ANNEX 8:
THE INFECTION PREVENTION AND CONTROL (IPC) MEASURES IN MANAGING PATIENT UNDER INVESTIGATION (PUI) OR CONFIRMED CORONA VIRUS DISEASE (COVID-19)
Contents:

- Introduction of COVID 19
- Transmission of COVID 19
- Case Definition of COVID 19
- Definition of Contact of COVID 19
- Admission Criteria
- Transfer to a Step Down Facility
- Checklist for Suitability of PUI to Undergo Home Surveillance
- Principles of IPC for Acute Respiratory Infection (ARI)
- Infection Prevention and Control (IPC) Measures when COVID-19 Suspected or Confirmed
Introduction of COVID-19

Coronavirus disease 2019 (COVID-19) is defined as illness caused by a novel (new) coronavirus now called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2; formerly called 2019-nCOV), which was first detected amid outbreak of respiratory illness in Wuhan City, Hubei Province, China.

Coronaviruses is an enveloped, positive sense, single-stranded RNA viruses that are round and sometimes pleomorphic with 80-120mm diameter and belongs to the family Coronaviridae.

Short Evolution of COVID-19

- **21 Dec 2019**: Chinese authority alerted WHO about outbreak in Wuhan, China
- **7 Jan 2020**: 2019 Novel Coronavirus identified
- **13 Jan 2020**: First case outside China (Thailand, Nepal, Japan and South Korea)
- **25 Jan 2020**: First case cluster in Malaysia
Transmission:

Mainly through respiratory droplets generated by coughing and sneezing, and through contact with contaminated surfaces.

Incubation Period:

2 - 14 days (estimated)
Case Definition

PUI of COVID-19

• Acute respiratory infection (sudden onset of respiratory infection with at least one of: shortness of breath, cough or sore throat) with or without Fever AND

• Travelled to / resided in foreign country within 14 days before the onset of illness OR

• Close contact\(^1\) in 14 days before illness onset with a confirmed case of COVID-19 OR

• Attended an event associated with known COVID-19 outbreak

Confirmed Case of COVID-19

• A person with laboratory confirmation of infection with the COVID-19
Definition of contact

A contact of a COVID-19 case is a person not currently presenting symptoms, who has, or may have been in contact with a COVID-19 case

<table>
<thead>
<tr>
<th>Close Contacts</th>
<th>Casual Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Health care associated exposure without appropriate PPE (including providing direct care for COVID-19 patients, working with health care workers infected with COVID-19, visiting patients or staying in the same close environment of a COVID-19 patient)</td>
<td>I. A person who has less than 15mins face-to-face contact with a COVID-19 case and more than 1m distance.</td>
</tr>
<tr>
<td>II. Working together in close proximity or sharing same classroom environment with a COVID-19 patient</td>
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<td>III. Traveling together with COVID-19 patient in any kind of conveyance</td>
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<tr>
<td>IV. Living in the same household as COVID-19 patient</td>
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</tbody>
</table>

**Note: Transit in an airport located in affecting countries is not considered as having travelled to that country.**
Admission Criteria

1. PUI COVID-19 who is critically ill

2. PUI COVID-19 with uncontrolled medical conditions, immuno-suppressed status, pregnant women, extremes of age (<2 or >65 years old)

3. Laboratory confirmed case (asymptomatic or symptomatic)

**PUI who do not fulfil this criteria but are not suitable for home surveillance, consider admission in quarantine station**
Transfer to A Step-down Facility

Confirmed COVID-19 who fulfil the criteria can be transferred to a step-down facility until discharge.

1. Symptomatic or asymptomatic positive COVID-19, and at least seven days have passed from diagnosis AND

2. At least three days (72 hours) have passed since recovery of symptoms (defined as resolution of fever without antipyretics and improvement in respiratory symptoms [eg, cough, shortness of breath]) AND

3. Stable co-morbidities if any (eg: well control Diabetes Mellitus, Hypertension etc)
Checklist for Suitability of PUI to Undergo Home Surveillance

- Has a separate bedroom with en-suite bathroom (preferable); if not, common bathroom with frequent disinfection
- Has access to food and other necessities
- Has access to face mask, glove and disinfectant at home
- Able to seek medical care if necessary and return with own private transport
- Able to adhere to instruction to follow home surveillance order
- Able to stay away (at least 2 meter apart) from the high-risk household members (e.g. people > 65 years old, young children <2 years, pregnant women, people who are immunocompromised or who have chronic lung, kidney, heart disease)
Hierarchy of Controls in Infection

**Hierarchy of Controls**

- **Elimination**: Physically remove the hazard
- **Substitution**: Replace the hazard
- **Engineering Controls**: Isolate people from the hazard
- **Administrative Controls**: Change the way people work
- **PPE**: Protect the worker with Personal Protective Equipment
Principles of IPC for Acute Respiratory Infection (ARI)

The principles of IPC for Acute Respiratory Infection (ARI) patient care include:

a) **Early and rapid recognition** AND **source control** that includes promotion of respiratory hygiene

b) Application of **routine IPC precautions** (**Standard Precautions**) for all patients;

c) **Additional precautions** in selected patients (i.e. contact, droplet, airborne) based on the presumptive diagnosis;

d) Establishment of an **IPC infrastructure** for the healthcare facility, to support IPC activities.

e) **Provision of adequate and regular supply of PPE** and appropriate training of Staff using the PPE serves to further reduce the risks of transmission of respiratory pathogens to health-care workers and other people interacting with the patients in the health-care facility.
Standard Precaution

What is standard precaution?

The **minimum** infection prevention practices that should be used in the care of **ALL patients, ALL the time.**

Standard precautions are **a set of infection control practices** used to prevent transmission of diseases that can be acquired by contact with blood, body fluids, non-intact skin and mucous membranes.
Standard Precaution

- Hand hygiene
- Personal Protective Equipment (PPE)
- Disinfectant & Sterilisation
- Environmental Hygiene

Element of Standard Precaution
Standard Precaution

Element of Standard Precaution

Linen Management

Waste Management

Spillage Management

Injection safety & Sharps management

Respiratory Hygiene & Cough Etiquette
Transmission Based Precautions

When treating patients who are known or suspected of being infected or colonized with infectious agents.

Applied according to the clinical syndrome and the likely etiologic agents, and then modified based on test results.

These precautions are to be implemented in conjunction with STANDARD PRECAUTION.

Infection Control Unit, Medical Care Quality Section, Medical Development Division, MOH
Transmission Based Precautions

Three types:
- Contact
- Droplet
- Airborne

May be combined for diseases that have multiple routes of transmission.
• **SARS-CoV-2 (COVID 19)**
• Herpes Simplex
• Herpes Zoster
• Multidrug Resistance Organisms (MDRO)
  • Methycillin Resistance Staphylococcus Aureus (MRSA)
  • Extended Spectrum Beta Lactamase (ESBL)
  • Carbapenem Resistance Enterobacteriaceae (CRE)
• Streptococcal Disease – skin, wound, burns
• Typhoid (Salmonella Typhii)
• Varicella Zoster
Contact Precautions

Isolate the patient in a single room, if single room is not available, cohort the patient (with same organism) at a designated area.

Strict hand hygiene before entering and upon exiting the patient room / area.

All patient need to be tag for easy identification e.g. medical records, bedside area.

Appropriate Personal Protective Equipment (PPE)

Dedicated medical equipment.
• SARS-CoV-2 (COVID 19)
• Diphtheria – Pharyngeal
• Epiglotittis – Haemophilus Influenza
• Meningitis (Haemophilus Influenza, Meningococcal)
• Severe Acute Respiratory Infection (SARI)
• Mumps
• Influenza
• Mers-CoV

** Certain organism requires the use of N95 mask especially during aerosol generating procedure
Droplet Precautions

Health-care facilities (Outpatient and Emergency Department) should:

Place acute febrile respiratory symptomatic patients at least 1 meter (3 feet) away from others in common waiting areas, if possible.

Place visual alerts at the entrance to health-care facilities instructing persons with respiratory symptoms to practice respiratory hygiene/cough etiquette.

Consider making hand hygiene resources, tissues and masks available in common areas and areas used for the evaluation of patients with respiratory illnesses.
# Infection Prevention and Control (IPC) Measures in Managing Patient Under Investigation (PUI) Or Confirmed Coronavirus Disease (COVID-19)

| A. | POINT OF ENTRY |
| B. | PATIENT PLACEMENT ON ADMISSION |
| C. | AEROSOL-GENERATING PROCEDURES (AGP) |
| D. | PATIENT TRANSFER AND TRANSPORT |
| E. | SPECIMEN COLLECTION AND TRANSPORT |
| F. | DISINFECTION AND STERILIZATION |
| G. | TERMINAL CLEANING OF AN ISOLATION ROOM |
| H. | DISHES AND EATING UTENSILS |
| I. | LINEN MANAGEMENT |
| J. | HEALTHCARE WORKER (HCW) |
| K. | VISITORS |
| L. | PATIENT RECORD / BED HEAD TICKET |
A. POINT OF ENTRY

(Applies to hospital emergency departments, health clinics / private GP clinics / fever centres / ambulatory care units and travellers screening points)

Clinical triage

• rapid case identification of patients at risk by using visual aid, and proper travel history taking in patient presenting with fever and cough.

• Rapid triage of patients with acute febrile respiratory diseases is recommended.

• Must offer surgical mask (not N95 mask) if patient is able to tolerate (not tachypnoeic, not hypoxic). If patient is unable to tolerate, advise the patient to cover nose and mouth during coughing or sneezing with tissue or flexed elbow.
• Separate PUI to a **dedicated waiting area** which is **well ventilated** with spatial separation of at least **1 - 2m** between patients in the waiting rooms.

• Provide **tissues/ surgical mask** and **no-touch bins or biohazard bag** for disposal of tissues/ surgical mask.

• Provide **resources for performing hand hygiene** (alcohol-based hand rub made available).

• **Cleaning of high touch areas** (i.e. chair, table, couch) at waiting and triage areas after patient leaves the area or as required (i.e. spillage, soiling).
Examination/ isolation room

• Examination/ isolation room should be in descending order of preference:

i. Single room (nursed with door closed) and en-suite bath

ii. Single room
## RECOMMENDED PPE TO BE USED IN THE CONTEXT OF COVID19 DISEASE ACCORDING TO RISK OF EXPOSURE

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<thead>
<tr>
<th>SETTING</th>
<th>TARGET PERSONNEL</th>
<th>ACTIVITY</th>
<th>TYPE OF PPE</th>
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</thead>
</table>
| Healthcare facilities    | HCW              | Direct contact with any patient (Non PUI/COVID-19 patient OR patient without respiratory symptoms) | • Surgical mask  
• Frequent hand hygiene |
| EMERGENCY DEPARTMENT     |                  |                                                                          |                                                                             |
| Primary Triage           | HCW              | Involved in triaging patients Maintain 1-2 metres spatial distance at all time | • Surgical mask  
• Frequent hand hygiene  
* Full PPE set must be made available at the site in case of emergency  
* Use physical barriers (such as glass or plastic windows) to reduce exposure |
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<th>TARGET PERSONNEL</th>
<th>ACTIVITY</th>
<th>TYPE OF PPE</th>
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<tbody>
<tr>
<td>Patient Waiting Area</td>
<td>Patients</td>
<td>Patient with respiratory symptoms</td>
<td>• Patient to wear a surgical mask</td>
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<td>* Should be seated at the designated area and to sit at least 1m apart</td>
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<td>Secondary triage</td>
<td>HCW</td>
<td>History taking and physical examination</td>
<td>• Surgical mask</td>
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<td>• Isolation Gown (fluid-repellent long-sleeved gown) OR long-sleeved plastic apron</td>
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<td>• Gloves</td>
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<td>• Eye Protection (face shield/goggles)</td>
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<td>• Boot cover / shoe cover (ONLY when anticipating spillage and vomiting)</td>
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<tr>
<td>Examination Room /</td>
<td>HCW</td>
<td>History taking and physical examination</td>
<td>• Surgical mask</td>
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<td>Consultation Room</td>
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<td>• Isolation Gown (fluid-repellent long-sleeved gown)</td>
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<td>• Boot cover / shoe cover (ONLY when anticipating spillage and vomiting)</td>
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<tr>
<td>Cleaners</td>
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<td>Cleaning in the outpatient consultation rooms</td>
<td>• Surgical mask</td>
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<td>• Long-sleeved plastic apron</td>
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<td>• Eye Protection (face shield/goggles)</td>
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<td>• Boots or closed shoes</td>
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</table>

* increase frequency of cleaning at areas with higher environmental contamination rates
<table>
<thead>
<tr>
<th>SETTING</th>
<th>TARGET PERSONNEL</th>
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<th>TYPE OF PPE</th>
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<tbody>
<tr>
<td>Patient Cubicle / Resuscitation Zone</td>
<td>HCW</td>
<td>Performing Aerosol Generating Procedures (AGP) on PUI / confirmed COVID-19 patients</td>
<td><strong>Minimum Recommendation:</strong></td>
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<tr>
<td></td>
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<td>• Intubation, extubation and related procedures / CPR</td>
<td>• N95 mask</td>
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<td>• Tracheotomy/tracheostomy procedures</td>
<td>• Isolation Gown (fluid-repellent long-sleeved gown) with plastic apron</td>
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<td>• Manual ventilation</td>
<td>• Gloves</td>
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<td>• Suctioning</td>
<td>• Eye Protection (face shield/goggles)</td>
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<td>• Bronchoscopy</td>
<td>• Boot cover / shoe cover</td>
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<td>• Nebulization</td>
<td>• Head cover</td>
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<td>• Others – Refer Guideline</td>
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<tr>
<td>Specimen Collection Area</td>
<td>HCW</td>
<td>Performing oropharyngeal or nasopharyngeal swab</td>
<td>• N95 mask</td>
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<td>**It is sufficient to change gloves and plastic apron between patients. Any soiled protective equipment’s should also be changed</td>
<td>• Gloves**</td>
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<td>• Isolation Gown (fluid-repellent long-sleeved gown)</td>
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<td>• Long-sleeved plastic apron**</td>
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<td>• Eye protection (face shield/goggles)</td>
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<td>• Boot cover/shoe cover (ONLY when anticipating spillage and vomiting)</td>
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</tbody>
</table>
B. PATIENT PLACEMENT ON ADMISSION

• Patient placement (in descending order of preference):

  i. Single room (nursed with door closed) and en-suite bath

  ii. Single room
Notes:

- **Cohorting confirmed** COVID-19 patients is allowed.
- Only **PUI cases with pending result** should be placed in **single isolation room**
- **Dedicated use of non-critical patient-care equipment**
  - E.g. stethoscope, sphygmomanometer, thermometer or bedside commode
  - If unavoidable, then adequately clean and disinfect them between use.
# RECOMMENDED PPE TO BE USED IN THE CONTEXT OF COVID19 DISEASE ACCORDING TO RISK OF EXPOSURE

**Setting**: Inpatient Facilities

<table>
<thead>
<tr>
<th>Target Personnel</th>
<th>Activity</th>
<th>Type of PPE</th>
</tr>
</thead>
</table>
| **Patient Room** | **HCW** | Providing care PUI/confirmed COVID-19 patients who are *not intubated* and *able to wear surgical mask* | - Surgical mask  
- Isolation Gown (fluid-repellent long-sleeved gown)  
- Gloves  
- Eye Protection (face shield/goggles)  
- Boot cover/shoe cover (ONLY when anticipating spillage and vomiting) |
|                   |          | Providing care to PUI/confirmed COVID-19 patients who are *not intubated* but *NOT able to wear surgical mask* | - N95 mask  
- Isolation Gown (fluid-repellent long-sleeved gown)  
- Gloves  
- Eye Protection (face shield/goggles)  
- Head cover  
- Boot cover/shoe cover (ONLY when anticipating spillage and vomiting) |
<table>
<thead>
<tr>
<th>SETTING</th>
<th>TARGET PERSONNEL</th>
<th>ACIVITY</th>
<th>TYPE OF PPE</th>
</tr>
</thead>
</table>
| Patient Room                    | HCW              | Performing oropharyngeal or nasopharyngeal swab to PUI/confirmed COVID-19 patients | • N95 mask  
• Isolation Gown (fluid-repellent long-sleeved gown)  
• Gloves  
• Eye Protection (face shield/goggles)  
• Head cover  
• Boot cover/shoe cover (ONLY when anticipating spillage and vomiting) |
|                                 |                  | Providing care to PUI/confirmed COVID-19 patients who are **ventilated in a closed circuit** | • N95 mask  
• Isolation Gown (fluid-repellent long-sleeved gown)  
• Gloves  
• Eye Protection (face shield/goggles)  
• Head cover  
• Boot cover/shoe cover (ONLY when anticipating spillage and vomiting) |
| Outside patient room (more than 1-2 meters) | All staff including HCW | Any activity that does not lead to contact with PUI/confirmed COVID-19 | • Surgical mask  
• Frequent hand hygiene |
C. AEROSOL-GENERATING PROCEDURES (AGP)

• An aerosol-generating procedure (AGP) is defined as any medical procedure that can induce the production of aerosols of various sizes, including small (< 5μm) particles. The aerosol-generating procedures include:
  – Intubation, extubation and related procedures;
  – Tracheotomy/tracheostomy procedures;
  – Manual ventilation;
  – Suctioning;
  – Bronchoscopy;
  – Nebulization
  – Non-invasive ventilation (NIV) e.g. Bi-level Positive Airway Pressure (BiPAP) and Continuous Positive Airway Pressure ventilation (CPAP);
  – Surgery and post-mortem procedures in which high-speed devices are used;
  – High-frequency oscillating ventilation (HFOV);
  – High-flow Nasal Oxygen (HFNO)
  – Induction of sputum
  – Dental procedures
• Patient placement (in descending order of preference):

i. Airborne Infection Isolation Room (AIIR)

ii. Adequately ventilated single room with at least natural ventilation with at least 160 l/s/patient air flow, with closed doors
<table>
<thead>
<tr>
<th>SETTING</th>
<th>TARGET PERSONNEL</th>
<th>ACTIVITY</th>
<th>TYPE OF PPE</th>
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</thead>
<tbody>
<tr>
<td><strong>INPATIENT FACILITIES</strong></td>
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</tbody>
</table>
| Patient Room | HCW              | Performing Aerosol Generating Procedures (AGP) on PUI/confirmed COVID-19 patients | Option 1 (Preferred):  
• Powered air-purifying respirator (PAPR)  
• Isolation Gown (fluid-repellent long-sleeved gown) with plastic apron / Coverall suit  
• Gloves  
• Eye Protection (face shield/goggles)*  
• Boot cover/shoe cover  
*Depends on type of PAPR                                                        |
|              |                  | • Intubation, extubation and related procedures;  
• Tracheotomy/tracheostomy procedures;  
• Manual ventilation;  
• Suctioning;  
• Bronchoscopy;  
• Nebulization  
• Non-invasive ventilation (NIV) e.g. Bi-level Positive Airway Pressure (BiPAP) and Continuous Positive Airway Pressure ventilation (CPAP);  
• Surgery and post-mortem procedures in which high-speed devices are used;  
• High-frequency oscillating ventilation (HFOV);  
• High-flow Nasal Oxygen (HFNO)  
• Induction of sputum  
• Dental procedures  
*Detailed information, refer to Intensive care preparedness and management for COVID-19 |

Option 2:  
• Coverall suit  
• N95 mask  
• Eye Protection (face shield/goggles)  
• Gloves  
• Boot cover/shoe cover  

Option 3 (if Option 1 & 2 not available):  
• N95 mask  
• Isolation Gown (fluid-repellent long-sleeved gown) with plastic apron  
• Gloves  
• Eye Protection (face shield/goggles)  
• Head cover  
• Boot cover/shoe cover
D. TRANSPORTING PATIENTS

- Avoid movement, unless medically necessary.
- If movement is required - use a pre-planned route (minimize exposure to other staff, patients or visitors).
- Notify the receiving area before sending the patient.
- Clean and disinfect patient-contact surfaces after use (e.g. bed, wheelchair, incubators).
- HCWs must wear appropriate PPE.
- Patient should wear a surgical mask if not in respiratory distress (if patient can’t tolerate, advise them to close their mouth and nose especially when coughing or sneezing).
- Oxygen supplement using nasal prong can be safely used under a surgical mask.
<table>
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<tr>
<th>SETTING</th>
<th>TARGET PERSONNEL</th>
<th>ACTIVITY</th>
<th>TYPE OF PPE</th>
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</thead>
</table>
| Ambulance transfer vehicle | Driver           | Involved in driving the patient with PUI/confirmed COVID-19 BUT NO direct contact with patient. Also involved in loading and unloading of patients Always maintain at foot end of stretcher * Windows should be kept open throughout the drive (about 3cm only) * Use aircon with fresh air intake | • Surgical mask  
• Isolation Gown (fluid-repellent long-sleeved gown) OR long-sleeved plastic apron  
• Gloves  
• Eye Protection (face shield/goggles) |
| Ambulance Transport Vehicle | HCW              | Decontamination of ambulance that transported PUI/confirmed COVID-19 patient | • Surgical mask  
• Long-sleeved plastic apron  
• Gloves  
• Eye Protection (face shield/goggles)  
• Boots or closed shoes |
<table>
<thead>
<tr>
<th>SETTING</th>
<th>TARGET PERSONNEL</th>
<th>ACTIVITY</th>
<th>TYPE OF PPE</th>
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<tbody>
<tr>
<td>Ambulance transfer vehicle</td>
<td>HCW</td>
<td>Transporting PUI/confirmed COVID-19 patient to the referral health care facility</td>
<td>• N95 mask</td>
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<td>Healthcare worker seating arrangement (Figure 1):</td>
<td>• Isolation Gown (fluid-repellent long-sleeved gown)</td>
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<td>A &amp; B: When patient is not in distress</td>
<td>• Gloves</td>
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<td></td>
<td>C: When patient requires oxygen support/intervention</td>
<td>• Eye Protection (face shield/goggles)</td>
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<td>• Head cover</td>
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Figure 1: Ambulance
All specimens should be regarded as potentially infectious, HCWs should adhere to strict **STANDARD PRECAUTIONS**

- Deliver all specimens **by hand**. **Do not use** pneumatic-tube systems.
- **State** the name of the infection **clearly** on the **request form**.
- **Notify** the laboratory as soon as possible that the specimen is being transported.
- HCWs who collect respiratory specimens from PUI / Confirmed patients wear **appropriate PPE**.
- Place specimens for transport in **leak-proof specimen bags** (please refer to Annex 5c for instructions on specimen packaging).
- **Personnel** who transport specimens are **trained** in safe handling practices and spill decontamination procedures.
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<thead>
<tr>
<th>SETTING</th>
<th>TARGET PERSONNEL</th>
<th>ACTIVITY</th>
<th>TYPE OF PPE</th>
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<tbody>
<tr>
<td><strong>INPATIENT FACILITIES</strong></td>
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<tr>
<td>Specimen Collection Area</td>
<td>HCW</td>
<td>Performing oropharyngeal or nasopharyngeal swab</td>
<td>• N95</td>
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<td>• Gloves**</td>
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<td>• Isolation Gown (fluid-repellent long-sleeved gown)</td>
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<td>• Long-sleeved plastic apron**</td>
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<td></td>
<td>**It is sufficient to change gloves and plastic apron between patients. Any soiled protective equipment’s should also be changed</td>
</tr>
<tr>
<td>Laboratory</td>
<td>HCW</td>
<td>• Manipulation of respiratory specimens which include oropharyngeal swabs, nasopharyngeal swabs, sputum, tracheal aspirate, bronchoalveolar lavage (BAL) must be accorded high risk</td>
<td>• N95 mask</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Specimen handling for RT-PCR or Antigen testing prior to viral inactivation step, must be carried out in BSL-2 or equivalent facilities</td>
<td>• Isolation Gown (fluid-repellent long-sleeved gown)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Gloves</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Eye Protection (face shield/goggles)</td>
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<td></td>
<td>• Head cover</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Boots or closed shoes</td>
</tr>
<tr>
<td>SETTING</td>
<td>TARGET PERSONNEL</td>
<td>ACTIVITY</td>
<td>TYPE OF PPE</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Laboratory   | HCW              | Handling and processing of specimens from PUI/ confirmed COVID-19 intended for additional laboratory tests, such as haematology, microbiology, biochemistry, cytology or histopathological processing should apply standard precautions to provide a barrier between the specimen and personnel | • Surgical mask  
• Isolation Gown (fluid-repellent long-sleeved gown)  
• Gloves  
• Eye Protection (face shield/goggles)  
• Boots or closed shoes |
| Patient room | HCW              | Transporting specimen to lab                                              | • Surgical mask  
• Gloves  
• Plastic Apron (optional) |

*PUI* = Person Under Investigation
F. DISINFECTION AND STERILIZATION

• Environmental cleaning and disinfection followed hospital recommendation.

• Clean and disinfect surfaces that are likely to be contaminated (e.g., bed rails, over bed tables) and frequently-touched surfaces in the patient care environment (e.g., door knobs, surfaces in and surrounding toilets in patients’ rooms):
  – At least **once a day** and more **frequently if visibly soiled** using standard hospital registered disinfectants, such as sodium hypochlorite 1000 ppm.
  – Visible contamination or spills - use a higher dilution of EPA registered disinfection such as sodium hypochlorite at 10000ppm.
• Reused equipment, follow general protocols for disinfection and sterilization:
  – If not visibly soiled, wipe external surfaces of large portable equipment (e.g. X-ray machines and ultrasound machines) that has been used in the isolation room or area
  – Proper cleaning and disinfection of reusable respiratory equipment
  – Follow the manufacturer’s recommendations for use or dilution, contact time and handling of disinfectants.
# Recommendations for Methods of Disinfection (Reused Equipment)

<table>
<thead>
<tr>
<th>Items</th>
<th>Recommendation</th>
<th>Minimum Frequency/Cleaning Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood pressure cuffs</td>
<td>Wipe with low-level disinfectant e.g. 70% alcohol or hypochlorite solution or QUAD wipes</td>
<td>In between patients</td>
</tr>
<tr>
<td>Stethoscope</td>
<td>• Wipe with 70% alcohol &lt;br&gt;• Option: disposable stethoscope cover</td>
<td>In between patients or use designated stethoscope for infectious or high-risk patient</td>
</tr>
<tr>
<td>Thermometer</td>
<td>Use sheath cover or wipe with 70% alcohol</td>
<td>After every use</td>
</tr>
<tr>
<td>Otoscope Handle</td>
<td>Wipe with low-level disinfectant e.g. 70% alcohol or hydrogen peroxide 0.5% wipes</td>
<td>In between patients</td>
</tr>
</tbody>
</table>
G. TERMINAL CLEANING OF AN ISOLATION ROOM

After discharge / transfer of a patient.

Before entering the room, cleaning equipment should be assembled before applying PPE.

Remove PPE and perform hand hygiene before moving to another room or task.

PPE must not be worn or taken outside the patient room or bed space.

Cleaning must include portable carts or built-in holders for equipment.

The room should be decontaminated from the highest to the lowest point and from the least contaminated to the most contaminated.
• Remove curtains and place in red linen bag with alginate plastic after patient is discharged.
• Use disinfectants such as sodium hypochlorite.
  – Surface must be free from organic soil.
  – Neutral detergent solution used to clean the environment prior to disinfection or a combined detergent /disinfectant may be used.
• Cleaning of Airborne Infection Isolation Rooms (AIIR).
  – Wait for sufficient air changes to clear the air before cleaning the room.
  – After patient/resident transfer or discharge, the door must be kept closed and the Airborne Precautions sign must remain on the door until sufficient time has elapsed to allow removal of airborne microorganisms. Duration depends on ACHR.
    • With ACHR of 12 or 15, the recommended duration is 23 to 35 minutes and 18 to 28 minutes with 99%-99.9% efficiency respectively
    • ACHR cannot be determined the room is left for time interval of 45 mins before the cleaning and disinfectant is commenced
<table>
<thead>
<tr>
<th>SETTING</th>
<th>TARGET PERSONNEL</th>
<th>ACTIVITY</th>
<th>TYPE OF PPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>INPATIENT FACILITIES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient Room</td>
<td>Cleaners</td>
<td>Cleaning the PUI/confirmed COVID-19 patient’s room; who is <strong>not intubated and able to wear surgical mask</strong></td>
<td>• Surgical mask&lt;br&gt; • Isolation Gown (fluid-repellent long-sleeved gown)&lt;br&gt; • Gloves&lt;br&gt; • Eye Protection (face shield/goggles)&lt;br&gt; • Boots or closed shoes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cleaning the PUI / confirmed COVID-19 patients’ room; who are <strong>not intubated but NOT able to wear surgical mask</strong></td>
<td>• N95 mask&lt;br&gt; • Isolation Gown (fluid-repellent long-sleeved gown)&lt;br&gt; • Gloves&lt;br&gt; • Eye Protection (face shield/goggles)&lt;br&gt; • Head cover&lt;br&gt; • Boots or closed shoes</td>
</tr>
</tbody>
</table>
## Active Ingredients and Their Working Concentrations Effective Against Coronaviruses

<table>
<thead>
<tr>
<th>Active Ingredient (A.I.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accelerated hydrogen peroxide (0.5%)&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Benzalkonium chloride* (0.05%)&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Chloroxylenol (0.12%)&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Ethyl alcohol (70%)&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>Iodine in iodophor (50 ppm)&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Isopropanol (50%)&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Povidone-iodine (1% iodine)&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>Sodium hypochlorite (0.05 – 0.5%)&lt;sup&gt;d, e&lt;/sup&gt;</td>
</tr>
<tr>
<td>Sodium chlorite (0.23%)&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

*Source: NEA, Singapore*
# List of Household Disinfectants / Cleaning Products Effective Against COVID-19

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Active Ingredients</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIF Power &amp; Shine Multipurpose Anti-Bac Spray 700ml</td>
<td>Benzalkonium chloride (0.75%)</td>
</tr>
<tr>
<td>CIF Professional All Purpose Cleaner</td>
<td>Benzalkonium chloride (0.75%)</td>
</tr>
<tr>
<td>CIF Professional Disinfectant Floor Cleaner 5L</td>
<td>Benzalkonium chloride (1.2-1.4%)</td>
</tr>
<tr>
<td>Clorox Disinfectant Wipes</td>
<td>Benzalkonium chloride (0.184%)</td>
</tr>
<tr>
<td>Clorox Scentiva Disinfecting Multi-Surface Cleaner (Various Scents)</td>
<td>Benzalkonium chloride (0.3%)</td>
</tr>
<tr>
<td>Dettol Anti-bacterial Surface Cleanser Trigger Spray</td>
<td>Benzalkonium chloride (0.096%)</td>
</tr>
<tr>
<td>Magiclean Floor Cleaner (Various Scent)</td>
<td>Benzalkonium chloride (0.7%)</td>
</tr>
<tr>
<td>Magiclean Wiper Wet Sheets</td>
<td>Benzalkonium chloride (0.05%)</td>
</tr>
<tr>
<td>Mr Muscle Multi-Purpose Cleaner (Various Scents)</td>
<td>Benzalkonium chloride (0.1-0.5%)</td>
</tr>
<tr>
<td>Dettol Antiseptic Disinfectant Liquid</td>
<td>Chloroxylenol (4.8%)</td>
</tr>
<tr>
<td>Dettol Antiseptic Germicide</td>
<td>Chloroxylenol (4.8%)</td>
</tr>
<tr>
<td>Clorox All Purpose Cleaner with Bleach</td>
<td>Sodium hypochlorite (2.4%)</td>
</tr>
<tr>
<td>Clorox Bleach Original</td>
<td>Sodium hypochlorite (5.25%)</td>
</tr>
<tr>
<td>Clorox Clean-Up All-Purpose Cleaner with Bleach (Various Scents)</td>
<td>Sodium hypochlorite (2.4%)</td>
</tr>
<tr>
<td>Clorox Clean-Up Cleaner + Bleach</td>
<td>Sodium hypochlorite (1.84%)</td>
</tr>
</tbody>
</table>

*Source: NEA, Singapore*
# Preparation of Disinfectants (Sodium Hypochloride)

<table>
<thead>
<tr>
<th>Concentration of Disinfectant</th>
<th>Total 2.5gm Disinfectant Tablets to be used</th>
<th>Water Volume (ml)</th>
<th>Usage</th>
</tr>
</thead>
</table>
| 10,000ppm                     | 1%                                          | 1,000ml           | • Spillage management  
                                           • Wiping and cleaning of blood/body fluids on surfaces of non-critical items |
| 5,000ppm                      | 0.5%                                        | 1,200ml           | • Wiping of external surface of soiled linen bag |
| 1,000ppm                      | 0.1%                                        | 1,000ml           | • General cleaning |
H. DISHES AND EATING UTENSILS

• Use **disposable** utensils as much as possible

I. LINEN MANAGEMENT

• Contaminated linen should be handled as little as possible to prevent contamination of the air.
• Washing / disinfecting linen should be handled according to **hospital protocol**.
HCWs with high risk condition / immune-compromised should not be allowed managing and providing care.

Vaccination schedules up to date.

Trained on proper use of PPE.

Keep a register of HCWs who have provided care for patients with confirmed cases, PUI and SARIs (for contact tracing).

Form a dedicated team consisting of nurses, medical officers and specialist and other supportive staff from other areas.

The HCWs/ support staff should be monitored for symptoms minimum daily.

If HCWs become symptomatic, he / she needs to report to the supervisor in the team and managed accordingly.
K. VISITORS

• **NO** visitor should be allowed.
  • If necessary, discuss managing team.
    – **Screened** for acute respiratory illness
    – **Document** and **limit the number, scheduled time**
    – Appropriate instruction on use of **PPE and other precautions** (e.g., Hand hygiene, limiting surfaces touched)
    – **Limit** their **movement** in the healthcare facility
    – Exposed visitors should report any signs of symptoms

• Staff instruct and supervise on the donning and doffing of PPE (gown, glove, N95 mask).
  • **Limit visiting time** and **avoid close contact** (< 1m).
  • **Hand hygiene** on entering and leaving the room.
  • **Long-term carers** should wear surgical mask (plastic aprons and gloves when anticipating exposure to bodily fluids).
L. **PATIENT RECORD / BED HEAD TICKET (BHT)**

- Bed head ticket (BHT) of confirmed COVID-19 should be **tagged**.

- The patient record / bed head ticket should be kept **outside the patient room**.
<table>
<thead>
<tr>
<th>SETTING</th>
<th>TARGET PERSONNEL</th>
<th>ACIVITY</th>
<th>TYPE OF PPE</th>
</tr>
</thead>
</table>
| Any Areas in Healthcare Facility | HCW               | Direct contact with any patient (Non PUI/confirmed COVID-19 patient OR patient without respiratory symptoms) | • Surgical mask  
• Frequent hand hygiene |
|                  |                  |                                                                          |                                                                            |
| ADMINISTRATIVE AREAS/ PUBLIC AREAS |                  |                                                                          |                                                                            |
| Any Areas        | All staff        | Any activities not involving direct contact with patient                 | No PPE needed                                                             |
|                  | Security Officer | Security officers in healthcare facilities  
Maintain more than 1 metre spatial distance at all times | • No PPE needed  
* However, use surgical mask if unable to maintain spatial distance of more than 1 metre.  
• Frequent hand hygiene |
# RECOMMENDED PPE TO BE USED WHEN ATTENDING OR TREATING SEVERE ACUTE RESPIRATORY INFECTION (SARI) / PNEUMONIA TRO COVID-19 PATIENT

<table>
<thead>
<tr>
<th>SETTING</th>
<th>TARGET PERSONNEL</th>
<th>ACTIVITY</th>
<th>TYPE OF PPE</th>
</tr>
</thead>
</table>
| SARI areas/cubicles  | HCW              | Providing care and **able to maintain 1-2 metres spatial distance at all time**  
*patient should be reminded to wear a surgical mask (if tolerable)  
If not tolerable, advise the patient to cover nose and mouth during coughing or sneezing with tissue or flexed elbow. | • Surgical mask  
• Frequent hand hygiene |
|                      |                  | Providing care and **unable to maintain 1-2 metres spatial distance at all time**  
*patient should be reminded to wear a surgical mask (if tolerable)  
If not tolerable, advise the patient to cover nose and mouth during coughing or sneezing with tissue or flexed elbow. | • Surgical mask  
• Gloves  
• Long-sleeved plastic apron  
• Eye protection (face shield/goggles) – when anticipating patient’s respiratory secretion |
## RECOMMENDED PPE TO BE USED WHEN ATTENDING OR TREATING SEVERE ACUTE RESPIRATORY INFECTION (SARI) / PNEUMONIA TRO COVID-19 PATIENT

<table>
<thead>
<tr>
<th>SETTING</th>
<th>TARGET PERSONNEL</th>
<th>ACTIVITY</th>
<th>TYPE OF PPE</th>
</tr>
</thead>
</table>
| SARI areas/cubicles | HCW              | Performing Aerosol Generating Procedures (AGP)                             | • High-flow mask oxygen  
• Intubation  
• Suctioning  
• Nebulization  
• CPR  
Also when performing oropharyngeal or nasopharyngeal swab | • N95 mask  
• Gloves  
• Isolation Gown (fluid-repellent long-sleeved gown)  
• Eye protection (face shield/goggles)  
• Head cover  
• Boot cover/shoe cover (ONLY when anticipating spillage and vomiting)  
- not always necessary |
RECOMMENDED PPE TO BE USED WHEN ATTENDING OR TREATING INFLUENZA LIKE ILLNESS (ILI) PATIENT

<table>
<thead>
<tr>
<th>SETTING</th>
<th>TARGET PERSONNEL</th>
<th>ACIVITY</th>
<th>TYPE OF PPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination Room / Consultation Room</td>
<td>HCW</td>
<td>History taking/physical examination/providing care</td>
<td>• Surgical mask</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* patient should be reminded to wear a surgical mask (if tolerable)</td>
<td>• Gloves</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If not tolerable, advise the patient to cover nose and mouth during</td>
<td>• Long-sleeved plastic apron</td>
</tr>
<tr>
<td></td>
<td></td>
<td>coughing or sneezing with tissue or flexed elbow.</td>
<td>• Eye protection (face shield/goggles) – when anticipating patient’s</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>respiratory secretion</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* Change plastic apron and gloves after examination of each patient</td>
</tr>
<tr>
<td>Performing Aerosol Generating Procedures (AGP)</td>
<td></td>
<td></td>
<td>• N95 mask</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Intubation</td>
<td>• Gloves</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Suctioning</td>
<td>• Isolation Gown (fluid-repellent long-sleeved gown)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Nebulization</td>
<td>• Eye protection (face shield/goggles)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• CPR</td>
<td>• Head cover</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Also when performing oropharyngeal or nasopharyngeal swab</td>
<td>• Boot cover / shoe cover (ONLY when anticipating spillage and vomiting)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- not always necessary</td>
</tr>
</tbody>
</table>
Novel Coronavirus COVID-19

For Healthcare Workers

Personal Protective Equipment (PPE) According to Healthcare Activities

Remember: Hand hygiene is always important. Clean hands before putting on, and after taking off, PPE.

Triage/points of entry screening personnel

- Medical mask

Collecting respiratory specimens

- Goggles OR face shield
- Medical mask
- Gown
- Gloves

Caring for a suspected/confirmed case of COVID-19 with NO aerosol-generating procedure

- Goggles OR face shield
- Medical mask
- Gown
- Gloves
Caring for a suspected/confirmed case of COVID-19 WITH aerosol-generating procedure

- goggles OR face shield
- Respirator (N95 or FFP2)
- gown
- gloves

Transport of suspected/confirmed case of COVID-19, including direct care

- goggles OR face shield
- medical mask
- gown
- gloves
Reference

1. Guidelines COVID-19 Management In Malaysia No. 5/2020
2. Policies & Procedures on Infection Control 3rd edition, 2018
3. Disinfection Guidelines 2nd Edition 2018
5. ECDC Public Health Management of persons, including healthcare workers, having had contact with COVID-19 cases in the European Union
6. Centre for Disease Control and Prevention, CDC
7. The COVID-19 Risk Communication Package For Healthcare Facilities, WPRO
THANK YOU

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