

27th March, 2020

COVID-19 PREPAREDNESS DOCUMENT

AIIMS, NEW DELHI

This document is meant for internal circulation at AIIMS, New Delhi



Note: This document is dynamic and may be modified as per progression of the disease in India and when more data are available regarding epidemiology, transmission, and treatment.



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CHAPTER 1: CASE DEFINITION

When to suspect

- All symptomatic individuals who have undertaken international travel in the last 14 days
or
- All symptomatic contacts of laboratory confirmed cases
or
- All symptomatic healthcare personnel (HCP)
or
- All hospitalized patients with severe acute respiratory illness (fever AND cough and/or shortness of breath)
or
- Asymptomatic direct and high risk contacts of a confirmed case (should be tested once between day 5 and day 14 after contact)

Symptomatic refers to fever/cough/shortness of breath.

Direct and high-risk contacts include those who live in the same household with a confirmed case and HCP who examined a confirmed case.

Confirmed case

A person with laboratory confirmation of COVID-19 infection, irrespective of clinical signs and symptoms



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CHAPTER 2: CLINICAL FEATURES

(Adapted from Report of the WHO-China Joint Mission on Coronavirus Disease 2019 based on 55,924 cases and a study on 1099 cases by Guan et al published in N Eng J Med)

- Fever (87.9%),
- Dry cough (67.7%),
- Fatigue (38.1%),
- Sputum production (33.4%),
- Shortness of breath (18.6%),
- Sore throat (13.9%),
- Headache (13.6%),
- Myalgia or arthralgia (14.8%),
- Chills (11.4%),
- Nausea or vomiting (5.0%),
- Nasal congestion (4.8%),
- Diarrhea (3.7%), and
- Hemoptysis (0.9%), and
- Conjunctival congestion (0.8%)
- ARDS (3%)
- Abnormalities on chest X-ray (59%)
- Radiological findings on chest CT scan (86%)

CHAPTER 3: LABORATORY DIAGNOSIS

As per directive from MoHFW, Government of India, all suspected cases are to be reported to district and state surveillance officers.



Figure 1: Helpline for COVID-19 (MOHFW, GOI)

Sample collection:

Preferred sample: Throat and nasal swab in viral transport media (VTM) and transported on ice

Alternate: Nasopharyngeal swab, BAL or endotracheal aspirate which has to be mixed with the viral transport medium and transported on ice

General guidelines:

- Patients will be tested for COVID-19 at department of microbiology AIIMS, New Delhi
- Trained health care professionals to wear appropriate PPE with latex free purple nitrile gloves while collecting the sample from the patient. Maintain proper infection control when collecting specimens
- Restricted entry to visitors or attendants during sample collection
- Complete the requisition form for each specimen submitted
- Proper disposal of all waste generated (yellow)

Respiratory specimen collection methods:

A. Lower respiratory tract

- Bronchoalveolar lavage, tracheal aspirate, sputum
- Collect 2-3 mL into a sterile, leak-proof, screw-cap sputum collection cup or sterile dry container.



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B. Upper respiratory tract

- Nasopharyngeal swab AND oropharyngeal swab

Oropharyngeal swab (e.g. throat swab): Tilt patient's head back 70 degrees. Rub swab over both tonsillar pillars and posterior oropharynx and avoid touching the tongue, teeth, and gums. Use only synthetic fiber swabs with plastic shafts. Do not use calcium alginate swabs or swabs with wooden shafts. Place swabs immediately into sterile tubes containing 2-3 ml of viral transport media.

Combined nasal & throat swab: Tilt patient's head back 70 degrees. While gently rotating the swab, insert swab less than one inch into nostril (until resistance is met at turbinates). Rotate the swab several times against nasal wall and repeat in other nostril using the same swab. Place tip of the swab into sterile viral transport media tube and cut off the applicator stick. For throat swab, take a second dry polyester swab, insert into mouth, and swab the posterior pharynx and tonsillar areas (avoid the tongue). Place tip of swab into the same tube and cut off the applicator tip.

Nasopharyngeal swab: Tilt patient's head back 70 degrees. Insert flexible swab through the nares parallel to the palate (not upwards) until resistance is encountered or the distance is equivalent to that from the ear to the nostril of the patient. Gently, rub and roll the swab. Leave the swab in place for several seconds to absorb secretions before removing.

Specimen Collection, Packaging and Transport Guidelines for 2019 novel Coronavirus (2019-nCoV)

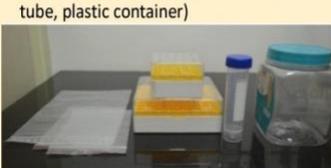
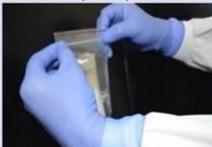
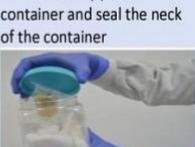
Requirements for Clinical Samples Collection, Packaging and Transport			
<p>1. Sample vials and Virus Transport Medium (VTM)</p> 	<p>2. Adsorbent material (cotton, tissue paper), paraffin, seizer, cello tape</p> 	<p>3. A leak-proof secondary container (e.g., ziplock pouch, cryobox, 50 mL centrifuge tube, plastic container)</p> 	
<p>4. Hard-frozen Gel Packs</p> 	<p>5. A suitable outer container (e.g., thermocol box, ice-box, hard-board box) (minimum dimensions: 10 x 10 x 10 cm)</p> 		
Procedure for Specimen Packaging and Transport			
<p>1. Use PPE while handling specimen</p> 	<p>2. Seal the neck of the sample vials using parafilm</p> 	<p>3. Cover the sample vials using adsorbent material</p> 	<p>4. Arrange primary container (vial) in secondary container</p> 
<p>5. Placing the centrifuge tube inside a zip-lock pouch</p> 	<p>6. Placing the zip-lock pouch inside a sturdy plastic container and seal the neck of the container</p> 	<p><i>Note: Sample vials can also be placed inside a zip-lock pouch, covered in adsorbent material and secured by heat-sealing or rubber bands. Then, the zip-lock pouch should be placed inside another plastic pouch and secured</i></p>	<p>7. Using a thermocol box as an outer container and placing the secondary container within it, surrounded by hard-frozen gel packs</p> 
<p>7. Using a hard card-board box as an outer container and placing the secondary container and the gel packs</p> 	<p>8. Placing the completed Specimen Referral Form (available on www.niv.co.in) and request letter inside a leak-proof, zip-lock pouch</p> 	<p>9. Securing the zip-lock pouch with the Specimen Referral Form on the outer container</p> 	<p>10. Attaching the labels:</p> <ul style="list-style-type: none"> • Senders' address, contact number; Consignee's address/contact number; • Biological substance-Category B; • 'UN 3373'; Orientation label, Handle with care 
<p>Documents to accompany:</p> <p>1) Packaging list/proforma Invoice 2) Air way bill (for air transport) (to be prepared by sender or shipper) 3) Value equivalence document (for road/rail/sea transport) [Note: 1. A vaccine-carrier/ice-box can also be used as an outer container 2. The minimum dimensions of the outer container should be 10 x 10 x 10 cm (length x width x height)]</p>			
<p>Routing of samples:</p> <ul style="list-style-type: none"> • Clinical specimens, official documents and Specimen request forms for testing of 2019-nCoV need to be sent to the ICMR-NIV address (The Director, ICMR-National Institute of Virology, 20-A, Dr Ambedkar Road, Pune, Maharashtra, Pin: 4110001). • For shipment-related queries/information, kindly contact Dr Sumit Bharadwaj (Scientist B, Influenza Group) on email: sumitduttbhardwaj@gmail.com, phone 020-26006290/26006390 			

Figure 2: Specimen collection, packaging and transport guidelines (ICMR)

CHAPTER 4: INFECTION CONTROL AND PREVENTION MEASURES

Patients suspected of having COVID-19 infection should be shifted to the isolation facility / designated COVID areas from the triage area as soon as possible. The HCP should be handling the patients after donning appropriate PPE according to their level of exposure as described in appendix IV.

Hand hygiene

- i. HCP should perform hand hygiene using alcohol-based hand rub (minimum 20 seconds) or by washing with soap and water (minimum 40 seconds). If hands are visibly soiled, use soap and water for hand wash.
- ii. Performed before and after using bathroom, before, during and after preparing food, before and after eating /drinking, after coughing, blowing or sneezing, after touching garbage, after touching mask or soiled PPE.
- iii. Foot operated sanitizers should be put outside elevators, OPDs, screening areas, ICUs and wards.

How to Handwash?

WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB

⌚ Duration of the entire procedure: 40-60 seconds



Figure 3: Hand hygiene technique (WHO)

Mask etiquette

If masks are worn, appropriate use and disposal is essential to ensure they are effective and to avoid any increase in risk of transmission associated with the incorrect use and disposal of masks.

- i. Place mask carefully to cover mouth and nose and tie securely to minimize any gaps between the face and the mask
- ii. While in use, avoid touching the mask
- iii. Remove the mask by using appropriate technique (i.e. do not touch the front but remove the lace from behind)
- iv. After removal or whenever you inadvertently touch a used mask, clean hands by using an alcohol-based hand rub for 20 seconds or soap and water if visibly soiled for 40 seconds
- v. Replace masks with a new clean, dry mask as soon as they become damp/humid
- vi. Do not re-use single-use masks
- vii. Discard single-use surface masks after each use and dispose-off them immediately upon removal
- viii. For N95 respirators adequate fit check must be performed after wearing. CDC recommends the following hairstyles styles for male HCP suitable for wearing N-95 respirators

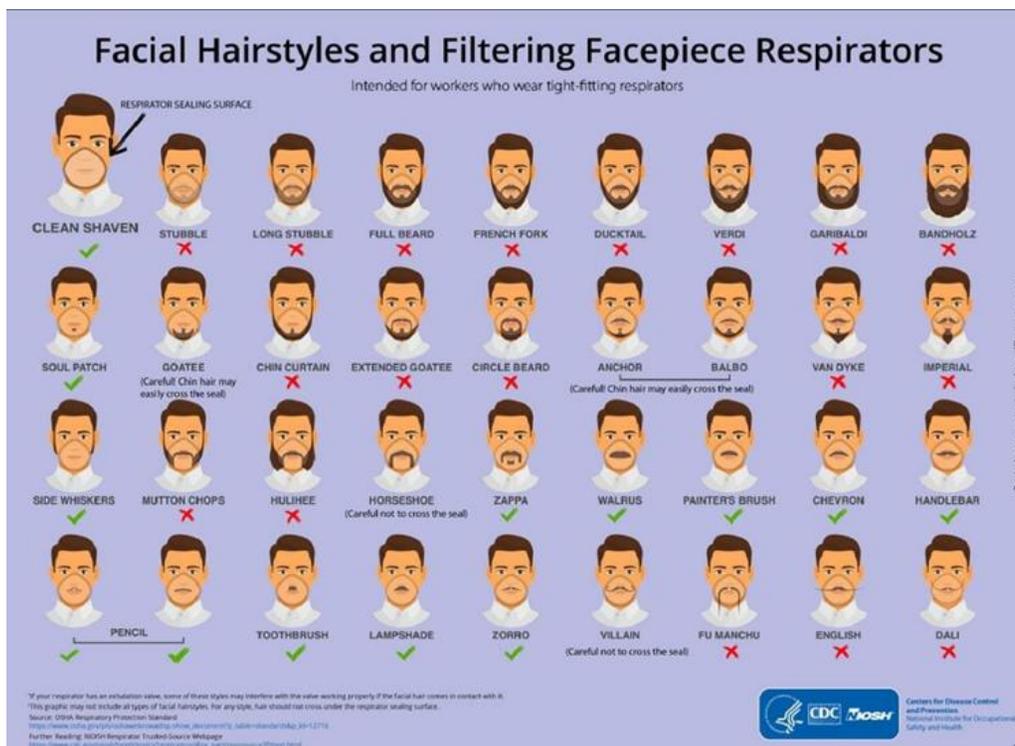


Figure 4: Facial hairstyles compatible with mask (CDC)



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Steps of donning PPE (Steps may vary depending on the kit used):

Donning of the PPE must be performed in designated area.

1. Remove home clothes, jewelry, watches, electronic etc. and wear clean hospital scrubs
2. Wash hands with soap and water
3. Wear shoe covers – tie lace in front of the shin
4. Wear first set of gloves – should be smaller than second pair, comfortable size, can be sterile or unsterile
5. Gown – wear a clean disposable non-permeable gown, arm sleeves of gown should cover the gloves at the wrists, tie the lace behind snugly without wrapping all around the waist. Decontaminate the gown if it becomes soiled. Remove gown only in designated doffing area and discard the gown (yellow bin) before leaving patient care area
7. Wear the N-95 respirator – cup the mask in hand, place the lower strap behind the neck passing below ears, then place the upper strap over back of head passing above ear. Check for snug fit of mask. There should be no more than minimal air leak from sides
8. Wear eye piece – adjust the strap according to required size, open the ports at upper end to prevent fogging while wearing, upper end N-95 mask should be covered by eye piece
9. Wear the hood – hood should lay over the gown without leaving any open space.
10. Wear 2nd pair of the gloves – should be of larger size than 1st pair, should cover free end of arms of gown. Change gloves if they become torn or heavily contaminated. Remove and discard gloves when leaving the patient room or care area, and immediately perform hand hygiene
11. Gown fitness check: Take help of companion for fitness check.

Steps of doffing PPE:

Doffing to be performed only in the designated area, check for any leak or soiling in PPE before doffing. If any, disinfect the area before doffing. Doffing room should have two chairs, one labelled “dirty” and the other “clean”. All the PPE must be discarded in the yellow bin. Hand hygiene MUST be performed after every step.

1. Disinfect the hands wearing gloves by following hand hygiene procedure.
2. Remove shoe covers only by touching the outer surface, and perform hand hygiene.
3. Remove outer gloves and perform hand hygiene.
4. Remove hood and perform hand hygiene.



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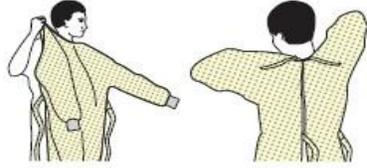
5. Remove gown slowly by holding the gown at the waist and pulling. Without touching the outer surface, remove with a rolling inside out technique. Perform hand hygiene again.
6. Remove eye piece by holding the straps, and perform hand hygiene.
7. Remove inner gloves and perform hand hygiene.
8. Wear another pair of sterile /unsterile gloves.
9. Remove mask – Do not touch exposed surface of mask. First remove lower strap of mask, remove mask holding upper strap in a slow and steady pace (as to not generate aerosols)
10. Perform hand hygiene
11. Sit over clean chair and clean your shoes with alcohol swabs
12. Remove last pair of gloves and perform hand hygiene

If any leak is found in PPE while caring for infected patients, caring HCPs should self-quarantine (see appendix I).

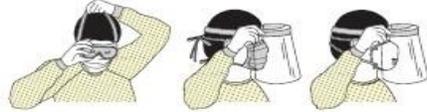
SEQUENCE FOR PUTTING ON PERSONAL PROTECTIVE EQUIPMENT (PPE)

The type of PPE used will vary based on the level of precautions required, such as standard and contact, droplet or airborne infection isolation precautions. The procedure for putting on and removing PPE should be tailored to the specific type of PPE.

- 1. GOWN**

 - Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
 - Fasten in back of neck and waist
- 2. MASK OR RESPIRATOR**

 - Secure ties or elastic bands at middle of head and neck
 - Fit flexible band to nose bridge
 - Fit snug to face and below chin
 - Fit-check respirator
- 3. GOGGLES OR FACE SHIELD**

 - Place over face and eyes and adjust to fit
- 4. GLOVES**

 - Extend to cover wrist of isolation gown

USE SAFE WORK PRACTICES TO PROTECT YOURSELF AND LIMIT THE SPREAD OF CONTAMINATION

- Keep hands away from face
- Limit surfaces touched
- Change gloves when torn or heavily contaminated
- Perform hand hygiene

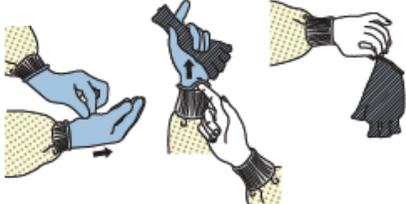


Figure 5: Sequence of donning PPE (CDC)

HOW TO SAFELY REMOVE PERSONAL PROTECTIVE EQUIPMENT (PPE)
EXAMPLE 1

There are a variety of ways to safely remove PPE without contaminating your clothing, skin, or mucous membranes with potentially infectious materials. Here is one example. **Remove all PPE before exiting the patient room** except a respirator, if worn. Remove the respirator **after** leaving the patient room and closing the door. Remove PPE in the following sequence:

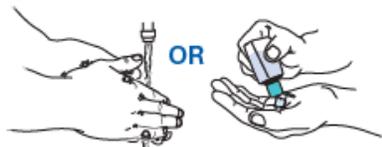
- ### 1. GLOVES

 - Outside of gloves are contaminated!
 - If your hands get contaminated during glove removal, immediately wash your hands or use an alcohol-based hand sanitizer
 - Using a gloved hand, grasp the palm area of the other gloved hand and peel off first glove
 - Hold removed glove in gloved hand
 - Slide fingers of ungloved hand under remaining glove at wrist and peel off second glove over first glove
 - Discard gloves in a waste container
- ### 2. GOGGLES OR FACE SHIELD

 - Outside of goggles or face shield are contaminated!
 - If your hands get contaminated during goggle or face shield removal, immediately wash your hands or use an alcohol-based hand sanitizer
 - Remove goggles or face shield from the back by lifting head band or ear pieces
 - If the item is reusable, place in designated receptacle for reprocessing. Otherwise, discard in a waste container
- ### 3. GOWN

 - Gown front and sleeves are contaminated!
 - If your hands get contaminated during gown removal, immediately wash your hands or use an alcohol-based hand sanitizer
 - Unfasten gown ties, taking care that sleeves don't contact your body when reaching for ties
 - Pull gown away from neck and shoulders, touching inside of gown only
 - Turn gown inside out
 - Fold or roll into a bundle and discard in a waste container
- ### 4. MASK OR RESPIRATOR

 - Front of mask/respirator is contaminated — DO NOT TOUCH!
 - If your hands get contaminated during mask/respirator removal, immediately wash your hands or use an alcohol-based hand sanitizer
 - Grasp bottom ties or elastics of the mask/respirator, then the ones at the top, and remove without touching the front
 - Discard in a waste container
- ### 5. WASH HANDS OR USE AN ALCOHOL-BASED HAND SANITIZER IMMEDIATELY AFTER REMOVING ALL PPE



PERFORM HAND HYGIENE BETWEEN STEPS IF HANDS BECOME CONTAMINATED AND IMMEDIATELY AFTER REMOVING ALL PPE



COVID-19-20

Figure 6: Sequence of doffing PPE (CDC)

Decontamination and waste management:

- Any surface or material known to be, or potentially be, contaminated by biological agents during laboratory operations must be correctly disinfected to control infectious risks.
- Proper processes for the identification and segregation of contaminated materials must be



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adopted before decontamination and/or disposal.

- Where decontamination cannot be performed in the laboratory area or onsite, the contaminated waste must be packaged in an approved (that is, leak proof) manner, for transfer to another facility with decontamination capacity.
- For details of effective disinfectants, please refer to appendix V.

Practices for environmental cleaning in healthcare facilities:

Environmental cleaning is part of standard precautions, which should be applied to all patients in all healthcare facilities. Ensure that cleaning and disinfection procedures are followed consistently and correctly.

Cleaning agents and disinfectants:

1. 1% Sodium Hypochlorite can be used as a disinfectant for cleaning and disinfection
2. The solution should be prepared fresh.
3. Leaving the solution for a contact time of at least 10 minutes is recommended.
4. Alcohol (e.g. isopropyl 70% or ethyl alcohol 70%) can be used to wipe down surfaces where the use of bleach is not suitable, e.g. metals.

PPE to wear while carrying out cleaning and disinfection works:

1. Wear heavy duty/disposable gloves, disposable long-sleeved gowns, eye goggles or a face shield, and a medical mask (please see the PPE document for details)
2. Avoid touching the nose and mouth (goggles may help as they will prevent hands from touching eyes)
3. Disposable gloves should be removed and discarded if they become soiled or damaged, and a new pair worn
4. All other disposable PPE should be removed and discarded after cleaning activities are completed. Eye goggles, if used, should be disinfected after each use, according to the manufacturer's instructions.
5. Hands should be washed with soap and water/alcohol-based hand rub immediately after each



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piece of PPE is removed, following completion of cleaning.

Cleaning guidelines:

1. Where possible, seal off areas where the confirmed case has visited, before carrying out cleaning and disinfection of the contaminated environmental surfaces. This is to prevent unsuspecting persons from being exposed to those surfaces
2. When cleaning areas where a confirmed case has been, cleaning staff should be attired in suitable PPE. Disposable gloves should be removed and discarded if they become soiled or damaged, and a new pair worn. All other disposable PPE should be removed and discarded, after cleaning activities are completed. Goggles, if used, should be disinfected after each use, according to manufacturer's instructions. Hands should be washed with soap and water immediately after the PPE is removed.
3. Mop floor with routinely available disinfectant.
4. Wipe all frequently touched areas (e.g. lift buttons, hand rails, doorknobs, arm rests, tables, air/light controls, keyboards, switches, etc.) and toilet surfaces with chemical disinfectants and allow to air dry. 1% sodium hypochlorite solution can be used. Alcohol can be used for surfaces, where the use of bleach is not suitable.
5. Clean toilets, including the toilet bowl and accessible surfaces in the toilet with disinfectant or 1% sodium hypochlorite solution.
6. Wipe down all accessible surfaces of walls as well as blinds with disinfectant or bleach solution.
7. Remove curtains/ fabrics/ quilts for washing, preferably using the hot water cycle. For hot-water laundry cycles, wash with detergent or disinfectant in water at 70°C for at least 25 minutes.
8. Discard cleaning items made of cloth and absorbent materials, e.g. mop head and wiping cloths, into biohazard bags after cleaning and disinfecting each area. Wear a new pair of gloves and fasten the double-bagged biohazard bag with a cable tie.
9. Disinfect buckets by soaking in disinfectant or bleach solution, or rinse in hot water before filling.
10. Disinfectant or 1% sodium hypochlorite solution should be applied to surfaces using a damp cloth. They should not be applied to surfaces using a spray pack, as coverage is uncertain and spraying may promote the production of aerosols. The creation of aerosols caused by splashing liquid during cleaning should be avoided. A steady sweeping motion should be used when cleaning either floors or horizontal surfaces, to prevent the creation of aerosols or splashing. Cleaning



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methods that might aerosolize infectious material, such as the use of compressed air, must not be used.

11. Biohazard bags should be properly disposed-off, upon completion of the disinfection work.

Frequency of cleaning of surfaces:

1. High touch surfaces: Disinfection of high touch surfaces like (doorknobs, telephone, call bells, bedrails, stair rails, light switches, wall areas around the toilet) should be done every 3-4 hours.
2. Low-touch surfaces: For Low-touch surfaces (walls, mirrors, etc.) mopping should be done at least once daily.

Precautions to take after completing the clean-up and disinfection:

1. Staff should wash their hands with soap and water immediately after removing the PPE, and when cleaning and disinfection work is completed.
2. Discard all used PPE in a double-bagged biohazard bag (yellow), which should then be securely sealed and labelled.
3. The staff should be aware of the symptoms and should report to their occupational health service if they develop symptoms.



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CHAPTER 5: CLINICAL MANAGEMENT

Indications for hospital admission

The following criteria may be applied to consider for admission (Any ONE of the following five criteria):

1. Respiratory rate > 24/min
2. SpO₂ < 94% on room air
3. Confusion/drowsiness
4. Systolic BP < 90 mmHg or diastolic BP < 60 mmHg
5. Those at high risk for severe disease:
 - a. Age > 60 years
 - b. Cardiovascular risk including hypertension
 - c. Diabetes mellitus/other immunocompromised states
 - d. Chronic lung/liver/kidney disease

This is general guidance regarding which patients should be admitted. However, the final decision to admit is at the discretion of the treating physician.

Management of mild cases

- Mild cases are those with low grade fever/cough/malaise/rhinorrhea/sore throat WITHOUT any shortness of breath
- Symptomatic treatment may be prescribed (eg. anti-tussive syrup containing Dextromethorphan/levodropropizine for cough, paracetamol for fever etc.)
- Tab Hydroxychloroquine 400 mg BD for 1 day followed by 200 mg BD for 4 days, along with Tab Vitamin C 500 mg BD for 5 days may be considered
- Antibiotics may be given if clinically indicated (Azithromycin + Amox/Clav)
- Tablet Oseltamivir may be given for high risk influenza suspects
- Those at high risk of severe disease (age > 60 years, cardiovascular disease including hypertension, diabetes mellitus, other immunocompromised states, chronic lung/liver/kidney disease) may be advised admission
- Those not at high risk for severe disease:
 - Should be advised home isolation



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- Should avoid public transport while going home
- Should be educated about appropriate home isolation precautions
- In case of onset of danger signs (shortness of breath, hemoptysis, altered mental status), patient should immediately inform the nearest health center or call 011-23978046.
- Duration of home isolation:
 - Afebrile for 72 hours AND at least 7 days after symptom onset
 - OR*
 - 2 negative samples 24 hours apart

Management of hospitalized cases

General Measures:

- Oxygen supplementation to maintain SpO₂ > 94%
(NIV may be considered in mild respiratory failure with good mask interface fitting but there might be an increased risk of aerosolization)
- Conservative fluid management if there is no evidence of shock
- Symptomatic treatment (eg. anti-tussive syrup containing Dextromethorphan/levodropropizine and paracetamol)
- Blood culture to be sent at time of admission before starting anti-microbials
- Empirical antimicrobials (Co-amoxiclav/Doxycycline/Azithromycin/Levofloxacin) within 1 hour of admission in case of sepsis) and Oseltamivir may be considered
- Other investigations to be sent at admission include CBC, LFT, KFT, ABG, Chest X-ray (portable) as well as any other investigations deemed necessary by the treating physician
- Systemic corticosteroids are not recommended, unless indicated for any other reason
- MDI preferred over nebulization to reduce risk of aerosolization
- Close monitoring for worsening clinical status is of paramount importance

Specific therapy:

NO SPECIFIC ANTIVIRALS have been proven to be effective as per currently available data. Drugs that may be considered on the basis of registered trials/in-vitro data include:



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1. Hydroxychloroquine –
 - Suggested dose – 400mg BD for 1 day followed by 200mg BD for 4 days maybe be considered
2. Lopinavir/Ritonavir –
 - Suggested dose – (200/50) 2 tab BD for maximum 14 days
 - Maybe considered on case to case basis as per ICMR protocol
 - ICMR to be informed whenever any patient is being treated with this drug regime

Caution: Do NOT co-administer Lopinavir/ritonavir and Hydroxychloroquine due to drug interaction which may cause increased Hydroxychloroquine levels and subsequent toxicity (eg. QT prolongation, hypoglycemia).

When to intubate:

- PaO₂/FiO₂ < 200
- PaO₂/FiO₂ < 300 with hypotension requiring vasopressor support
- GCS < 8 with threatened airway

Decision to intubate should be taken on a case by case basis based on the clinician's discretion

How to intubate:

- Pre-oxygenation with 100% FiO₂
- Try to avoid bag and mask ventilation (due to aerosol generation) but can be used if required by connecting an HME
- The most skilled member of the team should be identified at the beginning of each shift for performing intubation
- If difficult airway is anticipated (past history of difficult airway, mouth opening < 3cm, thyromental distance < 6cm, restricted head and neck mobility), critical care physician/anaesthesiologist to attempt intubation using videolaryngoscope
- In unanticipated difficult airway, use laryngeal mask airway and simultaneously call AB&ICU critical care team
- Rapid sequence intubation to be done using induction agents (propofol or etomidate) and muscle relaxant (Succinyl choline or Rocuronium)

- During induction, monitor for hemodynamic instability and use fluids and vasopressors if required
- Use end-tidal CO₂ and X-ray chest to confirm correct position of tube
- After intubation, appropriate cleaning/disinfection of equipment and environment should be done

Criteria for ICU admission:

- Requiring mechanical ventilation
- Hypotension requiring vasopressor support
- Worsening mental status
- Multi-organ dysfunction syndrome

Care of ventilated patient:

- Fresh ventilator circuit to be used for every new patient
- Tubings and HME to be changed every 48 hours or when visibly soiled
- Used closed suctioning technique and avoid routine suctioning
- Sedation and muscle relaxants may be used in difficult to ventilation patients
- ARDS management as per ARDS.net protocol (airway pressure release ventilation, ECMO, prone ventilation may be considered based on the expertise available)



INCLUSION CRITERIA: Acute onset of

1. PaO₂/FIO₂ ≤ 300 (corrected for altitude)
2. Bilateral (patchy, diffuse, or homogeneous) infiltrates consistent with pulmonary edema
3. No clinical evidence of left atrial hypertension

PART I : VENTILATOR SETUP AND ADJUSTMENT

1. Calculate predicted body weight (PBW)
Males = 50 + 2.3 [height (inches) - 60]
Females = 45.5 + 2.3 [height (inches) - 60]
2. Select any ventilator mode
3. Set ventilator settings to achieve initial V_T = 8 ml/kg PBW
4. Reduce V_T by 1 ml/kg at intervals ≤ 2 hours until V_T = 6ml/kg PBW.
5. Set initial rate to approximate baseline minute ventilation (not > 35 bpm).
6. Adjust V_T and RR to achieve pH and plateau pressure goals below.

OXYGENATION GOAL: PaO₂ 55-80 mmHg or SpO₂ 88-95%
Use a minimum PEEP of 5 cm H₂O. Consider use of incremental FIO₂/PEEP combinations such as shown below (not required) to achieve goal.

Lower PEEP/ higher FIO₂

FIO ₂	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.7
PEEP	5	5	8	8	10	10	10	12

FIO ₂	0.7	0.8	0.9	0.9	0.9	1.0
PEEP	14	14	14	16	18	18-24

Higher PEEP/ lower FIO₂

FIO ₂	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5
PEEP	5	8	10	12	14	14	16	16

FIO ₂	0.5	0.5-0.8	0.8	0.9	1.0	1.0
PEEP	18	20	22	22	22	24

PLATEAU PRESSURE GOAL: ≤ 30 cm H₂O

Check Pplat (0.5 second inspiratory pause), at least q 4h and after each change in PEEP or V_T.

If Pplat > 30 cm H₂O: decrease V_T by 1ml/kg steps (minimum = 4 ml/kg).

If Pplat < 25 cm H₂O and V_T < 6 ml/kg, increase V_T by 1 ml/kg until Pplat > 25 cm H₂O or V_T = 6 ml/kg.

If Pplat < 30 and breath stacking or dys-synchrony occurs: may increase V_T in 1ml/kg increments to 7 or 8 ml/kg if Pplat remains ≤ 30 cm H₂O.



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Figure 8: Protocol for management of ARDS (ARDS.net)

Supportive treatment in critically ill patients:

- Head end elevation
- Oral hygiene with mouthwash
- Glycemic control to maintain blood sugar below 180 mg/dl
- Ulcer prophylaxis with proton pump inhibitors
- Thromboprophylaxis with subcutaneous low molecular weight heparin and DVT pump
- Foley's catheter and Ryle's tube
- Central venous catheter
- Bedsore prevention by position change every 2 hours

Septic shock:

- Recognize septic shock in adults when infection is suspected or confirmed AND vasopressors are needed to maintain mean arterial pressure ≥ 65 mmHg AND lactate is ≥ 2 mmol/L in absence of hypovolemia.
- Recognize septic shock in children with any hypotension (systolic blood pressure [SBP] < 5 th centile or > 2 SD below normal for age) or two or more of the following: altered mental state; bradycardia or tachycardia (Heart rate < 90 /min or > 160 /min in infants and < 70 /min or > 150 /min in children); prolonged capillary refill (> 2 sec) or feeble pulses; tachypnea; mottled or cold skin or petechial or purpuric rash; increased lactate; oliguria; hyperthermia or hypothermia.
- Management should be as per surviving sepsis campaign guidelines

When to do dialysis:

- Urine output < 400 ml/24 hours
- Uremic encephalopathy
- Severe metabolic acidosis
- Uremic pericarditis
- Refractory hyperkalemia
- Fluid overload



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Keep low threshold for dialysis as fluid overload and acidosis are detrimental in ARDS.

Bedside dialysis to be preferred.

Pregnant patients:

- Testing to be prioritized
- Steroids may be given for fetal indications as per obstetrician's advice
- Obstetrician to monitor fetal well-being daily

Breastfeeding patients:

Currently there is no data suggestive of viral transmission via breast milk. However, due to close contact and risk of droplet transmission, breastfeeding should be avoided in COVID-19 confirmed mothers.

Discharge Criteria:

- Suspected case – if the laboratory results for COVID-19 are negative, discharge is to be decided as per discretion of the treating physician based on his provisional/confirmed diagnosis
- Confirmed case – resolution of symptoms, radiological improvement with a documented virological clearance in 2 samples at least 24 hours apart



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APPENDIX I: HOME QUARANTINE/ISOLATION GUIDELINES FOR SUSPECTED OR CONFIRMED COVID-19 CASES

Instructions for home quarantine of COVID-19 contacts:

- Stay in a well-ventilated room separated from other people and pets
- Should preferably have attached/separate toilet
- Restrict his/her movement within the house.
- In shared spaces, maintain a distance of at least 1-2 meters and wear a medical mask when in proximity with other people
- Take special care to stay away from elderly people, pregnant women, children and persons with co-morbidities
- Do **NOT** attend any social/religious/public gathering e.g. wedding, condolences, etc.
- Wash hand often thoroughly with soap and water (at least 40 seconds) or with alcohol-based hand sanitizer (at least 20 seconds) especially after coughing and sneezing, and before and after eating, drinking and using the washroom
- Follow all steps of handwashing as described in chapter 4
- Avoid sharing household items with other people at home (e.g. dishes, drinking glasses, cups, eating utensils, towels, bedding etc.)
- Used three layered medical mask should be considered as potentially infected
- If symptoms appear (cough/fever/difficulty in breathing), he/she should immediately inform the nearest health center or call **011-23978046**.

Instructions for the family members of person being home quarantined/isolated:

- Household members should stay in a different room and be separated from the person as much as possible
- Only an assigned family member should be tasked with taking care of the person and should help with groceries, prescriptions and other personal needs
- Avoid shaking the soiled linen or direct contact with skin
- Pets should be cared for by household members and should be kept separate from the person
- Use disposable gloves when cleaning the surfaces or handling soiled linen



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- Stay at least 1 m away from those who are coughing
- Wash hands after removing gloves and before and after eating, drinking and using the washroom with soap and water (at least 20 seconds) or with alcohol-based hand sanitizer (at least 30 seconds)
- All non-essential visitors should be prohibited
- In case the person being quarantined becomes symptomatic, all his close contacts will be home quarantined for 14 days and followed up for an additional 14 days or till the report of such case turns out negative on lab testing

Environmental sanitation:

- Immediately remove and wash clothes and bedding that have blood, stool or other body fluids on them
- Clean and disinfect frequently touched surfaces in the quarantined person's room (e.g. bed frames, tables etc.) daily with Sodium Hypochlorite solution (1%) or ordinary bleach (5%)
- Clean and disinfect toilet surfaces daily with regular household bleach solution/phenolic disinfectants
- Wash laundry used by the person separately using common household detergent and dry thoroughly using the warmest temperatures recommended on the clothing label
- Place all used disposable gloves, masks and other contaminated waste in a lined container before disposing of them with other household waste and wash hands with soap and water/alcohol-based hand rub as shown in the picture below

Duration of home quarantine period is for 14 days from contact with a confirmed case or earlier if a suspected case (of whom the index person is a contact) turns out negative on laboratory testing.

Duration of home isolation for confirmed cases with mild disease is:

- Afebrile for 72 hours AND at least 7 days after symptom onset

OR

- 2 negative samples 24 hours apart



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APPENDIX II: TRANSPORT PROTOCOL

For shifting any suspected or confirmed COVID-19 patients, the following steps must be followed by the accompanying healthcare provider:

A. Decontaminate hands (alcohol-based sanitiser/soap)

B. Don PPE

C. Inform Trauma Centre control room regarding the admission/transfer of a potentially infectious patient.

D. In ambulance

- Use single use or single patient use medical equipment where possible
- Use disposable linen if available
- Monitor and document vitals and medical management done in ambulance

E. Arrival at Trauma centre

- Before the patient leaves the ambulance ensure arrangements are in place for receipt of the patient
- Transfer patient to the care of hospital staff at Trauma Centre
- After transfer of patient remove PPE
- Perform hand hygiene

F. Before ambulance is used again

- Cleaning and disinfecting (PPE as outlined above should be worn while cleaning)
- Surfaces (stretcher, chair, door handles etc.) should be cleaned with a freshly prepared 0.5-1% hypochlorite solution or equivalent
- Medical equipment should be cleaned as per hospital infection control protocol



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APPENDIX III: PRECAUTION FOR HOSTEL RESIDENTS AT AIIMS

Precautions for residents caring for COVID-19 patients:

- To stay alone in separate rooms till 14 days after their duties in corona unit are over
- To avoid meeting friends, colleagues, working staff in hostel. In case of unavoidable circumstances use face mask while meeting them
- Do not travel outside or within country unless absolutely indicated (till 31st March)
- Food should be ordered from canteen to their room (Can order over phone)
- Hand sanitizer should be kept in room and as well as every wing in case of common bathroom
- Common bathroom to be cleaned twice daily
- Residents using common toilets can wipe seats after coming in body contact after each use
- Daily clothes used by the residents to be washed themselves and not to be given to laundry

Precautions for general residents:

- To avoid crowded places such as malls, cinema hall, CME, conferences
- To avoid meeting with residents who are taking care of corona infected patients
- To defer any plans of travel especially home particularly areas from where COVID-19 cases have been reported
- Practice regular hand washing and hygiene measures with sanitizer, soap and water
- To report to hospital authority if any of their friends, hostel staff develop fever or other respiratory symptoms



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APPENDIX IV: GUIDANCE ON USE OF PPE BASED ON LEVEL OF EXPOSURE

Setting	Target personnel or patients	Activity	PPE
DESIGNATED COVID AREAS			
ICU	Healthcare workers (Doctor/Nurses/Technician)	Aerosol Generating procedures	N95 Goggles or Face shield Gown (Water resistant) Gloves (Double) Apron (optional) Shoe cover Hood
	Cleaner/Sweeper/HA	Disinfection	N95 Goggles Gown (Water resistant) Heavy Duty Gloves Boots Hood
Ward	Healthcare workers (Doctor/Nurses/Technician)	Non-Aerosol Generating Procedure	N95 Goggles Gown (Water resistant) Gloves (Double) Shoe cover Hood
	Cleaner/Sweeper/HA	Disinfection/Patient Shifting	N95 Heavy Duty Gloves/ Gloves (Patient shifting) Goggles Gown (Water resistant) Boots Hood
Screening (Burns and plastic surgery)	Healthcare workers (Doctor/Nurses)	Screening	N95 Goggles Gown (Water resistant) Gloves (Double)



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	Healthcare workers (Doctor/Nurses)	Sampling	N95 Goggles Gown (Water resistant) Gloves (Double) Shoe cover Hood
	Cleaner/Sweeper/HA	Disinfection/Patient Shifting	Triple layer mask Gloves (Patient shifting) Heavy Duty Gloves
DESIGNATED SCREENING AREAS			
Screening (New RAK OPD)	Healthcare workers (Doctor/Nurses)	Screening	N95 Gloves (Single)
	Cleaner/Sweeper/HA	Disinfection	Triple layer mask Heavy Duty Gloves Boots
Screening (Emergency Medicine; Pediatrics OPD)	Healthcare workers (Doctor/Nurses)	Screening	N95 Goggles Gown [Surgical Linen (OT Gown)] use with an apron Gloves (Double)
	Cleaner/Sweeper/HA	Disinfection	Triple layer mask Heavy Duty Gloves
TRANSPORT of COVID SUSPECT/ CONFIRMED CASE IN AMBULANCE			
Ambulance (HCW travelling in patient compartment)	Healthcare workers (Doctor/Nurses)	Attending patient (Direct contact >15 min)	N95 Goggles Gown (Water resistant) Gloves (Double)
	Cleaner/Sweeper/HA	Disinfection	Triple layer mask Heavy Duty Gloves
	Driver	No Direct contact	Triple layer mask



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NON-COVID AREA; MAIN HOSPITAL, CENTERS			
Emergency Medicine (New Emergency; Pediatric Emergency; Surgical Emergency)	Healthcare workers (Doctor/Nurses/Technician)	Non-Aerosol generating procedure Resuscitation	Triple layer mask* Gown (In Red area only) Gloves (Double) *N95 [Red area only]
	Cleaner/Sweeper/HA	Disinfection/Patient Shifting	Triple layer mask Gloves (Patient Shifting) Heavy Duty Gloves
General OPD/EHS OPD	Healthcare workers (Doctor/Nurses)	Non-Aerosol generating procedure	Triple layer mask
	Cleaner/Sweeper/HA	Disinfection	Triple layer mask Heavy Duty Gloves
General Ward/Private Wards	Healthcare workers (Doctor/Nurses)	Non-Aerosol generating procedure	Triple layer mask
	Cleaner/Sweeper/HA	Disinfection/Patient Shifting	Triple layer mask Gloves (Patient Shifting) Heavy Duty Gloves
ICUs	Healthcare workers (Doctor/Nurses/Technician)	Aerosol Generating procedures in Non-COVID Area	Triple layer mask Cap Gown (Water resistant) Gloves Shoe cover
	Cleaner/Sweeper/HA	Disinfection/Patient Shifting	Triple layer mask Cap Gown (Water resistant) Gloves (Patient Shifting) Heavy Duty Gloves Boots
EHS Dispensary	Pharmacist	Drug Dispensing	Triple layer mask



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Laboratory personnel	Doctor/Technician	Dealing with Respiratory samples	Triple layer mask Gown (Water resistant) Gloves Goggles
Radiodiagnosis	Doctor/Technician	Non-aerosol generating procedures	Triple layer mask
Administrative offices	All staff	No direct/indirect patient contact	No PPE
COVID Confirmed case/Suspect	Patient	For Droplet prevention	Triple layer mask



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APPENDIX V: EFFECTIVE DISINFECTANTS FOR USE

Disinfectant	Composition	Preparation	Use	Contact period
Bacillol spray	Propanolol, Ethanol	Preformed spray	Surface cleaning, Patient care equipment, non easy accessible place of cot, wheels	5 min
7% lysol	Benzalkonium chloride solution (80%), water, Laurel alcohol ethoxylate	15 ml in 1 litre of water	Toilet cleaning in non-ICU area (floor surface)	10 mins
Avagard Hand rub	2-propanolol, 1-propanolol	Dispense 3-5 ml on hand	Hand rub purpose	20 sec
1% Hypochlorite	When preparing chlorine solutions note that: Discard after 24 hours Avoid direct contact with skin and eyes Wear PPE	2 Table spoon full of calcium hypochlorite in 1 liter of water	Ventilator circuits, oxygen mask, nasal prongs, suction jar and tubes, blood and body fluid stained instruments and linens	15 min
10% Hypochlorite	Prepare in well ventilated area Use plastic container which is covered with lid	20 Table spoon full of calcium hypochlorite in 1 liter of water	Decontaminate large blood spill>10ml	15 mins
0.1% Hypochlorite		2 Table spoon full of calcium hypochlorite in 10 liter of water	Infected patient bed in isolation room	10 min
Detergent soap		Soap chips in hot water-dilute the concentrate daily	For general floor cleaning	5 min



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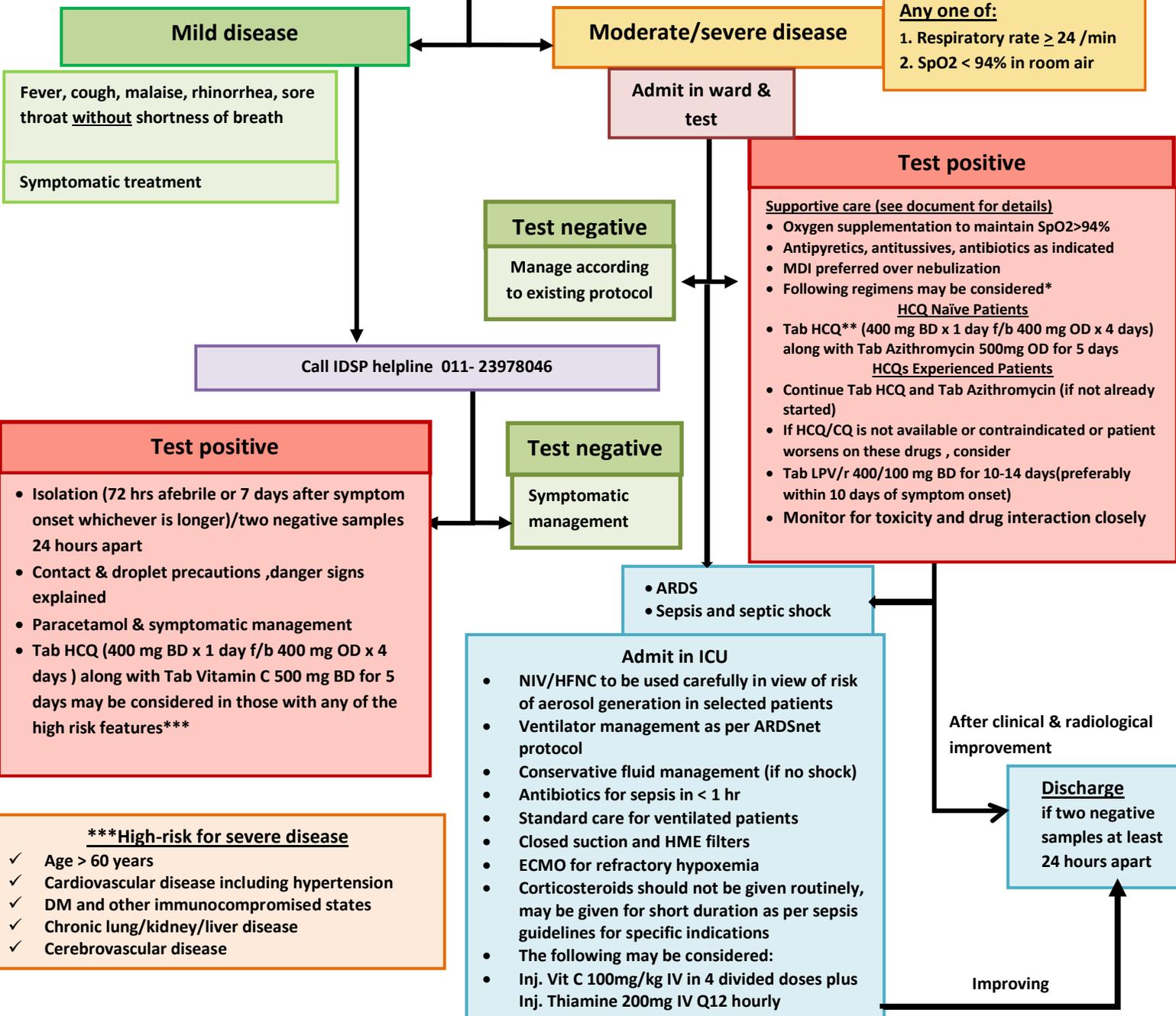
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INTERIM CLINICAL GUIDANCE FOR MANAGEMENT OF COVID-19

COVID-19 Suspect

- Symptomatic (fever with cough/shortness of breath) individuals who have undertaken international travel in the last 14 days, *or*
- Symptomatic contacts of laboratory confirmed cases, *or*
- Symptomatic healthcare personnel (HCP), *or*
- All hospitalized patients with severe acute respiratory illness (fever AND cough and/or shortness of breath) with no other etiology found, *or*
- Asymptomatic direct and high risk contacts of a confirmed case (should be tested once between day 5 and day 14 after contact)

Direct and high-risk contacts include those who live in the same household with a confirmed case and HCP who examined a confirmed case.



*****High-risk for severe disease**

- ✓ Age > 60 years
- ✓ Cardiovascular disease including hypertension
- ✓ DM and other immunocompromised states
- ✓ Chronic lung/kidney/liver disease
- ✓ Cerebrovascular disease

*Use of Antivirals is based on very limited good quality evidence

* *In case HCQ is not available, chloroquine phosphate (500 mg BD for 10 days) may be considered



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APPENDIX VII: DRUG INTERACTIONS

Category X

1. Midazolam – Atazanavir/Lopinavir-Ritonavir: May increase serum concentration of midazolam

Category D

2. Chloroquine – Atazanavir/Lopinavir-Ritonavir: May increase serum concentration of chloroquine
3. Fentanyl – Atazanavir/Lopinavir-Ritonavir: May increase serum concentration of fentanyl
4. Ketamine – Atazanavir/Lopinavir-Ritonavir: May increase serum concentration of ketamine

Category C

5. Chloroquine – Azithromycin/Levofloxacin: QT prolongation/hypoglycemia
6. Chloroquine – Levofloxacin/Aspirin/Linezolid: QT prolongation/hypoglycemia

X – Avoid combination D – Consider treatment modification C – Monitor therapy



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APPENDIX VIII: MANAGEMENT OF DEAD BODY

Packing and transport of the dead body of patients of potential concern to mortuary:

- Death due to COVID-19 is a non-medicolegal case.
- The deceased must be placed in a zipped body bag immediately after death with identification tag marked 'COVID-19'.
- Ensure that the body is fully sealed in an impermeable body bag before being removed from the isolation room or area, and before being transferred to the mortuary, to avoid leakage of body fluid.
- Transfer the body to the mortuary as soon as possible after death.
- Autopsy for medical/pathological/legal reasons must be avoided if there is no substantial reason.
- If an autopsy is being considered, the body may be kept in refrigeration in the mortuary and the autopsy conducted only when a safe environment is available in that mortuary.
- If body is to be held for less than 48 hours, storage at 6°C or below is appropriate. If longer-term storage is needed, this should be at temperatures of approximately 4°C. Carry out regular temperature checks of cold storage facilities to confirm that refrigeration units are working effectively.
- When properly packed in the body bag, the body can be safely removed for storage in the mortuary, sent to the crematorium, or placed in a coffin for burial.
- The vehicle used for transporting the body from hospital to mortuary or crematorium should be properly disinfected and decontaminated with 1% Sodium Hypochlorite.
- Ensure that mortuary staff and the burial team apply standard precautions (i.e. perform proper hand hygiene and use appropriate PPE, including long sleeved gown, gloves and facial protection if there is a risk of splashes from the patient's body fluids or secretions onto the body or face of the staff member).

If an autopsy is performed, collection of the following postmortem specimens is recommended:

- Postmortem clinical specimens for testing for SARS-CoV-2, the virus that causes COVID-19:
 - i. Upper respiratory tract swabs: nasopharyngeal swab AND oropharyngeal swab
 - ii. Lower respiratory tract swab: Lung swab from each lung



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- iii. Separate clinical specimens for testing of other respiratory pathogens and other postmortem testing as indicated
- iv. Formalin-fixed autopsy tissues from lung, upper airway, and other major organs

General guidance for workers / employee in mortuary:

- Mortuary and death care workers who have contact with human remains known or suspected to be contaminated must be protected from exposure to infected blood and body fluids, contaminated objects, or other contaminated environmental surfaces.
- The number of people allowed in the autopsy room should be limited.
- Use of an oscillating bone saw should be avoided for confirmed or suspected cases of COVID-19. Consider using hand shears as an alternative cutting tool. If an oscillating saw is used, attach a vacuum shroud to contain aerosols.
- After handing over the body of the deceased, the mortuary must be kept cleaned using 1% Sodium Hypochlorite. All the surfaces, instruments and transport trolleys should be properly disinfected with 1% Hypochlorite solution for a minimum period of 10 minutes.

PPE for handling dead bodies:

- Wear a disposable, long-sleeved, cuffed gown; if the outside of the body is visibly contaminated with body fluids, excretions, or secretions, ensure that this gown is waterproof. If no waterproof gown is available, wear a waterproof apron in addition to the gown.
- If splashing of body fluids is anticipated, use facial protection: preferably a face shield, or if not, goggles and a medical mask to protect the eyes and mucous membranes.
- Perform hand hygiene after taking off the PPE.
- Use PPE for heavy-duty tasks (e.g. rubber gloves, rubber apron and resistant closed shoes) in addition to regular PPE.

Personal protective equipment during autopsy:

- Engage a minimum number of staff in the procedure, and perform only if an adequately ventilated room suitable for the procedure is available;
- Scrub suit – tops and trousers, or equivalent garments;
- Single-use, fluid-resistant, long-sleeved gown;



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- Surgical mask or certified N95, EU FFP2 or equivalent;
- Either autopsy gloves (cut-proof synthetic mesh gloves) or two pairs.
- Knee-high boots.
- Avoid splashes when removing, handling or washing organs, especially lung tissue and the intestines
- Clean surfaces that have become contaminated with tissues or body fluids and decontaminate by removing most of the tissue or body substance with absorbent materials; cleaning surfaces with water and detergent; applying the disinfectant standardized by the health-care facility – if sodium hypochlorite solution is used wet the surface with the solution and allow at least 10 minutes contact time; rinsing thoroughly.
- Remove PPE before leaving the autopsy suite and follow appropriate disposal requirements. After removing PPE, always perform good hand hygiene practices.

Waste disposal:

- All waste generated from the mortuary or embalming room is potentially infectious and should be dealt with as risk waste.
- Staff that generate risk waste have a duty of care to ensure that it is correctly segregated, sealed and stored and disposed of appropriately, through a licensed agent. Anything that has been contaminated by body fluids should be sealed as risk waste.
- Body fluids and other contaminated liquids may be discharged into the drainage system.
- Liquid products from the management of human remains should not be allowed to drain into surface water, and working sinks in the mortuary and embalming room should be connected to the sewerage system.
- Extreme care must be exercised during the use and disposal of sharps. The use of disposable blades and needles is recommended and should be disposed of by the person who uses them.

Once the COVID-19 patient succumbs expires, the medical professionals should hand over the body of the deceased to relatives and friends for last rites assuring that there is no spread of the infection preferably in a fluid proof coffin. The methodology to be adopted to make sure that no spread of infection to people who are dealing with the dead body are enlisted below:



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- Handling staff should be appropriately dressed in PPE i.e. gloves, water resistant gown/ plastic apron over water repellent gown, and surgical mask. Use goggles or face shield to protect eyes, if there may be splashes.
- All tubes, drains and catheters attached to the dead body should be removed before handing over to the relatives.
- Wound drainage and needle puncture holes should be disinfected, surgically closed and dressed with impermeable material. Secretions in oral and nasal orifices can be cleared by gentle suction if needed.
- Oral, nasal and rectal orifices of the dead body have to be plugged to prevent leakage of body fluids.
- Before packing the dead body, it should be cleaned and disinfected using sterilizing agent based on 70% alcohol or 1% Sodium Hypochlorite.
- Transfer the body to mortuary at the earliest with body covered in a robust, leak proof zipped transparent plastic body bag which is locked properly using nylon cable zip ties to avoid spillage of any fluids. The plastic body bag should not be less than 150 µm thick.
- The bagged body should be either wrapped with a mortuary sheet or placed in an opaque body bag.
- The body bag packing should again be disinfected using sterilizing agent.
- Embalming of such bodies should be avoided.
- Relatives are allowed to view the deceased one last time before last rites after followed standard precautionary measures and unzipping the face end of the body bag.
- For the purpose of last rites, cremation should be preferred for complete elimination of chances of infection in either electric or gas crematorium in situ in zipped body bag. However keeping in mind the religious views of the family, if the burial of the body is requested, then it should be assured that the body is buried in a thick, air tight coffin and placed at normal depth of burial (4 to 6 feet). It is recommended that the area above and adjacent to the grave should be cemented immediately as an additional precautionary measure and the space should be marked and required precautions should be taken to avoid scavenging by animals.
- As a precautionary measure large gathering at the crematorium/ burial ground should be avoided to maintain a healthy distancing.
- The remains of the last rites like ashes do not pose any risk of infection and can be collected for religious immersion.
- Remove personal protective equipment after handling of the dead body. Then, perform hand hygiene immediately.