Strategies to support the COVID-19 response in LMICs

A virtual seminar series
Screening, Triage and Patient Flow

Bhakti Hansoti, MBChB, MPH, PhD

- Associate Professor in Emergency Medicine, Johns Hopkins University
OBJECTIVES

1. Clinical Features
2. Preparing the Department
3. Initial Management
4. Other Management Considerations
5. Summary
Clinical Features
How contagious is a disease?
Scientists use "R naught," or R0, to estimate how many other people one sick person is likely to infect.

- **2019-nCoV**: 2-3.11
  - This estimate is preliminary and likely to change.

- **Zika**: 3-6.6
  - An early estimate based on the Columbia outbreak in 2016.

- **Measles**: 11-18

- **Ebola**: 2

- **HIV**: 3.6-3.7
  - An estimate based on Reunion Island in 2009.

- **Seasonal flu**: 1.3

- **Norovirus**: 1.6-3.7

**Fatality rate** (log scale)

- Bird flu
- Ebola
- Smallpox

**New coronavirus**
Most estimates put the fatality rate below 3%, and the number of transmissions between 2 and 4.

**Average number of people infected by each sick person**

- **2009 flu**: 1
- **Common cold**: 0.1
- **Chickenpox**: 10
- **Measles**: 15

**Spreads faster**

**More deadly**

**Sources:** Travel Medicine, PLOS One, JAMA Pediatrics, MDR, NCBI, New England Journal of Medicine, "The Spread and Control of Norovirus Outbreaks Among Hospitals in a Region"
<table>
<thead>
<tr>
<th>Symptom</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Fever</td>
<td>77-98%</td>
</tr>
<tr>
<td>Cough</td>
<td>46-82%</td>
</tr>
<tr>
<td>Fatigue</td>
<td>11-52%</td>
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<tr>
<td>Shortness of breath</td>
<td>Up to 50%</td>
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<tr>
<td>Loss of appetite</td>
<td>3-31%</td>
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Severity

• Most people with COVID-19 develop mild or uncomplicated illness
• Approximately 14% develop severe disease requiring hospitalization and oxygen support
• 5% require admission to an intensive care unit
• In severe cases, COVID-19 can be complicated by
  • Acute respiratory disease syndrome (ARDS)
  • Sepsis and septic shock
  • Multiorgan failure, including acute kidney injury and cardiac injury.
Course of COVID-19 Infection

Stage 1: Asymptomatic
Stage 2: Non-severe Symptomatic
Stage 3: Severe Respiratory Inflammatory

Viral Response Phase
Hyperinflammatory Phase
Cytokine Storm

Severity of Illness Time Course
Elements to be assessed have been divided into the following areas:

- Establishment of a core team and key internal and external contact points
- Human, material and facility capacity
- Communication and data protection
- Hand hygiene, personal protective equipment (PPE), and waste management
- Triage, first contact and prioritization
- Patient placement, moving of the patients in the facility, and visitor access
- Environmental cleaning

Split flow

Flow Model for ILI/COVID-19 (Alternate Care Site/Tent)

1. Patient Arrives
   - Is resuscitation required? YES: Direct to ED
     NO: Is Patient toxic and/or high risk for deterioration or hospitalization?
       YES: Direct to ED
       NO: Does patient have fever, cough, shortness of breath/URI symptoms?
         YES: Place mask on patient
         NO: Direct to ED

2. Login/Registration

3. MSE - QMP (RN or Telerned)
   - Consider Alternate Care Site/Tent

4. Screening
   - High
     - Direct to Private Isolation Room in ED
   - Med
     - Direct to Shared Isolation Room/Zone in ED
   - Low
     - Send to Alternate Care Site/Tent
      - MSE Screening, Registration, Testing, TX & DC
Protecting Yourself

These videos can help with PPE donning and doffing technique:

- Donning and doffing PPE
  https://www.youtube.com/watch?v=I94lIH8xXg8

- Recommended PPE during care
  https://www.youtube.com/watch?v=oPLdi15YL3g
I STAYED AT WORK FOR YOU.

YOU STAY AT HOME FOR US!
COVID-19 Severity Scoring Tool for low resource settings:

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7128254/
- https://afem.africa
- programs@afem.info
THREE STAGES

SCREENING

TRIAGE

SEVERITY SCORING
**WHO Case Definition**

Flu like symptoms (sore throat, fever, cough, and difficulty breathing) AND In the 14 days prior to onset of symptoms:

- Were in close contact with a confirmed or probable case, OR
- Had a history of travel to areas with local transmission, OR
- Worked in, or attended a health care facility where patients with SARS-CoV-2 infections were being treated, OR
- Admitted with severe pneumonia of unknown etiology.

**JHU Screening**

- Documented or Reported Fever,
- Shortness of breath
- Cough
- Sore throat
- Muscle Aches (myalgia)
- New loss of sense of smell or taste
- HAVING ONE OF THE ABOVE ILI CRITERIA = COVID ISOLATION
Normal sats

RR>30 and O2<93%

ARF and/or shock
MILD

• Symptomatic
• Self-quarantine
• Return precautions

MODERATE

• Symptomatic support
• Self-quarantine
• Empiric Abx if pneumonia
• If bronchodilator use MDI
• No systemic steroids
• Return precautions
SEVERE

- Admit
- Provide supplemental O2 to achieve O2 sats >88%
  - Nasal cannula
    - 20-40% oxygen
    - O2 dose 1-5L/min
  - Simple facemask
    - 40-60% oxygen
    - O2 dose 6-10L/min
  - Non-rebreather facemask
    - 60-90% oxygen
    - O2 dose 10-15L/min
- Transfer to higher level of care

CRITICAL

- Intubation – most senior, RSI, NRB for pre oxygenation no bagging
- Mechanical Ventilation (see later)
- ECG / Labs
- Co-infections
- Anticoagulation
- Fluid resuscitation
  - 250-500 mL NS/LR
  - Monitor for signs for overload
- Administer vasopressors if shock persists
- Ventilator Triage?
What do they die from?

• Most patients are dying from Acute hypoxic respiratory failure or complications as a result of respiratory failure

• Low incidence seen of sudden cardiac death/myocarditis at day 10-14 of critical illness
Spectrum of Hypoxia

Patients present without respiratory symptoms to acute respiratory failure requiring emergent intubation

“Silent Hypoxia” – Occasionally some patients may develop hypoxemia and respiratory failure without dyspnea (especially elderly). This can lead to some unusual presentations.
What SpO2 to target?

- WHO recommends SpO2 > 94% for COVID patients
- Our experience so far
  - Pragmatic approach of keeping SpO2 > 88-92% while watching the work of breathing and clinical status
  - Lead to lower intubations
Intubation strategies

• Endotracheal intubation should be performed by a trained and experienced provider using airborne precautions.

• Pre-oxygenate with 100% FiO2 for 5 minutes, via a face mask with reservoir bag, bag-valve mask, HFNC.

• Rapid sequence intubation is appropriate after an airway assessment that identifies no signs of difficult intubation.

• Use of Fiberoptic or Video Assisted Intubation to maximize the distance between patient and Provider.
Remember

• Intubation is one of the most aerosolizing procedure and highest risk for transmission to provider.
• Maximize your chance of success by planning ahead
• Most experienced provider should do it
• Have your backup plans for a missed/failed airway ready
2 Types of COVID ARDS

1) Hypoxic and Low Compliance – The classic ARDS. Will likely need higher PEEP for oxygenation (H type)

2) Hypoxic with High Compliance – Seeing more of this type of patients (L type)
   • Higher PEEP doesn’t work and can also be harmful
Other considerations
Diagnostics

• CT Scan
  • More sensitive
  • Not readily available
  • Need to decontaminate the room after use
  • Risk of exposure/dissemination during patient transport

• Lung Ultrasound
  • More easily available
  • Abnormality must be closer/extend to pleural surface to be visible on USG (limitation)

• ECHO
  • Not done as much to minimize exposure to additional staff
CT

USG

Mingzhi Li et al. Coronavirus Disease (COVID-19): Spectrum of CT Findings and Temporal Progression of the Disease; Academic Radiology 2020
RebelEM
Diagnosis is NOT based on imaging. It only shows the extent of it and shows other differentials

Qian-Yi Peng et al; Findings of lung ultrasonography of novel corona virus pneumonia during the 2019–2020 epidemic; *Intensive Care Med*
Watch this space

BRONCHOSPASM  BLOOD CLOTS  SEDATION
To summarize

• Focus is on identifying PUI -> sick vs non-sick so that you can manage flow
• Majority of patients walking well
• Sick are really sick
• Patients can deteriorate rapidly
• Early intubation and peep maybe problematic
• Mostly supportive care
• Mortality is high