Coronavirus Disease 2019 (COVID-19)

Training slides based on guidelines for case-finding, diagnosis, management and public health response in South Africa

and

Clinical management of suspected or confirmed COVID-19 disease

Compiled by
Centre for Respiratory Diseases and Meningitis and Outbreak Response, Division of Public Health Surveillance and Response, National Institute for Communicable Diseases (NICD) of the National Health Laboratory Services (NHLS)

and

National Department of Health, South Africa
Including Communicable Diseases Cluster, Zoonotic Diseases Cluster, Port Health, Environmental Health and Emergency Medical Services
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health
Department:
Health
REPUBLIC OF SOUTH AFRICA

NATIONAL HEALTH LABORATORY SERVICE

NATIONAL INSTITUTE FOR COMMUNICABLE DISEASES
Division of the National Health Laboratory Service

Outline

- Welcome and objectives
- Microbiology, epidemiology, clinical presentation and outcome
- Management of suspected COVID-19 cases (triage, person under investigation, testing)
- Management of confirmed COVID-19 cases
- Contact tracing
- Infection prevention and control
- Public Health response

HOW TO STAY INFORMED:

THIS SITUATION IS RAPIDLY EVOLVING

Please check for updates on the NICD and NDoH websites

(www.nicd.ac.za and www.ndoh.gov.za)

Find the latest WHO COVID-19 situation report:

https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/

Advice and guidance from WHO on COVID-19

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

Coronavirus Disease 2019 (COVID-19)

WHO 11th February 2020

- **OUT**

  Novel Corona virus-2019 (NCoV-19)

- **IN**

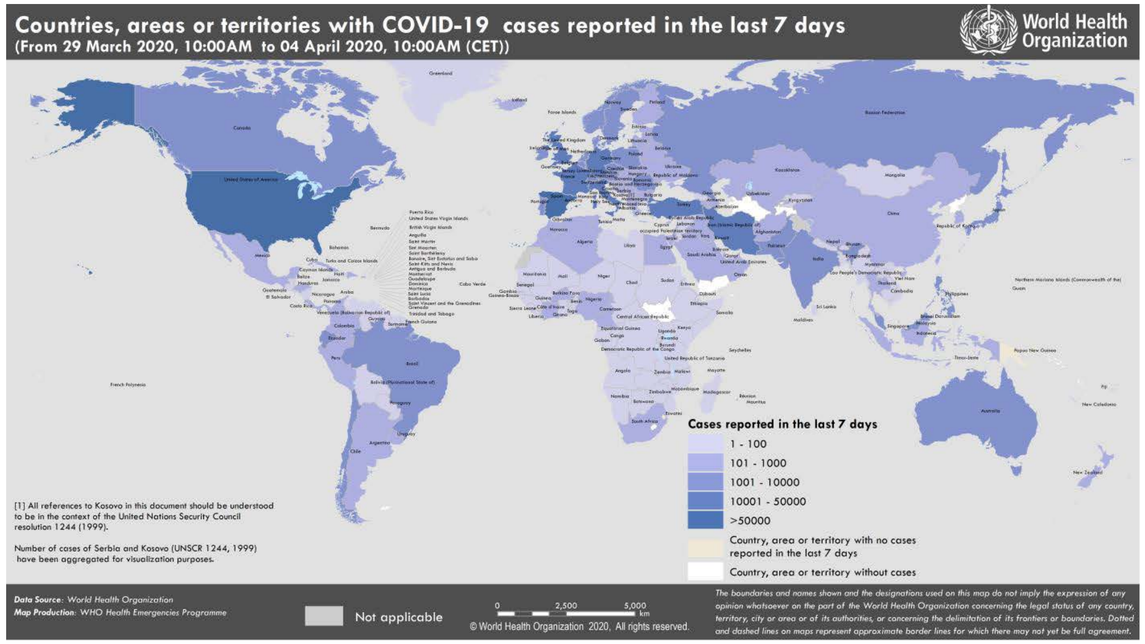
  COronaVirus Disease-2019 (COVID-19)

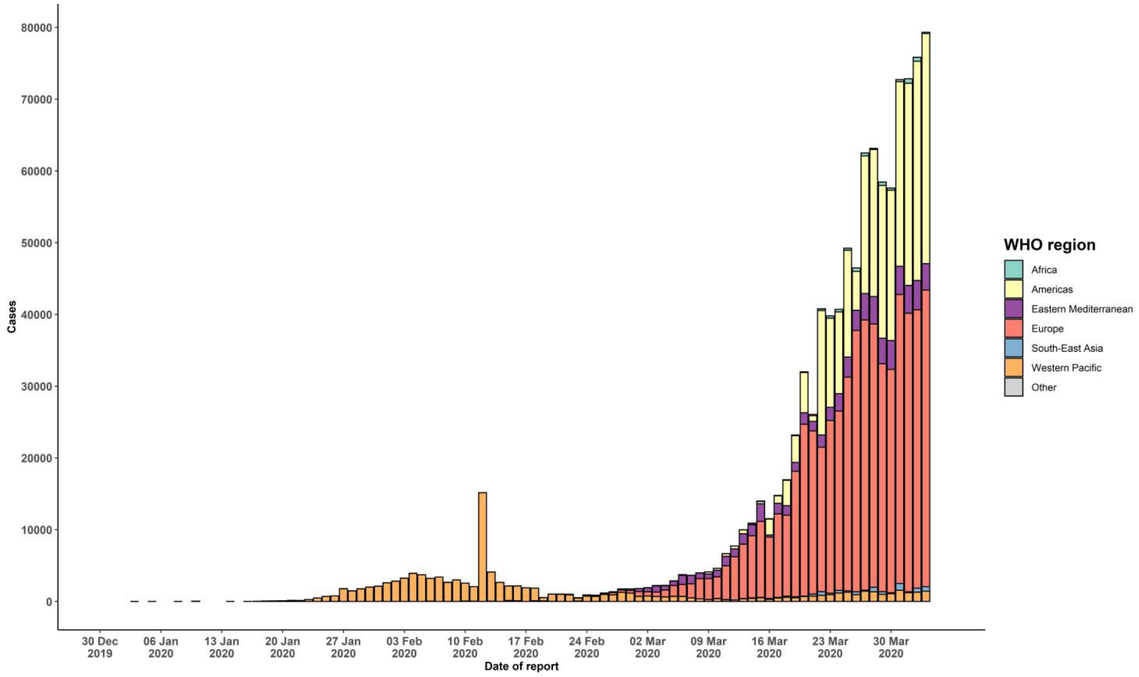
Virus: SARS-CoV-2

Microbiology, epidemiology and clinical presentation

Introduction

- 31 December 2019, the World Health Organization (WHO) China country office reported a cluster of pneumonia cases in Wuhan, Hubei Province of China
- 7 January 2020, causative pathogen identified as a novel coronavirus (COVID-2019)
- Initially person-to-person transmission not apparent and the majority of the cases were epidemiologically linked to a seafood, poultry and live wildlife market (Huanan Seafood Wholesale Market) in Jianghan District of Hubei Province
- Number of cases continued to increase rapidly, and evidence of person-to-person transmission mounted





COVID-19: Situation update

WHO: 8 June 2020

Globally

6 931 000 cases

400 857 deaths

Africa

135 412 cases

3 236 deaths

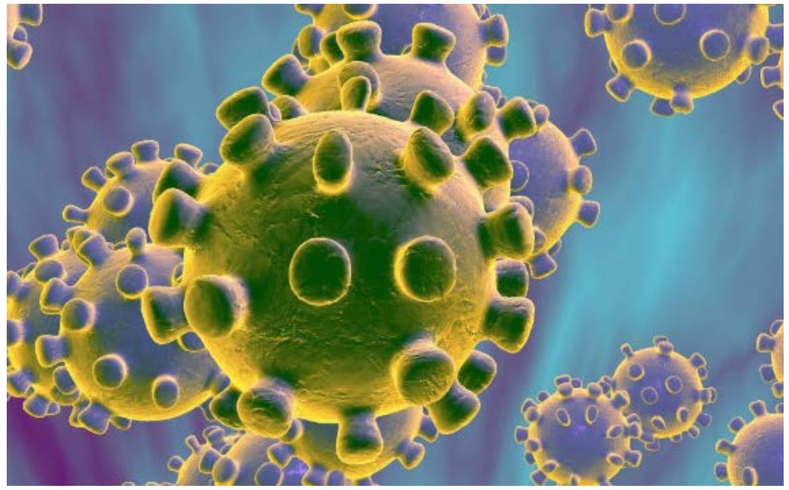
WHO transmission scenarios

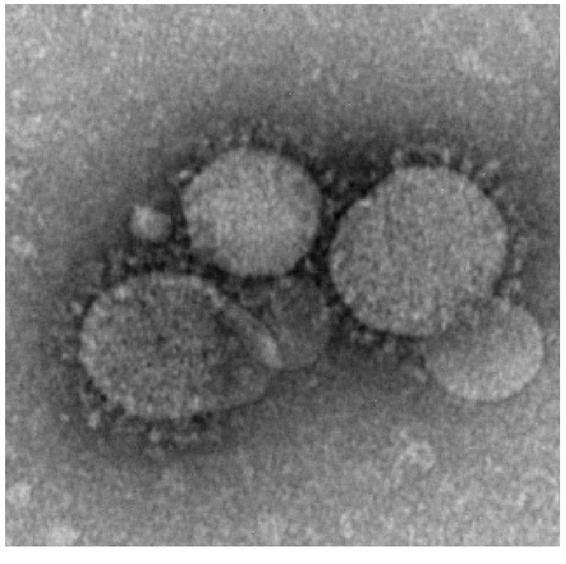
WHO has defined four transmission scenarios for COVID-19:

1. Countries with no cases (No Cases);
2. Countries with 1 or more cases, imported or locally detected (Sporadic Cases);
3. Countries experiencing cases clusters in time, geographic location and/or common exposure (Clusters of cases);
4. Countries experiencing larger outbreaks of local transmission (Community transmission)

Microbiology and epidemiology

- Coronaviruses are enveloped, single-stranded positive-sense RNA viruses.
- The envelope of the coronaviruses is covered with club-shaped glycoproteins which look like ‘crowns’, or ‘halos’ – hence the name ‘coronavirus.’
- Coronaviruses cause disease among humans and animals
- are responsible for the common cold, and usually cause self-limited upper respiratory tract infections.
  - Examples 229E, NL63, OC43 and HKU1





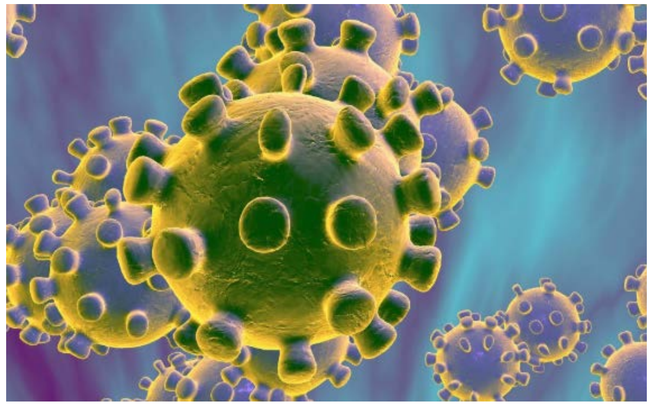
Microbiology and epidemiology

- Recent zoonosis with more severe disease (Lower Respiratory Tract Infection):

- In 2003, a new coronavirus emerged leading to the SARS (severe acute respiratory syndrome) outbreak
- SARS-CoV spread to **37 countries within 2 weeks** of original outbreak reporting; **8,098 probable cases and 774 deaths)**

- In 2012, the Middle East respiratory syndrome (MERS) was found to be caused by a coronavirus associated with transmission from camels.

- MERS-CoV as of Oct 2019 **>2400 lab-confirmed cases with >850 deaths**; high mortality; mostly contained within the Middle East, but has been detected in 17 other countries.)



Microbiology and epidemiology

- Following the identification of a cluster of pneumonia cases in Wuhan, Hubei Province of China, Chinese authorities reported on 7 January 2020 that the causative pathogen was identified as a novel coronavirus (COVID-2019).
- These new coronaviruses have RNA sequences that are very similar to coronaviruses from animals
    - MERS-CoV = camel coronavirus
    - SARS = bat coronavirus
    - SARS-CoV2 (COVID-19) ?=bat coronavirus, animal that mediated transmission to humans unknown ?pangolin

Transmissibility

- Main route of transmission respiratory droplets (airborne transmission has not proven)
- Excreted in stool (possibly faeco-oral)
- Mean incubation period 5.2 days (95% confidence interval [CI], 4.1 to 7.0), 95th percentile of the distribution at 12.5 days.
- 14 days of isolation or quarantine is suggested as it allows a window of 1.5 additional days. (Li, 2020)
- In early stages, epidemic doubled in size every 7.4 days
- Basic reproductive number was estimated 2.2 (95% CI, 1.4 to 3.9) - on average each infectious case gives rise to just over 2 infectious cases.

COVID-19: How does it spread?

- Person infected with COVID coughs or sneezes, release droplets of infected fluid
- Larger droplets fall on nearby surfaces and objects
- People infected when touch contaminated surface then touch their eyes, nose or mouth
- People infected by breathing in droplets if standing with 1m of infected person

COVID-19: Clinical presentation and outcome

Clinical presentation and outcome

- 81% of persons have mild disease (common cold or as severe as ‘flu’)
- 14% of cases develop severe disease, require hospital admission
- 5 % of cases become critically ill and require ICU
- Persons with underlying co-morbid illness esp cardiopulmonary disease, and the elderly are more at risk
- Very few severe cases reported among of children <15 years

COVID-19: Clinical presentation and outcome

Clinical presentation and outcome

- The most common presenting symptom has been **fever** (~90%, but may only present in a minority on admission)
- Other common symptoms include **cough** (66%), **shortness of breath** (33%)
- Myalgia, sore throat, nausea, vomiting and diarrhea (<20%)
- Anosmia (loss of sense of smell) and dysgeusia (alteration of the sense of taste) have also emerged as relatively common, early symptoms.
- Abnormalities are visible on chest X-ray in ~60% of COVID-19 patients, chest CT scans.

COVID-19: Clinical presentation and outcome

- Majority of cases will make a full recovery, may take several weeks, particularly in severe cases.
- Minority: rapid progression to acute respiratory distress syndrome (ARDS), multiple organ failure and sometimes death.
- The case fatality ratio: estimated 0.7-7% (partially determined by population's age distribution, pandemic's burden on healthcare system at the time, and extent of diagnosis of mild or asymptomatic cases)

Management of Suspected COVID-19 cases

Management of Suspected COVID-19 cases

- Early identification/triage
  - Case definition: "Suspected COVID-19 case"
  - Measures to facilitate early identification of suspected cases
  - Measures to be taken for any patient who fulfils criteria for a suspected COVID-19
- Testing
- Empiric treatment of other pathogens
- Managing patients at home while awaiting test results

Please refer to Clinical management of suspected or confirmed COVID-19 disease
https://www.nicd.ac.za/wp-content/uploads/2020/03/Clinical-management-of-suspected-or-acute-COVID-19-Version-3.pdf

Suspected COVID-19 cases

- **Early identification/ triage**

  -Stay updated: know the latest case definition ("suspected COVID-19 case"), criteria will change over time https://www.nicd.ac.za/wp-content/uploads/2020/05/COVID-19-Quick-reference-v14-25.05.2020.pdf

-For all suspected/confirmed Covid-19 cases use a combination of

Standard, contact and droplet precautions with further airborne precautions when performing aerosol-generating procedures (including taking specimens)

Criteria for a suspected COVID-19 case (updated 25 May 2020)

A suspected COVID-19 case includes any person presenting with an acute (≤14 days) respiratory tract infection or other clinical illness compatible with COVID-19, or an asymptomatic person who is a close contact to a confirmed case*.

In the context of COVID-19, the key respiratory syndrome consists of ANY of:

- Cough
- Sore throat
- Shortness of breath
- Anosmia or dysgeusia

… with or without other symptoms (which may include fever, weakness, myalgia, or diarrhoea).

*Note: Although asymptomatic close contacts are classified as suspected cases, they should not routinely be tested.

Close contact: A person having had face-to-face contact (≤1 metre) or been in a closed space with a confirmed case for at least 15 minutes. This includes, amongst others, all persons living in the same household as a case, and people working closely in the same environment as a case. Healthcare workers or other people providing direct care for a case, while not wearing recommended personal protective equipment or PPE (e.g., gowns, gloves, N95 respirator, eye protection). A contact in an aircraft sitting within two seats (in any direction) of the case, travel companions or persons providing care, and crew members serving in the section of the aircraft where the case was seated.

Confirmed case: A person with laboratory confirmation of SARS-CoV-2 infection (using an RT-PCR assay), irrespective of clinical signs and symptoms. Symptomatic cases are considered infectious from 2-3 days before symptom onset to 14 days after symptom onset.

Suspected COVID-19 cases

- Give patient a **surgical mask** to wear
- **Isolate** in separate area (preferably isolation room)or keep 1-2m distance from other patients
- Suspected COVID-19 to practice **cough etiquette** and **hand hygiene**
- **Limit movement**. If has to move, suspected COVID-19 must wear mask
- Suspected COVID-19 to have dedicated bathroom if possible
- **Suspected COVID-19 should be quickly triaged in terms of clinical severity**

Allows rapid implementation of supportive therapy (e.g. oxygen)

And decision whether patient can go home to await results or needs admission

Protection of patients and staff

Suspected COVID-19 cases: Testing

Testing:

- All suspected COVID-19 cases require testing for SARS-CoV-2 (reverse transcriptase PCR- detects SARS-CoV-2 genetic material)

Collecting a good quality specimen is vital

- Upper respiratory tract specimen for all patients
- A single nasopharyngeal swab is the preferred sample type. When not possible, a single nasal mid-turbinate swab, nasal or oropharyngeal swab may be collected

Lower respiratory tract specimen when available

- Sputum (if produced – do NOT induce), tracheal aspirates or bronchoalveolar lavage

Note: lower respiratory tract samples may have higher sensitivity than upper respiratory tract samples and should additionally be collected for severe cases

HCW to use contact, droplet and airborne precautions when collecting specimens

Suspected COVID-19 cases: Testing

- Complete NHLS or private laboratory request form. Send to the laboratory
- Mandatory information to be provided on lab request form
    1. Facility name
    2. Ward name
    3. Patient information:
        a. Surname and name
        b. Sex
        c. Date of birth
        d. Address
        e. Mobile telephone number
        f. Alternative telephone number
        g. ID number (or passport number) if available
    4. Specimen type
    5. Collection date and time
    6. Test required: SARS-CoV-2 PCR
    7. Health care worker name and contact details

- Ensure that samples are kept between 2-8°C until they are processed.
- Transport and store swabs in universal/viral transport medium (UTM) or sterile saline, between 2-8°C. If UTM is not available, use dry swabs in a sterile tube. Dry swabs can be sent at ambient temperature, but must reach the laboratory within 2 days
- Transport sputum in standard specimen container. Does not require UTM
- Transport in cooler box with cooled ice blocks

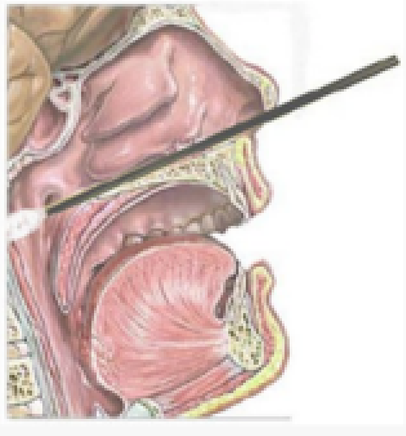
Suspected COVID-19 cases: Testing Equipment and materials

1. NHLS or private laboratory request form.
2. Nasopharyngeal (NP) (flocked) swab
3. Tube containing universal transport medium (UTM) if available
4. Gloves, gown
5. N95 mask (fit tested), goggles/visor (your own spectacles are not sufficient)
6. Biohazard bag for disposal of non-sharp materials.
7. Tissue for patient to wipe nose after sample collection.
8. Ziploc plastic specimen bag.
9. Cooler box and cooled ice packs.

Collection of naso/oropharyngeal swabs for detection of respiratory viruses

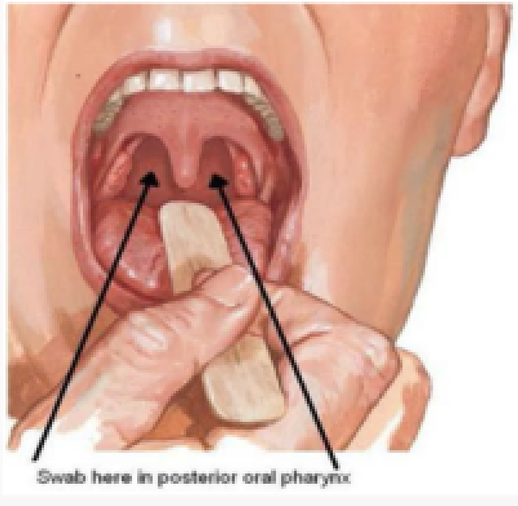
Collection of a nasopharyngeal specimen

1. Ask the patient to tilt his/her head back slightly.
2. Gently insert swab into the nostril, aiming backwards (not upwards) until a slight resistance is met – about the distance from the nose to the anterior ear. If resistance is met before fully inserted, remove and try the other nostril.
3. Rotate swab 2-3 times and hold in place for 2-3 seconds.
4. Slowly withdraw the swab and put it into the specimen tube containing universal transport medium.
5. Break the swab's shaft and close the tube.



Collection of an oropharyngeal specimen

1. Ask the patient to tilt his/her head back and open their mouth.
2. Hold the tongue down with a tongue depressor.
3. Have the patient say "aahh" to elevate the uvula.
4. Swab each tonsil first, then the posterior pharynx in a "figure 8" movement.
5. Avoid swabbing the soft palate or the tongue as this can induce the gag reflex.
6. Place the swab into the same specimen tube.
7. Break the swab's shaft and close the tube tightly.



Clinical management of suspected or confirmed COVID-19 disease: https://www.nicd.ac.za/wp-content/uploads/2020/05/Clinical-management-of-suspected-or-confirmed-COVID-19-Version-4.pdf

Collection of a mid-turbinate specimen

1. Ask the patient to tilt his/her head back slightly.
2. Gently insert swab less than 2cm into the nostril (until resistance is met at the turbinates).
3. Gently rotate swab several times against the nasal wall,.
4. Repeat in the other nostril using the same swab.
5. Withdraw the swab and put it into the specimen tube containing universal transport medium.
6. Break the swab's shaft and close the tube.

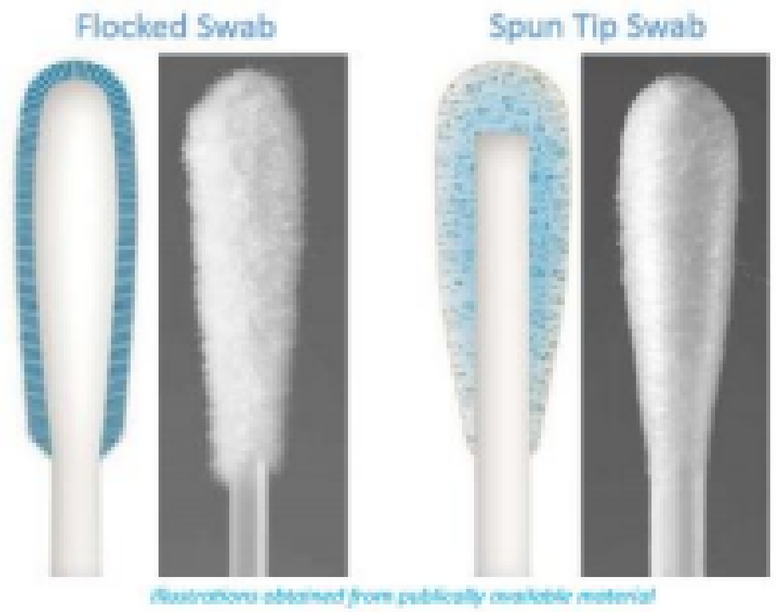
Collection of an anterior nares (nasal) specimen

1. Ask the patient to tilt his/her head back slightly.
2. Insert the swab at least 1 cm inside the nares.
3. Firmly sample the nasal membrane by rotating the swab and leaving it in place for 10-15 seconds.
4. Sample both nares with the same swab.
5. Withdraw the swab and put it into the specimen tube containing universal transport medium.
6. Break the swab's shaft and close the tube.

Clinical management of suspected or confirmed COVID-19 disease: https://www.nicd.ac.za/wp-content/uploads/2020/05/Clinical-management-of-suspected-or-confirmed-COVID-19-Version-4.pdf

Recommended swab types

Flocked (polyester/nylon) or spun fibre (polyester/rayon) swabs with plastic or aluminium shafts should be used.



**Not recommended: calcium alginate swabs or swabs with wooden shafts, as they may contain substances that inactivate some viruses and inhibit PCR testing.*

Interpretation of rRT-PCR results

- Negative result does not rule out possibility of infection
- Factors that could lead to a false –negative result:
  - Poor specimen quality
  - Specimen was collected late or very early in the illness
  - Specimen was not handled and shipped appropriately, (eg. the cold chain)
  - Technical reasons inherent in the test, e.g virus mutation

If a high clinical suspicion for COVID-19 persists despite an initial negative test, repeat testing should be considered in consultation with an infectious diseases expert, particularly in hospitalised patients for whom management might be significantly altered.

However, it is equally important to maintain a broad differential diagnosis and to always consider alternative diagnoses.

Suspected COVID-19 cases: Differential diagnosis

Differential diagnosis for suspected COVID-19 cases includes influenza, conventional/atypical bacterial pneumonia, for HIV positive patients with CD4 count <200, consider *Pneumocystis jirovecii* pneumonia.

Malaria as the cause of an acute febrile illness (typically with headache, rigors and malaise) must always be considered in persons residing in or travelling from malaria transmission areas.

Non-infectious causes of dyspnoea and/or fever should also be considered, such as pulmonary emboli, myocardial infarction, and heart failure.

Clinical management of suspected or confirmed COVID-19 disease: https://www.nicd.ac.za/wp-content/uploads/2020/05/Clinical-management-of-suspected-or-confirmed-COVID-19-Version-4.pdf

For patients with severe disease who require admission, appropriate tests may include:

- HIV test (if status unknown)
- Full blood count + differential
- Blood culture
- Nasopharyngeal and/or oropharyngeal swabs for detection of viral and atypical
- pathogens
- Chest radiography
- Sputum for MCS and Mycobacterium tuberculosis detection (GeneXpert MTB/RIF
- Ultra).
- Urine for lipoarabinomannan (LAM) if HIV positive
- Beta-D-glucan and expectorated sputum/tracheal aspirate for PJP if HIV positive and clinically suspicious of PJP (don’t induce sputum though)

For patients with mild disease who do not require admission, a more limited workup may be appropriate. Depending on the specific presentation, test may include:

- HIV test (if status unknown)
- Sputum GeneXpert MTB/RIF Ultra if patient is HIV positive and is coughing (would fulfil case definition for TB), or if HIV negative and in close contact with TB patients

Empiric treatment of other pathogens

- Where the patient fits the appropriate clinical syndrome, consider treatment of other pathogens such as:
- Conventional community-acquired pneumonia pathogens (or hospital-acquired pneumonia pathogens if appropriate) – e.g. amoxicillin or ceftriaxone [see primary healthcare and hospital level adult and paediatric standard treatment guidelines]
- Atypical pneumonia pathogens – e.g. azithromycin [see hospital level adult and paediatric standard treatment guidelines]
- Influenza (if seasonal epidemiology fits and has severe illness or if patient is at risk of severe influenza) – oseltamivir [see NICD influenza guidelines]
- PJP (if appropriate risk factors present, e.g. HIV with CD4 count <200 cells/mL, and not on cotrimoxazole prophylaxis)

Suspected COVID-19 cases: managing patients at home while awaiting results

- Suspected COVID-19 assessed a having mild disease can be managed at home while awaiting test results
- **Refer to clinical guidelines for criteria for "mild disease"**
- Must be instructed to self-isolate and advised on reducing possible transmission to others*

*Refer to:

- Clinical management of suspected or confirmed COVID-19 disease https://www.nicd.ac.za/wp-content/uploads/2020/03/Clinical-management-of-suspected-or-acute-COVID-19-Version-3.pdf
- Information for the public:

  "What to do if I test positive for coronavirus disease and am asked

  to home isolate" https://www.nicd.ac.za/what-to-do-if-i-test-positive-for-coronavirus-disease-and-i-am-asked-to-home-isolate%e2%80%8b/

Suspected COVID-19 cases :**Self-isolation:** Refer to guidelines for details

- Stay at home
- Do not use public transport or travel
- Stay in specific room or area, use own bathroom if possible
- If contact unavoidable, wear facemask, maintain at least 1 metre (preferable 2) from other people
- Wash hands with soap & water frequently (hand based sanitizers with at least 70% alcohol can be used)
- Good cough & sneeze hygiene, use tissue, discard and wash hands immediately
- Avoid sharing household items
- High touch surfaces table tops, phones, computers to be cleaned regularly
- Clean sick room/ area every day, using regular household soap then rince and follow with regular household disinfectant containing o.5% sodium hypochlorite (bleach)
- Clean and disinfect bathroom at least once a day
- If someone else cleans sick room/bathroom they should use PPE
- Machine wash laundry, use highest temperature compatible with fabric using laundry detergent (preferably 60-90°C) or use regular laundry soap and hot water in large container, stir with stick (see guidelines)
- Disposable gloves, plastic apron to be used when handling soiled materials if possible, surfaces and area around washing machine to be cleaned
- **Patient must know who to call if symptoms worsen**

Antibody tests

- Currently, we do not recommend using antibody-based (serological) tests for the diagnosis of acute COVID-19.

Point of care antigen tests

- We do not currently recommend point of care antigen-based tests, due to concerns about poor sensitivity and specificity.

Management of Confirmed COVID-19 cases

Clinical management of suspected or confirmed COVID-19 disease: https://www.nicd.ac.za/wp-content/uploads/2020/05/Clinical-management-of-suspected-or-confirmed-COVID-19-Version-4.pdf

Confirmed COVID-19 disease

- **Rapid triage of cases** –to ensure appropriate IPC measures (minimize transmission to uninfected contacts) and an appropriate level of supportive care can be commenced (reduce morbidity and mortality)
- Moderate/severe disease – admission
- Mild disease – consider management at home, provided able to safely self-isolate and not at risk of developing severe disease
- If managed at home, measures to prevent onward transmission
- 10-15% assessed as mild may worsen over week
- **Any deterioration in the ability to perform activities of daily living at home as a result of dyspnoea should prompt re-evaluation at a healthcare facility.**
- MUST have contact details of doctor or health care facility

Criteria for management at home (for age >12years) and Symptomatic treatment for COVID-19 patients managed at home or in hospital

- **Refer to Guidelines on Clinical management of suspected or confirmed COVID-19 disease for criteria for management at home Important sources of Information**: www.nicd.ac.za

Confirmed COVID-19 disease: Summary

Please refer to Clinical management of suspected or confirmed COVID-19 disease:
https://www.nicd.ac.za/wp-content/uploads/2020/05/Clinical-management-of-suspected-or-confirmed-COVID-19-Version-4.pdf

Early supportive therapy in hospitalised COVID-19 patients includes:

- Immediate supplemental oxygen therapy for patients with low oxygen saturation
- Judicious fluid management
- Empiric antimicrobials to treat co-pathogens if clinical suspicion
- Closely monitor patients with SARI for signs of clinical deterioration, apply supportive care interventions immediately

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Confirmed COVID-19 disease: Summary

Please refer to Clinical management of suspected or confirmed COVID-19 disease: https://www.nicd.ac.za/wp-content/uploads/2020/05/Clinical-management-of-suspected-or-confirmed-COVID-19-Version-4.pdf

Specific therapies

- Do not routinely give systemic corticosteroids for treatment of COVID-19 unless they are indicated for another reason.
- There is insufficient evidence to currently recommend any specific treatment for patients with suspected or confirmed COVID-19 infection.
- There is currently insufficient evidence for the use of any drug or vaccine to prevent COVID-19 infection.

Confirmed COVID-19 disease: Summary

Please refer to Clinical management of suspected or confirmed COVID-19 disease: https://www.nicd.ac.za/wp-content/uploads/2020/05/Clinical-management-of-suspected-or-confirmed-COVID-19-Version-4.pdf

Management of hypoxemic respiratory failure and ARDS

- Recognize severe hypoxic respiratory failure when a patient with respiratory distress is failing standard oxygen therapy
    - In the absence of an indication for endotracheal intubation, a trial of high-flow nasal oxygen (HFNO), continuous positive airway pressure (CPAP) or other non-invasive ventilation (NIV) technique may be considered for adults with COVID-19 and acute hypoxaemic respiratory failure failing standard oxygen therapy.
    - The use of the prone position in non-intubated, conscious patients may be beneficial.
- Patients with hypoxaemic respiratory failure may require intubation and mechanical ventilatory support.

Confirmed COVID-19 disease: De-isolation criteria

De-isolation criteria:

Patients can be de-isolated 14 days after the onset of their symptoms (in mild cases), 14 days after achieving clinical stability (in severe cases), or 14 days after the positive test (in asymptomatic cases).

It is not necessary to repeat PCR testing in order to de-isolate a patient. Patients can remain PCR positive even after they are no longer infectious. A positive PCR test does not equate to an infectious, viable virus.

Patients admitted to hospital can continue their isolation period at home once clinical stability has been achieved, provided criteria for management at home are met

It is common for patients to continue to have symptoms for longer than the above time periods.

Full recovery may take several weeks. Patients who are still symptomatic at the end of their isolation period can be de-isolated provided that their fever has resolved (without the use of antipyretics) and their symptoms have improved.

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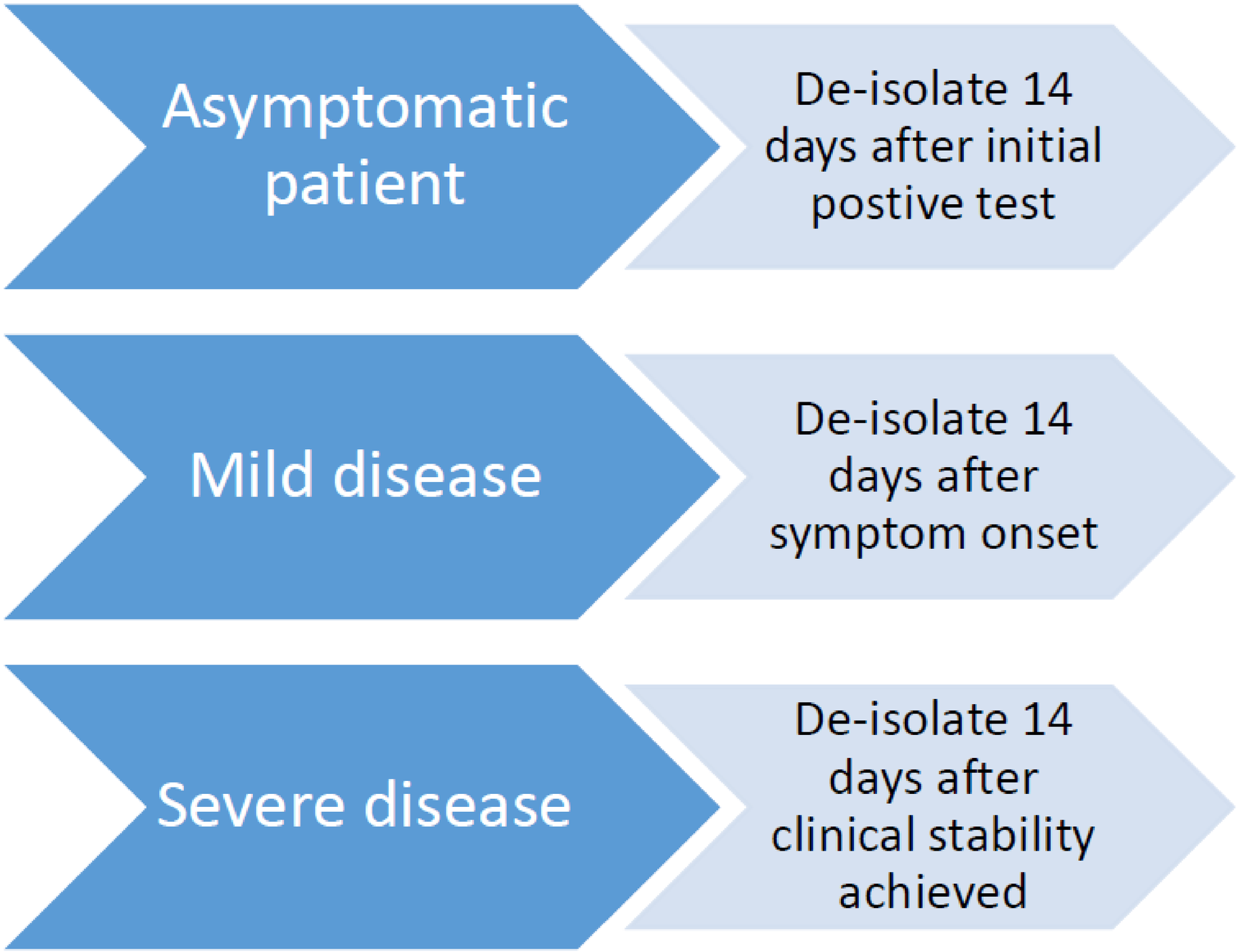


Please refer to Clinical management of suspected or confirmed COVID-19 disease: https://www.nicd.ac.za/wp-content/uploads/2020/05/Clinical-management-of-suspected-or-confirmed-COVID-19-Version-4.pdf

Special populations – children, newborns, pregnant and breastfeeding women, and people living with HIV

Please refer to Clinical management of suspected or confirmed COVID-19 disease: https://www.nicd.ac.za/wp-content/uploads/2020/05/Clinical-management-of-suspected-or-confirmed-COVID-19-Version-4.pdf

Tool (click for link)	**When to complete**	**Comments**
Contact line list	To be completed for all individuals suspected of COVID 19 disease and having a specimen taken	This needs to be completed for all patients from whom COVID-19 samples are collected.
Laboratory specimen submission form	For all COVID-19 specimens	Always include patient's ID/passport number and contact details
Clinical platform for hospitalised patients	To be completed for all confirmed inpatients daily (until discharge).	This form will document the presence of comorbidities, clinical progression, treatment and outcomes.
Home assessment forms[1]	To be completed at de-isolation, for all patients being cared for at home	This form will document patient progress and outcomes
Notifiable medical condition (NMC) case notification	To be completed for all confirmed COVID-19 cases	No longer required to notify suspected cases, only confirmed cases.

[1] A paper/modifiable PDF version of the home assessment form is available at the NICD's website. Completed forms should be emailed to ncov@nicd.ac.za

The online version of the contact line list is available at https://cci.nicd.ac.za. It is also available as an app on Android mobile devices:
https://play.google.com/store/apps/details?id=com.NICD.contactTracer&gl=ZA

The clinical platform for hospitalized patients is available at: https://nicd.comunity.me/d/NICD/

The latest version of these forms are available from www.nicd.ac.za
Source: Clinical management of suspected or confirmed COVID-19 disease

Management of the deceased

- Refer to COVID-19 Disease: Infection Prevention and Control Guidelines - Version 2 (21st May 2020)

https://www.nicd.ac.za/wp-content/uploads/2020/05/ipc-guidelines-covid-19-version-2-21-may-2020.pdf

Contact Tracing

Who is a close contact?

A close contact is defined as a person having had face-to-face contact (≤1 metre) or having been in a closed space with a confirmed COVID-19 case for at least 15 minutes. This includes, amongst others:

- All persons living in the same household as a COVID-19 case, and people working closely in the same environment as a case.
- Healthcare workers or other people providing direct care for a COVID-19 case while not wearing recommended personal protective equipment or PPE (e.g., gowns, gloves, N95 respirator, eye protection).
- A contact in an aircraft sitting within two seats (in any direction) of the case, travel companions or persons providing care, and crew members serving in the section of the aircraft where the case was seated.

How to do contact tracing and monitoring of close contacts

Once laboratory testing confirms COVID-2019 infection:

- Provincial CDCC needs to identify close contacts, and complete contact line list
- EVERY contact to complete the contact demographic section on the contact monitoring form
- Close contacts will be asked to self-quarantine at home for 14 days since exposure to the confirmed COVID-2019 and take their temperature daily and monitor for symptoms
- Contact tracing is devolved to provincial or district level
- Some provinces are implementing Apps for contact tracing

Monitoring of close contacts of known COVID-19 case

- **Close contacts under monitoring should be advised to:**
  - Remain at home
  - Avoid unnecessary social contact
  - Do not use public transport, do not travel
  - Separate sick room/one area , separate bathroom if possible
  - Clean sick room daily, bathroom at least once daily
  - Do not share utensils, bedding, towels
  - PPE for cleaner or home carer etc

  - Refer to: https://www.nicd.ac.za/what-to-do-if-i-am-a-close-contact-of-a-person-with-confirmed-disease-and-am-asked-to-home-quarantine/

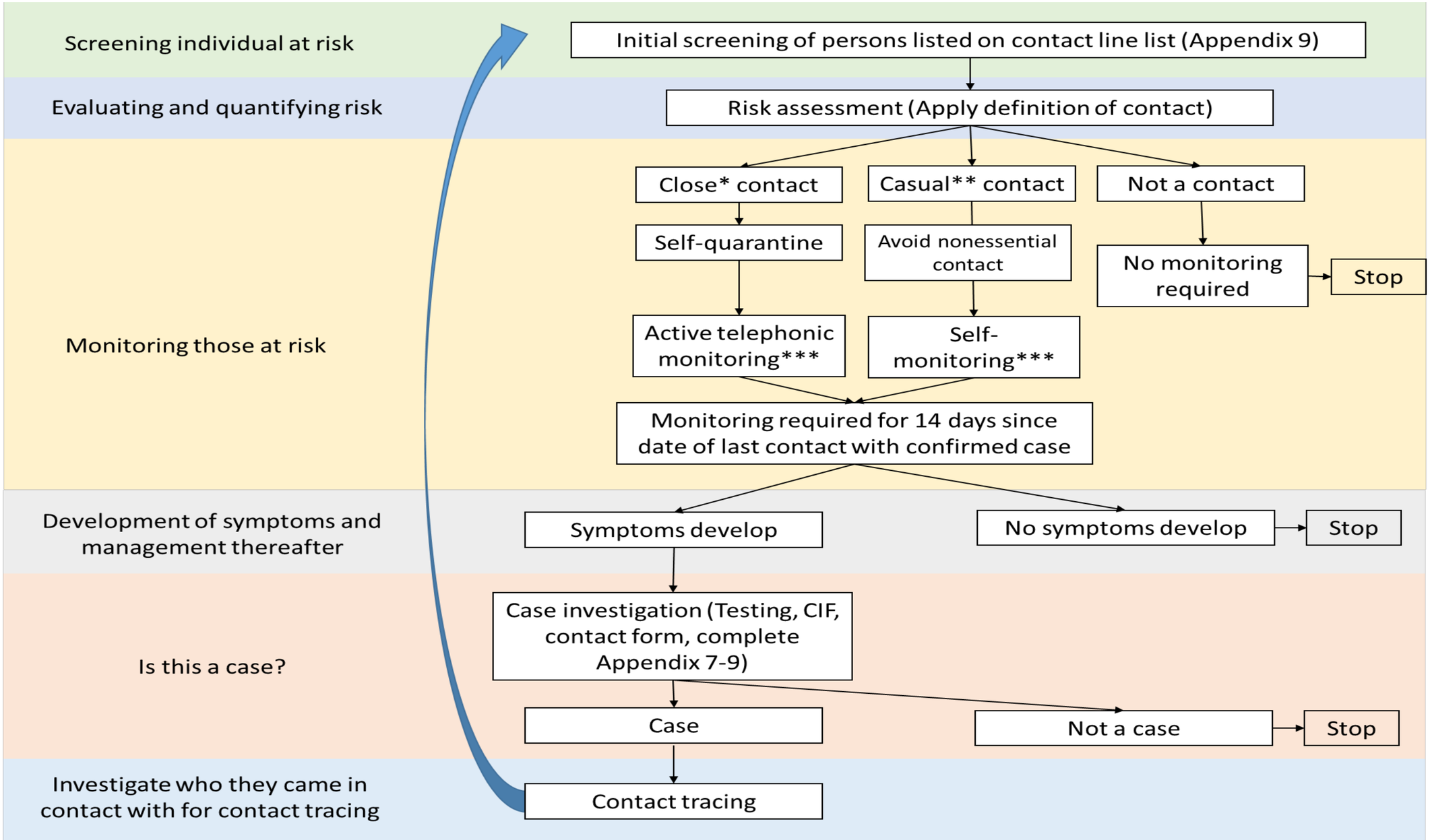
Quarantine

- Quarantine means separating asymptomatic persons who are exposed to a disease from non-exposed persons
- Isolation, which is the act of separating a sick individual with a contagious disease from healthy individuals without that contagious disease
- Quarantine procedures can be effective in limiting and slowing the introduction of a novel pathogen into a population but may entail the use of considerable resources and may infringe on the rights of members of society.
- Quarantine may take place
    - in the home
    - or in a designated facility.

Management of close contacts who develop symptoms

- Should a contact develop symptoms, a specimen should be collected and required documentation completed on the same day.
- If the contact tests negative, they should still remain in quarantine for the full 14 days after last exposure to known case. If symptoms persist or worsen, repeat testing may be indicated

Contact tracing summary



** Close contact: A person having had face-to-face contact (≤2 metres) or was in a closed environment with a 2019-nCoV case; this includes, amongst others, all persons living in the same household as a 2019-nCoV case and, people working closely in the same environment as a case. A healthcare worker or other person providing direct care for a 2019-nCoV case, while **not** wearing recommended personal protective equipment or PPE (e.g., gowns, gloves, NIOSH-certified disposable N95 respirator, eye protection). A contact in an aircraft sitting within two seats (in any direction) of the 2019-nCoV case, travel companions or persons providing care, and crew members serving in the section of the aircraft where the index case was seated.*

*** Casual contact:* Anyone not meeting the definition for a close contact but with possible exposure.

***Monitoring methods: Active-telephonic monitoring: NICD call centre will phone person who is home-quarantined each day for a symptom report; Self-monitoring: person to consult healthcare practitioner in the event of symptom development.

Monitoring Health workers with occupational exposure / laboratory confirmed COVID-19

- **Health Worker with occupational exposure**
  - Lists of healthcare workers with occupational exposure should be compiled by the health facility
  - Assess level of risk

Refer to: Guidelines for symptom monitoring and management of essential workers for COVID-19 related infection

https://www.nicd.ac.za/wp-content/uploads/2020/04/Guidance-for-symptom-monitoring-and-management-of-essential-staff-with-COVID-19-related-illness-final-2.pdf

Laboratory diagnostics

Table 1. Type of specimens that can be collected for 2019-nCoV diagnostics and the transport requirements of these specimens

Specimen type	Collection materials	Storage and transportation	Dangerous goods shipping category	Comment
FOR SYMPTOMATIC PATIENTS:				
Sputum*	Deep cough sputum in sterile leak proof container	Refrigerate and ship at 2-8 °C up to 48 hrs, if >48 hrs freeze at -70°C and ship on dry ice	Biological substance, Category B	The preferred sample but need to ensure the material is from the lower respiratory tract
Bronchoalveolar lavage*	2-3 ml in sterile leak proof container	Refrigerate and ship at 2-8 °C up to 48 hrs, if >48 hrs freeze at -70°C and ship on dry ice	As above	There may be some dilution of virus but still a worthwhile specimen
(Endo)tracheal or nasopharyngeal aspirate*	2-3 ml in sterile leak proof container	Refrigerate and ship at 2-8 °C up to 48 hrs, if >48 hrs freeze at -70°C and ship on dry ice	As above	
Nasopharyngeal and oropharyngeal swab	Dacron or nylon flocked swab in Universal Transport Medium (UTM) in a sterile leak proof container	Refrigerate at 2-8 °C up to 5 days, if >5 days freeze at -70°C and ship on dry ice	As above	Nasopharyngeal and oropharyngeal swabs should be placed in the same tube to increase the viral load
Serum	Serum separator tube**	Store upright for at least 30 minutes after collection. a Refrigerate and ship at 2-8 °C within 5 days	As above	Collect paired samples: • Acute – first week of illness • Convalescent – 2-3 weeks later
Lung tissue from biopsy or autopsy	Sterile container with saline	Refrigerate and ship at 2-8 °C up to 24 hrs, if >24 hrs freeze at -70°C and ship on dry ice		

* Aerosol-generating procedures may pose an infection risk for health care workers. ** Children and adults: collect 1 tube (5-10ml) of whole blood. Infant: a minimum of 1ml in a serum separator tube.

What PPE do I need in the laboratory?

Process as per normal BSL2 (suspected influenza sample)

- Closed specimen tube (transporting / receiving)
  - Lab coat and gloves


- Open specimen tube before inactivation (aliquoting)
  - If BSC available – lab coat and gloves



  - If BSC not available – lab coat, gloves, N95 mask and eye protection




- Inactivated specimen/extracted nucleic acids (PCR)
  - Lab coat and gloves


How do I package a specimen for Coronavirus testing?

- Send as per category B substance (**as per influenza specimen**)

- Locally or nationally:
  - Specimen in sealed, leak-proof ziplock bag, placed in sealed cooler box with cooled iceblocks.
  - Ensure the cooler box and ice packs stay at 2-8 degrees Centigrade

- Internationally:
  - Triple packaging according to IATA category B guidelines

Interpretation of rRT-PCR results

- Real-time reverse-transcription polymerase chain reaction (rRT-PCR) - amplification and detection of unique COVID-2019 viral nucleic acid sequences
- Negative result does not rule out possibility of infection
- Factors that could lead to a false –negative result:
  - Poor specimen quality
  - Specimen was collected late or very early in the illness
  - Specimen was not handled and shipped appropriately, (eg. the cold chain)
  - Technical reasons inherent in the test, e.g virus mutation

If a high clinical suspicion for COVID-19 persists despite an initial negative test, repeat testing should be considered in consultation with an infectious diseases expert, particularly in hospitalised patients for whom management might be significantly altered.

Infection prevention and control

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)

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 meningitides

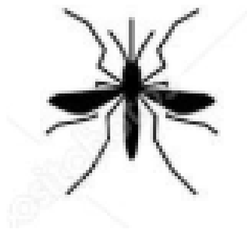
Control
- Gloves, surgical masks, +/- gowns, masks, visors (to prevent mucous membrane splashes, contamination of clothing)

Airborne transmission
- Inhaling droplets nurclei (<5um 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



COVID-19: How does it spread?

- Person infected with COVID coughs or sneezes, release droplets of infected fluid
- Larger droplets fall on nearby surfaces and objects
- People infected when touch contaminated surface then touch their eyes, nose or mouth
- People infected by breathing in droplets if standing with 1m of infected person

Coronavirus

?

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Control
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Infection prevention and Control

- A combination of standard, contact and droplet precautions
- Add airborne precautions when performing aerosol-generating procedures.
- Standard precautions

- hand hygiene
- appropriate use of PPE
- safe handling of sharps, linen and waste
- disinfection of patient care articles
- respiratory hygiene
- occupational health and injection safety

In all facilities……

- Ensure hand hygiene for HCW and patients is possible, and done!
- Provide soap, basins
- Use posters to show 5-movements of hand hygiene
- Provide hand sanitiser
- Use health promotion staff to demonstrate hand and cough hygiene

Infection prevention and Control

Transmission-based precautions - droplet, and contact:

- Hand hygiene
- Healthcare worker PPE: gloves, gown (or apron), and a medical mask.
- Safe waste management
- Use either disposable or dedicated equipment (e.g. stethoscopes, blood pressure cuffs and thermometers). If equipment needs to be shared among patients, clean and disinfect between each patient use.
- Limit patient movement (e.g. portable X-rays rather than sending the patient to the X-ray department). Patients must wear medical masks when outside their rooms

Infection prevention and Control

Aerosol-generating Procedures:

Aerosol precautions are required when performing aerosol-generating procedures. These include taking respiratory tract samples for SARS-CoV-2 testing (such as nasopharyngeal and oropharyngeal swabs), intubation, bronchoscopy, open suctioning of the respiratory tract, and cardiopulmonary resuscitation.

- **Aerosol precautions for healthcare workers:**

-Healthcare worker PPE: gloves, gown, a fit-tested particulate respirator (N95 respirator), and eye protection (goggles or face shield).

-Use an adequately ventilated single room when performing aerosol-generating procedures, with spacing between beds of at least 1-1.5 metres.

Comprehensive national IPC guidelines for COVID-19 are available at the NICD's website: https://www.nicd.ac.za/diseases-a-z-index/covid-19/covid-19-guidelines/

When caring for someone with suspected COVID-19 in Facilities

Implement contact and droplet precautions

- Put in a well ventilated isolation room
  - Ensure air-conditioning system is well maintained
- Provide patient with a mask
- Implement contact and droplet precautions
- Limit the number of staff who can enter the isolation room
- Limit patient movement – use portable X-rays.

Implement contact and droplet precautions

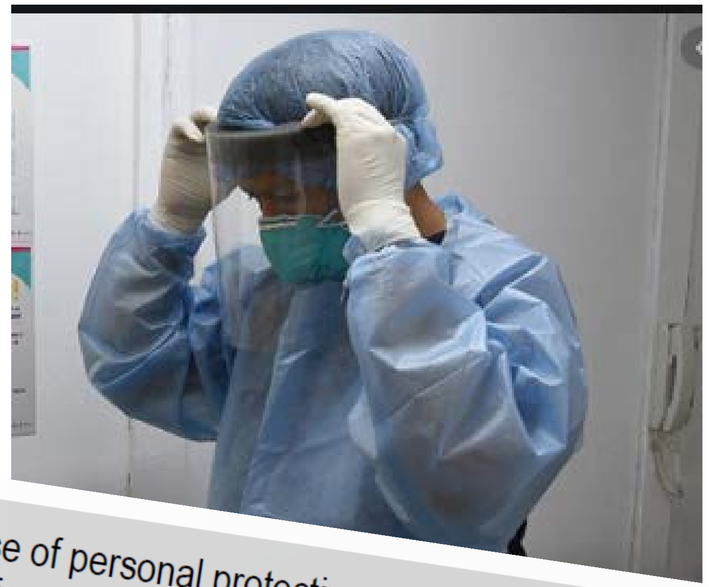
- Surgical/medical mask
- Disposable gown
- Gloves
- Eye protection

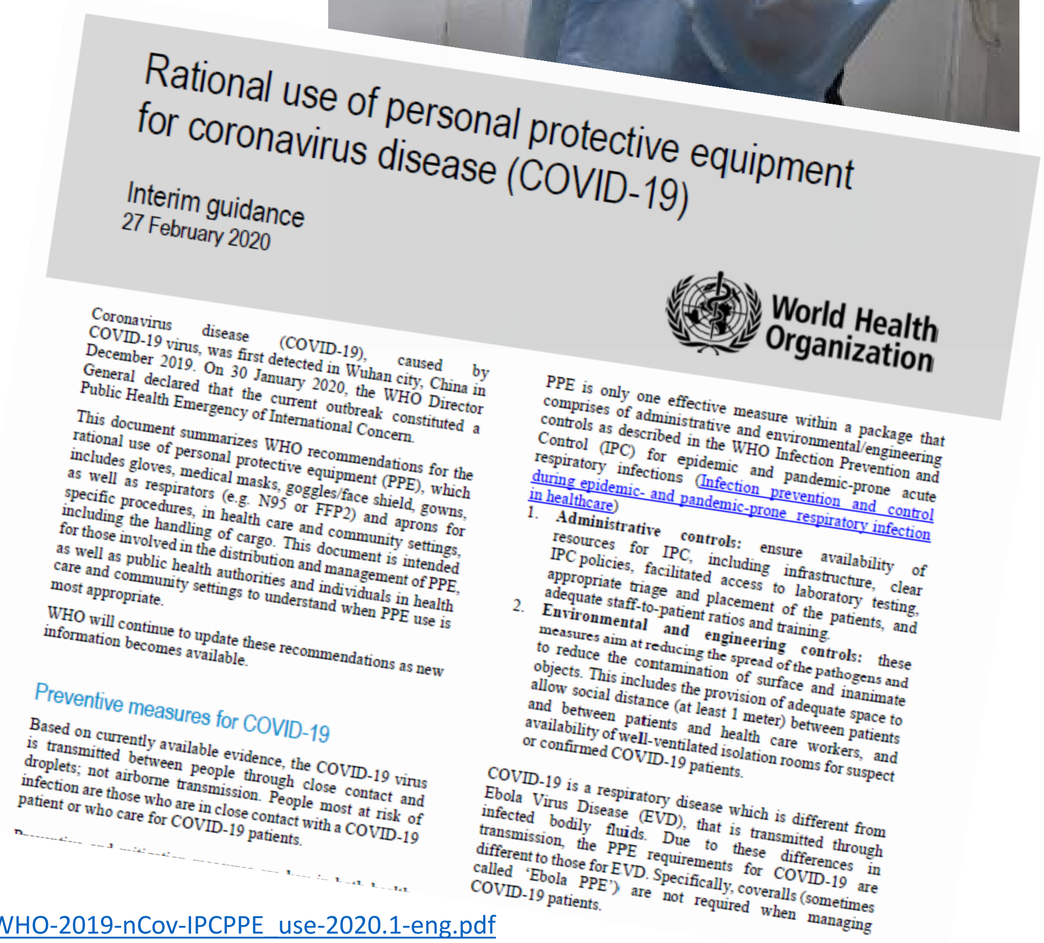
When caring for someone with suspected COVID-19 in Facilities

When taking a sputum specimen or nasopharyngeal swab), intubation, bronchoscopy, open suctioning of the respiratory tract, and cardiopulmonary resuscitation

airborne and contact precautions are required

- Always use gown (or apron), gloves
- Use a face-shield or goggles
- a fit-tested particulate respirator (N95 respirator)





Rational use of personal protective equipment for coronavirus disease (COVID-19)

Interim guidance
27 February 2020

World Health Organization

Coronavirus disease (COVID-19), caused by COVID-19 virus, was first detected in Wuhan city, China in December 2019. On 30 January 2020, the WHO Director General declared that the current outbreak constituted a Public Health Emergency of International Concern.

This document summarizes WHO recommendations for the rational use of personal protective equipment (PPE), which includes gloves, medical masks, goggles/face shield, gowns, as well as respirators (e.g. N95 or FFP2) and aprons for specific procedures, in health care and community settings, including the handling of cargo. This document is intended for those involved in the distribution and management of PPE, as well as public health authorities and individuals in health care and community settings to understand when PPE use is most appropriate.

WHO will continue to update these recommendations as new information becomes available.

Preventive measures for COVID-19

Based on currently available evidence, the COVID-19 virus is transmitted between people through close contact and droplets; not airborne transmission. People most at risk of infection are those who are in close contact with a COVID-19 patient or who care for COVID-19 patients.

PPE is only one effective measure within a package that comprises of administrative and environmental/engineering controls as described in the WHO Infection Prevention and Control (IPC) for epidemic and pandemic-prone acute respiratory infections (Infection prevention and control during epidemic- and pandemic-prone respiratory infection in healthcare)

1. **Administrative controls:** ensure availability of resources for IPC, including infrastructure, clear IPC policies, facilitated access to laboratory testing, appropriate triage and placement of the patients, and adequate staff-to-patient ratios and training.
2. **Environmental and engineering controls:** these measures aim at reducing the spread of the pathogens and to reduce the contamination of surface and inanimate objects. This includes the provision of adequate space to allow social distance (at least 1 meter) between patients and between patients and health care workers, and availability of well-ventilated isolation rooms for suspect or confirmed COVID-19 patients.

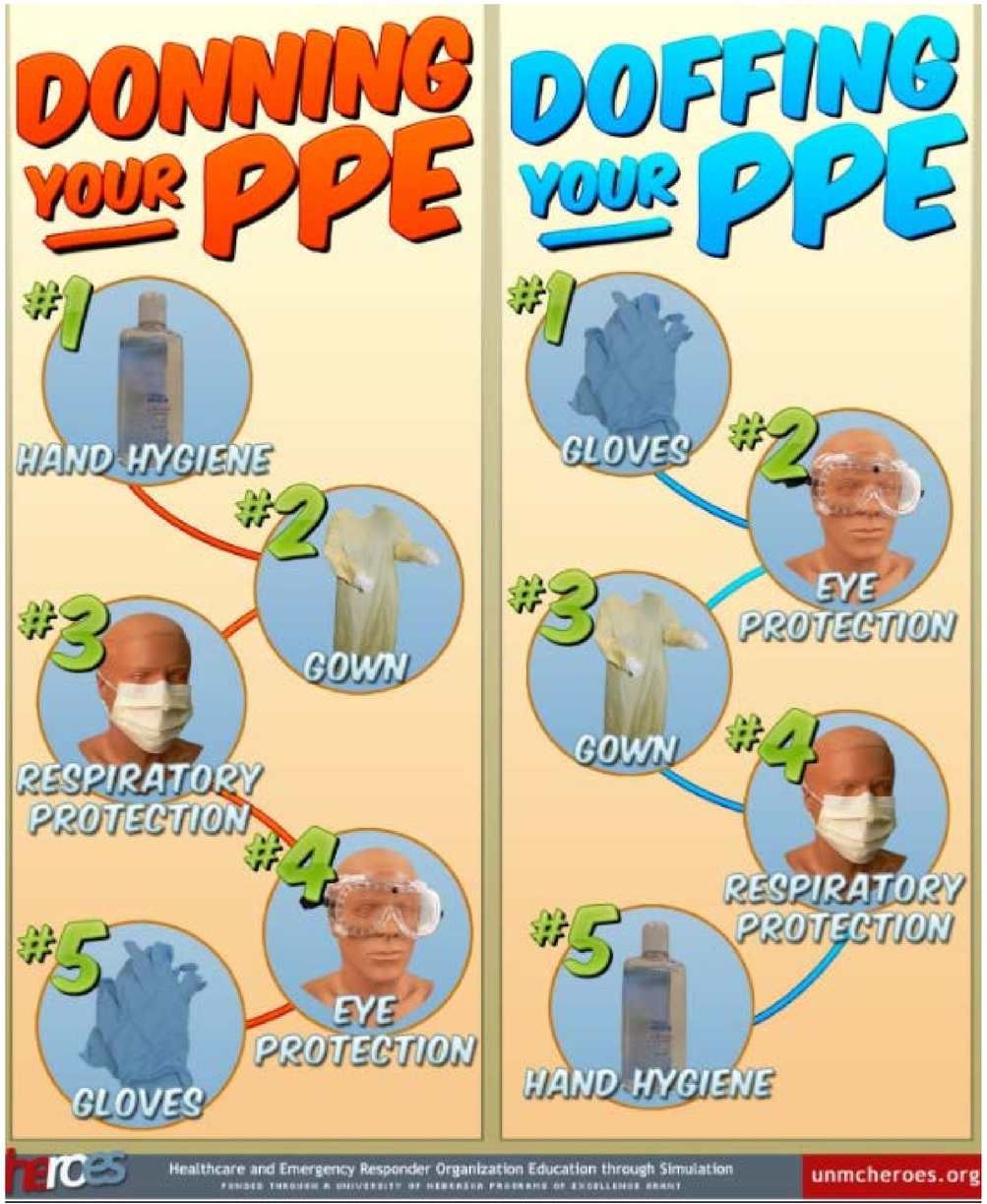
COVID-19 is a respiratory disease which is different from Ebola Virus Disease (EVD), that is transmitted through infected bodily fluids. Due to these differences in transmission, the PPE requirements for COVID-19 are different to those for EVD. Specifically, coveralls (sometimes called 'Ebola PPE') are not required when managing COVID-19 patients.

https://apps.who.int/iris/bitstream/handle/10665/331215/WHO-2019-nCov-IPCPPE_use-2020.1-eng.pdf

Training in use of IPC

Ensure staff are trained and familiar with

- Triage
- Handwashing
- Screening
- Case definitions
- Use of PPE



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COVID-19 Disease: Infection Prevention and Control Guidelines

Version 2 (21st May 2020)

https://www.nicd.ac.za/wp-content/uploads/2020/05/ipc-guidelines-covid-19-version-2-21-may-2020.pdf

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

Interim guidance
19 March 2020

World Health Organization

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,[1] based on current knowledge of the situation and experience with severe acute respiratory syndrome (SARS) and MERS.[2]

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.[2]

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

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)

https://www.who.int/publications/i/item/10665-331495

WHO

Rational use of personal protective equipment for coronavirus disease 2019 (COVID-19)

Interim guidance

6 April 2020

Rational use of personal protective equipment for coronavirus disease (COVID-19) and considerations during severe shortages

Interim guidance

6 April 2020

World Health Organization

Background

This document summarizes WHO's recommendations for the rational use of personal protective equipment (PPE) in health care and home care settings, as well as during the handling of cargo; it also assesses the current disruption of the global supply chain and considerations for decision making during severe shortages of PPE.

This document does not include recommendations for members of the general community. See here: for more information about WHO advice of use of masks in the general community.

In this context, PPE includes gloves, medical/surgical face masks - hereafter referred as "medical masks", goggles, face shield, and gowns, as well as items for specific procedures- filtering facepiece respirators (i.e. N95 or FFP2 or FFP3 standard or equivalent) - hereafter referred to as

- avoiding touching your eyes, nose, and mouth;
- practicing respiratory hygiene by coughing or sneezing into a bent elbow or tissue and then immediately disposing of the tissue;
- wearing a medical mask if you have respiratory symptoms and performing hand hygiene after disposing of the mask;
- routine cleaning and disinfection of environmental and other frequently touched surfaces.

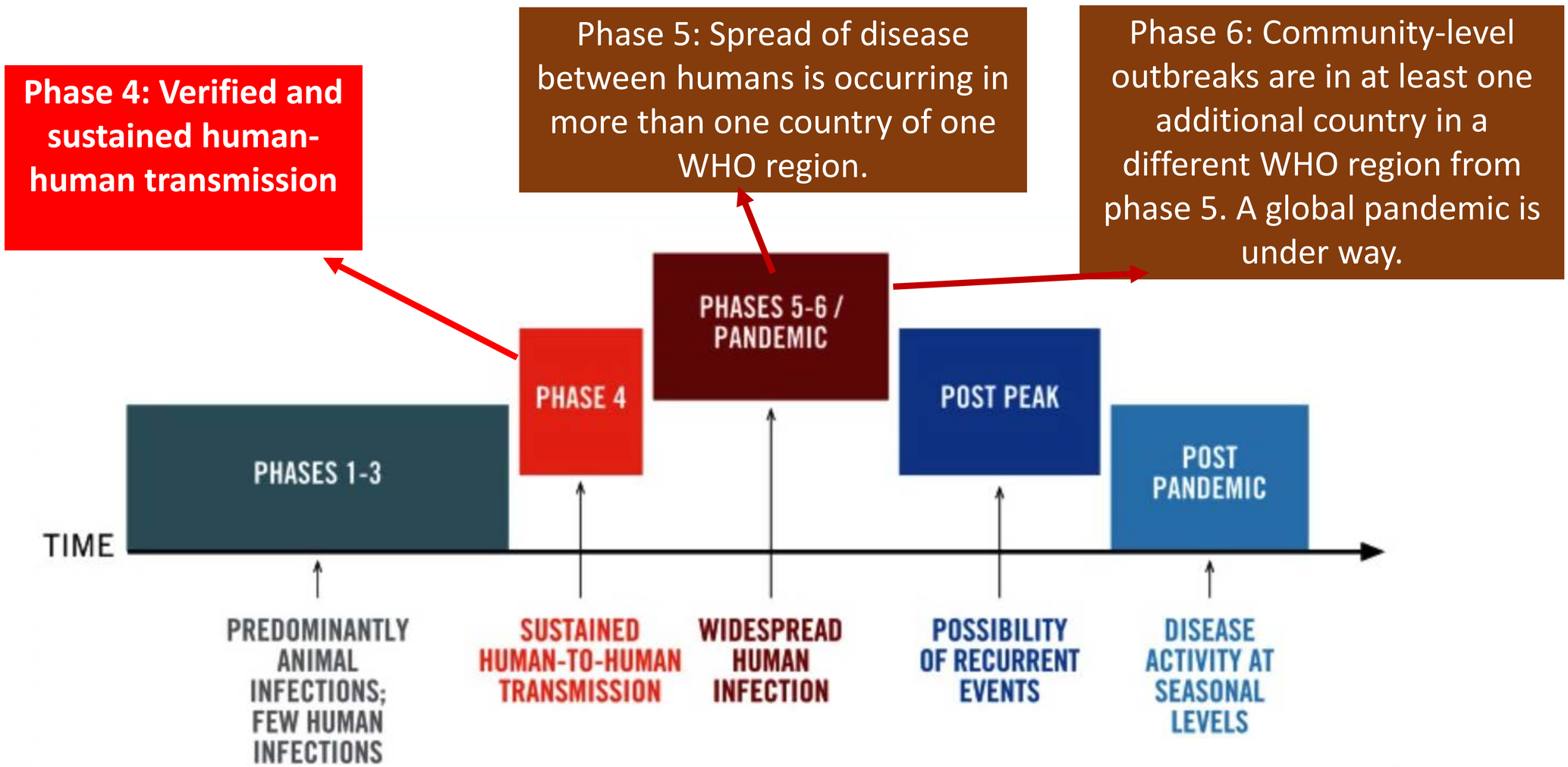
In health care settings, the main infection prevention and control (IPC) strategies to prevent or limit COVID-19 transmission include the following:[2]

1. ensuring triage, early recognition, and source control (isolating suspected and confirmed COVID-19 patients);
2. applying standard precautions[3] for all patients and including diligent hand hygiene;

https://apps.who.int/iris/bitstream/handle/10665/331695/WHO-2019-nCov-IPC_PPE_use-2020.3-eng.pdf

Public Health Response

Phases of a pandemic – and appropriate responses



Phases of a pandemic – and appropriate responses

- All public health responses are directed to 'containing' the disease
- Public Health responses moved to a 'mitigation' strategy

Direct and co-ordinate rapid pandemic containment activities to limit or delay spread of infection

Provide leadership and co-ordination to multisectoral resources to mitigate the societal and economic implications

Important messages

Public, students, employees, others……

- Stay informed
- Avoid stigma
- Hand washing
- Cough etiquette
- Stay at home if sick or self report
- Social distancing
- Wave, no hand shaking, 1-2m apart
- Travel restrictions, avoid domestic travel
- No mass gatherings
- Disinfect surfaces

Thank You