FEDERAL MINISTRY OF HEALTH

NATIONAL GUIDELINES FOR CLINICAL MANAGEMENT OF COVID-19

World Health Organization
Nigeria

Version 5, September 2021

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Dr. Adebimpe Adebiyi mni
National Team Lead, Case Management Pillar &
Director, Department of Hospital Services
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FOREWORD

The index case of COVID-19 was reported in Nigeria on 27th February 2020 as a case imported from Italy. The goal of the Federal Ministry of Health is to reduce mortality and morbidity from the disease by ensuring that every patient has timely access to care.

Following the outbreak of the disease in China and subsequent spread to other countries, the Federal Ministry of Health developed guidelines for accreditation of Treatment and Isolation Centres, whereafer facilities were designated as Treatment and Isolation Centres, while health workers were trained to recognize the disease and manage patients who tested positive for it.

Furthermore, the designated Health facilities were equipped and in some instances, upgraded to manage COVID-19 cases. Diagnostic and medical oxygen capacities of facilities are being constantly improved. Oxygen plants were repaired and efforts are ongoing to provide new oxygen plants in all States of the federation.

Government has ensured that the management of COVID-19 patients in the treatment centres is multidisciplinary, involving not only infectious disease experts, but other specialists to manage co-morbidities which tend to worsen prognosis.

This guideline has been revised in line with latest information on COVID-19 and global best practices. It is therefore my expectation that the use of this document will further improve management of confirmed cases of COVID-19, resulting in better outcomes.

Dr. E. Osagie Ehanire, *MD, FWACS*
Honourable Minister for Health

Executive Summary

The Guideline for Management of Confirmed Cases of COVID 19 is expected to guide clinicians in the management of COVID-19.

The document outlines the recent Case Definition of COVID-19, classification of the disease based on severity, IPC measures, collection of samples, clinical management of cases as well as other chapters aimed at ensuring the holistic care of the confirmed cases of COVID-19.

Key changes in the current guideline are as follows:

- *Updated Case definitions*
- *Disease classification into asymptomatic, mild, moderate, severe and critical disease.*
- *Emphasis on combination of evidence based practices which have shown improved care outcomes locally when applied consistently together.*
- *The use of Corticosteroids expanded to include other corticosteroids.*
- *Emphasis on awake prone position in patients with severe COVID-19 that are hospitalized requiring supplemental oxygen or non-invasive ventilation.*
- *Thromboprophylactic dosing of anticoagulants for hospitalised patients.*
- *Change in the discharge criteria from 14 days in Symptomatic cases to 10 days after symptom onset, plus at least 3 days without symptoms (fever and respiratory symptoms) and SpO2≥94% in room air for 3 days while for asymptomatic cases 10 days after positive test for SARS-CoV-2.*
- *Triage and IPC measures expanded to clearly capture hospital settings, in order not only to reduce transmission to other patients while in the hospital but to reduce transmission of the disease to healthcare workers*
- *Post acute covid-19 syndrome added to bring to the fore that following discharge, some COVID-19 patients may still have certain symptoms which may necessitate follow up for a variable period of time.*
- *The current document takes into cognisance that discharge from the COVID-19 pathway does not necessarily mean discharge from the hospital as there may still be need to manage a patient's comorbidity and or complications after discharge from COVID-19 pathway.*
- *Mental and psychosocial support is also emphasized.*

Adherence to this guideline will improve treatment outcomes with a reduction in morbidity and mortality, as well as reduce healthcare worker infection.

Preface

The updated version of the Clinical Management of COVID-19 was developed through collaborative efforts of the Federal Ministry of Health to guide health workers in response to cases of COVID-19 in Nigeria.

This guideline will continue to be updated based on emerging research and evidence. This current update is based on the recent WHO guideline: COVID-19 Clinical management. Living guidance 25 January 2021 (*https://www.who.int/publications*-WHO/2019-nCoV/clinical/2021.1) and Therapeutics and COVID-19 living guideline 6 July 2021 (https://www.who.int/publications/i/item/WHO-2019-nCoV-therapeutics-2021.2).

This document has been developed as a guide for the management of COVID-19 cases in Nigeria and should be used by all healthcare providers, including those working in the public and private sector.

The guideline includes guidance on:

- Identifying and reporting suspect COVID-19 cases
- Diagnosing COVID-19
- Clinical management of COVID-19 cases
- Managing complications in patients with COVID-19
- Discharge criteria for patients

Abbreviations

ADL	Activities of Daily Living
ARDS	Acute Respiratory Distress Syndrome
AWaRe	Access, Watch or Reserve (antibiotics)
BiPAP	Bilevel Positive Airway Pressure
BMI	Body Mass Index
BP	Blood Pressure
bpm	beats per minute
COPD	Chronic Obstructive Pulmonary Disease
COVID-19	Coronavirus disease
CPAP	Continuous Positive Airway Pressure
CRF	Case Record Form
CRP	C-Reactive Protein
CT	Computed Tomography
CV	Central Venous
DIC	Disseminated Intravascular Coagulation
DVT	Deep Vein Thrombosis
ECLS	ExtraCorporeal Life Support
ECMO	ExtraCorporeal Membrane Oxygenation
Epid ID	Epidemiology Identification number
FiO2	Fraction of Inspired Oxygen
GDG	Guideline Development Group
GRADE	Grading of Recommendations Assessment, Development and Evaluation
HFNO	High Flow Nasal Oxygen
HIV	Human Immunodeficiency Virus
HRF	Hypoxaemic Respiratory Failure
ICU	Intensive Care Unit
IFRC	International Federation of Red Cross and Red Crescent Societies
InFACT	International Forum for Acute Care Trialists
IPC	Infection Prevention Control
IQR	interquartile range
ISARIC	International Severe Acute Respiratory and emerging Infection Consortium
IV	Intravenous
LFT	Liver Function Test
LGA	Local Government Area
LRT	Lower Respiratory Tract
LTCF	Long-Term Care Facility
MAGIC	Magic Evidence Ecosystem Foundation
MAP	Mean Arterial Pressure
MERS	Middle East Respiratory Syndrome
MERS-CoV	Middle East respiratory syndrome coronavirus
MHPSS	Mental Health And Psychosocial support
MISC- C	Multisystem Inflammatory Syndrome temporally associated with COVID-19 in Children and adults
NAAT	Nucleic Acid Amplification Test
NCD	Non-Communicable Disease
NICU	Neonatal Intensive Care Unit
NIV	Non-Invasive Ventilation
OI	Oxygenation Index
OSI	Oxygenation Index using SpO2
PaO2	partial pressure arterial oxygen
PBW	Predicted Body Weight
PCR	Polymerase Chain Reaction

PCT	Procalcitonin
PEEP	Positive End Expiratory Pressure
PHEIC	Public Health Emergency of International Concern
PICS	Post-Intensive Care Syndrome
PPE	Personal Protective Equipment
PTSD	Post-Traumatic Stress Disorder
PUI	person/patient under investigation
RCT	Randomized Controlled Trial
RDT	Rapid Diagnostic Test
RM	Recruitment Manoeuvre
RR	Respiratory Rate
RT-PCR	Reverse Transcription Polymerase Chain reaction
SARS	Severe Acute Respiratory Syndrome
SARS-CoV	Severe Acute Respiratory Syndrome Coronavirus
SBP	Systolic Blood Pressure
SE	State Epidemiologist
SIRS	Systemic Inflammatory Response Syndrome
SOFA	Sequential Organ Failure Assessment
SOP	Standard Operating Protocol
SpO2	oxygen saturation
SVR	Systemic Vascular Resistance
TB	tuberculosis
UNICEF	United Nations Children's Fund
URT	Upper Respiratory Tract
VTE	venous thromboembolism
VTM	Viral Transport Medium
WHO	World Health Organization

CHAPTER 1: INTRODUCTION

1.1 Background

Coronaviruses are a large family of RNA viruses that infect avian (birds) and many mammals (humans). These viruses cause illnesses that range from common cold to more severe respiratory diseases and less commonly gastroenteritis. Coronavirus disease 2019 (COVID-19) is caused by an emerging strain of coronavirus (SARS-CoV-2) that has not been previously identified in humans. Similar coronaviruses are also responsible for Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS), which have caused outbreaks in various parts of the world.

Person-to-person transmission has been established between people who are in close contact with one another (within about 2 meters/6.6 feet), primarily via respiratory droplets. Droplet transmission occurs when respiratory droplets generated via coughing, sneezing, or talking come in contact with susceptible mucosal surfaces, such as the eyes, nose or mouth. Transmission may also occur indirectly via direct contact with contaminated fomites through hands and then mucosal surfaces.Airborne transmission in closed settings and during aerosol generating procedures can also occur.

The incubation period for COVID-19 is 5-7 days on average but could be up to 14 days. Infected individuals may however be infectious 1-3 days before the onset of symptoms. Viral shedding varies with severity of illness and could range from 10 days to 21 days after symptom onset or even longer in a few patients.

It is now known that children have milder disease and better prognosis than other age groups. An acute hyper-inflammatory syndrome has been described in children leading to multi-organ failure and worse prognosis.

Pregnant women are not at higher risk of getting the disease but are at increased risk of developing severe disease if infected compared with non-pregnant women of a similar age. COVID-19 during pregnancy has been associated with an increased likelihood of preterm birth.

There is an increased appreciation of the wider range of manifestations of COVID-19. Mental and neurological manifestations are frequent and varied and the latter have been reported even in the absence of respiratory symptoms. Post-acute sequelae of COVID-19 have been described in the mid and long terms, with a clustering of several symptoms that may last for as long as 6 months in many cases.

1.2 Case Definition for COVID-19*

**Please refer to the NCDC website for updates on the case definition www.covid19.ncdc.gov.ng*

COVID-19 cases are epidemiologically classified as suspected, probable or confirmed cases as defined below.

1.2.1 *Suspected case*

A. Any person who meets the clinical and epidemiological criteria:

Clinical Criteria:

Acute onset of ANY TWO OR MORE of the following signs and symptoms: fever, cough, runny nose, sore throat/ pharyngitis, headache, difficulty breathing/ dyspnoea, nausea, loss of taste, loss of smell, general weakness/ fatigue, diarrhoea, chest pain, vomiting, chills/ sweating, muscle pain/ myalgia, wheezing, abdominal pain, altered mental status.

Epidemiological Criteria:

1. Residing or working in a setting with high risk of transmission of the virus, for example, closed residential settings and humanitarian settings, such as camps and camp-like settings for displaced persons, any time within the 14 days before symptom onset.

   OR

2. Residing in or travel to a country, state or LGA with community transmission as classified by the Nigeria Centre for Disease Control (NCDC), anytime within the 14 days before symptom onset.

   OR

3. Working in a health setting, including within health facilities anytime within the 14 days before symptom onset.

B. A patient with Severe Acute Respiratory Illness (SARI) [acute respiratory infection with history of fever or measured fever of ≥ 38°C; and cough with onset within the last 10 days; and who requires hospitalization] or with chest imaging showing findings suggestive of COVID-19 disease.

C. A person not meeting epidemiological criteria with positive SARS CoV-2 antigen detecting rapid diagnostic test (Ag-RDT), irrespective of symptoms

D Close contact of a confirmed case irrespective of any symptoms

1.2.2 *Probable case*

A probable case is defined as a suspected case who dies prior to the collection of a valid sample.

1.2.3 *Confirmed case*

Any person with laboratory PCR confirmation of SARS-CoV-2 infection with or without signs and symptoms

1.2.4 *Contact*

A contact is a person who experienced any one of the following exposures during the 2 days before and the 14 days after the onset of symptoms of a probable or confirmed case:

1. Face to face contact with a probable or confirmed case within 1metre and for more than 15 minutes.
2. Direct physical contact with a probable or confirmed case.
3. Direct care for a patient with probable or confirmed COVID -19 disease without proper use of personal protective equipment;
   OR
4. Other situations as indicated by local risk assessments

Note:For confirmed asymptomatic cases, the period of contact is measured as the 2 days before, through the 14 days after the date on which the sample was taken which led to confirmation.

1.3 Triage

Table 1.1 COVID-19 disease severity

Asymptomatic		Confirmed cases of COVID-19 who do not have symptoms consistent with COVID-19
Mild disease		Symptomatic patients meeting the case definition for COVID-19 without evidence of viral pneumonia or hypoxia.
Moderate disease	**Pneumonia**	**Adolescent or adult** with clinical signs of pneumonia (fever, cough, dyspnoea, fast breathing) but no signs of severe pneumonia, including SpO2 ≥ 90% on room air *(2)*. **Child** with clinical signs of non-severe pneumonia (cough or difficulty breathing + fast breathing and/or chest indrawing) and no signs of severe pneumonia. Fast breathing (in breaths/min): < 2 months: ≥ 60; 2–11 months: ≥ 50; 1–5 years: ≥ 40 *(3)*. While the diagnosis can be made on clinical grounds; chest imaging (radiograph, CT scan, ultrasound) may assist in diagnosis and identify or exclude pulmonary complications. **Caution:** *The oxygen saturation threshold of 90% to define severe COVID-19 was arbitrary and should be interpreted cautiously. For example, clinicians must use their judgment to determine whether a low oxygenSaturation is a sign of severity or is normal for a given patient with chronic lung disease. Similarly, a saturation >90–94% on room air is abnormal (in a patient with normal lungs) and can be an early sign of severe disease, if the patient is on a downward trend. Generally, if there is any doubt, it is recommended to consider the illness as severe.*
Severe disease	**Severe pneumonia**	**Adolescent or adult** with clinical signs of pneumonia (fever, cough, dyspnoea, fast breathing) plus one of the following: respiratory rate > 30 breaths/min; severe respiratory distress; or SpO2 < 90% on room air *(2,4)*. **Child** with clinical signs of pneumonia (cough or difficulty in breathing) + at least one of the following: ● Central cyanosis or SpO2 < 90%; severe respiratory distress (e.g. fast breathing, grunting, very severe chest indrawing); general danger sign: inability to breastfeed or drink, lethargy or unconsciousness, or convulsions *(3)*. ● Fast breathing (in breaths/min): < 2 months: ≥ 60; 2–11 months: ≥ 50; 1–5 years: ≥ 40 *(5)*. While the diagnosis can be made on clinical grounds; chest imaging (radiograph, CT scan, ultrasound) may assist in diagnosis and identify or exclude pulmonary complications.
Critical disease	**Acute respiratory distress syndrome (ARDS)** *(6-8)*	**Onset:** within 1 week of a known clinical insult (i.e. pneumonia) or new or worsening respiratory symptoms. **Chest imaging:** (radiograph, CT scan, or lung ultrasound): bilateral opacities, not fully explained by volume overload, lobar or lung collapse, or nodules. **Origin of pulmonary infiltrates:** respiratory failure not fully explained by cardiac failure or fluid overload. Need objective assessment (e.g. echocardiography) to exclude hydrostatic cause of infiltrates/oedema if no risk factor present. **Oxygenation impairment in adults** *(5,6)*: ● Mild ARDS: 200 mmHg < PaO2/FiO2a ≤ 300 mmHg (with PEEP or CPAP ≥ 5 cmH2O).[b] ● Moderate ARDS: 100 mmHg < PaO2/FiO2 ≤ 200 mmHg (with PEEP ≥ 5 cmH2O).[b] ● Severe ARDS: PaO2/FiO2 ≤ 100 mmHg (with PEEP ≥ 5 cmH2O).[b] **Oxygenation impairment in children:** note OI and OSI.[c] Use OI when available. If PaO2 not available, wean FiO2 to maintain SpO^2 ≤ 97% to calculate OSI or SpO2/FiO2 ratio: ● Bilevel (NIV or CPAP) ≥ 5 cmH2O via full face mask: PaO2/FiO2 ≤ 300 mmHg or SpO2/FiO2 ≤ 264. ● Mild ARDS (invasively ventilated): 4 ≤ OI < 8 or 5 ≤ OSI < 7.5. ● Moderate ARDS (invasively ventilated): 8 ≤ OI < 16 or 7.5 ≤ OSI < 12.3. ● Severe ARDS (invasively ventilated): OI ≥ 16 or OSI ≥ 12.3.

	Sepsis *(9,10)*	**Adults:** acute life-threatening organ dysfunction caused by a dysregulated host response to suspected or proven infection. Signs of organ dysfunction include: altered mental status (delirium), difficult or fast breathing, low oxygen saturation, reduced urine output *(8)*, fast heart rate, weak pulse, cold extremities or low blood pressure, skin mottling, laboratory evidence of coagulopathy, thrombocytopenia, acidosis, high lactate, or hyperbilirubinemia. **Children:** suspected or proven infection and ≥ 2 age-based systemic inflammatory response syndrome (SIRS) criteria,[d] of which one must be abnormal temperature or white blood cell count.
	Septic shock *(9,10)*	**Adults:** persistent hypotension despite volume resuscitation, requiring vasopressors to maintain MAP ≥ 65 mmHg and serum lactate level > 2 mmol/L. **Children:** any hypotension (SBP < 5th centile or > 2 SD below normal for age) or two or three of the following: altered mental status; bradycardia or tachycardia (HR < 90 bpm or > 160 bpm in infants and heart rate < 70 bpm or > 150 bpm in children); prolonged capillary refill (> 2 sec) or weak pulse;
	Acute thrombosis	Acute venous thromboembolism (i.e. pulmonary embolism), acute coronary syndrome, acute stroke.
	MIS-C	**Preliminary case definition:** Children and adolescents 0–19 years of age with fever > 3 days **AND** Two of the following: • rash or bilateral non-purulent conjunctivitis or muco-cutaneous inflammation signs (oral, hands or feet); • hypotension or shock; • features of myocardial dysfunction, pericarditis, valvulitis, or coronary abnormalities (including ECHO findings or elevated troponin/NT-proBNP); • evidence of coagulopathy (by PT, PTT, elevated D-dimers), acute gastrointestinal problems (diarrhoea, vomiting, or abdominal pain); **AND** Elevated markers of inflammation such as ESR, C-reactive protein, or procalcitonin. **AND** No other obvious microbial cause of inflammation, including bacterial sepsis, staphylococcal or streptococcal shock syndromes. **AND** Evidence of COVID-19 (RT-PCR, antigen test or serology positive), or likely contact with patients with COVID-19.

a If altitude is higher than 1000 m, then the correction factor should be calculated as follows: PaO2/FiO2 x barometric pressure/760.
b When PaO2 is not available, SpO2/FiO2 ≤ 315 suggests ARDS (including in non-ventilated patients).
c Oxygenation Index (OI) is an invasive measurement of the severity of hypoxaemic respiratory failure and may be used to predict outcomes in paediatric patients. It is calculated as follows: percentage of fraction of inhaled oxygen multiplied by the mean airway pressure (in mmHg), divided by the partial pressure of arterial oxygen (in mmHg). Oxygen Saturation Index (OSI) is a non-invasive measurement and has been shown to be a reliable surrogate marker of OI in children and adults with respiratory failure. OSI replaces PaO2 with oxygen saturation as measured by pulse oximetry (SpO2) in the OI equation.
d SIRS criteria: abnormal temperature (> 38.5 °C or < 36 °C); tachycardia for age or bradycardia for age if < 1 year; tachypnoea for age or need for mechanical ventilation; abnormal white blood cell count for age or > 10% bands.

Abbreviations:
BP blood pressure; bpm beats per minute; CPAP continuous positive airway pressure; CT computed tomography; FiO2 fraction of inspired oxygen; MAP mean arterial pressure; NIV non-invasive ventilation; OI Oxygenation Index; OSI Oxygenation Index using SpO2; PaO2 partial pressure arterial oxygen; PEEP positive end-expiratory pressure; SBP systolic blood pressure; SD standard deviation; SIRS systemic inflammatory response syndrome; SOFA sequential organ failure assessment; SpO2 oxygen saturation

1.3.1 Triaging Modalities for Different Classes of COVID-19 Cases

All healthcare workers must ensure use of appropriate PPE for triaging

For the purpose of triage in a health facility,appropriate Personal Protective Equipment (PPE) are gloves and face mask. For specimen collection, healthcare workers MUST wear gloves, N95 respirator, face shield/goggles and apron. During aerosol generating procedures, N95 respirator should be worn in addition to gloves, gown and face/ eye protection. Rational use of PPE is important.

1.3.1.1 Suspect Case

a. Document using the standard tool for case investigation to check that the patient meets the case definition.
b. Put the patient in a holding area and institute infection prevention measures *(Refer to guideline on IPC).*
c. Alert the relevant authorities – Hospital management, infectious disease team or responsible physician, State Epidemiologist,
NCDC on NCDC toll-free number: **0800 9700 0010**
SMS: **0809 955 5577** and *WhatsApp*: **0708 711 0839.**
d. Using full PPE (apron, gloves, N95, and face shield), arrange for the collection of 1 nasal and 1 oropharyngeal swab. Both swabs should be placed into a single tube of Virus Transport Medium (VTM). Sputum samples can be collected if a patient has a productive cough. For severely ill patients, endotracheal aspirate or bronchoalveolar lavage are recommended.
Samples should be packaged according to national SOPs and sent to a designated testing laboratory for diagnostic testing (see sample collection section). These samples are also recommended for deceased patients.
e. Using full PPE (apron, gloves, face mask and goggles/face shield) conduct vital signs at presentation and closely monitor vital signs at least every 4 hours (Pulse Rate, Blood Pressure, Respiratory Rate (RR), Temperature, **SpO_2**).
f. Commence oxygen if **RR >30/min**, or **SpO_2 < 90% (<92% in children).**
g. Commence IV fluids (Crystalloids preferred-Normal Saline/Ringers Lactate) once **BP < 90/60mmHg**.
h. If in a designated treatment centre: take samples for full blood count and C-reactive protein

1.3.1.3 Confirmed Case

In addition to steps listed under suspected case,

a. Assess for severity of disease
b. Alert the relevant authorities – Hospital management, infectious disease team or responsible physician, State Epidemiologist, NCDC on NCDC toll-free number: 0800 9700 0010 SMS: 0809 955 5577 and WhatsApp: 0708 711 0839.
c. Continue supportive care as appropriate
d. Prepare patient for transfer (see *SOP on Transfer of Patien*t)

Confirmed cases who meet the criteria for Home- Based Isolation and Care should be managed in their homes and monitored closely by designated Home Based Care Teams (see *Interim Guideline for Home Based Isolation and Care of Confirmed COVID-19 Cases*)

Moderate and severe cases should be admitted in the wards while critical cases should be admitted to the Intensive Care Unit.

Table 1.2: Recommended strategies for health workers after confirmation of a case

S/N	Recommendation items
1	Isolate patients • Stop visits by family and friends • Restrict the patient's movement/activity • Have the patient stay alone in a well-ventilated room if feasible • In cases where wards with multiple beds are used, maintain a bed distance of at least 2 metres in-between patients
2	Maintain a sanitary environment • Clean and disinfect patients surrounding using 500 mg/L chlorine containing disinfectant frequently every day (e.g. *JIK, Hypo*)
3	Use of Appropriate PPEs • Wear gloves, face mask, face shield/goggles and apron at all times when interacting with patient • Wear N95 respirator, face shield/goggles, gloves and apron while performing aerosol generating procedures like intubation.
4	Commence therapy • Ensure optimal oxygenation • Conservative fluid therapy

Table 1.3: Recommended strategies for persons and caregivers at home, during self-isolation

S/N	Recommendation items
1	Self-isolate • Stop visits by family and friends • Restrict movement • Person in self-isolation should stay alone in a well-ventilated room
2	Maintain a sanitary environment • Clean and disinfect patients surrounding using 500 mg/L chlorine containing disinfectant frequently every day (e.g. *JIK, Hypo*)
3	Observe IPC measures • Wash hands with soap and water frequently especially when visibly soiled • Use hand sanitizer when there is limited access to soap and water. • Cough or sneeze into a disposable toilet roll/towel and wash hands immediately after this; if not available cough/sneeze into your elbow • Avoid sharing of toothbrush, towel, bedsheets, etc. • Wash and disinfect towel daily
4	Selection of a caregiver • Select a person who is healthy family member/caregiver without underlying diseases

1.4 Overview of PPE

Personal protective equipment (PPE) is designed to protect the wearer's skin, eyes, mucous membranes, airways and clothing from coming into contact with infectious agents. Mucous membranes and skin with compromised integrity are portals of entry that are highly susceptible to infectious agents such as COVID-19. It is important to note that the use of PPE is not a substitute for proper infection prevention and control practice. For example, the use of gloves is not a substitute for hand hygiene.

Healthcare workers who work with COVID-19 patients must be proficient in donning and doffing PPE and this requires specific training.

PPE is recommended in the care and management of suspected or confirmed cases of COVID-19.

1.4.1 Who should wear protective clothing?

Select which PPE items to wear based on this assessment:

- **Patients** with suspected or confirmed COVID-19 infection should wear a face mask when being evaluated medically.

- **Healthcare workers:** All doctors, nurses, and health workers who work in COVID-19 treatment centres should wear full/ complete PPEs. They must be proficient in donning and doffing PPE and this requires specific training.

- **Support staff** who clean the isolation room, handle contaminated supplies and equipment, launder re-usable supplies, and collect and dispose of infectious waste from COVID-19 patients should wear gown, gloves, and face masks while working in the treatment centre.

- **Laboratory staff** who handle patient specimens and body fluids from suspected COVID-19 cases should have complete PPEs (gown, gloves, N95, and face shield) on while performing their official duties.

- **Laboratory support staff** who clean and disinfect laboratory equipment used to test COVID-19 specimens should have complete
  PPEs put on gown, gloves, N95, and face shield while performing their official duties.

- **Safe burial teams** who remove bodies of deceased COVID-19 patients and prepare them for burial (gown, gloves, N95, and face shield).

Risk assessment is critical for all activities, i.e. assess each health care activity and determine the PPE that is needed for adequate protection.

The choice and combination of PPE ensembles to be worn in dealing with COVID-19 patients should be based on a careful risk assessment that considers risk of exposure and extent of contact anticipated with blood, body fluids, respiratory droplets, and/or open skin. The PPE is to be worn systematically.

Table 1.4-: Personal Protective Equipment and Use

PPE	Characteristics and how to use
Eye protection **(goggles or face shield)**  	• Face shield or goggles can be used • Should adequately protect the healthcare workers conjunctival mucous membranes from splashes • Goggles should be preferably used for high risk situations • Normal reading glasses are not acceptable as PPE for eye protection so a face shield with anti-fog should be worn over the glasses or goggles big enough to cover the glasses • Goggles must fit comfortably and securely; each person should have his/her own goggles/face shield with personal names on them • Condensation of the goggles can be a major problem: it impairs the user's vision and is dangerous but can be minimized by anti-fog spray
Mouth and nose protection **(surgical face mask)** 	• Healthcare workers must cover the mouth and nose to avoid body fluid splashes and droplet spread. • Medical-surgical mask should be fluid-resistant with structured design that does not collapse against the mouth
Respiratory protection (N95, FFP3) 	• The respirator protects from the inhalation of droplets and particles. • Given that the fitting of different types of respirator will vary for each user, the respirator will require a fitting test in order to find the best match of PPE to user. • A respirator should always be used when performing aerosol-generating procedures in a COVID-19 patient.

PPE	Body protection (gowns)
Gloves 	• Correctly sized latex or nitrile examination gloves should be used to protect hands against both direct and indirect contact. • A new pair of gloves should be used for each patient. Remember that for invasive procedures you need sterile gloves. • DO NOT touch eyes, nose or mouth areas with gloved hands.

PPE	Characteristics and how to use
Body protection (gowns) 	• Long-sleeved water-resistant gowns should be used. This PPE does not need to be sterile, unless used in a sterile environment (e.g. operating room). • If water-resistant gowns are not available, single-use plastic aprons can be used on top of the non-water-resistant gowns to prevent body contamination.
Apron 	• When the risk of splashes from patient's vomiting, diarrhea or bleeding is high, aprons should be worn over the gown or coverall because fluid-proof aprons provide extra protection of the front part of the body and is easier to replace than a soiled gown or coverall. • Disposable aprons should be used.
Protective body wear (Coverall) 	• Disposable gown or coverall made of fabric that is tested for resistance to penetration by blood or body fluids or blood borne pathogens should be worn over scrubs. This should only be used when there is a risk that the environment is highly contaminated and there will be very close contact with the patient
Footwear 	• Rubber or gum boots are preferred over closed shoes because they are fluid-proof, easier to clean and disinfect. • They provide optimal protection from splashes/wetness and protect from sharp injuries. • If not available, then wear closed shoes with disposable impermeable shoe covers. • Boots should also be cleaned to remove gross contamination and then disinfected prior to re-use.
Head cover 	• The purpose of head covers is to protect the skin and hair from virus contamination with subsequent unrecognised transmission to the mucosa of the eyes, nose or mouth.
Heavy-duty rubber gloves 	• Cleaners, laundry workers and healthcare workers when handling infectious waste (i.e. solid waste or any secretion or excretion of with visible blood) should wear heavy duty rubber gloves over nitrile gloves. • Movement of human remains or performing environmental cleaning activities also requires the use of heavy-duty rubber gloves.

- Before exiting isolation area, carefully remove PPE and dispose in waste containers in a designated doffing area.
- Do not recycle any single-use PPE.
- Remove PPE under supervision of a trained buddy.
- Avoid any contact with soiled items and areas of the face or skin.
- Place reusable equipment in bin for decontamination.

1.4.2 Key Infection, Prevention and Control (IPC) strategies to prevent transmission in healthcare settings

Summary of key IPC strategies to limit or prevent transmission in healthcare settings include the following:

Screening and triage for early recognition of suspected COVID-19 patients and rapid implementation of source control measures.

- Screen all persons at first point of contact in health facility to allow for early recognition followed by their immediate isolation/separation.
- Ask the suspected or confirmed COVID-19 patient to wear a medical mask and direct the patient to a separate, well-ventilated area, ideally an isolation room/area if available.
- Keep at least 1 m distance between patients.
- Instruct all patients to cover nose and mouth during coughing or sneezing with tissue or flexed elbow, dispose of tissues safely immediately after use in a closed bin and perform hand hygiene after contact with respiratory secretions.
- Restrict visitors to those that are essential such as the parents of paediatric patients and caregivers and ask them to wear a mask.

Apply standard precautions for all patients.

- Apply standard precautions according to risk assessment for all patients, always, when providing any diagnostic and care services.
    - Standard precautions include but are not limited to, hand and respiratory hygiene and the appropriate use of PPE; universal masking is required for all persons in areas of known or suspected community or cluster SARS-CoV-2 transmission *(11)*.
- Standard precautions also include appropriate patient placement; environmental cleaning; prevention of needle-stick or sharps injury and safe waste management.
- Use either disposable or dedicated equipment (e.g. stethoscopes, blood pressure cuffs, pulse oximeters and thermometers). Clean and disinfect between each patient use.
- Avoid contaminating environmental surfaces that are not directly related to patient care (e.g. door handles,light switches, hand rails, furniture, e.t.c)
- Do not touch eyes, nose and mouth with gloved or ungloved hands.
- Routinely clean and disinfect all surfaces especially high touch surfaces, those surfaces touched by patients and surfaces soiled or if contaminated with blood and body fluids.
- Always practice health care waste management, including sharps, needles, waste related to surgeries and obstetric care.

Apply contact and droplet precautions for suspected or confirmed COVID-19 patients.

- Place all cases in well-ventilated single rooms if feasible. When single rooms are not available. Where unavailable, ensure at least 1 metre space between beds. Where single rooms are not available ensure suspected, probable or confirmed COVID-19 patients are grouped together (cohorted) in adequately ventilated areas with bed space at least 1 m apart.

- Limit patient movement within the institution and ensure that patients wear medical masks when outside of their care area (e.g. when being transported).
- All health workers attending to suspected or confirmed cases should wear gloves, a clean, long sleeved gown, medical mask and eye protection (goggles or face shield).
- Remove PPE when leaving the patient care area, following instructions how to remove PPE safely *(12)*.

Apply airborne precautions when performing aerosol-generating procedures.

- Aerosol-generating procedures included the following; tracheal intubation and extubation, non-invasive ventilation [CPAP and BiPAP], tracheotomy, cardiopulmonary resuscitation, manual ventilation before intubation, bronchoscopy and sputum induction induced by using nebulized hypertonic saline), dental procedures (using high speed devices, for example ultrasonic scalers/high speed drills), respiratory tract suctioning, upper ENT airway procedures that involve respiratory suctioning, upper gastro-intestinal endoscopy where open suction of the upper respiratory tract occurs, high speed cutting in surgery/post-mortem procedures if respiratory tract/paranasal sinuses involved or in settings where aerosol-generating procedures are performed, airborne in combination with contact precautions should be used.
- Perform aerosol-generating procedures in adequately ventilated rooms.
- Use fit-tested particulate respirators (N95 or equivalent, or higher level of protection), gloves, long-sleeved gowns, eye protection (goggles or face shield) for all aerosol generating procedures.

  Note:
  In situations where TB may co-exist, specific measures may be necessary in addition to the above (13).

  Implementation of administrative controls

- All healthcare facilities in Nigeria must ensure that they have an IPC programme, their healthcare workers are correctly trained on basic IPC procedures and able to implement standard and droplet precautions.
- All facilities must provide the supplies, equipment, information leaflets and posters needed to assist healthcare workers and visitors adhere to IPC requirements.
- Use of environmental and engineering controls such as adequate spatial separation of patients, ventilation requirements and appropriate cleaning of the facility environment.

1.5 Standard Precautions

The highest risk of healthcare- associated transmission is in the absence of standard precautions, when basic IPC measures for respiratory infections are not in place, including when caring for patients for whom COVID-19 infection has not yet been confirmed. Although airborne transmission is not considered the principal transmission route for COVID-19, we recommend a cautious approach due to possible transmission through aerosols.

Modes of transmission:
This can occur by droplets sprayed by affected individuals, contact with patient respiratory secretions, contaminated surfaces and equipment. A possibility of airborne infection exists, especially while performing aerosol-generating procedures on severely ill patient(s), such as intubation. As such, airborne precautions must be observed during such procedures.

CHAPTER 2: DIAGNOSIS OF COVID-19

The gold standard for the laboratory diagnosis of COVID-19 is by real-time Polymerase Chain Reaction (PCR).

Antigen (Ag)- based rapid diagnostic tests (RDTs) can serve as a rapid means of identifying cases in settings where access to molecular testing is limited or impracticable. Antigen testing can be included in the diagnostic algorithm under the right circumstances. The currently recommended Ag-based RDTs for COVID-19 testing by WHO are by **SD Biosensor** and **Abbott.** See Annex 8 for GUIDANCE ON THE USE OF ANTIGEN RAPID DIAGNOSTIC KITS FOR DIAGNOSIS OF SARS-CoV-2 INFECTION IN NIGERIA.

Note: SARS-CoV-2 antibody tests are not recommended for diagnosis of current infection with COVID-19

2.1 Procedure for Sample Collection

2.1.1 Recommended samples for diagnosis using PCR

A minimum of 1 nasal swab and 1 oropharyngeal swab should be collected using the appropriate swab and the corresponding VTM.

Sputum should also be collected from patients with a productive cough. (Use appropriate PPE for specimen collection (droplet and contact precautions for URT specimens; airborne precautions for LRT specimens).

A minimum of 2 specimens possibly from different sites should be collected from each patient.

- **Patients with mild to moderate diseases:** oropharyngeal swab, nasal swabs and sputum (if it can be produced) should be collected.
- **Severely ill patients:** endotracheal aspirate or bronchoalveolar lavage is recommended if the patient is intubated.
- **Deceased patients:** oropharyngeal swab and nasal swab.

2.1.2 Recommended samples for diagnosis using Ag- Based RDTs

Currently the authorized Ag-RDTs for SARS CoV-2 require **nasal** or **nasopharyngeal** swab samples

1. Use appropriate PPE for specimen collection (droplet and contact precautions for URT specimens; airborne precautions for LRT specimens).
2. In the first week of symptom onset relatively high viral loads are generally observed in the upper respiratory tract (URT) specimens. For the collection of URT samples, we recommend the collection of nasopharyngeal and oropharyngeal specimens. When collecting URT samples, use viral swabs (sterile Dacron or rayon, not cotton), for nasopharyngeal swabbing use a swab with a long flexible shaft designed for nasopharyngeal sampling. Unless specified differently by the receiving laboratory, transport sample in viral transport media.
3. LRT (vs URT) samples are more likely to be positive after the first week of illness. Thus if URT are negative and clinical suspicion remains, also collect specimens from the LRT when readily available (expectorated sputum, or endotracheal aspirate/bronchoalveolar lavage in ventilated patient). Clinicians may elect to collect only LRT samples when these are readily available (for example, in mechanically ventilated patients). Sputum induction should be avoided owing to increased risk of aerosol transmission. In a patient with suspected COVID-19, especially with pneumonia or severe illness, a single negative URT sample does not exclude the diagnosis, and additional URT and LRT samples are recommended (15). In hospitalized patients with confirmed COVID-19, repeated URT and LRT samples can be collected, as clinically indicated, but are no longer indicated for release from COVID-19 precautions (16).

5. If repetitive negative NAAT/RT-PCR results are obtained from a patient in whom COVID-19 is strongly suspected, a paired serum specimen could be collected. One specimen taken in the acute phase and one in the convalescent phase 2–4 weeks later. This is only useful if validated (semi) quantitative serology assays and trained staff for the interpretations are available in the receiving laboratory. With these paired samples it can be retrospectively evaluated whether there is seroconversion or a rise in antibody titres, further supporting the suspicion that this individual indeed had recent COVID-19 despite negative NAATs.
6. Depending on the local epidemiology and clinical symptoms, test for other potential etiologies (e.g. influenza, malaria, dengue fever, typhoid fever) as appropriate.
7. If blood cultures cannot be taken timely before the administration of antimicrobial therapies, indicate the details of administered antibiotics on the laboratory request.

2.1.2 Materials and supplies required

- Spatula (tongue depressor)
- Dacron flocked swabs/ plastic swabs. Do not use swabs with wooden stick
- 2ml Viral transport medium
- Parafilm (or any leak proof film that serves the purpose)
- Triple packaging box
- Ice packs
- Waste bins
- Bin liners (Black, yellow and Red)
- Falcon tubes
- Ziploc bag
- Sterile collection Bottle for sputum/ bronchoalveolar lavage
- Freshly prepared 0.5% Hypochlorite solution
- Personal Protective Equipment (PPE) (Hand gloves, head cover, lab coat, N95 face mask, eye goggle/face shield, lab boots)
- Marker pens

2.1.3 Storage conditions of samples after collection

Specimen collected from patients must be appropriately packaged and transported at the right t emperature for successful testing of samples. The table below provides the details of materials needed and appropriate temperature for the specimen, for successful testing.

Table 1.5: Description of specimen types, storage and transportation conditions and key considerations.

Specimen type	Collection materials	Transport to laboratory	Storage till testing	Key Considerations
Nasal swab	Dacron or polyester flocked swab and VTM	2°C to 4₀C; frozen ice packs	≤5 days; 4°C >5days; -20₀C to -70°C	Can be placed in the same Virus Transport Medium (VTM) tube as oropharyngeal swab;
Oropharyngeal Swab	Dacron or polyester flocked swab and VTM	2°C to 4₀C; frozen ice packs	≤5 days; 4°C >5days; -20₀C to -70°C	Can be placed in the same VTM tube as nasal swab
Sputum	Sterile container	2°C to 4₀C; frozen ice packs	48 hrs; 4°C >48hrs -20₀C to -70°C	Ensure material is from lower respiratory tract; ensure adherence to IPC standards and correct use of PPE
Bronchoalveolar Lavage	Sterile container	2°C to 4₀C; frozen ice packs	≤48 hrs; 4₀C >48hrs -20₀C to -70°C	Collected from severely ill patient, Dry swab to be used if bacterial or fungal culture is to be performed. Ensure adherence to IPC standards and correct
(Endo)tracheal aspirate, nasopharyngeal aspirate or nasal Wash	Sterile container	2°C to 4₀C; frozen ice packs	≤48hrs; 4°C >48hrs -20₀C to -70°C	Dry swab to be used if bacterial or fungal culture is to be performed. Ensure adherence to IPC standards and correct use of PPE

CHAPTER 3: CLINICAL MANAGEMENT OF COVID-19

Clinical management of COVID-19 is guided by general principles of management of respiratory illnesses. This will be progressively updated based on emerging evidence on clinical care and management.

Note: Every healthcare worker should take this as a serious disease and treat patients with respect and utmost care.

3.1 Symptoms associated with COVID-19

Presenting signs and symptoms of COVID-19 vary.

Most persons experience fever (83–99%), cough (59–82%), fatigue (44–70%), anorexia (40–84%), shortness of breath (31–40%), myalgias (11–35%). Other non-specific symptoms, such as sore throat, nasal congestion, headache, diarrhoea, nausea and vomiting, have also been reported (14,15,16,17). Loss of smell (anosmia) or loss of taste (ageusia) preceding the onset of respiratory symptoms has also been reported (18,19,20).

Additional neurological manifestations reported include dizziness, agitation, weakness, seizures, or findings suggestive of stroke including trouble with speech or vision, sensory loss, or problems with balance in standing or walking (21,22).

Older people and immunosuppressed patients in particular may present with atypical symptoms such as fatigue, reduced alertness, reduced mobility, diarrhoea, loss of appetite, confusion, and absence of fever (23,24).

Symptoms such as dyspnoea, fever, gastrointestinal (GI) symptoms or fatigue due to physiologic adaptations in pregnant women, adverse pregnancy events, or other diseases such as malaria, may overlap with symptoms of COVID-19 (25).

Children might not have reported fever or cough as frequently as adults (26).

3.2 Management of Asymptomatic/Mild Cases

Patients with asymptomatic/ mild disease may present to an emergency unit, primary care/outpatient department, or be encountered during community outreach activities, such as home visits or by telemedicine.

These categories of patients are usually managed at home outside the Health Facility including clinically stable patients with well controlled co-morbidities. (See Interim Guideline for Home Based Isolation and Care of Confirmed COVID-19 cases

3.2.1 Clinical features

- Other patients may have non- specific symptoms such as fever, cough, sore throat, nasal congestion, malaise, headache and muscle pain.
- Other symptoms could include loss of smell, loss of taste, diarrhea, vomiting, abdominal pain.
- Early symptomatic treatment and careful monitoring is recommended for a favorable outcome.
- Remember that children with non-severe pneumonia could present with cough or difficulty in breathing ± fast breathing and no sign of progression to the severe form of pneumonia.

3.2.2 Supportive treatment and investigations

Early supportive therapy and monitoring is recommended for a favorable outcome

- Test for other causes of fever e. g malaria, lassa fever, Respiratory tract infections, Urinary Tract Infections etc
- Check for pre-existing co-morbidities- hypertension, diabetes, HIV, asthma (blood pressure, blood sugar level checks etc)
- Check oxygen saturation with a pulse oximeter,
- Chest x-ray for severe cases
- Baseline investigation- Full Blood Count, Electrolyte, Urea & Creatinine, C-Reactive Protein, Liver function test etc
- Counsel patient on need for isolation, regular monitoring for signs and symptoms of complications
- Give psychosocial support

3.2.3 Management of asymptomatic and mild cases

Asymptomatic and mild cases should be managed in their homes. The decision to monitor a suspect case with mild COVID-19 in a health facility, community facility or home should be made on a case-by-case basis based on the COVID-19 care pathway.

Additionally, this decision may depend on the clinical presentation, requirement for supportive care, potential risk factors for severe disease, and conditions at home, including the presence of vulnerable persons in the household. This should be guided by the Reviewed interim guidelines for home based isolation and care of confirmed cases.

- Manage symptomatically for fever, cough, sore throat, nasal congestion, malaise, headache and muscle pain – with antipyretics, cough medicine, rest etc
- Close monitoring of all vital signs
- Multivitamins and mineral supplements may be administered
- Ensure adequate rest and oral hydration
- **DO NOT give prophylactic antibiotics for asymptomatic or mild cases.**
- For patients being treated at home, proper counselling on signs and symptoms of complications (such as difficulty breathing, chest pain, etc.) should be provided to patients and their caregivers with need to seek urgent care when signs and symptoms of complications arise through the established COVID-19 care pathway. This should prompt urgent care and possible conversion from Home to facility care.
- Alternative delivery platforms such as home-based, phone, telemedicine or community outreach teams should be provided to assist with home-based care monitoring
- For symptomatic patients with COVID-19 who are not hospitalized, the following should be done;

    - Ensure pulse oximetry monitoring at home, with appropriate education of patient and provider on its use.
    - Closely monitor patients for signs and or symptoms of disease progression.
    - Provide mechanisms for close follow up care on need for escalation of medical care should need arise.

3.3 Management of moderate Cases

See Table 1.1 for classification of moderate cases
Patients with moderate disease may present to an emergency unit or primary care/outpatient department, or be encountered during community outreach activities, such as home visits or by telemedicine. Patients with suspected or confirmed moderate COVID-19 should be managed in a health facility. They may not require emergency interventions/oxygen supplementation but admission is necessary for urgent intervention in case of deterioration. Other management would be on a case-by-case basis.
For hospitalized patients, regularly monitor vital signs (including pulse oximetry) and, where possible, utilize medical early warning scores (e.g National early Warning Score-2 [NEWS2], Paediatric Early Warning Score-2 [PEWS]) that facilitate early recognition and escalation of treatment of the deteriorating patient *(27)*.

3.4 Management of Severe Cases

3.4.1 Clinical features (See Table 1.1)

3.4.1.1 Adults

A severe COVID-19 case in an adult is characterized by fever (>38°C) or suspected respiratory infection AND one of the following:

- respiratory rate >30 breaths/minute
- severe respiratory distress
- SpO_2 <90% on room air

Elderly and immunosuppressed patient may present with atypical symptoms.
Patients with mild pneumonia may progress to the severe form of the disease and thus require close monitoring

3.4.1.2 Children

Children with severe COVID-19 infection will typically present with cough or difficulty in breathing AND at least one of the following:

- central cyanosis or SpO_2 <92%
- severe respiratory distress e.g., grunting etc
- very severe chest in-drawing
- signs of pneumonia with a general danger sign
- inability to breast feed or drink
- lethargy/unconsciousness/convulsion

Multisystem inflammatory disorder in children and adolescents has been identified in Europe and America. The preliminary case definition reflects the clinical and laboratory features observed in children reported to date, and serves to identify suspected or confirmed cases both for the purpose of providing treatment and for provisional reporting and surveillance.

(See Case Definition on severity of COVID-19 for Children in Table 1.1 in Chapter One)

3.4.2 Risk factors associated with severe disease

Age more than 60 years (increasing with age). Underlying noncommunicable diseases NCDs): diabetes, (hypertension, cardiac disease, chronic lung disease, cerebrovascular disease, dementia, mental disorders, chronic kidney disease, immunosuppression, obesity and cancer have been associated with higher mortality (28,29). In pregnancy, increasing maternal age, high BMI, non-white ethnicity, chronic conditions and pregnancy specific conditions such as gestational diabetes and pre-eclampsia (30). Smoking.

3.4.3 Treatment of severe disease

Provision of supplemental oxygen therapy is a hallmark of treatment for severe cases

- As much as possible, all areas where severely ill patients are being cared should be equipped with pulse oximeter, functioning oxygen system and disposable, single use oxygen delivery interfaces (nasal cannula, venturi mask, simple face mask, and mask with reservoir bag).
- During emergency presentation, administer supplemental oxygen therapy to any patient
  during resuscitation to target SpO2 ≥ 94% and to any patient without emergency signs and hypoxemia (i.e stable hypoxemic patient) to target Sp02 > 90% or ≥ 92–95% in pregnant women.
- Once the patient is stable maintain the above Sp02 values.
- Deliver oxygen flow rates using appropriate delivery devices (e.g., use nasal cannula for rates up to 6 L/min; Venturi mask for flow rates 6–10 L/min; and face mask with reservoir bag for flow rates 10–15 L/min). *(31)*.
- In adult patients with evidence of increased secretion production, secretion retention, and/or weak cough, airway clearance management may assist with secretion clearances, such techniques include gravity-assisted drainage and active cycle of breathing technique. Devices including mechanical insufflation-exsufflation and inspiratory positive pressure breathing should be avoided where possible. Implementation of techniques should be tailored to the individual patient and follow available guidelines *(32)*.
- For **COVID-19 patients with severe or critical disease, also collect blood cultures, ideally prior to initiation of antimicrobial therapy.**

For children

- Children with emergency signs (obstructed or absent breathing, severe respiratory distress, central cyanosis, shock, coma or convulsions) should receive emergency airway management and oxygen therapy during resuscitation to target SpO2 ≥ 94% *(33,34)*.
- Once patient is stable, the target is > 90% SpO2 *(35)*.
- Use of nasal prongs or nasal cannula is preferred in young children, as they may be better tolerated.

3.5 General Principles for Treatment

a. Supplemental oxygen therapy

- Administer supplemental oxygen therapy during emergency resuscitation
- Once the patient is stable maintain current SpO2 target
- In adult patients with evidence of increased secretion production, secretion retention, and/or weak cough, airway clearance management may assist with secretion clearance Techniques include gravity-assisted drainage and active cycle of breathing technique. Devices including mechanical insufflation-exsufflation and inspiratory positive pressure breathing should be avoided where possible. Implementation of techniques should be tailored to the individual patient and follow available guidelines.
- Children with emergency signs (obstructed or absent breathing, severe respiratory distress, central cyanosis, shock, coma and convulsion) should receive oxygen therapy during resuscitation to target SpO_2 >94%.

b. Cautious and conservative use of fluid – to prevent fluid overload, as aggressive fluid resuscitation worsen oxygenation

c. Empiric antibiotics treatment secondary bacteria pneumonia

- Choice of antibiotics is based on the clinical diagnosis, local epidemiology, antibiotic susceptibility and treatment guidelines

d. Existing co-morbidities in COVID-19 patients should be managed appropriately.

e. Closely monitor patients with signs of clinical deterioration such as progressive respiratory failure and sepsis and apply supportive care interventions immediately.

f. There is no evidence of the efficacy of the following drugs and should not be administered except during clinical trials:

- Chloroquine and hydroxychloroquine (+/- azithromycin)
- Ivermectin
- Antivirals, including but not limited to:
  - Lopinavir/ritonavir
  - Remdesivir
  - Umifenovir
  - Favipiravir
- Immunomodulators, including but not limited to:
  - Interferon-β-1a
- Plasma therapy

3.6 Use of Corticosteroids (dexamethasone, hydrocortisone, prednisone & methylprednisolone) in COVID-19 Patients

Mild Cases

- It is not recommended for use for asymptomatic and mild cases unless the patient is already taking this medication for another condition eg Chronic Obstructive Pulmonary Disease, Chronic Autoimmune Disease etc

Moderate Cases

- For moderate cases requiring oxygen therapy, Corticosteroids should be administered

Severe and Critical Cases

- Corticosteroids is prescribed for use in severely ill and critical patients
- For peptic ulcer disease patients, a suitable ulcer protective medication should be used while using dexamethasone.
- Blood glucose should also be monitored

NB: Corticosteroids should only be administered in hospitalized patients and should be given orally or intravenously for the treatment of patients.

Transdermal and Inhalation routes, long term, high dose regimen and as prophylaxis are not recommended.

Daily dose should be 6 mg of dexamethasone, equivalent to 160 mg of hydrocortisone (i.e. 50 mg every 8 hours or 100 mg every 12 hours), 40 mg of prednisone, 32 mg of methylprednisolone (8 mg every 6 hours).

Time and duration of medication should be once daily for 7-10 days.

Corticosteroids should be discontinued once symptoms of respiratory distress improve.

3.7 IL-6 receptor blockers

IL-6 receptor blockers (tocilizumab or sarilumab) should be used for patients with severe or critical COVID-19 infection. These patients should receive both corticosteroids and IL-6 receptor blockers.IL-6 receptor blockers are administered intravenously and subcutaneous administration is not used in this case. IL-6 receptor blocker therapy should be administered in combination with systemic

corticosteroids, which may be administered both orally and intravenously, with due consideration to their high bioavailability but possible malabsorption in the case of intestinal dysfunction with critical illness.

Tocilizumab and sarilumab are administered as single intravenous doses, typically over 1 hour. A second dose may be administered 12 to 48 hours after the first dose. Duration of concurrent systemic corticosteroids is typically up to 10 days, though may vary between 5 and 14 days.

Tocilizumab is dosed at 8 mg per kilogram of actual body weight, up to a maximum of 800 mg. Sarilumab is most commonly dosed at 400 mg. Renal dose adjustment is not currently warranted for either drug.

Routine bloodwork including neutrophil count, platelets, transaminases, and total bilirubin should be checked prior to initiation of therapy. All patients should be monitored for signs and symptoms of infection, given the increased risk with immunosuppression in addition to systemic corticosteroids. Patients on longer-term IL-6 receptor blocker therapy are at risk of active tuberculosis, invasive fungal infections and opportunistic pathogens. Risks and benefits of therapy should be considered carefully in patients with any active, severe infection other than COVID-19; caution is advised when considering the use of tocilizumab in patients with a history of recurring or chronic infections or with underlying conditions which may predispose them to infections.

IL-6 receptor blockers should be initiated with systemic corticosteroids; specific timing during hospitalization or the course of illness is not specified. That being said, IL-6 receptor blockers have been administered early in the course of hospitalization in the included trials and clinicians may consider this approach if possible.

CHAPTER 4: MANAGEMENT OF CRITICAL CASES OF COVID-19

Critical Cases of COVID19 can present as:

a. Hypoxemic Respiratory Failure (HRF) and Acute Respiratory Distress Syndrome (ARDS)
b. Sepsis and Septic Shock

See Table 1.1

4.1 Hypoxemic Respiratory Failure (HRF) And Acute Respiratory Distress Syndrome (ARDS)

Acute **HRF** is defined as severe arterial hypoxemia that is refractory to supplemental oxygen which is caused by intrapulmonary shunting of blood resulting from airspace filling or collapse.
ARDS is said to be a new or worsening respiratory symptoms within one week of known clinical insult.

Worsening respiratory distress is evidenced by failure of response to standard oxygen therapy (continuous increased work of breathing /hypoxemia despite oxygen delivery via a face mask with reservoir bag). In such situations;

- Transfer patient to the Intensive Care Unit (ICU) or High Dependency Unit (HDU).
- Place patient in a comfortable position (raise head of bed; $30^0 – 45^0$ is advised)
- Commence High-Flow Nasal Oxygen (HFNO) or Non-Invasive Ventilation (NIV) at 10-15L/minutes. Do not place patient on HFNO or NIV if hypercapnia is suspected (exacerbation of obstructive lung disease, cardiogenic pulmonary oedema, hemodynamic instability, multi-organ failure, or abnormal mental status).
- Monitor closely for 1 hour for clinical improvement/deterioration.
- If status deteriorates, pre oxygenate with 100% FiO_2 for 5 minutes, via a face mask with reservoir bag/bag-valve mask/HFNO/NIV.
- Institute mechanical ventilation (endotracheal intubation) while maintaining strict IPC practices (refer to IPC section) by a trained and experienced provider
  (A rapid sequence intubation is appropriate after an airway assessment that identifies no signs of difficult intubation)
- Implement mechanical ventilation using lower tidal volumes (4-6mL/kg predicted body weight) and lower inspiratory pressures (plateau pressure <30cmH2O) in ARDS *(Deep sedation may be required to control respiratory drive and achieve tidal volume targets)*
- If ARDS worsens, safely commence prone ventilation for >12 hours per day.
- Commence conservative fluid management strategy (for ARDS patients without tissue hypoperfusion) to reduce the duration of ventilation.
- In patients with moderate or severe ARDS, give higher Positive End Expiratory Pressure (PEEP) instead of lower PEEP.
- Monitor patients closely for response to the initial application of higher PEEP otherwise, discontinue if no response
- Offer Extra-Corporeal Life Support (ECLS) under strict IPC guidance (if facility and trained personnel are available) when there is adequate case volume to maintain expertise.
- Avoid disconnecting the patient from the ventilator, to prevent loss of PEEP and atelectasis. Rather, use in-line catheters for airway suctioning and clamp endotracheal tube when disconnection is required (e.g. transfer to a transport ventilator).

- Ensure close monitoring of vital signs (heart rate, respiratory rate, blood pressure, pulse, oxygen saturation).
- Give supportive therapy as the need arises. This is to ensure adequate fluid and electrolyte balance (Exercise caution to avoid fluid overload).
- Maintain nutrition support (enteral or parental as indicated)
- Monitor for blood routine, CRP, PCT, organ function (E/U/Cr, LFT and Bilirubin, cardiac biomarkers, Urine volume, analysis, and culture etc.), coagulation function, arterial and venous gas analysis and chest imaging.

Avoid neuromuscular blockade by continuous infusion routinely in moderate-severe ARDS patients (PaO_2/FiO_2<150).

Exceptions in patients with ARDS include:

I. Ventilator dyssynchrony (occurs when patient's demands are not met by the ventilator) despite sedation, such that tidal volume limitation cannot be reliably achieved

II. Refractory hypoxemia or hypercapnia.

4.2 Sepsis and Septic Shock

Sepsis in adults is a life-threatening organ dysfunction caused by a dysregulated host response to suspected or proven infection; while in children, it is defined as suspected or proven infection with ≥ 2 Systemic Inflammatory Response Syndrome (SIRS) criteria, of which one must be abnormal temperature or white blood cell count.

Septic shock on the other hand in adults, is defined as persisting hypotension despite volume resuscitation, requiring vasopressors to maintain Mean Arterial Pressure (MAP) ≥65mmHg and serum lactate level >2mmol/L.

In the absence of a lactate measurement, use blood pressure (i.e., MAP) and clinical signs of perfusion to define shock.

In children, septic shock is any hypotension (SBP <5th percentile or >2 SD below normal for age) or 2–3 of the following: altered mental state, tachycardia/ bradycardia (HR <90 bpm or >160 bpm in infants and HR <70bpm or >150bpm in children), prolonged capillary refill (>2seconds) or warm vasodilation with bounding pulses, tachypnea, mottled skin, petechial or purpuric rash, increased lactate, oliguria, hyperthermia or hypothermia.

Early goal-directed therapy remains the mainstay of the resuscitation bundle in the management of severe sepsis and septic shock.

Upon recognition of COVID-19 infection, with clinical signs/laboratory evidence of life-threatening organ dysfunction,

- Obtain vascular access within 5minutes. Use of central venous and arterial catheters should be based on resource availability and individual patient needs.
- Within 1 hour of recognition of sepsis, following sample collection, commence:
    - antimicrobial therapy based on sensitivity result
    - Intravenous fluid
    - Vasopressors for hypotension
- Give at least 30 mL/kg of isotonic crystalloid (e.g., 0.9% Normal saline, Ringer's lactate etc.) in the first 3 hours. Avoid use of hypotonic crystalloids (e.g., 0.45% saline), starches, or gelatins for resuscitation.
- If there is no response to fluid loading and signs of volume overload appear (for example, jugular venous distension, crackles on lung auscultation,pulmonary oedema on imaging, or hepatomegaly), reduce or discontinue fluid administration.
    - o This is important where mechanical ventilation is not available.
- Determine need for additional fluid boluses (250-1000 ml in adults) based on clinical

response and improvement of perfusion targets.

- Monitor patient closely to guide volume administration beyond initial resuscitation;
  - *Perfusion* – MAP > 65 mmHg, urine output >0.5 mL/kg/hr, and improvement of skin mottling, capillary refill, level of consciousness, and lactate.
  - *Dynamic indices of volume responsiveness* - passive leg raises, fluid challenges with serial stroke volume measurements/variations in systolic pressure, pulse pressure, inferior vena cava size, or stroke volume in response to changes in intrathoracic pressure during mechanical ventilation
- Administer vasopressors (e.g., norepinephrine, epinephrine, vasopressin, and dopamine) through central venous (CV) line when shock persists during/ after fluid resuscitation.
  - Alternatively, use large vein intravenous (IV) line but monitor for signs of extravasation and local tissue necrosis. If this occurs, discontinue IV line.
  - Vasopressors can be administered using intraosseous needle
  - Titrate to the minimum dose necessary to maintain perfusion and prevent side effects
- Monitor blood pressure frequently (at least every 15 minutes)
- Give oxygen therapy via intra-nasal catheter, face mask with reservoir bag/ bag-valve mask/HFNO/NIV
- Monitor closely for about 1 hour for clinical improvement/deterioration
- If condition deteriorates, implement mechanical ventilation using lower tidal volumes (4-6mL/kg predicted body weight) and lower inspiratory pressures (plateau pressure <30cmH_2O)
  - Deep sedation may be required to control respiratory drive and achieve tidal volume targets.
- Ensure close monitoring of vital signs (heart rate, respiratory rate, blood pressure, pulse oxygen saturation).
- Give supportive therapy as need arises to ensure sufficient fluid and electrolyte balance
- Maintain nutrition support (enteral or parenteral as indicated)
- Monitor for blood routine, CRP, PCT, organ function (E/U/Cr, LFT and Bilirubin, cardiac biomarkers, Urine volume, analysis, and culture etc.), coagulation function, arterial and venous gas analysis and chest imaging.

4.3 Management of COVID-19 in Special Population

4.3.1 Children and Elderly

In addition to the management above, the following should be considered

- Give 20 mL/kg of isotonic crystalloid as a rapid bolus and up to 40mL/ kg–60mL/kg in the first 1 hour
  - Consider use of colloid infusion with albumin 5% for children who have **not** improved following >60mL/kg of crystalloid fluid, have hypoalbuminemia (albumin <3g/dL), or who develop a hyperchloremic metabolic acidosis.
- Determine need for additional fluid boluses (10-20mL/kg in children and elderly) based on clinical response and improvement of perfusion targets.
- Monitor closely to guide volume administration beyond initial resuscitation
  - *Perfusion* – MAP age-appropriate target, urine output >1mL/ kg/hr, and improvement of skin mottling, capillary refill, level of consciousness, and lactate.
- In children with **cold shock** (state of elevated Systemic Vascular Resistance and low cardiac output, cold extremities and delayed capillary refill), **low-dose epinephrine should be considered as first-line**, while norepinephrine should be used in those with warm shock (state of low SVR and normal or increased cardiac output)
- When performing rapid sequence endotracheal intubation:
  - If hemodynamically unstable, give appropriate support with fluid and/or catecholamines prior intubation

- Pre-treatment with atropine (infants and younger children) to counteract reflex bradycardia; or
- Administer ketamine if available and not contraindicated (e.g., patients younger than 3 months old or with psychosis etc.) for sedation prior endotracheal intubation
- Do not use short-acting barbiturates and propofol in children with septic shock. These are associated with hypotension.

- Give lower Positive End Expiratory Pressure (PEEP) instead of higher PEEP.

4.3.2 Pregnant women

- Supportive therapies as generically described, taking into consideration, physiologic adaptations of pregnancy.
- Therapy should weigh the risk-benefit for the mother and safety to the fetus in consultation with an obstetrician.
- The use of investigational therapeutic agents outside a research study is not recommended.
- Use of investigational therapeutic agents within a research study should be guided by weighing individual potential risk-benefit for mother and safety to fetus, with consultation from an obstetric specialist and ethics committee.
- Timing and mode of birth should be individualized, based on obstetric indications and the woman's preferences. Induction of labour and caesarean section should only be undertaken when medically justified and based on maternal and fetal condition.
- Consultations with obstetric, neonatal, and intensive care specialists (Depending on the condition of the mother) is recommended.

4.3.3 Patients with co-morbidities

- Pre-existing NCDs, including cardiovascular disease, diabetes, chronic respiratory disease, hypertension, obesity and cancer, have been identified as independent risk factors for death.
- In addition to general management, assessment of pre-morbid state must be conducted, and appropriate management instituted.
- For patients with suspected and confirmed COVID-19 that have underlying NCDs, clinicians should continue or modify previous medical therapy according to the patient's clinical condition.
- Antihypertensive drugs should not routinely be stopped in patients with COVID-19, but therapy may need to be adjusted based on general considerations for patients with acute illness, with particular reference to maintaining normal blood pressure and renal function.

- SARS-CoV-2 uses the ACE 2 receptor for entry into cells. It has been suggested that antihypertensive drugs that exert their effect by inhibiting ACE or blocking the ACE 2 receptor may either aggravate or ameliorate the clinical course of patients with COVID-19 (183). To date, there are no studies that can substantiate this, and it is generally advised to continue these medications unless there are other reasons to stop these (e.g. hyperkalaemia, hypotension or acute deterioration in renal function) (36).

4.4 Prevention of Complications

For patients with COVID-19 who are critically ill, with or without invasive mechanical ventilation, use existing care bundles (defined as three or more evidence-informed practices delivered together and consistently to improve care chosen locally by the hospital or ICU and adapted as necessary for local circumstances).

4.4.1 Thromboembolism

Coagulopathy is common in patients with severe COVID-19, and both venous and arterial thromboembolism have been reported (37,38,39,40,41).

Monitor patients with COVID-19, for signs or symptoms suggestive of thromboembolism, such as stroke, deep venous thrombosis, pulmonary embolism or acute coronary syndrome. If these are clinically suspected, proceed immediately with appropriate diagnostic and management pathways.

4.4.2 Thromboprophylaxis

In hospitalized patients with COVID-19, ***without an established indication for higher dose anticoagulation***, administer standard thromboprophylaxis dosing of anticoagulation rather than therapeutic or intermediate dosing. Therapeutic dosing of anticoagulation refers to the dose used for treatment of acute venous thromboembolism; intermediate dosing is commonly interpreted as twice the standard thromboprophylaxis dose.

Patients on standard thromboprophylaxis dosing of anticoagulation do not require monitoring, except for platelet count monitoring after 5–7 days if unfractionated heparin is used. Dosing should be adjusted according to body weight/BMI and renal function according to local protocols. For example, if renal failure is present, patient should receive unfractionated heparin or reduced dose of low molecular weight heparin.

Suggested dosing of standard thromboprophylaxis is as follows:

Enoxaparin 40 mg by subcutaneous injection every 24h:

- Prophylactic dosages (non-weight adjusted) in low body weight (women < 45 kg, men < 57 kg) may lead to a higher risk of bleeding. Careful clinical observation is advised.
- If BMI > 40 kg/m2 or weight > 120 kg: enoxaparin 40 mg by subcutaneous injection every 12h.
  Unfractionated heparin (UFH) 5000 units by subcutaneous injection every 8 or 12h:
- If BMI > 40 kg/m2 or weight > 120 kg: 7500 units q12h or 5000 units every 8h.
  Tinzaparin 4500 units/day if BMI < 40 kg/m2 or weight < 120 kg; 9000 units/day if BMI > 40 kg/m2 or weight > 120 kg.

Dalteparin 5000 units/day BMI < 40 kg/m2 or weight < 120 kg; 5000 units every 12h if BMI > 40 kg/m2 or weight > 120 kg.

Fondaparinux 2.5 mg by subcutaneous injection every 24h.

The suggested duration of standard thromboprophylaxis is until hospital discharge.

If therapeutic dosing is prescribed, clinicians should be aware of the increased risk of bleeding, including major bleeding requiring transfusion (e.g. gastrointestinal) or clinically significant bleeding even if transfusion is not required (e.g. intracranial). These increased risks may also occur with intermediate dosing of anticoagulants, especially in the presence of other risk factors for bleeding. Heparin-induced thrombocytopenia associated with thrombosis is also a risk of unfractionated heparin and, less commonly, low molecular weight heparin.

Potential agents for therapeutic and intermediate intensity anticoagulation include low molecular weight heparin, unfractionated heparin, direct oral anticoagulants, or fondaparinux. Factors influencing the choice of agent include availability of laboratory monitoring (needed for unfractionated heparin), requirement for rapid reversibility (favours unfractionated heparin), presence of severe renal dysfunction (favours unfractionated heparin), interaction with other drugs used to treat COVID-19 (especially direct oral anticoagulants), convenience (least with unfractionated heparin, most with direct oral anticoagulants), and suspicion of heparin-induced thrombocytopenia (favours fondaparinux or direct oral anticoagulants).

For therapeutic or intermediate intensity anticoagulation, patients should have baseline creatinine,

platelet count, prothrombin time or international normalized ratio, and partial thromboplastin time. Patients on therapeutic dosing of unfractionated heparin require monitoring of partial thromboplastin time or anti-factor Xa levels and ideally platelet count. Patients on warfarin require monitoring of international normalized ratio.

4.5 Prevention of other complications

Table 4.1 shows interventions to prevent complications in hospitalized and critically ill patients with COVID-19.

Table 4.1: Overview of anticipated outcome and recommended interventions

ANTICIPATED OUTCOME	INTERVENTIONS
Reduced days of invasive mechanical Ventilation	• Use weaning protocols that include daily assessment for readiness to breath spontaneously • Minimize continuous or intermittent sedation, targeting specific titration end points (light sedation unless contraindicated) or with daily interruption of continuous sedative infusion
Reduced incidence of ventilator -associated Pneumonia	• Oral intubation is preferable to nasal intubation in adults • Keep patient in semi-recumbent position (head of bed elevation at 300-450) • Use a close suctioning system, periodically drain and discard condensate in tubing • Use a new ventilator circuit for each patient. Once patient is ventilated, change circuit if it is soiled or damaged but not Routinely • Change each moisture exchanger when it malfunctions, whensoiled, or every 5-7 days
Reduced incidence of Thromboembolism	• Use pharmacological prophylaxis (low molecular weightheparin (preferred if available) or heparin 5,000 unitssubcutaneously twice daily) in adults without contraindication.For those with contraindications, use mechanical prophylaxis(Intermittent pneumatic compression device).
Reduced incidence of catheter-related bloodstream infection	• Use a check list, with completion verified by a real time observer as a reminder of each step needed for sterile insertion and as a daily reminder to remove catheter if no longer needed
Reduced incidence of pressure ulcer	• Turn patient every 2 hours (use appropriate PPE) • Use a ripple mattress where available

Reduced incidence of stress ulcers and gastrointestinal bleeding.	• Give early enteral nutrition (within 24-48 hours of admission) • Administer histamine-2 receptor blocker or proton pump inhibitor in patients with risk factors for GI bleeding. • Risk factors for gastrointestinal bleeding include mechanical ventilation for greater than 48 hours, coagulopathy, renal replacement therapy, liver disease, multiple comorbidities like diabetes and higher organ failure score.
Reduced incidence of ICU-related weakness	• Actively mobilize patient early in the course of illness when it is safe to do so

CHAPTER 5: MANAGEMENT OF NEUROLOGICAL AND MENTAL MANIFESTIONS ASSOCIATED WITH COVID-19

People with COVID-19 are at increased risk for neurological, neuropsychiatric, and mental manifestations (see 3.1). Neuropsychiatric manifestations such as delirium/encephalopathy and neurological manifestations such as stroke may be presenting features without respiratory symptoms.). In addition to acute neurological manifestations, Guillain-Barré syndrome, acute disseminated encephalomyelitis, and acute haemorrhagic leukoencephalitis-like presentations may occur weeks after the acute stage of infection (42). Moreover, there may be potential for longer term neurological consequences such as cognitive impairment (43) and/or post-intensive care syndrome (PICS).

Anxiety and depressive symptoms constitute common reactions for people in the context of COVID-19 diagnosis, especially for those who may be hospitalized, due to concerns for one's own health or the health of others, the need for physical isolation (which can lead to social isolation), potential risk of death, concerns over the risk of infecting others, and concerns over leaving family members alone who may need care. Stressors particular to COVID-19 include: fear of falling ill and dying, fear of being socially excluded/placed in quarantine, loss of livelihood and loss of loved ones, and feelings of helplessness, boredom and loneliness due to being isolated. These stressors may trigger new symptoms or exacerbate underlying mental or neurological conditions. Pre-existing mental, neurological or substance use disorders increase the risk of becoming severely ill or of death, or of having long-term complications due to COVID-19 (28, 29, 44,45,46,47). People with COVID-19 are also at higher risk for sleep problems owing to acute stress responses, as well as additional reasons for those who are hospitalized such as environmental factors, invasive medical procedures (e.g. mechanical ventilation) and the frequent combination of multiple medications possibly disrupting sleep patterns (48).

Delirium

In patients with COVID-19, measures to prevent delirium, an acute neuropsychiatric emergency, should be implemented; and patients should be evaluated using standardized protocols, for the development of delirium. If detected, immediate
evaluation by a clinician is recommended to address any underlying cause of delirium and treat appropriately.

Manage any underlying cause of delirium by monitoring oxygenation and fluid status, correcting metabolic or endocrine abnormalities, addressing coinfections, minimizing the use of medications that may cause or worsen delirium, treating withdrawal from substances, understanding and minimizing the effects of any harmful drug-drug interactions and maintaining normal sleep cycles as much as possible (49).

In patients receiving invasive ventilation, minimize continuous or intermittent sedation, targeting specific titration endpoints (light sedation unless contraindicated) or with daily interruption of continuous sedative infusions, to reduce delirium (49).

In patients experiencing agitation (defined as marked restlessness or excessive motor activity, often accompanied by anxiety), use calming communication strategies and attempt to reorient the person. Acute pain due to physical illness or air hunger should be considered as triggers for agitation and need to be addressed immediately. If the person continues to be agitated despite the strategies described above and is experiencing severe distress, it may be necessary to use psychotropic medications (50).

When using antipsychotic medications for agitation, consider side-effects that may worsen symptomatology, including sedation, respiratory or cardiac function, risk of fever or other immunological abnormalities, or coagulation abnormalities and any potential drug-drug interactions between these and other medications. Use minimum effective doses of antipsychotic medications at the lowest frequency and for the shortest duration possible, with doses adjusted according to age, medical co-morbidities and degree of distress (51). For severe agitation, low doses of haloperidol (administered orally or by intramuscular injection) can be considered, while carefully monitoring for adverse effects such as QT prolongation and extrapyramidal symptoms (50).

If haloperidol is contraindicated due to the patient's clinical condition (e.g. prolonged QT interval, recent myocardial infarction, Parkinson's Disease, Lewy-Body dementia, etc.), other antipsychotic medications with safer cardiovascular profiles may be used after careful consideration of other risks

(such as respiratory suppression or sedation) and drug-drug i nteractions (51).
If the patient remains severely agitated despite the strategies described above, benzodiazepines can be added, with preference given to those with shorter half-lives and lower risk of drug-drug interactions (such as lorazepam); lowest doses should be used and for the shortest duration possible. The intravenous route should be avoided (51).

Stroke
Patients presenting with rapidly developing neurological symptoms suggestive of stroke should be evaluated as soon as possible and standard stroke protocols should be followed including systemic thrombolysis and/or intra-arterial thrombectomy, if indicated. Signs and symptoms of stroke can include weakness of limbs or face, sensory loss, speech difficulties, impairment of vision, ataxia, confusion, or decreased consciousness. Standard IPC measures must be followed during the clinical evaluation, neuroimaging or procedures for patients with stroke.
Strokes can be missed in severely sick or unresponsive ICU patients and a low threshold for further evaluation (including neuroimaging) is recommended for acute neurological worsening.

Mental Health Psychosocial Support
It is essential to provide basic mental health and psychosocial support (MHPSS) for all persons with suspected or confirmed COVID-19 by asking them about their needs and concerns, and addressing them.
Ask people about their needs and concerns around diagnosis, prognosis, and other social, family or work-related issues. Listen carefully, try to understand what is most important to the person at this moment, and help them work out what their priorities are and link them with relevant resources and services.
Give accurate information on the person's condition and treatment plans in easily understood and non-technical language, as lack of information can be a major source of stress. Help people address urgent needs and concerns, and help with decision-making, as necessary. Help connect people with loved ones and social support, including through phone or internet as appropriate.
MHPSS and follow up should continue after the person is discharged from hospital to ensure their symptoms are not worsening and they are continuing to do well. This can be provided through telehealth, where available and appropriate.
Given the stress that COVID-19 may create at individual and family levels, the high prevalence of common mental health conditions among women in the antenatal and postpartum period, and the acceptability of programmes aimed at them, interventions for MHPSS targeted to mothers need to be more widely implemented. Prevention services should be available in addition to services that treat mental health conditions.
Parents and caregivers who may need to be separated from their children, and children who may need to be separated from their primary caregivers, should have access to appropriately trained health or non-health workers for MHPSS. MHPSS should be appropriately adapted for the needs of children, taking into consideration their social and emotional development, learning and behaviour (52).

Anxiety and Depression
Prompt identification and assessment for anxiety and depressive symptoms in the context of COVID-19 and initiate psychosocial support strategies and first-line interventions, for the management of new anxiety and depressive symptoms.
For people who are experiencing symptoms of anxiety, basic psychological skills such as psychological first aid stress management, and brief psychological interventions based on the principles of cognitive behavioural therapy should be considered (53,54).
For relieving anxiety causing severe distress that is not responsive to psychosocial support strategies, benzodiazepines can be considered, specifically in the hospital setting. Benzodiazepines should only be used with extreme caution with preference for those with shorter half-lives and lower risk of drug-

drug interactions (such as lorazepam). Lowest doses should be used and for the shortest duration possible; high doses and longer term use should be avoided. Benzodiazepines carry the risks of confusion and respiratory suppression, may worsen traumatic stress reactions, can produce tolerance and dependence, and are known to be prescribed indiscriminately in many emergencies (50).

For people who are experiencing symptoms of depression, brief psychological interventions based on the principles of cognitive behavioural therapy, problem-solving treatment and relaxation training can be considered (55). Consider using remote mental health support (i.e. telephone therapy) when access to regular services is disrupted.

If a person's anxiety or depressive symptoms persist beyond recovery from COVID-19 and/or discharge from the hospital, then an underlying anxiety or depressive disorder may be suspected, and a mental health professional should be consulted and these conditions should be managed appropriately. Refer to the mhGAP Intervention Guide for mental, neurological and substance use disorders in non-specialized health settings (56).

It is important to ask about thoughts or acts of self-harm, particularly during COVID-19, due to risk factors for self-harm and suicide such as sense of isolation, loss of a loved one, job, or financial loss and hopelessness. Remove possible means of self-harm, activate psychosocial support, follow up with the person, and consult a mental health professional as necessary.

To ensure comprehensive care and based on the initial assessment, following discharge, link the person to employment, education, social services (including housing) and other relevant sectors (56).

Cognitive-behavioural therapy with a trauma focus, eye movement desensitization and reprocessing or stress management should be considered for adults with post-traumatic stress disorder (PTSD) (57).

CHAPTER 6: Reporting and Coding of COVID-19 morbidity and mortality

The primary goal is to identify and accurately report all deaths due to COVID-19 and case managers should ensure that clinical data is imputed into the Data Management tool (SORMAS).

- For all mortality related to COVID-19, use emergency ICD codes as outlined in the international guidance for certification and coding of COVID-19 as cause of death (18). As there are many types of coronaviruses, do not use "coronavirus" in place of COVID-19.
- A death due to COVID-19 is defined for surveillance purposes as a death resulting from a clinically compatible illness, in a probable or confirmed COVID-19 case, unless there is a clear alternative cause of death that cannot be related to COVID-19 disease (e.g., trauma). There should be no period of complete recovery from COVID-19 between illness and death. A death due to COVID-19 may not be attributed to another disease (e.g., cancer) and should be counted independently of pre-existing conditions that are suspected of triggering a severe course of COVID-19.

The causal sequence leading to death in a medical certificate must be stated, for example, in cases when COVID-19 causes pneumonia, sepsis and acute respiratory distress; then pneumonia, sepsis and acute respiratory distress should be included, along with COVID-19. Certifiers should include as much detail as possible based on their knowledge of the case, from medical records, or about laboratory testing (18).

- The use of official terminology, COVID-19, should be used for all certification of this cause of death.
- COVID-19 should be recorded on the medical certificate as cause of death for all decedents where the disease caused, or is assumed to have caused, or contributed to death.

5.1 Morbidity and Morality Coding for COVID-19 in ICD-10 and ICD-11 (1)

ICD	Description of codes	
ICD -10	An emergency ICD-10 code of "U07.1 COVID-19, virus identified" is assigned to a disease diagnosis of COVID -19 confirmed by laboratory testing. An emergency ICD-10 code of "U07.2 COVID-19, virus not identified" is assigned to a clinical or epidemiological diagnosis of COVID -19 where laboratory confirmation is inconclusive or not available. Both U07.1 and U07.2 may be used for mortality coding and tabulation as cause of death.	
ICD-11	The code for the confirmed diagnosis of COVID -19 is RA01.0. The code for the clinical diagnosis (suspected or probable) of COVID -19 is RA01.1.	

Use coding below to document or flag conditions that occur in the context of COVID-19. The categories below will not be seen in primary tabulation of the single underlying cause of death. They may be used in multiple cause of death analysis and reporting.

5.2 Coding for conditions occurring in context of COVID-19 IN IN ICD-10 and ICD-11 (1)

ICD -10	1. U08 Personal history of COVID-19 U08.9 Personal history of COVID-19, unspecified Note: This optional code is used to record an earlier episode of COVID-19, confirmed or probable that influences the person's health status, and the person no longer suffers of COVID-19. This code should not be used for primary mortality tabulation. 2. U09 Post COVID-19 condition U09.9 Post COVID-19 condition, unspecified Note: This optional code serves to allow the establishment of a link with COVID-19. This code is not to be used in cases that still are presenting COVID-19. 3. U10 Multisystem inflammatory syndrome associated with COVID-19 U10.9 Multisystem inflammatory syndrome associated with COVID-19, unspecified
ICD-11	RA02 Post COVID-19 condition RA03 Multisystem inflammatory syndrome associated with COVID-19 QC42/RA01 Personal history of COVID-19

CHAPTER 7: Release from COVID-19 care pathway (Discharge Criteria)

In the management of COVID- 19, it is no longer mandatory that patients be retested after an initial positive test.(32-34)

7.1 Criteria for releasing patients from isolation:

Symptomatic

- 10 days after symptom onset, plus at least 3 days without symptoms (fever and respiratory symptoms).
- SpO2≥94% in room air for 3 days

Asymptomatic

- For asymptomatic cases: 10 days after positive test for SARS-CoV-2.

7.2 Continuation of Clinical Care

- Symptomatic patients should be discharged from the COVID -19 pathway in line with the above criteria. Except, those that have complications from COVID-19; in which case the patient should be referred for further management within the clinical pathway. Discharge from this clinical pathway should be done 3 days after resolution of clinical symptoms as determined by the managing clinical physician/team..
- Release from the COVID-19 care pathway is not the same as clinical discharge from a facility or from one ward to another. For example, some patients may still require rehabilitation, or other aspects of care, beyond release from the COVID-19 care pathway, based on clinical needs in the clinical care pathway. If release from the COVID-19 care pathway coincides with clinical discharge, then several clinical considerations, such as medication reconciliation, plan for follow up with clinical provider in place, review of routine immunization status, among others, should be considered.
- For the purpose of data capturing, clinicians should communicate the outcome of care to the epidemiological team.

7.3 Recommendations for Follow up

- Patients released from covid pathway may still require clinical management for underlying diseases or complications, and thus would require further care as determined by the managing physician.

- Continue hand hygiene, social distancing, use of face mask in public, adequate hydration and rest as well as multivitamin supplementation.

- Patients should be followed up the first week of discharge and monthly for the next three months, unless otherwise determined by the patients' clinical state. Every facility should have a multidisciplinary follow up team for follow up of COVID-19.
- The outcome of follow up assessment should be communicated to the epidemiological team by the managing clinicians.

7.4 Rehabilitation of COVID- 19 Patients

- In hospitalized patients, during the acute phase of illness, rehabilitation professionals may provide interventions that relieve respiratory distress, prevent complications and support communication.

- Prior to hospital discharge, COVID-19 patients should be screened for rehabilitation needs to facilitate onward referral.
- Patients with COVID-19 should be provided with education and support for the self- management of breathlessness and resumption of activities, both in a hospitalized and a non-hospitalized setting caring for COVID-19.
- For patients who have been discharged from the hospital or patients who have been managed at home and experience persistent symptoms and/or limitations in functioning, screen for physical, cognitive and mental impairments, and manage accordingly**.**
- Provide individualized rehabilitation programme from subacute to long term according to patient needs. The prescription and provision of rehabilitation programme should be guided by persistent symptoms and functional limitations.

CHAPTER 8: Care of COVID-19 patients after acute illness

New evidence is emerging about COVID-19 related persistent symptoms, which have parallels with other coronavirus diseases (56). The clinical characterization of mid- and long-term effect of COVID-19 remain to be clearly described and understood. In hospitalized patients, ICU and non-ICU, there are reports of new illness-related fatigue, breathlessness, PTSD symptoms, pain, voice change, cough, dysphagia, anxiety, depression, and problems with concentration, memory and continence. Patients admitted to ICU had greater prevalence of symptoms in almost all reported symptom domains than COVID-19 patients not admitted to ICU (59). As well, more than half of all COVID-19 patients who had been hospitalized, regardless of their clinical management, reported persistence of fatigue at 60 days since the onset of symptoms (59,60). Early findings report, most common ongoing symptoms (regardless of hospitalization status) are *fatigue, muscle ache, shortness of breath and headache* at a follow up of 4 months (61). Not returning to usual health within 2–3 weeks of testing was reported by approximately one third of symptomatic adults in an outpatient setting (62). A study reported that at 3 months after the onset of symptoms, one third of nonhospitalized patients were to some degree dependent on others for personal care (63).

Post-acute COVID-19 syndrome

Post-acute COVID-19 syndrome, long Covid or Covid long-hauler syndrome is defined as the persistence of symptoms for ***at least four weeks*** after acute SARS-CoV-2 infection and are not explained by an alternative diagnosis.

Many patients, however, experience symptoms for two to six months or longer. Most cases are preceded by symptomatic infection. People with asymptomatic SARS-CoV-2 infection rarely develop post-acute COVID-19 syndrome. Studies from Europe, Asia and USA have reported persistence of symptoms in one-third to two-thirds of patients at 60 days follow-up.

Symptoms of post-acute COVID-19 syndrome can be similar to those experienced during acute infection. Fatigue is the most common symptom, followed by myalgia, dyspnea, chest pain and joint pains. Neurologic manifestations, particularly brain fog, numbness and tingling throughout the body have been reported. Patients with long-term hospital stay often develop adverse mental health outcomes including anxiety, depression, post-traumatic stress disorder, and sleep abnormalities. Persistent loss of taste and or smell, and headaches have also been reported. Other manifestations include coronavirus associated nephropathy, cardiac arrythmias, hair loss, new or worsening of existing diabetes mellitus, subacute thyroiditis, and multisystem inflammatory syndrome in children. As the number of patients recovering from COVID-19 grows, it is important to understand the healthcare issues associated with post-acute COVID-19 syndrome and the required integrated multidisciplinary care possibly through dedicated clinics.

Best Practice Statement

Patients who have had suspected or confirmed COVID-19 (of any disease severity) who have persistent, new, or changing symptoms should have access to follow-up care.

Recognition

All patients (and their caregivers) with COVID-19 should be counselled to monitor for resolution of signs and symptoms. If any one or more of these persist, or patient develops new or changing symptom, they should seek medical care according to with their primary care provider.

Counselling should also include acute life-threatening complications, such as pulmonary embolism, myocardial infarction, dysrhythmias, myopericarditis and heart failure, stroke, seizures and encephalitis (64,65) for which they should seek emergency care.
Patients with severe and critical COVID-19 may develop post-intensive care syndrome (PICS), with a range of impairment including (but not limited to) physical deconditioning, cognitive, and mental health symptoms.
See Rehabilitation for patients with COVID-19 for more details on PICS.

Structure
A multidisciplinary clinic structure to support COVID-19 survivors for follow-up care should be put in place preferably led by a family physician at the general outpatient department of the nearest health facility to the patient.
Clinical assessment for respiratory, psychiatric, cognitive, thromboembolic sequelae, and rehabilitation needs, is recommended at 4 – 6 weeks after acute COVID-19 using a holistic, person-centred approach by the family physician.
Standard screening tools should be used to identify patients with anxiety, depression, sleep disturbances, PTSD, dysautonomia and fatigue.
Serial clinical and imaging evaluation with electrocardiogram and echocardiogram at 4 – 12 weeks is prescribed for those with cardiovascular complications during acute infection, or persistent cardiac symptoms.
Repeat clinical assessment and chest X-ray in all patients at 12 weeks post discharge is recommended.
Based on the 12-week assessment, patients are further recommended to be evaluated with high-resolution computed tomography of the chest, computed tomography pulmonary angiogram or echocardiogram, or discharged from follow-up.
Home pulse oximetry using approved devices is recommended as a useful tool for monitoring patients with persistent dyspnoea.

Management
The guidance for the management of post-acute COVID-19 syndrome is still evolving. All patients with persisting, new, or changing symptoms post COVID-19 care should be referred to appropriate caregivers including primary care providers (i.e. general practitioners, family physicians), relevant specialists (pulmonologists, cardiologists, dermatologists, clinical psychologists and psychiatrists), physiotherapists, multidisciplinary rehabilitation professionals, mental health and psychosocial providers, as well as social care services.
Management should be tailored according to patient needs and be coordinated preferably by the family physician or general practitioner.
Management interventions include addressing promptly life-threatening complications. For non-life threatening complications, management may entail education, advice on self-management strategies (i.e. breathing techniques, pacing), caregiver support and education, peer-to-peer groups, stress management, stigma mitigation and home modification; prescription of rehabilitation programmes, and/or specialty management.
Treatment with corticosteroids may be beneficial in a subset of patients with post-COVID inflammatory lung disease.
Direct oral anticoagulants or low-molecular-weight heparin for ≥3 months post discharge is recommended for imaging-confirmed venous thromboembolism.
Physical activity and ambulation are recommended to all patients as appropriate.
Competitive athletes with cardiovascular complications are to abstain from competitive sports or aerobic activity for 3–6 months until resolution of myocardial inflammation by either cardiac MRI or troponin normalization.
Patients with postural orthostatic tachycardia syndrome and abnormal sinus tachycardia may benefit from a low-dose beta blocker.

Survivors with persistent impaired renal function will benefit from early and close follow-up at a nephrology clinic.
Hyperthyroidism due to SARS-CoV-2-related thyroiditis should be treated with corticosteroids.
Provide advice and information on self-management: setting realistic goals; use of pulse oximeter; physical activity and ambulation; who to contact if patients are worried about their symptoms; sources of advice and support; how to get support from other services like social care. Ensure that people have clear instructions and parameters for when to seek further help. Using shared decision making, offer patients the option of monitoring remotely depending on availability, preference and whether it is clinically appropriate.
Consider additional support for older people and children, for example short-term care packages and referral for specialist advice for children respectively.
Support people in discussions with their employer or school about returning to work or education, for instance by having a phased return.
Refer people with post-acute COVID-19 syndrome urgently to the relevant acute services if they have signs or symptoms of life-threatening complications like; severe hypoxaemia; severe lung disease; cardiac chest pain; multisystem inflammatory syndrome in children. 21) Manage all underlying chronic medical conditions as appropriate.

• See Rehabilitation for patients with COVID-19 for recommendations regarding screening, assessment and rehabilitation interventions to facilitate onward referrals for inpatient, outpatient, or community-based follow up, to ensure continuity during transitions of care.

Prognosis

Many patients with post-acute COVID-19 syndrome will recover slowly and spontaneously with holistic support, rest, symptomatic treatment, and gradual increase in physical activity.

Annex 1: Step-by-step guide for sample collection

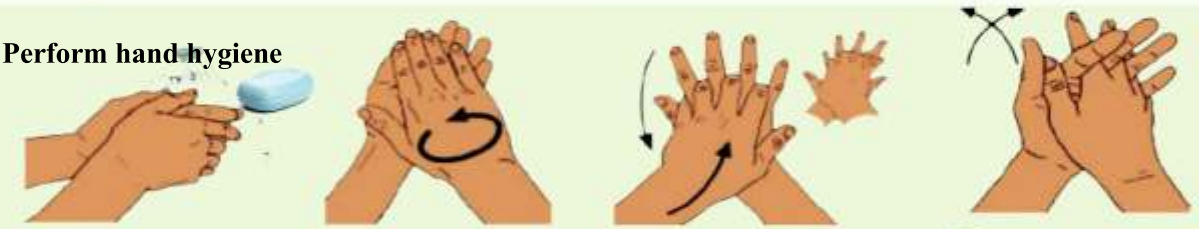
a. **Assemble materials** for respiratory specimen collection

b. **Label sample containers** with suspected case /deceased person's name, **EPID ID number**, hospital number, date of sample collection and time. (Contact State Epidemiologist for Epid ID number)

c. **Fill the Case Investigation form**

d. **Don PPE**. Allow buddy (trained observer) to mirror you for proper donning

e. **Perform hand hygiene**



1. Wet hands with water and enough soap to cover all hand surfaces
2. Rub hands, palm to palm
3. Right palm over left dorsum with interlaced fingers and vice versa
4. Palm to palm with fingers interlaced

5. Back of fingers to opposing palms with fingers interlocked
6. Rotational rubbing of left thumb clasped in right palm and vice versa
7. Rinse hands with water
8. Dry hands with thoroughly single use towel

f. **Two swabs should be collected.** Swab each nostril for

10 – 15 secs. Place both swabs into a single VTM. Wrap VTM with parafilm

g. **Oropharyngeal sample collection:** Use tongue depressor to hold down the tongue. Swab each tonsil for 10 – 15 secs. Place swab into a single VTM. Wrap the lid of VTM tube with parafilm

h. **Sputum collection:** For suspect/ill persons coughing, ask the person to take a deep breath and cough to produce sputum sample into the leak-proof screw cap sputum collection cup or sterile-dry collection bottle.

i. **For severely ill persons,** bronchoalveolar lavage or tracheal aspirate may be considered (to be collected by respiratory physicians or trained personnel only).

j. **Packaging of sample:** Place the

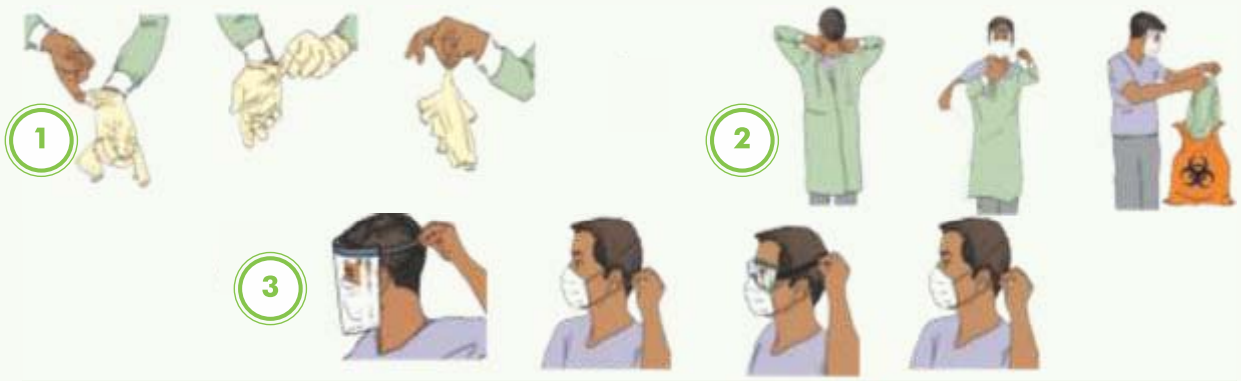
VTM tubes into a Falcon tube. Place the Falcon tube into a Ziploc bag

k. **Packaging of container:** Place Ziploc bag into Geostyle container

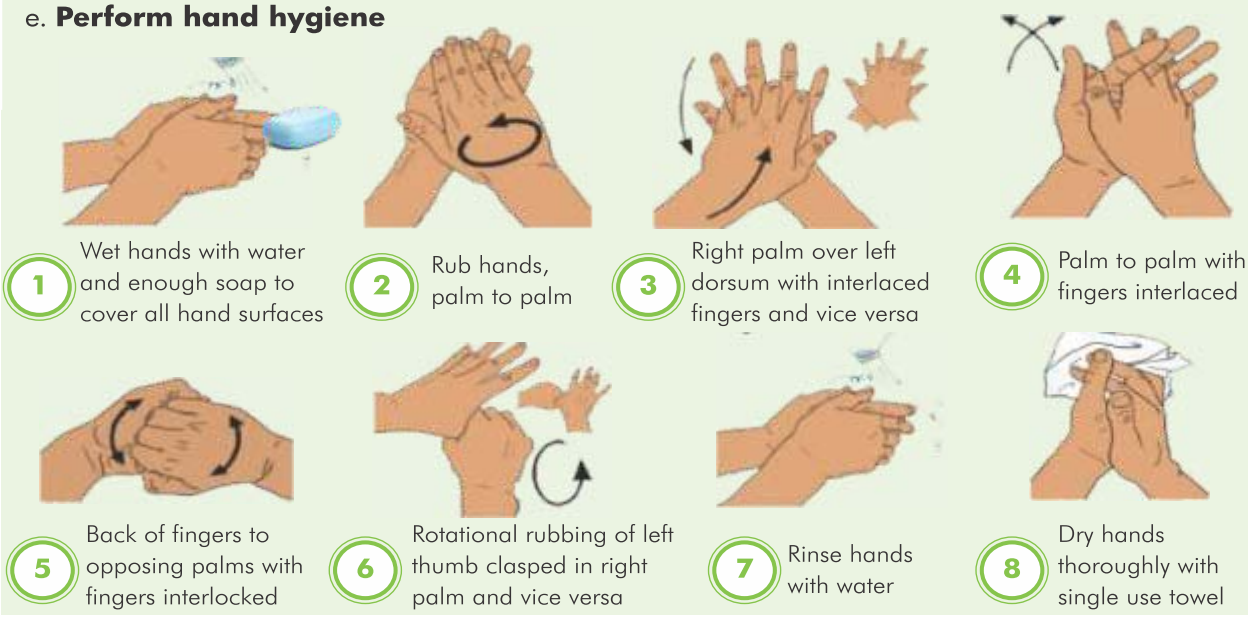
l. Discard sample collection materials in a properly labeled biohazard bin.
Decontaminate work surfaces with freshly prepared 0.5% hypochlorite solution

m. **Discard sample collection materials in a properly labelled biohazard bin.** Decontaminate work surfaces with freshly prepared 0.5% hypochlorite solution

n. **Doff PPE**



e. **Perform hand hygiene**



Annex 2: Determination of type of care: checklist for triaging confirmed COVID-19 patients

Date of triaging: …….

Demographic data

1	Name of patient	
2	Age	
3	Sex	
4	Address	
5	Epid no.	
6	Phone number	
7	Name of next of kin	
8	Phone number of next of kin	
9	Weight	
10	Height	
11	Blood group	

A. Epidemiological data

1. Date of sample collection: …….

2. Any symptom(s) before sample was collected? a] Yes b] No

   a. If yes, date of symptom onset……
   b. If yeas, list of symptoms
      ……

3. Any symptom(s) after sample was collected? a] Yes b] No

   a. If yes, date of symptom onset……
   b. If yes, list of symptoms
      ……

4. Any symptom(s) currently? a] Yes b] No
   a. If yes, list of symptoms
      ……

C. Clinical Symptoms

Indicate if the following symptoms are ongoing (O) or have resolved (R). (tick as appropriate)

Sn.	Symptoms	Yes	No
1	**Fever**		
2	Headache		
3	Fatigue		
4	Myalgia/body pains		

5	Anorexia		
6	Sore throat		
7	Catarrh/nasal congestion		
8	Loss/decrease in sense of smell		
9	Loss/decrease in sense of taste		
10	Diarrhoea		
11	**Cough**		
12	Hiccups		
12	**Shortness of breath**		
13	Other symptoms		

D. Clinical Signs

Sn.	Signs	Value	ND
1	Body temperature		
2	SPO2		
3	GCS		
4	Blood pressure		
5	Blood sugar		
6	Signs of pneumonia		

ND-not done

E. Classification of disease (tick as appropriate)

Stage	Description	Initial Assessment
Asymptomatic disease	No symptom before sample collection to date	
Mild	Symptomatic but no evidence of viral pneumonia or hypoxia (SPO2>95%)	

Moderate	Signs of pneumonia but no signs of severe pneumonia and with oxygen saturation (SpO2) ≥ 90% while breathing normal room air.	
Severe	Signs of severe pneumonia: plus, respiratory rate > 30 breaths/min; or severe respiratory distress; or SpO2< 90% room air	
Critical	Acute respiratory distress syndrome (ARDS), sepsis, life-threatening organ dysfunction	

F. Risk factors for disease progression (tick as appropriate)

Sn	Risk factors	Yes	No	Don't know
1	Age>60years			
2	History of diabetes			
3	History of hypertension			
4	Other Cardiovascular disease (e.g., Ischaemic heart disease, heart failure)			
5	Cerebrovascular disease e.g., stroke			
6	Cancer			
7	Obesity			
8	Chronic pulmonary disease, e.g., tuberculosis			
9	Immunosuppressive conditions (e.g., HIV/AIDS)			
10	Smoking			
11	Pregnancy with complications			

G. Decision matrix (tick as appropriate for case)

Sn.	Class of Disease	Type of care recommended	Remarks (as at time of visit)	Tick
1	At least 13days after sample collection plus asymptomatic in prior 3 days plus SPO2>94%	Consider Discharge	Repeat PCR and follow up in designated isolation facility in one week.	☐
2	Asymptomatic and no risk factor for progression	Consider Home care	Consider hospitalisation if patient's household is not suitable for home isolation or patient desires hospital care or there is high risk of exposure of vulnerable family member during home care.	☐
3	Asymptomatic but risk factors for progression	Consider Hospital care	Home care if case is cooperative and able to move to isolation facility at any time of the day and **sample was collected > 7days**	☐
4	Mild disease and no risk factor for progression	Consider Home care	Consider hospitalisation if patient's household is not suitable for home isolation or patient desires hospital care or there is high risk of exposure of vulnerable family member during home care	☐

5	Mild disease but risk factor for progression	Consider Hospital care	Consider home care if symptoms have resolved for more than 2days and if patient is cooperative, home environment suitable for safe isolation and vehicle available to move patient to isolation facility at any time of the day.	☐
6	Moderate, Severe and Critical Disease	Hospital Care	Home care may only be considered for moderate cases if bed spaces are not available in isolation facility. Also consider Home care if symptoms have resolved for more than 2days and sample collected >7days.	☐

NB: If patient currently has cough, fever, and shortness of breath, consider hospitalisation, especially if SPO2 is <94%

H. <u>Final Decision</u>

a. Home care [ ]
b. Hospital Care: patient should be moved to isolation facility [ ]
c. Qualified for discharge [ ]

Name of attending Physician: ……

Signature/Date: ……..

Annex 3: SOP for transfer of COVID-19 cases from POI to treatment centre

Purpose

This SOP provides operational guidance on transferring COVID-19 suspected and confirmed cases from point of identification (e.g. health facility, home) to a designated Isolation/treatment centre.

Steps

- **NOTIFICATION**

On identification of a suspected/confirmed case, the POI should immediately notify the State Epidemiologist through the quickest possible means. State Epidemiologist should immediately activate contact listing.

- **PRE-TRANSFER PREPARATION**

a. Point of Identification: Health Facility/Home

i. Maintain appropriate IPC measures

ii. Identify staff/persons who will be involved in transfer of suspected case(s)

iii. Prepare relevant transfer documents e.g. referral notes, contact tracing forms etc.

iv. Assemble personal belongings of suspected case(s) to be handed over to the receiving team (health personnel), packed appropriately in a new clean sealed bag.

v. Prepare suspect case(s) for transfer with appropriate Personal Protective Equipment (PPE) e.g. medical face mask and gloves

vi. If at a health facility, communicate reason for referral and transfer procedure to family/friends of suspected case(s)

vii. Identify a room/space for donning of PPE for the transporting team

b. State Epidemiologist should:

i. Notify focal person at designated treatment centre and confirm readiness to receive suspect case(s)Create **direct** linkage between **designated** focal persons in referring facility/home and receiving treatment centre

ii. Notify relevant authorities i.e. Director of Public Health (State), and state epidemiologist.

c. Designated Treatment Centre

i. Identify health worker(s) who will be involved in the transfer of the suspected case(s)

ii. Health worker(s) to conduct a pre-departure briefing for the transfer team

iii. Dispatch designated ambulance and transfer team to the POI

iv. Communicate to the referring team the estimated time of arrival (ETA) after confirmation of the specific route of travel

v. Notify designated managing team of impending referral
vi. Prepare ward in treatment centre to accommodate and manage suspected/confirmed case(s)

It is the responsibility of the referring health facility/home to identify and make available an appropriate parking area (which has a short direct route from the holding area) for the ambulance

Transfer Procedure

• On arrival of ambulance at the referring Health facility/Home:

a. Health Facility/Home

i. Direct the receiving team to the designated PPE donning area
ii. Debrief the receiving team on current clinical status of the suspect/confirmed case(s)
iii. Conduct pre-departure clinical evaluation (vital signs and general severity of illness, to decide appropriateness of planned transfer mechanism) before official transfer of suspected/confirmed case(s)
iv. Hand-over transfer documents and personnel belongings to the receiving team
v. Transfer suspected/confirmed case(s) to transporting team

b. Designated Treatment Centre

i. Park in the designated parking area, as shown by the transferring health facility/home
ii. Don appropriate PPE before debriefing
iii. Receive transfer documents and personal belongings of suspected case (s)
iv. Implement procedures to limit contamination on ambulance environmental surfaces
v. Receive suspected/confirmed case(s) from referring team
vi. Conduct pre-departure vital signs after receiving suspected/confirmed case(s)

• Upon departure from referring Health facility/Home

a. Health Facility/Home

i. Follow mission completion SOP (Doffing PPE, cleaning and disinfection)
ii. Communicate to the State Epidemiologist on the transfer of suspected case(s)

b. Designated Treatment Centre

i. Communicate to the focal person the Expected Time of Arrival after confirmation of the specific route of travel
ii. Monitor suspected case(s) closely at least every 30 minutes, if stable or PRN and administer necessary care
iii. Maintain strict IPC measures throughout the drive
iv. Update the focal person of the treatment centre on the clinical status of the suspected case(s)

- **Arrival at the designated treatment centre**

The Transfer team should:

i. Confirm arrival within treatment centre and specific route of travel within the facility before disembarking the suspected case (s) from the ambulance.
ii. Move suspected case(s) via earmarked direct route to designated ward(s)
iii. Return to ambulance and proceed to designated decontamination or disinfection station.
iv. Disinfect ambulance (refer to IPC SOP)
v. Ambulance transport personnel doff PPE under supervision of qualified personnel.
vi. Have appropriately trained personnel package waste from ambulance.
vii. Proper waste disposal should be carried out by trained personnel
viii. Debrief managing team and initiate post-mission surveillance, as needed

Annex 4: SOP on Sample Collection

Specimen collection and transportation Guide: Coronavirus Disease (COVID-19) – Nigeria 2021/22

Scope

To be used by government and non-governmental health authorities, health facilities, clinicians, laboratories and public health practitioners in collection, packaging and transporting suspected and confirmed infectious samples of COVID-19 for individuals that meets the case definitions for diagnosis in Nigeria.

Purpose

This document describes the process of collecting specimens from patients suspected of COVID-19 and the transportation of collected samples to the designated testing laboratories.

Sample collection requirements

PPE (apron, hand gloves, face shield, N95 Masks, etc), nasal and oropharyngeal swabs, tongue depressor, viral transport medium, centrifuge tube, zip-loc bag, hand sanitizer, secondary container, hard frozen gel packs, case investigation form, sample transportation form (if sample is to be transported), marker, disinfectant, and hard card box/ transport box

Sample packaging requirements

Section 1:

Labeling specimens for Transport

PPE (Apron, hand gloves, face shield, N95 Masks, etc), viral transport medium, centrifuge tube, zip-loc bag, biohazard label, secondary container, hard frozen gel packs, Gio-style carrier, sample transportation form, marker, disinfectant, and hard card box/transport box.

Case investigation forms should be filled AND specimen collection containers should be labelled before sample collection.

a. Label VTM tube and any other sample tube with the following:
   - Name of patient (First name first, then surname)
   - Hospital number/Epid number
   - Sex /Age
   - Date (dd/mm/yy)
   - Time

b. State the full name (first name first, then surname), date of birth of the suspected COVID-19 case, date of symptoms onset, date of sample collection and all other required information, clearly on the accompanying request form and the case investigation form (CIF).
c. Note the date and time of pick-up on the specimen tracking form.

Section 2:

Sample collection procedure

One nasal swab and one oropharyngeal swab (1 of each type) are the preferred specimen type. Sputum (if it can be produced) can be collected as an additional specimen type, in a separate sterile container. Only recommended swab and the associated transport medium should be utilize.
The procedure below must be conducted in well ventilated areas, ensuring that COVID 19 Protocol is maintained. Ensure the procedure of sample collection is explained and informed consent obtained.

1. Donn Personal Protective Equipment (PPE)
2. Clinicians/ Laboratorian must wear long sleeve apron/lab coat, hand gloves, face shield, N95, etc. Masks before collecting COVID-19 samples. In combination with a face-shield, if hands are cleaned with soap and water or an alcohol-based hand sanitizer before and after touching or adjusting the respirator.

3. i. *Nasal Swab:* Insert swab into the nostril parallel to the palate. Leave the swab in place for a few seconds to absorb secretion. Both nostrils should be swabbed with the same swab.

   ii. Oropharyngeal swab: Have the patient open his/her mouth wide open. Using a wooden tongue depressor, depress the tongue and swab the posterior pharynx, avoiding the tongue.

Only nasal and oropharyngeal swabs is recommended for COVID19 laboratory testing in Nigeria. However, sputum, bronchoalveolar lavage and tracheal aspirate can be collected as additional samples and used to diagnose COVID-19.

Section 3:

Sample packaging procedure

4. Place nasal and oropharyngeal swabs into a single sterile tube containing 2-3 ml of viral transport media (VTM) immediately after collection.

   If sputum, bronchoalveolar lavage or endotracheal aspirate is collected, please collect in a sterile sample tube

5. Label sample correctly and appropriately

6. Store samples at 4°C for ≤5 days and -70°C for >5 days in the fridge and refrigerator respectively.
   If samples are to be transported immediately, please move to Section 3.

   If samples are to be packaged by a different individual, please transfer and continue with steps 7 and 8.

7. Doff PPE (in the correct sequence –gown, gloves, face shield, N95 mask).

8. Wash hands with soap under running water

9. NOTE:

10. Refer to the NCDC website for updated guideline.

Samples should be packed in triple container packing and transported under cold chain to the reference laboratory as described below:

1. Apron/lab coat, hand gloves, face shield and N95 Masks must be worn during COVID-19 sample packaging, in combination with a face-shield.

2. Wrap the VTM tube containing the nasal and oropharyngeal sample in an adsorbent material that can absorb the content of the VTM tube in the event of breakage or spillage. Where an adsorbent rack-style holder is unavailable, cotton balls, tissue paper, paper towel, styro-foam may be used as adsorbent material. A cello tape should be used to hold the absorbent material in place if the material sits loosely.

3. Place the VTM tube wrapped in adsorbent material in a leak-proof secondary container. A falcon tube should be used as a secondary container.

4. Place the falcon tube in a zip- lock bag and attach a biohazard sign on the zip-lock bag.

5. Place the zip-lock bag into another airtight, sturdy container (e.g. bio-bottle).

6. Place the sturdy container into gio-styles ensuring the specimen is **surrounded (bottom and sides) by hard frozen gel packs** to make certain the sample is preserved during transport. COVID- 19 specimen should be transported at 4°C for ≤5 days and -70°C for>5 days.

7. Disinfect the gio-style.

8. Place the gio-styles into a hard card box container and disinfect again.

9. Doff PPE (in the correct sequence, gown, gloves, face shield, N95 mask).

10. Wash hands with soap under running water

11. Call the recommended courier service(s) for sample pickup. To invite the recommended courier service(s) for pick-up, call any of the following numbers telling them explicitly what sample needs to be transported, from which location, and to which laboratory.

    - **0818 105 5406**
    - **0907 036 0007**
    - **0803 499 0971**
    - **0907 036 0001**
    - **0706 193 9703**
    - **0907 036 0092**

12. Notify the testing laboratory as soon as the specimen is handed over to the ` courier service

Annex 5: Eligibility for Home Care for COVID-19

Recommended criteria for home care for COVID-19
These interim recommendations for home care are based on the current epidemiology of the disease in Nigeria.

a. With mild caution

- Below **50 years** old who clinically stable, Stable/well controlled (defined in the checklist) comorbidities or absence of co morbidities such as but not limited to Hypertension, Diabetes Mellitus, and Chronic obstructive airway disease
  AND
- Asymptomatic or mild symptoms
- Normal oxygen saturation (**SpO2 ≥ 94%** on room air)
- Available space for optimal self-isolation
- Can be followed up by CHEW/community volunteer every two days with home visits or phone call.

b. With moderate caution

- Over 50 years who is clinically stable AND with NO history of any co-comorbidity
- Asymptomatic or mild symptoms
- Normal oxygen saturation (**SpO2 ≥ 94%** on room air)
- Available space for optimal self-isolation
- Should be followed up with home visits by nurse/doctor every other day.

c. Not recommended

- Any age with moderate/severe symptoms
- Lack of adequate self-isolation facilities e.g. inadequate home accommodation
- Elderly Patients above 60 years

Any 'high risk' patient such as patients with complications from co-morbidities like renal impairment, heart disease, sickle cell anaemia, chronic obstructive airway disease etc. based on a clinical risk assessment done by a qualified clinician

Eligibility for Home-Based Isolation and Care
The HCW at receiving facility will evaluate the patient's clinical and household condition for eligibility of Home-Based Isolation & Care in the following areas:

Assessment of Eligibility for HBIC

- Clinical assessment checklist
- Home assessment checklist
- IPC checklist
- Waste management checklist
- Relevant basic care processes for HBIC
- Follow –Up and Referral

Below are points to consider for the eligibility of the patient;

Patient Assessment

1. Patient must be Laboratory confirmed COVID-19 positive individual
2. Patients with mild symptoms or are asymptomatic for COVID-19
3. Patient must be willing to self-isolate and adhere to recommended precautions
4. Stable/well controlled (defined in the checklist) comorbidities or absence of co morbidities such as but not limited to Hypertension, Diabetes Mellitus, and Chronic obstructive airway disease.

5. Shows symptomatic improvement with mild or no symptoms for consecutive 72 hours and treating physician decided to discharge to home care (for patients in treatment centre).
6. A care giver is not mandatory in all conditions. However, care giver is mandatory in the following conditions: paediatric + minor (<18 years) & geriatric (>65 years) age group, disabled, psychiatric or anyone with mental disability.

Home/Household Assessment:

A rapid assessment of the home environment will be conducted by a trained health care worker to ascertain that the home environment meets the minimum criteria for HBIC using the HBIC eligibility assessment check list. Key consideration will include the following:

1. Presence of Community health volunteer/appropriate care giver at home, who is able to provide relevant information about the patients' condition.
2. Proper setup preventing infection spread. If applicable, separate room with toilet, bathroom, and kitchen should be prepared. If separate facility is not applicable, the patient's resting area should be 2 meters apart from other household members and, toilet/bathroom facility and kitchen should be cleaned after every use.
3. Access to adequate basic PPE (Personal Protective Equipment) for the patient, caregiver and family members. E.g. (Face masks, Gloves(optional))
4. Ability to adhere to the standard droplet precautions e.g., appropriate cough etiquette
5. Availability of food and other necessities.
6. Special precautions should be in place for high-risk family members. (Individuals greater than 60 years old, children <2, Pregnant woman and individuals with co morbidities).
7. If the patient is eligible, he/she must sign the consent form. The HCW must make sure that the patient sanitizes his/her hands' or washes appropriately with soap and water before and after signing the consent form.

N.B The household assessment must be conducted by a trained health care worker. The professional must visit the setting in person before making any decision. The decision of the eligibility status should be filled out and signed by the professional.

Annex 6: Multisystem Inflammatory Syndrome in Children and Adolescents with COVID-19

Preliminary case definition Children and adolescents **0–19 years of age** with fever **> 3 days** **AND two of the following**:

a. Rash or bilateral non-purulent conjunctivitis or muco-cutaneous Inflammation signs (oral, hands or feet).

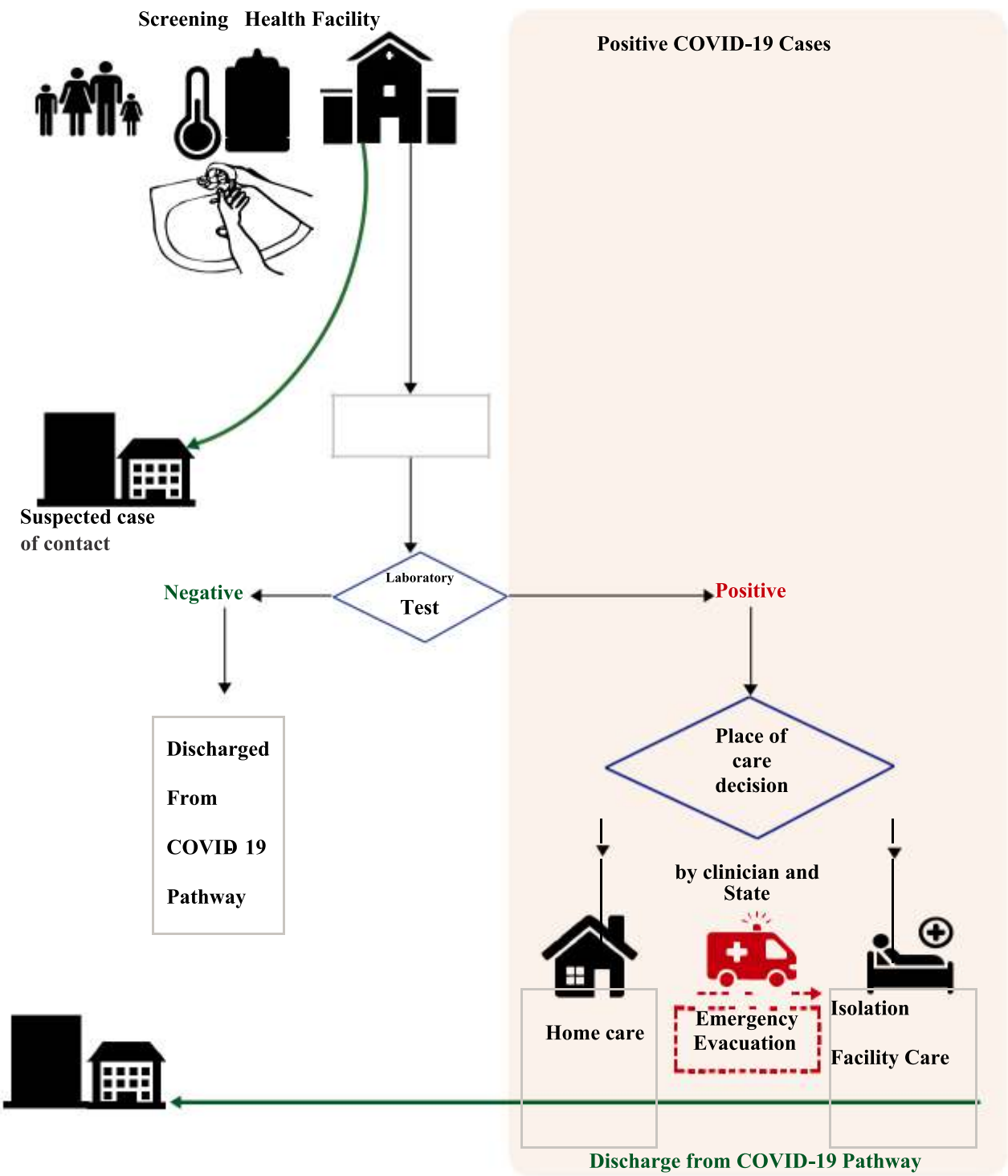
b. Hypotension or shock.

c. Features of myocardial dysfunction, pericarditis, valvulitis, or coronary abnormalities (including ECHO findings or elevated Troponin/NT-proBNP),

d. Evidence of coagulopathy (by PT, PTT, elevated d-Dimers).

e. Acute gastrointestinal problems (diarrhea, vomiting, or abdominal pain). **AND** Elevated markers of inflammation such as ESR, C-reactive protein, or procalcitonin. **AND** No other obvious microbial cause of inflammation, including bacterial sepsis, staphylococcal or streptococcal shock syndromes. **AND** Evidence of COVID-19 (RT-PCR, antigen test or serology positive), or likely contact with patients with COVID-19.

Annex 7: COVID-19 Pathway Summary



Annex 8: Guidance on the use of antigen rapid diagnostic kits for diagnosis of sars-cov-2 infection in Nigeria

Background

In September 2020, the World Health Organization (WHO) announced the EMERGENCY USE AUTHORISATION of two Antigen (Ag)-based rapid diagnostic tests (RDTs) by **SD Biosensor** and **Abbott** for COVID-19 testing.

Available WHO data on both RDTs show that they met the following minimal standards:

1. Ability to correctly identify individuals with the disease (Sensitivity >80%)
2. Ability to accurately identify those who do not have the disease (Specificity >97%)

Therefore, WHO recommends the use of Ag RDTs for:

Surveillance- To detect individuals during the infectious phase to reduce the risk of transmission

Point of care tests- RDTs are cheaper, have shorter Turn-Around Time (TAT) to detect localized outbreaks, isolate positive cases and stop transmission

Patient management- RDTs have high sensitivity and quick TAT for use to triage patients and screen health workers

Ag RDTs are not recommended for use in low prevalence settings such as screening in airports or border crossings at ports of entry. The Ag RDT does not replace the use of the Polymerase Chain Reaction (PCR) and should be used in combination where required, depending on the epidemiological situation and clinical history of the individual. PCR remains the recommended test especially in areas with no or sporadic cases. **PCR remains the gold standard for testing.**
In Nigeria, only these WHO emergency approved AgRDTs are recommended for use and only for the scenarios below. We also recommend diligent collection of data on the use of these RDTs with NCDC approved tools for integration into the national database. This guidance will evolve as new evidence emerges.

CONTEXT OF Ag RDT USE IN NIGERIA

Following the WHO guidance on the use of these diagnostic devices, the Nigeria Centre for Disease Control (NCDC) recommends that these approved tests can be used in the following context in Nigeria. This is subject to approval for the use of these tests in Nigeria by the National Agency for Food and Drug Administration and Control (NAFDAC) as well as further validation of the tests by the Medical Laboratory and Science Council of Nigeria (MLSCN).

1. *Use of AgRDTs to Screen for COVID-19 in Healthcare Settings*

The AgRDTs can be used for the testing of health workers for COVID-19 and for testing of patients with symptoms of COVID-19 presenting in hospital triage areas. In both circumstances, a positive RDT test confirms the SARS Cov-2 infection. All Ag RDT negative cases are considered negative, however if COVID-19 like symptoms are present or persist, a PCR test should be done. AgRDTs can also be used to screen for COVID-19 in non-symptomatic patients before elective surgery and/or emergencies. If the RDT result is positive, perform a PCR test for confirmation. If RDT is negative, the patient is considered as negative.

2. *Use of AgRDTs to Screen for COVID-19 among contacts of a PCR confirmed case*

AgRDTs can be used for the testing of contacts of a PCR confirmed COVID-19 case. A contact who tests positive on using AgRDT, is considered confirmed for COVID-19. If AgRDT is negative, the person is considered as negative.

3. *Use of AgRDTs to Screen for COVID-19 in Closed Settings*

AgRDTs can be used as a screening test for students in boarding houses, prison inmates, National Youth Service Camps and other similar closed settings. In these closed settings, the first case in each setting that is positive with AgRDT should be retested with PCR for confirmation. Once one positive test has been confirmed by PCR, all subsequent AgRDT positive results are considered as confirmed and do not require retesting. This should be the case, until there is a a 14-day (or more) gap between the recording of the last AgRDT positive case and a new case. All RDT negative cases are considered truly negative, if no SARS-CoV-2 symptoms persist.

4. *Interpretation of RDT results*

The performance and interpretation of Ag RDT results may differ in varying prevalence settings. In settings with high prevalence, for patients who test RDT negative and have COVID-19 like signs and symptoms and/or are close contacts of a case, testing should be repeated with PCR due to increased risk of false negatives. For patients with a positive RDT in a low prevalence setting, confirmation should be done by PCR due to the increased risk of false positives.

NOTE: To safeguard health workers, respiratory sample collection for any test from patients with suspected COVID-19 requires that operators wear gloves, gown, mask and face shield or goggles.

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