

## Airborne precautions, AU

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### ■ Introduction

Airborne precautions, used in addition to standard precautions, prevent the spread of infectious droplet nuclei, which are small particles (less than 5 micrometres) suspended in the air and dispersed over long distances by air currents.

Susceptible individuals can inhale these suspended particles even without having face-to-face contact with the source of the particles (for example, the infected individual).<sup>1 2</sup> (See [Conditions requiring airborne precautions.](#))

◆ **Clinical alert:** Please refer to the latest recommendations, *Infection prevention and control principles and recommendations for Ebola virus disease* from the Australian Government Department of Health<sup>3</sup> when caring for a patient with known or suspected Ebola virus infection.◆

CONDITIONS REQUIRING AIRBORNE PRECAUTIONS		
<p>If a patient is known to have a condition that requires airborne precautions, the health care facility should follow the <i>Australian Guidelines for the Prevention and Control of Infection in Healthcare</i> isolation precautions <i>to prevent the spread of the organism by the airborne route.</i><sup>1</sup> This table outlines some common conditions that require airborne precautions, including the required duration and special considerations.<sup>1 2</sup></p>		
Condition	Precautionary period	Special considerations (as applicable)
Avian influenza	For the duration of the illness	<p>Transmission of infection from birds to humans is rare but occurs from close contact with infected poultry or inhaling dust contaminated with their excrement</p> <p>In addition, requires direct contact precautions</p>
Chickenpox (varicella)	Until lesions are dry and crusted and no new lesions appear	<p>Susceptible health care workers shouldn't enter the room if immune health care workers are available</p> <p>Institute contact precautions to avoid direct contact with fluid in blisters or nasopharyngeal secretions</p> <p>Consider post-exposure prophylaxis in high-risk individuals and late pregnancy</p>
Herpes zoster (disseminated disease [rash affects three or more dermatomes] <sup>1</sup> in <i>any</i> patient], or localised disease in an <i>immunocompromised</i> patient until disseminated disease is ruled out)	<p>Duration of illness</p> <p>(If wound lesions are present, until wounds stop draining, are dry and crusted)</p>	<p>Susceptible health care workers shouldn't provide direct care if immune health care workers are available</p> <p>Institute contact precautions</p>
Measles (rubeola)	For 4 days after onset of rash	Susceptible health care workers shouldn't enter the

	For duration of illness in immunocompromised patients	room if immune health care workers are available
Monkeypox	Until the disease is confirmed and smallpox is excluded	Institute contact precautions until lesions have crusted
Severe acute respiratory syndrome (SARS)	Duration of illness plus 10 days after resolution of fever, provided respiratory symptoms are absent or improving	Wear eye protection (goggles or face shield) N95 or higher respiratory protection surgical mask if N95 unavailable Institute direct contact precautions Perform vigilant environmental disinfection
Smallpox	Duration of illness until all scabs have crusted and separated (typically 3 to 4 weeks)	Instituted contact precautions Unvaccinated health care workers shouldn't provide care if immune health care workers are available P2/N95 or higher respiratory protection for both susceptible and vaccinated individuals Post-exposure vaccine within 4 days of exposure is protective
Tuberculosis, extrapulmonary, draining lesion	Until the patient improves clinically and drainage has stopped or until three consecutive negative cultures of continued drainage are obtained <sup>1</sup> <sup>2</sup>	Institute contact precautions
Tuberculosis, pulmonary or laryngeal disease, confirmed	Until the patient improves clinically while on effective therapy (such as a decreased cough and fever or improved chest X-ray results), usually after 1 week, and has three consecutive sputum smears negative for acid-fast bacillus, collected on separate days <sup>1</sup> <sup>2</sup> Consult with respiratory physician	
Tuberculosis (TB), pulmonary or laryngeal disease, suspected	Until active TB is excluded and either another diagnosis explains the clinical findings or the results of three consecutive sputum smears for acid-fast bacillus, collected 8 to 24 hours apart are negative, including one early morning specimen <sup>1</sup> <sup>2</sup>	At least one of the three sputum specimens should be collected in the morning <sup>1</sup> <sup>2</sup>

Effective airborne precautions require an airborne-infection isolation room—a single-patient room that's equipped with monitored negative pressure (in relation to the surrounding area).

An airborne-infection isolation room should have 12 air exchanges per hour if the room has been newly constructed or renovated, or six air exchanges per hour if it's an existing room. The air is either vented directly to the outside of the building or filtered through high-efficiency particulate air (HEPA) filtration before recirculation.<sup>1</sup><sup>2</sup><sup>3</sup>

According to the Australasian Health Facility Guidelines, air pressure should be monitored daily, using visual indicators, while the room is in use.<sup>4</sup> The door to the room should be kept closed to maintain the proper air pressure balance between the isolation room and the adjoining hallway or corridor. An anteroom is preferable.

All people who enter an airborne-infection isolation room must wear respiratory protection, which is provided by a disposable respirator (such as a P2/N95 respirator or a disposable high-efficiency particulate air [HEPA] respirator) or a reusable respirator (such as a reusable HEPA respirator or a powered air-purifying respirator [PAPR]) when infectious pulmonary or laryngeal tuberculosis or smallpox is suspected or confirmed, and during procedures that cause aerosolisation of viable organisms in patients with suspected or confirmed infectious tuberculosis skin lesions.<sup>1 2 3 4</sup>

Regardless of the type of respiratory protection worn, ensure a proper fit to the face each time you wear a respirator by performing a user seal check.<sup>1 2 3 4</sup> When using a PAPR, ensure proper functioning of the unit.

At present, there are no recommendations for the type of personal protective equipment (for example, surgical mask or respiratory protection with an N95 or higher respirator) to be worn by susceptible health care personnel or those with presumed immunity who must have contact with patients with known or suspected measles, chickenpox, or disseminated herpes zoster.<sup>1 2</sup>

♦ **Clinical alert:** When a patient comes to your health care facility complaining of respiratory symptoms and an airborne infection is suspected, put a surgical mask on the patient's face (if tolerated) and immediately place the patient in a private room with the door closed until an airborne-infection isolation room is available. If the patient can't tolerate a mask, place the patient in a private room with the door closed and wear a respirator when entering the room and caring for the patient. ♦

## Equipment

- Isolation sign
- Tissues
- Non-touch waste receptacle
- Optional: P2 respirator (either disposable N95 or HEPA respirator or reusable HEPA respirator or PAPRs), surgical masks, gloves, gown

## Preparation of Equipment

Inspect all equipment and supplies; if a product is expired, its integrity appears compromised, or it's found to be defective, remove it from patient use, label it as expired or defective, and report the expiry or defect as directed by your health care facility.

Keep all airborne precaution supplies outside the patient's room in a wall- or door-mounted cabinet, a trolley, or an anteroom.

## Implementation

- Review the patient's medical record and verify the need for airborne precautions.
- Gather and prepare the necessary equipment.
- Perform hand hygiene.<sup>1 5 6</sup>
- Confirm the patient's identity using at least three patient identifiers.
- Situate the patient in a single-patient airborne-infection isolation room with the door closed *to maintain negative pressure*.<sup>1 2</sup> If possible, the room should have an anteroom. Ensure that a private bathroom, if available, is also under negative air pressure. Monitor negative pressure according to regulations.
- Explain isolation precautions to the patient and family or carer according to their individual communication and learning needs *to increase their understanding, allay their fears, and enhance cooperation*.<sup>2</sup>
- Keep the patient's door (and the anteroom door) closed at all times *to maintain negative pressure and to contain the airborne pathogens*.<sup>1 2</sup> Put an AIRBORNE PRECAUTIONS sign on the door *to notify anyone entering the room of the situation*.
- Before entering the room, if needed, put on a respirator according to the manufacturer's instructions.<sup>1 2</sup> Adjust the straps for a firm but comfortable fit. Check the seal. (See respirator [seal check](#).)

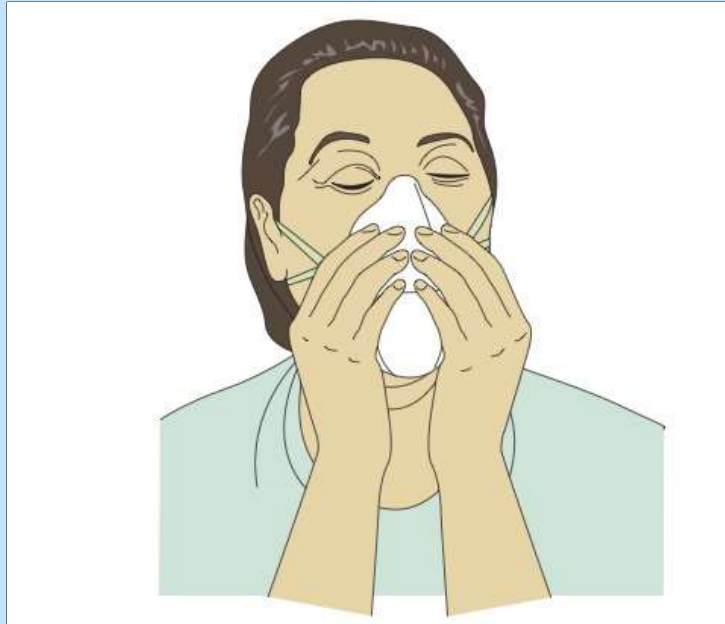


**EQUIPMENT****Respirator SEAL CHECK**

After you put on your respirator, perform a seal check by placing your hands over the face-mask, as shown below, then exhaling gently.

The seal is considered satisfactory if a slight positive pressure builds up inside the face-mask without air leaking from the seal.<sup>1</sup>

Air leakage is evidenced by the fogging of your glasses, a feeling of air trickling down your uncovered face, or a lack of pressure build-up under the face-mask.



If the respirator has an exhalation valve, cover the filter surface with your hands as much as possible, then inhale. The seal is considered satisfactory if the face-mask collapses on your face and you don't feel air passing between your face and the face-mask.

- If you're using a PAPR, check for proper function, battery life, and air flow.
- Perform hand hygiene.<sup>1 5 6</sup>
- Enter the patient's room and remove the patient's mask if they are wearing one.
- Provide the patient with tissues and instruct the patient to cover their nose and mouth with a tissue when coughing or sneezing. Place a sign in the patient's room as a reminder.<sup>1 2</sup>
- Provide the patient with a non-touch waste receptacle for used tissue disposal. Instruct the patient to dispose of tissues in the waste receptacle after use and to perform hand hygiene after contact with respiratory secretions and contaminated objects.<sup>8</sup>
- Perform hand hygiene.<sup>1 5 6</sup>
- If worn, remove your respirator after leaving the patient's room and closing the door. To remove your respirator, grasp the bottom, then the top elastic; *avoid touching the front of the respirator because the front is considered contaminated.*<sup>1 3 8</sup>
- As appropriate, discard the respirator in an appropriate waste receptacle, or store it for reuse. You may reuse an N95 respirator according to the manufacturer's recommendations if it isn't damaged or soiled.<sup>1</sup>
- Perform hand hygiene.<sup>1 5 6</sup>
- Document the procedure.<sup>7</sup>

**Special Considerations**

- Fit testing is performed to confirm that the respirator fits the user adequately. It's performed initially, then periodically at a frequency determined by state or territory guidelines and local regulations.<sup>1 3</sup> Fit testing also should be performed with changes in physical features that could affect the respirator fit (such as scarring, weight loss or gain, or dental changes).<sup>1</sup>
- Teach visitors the correct way to wear respiratory protection, and make sure they wear it while they're in the patient's room.<sup>1</sup>
- Limit the patient's movement from the airborne-infection isolation room. If the patient must leave for essential procedures, ensure they wear a surgical mask that covers their nose and mouth.<sup>1 2</sup> Notify the receiving staff of the patient's isolation precautions *so that the precautions will be maintained and the patient will be returned to the airborne-infection isolation room promptly*. If the patient has skin lesions from varicella, smallpox or *Mycobacterium tuberculosis*, the lesions should be covered *to decrease the risk of aerosolisation during transport*.<sup>1 2</sup>
- Depending on the type of respirator and recommendations from the manufacturer, discard your respirator or store it until the next use.<sup>1 2</sup> A reusable respirator should be stored by hanging it in a designated storage area or by placing it in a clean, breathable container such as a paper bag. Store respirators so they don't touch each other and make sure the person using the respirator is identified clearly *to minimise potential cross-contamination*.<sup>1</sup>
- If a patient on airborne precautions requires surgery, schedule the procedure when a minimal number of health care workers and other patients are present. If possible, schedule it as the last case of the day so that more time is available to clean and disinfect the operating room. Use an operating room with an anteroom, if possible. Ensure all health care workers involved in the surgery wear respiratory protection.<sup>1 2</sup>
- After a patient with suspected or confirmed *M. tuberculosis* leaves an airborne-infection isolation room, allow adequate time to elapse before allowing entry of another patient *to ensure removal of contaminated air from the room*. Consult with an infection preventionist about the appropriate length of time. The Australasian Health Facility Guidelines recommend that a room with six air exchanges/hour be left empty for 69 minutes to effectively remove 99.9% of airborne contaminants.

## ■ Complications

Social isolation is a complication of airborne precautions.

## ■ Documentation

Record the need for airborne precautions on the nursing care plan and as otherwise determined by your health care facility.

Document the start date and time and maintenance of the precautions, and the patient's tolerance of the procedure.

Document teaching provided to the patient and family or carer, their understanding of that teaching, and any need for follow-up teaching.

Also document the date at which airborne precautions were discontinued.

*This procedure has been endorsed by the Australian College of Nursing.*



## ■ References

[\(Rating System for the Hierarchy of Evidence for Intervention/Treatment Questions\)](#)

1. Australian Commission on Safety and Quality in Health Care. (2019). *Australian guidelines for the prevention and control of infection in healthcare*. Retrieved November 2019 from <https://www.nhmrc.gov.au/file/14289/download?token=QNDTcrjY> (Level V)
2. Hand Hygiene Australia. (2017). *Appropriate glove use*. Retrieved November 2019 from <https://www.hha.org.au/hand-hygiene/what-is-hand-hygiene/glove-use> (Level V)
3. Australian Government Department of Health. (2015). *Infection prevention and control principles and recommendations for Ebola virus disease: Including information about personal protective equipment for clinical care of patients with suspected or confirmed Ebola virus disease in the Australian healthcare setting*. Retrieved November 2019 from [https://www1.health.gov.au/internet/main/publishing.nsf/Content/D9CE7F7977BFB6A8CA257D8D00834F53/\\$File/ebola-infections-prevention-final-Mar2015.pdf](https://www1.health.gov.au/internet/main/publishing.nsf/Content/D9CE7F7977BFB6A8CA257D8D00834F53/$File/ebola-infections-prevention-final-Mar2015.pdf) (Level V11)
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5. Hand Hygiene Australia. (2017). *5 Moments for hand hygiene*. Retrieved November 2019 from <https://www.hha.org.au/hand-hygiene/5-moments-for-hand-hygiene> (Level V)
6. Hand Hygiene Australia. (2017). *What is hand hygiene?* Retrieved November 2019 from <https://www.hha.org.au/hand-hygiene/what-is-hand-hygiene> (Level V)
7. World Health Organization. (2009). *WHO guidelines on hand hygiene in health care: First global patient safety challenge, clean care is safer care*. Retrieved November 2019 from [http://apps.who.int/iris/bitstream/10665/44102/9789241597906\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/44102/9789241597906_eng.pdf) (Level IV)
8. Australian Commission on Safety and Quality in Health Care. (2017). *National safety and quality health service standards* (2nd ed.). Retrieved November 2019 from <https://www.safetyandquality.gov.au/standards/nsqhs-standards> (Level V)

## ■ Additional References

- Cheng, V. C., et al. (2015). Infection control preparedness for human infection with influenza A H7N9 in Hong Kong. *Infection Control and Hospital Epidemiology*, 36, 87–92. (Level VI)  
[Abstract](#) | [Complete Reference](#)

### Rating System for the Hierarchy of Evidence for Intervention/Treatment Questions

The following leveling system is from *Evidence-Based Practice in Nursing and Healthcare: A Guide to Best Practice* (2<sup>nd</sup> ed.) by Bernadette Mazurek Melnyk and Ellen Fineout-Overholt.

Level I: Evidence from a systematic review or meta-analysis of all relevant randomized controlled trials (RCTs)

Level II: Evidence obtained from well-designed RCTs

Level III: Evidence obtained from well-designed controlled trials without randomization

Level IV: Evidence from well-designed case-control and cohort studies

Level V: Evidence from systematic reviews of descriptive and qualitative studies

Level VI: Evidence from single descriptive or qualitative studies

Level VII: Evidence from the opinion of authorities and/or reports of expert committees

*Modified from Guyatt, G. & Rennie, D. (2002). Users' Guides to the Medical Literature. Chicago, IL: American Medical Association; Harris, R.P., Helfand, M., Woolf, S.H., Lohr, K.N., Mulrow, C.D., Teutsch, S.M., et al. (2001). Current Methods of the U.S. Preventive Services Task Force: A Review of the Process. American Journal of Preventive Medicine, 20, 21-35.*