

COVID-19: Treatment recommendations for hospitalised adult patients

Statewide Clinical Guideline - Adoption of
CALHN Guideline

Endorsed by CALHN Antimicrobial Stewardship (AMS) Committee:
08/04/2025









Endorsed by South Australian Medicines Advisory Committee
(SAMAC): 07/08/2025

Version 5.2

Approval date: 27/10/2025

GUIDELINE

Reference	CALHN-GDE05778
Title	COVID-19: Treatment recommendations for hospitalised adult patients
Scope	All CALHN clinical staff in acute care hospitals
Document owner	Infectious Diseases – Speciality Medicine 2
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Oversight committee	South Australian Medicines Advisory Committee
Committee endorsement	07 August 2025
Sponsor	Naomi Burgess – Chief Pharmacist, DHW Dr Renjy Nelson – Head of Unit, Infectious Diseases/ICPU, CALHN
Sponsor approval	08 April 2025
Priority Care Committee (PCC)	PCC: National Standard 4 Medication Safety
Risk rating	<input type="checkbox"/> Extreme <input type="checkbox"/> High <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Low
Title and reference of parent SA Health Policy	N/A
Summary (three sentences maximum)	This guideline provides recommendations on the antiviral and immunomodulatory medications available for patients hospitalised with COVID-19 in CALHN.
Keywords (five to eight)	COVID-19, Baricitinib, Molnupiravir, Nirmatrelvir, Ritonavir, Remdesivir, Tocilizumab, Sarilumab, Dexamethasone, Sotrovimab.

 Clinical Governance	 Partnering with Consumers	 Preventing and Controlling Healthcare Associated Infections	 Medication Safety	 Comprehensive Care	 Communicating for Safety	 Blood Management	 Recognising and Responding to Acute Deterioration
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Version	Change summary	Next scheduled review
5.2	Non-scheduled review. Change in eligibility criteria and access to remdesivir for mild covid-19 illness. Removal of recommendations for treatment of COVID-19 in pregnancy and breastfeeding. Updated information regarding drug interactions with nirmatrelvir/ritonavir.	April 2028
5.1	Non-scheduled minor review. Removal of tables for classification of immunosuppressed patients and link to PBS criteria inserted. Removal of declaration form requirement and sotrovimab and removal of critical shortage statement for tocilizumab. Clarification eligibility criteria for nirmatrelvir/ritonavir and molnupiravir for patients aged 50-69. Change in recommendations for remdesivir and nirmatrelvir/ritonavir in renal impairment. Additional section for immunocompromised patients with reactivation of COVID-19 infection.	April 2027
5.0	Non-scheduled minor review. Patients aged > 50 years with 1 risk factor eligible for PBS treatment with nirmatrelvir/ritonavir. Removed "not up to date vaccination status" as requirement for treatment eligibility for patients < 50 years.	July 2026
4.9	Non-scheduled update. Indications for anti-viral treatment updated to include individuals previously hospitalised with COVID-19 infection, independent of age and other risk factors.	May 2026
4.8	Non-scheduled review. Updated eligibility for access to oral antiviral medications to be in line with PBS changes made at the start of April 2023.	April 2026
4.7	Non-scheduled review. Updated risk factors for severe illness to be in line with changes made to the PBS in Jan 2023.	February 2026

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COVID-19: Treatment recommendations for hospitalised adult patients

Introduction

- Since the emergence of COVID-19 there have been significant developments in the antiviral and immunomodulatory medications recommended for patients hospitalised with COVID-19.
- This guideline only addresses the use of disease-modifying treatments for COVID-19 in hospitalised adult patients.
- This guideline **DOES NOT**:
 - provide guidance of the overall care for patients with COVID-19
 - provide advice regarding supportive therapies recommended for COVID-19
 - provide advice regarding the medication management of mild illness for outpatients
 - provide information regarding the prevention or chemoprophylaxis for the prevention of COVID-19.
 - Provide advice regarding the treatment and management of COVID-19 in pregnancy and/or breastfeeding
- For information related to the management and care of patients with COVID-19 please refer to:
 - [COVID-19 \(SARS-COV-2\) – Management Guide](#) (CALHN-PRC05409)

Medication recommendations for COVID-19 can change rapidly due to medication shortages, ongoing research and as novel agents are discovered.

Topics covered in this guideline

For detailed information on the following topics click on the links below:

1. [Definition of COVID-19 disease severity for adults](#)
2. [Risk factors for progressing to severe or critical illness](#)
3. [Classification of immunocompromised patients including medications associated with a reduced immune response to COVID-19 vaccination](#)
4. [COVID-19 treatment recommendations for hospitalised adults according to disease severity \(excluding pregnancy/breastfeeding\) – mild illness](#)
5. [COVID-19 treatment recommendations for hospitalised adults according to disease severity \(excluding pregnancy/breastfeeding\) – moderate to critical illness](#)
6. [Assessing a patient for nirmatrelvir plus ritonavir \(Paxlovid®\) – contraindications and interactions](#)
7. [Approach to treatment of immunocompromised patients with persistent or relapsed COVID-19 infection](#)
8. [Changes to the National Medicines Stockpile \(NMS\)](#)
9. [Treatments for COVID-19 - Drug Monographs](#)

[Remdesivir](#)
[Molnupiravir](#)
[Nirmatrelvir plus ritonavir](#)

[Dexamethasone](#)
[Baricitinib](#)
[Tocilizumab](#)

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1. Definition of COVID-19 disease severity for adults¹

Mild illness (outpatient or inpatients admitted for another condition)	<p>Adults not presenting any clinical features suggestive of moderate or severe disease or a complicated course of illness.</p> <ul style="list-style-type: none"> • Characteristics: <ul style="list-style-type: none"> ○ no symptoms (only PBS eligible for patients ≥ 70 years); or ○ mild upper respiratory tract symptoms; or ○ cough, new myalgia or asthenia without new shortness of breath or a reduction in oxygen saturation or ○ nausea, vomiting, diarrhea, loss of taste or loss of smell ○ Oxygen saturations $> 95\%$ on room air
Moderate illness (ward based care)	<p>Stable patient presenting with respiratory and/or systemic signs or symptoms. Able to maintain oxygen saturation above 92% at rest (or above 90% for patients with chronic lung disease) with up to 4L/min oxygen via nasal prongs.</p> <ul style="list-style-type: none"> • Characteristics: <ul style="list-style-type: none"> ○ Fatigue or persistent cough ○ clinical or radiological signs of lung involvement ○ no clinical or laboratory indicators of clinical severity or respiratory impairment
Severe illness (specialised ward or ICU)	<p>Adult patients meeting any of the following criteria:</p> <ul style="list-style-type: none"> • respiratory rate ≥ 30 breaths/min • oxygen saturation $\leq 92\%$ at a rest state on ≥ 4L/min oxygen via nasal prongs • arterial partial pressure of oxygen (PaO_2) / inspired oxygen fraction (FiO_2) ≤ 300
Critical illness (ICU)	<p>Adult patients meeting any of the following criteria:</p> <ul style="list-style-type: none"> • Respiratory failure as defined by: <ul style="list-style-type: none"> ○ severe respiratory failure ($\text{PaO}_2/\text{FiO}_2 < 200$), respiratory distress or acute respiratory distress syndrome ○ deterioration despite advanced forms of respiratory support (non-invasive ventilation, high flow nasal oxygen) OR requiring mechanical ventilation <p>OR</p> <ul style="list-style-type: none"> • Other signs of significant deterioration: <ul style="list-style-type: none"> ○ hypotension or shock ○ impairment of consciousness ○ other organ failure

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2. Risk factors for progressing to severe or critical illness

- Immunosuppression
- Renal impairment (eGFR < 60mL/min or equivalent renal impairment for pregnant women)
- Age ≥ 50 years, or age ≥ 30 years if Aboriginal and/or Torres Strait Islander
- Diabetes (requiring medication) or gestational diabetes (requiring medication) in pregnant women
- Obesity (BMI > 30 kg/m² or > 40 kg/m² for pregnant patients)
- Chronic liver disease (cirrhosis)
- Respiratory compromise including:
 - history of chronic bronchitis, bronchiectasis, chronic obstructive pulmonary disease (COPD) or moderate-to-severe asthma requiring an inhaled steroid to control symptoms or caused by neurological or musculoskeletal disease
- Neurological conditions including stroke, dementia and demyelinating conditions
- Coronary artery disease
- Heart failure or cardiomyopathies
- Residing in residential aged care
- Disability with multiple comorbidities and/or frailty
- Past COVID-19 infection episode resulting in hospitalisation
- Reduced, or lack of, access to higher level healthcare and lives in an area of geographic remoteness classified by the [Modified Monash Model as Category 5 or above](#)
- Pregnancy (see page 9)

3. Classification of Immunocompromised Patients

Immunocompromised patients are not expected to mount an adequate immune response to COVID-19 vaccination, or the COVID-19 infection due to their underlying conditions regardless of their vaccine status. Early access to treatment with COVID-19 antiviral medications is important for immunocompromised patients to reduce the likelihood of progression to more severe COVID-19 illness.

The following patients are considered moderately to severely immunocompromised per the PBS and CALHN guideline:

- 1) Any primary or acquired immunodeficiency including:
 - a) Haematologic neoplasms: leukaemias, lymphomas, myelodysplastic syndromes, multiple myeloma and other plasma cell disorders
 - b) Post-transplant: solid organ (on immunosuppressive therapy), haematopoietic stem cell transplant (within 24 months)
 - c) Immunocompromised due to primary or acquired (HIV/AIDS) immunodeficiency; **OR**
- 2) Any significantly immunocompromising condition(s) where, in the last 3 months the patient has received:
 - a) Chemotherapy or whole body radiotherapy
 - b) High-dose corticosteroids (at least 20 mg of prednisone per day, or equivalent) for at least 14 days in a month, or pulse corticosteroid therapy,
 - c) Biological agents and other treatments that deplete or inhibit B cell or T cell function (abatacept, anti-CD20 antibodies, BTK inhibitors, JAK inhibitors, sphingosine 1-phosphate receptor modulators, anti-CD52 antibodies, anti-complement antibodies, anti-thymocyte globulin),
 - d) Selected conventional synthetic disease-modifying anti-rheumatic drugs (csDMARDs) including mycophenolate, methotrexate, leflunomide, azathioprine, 6-mercaptopurine (at least 1.5mg/kg/day), alkylating agents (e.g. cyclophosphamide, chlorambucil), and systemic calcineurin inhibitors (e.g. cyclosporin, tacrolimus); **OR**
- 3) Any significantly immunocompromising condition(s) where, in the last 12 months the patient has received an anti-CD20 monoclonal antibody treatment, but criterion 2c above is not met; **OR**
- 4) Others with very high-risk conditions including Down Syndrome, cerebral palsy, congenital heart disease, thalassemia, sickle cell disease and other haemoglobinopathies; **OR**
- 5) People with disability with multiple comorbidities and/or frailty (irrespective of age or vaccination).

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4. COVID-19 treatment recommendations for hospitalised adult patients (excluding pregnancy/breastfeeding) with **confirmed** mild COVID-19 illness

For advice regarding the treatment and management of mild COVID-19 illness in pregnancy contact closest local health network with specialist perinatal services

Mild illness not requiring oxygen

For all hospitalised patients consider **VTE prophylaxis**

Consider **empiric influenza treatment*** until results of respiratory viral panel available

- Immunosuppressed patients (all ages)
- Previous COVID-19 infection requiring hospitalisation (all ages)
- Aged ≥ 70 years irrespective of risk factors
- Aged 50 to 69 years PLUS ≥ 2 [risk factors](#)
- Aboriginal or Torres Strait Islander AND Aged ≥ 30 years PLUS ≥ 1 [risk factor](#)



First Line: Symptom onset ≤ 5 days **Nirmatrelvir plus ritonavir**

Second Line*: Symptom onset ≤ 5 days **Molnupiravir^β**

* **Remdesivir** may be considered as second line therapy for mild COVID-19 illness in specific high risk patients or circumstances as described in **Box 1**

*Box 1: Remdesivir Eligibility

Remdesivir may be prescribed as **second line** therapy for patients where nirmatrelvir plus ritonavir is not appropriate due to **contraindications** or **significant drug-drug interactions** which **cannot** be managed, and symptom onset ≤ 7 days **AND** patient is/has:

- highly immunosuppressed, e.g.
 - solid organ transplant
 - haematological malignancy, or
 - received treatment with T or B cell depleting agents in previous 12 months
- cystic fibrosis
- nil by mouth (and without NGT/PEG), or
- severely compromised gastrointestinal absorption (e.g. severe GVHD), or
- currently being treated in the Intensive Care Unit

Infectious Diseases (ID) approval is required for all patients prescribed or referred for remdesivir for mild COVID-19 illness not meeting criteria above, or where local policy requires prescribing to be through ID approval.

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- Aged < 50 years or < 30 years if Aboriginal or Torres Strait Islander PLUS ≥ 2 [risk factors](#)



First Line: If symptom onset ≤ 5 days **Nirmatrelvir plus ritonavir**

Box 2: Dosing Recommendations

Nirmatrelvir plus ritonavir: eGFR > 60 mL/min: 300mg nirmatrelvir (2x150mg capsules) + 100mg ritonavir (1x100mg capsule) orally twice daily for 5 days. eGFR < 60 mL/min: 150mg nirmatrelvir (1x150mg capsule) + 100mg ritonavir (1x100mg capsule) orally twice daily for 5 days. Use with caution in patients with eGFR < 30 mL/min (see drug monograph on page 13)

Molnupiravir^β: 800mg (4 x 200mg capsules) orally 12-hourly for 5 days

Remdesivir: 200mg IV infusion loading dose day 1 then 100mg IV daily on day 2 and 3. Total 3 day course.

***Oseltamivir:** CrCl > 30 mL/min: 75mg orally twice daily, CrCl **10-30** mL/min: 75mg orally once daily, CrCl < 10 mL/min: 75mg orally alternate daily for 5 days **IF** Influenza confirmed. Cease immediately if respiratory viral panel negative for influenza

Note: **Nirmatrelvir plus ritonavir** and **molnupiravir** stock not available to be commenced after hours in CALHN

^β Molnupiravir: Consider risk versus benefits of molnupiravir as limited evidence in patients < 70 years. Prescribers should consider a pregnancy test prior to commencement of therapy. Advise women of childbearing potential to use effective contraception for the duration of treatment and for 4 days after the last dose of molnupiravir. Advise men who are sexually active with a partner of childbearing potential to use an adequate form of contraception during and for 3 months after treatment with molnupiravir.

Supportive care alone is recommended for patients who have symptom onset > 7 days and those considered at low risk of progressing to severe COVID-19 illness (i.e. immunocompetent patients aged < 50 years OR patients aged $\geq 50-70$ years with no risk factors for progressing to severe illness).

Non-PBS Oral Antiviral Medications: When prescribed in a public hospital on discharge, dispensing from the public hospital pharmacy is preferred due to the high cost to the patient if obtained in the community.

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5. COVID-19 treatment recommendations for hospitalised adult patients (excluding pregnancy/breastfeeding)

For advice regarding the treatment and management of mild COVID-19 illness in pregnancy contact closest local health network with specialist perinatal services

Moderate illness on supplemental oxygen	Severe illness on high flow oxygen	Critical illness on non-invasive or mechanical ventilation
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For all hospitalised patients: VTE prophylaxis[^]
Consider empiric influenza treatment* until results of respiratory viral panel available

<p>dexamethasone PLUS remdesivir</p> <p>If no improvement or increasing oxygen requirement and elevated markers of systemic inflammation[@]</p> <p style="text-align: center;">ADD</p> <p style="text-align: center;">baricitinib</p> <p>(if baricitinib contraindicated contact ID)</p>	<p>dexamethasone PLUS remdesivir</p> <p>If elevated markers of systemic inflammation[@]</p> <p style="text-align: center;">ADD</p> <p style="text-align: center;">baricitinib</p> <p style="text-align: center;">OR</p> <p>If clinical signs of deterioration[#] and not already on baricitinib</p> <p style="text-align: center;">tocilizumab</p>	<p>Non-invasive ventilation / high flow oxygen/mechanical ventilation</p> <p style="text-align: center;">dexamethasone</p> <p style="text-align: center;">PLUS</p> <p>If elevated markers of systemic inflammation[@]</p> <p style="text-align: center;">baricitinib</p> <p style="text-align: center;">OR</p> <p style="text-align: center;">tocilizumab</p> <p>(can continue remdesivir if already commenced)</p>
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[@] Consider clinical situation taking into account systemic inflammatory markers i.e CRP, LDH and ferritin
[#] rapidly increasing oxygen requirement despite high flow oxygen (≥ 4L/min), respiratory distress or signs of acute respiratory distress syndrome, sepsis or other organ failure

Box 1: Dosing Recommendations

Baricitinib: Daily oral dose for up to 14 days. Modify dose according to renal function: **eGFR > 60mL/min** 4mg daily, **eGFR 30-60mL/min** 2mg daily, **eGFR 15-30mL/min** 2mg every second day. **eGFR < 15mL/min:** not recommended

Dexamethasone: 6mg oral or IV for up to 10 days (can be ceased at discharge if this is before 10 days). Seek specialist advice if on long term or high dose corticosteroids prior to admission

Remdesivir (where required in line with local policy, prescribing must be through ID approval): Do not start remdesivir if > 10 days since symptom onset OR in patients on mechanical ventilation but it may be continued if commenced prior to ventilation. Dose: 200mg IV load on day 1 then 100mg IV daily for another 4 days (**total 5-day course but can be ceased after 3 days if no longer requiring supplemental oxygen**).

Tocilizumab (ID approval required outside of ICU): IV single dose based on weight. If ≤ 40kg: **8mg/kg**, > 40kg and ≤ 65kg: **400mg**, > 66kg and ≤ 90kg: **600mg**, > 90kg: **800mg**

[^]VTE Prophylaxis: Recommended for all hospitalised patients with COVID-19 unless contraindicated (i.e. major bleeding). **CrCl > 30mL/min:** enoxaparin 40mg subcutaneous injection daily. **CrCl < 30mL/min:** enoxaparin 20mg subcutaneous injection daily

Note: Patients in ICU requiring initiation of these medications after hours (between 10pm and 8am) do NOT require ID approval however they should be discussed the next day during the ICU/ID COVID ward round

***Oseltamivir: CrCl >30mL/min:** 75mg orally twice daily, **CrCl 10-30mL/min:** 75mg orally once daily, **CrCl <10mL/min:** 75mg orally alternate daily for 5 days

IF Influenza confirmed. Cease immediately if viral panel negative for influenza

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6. Assessing a patient for nirmatrelvir plus ritonavir (Paxlovid®) – contraindications and drug interactions

Paxlovid® (nirmatrelvir + ritonavir) has a high potential to cause significant drug-drug and drug-herbal interactions. Ritonavir is known to inhibit and induce CYP3A4 as well as many other CYP enzymes. It is also a strong inducer of UGT enzymes that mediate glucuronidation. Maximal inhibition of CYP3A4 is reached approximately 48 hours after initiating ritonavir and lasts several days after stopping.

1. Obtain a complete list of patient's current medications including:

- Current and recent prescription medications
- Over the counter medications, including all herbal and vitamin supplements
- Recreational drugs
- Other medications given infrequently or in a hospital setting, including:
 - Chemotherapy or other biologic/targeted immune therapy in the last month
 - Multiple sclerosis treatment
 - HCV/HBV/HIV treatment
 - Opiate substitution therapy (OST/MATOD)
 - Steroid injections
 - Depot antipsychotics
 - Hormonal contraceptives (except implant/depot)

2. Check <http://www.covid19-druginteractions.org/checker> and/or another drug interaction checker, and/or the Paxlovid® product information for potential drug-drug interactions

3. Check for absolute contraindications to Paxlovid® use:

- Age < 12 years and weight < 40kg
- Severe liver disease (i.e., Child-Pugh Class C)
- Compromised gastrointestinal absorption (e.g. severe GVHD) or nil by mouth (note: both oral agents can be administered to those with swallowing difficulties, including via enteral tubes – refer to individual drug monographs for details).

Interactions with Medicines and Nirmatrelvir + Ritonavir (Paxlovid®)

- Note: if the drug is not listed below, it cannot be assumed safe to prescribe – check the Liverpool [website](#) or product information
- Management of interactions with Paxlovid® is complex and full details should be obtained from the website where possible.
Reference: [Liverpool Drug Interactions Group](#) – last modified 31/5/23

Legend		Recommendation for Paxlovid Use
Colour/Symbol		
●	Contraindicated – Do not co-administer	Do not use Paxlovid® → risk of serious toxicity. Use alternative COVID-19 therapy Stopping the other drug will not mitigate the interaction (e.g., prolonged half-life, narrow therapeutic index, prolonged enzyme-inducing effects which may decrease effectiveness of nirmatrelvir/ritonavir).
	Do not co-administer unless the other drug can be held	Significant ↑ in drug concentrations expected. Paxlovid® may be appropriate IF the other drug can be safely held (see Liverpool website for more information). Interacting drug can be resumed at least 3 days after completing Paxlovid®. If the medication cannot safely be held, use an alternative COVID-19 medication
□	Caution – potential interaction	Dose modification required to allow use of Paxlovid® Significant ↑/↓ in drug concentrations expected, which may lead to toxicity or impaired efficacy. Only co-administer if the interacting drug can be safely held or dose-adjusted and closely monitored (see Liverpool website for more information)
	Potential Interaction Manageable by counselling patient	Proceed with Paxlovid® Interaction manageable by counselling the patient about potential interaction and advising to temporarily stop the drug if feeling unwell. Drug can be resumed 3 days after completing Paxlovid®
	Weak interaction No action needed	Proceed with Paxlovid® Drug metabolised partially by CYP3A4 or with low risk of adverse event from interaction
	No interaction expected	Proceed with Paxlovid®

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Analgesics	
Aspirin	
Buprenorphine	
Celecoxib	
Codeine	
Diclofenac	
□ Fentanyl – see Liverpool	
Hydromorphone	
Ibuprofen	
Mefenamic acid	
Methadone	
Morphine	
Naproxen	
□ Oxycodone – see Liverpool	
Paracetamol	
Pethidine – see Liverpool	
Tapentadol	
Tramadol	
Antiarrhythmics	
● Amiodarone	
□ Digoxin – see Liverpool	
Disopyramide – see Liverpool	
Flecainide – see Liverpool	
□ Lidocaine – see Liverpool	
Quinidine	
Anticoagulants / Antiplatelets	
□ Note 1 Apixaban – see Liverpool	
Aspirin	
Note 2 Clopidogrel	
□ Note 1 Dabigatran – see Liverpool	
Dalteparin	
Dipyridamole	
Enoxaparin	
Heparin	
Prasugrel	
Note 1 Rivaroxaban- see Liverpool	
Note 3 Ticagrelor	
□ Warfarin – monitor INR	

Anticonvulsants	
Brivaracetam	
● Carbamazepine	
Clonazepam	
□ Ethosuximide	
Gabapentin	
Lacosamide	
Lamotrigine	
Levetiracetam	
Oxcarbazepine	
● Phenobarbital	
● Phenytoin	
Pregabalin	
● Primidone	
Rufinamide	
□ Tiagabine	
Topiramate	
Valproate	
Vigabatrin	
Zonisamide	
Antidepressants	
Agomelatine	
Amitriptyline	
Bupropion	
Citalopram	
Clomipramine	
Desvenlafaxine	
Doxepin	
Duloxetine	
Escitalopram	
Fluoxetine	
Imipramine	
Lithium	
Mianserin	
Mirtazapine	
Nortriptyline	
Paroxetine	
□ Reboxetine – see Liverpool	
Sertraline	
● St John’s Wort	
Venlafaxine	
Vortioxetine	

Antihistamines	
Cetirizine	
Fexofenadine	
Loratadine	
Antipsychotics	
Amisulpride	
□ Aripiprazole – see Liverpool	
Asenapine	
□ Brexpiprazole – see Liverpool	
Cariprazine – see Liverpool	
Chlorpromazine	
Clonazepam – see Liverpool	
Droperidol	
Flupentixol	
□ Haloperidol	
Lurasidone – see Liverpool	
Olanzapine	
Paliperidone	
Periciazine	
Quetiapine – see Liverpool	
□ Risperidone – see Liverpool	
Ziprasidone	
Zuclophenthixol	
Drugs for Anxiety and Sleep Disorders	
□ Alprazolam – see Liverpool	
Bromazepam	
□ Buspirone – see Liverpool	
□ Clobazam – see Liverpool	
Clonazepam – see Liverpool	
Diazepam – see Liverpool	
□ Flunitrazepam – see Liverpool	
Lorazepam	
Midazolam – see Liverpool	
Nitrazepam – see Liverpool	
Oxazepam	
Temazepam	
□ Zolpidem – see Liverpool	
□ Zopiclone – see Liverpool	
Bronchodilators	
Salbutamol	
Ipratropium	
Note 4 Salmeterol – see Liverpool	
Cancer Drugs	
Seek specialist advice	

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Cardiovascular Drugs	
	Ambrisentan
	Amiloride
	ACE-Inhibitors
	Beta Blockers are not expected to interact except Labetalol
	Bosentan – see Liverpool
☐	Calcium Channel Blockers Dose adjustment preferred if high risk of bradycardia or hypotension. Monitor.
	Candesartan
☐	Digoxin – see Liverpool
	Eplerenone – see Liverpool
	Eprosartan
	Furosemide
	Hydralazine
	Hydrochlorothiazide
	Iloprost
	Indapamide
	Irbesartan
	Ivabradine – see Liverpool
	Losartan
	Macitentan
	Olmesartan
	Prazosin
☐	Riociguat – see Liverpool
	Sacubitril
	Sildenafil – see Liverpool
	Spironolactone
	Tadalafil – see Liverpool
	Telmisartan
	Valsartan
Cystic Fibrosis – seek specialist advice	
☐	Elexacaftor with Tezacaftor and Ivacaftor
☐	Ivacaftor
●	Lumacaftor with Ivacaftor
☐	Tezacaftor with Ivacaftor
Diabetes Medication	
	Acarbose
	Alogliptin
	Dapagliflozin
	Dulaglutide
	Empagliflozin

	Exenatide
	Glibenclamide
	Gliclazide
	Glimepiride
	Glipizide
	Insulin
	Linagliptin
	Metformin
	Pioglitazone
☐	Saxagliptin – see Liverpool
	Sitagliptin
	Vildagliptin
Gastrointestinal	
	Antacids
	Cisapride – see Liverpool
☐	Aprepitant – see Liverpool
Note 5	Domperidone- see Liverpool
	Famotidine
	Loperamide
	Mesalazine
	Metoclopramide
Proton pump inhibitors	
	Ondansetron
	Ranitidine
Hepatitis C Antivirals – seek specialist advice	
	Glecaprevir with Pibrentasvir – see Liverpool
	Ledipasvir with Sofosbuvir
	Sofosbuvir with Velpatasvir
☐	Sofosbuvir with Velpatasvir and Voxilaprevir
HIV Antiretrovirals – seek specialist advice	
	Abacavir
	Atazanavir/ritonavir
	Bictegravir
	Cabotegravir
	Darunavir/ritonavir
	Dolutegravir
	Emtricitabine
	Fostemsavir
	Lamivudine
	Nevirapine
	Raltegravir
	Rilpivirine

	Tenofovir (all salts)
Immunosuppressants – seek specialist advice	
	Adalimumab
	Azathioprine
	Basiliximab
	Belatacept
	Ciclosporin – see Liverpool
	Cyclophosphamide
	Etanercept
	Everolimus – see Liverpool
	Leflunomide
	Methotrexate
	Mycophenolate
	Sirolimus – see Liverpool
	Tacrolimus – see Liverpool
Lipid lowering Drugs	
☐Note 6	Atorvastatin – see Liverpool
	Evolocumab
	Ezetimibe
	Fenofibrate
	Fluvastatin
	Gemfibrozil
	Lovastatin – see Liverpool
	Pravastatin
☐Note 6	Rosuvastatin – see Liverpool
Note 6	Simvastatin – see Liverpool
Others	
	Alendronate
	Allopurinol
	Colchicine
☐	Dexamethasone ≥ 20mg/d
	Donepezil
	Ergometrine – see Liverpool
	Ergotamine – see Liverpool
	Finasteride
	Hydroxychloroquine
	Infliximab
	Levodopa
	Levothyroxine
	Memantine
	Methotrexate
☐	Mirabegron (no dose reduction in patients with normal renal function)

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Others continued	
	Modafinil
	Pramipexole
	Pyridostigmine
□	Rifabutin– see Liverpool
●	Rifampicin
Note 7	Tamsulosin
□	Triamcinolone – see Liverpool

Note 1 – Direct-acting oral anticoagulants (DOACs) including apixaban, dabigatran and rivaroxaban

Coadministration of nirmatrelvir/ritonavir with DOACs may lead to increased DOAC concentrations and therefore to an increased risk of bleeding. If low risk of clotting (e.g., taking for AF with [CHADS-VASc](#) score of 1 or 2) consider holding DOAC for duration of nirmatrelvir/ritonavir and restarting 3 days after nirmatrelvir/ritonavir therapy is completed. For inpatients with a high risk of clotting or where anticoagulation cannot be safely held, consider switching to enoxaparin for duration of nirmatrelvir/ritonavir therapy and for 3 days after nirmatrelvir/ritonavir therapy is completed, or consider using alternative COVID-19 therapy (i.e., molnupiravir).

Note 2 – Clopidogrel

Coadministration of nirmatrelvir/ritonavir is expected to decrease the antiplatelet effect of clopidogrel. It may be acceptable to prescribe nirmatrelvir/ritonavir if the benefits of nirmatrelvir/ritonavir use outweigh the risk of reduced clopidogrel efficacy. For patients with a very high risk of thrombosis (e.g., following a recent CVA or within the first 3 months following an ACS or coronary stent), consider prescribing an alternative COVID-19 therapy (i.e., molnupiravir).

Note 3 – Ticagrelor

Coadministration of nirmatrelvir/ritonavir with ticagrelor may significantly increase exposure to ticagrelor and increase the risk of bleeding. For patients with a very high risk of thrombosis (e.g., following a recent CVA or within the first 3 months following an ACS or coronary stent), consider prescribing an alternative COVID-19 therapy (i.e., molnupiravir). For patients with a low risk of thrombosis and also taking aspirin, consider temporarily holding ticagrelor during nirmatrelvir/ritonavir therapy and restarting ticagrelor 3 days after nirmatrelvir/ritonavir therapy is completed. If not taking aspirin prior to presentation then **do not** change antiplatelet therapy. Instead consider prescribing an alternative COVID-19 therapy (i.e., remain on ticagrelor monotherapy and prescribe molnupiravir).

Note 4 – Salmeterol

Coadministration of nirmatrelvir/ritonavir is expected to significantly increase concentrations of salmeterol. Where appropriate, consider temporarily holding salmeterol containing inhaler during nirmatrelvir/ritonavir therapy and for 3 days after the course it is completed. Where a salmeterol containing inhaler cannot be safely held for 8 days, consider switching to another long-acting beta-agonist (i.e. formoterol or indacaterol) for the duration of nirmatrelvir/ritonavir therapy and restart the salmeterol containing inhaler 3 days after nirmatrelvir/ritonavir therapy is completed.

Note 5 – Domperidone

Coadministration of nirmatrelvir/ritonavir may significantly increase domperidone exposure and increase the risk of cardiac adverse effects. Where appropriate, hold domperidone for the duration of nirmatrelvir/ritonavir therapy and for 3 days after the course is completed and/or prescribe an alternative anti-emetic for the duration of nirmatrelvir/ritonavir therapy and restart domperidone 3 days after nirmatrelvir/ritonavir therapy is completed.

Note 6 – Lipid Lowering Drugs (statins)

Coadministration of nirmatrelvir/ritonavir is expected to significantly increase exposure to simvastatin and moderately increase exposure to atorvastatin and rosuvastatin, increasing the risk of toxicity. However, fluvastatin and pravastatin exposure is not expected to change. Recommendations for patients on simvastatin, atorvastatin and rosuvastatin are as follows:

Simvastatin – Discontinue simvastatin at least 12 hours prior to initiation of nirmatrelvir/ritonavir and hold for duration of nirmatrelvir/ritonavir therapy. Restart simvastatin **5** days after nirmatrelvir/ritonavir therapy is completed.

Atorvastatin and rosuvastatin – Discontinue atorvastatin or rosuvastatin therapy for the duration of nirmatrelvir/ritonavir therapy (i.e., does not need to be held 12 hours prior to nirmatrelvir/ritonavir commencing). Restart atorvastatin or rosuvastatin 3 days after nirmatrelvir/ritonavir therapy completed.

Given the short duration of nirmatrelvir/ritonavir treatment, interacting statins should be held so nirmatrelvir/ritonavir can be prescribed. Temporarily stopping statins is acceptable considering that it will not negatively influence the therapeutic effect but can minimise the risk for adverse events related to a drug interaction.

Note 7 – Tamsulosin and tamsulosin/dutasteride combination

Coadministration of nirmatrelvir/ritonavir is expected to increase tamsulosin concentrations. Where appropriate, hold tamsulosin and restart 3 days after completing nirmatrelvir/ritonavir. Alternatively for patients at a heightened risk of urinary retention, hold tamsulosin or tamsulosin/dutasteride and consider alternative therapy such as low dose prazosin (0.5mg-1mg daily) for duration of nirmatrelvir/ritonavir and for 3 days after completing course. Monitor for hypotension.

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7. Approach to the treatment of immunocompromised patients with persistent or relapsed COVID-19 infection

Active, persistent COVID-19 infection can uncommonly occur in immunocompromised patients. Immunocompromised patients with persistent COVID-19 infection will often test positive on COVID-19 PCR testing for weeks to months with a low cycle threshold (CT) value which may indicate replicating, transmissible virus. Patients most at risk of persistent infection include those with severe B-cell depletion due to cancer therapy (ie patients treated with anti-CD 20 monoclonal antibodies within the previous 6-12 months and/or haematopoietic stem cell transplant recipients).

There is limited data about the optimal management of patients with persistent COVID-19 infection. Small observational studies and case reports suggest some efficacy with combination antiviral treatment and/or extended courses of antiviral medications however therapeutic management remains challenging and there are no guidelines currently available.

All patients with persistent COVID-19 infection should be seen as a formal consult by Infectious Diseases. The use of combination antiviral therapy, antiviral treatments more than 10 days after initial symptom onset or antiviral treatment courses beyond 5 days for nirmatrelvir/ritonavir and 10 days for remdesivir is “off-label” and will require an IPU as well as patient consent.

8. Changes to the National Medical Stockpile (NMS)

From 1 January 2024, the Commonwealth ceased supplying oral NMS COVID-19 medications to public hospitals free of charge. Nirmatrelvir/ritonavir (Paxlovid®) and molnupiravir (Lagevrio®) are available via the PBS for eligible outpatients, please refer to the PBS website for full eligibility criteria. Once the current supply of remdesivir is exhausted, it will be funded by individual Local Health Networks (LHNs).

Approximate cost of COVID-19 antivirals per course

Remdesivir: \$2300 (3 day course), \$3400 (6 day course)

Nirmatrelvir/ritonavir: \$1000

Molnupiravir: \$1000

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9. Treatments for COVID-19 – Drug Monographs

Nirmatrelvir plus Ritonavir (Paxlovid®)

Patient consent required (verbal or written).

Stock not available after hours in CALHN

Drug Class	<ul style="list-style-type: none"> Nirmatrelvir is a protease inhibitor that blocks the activity of the SARS-CoV-2-3CL protease thus inhibiting viral replication. Low dose ritonavir is given concurrently with nirmatrelvir as a 'booster' to maintain nirmatrelvir plasma levels during treatment through inhibition of the CYP3A4 mediated metabolism of nirmatrelvir.
Indications	<ul style="list-style-type: none"> First line treatment of mild COVID-19 for non-pregnant adults who do NOT require supplemental oxygen and are ≤ 5 days since symptom onset AND: <ul style="list-style-type: none"> Meets PBS criteria for treatment with nirmatrelvir/ritonavir OR <ul style="list-style-type: none"> Aged < 50 years (or < 30 years if Aboriginal or Torres Strait Islander) with TWO or more risk factors for severe or critical illness Treatment should not be commenced in hospitalised patients with severe or critical COVID-19 illness, however the course can be completed if commenced prior to initiation of supplemental oxygen or hospitalisation.
Contra-indications	<ul style="list-style-type: none"> Hypersensitivity to nirmatrelvir or ritonavir or any of the excipients listed in the product information. Children less than 12 years old and weighing <40kg Severe hepatic impairment – avoid due to insufficient data. Solid organ transplant recipients at risk of significant adverse outcomes from drug-drug interactions if prescribed nirmatrelvir/ritonavir Drug Interactions <ul style="list-style-type: none"> Contraception – Ritonavir may reduce the efficacy of combined hormonal contraceptives therefore alternative contraceptive methods or additional barrier protection is advised during treatment and for one full menstrual cycle after completing the nirmatrelvir plus ritonavir course. Co-administration of medications that are highly dependent on CYP3A4 for clearance and could be associated with serious/life-threatening reactions with elevated serum concentrations. See page 7-10 for more information. Co-administration of medications which are potent CYP3A4 inducers which can result in significantly reduced plasma concentrations of nirmatrelvir plus ritonavir and could be associated with loss of virologic response and possible resistance. See page 7-10 for more information.
Precautions	<ul style="list-style-type: none"> Exercise caution in patients with a history of anaphylaxis to other medicines. Pregnancy – limited data. For treatment and management of COVID-19 illness in pregnancy contact closest local health network with specialist perinatal services. Breastfeeding – limited data. The decision to breastfeed during treatment for COVID-19 should be evaluated as part of a shared decision-making process. Breastfeeding can continue if ritonavir-boosted nirmatrelvir is needed for the management of COVID-19. However, lactating patients with COVID-19 infection can transmit the virus through respiratory droplets and all precautions should be taken to avoid spreading the virus to the infant. Severe renal impairment (eGFR < 30 mL/min) – use with caution. Use is not recommended by manufacturer, however risk of toxicity is likely to be minimal with 5 day

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	<p>course. Dose recommendations (i.e. to dose as per eGFR <60 mL/min) are from the Renal Drug Database and are based on a study from Wales with small numbers of patients with end stage renal disease (ESRD). In this study patients with ESRD taking this dose experienced no serious adverse effects.</p> <ul style="list-style-type: none"> • Hepatotoxicity - Caution should be exercised in patients with pre-existing liver disease, or hepatitis. Hepatic transaminase elevations, clinical hepatitis and jaundice have been reported in patients using ritonavir. No dose adjustments required for patients with mild or moderate hepatic impairment. Avoid use in patients with severe hepatic impairment. • Risk of HIV-1 Resistance Development - Due to the co-administration of low dose ritonavir, there may be a risk of HIV-1 developing resistance to HIV protease inhibitors in individuals with uncontrolled or undiagnosed HIV-1 infection.
Storage and presentation	<ul style="list-style-type: none"> • This is a combination therapy. The two components are provided as individual, co-packaged medications. Each package contains 30 tablets in total; 20 x 150mg nirmatrelvir tablets, and 10 x 100mg ritonavir tablets. This is the supply required to complete the standard adult 5-day course. • Store at room temperature, less than 25°C
Dose and administration	<ul style="list-style-type: none"> • eGFR ≥ 60mL/min/1.73m²: Nirmatrelvir 300mg (two 150mg tablets) with ritonavir 100mg (one 100mg tablet) taken together orally every 12 hours for 5 days. • eGFR < 60 mL/min/1.73m²: Nirmatrelvir 150mg (one 150mg tablet) with ritonavir 100mg (one 100mg tablet) taken together orally every 12 hours for 5 days. See precautions section above for patients with eGFR < 30mL/min/1.73m² • eGFR <30 mL/min/1.73m² (including dialysis): Nirmatrelvir 150mg (one 150mg tablet) with ritonavir 100mg (one 100mg tablet) taken together orally every 12 hours for 5 days. Use with caution – see precautions section above. <p>If a dose of nirmatrelvir and ritonavir is missed within eight hours of the time it is usually taken, this dose should be taken as soon as remembered. If a dose is missed by more than eight hours, this dose should be skipped, and the next dose taken at the regular time. The dose should not be doubled up to make up for the missed doses of nirmatrelvir and ritonavir.</p> <p>The blister strips for Paxlovid® contain two tablets of nirmatrelvir and one tablet of ritonavir corresponding to the daily administration at the standard dose (morning and night doses are separated within the same blister strip). Therefore, patients with moderate renal impairment should be alerted to the fact that only one tablet of nirmatrelvir should be taken every 12 hours (with the tablet of ritonavir).</p>
Swallowing difficulties	<ul style="list-style-type: none"> • Where possible swallow the tablets whole, with or without food. • There is little information regarding the safety or efficacy of nirmatrelvir plus ritonavir when tablets are crushed or dispersed, however the following instructions have been provided for those with swallowing difficulties or enteral feeding tubes: <ul style="list-style-type: none"> ○ For patients with swallowing difficulties: <ol style="list-style-type: none"> 1. Disperse the nirmatrelvir tablet(s) in water OR if the patient is unable to swallow thin fluids, crush the nirmatrelvir tablet(s) and mix with a spoonful of yoghurt or apple puree. 2. Crush the ritonavir tablet and mix with water, or a spoonful of yoghurt or apple puree. ○ For patients with enteral feeding tubes: <ol style="list-style-type: none"> 1. Flush the tube with 30mL of water. 2. Disperse the nirmatrelvir tablet(s) in 10-20mL of water in an enteral syringe. The tablet(s) will form a milky, light pink dispersion within a few minutes. 3. Check carefully that the tablet(s) is completely dispersed and then give via enteral tube.

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	<ol style="list-style-type: none"> 4. Flush tube with 5mL of water. 5. Crush the ritonavir tablet and mix with water, then draw into an enteral syringe. 6. Give the mixture via enteral tube ensuring all the mixture has been administered. 7. Flush the tube with 30mL of water.
Monitoring	<ul style="list-style-type: none"> • Baseline creatinine, electrolytes and urea, LFTs and complete blood exam. • Monitor the patient for adverse effects. • If signs or symptoms of a clinically significant hypersensitivity reaction or anaphylaxis occur, immediately discontinue and initiate appropriate medications and/or supportive care.
Adverse Effects	<ul style="list-style-type: none"> • It may be difficult to distinguish between adverse effects of nirmatrelvir or ritonavir and the signs and symptoms of COVID-19. • As a new medication, adverse reactions to nirmatrelvir continue to be investigated. Refer to the Paxlovid® product information for a complete list of possible adverse effects. • To date the most common adverse reactions reported include: <ul style="list-style-type: none"> ○ altered sense of taste ○ headache ○ diarrhoea ○ vomiting ○ hypertension ○ myalgia • Suspected or confirmed adverse reactions should be reported via Safety Learning System and also via the Therapeutic Goods Administrations adverse effects online form: TGA adverse event reporting
Patient Information / consent forms	<ul style="list-style-type: none"> • Nirmatrelvir plus ritonavir patient information leaflets can be found here
Drug Interactions <i>Refer to pages 7-10 for specific examples</i>	<ul style="list-style-type: none"> • Ritonavir has many drug-drug and drug-herbal interactions which are complex and can be difficult to predict. Ritonavir is known to inhibit and induce CYP3A4 as well as many other CYP enzymes. It is also a strong inducer of UGT enzymes that mediate glucuronidation. Therefore use caution with: <ul style="list-style-type: none"> ○ Co-administration of medications that are highly dependent on CYP3A4 for clearance and could be associated with serious/life-threatening reactions with elevated serum concentrations. ○ Co-administration of medications which are potent CYP3A4 inducers which can result in significantly reduced plasma concentrations of nirmatrelvir plus ritonavir and could be associated with loss of virologic response and possible resistance. • Always check the University of Liverpool COVID-19 resource page or Up-To-Date interaction checker prior to prescribing nirmatrelvir plus ritonavir. • Some of the more significant interactions are listed on pages 7-10 however this is not an exhaustive list and information may change over time. Where it states 'consider risk vs benefit' refer to the Australian Medicines Handbook, the Liverpool resource page, Up-to-date interaction checker or the Paxlovid® product information for more information on the mechanism of the interaction.

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Molnupiravir (Lagevrio®) Patient consent (verbal or written) required Stock not available after hours in CALHN	
Drug Class	<ul style="list-style-type: none"> Antiviral pro-drug, which once metabolised to an active ribonucleoside triphosphate (NHC-TP), is incorporated into SARS-CoV-2 viral RNA resulting in an accumulation of transcribed mutations with each viral replication cycle, thus inhibiting further replication.
Indications	<p>In 2023, The National Clinical Evidence Taskforce recommended against routine use of molnupiravir except in specific circumstances and where all other treatment options were contraindicated OR inappropriate, based on the results of the PANORAMIC Trial. The median age of patients in the PANORAMIC trial was 56 years (younger than most target treatment groups in Australia) and a reduction in time to recovery was shown for all patients and trend to reduced hospitalisation/death in patients aged ≥ 80 years. The CALHN AMS Committee note recent Victorian data which showed a reduction in hospitalisation and death in patients aged ≥ 70 years who received molnupiravir. Molnupiravir should continue to be considered for the treatment of mild COVID-19 illness when nirmatrelvir/ritonavir is contraindicated or inappropriate.</p> <p>Consider risk versus benefits of molnupiravir as limited evidence in patients < 70 years. For patients aged < 70 years who are contraindicated from taking nirmatrelvir/ritonavir and/or remdesivir, only prescribe molnupiravir if benefits outweigh risks AND appropriate reproductive counselling can be provided</p> <ul style="list-style-type: none"> Second or third line treatment of mild COVID-19 for non-pregnant adults where nirmatrelvir plus ritonavir is contraindicated and benefits of treatment outweigh risks and appropriate reproductive counselling is provided. Patients must have symptom onset of no more than 5 days, not require supplemental oxygen and be: <ul style="list-style-type: none"> Meet PBS criteria for treatment with molnupiravir Treatment should not be commenced in hospitalised patients with severe or critical COVID-19 illness, however the course can be completed if commenced prior to initiation of supplemental oxygen or hospitalisation.
Contra-indications	<ul style="list-style-type: none"> Hypersensitivity to molnupiravir or any of the excipients in the product. Children less than 18 years old Pregnancy – the use of molnupiravir in pregnant patients is not recommended due to potential risk of reduced foetal growth and development. Breastfeeding – it is unknown whether molnupiravir is present in human breastmilk, affects breastmilk production, or has an effect on the breastfed infant. Based on the potential for adverse reactions on the infant, breastfeeding is not recommended during AND for 4 days after treatment. Contraception - Prescribers should consider a pregnancy test prior to commencement of therapy. Advise women of childbearing potential to use effective contraception for the duration of treatment and for 4 days after the last dose of molnupiravir. Advise men who are sexually active with a partner of childbearing potential to use an adequate form of contraception during and 3 months after treatment with molnupiravir.
Precautions	<ul style="list-style-type: none"> Exercise caution in patients with a history of anaphylaxis to other medicines. Renal Impairment - Patients with eGFR < 30 mL/min and patients on dialysis were excluded from the Phase 3 MOVE-OUT trial. Molnupiravir is a prodrug hydrolysed to NHC. The fraction of dose excreted as NHC was $\leq 3\%$ therefore renal impairment is not expected to have a significant effect on NHC exposure.

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	<ul style="list-style-type: none"> • Hepatic impairment - the pharmacokinetics of molnupiravir and NHC has not been evaluated in patients with hepatic impairment. Hepatic elimination is not expected to be a major route of NHC elimination.
Drug Interactions	<ul style="list-style-type: none"> • No formal interaction studies have been conducted with molnupiravir • The metabolite of molnupiravir is not a substrate of major drug metabolising enzymes or transporters. Neither molnupiravir nor its substrate are inhibitors or inducers of major drug metabolising enzymes or transporters. • While the potential for drug interactions with molnupiravir are considered unlikely, as this is a new drug, continue to check the University of Liverpool COVID-19 resource page
Presentation and storage	<ul style="list-style-type: none"> • Available as 200mg capsules supplied as a bottle of 40 capsules. • Store at room temperature, less than 30°C
Dose	<ul style="list-style-type: none"> • 800mg (4 x 200mg capsules) orally 12-hourly for 5 days • No dose adjustment is required for renal or hepatic impairment or the elderly (see precautions above). • If the patient misses a dose of molnupiravir within 10 hours of the time it is usually taken, the patient should take it as soon as possible and resume the normal dosing schedule. If a patient misses a dose by more than 10 hours, the patient should not take the missed dose and instead take the next dose at the regularly scheduled time. The patient should not double the dose to make up for a missed dose.
Administration	<ul style="list-style-type: none"> • Capsules can be taken with or without food. • Administration of molnupiravir via an oral solution has not been evaluated in clinical trials however the following advice has been provided for patients with swallowing difficulties and or for administration via an enteric tube. • Preparation of the solution: <ul style="list-style-type: none"> ○ Open FOUR (4) capsules and transfer contents into an oral syringe. Discard empty capsule shells ○ Add approximately 40 mL of water to the oral syringe. ○ Mix/stir the capsule contents and water for 3 minutes. <ol style="list-style-type: none"> 1. Insoluble capsule contents may not dissolve completely. 2. Reconstituted solutions prepared according to directions may have visible undissolved particulates and are acceptable for oral administration. ○ Administration should occur as soon as possible after the preparation and no later than 2 hours after the preparation. • For administration via enteral tube: <ul style="list-style-type: none"> ○ Prior to administration redisperse the suspension by mixing or stirring the oral syringe for 1 minute prior to administration ○ Flush enteral tube with 5 mL of water prior to administration. ○ Administer entire volume from the administration syringe. ○ Flush tube with 5 mL of water TWICE (10 mL total) after administration of the suspension.
Handling	<ul style="list-style-type: none"> • Occupational exposure to non-intact tablets may be harmful. Staff who are actively trying to conceive or who are pregnant or breastfeeding should not prepare or handle a dispersed dose. • For all other staff, use standard Personal Protective Equipment (PPE) if preparation or administration of a dispersed tablet is required.
Monitoring	<ul style="list-style-type: none"> • Baseline creatinine, electrolytes and urea, LFTs and complete blood exam. • Monitor the patient for adverse effects. • If signs or symptoms of a clinically significant hypersensitivity reaction or anaphylaxis occur, immediately discontinue and initiate appropriate medications and/or supportive care.

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Adverse Effects	<ul style="list-style-type: none"> It may be difficult to distinguish between adverse effects of molnupiravir and the signs and symptoms of COVID-19. As a new medication, adverse reactions to molnupiravir continue to be investigated. Refer to the product information for a complete list of possible adverse effects. To date reactions include: <ul style="list-style-type: none"> Common (>1%): diarrhoea, nausea, dizziness, headache Uncommon (0.1-1%): rash, urticaria Suspected or confirmed adverse reactions should be reported via Safety Learning System and also via the Therapeutic Goods Administrations adverse effects online form: TGA adverse event reporting
Patient Information and consent forms	<ul style="list-style-type: none"> Molnupiravir patient information leaflets can be found here (IH-CIS05843)

Remdesivir	
Patient consent (verbal or written) required	
Drug Class	<ul style="list-style-type: none"> Antiviral, a nucleotide analogue prodrug that binds to the viral RNA-dependent RNA polymerase and inhibits viral replication through premature termination of RNA transcription.
Indications	<ul style="list-style-type: none"> Treatment of mild COVID-19 illness: <ul style="list-style-type: none"> Second line treatment (when nirmatrelvir plus ritonavir is contraindicated or not appropriate due to significant drug-drug interactions which cannot be managed) of mild COVID-19 for non-pregnant adult patients who do not require supplemental oxygen and are within 7 days of symptom onset <p>AND</p> <ul style="list-style-type: none"> Are highly immunocompromised: including solid organ transplant recipients, patients with a haematological malignancy or patient who have received treatment with T or B cell depleting agents within previous 12 months OR Have cystic fibrosis OR nil by mouth (and without NGT/PEG) or concern for aspiration, OR severely compromised gastrointestinal absorption (e.g. severe GVHD) OR currently being treated in the Intensive Care Unit <p>Infectious Diseases (ID) approval is required for all patients prescribed or referred for remdesivir for mild COVID-19 illness not meeting criteria above.</p> <ul style="list-style-type: none"> Treatment of moderate to critical illness: <ul style="list-style-type: none"> Remdesivir may be considered for patients with a confirmed diagnosis of COVID-19 or known contact of a confirmed case with syndrome consistent with COVID-19 awaiting confirmation by diagnostic testing; AND Aged ≥ 18 years, or aged 12 to 17 years and weighing > 40 kg; AND With oxygen saturation ≤ 92% on room air and requiring supplemental oxygen; AND ≤ 10 days since symptom onset

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	<ul style="list-style-type: none"> • Remdesivir use in any patient not meeting the criteria above must be discussed with and approved by Infectious Diseases • Remdesivir is NOT indicated for patients requiring invasive mechanical ventilation or ECMO, although it may be continued if it was started prior to ventilation commencing. • Unless corticosteroids are contraindicated (see dexamethasone monograph above), remdesivir should be given in conjunction with dexamethasone for patients requiring supplemental oxygen (i.e. patients being treated for moderate to critical COVID-19)
Contra-indications	<ul style="list-style-type: none"> • Known hypersensitivity to any ingredient of remdesivir product or remdesivir metabolites. • Mechanical ventilation for >48 hours at the time of commencement. • Hepatic impairment: ALT \geq 5 times the upper normal limit (ULN) at baseline.
Precautions	<ul style="list-style-type: none"> • Severe Renal impairment¹: eGFR < 30mL/min/1.73m² <ul style="list-style-type: none"> ○ Formulated with the excipient sulfobutyl betadex sodium (SBECD) which accumulates in renal impairment. For most patients with an eGFR < 30mL/min/1.73m² the benefit of treatment will outweigh the risks of treatment as the reported toxic doses of SBECD are 50-100 times higher than exposure during a 5-10 day course of remdesivir. ○ The Renal Drug Database and FDA have updated dosing recommendations for patients with eGFR < 30mL/min/1.73m² and both state remdesivir can be used in patients with eGFR < 30mL/min/1.73m² without need for dose adjustment. • Factors where the benefit of remdesivir is uncertain & requires careful consideration before use: <ul style="list-style-type: none"> ○ Presence of an intercurrent illness likely to lead to patient death within one year; ○ Advanced age with limitations on activities of daily living; ○ Need for more than a 5 day treatment course
Drug Interactions	<ul style="list-style-type: none"> • Drug-drug interaction trials of remdesivir and other concomitant medications have not been conducted in humans. Remdesivir is a substrate for several drug metabolising enzymes however clinical relevance of these interactions has not been established. • Use with hydroxychloroquine or chloroquine is not recommended as it may reduce antiviral activity of remdesivir. • For detailed information regarding drug interactions with remdesivir please check the University of Liverpool COVID-19 resource page.
Preparation	<ul style="list-style-type: none"> • There are 2 preparations available in Australia: <ul style="list-style-type: none"> ○ Powder for injection <ul style="list-style-type: none"> ▪ 100 mg sterile, preservative-free, white to off-white to yellow lyophilised powder vial. ▪ Requires storage below 30°C. ▪ Contains sulfobutyl betadex sodium (SBECD 3 g), hydrochloric acid & sodium hydroxide. ○ Concentrated solution vial <ul style="list-style-type: none"> ▪ 100 mg/20 mL concentrate solution (clear colourless to yellow) vial; sterile preservative-free. ▪ Requires refrigerated storage at 2–8°C.

¹ NOTE: Dose adjustments are based on eGFR (CKD-EPI). For patients with extremes of body size, multiply the eGFR by the patient's body surface area (in m²) and divide by 1.73 m²

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	<ul style="list-style-type: none"> ▪ Stable for up to 12 hours at room temperature (20–25°C) prior to dilution. ▪ Contains sulfobutyl betadex sodium (SBECD 6 g), hydrochloric acid & sodium hydroxide. ▪ Concentrated solution not recommended in children < 12 years of age or adolescents weighing <40kg
Dose	<ul style="list-style-type: none"> • Mild illness: 200mg via IV infusion on day 1, then 100mg IV daily for a further 2 days (total 3 days treatment). • Moderate to critical illness: 200mg via IV infusion on day 1, then 100mg IV daily for a further 4 days (total 5 days treatment). Can be ceased after 3 days of therapy if no longer requiring supplemental oxygen.
Administration	<ul style="list-style-type: none"> • There are different formulations of remdesivir available and administration instructions may vary. • For administration details please refer either to the Australian Injectables Drugs Handbook
Monitoring	<ul style="list-style-type: none"> • As experience with remdesivir at these doses and for this duration is limited patients should have appropriate clinical and laboratory monitoring including: <ul style="list-style-type: none"> ○ Baseline creatinine, electrolytes, urea, LFTs, coagulation studies including prothrombin time and complete blood exam. Repeat every 1 to 2 days for inpatients or as clinically indicated for outpatients. <ul style="list-style-type: none"> ▪ Discontinue remdesivir if: <ul style="list-style-type: none"> ➢ ALT ≥ 5 times ULN during treatment with remdesivir (remdesivir may be restarted when ALT is < 5 times ULN), OR ➢ ALT elevation accompanied by signs or symptoms of liver inflammation or increasing conjugated bilirubin, alkaline phosphatase, or INR. ○ Heart rate ○ Observe for infusion-related reactions. If present, immediately discontinue administration of remdesivir and initiate supportive therapy if required.
Adverse Effects	<ul style="list-style-type: none"> • As experience with remdesivir at these doses and for this duration is limited patients it is important to document and report all suspected adverse effects. To date, the following adverse effects have been observed: <ul style="list-style-type: none"> ○ Very common (>10%): graded elevations in ALT, AST and bilirubin. ○ Common (>1%): prolonged prothrombin time, gastrointestinal symptoms (e.g. nausea, vomiting, diarrhoea), headache, rash. ○ Rare (<0.1%): hypersensitivity reactions (anaphylactic reactions are rare but are a medical emergency; stop the infusion and begin treatment immediately). • Infusion-related reactions may include hypotension, nausea, vomiting, diaphoresis, shivering. • Post-marketing adverse effects reported include bradycardia (including severe bradycardia and sinus bradycardia), cardiac failure and hypotension. • Suspected or confirmed adverse reactions should be reported via Safety Learning System and also via the Therapeutic Goods Administrations adverse effects online form: TGA adverse event reporting.
Patient information and consent forms	<ul style="list-style-type: none"> • CALNH Remdesivir Consumer Information leaflets can be found here

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Dexamethasone	
Drug Class	<ul style="list-style-type: none"> Corticosteroid
Indications	<ul style="list-style-type: none"> Dexamethasone is recommended for all adult patients with confirmed COVID-19 infection AND are receiving oxygen (including mechanically ventilated patients). Do not routinely use in patients with COVID-19 who do not require oxygen.
Contra-indications	<ul style="list-style-type: none"> Hypersensitivity to dexamethasone or any excipients of the tablet or injection or to other corticosteroids. Concomitant administration of live virus vaccines (risk of severe systemic infection).
Precautions	<ul style="list-style-type: none"> Seek specialist advice for patients taking long term or high dose corticosteroids prior to admission <ul style="list-style-type: none"> Patients with primary or secondary adrenal insufficiency, rheumatologic and other chronic conditions treated with corticosteroids may not be able to mount a normal stress response in the event of COVID-19 infection. Administration of physiologic stress doses of corticosteroids may need to be considered to avoid potentially fatal adrenal failure. Pregnancy: corticosteroid treatment is recommended for the treatment of moderate/severe or critical COVID-19 infections. Choice of steroid should be guided by Obstetric Medicine, Infectious Diseases and ICU (if required) at the time of treatment. Patients may be offered dexamethasone or prednisolone depending on their gestation, pregnancy details, comorbidities and other illness factors. Given the short duration of treatment for COVID-19 many of the recognised precautions for the use of corticosteroids may not apply. The treating doctor should assess if treatment with dexamethasone puts the patient at substantial risk of harm due to concurrent (non COVID-19) infection. This assessment must not delay treatment with dexamethasone. For a full list of precautions and considerations for special populations such as pregnancy and breastfeeding please visit the dexamethasone drug guideline available via the NSW Therapeutic Advisory Group.
Drug Interactions	<ul style="list-style-type: none"> Dexamethasone is a moderate inducer of CYP3A4 and P-glycoprotein (P-gp) and a substrate for CYP3A4. Use with CYP3A4 inhibitors may increase dexamethasone concentrations, while use with CYP3A4 inducers may decrease dexamethasone concentrations and efficacy. The effects of anticoagulant agents are usually decreased (but may be increased in some patients) with concurrent corticosteroid treatment. Close monitoring of the INR or prothrombin time is recommended. Concomitant use of drugs that irritate the gastrointestinal lining with dexamethasone may increase the risk of peptic ulceration and bleeding. For more detailed information regarding drug interactions with dexamethasone check the University of Liverpool COVID-19 resource page.
Preparation	<ul style="list-style-type: none"> Intravenous formulations: 4mg/mL or 8mg/2mL Oral formulation: 4mg and 0.5mg tablets
Dose and administration	<ul style="list-style-type: none"> 6mg via intravenous injection or 6mg orally with food ONCE daily for up to 10 days* <ul style="list-style-type: none"> If giving via intravenous injection give as a slow injection over 3-5 minutes

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	<ul style="list-style-type: none"> ○ May be diluted with 10 mL of sodium chloride 0.9% to facilitate slow injection <p>* If well enough to discharge prior to the 10 day course being completed dexamethasone can be ceased on discharge.</p>
Adverse Effects	<ul style="list-style-type: none"> ● Given the short duration for COVID-19 of treatment many known corticosteroid adverse effects are unlikely to occur. ● Some common adverse effects that may occur with short term use of dexamethasone include: <ul style="list-style-type: none"> ○ Transient itching, burning or tingling in perineal area (after high dose rapid IV bolus) ○ Infection ○ Electrolyte and fluid disturbances including: hypernatraemia, hypervolaemia, hypokalaemia ○ Hypertension, ○ Hyperglycaemia, ○ GI disturbances including increased appetite and dyspepsia ○ Delayed wound healing and bruising ○ Facial flushing ○ Myopathy, muscle weakness ○ Psychiatric effects (euphoria, hypomania, depression, disturbances of mood, cognition, sleep and behaviour. Delirium or psychosis are less common).
Monitoring	<ul style="list-style-type: none"> ● Clinicians should monitor for potential adverse effects listed above including monitoring blood sugar levels (especially if known diabetic) and creatinine and electrolytes. ● Baseline testing for hepatitis B, HIV, HCV should be undertaken for all patients and consider strongyloides and tuberculosis testing according to epidemiological risk factors. Dexamethasone treatment should NOT be delayed pending results of baseline tests.
Patient information	<ul style="list-style-type: none"> ● Dexamethasone product information and consumer medicines information leaflets are available via MIMS.

<p>Baricitinib</p> <p>ID approval and patient consent (verbal or written) required</p>	
Drug Class	<ul style="list-style-type: none"> ● Janus Kinase (JAK) 1 and 2 inhibitor, disease-modifying anti-rheumatic drug (DMARD), immunomodulator
Indications	<ul style="list-style-type: none"> ● Off-label use of baricitinib may be considered for patients with a current diagnosis of COVID-19 who require supplemental oxygen, high-flow oxygen and/or non-invasive ventilation including those who may be intolerant of steroid therapy particularly where there is evidence of systemic inflammation such as: <ul style="list-style-type: none"> ○ Elevated ESR, C-reactive protein (CRP, D-dimers, lactate dehydrogenase ● Baricitinib is equal first line therapy for patients on mechanical ventilation and can be continued if a patient progresses from needing high-flow oxygen/non-invasive ventilation to mechanical ventilation. ● Baricitinib should NOT be given to patients who have already received sarilumab or tocilizumab. ● Unless corticosteroids are contraindicated (see dexamethasone monograph above), baricitinib should be given in conjunction with dexamethasone.

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Contraindications	<ul style="list-style-type: none"> • Hypersensitivity: contraindicated in patients with known hypersensitivity to baricitinib or any of the excipients in the product. • Pregnancy and breastfeeding. • Renal impairment ²: Not recommended for patients on dialysis or patients with acute kidney injury or eGFR < 15mL/min/1.73m². • Patients with serious active infections (other than COVID-19). • Live vaccines should not be given concomitantly.
Precautions	<ul style="list-style-type: none"> • Thrombosis: Baricitinib may increase the risk of venous thromboembolism (VTE). Use with caution in individuals with an increased risk of thrombosis. • Use with caution if haemoglobin < 80 g/L, lymphocyte count < 0.2 x 10⁹/L or neutrophil count < 0.5 x 10⁹/L. • Renal impairment: Dose reduction required in patients with eGFR 30-60 mL/min/1.73m² • Hepatic: Baricitinib has not been studied in patients with severe hepatic impairment. It should only be used in patients with severe hepatic impairment if the potential benefit outweighs the potential risk of harm. • Gastrointestinal (GI): GI perforations have been reported. Use with caution in patients at risk of GI perforation. Evaluate new onset abdominal symptoms. • Infection: use is associated with an increased risk of serious infection including bacterial, viral, fungal and opportunistic infection, additive risk when used in combination with other immunosuppressive therapy. Patients should be monitored for signs and symptoms of infection. Patients should be evaluated for latent tuberculosis infection.
Drug Interactions	<ul style="list-style-type: none"> • Strong OAT3 inhibitors such as gemfibrozil and probenecid may increase concentrations of baricitinib – see below for dose adjustments. • Additive immunosuppressive risk when used with other immunomodulatory agents e.g. methotrexate, corticosteroids (excluding dexamethasone given for COVID-19), tocilizumab, adalimumab, rituximab and anakinra. Use of monoclonal antibodies targeting cytokines (e.g. TNF-alpha, interleukin-1, interleukin-6) or T-cells within the last 4 weeks and monoclonal antibodies targeting B-cells within the last 3 months are contraindicated. • Clozapine: increased risk of agranulocytosis. • Live vaccines should be avoided just prior to and during treatment with baricitinib. Specialist input should be obtained regarding timing of future vaccinations. • For a full list of drug interactions check the University of Liverpool COVID-19 resource page.
Presentation and storage	<ul style="list-style-type: none"> • Available as: <ul style="list-style-type: none"> ○ 2 mg film-coated tablets ○ 4 mg film-coated tablets • Store below 30^oC in original package
Dose	<ul style="list-style-type: none"> • NOTE: Dose adjustments are based on eGFR (CKD-EPI). For patients with extremes of body size, multiply the eGFR by the patient's body surface area (in m²) and divide by 1.73 m². • Oral daily dose for up to 14 days or until discharge – whichever comes first

² NOTE: Dose adjustments are based on eGFR (CKD-EPI). For patients with extremes of body size, multiply the eGFR by the patient's body surface area (in m²) and divide by 1.73 m²

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	<ul style="list-style-type: none"> ○ 4mg orally daily if eGFR > 60mL/min/1.73m² ○ 2mg orally daily if eGFR 30-60mL/min/1.73m² ○ 2mg orally every second day if eGFR 15-29mL/min/1.73m² ○ Do NOT use if eGFR < 15mL/min/1.73m² ● Patients taking strong OAT3 inhibitors, such as probenecid or gemfibrozil, prescribe half the dose which would be given for patient's renal function. 												
Administration	<ul style="list-style-type: none"> ● Can be given with or without regard to food. ● Do not crush or break the tablet. ● For patients who are unable to swallow whole tablets, place tablet(s) to achieve desired dose in a closed oral syringe with room temperature water and disperse by gentle swirling until an even suspension is formed. Tablet may take 5 minutes to completely disperse. ● Dispersed tablets are stable in water for up to 4 hours; however, the solution should be administered immediately whenever possible. The container should be rinsed with additional room temperature water and these contents also administered. <p style="text-align: center;">Dispersion instructions for 2mg and 4mg baricitinib tablets</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Administration via</th> <th>Dispersion volume of water</th> <th>Container rinse volume</th> </tr> </thead> <tbody> <tr> <td>Oral dispersion</td> <td>5-10 mL</td> <td>At least 5 mL</td> </tr> <tr> <td>Gastrostomy tube</td> <td>15 mL</td> <td>At least 15 mL</td> </tr> <tr> <td>Nasogastric tube*</td> <td>30 mL</td> <td>At least 15 mL</td> </tr> </tbody> </table> <p>* To avoid clogging of small diameter tubes (smaller than 12 Fr), the syringe can be held horizontally and shaken several times</p> <ul style="list-style-type: none"> ● See special instructions in NSW Therapeutic Advisory Group baricitinib drug guideline for further information. 	Administration via	Dispersion volume of water	Container rinse volume	Oral dispersion	5-10 mL	At least 5 mL	Gastrostomy tube	15 mL	At least 15 mL	Nasogastric tube*	30 mL	At least 15 mL
Administration via	Dispersion volume of water	Container rinse volume											
Oral dispersion	5-10 mL	At least 5 mL											
Gastrostomy tube	15 mL	At least 15 mL											
Nasogastric tube*	30 mL	At least 15 mL											
Handling	<ul style="list-style-type: none"> ● Intact baricitinib tablets can be handled with standard precautions for handling of oral medications. ● Occupational exposure to non-intact tablets may be harmful. Staff who are actively trying to conceive or who are pregnant or breastfeeding should not prepare or handle a dispersed dose. ● For all other staff, use standard Personal Protective Equipment (PPE) if preparation or administration of a dispersed tablet is required. 												
Monitoring	<ul style="list-style-type: none"> ● As baricitinib is a new medication, patients should have appropriate clinical and laboratory monitoring including: <ul style="list-style-type: none"> ○ Baseline and daily creatinine, electrolytes and urea as well as LFTs and complete blood exam. ● Interrupt treatment if: <ul style="list-style-type: none"> ○ Neutrophil count < 0.5 x 10⁹ cells/L ○ Lymphocyte count < 0.2 x 10⁹ cells/L ○ Haemoglobin < 80g/L ○ Increases in ALT or AST are observed and drug-induced liver injury is suspected ● Baseline testing for hepatitis B, HIV, HCV should be undertaken for all patients and consider strongyloides and tuberculosis testing according to epidemiological risk factors. Baricitinib treatment should NOT be delayed pending results of baseline tests. 												

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Adverse Effects	<ul style="list-style-type: none"> As the use of baricitinib for COVID-19 is off-label, it is important to document and report all (from possible to confirmed) adverse effects experienced by the patient during treatment to inform its safety profile and future use. Common (>1%): infections (including serious and opportunistic), hypercholesterolaemia, thrombocytosis (not associated with thrombotic events), nausea (especially in first 2 weeks), abdominal pain, headache, increased creatine kinase Infrequent (0.1–1%): thrombosis, neutropenia, lymphopenia, anaemia, acne, vomiting, hypertriglyceridaemia, increased liver enzymes. Suspected or confirmed adverse reactions should be reported via Safety Learning System and also via the Therapeutic Goods Administrations adverse effects online form: TGA adverse event reporting.
Patient information and consent forms	<ul style="list-style-type: none"> Baricitinib patient information leaflets are available via the NSW Therapeutic Advisory Group. Example patient consent forms can be found here

Tocilizumab	
ID approval and patient consent (verbal or written) required	
Drug Class	<ul style="list-style-type: none"> Anti-rheumatic, cytokine modulator, monoclonal antibody (humanised)
Indications	<ul style="list-style-type: none"> Off-label use of tocilizumab may be considered for patients with a current diagnosis of COVID-19, who require supplemental oxygen, particularly where there is evidence of systemic inflammation such as: <ul style="list-style-type: none"> Elevated ESR, C-reactive protein (CRP, D-dimers, lactate dehydrogenase, ferritin) Unless corticosteroids are contraindicated (see dexamethasone monograph above), tocilizumab should be given in conjunction with dexamethasone for patients.
Contraindications	<ul style="list-style-type: none"> Hypersensitivity to any component of the product, Chinese hamster ovary cell products or other recombinant human or humanised antibodies. Sepsis or active, severe infections from non-COVID-19 pathogens. Live and live-attenuated vaccines should not be given concurrently.
Precautions	<ul style="list-style-type: none"> A history of anaphylaxis to other medicines. A history of recurring or chronic infection, or with underlying conditions (e.g. diabetes) which may predispose patients to infections. A history of HIV, positive core antibody for hepatitis B, prior HCV infection or symptomatic EBV infection. A history of tuberculosis/tuberculosis exposure. Concurrent immunosuppressive/anti-rejection therapy increases the risk of infection and should be avoided. In patients with haematological abnormalities including the possibility of macrophage activation syndrome (MAS) or haemophagocytic lymphohistiocytosis, advice from a haematologist should be sought especially in those with <ul style="list-style-type: none"> Absolute neutrophil count < 2 x 10⁹/L Platelets < 100 x 10⁹/L Active hepatic disease or hepatic impairment including abnormal liver enzymes (transaminases 3–5 times the upper limit of normal).

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	<ul style="list-style-type: none"> Patients with current or previous history of diverticulitis or intestinal ulceration.
Drug Interactions	<ul style="list-style-type: none"> Concurrent immunosuppressive/anti-rejection therapy increases the risk of infection and should be avoided. Tocilizumab has no inhibitory or inducing effects on cytochromes. However, patients with COVID-19 may experience an elevation of IL-6, which has been shown to suppress activity of drug metabolising enzymes, namely CYP3A4, but also others. Tocilizumab will normalise cytochrome activity (via inhibition of IL-6). The indirect effect of tocilizumab on CYP450 enzyme activity in this setting is unknown but the effects may persist for several weeks after administration. Specialist input should be obtained regarding timing of future vaccinations. Live and live-attenuated vaccines should be avoided for 6 months. For a full list of drug interactions check the University of Liverpool COVID-19 resource page.
Presentation and storage	<p>Available as:</p> <ul style="list-style-type: none"> 80 mg/4 mL concentrate solution for IV infusion vial 200 mg/10 mL concentrate solution for IV Infusion vial 400 mg/20 mL concentrate solution for IV Infusion vial <p>Store vials at 2–8°C. (Refrigerate. Do not freeze.)</p>
Dose	<ul style="list-style-type: none"> The suggested dose is dependent on actual body weight (for pregnant women use the weight at the time of clinical need): <ul style="list-style-type: none"> Patients > 90 kg: 800 mg IV single dose Patients > 65 and ≤ 90 kg: 600 mg IV single dose Patients > 40 and ≤ 65 kg: 400 mg IV single dose Patients ≤ 40 kg: 8 mg/kg IV single dose <p>These dosing ranges are based on the doses used in the REMAP-CAP trial¹⁷.</p>
Administration	<ul style="list-style-type: none"> Administer as a single intravenous infusion over 60 minutes <ol style="list-style-type: none"> Ascertain the volume of tocilizumab solution that will be required and withdraw the same volume from a 100mL sodium chloride 0.9% infusion bag. Withdraw the tocilizumab dose from the vial(s) & add to the sodium chloride 0.9% infusion bag. Invert gently when mixing to avoid foaming. Do NOT shake. Inspect the bag, which must be clear to opalescent, colourless to pale yellow and free from visible particles. Do not use the same IV line to administer other medications at the same time Prime the line with tocilizumab infusion and then infuse intravenously over 60 minutes via either a central or peripheral line. After completion of the tocilizumab infusion, at least 20mL of 0.9% sodium chloride should be used to flush the giving set.
Monitoring	<ul style="list-style-type: none"> Monitor for adverse effects by performing including complete blood exam and electrolytes, creatinine, urea, LFTs and CRP (tocilizumab inhibits the production of CRP therefore a reduction in CRP should not be used as a marker of clinical improvement). New onset gastrointestinal symptoms Observe for hypersensitivity reaction during, and for 30 minutes after IV infusion. Resuscitation facilities must be readily available.

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	<ul style="list-style-type: none"> Baseline testing for hepatitis B, HIV, HCV should be undertaken for all patients and consider strongyloides and tuberculosis testing according to epidemiological risk factors. Tocilizumab treatment should NOT be delayed pending results of baseline tests.
Adverse Effects	<ul style="list-style-type: none"> As tocilizumab is provisionally registered by the TGA for use in patients with COVID-19, it is important to document and report all (from possible to confirmed) adverse effects experienced by the patient during treatment to inform its safety profile and future use. Common (>1%): Infections (including opportunistic), neutropenia, hypofibrinogenaemia, increased liver enzymes, gastritis, mouth ulcers, hypertension, infusion-related reactions (below), antibodies to tocilizumab, rash, itch, headache, dizziness. Infrequent (0.1–1%): GI perforation (possibly dose-related), thrombocytopenia, hypersensitivity reactions (e.g. urticaria, angioedema), dyspnoea, cough, conjunctivitis Rare (<0.1%): Serious hepatotoxicity (including acute liver failure, hepatitis and jaundice, in some rare cases treatment has required liver transplant), pancreatitis, pulmonary fibrosis. Infusion-related reactions: Occur within 24 hours of IV infusion; they include hypertension, headache, rash, hypersensitivity (anaphylaxis 0.2%). Suspected or confirmed adverse reactions should be reported via Safety Learning System and also via the Therapeutic Goods Administrations adverse effects online form: TGA adverse event reporting.
Patient information and consent forms	<ul style="list-style-type: none"> Refer to the Consumer Medicines Information (CMI) leaflets for tocilizumab.

DEFINITIONS/ACRONYMS/ABBREVIATIONS

ALP	Alkaline Phosphatase
ALT	Alanine Aminotransferase
AST	Aspartate Aminotransferase
CRP	C-Reactive Protein
EBV	Epstein Barr Virus
ECMO	Extracorporeal membrane oxygenation
eGFR	estimated Glomerular Filtration Rate
ESR	Erythrocyte Sedimentation Rate
GI	Gastrointestinal
HCV	Hepatitis C Virus
HIV	Human Immunodeficiency Virus
IV	Intravenous
LFTs	Liver Function Tests
NMS	National Medical Stockpile
PFS	Prefilled syringe
SBECD	Sulfobutyl betadex sodium
ULN	Upper Limit of Normal

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VTE Venous Thromboembolism

LINKS TO RESOURCES

- [Australian Immunisation Handbook: COVID-19](#)
- [IPCU: COVID-19 \(SARS-COV-2\) – Management Guide](#) (CALHN-PRC05409)
- [Anaphylaxis: Management Guidelines](#) (CALHN-CPA04038)
- [World Health Organisation. Therapeutics and COVID-19: Living Guideline](#)
- [Infectious Diseases Society of America Guidelines on the Treatment and Management of Patients with COVID-19. 2020.](#)
- [Australian Technical Advisory Group on Immunisation \(ATAGI\)](#)
- [Clinical Excellence Commission: Medication Safety Updates](#)
- [COVID-19: Medication Management of mild illness in the outpatient setting](#) (CALHN-GDE05808)

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