# Management of COVID-19 in Pregnancy in South Australia

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## Introduction

Following the opening of the South Australian borders, there is expected to be some community transmission of COVID-19, and during the early phase of 2022 this will likely be the delta variant. COVID-19 in pregnancy will pose multiple challenges for the South Australian community, including logistical challenges for streamlined care.

Pregnant patients are not more susceptible to infection, but are however, at greater risk from sequelae if they contract the disease. From data obtained from the United Kingdom, 63% of pregnant patients positive for COVID-19 were asymptomatic at the time of admission, making detection and diagnosis challenging in this group. Those with symptoms had an 18% rate of respiratory support and 10% risk of requiring care in ICU. From recent Australian data, this risk appears to be greater with the delta variant, with up to 20% of symptomatic patients requiring intensive care admission.

Those admitted to intensive care have a significantly greater risk of preterm delivery, with some studies suggesting up to 64% of these patients delivering <37 weeks. Those who are not delivered may have the course of their pregnancy altered, with additional considerations into fetal growth monitoring, thromboprophylaxis and modes of delivery all needing to be considered on a case by case basis.

The greatest protective factor at this point is vaccination with either Moderna or Pfizer BioNTech mRNA vaccines. Risk factors for significant disease include obesity, medical comorbidities and lower socioeconomic and non-white ethnicity backgrounds.

Unfortunately, at the time of opening our state borders the pregnant population of South Australia will have a significantly lower vaccination rate than the general population. The obstetric populations served by the major obstetric centres, particularly those in the north and south of the state have a predominance of risk factors. When combined with the low vaccination rates, the obstetric community is concerned for the welfare of our patients in the event of a COVID surge.

Advanced planning across all three sites and easy communication between multi-disciplinary practitioners will be required throughout the pandemic to ensure the best level of care and appropriate transfer of patients between services.

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Special thanks to Monash Medical Centre

## Common Acronyms

| | |
|---|---|
| SALHN | Southern Adelaide Local Health Network |
| CALHN | Central Adelaide Local Health Network |
| NALHN | North Adelaide Local Health Network |
| WCHN | Women's and Children's Health Network |
| rLHNs | Regional Local Health Networks |
| LHN | Local Health Network |
| FMC | Flinders Medical Centre |
| LMH | Lyell McEwin Hospital |
| WCH | Women's and Children's Hospital |
| GPAT | General Practitioner Assessment Team |
| SAAS | South Australian Ambulance Service |
| CRCT | COVID Response Care Team |
| CDCB | Communicable Diseases Control Branch |
| DOB | Date of birth |
| ICCU | Intensive and Critical Care Unit |
| MDT | Multi-disciplinary Team |
| CCU | COVID Care Unit |
| PPE | Personal protective equipment |
| CTG | Cardiotocograph |
| sCOVID | Suspected COVID |

## Treatment Streaming and Options

Treatment of COVID-19 in pregnant patients will involve sound teamwork between SALHN, CALHN, NALHN, WCHN, Regional LHN's, the CDCB, GPAT and the COVID Response Care Team (CRCT). The aim of these guidelines is to stratify each model of care and create simple flowcharts that can be utilised from each centre with COVID-19 positive obstetric patients with each degree of severity of illness. There will be individual cases that fall outside of this framework and will need to be managed on a case by case basis with these key stakeholders.

Once a patient is diagnosed, both Communicable Disease Control Branch (CDCB) and COVID Response Care Team (CRCT) are notified simultaneously. The patient will be contacted by the CDCB to be informed of their positive status. Initially this will be via telephone but as the incidence increases text messaging will be used. Although a phone conversation will happen this may be delayed if the incidence of COVID in the community is high. Part of the initial screening questions for risks for severe disease should include pregnancy for all female patients of appropriate age. Their name, date of birth and booking hospital should be recorded by CDCB, and their local care provider notified. Likewise, if a LHN or private provider were to become aware of a positive patient in the community the clinical staff should contact their local infection control who will ensure the CDCB is notified.

*Patients considered as Suspected COVID (sCOVID) who need medical review will need to be managed at their designated LHN or their private provider, not by CRCT or FMC. Patients requiring review for obstetric reasons should be asked to attend their LHN or contact their private provider. Those requiring review for medical reason should be asked to attend ED. The relevant area will need to be notified of their pending arrival.*

**Communication Between LHNs/CRCT/GPAT**

Once community transmission has been seen and there are multiple COVID positive and suspected COVID pregnant patients within the community, a daily huddle will begin. This will involve each of the major metropolitan LHNs, CRCT and GPAT, with extensions of invitation to Country Health, SAAS and MedSTAR as appropriate.

This daily huddle will allow for clear discussion across the state regarding the active caseload and allow for daily planning for individual cases, general bed state management, workflow and work force management

## Obstetric COVID Care Teams

The Obstetric COVID Care Team (OCCT) will be decided by each metropolitan maternity unit but initially will be made up of the treating midwives and the consultant on call. This team will function in conjunction with Infectious Diseases, Infection Control, Obstetric Medicine, General Medicine/Respiratory, Anaesthetic, Intensive Care and Neonatology as required.

The Midwife Unit Manager (MUM) or other designated officer of each LHN will keep a hospital record of all patients in the community who are COVID-19 positive or are in lockdown/cannot attend the hospital due to isolation or quarantine. Each patient will have a plan made which will include, frequency of telehealth visits, plan for adjustment to any antenatal care and who is responsible for following up the patient.

Follow up may be medical or midwifery based depending on the model of care the patient has chosen and their sequelae of disease.

The OCCT will review each case and plan for ongoing antenatal care, comprising of deferred care and telehealth review.

A telehealth review should then be scheduled with the patient ahead of time. In the first review, ongoing care should be explained, including whether other parameters of care will be deferred and the booking times of the new care.

Classification of COVID-19 in pregnancy should be as per the National COVID-19 Evidence Taskforce, with classifications of mild, moderate, severe and critical.

The management of mild patients will further be stratified, with symptomatic patients offered admission at a Hospital in the Hotel (dedicated positive site) and ongoing assessment and input from the GP Assessment Team (GPAT) in conjunction with their booked antenatal hospital providers. Pending the state's COVID position and the number of pregnant women with COVID, a daily huddle may be held with key personnel from across the state to ensure visibility and safety of patients and their babies. Key personnel involved in the daily huddles will include representatives from LHNs, Regional providers, Department of Health and Welfare, Private Providers and CRCT. Communication between these providers will be vital to provide a systematic approach, ensuring visibility of care for COVID pregnant patients across the state

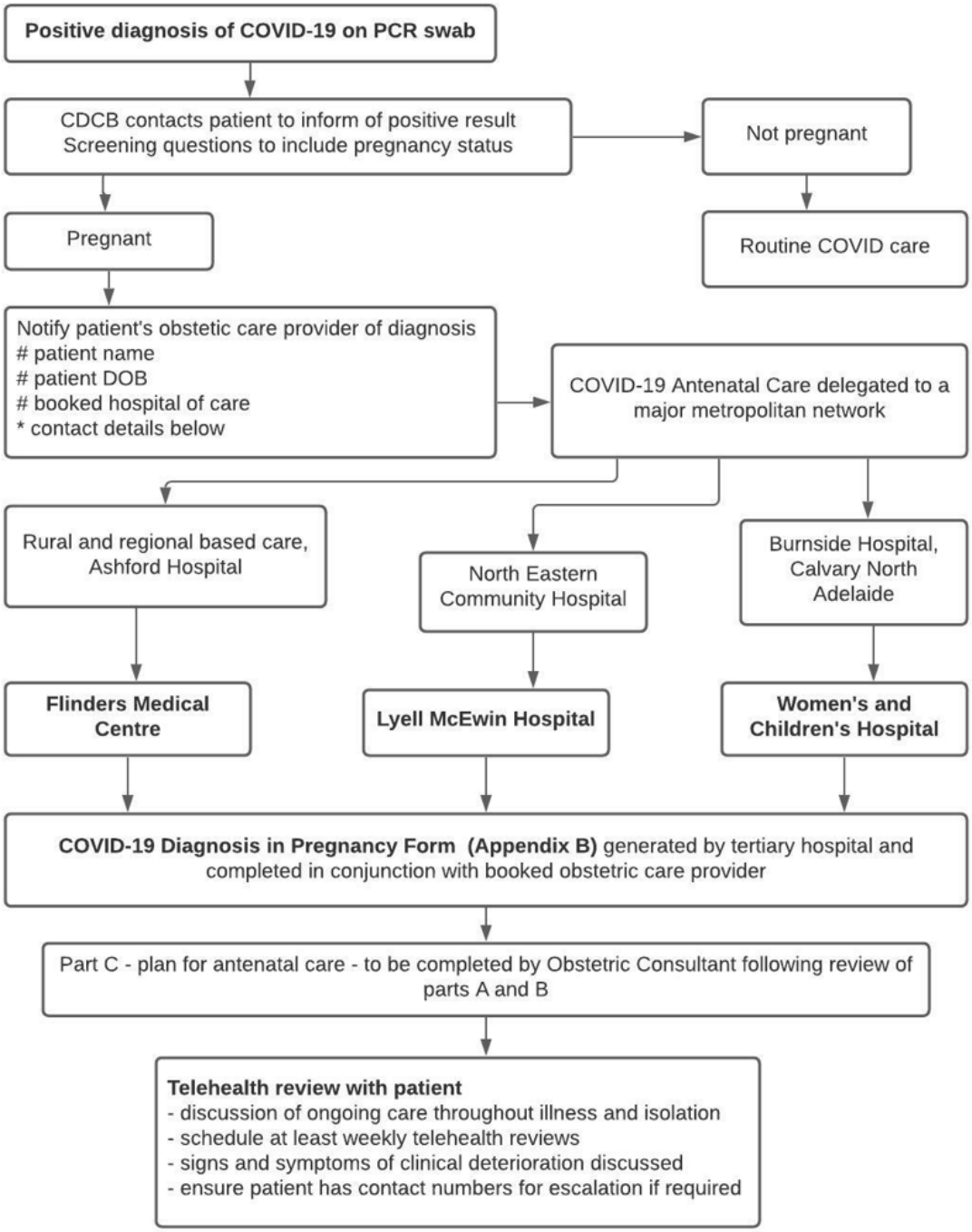
Additional options will need to be made available for smaller services, such as regional hospitals and private care providers, who may not have adequate case numbers or the expertise to coordinate Telehealth care for positive patients. These

providers may choose to reallocate care of their patient to an appropriate metropolitan health network (e.g. NALHN, SALHN or WCHN), either for the duration of their infectious period or the remainder of the pregnancy on a case by case basis.

Patients identified as at additional risk may have any of the following comorbidities:

- Hypertension
- Asthma
- Diabetes requiring treatment prior to pregnancy
- BMI ≥ 35
- Aboriginal or Torres Strait Islander background
- Other ethnic minority background
- Chronic respiratory or kidney disease
- Cardiovascular disease
- Other immunocompromised
- Significant psychosocial factors
- Significant mental health conditions
- Active cancer
- Unvaccinated

## Coordination of Care



## Monitoring of COVID Positive Patients

Pregnant patients diagnosed with COVID-19 will be supplied with an in-home observation monitoring kit. This will include an automated BP machine, pulse oximeter and thermometer. The patient will receive instructions on how to take their own heart rate, blood pressure, oxygen saturations, respiratory rate and temperature. They will also have access to the CRCT, GPAT and a live survey for feeding back their observations to GPAT/the CRCT. These observations can be utilised for the obstetric telehealth review.

CRCT will arrange transfer to Hospital in the Hotel for patients and their families who need closer observation.

All pregnant patients admitted to Hospital in the Hotel will have a daily review with CRCT and a GP through GPAT. All patients will require a weekly Telehealth review with the LHN obstetric team. Patients on home isolation should also be reviewed via Telehealth on a weekly basis.

In the event that a patient has required a medical review at dedicated positive Hospital in the Hotel, she should have a Telehealth review later that same day.

COVID positive patients in Hospital in the Hotel (dedicated positive sites) requiring obstetric review will be transferred to the FMC for assessment. Patients undergoing supervised quarantine in Hospital in the Hotel for suspected COVID will be transferred to the WCH if they require obstetric assessment.

COVID positive pregnant patients in the community requiring obstetric assessment or admission will need to be reviewed at Flinders Medical Centre.

**CRCT Dashboard**

Details of all COVID positive pregnant women within South Australia will be held within the CRCT at a secure dashboard. The dashboard can only be accessed via CRCT and will not be visible to individual providers or LHNs.

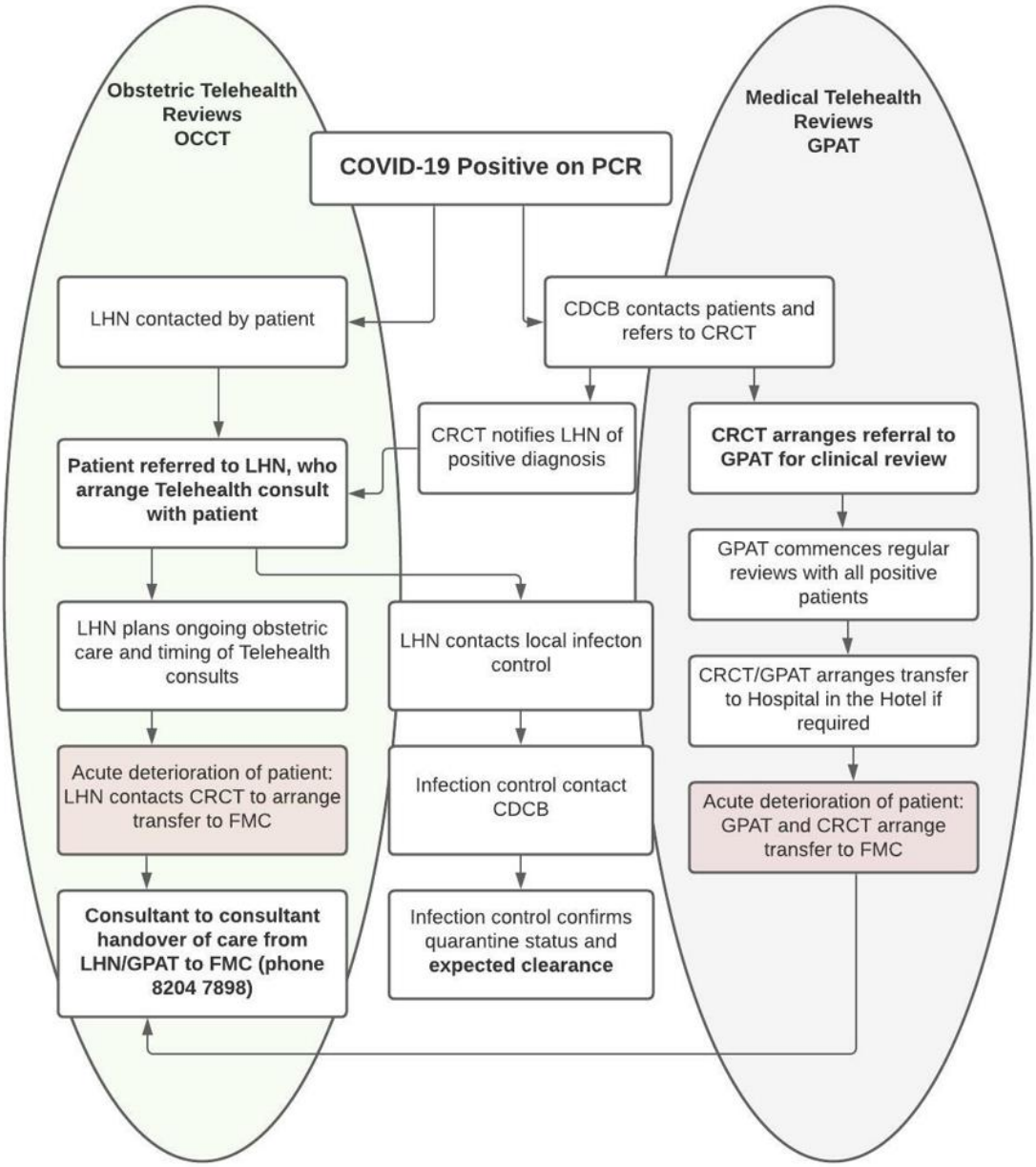
This area will hold information including estimated due date (EDD), gestation, previous pregnancies, single or multiple pregnancy, pregnancy complexities, patient location, local LHN, symptoms and the next planned antenatal visit, scan or bloods.

The dashboard will also hold up to date observations, including blood pressure, pulse oximetry and temperature.

**The CRCT Team Leader can be contacted 24/7 on 0401 577 241** if urgent information is required from the dashboard, e.g. a patient presenting for review.

The patient will also have access via a mobile phone or tablet application, which will allow the latest observations to be easily seen and read out to medical practitioners at the time of Telehealth reviews.

**Model of Care: Telehealth care to remain with booking hospital, inpatient reviews, and admissions to be managed by FMC**



## Telehealth Reviews

COVID-19 Obstetric Telehealth Review Form (see appendix C)

During obstetric telehealth reviews, patients should be screened for escalating symptoms and fetal concerns. These questions should include:

**Maternal:**

- Are you short of breath or having difficulty breathing?
- Do you need to catch your breath on walking around the room?
- Are you able to finish your sentences without breathlessness?
- Have you had any blood on coughing? Amount? (escalate if >1 teaspoon)
- Do you have any chest pain or pressure, particularly with coughing?
- Are you able to keep fluids down?
- Any dizziness with standing?
- Any drowsiness?
- Are you making a normal amount of urine?
- Screening questions for specific obstetric concerns relevant to the patient e.g. pre-eclampsia symptoms, symptoms of chorioamnionitis, symptoms of preterm labour

**Fetal:**

- Fetal movement patterns
- PV loss/bleeding
- Signs of labour

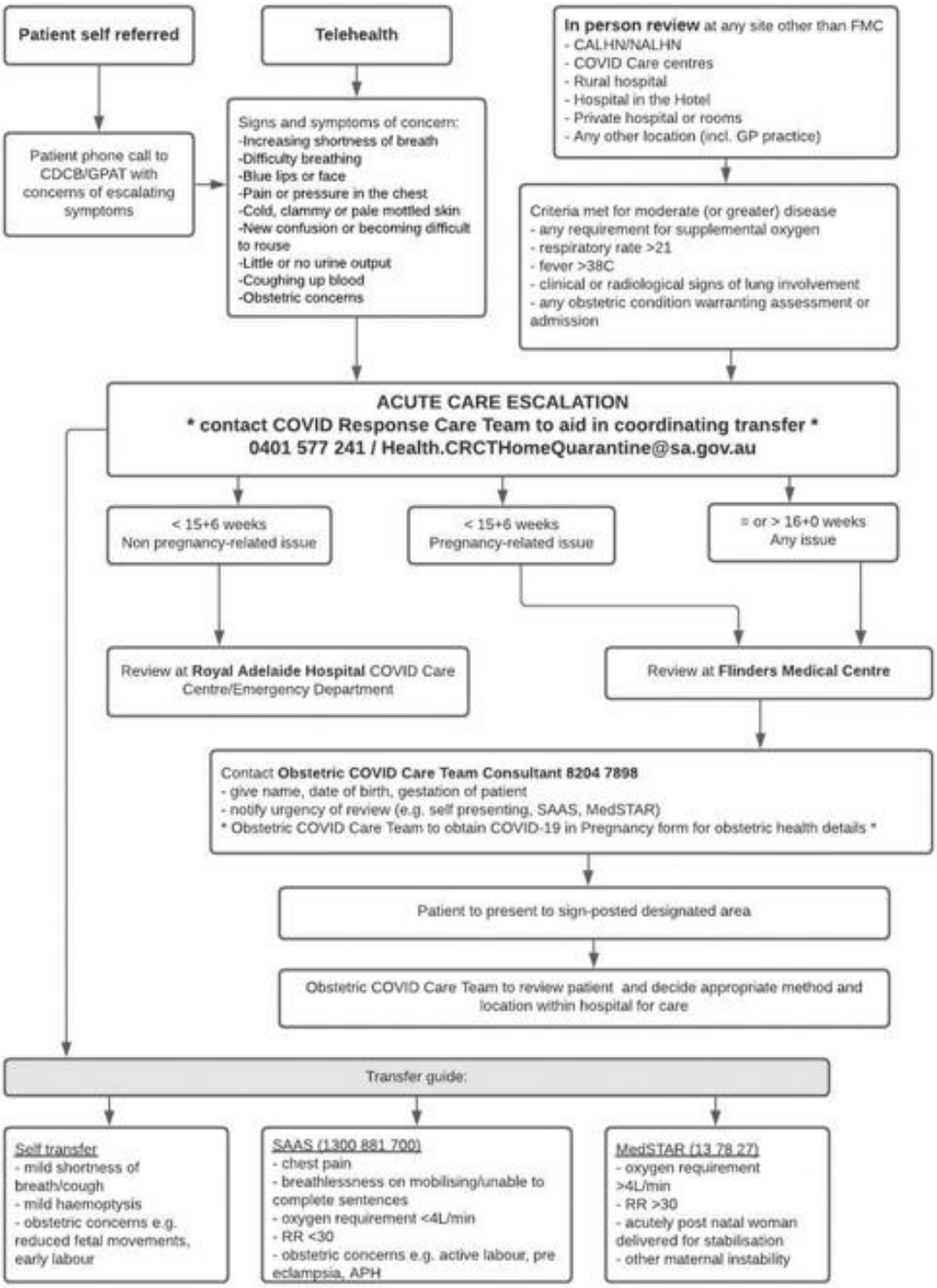
It should be checked that patients have received the appropriate written literature on when to escalate their care and the numbers to call to do this.

At the end of the obstetric Telehealth review, it should be explained that the patient will have a repeat review in 1 week unless otherwise clinically indicated, and this time should be specified.

## In Hospital Review and Inpatient Management

If a patient has symptoms during any obstetric Telehealth review that warrant review and escalation of care, the COVID Response Care Team should be notified to assist in coordination of presentation for review at Flinders Medical Centre. The FMC COVID obstetric consultant should be notified.

## Acute Care Escalation



**COVID-19 Obstetric Escalation Guide**
Designed for utilisation within SA Health

| Category | Oxygen requirements | Maternal Care | Fetal considerations (>23 weeks) |
|---|---|---|---|
| **Green** ***(mild disease)*** | SpO2 >95% Room air and RR ≤ 20 | Exclude other obstetric or medical issues<br><br>**OUTPATIENT CARE**<br>May be discharged for in home care<br>Consider budesonide, Sotrovimab or Casirivimab/Imdevimab and thromboprophylaxis | |
| **Yellow** ***(moderate disease)*** | SpO2 92-98% on < 4L/min<br><br>And/or RR ≥ 21 | **INPATIENT CARE**<br>- obstetric doctor review<br><br>**Notify**<br>- obstetric consultant<br>- obstetric anaesthetist<br>- COVID medical team | Assess fetal well being<br>Discuss timing of birth<br><br>Consider<br>- steroids for fetal lung maturity<br>- MgSO4 for neuroprotection |
| **Orange** ***(severe disease)*** | Sp02 92-98% on ≥ 4L/min<br><br>And/or RR ≥ 25 | **URGENT** Obstetric review<br>Refer for URGENT ICU review | Discuss risks and benefits of emergency caesarean<br><br>Notify neonatal team |
| **Red** ***(critical disease)*** | SpO2 <92% on 15L/min via non-rebreather mask | **URGENT ICU** review<br>Immediately activate MET call<br>URGENT Obstetric attendance<br>Consider awake proning/high flow oxygen | Discuss risks and benefits of emergency caesarean |
| **Peri-arrest** | **33# OBSTETRIC, NEONATAL MET/MER (CODE BLUE)**<br>Multidisciplinary team discussion regarding possible intubation of mother +/- delivery of neonate | | |

* Adapted from **Coronavirus (COVID-19) in Pregnancy, Information for Health Professionals.**

**RCOG** and **National COVID-19 Clinical Evidence Taskforce'** Mild Illness

**COVID-19 Disease Severity**

| **Disease-modifying agent in pregnancy** | **Asymptomatic or Mild illness** | **Moderate illness** (requiring supplemental oxygen) | **Severe illness** | **Critical illness** |
|---|---|---|---|---|
| **Sotrovimab** | Consider in second and third trimester | Not Recommended | Not Recommended | Not Recommended |
| **Casirivimab/Imdevimab (Ronapreve®)** | Consider **( A )** | Consider if seronegative | Consider if seronegative | Not Recommended |
| **Dexamethasone[b]** | Not Recommended | Start **( C )** | Start or continue **( C )** | Start or continue **( C )** |
| **Remdesivir** | Not Recommended | Consider **( D )** | Continue if commenced **(do not start)** | Continue if commenced **(do not start)** |
| **Baricitinib** | Not Recommended | Given the limited data on Baricitinib in pregnant and breastfeeding patients, should only be used in clinical trials | | |
| **Sarilumab** | Not Recommended | Given the limited data on Sarilumab in pregnant and breastfeeding patients, should only be used in clinical trials | | |
| **Tocilizumab** | Not Recommended | Consider **( E )** | Consider **( E )** | Consider **( E )** |

**( A )** Consider using Sotrovimab within five days or Casirivimab/Imdevimab within 7 days of symptom onset in pregnant or breast-feeding patient who do not require oxygen, are not fully vaccinated or immunosuppressed and who have one or more risk factors for disease progression (refer to individual drug monographs below)

**( B )** Seek specialist advice for patients talking long term or high dose corticosteroids prior to admission

**( C )** Obtain guidance from obstetric medicine, prednisolone or hydrocortisone may be preferred in the first trimester.

**( D )** Paucity of evidence of efficacy in COVID-19 infection. Consider using Remdesivir for selected pregnant or breastfeeding patients hospitalised with moderate to severe COVID-19 who do not require ventilation with ID guidance. Pregnant patients were excluded from all clinical trials of Remdesivir in COVID-19.

**( E )** Consider using tocilizumab for the treatment of COVID-19 in pregnant or breastfeeding women who require supplemental oxygen, particularly where there is evidence of systemic inflammation.

## Mild Illness

Adults not presenting any clinical features suggestive of moderate or severe disease or a complicated course of illness

**Mild Illness**

**Characteristics**

- No symptoms
- Or mild upper respiratory tract symptoms
- Or cough, new myalgia or asthenia without new shortness of breath a reduction in oxygen saturation

**Monitoring of Pregnant COVID Patients**

Pregnant patients who have mild disease only and are asymptomatic will be managed at home with Telehealth support via GPAT and their designated LHN Obstetric COVID Care Team.

Patients who display the following symptoms will be offered management at **Hospital in the Hotel (dedicated positive site):**

- Mild URTI Symptoms
- Cough
- Chills
- Less mentally alert
- Loss of taste
- Myalgia
- Vomiting/Diarrhoea
- Breathlessness
- Loss of smell
- Weakness
- Rhinorrhoea

**Investigations**: no routine investigations are required at this point.

## When to Escalate Care

Patients should be referred to Flinders Medical Centre for review if they report:

- Increasing shortness of breath
- Difficulty breathing
- Blue lips or face
- Pain or pressure in the chest
- Cold, clammy or pale mottled skin
- New confusion or becoming difficult to rouse
- Little or no urine output
- Coughing up blood

## Treatments

Disease modifying treatments are available for mild disease and are appropriate for use in pregnancy. Providing all appropriate criteria are fulfilled, pregnant patients may be considered for budesonide, Sotrovimab and/or Regen-CoV treatments. VTE prophylaxis should be discussed for all patients.

**VTE prophylaxis**

Patients with mild disease in home isolation with no other risk factors for VTE do not require thromboprophylaxis and should be counselled regarding hydration and mobility.

VTE prophylaxis should be considered for women who are isolating at home / Hospital in the Hotel (dedicated positive site) with any of the following risk factors:

- Prior VTE
- Age > 35
- BMI > 30 plus another risk factor
- BMI >40
- Blood dyscrasias
- Smoking
- Thrombophilias/antiphospholipid syndrome
- Multiple pregnancy
- Pre-eclampsia
- Immobility

VTE prophylaxis should consist of 40mg enoxaparin daily unless delivery is imminent and continue for at least 14 days or until all COVID-19 morbidity has resolved. Consider increased dosage to 60mg daily if maternal weight >100kg. Refer to National COVID-19 Evidence Taskforce if enoxaparin is not appropriate for any specific patient.

All patients admitted with COVID-19 should have VTE prophylaxis unless there are contraindication, including imminent delivery. Aspirin should be ceased upon commencement of thromboprophylaxis (RCOG recommendation)

**Budesonide**

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| **Mechanism of Action** | Immunosuppressant and anti-inflammatory delivered locally to the lungs |
| **Dose** | 800μg inhaled (by breath actuated inhaler) bd for up to 14 days<br>if patient is already on inhaled corticosteroid patient receives equivalent or higher doses of their existing therapy – a change to budesonide is not required. Discuss with Respiratory team if questions.<br>If patient deteriorates despite budesonide and is commenced on dexamethasone, cease budesonide |
| **Indications** | Symptomatic COVID-19 infection not requiring O2 in those with one or more risk factors for progression:<br>• Diabetes prior to pregnancy requiring medication<br>• BMI >30<br>• Chronic kidney disease (eGFR < 60)<br>• Congestive heart failure (NYHA ≥II)<br>• Moderate to severe asthma (requiring inhaled corticosteroid, or has been prescribed oral steroids in the last 12 months) |
| **Pregnancy** | Can use if indicated |
| **Contraindications** | None |
| **Adverse effects** | Candidiasis, cough, rash |
| **Monitoring** | Nil specific |

**Sotrovimab**

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|---|---|
| **Mechanism of Action** | Monoclonal antibody targeting the spike protein of SARS-CoV-2, designed to block virus attachment and entry into human cells |
| **Dose** | 500mg IV single dose<br>Give over 30 minutes<br>(no dosing adjustment required for hepatic or renal impairment) |
| **Indications** | Treatment of COVID-19 within 5 days of symptom onset in adults weighing >40kg who do not require oxygen and who have one or more risk factors for disease progression. These include<br>• Diabetes prior to pregnancy requiring medication<br>• BMI >30<br>• Chronic kidney disease (eGFR < 60)<br>• Congestive heart failure (NYHA ≥II)<br>• Moderate to severe asthma (requiring inhaled corticosteroid, or has been prescribed oral steroids in the last 12 months)<br>• Age ≥ 55<br><br>Only for use in<br>• Unvaccinated or partially vaccinated patients who meet the above criteria<br>• Immunocompromised: consider regardless of vaccination status<br>• Women in their second or third trimester<br><br>**Do NOT** use in fully vaccinated patients unless immunocompromised, such as<br>• Primary or acquired immunodeficiency<br>  ○ Hematologic neoplasms: leukaemia's, lymphomas, myelodysplastic syndromes<br>  ○ Post-transplant: solid organ (on immunosuppressive therapy), haematopoietic stem cell transplant (within 24 months)<br>  ○ Immunocompromised due to primary or acquired (HIV/AIDS) immunodeficiency<br>  ○ Other significantly immunocompromising conditions<br>• Immunosuppressive therapy (current or recent)<br>  ○ Chemotherapy or radiotherapy<br>  ○ High-dose corticosteroids (≥ 20mg of prednisolone per day, or equivalent) for ≥ 14 days<br>  ○ All biologics and most disease-modifying anti-rheumatic drugs (DMARDs) |
| **Pregnancy** | There is no data on use of Sotrovimab in pregnant or breastfeeding patients. However, its use should be considered in pregnant or breastfeeding patients, particularly for patients in their second and third trimesters of pregnancy, with additional risk factors for severe COVID-19.<br><br>Sotrovimab is a monoclonal antibody directed specifically against the SARS-CoV-2 virus and therefore is not expected to have significant off target effects. Because Sotrovimab is a large protein molecule, the amount in breast milk is likely to be very low. It is also likely to be partially destroyed in the infant's gastrointestinal tract and absorption both infant is probably minimal.<br><br>There are no available data on the excretion of Sotrovimab in human milk, and the potential benefits and risks to a breastfed baby are not known. The median elimination half-life of Sotrovimab is 49 days, and human IgGs are known to be excreted in breast milk. A decision whether to discontinue breastfeeding or to abstain from Sotrovimab therapy should consider the benefit of breastfeeding for the baby and the benefit of therapy for the woman. |
| **Contraindications** | For discussion in first trimester |
| **Adverse effects** | Allergy, diarrhoea, transfusion reaction, fever, rash |
| **Monitoring** | Observe for 1-hour post infusion |

## Casirivimab/Imdevimab

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| **Mechanism of Action** | Combination of 2 monoclonal antibodies targeting different sites on the receptor binding domain of the SARS-CoV-2 spike protein. |
| **Dose** | **Post-exposure prophylaxis:**<br>1200mg (600mg Casirivimab + 600mg Imdevimab) as a single dose via subcutaneous injection or intravenous infusion as soon as possible following exposure to COVID-19<br>**Treatment:**<br>1200mg (600mg Casirivimab + 600mg Imdevimab) as a single dose via intravenous infusion.<br>○ Larger doses can be used in severe infections in seronegative patients. Advice on dosing will be provided by Infectious Diseases in these cases.<br>○ Subcutaneous injection is an alternative route if IV infusion is not feasible or would lead to a delay in treatment however IV infusion is preferred. |
| **Indications** | **Post-exposure prophylaxis:**<br>Prevention of COVID-19 infection in adults and adolescents (aged ≥ 12 years and weighing ≥ 40kg) who have been exposed to COVID-19 and who have:<br>Been a close contact of a confirmed COVID-19 case within the previous 96 hours<br>**AND**<br>A medical condition making them unlikely to respond to or be protected by vaccination (i.e. immunosuppressed)<br>**OR**<br>Are considered at high risk of developing severe illness and are not vaccinated or only partially vaccinated against COVID-19<br>**Treatment:**<br>Treatment of mild to moderate COVID-19 infection in adults and adolescents (aged ≥ 12 years and weighing ≥ 40kg) who:<br>○ do not require supplemental oxygen<br>**AND**<br>are at an increased risk of progressing to severe COVID-19 and are not vaccinated or only partially vaccinated against COVID-19 OR are immunosuppressed<br>**AND**<br>are between day 5 and 7 of symptom onset (if < 5 days since symptom onset use Sotrovimab) OR if pregnant and within 7 days of symptom onset |
| **Pregnancy** | **Consider using Casirivimab plus Imdevimab within 7 days of symptom onset in pregnant or breastfeeding women who are outpatients with mild COVID-19 and who have one or more risk factors for disease progression:**<br>• Age ≥ 50 years<br>• Obesity (≥ 30 kg/m2)<br>• Cardiovascular disease (including hypertension)<br>• Chronic lung disease (including asthma)<br>• Type 1 or 2 diabetes mellitus<br>• Chronic kidney disease, including those that are on dialysis<br>• Chronic liver disease |

| | |
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| | Immunocompromised patients (including individuals with rheumatoid arthritis, HIV/AIDS and systemic lupus erythematosus)<br><br>There are no available data on the excretion of Casirivimab plus Imdevimab in human milk, and the potential benefits and risks to a breastfed baby are not known. Human IgGs are known to be excreted in breast milk. A decision whether to discontinue breastfeeding or to abstain from Casirivimab plus Imdevimab therapy should consider the benefit of breastfeeding for the baby and the benefit of therapy for the woman.<br><br>**Consider using Casirivimab plus Imdevimab in pregnant or breastfeeding women who are seronegative patients hospitalised with moderate to critical COVID-19 with ID guidance.** |
| **Contraindications** | Hypersensitivity to Casirivimab / Imdevimab including previous anaphylactic reactions |
| **Adverse effects** | It may be difficult to distinguish between adverse effects of Casirivimab/Imdevimab and signs and symptoms of COVID-19.<br><br>As a new medication, adverse reactions to Casirivimab / Imdevimab continue to be investigated. Refer to the product information for a complete list of possible adverse effects. To date reactions include:<br><br>**Common/uncommon**: injection site reactions, nausea, dizziness, rash and lymphadenopathy<br><br>**Rare**: urticaria, flushing, anaphylaxis<br><br>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 |
| **Monitoring** | Observe the patient for 60 minutes after the infusion is completed in case of infusion reaction or anaphylaxis |

## Moderate/Severe Illness

### Moderate Illness

Stable adult patient presenting with respiratory and/ or systemic symptoms or signs. Able to maintain oxygen Saturation above 92% (or above 90% for patients with chronic lung disease) with up to 4L/min oxygen via nasal prongs

**Characteristics:**

- Prostration, sever asthenia, fever >38 °C or persistent cough
- Clinical or radiological signs of lung involvement
- No clinical or laboratory indicators or clinical severity or respiratory impairment

### Severe Illness

Adult patients meeting any of the following criteria

- Respiratory rate >30 breaths/min
- Oxygen saturation <92% at rest state
- Arterial partial pressure of oxygen (PaO2) inspired oxygen fraction (FiO2 <300

In pregnancy, patients with moderate or severe disease will be managed as inpatients at Flinders Medical Centre.

**Investigations:** baseline CBC, EUC, LFT, CXR and ECG

**Observations:** all patients with moderate illness will begin on 4 hourly observations. If there is any clinical deterioration or progression to severe illness, observations will be hourly. Clinical escalation may be based on any observations, however guidance by oxygen requirements and respiratory rate is attached as an addendum to this document.

**Fetal monitoring:** should be decided on a case-by-case basis by the Obstetric COVID Care team taking into account the gestation and clinical status of the mother. Any acute deterioration >28 weeks should prompt a baseline CTG, with the decision for continuous monitoring to be decided by the clinical scenario.

## Treatment

Once a patient is diagnosed with moderate disease, there are increased options for pharmacotherapies.

Corticosteroids are recommended as part of the supportive care once oxygen administration has begun. Disease modifying treatments include Remdesivir for patients who are not ventilated and Casirivimab plus Imdevimab for patients who are seronegative. Once there are biochemical signs of systemic inflammation (CRP >75, Ferritin >500) if is recommended to treat with either Tocilizumab. Given the worldwide shortage of Tocilizumab, any immunomodulators in this group should be started after multidisciplinary input including infectious diseases and pharmacy.

**Thromboprophylaxis**

Should be considered for all patients with moderate to severe disease. Consideration of 40mg enoxaparin SC BD in patients with severe disease.

**Corticosteroid Treatment**

Corticosteroid treatment is recommended for the treatment of ≥ moderate disease, however the choice of steroid will be guided by Obstetric Medicine, Infectious Disease and ICU at the time of treatment. Patients may be offered dexamethasone or prednisolone depending on their gestation, pregnancy details, comorbidities and other illness factors.

**Dexamethasone**

| | |
|---|---|
| **Mechanism of Action** | Immunosuppressant and anti-inflammatory, including suppression of cytokine release |
| **Dose** | 6mg once daily (oral or intravenously) for up to a total of 10 days (can be discontinued if patient is well enough for discharge)<br>Alternative steroids may be used at equivalent doses |
| **Indications** | Adults with moderate, severe or critical COVID-19 including those on mechanical ventilation who are requiring oxygen supplementation |
| **Contraindications** | Adults who do not require oxygen supplementation, other than for other non-COVID-19 based indications |
| **Adverse effects** | Infection, oedema, hypertension, hyperglycaemia, dyspepsia/peptic ulceration, mood and sleep disturbance |
| **Monitoring** | Serology for Hepatitis B (surface antigen, surface antibody, core antibody), Hepatitis C, HIV, Strongyloidiasis (serology) and tuberculosis (QuantiFERON gold), however this should not delay use of the medication<br>QID blood glucose monitoring for at least 72 hours after the first dose of dexamethasone<br>For patients in ICU or those with persistent, severe hyperglycaemia, Endocrinology review +/- insulin infusion may be required<br>*Blood glucose monitoring can be ceased in patients without diabetes if all blood glucose levels are <7.8mmol/L after 72 hours without the need for glucose lowering therapy and there is no plan to increase the glucocorticoid dose* |

**Prednisolone/Hydrocortisone**

| | |
|---|---|
| **Mechanism of Action** | Immunosuppressant and anti-inflammatory, including suppression of cytokine release |
| **Dose** | Prednisolone: 50mg oral daily for up to 10 days<br>Hydrocortisone: 50mg intravenously 6-hourly for up to 10 days<br>(can be discontinued earlier if patient is well enough for discharge) |
| **Indications** | **Pregnant patients in the first trimester** with moderate, severe or critical COVID-19 including those on mechanical ventilation who are requiring oxygen supplementation. |
| **Contraindications** | Adults who do not require oxygen supplementation, other than for other non-COVID-19 based indications |
| **Adverse effects** | Infection, oedema, hypertension, hyperglycaemia, dyspepsia/peptic ulceration, mood and sleep disturbance |
| **Monitoring** | Serology for Hepatitis B (surface antigen, surface antibody, core antibody), Hepatitis C, HIV, Strongyloidiasis (serology) and tuberculosis (QuantiFERON gold), however this should not delay use of the medication<br>**QID blood glucose monitoring for at least 72 hours after the first dose of prednisolone/hydrocortisone.**<br>For patients in ICU or those with persistent, severe hyperglycaemia, Endocrinology review +/- insulin infusion may be required<br>*Blood glucose monitoring can be ceased in patients without diabetes if all blood glucose levels are <7.8mmol/L after 72 hours without the need for glucose lowering therapy and there is no plan to increase the glucocorticoid dose* |

**Remdesivir**

| | |
|---|---|
| **Mechanism of Action** | Prodrug metabolised to a C-adenosine nucleotide triphosphate analogue inhibits RNA-dependent RNA polymerase |
| **Dose** | 200mg IV loading dose, then 100mg daily (from day 2)<br>Total course 5 days (can be discontinued if patient well enough for discharge) |
| **Indications** | Adult patients who require supplemental oxygen, but NOT invasive or non-invasive ventilation, ALT < 5x upper limits of normal (ULN) and/or ALT <3x ULN and Bilirubin <2 ULN |
| **Pregnancy** | Paucity of evidence of efficacy in COVID-19 infection. Consider using Remdesivir for selected pregnant or breastfeeding patients hospitalised with moderate to severe COVID-19 who do not require ventilation with ID guidance. Pregnant patients were excluded from all clinical trials of Remdesivir in COVID-19.<br>Animal studies do not suggest reproductive toxicity, and use for COVID-19 in pregnant or breastfeeding patients overseas has not shown safety concerns |
| **Contraindications** | Ventilated patients<br>Evidence of multi-organ failure including coagulopathy, hepatic failure or renal failure (low urine output or eGFR <30 mL/min or dialysis) or significant cardiomyopathy with low cardiac output.<br>Known hypersensitivity to Remdesivir, the metabolite, or formulation excipient |
| **Adverse effects** | Bradycardia, hypotension, gastrointestinal disturbance, rash, hypalbuminaemia, hypokalaemia, anaemia, thrombocytopenia, abnormal LFTs, AKI, respiratory distress |
| **Monitoring** | Monitor CBC/EUC/LFTs regularly |

## Tocilizumab

| | |
|---|---|
| **Mechanism of Action** | Humanised anti-IL-6 receptor monoclonal antibody which antagonises IL-6 binding and thus inhibiting its pro-inflammatory effects, reducing inflammation |
| **Dose** | For intravenous administration over 60 minutes<br>800mg if weight >90kg<br>600mg if weight between 65 – 90kg<br>400mg if weight 40 – 65kg<br>8 mg/kg if weight <40kg<br>A second dose should be considered 12-24 hours if no clinical improvement is noted, or the CRP of ferritin do not start to fall |
| **Indications** | Adults with hypoxia requiring oxygen supplementation (with oxygen saturations below 92-94% on room air) and signs of inflammation |
| **Pregnancy** | Tocilizumab safety information is largely derived from pregnant patients with non-COVID indications such as rheumatoid arthritis. There is no Embryopathy at doses used to treat COVID-19. There is insufficient data to estimate other effects on the pregnancy, but they are likely to be less significant than the effect of COVID.<br>For the babies of patients who received Tocilizumab during pregnancy (after 20 weeks' gestation), live vaccines (rotavirus and BCG) should be avoided in the first 6 months of life. All non-live vaccinations are safe and should be undertaken.<br>Only small amounts of Tocilizumab are detected in breastmilk in patients who receive Tocilizumab whilst breastfeeding only, live vaccines (rotavirus and BCG) can be given to the baby. |
| **Contraindications** | • Presence of serious bacterial, fungal or serious viral infection (non-COVID)<br>• Active tuberculosis infection<br>• Bowel perforation/diverticulitis<br>• Abnormal ALT/AST >5 times limit of normal<br>• Platelet <50, neutrophil count <0.5<br>• Prior hypersensitivity to Tocilizumab |
| **Adverse effects** | Infections, gastritis, mouth ulcers, hypertension, allergic reactions, gastrointestinal perforation, Cytopenia and hepatotoxicity |
| **Monitoring** | Before commencing treatment measure CBC and LFTs; screen for Hepatitis B (surface antigen, surface antibody, core antibody), Hepatitis C, HIV, Strongyloidiasis (serology) and tuberculosis (QuantiFERON gold), however this does not delay use of the medication.<br>Observe for hypersensitivity reactions for 30 minutes<br>Monitor inflammatory markers 12 hours after dose |

## Other Considerations

**Bacterial pneumonia**:

Treat with antibiotics as appropriate in consultation with respiratory

**Antenatal corticosteroids:**

Should be given if there is concern for preterm delivery <34+6. Does not need to be given if patient on dexamethasone

**Magnesium sulphate**

Should be given for eclampsia prophylaxis and neuroprotection of the preterm neonate as routinely indicated.

**Delivery**

This is a multidisciplinary team decision within the Obstetric COVID Care Team and potentially in conjunction with ICCU. Decision for delivery will be decided on a case by case basis and encompass maternal health status, gestation and disease progression. All patients with ≥ moderate disease will need to have a delivery plan discussed and documented in case of acute deterioration.

## Critical Illness

**Critical Illness**

**Adult patient meeting any of the following criteria:**

Respiratory failure

- Occurrence of severe respiratory failure (paO2/Fi02 <200) respiratory distress or acute respiratory distress syndrome (ARDS).
  This includes patients deteriorating despite advanced forms of respiratory support (non-invasive ventilation (NIV), high flow nasal oxygen (HFNO) OR patients requiring mechanical ventilation

**OR other signs or significant deterioration**

- Hypotension or shock
- Impairment of consciousness
- Other organ failure

Patients with critical illness in pregnancy will be managed in the Intensive and Critical Care Unit at Flinders Medical Centre. The patient will need to be managed in a multi-disciplinary context, with liaison between ICCU, obstetrics, obstetrics physicians, anaesthetics, infectious diseases and neonatology.

**Medications:**

These patients may be offered dexamethasone, Tocilizumab / Baricitinib however will not be suitable for treatment with Remdesivir if mechanical ventilation is required. Each medication recommendation is as per the COVID-19 National Evidence Taskforce.

All patients in ICCU should have thromboprophylaxis unless there is a major contraindication or delivery is imminent

- Enoxaparin SC 40mg twice daily or
- Dalteparin 5000IU twice daily

Mechanical calf stimulators should also be considered for this group.

If delivery is planned, betamethasone should be considered for fetal lung maturity. Dexamethasone will cross the placenta, and if the patient has already been commenced on steroids betamethasone may not need to be administered.

Consider a loading dose of magnesium sulphate (4g IV over 20 minutes) for neuroprotection for all deliveries <30 weeks.

**Positioning:**

Pregnant patients >24 weeks gestation will need to be managed at 30° left lateral tilt whilst supine to prevent aortocaval compression.

Proning is recommended for patients with critical illness and patients on mechanical ventilation should be managed in the prone position for up to 12 hours per day, noting prone position may be less feasible later in pregnancy as per national guidelines due to the risk of hypofusion, compartment syndrome, pressure ulcers, airway swelling and peripheral arterial compression. A pictorial and video tutorial for appropriate positioning is available through the Green Journal at the following link:

https://journals.lww.com/greenjournal/fulltext/2020/08000/prone_positioning_for_pregnant_women_with.7.aspx

**Delivery:**

Any patient admitted to ICCU should have a delivery plan discussed and documented. If the patient requires intubation there should be a robust discussion regarding the timing of her delivery plans in consultation with their partner / family.

| Gestation at admission | Pregnancy planning |
|---|---|
| **<28 weeks** | Expectant management |
| **≥ 28-34 weeks** | Individualised care balancing maternal and fetal health |
| **>34 weeks** | Low threshold for delivery of fetus in deteriorating mother |

**Patients with Critical Disease outside of FMC:**

In the event that a patient presents with critical disease to a location outside of Flinders Medical Centre, care should be escalated as per the Acute Care Escalation plan detailed earlier in this document.

Acute management will need to be decided on a case by case basis involving (but not limited to) the treating team at the remote location, the COVID Care Response Team and MedSTAR. If the patient is deemed too unstable to transfer and requires delivery and ventilation at a remote location, MedSTAR Kids may also need to be involved to attend for neonatal retrieval.

## Birthing Management and Considerations

The birthing plan of a patient affected by COVID-19 may be altered by their disease, however in patients with mild disease or who have recovered it is important to aim to normalise care as much as possible. In patients with severe and critical disease, the birthing plan may be dictated by maternal instability with the decision to deliver made by the multidisciplinary team involved in patient care.

Patients who are birthing whilst positive for COVID-19 will need to be managed with appropriate personal protective equipment as per the SA Health matrix. It is important for the midwifery and obstetric team to remember that standard interventions may take longer due to the need for donning and doffing, which may complicate care in an acute emergency. Caution should be taken with abnormal CTGs, and delivery interventions such as caesarean section or instrumental deliveries offered in a timely manner to limit the need for high category emergency cases or rapid neonatal resuscitation. Whilst fetal scalp sampling is not contraindicated in a patient with COVID-19, the practitioner should be aware of the complexities of management of potential delays in resuscitation if an emergency situation arises at the end of labour.

**Mode of delivery**:

In patients with mild disease and recovered disease, the mode of delivery should be based on obstetric indications alone. If the patient had previously planned a vaginal delivery, then this plan can remain.

Delayed cord clamping and skin to skin contact may remain as per standard procedure, as can breastfeeding plans and rooming in on well infants. With each of these items, it is important to ensure appropriate hand hygiene and masks are used during the mother's infectious period at times of close contact, to reduce the risk of transmission to the neonate.

**CTG Monitoring:**

Patients that are positive with mild COVID-19 and asymptomatic do not need continuous electronic fetal monitoring, they will require CTG evaluation for the same reasons as per standard guidelines.

Any patient that is symptomatic regardless of severity will require continuous CTG monitoring throughout labour.

**Support persons:**

A nominated person will be able to attend as a support person. It must be assumed that they are COVID positive or likely to become positive, so they will be required to wear PPE as per the SA Health matrix, they should remain within the room with the patient and are not to walk through other areas of the hospital. They can attend when the patient is in active labour and will have to leave within 2 hours of delivery. The support person must be someone in the same household who is also in isolation for COVID-19

**Observations:**

Observations should be taken as per routine care throughout labour and include standard obstetric observations (heart rate, blood pressure, contractions, fetal heart rate) respiratory rate, oxygen saturations and oxygen requirements should also be documented.

Increasing oxygen requirements should be escalated as per the escalation chart in this document. Obstetric and ICU review sought at appropriate intervals.

Observations may be increased to 15 minutely in unwell patients as dictated by the obstetric and intensive care treating teams.

**Analgesia**

Patients should be offered analgesia throughout the induction and labour process:

- water immersion in first stage
  - patients who are positive for COVID-19 will not be able to utilise water immersion for first stage of labour
  - water immersion in a shower may be utilised provided the patient is clinically well with mild disease and no medical contraindications
  - water immersion for second stage is not recommended due to the presence of COVID-19 within faecal particulate matter and the increased risk of exposure to staff and the neonate
- inhaled nitrous oxide
  - inhaled nitrous oxide may be utilised providing a single-patient filter is available on the handpiece
- opiate medication
  - oral paracetamol + codeine, oxycodone, IM morphine and IV/SC fentanyl can all be used as per normal management

- epidural anaesthesia
  - epidural should be offered early in the labour process
  - early placement will allow time for the anaesthetist to don PPE and set up appropriately
  - placement of an epidural may reduce the need for a general anaesthetic in the event of fetal or maternal compromise. A general anaesthetic in these circumstances may incur more risks for a mother with COVID-19, and potentially expose staff at the time of intubation

**Fluid management:**

Patients with COVID-19 will need cautious fluid monitoring to avoid fluid overload and pulmonary oedema. The aim should be for euvolaemia throughout the labour process with hourly fluid input matching output, measured on a strict hourly fluid balance chart.

**Third Stage:**

Active management of the third stage is recommended to reduce the risk of post-partum haemorrhage and need for additional resuscitation for the patient.

Medications for management of third stage may be as per local guidelines and may include IM or IV stat oxytocin, IM Syntometrine or IV Carbetocin.

- Medications for post-partum haemorrhage may be given on obstetric indications, with standard considerations for asthma and underlying hypertensive disorders
- Oxytocin infusion should be given in a low volume regimen as described for Cardiac Disease in Pregnancy in the South Australian Perinatal Practice Guidelines
  - 40 units' oxytocin diluted in a 100mL bag of Normal Saline
  - Infusion run at 25mL/hour for 4 hours

**Placental Histology:**

All patients who have had COVID-19 at any stage of pregnancy should be offered placental histology. The severity of illness and any sequelae should be noted on the pathology form.

If the patient has active disease at the time of delivery, the placenta will need to be appropriately labelled and double bagged as per local guidelines for sending COVID-19 specimens to the laboratory.

**Neonatal Management**

Babies born to COVID positive patients at FMC, that require care within the first 14 days post-partum will be treated at SALHN, noting that if clinically indicated the baby be transferred to the WCH. Neonates greater than 14 days post-partum requiring care will receive treatment at the WCH. COVID positive children and babies not needing hospitalisation will be linked to COVID Kids for surveillance and follow up.
Please refer to the state neonatal and paediatric guidance for further information.

## COVID-19 Pre-Admission Testing in Pregnancy

Once community transmission has been observed within South Australia, SA Health will issue guidance to commence recommended pre-admission testing for COVID-19 infection with nasopharyngeal PCR testing for patients and their support people. Up to 2 in 3 pregnant patients' may not show any signs or symptoms of COVID-19 once infected and arranging for testing prior to elective entry into the hospital will help to reduce the risk of exposure to other patients and staff.

The return of a positive COVID-19 test result will result in the patient being managed by the Communicable Diseases Control Branch, with input from the obstetric team if pregnant.

Once a patient has undergone testing, it is recommended they reduce community contact until their result has returned; this is not an enforced quarantine. Once community transmission is observed within South Australia, it is recommended that pregnant patients and their support person avoid unnecessary face to face interactions with people outside of their household to reduce their chance of contracting COVID-19, particularly if they are non-vaccinated. If the patient is undergoing a COVID-19 PCR test prior to a scheduled admission, it is recommended they isolate until the time of admission. Reasons to leave the home whilst awaiting testing results prior to scheduled admission would include attending medical care and obstetric reviews, to attend the scheduled admission or in an emergency.

If testing has not been conducted, care may need to be performed with one-on-one staff and potentially in PPE. Elective admissions such as iron infusions and ECVs may be delayed if adequate staffing are not available and pre-admission testing has not been performed.

**Obstetrics:**

*All patients – Surveillance swabs*

It is recommended all patients and their partners undergo surveillance testing from 37 weeks of gestation. Preadmission testing is required 72 hours prior to an elective admission. The name and date of birth of the patients support person should be recorded in the case notes so that they can be checked prior to admission.

The patient is to await the SA Pathology text that their swab has been returned as negative. If their test result has not been returned by the time of admission, they will need to present via the appropriate COVID entry at their nominated hospital. The staff may ask the patient and support person to wear a mask and will wear appropriate PPE during their admission.

In the event that the scheduled birthing plan or intervention is <72 hours, the patient and their support person should undergo surveillance screening as soon as is practicable.

## Pre-Admission Swabs

### Prior to Caesarean Section

Patients and their support person are to undergo pre-admission testing 72 hours prior to admission. The results will need to be reviewed by a designated officer in each health network the day prior to each elective caesarean section list.

### Prior to Induction of Labour

Patients and their support person are to undergo pre-admission testing 72 hours prior to admission. These results will need to be reviewed by a delegated officer on a daily basis for all scheduled inductions.

### Patients Awaiting Spontaneous Onset of Labour

Patients awaiting spontaneous labour should be offered weekly nasopharyngeal PCR swabs from 37 weeks. It is advised their support person also undergoes weekly swabs to ensure their COVID-19 status is known at the time of presentation.

If a patient presents in labour and has not had a swab within the last 72 hours, they will need to be admitted via the appropriate COVID Obstetric entrance for their nominated hospital. Depending on epidemiological criteria and symptoms, the patient may have to undergo rapid testing +/- wear a mask and have staff wear appropriate PPE around them.

### Iron Infusions, external cephalic versions and amniocentesis

Patients booked for these admissions should have a swab performed 72 hours prior.

Checking for pre-admission swabs should be checked each afternoon for the following day by:

- Iron infusions – Women's Assessment Medical Staff
- ECVs – Birthing (Labour ward) Medical Staff
- Amniocentesis – relevant consultant on the day

Any missing tests should be escalated to the Obstetric Consultant and Midwifery Team Leader. Depending on workload and flow the following day, the iron infusion can remain as scheduled or be deferred. The patient should be phoned with this decision.

## Clearance and Discharge to Treating Hospital

Pregnant patients will be cleared once their infectious time period has elapsed. This will be confirmed by infection control at each LHN. If the patient has mild disease, they will then be released from quarantine, or discharged from the Hospital in the Hotel.

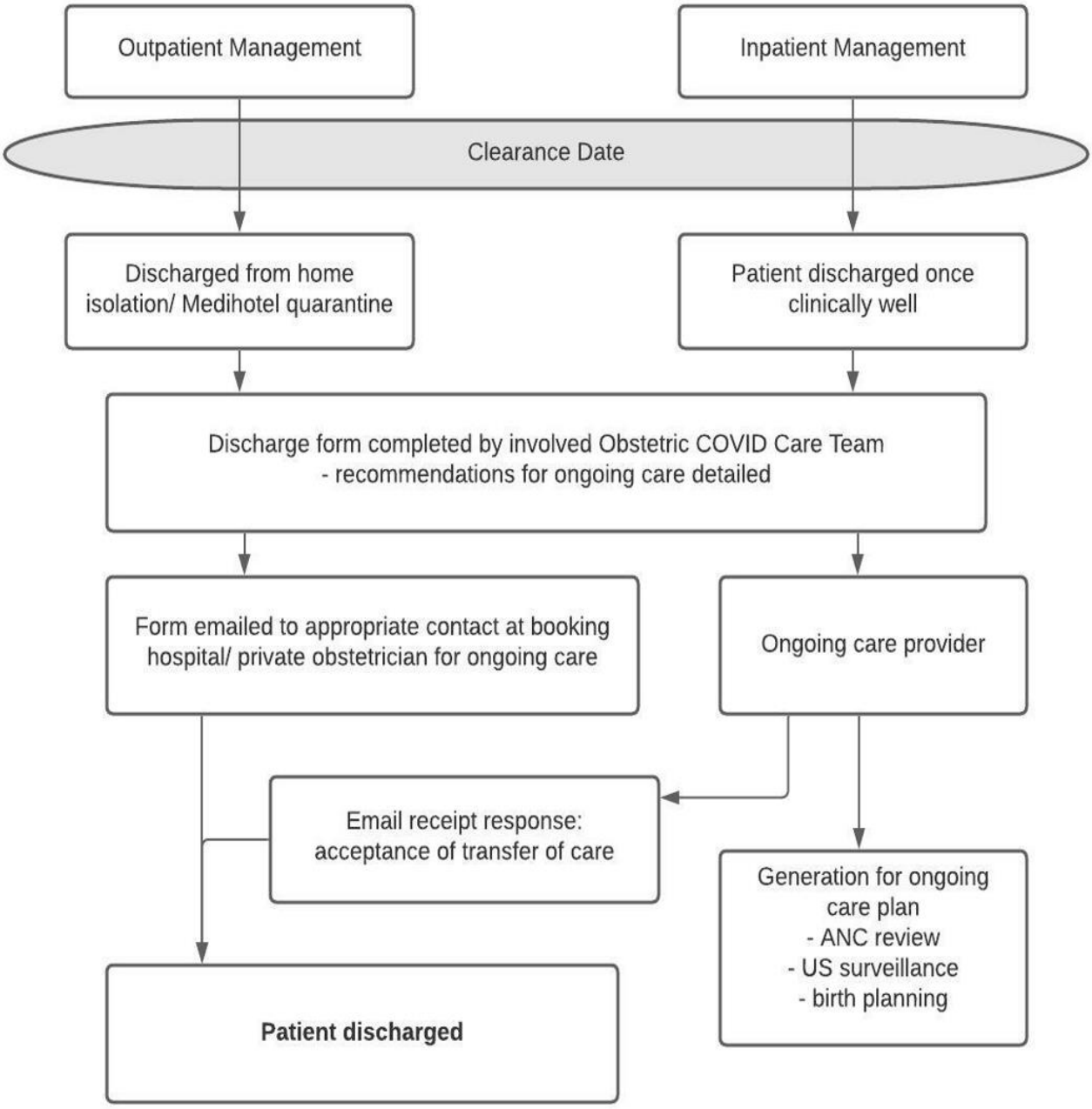
Official clearance dates will be supplied by infection control and the CDCB and will be dictated by both timing and resolution of symptoms. Patients do not require a nasopharyngeal PCR test for clearance, as this may remain positive beyond the time for which they are infectious.

Patients who have been admitted with ≥ moderate disease may have a lengthened stay in hospital and should remain under the care of Flinders Medical Centre until they are discharged back into the community.

Upon discharge, the Obstetric COVID Care Team should complete a discharge form that will details (Appendix D):

- Clearance status
- Hospital that the patient will be returning to for care/delivery
- Next planned care contact
- Any additional care changes as a result of the patients COVID infection
    - Ultrasound at 14 days after symptom onset
    - Continuance of acute thromboprophylaxis
    - Plan for post-natal thromboprophylaxis
    - Delivery planning if affected by the disease

**Discharge Planning**



## References and Guidelines

The authors of this guidelines thank Monash Health for access and reference to their protocols for COVID-19 in pregnancy.

**Coronavirus (COVID-19) in Pregnancy, Information for Health Professionals.** RCOG. Version 14.1. Published 2.11.21. *https://www.rcog.org.uk/globalassets/documents/guidelines/2021-11-02-coronavirus-covid-19-infection-in-pregnancy-v14.1.pdf*

**National COVID-19 Clinical Evidence Taskforce.** Updated 12.11.21. *Covid19evidence.net.au*

**Outpatient Assessment and Management for Pregnant Women with Suspected or Confirmed Novel Coronavirus (COVID-19).** The American College of Obstetricians and Gynecologists and the Society for Maternal-Fetal Medicine. Revised 14.7.20. *https://www.acog.org/-/media/project/acog/acogorg/files/pdfs/clinical-guidance/practice-advisory/covid-19-algorithm.pdf?la=en&hash=2D9E7F62C97F8231561616FFDCA3B1A6*

**Preliminary Findings of mRNA Covid-19 Vaccine Safety in Pregnant Persons.** Shimabukuro TT, Kim SY, Myers TR, Moro PL, Oduyebo T, Panagiotakopoulos L, Marquez PL, Olson CK, Liu R, Chang KT, Ellington SR, Burkel VK, Smoots AN, Green CJ, Licata C, Zhang BC, Alimchandani M, Mba-Jonas A, Martin SW, Gee JM, Meaney-Delman DM; CDC v-safe COVID-19 Pregnancy Registry Team.N Engl J Med. 2021 Jun 17;384(24):2273-2282. *doi: 10.1056/NEJMoa2104983. Epub 2021 Apr 21*

**COVID-19 Vaccination in Pregnancy and Breastfeeding Women and those planning pregnancy.** RANZCOG. Updated 18.8.21. *https://ranzcog.edu.au/statements-guidelines/covid-19-statement/covid-19-vaccination-information*

**Saving Lives, Improving Mothers' Care. Rapid report: Learning from SARS-CoV-2-related and associated maternal deaths in the UK.** MBRACCE-UK. March-May 2020. *https://www.npeu.ox.ac.uk/assets/downloads/mbrrace-uk/reports/MBRRACE-UK_Maternal_Report_June_2021_-_FINAL_v10.pdf*

**The incidence, characteristics and outcomes of pregnant women hospitalized with symptomatic and asymptomatic SARS-CoV-2 infection in the UK from March to September 2020: A national cohort study using the UK Obstetric Surveillance System (UKOSS).** Vousden N, Bunch K, Morris E, Simpson N, Gale C, O'Brien P, Quigley M, Brocklehurst P, Kurinczuk JJ, Knight M. PLoS One. 2021 May 5;16(5):e0251123. *doi: 10.1371/journal.pone.0251123*

**Prone Positioning for Pregnant Women with Hypoxemia due to Coronavirus Disease 2019 (COVID-19).** Tolcher, Mary Catherine MD, MSc; McKinney, Jennifer R. MD, MPH; Eppes, Catherine S. MD, MPH; Muigai, David MD, MMM; Shamshirsaz, Amir MD; Guntupalli, Kalpalatha K. MD; Nates, Joseph L. MD, MBA Prone Positioning for Pregnant Women With Hypoxemia Due to Coronavirus Disease 2019 (COVID-19), Obstetrics & Gynecology: August 2020 - Volume 136 - Issue 2 - p 259-261 *doi: 10.1097/AOG.0000000000004012*

**Cardiac Disease in Pregnancy.** South Australian Perinatal Practice Guidelines. Reviewed 16.9.21. *https://www.sahealth.sa.gov.au/wps/wcm/connect/c88d89804ee1e907af07afd150ce4f37/Cardiac+disease+in+pregnancy_PPG_v5_0.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-c88d89804ee1e907af07afd150ce4f37-nNnV21L*

## Appendix A

# ELECTIVE LSCS “OUTSOURCING” DURING THE COVID PANDEMIC

The following list is a guide to patients who may be suitable for outsourcing of their elective LSCS to decant public hospitals during the COVID pandemic.
It would be expected that the patient is seen at a mutually convenient time for the patient and surgeon prior to the LSCS but in some circumstances this might be deferred to the day of surgery.

**Suitable**

- BMI <40 (level 4 facility can take BMI up to 45 if no other contraindications)
- Gestation >37 weeks
- Primary CS – maternal request, previous 3rd / 4th degree tear
    - LGA
    - Breech
    - Uncomplicated DC/DA twins >+37wks
    - Primary genital herpes
- Repeat CS (=<3) - maternal request or medical recommendation for repeat
    - Other conditions listed for primary CS

**Relative Exclusions**

- BMI 40-45
- CS for maternal medical condition
    - type 1 DM
    - inflammatory bowel conditions
    - Musculoskeletal & neurological conditions
    - Stable cardiac conditions
- CS for fetal placental condition not requiring admission
    - Minor anterior placenta previa
    - Posterior major previa
    - No evidence of accrete
- Previous history of postnatal obstetric, medical or mental health issues
- Patients who required inpatient management during the pregnancy
- Complex DC/DA twins >37+ weeks gestation (although if complicated would usually be delivered before 37 weeks)

**Absolute Exclusions**

- BMI >45
- Unstable lie
- Suspected placenta accrete
- Placenta previa not managed in the community
- Vasa previa
- Significant cardiac condition (any condition needing cardiac opinion during pregnancy)
- Significant anemia (Hb <100)
- Bleeding disorder
- MC/MA twins or triplets or higher order pregnancy (*would most likely be delivered before 37 weeks GA)

## Appendix B

COVID-19 Diagnosis in Pregnancy Form (2 pages)

| NALHN / SALHN / WCHN / Other<br>**COVID-19 Diagnosis in Pregnancy** | **PATIENT LABEL**<br>UR Number: .....<br>Surname: .....<br>Given Name: .....<br>DOB: ..... Sex: ..... |
|---|---|

**Part A:**

Date of referral: ..... Phone number: .....

Email: ..... Alternative phone: .....

Exposure date: ..... Planned discharge date: .....

Location/source: .....

People isolating in the home *(list all and infection status)* .....

.....

.....

□ Interpreter required? If yes, please specify language: .....

Vaccination status □ Unvaccinated □ Single dose □ Double dose

**Part B: to be completed by obstetrician responsible for care**

G: P: EDD: BMI:

□ Aboriginal/ Torres Straight Islander heritage □ Other ethnic minority background: .....

Medical issues: □ Asthma □ Hypertension □ Diabetes: Type 1 / 2 / GDM

□ Other: .....

.....

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Obstetric Issues: .....

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.....

Next scheduled care event: Date: .....

□ Clinic –medical officer □ Clinic –midwifery □ Birthing centre □ Midwifery group practice

If next care is scheduled delivery: □ IOL □ LSCS

Other: .....

.....

Management/Investigations scheduled for next 14 days *(e.g. ultrasound, blood testing)*:

Date: ..... Item: .....

Date: ..... Item: .....

Date: ..... Item: .....

Date: ..... Item: .....

**Part C: to be completed by reviewing obstetric COVID-19 care consultant**

**Plan for review:**

□ Delay care □ In home review □ Other alternative

Details: .....

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Scheduled Telehealth reviews: □ Booked

Date: ..... Time: .....

Date: ..... Time: .....

Date: ..... Time: .....

Date: ..... Time: .....

**Is VTE Prophylaxis required?**

□ **Yes** □ **No**

Drug/dosage: .....

Arrangements: .....

.....

**Nominated Support Persons for Inpatient Attendance and Birth**

Person 1: ..... □ Vaccinated - double

Relationship: ..... □ Vaccinated - single

□ Exemption form completed □ Pending □ Approved □ Unvaccinated

COVID-19 Status: □ Positive – active □ Positive - cleared

□ Negative – no exposure □ Suspected: next swab date .....

Person 2: ..... □ Vaccinated - double

Relationship: ..... □ Vaccinated - single

□ Exemption form completed □ Pending □ Approved □ Unvaccinated

COVID-19 Status: □ Positive – active □ Positive - cleared

□ Negative – no exposure □ Suspected: next swab date .....

Signed: ..... Name: ..... Date: .....

## Appendix C

## Telehealth Review Form (2 pages)

| NALHN / SALHN / WCHN / Other<br>**COVID-19 Telehealth Review Form** | **PATIENT LABEL**<br>UR Number: .....<br>Surname: .....<br>Given Name: .....<br>DOB: ..... Sex: ..... |
|---|---|

**Details:**

Date: ..... Gravida: ..... Parity: ..... Gestation: .....

□ COVID-19 positive □ COVID-19 negative Next swab due: .....

□ Interpreter, please specify language: .....Thromboprophylaxis required yes/no (see over)

**Medical Evaluation:**

Maternal medical concerns:

| | |
|---|---|
| Are you short of breath or having difficulty breathing? | Yes / No |
| Do you need to catch your breath on walking around the room? | Yes / No |
| Are you able to finish your sentences without breathlessness? | Yes / No |
| Have you had any blood on coughing? Amount? (escalate if >1 teaspoon) | Yes / No |
| Do you have any chest pain or pressure, particularly with coughing? | Yes / No |
| Are you able to keep fluids down? | Yes / No |
| Any dizziness with standing? | Yes / No |
| Any drowsiness? | Yes / No |
| Are you making a normal amount of urine? | Yes / No |

Comments/Other .....

.....

.....

**Red Flag Symptoms:**
- severe breathlessness
- unable to finish sentences
- blood on coughing >1 teaspoon
- chest pain/pressure
- unable to keep fluids down
- dizziness with standing/syncope
- drowsiness
- low urine output

Fetal concerns:.....

.....

.....

Mental health concerns *(GPAT review/mental health support line)*:.....

.....

| Observation | **Blood Pressure** | **Heart Rate** | **Respiratory Rate** | **Sp02 - Oxygen Saturations** | **Fetal movements** |
|---|---|---|---|---|---|
| Home monitoring result: | | | | | |
| Obstetric Review | ≥ 140 systolic or ≥ 90 diastolic | ≥ 100 | | | Reduced |
| URGENT SALHN Review | ≥ 160 systolic or ≥110 diastolic, ≤ 90 systolic | ≥ 120 | ≥ 21 | < 95% | Absent |

**Ongoing Plan:**

□ Telehealth review Date: ..... Time: .....

□ GPAT Review: Phone 8130 3480 to request review

□ SALHN Review: □ Phone CRCT to arrange transfer 0401 577 241 Or SAAS 1300 881 700

□ Phone Obstetric Consultant SALHN 8204 7898

□ Other .....

.....

Signed: ..... Name:..... Date: .....

Version 5 -1/12/21

VTE prophylaxis

Patients with mild disease in home isolation with no other risk factors for VTE do not require thromboprophylaxis and should be counselled regarding hydration and mobility.

VTE prophylaxis should be considered for patients who are isolating at home/ Hospital in the Hotel (dedicated positive site) with any of the following risk factors:

- Prior VTE
- Age >35
- BMI >30 Plus another risk factor
- BMI >40
- Blood dyscrasias
- Smoking
- Multiple pregnancy
- Pre-eclampsia
- Immobility

VTE prophylaxis should consist of 40mg enoxaparin daily unless delivery imminent and continue for at least 14 days or until all COVID-19 morbidity has resolved. Consider increased dosage to 60mg daily if maternal weight >100kg. Refer to National COVID-19 Evidence Taskforce if enoxaparin is not appropriate for any specific patient.

| | |
|---|---|
| **Thromboprophylaxis required:** | □ Yes □ No |
| Medication: ..... | Dosage: ..... |
| Route: ..... | Timing: ..... |
| □ GPAT notified to arrange administration | |
| Signed: ..... | Name/Designation: ..... |

## Appendix D

# Discharge to Obstetric Care Provider Form (1 page)

| NALHN / SALHN / WCHN / Other<br>**COVID-19 Discharge to Obstetric Care Provider Form** | **PATIENT LABEL**<br>UR Number: .....<br>Surname: .....<br>Given Name: .....<br>DOB: ..... Sex: ..... |
|---|---|

**Discharge Details**

Date of discharge: .....

Service/ provider discharged to: .....

**Details of Illness**

| | | |
|---|---|---|
| **Severity of Illness:** | ◻ Outpatient management | ◻ Inpatient admission |
| ◻ Mild | ◻ Moderate | ◻ Severe/Critical |
| **Treatments required:** | ◻ Dexamethasone | ◻ Budesonide |
| ◻ Sotrovimab | ◻ Remdesivir | ◻ Tocilizumab |
| ◻ Respiratory support | ◻ High flow oxygen | ◻ Intubation |
| ◻ Thromboprophylaxis | ◻ Ceased | ◻ Date to cease: ..... |

**Disease complications:** .....

.....

.....

**Ongoing Antenatal Management**

◻ Routine antenatal care – no change to management

◻ Ultrasound growth surveillance. Details and timing: .....

◻ Other interventions: .....

.....

.....

**Birth Planning**

◻ Routine planning – no change to management

◻ Recommended alterations to birth planning or timing: .....

.....

.....

.....

**Post Partum Thromboprophylaxis**

◻ Thromboprophylaxis on obstetric indications only

◻ Thromboprophylaxis recommended ◻ Medication: .....

◻ Dosage: ..... ◻ Duration: .....

Signed: ..... Date: .....

Name: ..... Provider #: .....

Version 1 -14/11/21