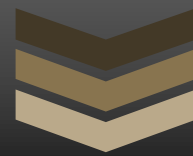


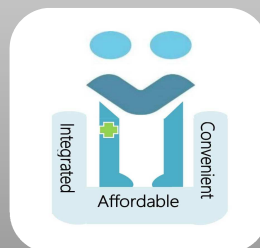
COVID-19 GUIDELINES



This is an abridged version of the COVID-19 guidelines meant to be easily understandable by the common people with relevant topics in focus. Some minor changes had been made in the original content to make it simple and lucid for all.

The links and attachments are sourced from NIH (National Institutes of Health)/ CDC, WHO, MOHFW – India and related agencies.

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5/24/2021



Version-3/2021

Covid-19 Guidelines

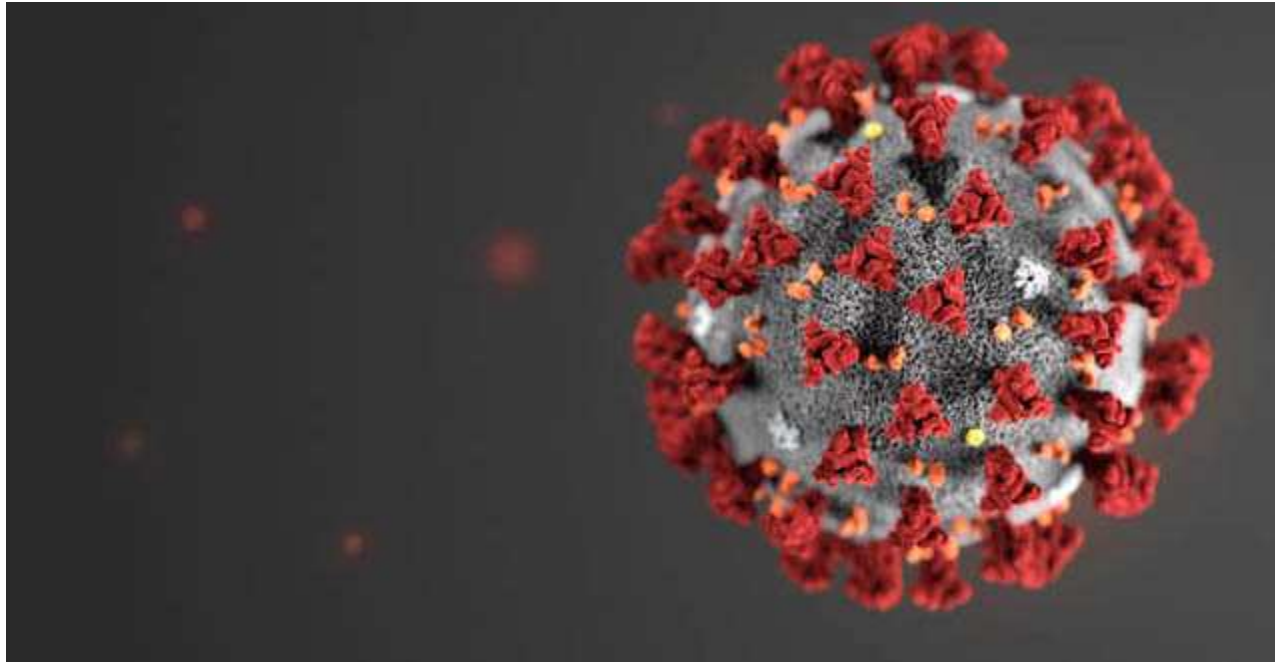


Table of Contents

HOW Covid-19 Spreads	4
COVID-19 most commonly spreads during close contact	4
COVID-19 can sometimes be spread by airborne transmission	4
COVID-19 spreads less commonly through contact with contaminated surfaces.....	5
COVID-19 rarely spreads between people and animals.....	5
How to wear a mask.....	6
Stay 6 feet away from others	6
Avoid crowds and poorly ventilated spaces	7
Wash hands often	7
Clean and disinfect.....	9

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Covid-19 Guidelines

Symptoms.....	11
Dermatologic (Skin related) Manifestations may be associated with COVID-19	15
Infection - Asymptomatic and Presymptomatic.....	23
Transmission -Asymptomatic and Presymptomatic	24
Illness Severity	24
Clinical Progression.....	24
Risk Factors for Severe Illness.....	24
Reinfection	25
Prolonged Detection of SARS-CoV-2	25
Laboratory and Radiographic Testing and Findings.....	26
Testing for Infection	26
Laboratory Findings.....	27
Mild to Moderate Disease.....	27
Hypercoagulability and COVID-19	28
Pediatric Considerations.....	29
Antiviral Drugs That Are Under Evaluation for the Treatment of COVID-19.....	29
COVID-19 Convalescent Plasma.....	30
For hospitalized patients with COVID-19 who do not have impaired immunity.....	30
For hospitalized patients with COVID-19 who have impaired immunity	31
For non-hospitalized patients with COVID-19.....	31
Antithrombotic Therapy in Patients with COVID-19.....	31
Venous Thromboembolism Prophylaxis and Screening.....	31
Managing Antithrombotic Therapy in Patients with COVID-19.....	32
<u>Selection of Anticoagulant or Antiplatelet Drugs for Patients with COVID-19:.....</u>	<u>32</u>

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Covid-19 Guidelines

Patients with COVID-19 Who Are Managed as Outpatients.....	33
Hospitalized Patients with COVID-19.....	33
Patients with COVID-19 Who Are Discharged from the Hospital	35
.....	36
AEFI	39
NIH Table on Pharmacologic management of Covid 19 patients based on disease severity.....	41
AIIMS/ ICMR Guideline on Covid 19 adult patient	42
Black Fungus (Mucormycosis)	43
What causes Mucormycosis	43
What are the common symptoms	44
How to prevent Mucormycosis	44
Diagnosis of ROCM	46
How is ROCM treated	47

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Covid-19 Guidelines

How COVID-19 Spreads

COVID-19 most commonly spreads during close contact

- People who are physically near (within 6 feet) a person with COVID-19 or have direct contact with that person are at greatest risk of infection.
- When people with COVID-19 cough, sneeze, sing, talk, or breathe they produce respiratory droplets. These droplets can range in size from larger droplets (some of which are visible) to smaller droplets. Small droplets can also form particles when they dry very quickly in the airstream.
- Infections occur mainly through exposure to respiratory droplets when a person is in close contact with someone who has COVID-19.
- Respiratory droplets cause infection when they are inhaled or deposited on mucous membranes, such as those that line the inside of the nose and mouth.
- As the respiratory droplets travel further from the person with COVID-19, the concentration of these droplets decreases. Larger droplets fall out of the air due to gravity. Smaller droplets and particles spread apart in the air.
- With passing time, the amount of infectious virus in respiratory droplets also decreases.

COVID-19 can sometimes be spread by airborne transmission

- Some infections can be spread by exposure to virus in small droplets and particles that can linger in the air for minutes to hours. These viruses may be able to infect people who are further than 6 feet away from the person who is infected or after that person has left the space.
- This kind of spread is referred to as airborne transmission and is an important way that infections like tuberculosis, measles, and chicken pox are spread.
- There is evidence that under certain conditions, people with COVID-19 seem to have infected others who were more than 6 feet away. These transmissions occurred within enclosed spaces that had inadequate ventilation. Sometimes the infected person was breathing heavily, for example while singing or exercising.
- Under these circumstances, scientists believe that the amount of infectious smaller droplet and particles produced by the people with COVID-19 became concentrated enough to spread the virus to other people. The people who were infected were in the same space during the same time or shortly after the person with COVID-19 had left.

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Covid-19 Guidelines

- Available data indicate that it is much more common for the virus that causes COVID-19 to spread through close contact with a person who has COVID-19 than through airborne transmission.

COVID-19 spreads less commonly through contact with contaminated surfaces

- Respiratory droplets can also land on surfaces and objects. It is possible that a person could get COVID-19 by touching a surface or object that has the virus on it and then touching their own mouth, nose, or eyes. Some researchers say that the virus may stay alive on the surface for a period of up to 9 days.
- Spread from touching surfaces is not thought to be a common way that COVID-19 spreads

COVID-19 rarely spreads between people and animals

- It appears that the virus that causes COVID-19 can spread from people to animals in some situations. CDC is aware of a small number of pets worldwide, including cats and dogs, reported to be infected with the virus that causes COVID-19, mostly after close contact with people with COVID-19. Learn what you should do if you have pets.
- At this time, the risk of COVID-19 spreading from animals to people is considered to be low. Learn about COVID-19 and pets and other animals.

How to Protect Yourself & Others

- Wear a mask that covers your nose and mouth to help protect yourself and others.
- Stay 6 feet apart from others who don't live with you.
- Get a COVID-19 vaccine when it is available to you.
- Avoid crowds and poorly ventilated indoor spaces.
- Wash your hands often with soap and water for at least 20 seconds. Use hand sanitizer if soap and water aren't available.
- Routinely clean and disinfect frequently touched surfaces, [Food](#) and take other steps to stop the spread at home.
- [Stay home and isolate from others when sick.](#)
- [Clinical Tips on COVID-19 for Healthcare Providers Involved in Patient Care](#)

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Covid-19 Guidelines

[How to wear a mask](#)

- Everyone 2 years and older should wear masks in public.
- Masks should be worn in addition to staying at least 6 feet apart, especially around people who don't live with you.
- If someone in your household is infected, people in the household should take precautions including wearing masks to avoid spread to others.
- Wash your hands or use hand sanitizer before putting on your mask.
- Wear your mask over your nose and mouth and secure it under your chin.
- Fit the mask snugly against the sides of your face, slipping the loops over your ears or tying the strings behind your head.
- If you have to continually adjust your mask, it doesn't fit properly, and you might need to find a different mask type or brand.
- Make sure you can breathe easily- Please open [Guide to Mask](#) for elaborate information.

Stay 6 feet away from others

Inside home

- Avoid close contact with people who are sick.
- If possible, maintain 6 feet between the person who is sick and other household members.

Outside your home

- Put 6 feet of distance between yourself and people who don't live in your household.
- Remember that some people without symptoms may be able to spread virus.
- Keeping distance from others is especially important for people who are at higher risk of getting very sick.
- Some people are more likely than others to become severely ill.
- Severe illness means that a person with COVID-19 may need: hospitalization, intensive care, a ventilator to help them breathe or they may even die.

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Covid-19 Guidelines

- People at increased risk, and those who live or visit with them, need to take precautions to protect themselves from getting COVID-19.

Get Vaccinated

- One should get an authorized COVID-19 vaccine when it is available to you as can help protect you from COVID-19.
- COVID-19 vaccines are safe and effective.
- Everyone 18 years of age and older is now eligible to get a COVID-19 vaccination.
- People who have been fully vaccinated can start to do some things that they had stopped doing because of the pandemic.
- Vaccination of a person with COVID-19 (confirmed, exposed or suspected) infection (WHO/ NIH)
 - There are no known medical contradictions to vaccinating persons who have COVID-19.
 - The individual should defer vaccination until symptoms resolve, preferably following two consecutive tests negative for COVID-19 (conducted 24 hours apart).
 - If testing is not feasible, WHO recommends deferring vaccination for 14 days after symptom resolution.
 - Go to the [Vaccination section](#) for detailed discussion. The Vaccination policies differ from country to country and MOHFW release updated guidelines on vaccination from time to time.
 - [Link of FAQs issued by MOHFW](#) is attached for better understanding.

Avoid crowds and poorly ventilated spaces

- Being in crowds like in restaurants, bars, fitness centres, or movie theatres puts you at higher risk for COVID-19.
- Avoid indoor spaces that do not offer fresh air from the outdoors as much as possible.
- If indoors, bring in fresh air by opening windows and doors, if possible.

Wash hands often

With soap and water for at least 20 seconds especially after you have been in a public place or after blowing your nose, coughing, or sneezing. It's especially important to wash:

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Covid-19 Guidelines

- Before eating or preparing food
- Before touching your face
- After using the restroom
- After leaving a public place
- After blowing your nose, coughing, or sneezing
- After handling your mask
- After changing a diaper
- After caring for someone sick
- After touching animals or pets
- If soap and water are not readily available, use a hand sanitizer that contains at least 60% alcohol. Cover all surfaces of your hands and rub them together until they feel dry.
- Avoid touching your eyes, nose, and mouth with unwashed hands.
- If you are wearing a mask: You can cough or sneeze into your mask. Put on a new, clean mask as soon as possible and wash your hands.
- If you are not wearing a mask: Always cover your mouth and nose with a tissue when you cough or sneeze, or use the inside of your elbow and do not spit. Throw used tissues in the trash.



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Clean and disinfect

- If someone is sick or has tested positive for COVID-19, disinfect frequently touched surfaces.
- Use a household disinfectant product from EPA's List N: Disinfectants for Corona virus (COVID-19) according to manufacturer's labelled directions.
- [Best Practices](#) for Cleaning and Disinfecting should be followed
- If surfaces are dirty, clean them using detergent or soap and water prior to disinfection.
- Benzalkonium Chloride, Alkyl Dimethyl Ethylbenzyl Ammonium Chloride, Phenol, Phenolate Sodium, Alcohol Anhydrous, Chlorhexidine Gluconate, Hypochlorous acid can kill Coronavirus.
- Guidelines to be followed to choose disinfectants which kill Covid-19 -[Link1](#)
- Guidelines on disinfection of Indoor areas ,common public places including offices as issued by MOHFW-[Link 2](#)

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Covid-19 Guidelines

The person who is sick should Stay at Home and isolate

- The sick person should separate themselves from others in the home.
- If possible, have the person who is sick use a separate bedroom and bathroom.
- If possible, have the person who is sick stay in their own “sick room” or area and away from others.
- Try to stay at least 6 feet away from the sick person.
- [Steps to be taken before discontinuing Home Isolation for Persons with Covid-19-Link](#)

Shared space

- If you have to share space, make sure the room has good air flow.
- Open the window to increase air circulation.
- Improving ventilation helps remove respiratory droplets from the air.
- Avoid having visitors. Avoid having any unnecessary visitors, especially visits by people who are at higher risk for severe illness.

Home treatment - Instructions for Caregivers Mask

- The caregiver should wear a triple layer medical mask appropriately when in the same room with the ill person.
- Front portion of the mask should not be touched or handled during use. If the mask gets wet or dirty with secretions, it must be changed immediately.
- Discard the mask after use and perform hand hygiene after disposal of the mask.
- Hand hygiene must be ensured following contact with ill person or his immediate environment.

Exposure to patient

- Avoid direct contact with body fluids of the patient, particularly oral or respiratory secretions.
- Use disposable gloves while handling the patient.
- Avoid exposure to potentially contaminated items in his immediate environment (e.g. avoid sharing cigarettes, eating utensils, dishes, drinks, used towels or bed linen).
- Food must be provided to the patient in his room.

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Covid-19 Guidelines

- The care giver and all close contact should self-monitor their health with daily temperature monitoring and report promptly if they develop any symptom suggestive of COVID-19 (fever/cough/difficulty in breathing/ loss of smell and taste).
- If care giver suffers with any of these symptoms, he/ she should consult to physician immediately who will guide you for COVID testing and treatment if required.

Incubation period

- Incubation period extends up to 14 days after exposure (whereas sometimes onset period may be as short as 4-5 days after exposure).
(However, one study reported that 97.5% of people with symptomatic COVID-19 infection will have symptoms within 11.5 days of SARS-CoV-2 infection)

Symptoms

- Fever or chills
- Cough
- Shortness of breath or difficulty breathing **
- Fatigue
- Muscle or body aches
- Headache
- Loss of taste or smell (unless previous history exists)
- Sore throat
- Congestion or running nose
- Nausea or vomiting
- Diarrhoea

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Covid-19 Guidelines

Further Description of Symptoms

- Atypical symptoms of COVID-19 occur often, and older adults and people with medical co-morbidities may experience fever and respiratory symptoms later during the course of illness than people who are younger or who do not have co-morbidities.
- Fatigue, headache, muscle aches (myalgia), sore throat, nasal congestion or runny nose (rhinorrhea) are among the most commonly reported symptoms in people who are not hospitalized
- Sometimes people with COVID-19, experience gastrointestinal symptoms such as nausea, vomiting or diarrhoea prior to having fever and lower respiratory tract signs and symptoms.
- Loss of smell (anosmia) or taste (ageusia) has been commonly reported, in one third of patients in one study, especially among women and younger or middle-aged patients.



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1
Self-isolate.
Do not wait to get tested or receive results.



2
Contact a doctor
for advice

AS SOON AS YOU FEEL UNWELL

Stay calm. Remember that most people recover from COVID-19 and do not require hospitalization.



3
Check your oxygen level every 6 hours or more frequently if your breaths are too fast.
Seek emergency care if oxygen level on the oximeter shows less than 94%.



5
Seek emergency medical care in any of these cases:

- Shortness of breath
- Lips or face turn blue-ish
- Feeling of disorientation increases
- Persistent pain or pressure in the chest
- Slurred speech/ seizures
- Unable to wake up or stay awake



4
Monitor your temperature every 6 hours. Do it more frequently if you have a fever.
Seek emergency care if fever of more than 101°F (38°C) persists for 3 days.

Please go through the link for understanding – [How to use Pulse oximeter at Home](#)

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Covid-19 Guidelines

- Normal saturation level is greater / equal to 95% in room air
- Take reading 3-4 times a day preferably at the same time
- Remove any nail polish and warm the hand. If the fingers are moist dry them
- Only the index or middle finger to be used
- Keep the hand near the level of the heart by keeping the hand over the precordium (region of chest over the position of the heart)
- Keep the hand steady for at least 10 seconds and record the reading that is steady for at least 5seconds.

Dermatologic (Skin related) Manifestations may be associated with COVID-19

- Dermatologic manifestations Skin disease severity and timing of skin symptoms among COVID-19 patients is unclear. The clinical presentation appears varied, ranging from mild to severe disease.
- The most common skin manifestations reported were: rash, discoloured lesions of the fingers and toes, and hives.

Monitoring of symptoms regularly

If one gets any one of the following, seek emergency medical care immediately:

- Worsening shortness of breath/ trouble breathing and cough
- If you are using a pulse oximeter, oxygen saturation less than 94%
- Worsening ability to concentrate/confusion
- Bluish lips or face
- A new or returning fever or persistent fever more than 101o F for 3 days
- Persistent pain or pressure in the chest
- Inability to wake or stay awake

Recovering from COVID 19 or returned home from the hospital

- During and after COVID-19 treatment, patients may experience some symptoms such as:
- Low energy levels and early fatigue
- Difficulty in breathing, and becoming breathless with even a little bit of physical activity.
- Chest Congestion and excessive phlegm.

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Covid-19 Guidelines

- Cough with phlegm
- Loss of appetite and altered taste in mouth
- Headaches
- Lack of concentration, Anxiety and Fear, Insomnia
- Some of the symptoms will get better on their own, as time passes. Other symptoms will require patience and further efforts.

People with serious complications

- Need ICU care and ventilator support for breathing, which can take a toll on their physical as well as mental health in the longer run.
- In many cases, the person may need assistance to breathe even after coming off a ventilator.
- The patient may need a mask or a Continuous Positive Airway Pressure (CPAP) ventilator at home, which would provide the required oxygen support.



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SERIOUS COVID-19 SYMPTOMS REQUIRING IMMEDIATE MEDICAL CARE

- If you develop any of these symptoms, call your healthcare provider or health facility and seek medical care immediately.
- **This is not an exhaustive list. These are the most common symptoms of serious illness, but you could get very sick with other symptoms – if you have any questions, call for help immediately.**



Shortness of breath/ Difficulty breathing



Loss of speech or mobility or confusion



Chest pain

MOST COMMON SYMPTOMS



Fever



Cough



Tiredness



Loss of taste or smell

LESS COMMON SYMPTOMS



Sore throat



Headache



Aches and pains



Diarrhea



A rash on the skin or discolouration of fingers or toes



Red or irritated eyes

Tips to manage a dry cough

A dry cough is likely to put greater strain on your throat. The following strategies can be used to manage a dry cough-

- Stay hydrated by drinking plenty of water (lukewarm preferably)
- Take small sips of fluids instead of taking large sips to facilitate swallowing.
- Steam inhalation is necessary to cure a dry cough.
- So pour hot water into a bowl and put your head over the bowl and breathe in the steam.

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Covid-19 Guidelines

- Salt water gargle or Betadine gargle (1 part Betadine& 3 part of water) can be effective for treating a sore throat.

Tips to manage a productive cough

- It's also important to note that viral infections, especially COVID-19, are contagious, so proper disposal of sputum is very important.
- Keep yourself hydrated with lukewarm water etc.
- Take steam inhalation at least thrice a day to loosen the phlegm congested in your lungs.
- Lie on either the left or the right side, instead of lying on your back. This might help drain the phlegm faster.
- Movement makes the lungs function, and it can also move the phlegm to facilitate your spitting it out. So, try to be mobile by walking around your room

Fatigue Management

Chronic fatigue is classified as fatigue lasting more than six weeks. The impact of fatigue is more than just lower productivity. Management of fatigue can be done by following:

- Planning for demanding (physically, mentally) and repetitive tasks
- Regular staggered breaks during a day allow for both physical and mental restoration as well as social distancing
- Days off during the week
- Plan your day schedule to allow you a better plan for completing your work as well as sleep between work periods

Please open the Link for better understanding with regard to: [Management of Fatigue](#)

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Covid-19 Guidelines

Taking care of one's emotional wellbeing

The experience of having COVID-19 can be very stressful with fear and anxiety. The disease may impact your emotional wellbeing along with your physical wellbeing.

Psychological impact of infection can vary from immediate effects

- Fear and worry about your own health and the health of your loved ones, your financial situation or job, or loss of support services one rely on
- Fear of social stigma
- Irritability, anger, confusion
- Frustration, loneliness
- Denial, anxiety, depression, insomnia, despair

Steps which one can do to cope up the stress, fear and anxiety and physical recovery

- Take a break from constant watching the news or limit the time for news
- Stay connected with your loved ones over audio or video calls
- Re-live your hobbies which you enjoy doing
- Take adequate rest
- Maintain healthy diet
- Do light exercises as your condition permits
- Do not hide your illness
- Due to the damage caused by the virus to the lungs and other organs, the body takes time to recover and get back to its former state- one should reach out an occupational therapist for help in adjusting to your new energy levels and limitations.
- Organizing daily routines to allow completion of essential activities when you have most energy.
- Keep frequently used items in easily accessible places.
- Prioritize the activities- do only those which are absolute necessary.
- Eating a balanced protein- rich diet, with at least five daily servings of different fruits and vegetables.
- Give plenty of rests in between the activities.
- Facilitate bathing by using shower seat/ hand held shower head.
- Doing breathing exercises regularly.

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Covid-19 Guidelines

Exercises/ activities which needs tobe additionally started

Self- awake Proning

- 30 minutes- 2 hours: Lying on belly. If patient is on oxygen support then oxygen should not be removed in this position, turn head to left/ right side & continue support.
- Place the pillows under the head, chest and pelvis for support but abdomen should not be compressed
- Ministry of Health and Family Welfare (MOHFW) guideline may be followed with the consultant of physician – [Proning for Self-care](#)



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Covid-19 Guidelines

Your healthcare team recommends trying to change your position every 30 minutes to 2 hours and even sitting up is better than laying on your back. **If you are able to, please try this:**

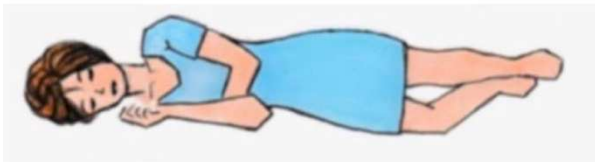
1. 30 minutes – 2 hours: lying on your belly
2. 30 minutes – 2 hours: lying on your right side
3. 30 minutes – 2 hours: sitting up
4. 30 minutes – 2 hours: lying on your left side; then back to position #1.

PHOTOS BELOW TO DEMONSTRATE THIS:

1. 30 minutes – 2 hours: laying on your belly



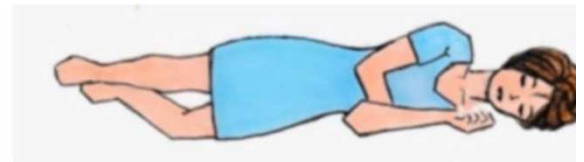
2. 30 minutes – 2 hours: laying on your right side



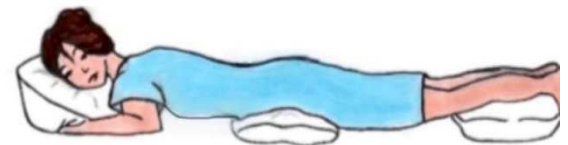
3. 30 minutes – 2 hours: sitting up



4. 30 minutes – 2 hours: laying on your left side



Then back to Position 1. Lying on your belly!



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PRONING (adj.) having the front or ventral part downward; lying face downward.



- Reduces pleural pressure gradients from non-dependent to dependent lung regions
- Increases end-expiratory lung volume & improves V/Q mismatching
- Mortality benefit shown & protects against ventilator induced lung injury
- 90% Consider in hypoxic patients w/moderate to severe ARDS
- Perform by a trained team to avoid extubation or ventilator circuit disconnections
- Prone for 12-16 hours following 12-24 hours of ventilator stabilization

Contraindications

- Facial/neck trauma
- Elevated ICP
- Unstable Pelvic/Spinal
- Hemoptysis
- Imminent CPR

Common Complications

- Pressure Ulcers
- Airway obstruction
- Increased abdominal pressure
- Loss of IV access
- ETT Dislodgement



Chest Exercise

- Incentive Spirometry exercise

The Balloon Exercise

- One can practice this simple exercise by blowing up a certain number of balloons each day

Resuming physical activities, slowly and in moderate way after recovery is an important part of recovery after a severe COVID-19 illness. Exercise can help to

- Improve fitness
- Reduce breathlessness
- Increase muscle strength
- Improve balance and coordination
- Improve your thinking

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Covid-19 Guidelines

- Reduce stress and improve mood
- Increase confidence
- Improve your energy

Simple rules helpful for exercising safely

- Always warm-up before exercising, and cool down after exercising
- Wear loose, comfortable clothing and supportive shoes
- Wait at least an hour after a meal before exercising
- Drink plenty of water
- Avoid exercising in very hot weather
- Exercise indoors in very cold weather
- Experts have recommended judicious / none usage of Masks while exercising- so that flow of oxygen supply to body, is not obstructed - leading to any complications.

If one feel any of the following symptoms, do not exercise and contact one healthcare professional

- Nausea or feeling sick
- Dizziness or light headedness
- Severe shortness of breath
- Clamminess or sweating
- Chest tightness
- Increased pain

Infection - Asymptomatic and Presymptomatic

- Current data, RT-PCR testing for SARS-CoV-2 and serologic studies suggest, asymptomatic infections can be common where patients may have abnormalities on chest imaging before the onset of symptoms.
- Several studies have documented infection with SARS-CoV-2, the virus causing COVID-19, in patients who never have symptoms (asymptomatic) and in patients not yet symptomatic (Presymptomatic)

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Covid-19 Guidelines

Transmission -Asymptomatic and Presymptomatic

- Increasing numbers of epidemiologic studies have documented SARS-CoV-2 transmission during the Presymptomatic incubation period. The proportion of SARS-CoV-2 transmission due to asymptomatic or Presymptomatic infection compared with symptomatic infection is not entirely clear; however, recent studies do suggest that people who are not showing symptoms may transmit the virus.

Illness Severity

- One Study, that included more than 44,000 people with COVID-19, as sample, showed that illness severity can range from mild to critical:
 - Mild to moderate (mild symptoms up to mild pneumonia): 81%
 - Severe (breathlessness and Low oxygen level) : 14%
 - Critical (respiratory failure, shock, or multiorgan system dysfunction): 5%
- In this study, all deaths occurred among patients with critical illness, and the overall Case fatality ratio (CFR) was 2.3%.The CFR among patients with critical disease was 49

Clinical Progression

- Among patients in multiple early studies from Wuhan, China who had severe COVID-19 illness, the median time from their onset of illness to the time they experienced dyspnea (breathlessness) was 5–8 days; the median time from onset of illness to acute respiratory distress syndrome (ARDS) was 8–12 days; and the median time from onset of illness to ICU admission was 9.5–12 days.
- Clinicians should be aware that some patients with COVID-19 may rapidly deteriorate about one week after illness onset.
- Among all hospitalized patients, 26%–32% of patients were admitted to the ICU. (Among the hospitalized patients 20%–42% of the patients and 67%–85% for patients admitted to the ICU had ARDS. Mortality among patients admitted to the ICU ranged from 39% to 72% depending on the study and characteristics of patient population. The median length of hospitalization among survivors was 10–13 days.

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Covid-19 Guidelines

Risk Factors for Severe Illness

Age is a strong risk factor for severe illness, complications, and death. Aged population is at higher risk.

- CFR (Case fatality rate) is elevated for patients with co morbidities, highest being - underlying cardiovascular disease followed those with diabetes. Next being those with chronic respiratory disease and further to those with cancer dying of COVID-related illness.
- Prior stroke, diabetes, chronic lung disease, and chronic kidney disease have all been associated with increased illness severity and adverse outcomes due to COVID-19.
- Heart conditions, including heart failure, coronary artery disease, cardiomyopathies, and pulmonary hypertension, put people at higher risk for severe illness from COVID-19. People with hypertension may be at an increased risk for severe illness from COVID-19
- People with severe illness should continue to take their medications as prescribed.

Reinfection

- In a first-of-its-kind exercise, a team of scientists from the Indian Council of Medical Research (ICMR) has identified a set of most plausible cases of reinfection of SARS-CoV2 virus in India. In a study that has been accepted for publication in the journal Epidemiology & Infection, the scientists examined the cases of 1,300 individuals who had tested positive for the virus twice, and had undergone tests even between the two positive results.
- The study found that the cases of 58 of the 1,300 individuals, or 4.5%, could actually be classified as possible reinfections. In these 58, the two positive results had come at least 102 days apart, and they also had a negative test result in between.

Prolonged Detection of SARS-CoV-2

- While viral RNA shedding declines with resolution of symptoms, SARS-CoV-2 RNA shedding may continue for days to weeks.
- Thus, detection of viral RNA during convalescence does not necessarily indicate replication of competent virus (infectiousness) or the presence of new infectious virus.
- Some people who have recovered may have detectable SARS-CoV-2 RNA in upper respiratory specimens for up to 3 months after illness onset where infectiousness is unlikely.

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Covid-19 Guidelines

- Some people with severe illness might produce replication-competent virus beyond 10 days that may warrant extending duration of isolation and precautions for up to 20 days after symptom onset.
- Limited data suggest that some severely immunocompromised patients (e.g., patients with lymphoma, hypogammaglobulinemia, hemopoietic stem cell transplant recipients, AIDS, those receiving immunosuppression with chemotherapy, systemic corticosteroids and biologics) might produce replication-competent virus beyond 20 days and require additional testing and consultation with infectious diseases specialists and infection control experts.

Laboratory and Radiographic Testing and Findings

Testing for Infection

- According to MFHW guidelines for testing no prescription is required.
- Diagnosis of COVID-19 requires detection of SARS-CoV-2 RNA or antigen in respiratory specimens. Detection of SARS-CoV-2 viral RNA is better in nasopharynx samples compared with throat samples. Lower respiratory samples may have better viral yield than upper respiratory samples.
- SARS-CoV-2 antigen tests can also be used in a variety of testing strategies.
- SARS-CoV-2 RNA has also been detected in stool and blood.
- RTPCR(Guidelines by GOI):
RTPCR must not be repeated in any individual who has been tested positive once either by RAT OR RTPCR

No testing is required for Covid 19 recovered individuals at the time of hospital discharge

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Covid-19 Guidelines

Laboratory Findings

- Lymphopenia is the most common laboratory finding among people with COVID-19 and is found in up to 83% of hospitalized patients.
- Lymphopenia, neutrophilia, elevated serum alanine aminotransferase and aspartate aminotransferase levels, elevated lactate dehydrogenase, high C-reactive protein (CRP), and high ferritin levels may be associated with greater illness severity.
- Elevated D-dimer and lymphopenia have been associated with mortality.
- Procalcitonin is typically normal on admission but may increase among those patients admitted to an ICU.
- Patients with critical illness had high plasma levels of inflammatory makers, suggesting potential immune dysregulation.

Radiographic Findings

- Given the variability in chest imaging findings, chest radiograph or CT alone is not recommended for the diagnosis of COVID-19. The American College of Radiology also does not recommend CT for screening, or as a first-line test for diagnosis of COVID-19.

Clinical Management and Treatment

- The U.S. Food and Drug Administration (FDA) have approved remdesivir for the treatment of COVID-19 in certain situations. Clinical management of COVID-19 includes infection prevention and control measures and supportive care, including supplemental oxygen and mechanical ventilatory support when indicated.

Mild to Moderate Disease

- Patients with a mild clinical presentation (absence of viral pneumonia as indicated by RT-PCR test and hypoxia-as indicated by O₂ level test) may not initially require hospitalization, and most patients will be able to manage their illness at home.
- The decision to monitor a patient in the inpatient or outpatient setting should be made on a case-by-case basis. This decision will depend on the clinical presentation, requirement for

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Covid-19 Guidelines

supportive care, potential risk factors for severe disease, and the ability of the patient to self-isolate at home.

- Patients with risk factors for severe illness should be monitored closely given the possible risk of progression to severe illness, especially in the second week after symptom onset.
- In certain clinical settings, pulse oximetry is used to assess and monitor a patient's oxygenation status. Clinicians should be aware that pulse oximeters may exhibit suboptimal accuracy in certain populations. Skin pigmentation can affect pulse oximeter accuracy.

Severe Disease

- Some patients with COVID-19 will have severe disease requiring hospitalization for management. Inpatient management includes supportive management of the most common complications of severe COVID-19: pneumonia, hypoxemic respiratory failure/ARDS, sepsis and septic shock, cardiomyopathies and arrhythmia, acute kidney injury, and complications from prolonged hospitalization, including secondary bacterial and fungal infections, thromboembolism, gastrointestinal bleeding, and critical illness polyneuropathy/myopathy.

[NIH COVID 19 Treatment Guideline , AIIMS-ICMR National Task Force](#)

Hypercoagulability and COVID-19

Some patients with COVID-19 may have signs of a hypercoagulable state and be at increased risk for venous and arterial thrombosis of large and small vessels. Laboratory abnormalities commonly observed among hospitalized patients with COVID-19-associated coagulopathy include:

- Mild thrombocytopenia
- Increased D-dimer levels
- Increased fibrin degradation products
- Prolonged prothrombin time

ELEVATED D-DIMER LEVELS HAVE BEEN STRONGLY ASSOCIATED WITH GREATER RISK OF DEATH

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Covid-19 Guidelines

Pediatric Considerations

- Increasingly, data indicate that the clinical symptoms experienced by children with COVID-19 are similar to adults, but disease is usually milder than adults and severity of symptoms varies by age of the child.
- Many children infected with SARS-CoV-2 remain asymptomatic or have mild illness. Commonly reported symptoms in children with COVID-19 include cough or fever, and many children also experience gastrointestinal or other symptoms.
- Even though most children with COVID-19 have asymptomatic or mild illness, severe outcomes, including deaths, have been reported in children.
- Children of all ages with certain underlying medical conditions may be at increased risk of severe illness;
- Infants (<12 months of age) may be at increased risk for severe illness from COVID-19.
- Patients with **multisystem inflammatory syndrome in children (MIS-C)** usually present with persistent fever, abdominal pain, vomiting, diarrhoea, skin rash, mucocutaneous lesions and, in severe cases, hypotension and shock.
- Affected children have elevated laboratory markers of inflammation (e.g., CRP, ferritin), and
- Majority of patients have laboratory markers of damage to the heart (e.g., troponin; B-type natriuretic peptide (BNP) or proBNP). Some patients have myocarditis, cardiac dysfunction, and acute kidney injury.
- Not all children with MIS-C experience the same signs and symptoms, and some children may have symptoms not listed here. MIS-C may begin weeks after a child was infected with SARS-CoV-2. The child might have been infected from an asymptomatic contact and, in some cases, the child and their caregivers might not realize that the child had been infected.

Antiviral Drugs That Are Under Evaluation for the Treatment of COVID-19

Chloroquine or Hydroxychloroquine With or Without Azithromycin

- The Panel recommends against the use of Chloroquine or Hydroxychloroquine with or without azithromycin for the treatment of COVID-19 in hospitalized patients (AI) as well as non-hospitalized patients.

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Covid-19 Guidelines

Ivermectin

- There are insufficient data for the Panel to recommend either for or against the use of Ivermectin for the treatment of COVID-19

Vitamin C

- There are insufficient data for the COVID-19 Treatment Guidelines Panel (the Panel) to recommend either for or against the use of vitamin C for the treatment of COVID-19.

Vitamin D

- There are insufficient data for the Panel to recommend either for or against the use of vitamin D for the treatment of COVID-19.

Zinc

- There are insufficient data for the Panel to recommend either for or against the use of zinc for the treatment of COVID-19.
- The Panel recommends against using zinc supplementation above the recommended dietary allowance for the prevention of COVID-1

COVID-19 Convalescent Plasma

The Panel is against the use of low-titer COVID-19 convalescent plasma for the treatment of COVID-19

For hospitalized patients with COVID-19 who do not have impaired immunity

- The Panel is against the use of COVID-19 convalescent plasma for the treatment of COVID-19 in mechanically ventilated patients.
- The Panel is against the use of high-titer COVID-19 convalescent plasma for the treatment of COVID-19 in hospitalized patients who do not require mechanical ventilation

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Covid-19 Guidelines

For hospitalized patients with COVID-19 who have impaired immunity

- There are insufficient data for the Panel to recommend either for or against the use of high-titer COVID-19 convalescent plasma for the treatment of COVID-19.

For non-hospitalized patients with COVID-19

- There are insufficient data for the Panel to recommend either for or against the use of high-titer COVID-19 convalescent plasma for the treatment of COVID-19 in patients who are not hospitalized.

Antithrombotic Therapy in Patients with COVID-19

Laboratory Testing

- In non-hospitalized patients with COVID-19, there are currently no data to support the measurement of coagulation markers (e.g., D-dimers, prothrombin time, platelet count, and fibrinogen) **(AIII)**.
- In hospitalized patients with COVID-19, hematologic and coagulation parameters are commonly measured, although there are currently insufficient data to recommend either for or against using this data to guide management decisions.

Venous Thromboembolism Prophylaxis and Screening

- For non-hospitalized patients with COVID-19, anticoagulants and antiplatelet therapy should not be initiated for the prevention of venous thromboembolism (VTE) or arterial thrombosis unless the patient has other indications for the therapy or is participating in a clinical trial **(AIII)**.
- Hospitalized nonpregnant adults with COVID-19 should receive prophylactic dose anticoagulation **(AIII)**. Anticoagulant or antiplatelet therapy should not be used to prevent arterial thrombosis outside of the usual standard of care for patients without COVID-19 **(AIII)**.
- There are currently insufficient data to recommend either for or against the use of thrombolytic or higher than the prophylactic dose of anticoagulation for VTE prophylaxis in hospitalized COVID-19 patients outside of a clinical trial.

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Covid-19 Guidelines

- Hospitalized patients with COVID-19 should not routinely be discharged from the hospital while on VTE prophylaxis **(AIII)**. Continuing anticoagulation with a Food and Drug Administration-approved regimen for extended VTE prophylaxis after hospital discharge can be considered for patients who are at low risk for bleeding and high risk for VTE, as per the protocols for patients without COVID-19 (see details on defining at-risk patients below) **(BI)**.
- There are currently insufficient data to recommend either for or against routine deep vein thrombosis screening in COVID-19 patients without signs or symptoms of VTE, regardless of the status of their coagulation markers.
- For hospitalized COVID-19 patients who experience rapid deterioration of pulmonary, cardiac, or neurological function, or of sudden, localized loss of peripheral perfusion, the possibility of thromboembolic disease should be evaluated **(AIII)**.

Treatment

- When diagnostic imaging is not possible, patients with COVID-19 who experience an incident thromboembolic event or who are highly suspected to have thromboembolic disease should be managed with therapeutic doses of anticoagulant therapy **(AIII)**.
- Patients with COVID-19 who require extracorporeal membrane oxygenation or continuous renal replacement therapy or who have thrombosis of catheters or extracorporeal filters should be treated with antithrombotic therapy as per the standard institutional protocols for those without COVID-19 **(AIII)**.

Managing Antithrombotic Therapy in Patients with COVID-19

Selection of Anticoagulant or Antiplatelet Drugs for Patients with COVID-19:

- Whenever anticoagulant or antiplatelet therapy is used, potential drug-drug interactions with other concomitant drugs must be considered **(AIII)**. The University of Liverpool has collated [a list of drug interactions](#). In hospitalized, critically ill patients, low molecular weight heparin or unfractionated heparin is preferred over oral anticoagulants because the two types of heparin have shorter half-lives, can be administered intravenously or subcutaneously, and have fewer drug-drug interactions **(AIII)**.

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Covid-19 Guidelines

Patients with COVID-19 Who Are Managed as Outpatients

- For non-hospitalized patients with COVID-19, anticoagulants and antiplatelet therapy should not be initiated for the prevention of VTE or arterial thrombosis unless the patient has other indications for the therapy or is participating in a clinical trial (**AIII**).

Hospitalized Patients with COVID-19

- For hospitalized patients with COVID-19, prophylactic dose anticoagulation should be prescribed unless contraindicated (e.g. a patient has active haemorrhage or severe thrombocytopenia) (**AIII**). Although data supporting this recommendation are limited, a retrospective study showed reduced mortality in patients who received prophylactic anticoagulation, particularly if the patient had a sepsis-induced coagulopathy score ≥ 4 . For those without COVID-19, anticoagulant or antiplatelet therapy should not be used to prevent arterial thrombosis outside of the standard of care (**AIII**). Anticoagulation is routinely used to prevent arterial thromboembolism in patients with heart arrhythmias. Although there are reports of strokes and myocardial infarction in patients with COVID-19, the incidence of these events is unknown.
- When imaging is not possible, patients with COVID-19 who experience an incident thromboembolic event or who are highly suspected to have thromboembolic disease should be managed with therapeutic doses of anticoagulant therapy as per the standard of care for patients without COVID-19 (**AIII**).
- There are currently insufficient data to recommend either for or against the use of thrombolytic agents or higher than the prophylactic dose of anticoagulation for VTE prophylaxis for hospitalized patients with COVID-19 outside of a clinical trial. Three international trials (ACTIV-4, REMAP-CAP, and ATTACC) compared the effectiveness of therapeutic dose anticoagulation and prophylactic dose anticoagulation in reducing the need for organ support over 21 days in moderately ill or critically ill adults hospitalized for COVID-19. The need for organ support was defined as requiring high-flow nasal oxygen, invasive or non-invasive mechanical ventilation, vasopressor therapy, or ECMO. The trials paused enrolment of patients requiring ICU-level care at enrolment after an interim pooled analysis demonstrated futility of therapeutic anticoagulation in reducing the need for organ support and a concern for safety. The results of the interim analysis are available on the [ATTACC website](#).
- Although there is evidence that multi-organ failure is more likely in patients with sepsis who develop coagulopathy, there is no convincing evidence to show that any specific antithrombotic

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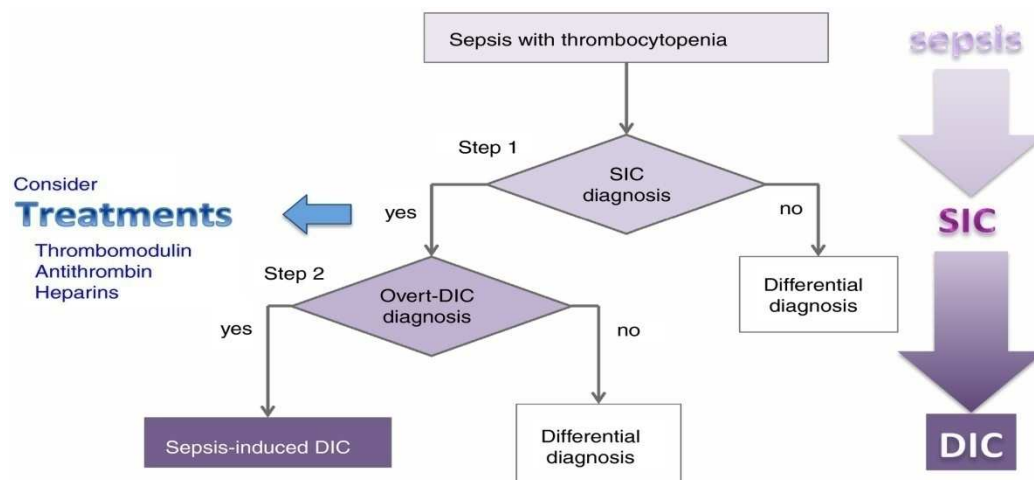
Covid-19 Guidelines

treatment will influence outcomes in those with or without COVID-19. Participation in randomized trials is encouraged.

- Patients with COVID-19 who require ECMO or continuous renal replacement therapy or who have thrombosis of catheters or extracorporeal filters should be treated as per the standard institutional protocols for those without COVID-19 (**AIII**).

[Link to Sepsis induced coagulopathy score](#)

Chart Flow of SIC treatment:



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Covid-19 Guidelines

	Points	SIC	Overt DIC
Platelet count ($\times 10^9 \text{ l}^{-1}$)	2	< 100	< 50
	1	$\geq 100, < 150$	$\geq 50, < 100$
FDP or D-dimer	3	–	Strong increase
	2	–	Moderate increase
	1	–	–
Prothrombin time–INR	2	> 1.4	$\geq 6 \text{ s}$
	1	> 1.2, ≤ 1.4	$\geq 3, < 6 \text{ s}$
Fibrinogen (g/l)	1	–	< 1
Total SOFA score	≥ 2	2	–
	1	1	–

The total SIC score is 4 or more with the sum of the SOFA score and coagulation criteria exceeding 2. The total SOFA score is the sum of four items (respiratory SOFA, cardiovascular SOFA, hepatic SOFA, and renal SOFA). The overt-DIC total score is 5 or more.

DIC, disseminated intravascular coagulation; FDP, fibrinogen/fibrin degradation products; INR, international normalization ratio; SIC, sepsis-induced coagulopathy; SOFA, sequential organ failure assessment.

Patients with COVID-19 Who Are Discharged from the Hospital

- VTE prophylaxis after hospital discharge is not recommended for patients with COVID-19 (AIII). For certain high-VTE risk patients without COVID-19, post-discharge prophylaxis has been shown to be beneficial. The Food and Drug Administration approved the use of rivaroxaban 10 mg daily for 31 to 39 days in these patients. Inclusion criteria for the trials that studied post-discharge VTE prophylaxis included:
- Modified International Medical Prevention Registry on Venous Thromboembolism (IMPROVE) VTE risk score ≥ 4 ; *or*
- Modified IMPROVE VTE risk score ≥ 2 and D-dimer level >2 times the upper limit of normal.

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Covid-19 Guidelines

Vaccination

(1) Can a person presently having COVID-19 (confirmed or suspected) infection be vaccinated?

Person with confirmed or suspected COVID-19 infection may increase the risk of spreading the same to others at vaccination site. For this reason, infected individuals should **defer vaccination for 14 days after symptoms resolution.** MOHFW recommends a period of 3 months before such people can be vaccinated.

(2) Is it necessary for a COVID recovered person to take the vaccine?

Yes, it is advisable to receive complete schedule of COVID vaccine irrespective of past history of infection with COVID-19. The entire schedule of vaccination is completed by only one type of vaccine as different COVID-19 vaccines are not interchangeable.

(3) What documents are required for registration of eligible beneficiary?

Any of the below mentioned ID with Photo may be produced at the time of registration: • Aadhar Card • Driving License • Health Insurance Smart Card issued under the scheme of Ministry of Labour • Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) Job Card • Official identity cards issued to MPs/MLAs/MLCs • PAN Card • Passbooks issued by Bank/Post Office • Passport • Pension Document • Service Identity Card with photograph issued to employees by Central/ State Govt./ PSUs/Public Limited Companies • Voter ID • Smart card issued by RGI under NPR

(4) Will a Photo / ID be required at the time of registration?

The Photo ID produced at the time of registration must be produced and verified at the time of vaccination.

(5) If one is taking medicines for illnesses like Cancer, Diabetes, Hypertension etc., can s/he take the COVID19 vaccine?

Yes. Persons with one or more of these comorbid conditions are considered high risk category. They need to get COVID -19 vaccinations.

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Covid-19 Guidelines

(6) When would antibodies develop?

Protective levels of antibodies are generally developed two weeks after receiving the 2nd dose of COVID-19 vaccine.

(7) When should I take vaccination after infection?

Today, there are no known medical contraindications to vaccinating persons who have COVID-19. To minimize risk of COVID-19 transmission, individuals with suspected or confirmed COVID-19 should be isolated according to WHO guidance. The act of seeking immunization may increase spreading infection to others, For that reason, this individual should defer vaccination until symptoms resolve, (preferably following two consecutive tests negative for COVID-19 conducted 24 hours apart).If testing is not feasible, WHO recommends deferring vaccination 14 days after symptom resolution.

If a person with confirmed or suspected COVID-19 is under care in a health care facility (e.g. inpatient) this individual should be vaccinated according to the national immunization schedule upon recovery.

- If you have tested positive but don't have any symptoms, stay isolated for at least 10 days after the day that you had your first positive test, according to CDC
- However, in cases the COVID-19 treatment did involve monoclonal antibodies (man-made proteins that act like human antibodies) or convalescent plasma, it is recommended that you wait for 90 days after recovering from the infection. The 3-month wait is to allow the antibodies to exit your system; otherwise the monoclonal antibodies will prevent your body from developing a robust immune response from the vaccine.
- MOHFW has advised that people who had been infected with Covid should defer vaccination for 3 months since clinically cured.
- The National technical Advisory Group on Immunization (NTAGI) has recommended that the gap between two doses of Covishield be changed to 12-16 weeks, while the interval between two doses of Covaxin be 4-6 weeks.
- The pregnant women may be offered choice to take any Covid 19 vaccine
- Lactating women will be eligible for vaccines any time after delivery

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Covid-19 Guidelines

(8) What if I get infected before the second vaccine dose?

- In such a case, simply wait until you get a negative report, and then proceed to complete the second dose of vaccination(WHO). [MOHFW recommends the second dose to be deferred by 3 months after clinical recovery from Covid.](#)

(9) Can a person exposed to a COVID-19 case be vaccinated (a contact)?

- If a person exposed to a COVID-19 case is not in a health facility (e.g. home), this individual should first complete 14 days of self-isolation to prevent risk of COVID-19 virus transmission to others, If the contact does not develop symptoms of COVID-19 after 14 days of self-isolation, then this person can be vaccinated,
- If a person exposed to a COVID-19 case is under care in a health care facility (e.g. inpatient) this individual should be vaccinated according to the national immunization schedule upon recovery and prior to discharge, assuming appropriate infection prevention and control measures are respected.

(10) Is adult vaccination recommended during the COVID-19 pandemic?

Countries with existing pneumococcal, influenza, or pertussis vaccination programmes for older adults and individuals with high-risk conditions should maintain those programs while implementing measures to avoid the spread of COVID-19, especially for those at higher risk of severe disease such as older adults, Preventing respiratory illness and hospitalization from pneumococcus, influenza, and pertussis through vaccination will allow respiratory medical equipment, medications, and health care workers to be more available to support patients with COVID-19, pneumococcal vaccination can prevent both primary and secondary bacterial infections and the unnecessary use of antibacterial medications (antibiotics),

(11)How long I will remain protected after vaccination?

Longevity of the immune response in vaccinated individuals is yet to be determined. Hence, continuing the use of masks, handwashing, physical distancing and other COVID-19 appropriate behaviours is strongly recommended.

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Covid-19 Guidelines

AEFI (Adverse Effect Following Immunization) and management

Minor AEFI:

- Common, self-limiting reactions
- E.g. pain, swelling at injection site, fever, irritability, malaise etc.)

Severe AEFI:

- Can be disabling and rarely life threatening; do not lead to long-term problems
- Examples of severe reactions include non-hospitalized cases of: anaphylaxis that has recovered, high fever (>102 degree F), etc.

Serious AEFI:

- Results in death
- Requires inpatient hospitalization
- Results in persistent or significant disability
- AEFI cluster
- Evokes significant parental/ community concern

Line of Treatment

For Minor AEFI like fever / pain or swelling at injection site etc.: which may be expected following COVID-19 vaccination.

- These should subside within 2-3 days on its own.
- Beneficiaries may be asked to take Tablet Paracetamol SOS with a minimum interval of 4 hours between two doses.
- If fever, injection site pain and swelling persist beyond 2-3 days, beneficiary may inform the vaccinator/ASHA/AWW of the respective area or a doctor may be consulted for further management.
- All minor AEFIs must be reported into Co-WIN and AEFI registers.

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Covid-19 Guidelines

For Serious/Severe AEFI e.g. anaphylaxis: \$as per the age of patient,-

- Administer one dose of injection adrenaline by deep intramuscular route;
- Don't panic & reassure the patient, parents and relatives; and
- Suspected case should never be left alone.

An AEFI management kit or an emergency tray should be available for use. The contents of the AEFI kit are:

Inj. Adrenaline (1:1000) (3), Inj. Hydrocortisone (3), Ringer lactate/Normal saline (2), 5% dextrose (2), IV drip set (2), scalp vein sets or IV cannula (2), disposable syringes – 5 ml with 24/25G IM needle (3 sets), adhesive tape and blank Case Reporting Formats (CRF).

Please visit following links for further elaboration on vaccines.

1. [Covid -19 Vaccines-operational guidelines-MOHFW](#)
2. [World Health Organisation \(WHO\)](#)

Rating of Recommendations: A = Strong; B = Moderate; C = Optional
Rating of Evidence: I = One or more randomized trials without major limitations; IIa = other randomized trials or subgroup analyses of randomized trials; IIb = Nonrandomized trials or observational cohort studies; III = Expert opinion

Top

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Figure 1. Pharmacologic Management of Patients with COVID-19 Based on Disease Severity

Doses and durations are listed in the footnotes.

DISEASE SEVERITY	PANEL'S RECOMMENDATIONS
Not Hospitalized, Mild to Moderate COVID-19	<p>For patients who are not at high risk for disease progression, provide supportive care and symptomatic management (AIII).</p> <p>For patients who are at high risk of disease progression (as defined by the FDA EUA criteria for treatment with anti-SARS-CoV-2 monoclonal antibodies), use one of the following combinations:</p> <ul style="list-style-type: none"> • Bamlanivimab plus etesevimab (AIIa) • Casirivimab plus imdevimab (AIIa)
Hospitalized but Does Not Require Supplemental Oxygen	<p>There are insufficient data to recommend either for or against the routine use of remdesivir. For patients at high risk of disease progression, the use of remdesivir may be appropriate.</p>
Hospitalized and Requires Supplemental Oxygen	<p>Use one of the following options:</p> <ul style="list-style-type: none"> • Remdesivir^{a,b} (e.g., for patients who require minimal supplemental oxygen) (BIIa) • Dexamethasone^c plus remdesivir^{a,b} (e.g., for patients who require increasing amounts of supplemental oxygen) (BIII)^{d,e} • Dexamethasone^c (e.g., when combination therapy with remdesivir cannot be used or is not available) (BI)
Hospitalized and Requires Oxygen Delivery Through a High-Flow Device or Noninvasive Ventilation	<p>Use one of the following options:</p> <ul style="list-style-type: none"> • Dexamethasone^c (AI)^g • Dexamethasone^c plus remdesivir^{a,b} (BIII)^{d,e} <p>For patients who were recently hospitalized^f with rapidly increasing oxygen needs and systemic inflammation:</p> <ul style="list-style-type: none"> • Add tocilizumab^g to one of the two options above (BIIa)
Hospitalized and Requires Invasive Mechanical Ventilation or ECMO	<ul style="list-style-type: none"> • Dexamethasone^c (AI)^h <p>For patients who are within 24 hours of admission to the ICU:</p> <ul style="list-style-type: none"> • Dexamethasone^c plus tocilizumab^g (BIIa)
<p>Rating of Recommendations: A = Strong; B = Moderate; C = Optional Rating of Evidence: I = One or more randomized trials without major limitations; IIa = Other randomized trials or subgroup analyses of randomized trials; IIb = Nonrandomized trials or observational cohort studies; III = Expert opinion</p>	

^a The remdesivir dose is 200 mg IV for one dose, followed by remdesivir 100 mg IV once daily for 4 days or until hospital discharge (unless the patient is in a health care setting that can provide acute care that is similar to inpatient hospital care). Treatment duration may be extended to up to 10 days if there is no substantial clinical improvement by Day 5.

^b For patients who are receiving remdesivir but progress to requiring oxygen through a high-flow device, noninvasive ventilation, invasive mechanical ventilation, or ECMO, remdesivir should be continued until the treatment course is completed.

^c The dexamethasone dose is 6 mg IV or PO once daily for 10 days or until hospital discharge. If dexamethasone is not available, equivalent doses of other corticosteroids (e.g., prednisone, methylprednisolone, hydrocortisone) may be used. See the Corticosteroids section for more information.

^d The combination of dexamethasone and remdesivir has not been studied in clinical trials.

^e In the rare circumstances where corticosteroids cannot be used, **baricitinib plus remdesivir** can be used (BIIa). The FDA has issued an EUA for baricitinib use in combination with remdesivir. The dose for baricitinib is 4 mg PO once daily for 14 days or until hospital discharge.

^f For example, within 3 days of hospital admission. See the Interleukin-6 Inhibitors section for more information.

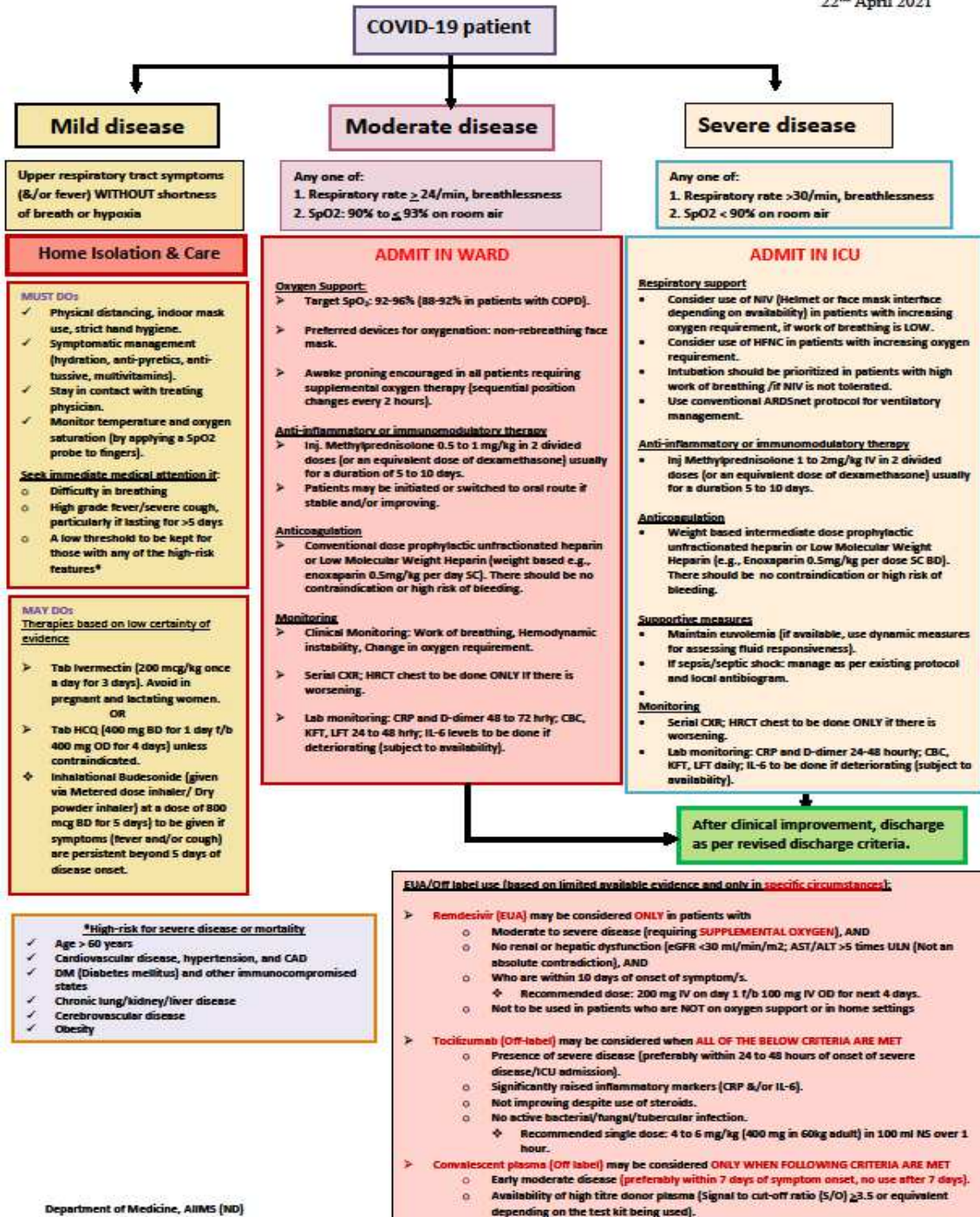
^g The tocilizumab dose is 8 mg/kg of actual body weight (up to 800 mg) administered as a single IV dose. Tocilizumab should not be combined with baricitinib and should be avoided in certain groups of patients who are at increased risk for complications. See the Interleukin-6 Inhibitors section for more information.

^h The combination of **dexamethasone plus remdesivir** may be considered for patients who have recently been intubated (CIII). The Panel **recommends against** the use of remdesivir monotherapy in these patients.



**AIIMS/ ICMR-COVID-19 National Task Force/Joint
Monitoring Group (Dte.GHS)
Ministry of Health & Family Welfare, Government of India
CLINICAL GUIDANCE FOR MANAGEMENT OF ADULT COVID-19 PATIENTS**

22nd April 2021



Department of Medicine, AIIMS (ND)

Black Fungus (Mucormycosis)

What is mucormycosis? (Black Fungus)

- Mucormycosis is a fungal infection.
- Black fungus or mucormycosis has been a cause of disease and death of patients in transplants, ICUs and immunodeficient patients for since long.

What causes Mucormycosis?

- People catch mucormycosis by coming in contact with the fungal spores in the environment.
- It can also develop on the skin after the fungus enters the skin through a cut, scrape, burn, or other types of skin trauma.
- The disease is being detected among patients who are recovering or have recovered from COVID-19.
- Moreover, anyone who is diabetic and whose immune system is not functioning well needs to be on the guard against this.

According to an advisory issued by the Indian Council of Medical Research, the following conditions in COVID-19 patients increase the risk of mucormycosis infection:

- Uncontrolled diabetes
- Weakening of immune system due to use of steroids
- Prolonged ICU/hospital stay
- Co-morbidities / post organ transplant / cancer
- Voriconazole therapy (used to treat serious fungal infections)

How does patient get predisposed to Mucormycosis?



Co-morbidities - post transplant/ malignancy



Uncontrolled diabetes mellitus



Immunosuppression by steroids



Prolonged ICU stay



Voriconazole therapy

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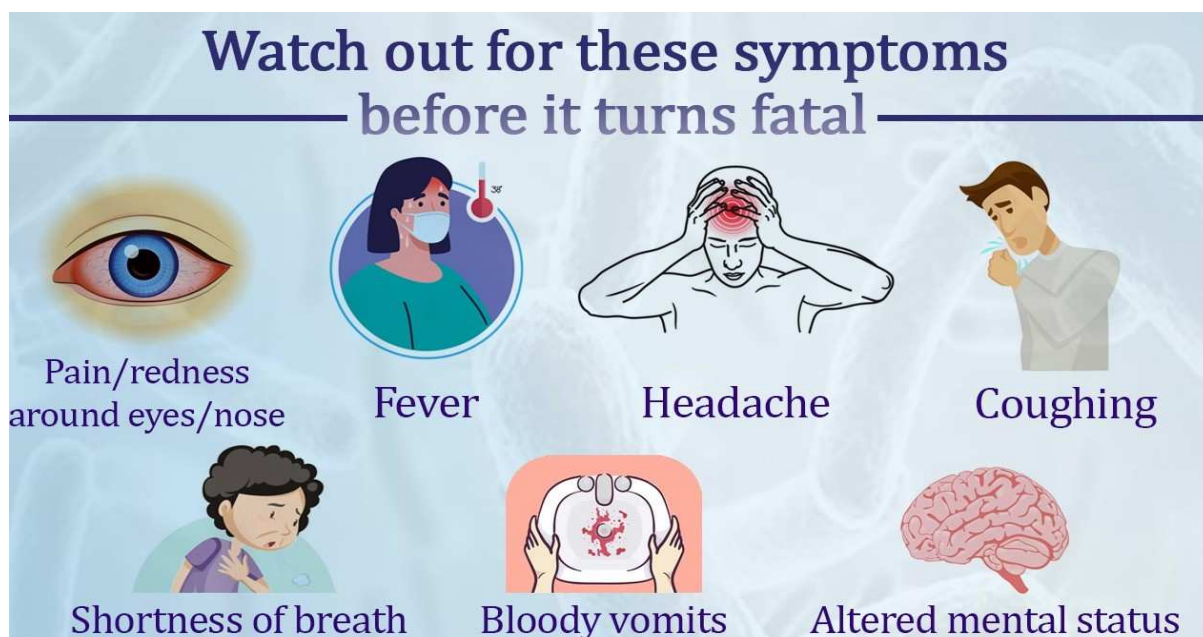
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Source: Code Mucor : Honavar SG . Rhino –Orbital-cerebral Mucormycosis - Guidelines for Diagnosis, Staging and Management. Indian J Ophthalmology 2021 ;69:XX-XX

Black Fungus (Mucormycosis)

What are the common symptoms?

- Mucormycosis begins to manifest as skin infection in the air pockets(Sinus) located behind our forehead, nose, cheekbones, and in between the eyes and teeth.
- It then spreads to eyes, lungs and can even spread to the brain.
- It leads to blackening or discoloration over the nose, blurred or double vision, chest pain, breathing difficulties and coughing of blood.



How to prevent Mucormycosis?

- Use masks if you are visiting dusty construction sites
- Wear shoes, long trousers, long sleeve shirts and gloves while handling soil (gardening), moss or manure
- Maintain personal hygiene, including thorough scrub bath
- With respect to Covid infection brushing teeth twice daily and maintaining good oral hygiene may prevent Mucormycosis

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Black Fungus (Mucormycosis)

- The disease can be managed by controlling diabetes, discontinuing immunomodulating drugs, reducing steroids and extensive surgical debridement- to remove all necrotic materials, according to the advisory.

In hospital:

- Maintenance of good hygiene and cleanliness is a must. Regular oral hygiene care with mouthwash, povidone-iodine gargles must be done.
- While administering oxygen, water for humidification must be sterile and there should be no leakage from the humidifier.
- Steroid usage must be limited to no more than necessary with strict blood glucose control.
- Unnecessary use of broad-spectrum antibiotics, antifungals should be stopped as this removes the normal commensal flora resulting in the growth of unwanted organisms due to lack of competition.
- Betadine mouth gargle twice a day (not nasal drops)
- Consider prophylactic oral Posaconazole in high-risk patients (>3 weeks of mechanical ventilation, >3 weeks of supplemental oxygen, >3 weeks of systemic steroids, uncontrolled diabetes mellitus with or without ketoacidosis, co-morbidities with immunosuppression)

Once discharged:

- Stay indoors as much as possible.
- Regular exercises.
- Control of blood sugars.

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Black Fungus (Mucormycosis)

- At home, the surroundings must be clean and free from dust and dampness.
- Maintain oral and nasal hygiene.
- While going out always wear an N-95 mask.
- Avoid construction areas, fields, grounds.
- Soil and plants are the areas that abound with fungi. Hence better to avoid working with soil, gardening. If unavoidable, masks, rubber gloves, and boots are a must.
- Post-Covid, during recovery, if a patient develops sinus headache, facial pain, stuffy nose, bloody nasal discharge, blackish discoloration over nose or palate, eye pain, swelling, diminished of vision or double vision, tooth pain, headache, seizures, drowsiness, limb weakness then immediate medical help must be attained.

Diagnosis of ROCM (Rhino Orbital Cerebral Mucormycosis)

ROCM can be categorized as Possible, Probable, and Proven.

- A patient who has symptoms and signs of ROCM in the clinical setting of concurrent or recently (<6 weeks) treated COVID-19, diabetes mellitus, use of systemic cortico steroids and tocilizumab, mechanical ventilation, or supplemental oxygen is considered as Possible ROCM.
- When the clinical symptoms and signs are supported by diagnostic nasal endoscopy findings, or contrast-enhanced MRI or CT Scan, the patient is considered as Probable ROCM.
- Clinico-radiological features, coupled with microbiological confirmation on direct microscopy or culture or histopathology with special stains are essential to categorize a patient as Proven ROCM.

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Black Fungus (Mucormycosis)

The different diagnostic techniques are :

- Direct microscopy of the endoscopy-guided nasal swab, paranasal sinus, or orbital tissue by using a KOH mount for rapid diagnosis. Direct microscopy has about 90% sensitivity.
- Culture of the deep or endoscopy-guided nasal swab, paranasal sinus, or orbital tissue.
- Molecular diagnostics of the tissue sample (deep or endoscopy-guided nasal swab, paranasal sinus, or orbital tissue) or blood. Molecular diagnostic kits are not widely available commercially. There is a promising role of quantitative polymerase chain reaction. Molecular diagnostics have about 75% sensitivity .
- Histopathology provides diagnostic information in about 80% of samples of probable ROCM. Obtaining the sample from clinically active parts of the lesion (not from grossly necrotic tissue) may help improve the diagnostic yield. Histopathology with Hematoxylin-Eosin, periodic acid-Schiff, and Grocott-Gomori's methenamine-silver special stain is diagnostic.
- Imaging – contrast-enhanced MRI and CT scan. Contrast-enhanced MRI is preferred over CT scan.

How ROCM is treated?

Induction with full-dose liposomal Amphotericin B is the definitive first step. In resource-constraint situations, Amphotericin B Deoxycholate or Amphotericin B Lipid Complex may be used in patients with good renal function. These have relatively lower efficacy and higher systemic toxicity as compared to liposomal Amphotericin B. There is no convincing data to support combination antifungal therapy, and it is not recommended. However, prolonged step-down oral antifungal therapy is warranted.

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Black Fungus (Mucormycosis)

 Do's	 Don'ts
<ul style="list-style-type: none">- Control hyperglycaemia- Monitor blood glucose level post COVID-19 discharge & in diabetics- Use steroid judiciously- Use clean, sterile water for humidifiers during oxygen therapy- Use antibiotics/ anti fungal judiciously	<ul style="list-style-type: none">- Do not miss warning signs & symptoms- Don't consider all cases of blocked nose as cases of bacterial sinusitis, especially in the cases of immunosuppression and/ or COVID-19 patients on immunomodulators- Don't hesitate in seeking aggressive investigations as appropriate for detecting fungal etiology- Don't lose crucial time to initiate treatment for mucormycosis

Covid 19 related Mucormycosis: [ICMR Mucormycosis Guideline](#)

[Global Guideline for the diagnosis and treatment of Mucormycosis : An initiative for the European confederation of Medical Mycology](#)

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Black Fungus (Mucormycosis)

Updates :

Black Fungus (Mucormycosis)

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Version 3/2021 - 24/5/21

