SPECIMEN COLLECTION, PACKAGING, TRANSPORTATION AND STORAGE

1. **Safety measures:**

   Health care personal involved in collecting, packaging and transporting COVID-19 specimens must be properly trained, wear appropriate PPE and adhere to infection control measures.

2. **Specimen collection**

   The optimal specimen depends on clinical presentation and time since symptom onset.

2.1 **Type of specimens:**

   2.1.1 **Respiratory specimens**

       Upper respiratory specimens are recommended for testing early-stage infections, especially in asymptomatic or mild cases. Collect both nasopharyngeal and oropharyngeal swabs from a patient and place both swabs into one viral transport medium container. For individual swabs, nasopharyngeal swabs yield a more reliable result than oropharyngeal swabs.

       Lower respiratory specimens which include sputum, tracheal aspirate and bronchoalveolar lavage (BAL) are suitable in later course of the COVID-19 disease or in patients with a negative upper respiratory tract sampling with a strong clinical suspicion of COVID-19. BAL can give a higher yield of viral RNA especially in severe patients.

   2.1.2 **For post-mortem specimens**, take a post-mortem swab, needle biopsy or tissue specimens from the autopsy, including lung tissue.

   2.1.3 **Specimens other** than the above must be validated by the laboratory before use.

2.2 **Procedure for specimen collection**

   2.2.1 **Nasopharyngeal swab/Oropharyngeal swab**

       Use synthetic fibre swabs with plastic shaft. Do not use calcium alginate swabs or swabs with wooden shafts which may contain substances that can inactivate some viruses and may inhibit molecular tests. Flocked swabs give the highest yield.
2.2.2 Nasopharyngeal swab

Insert swab with a flexible shaft through the nostrils parallel to the palate (not upwards) until resistance is encountered. Gently rub and roll the swab. Leave swab in place for several seconds to absorb secretions. Slowly remove swab while rotating it.

2.2.3 Oropharyngeal swab

Depress the tongue. Insert swab into the posterior pharynx and tonsillar areas. Rub swab over posterior oropharynx behind the tonsils. Avoid touching the tonsils.

2.2.4 Lower respiratory tract specimen - Sputum, bronchoalveolar lavage, tracheal aspirate

Collect 2 -3 ml specimen into a sterile, leakproof, screw cap container

For sputum specimen, patient needs to rinse the mouth with water and then expectorate deep cough sputum directly into the container. Educate the patient regarding the difference between sputum and saliva.
2.2.5 Tissue

Place tissue in viral transport medium (VTM) or sterile container with few drops of normal saline. Send the specimen to Institute of Medical Research (IMR) at National Institute of Health for further testing.

2.2.6 Deep Throat Saliva

Patient must not eat or drink, smoke, chew tobacco/betel leaves, brush teeth or gargle with mouth freshener for at least 1 to 2 hours prior to the sample collection. Let the patient sit comfortably, in a well-ventilated space.

Procedure for deep throat saliva collection

i. Instruct patient to drain mucus from the back of the nose and throat at least 3 times

ii. Ask patient to forcefully breathe in 3 times, with head tilt slightly up and cough out the deep throat saliva with mucus.

iii. If patient find difficulty with earlier method, they can be asked to collect the saliva in mouth and bring at deep throat then gargle it for >30sec.

iv. Ask patient to lift specimen collection cup close to his/her mouth and take a deep breath in and cough out or spit out the deep throat saliva into the collection cup.

v. A minimum of 2 ml of deep throat saliva sample is required.
2.2.7 Saliva/ Oral Fluid

Collect 1-5 mL of saliva in a sterile, leak-proof screw cap container. No preservative is required. Follow additional instructions from the healthcare provider or manufacturer.

2.2.8 Nasal Swab

Carefully insert the swab into patient’s nostril. The swab tip should be inserted up to an inch from the edge of the nostril. Dap along the lining of the nostril to ensure that both mucus and cells are collected. Turn the swab several times and remove the swab.

2.2.9 Specimen for self-test kit

For home-based self-test, please follow the instruction from the product insert and latest guideline on home-based test.

2.3 Specimen containers/transport media (PRIMARY CONTAINER)

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Container/ transport media (PRIMARY CONTAINERS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nasopharyngeal swab/ Nasal</td>
<td>Place both swabs in one VTM</td>
</tr>
<tr>
<td>Oropharyngeal swab</td>
<td>Sterile container</td>
</tr>
<tr>
<td>Sputum/BAL/ DTS/ oral fluid/ Saliva</td>
<td>VTM or sterile container with few drops of normal saline</td>
</tr>
<tr>
<td>Tissue</td>
<td>Sterile container</td>
</tr>
<tr>
<td>Tracheal aspirate/ nasopharyngeal aspirate/ nasal</td>
<td>Sterile container or Falcon tube</td>
</tr>
<tr>
<td>Blood for serology</td>
<td>Plain tube with gel</td>
</tr>
</tbody>
</table>
2.4 Packaging, transportation and storage

Specimens must be transported using triple layer packaging.

2.4.1 The primary container must be sealed with parafilm and wrap with gauze. Label the primary container with patient’s identification.

2.4.2 Put the primary container into biohazard plastic bag or screw-capped container (watertight and leak-proof SECONDARY CONTAINER)

2.4.3 Place the secondary container into an ice box or polystyrene box. Ensure enough frozen ice packs surrounding inside the polystyrene/ice box to maintain temperature at 2-8°C.

2.4.4 Send the specimens as soon as possible to the designated laboratory.

2.4.5 Inoculated VTM with swabs /specimens MUST be kept at 2-8°C if transportation to the laboratory and testing will be done within 72 hrs.

2.4.6 If time taken to transport the specimen is more than 72 hours, keep the specimens at -80°C.

2.4.7 Forms must be put into a plastic bag and placed outside the tertiary container.

Note:

a. Please avoid excessive packaging that is difficult to unpack.

b. Do not use any rubber band or seal the gauze too tight. (This could cause hazard to laboratory staff when unpacking the specimen using sharp material)

c. DO NOT PUT FORMS INTO THE BIOHAZARD PLASTIC/ WRAP AROUND THE VTM.

d. Freezing and thawing of specimens can cause RNA degradation.

2.4.8 Packaging for bigger quantity of samples.

2.4.8.1 Place 1 sample per 1 biohazard plastic bag

2.4.8.2 Secondary packaging can be grouped into 1 bigger plastic bag, not more than 20 samples each.
2.4.8.3 The big packaging must be coded according to the name list to facilitate identification of the samples.
2.4.8.4 Put the forms into plastic bag/envelope. The forms **MUST** be placed **OUTSIDE** the polystyrene box for bio-safety purpose.

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### 2.5 Airline shipment

2.5.1 For transporting patient specimens cultures or isolates, especially by air, personnel must be trained in the proper safety, packing, and shipping regulations in accordance with the current edition of the Division 6.2, UN 3373 Biological Substance, Category B International Air Transport Association (IATA) Dangerous Goods Regulations (DGR) and SOP for Transport of Biological Specimens in Malaysia 2012.

2.5.2 Specimens should be shipped at 2-8°C with ice packs. The primary receptacle and the secondary packaging should maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost. Packages containing dry ice should be designed and constructed so as to prevent the build-up of pressure and to allow the release of gas that could rupture the packaging.

Ensure the outer package has been properly marked and labelled with the following:

1. Hazard labelled with UN Identification Number already on label – UN 3373
2. Biological Substance, Category B
3. Shipper’s name, address, and phone number
4. Receiver’s name, address, and phone number
5. Name and phone number of a responsible person is optional if it is on the airway bill
Triple layer packaging

SOP for Transport of Biological Specimens in Malaysia 2012: category B