FOGSI GCPR

Good Clinical Practice recommendation on

PREGNANCY WITH COVID-19 Infection

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Disclaimer: The recommendations in this document are based on limited evidence as available now. As new evidence accumulates, some of the recommendations may change. This would be guided by growing global and Indian experience, published literature, guidelines from international and national professional bodies, and government guidelines. Users should use these recommendation in accordance with the latest government regulations and advisories.

FOREWORD

The coronavirus COVID-19 pandemic is upon us. This is a crisis of global proportions which has transformed our world view. The novel infection brings with it uncertainty. Knowledge is evolving in every aspect of the infection and its spread.

There is going to be every chance that community spread may happen in the next few days or weeks in India. The Government is trying its best to prevent the spread by lockdowns, self isolation, awareness, testing on a mass scale and prophylaxis. At present, healthcare providers are in a preparation mode. Matters related to childbirth cannot be delayed indefinitely. Given the propensity of this virus to affect large numbers, it will be inevitable that we will be caring for women infected with COVID-19 in pregnancy and for childbirth in the shortly foreseeable future. The maternity healthcare providers and facilities need to prepare for the situation with a view to prevent the consequences of the infection on the mother and her newborn. The other aspects that are vital are to prevent the spread of the infection from the infected woman to other pregnant women and the public at large. Healthcare providers need to keep themselves safe while they do this.

Healthcare systems everywhere in the world are under pressure. The pressure is not only of numbers and heavy workload but also dealing with an unknown pathogen. There are limitations of infrastructure, supply chains and availability of equipment and medications which will inevitably occur. In times of a lockdown, even transport of healthcare providers to and from the hospital is a challenge. The guidance in the next few pages is our attempt to present the ideal options and some real world experiences and alternatives. Team FOGSI hopes that it will be a useful resource to every FOGSIan and healthcare worker.

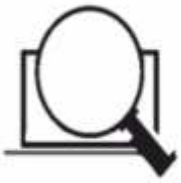
Dr Alpesh Gandhi
President FOGSI

EXECUTIVE SUMMARY

Measures for Pregnant Women to Prevent COVID-19 infection
Social Distancing – could be the single most important intervention at population level
Do the Five – Staying at home, Hand hygiene, Respiratory hygiene, Avoiding touching the face and Keeping distance should be practiced

Precautions for healthcare workers (HCW)
HCW as they are at high risk of getting infected. Precautions are necessary to protect themselves and prevent spread to others.
Distancing – where possible, HCW should keep a distance and practice hand hygiene
Personal Protective Equipment (PPE) – use should be according to clinical situation. Covering of all surfaces especially hands and face is vital. Proper technique to wear and remove PPE is essential.
Chemoprophylaxis – is recommended with Hydroxychloroquine only for HCW with known contact of COVID-19 positive patients. In case of accidental exposure, complete protocol should be followed

Clinical Presentation of COVID-19 in Pregnancy
Most pregnant women will present with mild symptoms and have a similar course to other adults with COVID-19 infection. A history of travel abroad, contact and respiratory symptoms should be elicited at every clinical interaction.



Testing for COVID-19 in Pregnancy
Current testing strategies in India – at present, pregnant women are tested according to same criteria as other adults. It is essentially meant for acute respiratory illness with exposure, travel, contact, being a HCW or requiring hospitalization. Test methods and facilities – presently the RT-PCR test from nasopharyngeal swab is used for diagnosis. Guidelines on testing should be followed as per Government of India guidelines. Other investigations – supportive investigations include blood studies for infection and systemic assessment and imaging by CT scan with abdominal shielding.

Notification of COVID-19 cases is mandatory

Quarantine for pregnant women –
Should be followed as per general population depending on contact tracing or diagnosis.

Effects of COVID-19 infection on mother and fetus
Maternal disease does not get aggravated by pregnancy unless there are co-morbidities. There is no evidence of transplacental spread to the fetus at present and fetal abnormalities or compromise have not been seen.

Arrangements in existing healthcare facilities to manage COVID-19 exposed and infected pregnant women
Hospitals should have isolation zones which should include outpatient, ward, ICU, labour rooms and operation theatres demarcated for COVID-19 infected women.

EXECUTIVE SUMMARY

Termination of pregnancy (MTP), sexual and reproductive healthcare services are time sensitive and their provision is essential during the pandemic for all women.

Assessment of Pregnant women (not in labour) with COVID-19 infection
Recognizing the critically ill woman – Most women will not need hospitalization or critical care. Tachypnoea (>30/min), hypoxia (SpO2 < 93%) and imaging showing > 50% lung involvement indicate a need for critical care.

Medical management and drugs used in the treatment of COVID-19 infection in pregnancy
Hydroxychloroquine 600 mg (200 mg thrice a day with meals) and Azithromycin (500 mg once a day) for 10 days has been used successfully. Antiviral therapy (Lopinavir + Ritonavir or Oseltamavir) may be used in high risk groups (immunocompromised, chronic disease, uncontrolled diabetes). Other supportive care should include rest, supplemental oxygen and paracetamol.

Management of Labour and Delivery in women with COVID-19 infection
There is no rationale to induce labour or deliver a woman early because of COVID-19 infection. Decisions regarding route of delivery should be as per standard obstetric practice in most situations.

Labour Analgesia and Anesthesia in Pregnant Women with COVID-19 infection
Regional analgesia and anesthesia can be used in women with COVID-19 infection. Specialized techniques should be adopted for general anesthesia.

Newborn care should be practiced as per routine. At present, testing is recommended if the mother has COVID-19 infection or if the baby is symptomatic. Breastfeeding can be given with good hygiene practices.

Cleaning, maintenance of facilities and medical equipment should be done with adequate PPE to the HCW. 1% sodium hypochlorite solution with contact time of 30 minutes can be used.

Postnatal Care and Advise to the mother infected with COVID-19 should follow routine practice. If the woman is isolated from the neonate, she should be offered psychological assessment and support.

Diet for the pregnant woman and COVID-19 infection should be as per routine. There are no special diets. Rumors related to diet should be dispelled

Training and managing the healthcare cadre is essential to prevent them from getting infected. Shift arrangements and transport need to be arranged. It is important to keep up morale.

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Introduction

This is an unprecedented global war, and mankind is facing the same enemy, the novel coronavirus. And the first battlefield is the hospital where our soldiers are the medical workers.

Novel coronavirus (SARS-COV-2) is a new strain of coronavirus causing COVID-19, first identified in Wuhan City, China. Its characteristic especially those of person to person transmission were documented in December 2019(1).

There are a number of other coronavirus infections that have been identified and are pathogenic to humans including the common cold, and the viruses that cause MERS (Middle Eastern Respiratory Syndrome) and SARS (Severe Acute Respiratory Syndrome). The COVID-19 strain of coronavirus infection has a high rate of transmission by droplet and through fomites(1). A study showed that stool samples continued to show presence of viral particles for a mean of 29 days after the first symptoms. This is longer than that of samples from the respiratory tract(2). This reiterates the need for hygiene and safe sanitation in general.

It was declared as a pandemic by the World Health Organization on 11 March 2020(3). Most countries across the globe have recognized this as a national emergency and have started taking measures against the infection. The pandemic is at different states of spread in different countries. At the point of writing this, it has reached 190 countries with more than 6 lakhs cases and over 27000 deaths(4).

On reviewing the scientific literature, 1794 articles on the Coronavirus infection, 36 addressed the issue in pregnant women. A total of eight studies (10 case series/reports and 1 retrospective cohort study) reported outcome in 73 women with pregnancy and COVID-19 infection. Much of the inferences that we are drawing comes from this cohort of pregnant women(5).

India declared the first diagnosed case on 30 January 2019. The first few cases were related to travel from the Middle East and Italy. As on 27th March 2020 there were 726 confirmed cases in the country and 19 deaths have occurred(6). It is expected that there will be large increase in these numbers if we go into the next stage – that of community spread. As of now, the Indian experience is limited. There is even less to draw from in terms of experience in pregnant women and neonates. We, at FOGSI, are trying to track every pregnancy and delivery process of COVID-19 affected women and learn about the problems faced and their on-ground solutions. This Good Clinical Practice Recommendation (GCPR) is therefore based on international experience and from the statements and guidance from the Government of India and WHO.

As knowledge evolves, some aspects of this recommendation will change. Newer versions will be released as new evidence emerges.

Measures for Pregnant Women to Prevent COVID-19 infection

The greatest tool to prevent COVID-19 Infection in the general population and for pregnant women is Social Distancing. As per the Government of India advisory, this is a non-pharmaceutical infection prevention and control intervention implemented to avoid/decrease contact between those who are infected with a disease/pathogen and those who are not, so as to stop or slow down the rate and extent of disease transmission in a community(7). The advisory essentially focuses on measures to be taken by local administration in relation to closure of establishments such as schools, universities, gyms, cultural centres, etc. Some important aspects for the pregnant woman in India from this advisory are:

- Disinfection of surfaces to reduce fomites related spread.
- For women working outside the house, it is preferable to take Work from Home.
- Keeping a distance of at least one metre in various necessary interactions and activities
- Avoid non-essential travel. If travel is undertaken, it is preferable to use a private vehicle. If public transport is used, distance should be maintained.
- Avoid gatherings and functions to celebrate the 7-month milestone, which is a common cultural practice.
- Minimize visitors from coming to meet the mother and newborn after delivery.

For the asymptomatic and uninfected woman, at present, the recommended strategy for antenatal care is to defer routine visits(8). They can consult the healthcare provider telephonically or through a web platform for minor ailments and questions. Essential milestone visits such as the 12 and 19 week scans are needed. Women are advised to note fetal movements everyday. The next visit can be at 32 weeks pregnancy.
Pregnant women are a special category in terms of healthcare and are possibly more susceptible. They should therefore, follow these guidelines fastidiously. They can protect themselves by the motto "Do the Five". The principle elements of this are:

Home	• Stay at home as much as possible unless there is a medical need related to development of symptoms of infection or related to pregnancy. • Routine antental visits are to be deferred. If there is a minor query, it can be sorted out telephonically. At present, telephonic consultations are permitted by the Medical Council of India till the situation comes under control (9). • Keep the traffic of home visitors including homecare personnel, maids, and staff members to a minimum or avoid completely if possible.
Hands	Washing their hands frequently and properly with a soap and water or an alcohol-based hand rub for minimum 20 seconds
Elbow	Covering their mouth and nose with their bent elbow, handkerchief or tissue while coughing or sneezing. Then the used tissue should be disposed immediately. This is an important component of respiratory hygiene.
Face	Avoid touching face, eyes, nose and mouth with hands.
Space	Keep a distance of at least 1 meter from the next person outside and in the house.

Precautions for healthcare workers

Why are precautions necessary for healthcare workers?

Healthcare workers are at high risk of acquiring the COVID-19 infection when they are caring for patients. This is because of the contact with large numbers of patients, close contact and procedures where there is spray/aerosolization (resuscitation, ventilation) or splash of body fluids (labour, delivery, surgical procedures). The reason to take universal precautions and use appropriate precautions is therefore, obvious. There is a risk of spread of infection from an infected patient to the healthcare provider and then onward spread to more patients and the population at large. As of early March, it is estimated that 3300 healthcare workers have gotten infected and at least 22 have died. It has been estimated that about 20% of healthcare workers who cared for COVID-19 infected patients in Italy acquired the infection(10). It is also important to note that this is not always the case. With thorough and adequate use of PPE and other protective measures, the experience in Singapore and Hong Kong has been that there was no transmission to healthcare workers(11).

The three principles that healthcare workers should follow are distancing, use of appropriate PPE correctly and chemoprophylaxis.

As for the general population, the healthcare worker should also consider social distancing as the cornerstone of prevention whenever possible. The following measures may be useful in addition to appropriate gear.

- Maintain a distance of at least 1 meter from patients and other healthcare workers. This is possible in clinic settings. However, this may not be feasible during examination, inpatient care and procedures.
- Remove non-essential items from the consulting or examination room to facilitate cleaning and disinfection and reduce the risk of fomites related spread.
- Regular hand cleaning with soap and water or alcohol based rubs for at least 20 seconds.
- Patients should be offered surgical masks if they have respiratory symptoms.

The term "universal precautions" (from the 1980s), refers to the measures taken to prevent the transmission of blood borne infections to health workers. This was later called "standard precautions" to cover the risk of transmission through all body fluids. In settings where the pregnant woman is confirmed to have COVID-19 infection and presents in labour or is undergoing a surgical procedure, there is a need to follow these and some enhanced measures using personal protective equipment (PPE) to prevent acquiring infection through respiratory droplets. The PPE should therefore include masks such as the N95 respirator (ideally fitted to size) and face protection by a face shield or at least goggles and other measures(12).

In the event that appropriate gear for PPE is not available at a particular unit, consider transferring the patient to a centre which is better equipped. If it is an emergency situation and there is limited PPE, it should be allocated to the workers who are caring for pregnant women who are confirmed cases or those who present with symptoms suggestive of acute respiratory illness or those who are close contacts of confirmed cases.

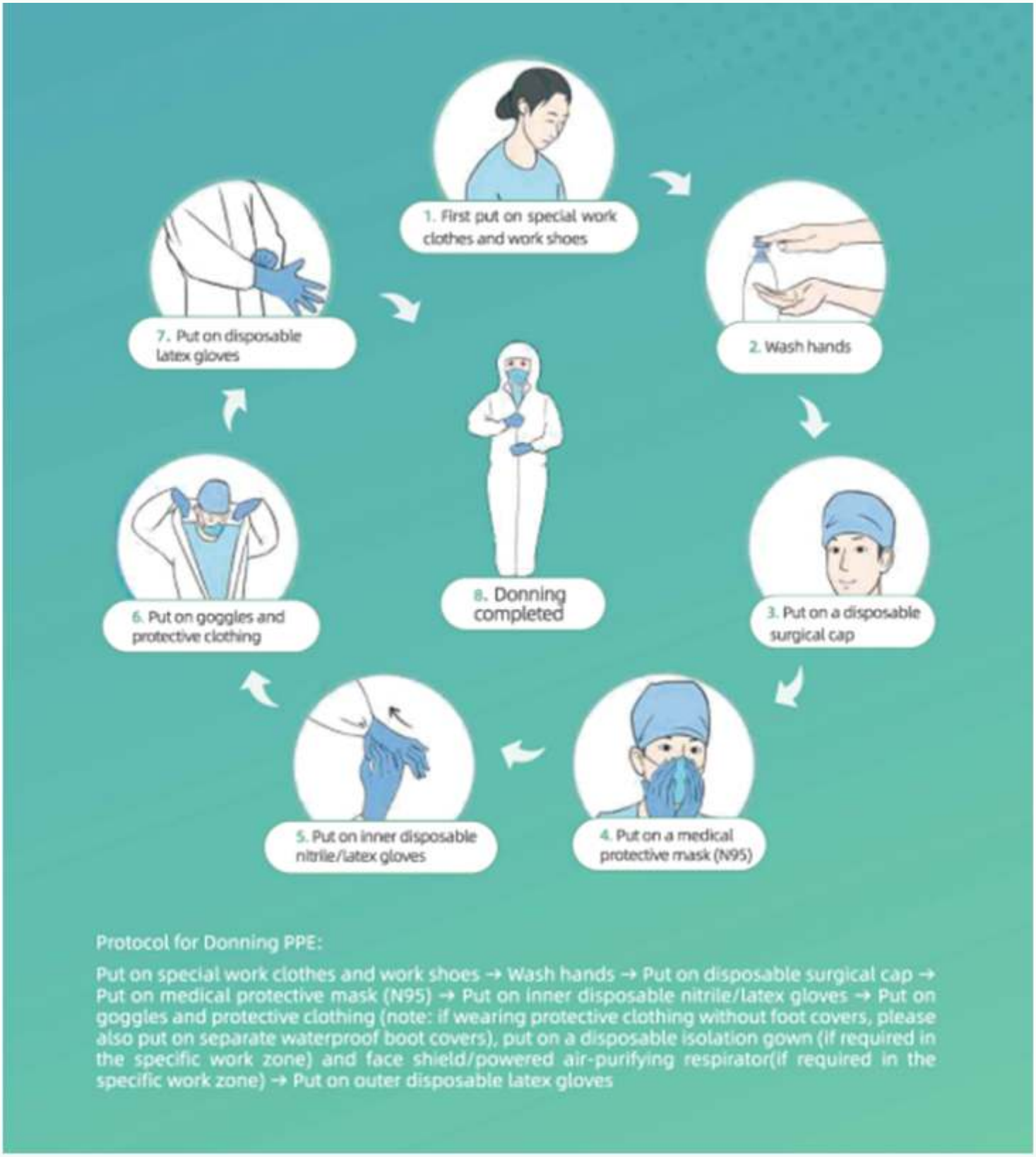
The following recommendations are available from the Handbook of COVID-19 Prevention and Treatment from the Zhejiang University School of Medicine(13).

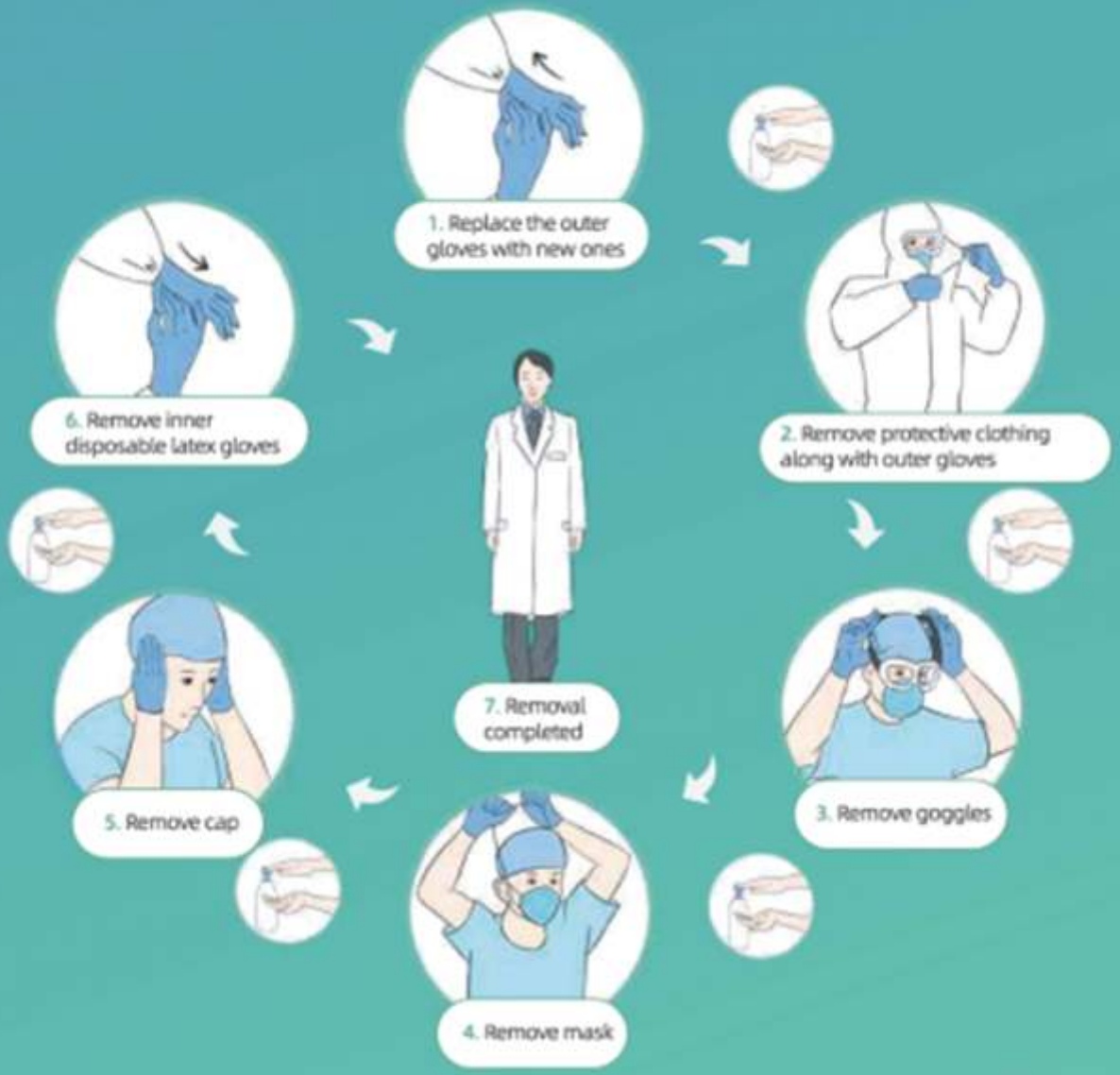
Personal Protective Equipment in relation to COVID-19 infection management

Protection Level	Protective Equipment	Scope of Application
Level I protection	Disposable surgical cap Disposable surgical mask Work uniform Disposable latex gloves and/or disposable isolation clothing	• Pre examination triage, general outpatient department
Level II protection	Disposable surgical cap Medical protective mask (N95) Work uniform Disposable medical protective uniform Disposable latex gloves Goggles	• Fever outpatient department • Non-respiratory specimen examination of suspected/confirmed patients • Imaging examination of suspected/confirmed patients • Cleaning of surgical instruments used with suspected/confirmed patients
Level III protection	Disposable surgical cap Medical protective mask (N95) Work uniform Disposable medical protective uniform Disposable latex gloves Full face respiratory protective devices or powered air-purifying respirator	• Intubation, resuscitation of suspected/confirmed patients where there is a risk of spray or splash of respiratory secretions of body fluids or blood • Surgery, procedures, delivery of suspected/confirmed patients • Autopsy of suspected/confirmed patients

The procedure of wearing (donning) and removing (doffing) of the PPE should be strictly followed as has been illustrated in the following two figures.

Guidance on Donning Removing Personal Protective Equipment (PPE) to manage COVID-19 Patients

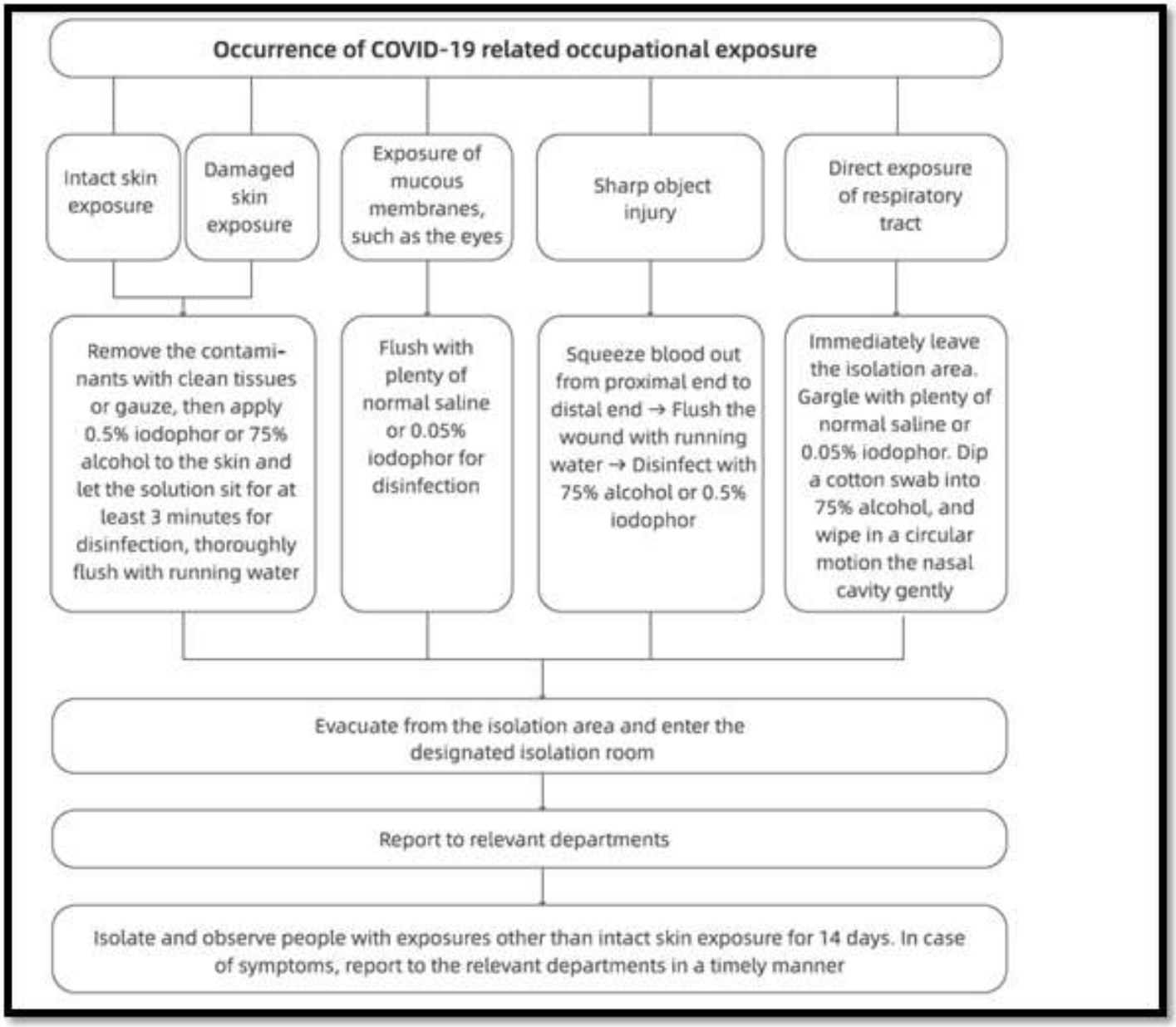




Protocol for Removing PPE:

Wash hands and remove visible bodily fluids/blood contaminants on the outer surfaces of both hands → Wash hands replace outer gloves with new gloves → Remove powered air-purifying respirator or self-priming filter-type full-face mask/mask (if used) → Wash hands → Remove disposable gowns along with outer gloves (if used) → Wash hands and put on outer gloves → Enter Removal Area No. ① → Wash hands and remove protective clothing along with outer gloves (for gloves and protective clothing, turn inside out, while rolling them down) (note: if used, remove the waterproof boot covers with clothing) → Wash hands → Enter Removal Area No. ② → Wash hands and remove goggles → Wash hands and remove mask → Wash hands and remove cap → Wash hands and remove inner disposable latex gloves → Wash hands and leave Removal Area No. ② → Wash hands, take a shower, put on clean clothes and enter the clean area

In addition to the above two measures, the Indian Council of Medical Research (ICMR) also recommends the use of hydroxychloroquine as prophylaxis for asymptomatic healthcare workers caring for suspected or confirmed COVID-19 infected patients(14). The recommended regimen is to take the tablet of 400 mg hydroxychloroquine twice a day on day 1 and then once weekly for 7 weeks. The medicine should be taken with meals. It is contraindicated in case of known sensitivity to the drug or if a healthcare worker suffers from G6PD deficiency or retinopathy. The healthcare worker should not fall into a false sense of security when pharmacoprophylaxis is being used and the other preventive measures should be followed.
In case of accidental occupational exposure, the following protocol should be followed in addition to pharmacoprohylaxis(13).



Clinical Presentation of COVID-19 in Pregnancy

The mean incubation period (from exposure to the appearance of clinical features) is 5 to 7 days. Most people who are infected will show features latest by 11 days of exposure(15). A history of travel abroad or contact with someone who has travelled abroad should be included in the history taking. The majority of people (pregnant and general population) present with respiratory symptoms of COVID-19 infection. Pregnant women don't appear to be more susceptible to consequences of infection of COVID-19 than general population(16).

Most pregnant women will have mild to moderate flu-like symptoms of cough, sore throat, and fever. Few may have difficulty in breathing or shortness of breath. These have been classified as features of severe acute respiratory illness (SARI) by the WHO. Pregnant women, especially those with associated medical diseases (diabetes, asthma, etc) may present with pneumonia and marked hypoxia. Immunocompromised and elderly pregnant women may present with atypical features such as fatigue, malaise, body ache and/or gastrointestinal symptoms like nausea and diarrhea(17).

At the time of every patient contact, irrespective of the reason for the clinical meeting with a pregnant woman, healthcare workers should enquire about features of SARI, travel abroad and/or contact with a known or possible COVID-19 infected person through household contact, visitors or attending events where such a person was present.

Testing for COVID-19 in Pregnancy

Indications (Criteria)

The criteria for offering a laboratory test are the same for pregnant women and the non-pregnant population. Currently, as per the guidance given by the Indian Council for Medical Research (ICMR) pregnant women should be tested in the following circumstances(18).

1. A pregnant woman who has acute respiratory illness with one of the following criteria:
   - a history of travel abroad in the last 14 days (6 March 2020 onwards). In addition to testing, these individuals (with or without symptoms) and their household contacts should home quarantine for 14 days.
   - is a close contact of a laboratory proven positive patient or
   - she is a healthcare worker herself or
   - hospitalized with features of severe acute respiratory illness.
2. A pregnant woman who is presently asymptomatic should be tested between 5 and 14 days of coming into direct and high risk contact of an individual who has been tested positive for the infection.

As per the guidance from the Government of India, direct and high risk contact is defined as those living in the same household, traveling together by any conveyance, working together in close proximity (same room), or healthcare workers providing direct care(19).

This testing strategy may evolve and recommendations may change. Some countries such as South Korea and the experiences in Shanghai were shaped by more widespread testing. In this approach, the rationale is to identify as many infected individuals as possible and isolate or quarantine them before they infect others. The counterpoint to this is that as community spread occurs, over 50% of the population is likely to carry the virus and it could mean a large outlay on testing which may not necessarily change the general recommendations of social distancing and hygiene which are already being propagated.

Test methods and facilities

The CDC recommends collection of a nasopharyngeal swab specimen to test for COVID-19(20). An oropharyngeal swab can be collected but is not essential; if collected, it should be placed in the same container as the nasopharyngeal specimen. Sputum should only be collected from patients with productive cough; induction of sputum is not indicated. COVID-19 is detected by reverse-transcription polymerase chain reaction (RT-PCR). The test should be performed from a center which is authorized by the government of India and state governments. There are 114 ICMR approved public laboratories where the test can be done. The government has allowed testing to be conducted at private laboratories from 22 March 2020. The detailed guidelines on testing are available on the ICMR website(21)(22). It highlights the preference for home collection of samples, maintaining safety during transport and disposal, guidance on disclosing results and fees. The cost of the test has been capped in private labs at Rs 4500/-. Reports should generally be available in 24 hours. Repeat test is indicated only if clinically warranted. More rapid molecular diagnostic tests which have been manufactured in India approved by FDA and ICMR which can give results in 2-3 hours may be available soon.

At present, the RT-PCR test is recommended by the ICMR. However, false negative tests are known to occur to the rate of 10-30% even with two serial swabs tested by the RT-PCR technique. In the near future, testing may be conducted by Nucleic Acid Amplification Test (NAAT) or by serological testing. NAAT is a gold standard test. It is

expensive and involves the risk of multiplication of viral particles. Serological testing is faster and cheaper. At a population level, serological testing may be more feasible to see the prevalence. Also, after 3 weeks of infection, the RT-PCR would be negative, but serology would give the diagnosis(13).

Other investigations

Other laboratory findings that have been seen with COVID-19 infection are leucopenia, lymphocytopenia, mild thrombocytopenia, mild elevation of liver enzymes and other acute infection markers. Co-infection with other common respiratory pathogens and the common cold virus are often seen with COVID-19.
CT scan and other imaging modalities usually show patterns consistent with atypical pneumonia. In cases where an X-Ray is taken or a CT scan is needed for a pregnant woman, there should be provision of an abdominal shield to protect the fetus from radiation exposure. An informed consent for the imaging should be taken from the pregnant woman and her relatives.

Notification of COVID-19 cases

Guidelines for notifying COVID-19 affected persons by Private Institutions have been given by the Government of India(23). In the wake of the prevailing COVID-19 situation, it is of utmost importance that each and every case (suspects/confirmed) of COVID-19 is isolated and provided appropriate treatment and their contacts are traced at the earliest to break the chain of transmission.

It is important that support and cooperation of private sector is enlisted, in this regard. Therefore, it shall be mandatory for all hospitals (Government and Private), Medical officers in Government health institutions and registered Private Medical Practitioners including AYUSH Practitioners, to **notify such person(s) with COVID-19** to concerned district surveillance unit.

All practitioners shall also get the **self-declaration forms** (enclosed) for those who, within their knowledge, are **having travel history of COVID-19** affected areas. In case the person has any such history in the last 14 days and is symptomatic as per case definition of COVID-19, the person must be isolated in the hospital and will be tested for COVID-19 as per protocol. Information of all such cases should be given to the State helpline number (list enclosed) and also to national helpline 1075. Email may also be sent at ncov2019@gov.in.

Quarantine for pregnant women in the times of COVID-19 pandemic

The term **Quarantine** is used to separate and restrict the movement of **well** persons who are known to be exposed (directly or indirectly) or suspected to be exposed to a communicable disease to see if they become ill. These people may have been exposed to a disease and remain asymptomatic. Quarantine may be at home or in a facility designated by the state which includes hotels, hostels, guesthouses or hospitals. This has been shown to be an effective measure against the spread of infection(24). On the other hand, **Isolation** refers to the separation and restriction of movements of **ill** persons who have a contagious disease in order to prevent its transmission to others. It typically occurs in a hospital setting or a special facility. At present, in India, all symptomatic patients who have a positive test for COVID19 are being isolated.

The criteria for quarantine are the same for pregnant women and the general population. These criteria, duration and measures may be changed with the passage of time as per advice of the Government of India(25). A contact in the context of COVID-19 is:

- A person living in the same household as a COVID-19 case
- A person having had direct physical contact with a COVID-19 case or his/her infectious secretions without recommended personal protective equipment (PPE) or with a possible breach of PPE
- A person who was in a closed environment or had face to face contact with a COVID-19 case at a distance of within 1 meter including air travel.

Instructions for contacts, being home quarantined

The home quarantined person should:

- Stay in a well-ventilated single-room preferably with an attached/separate toilet.
- If another family member needs to stay in the same room, it's advisable to maintain a distance of at least 1 meter between the two.
- Needs to stay away from elderly people, pregnant women, children and persons with co-morbidities within the household.
- Restrict his/her movement within the house.
- Under no circumstances attend any social/religious gathering e.g. wedding, condolences, etc.

General health measures to be followed in quarantine include hand washing, avoiding sharing fomites, wearing a surgical mask and changing it every 6 to 8 hours with correct disposal in 1% hypochlorite solution. If symptoms appear during quarantine, the pregnant woman should contact a health facility by telephone and follow the given advice.

Family members of the pregnant woman quarantined at home should keep a distance from her at all times and avoid direct contact with her and her fomites. Disposable gloves should be used in case soiled linen has to be handled. Visitors should not be allowed. Clothes should be washed separately.

The duration of home quarantine is 14 days from the time of exposure to a confirmed case or earlier if a test is performed on a suspect case and it is negative.

Effects of COVID-19 infection on mother and fetus

Pregnant women do not appear to be more likely to be severely unwell than other healthy adults if they are infected with COVID-19 as per currently available data. It is expected that the large majority of pregnant women will experience only mild or moderate cold/flu like symptoms.(9) With other viral infections such as the flu, maternal disease may be more severe. However, this has not been documented with COVID-19 infections at present. As seen with the general population, the risk factors for more severe disease may be found in pregnant women too. If the pregnant woman has co-morbid conditions such as diabetes, hypertension, obesity, respiratory disease or is of advanced age, she is more likely to have a severe form of respiratory disease. The caregiver should be watchful for worsening of symptoms and the clinical picture in these women.

Preliminary research suggests that the infection is not transmitted from the mother to child by placental transfer or through secretions in the genital tract. In two reports (19)(20) including a total of 18 pregnant women with suspected or confirmed COVID-19 pneumonia, all of the newborns, who were delivered via cesarean section, tested negative for the corona virus, and there were no traces of the virus in the mother's amniotic fluid, cord blood or breast milk (26)(27).

With the limited number of deliveries to COVID-19 infected women, at present, there is no evidence of any fetal effects of the infection in terms of fetal abnormalities or other fetal parameters of growth, amniotic fluid or doppler indices. There is no rationale for recommending amniocentesis to detect fetal infection at this time. An ultrasound 14 days after the infection can be considered for the pregnant woman who has recovered from infection. At present, there is no evidence of higher risk of abortion with COVID-19 infection. At present, there is no evidence of higher risk of preterm labour with COVID-19 infection. However, as with systemic disease which can compromise maternal health, there is a possibility that preterm labour may occur in these situations.

Arrangements in existing healthcare facilities to manage COVID-19 exposed and infected pregnant women

In an ideal world, the management of COVID-19 exposed or infected pregnant women would be carried out in a dedicated unit where other women are not being cared for and therefore the risk of transmission is minimized. In this

ideal set-up, there should be three demarcated zones – clean, potentially contaminated and contaminated with exclusive passageways to minimize exposure of individuals to each other once they have been allotted into these

zones. Each of these zones would then have its own facility to deal with outpatient, inpatient care and intensive care management. It may be beneficial for the entire contaminated zone (wards, labour rooms, operation theatres and ICU) to have a negative pressure system to limit the spread of infection. Wherever possible, It may be beneficial for the entire contaminated zone (wards, labour rooms, operation theatres and ICU) to have a negative pressure system to limit the spread of infection.

However, it may not be feasible to create such facilities everywhere. Therefore, the same principles should be applied to the existing facilities as far as possible. The purpose is to minimize the chance of contact between infected and non-infected pregnant women.

Every pregnant woman should be triaged at entry and then allotted into one of the zones depending on the presentation.

Infected	Potentially infected	Clean
· Tested and shown to be positive for COVID-19	· Symptoms of SARI · Contact with infected individual · Travel abroad in the last 14 days · Healthcare worker caring for COVID-19 infected individuals · Test result is awaited	· No symptoms of SARI · No contact with infected individual · No travel history

The infected and potentially infected pregnant women should be kept in separate isolation areas. Each isolation area includes isolation wards, and an isolation ICU area. If possible, each patient should be kept in a separate room with an attached bathroom.

Access to isolation areas should be strictly limited. Family visits and nursing shall be declined. Patients should be allowed to have their electronic communication devices to facilitate interactions with the family and friends.

Termination of pregnancy (MTP), sexual and reproductive healthcare in times of COVID-19

Abortion and reproductive healthcare may be affected by delayed presentations by the woman, lack of availability of providers and disruptions of the supply chain of material and drugs. Abortion care is essential healthcare. It is critical to ensure that women who seek abortion and family planning do not suffer from lack of access. It is well established that early abortions are safer for women and the MTP Act places limits on the gestational age for abortions. This makes the provision of abortion time-sensitive. It is also well established that women who seek an abortion tend to get it one way or another. A lack of these services may mean that women seek an abortion from unsafe providers and put themselves in harm's way. The services should therefore continue to be provided by public and private providers.

Assessment of Pregnant women (not in labour) with COVID-19 infection

If a pregnant woman is confirmed by tests to have COVID-19 infection, the first step is to assess the systemic status.

1. If asymptomatic, the woman should be quarantined in the hospital as per current practice. The measures to be taken are discussed in the previous section. If the numbers increase, the Government guidelines on hospital admission for quarantine may change. She should self monitor and report if symptoms arise.

2. If symptomatic, a decision needs to be made as to the requirement of hospitalization or further intensive care.

Hospitalization	Intensive Care (to be managed by critical care specialist) (13)
As of date (25 Mar 2020), all confirmed cases are being hospitalized in India for isolation and observation to watch for progress of symptoms	Pregnant women who meet any of the following criteria: · respiratory rate > 30 breaths/min; · oxygen saturation < 93% at a rest; · arterial partial pressure of oxygen (PaO2)/oxygen concentration (FiO2) < 300 mm Hg · Patients with > 50% lesions progression within 24 to 48 hours in lung imaging · Quick Sequential Organ Failure Assessment Score (qSOFA) score can be a useful adjunct to decision making for ICU management.
In the future, if there is a need to restrict hospitalization due to limited bed availability, pregnant women should be hospitalized if they have clinical or imaging features of pneumonia or systemic disease	

A quick bedside assessment tool is also usable for sepsis (typically for bacterial infections) screening in triage called the quick SOFA (qSOFA) score. It includes 1 point for each of 3 criteria.

qSOFA SCORE				Score ≥ 2 is suggestive of sepsis and needs intensive care
Number	Criteria		Point	
1.	Respiratory rate	≥ 22 breaths/min	1	
2.	Mental status	Altered	1	
3.	Systolic Blood pressure	≤ 100 mm Hg	1	

Medical management and drugs used in the treatment of COVID-19 infection in pregnancy

Supportive therapy for COVID-19 infections should include rest, oxygen supplementation, fluid management and nutritional care as needed.

The treatment of COVID-19 viral infection has been attempted by two approaches. The first approach is the use of a combination of Hydroxychloroquine and Azithromycin. These drugs are readily available and cost-effective in India. The other approach has been to use antiviral drugs, some of which are not yet available in India.

Hydroxychloroquine in a dose of 600 mg (200 mg thrice a day with meals) and Azithromycin (500 mg once a day) for 10 days has been shown to give virological cure on day 6 of treatment in 100% of treated patients in one study(28). The study included 20 treated patients with upper and lower respiratory symptoms. In this study, pregnancy was an exclusion criteria. However, as such, both these drugs have been used in pregnancy and during breastfeeding without significant effects on the mother or fetus. Alternative dosage regimens for hydroxychloroquine are to give 400 mg twice a day on day 1 and then 400 mg once a day for the next four days. Chloroquine can also be used as an alternative. The dose is 500 mg twice a day for 7 days. Some authorities recommend that azithromycin should be added only where there is a clinical suspicion of superadded bacterial infection(29).

Antiviral therapy

Lopinavir-ritonavir was the first antiviral combination used in an attempt to treat COVID-19 infection. This may be considered as a possible line of treatment for those who have chronic disease, immunocompromise or uncontrolled diabetes. However, there was no difference in time to clinical improvement or mortality at 28 days in a randomized trial of 199 patients with severe COVID-19 given lopinavir-ritonavir (400/100 mg) twice daily for 14 days in addition to standard care versus those who received standard of care alone(30).

Other agents such as Remdesivir are being evaluated in a randomized trial(29).

In India, some health authorities have prescribed a regimen of Oseltamavir 75 mg twice a day for five days in conjunction with hydroxychloroquine(31). The recommendation is based on the experience of the H1N1 (swine flu) experience. At present, data on this regimen is limited. The regimen is simple, cost effective and the drug is available easily.

Vaccine

At present, a number of organizations in the public and private sector are working towards the development of a vaccine. Some safety trials have been initiated. However, it is estimated that a vaccine would be available to use only after 6-12 months(32).

Other Drugs

A number of other drugs that are used in the management of pregnant women with COVID-19 infection are discussed below.

NSAIDs: These are the drugs used most often in the care of COVID-19 infected pregnant women for symptomatic relief of fever and myalgia. Paracetamol is the preferred drug. If possible, Ibuprofen and other NSAIDs may be avoided because there are concerns about potentiating ACE receptors.

Antenatal Steroids (fetal maturity): Steroids are recommended for enhancing fetal lung maturity in situations where preterm delivery is likely between 24 to 34 weeks of gestation. There is no documented evidence of the use of steroids in COVID-19 infection. However, glucocorticoids have been associated with an increased risk for mortality in patients with influenza and delayed viral clearance in patients. Therefore, the use of steroids needs to be individualized based on the woman's condition and should be discussed with her and her family.

Antihypertensives: There is controversy surrounding the use of ACE (Angiotensin Converting Enzyme) inhibitors and ARBs (Angiotensin Receptor Blockers) in the general population, especially the elderly with hypertension. In pregnancy, these drugs are not to be used due to their known deleterious effects on the fetus. The point of using them in pregnant women, therefore, does not arise.

Antibiotics: If there is a suspicion of secondary bacterial infection, appropriate antibiotics which are considered safe in pregnancy should be added.

Oxygen: If there is difficulty in breathing, oxygen supplementation by nasal prongs or mask may be added. High flow nasal oxygen at 4 to 6 liters per minute should be immediately administered. Non invasive ventilation can also be used. At this point, there should be a reevaluation of the patient's status and consideration should be given to the need for intensive care.

Intensive Care Management

It is estimated that about 15% of COVID-19 infected individuals will need care in hospital and 5% will need intensive care. (1) The outcome of such individuals is largely determined by the underlying co-morbidities and the availability of ICU facilities. In the public sector, India has a hospital bed availability of about 5 per 1000 population and intensive care bed availability of 1.3 per 100000 population. The number of ventilators are about half of what is estimated to be needed if there is a full-blown epidemic in the country(33). Western countries are also facing similar shortages or space, beds, personnel and infrastructure. This has resulted in a triage where care is being accorded only to infected individuals with a good prognosis of survival.

If a woman is identified to need intensive care, it should be done in conjunction with a team of ICU experts. Caring for critically ill pregnant women patients with COVID -19 is based on management of viral pneumonia with respiratory failure with additional precautions to reduce risk of transmission. The principle evidence based guidelines for ARDS include:

- Conservative Intravenous fluid strategies
- Empirical early antibiotic for possible bacterial pneumonia
- Early invasive ventilation may be needed
- Lung protective ventilation strategies
- Periodic prone positioning during mechanical ventilation .There is little evidence on prone positioning in pregnant women. **Pregnant women may benefit from being placed in the lateral decubitus position.**
- Extracorporeal membrane oxygenation where needed

Labour Triage for women with COVID-19 infection

A protocol should be in place in every maternity unit to receive pregnant women in labour or suspected labour with confirmed or suspected COVID-19 infection. The outline of the arrangements for healthcare facilities has been mentioned in an earlier section. The same principles should be followed. The following aspects should be borne in mind in planning for this triage process (9).

- The woman should call in advance to alert the maternity unit about her arrival whenever this is possible. This will give some time to the healthcare workers to prepare in triage and don the PPE.
- The woman should use private transport or an ambulance when possible to reach the maternity unit.
- She should be met with appropriately donned PPE at reception itself.
- Reception and triage in the same room as to be used for admission in labour and delivery. This should be a room with negative pressure. But it is not available everywhere.
- Keep the room free from any unnecessary items (decorations, extra chairs, etc) which could act as infected fomites later.
- There should be a restriction on the number of attendants allowed with the woman. There should be a restriction on the entry and exit of non-essential staff into the room. The companion of the woman should be treated as infected and all precautions should be taken.

In the future, if the number of COVID-19 infected patients rises, it is expected that there would be some who would be recognized to have the infection for the first time when they present in labour. Anticipating this, an elaborate advisory to this effect has been issued by the Ministry of Health and Family Welfare on hospital and institutional preparedness(34) and the conduct of mock drills and standard operating procedures(35) .

Management of Labor and Delivery in women with COVID-19 infection

In all circumstances, maternity care providers should continue to provide client-centred, respectful skilled care and support. Birth attendants should be limited to one named contact. There should be adequate counselling of the mother about the infection.

Separate delivery room and operation theatres are required for management of suspected or confirmed COVID-19 mothers. Both should have neonatal resuscitation corners located at least 2 m away from the delivery table. Resources required include space, equipment, supplies and trained healthcare providers for delivery, caesarean section and neonatal resuscitation. The standards and facilities required for infection control in these areas should be same as that for other adults with suspected or confirmed COVID-19 infection.

Following the principles in earlier sections on recognition, offering testing, PPE use and principles of isolation of COVID-19 infected women, this section is restricted to the management of labour and delivery and the modifications necessary in women with COVID-19 infection. Depending on the clinical picture and severity of the condition, a multispeciality team may be involved in caring for the pregnant woman in labour. The anaesthetist and neonatologist should be informed of such a woman presenting in labour.

If a woman presents in preterm labour, tocolysis is contraindicated in following the general principles of avoiding such an intervention with systemic disease. This decision should be individualized depending on the degree of clinical severity of the infection. If there is pulmonary involvement, beta-mimetic agents should be avoided.

Timing of delivery should not be altered on the basis of COVID-19 infection. The presence of infection is not an indication to induce labour or deliver the woman. At present, there is no evidence of transplacental vertical transmission. There would be no rationale in doing so. The exception to this would be the critically ill pregnant woman where delivery may be indicated to relieve the extra metabolic and pulmonary load. However, the possible benefits of this need to be weighed against the possible risks of worsening the systemic status with a surgical intervention. Such a decision has to be guided by individual circumstances including the degree of clinical stability, gestational age, available infrastructure and the couple's wishes.

In labour, monitoring should include the periodic evaluation of the respiratory status with a watch for symptoms of difficulty or shortness of breath, respiratory rate, pulse rate and oxygen saturation on pulseoximetry. If there is a deterioration of these features, intensive care measures would be required including ventilation.

As such, the pregnant woman with COVID-19 infection can be allowed to labour and indications for interventions should follow standard obstetric practice. With every examination and contact, healthcare workers should be mindful of adequate protective gear. An intravenous access should be established and fluids should be restricted in labour. It may be prudent to offer continuous electronic fetal monitoring in labour for women with COVID-19 infection wherever such facilities are available. The second stage of labour should be cut short to prevent maternal exhaustion and reducing maternal efforts, in case where there is respiratory involvement by the infection.

At present, pregnant women have almost universally been delivered by caesarean section when they present in labour with COVID-19 infection. There is no proven scientific rationale for this. It could reflect local preference and practices (36).

The maternal profiles and neonatal outcome of labour has been described in a study of 33 pregnant women who delivered with COVID-19 infection in Wuhan(37). The study describes the presentation of the women in labour. Three of the 33 neonates were found to be infected in this study. They had mild features of the infection. Excerpted data from this study is presented below.

	Neonates with SARS-CoV-2, No. (%)	
	No (n = 30)	**Yes (n = 3)**
Preterm	3 (10)	1 (33)
Small for Gestational Age	2 (7)	1 (33)
Asphyxia	1(3)	1(33)
Maternal Features		
Fever on admission	7 (23)	1(33)
Postpartum fever	4 (13)	1(33)
Cough	9 (30)	1(33)
ICU admission	0	0
Pneumonia on CT scan	30(100)	3 (100)
Nasopharyngeal swab	30(100)	3 (100)
Delivered by caesarean	23 (77)	3 (100)
Premature rupture of membranes	2 (7)	1 (33)

Labour Analgesia and Anesthesia in Pregnant Women with COVID-19 infection

Following the principles in earlier sections on recognition, PPE use and principles of isolation of COVID-19 infected women, this section is restricted to the specific aspects of anesthesia in labour and delivery. A team of anesthetists should be available with a senior anesthetist taking the clinical lead. There is interim guidance on the subject of obstetric analgesia and anesthesia with COVID-19 infection(38).

There is no evidence that epidural or spinal analgesia or anaesthesia is contraindicated in the presence of coronaviruses. Therefore, a COVID-19 infected woman who is fit enough to labour can be offered epidural analgesia. If she requires a cesarean delivery, the same epidural can be continued and a general anesthesia can be avoided.
If a woman who has not had an epidural anesthesia requires a cesarean birth, the choice of anesthesia is governed by the general health status of the woman. For most women, spinal anesthesia by standard techniques is suitable. However, in the situation where there is respiratory compromise, general anesthesia and subsequent ventilation will be needed.
If general anaesthesia is administered, preoxygenate the patient for five minutes with 100% O2 and perform rapid sequence induction (RSI) to avoid manual ventilation of the patient's lungs. Use a video-laryngoscope to improve intubation success and avoid awake fiberoptic intubations, when possible. This is a procedure that induces aerosolization. The need for using full PPE is reiterated. Place a high efficiency hydrophobic filter between the facemask and breathing circuit or between the facemask and reservoir bag to avoid contaminating the atmosphere.

Testing for the Newborn

The care of the newborn should be in the hands of a neonatologist or pediatrician. Some areas of concern regarding testing of the newborn are mentioned below to help with counseling the mother and family(5).

Which neonates to test?	• Neonates born to mothers with COVID-19 infection within 14 days of delivery or up to 28 days after birth • Symptomatic neonates exposed to close contacts with COVID-19 infection
When should the neonate be tested	**If symptomatic**, specimens should be collected as soon as possible **If asymptomatic and roomed-in**, test only if and when mother's test comes positive. If mother is COVID-19 positive and baby's initial sample is negative, another sample should be repeated after 48 hours.
What sample should be collected of the neonate?	*Not mechanically ventilated* - Upper respiratory nasopharyngeal swab (NP). Collection of oropharyngeal swabs (OP) is a lower priority and if collected should be combined in the same tube as the NP. *Mechanically ventilated* - Tracheal aspirate sample should be collected and tested as a lower respiratory tract specimen
How to collect?	*Upper nasopharyngeal swab* • Use only synthetic fiber swabs with plastic shafts. Do not use calcium alginate swabs or swabs with wooden shafts, as they may contain substances that inactivate some viruses and inhibit PCR testing. • Insert a swab into nostril parallel to the palate. Swab should reach depth equal to distance from nostrils to outer opening of the ear. Leave swab in place for several seconds to absorb secretions. Slowly remove swab while rotating it. • Place swabs immediately into sterile tubes containing 2-3 ml of viral transport media. *Oropharyngeal swab (e.g., throat swab):* Swab the posterior pharynx, avoiding the tongue. *Nasopharyngeal wash/aspirate or nasal aspirate* Collect 2-3 mL into a sterile, leak-proof, screw-cap sputum collection cup or sterile dry container. Other samples: Currently not advised; stool, urine and blood specimens, since the isolation is less reliable than from respiratory specimens. Do not take these specimens for testing (based on current advisory recommendations)

Breastfeeding and the COVID-19 infected mother

Some viral infections such as cytomegalovirus and HIV are transmitted through breast milk. However, as present knowledge stands, there is no evidence that COVID-19 is secreted in breast milk. The CDC states that "we do not know whether mothers with COVID-19 can transmit the virus via breast milk"(39). It is reassuring that in six Chinese cases tested, breastmilk was negative for COVID-19; however, given the small number of cases, this evidence should be interpreted with caution(27). The main risk for infants of breastfeeding is the close contact with the mother, who is also likely to share infective airborne droplets.

As breast milk is the best source of nutrition and immunity for the infant, UNFPA encourages it(40). In the light of the current evidence, we advise that the benefits of breastfeeding outweigh any potential risks of transmission of the virus through breast milk. The risks and benefits of breastfeeding, including the risk of holding the baby in close proximity to the mother, should be discussed with her.

This guidance may change as time goes on and more studies and knowledge evolves.
For women wishing to breastfeed, the following precautions should be taken to limit spread to the baby:

- Pregnant woman should wash her hands before and after touching her baby,
- Mother should practice respiratory hygiene by wearing a mask and not sneezing in front of a baby during breast feeding;
- All surfaces should be kept clean and disinfect she has touched
- If a mother is confirmed with COVID-19 infection or who is a symptomatic and wishes expressing breast milk with a manual or electric breast pump, the mother should wash her hands before touching any pump and bottle and should follow recommendations for proper pump cleaning after each use.
- Consider asking someone who is well to feed expressed milk to the baby

Where mothers are expressing breast milk in hospital, a dedicated breast pump should be used. For women bottle feeding with formula or expressed milk, strict adherence to sterilisation guidelines is recommended(39).
If she is too unwell to breastfeed her baby due to COVID-19 or its complications, she can be supported to safely provide breast milk to her baby in a way possible, and acceptable to her.

Cleaning, maintenance of facilities and medical equipment

The isolation areas, procedure and surgical areas and medical equipment should all be handled as potential sources of infection if a COVID-19 pregnant woman has been cared for in those areas(13). While this is being carried out, the worker should wear PPE.

For surface cleaning and disinfection, agents that are useful are alcohol or chlorine based. Alcohol based agents should contain 70% isopropyl alcohol. Chlorine based solutions are prepared by diluting liquid chlorine (1000 mg/L strength) or freshly prepared 1% sodium hypochlorite solution. The appropriate concentration of sodium hypochlorite for disinfecting general liquid biological waste is approximately 1%. Household bleach is 5 - 6 % sodium hypochlorite; therefore a 1:5 (v/v) dilution of bleach to liquid biological waste is appropriate. The contact time of these solutions should be at least 30 minutes.

- Floors, walls and object surfaces should be wiped 2-3 times a day or if there is visible contamination.
- Air can be sterilized by fumigation, plasma air sterilizers or ultraviolet lamps.
- After a procedure, the biological fluids, blood, and fecal matter should be treated with the above solutions before disposal.
- If there is a large fluid spill, sodium hypochlorite powder should be spread over the spill and left in contact for 30 minutes before swabbing or cleaning it.
- Reusable medical equipment, linen, fabric and clothes should also be treated with sodium hypochlorite before they are processed further.

Postnatal Care and Advise to the mother infected with COVID-19

Postnatal care of the mother infected with COVID-19 should include continued medical evaluation for respiratory status and symptoms and standard practices of routine postnatal care. She should be encouraged to maintain the good practices of hygiene related to the puerperium and hand hygiene. Advice should include management of engorged breasts when feeding has not been established and measures to enhance breastfeeding after the isolation period is completed. She should consume a healthy, nutritious diet to recover from the infection and build immunity.

The discharge card from the maternity unit should have advice about COVID-19 infection in addition to the usual post-delivery instructions. It should emphasize social distancing and need for evaluation if symptoms of acute respiratory illness (SARI) arise after delivery.

The mother who is recovering from an acute illness and/or is isolated from the infant may be at risk for developing anxiety, postpartum depression and other mental health issues. She should be offered counseling and psychological support. Some women may need a psychiatrist's consultations. These interventions can be safely provided by teleconsultation by remote electronic media. Further into the puerperium, the couple should follow contraceptive practices as per their informed choice.

Diet for the pregnant woman and COVID-19 infection

Diet has been the subject of numerous controversies in the wake of the COVID-19 pandemic. It is essential to understand and we state clearly at the outset that there is no particular diet that is recommended to treat or use as part of the treatment against COVID-19 infection in a pregnant woman or in the general population. There is also no evidence that consumption of meat, chicken or eggs leads to a higher risk of acquiring COVID-19 infection.

Certain populations of pregnant women who are at risk may have some benefits from dietary modifications in terms of lowering infection risk such as women who are diabetic, obese or have other metabolic abnormalities. For other pregnant women, there is limited evidence that any dietary substances may improve immune status and reduce infection risk. Based on such limited evidence, dietary advice is generic and would include a high protein diet and vitamin and micronutrient supplementation. Natural sources of these are called superfoods in common parlance and include citrus fruits, ginger, garlic, broccoli, turmeric, oregano oil and spinach. Liver detoxification is essential to reduce toxins burden on our body. While most of the above lack robust evidence, taking these measures will not do any harm, so they should be judiciously used in consultation with the treating doctor.

Training and managing the healthcare cadre

In addition to the general advice on hygiene and social distancing that has been described in earlier sections; some aspects of COVID-19 necessitate special training(11)(13). This is especially to do with the correct use of PPE. The type of training and measures will depend on the type of work that a staff member performs in the hospital. A baseline sensitization should be carried out for every staff member to make them aware of the risk of infection and dispel undue myths and rumors.
Before working in a ward, delivery room, or operation theatre, staff (including doctors – junior and senior) must undergo training and examinations to ensure that they know how to put on and remove personal protective equipment.

If case loads increase, the staff should be divided into different teams. Each team should be limited to a maximum of 4 hours of working in an isolation ward. The teams shall work in the isolation wards (contaminated zones) at different times. Arrange treatment, examination and disinfection for each team as a group to reduce the frequency of staff moving in and out of the isolation wards. Before going off duty, staff must wash themselves and conduct necessary personal hygiene regimens to prevent possible infection of their respiratory tracts and mucosa.

Operating with PPE gear can be a formidable task as has been described from some personal experiences. There can be difficulty with communication (hearing is reduced). Therefore it is good to have a set operating team which is generally familiar with standard operative steps of a particular procedure. Also, tactile sensation is diminished. This may lead to increase in operative time. Airconditioning has to be switched off to prevent the spread of the virus into the atmosphere and the operating team is faced with heat, perspiration and humidity. These challenges require fortitude and preparation to overcome them.

Keeping up the team spirit is essential

- Workforce safety is a high priority, active training in the proper use of barrier precautions and hygiene practices is important.
- Psychological stress and burnout of healthcare workers is common so provide emotional support, encouragement and appreciation
- Reduce stigmatization of ill-informed members of the public

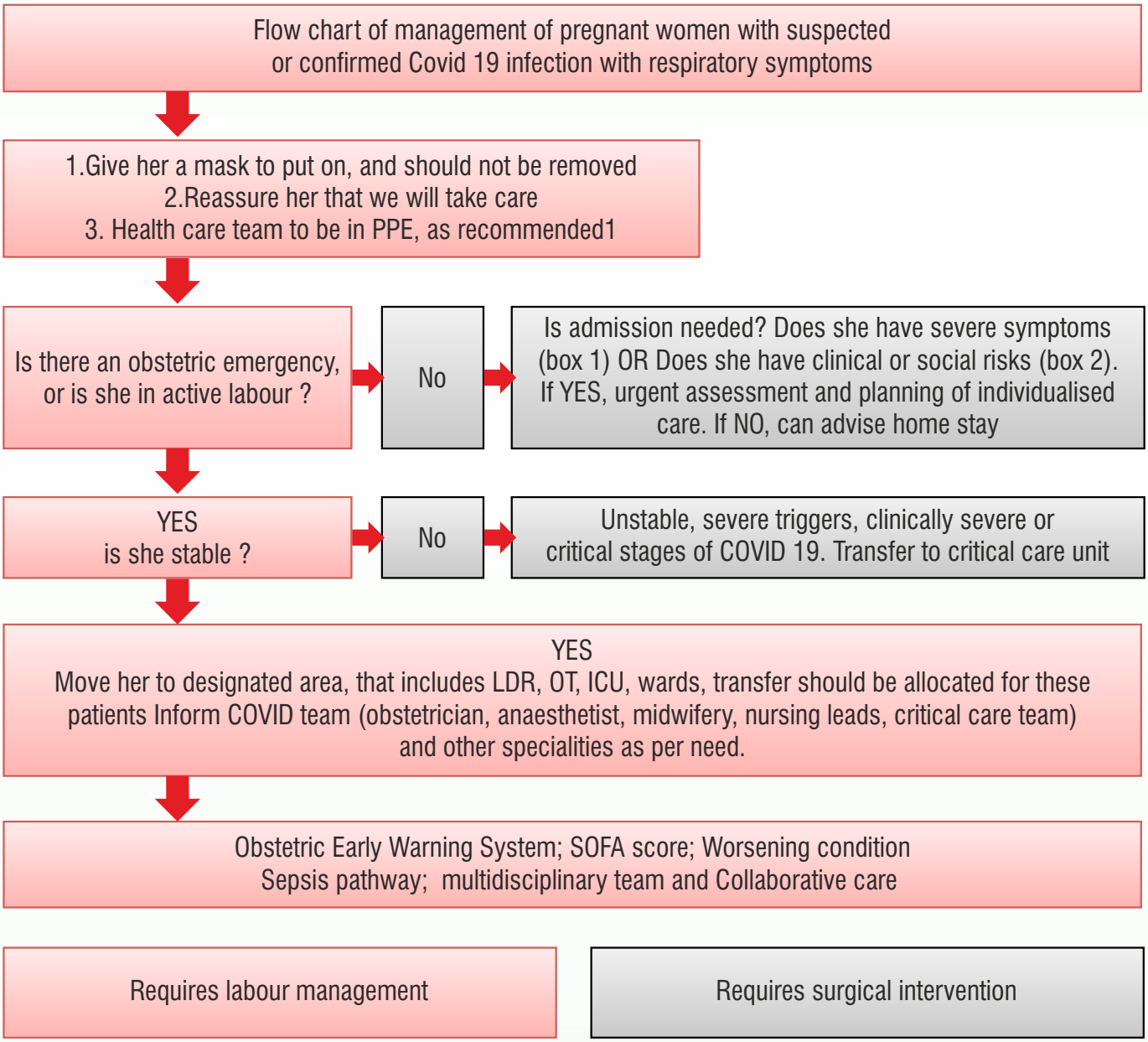
- Special provision of meals to boost morale; laundry service for used scrubs
- Provision of frequent updates and encouragements
- Health insurance
- Care of workers who may have medical conditions should be given appropriate care themselves.

Consent

In addition to routine consent taken at the time of admission, treatment procedures, delivery or surgery, it would be prudent to include aspects related to COVID-19 infection for the time of the pandemic. The points that should be included are the probable chances of COVID-19 infection while in hospital and its consequences and the precautions to be taken to avoid the infection.

Flow chart of management of pregnant women with suspected or confirmed Covid 19 infection with respiratory symptoms

Persons under investigation or confirmed cases , from the obstetric perspective, follow the same management pathwayas outlined; There is a significant group of patients, who though infected, remain asymptomatic. There should be good communication between the laboratory, the screening unit, the obstetric unit and the entire multidisciplinary COVID team to prepare a fast and quicktransfer from entry point to the isolation unit. A COVID team should be formed at each unit with a senior obstetrician, anaesthetist, neonatologist, critical care with infectious diseases expert to plan the best response. Examination and tests are performed for assessment of severity and further planning of care.



Management of Labour

Delivery suite designated for these cases with all isolation facilitieswith well equiped to monitor and care. This should not be a part of the running labour and delivery complex.

Minimise the number of persons in the room.
Healthcare team to be in PPE.
Birth companion to be in PPE*

1.Routine monitoring protocol for high risk pregnancy
2.Hourly vitals, intake output charting
3.3. Fetal monitoring as per protocol
4. Minimise interventions, if they can be avoided
5. Entonox use only if with a single use filter
6. Water birth is contraindicated
7. Cut short the second stage if she is getting exhausted
8. Mode of delivery : CS is reserved for those with obstetric indications.1 CS to be considered if she has severe disease**
9. Delayed cord clamping is recommended*** by RCOG1
10. Vertical transmission has not yet been proven

Surgical Procedure

Designated OT
Minimise the number of persons in the OT room
Healthcare team to be in PPE
Plan ahead and **minimize the movement of the team** in and out of the OT during the procedure

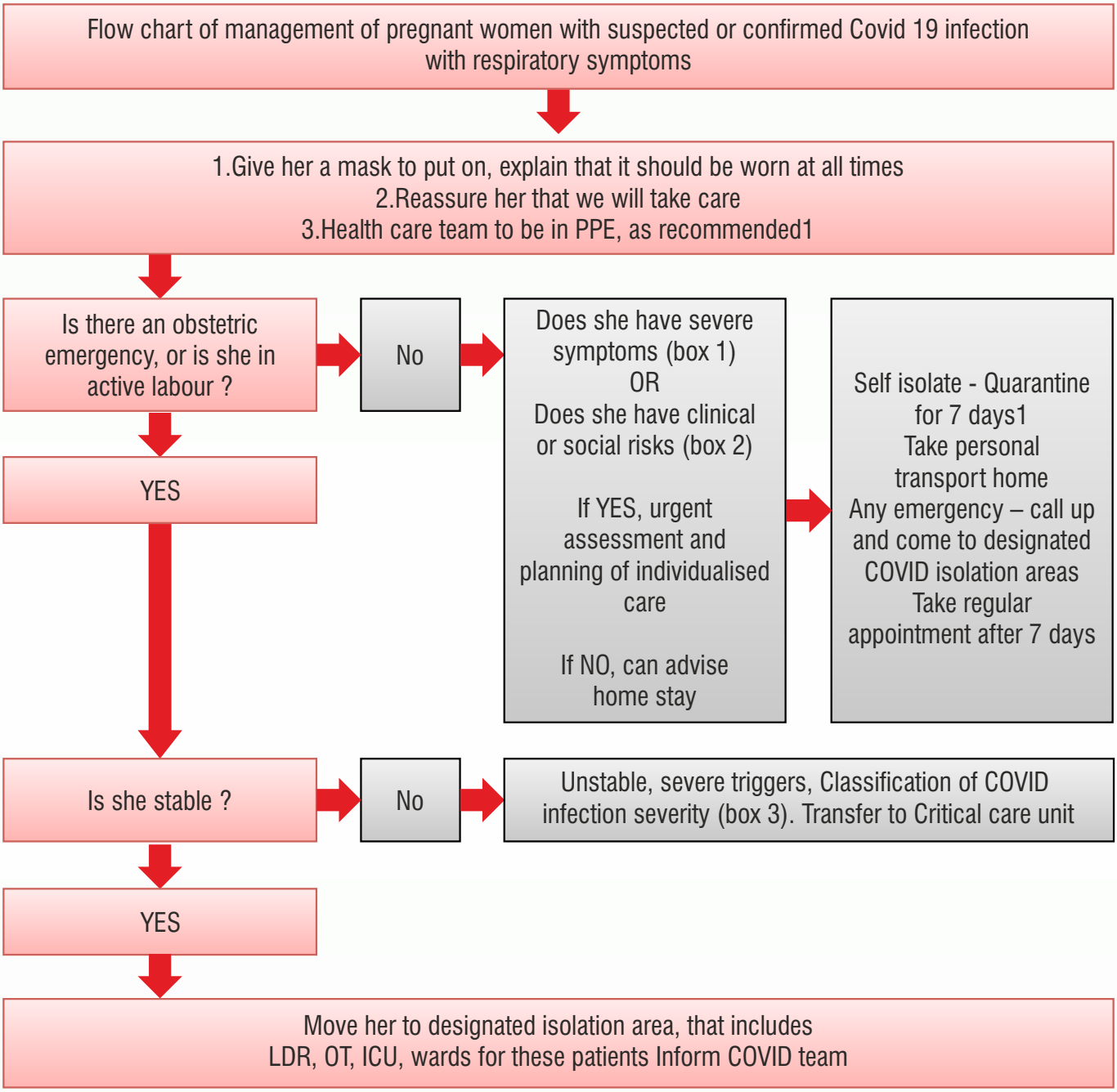
1. Anaesthesia : regional is preferred
If general anaesthesia is needed then, ensure negative presures in the OT through the procedure and at extubation
2. Antibiotics prophylaxis is recommended
3. Category 1, crash cesarean section may have a delay as the team needs time to put on PPE and prepare the entire team, which may need to be explained. 1

Post Op care as per standards
Isolation room principles, barrier nursing with universal standard precautions

* Birth companion is an important support sytem of these women, and hence should not be removed, but given adequate PPE to protect them. ** CS is reserved for those with obstetric indications by the RCOG guideline, but data from China shows a majority having a cesaren section. ***Delayed cord clamping is advocated as vertical transmission is not been proven, and benefits to baby are huge

Note – There is controversy about the timing of cord clamping. The ACOG recommends early (immediate) cord clamping, whereas the RCOG recommends delayed (1 minute) cord clamping.

SIMPLE PATHWAY



Box 1
Conduct Illness Severity Assessment

1. Does she have difficulty breathing or shortness of breath?
2. Does she have difficulty completing a sentence without gasping for air or needing to stop to catch breath frequently when walking across the room?
3. Does patient cough blood?
4. Does she have new pain or pressure in the chest other than pain with coughing?
5. Is she unable to keep liquids down?
6. Does she show signs of dehydration such as dizziness when standing?
7. Is she less responsive than normal or does she become confused when talking to her?

Box 2
Assess Clinical and Social Risks

1. Comorbidities (Hypertension, diabetes, asthma, HIV, chronic heart disease, chronic liver disease, chronic lung disease, chronic kidney disease, blood dyscrasia, and people on immunosuppressive medications)
2. Obstetric issues (eg, preterm labor)
3. Inability to care for self or arrange follow-up if necessary

Box 3
Clinical Classification of Covid 19 infection (China)

Mild disease: Clinical symptoms are mild and evidence of pneumonia on imaging

Moderate: Fever + respiratory symtoms + pneumonia manifestations on imaging

Severe: Respiratory rate > 30 / min, Spo2< 93% at rest, paO2/ FiO2 < 300 mmHg, Those with 50% lesions progression within 24 to 48 hours of imaging

Critical: Respiratory failure requiring mechanical ventilation, presence of shock, other organ failure that requires ICU care

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