Management of patient with confirmed COVID19

Updated 12 June 2020

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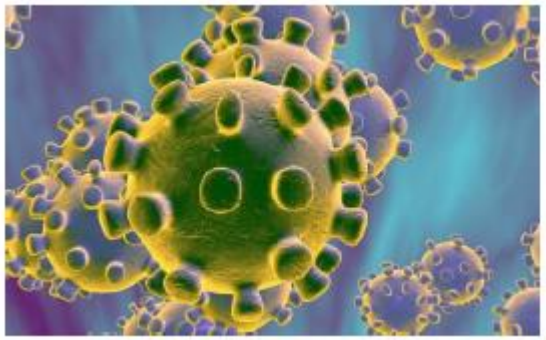
This presentation is compiled using the latest available NICD guidelines (version 4 of 18 May), the NDOH draft document for TB and input from local consultants. It is aimed at public sector facilities in-service training needs.

Terminology

- **SARS-COV-2**: The name of the virus
  - Severe Acute Respiratory Syndrome Coronavirus 2
  - It is a *betacoronavirus* related to SARS-COV and MERS-COV

- **COVID-19:** The name of the resulting illness



Epidemiology

INCUBATION: 4 to 5 days (range 2-7days)

Patients appear to be infectious 2-3days before symptoms and most infectious in first week of symptoms appearing

There might be transmission from asymptomatic patients – but extent is unknown

Reproductive number (R0): 2.2 (with no precautions 10 people with COVID19 will infect 22 others)

Clinical characteristics

- 81%: **mild disease**
  - fever (90%) – but not necessarily on admission
  - cough (2/3 of patients),
  - sputum production (1/3 of patients),
  - Sore throat, nausea, vomiting diarhoea < $1/5^{th}$ of cases
  - Loss of smell and taste – relatively common, early and moderate specific,
- 14%: **severe disease** with hypoxaemia, tachipnoea & extensive lung infiltrates
- 5%: **Critically ill** respiratory failure, septic shock and or multiorgan dysfunction.

CXR

Abnormalities in 60% of hospitalized patients – chest CT more sensitive

- Bilateral patchy ground glass opacities
- Normal CXR does not rule out COVID19 – especially in mild disease

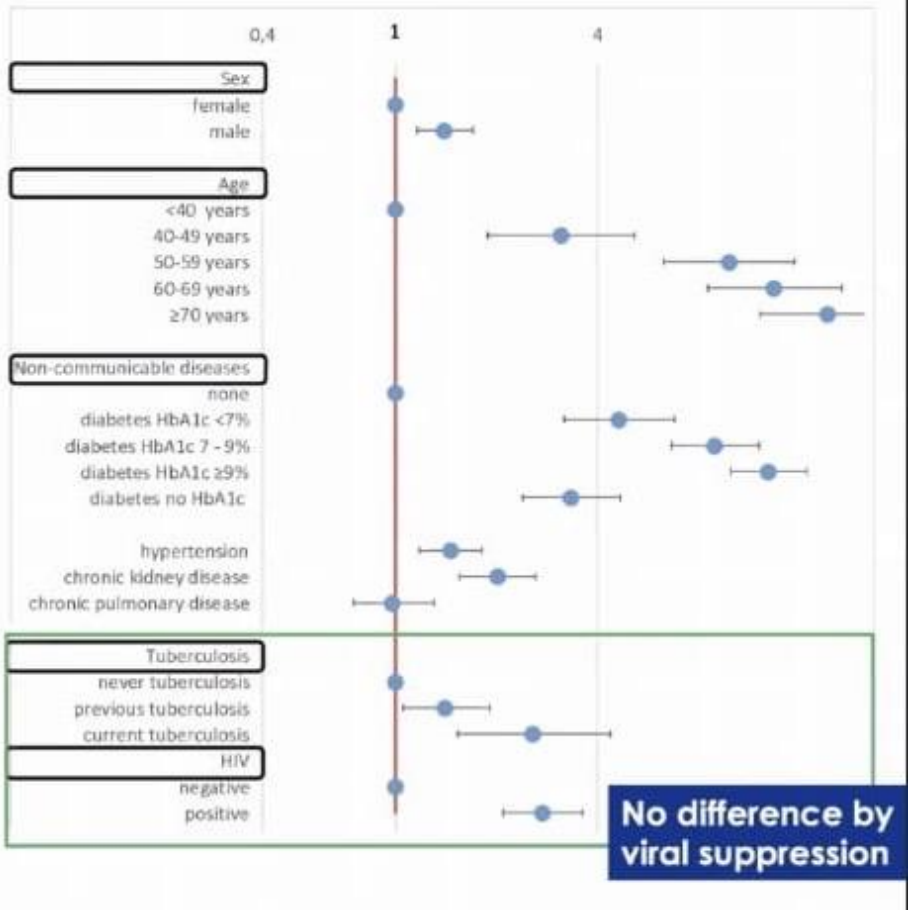
Outcomes and prognosis

- Median age about 50 years of reported cases
  - Very few cases report of hospitalization in children <15 years
  - Risk factors for severe disease: older age and cardio-pulmonary comorbidities, diabetes mellitus and obesity
- **96-99%** will make a full recovery – but may take several weeks.
- Case fatality of **0.7 – 7% due** to acute respiratory distress syndrome (ARDS), multiple organ failure and sometimes death.
- Death rate: partly depends on population age distribution, pandemic burden, extent of asymptomatic cases diagnosed

Risk of Death – latest WC statistics

What are the chances of dying from COVID-19 for different risk factors?

Patient characteristics	Hazard ratio	95% Confidence Interval
Sex		
female		
male	1,40	1,16; 1,70
Age		
<40 years		
40-49 years	3,12	1,88; 5,17
50-59 years	9,92	6,34; 15,54
60-69 years	13,55	8,55; 21,48
≥70 years	19,53	12,20; 31,26
Non-communicable diseases		
none		
diabetes well controlled (HbA1c <7%)	4,65	3,19; 6,79
diabetes poorly controlled (HbA1c 7 - 9%)	8,99	6,65; 12,14
diabetes uncontrolled (HbA1c ≥9%)	13,02	10,06; 16,87
diabetes – no measure of control	3,34	2,39; 4,68
hypertension	1,46	1,18; 1,81
chronic kidney disease	2,02	1,55; 2,62
chronic pulmonary disease	0,98	0,75; 1,30
Tuberculosis		
never tuberculosis		
previous tuberculosis	1,41	1,05; 1,90
current tuberculosis	2,58	1,53; 4,37
HIV		
negative		
positive	2,75	2,09; 3,61



Slide from Mary-Ann Davies (on behalf of WC Dept of Health)

Triage for Clinical severity

Patients should be quickly triaged in terms of clinical severity

- It allows for rapid initiation of O2 if necessary
- It has implications if patient can wait at home for results
- Protects staff and patients.

Rapid Triage of patient with COVID positive result

RAPID Triage:

- Severe disease: admit
- Mild disease: consider to manage at home if able to self-isolate
- Asymptomatic: manage at home

Management of Asymptomatic COVID Positive patients

WHAT IS AN ASYMPTOMATIC COVID19 positive patient?

- Some patients may have a positive COVID19 test, but have NO symptoms. The test may have been done because the patient had a close contact, or was picked up during routine community screening.
- Two sub-groups
  - The patient may be pre-symptomatic and will develop symptoms within 1-3 days.
  - The patient's immune system may be powerfully repressing the virus and will clear the virus without ever producing symptoms.

Extent of asymptomatic disease & implications

- It is too early to know the extent of asymptomatic infections.
- We do know it may contribute to infections – but at a lower rate than spread by symptomatic patients (6.4% - 40% postulated in different papers).
- A positive PCR identify both alive and dead organisms – a positive COVID test DOES NOT NECESSARILY INDICATE active infection.

Management of asymptomatic and COVID 19 positive patients

- Must self-isolate for 14 days from **date of positive test.**
- Daily self-screening for symptoms: if mild symptoms develop can manage at home
- If severe symptoms develop: to seek health care advice
- May de-isolate after 14 days from **date of test** – no follow up testing necessary to return to work.

Management COVID positive patients with MILD illness

Criteria for MILD disease

- SpO2 ≥ 95%
- RR < 25 *(age 5 to 12 <30)*
- HR <120 *(age 5 to 12: <130)*
- Temp 36-39^{o}C
- Mental state normal

Mild cases can self-isolate at home

CHECK: Can the patient self-isolate? If not – may need admission

- Separate bedroom?
- Able to maintain physical distancing at home?
- Able to maintain hand hygiene?
- Patient able to contact, and return to health care facility in case of deterioration.

Investigations of patients with mild disease may include

- HIV test (if status unknown)

- GeneXpert MTB if patient HIV positive and coughing or is HIV negative and contact of TB patients

Management of mild symptoms

- There is no treatment for COVID – give supportive advice
- Can use paracetamol as analgesia (rather than NSAID)
- Patients with asthma
  - Patients needing nebuliser – to use in separate room (it aerolises the virus). Better to use an inhaler with or without a spacer over a nebuliser if effective
  - Can continue inhaled steroids or nasal corticosteroids if needed
  - Can use short course steroids for asthma exacerbation – BUT NOT FOR ROUTINE USE
- Cough suppressants: NOT indicated
- **Do not discontinue** ACE-I, ARBs
- If unable to self-isolate safely: Admit

Advice to patients staying at home with COVID19: INFECTION Control

- Stay in specific room with own bathroom
- Avoid travel and contact with others – no visitors
- If with other people – wear a facemask and keep 1-2 m distance
- Regular hand washing / sanitizer
- Good cough and sneeze hygiene
- Avoid sharing household items such a dishes, cups utensils, towels
- High touch surfaces should be frequently cleaned
- Wash bedding, towels, clothes at 60 degrees if possible. Use hottest iron as appropriate. Where PPE when doing laundry, clean are thoroughly afterward and wash hands
- Patients should know where to call if symptoms get worse

Monitor for sudden worsening

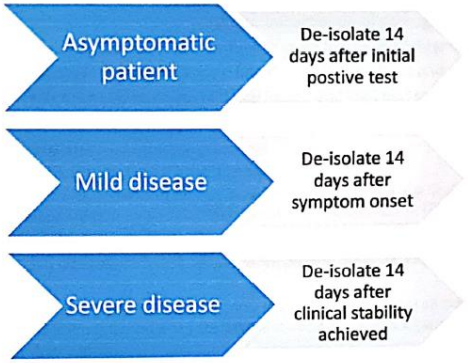
- Patients with “mild” disease can suddenly worsen over a week or more
- On average people who will need admission will
  - Develop dyspnoea median of 5 days after symptom onset
  - Require hospitalisation by day 7
  - ARDS by a median of day 8

ANY dispnoea that interfere with ability to perform daily activities of living to be reviewed in health care facility

When can patient with mild disease de-isolate

Patients: Most viable virus cleared by day 8 after starting symptoms. By day 10 the probability of culturing a live virus is < 5%

- Patients can de-isolate and return to work **14 days AFTER SYMPTOM ONSET**



Management COVID positive patients with SEVERE illness

EARLY SUPPORTIVE THERAPY IN HOSPITALISED COVID-19 patients.

Criteria for severe disease: one or more

- Pulse > 120 /min
- Rr >25
- SpO2 <92% on room air – beware of the happy hypoxic
- Temperature >39 degrees

Differential diagnosis

- Influenza
- Bacterial pneumonia (conventional and atypical)
- PTB
- If HIV positive and CD4 <200: considerPJP
- Malaria
- Non-infectious causes of dyspnoea- pulmonary emboli, MI, heart failure

Empiric treatment of other pathogens: consider if appropriate

- **CAP**: e.g add amoxicillin or Ceftriaxone (follow standard treatment guidelines)
- **Atypical pneumonia** –e.g. add azithromycin
  - See SA community-acquired pneumonia guidelines
- **Influenza** – consider oseltamivir (severe illness) – see NICD influenza guidelines
- **PJP**: if appropriate risk factors present: high dose CTX

Investigations: In all patients

- **HIV / CD4** if not known. If on ARVs do **VL**
- **FBC & diff** – typically lymphopaenia, normal neutrophils, thrombocytopaenia
- **Urea, Cr, Na/ K** – identify dehydration
- **CXR**
- **D-dimer**: often elevated in conditions other than pulmonary embolism
  - negative predictive value
  - if d-dimer markedly increased, then increased risk of clotting complications

Investigations: depending on clinical assessment

- **Blood cultures** if others sources of sepsis suspected
- **Nasopharyngeal swabs or aspirates** for viral or atypical pathogens if COVID diagnosis not clear
- **Sputum for MCS** if secondary infections suspected
- **GeneXpert for TB** if HIV positive or HIV negative and TB symptoms
- **LAM** if HIV positive
- If PJP suspected: **Beta-D-glucan & sputum for PJP**

Early supportive therapy in hospitalised patients (adults)

- Admit patient to an appropriate ward with available **oxygen**
- **Regular (2-4hourly) monitoring** of saturation, respiratory rate and pulse rate. Blood pressure if condition getting worse
- Focus on symptomatic and supportive treatment.
- Low oxygenation needs to be identified early and appropriate oxygen therapy given.

Early supportive therapy in hospitalised patients (adults)

Give O2

- Single most effective supportive measure: identify appropriate level of oxygen early
- Target SpO2 of ≥90% in non-pregnant and ≥ 92% in pregnant women.
- Titrate oxygen therapy up to reach targets by nasal canula, a simple face mask or reservoir bag: escalate quickly

Early supportive therapy in hospitalised patients (adults)

- Review after 2 hours and implement escalation plan
- Nasal canula should not be reused
- Face masks and reservoir bags must be heat disinfected between each patient use.

Early supportive therapy in hospitalised patients (continued)

- **Conservative fluid management** - aggressive fluid resuscitation may worsen oxygenation. Monitor for dehydration due to high fevers

- If clinical suspicion of co-infection exists **consider empiric antimicrobials** (but do not give routinely)

- **Closely monitor patients** for clinical deterioration such as (pO2 every 2 hours)
  - rapidly progressive respiratory failure
  - sepsis.

SPECIFIC THERAPIES

- **DO NOT ROUTINELY GIVE STEROIDS** unless indicated for other reasons. It may worsen the outcome

- There is NO RCTs to recommend any specific treatment for patients with suspected or confirmed infections.
  - Aim to enrol patients in a clinical trial to access specific medicines being investigated in your area. Link in with existing national / international trials taking place.
  - If therapeutics are used outside of clinical trial do it under the MONITORED EMERGENCY USE OF UNREGISTERED INTERVENTIONS framework.
    - Only consider using it in hospitalized patients (not mild cases)

Hypercoagulability

- Patients with **severe COVID19 disease** – increased hypercoagulability: due to variety of mechanisms
  - Increased risk of clotting abnormalities
  - If D-dimer >5000 – high risk of PE or DVT
  - INR and PT can be normal
- All patients with severe disease / all admitted patients: prophylaxis of enoxaparin 40mg SC od or unfractionated heparin 5000IU SC bd
- Use therapeutic dosing if specific indication e.g. DVT or Pulmonary embolism.
  - Dr Graeme Meintjies, from Groote Schuur COVID ICU recommends therapeutic dose enoxaparin in all patients with severe hypoxia or d-dimers >6x ULN unless contraindication.
  - Discuss these patients with an ID consultant before initiating Rx

Management COVID positive patients with HYPOXEMIC RESPIRATORY FAILURE

Management of hypoxemic respiratory failure and ARDS

Recognise severe hypoxemic respiratory failure early:
When failing standard oxygen therapy:

- increased work of
- or SpO2 <90%
- even when oxygen delivered via facemask with reservoir bag.

Hypoxemic respiratory failure (due to ARDS)

Due to intrapulmonary ventilation-perfusion mismatch or shunt.

usually requires mechanical ventilation

Mechanical ventilation

- In absence of ET intubation indication: trial of
  - High-flow nasal oxygen (HFNO)
  - Continues positive airway pressure (CPAP)
  - Non-invasive ventilation (NIV) technique
- In very specific scenarios high-flow nasal oxygen or non-invasive ventilation can be used but there is a high risk of treatment failure.
  - NIV and HFNO carry the risk of aerosolization of viral particles: patient to be nursed in single patient room.
- The use of prone position in non-intubated, conscious patients may be beneficial. Sit up at 30 to 60 degrees if unsure about proning

Mechanical ventilation: HFNO

- We are still learning about which types of ventilation is most appropriate in which patients
  - Has a very high mortality rate
- GSH has provided HFNO for 3 week now (at 11 June 2020)
  - 63 patients were treated – 46 with outcomes, 17 still on HFNO
- 31% success rate (14% died suddenly, 55% intubated)
- Of all those that failed HFNO that required ventilation – no survivors so far (either died or still on ventilator)

Non-pulmonary complications

- Acute Kidney Injury: typically a Fanconi type syndrome with loss of phosphate, sodium, potassium (65% of admitted patients)
- CNS
  - Common: loss of smell and loss of taste
  - Elderly – hypoactive delirium with “mute” presentation and visual hallucinations (e.g. a cat looks like a lion)
  - Dysregulation of autonomic nervous system: hypotension / collapse / hypoxia
  - Strokes – especially atypical strokes in younger patients

Non-pulmonary complications

- **Cardiac**: possible increased risk of arrhythmias, virus might also affect heart muscle
- **GIT**: can present with no respiratory symptoms but only with diarhoea and vomiting (can also have hepatitis) (< 5% of patients)
- **Septic shock**: drop in blood pressure
- **"Cytokine storm"** - often about day 10 with increased inflammatory response.
  - Develop ARDS picture with desaturation
  - High fever, thrombocytopaenia and elevation inflammatory makers
  - May also present as Kawasaki type picture with vasculitis, rash (tends to be younger people (20s)

De-isolation criteria

- Patients with severe disease sheds virus for a longer period of time.
- Patients can de-isolate after 14 days of being clinically stable (no longer needing oxygen).

HIV and TB and COVID

HIV: an evolving picture

Actual risk of death in those living with HIV is unknown. Recent data from the Western Cape shows the hazard ratio of a person with HIV and COVID19 is 2.75 (2.09-3.6)

HIV is a risk factor for many respiratory infections – and patients may have TB, post TB bronchi-ectasis and COPD that will increase their risk of COVID complications

Patients on ARV and VL LDL – ensure steady supply of all drugs.

Start ARVs ASAP in newly HIV diagnosed patients and immunize against influenza

PTB

- **R**isk of death in TB: early data from the WC – hazard ratio of 1.41(1.05- 1.90) in patient with previous TB and 2.58 (1,53 – 4.37) in patients with current TB
- ***All patients assessed for COVID should ideally also be screened for TB (high prevalence of TB in this country).***
- Diagnosis and management of TB should not be delayed
- Patients newly diagnosed with TB and COVID need to be treated apart from other non-TB patients for 14 days from onset of TB treatment.
- Management of COVID19 co-infection similar – with emphasis on early and appropriate O2
- Patients who have require ventilation for TB may have a poorer prognosis. Thus any decisions to ventilate patients must be carefully considered balancing the prognosis and resources available prior to starting on ventilation.

COVID and PJP

Distinguishing COVID and PJP – extremely difficult.

If suspecting PJP – add empiric treatment

- CD4<200
- Not on CTX > 1 month
- Chest infiltrates compatible with PJP
- Hypoxemia
- Test for serum beta-d-glucan

Palliative use of opioids

- Patients triaged not to receive intensive care or ventilator support require adequate relief of suffering, especially for breathlessness.
- In COVID-19 patients with breathlessness, clinical experience suggests opioids—a common palliative care intervention—can be safe and effective and should be widely available.

Non-opioids such as paracetamol remains the recommended first-line medication for the treatment of fever and pain.

Palliative use of opoids (adults) for distress due to shortness of breath

Morphine syrup (Mist morphine), oral.

- **Starting dose**: 10–15 mg (maximum 0.2 mg/kg) 4 hourly.
- Elderly or frail patients: 2.5–5 mg oral (maximum 0.1 mg/kg) 4 hourly.
- Increase dose by 50% every 24 hours if pain control is inadequate.
- Reduce the dosing interval if there is regular breakthrough pain.
- **Increase the dosing interval in patients with renal or liver impairment.**
- When stable on morphine syrup, the morphine syrup can be changed to an equivalent dose of long- acting, slow release morphine**:**

Palliative use of opoids (adults)

Morphine, long-acting, oral, 12 hourly.

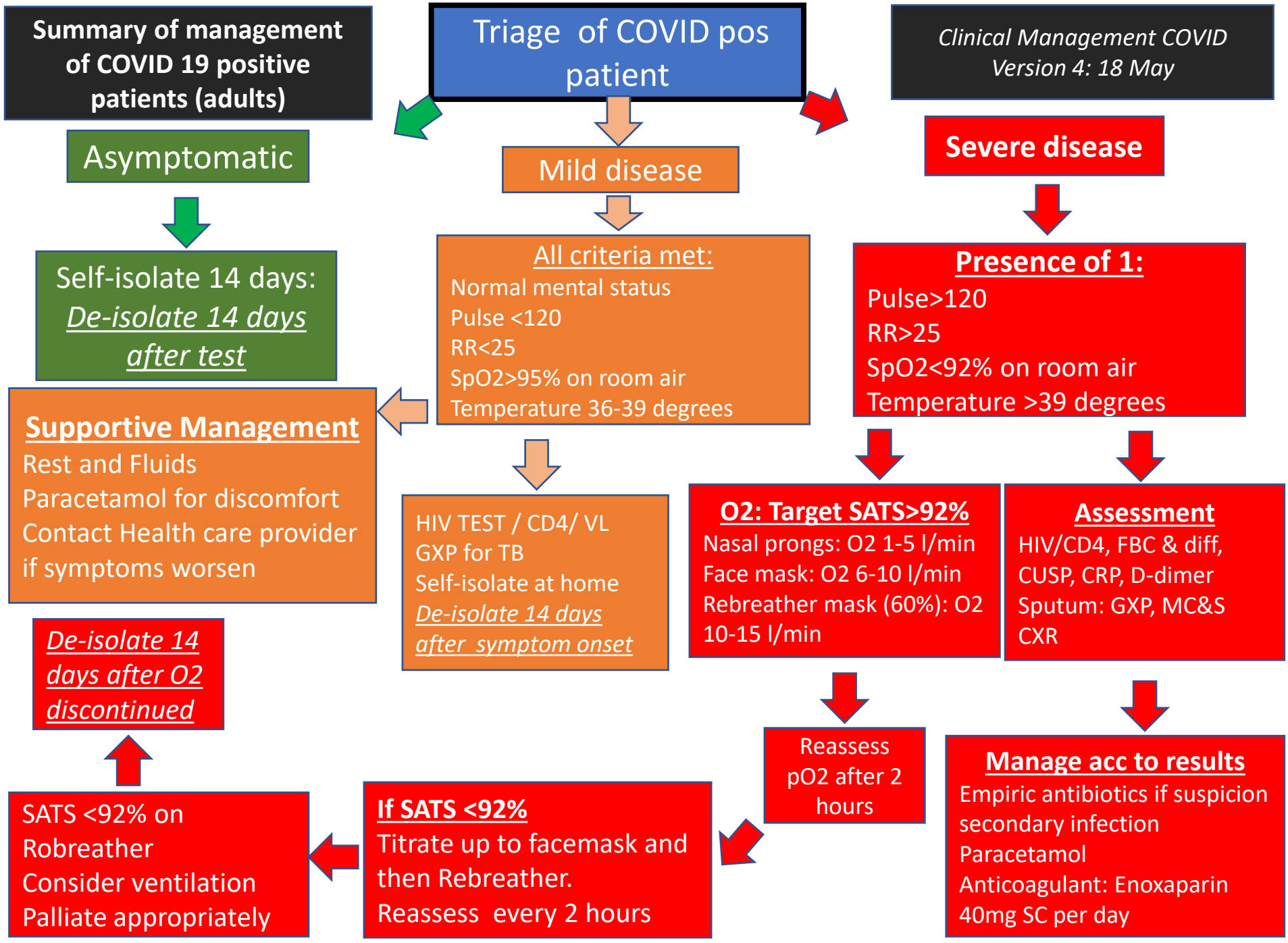
- Available in tablets of 10 mg, 30 mg and 60 mg
- Duration of action 12 hours.
- Dose according to previous morphine syrup requirement: e.g. a patient whose pain is controlled by 6 doses of morphine syrup 10 mg per 24 hours (i.e. 60 mg morphine per day) can be converted to slow release morphine tablets, 30 mg 12 hourly, oral.
- Maximum dose for non-cancer pain is usually 60 mg 12 hourly.
- **Note**: When morphine is used for chronic non-cancer pain, discuss potential side effects with the patient, the maximum dose of opioids that will be prescribed and anticipated duration of treatment.

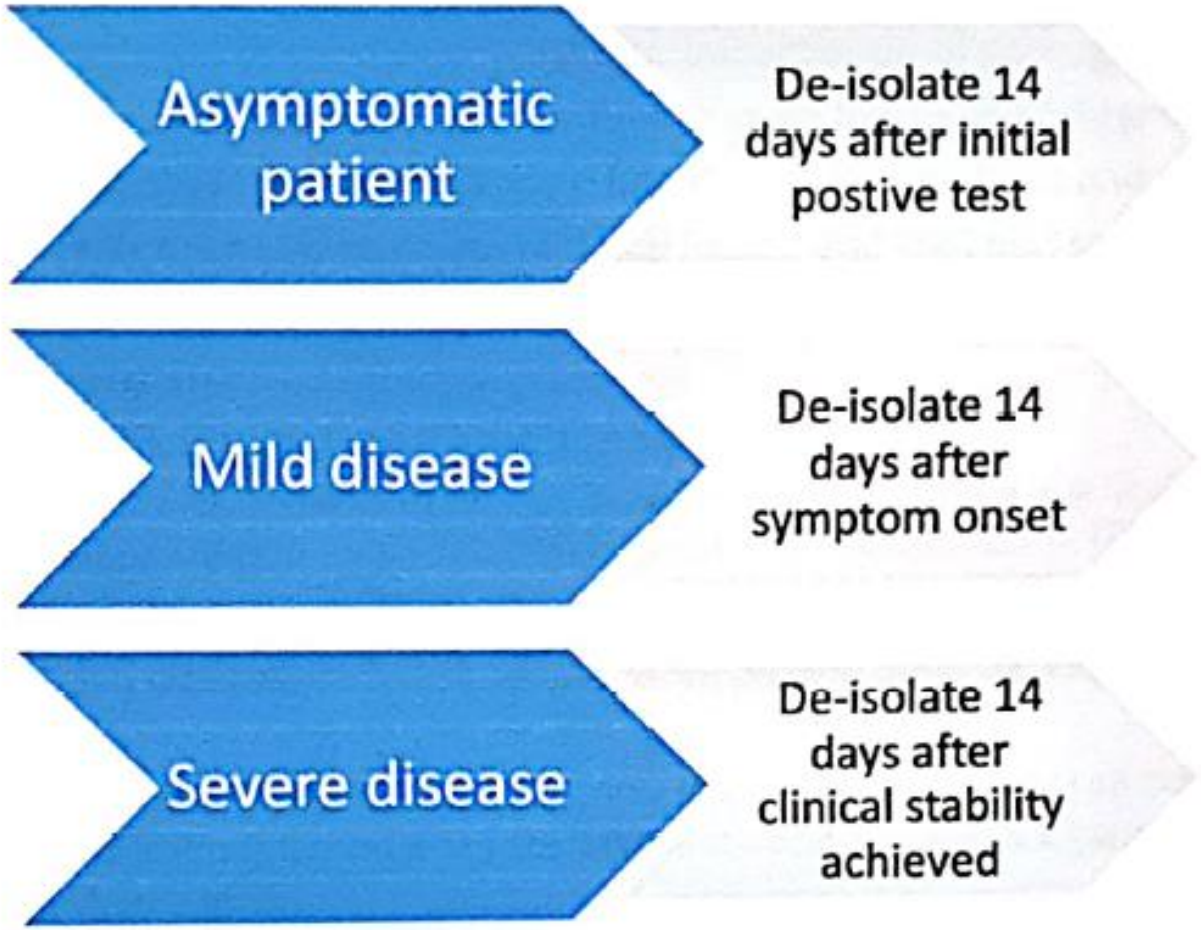
Palliative use of opoids (adults)

- **Constipation:** Patients on chronic opioids should routinely be prescribed a laxative.
  - Sennosides A and B, oral, 13.5 mg, 1–2 tablets at night. (Contraindicated in patients with potentially obstructive lesions).

In patients with potentially obstructive lesions:

- Lactulose, oral, 10–20 mL 12 hourly.


Summary of management of COVID 19 positive patients (adults)
Triage of COVID pos patient
Clinical Management COVID Version 4: 18 May
Asymptomatic
Mild disease
Severe disease
Self-isolate 14 days: De-isolate 14 days after test
All criteria met:
Normal mental status
Pulse <120
RR<25
SpO2>95% on room air
Temperature 36-39 degrees
Presence of 1:
Pulse>120
RR>25
SpO2<92% on room air
Temperature >39 degrees
Supportive Management
Rest and Fluids
Paracetamol for discomfort
Contact Health care provider if symptoms worsen
HIV TEST / CD4/ VL
GXP for TB
Self-isolate at home
De-isolate 14 days after symptom onset
O2: Target SATS>92%
Nasal prongs: O2 1-5 l/min
Face mask: O2 6-10 l/min
Rebreather mask (60%): O2 10-15 l/min
Assessment
HIV/CD4, FBC & diff, CUSP, CRP, D-dimer
Sputum: GXP, MC&S
CXR
De-isolate 14 days after O2 discontinued
Reassess pO2 after 2 hours
Manage acc to results
Empiric antibiotics if suspicion secondary infection
Paracetamol
Anticoagulant: Enoxaparin 40mg SC per day
SATS <92% on Robreather
Consider ventilation
Palliate appropriately
If SATS <92%
Titrate up to facemask and then Rebreather.
Reassess every 2 hours


Asymptomatic patient
De-isolate 14 days after initial postive test
Mild disease
De-isolate 14 days after symptom onset
Severe disease
De-isolate 14 days after clinical stability achieved

References

- Clinical management of suspected or acute COVID V4:18 May 2020
- Management of TB and COVID19 (NDOH). Drafted by Dr Francesca Conradie
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- Coronavirus disease 2019 (COVID-19): Critical care and airway management issues https://www.uptodate.com/contents/coronavirus-disease-2019-covid-19-critical-care-and-airway-management-issues#H1683933351