

## Management of COVID19 Pregnant Women: Guidelines for Health Care Providers in Pakistan

This guide is provided by **SOGP( Society of Obstetricians & Gynaecologists of Pakistan)** as a resource for Pakistani Healthcare Professionals based on a combination of available evidence from WHO and other leading sources, and adapted from RCOG guidelines (28.3.20).

This guideline will be updated as new information becomes available.

### Transmission

Most cases of COVID-19 globally have evidence of human to human transmission. This virus can be readily isolated from respiratory secretions, faeces and fomites.

There are two routes by which COVID-19 can be spread: directly from close contact with an infected person (within 2 metres) where respiratory secretions can enter the eyes, mouth, nose or airways - this risk increases the longer someone has close contact with an infected person who has symptoms; and secondly, indirectly by touching a surface, object or the hand of an infected person that has been contaminated with respiratory secretions and then touching one's own mouth, nose, or eyes.

Healthcare providers are recommended to employ strict infection prevention and control (IPC) measures (as described at the end of this document)

Pregnant women are at the same risk to contract the infection as the general population. Pregnancy itself alters the body's immune system and response to viral infections, which can occasionally be related to more severe symptoms and this will be the same for COVID-19.

**Vertical transmission** (transmission from mother to baby antenatally or intrapartum)

Emerging evidence now suggests that vertical transmission is probable, although the proportion of pregnancies affected and the significance to the neonate is yet to be determined. Previous case reports from China suggested that there was no evidence for this and amniotic fluid, cord blood, neonatal throat swabs, placenta swabs, genital fluid and breast milk samples from COVID-19 infected mothers have so far all tested negative for the virus. A new report published on 26 March 2020, describes an infant born to a COVID-19 positive mother was also found to have SARS-COV-2 IgM in serum at birth. Since IgM does not cross the placenta, this is likely to represent a neonatal immune response to in utero infection. The evidence above is all based on a small numbers of cases. The situation may change. Please keep your patient records and share the summaries with SOGP on [sogpjpmc@ormail.com](mailto:sogpjpmc@ormail.com) , so we can adapt our guidelines as we deal with this new illness

### Effect on the mother / symptoms

There may be asymptomatic individuals or those with very minor symptoms who are carrying the virus. Majority of women will experience only mild or moderate cold/flu like symptoms. Cough, fever and shortness of breath are other relevant symptoms.

Whilst pregnant women are not necessarily more susceptible to viral illness, changes to their immune system in pregnancy can be associated with more severe symptoms. This is particularly true towards the end of pregnancy. More severe symptoms such as pneumonia and marked

hypoxia are widely described with COVID-19 in older people, the immunosuppressed and those with longterm conditions such as diabetes, cancer and chronic lung disease. These same symptoms could occur in pregnant women so should be identified and treated promptly. The absolute risks are, however, small.

At present there is one published case of a woman with severe COVID-19 who was admitted to hospital at 34 weeks' gestation, had an emergency caesarean section for a stillborn baby and was admitted to the intensive care unit with multiple organ dysfunction and acute respiratory distress syndrome, requiring extracorporeal membrane oxygenation. There are no reported deaths in pregnant women. Other reported cases of COVID-19 pneumonia in pregnancy are milder and with good recovery. Individual responses to viral infection are different for different women and for different viruses. Influenza and pregnancy provides a useful comparator: data from Australia have identified that there are significant increases in critical illness in later pregnancy, compared with early pregnancy. In other types of coronavirus infection (SARS, MERS), the risks to the mother appear to increase in particular during the last trimester. In one study, there was an increased risk of preterm delivery being indicated for maternal medical reasons after 28 weeks' gestation.

### **Effect on the fetus**

There are currently no data suggesting an increased risk of miscarriage or early pregnancy loss in relation to COVID-19. Case reports from early pregnancy studies with SARS and MERS do not demonstrate a convincing relationship between infection and increased risk of miscarriage or second trimester loss.

There is no evidence currently that the virus is teratogenic. Very recent evidence has, however, suggested that it is probable that the virus can be vertically transmitted, although the proportion of pregnancies affected and the significance to the neonate is yet to be determined. There are case reports of preterm birth in women with COVID-19, but it is unclear whether the preterm birth was always iatrogenic, or whether some were spontaneous. Iatrogenic delivery was predominantly for maternal indications related to the viral infection, although there was evidence of fetal compromise and prelabour preterm rupture of the membranes in at least one report.

### **General advice regarding the continued provision of antenatal and postnatal services**

- Care for pregnant and postnatal women is an essential service & should be planned
- Women should be advised to attend routine antenatal care unless they meet current self-isolation [guidance for individuals and households of individuals with symptoms of new continuous cough or fever](#).

Maternity care has been shown repeatedly to be essential. If women do not attend antenatal services they are at increased risk of maternal death, stillbirth, and other adverse perinatal outcomes.

- Units should rapidly seek to adopt teleconferencing and videoconferencing capability and consider what appointments can be conducted remotely.
- Record keeping remains paramount.

- Electronic record systems should be used if possible, and where remote access for staff or patients is an available function, this should be expedited. When seeing women face to face, simultaneous electronic documentation will facilitate future remote consultation.
- Clinicians should co-ordinate care for women forced to miss appointments due to self-isolation. Women should notify their doctor/hospital, of their self-isolation through phone numbers that are already available to them. Appointments should then be reviewed for urgency and either converted to remote appointments, attendance advised or deferred.

### **Intrapartum services**

- Intrapartum services should be provided in a way that is safe, with reference to minimum staffing requirements and the ability to provide emergency obstetric, anaesthetic and neonatal care where indicated.
- Women should be permitted to have a birth attendant/support person present with them in their labour and during birth. Having a trusted birth attendant present throughout labour is known to make a significant difference to the safety and well-being of women in childbirth. A single, asymptomatic birth attendant should be permitted to stay with the woman, at a minimum, through pregnancy and birth, unless the birth occurs under general anaesthetic. Additional restrictions, such as limiting the number of birth attendants to one, restricting any visitors to antenatal or postnatal wards, and preventing swapping and postnatal visitors, should follow hospital policy.
- The evidence for the safety of birth settings that are not co-located with an obstetric unit is based on the availability of ambulance services to enable rapid transfer, and appropriate staffing levels.

### **Smoking in pregnancy**

Smoking cigarettes/ sheesha is very likely to be associated with worse outcomes for COVID-19, although presently available research cannot accurately estimate the effect. It is therefore particularly important to emphasise the need to stop smoking as soon as possible.

### **Guidance for maternity and antenatal services on service organization**

Units should identify areas where there are clear possibilities for rationalisation of services. Particular possibilities include reducing induction of labour for indications that are not strictly necessary, e.g for reduced fetal movements or before 41 weeks in healthy low-risk women. Reduce the number of routine growth scans where this is not for a strict guidance-based indication.

### **Advice for services caring for women with suspected or confirmed COVID-19**

Care of women in the first trimester should include attention to the same infection prevention and investigation/diagnostic guidance.

The following advice refers mostly to the care of women in the second or third trimesters of pregnancy.

#### **General advice for services providing care to pregnant women**

Pregnant women should reduce social contact based on the theoretical risks to pregnancy posed by COVID-19.

The majority of antenatal and postnatal care should be essential and women should be encouraged to attend, while minimising contact with others.

We recommend that, where practical, appointments should be conducted on the telephone or using videoconferencing, provided there is a reasonable expectation that maternal observations or tests are not required.

### **General advice for services providing care to women with suspected or confirmed COVID-19, for whom hospital attendance is necessary**

- Women should be advised to attend via private transport
- If an ambulance is required, the call handler should be informed that the woman is currently in self isolation for possible COVID-19.
- Women should be asked to alert a member of maternity staff about their attendance when on the hospital premises, but prior to entering the hospital.
- Staff providing care should take personal protective equipment (PPE) precautions as per [Health Protection guidance](#).
- Women should be met at the maternity unit entrance by staff wearing appropriate PPE and be provided with a surgical face mask (not FFP3 mask). The face mask should not be removed until the woman is isolated in a suitable room.
- Women should immediately be escorted to an isolation room where available, suitable for the majority of care during their hospital visit or stay.

**Isolation rooms** should ideally have an ante-chamber for putting on and removing staff PPE equipment and adjacent bathrooms.

- Only essential staff should enter the room and visitors not allowed or kept to a minimum.
- Remove non-essential items from the clinic/scan room prior to the woman arriving there.
- All clinical areas used will need to be cleaned after use as per [Health Protection guidance](#).

### **Women presenting for care with unconfirmed COVID-19 but symptoms suggestive of possible infection**

Maternity/ Obstetrics departments with direct entry for patients and the public should have in place a system for identification of potential cases 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 control. This should be employed before a patient takes a seat in the maternity waiting area.

If a woman meets [the criteria](#) for COVID-19, she should be tested. Until test results are available, she should be treated as though she has confirmed COVID-19.

Pregnant women may attend hospital for reasons directly related to pregnancy and also have coincidental symptoms meeting the 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). In cases of uncertainty, seek additional advice or in case of emergency, investigate and treat as suspected COVID-19 until advice can be sought. Suspected COVID-19 should not delay administration of therapy that would be usually given (for example, IV antibiotics in a woman with fever and prolonged rupture of membranes).

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 infection prevention and control (IPC) guidance. This includes transferring the woman to an isolation room and donning appropriate PPE. This can be time consuming and stressful for patients and health professionals. 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. Further care, in all cases, should continue as for a woman with confirmed COVID-19, until a negative test result is obtained.

### **Attendance for routine antenatal care in women with current suspected or confirmed COVID-19**

Routine appointments for women with suspected or confirmed COVID-19 (growth scans, OGTT, antenatal appointments) should be delayed until after the recommended period of self isolation.

Advice to attend more urgent pre-arranged appointments (fetal medicine surveillance, high risk maternal secondary care) will require a senior decision on urgency and potential risks/benefits. If it is deemed that obstetric care cannot be delayed until after the recommended period of isolation, IPC measures should be arranged locally to facilitate care. Pregnant women in self-isolation who need to attend should be contacted to re-book urgent appointments / scans, preferably at the end of the working day.

If ultrasound equipment is used, this should be decontaminated after use

### **Attendance for unscheduled/urgent antenatal care in women with current suspected or confirmed COVID-19**

When possible, provide advice over the phone. If this requires discussion with a senior member of staff who is not immediately available, a return telephone call should be made after consulting the Senior Doctor

Local protocols are required to ensure women with confirmed or suspected COVID-19 are isolated on arrival to hospital triage units and full PPE measures are in place for staff.

Medical, or obstetric care should be provided as per routine.

### **Women who develop new symptoms of COVID-19 during admission (antenatal, intrapartum or postnatal)**

There is an estimated incubation period of 0-14 days (mean 5-6 days); an infected woman may therefore present asymptotically, developing symptoms later during an admission.

Health professionals should be aware of this possibility, particularly those who regularly measure patient vital signs (e.g. Nurses). In the event of new onset of respiratory symptoms or unexplained fever of or above 37.8 degrees following admission, the woman should be isolated and appropriate infection control precautions initiated in line with [Infection Prevention and Control Guidance](#). The local IPC team/ Infectious disease/ Medical Consultant, should also be notified so that appropriate investigations can be carried out. It is recognised that this may lead to substantial numbers of women treated as suspected COVID-19.

Suspected COVID-19 should not delay administration of therapy that would be usually given (for example, IV antibiotics in woman with fever and prolonged rupture of membranes). Follow the recommended care for women who have moderate to severe symptoms of COVID-19 during pregnancy

### **Women attending for intrapartum care with current suspected/confirmed COVID-19**

All women should be asked to call the maternity unit for advice in early labour.

They should be informed about the potentially increased risk of fetal compromise in women infected with COVID-19 (as was noted in the Chinese case series of nine women) She should come to hospital for birth, where the baby can be monitored using continuous electronic fetal monitoring.

When a woman decides to attend the maternity unit, general recommendations about hospital attendance apply. (as given above)

Once settled in an isolation room, a full maternal and fetal assessment should be conducted to include:

- Assessment of the severity of COVID-19 symptoms, which should follow a multi-disciplinary team approach including an infectious diseases or medical specialist.
- Maternal observations including temperature, respiratory rate and oxygen saturations.
- Confirmation of the onset of labour
- Electronic fetal monitoring using cardiotocograph (CTG) or intermittent auscultation of FHR after each contraction if CTG/Doppler not available

In two Chinese case series, including a total of 18 pregnant women infected with COVID-19 and babies (one set of twins), there were 8 reported cases of fetal compromise. Given this relatively high rate of fetal compromise, continuous electronic fetal monitoring in labour is currently recommended for all women with COVID-19.

If there are no concerns regarding the condition of either the mother or baby, women who would usually be advised to return home until labour is more established, can still be advised to do so, if appropriate transport is available.

Women should be given the usual advice regarding signs and symptoms to look out for, but in addition should be told about symptoms that might suggest deterioration related to COVID-19 following consultation with the medical team (e.g. difficulty in breathing).

If labour is confirmed, then care in labour should ideally continue in the same isolation room.

### **Care in labour**

The following considerations apply to women in spontaneous or induced labour:

- When a woman with confirmed or suspected COVID-19 is admitted to the delivery suite, the following members of the multi-disciplinary team should be informed: consultant obstetrician, consultant anaesthetist, Nurse-in-charge, consultant neonatologist, neonatal nurse in charge and infection control team.
- Efforts should be made to minimise the number of staff members entering the room and units should develop a local policy specifying essential personnel for emergency scenarios.
- There is evidence of household clustering and household co-infection. Asymptomatic birth partners/ attendants should be asked to wash their hands frequently. Symptomatic, birth

partners/attendants should remain in self isolation and not attend the unit. Women should be advised when making plans about birth to identify potential alternative birth partners/ attendant, should the need arise.

- 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.

If the woman has signs of sepsis, investigate and treat as per [guidance on sepsis in pregnancy](#), but also consider active COVID-19 as a cause of sepsis and investigate according to [guidance](#).

- Given the rate of fetal compromise reported in the two Chinese case series, the current recommendation is for continuous electronic fetal monitoring in labour.

- There is currently no evidence to favour one mode of birth over another and therefore mode of birth should be discussed with the woman, taking into consideration her preferences and any obstetric indications for intervention. Mode of birth should not be influenced by the presence of COVID-19, unless the woman's respiratory condition demands urgent delivery.

At present, there are no recorded cases of vaginal secretions being tested positive for COVID-19.

- There is no evidence that **epidural or spinal analgesia or anaesthesia** is contraindicated in the presence of coronaviruses. Epidural analgesia should therefore be recommended in labour to women with suspected/confirmed COVID-19 to minimise the need for general anaesthesia if urgent delivery is needed.

- There is no evidence that the use of **Entonox (Nitrous Oxide/Oxygen)** is an aerosol-generating procedure (AGP).

- Entonox should be used with a single-patient microbiological filter.

- In case of deterioration in the woman's symptoms, and make an individual assessment regarding the risks and benefits of continuing the labour, versus proceeding to emergency caesarean section if this is likely to assist efforts to resuscitate the mother.

- When caesarean birth or other operative procedure is advised, follow guidance as given below

For category 1 caesarean section, donning PPE is time consuming. This may impact on the decision to delivery interval but it must be done. Women and their families should be told about this possible delay.

- An individualised decision should be made regarding shortening the length of the second stage of labour with **elective instrumental birth** in a symptomatic woman who is becoming exhausted or hypoxic.

- Given a lack of evidence to the contrary, **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.

### **Elective caesarean birth**

Where women with suspected or confirmed COVID-19 have scheduled appointments for pre-operative care and elective caesarean birth, an individual assessment should be made to determine whether it is safe to delay the appointment to minimise the risk of infectious transmission to other women, healthcare workers and, postnatally, to her infant.

In cases where elective caesarean birth cannot safely be delayed, the general advice for services providing care to women admitted when affected by suspected/confirmed COVID-19 should be followed

Obstetric management of elective caesarean birth should be according to usual practice.

### **Planned induction of labour**

As for elective caesarean birth, an individual assessment should be made regarding the urgency of planned delivery interval but it must be done. Women and their families should be told about this possible delay.

- An individualised decision should be made regarding shortening the length of the second stage of labour with elective instrumental birth in a symptomatic woman who is becoming exhausted or hypoxic.
- Given a lack of evidence to the contrary, 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.

### **Additional considerations for women with confirmed COVID-19 and moderate/severe symptoms**

#### **Women admitted antenatally**

When pregnant women are admitted to hospital with deterioration in symptoms and suspected/confirmed COVID-19 infection, the following recommendations apply:

- A multi-disciplinary discussion planning meeting ideally involving a consultant physician (infectious disease specialist where available), consultant obstetrician, midwife-in-charge and consultant 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.

The following should be discussed:

- Key priorities for medical care of the woman;
  - Most appropriate location of care (e.g. intensive care unit, isolation room in infectious disease ward or other suitable isolation room) and lead specialty;
  - Concerns amongst the team regarding special considerations in pregnancy, particularly the condition of the baby.
- The priority for medical care should be to stabilise the woman's condition with standard supportive care therapies.

A useful summary on supportive care for adults diagnosed with COVID-19 is available from the [WHO website](#)

#### **Management of patients with COVID-19 who are admitted to critical care**

has been published by NICE (see website)

Particular considerations for pregnant women are:

- Hourly observations, monitoring both the absolute values and the trends.
- Titrate oxygen to keep saturations >94%.
- Hourly respiratory rate looking for the rate and trends:

Young fit women can compensate for a deterioration in respiratory function and are able to maintain normal oxygen saturations before they then suddenly decompensate. So a rise in the



respiratory rate, even if the saturations are normal, may indicate a deterioration in respiratory function and should be managed by starting or increasing oxygen.

- Radiographic investigations should be performed as for the non-pregnant adult; this includes chest X-ray and CT of the chest. Chest imaging, especially CT chest, is essential for the evaluation of the unwell patient with COVID-19 and should be performed when indicated, and not delayed due to fetal concerns. Abdominal shielding can be used to protect the fetus as per normal protocols.
- Consider additional investigations to rule out differential diagnoses, e.g. ECG, CTPA as appropriate, echocardiogram. Do not assume all pyrexia is due to COVID-19 and also perform full sepsis screening.
- Consider bacterial infection if the white blood cell count is raised (lymphocytes usually normal or low with COVID-19) and commence antibiotics.
- Apply caution with IV fluid management. Try boluses in volumes of 250-500mls and then assess for fluid overload before proceeding with further fluid resuscitation.
- 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. If urgent delivery is indicated for fetal reasons, birth should be expedited as normal, as long as the maternal condition is stable.
- If maternal stabilisation is required before delivery, this is the priority, as it is in other maternity emergencies, e.g. severe pre-eclampsia.
- An individualised assessment of the woman should be made by the multidisciplinary team to decide whether elective birth of the baby is indicated, either to assist efforts in maternal resuscitation or where there are serious concerns regarding the fetal condition. Individual assessment should consider the maternal condition, the fetal condition, the potential for improvement following elective birth and the gestation of the pregnancy. The priority must always be the wellbeing of the mother.
- There is no evidence to suggest that steroids for fetal lung maturation, when they would usually be offered, cause any harm in the context of COVID-19. Steroids should therefore be given when indicated, and certainly prior to 30 weeks, where even one dose may benefit the neonate. As is always the case, urgent delivery should not be delayed for their administration.
- There are some reports that even after a period of improvement there can be a rapid deterioration.

Following improvement in a woman's condition, consider an ongoing period of observation, where possible, for a further 24-48 hours. On discharge, advise the woman to return immediately if she becomes more unwell.

### **Women requiring intrapartum care**

In addition to recommendations for women with moderate/severe COVID-19 requiring intrapartum care, it is also recommended that:

- **The neonatal team** should be informed of plans to deliver the baby of a woman affected by moderate to severe COVID-19, as far in advance as possible and should also be given sufficient notice at the time of birth, to allow them to attend and don PPE before entering the room/theatre.

- With regard to mode of birth, an individualised decision should also be made, with no obstetric contraindication. Caesarean section should be performed if indicated based on maternal and fetal condition as in normal practice.
- Given the association of COVID-19 with acute respiratory distress syndrome, 40 women with moderate-severe symptoms of COVID-19 should be monitored using hourly fluid input-output charts, and efforts targeted towards achieving neutral fluid balance in labour, in order to avoid the risk of fluid overload.

## Postnatal management

### Neonatal care

There are limited data to guide the postnatal management of babies of mothers who tested positive for COVID-19 in the third trimester of pregnancy. Literature from China has advised separate isolation of the infected mother and her baby for 14 days. However, routine precautionary separation of a mother and a healthy baby should not be undertaken lightly, given the potential detrimental effects on feeding and bonding.

Given the current limited evidence, we advise that women and healthy infants, not otherwise requiring neonatal care, are kept together in the immediate post-partum period. The mother should wear a mask while breastfeeding and handling the baby

A risks / benefits discussion with neonatologists and families to individualise care in babies who may be more susceptible is recommended.

### Infant feeding

It is reassuring that in six Chinese cases tested, breastmilk was negative for COVID-19;1 however, given the small number of cases, this evidence should be interpreted with caution. The main risk of breastfeeding for infants is the close contact with the mother, who is likely to share infective droplets. The benefits of breastfeeding outweigh any potential risks of transmission of the virus through breastmilk. The risks and benefits of breastfeeding, including the risk of holding the baby in close proximity to the mother or another care giver, should they be infected, should be discussed with the parents. This guidance may change as more evidence comes up.

The following precautions should be taken to limit viral spread to the baby:

- Hand washing before touching the baby, breast pump or bottles.
- Avoiding coughing or sneezing on the baby while feeding.
- Wearing a face mask, while feeding or caring for the baby.
- Where a breast pump is used, follow recommendations for pump cleaning after each use.
- Considering asking someone who is well to feed the baby.

For babies who are bottle fed with formula or expressed milk, strict adherence to [sterilisation guidelines](#) is recommended.

If mothers are expressing breast milk in hospital, a dedicated breast pump should be used.

### Discharge and readmission to hospital

Any mothers or babies requiring readmission for postnatal obstetric or neonatal care during the period of self isolation due to suspected or confirmed COVID-19 are advised to phone ahead to

contact their doctor/ hospital, and follow the attendance protocol (as described above)The place of admission will depend on the level of care required for mother or baby.

## Peri-operative advice for healthcare professionals caring for pregnant women with suspected/confirmed COVID-19 who require surgical intervention

### General advice for obstetric/emergency gynaecology theatre

- Elective obstetric procedures (e.g. cervical cerclage or caesarean) should be scheduled at the end of the operating list.
- Non-elective procedures should be carried out in a second obstetric theatre, where available, allowing time for a full post-operative theatre clean
- The number of staff in the operating theatre should be kept to a minimum, and all must wear [appropriate PPE](#).
- All staff (including Obstetric, neonatal and domestic) should have been trained in the use of PPE so that 24-hour emergency theatres are available and potential delays reduced.
- Anaesthetic management for women with symptoms or confirmed COVID-19 should be with reference to [anaesthetic guidance](#).
- Departments should consider running dry-run simulation exercises to prepare staff, build confidence and identify areas of concern to prepare for emergency transfers to the operating theatre.

### Personal Protective Equipment for caesarean birth

The level of PPE required by healthcare professionals caring for a woman with COVID-19 undergoing a caesarean birth should be determined based on the risk of requiring a general anaesthetic. Intubation for **general anaesthesia (GA) is an aerosol-generating procedure (AGP)**. This significantly increases the risk of transmission of coronavirus to the attending staff.

**Regional anaesthesia (spinal, epidural or CSE) is not an AGP.**

For the minority of caesarean births where GA is planned from the outset, all staff in theatre should wear full PPE, including a filtering face piece level 3 (FFP3) mask/ or N95 mask. The scrub team should scrub and don PPE before the GA is commenced.

For a non-urgent caesarean birth (Category 4 and some Category 3) where regional anaesthesia is planned, the risk of requiring GA is very small, as there is no time pressure. In this situation, all staff not required for siting of the regional anaesthetic should stay outside theatre until the block is effective. All staff in theatre should then don PPE with a fluid-resistant **surgical mask** (FRSM) and eye protection (to prevent against droplet or fomite spread of the virus).

In the small proportion of cases in which regional anaesthesia cannot be successfully achieved, and GA is required, the scrub team should enter the theatre, scrub and don full PPE, including an FFP3 mask, before the GA is commenced.

The chances of requiring conversion to GA during a caesarean birth commenced under regional anaesthesia are small but increase in relation to the urgency of caesarean birth. In situations where there are risk factors that make conversion to GA more likely, the decision on what type of PPE to wear should be judged based on the individual circumstances. If the risk of requiring conversion to GA is considered significant, the theatre team should scrub and don full PPE,

including an FFP3 mask, before the procedure is commenced. An example is a woman whose epidural has been suboptimal during labour, which is 'topped-up' for an emergency caesarean birth.

If the risk of requiring conversion to GA is considered low, the theatre team should scrub and don PPE with an FFRSM (surgical mask) with eye protection. Examples include a woman whose epidural has been working well during labour and has been 'topped-up' for an emergency caesarean birth or a woman with a newly sited spinal anaesthetic that was inserted without difficulty and became effective in the expected timeframe.

### **Advice for services caring for women following isolation for symptoms, or recovery from confirmed COVID-19**

#### **Antenatal care for pregnant women following self-isolation for symptoms suggestive of COVID-19**

Scheduled antenatal care that falls within the self-isolation period should be re-arranged for after the end of the isolation period. No additional tests, including ultrasound assessment of fetal growth, are necessary for women not requiring hospitalisation for COVID-19.

Even if a woman has previously tested negative for COVID-19, if she re-presents with symptoms, COVID-19 should be suspected.

#### **Antenatal care for pregnant women following hospitalisation for confirmed COVID-19 illness**

Further antenatal care should be arranged after the period of self-isolation for acute illness ends.

Referral to antenatal ultrasound services for fetal growth surveillance is recommended, 14 days following resolution of acute illness. Although there isn't currently evidence that fetal growth restriction (FGR) is a risk of COVID-19, two thirds of pregnancies with SARS were affected by FGR and a placental abruption occurred in a MERS case, so ultrasound follow-up seems prudent.

## **INFECTION PREVENTION**

### **When to use a surgical face mask or FFP3 respirator (ref: Public Health England)**

When caring for patients with suspected or confirmed COVID-19, all healthcare workers need to – prior to any patient interaction – assess the infectious risk posed to themselves and wear the appropriate personal protective equipment (PPE) to minimise that risk.

### **When to use a surgical face mask**

When caring for patients with suspected or confirmed COVID-19, all healthcare workers need to – prior to any patient interaction – assess the infectious risk posed to themselves and wear the appropriate personal protective equipment (PPE) to minimise that risk.

In cohorted area (but no patient contact) Close patient contact (within one metre) For example: Cleaning the room, equipment cleaning, discharge patient room cleaning, etc PPE to be worn

- Surgical face mask (along with other designated PPE for cleaning) For example: Providing patient care, direct home care visit, diagnostic imaging, phlebotomy services, physiotherapy, etc PPE to be worn
- Surgical face mask • Apron • Gloves • Eye protection (if risk of contamination of eyes by splashes or droplets)

#### **When to use an FFP3 respirator/ N95 mask**

- When carrying out aerosol generating procedures (AGP) on a patient with possible or confirmed COVID-19
- In high risk areas where AGPs are being conducted (eg: ICU)

#### **PPE to be worn :**

- FFP3 respirator
- Long sleeved disposable gown
- Gloves
- Disposable eye protection Always fit check the respirator

REMEMBER • PPE should be put on and removed in an order that minimises the potential for self-contamination • The order for PPE removal is gloves, hand hygiene apron or gown, eye protection, hand hygiene, surgical face mask or FFP3 respirator, hand hygiene

#### **Which procedures are considered to be aerosol generating?**

The following procedures are currently considered to be AGPs:

- Intubation, extubation and related procedures e.g. manual ventilation and open suctioning.
- Tracheotomy/tracheostomy procedures (insertion/open suctioning/removal)
- Bronchoscopy.
- Surgery and post-mortem procedures involving high-speed devices.
- Some dental procedures (e.g. high-speed drilling).
- Non-invasive ventilation (NIV) e.g. Bi-level Positive Airway Pressure (BiPAP) and Continuous Positive Airway Pressure ventilation (CPAP).
- High-Frequency Oscillating Ventilation (HFOV)
- Induction of sputum
- High flow nasal oxygen (HFNO)

\*Chest compressions and defibrillation (as part of resuscitation) are not considered AGPs; but for COVID 19 patients they are

Resuscitation carried out if wearing AGP PPE for patients with suspected/confirmed COVID-19

Where possible, these procedures should be carried out in a single room with the doors shut. Only those healthcare staff who are needed to undertake the procedure should be present. A disposable, fluid

repellent surgical gown, gloves, eye protection and a FFP3 respirator should be worn by those undertaking the procedure and those in the room.

Certain other procedures/equipment may generate an aerosol from material other than patient secretions but are not considered to represent a significant infectious risk. They include:

- administration of pressurised humidified oxygen;
- administration of medication via nebulisation.

Note: During nebulisation, the aerosol derives from a non-patient source (the fluid in the nebuliser chamber) and does not carry patient-derived viral particles. If a particle in the aerosol coalesces with a contaminated mucous membrane, it will cease to be airborne and therefore will not be part of an aerosol. Staff should use appropriate hand hygiene when helping patients to remove nebulisers and oxygen masks.

### **If a health care worker believes that a patient may have COVID-19:**

They should place a surgical mask on the patient and move the patient to a private room. Surgical masks placed on sick individuals help keep others healthy. The health care worker should then follow standard precautions, contact precautions, and droplet precautions by wearing the following:

- Gown
- Gloves
- Surgical mask
- Goggles or face shield

**The only time a mask needs to be worn with a face shield is if you are caring for a confirmed or suspected COVID-19 patient. If an aerosol generating procedure is performed on a confirmed or suspected COVID-19 patient, an N95 mask should be worn with the face shield.**

The health care worker should then also limit access to the patient room.

Faculty and staff who wear N95 masks as part of their jobs undergo a fit test to make sure there are no gaps around their mouths. **Faculty and staff are discouraged from stockpiling personal protective equipment (PPE) and they should not take PPE home from UI Health Care locations.**

### **When you should use a face shield ?**

All patient encounters when you are within 6 feet of the patient. In other words, face shields are now part of preferred precautions. The purpose is to protect your eyes, nose, and mouth from infectious droplets. **The face shield is to be worn in the place of a face mask.** It provides better coverage of your face and has the added benefit of keeping you from touching your face.

**The only time a mask needs to be worn with a face shield is if you are caring for a confirmed or suspected COVID-19 patient.** If an aerosol generating procedure is performed on a confirmed or suspected COVID-19 patient, an N95 mask should be worn with the face shield.

Face shields are to be used by everyone who sees patients on the unit or in the clinic. Unit-based staff (e.g., nurses, nursing assistants) should have a face shield assigned for their shift. Others will check one out on arrival to the unit or clinic and return as they leave the unit (e.g., rounding physicians, consultants).

## **Cleaning and removing face shields**

**Face shields should be cleaned after each use.**

To remove the face shield without damaging it, loosen the knob that sits over the back of your head, and lift the face shield off with a straight upward motion of the headpiece (not the clear shield).

### **For staff who wear green scrubs:**

Green scrubs are not to be worn outside of the hospital. If you currently have green scrubs at home, please bring them back to work as soon as possible so they can be laundered and reused appropriately.

### **In clinical settings:**

- Keep arms bare below the elbows in order to avoid sleeve contamination. This means that there should be nothing on your forearms, including wrist jewelry and watches. If you wear a long-sleeved shirt, roll up the sleeves.
- Neckties, scarves, and long necklaces should not be worn.
- Tie or clip up long hair.
- Wipe down your stethoscope after each use.
- Clip your nails short

(based on the [CDC](#) and OSHA standards)

## **Surgical Masks & N95 Respirators**

Face masks and N95 respirators may be reused until they are visibly soiled, or it is difficult to breathe through them. Carefully remove and store your mask and respirator when not in use. Always perform hand hygiene before donning and before doffing to minimize contaminating the device.

### **Surgical Masks**

- It may be worn continuously until visibly soiled or moist from respirations.
- It should be carefully folded so that the outer surface is held inward and against itself to reduce contact with the outer surface during storage. The folded mask can be stored between uses in a clean, sealable paper bag or breathable container.

### **N95 Respirators**

- It may be worn continuously up to 8 hours or reused as long as the inside of the respirator remains clean, and you're able to breathe easily through it.
- It should be stored between uses in a clean, sealable paper bag or breathable container.

CDC does list as a last resort, using a scarf or bandana as a protective barrier when nothing else is available. Yet it is literally the last-ditch after all other options and resources are exhausted, and they admit there is no science behind it.

## Eye Protection

When face shields are not available, use reusable safety glasses or goggles.

### How to Clean Eye Protection Equipment

1. While wearing gloves, carefully wipe the *inside*, followed by the *outside* of the face shield or goggles using a clean cloth saturated with neutral detergent solution or cleaning wipe.
2. Carefully wipe the *outside* of the face shield or goggles using a wipe or clean cloth saturated with EPA-registered hospital disinfectant solution.
3. Wipe the outside of face shield or goggles with clean water or alcohol to remove residue.
4. Fully dry (air dry or use clean absorbent towels).
5. Remove gloves and perform hand hygiene.

## Gowns

Paper and plastic gowns can be reused as long as they are not visibly soiled. Alternatives to paper or plastic gowns include patient gowns, disposable lab coats, and disposable coveralls.

### How to Remove a Gown for Reuse

- While wearing clean gloves, carefully untie the gown and remove it by gently pulling forward at the sleeves. Hang the gown in an open area and avoid having the gown come in contact with other garments.

## References

<https://www.rcog.org.uk/globalassets/documents/guidelines/2020-03-28-covid19-pregnancy-guidance.pdf> (accessed 1.4.20)

<https://medcom.uiowa.edu/theloop/covid-19/personal-protective-equipment-ppe> (accessed 28.3.20)

<https://www.registerednursing.org/how-reuse-ppe/>

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/874411/When\\_to\\_use\\_face\\_mask\\_or\\_FFP3.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/874411/When_to_use_face_mask_or_FFP3.pdf)

<https://www.youtube.com/watch?v=eANIs-Jdi2s&feature=youtu.be>

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/876577/Infection\\_prevention\\_and\\_control\\_guidance\\_for\\_pandemic\\_coronavirus.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/876577/Infection_prevention_and_control_guidance_for_pandemic_coronavirus.pdf) (accessed 29.3.20)

\* Chen H, Guo J, Wang C, et al. Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records. *Lancet* 2020 doi: [https://doi.org/10.1016/S0140-6736\(20\)30360-3](https://doi.org/10.1016/S0140-6736(20)30360-3)

\* Chen Y, Peng H, Wang L, et al. Infants Born to Mothers With a New Coronavirus (COVID-19). *Frontiers in Pediatrics* 2020;8(104) doi: 10.3389/fped.2020.00104

\* Li N, Han L, Peng M, et al. Maternal and neonatal outcomes of pregnant women with COVID-19 pneumonia: a case-control study. . Pre-print doi: 10.1101/2020.03.10.20033605

\* Zhu H, Wang L, Fang C, et al. Clinical analysis of 10 neonates born to mothers with 2019-nCoV pneumonia. *Transl Pediatr* 2020;9(1):51-60. doi: <http://dx.doi.org/10.21037/tp.2020.02.06>



- \* Wang L, Shi Y, Xiao T, et al. Chinese expert consensus on the perinatal and neonatal management for the prevention and control of the 2019 novel coronavirus infection (First edition). *Annals of Translational Medicine* 2020;8(3):47.
- \* Fan C, Lei D, Fang C, et al. Perinatal Transmission of COVID-19 Associated SARS-CoV-2: Should We Worry? *Clinical Infectious Diseases* 2020 doi: 10.1093/cid/ciaa226
- \* Chen S, Huang B, Luo DJ, et al. Pregnant women with new coronavirus infection: a clinical characteristics and placental pathological analysis of three cases. *Zhonghua Bing Li Xue Za Zhi* 2020;49(0):E005-E05. doi: 10.3760/cma.j.cn112151-20200225-00138
- \* Dong L, Tian J, He S, et al. Possible Vertical Transmission of SARS-CoV-2 From an Infected Mother to Her Newborn. *JAMA* 2020 doi: 10.1001/jama.2020.4621
- \* Guan W-j, Ni Z-y, Hu Y, et al. Clinical Characteristics of Coronavirus Disease 2019 in China. *New England Journal of Medicine* 2020 doi: 10.1056/NEJMoa2002032
- \* Liu Y, Chen H, Tang K, et al. Clinical manifestations and outcome of SARS-CoV-2 infection during pregnancy. *Journal of Infection* 2020;Online doi: <https://doi.org/10.1016/j.jinf.2020.02.028>
- \* Liu D, Li L, Wu X, et al. Pregnancy and Perinatal Outcomes of Women With Coronavirus Disease (COVID-19) Pneumonia: A Preliminary Analysis. *American Journal of Roentgenology* 2020;1-6. doi: 10.2214/AJR.20.23072
- \* Critical illness due to 2009 A/H1N1 influenza in pregnant and postpartum women: population based cohort study. *BMJ* 2010;340:c1279. doi: 10.1136/bmj.c1279
- \* Mullins E, Evans D, Viner R, et al. Coronavirus in pregnancy and delivery: rapid review. *Ultrasound in Obstetrics and Gynaecology* (In press) doi: 10.1002/uog.22014
- \* Zhang J, Wang Y, Chen L, et al. Clinical analysis of pregnancy in second and third trimesters complicated severe acute respiratory syndrome. *Zhonghua Fu Chan Ke Za Zhi* 2003;38:516-20.
- \* Zeng L, Xia S, Yuan W, et al. Neonatal Early-Onset Infection With SARS-CoV-2 in 33 Neonates Born to Mothers With COVID-19 in Wuhan, China. *JAMA Pediatr* 2020 doi: 10.1001/jamapediatrics.2020.0878
- \* COVID-19: guidance on social distancing and for vulnerable people 2020 [Available from: <https://www.gov.uk/government/publications/covid-19-guidance-on-social-distancing-and-for-vulnerable-people> accessed 17 March 2020.
- \* Stay at home: guidance for households with possible coronavirus (COVID-19) infection 2020 [Available from: <https://www.gov.uk/government/publications/covid-19-stay-at-home-guidance/stay-at-home-guidance-for-households-with-possible-coronavirus-covid-19-infection> accessed 17 March 2020.
- \* Major new measures to protect people at highest risk from coronavirus 2020 [Available from: <https://www.gov.uk/government/news/major-new-measures-to-protect-people-at-highest-risk-from-coronavirus> accessed 26 March 2020.
- \* Dowswell T, Carroli G, Duley L, et al. Alternative versus standard packages of antenatal care for low-risk pregnancy. *Cochrane Database of Systematic Reviews* 2015(7) doi: 10.1002/14651858.CD000934.pub3
- \* Knight M, Bunch K, Tuffnell D, et al. Saving Lives, Improving Mothers' Care. Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2014–16. In: MBRRACE-UK, ed., 2018.
- \* Fraser E. Impact of COVID-19 Pandemic on Violence against Women and Girls. In: Development UAftDoI, ed., 2020.
- \* Bohren MA, Berger BO, Munthe-Kaas H, et al. Perceptions and experiences of labour companionship: a qualitative evidence synthesis. *Cochrane Database of Systematic Reviews* 2019(3) doi: 10.1002/14651858. CD012449.pub2
- \* Bohren M, Hofmeyr G, Sakala C, et al. Continuous support for women during childbirth. . *Cochrane Database of Systematic Reviews* 2017(7) doi: 10.1002/14651858.CD003766.pub6
- \* Shakibazadeh E, Namadian M, Bohren MA, et al. Respectful care during childbirth in health facilities globally: a qualitative evidence synthesis. *Bjog* 2018;125(8):932-42. doi: 10.1111/1471-0528.15015 [published Online First: 2017/11/09]
- \* Birthplace in England Collaborative G, Brocklehurst P, Hardy P, et al. Perinatal and maternal outcomes by planned place of birth for healthy women with low risk pregnancies: the Birthplace in England national prospective cohort study. *BMJ* 2011;343:d7400. doi: 10.1136/bmj.d7400 [published Online First: 2011/11/26]
- \* Vardavas CI, Nikitara K. COVID-19 and smoking: A systematic review of the evidence. *Tobacco Induced Diseases* 2020;18(March) doi: 10.18332/tid/119324
- \* Norman JE, Heazell AEP, Rodríguez A, et al. Awareness of fetal movements and care package to reduce fetal mortality (AFFIRM): a stepped wedge, cluster-randomised trial. *Lancet* 2018;392(10158):1629-38. doi: 10.1016/S0140-6736(18)31543-5 [published Online First: 2018/10/03]
- \* National Institute for Health and Care Excellence. *Inducing Labour*, 2008.
- \* COVID-19: Infection, prevention and control guidance 2020 [Available from: <https://www.gov.uk/government/publications/wuhan-novel-coronavirus-infection-prevention-and-control/wuhan-novelcoronavirus-wn-cov-infection-prevention-and-control-guidance> accessed 05 January 2020.
- \* Coronavirus (COVID-19) 2020 [Available from: <https://www.hps.scot.nhs.uk/a-to-z-of-topics/covid-19/> accessed 06 March 2020.

- \* COVID-19: investigation and initial clinical management of possible cases 2020 [Available from: <https://www.gov.uk/government/publications/wuhan-novel-coronavirus-initial-investigation-of-possible-cases/investigationand-initial-clinical-management-of-possible-cases-of-wuhan-novel-coronavirus-wn-cov-infection> accessed 05 March 2020.
- \* Coronavirus disease 2019 (covid-19) Situation Report – 29. 2020 [Available from: [https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200219-sitrep-30-covid-19.pdf?sfvrsn=6e50645\\_2](https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200219-sitrep-30-covid-19.pdf?sfvrsn=6e50645_2) accessed 08 March 2020.
- \* Pung R, Chiew CJ, Young BE, et al. Investigation of three clusters of COVID-19 in Singapore: implications for surveillance and response measures. The Lancet doi: 10.1016/S0140-6736(20)30528-6
- \*COVID-19 - guidance for secondary care 2020 [Available from: <https://www.hps.scot.nhs.uk/web-resourcescontainer/covid-19-guidance-for-secondary-care/> accessed 06 March 2020.
- \* Clinical management of severe acute respiratory infection when novel coronavirus (nCoV) infection is suspected 2020 [Available from: [https://www.who.int/publications-detail/clinical-management-of-severeacute-respiratory-infection-when-novel-coronavirus-\(ncov\)-infection-is-suspected](https://www.who.int/publications-detail/clinical-management-of-severeacute-respiratory-infection-when-novel-coronavirus-(ncov)-infection-is-suspected) accessed 05 March 2020.
- \* COVID-19 rapid guideline: critical care in adults. In: Excellence TNIfHaC, ed., 2020.
- \*Li X, Xia L. Coronavirus Disease 2019 (COVID-19): Role of Chest CT in Diagnosis and Management. AJR Am J Roentgenol 2020(4):1-7. doi: 10.2214/AJR.20.22954
- \*Zhao W, Zhong Z, Xie X, et al. Relation Between Chest CT Findings and Clinical Conditions of Coronavirus Disease (COVID-19) Pneumonia: A Multicenter Study. . AJR Am J Roentgenol (3):1-6. doi: 10.2214/ AJR.20.22976.
- \*Ai T, Yang Z, Hou H, et al. Correlation of chest CT and RT-PCR testing in coronavirus disease 2019 (COVID-19) in China: a report of 1014 cases. . Radiology 2020 doi: 10.1148/radiol.2020200642.
- \*Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. The Lancet 2020;395(10223):497-506. doi: 10.1016/S0140-6736(20)30183-5
- COVID-19 - guidance for paediatric services. In: Health RCoPaC, ed., 2020. Swartz D, Graham A. Potential Maternal and Infant Outcomes from Coronavirus 2019-nCoV (SARS-CoV-2) Infecting Pregnant Women: Lessons from SARS, MERS, and Other Human Coronavirus Infections. Viruses 2020:1-16.
- Alserehi H, Wali G, Alshukairi A, et al. Impact of Middle East Respiratory Syndrome coronavirus ( MERS - CoV ) on pregnancy and perinatal outcome. BMC Infect Dis 2016:1-4. doi: <http://dx.doi.org/10.1186/s12879-016-1437-y>