



ASA CLINICAL STATEMENT | INFECTION PREVENTION AND CONTROL

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Introduction

To support sonographers in their implementation of safe and effective infection control practices, the Australasian Sonographers Association (ASA) has compiled extracts from the *Australian Guidelines for the Prevention and Control of Infection in Healthcare* developed by the National Health and Medical Research Council (NHMRC) that are relevant to sonographers.

This document contains extracts and summaries from the NHMRC Guidelines which are of most relevance to sonographers in their day-to-day clinical practice and should be used and referred to by all sonographers. This advice should be read together with other clinical guidance produced by the ASA.

This document is not intended to act as a replacement to the NHMRC Guidelines. ASA recommends that sonographers become familiar with the NHMRC Guidelines and have ready access to a copy in their workplace. The NHMRC Guidelines are published on the MAGICapp platform (<https://app.magicapp.org/#/guideline/Jn37kn>) and can be accessed online or downloaded in PDF format for reference. The online document is live, so is regularly updated and supersedes any previous references to the 2010 version.

In the first instance, sonographers should always follow their workplace protocols. If there are significant discrepancies between the guidelines in this document and a sonographer's workplace protocols or departmental policies, it is recommended that sonographers should seek to bring about change in their workplace through appropriate organisational channels.

Scope of this document

This document is designed to provide sonographers with practical and effective recommendations to minimise the risk of transmission of infectious agents in the workplace. As this document is focused specifically on the practices of sonographers, guidelines related to management strategies for infection prevention and control that are targeted at employers and healthcare organisations are not included.

It is recognised that employers and healthcare organisations have a significant role to play in managing and establishing infection prevention and control strategies to ensure the risk of infection in healthcare is effectively minimised. The complete NHMRC Guidelines contain information on how employers and healthcare organisations can encourage, improve and maintain best practice by their clinical staff in the prevention and control of infection in healthcare.

The safe use and storage of ultrasound gel is not covered in this resource as the ASA provides clinical guidance on this topic in a dedicated resource. The *ASA Clinical Statement: Safe use and storage of ultrasound gel* (revised February 2021) is available on the ASA website www.sonographers.org.

Structure of the guidelines

The guidelines are based around the following core principles:

- an understanding of the modes of transmission of infectious agents and of risk management
- effective work practices that minimise the risk of transmission of infectious agents
- governance structures that support the implementation, monitoring and reporting of infection prevention and control work practices
- compliance with legislation, regulations and standards relevant to infection control.

Infection prevention and control in the healthcare setting

- Infectious agents (also called pathogens) are biological agents that cause disease or illness to their hosts. Many infectious agents are present in healthcare settings.
- Infection includes six elements – causative agent (pathogen), reservoir, portal of exit, means of transmission, portal of entry, and a susceptible host.
- Patients and healthcare workers are most likely to be sources of infectious agents and are also the most common susceptible hosts. Other people visiting and working in healthcare may also be at risk of both infection and transmission. In some cases, healthcare associated infections (HAIs) are serious or even life-threatening.
- In healthcare settings, the main modes for transmission of infectious agents are contact (including blood-borne), droplet and airborne.

How standard precautions are implemented

1. Personal hygiene practices, particularly **hand hygiene**, aim to reduce the risk of contact transmission of infectious agents (see Section 3.1.1).
2. Appropriate use of **personal protective equipment (PPE)**, which may include gloves, gowns, plastic aprons, masks/face shields and eye protection, aims to prevent exposure of the healthcare worker and patients to infectious agents (see Section 3.3).
3. **Safe handling and disposal of sharps** assist in preventing transmission of blood-borne diseases to healthcare workers (see Section 3.1.2).
4. **Environmental controls**, including cleaning and spills management, assist in preventing transmission of infectious agents from the environment to patients (see Sections 3.1.3 and 4.6.1).
5. Appropriate **reprocessing of reusable equipment and instruments**, including appropriate use of disinfectants, aims to prevent patient-to-patient transmission of infectious agents (see Section 3.1.4).
6. Practising **respiratory hygiene and cough etiquette** reduces risk of transmission of infection (see Section 3.1.5).
7. **Aseptic technique** aims to prevent microorganisms on hands, surfaces or equipment from being introduced into a susceptible site (see Section 3.1.6).
8. Appropriate handling of **waste and linen** assists in reducing transmission of infectious agents (see Sections 3.1.7 and 3.1.8).

Standard precautions should be used in the handling of blood (including dried blood); all other body substances, secretions and excretions (excluding sweat), regardless of whether they contain visible blood, non-intact skin, and mucous membranes.

1. Hand hygiene

The key emphasis in any setting is to perform hand hygiene before and after any procedure, and after each consultation with a patient.

Routine hand hygiene

It is recommended that routine hand hygiene is performed:

- before touching a patient
- before a procedure
- after a procedure or body substance exposure risk
- after touching a patient
- after touching a patient's surroundings.

Hand hygiene must also be performed before putting on gloves and after the removal of gloves.

It is recommended that alcohol-based hand rubs that contain between 60% and 80% v/v ethanol or equivalent should be used for all routine hand hygiene practices.

It is good practice that alcohol-based hand rubs that meet the requirements of European Standard EN 1500 are used for all routine hand hygiene practices.

Alcohol-based hand rubs

One advantage of alcohol-based hand rubs is that they are easily accessible at point of care. They have:

- excellent antimicrobial activity against Gram-positive and Gram-negative vegetative bacteria, *Mycobacterium tuberculosis* and a wide range of fungi
- generally good antimicrobial activity against enveloped viruses
- lesser and/or variable antimicrobial activity against non-enveloped viruses (such as norovirus)
- no activity against protozoan oocysts and bacterial spores (such as *C. difficile*) (see Section 3.2.2).

Choosing an alcohol-based hand rub

It is necessary to choose products:

- that have excellent antimicrobial efficacy combined with good user acceptability and skin tolerability (dermal tolerance, fragrance, colour, texture and ease of use)
- that are TGA approved as a hand hygiene product
- meet the requirements of EN1500 testing standards for bactericidal effect (which are currently referred to by TGA).

Use of alcohol-based hand rub

- Apply the amount of alcohol-based hand rub recommended by the manufacturer onto dry hands.
- Rub hands together so that the solution comes into contact with all surfaces of the hand, paying particular attention to the tips of the fingers, the thumbs and the areas between the fingers.
- Continue rubbing until the solution has evaporated and the hands are dry.

Using soap (including antimicrobial soap) and water

- Wet hands under tepid running water and apply the recommended amount of liquid soap.
- Rub hands together for a minimum of 20 seconds so that the solution comes into contact with all surfaces of the hand, paying particular attention to the tips of the fingers, the thumbs and the areas between the fingers.
- Rinse hands thoroughly under running water, then pat dry with single-use towels.

Plain soaps act by mechanical removal of microorganisms and have no antimicrobial activity. They are sufficient for general social contact and for cleansing of visibly soiled hands. They are also used for mechanical removal of certain organisms such as *C. difficile* and norovirus.

Individual actions for reducing the risk

- Follow the five moments for hand hygiene, even when it seems that there is not enough time.
- Become familiar with your facility policy on hand hygiene and follow it.
- Use the appropriate product for the situation and use it as directed.
- Follow facility policy on cuts and abrasions, fingernails, nail polish and jewellery.
- Use hand-care products provided by your organisation; your own products may not be compatible with the hand hygiene products provided.
- Minimise physical contact with patient surroundings.
- Lead by example and champion hand hygiene in your setting.
- Attend hand hygiene education sessions regularly to refresh your knowledge and skills.
- Contact the person with designated responsibility for occupational health or infection prevention and control if you have a reaction to hand hygiene and hand-care products used in your setting.
- If alcohol-based hand rub is not readily accessible at key points of care in a patient care area, consider approaching management.

2. Personal protective equipment

What are the risks?

Personal protective equipment (PPE) refers to a variety of barriers, used alone or in combination, to protect mucous membranes, airways, skin and clothing from contact with infectious agents. PPE used as part of standard precautions includes aprons, gowns, gloves, surgical masks, protective eyewear, and face shields. Selection of PPE is based on the type of patient interaction, known or possible infectious agents, and/or the likely mode(s) of transmission.

Decision-making about PPE

Selection of protective equipment must be based on assessment of the risk of transmission of infectious agents to the patient or carer and the risk of contamination of the clothing or skin of healthcare workers or other staff by patients' blood, body substances, secretions or excretions. Local policies and current health and safety legislation should also be taken into account.

Factors to be considered are:

- probability of exposure to blood and body substances
- type of body substance involved
- probable type and probable route of transmission of infectious agents.

All PPE must meet relevant TGA criteria for listing on the Australian Register of Therapeutic Goods (ARTG) or equivalent and should be used in accordance with manufacturer's recommendations.

Where to wear PPE

PPE is designed and issued for a particular purpose in a protected environment and should not be worn outside that area. Protective clothing provided for staff that has been in contact with patients should not be worn outside the patient care area. Inappropriate wearing of PPE (e.g. wearing operating suite/room attire in the public areas of a hospital or wearing such attire outside the facility) may also lead to a public perception of poor practice within the facility.

Aprons and gowns

International guidelines recommend that protective clothing (apron or gown) be worn by all healthcare workers when:

- close contact with the patient, materials or equipment may lead to contamination of skin, uniforms or other clothing with infectious agents
- there is a risk of contamination with blood, body substances, secretions or excretions (except sweat). Gowns and aprons must be changed between patients.

Considerations in choosing a type of gown (e.g. long or short-sleeved) that is appropriate for the activity are:

- the volume of body substances likely to be encountered
- the extent and type of exposure to blood and body substances
- the probable type and route of transmission of infectious agents.

If a fluid-resistant full body gown is required, it is always worn in combination with gloves and with other PPE when indicated. Full coverage of the arms and body front, from neck to the mid-thigh or below, ensures that clothing and exposed upper body areas are protected.

Removing aprons and gowns

Removal of aprons and gowns before leaving the patient care area (e.g. in the room or anteroom) prevents possible contamination of the environment outside the patient's room. Aprons and gowns should be removed in a manner that prevents contamination of clothing or skin. The outer 'contaminated' side of the gown is turned inward and rolled into a bundle, and then discarded into a designated container for waste or linen to contain contamination.

Wearing of gloves

Gloves must be worn as a single-use item for:

- each invasive procedure
- contact with sterile sites and non-intact skin or mucous membranes
- activity that has been assessed as carrying a risk of exposure to blood, body substances, secretions and excretions.

Gloves must be changed between patients and after every episode of individual patient care.

Sterile gloves

Sterile gloves must be used for aseptic procedures and contact with sterile sites.

Removing and disposing of gloves

Gloves (other than utility gloves) should be treated as single-use items. They should be put on immediately before a procedure and removed as soon as the procedure is completed.

When removing gloves, care should be taken not to contaminate the hands. After gloves have been removed, hand hygiene should be performed in case infectious agents have penetrated through unrecognised tears or have contaminated the hands during glove removal.

Surgical masks

Surgical masks are loose fitting, single-use items that cover the nose and mouth. They are used as part of standard precautions to keep splashes or sprays from reaching the mouth and nose of the person wearing them. They also provide some protection from respiratory secretions and are worn when caring for patients on droplet precautions. Surgical masks can be placed on coughing patients to limit potential dissemination of infectious respiratory secretions from the patient to others.

Considerations when using a surgical mask

- Masks should be changed between patients and when they become soiled or wet.
- Masks should never be reapplied after they have been removed.
- Masks should not be left dangling around the neck.
- Touching the front of the mask while wearing it should be avoided.
- Hand hygiene should be performed upon touching or discarding a used mask.

Eye protection and face shields

- Protective eye goggles and face shields are not usually a necessary item of PPE for sonographers; however, if required, further information on these can be obtained from the guidelines.
- Personal eyeglasses and contact lenses are not considered adequate eye protection.

Removing face and eye protection

Removal of a face shield, protective eyewear and surgical mask can be performed safely after gloves have been removed and hand hygiene performed. The ties, earpieces and/or headband used to secure the equipment to the head are considered 'clean' and therefore safe to touch with bare hands. The front of a mask, protective eyewear or face shield is considered contaminated.

3. Use and management of sharps, safety engineered devices and medication vials

The use of sharp devices exposes healthcare workers to the risk of injury and potential exposure to blood-borne infectious agents, including hepatitis B virus, hepatitis C virus and human immunodeficiency virus (HIV).

Sharps injuries can occur in any healthcare setting, including non-hospital settings such as in office-based practices, home healthcare and long-term care facilities. Injuries most often occur:

- during use of a sharp device on a patient (41%)
- after use and before disposal of a sharp device (40%)
- during or after appropriate or inappropriate disposal of sharp devices (15%).

There are many possible mechanisms of injury during each of these periods.

Hollow bore needles are of particular concern, especially those used for blood collection or intravascular catheter insertion, as they are likely to contain residual blood and are associated with an increased risk for blood-borne virus transmission. Non-hollow bore sharps, such as glass vials and suture needles, have also been involved in sharps incidents.

Individual actions for reducing the risk

- Explain to patients the risks to healthcare workers and others involved in the use and disposal of sharps and the measures taken to reduce these.
- Become familiar with facility protocols on handling and disposal of sharps and legislated notifiable incidents.
- Use the appropriate product for the situation and use it as directed – safety devices should be considered, where appropriate, to minimise risk of injury.
- Avoid using needles where safe and effective alternatives are available.
- Before using any sharp medical device, such as needles or scalpels, always plan for their safe handling and immediate disposal at the point of use.
- Make sure every used sharp medical device, such as needles, scalpels, etc., are disposed of properly in puncture-resistant sharps containers located at the point-of-use.
- Report any needlestick or sharps-related injuries promptly as relevant (e.g. to infection control or occupational health and safety professional, management, insurer) and ensure that you receive appropriate follow-up care.
- Ensure that you are vaccinated against blood-borne viruses such as hepatitis B.
- Participate in education sessions and professional development sessions on handling sharps, as well as those on new safety devices and how to use them.

In the event of a sharps injury

- Seek care immediately if you sustain a sharps injury.
- If skin is penetrated, wash the affected area immediately with soap and water. Alcohol-based hand rub can be used to clean the area if soap and water are not available.
- Do not squeeze the affected area.
- Report the incident immediately to your supervisor.
- Ask about follow-up care, including post-exposure prophylaxis, which is most effective if implemented soon after the incident.
- Complete an accident/incident report form, including the date and time of the exposure, how it happened, and name of the source individual (if known).
- If a sharps injury happens to you, you can be reassured that only a small proportion of accidental exposures result in infection. Taking immediate action will lower the risk even further.

4. Management of the physical environment

Environmental surfaces can be safely decontaminated using less rigorous methods than those used on medical instruments and devices. The level of cleaning required depends on the objects involved and the risk of contamination – for example, surfaces that are likely to be contaminated with infectious agents (e.g. shared clinical equipment) require cleaning between patient uses, which is more often than general surfaces and fittings. This particularly applies to ultrasound transducers and the surface of the examination couch.

However, all surfaces require regular cleaning. Thorough cleaning of all surfaces is necessary after spills and between patient uses of a room or patient care area, especially in acute care settings.

It is good practice to routinely clean surfaces as follows:

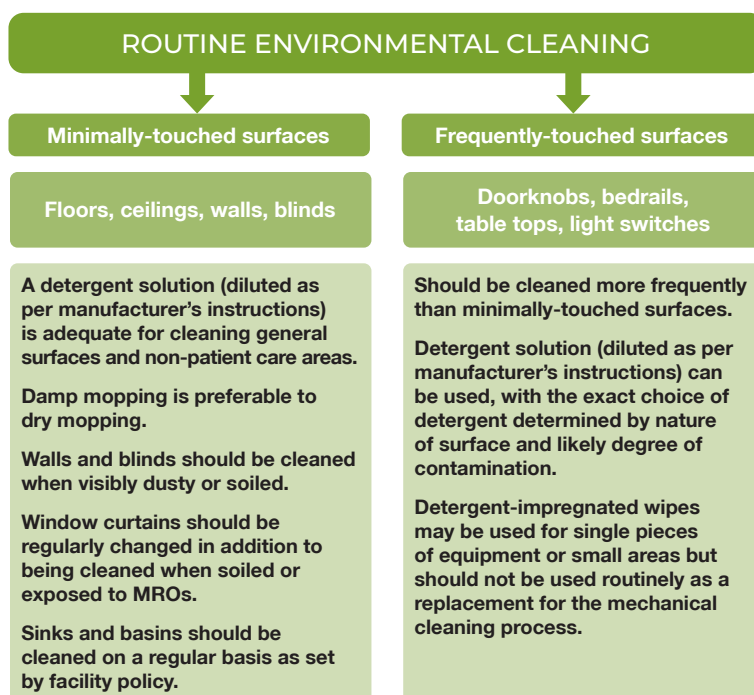
- Clean frequently touched surfaces with detergent solution at least daily, when visibly soiled, and after every known contamination.
- Clean general surfaces and fittings when visibly soiled, and immediately after spillage.

Factors to consider when choosing appropriate cleaning products

- Cleaning products used on different surfaces should be determined by risk assessment.
- Initial mechanical cleaning with a suitable detergent followed by disinfection with Therapeutic Goods Administration (TGA) listed hospital-grade disinfectant with specific claims or a chlorine-based product such as sodium hypochlorite, where indicated for use.
- Cleaning products should be determined by the intended purpose of the product as per manufacturer’s instructions.
- Cleaning products should be determined by ensuring that manufacturer’s instructions are able to be complied with in the facility.
- Cleaning products should be determined by the suitability of the product to the surface or setting.
- Cleaning products should be determined by the practical application of using the product or technology with available resources, including trained staff.
- Cleaning products should be determined by the effectiveness of the product against particular organisms, including microbiological activity and contact time to kill microorganisms.

Routine environmental cleaning

General surfaces and the cleaning requirements for each can be divided into two groups:





Decontamination after spills of blood or other potentially infectious materials

Spills of blood or other potentially infectious materials should be promptly cleaned as follows:

- Wear utility gloves and other PPE appropriate to the task.
- Confine and contain spill, clean visible matter with disposable absorbent material and discard the used cleaning materials in the appropriate waste container.
- Clean the spill area with a cloth or paper towel using detergent solution.

Use of chemical disinfectants, such as sodium hypochlorite, should be based on assessment of risk of transmission of infectious agents from that spill.

5. General criteria for reprocessing and storage of equipment and instruments in the ultrasound setting

Level of risk	Process	Examples	Storage
<p>*Critical Entry or penetration into sterile tissue, cavity or bloodstream</p>	<ul style="list-style-type: none"> • Clean thoroughly after using • Sterilise after cleaning • Ensure critical items are sterilised between each patient use 	<ul style="list-style-type: none"> • Surgical forceps used in sterile procedures such as Implanon removal under ultrasound guidance • Implants and ultrasound probes used in sterile body cavities 	<ul style="list-style-type: none"> • The integrity of the wrap must be maintained • Unpackaged sterile items must be used immediately or resterilised
<p>Semi-critical Contact with intact mucous membranes or non-intact skin</p>	<ul style="list-style-type: none"> • Clean thoroughly after using • Sterilise using a high level TGA-included chemical or thermal sterilant or medical device disinfectant 	<ul style="list-style-type: none"> • Probes, including transoesophageal echocardiogram, transrectal ultrasound and transvaginal probes 	<ul style="list-style-type: none"> • Store to prevent environmental contamination
<p>Non-critical Contact with intact skin</p>	<ul style="list-style-type: none"> • Clean as necessary with detergent solution • Disinfect, if necessary, with compatible low or intermediate level TGA-included sterilant or medical device disinfectant after cleaning 	<ul style="list-style-type: none"> • Non-invasive ultrasound probes (<i>not used in contact with non-intact skin or mucous membranes</i>) 	<ul style="list-style-type: none"> • Store in a clean, dry place to prevent environmental contamination

6. Respiratory hygiene and cough etiquette

Respiratory hygiene and cough etiquette should be applied as a standard infection control precaution at all times.

Covering sneezes and coughs prevents infected persons from dispersing respiratory secretions into the air. Hands should be washed with soap and water after coughing, sneezing, using tissues, or after contact with respiratory secretions or objects contaminated by these secretions.

Steps to take in respiratory hygiene and cough etiquette.

- Cover the nose/mouth with disposable single-use tissues when coughing, sneezing, wiping and blowing nose.
- Use tissues to contain respiratory secretions.
- Dispose of tissues in the nearest waste receptacle or bin after use.
- If no tissues are available, cough or sneeze into the inner elbow rather than the hand.
- Practise hand hygiene after contact with respiratory secretions and contaminated objects/materials.
- Keep contaminated hands away from the mucous membranes of the eyes and nose.

Healthcare workers should also assist patients (e.g. elderly, children) who need assistance with containment of respiratory secretions. Those who are immobile will need a receptacle (e.g. plastic bag) readily at hand for the immediate disposal of used tissues and will need to be offered hand hygiene facilities.

7. Aseptic technique

Aseptic technique is a set of practices aimed at minimising contamination and is particularly used to protect the patient from infection during procedures. Many of the other work practices that form standard precautions are required for aseptic technique; however, adherence to these practices alone does not constitute aseptic technique. Sterile single-use equipment or instruments must be used according to manufacturer's instructions and in such a way that the sterility of the item is maintained.

Commercial frameworks to assist with the implementation of aseptic technique are available and may be practised in some healthcare facilities.

The five essential principles of aseptic technique are:

1. Sequencing

- Performing a risk assessment
- Pre-procedure preparation
- Performing the procedure
- Post procedure practices, handover and documentation.

2. Environmental control

Prior to aseptic procedures, healthcare workers must ensure there are no avoidable nearby environmental risk factors, such as bed making or patients using commodes.

3. Hand hygiene

Perform hand hygiene before a procedure and after a procedure or body fluid exposure.

4. Maintenance of aseptic fields

- Cleaning and/or disinfection of equipment and patient prior to procedure(s)
- Establishing an aseptic field
- Use of sterile equipment
- Maintenance of the aseptic field, including protecting the key sites and key parts
- Use of a non-touch technique.

5. PPE

Correct selection and use of sterile and non-sterile PPE.

8. Waste management

As there is currently no national definition of clinical waste in Australia, healthcare facilities, including community healthcare settings, need to conform to relevant state or territory legislation and regulations on the management of clinical and related wastes. Healthcare facilities should also refer to *Standard AS/NZS 3816: 2018* and the *Waste Management Association of Australia's industry code of practice [147]*. Refer to section 3.1.7 Waste management of the NHMRC guideline for state and territory resources for waste management (table 12).

When handling waste

- Apply standard precautions to protect against exposure to blood and body substances during handling of waste; wash hands following procedure.
- Segregation should occur at the point of generation.
- Waste should be contained in the appropriate receptacle (identified by colour and label) and disposed of according to the facility waste management plan.
- Healthcare workers should be trained in the correct procedures for waste handling.

Regardless of where waste is generated (e.g. from isolation rooms/patients versus routine patient care areas), the principles of determining whether it is to be treated as clinical or general waste remain the same.

Handling of linen

Healthcare facilities must have documented policies on the collection, transport and storage of linen. Healthcare facilities that process or launder linen must have documented operating policies consistent with *Standard AS/NZS 4146: 2000*.

All used linen should be handled with care to avoid dispersal of microorganisms into the environment and to avoid contact with staff clothing. The following principles apply for linen used for all patients (i.e. whether or not transmission-based precautions are required):

- Appropriate PPE is worn during handling of soiled linen to prevent exposure of skin and mucous membrane to blood and body substances.
- Used linen is 'bagged' at the location of use into an appropriate laundry receptacle.
- Used linen must not be rinsed or sorted in patient care areas or washed in domestic washing machines.
- Linen soiled with body substances should be placed into leak-proof laundry bags for safe transport.
- Hand hygiene is performed following the handling of used linen.
- Clean linen must be stored in a clean and dry place that prevents contamination by aerosols, dust, moisture and vermin, and is separate from used linen.

Patient items

Domestic-type washing machines must only be used for a patient's personal items (not for other linen). Washing must involve the use of an appropriate detergent and hot water. If hot water is not available, only individual patient loads can be washed at one time. Clothes dryers should be used for drying.

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