Maternal Health in Low Resource Settings In the Age of COVID-19

Antenatal Care, Labor and Birth, and Postnatal Care

Joseph Sclafani, MD

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COVID-19 Infection Management during Pregnancy

- Update on the COVID-19 pandemic
- Symptoms and transmission
- Public health measures to reduce the spread
- Antenatal care
- Labor, birth and postpartum care
- Case review/simulation
- Q & A

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Pre-test

True or False?

①Pregnant women are at increased risk of contracting and dying from COVID-19 infection.

②Preterm labor is more common in women with COVID-19 infection.

③Patients can appear well on admission to the hospital but can rapidly decompensate during labor.

④Magnesium sulfate is safe to use in patients with COVID-19 infection.

⑤Patients requiring Cesarean birth are best managed with general anesthesia.

⑥Newborn infants can be born with COVID-19 infection.

⑦COVID-19 virus can be passed to newborns through breast milk.

COVID-19 Cases

as of 18 April 2020

COUNTRY	TOTAL CASES MARCH 24	TOTAL CASES APRIL 18
Worldwide	337,553	2,248,863
USA	33,546	718,185
Peru	363	14,420
Kenya	15	262
Zambia	3	57
Haiti	2	44
South Sudan	0	4

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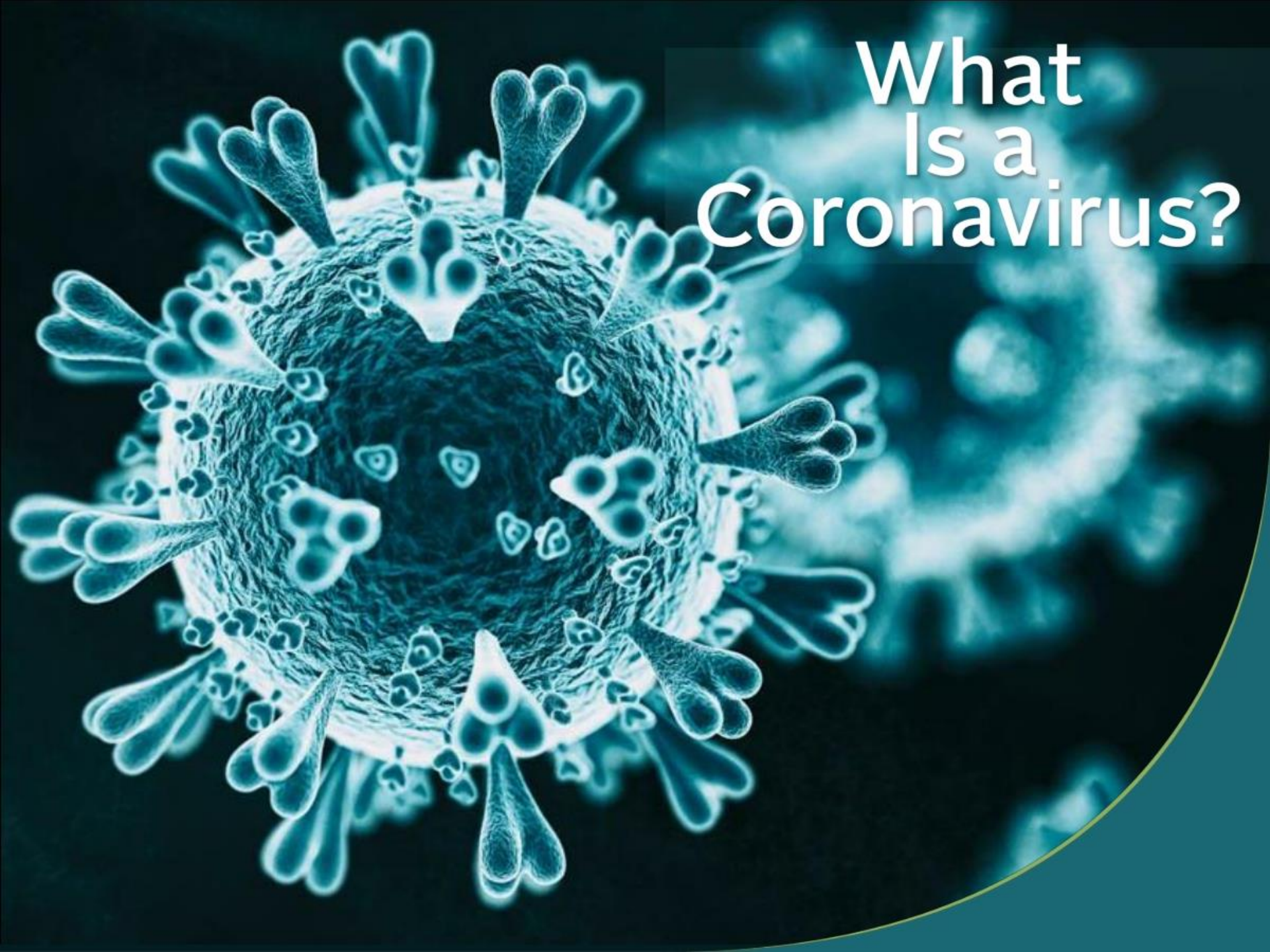
What
Is a
Coronavirus?

COVID-19 Pandemic

Cause: The SARS-CoV-2 virus (initially called “the novel coronavirus”) causes COVID-19 infection.

Transmission: The virus travels in respiratory droplets and enters the body through the mouth, nose, or eyes.

Symptoms: The virus can cause fever, cough, and shortness of breath.

Dangers: COVID-19 can progress to a severe state with pneumonia, ARDS, and shock.

Highest risk: The elderly and those with other serious health conditions are most at risk.

Treatments: The focus is on supportive care.

Vaccine: There is currently no vaccine.

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Common Symptoms

- Most common symptoms at illness onset among hospitalized patients:
  - Fever (77–98%)
  - Cough (46%–82%)
  - Myalgia or fatigue (11–52%)
  - Shortness of breath (3-31%)
  - Nausea, vomiting or diarrhea (5.0%)
  - Loss of sense of smell or taste

- If no underlying medical conditions: Overall 0.9%.

Case Fatality Rates

- For patients with comorbidities:
  - Cardiovascular disease: 10.5%.
  - Diabetes: 7%.
  - Cancer, chronic respiratory disease, hypertension: 6% for each.
  - Immunocompromised individuals
  - **For patients developing respiratory failure, septic shock, multiple organ dysfunction: 49%.**

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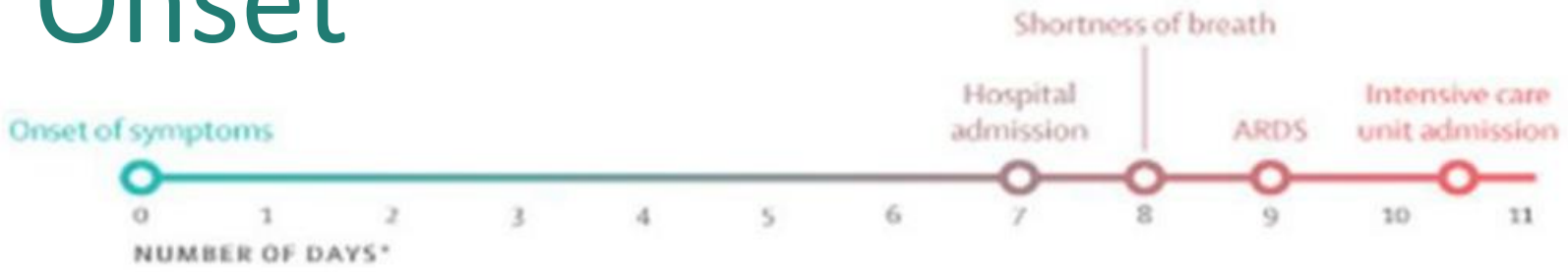
Onset



ARDS=Acute respiratory distress syndrome

*Median time from onset of symptoms, including fever (in 98% of patients), cough (75%), myalgia or fatigue (44%), and others.

- **Incubation:** About 5 days.

- **Presymptomatic people:** Those who are asymptomatic or presymptomatic (i.e., during the incubation period) can infect others.
- **Children:** So far considered at low risk, but unclear whether they can infect others.

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Preventing Transmission

"T-zone" = T-shaped area of the face that includes the forehead, nose, and chin.

- **Gatherings:** Close schools, sports events, other large community gatherings.
- **People with flu-like symptoms:** Stay home, and in isolation.
  - **Those at risk** (e.g., older or with comorbidities): Self-isolate.
  - **"Social distancing":** To stop community transmission.

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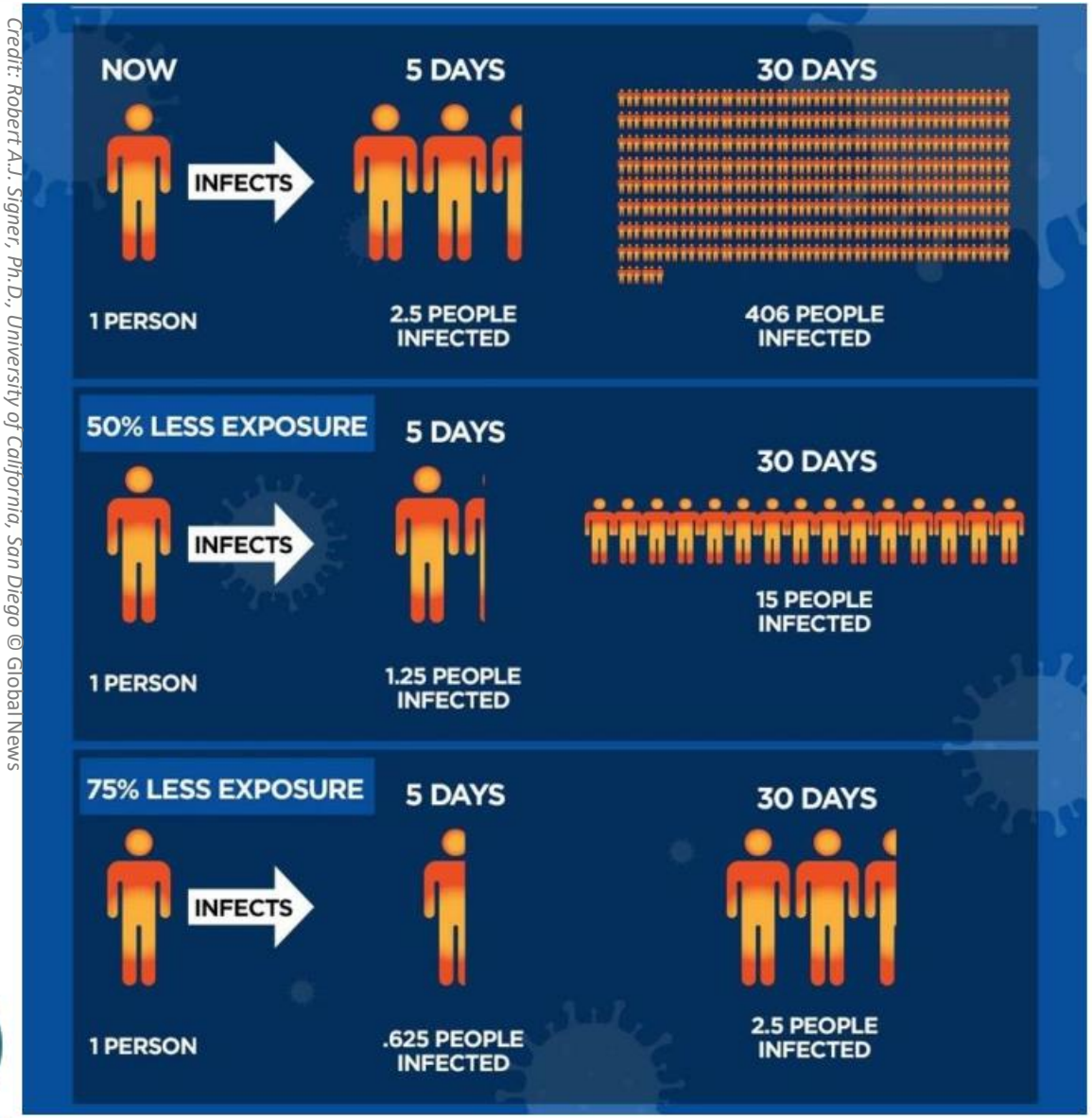
The Math Behind Social Distancing



Credit: Robert A.J. Signer, Ph.D., University of California, San Diego © Global News

Nonpharmaceutical Interventions

- Self quarantine

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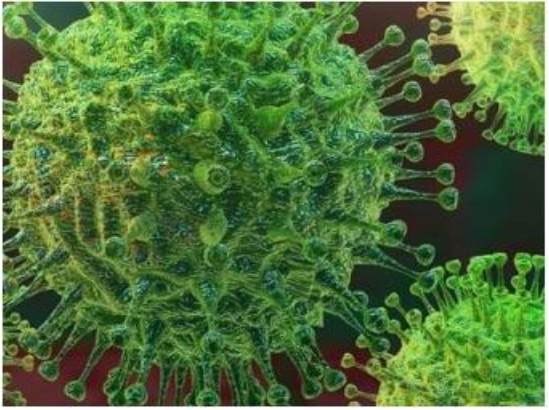
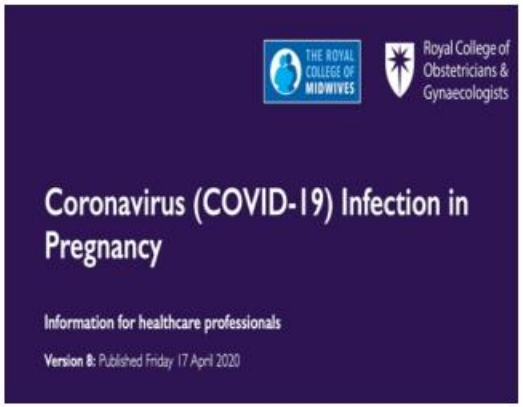


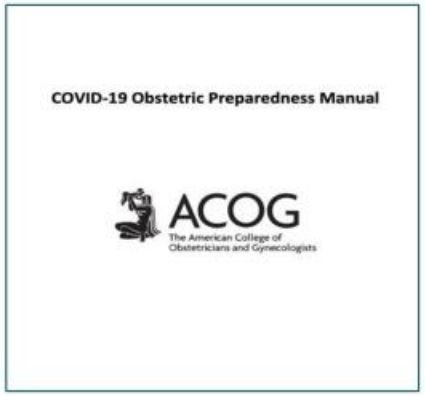
COVID-19 Infection during Pregnancy

- This is an evolving pandemic.
- Early guidance based on SARS and MERS epidemics and isolated case studies.
- Newer guidance is specific to COVID-19 infection.
- Guidance is targeted mainly to high-resource settings.

Resources

COVID-19 Infection in Pregnancy





1—https://www.rcog.org.uk/globalassets/documents/guidelines/2020-04-17-coronavirus-covid-19-infection-in-pregnancy.pdf

2—https://www.smfm.org/covidclinical

3—https://obgyn.onlinelibrary.wiley.com/doi/epdf/10.1002/ijgo.13156

4—https://www.acog.org/-/media/project/acog/acogorg/files/pdfs/education/covid-19-obstetric-preparedness-manual.pdf

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COVID-19 and Pregnancy

- Healthy pregnant women are not at an increased risk of contracting COVID-19 infection or of developing a severe COVID-19 pneumonia.
- As in other types of pneumonia, there is an increased risk of preterm birth, small for gestational age infants, and perinatal deaths and stillbirths from COVID-19 infection.
- There is evidence that patients with COVID-19 infections in labor have an increased incidence of fetal compromise.
- Diabetes and hypertension are risk factors for severe infection.
- Infection from mother to baby can occur, primarily through respiratory droplets at birth or during the postpartum period.
    - Transmission of COVID-19 across the placenta to the fetus does occur.

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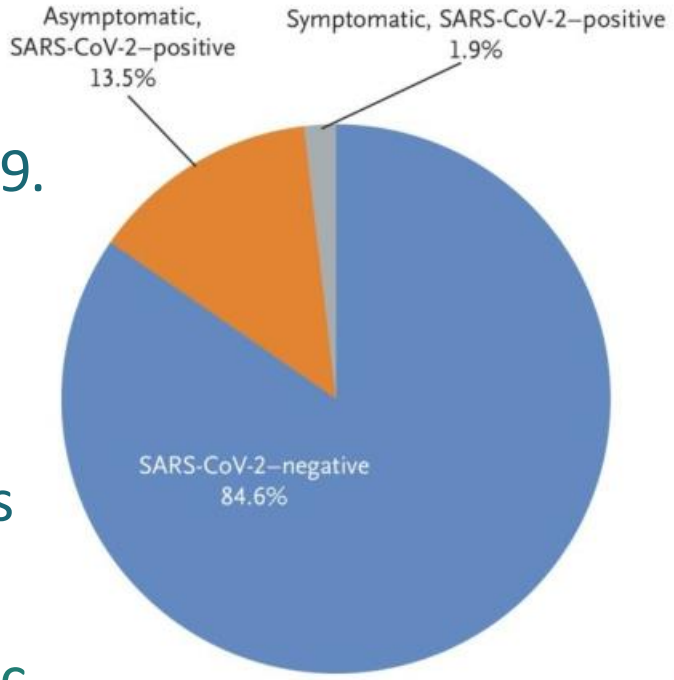
How Common is COVID-19 Infection among Patients in Labor?

- 215 women in labor at a major teaching hospital in labor were tested for COVID-19.
- 4 patients (1.9%) had symptoms of COVID-19 on admission.
- 29 (13.7%) of patients with no symptoms tested positive for COVID-19.
- 3 of the 29 patients became symptomatic after birth.



Sutton D, et al "Universal Screening for SARS-CoV-2 in Women Admitted for Delivery" N Engl J Med 2020

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COVID-19 during Pregnancy and Birth

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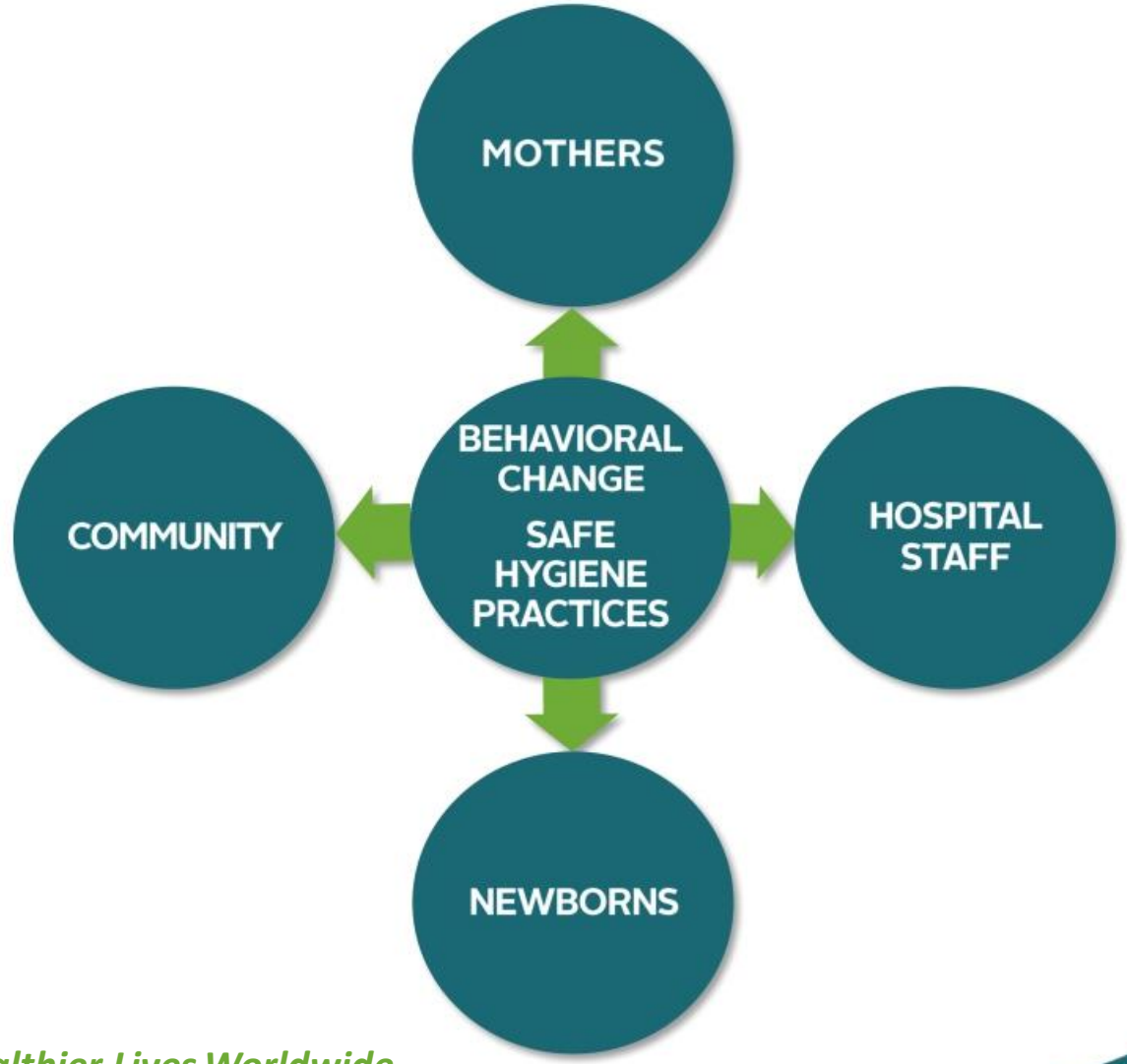
We Must Take Reasonable Steps to Protect All Patients and Caregivers

Adopting New Strategies in Safe Maternity Care



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How Common Is COVID-19 Infection among Nurses?

- Spain: 14%
- Italy: 10%

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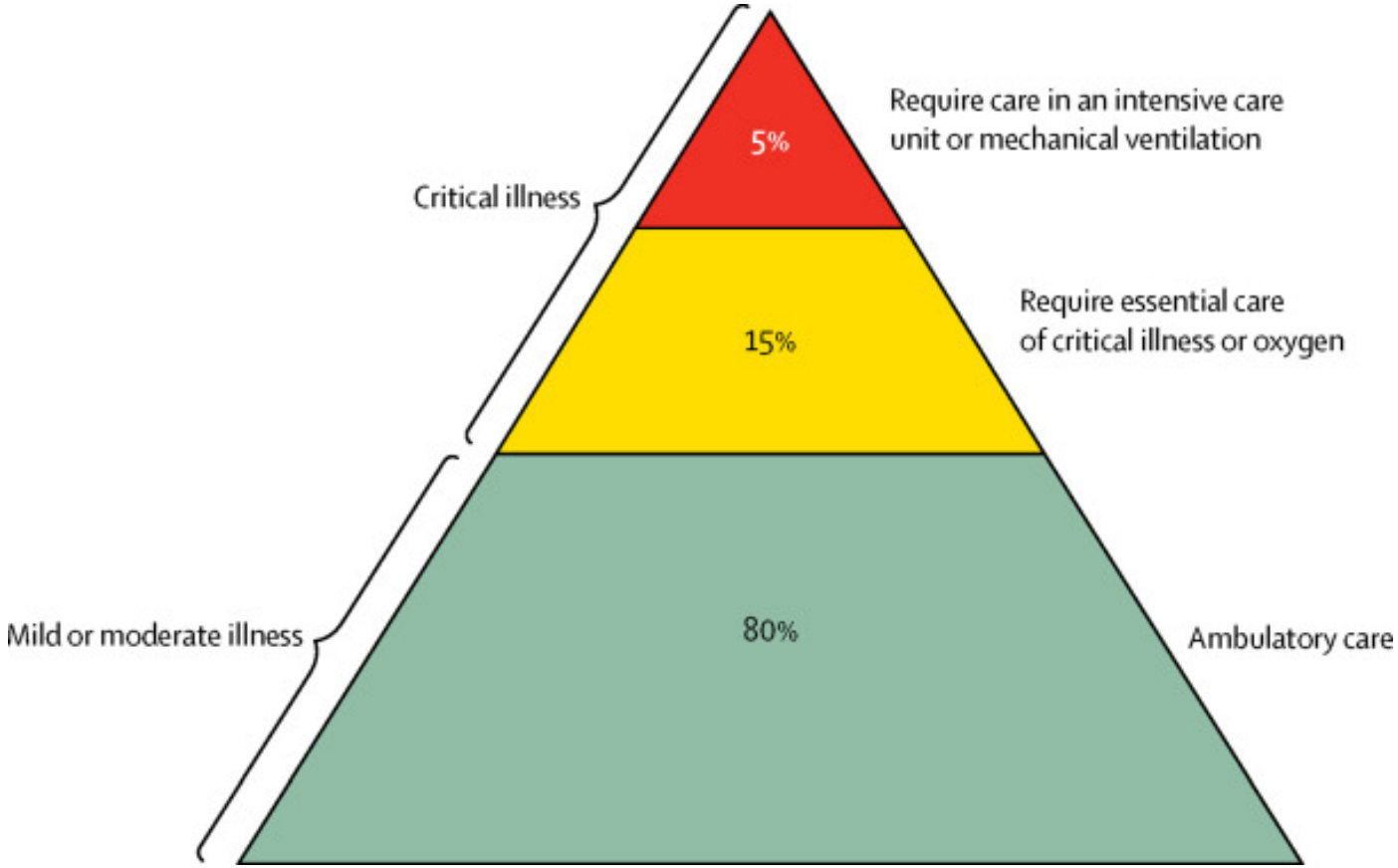
Adopting New Strategies: Essentials of Critical Care



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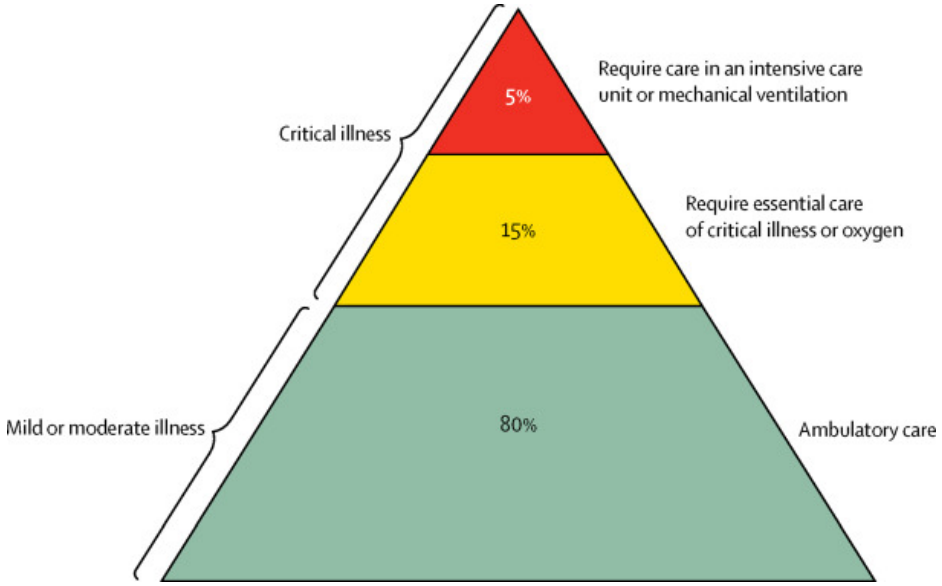
Adopting New Strategies: Essentials of Critical Care



- Oxygen concentrators
- Enhanced nursing skills
- Chest physiotherapy
- Suctioning
- Patient positioning

https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30793-5/fulltext

Clinic or Labor Triage Area Screening for COVID-19

"Are you experiencing any of the following symptoms at this time?"

- Fever
- Cough
- Myalgia or fatigue
- Shortness of breath
- Recent loss of sense of smell or taste

An oral temperature reading ≥ 38.0 C is abnormal.

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Four Steps to Keep Patients and Hospital Staff Healthy

1. Conduct COVID-19 education at antenatal clinics and before hospital discharge.
2. Screen for COVID-19 infection at antenatal clinic and in labor triage.
3. Use protective equipment properly.
4. Adopt best practices and follow existing protocols to prevent the spread of infection.

Recommendations for Antenatal Care Clinics

- Promote **accurate information** about COVID-19 infections.
- Practice **social distancing** at the antenatal clinic. .

- Establish an **outdoor registration area**
- **Limit** number of clients inside clinic facility and exam room
- **Limit** number of clients, guardians, companions and children at antenatal visits.
- **Limit** the number of ultrasound examinations.

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Triage Area for Patient Evaluation

- Use a dedicated triage area with dedicated equipment
- Screen all patients and support persons with history and temperature
- Disinfect the triage room after each patient visit.
- Include staff members and companions in the triage log book.

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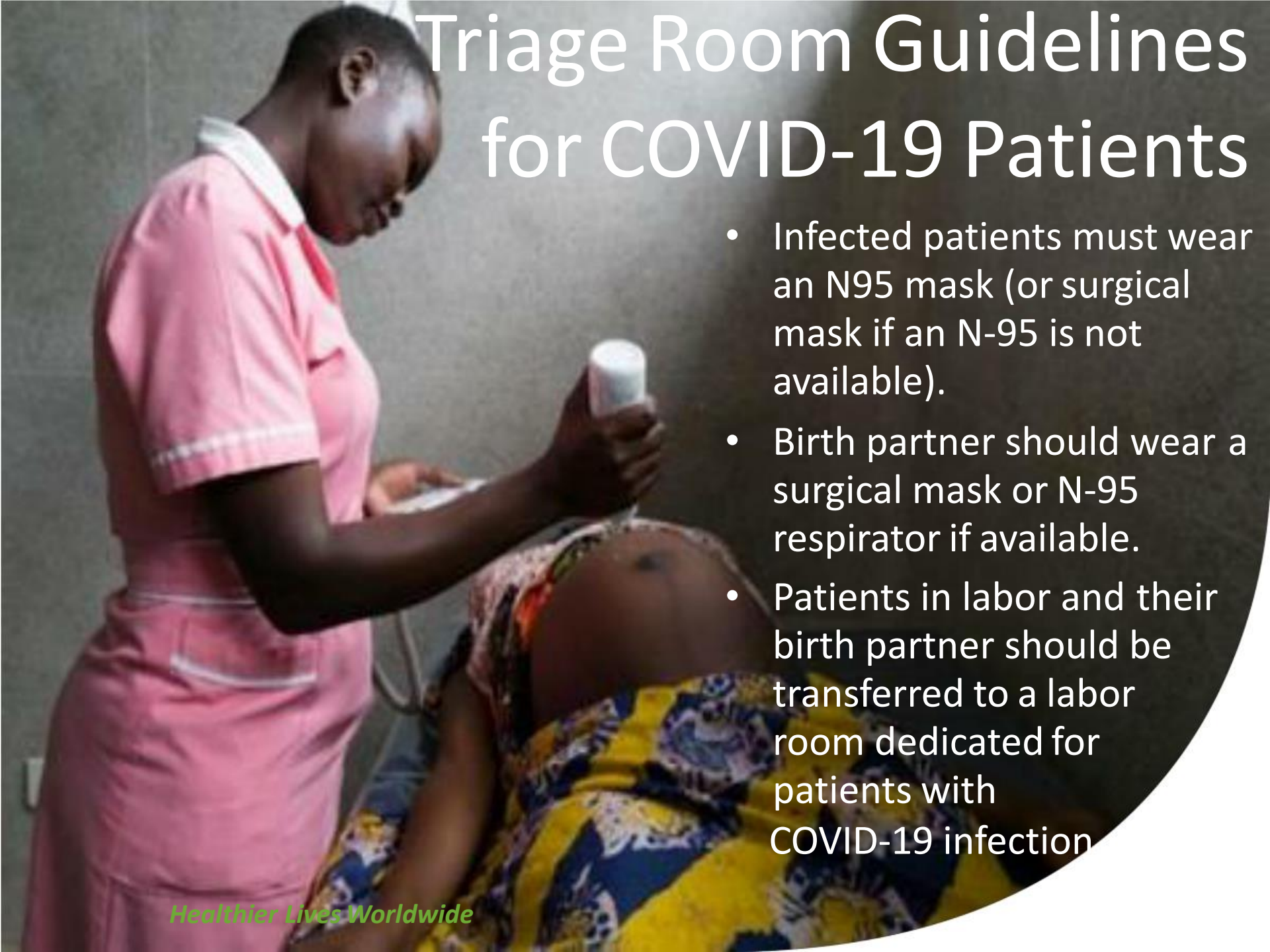

Triage Room Guidelines for COVID-19 Patients

- Infected patients must wear an N95 mask (or surgical mask if an N-95 is not available).
- Birth partner should wear a surgical mask or N-95 respirator if available.
- Patients in labor and their birth partner should be transferred to a labor room dedicated for patients with COVID-19 infection

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Labor Room Guidelines for Patients with COVID-19 Infection

- Once labor is confirmed, ensure the patient is assessed by the most senior available clinician.
- Monitor the patient's temperature, respiratory rate, and oxygen saturation (if a pulse oximeter is available).
- Have any birth partner with symptoms of COVID-19 infection removed from the unit.
- Ensure that all healthcare workers wear a gown, gloves, and an N-95 mask (or a surgical mask if an N-95 is not available).
- Have HCWs limit the times they enter and exit the labor room.

Obstetrical Complications in COVID-19 Infected Patients

Preterm labor and premature rupture of membranes

- The use of antenatal corticosteroids for prevention of RDS in the newborn is controversial.
- Do not use nifedipine to slow down labor.

Preeclampsia with Severe Features

- Nifedipine may be used for treatment of severe pre-eclampsia but should not be used for prevention of preterm labor.
- Magnesium sulfate should be used with caution since it can cause respiratory depression.

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Labor Room Guidelines

(continued)

- Patients may require assisted second stage by vacuum if respiratory status limits pushing efforts.
- The patient should wear a mask during labor and while pushing.
- If the woman develops a fever, chorioamnionitis and UTI should be ruled out.
- Some experts recommend immediate cord clamping at birth to reduce newborn exposure. This is controversial (FIGO).

Care of COVID-19 Patients in Labor Room

- Young fit women may maintain normal oxygen saturations before suddenly experiencing clinical decompensation.
- Signs of decompensation:
  - Respiratory rate >30.
  - Reduction in urine output.
  - Drowsiness.
  - Titrate oxygen to keep oxygen saturation >94%.
- Escalate urgently if any signs of decompensation develop in a woman in postpartum period.

COVID-19 Patients Requiring Cesarean Birth

- Minimize the number of staff necessary for proceeding to the operating theatre and performing a Cesarean birth.
- Spinal anesthesia is strongly preferred to reduce the risk of infection among staff members.
- If general anesthesia is used, all staff should employ the highest available level of PPE.

Post Partum Care of COVID-19 Patients

- **Continue contact precautions in isolation room, PPE by team and visitors**
- **Monitor maternal symptoms and vital signs**
- **Limit visitors in hospital or birth center**
- **Discuss with family before delivery:**
  - **Skin to skin contact with newborn**
  - **Mother-infant separation**
  - **Breastfeeding Issues**

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On-Site Simulation Exercises

- Simulation exercises help hospital staff design and practice protocols to manage patients with suspected COVID-19.
- Identify gaps in knowledge, resources, processes or facility design.
- Should be performed in the triage room, labor ward, and operating theater.
- Requires a simulation leader, patient actor, and two or more staff members.

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SIMULATION PATIENT

Patient History

Patient P.D. is a 31-year-old G3P2 at 37+3wks who comes to the hospital with 2 days of fevers, cough and worsening shortness of breath. Her sister, who lives with her, had traveled to South Africa 10 days ago, but she has not been sick.

The patient reports regular uterine contractions every 5 minutes for the past 3 hours. She denies any vaginal bleeding but thinks that her water may have broken about an hour ago.

Patient Information

- No pregnancy complications to date
- Her last two pregnancies resulted in term vaginal deliveries without complications.
- She last saw the midwife 3 days ago who told her that her cervix was 3 cm dilated at that time.

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Physical Examination

VITAL SIGNS

Pulse: 110
Blood Pressure: 120/70
PulseOx: 99% on room air
Temp: 38.1°C
FHRT*: 170s with no change in heart rate after contractions.
Uterus: 3 regular uterine contractions in 10 minutes

PHYSICAL EXAMINATION

Head and Neck: Throat slightly reddened ;small lymph nodes in neck.
Ears: TM clear, mobile.
Lungs: Bilateral wheezes heard bilateral lower lobes.
Cardiac: Tachycardia with no murmurs.
Cervix: 100/6/-1 VTX, leaking clear fluid

Simulation Checklist Infected Patient In Triage	Done Well	Delayed or Incompletely / Incorrectly Done	Not Done
Initial Care			
Recognizes patient is at risk for COVID-19 infection with screening			
Initial Infection Control - When a patient suspected to have a high-consequence infectious disease is identified, *gives the person and family member a facemask.*			
Isolate – Immediately moves the patient away from other people and to a room (negative pressure room preferably) and closes the door.			
Recognizes patient is in labor and requires admission			
Transports patient to Labor and Delivery or designated area through prearranged route to minimize exposure to other patients/health care professionals			
Informs Key Personnel - Notifies the Nursing Supervisor and Infection Control Department of patient			
Initiates efforts to limit number/frequency of personnel that enter the room and restricts visitors			
Creates room log to document all personnel entering/exiting room.			
PPE			
Describes necessary PPE and donning process / procedure			
Able to **locate** appropriate PPE supplies			
Evaluation and Disposition			
Discusses patient case and makes decision regarding COVID-19 testing			

PARTICIPANTS

Facilitator
Patient actor
2–5 staff

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Simulation Checklist for Vaginal Delivery	Done Well	Delayed or Incompletely / Incorrectly Done	Not Done
Initial Care			
Isolate – Patient is in designated room (negative pressure room preferably) and door remains closed whenever possible			
Inform – Notifies the Nursing Supervisor and Infection Control Department.			
Initiates efforts to limit number/frequency of personnel that enter the room and restricts visitors			
Creates room log to document all personnel entering/exiting room.			
PPE			
Describes necessary PPE and donning process / procedure			
Able to **locate** appropriate PPE supplies			
Management			
Recognizes patient is in labor and requires management for pain			
Contacts appropriate staff and informs them of patient's condition (anesthesia / NICU)			
Provides appropriate labor management while minimizing invasive procedures (IV access, uterine and fetal external monitoring)			
Monitors patient for signs of maternal sepsis and worsening respiratory symptoms			
Informs NICU team to prepare for suspected COVID-19 exposed infant (provides SBAR)			
Delivers patient by minimizing risk of exposure during cord clamping and handoff of infant			
Actively manages third stage to prevent postpartum hemorrhage			
Discusses need to separate infant and pumping/breastfeeding recommendations with patient/family			
Informs postpartum unit and infection control of new postpartum patient with suspected COVD-19			
Transports patient to postpartum care isolation unit (if not recovering in same room) through predetermined route to minimize exposure to other personnel.			

PARTICIPANTS

- Facilitator
- Patient actor
- 2–5 staff

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Post-test

①Pregnant women are at increased risk of contracting and dying from COVID-19 infection. *False*

- ②Preterm labor is more common in women with COVID-19 infection. *True*

③Patients can rapidly decompensate during labor and require intensive care within one hour. *True*

④Magnesium sulfate is safe to use in patients with COVID-19 infection. *False*

⑤Infected patients requiring Cesarean birth are best managed with general anesthesia. *False*

⑥Newborn infants can be born with COVID-19 infection. *True*

⑦COVID-19 virus has not been found in breast milk. *True*

Putting On PPE: "Donning"

More than one donning method may be acceptable. Ensure that you are trained in and understand your facility's procedure and practice it. For example:

❶ **Identify and gather PPE.** Make sure you have the correct gown size.

❷ **Perform hand hygiene.** Use hand sanitizer.

❸ **Put on isolation gown.** Tie all ties. Assistance may be needed.

❹ **Put on NIOSH-approved N95 respirator** or higher; use a facemask if a respirator is not available. If the respirator has a nosepiece, fit it to the nose with both hands. Do not bend or tent it and do not pinch the nosepiece with one hand. Extend the N95 or mask under chin. Place the top strap on crown of head, bottom strap at base of neck. (If you wear a mask with loops, hook them around your ears.) Ensure both nose and mouth are protected.

❺ **Perform a user seal check.** Do this each time you put on the respirator.

❻ **Put on face shield or goggles.** Face shields provide full face coverage. Goggles provide excellent eye protection, but commonly fog.

❼ **Perform hand hygiene.** Do this before putting on gloves. Ensure that the gloves cover the gown's cuff (wrist).

You may now enter the patient's room.

Never wear your respirator or facemask under your chin or store it in scrubs pocket between patients.

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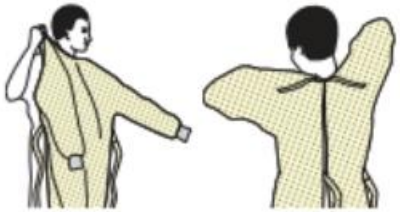
SEQUENCE FOR PUTTING ON PERSONAL PROTECTIVE EQUIPMENT (PPE)

The type of PPE used will vary based on the level of precautions required, such as standard and contact, droplet or airborne infection isolation precautions. The procedure for putting on and removing PPE should be tailored to the specific type of PPE.

1. GOWN

- Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
- Fasten in back of neck and waist



2. MASK OR RESPIRATOR

- Secure ties or elastic bands at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator

3. GOGGLES OR FACE SHIELD

- Place over face and eyes and adjust to fit

4. GLOVES

- Extend to cover wrist of isolation gown

USE SAFE WORK PRACTICES TO PROTECT YOURSELF AND LIMIT THE SPREAD OF CONTAMINATION

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Taking Off PPE: "Doffing"

More than one doffing method may be acceptable. Ensure that you are trained in and understand your facility's procedure and practice it. For example:

❶ **Remove gloves.** Use glove-in-glove, bird beak, or approved removal technique. Ensure that glove removal does not cause additional contamination of hands.

❷ **Remove gown.** Untie all ties or unsnap buttons. Some gown ties can be broken; do so gently, without forceful movement. Reach up to your shoulders and carefully pull the gown away from the body. It is acceptable to roll it down. Dispose of in trash receptacle.

You may now exit the patient's room.

❸ **Perform hand hygiene.**

❹ **Remove face shield or goggles.** Carefully remove by grabbing the strap and pulling upwards and away from head.

❺ **Remove and discard respirator or facemask.**
Respirator: Remove the bottom strap by touching only the strap; bring it carefully over your head. Grasp the top strap; bring it carefully over the head. Pull respirator away from face.
Facemask: Carefully untie straps or unhook from around ears; pull away from face.

❻ **Perform hand hygiene.** Do this after removing the respirator or facemask and before putting it on again if your workplace is practicing reuse.

Never touch the front of face shields, goggles, respirators, and facemasks when removing them.

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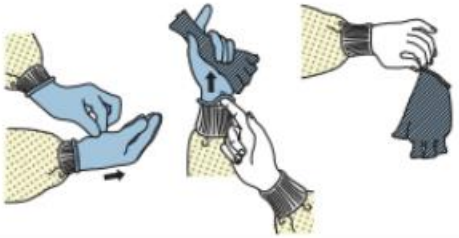
HOW TO SAFELY REMOVE PERSONAL PROTECTIVE EQUIPMENT (PPE)
EXAMPLE 1

There are a variety of ways to safely remove PPE without contaminating your clothing, skin, or mucous membranes with potentially infectious materials. Here is one example. **Remove all PPE before exiting the patient room** except a respirator, if worn. Remove the respirator **after** leaving the patient room and closing the door. Remove PPE in the following sequence:

1. GLOVES

- Outside of gloves are contaminated!
- If your hands get contaminated during glove removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Using a gloved hand, grasp the palm area of the other gloved hand and peel off first glove
- Hold removed glove in gloved hand
- Slide fingers of ungloved hand under remaining glove at wrist and peel off second glove over first glove
- Discard gloves in a waste container



2. GOGGLES OR FACE SHIELD

- Outside of goggles or face shield are contaminated!
- If your hands get contaminated during goggle or face shield removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Remove goggles or face shield from the back by lifting head band or ear pieces
- If the item is reusable, place in designated receptacle for reprocessing. Otherwise, discard in a waste container

3. GOWN

- Gown front and sleeves are contaminated!
- If your hands get contaminated during gown removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Unfasten gown ties, taking care that sleeves don't contact your body when reaching for ties
- Pull gown away from neck and shoulders, touching inside of gown only
- Turn gown inside out
- Fold or roll into a bundle and discard in a waste container

4. MASK OR RESPIRATOR

- Front of mask/respirator is contaminated — DO NOT TOUCH!
- If your hands get contaminated during mask/respirator removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Grasp bottom ties or elastics of the mask/respirator, then the ones at the top, and remove without touching the front
- Discard in a waste container

5. WASH HANDS OR USE AN ALCOHOL-BASED HAND SANITIZER IMMEDIATELY AFTER REMOVING ALL PPE

PERFORM HAND HYGIENE BETWEEN STEPS IF HANDS BECOME CONTAMINATED AND IMMEDIATELY AFTER REMOVING ALL PPE

CDC

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How to Clean N95 Respirators

EFFECTIVE	Clean the respirator with liquid or vapor **hydrogen peroxide.**	
	Expose to **ultraviolet light** for 30 minutes.	
	Heat in an **oven** for 30 minutes at 158°F (70°C).	
	Steam over **hot vapor** from boiling water for 10 minutes	
INEFFECTIVE	Soak respirator in 75% ethyl alcohol; let dry.	Alcohol will remove the static charge in the respirator's microfibers, reducing their filtration efficiency.
	Clean with bleach 5 to 10 minutes	Bleach will remove the static charge in the microfibers, reducing their filtration efficiency.
	Microwave respirator.	Microwaves melt respirators and render them useless.
	Soak respirator in soap and water.	

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Thank You!
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