# 2019 Novel Coronavirus (2019-nCoV)

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

**Compiled by**

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

**and**

**National Department of Health, South Africa**
**Including Communicable Diseases Cluster, Zoonotic Diseases Cluster, Port Health, Environmental Health and Emergency Medical Services**

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# Outline

- Welcome and objectives
- Microbiology, epidemiology and clinical presentation
- Surveillance for imported cases including case definitions
- Laboratory diagnosis
- Infection prevention and hospital readiness
- Patient flow and actions required at each step
- Co-ordinating a public health response

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# THIS SITUATION IS RAPIDLY EVOLVING

BEFORE USING THIS POWERPOINT AND GUIDELINES PLEASE CHECK FOR UPDATES ON THE NICD AND NDOH WEBSITES (www.nicd.ac.za and www.ndoh.gov.za )

or

CALL YOUR PROVINCIAL COMMUNICABLE DISEASE CO-ORDINATOR

# Objective of training

- To familiarise attendees with RSA guidelines for
  - surveillance,
  - case detection/diagnosis
  - and management, and
  - public health response to suspected and confirmed cases of infection with 2019-nCoV

# Microbiology, epidemiology and clinical presentation

# Introduction

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

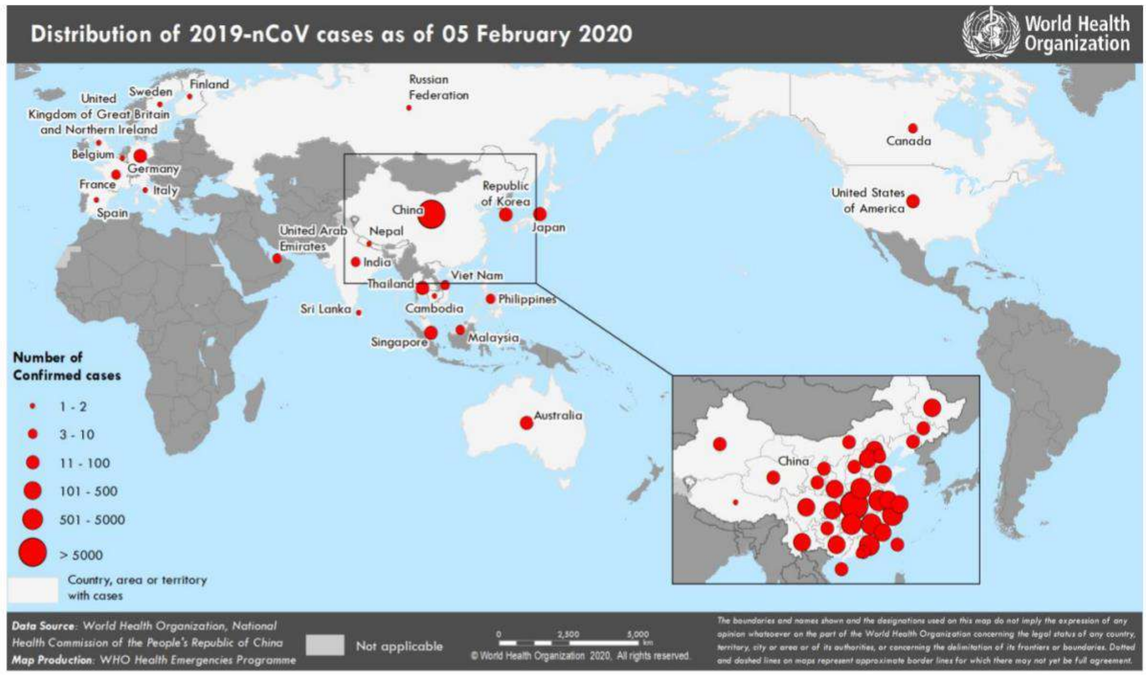
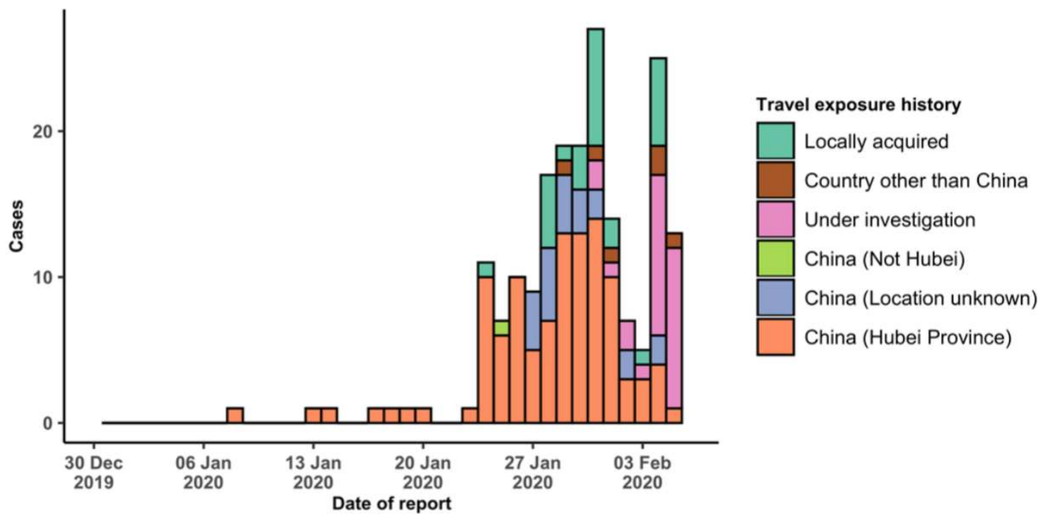
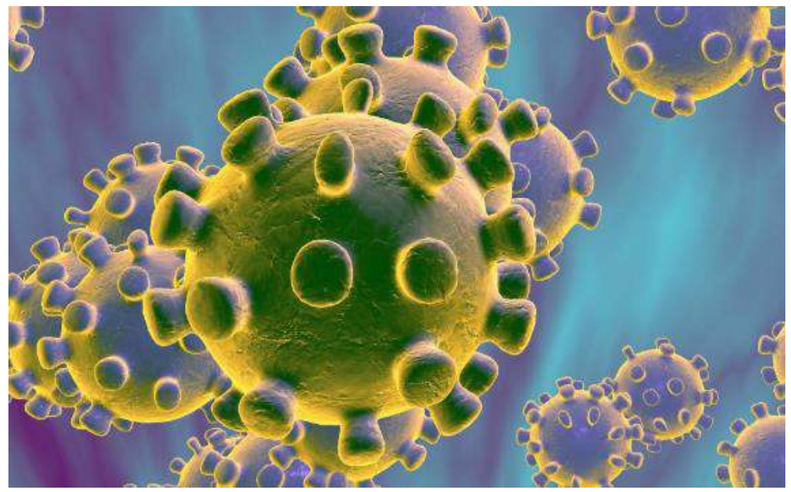



Figure 3: Epidemic curve of 2019-nCoV cases (n=191) identified outside of China, by date of reporting and travel history, 5 February 2020

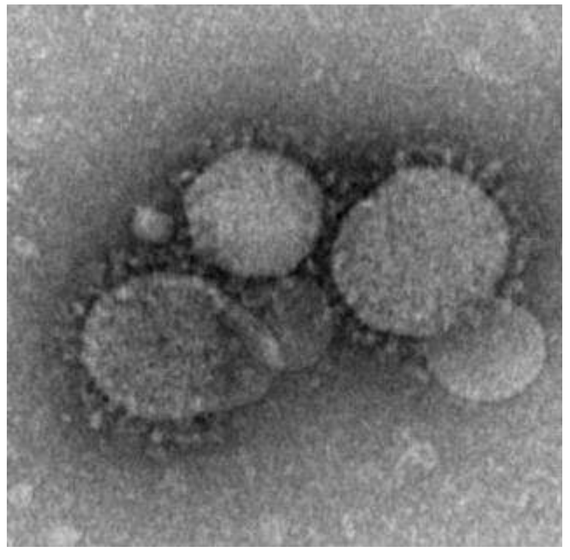


# Microbiology and epidemiology

- Coronaviruses are enveloped, single-stranded positive-sense RNA viruses.
- The envelope of the coronaviruses is covered with club-shaped glycoproteins which look like ‘crowns’, or ‘halos’ – hence the name ‘coronavirus.’



- Coronaviruses are responsible for the common cold, and usually cause self-limited upper respiratory tract infections.
  - Examples 229E, NL63, OC43 and HKU1



# Microbiology and epidemiology

- In 2003, a new coronavirus emerged leading to the SARS (severe acute respiratory syndrome) outbreak.
- In 2012, the Middle East respiratory syndrome (MERS) was found to be caused by a coronavirus associated with transmission from camels.
- Following the identification of a cluster of pneumonia cases in Wuhan, Hubei Province of China, Chinese authorities reported on 7 January 2020 that the causative pathogen was identified as a novel coronavirus (2019-nCoV).
- These new coronaviruses have RNA sequences that are very similar to coronaviruses from animals
    - MERS-CoV = camel coronavirus
    - SARS = bat coronavirus

# What is Coronavirus?

Coronaviruses are a large family of viruses that cause illness ranging from the common cold to more severe diseases like pneumonia, MERS and SARS

- **Sever Symptoms**
- **High Fever**
- **38°C**
- **Pneumonia**
- **Kidney Failure**
- **Death**

**COMMON SYMPTOMS**

Fever

After 2 to 7 days develop a dry cough

Mild breathing difficulties at the outset

Gastrointestinal issues

Diarrhea

General body aches

**TRANSMISSION**

Coughs or sneezes from infected person or touching contaminated objects

* Source: Centers for Disease Control and Prevention/ USA Today

EXPRESS

# Transmissibility

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

# Clinical presentation

- **Who is at highest risk?**
  - Largest published series to date from China - 99 2019-nCoV patients with pneumonia the commonest symptoms were fever (83%), cough (82%) and shortness of breath (31%).(Chen et al Lancet 2020)
  - The majority (but not all) of severe cases are elderly or have severe underlying illness
  - Among pneumonia patients 51% had chronic diseases
  - 11 patients who died, 7 aged >60 years, 3 had long history of smoking and 3 had hypertension
- **Number of cases and deaths continue to increase**
  - Approximately 2% of reported confirmed cases have died
  - Likely a substantial overestimation of the true case fatality ratio:
    - More severe disease tends to be reported first
    - Initial case definition in China really focused on patients with pneumonia
    - Possible backlog in testing and confirming cases in China

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# Surveillance and case definitions

# Clinical and epidemiological criteria for person under investigation (PUI)

- Patients with acute respiratory infection (sudden onset of at least one of the following: cough, sore throat, shortness of breath) requiring hospitalisation or not

**AND**

In the 14 days prior to onset of symptoms, met at least one of the following epidemiological criteria:

- Were in close contact with a confirmed or probable case of 2019-nCoV infection;

**OR**

- Had a history of travel to areas with presumed ongoing community transmission of 2019-nCoV; i.e. China

**OR**

- Worked in or attended a health care facility where patients with 2019-nCoV infections were being treated.

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# Who Should be tested

- Presently, the only persons who should undergo testing for 2019-nCoV are those described above under Person Under Investigation (PUI).
- All case to be discussed with NICD doctor on call before collecting samples
- The test will be free of charge for patients meeting the case definitions above

**NICD Hotline**

**082-883-9920**

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# If testing is indicated, what next?

- **Isolate the patient** using appropriate infection prevention control (see next section)
- Collect a specimen ASAP (see next section)
- Identify contacts

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# Who is a close contact

- A person having had face-to-face contact (within 2 metres) or was in a closed environment with a 2019-nCoV case; this includes,
  - amongst others, all persons living in the same household as a 2019-nCoV case and, people working closely in the same environment as a case.
- A healthcare worker or other person providing direct care for a 2019-nCoV case.
- A contact in an aircraft sitting within two seats (in any direction) of the 2019-nCoV case, travel companions or persons providing care, and crew members serving in the section of the aircraft where the index case was seated.

# How to do contact tracing and monitoring of close contacts

- Once laboratory testing confirms 2019-nCoV infection:
- Provincial CDCC needs to identify close contacts, and make make a contact line list using Appendix in guidelines (see next slide)
- EVERY contact to complete the contact demographic section on the contact monitoring form PDF version at: http://www.nicd.ac.za/diseases-a-z-index/novel-coronavirus-infection/ (see next slide)
- Completed linelist and contact form also to be emailed to ncov@nicd.ac.za
- Close contacts will be asked to self-quarantine at home for 14 days since exposure to the confirmed 2019-nCoV and take their temperature daily (thermometers need to be issued)
- CDC / NICD/ delegated person will call contacts telephonically to identify if symptoms are present

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# Monitoring of close contacts and Health workers with occupational exposure

- Monitoring of close contacts may switch from telephonic monitoring to self-monitoring dependant on the number of contacts to be followed up.
- **Close contacts under monitoring should be advised to:**
  - Remain at home (NICD can provide an official letter for employment or education facilities)
  - Avoid unnecessary social contact
  - Avoid travel
  - Remain reachable for monitoring

- **Health Worker with occupational Exposure**
  - Lists of healthcare workers with occupational exposure should be compiled by the health facility
  - They should be actively monitored for symptoms and rapidly isolated and tested should symptoms develop

# Quarantine

- Quarantine means separating asymptomatic persons who are exposed to a disease from non-exposed persons
- Quarantine is to be distinguished from isolation, which is the act of separating a sick individual with a contagious disease from healthy individuals without that contagious disease
- Quarantine procedures can be effective in limiting and slowing the introduction of a novel pathogen into a population but may entail the use of considerable resources and may infringe on the rights of members of society.
- Quarantine may take place
  - in the home
  - or in a designated facility.
- Depending on level of risk, and intensity of the exposure, different levels of quarantine will be employed, for example
  - If a person is expatriated from Wuhan, voluntary quarantine at a facility will be recommended.
  - A household member of a confirmed case will be asked to stay in their home for 14 days
  - if health worker wearing appropriate PEP is exposed to a confirmed case, the health worker would be allowed to work but would be requested to self-quarantine if symptoms develop within 14 days.

# Contact line List

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## 2019-nCoV CONTACT LINE LIST

Complete a contact line list for every case under investigation and every confirmed case

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| Details of case under investigation/confirmed case | | | |
|---|---|---|---|
| NICD Identifier | | Date Symptom Onset | DD/MM/YYYY |
| Surname | | Name | |
| Contact number | | Alternative number | |
| Travel (provide details of all: 7 days before onset) | | Travelled by | Bus ☐ Plane ☐ |
| Air/bus line | | Flight/bus # | Seat # |

| Details of health official completing this form | | Today's date | DD/MM/YYYY |
|---|---|---|---|
| Surname | | Name | |
| Role | | Facility name | |
| Email address | | Telephone number(s) | |

**Details of contacts** (*With close contact[1] 7 days prior to symptom onset, or during symptomatic illness.*)

| | Surname | First name(s) | Sex (M/F) | Age (Y) | Relation to case[2] | Date of last contact with case | Place of last contact with case (Provide name and address) | Residential address (for next month) | Phone number(s), separate by semicolon | HCW?[3] (Y/N) *If Yes, facility name* |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | DD/MM/YYYY | | | | |
| 2 | | | | | | DD/MM/YYYY | | | | |
| 3 | | | | | | DD/MM/YYYY | | | | |
| 4 | | | | | | DD/MM/YYYY | | | | |
| 5 | | | | | | DD/MM/YYYY | | | | |
| 6 | | | | | | DD/MM/YYYY | | | | |
| 7 | | | | | | DD/MM/YYYY | | | | |
| 8 | | | | | | DD/MM/YYYY | | | | |

*[1] Close contact: A person having had face-to-face contact (≤2 metres) or was in a closed environment with a 2019-nCoV case; this includes, amongst others, all persons living in the same household as a 2019-nCoV case and, people working closely in the same environment as a case. A healthcare worker or other person providing direct care for a 2019-nCoV case, while not wearing recommended personal protective equipment or PPE (e.g., gowns, gloves, NIOSH-certified disposable N95 respirator, eye protection). A contact in an aircraft sitting within two seats (in any direction) of the 2019-nCoV case, travel companions or persons providing care, and crew members serving in the section of the aircraft where the index case was seated.. [2] Chose from: Aunt, Child, Class mate, Colleague, Cousin, Father, Friend, Grandfather, Grandmother, Healthcare worker taking care of, Mother, Nephew, Niece, Other relative, Uncle. [3] Healthcare worker.*



Please refer to www.nicd.ac.za for most recent version of this document before use.

Version 4, 5 February 2020

PDF version at: http://www.nicd.ac.za/diseases-a-z-index/novel-coronavirus-infection/

To be emailed to PDF version at: http://www.nicd.ac.za/diseases-a-z-index/novel-coronavirus-infection/

# Close Contact Monitoring Tool

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## 2019-nCoV DAILY SYMPTOM MONITORING TOOL

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Complete for each contact of confirmed case.
Use electronic database if possible.
If not captured electronically at site, forward to ncov@nicd.ac.za, on completion of last day of monitoring.

| Details of contact of case under investigation/confirmed case | | | |
|---|---|---|---|
| NICD Identifier | Date last contact DD/MM/YYYY | Place last contact | |
| Surname | | Name | |
| Date of birth DD/MM/YYYY | | Age (Years) | Sex M ☐ F ☐ |
| Contact # | | Alternative contact # | |
| Relation to case | | Place of contact | |
| Healthcare worker | Y ☐ N ☐ | Facility name | |
| Traced | Y ☐ N ☐ | Contact type* | Close ☐ Casual ☐ |
| Email | | Monitoring method** | Direct ☐ Self-digital ☐ Self-telephonic ☐ Active-telephonic ☐ |
| Quarantine | Home ☐ Facility ☐ | Facility where quarantined | |
| Physical address (for next month, in South Africa | | | |
| House # | Street | Suburb | |
| Town | | Municipality | |
| District | | Province | |
| Next of kin or alternative contact person details | | | |
| Name, surname | | Contact number(s) | |

| Details of health official completing form | | Today's date | DD/MM/YYYY |
|---|---|---|---|
| Surname | | Name | |
| Role | | Facility name | |
| Email address | | Telephone number(s) | |

**Instructions for completion:** Mark "Y" if symptom present and "N" if not. If any symptoms are present collect, contact _____ immediately and make immediate arrangements for the collection of a combined nasopharyngeal and oropharyngeal swab. Refer to 2019-nCOV Quick Guide on the NICD website for additional details.

| DAY | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Date (DD/MM) | | | | | | | |
| Fever (≥38°C) | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N |
| Chills | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N |
| Cough | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N |
| Sore throat | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N |
| Shortness of breath | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N |
| Myalgia/body pains | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N |
| Diarrhoea | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N |

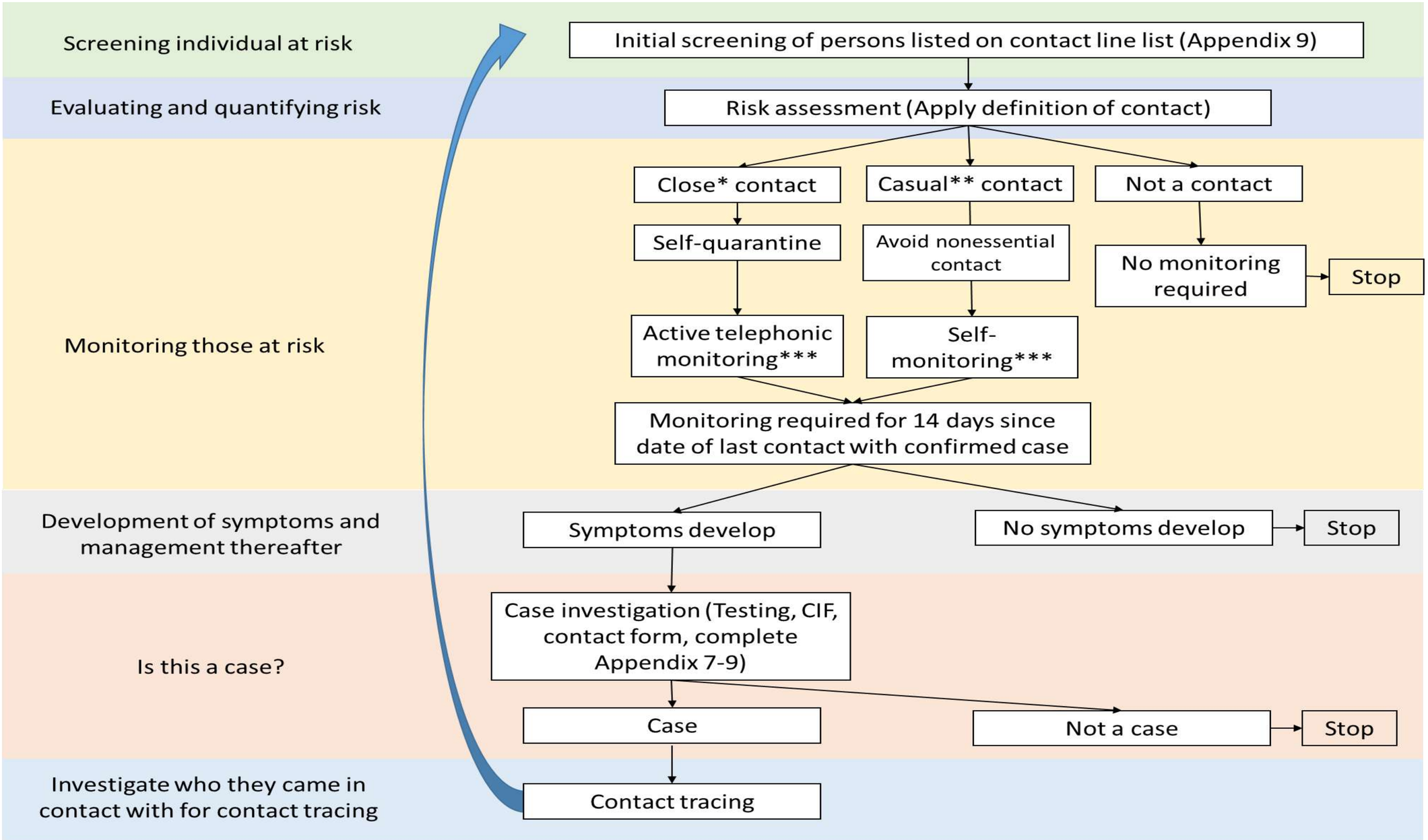
| DAY | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|
| Date (DD/MM) | | | | | | | |
| Fever (≥38°C) | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N |
| Chills | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N |
| Cough | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N |
| Sore throat | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N |
| Shortness of breath | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N |
| Myalgia/body pains | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N |
| Diarrhoea | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N | ☐ Y ☐ N |

PDF version at: http://www.nicd.ac.za/diseases-a-z-index/novel-coronavirus-infection/

# Management of close contacts who develop symptoms

- Should a contact develop symptoms, both the provincial CDCC and NICD call centre team should be informed
- Arrangements will be made by the provincial CDCC  with assistance from NICD to visit the patient in their home on the same day to collect a specimen and to complete the required documentation.
    - Appropriate PPE should be used (e.g., gowns, gloves, NIOSH-certified disposable N95 respirator, eye protection) during home visits.
    - If a healthcare worker is not available, the patient will be requested to visit their nearest healthcare facility to have a specimen collected.
- The CDCC should inform the healthcare facility of the incoming patient in order for the healthcare facility to use appropriate infection prevention and control (IPC) measures.

# Contact tracing summary




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

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

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

# Laboratory diagnostics

# Who should be tested?

- Only patients under investigation (PUI) for 2019-nCoV should be tested
- **Please discuss plans to collect samples with doctor on call before collecting sample: NICD hotline – 082 883 9920**
- Rapid collection, transport and testing of appropriate specimens from PUI is a priority
- Patients should be managed as potentially infected when the clinical and epidemiological data strongly suggest 2019-nCoV infection

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# Specimen Collection

- Lower respiratory tract samples are preferred.
- Respiratory samples are the primary method if diagnosis.
- Respiratory samples include:
    - Combined nasopharyngeal and oropharyngeal swab (placed in the same tube) in ambulatory patients and
    - sputum (if produced)
    - Tracheal aspirate or Broncho alveolar lavage in patients with more severe respiratory disease.
- Serum for serological testing - acute and convalescent samples may be submitted in addition to respiratory samples.
- Use universal/viral transport medium for swabs if available and if not dry swabs; sterile container for sputum and aspirates; clotted blood container for serum

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

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

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

# Collection of naso/oropharyngeal swabs for detection of respiratory viruses

**COLLECTION OF NASO/OROPHARYNGEAL SWABS FOR DETECTION OF RESPIRATORY VIRUSES:**

Respiratory viruses are best isolated from material that contains infected cells and secretions. Therefore, swabs should aim to brush cells and secretions off the mucous membranes of the upper respiratory tract. ***Good specimen quality*** (ie. containing sufficient cells and secretions), appropriate ***packaging and transport*** (i.e. to keep virus viable/detectable) is essential
**Please discuss plans to collect samples with doctor on call before collecting sample at NICD hotline - 0828839920**

**Step 1: Equipment and materials**

1. Specimen submission form **and** case investigation form
2. Nasopharyngeal (NP) and oropharyngeal (OP) flocked swab
3. Tube containing universal transport medium (UTM)
4. Tongue depressor
5. Gloves
6. N95 mask (fit tested)
7. Biohazard bag for disposal of non-sharp materials
8. Tissue for patient to wipe nose after sample collection
9. Cooler box and cooled ice packs
10. Ziploc plastic specimen bag

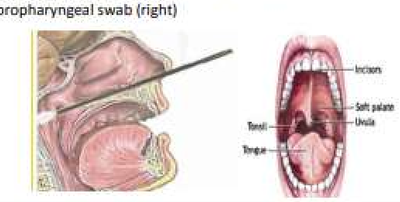
**Step 2: Record keeping**

1. Complete the specimen submission form **and** case investigation form (available on NICD website)
2. Place the specimen submission form into a ziplock bag
3. Label the tube of universal transport media (UTM) with the patient's name and date of birth

**Step 3: Collection of nasopharyngeal swab (NPS)**

1. Don a pair of gloves, and an N95 respirator, making sure the respirator has a good fit. Open a sterile flocked swab at the plastic shaft
2. Ask the patient to tilt his/her head back. Estimate the distance from the patient's nose to the ear: This is how far the swab should be inserted
3. Gently insert swab into the nostril and back (not upwards) to the nasopharynx until a slight resistance is met
4. Rotate swab 2-3 times and hold in place for 2-3 seconds
5. If resistance is met remove and try another nostril
6. Slowly withdraw swab and without touching it, put it into a UTM
7. Break plastic shaft at the break point line and close the tube

**Diagram:** How to collect a nasopharyngeal swab (left) and oropharyngeal swab (right)




**Step 4: Collection of oropharyngeal swab (OPS)**

1. Keeping the same pair of gloves on, and holding the UTM with the nasopharyngeal swab in, take a second flocked swab and open it at the plastic shaft
2. Ask the patient to tilt their head back and open mouth wide
3. Hold the tongue down with a tongue depressor
4. Have the patient say "aahh" to elevate the uvula
5. Swab each tonsil first, then the posterior pharynx in a "figure 8" movement
6. Avoid swabbing the soft palate and do not touch the tongue with the swab tip as this procedure can induce the gag reflex.
7. Place the swab into the same UTM tube with the NPS already in and break off the shaft at the break point line
8. Tightly close the tube
9. Place the closed tube with two swabs in the Ziploc
10. Remove gloves and N95 mask
11. Wash hands with soap and water

**Step 5: Transport of specimens**

1. Ensure the cooler box and ice packs stay at 2-8$^{0}$C
2. Transport to CRDM, NICD on same day as collection
3. Mark: Suspected Novel coronavirus, CRDM
   NHLS/NICD, Centre for Respiratory Disease and Meningitis (CRDM)
   Lower North Wing, SAVP building 1 Modderfontein Rd, Sandringham, Johannesburg, 2131
4. NHLS laboratories use usual overnight regional courier service
5. Private laboratories/clinics to organise shipment using existing systems, or contact CRDM for assistance if not available

**Step 6: Contact details for additional assistance**

| | | |
|---|---|---|
| **Sample collection** | | |
| Sibongile Walaza | sibongilew@nicd.ac.za | 011-386-6410/ 083-657-4741 |
| **Sample transport** | | |
| Linda de Gouveia | lindad@nicd.ac.za | 011-555-0327 |
| Amelia Buys | ameliab@nicd.ac.za | 011-386-6373 |
| Cardia Fourie | cardiaf@nicd.ac.za | 011-386-6373 |


Please refer to www.nicd.ac.za for most recent version of this document before use.
Version 3, 3 February 2020

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http://www.nicd.ac.za/wp-content/uploads/2020/02/2019-nCov-Quick-reference-v3-03.02.2020-final.pdf

# Swabs Important Information

- Clearly mark each specimen ( e.g. Left Nasal Swab Tight Nasal Swab)
- If you send multiple swabs unmarked the lab has no idea where they come from
- You must identify which facility the swab comes from
- Clinicians name and contact details are important

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# DO NOT
# send any specimen to NICD without prior discussion and notification

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# Hand hygiene before  and after any interaction with the patient

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# Equipment and materials

1. Specimen submission form and case investigation form.
2. Nasopharyngeal (NP) and oropharyngeal (OP) flocked swab.
3. Tube containing universal transport medium (UTM).
4. Tongue depressor.
5. Gloves.
6. N95 mask (fit tested).
7. Biohazard bag for disposal of non-sharp materials.
8. Tissue for patient to wipe nose after sample collection.
9. Cooler box and cooled ice packs.
10. Ziploc plastic specimen bag.

# Step 1: Report the PUI

1. **Report the PUI to the NICD to allow a risk assessment to be carried out and guide laboratory testing**
2. Contact the NICD Hotline +27 82 883 9920
3. The test will be free of charge for patients meeting the case definitions above

# Step 2: Record keeping

- 1. Complete the specimen submission form and case investigation form (available on NICD website). http://www.nicd.ac.za/diseases-a-z-index/novel-coronavirus-infection/

- 2. Place the specimen submission form into a ziplock bag.

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

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# Complete the correct forms

- For each person under investigation (PUI) a laboratory specimen submission form and a person under investigation (PUI) form has to be completed and submitted together with the specimens
- Always check on the NICD website that you have the current version of the forms http://www.nicd.ac.za/diseases-a-z-index/novel-coronavirus-infection/

CRDM episode no: CRDM lab no: Trak no: Date received:

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**Centre for Respiratory Diseases and Meningitis**

**Specimen Submission form**

| **Patient Information** | | **Submitter Information (contact person for results)** | |
|---|---|---|---|
| Identifier or Hospital no | | Surname | |
| Surname | | First name | |
| First name | | Laboratory | |
| Age/Date of birth | | City, Country | |
| Gender | | Contact number (country code) | + ( ) |
| Facility/Hospital | | Email address | |

**Specimen Details**

**Specimen collection date:** dd-mm-yyyy

**Specimen type:**

| | | |
|---|---|---|
| ☐ Combined NP/OP swab | ☐ Nasopharyngeal (NP) aspirate | ☐ Nasal swab |
| ☐ Nasopharyngeal (NP) swab | ☐ Bronchoalveolar lavage (BAL) | ☐ Sputum |
| ☐ Oropharyngeal (OP) swab | ☐ Pleural fluid | ☐ CSF |
| ☐ Tracheal aspirate (TA) | ☐ Blood culture | ☐ Serum |
| ☐ Whole blood | ☐ Other, specify: | |

**Laboratory Test Details** (please consult with CRDM if testing other than influenza, RSV or *B. pertussis* is required)

**Tests requested:** *Refer to page 2 for test panel details

| | | | |
|---|---|---|---|
| ☐ Avian influenza | ☐ Influenza / RSV | ☐ MERS-CoV | ☐ Neonatal sepsis* |
| ☐ *Bordetella pertussis* | ☐ *Legionella* spp. | ☐ Atypical pneumonia* | ☐ Bacterial meningitis* |
| ☐ *C. diphtheriae* | ☐ Respiratory panel (bacterial & viral)* | | ☐ Viral meningitis* |
| ☐ Group A streptococcus | ☐ Community-acquired pneumonia (bacteria)* | | ☐ Other, specify: |
| ☐ Group B streptococcus | ☐ Hospital-acquired pneumonia (bacteria)* | | |

**Clinical Presentation and Outcome** — **Date of symptom onset:** dd-mm-yyyy

**Clinical diagnosis:**

| | | |
|---|---|---|
| ☐ Acute rheumatic fever | ☐ Meningococcal disease | ☐ Lower respiratory tract infection |
| ☐ Diphtheria | ☐ Influenza-like illness | ☐ Upper respiratory tract infection |
| ☐ Pertussis | ☐ Meningitis | ☐ Other, specify: _____ |

**Symptoms:**

| | | | | |
|---|---|---|---|---|
| ☐ Fever (≥38°C) | ☐ Sore Throat | ☐ Cough | ☐ Headache | ☐ Stiff neck |
| ☐ Shortness of breath | ☐ Vomiting | ☐ Diarrhoea | ☐ Paroxysmal cough/inspiratory whoop | |
| ☐ Apnoea | ☐ Other, specify: _____ | | ☐ Unknown | ☐ None |

**Underlying Risk Factors:**

| | | | | | | |
|---|---|---|---|---|---|---|
| ☐ Asthma | ☐ Chronic Lung Disease | ☐ Diabetes | ☐ HIV | ☐ Pregnancy | ☐ TB | |
| ☐ Heart Disease | ☐ Other, specify: _____ | | | ☐ Unknown | ☐ None | |

| **Hospitalisation:** | **Outcome:** |
|---|---|
| ☐ Outpatient | ☐ Still hospitalised |
| ☐ Inpatient— not admitted ICU | ☐ Survived |
| ☐ Inpatient— admitted to ICU | ☐ Died |
| ☐ Unknown | ☐ Unknown |

**Exposure History**

**Did the patient travel in the 14 days prior to symptom onset?** ☐ Yes ☐ No ☐ Unknown

| Area/Country travelled to: | Date of travel to this area | Date of travel from this area |
|---|---|---|
| 1. | dd-mm-yyyy | dd-mm-yyyy |
| 2. | | |

**Did the patient have animal contact in the 14 days prior to symptom onset?** ☐ Yes ☐ No ☐ Unknown

| Animal type | Date of exposure | Exposure type |
|---|---|---|
| ☐ Swine ☐ Wildbirds ☐ Poultry (eg. chickens, ostrich, ducks) ☐ Other, specify: _____ | dd-mm-yyyy | |

Tel: +27 (0)11 555 0315 | 0317 NICD Hotline: 082 883 9920 Email: lindad@nicd.ac.za/orienkah@nicd.ac.za **Please attach any relevant information**

CRDM Specimen Submission Form V2 Aug 2019 Date entered: Initials:

CRDM episode no: CRDM lab no: Trak no: Date received:

**CRDM PCR Diagnostic Test Panels:**

| **Test name:** | **Pathogens:** |
|---|---|
| Respiratory panel | *Viruses:*<br>Influenza A, influenza B, influenza C, rhinovirus, human coronavirus, parainfluenza virus, human bocavirus, human metapneumovirus, enterovirus, adenovirus, parechovirus, respiratory syncytial virus (RSV)<br>*Bacteria:*<br>*Mycoplasma pneumoniae, Chlamydia pneumoniae, Haemophilus influenzae, Haemophilus influenzae type B, Staphylococcus aureus, Klebsiella pneumoniae, Legionella spp., Salmonella, Bordetella pertussis, Moraxella catarrhalis*<br>*Fungi:*<br>*Pneumocystis jiroveci* |
| Community-acquired pneumonia | *Streptococcus pneumoniae, Staphylococcus aureus, Haemophilus influenzae, Moraxella catarrhalis* |
| Hospital-acquired pneumonia | *Klebsiella pneumoniae, Pseudomonas aeruginosa* |
| Atypical pneumonia | *Mycoplasma pneumoniae, Chlamydia pneumoniae, Legionella spp.* |
| Neonatal sepsis | Group B *streptococcus, Listeria monocytogenes, Staphylococcus aureus, Chlamydia trachomatics, Ureaplasma urealyticum/parvum,* cytomegalovirus |
| Bacterial meningitis | *Streptococcus pneumoniae, Neisseria meningitidis, Haemophilus influenzae* |
| Viral meningitis | Adenovirus, cytomegalovirus, epstein barr virus, herpes simplex virus 1, herpes simplex virus 2, varicella zoster virus, enterovirus, parechovirus, human herpesvirus 6, human herpesvirus 7, parvovirus B19, mumps virus |

# Person under investigation form ( CIF)

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Final version 2_ 31JANUARY 2020
CENTRE FOR RESPIRATORY DISEASES AND MENINGITIS
OUTBREAK RESPONSE, DIVISION OF PUBLIC HEALTH SURVEILLANCE
AND RESPONSE

**Internal use**
CRDM PUI form no:_____
CRDM unique no:_____

**Patient under investigation (PUI) form: Request for 2019-nCoV Testing**

**Please note that the original case investigation forms should be sent together with the specimen collection form**
**Furthermore, the completed case investigation form must be scanned and emailed to ncov@nicd.ac.za as detailed below**
Tel: (+27)3866392/ (+27) 3866410| Fax: (+27)11 8829979 | **Hotline: 082 883 9920**| Queries / submission: ncov@nicd.ac.za

**Today's date:** DD/MM/YYYY **Form completed by (Name, Surname):** _____ **Contact number(s):** _____

**Is this a:** **New clinical query**☐ **Contact of a known case** ☐

**If contact of a known case, provide case details:**
**Known case first name:** _____
**Known case surname:** _____
**Known case DOB:** DD/MM/YYYY

**Detected at point of entry?** Y☐ N☐ Unkn☐ **If yes, date:** DD/MM/YYYY **Please specify the point of entry:** _____

**PATIENT DETAILS**

**Patient hospital number (if available):** _____
**First name:** _____ **Surname:** _____
**DOB:** DD/MM/YYYY **Sex:** **Male** ☐ **Female** ☐
**Residency:** **SA resident** ☐ **Non-SA resident** ☐ (specify) _____
**Current residential Address[1]:** _____
_____
_____
**Patient's contact number(s):** _____
Please include alternative number

**Please indicate occupation (tick any if apply):**
Student ☐ Unemployed ☐
Working with animals ☐ Health laboratory worker ☐
Healthcare worker ☐ Facility name:_____
Other ☐ Specify_____

**DOCTOR'S DETAILS**

**First name:** _____
**Surname:** _____
**Facility name:** _____
**Contact number/s:** _____
_____
_____
_____
**Email address:** _____
_____

**NEXT OF KIN CONTACT DETAILS (alternative contact details)**

**First name:** _____ **Surname:** _____
**Relationship to the patient:** _____ **Contact number(s):** _____

**CLINICAL PRESENTATION AND HISTORY**

**Date of symptom onset:** DD/MM/YYYY **Date of current consultation/admission:** DD/MM/YYYY

**Symptoms (tick all that apply):**

| | | | | | | |
|---|---|---|---|---|---|---|
| Fever (≥38˚C | ☐ | Sore throat | ☐ | Myalgia/body pains | ☐ | |
| History of fever | ☐ | Shortness of breath | ☐ | General weakness | ☐ | |
| Cough | ☐ | Nausea/vomiting | ☐ | Irritability/confusion | ☐ | |
| Chills | ☐ | Diarrhoea | ☐ | Other | ☐ | (specify if other)_____ |

**DIAGNOSIS**

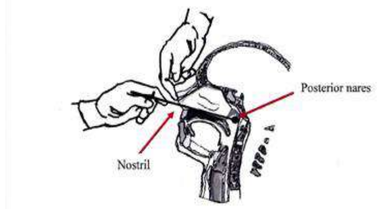
- Did the patient have clinical or radiological evidence of pneumonia Y☐ N☐
- Were chest X-rays (CXR) done: Y☐ N☐ If yes, CXR Findings: _____
- Did the patient have clinical or radiological evidence of acute respiratory distress syndrome (ARDS)? Y☐ N☐
- Does the patient have another diagnosis/etiology for their respiratory illness? Y☐ (specify)_____ N☐ Unknown☐

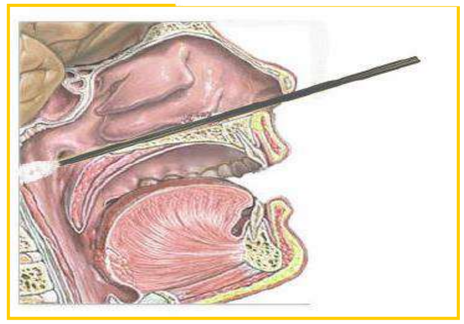
# Step 3: Collection of nasopharyngeal swab (NPS)

1. Don a pair of gloves, and an N95 respirator, making sure the respirator has a good fit. Open a sterile flocked swab at the plastic shaft

2. Ask the patient to tilt his/her head back. Estimate the distance from the patient's nose to the ear: This is how far the swab should be inserted

3. Gently insert swab into the nostril and back (not upwards) to the nasopharynx until a slight resistance is met



4. Rotate swab 2-3 times and hold in place for 2-3 seconds

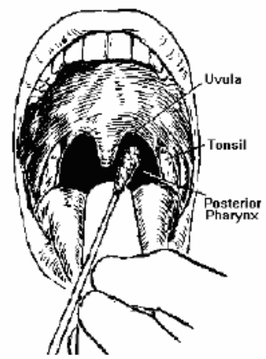
5. If resistance is met remove and try another nostril

6. Slowly withdraw swab and without touching it, put it into a UTM

7. Break plastic shaft at the break point line and close the tube

# Step 4: Collection of oropharyngeal swab (OPS)

1. Keeping the same pair of gloves on, and holding the UTM with the nasopharyngeal swab in, take a second flocked swab and open it at the plastic shaft
2. Ask the patient to tilt their head back and open mouth wide
3. Hold the tongue down with a tongue depressor
4. Have the patient say “aahh” to elevate the uvula
5. Swab each tonsil first, then the posterior pharynx in a “figure 8” movement




6. Avoid swabbing the soft palate and do not touch the tongue with the swab tip as this procedure can induce the gag reflex.
7. Place the swab into the same UTM tube with the NPS already in and break off the shaft at the break point line
8. Tightly close the tube
9. Place the closed tube with two swabs in the Ziploc
10. Remove gloves and N95 mask
11. Wash hands with soap and water

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# Step 5: Transport of specimens

- 1. Ensure the cooler box and ice packs stay at 2-8  degrees Centigrade.
- 2. Transport to CRDM, NICD on same day as collection.
- 3. Mark: **Suspected Novel coronavirus, CRDM NHLS/NICD, Centre for Respiratory Disease and Meningitis (CRDM) Lower North Wing, SAVP building 1 Modderfontein Rd, Sandringham, Johannesburg, 2131.**
- 4. NHLS laboratories use usual overnight regional courier service.
- 5. Private laboratories/clinics to organise shipment using existing systems, or contact CRDM for assistance if not available.

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# Packaging of specimens for transfer to NICD

- The principle of triple layer packaging should be followed (Figure 1).
- UN/WHO approved shipping containers for hazardous specimens are commercially available, e.g. SAF-T-PAK® (www.saftpak.com) or PATHOPAK® (www.intelsius.com).

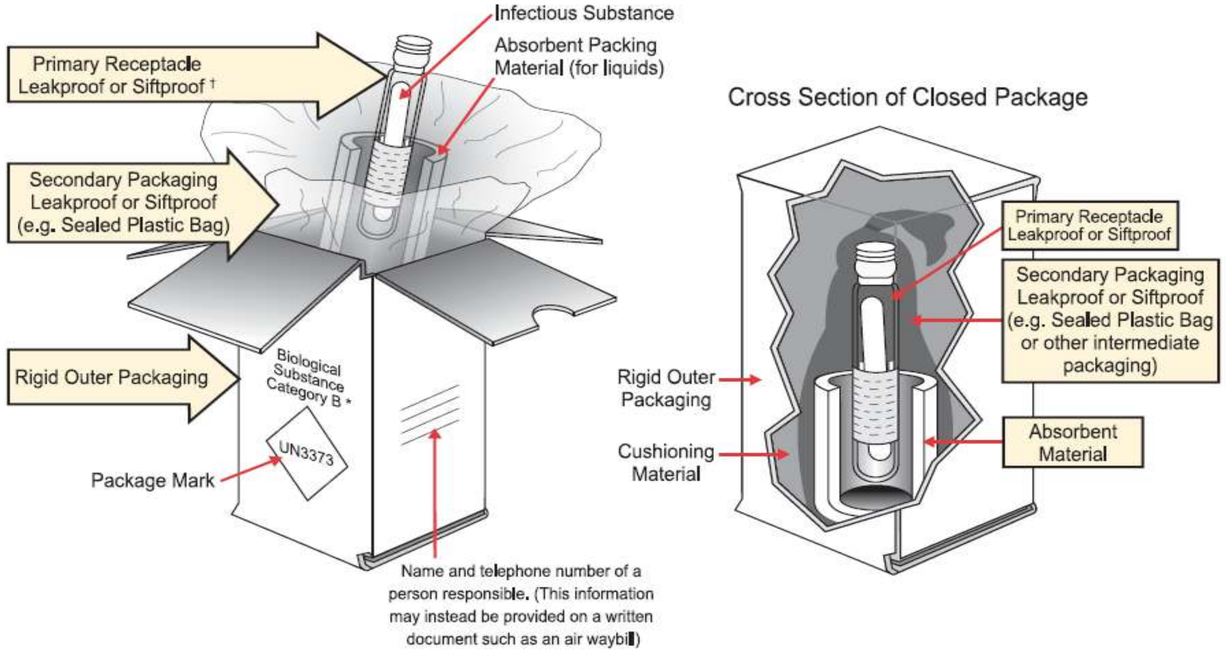


**Figure 1.** Example of the triple packaging system for the packing and labelling of Category B substances.

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# Step 6: Contact details for additional assistance

- Sample collection
  - Sibongile Walaza sibongilew@nicd.ac.za 011-386-6410
- Sample transport
  - Linda de Gouveia lindad@nicd.ac.za 011-555-0327
  - Amelia Buys ameliab@nicd.ac.za 011-386-6373
  - Cardia Fourie cardiaf@nicd.ac.za 011-386-6373
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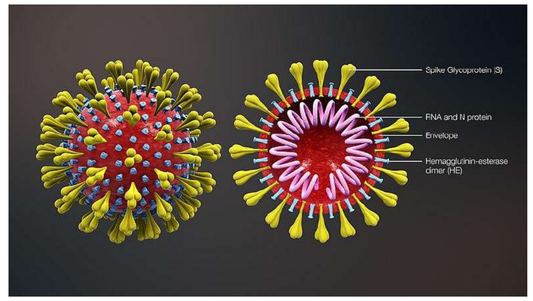
# Laboratory diagnostic assays




- Real-time reverse-transcription polymerase chain reaction (rRT-PCR) - amplification and detection of unique 2019-nCoV viral nucleic acid sequences
- TAT - 24 hours
- Positive specimens - characterised by viral culture and whole genome sequencing

Eurosurveillance Jan 2020

## Detection of 2019 novel coronavirus (2019-nCoV) by real-time RT-PCR

Victor M Corman[1], Olfert Landt[2], Marco Kaiser[2], Richard Molenkamp[3], Adam Meijer[4], Daniel KW Chu[5], Tobias Bleicker[1], Sebastian Brünink[1], Julia Schneider[1], Marie Luisa Schmidt[1], Daphne GJC Mulders[3], Bart L Haagmans[3], Bas van der Veer[4], Sharon van den Brink[4], Lisa Wijsman[4], Gabriel Goderski[4], Jean-Louis Romette[6], Joanna Ellis[7], Maria Zambon[7], Malik Peiris[5], Herman Goossens[8], Chantal Reusken[4], Marion PG Koopmans[3], Christian Drosten[1]

# Interpretation of rRT-PCR results

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

If negative results are obtained from patients with a high index of suspicion for 2019-nCoV infection, especially when only upper respiratory tract samples were collected, additional specimens, including lower respiratory samples should be collected and tested.

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# Infection prevention and control

# Principles of disease transmission

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

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

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

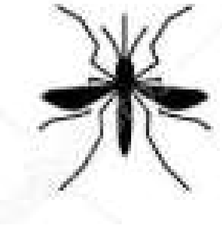
**Control**
- Gloves, surgical masks, +/- gowns, masks, visors (to prevent mucous membrane splashes, contamination of clothing)

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

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

**Vector transmission**
- Contact with vector
- E.g. malaria, dengue, Zika,

**Control**
- Prevent/eliminate exposure to vector
- Chemoprophylaxis if possible



# Principles of disease transmission

**Coronavirus** **?**

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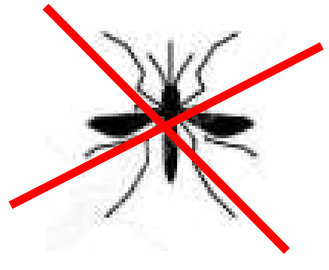


# IPC strategies to address suspected nCoV infection

- Ensure triage, early recognition and source control (early isolation of persons with suspected nCoV infection)
- Apply standard precautions for all patients
- Implement empiric additional precautions for suspected cases (droplet, contact and airborne where applicable)
- Implement administrative controls *(IPC committee, checklist, assign responsibility for opening windows and triaging)*
- Use environmental controls *(open windows, UV light, ensure airflow direction protects HCW)*
- Use engineering controls *(ensure air-conditioning is working, Uvlight germicidal irradiation unit is functional)*

# In all facilities….

- Implement screening for COUGH, respiratory symptoms and TRAVEL HISTORY at entrance to the facility / clinic / casualty / hospital
- Put a sign up asking for persons with a travel history to China in last 14 days to identify themselves to staff
- Provide surgical masks to persons who sneeze, cough etc
- See persons who have symptoms first
- Encourage hand hygiene amongst patients and HCW

# In all facilities……

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

# When caring for someone with suspected nCoV-

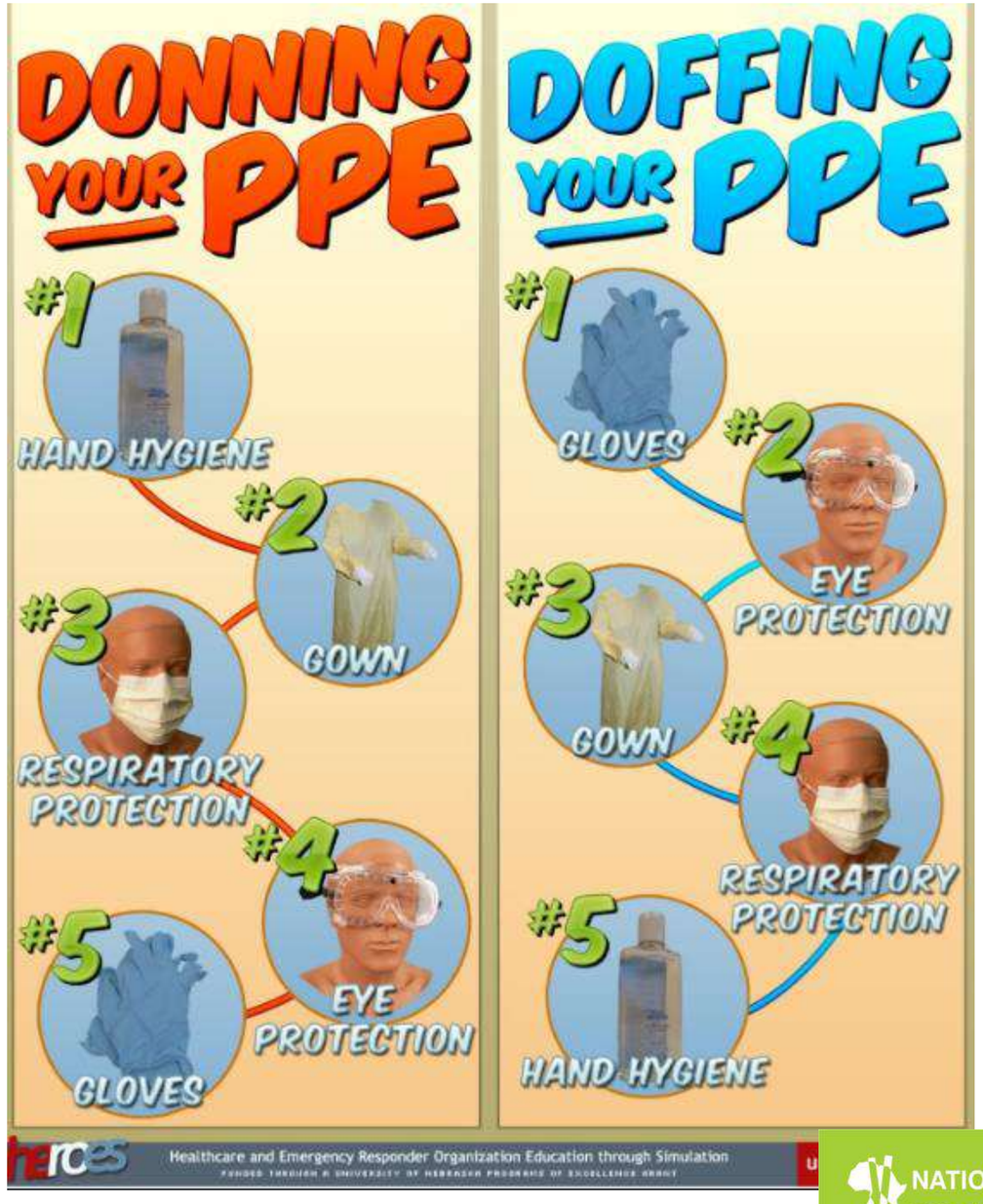
- Implement contact and droplet precautions
  - Put in a well ventilated isolation room
  - Provide them with a mask
  - Implement contact and droplet precautions
  - Limit the number of staff who can enter the isolation room
- Implement contact and droplet precautions:
  - Surgical/medical mask
  - Disposable gown
  - Gloves
  - Eye protection
- Not required for droplet precautions
  - Boots, apron not required
  - Negative pressure respiratory isolation room not required.

# When caring for someone with suspected nCoV-

- When taking a sputum specimen or nasopharyngeal swab use <u>airborne and contact</u> precautions are required
    - E.g. nasopharyngeal swabs, intubation, tracheal aspirate
- Use N95 respirator
- Use waterproof apron, boots
- Use a face-shield or goggles

# Training in use of IPC

- Ensure staff are trained and familiar with
  - Triage
  - Handwashing
  - Screening
  - Case definitions
  - Use of PPE



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

## Interim guidance

## 25 January 2020

World Health Organization

WHO/2019-nCoV/IPC/v2020.2

## Introduction

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

WHO will update these recommendations as new information becomes available.

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

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

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

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

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

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

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

### 2. Applying standard precautions for all patients

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

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

# Management of the deceased

- Confirm the diagnosis in deceased persons who are close contacts of nCoV cases.
  - NP swabs, bronchial washings can be taken post mortem
- Use contact and droplet precautions when handling the body
  - Airborne precautions not required as the deceased do not create airborne particles
- Environmental Health Practitioners
  e informed following the
  assist with procedures
- Follow Appendix 12 of RSA guideline
  - Triple body bag, first two are transparent and sealed, and third is black and unsealed
  - A biohazard warning tab should be attached as per SOP

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

# How can I know if my facility is ready?

- Use our facility readiness checklist
- Call your facility IPC committee
- Talk through the checklist
- Talk through a ‘desktop simulation scenario’

| Novel Coronavirus (nCoV) Readiness Checklist | | | |
|---|---|---|---|
| | | Total inFacilty | |
| General information | Number of HCW employed / working at your facility | | |
| | Number of designated points of entry for ill patients | | |
| | Do you have isolation units in the Facilty if yes how many beds | | |
| | Private wards | | |
| | Private ward airborn precautions( -ve Pressure cubicles ) | | |
| | Large cohort area identified Number of beds | | |
| | Isolation area in emergency department identified | | |
| | ICU Isolation cubicles number | | |
| | ICU isolation cubicles -ve pressure | | |
| **Intervention area** | **Indicators** | **Values** | **Yes/No** |
| Coordination | Is there a Facilty preparedness and response plan for events caused by respiratory pathogens? | | No |
| | Do you have a committee established in the Facilty to ensure all plans are in place | | No |
| | Do you maintain minutes of the meetings of this committee | | No |
| | Do you have and have you reviewed plans for implementation of surge capacity procedures and crisis standards of care. | | No |
| | Do you believe you have everything in place to identify and isolate patients with 2019-nCoV and inform key facility staff and public health authorities | | No |
| | Do you have supplies of PPE for staff in front line areas | | No |
| | Do you have supplies of PPE for staff in Facility care areas in case of a positive or suspected case | | No |
| | Do you have contingency plans if the demand for PPE or other supplies exceeds supply. | | No |
| | Have you designated an area for the isolation of patients who may be at risk for Corona virus | | No |
| | Have polans been made to ensure that stock is accessable in the Facility | | No |
| | Do you have a screening tool in place in all areas of entry for the Facilty | | No |
| | Has Training on n- Cov been commenced in your Facility? | | No |

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REPUBLIC OF SOUTH AFRICA

# Facility self assessment

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

| ( SOUTH AFRICAFacilty ) Novel Coronavirus (nCoV) Country Readiness Checklist | | | | Hospital Name | | |
|---|---|---|---|---|---|---|
| | | Total inFacilty | | CEO Name | | |
| General information | Number of HCW employed / working at your facility | | | CEO Contact details | | |
| | Number of designated points of entry for ill patients | | | Cell | | |
| | Do you haver isolation units in the Facilty if yes how many beds | | | Office | | |
| | Private wards | | | email | | |
| | Private ward airborn precautions( -ve Pressure cubicles ) | | | Fax | | |
| | Large cohort area identified Number of beds | | | Date of Report | | |
| | Isolation area in emergency department identified | | | Facility CEO / Manager Signature | | |
| | ICU Isolation cubicles number | | | | | |
| | ICU isolation cubicles -ve pressure | | | | | |
| Intervention area | Indicators | Values | Yes/No | Comments | Gaps | Resources |
| | Is there a Facilty preparedness and response plan for events caused by respiratory pathogens? | | No | | | |
| | Do you have a committee established in the Facilty to ensure all plans are in place | | No | | | |
| | Do you maintain minutes of the meetings of this committee | | No | | | |
| | Do you have and have you reviewed plans for implementation of surge capacity procedures and crisis standards of care. | | No | | | |
| | Do you believe you have everything in place to identify and isolate patients with 2019-nCoV and inform key facility staff and public health authorities | | No | | | |
| | Do you have supplies of PPE for staff in front line areas | | No | | | |
| | Do you have supplies of PPE for staff in Facilty care areas in case of a positive or suspected case | | No | | | |
| | Do you have contingency plans if the demand for PPE or other supplies exceeds supply. | | No | | | |
| | Have you designated an area for the isolation of patients who may be at risk for Corona virus | | No | | | |
| | Have polans been made to ensure that stock is accessable in the Facility | | No | | | |
| | Do you have a screening tool in place in all areas of entry for the Facilty | | No | | | |
| | Has Training on n-Cov been commenced in your Facility? | | No | | | |

# Patient and PUI* flow and actions required at each step

*PUI=person under investigation

# Process Flow for detection and response to cases

## 1.1 Appendix 1 – process flow for detection and response to cases

**DETECTION AND REPORTING OF SUSPECTED 2019-nCoV CASE**

- The case definition must be strictly adhered to
- For any suspected case, isolate the patient in a suitable room/ unit for assessment, apply IPC measures, contact NICD Hotline to confirm if case definition is met and if sample collection is warranted.
- If so, collect specimen and complete accompanying documentation (Appendix 7).
- Guidelines for the collection and submission of specimens to NICD available on NICD website: http://www.nicd.ac.za/diseases-a-z-index/novel-coronavirus-infection/ (see quick reference for healthcare workers) or appendix 5 and 6
- The facility IPC focal point, clinician or designated port health officer should complete the case investigation form and contact line list (Appendix 8, 9), forward the forms to the Provincial Communicable Disease Control and ncov@nicd.ac.za.
- All suspected cases who meet the case definition should be notified as Class 1 notifiable medical condition under "Respiratory Disease caused by a novel respiratory pathogen"

**Contacts and details:**
**Consultant on call for Infectious Diseases**
According to site-specific protocol

**NICD Hotline**
082-883-9920

**National Health Operations Centre**
012-395-9636/37

**MEDICAL MANAGEMENT**

- For all cases irrespective of symptom severity, isolate the patient and apply infection precautions in accordance with site-specific standard operating procedures for this purpose. When the number of confirmed cases becomes too high, mild cases may be managed at home (self-isolation)

**Contacts and details: see Appendix 14**

**National and Provincial CDC**

**Provincial Port Health**

**EMS**

# Process Flow for detection and response to cases

**TRANSPORT AND/OR REFERAL OF SUSPECTED nCoV-2019 CASE TO HOSPITAL**

- If facility is able to provide required clinical care for patient in isolation, referral or transfer is not indicated. If facility cannot offer required care, transfer or referral should be discussed by calling NICD Hotline.
- Transfer of patients from port of entry to healthcare facilities to be discussed with NICD Hotline, EMS will facilitate the transport arrangements.

Laboratory testing **excludes** 2019-nCoV

- Finalize reporting and do gap analysis for responses to the case.
- Perform mitigation of any shortcomings identified during case management

Laboratory testing **confirms** 2019-nCoV

**MULTI-DISCIPLINARY PUBLIC HEALTH RESPONSE**

- NICD report back case was confirmed to healthcare facility, clinician, patient, provincial CDC
- Provincial CDC/designated NICD personnel to perform contact tracing as described in appendix 3
- Collate information and share reports with key stakeholders.
- Handling of mortal remains of **a confirmed or suspected** case must be in accordance with guidelines
- Efficient and transparent communication with the media (press release/briefs) must be provided
- Writing of reports e.g. daily updates, preliminary and final (Appendix 13)

# Initial diagnosis and management of suspected case (PUI), including infection control measures

## 2019 novel coronavirus (2019-nCoV) process flow for use in healthcare facilities

**IPC measures**

1. Evaluate patient in private room
2. Request patient to wear surgical mask
3. Isolate PUI (ideally an airborne infection isolation room if available)
4. Use appropriate infection control for PUI
   a. Adequate standard precautions for all patients
   b. Add contact and droplet precautions for all patients
   c. Apply airborne precautions (eg N95 mask) and eye protection must be used when performing aerosol-generating procedures
   d. If available, airborne precautions can be used at all times
   e. Limit movement of patient (e.g. use designated portable X-ray equipment)

Does the patient meet the case definition?

Patients with acute respiratory infection (sudden onset of at least one of the following: cough, sore throat, shortness of breath) requiring hospitalisation or not **AND**
In the 14 days prior to onset of symptoms, met at least one of the following epidemiological criteria:

- Were in close contact with a confirmed or probable case of 2019-nCoV infection; **OR**
- Had a history of travel to areas with presumed ongoing community transmission of 2019-nCoV; i.e. China; **OR**
- Worked in or attended a health care facility where patients with 2019-nCoV infections were being treated.

Yes

No

Other aetiologies been excluded?

No

Request respiratory panel, especially influenza, RSV

Yes

Discuss with NICD (Hotline: 082-883-9920)

Reassess, if patient fails to improve and no alt diagnosis confirmed

2019-nCoV testing indicated. Follow IPC measures (left)

Monitoring stopped

Asymptomatic contact, 14 days post-exposure

Symptomatic contact

Complete specimen submission form, patient under investigation form, and contact list. Email to: ncov@nicd.ac.za

**Collect specimen: Combined nasopharyngeal and oropharyngeal swab in ambulatory patients and sputum (if produced) and/or tracheal aspirate or bronchoalveolar lavage in patients with more severe respiratory disease**

Notify to provincial CDC and NMC system

Daily, telephonic-monitoring

Self-monitoring

Home quarantine

Avoid unessential contact

Close* contacts

Casual** contacts

Monitor for symptom development for 14 days post-exposure

Initiate contact tracing

Ship specimens and documentation to NICD.
Mark: Suspected Novel coronavirus, CRDM
NHLS/NICD, Centre for Respiratory Disease and Meningitis (CRDM), Lower North Wing, SAVP building 1 Modderfontein Rd, Sandringham, Johannesburg, 2131

Patient discharged

nCoV Negative

nCoV Positive

Sequential swabbing

Admit to hospital and isolate

Positive test result 2019-nCoV

Negative test result 2019-nCoV

| Contact details: Provincial CDC coordinators | | |
|---|---|---|
| ECP | Ms Nosiphiwo Mgobo | 060 579 9027 |
| FSP | Ms Dekeledi Baleni and team | 083 757 8217<br>051 408 1794<br>051 408 1595 |
| FSP | Ms Bapsy Nyokong | 083 452 8954<br>066 471 4668 |
| GP | Ms Caroline Kesebilwe | 082 818 7001 |
| KZN | Ms Premi Govender | 071 609 2505<br>033 940 2690 |
| LP | Ms Marlene Freda Ngobeni | 079 491 1909 |
| MP | Mr Mandla Zwane and team | 082 229 8893<br>013 766 3078 |
| NCP | Ms Gloria Hottie | 072 391 3345 |
| NWP | Ms Chriselda Lebeko | 079 521 5004<br>082 421 7985 |
| WCP | Ms Charlene Jacobs-Lawrence | 082 229 8893<br>013 766 3078 |

Website: www.nicd.ac.za

24h NICD Hotline: 082-883-9920

Document submission: ncov@nicd.ac.za

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

# Initial diagnosis and management of suspected case (PUI), including infection control measures

## 2019 novel coronavirus (2019-nCoV) process flow for use in healthcare facilities

**PC measures**
te room
surgical mask
rborne infection isolation room if

n control for PUI
precautions for all patients
plet precautions for all patients
autions (eg N95 mask) and eye
used when performing aerosol-
res
e precautions can be used at all times
patient (e.g. use designated portable X-

Does the patient meet the case definition?

Patients with acute respiratory infection (sudden onset of at least one of the following: cough, sore throat, shortness of breath) requiring hospitalisation or not **AND**
In the 14 days prior to onset of symptoms, met at least one of the following epidemiological criteria:

- Were in close contact with a confirmed or probable case of 2019-nCoV infection; **OR**
- Had a history of travel to areas with presumed ongoing community transmission of 2019-nCoV; i.e. China; **OR**
- Worked in or attended a health care facility where patients with 2019-nCoV infections were being treated.

Yes

No

Other aetiologies been excluded?

No

Yes

Request respiratory panel, especially influenza, RSV

Reassess, if patient fails to improve and no alt diagnosis confirmed

Symptomatic contact

2019-nCoV testing indicated. Follow IPC measures (left)

Discuss with NICD (Hotline: 082-883-9920)

Complete specimen submission form, patient under investigation form, and contact list. Email to: ncov@nicd.ac.za

**Collect specimen: Combined nasopharyngeal and oropharyngeal swab in ambulatory patients and sputum (if produced) and/or tracheal aspirate or bronchoalveolar lavage in patients with more severe respiratory disease**

Notify to provincial CDC and NMC system

ic-
ring

Home quarantine

Close* contacts

Monitor for symptom development for 14 days post-exposure

Ship specimens and documentation to NICD.
Mark: Suspected Novel coronavirus, CRDM

| Contact details: Provincial CDC coordinators | | |
|---|---|---|
| ECP | Ms Nosiphiwo Mgobo | 060 579 9027 |
| | Ms Dekeledi Baleni and | 083 757 8217 |

c. Apply airborne precautions (eg N95 mask) and eye protection must be used when performing aerosol-generating procedures
d. If available, airborne precautions can be used at all times
e. Limit movement of patient (e.g. use designated portable X-ray equipment)

- Were in close contact with a confirmed or probable case of 2019-nCoV infection; **OR**
- Had a history of travel to areas with presumed ongoing community transmission of 2019-nCoV; i.e. China; **OR**
- Worked in or attended a health care facility where patients with 2019-nCoV infections were being treated.

Yes

No

Other aetiologies been excluded?

Discuss with NICD (Hotline: 082-883-992

2019-nCoV testing indicated. Follow IPC measures (left)

Monitoring stopped

Asymptomatic contact, 14 days post-exposure

Symptomatic contact

Complete specimen submission form, patient under investigation form, and contact list. Email to: ncov@nicd.ac.za

**Collect specimen: Combined nasopharyngeal and oropharyngeal swab in ambulatory patien and sputum (if produced) and/or tracheal aspirate or bronchoalveolar lavage in patients wit more severe respiratory disease**

Daily, telephonic-monitoring

Home quarantine

Close* contacts

Monitor for symptom development for 14 days post-exposure

Ship specimens and documentation to NICD.
Mark: Suspected Novel coronavirus, CRDM
NHLS/NICD, Centre for Respiratory Disease and Meningitis (CRDM), Lower North Wing, SAVP building 1 Modderfontein Rd, Sandringham, Johannesburg, 2131

Self-monitoring

Avoid unessential contact

Casual** contacts

Patient discharged

nCoV Negative

nCoV Positive

Sequential swabbing

Admit to hospital and isolate

Initiate contact tracing

Positive test result 2019-nCoV

Negative test result 2019-nCoV

| Website: www.nicd.ac.za | 24h NICD Hotline: 082-883-9920 | Document submission: ncov@nicd.ac.za |
|---|---|---|

| | STAGE OF ASSESSMENT OF TRAVELLERS/PERSONS UNDER INVESTIGATION FOLLOWING ARRIVAL AT PORT | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Symptom status** | **Arrival and disembarkation** | **Screening by Port Health** | **Screening by Port Health** | **Seen at Immigration and customs** | **In depth assessment at Port Health** | **Meets case definition, awaiting transfer by EMS** | **Transported by EMS to health facility** | **In Emergency Medicine Department (casualty)** | **Admission pending nCoV result** | **Confirmed positive test** |
| **Unknown** | X | | | X | | | | | | |
| **No symptoms, does not meet case definition** | | X | | X | | | | | | |
| **Thermoscan positive** | | | X | | X | | | | | |
| **Meets case definition** | | | | | X | X | X | X | X | X |

**ACTIONS REQUIRED BY HEALTH CARE WORKERS REGARDING IPC, reporting and data collection AT THIS STAGE**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Level of IPC care required by personnel** | Avoid crowds, keep 1m from people, frequent hand hygiene, MASKS not required* | Avoid crowds, keep 1m from people, frequent hand hygiene, MASKS not required* | Avoid crowds, keep 1m from people, frequent hand hygiene, MASKS not required* | Avoid crowds, keep 1m from people, frequent hand hygiene, MASKS not required* | Droplet precautions, incl surgical masks, gloves, disposable gowns, eye visor/goggles if collecting throat swab | Droplet precautions, incl surgical masks, gloves, disposable gowns, eye visor/goggles if collecting throat swab | Droplet precautions, incl surgical masks, gloves, disposable gowns, eye visor/goggles if collecting throat swab | Droplet precautions, incl surgical masks, gloves, disposable gowns, eye visor/goggles if collecting throat swab | Droplet precautions, incl surgical masks, gloves, disposable gowns, eye visor/goggles if collecting throat swab | Droplet precautions[#], incl surgical masks, gloves, disposable gowns, eye visor/goggles if collecting throat swab |
| **Actions required** | None | None | Immediately Port Health official gives patient a mask and moves traveller to private room, | None | Call NICD, collect throat swab, send to NICD<br>Arrange transfer to medical facility | Limit staff entry to isolation room | Call ahead and request facility to prepare isolation room for clinical assessment | Take patient straight to isolation room<br>Notify patient as suspected nCoV | Adhere to facility IPC protocols for respiratory isolation | Adhere to facility IPC protocols for respiratory isolation |
| **References** | WHO guidelines ‘Advice on use of masks’ (*individual may choose to wear mask) | WHO guidelines ‘Advice on use of masks’ (*individual may choose to wear mask) | WHO guidelines ‘Advice on use of masks’ (*individual may choose to wear mask) | WHO guidelines ‘Advice on use of masks’ (*individual may choose to wear mask) | RSA Coronavirus guidelines on NICD website<br>WHO ‘IPC for NCoV’ | RSA Coronavirus guidelines on NICD website<br>WHO ‘IPC for NCoV’ | RSA Coronavirus guidelines on NICD website<br>WHO ‘IPC for NCoV’ | RSA Coronavirus guidelines on NICD website<br>WHO ‘IPC for NCoV’ | RSA Coronavirus guidelines on NICD website<br>WHO ‘IPC for NCoV’ | [#]If possible, facilities should use airborne precautions |

| | STAGE OF ASSESSMENT OF TRAVELLERS/PERSONS UNDER INVESTIGATION FOLLOWING ARRIVAL AT HEALTH FACILITY | | | | | |
|---|---|---|---|---|---|---|
| **Symptom status** | **Arrival and registration** | **Screening by triage nurse** | **Screening by triage nurse** | **In depth assessment by Emergency Doctor** | **Admission pending nCoV result** | **Confirmed positive test** |
| **Unknown** | X | | | | | |
| **No symptoms, does not meet case definition** | | X | | | | |
| **Meets case definition** | | | X | X | X | X |
| **ACTIONS REQUIRED BY HEALTH CARE WORKERS REGARDING IPC, reporting and data collection AT THIS STAGE** | | | | | | |
| **Level of IPC care required by personnel** | Avoid crowds, keep 1m from people, frequent hand hygiene, MASKS not required* | Avoid crowds, keep 1m from people, frequent hand hygiene, MASKS not required* | Droplet precautions, incl surgical masks, gloves, disposable gowns, eye visor/goggles if collecting throat swab | Droplet precautions*, incl surgical masks, gloves, disposable gowns, eye visor/goggles if collecting throat swab | Droplet precautions, incl surgical masks, gloves, disposable gowns, eye visor/goggles if collecting throat swab | Droplet precautions#, incl surgical masks, gloves, disposable gowns, eye visor/goggles if collecting throat swab |
| **Actions required** | Screen for travel history and main complaint | Repeat screen for travel history and main complaint | Immediately provide patient with mask, and isolate patient | Collect throat swab, send to NICD | Adhere to facility IPC protocols for respiratory isolation | Adhere to facility IPC protocols for respiratory isolation; consider moving patient to designated facility |
| **References** | WHO guidelines ‘Advice on use of masks’ (*individual may choose to wear mask) | WHO guidelines ‘Advice on use of masks’ (*individual may choose to wear mask) | RSA Coronavirus guidelines on NICD website WHO ‘IPC for NCoV’ | RSA Coronavirus guidelines on NICD website WHO ‘IPC for NCoV’ (*airborne precautions if possible) | RSA Coronavirus guidelines on NICD website WHO ‘IPC for NCoV’ (*airborne precautions if possible) | RSA Coronavirus guidelines on NICD website WHO ‘IPC for NCoV’ (*airborne precautions if possible) |

# Clinical management

*prepared by Dr Jeremy Nel, Helen Joseph Hospital

Clinical management of suspected /confirmed nCoV case is essentially management of a Severe Acute Respiratory Illness (SARI)

There are two issues:

KEEP A BROAD DIFFERENTIAL DIAGNOSIS BEFORE DIAGNOSIS CONFIRMED

SUPPORTIVE CARE OF A SEVERE ACUTE RESPIRATORY ILLNESS

# Important differential diagnosis

- Conventional bacterial pneumonia
- Atypical bacterial pneumonia
- Other viral pneumonias
- *Pneumocystis* pneumonia

# Bacterial pneumonia

- Severe pneumonias generally require **broad-spectrum antibiotics** empirically.
- Recommended options for community-acquired pneumonia:

Amoxicillin-clavulanate (Augmentin)

OR

2nd or 3rd generation cephalosporin (e.g. ceftriaxone)

**PLUS**

macrolide (e.g. azithromycin)

2017 SA Community-acquired Pneumonia Guidelines

*J Thorac Dis*. 2017;9(6):1469–1502. doi:10.21037/jtd.2017.05.31

# Corticosteroids

- **Avoid routine administration**
- Although corticosteroids may be of benefit in severe bacterial pneumonias, they have been associated with prolonged viral shedding and increased mortality in influenza. (PMID: 30798570)
- Concern about possible similar effects in other viral pneumonias (including possibly 2019-nCoV)
- Should only be used if, after careful consideration, risks outweigh benefits
  - E.g. Suspected adrenal insufficiency, COPD, *Pneumocystis* pneumonia

# Atypical bacterial pneumonias

- Important differential diagnosis of a viral pneumonia. Like a viral pneumonia these may have:
  - Flu-like symptoms: pharyngitis, headache, myalgias, dry cough, rhinorrhoea
  - Bilateral infiltrates – can appear reticulonodular / patchy – don’t have to have consolidation

- Empiric treatment options:
  - Macrolide (e.g. azithromycin) OR
  - Quinolone (e.g. levofloxacin, moxifloxacin) OR
  - Doxycyline

# Viral pneumonia

- Influenza, parainfluenza, human metapneumovirus, respiratory syncytial virus, adenovirus, etc.

- **Influenza** is an important differential diagnosis to entertain, since:
  - It is currently influenza season in the Northern hemisphere, where many of the 2019-nCoV suspects will have come from.
  - It is potentially treatable.

# Influenza treatment

- Consider empiric **oseltamivir** (Tamiflu) or zanamivir treatment in patients with an influenza-like illness who:
  - Are severely ill
  - Are at high risk for complications (pregnant women, HIV patients, patients with asthma/COPD, etc.)

- Treatment should be started as soon as possible (best chance of benefit within 48 hours of symptom onset)

Oseltamivir 75mg po 12-hourly for 5 days

For more information, see 2019 NICD Influenza Guidelines
http://www.nicd.ac.za/wp-content/uploads/2019/06/Influenza-guidelines-rev_-6-June-2019clean.pdf

# *Pneumocystis* pneumonia

- Consider if:
  1. Patient significantly immunocompromised: HIV positive with CD4 < 200, chronic systemic steroid use, chemotherapy, transplant patients, etc.)
  2. Diffuse bilateral infiltrates (often with a mid- to lower-zone predominance)
  3. Hypoxaemia at rest (or in mild cases, with exertion)

- Consider empiric treatment if the above criteria are met:

Cotrimoxazole (Bactrim)

PLUS

Prednisone if severe disease
($pO_2$ < 70 mmHg, or alveolar-arterial gradient > 35)

# Basic work-up of patients with SARI

- Chest X-ray
- Blood cultures
- If productive of sputum: sputum MCS
- Samples for 2019-nCoV testing

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- If available (private sector > public sector)
  - Nasopharyngeal and oropharyngeal swabs for respiratory viruses and atypical pathogens
  - Urine *Legionella* antigen

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- If PCP suspected:
  - Serum beta-D-glucan
  - Sputum sample / bronchoalveolar lavage (not always possible) for PCP

# Supportive management of SARI

- Oxygen if required (titrate to $SpO_2 \geq 90\%$, or 92-95% in pregnant patients)
- Ventilatory support if required
  - If ARDS develops, consider neuromuscular prone position, and use lung-protective ventilation:
    - Low tidal volumes of 6 mL/kg or less
    - Low plateau airway pressure of 30 cm $H_2O$ or less
    - Moderate-high PEEP levels to recruit lung

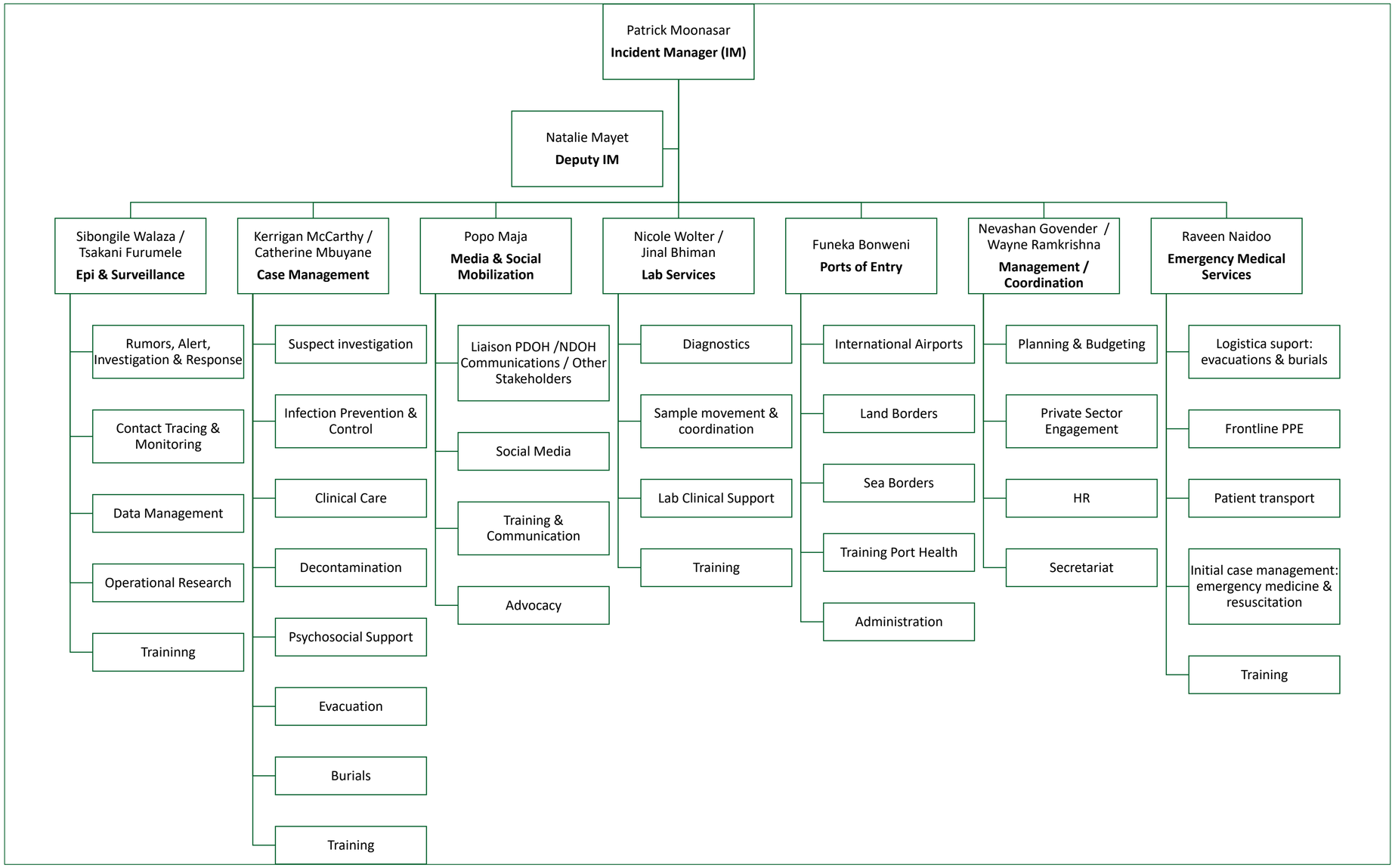
- Restrictive fluid management (unless shock or acute kidney injury)
- … and other standard supportive measures in critically ill patients (thromboprophylaxis, neuromuscular blockade, prone position, and lung protective ventilation.)

# Co-ordinating a public health response

# Actions to support a public health response

- Activate provincial and district outbreak response teams
    - Ensure representation from all stakeholders especially CDC, hospitals, PHC, NHLS lab rep, NICD provincial epidemiologist and NMC nurse trainer, environmental health, EPI, EMS, port health, procurement and finance
    - Provide an overview of nCoV status globally and in RSA
    - Give an overview of RSA nCoV guidelines
    - Go through ‘patient flow diagrams’
    - Emphasise importance of
        - Screening using case definitions (incl
        - Facility readiness – all facilities incl PHC can use ‘Facility readiness checklist’
        - Communication re suspected cases to NICD, and rapid transport of specimen for confirmation
    - Identify gaps and develop an action plan. Set date for next meeting

# Resources for training

- 2-page summary document for facilities
- Specimen request form, and case investigation form (both MUST be completed when a specimen is submitted)
- Training slide set from NICD
- Training videos from NICD
- Facility readiness checklist
- NDoH / NICD nCoV guidelines
- WHO IPC for nCoV 2-page document
- NDoH communications

# NDoH and NICD response structures