Management of COVID-19 in Adults

Document 1

Unite against COVID-19

Introduction

Initial clinical assessment for potential COVID-19 in all patients should be guided by the Clinical Assessment Tool. Further guidelines on infection control precautions, bed management etc. are also found at the same link.

This guideline has been adapted from the Australian National COVID-19 Clinical Evidence Taskforce, jointly revised by Respiratory and Infectious Diseases, for use at Counties Manukau Health. It refers to ongoing clinical management **FOR ADULTS ONLY** in the following patient groups:

Confirmed COVID-19	Probable COVID-19
(SARS-CoV-2 test positive during current illness)	*(tested negative, but ID decision to treat as COVID)*

i.e. does not apply to 'Suspected', 'Surveillance', 'Acute respiratory infections' or 'Exposed' groups.

Initial Management

	MILD	MODERATE	SEVERE / CRITICAL
DEFINITION	No symptoms **OR** URTI symptoms only **OR** cough, new myalgia or asthenia without new shortness of breath or reduction in oxygen saturation	Stable adult patient presenting with shortness of breath and/or systemic symptoms or signs. Able to maintain oxygen saturation ≥92% (or ≥90% for patients with chronic lung disease) with up to 4 L/min oxygen via nasal prongs.	Adul patients meeting any of the following criteria: • Respiratory rate ≥30/min • Oxygen saturation <92% on 4L/min oxygen via nasal prongs • Clinically deteriorating
BASELINE TESTING & WORK-UP	• Only as clinically indicated. • Low value testing is discouraged.	• FBC, Creat, electrolytes, LFTs, CRP • ECG only if specific indication • Chest x-ray • ABG • Investigations for CAP (urinary antigens, sputum PCR panel) if CXR shows focal consolidation. • Blood cultures if febrile or shocked • d-dimer & ferritin	• FBC, Creat, electrolytes, LFTs, CRP • ECG • Chest x-ray • ABG • Investigations for CAP (urinary antigens, sputum PCR panel) if CXR shows focal consolidation. • Blood cultures if febrile or shocked • Coag screen, d-dimer, LDH, ferritin, BNP, Troponin
TREATMENT ESCALATION PLANNING	• Assess ability to manage in a quarantine (hotel) setting. • Consider & document risk factors for seve e COVID.	• Early decision & documentation of ceiling of therapy (including respiratory support modalities). • Consider & document risk factors for poor COVID outcome. • Complete blue resuscitation decision form for all patients.	
	• NOTE – any new deterioration >7 days post onset of illness requires careful assessment, observation & judgement. Severe COVID-19 frequently develops with a rapid deterioration.		
DISPOSITION DECISION	• Encourage discharge (discuss with JetPark via ID). • Liaise with Public Health.	• Admit to Ward 7 under Gen Med. • Admit under Respiratory if requiring oxygen >2L/min and/or comorbid respiratory disease.	• Admit to ICU or Ward 7. • Discuss with ICU and/or Respiratory regarding destination.
PROBABLE ONLY	Collect serum sample in acute phase, repeat ≥2 weeks later, for 'COVID serology'		
MONITORING & MARKERS OF CLINICAL DETERIORATION	• Monitor for progressive respiratory failure and sepsis, especially on days 5 to 10 after onset of symptoms. • Only repeat CXR in people with suspected or confirmed COVID-19 if clinically indicated (e.g. in cases of clinical deterioration or recent intubation). • Do not routinely perform CT scanning - only if clinically indicated. • Anticipate complications such as pulmonary embolism, other thromboembolism, arrhythmias, cardiac impairment, acute kidney injury, sepsis, shock and multi-organ dysfunction, and address using existing standards of care. Also be aware of potential complications from trial drugs, if applicable. • Repeat baseline investigations (see above) periodically in patients who are not clearly improving, in order to detect & manage the above complications.		
NOTIFICATION	• Discuss all cases with ID at the earliest opportunity • If not already notified, send e-ref to Auckland Regional Public Health AND notify by telephone (09 623 4600)		
CLINICAL TRIALS	• All patients should be screened for eligibility for one of two clinical trials currently recruiting at CMH • 'REMAP-CAP' is recruiting patients admitted to ICU, and 'ASCOT-ADAPT' is recruiting hospitalised patients outside of ICU. Discuss with ID in the first instance.		

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Approved by:	Infection Services / Respiratory	Date first issued:	05/09/2020

This information is correct at date of issue. Always check on Counties Manukau DHB Controlled Documents site that this is the most recent version.

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Treatment

NOTE:- the standard-of-care for patients with COVID-19 is to be offered enrolment in one of our clinical trials. This table indicates which treatment modalities are affected if the patient is enrolled in a trial:

MODALITY	PATIENT SUB-GROUPS	RECOMMENDATION
STEROIDS	Adults who do not require oxygen	Do not use steroids to treat COVID-19
	Adults requiring oxygen and/or ventilatory support to maintain oxygen saturation ≥92%	Dexamethasone 6mg daily IV/PO for up to 10 days or until discharge.
	Adults with another evidence-based indication for steroids (e.g. asthma/COPD exacerbations)	Steroids as per usual practise.
ANTI-VIRAL THERAPY	***All patients enrolled in ASCOT-ADAPT trial (anti-viral domain)***	***As per trial protocol & randomisation (in addition to remdesivir, if indicated below)***
	Adults with mild COVID-19	Do not use remdesivir or any other anti-viral outside of a clinical trial
	Adults with moderate to severe COVID-19 who do not require ventilation • *Note – must have ALT <5 x ULN and/or ALT <3 x ULN and bilirubin <2 x ULN*	Commence Remdesivir: • Contact on-call pharmacist - an access form needs to be completed; stock is held at Auckland Hospital • 200mg IV on day 1, then 100mg q24h for a further 4 days (up to 10 days may be considered in selected severe cases) • Dose made up in 250mL 0.9% NaCl, infuse over 30-120min • Monitor LFTs daily; discuss with ID if eGFR <30 or AKI
	Adults with critical COVID-19 who require ventilation (invasive or non-invasive)	Do not use remdesivir or any other anti-viral outside of a clinical trial
IMMUNE MODULATION THERAPY	***There are no trials of immune modulation therapies currently recruiting at CMH***	
	Adults with COVID-19: • AND receiving oxygen + steroids • AND CRP ≥75mg/L OR other evidence of severe systemic inflammation • AND there is not another active, severe secondary infection	Give Tocilizumab: • ID will need to apply to Pharmac for a 'rapid NPPA' but the dose can be given prior to this; stock is held at MMH • 8mg/kg (actual body weight) rounded to nearest 200mg (max dose 800mg), as a single dose • A second dose may be considered 12-24 hours later if the patient's condition has not improved • *Notes:– cytotoxic precautions are not required if used for COVID-19; risk of secondary infection is significantly increased; CRP response is inhibited.*
	COVID-19 not meeting the criteria above	Do not use immune modulation therapy
VTE PROPHYLAXIS	***All patients enrolled in ASCOT-ADAPT trial (anticoagulation domain)***	***As per trial protocol & randomisation (in addition to standard VTE prophylaxis below)***
	Adults with mild COVID-19 plus any additional VTE risk factors OR all cases of moderate to severe/critical COVID-19 AND no contra-indication to anticoagulation e.g. risk for major bleeding	Enoxaparin 40mg SC once daily • Reduce to 20mg if eGFR <30 mL/min/1.73m^2 • *NOTE:- Higher dosing strategies, or d-dimer-guided treatment, are not currently supported by the balance of evidence (outside of clinical trials)*
	Pregnant or postpartum women with any severity of COVID-19	Enoxaparin as above • *NOTE:- Discuss dosing & duration with Obstetrics*
ANTIBIOTIC THERAPY *(not routinely indicated to treat COVID-19)*	Mild or moderate COVID-19 without specific evidence of concurrent bacterial infection (which is rare in the first 7 days of illness)	Do not use antibiotics
	Any severity of COVID-19 AND specific evidence of concurrent bacterial infection (e.g. positive culture/antigen, purulent sputum, focal/unilateral consolidation, unilateral pleural effusion, neutrophilia)	Calculate CURB-65 score: • 0-2 = Doxycycline 200mg PO once daily for 5 days • ≥3 = Ceftriaxone 2g IV once daily for 5 days • Review decision/results at 48-72 hours
	Severe/critical COVID-19, especially with any deterioration occurring >7 days post onset	Discuss with ID (in hospitalised COVID-19 it is common to develop late, severe, secondary bacterial sepsis)

FLUID MANAGEMENT	• Use a restrictive fluid management strategy • Avoid: 'maintenance' IV fluids, high volume enteral nutrition, and repeated fluid boluses for hypotension.	
RESPIRATORY SUPPORT	All patients	Switch nebulisers to metered dose inhalers via spacer if possible.
	SpO_2 <92% or significantly below baseline	• Administer dry oxygen (1-4 L/min) via standard nasal prongs • Aim for SpO_2 92–96% (88–92% for those at risk of hypercapnic respiratory failure) • Use Hudson mask (5-10 L/min) if higher flow rates required • Consider use of self-proning after consulting with Respiratory Physiotherapy
	Unable to maintain SpO2 ≥92% on conventional oxygen at 6 L/min	• Consider High Flow Nasal Oxygen (HFNO) • *Note that this is a potential aerosol-generating procedure* • Consider use of self-proning after consulting with Respiratory Physiotherapy
	Hypercapnic patients with underlying COPD or OHS	• Discuss with Resp about Non-Invasive Ventilation (NIV) • *Note that this is a potential aerosol-generating procedure*
ICU CARE	Patients with any of the following signs of deterioration should be discussed with ICU: • Increasing oxygen requirement (requiring FiO2 of 0.4 to maintain SpO_2 >92% on HFNO, or 10-15L/min conventional O_2 therapy) • Increased work of breathing with impending respiratory failure • Haemodynamically unstable • Rapidly worsening tachypnoea or hypoxaemia Detailed clinical guidelines for ICU care of COVID-19 is beyond the scope of this guideline.	
THERAPIES FOR EXISTING INDICATIONS	• ACE-inhibitors / ARBs • Oral contraceptive pill (with or without oestrogen) • Antenatal steroids for high risk of preterm birth	• Usual care (i.e. may be continued in COVID-19 unless otherwise contra-indicated)
	• Corticosteroids for asthma/COPD (inhaled or oral, with or without bronchodilators)	• Usual care • Do not use a nebuliser
	• Oral menopausal hormone therapy / HRT	• Consider stopping until after recovery
SURGERY	• Do not routinely perform elective surgery within eight weeks of recovery from COVID-19 infection, unless outweighed by the risk of deferring surgery, such as disease progression or clinical priority. • For people undergoing elective surgery following COVID-19 infection, consider carrying out multisystem preoperative assessment in consultation with ID and/or Respiratory.	
PREGNANCY & PERINATAL CARE	• Out of scope for this local guideline; detailed guidance is included in the Australian COVID-19 guidelines • Input from Obstetrics in discussion with ID and/or other relevant specialties, is essential.	

Discharge Planning:

Patients with Suspected, Probable or Confirmed COVID-19 who are being considered for discharge need to have specific decisions made about the following aspects of post-discharge care:

1. Further investigations (for Suspected)
2. Discharge destination:
   - Suspected cases being discharged before results are available should be notified to the Medical Officer of Health, who may request discharge to a quarantine facility.
   - Most Probable/Confirmed cases who remain in isolation will be discharged to Jet Park.
3. Clearance from isolation:
   - Mild cases can be released from isolation after ≥10 days have passed since the onset of symptoms AND there has been resolution of the acute symptoms for ≥72 hours.
   - Most hospitalised moderate & severe cases will require a further 10 days of isolation after discharge.
   - Patients with prolonged illness, long hospital stay, or major immunosuppression will require case-by-case review by ID.
   - Note – repeat swabs are generally discouraged (but may be requested by ID on a case-by-case basis).
4. Appropriate follow-up:
   - Patients who have had significant respiratory failure and/or persistent dyspnoea or hypoxia may require respiratory follow up and support on discharge e.g. pulmonary rehabilitation, short-term oxygen.

All cases should be discussed with ID in advance to individualise the plan.

Interim Guidance - Clinical Management of COVID-19 in Adults

Introduction

07 September 2021

This guideline is intended to be an accessible summary of key components of hospital management of **ADULTS** with **confirmed or probable COVID-19**. It has been adapted from international 'living' guidelines for the New Zealand context by an advisory group of New Zealand clinicians, including representation from Infectious Diseases, Respiratory Medicine, Intensive Care, General Medicine and Pharmacy.

New evidence informing the optimal management of patients with COVID-19 continues to accumulate rapidly. This document will be reviewed and updated periodically, or in response to significant changes in evidence and/or recommendations by international guideline groups.

Further detailed guidance, including treatments that are either not recommended, or recommended only within a clinical trial, can be accessed in links to international guidance at the end of this document. Local specialist services with expertise in managing COVID-19 may consider emerging treatments outside of this guideline.

Initial Management

	MILD	MODERATE	SEVERE / CRITICAL
DEFINITION	No symptoms **OR** URTI symptoms only **OR** cough, new myalgia or asthenia <u>without</u> new shortness of breath or reduction in oxygen saturation	Stable adult patient presenting with shortness of breath and/or systemic symptoms or signs. Able to maintain oxygen saturation ≥92% (or ≥90% for patients with chronic lung disease) with up to 4 L/min oxygen via nasal prongs	Adult patients meeting any of the following criteria: • Respiratory rate ≥30/min • Oxygen saturation <92% on 4L/min oxygen via nasal prongs • Clinically deteriorating
BASELINE TESTING & WORK-UP	• Pulse oximetry • Other tests only as clinically indicated • Low value testing is discouraged	• FBC, Creat, electrolytes, LFTs, CRP • ECG only if specific indication • Chest x-ray • Arterial blood gas • Investigations for CAP (e.g. urinary antigens, sputum PCR panel) if radiography suggests bacterial infection • Blood cultures if febrile or shocked • d-dimer & ferritin	• FBC, Creat, electrolytes, LFTs, CRP • ECG • Chest x-ray • Arterial blood gas • Investigations for CAP (e.g. urinary antigens, sputum PCR panel) if radiography suggests bacterial infection • Blood cultures if febrile or shocked • Coag screen, d-dimer, ferritin, BNP, Troponin
	• 'Probable' COVID-19 (i.e. high suspicion with inconclusive testing): Collect serum sample in acute phase, repeat ≥2 weeks later, for 'COVID-19 serology'. Discuss confirmatory testing options with local Microbiology/ID		
TREATMENT ESCALATION PLANNING	• Assess ability to manage in a quarantine (hotel) setting and communicate any difficulties to Public Health (e.g. use of usual nocturnal CPAP for OSA) • Consider & document risk factors for severe COVID-19	Assess & document individual risk factors for poor outcome • Early discussion of patient goals of care, including existing advanced care plans, with patient and their family/whānau • Early, clear documentation of resuscitation decision and treatment escalation plan for <u>all</u> patients, specifically including appropriate modalities of respiratory support	
	• **NOTE – any new deterioration > 5 days post onset of illness requires careful assessment, observation & judgement. Severe COVID-19 frequently develops with a rapid deterioration**		
DISPOSITION DECISION	• Encourage discharge • Liaise with Public Health or Regional Isolation and Quarantine (RIQ) according to regional processes	• Admit to hospital • Discuss with local COVID team	• Admit to hospital • ICU and/or Respiratory review
MONITORING & MARKERS OF CLINICAL DETERIORATION	• Monitor for progressive respiratory failure and sepsis, especially after day 5 of illness • Only repeat CXR in people with confirmed COVID-19 for specific clinical indications • Perform a chest CT scan only if it would change management, in particular if concern for pulmonary embolism • Anticipate complications such as delirium, pulmonary embolism, other thromboembolism, arrhythmias, cardiac impairment, acute kidney injury, sepsis, shock and multi-organ dysfunction, and address using existing standards of care. Also be aware of potential medication complications • Repeat baseline investigations (see above) periodically in patients who are not clearly improving, in order to detect & manage the above complications		

NOTIFICATION	• Discuss all cases with local COVID team at the earliest opportunity • If not already notified according to regional process, (e.g. by laboratory) contact local Public Health Unit
CLINICAL TRIALS	• As the optimal management of COVID-19 is not yet known, the **standard of care is to be offered enrolment in a clinical trial,** if available • **All** patients should be screened for eligibility for a locally available COVID-19 clinical trial (e.g. 'REMAP-CAP' and 'ASCOT-ADAPT')

Supportive Management

MODALITY	PATIENT SUB-GROUPS	RECOMMENDATION
RESPIRATORY SUPPORT	All patients	• Switch nebulisers to metered dose inhalers via spacer if possible • Monitor closely for worsening hypoxia if elevated work of breathing or respiratory rate
	SpO_2 <92% at rest	• Administer dry oxygen (1-4 L/min) via standard nasal prongs • Aim for SpO_2 92–96% (88–92% for those at risk of hypercapnic respiratory failure) • Use Hudson mask (5-10 L/min) or Venturi device if higher flow rates required • Consider use of self-proning
	Unable to maintain SpO2 ≥92% on conventional oxygen at 6 L/min via Hudson mask (required Fi02 >36%)	• Consider CPAP or High Flow Nasal Oxygen (HFNO) • *Choice depends on availability, staff expertise, patient tolerance* • Consider use of self-proning
	Hypercapnic patients with underlying COPD or OHS	• Consider BiLevel Non-Invasive Ventilation (NIV)
FLUID MANAGEMENT	• Assess for hypovolaemia and correct as required. Anticipate and monitor ongoing fluid losses • Avoid excessive resuscitation or 'maintenance' fluids	
VTE PROPHYLAXIS	• ***All patients enrolled in ASCOT-ADAPT or REMAP-CAP (anticoagulation domains)***	• ***As per trial protocol***
	Hospitalised adults with: • mild COVID-19 and any additional VTE risk factors • <u>OR</u> severe and critical COVID-19 <u>AND</u> no contra-indication to anticoagulation e.g. risk for major bleeding	Enoxaparin 40mg SC once daily (standard prophylaxis) • Adjust dose for impaired renal function
	Moderate COVID-19	Therapeutic dose anticoagulation **may be considered** over standard prophylaxis for up to 14 days, or until clinical recovery (discharge or resolved hypoxia) if there are NO additional risk factors for bleeding • Enoxaparin 1mg/kg SC twice daily (max 150mg BD) • Adjust dose for impaired renal function **All other patients should receive standard prophylaxis** as detailed above

INTENSIVE CARE	Regular, open and early discussions between ward-based clinicians and local ICU team is strongly encouraged. In addition to local referral guidelines, ICU review should be prompted by the following: • Significant oxygen requirement (e.g. requiring FiO2 of 0.4 to maintain SpO_2 >92%, or needing HFNO or CPAP) • Increased work of breathing with impending respiratory failure • Haemodynamically unstable and / or hypotension not responsive to fluid bolus • Rapidly worsening tachypnoea or hypoxaemia Detailed clinical guidelines for ICU care of COVID-19 is beyond the scope of this guideline	
ANTIBIOTIC THERAPY *(not routinely indicated)*	Mild or moderate COVID-19 without specific evidence of concurrent bacterial infection (rare in the first 7 days of illness)	Do not use antibiotics
	Severe/critical COVID-19 especially with any deterioration occurring >7 days post onset and/or >3 days after hospital admission	• Evaluate for secondary infection, including hospital-acquired infection • Discuss with local Infectious Diseases / Microbiology team if concern for secondary infection
	Any severity of COVID-19 AND specific evidence of concurrent bacterial pneumonia (e.g. positive culture/antigen, purulent sputum, focal/unilateral consolidation, unilateral pleural effusion, neutrophilia)	Antibiotics as per local guidelines for community acquired pneumonia
COMMUNICATION & HOLISTIC CARE	Encourage for all patients: • Clearly communicate typical symptoms and anticipated clinical course with patient, family/whānau or carers • Reinforce importance of complying with all Public Health messages, including self-isolation and testing • When possible, explain risks, benefits and likely outcomes of treatments with patients, family/whānau or carers • Use an interpreting service to assist communication if required • Facilitate regular clinical updates, and video calls between patient family/whānau or carers • Routinely refer to local cultural and/or spiritual support services • Consider early involvement of Palliative Care and/ or Liaison Psychiatry services to assist with symptom management, particularly anxiety, dyspnoea and delirium/agitation • Ensure appropriate housing, financial and social support is in place prior to discharge (including a working phone). If concerns, refer to social work • If welfare or cultural support issues identified, liaise with Public Health or Regional Isolation Quarantine (RIQ) according to regional processes as part of discharge planning	
THERAPIES FOR EXISTING INDICATIONS	• Nocturnal CPAP for Obstructive Sleep Apnoea	Consider change usual vented CPAP mask to a non-vented mask + expiratory port + filter (decision depends on equipment availability and staff expertise)
	• ACE-inhibitors / ARBs • Oral contraceptive pill (with or without oestrogen) • Antenatal steroids for high risk of preterm birth	• Usual care (i.e. may be continued in COVID-19 unless otherwise contra-indicated)
	• Corticosteroids for asthma/COPD (inhaled or oral, with or without bronchodilators)	• Usual care • Do not use a nebuliser unless definite clinical need
	• Oral menopausal hormone therapy / HRT	• Consider stopping until after recovery
SURGERY	• **Elective** surgery should generally be deferred until at least eight weeks following recovery from COVID-19 • **Non-deferrable** surgery should be discussed with local ID and infection control services	
PREGNANCY & PERINATAL CARE	• Out of scope for this guideline; detailed guidance is included in the **Australian COVID-19 guidelines** • Input from Obstetrics, in discussion with ID and/or other relevant specialties, is essential	

COVID-19 Therapeutics

MODALITY	PATIENT SUB-GROUPS	RECOMMENDATION
STEROIDS	Adults who do not require oxygen	Do not use systemic steroids to treat COVID-19
	Adults without oxygen, but another evidence-based indication for systemic steroids (e.g. asthma/COPD exacerbations)	Steroids as per usual practise
	Adults with sustained oxygen requirement	Dexamethasone 6mg daily IV/PO for up to 10 days OR until hospital discharge Consider a minimum dexamethasone duration of 5 days, if discharged within this time
ANTI-VIRAL THERAPY	***All patients enrolled in ASCOT-ADAPT trial (anti-viral domain)***	***As per trial protocol & randomisation (in addition to remdesivir, if indicated below)***
	Adults with mild COVID-19	• Do not use remdesivir • Do not use any other anti-viral outside of a clinical trial
	Adults within the first 7 days of illness, with moderate COVID-19 • *Note – must have ALT <5 x ULN and/or ALT <3 x ULN and bilirubin <2 x ULN*	Commence remdesivir: • 200mg IV on day 1, then 100mg IV q24h for up to further 4 days (maximum 5 days total) • PHARMAC access form to be completed
	Adults with severe / critical COVID-19 who require ventilation (invasive or non-invasive)	• Do not start remdesivir • Complete course (5 days) if started earlier in illness • Do not use any other anti-viral outside of a clinical trial
	Adults with significant immunocompromise	Discuss with local infectious diseases team
IMMUNE MODULATION THERAPY	**In patients receiving systemic steroids in combination with immune modulation, we recommend screening for, and consider empiric treatment of latent infection, e.g. Hepatitis B or strongyloidiasis (in patients who have lived in an endemic region)**	
	There are no trials of immune modulation therapies currently recruiting in New Zealand	
	Adults with moderate COVID-19: • AND receiving both oxygen + systemic steroids • AND elevated CRP or other evidence of severe systemic inflammation • AND there is not another active, severe concurrent infection Adults with severe / critical COVID-19: • Within 48h of starting HFNO, NIV, mechanical ventilation or organ support • AND receiving systemic steroids • AND elevated CRP or other evidence of severe systemic inflammation • AND there is not another active, severe secondary infection	Give tocilizumab: • 8mg/kg (actual body weight) rounded to nearest 200mg (max dose 800mg), as a single dose • Complete PHARMAC funding application on next working day • *Notes:– risk of secondary infection is increased; CRP response is inhibited, and consequent reduction in CRP does not necessarily correlate with response to treatment*
	COVID-19 not meeting the criteria above	Do not use immune modulation therapy

Discharge Planning and Follow-up

Patients with Suspected, Probable or Confirmed COVID-19 who are being considered for discharge need to have specific decisions made about the following aspects of post-discharge care:

FURTHER INVESTIGATIONS	• Follow-up investigations are not universally required after COVID-19 • A repeat chest x-ray in 6-12 weeks to confirm resolution of pulmonary opacities should be arranged for individuals with significant radiographic abnormalities and / or risk factors for lung cancer • Ensure follow up serology is arranged for 'probable' cases	
DISCHARGE DESTINATION	• Suspected cases being discharged before results are available should be notified to the Medical Officer of Health, who may request discharge to a quarantine facility • All probable/confirmed cases who remain in isolation will be discharged to a quarantine facility. Exemptions may be approved by Public Health in exceptional circumstances	
CLEARANCE FROM ISOLATION	Public Health is responsible for releasing all COVID-19 cases from isolation, however, for complex cases there should be liaison between Public Health and relevant hospital clinicians. In general: • Hospital patients with a primary diagnosis other than COVID 19 are likely to be released after ≥10 days have passed since the onset of symptoms AND there has been resolution of the acute symptoms for ≥72 hours at the discretion of Public Health • Most hospitalised cases will require further isolation after discharge, but this is decided on a case-by-case basis by Public Health • Patients with prolonged illness, long hospital stay, or major immunosuppression will require case-by-case review by ID and Public Health • Note: repeat swabs are generally discouraged (but may be requested by ID on a case-by-case basis)	
FOLLOW-UP	All patients	Telephone follow-up within 6 weeks of discharge with Primary Care Provider: to assess trajectory of recovery, identify persistent symptoms and facilitate referral to specialty services as required
	Patients with significant respiratory failure (and/or persistent dyspnoea), or other persistent organ dysfunction	Specialist clinic follow-up, investigations and support following discharge (as advised by local specialty services)
	Pa ients discharged with nocturnal CPAP (usual OR new device)	Consider providing a non-vented mask + expiratory port + filter, depending on equipment availability and staff expertise. Can transition to vented mask on return to own home. Sleep service remote follow-up within 48 hours of hospital discharge is recommended.

Links to other guidelines

- **Australian COVID-19 living guidelines:** https://covid19evidence.net.au/
- **NICE (UK) living guideline:** https://www.nice.org.uk/guidance/ng191
- **National Institute of Health (USA):** https://www.covid19treatmentguidelines.nih.gov/
- **WHO COVID-19 living guideline:** https://www.who.int/publications/i/item/WHO-2019-nCoV-clinical-2021-1
- **Ontario COVID-19 Science Advisory Group guideline (Canada) :** https://covid19-sciencetable.ca/sciencebrief/clinical-practice-guideline-summary-recommended-drugs-and-biologics-in-adult-patients-with-covid-19-2/
- **Australian guidance for Pregnancy and perinatal care:** https://covid19evidence.net.au/

COVID-19

Interim Guidance - Clinical Management of COVID-19 in Hospitalised Adults

Introduction

Updated: 24 September 2021 – Next planned update 08 October 2021

- Modification of 'moderate' illness definition
- Modified recommendation for use of remdesivir
- Modified wording for recommendation of tocilizumab
- Addition of recommendation to encourage post-recovery vaccination at discharge

New content in this update is highlighted in red.

This guideline is intended to be an accessible summary of hospital management of **ADULTS** with **confirmed or probable COVID-19**. It has been adapted from international 'living' guidelines for the New Zealand context by an advisory group of New Zealand clinicians, including representation from Infectious Diseases, Respiratory Medicine, Intensive Care, General Medicine and Pharmacy.

New evidence informing the optimal management of patients with COVID-19 continues to accumulate rapidly. This document will be reviewed and updated periodically, or in response to significant changes in evidence and/or recommendations by international guideline groups.

Further detailed guidance, including treatments that are either not recommended, or recommended only within a clinical trial, can be accessed in links to international guidance at the end of this document. Local specialist services with expertise in managing COVID-19 may consider emerging treatments outside of this guideline.

Initial Management

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BASELINE TESTING & WORK-UP	• Pulse oximetry • Other tests only as clinically indicated • Low value testing is discouraged	• FBC, Creat, electrolytes, LFTs, CRP • ECG only if specific indication • Chest x-ray • Arterial blood gas • Investigations for CAP (e.g. urinary antigens, sputum PCR panel) if radiography suggests bacterial infection • Blood cultures if febrile or shocked • d-dimer & ferritin	• FBC, Creat, electrolytes, LFTs, CRP • ECG • Chest x-ray • Arterial blood gas • Investigations for CAP (e.g. urinary antigens, sputum PCR panel) if radiography suggests bacterial infection • Blood cultures if febrile or shocked • Coag screen, d-dimer, ferritin, BNP, Troponin
	• 'Probable' COVID-19 (i.e. high suspicion with inconclusive testing): Collect serum sample in acute phase, repeat ≥2 weeks later, for 'COVID-19 serology'. Discuss confirmatory testing options with local Microbiology/ID		
TREATMENT ESCALATION PLANNING	• Assess ability to manage in a quarantine (hotel) setting and communicate any difficulties to Public Health (e.g. use of usual nocturnal CPAP for OSA) • Consider & document risk factors for severe COVID-19	Assess & document individual risk factors for poor outcome • Early discussion of patient goals of care, including existing advanced care plans, with patient and their family/whānau • Early, clear documentation of resuscitation decision and treatment escalation plan for all patients, specifically including appropriate modalities of respiratory support	
	• **NOTE – any new deterioration > 5 days post onset of illness requires careful assessment, observation & judgement. Severe COVID-19 frequently develops with a rapid deterioration**		
DISPOSITION DECISION	• Encourage discharge • Liaise with local Public Health Unit or Regional Isolation and Quarantine (RIQ) according to regional processes	• Admit to hospital • Discuss with local COVID team	• Admit to hospital • ICU and/or Respiratory review
MONITORING & MARKERS OF CLINICAL DETERIORATION	• Monitor for progressive respiratory failure and sepsis, especially after day 5 of illness • Only repeat CXR during admission for confirmed COVID-19 for specific clinical indications • Perform a chest CT scan only if it would change management, in particular if concern for pulmonary embolism • Anticipate complications such as delirium, pulmonary embolism, other thromboembolism, arrhythmias, cardiac impairment, acute kidney injury, sepsis, shock and multi-organ dysfunction, and address using existing standards of care. Also be aware of potential medication complications • Repeat baseline investigations (see above) periodically in patients who are not clearly improving, in order to detect & manage the above complications		

NOTIFICATION	• Discuss all cases with local COVID team at the earliest opportunity • If not already notified according to regional process, (e.g. by laboratory) contact local Public Health Unit
CLINICAL TRIALS	• As the optimal management of COVID-19 is not yet known, the **standard of care is to be offered enrolment in a clinical trial,** if available • **All** patients should be screened for eligibility for a locally available COVID-19 clinical trial (e.g. 'REMAP-CAP' and 'ASCOT-ADAPT')

Supportive Management

MODALITY	PATIENT SUB-GROUPS	RECOMMENDATION
RESPIRATORY SUPPORT	All patients	• Switch nebulisers to metered dose inhalers via spacer if possible • Monitor closely for worsening hypoxia if elevated work of breathing or respiratory rate
	SpO_2 <92% at rest	• Administer dry oxygen (1-4 L/min) via standard nasal prongs • Aim for SpO_2 92–96% (88–92% for those at risk of hypercapnic respiratory failure) • Use Hudson mask (5-10 L/min) or Venturi device if higher flow rates required • Consider use of self-proning
	Unable to maintain SpO2 ≥92% on conventional oxygen at 6 L/min via Hudson mask (required Fi02 >36%)	• Consider CPAP or High Flow Nasal Oxygen (HFNO) • *Choice depends on availability, staff expertise, patient tolerance* • Consider use of self-proning
	Hypercapnic patients with underlying COPD or OHS	• Consider BiLevel Non-Invasive Ventilation (NIV) in addition to above
FLUID MANAGEMENT	• Assess for hypovolaemia and correct as required. • Avoid excessive resuscitation or 'maintenance' fluids • Anticipate and monitor ongoing fluid losses	
VTE PROPHYLAXIS	• ***All patients enrolled in ASCOT-ADAPT or REMAP-CAP (anticoagulation domains)***	• ***As per trial protocol***
	Hospitalised adults with: • mild COVID-19 and any additional VTE risk factors • OR severe and critical COVID-19 AND no contra-indication to anticoagulation e.g. risk for major bleeding	Enoxaparin 40mg SC once daily (standard prophylaxis) • Adjust dose for impaired renal function
	Hospitalised adults with Moderate COVID-19 AND no contra-indication to anticoagulation e.g. risk for major bleeding	Therapeutic dose anticoagulation **may be considered** over standard prophylaxis for up to 14 days, or until clinical recovery (discharge or resolved hypoxia) Enoxaparin 1mg/kg SC twice daily (max 150mg BD) • Adjust dose for impaired renal function **All other patients should receive standard prophylaxis** as detailed above

INTENSIVE CARE	Regular, open and early discussions between ward-based clinicians and local ICU team is strongly encouraged. In addition to local referral guidelines, ICU review should be prompted by the following: • Significant oxygen requirement (e.g. requiring FiO2 of 0.4 to maintain SpO_2 >92%, or needing HFNO or CPAP) • Increased work of breathing with impending respiratory failure • Haemodynamically unstable and / or hypotension not responsive to fluid bolus • Rapidly worsening tachypnoea or hypoxaemia Detailed clinical guidance for ICU care of COVID-19 is beyond the scope of this guideline	
ANTIBIOTIC THERAPY *(not routinely indicated)*	Mild or moderate COVID-19 without specific evidence of concurrent bacterial infection (rare in the first 7 days of illness)	Do not use antibiotics
	Severe/critical COVID-19 especially with any deterioration occurring >7 days post onset and/or >3 days after hospital admission	• Evaluate for secondary infection, including hospital-acquired infection • Discuss with local Infectious Diseases / Microbiology team if concern for secondary infection
	Any severity of COVID-19 AND specific evidence of concurrent bacterial pneumonia (e.g. positive culture/antigen, purulent sputum, focal/unilateral consolidation, unilateral pleural effusion, neutrophilia)	Antibiotics as per local guidelines for community acquired pneumonia
COMMUNICATION & HOLISTIC CARE	Encourage for all patients: • Clearly communicate typical symptoms and anticipated clinical course with patient, family/whānau or carers • Reinforce importance of complying with all Public Health messages, including self-isolation and testing • When possible, explain risks, benefits and likely outcomes of treatments with patients, family/whānau or carers • Use an interpreting service to assist communication if required • Facilitate regular clinical updates, and video calls between patient family/whānau or carers • Routinely refer to local cultural and/or spiritual support services • Consider early involvement of Palliative Care and/ or Liaison Psychiatry services to assist with symptom management, particularly anxiety, dyspnoea and delirium/agitation • Ensure appropriate housing, financial and social support is in place prior to discharge (including a working phone). If concerns, refer to social work • If welfare or cultural support issues identified, liaise with Public Health or Regional Isolation Quarantine (RIQ) according to regional processes as part of discharge planning	
THERAPIES FOR EXISTING INDICATIONS	• Nocturnal CPAP for Obstructive Sleep Apnoea	Consider changing usual vented CPAP mask to a non-vented mask + expiratory port + filter (decision depends on equipment availability and staff expertise)
	• ACE-inhibitors / ARBs • Oral contraceptive pill (with or without oestrogen) • Antenatal steroids for high risk of preterm birth	• Usual care (i.e. may be continued in COVID-19 unless otherwise contra-indicated)
	• Corticosteroids for asthma/COPD (inhaled or oral, with or without bronchodilators)	• Usual care • Do not use a nebuliser unless definite clinical need
	• Oral menopausal hormone therapy / HRT	• Consider stopping until after recovery
SURGERY	• **Elective** surgery should generally be deferred until at least eight weeks following recovery from COVID-19 • **Non-deferrable** surgery should be discussed with local ID and infection control services	
PREGNANCY & PERINATAL CARE	• Out of scope for this guideline; detailed guidance is included in the **Australian COVID-19 guidelines** • Input from Obstetrics, in discussion with ID and/or other relevant specialties, is essential	

COVID-19 Therapeutics

MODALITY	PATIENT SUB-GROUPS	RECOMMENDATION
STEROIDS	Adults who do not require oxygen	Do not use systemic steroids to treat COVID-19
	Adults without oxygen, but another evidence-based indication for systemic steroids (e.g. asthma/COPD exacerbations)	Steroids as per usual practise
	Adults with sustained oxygen requirement	Dexamethasone 6mg daily IV/PO for up to 10 days OR until hospital discharge Consider a minimum dexamethasone duration of 5 days, if discharged within this time
ANTI-VIRAL THERAPY	***All patients enrolled in ASCOT-ADAPT trial (anti-viral domain)***	***As per trial protocol & randomisation (in addition to remdesivir, if indicated below)***
	Adults with mild COVID-19	• Do not use remdesivir • Do not use any other anti-viral outside of a clinical trial
	Adults within the first 7 days of illness, with moderate COVID-19 • *Note – must have ALT <5 x ULN and/or ALT <3 x ULN and bilirubin <2 x ULN*	Consider remdesivir: • 200mg IV on day 1, then 100mg IV q24h for up to further 4 days (maximum 5 days total) • PHARMAC access form to be completed • Have a low threshold for cessation if any potential adverse effects from remdesivir
	Adults with severe / critical COVID-19 OR moderate illness after day 7 of illness	• Do not start remdesivir • Complete course (5 days) if started earlier in illness • Do not use any other anti-viral outside of a clinical trial
	Adults with significant immunocompromise	Discuss with local infectious diseases team
IMMUNE MODULATION THERAPY	**In patients receiving systemic steroids in combination with immune modulation, we recommend screening for, and consider empiric treatment of latent infection, e.g. Hepatitis B or strongyloidiasis (in patients who have lived in an endemic region)**	
	There are no trials of immune modulation therapies currently recruiting in New Zealand	
	Adults wi h moderate COVID-19 • AND receiving systemic steroids • AND elevated CRP or other evidence of severe systemic inflammation OR clinically deteriorating • AND there is not another active, severe concurrent infection Adults with severe / critical COVID-19: • Within 24h (as soon as possible) of starting HFNO, NIV, mechanical ventilation or organ support • AND receiving systemic steroids • AND there is not another active, severe secondary infection	Give tocilizumab: • 8mg/kg (actual body weight) rounded to nearest 200mg (max dose 800mg), as a single dose • Complete PHARMAC funding application on next working day • *Notes:– risk of secondary infection is increased; CRP response is inhibited, and consequent reduction in CRP does not necessarily correlate with response to treatment*
	COVID-19 not meeting the criteria above	Do not use immune modulation therapy

Discharge Planning and Follow-up

Patients with Suspected, Probable or Confirmed COVID-19 who are being considered for discharge need to have specific decisions made about the following aspects of post-discharge care:

FURTHER INVESTIGATIONS	• Follow-up investigations are not universally required after COVID-19 • A repeat chest x-ray in 6-12 weeks to confirm resolution of pulmonary opacities should be arranged for individuals with significant radiographic abnormalities and / or risk factors for lung cancer • Ensure follow up serology is arranged for 'probable' cases	
DISCHARGE DESTINATION	• Suspected cases being discharged before results are available should be notified to the Medical Officer of Health, who may request discharge to a quarantine facility • All probable/confirmed cases who remain in isolation will be discharged to a quarantine facility. Exemptions may be approved by Public Health in exceptional circumstances	
CLEARANCE FROM ISOLATION	1. While each case is different, the following guidance is designed to assist individual decision making. This advice applies to patients in ICU, hospitalised, and those in hospital (due to COVID-19) for part of their illness. a) In general, a case should be released if it has be n at least 14 days since onset of symptoms and the individual has been symptom free for at least 72 hours. b) In most cases a patient can be considered to no longer be infectious 20 days after symptom onset (even if symptoms persist if they have developed an antibody response. c) Consider serology to determine antibody response especially if patient is immunocompromised or has had a prolonged admission to Intensive Care. d) Note that PCR testing is not a useful modality for determining release from isolation as shedding of non-infectious iral RNA may persist for many days or months. e) When the determination for release is not clear, then the decision should be made in consultation with the medical officer of health, infection prevention and control, and infectious disease specialists.	
FOLLOW-UP	All patients	• Telephone follow-up within 6 weeks of discharge with Primary Care Provider: to assess trajectory of recovery, identify persistent symptoms and facilitate referral to specialty services as required • Encourage vaccination if not fully vaccinated. Vaccination is recommended from 4 weeks after clinical recovery. If a patient has received either monoclonal antibodies or convalescent plasma delay vaccination until at least 90 days after treatment.
	Patients with significant respiratory failure (and/or persistent dyspnoea), or other persistent organ dysfunction	Specialist clinic follow-up, investigations and support following discharge (as advised by local specialty services)
	Patients discharged with nocturnal CPAP (usual OR new device)	Consider providing a non-vented mask + expiratory port + filter if discharging to MIQ,(depending on equipment availability and staff expertise). Sleep service remote follow-up within 48 hours of hospital discharge is recommended if non-vented mask set up is used. Can transition to vented mask on return to own home.

Links to other guidelines

- **Australian COVID-19 living guidelines:** https://covid19evidence.net.au/
- **NICE (UK) living guideline:** https://www.nice.org.uk/guidance/ng191
- **National Institute of Health (USA):** https://www.covid19treatmentguidelines.nih.gov/
- **WHO COVID-19 living guideline:** https://www.who.int/publications/i/item/WHO-2019-nCoV-clinical-2021-1
- **Ontario COVID-19 Science Advisory Group guideline (Canada) :** https://covid19-sciencetable.ca/sciencebrief/clinical-practice-guideline-summary-recommended-drugs-and-biologics-in-adult-patients-with-covid-19-2/
- **Australian guidance for Pregnancy and perinatal care:** https://covid19evidence.net.au/

COVID-19

Clinical Management of COVID-19 in Hospitalised Adults (including in pregnancy)

Introduction

Updated: 05 November 2021 – Next planned update 03 December 2021

- Clarification of 'moderate' illness definition of reduced oxygen saturation
- Addition of specific advice for management of COVID-19 in pregnancy
- Allowance for use of venous blood gas in baseline testing
- Updated discharge advice
- Strengthened recommendation for use of self-proning
- Strengthened recommendation for use of therapeutic-dose enoxaparin for patients with moderate illness
- Updated advice on timing of surgery following recovery from COVID-19
- Addition of conditional recommendation for inhaled budesonide in patients with mild illness

New content in this update is highlighted in red.

This guideline is intended to be an accessible summary of hospital management of **ADULTS** (including in pregnancy**)** with **confirmed or probable COVID-19**. It has been adapted from international 'living' guidelines for the New Zealand context by an advisory group of New Zealand clinicians, including representation from Infectious Diseases, Respiratory Medicine, Intensive Care, General Medicine, Obstetric Medicine, Primary Care, Emergency Medicine and Pharmacy.

New evidence informing the optimal management of patients with COVID-19 continues to accumulate rapidly. This document will be reviewed and updated periodically, or in response to significant changes in evidence and/or recommendations by international guideline groups.

Further detailed guidance, including treatments that are either not recommended, or recommended only within a clinical trial, can be accessed in links to international guidance at the end of this document. Local specialist services with expertise in managing COVID-19 may consider emerging treatments outside of this guideline.

Additional details or differences on managing a pregnant woman are highlighted in orange rows just below the adult guidance.

Initial Management

	MILD	MODERATE	SEVERE / CRITICAL
DEFINITION	No symptoms **OR** URTI symptoms only **OR** cough, new myalgia or asthenia without new shortness of breath or reduction in resting oxygen saturation	Stable adult patient presenting with shortness of breath and/or reduction in resting oxygen saturation while breathing air. Able to maintain oxygen saturation ≥92% (or ≥90% for patients with chronic lung disease) with up to 4 L/min oxygen via nasal prongs	Adult patients meeting any of the following criteria: • Respiratory rate ≥30/min • Oxygen saturation <92% on 4L/min oxygen via nasal prongs • Clinically deteriorating
	Pregnancy: use an oxygen saturation **target of 94-98%** rather than ≥92%		
BASELINE TESTING & WORK-UP	• Pulse oximetry • Other tests only as clinically indicated • Low value testing is discouraged	• FBC, Creat, electrolytes, LFTs CRP • ECG only if specific ind cation • Chest x-ray • Venous blood gas (consider arterial) • Investigations for CAP (e.g. urinary antigens, sputum PCR panel) if radiography suggests bacterial infection • Blood cultures if febrile • d-dimer & ferritin	• FBC, Creat, electrolytes, LFTs, CRP • ECG • Chest x-ray • Venous blood gas (consider arterial) • Investigations for CAP (e.g. urinary antigens, sputum PCR panel) if radiography suggests bacterial infection • Blood cultures if febrile or shocked • Coag screen, d-dimer, ferritin, BNP, Troponin
	• If the diagnosis of COVID-19 is highly suspected, but unable to be confirmed by PCR: Collect serum sample in acute phase for COVID-19 serology (and repeat ≥2 weeks later). Discuss confirmatory testing options with local Microbiology/ID		
	• **Pregnancy:** also request urine protein:creatinine ratio, coagulation profile, group and screen (or cross match if delivery is thought to be imminent) • *NB* CXR and CT chest / CTPA can safely be performed in pregnancy if strongly indicated • Laboratory results should be cautiously interpreted, using pregnancy-specific ranges where available. D-dimer is particularly hard to interpret, so consider monitoring trend for prognostic purposes in severe/deteriorating COVID-19		
TREATMENT ESCALATION PLANNING	• Assess ability to safely isolate in community. • Notify and refer through local pathways • Consider & document risk factors for severe COVID-19	• Assess & document individual risk factors for poor outcome • Early discussion of patient goals of care, including existing advanced care plans, with patient and their family/whānau • Early, clear documentation of resuscitation decision and treatment escalation plan for all patients, specifically including appropriate modalities of respiratory support	
	NOTE – any new deterioration > 5 days post onset of illness requires careful assessment, observation & judgement. Severe COVID-19 frequently develops with a rapid deterioration		
	• For pregnant and post-partum observations, utilise a maternity-specific chart (if available) • Recommend early consultation with Obstetrics, Anaesthesia and NICU (Obstetric Physician if available)		

DISPOSITION DECISION	• Encourage discharge • Liaise with local Public Health Unit or Regional Isolation and Quarantine (RIQ) according to regional processes	• Admit to hospital • Discuss with local COVID team	• Admit to hospital • ICU and/or Respiratory review
MONITORING & MARKERS OF CLINICAL DETERIORATION	• Ferritin and d-dimer are suggested as severity/prognosis markers, as part of an overall assessment • Monitor for progressive respiratory failure and sepsis, especially after day 5 of illness • Only repeat CXR during admission for confirmed COVID-19 for specific clinical indications • Perform a chest CT scan only if it would change management, in particular if concern for pulmonary embolism • Anticipate complications such as delirium, pulmonary embolism, other thromboembolism, arrhythmias, cardiac impairment, acute kidney injury, sepsis, shock and multi-organ dysfunction, and address using existing standards of care. Also be aware of potential medication complications • Repeat baseline investigations (see above) periodically in patients who are not clearly improving, in order to detect & manage the above complications		
	Additional considerations in pregnancy: • Screen for pre-eclampsia in all pregnancies > 20/40 gestation and review at each assessment: i.e., BP > 140/90, worsening peripheral oedema, headache, visual changes or upper abdominal pain. Risk of pre-eclampsia is increased in COVID-19. • Consider repeating laboratory investigations if there is a change in maternal condition • Appropriateness and frequency of fetal heart rate monitoring and ultrasound to be considered on individual basis, accounting for gestational age and clinical severity. Consider parameters for delivery (in discussion with neonatologists, anaesthetists ± intensive care team) • Consider steroids for the fetal lung maturation, and magnesium sulphate for neuroprotection or severe pre-eclampsia as per local obstetric guidelines • Consider emergency delivery if required for maternal resuscitation (including need for prone positioning) or for immediate fetal concern		
NOTIFICATION	• Discuss all cases with local COVID team at the earliest opportunity • If not already notified according to regional process, (e.g. by laboratory) contact local Public Health Unit		
	• If hospitalised, all pregnant women should have multidisciplinary assessment by obstetricians, midwives, neonatologists +/- an obstetric physician at the earliest opportunity		
CLINICAL TRIALS	• As the optimal management of COVID-19 is not yet known, the **standard of care is to be offered enrolment in a clinical trial,** if available • **All** patients should be screened for eligibility for a locally available COVID-19 clinical trial (e.g. 'REMAP-CAP' and 'ASCOT-ADAPT')		

Supportive Management

MODALITY	PATIENT SUB-GROUPS	RECOMMENDATION
RESPIRATORY SUPPORT	All patients	• Switch nebulisers to metered dose inhalers via spacer if possible • Monitor closely for worsening hypoxia if elevated work of breathing or respiratory rate
	SpO_2 <92% at rest	• Administer dry oxygen (1-4 L/min) via standard nasal prongs • Aim for SpO_2 92–96% (88–92% for those at risk of hypercapnic respiratory failure) • Use Hudson mask (5-10 L/min) or Venturi device if higher flow rates required • Encourage use of self-proning

	Unable to maintain SpO2 ≥92% on conventional oxygen at 6 L/min via Hudson mask (required Fi02 >36%)	• Consider CPAP or High Flow Nasal Oxygen (HFNO) • *Choice depends on availability, staff expertise, patient tolerance* • Encourage use of self-proning
	Hypercapnic patients with underlying COPD or OHS	• Consider BiLevel Non-Invasive Ventilation (NIV) in addition to above
	Pregnancy	• SpO2 target is ≥ 94%; ideally aim for sO2 96-98% • NEVER position flat on back: must have a wedge for lateral supine positioning. Left lateral during resuscitation or if hypotensive • Self-proning may be possible (depending on gestation and habitus)
FLUID MANAGEMENT	• Assess for hypovolaemia and correct as required • Avoid excessive resuscitation or 'maintenance' fluids • Anticipate and monitor ongoing fluid losses	
VTE PROPHYLAXIS	• ***All patients enrolled in ASCOT-ADAPT or REMAP-CAP (anticoagulation domains)***	• ***As per trial protocol***
	Hospitalised adults with: • mild COVID-19 • <u>OR</u> severe and critical COVID-19 <u>AND</u> no contra-indication to anticoagulation e.g. risk for major bleeding	Enoxaparin 40mg SC once daily (standard prophylaxis) • Adjust dose for impaired renal function
	Hospitalised adults with Moderate COVID-19 <u>AND</u> no contra-indication to anticoagulation e.g. risk for major bleeding	Therapeutic dose anticoagulation **should be considered** over standard prophylaxis for up to 14 days, or until clinical recovery (discharge or resolved hypoxia) Enoxaparin 1mg/kg SC twice daily (max 150mg BD) • Adjust dose for impaired renal function **All other patients should receive standard prophylaxis** as detailed above
	Hospitalised pregnant adults with mild OR severe/critical COVID-19 UNLESS: • Delivery expected within 24 hours (unless only on enoxaparin 40mg SC once daily then 12 hours) • Platelets < 50 • Actively bleeding / coagulopathy • Severe hypertension (>160/110) • Other risk factors for obstetric haemorrhage e.g. placenta previa	Enoxaparin 40mg SC once daily (standard prophylaxis) • Consider increasing dose if current weight ≥90kg
	Hospitalised pregnant or postpartum adults with moderate COVID-19 AND no contra-indication to anticoagulation (as above)	Consider therapeutic anticoagulation as for non-pregnant adults (above)
	Anticoagulation in pregnancy should be continued for: • At least 10 days following discharge from hospital • Minimum of 6 weeks if the woman is post-partum and has additional risk factors (discuss with Obstetrics) or ongoing morbidity (including limited capacity to exercise in managed isolation)	

INTENSIVE CARE	Regular, open and early discussions between ward-based clinicians and local ICU team is strongly encouraged. In addition to local referral guidelines, ICU review should be prompted by the following: • Significant oxygen requirement (e.g. requiring FiO2 of 0.4 to maintain SpO_2 >92%, or needing HFNO or CPAP) • Increased work of breathing with impending respiratory failure • Haemodynamically unstable and / or hypotension not responsive to fluid bolus • Rapidly worsening tachypnoea or hypoxaemia Detailed clinical guidance for ICU care of COVID-19 is beyond the scope of this guideline	
ANTIBIOTIC THERAPY	Antibiotics should not be used for treatment of mild or moderate COVID-19. Bacterial co-infection is very uncommon.	
	Severe/critical COVID-19 especially with any deterioration occurring >7 days post onset and/or >3 days after hospital admission	• Evaluate for secondary infection, including hospital-acquired infection • Discuss with local Infectious Diseases / Microbiology team if concern for secondary infection
COMMUNICATION & HOLISTIC CARE	Encourage for all patients: • Clearly communicate typical symptoms and anticipated clinical course with patient, family/whānau or carers • Reinforce importance of complying with all Public Health messages, including self-isolation and testing • When possible, explain risks, benefits and likely outcomes of treatments with patients, family/whānau or carers • Use an interpreting service to assist communication if required • Facilitate regular clinical updates, and video calls between patient family/whānau or carers • Routinely refer to local cultural and/or spiritual support services • Consider early involvement of Palliative Care and/ or Liaison Psychiatry services to assist with symptom management, particularly anxiety, dyspnoea and delirium/agitation • Ensure appropriate housing, financial and social support is in place prior to discharge (including a working phone). If concerns, refer to social work • If welfare or cultural support issues identified, liaise with Public Health or Regional Isolation Quarantine (RIQ) according to regional processes as part of discharge planning	
	Ensure Maternity services are alerted so wrap-around antenatal and post-natal care can be provided for the mother and baby.	
THERAPIES FOR EXISTING INDICATIONS	• Nocturnal CPAP for Obstructive Sleep Apnoea	Consider changing usual vented CPAP mask to a non-vented mask + expiratory port + filter (decision depends on equipment availability and staff expertise)
	• ACE-inhibitors / ARBs • Oral contraceptive pill (with or without oestrogen)	• Usual care (i.e. may be continued in COVID-19 unless otherwise contra-indicated)
	• Corticosteroids for asthma/COPD (inhaled or oral, with or without bronchodilators)	• Usual care • Do not use a nebuliser unless definite clinical need
	• Oral menopausal hormone therapy / HRT	• Consider stopping until after recovery
	All pregnancy-related supplements and medications should be continued.	
SURGERY	• Elective minor surgery should generally be deferred until at least four weeks, and major surgery until 8-12 weeks, following recovery from COVID-19 if patient outcome is not compromised • Acute surgical procedures that are indicated during active COVID-19 infection should be discussed with local ID and infection control services • Comprehensive preoperative and ongoing assessment must be carried out to ensure optimal clinical decision-making	
	Caesarean section (including emergency) should not be deferred if clinically indicated, e.g. if needed for maternal resuscitation or immediate fetal concern; mode of delivery should otherwise remain based on obstetric indication, as per usual care.	

COVID-19 Therapeutics

MODALITY	PATIENT SUB-GROUPS	RECOMMENDATION
STEROIDS	Adults who do not require oxygen	Do not use systemic steroids to treat COVID-19 Consider inhaled budesonide 800micrograms BD for up to 14 days if respiratory symptoms and: • 65 years or older *OR* any age with comorbidities* • AND < 14 days since symptom onset • AND not taking other inhaled or systemic corticosteroid * Diabetes, obesity, heart disease or hypertension, asthma, chronic lung disease, immunosuppressed, liver disease, stroke or neurological disease.
	Adults without oxygen requirement, but another evidence-based indication for systemic steroids (e.g. asthma/COPD exacerbations)	Steroids as per usual practise
	Adults with sustained oxygen requirement	Dexamethasone 6mg daily PO/IV for up to 10 days OR until hospital discharge Consider a minimum dexamethasone duration of 5 days, if discharged within this time
	Pregnancy with sustained oxygen requirement to maintain SpO2 ≥94%	If steroids needed for fetal lung maturation (usually < 34^{+6} weeks): • dexamethasone 6mg IM every 12 hours for four doses • THEN either prednisone 40mg PO daily, OR hydrocortisone 80mg IV twice daily If steroids <u>not</u> required for fetal lung maturation, use non-fluorinated steroids: • prednisone 40mg PO daily OR hydrocortisone 80mg IV twice daily OR methylprednisolone 40mg IV once daily Total duration is 10 days total OR until discharge, whichever is sooner.
	Note risk of **gestational diabetes:** monitor BSLs closely and start GIK (pregnancy) if elevated.	
ANTI-VIRAL THERAPY	***All patients enrolled in ASCOT-ADAPT trial (anti-viral domain)***	***As per trial protocol & randomisation (in addition to remdesivir, if indicated below)***
	Adults with mild COVID-19	• Do not use remdesivir • Do not use any other anti-viral outside of a clinical trial
	Adults within the first 7 days of illness, with moderate COVID-19 • *Note – must have ALT <5 x ULN and/or ALT <3 x ULN and bilirubin <2 x ULN*	Consider remdesivir: • 200mg IV on day 1, then 100mg IV q24h for up to further 4 days (maximum 5 days total) • PHARMAC access form to be completed • Have a low threshold for cessation if any potential adverse effects from remdesivir (e.g. liver injury, bradycardia, hypotension, hypersensitivity)
	Adults with severe / critical COVID-19 OR moderate illness after day 7 of illness	• Do not start remdesivir • Complete course (5 days) if started earlier in illness • Do not use any other anti-viral outside of a clinical trial
	Adults with severe immunocompromise with any stage/severity of COVID-19	Discuss with local infectious diseases team

	Pregnancy (meeting the same clinical criteria as above)	• Avoid remdesivir in <12/40 gestation • Use remdesivir if >12/40 gestation and if benefits likely to outweigh possible harm (same dosing as above) • Remdesivir is compatible with breastfeeding
IMMUNE MODULATION THERAPY	**In patients receiving systemic steroids in combination with immune modulation, we recommend screening for, and consider empiric treatment of latent infection, e.g. Hepatitis B or strongyloidiasis (in patients who have lived in an endemic region)**	
	There are no trials of immune modulation therapies currently recruiting in New Zealand	
	Adults with moderate COVID-19 • AND receiving systemic steroids • AND elevated CRP or other evidence of severe systemic inflammation OR clinically deteriorating • AND there is not another active, severe concurrent infection Adults with severe / critical COVID-19: • Within 24h (as soon as possible) of starting HFNO, NIV, mechanical ventilation or organ support • AND receiving systemic steroids • AND there is not another active, severe secondary infection	Give tocilizumab: • 8mg/kg IV (actual body weight) rounded to nearest 200mg (max dose 800mg) as a single dose • *Notes:– risk of secondary infection may be increased; CRP response is inhibited, and consequent reduction in CRP does not necessarily correlate with response to treatment*
	COVID-19 not meeting the criteria above	Do not use immune modulation therapy
	Pregnancy (meeting the same clinical criteria as above)	Give tocilizumab (same dosing as above): • *Notes:- Tocilizumab actively crosses the placenta after 28/40, but no evidence of harm. Neonates should defer live vaccination (i.e. Rotarix, BCG) for up to 6 months if exposed to tocilizumab (notify neonatologists / lead maternity carer). All other vaccinations are safe* • *Compatible with breastfeeding* • *May cause raised ALT and thrombocytopenia, mimicking pre-eclampsia / HELLP*

Discharge Planning and Follow-up

Patients with Suspected, Probable or Confirmed COVID-19 who are being considered for discharge need to have specific decisions made about the following aspects of post-discharge care:

FURTHER INVESTIGATIONS	• Follow-up investigations are not universally required after COVID-19 • A repeat chest x-ray in 6-12 weeks to confirm resolution of pulmonary opacities should be arranged for individuals with significant radiographic abnormalities and / or risk factors for lung cancer • Ensure follow up serology is arranged for 'probable' cases
DISCHARGE DESTINATION	• Suspected cases being discharged before results are available should be notified to local Medical Officer of Health, who may request discharge to a quarantine facility • Decision about ability to safely isolate in usual place of residence needs to be assessed prior to discharge. If not able to safely complete isolation period in usual place of residence, should be referred for isolation in managed isolation facility, according to local referral pathways.

CLEARANCE FROM ISOLATION	While each case is different, the following guidance is designed to assist individual decision making. This advice applies to patients in ICU, hospitalised, and those in hospital (due to COVID-19) for part of their illness a) In general, a case should be released if it has been at least 14 days since onset of symptoms and the individual has been symptom free for at least 72 hours b) In most cases a patient can be considered to no longer be infectious 20 days after symptom onset (even if symptoms persist) if they have developed an antibody response c) Consider serology to determine antibody response especially if patient is immunocompromised or has had a prolonged admission to Intensive Care d) Note that PCR testing is not a useful modality for determining release from isolation as shedding of non-infectious viral RNA may persist for many days or months e) When the determination for release is not clear, then the decision should be made in consultation with the medical officer of health, infection prevention and control, and infectious disease specialists	
FOLLOW-UP	All patients	• Telephone follow-up within 6 weeks of discharge with Primary Care Provider: to assess trajectory of recovery, identify persistent symptoms and facilitate referral to specialty services as required • Encourage vaccination if not fully vaccinated. Vaccination s recommended from 4 weeks after clinical recovery. If a patient has received either monoclonal antibodies or convalescent plasma delay vaccination until at least 90 days after treatment.
	Patients with significant respiratory failure (and/or persistent dyspnoea), or other persistent organ dysfunction	Specialist clinic follow-up, investigations and support following discharge (as advised by local specialty services)
	Patients discharged with nocturnal CPAP (usual OR new device)	Consider providing a non-vented mask + expiratory port + filter if discharging to MIQ (depending on equipment availability and staff expertise). Sleep service remote follow-up within 48 hours of hospital discharge is recommended if non-vented mask set up is used. Can transition to vented mask on return to own home.
	Pregnancy (or recently post-partum)	• VTE prophylaxis - refer to specific guidelines above • Follow up growth scan in 2 weeks • If possible, delay follow-up CXR until post-partum

Links to other guidelines

- **Australian COVID-19 living guidelines:** https://covid19evidence.net.au/
- **NICE (UK) living guideline:** https://www.nice.org.uk/guidance/ng191
- **National Institute of Health (USA):** https://www.covid19treatmentguidelines.nih.gov/
- **WHO COVID-19 living guideline:** https://www.who.int/publications/i/item/WHO-2019-nCoV-clinical-2021-1
- **Ontario COVID-19 Science Advisory Group guideline (Canada) :** https://covid19-sciencetable.ca/sciencebrief/clinical-practice-guideline-summary-recommended-drugs-and-biologics-in-adult-patients-with-covid-19-2/
- **Australian guidance for Pregnancy and perinatal care:** https://covid19evidence.net.au/

COVID-19

Clinical Management of COVID-19 in Hospitalised Adults (including in pregnancy)

Introduction

Updated 03 December 2021 – Next planned update 21 January 2022

- Change to layout of immunomodulatory therapeutics section for moderate COVID-19
- Statement indicating baricitinib is a section 29 medication
- Removal of 'other risk factors for obstetric haemorrhage' as a contraindication to prophylactic enoxaparin in pregnancy
- Clarification of recommendation for lateral positioning during pregnancy
- Updated wording of recommendation for post-hospital prophylactic enoxaparin in pregnancy and post-partum
- Updated advice for clearance from isolation

New content in this update is highlighted in red.

This guideline is intended to be an accessible summary of hospital management of **ADULTS** (including in pregnancy**)** with **confirmed or probable COVID-19**. It has been adapted from international 'living' guidelines for the New Zealand context by an advisory group of New Zealand clinicians, including representation from Infectious Diseases, Respiratory Medicine, Intensive Care, General Medicine, Obstetric Medicine, Primary Care, Emergency Medicine and Pharmacy.

New evidence informing the optimal management of patients with COVID-19 continues to accumulate rapidly. This document will be reviewed and updated periodically, or in response to significant changes in evidence and/or recommendations by international guideline groups.

Further detailed guidance, including treatments that are either not recommended, or recommended only within a clinical trial, can be accessed in links to international guidance at the end of this document. Local specialist services with expertise in managing COVID-19 may consider emerging treatments outside of this guideline.

Additional details or differences on managing a pregnant woman are highlighted in orange rows just below the adult guidance.

Initial Management

	MILD	MODERATE	SEVERE / CRITICAL
DEFINITION	No symptoms **OR** URTI symptoms only **OR** cough, new myalgia or asthenia <u>without</u> new shortness of breath or reduction in resting oxygen saturation	Stable adult patient presenting with shortness of breath and/or reduction in resting oxygen saturation while breathing air. Able to maintain oxygen saturation ≥92% (or ≥90% for patients with chronic lung disease) with up to 4 L/min oxygen via nasal prongs	Adult patients meeting any of the following criteria: • Respiratory rate ≥30/min • Oxygen saturation <92% on 4L/min oxygen via nasal prongs • Clinically deteriorating
	Pregnancy: use an oxygen saturation **target of ≥ 94%** rather than ≥92%		
BASELINE TESTING & WORK-UP	• Pulse oximetry • Other tests only as clinically indicated • Low value testing is discouraged	• FBC, Creat, electrolytes, LFTs, CRP • ECG only if specific indication • Chest x-ray • Venous blood gas (consider arterial) • Investigations for CAP (e.g. urinary antigens, sputum PCR panel) if radiography suggests bacterial infection • Blood cultures if febrile • d-dimer & ferritin	• FBC, Creat, electrolytes, LFTs, CRP • ECG • Chest x-ray • Venous blood gas (consider arterial) • Investigations for CAP (e.g. urinary antigens, sputum PCR panel) if radiography suggests bacterial infection • Blood cultures if febrile or shocked • Coag screen, d-dimer, ferritin, BNP, Troponin
	• If the diagnosis of COVID-19 is highly suspected, but unable to be confirmed by PCR: Collect serum sample in acute phase for COVID-19 serology (and repeat ≥2 weeks later). Discuss confirmatory testing options with local Microbiology/ID		
	• **Pregnancy:** also request urine protein:creatinine ratio, coagulation profile, group and screen (or cross match if delivery is thought to be imminent) • *NB* CXR and CT chest / CTPA can safely be performed in pregnancy if clinically indicated. • Laboratory results should be cautiously interpreted, using pregnancy-specific ranges where available. There are no validated pregnancy-specific values for D-dimer; consider monitoring trend for prognostic purposes in severe/deteriorating COVID-19.		
TREATMENT ESCALATION PLANNING	• Assess ability to safely isolate in community. • Notify and refer through local pathways • Consider & document risk factors for severe COVID-19	• Assess & document individual risk factors for poor outcome • Early discussion of patient goals of care, including existing advanced care plans, with patient and their family/whānau • Early, clear documentation of resuscitation decision and treatment escalation plan for <u>all</u> patients, specifically including appropriate modalities of respiratory support	
	• **NOTE – any new deterioration > 5 days post onset of illness requires careful assessment, observation & judgement. Severe COVID-19 frequently develops with a rapid deterioration**		
	• For pregnant and post-partum observations, utilise a maternity-specific chart (if available) • Recommend early consultation with Obstetrics, Anaesthesia and NICU (and Obstetric Physician if available)		
DISPOSITION DECISION	• Encourage discharge • Liaise with local Public Health Unit or Regional Isolation and Quarantine (RIQ) according to regional processes	• Admit to hospital • Discuss with local COVID team	• Admit to hospital • ICU and/or Respiratory review

MONITORING & MARKERS OF CLINICAL DETERIORATION	• Ferritin and d-dimer are suggested as severity/prognosis markers, as part of an overall assessment • Monitor for progressive respiratory failure and sepsis, especially after day 5 of illness • Only repeat CXR during admission for confirmed COVID-19 for specific clinical indications • Perform a chest CT scan only if it would change management, in particular if concern for pulmonary embolism • Anticipate complications such as delirium, pulmonary embolism, other thromboembolism, arrhythmias, cardiac impairment, acute kidney injury, sepsis, shock and multi-organ dysfunction, and address using existing standards of care. Also be aware of potential medication complications • Repeat baseline investigations (see above) periodically in patients who are not clearly improving, in order to detect & manage the above complications
	Additional considerations in pregnancy: • Screen for pre-eclampsia in all pregnancies > 20/40 gestation and review at each assessment: i.e., systolic BP ≥ 140mmHg and/or diastolic ≥ 90, worsening peripheral oedema, headache, visual changes or upper abdominal pain. Risk of pre-eclampsia is increased in COVID-19. • Consider repeating laboratory investigations if there is a change in maternal condition • Appropriateness and frequency of fetal heart rate monitoring and ultrasound to be considered on individual basis, accounting for gestational age and clinical severity Consider parameters for delivery (in discussion with neonatologists, anaesthetists ± intensive care team) • Consider steroids for the fetal lung maturation, and magnesium sulphate for neuroprotection or severe pre-eclampsia as per local obstetric guidelines • Consider emergency delivery if required for maternal resuscitation (including need for prone positioning) or for immediate fetal concern
NOTIFICATION	• Discuss all cases with local COVID team at the earliest opportunity • If not already notified according to regional process, (e.g. by laboratory) contact local Public Health Unit
	• If hospitalised, all pregnant women should have multidisciplinary assessment by obstetricians, midwives, neonatologists +/- an obstetric physician at the earliest opportunity • Recommend notification of all antenatal and postnatal cases to New Zealand Registry of COVID-19 in Pregnancy
CLINICAL TRIALS	• As the optimal management of COVID-19 is not yet known, the **standard of care is to be offered enrolment in a clinical trial,** if available • **All** patients should be screened for eligibility for a locally available COVID-19 clinical trial (e.g. 'REMAP-CAP' and 'ASCOT-ADAPT')

Supportive Management

MODALITY	PATIENT SUB-GROUPS	RECOMMENDATION
RESPIRATORY SUPPORT	All patients	• Switch nebulisers to metered dose inhalers via spacer if possible • Monitor closely for worsening hypoxia if elevated work of breathing or respiratory rate
	SpO_2 <92% at rest	• Administer dry oxygen (1-4 L/min) via standard nasal prongs • Aim for SpO_2 92–96% (88–92% for those at risk of hypercapnic respiratory failure) • Use Hudson mask (5-10 L/min) or Venturi device if higher flow rates required • Encourage use of self-proning
	Unable to maintain SpO2 ≥92% on conventional oxygen at 6 L/min via Hudson mask (required Fi02 >36%)	• Consider CPAP or High Flow Nasal Oxygen (HFNO) • *Choice depends on availability, staff expertise, patient tolerance* • Encourage use of self-proning

	Hypercapnic patients with underlying COPD or OHS	• Consider BiLevel Non-Invasive Ventilation (NIV) in addition to above
	Pregnancy	• SpO2 target is ≥ 94%; ideally aim for sO2 96-98%. • After 20/40 avoid positioning flat on back: use a wedge for lateral supine positioning. Left lateral during resuscitation or if hypotensive. • Self-proning may be possible (depending on gestation and habitus).
FLUID MANAGEMENT	• Assess for hypovolaemia and correct as required. • Avoid excessive resuscitation or 'maintenance' fluids • Anticipate and monitor ongoing fluid losses	
VTE PROPHYLAXIS	• ***All patients enrolled in ASCOT-ADAPT or REMAP-CAP (anticoagulation domains)***	• ***As per trial protocol***
	Hospitalised adults with: • mild COVID-19 • <u>OR</u> severe and critical COVID-19 <u>AND</u> no contra-indication to anticoagulation e.g. risk for major bleeding	Enoxaparin 40mg SC once daily (standard prophylaxis) • Adjust dose for impaired renal function (NB Therapeutic-dose anticoagulation is not beneficial and probably hazardous when initiated prophylactically in severe and critical COVID-19)
	Hospitalised adults with **moderate** COVID-19 <u>AND</u> no contra-indication to anticoagulation e.g. risk for major bleeding (NB moderate = *stable adult patient presenting with shortness of breath and/or reduction in resting oxygen saturation while breathing air. Able to maintain oxygen saturat on ≥92% (or ≥90% for patients with chronic lung disease) with up to 4 L/min oxygen via nasal prongs*)	Therapeutic dose anticoagulation **should be considered** over standard prophylaxis for up to 14 days, or until clinical recovery (discharge or resolved hypoxia) Enoxaparin 1mg/kg SC twice daily (max 150mg BD) • Adjust dose for impaired renal function **All other patients should receive standard prophylaxis** as detailed above
	Hospitalised pregnant adults with mild OR severe/critical COVID-19 UNLESS: • Delivery expected within 24 hours (unless only on enoxaparin 40mg SC once daily then 12 hours) • Platelets < 50 • Actively bleeding / coagulopathy • Severe hypertension (>160/110)	Enoxaparin 40mg SC once daily (standard prophylaxis) • dose adjustment may be necessary if current weight ≥90kg
	Hospitalised pregnant or postpartum adults with moderate COVID-19 AND no contra-indication to anticoagulation (as above)	Consider therapeutic anticoagulation as for non-pregnant adults (above)
	Anticoagulation in pregnancy should be continued for: • At least 10 days following discharge from hospital, or for duration of reduced mobility. • A longer duration could be considered if post-partum or has additional risk factors for VTE (discuss with Obstetrics)	

INTENSIVE CARE	Regular, open and early discussions between ward-based clinicians and local ICU team is strongly encouraged. In addition to local referral guidelines, ICU review should be prompted by the following: • Significant oxygen requirement (e.g. requiring FiO2 of 0.4 to maintain SpO_2 >92%, or needing HFNO or CPAP) • Increased work of breathing with impending respiratory failure • Haemodynamically unstable and / or hypotension not responsive to fluid bolus • Rapidly worsening tachypnoea or hypoxaemia Detailed clinical guidance for ICU care of COVID-19 is beyond the scope of this guideline	
ANTIBIOTIC THERAPY	Antibiotics should not be used for treatment of mild or moderate COVID-19. Bacterial co-infection is very uncommon.	
	Severe/critical COVID-19 especially with any deterioration occurring >7 days post onset and/or >3 days after hospital admission	• Evaluate for secondary infection, including hospital-acquired infection • Discuss with local Infectious Diseases / Microbiology team if concern for secondary infection
COMMUNICATION & HOLISTIC CARE	Encourage for all patients: • Clearly communicate typical symptoms and anticipated clinical course with patient, family/whānau or carers • Reinforce importance of complying with all Public Health messages, including self-isolation and testing • When possible, explain risks, benefits and likely outcomes of treatments with patients, family/whānau or carers • Use an interpreting service to assist communication if required • Facilitate regular clinical updates, and video calls between patient family/whānau or carers • Routinely refer to local cultural and/or spiritual support services • Consider early involvement of Palliative Care and/ or Liaison Psychiatry services to assist with symptom management, particularly anxiety, dyspnoea and delirium/agitation • Ensure appropriate housing, financial and social support is in place prior to discharge (including a working phone). If concerns, refer to social work • If welfare or cultural support issues identified, liaise with Public Health or Regional Isolation Quarantine (RIQ) according to regional processes as part of discharge planning	
	• Ensure Maternity services including lead maternity carer are alerted so wrap-around antenatal and post-natal care can be provided for the mother and baby	
THERAPIES FOR EXISTING INDICATIONS	• Nocturnal CPAP for Obstructive Sleep Apnoea	Consider changing usual vented CPAP mask to a non-vented mask + expiratory port + filter (decision depends on equipment availability and staff expertise)
	• ACE-inhibitors / ARBs • Oral contraceptive pill (with or without oestrogen)	• Usual care (i.e. may be continued in COVID-19 unless otherwise contra-indicated)
	• Corticosteroids for asthma/COPD (inhaled or oral, with or without bronchodilators)	• Usual care • Do not use a nebuliser unless definite clinical need
	• Oral menopausal hormone therapy / HRT	• Consider stopping until after recovery
	• All pregnancy-related supplements and medications should be continued	
SURGERY	• Elective minor surgery should generally be deferred until at least four weeks, and major surgery until 8-12 weeks, following recovery from COVID-19 if patient outcome is not compromised • Acute surgical procedures that are indicated during active COVID-19 infection should be discussed with local ID and infection control services • Comprehensive preoperative and ongoing assessment must be carried out to ensure optimal clinical decision-making	
	• Caesarean section (including emergency) should not be deferred if clinically indicated, e.g. if needed for maternal resuscitation or immediate fetal concern; mode of delivery should otherwise remain based on obstetric indication	

COVID-19 Therapeutics

MODALITY	PATIENT SUB-GROUPS	RECOMMENDATION
STEROIDS	Adults who do not require oxygen	Do not use systemic steroids to treat COVID-19 Consider inhaled budesonide 800micrograms BD for up to 14 days if respiratory symptoms and: • 65 years or older *OR* any age with comorbidities* • AND < 14 days since symptom onset • AND not taking other inhaled or systemic corticosteroid * Diabetes, obesity, heart disease or hypertension, asthma, chronic lung disease, immunosuppressed, liver disease, stroke or neurological disease
	Adults without oxygen requirement, but another evidence-based indication for systemic steroids (e.g. asthma/COPD exacerbations)	Steroids as per usual practise
	Adults with sustained oxygen requirement	Dexamethasone 6mg daily PO/IV for up to 10 days OR until hospital discharge Consider a minimum dexamethasone duration of 5 days, if discharged within this time
	Pregnancy with sustained oxygen requirement to maintain SpO2 ≥94%	If steroids needed for fetal lung maturation (usually < 34^{+6} weeks): • dexamethasone 6mg IM every 12 hours for four doses • THEN either prednisone 40mg PO daily, OR hydrocortisone 80mg IV twice daily If steroids <u>not</u> required for fetal lung maturation, use non-fluorinated steroids: • prednisone 40mg PO daily OR hydrocortisone 80mg IV twice daily OR methylprednisolone 40mg IV once daily Total duration is 10 days total OR until discharge, whichever is sooner.
	Risk of **gestational diabetes:** monitor blood glucose levels closely and start treatment if elevated.	
ANTI-VIRAL THERAPY	***All patients enrolled in ASCOT-ADAPT trial (anti-viral domain)***	***As per trial protocol & randomisation (in addition to remdesivir, if indicated below)***
	Adults with mild COVID-19	• Do not use remdesivir • Do not use any other anti-viral outside of a clinical trial
	Adults within the first 7 days of illness, with moderate COVID-19 • *Note – must have ALT <5 x ULN and/or ALT <3 x ULN and bilirubin <2 x ULN*	Consider remdesivir: • 200mg IV on day 1, then 100mg IV q24h for up to further 4 days (maximum 5 days total) • PHARMAC access form to be completed • Have a low threshold for cessation if any potential adverse effects from remdesivir (e.g. liver injury, bradycardia, hypotension, hypersensitivity)
	Adults with severe / critical COVID-19 OR moderate illness after day 7 of illness	• Do not start remdesivir • Complete course (5 days) if started earlier in illness • Do not use any other anti-viral outside of a clinical trial
	Adults with severe immunocompromise with any stage/severity of COVID-19	Discuss with local infectious diseases team