New Coronavirus Pneumonia Diagnosis and Treatment Guideline, 7th Edition

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Who we are
As COVID-19 begins to impact the United States, we as medical students would like to contribute to the efforts to contain this unprecedented epidemic. A group of Chinese-speaking medical students at multiple medical schools across the United States joined together on a voluntary basis to translate the latest clinical practice guideline on COVID-19 published by the National Health Commission of China, in hopes to offer useful information for those providing care at the frontlines. These contributors are:

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Disclaimer

• This document does not represent any organization or country.
• Although we have worked hard to ensure the accuracy of our translation, with our limited clinical training and lack of professional translation experience, we ask that you use this document at your own discretion, and verify the recommendations outlined in this guideline with available scientific literature. If you have any questions regarding the content of the translation, please refer to the original Chinese version of this document published on the website of the National Health Commission of the People’s Republic of China on March 4th, 2020.
• Section 10.d Treatment using traditional Chinese medicine was not translated.
• For readers familiar with the 6th edition of the guideline, a summary of changes is included at the end of this document as appendix A.
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Introduction

Since December 2019, cases of novel coronavirus pneumonia have emerged in Wuhan, Hubei Province. With the spread of the disease, similar cases (officially named as Coronavirus Disease 2019 [COVID-19] by WHO) have also been reported in other regions of China and abroad. COVID-19 was urgently recognized and classified, by the Law of the People’s Republic of China on the Prevention and Treatment of Infectious Disease as a Class B communicable disease, and is managed as a Class A communicable disease. Through a series of preventative measures and medical treatments, the progression of this epidemic in China has become under control to some extent, and the epidemic is showing signs of easing at most provinces. However, the cases overseas continue to be rising sharply. With increased experience and knowledge on the clinical presentation, pathology, diagnosis and treatment of COVID-19, and to aim for the early diagnosis and treatment of the disease, increase the recovery rate, lower the mortality rate, avoid cross-infection within the hospital and in the meantime pay close attention to the spread of disease by imported cases from overseas, we have revised the New Coronavirus Pneumonia Diagnosis and Treatment Guideline (the tentative 6th revised edition) and formed the current tentative 7th edition.

1. Virology

SARS-CoV-2, the pathogen causing the disease termed COVID-19, belongs to the family of beta coronavirus, enveloped, round or oval shaped with a diameter of 60-140 nm. The genetic characteristics of SARS-CoV-2 are significantly different from MERS-CoV and SARS-CoV. Current study has shown that SARS-CoV-2 shares >85% homology with bat-SL-CoVZC45. In vitro culture study has shown SARS-CoV-2 can be detected within 96 hours in human respiratory epithelial cells, while when cultured in Vero E6 and Huh-7 cell lines, it takes about 6 days.

The understanding of the physical and chemical properties of coronavirus is based on the research on SARS-CoV and MERS-CoV. The virus is sensitive to UV light and heat. Methods that can effectively inactivate the virus include 56˚C heat for 30 minutes, diethyl ether, 75% ethanol, chlorine-based disinfectant, peroxyacetic acid and lipophilic solvent (e.g. chloroform). Chlorhexidine cannot effectively inactivate the virus.

2. Epidemiology

Source of infection

Thus far, the major source of infection are individuals with COVID-19. Infected individuals who are asymptomatic may also be the source of infection.
Route of transmission

Respiratory droplets and close contact with the infected individuals are the major ways of spreading. There is a possibility of spreading via aerosol when exposed to high density of aerosol in enclosed spaces over an extended period of time. Because the virus can be detected in stool and urine samples, it is important to be cautious of potential spreading via direct contact of stool or urine samples or aerosol from contaminated stool or urine.

Susceptible populations

All individuals are susceptible.

3. Pathology Findings

Based on the limited autopsy and biopsy results, the findings include:

Lungs

Various degrees of lung consolidations.

Serous fluid, fibrous protein exudate and hyaline membrane formation were seen in alveoli; fluid analysis of exudate mainly consists of monocytes and macrophages, with multinucleated giant cells seen in many occasions. Significant proliferations of type II alveolar cells and some cells sloughing off were noticed. Inclusions are observed in type II alveolar cells and macrophages. Alveolar septal capillary bed shows congestion, edema, with monocyte and lymphocyte infiltration, and intra-capillary transparent thrombosis formation. Lung tissue shows focal hemorrhage, necrosis, and even hemorrhagic infarct. Some alveoli show organization of cavity exudate and lung interstitial fibrosis.

Intralobular bronchial mucosa shows partial epithelial sloughing, with mucus and mucus plugs seen in the lumen. Small portion of alveoli shows hyperinflation, with interalveolar septal rupture or cyst formation.

Under electron microscopy, bronchial mucosal epithelium and type II alveolar epithelial cells show viral inclusion granules in cytoplasm. Some alveolar epithelial cells and macrophages are positive for SARS-CoV-2 antigen under immunohistochemical staining, with RT-PCR assay positive for SARS-CoV-2.

Spleen, hilar lymph nodes and bone marrow

Spleen shrinks significantly. Lymphocyte count is reduced significantly. Focal hemorrhage and necrosis are seen. Splenic macrophage proliferation, with phagocytosis observed. Fewer lymphocytes are seen in lymph nodes, and necrosis is observed. CD4+ and CD8+ T cell count are reduced in both spleen and lymph nodes. Pancytopenia is also observed in bone marrow.
Heart and vessels

Cardiac cell degeneration and necrosis are observed, with a small number of monocytic, lymphocytic and/or neutrophilic infiltration observed in mesenchyme. Part of vessels show endothelial sloughing, inflammation of intima and thrombus formation.

Liver and gallbladder

Liver becomes enlarged and dark red in color. There is hepatocellular degeneration, focal necrosis with neutrophilic infiltration; sinusoidal congestion, lymphocyte and monocyte infiltration seen in portal area, with microthrombi formation. Gallbladder appears full.

Kidneys

Proteinaceous exudate in glomerular cavity, glomerular epithelial degeneration, sloughing, with hyaline cast formation are observed. Congestion is found in kidney mesenchyme, with microthrombi formation and focal fibrosis.

Other organs

Brain tissue congestion, edema, with some neuronal degeneration are observed. Adrenal glands show focal necrosis. Esophageal, gastric and intestinal epithelia show various levels of degeneration, necrosis and sloughing.

4. Clinical Characteristics

Clinical presentation

Based on the epidemiological surveillance, the incubation period is 1-14 days, with the majority of cases having an incubation period of 3-7 days.

Fever, dry cough, and fatigue are the major presentations. A small number of patients also present with nasal congestion, rhinorrhea, sore throat, myalgia and diarrhea. Severe cases often present with dyspnea and/or hypoxemia one week after initial symptom onset. More severe cases can rapidly progress into ARDS, septic shock, and difficult-to-correct metabolic acidosis, coagulopathy and multiorgan failure. Note that during the course of the disease, the severely and critically ill patients may only have a low- to medium-grade fever, or even no fever.

Some children and neonates may have atypical presentation, which includes GI symptoms like vomiting and diarrhea, or lethargy or tachypnea.

Mild cases may present as low-grade fever, mild fatigue, with no signs of pneumonia.

Judging from the cases we have managed, the majority of patients have good prognosis, and a small subset of patients will be critically ill. People of advanced age and people with preexisting
Comorbidities have worse outcomes. The disease progression in pregnant women is similar to that of the patients in the same age group. Pediatric patients have milder symptoms.

**Laboratory studies**

**Routine labs**

In early phase of the disease, WBC counts are normal or low, lymphocyte counts are low, and some patients may have elevated AST/ALT, LDH, CK and myoglobin levels. Critically ill patients may have elevated troponin. The majority of patients have an elevated CRP and ESR, a normal procalcitonin level. Severe cases have an elevated d-dimer, a progressively decreasing lymphocyte count. Severe and critical cases often have elevated levels of inflammatory markers.

**Specimen and serology**

Specimen: When examined using RT-PCR or NGS (next generation sequencing), viral nucleotides can be detected from swab samples obtained from nasopharynx, sputum, lower respiratory tract secretions, blood serum, and stool. Samples obtained from lower respiratory tract (sputum or bronchial lavage) yield more consistent results. These samples should be sent to the lab for testing expeditiously.

Serology: IgM becomes positive 3-5 days after symptom onset, IgG titers in the recovery phase have a minimum of 4-time increase from acute phase.

**Chest imaging**

In early phase, small patchy infiltration and interstitial changes can be seen, especially in the periphery of the lung. Then rapidly progressing to bilateral multifocal ground glass opacities and infiltrations. Severe cases can have consolidation of lung parenchyma. Pleural effusion is rarely seen.

5. **Diagnostic criteria**

**Suspected cases**

One item from the epidemiological history AND two items from the clinical presentation OR Three items from the clinical presentation

**Epidemiological history**

(1) History of travel or residence in the city of Wuhan or surrounding regions or any other communities with reported confirmed cases, within 14 days of symptom onset.

(2) History of contact with people who tested positive for COVID-19, within 14 days of symptom onset.
(3) History of contact with people who are febrile or with respiratory symptoms and who are from the city of Wuhan or surrounding regions, or from other communities with confirmed COVID-19 cases, within 14 days of symptom onset.

(4) From the communities with evidence of community-spread of COVID-19 (2 or more people with fever and/or respiratory symptoms in the same family, office, school class within 2 weeks).

Clinical presentation

(1) Fever and/or respiratory symptoms.

(2) With aforementioned COVID-19 chest imaging findings.

(3) In the early phase of the disease, with a low or normal WBC counts, low or normal lymphocyte counts.

Confirmed cases

Suspected cases and one of the following:

(1) RT-PCR positive for SARS-CoV-2.

(2) Viral sequencing yields a highly homologous sequence with known SARS-CoV-2.

(3) SARS-CoV-2 specific IgM and IgG positive; IgG seroconversion from negative to positive or recovery-phase IgG level 4 times higher or more compared to acute-phase.

6. Clinical Severity Classification

Mild

Patients with mild clinical symptoms but without evidence of pneumonia on imaging.

Regular

Patients with fever, respiratory symptoms and evidence of pneumonia on imaging.

Severe

Adult with any one of the following:

(1) Tachypnea, respiratory rate ≥ 30/min.

(2) Resting pulse oximetry O₂ Sat ≤93% (finger).

(3) PaO₂/FiO₂ ≤ 300 mmHg.
(4) >50% increase of involved lung area in 24-48 hours on chest imaging.

Children with any one of the following:

(1) Tachypnea (age <2 months, RR ≥ 60/min; age 2-12 months, RR ≥ 50/min; age 1-5 years, RR ≥ 40/min; age >5 years, RR ≥ 30/min), excluding tachypnea in the settings of fever and irritability.

(2) Resting O₂ sat ≤ 92% (finger).

(3) Signs of dyspnea (e.g. moaning, nasal flaring), cyanosis, paroxysmal apnea.

(4) Lethargy or convulsion.

(5) Decreased appetite or difficulty feeding, signs of dehydration.

Critical

Any one of the following:

(1) Respiratory failure requiring mechanical ventilation.

(2) Shock.


7. Sentinel Clinical Characteristics of Severe and Critical Cases

Adult

(1) Progressive lymphopenia.

(2) Progressive rise of inflammatory markers, e.g. IL-6, CRP.

(3) Progressive lactic acidosis.

(4) Rapidly worsening lung pathology.

Children

(1) Increasing respiratory rate.

(2) Poor mental reactivity, lethargy.

(3) Progressively increasing levels of lactic acid.
(4) Radiological evidence for bilateral or multilobar involvement, pleural effusion, or rapidly progressing pathology.

(5) Infants age <3 months, or with preexisting conditions (e.g. congenital heart disease, bronchopulmonary dysplasia, respiratory tract malformation, abnormal hemoglobin, severe malnutrition), or immunodeficiency or immunosuppression (chronic immunosuppressive therapy).

8. Differential Diagnoses

Mild clinical manifestation of COVID-19 should be distinguished from upper respiratory infection caused by other viruses.

COVID-19 pneumonia should be distinguished from mycoplasma pneumonia and other viral pneumonia caused by influenza virus, adenovirus, respiratory syncytial virus, etc. For suspected cases, it is crucial to adopt methods such as rapid antigen detection and multiplex PCR nucleic acid testing to rule out common respiratory pathogens.

It is also important to distinguish COVID-19 from other non-infectious diseases, such as vasculitis, dermatomyositis, organizing pneumonia, etc.

9. Case Identification and Reporting

Once a suspected case which meets guideline-defined criteria is identified, healthcare professionals of hospitals and clinics at all levels should immediately start isolated treatment in single rooms, consulting experts or attending physicians. If the case is still considered a suspected case, it should be reported online within 2 hours, with samples collected for SARS-CoV-2 nucleic acid testing. In the meantime, transfer the patient to designated hospital when transfer safety can be guaranteed. Patients who have been in close contact with confirmed positive patients, even when they are tested positive for common upper respiratory antigens, are recommended to be also tested for SARS-CoV-2 antigen.

Two consecutive negative results of SARS-CoV-2 nucleic acid testing (sampling interval > 24 hours) AND negative IgM and IgG against SARS-CoV-2 specific antigen 7 days after symptom onset rule out COVID-19 for a suspected case.
10. Management
Determining appropriate unit of admission

(1) Suspected and confirmed cases should be managed in the hospitals equipped with sufficient measures of isolation and protection. Suspected cases should be managed one patient per room. Multiple confirmed cases can be managed in the same room.

(2) Severe cases should be transferred to ICU as soon as possible.

General treatment

(1) Bed rest, supportive treatment, ensure sufficient caloric intake. Monitor electrolytes and hydration status. Monitor vital signs and O₂ saturation.

(2) Monitor CBC, U/A, CRP, CMP (LFTs, cardiac enzymes, renal function, etc.), coagulation panel, ABG, chest imaging studies based on disease progression. Cytokine levels can also be measured if possible.

(3) Provide sufficient oxygenation, via nasal cannula, mask, or high-flow nasal cannula. If available, can give H₂/O₂ mixture (H₂/O₂: 66.6%/33.3%)

(4) Antiviral: Can begin trial of alpha-interferon (adult dose: 5 million Units dissolved in 2 mL saline/Lactated Ringer for nebulized inhalation twice daily), lopinavir/ritonavir (adult dose 200 mg/50 mg capsule x 2, twice daily, for a course no more than 10 days total), ribavirin (recommended to be used together with interferon or lopinavir/ritonavir, adult 500 mg BID or TID, IV gtt, with treatment course no more than 10 days), chloroquine phosphate (adult 18-65 yo, with body weight >50 kg, 500 mg BID, for 7 days; with body weight <50 kg, 500 mg BID for the first 2 days, then 500 mg QD for the 3rd day to the 7th day), arbidol (Umifenovir) (adult 200 mg, TID, with treatment course no more than 10 days). Monitor for adverse effects of the above medications, drug-drug interactions, and contraindications (e.g. chloroquine phosphate is contraindicated in patients with cardiac diseases). The efficacy of the medication in individual patients needs to be further evaluated in clinical practice. The concurrent use of three or more antivirals is not recommended. The medication should be discontinued if intolerable adverse effects occur. The choice of antivirals in pregnancy should be chosen based on least impact to fetus if possible and titrated based on gestational age. Alternatively, treatment may be initiated after delivery/pregnancy termination. Informed consent from patient is required.

(5) Antibiotics: Avoid unnecessary or inappropriate use of antibiotics, particularly broad-spectrum agents.

Treatment of the severe and critical cases
Principle

In addition to symptomatic treatments, complications should be prevented proactively, by optimizing preexisting conditions, preventing secondary infections, and if needed provide support to organ function expeditiously.
Ventilation support

Oxygen therapy

Severe cases should receive oxygen through nasal cannula or mask. Respiratory status and/or hypoxemia should be monitored carefully to ensure effective oxygenation.

High-flow nasal cannula and non-invasive ventilation support

If respiratory status does not improve after initial oxygen support, high-flow NC or non-invasive ventilation support should be considered. If the patient’s presentation does not rapidly improve (in 1-2 hours), endotracheal intubation and mechanical ventilation should be initiated.

Invasive mechanical ventilation

Small tidal volume (6-8 mL/kg ideal body weight) and low plateau pressure (≤30 cmH\textsubscript{2}O) should be utilized to minimize ventilator-induced lung injury. When a plateau pressure is maintained at ≤35 cmH\textsubscript{2}O, a high PEEP may be used. At the same time, the warmth and moisture of the respiratory tract should be maintained, long-duration sedation avoided, and sedation discontinued early for lung-recovery therapy. Patient-ventilator dyssynchrony exists in many patients, and in these patients, sedatives and neuromuscular blocking agents may be necessary. Based on the nature of the respiratory secretion, closed endotracheal suctioning and bronchoscopy should be considered when necessary.

Salvage therapy

Lung recruitment maneuvers are recommended in patients with severe ARDS. When possible, >12 hours of prone positioning should be maintained. If mechanical ventilation in prone-position proves inadequate, ECMO should be considered. Indications for ECMO: (1) FiO\textsubscript{2} >90%, but PaO\textsubscript{2} <80 mmHg for 3-4 hours; (2) plateau pressure ≥35 cmH\textsubscript{2}O. For patients with isolated respiratory failure, VV-ECMO should be considered first; and if circulation support is needed, VA-ECMO should be used. When preexisting conditions are under control and there are signs of the improving cardiopulmonary function, can begin trial to wean ECMO.

Circulation support

In addition to sufficient fluid resuscitation, vasoactive medications can be used. The change in blood pressure, heart rate, and urine output should be monitored, as well as lactic acid and base excess in ABG. Invasive and non-invasive methods for hemodynamic monitoring can be considered, e.g. US Doppler, echocardiography, invasive blood pressure or PiCCO monitoring. In the treatment course, the fluid balance should be optimized. Septic shock, GI bleeding, or heart failure should be ruled out if heart rate increased by 20% or blood pressure decreased by 20% of baseline, accompanied with signs of cutaneous hypoperfusion and decrease in urine output.

Renal failure and renal replacement therapy

The cause for damage of renal function in severe cases should be sought actively, e.g. hypoperfusion and drug-induced kidney injury. For patients with renal failure, water balance, acid-base balance and electrolyte balance should be monitored and maintained. The nitrogen balance should be maintained in nutritional support, and calorie and microelements should be
replenished. In severe cases, continuous renal replacement therapy (CRRT) can be considered. The indications for CRRT include: (1) hyperkalemia, (2) acidosis, (3) pulmonary edema or volume overload, (4) maintaining fluid balance in multiorgan dysfunction.

Treatment using plasma from recovered patients

Suitable for patients who are rapidly progressing, or severe or critical cases. See Treatment Guidelines for Using Plasma of Recovered Patients of COVID-19 Pneumonia.

Extracorporeal blood purification

Techniques include plasmapheresis, blood/plasma filtration, which can mitigate the damage to the body by removing inflammatory cytokines and dampen cytokine storm. These techniques can be used in severe and critical cases who are in the early- to mid-phase of cytokine storm.

Immunomodulators

In patients with extensive bilateral lung involvement and critical cases, tocilizumab can be used if IL-6 is elevated. First dosage: 4-8 mg/kg, recommended dose is 400 mg diluted in 100 mL 0.9% normal saline, delivered intravenously over at least one hour. One additional dose can be given after 12 hours if needed. Tocilizumab cannot be given more than two doses, and maximum single dose cannot exceed 800 mg. Monitor for anaphylaxis. Tocilizumab is contraindicated in patients with active infection, such as tuberculosis.

Other treatments

(1) For patients with worsening $O_2$ saturation, rapidly worsening by radiographic evidence and inflammatory cytokine storm, glucocorticoids can be used on a short-term (3-5 days) basis, with recommended dose less than methylprednisolone 1-2 mg/kg/day steroid dose equivalents. Caution: high dose steroids can delay viral clearance due to immunosuppressive effect. The gut microbiome should be maintained to prevent secondary infection.

(2) For pediatric severe and critical cases, Intravenous immunoglobulin (IVIG) can be used.

(3) For pregnant severe and critical cases, pregnancy termination should be recommended, with caesarean section as the preferred method.

(4) The anxiety and fear among patients should be recognized and addressed.

Treatment using traditional Chinese medicine

Not translated.
11. Discharge Criteria and After-Discharge Precautions

Discharge criteria

Need to satisfy ALL of the following:

(1) Remains afebrile for more than 3 days.

(2) Significant clinical improvement of respiratory symptoms.

(3) Significant improvement of pulmonary infiltrate by radiographic evidence

(4) At least two consecutive negative sputum cultures or negative nasopharyngeal swabs for SARS-CoV-2 at least 24 hours apart in between swabs.

Post-discharge precautions

(1) The hospitals need to inform the patient’s primary care physician and provide medical records and discharge summary to PCP.

(2) After discharge, we recommend a 14-day self quarantine and continued close monitoring of health conditions. We recommend the patient continue to wear a face mask, live in a well-ventilated room, and avoid close-contact with family members, use a separate set of utensils, practice good hand hygiene, and avoid public areas.

(3) We recommend patients to follow up in 2 weeks after discharge and again in 4 weeks.

12. Transportation Principle

Transportation of patients is implemented according to the COVID-19 Patients Transportation Principle by National Health Commission of the People’s Republic of China.

13. Infection Prevention and Control in Hospitals

Appendix A. New Changes in the 7th Edition

- **Mentioning of the risk of imported cases in the introduction**
- **New possible route of transmission was added**
  - Precautions should be taken to prevent transmission by contaminated feces and/or urine via contact or aerosol; SARS-CoV-2 was isolated from human feces and urine. In addition, droplets and close contact with infected patients are still the main routes of transmission. Under certain circumstances, transmission by aerosol also remains a possibility.
- **Preliminary autopsy and biopsy pathology findings were added**
  - This new edition includes gross and microscopic description of lung, spleen, hilar lymph nodes, heart, vasculature, liver, gallbladder, kidney, brain parenchyma, adrenal gland, esophagus, stomach and intestines.
  - The results indicated that the pathophysiology of COVID-19 mainly involves the lung and immune system. Other organs may be susceptible to secondary damages, depending on existing underlying comorbidities.
- **Addition of serum antibody testing as a detection method**
  - In addition to nucleic acid detection and viral genetic sequencing, the 7th edition included serum antibody testing as one of the detection methods. Patients often test positive for SARS-2-CoV specific IgM antibody 3-5 days after disease onset, and IgG antibody titers increase of minimum 4 fold during recovery phase as compared to acute phase.
  - In addition, the 7th edition deleted the following statement from the previous edition: “To improve sensitivity of the nucleic acid testing, it is recommended to obtain as much patient sputum as possible and perform tracheal intubation to obtain secretion from the lower respiratory tract.”, and recommended to “adopt RT-PCR and/or NGS methods to perform nucleic acid tests.”, while also emphasizing that “samples(sputum or airway extractions) from the lower respiratory tract yield more consistent results.”
- **More insights into clinical manifestations of pregnant/postpartum women and children**
  - The 7th addition added description for pregnant/postpartum women and children, such as “clinical manifestation of pregnant/postpartum women is similar to the other patients at similar age”; “Some children and neonates demonstrated atypical symptoms, such as vomiting, diarrhea, and other GI conditions or simply demonstrated fatigue and respiratory distress, etc.”
  - In addition, the criteria for adult critical case did not change in the 7th edition, while the criteria for children critical case is added, with symptoms include: “demonstrating shortness of breath (excluding in setting of fever and crying); O2 Sat ≤92% under resting condition; assisted respiration, cyanosis, intermittent apnea; lethargy and convulsions, etc.”
- **Addition of alarming signs for severe and critical cases**
  - To improve early treatment and reduce chances of progression from mild to severe condition, the 7th edition included warning signs for severe and critical cases.
  - In adults, the clinical warning signs include: progressive decrease in serum lymphocytes; rise in serum cytokines, such as IL-6, C-reactive protein, etc.; progressive increase in lactic acid; rapid progression of lung pathology.
  - In children, the clinical warning signs include: increased respiratory rate; altered mental status, lethargy; progressive lactic acidosis; bilateral or unilateral lobar infiltration on imaging, pleural effusion or rapid progression of pathological changes; infant under 3 months of age or with underlying diseases (e.g. congenital heart disease, bronchopulmonary dysplasia, airway malformation, hemoglobinopathy, and severe malnutrition, etc.), immunocompromised individuals (due to conditions that cause immune insufficiency or on chronic immunosuppressive therapy).
- **Addition of immunotherapy with Tocilizumab**
  - The 7th edition included multiple targeted changes and improvement in treatment options. For instance, new pathological examination shows mucus and mucus plug formation in
the airways. Therefore, during invasive mechanical ventilation of severe and critical cases, to improve patient ventilation, it is recommended to “adopt closed endotracheal suction of sputum, and bronchoscopy if necessary.”

- In the treatment of severe and critical cases, Tocilizumab was used as immunotherapy to treat severe cases or patients “with bilateral diffuse pathological changes in the lungs” and those who demonstrate increase in IL-6 level upon lab testing. Detailed treatment plan with method, dosage, potential allergic responses, is included in this edition. Patients with other active infections, such as tuberculosis should not use this medication.
- In addition, the 7th edition improved exclusion criteria for suspected cases and modified criteria for discharge and precautions after discharge.