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## Preparing an obstetric unit in the heart of the epidemic strike of COVID-19: quick reorganization tips

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### ABSTRACT

COVID-19 is placing considerable strain on healthcare systems. Disaster and military medicine specialists were involved in the outbreak in Italy, after many units were overwhelmed. Health providers were caught off guard and personnel was unprepared to face this unprecedented threat. Local decisions accelerated the rate of the spread. Many countries declared a state of emergency and lockdown to contain the exponential transmission of the disease. The purpose of this review is to suggest quick key points of strategies to implement in obstetric units without delay to respond to the oncoming wave, based on experience and feedback from the field. It is essential in an emergency situation to understand what is at stake and prepare maternity wards in the best possible way.

### ARTICLE HISTORY

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### Introduction

As of 17 March 2020, the world is facing one of the major public health emergencies of modern history.

The new emerging viral pathogen: acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is responsible for the disease known as COVID-19.

The WHO declared this outbreak a pandemic on 11 March 2020 [1].

During this deadly outbreak, 191127 cases tested positive and 7.807 subsequent deaths were recorded (data from 18 March) [2].

To date, containment measures appear to be the best strategy to break the chain of transmission. The most prominent example came from China, where the disease appears to be controlled.

COVID-19 is placing considerable strain on health systems. Disaster and military medicine specialists were involved promptly in the outbreak in Italy, after many units were overwhelmed.

Health providers were caught off guard and personnel were unprepared to face this unprecedented threat. Local decisions accelerated the rate of the



spread; many countries declared a state of emergency and lockdown to contain the exponential transmission of the disease. The current crisis we are facing is essentially due to a lack of anticipation.

There is a need for an emergency response system. We learned from previous epidemic diseases that their rapid spread requires a complete reorganization of infrastructures which must continue adapting as knowledge of the disease progresses [3].

Although current data regarding the impact of COVID-19 on pregnancy is reassuring [4], it should be interpreted with caution given the small number of cases [5,6].

We are all learning as we proceed. Technical guidance for pregnancy and COVID was released in earlier publications [7,8].

In the current situation, the lack of early involvement of experts in disaster medicine or military doctors generated a delay in managing the emergency. The focus was on the hospitals, but what was happening in the field was neglected, until the situation was out of hand. We now understand that triage of cases

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should have started within the community. Early identification, isolation and selective referral only of cases where hospital care was necessary, would have prevented hospital overload and healthcare infrastructure collapse.

It is essential, in a crisis such as this one, to change your mindset, your unit and resources in order to face to the epidemic. Nothing is as it was, decisions and reorganization need to be carried out in extreme emergency.

The purpose of this review is to suggest quick key points of strategies to implement in obstetric units, without delay to respond to the oncoming wave, based on experience and feedback from the field.

### Coronavirus surface and air stability

A recent article by Kampf et al. found persistence of viral genomes of coronaviruses of up to 9 days on metal, glass and plastic surfaces at room temperature [9].

SARS-CoV-2 specifically was detected on surfaces 72 h after application and in aerosol particles after 1 h, supporting the plausibility of aerosol and fomite transmission [10]. These viruses could be inactivated within 1 min after disinfection with >62% ethanol, 0.5% hydrogen peroxide or 0.1% sodium hypochlorite [9]. Adequate disinfection therefore stops the chain of transmission.

### Isolation

Following the Chinese model, the key in this pandemic period is to isolate the virus and the cases, to avoid to spread of infection.

Nosocomial transmission due to inadequate infection control is well established as a significant driver of MERS-CoV infections in humans. Infection control lapses were apparently responsible for virtually all reported healthcare transmission events, highlighting the need for strengthened infection control capacity worldwide [11].

Communities worldwide have been instructed to isolate at home. We are striving to avert the oncoming overload and eventual collapse of healthcare infrastructure due to a lack of hospital beds, but also to keep healthcare personnel from becoming infected and further depleting available resources. We must avoid circulation of the virus and in order to achieve this, we need healthy, suspected and infected people to stay at home.

Testing of suspected or positive people must be carried out at home or outside the hospital (mobile structure) in order to channel patients directly to the COVID + zone.

### Set up a local task force

One initial step toward resolving the crisis could be to establish a:

1. TASKFORCE in the healthcare facility, with regular meetings to study the resources involved and shared decision-making. The taskforce must include: an obstetrician, an anesthesiologist, a neonatologist, a midwife or nurse, a local administrator. The taskforce must designate a leader COVID-advisor.
2. TRIAGE CALL CENTER for all pregnant women, with a toll-free number.
3. MOBILE SCREENING TEAM (midwife or doctor or nurse) for all pregnant women with suspected infection: the team is mobilized to carry out screening and give advice to the patient before attending the hospital or at least upon arrival.

### General rules

It is fundamental to separate COVID + and COVID – in the local setting and mandatory to achieve a closed circuit for all COVID + patients.

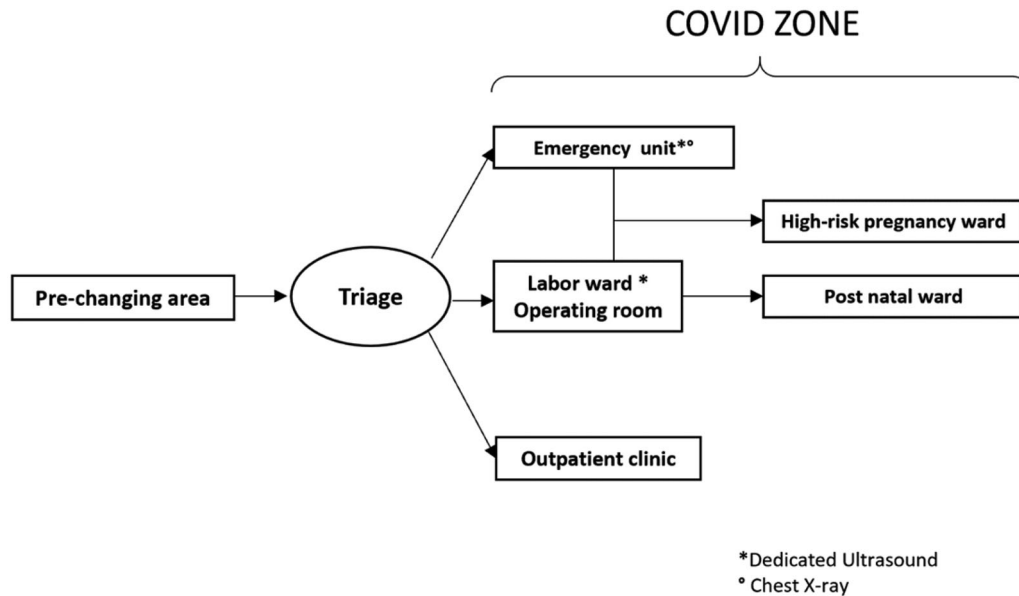
Emergency ward, admission, lift, corridor, labor ward, outpatient clinic, ultrasound department, high-risk pregnancy ward, operating theater must have a clear area defined as “COVID ZONE.”

Initial triage must be done outside the hospital (home or mobile structure; phone interview). If not possible or in cases of vital emergencies, a specific isolated room should be available to evaluate these patients. This room should be large enough to be able to perform a physical exam, an ultrasound scan and/or a CTG. The room must have a good ventilation system and a cleaning team must be ready before and after caring for patients.

- We are facing a possible collapse of resources (human and material), all facilities must have a strict saving policy to approach the matter.
- Central focus of infection prevention-control (IPC) strategy is protecting healthcare workers with appropriate IPC supplies and ensuring basic health logistics at responding facilities [12].

- Personal protective equipment (PPE) must be defined clearly in accordance with local policies following WHO recommendations [13].
- Patient condition and stability is a priority.
- If possible, postpone appointments until fulfillment of 14-day quarantine or until patient is asymptomatic.
- Use telemedicine when possible.

### How to set up a covid zone



### All these units must have entirely separate tracks for COVID+ and COVID-

The COVID+ ZONE is a separate area with isolated rooms, and can be identified as a “second level” of care, if required, walls must be built, in order to allow for separation. Internal policies must be adapted.

A COVID+ ZONE must have its own material/supply which should preferably not be moved to a COVID- ZONE unless it is necessary.

A COVID transportation policy must be clarified and avoid any interaction with other people, specifically droplet and contact precautions.

For personnel doing shifts in COVID+ wards, it is important to limit shift duration to a maximum of 6 h. Personnel in these wards must scrub out entirely in order to drink, use the bathroom, eat, etc as none of these activities may be carried out with PPE.

Healthcare teams need to be split and rotate periodically, in order to keep part of the workforce home (to rest, but also to avoid infecting the entire team simultaneously) while the rest carry out necessary hospital duties.

Two groups must be put in place: one for the COVID- area and one for the COVID+ zone. Changing shifts between the 2 groups must be arranged weekly or every 15 days.

### Pre-changing room COVID+ area

It is fundamental to create a pre-changing area for personnel entering into a COVID+ area with Personal Protective Equipment (PPE). All personnel must be equipped with PPE. In this area all efforts must be deployed to avoid workers’ contamination [14].

We are facing a pandemic. Therefore, since it is impossible, in this situation, to distinguish between a paucisymptomatic patient and one in viral incubation, all patients must be regarded as *potentially infected*.

All personnel in contact with patients should be equipped with facial mask (type FFP2 or FFP3) and PPE (disposable gown, gloves, goggles or facial screen). Patients should be equipped with surgical masks.

In healthcare, the goal of personal protective equipment (PPE) is to protect healthcare personnel and patients from bodily fluids and infectious organisms *via* contact, droplet, or airborne transmission. The critical importance of using PPE properly is highlighted by 2 potentially fatal viral infections, severe acute respiratory syndrome-associated coronavirus and Ebola virus, where healthcare personnel became infected while caring for patients due to errors in the use of PPE [13]. In Italy, the number of positive cases, according to the most recent estimates as of March 16, 18:00 h, is 27 980, which is about 2.8 times higher than 1 week

before (10 149 cases recorded on March 10). Among these, 2339 (8,4%) are health workers, a proportion that has been increasing over time [15]. The rapid decline in Ebola mortality is multifactorial. The efforts of US military medical personnel likely were a contributing factor in this rapid decline as those international health workers were afforded the latest in PPE training with strict attention to detail [16].

There are several videos resources available. The greatest danger comes from undressing rather than dressing. These procedures should be carried out in calm and structured manner. Contaminated parts should never be touched with bare hands. It is important to wash hands with hydroalcoholic solution or similar after each step. Small lesions on the skin of the hands or face should be specifically covered.

### How should I be dressed going to work?

That is a question not addressed in our medical books.

It is advisable to remove all jewelry, which is probably a source of contamination. Beard should be shaved and long hair tied back.

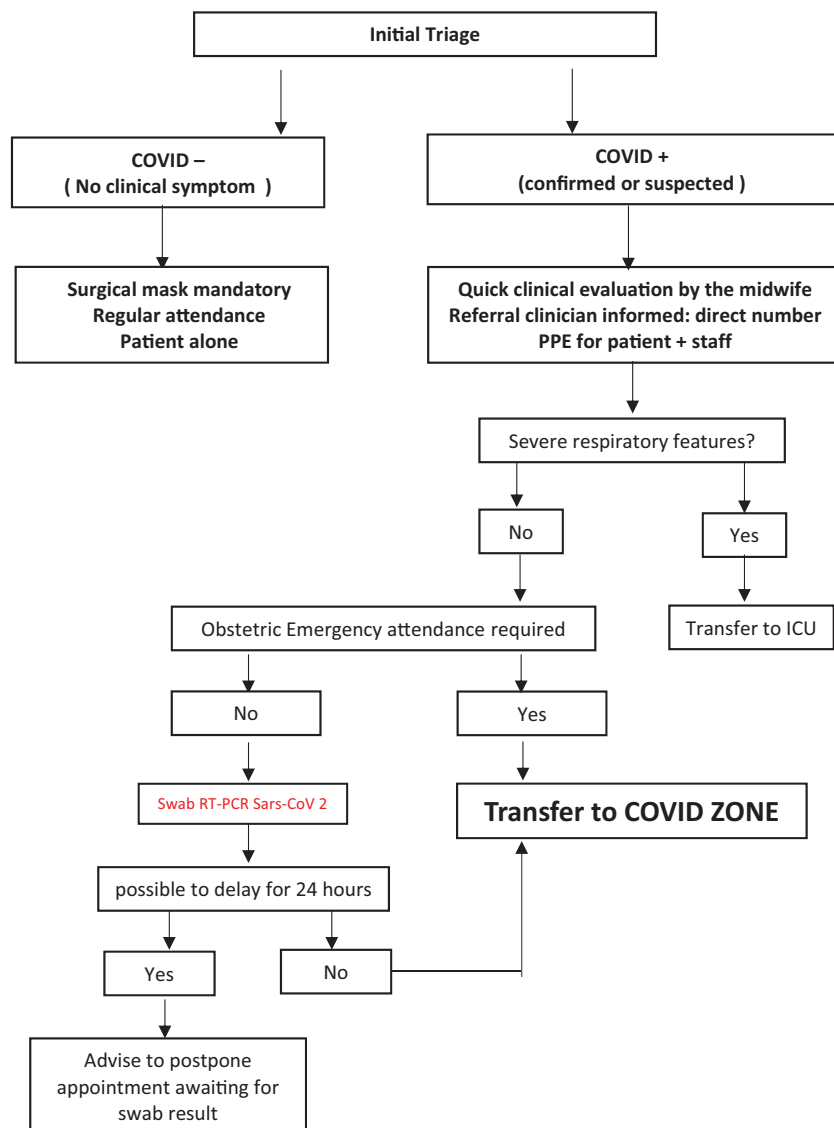
Don't use your phone, or disinfect it. Wear eye glasses instead of contact lenses.

When you arrive home, leave your shoes outside the door and your clothes in a decontaminated area and wash at 60 °C.

At work hand washing is not enough, all surfaces, computers, desks, door handles, and toilets, need to be cleaned with higher hygiene level (sodium hypochlorite 0.1%) [9].

### Algorithm for pregnant patients attending maternity unit

#### Maternity Unit



## Proposed strategy in setting maternity units [6,17–22]

### Outpatient clinic

- Cancel/ postpone all attendance if non-essential.
- Redirect if possible, to a private obstetrician/gynecologist or a community midwife.
- Implement telemedicine.
- PPE for midwife/obstetrician in close contact.
- Ultrasound dedicated for the COVID ZONE.
- Triage for low-risk and high-risk pregnancy.

### Ultrasound unit/Imaging

- Reschedule all regular appointments if not necessary
- Make a list for strict indications for scan
- Avoid invasive procedure (CVS, amniocentesis) for COVID + patients
- Cover probe with plastic and disinfect before/after use
- PPE for sonographer and write report in same room
- Set appointments with the largest interval possible

Current data suggest that Sars-Cov 2 does not cross the placenta. It seems there is no effect of the virus on fetal development.

### Antenatal ward

- Beware of steroid use because it has been reported that this could aggravate the disease. Only use when potential benefits far outweigh the risks.
- Fetal monitoring only when necessary.
- Weekly multi-disciplinary meetings and individualized decisions according to the situation.
- Fever or suspected chorioamnionitis should be taken with extreme caution as may trigger delivery.
- Respiratory deterioration may prompt delivery based on individual cases.
- Timing and mode of delivery should be individualized.
- Shorten hospital stay as much as possible.
- Implement telemedicine follow-up.

### Labor ward/induction of labor

- Consider obstetric assistance for vaginal birth as “assistance maneuvers that can produce aerosols”: use FFP2 / FFP3 facial filters, disposable water-repellent TNT long-sleeved gown, double gloves,

visor / goggles, disposable headgear, shoes and proceed for disposal in accordance with the appropriate standards

- Surgical mask for patient. Allow removal of mask for pushing.
- Partner allowed following internal policies, preferably not.
- For COVID + patients, indication for labor induction must be individualized and postponed if possible.
- For COVID + and need for induction, one line of cervical ripening advised and preferably following a protocol for «quick induction» (e.g. balloon /dilation/ amniorexis + oxytocin)
- Routine labor management, active management may be required depending on maternal condition.
- Intrapartum fever or suspected chorioamnionitis should be considered with extreme caution and delivery expedited.
- Epidural/spinal analgesia not contraindicated.
- Continuous fetal monitoring (given that a higher incidence of fetal distress in labor has been reported).
- C-section or instrumental deliveries for obstetric indication or deterioration of maternal condition only.
- If maternal health deteriorates, a cesarean section may be necessary.
- If the pregnant woman is symptomatic, the risks / benefits of proceeding as soon as possible performing cesarean section (maximum 37 weeks completed if elective) should be evaluated in order to allow better control of lung function and also the possible administration of antivirals and anti-cytokines agents.
- No presence of father or family member at birth, no skin to skin.
- Perform early clamping of the cord (the double distal clamp and the double proximal clamp allows to have an intact cord section for sampling).
- Ensure the presence of the neonatologist at delivery.
- Do not aspirate with a suction device.
- Allow breastfeeding with mask (if no symptoms or paucisymptomatic). [Figure 1](#).

### Post natal ward

- PPE for staff.
- Surgical mask for patient.
- Limited visiting time for partner/support person\* only (internal policy) \* If COVID+: no visit
- Routine post-partum care.
- Avoid certain groups of NSAIDs.



**Figure 1.** Flow-chart for the perinatal-neonatal management of a suspicious or already confirmed positive mother to SARS-CoV-2. (Modified from Wang et al. Ann Translat Med 2020)

- Allow breastfeeding with mask in mildly symptomatic mothers.
- Babies born to suspected or confirmed COVID-19 mothers should be tested.
- Encourage early discharge in mildly symptomatic, otherwise healthy patients, with home care and isolation guidance.
- Neonatal monitoring and follow-up after discharge.
- Advise patient to call clinic for triage if worsening symptoms.
- Community midwife informed. [Figure 1](#).

## Conclusion

It is essential in an emergency situation to understand and prepare a maternity ward in the most efficient manner. Anticipation is paramount, maternity departments need to be prepared structurally, with protocols and well-trained personnel.

At this moment in time it is important to preserve personnel, equipment and hospital structures. A COVID+ area must be set up and kept fully separate from other units. If this separation is not ensured, the entire hospital must be considered COVID+ and all



personnel within the building should be dressed according to second level guidelines (PPE). This situation is possible for a week, but is not tenable in the long run, as it will exert inordinate demand on protective gear and personnel. Protective gear will run out and medical personnel will be contaminated. The financial investment to achieve separation between COVID+ and COVID- wards will be rewarded in the long term.

We must make a transition to military medicine-like planning; rational protocols and rapid action are essential in order to stem the spread of disease and anticipate the inevitable shortage of material and human resources. Thought must be given to reusable, machine-washable equipment which can readily be disinfected. In order to carry out this work in the long term, it is of paramount importance that frontline personnel be afforded adequate protection and safe working conditions. National and local authorities must work with healthcare professionals to ensure that every possible measure is taken to stop disease transmission.

### Disclosure statement

No potential conflict of interest was reported by the author(s).

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