National Taskforce for Combatting (COVID-19)

الحملة الوطنية لمكافحة فيروس كورونا (COVID-19)

وزارة الصحة
Ministry of Health

Bahrain COVID-19 National Protocol

V 12.5.4

Last review and update: 9h Jan 2024

Disclaimer:

- This protocol was originally prepared by the Bahrain COVID-19 National Task Force and updated by the Public health directorate, Governmental hospital and Royal Medical Services
- These recommendations will be changed frequently based on available evidence about the best practices in caring for novel Coronavirus 2019 (COVID-19) disease

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COVID-19 Case Definitions

Suspected cases

A person who meets the clinical OR epidemiological criteria

Clinical criteria

- Acute onset of fever AND cough OR
- Acute onset of ANY THREE OR MORE of the following signs or symptoms:

Fever, cough, general weakness/fatigue, headache, myalgia, sore throat, coryza, dyspnea, nausea/diarrhea/anorexia

OR

Epidemiological criteria

- Contact of a probable or confirmed case or linked to a COVID-19 cluster.

Confirmed cases

A person with a positive Nucleic Acid Amplification Test (NAAT), regardless of clinical criteria OR epidemiological criteria.

A person meeting clinical criteria AND/OR epidemiological criteria (suspect case A) with a positive professional-use or self-test SARS-CoV-2 Antigen-RDT

Note :

- False Negative results can be seen early during the infection.

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Contact of COVID-19 Definitions

Contact cases

A SARS-CoV-2 contact is a person who has had any one of the following exposures to a probable or a confirmed case of SARS-CoV-2 infection:

Face-to-face contact with a probable or confirmed case within 1 meter and for at least 15 minutes

OR

Direct physical contact with a probable or confirmed case

OR

Direct care for a patient with probable or confirmed COVID-19 disease without the use of recommended personal protective equipment (PPE)23

OR

- Other situations as determined by local health authorities based on local risk assessments.

Note :

- Contact tracing (testing and isolation) is not recommended in the current situation except with symptomatic contact where testing is advised and if positive to be treated as a COVID-19 case. Negative tests do not require further actions.
- Contact tracing for positive cases inside the health facility can be considered based in infection control personnel assessment

WHO-2019-nCoV-Surveillance-Case-Definition-2022.1-eng%20(1).pdf

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Definition of COVID-19 Reinfection

Confirmed Reinfection:

At any time, If an isolated virus is found by gene sequencing to be different from the previous infection it is a confirmed reinfection

Presumed Reinfection

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

Previous infection

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

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Visual Triage Checklist For Health Care Facilities

For early detection of suspected cases in any outpatient healthcare facility

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Visual Triage Checklist For Respiratory Illness

- 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, to identify suspected cases early

Risks	Score
A. Exposure risk	
Contact with a confirmed case of respiratory illness/COVID-19 in the last 14 days 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 **OR** Travel to a country of high-transmission of respiratory infections in the past 14 days	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, let the patient to wear a mask, inform physician for assessment and test for COVID-19

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COVID-19 Risk Assessment and Stratification

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COVID-19 Risk Assessment For Confirmed Or Suspected COVID-19 Cases

Sign and Symptoms	Mild Home isolation	Moderate to Severe: Transfer to A/E
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 the patient has mild symptoms, sick leave can be issued from the health facility based on the patient's clinical evaluation and to be assessed for eligibility for COVID-19 treatment

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COVID-19 Testing Protocol

COVID-19 Molecular, Serology and Antigen Tests

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Testing For Suspected COVID-19 Cases In Governmental And Private Hospitals And Clinics

Suspected Case

As per COVID-19 case definition

1. **Isolation**
2. **Collect Nasopharyngeal swab**
3. **PCR / RADT testing**
4. **If negative, continue usual inpatient care**

Suspected cases

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

Clinical criteria

• Acute onset of fever AND cough (ILI)

OR

• Acute onset of ANY THREE OR MORE of the following signs or symptoms: fever, cough, general weakness/fatigue, headache, myalgia, sore throat, coryza, dyspnea, nausea/diarrhea/anorexia

OR

Epidemiological criteria

• Contact of a probable or confirmed case, or linked to a COVID-19 cluster

Note :

- False Negative results can be seen early during the infection. The peak of viral shedding appears 3 to 5 days after the onset of the disease.
- If the nucleic acid test is negative at the beginning, and the case is suspected, to test for COVID-19 in subsequent days.
- If a patient is admitted with SARI (fever, cough, with 10 days) test for other causes (influenza –RSV)

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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, deep tracheal aspirate (DTA), mid-turbinate swab, anterior nasal swab, saliva

  Serology: blood

Molecular and RADT are acceptable in the Kingdom of Bahrain to diagnose *SARS-Cov2*

Molecular Testing (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 COVID-19 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, and dental procedures; Non-surgical interventions like bronchoscopy, upper GI endoscopy, and dialysis

All the above categories can also be tested using RADT

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Serology Testing for *SARS-CoV2*

- Antibody testing is not recommended for the diagnosis of acute infection
  - Antibody tests are not authorized for diagnostic purposes
- Antibodies start developing within 1 to 3 weeks after infection
  - IgM and IgG antibodies arise nearly simultaneously, and it is 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
- False positive result can be expected in a population with low prevalence of COVID-19 (<5% of the population affected)
- Serologic assays may be used to support clinical assessment of a person who present late in their illness, in conjunction with viral molecular tests

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Antigen Testing for *SARS-CoV2*

- 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
- Antigen tests for SARS-CoV-2 are generally less sensitive than molecular tests but can return results in approximately 15-20 minutes
- 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

For surveillance purposes
The minimum testing rate that should be maintained is one person tested per 1000 population per week

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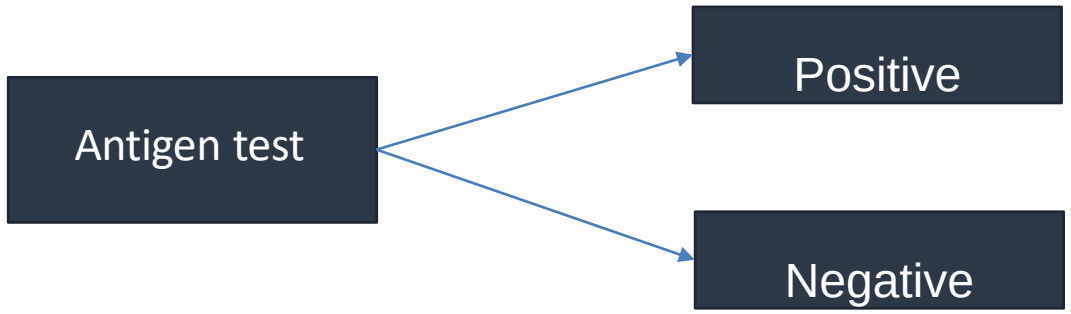
Rapid Antigen Detection Tests Interpretation

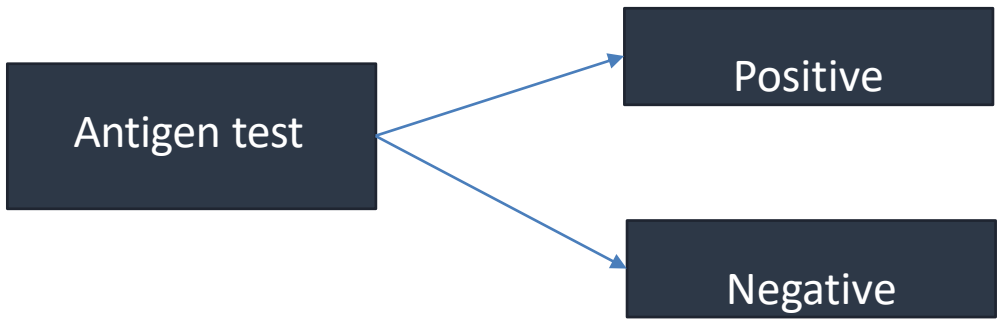
- **For Symptomatic* individuals:**



Symptomatic individuals are advised to isolate as advised by physician

- Can repeat the test if the symptom persists
- Advised to wear a mask to stop spreading the infection (other respiratory illnesses)

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



- Advised to wear a mask to stop spreading the infection and to self-isolate when develop symptoms

- No further action required

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

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Admissions*

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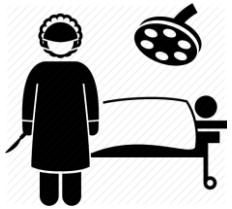

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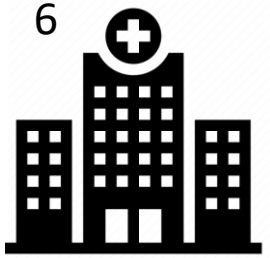

(Stable symptomatic patients in Emergency Room and health centers)

- ❑ The antigen test (RADT) can be used to screen admitting patients to the hospital.
- ❑ All admitted or patients undergoing surgical procedures can be tested using RADT, If the results are negative but the patient is exhibiting flu-like symptoms, confirm it with a molecular test (Multiplex-PCR / RT-PCR or NAAT)

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Vaccination Status Categorization

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Currently Available COVID-19 Vaccine In Bahrain

	Dose presentation	Number of doses/boosters	Route /site of administration	Recommended age group
Inactivated SARS-CoV2 (Valneva)	10 doses/vial To be discarded after 6 hours from opening the vial.	Two doses 28 days apart and as a booster dose for certain categories.	**0.5 ml** Administered intramuscularly in the deltoid muscle.	18 years and older.
Pfizer-BioNTech COVID-19 vaccine, (Monovalent XBB.1.5) **Adult formulation** (Dark gray cap)	6 doses/vial **Ready to use.** To be discarded after 12 hours from opening the vial.	Single dose for previously unvaccinated individual and as Booster dose.	**0.3 ml** Administered intramuscularly in the deltoid muscle.	12 years and older.
Pfizer-BioNTech COVID-19 vaccine, (Monovalent XBB.1.5) **Child formulation** (Blue cap vial)	6 doses/vial **Ready to use.** To be discarded after 12 hours from opening the vial.	Single dose for previously unvaccinated individual.	**0.3 ml** Administered intramuscularly in the deltoid muscle.	5 years to 11 years.
Pfizer-BioNTech Bivalent (original and omicron BA.4/BA.5). **Adult formulation**	6 doses/vial. To be discarded after 12 hours from opening the vial.	Single dose for previously unvaccinated individual and as Booster dose.	**0.3 ml** Administered intramuscularly in the deltoid muscle.	12 years and older.

Inactivated SARS- COV 2 vaccine by "Valneva". Can be administered as primary series and as a booster dose to individuals from the age of 18 years and above.

Pfizer-BioNTech COVID-19 vaccine, (Monovalent XBB.1.5) adult formulation Administered to any individuals from 12 years of age and above as single dose for previously unvaccinated individuals and as booster dose for vaccinated individuals.

Pfizer-BioNTech COVID-19 vaccine, (Monovalent XBB.1.5) child formulation. Administered to any child from 5 years of age up to 11 years as single dose for previously unvaccinated child.

Pfizer-BioNTech COVID-19 vaccine, Bivalent (original and omicron BA.4/BA.5) adult formulation. Administered to any individuals from 12 years of age and above as single dose for previously unvaccinated individuals and as booster dose for vaccinated individuals.

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Vaccination Categorization Pathway

Not Vaccinated with COVID-19 vaccine previously

Did not get infected with COVID-19

2 doses of Inactivated SARS-CoV2 (Valneva) Vaccine
for adult >18 years
OR
One dose of **Monovalent XBB 1.5** (adult/child)
OR
One dose of **Pfizer-BioNTech (Bivalent)**

Got infected after the first dose

Complete the second dose after 10-14 days if applicable

Infected with COVID-19 and Recovered

Administer the vaccine 10-14 days from infection if clinically stable

.

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

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Recommendation of booster dose for vaccinated individuals

Type of COVID-19 vaccine received/ manufacturer	Duration from the second dose of SARS-COV2 vaccine	Type of COVID-19 vaccine recommended	Target group
Inactivated SARS- COV 2/ "Sinopharm company".	One month	• The same vaccine type OR • Inactivated SARS- COV 2 vaccine by "Valneva" OR • Pfizer-BioNTech (Bivalent). • Pfizer-BioNTech COVID-19 vaccine, (Monovalent XBB.1.5)	Individuals at age of 40 years and above.
	Three months	• The same vaccine type OR • Inactivated SARS- COV 2 vaccine by "Valneva" OR • Pfizer-BioNTech (Bivalent). • **Pfizer-BioNTech COVID-19 vaccine, (Monovalent XBB.1.5)**	Individuals 18 years until 39 years.
	Six months	• The same vaccine type OR • Inactivated SARS- COV 2 vaccine by "Valneva" OR • Pfizer-BioNTech (Bivalent). • **Pfizer-BioNTech COVID-19 vaccine, (Monovalent XBB.1.5)**	Individuals 12 years until 17 years
Inactivated SARS- COV 2 vaccine by "Valneva"	Three months	• The same vaccine type OR • Pfizer-BioNTech (Bivalent). • **Pfizer-BioNTech COVID-19 vaccine, (Monovalent XBB.1.5)**	Individuals 18 years and above.
mRNA vaccines including the bivalent or monovalent "Pfizer-BioNTech"	Three months	• Pfizer-BioNTech (Bivalent). • **Pfizer-BioNTech COVID-19 vaccine, (Monovalent XBB.1.5)**	Individuals 18 years and above.
	Six months	• Pfizer-BioNTech (Bivalent) • **Pfizer-BioNTech COVID-19 vaccine, (Monovalent XBB.1.5)**	Individuals 12 years until 17 years
Viral vector "Oxford AstraZeneca vaccine"	Three months	• Pfizer-BioNTech (Bivalent). • **Pfizer-BioNTech COVID-19 vaccine, (Monovalent XBB.1.5)**	Individuals 18 years and above.
	Six months	• Pfizer-BioNTech (Bivalent) • **Pfizer-BioNTech COVID-19 vaccine, (Monovalent XBB.1.5)**	Individuals 12 years until 17 years
Recombinant adenovirus vector "Sputnik V"	Three months	• Pfizer-BioNTech (Bivalent). • **Pfizer-BioNTech COVID-19 vaccine, (Monovalent XBB.1.5)**	Individuals 18 years and above.
A recombinant, adenovirus type 26 (Ad 26) vector. "Janssen Biotech, Inc".	Two months	• The same vaccine type (not available in Bahrain).	Individuals 18 years and above.
	Three months	• Pfizer-BioNTech (Bivalent). • **Pfizer-BioNTech COVID-19 vaccine, (Monovalent XBB.1.5)**	Individuals 18 years and above.

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Additional Booster Doses Criteria For High Priority Targets

>50 years	18-49 years with comorbidities	> 12 years with immunocompromised condition	Health care workers	Pregnant
People above 50 years	Chronic lung diseases Chronic heart disease Chronic liver disease Chronic renal disease Chronic haematological conditions Chronic metabolic disease including DM Chronic neurological and neurodevelopmental conditions Severe obesity BMI > 40%	Adolescents and Adults with moderate to severe immunocompromising conditions (those with active cancer, transplant recipients, and those who are immunodeficient and being actively treated with immunosuppressives including people living with HIV with a current CD4 cell count of <200 cells/µl).		An additional booster dose should be given once in pregnancy if the last dose was more than 6 months, The vaccine can be administered at any time during pregnancy preferably after the first trimester if not among the high-risk group. It can be given to lactating women. "**Pfizer-BioNTech COVID-19 vaccine, (Monovalent XBB.1.5)"**

High priority targets are recommended to receive additional booster doses at least ***after 6 months to 12 months*** from the last dose.

Additional booster doses can be given to other individuals more than 12 years of age if they are not belonging to high priority targets after a minimum interval of ***12 months*** from the last COVID-19 vaccine dose according to their request.

Recovered individuals who have been vaccinated with 2 doses

After completing <u>6 months</u> 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 according to the type of vaccination received before having COVID-19

BACK

Dealing With Respiratory Illnesses (Including COVID) In Schools

Dealing With Respiratory Illnesses (Including COVID-19) In Schools

Suspected COVID cases with respiratory symptoms (e.g. fever & cough)

Refer the patient to health facility for evaluation

COVID negative
Follow the physician treatment plan

Positive COVID 19
Follow the physician's treatment plan (Sick leave as per the physician assessment up to 5 days)

Instruction when there is surge in COVID cases in school

- Inform official in Both ministry of education and ministry of health (School health section and public health)
- Assign specific personnel in each school for health issues

General instruction

- Instruct the student and staff in school in regard to health matters specifically how to prevent the spread of communicable disease
- Check that all student had received all the mandatory vaccination
- Take the student to health facility if he is sick

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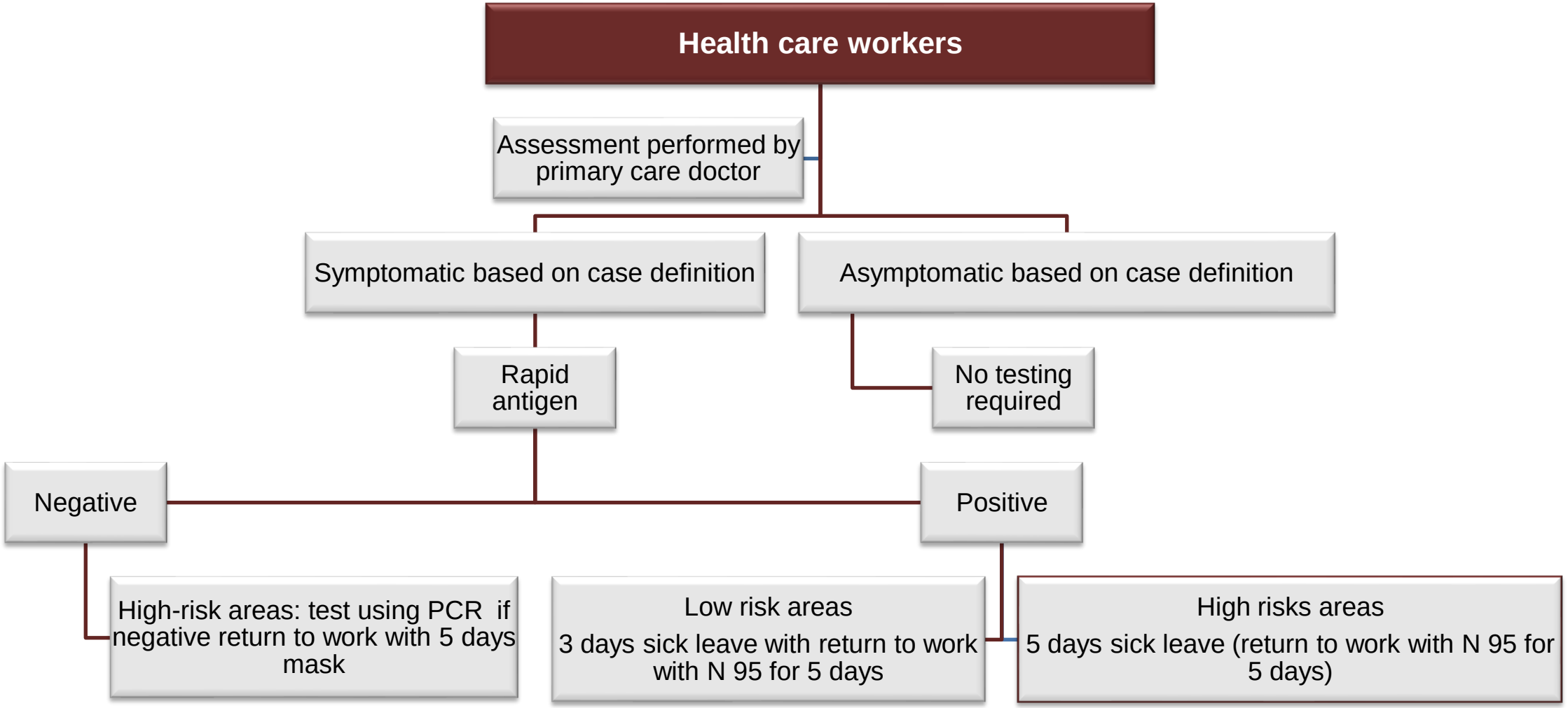
Health Care Workers Testing Algorithm And Return To Work

Health Care Workers Algorithm



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Return to Work

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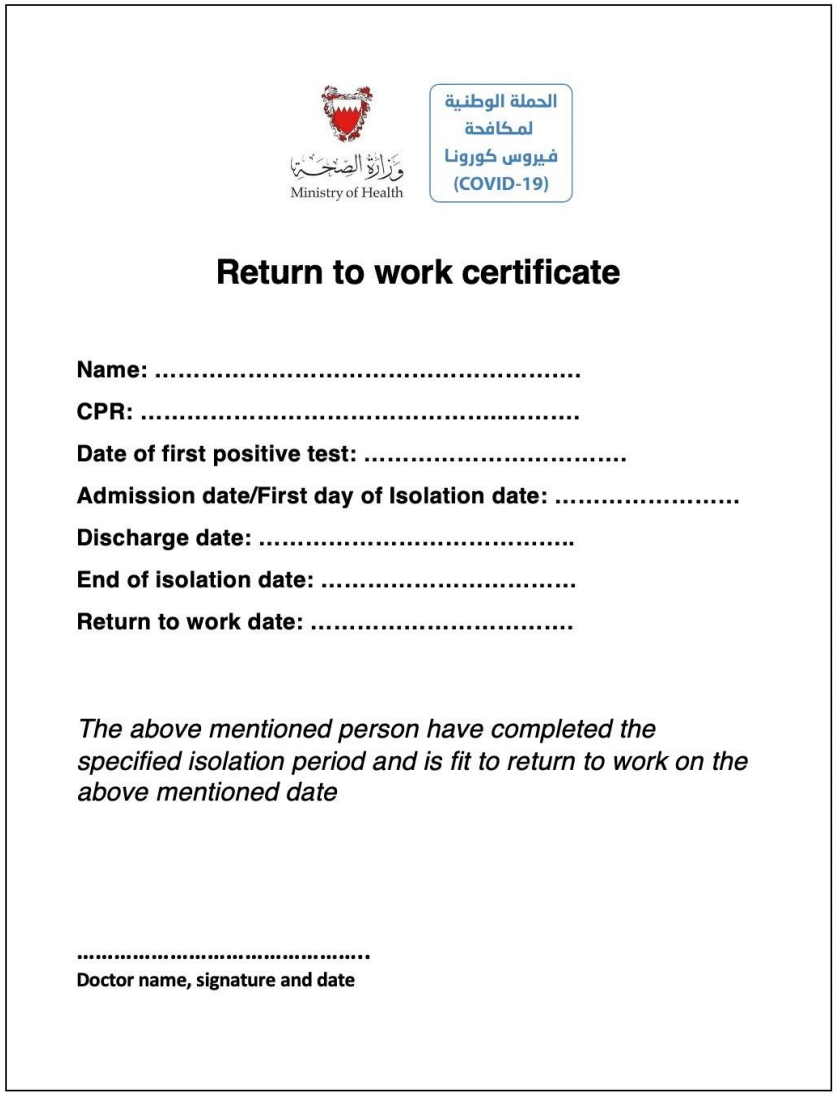
Return to Work Criteria

Return-to-work criteria can be issued for the patient who requests it.
If not specified, the patient can return to work after his sick leave.



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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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Return to Work Criteria

- Recovered COVID-19 patients can return to work whenever:
  1. Have completed the isolation/ Sick leave specified by the physician
  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 results 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/ Sick leave up to five days specified by the discharge protocol
- The latest positive PCR has a Ct value > 30

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Managing COVID-19 Cases In Private Practice

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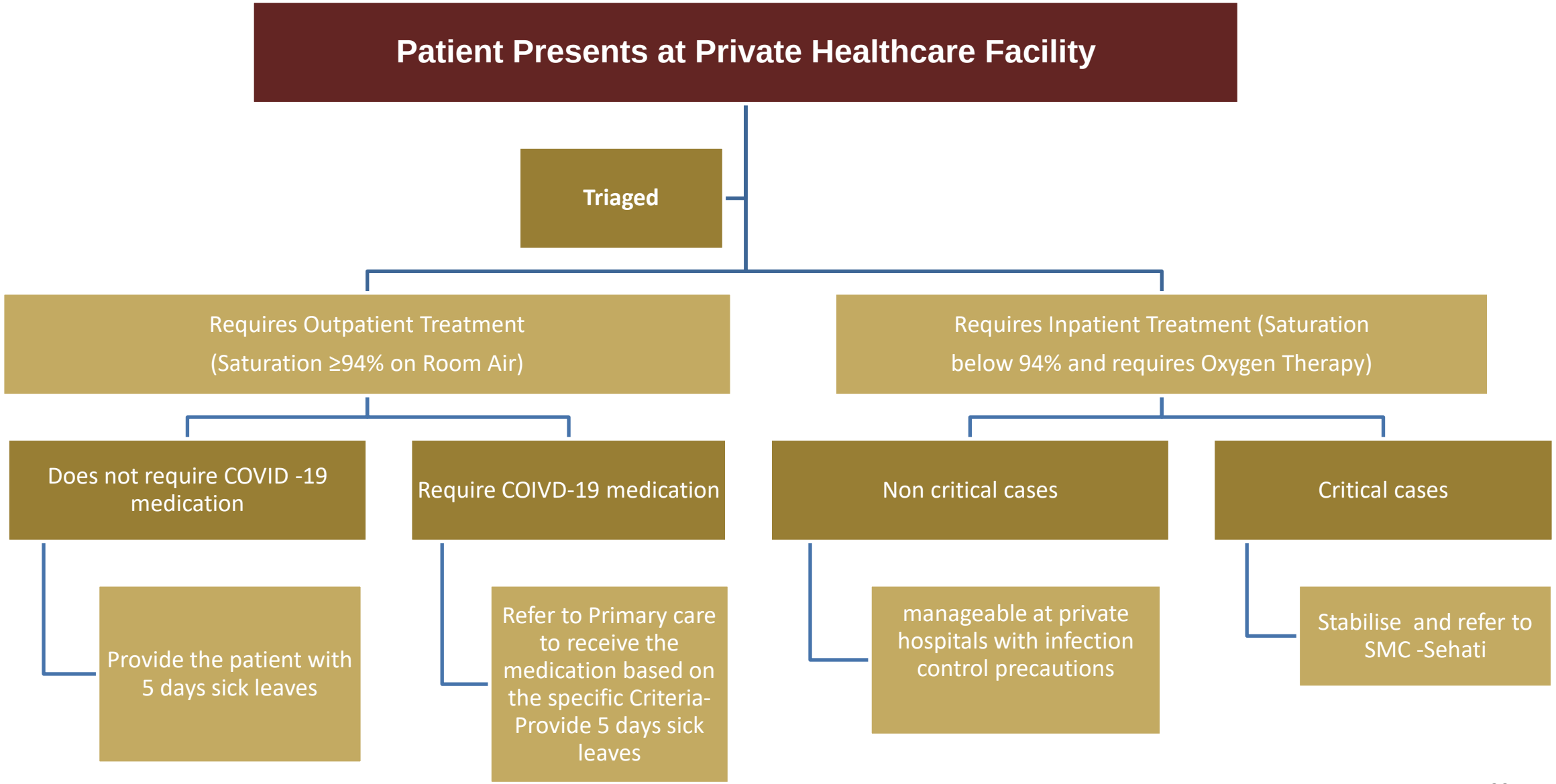
Managing COVID-19 Cases In Private Health Facility



BACK

COVID-19 Admission

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Admissions of COVID19

Sources of admission:

- Emergency room: COVID-19 cases with moderate to severe or life-threatening symptoms attributed to COVID-19 infection
- In-hospital transfer: Cases diagnosed as COVID-19 while being hospitalized in a non-COVID facility:
  - Patients presenting with symptoms not related to COVID-19 but RAT +ve, then PCR must be done before deciding on site of admission or transfer. Those with CT value ≥30 do not require admission to COVID-19 facility and isolation not mandatory
  - In case of outbreak in any long-term facility / psychiatric hospital, cases and contacts to be a cohort and swabbed for PCR, those with CT value ≥30 do not require admission to COVID-19 facility and isolation not mandatory regardless of vaccination status

The above is to minimize unnecessary transfers from other hospitals particularly that severity of current variants is low in majority of cases we are addressing at SMC and CT value 30 and above is considered generally non or low risk of infectivity

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

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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-
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	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

Sources of admission

- Emergency room: cases with moderate to severe or life-threatening symptoms
- In-hospital transfer: Cases diagnosed as COVID-19 while being hospitalized in a non-COVID facility

CONSIDER HOME ISOLATION

None of admission criteria

BACK

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 checklist:

- **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:

BACK

Recovered & Reinfected COVID-19 Cases : Readmission guidelines

BACK

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 with CT value <30, 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 or CT value≥ 30, admit into Non-COVID facility unless infectious disease consultant advise otherwise.

If within 15 to 89 days from COVID-19 Pathway Discharge and CT value < 30:

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

Mild cases: Manage as an out patient or 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 protocol.

BACK

Discharge Protocol from COVID-19 Facility

BACK

Discharge Protocol From All COVID-19 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

One negative PCR result

AND

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

Early Discharge and Transfer:

Criteria for early discharge:

- Approval from the attending physician.
- If the patient clinical condition allows

Criteria for early Transfer to Non-COVID facilities:

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

BACK

Outpatient And Follow Up Guidelines

BACK

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.Follow up appointment if indicated by the treating physician

- **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**

BACK

Reporting Of COVID-19 Death

BACK

COVID-19 Related Deaths

Following WHO guidance

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.

BACK

Guidelines For Certifying COVID-19 As A Cause Of Death

Recording COVID-19 on the medical certificate as the 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.

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.

BACK

Example 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:

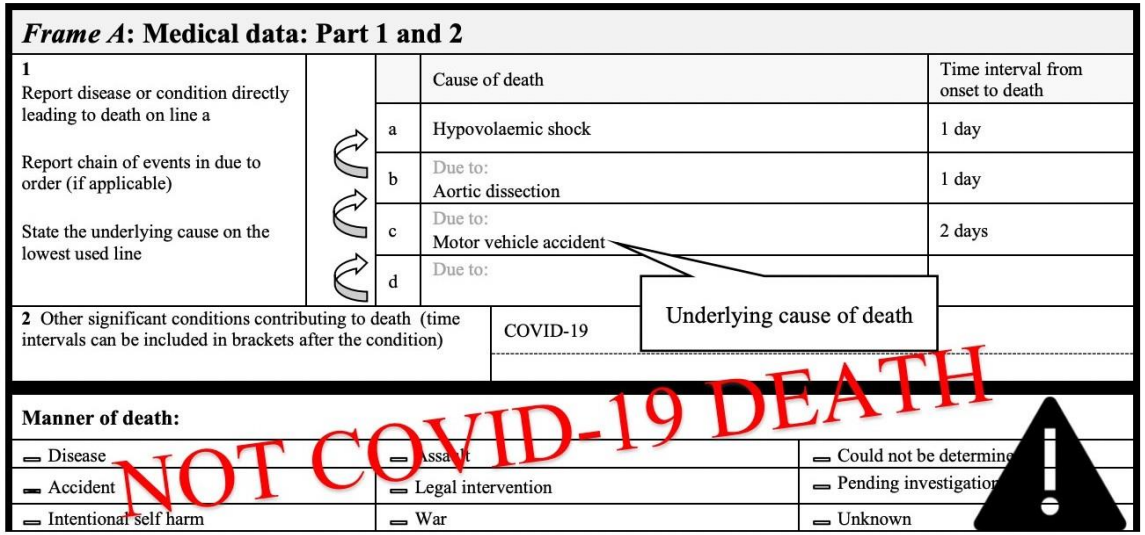
▬ Disease	▬ Assault	▬ Could not be determined
▬ Accident	▬ Legal intervention	▬ Pending investigation
▬ Intentional self harm	▬ War	▬ Unknown

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.**

BACK

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

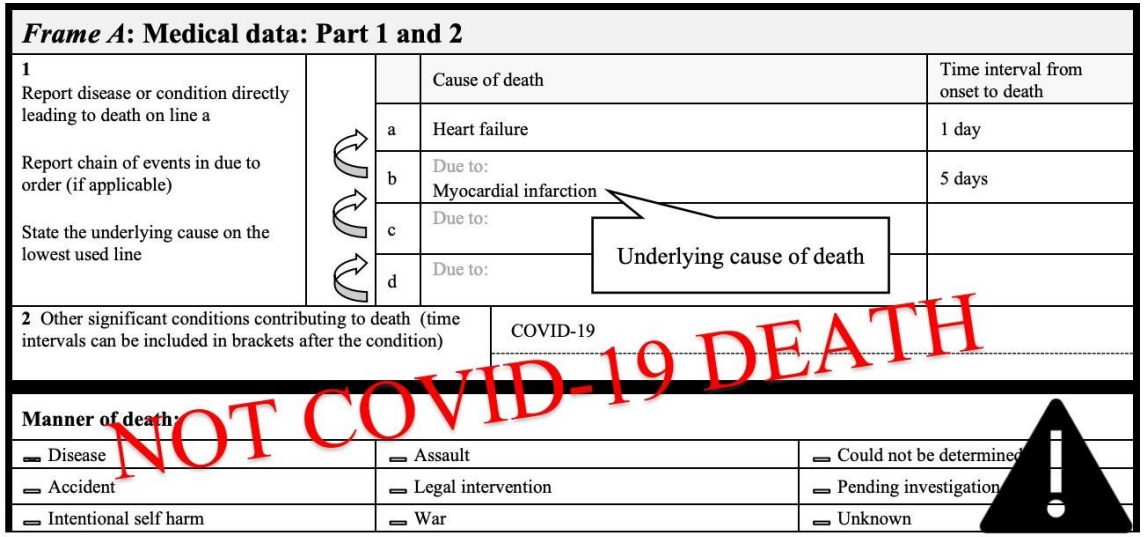
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)	COVID-19

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

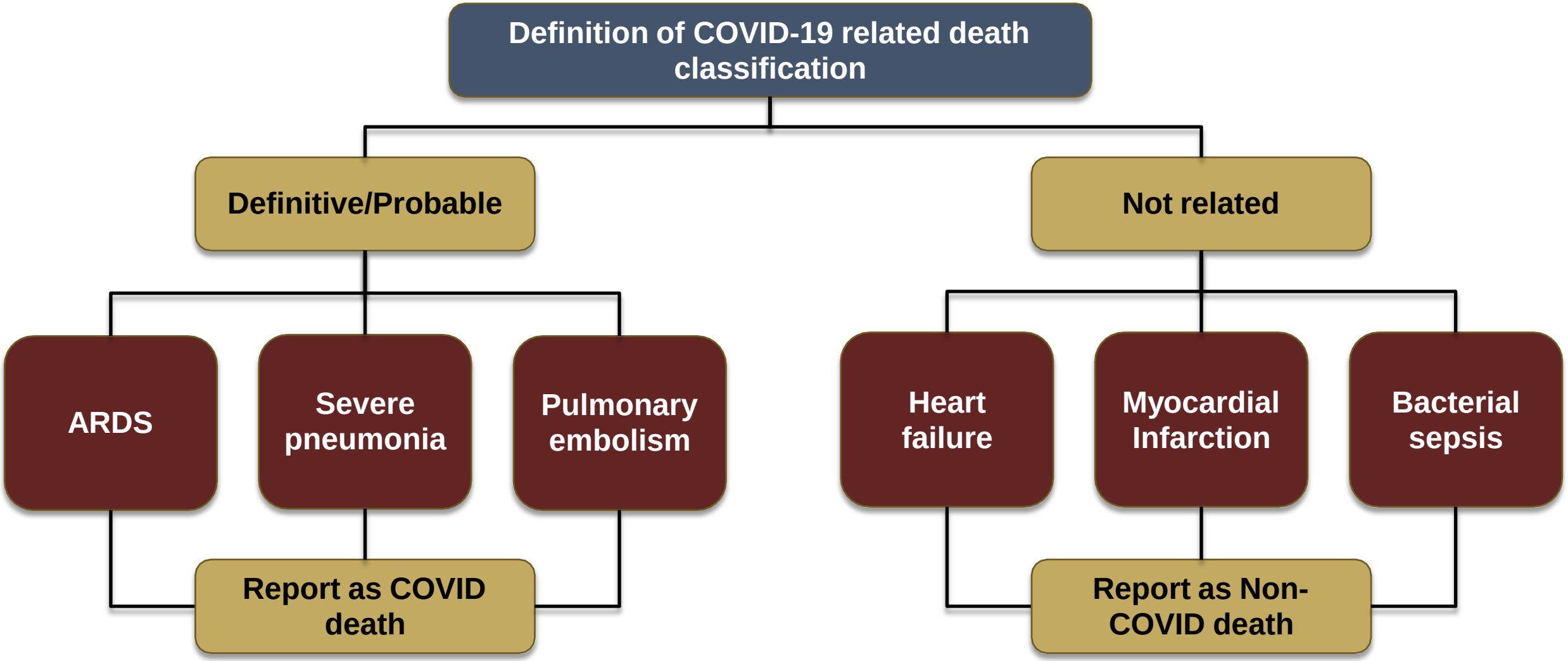
NOT COVID-19 DEATH

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.

BACK

Difference Between Definitive And Probable COVID-19 Related Death

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



BACK

Reporting COVID-19 Unexpected Death

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

BACK

Guidance For Management Of Neonates Born To Mothers With Suspected Or Confirmed COVID-19 Infection

BACK

Management of Neonate born to Mothers with Suspected or Confirmed COVID-19 Infection

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

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

BACK

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 if the mother is sick and cannot take care of the neonates is advised.
- The mother and the neonates can room but the mother must follow the preventive precaution
    1. Maintain a reasonable distance from the infant “Staying 2 meters away from the mother.”
    2. Practice safe hand hygiene
    3. Wear a face mask
- Breastfeeding:
    - Infected mothers should perform hand hygiene before breastfeeding and wear a mask during 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

Source: American Academy of Pediatrics

BACK

Multi-level Hospital Responses To Covid-19 Pandemic

BACK

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 discrestion
- **Visitors**
  - As per healthcare institute discrestion

***Percentages are positivity rate among overall Healthcare institute workers**
****Nonessntial workforce:** As defined by Healthcare institute

BACK

Treatment Guidelines and Pathways

BACK

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 (in 50 years or above or with underlying risk factors or chest pain)
  - Chest Xray/ Ultrasound chest
  - CBC, Urea/Electrolytes, Creatinine, LFT
  - CRP, LDH, ESR, D-Dimer, Ferritin, PCT
  - PCR for respiratory panel if needed based on clinical judgment.
- Risk stratification and prognostic markers (to be requested based on initial assessment and patient condition – Not routine)
  - 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
- Disclaimer
  - Guidelines are created based on the best available evidence. Physicians should use this as a guide and depend on clinical and scientific judgment and individualizing of care
  - Physicians should use this as a guide and depend on clinical and scientific judgment and individualizing care
  - This guideline is subject to change based on more evidence and will be updated regularly whenever needed

BACK

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

Consider using **Ritonavir-boosted nirmatrelvir (Paxlovid)**

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

BACK

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**
- **Tocilizumab**
- **Dexamethasone or Methylprednisolone** (if evidence of hypoxia)
- **LMWH/UFH** if not contraindicated
- 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**
- **Tocilizumab**
- **Dexamethasone or Methylprednisolone** (if evidence of hypoxia)
- Consider the use of **Tocilizumab** (if fitting criteria)
- **LMWH/UFH** if not contraindicated
- 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.

P

BACK

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
- 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

BACK

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

BACK

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

BACK

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

BACK

Anti-thrombotic 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.	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.	

BACK

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

BACK

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) or	2000 to 4000 iU daily or 50,000 iU weekly (With Ca+2 monitoring twice a week) 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 OR IV hydrocortisone 80 mg IV BID Equivalent to Dexamethasone: Prednisolone 40mg or Methylprednisolone 32mg or Hydrocortisone 160mg
Tocilizumab	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) Recommended alternative agent if tocilizumab is not available(not in combination) 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.

BACK

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**. No dosage adjustment for Renal impairment or dialysis
Contraindications	• Hypersensitivity to Remdesivir or any component of the formulation. • Patients with ALT ≥10 times the ULN (upper limit of normal).
Monitoring	• Serum Creatinine, • Biochemical profile • Liver Function tests: ALT, AST, ALP, Bilirubin
Adverse Reactions	• Increased serum glucose • Fever • Infusion reactions

BACK

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. **Sickle cell disease**
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

BACK

Tocilizumab

- Tocilizumab can be given in COVID19 in the presence of severe cytokine storm
- Criteria of Severe Cytokine Syndrome:
  1. **It should be used with Dexamethasone 6-12mg (NHS, ASHP)**
  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)

Avoid use

- 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 10 times the upper limit of normal.
- A pre-existing condition or treatment resulting in ongoing immunosuppression. (NHS, NIH)

(Recovery and REMAP –CAP)

BACK

Baricitinib

Recommended as an alternative agent for tocilizumab (If tocilizumab is not available or if dexamethasone is not available.

Dose adjustment in renal impairment: (NIH)

- eGFR ≥60 mL/min/1.73 m2: BAR 4 mg PO once daily
- eGFR 30 to <60 mL/min/1.73 m2: BAR 2 mg PO once daily
- eGFR 15 to <30 mL/min/1.73 m2: BAR 1 mg PO once daily
- eGFR <15 mL/min/1.73 m2: BAR is not recommended

BACK

COVID-19 Multisystem Inflammatory Disease in Children

BACK

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.

BACK

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

BACK

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	++	+

BACK

Presentation

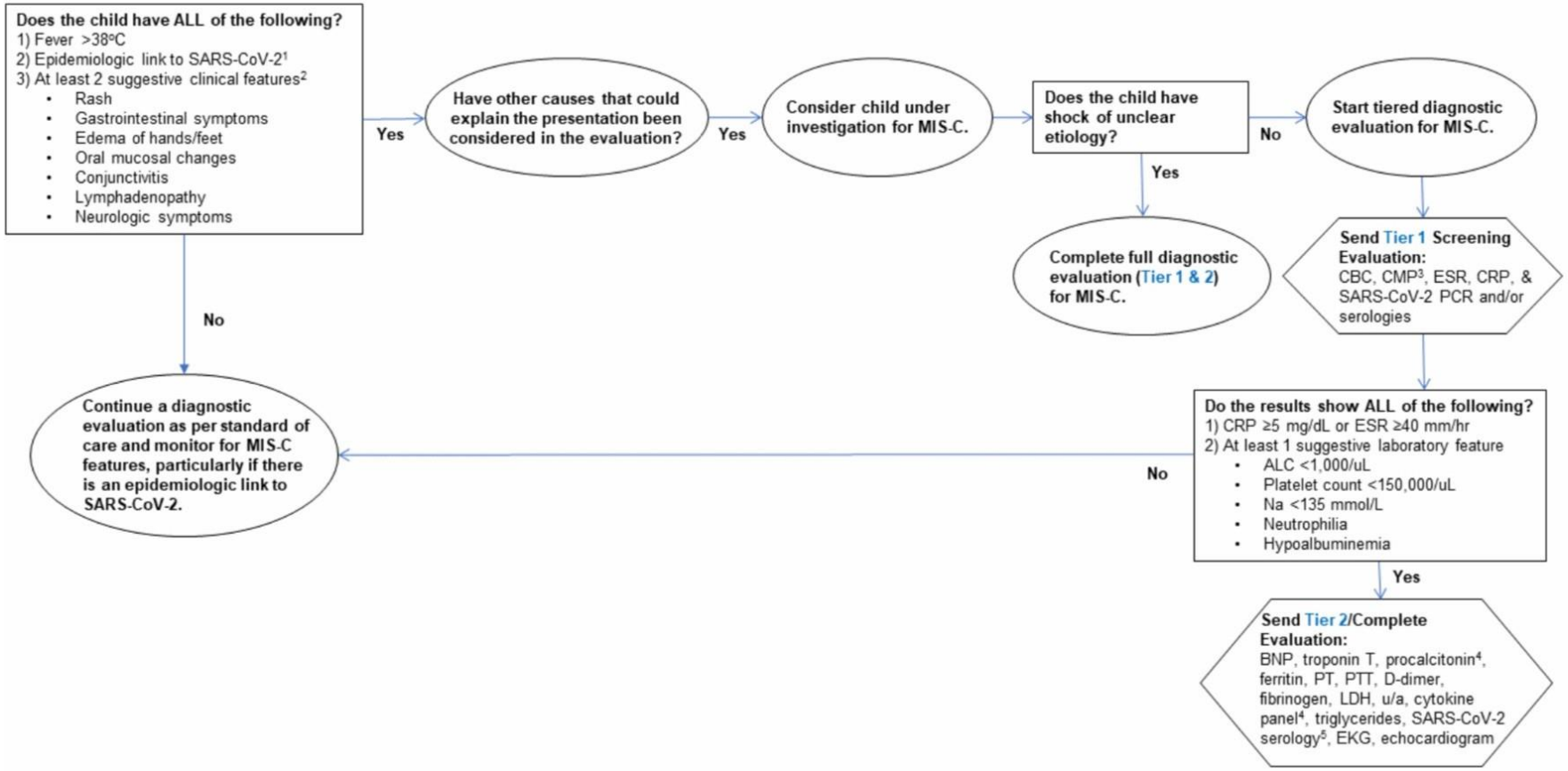
- The hallmark of PIMS/MIS-C is fever >3 days that is unexplained by other causes, evidence of systemic inflammation, and a temporal association with COVID-19.
- The clinical presentation is fever with hyper-inflammation with features of Kawasaki Disease or features of Toxic Shock Syndrome with signs 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.

BACK

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.

BACK

Management

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

BACK

Outpatient Treatment protocol for COVID-19- Paxlovid treatment

BACK

Outpatient Treatment Protocol For COVID-19

Referral Process

Sehati 1(SMC)

Accept All cases from Hospitals/call center /private hospitals

≥60 years for **Paxlovid** based on Criteria(see criteria)

Fits the Criteria for Paxlovoid

Patient will be assessed by Physician & Clinical Pharmacist→ dispense the medication and Educate the patient (Side effects, Missed doses, etc.)

LHC

Positive Cases ≥60 or adults with comorbidities will be assessed

Those fits **Paxlovid** based on Criteria

Fits Paxlovid Criteria

Patient will be assessed by Physician to confirm eligibility + Drug interaction.

Pharmacist will dispense the medication and Educate the patient (Side effects, Missed doses, etc.)

Paxlovid Dose Adjustment Based on Estimated eGFR

≤ 65 years of age + No recent eGFR
OR
Any age + Recent eGFR ≥60 to 90 ml/min

Paxlovid

300 mg Nirmatrelvir
100 mg Ritonavir
(Two tablets of Nirmatrelvir + One tablet of Ritonavir)
Twice Daily for 5 days

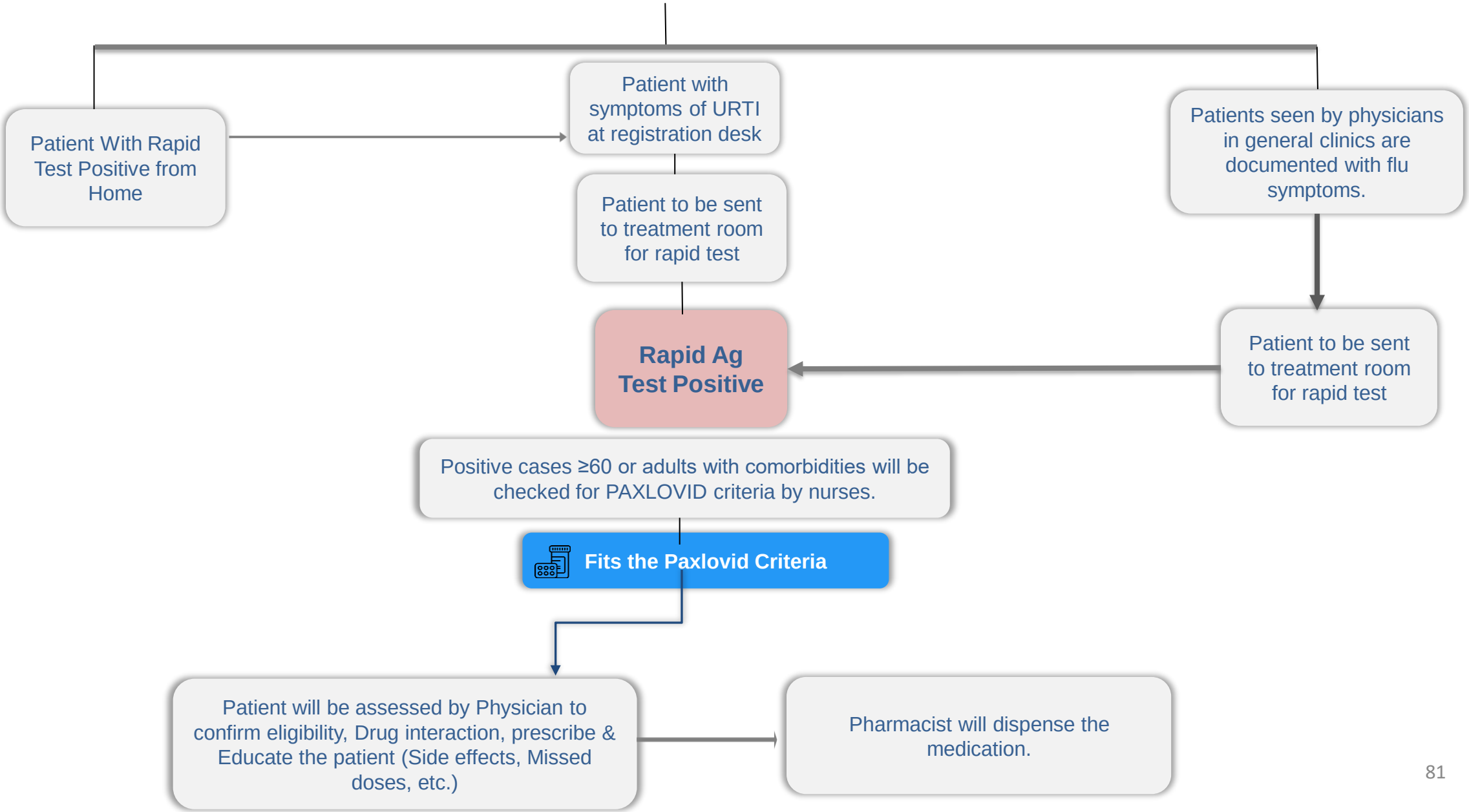
≥ 65 years of age + No Recent eGFR
OR
Any Age + Recent eGFR ≥30 to <60 ml/min

Paxlovid

150 mg Nirmatrelvir
100 mg Ritonavir
(One tablet of Nirmatrelvir + One tablet of Ritonavir)
Twice Daily for 5 days

BACK

Prescribing Paxlovid In Primary Care Centers



Treatment protocol for Paxlovid in the health facility

Role Of :

Nurse

- Checking the vitals (SPO2 should be ≥94% RA).
- Assessing patient fitness for the criteria .

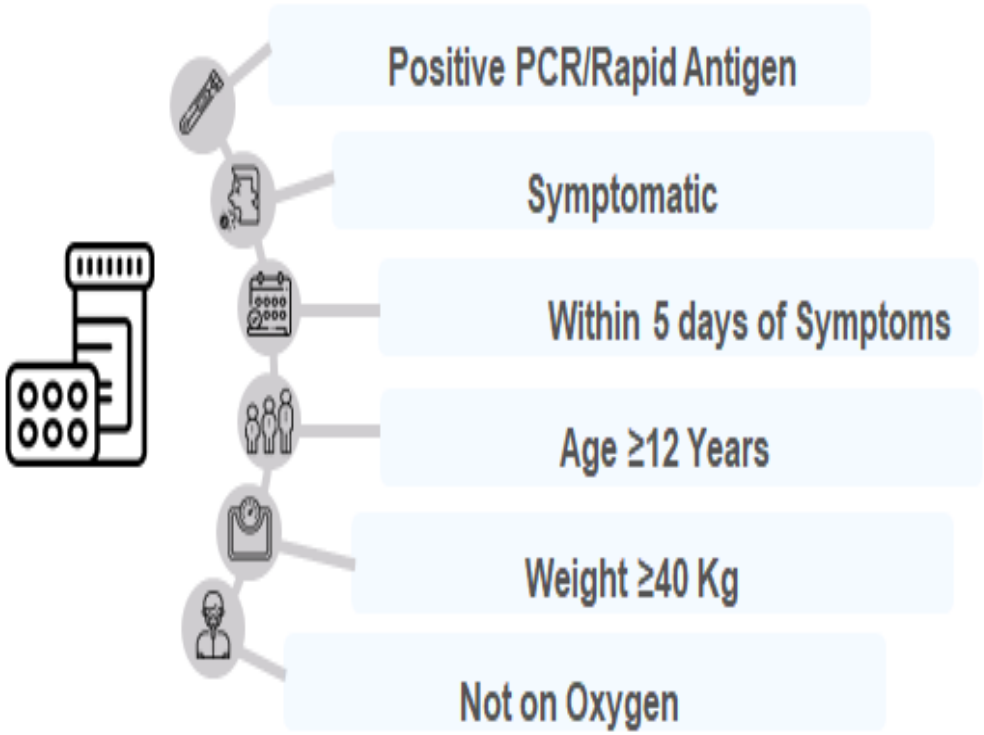
Doctor

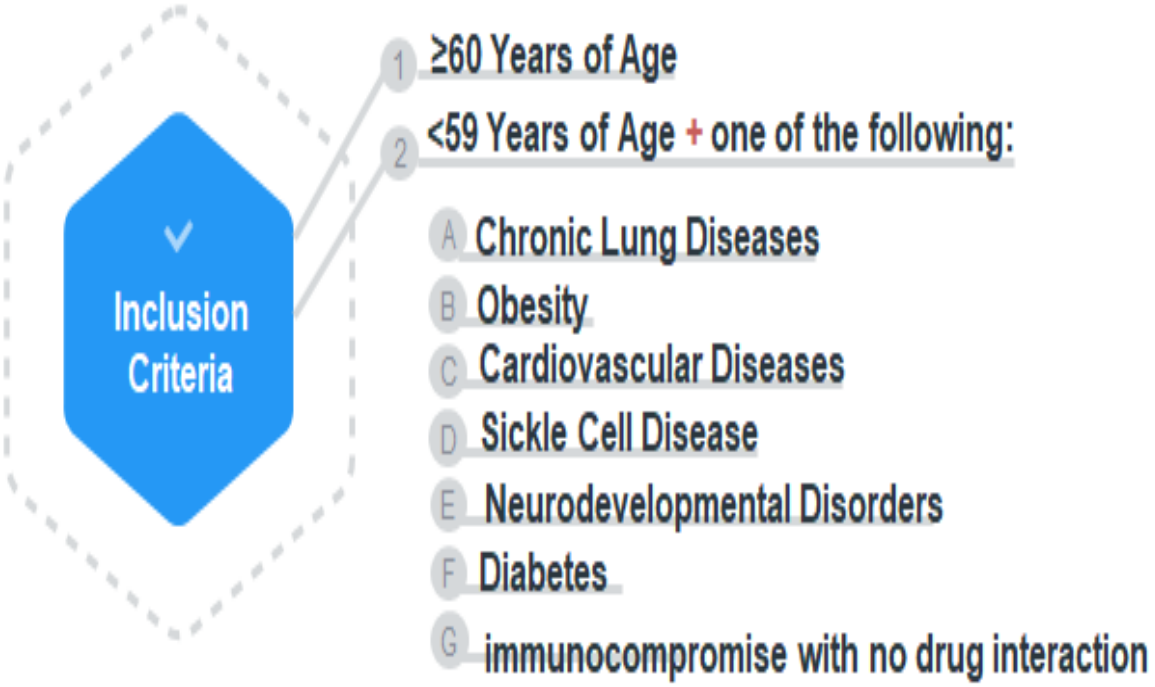
- Medical assessment and check drug interaction to confirm eligibility for PAXLOVID .
- Fill ISEHA sheet (PAXLOVID assessment sheet)
- Prescribing PAXLOVID and Educate the patient (Side effects, Missed doses, etc.).

Pharmacist

- Assessing patient medication interaction .
- Dispense the medication and Educate the patient (Side effects, Missed doses, etc.)

Paxlovid Criteria

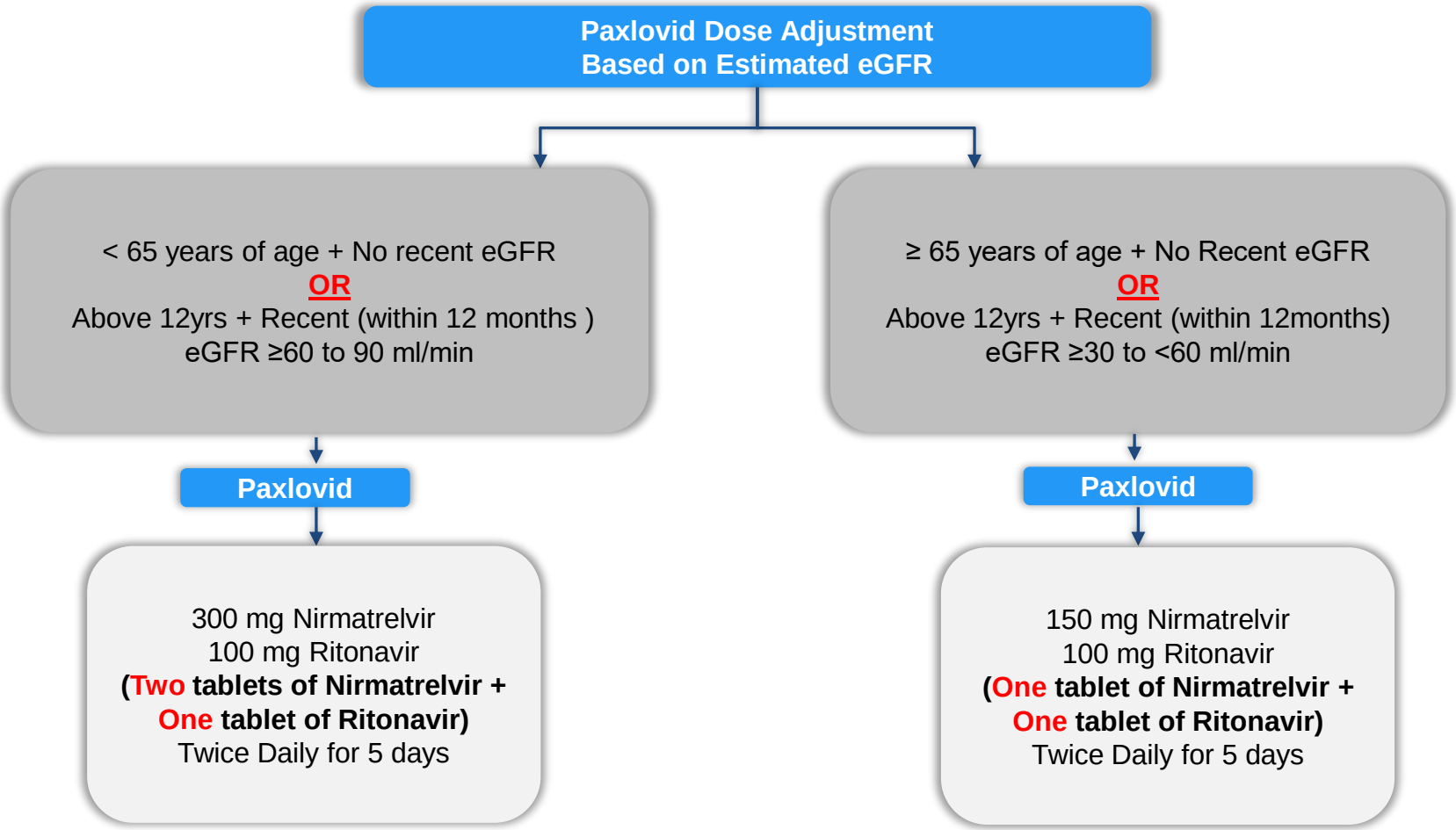




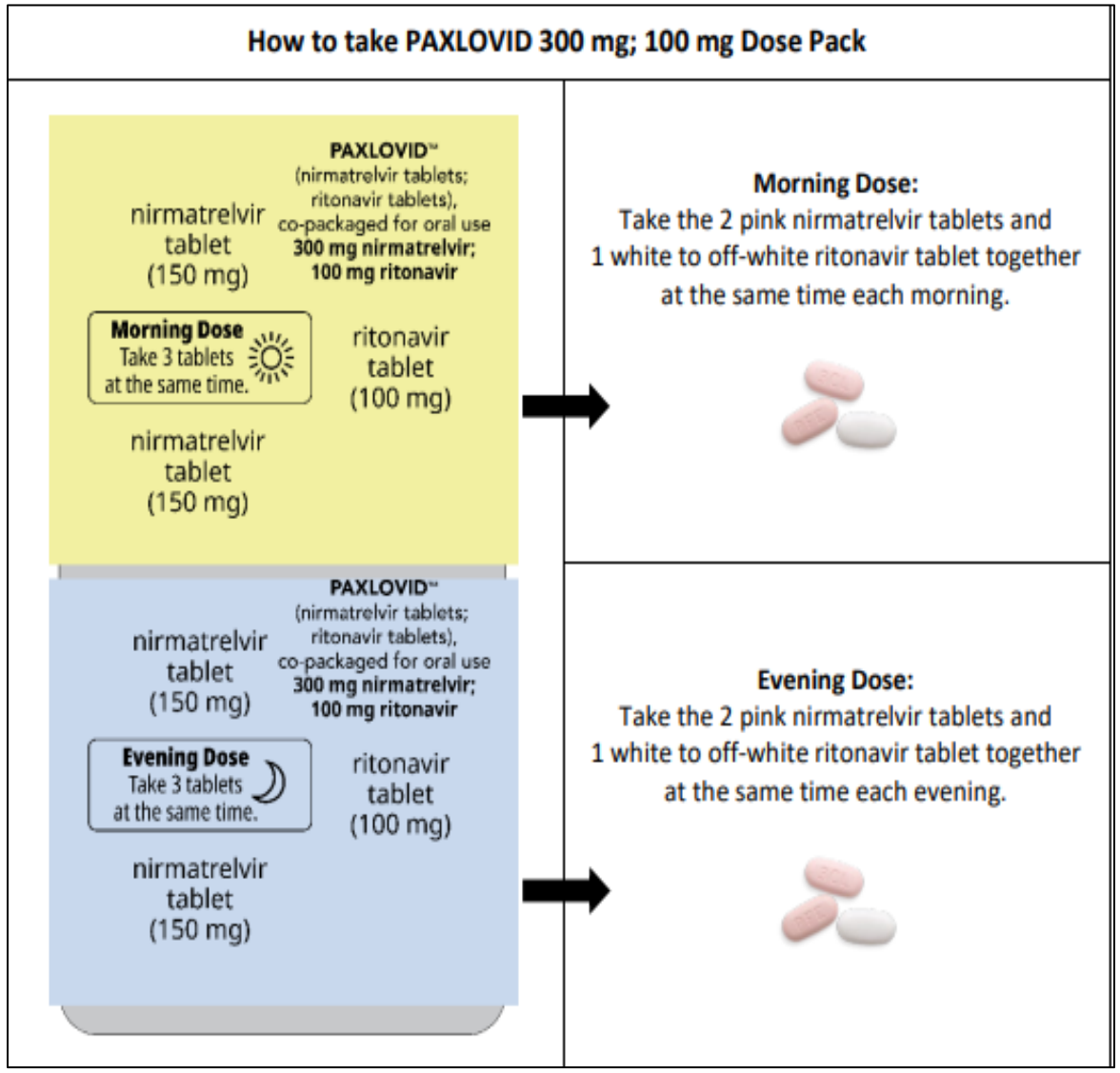
* Obesity (BMI ≥ 35)

BACK

Paxlovid Dose Adjustment



How to take Paxlovid?

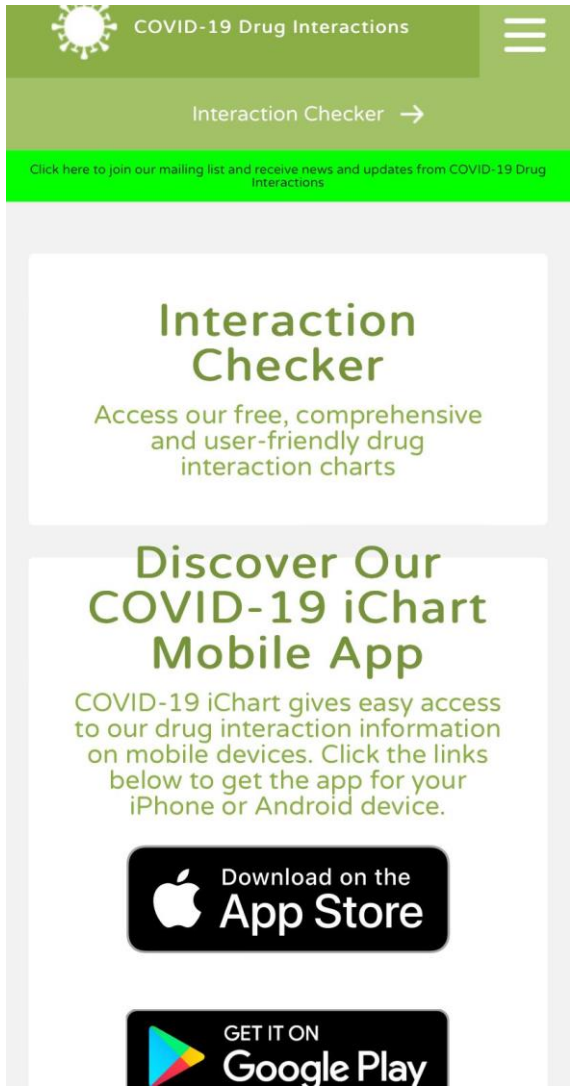


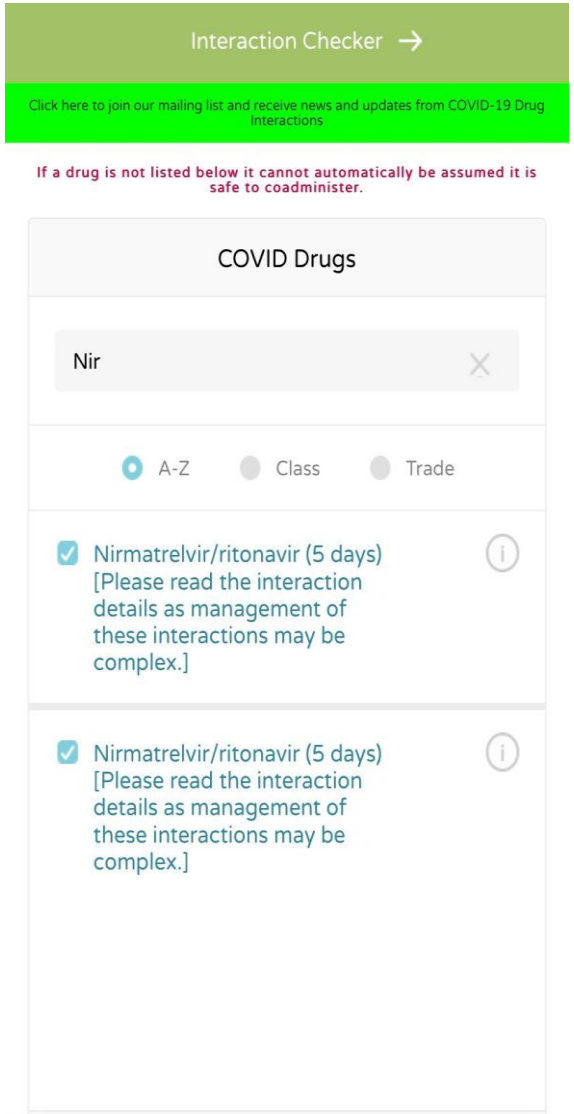
Possible Side Effects Of Paxlovid are :

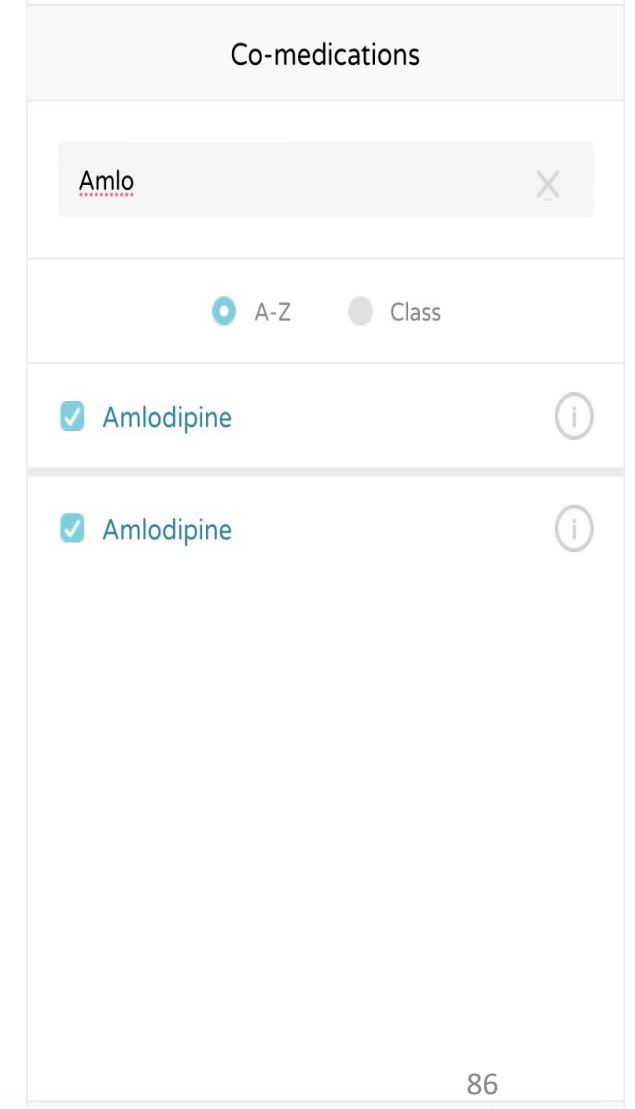
- Impaired /bitter taste.
- Muscle ache .
- Diarrhea .
- Abdominal pain , nausea .
- High BP.
- Allergic reaction .
- Liver problem .

Drug Interaction

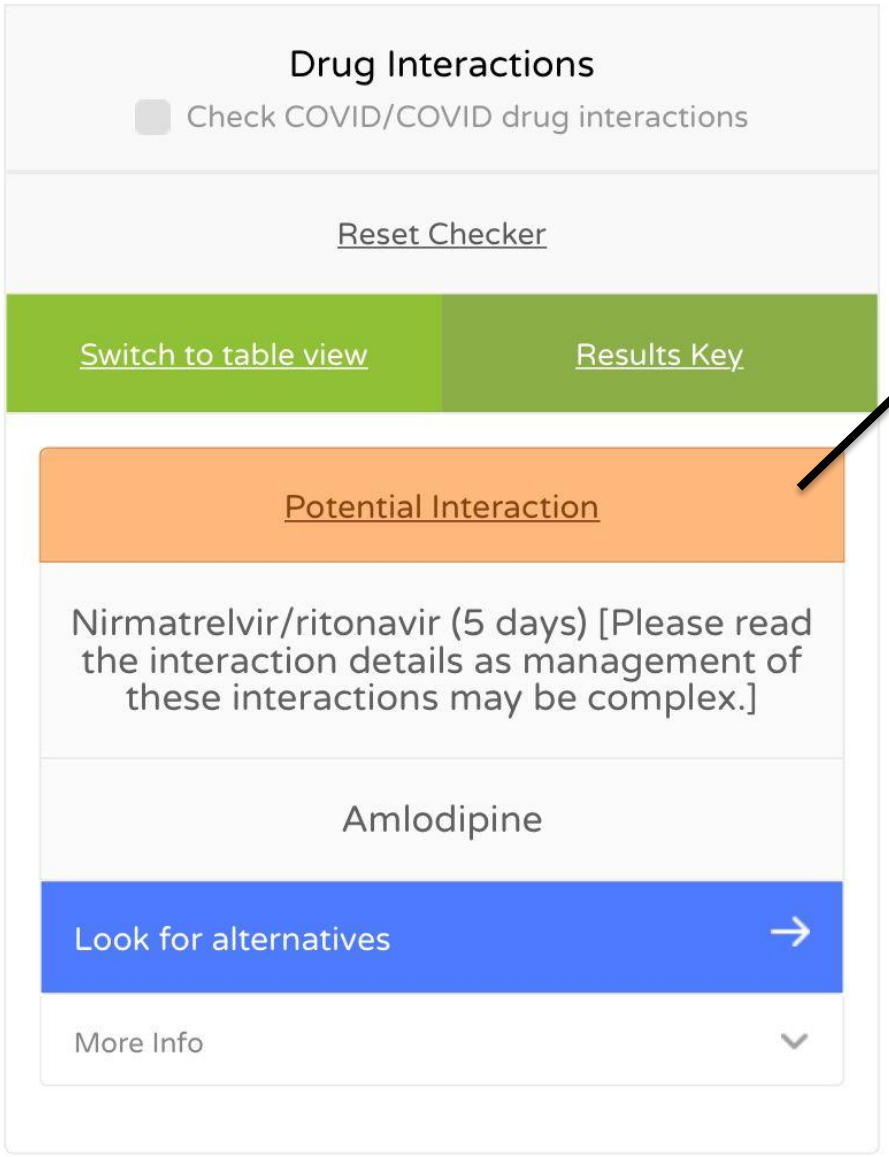
Liverpool COVID-19 Interactions (covid19-druginteractions.org)

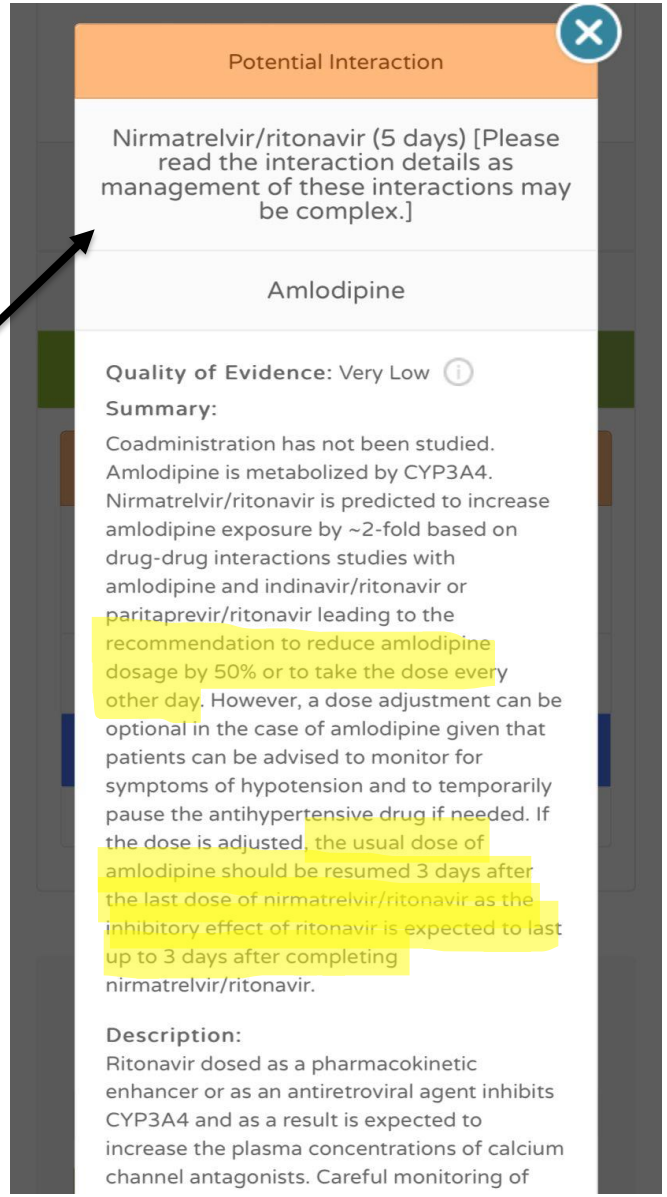






Drug Interaction Checker





- Do Not Co-administer
- Potential interaction
- Potential weak interaction
- No interaction

BACK

Paxlovid Contraindication

Paxlovid Contraindication

• Paxlovid is a strong inhibitor of CYP3A and may increase plasma concentrations of drugs that are primarily metabolized by CYP3A

• Paxlovid is contraindicated with drugs that are highly dependent on CYP3A for clearance and for which elevated concentrations are associated with serious and/or life-threatening reactions.

- Severe renal insufficiency (GFR < 30mL/min)
- Severe hepatic impairment (Child-Pugh Class C)
- Hypersensitivity to nirmatrelvir or ritonavir

Notable Drug – Drug interaction

- Alfuzosin
- Amiodarone
- Clozapine
- Colchicine
- Dihydroergotamine
- Dronedarone
- Eletriptan
- Eplerenone
- Ergotamine
- Finereone
- Flecainde
- Flibanserin
- Ivabradine
- Lomitapide
- Lovastatin
- Lurasidone
- Methylergonovine
- Midazolam, oral
- Naloxegol
- Pethidine
- Pimozide
- Propafenone
- Quinidine
- Ranolazine
- Tamsulosin
- Simvastatin

*This list may not be all inclusive

Resources For Evaluating Drug Interactions

- Fact sheet for health care providers
- University of Liverpool COVID 19 drug interaction checker
- COVID 19 advisory for Ontario what prescribers and pharmacist need to know

Other resources

- PAXLOVID Patient Eligibility Screening Checklist Tool for Prescribers
- AHFS Nirmatrelvir Monograph

BACK

Management of MIS-C

BACK

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).

BACK

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).

BACK

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).

BACK

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

Immunomodulatory Treatment In Children With COVID-19 (Current Acute Symptoms Of SARS-COV2

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

BACK

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

Back

References for MIS_C

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

BACK

COVID-19 Medication Order Sheet

BACK

Medication Order sheet for Adult COVID-19

Medication	Dose	Contraindication	Monitoring
Antivirals			
□ **Remdesivir**	□200 mg iv day 1 then 100 mg daily for 5 days. Can be given for 10 days in severe cases	• 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 • Fondaparinux use is contraindicated when CrCl <30 mL/minute (manufacturer's labeling)	▪ Bleeding parameter

BACK

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 **Or equivalent doses of corticosteroid**	■ **In pregnant or breastfeeding women**, 40 mg once daily oral prednisolone or IV Hydrocortisone 80 mg twice daily **should be used instead of Dexamethasone** ■ If steroids are indicated for fetal lung maturity, prescribe intramuscular dexamethasone 12 mg twice (24 hours apart), immediately followed by oral prednisolone 40 mg once a day, or IV hydrocortisone 80 mg twice daily, to complete a total of 10 days or until discharge, whichever is sooner. (RCOG 2022) ■ **Take precautions** when used with: Cardiovascular, diabetes, Gastrointestinal, Myasthenia graves and seizure patients	
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

BACK

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
- Test using (RADT or PCR).
- Report cases to Infection control &public health
- If positive, assess the health status of the patient and isolate.
- If cluster is identified to do contact tracing and test according to infection control advise
- If symptomatic and negative (to take precautions)

Prison Guard & Staff

- Check for symptoms
- Encourage self-reporting of close contact with COVID-19 cases
- Test any staff who fits the criteria for testing, based on case definitions
- Positive cases are followed according to the general protocol
- Negative symptomatic (precautionary measure eg face mask , hand hygiene