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FIP HEALTH ADVISORY

**COVID-19:
CLINICAL INFORMATION
AND TREATMENT GUIDELINES**

INTERNATIONAL PHARMACEUTICAL FEDERATION

COVID-19: CLINICAL INFORMATION AND TREATMENT GUIDELINES

FIP will update this interim guidance as more information becomes available.

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Purpose of this document

Since December 2019, an outbreak of a new human coronavirus (SARS-CoV-2) has spread to many countries, causing millions of cases and hundreds of thousands of deaths. COVID-19 is the disease caused by this new virus. The virus is easily transmitted in the community via respiratory droplets, direct contact with an infected individual or surfaces that have been contaminated. While most people who are infected only experience mild to moderate symptoms that can be managed, up to 20% of infected individuals develop more severe illness requiring hospital treatment. Individuals at higher risk of severe illness are older adults, people with underlying conditions and those with acquired or congenital immunodeficiency. The large number of COVID-19 patients requiring hospital care (including intensive care) has placed significant burden on health systems and healthcare professionals all over the world. It has led most countries to implement exceptional measures to contain the spread of the virus, including extensive lockdowns, emergency protocols and social distancing measures. All health professions, including pharmacists, are called on to play a crucial role in managing and controlling this pandemic.

The purpose of this document is to provide relevant clinical information and treatment guidelines on the COVID-19 pandemic for pharmacists and the pharmacy workforce in a primary care context (i.e. community pharmacies and primary healthcare facilities) and in hospital settings, and for pharmacists working as clinical biologists in medical analysis laboratories.

Coronavirus infections can be prevented and an outbreak can be stopped through the active engagement of decision-makers, healthcare professionals, the media, and the community. This was demonstrated in previous coronavirus outbreaks such as in 2003 with SARS-CoV (severe acute respiratory syndrome coronavirus) and in 2012 with MERS-CoV (Middle East respiratory syndrome coronavirus). Even in the current pandemic, several countries have successfully controlled the outbreak so far. This document aims to assist pharmacists and the pharmacy workforce in preventing the spread of the disease and contributing to its efficient management in the healthcare system.

SARS-CoV-2 Coronavirus: Basic facts

What is a coronavirus?

Coronaviruses are a large family of viruses that cause illness ranging from the common cold to more severe diseases, such as [Middle East respiratory syndrome \(MERS-CoV\)](#) and [severe acute respiratory syndrome \(SARS-CoV\)](#). A novel coronavirus (nCoV) is a new strain that has not been previously identified in humans.

Coronaviruses are zoonotic, meaning they are transmitted between animals and people. Detailed investigations found that SARS-CoV was transmitted from civet cats to humans and MERS-CoV from dromedary camels to humans. There are several known coronaviruses circulating in animals which have not yet infected humans.

Coronaviruses are large, enveloped, positive-stranded RNA viruses. They have the largest genome among all RNA viruses. The genome is packed inside a helical capsid formed by the nucleocapsid protein and further surrounded by an envelope. Associated with the viral envelope are at least three structural proteins: the membrane protein and the envelope protein are involved in virus assembly, whereas the spike protein mediates virus entry into host cells. Among the structural proteins, the spike forms large protrusions from the virus surface, giving coronaviruses the appearance of having crowns (hence their name; *corona* in Latin means crown). In addition to mediating virus entry, the spike is a critical determinant of viral host range and tissue tropism and a major inducer of host immune responses. (1)

Coronaviruses usually affect mammals and birds, causing a variety of potentially lethal diseases. In general, coronaviruses cause widespread respiratory, gastrointestinal and central nervous system diseases in humans and other animals, threatening human health and causing economic loss from mild upper to lower respiratory tract infections. (1)

Coronaviruses are capable of adapting to new environments through mutation and recombination with relative ease. (1) As such, they can affect new hosts and tissues.

For this reason, although rarely, certain coronaviruses that usually affect only certain animal species can generate new strains that can cross over to human hosts and then be transmitted between humans. Since humans had not been exposed to such viruses before and cannot be protected by either existing vaccines or natural immunity, these mutations can rapidly lead to disease outbreaks and, eventually, pandemics. This was the case with the previous outbreaks of SARS and MERS.

What is the SARS-CoV-2 coronavirus / COVID-19 pandemic?

The SARS-CoV-2 is a novel strain of coronavirus that was first detected in the city of Wuhan, in the province of Hubei, in the People's Republic of China — a city with a population of 11 million. The recorded outbreak started as a pneumonia of unknown causal agent at the end of December 2019.

Phylogenetic analyses undertaken with available full genome sequences suggest that bats appear to be the reservoir of SARS-CoV-2 virus, but the intermediate host(s) has not yet been identified. (2)

On 30 January 2020, the World Health Organization (WHO) declared the outbreak a Public Health Emergency of International Concern. The WHO recommended that the interim name of the disease causing the current outbreak should be 2019-nCoV acute respiratory disease. In the 2019-nCoV acronym, "2019" is the year the virus was first detected, "n" means "new", and "CoV" corresponds to the coronavirus family.

On 11 February 2020, the International Committee on Taxonomy of Viruses (ICTV) decided to name the virus as **severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)**, and the WHO finally decided to name the disease caused by this virus as **COVID-19** (for **coronavirus disease identified in 2019**).

Following large outbreaks of the disease in multiple countries, with thousands of deaths around the world, on 11 March 2020 the WHO declared the outbreak to be a pandemic.

For updated figures of the number of confirmed cases and deaths, as well as demographic and epidemiological data on the pandemic, you can consult the webpage www.worldometers.info/coronavirus/ and/or the [webpage](#) developed by the [Center for Systems Science and Engineering at Johns Hopkins University, Maryland, USA](#).

The virus seems to have mutated already after its original transmission from the animal host or reservoir to humans, leading to at least two different strains. However, it is important to keep in mind that viruses mutate all the time and that not all mutations are indicative of increased disease severity or transmission rates. Given that multiple groups around the world are working on a vaccine, knowing the exact number of strains (or types) of the virus is crucial because, in order to be effective, the eventual vaccine will have to target features present in all known strains. Fortunately, many of the identified genetic differences are unlikely to affect the production of proteins, meaning there should not be significant changes to how the virus operates or the symptoms it causes. (3)

Coronavirus disease 2019 (COVID-19) — Clinical information

Modes of transmission

The transmission of SARS-CoV-2 occurs by the following mechanisms:

- a. According to current evidence, the COVID-19 virus is primarily transmitted between people through respiratory droplets and contact routes.
- b. Most often, spread from person to person can occur by close contact (within 1 metre), by indirect contact with surfaces in the immediate environment or by contact with objects used on an infected person followed by touching mucosal membranes.
- c. Person-to-person spread is thought to occur mainly via respiratory droplets produced when an infected person coughs or sneezes, similar to how influenza and other respiratory pathogens spread.
- d. These droplets can land in the mouths, noses or eyes of people who are nearby or possibly be inhaled into the lungs.
- e. A person can get COVID-19 by touching a surface or object that has the virus on it and then touching their own mouth, nose or, possibly, eyes. There is evidence that coronaviruses can remain infectious on inanimate surfaces for several hours or even days, depending on the type of surface. (4) (See also the section on “Cleaning and disinfection management”.)
- f. Airborne transmission may be possible in specific circumstances and settings in which procedures or support treatments that generate aerosols are performed.
- g. With most respiratory viruses, people are thought to be most contagious when they are most symptomatic. With COVID-19, however, there have been reports of spread from asymptomatic infected people to close contacts. (5) (6). Recent studies suggest that asymptomatic (or pre-symptomatic) people may indeed be driving the rapid expansion of the disease. (7)
- h. According to the WHO, people can be tested positive for COVID-19 one to three days before they start developing symptoms. It is currently not known what proportion of these pre-symptomatic people contribute to the disease transmission. Despite the fact that there is no published literature yet, the WHO states that, based on country reports, asymptomatic transmission is less likely than symptomatic transmission.
- i. In addition, patients may remain contagious up to two weeks after the remission of symptoms. According to Wölfel and collaborators, whereas symptoms mostly waned by the end of the first week, viral RNA remained detectable in throat swabs well into the second week. Stool and sputum samples remained RNA-positive over even longer periods, in spite of full resolution of symptoms. (8)
- j. To date, the active virus has not been found in samples of amniotic fluid or breastmilk. Limited evidence is available regarding COVID-19 during pregnancy. Intrauterine or perinatal transmission has not been identified. In two reports including a total of 18 pregnant women with suspected or confirmed COVID-19 pneumonia, there was no laboratory evidence of transmission of the virus to the neonate. However, two neonatal cases of infection have been documented. In one case, the diagnosis was made at day 17 of life after close contact with the infant’s mother and a maternity nurse who were both infected with the virus. The other case was diagnosed 36 hours after birth; the source and time of transmission in that case were unclear. (9) Much of the advice in various countries, such as the UK, that pregnant women should socially isolate is preventive rather than based on evidence of increased risk of harm.
- k. In limited studies on women with COVID-19 or another coronavirus infection, severe acute respiratory syndrome (SARS-CoV), the virus has not been detected in breast milk. However, it is not known whether mothers with COVID-19 can transmit the virus via breast milk. Breast milk provides protection against many illnesses. It is recommended by UNICEF that mothers who are infected with COVID-19 can breastfeed if they wish so. For breastfeeding safely, they should follow good

[respiratory hygiene](#), hold their new-born skin-to-skin, share a room with their baby, wash hands before and after touching the baby, and keep all surfaces clean. (10)

- I. With regards to the role of air conditioning systems in the dissemination of the virus in closed spaces, the evidence is limited.

However, the European CDC has issued a document on this subject with the following conclusions:

- There is currently no evidence of human infection with SARS-CoV-2 caused by infectious aerosols distributed through the ventilation system ducts of heating, ventilation and air conditioning (HVAC). The risk is rated as very low.
- Well-maintained HVAC systems, including air-conditioning units, securely filter large droplets containing SARS-CoV-2. It is possible for COVID-19 aerosols (small droplets and droplet nuclei) to spread through HVAC systems within a building or vehicle and stand-alone air-conditioning units if air is recirculated.
- Air flow generated by air-conditioning units may facilitate the spread of droplets excreted by infected people over longer distances within indoor spaces.
- HVAC systems may have a complementary role in decreasing transmission in indoor spaces by increasing the rate of air change, decreasing recirculation of air and increasing the use of outdoor air.

In one study, the authors concluded that the air-conditioning system of a restaurant in Guangzhou, China, played a role in disseminating the virus to three separate clusters of customers. (11) However, this is an analysis of one specific situation and the evidence may not be conclusive. Another study focused on the transmission routes of the virus on the *Diamond Princess* cruise ship. In this case, the authors concluded that the air conditioning system did not play a role in the dissemination of the virus across the ship, and that transmission must have taken place mostly through close contact between passengers in the common areas, or by contact with surfaces/objects contaminated with respiratory droplets. According to the authors, “infection among passengers after Feb 6 [the date when confinement to the passengers’ rooms was implemented] was limited to those who stayed in the same stateroom with an infected passenger.” (12)

The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) has published the following statements regarding transmission of SARS-CoV-2 and the operation of HVAC systems during the COVID-19 pandemic:

“Transmission of SARS-CoV-2 through the air is sufficiently likely that airborne exposure to the virus should be controlled. Changes to building operations, including the operation of heating, ventilating, and air-conditioning systems, can reduce airborne exposures. These changes include increasing outdoor air ventilation rather than recycling air, use the highest possible filter, and keeping systems running longer hours which allows the 2 above actions to have more impact.”

“Ventilation and filtration provided by heating, ventilating, and air-conditioning systems can reduce the airborne concentration of SARS-CoV-2 and thus the risk of transmission through the air. Unconditioned spaces can cause thermal stress to people that may be directly life threatening and that may also lower resistance to infection. In general, disabling of heating, ventilating, and air-conditioning systems is not a recommended measure to reduce the transmission of the virus.”

ASHRAE also updated their “Position Document on Infectious Aerosols” with more detailed technical guidance, which can be found [here](#). The organisation also issued a document discussing the alignment of their position agrees with those of the WHO and the US Centers for Disease Control and Prevention (US CDC), where they conclude that “ASHRAE’s position that engineering controls to reduce airborne concentrations

of viral particles or droplets are warranted to mitigate this risk is not in conflict with WHO and CDC's positions." (13)

Disease prevention

To help control further spread of the virus, people who are suspected or confirmed to have the disease should limit their contact with other individuals. In a healthcare setting, this may include isolation from other patients where possible and implementation of strict infection prevention and control methods by healthcare workers. For patients not requiring admission to a health facility, this should include self-isolating as much as possible, having a dedicated carer, and following infection prevention and control guidance within the household.

Ideally, individuals who have had social contact with symptomatic individuals who have tested positive for infection with COVID-19 should be followed up as a contact through local healthcare teams; however, this may not be possible especially at the peak of the outbreak.

The WHO's standard recommendations for the general public to reduce exposure to and transmission of this and other respiratory illnesses include the following:

1. Wash hands frequently

- a. Use soap and water for at least 20 seconds.
- b. Use alcohol-based hand rub containing at least 60% alcohol if soap and water are unavailable (keep alcohol-based hand rubs out of reach of children).
- c. Avoid touching eyes, nose or mouth with unwashed hands.

NOTE: Isopropyl alcohol or ethyl alcohol are appropriate for hand sanitisers. Methanol can be toxic, even when used on the skin, and should be avoided.

2. Avoid close contact with others

- a. Maintain a distance of at least 1-2 metres (3.3-6.6 feet) between yourself and others. The WHO recommends a minimum distance of 1 metre, (14) while other organisations like the US CDC recommend 6 feet (1.8 metres). (15)
- b. The risk of SARS-CoV-2 transmission falls as physical distance between people increases, so relaxing the distancing rules, particularly for indoor settings, might risk an increase in infection rates. In some settings, even 2 metres may be too close, (16) so a greater distance should be kept whenever possible.
- c. Safe transmission mitigation measures depend on multiple factors related to both the individual and the environment, including viral load, duration of exposure, number of individuals, indoor versus outdoor settings, level of ventilation and whether face coverings are worn. (16)
- d. Social distancing should be adapted and used alongside other strategies to reduce transmission, such as air hygiene, involving in part maximising and adapting ventilation to specific indoor spaces, effective hand washing, regular surface cleaning, face coverings where appropriate and prompt isolation of affected individuals. (16)
- e. Avoid close contact with individuals who are sick, including those living in the same household as yourself.
- f. Avoid going to crowded places.
- g. Avoid close contact with anyone who has fever and cough.

3. Cover mouth and nose when coughing or sneezing

- a. When coughing or sneezing, cover the mouth and nose with a flexed elbow or tissue.
- b. Throw the tissue in the trash immediately and wash hands afterwards.

4. Monitor your health

- a. Monitor for symptoms.
- b. Stay home and self-isolate even with minor symptoms, such as cough, headache or mild fever until you recover.

- c. If you have a fever, cough or difficulty breathing, seek medical care early by telephone if possible and share any history of contact with suspected or confirmed COVID-19 cases with your healthcare provider.
- d. Remain physically active.
- e. Maintain a healthy diet.

5. Clean and disinfect surfaces

- a. Clean and disinfect frequently touched surfaces (for example, countertops, phones, doorknobs and taps) at least daily.
- b. Clean dirty surfaces with soap or detergent and water, then disinfect them with household disinfectant.

6. Maintain adequate food safety practices

- a. Wash hands before handling food and before eating
- b. When visiting live markets in areas currently experiencing cases of novel coronavirus, avoid direct unprotected contact with live animals and surfaces in contact with animals.
- c. The consumption of raw or undercooked animal products should be avoided. Raw meat, milk or animal organs should be handled with care, to avoid cross-contamination with uncooked foods, as per good food safety practices. (14)

Self-isolation by persons with symptoms and/or persons who may have been in contact with infected persons

Self-isolation means avoiding situations where you could infect other people. This means all situations where you may come in contact with others, such as social gatherings, workplaces, schools, child care/pre-school centres, universities, faith-based gatherings, aged care and healthcare facilities, prisons, sports gatherings, supermarkets, restaurants, shopping malls and all public gatherings. (17)

Diagnostic testing for COVID-19 in suspected human cases

There are currently several tests available on the market or under development for diagnosing COVID-19 (SARS-CoV-2 infection). They are mostly based on a molecular diagnosis (complex polymerase chain reaction [PCR] or reverse transcription polymerase chain reaction [RT-PCR] techniques) targeting different parts of the viral genome.

Some serological assays are also in development, but currently they cannot compete in accuracy with molecular diagnosis, particularly in the early phase of infection. This is particularly true for patients who are immunocompromised, and for the elderly, whose immune response through antibody production may be weaker than in immunocompetent individuals. This lack of equivalency is also true in terms of analytical performance. The use of antibody tests may, nevertheless, be more suitable for purposes other than diagnosis, such as public health monitoring and vaccine development.

For further details about diagnostic tests and the roles of pharmacists in this area, see the FIP guidance “COVID-19: Guidelines for pharmacists and the pharmacy workforce” at www.fip.org/coronavirus.

Disease onset

SARS-CoV-2 has an incubation period of 2 to 14 days before the onset of symptoms. On average, symptoms usually appear in 5-6 days.

A study led by researchers at Johns Hopkins Bloomberg School of Public Health, Maryland, USA, yielded an estimate of 5.1 days for the median disease incubation period. This median time from exposure to onset of symptoms suggests that the 14-day quarantine period recommended by the WHO and other organisations is reasonable.

The analysis suggests that 97.5% of people who develop symptoms of SARS-CoV-2 infection will do so within 11.5 days of exposure. The researchers estimated that for every

10,000 individuals quarantined for 14 days, only about 101 would develop symptoms after being released from quarantine. (18)

Symptoms

For confirmed COVID-19 cases, reported illnesses have ranged from people with little to no symptoms to people being severely ill and dying. Symptoms can include (on admission to hospital): (19)

- Fever (>80% of patients)
- Cough (>80%)
- Shortness of breath (31%)
- Muscle ache (11%)

The disease may also occur with mild symptoms only, including low-grade fever, cough, malaise, rhinorrhoea and sore throat without any warning signs such as shortness of breath or difficulty in breathing, increased respiratory secretions (i.e. sputum or haemoptysis), gastrointestinal symptoms, such as nausea, vomiting, and/or diarrhoea, and without changes in mental status (i.e. confusion, lethargy). (20) Other symptoms may include fatigue or headache. (21)

The largest cohort reported of >44,000 persons with COVID-19 from China showed that illness severity can range from mild to critical:

- Mild to moderate (mild symptoms up to mild pneumonia): 81%
- Severe (dyspnea, hypoxia, or >50% lung involvement on imaging): 14%
- Critical (respiratory failure, shock, or multiorgan system dysfunction): 5% (22)

COVID-19 is associated with mental and neurological manifestations, including delirium or encephalopathy, agitation, stroke, meningo-encephalitis, impaired sense of smell or taste (19) anxiety, depression and sleep problems. In many cases, neurological manifestations have been reported even without respiratory symptoms. (23)

Risk factors for severe illness are not yet clear, although older patients, smokers or patients with underlying medical comorbidities (e.g. severe obesity, asthma, chronic obstructive pulmonary disease, diabetes, hypertension, cardiovascular disease, chronic kidney disease, immunocompromised state from solid organ transplant, sickle cell disease, cancer) may be at higher risk. (24) (25)

The disease in children appears to be relatively rare and mild with approximately 2.4% of the total reported cases reported among individuals aged under 19 years. A small proportion of those aged under 19 years have developed severe (2.5%) or critical disease (0.2%). (2)

COVID-19: Treatment guidelines and research updates

Clinical treatment medicines

Currently, there is no specific medicine or vaccine for treating or preventing COVID-19, and no medicines or vaccines have been fully tested for safety and efficacy.

At present, current clinical management involves symptomatic and supportive treatment based on the clinical condition of the patient. Supportive treatments include oxygen therapy, mechanical ventilatory support hydration, fever/pain control, and antibiotics in the presence of bacterial co-infection.

The WHO does not recommend any of the following medicines administered as a treatment or prophylaxis for COVID-19 unless it is in the context of a clinical trial:

- Chloroquine and hydroxychloroquine (+/- azithromycin);
- Antivirals including:
 - Lopinavir/ritonavir
 - Remdesivir
 - Umifenovir
 - Favipiravir
- Immunomodulators including:
 - Tocilizumab
 - Interferon-beta-1a
- Convalescent plasma

There is a lack of robust evidence to support the use of any of the above medicines.

Hydroxychloroquine/chloroquine Please refer to the [FIP Holding Statement](#). Common side effects include gastrointestinal symptoms, pruritis and dermatological changes. More serious side effects include neuromyopathy, cardiotoxicity, and retinopathy.

Lopinavir/ritonavir (As a combination treatment is part of several clinical trials.) One study has so far showed no benefit. The most common side effects are gastrointestinal.

Remdesivir Recovery time of COVID-19 patients enrolled in clinical trials has been shown to be shortened. Some countries authorise emergency use of remdesivir. Important side effects include elevation of hepatic enzymes, gastrointestinal complications, rash, renal impairment and hypotension.

Umifenovir Being trialled as a stand-alone treatment. Side effects include diarrhoea and nausea.

Favipiravir Part of studies alone or in combination with tocilizumab. Side effects include QT interval prolongation.

Tocilizumab Being investigated in a number of clinical trials. Side effects include urinary tract infections, nasopharyngitis, headache, hypertension, raised alanine aminotransferase (ALT), and injection site reactions.

Interferon-beta-1a Currently being evaluated in clinical trials. Adverse effects include pyrexia and rhabdomyolysis.

Convalescent plasma Trials are under way and clinical improvement of patients with severe cases of COVID-19 have been seen in some small studies.

Corticosteroids Not routinely recommended for viral pneumonia or acute respiratory distress syndrome (ARDS). Corticosteroids should be avoided because of the potential for prolonging viral replication as observed in MERS-CoV patients, unless indicated for other reasons (e.g., chronic obstructive pulmonary disease exacerbation, refractory septic shock following Surviving Sepsis Campaign Guidelines). (26) (27) The RECOVERY trial under way in the UK, has reported that **dexamethasone** has significantly reduced mortality in patients seriously unwell with COVID-19. Patients received 6mg of dexamethasone once a day for 10 days, orally or by intravenous injection.

In summary, most of the currently published related studies focus on COVID-19 epidemiological investigation or clinical characteristics analysis. There is still a lack of robust evidence regarding the effectiveness/safety of potential treatment options, and large-scale clinical trials are still in progress.

Symptomatic management of mild COVID-19

For mild cases in the community, patients are advised to stay home in isolation. Patients who may be at higher risk of developing severe forms of the disease, including older adults

(>65 years old in some countries, >70 in others), people with underlying conditions (such as cardiovascular diseases, diabetes, respiratory diseases such as COPD, or cancer) and patients with compromised immunity (congenital or acquired) should be monitored closely and if their condition deteriorates, they should receive urgent care.

The management of symptoms may involve the use of antipyretics and/or anti-inflammatory medicines for fever and mild pain. The safety of the use of ibuprofen in COVID-19 patients has been questioned by an opinion article published by *The Lancet* suggesting that patients being treated with medicines that increase the expression of angiotensin converting enzyme 2 (ACE2) may be at increased risk of infection and/or severe COVID-19 disease. (28) ACE2 has been proven to mediate cell entry by SARS-CoV-2 in another paper. (29) However, the evidence against the use of ibuprofen in COVID-19 patients is not sufficiently robust to rule it out. In overall clinical practice, ibuprofen has well-established effectiveness in controlling the symptoms it is indicated for, both in mild and severe infectious disease. There is currently no conclusive evidence to establish a direct association between the use of non-steroidal anti-inflammatory medicines (including ibuprofen) and increased risk of infection or severity of disease. (30) Paracetamol (acetaminophen) is recommended for the management of fever in COVID-19 patients if appropriate.

Likewise, there is no evidence to support the assertion that treatment with ACE inhibitors (ACEi) or angiotensin receptor blockers (ARB) could predispose individuals to adverse outcomes should they become infected with COVID-19. Various scientific and professional societies have stated that patients should continue treatment with their ACEi and ARB unless specifically advised to stop by their medical team. (31)

Patients experiencing cough should be advised to avoid lying on their back and to use simple measures such as a cough linctus to help. Olfactory dysfunction often improves spontaneously, and there is no evidence to support the use of treatments for this symptom in patients with COVID-19. Patients should also be advised on adequate nutrition and appropriate hydration. Patients can improve air circulation by opening a window although fans are not recommended because they can spread infection. Basic mental health and well-being support should be provided for all patients. If symptoms of insomnia, depression or anxiety are present, these should be managed.

Management of moderate COVID-19

It is recommended that patients with suspected or confirmed moderate disease with clinical signs of pneumonia should be isolated to contain virus transmission. The location of care will depend on how at-risk the patient is. Symptom management and supportive care should be provided. Local infection prevention and control procedures should be implemented. Antibiotics can be considered if bacterial infection is suspected.

Management of severe COVID-19

Patients with suspected or confirmed severe disease are at risk of rapid clinical deterioration. The location of care will be an appropriate healthcare facility under the guidance of a specialist team. For patients with progressive deterioration of oxygenation indicators (SpO₂ <90%), respiratory rate >30 breaths/minute and in severe respiratory distress, immediate administration of supplemental oxygen therapy is recommended. Local infection control and prevention procedures should be implemented.

Reported incidence of venous thromboembolism (VTE) in hospitalised patients with COVID-19 varies. There are currently insufficient data to recommend for or against the use of thrombolytics or increasing anticoagulant doses for VTE prophylaxis in hospitalized COVID-19 patients outside the setting of a clinical trial. Hospitalized patients with COVID-19 should not routinely be discharged on VTE prophylaxis. (32)

Considering the rapid evolution in the available evidence about treatment options, it is recommended to consult updated information on the internet, including the “Assessment of Evidence for COVID-19-Related Treatments” by the American Society of Health-System Pharmacists, which is available [here](#).

Advances in vaccines development for the prevention of COVID-19

Since the vaccine development process involves procedures such as virus strain isolation and selection, *in vitro* experiments, animal experiments, clinical trials, and administrative approvals, it takes a long time. At present, some recognition sites (sequences of the DNA or RNA molecule that are specifically recognised by restriction enzymes) for SARS-CoV-2 have been found and can be used for vaccine development. (33) (34)

The Ministry of Science and Technology of the People’s Republic of China has organised national key units to carry out joint research, and arranged five technical routes in parallel, including inactivated vaccines, recombinant genetically engineered vaccines, adenovirus vector vaccines, nucleic acid vaccines (mRNA vaccine and DNA vaccine), and vaccines made from attenuated influenza viral vaccine vectors.

Some vaccines have entered the research stage for safety and effectiveness in experimental animals. The European Medicines Agency has been in discussion with the developers of 33 potential COVID-19 vaccines. The EMA estimates that it might take at least until the beginning of 2021 before a vaccine against COVID-19 is ready for approval and available in sufficient quantities to enable widespread use. (35)

Progress of clinical trials for the treatment of COVID-19

As of 25 June 2020, there were 646 clinical trials that were recruiting.

Information about clinical trials currently underway is continually updated at ClinicalTrials.gov—the US National Library of Medicine resource — as well as through the European Medicines Agency (www.ema.europa.eu), the Chinese Clinical Trials Registry (www.chictr.org.cn/searchprojen.aspx), and other resources.

As of 26 May 2020, the European Medicines Agency has reported 125 potential COVID-19 treatments that are being discussed with developers. The US Library of Medicine lists 2,042 studies for COVID-19 on its database (of privately and publicly funded clinical studies conducted around the world).

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Validity

This document was initially prepared based on commonly accepted evidence as of 5 February 2020. It was last updated on 14 July 2020 in accordance with newly available evidence.

Disclaimer

This document is based on the available evidence and the recommendations of reputable organisations such as the World Health Organization, the United States and the European Centres for Disease Control and Prevention, and others, as cited at the time of publishing. The available knowledge about COVID-19 is rapidly changing and such recommendations may change accordingly. Although FIP will strive to keep these guidelines up to date, we recommend consulting the websites of these organisations and any newly available evidence for the most recent updates.

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