University of Nairobi

COVID-19 Webinar

saving children's lives
ETAT+
Emergency Triage Assessement and Treatment plus admission

An initiative by ETAT+ Trainers in partnership with CPHD

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Medinfo
Every Child Counts

Outline

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Clinical manifestation & diagnosis
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Dr. Tauhida Mohammed
Introduction

Dr. Mariana Mutinda
Goals of management

Dr. Wangui Mavumba-
Transmission

Dr. Fareen Musa
Management and emerging science

Outline - 2

Dr. Rachael Kanguha(Host)
Contact tracing
& Management

Dr. Sylvia Mwathi
Health care workers
protection

Dr. Adem Achieng
Health care workers
protection

Message from one of our colleagues:

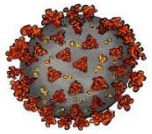
I was on quarantine for 14 days after exposure to a COVID19 patient in whom diagnosis was not made on admission; and I did not have the correct PPE!

I thank God , I was not infected. We are here to share with you how to make diagnosis and to protect the health workers from getting infected.

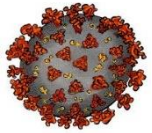
Early diagnosis, isolation and correct PPE!!! Stay home if you are unwell!

Introduction

What is COVID-19?



Coronavirus disease 2019 (COVID-19) is a respiratory tract infection caused by a newly emergent coronavirus , that was first recognized in Wuhan, China, in December 2019



The virus that causes COVID-19 is designated as **severe acute respiratory syndrome corona virus 2 (SARS-CoV-2)**

March 11, 2020 , WHO characterized COVID-19 as a pandemic

Current COVID-19 status

Global figures

- Confirmed cases : **1,930780**
- Deaths : **120,863**
- Recovered : **464,398**

Kenya figures

- Confirmed cases : **216**
- Deaths : **9**
- Recovered: **41**

COVID-19 is less severe than SARs CoV- 1 but highly infectious

Number of healthcare workers affected:

- China : 3,300 got infected by early March and 33 died
- Italy : 15,314 got infected (10th April 2020)
- Spain : More than 9,000 health workers have been infected

Transmission

There are four transmission scenarios described by WHO

No cases

- Country with no cases

Sporadic cases

- Country with 1 or more cases, imported or locally detected

Cluster of cases

- Country experiencing cases clusters in time, geographic location, or common exposure; Most cases of local transmission linked to chains of transmission- Kenya is currently experiencing this

Community transmission

- Country experiencing larger outbreaks of local transmission where confirmed cases cannot be linked to the source through chains of transmission

Countries may adapt similar definition of transmission scenarios within the states, counties and regions

Four modes of transmission

There are 4 modes of transmission causing COVID-19

Droplet transmission:
- Large nuclei(>5µm) spread within 1m by coughing, sneezing or talking to an infected person

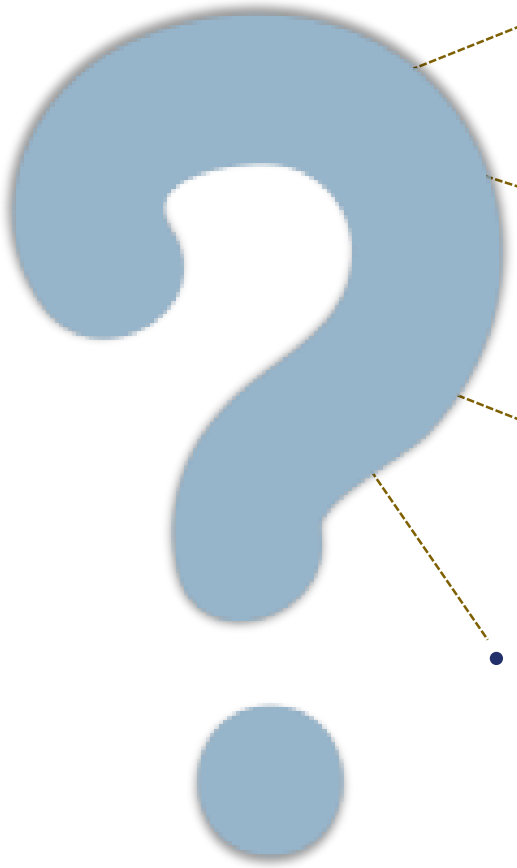
Direct contact exposure:
- Contaminated hands directly touches mucous membranes of a susceptible person

Fomites:
- Object/surfaces likely to carry the microbes i.e. stethoscope or thermometer

Airborne transmission:
- microbes within droplet nuclei (< 5µm)/ dust particles aerosolized by procedures (alveoli)

Source: Modes of transmission of virus causing COVID-19 : implications for IPC precaution recommendations. 2020;(March):19–21;

What is the size of SARS COV 2 droplets?



- > 5-10 µm in diameter; nasopharyx
- Virus transmission up-to 1 meter range
- Beyond that they fall mostly due to gravity[1]
- However, in strong ambient air cross-flows (opening doors, moving objects), these droplets can behave like aerosols and cover long range

Source: (1) Tellier R, Li Y, Cowling BJ, Tang JW. Recognition of aerosol transmission of infectious agents : a commentary. 2019;1–9;

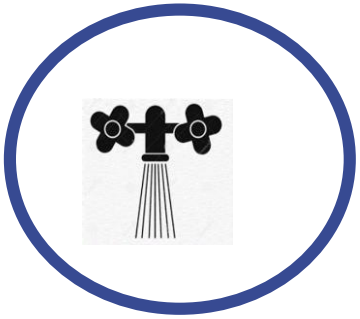
Aerosol and surface stability of SARS-CoV2 – in experimental setting

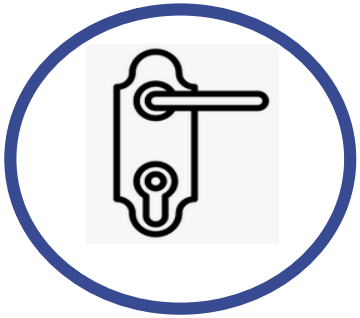
Air

3 hours

Steel

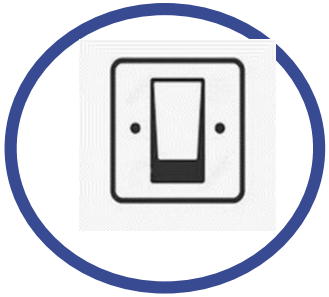
48 hours





Plastics

72 hours



Rationale of Kick off Corona Virus Message

- High viral loads in the upper respiratory tract
- Potential viral shedding and transmission by asymptomatic persons
- Virus can remain viable and infectious in aerosols for hours and on surfaces up to days

Ways to prevent spread of the virus:

- Cough etiquette
- Hand hygiene
- Not touching your face, nose, mouth
- Physical distance
- Stay home if you are unwell

Source: (1) van Doremalen N, Bushmaker T, Morris DH, Holbrook MG, Gamble A, Williamson BN, et al. Coronavirus disease 2019 (COVID-19)Situation Report 16.pdf. N Engl J Med [Internet]. 2020;2019(March). Available from: http://www.ncbi.nlm.nih.gov/pubmed/32182409

Clinical manifestation and diagnosis

Screening questions for suspected COVID-19

Ask:

Fever

- Have you experienced new onset of fever >380C in last 14days?

Cough

- Have you experienced new onset of cough or shortness of breath in last 14days?

Travel and contact history

- Have you travelled from country or counties with high transmission of COVID-19?

OR

- Have you had contact with someone experiencing fever or respiratory symptoms in the last 14 days?

Definition of contacts of COVID-19

A contact is a person (including caregivers and HCWs) who is exposed to individuals with a probable or confirmed COVID-19 disease from 2 days before and up to 14 days after onset of symptoms in the patient

1. Face to face meeting with probable or confirmed case where social distance of **1 meter** is not adhered to & for **>15 min**
2. Direct physical contact with a probable or confirmed case e.g handshaking
3. Direct care for a patient with probable or confirmed COVID-19 disease without proper protective equipment for the level of care
4. Staying in the same close environment with a probable or confirmed case (workplace, classroom, household, gatherings) for any amount of time
5. Travelling in close proximity, within 1 m separation, with a COVID-19 patient in any kind of conveyance (cars, airplane, cruise ship)

For confirmed COVID-19 the period of contact is measured as the 2 days before through the 14 days after the date on which the sample was taken which led to confirmation

Definition of contacts of COVID-19- Health worker without appropriate PPE

6 Direct contact with the body fluids or the laboratory specimens of a case without appropriate PPE

7 Presence in the same room in a health care setting when an aerosol-generating procedure is undertaken on a case

Aerosolizing procedures

Mechanical ventilation

Nebulization

Bronchoscopy

suctioning

Cardiopulmonary resuscitation

Chest physiotherapy

Definition of terms to describe COVID-19 cases

Suspected case

- Acute respiratory illness and/or fever >38^{0}C **AND** no known aetiologies that fully explain the presentation **AND** a history of travel to a community with COVID-19 transmission at least **14 days** prior to symptom onset; OR
- **Any** acute respiratory illness **AND** having been in contact with a confirmed or probable COVID-19 case in the last 14 days prior to symptom onset; OR
- Severe acute respiratory illness **AND** requiring hospitalization **AND** in the absence of an alternative diagnosis that fully explains the clinical presentation

Probable case

- A suspect case for whom testing for the COVID-19 virus is inconclusive; OR
- A suspect case for whom testing could not be performed for any reason

Confirmed case

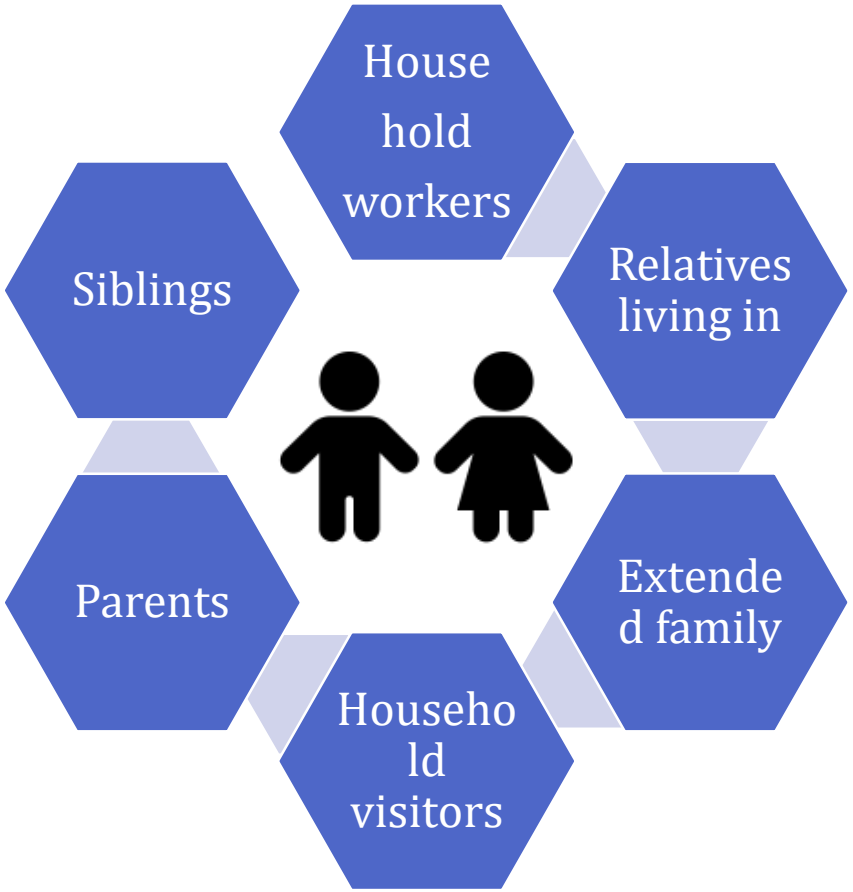
- A person with **laboratory** confirmation of COVID-19 infection, **irrespective** of clinical signs and symptoms

(1) WHO 2020; Global surveillance for COVID-19 caused by human infection with COVID-19 virus: interim guidance;

Identifying a child's household contacts

Experience from China:

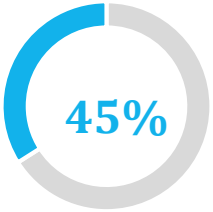
- **>50%** of all patients with COVID-19 had at least one family member with the disease
- **75–80%** of all clustered infections were within families



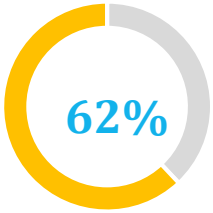
Chen et al: Fangcang shelter hospitals: a novel concept for responding to public health emergencies; Published online April 2, 2020 https://doi.org/10.1016/S0140-6736(20)30744-3

Challenges in using suspected COVID-19 definition as per WHO/MoH criteria

Data from 13 County hospitals in the Clinical Information Network shows prevalence among 2-59 months (N=30042) Pneumonia & fever are common admission diagnosis[1]

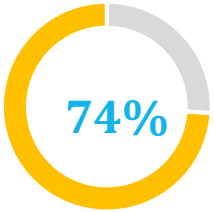


Prevalence of pneumonia

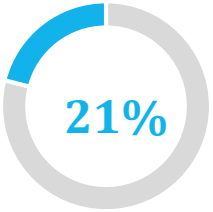


Prevalence of history of fever

Agweyu et al conducted retrospective analysis of severity of pneumonia among 16162 children aged 2-59 months admitted in 14 County hospitals in Kenya[2]



*Had **non-severe** pneumonia*



*had **severe** pneumonia*

(1) Ayieko P, et al. Arch Dis Child 2016;101:223–229. doi:10.1136/archdischild-2015-309269; (2) Agweyu et al Lancet Glob Health 2018;6: e74–83 (New WHO classification)

Criteria for suspected case definition

1. **Broad enough to capture all** those who may have the disease

2. **Rule out common illnesses -** COVID-19 symptoms are similar to other common illnesses – attempt to made to rule out bacterial infections and malaria

3. All people meeting the suspect, probable or confirmed case definitions **should undergo isolation as stipulated by the MoH**

Clinical Features of COVID-19

Symptoms	Children (% Freq)	Adults (% Freq)
Cough	48.5	59
Fever	41.5	99
Tachypnea	28.7	31
Fatigue	7.6	70
Pharyngeal Erythema	46.2	-
Tachycardia	42.1	-
Diarrhea	8.8	-

Spectrum of Illness	Children (% Freq)	Adults(% Freq)
Mild & Asymptomatic	94.2	81
Severe	5.2	14
Critical	0.6	5
Paediatric Severe & Critical Illness		
< age 1 year	10.6	
1-5 years	7.3	
6-10 years	4.2	
11-15 years	4.1	
16-17 years	3	

For children **History of household contact** is important

The New England Journal of Medicine
https://www.uptodate.com/contents/covid-19-2019-novel-coronavirus-the-basics
Systematic review of COVID-19 in children shows milder cases and a better prognosis than adultshttps://onlinelibrary.wiley.com/doi/pdf/10.1111/apa.15270

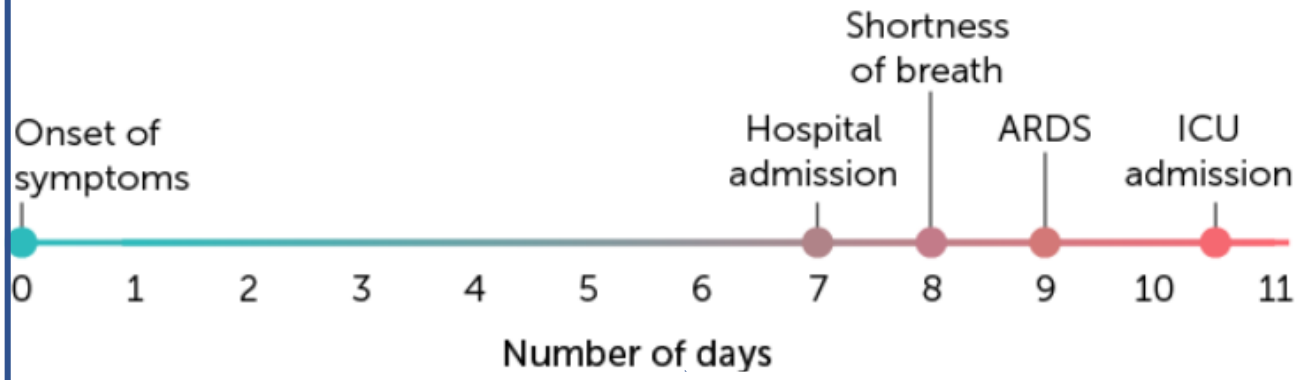
Clinical features: Clinical Syndromes Associated with COVID-19

Clinical features	Children	Adults (& adolescents)
Non-severe pneumonia	• Cough/DIB + tachypnea for age, Lower chest wall in drawing	• Cough, mild shortness of breathe not requiring supplemental oxygen
Severe pneumonia	• Cough/DIB **plus one** danger sign: SPO2 <90%, Cyanosis, Inability to feed, grunting, AVPU<A	• Fever or suspected respiratory infection, plus one of respiratory rate >30 breaths/min, severe respiratory distress, or SpO2 <93%
Critical cases	• Any of: *1. Respiratory failure and requiring mechanical ventilations* *2. Shock* *3. Other organ failure that requires ICU care*	
Acute Respiratory Distress Syndrome	• New or worsening pulmonary symptoms 1 week after initial onset of illness. • The respiratory failure and Chest imaging features (bilateral infiltrates) not fully explained by cardiac overload	

Source: (1) MoH Kenya 2020: Interim guidelines on management of COVID-19 in Kenya;

How fast the severity of the new coronavirus infection progresses

- Well no symptoms after contact with corona virus



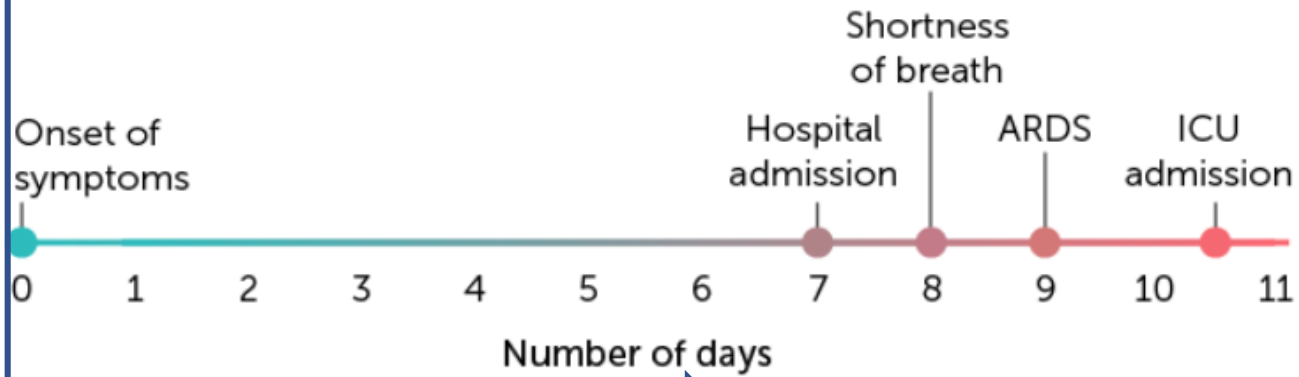
Incubation period
1-14 days
Median 5 days

C. Huang et al Lancet 2020

How fast the severity of the new coronavirus infection progresses

- Well no symptoms after contact with corona virus

Incubation period
Median 5 days



80%
Mild & moderate

15%
severe

Critical
5%

C. Huang et al Lancet 2020

Diagnostic tests

Reverse-transcription polymerase chain reaction (RT-PCR)

- Current gold standard test
- Detects SARS-CoV-2 RNA
- Nasopharyngeal swab specimen is recommended
- A **positive test** is confirmatory
- If initial test is negative: resampling and testing from multiple respiratory tract sites required

Positivity rates on RT-PCR

Specimen	Positive %
Bronchoalveolar lavage	93
Sputum	72
Nasopharyngeal swab	63
Bronchoscopy brush biopsy	46
Oropharyngeal swab	32
Faeces	29
Blood	1
Urine	0

https://www.uptodate.com/contents/covid-19-2019-novel-coronavirus-the-basics
Detection of SARS-CoV-2 in Different Types of Clinical Specimens https://jamanetwork.com

Essential investigations to rule out common causes of respiratory illness

Full Hemogram	WBC counts vary- Lymphopenia is commonest
Chest X-ray	**Common**: patchy or diffuse asymmetric airspace opacities **Less common**: pneumothorax, cavitation, or lymphadenopathy

CT Scan chest- increase diagnostic yield when used with RT-PCR

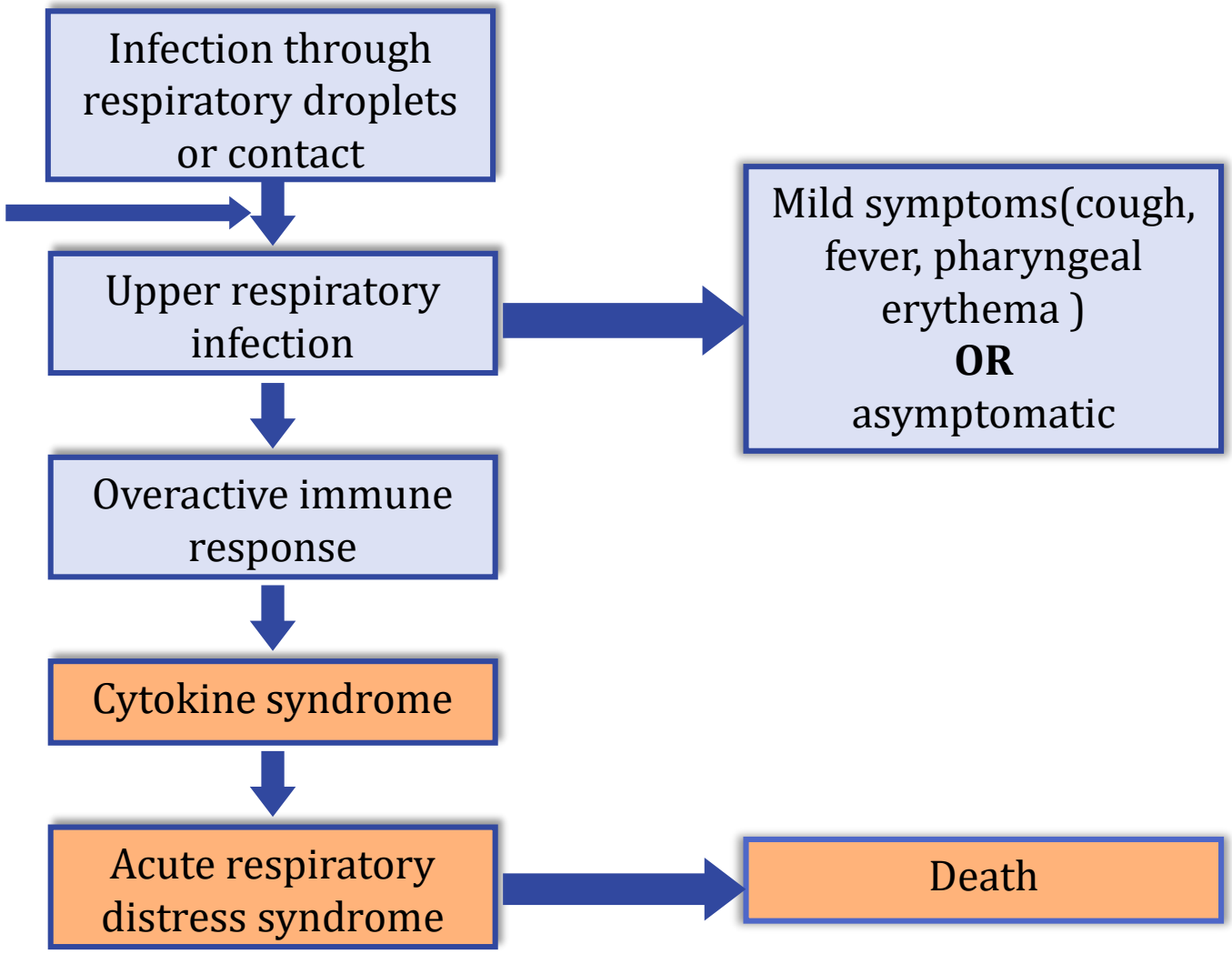
Common: bilateral ground glass opacification- peripheral distribution and involving lower lobes

Less common: pleural thickening, pleural effusion and lymphadenopathy

https://www.uptodate.com/contents/covid-19-2019-novel-coronavirus-the-basics

How the body reacts to the virus

ACE2 receptors are broadly expressed in several human organs



Goals of COVID-19 management

Early recognition of virus

- Early recognition of the virus from suspected patients allows for timely initiation of appropriate infection prevention and control (IPC) measures
- Protection of health care workers

Early identification of the severely ill patients

- Early identification of those with severe illness and provision of early supportive care and referral to isolation ward
- Protection of health care workers

Identification of high-risk deterioration patients

- Identification of COVID-19 patients at high risk of deterioration- elderly and those with comorbidities

Screening criteria for suspected COVID-19 cases

Epidemiological history

1. Within 14 days before onset of disease the patient has:

a. A travel or residence history in the high-risk regions or countries or

b. A history of contact with those infected with SARS-CoV-2 Or

c. Had direct contact with patients with fever or respiratory symptoms in high risk regions or countries

OR

2. Disease clustering (>2 cases with fever and/or respiratory symptoms occur at such places as homes, offices, classrooms, etc. within 2 weeks

Clinical manifestations

The patient has:

1) Fever and/or respiratory symptoms

2)The following chest Xray features of COVID-19:

Common: patchy or diffuse asymmetric airspace opacities

Less common: pneumothorax, cavitation, or lymphadenopathy

3)WBC in the early stage of the disease may be normal or decreased, or the lymphocytes count decreases over time

Patient meets 1 epidemiological history & 2 clinical manifestations

Suspected case diagnosis

YES

Patient has no epidemiological history & meets 3 clinical manifestations

Suspected case diagnosis

YES

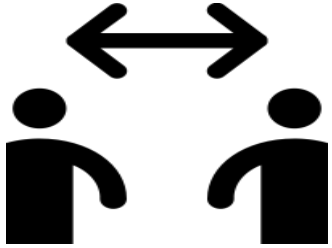
Patient has no epidemiological history, meets 1-2 clinical manifestations but cannot be excluded from COVID-19 through imaging

Expert consultation

Lay out – screening for suspected COVID 19

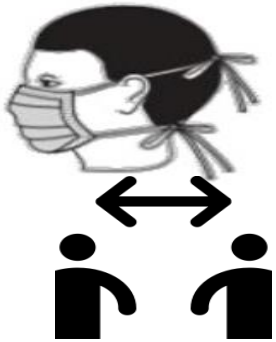
Screening point

All patients to keep 1 meter apart . All patients wash hands & wear masks; those with fever (+ their caregivers) wear surgical masks. Instruct all patients on cough etiquette and hand hygiene

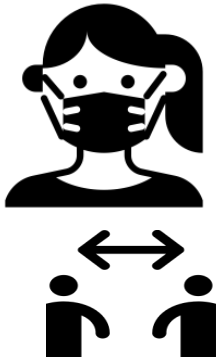


Contaminated zone
Suspected COVID 19

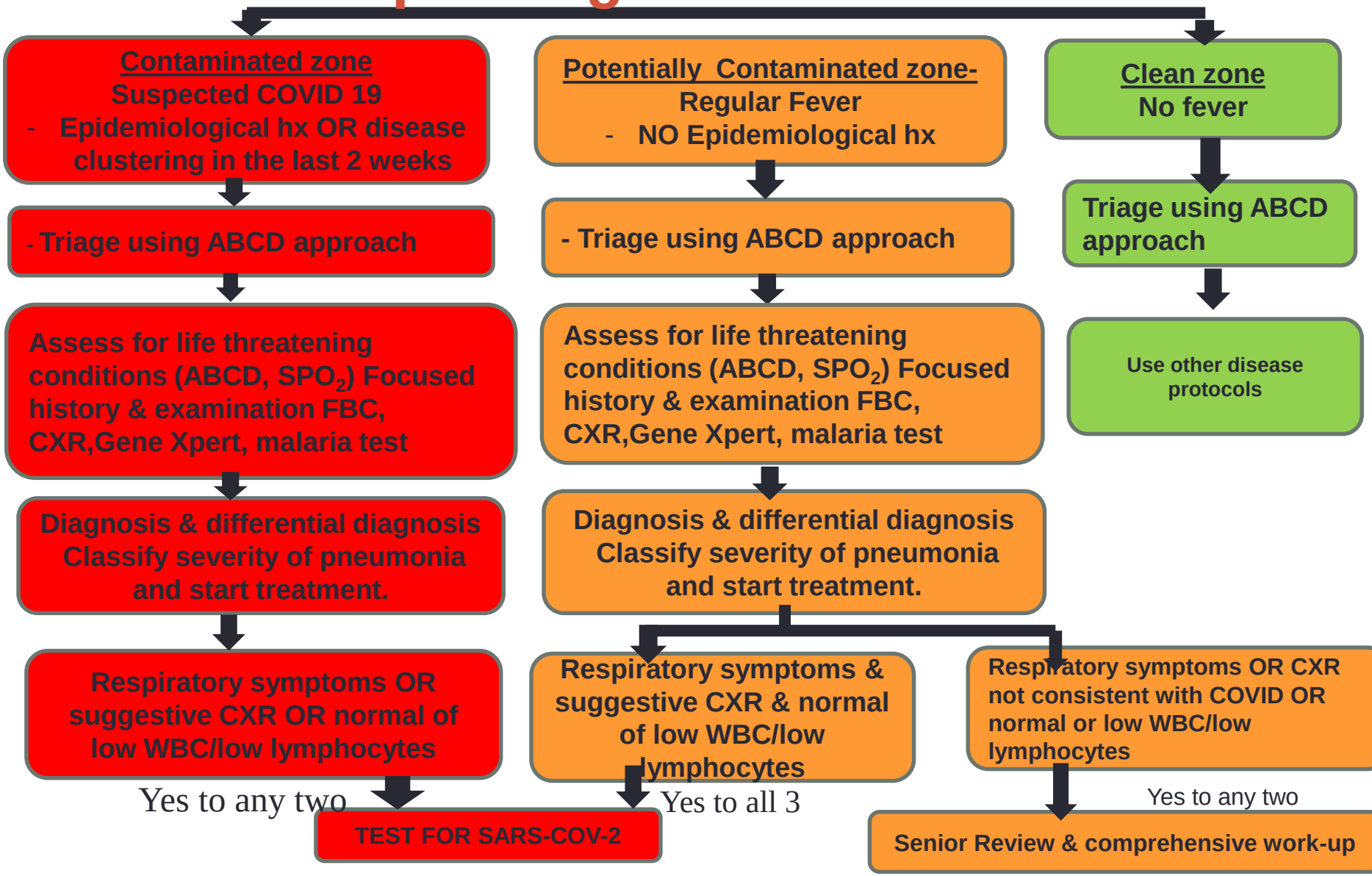
Potentially Contaminated zone-
Regular Fever
- NO Epidemiological hx



Clean zone
No fever



Lay out – screening for suspected COVID 19
3 Zones depending on risk of contamination



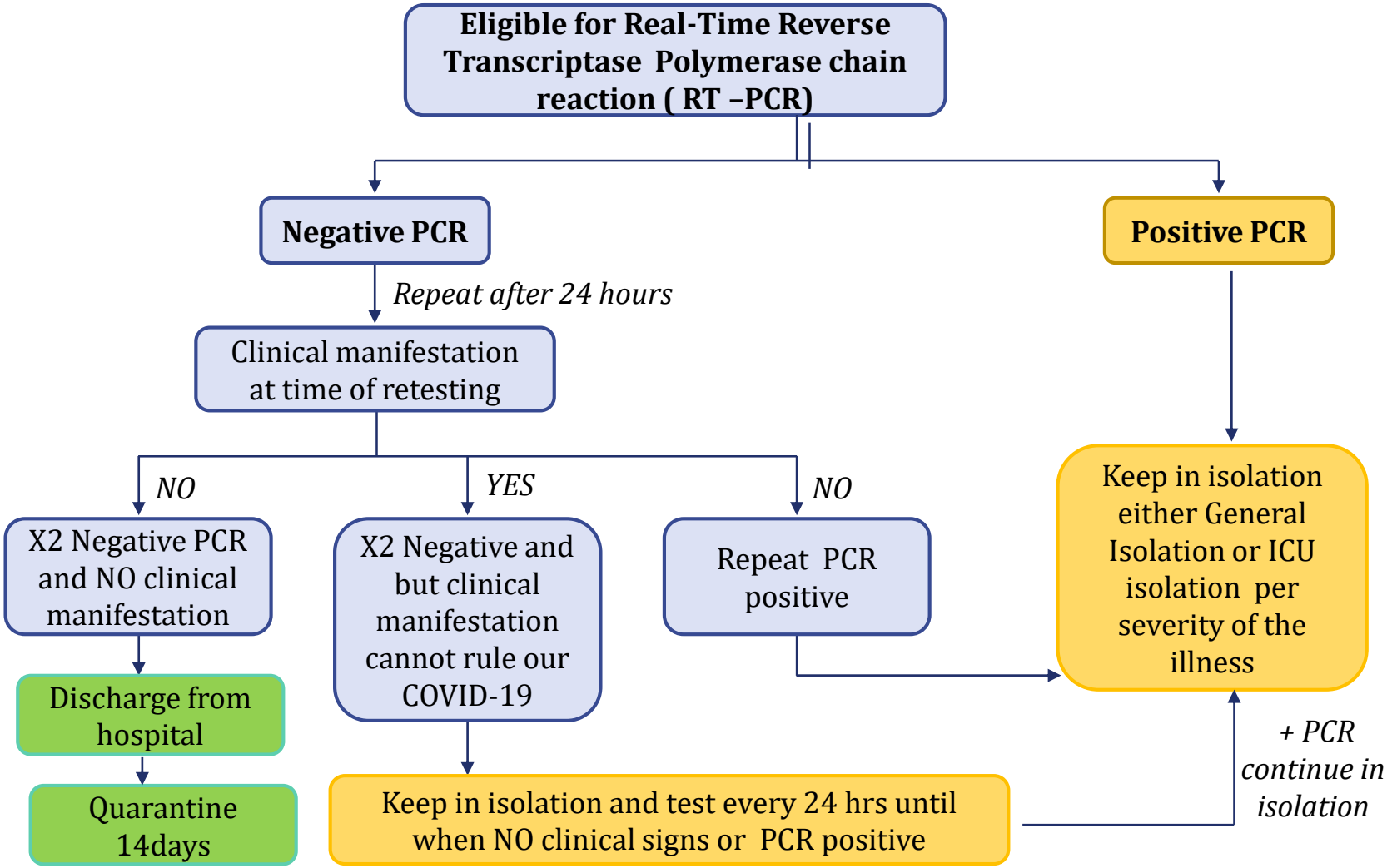
STOP SPREAD OF VIRUS! Protect others! Keep safe!

In regard to the 3 zones in outpatient the following should be observed:

- **Only patients** are allowed to enter waiting area to avoid overcrowding; for children, only one care giver. Patients must keep one meter distance
- **All patients** must wear masks (surgical masks if they have fever)
- **Instruct all patients** to cover nose and mouth during coughing or sneezing with tissue or flexed elbow and perform hand hygiene after contact with respiratory secretions
- **Educate patients and their families** about early identification of symptoms and essential preventative actions
- **Limited** duration in the examination room
- Clean and disinfect equipment (stethoscopes, blood pressure cuffs, pulse oximeters, and thermometers) between each patient use

All the three zones must have each independent examination room, lab, observation room and resuscitation room

Testing for SARS-COV-2 for eligible persons admitted in isolation ward



Isolation ward – symptomatic patients

Suspected – not confirmed positive

- Single room each with a bathroom
- All patient's activities confined to isolation ward

Confirmed COVID-19 infection

- Can share room with other confirmed cased but bed space must be more than 1.5meter apart
- Bathroom can be shared by those in the room. All patient's activities confined to isolation ward

Patients in isolation ward

- No family visits but allowed to keep mobile phones to facilitate social interaction
- Patient education to prevent further spread of COVID-19
  - Instruction on how to wear surgical mask
  - Proper hand wash
  - Cough etiquette/handling nasal discharge
  - Self medical observation – Temperature + Respiratory signs and symptoms
  - Home quarantine if discharged early due to bed spaces

Triage for children

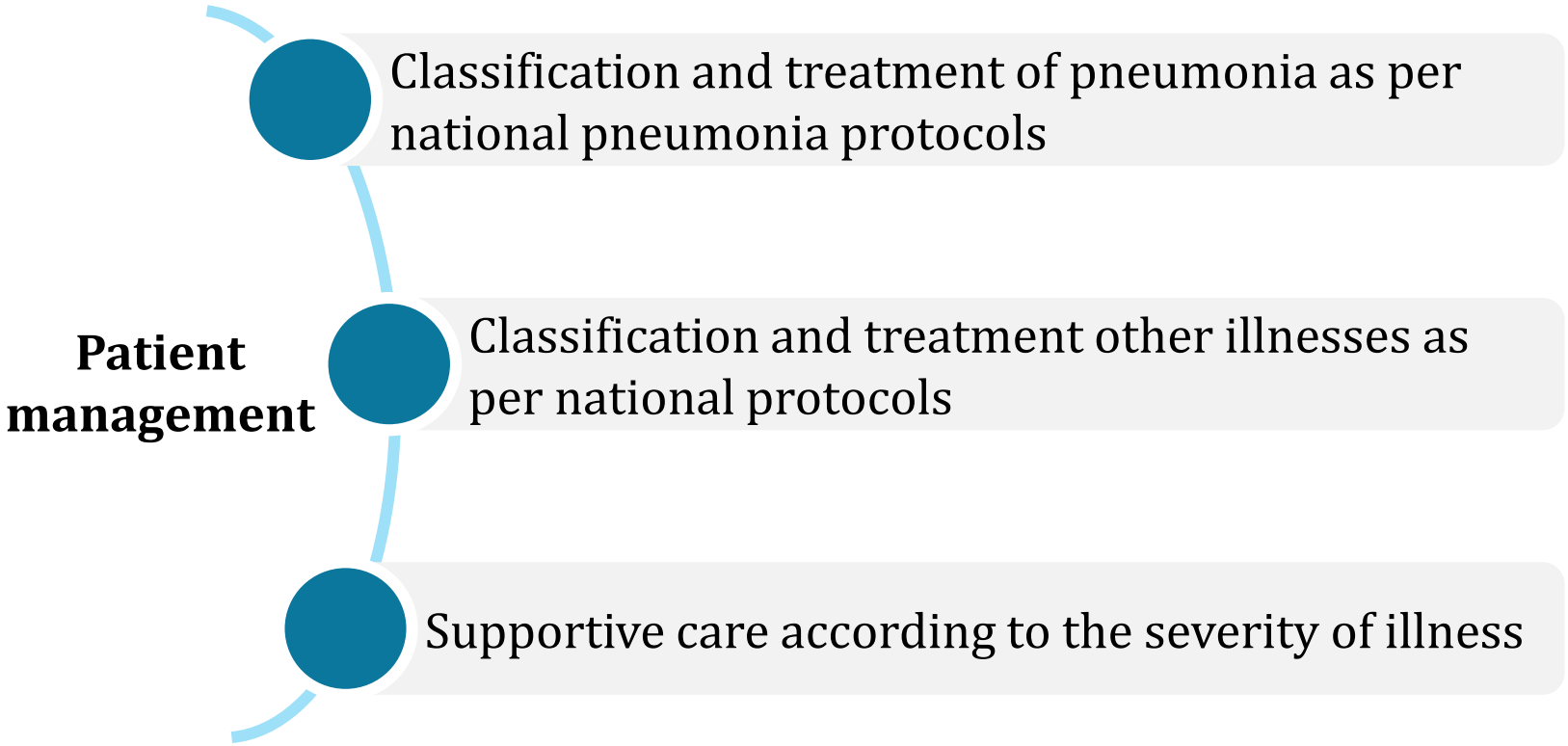
- Group all children identified at the point of triage to have respiratory symptoms to one area at least six feet away from each other & process them rapidly ensuring that social distancing is observed in waiting area

- Screen and isolate all children with suspected COVID-19 as per the case definitions

- Children with indrawing pneumonia +/- danger signs as per Integrated Management of Childhood Illness should be prioritized for COVID-19 testing

Source: (1) Guidelines on the management of paediatric patients during the covid-19 pandemic (Kenya);

Patient management



Where to manage patients

All laboratory cases should be isolated in hospital facilities

If admission of all confirmed cases is not possible

Admit all high risk patients

- Illness classified as critical or severe illness
- All those over 60years
- Mild/moderate with comorbidities (chronic cardiovascular diseases, chronic respiratory disease, diabetes and cancer

Patients with mild disease

- Admit in non-traditional facilities, such as, repurposed hotels, stadiums or gymnasiums
- **If not possible**, e.g. in disease clustering, manage at home **but only if they can followed up and cared for by family members**

Admit until their symptoms resolve and laboratory tests for COVID-19 virus are negative

Home care – home based isolation

Mild infections

- Uncomplicated URTI, fever, fatigue, cough ,anorexia, malaise, muscle pain, sore throat, nasal congestion, or headache. Rarely, diarrhoea, nausea and vomiting

Stop prevention. Prevent family & community

- Focus on stopping spread prevention
- Hand hygiene, cough etiquette, physical distancing, disinfection of surfaces.

Monitor clinical status

- Monitor worsening of clinical status- prompt hospitalization i.e respiratory distress, fevers

Home care – prevention of spread

a) **Recommendations for the Isolated individual**

- Well ventilated room(open windows and open door)
- Minimize shared spaces and movements

- Patient should use a surgical mask
- Cough etiquette and Hand hygiene

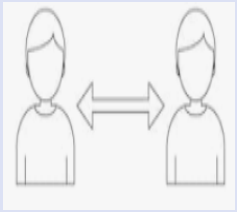
- Dedicated linen and eating utensils; clean with soap and water. Can be re-used
- Daily cleaning of high contact areas: bedside tables, bedframes, and other bedroom furniture- **soap and water then regular household disinfectant.**

- Clean and disinfect bathroom and toilet surfaces at least once daily- **soap and water then regular household disinfectant.**

- Clean the patient's clothes, bed linen, and bath and hand towels- **common household detergent, and dry thoroughly**

Prevention of spread of corona virus

b) Recommendations for other household members



- Other family members utilize a different room/ 1M distance

- Avoid direct contacts with body fluids/ secretions

- Use of surgical mask- same room/ close proximity.
- Do not reuse masks and gloves

- No visitors allowed
- Limit the number of caregivers- ideally one well caregiver

Hand hygiene to protect you from getting infected by corona virus

Duration of home care isolation

It is determined by:

- Resolution of symptoms
- Two documented negative viral PCRs tests in 2 respiratory samples collected at least 24 hours apart. Repeat testing is done 10 days after diagnosis provided all the symptoms have resolved

If testing is not possible then WHO recommends confirmed patients remain isolated for an additional two weeks after symptoms resolve

The above criteria also applies to those hospitalized

Hospital care- supportive care

Modalities of oxygen administration

Nasal prong and NRM	• COVID 19 pneumonia *Patient to have mask*	Target SpO2 ≥90%.
Mechanical ventilation	• ARDS • Hypoxemia on NRM	Target SpO2 ≥ 94%,
ECMO	• Refractory hypoxemia	

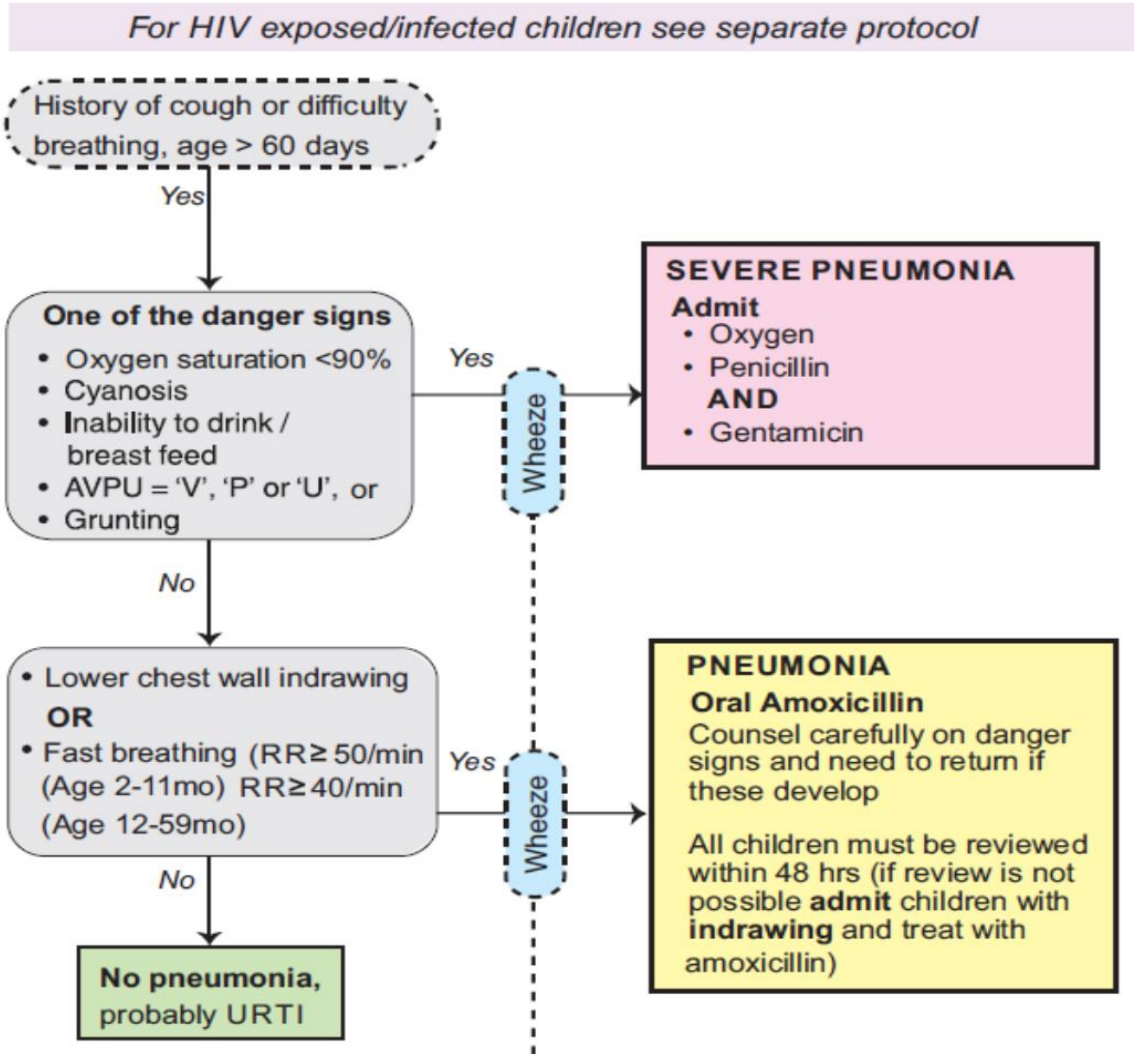
Non invasive ventilation is not recommended because of risk of aerosolization and lung injury.

Empiric treatment of bacterial pneumonia & supportive care

- Empiric antibiotics- suspected bacterial pneumonia (within 1 hour in outpatient)
  - Below 5 years- Amoxicillin DT, IV antibiotics(penicillin and gentamicin)
  - Above 5 years- Amoxicillin-clavulanic PLUS erythromycin or azithromycin
- Safety of NSAIDS – **Paracetamol** has been used for management of fever.
- Ensure adequate feeds.
  - Oral- Preferred route
  - NGT – unable to feed/ severely ill patients
  - IVF- Vomiting everything or unarousable coma.
- Steroids - not indicated

Clinical management of severe acute respiratory infection (SARI) when COVID-19 disease is suspected: Interim guidance V 1.2
Interim guidelines on management of COVID19 in Kenya.
https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-guidance-management-patients

Treatment of pneumonia syndrome



Medical treatment

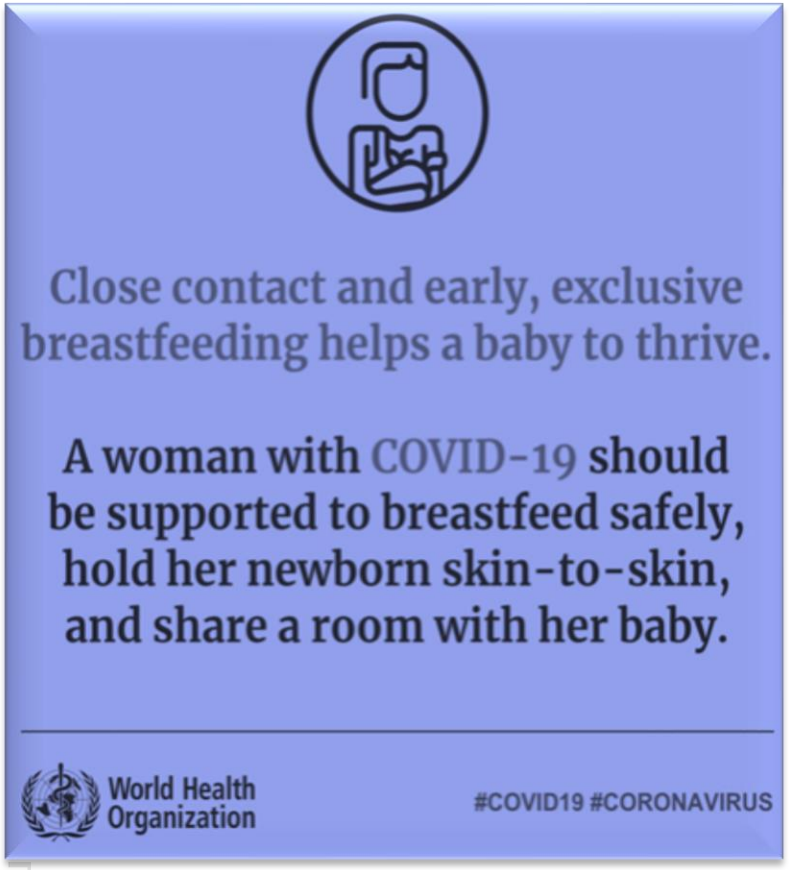
- Lopinavir- Ritonavir- No role
- Tocilizumab and Remdesevir- Clinical trials ongoing.
- Zinc
  - Impairs the replication of RNA viruses (SARS virus and Influenza virus)
  - Shown to reduce incidence and duration of flu illnesses.
  - Australian trial ongoing- Role of IV Zinc in COVID 19

- Chloroquine/ Hydroxychloroquinine- Antimalarial.
  - Alters the cell Ph, which can interfere with the ability of viruses to escape into the host cell and start replicating.
  - Activity against SARS-COV1 and SARS-COV2.
  - Known safety profiles.
  - Main concerns is cardiotoxicity (QT prolongation), hepatic and nephrotoxicity.
  - Dosage: **no consensus on optimal dosing**- no RCTs yet.

https://www.cdc.gov/coronavirus/2019-ncov/hcp/therapeutic-options.html and
COVID-19: Could Hydroxychloroquine Really Be An Answer?- Medscape
Zn2+ Inhibits Coronavirus and Arterivirus RNA Polymerase Activity In Vitro and Zinc Ionophores Block the Replication of These Viruses in Cell Culture Aartjan J. W. te Velthuis1, Sjoerd H. E. van den Worm1, Amy C. Sims2, Ralph S. Baric2, Eric J. Snijder1*, Martijn J. van Hemert

COVID-19 in the newborn

- 4 confirmed cases so far
- Spread via amniotic fluid or breast milk unknown



Breastfeeding

If a women with COVID-19 is too unwell to breastfeed, she can be supported to safely provide her baby with breastmilk in other ways, including by:

Expressing milk | Relactation | Donor human milk

World Health Organization

#COVID19 #CORONAVIRUS

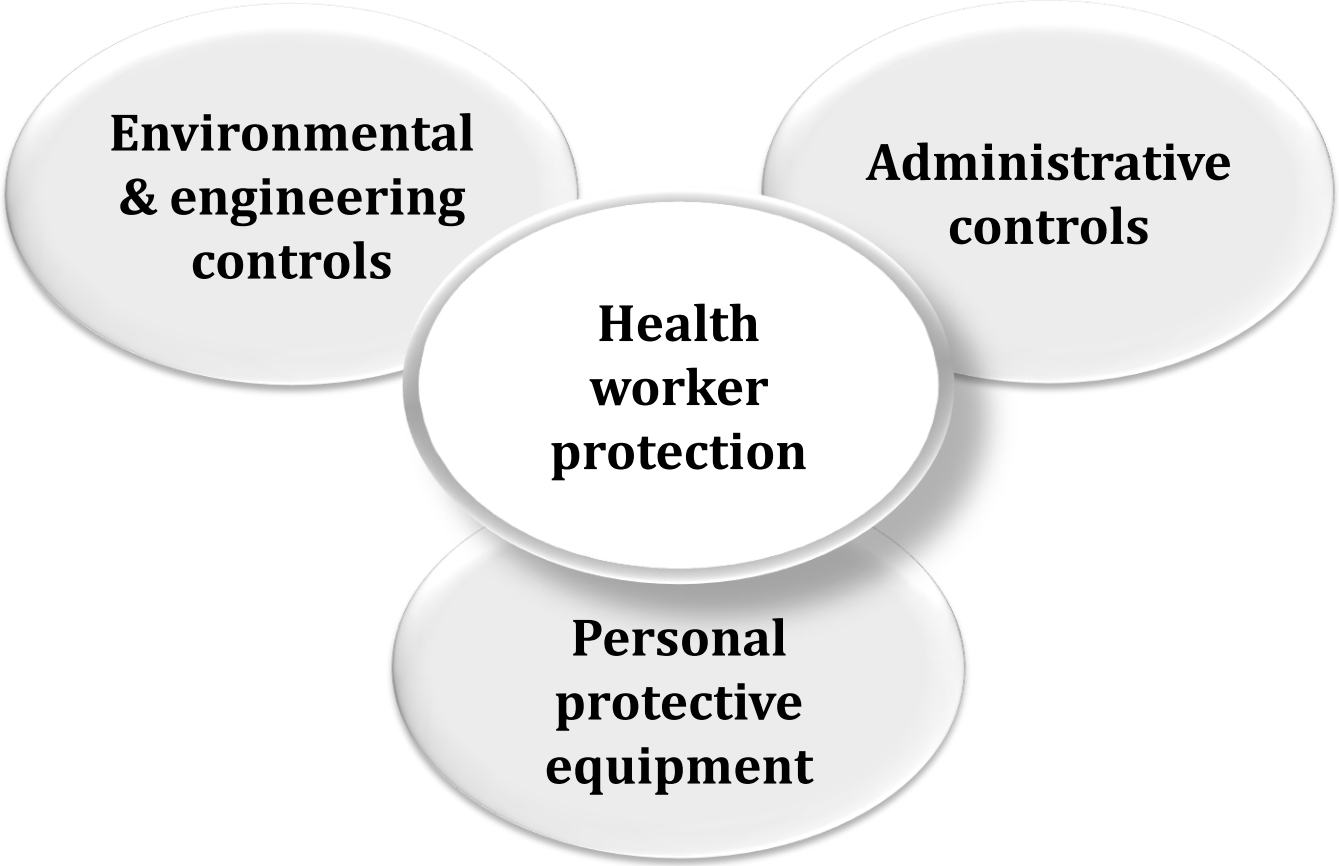
Actions for health facilities and their staff

- If you are providing maternity and newborn services, you should not promote breastmilk substitutes, feeding bottles, teats, pacifiers or dummies in any part of your facilities, or by any of your staff.
- Whether or not the mother or child has suspected, probable, or confirmed COVID-19, you should enable mothers and infants to:
  - remain together
  - practice skin-to-skin contact and
  - room-in throughout the day and night, especially straight after birth during establishment of breastfeeding.

Level of health workers' protection

Health workers' protection

- To prevent virus transmission in health care settings, procedures and protocols -controls need to be applied at all levels



Source: (1) Kim PD, Denny FJ, Salk-Pope SJ. Personal protective equipment. Koenig schultz's Disaster Med Compr Princ Pract. 2009;174–83;

Personal protective equipment

Three levels of precautions need to be handled

Contact precautions	• Use gloves, gowns or coveralls and aprons
Droplet precautions	• Use of the surgical masks when within 1 metre range of the patient
Airborne precautions	• Use of N95 mask or equivalent especially when performing aerosol generating procedures

Level of health workers' protection

Protection level	Areas and operation	Protective equipment
Level 1	• Pre-examination triage • General outpatient department (no fever patients, non-contaminate zones)	• Disposable surgical cap • Disposable latex glove • Work uniform • Disposable surgical mask
Level 2	• Fever outpatient department • Isolation wards • Areas that attend the suspected/confirmed patients beyond the isolation areas: • Persons handling non-respiratory • imaging examination • Cleaning the used surgical equipment	• Disposable surgical cap • Disposable latex glove • Work uniform • **Medical protective mask (N95)** • **Goggles**
Level 3	• Staff carrying out invasive procedure on suspected/confirmed where there is risk of patient spraying or splashing respiratory secretion (including obtaining secretions for RT-PCR for COVID-19), blood or any body fluids. – cardiopulmonary resuscitation, nebulization, tracheal intubation, tracheostomy bronchoscopyy, surgery , autopsy)	• Disposable surgical cap • Disposable latex glove • Work uniform • **Disposable Medical protective uniform** • **Full-face respiratory protective devices or powered air-purifying respirator**

PPE based on risk of exposure category

Risk Category	Characteristic of Exposure of Staff	Examples of Staff	Surgical Masks	Gloves	Gown	Particulate Respirators (e.g. N95 masks)	Eye Protection (e.g. Goggles/ Face Shield)
1	Health care workers who manage patients clinically and have close contact (<1 meter) with known/suspected COVID-19 patients or their infectious material	E.g. Doctors, nurses who work in the fever clin	√	√	√	√	√
2	Non-health care worker staff who have close contact (<1 meter) with known/suspected COVID-19 patients or their infectious material	E.g. Security personnel, receptionist, cleaning staff who work in the fever clinic	√	√	√	X	X
3	Staff with close contact (<1 meter) with persons of "unknown" COVID-19 status	E.g., Essential duty travelers	√	X	X	X	X
4	Staff infected with COVID-19 influenza	E.g. Patients in the fever clinic	√	X	X	X	X
5	Staff with no known close contact (<1 meter) with known/ suspected COVID-19 patients or their infectious material	E.g. Critical staff "quarantined" in work space, and not working in the fever clinic	X	X	X	X	X

Source: (1) MoH updated guideline March 26, 2020;

N95 mask vs surgical mask

N95 respirator mask

- Designed to block 95 -99% of aerosol particles - very small (0.3 micron) particles.
- It achieves a very close facial fit and very efficient filtration of airborne particles; are not for use by public
- Are not designed for children or people with facial hair – no tight fit!

Surgical/medical mask

- Designed to block large particles, droplets and sprays, but are less effective in blocking small particle aerosols (< 5 micrometers)
- Effective in blocking splashes & large-particle droplets
- Do not provide complete protection from germs and other contaminants because of the loose fit between the surface of the face mask and your face

All masks must be worn correctly and disposed correctly

Sterilization of N95/Respirators

- Respirators are usually discarded after use
- Decontamination (eg using gamma irradiation with 24kGy) may affect filtering material, straps, nose bridge material, or strap attachments of the N95 leading to :
  - Poorer fit,
  - Filtration inefficiency,
  - Impaired breathability.
- Due to limited availability reuse may be considered for a limited time, unless there is a risk for contamination through the deposition of infectious particles on the surface

Promising decontamination processes

a. Ultraviolet (UV) germicidal irradiation
b. Vaporous hydrogen peroxide (VHP)
c. Moist heat

Cloth masks for use by the public- well persons

- Available evidence shows that they are less protective than surgical masks and may even increase the risk of infection due to moisture retention, liquid diffusion and retention of the virus.

- Penetration of particles through cloth is reported to be high. In one study, 40–90% of particles penetrated the mask. **It is not appropriate for HCW.**

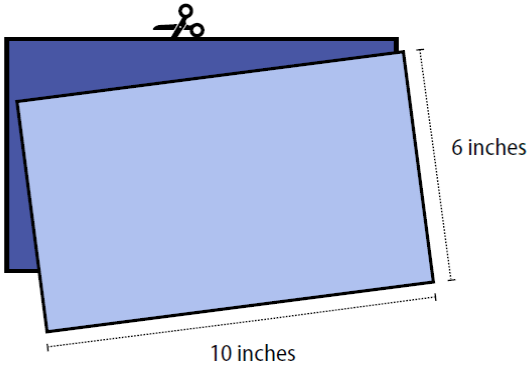
- Cloth mask are reusable and washed daily using hot water and soap and dry in the sun for approximately 5hrs

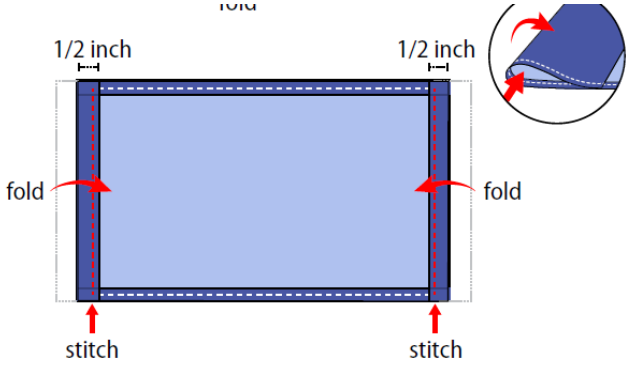
- Always wash hands before and after touching the masks

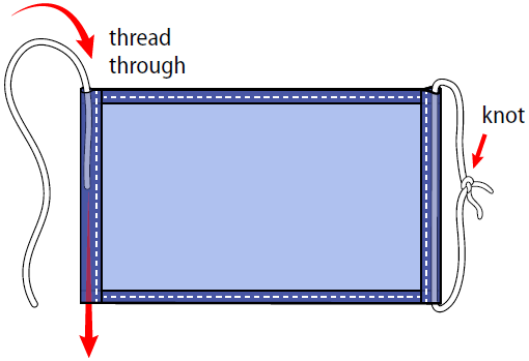
- Not appropriate for use under 2 years of age

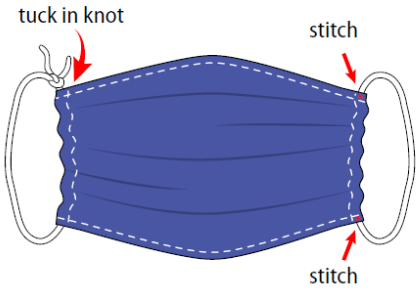
Source: (1) Suggested citation: European Centre for Disease Prevention and Control. Cloth masks and mask sterilisation as options in case of shortage of surgical masks and respirators – 26 March 2020. Stockholm: ECDC; 2020;

Making double layer 100% cotton masks





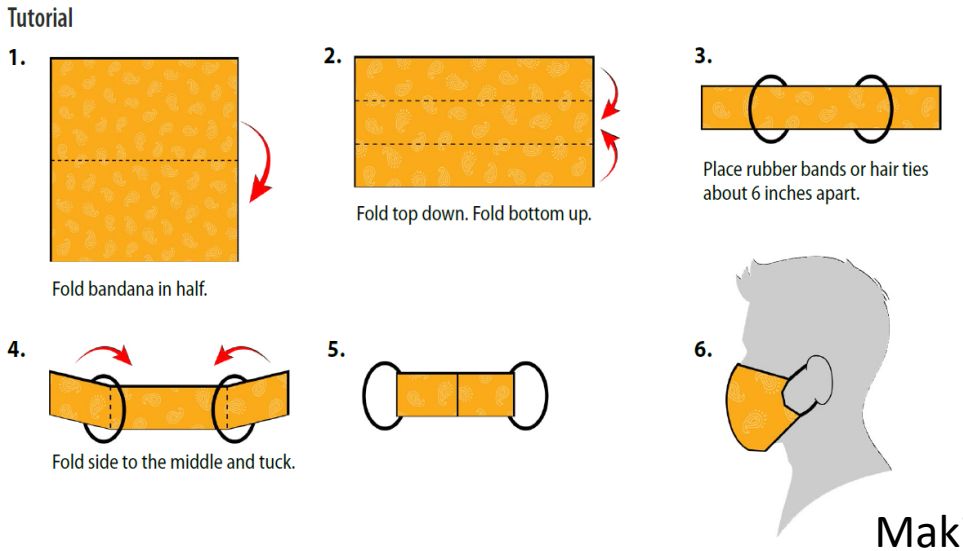




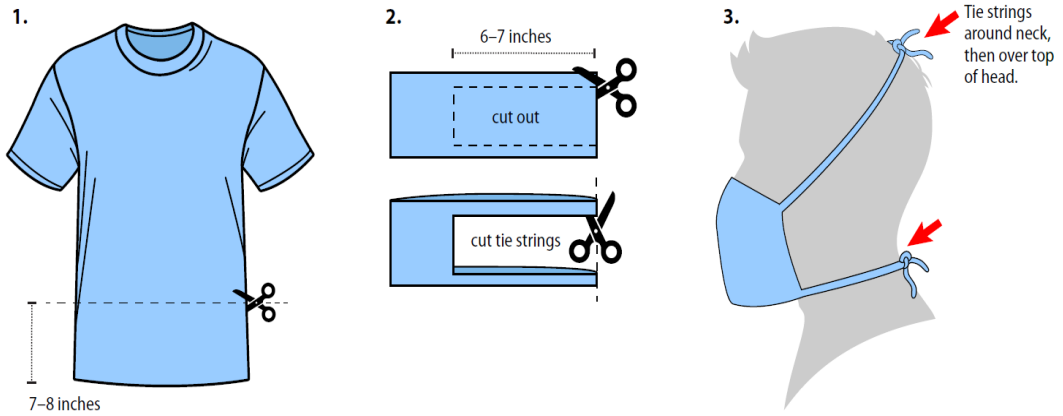
Masks should not tried on for fit and returned and should not be shared. Do not reverse the mask for reuse.

Home made Face mask

Making masks from Bandana (20"X20")



Making masks from T-Shirt



CDC

cdc.gov/coronavirus

ETAT+ Emergency Triage Assessment and Treatment plus admission

MedInfo Every Child Counts

How to remove your gloves. Protect yourselves!!!

1

Grasp the outside of one glove at the wrist. Do not touch your bare skin.

2

Peel the glove away from your body, pulling it inside out.

3

Hold the glove you just removed in your gloved hand.

4

Peel off the second glove by putting your fingers inside the glove at the top of your wrist.

5

Turn the second glove inside out while pulling it away from your body, leaving the first glove inside the second.

6

Dispose of the gloves safely. Do not reuse the gloves.

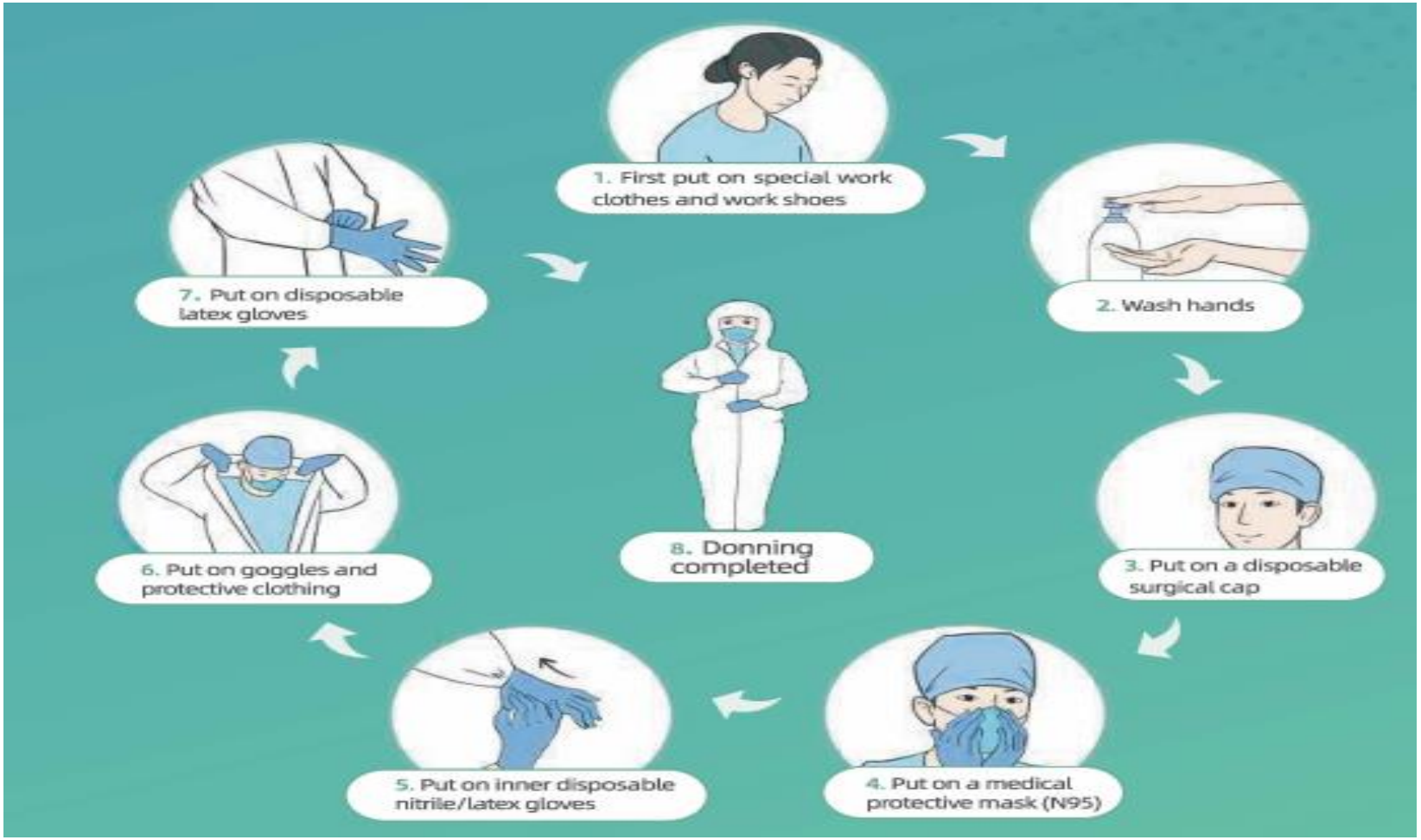
7

Clean your hands immediately after removing gloves.

Do not touch the mask while working.
Use it for 3 to 8 hours as it gets damp.
Dispose off correctly in the red lined bin after use

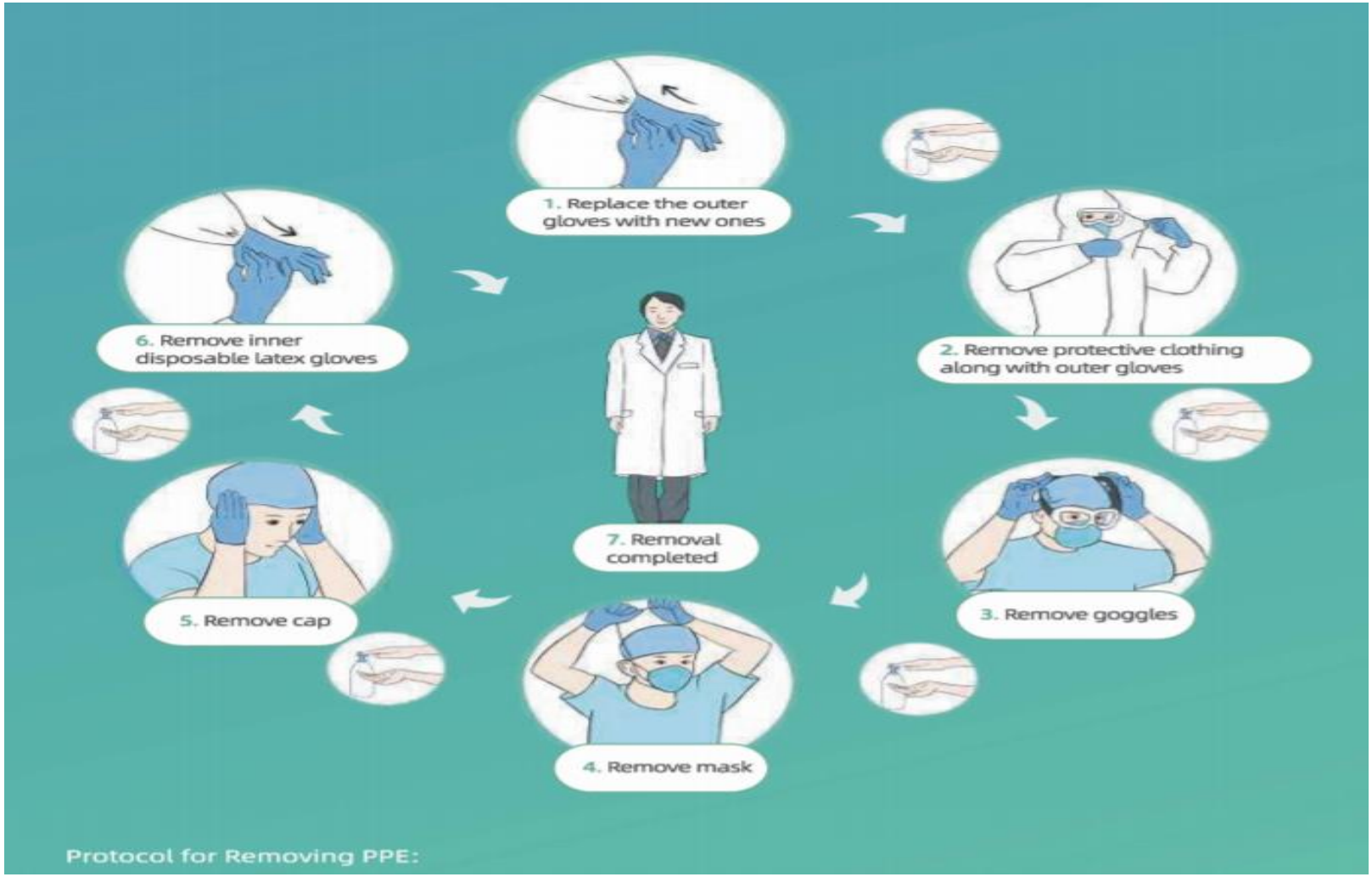
Kalra, A. S. (2020, January 30). How and when to wear a surgical mask during the Wuhan virus outbreak. Retrieved from https://www.humanresourcesonline.net/how-and-when-to-wear-a-surgical-mask-during-the-wuhan-virus-outbreak/
https://www.youtube.com/watch?v=M4olt47pr_o

Donning of PPE



Source: (1) https://www.youtube.com/watch?v=8jX0-cKqnVw;

Doffing procedure



Source: (1) https://www.youtube.com/watch?v=HdT-0Lf2fw

Fever department & isolation ward health workers protection (1/2)

Domain	Minimum requirement
Training	• All staff must be trained diligently on putting on (donning) and removing the personal protective equipment and show competence by passing a practical examination • The skills should be reinforced by regular drills and supervisors delegated to ensure practice is maintained. Long mirrors to be available in the corridors and changing areas
Work organization	• The staff should be divided in teams to work in shifts. Each team should not work for more than 4 hours • Change of shift should apply as 'block' to allow examination and disinfection of each team as a group to reduce frequency of staff moving in and out of isolation room • Before going off duty, staff must wash themselves and conduct necessary personal hygiene • regimens to prevent possible infection of their respiratory tracts and mucosa

Fever department & isolation ward health workers protection (2/2)

Domain	Minimum requirement
Maintain health work force	• All frontline staff shall live in an isolation accommodation and shall not go out without permission • they should be provided with nutritious diet to improve the immunity. • Their health status should be monitored and recorded – body temperature and respiratory symptoms • Proactive expert counselling or when needed to address any psychological and physiological problems • If staff develops symptoms suggestive of COVID19 – immediate isolation and RT-PCR test
End of service in the isolation wards	• Before returning to normal all staff should be tested for SARS-CoV-2. If negative, they shall be isolated collectively at a specified area for 14 days before being discharged from medical observation. • If positive they will be handled similar to the confirmed patients

Multidisciplinary care inside & outside isolation wards

Frontline health workers in fever clinics & isolation wards

- Doctors
- Nurses
- Biomedical technicians/engineers
- Logistic personnel
- Support staff

All require level 3 health worker protection

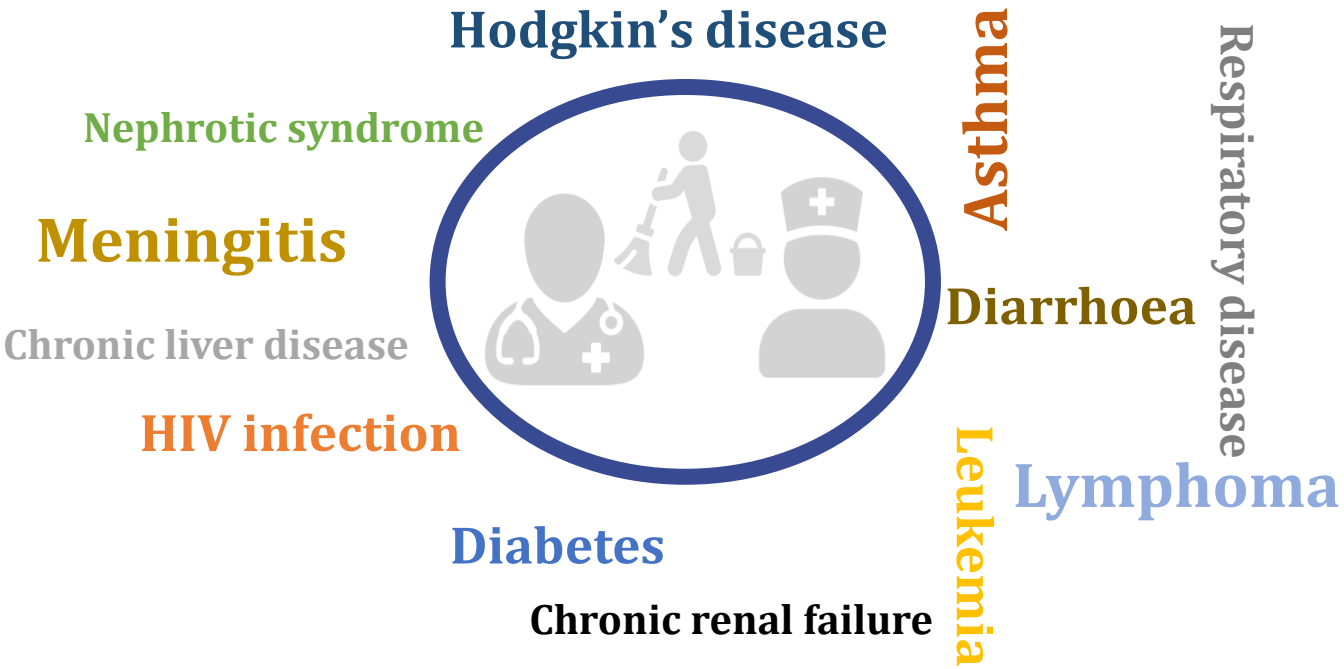
Video conferencing to allow personalized treatment for critically sick patient

Multidisciplinary team outside isolation areas

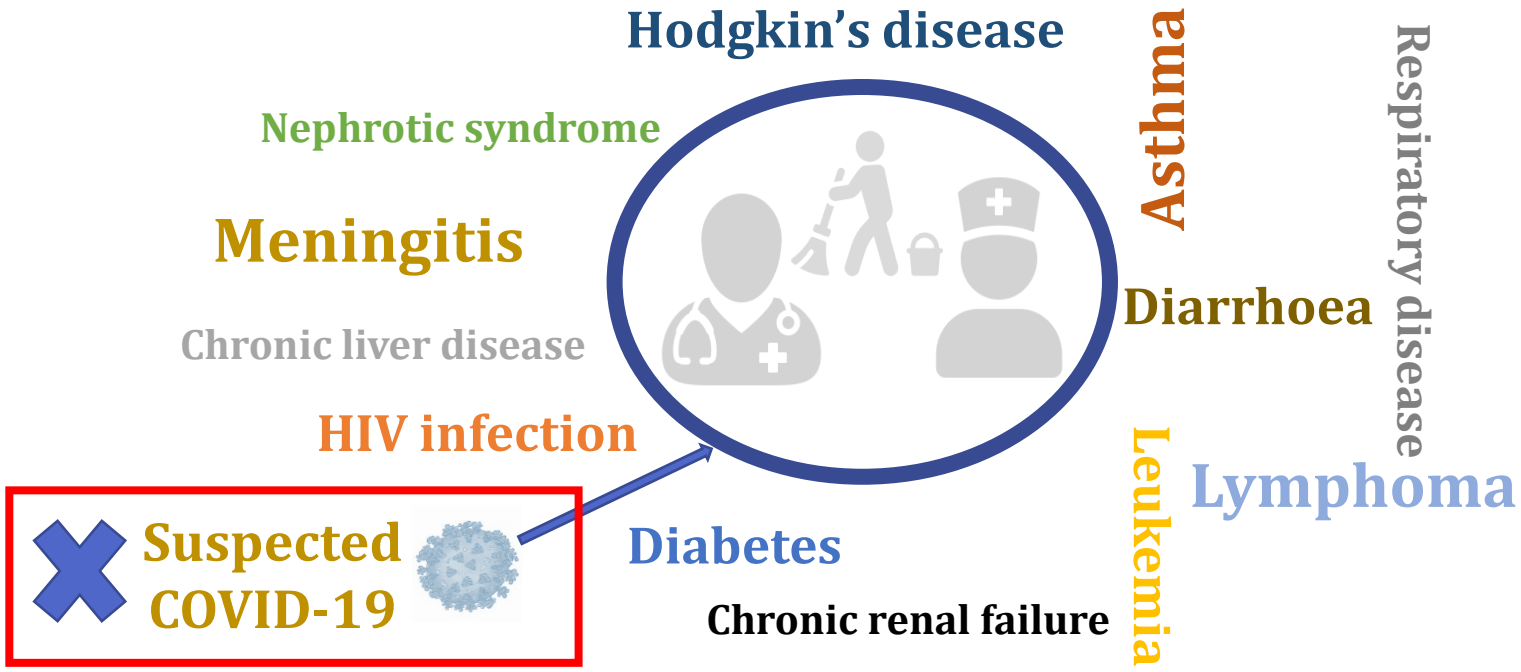
- Infectious disease experts
- Respiratory medicine
- ICU
- Laboratory
- Radiology
- Pharmacy
- Psychology
- Respiratory therapist
- Rehabilitation
- Nutritionist
- Nurses

Experts focus on issues from their specialized fields. Allows for scientific, integrated and customized treatment strategies. Eg when to initiate antivirals, oxygen therapy, and nutritional support

Preventing hospital acquired COVID-19



Risk of weak triage system



DISINFECTING AGENTS

- The viruses and bacteria that cause ARIs are inactivated by a range of disinfectants.
- The commonly used include:

I. Ethyl alcohol (70%) for disinfecting equipment
eg thermometer, oxygen concentrator

II. Household bleach (sodium hypochlorite -0.5%)
for disinfecting surfaces

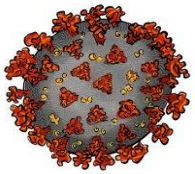
Recommended dilution 1:10 dilution of 5% sodium hypochlorite.
Use 1 part bleach to 9 parts cold tap water (1:10 dilution)
for disinfection of surfaces and will yield 0.5% chlorine

DISINFECTION

- Disinfection by wiping of nonporous surfaces: a contact time of ≥ 10 minutes is recommended.
- Disinfection by immersion of items eg oxygen masks, nasal prongs: a contact time of 30 minutes is recommended.
- Protective equipment must be worn while cleaning any equipment or linen including:
  - a mask,
  - goggles for eye protection,
  - a fluid-resistant apron, heavy duty gloves & boots/closed shoes.

Organic materials, such as secretions**, mucus, vomit, faeces, blood or other body fluids** must be cleaned before disinfection or immersion in sodium hypochlorite as the organic substances **deactivates** the chlorine

Contact tracing
Stop spread of corona virus!



1 **Case identified** – list made for all who have interacted with the case in the last 2 weeks. Attention to HCWs

2 **Contact Tracing** –all listed are contacted by MoH or County designated people
(they introduce themselves, verify name & details).

3 **Management of contact – Assess:**
?? Well contact
?? Unwell contact

Definition of contacts of COVID-19

A contact is a person (including caregivers and HCWs) who is exposed to individuals with a probable or confirmed COVID-19 disease from 2 days before and up to 14 days after onset of symptoms in the patient

1. Face to face meeting with probable or confirmed case where social distance of **1 meter** is not adhered to & for **>15 min**
2. Direct physical contact with a probable or confirmed case e.g handshaking
3. Direct care for a patient with probable or confirmed COVID-19 disease without proper protective equipment for the level of care
4. Staying in the same close environment with a probable or confirmed case (workplace, classroom, household, gatherings) for any amount of time
5. Travelling in close proximity, within 1 m separation, with a COVID-19 patient in any kind of conveyance (cars, airplane, cruise ship)

For confirmed COVID-19 the period of contact is measured as the 2 days before through the 14 days after the date on which the sample was taken which led to confirmation

Definition of contacts of COVID-19: Health worker without appropriate PPE

6 Direct contact with the body fluids or the laboratory specimens of a case without appropriate PPE

7 Presence in the same room in a health care setting when an aerosol-generating procedure is undertaken on a case

Aerosolizing procedures

Mechanical ventilation

Nebulization

Bronchoscopy

suctioning

Cardiopulmonary resuscitation

Chest physiotherapy

Contact identification and listing

Contact listing form

2019-nCoV CONTACT LISTING FORM

Case Information

Outbreak Case ID	Surname	Other Names	Head of Household	Address	Town	Sub-County	Date of Symptom Onset	Location Case Identified

Contact Information

Surname	Other Names	Sex (M/F)	Age (yrs)	Relation to Case	Date of Last Contact with Case	Type of Contact (1,2,3,4)* list all	Head of Household	Address	Town	Sub county	Phone Number	Healthcare Worker (Y/N) *If yes,* what facility?

Ministry of Health Kenya. 2020 COVID-19 data tools

Contact follow up

Ministry of Health
Division of Disease Surveillance and Response

2019-nCoV Contact Tracing and Follow-up Form

(To be filled by a health worker, community health worker or a volunteer)

Name of person conducting tracing/follow-up..... **Address** .....

County..... **Sub-county**.....

CN	Family Name	First name	Age	Sex	Date of last contact	Day of follow-up													
						1	2	3	4	5	6	7	8	9	10	11	12	13	14

Ministry of Health Kenya. 2020 COVID-19 data tools .

Contact tracing data

- Data is used to inform response.
- Gain understanding of transmission and attack rates
- Documenting settings where transmission takes place
- Understanding the effectiveness of different mitigation measures such as physical distancing.

European centre of disease prevention and control, Contact tracing: Public health management of persons, including healthcare workers, having had contact with COVID-19 cases in the European Union – first update March 31st 2020.

Quarantine vs isolation

Quarantine		Isolation
• Is the restriction of activities of or the separation of persons who are not ill but who may been exposed to an infectious agent or disease, with the objective of monitoring their symptoms and ensuring the early detection of cases	VS	• Keeps infected away from the healthy people to prevent the spread of infection or contamination Mostly in health facility/ designated isolation units.

Both quarantine and isolation serve the same purpose of stopping the COVID-19 spread

Quarantine

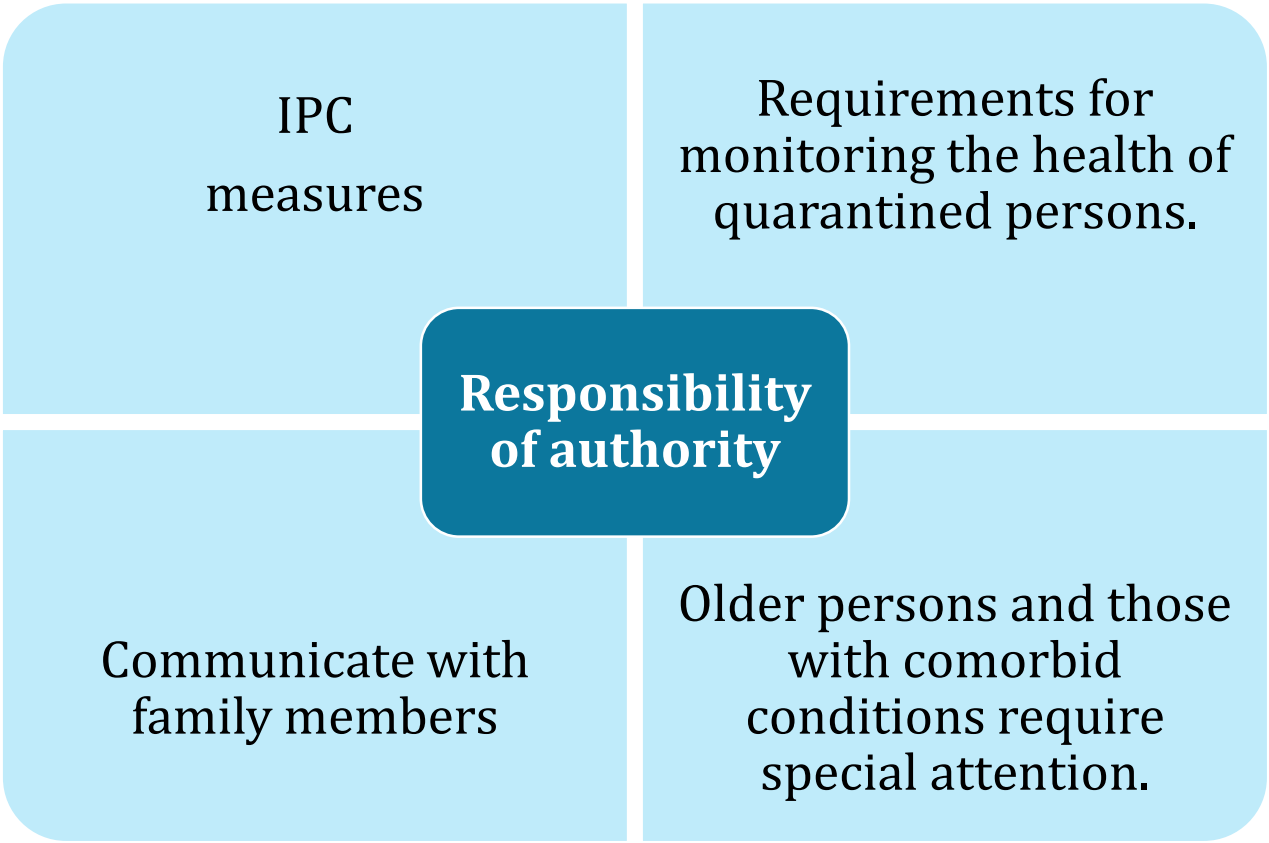
Introducing quarantine measures early in an outbreak may:

- Delay the introduction of the disease in an area/ country
- Delay the peak of an epidemic in an area where local transmission is ongoing

WHO recommends that contacts of patients with laboratory-confirmed COVID-19 be quarantined for 14 days from the last time they were exposed to the patient

If not implemented properly, may create additional sources of contamination and dissemination of SARS-CoV-2

Quarantine contact



Source: (1) Considerations for quarantine of individuals in the context of containment for coronavirus disease-who;

Implementing quarantine

Setting IPC measures

- Adequately ventilated single rooms with hand hygiene and toilet facilities. If no single rooms beds to be separated by 1meter apart
- If home care and spaces have to be shared, ensure that shared spaces, such as, the kitchen and bathroom are well ventilated

Basic needs and communication with family

- Adequate food, water, and hygiene provisions
- If possible, provide access to the internet, news, & entertainment
- Psychosocial support must be available.
- Facilitate communication with family members

Early detection of infection & preventing of spread

- Monitor the health fever & respiratory symptoms
- Hand hygiene and cough etiquette

Comorbidities

- Older persons & those with comorbid conditions require special attention.
- Appropriate medical attention for existing medical conditions

Management of well contact

Daily

- Hand Hygiene, cough etiquette, physical distancing
- Monitor body temperature and respiratory symptoms
- Medical Mask is **not** required if NO symptoms
- Groups of persons at higher risk of infection and severe disease may require additional surveillance

At end of Quarantine

- Respiratory samples for testing **(irrespective of whether they have symptoms)**

Management of unwell contact

All contacts on quarantine monitor for fever, respiratory symptoms (pneumonia)

If symptoms develop:

- Notify the receiving medical facility
- During travel wear a surgical mask
- Avoid public transport- Private means (open windows) /ambulance
- Respiratory hygiene
- Hand hygiene
- Maintain distance at least 1 metre
- Soiled / contact surfaces should be cleaned appropriately

Source: (1) Home care for patients with COVID-19 presenting with mild symptoms and management of their contacts- WHO;

Summary

5 key message to the 'Kick out coronavirus'

Handwashing.
Coughing etiquette.
Not touching your face.
Physical distance.
Stay home if you are unwell

Stop spread – protect all persons :
Early identification and appropriate management of contact, suspected case and confirmed cases

- Quarantine
- Isolation
- Identification of COVID-19 patients at high risk of deterioration- elderly and those with comorbidities

Protect the health workers and caregivers

- Early identification of all infected
- Provision and correct use of personal protective equipment
- Support of health workers in the fever clinics and isolation wards.