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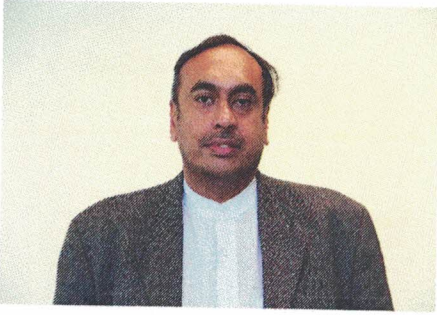
Department:
Health
REPUBLIC OF SOUTH AFRICA



Managing Maternal, Neonatal and Child Health during the COVID-19 pandemic in South Africa: A clinical guide for health workers and clinical managers

APRIL 2020-

FOREWORD



“The World Health Organisation (WHO) declared COVID-19 a global pandemic on 11th March 2020. The first case was diagnosed in South Africa on 5th March 2020. South Africa faces a particular challenge given the large vulnerable immunocompromised population living in overcrowded conditions.

These guidelines provide guidance to healthcare workers and managers for the management and treatment of pregnant women and their newborn babies, and children in the context of COVID-19. They should be read in conjunction with the current Maternal and Neonatal health Guidelines and the Guidelines for Clinical Management of suspected or confirmed COVID-19 disease.

These guidelines are likely to change as knowledge regarding strategies to address COVID-19 develop globally and in South Africa. The guidelines will be updated regularly based on emerging evidence and WHO recommendations.

The National Department of Health would like to thank the clinical and academic experts from different settings who contributed to the development of these guidelines


Dr Anban Pillay

Acting Director General

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Introduction

These guidelines are based on a combination of available evidence and expert opinion. This is an evolving situation and these guidelines are a living document that may be updated if or when new information becomes available. Furthermore, this document is split into Section A for Maternal guidance and Section B for Neonatal and Child health. This is done to assist in locating relevant information quickly; however it is important to remember that care should always focus on the mother-baby pair as a unit.

SECTION A: MATERNAL COVID-19 CLINICAL GUIDELINES

1. COVID-19 and Pregnancy

Coronavirus disease 2019 (COVID-19) is a respiratory tract infection caused by a newly emergent coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), that was first recognized in Wuhan, China, in December 2019.

Pregnant and recently pregnant women with suspected or confirmed COVID-19 should be managed with supportive care, taking into account the immunologic and physiologic adaptations during and after pregnancy.

2. The Biology

Coronaviruses are enveloped, non-segmented, positive-sense ribonucleic acid (RNA) viruses belonging to the family Coronaviridae. SARS-CoV-2 belongs to the same β -coronavirus subgroup as the SARS-CoV and the Middle East respiratory syndrome coronavirus (MERS-CoV), with which it has genome similarity of 80% and 50% with respective4ly.

3. Epidemiology in Pregnancy

The virus appears to have originated in Hubei Province in China towards the end of 2019.

Pregnancy is a physiological state that predisposes women to respiratory complications of viral infection. Due to the physiological changes in their immune and cardiopulmonary systems, pregnant women are more likely to develop severe illness after infection with respiratory viruses. However, pregnant women do not appear to be more susceptible to the consequences of COVID-19 than the general population. Unlike Influenza and other respiratory illnesses, based on a limited number of confirmed COVID-19 cases, pregnant women do not appear to be at increased risk for severe disease. Current data is limited and diligence in evaluating and treating pregnant women is warranted. Special consideration should be given to pregnant women with comorbid medical conditions and COVID-19 until the evidence base provides clearer information. There are no reported deaths in pregnant women yet.

Over and above the impact of COVID-19 on a pregnant woman, there are concerns relating to the potential effect on fetal and neonatal outcome; therefore, pregnant women require special attention in relation to prevention, diagnosis and management. (To date, no cases of vertical transmission)

4. Transmission

Most cases of COVID-19 globally have evidence of human-to-human transmission. Respiratory droplets and direct contact spread COVID-19. However, there are recent cases that have appeared where there is no evidence of contact with infected people. The virus appears to spread readily, through respiratory, fomite or faecal routes.

No vertical transmission has been documented. The virus has not been isolated from cord blood or amniotic fluid. Expert opinion is that the fetus is unlikely to be exposed during pregnancy. Any transmission to the neonate is therefore most likely to be after delivery, through close contact with the mother or other infected people. The virus has not been found in the breastmilk of mothers with COVID-19 infection, so for now breastfeeding is not thought to be a route of transmission

5. Presentation in pregnancy

There is currently no known difference between the clinical manifestations of COVID-19 in pregnant and non-pregnant women or adults of reproductive age.

Effect on the Mother: The majority of women will experience only mild or moderate cold/flu like symptoms. Cough (67.8%), fever (43.8% of cases on admission and 88.7% during hospitalization), and shortness of breath are other relevant symptoms (diarrhoea is uncommon (3.8%).

More severe symptoms such as pneumonia and marked hypoxia are widely described with COVID-19 in older people, the immunosuppressed and those with chronic medical conditions such as diabetes, hypertension, cancer and chronic lung and heart disease. Within the general population there is evolving evidence that there could be a cohort of asymptomatic individuals or those with very minor symptoms that are carrying the virus, although the incidence is unknown.

Effect on the Foetus: There is currently no data suggesting an increased risk of miscarriage or early pregnancy loss in relation to COVID-19. As there is no evidence of intrauterine fetal infection with COVID-19 it is currently considered unlikely that there will be congenital effects of the virus on fetal development.

There are case reports of preterm birth in women with COVID-19, but it is unclear whether the preterm birth was iatrogenic, or whether some were spontaneous. Iatrogenic delivery was predominantly for maternal indications related to the infection. There were a few reports of fetal compromise and pre-labour premature rupture of membranes.

Fever is common in COVID-19-infected patients. Previous data from other studies have demonstrated that maternal fever in early pregnancy can cause congenital structural abnormalities. However, a recent study in non-COVID-19 women, reported that the rate of fever in early pregnancy was 10%, and the incidence of fetal malformation in this group was 3.7%. Previous studies have reported no evidence of congenital infection with SARS-CoV, and currently there are no data on the risk of congenital malformation when COVID-19 infection is acquired during the first or early second trimester of pregnancy.

6. Investigation and Diagnosis

The process of COVID-19 testing and diagnosis is changing rapidly. Pregnancy does not alter the criteria for testing. Pregnant women should be investigated and diagnosed as per local criteria: www.nicd.ac.za and www.ndoh.gov.za

7. Prevention

Currently, there are no effective drugs or vaccines to prevent COVID-19. There are however several interventions that can prevent spread of the virus and confer protection from acquiring the virus.

- Any person with symptoms suggestive of the disease should be advised to and should take responsibility to isolate themselves from others. They should additionally wear a face mask. They should phone their local health facility or the National COVID-19 helpline (0800 029 999) to enquire about whether they should be tested for COVID.
- Maintain good personal hygiene: Wash hands and/or use hand sanitizer frequently. Avoid touching face (particularly eyes) with hands or fingers unless the hands have just been washed. This advice is applicable to everyone, and most especially to health workers on duty.
- Personal protective equipment (PPE) must be used by those working in the health care environment according to local guidelines.
- Citizens must abide by National “lock down” regulations. For those such as health workers who have to be at work despite the lock down, they must consciously avoid unnecessary close contact with others, such as greeting with handshakes, hugs and kisses. Any essential meetings that cannot be conducted remotely must ensure that participants maintain a 1.5 meter distance between each other.

8. Notes on Clinical Management

For pregnant women the same infection prevention, investigation and diagnostic guidance applies, as for non-pregnant adults.

- COVID-19 infection is not an indication for delivery, unless delivery is required as part of maternal resuscitation to improve maternal oxygenation, or to restore haemodynamic stability.
- COVID-19 infection is not an indication for caesarean delivery. Women with COVID 19 infection should be allowed to deliver vaginally, unless there are clear obstetric indications for caesarean section. (WHO recommends that caesarean section should ideally be undertaken only when medically justified).
- Shortening the second stage by assisted vaginal delivery can be considered if the woman is exhausted or has respiratory distress.
- For suspected and confirmed cases of COVID-19 infection, intrapartum care, delivery and immediate postnatal care should be conducted in an appropriate isolation room. There must be dedicated midwives allocated to care for the woman and her newborn. These midwives must not be involved with managing other women in labour on the same shift. Appropriate personal protective equipment (PPE) must be worn by the midwives caring for the COVID 19 patient.

- Induction of labour is not routinely indicated for women with COVID 19, but should be performed for appropriate obstetric indications.
- Where preterm delivery is anticipated, there is a need for caution with the use of antenatal corticosteroids for fetal lung maturation in a critically ill patient, because steroids could potentially worsen the mother's clinical condition. The use of antenatal steroids should be considered in discussion with a multidisciplinary team (infectious disease specialists (where available), specialist physician, specialist obstetrician, maternal-fetal-medicine specialists (where available) and neonatologists). WHO- in cases where the woman presents with mild COVID-19, the clinical benefits of antenatal corticosteroid might outweigh the risks of potential harm to the mother. In this situation, the balance of benefits and harms for the woman and the preterm newborn should be discussed with the woman to ensure an informed decision, as this may vary depending on the woman's clinical condition, her wishes and that of her family, and available health care resources.
- In the case of an infected woman presenting with spontaneous preterm labour, tocolysis should not be used in an attempt to delay delivery in order to administer antenatal corticosteroids.
- Products of conception from miscarriages or terminations of pregnancy and placentas of COVID-19-infected pregnant women should be treated as infectious tissues and they should be disposed of appropriately.
- Delayed cord clamping is still recommended following birth, provided there are no other contraindications. The baby can be cleaned and dried as normal, while the cord is still intact. COVID-19 has not been isolated from cord blood.
- Newborns to mothers with suspected or confirmed COVID-19 should routinely be kept together with the mother for bonding and breastfeeding, with the mother applying necessary precautions for IPC (the mother should wear a mask and wash or sanitize her hands frequently). If possible, the mother/baby pair should continue to occupy the same isolation room used by the mother during labour. Otherwise, they may need to be transferred to an alternative isolation ward, but will still require appropriate postnatal/neonatal care.
- For women expressing breast milk, hands must be washed before expressing. A dedicated breast pump/milk cups should be used. Follow recommendations for breast pump cleaning after each use (Rinse all expressing equipment in clean, running water before sterilizing). Consider asking someone who is well to feed expressed milk to the baby (Mother can decant milk from her container into a clean container held by a healthy person to prevent transmission via the containers surface).
- All newborn of women with suspected or confirmed COVID-19 need careful assessment at birth and monitoring, with referral to or consultation with the next level of expertise in selected cases. All babies will need neonatal follow-up and ongoing surveillance after discharge.
- Routine neonatal criteria for admission to the neonatal nursery/NICU will apply. Expressed breast milk would be ideal for the baby in this situation, if the mother is not able to enter the neonatal nursery due to infection concerns.
- If the mother is unwilling to breastfeed the baby or is unable to breastfeed the baby because she is critically ill, then arrangements for the baby to be taken home for care by the family should be investigated.

- When mother with COVID-19 and baby are both fit for discharge, they can be discharged home as long as home circumstances will allow self-isolation of the mother/baby pair. If this is not possible, referral to an alternative isolation/quarantine unit may be necessary.
- For PUIs, every attempt must be made to obtain a COVID-19 test result before discharge to clarify isolation requirements post-discharge.
- The postnatal visit schedule must be arranged before discharge. Discharge must be authorized by a senior team member. On discharge, the mother with COVID-19 must be provided with contact details of the relevant postnatal/neonatal care team member to call if she has any concerns before her next scheduled visit. The postnatal/neonatal team should also obtain contact numbers for the mother, so that telephonic follow-up can be conducted if required.
- For symptomatic relief or fever or headache, paracetamol is recommended. There are some concerns (not proven) that non-steroidal anti-inflammatory drugs, specifically ibuprofen, may worsen the course of COVID-19, and they should therefore not be used as first-line treatment for symptomatic relief.
- The COVID-19 pandemic places most pregnant and postnatal mothers and their families under considerable social, economic and psychological strain. Many women will be at increased risk for food insecurity and domestic violence. Although staff too are likely to be highly stressed and deserve care, their engagement with mothers should always be respectful and empathic.
- For pregnant women the same infection prevention and COVID-19 investigation/ diagnostic guidance applies, as for non-pregnant adults.
- For staff attending to pregnant woman with COVID-19 or PUIs, the same personal protective equipment (PPE) requirements apply as when attending non-pregnant adults with COVID-19. As with all pregnancies, irrespective of COVID-19 status, particularly during labour, there are risks of staff exposure to blood, urine, faeces and amniotic fluid. Routine infection control measures as required for managing all pregnancies and deliveries must therefore be strictly adhered to. However, staff can be reassured that the virus has not so far been detected in amniotic fluid or in breastmilk.
- For symptomatic relief or fever or headache, paracetamol is recommended. There are some concerns (not proven) that non-steroidal anti-inflammatory drugs, specifically ibuprofen, may worsen the course of COVID-19, and they should therefore not be used as first-line treatment for symptomatic relief.

- COVID-19 is not an indication for delivery, unless it is felt that delivery is required as part of maternal resuscitation to improve maternal oxygenation, or to restore haemodynamic stability.
- COVID-19 is not an indication for caesarean delivery. Women with COVID-19 should be allowed to deliver vaginally, unless there are clear obstetric indications for caesarean section.
- Shortening the second stage by assisted vaginal delivery can be considered if the woman is having respiratory distress.
- Do not monitor the fetal condition in a woman with severe COVID-19. The priority is stabilizing the mother's condition. The presence of the fetal heart can be checked intermittently in such cases.
- For asymptomatic women or those with mild disease, standard fetal monitoring guidelines apply, taking into consideration any obstetric risk factors
- Induction of labour (IOL) is not routinely indicated for women with COVID-19, but should be performed for appropriate obstetric indications. The decision for IOL should involve an experienced obstetric doctor, to ensure that the IOL is definitely indicated. Where possible, it would be better to avoid labour and delivery until the woman has recovered from the COVID-19
- Women scheduled for elective caesarean sections, who have contracted COVID-19 should if possible have the caesarean section postponed until 14 days after the onset of COVID-19 symptoms. PUIs should wait for the test result before a decision is made on the timing of the caesarean section. The postponing of elective caesarean sections should be overseen by an experienced obstetric doctor, to ensure that it is safe to do so, and to determine an appropriate monitoring/review schedule for the mother while awaiting the new date.
- For suspected COVID-19 cases (including recent contacts of a confirmed COVID-19 case) and confirmed cases of COVID-19, intrapartum care, delivery and immediate post-natal care should be conducted in an appropriate isolation room. There should ideally be two dedicated midwives allocated to care for such a woman and her newborn (if this is not possible, then at least one midwife and a nurse), and these midwives must not be involved with managing other women in labour on the same shift. Appropriate personal protective equipment (PPE) must be worn by the midwives and nurses caring for the COVID-19 patient.

- Where preterm delivery is anticipated, there is a need for caution regarding the use of antenatal corticosteroids for fetal lung maturation in a critically ill patient, because steroids could potentially worsen the mother's clinical condition. Ideally the use of antenatal steroids should be considered in discussion with a multidisciplinary team (infectious disease specialists, maternal-fetal-medicine specialists and neonatologists). A general guide is that a course of steroids can be given where there is mild COVID-19, but should be avoided when there is severe COVID-19
- In the case of woman with COVID-19 presenting with spontaneous preterm labour, tocolysis should not be used in an attempt to delay delivery in order to administer antenatal steroids.
- Although the virus has not been isolated from umbilical cord blood or amniotic fluid of pregnancies where the mother has COVID-19, products of conception from miscarriages or terminations of pregnancy and placentae of women with COVID-19 should nonetheless be treated as infectious tissues and be disposed of using appropriate infection control practices
- The COVID-19 virus has not been isolated from cord blood. Delayed cord clamping is still recommended following birth. The baby can be cleaned and dried as normal, while the cord is still intact.

9. When caesarean section (CS) is required for the woman with COVID-19, the following guidelines apply:

- Birth partners should not accompany the patient in the theatre complex
- Platelet count should always be checked in preparing for the CS. NOTE: Approximately one third of patients in a case series from Wuhan developed thrombocytopaenia (platelet count <150). This may have implications both for the anesthetic and for the surgery
- Early warning for the senior anaesthetist of an impending caesarean section is essential in order to facilitate preparation of theatre and PPE.
- Where possible, a senior anaesthetist should administer the anaesthesia. This is aimed at reducing theatre time, reducing the incidence of failed spinal anaesthesia and potentially reducing aerosol generation during intubation, if required.
- The surgeon should also be at senior level in order to reduce the risk of operative complications and prolonged surgery, and thereby reducing the incidence of conversion of spinal anaesthesia to general anaesthesia.

- The surgeon, surgical assistant, scrub nurse and midwife (receiving baby) must wear full PPE, including an N95 mask and goggles or visor.
- Anaesthesia for these patients may be either regional or general anaesthesia (GA), as for non-COVID-19 patients. However, GA, which for CS requires endotracheal intubation, creates a greater risk for virus transmission to staff in theatre and for viral contamination of the theatre. If the anaesthesia machine is used either for a GA or for administration of supplemental oxygen, a hydrophobic filter must be used to prevent the machine being contaminated with the virus ($\leq 0.05\mu\text{m}$ pore size).
- Spinal anaesthesia remains the anaesthetic of choice in the absence of contra-indications. The patient should be wearing a surgical facemask for the duration of the perioperative period.
- Where spinal anaesthesia is used the airway theatre trolley should be prepared as for a GA. Two sets of intubation PPE: N95 mask, goggles or visor and two pairs of non-sterile gloves should be available on the trolley. An alcohol based hand sanitizer should be available. In the event of a “stable” conversion to GA, the anaesthetist should don full PPE for intubation whilst the assistant monitors the patient. The anaesthetist should return in full PPE and the assistant should then don PPE. Before proceeding, ensure all staff in the operating theatre are wearing PPE. Induction of anaesthesia should be performed and surgery commence/ restart after the airway is secured. In patients at high risk for GA conversion, PPE should be donned before the initiation of spinal anaesthesia.
- Donning PPE is mandatory for tracheal intubation; double glove if intubating the patient and remove the outer gloves once the endotracheal tube is secured. See SASA guidelines: <https://sasacovid19.com>.
- Tracheal intubation is a high-risk procedure for staff, irrespective of the clinical severity of the disease. Where possible, video-laryngoscopy should be used as first-line. Avoid face mask ventilation unless needed.

10. Failed spinal guidelines:

- Senior anaesthetic advice should be sought in the event of a failed spinal. If the clinical circumstances permit, a second attempt at spinal anaesthesia is preferred within current ESMOE guidelines. These state that if there are no effects of the failed spinal within 20

minutes, a repeat spinal anaesthetic may be administered. In the event of partial effects, surgery should either be delayed for six hours or converted to GA. If delayed surgery is chosen, a repeat failed spinal anaesthetic should be converted to GA. Conversions to GA should be done within the current SASA guidelines for GA in the COVID-19 positive patient. ii) Where the need to deliver the baby is very urgent, either for fetal or maternal reasons, the perioperative team may make a decision to proceed straight to an urgent GA. In this event, the assistant and anaesthetist should remove gloves and sterilize hands with alcohol. N95 should be applied along with double gloves. Induction and intubation should proceed with all due speed. No induction should occur without all staff in the theatre having first donned PPE.

- Consider neonatal resuscitation outside the operating theatre where possible. This may reduce exposure of the baby and staff resuscitating the baby to aerosols, and potentially minimize the unnecessary use of PPE.
- A combination of paracetamol and an opiate should be routinely used as first-line for post-operative pain relief in the woman with COVID-19. Local anaesthetic around the incision is an additional option. Concerns regarding the use of NSAIDs in the Covid-19 positive patient are not yet proven by clinical data. Accordingly, NSAIDs may be used with caution in the absence of other contraindications, on an individual patient basis
- Well newborns of mothers with suspected or confirmed COVID-19 should routinely be kept together with the mother for bonding and breastfeeding, with the mother applying necessary precautions for IPC (mother should wear a mask and wash or sanitize her hands frequently.)
- For PUIs, every attempt must be made to obtain a COVID-19 test result before discharge to clarify isolation requirements post-discharge. The postnatal visit schedule must be arranged before discharge. On discharge, the mother with COVID-19 must be provided with contact details of the relevant postnatal/neonatal care team member to call if she has any concerns before her next scheduled visit. The postnatal/neonatal team should also obtain contact numbers for the mother, so that telephonic follow-up can be conducted if required
- Routine neonatal criteria for admission to the neonatal nursery/NICU will apply when the mother has COVID-19. Expressed breast milk will be important for the baby in this situation, if the mother is not be allowed to enter the neonatal nursery, due to infection control restrictions

- If the mother is unwilling to breast feed the baby or is unable to breast feed the baby because she is critically ill, then arrangements for the baby to be taken home for care by the family should be investigated.
- If the mother is unable to breastfeed the baby because she is critically ill, sourcing donor breast milk for the baby should be attempted.

11. Common Scenarios related to COVID-19 in pregnancy

Patient Scenario	Management advice (Adapted for RSA from RCOG, ACOG, WHO and SASA recommendations)
<p>1. Pregnant woman phones the health facility and asks if she must attend for her antenatal or postnatal visit. She has no symptoms suggestive of COVID-19</p>	<p>Ask the woman if she would prefer to be called back to save her airtime.</p> <p>Take a detailed history on the phone, asking about travel history, symptoms and contact with anyone who has COVID. Ask if she has been tested for COVID.</p> <p>Ask about any other problems or concerns she has regarding the pregnancy.</p> <p>If the history confirms that she has not recently returned from travel to a high-risk country for COVID, that she does not have COVID symptoms and that she does not have a COVID contact, then she should be advised to attend antenatal care or postnatal care as usual.</p> <p>Advise her that she should expect to be screened for COVID on arrival at the facility, before joining the antenatal or postnatal clinic queue.</p> <p>Take the opportunity to re-emphasize general preventative measures for COVID including handwashing and social distancing.</p>
<p>2. Pregnant woman phones the health facility and reports that she has symptoms suggestive of COVID-19</p>	<ul style="list-style-type: none"> ● Ask the woman if she would prefer to be called back to save her airtime. ● Take a detailed history on the phone, asking about travel history, symptoms and contact with anyone who has COVID. Ask if she has been tested for COVID. ● Assess severity of symptoms, including whether there is shortness of breath, whether she is able to eat and drink, whether she is able to do her normal household activities. ● Ask about any other problems or concerns she has regarding the pregnancy. ● Ask about her home circumstances ● Consider calling another household member to get further information on the woman's condition and home circumstances.

	<ul style="list-style-type: none"> ● If the woman meets the criteria for testing, make a plan for testing her for COVID, either through an outreach visit to her, or through her making a visit to the health facility. ● If the woman is well (not short of breath and can conduct her normal household activities), and home circumstances allow, a plan can be made for her to self-isolate herself at home, until her test result comes back negative, or if positive, until 14 days after the onset of symptoms. <p>For women who are advised to self-isolate, the guidance currently recommends to:</p> <ul style="list-style-type: none"> ● Not go to school, work, or public areas ● Not use public transport ● Stay at home and not allow visitors ● Ventilate the rooms by opening a window ● Separate themselves from other members of their household as far as possible, using their own towels, crockery and utensils and eating at different times ● Use friends, family or delivery services to run errands, but advise them to leave items outside. <p>If home circumstances do not allow self-isolation at home, contact the local quarantine/isolation centre to discuss admission for isolation</p> <p>She can resume her routine antenatal visits after the isolation period has been completed.</p> <p>If there is any concern that she may have severe COVID-19, or if she has other obstetric problems requiring urgent assessment, a plan must be made for her to come for assessment at the health facility, where she must be attended to in isolation</p> <p>Transport to the health facility will in such cases usually be by ambulance, unless the woman has access to suitable private transport. The woman must ideally wear a face mask throughout the transfer period.</p>
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<p>3. Pregnant woman phones the health facility and reports that she has no symptoms of COVID-19, but a close contact of hers has just been diagnosed with COVID</p>	<ul style="list-style-type: none"> ● Ask the woman if she would prefer to be called back to save her airtime. ● Take a detailed history on the phone, asking about travel history, symptoms and details of the contact history. Ask if she has been tested for COVID. ● Ask about any other problems or concerns she has regarding the pregnancy. ● Ask about her home circumstances. ● If the woman meets the criteria for testing, make a plan for testing her for COVID, either through an outreach visit to her, or through her making a visit to the health facility. ● If the contact history is confirmed, and the woman remains well (not short of breath and can conduct her normal household activities), and home circumstances allow, a plan can be made for her to self-isolate herself at home, until 14 days after the last date of the contact ● If home circumstances do not allow self-isolation at home, contact the local quarantine center to discuss admission for isolation.
<p>4. General advice for a facility providing care to pregnant or postpartum women with suspected or confirmed COVID-19, in whom hospital attendance becomes necessary because of obstetric reasons</p>	<ul style="list-style-type: none"> ● The woman should be advised to attend via private transport where possible (e.g. by private car or on foot; not by meter taxi/uber etc). All feasible precautions should be taken to protect any accompanying person from infection (the patient should wear a mask and maintain a distance of over 1m from others). ● If the woman has no access to private transport, or if her current condition makes private transport inappropriate, then she should call for an ambulance. When calling for the ambulance the call centre must be informed that the woman is currently in self-isolation for COVID- 19 or possible COVID-19. ● The woman should if possible call the facility in advance to alert them that she will be coming. If the woman is being brought by ambulance, then the EMS must inform the receiving facility that the patient they are bringing is a COVID case, or a PUI. ● On arrival at the health facility, the woman must, without joining any queue, immediately report to a staff member that she has COVID or is a PUI, and explain the reason for her attendance. This should be done on the facility premises, but prior to entering the facility building. ● All staff providing care should take personal protective equipment (PPE) precautions as per local guidance. If the woman is not already wearing a

	<p>face mask, then she must be provided with one on arrival to the facility.</p> <ul style="list-style-type: none"> ● The woman should be met at the maternity unit entrance by staff wearing appropriate PPE and provided with a surgical face mask. ● The woman should immediately be escorted to an isolation room, suitable for the majority of care during her hospital visit or stay- For overnight stays, isolation rooms should ideally have an ante-chamber for donning and doffing PPE, and en-suite bathroom facilities. ● Only essential staff should enter the room and visitors should be kept to a minimum. ● Remove non-essential items from a clinic/ultrasound room prior to consultation. ● All clinical areas used will need to be cleaned after use as per local guidance and IPC.
<p>5. Woman presenting for care with unconfirmed COVID-19 but symptoms suggestive of possible infection</p>	<p>All health facilities including maternity departments with direct entry for patients and the public should have in place a system for identification of potential cases (screening for COVID on arrival to the facility) as soon as possible to prevent potential transmission to other patients and staff. This should be at first point of contact (either near the entrance or at reception) to ensure early recognition and infection prevention control. All women must be screened before sitting in the maternity waiting area.</p> <p>If woman shows symptoms suggestive of COVID-19 infection (cough or fever above 37.8 degrees) they should be tested. Until test results are available, they should be treated as though they have confirmed COVID-19, immediately isolated from other patients, and attended to by health workers using PPE</p> <p>Pregnant women may attend for pregnancy reasons and be found on screening to have coincidental symptoms meeting current COVID-19 case definition. There are some situations where overlap between pregnancy symptoms and COVID-19 symptoms may cause confusion (e.g. fever with ruptured membranes/other systemic infection). A thorough examination is required.</p> <p>In cases of uncertainty seek additional advice or in case of emergency investigate and treat as COVID-19 until proven otherwise.</p> <p>In the event of a pregnant woman attending with an obstetric emergency and being suspected or confirmed to have COVID-19, maternity staff must first follow IPC guidance. This includes transferring the woman to an isolation room and donning appropriate PPE. Once IPC measures are in place the obstetric emergency should be dealt with as the priority. Do not delay obstetric management in order to test for COVID-19.</p> <p>Further care, in all cases, should continue as for a woman with confirmed COVID-19, until a negative test result is obtained.</p>

<p>6. Attendance for routine antenatal care in a woman with suspected or confirmed COVID-19</p>	<p>Routine appointments for women with suspected or confirmed COVID-19 should be delayed until after the recommended period of isolation. Advice to attend more urgent pre-arranged appointments (fetal medicine, high risk clinic) will require a senior decision on urgency and potential risks/benefits. If it is deemed that obstetric or midwifery care cannot be delayed until after the recommended period of isolation, infection prevention and control measures should be arranged locally to facilitate care.</p> <p>All facilities providing maternity care must arrange local, robust communication pathways for senior maternity staff members to screen and coordinate appointments missed due to suspected or confirmed COVID-19.</p> <p>All women attending antenatal or postnatal care (ANC/PNC), not only those with COVID, must be provided with a phone/sms/WhatsApp number through which they can liaise with a senior staff member at their ANC/PNC facility, to report symptoms, plan suitable dates for appointments, report transport difficulties preventing attendance etc.</p> <p>Furthermore, reliable contact details of any COVID case or PUI must be obtained so that in cases where the woman will be managed through self-isolation at home, or in an isolation/quarantine facility, telephonic follow-up can be conducted by the ANC/PNC staff, to plan ongoing management.</p>
<p>7. Woman who develops new symptoms during admission (antenatal, intrapartum or postnatal)</p>	<p>The estimated incubation period of the virus is 0-14 days (mean 5-6 days); some woman may present asymptotically, developing symptoms later during an admission. It is also possible that people may be infectious for one or two days before symptoms appear. Health professionals should be aware of this possibility (particularly those who regularly measure patient vital signs), and maintain standard infection prevention control measures for all patients (e.g. sanitiser or washing hands in between all patient contact).</p> <p>As soon as symptoms of COVID become apparent, isolation of the patient must be arranged at the facility where she is admitted. Local guidance should be available on whom to contact for further assessment of the patient in the event of new onset respiratory symptoms or unexplained fever of or above 37.8 degrees.</p>
<p>8. Woman attending for intrapartum care with suspected/confirmed COVID-19 and no/mild symptoms</p> <p>Attendance in labour</p>	<p>All women who have attended antenatal care should have made a plan with the health care provider about the appropriate birthing site according to obstetric risk factors.</p> <p>At the time when the woman goes into labour, if she now has COVID or suspects she may have COVID, then she should contact her maternity care facility to confirm where she must attend for labour and to discuss transport arrangements. Every woman should during antenatal care have been provided with a phone number to call in such situations (see box 6 above). If the woman is unable to contact her local facility, she should call the SA COVID helpline 0800 029 999.</p> <p>If the woman cannot make a call or get through to the relevant number, she must just attend her planned birthing facility.</p>

	<p>All designated birthing facilities should have a plan in place to manage women with COVID in labour. However, particularly if the woman has significant respiratory symptoms or is critically ill, then arrangements should be made for the woman to attend for labour at a specialised COVID centre where she will have access to a multi-disciplinary specialist team.</p> <p>When a woman in labour who is a COVID case or a PUI presents to the maternity unit, general recommendations about hospital attendance apply (see box 4).</p> <p>Once settled in an isolation room, a full maternal and fetal assessment should be conducted to include:</p> <ul style="list-style-type: none"> ● Maternal observations including temperature, pulse, blood pressure, respiratory rate and oxygen saturation (if saturation is monitor available), in order to assess the severity of COVID-19. ● Confirmation of the onset of labour, as per standard care. ● Fetal monitoring as per standard guidelines according to the obstetric risk factors. Not for fetal monitoring if the mother is unstable. ● If the woman has signs of sepsis, investigate and treat as per local guidelines on sepsis in pregnancy, but also consider COVID-19 as a cause of sepsis and investigate accordingly. (Look out for other co-infections) ● Once a full assessment has been made, decide whether referral to a designated specialised COVID centre is necessary. Consult the doctor at the specialised centre as required. ● If COVID not confirmed, test for COVID after attending to any obstetric emergency. <p>If labour is confirmed, then care in labour should ideally continue in the same isolation room.</p> <p>If spontaneous preterm labour, tocolysis should not be used in an attempt to delay delivery in order to administer antenatal steroids.</p>
<p>9. Care in labour- Severe COVID; considerations apply to woman in spontaneous or induced labour:</p>	<p>A pregnant woman in labour with evidence of severe COVID (e.g. breathing difficulties, decreased level of consciousness, with no other obvious cause after thorough history and examination) should be taken ideally by ambulance straight to a specialised COVID centre. This is irrespective of whether the COVID has been confirmed yet or not.</p> <p>When the woman is admitted to the designated labour ward, members of the multi-disciplinary team should be informed: specialist obstetrician, specialist anaesthetist, specialist physician, midwife-in-charge, specialist neonatologist and neonatal nurse in charge and infectious disease specialist if available,etc.</p> <p>Efforts should be made to minimise the number of staff members entering the room and units/facilities should develop a local policy specifying essential personnel for emergency scenarios.</p>

	<p>Maternal observations and assessment should be continued as per standard practice, with the addition of hourly oxygen saturations. (Aim to keep oxygen saturation >94%, titrating oxygen therapy accordingly).</p> <p>Fetal monitoring is not recommended until the mother’s condition has been stabilised.</p> <p>Mode of birth should not be influenced by the presence of COVID-19, unless the woman’s respiratory or haemodynamic condition demands urgent delivery to improve oxygenation.</p> <p>There is no evidence that epidural or spinal analgesia or anaesthesia is contraindicated in the presence of corona viruses.</p> <p>When caesarean delivery or other operative procedure is advised, follow IPC guidance. (PPE may impact on the decision to delivery interval but it must be done. Women and their families should be told about this possible delay).</p> <p>An individualised decision should be made regarding shortening the length of the second stage of labour with instrumental delivery in a symptomatic woman who is becoming exhausted or has respiratory distress.</p> <p>Delayed cord clamping is still recommended following birth, provided there are no other contraindications.</p>
<p>10. Woman Planned induction of labour</p>	<p>As for elective caesarean delivery, an individual assessment should be made regarding the urgency of planned induction of labour for women with mild symptoms and suspected or confirmed COVID-19.</p> <p>If induction of labour cannot safely be delayed, the general advice for services providing care to women admitted to hospital when affected by suspected/confirmed COVID-19 should be followed.</p> <p>Women should be admitted into an isolation room, in which they should ideally be cared for the entirety of their hospital stay.</p>
<p>11. Additional considerations for women with confirmed COVID-19 and moderate/severe symptoms</p> <p>The following recommendations apply in addition to those specified for women with no/mild symptoms.</p>	<p>Where pregnant women are admitted to hospital with deterioration in symptoms and suspected or confirmed COVID-19 infection, the following recommendations apply:</p> <ul style="list-style-type: none"> ● Admit/refer to a specialized COVID 19 hospital. A multidisciplinary team (MDT) – involving a specialist physician (infectious disease specialist where available), specialist obstetrician, midwife-in-charge, specialist neonatologist, neonatal-nurse in charge, virologist/microbiologist (where available) and specialist anaesthetist responsible for obstetric care should be arranged as soon as possible following admission. (The discussion and its conclusions should be discussed with the woman). <p>The following should be discussed:</p> <p>Key priorities for medical care of the woman:</p> <ul style="list-style-type: none"> ● Most appropriate location of care (e.g. intensive care unit, isolation

<p>Women admitted during pregnancy (not in labour)</p>	<p>room in infectious disease/labour ward or other suitable isolation room) and lead specialty. (Covid19 designated hospitals for severely ill women)</p> <ul style="list-style-type: none"> ● Concerns amongst the team regarding special considerations in pregnancy and newborns. ● The priority for medical care should be to stabilise the woman’s condition with standard supportive care therapies. <p>Considerations for the pregnancy:</p> <ul style="list-style-type: none"> ● Radiographic investigations should be performed as indicated for the non-pregnant adult; this includes chest X-ray and/or CT of the chest. (Reasonable efforts to protect the fetus from radioactive exposure should be made, as per usual protocol). ● The frequency and suitability of fetal heart rate monitoring should be considered on an individual basis, taking into consideration the gestational age of the fetus and the maternal condition. ● Do not monitor the fetal condition in a woman with severe COVID-19. The presence of the fetal heart can be checked intermittently in such cases. ● If urgent delivery is indicated for fetal reasons, birth should be expedited as normal, as long as the maternal condition is stable. ● If maternal stabilization is required before delivery, this is the priority, as it is in other obstetric emergencies. <p>An individualised assessment of the woman should be made by the MDT team to decide whether urgent delivery of the baby is indicated, either to assist efforts in maternal resuscitation or where there are serious concerns regarding the fetal condition.</p> <p>Individual assessment should consider the maternal condition, the fetal condition, the potential for improvement following elective delivery and the gestation of the pregnancy. The priority is stabilizing the mother’s condition.</p> <p>Preterms: Women presenting with moderately severe COVID-19, it is not clear whether the clinical benefits of antenatal corticosteroids might outweigh the risks of potential harm to the mother. The balance of benefits and harms for the woman and the preterm newborn should be discussed. (informed decision, woman’s clinical condition, woman’s wishes, family wishes, available health care resources). (For critically ill women corticosteroids are contraindicated)</p> <p>If spontaneous preterm labour occurs, tocolysis should not be used in an attempt to delay delivery in order to administer antenatal corticosteroids.</p>
<p>12. General advice for obstetric theatre</p>	<p>All staff (including maternity, neonatal and theatre) should have been trained in the use of PPE.</p> <p>The number of staff in the operating theatre should be kept to a minimum, all of whom must wear appropriate PPE.</p>

	<p>Any elective surgery, including elective caesarean section, should be postponed in women with COVID until the infectious period has passed (usually 14 days after the onset of symptoms). For pregnant women who are PUIs, the surgery should be postponed either until the test result comes back as negative or if, the test result is positive, until the infectious period has passed.</p> <p>In cases where elective caesarean delivery cannot safely be delayed (i.e. there is now an urgent or emergency need for caesarean section), the general advice for services providing care to women admitted when affected by suspected/confirmed COVID-19 should be followed.</p>
<p>13. When caesarean section (CS) is required for the woman with COVID-19.</p>	<p>The following guidelines apply:</p> <ul style="list-style-type: none"> ● Birth partners should not accompany the patient in the theatre complex ● Platelet count should always be checked in preparing for the caesarean section. NOTE: Approximately one third of patients in a case series from Wuhan developed thrombocytopenia (platelet count <150). This may have implications both for the anaesthetic and for the surgery. ● Early warning for the senior anaesthetist of an impending caesarean section is essential in order to facilitate preparation of theatre and PPE. ● Where possible, a senior anaesthetist should administer the anaesthesia. This is aimed at reducing theatre time, reducing the incidence of failed spinal anaesthesia and potentially reducing aerosol generation during intubation, if required. ● The surgeon should also be at senior level in order to reduce the risk of operative complications and prolonged surgery, and thereby reducing the incidence of conversion of spinal anaesthesia to general anaesthesia. ● The surgeon, surgical assistant, scrub nurse and midwife (receiving baby) must wear full PPE, including an N95 mask and goggles or visor. ● Anaesthesia for these patients may be either regional or general anaesthesia (GA), as for non-COVID-19 patients. However, GA, which for CS requires endotracheal intubation, creates a greater risk for virus transmission to staff in theatre and for viral contamination of the theatre. If the anaesthesia machine is used either for a GA or for administration of supplemental oxygen, a hydrophobic filter must be used to prevent the machine being contaminated with the virus ($\leq 0.05\mu\text{m}$ pore size).

	<ul style="list-style-type: none"> ● Spinal anaesthesia remains the anaesthetic of choice in the absence of contra-indications. The patient should be wearing a surgical facemask for the duration of the perioperative period. ● Where spinal anaesthesia is used, the airway theatre trolley should be prepared as for a GA. Two sets of intubation PPE: N95 mask, goggles or visor and two pairs of non-sterile gloves should be available on the trolley. An alcohol based hand sanitizer should be available. In the event of a “stable” conversion to GA, the anaesthetist should don full PPE for intubation whilst the assistant monitors the patient. The anaesthetist should return in full PPE and the assistant should then don PPE. Before proceeding, ensure all staff in the operating theatre are wearing PPE. Induction of anaesthesia should be performed and surgery commence/ restart after the airway is secured. In patients at high risk for GA conversion, PPE should be donned before the initiation of spinal anaesthesia. ● Donning PPE is mandatory for tracheal intubation; double glove if intubating the patient and remove the outer gloves once the endotracheal tube is secured. See SASA guidelines: https://sasacovid19.com. ● Tracheal intubation is a high-risk procedure for staff, irrespective of the clinical severity of the disease. Where possible, video-laryngoscopy should be used as first-line. Avoid face mask ventilation unless needed. <p>Failed spinal guidelines:</p> <ul style="list-style-type: none"> ● i) Senior anaesthetic advice should be sought in the event of a failed spinal. If the clinical circumstances permit, a second attempt at spinal anaesthesia is preferred within current ESMOE guidelines. These state that if there are no effects of the failed spinal within 20 minutes, a repeat spinal anaesthetic may be administered. In the event of partial effects, surgery should either be delayed for six hours (depending on indications for CS) or converted to GA. If delayed surgery is chosen, a repeat failed spinal anaesthetic should be converted to GA. Conversions to GA should be done within the current SASA guidelines for GA in the COVID-19 positive patient. ● ii) Where the need to deliver the baby is very urgent, either for fetal or maternal reasons, the perioperative team may make a decision to proceed straight to an urgent GA. In this event, the assistant and anaesthetist should remove gloves and sterilize hands with alcohol. N95 should be applied along with double gloves. Induction and intubation should proceed with all due speed.
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	<ul style="list-style-type: none"> ● No induction should occur without all staff in the theatre having first donned PPE. <p><i>Neonatal Resuscitation post CS:</i></p> <p>Consider neonatal resuscitation outside the operating theatre where possible. This may reduce exposure of the baby and staff resuscitating the baby to aerosols, and potentially minimize the unnecessary use of PPE.</p> <p><i>Post operative pain considerations:</i></p> <p>A combination of paracetamol and an opiate should be routinely used as first-line for post-operative pain relief in the woman with COVID-19. Local anaesthetic around the incision is an additional option. Concerns regarding the use of NSAIDs in the Covid-19 positive patient are not yet proven by clinical data. Accordingly, NSAIDs may be used with caution in the absence of other contraindications, on an individual patient basis.</p>
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12. Summary of key considerations:

- All health facilities must have a process of screening all outpatients for COVID-19 before or as they arrive at the facility. The facility must be able to provide surgical face masks for patients who screen positive, to be worn during all further interactions at the facility.
- Pregnant women with confirmed COVID-19 infection should be managed at the appropriate level of care. All designated birthing sites should be able to identify potential COVID-19 cases, test for COVID-19, identify women with severe COVID-19 disease and be able to manage deliveries with mild COVID-19 disease.
- Outpatient examination and all inpatient management of pregnant women with COVID-19 should be carried out in an appropriate isolation room. Human traffic around this room should be limited to the necessary personnel.
- Birthing sites must set up an isolation room(s) for safe labour and delivery and neonatal care.
- Chest imaging and CT scan, when clinically indicated should be included in the work-up of pregnant women with suspected, probable or confirmed COVID-19 infection.
- All medical staff involved in management of infected women should don PPE as required.
- A specialist multidisciplinary team (midwives, obstetrician, physician, anesthetist, intensivist, virologist,

neonatologist, etc as available) should undertake management of COVID-19-infected pregnant women with severe disease at specialized COVID-19 management centers.

- Timing and mode of delivery should be individualized, depending on both obstetric and medical factors
- Safety of breastfeeding and the need for mother – baby separation: If either the mother or the baby is severely ill, separation may sometimes be necessary, with expressed breastmilk or donor breast milk feeding. In general, for the baby whose mother has COVID, breastfeeding and rooming-in is recommended.

Healthcare professionals engaged in obstetric care including those who perform CT or ultrasound examinations should be trained in IPC measures related to COVID-19 and provided with appropriate PPE. This includes appropriate disinfection of equipment such as ultrasound probes, and CT scan equipment, according to manufacturer specifications

13. General Advice for Healthcare providers

- The COVID-19 pandemic places most pregnant and postnatal mothers and their families under considerable social, economic and psychological strain. Many women will be at increased risk for food insecurity and domestic violence. Although staff too are likely to be highly stressed and deserve care, their engagement with mothers should always be respectful and empathic.
- During the pandemic, health care staff should not be working if they have any COVID-19 symptoms. They must be thoroughly assessed and if appropriate tested for COVID-19 and managed accordingly.
- Health care staff who have been exposed unexpectedly, while without PPE to a COVID-19-infected patient, should be thoroughly assessed regarding exposure history, and if appropriate tested for COVID-19 and kept in quarantine or self-isolation for 14 days from the time of the contact.
- For staff attending to pregnant woman with COVID-19 or PUIs, the same PPE requirements apply as when attending non-pregnant adults with COVID-19. As with all pregnancies, irrespective of COVID-19 status, particularly during labour, there are risks of staff exposure to blood, urine, faeces and amniotic fluid. Routine IPC measures as required for managing all pregnancies and deliveries must therefore be strictly adhered to. However, staff can be reassured that the virus has not so far been detected in amniotic fluid or in breastmilk.

SECTION B: NEONATAL AND CHILD COVID-19 CLINICAL GUIDELINES

Introduction & Epidemiology

Preamble:

“Children are not the face of this epidemic, but they risk being among its biggest victims”

(UN Secretary General’s Policy Brief¹)

Although the vast majority of infected individuals are adults, it is important to make sure that the needs of children are not forgotten, and that adequate provision is made to care for COVID-19 exposed and infected newborn babies and children while maintaining optimal routine and emergency care of children.

“While a strong response to control COVID-19 is needed to save lives, policy makers must also preserve or reinforce resources for maternal and child health, and ensure access to routine care, to prevent a broader crisis and ... limit the direct impact of COVID-19 while maintaining routine health services. While mortality from COVID-19 is currently low for children and women of reproductive age, the indirect effects of the pandemic on maternal and child health, if not acted on immediately, will be profound.”²

The unfortunate fact is that children are seen as not being so severely affected by COVID-19 and are therefore not central to the response. However, interventions to reduce the impact of COVID-19, especially on older adults, have a disproportionate impact on children's lives and health.

14. Epidemiological picture

Based on various reviews of the Chinese experience³ it appears that:

- Children account for fewer COVID-19 infections than adults:
 - 2% of infected individuals are < 19 years of age;
 - <1% of infected individuals are < 10 years of age.
- Children have less severe disease than adults and current data suggest that:
 - 4% are asymptomatic;

¹ UN Secretary General: Policy brief: [The impact of COVID-19 on children](#) (16 April 2020)

² Timothy Robertson DrPH et al. Early estimates of the indirect effects of the coronavirus pandemic on maternal and child mortality in low- and middle-income countries

³ Dong Y, Mo X, Hu Y, et al. Epidemiology of COVID-19 Among Children in China. *Pediatrics*. 2020;145(6):e20200702.

- 51% have mild disease;
- 39% have moderate disease;
- 5% have severe disease;
- <1% have critical disease requiring ventilation;
- Children are infected at home:
 - 82 – 90% of infected children report a household contact.

Newborn babies are at risk of horizontal transmission of infection from a COVID-19 positive mother, with some pointers towards possible vertical transmission although more data is required.

Plans for the management of COVID-19 infected children therefore need to provide guidance on:

- The care of babies born to COVID-19 infected women;
- The care of children with suspected COVID-19 infection;
- Home / community care and isolation (and quarantine for COVID-exposed children);
- In-patient care;
- ICU care.

15. Challenges and considerations

There are a number of significant challenges in developing a response to COVID-19 infection in children:

1. **Unknown number of infected children:** There is no certainty regarding how many children will be infected or, more importantly, how many will have moderate or severe disease requiring admission to hospital or critical care services. Services therefore need to be developed with the worst case scenario in mind.
2. **Delay in diagnostic confirmation of COVID-19 infection:** The reality is that there is both limited laboratory capacity and more importantly substantial delays in delivering specimens from more rural hospitals to laboratories able to perform the necessary test. Until this issue is addressed there will be a significant number of children with suspected infection who need to be managed as though they are infected.
3. **Emergency Medical Services (EMS):** There are a finite number of ambulances with a limited capacity to transport sick children between health facilities. This means that services need to be created in all facilities and the EMS capacity should be reserved for the transfer of sicker children to higher levels

of care. Children’s need for emergency transport will also be impacted by the adult need for EMS services, and there is a real risk that children will be “crowded out”.

4. **Home isolation:** The living circumstances of many children in the country are poor and the ability to implement safe or effective home isolation is extremely limited. As a result, a large proportion of the many children with suspected, asymptomatic or mild disease will not be able to self-isolate at home and will require hospitalization; if alternative plans for isolation sites and quarantine sites, which take children and family units into account, are not implemented
5. **Imminent RSV season:** Winter is associated with RSV season amongst children. The clinical picture of the two conditions (RSV disease and COVID-19) is similar, and every child with RSV infection will need to be managed as a suspected COVID-19 infection, especially in terms of possible exposure risk to staff who will be managing them.
6. **Atypical clinical presentation:** While the clinical presentation of COVID-19 in children in other countries have been described as mostly being asymptomatic or mild, clinicians will need to be alert towards atypical presentations in children. One such group is neonates, many of whom will likely not present with a typical influenza-like disease with fever, and with signs suggestive of neonatal pneumonia and/or sepsis (respiratory distress, temperature instability, apnoea and signs of shock) COVID-19 will need to form part of the differential diagnosis. The other possible atypical presentation is one of a multi-system inflammatory condition with features similar to Kawasaki disease and toxic shock syndrome.
7. **Provision of routine essential health and nutrition services:** this is crucial to ensure good overall Child Health outcomes. The potential of collateral damage on the overall child health services is substantial as a result of an intensive health system response, which is targeted at alleviating the effects of the COVID-19 pandemic. This should be actively mitigated against. Adequate childhood nutrition is also an essential part of ensuring good health and nutritional status in children, and children will likely be at increased risk of poor nutrition in the months to come due to the impact of the COVID-19 epidemic on the socio-economic conditions within households.

16. Case definition and testing

Case definition in children

The definition of COVID-19 disease is likely to change over time as the epidemic progresses and as more

evidence becomes available.

The current case definition, applicable to all ages including adults, children and newborn babies, is:

Persons with an acute (<14 days) illness that includes any of the following:

- **Cough**
- **Sore throat**
- **Shortness of breath**
- **New anosmia (loss of a sense of smell) or ageusia (alteration of the sense of taste)**

Patients with an acute (<14 days) exacerbation of a chronic pulmonary condition should also be considered PUIs (e.g. asthma or COPD exacerbation).

In both children and newborn babies there are variations in their presentation in relation to the above case definition:

- **Children:**

While all children meeting the case definition will be managed as a PUI, it is important to note that children are more likely to present with sudden onset of fever (>38°C) or history of fever; sore throat would often manifest as difficulty swallowing in young children; while shortness of breath would need to include associated chest in-drawing. (Children may also present with a clinical picture of a Kawasaki-like/ hyperinflammatory syndrome - see below)

- **Newborn babies:**

It is expected that the presentation in newborn babies will be atypical, and a high index of suspicion should be maintained:

- They may not have a typical influenza-like illness, particularly a fever.
- Signs suggestive of neonatal pneumonia and/or sepsis (respiratory distress, temperature instability, apnoea and signs of shock) or newborns who present with an atypical clinical presentation should be tested for COVID-19.
- Tests done before 72 hours of age may give a false negative result.
- Neonates from home may also present for medical care after initial discharge from the birthing facility. COVID-19 infection should be included in the differential diagnosis of any neonate presenting with acute respiratory disease, pneumonia or sepsis, and such neonates should be tested for COVID-19 on presentation.

Early diagnosis and appropriate supportive management, especially oxygen, improves the outcome of COVID-19 infected individuals. **Early testing is therefore essential and a low threshold for testing all children**

meeting the above case definition is required.

Screening of children

Screening is the process of identifying children and newborns who meet the case definition (as above), may have COVID-19 and need to be tested.

The following children need to be screened:

- Every baby born to a COVID-19 positive woman;
- Every child attending any health facility;
- All children present during routine household profiling or community testing.

Every child or newborn who fulfils the case definition needs to be tested.

Testing of children

Suspected infection (PUI)

Every child identified through a routine screening process who meets the case definition **MUST** be tested for COVID-19.

Asymptomatic, COVID-19 exposed children must:

- Not be tested;
- Self-isolate at home for 14 days;
- Receive daily monitoring;
- Be tested if they become symptomatic.
- Child-care arrangements should be discussed with the family (child not to be cared for by elderly or person with co-morbidities, like diabetes, hypertension), if at all possible.

Symptomatic children, while waiting to be tested:

- Apply a surgical mask to children over 2 years of age;
 - Place child in an isolation room / separate area in OPD / A&E.

If none is available keep apart from other patients;

- Assess severity of the child's respiratory disease (none, mild, moderate or severe – see section 3.2);
- Until test result available manage the child as a suspected COVID-19 case and according to the severity of his/her disease:
 - Children with asymptomatic or mild disease can self-isolate at home when home

circumstances allow, if not then they must be admitted to a COVID-19 isolation facility if one is available or the “suspected COVID-19” area in the children’s ward.

- Children with moderate or severe diseases need to be admitted to the “suspected COVID-19” area of the children’s ward.

Testing points and technique

Testing should:

- Occur in a designated isolation room/cubicle in a health facility.
- Be performed by a health care worker wearing full PPE including eye protection (goggles or visor), gloves, an apron or gown and an N95 mask (or equivalent, e.g. FFP2 mask).

Meticulous hand hygiene is also essential.

- Include one upper respiratory tract sample (nasopharyngeal or oropharyngeal swabs) in the universal transport medium tube. Use of paediatric swabs are recommended, if available.
- Ensure that samples are kept at 2 – 8°C until processed. (Keep sample in fridge if there is any transport delay)

A system must be established to fast track the processing of tests by the laboratory of children who are classified as having severe disease.

Make sure that arrangements are made to check results and provide these to the child’s family.

- Children with a positive COVID-19 test result can be moved to the “confirmed COVID-19” area.
- Children who test negative for COVID-19 may have been infected during their stay in hospital.

If any child / adult with whom they were cohorted had a positive COVID-19 test then they:

- Must remain in the “suspected COVID-19” area of the ward until discharge.
- On discharge must be quarantined and perform self-monitoring for 14 days from exposure.

While every child meeting the case definition should be tested, there may be circumstances in which it becomes impossible to test every child. Arrangements must be made however to **always** test the following children:

Any child meeting the case definition who

- Is a close household contact of a confirmed COVID-19 case in the past 14 days
- Has attended a health facility at which COVID-19 positive cases are treated in the past 14 days
- Presents with severe pneumonia of unknown origin.

17. Newborns of Mothers with suspected or confirmed COVID-19 disease

Protecting breastfeeding and mother-baby bonding

As far as possible do NOT separate a COVID-19 positive mother from her baby.

- Well women should participate in the care of their babies but IPC (including hand and breast hygiene, face mask, respiratory etiquette) is essential.
- Mothers who are too unwell to take care of their babies should identify an alternative, COVID-19 uninfected caregiver and the baby should be discharged into their care immediately after birth without postnatal contact with the mother. The use of electronic media is encouraged as an attempt to bridge the loss of mother-baby bonding. The baby and caregiver should self-isolate for 14 days during which time the baby is considered potentially infectious. The caregiver should be given preventative advice on hand hygiene, face mask use and respiratory etiquette with education on danger signs (fever/temperature instability etc) and follow-up dates.

Even within difficult clinical scenarios with possible separation of mother-infant pairs due to severe COVID-19 disease, it remains important to adhere to breastfeeding promotion as far as practically possible. This is done by promoting skin-to-skin and breastfeeding by well mothers, whilst unwell mothers should be encouraged to express their breastmilk (EBM) if they can, with the EBM then delivered to the baby by a well family member or staff member.

If a baby is taken home by an interim caregiver, the attempt should still be made feed the baby expressed breastmilk, taking into consideration that the maternal COVID-19 disease is an acute, time-limited illness, and that the breastfeeding period is potentially far longer, with important positive considerations of breastmilk on overall child survival. If unavoidable, infant formula can be used to bridge the period until maternal health is improved, where after additional support should be given to the mother to (re-)lactate.

Within the context of added maternal HIV-infection (and the mother choosing to breastfeed), additional care should be taken to avoid mixed feeding and thereby potentially increase the risk of HIV transmission to the infant. In such situations it may be necessary to admit the baby into the neonatal ward in order to ensure closer geographical proximity between the mother and infant (despite the mother not being able to visit her baby), thereby increasing the chances of feeding only EBM and avoiding mixed-feeding. In such a clinical scenario, maternal ART and viral suppression also need to be managed clinically as per PMTCT guidelines, in addition to her acute illness with COVID-19

Care of well babies

All well babies whose mothers are well enough to care for them should

- remain with their mother in isolation;
- not be admitted to the neonatal ward/ nursery, unless absolutely necessary, any needed treatment to be administered in the postnatal ward if possible (to avoid admission) (staff to use standard PPE; no aerosol-generating procedures to be performed unless full precautions observed (see below))
- receive the usual postnatal care, including skin-to-skin and delayed cord clamping (staff to use standard PPE);
- can breastfeed;
- not have a COVID-19 test;
- be discharged as soon as possible with advice to the mother (see below) regarding danger signs (fever, temperature instability, etc) and IPC ;
- be considered potentially infectious for 14 days and must self-isolate with the mother at home.

Care of well babies whose mothers are unwell

Well babies whose mother is unable to care for them and no caregiver is available or awaiting a caregiver should

- Be admitted to the ward / nursery
- Transported and managed in a closed incubator for the entire duration of admission, while being considered infectious
- Be isolated/cohorted if possible
- Not be tested for COVID-19 unless develops signs meeting the case definition
- Receive standard postnatal care with staff using standard PPE
- Should be fed EBM if mother able to provide this
- Be discharged as soon as possible with advice to the caregiver (see below) regarding feeding and danger signs;
- Be considered infectious for 14 days and must self-isolate with the caregiver at home.
- If mother well enough to take care of the baby before 14 days - be transferred back to her in the postnatal ward ; staff to use PPE as indicated

Care of symptomatic babies needing admission

All unwell/symptomatic babies should:

- Be transported and managed in a closed incubator for the entire duration of admission, and

considered infectious

- Be isolated/cohorted if possible
- Be tested only if meets the case definition
 - Test on day 3 and if negative repeat on day 5 or at another time if clinically indicated
 - Value of repeat testing is not known however delaying and repeating a test reduces the false negative rate
 - If the clinical course is felt to be atypical after 24 hours of birth (e.g. the baby is not following the normal course for respiratory distress syndrome in a preterm baby or transient tachypnoea of the newborn in a late preterm/ term baby) then consider testing before 72 hours with repeat testing on day 5 if negative
 - False negative results are possible before 72 hours of life
 - Testing includes nasopharyngeal and/or oropharyngeal swab for SARS- CoV-2 PCR (nasopharyngeal swab is preferred), or tracheal aspirate (if intubated)
- Have differential diagnoses explored and managed according to standard neonatal guidelines
 - This includes indications and use of nasal CPAP/IPPV if required
 - Staff to use PPE as indicated with the use of a N95 mask for AGP's
- Receive no visitors
 - Mothers may not visit or breastfeed, for 14 days from symptom onset; but are encouraged to provide expressed breastmilk if possible. Use of electronic media is encouraged to assist in mother-infant bonding during this time of separation.
- Be considered potentially infectious for 14 days from onset of symptoms, or 14 days from birth (if not symptomatic)
- Be discharged when clinically recovered:
 - If discharged before 14 days, to complete self-isolation at home for 14 days from symptom onset, or 14 days from birth (if asymptomatic)
 - Follow-up dates must be arranged
 - Mother to first seek telephonic advice if possible to avoid entry into a health facility

18. Clinical picture in children

The clinical manifestations and management of COVID-19 in children are very similar to that in adults.

Simplistically there are seven categories of children infected or affected by COVID-19:

Uninfected;

Newborns of suspected or confirmed COVID-19 infected women (covered in Section 3 above);

Suspected COVID-19 infection;

Asymptomatic / Mild COVID-19 disease;
Moderate COVID-19 disease;
Severe COVID-19 disease;
Kawasaki-like/ hyperinflammatory syndrome.

Clinical symptoms

- Asymptomatic (4%)
- General features:
 - Fever (42 – 50%);
 - Poor feeding;
 - Fatigue;
 - Headache.
- Respiratory:
 - Pharyngitis (45%);
 - Cough (38 – 48%);
 - Rhinitis;
 - Shortness of breath.
- Gastrointestinal:
 - Diarrhoea (9%);
 - Vomiting (6%).

Special investigations in COVID-19 infection:

- FBC: *WCC normal or reduced with reduced neutrophil and lymphocyte counts.

*Platelets reduced.

- CRP / PCT *normal.
- LDH *increased.
- LFTs * abnormal in severe disease.
- CXR *bilateral patchy nodular/speckled ground glass opacities.

Investigations to exclude alternate causes of acute respiratory infection:

- blood culture, HIV test; GeneXpert for TB.

NB. Visualisation of the oropharynx (routine ENT examination) should be minimized, and if required must be performed with the healthcare worker in full PPE. This is not only true for admitted children, but also for children presenting with fever/respiratory symptoms at OPD/A&E, during the time period of the current

COVID-pandemic.

Note on Kawasaki-like /hyperinflammatory syndrome

There have been several reports from Europe and the US of children with a hyper-inflammatory syndrome/ Kawasaki-like disease in contemporaneous relationship to the COVID-19 pandemic. Some of these children, but not all, had positive SARS-CoV2 PCR results, whereas others had positive SARS-CoV2 IgG results, pointing towards an earlier COVID-19 infection, while in some no current or prior COVID-19 infection could be proven.

The clinical presentation has been described as varied, but the condition should be considered when children meet the following case definition:

Children and adolescents 0–19 years of age with fever ≥ 3 days

AND two of the following:

1. Rash or bilateral non-purulent conjunctivitis or muco-cutaneous inflammation signs (oral, hands or feet).
2. Hypotension or shock.
3. Features of myocardial dysfunction, pericarditis, valvulitis, or coronary abnormalities (including ECHO findings or elevated Troponin/NT-proBNP),
4. Evidence of coagulopathy (by PT, PTT, elevated d-Dimers).
5. Acute gastrointestinal problems (diarrhoea, vomiting, or abdominal pain).

AND

Elevated markers of inflammation such as ESR, C-reactive protein, or procalcitonin.

AND

No other obvious microbial cause of inflammation, including bacterial sepsis, staphylococcal or streptococcal shock syndromes.

AND

Evidence of COVID-19 (RT-PCR, antigen test or serology positive), or likely contact with patients with COVID-19.

All children meeting the above case definition should be referred to the nearest paediatric ICU

Classification of severity of Paediatric COVID-19 disease

Criteria for the classification of the severity of disease are provided in the following table

	Mild	Moderate	Severe
Mental status	Normal	Restless	Irritable/lethargic
Feeding	Finishes feed	Does not finish feed	Unable to feed
Talking	Full sentence	Interrupted sentence	Unable to talk
Respiratory rate /min	<40/min if under 1yr <30/min if 1 – 5 years <20/min if over 5 years	40-60/min if under 2 months 40-50/min if 2 – 12 months 30-40/min if 1 – 5 years 20-30/min if over 5 years	>60/min if under 2 months >50/min if 2 – 12 months >40/min if 1 – 5 years >30/min if over 5 years
Respiratory signs	No distress	Chest wall indrawing	Grunting and/or severe Chest wall indrawing
Pulse oximetry (SpO₂)	≥95% in room air	<92% in room air	<92% in room air Central cyanosis

19. Clinical care of children

General assessment of all cases:

- Vaccination status
- Nutritional status
- HIV, TB
- Chronic disease

Differential diagnosis

Asthma and wheezing

Influenza and RSV (or other respiratory viruses)

Typical and atypical pneumonia

Mild disease

Asymptomatic or mild disease can self-isolate at home when home circumstances allow, if not then they must be admitted to the “suspected COVID-19” area in the children’s ward.

Supportive care / symptomatic treatment as per standard protocols:

Paracetamol

Maintenance fluids and feeds with additional sorol/ oral rehydration solution (ORS), if child has diarrhoea.

AVOID: Non-steroidal anti-inflammatories

Nebulising – if necessary use a metered-dose inhaler (MDI) with a spacer.

The mother / caregiver must be given information verbally by the HCW as well as a leaflet on home care and preventing transmission of COVID-19 (see Annexure) that includes a care plan and appropriate information so that they can detect deterioration in the child's condition and details of whom to contact / how to respond should the child's condition deteriorate.

Moderate disease

Children with moderate disease MUST be admitted for in-patient care.

Supportive care:

Monitor 3 - 4 hourly for respiratory deterioration; reduce frequency of monitoring once child is improving.

Supplementary oxygen to keep SpO₂ >90%:

Progress as required from nasal cannula to face mask to face mask with reservoir bag.

If unable to keep SpO₂ > 90% on face mask with reservoir bag contact nearest PICU.

Normal maintenance fluids and feeds with additional sorol/ORS if child has diarrhoea.

Guidance on oxygen therapy:

- If unable to maintain SpO₂ > 92% in room air add nasal prong oxygen (NPO₂) at 2l/min
- If unable to maintain SpO₂ > 92% in NPO at 2l/min then change to 40% face mask (pink) oxygen at 8 l/min
- If unable to maintain SpO₂ > 92% in 40% face mask (pink) oxygen at 8 l/min then change to 60% face mask (orange) at 10l/min
- If unable to maintain SpO₂ > 92% in 60% face mask oxygen at 10l/min change to face mask oxygen with reservoir bag (non-rebreather face mask) at 15l/min and contact nearest PICU
- If unable to maintain SpO₂ > 92% in face mask oxygen with reservoir bag (non-rebreather face mask) at 15l/min consider transfer to nearest PICU if bed available
- PICU would consider the use of HFNC and NIV

Treatment:

There is no specific treatment for COVID-19.

Provide symptomatic relief – Paracetamol as required for pain or fever.

Treat suspected co-infection as per standard protocols for community-acquired pneumonia

Amoxicillin 45 mg/kg/dose 12 hourly per os for 5 days;

OR

Ampicillin 50 mg/kg/dose IVI 6 hourly (AND Gentamicin 6 mg/kg IVI daily for 5–10 days if indicated)

DO NOT give Corticosteroids / Non-steroidal anti-inflammatories

Nebuliser – if necessary use a metered-dose inhaler (MDI) with a spacer.

ICU care for children with severe disease

Children with severe disease are eligible for possible admission to ICU.

The child must be discussed with the nearest paediatric ICU or high care unit for:

- Possible transfer;
- Advice on interim management pending transfer including both what should and should not be done;
- Ongoing care, if for any reason, they are unable to accept or it is not possible to transfer the child.

Intubation should only be undertaken in consultation with the nearest paediatric ICU/HCU and must be undertaken by the most senior member of staff on site using full protective measures (see below).

Further ICU management is similar to that for any other child. Proning may be beneficial

To ensure maximal benefit from the few available paediatric ICU beds in the province the withdrawal of support will be considered in any child whose condition is deteriorating. Criteria for this assessment are being developed.

De-isolation

Adults with COVID-19 continue to shed SARS-CoV-2 from their upper airways for 8 – 37 days depending on the severity of their disease – the more severe the disease the longer the period of viral shedding.

Children need to be isolated until they are no longer likely to be shedding virus:

- Asymptomatic children 14 days from initial +ve test

- Mild disease 14 days from onset of symptoms
- Moderate / severe disease 14 days after they are clinically stable ie cessation of oxygen.

In addition to respiratory viral SARS-CoV-2 shedding, there have been reports of viral shedding in stools of children. The importance of this in terms of possible viral transmission is not fully understood. Care should be taken with nappy changes, with hygiene precautions, especially with good hand washing when changing nappies at home, and wearing of gloves when changing nappies in the hospital setting.

Children admitted to hospital can complete their isolation at home once they are well enough to be discharged provided their home circumstances support self-isolation, or could be discharged to a quarantine/isolation facility (see annexure).

There should be careful consideration as to how any discharged patient who is still potentially infectious travels home (obligatory mask-wearing, if possible through Planned Patient Transport).

20. COVID-19 Service and care plan for neonates and children

Isolation and PPE for neonates and children

Newborns would acquire the infection post-natally through close contact with their COVID-19 positive mother (or other caregivers) and usually not through vertical transmission in-utero. Children with confirmed COVID-19 infection likely acquired the infection at home, most commonly from their mother/primary caregiver.

An infected child (or neonate) can transmit the infection to their household (and other) contacts as well as to other users of health services (i.e. is considered infectious).

Self-isolation or home-based care

These guidelines aim to reduce transmission from or to children within the household in circumstances where a child is either asymptomatic or has mild symptoms and is not clinically in need of a hospital admission.

Newborns of COVID-19 positive mothers

The mother should self-isolate at home with her baby, practising strict infection control rules to avoid infecting the baby while caring for him/her, especially while breast feeding. Other family members should ideally avoid coming close to or touching the baby until this high-risk period is over. The mother would be given guidance on the danger signs to look out for and when and where to take the baby for follow-up. Non-urgent follow-up should be scheduled for after the risk period is over.

In the case of a newborn baby the major objective is to sustain breastfeeding and bonding between mother

and newborn, while reducing as far as possible horizontal transmission from mother to newborn while the mother is still infectious (i.e. for 14 days from the onset of symptoms, and is asymptomatic) It must be remembered that there may be other infected people in the family unit / household who might also infect the baby.

Suspected or confirmed COVID-19 positive children

The child needs social, psychological and physical support, so ongoing interaction with mother/primary caregiver is very important. The purpose of isolation is to limit spread beyond the mother and child but not between them.

Basic principles/assumptions:

- Most household members will have been exposed to the SARS-CoV2 virus by the time the first (index) case is confirmed.
- Home-based care for people with mild COVID-19 disease and those who have been exposed to infection with the virus (SARS-CoV2) is very similar.

The health care worker who decides that home-based care is appropriate should explain to the mother/caregiver what is expected of them, both verbally and then by providing a written care plan and leaflet.

At the top of the leaflet is a section with blank spaces where the health care worker must fill in the quarantine/isolation plan for that child/family and hand it to the caregiver.

1. The health care worker needs to find out who lives in the household: the number of people, their ages, who has confirmed/suspected disease or is asymptomatic, and the physical arrangements (how many rooms, bathrooms, spaces etc.)
2. Healthier individuals (without symptoms/unknown status) should care for those children who are not confirmed positive
3. Since the elderly (e.g. grandparents) are at highest risk for severe COVID-19, they should, as far as possible, not provide care for those with suspected or confirmed disease.

(NOTE: if the household is not able to follow these guidelines for safe home-based care then the health care worker should make arrangements for the child and caregiver to stay in a quarantine facility; or even in some cases to be admitted to hospital, until no longer able to transmit the disease to others).

Isolation in hospital

Neonates:

Every facility which either conducts deliveries and /or admits newborns needs to make provision for the following:

- A postnatal isolation ward for suspected or confirmed COVID-19 positive mothers. This ward would

enable rooming-in of well newborns with their mothers, and with provision made to deliver all postnatal care, as well as delivering at the bedside additional interventions for the newborn that do not require admission (including phototherapy, glucose control, etc). Staff caring for babies born to mothers with suspected or confirmed COVID-19 must use standard PPE; all mothers must use a surgical mask and practice hand and breast hygiene.

- Careful consideration needs to be given to the care of premature babies born to COVID-19 positive mothers, as they would need to practice KMC in an isolation postnatal ward until the mother is considered non-infectious.
- Any baby requiring admission to the neonatal unit should be nursed in a closed incubator for the entire duration that the baby is considered infectious. If possible babies may be cohorted or placed in an isolation cubicle. All babies on respiratory support should be managed in a closed incubator.
- Capacity will be needed to care for well newborns of COVID-19 positive mothers who have been admitted / are not well enough to care for them and who are awaiting a caregiver chosen by the mother / family who will care for them home. This would require a closed incubator for transport and management of the newborn.
- Capacity will be needed to isolate and care for newborns who are admitted, including requiring a closed incubator at all times; such newborns maybe cohorted together or admitted to an isolation cubicle if available,
- Full PPE is required for any aerosol-generating procedure (AGP) performed on either the mother or the baby which includes hand hygiene, apron/gown, gloves, eye protection (goggles/visor) and a N95 mask (or equivalent). AGP's include intubation, extubation and related procedures (bag mask ventilation and open suctioning of the respiratory tract), surfactant administration, obtaining nasopharyngeal/oropharyngeal swabs, induced sputum and all forms of ventilation (non-invasive and invasive) which includes CPAP and high flow nasal cannulae. PPE as indicated should be used for the entire duration that the baby is considered infectious.

Children and accompanying caregivers

A COVID-19 infected child or one suspected of being infected can obviously be infectious and thus pose an infectious risk to those around him/her (although the level of this risk is not known). However, for paediatric care (not neonatal) the approach to the mother-child pair during testing or hospital admission must take into account that PPE and isolation procedures will be absolutely frightening for children. There should be specific attention paid to ensuring the presence of the mother or familiar caregiver at all times, even though this will require additional provisions, to accommodate both in isolation facilities and to ensure adequate vigilance.

- A regular caregiver/mother who had been looking after the child before admission probably is/was

already infected, and there would be a need to test her immediately. The mother/caregiver should be given PPE until her test result is available, but this can be suspended (in relation to the child) if she tests positive.

- She herself should be monitored at least twice daily for fever or symptoms requiring clinical care (having 2 patients instead of one, cared for together if at all possible). A caregiver who is not a regular caregiver should not accompany the child for the hospital admission, as invariably this person will have a big risk of becoming infected by COVID-19 by caring for the child.
- The case of a mother who is not the regular caregiver of the child, but brings the child to hospital for medical attention, might also arise and will need to be handled on an individual basis. In all such situations it is crucial that good communication is practiced with the family, the risks and benefits are explained, and a combined strategy is devised and agreed upon.

Lodger mothers

Well postnatal mothers who stay at the hospital because the baby is admitted (sick and/or small) –the lodger and KMC mothers – may need to stay at the hospital for weeks.

The risk in terms of COVID-19 would be mothers who initially were thought to be COVID-19 negative, but then either develop disease because they were still in the early disease phase on admission; or get infected nosocomially (i.e. a local outbreak).

Interventions in relation to these mothers must include maternal hand washing; mask wearing; at least twice daily symptom screening and temperature checks; social distancing as far as possible, including looking at sleeping arrangements (avoiding overcrowding as far as possible); restriction of movement; and twice daily cleaning of lodger facilities.

Staff PPE in this setting (staff working with any KMC /lodger mothers) would need to assume at least some level of risk – so hand washing and surgical mask wearing as a minimum.

21. Requirements for PPE

Indication	Consists of	Required for
Standard PPE (staff)	gloves, surgical mask, apron May require eye covering (visor or goggles) if risk of	All staff caring for or transporting women with suspected or confirmed COVID-19 or their newborn babies.

	mucosal splash.	
Full PPE (staff)	gloves, gown, hair cover, N95 respiratory mask, goggles/visor	Any aerosol generating procedure in newborns or children (see 4.4.5)
PPE for mothers / caregivers	Hand hygiene, face mask	Mother with confirmed or suspected COVID-19 infection caring for or breastfeeding her newborn child. Lodger mothers entering nurseries, KMC mothers

22. Requirements in relation to organisation of services

Uninfected

Children requiring admission for any non-respiratory illness need to be kept apart from children with suspected or confirmed COVID-19 infection.

Suspected infection

Every child meeting the case definition is regarded as a suspected infection and needs to be given a surgical mask (if above 2 years of age) and directed to an isolation room / separate area in OPD / A&E. If none is available, keep apart from other patients.

The child is tested for COVID-19 according to guidelines (above), staff to be wearing PPE with appropriate precautions.

The child is then managed as a confirmed case and according to severity of his/her disease:

- Asymptomatic or mild disease can self-isolate at home when home circumstances allow, if not then they must be admitted to the “suspected COVID-19” area in the children’s ward.
- Children with moderate or severe diseases need to be admitted to the “suspected COVID-19” area of the children’s ward (see below for admitted children).

Make sure that arrangements are made to check results and provide these to the child’s family.

Systems must be established to fast track the processing of tests by the laboratory of children with suspected COVID-19 who are classified as having severe disease.

Mild disease

Consider home care and self-isolation for all children with mild disease.

Requirements for self-isolation at home include:

- Facilities and capacity allow for self-isolation:

- Cohort all exposed household members;
 - If possible - separate bedroom and bathroom;
 - If not possible – occupancy must be restricted to household members only;
 - occupants must maintain a 1 – 2 meter distance from child;
 - child needs to wear a face mask (if older than 2 years).
 - Child must have own/dedicated household items (cup; eating utensils et);
 - Household must practice strict hand hygiene;
 - All high touch surfaces should be cleaned frequently – at least twice a day.
- Family has means to contact or return to health facility if the child deteriorates

NB if home circumstances do not support self-isolation then the child must be admitted to an isolation facility if this is available or a hospital if it is not.

Caregiver must be given appropriate information and a leaflet (appendix x)

Moderate disease

Children with moderate disease need to be admitted for in-patient care. .

On admission, isolation and cohorting of COVID confirmed or suspected children and their caregivers would need to be carefully planned in accordance with the capacity of each facility. Plans must take into account that uninfected children should not be exposed to nosocomial infection risk, including where possible those who present with respiratory symptoms but are found on testing to not be infected. Children with confirmed COVID-19 infection, and persons under investigation (PUI) who were in close contact with a confirmed / probable case of COVID-19 or attended a facility managing COVID-19 patients will be prioritised for management in single isolation cubicles if possible.

Among children with acute respiratory infection who require high care, children with bronchiolitis / asthma should be cohorted separately from those with other acute respiratory infections. Increased spacing in the high care area or cubicles should be considered wherever possible.

As there are three broad groups of children each hospital needs to create THREE in-patient areas, one for each category:

Non-COVID-19 children

Suspected COVID-19 children

Confirmed COVID-19 children

Each area needs to be totally separate and enclosed with its own equipment and staff.

Ablutions should ideally be separate, or bed pans used if separation not possible.

Options for creating three areas include:

- Dedicated cubicles in a children's ward – if the ward has cubicles.
- Dedicated children's wards – if the hospital has 2 or more children's wards.

If there are 2 children's ward it is suggested that one is used as a non COVID-19 ward and the other as a COVID-19 ward split into two sections – suspected and confirmed.

- Dedicated hospital COVID-19 wards for both adults and children

In this circumstance it is important that:

- Children are preferably placed in a female ward; Or
- Are accommodated together in a single cubicle/corner/section of the ward.

The relative size and number of beds in each area will change as the South African epidemic evolves. The preferred option will therefore be dictated by the structures of the facility and the number of children needing accommodation.

In light of the imminent RSV season the number of suspected paediatric cases is expected to be high and any impulse to use underutilized children's wards for adult services should be avoided.

ICU care for children with severe disease

Children with severe disease are eligible for possible admission to ICU.

This will require a province-by-province and often a region-by-region plan identifying all existing or potential paediatric high-care (HICU) and intensive care (PICU) beds in tertiary and central hospitals. Some Regional Hospitals may also be able to provide short term interim ventilation for 1 or 2 children pending transfer to a PICU (as a holding unit).

Children with COVID-19 infection:

- MUST be accommodated apart from those without the infection; and
- ICU services also need to be provided for children without COVID-19 infection

Existing ICUs must therefore be configured to cater for both requirements, generally in different hospitals or with separate facilities for both categories of children.

A provincial "bed manager" is strongly advised to monitor the use and availability of ICU beds for children

across the province and inform / support any hospital with a child who is considered eligible for admission to a PICU in relation to contacting the receiving hospital, arranging transport and if no bed is available facilitating advice on supportive or palliative care whichever is most appropriate.

Children under investigation for COVID-19 who require CPAP should be managed in the PICU or in an isolation space. Filters should be routinely added to CPAP systems throughout the hospital.

23. Aerosol-generating procedures

Avoid common modalities of care likely to promote aerosolisation of the virus – routine oropharyngeal examination; nebulisers (instead use metered dose inhalers, together with spacers, if needed); high flow oxygen therapy; nCPAP/BiPAP.

Any AGP that may be necessary including intubation, must be carried out by experienced staff wearing full PPE (N95 respirator, goggles, hair cover and gown) in a closed room (with negative pressure if this is available). It is recognised that nCPAP / BiPAP -[1] nCPAP/BiPAP are beneficial to individual children. However, the risk to staff and caregivers from aerosolisation is high and persists for as long as the modality of care is being used. These modalities should therefore only be considered in the following circumstances:

- The child should be nursed in an isolation room;
 - Ideally this room should have negative pressure;
 - If negative pressure is not available then a Perspex intubation box should be used
- Staff need to wear full PPE, with visor and N95 mask, continuously whilst in the same room as the child;
- Filters should be applied to the nCPAP/BiPAP exit limb tubing.

24. Ensuring ongoing care

Maintaining essential services and continuity of care

There is clearly a risk of transmission of COVID-19 between users who are waiting to receive health care services. However, there is also a great risk of collateral damage to emergency care for children as well as to routine essential paediatric services, especially neonatal care, infant feeding, routine preventive services like EPI as well as HIV/PMTCT/TB/ nutrition services.

Such services need to be prioritized and potentially re-organized to ensure ongoing access for children. Mothers (and others in the community) must be made aware of the need to continue bringing their children for essential services. In spite of the need for health facilities to isolate or separate those with respiratory

symptoms, effective systems for triage of seriously ill children in place must be in place. Mothers must be given clear instructions on danger signs and when to bring children back, and health services must be set up to meet such needs.

Childhood nutrition, due to its multi-sectoral and socio-political context, will need enhanced attention/intervention in the current environment.

Essential outpatient services that must continue

- Immunizations
- PMTCT services for pregnant women and babies
- All HIV- and TB-services, including testing and treatment
- IMCI/sick child visits
- At this stage of the pandemic, the day 3 neonatal visit at the PHC level will continue. The situation will be monitored closely. These visits may be suspended in future as the pandemic evolves.
- Deworming and Vitamin A supplementation should continue, if they form part of any other visits to the PHC facilities.
- Nutritional assessment and interventions
- Monthly well-child visits without other child health service provision (like immunizations, PMTCT, etc) can potentially be suspended in geographical areas on high alert of SARS CoV2 transmission, except if a child is already classified as nutritionally at risk

Protecting children from COVID-19 exposure during care

Care of children with acute respiratory illness

Care of children presenting with other acute illnesses during this period, especially acute upper- and lower respiratory diseases (RSV bronchiolitis season, etc) requires specific provisions to be made.

Due to the potential risk of nosocomial aerosolized spread of (undiagnosed) COVID-19 through use of inhalations (in OPDs, casualties and paediatric wards) the following guidelines have been introduced:

- **Bronchiolitis:** All use of inhalations is stopped. Only oxygen is given.
- **Asthma:** Inhalations are given using MDIs, with spacers if needed. [Status asthmaticus and critically ill children are exceptions, since they might not inhale well enough and need continuous oxygen.]
- **Croup:** Individualized management, but probably will need to give inhalations, but with additional care and health worker protection.

This means that for asthmatic patients health facilities need to order ward stock of MDIs and spacers

for the casualties and paediatric wards. The spacers would need to be patient-specific (not shared) to avoid cross-contamination, and can be given to patients to take home afterwards.

Reducing visits to or exposure in healthcare facilities

Non-urgent paediatrics OPD and or specialist clinics should be scaled down to face to face visits of 3-6 months' intervals, except if more frequent visits are clinically indicated. Where possible, medication can be given for more extended periods with clear instructions on when to return. Children on chronic medication who are clinically stable should be enrolled on the CCMDD programme wherever possible. Managers must ensure that children with chronic illnesses returning for follow-up or for urgent reviews are not mistakenly turned away.

Strategies for providing acute emergency paediatric and neonatal services

It is envisaged that the emergency department will be inundated with assessment of patients with suspected or confirmed COVID-19 infection.

To protect patients from getting infected with COVID-19 from exposure from the emergency department, the following strategies should be used:

- There should be screening outside the emergency department to separate patients under investigation for COVID-19 from the other patients;
- Where possible the ED should deal with patients with respiratory symptoms and suspected or confirmed COVID-19 disease;
- There should be separation of areas of emergencies for non-COVID-19 disease without respiratory symptoms

25. Recording and reporting

COVID-19 reporting

There are a variety of different forms to record and report cases of COVID-19 infection.

All forms are available from www.nicd.ac.za

Tool	When to complete	Comment
Patient under investigation (PUI) form	To be completed for all individuals suspected of COVID-19 disease and have a specimen taken	This needs to be completed for all patients from whom NP/OP swabs are collected. Remember to document patient's full contact information, travel history, any comorbidities that the patient may have and whether they

		are in hospital or not
Notifiable medical condition (NMC) case notification	To be completed for all cases who meet the case definition for COVID-19 infection	Notify confirmed cases only Can be completed online using NICD NMC mobile or web based app
Daily Monitoring form	To be completed for all confirmed patients daily until de-isolation	This form will document patient progress and outcomes

COVID-19 NIDS

The clinical data that this requires is:

1. No of COVID-19 admissions into
 - a. Standard care bed
 - b. Critical care bed (HC or ICU)
2. No of COVID admissions (total of above – std & critical care)
3. No of inpatients with COVID-19
 - a. Isolation (community care)
 - b. Std care bed
 - c. High care bed
 - d. ICU bed
4. No of inpatients with COVID-19 – total
5. No of +ve COVID-19 cases discharged - <5 years or 5 – 60 yrs or > 60 yrs
6. No of deaths of COVID-19 cases < 5 years or 5 – 60 yrs or > 60 yrs
7. No of COVID-19 transfers out < 5 years or 5 – 60 yrs or > 60 yrs
8. Separations COVID-19 cases - < 5 yrs or 5 – 60 yrs or >60 yrs
9. Separations total

How this data is collected should not be prescribed as each province or facility may chose different processes (eg by adding a sheet with columns to the admission/discharge register)

Additional information for neonates and children

As part of a larger process to collect data on pregnancy outcomes, data collection relating to pregnant women with Covid-19 is proposed as an addition onto the PPIP data collection system and use that base to monitor the impact of Covid-19 and non- Sars-CoV-2 virus infection on pregnant women and their babies.

All sites would be asked to complete a one-page data sheet for women who are or have been infected with Sars-CoV-2 virus during their pregnancy and a one-page summary of the outcome of the neonate (see annex). The form would be completed for the woman at delivery and for the neonate at discharge. The sites must continue to complete PPIP as they would have in the past, but will need to submit their data **monthly** to the National PPIP database.

Discussions are currently underway to finalise this proposal based on its successful conclusion, to develop a similar one drawing on the Child PIP data base for children above 1 month of age.

26. APPENDICES

Appendix: Accommodation of Child and Caregiver

The principles to be considered when deciding on where to place children and their mothers are:

- As far as possible every child should be admitted with his/her mother or primary caregiver;
- Children acquire COVID-19 infections at home so if child and mother or caregiver live together then they are likely to both be infected;
- When keeping mother or primary caregiver and child together in hospital this needs to occur in a fashion that does not:
 - Place the mother or primary caregiver at unnecessary risk; OR
 - Expose other mothers or caregivers to possible COVID-19 infection.

Child	Mother / Caregiver	Placement
Well or mild with Suspected or confirmed	Well	Home isolation
	Infected but well	Home isolation – cohort mother and child
	Admitted	Home isolation with alternate caregiver
Moderate: Suspected or confirmed	Well	Mother to room in with child NOT mother's lodge*
	Infected but well	Mother to room in with child NOT mother's lodge
	Admitted	Option for alternate caregiver to stay with child*
Severe**: Suspected or confirmed	Well	Mother to room in with child NOT mother's lodge*
	Infected but well	Mother to room in with child NOT mother's lodge
	Admitted	Option for alternate caregiver to stay with child*

* Provide an indemnity form, about the risk of COVID-19, for the mother / alternate caregiver to sign.

** When considering accommodating mothers in the PICU bear in mind that:

These children are critically ill;

The mother is unlikely to be able to support her child but needs to be present;

Health care workers may need urgent access to the mother or family;

Health care workers require complete access to the child at any time.

So.... Explore whatever option to accommodate mothers that works in your ICU without compromising the care of children.

Appendix: Management algorithms

See link

Appendix: Caregiver Information –Guideline for home-based care of children with suspected/confirmed COVID-19

See link

Appendix: Standard Operating Procedures for Quarantine / isolation of Pregnant women and children

Appendix: proposed form for collection of neonatal data

In-hospital COVID-exposed neonates: Individual data sheet

Maternal ID	<i>[link to maternal ID on obstetric COVID-19 form]</i>	
Infant ID	<i>[keep list onsite of Infant ID with names & facility reference Nr]</i>	
Maternal information <small>(if out-born or admitted from home) OR (if maternal COVID-19 data is not collected at local site) OR (if paediatric staff opts to document the maternal data)</small>	Parity	/ not recorded
	Age	/ not recorded
	Antenatal care	Yes / no / not recorded
	Maternal HIV status	Positive / negative / not recorded
	If HIV-positive, maternal ART	TEE / TLD / 2 nd -line / other / intrapartum / none / not recorded
	Mode of delivery	Vaginal / Caesarean section / not recorded
	Hypertensive disease	PET / eclampsia / non-pregnancy HT / none / not recorded
	Diabetes	Yes (gestational) / yes (non-gest) / none / not recorded
	Number of fetuses	/ not recorded
	Antenatal steroids	Yes / no / not recorded
	Prolonged rupture of membranes	Yes / no / not recorded
	Maternal pneumonia	Yes / no / not recorded
	Maternal level of illness	Well / ill / critically ill (HCU or ICU) / not recorded
	Maternal death (any cause)	Yes / no / not recorded
Maternal positive COVID-19 test <small>(from 14 days before delivery up until neonatal admission date)</small>	Date maternal COVID-19 test	
	Type maternal COVID-19 test	PCR / antibody / other:
Neonatal information <small>(in-born and out-born) (all admissions within neonatal period) (include COVID-exposed neonates who room-in with their mothers after birth) (filled at primary neonatal ward, before down-referral/step-down)</small>	Date of birth	
	Date of admission	
	Birth weight	
	Sex	Male / female / not recorded
	Place of birth	Inborn / another facility / in transit / at home / not recorded
	Gestational age	
	Apgar score @ 1 min	/ not recorded
	Apgar score @ 5 min	/ not recorded
	Admission ward	NICU / HCU / standard neonatal / with mother / not recorded
Neonatal signs & symptoms <small>(tick all relevant)</small>		Rash/ oedema/ fever/ hypothermia/ cyanosis/ resp distress/ hypoglycaemia/ hyperglycaemia/ apnoea/ lethargy/ seizures/ feeding intolerance/ vomiting/ diarrhoea/ dehydration/ pallor / jaundice / other:
Neonatal diagnosis <small>(tick all relevant)</small>		Prematurity/ LBW/ VLBW/ ELBW/ HMD/ TTN/ MAS / congenital pneumonia/ cong sepsis/ nosocomial sepsis/ NEC/ jaundice (phototherapy)/ perinatal hypoxia (prem baby)/ HIE/ intracranial haemorrhage/ shock/ cong abnormalities/ other:
Interventions <small>(tick all relevant)</small>	Respiratory support	O ₂ / NPO ₂ / HFNC/ CPAP/ IPPV/ Oscillation/ None/ other:
	Surfactant administration	Yes / no / not recorded
Neonatal COVID-19 testing <small>(record all relevant)</small>	Result COVID-19 test (test 1)	Positive / negative / indeterminate / not recorded / not done
	Date COVID-19 test (test 1)	
	COVID-19 specimen type (test 1)	NPA / OPA / tracheal aspirate / other:
	Type COVID-19 test (test 1)	PCR / antibody / other:
	Result COVID-19 test (test 2)	Positive / negative / indeterminate / not recorded / not done
	Date COVID-19 test (test 2)	
	COVID-19 specimen type (test 2)	NPA / OPA / tracheal aspirate / other:
	Type COVID-19 test (test 2)	PCR / antibody / other:
Infant feeding <small>(tick all relevant)</small>	Infant feeding type	Breastfeeding / expressed breast milk / infant formula / donor milk / TPN / not recorded
Neonatal outcome <small>(record at discharge/ down-referral/ separation)</small>	Discharge type	Remained with mother / discharged to mother / discharged to caregiver / referred out for neonatal care / down-referred (step-down) / death
	Date of discharge/ death	

Appendix: Simple terminology / Concepts

There are a variety of terms or concepts that patients and their family need to understand in dealing with COVID-19.

These include:

Close Contact

Contact with a confirmed or suspected COVID-19 infected person in the following context:

- Face-to-face contact (within 2 meters) or in a closed environment for more than 15 minutes;
- Living in the same household;
- Working closely together;
- Any healthcare worker not wearing PPE.

Hand Hygiene

This is a preventive and protective measure.

There are 2 modalities of hand hygiene:

- Hand washing:
 - Washing with soap and hot running water;
 - For 20 seconds;
 - Both surfaces of hands and forearms and between all fingers;
 - At least twice daily; when soiled; before preparing food; before eating; after using the toilet.
- Sanitising with alcohol-based hand rub (at least 60% alcohol):
 - When unable to wash with soap and water;
 - After contact with frequently touched surfaces.

Social Distancing

This is a preventive and protective measure.

Maintaining sufficient space from potential sources of COVID-19 infection by:

- Staying at home as much as possible;
- Staying at least 1 – 2 meters from other people;
- NOT hugging, kissing or shaking hands;
- Avoiding groups
- Avoiding contact with frequently touched surfaces such as door knobs.

Self Quarantine

Applies to COVID-19 exposed person or person with suspected infection.

This entails the following:

- Staying at home for 14 days
- Minimising contact with other household members
- Not sharing household items

Self Monitor

Applies to COVID-19 exposed individual in quarantine.

Involves looking out for early signs of COVID-19 infection:

- Check temperature twice a day
- Watch for symptoms:
 - Respiratory illness – rhinitis; cough; sore throat; shortness of breath;
 - General ill health – fatigue; muscle aches and pains; diarrhea.

Self Isolation

This applies to an individual with confirmed COVID-19 infection.

This entails the following:

- Staying at home for 14 days;
- As far as possible using separate bedroom and bathroom;
- Minimising contact with other household members;
- Not sharing any household items.