



Republic of Rwanda  
Ministry of Health



# COVID-19 CLINICAL MANAGEMENT GUIDELINES

4th Edition

September 2021

# TABLE OF CONTENT

Foreword	3
Acknowledgements	4
Background	5
Case and contact definitions	8
Management of contacts	10
Laboratory diagnostics	12
The management of confirmed Covid-19 patients	14
1. Screening and triage on admission	14
2. Treatment	17
3. Infection prevention measures	26
4. Supportive management and Psycho-social support	29
5. Special populations	34
6. Discharge criteria for confirmed Covid-19 patients	43
7. Medical follow up and social reintegration of discharged patients	44
8. Physiotherapy and Rehabilitation prescription for a patient with Covid-19	47
9. Dead body management in the context of Covid-19	50
10. Mourning in times of Covid-19	53
11. Covid-19 vaccination in Rwanda	54
List of reviewers	56
References	57

## FOREWORD

This fourth edition of the Covid-19 Clinical Management Guidelines comes at a critical time when Rwanda is experiencing a surge in Covid-19 cases with different identified potential drivers, including the emergence of new viral strains. It is also built on extensive research developments, and the experience in Covid-19 case management in Rwanda, gained during the first and second waves. It has been developed for the multi-disciplinary team (i.e. doctors, nurses, paramedics etc.) involved in Covid-19 care in Rwanda, including also the team taking care of Covid-19 patients with asymptomatic and mild disease in the community. It englobes the care needed for individuals under investigation for Covid-19 and the confirmed patients across all age groups; including those with special medical needs.

In this updated guidelines document you will find key highlights as follow:

The systematic use of therapeutics such as favipiravir, monoclonal antibodies in eligible Covid-19 patients.

The management of hyperglycemia (and related hyperglycemic emergencies) caused by SARS-COV-2 infection.

The guidance on the referral pathways from Home-Based-Care, Health Centers, District/Provincial Hospitals to the National Tertiary Centers for different components of Covid-19 treatment.

The interpretation and use of laboratory diagnostics and imaging for better management of Covid-19 patients.


The approach to the management of Post Covid-19 sequelae in existing health facilities in Rwanda.

The Physio-Rehabilitation of patients with Covid-19 in Home-Based-Care and in Facility-Based-Care.

The role of a Community Health Worker in Covid-19 care in Rwanda, and the need to innovate for the development of new working relationship between the health sector and Local Government such as the "Operation Save the Neighbor" (OSN) first-piloted in Gasabo District of Kigali.

As for all guidelines, and considering that there is still so much knowledge to gain on the pathogenesis, immunology and therapeutics of Covid-19, these guidelines will evolve in line with new relevant knowledge and progress in the effective management of Covid-19 patients.

I am delighted to present these updated guidelines and highly recommend their use by all health care workers and key responders to Covid-19 pandemic in Rwanda.

  
**Dr. Daniel NGAMIJE**  
**Minister of Health**



# ACKNOWLEDGEMENTS

The fourth version of the Covid-19 Clinical Management Guidelines for Rwanda is another step forward towards ensuring that all clinicians have a common understanding and references for the management of Covid-19 in Rwanda. At the moment we know that this ongoing third wave is being driven by much virulent virus strains, the difficulties in controlling population movements with strict observation of preventive measures, and the fact that our vaccination coverage is still low due to the continued inequitable share of the available vaccines globally.

This pandemic has resurfaced numerous challenges to contain health threats that wave back and forth beyond borders. The hyper-mutability of SARS-COV-2 virus continues to unveil unending new faces on its pathogenicity, and in the absence of effective drugs and vaccines able to provide long lasting safety the world population remains vulnerable. As you know, we are still short of effective therapeutics for patients with severe Covid-19 disease, and we are heavily relying on disease prevention, early detection, early diagnosis and early initiation of treatment. There is a need for constant vigilance and learning all along the response, and collaboratively forge innovative approaches to respond to this health problem.

We wish to acknowledge all healthcare workers and support staff who are working tirelessly in the fight to control this health and security threat in Rwanda. We salute the efforts made by our community and we encourage all our clinicians in private and public health facilities to continue working together and come up with innovative context specific approaches that we can use during this Covid-19 response. We are thankful to the medical doctors who co-piloted the recent innovation of “Operation Save the Neighbor” first-piloted in Gasabo District, and we are looking for more innovation well-tailored and with higher community buy-ins especially now that we look for more horizontal integration of Covid-19 care in the Rwandan health system.

These guidelines should be read in conjunction with other treatment guidelines for common medical conditions in Rwanda (Chronic heart failure, COPD, Diabetes, Hypertension, Valvular heart disease, cancer etc.), especially for patients with existing chronic conditions requiring chronic medications use. As we move forward, considering the current Covid-19 cases burden, it is imperative that we strengthen the pathways for ambulatory Covid-19 patients in need of health services in all health facilities. The pressing need for the set-up of “Covid-19 Clinics” is an area that needs everyone’s collaboration and great attention, as this will enable us to keep our system smoothly running to deliver other essential services in parallel with the Covid-19 care.

As we continue to increase the Covid-19 vaccine coverage in Rwanda, we believe that our continued collaboration will bear more fruits, and soon we will successfully emerge from this crisis with sustainable successes and a great collection of experience and lessons that will enable us to successfully face future pandemics.

**Dr. Sabin NSANZIMANA**

**Director General, Rwanda Biomedical Centre**



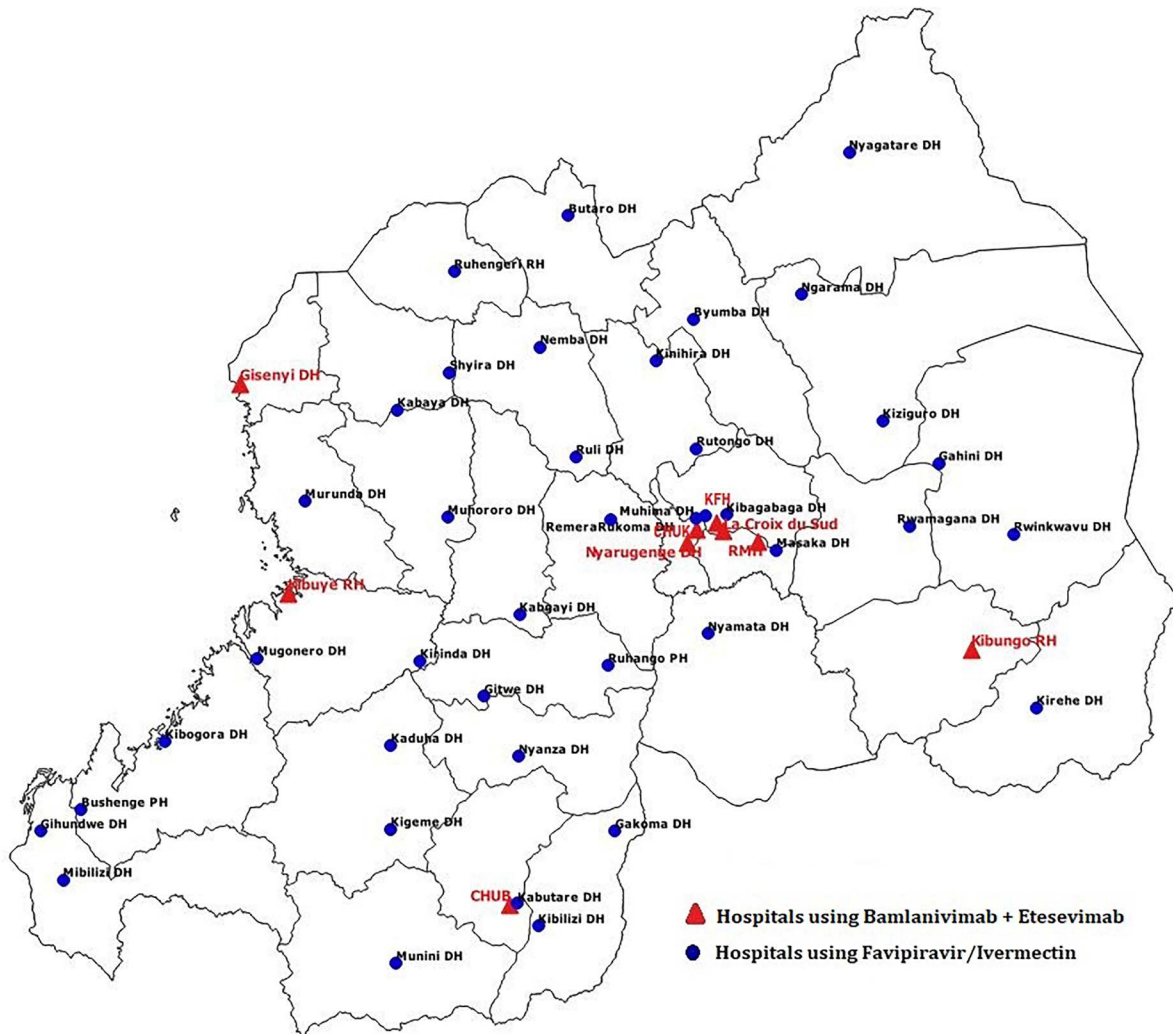

# BACKGROUND

Coronavirus disease 2019 (Covid-19) is a respiratory tract infection caused by a new strain of coronavirus that was first recognized in Wuhan, China, in December 2019. Genetic sequencing of the virus suggests that it is a beta coronavirus closely linked to the SARS virus and that is why it is called SARS-CoV-2 by the International Committee of Taxonomy of Viruses. Since it was first identified in Wuhan, thousands of infected cases have been reported, first in China then in many other countries across the 5 continents, either as imported cases or as result of local transmission.

The disease spread rapidly across the world and according to current evidence, Covid-19 virus is primarily human to human transmitted by (i) direct contact through respiratory droplets and aerosols transmission that occurs when a person is in close contact with someone who has respiratory symptoms (e.g., coughing or sneezing) or even asymptomatic, and by (ii) indirect contact with surfaces in the immediate environment or with objects used on the infected person. It is of common knowledge that crowded places are now driving the observed surge in Covid-19 cases. Following the emergence of newly imported strains, the current estimated basic reproductive number (R0) for Rwanda is now above 1, hence the nearly vertical surge in Covid-19 cases observed in Rwanda from the month of June 2021. Concerning the transmission period, the virus has been identified in respiratory tract specimens 1–2 days before the onset of symptoms, and it can persist up to 2 weeks; the high viral load close to symptoms onset suggests that the virus can be easily transmissible at an early stage of infection.

The median incubation period is reported to be from five to six days for Covid-19 with a range from 2 to 14 days. Recent scholarly reports suggest that the transmissibility of the virus after 10 days (counting from the culprit contact or the onset of symptoms) is very low as the patient would be shedding a non-replicating viral particles (WHO, June 2020 & CDC, August 2020).

The symptomatic people have been classified in 4 categories with increasing order of severity that will determine the type of care and management to be provided: mild, moderate, severe and critical. Based on the largest patients' cohort to date, from asymptomatic cases with Covid-19, about 80% have mild or moderate disease, 15% have severe disease and 5% develop critical conditions. However, during this third Covid-19 wave in Rwanda, the proportion of symptomatic cases has increased to reach nearly 50%, among whom a sizeable number would succumb to the disease without any prior documented comorbidities or any classical risk factor for severe Covid-19 disease. The early use of antiviral therapy has enabled us to control the rates of transmission in the community, and Rwanda strives for improving the medications provision network strategically, and aligned along the existing supply chains of public hospitals [Figure 1].



**Figure 1:** The availability of anti-SARS-CoV-2 therapies in Rwanda

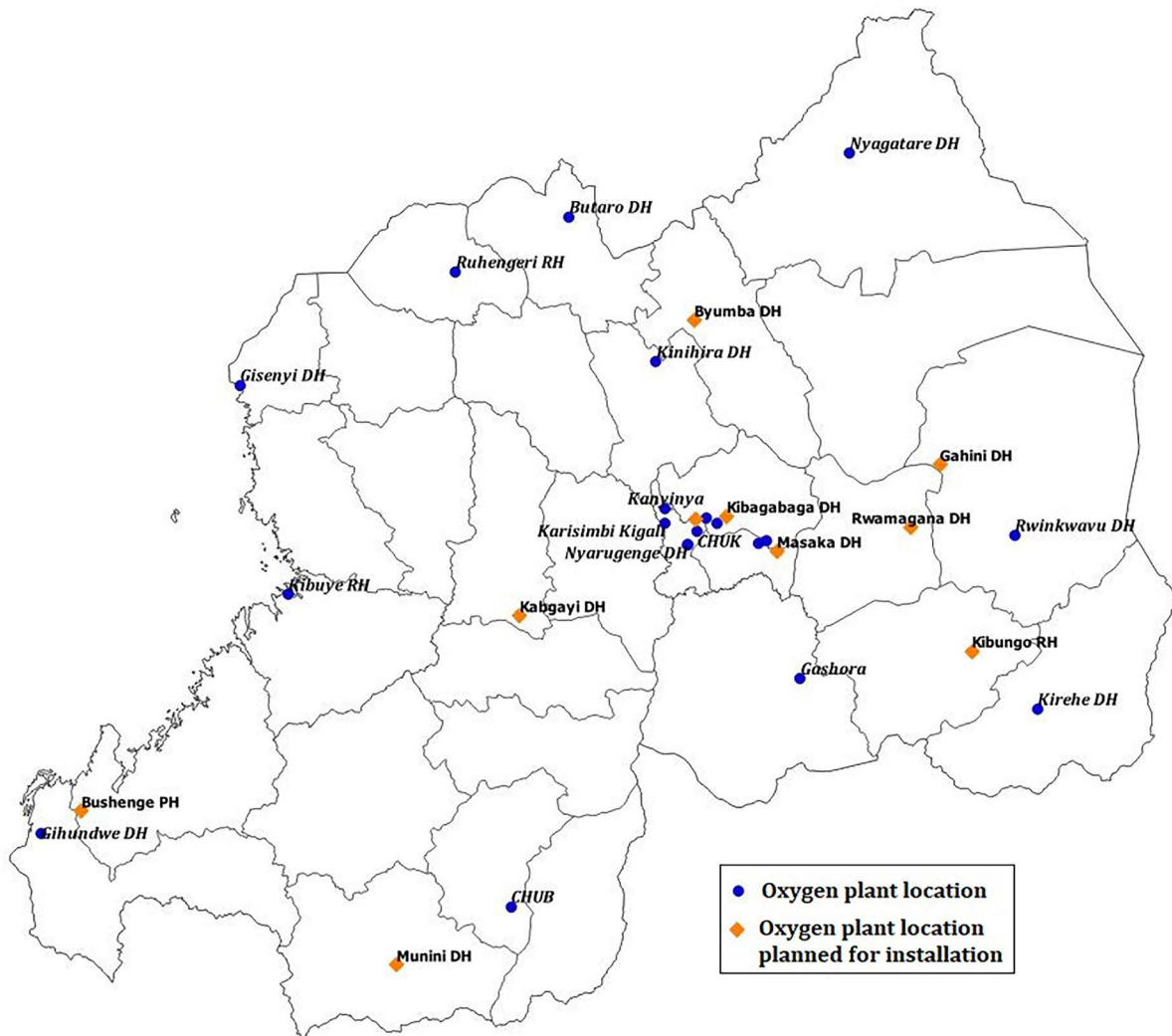
The vulnerable groups more at risk to present with critical conditions are now of any age groups, and irrespective of the underlying conditions previously documented as risk factors such as hypertension, diabetes, cardiovascular disease, chronic respiratory disease, HIV infection, chronic kidney disease and cancer.

Concerning the Case Fatality Rate (CFR), in the largest cohort of >44,000 persons with Covid-19 from China, all deaths occurred among patients with critical conditions and the overall case fatality rate was 2.3% but the case fatality rate among patients with risk factor (vulnerable) was 49%. Globally, the mortality among patients admitted to the ICU ranges from 39% to 72% depending on the study. For Rwanda, the current Case Fatality Rate is 1.1 % (Covid-19 Updates from MoH on 10 July 2021). Our current data in Rwanda shows that the proportion of delta strain is high (above 50%) and the majority of cases who succumb to the Covid-19 disease are largely unvaccinated. However, we encourage all the vaccinated people to continue obeying the preventing measures because not only they can be infected with SARS-CoV-2 virus and succumb to the disease, but also they can be a source of infection for people around them.

Considering the present situation where Covid-19 is striking back in many countries, the risk of

occurrence of widespread national community transmission of Covid-19 in Rwanda in the coming weeks is still there as the country works on sustainable control of Covid-19.

Against this background, Rwanda is drawing much focus on strengthened Home-Based-Care monitoring and improved decentralized capacity for oxygen therapy and intensive care provision [Figure 2].



**Figure 2:** *The oxygen capacity in Rwanda.*

In the previous Covid-19 waves in Rwanda, the case management team has adjusted the treatment guidelines based on the real-time situation including the management of new onset Diabetes Mellitus and its complications which drove the surge in Covid-19 mortalities in the fall of 2020 and early 2021. Since then, our current strategy in case management lies on the principle of “hit hard, hit early” with the available therapies and close serum glucose monitoring for all admitted Covid-19 patients. The use of newly recommended therapeutics for a robust accompaniment of severe and critical Covid-19 patients experiencing an overwhelming cytokine storm remains at the center of Covid-19 case management strategies.

Building on evidence-informed guidelines developed by a multidisciplinary panel of health care

providers with experience in the clinical management of patients with Covid-19 and other viral infections, including SARS and MERS, as well as sepsis and ARDS, these guidelines should serve as a foundation for optimized Covid-19 containment in Rwanda.

## Case and contact definitions

Case and contact definitions are based on the current available information and are regularly revised as new information accumulates. Rwanda has adapted case definitions depending on its local epidemiological situation and other factors. All patients attending health facilities for any reason MUST be screened as potential carriers of SARS-COV-2 virus. The screening should be done after passing the hand hygiene stations (or use of hand sanitizer) before accessing the premises. ONLY the people wearing face masks (except children under 2 years old, those individuals with medical certificate exempting them to use face masks because of their conditions and those judged unfit to use face masks) should be allowed to enter the health facility.

**Screening and triaging:** Who? ALL patients, visitors and staff of ALL health facilities (both public and private).

- **Objective:** To quickly identify patients (or visitors) with possible Covid-19 infection and prevent transmission of infection to other patients, visitors and healthcare workers.
- **Where to screen:** At the point of entry. Most healthcare facilities reduce the number of available entrances and set up screening stations with trained staff at every entrance.
- **Whom to screen:** All people entering a healthcare facility should be screened (patients, visitors, staff). Patients who are coming in for routine care (cancer patients, dialysis patients, prenatal consultations etc.) should be screened prior to arrival if possible (typically via telephone 24 hours before the appointment) and again at the designated point of entry (whether or not the patient was already screened). Patients en-route to the emergency room using ambulances equipped with communication devices should be screened while en-route so that the receiving facilities can arrange all the necessary logistics for better preparations. However, even in the absence of prior communication, all patients in need of emergency services are received at destination facilities where the team is trained to ensure appropriate PPEs are used while attending to unscreened patients with life threatening conditions that are often unrelated to Covid-19 (i.e. trauma, convulsions, coma, heart failure etc.).

**Example of screening questions:** Ideally a form should be designed for all these questions for records and transfers purposes. In order to minimize the amount of written documents that could become a hazard, electronic forms are preferred (i.e. self-declaration using own mobile phones with pre-installed Apps, or a hand-held electronic devices operated only by the staff assigned for the screening).

### 1. Do you have any of the following new symptoms?

- Fever
- Cough



- Shortness of breath
  - Muscle aches
  - Sore throat
  - Runny nose
  - Loss of smell or taste
2. Have you been tested for or had Covid-19 in the last 14 days?
  3. In the last 14 days have you spent at least 10 minutes within 6 feet of anyone with Covid-19 or symptoms of Covid-19?
  4. Are you, or a household member, currently on home isolation or quarantine, or have you traveled to a place that requires quarantine?

If the patient answers “No” to all of the above, continue routine check in. People who screen negative should be separated from those who screen positive.

### Please Note:

**Isolation:** If the patient is positive during screening, they should be treated as a possible Covid-19 case, also called a “Person Under Investigation” (PUI) and be separated from patients who screen negative.

Screened Negative should go through usual pathway of care.

After screening positive, patients should next undergo an acuity assessment to determine how urgently they need to be seen by a medical provider, and the hospital or clinic should make all the necessary arrangements to ensure that a Covid-19 test is done, ideally instantly (using Covid-19 Ag-RDT or rapid PCR), in order to determine the patient’s Covid-19 status.

### Categorization

Not all patients who screen positive on questionnaires will have Covid-19 and it is important to try to separate patients by how likely they are to have Covid-19 in order to avoid exposing patients who do not have Covid-19. Patients who have tested negative or who are not suspected to have Covid-19 should be separated from patients confirmed positive or those with Covid-19 related symptoms. Patient’s rights to access care regardless of Covid-19 status must always be respected.

Refer to the following definitions for proper categorization of the individual undergoing health screening.

#### 1. Suspect case

A patient with any acute febrile illness, any sign/symptom of respiratory disease or flu-like illness, e.g. sneezing, runny nose, nasal congestion, sore throat, cough, shortness of breath etc.), a new loss of smell and taste sensations, headache, myalgia, joints pains, abdominal pain, nausea and/or vomiting, and altered mental status.

A patient for whom the imaging of the lungs is suggestive of Covid-19 pneumonia but the laboratory test (Covid-19 Ag-RDT or PCR) is still pending.

## 2. Probable case

1. A suspect case for whom testing for the Covid-19 virus is reported as “presumptive”.

**OR**

2. A suspect case for whom testing could not be performed for any reason.

**OR**

3. A suspect case for whom the imaging of the lungs is suggestive of Covid-19 pneumonia but the laboratory test (Covid-19 Ag-RDT or PCR) is negative.

## 3. Confirmed case

A person (dead or alive) with laboratory confirmation of Covid-19 infection using Ag-RDT or PCR method, irrespective of clinical signs and symptoms.

## 4. Contact

A contact of a Covid-19 case is any person who had contact with a Covid-19 confirmed case within a timeframe ranging from 72 hours before the onset of symptoms of the case to 10 days after the onset of symptoms.

If the case had no symptoms: a contact person is defined as someone who had contact with the case within a timeframe ranging from 72 hours before the sample which led to confirmation was taken to 10 days after the sample was taken.

# Management of Contacts

General consideration – Continuum of care and triage screening at all facilities

People with and without Covid-19 will initially access the health system in the same way, which points to a critical step of establishing robust screening desks right upon the patient’s arrival at the healthcare facility. Now all healthcare settings in Rwanda have designed patients’ flow that enables them for an early detection of patients who might have Covid-19 patients. Basic infection-prevention measures (hand hygiene, respiratory etiquette, physical distancing) are promoted universally. At each point of entry into the healthcare facility (emergency department, out-patient clinic, antenatal clinic, etc.), there is an identified space where a triage station is placed.

Patients who have Covid-19 symptoms or their close contacts should be placed in a separated seated area ( maintaining at least 1m distance) from patients who screened/tested negative for Covid-19. An isolation space should be placed close to triage and must always be established to separate suspected Covid-19 cases from others. Instituting targeted referral and counter-referral criteria and processes is very crucial to keep the system from becoming overwhelmed.

# 1. Contact identification and listing

Immediately after a confirmed or probable case has been identified, the next steps regarding the contact tracing for the public health authorities include:

Interviewing the case to collect information on clinical history and possible contacts from three days before onset of symptoms or counting from the date the positive sample was taken.

Tracing, and communicating with, the identified contacts and providing information about suitable infection control measures, symptoms monitoring and other precautionary measures such as the need for self-quarantine before they are tested for Covid-19, especially if they are symptomatic.

From our recent experience with the volcanic eruption in Goma city of the Democratic Republic of Congo, which led to massive population movements into Rwanda, we have learnt that the interaction between known Covid-19 cases and their contacts can be a lot more complex. As we are in an era marked with several natural disasters, we need to constantly reflect on the general principle of cases identification and contacts management. The general idea to keep in mind is that, in the rare event that the movements of the known (or unknown) Covid-19 cases might happen beyond our control, the quick action would be managing the cases and their close contacts together, place them in transit centers or camps, and re-start the screening of the moving population once they are re-settled and out of immediate danger caused by the natural disaster. As soon as the positive cases are detected, they must be immediately communicated, educated, isolated and managed appropriately.

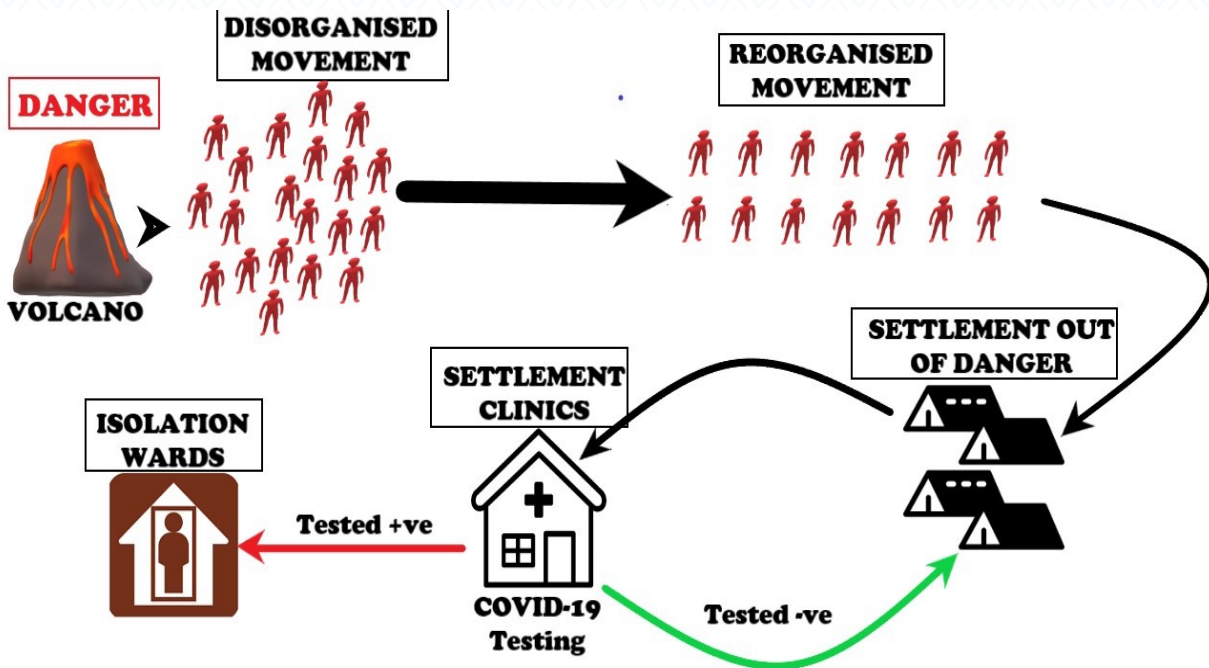


Figure 3: Movement re-organization and Covid-19 testing during the Nyiragongo volcanic disaster

## 2. Contact follow-up

Contact tracing can be resource intensive. The contact tracing intensity will be adapted to the local epidemiological situation and according to available resources. These resources may be strengthened by recruiting non-medical staff, including volunteers, if sufficient data protection safeguards, training, and supervision can be provided. To enable scaling up contact tracing, contacts could also be contacted and informed through text messages instead of phone calls. All the symptomatic known contacts of a positive Covid-19 patient are tested for Covid-19 as soon as possible (preferable on the same day, so that they can know their status and prevent further disease dissemination if found to be positive). Those without symptoms, are advised to self-isolate and test at least 3 days ( ideally 5 days) after contact with a positive case to increase the chances of detection of SARS COV-2 based on usual incubation period of the virus.

# Laboratory diagnostics

## 1. Laboratory testing guiding principles for patients in Rwanda

### For all individuals who:

Meet the suspect case definition criteria

Any close contact with a Covid-19 case, even if they are asymptomatic if resource allowed or if they had low exposure with a Covid-19 but developed Covid-19 related symptoms, including fever of any grade, cough, fatigue, difficulty breathing symptoms, anosmia, dysgeusia, severe headache, muscle and joints pain etc.

Suspected cases or contacts should be tested using Covid-19 Antigen Rapid Diagnostic Tests or a RT-PCR test if available. Covid-19 validated self-tests are currently being used in different settings and are also recommended for use in Rwanda; detailed implementation guidelines shall be provided in the near future. Other innovative testing strategies ( ex: scent dogs etc.) are under strict scientific validation before they are approved and rolled out.

## 2. Specimen collection

Any testing for the presence of Covid-19 or clinical specimens from individuals meeting the suspect case definition should be performed in appropriately equipped laboratories by staff trained in the relevant technical and safety procedures. National guidelines on the laboratory biosafety should be followed in all circumstances.

All technical procedures should be performed in a way that minimizes the generation of aerosols and droplets and appropriate personal protective equipment (PPE), should be worn by all laboratory

personnel handling these specimens. More details are provided in laboratory standard operating procedures.

### **Specimens to be collected:**

Nasopharyngeal, oropharyngeal, broncho-alveolar lavage or saliva specimens can be used alone or combined according to the availability of different compatible kits.

### **Packaging and shipment of clinical specimens:**

Specimens for virus detection should reach the laboratory as soon as possible after collection. Correct handling of specimens during transportation is essential. Specimens that can be delivered promptly to the laboratory can be stored and shipped at 2- 8°C. When there is likely to be a delay in specimens reaching the laboratory, the use of viral transport medium is strongly recommended. Specimens may be frozen to - 20°C or ideally -70°C and shipped on dry ice if further delays are expected. It is important to avoid repeated freezing and thawing of specimens. Alerting the laboratory before sending specimens encourages proper and timely processing of samples and timely reporting. Specimens should be correctly labelled and accompanied by a diagnostic request form.

## **3. Laboratory testing for Covid-19 virus**

The use of locally validated Rapid Diagnostic Test kits is now widely available, and this has enabled the healthcare system to timely detect Covid-19 patients, with a turnaround time that is more strategic to put us few steps ahead of this pandemic.

Nucleic acid amplification tests (NAAT) for Covid-19 virus is still also used in some settings. For this modality, the testing for Covid-19 is based on detection of unique sequences of virus RNA by NAAT such as real-time reverse-transcription polymerase chain reaction (RT-PCR) with confirmation by viral cultures when necessary. The viral genes targeted so far include the N, E, ORF and RdRp genes. RNA extraction should be done in a biosafety cabinet in a BSL-2 or equivalent facility. For newly diagnosed Covid-19 individuals, **a positive result means CT value less than 37 cycles**. Further details are presented in the laboratory algorithm and SOPs.

## **4. Management of presumptive test results**

The current laboratory data indicates that 70% of the presumptive positive results are negative when retested using a new sample while 30% are confirmed positive. It is therefore recommended that individuals with presumptive positive results be retested using a new sample as soon as possible.

If positive, the patient is managed as a confirmed positive case.

If the confirmation test is negative, the follow-up of the case is discontinued, and he/she is encouraged to continue the observation of all other public health measures for Covid-19 control.

## 5. Reporting of cases and test results

Laboratories should follow national reporting requirements. In general, all test results, positive or negative, should be immediately reported to national health authorities for continuum of care. Everyone tested positive is strongly advised to inform his/her contacts so that they can isolate/test for Covid-19 to limit the spread of the virus.

We have observed rare cases whereby there is a discordance between result obtained from Covid-19 Antigen Rapid Diagnostic Test, and that of RT-PCR. In such situation, It is advised to collect a combined nasopharyngeal and oropharyngeal swabs, mix the two in one viral transport media, and run the obtained mixed sample on RT-PCR platform in order to have a clear information on the status of the patient.

# The management of confirmed Covid-19 patients

## 1. Screening and triage on admission

Early diagnosis, treatment and isolation should be carried out as soon as possible.

On admission, the physician at the isolation units and treatment centers must classify patients based on the following clinical symptoms and a comprehensive clinical examination.

The most common symptoms are: fever, cough, fatigue, and dyspnea but many other symptoms are reported: anorexia, sputum production, myalgia, headache, confusion, rhinorrhea, sore throat, hemoptysis, vomiting, diarrhea, anosmia, dysgeusia and hypoxemia without respiratory distress ("silent hypoxia"). Typical malaria signs and symptoms (fever, shivering, headache, fatigue, muscle aches, diarrhea, vomiting) may overlap with common Covid-19 symptoms. Clinicians should be able to have in mind the possibility of presence of one or more differential diagnoses especially in tropical diseases endemic regions like Sub Saharan Africa.

The median time from symptoms onset to the development of pneumonia is approximately 5 days and the median time from symptoms onset to severe hypoxemia and ICU admission is approximately 7-12 days. With the newly emerging virus strains especially of the "delta" type, the clinical progression can be much faster.

Most patients have bilateral peripheral ill-defined opacities on chest radiograph and common CT findings are ground glass opacities and consolidation. Acute hypoxemic respiratory failure from acute respiratory distress syndrome (ARDS) is the most common complication (in 60 – 70% of patients admitted to the ICU), followed by shock (30%), myocardial dysfunction (20 – 30%), and acute kidney injury (10 – 30%). Some patients might develop hypoxemia without respiratory distress and arrhythmia are also reported in ICU patients.

Covid-19 may lead to thromboembolism especially pulmonary embolism (PE) and deep vein thrombosis (DVT). This is due to excessive inflammation, hypoxia, immobilization and disseminated intravascular coagulation. Reports on endotheliitis or vasculitis also call for attention and attentive management.

**Upon notification of a confirmed Covid-19 case, pay attention to the following comorbidities:**

- Chronic lung diseases or moderate to severe asthma
- Cardiovascular diseases and serious heart conditions
- Immunocompromised patients (cancer treatment, smoking, organ transplantation, immune deficiencies, uncontrolled HIV/AIDS, prolonged use of corticosteroids)
- Obesity (BMI ≥ 30)
- Diabetes Mellitus
- Chronic Kidney Disease
- Liver disease

**Table 1:** Case classification according to clinical and lungs imaging findings

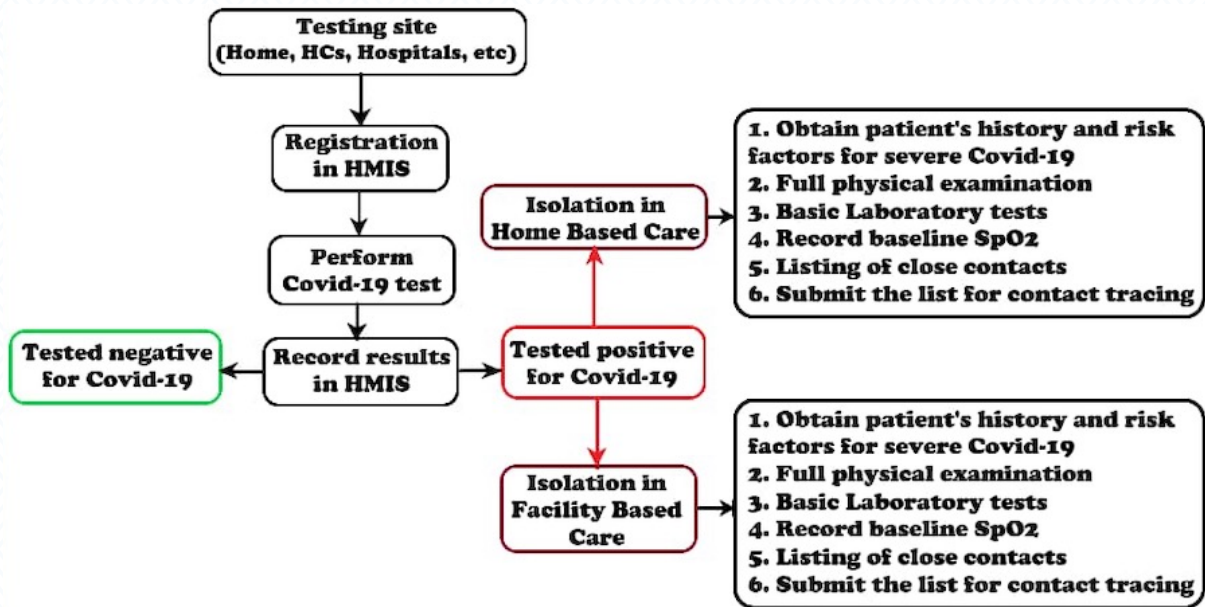
Stage of the Severity	Main symptoms and Imaging	Laboratory and imaging investigations
<b>Asymptomatic</b>	The infection can remain asymptomatic at the time of laboratory confirmation but a large proportion of these cases developed some symptoms at a later stage of infection.	For all confirmed, for a baseline (recommended, depending on available logistics):  Full Blood Count.  Liver function: AST, ALT, GGT, Bilirubin, Albumin and Total proteins.
<b>Mild</b>	Mild symptoms, non-specific: Fever, cough, fatigue, anorexia, myalgia, headache, rhinorrhea, sore throat, vomiting, diarrhea, smell and taste disorders.  No clinical signs of pneumonia.	Renal function: blood urea and creatinine.  Inflammation markers: CRP, LDH, Ferritin, D-dimers wherever possible.  If high fever: do a malaria test.
<b>Moderate</b>	Fever and/or respiratory symptoms, no signs of sepsis or shortness of breath.  Clinical signs of pneumonia and abnormal chest imaging (reticular opacities and nodules can be seen on standard chest X-ray).  Covid-19 at the early stage often presents with multifocal patchy shadows or ground glass opacities located in the lung periphery, subpleural area, and both lower lobes on chest CT scans.	Add chest X-ray if clinical signs of pneumonia.  High Resolution Chest CT scan can be considered.  Monitoring of FBC, LFT, RFT as needed.  Blood culture if persistent high fever (especially in areas endemic for salmonellosis).  Consider checking DIC panel i.e. D-dimer, fibrinogen levels, platelets levels and PT and APTT.

<p><b>Severe</b></p>	<p>Adult: Fever (<math>&gt; 38.5</math> Degrees Celsius ) and dyspnea and/or                      Hypoxia (<math>SpO_2 \leq 90\%</math> on room air) and/or                      For adult: <math>RR \geq 30/min</math>.                      For Children 1-5 years: <math>RR \geq 40</math>, 2-11 months: <math>RR \geq 50</math> and <math>&lt; 2</math> months: <math>RR \geq 60</math>; look for central cyanosis in children                      For pregnant women consider severe case if <math>SpO_2 \leq 95\%</math>                      Arterial Blood Gas Analysis: partial pressure of oxygen (<math>PaO_2</math>)/fraction of inspired oxygen (<math>FiO_2</math>) <math>\leq 300</math> mmHg.                      Patients with <math>&gt; 50\%</math> lesions progression within 24 to 48 hours in lung imaging; enlarged and increased density of the lesions compared with previous chest imaging, and consolidated lesions with air bronchogram sign.</p>	<p>As above: FBC, LFT, RFT,                      Arterial Blood Gas Analysis, Blood cultures, Malaria smear, Coagulation panel etc. as indicated.                      Consider monitoring the DIC panel, inflammatory markers, IL-6 levels, echocardiography, EKG etc. as required case by case.</p>
<p><b>Critical</b></p>	<p>Respiratory failure and/or                      Sepsis with signs of (multi)organ dysfunction including altered mental status, difficult or fast breathing, low oxygen saturation, reduced urine output, fast heart rate, weak pulse, cold extremities or low blood pressure, skin mottling, coagulopathy and/or                      Shock with persisting hypotension despite volume resuscitation, requiring vasopressors to maintain and/or                      Multi-organ system dysfunction                      There are three stages according to the oxygenation index:                      - Mild Acute Respiratory Distress Syndrome (ARDS):  <math>200mmHg &lt; PaO_2/FiO_2 \leq 300</math> mm Hg (<math>SpO_2/FiO_2 \leq 315</math>)                      - Moderate Acute Respiratory Distress Syndrome (ARDS):  <math>100</math> mmHg <math>&lt; PaO_2/FiO_2 \leq 200</math> mm Hg                      - Severe Acute Respiratory Distress Syndrome (ARDS): <math>PaO_2/FiO_2 \leq 100</math> mm Hg</p>	<p>As above.                      Note that the standard Hospital Guidelines for ARDS are applied.</p>



## 2. Treatment

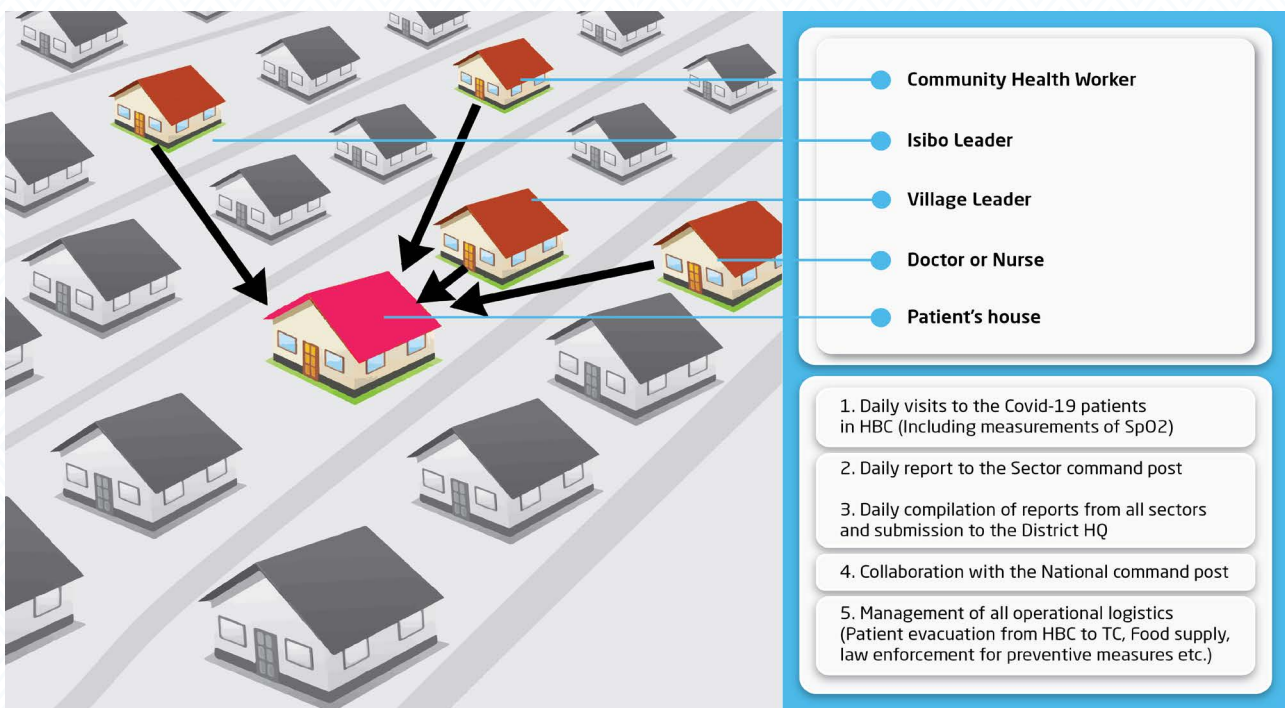
What should a health care provider do in the presence of newly diagnosed Covid-19 patient?



\* Self register if self-test kit used at home following related guidelines

Provide antiviral medications and prescribe additional medications as deemed necessary (details are shown below).

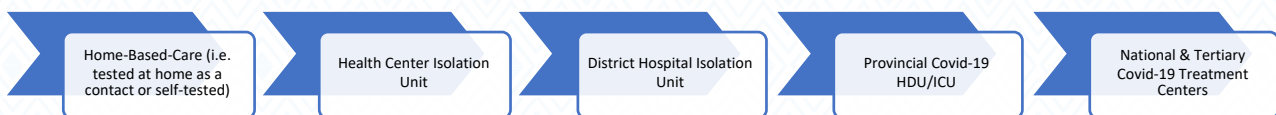
Refer to the successful implementation of the good working relationship between community health workers, the local government and the Doctors & Nurses in their living neighborhoods (i.e. "Operation Save the Neighbor" first-piloted in Gasabo District, see the graphic image below).



We encourage all health care workers working in Rwanda to remain involved in the Home-Based-Care management in their respective communities. As healthcare practitioners with medical prescription privilege, the participation in Covid-19 case management in the community is of a great necessity considering that more than 90% of active Covid-19 cases in Rwanda are managed in the community. One of the key clinical measurements that we focus on is patient's SpO2 while at home, to enable us to detect when additional therapies including oxygen supplementation might be required.

If SpO2 is less than 90% OR Temperature > 38.5 OR Presence of danger signs e.g. chest pains, shortness of breath, severe weakness, severe headache, nausea and vomiting, a recommendation is made to undergo Facility-Based-Care (at least for a short close observation, unless the doctors can safely arrange for alternative safe measures) at the testing clinic or hospital isolation units (if not available, consult for referral to the most appropriate center or hospital based on the level of oxygen requirement; high flow vs. low flow).

During the daily follow-up of patients in Home-Based-Care, there is a possibility that the patient could deteriorate to require a Facility-Based-Care. In order to ensure that there is a constant and timely communication and collaboration across all the facility, below is the channel for inter-facility referrals.



The transferring facility should take all the necessary measures to ensure the en-route patient's monitoring and care are maintained so that the patient can safely reach the destination facility. In all cases, it is advised to consult the Biomedical Engineers to assist in the assessment and quantification of oxygen use while en-route so that enough O2 tanks to be used in the ambulance are obtained or stopovers for O2 refills are strategically mapped.

### **What are the basics a health care provider should remember while assessing for Covid-19 disease severity?**

- It is crucial to identify severe cases and start supportive treatment without delay but also applying strict IPC measures. Co-morbidities should be assessed quickly and supplemental oxygen initiated for patients with low oxygen levels (see the table below for disease staging).
- People who are vaccinated against Covid-19 can also get SARS-COV-2 infection, and they can also progress towards severe disease in rare cases. The treatment approach for this group of population is the same as for the non-vaccinated patients. It is very important to remind the general population that even those individuals that are vaccinated against Covid-19 MUST continue to abide to all the preventive measures.
- Although most infections are not severe, some patients can quickly develop critical disease requiring admission to a High Dependence/ Intensive Care Unit. Close monitoring is therefore essential to be able to react accordingly, especially for vulnerable groups more at risk to be

admitted in ICU (unvaccinated individuals especially those above 60 years of age, people with underlying conditions such as hypertension, diabetes, cardiovascular disease, chronic respiratory disease, chronic kidney disease and cancer). Chronic obstructive pulmonary disease (COPD), cardiovascular diseases, and hypertension have been identified as strong predictors for ICU admission. Pulmonary embolism, deep vein thrombosis and vasculitis are common and need to be prevented or treated as per the national guidelines. Dynamic monitoring of lungs imaging and oxygenation index are helpful for early identification of patients who may progress into severe and critical cases.

- While the guidelines below provide management guidance, severe and critically ill patients will require the presence of senior internal medicine specialists and intensivists.

**Table 2: Covid-19 case management in Rwanda (on basis of the stage of the disease)**

<b>Stage of the disease</b>	<b>Clinical Management (to be owned and supervised by a medical doctor and he/she ensures its completeness while caring for a Covid-19 patient)</b>
<b>Asymptomatic</b>	<ul style="list-style-type: none"> <li>• Encourage telehealth for follow-up during the home/community-based care.</li> <li>• Daily monitoring of SpO2 and ensure it is above 90% on room air.</li> <li>• Daily monitoring of any Covid-19 related symptoms that may appear (fever of any grade, cough, fatigue or difficulty in breathing, etc.).</li> <li>• Implement rigorous hand hygiene and respiratory etiquette measures.</li> <li>• Wear a face mask when in the same house with other people.</li> <li>• Favipiravir loading dose 1800 mg BID for day-1, then maintenance dose of 800 mg BID for a maximum of 10 days. Occasionally, a combination therapy can be discussed and provided. Note that Favipiravir is contraindicated in people under 18 years of age. However, weighing the risks and benefits, few exceptions might be made after multidisciplinary consultations.</li> <li>• Perform a Covid-19 control test at Day 10 counting from the time of collection of the sample which was returned positive.</li> </ul>
<b>Mild and moderate</b>	<ul style="list-style-type: none"> <li>• Encourage home visits by the community health worker or other health personnel living in the same village for follow-up, unless already admitted in a health facility.</li> <li>• Daily monitoring of SpO2 to be maintained above 90% on room air.</li> <li>• Daily monitoring of progression of related signs (including fever of any grade, cough, fatigue or difficulty in breathing).</li> <li>• Implement rigorous hand hygiene and respiratory etiquette measures.</li> <li>• Wear a face mask when in the same house with other people.</li> </ul>

<p><b>Mild and moderate</b></p>	<ul style="list-style-type: none"> <li>• Maintain good hydration and provide antipyretics, analgesics and other medications as needed: Example for Adults: paracetamol 1gm PO every 6-8hrs (max 4g/24h), 15mg/kg (in children); Vitamin C effervescent 1 gm daily, Paidoterin syrup (or other decongestant), cough mixtures (ascoril, bronchalene etc.) and a variety of locally manufactured and licensed essential oils (eucalyptus, tagetes and mixtures).</li> <li>• If pneumonia (confirmed or highly suspected based on clinical signs), the patient will be treated with empiric antibiotics: Drugs of choice: Doxycycline 100 mg BID for 7 - 10 days, Amoxicillin 500 mg PO TID for 7 days or Amoxycillin + Clavulanic acid (Augmentin) 625mg TID for 7 days.</li> </ul> <p><b>Caution:</b> Do not give anti-inflammatory drugs like ibuprofen as they are believed to increase the ACE receptors expression and worsen the Covid-19 infection course.</p> <ul style="list-style-type: none"> <li>• Provide Deep Vein Thrombosis (DVT) prophylaxis with low molecular weight Heparin (i.e. Lovenox, Clexane, Enoxaparin etc.) systematically to all hospitalized patients unless there is a contraindication.</li> <li>• Favipiravir loading dose 1800 mg BID for day1, then maintenance dose of 800 mg BID for a maximum of 10 days.</li> <li>• <b>Caution:</b> Favipiravir is contraindicated in people under 18 years of age. However, weighing the risks and benefits, exceptions might be made after multidisciplinary consultations.</li> <li>• Treatment with monoclonal antibodies (i.e. Bamlanivimab and Etesevimab, etc.) can be provided at the regional infusion center (see the annexed drugs roll-out map for Rwanda), based on the risk assessment and eligibility to other molecules. Detailed infusion protocol is found at these selected centers.</li> <li>• Prone positioning is highly recommended.</li> <li>• Physio-rehabilitation is recommended, guided and supervised by trained personnel.</li> <li>• Control Covid-19 test at Day 10 counting from the time of collection of the sample which was returned positive.</li> </ul>
<p><b>Severe</b></p>	<ul style="list-style-type: none"> <li>• All severe cases must be handled at a well-equipped health facility.</li> <li>• If SpO2 ≤ 90% or obvious respiratory distress (RR &gt;24): Oxygen therapy to maintain SpO2 preferably at above 90% for patients without chronic pulmonary disease and provide oxygen supplementation for SpO2 goal of 88 - 92% for patients with chronic respiratory failure or severe obesity.</li> <li>• Oxygen therapy should be initiated at 3L/min and titrate the flow rate as necessary starting with the delivery via nasal prongs and regular oxygen masks, or use a Non rebreathing masks in more severe cases to achieve the desired SpO2 goals.</li> </ul>

<p>Severe</p>	<ul style="list-style-type: none"> <li>• High-flow nasal cannula (HFNC) oxygen therapy should be tried, as much as possible to delay the need for invasive mechanical ventilation. Note that some centers/hospitals are equipped with devices that are able to deliver up to 70 L/min oxygen flow.</li> <li>• Steroids are systematically given to this category of patients (especially with increased inflammatory markers such as CRP and ESR), except if known contraindications. Drugs of choice: Dexamethasone IV 6 mg BID or TDS (titrated and tapered as necessary). Alternative choice: Prednisolone P.O 40 mg OD or Hydrocortisone IV 200 mg OD.</li> <li>• Provide prevention of secondary bacterial pulmonary infection: antibiotics can be used with discretion in patients who have the following conditions: extensive lung lesions; excess bronchial secretions; chronic airway diseases with a history of pathogen colonization in the lower respiratory tract. The options of antibiotics include Augmentin 1.2 gms BID with Clarithromycin 500 mg BID or Cefuroxime 750 mg TID with Clarithromycin 500 mg BID or Ceftriaxone IV 1 – 2 gms BID (If allergy to penicillin, give Levofloxacin 500 mg BID for 7 days).</li> </ul> <p><b>Caution:</b> Do not give anti-inflammatory drugs like ibuprofen as they are believed to increase the ACE receptors expression and worsen the Covid-19 infection course.</p> <ul style="list-style-type: none"> <li>• DVT prophylaxis with low molecular weight heparin (i.e. Lovenox, Clexane etc.) is systematically given to all the hospitalized patients. For patients with SpO<sub>2</sub>&lt;90%, RR&gt;24, increased C-reactive protein levels or patients with grossly abnormal chest X ray should receive a therapeutic dose of anticoagulants unless there are contraindications (i.e. low platelets, bleeding diathesis etc.).</li> <li>• Favipiravir loading dose 1800 mg BID for day1, then maintenance dose of 800 mg BID for a maximum of 10 days.</li> </ul> <p><b>Caution:</b> Favipiravir is contraindicated in people under 18 years. However, weighing the risks and benefits, few exceptions might be made after multidisciplinary consultations.</p> <ul style="list-style-type: none"> <li>• Treatment with a single dose of Interleukin-6 inhibitor (i.e. Tocilizumab) at 4 – 8 mg/ Kg is recommended. An equivalent drug for the same purpose of aborting or limiting the cytokine storm can be provided depending on the drug availability, within the first 3 days of the onset of the respiratory failure. The dose can be repeated at the discretion of treating specialist.</li> <li>• Prone positioning is highly recommended for both awake and ventilator supported patients.</li> </ul>
---------------	--

<p><b>Critical</b></p>	<ul style="list-style-type: none"> <li>• All critical cases must be handled at a well-equipped health facility.</li> <li>• Most of interventions and treatment options proposed for severe cases can be applied here.</li> <li>• In addition, mechanical ventilation support if High Flow Nasal Cannula (HFNC) treatment fail as some severe patients progress to moderate and severe ARDS rapidly. The standard local ARDS protocols are applied.</li> <li>• Non-invasive Ventilation (NIV): if performed ideally in a negative pressure room or through a helmet. A virus filter should be installed between the mask and the exhalation valve when applying NIV with a single tube. Suitable masks (according to size and age) should be chosen to reduce the risk of virus spread through air leakage.</li> <li>• Invasive Mechanical Ventilation with prone ventilation wherever possible.</li> <li>• Nutrition support by a trained provider.</li> <li>• Vasopressor support (consider norepinephrine as per the local guidelines and drugs availability to achieve the hemodynamic stability).</li> <li>• Steroids are systematically given to this category of patients, except if known contraindications. Drugs of choice: Dexamethasone IV 6 mg BID or TDS (titrated and tapered as necessary). Alternative choice: Prednisolone P.O 40 mg OD or Hydrocortisone IV 200 mg OD.</li> <li>• Anticoagulants are used at the therapeutic dose using low molecular weight heparin (i.e. Lovenox, Clexane, Enoxaparin etc.).</li> <li>• Antibiotics: as above. For ventilator-associated pneumonia: Ceftazidime IV 2 gms TID or Levofloxacin 500 mg BID.</li> <li>• Favipiravir loading dose 1800 mg BID for day1, then maintenance dose of 800 mg BID for a maximum of 10 days.</li> </ul> <p><b>Caution:</b> Favipiravir is contraindicated in people under 18 years of age. However, weighing the risks and benefits, few exceptions might be made after multidisciplinary consultations.</p> <ul style="list-style-type: none"> <li>• Treatment with a single dose of Interleukin-6 inhibitor (i.e. Tocilizumab) at 4 – 8 mg/ Kg is recommended. An equivalent drug for the same purpose of aborting or limiting the cytokine storm can be provided depending on the drug availability. The dose can be repeated at the discretion of treating specialist.</li> <li>• Physio-rehabilitation is recommended, guided and supervised by trained personnel.</li> <li>• Control Covid-19 test at Day 10 counting from the time of collection of the positive</li> </ul>
------------------------	--

<p><b>Special categories: pregnant and breastfeeding women.</b></p>	<ul style="list-style-type: none"> <li>• Daily monitoring of SpO2 and provide oxygen supplementation as needed to maintain SpO2 above 95%.</li> <li>• Daily monitoring of Covid-19 related symptoms (including fever of any grade, cough, fatigue or difficulty in breathing).</li> <li>• Implement rigorous hand hygiene and respiratory etiquette measures.</li> <li>• Wear a mask when in the same house with other people.</li> <li>• Treatment with monoclonal antibodies (i.e. Bamlanivimab and Etesevimab, etc.) can be provided at the regional infusion center (see the annexed drugs roll-out map for Rwanda), based on the risk assessment and eligibility to other molecules. Detailed infusion protocol is found at these selected centers.</li> </ul> <p><b>Caution:</b></p> <ul style="list-style-type: none"> <li>• Do not give anti-inflammatory drugs like ibuprofen as they are believed to increase the ACE receptors expression and worsen the Covid-19 infection course.</li> <li>• Do not give Favipiravir, as it is contra-indicated for this category of patients. However, weighing the risks and benefits, few exceptions might be made after multidisciplinary consultations.</li> <li>• Treat symptomatically to relieve symptoms, and we encourage the doctors to always consult the primary Gyne-Obstetrician for any need to use different drugs in order to prevent the potential harm to the fetus and the baby.</li> <li>• If SpO2 drops below 95% on room air:             <ul style="list-style-type: none"> <li>◊ Please provide supplemental oxygen to maintain SpO2 above 95% at all the times.</li> <li>◊ Commence full dose anticoagulation protocol (i.e. Lovenox s/c 40 mg BID) for a duration that is discussed with Gyne-Obstetrician bearing in mind that an emergency caesarian section might be planned at any time.</li> <li>◊ Commence Dexamethasone IV 6 mg BID or TDS (titrated and tapered as necessary). Alternative choice: Prednisolone P.O 40 mg OD or Hydrocortisone IV 200 mg OD.</li> <li>◊ Commence antibiotics to treat concurrent bacterial infection: use IV Augmentin 1.2 gms BID for 7 days.</li> </ul> </li> </ul> <p>For a viable fetus, all attempts should be made to arrange removing the baby before the mother condition deteriorates further.</p> <ul style="list-style-type: none"> <li>• Control Covid-19 test at Day 10 counting from the time of collection of a positive</li> </ul>
---	---

The above treatment plan is provided along with other existing therapies for concurrent medical conditions, it is left at the discretion of the prescriber to assess and adjust the treatment plan based on the clinical judgement, especially for the special category groups such as children, pregnant or breastfeeding mother, peri-operative patients and other patients detected in the emergency context.

Appropriate patients' monitoring capability should be maintained (full set parameters, especially for critically ill Covid-19 patients, **see Figure 4**), especially by ensuring that the correct patient-to-nurse ratio is observed for better clinical outcomes. This is also reflected in the daily patient's clinical status documentation which can be evaluated as per the patient's level of acuity as follow:

**A patient off oxygen:** vital signs three times daily, drugs administration as per prescription's frequency, patient's education and bed making. **Ideal standard nurse-to-patient ratio is 1:8.**

**A patient on oxygen:** vital signs every 6 hours or as prescribed by the physician, drugs administration as per prescription's frequency, patient's education, bed making, patient's hygiene (bathing, mouth wash etc.) and feeding. **Ideal standard nurse-to-patient ratio is 1:4.**

**A bedridden patient, elderly or a patient with multiple comorbidities:** vital signs every 30 minutes to 2 hours, as per the prescription's frequency, drugs administration, patient's education, bed making, patient's hygiene (bathing, mouth wash etc.), feeding and changing position. **Ideal standard nurse-to-patient ratio is 1:2.**

The above standards are the minimum to be expected, and the clinical roles would include also other common needs such as taking laboratory samples, suctioning, nasogastric tube and urinary catheter placement. This is very crucial and is directly linked to the hospitalization's outcomes.

The referral of patients from a facility to another, or from Home-Based-Care should be clinically sound, justified and reflected in the transfer note; highlighting the clinical care component that is needed at the destination facility, which could not be obtained at the facility where the patient was being taken care of. In all cases, the expected outcomes should be weighed in the clinical reasoning for the case being referred.

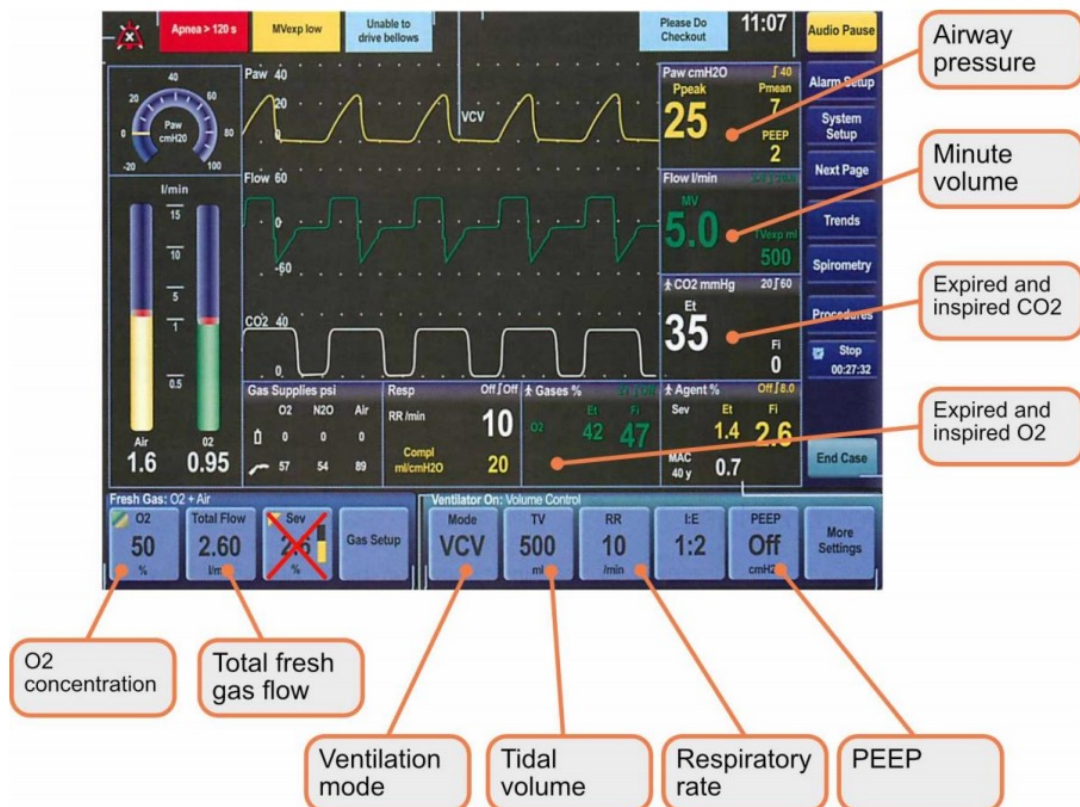


Figure 4: Critical Covid-19 patient's monitoring parameters.



The second Covid-19 surge in Rwanda was notable for severe and critically patients with hyperglycemia and related acute (often fatal) complications. It is in this regards that we highlight below the key principles in the management of increased blood glucose levels (new onset, or acutely uncontrolled) among patients with acute Covid-19 infection:

### **Key principles in the management of hyperglycemia among Covid-19 patients:**

1. Sliding scale is not advisable for Covid-19 patients due to potential inflammatory storm. A basal-bolus treatment approach is the most recommended. For patients with hyperglycemic emergencies (i.e. Diabetic Keto-Acidosis and Hyperosmolar Hyperglycemic State), the insulin therapy is provided via continuous infusion as per the standard protocols.
2. All patients with Covid-19 infection should be screened for hyperglycemia and receive optimized treatment if needed.
3. Screening for hyperglycemia should not be a one-time event. Rather, re-initiation of blood glucose monitoring should be considered if patients moves up the Covid-19 severity ladder, is started on steroids or in patients with high-risk phenotype (such as obese, elderly or those with Non-Communicable Diseases).
4. The choice of drugs to use should be based on the Covid-19 disease severity, level of glucose control in known diabetes and hyperglycemic states on admission.
5. Early transfer to the next level of health facility is advised for the challenging cases depending on the complexity of comorbidities and the setting capacity. Attention should be paid on patients with elevated HbA1c (>9%) with or without underlying immunocompromised conditions such uncontrolled HIV, malnutrition etc.
6. Metformin should be discontinued in severe, critically-ill patients to minimize the risk of lactic acidosis as well as other Oral Anti-Diabetes Drugs (OAD) except DPP-4 inhibitors (Gliptins).
7. Steroids are not contraindicated in patients with hyperglycemia, however insulin should be considered to control the blood glucose and preferably, steroids should be administered at the time of insulin injection in critically ill patients.
8. Patients should have regular meals: 3 main meals and 3 small meals. If fed through NGT, 300-450 ml (depending on the weight and tolerance) at breakfast (7:00am), lunchtime (1:00pm), and dinner (7pm) time. 150ml of small meal should be given at 10: 00am, 4:00 pm and 10:00 pm depending on tolerance/digestion of the previous meal.
9. Blood glucose monitoring and its documentation should be done before each big meal: Breakfast (BBF), before lunch (BL), before dinner (BD) and at bed time (BT).
10. Types of insulin: Regular insulins and NPH are the one preferred to be used for Covid-19 patients with hyperglycemia. Patients on analogues may be continued on their insulin with a physician consultation.
11. The monitoring should focus, not only on hyperglycemia, but also on prevention of hypoglycemia and prevention of electrolytes imbalance from insulin administration or dehydration status.

12. Discharge management: Depending on the profile of blood glucose when discharge is decided, patient may be discharged on ongoing regimen, oral antidiabetic therapy or diet/lifestyle advice and be referred to the nearest health facility on the choice of patient (NCD clinic or public or private hospital to adjust home medications).

### 3. Infection prevention measures

#### **Isolation of the patient with Covid-19:**

To protect other patients and health-care workers, patients with suspected or confirmed Covid-19 should ideally be admitted to an airborne infection isolation room (AIIR) that is at negative pressure relative to surrounding areas, with accessible sinks and alcohol hand gel dispensers, especially if aerosol-generating procedures are done. Of course, very few institutions have this AIIR available. If AIIRs are unavailable, patients can be placed in adequately ventilated rooms or wards with the doors closed and with frequently cleaned sanitation facilities, as recommended by WHO. Where single rooms are unavailable, co-hosting of cases in shared rooms with dedicated staff is an alternative, with beds spaced apart because concerns of nosocomial transmission in shared rooms remain, especially when aerosol-generating procedures are performed. Thus, PPEs should be strictly used by all healthcare professionals attending to suspect or confirmed patients in shared rooms. The patient should wear a respirator N95/FFP2 mask where available or surgical mask as an alternative option.

The duration of infectivity for Covid-19 patients is currently not known definitely. Covid-19 virus can be initially detected in upper respiratory samples 1 to 2 days before the onset of symptoms and persist for 7 to 12 days in moderate cases, and up to two weeks in severe cases. In feces, viral RNA has been detected in up to 30% of patients from day 5 after onset and up to 4 to 5 weeks. Recent scholarly reports have availed some evidence that the Covid-19 nucleic particles detected on PCR amplification method are not viable (non-replicating virus) after 10 days from the infection onset and these new findings would orient further the level of precautions that are necessary and duration for isolation of Covid-19 patients before they are safely discharged to observe regular public health preventive measures.

#### **For healthcare workers providing direct care to patients with Covid-19:**

Facemasks (surgical masks) mainly protect from exhaled droplets. Their use is recommended if there is a shortage of respirators and on a case-by-case assessment but should not be used in case of aerosol-generating procedures.

For aerosol-generating procedures (tracheal intubation, NIV, tracheostomy, cardiopulmonary resuscitation, bag-valve ventilation, and bronchoscopy), masks should be N95 or FFP2-equivalent respirators, and gowns or aprons should be fluid resistant. Non-N95 reusable masks with high-efficiency particulate air (HEPA) filters that do not require fit testing might be considered.

In order to maximize the use of respirator masks in the event of shortages, it is acceptable for staff to wear the same respirator while caring for multiple patients with the same diagnosis without

removing the respirator if the respirator is not damaged, soiled or contaminated. This reduces consumption of PPE. The maximum time a respirator can be worn is 4-6 hours ideally, as long as it is not removed between patients or contraindicated by the manufacturer.

Healthcare workers should strictly follow the procedures for the wearing (donning) and the safe removal (doffing) of PPE in correct sequence. Active assistance during donning and doffing is a valid option for minimizing the risk of accidental contamination. Hand hygiene should be performed immediately after removing PPE. It is essential to ensure that staff assigned to treat Covid-19 patients are trained in the proper use of PPEs. Quality assurance should be promoted through appropriate systems before assigning staff to Covid-19 patient care; for example, hospitals could require documented participation in a training course to ensure a staff member's competency in the correct use of PPEs.

### **For Staff engaged in environmental cleaning and waste management:**

Staff engaged in environmental cleaning and waste management should wear appropriate PPEs. If there is an insufficient stock of respirators, then a surgical mask may be worn, as well as gloves, goggles, gumboots and gown. In addition, the use of heavy-duty gloves and boots should be considered.

### **Environmental measures:**

It refers to routine cleaning of frequently used surfaces, clothes and objects, minimizing the sharing of objects, and ensuring appropriate ventilation.

Surface decontamination is key for infection prevention because viable Covid-19 persists on inanimate surfaces such as plastic and stainless steel for many days.

Mobile phone, tablets might be contaminated with common viral pathogens, these should be cleaned regularly or wrapped with specimen bags that are discarded after contact with patients.

Environmental contamination by Covid-19 was detected on furniture and equipment in patient's rooms (doorknobs, bed guardrails, air exhaust dampers, etc.).

Regular cleaning followed by disinfection is recommended, using hospital disinfectants active against viruses; and cleaning inpatient rooms are particularly important for frequently touched surfaces. If there is a shortage of hospital disinfectants, decontamination may be performed with 0.1% sodium hypochlorite (dilution 1:50 if household bleach at an initial concentration of 5% is used) after cleaning with a neutral detergent, although no data are available for the effectiveness of this approach against Covid-19. Surfaces that may become damaged by sodium hypochlorite may be cleaned with a neutral detergent, followed by a 70% concentration of ethanol.

Growing evidence suggests that cleaning with enough soap and water in addition to keeping windows and doors open for maximum ventilation can be sufficient and doesn't require IPC experts to be performed.

Waste should be treated as infectious clinical waste Category B (UN3291) and handled in accordance with healthcare facility policies and local regulations.

**Visits:**

It should be restricted or banned to prevent further transmission, except perhaps for the imminently dying. Where feasible, video conferencing via mobile phones or other interfaces can be used for communication between family members and patients or health-care workers. Physical contacts between visitors and patients should be strongly discouraged.

**Hand hygiene:**

The risk of transmitting or acquiring Covid-19 infection can be reduced by the correct application of hand hygiene. Hand hygiene refers to the frequent washing of hands with soap and water or cleaning of hands with alcoholic solutions, gels or tissues. Hands should be washed regularly using soap and water for 40–60 seconds. Alcohol-based hand sanitizers provide limited added benefit over soap and water in community settings, and if used should contain 60–85% alcohol. If hands are soiled, soap and water should precede the use of alcohol-based hand sanitizers. Since the Covid-19 virus can be transmitted by direct contact through droplets or indirectly through hand-mediated transfer of respiratory or possibly other secretions, we recommend applying hand-hygiene measures in all settings during all phases of the epidemic. Proper hand hygiene would also prevent the transmission of other communicable diseases. In healthcare settings, proper hand hygiene will need to be performed immediately before and after contact with a patient, before wearing or removing personal protective equipment (PPE) and after contact with potentially infectious material, such as respiratory or other secretions. The same applies to patients or people caring for patients at home. Recommending hand hygiene is considered to be a rational precaution, involving limited costs and no significant associated risks. Its effectiveness is likely to increase in combination with other measures (e.g. facemasks used in healthcare settings). The effectiveness of hand hygiene depends on the ability to ensure that people comply, through appropriate and repeated training and an adequate and regular supply of soap, tissues and alcohol-based hand sanitizers.

**Cough etiquette:**

Cough etiquette refers to covering the mouth and nose when coughing and sneezing (e.g. using a paper tissue or cloth handkerchief) with the aim of reducing person-to-person transmission through droplets which are a known mode of transmission for coronaviruses. Cough etiquette is widely recommended in public health guidelines for all settings at all times. Supply of materials (e.g. tissues, no-touch waste bins, etc.) needs to be ensured. It is important that tissues are properly disposed of immediately after the use and hands are then washed with soap and water, as described in the hand hygiene section. If tissue is not available, it is recommended to cough or sneeze in his elbow then wash hands.

## 4. Supportive management and Psycho-social support

During this time of crisis that is generating stress, anxiety and fear in the population, attention must be given to providing adequate context and culture related information and messages. This information need to be adjusted according to target groups: general population, health professionals, contacts of cases, confirmed cases, older people, pregnant women as well as adolescents and children. These guidelines will concentrate on psychosocial support for people in self-isolation, hospital isolation units and those admitted in Treatment Centers.

**Table 3:** *What to expect: Typical Reactions for people affected by Covid-19 (adapted from SAMHSA)*

Everyone reacts differently to stressful situations such as an infectious disease outbreak that requires social distancing, quarantine, or isolation.

People may feel:

**Anxiety, worry, or fear** related to:

- Their own health status.
- The health status of others whom they may have exposed to the disease.
- The resentment that their friends and family may feel if they need to go into quarantine as a result of contact with them.
- The experience of monitoring themselves, or being monitored by others for signs and symptoms of the disease.
- Time taken off from work and the potential loss of income and job security.
- The challenges of securing things they need, such as groceries and personal care items.

**Concern** about being able to effectively care for children or others in your care.

**Uncertainty or frustration due to lack of information** about how long you will need to remain in this situation, and uncertainty about the future.

**Loneliness** associated with feeling cut off from the world and from loved ones.

**Anger** if you think you were exposed to the disease because of others' negligence.

**Boredom and frustration** because you may not be able to work or engage in regular day-to-day activities.

**Uncertainty or ambivalence** about the situation.

**A desire to use alcohol or drugs** to cope.

**Symptoms of depression**, such as feelings of hopelessness, changes in appetite, or sleeping too little or too much.

**Symptoms of post-traumatic stress disorder (PTSD)**, such as intrusive distressing memories, flashbacks (reliving the event), nightmares, changes in thoughts and mood, and being easily startled if you or a loved one experience any of these reactions for 2 to 4 weeks or more, contact your health care provider or one of the resources at the end of this tip sheet.

## **Promoting Psychological Wellbeing During Covid-19 Pandemic - What to advise to the patients:**

Compassionate talking or counseling entails specific components of Psychosocial First Aid (PFA) such as: listening non-judgmentally; giving re-assurance and general information; and encouraging self-help and other support strategies.

These counselors offer psychosocial support to the patients in the form of Covid-19 education and bereavement counseling as well as enabling catharsis and inspiring hope.

Use communication as an intervention. Clear, understandable, and practical communication can reduce adverse psychological responses and increase behavioral adherence. Provide rapid, repeated, and developmentally and culturally appropriate communication about the nature of the disease, the reasons for quarantine, and other essential information.

Facilitate communication with loved ones. Knowledge of loved ones' conditions can have a powerful impact on the emotional health of quarantined individuals and improve adherence to recommended quarantine. For example, knowing that loved ones are safe, healthy, and well-cared for can reduce stress, while increased stress should be anticipated when information is lacking or in cases of worrisome news. Before quarantine, allow sufficient time (within the limits of public health concerns) for patients to make arrangements, reassure their loved ones, and say goodbye. During quarantine, facilitate the use of technology (e.g., phone and video calls, social media) to keep loved ones in contact with each other.

Reduce boredom and isolation. Planning for activities during quarantine can help reduce boredom and lessen the focus on symptoms and feelings of being isolated from family and friends. As above, facilitating access to the internet and social media is important to maintaining social networks and remote communication while in quarantine. However, media exposure should be monitored, as too much exposure and exposure to unreliable sources can increase stress.

Talk about your worries: It is quite common to feel worried, scared or helpless about the current situation. Remember that this is a difficult time for everyone and sharing how you are feeling and the things you are doing to cope with family and friends can help them too. If you don't feel able to do that, there are people you can speak to via NHS recommended helplines or you could find support groups online to connect with.

Take care of your body– Try to eat healthy well-balanced meals, exercise regularly, and get plenty of sleep. Avoid alcohol, tobacco, and other illicit drugs. Learn more about wellness strategies for mental health i.e. Physical exercise (e.g. yoga, tai chi, stretching), Cognitive exercises, Relaxation exercises (e.g. breathing, meditation, mindfulness), Reading books and magazines.

Connect with others– Share your concerns and how you are feeling with a friend or family member. Maintain healthy relationships, and build a strong support system.

Take breaks– Make time to unwind and remind yourself that strong feelings will fade. Try taking in deep breaths. Try to do activities you usually enjoy.

Stay informed– When you feel that you are missing information, you may become more stressed or nervous. Watch, listen to, or read the news for updates from officials. Be aware that there may be rumors during a crisis, especially on social media. Always check your sources and turn to reliable

sources of information like your local government authorities.

Avoid too much exposure to news– Take breaks from watching, reading, or listening to news stories. It can be upsetting to hear about the crisis and see images repeatedly. Try to do enjoyable activities and return to normal life as much as possible and check for updates between breaks.

Seek help when needed– If distress impacts activities of your daily life, talk to a counselor, or doctor, or contact the psychologist at the isolation unit or treatment center.

### **Clinicians and psychologists to look out for these common signs of distress:**

- Feelings of numbness, disbelief, anxiety or fear.
- Changes in appetite, energy, and activity levels.
- Difficulty concentrating.
- Difficulty sleeping or nightmares and upsetting thoughts and images.
- Physical reactions, such as headaches, body pains, stomach problems, and skin rashes.
- Worsening of chronic health problems.
- Anger or short-temper.
- Increased use of alcohol, tobacco, or other drugs.

### **Managers should protect staff from stress.**

Take care of staff. Healthcare providers are also vulnerable to experiencing the psychological effects of quarantine, and this can be compounded by the stress of caring for sick and distressed patients. Get regular one to one and clinical supervision/mentorship in order to maintain the best standards of care. Make sure your own basic needs are met, including: eating, drinking, and sleeping; taking breaks at predetermined intervals; checking in with colleagues and loved ones; and ensuring that your family and organization are safe and have a plan in place for possible quarantine. If you are likely to work with infected individuals, have frank discussions with your family about the risk to you and to them and steps being taken to minimize that risk. Plan for the possibility that you may be quarantined separately from them if they are not exposed.

Keeping all staff protected from chronic stress and poor mental health during this response means that they will have a better capacity to fulfil their roles whether health workers or in allied supporting roles. So a manager should:

- Encourage healthcare providers to share their thoughts, feelings, emotions, behavior, attitudes toward Covid-19 with their supervisor, managers, employers and mental health professionals.
- Regularly and supportively, monitor the staff for their well-being and foster an environment, which promotes staff speaking with him/her if their mental well-being deteriorates.

- Ensure that good communication and accurate information updates are provided to all staff.
- Consider if there is any capacity to ensure the staff get the rest and recuperation they need.
- Provide brief and regular forums to allow workers to express their concerns and ask questions.
- Encourage peer-support amongst colleagues.
- Pay particular attention to any staff who may be experiencing difficulties in their personal life, previously experiencing poor mental health or who are lacking social support.
- Ensure that staff are aware of where and how they can access mental health and psychosocial support.
- Psychosocial monitoring of patients isolated at home, those in Hospital isolation units and Covid-19 Treatment Centers
- Daily checklist to be filled by the clinician (nurse or doctor). This checklist will allow the clinician to identify patients who may need specific psychosocial support from the mental healthcare provider at the center

Mental health and psychosocial support pillar I	Activity (assess how the elements below are met)	Findings (write down how every element is met)	Action to be taken	Action taken	Recommendation
Basic services and security	Feeding		1. No action required 2. Reassure the patient/respondent that you will do the advocacy or report to relevant authorities 3. Explain to the In-charge or relevant authority the impact that this may have on the individual's mental health 4. Do advocacy for change		Attention should be given to the needs of the most vulnerable groups : very poor people, ubudehe 1, Older adults, children, adolescents, street dwellers, incarcerated persons, people who are institutionalized or living in temporary shelter , and people with preexisting and chronic conditions.
	Treatment				
	Hygiene				
	Respect of diversity				
	Hazard free environment				
	Additional elements (to brainstorm)				
Mental health and psychosocial support pillar II	Activity (assess if the following conditions are met)	Findings (write down how every element is met)	Action to be taken	Action taken (tick the corresponding number/s)	Recommendation
Community and family support	Connection with the family/friends via telephone, internet, ...		1. No action required 2. Reassure the patient/respondent that you will do the advocacy or report to relevant authorities 3. Explain to the In-charge or relevant authority the impact that this may have on the individual's mental health 4. Do advocacy for change		
	Children are not separated from their caregivers when considered safe				
	Additional elements (to brainstorm)				
Mental health and psychosocial support pillar III	Activity	Findings (write down screening severity if any)	Action to be taken	Action taken (Yes/No)	Recommendation



Focused non-specialized support	Screening for stress, anxiety and depression using DASS-21 and any other underlying mental health condition	Normal	No action required		
		Mild	First aid psychological support/psychological counselling		
		Moderate and beyond	Requesting for a consult for psychiatric review		
		Underlying mental health condition	Requesting for a consult for psychiatric review		
Psychosocial support pillar IV	Activity	Findings (write down the diagnosis)	Action to be taken	Action taken (Yes/No)	Recommendation
Specialized services	Psychiatric evaluation to establish the diagnosis.		Psychotherapy		
			Pharmacotherapy		
			Combined therapy		

## Psychosocial support to people with special needs:

### Children:

*“The Covid-19 pandemic has resulted in less healthy lifestyle habits and increased mental health symptoms in children with Attention-Deficit/Hyperactivity Disorder ‘ADHD,’. Longitudinal studies to better understand the relationship between these factors are recommended. During stressful time, it is normal for children to seek more attachment and be more demanding.*

Keep children closer to their parents and family if considered safe.

Avoid separating children and their parents as much as possible.

Help children find positive ways to express feelings such as fear and sadness

### Adolescents

*“ Tomorrow will bring good things! Stay a life to see it!”*

The high level of uncertainty is affecting adolescents differently than adults. Physical distancing and the inability for teens to spend time with friends is negatively impacting their social development and causing psychological trouble like worry, sadness and fear.

Many teens and young adults have had to mourn the loss of important graduation ceremonies, dances, and other milestone events they looked forward to. Not to mention those who have had to deal with the loss of a family member during or due to Covid-19. Although returning to school for some has reunited friends and classmates, students are also concerned about their safety at school.

Everyone is feeling the stress. Students who have to attend school online or learn in a different method might be struggling with the change.

#### How can adolescent cope with that stress:

- Encourage the teen/adolescents to exercise or work at home (clean the house, prepare food, clean the clothes).

- Make sure the teen/adolescents have special time to do an activity they enjoy and give them space if they need it.
- If you notice your teen/adolescent has lost interest in something they used to love, talk with them about their feelings; if it persists, schedule a doctor's appointment.
- Ask questions and check in with your teen/adolescent.
- Encourage them to meditate or stretch and focus on non-Covid-19 topics.
- It's highly important to reduce stress in a growing mind and teach healthy habits for coping with stress.

### **Older adults:**

Older adults or those with chronic mental disorders or cognitive decline may become more anxious, angry, stressed, agitated or withdrawn during quarantine, or stay in an isolation unit or treatment center. Healthcare providers are advised to:

Share simple facts about what is going on.

Regularly monitor their general health status.

Check on comorbidities they may have and ensure they are provided with good drug supply.

## **5. Special populations**

### **Pregnant women and neonate:**

To date, in Rwanda there is limited data on clinical presentation and perinatal outcomes after Covid-19 infection during pregnancy or the puerperium. There is no evidence that pregnant women present with different signs and/or symptoms, but of recent we have noted that they are at higher risk of severe illness. So far, there is no evidence on mother-to-child transmission when infection manifests in the third trimester, based on negative samples from amniotic fluid, cord blood, vaginal discharge, neonatal throat swabs or breastmilk. During this 3rd wave of Covid-19 in Rwanda, we have recorded cases of premature rupture of membranes, fetal distress and preterm birth. The case fatality rate (both for the mother and the baby) has been increasing for this category of patients.

In this context, the routine facilities activities should continue to be provided to clients in need with the consideration of potential contamination, therefore measures should be taken so that both HCW and client are protected and quality of care is respected and centered. The following recommendations are given with the assumption that newborns and children with Covid-19 will be hospitalized in center that are fully equipped to the level of a referral hospital (see list of equipment, materials and medications in "Managing children and neonates with Covid-19 in Rwanda"). The center should have a senior pediatrician with expertise in child intensive care. If the treatment center is not equipped with the materials and staff of a referral hospital level, then criteria for transfer and safe transport mechanisms to higher level of care should be developed that are specific for children and newborns with confirmed Covid-19.

### **Pregnancy management:**

Because coronavirus disease 2019 might increase the risk for pregnancy complications, management should optimally be in a health care facility with close maternal and fetal monitoring. Therefore, to maintain and optimize the continuity of essential maternal and newborn care services, effort should be put on services and supplies related to reproductive health, nutrition, including care during pregnancy; delivery, and postnatal care. Basic Comprehensive Emergency Obstetric and Newborn Care, Family planning services, Safe abortion/Post abortion care as per the law and legal framework of the country, management of Gender Based Violence and referral linkage should continue to be available and strengthened.

All pregnant women with a suspected, probable or confirmed Covid-19 infection, including women who may need to spend time in isolation, should have access to woman-centered, respectful skilled care, including obstetric, fetal medicine and neonatal care, as well as mental health and psychosocial support, with readiness to care for maternal and neonatal complications.

Principles of management of coronavirus disease 2019 in pregnancy include early isolation, aggressive infection control procedures, oxygen therapy, avoidance of fluid overload, consideration of empiric antibiotics (for the risk of secondary bacterial infection), laboratory testing for the virus and co-infection, fetal and uterine contraction monitoring, timely mechanical ventilation for progressive respiratory failure, individualized delivery planning, and a team-based approach with multispecialty consultations. Recently, pregnant women who have recently recovered from Covid-19 should be enabled and encouraged to attend routine antenatal, postpartum care as appropriate. Additional care should be provided if there are any complications. In Rwanda, the majority of babies born from Covid-19 infected mothers (either by normal delivery, or via caesarian section) had negative PCR for Covid-19 at birth, and they will continue to be followed closely by the child health specialists. We have also recorded some few deaths, including the youngest who was of 2-days of age, born prematurely.

Information on coronavirus disease 2019 is increasing rapidly. Clinicians should continue to follow the WHO, the Center for Disease Control and Prevention and UNICEF websites among others to stay up to date with the latest information. In collaboration with the Rwanda Biomedical Center, the professional societies (Rwanda Society of Gynecology & Obstetrics, and Rwanda Pediatric Association) will also continue to engage in research and publish periodical scientific reviews to update the current knowledge in this domain.

### **Delivery room management:**

Delivery room management and neonatal resuscitation should follow the principles outlined in the *“Rwanda Neonatal Care Protocol”*.

All health care workers present at the delivery, should adhere to local infection prevention and control recommendations.

There should be anticipated planning for attendance by several specialist teams at delivery for a mother suspected or confirmed with Covid-19.

For deliveries that are considered *“low risk”* but for which a neonatal team is usually in attendance, such as planned C-section at term in a mother without pregnancy complications, the neonatal

team is allowed to be on standby, outside the delivery room but with PPE on and all equipment for neonatal resuscitation ready.

Immediate skin to skin is not recommended, however as soon as the chest is cleaned skin to skin may apply.

If a neonatal resuscitation is needed (fetal distress, prematurity or any other condition), a very limited and experienced team should be present at the delivery. This team should use Airborne, Droplet, and Contact Precautions-level PPE, given both the increased likelihood of maternal virus aerosols and the potential need to intubate, perform airways suctioning, and initiate positive pressure ventilation, all of which may generate aerosols.

The neonatal team should maintain a minimum of 2 meters from the mother during the delivery of newborn care. This is explained by the fact that we presume that newborns are unlikely infected at delivery.

If the mother is intubated or needs to be intubated, newborn resuscitation and post-natal care should be done in a separate room.

### **Breastfeeding for newborns:**

As of yet, the Covid-19 virus has not been found in the breast milk of women with Covid-19. Breastfeeding protects against morbidity and death in the post-neonatal period and throughout infancy and childhood. The protective effect is particularly strong against infectious diseases that are prevented through both direct transfer of antibodies and other anti-infective factors and long-lasting transfer of immunological competence and memory. Therefore, standard infant feeding guidelines should be followed with appropriate precautions for IPC, keeping in mind that close contact and early, exclusive breastfeeding helps a baby to thrive.

### **The following adjustments are to be made to neonatal and kangaroo mother care:**

Before the birth of her baby, the health care professionals should explain to the mother the benefits of breast milk and breastfeeding and the need for IPC measures to prevent contaminating the baby after delivery.

Infants born to mothers with suspected, probable, or confirmed Covid-19 should be fed according to standard newborn and infant feeding guidelines, while applying necessary precautions for IPC.

Breastfeeding should be initiated within 1 hour of birth.

Because there is a dose-response effect, in that earlier initiation of breastfeeding results in greater benefits, mothers who are not able to initiate breastfeeding during the first hour after delivery should still be supported to breastfeed as soon as they are able.

Exclusive breastfeeding should continue for 6 months with timely introduction of adequate, safe and properly fed complementary foods at age 6 months, while continuing breastfeeding up to 2 years of age or beyond.

Women with Covid-19 should be supported to breastfeed safely, hold their newborns skin-to-skin and share a room with their babies.

Symptomatic mothers who are breastfeeding or practicing skin-to-skin contact or kangaroo mother care should practice respiratory hygiene, including during feeding with the use of a medical mask when feeding or near her newborn. Mothers should be assisted to perform hand hygiene before and after contact with the child, wash the breasts and surfaces in which the mother has been in contact should be routinely cleaned and disinfected.

In situations when severe illness in a mother due to Covid-19 or other complications prevent her from caring for her infant or prevent her from continuing direct breastfeeding, mothers should be encouraged and supported to express milk and/or a caregiver can safely provide breast milk to the infant, while applying appropriate IPC measures.

Only in the event that the mother is too unwell to breastfeed or express breast milk, appropriate breast milk substitutes can be used.

There should be no promotion of breast milk substitutes, feeding bottles, pacifiers or dummies in any part of facilities providing maternity and newborn services.

Minimizing disruption to breastfeeding during the stay in the facilities providing maternity and newborn services will require health care practices that enable a mother to breastfeed for as much, as frequently, and as long as she wishes.

Mothers and infants should be enabled to remain together and practice skin-to-skin contact, kangaroo mother care and to remain together and to practice rooming-in throughout, whether they or their infants have suspected, probable or confirmed Covid-19 virus infection.

The mother should sleep at two meters' distance from the baby when she is not breastfeeding.

Kangaroo Mother Care (KMC) is recommended for premature babies with IPC precautions.

### **Temporary maternal separation with newborn:**

Systematic separation of mothers and newborn is NOT recommended. The only situation where a newborn will need to be separated from his mother is when a term or preterm newborn is admitted to the NICU and the mother is a suspect, probable or confirmed Covid-19 case.

Mothers may decide to opt for temporarily separating from the baby.

Breast milk can be expressed during separation period until the mother has fully recovered and is discharged.

### **Covid-19 testing of newborns from confirmed Covid-19 mother:**

All the newborns require testing for Covid-19 to establish their Covid-19 status at birth.

The re-testing for Covid-19 is done at 72 hours of life.

If the test is negative, these newborns should be considered close contact of a confirmed case and must be cared for under droplet/contact precautions.

If the test is positive, these newborns should care for their underlying conditions and supportive care for Covid-19.

**Neonatal admission:**

Admission for symptomatic or preterm neonate born to Covid-19 suspect, probable or confirmed mothers:

Negative-pressure room (if possible) under airborne/droplet/contact precautions.

Visit restriction for symptomatic mother in the NICU while pending test result.

Testing of the baby can depend on mother’s Covid-19 result. If mother is negative, consider allow visit under IPC measures.

Asymptomatic neonates born to Covid-19 suspect, probable or confirmed mothers and admitted to the NICU for other reasons:

A separate space from other babies with the mother having to comply to droplet/contact precautions.

Suspect mothers are NOT allowed in the NICU pending test results.

If mother is negative, testing the baby who remains asymptomatic is not mandatory.

If mother is a confirmed case of Covid-19, she is not allowed in the NICU.

**Children:**

Following the epidemiological data from Rwanda, it appears children are also affected by infection with SARS-CoV-2 during this 3rd Covid-19 wave. This is reflected both in total case numbers, but also severity, with increasing cases in young children and deaths in children under 10 years. The overarching principles of international guidelines are that best practice care should not be hindered by pandemic-related concerns, and consideration must be given to reduction in health care worker exposure.

The principles of management of children with Covid-19 is detailed in the “Managing children and newborns with Covid-19 in Rwanda” guidelines. The following management issues are specific to children and should be highlighted about management of children with Covid-19.

Clinical presentation of Covid-19 is different in children than in adults and keep a high index of suspicion for Covid-19 as well as for the common pediatric illnesses.

Check for High Risk Vital signs in Children:

Temp < 36° or > 39°

SpO2 < 92%

**AVPU other than A:**

Respiratory Rate	< 1 year	1-4 years	5-12 years
High	50	40	30
Low	25	20	10
Heart Rate	< 1 year	1-4 years	5-12 years
High	180	160	140
Low	< 90	< 80	< 70

The majority of children with Covid-19 will be either asymptomatic or have mild symptom. Only a very small proportion of children will become severely ill and require a high dependence or intensive care unit.

Healthcare providers must take into consideration issues pertaining to management of severe pneumonia and acute respiratory distress syndrome that are specific to children. A pediatrician or an intensivist experienced in the care of severely ill children must be involved in the daily management of these children. Best practice care considerations for ventilated patients should be implemented under daily guidance by a pediatrician or intensivist with pediatric expertise.

A close monitoring and supportive care should be provided to all children with Covid-19.

Healthcare facilities that will be hospitalizing pediatric patients should take into consideration Children's rights in the context of Covid-19. Children (and in particular small children) may have difficulties tolerating the use of masks. Child size masks should be available. Quarantine and isolation may have negative effects on the children's physical and mental health. It can greatly increase the risk of post-traumatic stress disorder. Therefore, as the isolation facilities are set up, there is a need to have interventions to circumvent this including counselling by trained child psychologist and play areas.

Where possible, one healthy parent or caregiver is allowed to stay with the child at all times. This caregiver must wear a surgical mask and if the child is a confirmed Covid-19 case, the parent or caregiver will be considered a close contact.

### **Caring for older persons with Covid-19:**

Older age and comorbid diseases such as diabetes and hypertension have been reported as a risk factor for death with people with Covid-19. Therefore, older people are at highest risk for fatality and are one of the most vulnerable populations. It is important to recognize that older people have the same rights as others to receive high-quality health care, including intensive care.

For older people with probable or suspected Covid-19, provide person-centered assessment, including not only conventional history taking, but a thorough understanding of the person's life, values, priorities, and preferences for health management.

Ensure multidisciplinary collaboration among physicians, nurses, pharmacists, and other health care professionals in the decision-making process to address multi-morbidity and functional decline.

**Remark 1:** Physiological changes with age lead to declines in intrinsic capacity, manifested as malnutrition, cognitive decline, and depressive symptoms; those conditions should be managed comprehensively.

Early detection of inappropriate medication prescriptions is recommended to prevent adverse drug events and drug interactions for those being treated for Covid-19.

**Remark 2:** Older people are at greater risk of polypharmacy, as a result of newly prescribed medications, inadequate medication reconciliation, and a lack of coordination of care, all of which increase the risk of negative health consequences. Involve caregivers and family members in decision-making and goal-setting throughout the management of older Covid-19 patients.

## **Caring for patients confirmed or flagged as Covid-19 suspects in need for emergency care who present to the general emergency rooms at public & private health facilities:**

### **Pre-hospital care:**

The contamination from Covid-19 patients is more prominent in symptomatic patients likely to present to emergency rooms compared to asymptomatic carriers. All the frontline providers should be prepared for contagious source in their working environment.

The prehospital service, the patient or a family member should ideally call the emergency department prior to arrival to inform about the visit if respiratory symptoms are present (e.g. cough, fever, shortness of breath etc.). All ambulances called for review should be equipped with the necessary PPEs, operated by trained staff in Covid-19 disease prevention and care. The Covid-19 patients in need for a medical evacuation are likely to be in need of supplemental oxygen therapy. Therefore, during the preparations for dispatch, enough quantity of medical oxygen should be prepared to be used en-route to the emergency room (if indicated).

### **In the emergency room:**

The WHO recommends key coronavirus transmission prevention strategies within hospitals settings which include ensuring triage, early recognition, and source control (isolating suspected and confirmed Covid-19 patients); applying standard precautions for all patients and including diligent hand hygiene; implementing empiric additional precautions (droplet and contact and, wherever applicable for aerosol-generating procedures and support treatments, airborne precautions) for suspected and confirmed cases of Covid-19.

The Covid-19 confirmed or suspect patients can present to the emergency departments with conditions independent from Covid-19 disease including trauma.

The emergency department providers should be prepared to receive undifferentiated patients and use personal protective measures. The preparations for this protection should not delay the initiation of emergency care aiming at airways, breathing and circulation stabilization before further work up.

The minimum PPEs for emergency providers receiving Covid-19 undifferentiated patients should be comprised of gloves, apron, N95 facial masks and facial shields.

The trauma or other critically ill patients have the right to access emergency care packages to successfully achieve care during the "golden hour" as the primary focus of Advanced Trauma Life Support (ATLS), when rapid assessment, resuscitation, and often operative interventions improve survival and decrease associated morbidity dramatically.

### **The following standard steps of trauma assessment should be achieved:**

1. Airways: Opening airways and protection if intubation is needed, REMEMBER Covid-19 precautions during C-spine immobilization.



2. Breathing: Assess and perform required procedures for breathing stabilization.
3. Circulation: Prevention of hypotension (IV lines placement, fluids and blood transfusion; E-FAST).
4. Disability : Glasgow Coma Scale (GCS), assessment of the pupils, and an evaluation for any focal neurological deficit, check the spine for deformities and/or open abnormalities.

For the radiological investigations and surgical interventions, there is a need to communicate effectively to the radiology and surgical team to prepare to receive the undifferentiated patients in need of imaging services and emergency surgery, who might also have Covid-19 infection as an additional diagnosis. If the patient’s status is confirmed as Covid-19, a different arrangement will be made to undergo the needed imaging services during specified time flows for confirmed Covid-19 patients.

The standard precautions are based on risk assessment and hand washing moments.

For Emergency Departments (Pediatrics, Adult, Trauma, Obstetrics & Gynecology)									
	Types Of patients	1m distancing	Hand Hygiene	Gloves	Medical Mask	Apron	Gown	Coverall	Eye protection
Screening	All*	√	√	√	N95				
Triage		+/-	√	√	N95	√			√
Physical examination	Covid-19 symptoms		√	√	N95	+/-	√		√
	No Covid-19 symptoms		√	√	N95	+/-			+/-
AGPs	All		√	√	N95	√	+/-	+/-	√
Bed bath	In isolation		√	√	N95	√		√	√
Administration	All	√	√		√				
Cleaners	In isolation	-Heavy duty gloves			√	√	√		√
	Routine cleaning other areas	-Plastic boots -Full uniform							
	Waste transportation	-Hands hygiene							

\*Provide a mask if the patient doesn't have one.

**AGP denotes aerosols generating procedures.**

The emergency providers should be prepared to initiate all the needed emergency procedures including those with generating aerosols within the resuscitation room for any undifferentiated patient who might also have Covid-19 infection as an additional diagnosis.

### INTUBATION TEAM

- Most experienced staff
- Drugs assistant

### PRE-CHECK

- Laryngoscope (video preferred)
- COETT with syringe attached and cuff checked
- Tie
- Bougie/ Stylet
- LMA
- AMBU Bag
- Oxygen cylinder (full)
- Suction
- IV access X2 (checked and working)
- Optimize position

### INSIDE THE ROOM

- Airway assessment
- Identify cricothyroid membrane
- Monitoring applied – SpO2, ECG, Blood Pressure
- Check IV Access (x2)
- Optimize Position
- Pre-oxygenation (5 tidal volume breaths)- 2 handed approach
- Emergency drugs ready
- Aspirate NGT if present
- DO NOT** manually ventilate the patient prior to intubation if NIV can still be tolerated
- PLAN A**- MAC 4, BOUGIE, INTUBATE
- PLAN B**- LMA AND VENTILATE
- PLAN C**- OPEN BOX 2, CONSIDER VIDEO LARYNGOSCOPE/ AIRTRAQ
- PLAN D** – DECLARE FAILED INTUBATION, EFONA

### INSIDE THE ROOM

- Airway assessment
- Identify cricothyroid membrane
- Monitoring applied – SpO2, ECG, Blood Pressure
- Check IV Access (x2)
- Optimize Position
- Pre-oxygenation (5 tidal volume breaths)- 2 handed approach
- Emergency drugs ready
- Aspirate NGT if present
- DO NOT** manually ventilate the patient prior to intubation if NIV can still be tolerated
- PLAN A**- MAC 4, BOUGIE, INTUBATE
- PLAN B**- LMA AND VENTILATE
- PLAN C**- OPEN BOX 2, CONSIDER VIDEO LARYNGOSCOPE/ AIRTRAQ
- PLAN D** – DECLARE FAILED INTUBATION, EFONA

Adapted from: <https://icmanaesthesiacovid-19.org>

## 6. Discharge criteria for confirmed Covid-19 patients

The patients with Covid-19 infection will eventually reach a clinical state that will trigger the process of consideration to be discharged from the follow-up in home isolation, Hospital isolation units and Covid-19 Treatment Center.

From the studies done in centers equipped with the laboratory capacity for viral cultures, there is an emerging evidence that the virus is no longer replicating after 10 days of symptomatic infection or the date of the culprit contact, and especially among those patients with a high CT value on RT-PCR.

For Rwanda, we set the following criteria for consideration to be discharged from the isolation:

### **TEST BASED CRITERIA:**

One negative control result using the locally validated Antigen Rapid Diagnostic Test for Covid-19, obtained from a sample taken after 10 completed days counting from the day the positive sample was collected. If the testing modality used is RT-PCR, the cut off CT value for the control test is 37 (for the screened genes), meaning that the CT value that is equal or greater than 37 cycles corresponds to a very low likelihood of replicating virus; meaning that the viral culture would be negative.

We encourage all the clinicians in all health facilities (including Covid-19 isolation units and treatment centers) to use the locally validated Rapid Diagnostic Testing kits that have been proven to have a sensitivity rate (above 90%) that is comparable to that of RT-PCR.

**SYMPTOMS BASED CRITERIA** (to be used only in case there is no testing facility for individuals or groups requiring to be assessed for discharge, with prior consultation with health authorities at MoH /RBC):

For symptomatic patients: 10 completed days after symptoms onset, plus at least 3 additional days without symptoms (including fever and without respiratory symptoms). The loss of smell and taste sensation is usually regained at a much later time, and it should not be used as part of the discharge criteria.

For asymptomatic patients: after 10 completed days counting from the date of sample collection of the positive test for Covid-19.

### **Please note the following:**

1. Some patients are diagnosed positive for Covid-19 by RT-PCR with CT values more than 30 and sometimes even close to the cut off of 37. These particular situations are discussed case by case, and the control test might be scheduled much sooner than 10 days.
2. For patients receiving therapeutics with an antiviral effect, a series of Covid-19 control tests might be scheduled in order to allow collection of enough data that will inform medical decision based on safety and efficacy of those therapeutics in use against SARS-COV-2.

## 7. Medical follow up and social reintegration of discharged patients

Counting from the day of discharge, a follow-up call is made regularly up to 3 months and it is facilitated by the District Hospital in the catchment where the patient resides.

Patients with Covid-19 disease have gone through severe physical (unless asymptomatic) and psychological pressure. They were isolated from their relatives and friends and full recovery is likely to take time. While physical recovery can be assisted through physiotherapy and exercising, psychosocial support to the discharged patients and the family is required. A significant number of patients remain symptomatic even long after clearing the SARS-COV-2 virus. This is often referred to as "Long Covid-19" or "Post Covid-19 Syndrome".

The term "Long Covid-19" is commonly used to describe signs and symptoms that continue or develop after acute Covid-19 disease.

In order to capture the Covid-19 disease progress, three timeframe categories were developed:

Acute Covid-19 (0 to 4 weeks), Ongoing symptomatic Covid-19 (4 to 12 weeks) and Post-Covid-19 syndrome (12 weeks or longer). It is estimated that one in five people have symptoms that persist after 5 weeks, and one in ten have symptoms for 12 weeks or longer after acute Covid-19 infection.

CDC defines long covid patients or covid long haulers as individuals with ongoing symptoms of Covid-19 that persist beyond four weeks from initial infection.

The following is a list of conditions seen in Covid-19 survivors, never experienced before their episodes of acute Covid-19:

Myocarditis or pericarditis.

Microvascular angina.

Cardiac arrhythmias, including atrial flutter and atrial fibrillation.

Dysautonomia, including postural orthostatic tachycardia syndrome.

Mast cell activation syndrome.

Interstitial lung disease.

Thromboembolic disease (pulmonary emboli or cerebral venous thrombosis).

Myelopathy, neuropathy, and neurocognitive disorders.

Renal impairment.

New-onset diabetes and thyroiditis.

Hepatitis and abnormal liver enzymes.

New-onset allergies and anaphylaxis.

Dysphonia.

The long term sequelae of Covid-19 include:

### **1. In the alveoli of the lungs:**

Chronic inflammation results in the sustained production of pro-inflammatory cytokines and reactive oxygen species (ROS) which are released into the surrounding tissue and bloodstream. The endothelial damage triggers the activation of fibroblasts, which deposit collagen and fibronectin resulting in fibrotic changes. The endothelial injury, complement activation, platelet activation, and platelet-leukocyte interactions, release of pro-inflammatory cytokines, disruption of normal coagulant pathways, and hypoxia may result in the development of a prolonged hyperinflammatory and hypercoagulable state.

### **2. In the heart:**

Chronic inflammation of cardiomyocytes can result in myositis and cause cardiomyocytes death. The dysfunction of the afferent autonomic nervous system can cause complications such as postural orthostatic tachycardia syndrome. Prolonged inflammation and cellular damage prompt fibroblasts to secrete extracellular matrix molecules and collagen, resulting in fibrosis fibrotic changes, accompanied by an increase in cardiac fibromyoblasts. A damage to desmosomal proteins results in reduced cell-to-cell adhesion.

### **3. In the central nervous system:**

Long term immune response activates glial cells which chronically damage neurons. Hyperinflammatory and hypercoagulable states lead to an increased risk of thrombotic events. Blood-brain barrier damage and dysregulation results in pathological permeability, allowing blood derived substances and leukocytes to infiltrate the brain parenchyma. Chronic inflammation in the brainstem may cause autonomic dysfunction effects of long covid in the brain which can lead to cognitive impairment.

### **4. Post-Covid-19 fatigue**

A range of central, peripheral, and psychological factors may cause chronic fatigue in Long covid.

Chronic inflammation in the brain, as well as at the neuromuscular junctions, may result in long term fatigue. Skeletal muscle sarcolemma damage and fiber atrophy and damage may play a role in fatigue. Psychological and social factors may play a role in chronic fatigue in Long Covid-19.

## **Pathophysiology**

The causes of Post-Covid-19 Syndrome are yet to be elucidated. However, the current research proposes three possibilities: (1) virus-specific pathophysiologic changes (i.e. direct damage to the endothelium, causing a pro-coagulable stage), (2) immunologic aberrations and inflammatory damage and (3) expected post-critical illness consequences.

## General Management

1. Optimize comorbidities and health behaviors including sleep hygiene, smoking cessation, and decreased alcohol intake.
2. If the patient has residual oxygen requirement, have them monitor their SpO<sub>2</sub> on daily basis and write down the measurements.
3. Encourage gradual increase in exercise. Generally, patients should exercise as much as tolerated with SpO<sub>2</sub> >90% and pay a great attention to symptoms. Transient desaturations are unlikely to have negative consequences, but persistent desaturation should be avoided. The recovering patients can use incentive spirometers if available, but they can also use simpler methods such as inflating gloves or balloons, prone positioning as much as possible etc.
4. Consider early rehabilitation referral for the patient if it is available.
5. Educate patient on the typical course of recovery.
6. Consider enrollment in patient's studies if available and patient advocacy groups if desired.
7. Make sure the patient still gets vaccinated against Covid-19.
8. Extended thromboprophylaxis can be deferred, unless it would be otherwise indicated (i.e. hospitalized patient with an acute illness).

Post Covid-19 Syndrome is a global challenge, and all healthcare facilities should make the necessary arrangements to set up the corresponding **Post Covid-19 Clinics** to allow patients to continue receiving the necessary health services that would enable them to gain a full recovery. The laboratory and imaging tests that are ordered during these visits are decided by the clinician receiving the patient.

Similarly, community sensitization sessions are needed to be organized to address possible stigmatization of discharged patients.

### **Emotional reactions of discharged patients may include:**

- Mixed emotions, including relief after quarantine.
- Fear and worry about your own health and the health of your loved ones.
- Stress from the experience of monitoring yourself or being monitored by others for signs and symptoms of Covid-19.
- Sadness, anger, or frustration because friends or loved ones have unfounded fears of contracting the disease from contact with you, even though you have been determined not to be contagious.
- Guilt about not being able to perform normal work or parenting duties during quarantine.
- Other emotional or mental health changes.
- Children may also feel upset or have other strong emotions if they, or someone they know, has been affected by Covid-19.

**Stressors of discharged patients may include:**

Financial loss: the absence from work, healthcare costs, and other unanticipated financial burdens that can result in socioeconomic distress, particularly among those with lower incomes.

Stigma from others: the stigmatization and rejection by neighbors, co-workers, friends, and even family members can manifest as being treated differently or with fear and suspicion, being avoided or excluded from leisure, workplace, or school activities, and experiencing stigmatizing comments.

Getting back to one's "normal" routine: the returning to usual work and social routines may take anywhere from several days to several weeks or even months. Knowing that it might take time to get back into regular routines can help with concern, anxiety, and frustration.

## **8. Physiotherapy and Rehabilitation prescription for a patient with Covid-19**

Physiotherapy can play an important role in the rehabilitation of patients with Covid-19 who experience limitations in respiratory and daily physical functioning. This specifically relates to patients who experience reduced functional capacity and/ or reduced physical activity levels after active infection of Covid-19. Patients who have been severely or critically ill may display low exercise capacity. They need time to recover from illness and time to rehabilitate from the related limitations they may experience. Physiotherapists should therefore assess the severity of activity limitations and participation restrictions to gradually increase the patient's functioning.

The physiotherapy management of patients with Covid-19 can be subdivided into home/Community-based management and rehabilitation, Intensive Care Unit (ICU) management, ward-based management (with or without ICU stay), and outpatient services.

### **1) Advice for a patient in Home-Based-Care (or equivalent)**

Physiotherapists can get involved in caring for Covid-19 with mild symptoms by providing home support. Assessment of patient's environment for suitability becomes necessary regarding care. The WHO guidelines for home care for patients with mild symptoms and comorbid conditions should be followed as discussed in previous sections. In addition, physiotherapists can prescribe exercise regime depending on the home environment.

### **Physiotherapy management of discharged Covid-19 patients in the community**

Most patients who have been hospitalized receive a medical follow-up from the hospital after discharge. During the out-patient follow-up, Physiotherapists conduct chest and respiratory integrity testing, cardio-pulmonary function testing, physical activity as well as performance levels. Based on these test results, the physiotherapist can determine more adequately the patient's exercise capacity and how to gradually increase their physical activity levels. The Principles of exercise prescription should be followed in terms frequency, intensity, time and type (FITT procedure). It is

important to provide information and educate the patient about the disease process, the expected course of recovery and physiotherapy treatment plan. If physical functioning of the patient is limited, the physiotherapist advises and coaches the patient to gradually increase physical functioning. The aims of exercise prescription are to increase activities of daily living, improve muscle strength and balance, cardiopulmonary endurance, breathing and relaxation. Physiotherapists should design home programme and further education for patient compliance.

## **2) Patients in Facility-Based-Care**

### **Physiotherapy management of ventilated Covid-19 patients in the ICU**

Patients in severe and critical condition will require further treatment in the intensive care unit. They may be subjected to intubation and invasive mechanical ventilation. Many Covid-19 patients using a ventilator completely lose their spontaneous breathing due to the use of strong sedatives and anesthetics. The initiation of physiotherapeutic interventions at the right time may significantly shorten the period of delirium and the time when the patient requires mechanical ventilation, as well as improve the functional condition of patients.

Before starting physiotherapy of severely and critically ill patients, a comprehensive assessment of the patient's general functional status should be carried out, particularly concerning the state of consciousness, respiratory system, cardiovascular system and musculoskeletal system. Patients meeting the physiotherapy inclusion criteria should start treatment as soon as possible. The decision to start the therapy is made by the physiotherapist after consultation with the medical team. Patients not meeting physiotherapy inclusion criteria should be re-evaluated on a daily basis until the criteria are met and the therapy begins. The aims of Physiotherapy interventions in ventilated patients in the Intensive Care Unit are respiratory optimization, and prevention of negative effects of immobilization and mechanical ventilation to minimize disability and optimize functional capabilities.

Physiotherapists should select suitable techniques for bronchial cleansing to improve the patient's breathing. In Rwanda, unlike in other countries, suctioning is done by nurses. Therefore, chest physiotherapy techniques should be performed to mobilize secretions while nurses are doing suctioning optimal airway clearance. Physiotherapist play an active role in regular patient position change as well as the prone deemed appropriate for patients with severe Acute Respiratory Distress Syndrome (ARDS). Treatment techniques including passive movement exercises to maintain joint range of motion, muscle stretching to maintain or improve soft tissue flexibility and prevent contractures should be performed.

Due to the prevalence of fatigue, caution is required when patients are being weaned from the ventilator so as not to overload the respiratory system. Equally, once patients with Covid-19 are extubated, pacing of various therapies is vital. Inspiratory muscle training can reduce ventilator weaning time and improve inspiratory muscle strength. During physiotherapy intervention of a mechanically ventilated patient, care should be taken not to disconnect the closed respiratory system between the patient and the ventilator, and the other tubes connected to the patient.



## Ward-based Physiotherapy management of Covid-19 patients

In Rwanda, patients discharged from ICU or those who did not require escalation to ICU are referred to High Depended Unit (HDU). These patients may have high O<sub>2</sub> requirements and/or be dependent on NIV. It is expected that recovering from severe respiratory illness and the secondary effects from intensive care treatments will have an impact on patients' rehabilitation. Patients with severe and critical Covid-19 are potentially very unstable and have low exercise tolerance, therefore physical rehabilitation may be limited. The presence of comorbidities may also have an impact on rehabilitation. Physiotherapists play a role in the weaning the patient from non-invasive ventilator supports and oxygen therapy and use airway clearance techniques to patients who are unable to clear secretions independently.

In this stage, patients should be gradually mobilized to antigravitational positions, until the patient is able to maintain an upright position. The verticalization shall be performed gradually increasing the frequency and/or time, later moving to higher stages of verticalization. Active and assisted exercises should be introduced as the patient's condition improves. The physical activity intensity and duration should be gauged in patients with limited physical capacity. Patients can be initially encouraged to sit out of bed and perform simple activities of daily living. Deep breathing exercises, chest expansion and incentive spirometry can be prescribed for the patients.

Patients should have an individualized assessment in order to document immediate needs (including muscle strength, mobility, balance, symptom control (dyspnea, fatigue, pain), need for supplemental oxygen, adequate nutrition, sufficient psychological/ social support) and short/medium term needs (including improved physical and emotional functioning, return to work). Using the patient-centered management further rehabilitation goals should be discussed with the patient based on the functional assessment.

Patients recovering from a critical care and hospital stay should have a follow up examination at 2–3 months to further assess functional and rehabilitative needs. Residual pulmonary function defects have been found in half of the patients who recovered from SARS three months after hospital discharge, while others had impaired exercise capacity. Physiotherapists should be involved in the follow up of discharged patients to tailor the rehabilitation. It has been shown that a 6-week pulmonary rehabilitation course improved the function, quality of life and anxiety in elderly patients recovering from Covid-19 elsewhere and a 6-week exercise training programme was effective in improving both the cardiorespiratory and musculoskeletal fitness in patients recovering from SARS. Mobilization and exercise prescription should involve careful consideration of patient's state.

## Use of outcome measures

Clinical outcome measures are used assist the physiotherapist in assessing and evaluating the patient's physical capacity, clinical decision making, re-establishing treatment goals and optimizing further treatment. Physiotherapists should select valid and reliable clinical outcome measures that focus mainly on physical functioning. The core set is intended as a minimal set of clinical outcome measures to be used in all patients. For example, **the Patient Specific Functioning Scale (PSFS)** to determine the perceived physical limitations in participation and activities of daily living; **Oxygen saturation (SpO<sub>2</sub>)** at rest, during and after physical activity and therapeutic exercise; **Heart**

**rate (HR)** at rest, during and after physical activity and therapeutic exercise. The physiotherapist should be aware that outcomes can be influenced by medication. **Short Physical Performance Battery (SPPB)** to measure balance, muscle strength and mobility. **Grip Strength** to estimate overall peripheral muscle strength. If possible and available, a hand-held dynamometer is used. **One-Repetition' Maximum test (1RM)** of large muscle groups to measure muscle strength. **6-minutes' walk test (6MWT)** to estimate the exercise capacity. In case the patient has (very) low exercise tolerance levels, the 6MWT should not be attempted. The physiotherapist must at all times ensure the safety of the patient if they are (seriously) weakened.

### **Basic equipment to be used during rehabilitation**

1. Spirometers (deep breathing lung exerciser)
2. Finger pulse oxymeter
3. Pedal exerciser
4. Theraband
5. Dumbbells
6. Walking frames
7. Oscillating positive expiratory pressure devices: Flutter, acapella

The physiotherapist should keep in close contact with the attending doctor (Specialist or GP) and report on the progression of the patient's health status. When identified limitations cannot be considered within the field of physiotherapy, referring the patient to or collaborating with other health care disciplines, such as dieticians, occupational therapists, speech and language therapists and/or psychologists is important. Therefore, the use of interdisciplinary communication and collaboration are of great importance in delivery of adequate physiotherapy and rehabilitation services for the novel Covid-19 patients.

## **9. Dead body management in the context of Covid-19**

### **Key considerations:**

- Consider that the virus may stay alive in all body fluids for a long period, therefore the risk of transmission is as high as in a confirmed case or patient.
- Any Covid-19 positive dead body is potentially infectious and standard hygiene precautions must be applied. However, the risk of transmission is estimated very low if the coffin has been handled with caution and decontaminated on the outer surface.
- The virus is present in upper respiratory tract and potentially lower respiratory tract as well as digestive system. It may be excreted in stools though it is not confirmed whether the virus found in the stools is still infectious.
- There are still some uncertainties in the natural history of the Covid-19, including source(s), transmissibility mechanisms, viral shedding, and persistency of the virus in the environment.
- Transmission of infectious diseases associated with the management of a dead body can occur,

and can be enhanced by non-compliance to standard and transmission-based precautions, especially in healthcare settings.

- Assess the risk during the mortuary care process and provide adequate explanation to the family, respecting the cultural context of the local community. If indicated, provide personal protective equipment (PPE) to the family, with instruction in its use.
- Manage each situation on a case-by-case basis, balancing the rights of the family with the risks of exposure to infection.
- Packing and transfer of the body from the isolation room/ward/other setting to a mortuary, crematorium or burial.
- Ensure that mortuary staff and the burial team apply standard precautions at all times (i.e. perform hand hygiene and environmental cleaning) including appropriate use of PPE; long sleeved gown, gloves and facial protection if there is a risk of splashes from the patient's body fluids or secretions onto the body or face of the staff member).
- Avoid any direct contact with blood and body fluids.
- Remove all catheters, tubes and drains.
- Body bags can be used if available, or wrap the body in cloth or any other tissue for transfer and remove it as soon as possible to the mortuary area.
- Keep both handling and movement of the body at minimum.
- Cover the stretcher with a sheet and bring the body on top of the sheet.
- PPE requirements for transport team (if change of team from the team doing packing of the body) include gloves and gown/apron.
- No special vehicle is required.

### **Mortuary care:**

When preparing the deceased body (e.g. cleaning of body, tidying of hair, trimming of nails and shaving) wear appropriate PPE including gloves, gown, mask and eye protection).

Mortuary staff and funeral directors must be advised of the biohazard risk and should be trained on safe procedures to avoid infection transmission.

Apply principles of cultural sensitivity. If the family of the patient wishes to view the body after its removal from the isolation room or related area, they may be allowed to do so with following the standard precautions at all times, especially the hand hygiene. Give the family clear instructions not to touch or kiss the body.

Embalming is not recommended.

The body is taken into the coffin, sealed by IPC expert and shouldn't be reopened.

Room cleaning should be conducted in accordance with manufacturer's instructions for all cleaning and disinfection products (e.g., concentration, application method and contact time, etc.).

**Burial:**

In most of the cases, families and community members have not been able to attend the funeral prayers either because of physical distancing measures or due to fear of the infection. Some families are already worried about not knowing how the body would be handled during the final moments. To cope, all families need to mourn the loss and bury their dead. Proper and dignified management of the dead is key to dealing with such situations.

The family can be allowed to pay their last respect if the ceremony is held outdoor at home or at the hospital. The coffin shouldn't be reopened and IPC expert can advise the family members and support accordingly.

Transportation of a dead body from one place to another within the country must comply with the following:

- The body must be decontaminated and transported in designated plastic body bag (s).
- The coffin has to be decontaminated and sealed by IPC experts.
- Death certificate including Covid-19 test results should accompany the body.
- Transport/requirements to another country by road or by air is acceptable following the above mentioned conditions and with IPC expert facilitation. However, cross-border guidelines at country of destination should be checked in advance as well as airlines protocol for transporting dead body (if applicable).

Decedents with Covid-19 can be buried or cremated.

Check local requirements that may dictate the handling and disposition of the remains of individuals who have died of Covid-19.

**Environmental cleaning:**

Human coronaviruses can remain infectious on inanimate surfaces for up to 9 days. Surface disinfection with 0.1% sodium hypochlorite or 62 – 71% ethanol significantly reduces coronavirus infectivity on surfaces within 1 min exposure time. It is expected a similar effect against the SARS-CoV-2.

Chlorine should be diluted to 0.1% (1000 ppm) daily and be kept out of sunlight. Clean all surfaces while wearing the appropriate PPE.

Removing any spill/body fluids with absorbent (paper) towels then dispose them immediately as infectious waste.

Cleaning surfaces with water and detergent first than disinfect with chlorine 0.1% or other disinfectant standardized by the health-care facility – if sodium hypochlorite solution is used, wet the surface with the solution and allow at least 10-minutes contact time.

Rinsing the area with clean water to remove the disinfectant residue (if required).

**Room cleaning (after removal of the body):**

Cleaners to wear masks while cleaning the room, with gown and gloves.

Ventilate the room for at least 30 minutes.

Clean all surfaces, walls (man height) and floor with chlorine 0.1%.

Take linen into specific bags to be disposed and washed appropriately.

**PPE Summary:**

PROCEDURE	Hand hygiene	Gloves	Surgical mask	N-95 or similar	Long sleeves waterproof gown	Facial protection
Managing the body at isolation room/home	X	X	X		X	X
Removal of the body to mortuary	X	X	X		X	X
Mortuary care	X	X	X	X	X	X

**10. Mourning in times of Covid-19**

The time of mourning cannot be generalized. A death is real pain in a lifetime, unspeakable grief. Whether it is due to an illness, an accident, a death of old age, concerning a child, a parent or a loved one, mourning is so complicated. According to Christophe Faure, loss leads to bereavement.

There are five common stages of bereavement: -Immediate shock, denial, unable to accept, depression, and renewal. Whatever stage of bereavement you are at, remember that the pain will pass and life will again be full of strength, focus and joy.

**Immediate shock, Denial**

“This is wrong, he / she is not dead, I do not believe it. “It is the very first of emotions. Protective mechanisms are thus the law to preserve us. Our emotions are as if numbed when the announcement of death occurs, because it is a real trauma. Anger can happen very quickly, when the incomprehension is total and it can have repercussions on the entourage, the family. According to Elisabeth Kübler-Ross, “anger is the stage where the pent-up feelings from previous stages are released. ”

**Unable to accept**

Some people want to get as far away as possible from this death, which happened suddenly or not. There is a desire to flee reality, suffering, pain, the images of one’s loved one. They thus focus on mobilizing their energy on things that are easily accessible.

## Depression

The shock of death takes place; the broken relationship is understood. A depressive state gradually sets in with unmistakable signs: loss of interest in the outside world, lack of energy and concentration, great sadness and obsession with the missing person. The landmarks in her life are completely blurred, loneliness becomes such a sad companion.

## Heal and rebuild

Awareness can give way. "I have to move on, I can't stay like that.". The lived relationship with the loved one is perpetuated within us. In the mind and the heart. She continues to 'live' in this way, a call to memories. It is a work on oneself. The following days will become less gloomy. You start to see your loved ones again. Writing and listening are the allies of choice for its reconstruction. New activities, too, allow a return to values of solidarity, loneliness will disappear.

## 11. Covid-19 vaccination in Rwanda

As per the current vaccination agenda for Rwanda, at least 60 percent of the Rwandan population is set to receive Covid-19 vaccine by the end of the year 2022. A prioritization approach, based on risk factors for severe Covid-19 disease is used, starting from the Covid-19 front-liners, the elderly and gradually towards a coverage for the remaining population. The category of pregnant women is currently undergoing vaccination, based on the epidemiological data showing that they are at risk of severe disease during this period of 3rd Covid-19 wave in Rwanda.

The Covid-19 vaccines brands that are currently approved for use in Rwanda by R-FDA are Moderna (mRNA-1273), Pfizer-BioNTech (BNT162b2), AstraZeneca (ChAdOx1 n-COV-19), Johnson & Johnson (JNJ-78436735), Sputnik V (Gam-COVID-Vac) and Sinopharm (BBIBP-CorV). Four of them require a minimum two doses as shown in the table below:

Manufacturer	Type	Doses *	Storage requirement
<b>Moderna</b>	Messenger RNA (mRNA)	2 (28 days apart)	Ultra-cold storage
<b>Pfizer-BioNTech</b>	Messenger RNA (mRNA)	2 (21 days apart)	Ultra-cold storage
<b>AstraZeneca</b>	Viral vector (genetically modified virus)	2 (8 -12 weeks apart)	Temperature between 2- 8 Degrees Celsius
<b>Johnson &amp; Johnson</b>	Attenuated virus	1	Temperature between 2-8 Degrees Celsius (storage time not exceeding three months under this temperature range)
<b>Sinopharm</b>	Inactivated virus	2 ( 21 days apart )	Temperature between 2-8 Degrees Celsius.
<b>Sputnik V</b>	Viral Vector	2 ( 21 days apart ) 1* Sputnik light	Temperature between 2-8 Degrees Celsius.

\* *Booster doses may be added to any of these vaccines as we know more from ongoing vaccine efficacy trials.*

## Who is vaccinated against Covid-19 in Rwanda?

As per the available guidance, all individuals aged 12-years and above are recommended to be vaccinated against Covid-19, including the breastfeeding women and pregnant women with a gestational age of completed 12 weeks and above. For those women in the first trimester of pregnancy, the decision for Covid-19 vaccination will be made case by case, based on the recommendation and risks assessment by the primary treating doctor (i.e. Gyne – Obstetrician provider). The expectant mother’s willingness to be vaccinated for Covid-19 will also be weighed in the final decision to whether the vaccine is to be administered or not.

All individuals who would have acquired Covid-19 disease at any time, and who would have recovered from it (as evidenced by a negative control Covid-19 test), are also recommended to receive Covid-19 vaccine as long as the timeline falls after at least one month counting from the date of recovery. This category of individuals is also required to complete the Covid-19 vaccine calendar as recommended by the Rwandan health authorities, regardless to their prior history of Covid-19 disease.

For individuals who have received only one dose of a vaccine that requires at minimum 2 doses, in these guidelines we recommend a “mix and match” with a different vaccine type. Latest scientific data suggest that a person who received one dose of AstraZeneca vaccine, can receive the subsequent dose using Pfizer vaccine if it happens that it is the type of vaccine that is readily available in the country. Mix and match with other types of vaccines is still to be evaluated and shall be updated as we know more from ongoing trials.

As the science of vaccinology evolves, we are likely to obtain more vaccines for use against Covid-19, and their respective doses and schedules are likely to be updated over time based on the available data on vaccines efficiency and safety. We encourage all the users of these guidelines to consult the most updated Covid-19 vaccines roll-out strategy for Rwanda, as more adjustments are likely to happen over time, especially for the prioritization of different groups that are yet to be vaccinated against Covid-19 in Rwanda. The order of priority will be changing based on the recommendations made by the relevant authorities.

It is VERY important to remind all the vaccinated people that they MUST continue following all the preventive measures for Covid-19.

## List of reviewers

Dr. Sabin Nsanzimana, CP Dr. Daniel Nyamwasa, Dr. Edson Rwagasore, Dr. Corneille Ntihakose, Dr. Menelas Nkeshimana, Dr. David Turatsinze, Dr. Deborah Abimana, Dr. Damas Dukundane, Dr. Jean Bonaventure Uwineza, Dr. Elizabeth Mgamb, Dr. Albert Tuyishimire, Dr. Swaibu Gatere, Mr. Robert Rutayisire, Ms. Noella Bigirimana, Mr. Julien Mahoro Niyingabira, Prof. Leon Mutesa, Dr. Yvan Butera, Dr. Jean Muragizi, Dr. Ernest Nahayo, Dr. Theophile Dushime, Dr. Aimee L. Geissler, Dr. Emmanuel Musabeyezu, Dr. Musafiri Sanctus, Prof. Charlotte Bavuma, Dr. Leopold Bitunguhari, Dr. Vincent Ndebwanimana, Dr. Yvonne Kayiteshonga, Prof. Lisine Tuyisenge, Prof. Stephen Rulisa, Lt Col. Dr. Augustin Ndatinya, CSP Dr. Oreste Tuganeyezu, Dr. Fulgence Nkikabahizi, Dr. Placide Nshizirungu, Dr. Violette Ayingeneye, Dr. Hassan Sibomana, Dr. Nuhu Assuman, Dr. Nadine Rujeni, Prof. Emile Rwamasirabo, Dr. Augustin Sendegeya, Prof. Theogene Twagirumugabe, Dr. Otto Niyonsenga, Dr. Emmanuel Bizimana, Dr. Bienvenu Muvunyi, Dr. Laurent Lussungu, Dr. Gabin Mbanjumucyo, Dr. Joel Bahoza, Dr. Cyprien Iradukunda, Mr. Emmanuel Rutayisire, Mr. Olivier Nsekuye, Dr. Benedicte Ndayishimiye, Dr. Ami Nkumbuye, Dr. James Biganiro Sebintu, Dr. Isaac Ndayishimiye, Maj. Jean Bosco Karangwa, Soeur Marie Josee Maliboli, Matron Christine Uwineza, Eng. Francine Umutesi, Eng. Annick Ishimwe, Eng. Costica Uwitonze, Eng. Welcome Mbonyimfura, Lt. Col. Dr. Eric Seruyange.

We are thankful to Rwanda Medical Association, Rwanda College of Physicians, Rwanda Surgical Society, Rwanda Society of Gynecology & Obstetrics, Rwanda Emergency Care Association, Rwanda Pediatrics Association, Rwanda Society of Anesthesia, Rwanda Physiotherapy Organization, King Faisal Hospital, Hopital La Croix du Sud, Rwanda Military Hospital, Centre Hospitalier Universitaire de Butare and the Centre Hospitalier Universitaire de Kigali for their active participation, technical and scientific inputs all along Covid-19 response in Rwanda.

We are thankful to the authorities of the District of Gasabo, and the City of Kigali for the great initiative of “Operation Save the Neighbor” which is a very innovative approach in the strengthening of the Covid-19 Home-Based-Care in Rwanda.

We are also thankful to the Covid-19 Scientific Advisory Group in Rwanda for their valuable advice all along Covid-19 response in Rwanda



# References

Clinical management of severe acute respiratory infection (SARI) when COVID-19 disease is suspected: Interim guidance V 1.2. 13 March 2020 – WHO.

Modes of transmission of virus causing COVID-19: implications for IPC precaution recommendations. Scientific brief 29 March 2020 – WHO.

Coronavirus disease 2019 (COVID-19) pandemic: increased transmission in the EU/EEA and the UK – seventh update - 25 March 2020 - European Centre for Disease Prevention and Control, Stockholm, 2020.

Contact tracing: Public health management of persons, including healthcare workers, having had contact with COVID-19 cases in the European Union – first update 31 March 2020 - European Centre for Disease Prevention and Control, Stockholm, 2020.

Interim Clinical Guidance for Management of Patients with Confirmed Coronavirus Disease (COVID-19) – CDC 30 March 2020.

Severe Acute Respiratory Infections Treatment Centre - Practical manual to set up and manage a SARI treatment centre and a SARI screening facility in health care facilities WHO March 2020.

Global surveillance for COVID-19 caused by human infection with COVID-19 virus, Interim guidance - 20 March 2020 – WHO.

Laboratory biosafety guidance related to the novel coronavirus (2019-nCoV) Interim guidance - 12 February 2020 – WHO.

Laboratory testing for coronavirus disease (COVID-19) in suspected human cases Interim guidance - 19 March 2020 – WHO.

Handbook of COVID-19 Prevention and treatment – Zhejiang University School of Medicine 2020.

Jason Phua, Li Weng, Lowell Ling, et al. Intensive care management of coronavirus disease 2019 (COVID-19): challenges and recommendations. *Lancet Respir Med* 2020 Published Online April 6, 2020 [https://doi.org/10.1016/S2213-2600\(20\)30161-2](https://doi.org/10.1016/S2213-2600(20)30161-2).

J. Chen, X. Wang, S. Zhang, et al., Findings of acute pulmonary embolism in COVID19 patients, *The Lancet Infectious Diseases* (3/1/2020), <https://doi.org/10.2139/ssrn.3548771> (preprint. Available at SSRN), <https://ssrn.com/abstract=3548771>.

Hussin A Rothan, Siddappa N. Byrareddy. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *Journal of Autoimmunity* – Article in Press.

Infection prevention and control for COVID-19 in healthcare settings - first update - 12 March 2020 - European Centre for Disease Prevention and Control.

Guidelines for the use of non-pharmaceutical measures to delay and mitigate the impact of 2019-nCoV - February 2020 - Centre for Disease Prevention and Control.

Novel coronavirus (SARS-CoV-2) - Discharge criteria for confirmed COVID-19 cases – When is it safe to discharge COVID-19 cases from the hospital or end home isolation? - Centre for Disease Prevention and Control.

Sonja A. Rasmussen, John C. Smulian, John A. Lednicky et al. Coronavirus Disease 2019 (COVID-19) and pregnancy: what obstetricians need to know. *American Journal of Obstetrics and Gynecology*. Available online 24 February 2020.

Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected: interim guidance, 25 January 2020 - World Health Organization – 2020.

Mental health and psychosocial considerations during the COVID-19 outbreak – 18 March 2020 - World Health Organization – 2020.

Taking Care of Your Behavioral Health: tips for social distancing, quarantine, and isolation during an infectious disease outbreak – SAMHSA – Substance Abuse and Mental Health Services Administration – 2014.

Psychological Effects of Quarantine During the Coronavirus Outbreak: What Healthcare Providers Need to Know – Center for Study of traumatic Stress – 2020.

Briefing note on addressing mental health and psychosocial aspects of COVID-19 Outbreak Version 1.0 – IASC Inter-Agency Standing Committee Reference Group for Mental Health and Psychological Support in Emergency Settings – Feb 2020.

Helping children cope with stress during the 2019-nCoV outbreak (Handout). WHO: Geneva, 2020.

Guidance for the public on the mental health and wellbeing aspects of coronavirus (COVID-19) – updated 31 March 2020 – Public Health England – Gov.UK <https://www.gov.uk/government/publications/covid-19-guidance-for-the-public-on-mental-health-and-wellbeing/guidance-for-the-public-on-the-mental-health-and-wellbeing-aspects-of-coronavirus-covid-19>.

Kampf G, Todt D, Pfaender S, Steinmann E. Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. *Journal of Hospital Infection*. 2020;104(3):246-51.

Department of Health. Precautions for handling and disposal of dead bodies (10th edition). Hong Kong Special Administrative Region. Feb 2020.

Healthcare workers and employers - United states – Department of Labor. Occupational safety and Health administration. <https://www.osha.gov/SLTC/covid-19/controlprevention.html>.

HAS: Avis relatif à la prise en charge du corps d'un patient décédé infecté par le virus SARS-CoV-2 (COVID-19) 18 février 2020.

[https://www.uptodate.com/contents/coronavirus-disease-2019-covid-19?source=history\\_widget](https://www.uptodate.com/contents/coronavirus-disease-2019-covid-19?source=history_widget).

Rwanda Home Based Isolation and Care Guidelines for Patients with Covid-19. Edition August 2020.

Estimates of Time Varying R (Rt) – Rwanda, March 14-August 15, 2020 (N=2352). Using the Model based on Li et. Al, and the model based on Nishiura et. Al.

Criteria for releasing Covid-19 patients from isolation. WHO Scientific Brief, 17 June 2020.

Duration of Isolation & Precautions for Adults. CDC, Aug. 16, 2020.

One hundred thirty-three observed COVID-19 deaths in 10 months: unpacking lower than predicted mortality in Rwanda. Accessed via the link: One hundred thirty-three observed COVID-19 deaths in

10 months: unpacking lower than predicted mortality in Rwanda | BMJ Global Health.

Impact of COVID-19 on Mental Health in Rwanda. Accessed via the link: Article 3.pdf (rbc.gov.rw).

Experience of Rwanda on COVID-19 case management: from uncertainties to the era of monoclonal antibodies [manuscript under review].

Therapeutics and COVID-19: living guideline. Accessed via the link: Therapeutics and COVID-19: living guideline (who.int).

WHO recommends life-saving interleukin-6 receptor blockers for COVID-19 and urges producers to join efforts to rapidly increase access. Accessed via the link: WHO recommends life-saving interleukin-6 receptor blockers for COVID-19 and urges producers to join efforts to rapidly increase access.

Bamlanivimab plus Etesevimab in Mild or Moderate Covid-19. Accessed via the link: Bamlanivimab plus Etesevimab in Mild or Moderate Covid-19 | NEJM.

Anti-SARS-CoV-2 Monoclonal Antibodies. Accessed via the link: Anti-SARS-CoV-2 Monoclonal Antibodies | COVID-19 Treatment Guidelines (nih.gov).

Summary of respiratory rehabilitation and physical therapy guidelines for patients with COVID-19 based on recommendations of World Confederation for Physical Therapy and National Association of Physical Therapy.

Avis du 25 Septembre 2020 de la Societe Francaise de Microbiologie (SFM) relatif a l'interpretation de la valeur de Ct (estimation de la charge virale) obtenue en cas de RT-PCR SARS-CoV-2 positive sur les prelevements cliniques realises a des fins diagnostiques ou de depistage Version 1\_25/09/2020.

Avis SFM du 25/09/2020 de la Societe Francaise de Microbiologie (SFM) relatif à l'interprétation de la valeur de Ct (estimation de la charge virale) obtenue en cas de RT-PCR SARS-CoV-2 positive - Version 4 du 14/01/2021

Accessed via the link: Summary of respiratory rehabilitation and physical therapy guidelines for patients with COVID-19 based on recommendations of World Confederation for Physical Therapy and National Association of Physical Therapy (nih.gov).

Rehabilitation to enable recovery from COVID-19: a rapid systematic review. Accessed via the link: Rehabilitation to enable recovery from COVID-19: a rapid systematic review - PubMed (nih.gov).

CH. Faure., *Vivre le deuil au jour le jour*, ed. Albin Michel, Paris, Sept 2018.

E. Kubler-Ross, *On death and dying*, New York, 1997.

PAHO, COVID-19, Recommended interventions in Mental Health and Psychosocial support during the pandemic, June 2020.

[www.moh.gov.rw](http://www.moh.gov.rw) | [www.rbc.gov.rw](http://www.rbc.gov.rw)

