health
Department:
Health
REPUBLIC OF SOUTH AFRICA

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

2030 NDP

Clinical management of suspected or confirmed COVID-19 disease

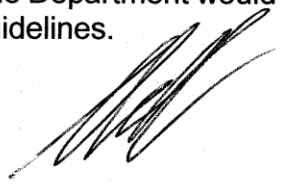
Version 4 (18th May 2020)

FOREWORD

The clinical spectrum of COVID-19 ranges from an asymptomatic or mild flu-like illness to a severe pneumonia requiring critical care. These guidelines describe the clinical management of cases of COVID-19 disease, including clinical care in and outside of health care facilities, and are intended for use in both the public and private sectors.

The National Department of Health is committed to providing regular updates of guidelines, as knowledge regarding strategies to address COVID-19 develops both globally and in South Africa. This version of the guidelines provides updated and additional information on the diagnosis and management of patients with COVID-19, as well as specific guidance on management of specific groups such as pregnant and breastfeeding women, children and people living with HIV.

The Department would like to thank all those who contributed to the development of these guidelines.



Dr T Pillay
Acting Director-General: Health
Date: 18/05/2020.

Contents

Guidelines committee (in alphabetical order): Lesley Bamford, Tom Boyles, Lucille Blumberg, Angelique Coetzee, Cheryl Cohen, Andrew Gray, Dean Gopalan, Ivan Joubert, Tamara Kredo, Ahmad Haeri Mazanderani, Tendesayi Kufa-Chakeza, Halima Dawood, Nelesh Govender, Shelley-Ann McGee, Manala Makua, Shaheen Mehtar, Kerrigan McCarthy, Marc Mendelson, Jeremy Nel, Wolfgang Preiser, Jantjie Taljaard, Francois Venter.

NEMLC COVID-19 subcommittee (in alphabetical order): Marc Blockman, Karen Cohen, Andrew Gray, Tamara Kredo, Jeremy Nel, Gary Maartens, Andrew Parish (chairperson), Helen Rees, Gary Reubenson (vice chairperson), Renee de Waal.

Paediatrics subcommittee (in alphabetical order): Lesley Bamford, Adrie Bekker, Heloise Buys, Ute Feucht, Marian Jacobs, Prakash Jeena, Fikile Mabena, Nomalinda Makubalo, Carol Marshall, Ntombi Mazibuko, Neil McKerrow, Jame Nuttall, Shakti Pillay, Robert Pattinson, Gary Reubenson, Natasha Rhoda

Suspected COVID-19 cases

- 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.
- All symptomatic suspected cases should be identified as soon as possible (ideally prior to entering the facility). Such cases should immediately be given a surgical mask and be isolated. Good hand hygiene and cough etiquette should be taught, and appropriate samples obtained.
- A broad differential diagnosis should be entertained for symptomatic suspected COVID-19 cases. Appropriate testing must be undertaken and empiric management prescribed as required for likely alternative diagnoses.
- Suspected COVID-19 cases who are medically well, or have mild disease, may be managed at home while awaiting test results if they are able to safely self-isolate (asymptomatic contacts should not be routinely testing).

Testing

- PCR-based testing is required for the diagnosis of acute COVID-19 cases. Only one upper respiratory tract swab needs to be taken – currently, a nasopharyngeal sample is recommended, but saliva maybe a viable alternative. Lower respiratory tract samples (e.g. sputum or endotracheal aspirate) should also be sent if available (do not perform sputum induction however).
- Antibody-based (serological) tests are not currently recommended for the diagnosis of acute COVID-19.

Confirmed COVID-19 cases

- Patients with mild disease may be considered for management at home, provided they are able to safely self-isolate (see criteria in table 2).
- We do not recommend that patients on ACE-inhibitors, angiotensin-receptor blockers, or nonsteroidal anti-inflammatory discontinue these agents due to COVID-19 related concerns. Paracetamol remains the recommended first-line medication for the treatment of fever and pain.
- Oxygen therapy is the cornerstone of management for most patients requiring admission – target oxygen saturations of ≥90% for most patients, using nasal prong oxygen, a simple face mask, or a face mask with a reservoir bag.
- For intubated patients with ARDS and low lung compliance, use lung-protective ventilation strategies.
- There is currently insufficient evidence to support the use of any specific therapy for COVID-19. Any investigational drugs or therapeutics should be reserved for hospitalized patients. They should ideally be administered as part of a clinical trial, but at a minimum they should be administered under the Monitored Emergency Use of Unregistered Interventions (MEURI) framework.
- Patients may be de-isolated without the need for repeat PCR tests. Provided the patient's fever has resolved and their symptoms have improved, those with mild disease may be de-isolated 14 days after symptom onset, while those with severe disease may be de-isolated 14 days after achieving clinical stability (e.g. once supplemental oxygen is discontinued).

Healthcare worker personal protective equipment (PPE)

- For the majority of direct COVID-19 patient interactions, appropriate healthcare worker personal protective equipment consists of gloves, a gown or apron, a surgical mask and a face shield/visor/goggles.
- When performing aerosol-generating procedures (e.g. taking nasopharyngeal swabs, performing CPR, or intubating a patient), an N95 respirator should be used instead of a surgical mask.
- Meticulous compliance with donning and doffing procedures is critical to avoid contamination and infection.

Version 4: What's New?

- Updated case definition for a suspected COVID-19 case (section 3.1)
- New guidance on SARS-CoV-2 sampling and on repeat testing (section 3.2)
- Recommendation against the use of rapid antibody-based tests for the routine diagnosis of acute COVID-19 (section 3.2)
- Removal of the requirement that mild disease in high-risk individuals requires hospitalization (section 4.1)
- Guidance on patients requiring nebulized medications or inhaled or systemic steroid use for management of their comorbidities (section 4.2)
- Updates to critical care section (section 4.5)
- Specific guidance on children, HIV patients, and pregnant/breastfeeding women (section 5)
- Updated guidance on the forms required when testing and managing COVID-19 patients (section 7)

1. Background

On 31st December 2019, the World Health Organization (WHO) was alerted to a cluster of pneumonia of unknown aetiology in patients in Wuhan City, Hubei Province of China. One week later the novel coronavirus (severe acute respiratory syndrome coronavirus 2: SARS-CoV-2) was identified as the cause. The resulting illness was named COVID-19 on the 11th February 2020. The clinical spectrum of COVID-19 ranges from an asymptomatic or mild flu-like illness to a severe pneumonia requiring critical care.

These guidelines describe the clinical management of cases of COVID-19 disease and covers clinical care in and outside health care facilities.

Scope and health questions

These guidelines cover the case definitions, screening and diagnosis and clinical management of suspected and confirmed COVID-19 patients. The scope includes all levels of care from ambulatory patients seen in primary care and for screening purposes and symptomatic patients managed in health facilities, including intensive care units.

Target audience for the guidelines

The guidelines are intended for use by health care providers working in both the public and private sectors in South Africa at all levels of care. The clinical management of COVID-19 should be guided by this document. These guidelines may also be important for health facility managers and policymakers planning the response to COVID-19.

Methods

The evidence regarding COVID-19 is evolving rapidly. These guidelines are based on available guidance for known aspects of clinical care (e.g pneumonia, severe acute respiratory syndrome). However, for new health care recommendations specific to COVID-19, the recommendations are based on the consensus of the expert guideline writing group based on emerging evidence. Specific recommendations regarding therapeutic interventions are based on rapid reviews of the available research evidence by the COVID-19 subcommittee of the National Essential Medicines List Committee (NEMLC), using systematic searching appraisal and synthesis methods. All contributors have completed a Declaration of Interest form, as stipulated by the National Department of Health. No specific funding has been sourced for these guidelines. Contributors are not paid to write these guidelines.

2. Epidemiology and clinical characteristics

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 thought to have originated in bats but the animal responsible for transmission to humans remains unknown.

2.1 Epidemiology

The median incubation period for COVID-19 is estimated to be 4-5 days, with an interquartile range of 2-7 days. Based on patients' viral shedding patterns and on epidemiological modelling, patients appear to be infectious for 2-3 days prior to the onset of symptoms, and the contribution of pre-symptomatic infections to the overall pandemic may be substantial.[1-7] Based on early data, the basic reproductive number for the virus was approximately 2.2 (meaning that on average each person spread the infection to two others).[8] A male preponderance of cases has been noted globally both in terms of absolute case numbers, and in severe disease.[9-11] Risk factors for severe disease include older age, cardiopulmonary comorbidities and diabetes mellitus. Very few cases which required hospitalisation have been reported among children under the age of 15 years (~1%). To date there has been little reported on associations between patients with HIV or TB and COVID-19.

2.2 Clinical characteristics – what to look for

Truly asymptomatic COVID-19 patients (as distinguished from pre-symptomatic patients) have been described, but their proportion is not well characterised yet.[6, 12] Among symptomatic patients in China, 81% developed mild disease, an estimated 14% developed severe disease (with hypoxaemia, marked tachypnoea and extensive lung infiltrates), while 5% became critically ill (with respiratory failure, septic shock and/or multiorgan dysfunction).[13] Because of the strong effect of age on disease severity, the proportions of mild, severe, and critical cases seen in a country will partially depend on that country's population age structure however.

The most common presenting symptom has been fever in approximately 90%, but importantly this may only be present in a minority of patients on admission.[11, 14] A cough is present in two-thirds of patients, but sputum production is only reported by one third of patients, as is dyspnoea. Myalgia, a sore throat, nausea, vomiting, and diarrhoea are all present in less than one fifth of cases.[11, 14, 15] Anosmia (loss of sense of smell) and dysgeusia (alteration of the sense of taste) have also emerged as relatively common, early, and moderately specific symptoms.[16, 17]

Abnormalities are visible on chest X-ray in at least 60% of hospitalised COVID-19 patients, with chest CT scans being more sensitive.[11, 14, 18] These are typically bilateral patchy ground glass opacities, though other patterns have been described.[11, 19] However, a normal chest X-ray or chest CT scan does not rule out COVID-19. This is especially true of patients with mild disease, in whom a majority of chest X-rays may be normal.[20]

2.3 Outcomes and prognosis

The vast majority of cases will make a full recovery although this may take several weeks, particularly in severe cases. In a minority of cases, COVID-19 has been associated with rapid progression to acute respiratory distress syndrome (ARDS), multiple organ failure and sometimes death. Internationally, the case fatality ratio has ranged between 0.7-7%, and is partially determined by the particular population's age distribution, the pandemic's burden on the healthcare system at the time, and the extent to which mild or asymptomatic cases are diagnosed.[9, 21] Long-term sequelae, if any, are currently unknown.

3. Management of Suspected COVID-19 Cases

3.1 Early identification/triage

Patients seeking healthcare services for potential COVID-19 should preferably phone ahead of time to their doctor, clinic, emergency room, or closest testing centre, so that adequate precautions can be taken. Patients should wear masks while in transit to the hospital (cloth masks can suffice until they are given a surgical mask on arrival). Patients who do not self-identify as potentially having COVID-19 should be screened and identified as soon as possible upon arriving at a health facility, to avoid prolonged contact with other patients and healthcare workers.

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.

Atypical manifestations are increasingly being recognised, including large vessel strokes in young patients, unexplained abdominal pain, various dermatological manifestations, and a multisystem inflammatory syndrome in children.[22-24]

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.

Asymptomatic close contacts should not routinely be tested. However, under certain circumstances (e.g. in institutions such as care homes) testing of asymptomatic contacts may be indicated. (Further guidance on this topic is expected shortly.)

- Measures that may facilitate early identification of suspected COVID-19 cases include:
    - Posters, pamphlets, billboards or staff members outside and within the healthcare facility asking patients who fulfil criteria for a PUI to identify themselves to healthcare workers as soon as possible (rather than remaining in line in a waiting area).

    - Including a screening questionnaire for COVID-19 as part of the standard triage form at healthcare facilities.
- Anyone who fulfils the clinical criteria for a suspected COVID-19 case should immediately have the following measures taken:
    - Give them a medical (surgical) mask (N95 respirators are NOT required for patients).
    - Direct them to a separate area, preferably an isolation room if available. Where an individual isolation room is not available, a 2 metre distance should be kept between suspected COVID-19 cases and other patients.
    - Instruct them to cover their nose and mouth during coughing or sneezing with a tissue or a flexed elbow. They should perform hand hygiene after contact with respiratory secretions (wash hands or use alcohol-based hand rub, which should be readily available at the point of triage).
    - Limit their movement (e.g. use portable X-rays rather than sending the patient to the X-ray department). If they have to be moved, ensure that they wear a surgical mask at all times.
    - The patient should ideally have a specifically allocated bathroom (where this is possible).
- Symptomatic suspected cases should be quickly triaged using standard emergency department triage systems. This facilitates:
    - Rapid initiation of supportive therapy (e.g. supplementary oxygen)
    - Recognition of patients who can be allowed home to await results of the COVID-19 testing (see below).
    - Protection of both patients and staff.

Table 1 – Criteria for mild disease

Mild disease (all must apply)[1]
• SpO_2 ≥95% on room air • Respiratory rate <25 • Heart rate <120 • Temp 36-39°C • Mental status normal

[1]For age <12, use paediatric criteria in section 5.1
HFNO – high flow nasal oxygen. CPAP – continuous positive airway pressure. NIV – non-invasive ventilation

3.2 Testing

Testing for acute COVID-19 infection should be by means of polymerase chain reaction (PCR) assays.

Samples to be sent are:

- *Upper respiratory tract samples* – A sample from the upper respiratory tract should be sent from all patients. A single site is sufficient. Currently, a nasopharyngeal swab is the preferred specimen, but in patients where this is not possible (e.g. recent nasal surgery, or severe coagulopathy), an oropharyngeal, nasal mid-turbinate, or anterior nares swab can be collected instead.[25, 26]
    - Recently, saliva has emerged as a viable alternative to nasopharyngeal swabs.[27-29] Saliva can be collected without requiring aerosol precautions or invasive sampling, and does not require swabs or viral transport medium. Guidance on this will be updated shortly.

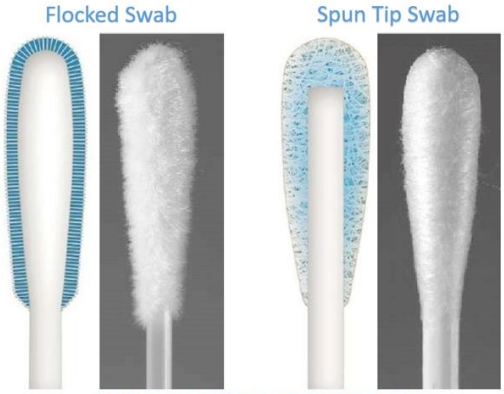
- *Lower respiratory tract samples* – send when available. Lower respiratory tract samples may have a higher sensitivity than upper respiratory tract samples.[25, 30] Sputum, tracheal aspirates, or bronchoalveolar lavage fluid are all acceptable samples to send. Sputum induction should not be performed however.

Where both upper and lower respiratory tract samples are available, both should be sent.

Appropriate personal protective equipment (PPE) should be worn by all healthcare workers when obtaining specimens (see IPC section below).

Obtaining samples for SARS-CoV-2 testing

- Healthcare workers obtaining respiratory samples require appropriate personal protective equipment, including eye protection (goggles or visor), gloves, an apron or gown, and an N95 respirator (or equivalent, e.g. FFP2 mask). Meticulous hand hygiene is also essential. See section 6 for further details.
- Collecting a good quality specimen is vital – see box below.
- Appropriate swabs are flocked or spun, and consist of polyester, nylon or rayon material with a plastic or aluminium shaft. Cotton swabs, calcium alginate swabs, and swabs with a wooden shaft are not recommended, as they may contain substances that inactivate SARS-CoV-2 and inhibit PCR testing.



Illustrations obtained from publically available material

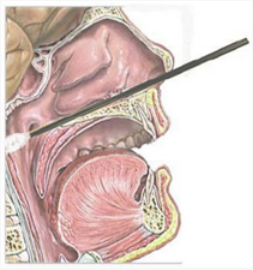
Transport of specimens

- Nasopharyngeal, mid-turbinate and anterior nares samples should ideally be placed in viral/universal transport medium (UTM) and kept between 2-8°C until they are processed at the laboratory. Due to constraints in the supply of viral/universal transport medium, dry swabs can be sent provided that the sample will reach the laboratory within 2 days. Dry swabs can be sent at ambient temperature.
- Lower respiratory tract samples can be sent in standard specimen containers and do not require viral/universal transport medium.

Transport time to testing laboratory	
<2 days: can use dry swab (no transport medium needed) and can be transported at ambient temperature	>2 days: transport in UTM, preferably at 2-8°C. If UTM is not available, can use normal saline as an alternative.

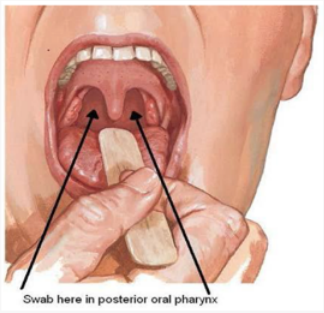
Collection of a nasopharyngeal specimen

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.



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.

<u>Repeat testing</u>

PCR tests may produce false negative results due to factors such as poor sampling technique, suboptimal specimen storage (e.g. unavailability of viral/universal transport medium, or specimen not stored at cold temperatures), the site the sample is obtained from, and the time point at which the swab is taken (viral loads are usually highest early on in the disease course). 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 (see box below).

A single positive PCR test is sufficient proof of COVID-19 infection. There is no role for repeat "confirmatory" PCR testing on patients who test positive despite the absence of symptoms, as PCR-based tests have excellent specificity, and asymptomatic and presymptomatic COVID-19 patients are now well described.

The **differential diagnosis** of suspected cases includes influenza (remembering the seasonality), both conventional and atypical bacterial pneumonias, and in patients with HIV and a CD4 count <200 cells/mm^3 (or equivalent immunosuppression), *Pneumocystis jirovecii* pneumonia (PJP).

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.

<u>For patients with severe disease who require admission</u>, 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)

<u>For patients with mild disease who do not require admission</u>, 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

<u>Antibody tests</u>

Currently, we do not recommend using antibody-based (serological) tests for the diagnosis of acute COVID-19. These tests are insufficiently sensitive early in the disease course (before sufficient antibodies have been produced).[31, 32] In addition, antibody-based tests tend to be less specific than PCR-based tests. When the proportion of the population who have active or resolved COVID-19 is low, antibody-based tests may consequently have a low positive-predictive value (meaning that a substantial proportion of "positive" results may be false positives).

- The role of antibody-based tests in other scenarios, such as for community surveillance, or when used in combination with RT-PCR tests, remains to be defined.

<u>Point of care antigen tests</u>

We do not currently recommend point of care antigen-based tests, due to concerns about poor sensitivity and specificity.[33]

3.3 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)

3.4 Managing patients at home while awaiting COVID-19 test results

Suspected COVID-19 cases who are medically well, or who are assessed as having only mild disease, may be managed at home while awaiting test results.

Such patients should be instructed to self-isolate at home. However, any deterioration in their ability to perform activities of daily living at home as a result of dyspnoea should prompt re-evaluation at a healthcare facility. Isolation is the act of separating a symptomatic individual with a contagious disease from healthy individuals without that contagious disease. The following advice should be given to a person self-isolating to reduce the possible transmission to others:

- Patients should stay in a specific room and use their own bathroom (if possible). Patients should avoid unnecessary travel and unnecessary contact with other people. If they live in shared accommodation (university halls of residence or similar) with a communal kitchen, bathroom(s) and living area, they should stay in their room with the door closed, only coming out when necessary, wearing a surgical mask if they do so.
- Where contact is unavoidable, the patient should wear a surgical mask, and maintain a distance of at least 1 metre (preferably 2 metres) from other people.
- Patients should clean their hands with soap and water frequently. Alcohol-based sanitizers may also be used, provided they contain at least 70% alcohol.
- Patients should practice good cough and sneeze hygiene, by using a tissue, and then immediately discarding the tissue in a lined trash can, followed by washing hands immediately.
- Patients should not have visitors in their home. Only those who usually live in their home should be allowed to stay.
- Patients should avoid sharing household items like dishes, cups, eating utensils and towels. After using any of these, the items should be thoroughly washed with soap and hot water.
- All high-touch surfaces like table tops, counters, toilets, phones, computers, etc. should be appropriately and frequently cleaned.
- If patients need to wash laundry at home before the PCR results are available, then they should wash all laundry at the highest temperature compatible with the fabric using laundry detergent. This should be above 60°C. If possible, they should tumble dry and iron using the highest setting compatible with the fabric. Disposable gloves and a plastic apron should be used when handling soiled materials if possible and all surfaces and the area around the washing machine should be cleaned. Laundry should not be taken to a launderette. The

patient should wash his/her hands thoroughly with soap and water after handling dirty laundry (remove gloves first if used).

- Patients should know who to call and/or where to go if they develop any worsening symptoms, so that they can be safely reassessed.
- In addition to this advice, a patient information sheet should be provided (see Appendix 1 for an example).

Patients with suspected COVID-19 disease who are unable to meet the minimum criteria to safely self-isolate (stay in a separate room, maintain physical distancing, maintain good hand hygiene, and return timeously to a healthcare facility in case of deterioration) should be admitted to an appropriate isolation facility if available.

This is distinct from quarantine, which is the act of separating asymptomatic individuals potentially exposed to a disease from non-exposed individuals. See also further advice on self-quarantining from the NICD website.

For the **symptomatic management** of suspected COVID-19 patients managed at home or in isolation facilities, see section 4.2.

An example of patient management algorithm that may be suitable for primary care is provided in appendix 2.

4. Management of Confirmed COVID-19 Cases

The goal in clinical management of cases is to reduce morbidity and mortality and minimise transmission to uninfected contacts. Triaging patients and early identification of patients who require hospital or ICU admission is essential to achieve this. Isolation and implementation of infection prevention and control (IPC) measures within facilities, as well as contact tracing and education on IPC at home will help minimise onward transmission of the virus. Key management principles include:

4.1 Rapid triage of cases – in order that appropriate IPC measures and an appropriate level of supportive care can be commenced.

- Patients not meeting the criteria for mild disease will require admission on medical grounds.
- Patients with mild disease may be managed at home, provided they are able to safely self-isolate (see criteria in table 2). Patients at risk of developing severe disease do not necessarily require hospitalisation if they have only mild COVID-19 disease.
- If patients are to be managed at home, it is imperative that all appropriate measures are taken to prevent transmission of the disease to others - give advice as in section 3.1.
- Those patients with mild disease who are unable to safely self-isolate at home may be considered for isolation at a designated government facility if available.
- Some patients initially assessed as having "mild" disease may continue to worsen over the course of a week or more and subsequently require hospitalisation. In one study by Wang et al., those who required hospitalisation developed dyspnoea a median of 5 days after symptom onset, required hospitalisation on day 7, and were assessed as having ARDS by a median of day 8.[15] **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**. Patients managed at home need to be given the contact details of their doctor or healthcare facility in case of any clinical worsening**.** This is particularly important for those at high risk for deterioration (e.g. age >65, cardiac or pulmonary comorbidities and/or diabetes mellitus).

Table 2 - Criteria for management at home (for age >12 years[1]):

Mild disease[1]
• SpO_2 ≥95% • Respiratory rate <25 • HR <120 • Temp 36-39°C • Mental status normal
Able to safely self-isolate
• Separate bedroom available for patient to self-isolate in • Able to maintain physical distancing at home • Able to maintain hand hygiene • Patient able to contact, and return to, healthcare facility in case of deterioration

[1]For age <12, see paediatrics criteria for mild disease in section 5.1.

4.2 Symptomatic treatment for COVID-19 patients managed at home or in hospital

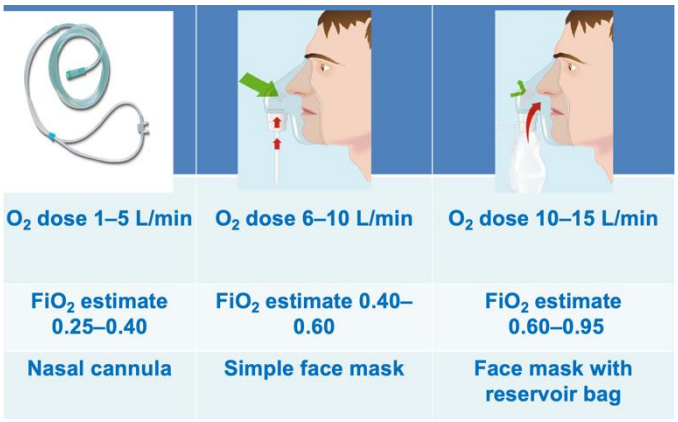
- For patients requiring symptomatic relief of fever or pain, we suggest using paracetamol as a first-choice agent rather than a nonsteroidal anti-inflammatory drug (NSAID).
    - There is no good evidence that NSAIDs worsen COVID-19 infection, so patients currently requiring NSAIDs for other indications should not discontinue NSAIDs for COVID-related reasons.[34]
- Whether nebulisers increase the risk of transmission of SARS-CoV2 is currently unknown. Evidence reviews conducted prior to the COVID-19 outbreak have not found clear evidence of increased transmission of respiratory viruses.[35, 36] Furthermore, the aerosol generated by nebulisers is derived from the nebulising chamber rather than the patient.[37] Nonetheless for patients with asthma or chronic pulmonary obstructive pulmonary disease (COPD) who may experience an acute exacerbation of their illness due to COVID-19, the use of metered dose inhalers, with or without a spacer, is preferred to the use of a nebuliser.
    - Patients who do require a nebuliser should use it in a room that is isolated from other household members and/or other patients. Good ventilation for this area is recommended; this may be facilitated by opening the windows in the room.
    - Spacers need to be disinfected between patients with either soap and water followed by a wipe down with 70% alcohol, or by using a chlorine-based disinfectant (soak for 30 mins then rinse well with water to avoid chlorine being absorbed into the spacer).
- Patients requiring inhaled corticosteroids for the chronic management of asthma or COPD, or topical nasal corticosteroids for allergic rhinitis, should not discontinue these therapies due to COVID-19-related concerns.[38]
- Similarly, patients who require a short course of oral corticosteroids for an asthma or COPD exacerbation should be given this therapy, notwithstanding concerns relating to corticosteroids and COVID-19 (see section 4.4). See also section 5.3 for a fuller discussion of the use or corticosteroids in patients suspected of having PJP.
- Cough suppressants, such as codeine-containing cough mixtures, are not indicated, and are not available in public sector health facilities. Opioids, such as morphine, should not be used for this reason alone, and where they are indicated they should only be used with due caution and careful monitoring.
- Recent work suggested that angiotensin converting enzyme inhibitors (ACEi) or angiotensin receptor blockers (ARBs) might upregulate ACE2 receptors, the binding site for SARS-CoV-2, within tissues including the lung and heart, prompting theoretical concerns that this might place patients at risk of worse outcomes with COVID-19.[39] To date, this remains purely theoretical, with no evidence of worse clinical outcomes.[40] Furthermore, discontinuing or switching ACEi or ARBs to alternative agents may be deleterious to patient care. Pending further evidence, we therefore do not recommend discontinuing ACEi or ARBs unless there are other medical reasons to do so.

4.3 Early supportive therapy in hospitalised COVID-19 patients

Give supplemental oxygen therapy immediately to patients with low oxygen saturation.[41]

- Oxygen therapy is likely to be the single most effective supportive measure in COVID-19 patients. Target SpO_2 ≥90% in non-pregnant adults and SpO_2 ≥92% in pregnant patients.[41] Children with emergency signs (obstructed or absent breathing, severe respiratory distress, central cyanosis, shock, coma or convulsions) should receive oxygen therapy during resuscitation to target SpO_2 ≥94%; otherwise, the target SpO_2 is ≥92%.
- Titrate oxygen therapy up and down to reach targets by means of a nasal cannula, simple face mask or face mask with reservoir bag, as appropriate. Nasal cannulae should

not be reused. Face masks and reservoir bags must be heat disinfected between each patient use if they are used for more than one patient.



O_2 dose 1–5 L/min	O_2 dose 6–10 L/min	O_2 dose 10–15 L/min
FiO_2 estimate 0.25–0.40	FiO_2 estimate 0.40–0.60	FiO_2 estimate 0.60–0.95
Nasal cannula	Simple face mask	Face mask with reservoir bag

For paediatric oxygen recommendations, see section 5.1

Judicious fluid management in patients with COVID-19 is needed.
Patients who are relatively hypovolaemic (e.g. due to prolonged high fever), will need appropriate fluid replacement. However, overly aggressive fluid resuscitation may worsen oxygenation. This may especially problematic in settings where there is limited availability of mechanical ventilation, and in patients with established ARDS.[42, 43]

If evidence for co-infection exists, consider empiric antimicrobials to treat co-pathogens causing the syndrome, particularly in severe cases. This may include conventional and atypical bacterial pathogens, influenza and PJP (see section 3.3 above). Empiric antibiotics are not routinely required for confirmed COVID-19 cases, unless there is evidence of co-infection. One recent review reported bacterial or fungal coinfection in <10% of hospitalised patients.[44]

Closely monitor patients with COVID-19 for signs of clinical deterioration, such as rapidly progressive respiratory failure and sepsis, and apply supportive care interventions immediately.

4.4 Specific therapies

Do not routinely give systemic corticosteroids for treatment of COVID-19 unless they are indicated for another reason.
Corticosteroid use has been associated with various deleterious effects in related viruses.[45] Their use in influenza has been associated with an increased risk of mortality, a higher rate of secondary infections, and a greater length of ICU stay.[46, 47] A systematic review of observational studies of corticosteroids administered to patients with SARS reported no survival benefit and probable harms (avascular necrosis, psychosis, diabetes, and delayed viral clearance).[48] A recent study of patients receiving corticosteroids for MERS used a similar statistical approach and found no effect of corticosteroids on mortality but delayed lower respiratory tract (LRT) clearance of MERS-CoV.[49] The effects of corticosteroid administration on patients with COVID-19 has not been adequately studied, but as with MERS and SARS, corticosteroid use has been associated with delayed viral clearance when used in COVID-19 patients.[50]

Given lack of effectiveness and possible harm previously seen, routine corticosteroids should be avoided unless they are indicated for other reasons, such as an asthma or COPD exacerbation.

- The role of corticosteroids in patients with COVID-19 and refractory shock remains to be clarified. *Surviving Sepsis* guidelines for COVID-19 gave a weak recommendation, based

on “very low quality evidence”, for low-dose corticosteroids in patients with refractory shock (e.g. hydrocortisone 200mg daily in adults).[51] This was extrapolated from a 2018 systematic review of corticosteroids in adults with septic shock demonstrating an average one day shorter ICU stay but no effect on mortality.[52]

There is insufficient evidence to currently recommend any specific treatment for patients with suspected or confirmed COVID-19 infection. This is an area of active study. Candidate therapeutics undergoing investigation include remdesivir, lopinavir/ritonavir, chloroquine, interferon, tocilizumab, and convalescent plasma. To date, published clinical data on these agents are insufficient to justify any recommendation for their use. Much of the data consist of in vitro studies, with human data limited to observational cohorts and/or small, underpowered trials, many of which have serious methodological limitations. Hence it is unclear whether these medicines benefit or cause harm to patients with COVID-19. Given the state of evidence, we suggest consideration of the following:

- Where possible, consideration should be given to enroll hospitalized patients in clinical trials. This provides both adequate monitoring and ethics oversight, and affords the opportunity to contribute to the therapeutics evidence base for future patients.
- Where investigational therapeutics are given outside of a clinical trial, this should be done under the Monitored Emergency Use of Unregistered Interventions (MEURI) framework, which provide an appropriate structure to offer individuals investigational interventions on an emergency basis in the context of an outbreak with a high mortality.[53] The principles of this include:
    - Data providing preliminary support for the intervention’s efficacy and safety are available, at least from laboratory or animal studies.
    - The relevant human research ethics committee has approved the therapeutics’ use.
    - The patient’s informed consent is obtained.
    - Adequate resources are devoted to minimizing the risk of administering the therapeutic agent.
    - The results of the intervention are documented and shared with the wider medical and scientific community.
- Where therapeutics are given to patients outside of a clinical trial, these should be reserved only for *hospitalized patients* (rather than given to mild cases, the vast majority of whom will recover fully without any intervention).
- NEMLC’s COVID-19 subcommittee has produced rapid reviews of the evidence for several therapeutic agents for patients with COVID-19. These evidence reviews will be updated as new evidence emerges, and are available at http://www.health.gov.za/index.php/national-essential-medicine-list-committee-nemlc/category/633-covid-19-rapid-reviews

There is currently insufficient evidence for the use of any drug or vaccine to prevent COVID-19 infection. Prophylaxis trials are ongoing. Prevention consists of non-pharmaceutical interventions, such as good hand hygiene and physical distancing.

4.5 Management of hypoxemic respiratory failure

Recognize severe hypoxemic respiratory failure when a patient with respiratory distress is failing standard oxygen therapy. Patients may continue to have increased work of breathing or hypoxemia (SpO_2 <90%, PaO_2 <60 mmHg [<8.0 kPa]) even when oxygen is delivered via a face mask with reservoir bag. Hypoxemic respiratory failure in ARDS commonly results from intrapulmonary ventilation-perfusion mismatch or shunt and usually requires mechanical ventilation.

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.

- Patients receiving HFNO, CPAP or other NIV should be in a closely monitored setting and cared for by experienced personnel capable of endotracheal intubation if the patient acutely deteriorates. Intubation should not be delayed in such circumstances.
- In addition, NIV and possibly HFNO carry the risk of aerosolization of viral particles. Patients using HFNO or NIV should be nursed in a single patient room using airborne precautions.

The use of the prone position in non-intubated, conscious patients may be beneficial. This can be accomplished with minimal risk, and may offer a potential benefit in oxygenation.[54, 55]

Patients with hypoxaemic respiratory failure may require intubation and mechanical ventilatory support. Detailed recommendations on ventilation strategies are beyond the scope of this guideline. Always consult an intensivist if possible, or alternatively a practitioner experienced with mechanical ventilation. Nonetheless, the general principles to consider include:

- Individualise ventilatory strategies based on respiratory mechanics and disease progression.
- Use lung-protective ventilation strategies for patients with established ARDS who have low lung compliance.
- Aim for an initial tidal volume of 4-6ml/kg.[56] Higher tidal volume up to 8 ml/kg predicted body weight may be needed if minute ventilation requirements are not met in a patient with good lung compliance.
- Strive to achieve the lowest plateau pressure possible. Plateau pressures above 30 cmH_20 are associated with an increased risk of pulmonary injury.[56]
- Hypercapnia is permitted if meeting the pH goal of >7.15-7.20.
- Application of prone ventilation 12-16 hours a day is strongly recommended for patients with severe ARDS.[56]
- In patients with moderate or severe ARDS, identifying optimal PEEP levels will require titration of PEEP.[56]
- The use of deep sedation may be required to control respiratory drive, achieve tidal volume targets, and assist with patient-ventilator dyssynchrony.
- In patients with moderate-severe ARDS (PaO_2/FiO_2 <200), neuromuscular blockade by continuous infusion should not be routinely used.[57] Continuous neuromuscular blockade may still be considered in patients with ARDS in certain situations: ventilator dyssynchony despite sedation, such that tidal volume limitation cannot be reliably achieved; or refractory hypoxemia.
- Avoid disconnecting the patient from the ventilator, which results in loss of PEEP and atelectasis. Use closed system catheters for airway suctioning and clamp endotracheal tube when disconnection is required (for example, transfer to a transport ventilator).
- A high efficiency particulate filter on the expiratory limb of the ventilator circuit should be used.

4.6 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.**

Most patients with mild COVID-19 infection continue to shed SARS-CoV-2 from their upper airways for approximately 7-12 days.[21, 58, 59] The duration of shedding is longer in severe cases, though in both mild and severe cases, significant variation is seen.[21, 58, 60]

Viral shedding does not necessarily equate to infectiousness however. Viral shedding may decline to a level below the infectious threshold before it ceases completely, and/or non-viable virus may be shed. In a small cohort of mild COVID-19 cases from Germany (n=9), viral loads and viral cultures were performed on a variety of specimens simultaneously.[61] The virus was readily culturable from specimens taken during the first week of symptoms, but no positive cultures were obtained from samples taken after day 8. Importantly, this was despite ongoing high viral loads being detected at the time. The authors estimated that there would be a <5% chance of successful culture by day 10. This work aligns with epidemiological modelling which suggests that infectiousness likely peaks near to the onset of symptoms, and falls rapidly over the course of a week thereafter.[62, 63]

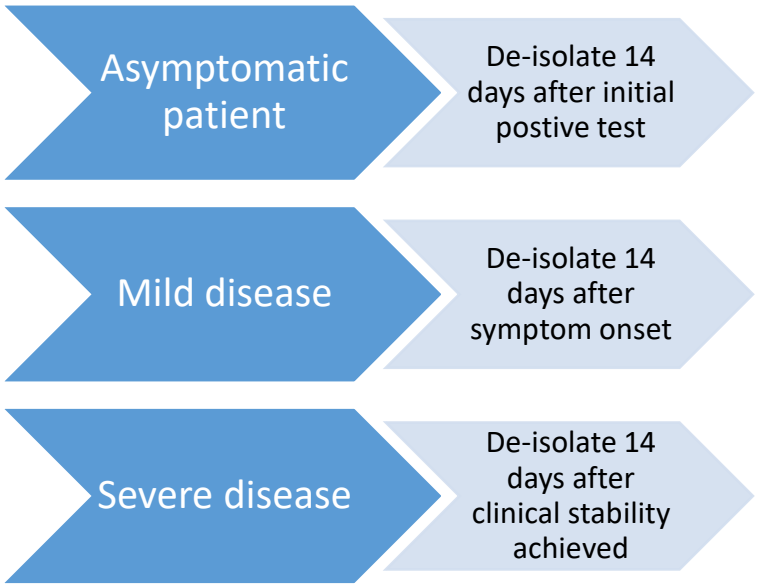
For the above reasons, we recommend de-isolating patients with mild disease 14 days after symptom onset.

Patients with severe disease (i.e. requiring admission due to clinical instability) may continue to shed virus at higher levels for longer periods. We therefore recommend de-isolating such patients 14 days after clinical stability has been achieved (e.g. after supplemental oxygen was discontinued).

Patients who remain asymptomatic after a positive COVID-19 result can be de-isolated 14 days after their positive test. Although asymptomatic patients might be expected to be less infectious than symptomatic patients, the two groups' viral loads appear to be similar, and we believe a similarly cautious approach to de-isolation is warranted.[6, 60]

Patients admitted to hospital can continue their isolation period at home once clinical stability has been achieved, provided that the criteria in table 2 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 <u>still symptomatic</u> 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**.


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

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

5.1 Children

- Childhood is a period of innate physical, social and psychological vulnerability which are likely to be aggravated by the COVID-19 pandemic as children become infected or affected.
- Children may be infected by SARS-COV 2 virus, albeit with lower subsequent morbidity and mortality than adults. In the early Chinese experience, children under 10 years of age[64]:
    - Accounted for fewer than 1% of all cases;
    - Acquired their infection at home (82 - 90%);
    - Were asymptomatic (4%) or had mild (51%) or moderate (39%) disease;
    - Had very few reported deaths.
- The clinical picture and treatment of children is similar to that of adults. The case definition for adults and children is the same. However, our understanding of the entire spectrum of COVID-19-related symptoms continues to evolve and may be different at different ages. If in doubt, healthcare workers should seek additional advice and if still unsure err on the side of testing.

The focus of any response for children to the COVID-19 pandemic should include:

1. *Protection and prevention of primary infection:*
    - Provide routine childcare, focusing on nutritional support, stimulation and love.
    - Ensure environmental hygiene.
    - Promote appropriate infection prevention and control (IPC) practices including hand hygiene; masks for children over 2 years of age; respiratory etiquette and social distancing.
    - Self-isolation and quarantine together with the primary caregiver, as appropriate.

2. *Early detection, isolation and treatment if infected:*
    - Suspect COVID-19 infection in every child with an acute respiratory infection. Isolate and test each such child.
    - Assess the severity of their clinical condition:

Mild	Active child with no respiratory distress; SpO_2 >95% in room air
Moderate	Restless; tachypnoeic, chest indrawing; SpO_2< 92% in room air
Severe	Tachypnoeic; chest indrawing; SpO_2< 92% in room air; cyanosis

    - Explore differential diagnosis and risk factors, e.g. chronic disease; address holistic needs in terms of HIV status, TB risk, nutritional assessment, etc.
    - Manage according to this assessment - the focus of treatment is supportive, including nutritional support, oxygen and paracetamol (as required for pain or fever), avoid NSAIDs and oral corticosteroids unless indicated for other conditions.

        - Mild: isolate at home; paracetamol; alert to danger signs (severe diarrhoea, shaking, not moving/waking or swelling of body/legs) or worsening respiratory distress.
        - Moderate: cohort/isolate in hospital; oxygen to keep SpO_2 >92% (see below); monitor 3-4 hourly, paracetamol, empiric antibiotics according to paediatric standard treatment guidelines.
        - Severe: discuss with local HCU/ICU for possible admission and transport using PPE; general respiratory supportive measures (oxygen, stopping feeds, nursing prone); manage for severe pneumonia (according to paediatric standard treatment guidelines).

Guidance on oxygen therapy:

- If unable to maintain SpO_2 > 92% in room air add nasal prong oxygen (NPO) at 2l/min
- If unable to maintain SpO_2 > 92% in NPO at 2l/min then change to 40% face mask (pink) oxygen at 8 l/min
- If unable to maintain SpO_2 > 92% in 40% face mask (pink) oxygen at 8 l/min then change to 60% face mask (orange) at 10l/min
- If unable to maintain SpO_2 > 92% in 60% face mask oxygen at 10l/min change to face mask oxygen with reservoir bag (non-rebreather face mask) at 15l/min and contact nearest PICU
- If unable to maintain SpO_2 > 92% in face mask oxygen with reservoir bag (non-rebreather face mask) at 15l/min consider transfer to nearest PICU if bed available
- PICU would consider the use of HFNC and NIV
- Use a surgical mask over the child's face with the use of any forms of oxygen therapy especially high flow oxygen whether with or without the machine and NIV to help protect the HCW

- nCPAP/BiPAP are beneficial to individual children. However, the risk to staff and caregivers from aerosolisation is uncertain, may be high and persists for as long as the modality of care is being used. These modalities should therefore only be considered in the following circumstances:
  - The child must be nursed in an isolation room. Ideally this room should have negative pressure. If negative pressure is not available, then a Perspex intubation box or other form of barrier should be used (if available).
  - Staff must wear PPE that includes a visor and N95 mask continuously whilst in the same room as the child.
  - Filters must be applied to the nCPAP/BiPAP exit limb tubing.

Precautionary measures during resuscitation and stabilization of a child
Personal protective equipment must be utilised by all HCW at any health car level in caring for all cases where resuscitation is required. These include use of N95 mask, visor, hair cover and Perspex intubation box if available. Oral intubation with a cuffed tube is preferred.

3. *Psychosocial support and child-caring arrangements for both infected and affected children:*
   - Balance the need for isolation to prevent spread to other people, with the basic needs of every child for love, care and support.
   - Do not separate children from their primary caregiver and support access to their mothers/ primary caregivers where this is feasible.
   - Advise families on child-caring practices that avoid contact of children with at-risk populations (elderly, co-morbidities), as far as practically possible.
   - Ensure access to stimulation activities and play.
   - Provide basic information to mother and older children on their condition and treatment.

4. *Preservation of and access to routine health services:*
   - Ensure ongoing provision of routine paediatric and child health services including access to immunisations; acute and emergency care; nutritional support and care of long-term health conditions (including HIV, TB, asthma, epilepsy, and others).

5.2 Newborns

- Whilst there is a risk of horizontal transmission of infection from a COVID-19 positive mother to her newborn baby these infections appear to be mild. There is no evidence to date that vertical transmission occurs. Babies are currently considered potentially infectious for 14 days after birth and staff should use hand hygiene and standard PPE in caring for them (gloves, surgical mask, apron, eye protection if risk of mucosal splash).
- As far as possible do NOT separate a COVID-19 positive mother from her baby.
  - Well mothers should participate in the care of their babies but IPC (including hand and breast hygiene, face mask, respiratory hygiene) is essential.
  - Unwell mothers should not participate in the care of their babies and the family should identify an alternative, COVID-19-uninfected caregiver into whose care the baby should be discharged. If this is not possible, the neonate needs to be admitted.
- Promote breastfeeding by well mothers. Unwell mothers should be encouraged to express their breastmilk if they can.
- The case definition is the same as for children or adults, although it is expected that neonatal presentations may sometimes be atypical, without a typical influenza-like illness or fever. A high index of suspicion should be maintained. Neonates from home may also present for medical care after initial discharge from the birthing facility. COVID-19 infection should be included in the differential diagnosis of any neonate presenting with acute respiratory disease, pneumonia or sepsis, and such neonates should be tested for COVID-19 on presentation.
- Well babies should:
  - Remain with mother in isolation;
  - Not be admitted to the neonatal ward/ nursery, unless absolutely necessary. Any required treatment (like phototherapy, glucose monitoring, etc.) should be administered in the postnatal ward if possible (staff to use standard PPE)
  - Receive the usual postnatal care (staff to use standard PPE);
  - Not have a COVID-19 test;
  - Be discharged as soon as possible with advice to the mother regarding danger signs (respiratory distress/ fever, etc.);
  - Be considered potentially infectious for 14 days and must self-isolate with the mother at home.

- Well babies whose mother is unable to care for them and who are awaiting a caregiver should:
  - Be isolated in a closed incubator.
  - Be cohorted or isolated if possible, and receive no visitors;
  - Receive the usual postnatal care and expressed breastmilk if possible;
  - Be discharged as soon as possible with advice to the caregiver regarding feeding and danger signs (respiratory distress/ fever, etc.);
  - Be considered potentially infectious for 14 days and must self-isolate with the caregiver at home.

- Unwell/symptomatic babies should:
  - Be isolated in a closed incubator (cohorted or in an isolation room if available)
  - Have a COVID-19 test on day 3 of life if he/she meets the case definition, or at another time if clinically indicated (tests done before 72 hours of age may give a false negative result). This must be repeated on day 5 of life if the first test is negative.
  - Receive no visitors, including their mother, for 14 days;
  - Receive expressed breast milk if possible. Mixed feeding should be avoided if possible, especially if HIV-exposed.
  - Be considered potentially infectious for 14 days;

- Be discharged according to neonatal condition and, if needs be, complete self-isolation at home.

- Aerosol precautions should be taken for any aerosol-generating procedure (intubation, extubation, bag mask ventilation and open suctioning of the respiratory tract, surfactant administration, obtaining nasopharyngeal/oropharyngeal swabs, all forms of ventilation (non-invasive and invasive) which includes CPAP and high flow nasal cannulae).
- On discharge, the follow-up of baby needs to be planned. This includes preventative advice regarding infection (hand hygiene, cough etiquette, mask use) and importance of immunizations and routine care.

5.3 Pregnant and breastfeeding women

- Although evidence is limited, there is currently no indication that pregnant women are at higher risk of either contracting COVID-19 or of worse maternal outcomes with COVID-19.[65, 66]
- Similarly, definitive *in utero* transmission of COVID-19 has not been established, although possible cases have been described.[67-71] In one study of six mothers with COVID-19, SARS-CoV-2 was not detected in any of the amniotic fluid, cord blood, neonatal throat swab, or breastmilk samples.[68]
- All antenatal care must continue during the COVID pandemic to avoid preventable pregnancy complications. Pregnant women with mild COVID-19 with no current obstetric complications can delay their antenatal visits until they are noninfectious.
- Outpatient examination and all inpatient management of pregnant women with COVID-19 should be carried out in an appropriate isolation area. For intrapartum care, delivery and immediate postnatal care, dedicated midwives should be allocated to care for the woman and her newborn. These midwives should preferably not be involved with managing other women in labour on the same shift.
- COVID-19 is not in itself an indication for caesarean delivery. Women with COVID-19 infection should be allowed to deliver vaginally, unless there are clear obstetric indications for caesarean section.
    - Shortening the second stage of labour by assisted vaginal delivery can be considered if the woman is exhausted or has respiratory distress.
- Where preterm delivery is anticipated, the benefits of antenatal corticosteroids for fetal lung maturation might outweigh the risks of potential harm to the mother (see section 4.4 above). In this situation, the balance of benefits and harms for the woman and the preterm newborn should be discussed with the woman to ensure an informed decision, as this may vary depending on the woman's clinical condition, her wishes, and available health care resources.
- Women with COVID-19 may breastfeed. However, they should practice excellent hand and respiratory hygiene, and should wear a surgical or cloth mask while breastfeeding. They should wash hands before and after touching the baby, and clean and disinfect surfaces they have touched. For women expressing breastmilk, dedicated breast pumps and feeding cups should be used. Feeding cups must be cleaned and heat disinfected between use.

5.4 People living with HIV

- The risk of COVID-19 in those living with HIV is unknown, both in terms of risk of acquisition, as well as the risk of complications. Information and guidance will likely evolve rapidly.
- As untreated (and even treated) HIV is a risk factor for many respiratory infections, we anticipate that COVID-19 will impact on this population. This risk may be exacerbated with age and other comorbidities such tuberculosis, post-TB bronchiectasis, diabetes and COPD.

- For patients already on antiretroviral therapy (ART), ensure that the patient obtains an adequate supply of all drugs, including prophylaxis as required. Supplies of up to 6 months are appropriate if adherence is good. Emphasise the importance of maintaining an undetectable viral load, and ensure that a contact point exists with a health care worker.
- For patients newly diagnosed with HIV, ART should be started as soon as the patient is ready.
- Ensure patients have been adequately vaccinated (e.g. against influenza).
- Distinguishing COVID-19 from PJP may be extremely difficult. In the appropriate context (e.g. CD4 <200, not on cotrimoxazole prophylaxis for >1 month, chest infiltrates compatible with PJP on X-ray, and hypoxaemia) we suggest empiric coverage for PJP with cotrimoxazole (or alternatives if cotrimoxazole is contraindicated) while COVID-19 is ruled out.
    - In this scenario, we suggest testing for serum beta-D-glucan (BDG) levels, and sending sputum (if productive) for PJP (by PCR or special staining as per local lab protocol – do not induce sputum however). Although both tests have significant limitations (BDG is insufficiently specific, and routine sputum testing for PJP has a very poor sensitivity), they may be justified in the context of the COVID-19 pandemic to assist with differentiating these two aetiologies.
    - When treating empirically for moderate-severe PJP, we suggest using corticosteroids. Corticosteroids have significant mortality benefits in moderate to severe PJP, and these most likely outweigh the potential risks of corticosteroids in patients with COVID-19 (see section 4.4 above) when these two aetiologies cannot easily be differentiated.[72] The corticosteroids should be stopped if a positive COVID-19 result is obtained (or if another diagnosis is made).

6. Infection prevention and control (IPC)

IPC is a critical and integral part of clinical management of patients and should be initiated at the point of entry of the patient to hospital (typically the Emergency Department). **A combination of standard, contact and droplet precautions should be practiced for all COVID-19 cases, and further precautions when performing aerosol-generating procedures (AGP).**

Standard precautions are used to prevent or minimize transmission of pathogens at all times and should be applied to all patients in healthcare facilities irrespective of their diagnosis or status. These include 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.

Transmission-based precautions - droplet, and contact:

- Hand hygiene is the first and most essential aspect
- Healthcare worker PPE consists of 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 within the institution (e.g. where possible, use portable X-rays rather than sending the patient to the X-ray department), and ensure that patients wear medical masks when outside their rooms.

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 consists of gloves, gown (or apron), a fit-tested particulate respirator (N95 respirator or equivalent), 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.

A fuller discussion of IPC is beyond the scope of these guidelines. 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/

7. Recording and reporting

It is vital to record and report cases of COVID-19 in order to track the size and severity of the epidemic, the care received by patients in and out of hospital, and to identify areas for improvement in current and future outbreaks. There are different tools which will be needed to record and report clinical cases of COVID-19.

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/

Online versions of the NMC forms can be completed at https://mstrmobile.nicd.ac.za/nmc/
An Android app for this is also available at the same link.

References

1. Du Z, Xu X, Wu Y, Wang L, Cowling BJ, Meyers LA. Serial Interval of COVID-19 among Publicly Reported Confirmed Cases. Emerg Infect Dis. 2020;26(6).
2. Yu P, Zhu J, Zhang Z, Han Y, Huang L. A familial cluster of infection associated with the 2019 novel coronavirus indicating potential person-to-person transmission during the incubation period. J Infect Dis. 2020.
3. Tindale L, Coombe M, Stockdale JE, Garlock E, Lau WYV, Saraswat M, et al. Transmission interval estimates suggest pre-symptomatic spread of COVID-19. medRxiv. 2020:2020.03.03.20029983.
4. Nishiura H, Linton NM, Akhmetzhanov AR. Serial interval of novel coronavirus (COVID-19) infections. Int J Infect Dis. 2020;93:284-6.
5. Nishiura H, Kobayashi T, Suzuki A, Jung SM, Hayashi K, Kinoshita R, et al. Estimation of the asymptomatic ratio of novel coronavirus infections (COVID-19). Int J Infect Dis. 2020.
6. Arons MM, Hatfield KM, Reddy SC, Kimball A, James A, Jacobs JR, et al. Presymptomatic SARS-CoV-2 Infections and Transmission in a Skilled Nursing Facility. New England Journal of Medicine. 2020.
7. Gandhi M, Yokoe DS, Havlir DV. Asymptomatic Transmission, the Achilles' Heel of Current Strategies to Control Covid-19. New England Journal of Medicine. 2020.
8. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus-Infected Pneumonia. N Engl J Med. 2020.
9. Onder G, Rezza G, Brusaferro S. Case-Fatality Rate and Characteristics of Patients Dying in Relation to COVID-19 in Italy. JAMA. 2020.
10. Chen T, Wu D, Chen H, Yan W, Yang D, Chen G, et al. Clinical characteristics of 113 deceased patients with coronavirus disease 2019: retrospective study. BMJ. 2020;368:m1091.
11. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, et al. Clinical Characteristics of Coronavirus Disease 2019 in China. N Engl J Med. 2020.
12. Mizumoto K, Kagaya K, Zarebski A, Chowell G. Estimating the asymptomatic proportion of coronavirus disease 2019 (COVID-19) cases on board the Diamond Princess cruise ship, Yokohama, Japan, 2020. Euro Surveill. 2020;25(10).
13. Wu Z, McGoogan JM. Characteristics of and Important Lessons From the Coronavirus Disease 2019 (COVID-19) Outbreak in China: Summary of a Report of 72314 Cases From the Chinese Center for Disease Control and Prevention. JAMA. 2020.
14. Goyal P, Choi JJ, Pinheiro LC, Schenck EJ, Chen R, Jabri A, et al. Clinical Characteristics of Covid-19 in New York City. N Engl J Med. 2020.
15. Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, et al. Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus-Infected Pneumonia in Wuhan, China. JAMA. 2020.
16. Giacomelli A, Pezzati L, Conti F, Bernacchia D, Siano M, Oreni L, et al. Self-reported olfactory and taste disorders in SARS-CoV-2 patients: a cross-sectional study. Clin Infect Dis. 2020.
17. Yan CH, Faraji F, Prajapati DP, Boone CE, DeConde AS. Association of chemosensory dysfunction and Covid-19 in patients presenting with influenza-like symptoms. Int Forum Allergy Rhinol. 2020.
18. Wong HYF, Lam HYS, Fong AH-T, Leung ST, Chin TW-Y, Lo CSY, et al. Frequency and Distribution of Chest Radiographic Findings in COVID-19 Positive Patients. Radiology.0(0):201160.
19. Salehi S, Abedi A, Balakrishnan S, Gholamrezanezhad A. Coronavirus Disease 2019 (COVID-19): A Systematic Review of Imaging Findings in 919 Patients. AJR Am J Roentgenol. 2020:1-7.
20. Weinstock MB EA, Russell JW, et al. Chest x-ray findings in 636 ambulatory patients with COVID-19 presenting to an urgent care center: a normal chest x-ray is no guarantee. J Urgent Care Med. 2020;14(7):13-8.

21. World Health Organization. Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19)2020. Available from: https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf.
22. Oxley TJ, Mocco J, Majidi S, Kellner CP, Shoirah H, Singh IP, et al. Large-Vessel Stroke as a Presenting Feature of Covid-19 in the Young. N Engl J Med. 2020.
23. Galvan Casas C, Catala A, Carretero Hernandez G, Rodriguez-Jimenez P, Fernandez Nieto D, Rodriguez-Villa Lario A, et al. Classification of the cutaneous manifestations of COVID-19: a rapid prospective nationwide consensus study in Spain with 375 cases. Br J Dermatol. 2020.
24. Riphagen S, Gomez X, Gonzalez-Martinez C, Wilkinson N, Theocharis P. Hyperinflammatory shock in children during COVID-19 pandemic. Lancet. 2020.
25. Wang W, Xu Y, Gao R, Lu R, Han K, Wu G, et al. Detection of SARS-CoV-2 in Different Types of Clinical Specimens. JAMA. 2020.
26. Centre for Evidence-Based Medicine. Comparative accuracy of oropharyngeal and nasopharyngeal swabs for diagnosis of COVID-19. 2020 Accessed: 19 April 2020. Available from: https://www.cebm.net/covid-19/comparative-accuracy-of-oropharyngeal-and-nasopharyngeal-swabs-for-diagnosis-of-covid-19/.
27. Wyllie AL, Fournier J, Casanovas-Massana A, Campbell M, Tokuyama M, Vijayakumar P, et al. Saliva is more sensitive for SARS-CoV-2 detection in COVID-19 patients than nasopharyngeal swabs. medRxiv. 2020:2020.04.16.20067835.
28. Azzi L, Carcano G, Gianfagna F, Grossi P, Gasperina DD, Genoni A, et al. Saliva is a reliable tool to detect SARS-CoV-2. J Infect. 2020.
29. Williams E, Bond K, Zhang B, Putland M, Williamson DA. Saliva as a non-invasive specimen for detection of SARS-CoV-2. J Clin Microbiol. 2020.
30. Yu F, Yan L, Wang N, Yang S, Wang L, Tang Y, et al. Quantitative Detection and Viral Load Analysis of SARS-CoV-2 in Infected Patients. Clin Infect Dis. 2020.
31. Zhao J, Yuan Q, Wang H, Liu W, Liao X, Su Y, et al. Antibody responses to SARS-CoV-2 in patients of novel coronavirus disease 2019. Clin Infect Dis. 2020.
32. Guo L, Ren L, Yang S, Xiao M, Chang, Yang F, et al. Profiling Early Humoral Response to Diagnose Novel Coronavirus Disease (COVID-19). Clin Infect Dis. 2020.
33. World Health Organization. Advice on the use of point-of-care immunodiagnostic tests for COVID-19. 2020 [20th April 2020]. Available from: https://www.who.int/news-room/commentaries/detail/advice-on-the-use-of-point-of-care-immunodiagnostic-tests-for-covid-19.
34. SAHPRA. The Use of Non-Steroidal Anti-Inflammatory Drugs in patients with Covid-19. Media release. 2020.
35. Tran K, Cimon K, Severn M, Pessoa-Silva CL, Conly J. Aerosol generating procedures and risk of transmission of acute respiratory infections to healthcare workers: a systematic review. PLoS One. 2012;7(4):e35797.
36. Wan GH, Tsai YH, Wu YK, Tsao KC. A large-volume nebulizer would not be an infectious source for severe acute respiratory syndrome. Infect Control Hosp Epidemiol. 2004;25(12):1113-5.
37. Public Health England. COVID-19. Guidance for infection prevention and control in healthcare settings. 2020.
38. Global Initiative for Asthma. COVID-19: Gina answers to frequently asked questions on asthma management2020. Available from: https://ginasthma.org/covid-19-gina-answers-to-frequently-asked-questions-on-asthma-management/.
39. Fang L, Karakiulakis G, Roth M. Are patients with hypertension and diabetes mellitus at increased risk for COVID-19 infection? Lancet Respir Med. 2020.
40. Zhang P, Zhu L, Cai J, Lei F, Qin JJ, Xie J, et al. Association of Inpatient Use of Angiotensin Converting Enzyme Inhibitors and Angiotensin II Receptor Blockers with Mortality Among Patients With Hypertension Hospitalized With COVID-19. Circ Res. 2020.

41. World Health Organization. Clinical management of severe acute respiratory infection when novel coronavirus (nCoV) infection is suspected 2020 [Available from: https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-(ncov)-infection-is-suspected.
42. Schultz MJ, Dunser MW, Dondorp AM, Adhikari NK, Iyer S, Kwizera A, et al. Current challenges in the management of sepsis in ICUs in resource-poor settings and suggestions for the future. Intensive Care Med. 2017;43(5):612-24.
43. Rhodes A, Evans LE, Alhazzani W, Levy MM, Antonelli M, Ferrer R, et al. Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock: 2016. Intensive Care Med. 2017;43(3):304-77.
44. Rawson TM, Moore LSP, Zhu N, Ranganathan N, Skolimowska K, Gilchrist M, et al. Bacterial and fungal co-infection in individuals with coronavirus: A rapid review to support COVID-19 antimicrobial prescribing. Clin Infect Dis. 2020.
45. Russell CD, Millar JE, Baillie JK. Clinical evidence does not support corticosteroid treatment for 2019-nCoV lung injury. Lancet. 2020;395(10223):473-5.
46. Lansbury L, Rodrigo C, Leonardi-Bee J, Nguyen-Van-Tam J, Lim WS. Corticosteroids as adjunctive therapy in the treatment of influenza. Cochrane Database Syst Rev. 2019;2:CD010406.
47. Ni YN, Chen G, Sun J, Liang BM, Liang ZA. The effect of corticosteroids on mortality of patients with influenza pneumonia: a systematic review and meta-analysis. Crit Care. 2019;23(1):99.
48. Stockman LJ, Bellamy R, Garner P. SARS: systematic review of treatment effects. PLoS Med. 2006;3(9):e343.
49. Arabi YM, Mandourah Y, Al-Hameed F, Sindi AA, Almekhlafi GA, Hussein MA, et al. Corticosteroid Therapy for Critically Ill Patients with Middle East Respiratory Syndrome. Am J Respir Crit Care Med. 2018;197(6):757-67.
50. Xu K, Chen Y, Yuan J, Yi P, Ding C, Wu W, et al. Factors associated with prolonged viral RNA shedding in patients with COVID-19. Clinical Infectious Diseases. 2020.
51. Alhazzani W, Moller MH, Arabi YM, Loeb M, Gong MN, Fan E, et al. Surviving Sepsis Campaign: guidelines on the management of critically ill adults with Coronavirus Disease 2019 (COVID-19). Intensive Care Med. 2020.
52. Rygard SL, Butler E, Granholm A, Moller MH, Cohen J, Finfer S, et al. Low-dose corticosteroids for adult patients with septic shock: a systematic review with meta-analysis and trial sequential analysis. Intensive Care Med. 2018;44(7):1003-16.
53. World Health Organization. Guidance For Managing Ethical Issues In Infectious Disease Outbreaks 2016. Available from: https://apps.who.int/iris/bitstream/handle/10665/250580/9789241549837-eng.pdf;jsessionid=2C3A0BBB41D97192E283FF36FF1D7644?sequence=1.
54. Intensive Care Society. ICS Guidance for Prone Positioning of the Conscious COVID Patient 2020. [26/04/2020]. Available from: https://emcrit.org/wp-content/uploads/2020/04/2020-04-12-Guidance-for-conscious-proning.pdf.
55. Caputo ND, Strayer RJ, Levitan R. Early Self-Proning in Awake, Non-intubated Patients in the Emergency Department: A Single ED's Experience during the COVID-19 Pandemic. Acad Emerg Med. 2020.
56. Fan E, Del Sorbo L, Goligher EC, Hodgson CL, Munshi L, Walkey AJ, et al. An Official American Thoracic Society/European Society of Intensive Care Medicine/Society of Critical Care Medicine Clinical Practice Guideline: Mechanical Ventilation in Adult Patients with Acute Respiratory Distress Syndrome. Am J Respir Crit Care Med. 2017;195(9):1253-63.
57. National Heart L, Blood Institute PCTN, Moss M, Huang DT, Brower RG, Ferguson ND, et al. Early Neuromuscular Blockade in the Acute Respiratory Distress Syndrome. N Engl J Med. 2019;380(21):1997-2008.

58. Liu Y, Yan L-M, Wan L, Xiang T-X, Le A, Liu J-M, et al. Viral dynamics in mild and severe cases of COVID-19. Lancet Infect Dis [Internet]. 2020. Available from: https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(20)30232-2/fulltext.
59. Young BE, Ong SWX, Kalimuddin S, Low JG, Tan SY, Loh J, et al. Epidemiologic Features and Clinical Course of Patients Infected With SARS-CoV-2 in Singapore. JAMA. 2020.
60. Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. Lancet. 2020.
61. Wolfel R, Corman VM, Guggemos W, Seilmaier M, Zange S, Muller MA, et al. Virological assessment of hospitalized patients with COVID-2019. Nature. 2020.
62. He X, Lau EHY, Wu P, Deng X, Wang J, Hao X, et al. Temporal dynamics in viral shedding and transmissibility of COVID-19. Nature Medicine. 2020.
63. Cheng H-Y, Jian S-W, Liu D-P, Ng T-C, Huang W-T, Lin H-H. High transmissibility of COVID-19 near symptom onset. medRxiv. 2020:2020.03.18.20034561.
64. Dong Y, Mo X, Hu Y, Qi X, Jiang F, Jiang Z, et al. Epidemiological Characteristics of 2143 Pediatric Patients With 2019 Coronavirus Disease in China. Pediatrics. 2020.
65. Liu D, Li L, Wu X, Zheng D, Wang J, Yang L, et al. Pregnancy and Perinatal Outcomes of Women With Coronavirus Disease (COVID-19) Pneumonia: A Preliminary Analysis. AJR Am J Roentgenol. 2020:1-6.
66. Breslin N BC, Gyamfi-Bannerman C, Miller R, Martinez R, Bernstein K, et al. COVID-19 infection among asymptomatic and symptomatic pregnant women: Two weeks of confirmed presentations to an affiliated pair of New York City hospitals. American Journal of Obstetrics & Gynecology MFM. 2020; Pre-print.
67. Wölfel R, Corman VM, Guggemos W, Seilmaier M, Zange S, Mueller MA, et al. Clinical presentation and virological assessment of hospitalized cases of coronavirus disease 2019 in a travel-associated transmission cluster. medRxiv. 2020:2020.03.05.20030502.
68. Chen H, Guo J, Wang C, Luo F, Yu X, Zhang W, et al. Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records. Lancet. 2020;395(10226):809-15.
69. Zeng H, Xu C, Fan J, Tang Y, Deng Q, Zhang W, et al. Antibodies in Infants Born to Mothers With COVID-19 Pneumonia. JAMA. 2020.
70. Zeng L, Xia S, Yuan W, Yan K, Xiao F, Shao J, et al. Neonatal Early-Onset Infection With SARS-CoV-2 in 33 Neonates Born to Mothers With COVID-19 in Wuhan, China. JAMA Pediatr. 2020.
71. Mullins E, Evans D, Viner RM, O'Brien P, Morris E. Coronavirus in pregnancy and delivery: rapid review. Ultrasound Obstet Gynecol. 2020.
72. Ewald H, Raatz H, Boscacci R, Furrer H, Bucher HC, Briel M. Adjunctive corticosteroids for Pneumocystis jiroveci pneumonia in patients with HIV infection. Cochrane Database Syst Rev. 2015(4):CD006150.

Appendix 1 – Example of a patient information sheet

Example of a patient information sheet for use with suspected cases who are being sent home to await test results for SARS-CoV-2 (COVID-19).

While awaiting test results for COVID-19 (the novel coronavirus), you have been assessed as being medically well enough to be managed at home.

However, please consider yourself as potentially infectious until the final results are available. You will need to abide by the following:

- You should quarantine yourself at home. Don't go to work, avoid unnecessary travel, and as far as possible avoid close interactions with other people.
- You should clean your hands with soap and water frequently. Alcohol-based sanitizers may also be used, provided they contain at least 60% alcohol.
- Do not have visitors in your home. Only those who live in your home should be allowed to stay. If it is urgent to speak to someone who is not a member of your household, do this over the phone.
- You should wear a surgical mask when in the same room (or vehicle) as other people.
- At home, you should stay in a specific room and use your own bathroom (if possible). If you live in shared accommodation (university halls of residence or similar) with a communal kitchen, bathroom(s) and living area, you should stay in your room with the door closed, only coming out when necessary, wearing a surgical mask if one has been issued to you.
- You should practice good cough and sneeze hygiene by coughing or sneezing into a tissue, discarding the tissue immediately afterwards in a lined trash can, and then wash your hands immediately.
- If you need to wash the laundry at home before the results are available, then wash all laundry at the highest temperature compatible with the fabric using laundry detergent. This should be above 60° C. If possible, tumble dry and iron using the highest setting compatible with the fabric. Wear disposable gloves and a plastic apron when handling soiled materials if possible and clean all surfaces and the area around the washing machine. Do not take laundry to a laundrette. Wash your hands thoroughly with soap and water after handling dirty laundry (remove gloves first if used).
- You should avoid sharing household items like dishes, cups, eating utensils and towels. After using any of these, the items should be thoroughly washed with soap and water.
- All high-touch surfaces like table tops, counters, toilets, phones, computers, etc. that you may have touched should be appropriately and frequently cleaned.
- Monitor your symptoms - Seek prompt medical attention if your illness is worsening, for example, if you have difficulty breathing, or if the person you are caring for symptoms are worsening. If it's not an emergency, call your doctor or healthcare facility at the number below. If it is an emergency and you need to call an ambulance, inform the call handler or operator that you are being tested for SARS-CoV-2.

If your symptoms worsen:

- Call:

- Or come to:

For more information on COVID-19, see the NICD's FAQ page:
http://www.nicd.ac.za/diseases-a-z-index/covid-19/frequently-asked-questions/

Standard precautions to prevent transmission of COVID-19

Keep your hands clean

When?
- After visiting the bathroom
- Before and after eating
- After blowing your nose
- Whenever you think your hands are dirty

How? Use alcohol hand rub or wash hands with soap and water

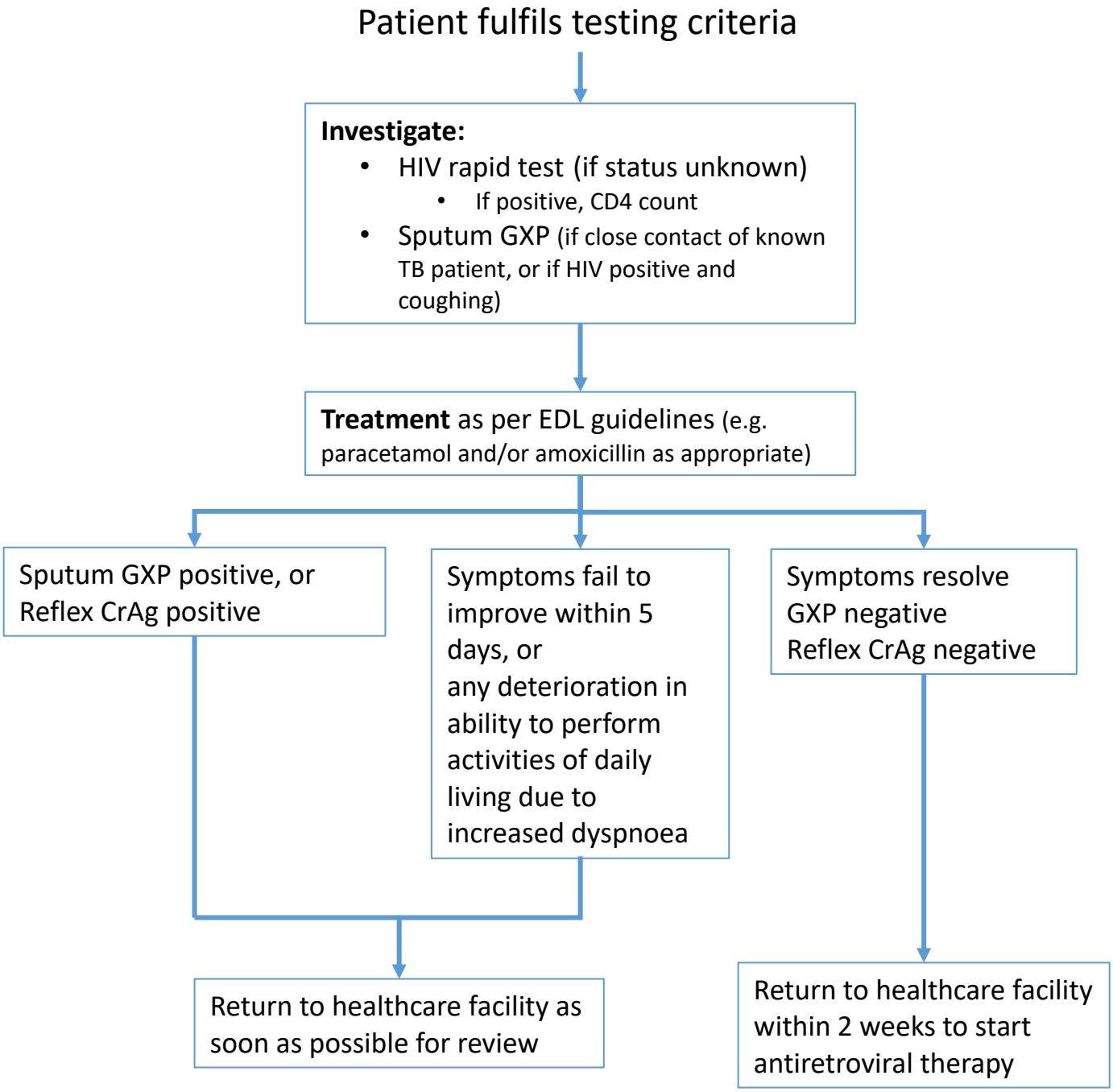
Caution Never touch your eyes, nose or mouth with unwashed hands

Cough etiquette
- Keep a distance of 2 meters between you and a person with a cough
- Cover your own cough or sneeze with a tissue
- Once used, throw the tissue away in a closed container
- Clean your hands afterwards

- **Do not share items with other people** (clothing, blankets, pillows, towels, mobile phones, uncovered food, magazines, books)
- **Do not keep the toilet lid up when you flush the toilet** (you can transmit the virus from all body excretions)

Keep your immediate environment clean
- Wipe frequently-touched areas regularly with a disinfectant cloth
- Discard all waste immediately

Appendix 2 – Example of patient algorithm in a primary care setting



GXP – GeneXpert MTB/RIF Ultra; CrAg – cryptococcal antigen