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فيروس كورونا
(COVID-19)

Bahrain COVID-19 National Protocols

Disclaimer: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

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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 (especially if ICU admission OR Bilateral radiological infiltrates OR Hypoxic Respiratory failure)
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

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.
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

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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

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**
Chest Xray changes* (applied in health facilities)	Normal		Changes suggetsive of Pneumonia

COVID-19 Clinic Risk Assessment for confirmed 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	✓	-
Fatigue	✓	-
Fever	Less than 38°C	**≥38°C**
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 (applied in treatment facilities)	Normal	**Changes suggetsive of pneumonia**

COVID-19 Testing Protocol

COVID-19 Molecular tests and Serology

Testing categories for SARS-CoV2

- Two types of tests are available : Molecular tests (PCR) and Serology tests (Antibody test)
  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 or immune response

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. Symptomatic suspected cases
  2. Asymptomatic individuals with known or suspected exposure to confirmed cases
  3. Asymptomatic individuals withOUT known or suspected SARS-CoV-2 exposure , however early identification is needed in special settings (eg: regular screening of healthcare workers in COVID19 facilities and other certain workplace settings)
  4. Public health surveillance for SARS-CoV-2 (i.e. random testing for targeted subpopulations)

Molecular COVID-19 is not recommended for recovered COVID-19 cases unless clinically indicated and approved through National task force infectious diseases consultation

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*
  - 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

COVID19 serology survillance startegy invloves two pouplations

Recovered COVID-19 Patients	NO previous COVID-19 diagnosis
• Any patient who <u>was</u> infected with SARS-CoV2 • Diagnosis made since 14 days or **<u>longer</u>**	• 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 <u>reactive</u> → Reassure, consider for **plasma donation**

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

Antibody result <u>reactive</u> → Perform NP swab for PCR test, **only if <u>Symptomatic</u>**

- ✓ 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

Molecular Testing for CLOSE CONTACTS of COVID-19 cases

NO Prior COVID-19 infection

1. Quarantine and arrange for NP swab
2. PCR testing of NP swab
3. If negative, quarantine for 10 days followed by exit swab
4. If positive, follow confirmed COVID19 case pathway

Recovered cases from previous COVID-19 infection who are a close contact of a positive case should have serology instead of molecular testing

- if serology is positive for antibodies, No need to quarantine
- if serology is negative; Quarantine for 10 days with exit swab

Suspected Cases

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- If the nucleic acid test is negative at the beginning, and case is suspected, to test on subsequent days.

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 war room and arrange transfer to COVID-19 facilities
5. If negative, continue inpatient care

Suspected Cases

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Healthcare providers (HCP) and Laboratory personnel COVID-19 testing protocol

The following procedures apply to all HCP and lab personnel exposed to positive/suspected COVID19 cases

High Risk

Defined as prolonged (15min) close contact without recommended PPE
Exposure during the performance of an aerosolizing procedure without recommended PPE

1. Isolate and test for COVID-19 and wait for result
2. HCP working in COVID-19 facilities can undergo testing in their facility. Otherwise, can be tested in testing center
3. If positive, admit in isolation facility/Home isolation
4. If negative*, home isolation 10 days
5. Retest at the end of the isolation period before going back to work

***If the PCR test is negative, and case is suspected, to test on subsequent days.**

Low Risk

Defined as exposure other than high risk, without recommended PPE

1. Isolate and test for COVID-19 and wait for result
2. HCP working in COVID-19 facilities can undergo testing in their facility. Otherwise can be tested in testing center
3. If positive, admit in isolation facility/Home isolation
4. If negative* and asymptomatic, can return to work with extra safety precautions (face mask and daily symptoms assessment for 10 days).
5. If negative* and symptomatic, home isolate until symptoms resolve for 72hrs and retest, if negative can return to work

***If the PCR test is negative, and case is suspected, to test on subsequent days.**

- IN CASE OF THE INABILITY TO PROVIDE SAFE PATIENT CARE DUE STAFF SHORTAGE, any HCW with history of exposure and is asymptomatic can managed as the low risk pathway. Daily checking and recording of symptoms is mandatory for those individuals. In case of any symptoms appear, immediately isolate and retest. If negative, HCW can return to work when asymptomatic for atleast 72hrs
- All HCW should report any symptoms or unprotected exposure to confirmed cases of COVID19, to their designated department and 444

All healthcare providers caring for COVID19 positive cases should undergo molecular test for COVID-19 by NP swab every 7 days in their facilities. Results are to be traced by the facility supervisor, and to follow-up on the results accordingly

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
- Daily report about prison situation to war room

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

Symptoms : Fever or cough or shortness of breath

Reporting of COVID-19 death

COVID-19 related 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)

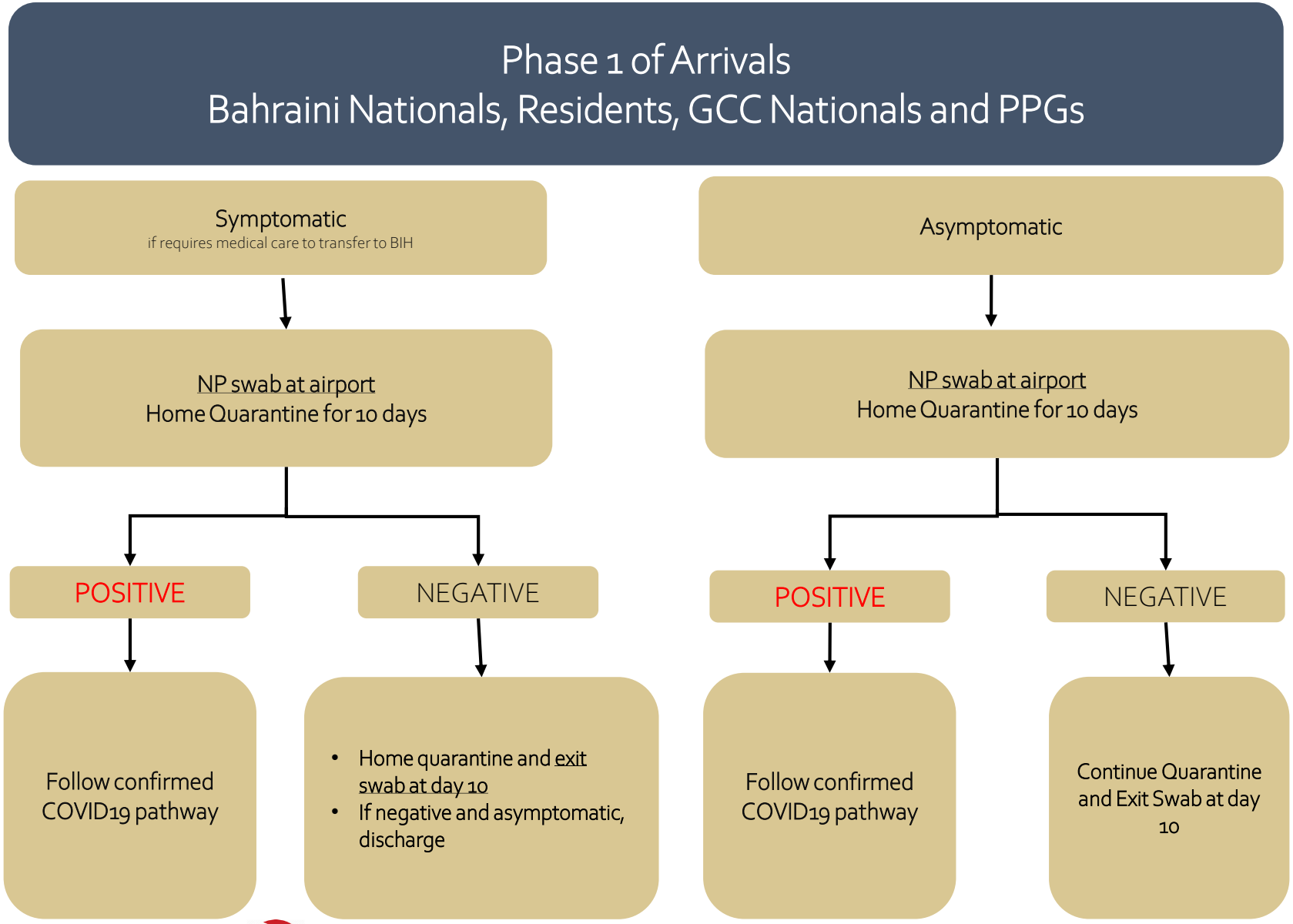
1. If swab is taken before death and turns to be positive:
   - Patient will be counted as a case of COVID19; however mortality will not be reported due to COVID19, if no clinical evidence is present

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

Airline Arrivals: Testing and Quarantine protocol

Phase 1

Airline Arrivals: Testing and Quarantine



COVID-19 Patient Allocation

Patient Allocations

COVID-19 patients will be allocated to the following categories based on the presented symptoms and criteria:

- Home isolation: Subject to specific criteria (refer to Home isolation protocol)
- Isolation facilities: Asymptomatic or Mildly symptomatic cases who don't fit home isolation
  - Mild symptoms: Shamil Field Hospital (SFH), KBH (Private)
  - Asymptomatic: Shamil Field Hospital (SFH), Hidd Isolation, Sitra Camp, Other NHRA approved private facilities
- Treatment Facilities: Mild to Moderate Disease and those who require in-hospital medical care and to follow **admission office criteria**
  - **EKK:** Mild-Moderate pneumonia, or Mild cases with comorbidities that need hospital management i.e. Hemodialysis
  - **JMH:** Mild-Moderate pneumonia, Mild cases with comorbidities that need hospital management, Paediatric, and uncomplicated Obstetric cases
  - **BIH:** Mild pneumonia, or Mild cases with comorbidities that need hospital management
  - **SMC 6th floor:** cases requiring other subspecialty care
  - **RAF:** Non Bahraini with Mild pneumonia, or **any** Mild cases with comorbidities that need hospital management or cases requiring nursing care
  - **HBDC** (H2+3+4): Moderate Pneumonia (as per admission office eligibility)
- ICU Facilities : Severe Diseases or cases who require advanced therapies
  - HBDC (H1), BDF FICU, Sitra FICU
- MKCC Facility: VIP Cases - subject to prior approval

Home isolation Protocol

Criteria that must be met to qualify patients for Home Isolation:

1. Age less than 60 years old
2. Asymptomatic or mildly symptomatic
3. Absence of risk factors
   - Risk factors defined as : Chronic diseases or Age 60 or above
4. Appropriate home setting for a self isolation
5. No household members with an immunocompromised state
6. Able to stay in contact with the medical team electronically
7. Activation of “Be Aware Bahrain” App

Household contacts should be managed as close contacts

Home Isolation Protocol

Primary Healthcare workers Following up with the patients through daily phone calls and the filling of the daily follow-up form on the application

*Patient should **contact 999 in case of emergency**.*
Contact 444 in the case of any progress in symptoms to facilitate appropriate transfer for medical care

Diagnosis and informing the patient with the result of the test

Within 24 Hours

Receiving the patients at SFH to give them the electronic bracelet Declaration form & the care package (Masks, Gloves, Sanitizers and needed medications)

Staying in Home isolation while using the application and the electronic Bracelet

End of home Isolation in 10 days

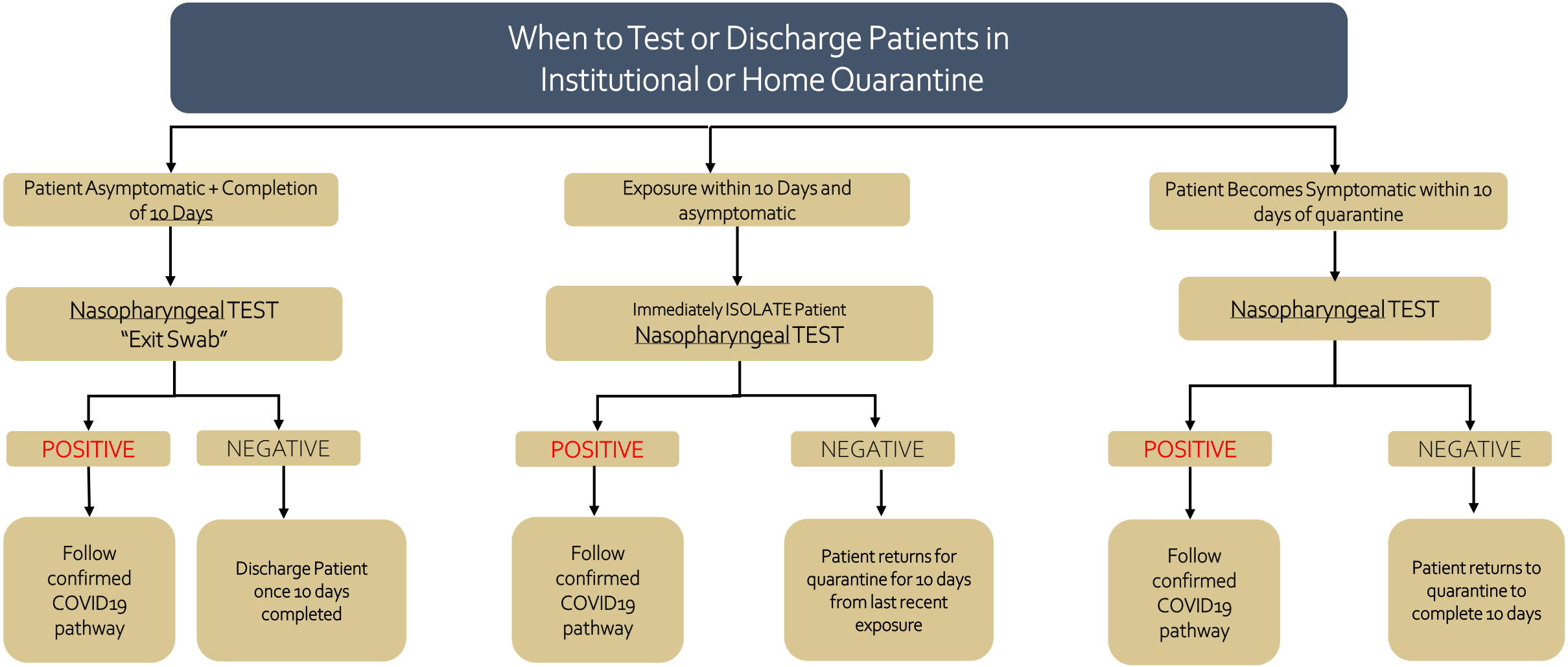
Discharge from home isolation

- After completion of 10days in home isolation while being asymptomatic at least 72hrs prior to discharge ; patient can be discharged without a PCR test
- 10 days of home isolation is counted from onset of symptoms if patient is symptomatic ; otherwise will be counted from diagnosis
- Patients can return electronic bracelet to his/her health center **with** deceleration form

Discharge Protocol and Repeat testing guidelines

for Quarantine and Isolation/Treatment facilities

Testing and Discharge Protocol for Patients in Institutional or Home Quarantine (Close contacts with NEGATIVE PCR)



EXPROSURE: Patient was exposed to a confirmed case for at least 15 minutes at a distance of less than 1 meter without proper PPE

COVID19 Discharge protocol from all treatment facilities : ASYMPTOMATIC OR MILD SYMPTOMS

The Following Procedures Govern Discharge of Patients who are Mildly symptomatic or Asymptomatic at Treatment Facilities

Mild Symptoms
- Absence of Pneumonia
- Symptoms limited to upper respiratory tract

Discharge criteria

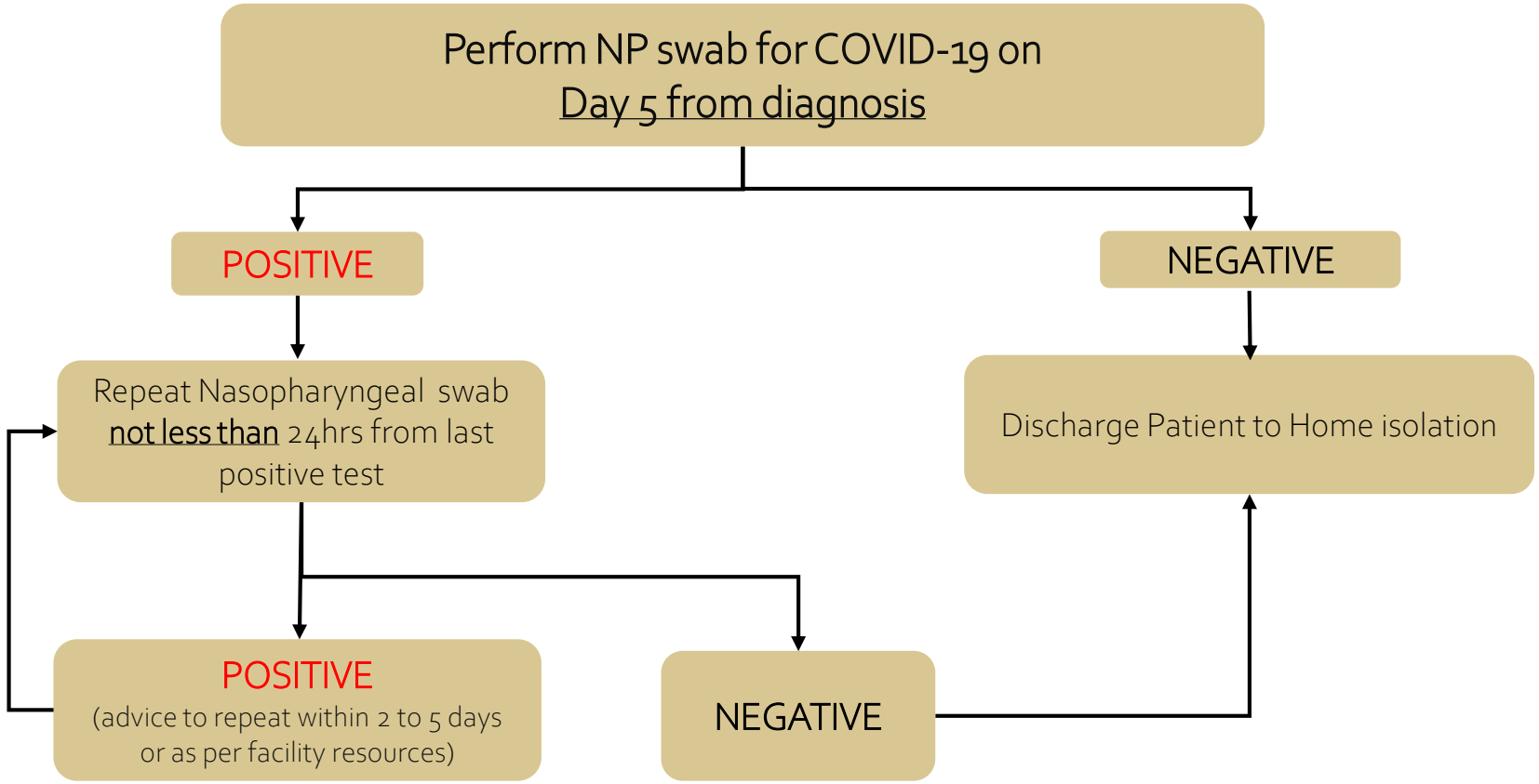
(1) Resolution of symptoms for atleast 72hrs prior to discharge

(2) One negative NP Swab

Isolation instruction
- Need to complete a total of 10 days of self isolation since onset of symptoms (or since date of their first positive COVID-19 test if Asymptomatic)
- Follow home isolation instruction with the use of BeAware App
- Sick leave to be issued from the discharging treatment facility

Return to work

Refer to the Return to work protocol



If patient has persistent positive PCR + completed 10 days as inpatient + atleast 72hrs have passed since resolution of symptoms – Discharge Patient with additional 1 week of home isolation

Patient that has passed >8 days from onset of symptoms and SARS-CoV2 E gene RT-PCR CT Value >24 may predict lack of infectivity (reference)

Patients can return electronic bracelet to his/her health center **with** deceleration form

COVID19 Discharge protocol from all treatment facilities : MODERATE TO SEVERE DISEASE

Moderate to Severe Disease

- Chest Xray suggestive of pneumonia
- Or Shortness of Breath
- Or Signs of respiratory distress (tachypnea >20breath/min) or Hypoxia (Sat <94%) on Room Air

Discharge criteria

(1) Resolution of symptoms for atleast 72hrs prior to discharge

(2) Two consecutive negative Nasopharyngeal swabs that are 24hrs apart or more

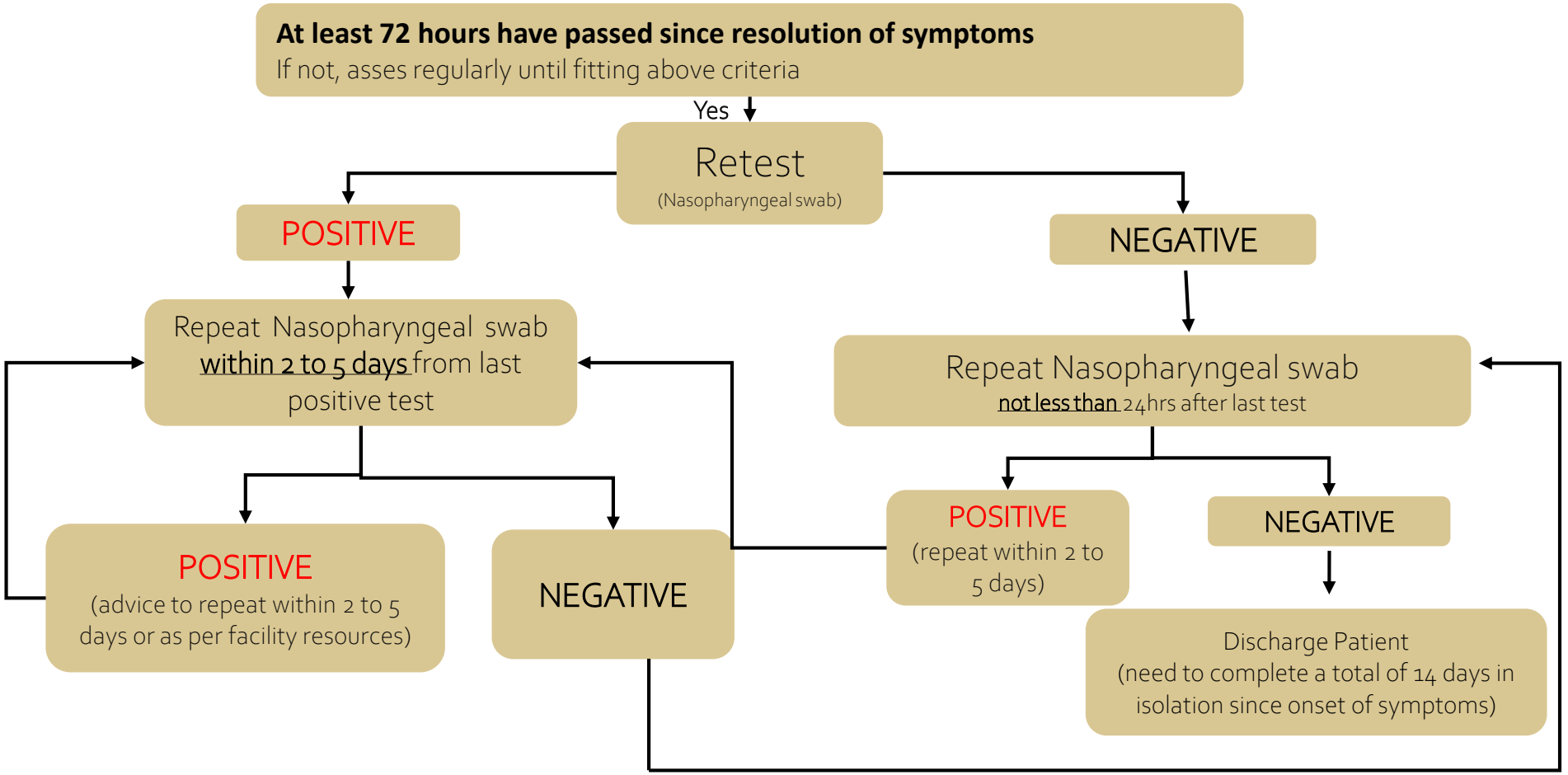
Isolation instruction

- Need to complete a total of 14 days of self isolation since onset of symptoms
- Sick leave to be issued from the discharging treatment facility
  Follow home isolation instruction with the use of BeAware App

Return to work

Refer to the Return to work protocol

The Following Procedures Govern Discharge of Patients at any Treatment Facilities for Moderate and Severe disease



If patient has persistent positive PCR + completed 14 days as inpatient + atleast 72hrs have passed since resolution of symptoms – Discharge Patient with additional 1 week of home isolation

Patient that has passed >8 days from onset of symptoms and SARS-CoV2 E gene RT-PCR CT Value >24 may predict lack of infectivity (reference)

Return to Work Criteria

Return to Work Criteria

- Recovered COVID-19 patients (Non-Health Care Workers) can return to work whenever:
  1. They are Asymptomatic for atleast 72 hours
  2. AND have completed the isolation period specified by the discharge protocol.

- **Healthcare workers** can return to work based on **one** of the following criteria:
  1. 72 hours have passed from resolutions of symptoms **AND** has 2 consecutive negative NP swabs that are at least 24hr apart
  2. Patient is asymptomatic for atleast 72hours **AND** 10 days have passed from diagnosis **AND** 1 negative NP swab.

- All recovered HCW should have serology testing after 2 weeks from diagnosis
- Weekly PCR is NOT required unless requested by infectious Diseases consultant

Recovered 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 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

1. Any Recovered COVID-19 who presented with COVID-19 related symptoms, can be readmitted to COVID-19 facilities if clinically indicated.
    - If Recovered cases develops respiratory symptoms, consider investigating for post COVID-19 complications (such as bacterial pneumonia, VTE) and other infections.
2. If Recovered COVID-19 patients presents with non COVID related illness and requires admission to a non covid facility relating to his presenting illness, patient can be admitted to the appropriate medical are facility with infection control precaution

After 14 days from COVID-19 Pathway Discharge :

Patient follow normal care pathway, unless indicated otherwise

Scientific Justification *Reference: Alberta Health Services Scientific Advisory Group COVID-19 Recommendations*

- The possibility of reinfection with SARS-CoV-2 is very unlikely : there have been no well substantiated cases of reinfection to date and most of the suspect cases are likely related to inconsistent detection of prolonged viral RNA shedding.
- Current evidence suggest that viable virus declines relatively quickly in initial infection, but RT- PCR positivity can be prolonged
- Rising antibody titers over the second and third week of illness are likely protective or partially protective. However, The duration of likely immunity is unclear as yet, but reinfection is unlikely in the short term.

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 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 (oro+nasopharyngeal in one swab) 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 37)*

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, follow institutional protocol and provide appropriate care in an isolation room and perform COVID19 swabs as indicated if mother tested positive or mother under investigation.

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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Treatment Guidelines and Pathways

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
- <u>All Patients should have the baseline investigations done, with the addition of Blood Grouping and Vitamin D level</u>
- <u>Avoid Hydroxychloroquine with Azithromycin due to increased risk of cardiac arrythmias</u>

- 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
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  - 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/m_2)
- 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 the use of Hydroxychloroquine if fitting the criteria (page 50)

Consider **Thromboprophylaxis with low molecular weight heparin (LMWH)** if not contraindicated (page 43)

Regular laboratory investigations for individuals with risk factors*

Investigations

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)

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

Daily ECG if on hydroxychloroquine or any QT prolonging medication

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

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
- Consider the use of Remdesivir or Favipiravir
- **Convalescent** Plasma Therapy
- Dexamethasone or Methylprednisolone (if evidence of hypoxia)
- LMWH/UFH if not contraindicated (refer to pg 43)
- 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
- Consider the use of Remdesivir or Favipiravir
- **Convalescent** Plasma Therapy
- Dexamethasone or Methylprednisolone (if evidence of hypoxia)
- Consider the use of Plasmapheresis in a selected group of patients, on case to case basis, as per facility protocol
- Consider the use of Tocilizumab if fitting criteria
- LMWH/UFH if not contraindicated (refer to pg 43)
- Rule out other causes for pneumonia and PE

Investigations

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)

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
- Consider the use of **Remdesivir** or **Favipiravir**
- **Convalescent** Plasma Therapy
- **Dexamethasone or Methylprednisolone** (if evidence of hypoxia)
- Consider the use of **Plasmapheresis** in a selected group of patients, on case to case basis, as per facility protocol
- Consider the use of **Tocilizumab** if fitting criteria
- **LMWH/UFH** if not contraindicated (refer to pg 43)
- Rule out other causes for pneumonia and treat accordingly
- Rule out the possibility of PE incase of worsening hypoxia

Investigations

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)

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

To be guided as per local facility guidelines

- 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

- 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

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 43	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 .	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.	

Routine post-discharge VTE prophylaxis is NOT recommended for patients with COVID-19 .

However, the benefits of post-discharge prophylaxis for certain high-risk patients without COVID-19 led to the Food and Drug Administration approval of two regimens:

- Enoxaparin 40mg SC OD for 6 to 14 days
- Rivaroxaban 10 mg daily for 31 to 39 days

Inclusion criteria :

- Modified IMPROVE-VTE score ≥4; or
- Modified IMPROVE-VTE score ≥2 and D-dimer level >2 times the upper limit of normal; or
- Age ≥75 years; or
- Age >60 years and D-dimer level >2 times the upper limit of normal; or
- Age 40 to 60 years, D-dimer level >2 times the upper limit of normal, and previous VTE event or cancer.17
- Any decision to use post-discharge VTE prophylaxis should consider the individual patient's risk factors, including reduced mobility, bleeding risks, and feasibility

Modified IMPROVE-VTE score

- 3 point for previous VTE
- 2 points for Thrombophilia
- 2 points for current lower limb paralysis or paresis
- 2 point for History of Cancer
- 1 point for ICU/CCU stay
- 1 point for One or more day of immobilization
- 1 point for Age more than or equal to 60 years

Drugs	Dose
Zinc	50mg Oral Once daily
Vitamin C	1g Oral once daily
Vitamin D (dependig of patients Vitamin D levels)	2000units daily or 50,000units weekly Can also consider dosing related to Vitamin D Level • Serum 25(OH)D 20 to 30 ng/mL: 1000 to 2000 units once daily • Serum 25(OH)D 10 to <20 ng/mL: 2000U once daily or 50,000 units once weekly or 5,000 to 7,000 units once daily • Serum 25(OH)D <10 ng/mL or in patients with deficiency symptoms: 50,000 units once weekly or 5,000 to 7,000 units once daily
Hydroxychloroquine	Adult dose: Day 1: loading dose of 400 mg orally every 12 hours, Day 2 to 5 : 200 mg orally every 12 hours *Refer to Hydroxychloroquine protocol*
Favipiravir	Adult dose: Day 1: 1600 mg PO twice daily (loading doses) Days 2 to 10: 600 mg PO twice daily (14 days can be considered) *Refer to Favipiravir protocol*
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
Tocilizumab (refer to next page)	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

Tisdale Risk Score for QT Prolongation

Risk Score Calculation to predict QT prolongation greater than 500msec		
Variable		**Points**
Age ≥68 years		1
Female		1
Loop diuretic		1
Potassium ≤3.5 mEq/L potassium determined closest to EKG timing		2
Admission QTc ≥450 msec		2
Being admitted for acute myocardial infarction		2
Being admitted for sepsis		3
Being admitted for heart failure		3
Number of QTc-prolonging drugs given If receiving ≥2 drugs, patient receives 3 points for 1 QTc-prolonging drug as well as 3 additional points for ≥2.	None	0
	1 QTc-prolonging drug	3
	≥2 QTc-prolonging drugs	6

Interpretation and Recommendations		
Risk Score	**Risk for QT prolongation**	**Recommendation**
≤6	Low	Always consider that higher risk may develop depending on clinical course and drug interactions and pharmacokinetics.
7-10	Moderate	• Clinical Pharmacist Consultation • Adjust risk factors as much as possible. • EKG should be repeated after 5 half-lives of QT-prolonging drugs given to evaluate QTc.
≥11	High	• Clinical Pharmacist Consultation • Adjust risk factors • Use alternative medications • EKG should be repeated after 5 half-lives of QT-prolonging drugs given to evaluate QTc.

Hydroxychloroquine Treatment Protocol

Category	Details
Dose	<u>Adult dose:</u> • Day 1 : Loading dose of 400 mg orally every 12 hours, • Followed by 200 mg orally every 12 hours for a total of 5 to 10 days
Indications (ALL apply)	• Adults with mild disease (Upper respiratory tract infection) or Asymptomtatic adults with risk factors • Early during the course of the disease ; less than 7 days before onset of symptoms • Inpatients only • Follow daily monitoring protocol, with cardiac telemetry
Contraindications	• G6PD Deficency • QTc > 500msec , or 550msec with pacing • Bundle Branch Block • Epilepsy • Porphyria • Pre-existing Retinopathy
Monitoring	• QT Interval : ECG 2-3 hours after the second dose of hydroxychloroquine, and daily thereafter. • Serum Creatinine, • Potassium • Magnesium • Liver Function tests: ALT, AST • Hemoglobin level • Plateletes • Blood sugar
Adverse Effects	• QT Prolongation • Cardiac arhythmias • Hypoglycemia

Favipiravir Treatment Protocol

Category	Details
Dose	<u>Adult dose:</u> • Day 1: 1600 mg PO twice daily (loading doses) • Days 2 to 10: 600 mg PO twice daily (14 days can be considered) <u>Hepatic adjustment in Child Pugh C</u> • Day 1: 800 mg PO twice daily • Days 2 to 10: 400 mg PO twice daily
Monitoring	• Serum Creatinine, • Uric acid • Liver Function tests: ALT, AST, ALP, Bilirubin • WBC and Neutrophil count
Adverse effects	• Hyperuricemia • Neutropenia • Hepatic Injury
Drug Interaction	• Tamoxifen, • Calcium Channel Blockers • Loop diuretics • Tricyclic antidepressants • Diabetic medications • Paracetmol to be limited to 3g per day
Precautions	• Caution in using in patients with pre-existing gout and gouty arthritis. • Monitor for QT- prolongation if combined with other QT-prolonging agents. • Testes toxicity was also noted when taking favipiravir. • Contraindicated in pregnancy.

Remdesivir Treatment Protocol

Category	Details
Dose	<u>Adult dose:</u> • 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.* *Indicated for patient with COVID19 requiring supplemental oxygen therapy*
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	<u>Adult dose:</u> 6mg IV OD for 5 -10 days
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. Abnormal chest imaging consistent with COVID19
  2. 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 >100 or >50 but doubled in past 48 hours
  3. AND Rapidly worsening gas exchange requiring >6 L/min O2, O2 sats <93% PaO2/FiO2

- 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
  - Avoid in AST/ALT >1.5x upper limit of normal

References and Further Reading

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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 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			
□ **Favipiravir**	□ Day 1: 1800mg PO/NGT BD □ Day 2 - 14: 800mg PO/NGT bd for (7-14 days)	Note: Avoid in pregnancy No dose adjustment for any renal impairment. For liver impairment adjust according to the child Pugh score C: Day 1: 800 mg PO/NGT bd Day 2 - 10: 400 mg PO/NGT bd	
□ **Hydroxychloroquine**	□ Day 1 : 400mg twice PO/NGT □ 200 mg twice PO/NGT for 5 to 10 days	• G6PD Deficency • QTc > 500msec , or 550msec with pacing • Bundle Branch Block • Epilepsy • Porphyria • Pre-existing Retinopathy	• QT Interval : ECG 2-3 hours after the second dose of hydroxychloroquine, and daily thereafter. • Serum Creatinine, • Potassium • Magnesium • Liver Function tests: ALT, AST • Hemoglobin level • Plateletes • Blood sugar
□ **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
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	
Disease modifying interleukin 6 receptor antagonist			
□ **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>100 mg/dl • LDH >250 U/L • Lymphocyte count <0.8 **Discontinue** Interferon beta-1b 24 hours prior to dose	

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		
□ **Doxycycline**	100 mg □ IV or OPO ql2 hours		