(Revised version dated 8 April 2020) for Medical and Healthcare Personnel

Guidelines for clinical practice, diagnosis, treatment and prevention of healthcare-associated infection in response to patients with COVID-19 infection

Registration/Screening
- History taking
- OPD or ER

Hospital-based surveillance

Fever & ARI Clinic
History taken and PE by physician

1) Patient with history of having fever or documented temperature ≥37.5 °C with any of the following respiratory symptoms (cough, runny nose, sore throat, tachypnea, or shortness of breath, or difficult breathing), and within 14 days prior to symptom onset, the patient:
   a. Has recently returned from or lived in the area affected by ongoing outbreaks of COVID-19,* or;
   b. Has occupation with exposure to foreign tourists, crowded places, or with interaction with a large number of people, or;
   c. History of close contact with a confirmed case of COVID-19 infection, or exposure to respiratory secretions of suspected or confirmed case of COVID-19 infection without wearing appropriate personal protective equipment (PPE),** or;
   d. History of visiting public places or attending large gatherings, e.g. local markets, shopping malls, health facilities, public transport systems, or any places or facilities as announced by Provincial Communicable Disease Committee**

2) Patient with pneumonia with any of the following history**
   a. History of close contact with a COVID-19 case, or;
   b. Patient with pneumonia of unknown etiology and whose condition has not improved within 48-72 hours of treatment, or;
   c. Patient with pneumonia whose signs and symptoms are consistent with those of COVID-19 infection.

3) Healthcare worker** with history of fever or documented temperature ≥37.5 °C accompanied by any respiratory symptoms and is recommended by physician responsible for COVID-19 response or disease control official for further examination.

4) Detection of cluster of patients**
   a. ≥ 3 HCWs infected in the same unit, same week (if in a small healthcare facility, e.g. clinic, ≥ 3 cases in the facility will be considered as cluster)
   b. ≥ 5 non-HCWs infected in the same place, same week, with epidemiological linkage

* For the areas with ongoing outbreaks of COVID-19, refer to https://ddc.moph.go.th/viralpneumoia/intro.php
** Further examination is recommended at discretion of physician responsible for COVID-19 response or disease control official

PUI criteria are met

1) **Have patient wear face mask and wait in a designated area or home quarantine with provided guidelines while waiting for test results. If clinically indicated, admit a patient in a single room or isolation room if the criteria are met, no need to be admitted in AIIR.**
2) **Medical and clinical staff wear PPE as appropriate. In general, staff is required to follow Droplet and Contact Precautions** (e.g. donning of gown, gloves, surgical mask, face shield). **If aerosol-generating procedure is to be conducted, e.g. collection of nasopharyngeal swab, Airborne and Contact Precautions should be taken** (donning waterproof gown, gloves, N95 respirator, face shield, goggles and surgical cap) #
3) **If chest radiography indicated, portable x-ray is recommended.**
4) **Perform basic laboratory testing as appropriate** (no need to have designated receiving area; follow laboratory standard practices)
5) **Specimen collection to test for SARS-CoV-2**
   a) **Patient without pneumonia:** Collect nasopharyngeal swab and throat swab/oropharyngeal swab, put 2 swabs in 1 UTM or VTM (at least 2 ml.)
   b) **Patient with pneumonia and without intubation**
      - Collect sputum in 1 sterile container or UTM or VTM
      - Patient < 5 years, or sputum is not available, collect nasopharyngeal swab and throat swab/oropharyngeal swab or suction in 1 UTM or VTM
   c) **Patient with pneumonia and with intubation** collect tracheal suction in 1 UTM or VTM

Laboraltory results for SAR-CoV-2

In case where staff continue swabbing patients, change gloves after swabbing each patient. Consider changing face shield if contaminated.

Negative for COVID-19 (1 laboratory)
1) Consider providing treatment as appropriate
2) Treat as OPD case and recommends personal health practices (home quarantine) for at least 14 days
3) For severe case, consider admitting patient in a hospital for diagnosis and treatment as appropriate. Follow droplet precautions while waiting for the final diagnosis
4) **If the conditions not improved within 48 hours**, consider repeating testing for SAR-CoV-2

Positive for COVID-19
1) Admit patient in single isolation room or cohort ward (designated specifically for confirmed cases of COVID-19 infection) with at least 1-meter distance between the beds
2) Admitted in AIIR for severe case, or in case aerosol-generating procedure needed to be conducted, admit patient in AIIR
3) Treat with antiviral medication following treatment guidelines

Guidelines for Clinical Management and Administration of Antiviral Medications for Cases of COVID-19 Infection

Clinical Management of COVID-19 based on disease severity

1. **Confirmed case without symptoms (asymptomatic infection)**
   - Recommend hospitalization or keep under observation at designated facilities for 2-7 days. If no complications are observed, consider transferring to stay in a designated hospital or temporary patient ward for COVID-19 for at least 14 days from date of onset. After that the patient should be recommended to wear surgical mask at all times and pay extra attention to respiratory hygiene when interacting with other people until reaching 1 month from the date of illness onset.
   - Provide symptomatic treatment as appropriate. No antiviral medication is needed as most patients will eventually recover and they may potentially experience side effects of antiviral drugs.
2. **Confirmed case with mild symptoms and no risk factors** (normal chest radiograph without significant risk factors/preexisting health conditions/co-morbidities)
   - Recommend hospitalization for 2-7 days and provide symptomatic treatment. Consider administration of the following combination therapy for 5 days.
     1) Chloroquine or hydroxychloroquine in combination with
     2) Darunavir + ritonavir or lopinavir/ritonavir or azithromycin[##]
   - When the conditions have improved and chest radiograph still remained normal, consider transferring to stay in a designated hospital or temporary patient ward for COVID-19 case for 14 days from the date of illness onset. After that the patient should be recommended to stay home to recuperate and wear surgical mask at all times. Patient will also be advised to pay extra attention to respiratory hygiene when interacting with other people until reaching 1 month from the date of illness onset.

3. **Confirmed case with mild symptom and risk factors:**
   Normal chest radiograph with one of the following significant risk factors/preexisting health conditions/co-morbidities: Aged >60 yrs, Chronic Obstructive Pulmonary Disease (COPD) and other chronic lung diseases, chronic kidney disease (CKD), cardiovascular diseases including congenital heart diseases, cerebrovascular diseases, poorly controlled diabetes, obesity (BMI $\geq$ 35 kg/m^2), cirrhosis, immunocompromised condition, and lymphocyte counts <1,000 cells/mm^2.
   - Recommend using combination therapy consisting of at least two medications for 5 days
     1) Chloroquine or hydroxychloroquine in combination with
     2) Darunavir + ritonavir or lopinavir/ritonavir
     A third drug, azithromycin,[##] may also be added to the regimen.
   - If progression of infiltration is shown on chest radiograph, consider adding Favipiravir for 5-10 days depending on clinical symptoms.
4. **Confirmed case with pneumonia, or in case of normal chest radiograph but presence of symptoms or signs consistent with pneumonia, and SpO_2 at room air <95%**
   Recommend using combination therapy consisting of at least three medications (excluding favipiravir) for 10 days
   1) Favipiravir for 5-10 days depending on clinical symptoms in combination with
   2) Chloroquine or hydroxychloroquine in combination with
   3) Darunavir+ ritonavir or lopinavir/ritonavir
   A fourth drug, azithromycin,[##] may also be added to the regimen.

   - Prioritize respiratory support with HFNC before invasive ventilation
   - Consider using others organ supports as deemed necessary

[##] **Combination treatment with hydroxychloroquine and azithromycin is a regimen with limited clinical evidence** and further studies are needed. Attending physician should closely monitor clinical conditions of the patient receiving treatment using this combination regimen and treatment adjustment may be made as deemed appropriate.

Guidelines for Clinical Management and Administration of Antiviral Medications for Cases of COVID-19 Infection

Other recommendations

- Cases who are administered **darunavir + ritonavir** or **lopinavir/ritonavir**, consider testing for HIV status prior to drug administration and closely monitor the most common side effects of diarrhea, nausea, hepatitis, as well as monitoring potential drug-drug interactions.
- Cases who are administered **darunavir + ritonavir** or **lopinavir/ritonavir** for more than 5 days plus **azithromycin**, consider performing ECG on Day 5. If QTc >480 msec, consider discontinuation of **darunavir + ritonavir** or **lopinavir/ritonavir** or **azithromycin**, or correct other conditions associated with QTc prolongation
- **Favipiravir** may have a potential teratogenic effect in pregnant woman, use with caution and inform patient for a decision.
- If SAR-CoV-2 with bacterial superimposed infection is suspected, consider using other antibiotics as appropriate.
- Steroid is not recommended in COVID-19 management, except the use with indication such as ARDS at discretion of attending physician.

Patient may be discharged if the following criteria are met:

- Patient's conditions have improved and no deterioration in chest radiograph findings is observed.
- Documented temperature does not exceed 37.8 °C for 48 consecutive hours.
- Respiratory rate does not exceed 20 breaths/min
- Resting SpO_2 at room air $\geq$ 95%

- Consider referring the patient to stay at a designated hospital/cohort ward for at least 14 days from the date of illness onset. After that patient is advised to stay home and wear surgical mask at all times for one month from the date of illness onset.
- Patient may be discharged at this point and repeat swab is not required.

Clinical Management of Pediatric COVID-19 cases

1. **Confirmed case with mild symptoms, no risk factors**
   No significant risk factors/preexisting health conditions/co-morbidities, and normal chest radiograph
   Symptomatic treatment is recommended and consider giving combination therapy consisting of two drugs, i.e. **chloroquine** or **hydroxychloroquine plus darunavir** + **ritonavir** or **lopinavir/ritonavir** or **azithromycin** for 5 days.
2. **Confirmed case with mild symptoms and with risk factors**
   Presence of significant risk factors/preexisting health conditions/co-morbidities (<5 yr of age and other conditions listed in adult section)
   Recommend using combination therapy consisting of at least two medications for 5 days
   - Chloroquine or hydroxychloroquine plus
   - Darunavir + ritonavir (if aged >3 yrs) or lopinavir/ritonavir (if aged <3 yrs)

   A third drug, **azithromycin**,[##] may also be added to the regimen.

3. **Confirmed case with pneumonia**
   Or pediatric case with symptoms or signs consistent with pneumonia without presence of pulmonary lesions, but SpO_2 at room air <95%
   Combination therapy consisting of at least three medications is recommended, i.e. favipiravir for 5-10 days, plus two other drugs according to Item 2 above for 10 days. Additionally, a fourth drug, azithromycin,[##] may also be added to the regimen.

[##] **Combination treatment with hydroxychloroquine and azithromycin is a regimen with limited clinical evidence** and further studies are needed. Attending physician should closely monitor clinical conditions of the patient receiving treatment using this combination regimen and treatment adjustment may be made as deemed appropriate.

Table 1. Recommended dosage for adults and children with COVID-19 infection

Medications/ adult dosage	Pediatric dosage	Precautions/most common adverse effects
Favipiravir (200 mg/tab) **Day 1:** 8 tabs bid **Subsequent days:** 3 tabs bid If BMI ≥35 kg/mm^2 **Day 1:** 60 mg/kg/day (administered twice per day) **Subsequent days:** 20 mg/kg/day (administered twice per day)	**Day 1:** 30 mg/kg/dose bid **Subsequent days:** 10 mg/kg/dose bid	- Risk of teratogenic effect, extra caution in pregnant or reproductive women and may need the patient's informed decision - Potential effects on erythropoiesis and liver functions
Darunavir (DRV) 600 mg/tab co-administered with **Ritonavir** (RTV) 100 mg/tab DRV and RTV 1 tab every 12 hrs	**Dosage by body weight** **12-15 kg** DRV 300 mg + RTV 50 mg bid **15-30 kg** DRV 450 mg + RTV 100 mg am and DRV 300 mg + RTV 100 mg pm **30-40 kg** DRV 450 mg + RTV 100 mg bid **>40 kg** Use adult dosage	- Not recommended in children <3 yr or body weight less than 10 Kg - Diarrhea, nausea, vomiting and rashes - **Should take with meal**
Lopinavir/ritonavir (LPV/r) (tablet:200/50 mg/tab, liquid: 80/20 mg/ml) 2 tabs every 12 hrs	**Age 2 wk-1 yr** 300/75 mg/m^2/dose bid **Age 1-18 yr** 230/57.5mg/m^2/dose bid **Tab dosage by body weight** **15-25 kg** 200/50 mg bid **25-35 kg** 300/75 mg bid **>35 kg** 400/100 mg bid	- Nausea, vomiting or diarrhea - Liquid preparation needs refrigeration and must taken with meals to enhance absorption. But tablet forms do not need refrigeration - May cause QT prolongation - Rare reports of hepatitis, pancreatitis
Chloroquine (250mg/tab equivalent to chloroquine base 150 mg/tab) 2 tab bid	8.3 mg/kg/dose (equivalent to chloroquine base 5-10 mg/kg/dose) bid	- May lead to prolonged QT syndrome, Torsardes de Pointes, Atrioventricular block. EKG, serum Mg^+ and K^+ before starting medication - Nausea, vomiting, diarrhea and rashes - Check G6PD status - **Should be taken with meal**
Hydroxychloroquine (200mg/tab equivalent to chloroquine base 155 mg/tab) **Day 1:** 3 tab bid **Subsequent days:** 2 tab bid	**Day 1:** 10 mg/kg/dose (equivalent to chloroquine base 7.5 mg/kg/dose) bid **Subsequent days:** 6.5 mg/kg/dose (equivalent to chloroquine base 5 mg/kg/dose) bid	- Nausea, vomiting, abdominal pain, bloating, rashes, hyperpigmentation - Check G6PD prior to starting medication - **Should be taken with meal**
Azithromycin (250 mg/tab, 200 mg/tsp) **Day 1:** 2 tab daily **Days 2-5:** 1 tab daily	**Day 1:** 10 mg/kg/dose daily **Days 2-5:** 5 mg/kg/dose daily	- For capsule, it should be taken at least 1 hr before meal or 2 hr after meal. For tablet, it may be taken with/without meal. - Abdominal pain, nausea, vomiting, diarrhea, bloating - Cautions when taken with medications potentially leading to QT prolongation - Cautions when prescribing to a patient with significant hepatic disease

Guidance for referral of patients with COVID-19 infection

- **If the patient's symptoms are so severe to the extent that it cannot not be managed by referring hospital, the patient should be referred to another hospital with higher capacity.**
- **Referring hospital should coordinate case referral at the early stages.**

Criteria for case referral

- **SpO_2 at room air <95%**
- **Rapid progressive pneumonia within 48 hours of treatment**

Table 2. Hospital level category for case referral purposes

COIVD-19 Case	Hospital	Upon improvement of symptoms
1) Confirmed case without symptoms (asymptomatic infection)	Hospital at all levels	Hospital/hospitel
2) Confirmed case with mild symptoms and normal chest radiograph, and without significant risk factors/preexisting health conditions/co-morbidities	F1-, M1-, M2-, S-, A-level hospital	Hospital/hospitel
3) Confirmed case with mild symptoms and normal chest radiograph, but with significant risk factors/preexisting health conditions/co-morbidities	M1-, S-, A-, A+-level hospital	Remain in hospital until discharge
4) Confirmed case with pneumonia, or SpO_2 at room air <95%	M1-, S-, A-, A+-level hospital	Remain in hospital until discharge

Hospital discharge

Patient with mild symptoms:

1) Stay in hospital for 2-7 days or longer, depending on clinical symptoms and disease severity.
2) Discharge criteria
   a) Patient's conditions have improved and no deterioration in chest radiograph findings was observed.
   b) Documented temperature not exceeding 37.8 °C for consecutive 48 hours.
   c) Respiratory rate not exceeding 20 breaths/min.
   d) Resting O2 saturation at room air ≥95%.
3) Refer the patient to designated hospital/hospital for COVID-19 patients.
4) **Patient may be discharged from hospital at this point and repeat swab is not required.**

Hospitel discharge

1) Patient has stayed in hospitel for at least 14 days from the date of illness onset.
2) After that patient will be advised to stay home for one month from the date of illness onset. During this period, patient will be recommended to strictly practice social distancing, wear face mask at all times, and follow respiratory hygiene.
3) Patient will be advised to wear face mask and follow respiratory hygiene.
4) **Patient may be discharged from hospitel at this point and repeat swab is not required.**