A large, detailed 3D model of a coronavirus particle is positioned on the left side of the slide. The particle has a spherical shape with a textured surface. It is primarily red, with a greyish-blue core and numerous small, orange-yellow protrusions representing the viral surface proteins. A horizontal band of colorful, pixelated noise is visible across the middle of the particle.

# COVID-19 Infection Prevention and Control webinar and Community of Practice

## INTRODUCTION

Infection Control African Network

# Training overview

- **Week 1:** Assessing IPC preparedness and overview
- **Week 2:** Triage and patient flow:
- **Week 3:** Personal Protective Equipment for COVID
- **Week 4:** Transmission based precaution Isolation and Cohorting
- **Week 5:** Environmental Hygiene
- **Week 6:** Infection Control Measures in the community

# Week 1: IPC preparedness:

## Objectives

- Describe the epidemiology of COVID-19
- Relate the breaking of the chain of infection to IPC strategies for COVID- 19.
- Preparing your country /healthcare Facility for COVID -19
- Convening an IPC team to respond to COVID-19

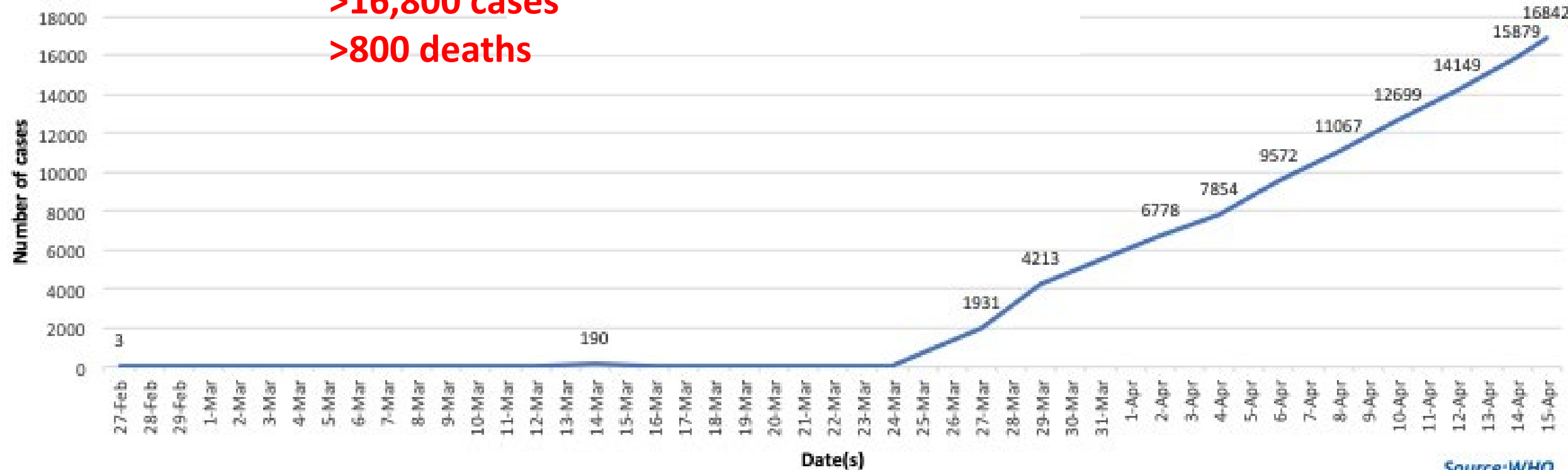


# Epidemic is moving Fast

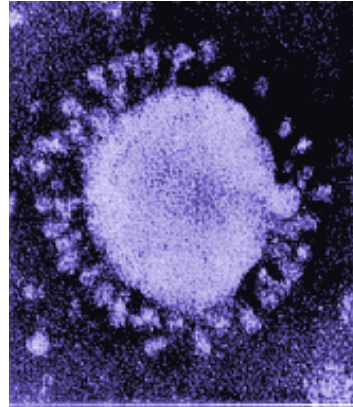
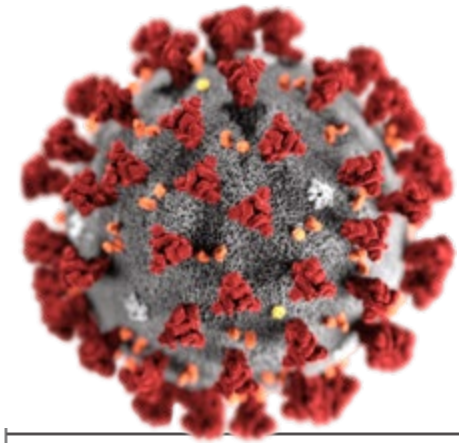
- December 31, 2019 • WHO alerted about a cluster of pneumonia cases of unknown aetiology in Wuhan City, China
- January 9, 2020 • Chinese CDC identified a novel Corona Virus from respiratory secretions of patients
- January 30, 2020 • WHO declares Public Health Emergency of International Concern
- February 11, 2020 • Disease named **COVID-19**.
- February 14, 2020 • Africa records first case of COVID 19 in Egypt named **SARS-2-CoV**
- March 11, 2020 • **COVID-19 declared a Pandemic**
- April 16, 2020 • 2,083,607 cases, 134, 632 dead 510,666 -recovered

## Trends of confirmed COVID-19 cases in Africa as at 15th April 2020

>16,800 cases  
>800 deaths

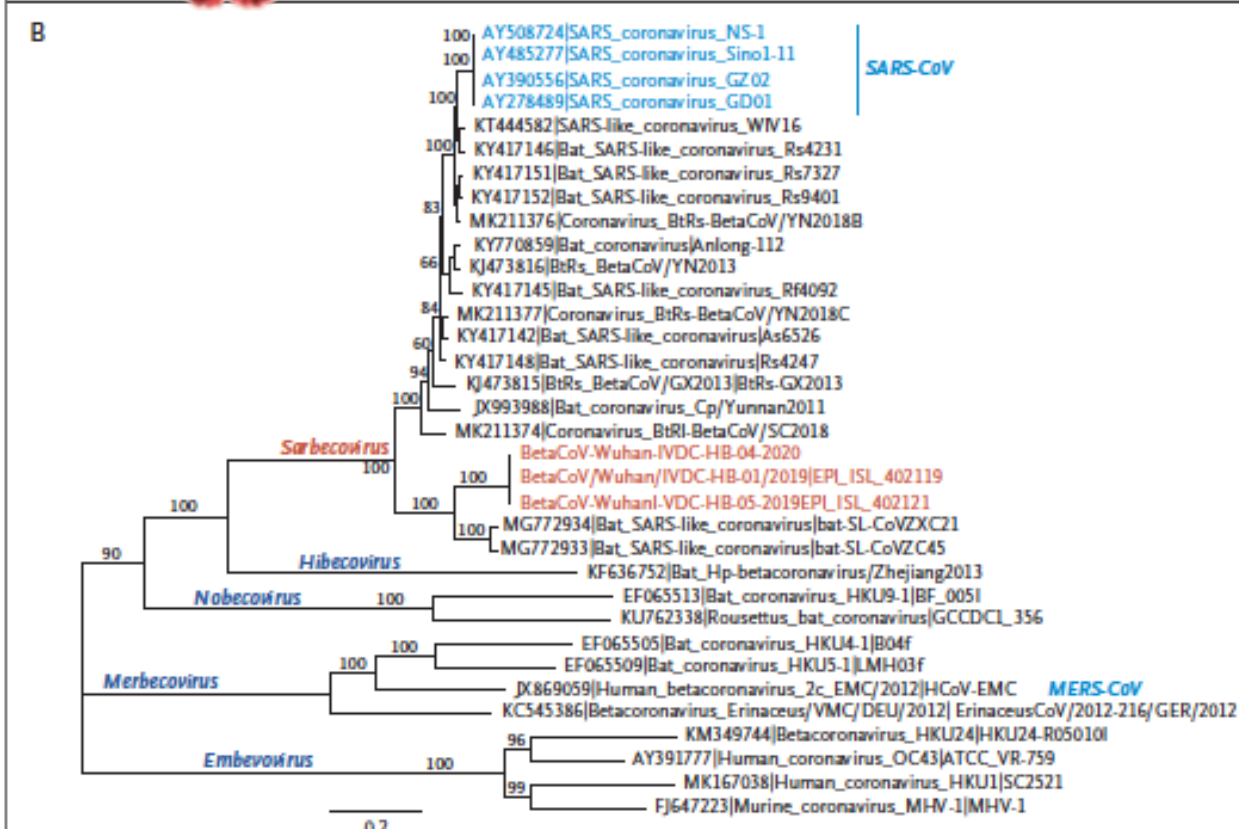


Source: WHO

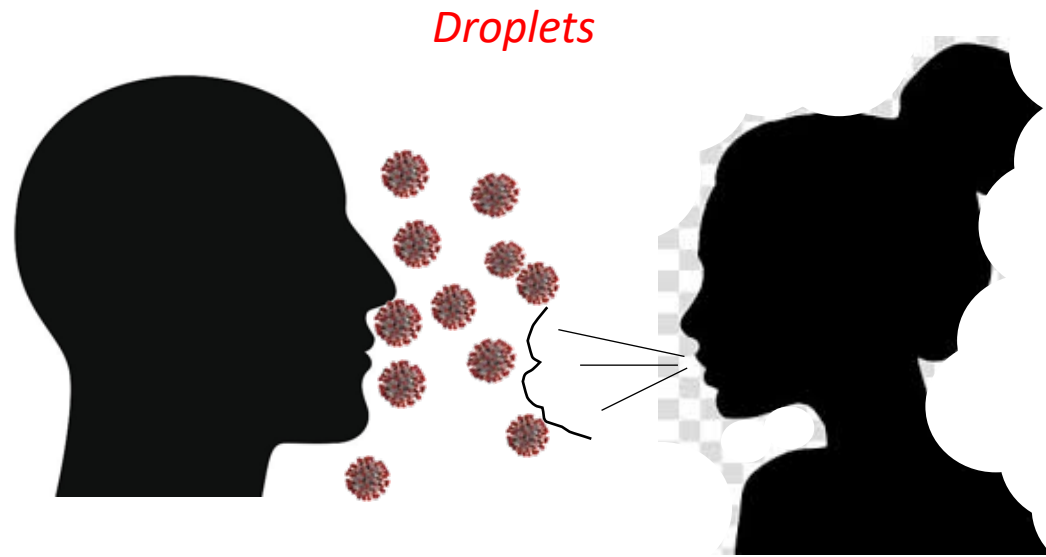


# SARS Co-V2

- Derives name from outer envelope with distinctive, 'club-shaped' spikes
- A novel beta-coronavirus -not previously present in human populations.
- Similar to other corona viruses in bats.
- Different from SARS-CoV and MERS-CoV
- Exact origin not yet known – possibly a bat



# Transmission



*Hands contaminated with droplets and transferred to face*



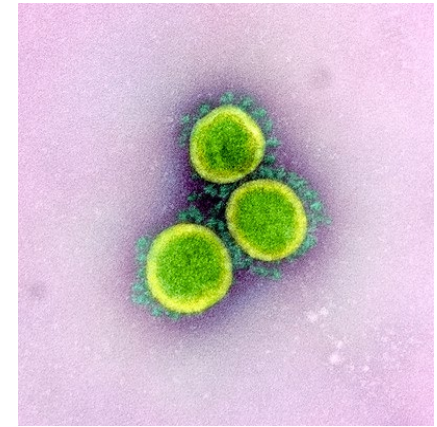
Human to human transfer occurs from

- Inhalation of droplets expelled from infected persons respiratory tract through coughing, sneezing in close proximity
- Contact with patient respiratory secretions
  - Via hands through contact with surfaces contaminated with patient respiratory secretions
- Incubation period: Estimated 1- 12.5 days median 5-6 days
- Most infections occur through symptomatic patients

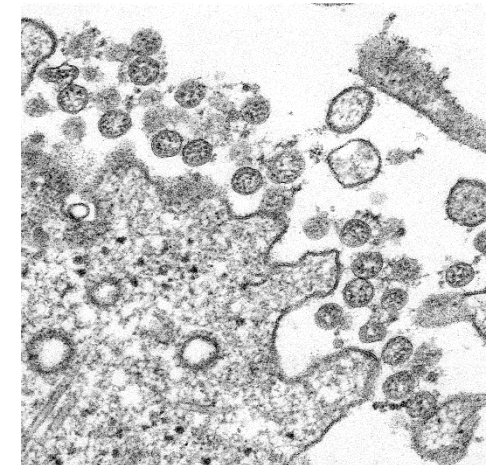


# How long does an infected person continue to shed SARS-CoV-2 ?

- Highest shedding early in the course of disease
- Virus can be detected in the 24-48 hours prior to disease onset in throat samples
- Peak viral loads occur within first 5 days and shedding may continue for 7-12 days in mild/moderate cases, and for > 2 weeks in severe cases. Up to 20 days post symptoms in some.



Credit NIAID-RML



WHO 2020 <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>.

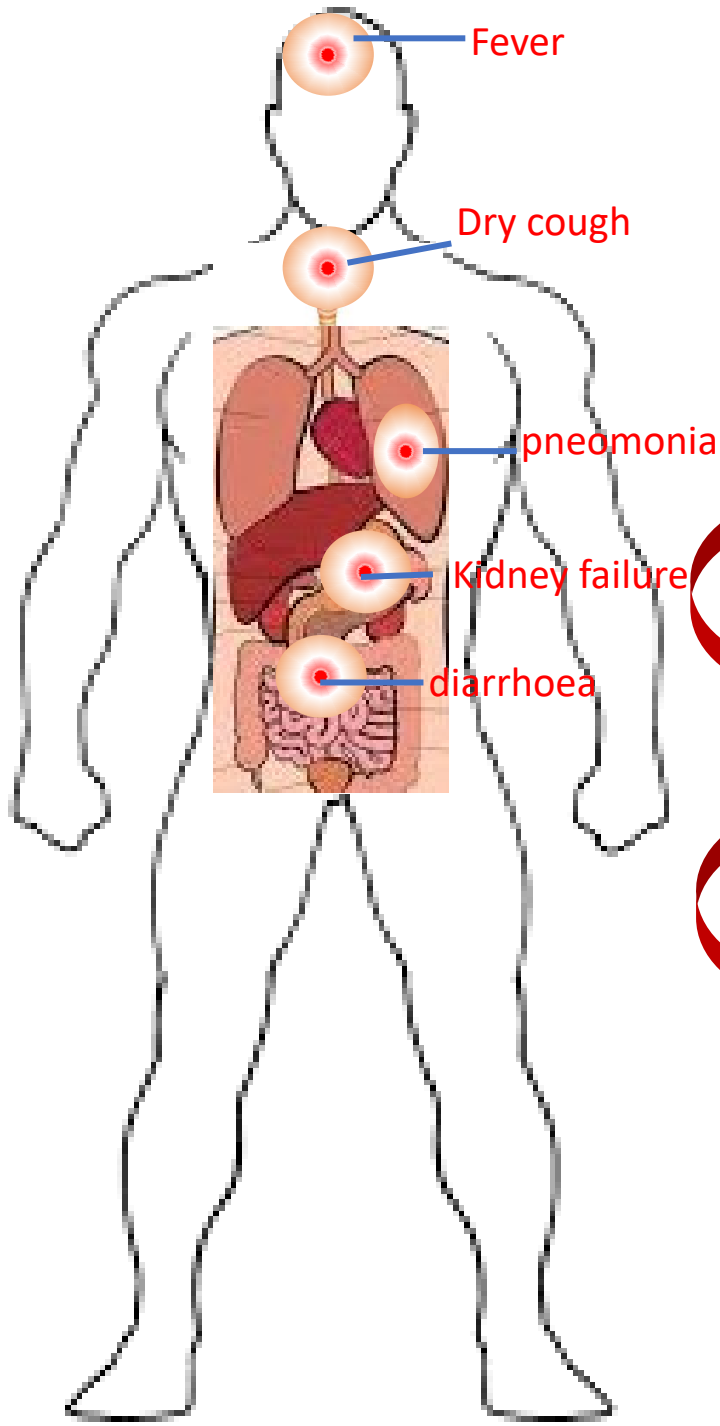


# R<sub>0</sub> For Various Infectious Diseases

Disease	Transmission	R <sub>0</sub>
Measles	Airborne	12-18
Diphtheria	Saliva	6-7
Smallpox	Airborne droplet	5-7
Polio	Fecal-oral route	5-7
Rubella	Airborne droplet	5-7
Mumps	Airborne droplet	4-7
HIV/AIDS	Sexual contact	2-5
Pertussis	Airborne droplet	5.5 <sup>[2]</sup>
SARS	Airborne droplet	2-5 <sup>[3]</sup>
Influenza (1918 pandemic strain)	Airborne droplet	2-3 <sup>[4]</sup>
Ebola (2014 Ebola outbreak)	Bodily fluids	1.5-2.5 <sup>[5]</sup>

- R<sub>0</sub> for Covid-19 = 2-3

# Clinical signs and symptoms



Early/mild disease

Fever  $>38^{\circ}\text{C}$  and headache, Dry cough

General malaise, fatigue, shortness of breath,  
Diarrhoea, nausea & vomiting

Severe acute respiratory syndrome/ pneumonia /  
Bronchitis /kidney failure/Death

Severe disease may require hospitalisation

Most infections do not require hospitalisation

# Suspect case (Symptom +Exposure)

- **A.** A patient with acute respiratory illness (fever and at least one sign/symptom of respiratory disease, e.g., cough, shortness of breath), **AND** A history of travel to or residence in a location reporting community transmission of COVID-19 disease during the 14 days prior to symptom onset;
- **B.** A patient with 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;
- **C.** A patient with severe acute respiratory illness (fever and at least one sign/symptom of respiratory disease, e.g., cough, shortness of breath; **AND** requiring hospitalization) **AND** in the absence of an alternative diagnosis that fully explains the clinical presentation.

# Who is vulnerable?

- Everyone can be infected and TRANSMIT to Others
- But severe disease appears to affect the
  - Elderly
  - People with underlying disease such as Diabetes mellitus, Asthma
  - People with prior disease
- Most deaths have been in the old and people with underlying disease
- In Africa so far pattern seems the same



# Laboratory Testing

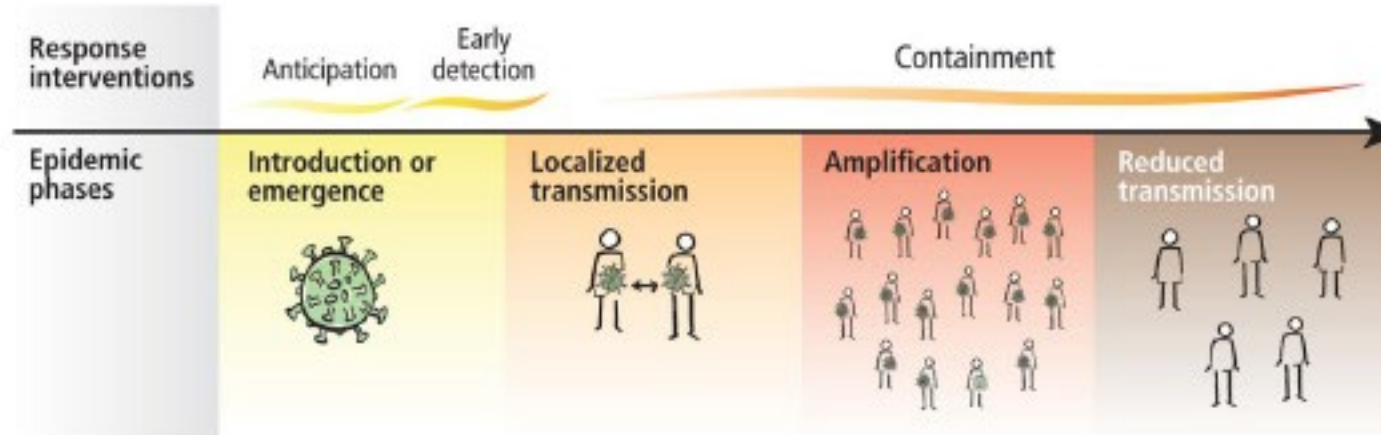
- No commercially available antibody test yet
- Nasopharyngeal swabs, Sputum.
- Can be identified by real-time PCR
- The genome sequence is available on the World Health Organization website for reference.
- Infectious Viral particles not detected in **Urine blood and stool**
- Viral RNA detected in stool



# How can it be treated?

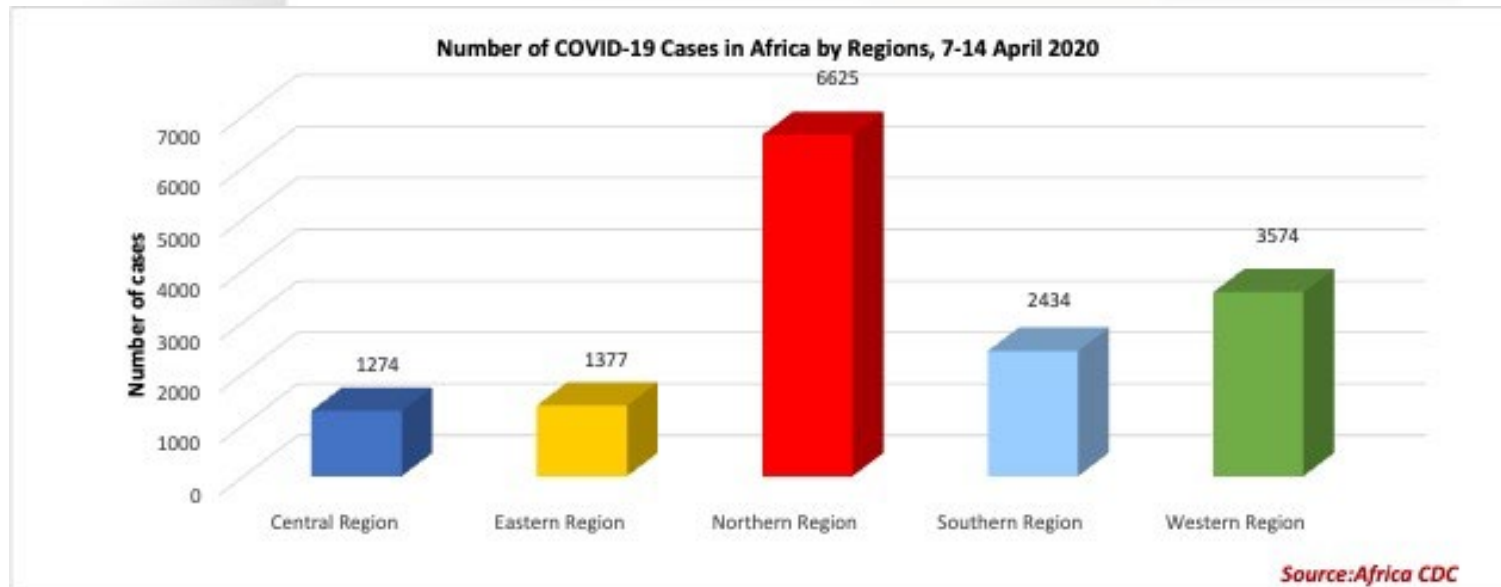
- There is still no treatment: Clinical trials ongoing ,  
Hydroxychloroquine,
- No vaccine exist
- Treatment is by supportive therapy and related to patients symptoms
- Infection prevention and Control to limit exposures is a key strategy in containing this disease.

# Countries are at different stages of the epidemic



Number of cases per country

0 – >2000 cases







# Principles of Emergency Management

Evaluate prevention, mitigation preparedness and response efforts; facilities seek to return to “normal” or Build Back Better (BBB)

Prevention and Mitigation

Strategies that can help a facility prevent and reduce the impact of an emergency (e.g., providing the staff vaccination against diseases)

Recovery

Preparedness and Readiness

Actions that take place before an emergency

Activities in reaction to a known or suspected event

Response

# Infection prevention and control during health care when COVID-19 is suspected

Interim guidance  
19 March 2020



## Background

This is the first edition of guidance on infection prevention and control (IPC) strategies for use when COVID-19 is suspected. It has been adapted from WHO's Infection prevention and control during health care for probable or confirmed cases of Middle East respiratory syndrome coronavirus (MERS-CoV) infection,<sup>1</sup> based on current knowledge of the situation and experience with severe acute respiratory syndrome (SARS) and MERS.<sup>2</sup>

WHO will update these recommendations as new information becomes available.

This guidance is intended for health care workers (HCWs), health care managers, and IPC teams at the facility level but it is also relevant for national and district/provincial levels. Full guidelines are available from WHO.<sup>3</sup>

## Principles of IPC strategies associated with health care for suspected COVID-19.

To achieve the highest level of effectiveness in the response to the COVID-19 outbreak using the strategies and practices recommended in this document, an IPC programme with a dedicated and trained team or at least an IPC focal point should be in place and supported by the national and facility senior management.<sup>4</sup> In countries where IPC is limited or inexistent, it is critical to start by ensuring that at least minimum requirements for IPC are in place as soon as possible, both at the national and facility level, and to gradually progress to the full achievement of all requirements of the IPC core components according to local priorities.<sup>4</sup>

IPC strategies to prevent or limit transmission in health care settings include the following:

1. ensuring triage, early recognition, and source control (isolating patients with suspected COVID-19);
2. applying standard precautions for all patients;
3. implementing empiric additional precautions (droplet and contact and, whenever applicable, airborne precautions) for suspected cases of COVID-19;
4. implementing administrative controls;
5. using environmental and engineering controls.

### 1. Ensuring triage, early recognition, and source control.

Clinical triage includes a system for assessing all patients at admission, allowing for early recognition of possible COVID-19 and immediate isolation of patients with suspected disease in an area separate from other patients (source control). To facilitate the early identification of cases of suspected COVID-19, health care facilities should:

- encourage HCWs to have a high level of clinical suspicion;
- establish a well-equipped triage station at the entrance to the facility, supported by trained staff;
- institute the use of screening questionnaires according to the updated case definition. Please refer to the [Global Surveillance for human infection with coronavirus disease \(COVID-19\)](#) for case definitions, and
- post signs in public areas reminding symptomatic patients to alert HCWs.

Hand hygiene and respiratory hygiene are essential preventive measures.

### 2. Applying standard precautions for all patients

Standard precautions include hand and respiratory hygiene, the use of appropriate personal protective equipment (PPE) according to a risk assessment, injection safety practices, safe waste management, proper linens, environmental cleaning, and sterilization of patient-care equipment.

Ensure that the following respiratory hygiene measures are used:

- ensure that all patients cover their nose and mouth with a tissue or elbow when coughing or sneezing;
- offer a medical mask to patients with suspected COVID-19 while they are in waiting/public areas or in cohorting rooms;
- perform hand hygiene after contact with respiratory secretions.

HCWs should apply WHO's My 5 Moments for Hand Hygiene approach before touching a patient, before any clean or aseptic procedure is performed, after exposure to body fluid, after touching a patient, and after touching a patient's surroundings.<sup>5</sup>

- hand hygiene includes either cleansing hands with an alcohol-based hand rub or with soap and water;
- alcohol-based hand rubs are preferred if hands are not visibly soiled;

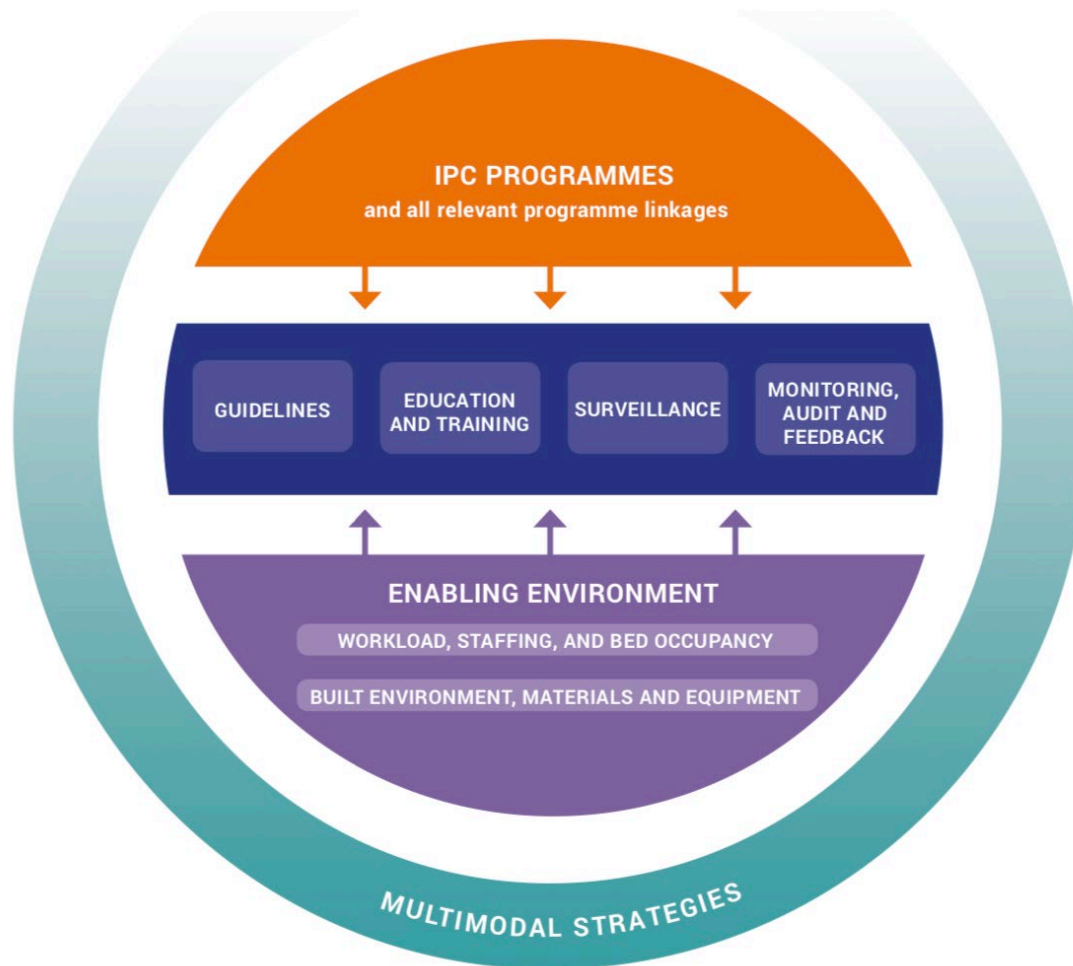


- To achieve the highest level of effectiveness in the response to the COVID-19 outbreak.....

1. A IPC programme with a dedicated and trained team or at least an IPC focal point
2. Should be supported by the national and facility senior management.
3. In countries where IPC is limited or inexistent, start by ensuring that at least minimum requirements for IPC are in place as soon as possible, both at the national and facility level,
4. Work to achievement requirements of the IPC core components according to local priorities.

<https://www.who.int/emergencies/diseases/novel-coronavirus-2019>

# Core components for effective IPC programmes in

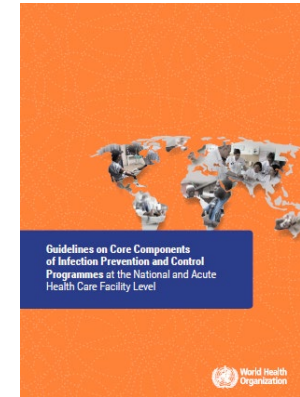


- Effective IPC programmes must be based on the implementation of all Core Components

# Any IPC Practices to prevent SARS-CoV-2 transmission in health facilities should be embedded in the facility IPC programme

## Components of an IPC programme:

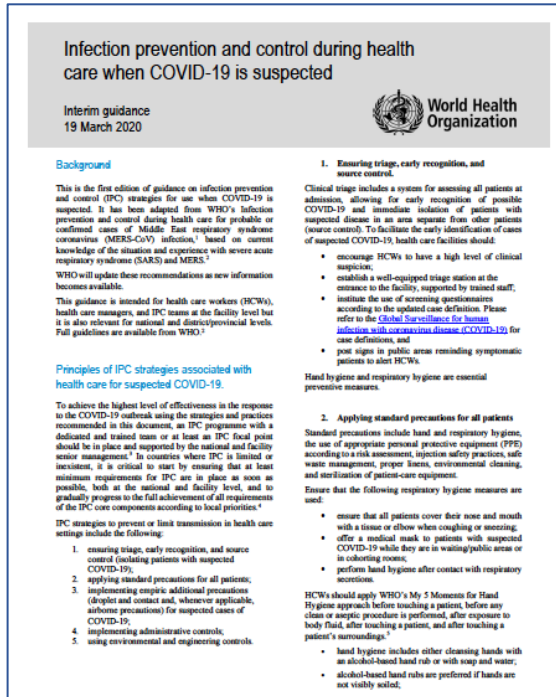
- A focal IPC focal person \*
- Infection control Committee/Team
- Infection Control Guidelines + SOPs: \*
- Standard Precautions \*
- Transmission based precautions \*
- System of Monitoring of IPC practice -  
Includes risk assessment \*
- Surveillance of HAIs and Multi-drug resistant organisms \*
- Training \*





# Strategies for effective IPC IN COVID-19

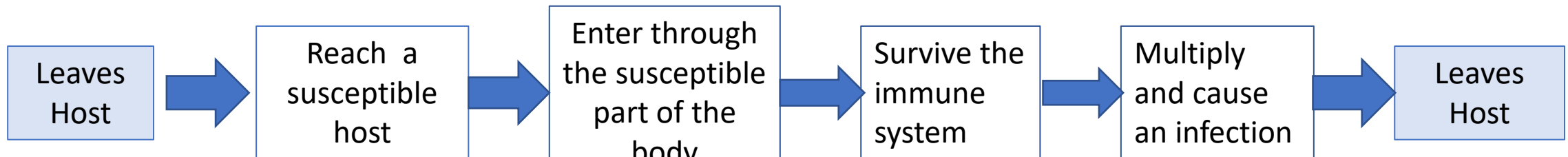
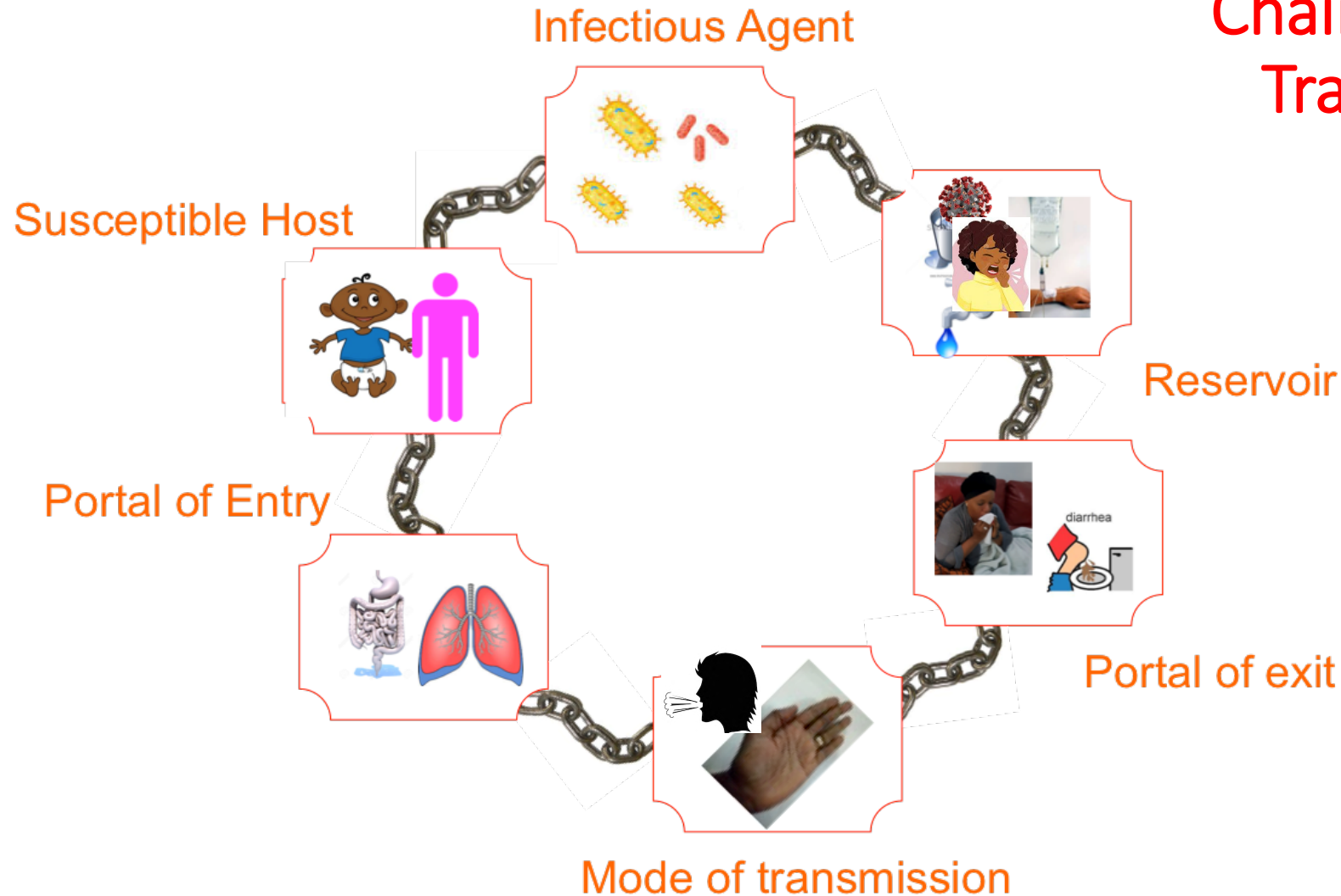
1. Ensuring triage, early recognition, and source control (isolating patients with suspected COVID-19);
2. Applying standard precautions for all patients;
3. Implementing empiric additional precautions (droplet and contact and, whenever applicable, airborne precautions) for suspected cases of COVID-19;
4. Implementing administrative controls; - Policies, Guidance work schedules etc
5. Using environmental and engineering controls -



All these strategies are based on Breaking the chain of transmission



# Chain of Disease Transmission



# Principles of disease transmission: Spread



## Direct contact

- Touching an ill person or a contaminated surface
- E.g. agents of diarrhoea, skin infections, common cold, ebola virus

## Control

- Gloves, +/- gowns, masks, visors (to prevent mucous membrane splashes, contamination of clothing)



## Droplet transmission

- Inhaling droplets (up to 1/4mm in diameter)
- Persons within 2m radius are at risk. On aircraft, 2 rows behind and in front
- E.g. agents of bacterial pneumonia, Neisseria meningitidis

## Control

- Gloves, surgical masks, +/- gowns, masks, visors (to prevent mucous membrane splashes, contamination of clothing)

## Airborne transmission

- Inhaling droplets nuclei (10-20um in diameter)
- Persons breathing the same air
- E.g. influenza, measles, chickenpox,

## Control

- Gloves, N95 masks, +/- gowns, masks, visors (to prevent mucous membrane splashes, contamination of clothing)



## Vector transmission

- Contact with vector
- E.g. malaria, dengue, Zika,

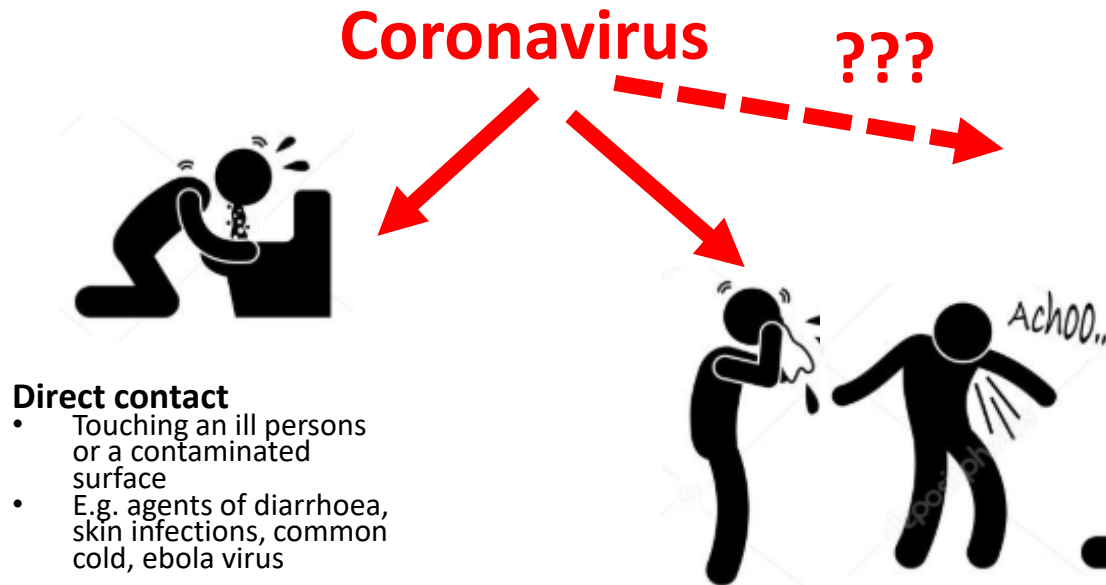
## Control

- Prevent/eliminate exposure to vector
- Chemoprophylaxis if possible





# Principles of disease transmission



## Direct contact

- Touching an ill persons or a contaminated surface
- E.g. agents of diarrhoea, skin infections, common cold, ebola virus

## Control

- Gloves, +/- gowns, masks, visors (to prevent mucous membrane splashes, contamination of clothing)

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- Persons breathing the same air
- E.g. influenza, measles, chickenpox,

## Control

- Gloves, N95 masks, +/- gowns, masks, visors (to prevent mucous membrane splashes, contamination of clothing)

## Aerosol generating procedures

## Vector transmission

- Contact with vector
- E.g. malaria, dengue, Zika,

## Control

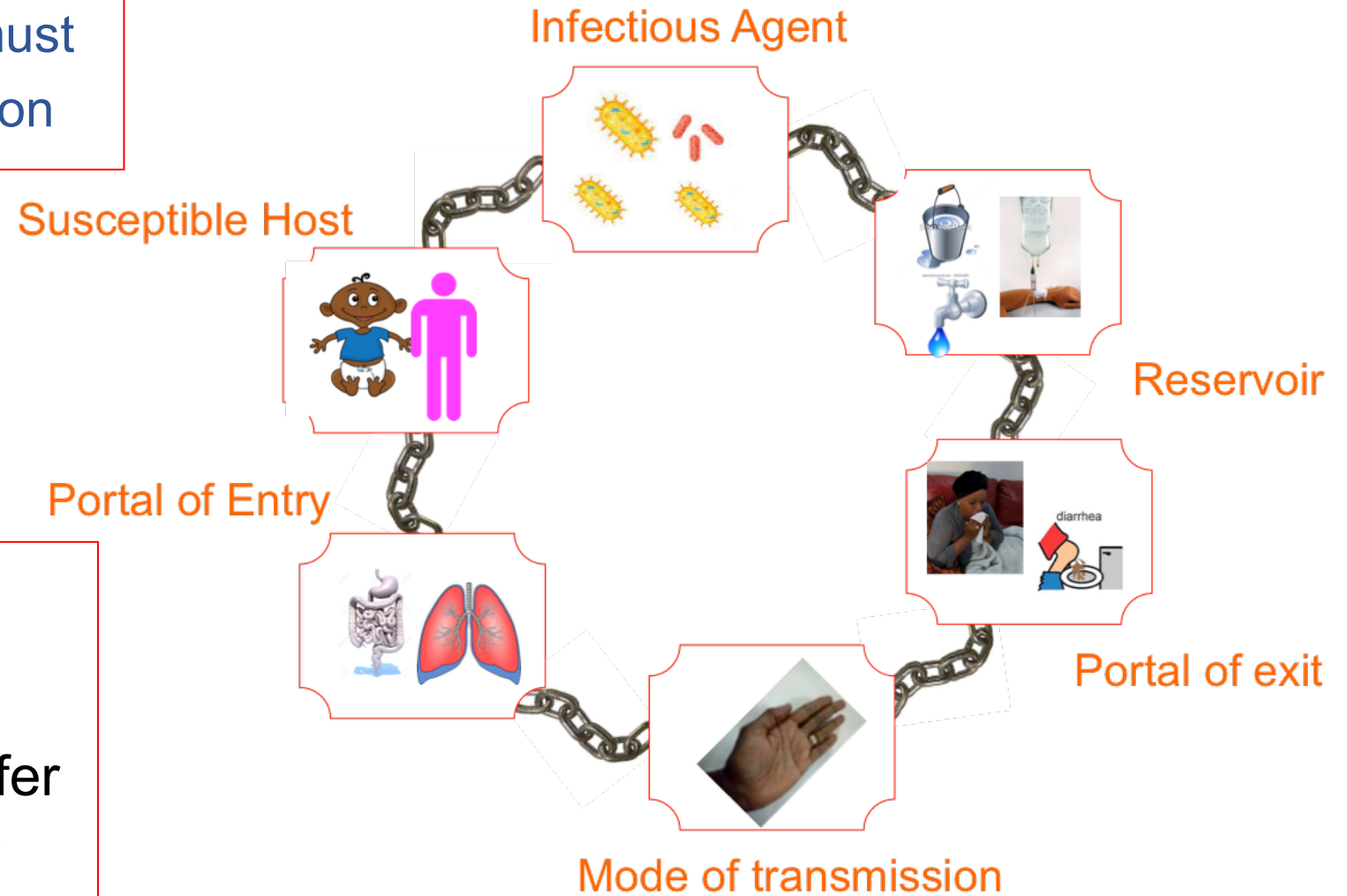
- Prevent/eliminate exposure to vector
- Chemoprophylaxis if possible



# Breaking the chain of transmission

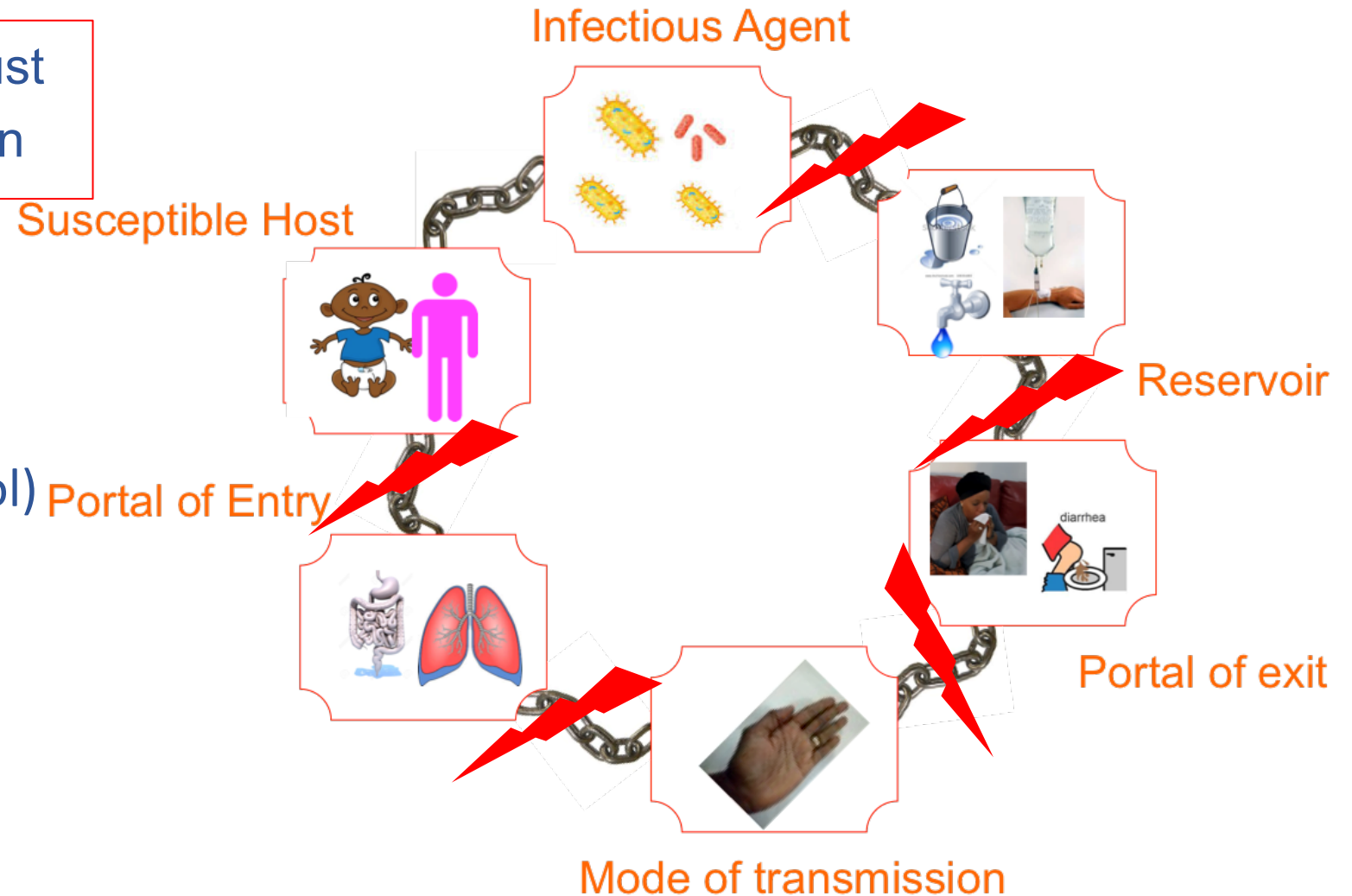
To control Any Infection we must break the chain of transmission

- Remove the reservoir/organism **source control**
- Interrupt the mode of transfer
- Prevent acquisition by new host



# Breaking the chain of COVID 19 transmission

To control Any Infection we must break the chain of transmission



- Screen Isolation, Notify (Triage , early recognition, Source Control)
- Standard Precautions
- Droplet Contact Precautions
- Airborne for AGP
- Administrative controls
- Engineering and environmental controls

# Infection Prevention and Control

- Infection control is therefore about
  - Eliminating,
  - Minimizing or
  - Preventing

**The risk** of acquiring infection during the provision of Healthcare services

# IPC strategies to Break Chain of Infection

## Source Control

- Eliminate the reservoir
- Isolation of infected patient
- Treatment of Infected patients
- Waste management
- Cleaning
- PPE

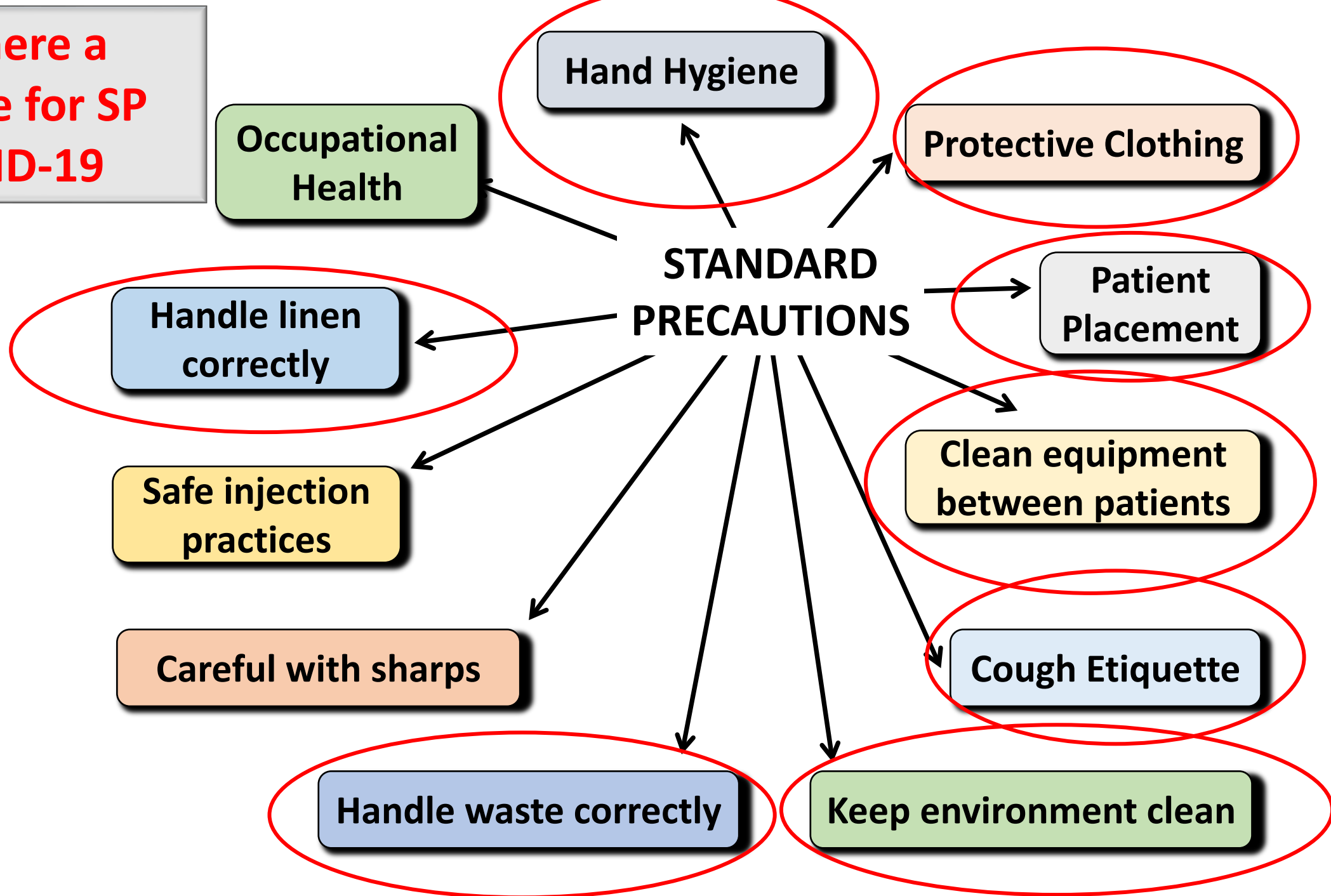
## Interrupt the mode of transfer

- Wash hands
- Cleaning  
Disinfection and sterilisation
- Cough etiquette
- WASH
- PPE

## Protect susceptible host

- Isolation
- Prophylaxis
- Vaccination
- PPE

Is there a  
place for SP  
COVID-19



# Standard Recommendations for prevention

- Regular hand washing,
- Covering mouth and nose when coughing and sneezing,
- Avoid close contact with anyone showing symptoms of respiratory illness such as coughing and sneezing.





# Common infections that would indicate transmission-based precautions

- **Contact**: Multi-drug resistant pathogens such as *Staph aureus* (including MRSA), Enterococcus (VRE), and *E. coli*; diarrhea from suspected *Clostridium difficile*, norovirus
- **Droplet**: Pertussis; meningococcus; seasonal, pandemic, and Avian influenza; Group A Streptococcus (1<sup>st</sup> 12 hours after prescription); adenovirus. **COVID-19**
- **Airborne**: **Pulmonary** TB; measles; varicella; and **aerosol-generating procedures** in suspected TB, influenza, or SARS patients, **COVID-19**

# Droplet Precautions

- Wear a medical mask when within a 1 metre range of the patient.
- Put the patient in a single room or in a room that contains only other patients with the same diagnosis, or with similar risk factors, and ensure that every patient is separated by at least one metre.
- Ensure that the transportation of a patient to areas outside of the designated room is kept to a minimum.
- Perform hand hygiene immediately after removing any item of PPE.

# CONTACT PRECAUTIONS

- ✓ Use clean, unsterilized gloves and a disposable or re-usable gown whenever you have direct contact with a patient.
- ✓ Remove safely the gloves and gown immediately following any contact with a patient. Perform hand hygiene immediately after removing any item of PPE.
- ✓ Dedicate specific equipment for use with a single patient and ALWAYS clean and disinfect shared equipment between patient uses.
- ✓ Avoid touching your face, eyes or mouth with either gloved or un-gloved hands as these may be contaminated.
- ✓ Place patients in a single occupancy room whenever possible or alternatively with other patients with the same diagnosis.



# AIRBORNE INFECTION ISOLATION PRECAUTIONS

*Visitors must report to Nursing Station before entering.*



Perform hand hygiene before entering and before leaving room



Wear N95 respirator when entering room  
Visitors see nurse for instruction on proper use.



Keep door closed



Dietary may not enter  
No debe entrar el dietista

## PRECAUCIONES AMBIENTALES

*Los visitantes deben presentarse primero al puesto de enfermería antes de entrar. Lávese las manos. Póngase máscara N95 con filtro al entrar al cuarto. Mantenga la puerta cerrada. No debe entrar el dietista.*

- For Aerosol Generating Procedures
- Endotracheal intubation
- Open suctioning of endotracheal sites
- Bronchoscopy
- Physiotherapy
- Nasogastric intubation
- Insertion and removal of chest drain
- Conducting post mortem

# Infection prevention and control during health care when COVID-19 is suspected

Interim guidance  
19 March 2020



## Background

This is the first edition of guidance on infection prevention and control (IPC) strategies for use when COVID-19 is suspected. It has been adapted from WHO's Infection prevention and control during health care for probable or confirmed cases of Middle East respiratory syndrome coronavirus (MERS-CoV) infection,<sup>1</sup> based on current knowledge of the situation and experience with severe acute respiratory syndrome (SARS) and MERS.<sup>2</sup>

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## Principles of IPC strategies associated with health care for suspected COVID-19.

To achieve the highest level of effectiveness in the response to the COVID-19 outbreak using the strategies and practices recommended in this document, an IPC programme with a dedicated and trained team or at least an IPC focal point should be in place and supported by the national and facility senior management.<sup>4</sup> In countries where IPC is limited or inexistent, it is critical to start by ensuring that at least minimum requirements for IPC are in place as soon as possible, both at the national and facility level, and to gradually progress to the full achievement of all requirements of the IPC core components according to local priorities.<sup>4</sup>

IPC strategies to prevent or limit transmission in health care settings include the following:

1. ensuring triage, early recognition, and source control (isolating patients with suspected COVID-19);
2. applying standard precautions for all patients;
3. implementing empiric additional precautions (droplet and contact and, whenever applicable, airborne precautions) for suspected cases of COVID-19;
4. implementing administrative controls;
5. using environmental and engineering controls.

### 1. Ensuring triage, early recognition, and source control.

Clinical triage includes a system for assessing all patients at admission, allowing for early recognition of possible COVID-19 and immediate isolation of patients with suspected disease in an area separate from other patients (source control). To facilitate the early identification of cases of suspected COVID-19, health care facilities should:

- encourage HCWs to have a high level of clinical suspicion;
- establish a well-equipped triage station at the entrance to the facility, supported by trained staff;
- institute the use of screening questionnaires according to the updated case definition. Please refer to the [Global Surveillance for human infection with coronavirus disease \(COVID-19\)](#) for case definitions, and
- post signs in public areas reminding symptomatic patients to alert HCWs.

Hand hygiene and respiratory hygiene are essential preventive measures.

### 2. Applying standard precautions for all patients

Standard precautions include hand and respiratory hygiene, the use of appropriate personal protective equipment (PPE) according to a risk assessment, injection safety practices, safe waste management, proper linens, environmental cleaning, and sterilization of patient-care equipment.

Ensure that the following respiratory hygiene measures are used:

- ensure that all patients cover their nose and mouth with a tissue or elbow when coughing or sneezing;
- offer a medical mask to patients with suspected COVID-19 while they are in waiting/public areas or in cohorting rooms;
- perform hand hygiene after contact with respiratory secretions.

HCWs should apply WHO's My 5 Moments for Hand Hygiene approach before touching a patient, before any clean or aseptic procedure is performed, after exposure to body fluid, after touching a patient, and after touching a patient's surroundings.<sup>5</sup>

- hand hygiene includes either cleansing hands with an alcohol-based hand rub or with soap and water;
- alcohol-based hand rubs are preferred if hands are not visibly soiled;



- To achieve the highest level of effectiveness in the response to the COVID-19 outbreak.....

1. A IPC programme with a dedicated and trained team or at least an IPC focal point
2. Should be supported by the national and facility senior management.
3. In countries where IPC is limited or inexistent, start by ensuring that at least minimum requirements for IPC are in place as soon as possible, both at the national and facility level,
4. Work to achieve requirements of the IPC core components according to local priorities.

# Control of COVID-19 needs multi-modal strategies

Success in controlling the spread of COVID-19 in different countries has come from:

- Screening at airports +fever checks throughout selected population groups
- Isolation, contact tracing and follow-up; quarantine; travel restrictions
- Designation of dedicated hospitals to minimize the risk of spread tand strengthening IPC
- Mass media campaigns to educate public and encourage prompt reporting of symptoms and implementation of transmission reduction measures – **cough hygiene** and **hand hygiene**



# Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected

Interim guidance

25 January 2020



WHO/2019-nCoV/IPC/v2020.2

## Introduction

This is the first edition of guidance on infection prevention and control (IPC) strategies for use when infection with a novel coronavirus (2019-nCoV) is suspected. It has been adapted from WHO's *Infection prevention and control during health care for probable or confirmed cases of Middle East respiratory syndrome coronavirus (MERS-CoV) infection*,<sup>1</sup> based on current knowledge of the situation in China and other countries where cases were identified and experiences with severe acute respiratory syndrome (SARS)-CoV and MERS-CoV.<sup>2</sup>

WHO will update these recommendations as new information becomes available.

This guidance is intended for healthcare workers (HCWs), healthcare managers and IPC teams at the facility level but it is also relevant for the national and district/provincial level. Full guidelines are available from WHO.<sup>3</sup>

## Principles of IPC strategies associated with health care for suspected nCoV infection

To achieve the highest level of effectiveness in the response to an 2019-nCoV outbreak using the strategies and practices recommended in this document, an IPC programme with a dedicated and trained team or at least an IPC focal point should be in place and supported by the national and facility senior management.<sup>3</sup> In countries where IPC is limited or inexistent, it is critical to start by ensuring that at least

### 1. Ensuring triage, early recognition, and source control

Clinical triage includes a system for assessing all patients at admission allowing early recognition of possible 2019-nCoV infection and immediate isolation of patients with suspected nCoV infection in an area separate from other patients (source control). To facilitate the early identification of cases of suspected nCoV infection, healthcare facilities should:

- encourage HCWs to have a high level of clinical suspicion;
- establish a well-equipped triage station at the entrance of health care facility, supported by trained staff;
- institute the use of screening questionnaires according to the updated case definition ([https://www.who.int/publications-detail/global-surveillance-for-human-infection-with-novel-coronavirus-\(2019-ncov\)](https://www.who.int/publications-detail/global-surveillance-for-human-infection-with-novel-coronavirus-(2019-ncov))) and
- post signs in public areas reminding symptomatic patients to alert HCWs.

The promotion of hand hygiene and respiratory hygiene are essential preventive measures.

### 2. Applying standard precautions for all patients

Standard precautions include hand and respiratory hygiene, the use of appropriate personal protective equipment (PPE) according to risk assessment, injection safety practices, safe waste management, proper linens, environmental cleaning and sterilization of patient-care equipment

- If in doubt, refer to this WHO guideline
- It is ESSENTIAL to Read distribute this guideline to your facility staff and follow up on implementation





# Key

- Prevention is Key
- Droplet and Contact Precautions should be applied for suspect and confirmed cases
- Airborne precautions are for aerosol generating Procedures
- It is important to have an IPC team and strategy in place
- Even if there is inadequate IPC , Start where you are, follow the guide lines and grow till you can achieve all the components
- IPC is a major Pillar and should be represented strongly in The EOC and in the Facilities

THANK YOU

# References

- World Health Organisation. Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected Interim guidance . 25 January 2020
- WHO 2019 novel Corona Virus resources and guidance.  
<https://www.who.int/emergencies/diseases/novel-coronavirus-2019>