Evidence check

26 April 2020

Rapid evidence checks are based on a simplified review method and may not be entirely exhaustive, but aim to provide a balanced assessment of what is already known about a specific problem or issue. This brief has not been peer-reviewed and should not be a substitute for individual clinical judgement, nor is it an endorsed position of NSW Health.

Inpatient management of COVID-19

Rapid review question

What guidelines are available for the inpatient management of COVID-19?

In brief

- Guidance is published by organisations including the World Health Organization (WHO), the Centers for Disease Control and Prevention (CDC), the National Institutes of health, the Australian National COVID-19 Clinical Evidence Taskforce, and in peer reviewed journals.
- Investigations include; chest x-ray, ultrasound, and if indicated computed tomography (CT) and/or Electrocardiogram (ECG), laboratory testing comprising a complete blood count (CBC) including liver and kidney function tests. Measurements of inflammatory markers such as C-reactive protein (CRP), D-dimer, and ferritin, may have prognostic value.
- Patients' vital signs and oxygen saturation should be monitored and supportive treatment given. Some guidelines advise repeat blood tests on days three, five and seven following admission.
- Patients should be given effective oxygen therapy; one publication suggests monitoring patients on oxygen therapy 30 minutes initially, then every two or six hours depending on results. Currently, there is no evidence to support the effectiveness of existing antiviral drugs.
- Some individual hospitals have made their treatment protocols publicly available.

Methods (Appendix 1)

PubMed and Google searches were conducted on 9 April 2020 and updated on 20 April 2020. An updated search for guidelines only was conducted on the 26 April 2020. Management of specific conditions and studies evaluating individual drug therapies were excluded.

Limitations

Evidence is emerging rapidly and this review will be subject to frequent revision. The evidence base is dynamic and information is still emerging about best treatment for COVID-19. Recommendations are copied from source material and no attempt has been made to integrate the different guidance.

Results (Tables 1 and 2)

General principles of management include:

- appropriate infection control and supportive care
- immediate implementation of appropriate infection prevention and control (IPC) measures
- collection of specimens for laboratory diagnosis(1)
- limit infection in a facility (such as by reduce points of entry, screen people with symptoms)
- isolate symptomatic patients as soon as possible
- protect healthcare personnel(2).

Potential and ongoing therapeutics trials for COVID-19 are currently underway.(3)

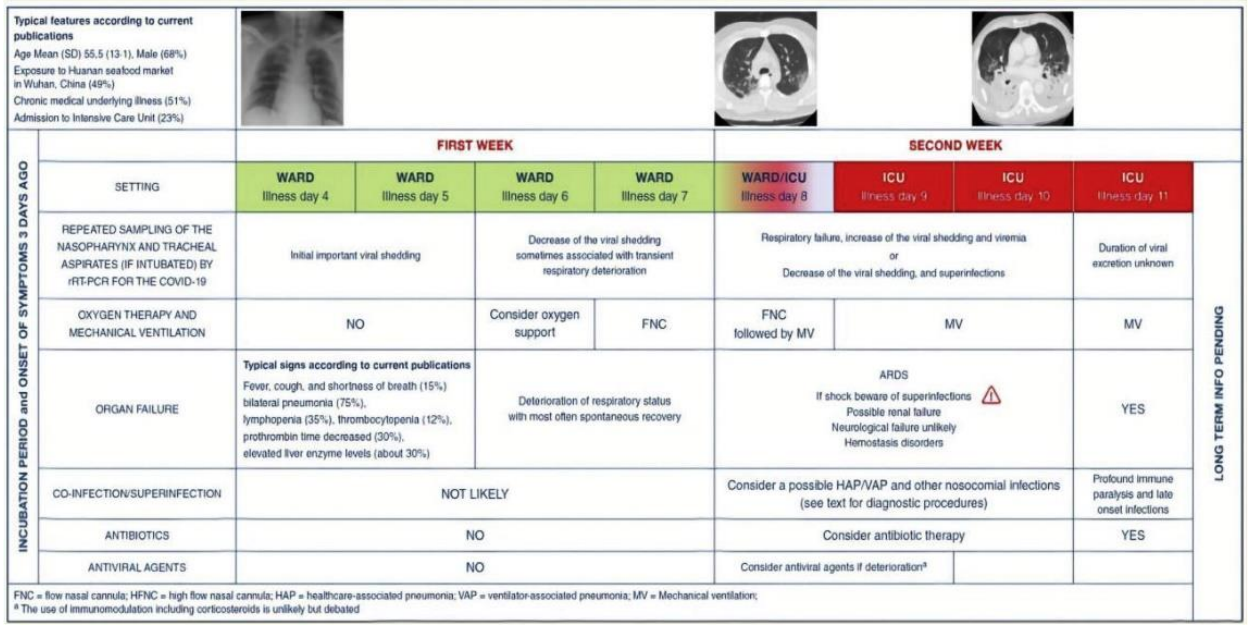
Table 1: Peer reviewed publications for inpatient management

Reference	Title	Recommendations
Li 2020 (4)	Diagnosis and clinical management of severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2) infection: an operational recommendation of Peking Union Medical College Hospital (V2.0)	Routine examination of SARS-CoV-2 infected patient Screening cases on the day of visit • Nucleic acid examination of sputum or naso-/oropharyngeal swabs, complete blood count, urine analysis, arterial blood gas analysis, liver and kidney function • CRP, procalcitonin, creatine kinase plus myoglobin, coagulation, and chest CT should be performed. Inflammatory cytokines [such as interleukin (IL)-6, IL-10, and tumour necrosis factor (TNF)-α], lymphocyte subsets, and complement can be tested as appropriate Sequential examination of confirmed patients • Complete blood count, liver and kidney function, creatine kinase and myoglobin, coagulation function and CRP on the third, fifth and seventh days after admission and on discharge. PCT and lymphocyte subsets can be repeated on days 5-7 if feasible • The chest x-ray or CT scan is re-examined 1-2 days after the admission. The time for subsequent re-examination depends on the disease status, but is no longer than five days • Complete blood count, chest X-ray, liver and kidney function, and all abnormal examinations on admission re-examined before discharge except for referrals. *General treatment* Patients should be kept in bed and closely monitored for vital signs and levels of oxygen saturation. Supportive treatment should be ensured, including enough supply of energy and fluid, maintenance of electrolyte and acid-base homeostasis. *Oxygen therapy* Patients with hypoxemia should be given oxygen therapy immediately and maintain a blood oxygen saturation level to no less than 90% in men and non-pregnant women, and 92-95% in pregnant women. Currently, there is no evidence to support the effectiveness of existing antiviral drugs. Severe patients could receive glucocorticoid at an early stage.

Reference	Title	Recommendations
Jin 2020 (5)	A rapid advice guideline for the diagnosis and treatment of 2019 novel coronavirus (2019-nCoV) infected pneumonia (standard version)	• The patient should rest, be monitored for vital signs (heart rate, pulse oxygen saturation, respiratory rate, blood pressure) and given supportive treatment. • The patient should be monitored for routine CRP, PCT, organ function (liver enzyme, bilirubin, myocardial enzyme, creatinine, urea nitrogen, urine volume, etc.), coagulation function, arterial blood gas analysis and chest imaging. • The patient should be given effective oxygen therapy. *Antiviral treatment* • At present, there is no evidence from randomised controlled trials to support specific drug treatment against the new coronavirus in suspected or confirmed cases. • The α-interferon atomization inhalation or lopinavir/ritonavir orally can be considered. *Antibiotic therapy* • Avoid blind or inappropriate use of antibacterial drugs, especially the combination of broad-spectrum antibacterial drugs. • Mild patients can take antibacterial drugs against community-acquired pneumonia if the accompanying bacterial infection cannot be ruled out. *Corticosteroid therapy* • The use of corticosteroids for severe acute respiratory distress syndrome (ARDS) is controversial and use needs to be cautious. Methylprednisolone can be used as appropriate for patients with rapid disease progression or severe illness. *Other medications described for:* • Symptomatic treatment of fever • Nutrition support treatment • Reducing the incidence of stress ulcers • Reducing the secretion of lung glands • Reducing the incidence of venous embolism

Reference	Title	Recommendations
Jamil 2020 (6)	Diagnosis and Management of COVID-19 Disease	*General treatment recommendations (recommended based on experience to date, and should not replace clinical judgement at the bedside)* • Fluid-sparing resuscitation • Empiric antibiotics if suspicion for secondary infection • Monitor for and treat cardiomyopathy and cardiogenic shock • Corticosteroids are not recommended except when required for other indications • Oxygen by nasal cannula OR simple mask OR nonrebreather masks • Consider early intubation to avoid use of aerosolizing NIPPV and emergent intubations. Use rapid-sequence intubation • Avoid direct laryngoscopy to distance provider from patient. Use video laryngoscopy where possible • The WHO has not recommended against the use of non-steroidal anti-inflammatory agents. Clinicians should consider alternatives if concerns exist • The American College of Cardiology, American Heart Association and Heart Failure Society of America's joint statement recommends against discontinuing ACE-I and ARBs in patients with COVID-19.
Thevarajan 2020 (7)	Clinical presentation and management of COVID-19	*Respiratory management* • Supplemental oxygen should be administered for patients with SaO2 <92%. • Manoeuvres to improve gas exchange such as deep breathing, positioning patients appropriately in bed, mobilising when able should be implemented where possible. • In the setting of progressive hypoxaemia despite low or moderate-flow oxygen (via nasal prongs or Hudson mask), high-flow oxygen can be considered. Personal protective equipment (PPE) precautions should be taken by staff and the patient should be in a single negative pressure room with the door closed. • Nebulised medications should also be avoided where alternatives exist (such as metered dose inhalers plus spacers). When needed, appropriate PPE should be used. • In general, most guidelines recommend early consideration of intubation and mechanical ventilation for patients with ARDS. Non-invasive ventilation such as CPAP and BiPAP should only be used with appropriate precautions; their role is contentious.

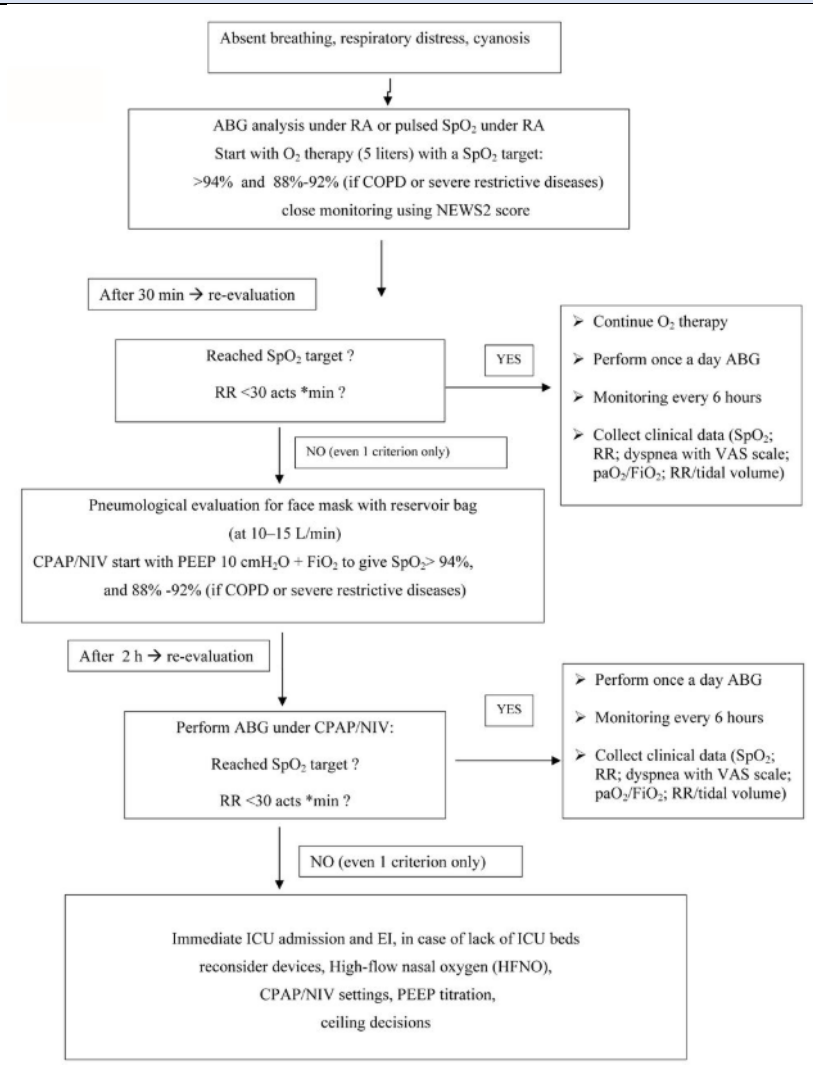
Reference	Title	Recommendations
		Specific therapies • No specific agent has yet been demonstrated to be clinically effective in the management of COVID-19. The WHO's interim guidance asserts that investigational anti-COVID-19 therapeutics should be used only in approved, randomised, controlled trials. *Holistic care* • Ensuring emotional care for those most vulnerable, and those experiencing high levels of stress.
Nicola et al, 2020 (8)	Evidence Based Management Guideline for the COVID-19 Pandemic – Review Article	Refers to WHO guidance for managing severe disease, and includes visual management table:



Typical features according to current publications Age Mean (SD) 55.5 (13·1), Male (68%) Exposure to Huanan seafood market in Wuhan, China (49%) Chronic medical underlying illness (51%) Admission to Intensive Care Unit (23%)		FIRST WEEK				SECOND WEEK				
INCUBATION PERIOD and ONSET OF SYMPTOMS 3 DAYS AGO	SETTING	WARD Illness day 4	WARD Illness day 5	WARD Illness day 6	WARD Illness day 7	WARD/ICU Illness day 8	ICU Illness day 9	ICU Illness day 10	ICU Illness day 11	LONG TERM INFO PENDING
	REPEATED SAMPLING OF THE NASOPHARYNX AND TRACHEAL ASPIRATES (IF INTUBATED) BY rRT-PCR FOR THE COVID-19	Initial important viral shedding		Decrease of the viral shedding sometimes associated with transient respiratory deterioration		Respiratory failure, increase of the viral shedding and viremia or Decrease of the viral shedding, and superinfections			Duration of viral excretion unknown	
	OXYGEN THERAPY AND MECHANICAL VENTILATION	NO		Consider oxygen support	FNC	FNC followed by MV	MV		MV	
	ORGAN FAILURE	Typical signs according to current publications Fever, cough, and shortness of breath (15%) bilateral pneumonia (75%), lymphopenia (35%), thrombocytopenia (12%), prothrombin time decreased (30%), elevated liver enzyme levels (about 30%)		Deterioration of respiratory status with most often spontaneous recovery		ARDS If shock beware of superinfections ⚠ Possible renal failure Neurological failure unlikely Hemostasis disorders			YES	
	CO-INFECTION/SUPERINFECTION	NOT LIKELY				Consider a possible HAP/VAP and other nosocomial infections (see text for diagnostic procedures)			Profound immune paralysis and late onset infections	
	ANTIBIOTICS	NO				Consider antibiotic therapy			YES	
	ANTIVIRAL AGENTS	NO				Consider antiviral agents if deterioration[a]				

FNC = flow nasal cannula; HFNC = high flow nasal cannula; HAP = healthcare-associated pneumonia; VAP = ventilator-associated pneumonia; MV = Mechanical ventilation;
[a] The use of immunomodulation including corticosteroids is unlikely but debated

Reference	Title	Recommendations
Sahu et al, 2020 (9)	COVID-2019: update on epidemiology, disease spread and management	• Supportive care to alleviate symptoms such as isolating the patient into a negative pressure isolation room and providing adequate rest, hydration, nutritional support and electrolyte balance. • There are no specific antiviral therapies. • Antbacterial agents are not to be used empirically. • The role of corticosteroids is controversial.
Hill et al, 2020 (10)	Coronavirus: Origins, Signs, Prevention and Management of Patients	• All patients should be monitored closely for any changes in their vital signs, oxygen saturations, respiratory rate, blood pressure, pulse, changes in consciousness and blood glucose levels. • Clinical staff should use the National Early Warning Score (NEWS 2) to track a patient with COVID-19 and to note deterioration. • Corticosteroids should be avoided, unless indicated for other reasons, such as an exacerbation of chronic obstructive pulmonary disease or septic shock. • Refers to WHO guidelines for management.

Reference	Title	Recommendations
Vitacca et al, 2020 (11)	Early Consensus Management for non-ICU ARF SARS-CoV-2 Emergency in Italy: From Ward to Trenches	

Reference	Title	Recommendations
Casini et al, 2020 (12)	Suggestions for thromboprophylaxis and laboratory monitoring for in-hospital patients with COVID-19	Evidence from retrospective cohorts indicates that hospitalised COVID-19 patients could suffer from an excessive coagulation activation. • All in-hospital COVID-19 patients should receive pharmacological thromboprophylaxis according to a risk stratification score, unless contraindicated. • In patients with creatinine clearance >30 ml/min, low molecular weight heparin (LMWH) should be administered. • In patients with creatinine clearance <30 ml/min, unfractionated heparin (UHF) subcutaneously twice or three times daily or intravenously should be administered • Anti-Xa activity should be monitored when indicated. • Antithrombin monitoring could be considered on individual basis • Regularly monitor prothrombin time, D-dimers, fibrinogen, the platelet count, lactate dehydrogenase (LDH), creatinine and alanine aminotransferase (ALT) (daily or at least 2−3 times per week). • Consider heparin-induced thrombocytopenia (HIT) in patients with fluctuations in platelet counts or signs of heparin resistance. There are no data on the use of direct oral anticoagulants.
Nicastri et al, 2020 (13)	National Institute for the Infectious Diseases "L. Spallanzani", IRCCS. Recommendations for COVID-19 clinical management	Stable patients; • Clinical monitoring; (once/work shift; thrice/day), periodic vital signs recording (blood pressure, heart rate, respiratory rate, SpO2, GCS, body temperature), arterial blood gas analysis monitoring. • Virological monitoring; SARS-CoV-2 RT-PCR performed on rhinopharyngeal swab every 48-72 hours until persistently negative. • Imaging; Chest x-ray useful first line examination, chest CT no absolute indicate at this stage of disease but highly valuable. • Antiviral; Lopinavir/ritonavir, Hydroxychloroquine phosphate, Chloroquine phosphate, Alternatively to Lopinavir/ritonavir is Darunavir plus Ritonavir. • Supportive therapy; symptomatic, oral rehydration, consider antimicrobial therapy. Clinically unstable but not critical; • Strict monitoring.

Reference	Title	Recommendations
		• Clinical monitoring; Strict periodic vital signs recording (blood pressure, heart rate, respiratory rate, SpO2, GCS, body temperature), arterial blood gas analysis monitoring. • Virological monitoring; SARS-CoV-2 RT-PCR performed on rhinopharyngeal swab every 48-72 hours until persistently negative. IL-6 plasma levels, D-dimer, ferritin, fibrinogen, C-reactive protein, tryglicerides, lactate dehydrogenase (LDH). • Imaging; Chest x-ray useful first line examination, chest CT no absolute indicate at this stage of disease but highly valuable, echocardiography. • Antiviral; Remdesivir, Lopinavir/ritonavir, Hydroxychloroquine phosphate, Chloroquine phosphate, Tocilizumab, Alternatively to Lopinavir/ritonavir is Darunavir plus Ritonavir • Empirical or targeted treatment of possible bacterial co-infections. • Prompt assessment of the need of drugs aimed at modulating the immune and inflammatory response, in order to counteract the evolution to ARDS. • Supportive therapy; Maintenance of an adequate peripheral oxygenation, through O2 administration, Aantimicrobial therapy, Oral or intravenous rehydration, Consider systemic steroids administration.

Table 2: Guidelines for inpatient management

Organisation	Guideline title	Recommendations	Source link
World Health Organization	Clinical management of severe acute respiratory infection (SARI) when COVID-19 disease is suspected - 2020	Management of mild COVID-19 – symptomatic treatment and monitoring: • Patients with mild disease do not require hospital interventions, but isolation is necessary to contain virus transmission. • Provide patient 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. Management of severe COVID-19 – oxygen therapy and monitoring: • Give supplemental oxygen therapy immediately to patients with SARI and respiratory distress, hypoxaemia or shock and target > 94%. • Closely monitor patients with COVID-19 for signs of clinical deterioration, such as rapidly progressive respiratory failure and sepsis. • Respond immediately with supportive care interventions. • Understand the patient's co-morbid condition(s). Management of severe COVID-19 – treatment of co-infections: • Give empiric antimicrobials to treat all likely pathogens causing SARI and sepsis as soon as possible, within one hour of initial patient assessment for patients with sepsis. • Empiric therapy should be de-escalated on the basis of microbiology results and clinical judgement. Note this guideline extends to include recommendations for critical care but these recommendations are not included here.	https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-(ncov)-infection-is-suspected

Organisation	Guideline title	Recommendations	Source link
Centers for Disease Control and Prevention	Interim Clinical Guidance for Management of Patients with Confirmed Coronavirus Disease (COVID-19)	For mild to moderate disease, it is recommended to follow infection prevention and control recommendations. For severe disease, no specific treatment for COVID-19 is currently Food and Drug Administration (FDA) approved. Corticosteroids should be avoided unless indicated for other reasons, such as management of chronic obstructive pulmonary disease exacerbation or septic shock. Inpatient management of COVID-19 revolves around the supportive management of the most common complications of severe COVID-19: pneumonia, hypoxemic respiratory failure/ARDS, shock, multi-organ failure, and the complications associated with prolonged hospitalisation, including secondary nosocomial infection, thromboembolism, gastrointestinal bleeding, and critical illness polyneuropathy/myopathy. No FDA-approved drugs have demonstrated safety and efficacy in randomised controlled trials for patients with COVID-19.	https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-guidance-management-patients.html
NIH COVID-19 Treatment Guidelines	Management of Persons with COVID-19	Moderate Illness • Most patients with moderate illness require hospitalisation. • Hospital infection and prevention control measures should be followed. • The number of people entering the room should be limited. • If possible use airborne infection isolation rooms. • Initial evaluation may include chest x-ray, ultrasound, or if indicated, CT. • Electrocardiogram (ECG) should be performed if indicated. • Laboratory testing includes a complete blood count (CBC) with differential and a metabolic profile, including liver and renal function tests. • Measurements of inflammatory markers such as C-reactive protein (CRP), D-dimer, and ferritin, while not part of standard care, may have prognostic value. Severe Illness	https://covid19treatmentguidelines.nih.gov/overview/management-of-covid-19/

Organisation	Guideline title	Recommendations	Source link
		• These patients will likely need to undergo aerosol-generating procedures. • They should be placed in airborne infection isolation rooms, if available. • Oxygen therapy should be administered immediately using nasal cannula or high-flow oxygen. • There are insufficient data to recommend either for or against any antiviral or immunomodulatory therapy. • If secondary bacterial pneumonia or sepsis is suspected, administer empiric antibiotics, re-evaluate daily, and if there is no evidence of bacterial infection, de-escalate or stop antibiotics. • Evaluation should include pulmonary imagining (chest x-ray, ultrasound, or if indicated, CT) and ECG, if indicated. • Laboratory evaluation includes CBC with differential and metabolic profile, including liver and renal function tests. • Measurements of inflammatory markers such as CRP, D-dimer, and ferritin, while not part of standard care, may have prognostic value.	
National COVID-19 Clinical Evidence Taskforce	Australian guidelines for the clinical care of people with COVID-19	• For people with COVID-19, monitor markers of clinical progression, such as rapidly progressive respiratory failure and sepsis, especially on days 5 to 10 after onset of symptoms. • For people with COVID-19, only administer antiviral medications or other disease-modifying treatments in the context of clinical trials with appropriate ethical approval. • For patients with COVID-19 for whom respiratory support (HFNO/NIV) is being considered, decisions should balance likelihood of patient benefit against the risk of infection for healthcare workers.	https://app.magicapp.org/app#/guideline/4179

Infectious Diseases Society of America	Guidelines on the Treatment and Management of	• Among patients who have been admitted to the hospital with COVID-19;
		  ○ hydroxychloroquine/chloroquine
		  ○ hydroxychloroquine/chloroquine plus azithromycin
			https://www.idsociety.org/practice-guideline/covid-19-guideline-treatment-and-management/

Organisation	Guideline title	Recommendations	Source link
	Patients with COVID-19	○ the combination of lopinavir/ritonavir ○ tocilizumab ○ convalescent plasma are all only recommended in the context of a clinical trial • Among patients who have been admitted to the hospital with COVID-19 pneumonia, suggests against the use of corticosteroids. • Among patients who have been admitted to the hospital with ARDS due to COVID-19, recommends the use of corticosteroids in the context of a clinical trial.	
American Thoracic Society-led International Task Force	COVID-19: Interim Guidance on Management Pending Empirical Evidence.	For hospitalized patients with COVID-19 who have no evidence of pneumonia; • We make no suggestion either for or against hydroxychloroquine (or chloroquine). For hospitalized patients with COVID-19 who have evidence of pneumonia; • We suggest hydroxychloroquine (or chloroquine) on a case-by-case basis. • We make no suggestion either for or against treatment with remdesivir, lopinavir-ritonavir, tocilizumab or systemic corticosteroids.	https://www.thoracic.org/covid/covid-19-guidance.pdf
Government of Canada	Clinical management of patients with moderate to severe COVID-19 - Interim guidance	Management of severe COVID-19 • Give supplemental oxygen therapy immediately to patients with COVID-19 who have severe acute respiratory infection and respiratory distress, hypoxaemia or shock, and target saturations of 90-96% SpO2 during resuscitation. • Closely monitor patients with COVID-19 for signs of clinical deterioration and respond immediately with supportive care interventions. • Understand the patient's co-morbid conditions to tailor the management. • Use conservative fluid management in patients with severe acute respiratory infection when there is no evidence of shock.	https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/clinical-management-covid-19.html

Organisation	Guideline title	Recommendations	Source link
		• Give empiric antimicrobials to treat all likely pathogens causing severe acute respiratory infection and sepsis as soon as possible, within 1 hour of initial patient assessment for patients with sepsis. • De-escalate empiric therapy on the basis of microbiology results and clinical judgment.	
NHS	Clinical management of persons admitted to hospital with suspected COVID-19 infection	• Assess the need for oxygen supplementation in line with BTS guidelines. • Assess the need for fluid replacement/resuscitation in line with NICE sepsis guidelines. • Consider empirical antimicrobial treatment in line with NICE pneumonia guidance, lower respiratory tract infection (LRTI) guidelines and sepsis guidelines. • antimicrobial agents may treat non COVID-19 infections, the choice of antibiotic should follow local protocols, empirical therapy should be de-escalated on the basis of microbiology results and clinical judgement. • For confirmed COVID-19 and no indications of a secondary bacterial infection, stopping empirical antibiotics early should be considered. • High-dose corticosteroids should not be routinely given to treat viral pneumonia or ARDS (unless for other indication or part of a clinical trial). • Clinical need should determine the use of non-invasive ventilation (NIV) and high flow nasal oxygen (HFNO), taking into account IPC considerations.	https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/03/clinical-management-of-persons-admitted-to-hospita-v1-19-march-2020.pdf
Best Practice BMJ	Coronavirus disease 2019 (COVID-19)	• Immediately isolate all confirmed cases and implement appropriate infection prevention and control procedures. • Assess all adults for frailty on admission to hospital, irrespective of age and COVID-19 status. • Discuss the risks, benefits, and potential outcomes of treatment options with patients and their families.	https://bestpractice.bmj.com/topics/en-gb/3000168/treatment-algorithm#referencePop3

Organisation	Guideline title	Recommendations	Source link
		• Monitor patients closely for signs of clinical deterioration, and immediately start general supportive care interventions as indicated • Immediately start supportive care, if necessary. • Oxygen: give supplemental oxygen at a rate of 5 L/minute to patients with severe acute respiratory infection and respiratory distress, hypoxaemia, shock, or SpO_2 <90% • Intravenous fluids, breathlessness and anxiety. • Patients with severe illness may require continued antimicrobial therapy once COVID-19 has been confirmed. • Antipyretic drugs should be taken only when necessary while symptoms are present. • For cough, first use simple measures first e.g. honey then consider short-term use of an oral opioid in adults if the cough is distressing to the patient. • Provide advanced oxygen/ventilatory support in patients who are deteriorating and failing to respond to standard oxygen therapy. • Consider using experimental drug therapies only be administered in the context of ethically-approved clinical trials.	
The first affiliated hospital, Zhejian University School of Medicine	Handbook of COVID-19 Prevention and Treatment	Detailed guidance including; • Antiviral treatment • Anti-shock and anti-hypoxemia treatment • Oxygen therapy • Antibiotics • Microecology and nutritional support.	https://video-intl.alicdn.com/Handbook%20of%20COVID-19%20Prevention%20and%20Treatment.pdf
UpToDate (Note this is a review, not a guideline)	Coronavirus disease 2019 (COVID-19): Critical care issues	• Patients with severe disease often need oxygenation support. • Specific aspects of respiratory care for deteriorating patients before admission to the intensive care unit (ICU) include oxygenation with low flow and high-flow systems, non-invasive ventilation and the administration of nebulised medications.	https://www.uptodate.com.acs.hcn.com.au/contents/coronavirus-disease-2019-covid-19-critical-care-issues?sectionName=RESPIRATORY%20CARE%20

Organisation	Guideline title	Recommendations	Source link
		• For hospitalised patients who develop progressive symptoms, early admission to the ICU is prudent when feasible.	OF%20THE%20NONINTUBATED%20PATIENT&search=covid-19&topicRef=126981&anchor=H1683933351&source=see_link#H1683933351
Examples of individual hospital COVID-19 management protocols			
Royal Children's Hospital Melbourne	COVID-19 guidelines (paediatric)	*Mild to moderate disease* • Should be managed as per clinical syndrome. • Confirmed COVID-positive cases should be isolated. • Droplet and contact precautions (gloves, gown, surgical mask, eye wear) should be observed for all health care workers and visitors. • High-flow nasal oxygen therapy should be avoided if possible due to risk of aerosolisation. • Nebulised adrenaline should be reserved for severe croup. • Confirmed cases may not require admission if respiratory and hydration status are stable. The decision should be based on clinical assessment (including risk factors), social and geographical factors, and phase of illness. *Severe disease* • Respiratory support as required. • Airborne precautions (full PPE, including N95 mask) must be maintained if child requires high-flow oxygen, non-invasive ventilation or nebulised therapy. Do not withhold these therapies if indicated. • Management must occur in the highest level of isolation available. • A number of antiviral and other medications have been suggested as possible treatments for severe COVID-19 – consult the Infectious Diseases team.	https://www.rch.org.au/clinicalguide/guideline_index/COVID-19/

Organisation	Guideline title	Recommendations	Source link
Massachusetts General Hospitals	Massachusetts General Hospital COVID-19 Treatment Guidance	• All hospitalised patients: Continue statins if already prescribed. If no contraindication, and for those who have a guideline indication for a statin, consider starting: atorvastatin 40mg daily. • For patients with no Category 2 or 3 risk factors for severe disease: Supportive care and monitoring. • For patients with moderate or severe disease, i.e. patients with any Category 2/3 feature: Application for remdesivir (RDV) through a clinical trial. With guidance from Infectious Diseases, can consider adding hydroxychloroquine.	https://www.massgeneral.org/assets/MGH/pdf/news/coronavirus/mass-general-COVID-19-treatment-guidance.pdf
Michigan Medicine	Inpatient guidance for treatment of COVID-19 in adults and children	• Treatment: The current body of literature and local experience does not support the routine use of any specific treatment regimen, including hydroxychloroquine, for patients with confirmed COVID-19. • Supportive care: Appropriate treatment of concomitant pneumonia, respiratory failure, ARDS, sepsis, septic shock. • Limited evidence on Concomitant use of NSAIDs and/or ACE-I/ARBs and corticosteroids	http://www.med.umich.edu/asp/pdf/adult_guidelines/COVID-19-treatment.pdf

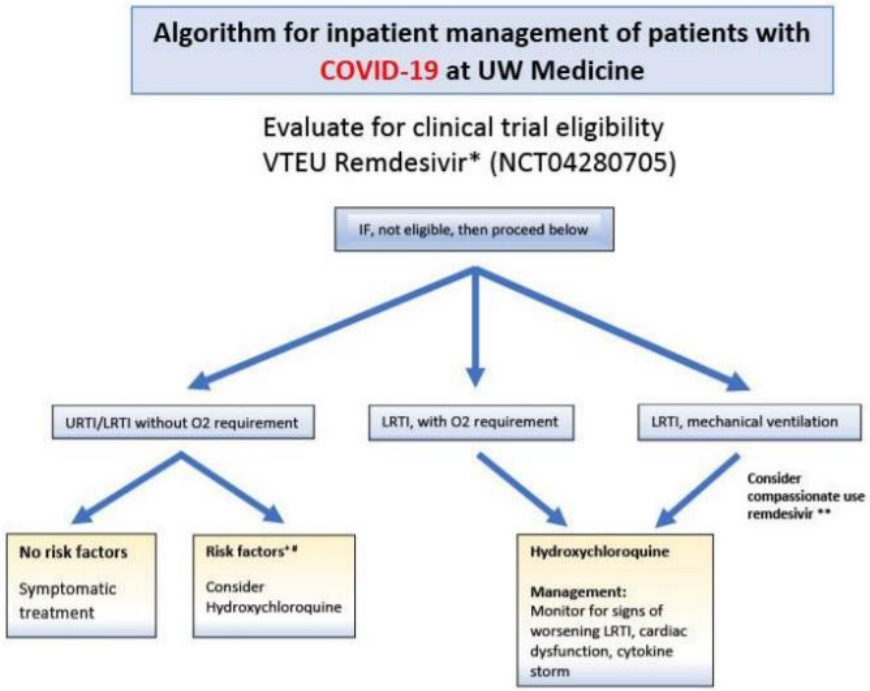
<table>
<tr><th>Organisation</th><th>Guideline title</th><th>Recommendations</th><th>Source link</th></tr>
<tr><td>Nebraska Medicine</td><td>COVID-19 Antiviral and Pharmacotherapy Information</td><td>
Preferential (clinical trial enrollment):
» Remdesivir Clinical Trial (NCT04280705) – E-mail Andre Kalil (akalil@unmc.edu) and LuAnn Larson (llarson@unmc.edu) for evaluation
• Dosing: 200mg IV once, then 100mg IV daily for duration of hospitalization or up to 10 total days
• Adverse Effects: Generally mild severity - GI intolerances, LFT abnormalities, infusion-related reactions
• Inclusion Criteria: Age ≥18, PCR confirmed SARS-CoV-2 infection within past 3 days, one of: 1) infiltrates on chest imaging 2) requiring supplemental oxygen or mechanical ventilation 3) respiratory physical exam findings and $SpO_2 \leq 94\%$ on RA
• Exclusion Criteria: AST or ALT >5x ULN, eGFR<50 or on dialysis, pregnancy or breast feeding, anticipated discharge within 3 days

Situational (alphabetical order): Risk/benefit ratio may favor use in selected patients. ID consultation required.
» Remdesivir Expanded Access (NCT04323761) – This program is being transitioned from an eIND-requiring compassionate use protocol to an IRB-approved expanded access program and may not currently be available for enrollment. The UNMC Clinical Research Center (llarson@unmc.edu) can be contacted for the latest status.
• Dosing: 200mg IV once, then 100mg IV daily for up to 10 total days
• Adverse Effects: Generally mild severity – GI intolerances, LFT abnormalities, infusion-related reactions
• Inclusion Criteria: Age ≥18, PCR confirmed SARS-CoV-2 infection or known contact of a confirmed case with PCR pending, requiring mechanical ventilation
• Exclusion Criteria: AST or ALT >5x ULN, eGFR<30 or on dialysis, pregnancy, multi-organ failure, requiring vasopressor support

Situational (alphabetical order): Efficacy unproven and toxicity risk noteworthy; closely monitor for safety. ID consultation required.
» Hydroxychloroquine[1-4,11,24-27]
• Dosing: 400mg PO BID x2 doses, then 200mg PO BID. Preferentially give with food.
• Duration: 5-10 days. Up to 20 total days of therapy have been reported in manuscripts.
• Adverse Effects: Generally mild/moderate severity - GI intolerances, cytopenias, QT prolongation, headaches, dizziness
• Notes: Potent in vitro inhibitor of SARS-CoV-2, but with multiple inconclusive, uncontrolled, or non-peer-reviewed early clinical reports. Being investigated for all stages of disease severity; use for prophylaxis appropriate only within a registered clinical trial. Use with caution in pediatrics. Impact of immunosuppressive effects is unknown. Has been studied in combination with azithromycin, without additive benefit but potential for additive cardiac toxicities (see below). Use for COVID-19 may exacerbate current shortages for patients with well-accepted autoimmune indications.
» Lopinavir/ritonavir[13-14,18]
• Dosing: 400/100mg (2 tabs) PO BID
• Duration: 5-10 days. Up to 14 total days of therapy have been reported, but many patients have adverse effects requiring early termination.
• Adverse Effects: Occur in most patients and can be moderate/severe – GI intolerances, hepatitis, and LFT abnormalities
• Notes: Multiple in vitro studies suggesting activity. Early clinical reports are inconclusive; one randomized trial with LPV/r initiated late in the disease course in moderately-ill hospitalized patients did not demonstrate benefit. Being investigated in further clinical trials. Many clinically significant drug-drug interactions. Adverse effects are common.
</td><td>https://www.nebraskamed.com/sites/default/files/documents/covid-19/antiviral-and-pharmacotherapy-information.pdf</td></tr>
<tr><td>University of Pennsylvania health</td><td>Treatment of Adult Patients with Laboratory-Confirmed SARS-CoV-2 (COVID-19) Infection</td><td>
<table>
<tr><th>Clinical Situation</th><th>Treatment Considerations</th><th>Special Considerations</th></tr>
<tr><td>Mild illness, not requiring hospitalization (non-pregnant)
OR
Hospitalized patient with mild illness (no hypoxia or radiographic</td><td>Symptomatic treatment and monitoring</td><td>Not applicable</td></tr>
</table>
</td><td>http://www.uphs.upenn.edu/antibiotics/COVID19.html</td></tr>
</table>

Organisation	Guideline title	Recommendations			Source link
		evidence of pneumonia) and no risk factors[1] (non-pregnant)			
		Hospitalized or non-hospitalized patients with mild illness (no hypoxia or radiographic evidence of pneumonia) and risk factors[1] for progression to severe disease (non-pregnant) **OR** **Hospitalized with hypoxia or radiographic evidence of pneumonia but not critically ill (non-pregnant)**	Consider treatment with: **Hydroxychloroquine** 400 mg PO q12h x 1 day then 400 mg daily[2] for total 5 days **AND/OR** **Clinical trial with Remdesivir** if patient qualifies (dosing and duration depend on clinical trial)[2]	**Hydroxychloroquine**: • Hydroxychloroquine can increase QT interval. Consider with caution in patients with prolonged QT at baseline and/or other QT-prolonging medications. If benefits of hydroxychloroquine outweigh risks, monitor electrocardiograms or telemetry when able (to avoid frequent electrocardiograms) in these high-risk patients. • Other risks include but are not limited to arrhythmia, cardiomyopathy, bone marrow suppression, and hypoglycemia and patients should be monitored for these side effects. **Remdesivir**: • Remdesivir is an investigational drug[2,3] • Monitor LFTs daily while on therapy
		Hospitalized requiring mechanical ventilation but no non-pulmonary end-organ damage (including liver injury with ALT>5 times upper limit of normal and creatinine clearance <30 mL/min or dialysis) and not requiring pressors (non-pregnant)	Consider treatment with the following agents: **Expanded access or clinical trial with Remdesivir** if patient qualifies (dosing and duration depend on clinical trial)[2,3] **AND/OR** **Hydroxychloroquine** 400 mg PO q12h x 1 day	**Remdesivir**: as above **Hydroxychloroquine**: as above **Corticosteroids**: CDC and WHO recommend avoiding corticosteroids given risk of prolonged viral shedding and toxicities, but can consider

Organisation	Guideline title	Recommendations			Source link
			then 400 mg daily for total 5 days ***__Corticosteroids__ (both inhaled and systemic) have mixed data with some studies suggesting potential improvement in ARDS and others suggesting worse outcomes and prolonged viral shedding so are not recommended at this time. However, they could be considered if patient has another compelling indication***	giving if there is another indication.	

Organisation	Guideline title	Recommendations	Source link
UW Medicine	UW Medicine Interim Treatment Guidelines for SARS-CoV-2 Infection/COVID-19		file:///C:/Users/60045140/Downloads/08%20-%20UW%20ID%20Treatment%20Guidelines%20for%20SARS-CoV2%2003_28_2020.pdf

Appendix 1

PubMed search terms: (("acute care"[title/abstract] OR ward[title/abstract] OR inpatient*[title/abstract] OR inpatients[MeSH Terms])) AND ((2019-nCoV[title/abstract] or nCoV[title/abstract] or covid-19[title/abstract] or covid19[title/abstract] or "covid 19"[title/abstract] OR "coronavirus"[MeSH Terms] OR "coronavirus"[title/abstract]))
PubMed: ((2019-nCoV[title/abstract] or nCoV*[title/abstract] or covid-19[title/abstract] or covid19[title/abstract] OR "covid 19"[title/abstract] OR "coronavirus"[MeSH Terms] OR "coronavirus"[title/abstract] OR sars-cov-2[title/abstract] OR “severe acute respiratory syndrome coronavirus 2”[Supplementary Concept])) AND (management[ti]) Filters: from 2020 - 2020
Google searches: ‘COVID-19’ and ‘inpatient/hospital ward’ and ‘guideline/protocol’

Care in the emergency department (ED) and intensive care unit (ICU) and for specific units such as inpatient rehabilitation units, or disciplines such as physiotherapy, were excluded. Some guidelines also included recommendations on critical care, but are not summarised in this evidence check. Guidelines focused solely on care for critically ill patients were excluded, as was Chinese medicine.

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Document history

Original search 11 April 2020	**Updates**
20 April 2020	• Five references added to table 1 • Updated methods to reflect inclusion criteria • Updated 'in brief' to reflect additional references • Condensed some information in results tables
26 April 2020	• Updated to included additional published guidelines in table 2