V 12.1

Last review and update: 30th January 2022

الحملة الوطنية
لمكافحة
فيروس كورونا
(COVID-19)

مَمْلَكَة البَحْرَيْن
KINGDOM OF BAHRAIN

Bahrain COVID-19 National Protocol

Disclaimer:

- This protocol was prepared and approved by The National Taskforce for Combating the Coronavirus COVID-19 – NTCC19
- These recommendations will be changed frequently based on available evidence about the best practices in caring for novel Coronavirus 2019 (COVID-19) disease

Updates Summary

Protocol V12.0 update changes

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P.71	Monoclonal Selection Criteria Outpatient Setting
P.105-106	Added information to Multi-system Inflammatory Syndrome in Children (MIS-C)
P.116	ICU COVID-19 Rounds Template
	Patient Allocations Removed
	Doxycycline removed from treatment protocol
	Convalescent plasma removed from treatment protocol
	Bamlanivimab removed from treatment protocol
	Ritonavir-boosted nirmatrelvir (Paxlovid) Added to treatment protocol

Protocol V12.1 update changes

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COVID-19 Case Definitions

COVID-19 Case Definitions

Suspected Cases

A **suspected case** is a person that fulfill **any** of the following

1. **Any Symptoms of Fever, Cough , Shortness of Breath, loss of smell or taste, or Gastrointestinal symptoms**
2. **Acute respiratory illness with or without fever**
3. **Any patient with community acquired pneumonia requiring admission**
4. **Any admitted inpatient with unexplained severe acute respiratory infection (SARI)**
5. **Contact with a positive case with *SARS-CoV2*, with or without symptoms**
6. **History of Travel, with or without symptoms**
7. **Any case fitting definition of Multisystem inflammatory syndrome in children** (page 91)

Note :
- False Negative results can be seen early during the infection. Peak of viral shedding appears 3 to 5 days after the onset of disease.
- If the nucleic acid test is negative at the beginning, and case is suspected, to test on subsequent days.

Contact Cases

A **contact** is a person that belongs to either of the two defined groups

There are two types of contact cases

1 - Close Contact (High Risk Exposure), any of the following

1. A person living in the same household as a COVID-19 case
2. Had direct physical contact with a COVID-19 case (e.g shaking hands, infectious secretions of a COVID-19 case)
3. Had face-to-face contact with a COVID-19 case within 2 metres and > 15 minutes or cumulative total of 15 minutes or more over a 24-hour period starting from **2 days** before illness onset or positive test)
4. Was in a closed environment (e.g. classroom, meeting room, hospital waiting room, etc.) with a COVID-19 case for 15 minutes or more and at a distance of less than 2 metres
5. A healthcare worker (HCW) or other person providing direct care for a COVID-19 case, or laboratory workers handling specimens from a COVID-19 case without recommended PPE or with a possible breach of PPE;
6. A contact in an aircraft sitting within two seats (in any direction) of the COVID-19 case, travel companions or persons providing care, and crew members serving in the section of the aircraft where the index case was seated (if severity of symptoms or movement of the case indicate more extensive exposure, passengers seated in the entire section or all passengers on the aircraft may be considered close contacts).

2 - Casual Contacts (Low Risk Exposure)

Casual contact defined as any of contacts not listed in the close contacts, examples such as:
- Had casual contact with an ambulant COVID-19 case
- Had casual contact with presumptive (not confirmed) COVID-19 case
- Had stayed in an area presumed to have ongoing, community transmission

https://wwwn.cdc.gov/nndss/conditions/coronavirus-disease-2019-covid-19/case-definition/2020/

Definition of COVID-19 Reinfection

Confirmed Reinfection:

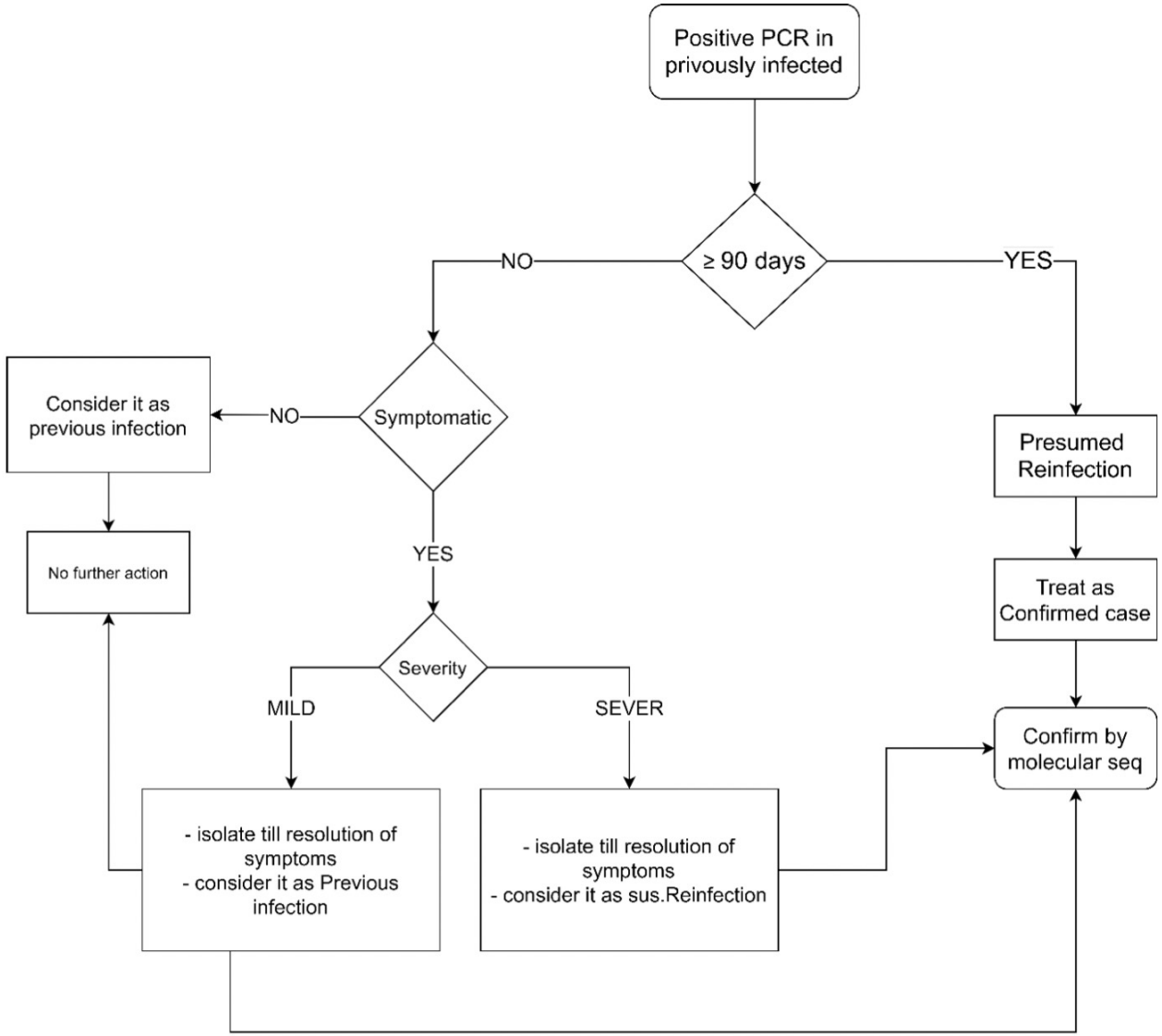
At anytime If isolated virus found by gene sequencing to be different from previous infection it is a confirmed reinfection

Presumed Reinfection

- **IF** Tested (PCR) positive beyond or equal to 90 days from the initial positive PCR test
- **IF** Tested (PCR) positive less than 90 days from the initial positive PCR test **AND** the current symptoms are severe (hospitalized as severe case) **(Presumed reinfection until sequencing results)**

Previous infection

- **IF** Tested (PCR) positive less than 90 days from the initial positive PCR test **AND** The current symptoms are mild **(Previous infection until sequencing results)**



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Visual Triage checklist for healthcare facilities

For early detection and isolation of suspected cases in any outpatient healthcare facility

Visual triage checklist

- Visual triage is to be used at Health Centres, A/E, Private Clinics and any Outpatient healthcare setting.
- Visual triaging is to be done on entry of patients, in order to early identify suspected cases and to isolate early if necessary

Risks	Score
A. Exposure risk	
Contact with a confirmed case of COVID19 in the last 14days prior to symptoms onset OR Lived or worked in a facility known to be experiencing an outbreak of COVID-19 in the last 14days prior to onset of symptoms	3
B. Clinical Signs and Symptoms	
Fever or recent history of fever	4
Cough (new or wrosening)	4
Shortness of breath (new or wrosening)	4
Headache, sore throat or rhinorrhea	1
Nausea, vomiting and/or diarrhea	1
Chronic renal failure, Chronic heart disease, immunocompromisded patient	1
Total Risk Score (A +B)	

If score of ≥4, isolate patient, ask to wear a mask, inform physician for assessment and call 444

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COVID-19 Risk Assessment and Stratification

444 phone risk assessment for symptomatic suspected COVID-19 cases

Sign and Symptoms	Routine Care (test within 72hrs)	Intermediate Care (test within 24hrs)	Urgent Care (Act Immediately)
Sore thorat and flu like symptoms	✓	Patient wth the the following risk factors regardless the presence of symptoms (excluding "Urgent care*" symptoms) Risk factors include **ANY** of the following • Diabetes • Hypertension • Heart disease • Lung disease • Malignancy • Age>60 years	-
Loss of Smell or Taste	✓		-
Myalgia	✓		-
Fatigue	✓		-
Fever*	Less than 38°C		**≥38°C**
Shortness of Breath*	-		✓
Chest Pain*	-		✓
Respiratiry Rate >30*	-		✓
Change in Mental Status*	-		✓
Oxygen Saturation*	Normal		**≤93% on Room Air**

COVID-19 Risk Assessment for confirmed or suspected COVID-19 Cases

Sign and Symptoms	Mild: Home isolation *(refer to home isolation protocol)* or Isolation facility admission	Moderate to Severe: Transfer to Treatment facility
Sore thorat and flu like symptoms Loss of Smell or Taste Myalgia and Fatigue GI Symptoms	✓	-
Fever	Less than 38°C	**≥38°C with either one of the below**
Shortness of Breath	X	✓
Chest Pain	X	✓
Change in Mental Status	X	✓
Respiratiry Rate >30	X	✓
Saturation	Normal	**Saturation ≤93% on Room Air**
Chest Xray changes	Normal	**Changes suggetsive of pneumonia**

If patient revisit a clinic more than once with symptoms suspecting COVID-19, regardless of swab result, patient should be referred to A/E for evaluation, assessment and testing

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COVID-19 Testing Protocol

COVID-19 Molecular, Serology and Antigen Tests

Testing categories for SARS-CoV2

- Three types of tests are available : Molecular (PCR), Serology (Antibody test) and Antigen tests

1. Molecular (PCR) tests the presence of Viral nucleic acid, it indicates the presence of the virus
2. Serology tests the presence of antibodies against the virus, and it indicates previous infection
3. Rapid Antigen detection test (RADT), detects the presence of viral proteins

Acceptable Specimens

Molecular and RADT nasopharyngeal swab, mid-turbinate swab, anterior nasal swab, saliva

Serology : blood

Molecular testing is the main national testing strategy in the Kingdom of Bahrain to diagnose COVID19

Testing categories for SARS-CoV2

1. Molecular testing (ie Viral testing by PCR)

- Two methods are available : RT-PCR and Xpert Xpress SARS-CoV 2

- When to test using Molecular assays ?
  1. Acute Care Hospitals/ Emergency Departments or COVID19 centers
     1. All symptomatic suspected cases presenting to a healthcare facility
     2. Patients who are seeking hospitalization for non-COVID related symptoms, in the following high risk group
        - Immunosuppressed or undergoing chemotherapy
        - Elderly with comorbidities
     3. Patients undergoing aerosol-generating surgical or non-surgical interventions
        - Surgical procedures like neurosurgery, ENT surgery, dental procedures; Non-surgical interventions like bronchoscopy, upper GI endoscopy and dialysis
  2. Public health department directed testing
     1. Contact Tracing – Close Contacts
     2. Regular screening of healthcare workers in COVID19 facilities and other certain workplace settings
     3. Random testing for targeted subpopulations

Testing and Quarantine for CLOSE CONTACTS of COVID-19 cases

Close Contacts that are Non-Green shield carrier

حاصل على التطعيم
COVID-19 Vaccinated

حاصل على التطعيم
COVID-19 Vaccinated

غير حاصل على التطعيم
Not Vaccinated

- Quarantine required for 7 days from the last known exposure.
- NP RT-PCR Test on Day 1 followed by an exit swab on day 7

Close Contacts that are Green shield carrier

متعافي
Recovered

حاصل على التطعيم
COVID-19 Vaccinated

- No quarantine required
- NP RT-PCR Test on Day 1 followed by an exit swab on day 7

HCWs & EWs Quarantine Protocol

Exposed Heath Care Workers and Essential Workers (PCR -ve)

Vaccinated

1 Test
1<o>5

No Quarantine

RT-PCR test to be done any day between **Day 1** to **Day 5** from the last known exposure

Unvaccinated

2 Tests
1 & 7

Quarantine for a total of **7 Days** with Negative Exit Swab

Any HCWs & EWs that are symptomatic or develops symptoms must be sent to get a PCR test and isolated until the results

Testing for suspected COVID-19 cases in governmental and private hospitals and clinics

Inpatient Suspected Case

As per COVID-19 case definition

1. **Immediate isolation**
2. **Collect Nasopharyngeal swab**
3. **PCR testing of NP swab**
4. **If positive, inform 444 and arrange transfer to COVID-19 facilities**
5. **If negative, continue usual inpatient care**

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Note :

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Testing for Prison Personnel and Inmates

General Recommendations

- Encourage good hygiene by education and posters
- Increase the frequency of cleaning lavatories
- Distribution of hand sanitizers and tissues in the building
- Strict procedure to prevent animals entering the prison site

Prison

Symptomatic Inmates/Staff

- Isolate immediately
- Take nasopharyngeal swab and send to lab for PCR testing
- Inform 444/War room
- If positive, to arrange transfer to isolation facility

Prison Guard & Staff

- Daily checking of temperature and symptoms
- Encourage self reporting of close contact to COVID-19 cases
- Test any staff who fits the criteria for testing, based on case definitions
- Encourage use of rapid antigen detection test as screening tool (Page 23)

Testing categories for SARS-CoV2

2. Serology

- National Taskforce for combating COVID -19 does not currently recommend using antibody testing as the sole basis for diagnosis of acute infection
  - Antibody tests are not authorized by FDA for diagnostic purposes until this date
- Antibodies start developing within 1 to 3 weeks after infection
  - IgM and IgG antibodies arise nearly simultaneously and its uncommon to detect IgM alone
- Positive antibody test indicates a person has been infected with *SARS-CoV-2* in the past.
  - It does not necessarily mean they are currently infected (based on current available evidence)
  - False positive result can be expected in a population with low prevalence of COVID-19 (<5% of the population affected)
  - Serologic tests may NOT be used routinely at this time to determine if an individual is immune, until more evidence becomes available
  - It is currently not clear whether a positive serologic test indicates immunity against *SARS-CoV-2*
- Serologic assays may be used to support clinical assessment of a person who present late in their illness, in conjunction with viral molecular tests

Serology Surveillance Testing Strategy

COVID19 serology survillance startegy invloves two pouplations

Recovered COVID-19 Patients	NO previous COVID-19 diagnosis
• Any patient who was infected with SARS-CoV2 Diagnosis made since 10 days or **longer**	• Never tested for COVID19 or tested negative for COVID-19

1. Collect venous blood sample in designated centres
2. Enter serology request with patient required information
3. Send Sample to BDFRMS lab; where it will be recieved and processed
4. Result available in BDF-RMS External Portal accesible to all healtcare facilities

Antibody result reactive → Reassure, consider for **plasma donation**

Antibody result non-reactive → Reassure , no action needed & repeat after 2 weeks from last non-reactive result

Antibody result reactive → Perform NP swab for PCR test, **only if Symptomatic**

- ✓ if PCR negative: Indicates Past exposure ; or need further clinical assessment for his current symptoms
- ✓ If PCR Positive: Active infection, proceed as per protocol

Antibody result non-reactive → Reassure

Testing categories for SARS-CoV2

3. Antigen Test

- Antigen tests are immunoassays that detect the presence of a specific viral antigen, which implies current viral infection.
- Antigen tests are currently authorized to be performed on nasopharyngeal or nasal swab specimens
- The currently NHRA authorized devices return results in approximately 15-20 minutes
- Antigen tests for SARS-CoV-2 are generally less sensitive than molecular tests
- The clinical performance of rapid antigen diagnostic tests largely depends on the circumstances in which they are used
- Rapid antigen tests perform best when
  1. The person is tested in the early stages of infection with SARS-CoV-2 usually within 7 days of symptom onset
  2. The person has a known exposure to a confirmed case of COVID-19
  3. Can be used for screening testing in high-risk congregate_settings in which repeat testing could quickly identify infectious individuals with SARS-CoV-2

Testing categories for SARS-CoV2

3. Antigen Test

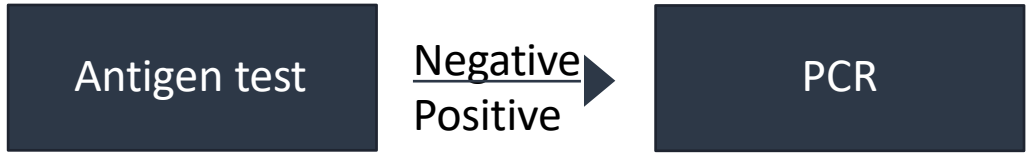
Interpretation of results

- Positive antigen results should be confirmed by PCR

- Negative results do not rule out SARS-CoV-2 infection
  - Negative results should be considered in the context of a patient's recent exposures, history and the presence of clinical signs and symptoms consistent with COVID-19.
  - They should not be used as the sole basis for treatment or patient management decisions, including infection control decisions.
  - In the presence of a high pretest likelihood, a negative test should warrant a repeat PCR test , especially if the patient is symptomatic or has a known exposure to a person confirmed to have COVID-19

Rapid Antigen Detection Tests Interpretation

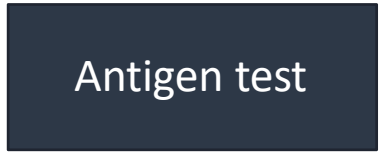
- **For Symptomatic* individuals:**



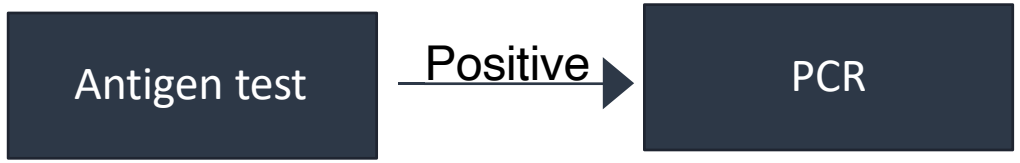
- All Symptomatic individuals should be isolated
- If PCR positive, case is confirmed
- if PCR negative, repeat PCR test after 24hr continue self isolation and follow result

***High pre-test probability for SARS CoV2 infection: known contact, very symptomatic, high community transmission) should do Rt PCR and advised to be assessed by physician.**

- **For Asymptomatic individuals/ No known history of contact:**



Negative, Stop



- If PCR positive, case is confirmed
- If PCR negative, repeat PCR test after 24hr continue self isolation and follow result

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Testing strategy for COVID-19 in High-Density Workplace

High-Density Workplaces Outbreak Control Measures

With the introduction Of Rapid Antigen Detection Tests (RADT)

1. Positive cases were moved to isolation centers
2. All close contacts were quarantined in quarantine facilities
3. Other workers living in the camp could work under supervision given RADT were done daily for 10 days from the last exposure to the positive case

- Buildings were not locked down.
- This have allowed continuity of work while ensuring adequate testing and safety.

High-Density Workplaces *Surveillance* Measures

High density locations like ***prisons, labourers accomodations and camps*** are breeding grounds for the spread of the virus, as such decisive preventative action needs to be taken.

Rapid antigen tests have proven their efficiency both in cost and early detection, thus we recommend that rapid antigen testing should conduct in such locations at least 3 times a week. As these locations pose a great risk for outbreaks.

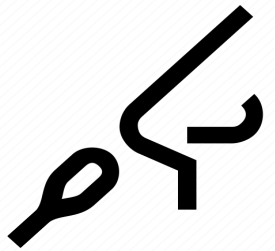
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Rapid Antigen Test		Rapid Antigen Test		Rapid Antigen Test		

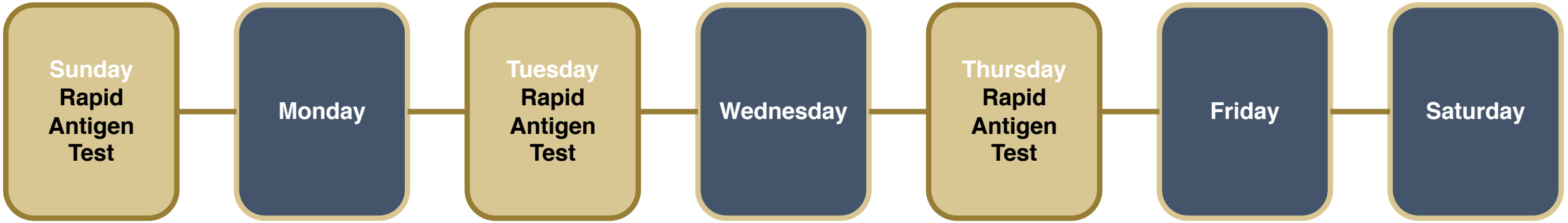
Alternatively, PCR or Antibody testing in such locations can be used as surveillance tool

School **Surveillance** Measures

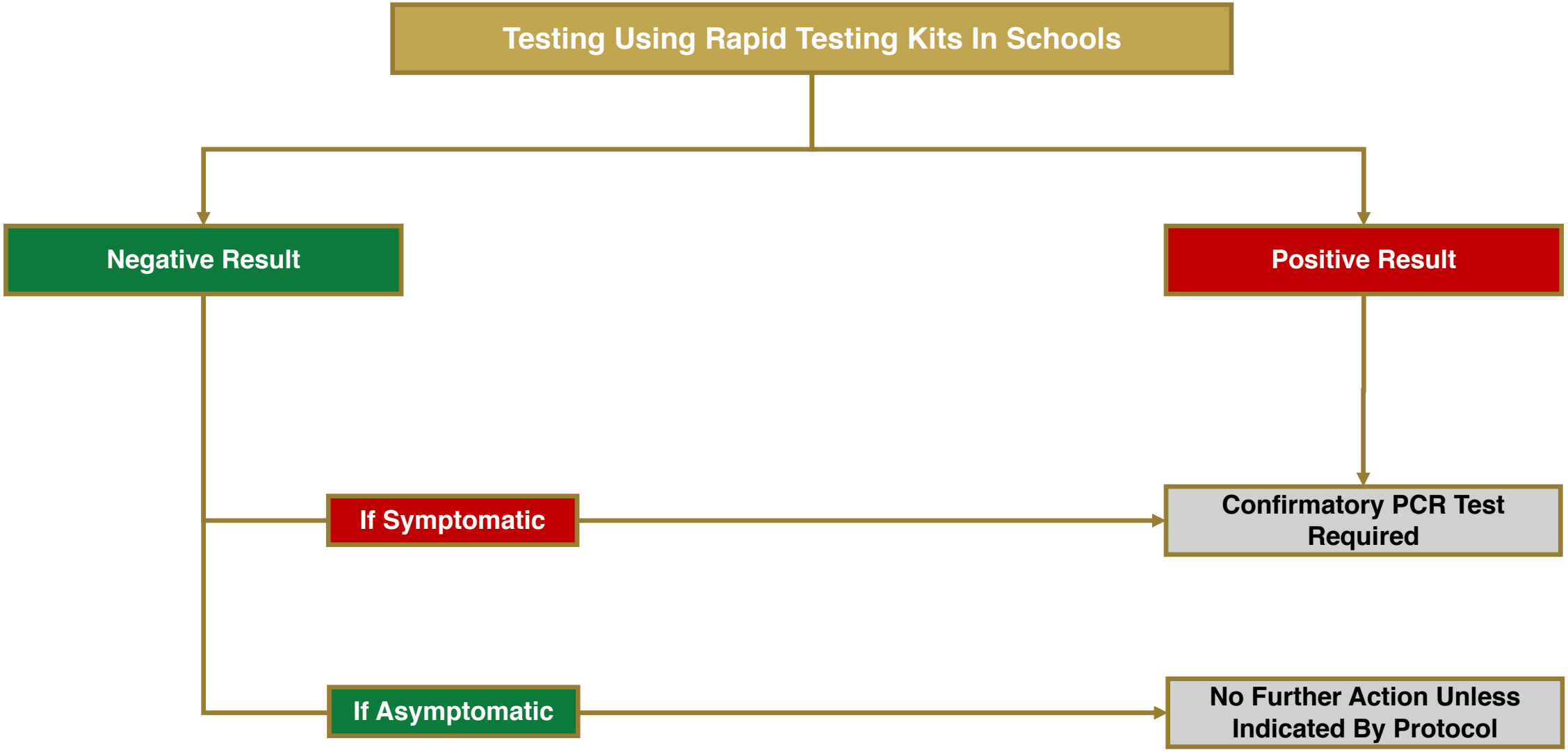
Following the good outcomes in the trial, the RADT was used in all schools and the test was done by the school staff:

- **The RADT can be deployed in all schools for attending students and staff**
- **The RADT is preferably done on Sunday Tuesday and Thursday**
- **This allows early detection of cases and keeping schools safe**
- **This also provides reassurance to families and teachers**





Schools Protocol



Bahrain Sports Model

Bubble group training

Three times weekly antigen surveillance test for all players and staff

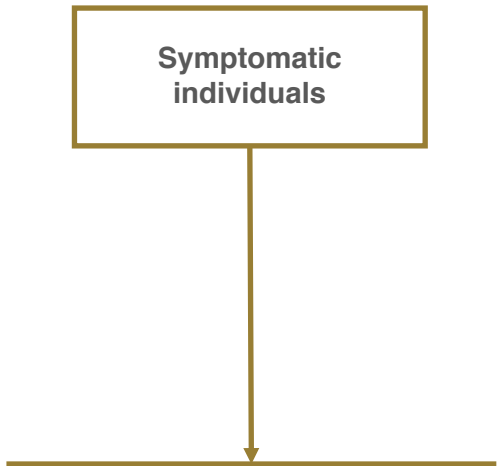
Close contacts (with negative PCR) are tested on daily basis for 10 days (antigen test) and must remain isolated except for games and training

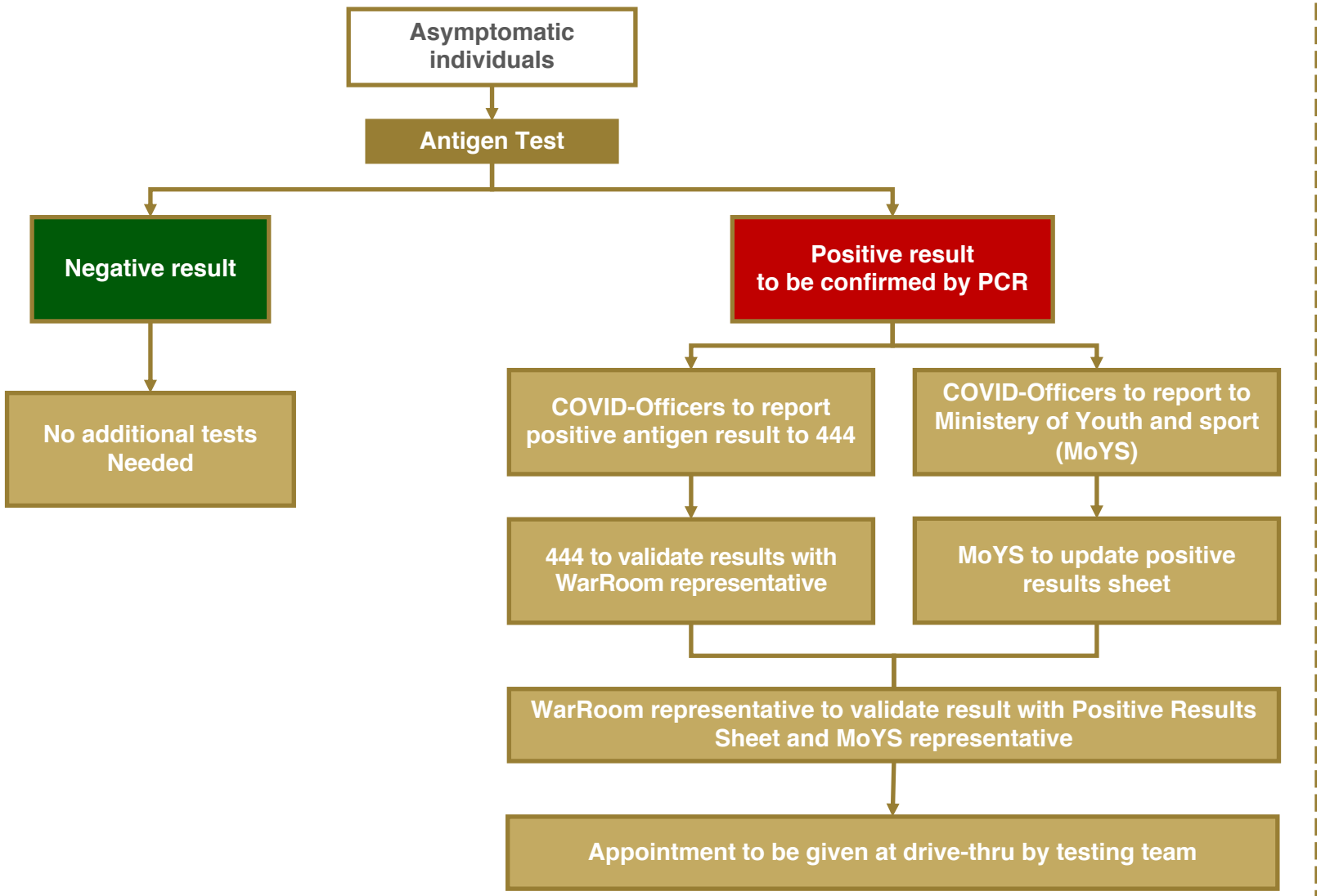
Prior to matches, antigen test for all involved players and staff

Continue all public health measures, including restricted community engagement

In case of cluster or crisis inside one or multiple teams escalate it to national taskforce medical team

Sports Protocol of Outbreak Control Measures



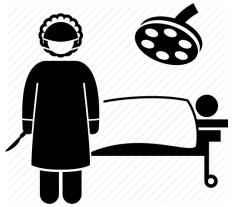


The Use of Rapid Antigen Detection Tests (RADT) in Hospitals

1

Admissions*

2



Surgical Procedures*

3

Delivery

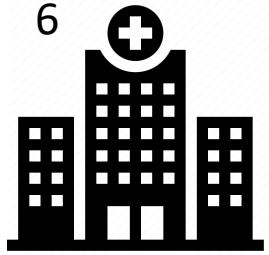
4

Health Care Workers Weekly Screening

5

Inpatients Overnight Visitors

6



(Stable symptomatic patients in Emergency Room and health centers)

- ❑ The antigen test can be used to screen admitting patients with **low COVID-19 disease probability.**
- ❑ Any positive antigen test must be confirmed by RT-PCR.
- ❑ **All admitted or patients undergoing surgical procedures can be tested using RADT except the followings:**
  - All clinically **suspected COVID-19** (including pneumonia or any COVID19 like presentation)
  - **High Risk Admission Groups**
    - Immunosuppressed or undergoing chemotherapy
      - Transplant within last 6 months and actively on immunosuppressed medications
  - Patients undergoing **aerosol-generating surgical or non-surgical procedures**
    - Surgical procedures like ENT surgery, dental procedures;
    - Non-surgical interventions like bronchoscopy, upper GI endoscopy
    - Any procedure requiring intubation

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Vaccination status categorization

Vaccination categorization pathway

Not Vaccinated with COVID-19 vaccine

Did not get infected with COVID-19

2 doses Vaccine recommended according to age and risk status

国药致君 SINOPHARM ZHIJUN · AstraZeneca · Pfizer · Sputnik V

Got infected after first dose

Complete the second dose after the completion of isolation period

infected with COVID-19 and Recovered

2 doses Vaccine
according to age and risk status *after*
3 months from date of positive PCR

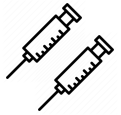
国药致君 SINOPHARM ZHIJUN · AstraZeneca · Pfizer · Sputnik V

Report any adverse events related to vaccination by following this link:
https://healthalert.gov.bh/category/reporting-vaccines

HIGH RISK CATEGORIES

Age ≥ 50 years.
- **Morbid obesity (BMI ≥ 35))**
- **Immunocompromised individuals.**
- **Frontliners (i.e., health care workers)**

Booster Dose Criteria For Vaccinated And Recovered Individuals

	Sinopharm	Pfizer- BioNTech	Covishield- AstraZeneca	Sputnik V
 **For those who received two doses of the vaccine**	**Those aged 18-39** **3 months after the second dose** Can receive either: • Sinopharm • Pfizer-BioNTech **Those aged 40+ and those under 40 years who suffer from obesity, immunodeficiencies or chronic diseases** **1 month after the second dose** Can receive either: • Sinopharm • Pfizer-BioNTech	**Those aged 18+** **3 months after the second dose** Can receive either: • Pfizer-BioNTech	**Those aged 18+** **3 months after the second dose** Can receive either: • Covishield- AstraZeneca • Pfizer-BioNTech	**Those aged 18+** **3 months after the second dose** Can receive either: • Sputnik V • Pfizer-BioNTech
 **Recovered individuals who have been vaccinated with 2 doses**	**After completing 6 months from the date of infection and after completing the required period after the second dose of the vaccination** The booster shot can be administered in accordance with the specified protocol regarding the type of vaccination received before having COVID-19			
For those who received Three doses of Sinopharm vaccine + Immunocompromised who received Three doses of any vaccine	**Those who received Three doses of Sinopharm vaccine and Immunocompromised who received Three doses of any vaccine** **3 months after the last dose** Can receive any vaccine but the medical recommendation based on local data is: • Pfizer-BioNTech			

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Travelers Protocols

Travelers

Passengers All arriving passengers above the age of 6 years will be subject to the following procedures	V27 30/1/2022
All arriving passengers are required to Bear The Cost of mandatory COVID-19 testing in Bahrain International Airport **EXCEPT: Cabin Crew, Diplomats, Official Travelers, Military Personnel, Medical travelers and Participants in the clinical trials for COVID-19 vaccine**	
1. Swab **2. Release** **3. Home isolate**	1. All passengers must present, before boarding their flight to Bahrain, a certificate with a negative result for a PCR test administered within 72 hours of their departure. All results must be verifiable via a QR code on the certificate - *passengers recently recovered from COVID-19 can present a recovery certificate or positive PCR test taken 14 days prior to departure and no earlier than 30 days prior to departure* 1. Passenger is required to complete the **payment of COVID-19 testing (BD12)** or present a proof of Payment 2. Passengers are tested in the designated tested area **Isolation** - Unvaccinated: Self isolate for a period of 7 days at their residence or hotel (passengers below the age of 12 are exempt) - Fully vaccinated: Self isolate until results are reported, if results are negative, passenger ends isolation *Vaccinated in Bahrain: green shield on the Be Aware Application* *Vaccinated not in Bahrain: 14 days after administration of the second dose (or 14 days after administration of single dose vaccine)* - Passengers advised to call 444 should symptoms develop and follow instructions provided **If results are positive:** the passenger will be contacted by health authorities

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Admissions of COVID19 patients

Admissions of COVID19

Sources of admission:

- Triage clinic : for newly diagnosed cases
- BIH COVID Clinic : for home isolation cases who develop symptoms
- Emergency room: cases with severe or life-threatening symptoms
- In-hospital transfer: Cases diagnosed as COVID19 while being hospitalized in a non-COVID facility
- Direct admission from home with no clinical assessment is prohibited

Admission of patient should be based on the primary admitting diagnosis and the level of care required, regardless of COVID-19 result:

- If type of care can be provided in COVID facility without jeopardizing level of care, then patient can be admitted in COVID facility and followed by concerned specialty
- If optimum patient care cannot be provided in COVID facility , then patient should be admitted under concerned specialty in the appropriate level of care, while taking full infectious control precaution
    - This also concerns any kind of intervention required
- Clinical Judgment should be prioritized over SARS-CoV2 swab result. Infectious disease consultation for follow up, assessment and interpretation is also required
- For non-COVID presentation and SARS-CoV2 PCR CT Value ≥ 30
    - Patient unlikely to be infectious, however precautionary measures should be taken and can be admitted in non-COVID facility
    - Perform Serology test to check for previous infection/exposure
    - Consult Infectious disease and Infection control for interpretation and assessment

COVID-19 Admission Criteria

Category	Criteria	Destination
Adult		
• **High Risk Asymptomatic** • **Very mild Symptoms** • **Mild cases**	• Mild symptoms • O2 Sat RA ⩾94% • Minimal CXR changes (<50% lung infiltrate) • Other non acute indications	Home Isolation (Close F/U Primary Care) **Unless clinically not fit or has an active *ACUTE* Non-COVID indication for admission**
Moderate	• Moderate symptoms • O2 saturation of <94 % on room air or decrease in saturation to < 90% with ambulation • Respiratory rate of >30/min • Lung infiltrates >50 %	Non-ICU facilities
Severe Critical	• Severe Symptoms or altered mental status • Pneumonia +Other system/organ failure • Unstable hemodynamic status • Requiring >15L Oxygen. • HFNC, Intubation or NIV • Impending Respiratory Failure on ABG	HDU/ICU Facility
Pediatric		
Infants >1 year with moderate disease	• Radiographic evidence of pneumonia • SPO2 <92 % on RA • Respiratory Failure • Chronic medical condition with moderate disease including Chronic pulmonary disease, Cardiovascular disease, chronic kidney disease, chronic liver disease, neuromuscular disease, metabolic disorders. • Immunosuppressed or immunocompromised children • Children with symptoms of Kawasaki disease typical or atypical • Gastroenteritis with moderate to severe dehydration • Persistent fever for more than 5 days	• BDF • SMC

Special Indication	Destination
ECMO	BDF FICU, MKCC
Hemodalysis	BIH, Sehati
Isolation	BIH, Sehati
Labor	Sehati

CONSIDER HOME ISOLATION
None of admission criteria
Reliable phone number where the patient could be reached for post-discharge follow-up
Ability to understand and follow self-isolation recommendations
Satisfactory Home isolation setup

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Recovered & Reinfected COVID-19 Cases : Readmission guidelines

Readmission guideline

Definition of Recovered Case: Recovered COVID-19 cases are patients who were diagnosed with COVID19 and fulfilled all the isolation and discharge criteria

Definition of COVID-19 Confirmed Reinfection: At anytime If isolated virus found by gene sequencing to be different from previous infection it is a confirmed reinfection

Definition of COVID-19 Pathway refers to all the processes encountered in a confirmed COVID-19 case from the diagnosis until satisfying discharge criteria and end of isolation

Within 14 days from COVID-19 Pathway Discharge

- Any Recovered COVID-19 who presented with COVID-19 related symptoms AND positive swab, can be readmitted to COVID-19 facilities if clinically indicated.
    - If Recovered cases has worsening respiratory symptoms, consider investigating for post COVID-19 complications (such as bacterial pneumonia, VTE) and other infections.
- If negative swab, admit into Non-COVID facility unless infectious disease consultant advise otherwise.

If within 15 to 89 days from COVID-19 Pathway Discharge:

Severe cases: Readmit to COVID-19 facilities and considered as suspected reinfection.

Mild cases: Admit to Non-COVID-19 facilities (if clinically indicated) and considered as Previous infection.

If beyond 90 days:

If PCR positive, it is a Presumed Reinfection case which is treated as a confirmed COVID-19 case and follow COVID-19 admission protocol.

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Discharge Protocol from COVID-19 Facility

Discharge protocol from all COVID19 treatment facilities

Non-ICU

Fully vaccinated

Yes

At least 7 Days have passed since intial +Ve PCR or onset of the symptoms

AND

Resolution of fever for at least 24h W/O antipyretics

No

At least 10 Days have passed since intial +Ve PCR or onset of the symptoms

AND

Resolution of fever for at least 3 days W/O antipyretics

ICU / Immunocomromised

At least 21 Days have passed since intial +Ve PCR or onset of the symptoms

AND

No recorded fever for at least 3 days W/O antipyretics

OR

Two –Ve PCR result 24h apart

AND

Resolution of resipratory symptoms and fever W/O antipyretics for at least 3 days

Early Discharge and Transfer:

Criteria for early discharge:

- Approval from the attending physician.
- Proper home isolation is availabel to the complete total isolation period.

Criteria for early Transfer to Non-COVID facilities:

- Approval from the attending and receiving physician.
- Non-covid facility that can accomedate patients' infection control needs safely.

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Home isolation Protocol

Home Isolation

All newly diagnosed cases need to be evaluated by the COVID19 triage team to assess fitness for home isolation

- Criteria that **must be met** to qualify patients for Home Isolation:
  1. Appropriate home setting for a self isolation
  2. Able to stay in contact with the medical team electronically
  3. Activation of “Be Aware Bahrain” App
- Clinical Criteria (either)
  - Mild symptoms without risk factors, or
  - Asymptomatic regardless of risk factors

Risk factors include Obesity, Cardiac diseases, Chronic lung diseases, Clotting risk factors, SCD in crisis

Household contacts shall be continued to be managed as close contacts through public health

- Primary Healthcare workers will follow up patients with phone calls on day 3 and 6 for 40y+ patients.
- Instruction sheet to be given to all individuals
- Patient will continue to fill the daily follow-up form on the BeAware application
- In case of deterioration, severe cases are referred to closest A/E and mild-moderate cases are referred to COVID19 clinics at BIH

COVID-19 Home isolation Risk Assessment

Sign and Symptoms	Mild: Home isolation	Moderate to Severe: Transfer to Treatment facility
Sore thorat and flu like symptoms Loss of Smell or Taste ; Myalgia and Fatigue ; GI Symptoms	✓	-
Fever	Less than 38°C	**≥38°C and if clinically indicated**
Shortness of Breath	X	✓
Chest Pain	X	✓
Change in Mental Status	X	✓
Respiratiry Rate >30	X	✓
Saturation	Normal	**Saturation ≤93% on Room Air**
Chest Xray changes	Normal	**Changes suggestive of pneumonia**
Major Risk factors for Severe COVID19	X	Any one of the mentioned risk factors
• Obesity	X	✓
• Cardiac disease: Heart Failure, Coronary artery disease, Cardiomyopathy	X	✓
• Chronic Lung Disease: Fibrosis, Sever Asthma/ COPD	X	✓
• Clotting Predispoising condition	X	✓
• SCD in crisis	X	✓

Home Isolation for Infected individuals of the general public

Infected patients that are Non-Green shield carrier

حاصل على التطعيم
COVID-19 Vaccinated

حاصل على التطعيم
COVID-19 Vaccinated

غير حاصل على التطعيم
Not Vaccinated

- Isolate for a total of 10 days from diagnosis
- No end of isolation swab required

Infected patients that are Green shield carrier

متعافي
Recovered

حاصل على التطعيم
COVID-19 Vaccinated

- Isolate for a total of 7 days from diagnosis
- No end of isolation swab required

HCWs and EWs Home Isolation Protocol

Infected Health Care Workers and Essential Workers (PCR +ve)

Vaccinated

Able to verify test:*
Isolate for **6 Days** and come back on **D7** to do an Antigen test at their institution. If negative resume duty, if positive return on **D8** after completing the **7 Days** isolation period

Unable to verify test:**
Isolate for a total of **7 Days**

Unvaccinated

Able to verify test:*
Isolate for **7 Days** and come back on **D8** to do an Antigen test at their institution. If negative resume duty, if positive return on **D11** after completing the **10 Days** isolation period

Unable to verify test:**
Isolate for a total of **10 Days**

HCWs that are returning must be Asymptomatic OR Improving in Symptoms for at least 24h prior to resuming duty

***Able to verify test:** Able to test in a institute with an infection control unit.
****Unable to verify test:** Unable to test in a institute with an infection control unit.

Note: When there is a severe need for essential HCWs, they can return to work immediately or shorten isolation period to 5 days provided they have one negative Ag test and Asymptomatic or improved symptoms for at least 24hrs (as per CDC recommendation) Refer to P.119

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Outpatient and follow up guidelines

Discharge Instruction and follow up

- Discharge instruction leaflet to be provided in different languages
  1. Continuation of the specified isolation period
  2. Patient should be instructed to visit closest A/E should they develop severe symptoms (chest pain, SOB)
  3. Patient discharged before 10 days should visit COVID clinic in case symptoms recur

- **After hospital discharge, VTE prophylaxis is not recommended for patients with COVID-19**

- **Any decision to use post-discharge VTE prophylaxis for patients with COVID-19 should consider the individual patient's risk factors for VTE, including reduced mobility, bleeding risks, and feasibility**

Outpatient follow up post discharge

1. Categorization of patients to be followed up
   1. Age >60 yrs regardless of comorbidities
   2. Patients with the following risk factors: CVD, lung disease, Obesity, or at risk for thrombosis

2. The above categorized patients must be followed up within 10 days from discharge, either by phone or scheduled appointment

3. Follow up to be done according to patient entitlement
   1. BDF personnel to follow at BDF clinics
   2. MOI personnel to follow at MOI clinics
   3. Public population (non BDF nor MOI) to follow up at MOH sites (SMC, LHC)

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Return to Work

Return to Work Criteria

- Recovered COVID-19 patients (Non-Health Care Workers) can return to work whenever:
  1. Have completed the isolation period specified by the discharge protocol

  AND

  2. are Asymptomatic for at least 24 hours (without the use of fever reducing medications) or Symptoms (e.g., cough, shortness of breath) have improved

Cases with persistent positive PCR or fluctuating PCR result within 90 days from the initial COVID19 diagnosis can return to work after physician assessment, given

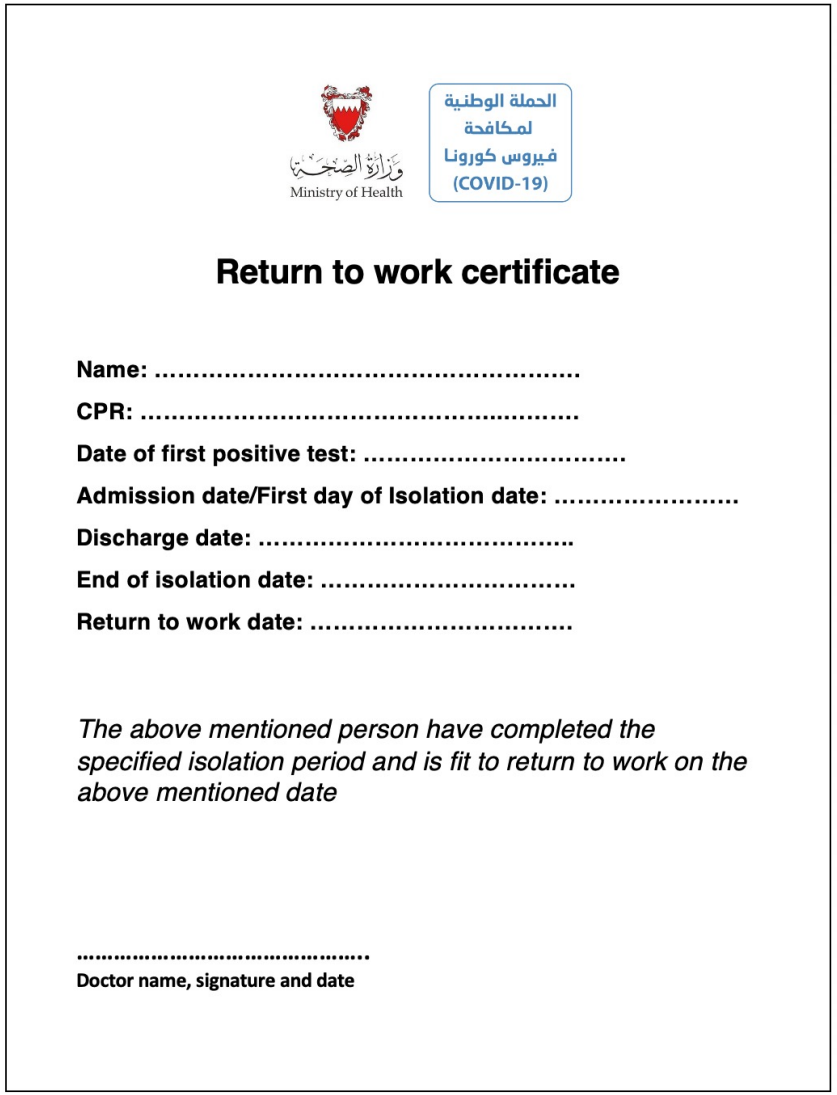
- They are asymptomatic for at least 24 hours (without the use of fever reducing medications)
- Completed the isolation period specified by the discharge protocol
- The latest positive PCR has a Ct value > 30

Please note that cases who were asymptomatic during their initial diagnosis , should be retested and isolated if symptoms occur
In case of the inability to provide safe patient care due staff shortage – refer to page 49 for feasible recommendation

Return to Work Criteria

- Return to work certificate is to be issued from the admitting facility once the specified criteria were completed (page 44)

- Primary care physicians will issue the certificate for home isolated patients, once the specified criteria were completed (page 48)



وزارة الصحة
Ministry of Health

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Return to work certificate

Name: .....

CPR: .....

Date of first positive test: .....

Admission date/First day of Isolation date: .....

Discharge date: .....

End of isolation date: .....

Return to work date: .....

The above mentioned person have completed the specified isolation period and is fit to return to work on the above mentioned date

.....

Doctor name, signature and date

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Reporting of COVID-19 death

COVID-19 related death

Following WHO guidance REF

Definition of COVID-19 related death:

- A death due to COVID-19 is defined for surveillance purposes as a death resulting from a clinically compatible illness, in a probable or confirmed COVID-19 case, unless there is a clear alternative cause of death that cannot be related to COVID disease (e.g. trauma). There should be no period of complete recovery from COVID-19 between illness and death.

- A death due to COVID-19 may not be attributed to another disease (e.g. cancer) and should be counted independently of pre-existing conditions that are suspected of triggering a severe course of COVID-19.

Guidelines for certifying COVID-19 as a cause of death

Recording COVID-19 on the medical certificate as cause of death:
for all decedents if the disease caused, or is assumed to have caused, or contributed to death

Terminology:
The use of official terminology, COVID-19, should be used for all certification of death

Chain of events:
Specification of the causal sequence leading to death in part of the certificate is important, Example on slide 60

Comorbidities:
There is increasing evidence that people with existing chronic conditions or compromised immune systems due to disability are at higher risk of death due to COVID-19. Chronic conditions may be non-communicable diseases such as coronary artery disease, chronic obstructive pulmonary disease (COPD), and diabetes or disabilities. If the decedent had existing chronic conditions, such as these, they should be reported in Part 2 of the medical certificate of cause of death. Example on slide 60

Examples of COVID-19 deaths

Chain of events example

Here, on the International Form of Medical Certificate of Cause of Death, is an example of how to certify this chain of events for deaths due to **COVID-19** in Part 1:

***Frame A*: Medical data: Part 1 and 2**

1 Report disease or condition directly leading to death on line a Report chain of events in due to order (if applicable) State the underlying cause on the lowest used line		Cause of death	Time interval from onset to death
	a	Acute respiratory distress syndrome	2 days
	b	Due to: Pneumonia	10 days
	c	Due to: COVID-19 (test positive)	14 days
	d	Due to:	

Underlying cause of death

2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)	

Manner of death:

▬ Disease	▬ Assault	▬ Could not be determined
▬ Accident	▬ Legal intervention	▬ Pending investigation
▬ Intentional self harm	▬ War	▬ Unknown

Note: This is a typical course with a certificate that has been filled in correctly. Please remember to indicate whether the virus causing COVID-19 had been identified in the defunct.

Comorbidities example

Here, on the International Form of Medical Certificate of Cause of Death, are examples of how to certify this chain of events for deaths due to **COVID-19** in Part 1, with comorbidities reported in Part 2:

***Frame A*: Medical data: Part 1 and 2**

1 Report disease or condition directly leading to death on line a Report chain of events in due to order (if applicable) State the underlying cause on the lowest used line		Cause of death	Time interval from onset to death
	a	Acute respiratory distress syndrome	2 days
	b	Due to: Pneumonia	10 days
	c	Due to: Suspected COVID-19	12 days
	d	Due to:	

Underlying cause of death

2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)	**Coronary artery disease [5 years], Type 2 diabetes [14 Years], Chronic obstructive pulmonary disease [8 years]**

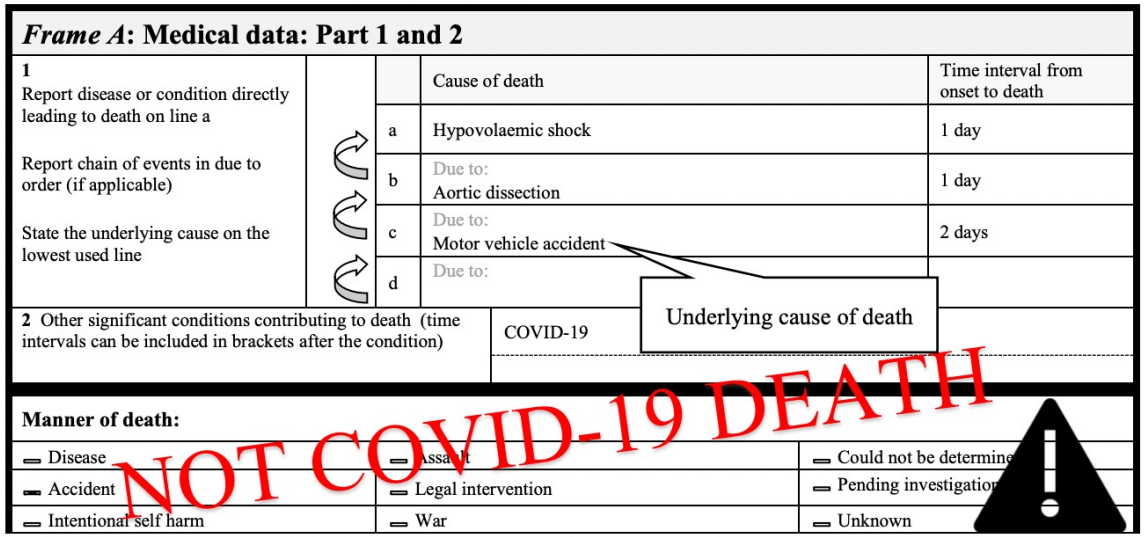
Manner of death:

▬ Disease	▬ Assault	▬ Could not be determined
▬ Accident	▬ Legal intervention	▬ Pending investigation
▬ Intentional self harm	▬ War	▬ Unknown

Note: This is a typical course with a certificate that is filled in correctly. COVID-19 cases may have comorbidity. **The comorbidity is recorded in Part 2.**

Examples of non-COVID-19 deaths

The examples below show recording of cases where death may have been influenced by COVID-19, but death was caused by another disease or an accident.



***Frame A*: Medical data: Part 1 and 2**

1 Report disease or condition directly leading to death on line a Report chain of events in due to order (if applicable) State the underlying cause on the lowest used line		Cause of death	Time interval from onset to death
	a	Hypovolaemic shock	1 day
	b	Due to: Aortic dissection	1 day
	c	Due to: Motor vehicle accident	2 days
	d	Due to:	

Underlying cause of death

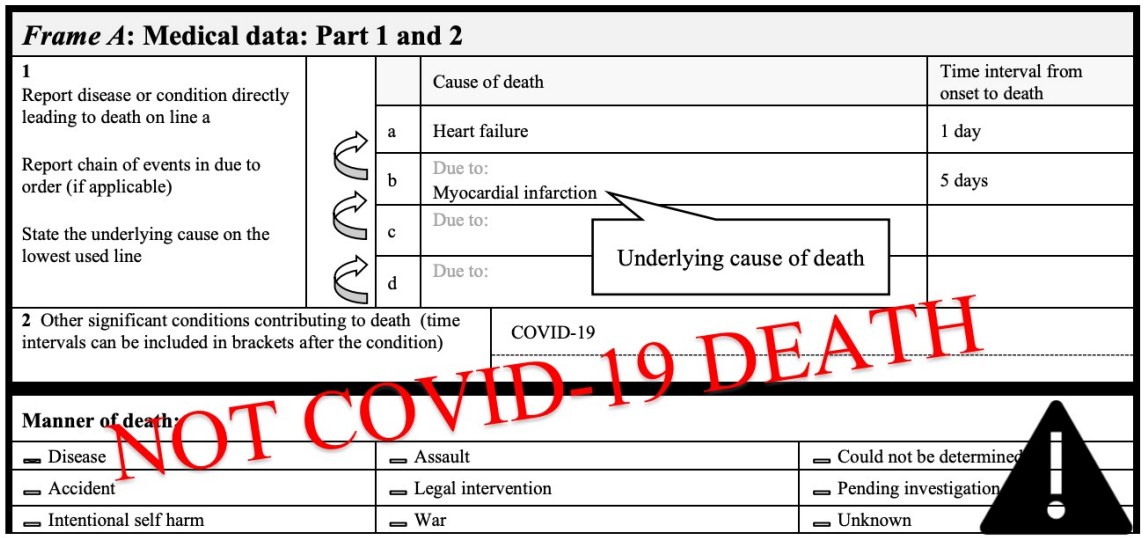
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)	COVID-19

Manner of death:

▬ Disease	▬ Assault	▬ Could not be determine
▬ Accident	▬ Legal intervention	▬ Pending investigation
▬ Intentional self harm	▬ War	▬ Unknown

NOT COVID-19 DEATH

Note: Persons with COVID-19 may die of other diseases or accidents, such cases are not deaths due to COVID-19 and should not be certified as such. In case you think that COVID-19 aggravated the consequences of the accident, you may report COVID-19 in Part 2. Please remember to indicate the manner of death and record in part 1 the exact kind of an incident or other external cause.



***Frame A*: Medical data: Part 1 and 2**

1 Report disease or condition directly leading to death on line a Report chain of events in due to order (if applicable) State the underlying cause on the lowest used line		Cause of death	Time interval from onset to death
	a	Heart failure	1 day
	b	Due to: Myocardial infarction	5 days
	c	Due to:	
	d	Due to:	

Underlying cause of death

2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)	COVID-19

Manner of death:

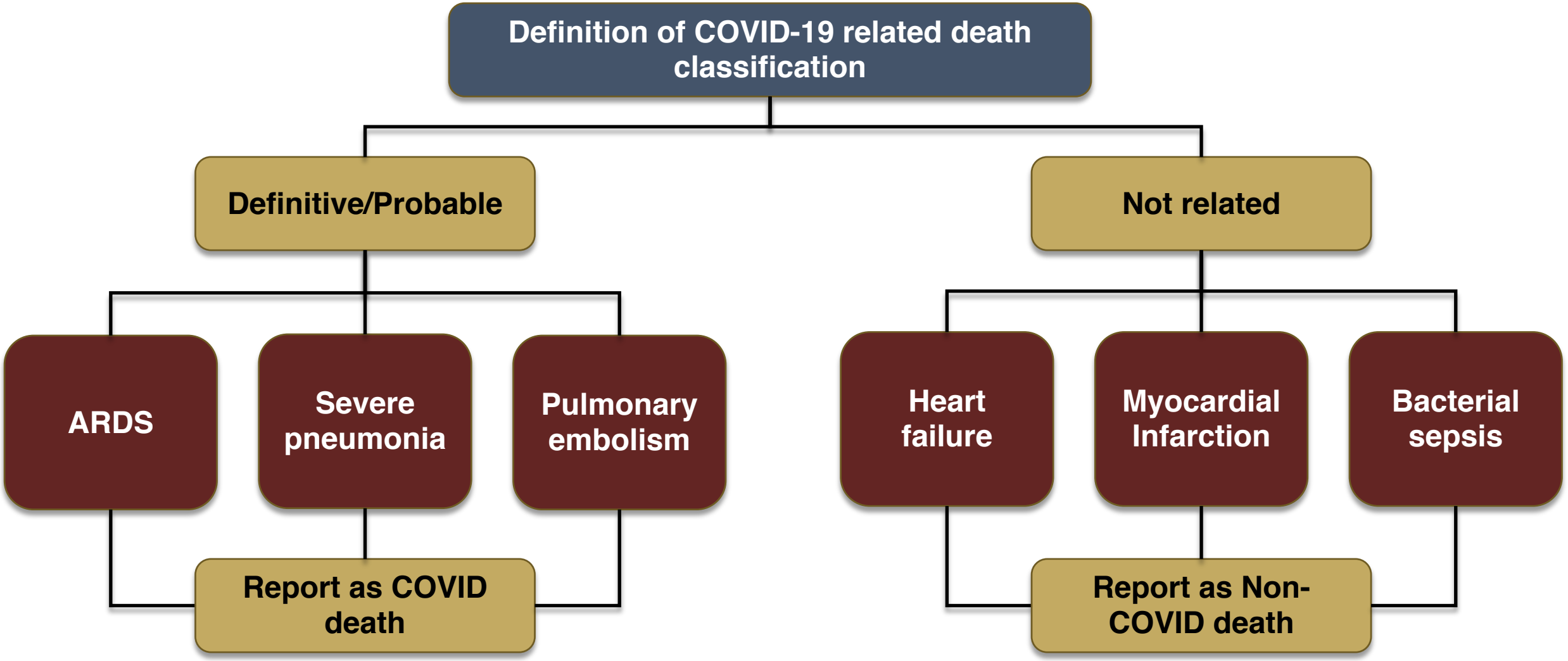
▬ Disease	▬ Assault	▬ Could not be determined
▬ Accident	▬ Legal intervention	▬ Pending investigation
▬ Intentional self harm	▬ War	▬ Unknown

NOT COVID-19 DEATH

Note: Persons with COVID-19 may die due to other conditions such as myocardial infarction. Such cases are not deaths due to COVID-19 and should not be certified as such.

Difference between definitive and probable COVID-19 related death

All these causes of deaths are examples, as other scenarios can occur; what is important is the chain of events having direct corelation to COVID-19 death:



Reporting COVID-19 unexpected death

Due to the current pandemic and the prevalence of the virus in the community, it is challenging to differentiate between cases who died WITH the virus or those who died because OF the virus

- There is no consensus in the literature nor a recommendation on reporting sudden death in COVID-19

The National task force provides the following recommendations for reporting cases of sudden death outside the COVID-19 pathway (ie at home)

1. If swab is taken before death and turns to be positive:
   - Patient will be counted as a case of COVID19; however, mortality will not be reported due to COVID19, if no clinical evidence is present

2. If swab is taken after death of the individual and is positive
   - The case will NOT be counted neither as a case of COVID19 nor as a case of COVID-19 Death

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Guidance for management of Neonates born to Mothers with Suspected or Confirmed COVID-19 Infection

Management of Neonate born to Mothers with Suspected or Confirmed COVID-19 Infection : **Healthy and Asymptomatic Neonate**

Newborns should be separated at birth from their mother and bathed as soon as possible
Neonate to be kept in isolation from other infants
NP swab for mother – use Gene Xpert or RADT for more rapid results

Mother tetsed Positive

If mother tetsed Negative and neonate is asymptomatic and stable, discharge from COVID pathway

Tests newborn for COVID-19 at 24hours of age and if negative, repeat at 48hours of age

- If testing is limited and baby is stable and asymptomatic and are expected to be discharged before 48 hours a single test can be done at 24-48 hours

If both PCR tests negative and neonate is asymptmatic and stable, can be discharged and to follow the advised guidelines (page 47)

If newborn tested positive, follow COVID-19 Pathway

1. Newborns can remain with their mothers
2. Observe for the development of any symptoms
3. Discharge once two consecutive negative NP test
4. Plan for frequent follow-up through 14 days after birth

If neonate is symptomatic or unstable, provide appropriate care in an isolation room and perform COVID19 swabs as indicated if mother tested positive

Source: American Academy of Pediatrics and KSA guidelines

Newborns and Infected Mothers

The following guideline are recommended regarding Neonate born to Mothers with Confirmed COVID-19 Infection

- Temporary separation between the mother and the newborn minimizes the risk of transmission and is advised
  - If parents refuse separation and willing to room in together, then precautions should be taken to minimize risk of viral transmission:
    1. Staying 2 meters away from the mother,
    2. practice safe hand hygiene
    3. wear a mask
- Breastfeeding: mothers may express breast milk after appropriate breast and hand hygiene. Caregivers who are not infected may feed the breast milk to the infant
  - Mother who request direct breastfeeding, should understand the increased risk of transmission and comply with strict preventive precautions that include use of a mask and meticulous breast and hand hygiene.

Source: American Academy of Pediatrics

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Multi-level Hospital Responses To Covid-19 Pandemic

Multi-level Hospital Responses To Covid-19 Pandemic

Low Alert

<2%* Or as per Healthcare institute need for a precautionary measure

- **Nonessntial workforce****
  - Resume standard levels of activity
- **Vaccination status**
  - Apply standard policy
- **Elective surgeries**
  - Resume standard levels of activity
- **Outpatiants clinics**
  - Resume standard levels of activity
- **Pharmacy home delivery**
  - Resume standard levels of activity
- **Infection control**
  - Resume standard levels of activity
- **Patients accompanying caregiver**
  - Apply standard policy
- **Visitors**
  - Apply standard policy

Moderate Alert

>2% & <5%* Or as per Healthcare institute need for a precautionary measure

- **Nonessntial workforce****
  - Reduce to 70%
- **Vaccination status**
  - 70% of HCWs must be vaccinated and boosted
- **Elective surgeries**
  - Reduce to 70%
- **Outpatiants clinics**
  - Reduce to 70% and use telemedicine
- **Pharmacy home delivery**
  - Provide home delivery service for the Elderly and High-Risk patients
- **Infection control**
  - Enhance cleaning process all over hospital & Monitoring
  - Apply history taking and proper visual Triaging at entrances and ER
- **Patients accompanying caregiver**
  - Reduced to only one and must be vaccinated and boosted
- **Visitors**
  - Limited to one vaccinated and boosted visitor at a time with a maximum of five

High Alert

>5%* Or as per Healthcare institute need for a precautionary measure

- **Nonessntial workforce****
  - Reduce to 50%
- **Vaccination status**
  - 100% of HCWs must be vaccinated and boosted
- **Elective surgeries**
  - Stop and only conduct emergency surgeries
- **Outpatiants clinics**
  - Switch completely to telemedicine and mobile home visits
- **Pharmacy home delivery**
  - Provide home delivery service to all patients
- **Infection control**
  - Strict cleaning process all over hospital & Monitoring
  - Increase strictness of history taking and proper visual Triaging at entrances and ER
- **Patients accompanying caregiver**
  - As per healthcare institute discretion
- **Visitors**
  - As per healthcare institute discretion

***Percentages are positivity rate among overall Healthcare institute workers**

****Nonessntial workforce:** As defined by Healthcare institute

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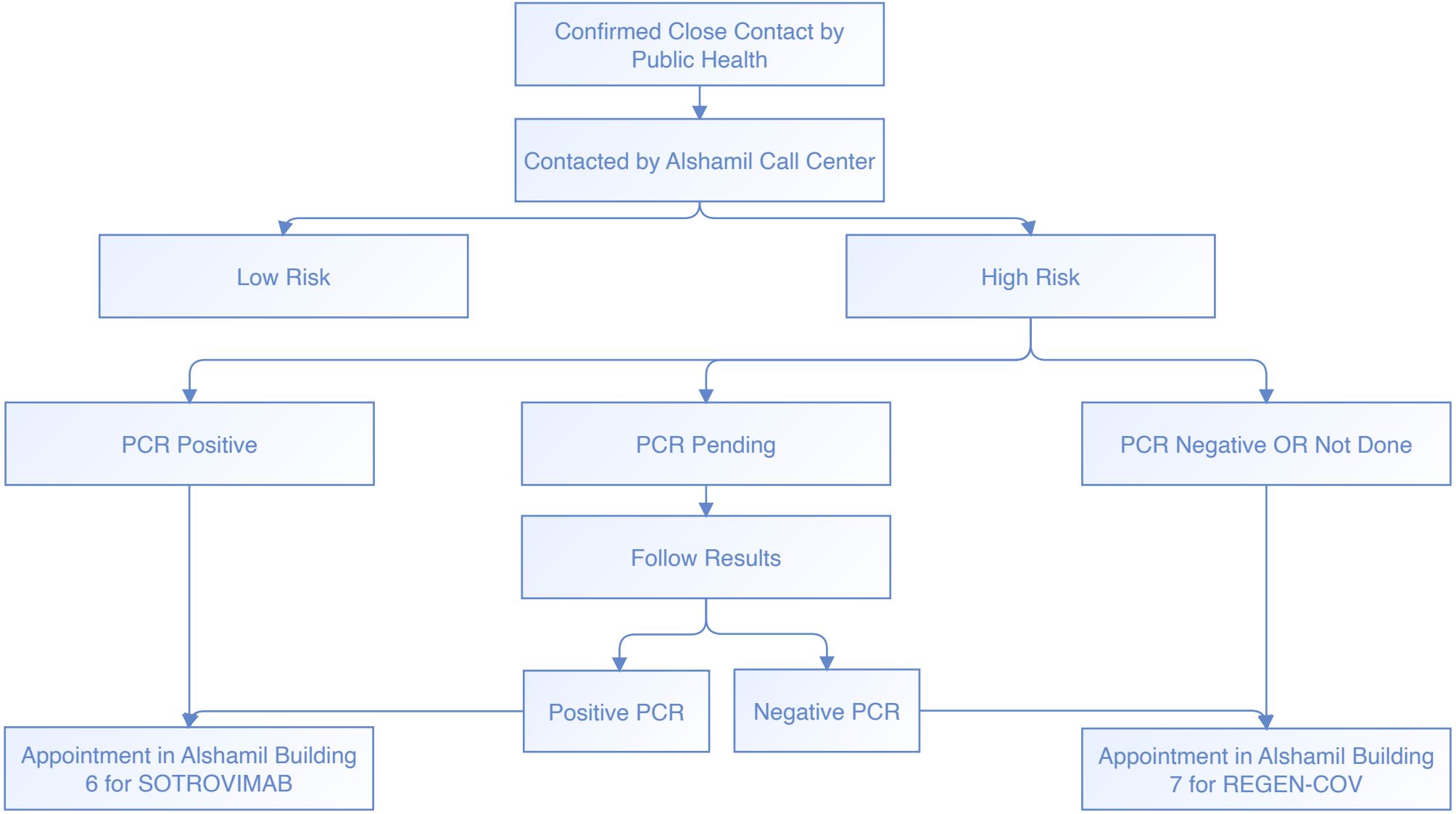
Treatment Guidelines and Pathways

Monoclonal Antibodies Treatment Pathway



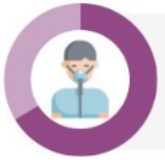
Responsible team: Prof. Manaf Alqahtani, Dr. Aamal Husain, Dr. Alwaleed Behzad

Monoclonal Selection Criteria Outpatient Setting

Sotrovimab Inclusion Criteria

Within 10 Days of Positive PCR

Weight ≥40 Kg



Do Not Require Oxygen

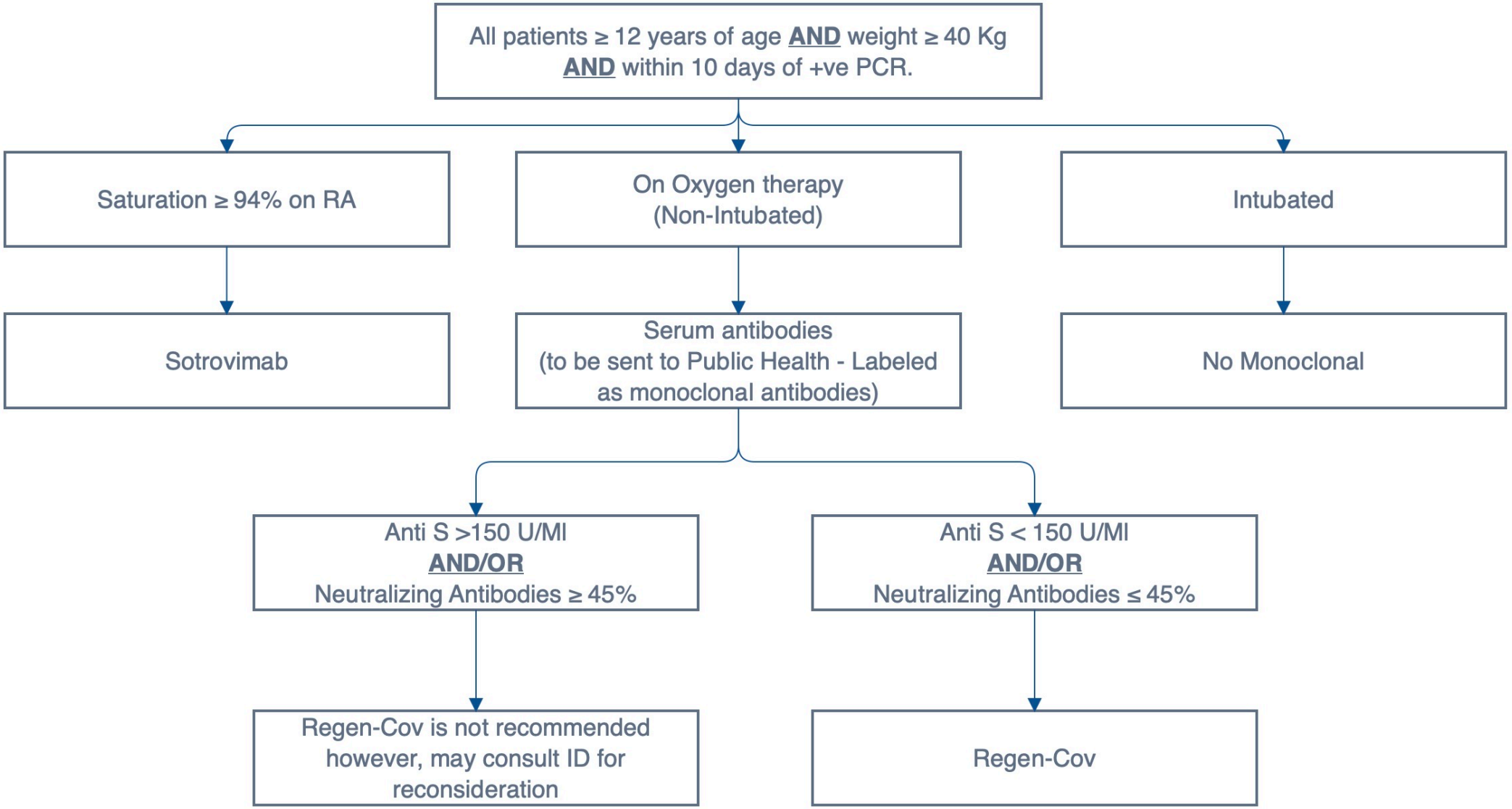
Criteria:

≥50 Years of Age	Unvaccinated	OR	One or More Risk Factors
≥18 Years of Age	Unvaccinated	AND	One or More Risk Factors
≥12 Years of Age	One or More Risk Factors		

Risk Factors:

1. Obesity
2. Cardiovascular Diseases
3. Chronic Lung Diseases
4. Immunocompromised
5. Chronic Kidney Disease
6. Pregnancy
7. Neurodevelopmental Disorders
8. Sickle Cell Disease
9. Diabetes

Monoclonal Selection Criteria Inpatient Setting



Sortovimab

Sotrovimab

- Within 10 days of Lab Confirmed COVID 19 PCR.
- Weight ≥ 40 Kg.
- Do Not require Oxygen

Has at least one of the following:

1. Age ≥50 years.

OR

2. Age ≥ 18 years + Non vaccinated
   - Not Vaccinated = Yellow/Red/Grey shield carrier in Beaware application **OR** 6 Months post 2nd dose of any type of vaccine (for those who received their vaccination outside Bahrain)

OR

3. Age ≥ 12 + has at least one of the following
   - BMI ≥ 35 (BMI ≥85th percentile in <18 years age group).
   - Pregnancy.
   - Chronic Kidney Disease.
   - Diabetes.
   - Immunosupressive disease or on Immunosupressive Treatment.
   - Cardiovascular Diseases (including Congenital heart disease) or hypertension.
   - Chronic Lung Disease.
   - Having a medical-related technological dependence.
   - Sickle Cells disease.
   - Neurodevelopmental disorders.

Sortovimab is a monoclonal antibody that is specifically directed against the spike protein of SARS-CoV-2, designed to block the virus' attachment and entry into human cells. It is FDA Emergency use authorization (EUA) approved for Treatment of mild to moderate COVID-19 in adult and pediatric patients who are ≥12 years of age and weighing at least 40 Kg with positive result of direct SARS-CoV-2 viral testing.

- Sotrovimab use should be considered for persons with mild to moderate COVID-19 who are hospitalized for a reason other than COVID-19 and who otherwise meet the EUA criteria.

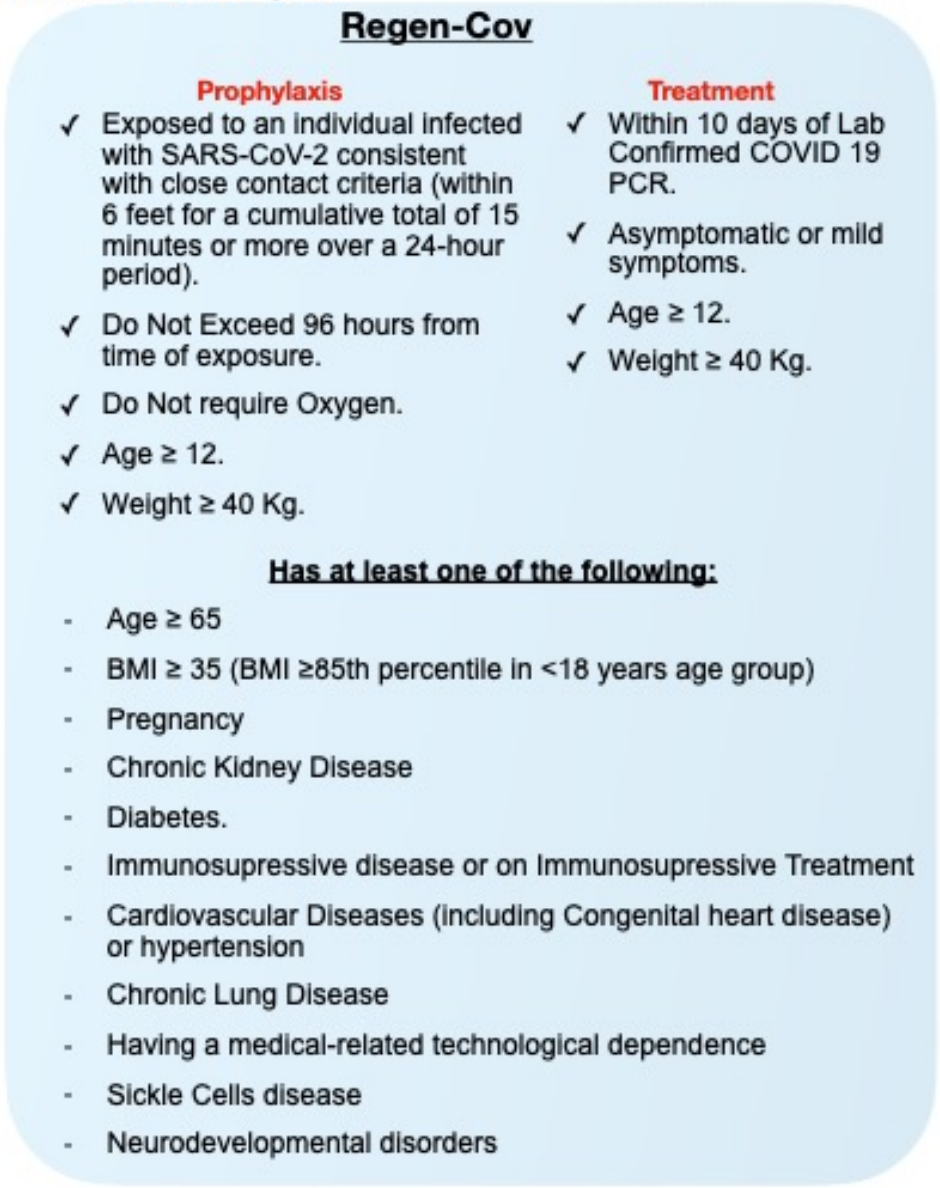
Sotrovimab Treatment Protocol

Category	Details
Dose	• The dosage of sotrovimab is 500 mg of Sotrovimab. (One vial of sotrovimab (500 mg/8mL) - single dose. • Sotrovimab should be given as soon as possible aier positive results of direct SARS- CoV-2 viral testing and within 10 days of symptom onset. Sotrovimab must be diluted in 50 OR 100ml Normal Saline and administered as a single intravenous infusion of 500 mg over 30 minutes. • Dosage Adjustment in Specific Populations: • No dosage adjustment is recommended based on renal impairment, during pregnancy or while lactating. • No dosage adjustment is recommended in pediatric patients who weigh at least 40 kg and are 12 years of age and older.

Monitoring	• Full sets of vital signs should be measured as follows:
	  • Pre-infusion.
	  • 15 minutes after start of infusion.
	  • End of infusion.
	• Patient should stay 60 minutes post completion of dose for observation and final sets of vitals will be taken before discharge.

Adverse effects	• Hypersensitivity reactions • Infusion related reactions
Contraindication	• Severe Covid • Passing of more than ten days since onset of symptom

Regen-Cov



FDA Emergency use authorization (EUA) of the approved product Regen-Cov (casirivimab and imdevimab) for Treatment of mild to moderate COVID-19 or as a post-exposure prophylaxis in adult and pediatric patients who are ≥12 years of age and weighting at least 40 Kg with positive result of direct SARS-CoV-2 viral testing. Target patient who are at high risk of progression to severe COVID-19. With the Aim to Reduce COVID-19 Related Hospitalization and death.

For Positive Cases: Within 10 days of Lab Confirmed COVID-19 PCR.

For Post Exposure Prophylaxis:

- Exposed to an individual infected with SARS-CoV-2 consistent with close contact criteria (within 6 feet of someone for a cumulative total of 15 minutes or more over a 24-hour period)
- Do Not Exceed 96 hours from time of exposure.

Regen-Cov Treatment Protocol

Category	Details
Dose	• 600 mg of casirivimab and 600 mg of imdevimab administered together as a single intravenous infusion over a minimum of 20 minutes. • For COVID-19 Positive PCR: Regen-Cov should be given as soon as possible after positive results of direct SARS-CoV-2 viral testing and within 10 days of symptom onset. • For Post Exposure Prophylaxis: Regen-Cov should be given as soon as possible after exposure to an individual infected with SARS-CoV-2 and within 96 hours from time of exposure. • No dosage adjustment is recommended in pregnant or lactating women • No dosage adjustment is recommended in pediatric patients who weigh at least 40 kg and are older than 12 years of age. • No dosage adjustment is recommended in patients with renal impairment

Monitoring	• Full sets of vital signs should be measured as follows:
	  • Pre-infusion.
	  • 15 minutes after start of infusion.
	  • End of infusion.
	• Patient should stay 60 minutes post completion of dose for observation and final sets of vitals will be taken before discharge.

Adverse effects	• Hypersensitivity Reaction, including anaphylaxis. • Infusion Related Reaction, occurring during the infusion and up to 24 hours after the infusion.
Contraindication	• Severe Covid • individuals with previous severe hypersensitivity reactions, including anaphylaxis, to REGEN-COV

Treatment Guidelines : General approach

- Daily clinical assessment of patients is required
- It have been reported that deterioration is more common within the 8 to 10 days from symptoms onset
- Strict Isolation and adherence to infection control measures
- Baseline investigations for all patients:
  - ECG, Chest Xray/ Ultrasound chest
  - Echocardiography
  - CBC, Urea/Electrolytes, Creatinine, LFT
  - CRP, LDH, ESR, D-Dimer, Ferritin, PCT
- Risk stratification and prognostic markers
  - D-dimer, Fibrinogen, PT/PTT, Mg
  - Ferritin, CRP, ESR, PCT
  - LDH, Troponin, BNP
  - VWF, IL6
- All Patients should have the baseline investigations done, with the addition of Blood Grouping and Vitamin D level
- Medication Order Sheet
- **Figure 2:** Pharmacological management of patients with COVID-19 based on disease severity.
- Disclaimer
  - At present, no drug has been proven to be safe and effective for treating COVID-19. There are insufficient data to recommend either for or against the use of any antiviral or immunomodulatory therapy in patients with COVID-19 who have mild, moderate, severe, or critical illness
  - Guidelines are created based on best available evidence. Physicians should use this as a guide and depend on clinical and scientific judgment and individualizing of care
  - Physician should use this as a guide and depend on clinical and scientific judgment and individualizing of care
  - This guideline is subject to change based on more evidence and will be updated regularly whenever needed

Uncomplicated Infection (Upper Respiratory Tract Infection)

Definition:
- non-specific symptoms such as fever, cough, sore throat, nasal congestion, malaise, headache, muscle pain.
- These patients do not have any signs of dehydration, sepsis or shortness of breath.
- Absence of signs of pneumonia

***Risk Factors**: any ONE of :
- Age ≥65 years
- Residence in a nursing home or long-term care facility
- Immunocompromising condition
- Chronic lung disease or moderate to severe asthma
- Cardiovascular disease (including hypertension)
- Severe obesity (body mass index [BMI] ≥40 kg/m2)
- Diabetes mellitus
- Chronic kidney disease (undergoing dialysis)
- Cerebrovascular disease
- Chronic liver disease
- Tobacco use disorder

Immediately implement strict infection control measures

Supportive care:
- IVF
- Antipyretics (Avoid NSAID)
- Symptomatic care

Consider the use of Zinc, Vitamin C and Vitamin D
Consider Thromboprophylaxis with **low molecular weight heparin (LMWH)** if not contraindicated (page 81)
Consider using **Ritonavir-boosted nirmatrelvir (Paxlovid)** (page 110)
Regular laboratory investigations for individuals with risk factors*

Baseline investigations :
- ECG, Chest Xray/ Ultrasound chest
- CBC, Urea/Electrolytes, Creatinine, LFT
- Blood Group and Vitamin D
- CRP, LDH, ESR, D-Dimer, Ferritin, PCT (and Respiratory panel PCR if available)

Investigations:

Risk stratification and prognostic markers (Daily for individuals with risk factors)
- D-dimer, Fibrinogen, PT/PTT, Mg
- Ferritin, CRP, ESR, PCT
- LDH, Troponin, BNP
- VWF, IL6

Guidelines are created based on best available evidence.
Physicians should use this as a guide and depend on clinical and scientific judgment and individualizing of care

Pneumonia

Definition

Pneumonia:

Patient with pneumonia and no signs of severe pneumonia.
Child with non-severe pneumonia has cough or difficulty breathing + tachypnea

Severe Pneumonia:

Adolescent or adult:
fever or suspected respiratory infection, **plus** one of

- Respiratory rate >30 breaths/min
- Severe respiratory distress
- SpO2 <93% on room air
- Lung infiltrates >50% of the lung field within 24- 48 hours
- Ferritin >500 ug/L; Ddimer >1mg/L ; CRP>100mg/L ; LDH>245 U/L ; Elevated Troponin

Child with cough or difficulty in breathing, **plus** at least one of the following:

- Central cyanosis
- SpO2 <93%;
- Severe respiratory distress (e.g. grunting, very severe chest indrawing);
- Signs of pneumonia with a general danger sign:
- Inability to breastfeed or drink,
- lethargy or unconsciousness, or convulsions.
- Other signs of pneumonia may be present: chest indrawing and tachypnea.

Immediately implement strict infection control measures (refer to Figure 2)

Pneumonia

- ICU Consultation and ICU care if necessary
- **Supportive care:**
  - IVF
  - Antipyretics (Avoid NSAIDS) and Symptomatic care
  - Oxygen (keep saturation >94%, start with 5L)
- Consider the use of Zinc, Vitamin C and Vitamin D
- **Remdesivir** (refer to page 86)
- **Ritonavir-boosted nirmatrelvir (Paxlovid)** (page 110)
- **Tocilizimab** (refer to page 86)
- **Dexamethasone or Methylprednisolone** (if evidence of hypoxia)
- **LMWH/UFH** if not contraindicated (refer to page 81)
- Rule out other causes of pneumonia and PE

Severe Pneumonia

- ICU Consultation and ICU care
- **Supportive care:**
  - IVF, Antipyretics (Avoid NSAIDS) and Symptomatic care
  - Oxygen (keep saturation >94%, start with 5L)
  - Ventilatory support if needed
- **Remdesivir** (refer to page 86)
- **Tocilizimab** (refer to page 86)
- **Dexamethasone or Methylprednisolone** (if evidence of hypoxia)
- Consider the use of **Tocilizumab** (if fitting criteria)
- **LMWH/UFH** if not contraindicated (refer to page 81)
- Rule out other causes for pneumonia and PE

Baseline investigations :

- ECG, Chest Xray/Ultrasound chest
- CBC, Urea/Electrolytes, Creatinine, LFT
- CRP, LDH, ESR, D-Dimer, Ferritin, PCT
- Blood group and Vitamin D
- and Respiratory panel PCR (if available)

Investigations:

Risk stratification and prognostic markers (q12hr)

- D-dimer, Fbrinogen, PT/PTT, Mg
- Ferritin, CRP, ESR,PCT
- LDH, Troponin, BNP
- VWF, IL6

Daily: CBC, Biochemistry, ECG

Guidelines are created based on best available evidence.
Physicians should use this as a guide and depend on clinical and scientific judgment and individualizing of care

Acute Respiratory Distress Syndrome (ARDS)

Definition

Onset: new or worsening respiratory symptoms within one week of known clinical insult.

Chest imaging (radiograph, CT scan, or lung ultrasound): bilateral opacities, not fully explained by effusions, lobar or lung collapse, or nodules.

Origin of edema: respiratory failure not fully explained by cardiac failure or fluid overload. Need objective assessment (e.g. echocardiography) to exclude hydrostatic cause of edema if no risk factor present.

Oxygenation (adults):

- Mild ARDS: 200 mmHg < PaO2/FiO2 ≤ 300 mmHg (with PEEP or CPAP ≥5 cmH2O,
- Moderate ARDS: 100 mmHg < PaO2/FiO2 ≤200 mmHg with PEEP ≥5 cmH2O
- Severe ARDS: PaO2/FiO2 ≤ 100 mmHg with PEEP ≥5 cmH2O,
- When PaO2 is not available, SpO2/FiO2 ≤315 suggests ARDS (including in non-ventilated patients)

Oxygenation (children):

- Bilevel NIV or CPAP ≥5 cmH2O via full face mask: PaO2/FiO2 ≤ 300 mmHg or SpO2/FiO2 ≤264
- Mild ARDS (invasively ventilated): 4 ≤ OI < 8 or 5 ≤ OSI < 7.5
- Moderate ARDS (invasively ventilated): 8 ≤ OI < 16 or 7.5 ≤ OSI < 12.3
- Severe ARDS (invasively ventilated): OI ≥ 16 or OSI ≥ 12.3

OI= Oxygenation Index and OSI = Oxygenation Index using SpO2

Immediately implement strict infection control measures

- ICU Consultation and ICU care
- **Supportive care:**
  - IVF, Antipyretics (Avoid NSAIDS) and Symptomatic care
  - Oxygen (keep saturation >94%, start with 5L)
  - Ventilatory support if needed
- **Remdesivir**
- **Dexamethasone or Methylprednisolone** (if evidence of hypoxia)
- Consider the use of **Tocilizumab** (if fitting criteria)
- **LMWH/UFH** if not contraindicated (refer to page 81)
- Rule out other causes for pneumonia and treat accordingly
- Rule out the possibility of PE incase of worsening hypoxia

Baseline investigations :

- ECG, Chest Xray/ Ultrasound chest
- CBC, Urea/Electrolytes, Creatinine, LFT
- CRP, LDH, ESR, D-Dimer, Ferritin, PCT
- Blood Group and Vitamin D
- and Respiratory panel PCR (if available)

Investigations

Risk stratification and prognostic markers (q12hr)

- D-dimer, Fbrinogen, PT/PTT, Mg
- Ferritin, CRP, ESR,PCT
- LDH, Troponin, BNP
- VWF, IL6

Daily: CBC, Biochemistry, ECG

Consider ruling out PE (by echo or CTPA)

Guidelines are created based on best available evidence.
Physicians should use this as a guide and depend on clinical and scientific judgment and individualizing of care

Thromboprophylaxis dosing schedule

D-Dimer level (mcg/ml)	Weight (kg)	LMWH dose
<1	<100kg	Enoxaparin 40mg SC once daily
	100 – 150kg	Enoxaparin 40mg SC twice daily
	>150kg	Enoxaparin 60mg SC twice daily
>1	<100kg	Enoxaparin 40mg SC twice daily
	100 – 150kg	Enoxaparin 80mg SC twice daily
	>150kg	Enoxaparin 120mg SC twice daily

Empiric therapeutic anticoagulation in critical ill patient may be linked with increase complications. However, it is likely to be beneficial for moderate to severe cases. The choice and dose of Heparin should be adjusted based on creatine clearance, refer to your hospital protocol.

Clinician should weigh the potential benefit and harms based on the most up to date available evidence REFERENCE

Oxygenation and Ventilation

- For adults with COVID-19 and acute hypoxemic respiratory failure despite conventional oxygen therapy, high-flow nasal cannula (HFNC) oxygen is recommended over noninvasive positive pressure ventilation (NIPPV)
- Consider awake prone positioning to improve ventilation, if possible
- Incentive Spirometry if patient can perform
- Indirect evidence from other critical illnesses suggests the optimal oxygen target is an SpO2 between 92% and 96%
- Close monitoring for worsening respiratory status and intubation if necessary, in a controlled setting and by an experienced practitioner

Oxygenation and Ventilation

- For mechanically ventilated adults with COVID-19 and ARDS:
  - Use low tidal volume (Vt) ventilation (Vt 4–8 mL/kg of predicted body weight)
  - Target plateau pressures of <30 cm H2O
  - Use conservative fluid strategy over a liberal fluid strategy

- For mechanically ventilated adults with COVID-19 and moderate-to-severe ARDS:
  - Use a higher positive end-expiratory pressure (PEEP) strategy over a lower PEEP strategy

- For mechanically ventilated adults with COVID-19 and refractory hypoxemia despite optimizing ventilation, use prone ventilation for 12 to 16 hours per day

Antithrombotics in patients with COVID19

Hospitalized Patients	Patients for Home isolation
Laboratory Testing	
Measure coagulation markers (e.g.,CBC, D-dimers, prothrombin time, platelet count, fibrinogen) in Hospitalized patients.	There are currently no data to support the measurement of coagulation markers in non-hospitalized COVID-19 confirmed cases.
Venous Thromboembolism Prophylaxis and Screening:	
Hospitalized patient should be screened and VTE prophylaxis be initiated. Reference doses in page 81	Anticoagulants and antiplatelet therapy should not be initiated for prevention of venous thromboembolism (VTE) or arterial thrombosis unless there are other indications
Chronic Anticoagulant and Antiplatelet Therapy:	
Anticoagulant or antiplatelet therapies for underlying conditions should be continued unless there is need for switching to heparin	Patients who are receiving anticoagulant or antiplatelet therapies for underlying conditions should continue these medications if they receive a diagnosis of COVID-19
Special Considerations During Pregnancy	
Management of anticoagulation therapy in pregnant patients with COVID-19 is same as other conditions that require anticoagulation in pregnancy (40mg once daily) (Lexicomp, 2021).	If antithrombotic therapy is prescribed during pregnancy for another indication, this therapy should be continued if the patient receives a diagnosis of COVID-19 and is not admitted in hospital.
The D-dimer level may not be a reliable predictor of VTE in pregnancy, because there is a physiologic increase of D-dimer levels throughout gestation.	
Venous Thromboembolism Prophylaxis in children with COVID-19	
Pediatric patients admitted for COVID-19 who are moderately or severely ill be given VTE risk prophylaxis in accordance with existing institutional guidelines.	

Thromboprophylaxis post COVID 19 infection

- Extended thromboprophylaxis on discharge can be considered if the patient is at high risk of VTE and if risk of thrombosis outweight risk of bleeding

- The nature and duration of thromboprophylaxis in patients recovering from COVID-19 pneumonia is not clear but a standard prophylactic dose of LMWH or DOAC for **4 weeks** may be a reasonable approach.
  - Duration also depend on disease severity, bleeding risk, possibility of VTE and patient condition

- **Possible medications to be considered:**
  - Apixaban 2.5 mg BD
  - Rivaroxaban 15 mg OD
  - Clexane 40 mg SC OD

- **Risk factors for high risk of VTE**
  - Past history VTE
  - Known case of malignancy
  - Significantly reduced mobility
  - Critical care admission
  - Disease severity (e.g. need for MV, NIV, or high oxygen requirements (e.g. PaO2/FiO2 ≤40 kPA (300 mmHg)) during admission
  - D-dimer >1 mcg/ml

- **Important Considerations**
  - Bleeding risk to be evaluated, the risk of VTE should be outweigh the risk of bleeding.
  - Renal function should be checked before starting patient on DOAC.
  - Drug interaction needs to be reviewed.
  - Coagulation profile and platelet count need to be reviewed before starting patient on thromboprophylaxis

Reference: BTS Guidance on Venous Thromboembolic Disease in patients with COVID-19 Updated 4 May 2020

COVID19 Medications and Dosage

Drugs	Dose
Zinc	50mg Oral Once daily
Vitamin C	1g Oral once daily
Vitamin D (dependig of patients Vitamin D levels)	2000 to 4000 iU daily or 50,000 iU weekly (With Ca+2 monitoring twice a week) or Can also consider dosing related to Vitamin D Level • Serum 25(OH)D 20 to 30 ng/mL: 2000- 4000 iU once daily • Serum 25(OH)D<20 ng/ml: 50,000 iU per day for 7 days with Rechecking level at Day 7. Adjust the dose based on Vit D level **Reference**
Remdisivir	Adult dose: • Day 1: 200mg IV Once Daily • Days 2 to 5: 100mg IV Once Daily *may extend for up to 5 additional days in patients who do not demonstrate clinical improvement.*
Dexamethasone	6mg IV OD for 5-10 days For pregnant: consider prednisolone 40mg OD or 20mg BID Reference Equivalent to Dexamethasone: Prednisolone 40mg or Methylprednisolone 32mg or Hydrocortisone 160mg
Tocilizumab (refer to page 89)	The initial dose is 4-8mg/kg (recommended dose of 400mg diluted with 0.9% normal saline to 100ml). If the initial medication is not effective, one extra administration can be given after 12 hours (same dose as before). No more than two administrations should be given, with the maximum single dose no more than 800mg. The infusion time should be more than 1 hour. Contraindicated for people with active infections such as tuberculosis. Avoid using with interferon
Ritonavir-boosted nirmatrelvir (Paxlovid)	≥12 years and weighing ≥40 kg: nirmatrelvir 300 mg plus ritonavir 100 mg (oral) twice daily for 5 days. • Significant hypersensitivity • Coadministration with drugs that are highly dependent on CYP3A s per clinical pharmacist
Baricitinib	Consider Remdesivir and Baricitinib (once available) Adult Dosing: Remdesivir 200 mg loading dose (IV, within 30 min), followed by 100 mg once Plus Baricitinib 4 mg (oral) once daily for 5 days. Pediatric dosing for Remdesivir <40 kg: 5 mg/kg IV load, then 2.5 mg/kg q24h ≥40 kg: 200 mg IV load, then 100 mg IV q24h Plus Pediatric dosing for Baricitinib ≥ 9 years: 4 mg (oral) once daily for 5 days. 2 - 9 years: 2 mg (oral) once daily for 5 days.

Remdesivir Treatment Protocol

Category	Details
Dose	Adult dose: • Day 1: 200mg IV Once Daily • Days 2 to 5: 100mg IV Once Daily Pediatric dose: *weight-based dosing 3.5 ≥40* • Day 1: 5 mg/kg IV Once Daily • Days 2 to 5: 2.5 mg/kg IV Once Daily General comments: For patients **not requiring** invasive mechanical ventilation and/or ECMO, recommended total treatment duration is **5 days**; if patients do not demonstrate clinical improvement, treatment may be extended for up to **5 additional days** (i.e., up to a total treatment duration of 10 days). For those **requiring** invasive mechanical ventilation and/or ECMO, recommended total treatment duration is **10 days**.
Contraindications	• Hypersensitivity to Remdesivir or any component of the formulation. • Patients with ALT ≥5 times the ULN (upper limit of normal) at baseline. • Renal impairment. (eGFR <30)
Monitoring	• Serum Creatinine, • Biochemical profile • Liver Function tests: ALT, AST, ALP, Bilirubin
Adverse Reactions	• Increased serum glucose • Fever • Infusion reactions

Dexamethasone Treatment Protocol

Category	Details
Dose	Adult dose: 6-12mg IV OD for 5 -10 days or until discharge
Monitoring	• Serum K, Glucose, sugars • Blood pressure, hemoglobin • Occult blood loss • WBC and Neutrophil count
Adverse effects	• Hypertension • Hyperglycemia • Gastric perforation
Precautions:	**Cardiovascular disease:** Use with caution in patients with heart failure and/or hypertension/ following acute myocardial infarction **Diabetes:** More frequent monitoring and dose titration of Anti-diabetic medications **Gastrointestinal disease:** Use with caution in patients with GI diseases (diverticulitis, fresh intestinal anastomoses, active or latent peptic ulcer, ulcerative colitis, abscess or other pyogenic infection) due to perforation risk. **Myasthenia gravis:** exacerbation of symptoms has occurred especially during initial treatment with corticosteroids. **Seizure disorders:** Seizures have been reported with adrenal crisis.
Contraindication	Hypersensitivity to dexamethasone or any component of the product Systemic fungal infection Concomitant use of more than a single dose of dexamethason with rilpivirine

Tocilizumab

- Tocilizumab can be given in COVID19 in the presence of severe cytokine storm
- Criteria of Severe Cytokine Syndrome:
  1. **<u>It should be used with Dexamethasone 6-12mg (NHS, ASHP)</u>**
  2. A Maximum of two **Tocilizumab** doses(each of 800mg) can be given at least 8 hours apart.
  3. AND Laboratory parameters supportive of cytokine storm including:
     - Serum IL-6 at least 3 X ULN; OR
     - Ferritin >300 ug/L (or surrogate) with doubling within 24 hours; OR
     - Ferritin > 600 ug/L at presentation with LDH >250 U/L; OR
     - Elevated D-dimer (> 1 mg/L).
     - CRP ≥75 mg/L or >50 but doubled in past 48 hours
  4. AND Rapidly worsening gas exchange within 24hrs requiring >6 L/min or HFNC, or O2 sats <93% (NHS, NIH ASHP)

<u>Avoid use</u>

- Avoid use in patients with platelets <50,000 and those with ANC <1,000
- Known hypersensitivity to tocilizumab or any component of the formulation
- Active infections, interrupt the treatment in case of developing severe infection.
- Patient with decompensated cirrhosis
- A baseline alanine aminotransferase (ALT) or aspartate aminotransferase (AST) more than 5 times the upper limit of normal.
- A pre-existing condition or treatment resulting in ongoing immunosuppression. (NHS, NIH)

(Recovery and REMAP –CAP)

References and Further Reading

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الحملة الوطنية
لمكافحة
فيروس كورونا
(COVID-19)

COVID-19 Multisystem Inflammatory Disease in Children

Background

- Children compromise a small percentage of symptomatic SARS-COV-2 cases, even with symptoms children are usually reported to have mild to moderate symptoms.
- Recent reports have shown rare cases of systemic inflammation associated temporarily with SARS-COV-2.
- Children with this condition present with fever and hyper-inflammation, and may also have features of Kawasaki disease (KD), features of Toxic Shock Syndrome (TSS), or with acute gastrointestinal symptoms mimicking appendicitis.
- This can further develop into life threatening shock with single or multi-system dysfunction and require admission into critical care.
- A temporal association is clear, and the onset of PIMS/MIS-C typically follows 3 to 6 weeks after the peak of a COVID-19 outbreak in the local population.
- Studies have shown that most children test negative for SARS-COV-2 by PCR from nasopharyngeal swabs, however 80-100% tested positive to SARS-COV-2 antibodies.

Case Definition

- Case definition varies between institutes and its important to be aware of all

Category	RCPCH	CDC	WHO	CPSP
Age	Child	<21years	0 to 19 years	<18 years
Length of fever	Not specified	≥ 24hr	≥3days	≥3days
Evidence of inflammation	Yes	Yes	Yes	Yes
Multisystem	Single organ or multisystem	≥ 2 systems involved	≥ 2 systems involved	Implied, but not specified
Exclude other causes	Yes	Yes	Yes	Yes
SARS-CoV2 PCR or Antibody or exposure	Not necessary	Necessary	Necessary	Necessary

RCPCH: Royal College of Pediatrics and Child Health
CPSP: Canadian Pediatric Surveillance Program

Presentation

	Classic pre-pandemic KD	PIMS/MIS-C
Average age at presentation (years)	<5	7 to 9
Ethnicity	East Asian +	African, Afro-Caribbean +
Gastrointestinal symptoms	+	+++
Cardiac dysfunction	+	+++
Coagulopathy	+	++
Shock	+	++
Macrophage activation syndrome	+	++
Markedly elevated CRP	++	++++
Elevated ferritin	+	++
Elevated D-dimers	+	++
Elevated cardiac biomarkers (NT-proBNP, troponin)	+	++
Thrombocytopenia	rare	++
Coronary artery abnormalities	++	+

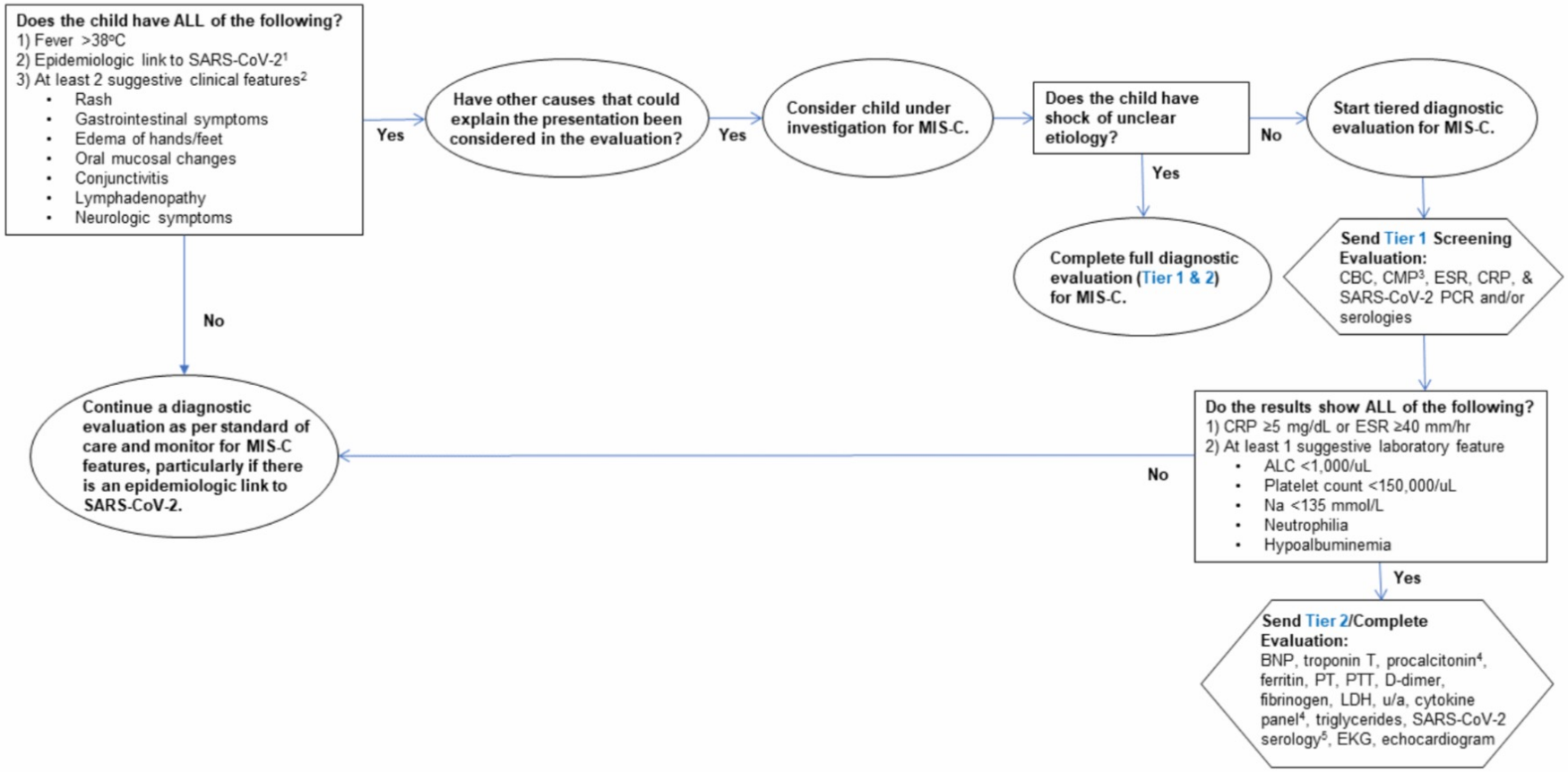
Presentation

- The hallmark of PIMS/MIS-C is fever >3 days that is unexplained by other causes, evidence of systemic inflammation, and a temporal association with COVID-19.
- The clinical presentation is fever with hyper-inflammation with features of Kawasaki Disease or features of Toxic Shock Syndrome with signs of shock or shock-like state with hypotension or poor perfusion and myocardial dysfunction, or GI distress, or neurological symptoms (like neck stiffness, lethargy, and altered mental status)
  - see appendix Table A and Table B for features of KD and TSS

- PIMS/MIS-C shares many symptoms with KD. A few major differentiating features are
  - PIMS/MIS-C has GI symptoms (rare in classic KD) and more severe myocarditis and cardiac dysfunction.
  - GI symptoms at presentation have been prominent in all case series reported to date and included features of an acute abdomen, with vomiting, diarrhea, and severe pain, but have rarely prompted surgical intervention.
  - While the major cardiac morbidity associated with KD is the development of coronary artery aneurysms, children with PIMS/MIS-C have presented with severe myocarditis and cardiogenic shock.

Evaluation

- Early diagnosis is essential to provide the required care



1An epidemiologic link to SARS-CoV-2 infection is defined as a child with ANY of the following criteria: positive SARS-CoV-2 polymerase chain reaction (PCR), positive SARS-CoV-2 serologies, preceding illness resembling COVD-19, or close contact with confirmed or suspected COVID-19 cases in the past 4 weeks.
2Rash, (polymorphic, maculopapular, or petechial, but not vesicular); GI symptoms, (diarrhea, abdominal pain, or vomiting); oral mucosal changes, (red and/or cracked lips, strawberry tongue, or erythema of the oropharyngeal mucosa); conjunctivitis, (bilateral conjunctival injection without exudate); neurologic symptoms, (altered metal status, encephalopathy, focal neurologic deficits, meningismus, or papilledema).
3Complete metabolic panel: Na, K, CO2, Cl, BUN, Cr, glucose, Ca, albumin, total protein, AST, ALT, ALP, Bilirubin. 4Send procalcitonin and cytokine panel, if available.
5If not sent in tier 1 evaluation. If possible, send SARS-CoV-2 IgG, IgM, IgA.

Management of MIS-C involves:

- Immunomodulatory treatment in MIS-C
- Antiplatelet and anticoagulation therapy in MIS-C
- Cardiac management of MIS-C
- Immunomodulatory treatment in children with acute symptoms of COVID-19 (respiratory symptoms of SARS-CoV2)

- Details on management provided in appendix

- **Further management:** https://www.rheumatology.org/Portals/0/Files/ACR-COVID-19-Clinical-Guidance-Summary-MIS-C-Hyperinflammation.pdf

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(COVID-19)

Appendix

Pharmacological Management of Outpatients With COVID-19 Based on Disease Severity

Figure (1)

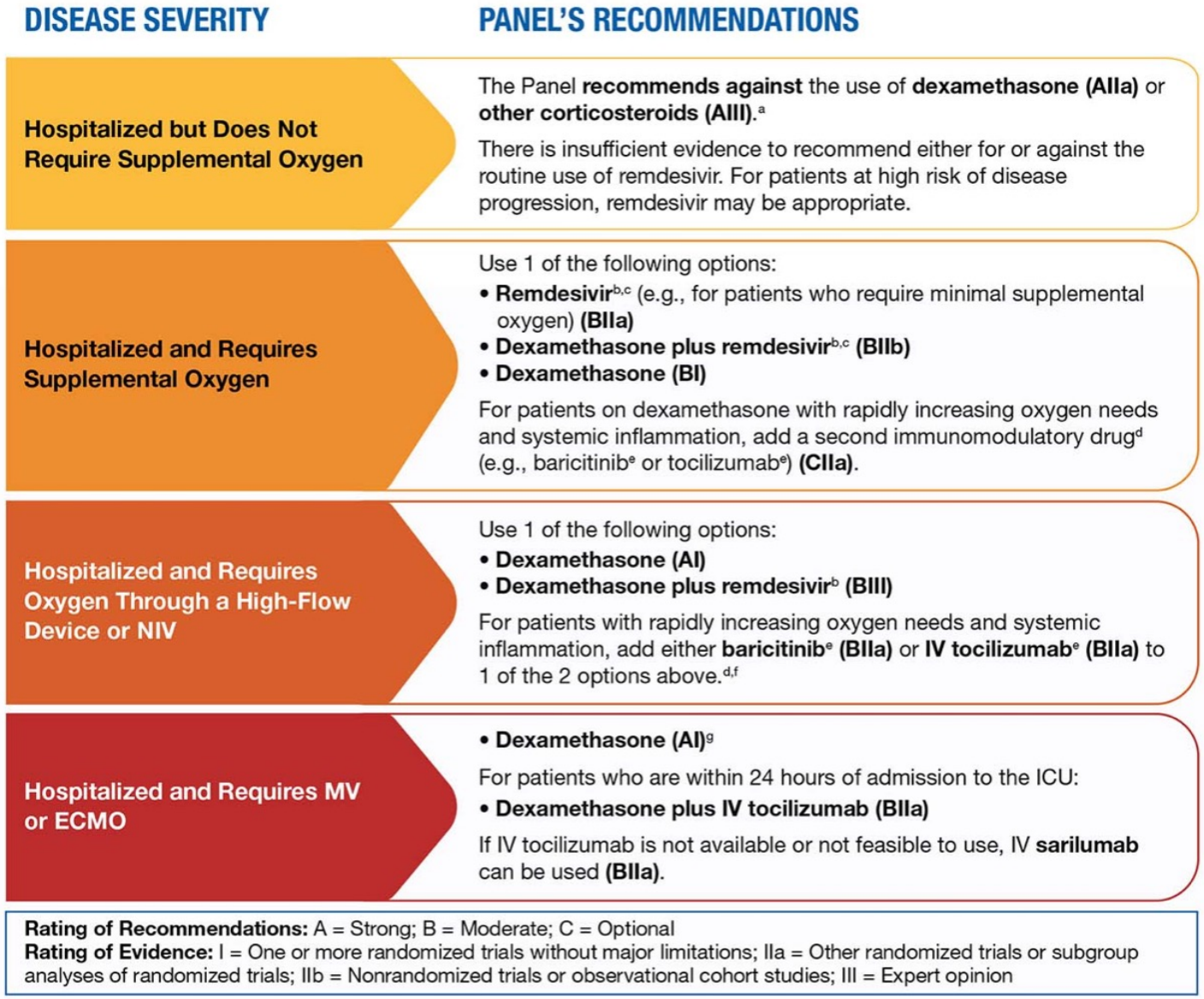
PATIENT DISPOSITION	PANEL'S RECOMMENDATIONS
Not Requiring Hospitalization or Supplemental Oxygen, As Determined by a Health Care Provider During an ED, In-Person, or Telehealth Visit	Provide symptomatic management for patients who are not at high risk of disease progression. For patients who are at high risk of progressing to severe COVID-19 (treatments are listed in order of preference, based on efficacy and convenience of use): • **Ritonavir-boosted nirmatrelvir (Paxlovid)**; *or* • **Sotrovimab**; *or* • **Remdesivir**; *or* • **Molnupiravir** The Panel **recommends against** the use of **dexamethasone** or **other systemic glucocorticoids** in the absence of another indication **(AIII)**.[a]
Discharged From Hospital Inpatient Setting in Stable Condition and Does Not Require Supplemental Oxygen	The Panel **recommends against** continuing the use of **remdesivir (AIIa)**, **dexamethasone (AIIa)**, or **baricitinib (AIIa)** after hospital discharge.
Discharged From Hospital Inpatient Setting and Requires Supplemental Oxygen *For those who are stable enough for discharge but who still require oxygen*[b]	There is insufficient evidence to recommend either for or against the continued use of remdesivir, dexamethasone, and/or baricitinib. Review the text below when considering the use of any of these agents after hospital discharge.
Discharged From ED Despite New or Increasing Need for Supplemental Oxygen *When hospital resources are limited, inpatient admission is not possible, and close follow-up is ensured*[c]	The Panel recommends using **dexamethasone** 6 mg PO once daily for the duration of supplemental oxygen (dexamethasone use **should not** exceed 10 days) with careful monitoring for AEs **(BIII)**. There is insufficient evidence to recommend either for or against the use of remdesivir. When considering the use of remdesivir, review the text below for more information. The Panel **recommends against** the use of **baricitinib** in this setting, except in a clinical trial **(AIII)**.

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

https://www.covid19treatmentguidelines.nih.gov/management/clinical-management/nonhospitalized-adults--therapeutic-management/

Pharmacological Management of Inpatients With COVID-19 Based on Disease Severity

Figure (2)



https://www.covid19treatmentguidelines.nih.gov/management/clinical-management/hospitalized-adults--therapeutic-management/

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Management of MIS-C

Immunomodulatory treatment in MIS-C

- A stepwise progression of immunomodulatory therapies should be used to treat MIS-C with IVIG and/or glucocorticoids considered as first tier treatments (M/H).
- High dose IVIG (typically 1-2 gm/kg) may be considered for treatment of MIS-C. Cardiac function and fluid status should be assessed in MIS-C patients with shock before IVIG treatment is provided, and IVIG should be administered when cardiac function is restored. (M/H).
- Low-moderate dose glucocorticoids may be considered for treatment of MIS-C. High dose, IV pulse glucocorticoids may be considered to treat patients with life-threatening complications, such as shock, and specifically, if a patient requires high dose or multiple inotropes and/or vasopressors (M/H).
- Anakinra (IV or SQ) may be considered for treatment of MIS-C refractory to IVIG and glucocorticoids or in patients with contraindications to these treatments (M/H).
- Serial laboratory testing and cardiac assessment should guide immunomodulatory treatment response and tapering. Patients will often require a 2-3-week taper of immunomodulatory medications (H).

Antiplatelet and anticoagulation therapy in MIS-C

- Low dose aspirin (3-5 mg/kg/day; max 81 mg/day) should be used in patients with MIS-C and KD-like features and/or thrombocytosis (platelet count ≥450,000/μL) and continued until normalization of platelet count and confirmed normal coronary arteries at ≥4 weeks after diagnosis. Treatment with aspirin should be avoided in patients with a platelet count ≤80,000/μL (M).
- MIS-C patients with CAAs and a maximal z-score of 2.5-10.0 should be treated with low dose aspirin. Patients with a z-score ≥10.0 should be treated with low dose aspirin and therapeutic anticoagulation with enoxaparin (factor Xa level 0.5-1.0) or warfarin (M/H).
- Patients with MIS-C and documented thrombosis or an ejection fraction (EF) <35% should receive therapeutic anticoagulation with enoxaparin until at least 2 weeks after discharge from the hospital (H).
- Indications for longer outpatient therapeutic enoxaparin dosing include: CAA with z-score >10.0 (indefinite treatment), documented thrombosis (treatment for ≥3 months pending thrombus resolution), or ongoing moderate to severe LV dysfunction (H).
- For MIS-C patients who do not meet the above criteria, the approach to antiplatelet and anticoagulation management should be tailored to the patient's risk for thrombosis (H).

Cardiac management of MIS-C:

- Patients with MIS-C and abnormal BNP and/or troponin T at diagnosis should have these laboratory parameters trended over time until they normalize (H).
- EKGs should be performed at a minimum of every 48 hours in MIS-C patients who are hospitalized and during follow-up visits. If conduction abnormalities are present, patients should be placed on continuous telemetry while in the hospital, and Holter monitors should be considered during follow-up (M/H).
- Echocardiograms conducted at diagnosis and during clinical follow-up should include evaluation of ventricular/valvar function, pericardial effusion, and coronary artery dimensions with measurements indexed to body surface area using z-scores (H).
- Echocardiograms should be repeated at a minimum of 7-14 days and 4-6 weeks after presentation. For those patients with cardiac abnormalities occurring in the acute phase of their illness, an echocardiogram 1 year after MIS-C diagnosis could be considered. Patients with left ventricular (LV) dysfunction and/or CAA will require more frequent echocardiograms (M/H).
- Cardiac MRI may be indicated 2-6 months after MIS-C diagnosis in patients who presented with significant transient LV dysfunction in the acute phase of illness (LV ejection fraction <50%) or persistent LV dysfunction. Cardiac MRI should focus on myocardial characterization including functional assessment, T1/T2 weighted imaging, T1 mapping and extracellular volume (ECV) quantification, and late gadolinium enhancement (H).
- Cardiac CT should be performed in patients with suspicion of distal CAAs that are not well seen on echocardiogram (M).

Immunomodulatory treatment in children with COVID-19 (Current acute symptoms of SARS-COV2):

- Children with severe respiratory symptoms due to COVID-19 with any of the following should be considered for immunomodulatory therapy: acute respiratory distress syndrome (ARDS), shock/cardiac dysfunction, substantially elevated lactate dehydrogenase (LDH), D-dimer, IL-6, IL-2R, CRP, and/or ferritin, and depressed lymphocyte count, albumin, and/or platelet count (M/H).
- Glucocorticoids may be considered for use as immunomodulatory therapy in patients with COVID-19 and hyperinflammation (as outlined in point above) (M).
- Anakinra appears safe in severe infections and in children with hyperinflammatory syndromes. In children with COVID-19 and hyperinflammation, anakinra (>4mg/kg/day IV or SQ) should be considered for immunomodulatory therapy. Initiation of anakinra before invasive mechanical ventilation may be beneficial (H).
- Children with COVID-19 treated with anakinra should be monitored for liver function test (LFT) abnormalities (M).
- Compared to standard care, tocilizumab may be effective in reducing mortality and ICU admission in patients with severe COVID-19 pneumonia and signs of hyperinflammation; however, patients treated with tocilizumab may be at higher risk for bacterial and fungal infections (M).
- When tocilizumab is used to treat children with COVID-19, weight-based dosing should be employed (<30kg: 12mg/kg IV; ≥30kg: 8mg/kg IV, max 800mg). Children treated with tocilizumab should be monitored for LFT abnormalities and elevated triglycerides (M/H).
- In the absence of randomized controlled trails or comparative effectiveness studies, if immunomodulation is to be used at all, the balance of risks and benefits suggests anakinra as first-line immunomodulatory treatment of children with COVID-19 and hyperinflammation. There is insufficient evidence to support the use of other immunomodulatory agents unless glucocorticoids

Multisystem Inflammatory Syndrome in Children (MIS-C)

Criteria for Management:

•- Patient aged < 21 years presenting with fever (>38.0°C for ≥24 hours, or report of subjective fever lasting ≥24 hours), laboratory evidence of inflammation (Including, but not limited to, one or more of the following: an

•elevated CRP, ESR, fibrinogen, procalcitonin, D-dimer, ferritin, LDH, or IL-6; elevated neutrophils; reduced lymphocytes; and low albumin), and evidence of clinically severe illness requiring hospitalization, with multisystem

•(≥2) organ involvement (cardiac, renal, respiratory, hematologic, gastrointestinal, dermatologic or neurological)

•- No alternative plausible diagnoses

•- Positive for current or recent SARS-CoV-2 infection by RT-PCR, serology, or antigen test; or COVID-19 exposure within the 4 weeks prior to the onset of symptoms

Immunomodulatory treatment in children with COVID-19 (Current acute symptoms of SARS-COV2):

COVID-19 Testing*	Category	Supportive Care	Pharmacotherapy	Precautions

Management:

There are no established therapies for COVID-19-associated CSS or MIS-C. These medications are to be used only with guidance from Rheumatology, Cardiology and Infectious Diseases. Patients who are being evaluated for immunomodulatory therapy should also be considered for antiviral therapy if they are not already receiving it.

- Supportive Care: Children with moderate to severe signs and symptoms should be admitted to the hospital. Admission to a pediatric intensive care unit is appropriate for children with hemodynamic instability (shock, arrhythmia), significant respiratory compromise, or other potentially life-threatening complications
- Thromboprophylaxis (see above section)
- Antiviral therapy (see above based of patient category)
- Immunomodulator Dosing and Monitoring

Immunomodulator	Dosing	Safety monitoring
IVIG with methylprednisolone see below table *"Medication Related Information"* MIS-C with or without features of Kawasaki disease or signs of myocardial dysfunction OR Severe or critical COVID-19 with evidence of CSS	- IVIG 2 g/kg + methylprednisolone at 0.8 to 1 mg/kg every 12 hours (maximum of 30 mg for 12 hours) for 5 days - IVIG 2 g/kg + methylprednisolone bolus of 15 to 30 mg/kg/d for 3 days	- Assess cardiac function and fluid status prior to giving to avoid fluid overload - Baseline renal function tests, urine output, IgG level, CBC - Monitor clinically for signs of hemolysis after first dose - Potential adverse reactions: anaphylaxis, - Infusion reaction, hemolysis, transaminitis, aseptic meningitis - Pulmonary adverse reactions; blood pressure (prior to, during, and following infusion); clinical response. - For patients at high risk of hemolysis (dose ≥2 g/kg, given as a single dose or divided over several days, and non-O blood type): Hemoglobin or hematocrit prior to and 36 to 96 hours post-infusion and again at 7 to 10 days post-infusion
Glucocorticoids MIS-C with features of shock or coronary artery dilation/aneurysm OR Severe or critical COVID-19 with evidence of CSS	- 1-2 mg/kg/day divided BID (prednisone, prednisolone, methylprednisolone) - 5 mg/m2 daily (dexamethasone)	*(see precautions above)*

Abbreviations:

ANC: Absolute neutrophil count, ARDS: Acute respiratory distress syndrome, COVID-19: Coronavirus Disease 2019, CBC: Complete Blood Count, CRP: C-Reactive Protein, ECMO: Extracorporeal Membrane Oxygenation, IL6: Interleukin 6, LFT: Liver Function Test, PCR: Polymerase Chain Reaction, ECG: Electrocardiogram, G6PD: Glucose-6-Phosphate Dehydrogenase, ACEI: Angiotensin-converting enzyme inhibitors, ARBs: Angiotensin II receptor blockers, MI: Myocardial infarction, MIS-C: Multisystem Inflammatory Syndrome in Children, CSS: Cytokine Storm Syndrome, mechanical ventilation (MV), noninvasive mechanical ventilation (NIV), high-flow nasal canula (HFNC), VTE : venous thromboembolism

Footnotes:

*Testing for SARS-COV2 virus shall be performed in accordance with published case definition by Saudi CDC guidelines.

$High risk patients have one or more: 1. Elderly (age > 65 years), 2. With underlying end organ dysfunction, 3. Diabetes, 4. History of cardiovascular disease, 5. History of pulmonary disease, 6. Immunocompromised, and/or 7. Pregnancy

References

- Canadian Pediatric Society
- Royal College of Pediatrics and Child Health
- American College of Rheumatology
- Saudi MoH Protocol

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COVID-19 Medication Order Sheet

Medication Order sheet for Adult COVID-19

Indicate choice by checking the box:

□ **Pregnancy test** for Hydroxychloroquine, Lopinavir/ritonavir, Ribavirin, or Favipiravir

□ **ECG monitoring 12-lead or telemetry**: (check all that apply per guideline): □ Baseline. □ 2 hours after Hydroxychloroquine dose. □ Daily. □ Every 48 hours

□ **Baseline tests**: CBC with differential, Blood Group and Vitamin D level, urea, creatinine, electrolytes serum glucose level, LFT, CRP, PCT, ESR, D-dimer, PT&PTT, Fibrinogen (repeat 24 - 48 hrs as indicated)

□ **Tests to assess complicated infection**: serum ferritin, LDH, triglycerides, serum lactate, Troponin-I, BNP, CK-MP, VWF and IL-6 *(repeat 24 - 48 hours as indicated)*

Medication	Dose	Contraindication	Monitoring
Vitamins			
□ **Zinc**	□ 50 mg daily	Hypersensitivity	• Serum copper • serum zinc • Alkaline phosphatase • Mental depression • taste acuity
□ **Vitamin C**	□ 1g daily	Non specific	• Renal function • Hb and CBC (in patients with G6PD)
□ **Vitamin D**	□ 50,000 unit's PO/NGT weekly or 2000/4000 PO/NGT Daily	No specific contraindications	Vitamin D level
Antipyretics			
□ **Paracetamol**	□ 325 - 650 mg q4-6 hr Or 1 g q 6hr Not Exceed 4 g/day	Hypersensitivity Severe hepatic impairment	Relief of fever

Medication Order sheet for Adult COVID-19

Medication	Dose	Contraindication	Monitoring
Antivirals			
□ **Remdesivir**	□200 mg iv day 1 then 100 mg daily for 9 days	• Hypersensitivity	• Baseline and daily (ALT, AST, Bilirubin, ALP) • serum creatinine and CrCl
□ **Ritonavir-boosted nirmatrelvir (Paxlovid)**	≥12 years and weighing ≥40 kg: nirmatrelvir 300 mg plus ritonavir 100 mg (oral) twice daily for 5 days.	• Significant hypersensitivity • Coadministration with drugs that are highly dependent on CYP3A	• As per clinical pharmacist
Anticoagulants			
□ **Enoxaparin**	□ 40 mg once daily Consider higher dose if D Dimer >1000 ng/ml	• Hypersensitivity • Active major bleeding	▪ Bleeding parameter ▪ Serum creatinine
□ **Heparin**	□ 5000 IUq 8-12 hr	• Hypersensitivity • Active major bleeding • HIT in the past 100 days	▪ Bleeding parameter
□ **Fondaparinux**	□ 2.5mg SC Daily	• Hypersensitivity • Active major bleeding	▪ Bleeding parameter

Medication Order sheet for Adult COVID-19

Medication	Dose	Contraindication	Monitoring
Steroids			
□ **Dexamethasone (For patients who require non- invasive or invasive ventilation):**	Adult dosing: **6 mg once daily** oral (liquid or tablet or IV for 5-10 days	■ **In pregnant or breastfeeding women**, prednisolone or IV Hydrocortisone 80 mg twice daily **should be us instead of Dexamethasone** ■ **Take precautions** when used with: Cardiovascular, diabetes, Gastrointestinal, Myasthenia graves and seizure patients	
□ **Methylprednisolone**	1 mg/kg/day (based on actual body weight divided in 2 doses) mg □ IV or □ PO/NGT BID for 3 days	■ (If severe hypoxia persists with continued supplemental oxygen requirement on day 3, extend to a total duration of 5 - 7 days)	
Statin			
□ **Atorvastatin**	□ 40 mg PO daily	If patient receiving Lopinavir/Ritonavir, then Atorvastatin 20 mg PO daily	
□ **Rosuvastatin**	□ 20 mg PO daily	If patient receiving Lopinavir/Ritonavir, then Rosuvastatin 10 mg PO daily	
Immunomodulators			
□ **Tocilizumab**	□ 4-8 mg/kg/dose. Maximum 2 doses □ 50-59 kg: 400 mg IV X 1 dose □ 60-85 kg: 600 mg IV X 1 dose □ >85 kg: 800 mg IV X 1 dose	Laboratory criteria for patient at high risk of developing cytokine storm: • Ferritin >500 mcg/l • Elevated D-Dimer > 1 mg • CRP>75-100 mg/dl • LDH >250 U/L • Lymphocyte count <0.8	
□ **Baricitinib**	Consider Remdesivir and Baricitinib (once available) • Adult Dosing: Remdesivir 200 mg loading dose (IV, within 30 min), followed by 100 mg once Plus Baricitinib 4 mg (oral) once daily for 5 days. • Pediatric dosing for Remdesivir • <40 kg: 5 mg/kg IV load, then 2.5 mg/kg q24h ≥40 kg: 200 mg IV load, then 100 mg IV q24h • Plus Pediatric dosing for Baricitinib • ≥ 9 years: 4 mg (oral) once daily for 5 days. 2 - 9 years: 2 mg (oral) once daily for 5 days.	• Hypersensitivity to Baricitinib or any component of formulation	• As per clinical pharmacist

Medication Order sheet for Adult COVID-19

Medication	Dose	Contraindication	Monitoring
Antibiotics ONLY for Community or Hospital Acquired Pneumonia :			
□ **Vancomycin**	15 mg/kg .....mg IV every.....hours	Vancomycin trough 30-minute pre 4th dose or 24 hours if renal impaired (target trough 15 - 20 mg/dl)	
□ **Azithromycin**	500 mg IV or PO Daily		
□ **Ceftriaxone**	1 or 2g IV Daily		
□ **Cefepime**	2 g IV q 8 hours:		
□ **Piperacillin/tazobactam**	___g IV q___hours		
□ **Meropenem**	___mg IV q___hours		

Medication Order sheet for Adult COVID-19

Medication	Dose	Contraindication	Monitoring
Monoclonal antibodies			

Sortovimab	• The dosage of sotrovimab is 500 mg of Sotrovimab. (One vial of sotrovimab (500 mg/8mL) - single dose.
	• Sotrovimab should be given as soon as possible aier positive results of direct SARS- CoV-2 viral testing and within 10 days of symptom onset. Sotrovimab must be diluted in 50 OR 100ml Normal Saline and administered as a single intravenous infusion of 500 mg over 30 minutes.
	• Dosage Adjustment in Specific Populations:
	• No dosage adjustment is recommended based on renal impairment, during pregnancy or while lactating.
	• No dosage adjustment is recommended in pediatric patients who weigh at least 40 kg and are 12 years of age and older.
		• Severe Covid
		• Passing of more than ten days since onset of symptom
			• Full sets of vital signs should be measured as follows:
			  • Pre-infusion.
			  • 15 minutes after start of infusion.
			  • End of infusion.
			• Patient should stay 60 minutes post completion of dose for observation and final sets of vitals will be taken before discharge.

Medication Order sheet for Adult COVID-19

Medication	Dose	Contraindication	Monitoring
Monoclonal antibodies			

Regen-Cov	• 600 mg of casirivimab and 600 mg of imdevimab administered together as a single intravenous infusion over a minimum of 20 minutes.
	• For COVID-19 Positive PCR: Regen-Cov should be given as soon as possible after positive results of direct SARS-CoV-2 viral testing and within 10 days of symptom onset.
	• For Post Exposure Prophylaxis: Regen-Cov should be given as soon as possible after exposure to an individual infected with SARS-CoV-2 and within 96 hours from time of exposure.
	• No dosage adjustment is recommended in pregnant or lactating women
	• No dosage adjustment is recommended in pediatric patients who weigh at least 40 kg and are older than 12 years of age.
	• No dosage adjustment is recommended in patients with renal impairment
		• Severe Covid
		• individuals with previous severe hypersensitivity reactions, including anaphylaxis, to Regen-COV
			• Full sets of vital signs should be measured as follows:
			  • Pre-infusion.
			  • 15 minutes after start of infusion.
			  • End of infusion.
			• Patient should stay 60 minutes post completion of dose for observation and final sets of vitals will be taken before discharge.

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ICU COVID-19 Rounds Template

ICU COVID-19 Rounds Template

ICU COVID-19 Rounds

General Information:

- Name:
- Age:
- Covid19 test date: CT Value:
- Comorbidities:
- Date of hospital admission:
- Immunocompromised:

Stages of COVID pneumonia:

On room air	stage 0
On NC	stage 1
FM	stage 2
NRBM	stage 3
BiPAP	stage 4
HFNC	stage 5
Ventilator	stage 6

Example:

Patient admitted at stage 0 and stepped up to stage 3 NRBM in 72 hours
OR
Patient Stepped up to Stage 4 BiPAP and with treatment stepped down to Stage 0 on room air in 6 days

Respiratory check list:

- **On conventional oxygen therapy**
  - Device: Nasal cannula / Venturi mask / Non-rebreather mask
  - Oxygen flow or FiO2
- **On High flow nasal cannula**
  - Date of initiation
  - Flow FiO2
  - Day 1: ROX index H2 Rox index H6 Rox index H12.
  - Daily Rox Index
- **On Non-invasive mechanical ventilation**
  - Date of initiation
  - Mode: CPAP BiPAP
  - PS PEEP FiO2
  - Tidal volume on BiPAP RR on BiPAP

- **On Invasive mechanical ventilation**
  - Date of intubation
  - Weight Hight Ideal Body weight
  - Mode of mechanical ventilation Volume controlled Pressure controlled CPAP-PS Other:
  - Vt Rate PEEP FiO2 I/E ratio
  - Plateau pressure Driving pressure
  - R/I ratio
  - Use of nitric oxide Date
  - Proning: Date
  - Recruitment manoeuvre: Date
  - Time to intubation:

ABG: pH PaO2 PaCO2 Bicarb Sat **PaO2/FiO2 ratio**
Chest X-ray:
CT scan (or CTPA):

- Peak PaCO2: how long:
- If peak inspiratory pressure above 42 how long:

Cardiovascular status

BP HR
Vasopressors/inotropes: Doses
Anti-hypertensive(s) Dose
Echocardiogram report
ECG
Central line (if any) Site
Arterial line (if any) Site
Cardiac arrest during same admission
Pupillary size and reaction
CVP
Medication

CNS dysfunction:

GIT

- Diet
- Stress ulcer prophylaxis
- Bowel motion
- Laxatives.
- Thiamine and multivitamin supplements.

Renal function:

Daily I/O balance Net I/O balance.
Diuretics (Y/N).
Renal replacement therapy:
- Type: Hemodliaysis SLED CRRT (CVVH/CVVHDF/SCUF)
- Ultrafiltration

VTE Prophylaxis/Therapeutic:

- LMWH
- Heparin
- Mechanical methods

Microbiology and inflammatory status:

- Cultures
- PCT, CRP
- LDH, Ferritin, 1L.6
- Antibiotic history

Sedation:

- Richmond-Agitation-sedation score (RASS)
- Muscle relaxants.
- Sedation.

Labs:

CDC recommendation regarding HCWs Quarantine and Isolation

CDC recommendation regarding HCWs Quarantine and Isolation

Work Restrictions for HCP With SARS-CoV-2 Infection and Exposures

"Up to Date" with all recommended COVID-19 vaccine doses is defined in Stay Up to Date with Your Vaccines | CDC

For more details, including recommendations for healthcare personnel who are iimmunocompromised, have severe to critical illness, or are within 90 days of prior infection, refer to Interim Guidance for Managing Healthcare Personnel with SARS-CoV-2 Infection or Exposure to SARS-CoV-2 (conventional standards) and Strategies to Mitigate Healthcare Personnel Staffing Shortages (contingency and crisis standards).

Work Restrictions for HCP With SARS-CoV-2 Infection

Vaccination Status	Conventional	Contingency	Crisis
Up to Date and Not Up to Date	10 days OR 7 days with negative test†, if asymptomatic or mild to moderate illness (with improving symptoms)	5 days with/without negative test, if asymptomatic or mild to moderate illness (with improving symptoms)	No work restriction, with prioritization considerations (e.g., types of patients they care for)

Work Restrictions for Asymptomatic HCP with SARS-CoV-2 Exposures

Vaccination Status	Conventional	Contingency	Crisis
Up to Date	No work restrictions, with negative test on days 1‡ and 5–7	No work restriction	No work restriction
Not Up to Date	10 days OR 7 days with negative test†	No work restriction with negative tests on days 1‡, 2, 3, & 5–7 (if shortage of tests prioritize Day 1 to 2 and 5-7)	No work restrictions (test if possible)

†Negative test result within 48 hours before returning to work

‡For calculating day of test: 1) for those with infection consider day of symptom onset (or first positive test if asymptomatic) as day 0; 2) for those with exposure consider day of exposure as day 0