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

Antenatal Care, Labor and Birth, and Postnatal Care

Joseph Sclafani, MD
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

Healthier Lives Worldwide
Pre-test

True or False?

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

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

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

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

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

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

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

*as of 18 April 2020*

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>TOTAL CASES MARCH 24</th>
<th>TOTAL CASES APRIL 18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worldwide</td>
<td>337,553</td>
<td>2,248,863</td>
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<tr>
<td>USA</td>
<td>33,546</td>
<td>718,185</td>
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<tr>
<td>Peru</td>
<td>363</td>
<td>14,420</td>
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<tr>
<td>Kenya</td>
<td>15</td>
<td>262</td>
</tr>
<tr>
<td>Zambia</td>
<td>3</td>
<td>57</td>
</tr>
<tr>
<td>Haiti</td>
<td>2</td>
<td>44</td>
</tr>
<tr>
<td>South Sudan</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>
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.
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%.

• 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%.
Onset

- **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.

*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.*
**Preventing Transmission**

- **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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“T-zone” = T-shaped area of the face that includes the forehead, nose, and chin.
The Math Behind Social Distancing

Nonpharmaceutical Interventions

- Self quarantine
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

Coronavirus (COVID-19) Infection in Pregnancy
Information for healthcare professionals
Version 2. Published Friday 17 April 2020

SPECIAL ARTICLE
Global interim guidance on coronavirus disease 2019 (COVID-19) during pregnancy
and puerperium from RCOG and allied partners: Information for healthcare professionals

Libora C. Poon1,1, Huilia Yang1,1, Anil Kupup1,1, Nir Melamed, Blami Dao, Renu Dhiraka,
H. David McIntyre2, Anne B. Kihara, Diego Ayere-de-Campos1, Enrico M. Ferrazzi1,
Gian Carlo Di Renzo1,2, Mothe H2

COVID-19 Obstetric Preparedness Manual

1—https://www.rcog.org.uk/globalassets/documents/guidelines/2020-04-17-
2—https://www.smfm.org/covidclinical
4—https://www.acog.org/-/media/project/acog/acogorg/files/pdfs/education/covid-
19-obstetric-preparedness-manual.pdf
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.
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.

COVID-19 during Pregnancy and Birth
We Must Take Reasonable Steps to Protect All Patients and Caregivers
Adopting New Strategies in Safe Maternity Care

- Mothers
- Community
- Newborns
- Hospital Staff

Behavioral Change
Safe Hygiene Practices

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How Common Is COVID-19 Infection among Nurses?

- Spain: 14%
- Italy: 10%

Healthier Lives Worldwide
Adopting New Strategies: Essentials of Critical Care

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

Healthier Lives Worldwide
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 $\geq 38.0$ C is abnormal.
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.
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.
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.

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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.

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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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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.
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

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## Simulation Checklist
### Infected Patient In Triage

<table>
<thead>
<tr>
<th>Initial Care</th>
<th>Done Well</th>
<th>Delayed or Incompletely / Incorrectly Done</th>
<th>Not Done</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognizes patient is at risk for COVID-19 infection with screening</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Initial Infection Control</strong> - When a patient suspected to have a high-consequence infectious disease is identified, gives the person and family member a facemask.</td>
<td></td>
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</tr>
<tr>
<td>Isolate – immediately moves the patient away from other people and to a room (negative pressure room preferably) and closes the door.</td>
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<tr>
<td>Recognizes patient is in labor and requires admission</td>
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<tr>
<td>Transports patient to Labor and Delivery or designated area through prearranged route to minimize exposure to other patients/health care professionals</td>
<td></td>
<td></td>
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<tr>
<td>Informs Key Personnel - Notifies the Nursing Supervisor and Infection Control Department of patient</td>
<td></td>
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</tr>
<tr>
<td>Initiates efforts to limit number/frequency of personnel that enter the room and restricts visitors</td>
<td></td>
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</tr>
<tr>
<td>Creates room log to document all personnel entering/exiting room.</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>PPE</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Describes necessary PPE and donning process / procedure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Able to locate appropriate PPE supplies</td>
<td></td>
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</tbody>
</table>

### Evaluation and Disposition

<table>
<thead>
<tr>
<th></th>
<th>Done Well</th>
<th>Delayed or Incompletely / Incorrectly Done</th>
<th>Not Done</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discusses patient case and makes decision regarding COVID-19 testing</td>
<td></td>
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</tr>
</tbody>
</table>

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**PARTICIPANTS**

Facilitator
Patient actor
2–5 staff

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# Simulation Checklist for Vaginal Delivery

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

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**PARTICIPANTS**

- Facilitator
- Patient actor
- 2–5 staff

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Post-test

1. Pregnant women are at increased risk of contracting and dying from COVID-19 infection. *False*
2. Preterm labor is more common in women with COVID-19 infection. *True*
3. Patients can rapidly decompensate during labor and require intensive care within one hour. *True*
4. Magnesium sulfate is safe to use in patients with COVID-19 infection. *False*
5. Infected patients requiring Cesarean birth are best managed with general anesthesia. *False*
6. Newborn infants can be born with COVID-19 infection. *True*
7. COVID-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:

1. **Identify and gather PPE.** Make sure you have the correct gown size.
2. **Perform hand hygiene.** Use hand sanitizer.
3. **Put on isolation gown.** Tie all ties. Assistance may be needed.
4. **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.

5. **Perform a user seal check.** Do this each time you put on the respirator.
6. **Put on face shield or goggles.** Face shields provide full face coverage. Goggles provide excellent eye protection, but commonly fog.
7. **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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**cmmb**  Healthier Lives Worldwide
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
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:

1. **Remove gloves.** Use glove-in-glove, bird beak, or approved removal technique. Ensure that glove removal does not cause additional contamination of hands.
2. **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.

3. **Perform hand hygiene.**

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

5. **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.

6. **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.
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**
# How to Clean N95 Respirators

<table>
<thead>
<tr>
<th>EFFECTIVE</th>
<th>INEFFECTIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean the respirator with liquid or vapor <strong>hydrogen peroxide</strong>.</td>
<td>Alcohol will remove the static charge in the respirator's microfibers, reducing their filtration efficiency.</td>
</tr>
<tr>
<td>Expose to <strong>ultraviolet light</strong> for 30 minutes.</td>
<td>Bleach will remove the static charge in the microfibers, reducing their filtration efficiency.</td>
</tr>
<tr>
<td>Heat in an <strong>oven</strong> for 30 minutes at 158°F (70°C).</td>
<td>Microwave respirator.</td>
</tr>
<tr>
<td>Steam over <strong>hot vapor</strong> from boiling water for 10 minutes</td>
<td>Microwaves melt respirators and render them useless.</td>
</tr>
</tbody>
</table>

Clean with bleach 5 to 10 minutes

Soak respirator in 75% ethyl alcohol; let dry.

Soak respirator in soap and water.
Thank You!

Healthier Lives Worldwide