Case management of SARI/COVID-19 at district hospitals without an ICU

March 17 2020
Objectives:

At the end of this session, participants should be able to:

• Understand COVID-19 clinical presentation, progression and management

• Prepare to manage severely ill patients with SARI from Quick Check triage to caring for the patient in a non-ICU setting

• Use the correct level of PPE for SARI such COVID-19
This material has been developed from:
• WHO IMAI District Clinician Manual and the associated Second Level Learning Programme for district clinicians working at hospitals in limited-resource settings:
  • Quick Check
  • Management of the severely ill patient with septic shock or severe respiratory distress
  • Clinician’s Role in Disease Surveillance and Response
• Currently being adapted for SEARO after adaptation and use in Nepal
• Updated with WHO IPC, Laboratory, Clinical management of SARI when COVID-19 suspected 13 March (v2 of interim clinical guidelines); WHO SARI Critical Care Training- 2019-NCOV CLINICAL UPDATE (30 Jan)
IMAI District Clinician Manual and training: for district hospitals without an ICU

• Target audience:
  • Medical or clinical officers and senior clinical nurses at district hospitals, hospital managers, and auxiliary staff
  • Specialists not routinely available

• Limited essential drugs: fluids, oxygen, antimicrobials, bronchodilators and others based on country adaptation of essential medicines list

• Limited equipment
  • Airway management, intubation, hand bagging
  • No mechanical ventilation for medical patients (refer to ICU if feasible)

• Limited laboratory/other investigations
  • Pulse oximeter but no arterial blood gas or central venous catheter
Clinical presentation of COVID-19

Evaluation of 1099 patients with laboratory-confirmed COVID-19 in China:

- Median age: 47 years, predominantly male
- Fever
  - 43.8% on admission
  - 88.7% during hospitalization
- Cough (67.8%)
- Sputum production (33.7%)
- Shortness of breath (18.7%)
- Nausea or vomiting (5%)
- Diarrhea-uncommon (3.8%)

Clinical presentation of COVID-19- continued

- 91% with dx Pneumonia, ARDS (3.4%), shock (1.1%)
- Radiography- Abnormal CXR (59.1%), abnormal Chest CT(86.2%) – most common, ground-glass opacity or B/L patchy shadowing
- Lymphocytopenia 83.2%
- 23.7% had one co-existing condition (e.g HTN, DM, COPD)
- 6.7% had following outcomes: admission to ICU, use of mechanical ventilation or death
- Median duration of hospitalization: 12 days
- Mean time from illness onset to hospital admission with pneumonia was 9 days (this and Huang report suggest clinical deterioration during the second week of illness)

Other clinical observations

• Incubation: 4-5 days (Range 2-12 days)
• Most cases are mild
• For severe to critical cases:
  • Progression of atypical pneumonia
  • Severe hypoxia for first few days
  • Hypoxic respiratory failure $\rightarrow$ ARDS
  • Shock/sepsis- some cardiogenic shock
  • Significant myocarditis/cardiomyopathy and arrhythmias seen in China, as well as anecdotal cases in US- possible viral cardiomyopathy
  • Other organ dysfunction- renal, hepatic
“About a quarter of severe and critical cases require mechanical ventilation while the remaining 75% require only oxygen supplementation.” (page 32)

Note: Relative size of boxes for disease severity and outcome reflect the proportion of cases reported as of 20 February 2020. The size of the arrows indicates the proportion of cases who recovered or died. Moderate cases have a mild form of pneumonia.

Mild / Moderate 81%
No pneumonia / mild pneumonia

Severe - 14%

Died - 2.5%

Critical - survived with intensive care - 2.5%

mild infections which are asymptomatic, untested and unreported – unknown number, %

China - 5% required ICU critical care

Italy - 12% of positive cases required ICU critical care

Wu Z. China CDC–in 44,672 confirmed cases.
JAMA 24 Feb 2020

Step 1: Triage and Quick Check

Remember IPC for every step!
Infection prevention and control for COVID-19: Standard + Droplet + Contact precautions

- Standard precautions with ALL patients
  - Make sure correct handwashing technique- alcohol handrub or with soap/water (if visibly soiled)
  - Respiratory hygiene/ source control

- Droplet plus Contact precautions
  - PPE- gloves, mask, eye protection, long-sleeved gown
  - Review how to safely remove gloves, face mask, gown
  - Repeat hand hygiene after doffing
  - Hand Hygiene- WHO “5 Moments” includes before and after PPE!

SAFETY first! Infection prevention and control- COVID-19

In the waiting room- first point of contact:

- Educate all staff, health workers and hospital visitors on respiratory hygiene and cough etiquette
- Cover mouth and nose when coughing or sneezing
- Have tissues in waiting area or provide a medical mask
- Hand hygiene after contact with respiratory secretions
- Remind all to dispose of tissues and masks in no-touch receptacles and to wash their hands
- Have posters in waiting areas to educate on this

Give patients with suspect COVID-19 a mask and direct to separate area:

- Separate suspects by 1-2 metres from other suspect patients in the separate area

As you start the medical triage assessment, consider your team’s safety first-

If a dangerous pathogen with human-to-human transmission (COVID-19, MERS-CoV, human avian influenza, Ebola, CCHF) is occurring in your province or a travel history:

- Screen and complete only a visual assessment
- Call for help in appropriate PPE if positive screening or if cannot determine contact status.
- If screening negative, continue with assessment and management using standard precautions

Source: WHO. Infection prevention and control for novel coronavirus (COVID-19)
https://openwho.org/courses/COVID-19-IPC-EN
Triage: Process of rapidly screening patients soon after arrival in hospital to identify if:

EMERGENCY: Check for ABCDE emergency signs

PRIORITy

QUEUE= non-urgent

SAFETY first!
Infection prevention and control

The Quick Check guidelines are presented both on a wallchart and in the IMAI District Clinician Manual and training course.
Quick Check and emergency treatments

Remember ABCDEs

• **AIRWAY**
• **BREATHING**
• **CIRCULATION**
• **DISABILITY**
• **EXPOSE** and **EVALUATE** for life threats
Quick Check and emergency treatments: Airway and Breathing

First assess: Airway and breathing

- Appears obstructed or
- Central cyanosis or
- Severe respiratory distress

Check for obstruction (noisy breathing, gurgling, neck swelling), slow breathing, wheezing, choking, not able to speak. Check pupils. Check oxygen saturation.

Do not move neck if cervical spine injury possible – immobilize spine (see p. 29).

If obstructed airway:
- If foreign body aspiration, treat choking patient (see p. 13).
- If suspect anaphylaxis, give 1:1000 epinephrine (adrenaline) IM - 0.5 ml if 50 kg or above, 0.4 ml if 40 kg, 0.3 if 30 kg (see p. 14).

For all patients:
- Manage airway (see p. 15).
- Give oxygen 5 litres (see p. 19).
- If inadequate breathing, assist ventilation with bag valve mask (see p. 17).
- If pinpoint pupils, excessive respiratory secretions, muscle weakness and other signs of organophosphate poisoning, give atropine IV/IM 0.05 mg/kg bolus (for 60 kg, 3 mg = 6 ampules) then continue atropinization.
- Help patient assume position of comfort.
- If wheezing, give salbutamol (see p. 23).
Quick Check and emergency treatments: **Circulation**

- Weak or fast pulse
- Capillary refill longer than three seconds
- Heavy bleeding from any site
- Severe trauma

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**Check SBP, pulse**

**Is she pregnant?**

- Do not move neck if cervical spine injury possible – immobilize spine (see p. 44).

- If SBP < 90 mmHg or pulse > 110 per minute or heavy bleeding:
  - Give oxygen 5 litres if respiratory distress or SpO₂ < 94 (10-15 litres if critically ill).
  - Insert IV, give 1 litre bolus crystalloid (LR or NS) then reassess (see give fluids rapidly).
  - Keep warm (cover).
  - If > 20 weeks pregnant, place on left side.
  - If anaphylaxis, give 1:1000 epinephrine (adrenaline) IM – 0.5 ml if 50 kg or above, 0.4 ml if 40 kg, 0.3 if 30 kg.

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**THEN ASSESS: CONSCIOUSNESS/CONVULSING**
Follow a stepwise approach when assessing and managing emergency signs of airway and breathing.

**Step 1: Assess Airway**
- Talk to the patient. If the patient is speaking clearly, the airway is open.
- Look/Listen for signs of airway obstruction:
  - Snoring or gurgling.
  - Stridor or noisy breathing.
  - Foreign body or vomit in mouth.

**Step 2: If Airway Obstructed, Open Airway and Clear Obstruction**
- **No trauma**
  - Position patient on firm surface.
  - Tilt the head.
  - Lift the chin.
  - Remove foreign body if visible.
  - Clear secretions.
  - If unconscious, place in recovery position (see p.42).
- **Trauma**
  - Stabilize cervical spine – do not lift head.
  - Place fingers behind both sides of mandible and lift up (jaw thrust).
  - Remove foreign body if visible.
  - Clear secretions with suction.

**Step 3: Insert Airway Device**
- If airway is obstructed by tongue, insert airway device.
- Oropharyngeal airway:
  - Use if patient is unconscious.
  - Use appropriate size (measure from front of ear to corner of mouth).
  - Slide airway over tongue.
  - Give oxygen after placing airway device.
  - If patient resists, gags, or vomits, remove immediately.
- Nasopharyngeal airway:
  - Better tolerated if patient is semi-conscious.
  - Pass well-lubricated airway into one nostril directed posterior towards the throat.
  - Give oxygen after placing airway device.

**Step 4: Assess Ventilation**
- If ventilation is inadequate, or patient is cyanotic or unconscious with respiratory distress, then assist breathing via bag valve mask ventilation (go to Step 5).
- If ventilation is adequate, give oxygen and titrate flow.

**Step 5: Assist Ventilation with Bag Valve Mask**

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**Airborne precautions**
Give oxygen if hypoxemic - measure oxygen saturation by pulse oximeter then titrate

- Easy to use
- Detect and monitor hypoxemia (low oxygen saturation)
- Titrating oxygen using an oximeter allows efficient use of a limited resource
- Give oxygen if*
  - SpO2 < 90% (haemodynamically stable patient)
  - SpO2 < 94% (pts with A, B or C emergency signs)
  - SpO2 < 92-95% (pregnant women)

*Updated oxygen thresholds based on WHO Updated ETAT and Critical care SARI Training: Module 6: Oxygen Therapy. 
https://openwho.org/courses/severe-acute-respiratory-infection/overview

Simplified to SpO2 < 94 if ABC emergency sign or pregnant)
HOW TO DELIVER INCREASING oxyGEN

- Start oxygen at 5 litres/minute (10-15 litres if critically ill (see below)
- Use nasal prongs
- Assess response

- Place prongs inside the nostril. Hook tubing behind ears. Flow rates higher than 5 litres will dry mucous membranes.

- Use face mask
- Increase oxygen to 6–10 litres/minute
- Assess response

- Secure mask firmly on face over nose and mouth. Pull strap over head.

- Use face mask with reservoir
- Increase oxygen to 10–15 litres/minute
- Make sure bag inflates
- Call for help from district clinician
- Assess response

- Make sure bag is full to deliver highest oxygen concentration. An empty bag is dangerous.

- If increasing respiratory distress or SpO2 <90; <94 if ABC emergency sign or pregnant
- If not improving with BVM on high flow oxygen
- Patient has an easily reversible condition (e.g. drug overdose, snakebite) and manual ventilation (bagging – p. 17) possible
- Transfer to a hospital with available invasive mechanical ventilator possible.
- See Referral and transfer of severely ill patients, p. 49.

- Call for help from district clinician for possible tracheal intubation – see advanced airway management, p. 18.
- Start manual ventilation (bagging) with high flow oxygen – see p. 17.
How to Titrate Oxygen up and down

• After starting a patient on oxygen → recheck for signs and symptoms of respiratory distress and check SpO₂.
  • Most patients will have improvement in their symptoms and SpO₂ within a few minutes.
• For any change to a patient’s oxygen treatment, directly observe the patient for 2-3 minutes to ensure that they are stable.
• If the patient remains stable → reassess in 15 minutes and record clinical exam and SpO₂.
• If the patient develops severe respiratory distress or the SpO₂ is <90% (or <94% if ABC emergency sign or pregnant) → increase the oxygen flow.
• Only start to decrease the flow of oxygen once you are convinced that the patient is receiving enough oxygen with the current flow and you have completed other first-line emergency treatments.
• Once stable → slowly wean by 1-2 LPM. Observe for 2-3 min to ensure stability and then reassess in 15 minutes.
Increasing oxygen delivery in respiratory distress when oxygen saturation does not reach threshold

Nasal cannula

O₂ 1–5 L/min

FiO₂ 0.25–0.40

Face mask

O₂ 6–10 L/min

FiO₂ 0.40–0.60

Face mask with reservoir

O₂ 10–15 L/min

FiO₂ 0.60–0.95

High flow nasal oxygen

Up to 60 L/min oxygen plus air titrates FiO₂ up to 100%

Intubate, give high flow oxygen, transfer to ICU

Mechanical ventilation

If available & patient awake, cooperative, haemodynamically stable without urgent need for intubation.

Caution: generates aerosols - use airborne precautions

Hypoxemic respiratory failure
Assess need for advanced airway management (**intubation**)

<table>
<thead>
<tr>
<th>STEP 6</th>
<th>ASSESS NEED FOR ADVANCED AIRWAY MANAGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Some patients with easily reversible conditions may quickly improve and be able to ventilate on their own after emergency treatments are given.</td>
</tr>
<tr>
<td></td>
<td>Others may need continued assistance with ventilation or intubation to protect airway. Look for signs:</td>
</tr>
<tr>
<td></td>
<td>- Is SpO$_2$ &lt; 90, cyanosis or severe respiratory distress on high flow oxygen therapy?</td>
</tr>
<tr>
<td></td>
<td>- Is there impending airway failure (e.g. inhalation injury, angioedema)?</td>
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<tr>
<td></td>
<td>- Are these basic airway manoeuvres (Steps 1 to 5) failing to maintain or protect airway?</td>
</tr>
<tr>
<td></td>
<td>- Is prolonged ventilation likely needed (e.g. suspect continued failure from drug overdose, snakebite)?</td>
</tr>
<tr>
<td></td>
<td>If yes, call for help from district clinician and see advanced airway management (see p. 41).</td>
</tr>
</tbody>
</table>

If need ventilation, prepare to transfer to ICU, if available.
Stabilize before transfer to ICU

• Stabilize patient before transfer to another hospital or within the hospital to where they will receive definitive treatment (ward, intensive care unit, operating theatre, or higher level of care).

• Do not delay transport for additional diagnostic testing if testing can be performed at the receiving facility.

• Keep patient comfortable. Treat anxiety and pain. Cover patient and keep warm.

• Transfer checklist
  - Airway and NG tube
  - Breathing - adequate SpO2
  - Circulation, monitoring and IV
  - Family informed
  - Final considerations
    - Ask for notes, X-rays, other results
    - **Bed confirmed at receiving ICU**
    - Continuity of care assured? Communication equipment
    - Drugs and spare? Documentation, including patient history
    - Everything secure? Enough drugs? **Enough oxygen?** Enough fuel? Enough IV fluids?
    - Health worker accompanying patient - prepared? Remember IPC/PPE!!
Finish Quick Check and provide emergency treatments then Continue urgent management

Steps to manage severely ill patient with respiratory distress- suspect severe pneumonia- possible COVID-19

1. Recognize
2. Fix the physiology
3. Treat infection
4. Monitor, Record and Respond

This systematic approach is summarized in tables for management of severe respiratory distress or septic shock in the IMAI District Clinician, for
• First 2 hours
• 2-6 hours
• 6-24 hours
• Post-resuscitation
1. Recognize

• Consider the differential diagnosis - take history, focused exam; send investigations

• In severely ill patients with emergency signs of airway or breathing and fever, suspect **severe pneumonia** if
  
  • Fever or suspected respiratory infection plus one of the following
    • Respiratory rate >30
    • **Severe respiratory distress** (such as inability to speak, use of accessory muscles)
    • SpO\textsubscript{2} <94%

In patients **not responding to oxygen therapy** - suspect acute hypoxemic respiratory failure/ ARDS if:

• signs of severe respiratory distress
• SpO\textsubscript{2} < 90% (hypoxemia) despite escalating oxygen therapy
• SpO\textsubscript{2}/FiO\textsubscript{2} < 315 while on at least 10 L/min oxygen therapy (or PaO\textsubscript{2}/ FiO\textsubscript{2} < 300)
• No clinical evidence of fluid overload from poor cardiac function
• Chest X-ray shows diffuse infiltrates

• For patients who meet the suspect case definition for COVID-19, obtain respiratory specimen
  • If suspect influenza or bacterial pneumonia, also test for other respiratory specimens
  • Even if another respiratory pathogen is found, all patients who meet the suspect case definition for COVID-19 should be tested as co-infections can occur.
Laboratory Testing for COVID-19 and influenza

- HW should wear appropriate PPE when collecting specimens for RT-PCR testing
- Store and ship specimens as per local laboratory guidance
- Specimens to be collected:
  1) Upper respiratory specimens
     - Nasopharyngeal and oropharyngeal swab or wash
     - Dacron or polyester flocked swab
  2) Lower respiratory specimens
     - If sputum being produced—also send sputum
     - If patient is intubated—send endotracheal aspirate

- Additional specimens for consideration: blood, stool

2. Fix the physiology

• Respond to signs of abnormal physiology with appropriate treatment
• First-line treatments for patients with emergency signs should have already been given-- e.g. airway management and administration of oxygen
• Titrate the oxygen flow to SpO$_2$ $\geq$ 94% in adults with emergency ABC signs/during resuscitation.
  • Once patient is stable, the target is $>90\%$ in non-pregnant adults; $>92$-$95\%$ in pregnant women
• If oxygenation deteriorates, check oxygen equipment to make sure it is working correctly
• Use conservative fluid management in patients with SARI when there is no evidence of shock
3. Treat infection

• Consider differential diagnosis and treat likely cause(s)

• If COVID-19, no antiviral is available. Give supportive care.
  • Do NOT give corticosteroids unless indicated for another reason e.g. COPD, exacerbation asthma or sepsis (in sepsis, balance small reduction in mortality versus prolonged shedding coronavirus in respiratory tract, as shown in MERS CoV)

• If suspect pneumonia or sepsis, give empirical antibiotics (see DCM, Sections 3.1- 3.2). *Early administration of antibiotics within one hour saves lives in sepsis.*

• If influenza is suspected, early treatment with antivirals can help decrease morbidity and mortality in severely ill patients. Send a throat swab and initiate antiviral therapy empirically if ongoing local circulation of seasonal influenza (see DCM, sections 3.2 and 8.2).

• All severely ill patients should have IV access. Insert IV (16 or 18 gauge) and start fluids at 1 ml/kg/hour. Use conservative fluid management in patients with SARI when there is no evidence of shock
  • If the patient has emergency signs of circulation or volume overload is suspected, adjust the rate of fluid administration accordingly.
4. Monitor, Record and Respond

Use a Severe Illness Monitoring Form

(from WHO IMAI District Clinician Manual, section 3.11)

<table>
<thead>
<tr>
<th>Diagnosis:</th>
<th>Patient No.:</th>
<th>Birth date:</th>
<th>Age:</th>
<th>Sex:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Circle if test sent and record result:</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Electrolytes</td>
<td>Malaria</td>
</tr>
<tr>
<td>Pregnant:</td>
<td>Yes/No</td>
<td>EDD:</td>
<td>Allergies:</td>
<td></td>
</tr>
<tr>
<td>Time of day</td>
<td>Monitoring interval (minutes) from arrival or start</td>
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<td></td>
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<tr>
<td>0</td>
<td>30</td>
<td>60 (1 hr)</td>
<td>90</td>
<td>120</td>
</tr>
<tr>
<td>Q30 – 60 min (until normal)</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>SpO₂</td>
<td>Heart rate</td>
<td>Systolic BP</td>
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<td></td>
</tr>
<tr>
<td>Respiratory rate</td>
<td>Conscious level (AVPU)</td>
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<tr>
<td>Q1 – 6 hours, repeat if abnormal</td>
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</tr>
<tr>
<td>Temperature (°C)</td>
<td>Glucose</td>
<td>Urine output*</td>
<td>Haemoglobin</td>
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<tr>
<td>Exam</td>
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<tr>
<td>Assess</td>
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<tr>
<td>Response</td>
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<tr>
<td>Fluids (type, rate)</td>
<td>Oxygen (method/flow)</td>
<td>Salbutamol</td>
<td>Vasopressor (type/rate)</td>
<td>Glucose</td>
</tr>
<tr>
<td>Clinician (initials)</td>
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</tbody>
</table>

- Monitoring using a detailed patient flow chart will help to recognize changing patterns in a patient’s condition >>> rapid response
- In first 6 hours, monitor the following every 30 min, then every 60 min once stable
  - SBP, HR, RR, SpO₂, mental status
- Monitor the following every 6 hours:
  - Temperature, urine output, physical exam (respiratory, cardiovascular)
- RESPOND TO CHANGES!
Decide on management suspect COVID-19 patient with no emergency signs

- Most patients have mild illness, presenting with non-specific signs including fever, dry cough or with sputum production, fatigue, malaise, anorexia, muscle pains, sore throat, nasal congestion, headache
- Establish local protocols to triage patients with respiratory symptoms, test them rapidly, and decide on disposition.
- For example, for mild confirmed cases (no pneumonia)- hospital or home self-isolation?
  - Do they have risk factors? older age or underlying chronic medical conditions such as lung disease, cancer, heart failure, cerebrovascular disease, renal disease, liver disease, diabetes, immunocompromising conditions → admit to designated unit for close monitoring.
  - If mild illness and no risk factors, patient can be isolated at home if close monitoring possible and able to return to hospital if deterioration
    - Follow local/regional public health protocols for home isolation*
- Beware of deterioration in second week illness

* WHO: Home care for patients with suspected novel coronavirus (COVID-19) infection presenting with mild symptoms, and management of their contacts. 4 February 2020
IPC for hospitalized COVID-19

Hospitalized patients:
• Should be in single room or cohorted with other confirmed positive patients, separately from suspects
• On a ward, minimum 1-2 m away from other patients; medical masks should be worn if in public area
• Equipment should be single use when possible, dedicated to patient, disinfected between uses
• Enhanced environmental cleaning
• Limit visitors to dedicated health workers and family. Should wear PPE and recorded for contact tracing purposes. (Some hospitals are not allowing visitors or only one at a time.)

Airborne precautions for aerosolized generating procedures e.g. hand bagging, intubation, nebulization or use of CPAP/BIPAP or high-flow nasal oxygen
• PPE should include high efficiency mask: N95 or FFP2

Hospital Planning

Organize and Prepare!

- waiting room- screening, medical masks, tissues, receptacles, hand sanitizers, signs; area to separate suspect patients

- PPE for health workers- is there enough? are health workers trained-
  - How to don/doff PPE (review)
  - N95 fit testing

- Train health workers: when to suspect COVID-19, differential diagnosis, laboratory testing, how to triage, give emergency treatments, manage respiratory distress

- Be prepared to separately cohort suspect and confirmed patients if a surge
  - Coordinate isolation room/area for sick patients- if same room, patients should be spaced at least 1-2 meters apart
  - Assess adequacy oxygen supply- how many severely ill adult patients can we manage at the same time? augment if low
  - Able to increase ICU capacity?

- Plan for safe transfers to an ICU- ambulance staff need to be trained
- Communicate!

See additional sources on hospital set up for a surge of patients; special centres, designated hospitals, drive-through testing, etc
Flowchart of WHO SEARO IMAI Training for district hospitals without an ICU

Creating an emergency distance learning approach to COVID-19 adapted materials

1.5 days: all clinical teams - Infection prevention and control for clinicians
   Clinician’s role in disease surveillance and response - module 1 and SARI module

SEARO-adapted IMAI District Clinician Manual

4.5 days: Quick Check+
- Triage assessment and emergency treatment
- Manage severely ill patient with septic shock and severe respiratory distress

Manager’s course
Auxiliary course

4.5 days: ETAT+
- Emergency triage assessment and treatment
- Inpatient management severely ill child - modified for more emphasis on SARI and septic shock

Clinical team from each hospital works together on:
Implementation planning and QI
THANK YOU!

Questions?