



COVID-19 CLINICAL CASE MANAGEMENT

(Version 1 - April 2020)



health

Department:
Health
REPUBLIC OF SOUTH AFRICA



Outline



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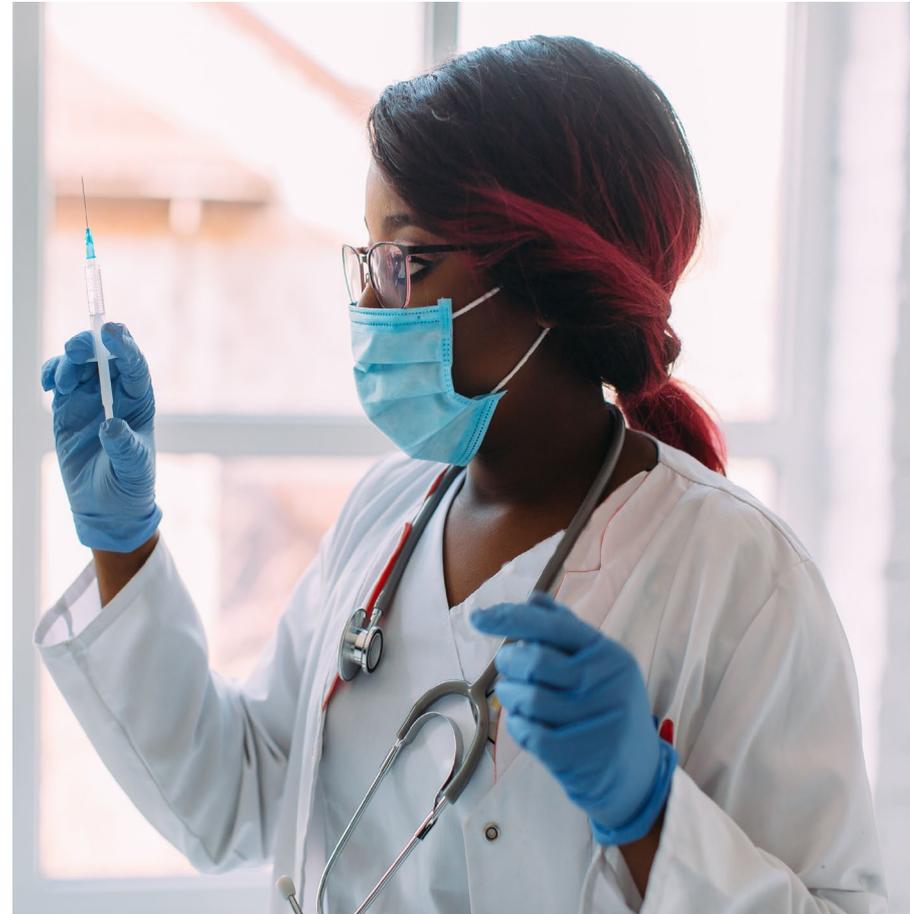
Introduction

- The World Health Organization (WHO) was alerted on 31st December 2019 to a cluster of pneumonia cases of unknown etiology in patients in Wuhan City, China
- A week later it was known to be the novel coronavirus
- Also called Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2)
- That is why the illness is called COVID-19 as of 11st February 2020
- This presentation describes clinical care in and outside health care facilities for patients who are suspected or confirmed to have contracted COVID-19

Objectives

At the end of this training, the attendees will:

- Understand what COVID-19 is
- Be able to suspect and screen individuals suspected to have COVID-19
- Understand how COVID-19 is diagnosed in the laboratory
- Familiarise themselves with the clinical management of COVID-19
- Be able to prevent COVID-19 while assisting those in need of help



Epidemiology

- SARS-CoV-2 is a betacoronavirus closely related to SARS-Cov and MERS-Cov.
- It is an enveloped, non-segmented, positive sense RNA virus.
- It is believed to have originated in bats but the animal that mediated transmission to humans remains unknown.
- The incubation period is estimated to be 4–5 days.
- On average each infected person spreads the infection to 2 others.



Clinical Presentation (1)

- 40-70% of infected individuals remain asymptomatic.
- Among those who are symptomatic:
 - a) 80% of individuals develop mild disease
 - b) 15% develop severe disease with hypoxaemia, dyspnea and tachypnea.
 - c) 5% become critically ill (with respiratory failure, septic shock and/or multiorgan dysfunction).

Clinical Presentation (2): Symptomatology

- Fever is the most common
- Cough is also very common
- Fatigue
- Sputum production
- Shortness of breath
- Myalgia or arthralgia
- Sore throat
- Headache
- Chills
- Gastrointestinal symptoms such as nausea, vomiting or diarrhea are uncommon

Transmissibility



Main route of transmission is respiratory droplets



Airborne when performing aerosol-generating procedures (e.g. taking nasopharyngeal swabs, performing CPR or intubation)



Excreted in stool (possibly faeco-oral)



No evidence of sexual transmission

Person Under Investigation for COVID-19

1. This is a person to be tested for COVID-19
2. Persons with acute respiratory illness with sudden onset of at least **one** of the following:
 - Cough
 - Sore throat
 - Shortness of breath
 - Fever (= or > 38 degrees Celsius measured) or history of fever (subjective) irrespective of admission status

Persons at highest risk for COVID-19 (1)

3. Persons at a highest risk are those who have an acute respiratory illness and who, in the 14 days prior to onset of symptoms, met at least one of the following epidemiological criteria:
 - Were in close contact **(1)** with a confirmed **(2)** or probable case **(3)** of SARS-CoV-2 infection; or
 - Had a history of travel to areas with local transmission of SARS-CoV-2; (NB Affected countries will change with time, consult NICD website for current updates); or

Persons at highest risk for COVID-19 (2)

3. Worked in, or attended a health care facility where patients with SARS-CoV-2 were being treated **(4)**; or
4. Admitted with severe pneumonia of unknown aetiology

Management of suspected COVID-19

- HCW to use N95 respirator and cover eyes – especially when taking a specimen or performing an aerosol generating procedure)
- Use the screening questionnaire
- If screening is positive, give the patient a medical/surgical mask
- Direct the patient to a separate area, preferably isolation room if available
- Educate the patient on how to cover the nose and mouth while coughing or sneezing (flexed elbow may be used)
- Educate the patient on hand hygiene
- Early initiation of supportive therapy may be required
- Limit patient's movements in the facility



Laboratory Diagnosis



Polymer Chain Reaction (PCR method) used



GeneXpert will be used in near future



Samples to be sent are: **upper respiratory tract samples** (nasopharyngeal and oropharyngeal swabs in universal transport medium) or **lower respiratory tract samples** if possible (sputum, tracheal aspirates, bronchoalveolar lavage fluid)

Differential Diagnosis

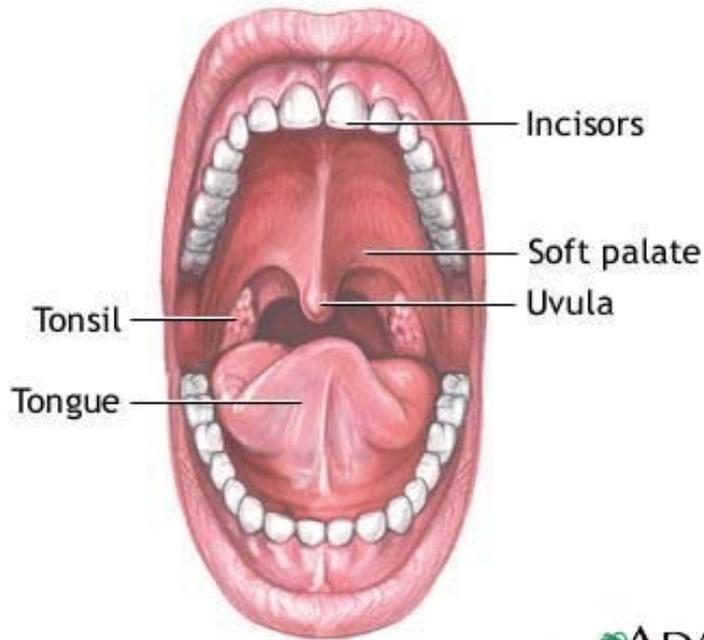
The **differential diagnosis** of suspected cases includes influenza (remembering the seasonality in patients from the northern hemisphere differs from those of the southern hemisphere), both conventional and atypical bacterial pneumonias, and in patients with HIV and a CD4 count <200 cells/mm³ (or equivalent immunosuppression), *Pneumocystis jirovecii* pneumonia. Depending on the patient, appropriate samples may include:

- Full blood count + differential count
- Blood culture
- Nasopharyngeal swabs or aspirates and 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) test if HIV positive

Specimen collection for SARS-CoV-2 testing

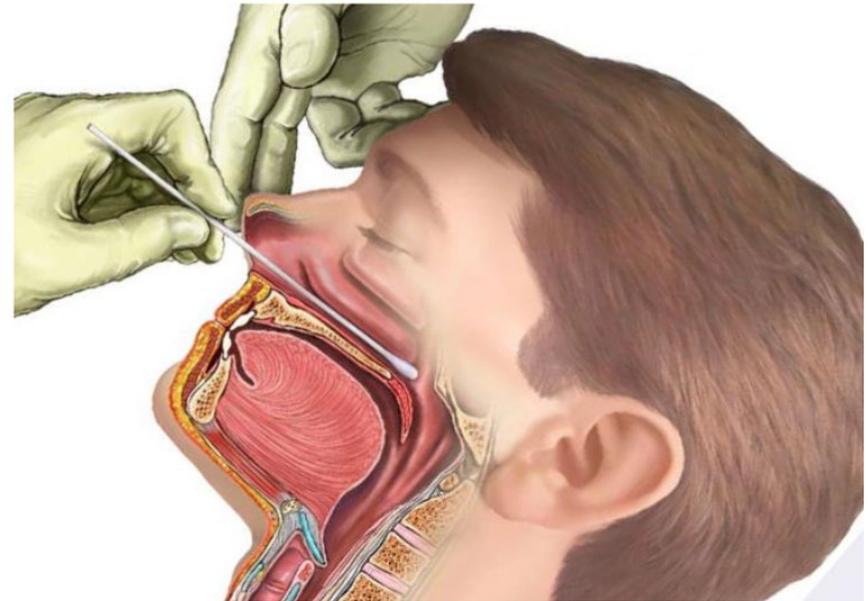
- Collect appropriate samples
- Lower respiratory tract samples are preferred because the lower respiratory tract is the primary site of infection
- Take combined nasopharyngeal and oropharyngeal swabs in ambulatory patients and sputum (if produced) and/or tracheal aspirate or bronchoalveolar lavage in patients with more severe respiratory disease
- Use universal/viral transport medium for swabs, if available; sterile container for sputum and aspirates

How to collect nasopharyngeal and oropharyngeal swabs



ADAM.

Oropharyngeal swab



Nasopharyngeal swab

Step 1: Equipment and materials

- Complete specimen submission form **and** person under investigation (PUI) form **and** contact line list found here
- Nasopharyngeal (NP) and oropharyngeal (OP) flocked swabs
- Tube containing universal transport medium (UTM), if UTM unavailable may use gel or send dry in sterile tube
- Tongue depressor
- Gloves, N95 respiratory (or surgical mask if unavailable) and eye protection
- Tissue for the patient to use after sample collection
- Biohazard bag for disposal of non-sharp materials
- Cooler box and cooled ice packs
- Ziploc plastic specimen bag

Step 2: Record keeping

Complete

- Complete the specimen submission form and person under investigation (PUI) form and contact line list

Place

- Place specimen submission and PUI form into a Ziploc bag

Label

- Label the tube of universal transport media (UTM) with the patient's name and date of birth and sample type

Step 3: Collection of nasopharyngeal swab (NPS)

- Don gloves, respirator or mask, and eye protection.
- Open a sterile flocked swab at the plastic shaft.
- Ask the patient to tilt his/her head back. Estimate the distance from the patient's nose to the ear.
- Gently insert swab into the nostril and back (not upwards) to the nasopharynx until a slight resistance is met.
- Rotate swab 2-3 times and hold in place for 2-3 seconds.
- If resistance is met before fully inserted, remove and try the other nostril.
- Slowly withdraw the swab and put it into the specimen container.
- Break plastic shaft at the break point line and close the tube.

Step 4: Collection of oropharyngeal swab (OPS)

- Wearing gloves, respirator or mask, and eye protection, and holding the UTM with the nasopharyngeal swab in, open a second flocked swab for OPS collection.
- Ask the patient to tilt their head back and mouth open.
- Hold the tongue down with a tongue depressor.
- Have the patient say “aahh” to elevate the uvula.
- Swab each tonsil first, then the posterior pharynx in a figure-8 movement.
- Avoid swabbing the soft palate or the tongue with the swab tip as this can induce the gag reflex.
- Place the swab into the same UTM tube with the NPS already in and break off the shaft at the break point.
- Tightly close the tube.
- Place the closed tube with two swabs in the Ziploc bag.
- Remove gloves, respiratory or mask, and eye protection and wash hands thoroughly.

Step 5: Transport of specimens

- Ensure the cooler box and ice packs stay at 2-8°C.
- Transport to NHLS or private laboratory on the day of specimen collection.
- Contact NHLS laboratories as below for shipping instructions or contact private laboratories directly.
- If shipping to NICD (for reference testing), mark:
 - “Suspected COVID-19, NHLS/NICD, Centre for Respiratory Diseases and Meningitis (CRDM), Lower North Wing, SAVP building 1 Modderfontein Rd, Sandringham, Johannesburg, 2131”
 - NHLS laboratories use usual overnight regional courier service; private labs will ship via existing systems.

Step 6: NHLS laboratory contact details

Eastern Cape Province:

Dora Nginza Virology Lab
Dr Howard Newman
0413956152

Free State Province:

Universitas Virology
051 405 3162
After hours ask for virologist on call
051 405 3033

Gauteng Province:

Charlotte Maxeke Laboratory
082 329 2914

Tshwane Virology Laboratory
Prof Sim Mayaphi
012 319 2351

DGM Virology Laboratory
Dr Temitayo Famoroti
012 521 4398

KwaZulu Natal Province:

**Inkosi Albert Luthuli Academic
Hospital Virology**
Dr Khanyisile Msomi
031 240 2791/4

Northern Cape Province:

Universitas Virology
051 405 3162
After hours ask for virologist on call
051 405 3033

Western Cape Province:

Tygerberg Virology
021 938 4330/4934

Groote Schuur Hospital Virology
021 404 4129/3091

Empiric
treatment
of other
pathogens

Depending on the clinical
syndrome that is appropriate

Conventional community-
acquired pneumonia see SA
community-acquired pneumonia
guidelines

Atypical pneumonia (see above
guidelines)

Managing Patients at Home while Awaiting Lab Results



Suspected cases who are medically well, or who are assessed as having only mild disease, may be managed at home while awaiting test results.

Criteria for mild disease:

- SpO₂ equal or >95%
- Respiratory rate <25
- Heart rate <120
- Temperature 36–39°C
- Mental status normal

Advice for Patients Self-Isolating at Home



Sleep in own room and use own bathroom (if possible)



Use surgical mask, maintain at least 1m distance from other members



Wash hands with soap or alcohol-based solution



Practice cough etiquette (elbow crease)



Frequently clean hard surfaces and objects at patient's disposal



Use own dishes, cups, spoons, forks etc.



Patient should know who to call if condition worsens

Management of confirmed COVID-19 cases



The goal is to reduce morbidity and mortality and minimise transmission



Triaging patients and early identification of severe cases that may need hospital or ICU admission is important in morbidity and mortality



Prevent transmission of coronavirus



Contact tracing



Patient's education on cough hygiene and IPC at home

Rapid Triaging of Cases

- Assess severity of disease.
- Mild disease may be treated at home (as long as patients can self-isolate and access health care if symptoms worsen).
- Moderate to severe disease will require admission.
- Criteria for management at home (age 12 or higher):
 - Mild disease: Oxygen saturation = or above 95%, respiratory rate less than 25/min, heart rate less than 120, body temperature 36–39°C and normal mental status
 - Able to safely self-isolate: separate room, able to contact and return to health care facility in case of deterioration



Early Supportive Therapy During Hospitalisation



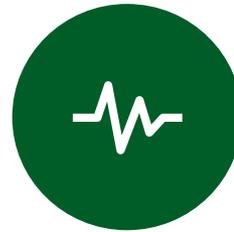
Provide **supplemental oxygen immediately in patients with poor saturation** aiming at achieving at least oxygen saturation of 90% or higher



Use **conservative fluid management** because aggressive fluid resuscitation may worsen oxygenation, especially in settings where there is limited availability of mechanical ventilation



Empiric treatment as per NEMLC Standard Treatment Guidelines



Close clinical monitoring is very important

Oxygen Therapy

Provide supplemental oxygen immediately in patients with poor saturation using:

1. A nasal canula (Oxygen dose 1 – 5 L/min) or
2. A face mask (6 – 10 L/min) or
3. A face mask with reservoir bag (10 – 15 L/min)

This is the intervention that will save most lives.

Specific Therapies (1)



Do not use corticosteroids routinely because there is no evidence of effectiveness and possible harm



Use corticosteroids if indicated for another reason



There is no current evidence from RCTs



There are candidate drugs undergoing investigation including: remdesivir, lopinavir/ritonavir, chloroquine, interferon and tocilizumab



The candidate drugs may only be used in facilities that have access to existing clinical trials

Specific Therapies (2)

Where possible, consideration should be given to enrol hospitalized patients in clinical trials: this is very good, it will help provide adequate monitoring and ethics oversight, and affords the opportunity to contribute to the therapeutics evidence base for future patients.

If investigational therapeutics are given outside of a clinical trial, this should be done under the Monitored Emergency Use of Unregistered Interventions (MEURI) framework.

Specific Therapies (3): Meuri Principles



Data providing preliminary support for the intervention's efficacy and safety are available, at least from laboratory or animal studies



Ethics' approval should be in place



The patient's informed consent should be obtained before treatment administration



Adequate resources are required before implementation



The results of the intervention are documented and shared with the wider medical and scientific community



Therapies outside clinical trials should include hospitalized patients, not those on ambulatory care

Specific Therapies (3): Other Agents

- Patients on Angiotensin-Converting Enzyme Inhibitors (ACEi) or Angiotensin Receptor Blockers (ARBs) should not be switched to other drugs unless there are other medical reasons to do so.
- Regarding the use of nonsteroidal anti-inflammatory (NSAIDs) in patients infected with coronavirus, there is no evidence these agents do worsen COVID-19, although it may be prudent to use drugs from other classes such as PARACETAMOL.
- For patients that require NSAIDs, the evidence does not warrant discontinuation.

Management of Hypoxemic Respiratory Failure and ARDS



Recognise severe hypoxemic respiratory failure in respiratory distressed patients.



Hypoxemic respiratory failure in ADRS commonly results from intrapulmonary ventilation-perfusion mismatch or shunt and usually requires mechanical ventilation.



High-flow nasal oxygen (HFNO) or non-invasive ventilation (NIV) should only be used in selected patients with hypoxemic respiratory failure. Such patients should be **closely monitored** for clinical deterioration.



HFNO and NIV carry the risk of aerosolization of viral particles against which adequate precautions need to be taken.

Contra-indications for HFNO

- Hypercapnia (exacerbation of obstructive lung disease, cardiogenic pulmonary oedema)
- Hemodynammic instability
- Multi-organ failure
- Abnormal mental status



Intubated Patients with Adrs use Lung-protective Ventilation Strategies (1)

- Always consult expert intensivist, Internal Medicine Specialist or Senior Medical Officer with adequate experience
- Detailed recommendations on mechanical ventilation strategies are beyond the scope of the guideline
- However key principles include the following:
 - Aim for an initial tidal volume of 6 ml/kg – higher tidal volume up to 8 ml/kg
 - Strive to achieve the lowest plateau measure possible, plateau pressures above 30 cm H₂O are associated with an increased risk of pulmonary injury

Intubated Patients with Adrs use Lung-protective Ventilation Strategies (2)

However key principles include the following:

- Hypercapnia is permitted if meeting the pH of 7.30 – 7.45
- Application of prone ventilation > 12 hours a day is strongly recommended for patients with severe ADRS
- In patients with moderate or severe ADRS, moderately higher PEEP instead of lower PEEP is suggested
- The use of deep sedation may be required to control respiratory drive and achieve tidal volume targets

Intubated Patients with Adrs use Lung-protective Ventilation Strategies (3)

However key principles include:

- Continuous neuromuscular blockade may be considered in situations such as ventilator dyssynchrony despite sedation, such tidal volume limitation cannot be reliably achieved or refractory hypoxemia or hypercapnia. It should not be used in patients with moderate to severe ADRS ($\text{PaO}_2/\text{FiO}_2 < 150$).
- Consider referral for extracorporeal life support (ECLS) if available.
- Avoid disconnecting the patient from the ventilator, which results in loss of PEEP and atelectasis. Use in-line catheters for airway suctioning and clamp endotracheal tube when disconnection is required (e.g. transfer to a transport ventilator). A high efficiency particulate filter on the expiratory limb of the ventilator circuit should be used.

De-isolation Criteria (1)

Patients can be de-isolated 14 days after the onset of their symptoms (mild cases)

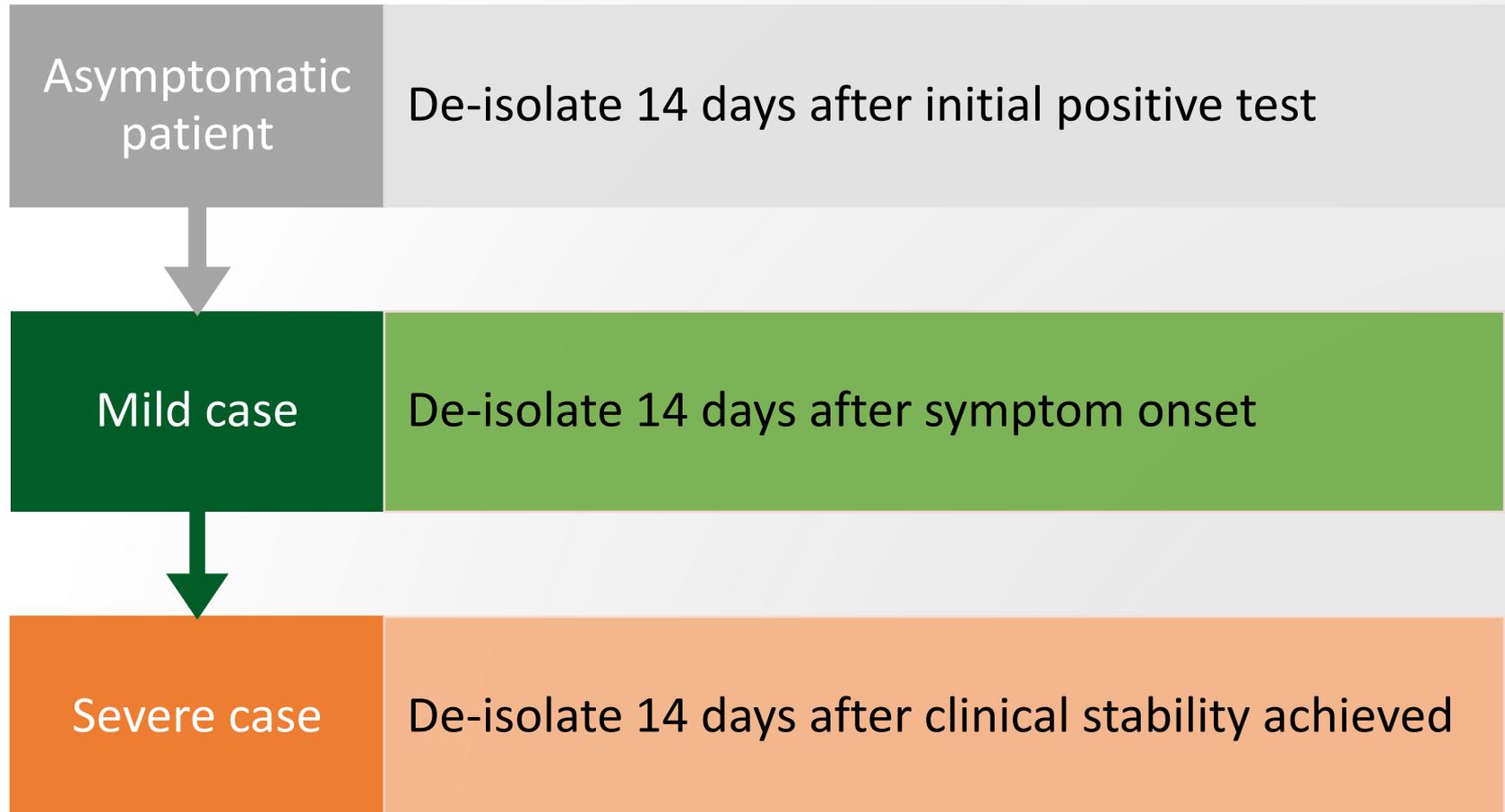
14 days after achieving clinical stability (moderate-severe cases), meaning from the time of disconnection from supplemental oxygen for example

Most patients with mild COVID-19 infection continue to shed SARS-CoV-2 from their upper airways for approximately 7 – 12 days

The duration of shedding is longer in severe cases

Viral shedding does not necessarily equate to infectiousness; it may decline to a level below the infectious threshold before it ceases completely, and/or non-viable virus may be shed

De-isolation Criteria (2)



Recording and Reporting

- This is very important.
- The goal of clinical management is to reduce morbidity and mortality from COVID-19 .
- We therefore need to record and report with accuracy and completeness in order to track the size and severity of the pandemic.
- The use of ordinary laboratory request form from NHLS is recommended.
- Please capture patient's ID number or passport number.
- Do not forget to capture the province as well as other data elements indicated on the lab request form.

Recording Tools

TOOL	WHEN TO COMPLETE?	COMMENTS
Person of interest form	For all individuals suspected of COVID-19 and have a specimen taken	
NMC case notification	For all cases who meet the case definition for COVID-19	Can be completed online using NICD NMC mobile or web-based app
Admission form (for inpatients)	For all confirmed patients admitted to a health care facility at admission or as soon as possible after admission	Documents presence of co-morbidities, severity of illness at admission
Daily monitoring form (separate forms for inpatients and outpatients)	For all confirmed patients for each day until they are considered cured (using laboratory criteria e.g. PCR)	Documents the daily symptoms, signs and severity of disease during admission
Discharge form (different forms for patients and outpatients)	For all confirmed patients	Documents patient's outcomes such as death, transfer or discharge
Homecare form (for outpatients)	For all confirmed patients admitted with mild disease managed at home	Documents presence of co-morbidities, severity of illness at admission

Palliative care for COVID-19 patients (1)

- Patients who do not qualify for intubation and ventilation and are deteriorating despite best supportive care require good palliative care interventions and support to alleviate symptoms that cause distress and promote a dignified death.
- Spiritual and psychological well-being are paramount as many of these patients will die alone in a room without their loved ones present.
 - Explain the prognosis to the patient and their family.
 - Please encourage them to talk to their family/friends, if possible, on their own phones.
 - Guide families as needed on how to communicate with the patient.
- Refer patients and families to the palliative care team (if available) for further counselling as required.

Palliative care for COVID-19 patients (2)

- The physical symptoms requiring palliation include breathlessness, anxiety, increased secretions, cough and fever, as well as constipation from opioid use.
 - Interventions include non-pharmacological and pharmacological strategies.
 - Do not withhold medications for fear of respiratory depression.
 - Doses in this guideline are a starting point and can be increased as necessary.
 - The side effects of the medicines should be explained to the patient. Some may cause increased confusion and should be explained to the family (telephonically).
- Stop vitals monitoring and routine blood tests during this phase of illness as this is uncomfortable for the patient and causes unnecessary contact.
- If the patient is unable to eat, do not use artificial (NGT/PEG etc.) nutrition. Offer oral fluids as tolerated.
- Regular mouth care (cleaning and keeping moist) and skin care (regular turning) is essential.

Palliative care for COVID-19 patients (3)

- A table of management options is provided on slides below.
- If a patient is unable to swallow, MST tablets may be administered rectally.
- Some oral medications (not slow/prolonged release formulations) may be crushed or capsules emptied into liquid and administered orally.
- If IV access is not available, medications may be administered subcutaneously (SC) through a primed butterfly needle sited on the upper chest or back above the scapula and secured with a transparent dressing; or with a portable syringe driver, if available.

Palliative care for COVID-19 patients (4)

Symptom	Non-pharmacological	Pharmacological
Fever	Cool cloth	Paracetamol 500mg - 1g PO 6 hrly/prn
Nausea		Metoclopramide 10mg PO/IVI/SC 8 hrly/prn Alternatively, haloperidol 1 – 2.5mg PO nocte
Breathlessness	Open window – fresh air Sit upright	<p>Start with Morphine syrup at 2.5 – 5mg PO prn, If > 2 doses needed /24 hours:</p> <ul style="list-style-type: none"> • MST 10mg 12hourly or Morphine syrup 2.5 – 5mg PO 6 hrly/prn • If cannot swallow – Morphine sulphate 1mg IVI/SC – can repeat 6hrly if necessary • If severe underlying respiratory disease (e.g. COPD): start with morphine syrup 1mg PO prn/6hourly) • If swallowing tablets ok, can convert to MST (24 hour requirement/2 given 12 hourly) • Give nausea prophylaxis and add laxatives • Increase doses as required for symptom control

Palliative care for COVID-19 patients (5)

Symptom	Non-pharmacologica	Pharmacological
Cough		Morphine as above Or Codeine sulphate 30mg po 6 hourly
Anxiety (can contribute to breathlessness)	Deep breathing Talking to family may help Counselling	Clonazepam (rivotril) 0.5 – 1mg po/IMI/IVI 8hourly Lorazepam 1mg PO/SL/IVI/SC Midazolam 2mg IVI/sc stat, can repeat prn Valium 2 - 5mg PO nocte

Palliative care for COVID-19 patients (6)

Symptom	Non-pharmacological	Pharmacological
Respiratory secretions	Position semi-prone for postural drainage or sit upright/semi-recumbant if pulmonary oedema or reflux	<p>Buscopan 20mg IVI/SC 6 hrly (not oral)</p> <p>Glycopyrolate 0.2 mg SC/IVI up to 6hrly prn (Medications need to be given as soon as secretions begin as they do not eliminate existing secretions)</p> <p>*atropine 1% ophthalmic solution may be used SL 2- 4 drops 6 hourly (off-licence)</p>
Delirium	<p>Orientation</p> <p>Treat other symptoms – pain, hypoxia, anxiety</p>	<p>Haloperidol 1-2 mg PO/IVI/SC stat – repeat if needed in 1hr or Chlorpromazine (largactil) 25mg PO/IMI as needed or Quetiapine (Seroquel) 12.5 - 25mg bd/tds</p>
Constipation (side effect of opioids)		<p>Senokot 1-2 tabs po nocte (may also add liquid paraffin as a stool softener)</p> <p>Lactulose 15 – 30mls nocte</p> <p>May need suppository if no stool after 3 days</p>

Conclusion

- This training course is based on NDoH clinical management guidelines version 3 of 27th March 2020.
- Clinical guidelines for COVID-19 are changing rapidly.
- Every time there is a new version, we shall send it to you seeing that we may not update these slides regularly.
- Your contribution is essential in the fight against COVID-19.
- Your most important contribution is adherence to NDoH guidelines.

“TOGETHER WE SHALL DEFEAT COVID-19”