3. Immediate implementation of appropriate infection prevention and control (IPC) measures

IPC is a critical and integral part of clinical management of patients and WHO guidance is available (https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/infection-prevention-and-control).

- **Initiate IPC at the point of entry of the patient to hospital. Screening should be done at first point of contact at the emergency department or outpatient department/clinics. Suspect patients should be given a mask and directed to separate area. Keep at least 1 m distance between suspected patients.**
- **Standard precautions should always be applied in all areas of health care facilities. Standard precautions include hand hygiene and the use of personal protective equipment (PPE) when in indirect and direct contact with patients' blood, body fluids, secretions (including respiratory secretions) and non-intact skin. Standard precautions also include prevention of needle-stick or sharps injury; safe waste management; cleaning and disinfection of equipment; and cleaning of the environment.**
- **In addition to standard precautions, health care workers should do a point-of-care risk assessment at every patient contact to determine whether additional precautions (e.g. droplet, contact, and/or airborne) are required.**

Table 3. How to implement IPC measures for patients with suspected or confirmed COVID-19 infection

Instructions for patients	Give suspect patient a medical mask and direct patient to separate area; an isolation room if available. Keep at least 1 m distance between suspected patients and other patients. Instruct all patients to cover nose and mouth during coughing or sneezing with tissue or flexed elbow and perform hand hygiene after contact with respiratory secretions.
Apply droplet precautions	Droplet precautions prevent large droplet transmission of respiratory viruses. Use a medical mask if working within 1 m of the patient. Place patients in single rooms, or group together those with the same etiological diagnosis. If an etiological diagnosis is not possible, group patients with similar clinical diagnosis and based on epidemiological risk factors, with a spatial separation. When providing care in close contact with a patient with respiratory symptoms (e.g. coughing or sneezing), use eye protection (face mask or goggles), because sprays of secretions may occur. Limit patient movement within the institution and ensure that patients wear medical masks when outside their rooms.
Apply contact precautions	Contact precautions prevent direct or indirect transmission from contact with contaminated surfaces or equipment (i.e. contact with contaminated oxygen tubing/interfaces). Use PPE (medical mask, eye protection, gloves and gown) when entering room and remove PPE when leaving and practice hand hygiene following PPE removal. If possible, use either disposable or dedicated equipment (e.g. stethoscopes, blood pressure cuffs, pulse oximeters and thermometers). If equipment needs to be shared among patients, clean and disinfect between each patient use. Ensure that health care workers refrain from touching their eyes, nose and mouth with potentially contaminated gloved or ungloved hands. Avoid contaminating environmental surfaces that are not directly related to patient care (e.g. door handles and light switches). Avoid medically unnecessary movement of patients or transport. Perform hand hygiene.
~~Apply airborne precautions when performing an aerosol-generating procedure~~	
Ensure that health care workers performing aerosol-generating procedures (e.g. open suctioning of respiratory tract, intubation, bronchoscopy, cardiopulmonary resuscitation) use the appropriate PPE, including gloves, long-sleeved gowns, eye protection, and fit-tested particulate respirators (N95 or equivalent, or higher level of protection). A scheduled fit test should not be confused with a users' seal check before each use. Whenever possible, use adequately ventilated single rooms when performing aerosol-generating procedures, meaning negative pressure rooms with a minimum of 12 air changes per hour or at least 160 L/second/patient in facilities with natural ventilation. Avoid the presence of unnecessary individuals in the room. Care for the patient in the same type of room after mechanical ventilation commences.	

Abbreviations: ARI acute respiratory infection; PPE personal protective equipment.

4. Collection of specimens for laboratory diagnosis

WHO guidance on specimen collection, processing and laboratory testing is available (https://www.who.int/publications-detail/laboratory-testing-for-2019-novel-coronavirus-in-suspected-human-cases-20200117). Additionally, guidance on related biosafety procedures is available (https://apps.who.int/iris/bitstream/handle/10665/331138/WHO-WPE-GIH-2020.1-eng.pdf).

Collect blood cultures for bacteria that cause pneumonia and sepsis, ideally before antimicrobial therapy. DO NOT delay antimicrobial therapy to collect blood cultures.

Collect specimens from the upper respiratory tract (URT; nasopharyngeal and oropharyngeal) AND, where clinical suspicion remains and URT specimens are negative, collect specimens from the lower respiratory tract when readily available (LRT; expectorated sputum, endotracheal aspirate, or bronchoalveolar lavage in ventilated patient) for SARS-CoV-2 testing by RT-PCR and bacterial stains/cultures.

In hospitalized patients with confirmed COVID-19, repeat URT and LRT samples can be collected to demonstrate viral clearance. The frequency of specimen collection will depend on local epidemic characteristics and resources. For hospital discharge, in a clinically recovered patient two negative tests, at least 24 hours apart, is recommended.

Remark 1: Use appropriate PPE for specimen collection (droplet and contact precautions for URT specimens; airborne precautions for LRT specimens). When collecting URT samples, use viral swabs (sterile Dacron or rayon, not cotton) and viral transport media. Do not sample the nostrils or tonsils. In a patient with suspected COVID-19, especially with pneumonia or severe illness, a single URT sample does not exclude the diagnosis, and additional URT and LRT samples are recommended. LRT (vs URT) samples are more likely to be positive and for a longer period *(23)*. Clinicians may elect to collect only LRT samples when these are readily available (for example, in mechanically ventilated patients). Sputum induction should be avoided due to increased risk of aerosol transmission.

Remark 2 for pregnant patients: COVID-19 testing of symptomatic pregnant women may need to be prioritized to enable access to specialized care.

Remark 3: Dual infections with other respiratory viral and bacterial infections have been found in SARS, MERS and COVID-19 patients *(8)*. As a result, a positive test for a non-SARS-CoV-2 pathogen does not rule out COVID-19. At this stage, detailed microbiologic studies are needed in all suspected cases. Both URT and LRT specimens can be tested for other respiratory viruses, such as influenza A and B (including zoonotic influenza A), respiratory syncytial virus, parainfluenza viruses, rhinoviruses, adenoviruses, enteroviruses (e.g. EVD68), human metapneumovirus and endemic human coronaviruses (i.e. HKU1, OC43, NL63, and 229E). LRT specimens can also be tested for bacterial pathogens, including *Legionella pneumophila*. In malaria endemic areas, patients with fever should be tested for the presence of malaria or other co-infections with validated rapid diagnostic tests (RDTs) or thick and thin blood films and treated as appropriate. In endemic settings arbovirus infection (dengue/chikungunya) should also be considered in the differential diagnosis of undifferentiated febrile illness, particularly when thrombocytopenia is present. Co-infection with SARS-CoV-2 may also occur and a positive diagnostic test for dengue (e.g. dengue RDTs) does not exclude the testing for COVID-19 *(24)*.