

Infection Prevention and Control

Novel Coronavirus 2019 (2019-nCoV) – Hospital setting

Introduction

This information sheet provides interim Infection Prevention and Control guidance when novel coronavirus (nCoV) is suspected/confirmed in a patient in a hospital or similar health care setting

Clinicians should also refer to the NSW Health website [Infectious Diseases Novel Coronavirus](#) and the NSW [Infection Prevention and Control Practice Handbook](#). Additional resources can also be found on the [CEC Infection Prevention and Control web site](#).

General Principles of Infection Prevention and Control to Prevent or Limit Transmission Of nCoV ¹

1. Early recognition and source control
2. Application of Standard Precautions for all patients
3. Cough etiquette and respiratory hygiene
4. Implement Transmission Based Precautions
 - **Contact** and **Droplet** Precautions (except for aerosol generating procedures or critically ill patients with high volume/high frequency, prolonged care)
 - **Airborne** Precautions for aerosol generating procedures (critically ill patients with high volume/high frequency, prolonged care)
5. Hand Hygiene (5 moments)
6. Environmental Cleaning

Application of Standard Precautions

1. Offer a surgical/procedural mask for suspected (symptomatic) nCoV infection:
 - Perform hand hygiene after contact with respiratory secretions.
2. Perform Hand Hygiene before and after contact or before and after any procedure.⁴
3. For risk of exposure to blood and body substance don appropriate PPE.
4. Environmental cleaning.

Collecting Specimen Samples

When collecting respiratory specimens, transmission-based precautions should be observed whether or not respiratory symptoms are present.

For most patients collection of respiratory specimens is a low risk procedure and can be performed using **contact** and **droplet** precautions:

- Perform hand hygiene before donning gown, gloves and surgical mask; add eye protection as per standard precautions
- To collect throat or nasopharyngeal swab stand slightly to the side of the patient to avoid exposure to respiratory secretions, should the patient cough or sneeze.
- At completion of consultation, remove personal protective equipment (PPE) and perform hand hygiene, wipe any contacted/contaminated surfaces with detergent/disinfectant.

Patient with severe symptoms

If the patient has severe symptoms suggestive of pneumonia, e.g. fever and breathing difficulty, or frequent, severe or productive coughing episodes

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then **contact** and **airborne** precautions should be observed:

- If possible, specimens should be collected in a negative pressure room (e.g. in a hospital setting).
- If this is not possible, then collect the specimens in a room with the door closed and leave. The room should be left vacant for at least 30 minutes after specimen collection (cleaning can be performed during this time by a person wearing PPE).
- Perform hand hygiene before donning gown, gloves, eye protection (goggles or face shield) and a **P2/N95 respirator – which should be [fit checked](#)**.
- At completion of consultation, remove gown and gloves, perform hand hygiene, remove eye protection and P2/N95 respirator. Do not touch the front of any item of PPE during removal, perform hand hygiene.
- The room surfaces should be wiped clean with disinfectant wipes by a person wearing gloves, gown and surgical mask.

Standard Precautions

(See [Infection Control Handbook](#) for greater details not covered here).

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 (including rashes), and mucous membranes. They are applied to all patients regardless of suspected or confirmed infectious status. The application of PPE is based on anticipation of any blood or body substance exposure and the required mitigating PPE.

Transmission Based Precautions^{2,3,4} (See Appendix 1, 2 & 3)

CONTACT and DROPLET PRECAUTIONS

In addition to **Standard** Precautions, **Contact** and **Droplet** precautions are the minimum recommended precautions for routine care of patients with suspected and confirmed nCoV infection.

On presentation or admission the patient should be:

1. Given a surgical mask to put on, and
2. Placed in a single isolation room
3. Hand Hygiene (5 moments).

Personal Protective Equipment (PPE)

For most inpatient contacts between healthcare staff and patients the following PPE is safe and appropriate and should be put on before entering the patient's room:

- long-sleeved gown
- surgical mask
- face shield or goggles
- disposable nonsterile gloves when in contact with the patient (hand hygiene before donning and after removing gloves).

Other Precautions

1. Use disposable equipment or dedicated equipment.
2. Avoid transferring patient out of room or area unless medically necessary. Where required patient to wear surgical/procedural mask

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during transfer and follow respiratory hygiene and cough etiquette.

3. Limit number of HCWs, family members and visitors in contact with a patient with suspected/confirmed nCoV.

AIRBORNE PRECAUTIONS

The potential for airborne spread of nCoV is still unknown, but **contact** and **airborne** precautions should be used routinely for AGPs, which include:

- tracheal intubation, non-invasive ventilation, tracheotomy, cardiopulmonary resuscitation, manual ventilation before intubation, and bronchoscopy (and bronchoalveolar lavage), high flow nasal oxygen
- taking samples from severely ill patients If the patient has severe symptoms suggestive of pneumonia, e.g. fever and breathing difficulty, or frequent, severe or productive coughing episodes.

Airborne Precautions may also be applied as risk assessed to:

Patients suspected/confirmed and admitted to hospital that are critically ill patients with high volume/high frequency, prolonged care.

1. Place in negative pressure isolation room, door closed (where available)
2. Adequately ventilated Single room with door closed could be used in addition to airborne precaution PPE for staff
3. Limit people in room when performing procedure.

Personal Protective Equipment (PPE)

PPE for **contact** and **airborne** procedures should be put on before entering patient's room:

- Fluid resistant long-sleeved gown
- P2/N95 respirator (mask) – should be fit-checked with each use
- face shield or goggles
- disposable nonsterile gloves when in contact with patient (hand hygiene before donning and after removing gloves)

P2/N95 respirators (mask) should be used only when required and fit checked with each use.

Only PPE marked as reusable should be reused following reprocessing according to manufacturer's instructions, all other PPE must be disposed of after use.

Staff should be trained in the correct use of PPE, directed by Infection Prevention and Control. Incorrect removal of PPE is associated with a risk of contamination.

Contact and **airborne precautions**^{5,6} are recommended when performing aerosol generating procedures (AGPs: see below).

Airborne Precautions, Aerosol Generating Procedures (AGPs) and Room Management

Some aerosol generating procedures have been associated with increased risk of transmission of coronaviruses (SARS-CoV and MERS-CoV) such as: tracheal intubation, non-invasive ventilation,

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tracheotomy, cardiopulmonary resuscitation, manual ventilation before intubation, bronchoscopy, and nebulised medications.^{7,8}

Ensure that HCWs performing aerosol-generating procedures:

- Use a P2/N95 respirator mask
- When putting on a P2/N95 particulate respirator, always perform the seal-check⁶
Note that if the wearer has facial hair (beard) this can prevent a proper respirator fit⁶
- Eye protection – goggles or face shield

The requirement to leave a room vacant following a patient in airborne precautions or an AGP is associated with risk of airborne particles and the time lapse required for enough air changes to remove potentially infectious material (see Table below).

Areas in the facility where suspect or confirmed cases have been cared for without AGPs being performed do not need to be left vacant for any time period and the staff cleaning areas should wear appropriate PPE: Long sleeve gown, Gloves, surgical mask and protective eyewear or facial shield (as per standard precautions) when cleaning

If AGPs were performed or patient cared for under airborne precautions, then room does need to be left vacant for at least 30mins for ventilation clearance after the patient has left. Staff can enter the room during this time for cleaning providing PPE as per airborne precautions is worn.

1. Airborne Contaminant Removal

Table B.1. Air changes/hour (ACH) and time required for airborne-contaminant removal by efficiency *

ACH [†]	Time (mins.) required for removal 99% efficiency	Time (mins.) required for removal 99.9% efficiency
2	138	207
4	69	104
6 ⁺	46	69
8	35	52
10 ⁺	28	41
12 ⁺	23	35
15 ⁺	18	28
20	14	21
50	6	8

* This table is revised from Table S3-1 in reference 4 and has been adapted from the formula for the rate of purging airborne contaminants presented in reference 1435.

[†] Denotes frequently cited ACH for patient-care areas.

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Environmental Cleaning

Cleaning and disinfection is recommended to decontaminate the environment: (2 step clean or 2 in 1 step clean).

- Patient room should be cleaned daily.
- Cleaners should observe contact and droplet precautions
- Ensure adherence to the cleaning product manufacturer's recommended contact time
- Use products with demonstrated efficacy against enveloped viruses (as the easiest class of microorganisms to kill) ⁽¹⁰⁾
- Terminal Clean on discharge from room
- Minimise equipment and items in the patient areas

NB: if unsure of properties of your disinfectant use of a chlorine based product such as sodium hypochlorite is the recommended solution for disinfection).

Handling of Linen

Handle per normal procedures.

All linen is treated as potentially infectious and processes in place are currently adequate.

Grossly contaminated/ soiled linen should be placed in a soluble plastic bag and then placed in the linen skip or the linen skip should be lined with a plastic bag for soiled linen.

Food service Utensils

Manage in accordance to routine procedures.

Units may choose to implement disposable items to reduce handling by staff.

Waste Management

Waste to be disposed of in normal clinical waste streams.

All non-clinical waste is disposed of into general waste stream.

Management of Deceased Bodies

Normal processes apply to the management of deceased bodies. Staff handling deceased should wear PPE Gown, Gloves, Mask, shield/goggles.

Recommend body to be placed in hermetically sealed bag.

Where can I find more information?

Further online information is available at:

NSW Health

<https://www.health.nsw.gov.au/Infectious/diseases/Pages/coronavirus.aspx>

Clinical Excellence Commission

<http://www.cec.health.nsw.gov.au/patient-safety-programs/infection-prevention-and-control/novel-coronavirus-2019-ncov>

References

1. Infection prevention and control during health care for probable or confirmed cases of Middle East respiratory syndrome coronavirus (MERS-CoV) infection. Interim guidance. Updated October 2019. Geneva, World Health Organization.

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https://www.who.int/csr/disease/coronavirus_infections/ipc-mers-cov/en/

2. Infection prevention and control of epidemic- and pandemic-prone acute respiratory infections in healthcare - WHO Guidelines. Geneva, World Health Organization, 2014.

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3. How to put on and take off Personal Protective Equipment (PPE). Geneva, World Health Organization 2008.

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<http://www.who.int/csr/resources/publications/puttakeoffPPE/en/>.

4. WHO Guidelines on hand hygiene in health care. Geneva, World Health Organization, 2009.

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http://whqlibdoc.who.int/publications/2009/9789241597906_eng.pdf.

5. Natural ventilation for infection control in health-care settings. Geneva, World Health Organization, 2009.

Available at

http://www.who.int/water_sanitation_health/publications/natural_ventilation/en/index.html.

6. How to perform a particulate respirator seal check. Geneva, World Health Organization 2008.

<https://www.who.int/csr/resources/publications/respiratorsealcheck/en/>.

For the latest information, please consult the WHO coronavirus web page at

http://www.who.int/csr/disease/coronavirus_infections/en/.

7. Hui DS. Epidemic and Emerging Coronaviruses (Severe Acute Respiratory Syndrome and Middle East Respiratory Syndrome). Clin Chest Med. 2017 Mar;38(1):71-86. doi:10.1016/j.ccm.2016.11.007

8. Tran K, Cimon K, Severn M, Pessoa-Silva CL, Conly J. Aerosol generating procedures and risk of

transmission of acute respiratory infections to healthcare workers: a systematic review. PLoS One 2012;7:e35797.

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<https://www.cdc.gov/coronavirus/2019-ncov/about/prevention-treatment.html>

10. Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected Interim guidance January 2020.

Available at:

<https://apps.who.int/iris/bitstream/handle/10665/330375/WHO-2019-nCoV-IPC-v2020.1-eng.pdf>

11. Rutala and Weber (2014) Hierarchy of Microbial resistance to Disinfectants and Sterilants

The Healthcare Associated Infections (HAI) Program provides expertise in Infection Prevention and Control and assists local health districts and specialty networks in NSW to manage and monitor the prevention and control of HAIs.

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APPENDIX 1: CONTACT PRECAUTIONS

Requirements	Contact Precautions
Single room	Yes, or cohort with patient with same pathogen (in consultation with infection control professional or infectious diseases physician).
Negative pressure*	No
Hand hygiene	Yes
Gloves	Yes, If there is direct contact with the patient or their environment.
Gown/apron	Yes, if there is direct contact with the patient or their environment.
Mask	Standard Precautions
Protective eyewear	Standard Precautions
Special handling of equipment	Single use or if reusable, reprocess before next patient. Avoid contaminating environmental surfaces and equipment with used gloves.
Transport of patients	Surgical mask if coughing/sneezing and other signs and symptoms of an infectious transmissible disease spread by airborne or droplet route. Notify the area receiving patient. Advise transport staff of level of precautions to be maintained
Alerts	Remove gloves and gown/apron and perform hand hygiene on leaving the room. Patient Medical Records must not be taken into the room. Signage of room.
Room cleaning	Standard cleaning protocol. May require additional cleaning with a disinfectant agent depending on organism. Consult with infection prevention and control professional.

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APPENDIX 2: DROPLET PRECAUTIONS

Requirements	Droplet Precautions
Single room	Yes, or cohort with patient with same pathogen (in consultation with infection control professional, or infectious diseases physician), or maintain spatial separation of at least one metre It is recommended that single patient rooms be fitted with ensuite facilities. In the advent of no ensuite facilities, a toilet and bathroom should be dedicated for individual or cohort patient use.
Negative pressure*	No
Hand hygiene	Yes
Gloves	Standard Precautions
Gown/apron	Standard Precautions
Mask	Yes, Surgical mask. Remove mask after leaving patients room.
Protective eyewear	Yes
Special handling of equipment	Standard Precautions
Transport of patients	Surgical mask if coughing/sneezing and other signs and symptoms of an infectious transmissible disease spread by airborne or droplet route. Surgical mask for patient when they leave the room. Patients on oxygen therapy must be changed to nasal prongs and have a surgical mask over the top of the nasal prongs for transport (if medical condition allows). Advise transport staff of level of precautions to be maintained. Notify area receiving the patient.
Alerts	When cohorting patients, they require minimum of one metre of patient separation. Visitors to patient room must wear a fluid resistant surgical mask and protective eyewear and perform hand hygiene. Patient Medical Records must not be taken into the room. Signage of room.
Room cleaning	Cleaning and Disinfection

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APPENDIX 3: AIRBORNE PRECAUTIONS

Requirements	Airborne Precautions
Single room	Yes Door closed. It is recommended that single patient rooms be fitted with ensuite facilities. In the advent of no ensuite facilities, a toilet and bathroom should be dedicated for individual patient use.
Negative pressure*	Yes, if available otherwise single room with door closed and window open.
Hand hygiene	Yes
Gloves	Standard Precautions
Gown/apron	Standard Precautions
Mask	Yes, P2/N95 Mask (perform fit check prior to entering room) Remove mask after leaving patient room.
Protective eyewear	Standard Precautions
Special handling of equipment	Standard Precautions Avoid contaminating environmental surfaces and equipment with used gloves.
Transport of patients	Surgical mask for patient when they leave the room ^{3,4} Patients on oxygen therapy must be changed to nasal prongs and have a surgical mask over the top of the nasal prongs for transport (if medical condition allows). Advise transport staff of level of precautions to be maintained. Surgical mask if coughing/sneezing and other signs and symptoms of an infectious transmissible disease spread by airborne or droplet route. Notify area receiving patient.
Alert	Visitors to patient room must also wear P2/N95 mask and perform hand hygiene. Patient Medical Records must not be taken into the room. Signage of room.
Room cleaning	Cleaning and Disinfection