



INTERIM GUIDELINE ON THE CLINICAL MANAGEMENT OF PATIENTS WITH SUSPECTED AND CONFIRMED 2019- NOVEL CORONAVIRUS (nCoV) ACUTE RESPIRATORY DISEASE

Version 1.0, as of 12 February 2020

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I. Diagnostic testing

All individuals with suspected 2019-CoV respiratory tract infection i.e., patients under investigation (PUIs) should undergo testing for nCoV as well as other tests as warranted by their clinical condition.

1. The test to confirm 2019-nCoV infection is a real-time reverse transcription–polymerase chain reaction (rRT-PCR) assay that can be used to detect the virus in respiratory and serum samples from clinical specimens. The following specimens should be sent for nCoV testing¹:

- Nasopharyngeal swabs (NPS) AND Oropharyngeal swabs (OPS)
- Sputum, endotracheal aspirate, or bronchoalveolar lavage fluid as appropriate. Clinicians may elect to collect only LRT samples when these are readily available (for example, in mechanically ventilated patients).

2. Perform other laboratory tests as needed ^{2,3,4}

- Complete Blood Count (CBC)
 - leukopenia and lymphopenia are common findings, with non survivors or critically ill patients in the ICU developing more severe lymphopenia compared to those not in the ICU (median 1 vs. 0.4 cells/mm³).⁴
- Blood chemistries and inflammatory markers such as lactate dehydrogenase (LDH), C-reactive protein (CRP), and procalcitonin
 - elevation in LDH, CRP, and procalcitonin are common findings
- Prothrombin and D-Dimer
 - prolonged prothrombin time and elevated D-Dimer are observed
- Arterial Blood Gas (ABG) measurement
- Blood cultures (2 sets), ideally before antimicrobial therapy
- Respiratory tract specimen for influenza A/B testing, if available
- Respiratory tract specimen to determine other co infections through standard bacterial tests (e.g., Gram's stain and culture) or respiratory panels (e.g. Respiratory Film Array)
- Serology for diagnostic purposes is recommended only when RT-PCR is not available
- Chest x-ray
 - may reveal pulmonary infiltrates
- High resolution chest CT scan
 - may reveal ground-glass infiltrates or consolidations with bilateral distribution ^{2,3,4,5}

II. Collection of respiratory tract specimens

1. Personal Protective Equipment (PPE) for HCW collecting and handling respiratory tract specimens

When collecting respiratory tract specimens, healthcare workers should wear the following PPE: eye protection, surgical mask, double gloves, a disposable impermeable, breathable, long-sleeved, laboratory gown fastened at the back. If the specimen is collected with an aerosol-generating procedure, staff should wear a particulate respirator at least as protective as a NIOSH-certified N95, an EU standard FFP2, or the equivalent.⁶

2. Procedure for collecting respiratory specimens⁷

- Use sterile Dacron or rayon viral swabs for collecting upper respiratory tract specimens from both the nasopharynx and the oropharynx. Do not use calcium alginate swabs.
- Collecting the OPS:

Insert swab into the posterior pharynx and tonsillar areas. Rub swab over both tonsillar pillars and posterior oropharynx and avoid touching the tongue, teeth, and gums. Do not sample the tonsils.

- Collecting the NPS:

Insert flexible wire shaft swab through the nares parallel to the palate (not upwards) until resistance is encountered or the distance is equivalent to that from the ear to the nostril of the patient indicating contact with the nasopharynx. Gently, rub and roll the swab. Leave the swab in place for several seconds to absorb secretions before removing. Do not sample the nostrils.

- Lower respiratory tract specimens should be collected in sterile containers.
- Avoid sputum induction to reduce the risk of aerosol transmission.

3. Specimen handling⁷

- Place NP and OP swabs immediately into a sterile vial containing 2 ml of viral transport media without antibiotics. Both swabs can be placed in the same vial, if desired. Aseptically, cut or break applicator sticks off near the tip to permit tightening of the cap.
- Label the vial with the patient's name, specimen type, date collected and other required information.
- If specimens will be examined within 48 hours after collection, keep specimen at 4°C and ship on wet ice or refrigerant gel-packs, otherwise store frozen at ≤-70°C and ship on dry ice.
- Avoid freezing and thawing specimens.

4. Specimens should be packaged using the triple packaging system detailed below¹:

- Seal the primary receptacle containing the swabs and viral transport media using Parafilm. Wrap the primary receptacle with an absorbent material e.g., gauze.
- Place the primary receptacle into the second container. The second container should be durable and leak-proof.
- Place the second container into the outer container e.g., ice box. Ensure that the required temperature is maintained in the outer container through the use of wet ice or refrigerant packs.

5. All specimens for nCoV testing should be sent to the Research Institute for Tropical Medicine (RITM) by the health facility. Sending of specimens for nCoV testing should be coordinated with the appropriate DOH-Regional Epidemiology and Surveillance Unit (RESU). The hotline mobile number for the RITM Surveillance and Response Unit is +63-9478706673.¹

Refer to **Annex A: Guidelines for proper specimen collection of OPS and NPS Swab** for more detailed information on specimen collection.

Refer to **Annex B: Guidance on specimen collection of the RITM Advisory for Clinicians on 2019 Novel Coronavirus (2019-nCoV) testing** for more detailed information on specimen transport.

III. Equipment needed in units managing patients with suspected 2019-nCoV infection

- PPE
- Dedicated equipment including a thermometer, stethoscope and blood pressure apparatus
- Pulse oximeters
- Functioning oxygen systems
- Disposable, single-use, oxygen-delivering interfaces (nasal cannula, simple face mask, and mask with reservoir bag)

NOTE: Use standard, contact, droplet/airborne precautions when handling contaminated oxygen interfaces of patients with nCoV infection⁶.

IV. Clinical presentation of patients with 2019-nCov infection

The 2019-nCoV was identified as the etiologic agent of pneumonia among hospitalized patients Wuhan, Hubei province, China in December 2019. The clinical spectrum of the 2019-nCoV infection has not yet been fully defined. Some reports describe that signs and symptoms of patients infected with the 2019-nCoV are non-specific and mild. Most patients will present with cough, fever and generalized body malaise and some patients would develop pneumonia requiring hospital and even ICU admission. Among hospitalized patients with novel coronavirus-infected pneumonia (NCIP), common complications were ARDS (27 [19.6%]), arrhythmia (23 [16.7%]), shock (12 [8.7%]), and acute cardiac injury (10 [7.2%]).⁴

1. Demographics of patients with 2019-nCoV infection

The following table describes the demographic of the first hundred hospitalized patients confirmed to have 2019-nCoV infection in Hubei, China:

Table 1. Summary of demographics of hospitalized patients confirmed to have 2019-nCoV infection.

Demographics	Huang, et al (N=41) ²	Chen, et al (N=99) ³	Wang, et al (N=138) ⁴
Age	49 years old (median)	55.5 years old (mean)	56 years old (median)
Gender	73%	68%	54.3%
Exposure to Huanan seafood market	66%	49%	8.7%
With underlying diseases	32%	51%	46.4%
Admitted to the ICU for respiratory support	32%	23%	26%

2. Clinical symptoms of patients with 2019-nCoV infection

Fever and cough are the most common symptoms among patients diagnosed with the 2019-nCoV infection in Wuhan, Hubei Province, China. In the study by Wang et.al, 82% had dry cough. In the study by Chen, 90% of cases presented with more than one sign or symptom³. Table 2 summarizes the common signs and symptoms of patients with nCoV infection.

Table 2. Clinical signs and symptoms of patients with 2019-nCoV infection.

Symptom/Sign	Huang, et al (N=41) ²	Chen, et al (N=99) ³	Wang, et al(N=138) ⁴
Fever	98%	83%	98.6%
Cough	76%	82%	82% (dry cough)
Shortness of breath	55%	31%	31.2
Muscle ache	44%	11%	34.8%
Confusion	NR	9%	NR
Headache	8%	8%	6.5%
Sore throat	NR	5%	17.4%
Rhinorrhea	NR	4%	NR
Chest pain	NR	2%	NR
Diarrhea	3%	2%	10.1%
Nausea and vomiting	NR	1%	10.1% (nausea) 3.6% (vomiting)
Fatigue	NR	NR	69.6%

*NR – not reported

V. Management of patients according to severity of illness⁸

IMPORTANT: There is no current evidence from randomized controlled trials (RCTs) to recommend any specific anti-nCoV treatment for patients with suspected or confirmed nCoV infection. Until specific treatment for the 2019-nCoV is determined, meticulous supportive care is warranted in the management of these patients.^{2, 3, 4}

Classification of patients suspected or confirmed to have nCoV infection (see Table 3 and 4 for signs and symptoms and management):

- A. Patients with uncomplicated upper respiratory tract infection**
- B. Patients with mild pneumonia**
- C. Patients with severe pneumonia, severe sepsis or septic shock** (manage as CAP-HR based 2016 Philippine CAP Guidelines)
- D. Patients with Acute Respiratory Distress Syndrome (ARDS)**

Table 3. Classification of Adult patients suspected or confirmed to have nCoV infection

Group	Signs and Symptoms	Management
A	Non-specific symptoms such as fever, cough, sore throat, nasal congestion, headache, muscle pain or malaise.	<ul style="list-style-type: none"> • Admit to a designated isolation room. • Give symptomatic treatment and supportive care as needed. • Most cases will not require antibiotic treatment.
B	With mild pneumonia (e.g. RR <30, HR <125, SpO2 >90% on room air)	Manage as CAP-Low Risk based on 2020 Philippine CAP Guidelines (Annex C)
C	Fever or suspected respiratory infection, plus one of the following: <ul style="list-style-type: none"> • respiratory rate >30 breaths/min • severe respiratory distress, or SpO2 <90% on room air 	Manage as CAP-Moderate Risk based on 2020 Philippine CAP Guidelines (Annex C)

	<p>Sepsis: life-threatening organ dysfunction caused by a dysregulated host response to suspected or proven infection, with organ dysfunction presenting as follows:</p> <ul style="list-style-type: none"> • altered mental status • difficult or fast breathing (RR>30 breaths/minute) • low oxygen saturation (< 90% on room air) or arterial hypoxemia (PaO₂/FiO₂ < 300) • reduced urine output (U/O <0.5 ml/kg/hour for at least 2 hours despite adequate fluid resuscitation) • fast heart rate (>90 beats/minute), weak pulse, cold extremities or low blood pressure (systolic BP <90 mmHg, mean arterial pressure (MAP) < 70 mmHg) • skin mottling, or • laboratory evidence of coagulopathy (INR >1.5 or aPTT > 60 seconds), thrombocytopenia (platelet count < 100,000 microL⁻¹), acidosis, high lactate (>2 mmol/L) or hyperbilirubinemia (>4 mg/dL) 	Manage as CAP-High Risk based on 2020 Philippine CAP Guidelines (Annex C)
	Septic Shock: persisting hypotension despite volume resuscitation, requiring vasopressors to maintain MAP ≥65 mmHg and serum lactate level >2 mmol/L	Manage as CAP-High Risk based on 2020 Philippine CAP Guidelines
D	new or worsening respiratory symptoms (e.g. SpO ₂ < 90%, RR> 30 breaths/minute, with or without progressing infiltrates on CXR) within one week of known clinical insult	Consider ARDS. Management will depend on classification of ARDS.

Table 4. Classification of Pediatric patients suspected or confirmed to have nCoV infection

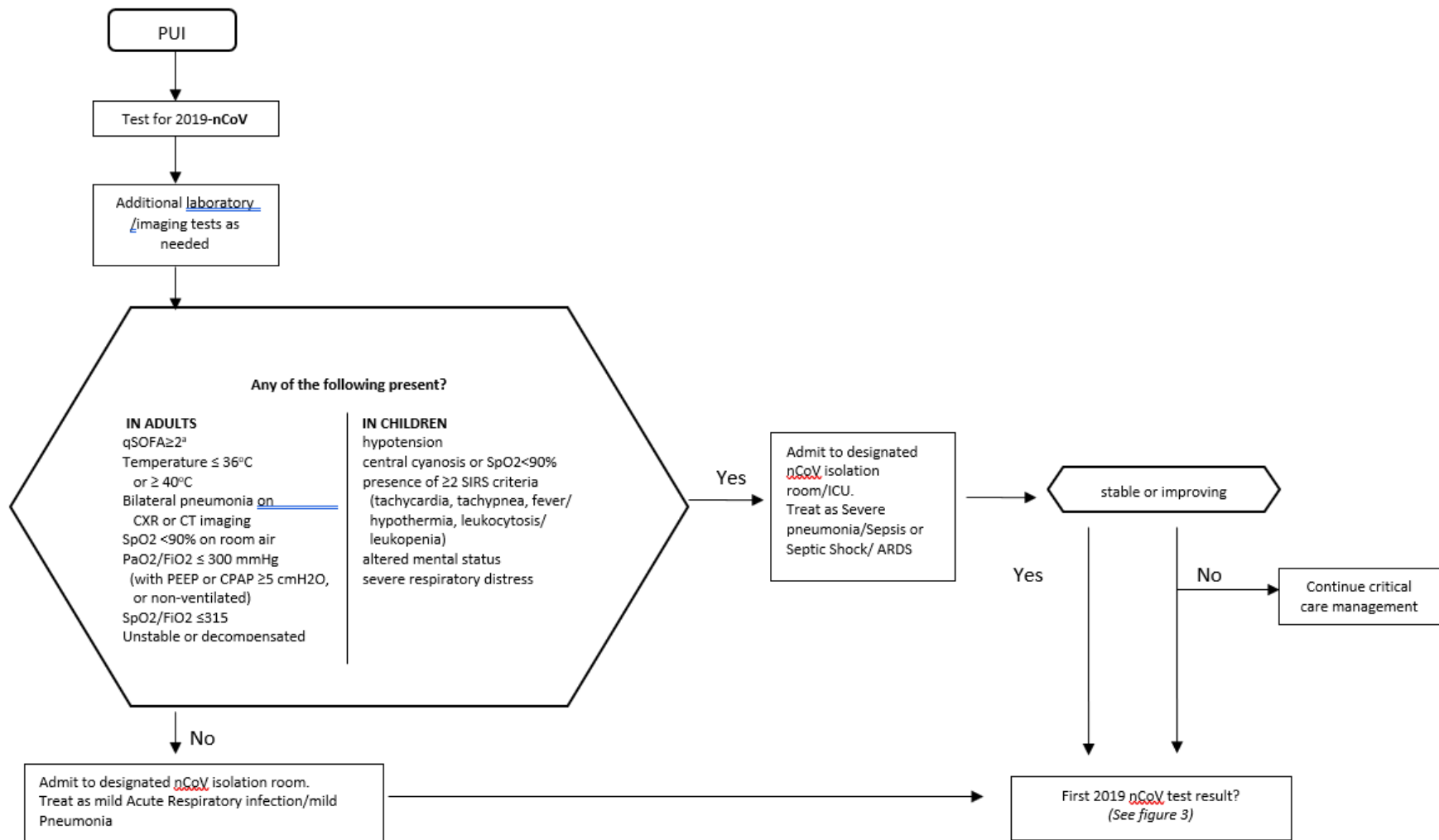
Group	Signs and Symptoms	Management
A	Non-specific symptoms such as fever, cough, sore throat, nasal congestion, headache, muscle pain or malaise.	<ul style="list-style-type: none"> • Admit to the designated isolation room. • Give symptomatic treatment and supportive care as needed. • Most cases will not require antibiotic treatment.
B	<p>Child with non-severe pneumonia has:</p> <ul style="list-style-type: none"> • cough or difficulty breathing • fast breathing (in breaths/min): <ul style="list-style-type: none"> ○ <2 months, ≥60 ○ 2–11 months, ≥50 ○ 1–5 years, ≥40 • and no signs of severe pneumonia 	<ul style="list-style-type: none"> • Admit to a designated isolation room • Manage as pediatric community-acquired pneumonia (pCAP) A/ B (Annex D)
C	<p>Child with cough or difficulty in breathing, plus at least one of the following:</p> <ul style="list-style-type: none"> • central cyanosis or SpO₂ <90% • severe respiratory distress (e.g. grunting, very severe chest indrawing) • signs of pneumonia with a general danger sign: inability to breastfeed or drink, lethargy or unconsciousness, or convulsions 	<ul style="list-style-type: none"> • Admit to a designated isolation room • Manage as pediatric community-acquired pneumonia (pCAP) C (Annex D)

	Other signs of pneumonia may be present: chest indrawing, fast breathing (in breaths/min): <ul style="list-style-type: none"> ○ <2 months, ≥60 ○ 2–11 months, ≥50 ○ 1–5 years, ≥40 	
	Sepsis: suspected or proven infection and ≥2 SIRS criteria, of which one must be abnormal temperature or white blood cell count	<ul style="list-style-type: none"> ● Admit to the designated isolation room ● Manage as pediatric community-acquired pneumonia (pCAP) C (Annex D)
	Septic Shock: any hypotension (SBP <5th centile or >2 SD below normal for age) or 2-3 of the following: <ul style="list-style-type: none"> ● altered mental state ● tachycardia or bradycardia (HR <90 bpm or >160 bpm in infants and HR <70 bpm or >150 bpm in children) ● prolonged capillary refill (>2 sec) or warm vasodilation with bounding pulses ● tachypnea ● mottled skin or petechial or purpuric rash ● increased lactate ● oliguria ● hyperthermia or hypothermia 	<ul style="list-style-type: none"> ● Admit to the designated isolation room ● Manage as pediatric community-acquired pneumonia (pCAP) D (Annex D)
D	new or worsening respiratory symptoms within one week of known clinical insult	Management will depend on classification of ARDS

Table 5. Risk stratification for Community Acquired Pneumonia for Adults (Annex C)

	Low Risk	Moderate Risk	High Risk ^a
Vital Signs	Stable	Unstable	
Respiratory rate	< 30/minute	≥ 30/minute	
Pulse rate	<125/minute	≥125/minute	
Systolic blood pressure	> 90 mmHg	< 90 mmHg	
Diastolic blood pressure	> 60 mmHg	≤ 60 mmHg	
Temperature	> 36°C or < 40°C	≤ 36°C or ≥ 40°C	
Others			
Altered mental state of acute onset	Absent	Present	Present
With suspected aspiration	No	Yes	Yes
Co-morbid condition	None or stable co-morbid	Unstable or decompensated <ul style="list-style-type: none"> ● Uncontrolled diabetes mellitus ● Active malignancies ● Neurologic disease in evolution ● Congestive heart failure Class II-IV ● Unstable coronary artery disease ● Renal failure on dialysis ● Uncompensated COPD ● Decompensated liver disease 	
Severe Sepsis and Septic shock	Absent	Absent	Present/Absent
Need for mechanical ventilator	No	No	No/Yes

Figure 1. Approach to a PUI suspected of having 2019-nCoV



^a qSOFA score for sepsis (each criterion is assigned one point): altered mental status (GCS < 15), respiratory rate ≥ 22/minute, systolic BP ≤ 100 mm Hg

^b Unstable or decompensated comorbidities: uncontrolled diabetes mellitus, active malignancies, neurologic disease in evolution, congestive heart failure II-IV, unstable coronary artery disease, renal failure on dialysis, uncompensated COPD, decompensated liver disease

^c Resolution of vital sign abnormalities (temperature of 36-37.5°C, pulse < 100/min, respiratory rate between 16-24/min, systolic BP > 90 mmHg, blood oxygen saturation > 90%), ability to eat and normal mentation

VI. Additional supportive therapy and monitoring for patients with pneumonia

- Give supplemental oxygen therapy immediately to patients with pneumonia and respiratory distress, hypoxemia, or shock.
 - Initiate oxygen therapy at 5 L/min and titrate flow rates to reach target SpO₂ ≥90% in non-pregnant adults and SpO₂ ≥92-95 % in pregnant patients
 - 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 SpO₂ ≥94%; otherwise, the target SpO₂ is ≥90%.
 - All areas where patients with pneumonia are cared for should be equipped with pulse oximeters, functioning oxygen systems and disposable, single-use, oxygen-delivering interfaces (nasal cannula, simple face mask, and mask with reservoir bag).
- Assess the need for intubation and mechanical ventilation. Endotracheal intubation should be performed by a trained and experienced provider using airborne precautions.
- Use conservative fluid management in patients with pneumonia when there is no evidence of shock.
 - Patients with pneumonia should be treated cautiously with intravenous fluids, because aggressive fluid resuscitation may worsen oxygenation, especially in settings where there is limited availability of mechanical ventilation.
- Give appropriate empiric antimicrobials. Please refer to the Guidelines for the Diagnosis and Treatment of Community-acquired Pneumonia in Adults (Annex C)/ 2016 Guidelines for Evaluation and Management of Pediatric Community-acquired Pneumonia (Annex D) for patients with community-acquired infection.
 - Although the patient may be suspected to have nCoV, administer appropriate empiric antimicrobials within ONE hour of identification of sepsis.
- Give oseltamivir 75 mg per tab BID for adults and 3mg/kg per dose BID for pediatric patients for 5 to 10 days for patients who are confirmed to have influenza A or B infection.
- Empiric therapy includes oseltamivir 75 mg per tab BID for adults and 3mg/kg per dose BID for pediatric patients for 5 to 10 days for treatment of influenza when there is local circulation or other risk factors, including travel history.
- Streamline antimicrobial treatment when microbiologic exam results become available.
- Do NOT routinely give systemic corticosteroids for treatment of viral pneumonia or ARDS outside of clinical trials unless they are indicated for another reason.
 - There is insufficient evidence to support the use of steroids in the management of patients with confirmed or suspected 2019-nCoV infection with acute lung injury and ARDS. Use of steroids may provide little benefit and cause more harm among these patients⁹.
- Closely monitor patients with pneumonia for signs of clinical deterioration, such as rapidly progressive respiratory failure and sepsis, and apply supportive care interventions immediately.
- Identify and properly manage other co-morbidities adequately.

VII. Management of Sepsis or Septic Shock¹⁰

- Admit the patient to designated nCoV isolation room/ICU.
- Give appropriate antimicrobials within one hour of initial patient assessment. Blood cultures should ideally be collected prior to antimicrobial treatment, but this should not delay administration of antimicrobials
- Determine if infection was acquired in the community or in the hospital setting and provide appropriate empiric therapy based on clinical presentation. Please refer to Annex C: Guidelines for the Diagnosis and Treatment of Community-acquired Pneumonia in Adults for patients with community-acquired infection.
- Early effective fluid resuscitation as follows¹⁰:
 - In adults, administer at least 30 ml/kg of balanced crystalloid or normal saline solution within 1 hours if with signs of sepsis-induced hypoperfusion (i.e. hypotension, or serum lactate levels of ≥ 4 mmol/L with or without hypotension)
 - In resuscitation from septic shock in children in well-resourced settings, give 20 ml/kg as a rapid bolus and up to 40-60 ml/kg in the first 1 hr.
 - Do not use hypotonic crystalloids, starches, or gelatins for resuscitation.
 - Monitor for volume overload during resuscitation. Fluid overload can lead to respiratory failure.
- In patient who remain hypotensive, assessment of fluid responsiveness is suggested before additional fluids are administered. If fluid unresponsive, vasopressors may be initiated to target MAP ≥ 65 mmHg in adults. A higher MAP of 75 to 85 mmHg is suggested for patients with preexisting hypertension. Use of vasopressors should not be delayed.
- If central venous catheters are not available, vasopressors can be given through a peripheral IV, but use a large vein and closely monitor for signs of extravasation and local tissue necrosis. If extravasation occurs, stop infusion. Central venous pressure (CVP) should not be used to assess fluid responsiveness.
- If signs of poor perfusion and cardiac dysfunction persist despite achieving MAP target with fluids and vasopressors, consider an inotrope such as dobutamine.

VIII. Management of Acute Respiratory Distress Syndrome (ARDS)⁸

Recognize severe hypoxemic respiratory failure when a patient with respiratory distress is failing standard oxygen therapy.

1. Signs and symptoms

Onset: new or worsening respiratory symptoms within one week of known clinical insult

Chest imaging (radiograph, CT scan, or lung ultrasound): bilateral opacities, not fully explained by effusions, lobar or lung collapse, or nodules.

Origin of edema: respiratory failure not fully explained by cardiac failure or fluid overload. Need objective assessment (e.g. echocardiography) to exclude hydrostatic cause of edema if no risk factor present.

2. Classification of ARDS based on oxygenation among adults:

- **Mild ARDS:** $200 \text{ mmHg} < \text{PaO}_2/\text{FiO}_2 \leq 300 \text{ mmHg}$ (with PEEP or CPAP $\geq 5 \text{ cmH}_2\text{O}$, or non-ventilated)
- **Moderate ARDS:** $100 \text{ mmHg} < \text{PaO}_2/\text{FiO}_2 \leq 200 \text{ mmHg}$ with PEEP $\geq 5 \text{ cmH}_2\text{O}$, or non-ventilated)
- **Severe ARDS:** $\text{PaO}_2/\text{FiO}_2 \leq 100 \text{ mmHg}$ with PEEP $\geq 5 \text{ cmH}_2\text{O}$, or non-ventilated). When PaO_2 is not available, $\text{SpO}_2/\text{FiO}_2 \leq 315$ suggests ARDS (including in non-ventilated patients)

3. Classification of ARDS based on oxygenation among children:

- Bilevel NIV or CPAP $\geq 5 \text{ cmH}_2\text{O}$ via full face mask: $\text{PaO}_2/\text{FiO}_2 \leq 300 \text{ mmHg}$ or $\text{SpO}_2/\text{FiO}_2 \leq 264$
- Mild ARDS (invasively ventilated): $4 \leq \text{OI} < 8$ or $5 \leq \text{OSI} < 7.5$
- Moderate ARDS (invasively ventilated): $8 \leq \text{OI} < 16$ or $7.5 \leq \text{OSI} < 12.3$
- Severe ARDS (invasively ventilated): $\text{OI} \geq 16$ or $\text{OSI} \geq 12.3$

4. Management of ARDS

- Admit the patient to the ICU.
- Recognize severe hypoxemic respiratory failure when a patient with respiratory distress is failing standard oxygen therapy.
- **Hypoxemic patients without ARDS** may benefit from high flow nasal oxygen (HFNO) therapy or non-invasive ventilation. As progression into ARDS may happen rapidly, these patients should be monitored closely in an ICU setting for clinical deterioration and for assessment on need for escalation to invasive mechanical ventilation with intubation
- Manage ARDS if present. Referral to the appropriate specialists (e.g. Pulmonologist and/or Intensivist) is highly recommended.
- Endotracheal intubation should be performed by a trained and experienced provider using airborne precautions.
- Implement lung protection strategy with initial tidal volumes at 6-8 ml/kg of predicted body weight, provision of adequate PEEP for recruitment, while limiting inspiratory pressures (plateau pressures) below 30 cmH₂O
 - In patients with moderate or severe ARDS, higher PEEP instead of lower PEEP is suggested.
- ARDS patients who remain hypoxemic despite lung protection strategy should be immediately placed prone for no less than 12 hours with the goal of lung recruitment. Reassessment and the decision to terminate prone positioning after 12 hours should be made in consultation with a pulmonologist and/or an intensivist.
- Use a conservative fluid management strategy for ARDS patients without tissue hypoperfusion.
 - **This is a strong guideline recommendation; the main effect is to shorten the duration of ventilation.**
- In patients with moderate-severe ARDS ($\text{PaO}_2/\text{FiO}_2 < 150$), neuromuscular blockade by continuous infusion should not be routinely used.
- Extracorporeal life support (ECLS) should be considered when the above measures are unable to provide adequate oxygenation. Consider referral to a center with access to ECLS.

- Avoid disconnecting the patient from the ventilator, which results in loss of PEEP, de-recruitment and atelectasis. Minimize nebulizations as they can also cause de-recruitment. Keep the ventilator humidified at all times. Use in-line catheters for airway suctioning and clamp endotracheal tube when disconnection is required (for example, transfer to a transport ventilator).

IX. Prevention of Complications⁸

Implement the following interventions to minimize complications associated with critical illness⁸.

Table 6. Prevention of complications

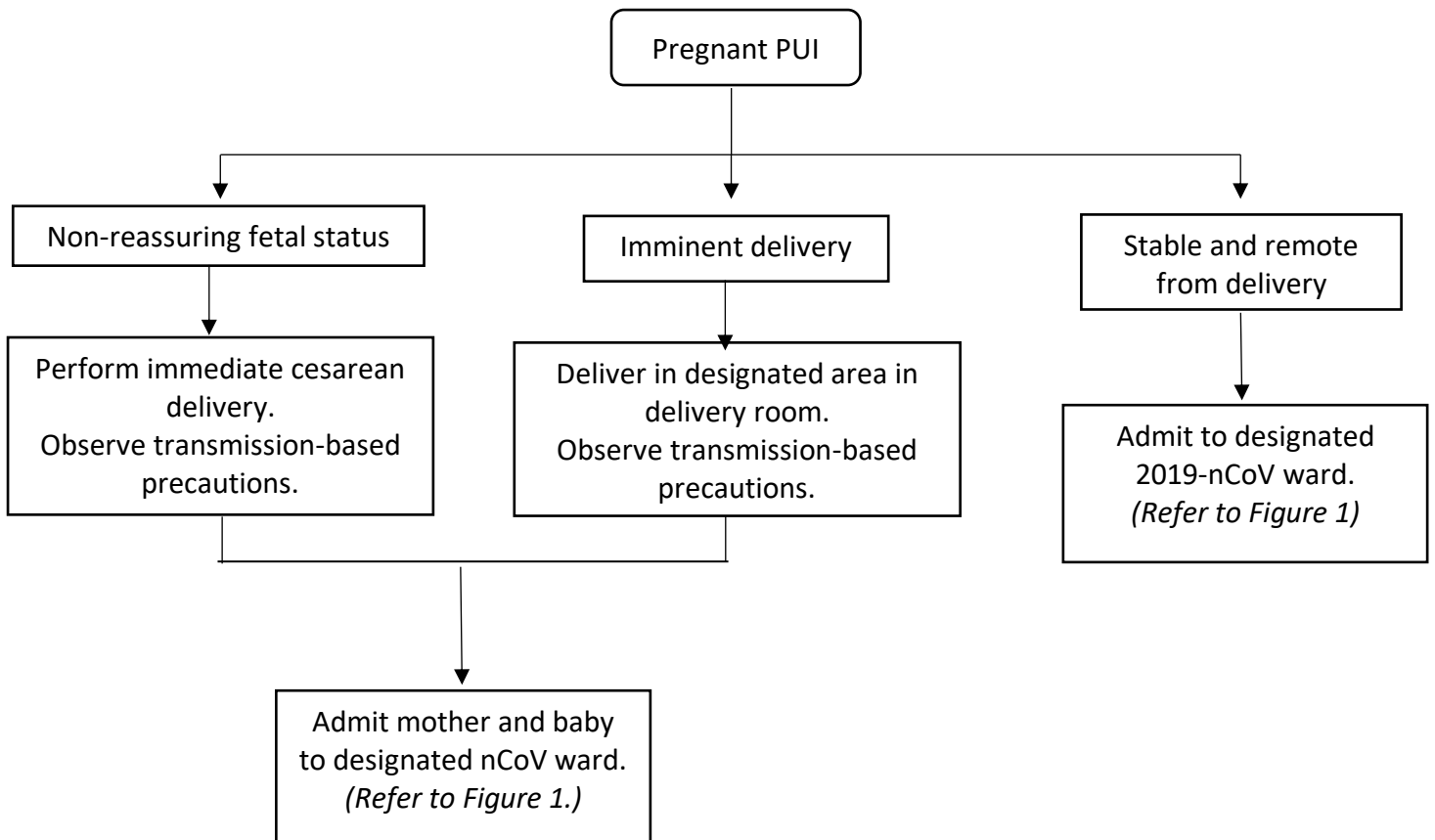
Anticipated Outcome	Interventions
Reduce days of invasive mechanical ventilation	<ul style="list-style-type: none"> • Use weaning protocols that include daily assessment for readiness to breathe spontaneously • Minimize continuous or intermittent sedation, targeting specific titration endpoints (light sedation unless contraindicated) or with daily interruption of continuous sedative infusions
Reduce incidence of ventilator-associated pneumonia	<ul style="list-style-type: none"> • Oral intubation is preferable to nasal intubation in adolescents and adults • Keep patient in semi-recumbent position (head of bed elevation 30-45°) • Use a closed suctioning system; periodically drain and discard condensate in tubing • Use a new ventilator circuit for each patient; once patient is ventilated, change circuit if it is soiled or damaged but not routinely • Change heat moisture exchanger when it malfunctions, when soiled, or every 5–7 days
Reduce incidence of venous thromboembolism	<ul style="list-style-type: none"> • Use pharmacological prophylaxis (low molecular-weight heparin [preferred if available] or heparin 5000 units subcutaneously twice daily) in adolescents and adults without contraindications. For those with contraindications, use mechanical prophylaxis (intermittent pneumatic compression devices).
Reduce incidence of catheter-related bloodstream infection	<ul style="list-style-type: none"> • Use a checklist with completion verified by a real-time observer as reminder of each step needed for sterile insertion and as a daily reminder to remove catheter if no longer needed
Reduce incidence of pressure ulcers	<ul style="list-style-type: none"> • Turn patient every two hours
Reduce incidence of stress ulcers and gastrointestinal bleeding	<ul style="list-style-type: none"> • Give early enteral nutrition (within 24–48 hours of admission) • Administer histamine-2 receptor blockers or proton-pump inhibitors in patients with risk factors for GI bleeding. Risk factors for gastrointestinal bleeding include mechanical ventilation for ≥48 hours, coagulopathy, renal replacement therapy, liver disease, multiple comorbidities, and higher organ failure score
Reduce incidence of ICU-related weakness	<ul style="list-style-type: none"> • Actively mobilize the patient early in the course of illness when safe to do so

X. Special considerations for pregnant patients

Data on pregnant women is limited at this time. Pregnant women with suspected or confirmed 2019-nCoV infection should be treated with the supportive therapies as described above, taking into account the physiologic adaptations of pregnancy.

Assess all pregnant patients to determine severity of illness and imminence of delivery. If the patient must be admitted, she should be admitted to the appropriate isolation unit. If delivery is imminent, observe transmission-based precautions in the delivery and recovery room. Figure 3 shows the pathway for pregnant patients.

Figure 2. Approach to a pregnant patient suspected of 2019-nCoV infection



XI. Complications and outcome of patients with 2019-nCoV infection

Data regarding the complications and outcome of individuals infected with 2019-nCoV remain limited to case series and reports. Majority of patients seem to recover. However, among the 99 cases described by Chen, et al., 17 (17%) patients developed ARDS of whom 11 (11%) patients worsened in a short period of time and died of multiple organ failure. Similarly, among the 41 cases reported by Huang et al., 13 (32%) patients were admitted to an ICU and six (15%) died. In the review of Wang, et. al, among 138 hospitalized patients, 36 (26.1%) were transferred to the ICU of which 22 (61.1%) developed ARDS. The mortality rate reported by Wang, et.al. was 4.3%. To date, among cases reported globally, mortality is estimated at 2%. The elderly and individuals with underlying diseases have higher fatality rate compared to younger and healthier patients.

A summary of complications and outcomes of these patients are in Table 6.

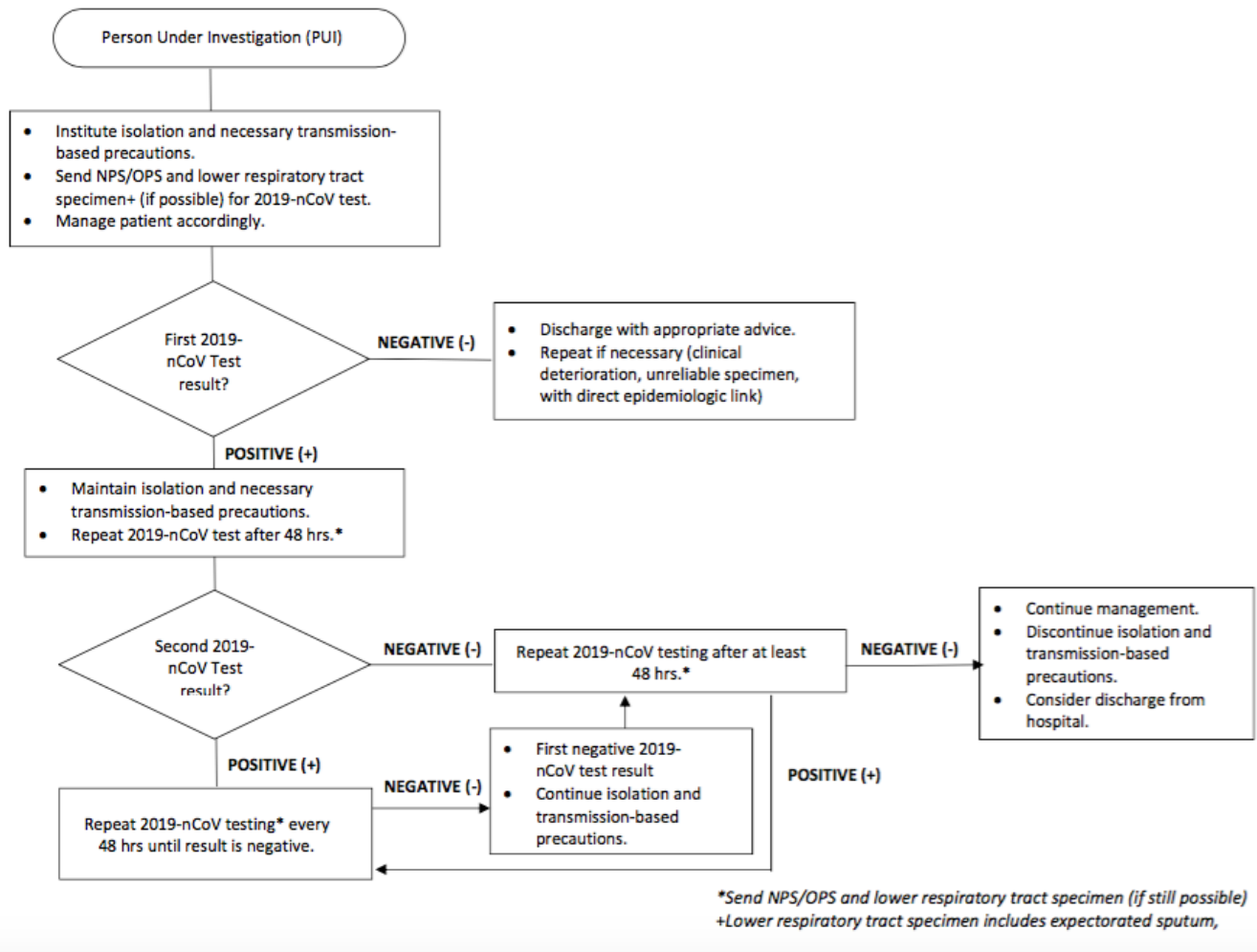
Table 6: Complications and Outcomes of Patients w/ Confirmed nCoV

Outcome	Huang, et al (N=41)²	Chen, et al (N=99)³	Wang, et al(N=138)⁴
ARDS	12 (29) [^]	17 (17)	27 (19.6)
Septic shock	3 (7)	4 (4)	12 (8.7)
Invasive ventilation	2 (5) [*]	4 (4)	17 (12.3)
ECMO	--	3 (3)	4 (2.9)
Discharged	28 (68)	31(31)	47 (34.1)
Death	6(15)	11 (11)	6 (4.3)

[^] percent ^{*} combined ECMO/invasive ventilation

LEGEND: ARDS – acute respiratory distress syndrome; ECMO- Extracorporeal membrane oxygenation

Figure 3. Algorithm for 2019-nCoV testing of PUIs and confirmed 2019-nCoV (adopted from RITM Advisory for Clinicians on 2019 Novel Coronavirus Testing)



XII. Recommendations for repeat testing for 2019-nCoV

1. Repeat testing after a positive 2019-nCoV test

- a. Submit NPS/OPS and lower respiratory tract specimens (if possible) 48 hours from the first positive 2019-nCoV test.
- b. If still positive, recollect NPS/OPS and lower respiratory tract specimens (if possible) for 2019-nCoV testing every 48 hours until the patient has two (2) consecutive negative test results.

2. Repeat testing after an initial negative 2019-nCoV test

Repeat testing for patients with an initial negative 2019-nCoV test result may be performed **ONLY** if there is a high index for suspicion for nCoV infection despite an initial negative test result. Such conditions include, but are not limited, to the following:

- a. Clinical deterioration in the presence of an established disease etiology and with adequate treatment. A single negative test result, particularly if this is from an upper respiratory tract specimen, does not exclude infection. Repeat sampling and testing, preferably of lower respiratory specimen, is strongly recommended in severe or progressive disease. Consider a possible co-infection with 2019-nCoV.
- b. No other etiology for the patient's signs and symptoms has been identified despite work-up.
- c. Clinical specimen(s) initially sent was/were deemed to be unsatisfactory or insufficient (delay in transport and processing, only NPS or OPS was sent).

XIII. Criteria for discharge

1. Criteria for discharge of PUI

PUI may be discharged after the initial 2019-nCoV test is negative **AND** any of the following conditions are met:

- there is clinical improvement
- there is no other indication for admission
- an alternative diagnosis is available
- the possibility of nCoV has been ruled out

2. Criteria for discharge of patients with confirmed 2019-nCoV infection

Patients who have clinically recovered (with resolution of symptoms) may be discharged from the hospital after **two consecutive negative tests for nCoV**.

XIV. References:

¹RITM advisory for clinicians on 2019–Novel Coronavirus (2019–nCoV) testing as of 02 February 2020

²Huang et al. [Lancet](#). 2020 Jan 24. pii: S0140-6736(20)30183-5. doi: 10.1016/S0140-6736(20)30183-5.

³Chen et al, [Lancet](#). 2020 Jan 30. pii: S0140-6736(20)30211-7. doi: 10.1016/S0140-6736(20)30211-7

⁴Wang, et al. *JAMA*. Published online February 7, 2020. doi:10.1001/jama.2020.1585. Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus–Infected Pneumonia in Wuhan, China.

⁵Kanne, J.P. *Radiology*. 2020 Feb 4. doi: 10.1148/radiol.2020200241

⁶Infection prevention and control during health care when novel coronavirus (nCoV) infections is suspected. 25 January 2020. WHO. Interim Guidance.

⁷RITM Guidelines for Proper Specimen Collection of Oropharyngeal and Nasopharyngeal Swab. 2020.

⁸World Health Organization. Clinical management of severe acute respiratory infection when novel coronavirus (nCoV) infection is suspected. Interim guidance 28 January 2020.

⁹Rusell, et al 2020 Clinical evidence does not support corticosteroid treatment for 2019–nCoV lung injury

¹⁰Levy, et.al. The Surviving Sepsis Campaign Bundle: 2018 Update

ANNEX A:

GUIDELINES FOR PROPER SPECIMEN COLLECTION OF OPS AND NPS SWAB

GUIDELINES FOR SPECIMEN COLLECTION, STORAGE AND TRANSPORT

OROPHARYNGEAL OR THROAT SWAB (OPS) FOR PCR

I. Timing of Collection:

Collect specimen as soon as possible (within 14 days after the onset of symptoms). Sample collected greater than 14 days after onset have much lower chances for successful isolation of the virus.

II. Pre- specimen collection

1. Take out only the number of Viral Transport Media (VTM) needed from the freezer (-20 °C)/refrigerator freezer where they are stored.
2. Frozen VTM shall be thawed just before use. If the collection site is far from a refrigerator, have a thermo box with 4-6 frozen ice packs at hand to maintain a refrigerated temperature during collection.
3. Check VTM for turbidity. The medium shall be clear and pinkish. Tap the tube to mix contents.
4. Check also the integrity of the swab and tongue depressor pouch to ensure sterility. Do not use swabs or tongue depressor that has been opened.
5. Completely and legibly fill up the CIF.

III. Specimen Collection and Storage

Label the VTM tube with the patient's Full Name and date of collection. The information on the label must be legible and shall match the information on the CIF. Label must remain attached under all conditions of storage and transport.

Oropharyngeal swab (OPS)

1. With gloved hands, hold down the tongue with a sterile tongue depressor.
2. Have the patient say "aahh" to elevate the uvula.
3. Use a sweeping motion to swab the posterior pharyngeal wall and tonsillar pillars. Apply a little force, taking large quantities of mucosa.
4. Avoid swabbing the soft palate and do not touch the tongue with the swab tip. (N.B. This procedure can induce the gag reflex)
5. Place the oropharyngeal swab immediately in the VTM tube.
6. Break/cut with scissors the end of the swab that sticks out of the tube and close the tube tightly.
7. Secure the cap with parafilm to prevent leakage during transport.
8. Store inside the refrigerator (2-8°C)/thermobox with ice packs while awaiting transport.

IV. Transport

1. In transporting the specimen, wrap VTM tubes with specimens in tissue paper or any absorbent material; place upright in a separate 50 ml centrifuge tube or any leak/puncture proof container; place the 50 ml tube or any container in a resealable plastic bag (Ziplock™).
2. Put the VTM tubes with specimens in a shipment/carrier box with at least 4 frozen ice packs inside to maintain prescribed temperature: put frozen ice packs in first, at the bottom and at the sides of the carrier box; then place specimens at the middle so that they are surrounded by the ice packs. Cover the carrier box.
3. Place the completely filled-up CIF in a separate zip-locked plastic bag and put on top of the box and secure with tape.
4. Send to the Research Institute for Tropical Medicine (RITM) within 3 days of specimen collection:

Research Institute for Tropical Medicine
Filinvest Corporate Compound
Alabang, Muntinlupa City, 1781
Telefax Number: (02)809-7120

NOTE: SPECIMENS MUST BE SHIPPED WITHIN 48 HOURS (2 DAYS) AFTER COLLECTION TO ENSURE ARRIVAL AT RITM WITHIN 72 HOURS (3 DAYS).

V. Rejection Criteria

1. Inadequate sample collection.
2. Samples without CIF.
3. Improperly labelled sample.
4. Samples with visible contamination.
5. Spillage or breakage in transit.

DIAGRAM-Collection of Nasopharyngeal and Oropharyngeal Swabs (NPS/OPS)

1. Prepare all Materials/Equipment required



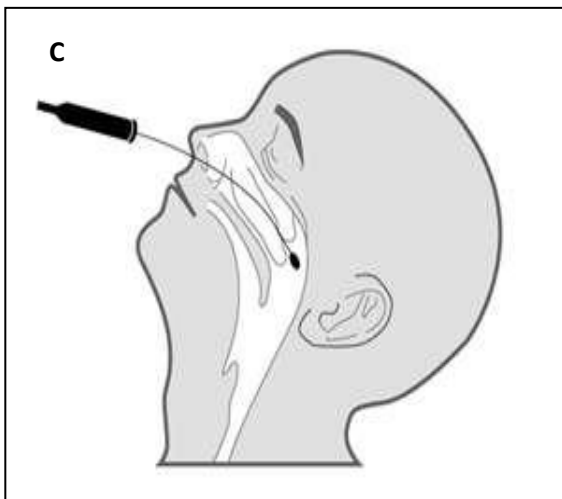
- Case Report Form (CRF)
- Virus Transport Media (VTM)
- Nasopharyngeal/Oropharyngeal swab, Sterile Dacron/Rayon swab with pliable shaft
- Sterile tongue depressor
- Test Tube rack
- Resealable plastic bags (zip lock)
- Laboratory sealing film (parafilm)
- Masking tape
- Permanent tube marker
- PPE (gloves, mask, goggles and lab.gown)
- Refrigerator or Thermo box with 4-6 frozen ice packs

2. Collecting Nasopharyngeal Swab (NPS)



A. To ensure optimal collection, the proper length of the swab to be inserted into the nasopharyngeal area must be

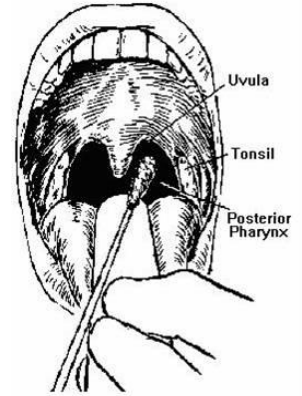
IMPORTANT: Use only sterile Dacron or Rayon-tip swabs with plastic shaft . DO NOT USE cotton swab with wooden shaft as this will inactivate viruses.



- Rotate swab applying a little force taking **large quantities of mucosa**. Using the same swab (if possible), repeat the procedure in the other nostril.
- Place the nasopharyngeal swab immediately in the VTM tube to avoid drying of the swab.
- Break/cut with scissors the end of the swab that sticks out of the tube and close the tube.
- Make sure that the cover is sealed tightly. Secure the cover with Parafilm.

3. Collecting Oropharyngeal Swab (OPS)

- With gloved hands hold down the tongue with a sterile tongue depressor.
- Have the patient say "aahh" to elevate the uvula.
- Use a sweeping motion to swab the posterior pharyngeal wall and tonsillar pillars. Apply a little force, taking large quantities of mucosa.



IMPORTANT: Use only sterile Dacron or Rayon-tip swabs with plastic shaft . DO NOT USE cotton swab with wooden shaft as this will inactivate viruses.



- Place the oropharyngeal swab immediately in the same VTM tube with the nasopharyngeal swab.
- Break/cut with scissors the end of the swab that sticks out of the tube and close the tube tightly.
- Secure the cap with parafilm to prevent leakage during transport.

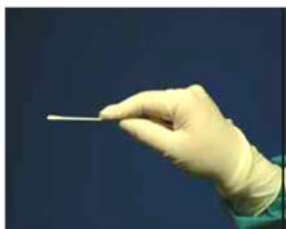
4. Proper holding and position of swab



Swab held correctly



Correctly held swab can slide out of the way.



Swab held incorrectly



Incorrectly held swab can injure patient.



Secure the cap with parafilm to prevent leakage. Wrap VTM tubes with specimens in tissue paper or any absorbent material.



Place the VTM upright in a separate 50 ml centrifuge tube or any leak/puncture proof container; place the 50 ml tube or any container in a resealable plastic bag (Ziplock™).



Store inside the refrigerator (2-8°C)/ thermobox with ice packs while awaiting transport.

IMPORTANT: SPECIMENS SHOULD BE SHIPPED WITHIN 48 HOURS (2 DAYS) AFTER COLLECTION TO ENSURE ARRIVAL AT RITM WITHIN 72 HOURS (3 DAYS)



Guidelines for Proper Specimen Collection of
Oropharyngeal
and
Nasopharyngeal Swab



OUTLINE

- I. Supplies and Equipment needed
- II. Guidelines prior to specimen collection
- III. Lecture on Nasopharyngeal Swab and Oropharyngeal Swab collection
- IV. Video Presentation
- V. Return Demonstration



OBJECTIVES

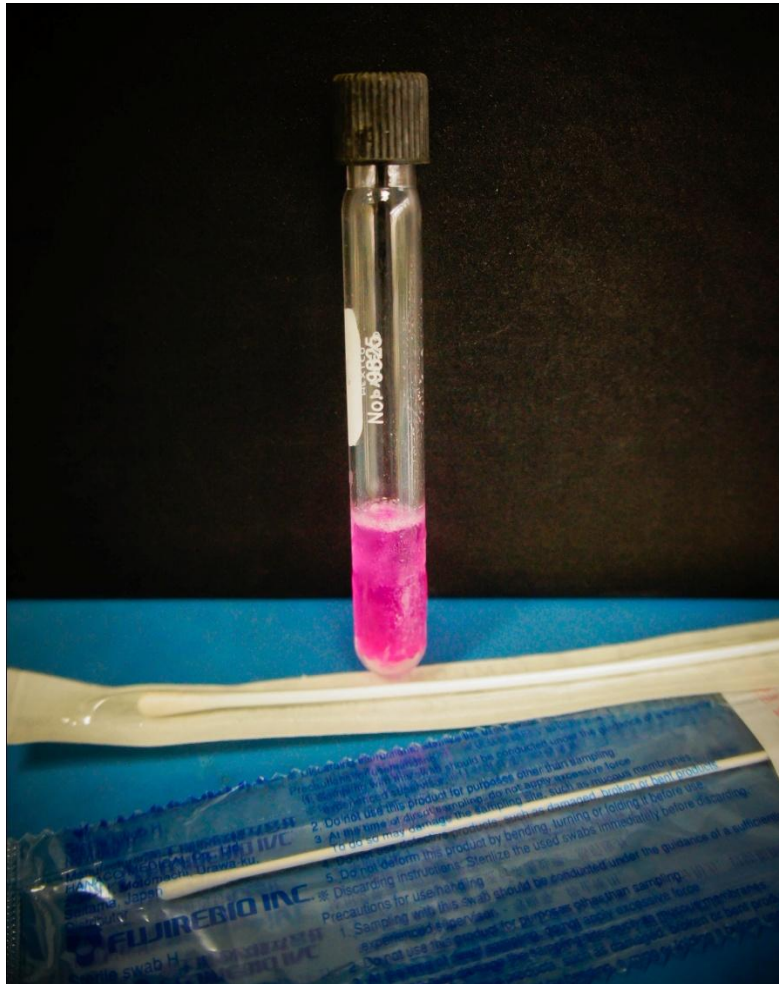
1. Identify the appropriate supplies and equipment needed in the collection of nasopharyngeal and oropharyngeal swab specimens.
2. Apply good infection control practices.
3. Demonstrate proper oropharyngeal and nasopharyngeal swab collection.



SUPPLIES/EQUIPMENT NEEDED for NPS and OPS COLLECTION

- Case Investigation Form (CIF)
- Universal Transport Medium (UTM)/Virus Transport Medium (VTM)
- Nasopharyngeal swab, Sterile **Dacron/Rayon /flocked-tip swab** with pliable plastic shaft
- Oropharyngeal swab, Sterile **Dacron/Rayon swab/flocked-tip swab** with pliable plastic shaft
- Test Tube rack
- Laboratory sealing film (parafilm)
- Permanent tube marker
- Scissors
- PPE (gloves, mask, goggles)
- Refrigerator

VIRUS TRANSPORT MEDIUM COLLECTION KIT

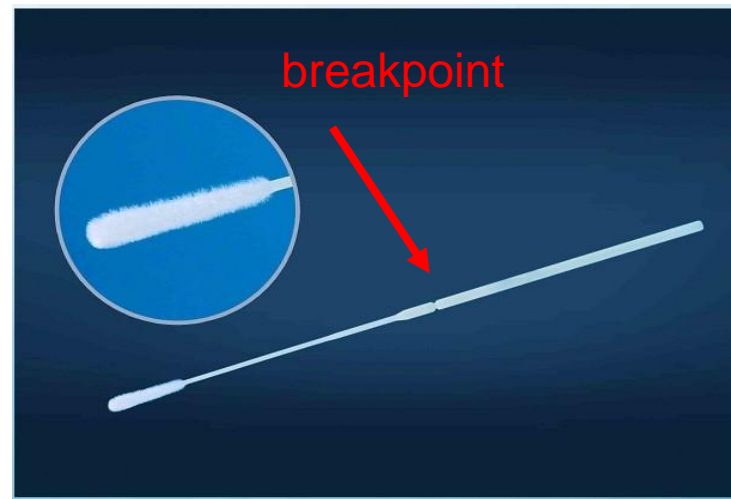


- Virus Transport Medium
- Nasopharyngeal swab
- Oropharyngeal swab
- Tongue depressor



COPAN SAMPLE COLLECTION KIT

- Universal Transport Medium (UTM)
- Copan Flocked Swab





DIRECTIONS FOR USE OF SWAB

- Swabs should not be used if
 - there is evidence of **damage or contamination**
 - the **expiration date** has passed
 - the swab package is **damaged**
 - there are other signs of **deterioration**
- Do not use excessive force when collecting swab samples from patients as this may result in accidental breakage of the swab shaft.
- Swabs are for single use only.

TECHNICAL NOTES: CORRECT HANDLING OF SWAB



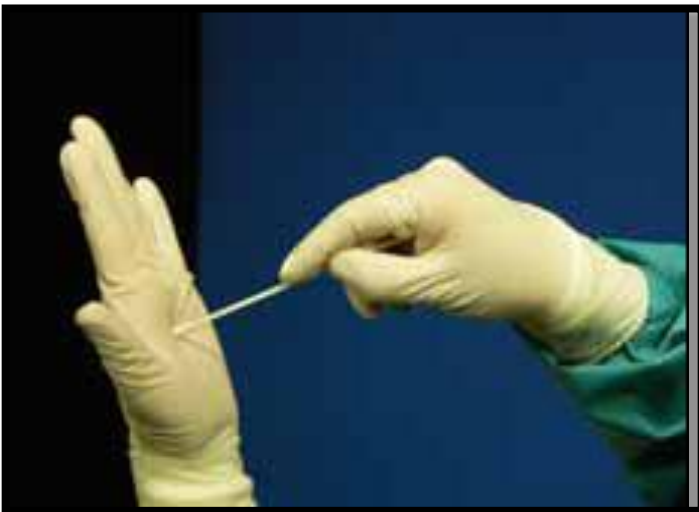
Swab held correctly



Swab held incorrectly



Correctly held swab can slide out of the way.



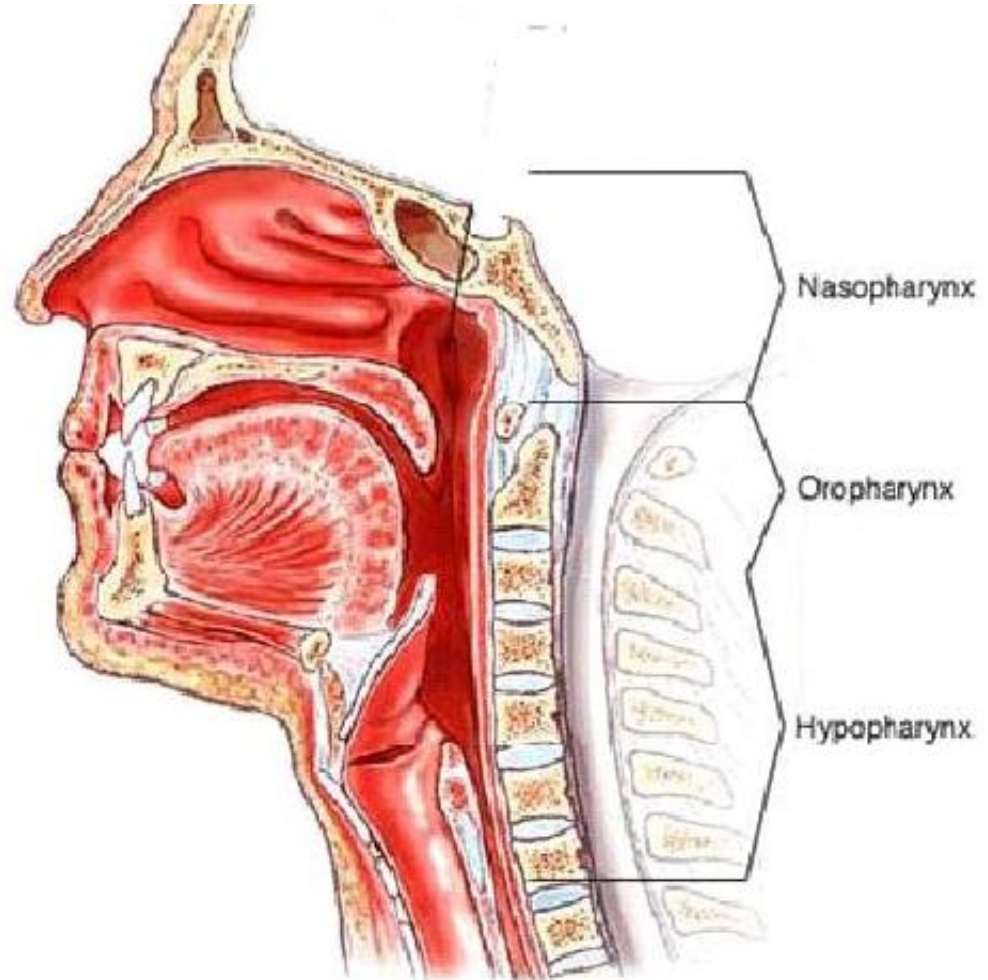
Incorrectly held swab can injure patient.



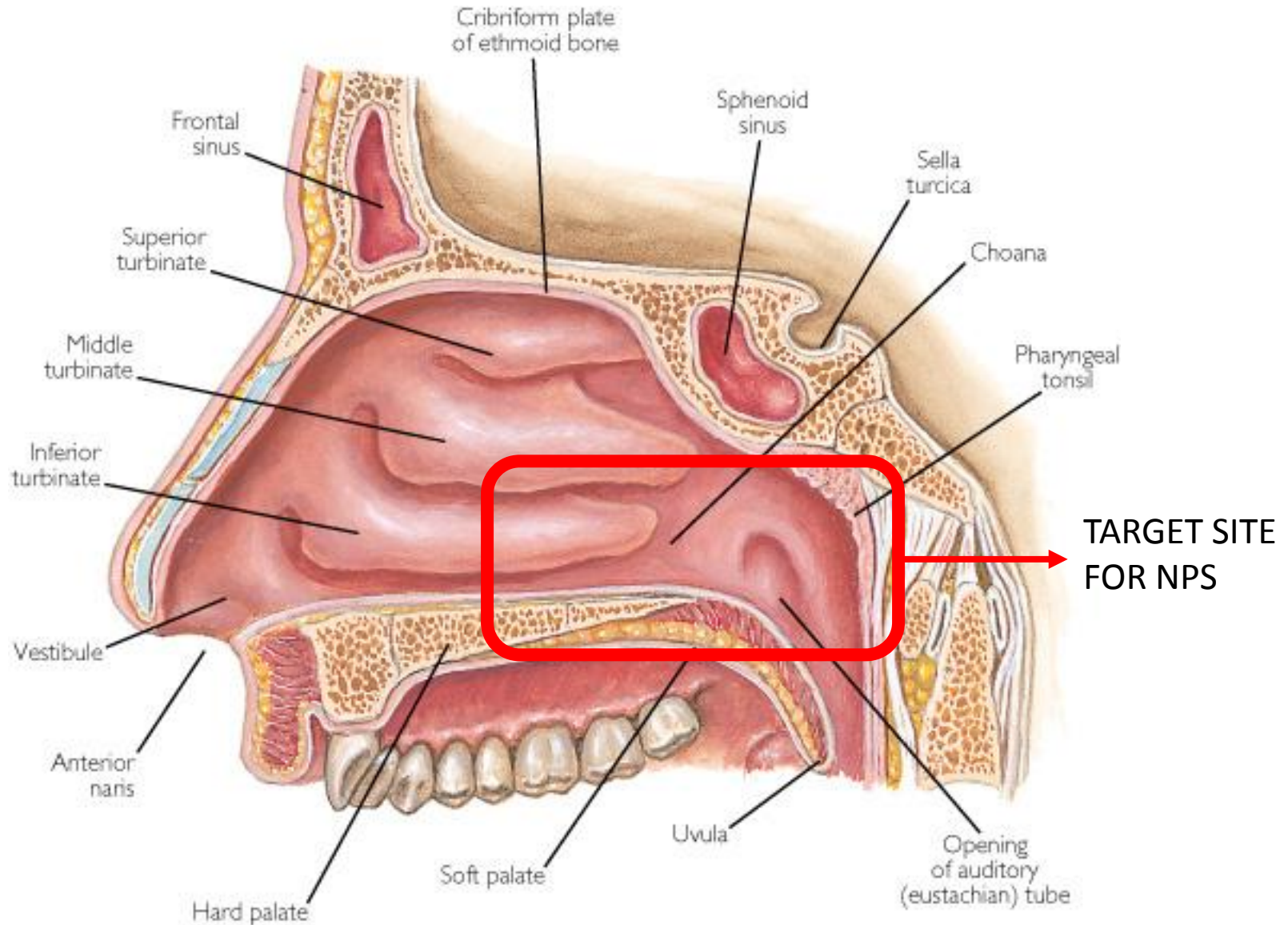
RELEVANT ANATOMY: THE RESPIRATORY SYSTEM

RELEVANT ANATOMY

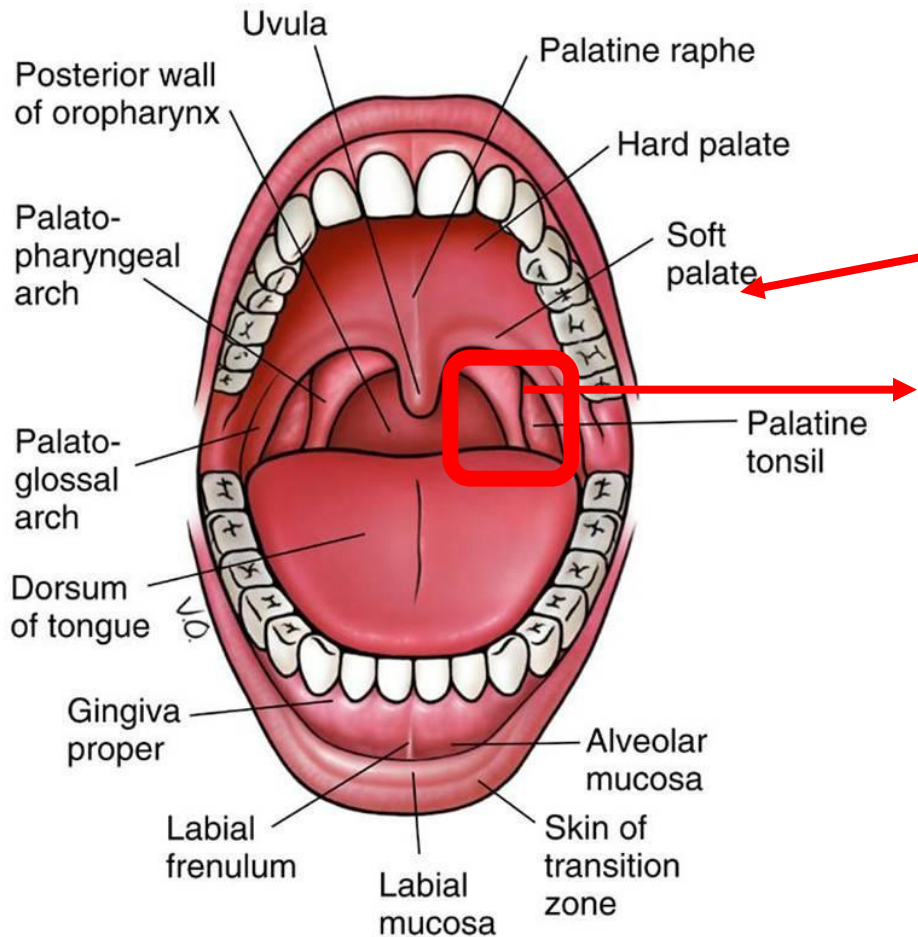
- The Pharynx is divided into three (3) regions:
 - ✓ Nasopharynx (epipharynx)
 - ✓ Oropharynx (mesopharynx)
 - ✓ Hypopharynx
- Relevant to NPS/OPS are the **nasopharynx and oropharynx**
- These areas are lined by mucous membranes that are sensitive and easily irritated



AREA FOR NASOPHARYNGEAL SWAB SAMPLING



THE ORAL CAVITY



Sensitive to gag reflex

TARGET SITE FOR OPS



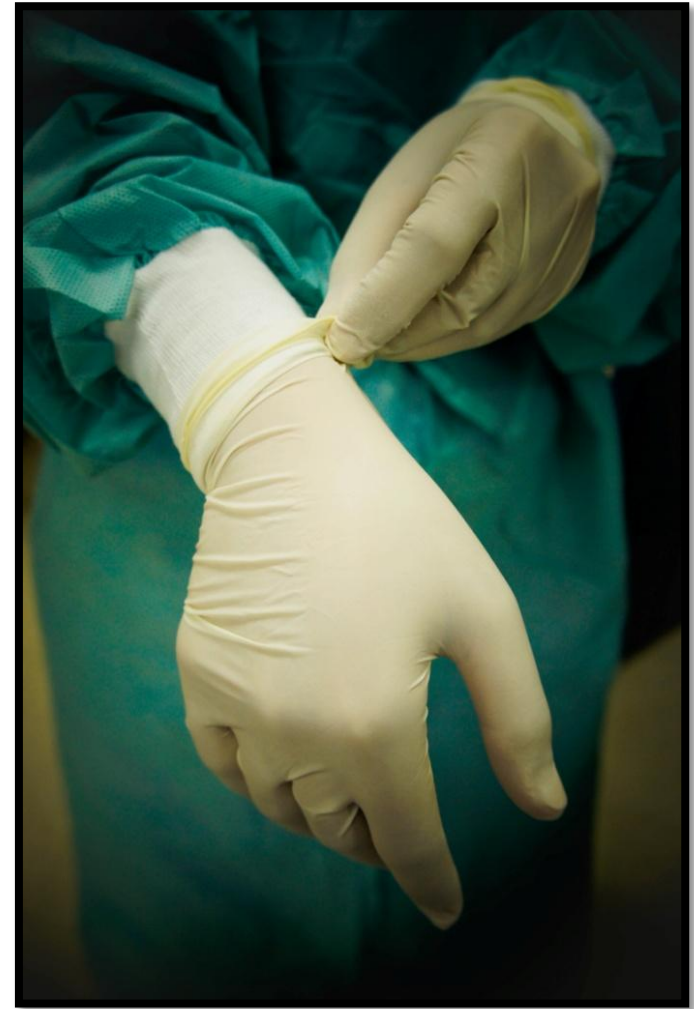
To gain access to the oral cavity, use a tongue depressor



GUIDELINES PRIOR TO SPECIMEN COLLECTION

INFECTION CONTROL GUIDELINES

- Personal protective equipment: wear **N95 mask** and **disposable gloves**.
- When completed, dispose of all PPE and other contaminated materials in the appropriate trash bin.
- Wash hands thoroughly with soap and water or alcohol-based hand gel **before AND after** the procedure.





SPECIMEN COLLECTION POLICIES

- Specimens shall be collected within 10 days from onset of illness.
- Only qualified and trained staff shall perform the procedures.
- **Do NOT use wooden and cotton swabs.**
- **Check for integrity of the OPS/NPS swabs and do not use beyond expiration.**
- Use only the approved kits for specimen collection.



SPECIMEN COLLECTION POLICIES

	<u>Universal Transport Medium</u>	<u>Virus Transport Medium</u>
No Specimen	Store at 2-25C	Store at -20C
With OPS/NPS	Store at 2-8C	Store at 2-8C
Use if color of the Media	Light orange	Salmon-pink
Do not use if color of the media	Red	Yellow or any change in color

Do not use UTM/VTM if there is evidence of contamination.

Do not use expired UTM/VTM!!



SPECIMEN COLLECTION POLICIES

- Correctly identify the patient and label the UTM tube prior to collection.
- Label the tube with the **patient's full name, age and date of collection**. The information on the label must MATCH the information on the CIF.
- Remove possible visual obstructions.
- **Strictly follow infection control guidelines prior to each procedure.** (Protect yourself from the patient)



SPECIMEN COLLECTION PROPER NASOPHARYNGEAL SWAB (NPS)

NPS: STEP 1

- Using the swab, visually measure* from the base of the nostril towards the auditory pit.
- Divide the length into half in order to know into what extent will be inserted into the nostril (**usually 5–6 cm in adults**) to ensure that it reaches the posterior pharynx.

*Alternatively, you may use a ruler for more accurate measurements



NPS: STEP 2

- With the patient seated, tilt the head slightly backwards. Insert the swab into the nostril parallel to the palate

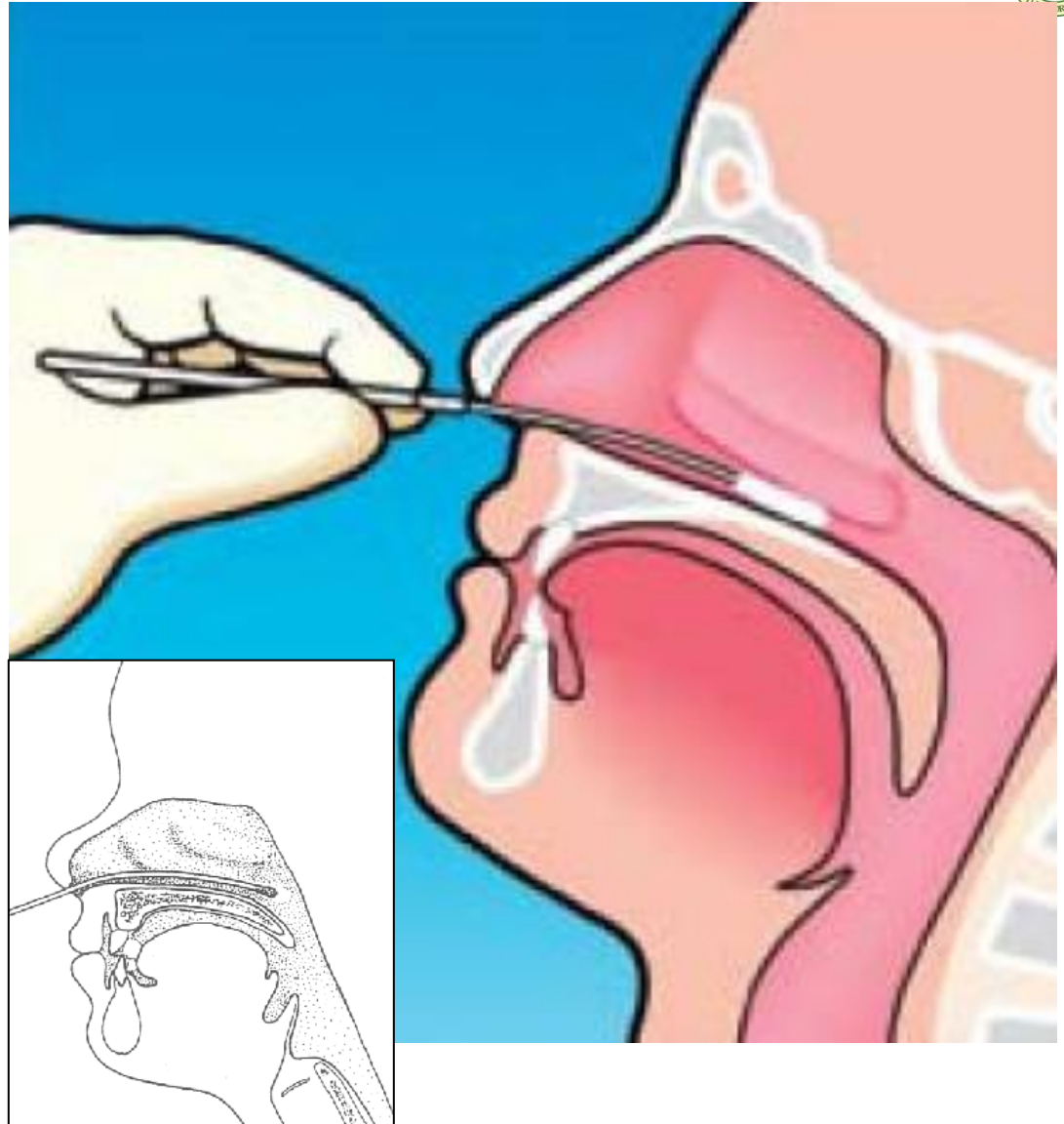
What is wrong with this picture?





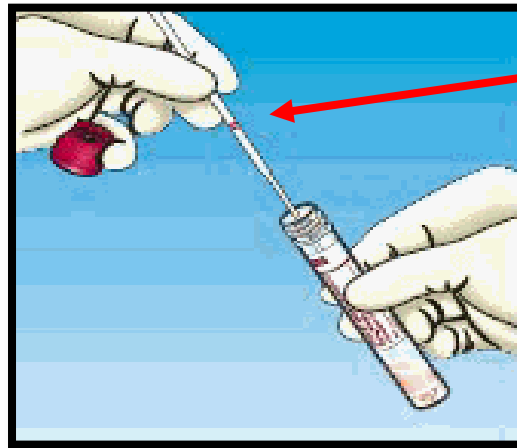
NPS: STEP 3

- Insert the swab into the nasal cavity until a slight resistance is met.
- Rotate the swab and apply a little force to take large quantities of mucosa
- Repeat in the other nostril using same swab

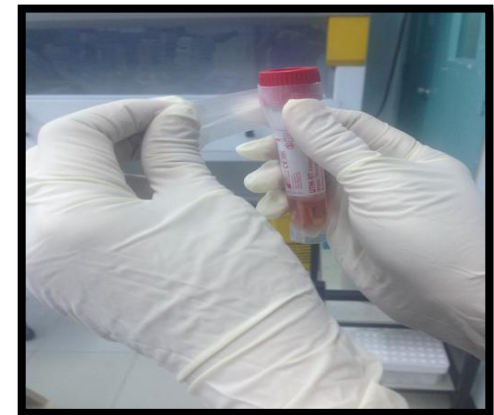


NPS: STEP 4

- Place the NPS immediately in the UTM tube to avoid drying of the swab.
- Break/Cut the end of the shaft that sticks out of the tube (break point) and close the tube tightly.
- Secure the cap with Parafilm to prevent leakage during transport



breakpoint





NPS: STEP 5

- Transport the specimen to the laboratory and immediately store inside refrigerator (2-8C) .
- If site is far from a refrigerator, use a thermo bag/box with 4-6 icepacks





SPECIMEN COLLECTION PROPER OROPHARYNGEAL SWAB (OPS)

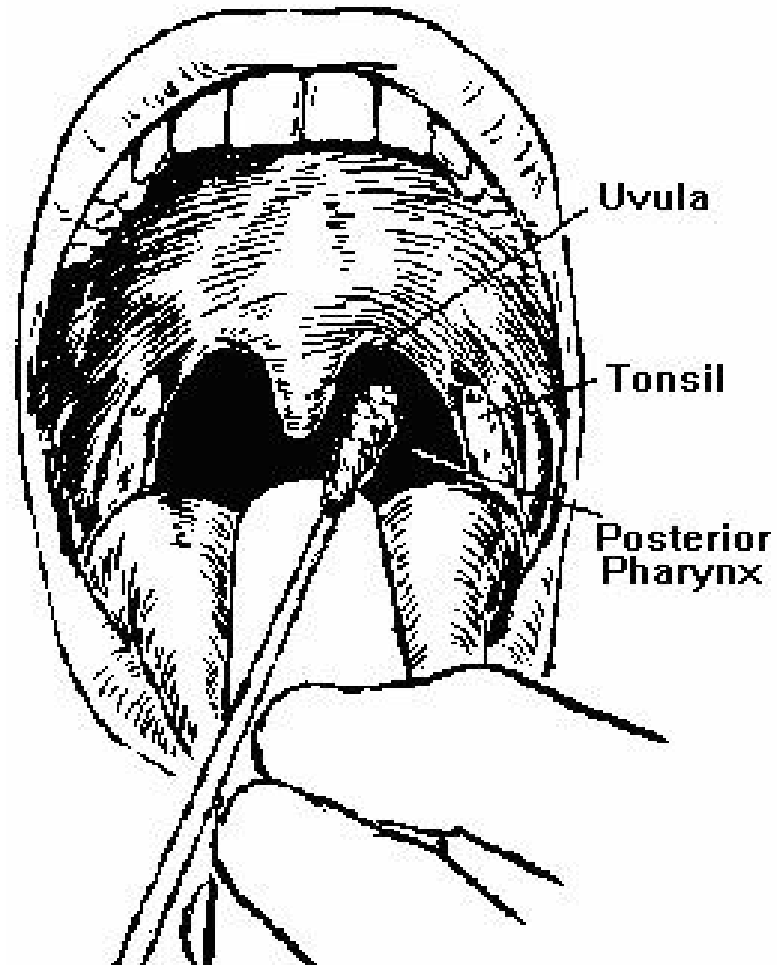
OPS: STEP 1

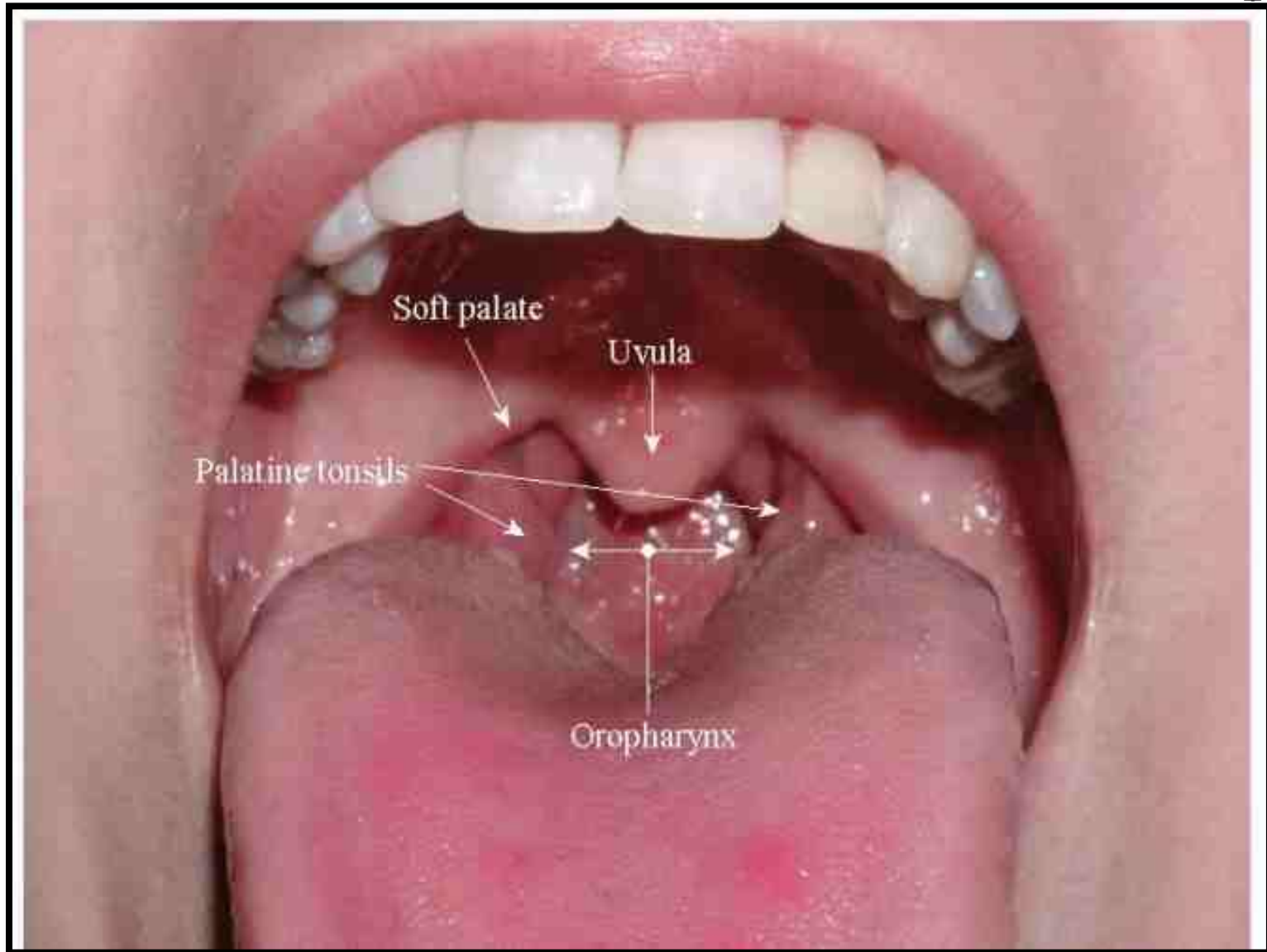
- Have the patient seated comfortably.
- Have the patient open his mouth.
- With gloved hands, hold down the tongue with a sterile tongue depressor
- Have the patient say “AAH” to elevate the uvula



OPS: STEP 2

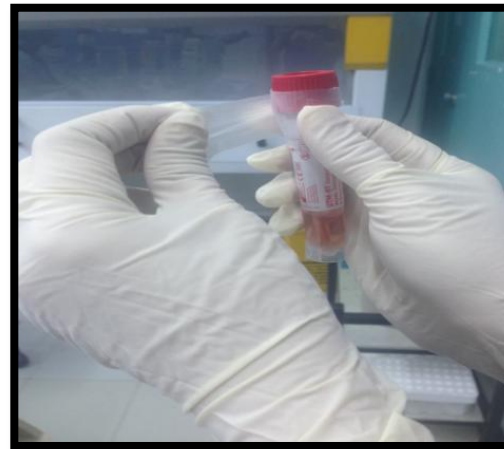
- Use a sweeping motion to swab the posterior pharyngeal wall and tonsillar fossa.
- **Avoid swabbing the soft palate.**
- **Do not touch the tongue with the swab tip.**





OPS: STEP 4

- Place the OPS immediately in the same UTM with NPS.
- Cut the end of the shaft that sticks out of the tube and close the tube tightly.
- Secure the cap with Parafilm to prevent leakage during transport.





VIDEO PRESENTATIONS



BEST PRACTICES

- ✓ Ask patient to remove extra secretions before procedure.
- ✓ Ask patient to close his or her eyes.
- ✓ Visually estimate the depth of insertion.
- ✓ Label the tube first PRIOR to collection.
- ✓ **REMEMBER: Your safety first and foremost.**



Thank you

ANNEX B:

RITM Advisory for Clinicians on 2019 Novel Coronavirus (2019-nCoV) Testing



RITM Advisory for Clinicians on 2019 Novel Coronavirus (2019-nCoV) Testing 2 February 2020

1. Indications for 2019-nCoV testing

ALL Persons Under Investigation (PUIs) should undergo testing for 2019-nCoV.

2. Specimens to be collected (Refer to **Annex A: Guidance on specimen collection)**

- a. Nasopharyngeal swab (NPS) and oropharyngeal swab (OPS) from ambulatory patients AND
- b. If possible, lower respiratory tract specimen, i.e. sputum (if produced) or endotracheal aspirate or bronchoalveolar lavage in patients with more severe respiratory disease

NOTE: Staff collecting and handling specimens shall be guided by the **RITM Interim Laboratory Biosafety Guidelines for Handling and Processing Suspected 2019 Novel Coronavirus (2019-nCoV) Specimens** (see attached separate files).

3. Coordination with RESU for Specimen Referral

Healthcare facilities managing PUIs need to coordinate with the Regional Epidemiology and Surveillance Unit (RESU) for specimen referral to RITM. **All specimen referrals shall be coordinated through the RESU.**

4. Indications for repeat testing after an initial negative 2019-nCoV test (Annex B)

Repeat testing for 2019-nCoV may be performed if a high index for suspicion for nCoV remains despite an initial negative test result. Such conditions include, but are not limited, to the following:

- a. Clinical deterioration in the presence of an established disease etiology and with adequate treatment. A single negative test result, particularly if this is from an upper respiratory tract specimen, does not exclude infection. Repeat sampling and testing, preferably of lower respiratory specimen, is strongly recommended in severe or progressive disease. Consider a possible co-infection with 2019-nCoV.
- b. No other etiology for the patient's signs and symptoms has been identified despite work-up.
- c. Clinical specimen(s) initially sent was/were deemed to be unsatisfactory or insufficient (delay in transport and processing, only NPS or OPS was sent).



Research Institute for Tropical Medicine - Department of Health

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Tel Nos.: (632) 809-7599 / 807-2631/32/37 • Fax: (632) 842-2245 • Website: www.ritm.gov.ph



A PUI presenting only with mild respiratory signs and symptoms and who has improved after an initial negative test need **not** undergo repeat testing for 2019-nCoV. However, in those with established direct epidemiologic link with a confirmed case, repeat testing may be justified.

5. Repeat testing after a positive 2019-nCoV test

- a. Submit NPS/OPS (and lower respiratory tract specimen if possible) **48 hrs** from the first positive 2019-nCoV test.
- b. If still positive, repeat testing NPS/OPS and lower respiratory tract specimen (if possible) for 2019-nCoV **every 48 hours until the patient has two (2) consecutive negative test results.**

6. Criteria for discharge

Confirmed cases (2019-nCoV test positive) SHOULD ONLY be discharged if ALL of the following conditions are fulfilled:

1. Two consecutive negative RT-PCR tests for nCoV done **at least 48 hours** apart.
2. Clinical improvement
 - Afebrile and asymptomatic (including cough and respiratory symptoms) for 48 hours
 - Laboratory tests (WBC, platelet count, CPK, liver functions tests, plasma sodium, etc.) that were previously abnormal are improving or returning to normal, improving chest x-ray findings)

PUIs may be discharged after an initial nCoV test is negative AND any of the following conditions are met:

- there is clinical improvement
- there is no indication for admission
- an alternative diagnosis is available
- the possibility of nCoV has been clinically ruled out





Annex A: Guidance on specimen collection (adapted from WHO)

Table 1. Specimens to be collected from symptomatic patients

Guidance on specimen collection (adapted from reference 5)

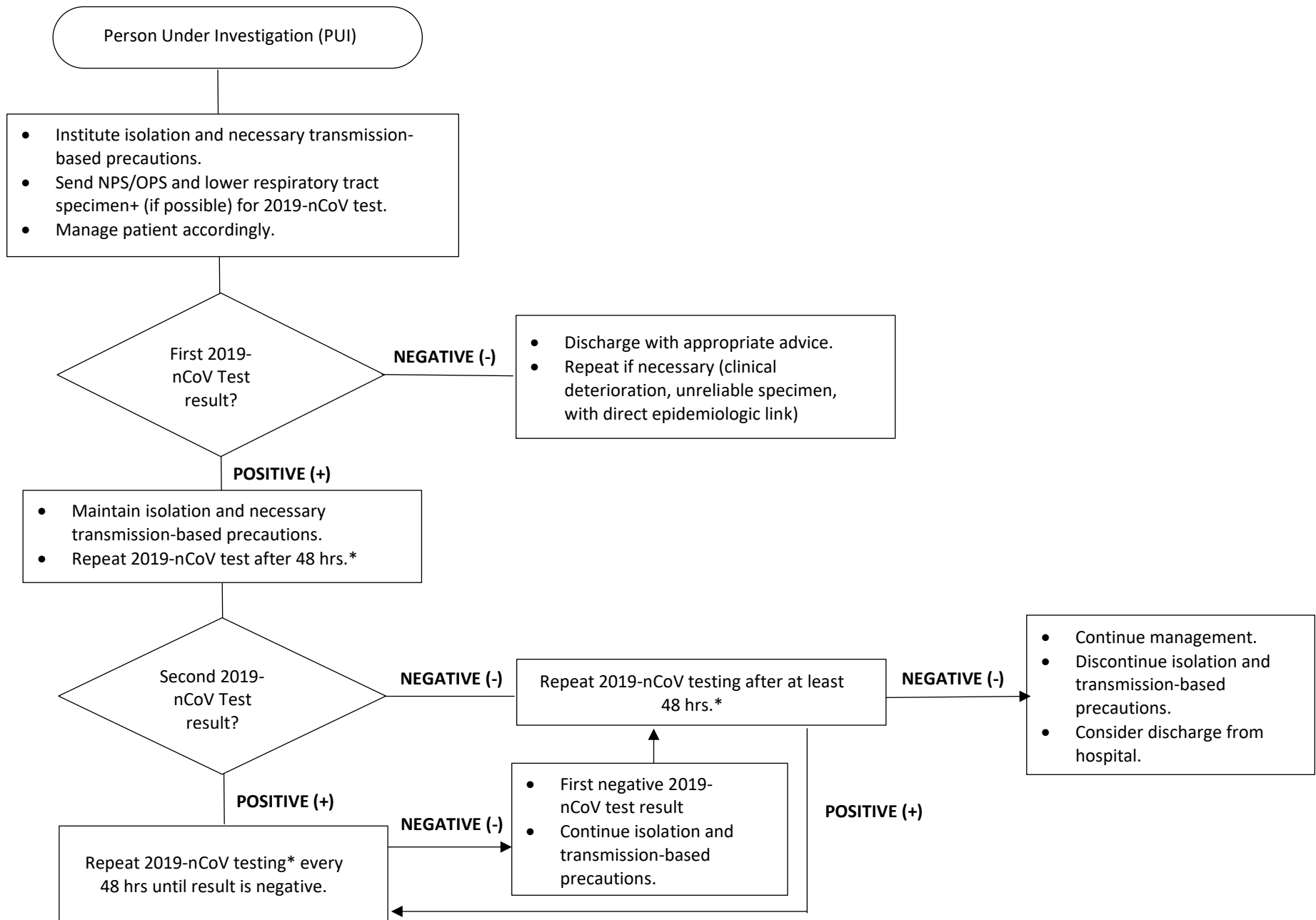
Specimen type	Collection materials	Transport to laboratory	Storage till testing	Comment
Nasopharyngeal and oropharyngeal swab	Dacron or polyester flocked swabs*	4 °C	≤5 days: 4 °C >5 days: -70 °C	The nasopharyngeal and oropharyngeal swabs should be placed in the same tube to increase the viral load.
Bronchoalveolar lavage	sterile container *	4 °C	≤48 hours: 4 °C >48 hours: -70 °C	There may be some dilution of pathogen, but still a worthwhile specimen
(Endo)tracheal aspirate, nasopharyngeal aspirate or nasal wash	sterile container *	4 °C	≤48 hours: 4 °C >48 hours: -70 °C	
Sputum	sterile container	4 °C	≤48 hours: 4 °C >48 hours: -70 °C	Ensure the material is from the lower respiratory tract
Tissue from biopsy or autopsy including from lung	sterile container with saline	4 °C	≤24 hours: 4 °C >24 hours: -70 °C	
Serum (2 samples acute and convalescent possibly 2-4 weeks after acute phase)	Serum separator tubes (adults: collect 3-5 ml whole blood)	4 °C	≤5 days: 4 °C >5 days: -70 °C	Collect paired samples: • acute – first week of illness • convalescent – 2 to 3 weeks later
Whole blood	collection tube	4 °C	≤5 days: 4 °C >5 days: -70 °C	For antigen detection particularly in the first week of illness
Urine	urine collection container	4 °C	≤5 days: 4 °C >5 days: -70 °C	

*For transport of samples for viral detection, use VTM (viral transport medium) containing antifungal and antibiotic supplements. For bacterial or fungal culture, transport dry or in a very small amount of sterile water. Avoid repeated freezing and thawing of specimens.

Aside from specific collection materials indicated in the table also assure other materials and equipment are available: e.g. transport containers and specimen collection bags and packaging, coolers and cold packs or dry ice, sterile blood-drawing equipment (e.g. needles, syringes and tubes), labels and permanent markers, PPE, materials for decontamination of surfaces.



Annex B. Algorithm for 2019-nCoV Testing (as of 2 February 2020)



*Send NPS/OPS and lower respiratory tract specimen (if still possible)
+Lower respiratory tract specimen includes expectorated sputum,



Interim Laboratory Biosafety Guidelines for Handling and Processing Suspected 2019 Novel Coronavirus (2019-nCoV) Specimens

Biorisk Management Office – RITM-DOH
January 30, 2020



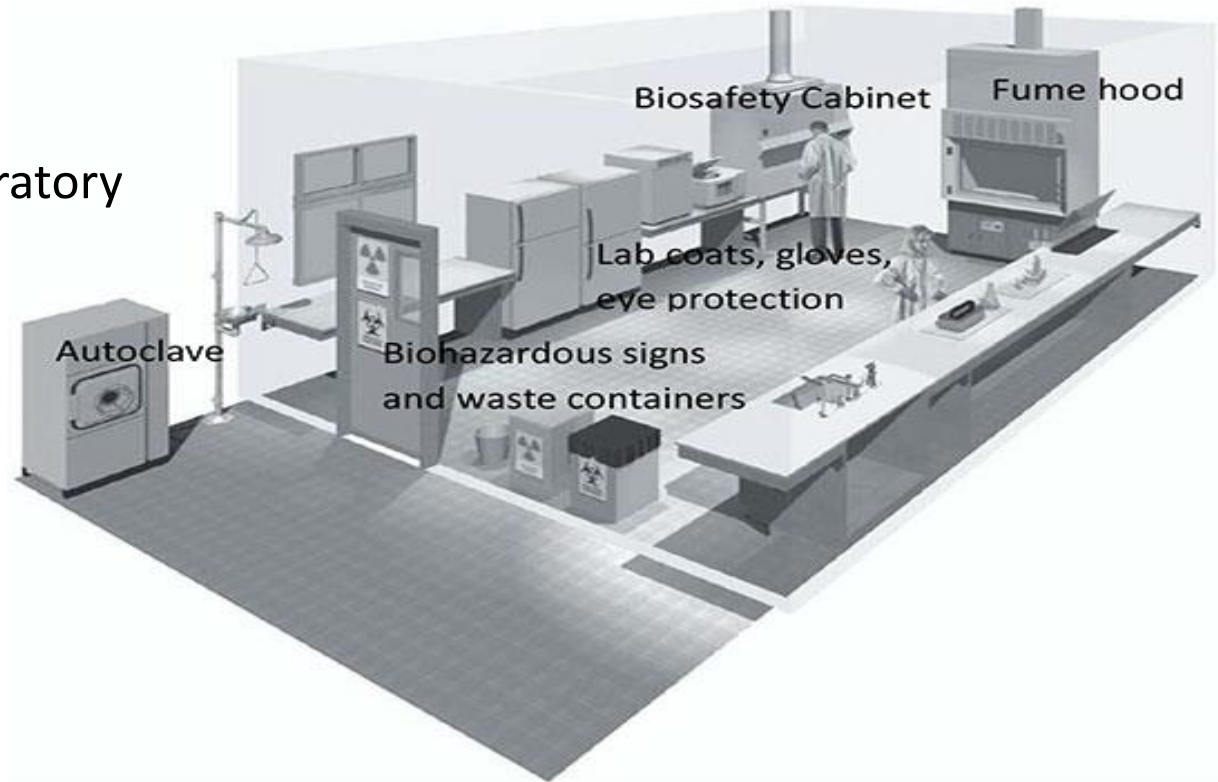
Biorisk Assessment

- Local biorisk assessment **must be conducted** to determine **specific** mitigation control measure towards an effective biorisk management.
- **No** laboratory procedures and examination shall be conducted without approved and established standard operating procedures, appropriate / prescribed mitigation measures based on local risk assessment and quality assurance or validation system.



Laboratory must strictly enforce compliance with Biosafety Level 2 laboratory guidelines for facility, equipment and practices.

Biosafety Level 2 laboratory



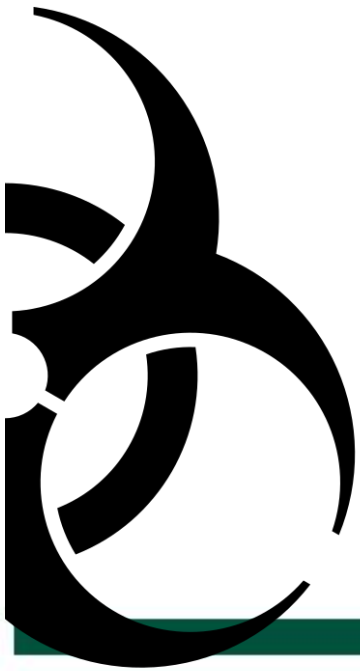
Please refer to:

- A. **WHO Biosafety Manual**
<https://www.who.int/csr/resources/publications/biosafety/Biosafety7.pdf?ua=1> and
- B. **Biosafety for Biomedical and Microbiological Laboratories BMBL 5th Edition**
<https://www.cdc.gov/labs/pdf/CDC-BiosafetyMicrobiologicalBiomedicalLaboratories-2009-P.PDF>



Virus Isolation

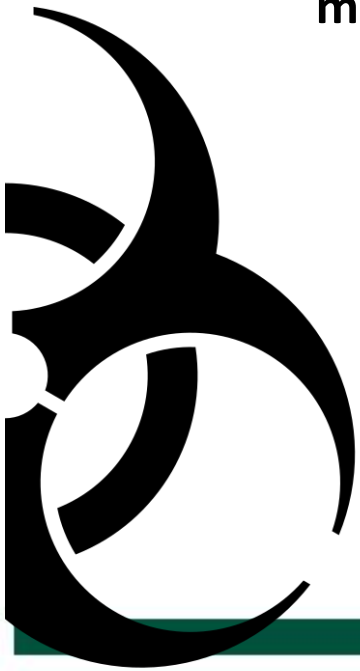
In vitro and *in vivo* culture (viral culture, animal inoculation and other related procedure that requires viral isolation) of the 2019 Novel Coronavirus **is strongly discouraged.**





Routine clinical diagnostic laboratory tests

- **Routine clinical diagnostic tests** and other non- viral propagative research procedure can be safely conducted in a **Biosafety Level 2** or **BSL 2** laboratory.
- This includes **blood and other blood products, stool, urine and other body fluids except respiratory samples** for routine testing in **hematology, microscopy, serology and microbiology.**





Laboratory Testing of Respiratory Specimens

- Respiratory specimen for laboratory diagnostic test must be inactivated or fixed.
- Obtaining aliquots and inactivation (cell lysis) of original specimen must be done only in **BSL 2 Enhanced laboratory facility**.
- In case of procedure that requires bacterial / fungal culture, antimicrobial susceptibility and staining of respiratory specimen, procedures must be done in **BSL 2 laboratory facility with enhancements in PPE and practices**.



Personal Protective Equipment

Laboratory workers must wear the prescribed Personal Protective Equipment (PPE) **based on local risk assessment.**

Below are the prescribed minimum PPE

- **Collection**

Prescribed PPE: Double Gloves (*preferably Nitrile*); Scrub Suit; Disposable Laboratory Gown (*impermeable/breathable/ long sleeves / back enclosure*); Fit Tested N95; Face shield / visor

- **Routine Clinical Procedures (Hematology, Clinical Microscopy, Clinical Chemistry and Serology)**

Prescribed PPE: Gloves; Scrub Suit; Laboratory Gown; Surgical Face Mask; Face shield / visor (selection is based on risk assessment)





Reminder !

No potentially contaminated PPE shall be taken out of laboratory for washing and reuse.



Respiratory Protection

- Use a properly fit-tested, NIOSH-approved filtering face piece respirator (N-95) or a powered air-purifying respirator (PAPR) equipped with high-efficiency particulate air (HEPA) filters in case of failed Respirator Fit Test.
- Personnel must be evaluated properly by a Medical Doctor for fitness to use of a respirator.





Aerosol-Generating Procedures

vortex mixing the specimen, pipetting, opening primary containers after vigorous mixing and other procedure that applies pressure to specimen potentially containing the viral agents.



- **Must be performed in a certified Class II Biological Safety Cabinet (BSC II)**





Packaging, Shipping and Transport

- Must comply with the requirements of the Transportation of Dangerous Goods Regulations (IATA).
- For air shipments, suspected patient sample should be shipped as Category B, UN3373.
- For local land transport, patient sample must be shipped following the basic triple packaging system and guidelines presented in

DOH Manual on Packaging and Transport of Laboratory Specimen for Referral and
DOH DM 2018-0413 - Interim Guidelines on Transportation of Biological Specimens

<https://drive.google.com/drive/folders/1-NXwUaOqDak1AsnKw2EvxHnZ2T0SmgfY?usp=sharing>



Refer to Annex 1 Local Transport of Infectious Substances



Local Triple Packaging System

Biological substances sent to RITM should be packaged according to **the triple packaging system**:

1. Primary receptacle
 - do not use glass containers
 - secure with parafilm
 - wrap with absorbent material
 - place inside an air-tight, leak-proof plastic ziplock bag
2. Secondary container , e.g. plastic bottle
 - Durable
 - Leak-proof
3. Outer container, e.g. sturdy box
 - labeled with all the necessary signs and markings



Materials for Local Triple Packaging and Transport



Materials for Triple Packaging:
1. Primary Container, a. absorbent material, b. parafilm, c. ziplock bag; 2. Secondary Container; 3. Outer container

Source: RITM Outbreak Manual



Steps in Local Triple Packaging of Samples for Transport

1



Figure 1: Place the specimen on the primary container, seal the cover using parafilm and wrap the primary container using an absorbent material (cotton or gauze)

2

Figure 2: Place the primary container inside the secondary container. Seal properly.



3



Figure 3: Place the secondary container inside the outer container . Make sure to take into account the transport requirements of the specimens for transport.

Source: RITM Outbreak Manual





Packaging & Transport

- Maintain integrity of specimen:
 - temperature
 - preservation of sample
 - special transport containers
 - time limitations
- Assure safety regulations are met





- Requirements depend on type of specimen and sample, should be determined *before* specimen collection begins
- Most specimens need to be transported in sterile containers
 - ✓ Specimens transported in incorrect containers **may be rejected by the lab**
- Specimen containers should **be closed tightly**
 - ✓ Labs may reject a specimen for signs of leakage or seepage, since this could expose laboratory personnel to contents





Annex 1 : LOCAL TRANSPORT OF INFECTIOUS SUBSTANCES

1. Prepare all the materials needed
2. After specimen collection, disinfect the primary container; be careful not to erase the label.
3. Seal the cover of the specimen container using parafilm and wrap the primary container using an absorbent material (cotton or gauze).
4. Put the primary container inside a zip lock bag and seal tightly; then place it inside the secondary container and seal properly.
5. Disinfect the secondary container and place it inside the outer container.
6. Make sure to take into account the transport requirements of the specimen/s for transport. If the samples require cold temperature, place 4-6 ice packs, one at the bottom, all four sides and at the top.
7. Seal the outer container properly and disinfect the outside of the container.
8. Place the necessary labels (shipper and sender's details) and forms (CIF and Line list) in separate zip lock bags and seal tightly. Securely tape the labels and forms outside the box.
9. Coordinate with the courier on how to send out the samples.
10. Once the samples were pick up by the courier, coordinate with the receiving laboratory and inform them on your pending shipment.





Annex 2 Biological Spill Response

- Biological spill kits must be available and strategically located in the laboratory.
- A 1:10 dilution of Sodium Hypochlorite solution must be freshly prepared
- A contact time of at least 20-30 minutes must be observed prior cleaning the spilled area.
- Perform hand hygiene before and after clean-up.
- Don appropriate PPE before clean-up.
- Buddy system must be observed during biological spill response.



Spill kit contents	Quantity
Disinfectant	
Concentrated Bleach <i>Working dilution 1:10 dilution of bleach (freshly prepared)</i>	500 mL
70% Alcohol	500 mL
Disinfectant Bottle Container with clean water	2L
Alcohol-based Hand Sanitizer	1000mL
Personal Protective Equipment	
Disposable Gowns (water-proof that close in the back)	2 pieces
Gloves – Nitrile (double if necessary)	8 pairs
Disposable shoe covers (Booties)	2 pairs
Face mask (surgical mask)	2 pieces
N-95 respirator (Medical Clearance & fit-testing required by Occupational Safety)	2 pieces
Eye goggles or full face shield that fits over N-95 respirator	2 pieces
Towels	4 pieces
Absorbent paper towels May also include diking material or spill pillows for large spills	1 pack
Small disposable broom with dustpan	1 piece
Wiper	1 piece
Plastic tie	2 piece
Steel Tongs Large	1 piece
Forceps for sharps	1 piece
Sharps container	1 piece
Biohazard/Autoclave bags – Large	1 piece
Biohazard/Autoclave bags – Small	1 piece
Laminated copy of (SOP) spill response and cleanup procedures	1 piece
Laminated copy of Spill Kit Check List	1 piece
Zip bag container	1 piece
Signage “Do not Enter!”	1 piece

References :

Laboratory must strictly enforce compliance with Biosafety Level 2 guidelines for facility, equipment and practices.

Please refer to:

- A. **WHO Biosafety Manual**
<https://www.who.int/csr/resources/publications/biosafety/Biosafety7.pdf?ua=1> and
- B. **Biosafety for Biomedical and Microbiological Laboratories BMBL 5th Edition**
<https://www.cdc.gov/labs/pdf/CDC-BiosafetyMicrobiologicalBiomedicalLaboratories-2009-P.PDF>
- C. **CDC Interim Laboratory Biosafety Guidelines for Handling and Processing Specimens Associated with 2019 Novel Coronavirus (2019-nCoV)** <https://www.cdc.gov/coronavirus/2019-nCoV/lab/lab-biosafety-guidelines.html>
- D. **CDC Interim Guidelines for Collecting, Handling, and Testing Clinical Specimens from Patients Under Investigation (PUIs) for 2019 Novel Coronavirus (2019-nCoV)** <https://www.cdc.gov/coronavirus/2019-nCoV/lab/guidelines-clinical-specimens.html>





THANK YOU!



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Interim Laboratory Biosafety Guidelines for Handling and Processing Suspected 2019 Novel Coronavirus (2019-nCoV) Specimens

Biorisk Management Office – RITM-DOH

January 30, 2020

Properties and pathogenicity of the 2019 Novel Coronavirus (2019-nCoV) is cautiously being investigated. Information on the agent's risk factors including virulence, natural route of infection, mode of transmission, survival in the environment, infectious dose, availability of effective preventive and therapeutic treatments, host range and its area of natural distribution is now under study. Due to the limited existing information, precautions and biorisk control measures written herein, for the collection, handling, transport, testing and storage of clinical specimens that may contain this novel pathogen were based on the dynamic nature of coronaviruses and other emerging infectious disease agents with similar clinical manifestations. Clinical specimens suspected of containing coronaviruses can be safely handled at Biosafety Level 2 laboratory. General and specific biosafety guidelines for handling 2019-nCoV specimens are provided below.

1. Local biorisk assessment

Local biorisk assessment must be conducted to determine specific mitigation control measure towards an effective biorisk management. No laboratory procedures and examination shall be conducted without approved and established standard operating procedures, appropriate / prescribed mitigation measures based on local risk assessment and quality assurance or validation system.

2. References

Laboratory must strictly enforce compliance with Biosafety Level 2 guidelines for facility, equipment and practices. Please refer to:

- A. WHO Biosafety Manual
<https://www.who.int/csr/resources/publications/biosafety/Biosafety7.pdf?ua=1> and
- B. BMBL 5th Edition <https://www.cdc.gov/labs/pdf/CDC-BiosafetyMicrobiologicalBiomedicalLaboratories-2009-P.PDF>
- C. CDC Interim Laboratory Biosafety Guidelines for Handling and Processing Specimens Associated with 2019 Novel Coronavirus (2019-nCoV) <https://www.cdc.gov/coronavirus/2019-nCoV/lab/lab-biosafety-guidelines.html>
- D. CDC Interim Guidelines for Collecting, Handling, and Testing Clinical Specimens from Patients Under Investigation (PUIs) for 2019 Novel Coronavirus (2019-nCoV) <https://www.cdc.gov/coronavirus/2019-nCoV/lab/guidelines-clinical-specimens.html>

3. Virus Isolation

In vitro and *in vivo* culture (viral culture, animal inoculation and other related procedure that requires viral isolation) of the 2019 Novel Coronavirus is **strongly discouraged**.



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4. Routine clinical diagnostic laboratory tests

Routine clinical diagnostic tests and other non- viral propagative research procedure can be safely conducted in BSL 2. This includes blood and other blood products, stool, urine and other body fluids except respiratory samples for routine testing in hematology, microscopy, serology and microbiology.

5. Laboratory Testing of Respiratory Specimens

Respiratory specimen for laboratory diagnostic test must be inactivated or fixed. Obtaining aliquots and inactivation (cell lysis) of original specimen must be done only in **BSL 2 Enhanced laboratory facility**. In case of procedure that requires bacterial / fungal culture, antimicrobial susceptibility and staining of respiratory specimen, procedures must be done in **BSL 2 laboratory facility with enhancements in PPE and practices**.

6. Personal Protective Equipment

Laboratory workers must wear the prescribed Personal Protective Equipment (PPE) based on local risk assessment. Below are the prescribed minimum PPE:

- Collection

Prescribed PPE: Double Gloves (*preferably Nitrile*); Scrub Suit; Disposable Laboratory Gown (*impermeable/breathable/ long sleeves / back enclosure*); Fit Tested N95; Face shield / visor

- Routine Clinical Procedures (Hematology, Clinical Microscopy, Clinical Chemistry and Serology)

Prescribed PPE: Gloves; Scrub Suit; Laboratory Gown; Surgical Face Mask; Face shield / visor (optional based on risk assessment)

No potentially contaminated PPE shall be taken out of laboratory for washing and reuse.

7. Respiratory Protection

Respiratory protection is essential since the virus is known to spread naturally via inhalation routes. It is recommended to use a properly fit-tested, NIOSH-approved filtering face piece respirator (N-95) or a powered air-purifying respirator (PAPR) equipped with high-efficiency particulate air (HEPA) filters in case of failed Respirator Fit Test. Personnel must be evaluated properly by a Medical Doctor for fitness to use of a respirator.

8. Aerosol-Generating Procedures

Procedures with high potential (likelihood) of generating fine-particulate aerosols must be performed in a certified Class II Biological Safety Cabinet (BSC II). These procedures include vortex mixing the specimen, pipetting, opening primary containers after vigorous mixing and other procedure that applies pressure to specimen potentially containing the viral agents. Appropriate physical containment devices like safety centrifuge buckets or sealed rotors



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should be used for centrifugation. Safety centrifuge buckets must be sealed and should be loaded and unloaded only inside a BSC II.

9. Packaging, Shipping and Transport

Packaging, shipping and transport of specimens must comply with the requirements of the Transportation of Dangerous Goods Regulations (IATA). For air shipments, suspected patient sample should be shipped as Biological Substance Category B, UN3373. For local land transport, patient sample must be shipped following the basic triple packaging system and guidelines presented in DOH Manual on Packaging and Transport of Laboratory Specimen for Referral and DOH DM 2018-0413 - Interim Guidelines on Transportation of Biological Specimens

<https://drive.google.com/drive/folders/1-NXwUaOqDak1AsnKw2EvxHnZ2T0SmgfY?usp=sharing>

See Annex 1 Local Transport of Infectious Substances

10. Decontamination

Decontaminate exposed work surfaces and equipment using 1:10 dilution of Sodium Hypochlorite solution (observe contact time of 10-15 minutes) followed by 70% alcohol (then allow to dry). All contaminated wastes generated should be decontaminated with prescribed dilution of commercial Lysol solution (2oz in 1gal of water; 10 minutes contact time) and then autoclaved at 121°C, 15 psi for 30 minutes.

11. Biological Spill Response

In areas with anticipated potential risk for spills, biological spill kits must be available and strategically located in the laboratory. A 1:10 dilution of Sodium Hypochlorite solution must be freshly prepared and absorbent cloth, gauze or paper towels must be available to cover the spill. A contact time of at least 20-30 minutes must be observed prior cleaning the spilled area. Refer to Annex 2 for the specific contents of a Biological Spill Response Kit and the general guide and specific procedure for responding to a biological spill.



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Annex 1 : LOCAL TRANSPORT OF INFECTIOUS SUBSTANCES

1. Prepare all the materials needed:
 - a. Primary container with specimen and label
 - b. Cotton, gauze, tissue or any absorbent material
 - c. Parafilm
 - d. Zip lock bag
 - e. Secondary container
 - f. Outer container
 - g. Ice packs (if applicable)
 - h. Case Investigation Form (CIF)
 - i. Line list (if applicable)
 - j. Labels (sender and shipper's details)
 - k. 70% Alcohol / Sodium Hypochlorite Solution
2. After specimen collection, disinfect the primary container; be careful not to erase the label.
3. Seal the cover of the specimen container using parafilm and wrap the primary container using an absorbent material (cotton or gauze).
3. Put the primary container inside a zip lock bag and seal tightly; then place it inside the secondary container and seal properly.
4. Disinfect the secondary container and place it inside the outer container.
5. Make sure to take into account the transport requirements of the specimen/s for transport. If the samples require cold temperature, place 4-6 ice packs, one at the bottom, all four sides and at the top.
6. Seal the outer container properly and disinfect the outside of the container.
6. Place the necessary labels (shipper and sender's details) and forms (CIF and Line list) in separate zip lock bags and seal tightly. Securely tape the labels and forms outside the box.
7. Coordinate with the courier on how to send out the samples.
8. Once the samples were pick up by the courier, coordinate with the receiving laboratory and inform them on your pending shipment.





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Annex 2: Biological Spill Response

Have a complete biological spill kit ready before starting a Biological Spill clean-up.

Spill kit contents	Quantity
Disinfectant	
Concentrated Bleach <i>Working dilution 1:10 dilution of bleach (freshly prepared)</i>	500 mL
70% Alcohol	500 mL
Disinfectant Bottle Container with clean water	2L
Alcohol-based Hand Sanitizer	1000mL
Personal Protective Equipment	
Disposable Gowns (water-proof that close in the back)	2 pieces
Gloves – Nitrile (double if necessary)	8 pairs
Disposable shoe covers (Booties)	2 pairs
Face mask (surgical mask)	2 pieces
N-95 respirator (Medical Clearance & fit-testing required by Occupational Safety)	2 pieces
Eye goggles or full face shield that fits over N-95 respirator	2 pieces
Towels	4 pieces
Absorbent paper towels May also include diking material or spill pillows for large spills	1 pack
Small disposable broom with dustpan	1 piece
Wiper	1 piece
Plastic tie	2 piece
Steel Tongs Large	1 piece
Forceps for sharps	1 piece
Sharps container	1 piece
Biohazard/Autoclave bags – Large	1 piece
Biohazard/Autoclave bags – Small	1 piece
Laminated copy of (SOP) spill response and cleanup procedures	1 piece
Laminated copy of Spill Kit Check List	1 piece
Zip bag container	1 piece
Signage “Do not Enter!”	1 piece

General guidelines for ALL biological spills:

- Report all spills to the immediate supervisor. Seek immediate medical attention (if needed)
- Perform hand hygiene before and after clean-up.
- Don appropriate PPE before clean-up.
- Buddy system must be observed during biological spill response.



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- Use freshly prepared 1:10 dilution of sodium hypochlorite (household bleach); allow at least 20-30 minutes contact time.
- Dispose-off clean-up materials as biohazard waste and place on a biohazard bag before autoclaving.
- Prepare a written report about the incident and conduct Incident Investigation

Biological Spill Response Guidelines and Clean Up Procedures

Biological Spill Response Guidelines

- Do not panic. Stay calm.
- Alert the people. Inform the people about the spill incident and the immediate area of spill.
- Remove contaminated clothing and wash affected area with water and soap (if applicable)
- Perform hand hygiene.
- Leave area of spill (evacuate).
- Close the area, post a "DO NOT ENTER !" sign, and allow agents to settle (at least 30 minutes)
- Identify the hazards and review the agent's specific issues with the immediate supervisor, biosafety officer and/or experienced colleagues.
- Assess the degree of contamination and formulate a plan for the action required
- Initiate clean-up as soon as possible.

Biological Spill Clean Up Procedures

- Don shoe covers, gloves, gowns, N-95 (if applicable), mask, full covered face shield.
- Prepare 1:10 dilution of sodium hypochlorite (bleach).
- Cover the spill with paper towels or other absorbent material, starting at the edges and working toward the center of the spill.
- Carefully pour disinfectant over the absorbent material and spill starting around the edges and working toward the center. Saturate the area with the disinfectant.
- Allow sufficient contact time for the disinfectant to inactivate all material in the spill; non-viscous spills, 15-20 minutes, viscous spill, at least 30 minutes disinfection.
- Use tongs/forceps to pick up sharp objects (broken glass sharps, etc.) that may puncture gloves.
- Wipe up spill using paper towels / absorbent materials and tongs/forceps. Work from the edges to the center.
- Discard absorbent material in biohazard waste bag as you clean-up the spill.
- Clean the spill area with fresh absorbent material soaked in disinfectant. Thoroughly wet the spill area and allow disinfecting for approximately 15-20 minutes.



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- Discard clean-up materials in biohazard bag, along with any contaminated PPE.
- Close and secure bag, then place bag in second biohazard bag. Secure outer bag and disinfect by autoclaving (steam sterilization).
- Prepare written report about the incident and coordinate with the biosafety officer or the supervisor for immediate medical attention and further evaluation / surveillance.



ANNEX C
Clinical Practice Guidelines Management and Prevention of
Adult Community-Acquired Pneumonia
Executive Summary

Table 1. RISK STRATIFICATION FOR COMMUNITY ACQUIRED PNEUMONIA

	Low Risk	Moderate Risk	High Risk ^a
Vital Signs	Stable	Unstable	Unstable
Respiratory rate	< 30/minute	≥ 30/minute	≥ 30/minute
Pulse rate	<125/minute	≥125/minute	≥125/minute
Systolic blood pressure	> 90 mmHg	< 90 mmHg	< 90 mmHg
Diastolic blood pressure	> 60 mmHg	≤ 60 mmHg	≤ 60 mmHg
Temperature	> 36°C or < 40°C	≤ 36°C or ≥ 40°C	≤ 36°C or ≥ 40°C
Others			
Altered mental state of acute onset	Absent	Present	Present
With suspected aspiration	No	Yes	Yes
Co-morbid condition	None or stable co-morbid	Unstable or decompensated <ul style="list-style-type: none"> • Uncontrolled diabetes mellitus • Active malignancies • Neurologic disease in evolution • Congestive heart failure Class II-IV • Unstable coronary artery disease • Renal failure on dialysis • Uncompensated COPD • Decompensated liver disease 	Unstable or decompensated <ul style="list-style-type: none"> • Uncontrolled diabetes mellitus • Active malignancies • Neurologic disease in evolution • Congestive heart failure Class II-IV • Unstable coronary artery disease • Renal failure on dialysis • Uncompensated COPD • Decompensated liver disease
Severe Sepsis and Septic shock	Absent	Absent	Present/Absent
Need for mechanical ventilator	No	No	No/Yes

^a**High risk CAP:** Any of the clinical feature of moderate risk CAP plus any of the following: Severe sepsis and Septic shock OR need for mechanical ventilator

Table 2. Summary of Clinical Practice Guideline Recommendations

No	Recommendations	Strength of Panel Recommendations	Quality of Evidence
1	<p>Empiric Treatment for Low-risk CAP</p> <p>Recommendation 1: The following antibiotics should be started for empiric treatment of patients with low risk CAP without co-morbidities: Amoxicillin 1 gram, three times daily OR Clarithromycin 500mg, twice daily OR Azithromycin 500mg once daily</p>	<p><i>Strong recommendation</i></p> <p><i>Strong Recommendation</i></p>	<p><i>low quality of evidence</i></p> <p><i>low quality of evidence</i></p>
	<p>Recommendation 2: The following antibiotics should be started for empiric treatment of patients with low risk CAP with stable co-morbidities:</p> <p><i>Beta-lactam</i> Co-amoxiclav (amoxicillin/clavulanate 500 mg/125 mg three times daily, OR amoxicillin/ clavulanate 875 mg/125 mg twice daily) OR Cefuroxime 500mg, twice daily</p> <p>PLUS OR MINUS (+/-)</p> <p><i>Macrolide</i> Clarithromycin 500mg, twice daily OR Azithromycin 500mg once daily</p> <p>OR Doxycycline 100mg, twice daily</p>	<p><i>Strong recommendation</i></p> <p><i>Strong recommendation</i></p> <p><i>Conditional recommendation</i></p>	<p><i>moderate quality of evidence</i></p> <p><i>low quality of evidence</i></p> <p><i>low quality of evidence</i></p>
2	<p>Empiric Treatment for Moderate-risk CAP</p> <p>Recommendation 3: The following antibiotics should be started for empiric treatment of patients with moderate risk CAP without MDRO infection</p> <p><i>Non-pseudomonal Beta-lactam antibiotic</i> Ampicillin-sulbactam 1.5–3 g every 6 h OR Cefotaxime 1–2 g every 8 h OR Ceftriaxone 1–2 g daily</p> <p>PLUS</p> <p><i>Macrolide</i> Azithromycin 500 mg daily</p>	<p><i>Strong recommendation</i></p>	<p><i>moderate quality of evidence</i></p>

	<p>OR Clarithromycin 500 mg twice daily</p>		
3	<p>Empiric Treatment for High-risk CAP without MDRO infection</p> <p>Recommendation 4: The following antibiotics should be started for empiric treatment of patients high risk CAP without MDRO infection:</p> <p>FIRST LINE THERAPY</p> <p><i>Non-pseudomonal Beta-lactam antibiotic</i> Ampicillin-sulbactam 1.5–3 g IV every 6 h</p> <p>OR Cefotaxime 1–2 g IV every 8 h</p> <p>OR Ceftriaxone 1–2 g IV daily</p> <p>PLUS</p> <p><i>Macrolide</i> Azithromycin 500 mg PO/IV daily</p> <p>OR Erythromycin 500 mg PO every 6 hours</p> <p>OR Clarithromycin 500 mg PO twice daily</p> <p>ALTERNATIVE THERAPY</p> <p><i>Non-pseudomonal Beta-lactam antibiotic</i></p> <p>PLUS</p> <p><i>Respiratory fluoroquinolone*</i> Levofloxacin 750 mg PO/IV daily</p> <p>OR Moxifloxacin 400 mg PO/IV daily * given as 1 hour IV infusion</p>	<p><i>Strong recommendation</i></p>	<p><i>low quality of evidence</i></p>
4	<p>Atypical coverage for Aspiration pneumonia</p> <p>Recommendation 5: Routine anaerobic coverage for suspected aspiration pneumonia is NOT recommended, unless lung abscess or empyema is suspected</p>	<p><i>Conditional recommendation</i></p>	<p><i>Very low quality of evidence</i></p>
6	<p>Initiation of Treatment</p> <p>Recommendation 7: As soon as diagnosis is established, treatment of community acquired pneumonia, regardless of risk, should be initiated within 4 hours.</p>	<p><i>Strong recommendation</i></p>	<p><i>very low quality of evidence</i></p>
7	<p>Duration of Treatment</p>	<p><i>Strong recommendation</i></p>	<p><i>moderate quality of evidence</i></p>

	Recommendation 8: Among patients with low to moderate risk CAP, a treatment duration of 5 days is recommended as long as the patient is clinically stable (afebrile within 48 hours, able to eat, normal blood pressure, normal heart rate, normal respiratory rate, normal oxygen saturation, and return to baseline sensorium).		
	Recommendation 9: Antibiotic therapy may be extended according to clinical consideration such as: (1) pneumonia is not resolving, (2) pneumonia complicated by sepsis, meningitis, endocarditis and other deep-seated infection, (3) infection with less common pathogens (i.e. Burkholderia pseudomallei, Mycobacterium tuberculosis, endemic fungi, etc), (4) infection with a drug resistant pathogens.	<i>Best practice</i>	
8	De-escalation Recommendation 10: De-escalation of initial empiric broad spectrum or extended spectrum antibiotic with coverage for MRSA, Pseudomonas or ESBL to targeted or oral antibiotics based on culture results is recommended once the patient is clinically improving, hemodynamically stable and able to tolerate oral medications.	<i>Strong recommendation</i>	<i>moderate quality of evidence</i>
9	Prevention Recommendation 11: Pneumococcal polysaccharide vaccine (PPSV) or pneumococcal conjugate vaccine (PCV) is recommended for the prevention of invasive pneumococcal disease in adults 50 years old and older.	<i>Strong recommendation</i>	<i>moderate quality of evidence</i>
	Recommendation 12: Pneumococcal polysaccharide vaccine is recommended for adults to prevent (a) pneumococcal pneumonia, (b) mortality from IPD or pneumonia and (c) pneumonia among high-risk groups and adults 50 years and above.	<i>Strong recommendation</i>	<i>low quality of evidence</i>
	Recommendation 13: Influenza vaccine is recommended to prevent influenza, influenza-like illness and hospitalization in all adults.	<i>Strong recommendation</i>	<i>low quality of evidence</i>
	Recommendation 14: Administration of both influenza and pneumococcal vaccine is recommended to prevent pneumonia, hospitalization and mortality in adults 50 years old and above	<i>Strong recommendation</i>	<i>very low quality of evidence</i>

ANNEX D
Summary of Management Recommendations for
Pediatric Community-Acquired Pneumonia

(adapted from the 3rd PAPP Update [2016] in the Evaluation and Management of Pediatric Community-acquired Pneumonia by the 2016 Philippine Academy of Pediatric Pulmonologists Task Force on pCAP)

Clinical Question	PCAP A/B	PCAP C	PCAP D
When is antibiotic recommended?	Antibiotic may be administered if a patient is <ul style="list-style-type: none"> • beyond 2 years of age OR • with high grade fever without wheeze 	Empiric antibiotic may be started if any of the following is present. <ul style="list-style-type: none"> • Elevated serum C-reactive protein, procalcitonin level, WBC count > 15,000, lipocalin 2 [Lpc-2] • Alveolar consolidation on chest x-ray • Persistent high-grade fever without wheeze 	Specialist consultation recommended
What empiric treatment should be administered if a bacterial etiology is strongly considered?	Without previous antibiotic, regardless of the immunization status against <i>Haemophilus influenzae</i> type b or <i>Streptococcus pneumoniae</i> , <ul style="list-style-type: none"> • Amoxicillin trihydrate <ul style="list-style-type: none"> ○ In areas with proven low antibiotic resistance to amoxicillin: given at 40-50 mg/kg/day, maximum dose of 1500 mg/day in 3 divided doses ○ In areas with proven high amoxicillin resistance: may be given at 90 mg/kg/day ○ Duration: may be given for a minimum of 3 days. Option is to give amoxicillin in 2 divided doses for a minimum of 5 days • Azithromycin [10 mg/kg/day OD for 3 days, or 10 mg/kg/day at day 1 then 5 mg/kg/day for day 2 to 5, maximum dose of 500 mg/day], or clarithromycin [15 mg/kg/day, maximum dose of 1000 mg/day in 2 divided doses for 7 days] may be given if there is <ul style="list-style-type: none"> ○ known hypersensitivity to amoxicillin ○ suspicion of atypical organisms particularly <i>Mycoplasma pneumoniae</i> 	Without previous antibiotic and requiring hospitalization, and <ul style="list-style-type: none"> • Completed primary immunization against <i>Haemophilus influenzae</i> type b: Penicillin G [100,000 units/kg/day in 4 divided doses] may be given • Incomplete primary immunization or immunization status unknown, against <i>Haemophilus influenzae</i> type b, ampicillin [100 mg/kg/day in 4 divided doses] may be given Patients who can tolerate oral feeding and do not require oxygen support: <ul style="list-style-type: none"> • Amoxicillin trihydrate <ul style="list-style-type: none"> ○ In areas with proven low antibiotic resistance to amoxicillin: given at 40-50 mg/kg/day, maximum dose of 1500 mg/day in 3 divided doses ○ In areas with proven high amoxicillin resistance: may be given at 90 mg/kg/day for 7 days; may be given on an outpatient basis 	Specialist consultation recommended

Clinical Question	PCAP A/B	PCAP C	PCAP D
<p><i>What ancillary treatment can be given?</i></p>	<p>The following may be beneficial:</p> <ul style="list-style-type: none"> • Oral steroid in a patient with coexisting asthma • Bronchodilator in the presence of wheezing <p>The following may NOT be beneficial:</p> <ul style="list-style-type: none"> • Cough preparation [• Parenteral steroid in a patient without asthma • Elemental zinc, vitamin D3 and probiotic 	<p>The following may be beneficial:</p> <ul style="list-style-type: none"> • Use of either nasal catheter or nasal prong in administering oxygen • Zinc supplement in reducing mortality • Use of bubble CPAP instead of low flow oxygen in improving oxygenation • Steroid or spirulina in reducing length of stay • Oxygen for oxygen saturation below 95% at room air in improving oxygenation <p>The following may NOT be beneficial:</p> <ul style="list-style-type: none"> • Zinc supplement in reducing treatment failure or length of hospital stay • Vitamin D3 in reducing length of hospital stay • Parenteral steroid, probiotic, virgin coconut oil, oral folate and nebulization using saline or acetylcysteine 	<p>Specialist consultation recommended</p>