State of Palestine
Ministry of Health

Palestinian National Covid-19 Management Protocol

تقديم

يسرني أن أضع بين ايديكم البروتوكول الوطني المعتمد للإجراءات التشخيصية والعلاجية لوباء فيروس كورونا (كوفيد-19)، والذي أعدته اللجنة الوطنية العلمية المكلفة بهذا الخصوص، وذلك بما يتماشى مع آخر المستجدات العلمية والطبية لمنظمة الصحة العالمية والاستفادة من خبرات الدول الأخرى في مواجهة الوباء.

إننا في وزارة الصحة نلتزم بالعمل على توفير خدمات صحية آمنه لكافة المواطنين وفي كافة الظروف وخاصة الظروف الحالية التي يمر بها الوطن في مواجهة هذا الوباء العالمي، ونلتزم بالعمل مع كافة الشركاء على وضع النظام الصحي الفلسطيني على أهبة الأستعداد لمواجهة هذا الفيروس.

وأخيرا لا يسعني إلا ان أتقدم بالشكر والإمتنان لكافة أعضاء اللجنة الوطنية الذين ساهموا في إعداد هذا البروتوكول آملين أن نتمكن من تجاوز هذه المحنة بأقل الخسائر.

الدكتورة مي سالم الكيلة

وزيرة الصحة

Forward

It's my pleasure to present for you the "Palestinian National COVID 19 Management Protocol". This protocol prepared by the assigned National Scientific Committee is aligned with the scientific and medical updates of the World Health Organization, and the experiences learned from other countries facing the pandemic.

We are in the Palestinian Ministry of Health committed to provide safe and high-quality health services for all citizens in all circumstances especially in the current situation we are facing. We are committed to work cooperatively with all stakeholders to take all preparedness measures of the Palestinian health system to be able to face the current urgent situation.

Finally, I am highly appreciates and thankful to all the national committee members who actively contributed to preparing this protocol, hoping that we can overcome this crisis with the minimal loss.

Dr. Mai S. Al Kaila
Minister of Health

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Table of contents

1. Background and Etiology

Coronaviruses are zoonotic viruses that circulate amongst animals. Some have been identified in humans, causing illness ranging from mild symptoms to severe illness. On 31 December 2019, WHO was alerted to several cases of pneumonia of unknown origin in Wuhan City in the Hubei Province of China. One week later, on 7 January 2020, Chinese authorities confirmed that they had identified a new virus as the cause of the pneumonia cluster. The new virus is a coronavirus, belonging to the same family of viruses that cause the common cold, as well as viruses that cause severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome coronavirus (MERS-CoV).

2. Epidemiology

Since Jan 2020, the outbreak has escalated rapidly, with the WHO declaring a public health emergency of international concern on 30 January 2020. The outbreak spread rapidly from a single city to an entire country in only 30 days. March 13 2020 WHO has declared it as A Pandemic.

3. Pathophysiology

A. The source of infection.

a. The COVID-19 patients;
b. Asymptomatic infected people can also be a source of infection.

B. Route of transmission

a. Respiratory droplets and contaminated surfaces contact are the main routes of transmission.
b. There is the possibility of aerosol transmission in a relatively closed environment for a long-time exposure to high concentrations of aerosol.
c. There is evidence about detection of virus from stool and Urine; which could make it a rout of transmission at least from touching contaminated surfaces.

C. Susceptible population.

- All the population and age groups are generally susceptible.
- Infection in children is being reported much less commonly than among adults and all cases so far have been in family clusters or in children who have a history of close contact with an infected patient.
- There is currently no known difference between the clinical manifestations of COVID-19 pregnant and non-pregnant women or adults of reproductive age.

D. Incubation Period

- Current estimates of the incubation period range from (1-14) days, according to the WHO and CDC. The median incubation period has been estimated to be 5 days. Transmission may be possible during the incubation period (2-5 days) prior to onset of symptoms.

E. Reproductive Number

- Preliminary reports suggest that the reproductive number (R_0), the number of people who acquire the infection from an infected person, is approximately 2.2. However, as the situation is still evolving, the R_0 may actually be higher or lower.

4. Clinical presentation

- The clinical presentation resembles any viral infection, and the severity of illness ranges from mild to severe.
- Reports suggest that illness severity is associated with older age and the presence of underlying health conditions.
- **Based on an early analysis of case series, the most common symptoms are:**

Common	Less Common
• Fever • Cough • Dyspnea and shortness of breath • Myalgia • Fatigue.	• Anorexia • Sputum production • Sore throat • Confusion • Dizziness • Headache • Rhinorrhea • Chest pain • Hemoptysis • GI Symptoms: - Diarrhea, Nausea and vomiting and Abdominal pain.

5. Case Definitions

A suspected case (3 scenarios)	✓ **A patient with acute respiratory illness (that is, fever and at least one sign or symptom of respiratory disease, for example, cough or shortness of breath)** **AND** ✓ **No other etiology that fully explains the clinical presentation** **AND** ✓ **A history of travel to or residence in a country area or territory that has reported local transmission of Corona Virus Disease-19 (COVID-19) during the last 14 days prior to symptom.** **OR**
	✓ A patient with any acute respiratory illness **AND** ✓ Who has been a contact of a confirmed or probable case of COVID-19 during the last 14 days prior to the onset of symptoms; **OR**
	✓ A patient with Severe Acute Respiratory Infection (SARI) (that is, fever and at least one sign or symptom of respiratory disease, for example, cough or shortness breathe) AND who requires hospitalization AND who has no other etiology that fully explains the clinical presentation.
Probable case	✓ A case for whom the report from laboratory testing for the COVID-19 virus is inconclusive.
Confirmed case	✓ A confirmed case is a person **with laboratory confirmation of infection with the COVID-19 virus**, irrespective of clinical signs and symptoms.
A contact	✓ Is a person who is involved in any of the following within 14 days after the onset of symptoms in the patient:- ○ Providing direct care for patients with COVID-19 without using proper Personal Protective Equipment (PPE); ○ Staying in the same **close environment** as a COVID-19 patient (including sharing a workplace, classroom or household or being at the same gathering); ○ Travelling in close proximity with (that is, having less than 1 m separation from) a COVID-19 patient in any kind of conveyance.

✓ **الحالة المشتبه فيها:**

أ : مريض مصاب باعتلال تنفسي حاد (أي بالحمى وبعلامة واحدة أو عرض واحد يشير إلى مرض الجهاز التنفسي، مثل السعال أو ضيق النفس)، مع عدم وجود أسباب أخرى تفسر المظاهر السريرية، ومع وجود سابقة سفر أو إقامة في بلد أو منطقة أبلغ عن السريان المحلي لمرض كوفيد-19 خلال الأربعة عشر يوماً السابقة لبدء الأعراض.

أو

ب : مريض مصاب بأي اعتلال تنفسي حاد وكان قد خالط إحدى حالات العدوى المحتملة أو المؤكدة بمرض كوفيد-19 خلال الأربعة عشر يوماً السابقة لبدء الأعراض.

أو

ج : مريض مصاب بمرض الجهاز التنفسي الحاد الوخيم (أي بالحمى وبعلامة واحدة أو عرض واحد على الأقل يشير إلى مرض الجهاز التنفسي، مثل السعال أو ضيق التنفس) ويحتاج إلى دخول المستشفى ولا توجد لديه أسباب أخرى تفسر هذه المظاهر السريرية تفسيراً كاملاً.

✓ **الحالة المحتملة:**

- **الحالة المحتملة هي حالة مشتبه فيها لم يشر تقرير الفحص المخبري للكشف عن الفيروس لمرض كوفيد-19 لديها إلى نتيجة حاسمة.**

✓ **الحالة المؤكدة:**

- **الحالة المؤكدة هي شخص تأكدت مخبرياً إصابته بعدوى الفيروس لمرض كوفيد-19 بغض النظر عن العلامات والأعراض السريرية.**

6. Triage and screening:-

➢ All Hospitals

- Should provide good visual signage's requesting patients to declare symptoms, travel or contact with a confirmed case.
- Through verbal (Questioners) and visual cues, identify those with respiratory symptoms and offer (surgical/ medical) masks and hand sanitizer to the patient and Companion.
- In isolation room using appropriate PPE Clinically assesses the severity and whether the patient qualifies as a case.

➢ WHEN SHOULD YOU SUSPECT COVID-19

- COVID-19 is to be suspected when a patient presents to triage counter with the following:

- Fever **OR** Acute respiratory infection (Sudden onset of respiratory infection with at least one of: shortness of breath, cough or sore throat)

AND

- Travel or Residence to affected Country or area in the last 14 days before the onset of illness

OR

- Close contact in 14 days before illness onset with a confirmed case of COVID-19

If patient fulfill the description, to institute infection prevention and control measures as the following:
✓ **Place patients at least 1 meter away from other patients or healthcare workers.**
✓ **Clinics and emergency departments are to prepare an isolation area/room for patients.**
✓ **Ensure strict hand hygiene for all clinic staffs and suspected patients.**
✓ **Provide surgical mask to patients if not contraindicated (Not Distress) But can be used on top of nasal cannula**
✓ **If entering patient room or dealing with a suspected or Confirmed case; PPE as per recommendation should be worn at all times**
✓ **After the encounter, ensure proper disposal of all PPE that have been used.**
✓ **Decontamination of the isolation area and equipment's used should be done.**
✓ **A group of suspected cases who come to any healthcare facilities in a specific vehicle (e.g. Bus) should be contained in that vehicle until being evaluated by a dedicated team to minimize exposure to healthcare workers and other patients.**

NOTE:

It is not always possible to identify patients with COVID-19 early because some have mild or unusual symptoms. For this reasons, it is important that health care workers apply **standard precautions** (Hand Hygiene, Avoid direct contact, clean surfaces etc.) Consistently with all patients

7. Clinical Classification

a. Although the majority of people with COVID-19 have **uncomplicated or mild illness (81%),**

b. Some will develop **severe illness** requiring oxygen therapy (14%) and

c. Approximately 5% will require intensive care unit treatment. Of those **critically ill**, most will require mechanical ventilation.

d. Classification

i. Mild: The clinical symptoms were mild, and there was no sign of pneumonia on imaging.

ii. Moderate: Showing fever and respiratory symptoms with radiological findings of pneumonia.

iii. Severe: In accordance with any of the following:

- ✓ Shortness of breath (RR ≧30 breaths/min);In resting state,
- ✓ oxygen saturation ≤ 93% at room air;
- ✓ Arterial partial pressure of oxygen (PaO2)/ fraction of inspired oxygen (FiO2) ≦300mmHg.
- ✓ Cases with chest imaging showed **obvious lesion progression more than 50% within 24-48 hours.**

iv. Critical: One of the following: Respiratory failure, requiring mechanical ventilation or Shock with other organ failure that requires ICU care.

Clinical syndromes associated with COVID-19	
Mild illness	➢ Mild non-specific symptoms such as:- • Fever, fatigue, cough (with or without sputum production), anorexia, malaise, muscle pain, sore throat, dyspnea, nasal congestion, or headache. • Rarely, patients may also present with diarrhea, nausea, and vomiting. • The elderly and immunosuppressed may present with atypical symptoms.
Moderate Pneumonia	• **Adult** with pneumonia but no signs of severe pneumonia and no need for supplemental oxygen. • **Child** with non-severe pneumonia who has cough or difficulty breathing + fast breathing: fast breathing (in breaths/min): ✓ < 2 months: ≥ 60; 2–11 months: ≥ 50; 1–5 years: ≥ 40, and no signs of severe pneumonia.

Severe pneumonia	• **Adult:** fever or suspected respiratory infection, plus one of the following: ✓ Respiratory rate > 30 breaths/min; ✓ severe respiratory distress; or ✓ SpO2 ≤ 93% on room air. • **Child** with cough or difficulty in breathing, plus at least one of the following: ✓ Central cyanosis or SpO2 < 90 %; ✓ 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.
Acute Respiratory Distress Syndrome	• **Onset:** within 7-10 days of a known clinical insult or new or worsening respiratory symptoms. • **Chest imaging** (radiograph, CT scan): bilateral opacities, not fully explained by volume overload, lobar or lung collapse, or nodules.
❖ **Mild ARDS: 200 mmHg < PaO2/FiO2a ≤ 300 mmHg (with PEEP or CPAP ≥ 5 cmH2O, or non-ventilated)** ❖ **Moderate ARDS: 100 mmHg < PaO2/FiO2 ≤ 200 mmHg (with PEEP ≥ 5 cmH2O, or non-ventilated)** ❖ **Severe ARDS: PaO2/FiO2 ≤ 100 mmHg (with PEEP ≥ 5 cmH2O, or non-ventilated)** ❖ **When PaO2 is not available, SpO2/FiO2 ≤ 315 suggests ARDS (including in non-ventilated patients).**	
Abbreviations: ARI acute respiratory infection; BP blood pressure; bpm beats/minute; CPAP continuous positive airway pressure; FiO2 fraction of inspired oxygen; MAP mean arterial pressure; NIV non-invasive ventilation; PaO2 partial pressure of oxygen; PEEP positive end-expiratory pressure.	

8. Clinical early warning indicators

a. The peripheral blood lymphocytes decrease progressively;
b. Progressively elevation of inflammatory factors, C-reactive proteins;
c. Lactate sustained or progressive elevation;
d. Lung lesions develop rapidly in a short period.

9. Management

a. Infection prevention and control

i. Triage all patients on admission and immediately isolate all suspected and confirmed cases in an area separate from other patients.
ii. Implement appropriate infection prevention and control procedures.
iii. Implement standard precautions at all times:Practice hand and respiratory hygiene
iv. Use PPE accordingly

PPE Needed/ Category	
✓ **INFECTION, PREVENTION, AND CONTROL (IPC):-** ❖ **All health care workers involved in managing suspected or confirmed case shall adhere to the infection and prevention control guideline at all time.** ❖ **Personal Protective Equipment (PPE) shall be used per recommendation below:-**	
A. Registration counter: 1. Surgical mask 2. Gloves 3. Maintain distance >1meter 4. Frequent hand hygiene, preferably with alcohol-based hand rub **B. General triage counter:** a. Surgical mask b. Frequent hand hygiene/strict hand hygiene adherence, preferably with alcohol-based hand rub c. Ensure these PPE are available on side (Masks for suspected cases). d. Avoid touching the face, surfaces and objects with contaminated gloves.	**C. Healthcare worker (HCW) should wear:** a. Standard isolation gown (Fluid-REPELLENT LONG SLEEVED GOWN) b. N95 mask c. Face shield or Goggle d. Head cover e. Gloves f. Frequent hand hygiene/Strict hand hygiene adherence. **D. Paramedic and driver who directly involved in patient care:** a. Disposable gown or cover whole suite b. Mask N95 c. Face shield or goggle d. Gloves e. Head cover
➢ **Ensure patients maintained surgical mask and cough etiquette**	

COVID-19

Public Health England

Putting on (donning) personal protective equipment (PPE)

Use safe work practices to protect yourself and limit the spread of infection

- keep hands away from face and PPE being worn
- change gloves when torn or heavily contaminated
- limit surfaces touched in the patient environment
- regularly perform hand hygiene
- always clean hands after removing gloves

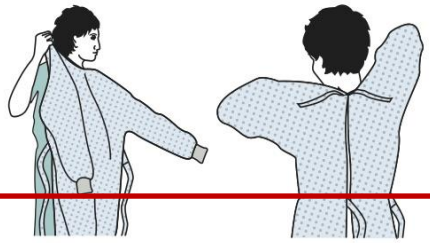
Pre-donning instructions

- ensure healthcare worker hydrated
- tie hair back
- remove jewellery
- check PPE in the correct size is available

Putting on personal protective equipment (PPE). The order for putting on is gown, respirator, eye protection and gloves. This is undertaken outside the patient's room.

Perform hand hygiene before putting on PPE

1 **Put on the long-sleeved fluid repellent disposable gown** - fasten neck ties and waist ties.



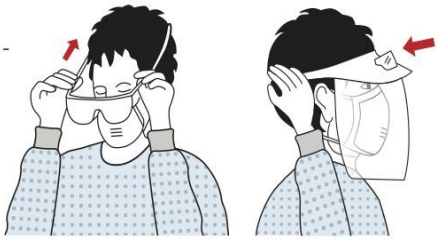
2 **Respirator.**

Note: this must be the respirator that you have been fit tested to use. Where goggles or safety spectacles are to be worn with the respirator, these must be worn during the fit test to ensure compatibility

Position the upper straps on the crown of your head, above the ears and the lower strap at the nape of the neck. Ensure that the respirator is flat against your cheeks. With both hands mould the nose piece from the bridge of the nose firmly pressing down both sides of the nose with your fingers until you have a good facial fit. If a good fit cannot be achieved **DO NOT PROCEED**

Perform a fit check. The technique for this will differ between different makes of respirator. Instructions for the correct technique are provided by manufacturers and should be followed for fit checking

3 **Eye protection** - Place over face and eyes and adjust the headband to fit



4 **Gloves** - select according to hand size. Ensure cuff of gown covered is covered by the cuff of the glove.

COVID-19

Public Health England

Removal of (doffing) personal protective equipment (PPE)

PPE should be removed in an order that minimises the potential for cross contamination. Unless there is a dedicated isolation room with ante room, PPE is to be removed in as systematic way before leaving the patient's room i.e. gloves, then gown and then eye protection.

The FFP3 respirator must always be removed outside the patient's room.

Where possible (dedicated isolation room with ante room) the process should be supervised by a buddy at a distance of 2 metres to reduce the risk of the healthcare worker removing PPE and inadvertently contaminating themselves while doffing.

The FFP3 respirator should be removed in the anteroom/lobby. In the absence of an anteroom/lobby, remove FFP3 respirator in a safe area (e.g., outside the isolation room).

All PPE must be disposed of as healthcare (including clinical) waste.

The order of removal of PPE is as follows:

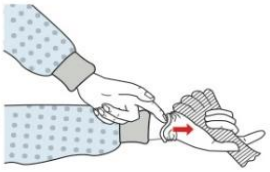
1 Gloves – the outsides of the gloves are contaminated

Firstly:

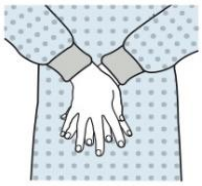
- grasp the outside of the glove with the opposite gloved hand; peel off
- hold the removed glove in gloved hand

Then:

- slide the fingers of the un-gloved hand under the remaining glove at the wrist
- peel the remaining glove off over the first glove and discard



Clean hands with alcohol gel

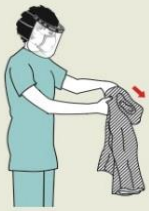


2 Gown – the front of the gown and sleeves will be contaminated

Unfasten neck then waist ties

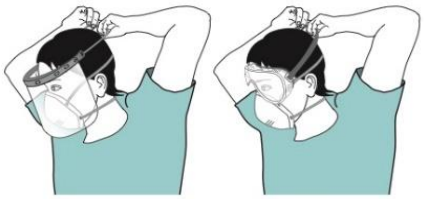
Pull gown away from the neck and shoulders, touching the inside of the gown only using a peeling motion as the outside of the gown will be contaminated

Turn the gown inside out, fold or roll into a bundle and discard into a lined waste bin



3 Eye protection (preferably a full-face visor) - the outside will be contaminated

To remove, use both hands to handle the retraining straps by pulling away from behind and discard.



4 Respirator – In the absence of an anteroom/lobby remove FFP3 respirators in a safe area (e.g., outside the isolation room).

Do not touch the front of the respirator as it will be contaminated

- lean forward slightly
- reach to the back of the head with both hands to find the bottom retaining strap and bring it up to the top strap
- lift straps over the top of the head
- let the respirator fall away from your face and place in bin

5 Wash hands with soap and water

b. Diagnostic tests

- Positive patients are recommended to perform a full respiratory viral panel and sputum culture to rule out additional illness caused by additional viruses/bacteria

Molecular (PCR)	Routine Tests	Microbiology	Imaging
• Lower respiratory tract specimens (sputum, endotracheal aspirate, bronchoalveolar lavage) where possible and depending upon the patient's condition • Upper respiratory tract specimens (nasopharyngeal and oropharyngeal swabs) may be used if lower respiratory tract specimens cannot be collected • <u>Its 75% Sensitive specially if Nasopharyngeal</u>; If initial testing is negative in a patient who is strongly suspected to have COVID-19, recollect specimens from multiple respiratory tract sites (nose, sputum, endotracheal aspirate) and retest	**1.** ABG **2.** CBC **3.** CRP **4.** coagulation screen **5.** Chemistry Panel (KFT, Liver enzymes, Serum Lytes) **If clinically indicated:** • D-Dimer • Ferritin • LDH • Serum Troponin • CPK (CK) • Serum Troponin • G6PD level • Baseline ECG	✓ Blood culture ✓ sputum cultures ○ Collect blood and sputum specimens for culture in all patients. ○ Specimens should be collected prior to starting empirical antimicrobials **<u>if possible.</u>**	✓ chest x-ray • Order in all patients with suspected pneumonia. • Consider in mild cases with high suspicion to deteriorate. ✓ (CT) chest • Consider a CT scan of the chest. • It is particularly helpful in patients with suspected pneumonia who have a normal chest x-ray.

c. General Management:

These symbols are used to flag interventions:

- ✅ **Do**: the intervention is beneficial (strong recommendation) **OR** the intervention is a best practice statement.
- ❌ **Don't:** the intervention is known to be harmful.
- ⚠ **Consider:** the intervention may be beneficial in selected patients (conditional recommendation) **OR** be careful when considering this intervention.

- ✓ So far; no specific treatments are known to be effective for COVID-19 yet; all of the current regimen are based on others experience and case reports; therefore, the mainstay of management is optimized supportive care to relieve symptoms and to support organ function in more severe illness.
  1. Rest and symptomatic support therapy (Antipyretics); sufficient caloric; water and electrolyte;
  2. Closely monitoring vital signs and oxygen saturation.
  3. Monitoring lab test: blood routine result, C-Reactive Protein (CRP), biochemical indicators (liver enzyme, myocardial enzyme, renal function etc.), coagulation function, arterial blood gas analysis, and chest imaging.
  4. Consider ECG (EKG)
  5. Early oxygen therapy and airway drainage via face mask /nasal cannula.
- ✓ Patients should be managed in a hospital setting where possible; however, home care may be suitable for selected patients with mild illness.

Management

➢ Indication for Admission:-

- ✓ **Suspected, probable and confirmed cases who is moderately; severely or critically ill.**
- ✓ **Confirmed case: - Patients with uncontrolled Co-morbidities, such as Respiratory, cardiovascular diseases and diabetes mellitus, etc.**
- ✓ **Confirmed case:- Immuno-compromised Patient**
- ✓ **Confirmed case:- Old ages ≥ 65 years**
- ✓ **Confirmed case: Patients with no caregiver.**

Mild COVID-19: symptomatic treatment and monitoring	☑ Older patients > 65 years and those with comorbidities, such as cardiovascular disease and diabetes mellitus, have increased risk of severe disease and mortality. They may present with mild symptoms but have high risk of deterioration and should be admitted to a designated unit for close monitoring. ☑ Patients with mild disease do not require hospital interventions, but isolation is necessary to contain virus transmission and will depend on national strategy and resources. ☑ Although most patients with mild disease may not have indications for hospitalization, it is necessary to implement appropriate IPC to contain and mitigate transmission. This can be done either in hospital, if there are only sporadic cases or small clusters, or in repurposed, non-traditional settings; or at home. ☑ Provide patients with mild COVID-19 with symptomatic treatment such as antipyretics for fever. ☑ Counsel patients with mild COVID-19 about signs and symptoms of complicated disease. If they develop any of these symptoms, they should seek urgent care through national referral systems.

Severe COVID-19: oxygen therapy and monitoring	☑ Give supplemental oxygen therapy immediately to patients with SARI and respiratory distress, hypoxaemia or shock and target SpO2 >94%. ✓ Remarks for adults: Initiate oxygen therapy at 5 L/min and titrate flow rates to reach target SpO2 ≥ 93% during resuscitation; or use face mask with reservoir bag (at 10–15 L/min) if patient in critical condition. Once patient is stable, the target is > 90% SpO2 in non-pregnant adults and ≥ 92–95% in pregnant patients ✓ Remarks for children: Children with emergency signs (obstructed or absent breathing, severe respiratory distress, central cyanosis, shock, coma or convulsions) should receive airway management and oxygen therapy during resuscitation to target SpO2 ≥ 94%; otherwise, the target SpO2 is ≥ 90%. Use of nasal prongs or nasal cannula is preferred in young children, as they may be better tolerated. ☑ Closely monitor patients with COVID-19 for signs of clinical deterioration, such as rapidly progressive respiratory failure and sepsis and respond immediately with supportive care interventions. ✓ Remark 1: Patients hospitalized with COVID-19 require regular monitoring of vital signs. ✓ Remark 2: Hematology and biochemistry laboratory testing and ECG should be performed at admission and as clinically indicated to monitor for complications, such as acute liver injury, acute kidney injury, acute cardiac injury, or shock. ☑ Understand the patient's co-morbid condition(s) to tailor the management of critical illness. ✓ Remark 1: Determine which chronic therapies should be continued and which therapies should be stopped temporarily. Monitor for drug-drug interactions. ☑ Use conservative fluid management in patients with SARI when there is no evidence of shock. ✓ **Remarks: Patients with SARI should be treated cautiously with intravenous fluids, because aggressive fluid resuscitation may worsen oxygenation, this applies for care of children and adults.** ☑ Give empiric antimicrobials to treat all likely pathogens causing SARI and sepsis as soon as possible, within 1 hour of initial assessment **for patients with sepsis**. Suggested Regimen based on Palestinian Antibiogram (MRSA high percentage ~ 40%): (see below) ☑ When there is ongoing local circulation of seasonal influenza, empiric therapy with Oseltamivir (Tamiflu).

Critical COVID-19: Acute Respiratory Distress Syndrome (ARDS)	☑ Give supplemental oxygen therapy immediately to patients with SARI and respiratory distress, hypoxemia or shock and target SpO2 >94%. ✓ Remarks for adults: **see above Severe COVID-19** ✓ Remarks for children: **see above Severe COVID-19** ☑ Closely monitor patients with COVID-19 for signs of clinical deterioration, such as rapidly progressive respiratory failure and sepsis and respond immediately with supportive care interventions. ✓ Remark 1: **see above Severe COVID-19** ✓ Remark 2: **see above Severe COVID-19** ☑ Understand the patient's co-morbid condition(s) to tailor the management of critical illness. ✓ Remark 1: Determine which chronic therapies should be continued and which therapies should be stopped temporarily. Monitor for drug-drug interactions. ☑ Use conservative fluid management in patients with SARI when there is no evidence of shock. ✓ Remarks: **see above Severe COVID-19** ☑ Give empiric antimicrobials to treat all likely pathogens causing SARI and sepsis as soon as possible, within 1 hour of initial assessment **for patients with sepsis**. Make sure cultures taken prior to antibiotics administration if possible. ☑ When there is ongoing local circulation of seasonal influenza, empiric therapy with Oseltamivir (Tamiflu).

Antiviral Drugs And Adjunctive Treatment	
Corticosteroids	☒ **Do not routinely give systemic corticosteroids for treatment of viral pneumonia outside clinical trials.** ✓ Given the lack of effectiveness and possible harm, routine corticosteroids should be avoided unless they are indicated for another reason. Other reasons may include exacerbation of asthma or COPD, septic shock, and risk/benefit analysis needs to be conducted for individual patients.

Therapeutic Protocol	➢ **All drug treatments are on an experimental basis, and none has been demonstrated in phase 2 or 3 clinical trials at this time.** ➢ **Cultures Blood, urine and sputum/ trap or lavage should be taken and if negative Stop Antibiotics**
	➢ **COVID-19 positive patient asymptomatic or with mild symptoms:** ✓ (Fever > 38° C, cough without dyspnea), age <65 years and without risk factors (COPD, diabetes and heart disease) and negative chest X-ray: ✅ **Clinical observation, supportive therapy**
	➢ **COVID-19 positive patient with mild respiratory symptoms but:-** ✓ Aged> 65 years and / or with risk factors (COPD, diabetes and heart disease) or ✓ Symptomatic or with mild symptoms (Fever (> 38 ° C), cough, dyspnoea mild to moderate) **and chest x-ray with pneumonia:-** ✅ Lopinavir / Ritonavir cap (Kaletra) + Hydroxychloroquine (Plaquenil)Plus Azithromycin ✓ **See table below for dosage and duration below.**
	➢ **In case of need for oxygen therapy or rapid clinical worsening** ✅ Lopinavir / Ritonavir cap (Kaletra) + Hydroxychloroquine and Azithromycin for total of 5 days ✅ Dexamethasone ✅ Alternatively, methylprednisolone (IV). ✅ **Antibiotics:-** ✓ Vancomycin plus Ceftriaxone or ✓ Vancomycin Plus Levofloxacin/ Ciprofloxacin (IV or PO) (If B-lactam Allergy) ⚠ **If high risk to hospital Acquired infection or multidrug Resistant Organisms (MDROs):-** ✓ Vancomycin plus Piperacillin-Tazobactamor ✓ Vancomycin plus Meropenem ✓ Vancomycin Plus Levofloxacin/ Ciprofloxacin (If B-lactam Allergy) ⚠ If Suspicion about ongoing or Coinfection consider Oseltamivir (Tamiflu) ⚠ **IfRemdesivir Available (use it instead of Kaletra)**

	➢ **COVID-19 positive patient with severe pneumonia, ARDS or overall respiratory failure, hemodynamic failure, need for mechanical (or non-invasive) ventilation:-** ☑ Dexamethasone or methylprednisolone. ☑ Hydroxychloroquine via NGT. Plus (Azithromycin for total of 5 days) in addition to the Antibiotics/ Oseltamivir (Same as above)**Plus One of the following:-** ☑ Lopinavir / Ritonavir cap (Kaletra) ☑ **If Available Remdesivir** **Or** ☑ **If Available Favipiravir**
❗ **Consider using plasma from the blood of people who have recovered from the novel coronavirus for critically severely ill patients.**	

☑ **Consider drug-drug interaction, dose adjustment in Renal or Hepatic impairment.**

1) Lopinavir/ Ritonavir (Kaletra)

- ❖ Adult dose:
  - ✓ Lopinavir 400mg/Ritonavir 100mg twice daily for 7- 14 days
- ❖ Infants and pediatrics dose:
  - ✓ 16mg/kg/dose twice daily
  - ✓ Or 300mg/m²/dose twice daily
- ➢ Do not exceed recommended adult dose.
- ➢ Use of tablets in patients <15kg or <0.6 m² is not recommended (oral solution is preferred)

2) **Favipiravir** 1600 mg PO BID on day 1, followed by 600 mg PO TID from day 2 up to 14 days.

3) Remdesivir; ampoules 150 mg: day (1) 200 mg IV in 30 minutes then 100 mg iv / day for another 9 days.

4) Hydroxychloroquine (Plaquenil)

- ❖ Adult dose:
- ✓ Day (1)400mg x 2 the 200mg x 2 for 7-10 days
- ❖ Infants and pediatrics dose:
- ✓ 6.5mg/kg once daily (maximum 400mg)

5) Dexamethasone 20 mg / day for 5 days then 8 mg / day for 5 days (on an intensivist indication) or methylprednisolone 1-2 mg/kg/day x 5 days

☑ Medication Safety Information

- ✓ **Hydroxychloroquine/ Chloroquine is contraindicated in Patient with G6PD Deficiency.**
- ✓ Check for any potential drug interaction if patient is on any other medication or being started while on COVID-19 treatment.
- ✓ **Be aware of QT interval prolongation with Hydroxychloroquine and Azithromycin Combination (Consider ECG).**
- ✓ Blood glucose in patients with Hydroxychloroquine, frequent blood glucose monitoring is required in diabetic patients as risk of hypoglycemia is high, (may require adjusting Insulin or other diabetic medications dosing).
- ✓ Keep monitoring patient clinically for any early sign of potential drug adverse effect and take prompt action to assess the patient regimen and manage accordingly.
- ✓ For pregnant and pediatrics confirmed cases please refer to concerned specialty and infectious disease specialty.
- ✓ Consideration of antiviral therapy in combination with Hydroxychloroquine should be based on patient condition, safety profile and availability

10.Pregnancy and Breastfeeding

☑ Caring for pregnant women with COVID-19

- ➢ So far, there is no evidence on mother-to-child transmission when infection manifests in the third trimester, based on negative samples from amniotic fluid, cord blood, vaginal discharge, neonatal throat swabs or breastmilk. Similarly, evidence of increased severe maternal or neonatal outcomes is uncertain, and limited to infection in the third trimester, with some cases of premature rupture of membranes, fetal distress, and preterm birth reported.
- ➢ Mode of birth should be individualized based on obstetric indications and the woman's preferences. WHO recommends that caesarean section should ideally be undertaken only when medically justified. Spinal anesthesia is preferred if no Contraindication.
- ➢ All recently pregnant women with COVID-19 or who have recovered from COVID-19 should be provided with information and counselling on safe infant feeding and appropriate IPC measures to prevent COVID-19 virus transmission.
- ➢ For discharging pregnant or delivered woman see discharging Criteria.

☑ Caring for infants and mothers with COVID-19: IPC and breastfeeding

- ➢ Relatively few cases have been reported of infants confirmed with COVID-19; those that have been reported experienced mild illness. No vertical transmission has been documented.

- Infants born to mothers with suspected, probable, or confirmed COVID-19 should be fed according to standard infant feeding guidelines, while applying necessary precautions for IPC. Breastfeeding should be initiated within 1 hour of birth.
- As with all confirmed or suspected COVID-19 cases, symptomatic mothers who are breastfeeding or practicing skin-to-skin contact should practice:
- ✓ Respiratory hygiene, including during feeding (for example, use of a surgical mask when near a child if the mother has respiratory symptoms),
- ✓ Perform hand hygiene before and after contact with the child, and
- ✓ Routinely clean and disinfect surfaces with which the symptomatic mother has been in contact.
- In situations when severe illness in a mother with COVID-19 or other complications prevents her from caring for her infant or prevents her from continuing direct breastfeeding, mothers should be encouraged and supported to express milk, and safely provide breastmilk to the infant, while applying appropriate IPC measures.
- Mothers and infants should be enabled to remain together and practice skin-to-skin contact and to remain together, whether they or their infants have suspected, probable, or confirmed COVID-19.

11. De-Isolation and Discontinuation of precautions for hospitalized patients with previous diagnosis of COVID-19.

✓ **Patients with COVID-19 who may require continuedhospitalization for other medical or care needs after resolution of their COVID-19 infection; the following conditions must be met prior to consideration of discontinuing precautions.**

A. For patients on Acute Care or non-intubated in the ICU:-

1. **On hospital day 7 or after 72 hours of symptom resolution, whichever is longer. Send at least 2 consecutive sets of (two nasopharyngeal and two throat swabs→ each set one Nasopharyngeal and one throat at the same time and repeat ≥ 24hour apart) from a patient with COVID-19 (a total of four negative specimens) can be out of Isolation.**

2. **If either test is still positive, repeat another set in 72 hours if the patient is still hospitalized.**

B. For patients intubated in the ICU:

1) **Send a Nasopharyngeal (NP) swab <u>AND</u> endotracheal aspirate for COVID-19 testing on hospital <u>day 14</u>.**
2) **If first tests are negative, send a second NP swab and endotracheal aspirate - require negative tests 24 hours apart for consideration of discontinuing precautions.**
3) **If any of the tests are still positive, consider repeat testing in 72 hours if still hospitalized.**

- **Please contact infection prevention & control once the tests 24 hours apart are all negative. Isolation precautions can only be discontinued after review and approval by Infection Prevention & Control team.**

12.Discharge criteria and after-discharge considerations

Discharge and De-Isolate criteria for confirmed COVID-19 cases – When is it safe to discharge COVID-19 cases from the hospital or end home isolation?	
For <u>Asymptomatic</u> COVID-19 infected persons	**For <u>Symptomatic</u> patient infected COVID-19**
• The tests to document virus clearance should be taken at a minimum of 14 days after the initial positive test; If negative (end of the quarantine period).	• Resolution of fever, without use of antipyretic medication, improvement in illness signs and symptoms AND • At least 2 consecutive sets of (two nasopharyngeal and two throat swabs→ each set one Nasopharyngeal and one throat at the same time and repeat ≥ 24hour apart) from a patient with COVID-19 (a total of four negative specimens). • After discharge, patients are recommended to continue 14 days of isolation management and health monitoring, wear a mask, live in a single room with good ventilation, reduce close contact with family members, eat separately, keep hands clean and avoid outdoor activities.
• **For all patients (Symptomatic and Asymptomatic)→itis recommended that discharged patients should have follow-up visits after 2-4 weeks (Telemedicine).**	

13.Home Isolation and Surveillance

➢ Checklist for suitability of suspected or close contact to undergo home Isolation:	
	✓ Has a separate bedroom with bathroom (Preferable); if not, common bathroom with frequent disinfection
	✓ Has access to food and other necessities.
	✓ Has access to face mask, glove and disinfectant at home.
	✓ Able to seek medical care if necessary and return with own private transport.
	✓ Able to adhere to instruction to follow home surveillance order
	✓ Able to stay away (at least 2 meter apart) from the high-risk household members (e.g. People > 65 years old, young children <2 years, pregnant women, people who are immunocompromised or who have chronic lung, kidney, heart disease).

14.Transporting Patients Intra Hospital

a. Avoid the movement of patients unless medically necessary.
b. If movement of patient is required, use pre planned routes that minimize exposure to other staff, patients and visitors. Notify the receiving area before sending the patient.
c. Clean and disinfect patient-contact surfaces (e.g. bed, wheelchair, incubators) after use.
d. HCWS transporting patients must wear appropriate PPE. (Surgical mask, eye protection, fluid-repellent long-sleeved isolation gown and gloves).
e. When outside of the airborne isolation room, patient should wear a surgical mask (not N95 mask) if not in respiratory distress. Oxygen supplement using nasal prong can be safely used under a surgical mask.
f. If patient is unable to tolerate surgical mask, advise the patient to cover nose and mouth during coughing or sneezing with tissue or flexed elbow during transport.

15.Dealing with Dead Body:-

A. Transport Of Body With Suspected/ Probable/ Confirmed Covid-19 Infection To Mortuary

a. Bodies of suspected/probable/confirmed COVMD-19 infection shall be sent to the mortuary as soon as practicable.

b. While handling / preparing the body; staff must wear the appropriate PPE and Clothing:-

- (N95 masks, Goggle or face shield, long sleeve fluid repellent disposable gown and gloves).

c. Sampling for all suspected or probable COVID-19 cases shall be taken in Emergency Department or ward by the team.

d. Relatives are **STRICTLY FORBIDDEN** to touch or kiss the body. The number of relatives allowed to view the body for identification must be minimized to 1 person. They must wear mask N95, gloves and protective aprons. They should only be allowed to stand at a minimum of 1 meter from the body.

e. Body shall be prepared in the ward by the ward staff before conveying to the mortuary.

f. Body preparation; three layers:-

i. First layer: Wrap body with white cotton linen.

ii. Second layer: Place body in body bag.

iii. Third layer: Place body in body bag, then wipe with Chlorine 0.5% sodium hypochlorite (1: 5000) disinfectant

g. Body transfer shall be carried out by 2 attendants. Both attendants must wear appropriate PPE (N95, Goggles or face shield, gloves and Gown).

h. On arrival at the mortuary, the body must be immediately placed in a designated refrigerated body storage compartment.

i. No autopsy to be performed for all confirmed COVID-19 dead bodies.

B. Guidelines for the Disposal of Deceased in Cases Due To Suspected/Probable Covid-19 Infection:-

a. It is recommended that bodies of suspected or probable COVID-19 infection (after post-mortem examination) shall be disposed of (burial) as soon as practicable.

b. Religious body preparation must be conducted under supervision of the Environmental Health Officer.

c. The release of the body to the relatives must be carried out with strict precautionary measures under the supervision of the Environmental Health Officer.

d. Relatives are prohibited from opening the sealed coffin and the Environmental Health Officer must ensure this precaution is strictly adhered.

e. All suspected or probable infection with COVID-19 bodies are recommended to be taken for burial directly from the mortuary, preferably within the same day of death or the post-mortem examination.

16. References

5.1 *USA CDC guidelines*
5.2 *WHO guidelines*
5.3 *European CDC guidelines*
5.4 *BMJ guidelines*
5.5 *Diagnosis and treatment Protocol of COVID-19, Gui-Qiang Wang*
5.6 *Landscape analysis of therapeutics as 17 February 2020*
5.7 *Malaysian COVID-19 Management guidelines*

17. Attachment

17.1 Oxygenation and Ventilation support
17.2 Strategy to prevent Ventilation complication
17.3 ICU Management Hints for Pediatrics

17.1 Oxygenation and Ventilation support

➢ **Management of severe respiratory distress, hypoxemia and ARDS**

A. Patients with severe respiratory distress, hypoxemia

- **High oxygen flows** (10 to 15 L/min) are delivered through a face mask with reservoir bag (Fio2 between 0.60 to 0.95)
- **High flow nasal cannula** deliver up to 50–60 L/min flow rates

✓ **Wherever available, and when staff members are trained, mechanical ventilation should be instituted early in patients with increased work of breathing or hypoxemia that persists despite high-flow oxygen therapy.**

- **Non-invasive ventilation (NIV)** (administration of ventilatory support through a mask)
  - Consider NIV if local expertise is available, when immunosuppression is also present, or in cases of mild ARDS without impaired consciousness or cardiovascular failure
  - NIV is the delivery of bi-level positive airway pressure through a tight-fitting mask.
  - Patients with mild ARDS may be considered for a trial of NIV if there is local experience
  - If NIV is tried, monitor the patient closely in an ICU; if NIV is unsuccessful, do not delay endotracheal intubation.
- **Invasive mechanical ventilation** administered through an end tracheal tube or tracheotomy.
  - **If equipment is available and staff are trained, proceed with endotracheal intubation to deliver invasive mechanical ventilation**

B. Patients with ARDS

- Pre-oxygenate patients with 100% FiO2 for 5 minutes, via a bag-valve mask or NIV and then proceed with rapid-sequence intubation.
- **Use a lung-protective ventilation strategy (LPV) for patients with ARDS:**
  - **low-volume, low-pressure** ventilation strategy which targets a tidal volume of 6 ml/kg (predicted body weight)
  - **A plateau airway pressure** (Pplat) of ≤ 30 cm H2 O and SpO2 88–93% or PaO2 55–80 mm Hg (7.3–10.6 kPa) has been shown to reduce mortality in a heterogeneous population of ARDS patients .
  - **To reach LPV targets, allow permissive hypercapnia.**
  - To reach target SpO2 , use adequate PEEP for the degree of hypoxemia.
  - Double-triggering, a common form of asynchrony, can be treated by increasing inspiratory flow, prolonging inspiratory time, suctioning trachea, eliminating water from ventilator tubing, and eliminating circuit leaks.
  - Deep-sedation targets should be considered if unable to control tidal volume. Avoid disconnecting the patient from the ventilator. Disconnection results in loss of PEEP and lung collapse. Use in-line catheters for airway suctioning, clamp tube when disconnection is required and minimize transport.
- **In patients with severe ARDS, consider adjunctive therapeutics early, especially if failing to reach LPV targets:**
  - Administration of neuromuscular blockade for initial 48 hours
  - Placing the patient in the prone position improves oxygenation and survival but care must be taken to turn the patient safely (12 hours daily)
  - High PEEP improves oxygenation and reduces need for other rescue therapies
- **Use a conservative fluid management strategy for ARDS patients who are not in shock to shorten the duration of mechanical ventilation.**
- **Prevention of complications**

17.2 Strategy to prevent Ventilation complication

Anticipated Outcome	Interventions
✓ **Reduce days of invasive mechanical ventilation (IMV)**	• Weaning protocols that include daily assessment for readiness to breathe spontaneously • Sedation protocols to titrate administration of sedation to a specific target, with or without daily interruption of continuous sedative infusions
✓ **Reduce incidence of ventilatorassociatd pneumonia (VAP)**	• Oral intubation is preferable to nasal intubation • Perform regular antiseptic oral care • Keep patient in semi-recumbent position • Use a closed suctioning system; periodically drain and discard condensate in tubing • Use a new ventilator circuit for each patient; once patient is ventilated, change circuit if it is soiled or damaged but not routinely

	• Change heat moisture exchanger when it malfunctions, when soiled or every 5–7 days • Reduce days of IMV
✓ **Reduce incidence of venous thromboembolism**	• Use pharmacological prophylaxis (for example, heparin 5000 units subcutaneously twice daily) in patients without contraindications. • For those with contraindications, use mechanical prophylactic device such as intermittent pneumatic compression devices
✓ **Reduce incidence of pressure ulcers**	• Turn patient every two hours
✓ **Reduce incidence of stress ulcers and gastric bleeding**	• Give early enteral nutrition (within 24–48 hours of admission), • administer histamine-2 receptor blockers or proton-pump inhibitors
✓ **Reduce incidence of ICU-related weakness**	• Early mobility

17.3 **ICU Management Hints for Pediatrics**

17.3 ICU Management Hints for Pediatrics
• Cardiovascular:- • Avoid fluid boluses unless in shock ○ Fluid sparing resuscitation, 60-80% maintenance at maximum. Aim CVP 8-10 at max. ○ Utilize Noradrenaline if hypotension. Adrenaline if myocarditis with low ejection fraction. ○ Arterial line essential in sick patients for PaO2 and BP monitoring. ○ Myocarditis can be present as the course progress. Check troponin regularly as it is found to be highly sensitive to detect these cases early. • Airway and ventilation: ○ Consider helmet oxygen/ nonrebreather oxygen mask for optimal oxygen delivery. ○ Utilize High flow nasal cannula cautiously. Best if in negative pressure room ○ Avoid Noninvasive ventilation (NIV) unless individualized decision & negative pressure room is available because of high risk of transmission. ○ Intubate early (improve outcome) and under controlled conditions. Consider if PaO2/FiO2 ratio <200 even if apparently looks OK! ▪ Preoxygenate x5 min with 100% O2 to avoid manual ventilation ▪ Rapid sequence intubation, no bagging if possible, have suction ready. Most experienced to intubate. Use cuffed endotracheal tube ○ Utilize in-line (closed) suction if possible. ○ Ventilators should be protected with a high efficiency filter

- Mechanical ventilation:
  - Patients usually start to have a very low paO2/FiO2 when intubated. They need time to improve.
  - Lung recruitment maneuvers should be considered
  - Utilize lung protective strategies as per ARDS net protocol.
  - Tidal volume of 4-6ml/kg of ideal body weight
  - PIP <30
  - High PEEP 12-15 is recommended and even higher as hypoxemic respiratory failure dominate.
  - Utilize FiO2 up to 0.6 to target >88-90% saturation.
  - APRV ventilation strategy may be used if familiar with it.
  - Allow for permissive hypercapnia and pH> 7.2 (>7.25 if heart is affected)
  - Bronchoscopy with bronchoalveolar lavage may be needed for lungs recruitment
- Neuromuscular blocking may be used if desynchrony or lung decruitment is present.
- Consider prone positioning for 12-16hrs/day especially if PaO2/FiO2 <150.
- HFOV is not recommended because of risk of transmission and high number of expected casualties

Other Rx:

- If arrested: Identify resus team. All team must have PPE. If intubated and ventilated, try not to disconnect from the ventilator when doing CPR.
- Cytokine Storm Syndrome & HLH may develop and a major cause for mortality. Check Ferritin, fibrinogen and LDH as needed.

This protocol will be updated based on upcoming international Recommendations and evidence based guidelines as still not that much is well Known about COVID-19.

Drug name	Dose (Consider Dose Adjustment in Renal and Hepatic Impairment)	Type of Diluent	Infusion time	Stability&Other Considerations
Azithromycin	**For Adults** IV: 500mg once daily **For Pediatrics** IV: 10mg/kg once daily (maximum 500mg/dose)	D5W, NS	❖ **IV infusion:** ✓ Reconstitute ZITHROMAX by adding 4.8 mL of SWFI. ✓ Dilute 500 mg in 250 ml then administer over 1 h. ✓ Dilute 1000 mg in 500 ml then administer over 2 hrs.	❖ Stable for 24h if stored under refrigeration. ❖ Not to be given as IV push or as an intramuscular injection.
Ceftazidime	**For Adults** IV: 1-2g every 8hrs **For Pediatrics** IV: 200mg/kg/day divided every 8hrs (Maximum 6g/day)	D5W, NS	❖ **Direct I.V push:** ✓ Dilute in 10ml and administer over 5 min. ❖ **IV infusion:** ✓ Dilute (0 to 1 g) in 50ml infuse over 30 min ✓ Dilute> 1g in 100 ml infuse over 30 min. ❖ **IM injection:** ✓ 1g ceftazidime vial should be dissolved in 3ml of SWI or 1% Lidocaine Injection	❖ Reconstituted solution is stable for 24 at RT and 3 days if stored under refrigeration. ❖ Solutions, tend to darken depending on storage conditions, should be protected from excessive light. ❖ ceftazidime should not be mixed with aminoglycosides (as amikacin, gentamicin, tobramycin) in the same giving set or syringe
Ceftriaxone	**For Adults** IV: 1-2g every 12hrs **For Pediatrics** IV: 50mg/kg/dose every 12hrs (maximum 4g/day)	D5W, NS	❖ **Direct I.V push:(for children >=12y and adults preferably in larger veins)** ✓ Dilute in 10ml and administer over 5 min ❖ **IV infusion: (preferred)** ✓ Dilute (0 to 1 g) in 50ml infuse over 30 min ✓ Dilute> 1g in 100 ml infuse over 60 min. ❖ **IM injection:** ❖ 1g ceftriaxone vial should be dissolved in 3.5ml of 1% Lidocaine Injection.	❖ Reconstituted solution is stable for 24h at RT and 10 days if stored under refrigeration. ❖ Do not use diluents containing calcium, such as Ringer's solution. ❖ Ceftriaxone and calcium-containing solutions, including continuous calcium-containing infusions such as parenteral nutrition, should not be mixed or co-administered to any patient irrespective of age because of the risk of precipitation of ceftriaxone-calcium.

Drug name	Dose (Consider Dose Adjustment in Renal and Hepatic Impairment)	Type of Diluent	Infusion time	Stability&Other Considerations
Ciprofloxacin	**For Adults** 400mg every 8 hrs **For Pediatrics** 10mg/kg/ dose every 8-12 hrs(maximum 400mg/dose)	-----	❖ **IV infusion(For adults)** ✓ Administer 200mg over 30 min. ✓ Administer 400 mg over 1h. ✓ For children, the infusion duration is 1h.	❖ Keep the vials in the outer carton, in order to protect from light. ❖ Stable for 24h if stored under refrigeration. ❖ Slow IV infusion over 60 min is preferred to reduce the risk of venous irritation (burning; pain; erythema; and swelling).
Clindamycin	**For Adults** 600-900 mg every 8 hrs **For Pediatrics** 40mg /kg/day divided every 8hrs	D5W, NS	❖ **IV infusion:** ✓ Dilute 300 mg in 50 ml then administer over 10min. ✓ Dilute 600 mg in 50 ml then administer over 20min. ✓ Dilute 900 mg in 100 ml then administer over 30min.	❖ Stable for 24h if stored under refrigeration.
Colistin	**For Adults** 2 MIU every 8 hrs **For Pediatrics** 75,000-100,000/kg/day divided every 8hrs ========== (**Nebulizer** 1 million x 2)	D5W, NS	❖ **Direct I.V push:** ✓ Dilute in 10ml and administer over 5 min. ❖ **IV infusion:** ✓ Prescribed dose dilute in (50 - 100 ml) then administer over 30 min. ✓ High doses should be diluted in 100ml NS; administer over 1-2hrs. ❖ **Inhalation:** ✓ Dissolve in 2-4 mL of 0.9%NS. ✓ Use inhaled colistin promptly after reconstitution.	❖ Reconstituted solution is stable for 8h at RT and 24h if stored under refrigeration. ❖ For colistin inhalation: ✓ Pre-medicate with salbutamol (Ventolin). ✓ Patient who will receive chest physiotherapy should be done prior to the administration of inhaled colistin.
Levofloxacin	**For Adults** 500-750 mg once daily **For Pediatrics** IV: 6months to < 5 years: 10mg/kg/dose twice daily ≥ 5 years: 10mg/kg/dose once daily (maximum 750mg /day)	-----	❖ Premixed solution should be administrated as IV infusion ❖ Administer 250 mg over 60 min. ❖ Administer 500 mg over 60 min. ❖ Administer 750 mg over 90 min.	❖ Keep the vials in the outer carton, in order to protect from light. ❖ Stable for 48h if stored under refrigeration. ❖ Avoid administration through an IV line with a solution containing cations (as Calcium; Magnesium;…) Maintain adequate hydration to prevent crystalluria.

Drug name	Dose (Consider Dose Adjustment in Renal and Hepatic Impairment)	Type of Diluent	Infusion time	Stability&Other Considerations
Meropenem	**For Adults** IV: 1-2g every 8hrs **For Pediatrics** IV: 20-40 mg/kg/dose every 8 hrs (maximum 2g/dose)	NS-preferred. D5W	❖ Reconstitute the 1 g vial with 10 mL of water for injection or 0.9 % NS ❖ **IV infusion:** ✓ Dilute (0 to 1 g) in 50ml infuse over 15 to 30 min. ✓ Dilute 2g in 100ml infuse over 15 to 30 min ✓ Dilute to a final concentration of 1 to 20 mg/ml. ❖ **Direct I.V push:** ✓ Doses up to 1 g can be given as an intravenous bolus injection over approximately 5 min	❖ Reconstituted solution 0.9 % NS are stable for up to 2 hrsat RT and for up to 16 hrs if stored under refrigeration. ❖ Solution constituted with D5W should be used immediately. ❖ Infants <3m as IV infusion over 30min. ❖ Infants >=3m children over 15 to 30 min.
Piperacillin/ Tazobactam	**For Adults** IV: 4.5g every 6 hrs **For Pediatrics** IV: 100 mg/kg/dose every 6 hrs (maximum 16g/day)	D5W, NS	❖ Each vial contains 4g piperacillin+ 0.5g tazobactam ❖ Reconstitute 2.25 g with 10ml; 4.5g with 20ml D5W, NS. ❖ Swirl until dissolved. When swirled constantly, reconstitution generally occurs within 5 to 10 min. ❖ Dilute the reconstituted solution to at least 50 ml and administer by I.V. infusion over 30 min. ✓ (2.25 grams) in (50 ml) over 30 min. ✓ (3.375 grams) (100 ml) 30 min. ✓ (4.5 grams) in (100 ml) over 30 min.	❖ After reconstitution can be stored at refrigerator temp for 48h ❖ Do not mix in the same syringe with an aminoglycoside (as amikacin, gentamicin, tobramycin); tazocin and the aminoglycoside are recommended to be administered seperatly.
Teicoplanin	**For Adults** IV: 400 mg every 12hrs for three doses Then 400mg every 24hrs **For Pediatrics**	D5W, NS	❖ Reconstitute vial with the Water for Injection provided (3ml). ❖ Should be rotated until all the powder is dissolved to avoid foaming. If foam is developed, allow the solution to stand for approximately 15 min ❖ **IV infusion:** ✓ Dilute with 50-100ml 0.9 of % NS then administer over 30-min. ❖ **Direct I.V push**:	❖ Stable for 24h if stored under refrigeration. ❖ Red man syndrome rarely observed (even at the first dose). Stopping or slowing the infusion over a 30-min may result in cessation of these reactions.

Drug name	Dose (Consider Dose Adjustment in Renal and Hepatic Impairment)	Type of Diluent	Infusion time	Stability&Other Considerations
	IV: 10 mg / kg every 12 hours for three doses Then 10 mg / kg every 24 hours		✓ Administer over 3-5 min. ✓ Only the infusion method should be used in neonates. ❖ **IM injection**: ✓ Should not exceed 3 mL (400 mg) at a single site.	
Vancomycin	**For Adults** IV: 1g every 8-12hrs **For Pediatrics** IV: 15-20mg/kg/dose (maximum 2g/dose)	D5W, NS	❖ **IV infusion:** ❖ Recommended infusion time of ≥30 min for every 500mg. ❖ Administer with a final conc. Not more than 5mg/ml. ✓ ≤ 1000 mg: dilute in 100- 250 ml, infuse over 1 hr. ✓ 1250-1500 mg: dilute in 250 -500 ml, infuse over 1.5 hrs. ✓ 1750-2000 mg: dilute in 500 ml, infuse over 2 hrs. ✓ >2000mg: dilute in 500 mL then infuse over 3 hrs. ❖ A central line is preferred for administration of vancomycin, especially if concentration of mixed solution is 5-10 mg/mL (usually in fluid restricted patients) ❖ **Oral administration:** ❖ The contents of vials for parenteral administration may be used. ❖ Each dose may be reconstituted in 30ml water and either given to the patient to drink, or administered by nasogastric tube	❖ Stable for 24h if stored under refrigeration. ❖ Vancomycin trough level should be drawn 30 minutes prior to next dose. (Usually should be checked prior to the 4th dose). ❖ Observe for red-man syndrome (Flushing usually involves the face and neck, hypotension, nausea, chills, pruritus, rash, dyspnea). To minimize the reaction include: ✓ Slowing infusion rate (no more than 500 mg/hr) ✓ Dilute vancomycin that would not to exceed 5 mg/ml. ❖ Premedicate with an antihistamine.

❖ **References:**

- **Lexi-comp-Clinical Drug Information (www.wolterskluwercdi.com/lexicomp-online/)**
- **Global RPH (http://www.globalrph.com/index.htm)**
- **The electronic medicines compendium (emc) (https://www.medicines.org.uk/emc/about-the-emc).**