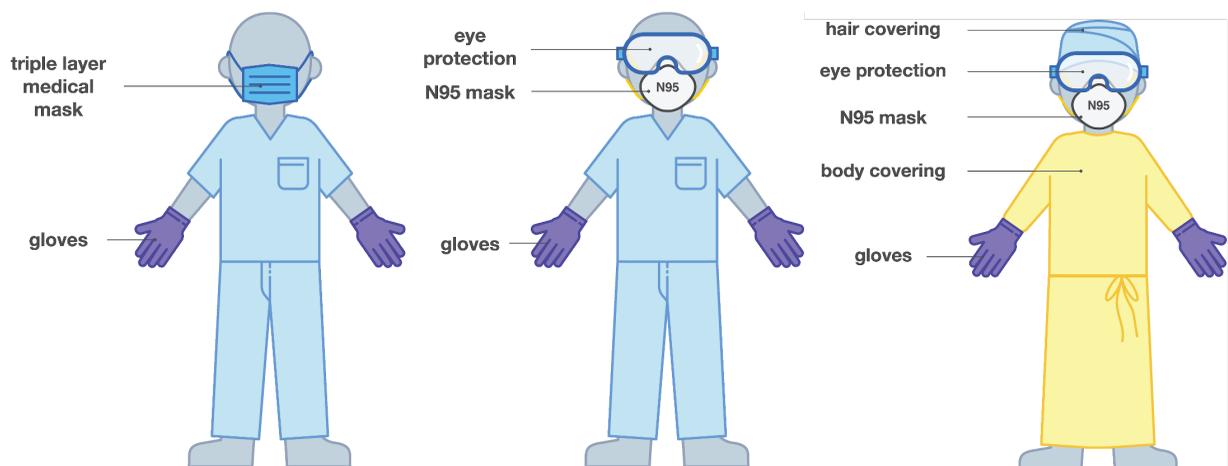
Infection prevention

Personal protective equipment (PPE) and hand hygiene remain foundational to protecting healthcare workers
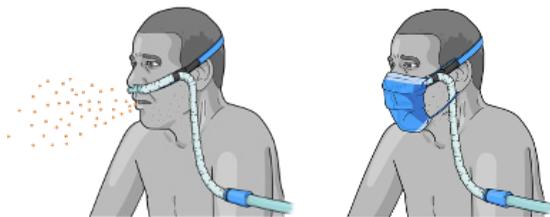
Patient mask use to limit aerosoliSation of viral particles and prevent COVID-19 spread

and preventing the spread of COVID-19. Differing levels of PPE are used depending on the likelihood of infection of the patient and the type of care or procedure being performed.

Vaccines are effective at preventing COVID-19 infection, but more importantly, vaccination has nearly eliminated severe illness in those that do become infected, with very low rates of hospitalization and death. A number of vaccines have received emergency use authorization or similar approvals, and each has its unique effectiveness and side effect profile. In general, side effects of mild flu-like illness are relatively common while severe side effects are extremely rare. Eligibility and uptake of vaccines has been highly location-dependent and access to vaccines across

nations and communities is disturbingly unequitable. Led by the WHO, international health organisations are aggressively pushing for more equity in vaccine distribution and access.

Role for trusted information sources

Vaccine uptake, public health prevention measures, and patient care practices have been hampered by the "Infodemic" or deluge of misinformation being disseminated primarily on social media platforms and through informal social networks.[8] Healthcare workers are viewed as trusted sources of accurate information and have a pivotal role in not only caring for their patients, but also in educating their communities. Unfortunately, healthcare workers themselves are challenged to find readily available, trusted sources of information. The partnership between AFREHealth and Stanford University aims to bridge this gap by providing training materials from trusted sources that will support healthcare workers as they combat the rampant misinformation in their communities.

Conclusion

Together AfreHealth and Stanford University are disseminating a free course designed to train healthcare workers on identifying and managing patients with COVID-19. Evidence to date demonstrates that early detection and optimal care can dramatically reduce the mortality rate and prevent the spread of infection. Healthcare workers must supplement what they already know with reliable information that allows them to improve the care they provide to their patients and better serve as key information sources for their communities.

References

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I just found out I have COVID-19.
What do I do to protect my friends and family?

World Health Organization

If you are diagnosed with COVID-19 or receive a positive test result, you have done nothing wrong.

Anyone can contract COVID-19 regardless of race, gender, age, or income. Remember we are all in this together.

If you have COVID-19 with symptoms, or a positive test result without symptoms, you will be asked to self-isolate at home or in a health care facility.

Contact your local public health authority. They may be able to help you to notify your contacts and inform them about next steps.

Think back to 48 hours before you started to feel unwell, or if you don't have any symptoms, 48 hours before you took your COVID-19 test until you began self-isolation. Consider where you went and who you might have spent time with.

Contact people with whom you had physical contact or spent more than 15 minutes at a distance closer than one metre, and let them know of your positive test result.

If you visited a store, health facility, or other close and crowded establishment during this period, please call and let them know the day and time that you were present.

Doing your part protects yourself and others. Your friends and family will thank you.