

The background of the cover is a photograph of an ultrasound probe resting on a surface, with a blurred computer keyboard visible in the upper left. The image is tinted with a green color scheme.

INFECTION PREVENTION AND CONTROL GUIDELINES FOR SONOGRAPHERS

An adapted summary of the *Australian Guidelines for the Prevention and Control of Infection in Healthcare*



the peak body and leading voice
for sonographers

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Infection Prevention and Control guidelines for Sonographers:

An adapted summary of the *Australian Guidelines for the Prevention and Control of Infection in Healthcare*

Introduction

The Australasian Sonographers Association (ASA) is dedicated to guiding the advancement of the sonography profession to ensure the community has access to quality sonographic services. A key strategic objective of the ASA is to promote and advocate for best practice in medical sonography through the development of evidence-based standards and guidelines.

To support sonographers in their implementation of safe and effective infection control practices, the ASA has compiled extracts from the *Australian Guidelines for the Prevention and Control of Infection in Healthcare*¹ developed by the National Health and Medical Research Council (NHMRC) that are relevant to sonographers. This document, *Infection Prevention and Control Guidelines for Sonographers: An adapted summary of the Australian Guidelines for the Prevention and Control of Infection in Healthcare*, contains extracts from the NHMRC guidelines of most relevance to sonographers in their day-to-day clinical practice, and should be used and referred to by all sonographers.

This adapted summary is not intended to act as a replacement to the NHMRC guidelines. ASA recommends all sonographers become familiar with the NHMRC guidelines and have access to a copy in their workplace. This adapted summary and any workplace protocols on infection control procedures should also be readily accessible in the workplace.

In the first instance, sonographers should always follow their workplace protocols. If there are significant discrepancies between the guidelines in the adapted summary 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 adapted summary

This adapted summary is primarily designed to provide sonographers with practical and effective practice recommendations to minimise the risk of transmission of infectious agents in the workplace. As this document is focused on the practices of individual 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, especially *Part C – Organisational Support*, 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.

Structure of adapted summary

This adapted summary contains direct extracts from the NHMRC guidelines that are most relevant to sonographers. For further details on any section beyond the extracts used, page numbers included at the end of each section in this summary refer to the extract's location in the NHMRC guidelines. Texts coloured in dark green in this summary are not direct extracts from the NHMRC guidelines, but additional information and clarification developed by ASA. The NHMRC has approved of this document as a valid summary of the *Australian Guidelines for the Prevention and Control of Infection in Healthcare*.

Extracts from the NHMRC guidelines are from pages 3–27 of this document.

1. National Health and Medical Research Council (2010). *Australian Guidelines for the Prevention and Control of Infection in Healthcare*. Canberra: Australian Government.

Extracts from the *Australian Guidelines for the Prevention and Control of Infection in Healthcare*:

NHMRC Disclaimer

This document aims to combine a review of the best available evidence with current clinical and expert practice. It is designed to provide information based on the best evidence available at the time of publication to assist in decision-making. The members of the Infection Control Guidelines Steering Committee, the Australian Commission for Safety and Quality in Health Care and the National Health and Medical Research Council give no warranty that the information contained in this document and any online updates available on the NHMRC website are correct or complete.

Infection prevention and control guidelines are necessarily general and are not intended to be a substitute for a healthcare professional's judgment in each case. The members of the Infection Control Guidelines Steering Committee, the Australian Commission for Safety and Quality in Health Care (ACSQHC) and the National Health and Medical Research Council shall not be liable for any loss whatsoever whether due to negligence or otherwise arising from the use of or reliance on this document.

Introduction

Scope

The guidelines were developed to establish a nationally accepted approach to infection prevention and control, focusing on core principles and priority areas for action. They provide a basis for healthcare workers and healthcare facilities to develop detailed protocols and processes for infection prevention and control specific to local settings.

This approach is underpinned by a risk-management framework to ensure the basic principles of infection prevention and control can be applied to a wide range of healthcare settings including office-based practice, long-term care facilities, remote area health services, home and community nursing and emergency services.

The evidence base for the guidelines addresses the highest level of risk of infection transmission in the healthcare setting, and has predominantly been drawn from the acute-care setting.

The level of risk and practicality of implementation associated with each recommendation made in this document should inform any decisions on how these guidelines are adapted to suit the individual circumstances of each workplace.

The guidelines do not duplicate information provided in existing Australian Standards but refer to specific standards wherever relevant.

Target audience

The guidelines are for use by all those working in healthcare—this includes healthcare workers, management and support staff.

Evidence base

These guidelines are based on the best available evidence and knowledge of the practicalities of clinical procedures. They draw from other work in this area, including the two previous national infection control guidelines, international infection control guidelines, systematic literature reviews conducted to inform the development of these guidelines, work on Healthcare Associated Infection (HAI) prevention from ACSQHC, national discipline-based infection control guidelines, and Australian Standards relevant to infection prevention and control. Australian data are used wherever available.

From NHMRC p. 8

Structure of the guidelines

These 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.

The parts of the document are based on these core principles and are organised according to the likely readership.

As this document is primarily focused on the standard precautionary practices of individual sonographers, only extracts from *Part B – Section B1* and some of *Part C* are included. For information on recommendations and guidelines not included in this adapted summary, refer directly to the NHMRC guidelines.

Part A (not included in this adapted summary) presents background information that should be read by **everyone working in healthcare** (for example, as orientation or as part of an annual review)—this includes important basics of infection prevention and control, such as the main modes of transmission of infectious agents and the application of risk-management principles. This part of the guidelines does not include recommendations (*NHMRC p. 17*).

Part B is specific to the practice of **healthcare workers** and **support staff**, and outlines effective work practices that minimise the risk of transmission of infectious agents.

Section B1 describes standard precautions used at all times to minimise the risk of transmission of infectious agents (*NHMRC p. 33*).

Section B2 (not included in this adapted summary) outlines transmission-based precautions to guide staff in the presence of suspected or known infectious agents that represent an increased risk of transmission (*NHMRC p. 91*).

Section B3 (not included in this adapted summary) outlines approaches to the management of multi-resistant organisms (MROs) or outbreak situations (*NHMRC p. 111*).

Section B4 (not included in this adapted summary) outlines processes for risk identification and the application of standard and transmission-based precautions for certain procedures (*NHMRC p. 133*).

Section B5 (not included in this adapted summary) includes supplementary information to assist in the application of standard and transmission-based precautions (*NHMRC p. 159*).

Most of *Part C* is not included in this adapted summary as it is targeted towards healthcare organisations and employers.

Part C describes the responsibilities of **management of healthcare facilities**, including governance structures that support the implementation, monitoring and reporting of effective work practices. The chapters outline the main components of a systems approach to facility-wide infection prevention and control, giving guidance on management and staff responsibilities, protection of healthcare workers, requirements for education and training of all staff, considerations for facility design and renovation, and other important activities such as surveillance and antibiotic stewardship (*NHMRC p. 191*).

From NHMRC p. 11

Part B: Standard and transmission-based precautions

B1 Standard precautions

Standard precautions consist of:

- hand hygiene, before and after every episode of patient contact
- the use of personal protective equipment
- the safe use and disposal of sharps
- routine environmental cleaning
- reprocessing of reusable medical equipment and instruments
- respiratory hygiene and cough etiquette
- aseptic non-touch technique
- waste management
- appropriate handling of linen.

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.

From NHMRC p. 33

B1.1 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.

RECOMMENDATION:

Routine hand hygiene

Hand hygiene must be performed before and after every episode of patient contact. This includes:

- 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 after the removal of gloves.

From NHMRC p. 36

Existing guidelines (WHO 2009; Boyce & Pittet 2002; Pratt et al 2007; Canada Standards and Guideline Core Committee 2008; PIDAC 2008) and literature reviews (Pittet & Boyce 2001; Picheansathian 2004; Rotter 2004; Nicolay 2006; Larmer et al 2008; Grayson et al 2009) agree that hand hygiene using alcohol-based hand rubs is more effective against the majority of common infectious agents on hands than hand hygiene with plain or antiseptic soap and water.

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.

If gloves are worn during the care of patients in settings where *C. difficile* or non-enveloped viruses are suspected or known to be present, spore contamination of the hands will be minimal and alcohol-based hand rub remains the agent of choice for hand hygiene (Johnson et al 1990; Jabbar et al 2010). However, if gloves have not been worn or the hands are visibly soiled, they must be meticulously washed with soap and water and patted dry to facilitate the mechanical removal of spores.

Neutral hand-wipe products may be considered in instances where hygienic access to soap and water is not readily available, such as in community care settings. Alcohol-based hand rubs are also suitable for use in resource-limited or remote areas with lack of accessibility to sinks or other facilities for hand hygiene (including clean water, towels, etc.).

Table B1.1: Non-clinical situations when hand hygiene should be performed

BEFORE	AFTER
Starting/leaving work	Hands becoming visibly soiled
Eating/handling of food/drinks (whether own or patient's)	Eating/handling of food/drinks (whether own or patient's)
Using computer keyboard in a clinical area	Visiting the toilet
Contact with patients, particularly immuno-compromised patients	Using a computer keyboard in a clinical area
	Being in patient-care areas during outbreaks of infection
	Removing gloves
	Handling laundry/equipment/waste
	Blowing/wiping/touching nose and mouth
	Touching a patient, particularly patients being cared for in isolation or having transmission-based precautions applied due to the potential for spread of infection to others
	After touching a patient's surroundings
	Entering/leaving clinical areas
	Touching inanimate objects (e.g. equipment, items around the patient) and the patient environment, particularly if within an isolation room or where transmission-based precautions are applied
	Blood/body substance contamination

From NHMRC pp. 37–8

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)
- are Therapeutic Goods Administration (TGA) approved for skin antisepsis
- meet the requirements of EN1500 testing standard for bactericidal effect (which are currently referred to by TGA).

The selected alcohol-based hand rubs, soaps and moisturising lotions should be chemically compatible, to minimise skin reactions and ensure that the decontaminating properties of the hand hygiene product are not deactivated. It is advisable to purchase hand hygiene and hand-care products from a range made by a single manufacturer as this ensures compatibility between the products.

From NHMRC p. 38

The *Hand Hygiene Australia Manual* (Grayson et al 2009) outlines the following alcohol-based hand rub features as important in influencing acceptability, as well as ready accessibility at each bedside and in all patient care areas:

- *fragrance and colour*—these may increase the initial appeal but may cause allergenic reactions and are therefore discouraged
- *emollient agent(s) in the alcohol-based hand rub*—these should prevent skin drying and irritant skin reactions but not leave a sticky residue on hands
- *drying characteristics*—in general, solutions have lower viscosity than gels and therefore tend to dry more quickly
- *risk of skin irritation and dryness*—proactive and sympathetic management of this problem is vital.

There is some evidence to suggest that gels are preferred to solutions (WHO 2009); however, it is important for staff to evaluate products themselves before implementation, where possible. Even where emollient agents are present in the product, ready access to a moisturising skin-care product is essential.

Other issues associated with alcohol-based hand rubs

Consideration should also be given to occupational health and safety issues associated with alcohol-based hand rubs. Alcohols are flammable and healthcare workers handling alcohol-based preparations should respect safety standards. Accidental and intentional ingestion and dermal absorption of alcohol based products used for hand hygiene have also been reported (Roberts et al 2005; Brown et al 2007). The risk of these issues can be mitigated by appropriate placement of dispensers within the facility (see Section C).

RECOMMENDATION:

Choice of product for routine hand hygiene practices

For all routine hand hygiene practices in healthcare settings, use alcohol-based hand rubs that:

- contain between 60% and 80% v/v ethanol or equivalent
- meet the requirements of EN1500.

Choice of hand hygiene product when hands are visibly soiled

If hands are visibly soiled, hand hygiene should be performed using soap and water.

From NHMRC p. 39

Table B1.2: 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.

Table B1.3: 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 15 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.

B1.1.4 Other aspects of hand hygiene

To reduce the risk of cross-transmission of infectious agents, cuts and abrasions should be covered with waterproof dressings.

Fingernails should be kept short (e.g. the length of the finger pad) and clean and artificial fingernails should not be worn. It is good practice to not wear nail polish, but if it must be used it should not be chipped and should be removed every four days (AORN 2007).

The consensus recommendation is to strongly discourage the wearing of watches, rings or other jewellery during health care; however, if jewellery must be worn in clinical areas it should be limited to a plain band (e.g. wedding ring) and this should be moved about on the finger during hand hygiene practices.

Each healthcare facility should develop policies on the wearing of jewellery, artificial fingernails or nail polish by healthcare workers.

When considering how to apply these recommendations, sonographers should consider the level of risk in their workplace of cross-transmission of infectious agents that may occur from wearing jewellery, artificial fingernails or nail polish.

From NHMRC p. 40

B1.1.5 Hand care

Generally, alcohol-based hand rubs cause significantly less skin reaction or irritation than hand hygiene with plain or antiseptic soaps (Pittet & Boyce 2001).

An emollient hand cream should be applied regularly, such as after performing hand hygiene, before a break or going off duty, and when off duty. Hand hygiene technique should be reviewed if skin irritation occurs. If the irritation persists or if it is caused by a particular soap, antiseptic agent or alcohol-based product, the person with designated responsibility for infection control or occupational health should be consulted.

B1.1.6 Putting it into practice

Individual actions for reducing the risk:

- Follow the five moments for hand hygiene (see Recommendation p. 5), 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.

From NHMRC p. 41

For a list of additional resources on *B1.1 Hand hygiene*, see *NHMRC p. 43*.

B1.2 Personal protective equipment

B1.2.1 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.

B1.2.2 Decision-making about personal protective equipment

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 (Clark et al 2002).

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.

From NHMRC pp. 46–7

B1.2.3 Aprons and gowns

International guidelines recommend that protective clothing (apron or gown) be worn by all healthcare workers when (Garner 1996; Pratt et al 2001; Clark et al 2002; Pratt et al 2007):

- 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.

Table B1.4: Characteristics of aprons/gowns

Plastic apron	Impervious/fluid resistant
	Single-use, for one procedure or episode of patient care
	Disposable
	Worn when there is a risk that clothing may become exposed to blood or body substances (usually from the environment) during low-risk procedures and where there is low risk of contamination to the healthcare worker's arms
	Worn during contact precautions when contact with the patient or the patient environment is likely
Gown	Single-use*
	Disposable
	Worn to protect skin and prevent soiling of clothing during procedures and/or patient-care activities that are likely to generate splashing or sprays of blood or body substances
	Choice of sleeve length depends on the procedure being undertaken and the extent of risk of exposure of the healthcare worker's arms
Full body gown	Fluid resistant
	Single-use*
	Long-sleeved
	Worn when there is a risk of contact of the healthcare worker's skin with a patient's broken skin, extensive skin to skin contact (e.g. lifting a patient with scabies or non-intact skin), or a risk of contact with blood and body substances which are not contained (e.g. vomiting, uncontrolled faecal matter)
	Worn when there is the possibility of extensive splashing of blood and body substances
	Worn when there is a risk of exposure to large amounts of body substances e.g. in some operative procedures
Sterile gown	Pre-packaged
	Used for procedures requiring an aseptic field
*Some gown types can be reused. Reusable gowns need to be laundered or reprocessed according to AS/NZS4146–2000 Laundry Practice	

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 (see Section B1.2.7).

From NHMRC pp. 47–8

RECOMMENDATION:

Wearing of aprons/gowns

Aprons or gowns should be appropriate to the task being undertaken. They should be worn for a single procedure or episode of patient care and removed in the area where the episode of care takes place.

B1.2.4 Face and eye protection

Face and eye protection reduces the risk of exposure of healthcare workers to splashes or sprays of blood and body substances (Dancer 1999; Pratt et al 2001; Clark et al 2002) and is an important part of standard precautions. Procedures that generate splashes or sprays of blood, body substances, secretions or excretions require either a face shield or a mask worn with protective eyewear (CDC 1978; Davidson et al 1995; Gehanno et al 1999; Scales et al 2003; Seto et al 2003; Fowler et al 2004; Loeb et al 2004; ADA 2008).

Face and eye protection is worn as part of transmission-based precautions as discussed in Sections B2.2.3, B2.3.3 and B2.4.3.

Table B1.5: Use of face and eye protection as part of standard precautions

Type of care	Face and eye protection required
Routine care	Not required unless caring for a patient on droplet precautions (surgical mask) (see Section B2.3) or airborne precautions (P2 respirator) (see Section B2.4)
Procedures that generate splashes or sprays	Protective eyewear/full-length face shield
	Surgical mask
Procedures involving the respiratory tract (including the mouth)	Protective eyewear
	P2 respirator

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 differ from P2 respirators, as outlined in Table B1.6.

From NHMRC p. 49

Table B1.6: Properties of different types of mask

Properties	Surgical masks	P2 respirator (see Section B2.4.3)
Other names	Single-use face mask, medical mask, patient-care mask, general purpose mask	P2 respirator, N95 respirator, respiratory protection device, particulate respirator
Australian standards	AS4381:2002	AS1715:2009
Intended use	Procedures that generate splashes or sprays of large droplets of blood, body substances, secretions and excretions	Routine care of patients on airborne precautions
	Procedures requiring a surgical aseptic technique (to protect patients from exposure to infectious agents carried in a healthcare worker's mouth or nose)	High-risk procedures such as bronchoscopy when the patient's infectious status is unknown
	Routine care of patients on droplet precautions	Procedures that involve aerosolisation of particles that may contain specific known pathogens

Surgical masks can be placed on coughing patients to limit potential dissemination of infectious respiratory secretions from the patient to others (see Section B2.3.3).

Considerations when using a surgical mask include:

- Masks should be changed 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.

Children should wear a specifically designed child mask and their oxygen saturation should be monitored.

Eye protection

Goggles with a manufacturer's anti-fog coating provide reliable, practical eye protection from splashes, sprays, and respiratory droplets from multiple angles. Newer styles of goggles fit adequately over prescription glasses with minimal gaps. (To be efficacious, goggles must fit snugly, particularly from the corners of the eye across the brow.)

While effective as eye protection, goggles and safety glasses do not provide splash or spray protection to other parts of the face. Personal eyeglasses and contact lenses are not considered adequate eye protection.

Face shields

Single-use or reusable face shields may be used in addition to surgical masks as an alternative to protective eyewear. Compared with other forms of protective eyewear, a face shield can provide protection to other parts of the face as well as the eyes. Face shields extending from chin to crown provide better face and eye protection from splashes and sprays; face shields that wrap around the sides may reduce splashes around the edge of the shield.

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.

Cleaning reusable face and eye protection

Reusable face shields and protective eyewear should be cleaned according to the manufacturer's instructions, generally with detergent solution, and be completely dry before being stored. If they are to be disinfected, they should be disinfected using either a TGA registered instrument-grade disinfectant – low level or by heat as per AS/NZS 4187:2003.

RECOMMENDATION:

Use of face and protective eyewear for procedures

A surgical mask and protective eyewear must be worn during procedures that generate splashes or sprays of blood, body substances, secretions or excretions into the face and eyes.

From NHMRC pp. 50–1

B1.2.5 Gloves

When gloves are worn in combination with other PPE, they are put on last (see Section B1.2.7).

When should gloves be changed?

International guidance suggests that changing of gloves is necessary:

- between episodes of care for different patients, to prevent transmission of infectious material (Pratt et al 2001; Siegel et al 2007)
- during the care of a single patient, to prevent cross-contamination of body sites (CDC 1995; Boyce & Pittet 2002)
- if the patient interaction involves touching portable computer keyboards or other mobile equipment that is transported from room to room (Siegel et al 2007).

Prolonged and indiscriminate use of gloves should be avoided as it may cause adverse reactions and skin sensitivity (Pratt et al 2001; Clark et al 2002).

Hand hygiene should be performed before putting on gloves and after removal of gloves. Single-use gloves should not be washed but discarded.

RECOMMENDATION:

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.

What type of gloves should be worn?

Non-sterile, single-use medical gloves are available in a variety of materials, the most common being natural rubber latex (NRL) and synthetic materials (e.g. nitrile). NRL remains the material of choice due to its efficacy in protecting against blood-borne viruses and properties that enable the wearer to maintain dexterity (Pratt et al 2001; Clark et al 2002). However, sensitivity to NRL in patients, carers and healthcare workers may occur and must be documented.

Facility policies for creating a latex-free environment should be taken into account.

Table B1.7: Selection of glove type

Glove	Indications for use
Non-sterile gloves	<ul style="list-style-type: none"> ■ Potential for exposure to blood, body substances, secretions or excretions ■ Contact with non-intact skin or mucous membranes <p>For example, intracavity sonographic examinations</p>
Sterile gloves	<ul style="list-style-type: none"> ■ Potential for exposure to blood, body substances, secretions or excretions ■ Contact with susceptible sites or clinical devices where sterile conditions should be maintained <p>For example, intraoperative sonographic examinations</p>
Reusable utility gloves	<ul style="list-style-type: none"> ■ Indicated for non-patient-care activities ■ Handling of cleaning contaminated equipment or surfaces ■ Handling hazardous materials
Gloves suitable for clinical use	
NRL (latex) gloves	<ul style="list-style-type: none"> ■ Preferable for clinical procedures that require manual dexterity and/or will involve more than brief patient contact ■ Select powder-free latex gloves to minimise the risk of latex sensitivity or allergies
Synthetic gloves (e.g. nitrile)	<ul style="list-style-type: none"> ■ Procedures involving high risk of exposure to blood-borne virus and where high barrier protection is needed ■ Provides suitable alternative to latex if there are no issues with glove fit or sensitivity

Sonographers should consider whether it might be appropriate to adopt a latex-free environment in the workplace to minimise the risk of latex sensitivity or latex allergies.

Utility/cleaning gloves

- Intended for use when a more physically protective glove is required (e.g. for instrument cleaning and housekeeping activities)
- Reusable, cleaned according to the manufacturer's instructions and stored dry between uses
- Should be replaced when they are showing signs of deterioration.

Sources: Derived from Kotilainen et al 1989; Korniewicz et al 1989; Korniewicz et al 1993; Rego & Roley 1999; Pratt et al 2001; Korniewicz et al 2002; Schulster & Chinn 2003; Siegel et al 2007; Queensland Health 2010

From NHMRC pp. 51–3

Latex allergy

The amount of latex exposure needed to produce sensitisation or an allergic reaction is unknown. However, current understanding of latex allergy is as follows (NIOSH 1998):

- Increasing the exposure to latex proteins increases the risk of developing allergic symptoms—most people who are allergic to latex have had frequent exposure to latex over many years; the majority are nurses, doctors, dentists or patients who have had a number of operations.
- In sensitised people, symptoms usually begin within minutes of exposure; but they can occur hours later and can be quite varied—mild reactions involve skin redness, rash, hives, or itching; more severe reactions may involve respiratory symptoms such as runny nose, sneezing, itchy eyes, scratchy throat, and asthma (difficult breathing, coughing spells, and wheezing); and rarely, shock may occur although a life-threatening reaction is seldom the first sign of latex allergy.
- The risk of latex allergy is influenced by the amount of protein/allergen and powder in the latex glove, not by powder alone (Hunt et al 2002).

Healthcare workers with latex allergies should inform their managers to ensure that their work areas can be latex free.

If latex gloves are used, they should be non-powdered due to the risks associated with aerosolisation and an increased risk of latex allergies.

In addition to these recommendations, sonographers should:

- consider if it may be appropriate to adopt a latex-free environment in the workplace
- be aware of the types of latex-free products available in the workplace for clinical use
- ask the patient if they are aware of having any allergic reaction to latex in the past before conducting a sonographic examination with latex products.

Sonographers should apply these latex allergy recommendations to both latex gloves and latex transducer covers.

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 (Olsen et al 1993; Tenorio et al 2001; Boyce & Pittet 2002).

Gloves must not be washed for subsequent re-use—infectious agents cannot be removed reliably from glove surfaces, and continued glove integrity cannot be ensured. Glove re-use has been associated with transmission of methicillin-resistant *Staphylococcus aureus* (MRSA) and Gramnegative bacilli (Doebbeling et al 1988; Maki et al 1990; Olsen et al 1993). Gloves should be disposed of as soon as they are removed with disposal complying with local policies and standards.

From NHMRC p. 54

B1.2.8 Putting it into practice

Individual actions for reducing the risk:

- Before putting on PPE, explain to the patient that it is a routine part of infection prevention and control.
- Assess the risk of spraying or splashing in the specific situation and choose PPE accordingly.
- If you have a sensitivity or allergy to latex, inform your manager and ensure you always use an alternative glove type.
- Follow the appropriate sequence and procedure for putting on and removing PPE as outlined in Table 1.8 (NHMRC p. 55).
- Remove PPE before leaving the patient care area and follow the sequence and procedure outlined in Table 1.8.
- Lead by example and champion the appropriate use of PPE in your setting.

From NHMRC p. 57

For a list of additional resources on *B1.2 Personal protective equipment*, see *NHMRC p. 58*.

B1.3 Handling and disposing of sharps

B1.3.1 What are the risks?

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 (CDC 2008):

- 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%).

From NHMRC p. 62

B1.3.2 Handling of sharps

All healthcare workers should take precautions to prevent injuries caused by needles, scalpels and other sharp instruments or devices: during procedures, when cleaning used instruments, during disposal of used needles, and when handling sharp instruments after procedures.

Standard measures to avoid sharps injuries include handling sharp devices in a way that prevents injury to the user and to others who may encounter the device during or after a procedure. Examples include (CDC 2008):

- using instruments, rather than fingers, to grasp needles, retract tissue, and load/unload needles and scalpels
- giving verbal announcements when passing sharps
- avoiding hand-to-hand passage of sharp instruments by using a basin or neutral zone
- using round-tipped scalpel blades instead of pointed, sharp-tipped blades.

RECOMMENDATION:

Safe handling of sharps

Sharps must not be passed directly from hand to hand, and handling should be kept to a minimum. Needles must not be recapped, bent or broken after use.

B1.3.3 Disposal of single-use sharps

Any person who has used a disposable sharp instrument or equipment must be responsible for its safe management and immediate disposal after use.

After they are used, single-use syringes and needles, scalpel blades and other sharp items should be placed in an appropriate container. These containers should be clearly labelled, be puncture and leak proof and conform to AS4031 or AS/NZ 4261. The containers should be located at the point of use or, if this is not possible, as close as practical to the use area. Reusable sharps requiring transport to a reprocessing area must be placed in a puncture-resistant lidded container.

Sharps containers must be appropriately placed so that they are out of reach of children. They should also be placed in a secure position or mounted on the wall to prevent tipping.

There are numerous safety devices available that assist with safe removal and disposal of sharps (e.g. scalpel blade removers). Local protocol and procedures need to be developed to outline their appropriate use.

From NHMRC p. 63

Table B1.10: Reducing risks if a sharps injury is sustained

■ 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.

For more information on sharps injuries sustained by healthcare workers and post-exposure prophylaxis, see **NHMRC p. 213**.

RECOMMENDATION:

Disposal of single-use sharps

The person who has used the single-use sharp must be responsible for its immediate safe disposal. Used disposable sharps must be discarded into an approved sharps container at the point-of-use. These must not be filled above the mark that indicates the bin is three-quarters full.

For information on *B1.3.4 Safety-engineered devices for sharps*, see **NHMRC p. 64**.

B1.3.5 Putting it into practice

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.
- Use the appropriate product for the situation and use it as directed.
- 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 needle stick 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.

From NHMRC p. 65

For a list of additional resources on *B1.3 Handling and disposing of sharps*, see **NHMRC p. 67**.

B1.4 Routine management of the physical environment

B1.4.2 Routine environmental cleaning

Infection control professionals typically use a risk-assessment approach to identify frequently touched surfaces and then coordinate an appropriately thorough cleaning strategy and schedule with the housekeeping staff.

Cleaning schedules

The recommendations outlined for cleaning should be justified by the risk of transmission of infection within a particular healthcare facility. All organisations should have a documented cleaning schedule that outlines clear responsibilities of staff, a roster of duties and the frequency of cleaning required, and the products that should be used to clean specific areas.

If cleaning is outsourced to cleaning service providers, all cleaning service delivery procedures should be documented, including details of how the cleaning service will be undertaken.

The risk of transmission of particular infections should be assessed and the cleaning schedule should be adjusted if a known infectious agent is present (e.g. an outbreak of *C. difficile* requires surfaces to be disinfected with sodium hypochlorite after cleaning with detergent [HPS 2008]).

Cleaning

Most hard surfaces can be adequately cleaned with warm water and detergent as per manufacturer's instructions. Allowing the cleaned surface to dry is an important aspect of cleaning.

From NHMRC p. 69

Minimal touch surfaces

A detergent solution (diluted as per manufacturer's instructions) is adequate for cleaning general surfaces (e.g. floors, walls) as well as non-patient-care areas (e.g. administrative offices). Damp mopping is preferable to dry mopping for routine cleaning (Andersen et al 2009).

Walls and blinds in patient-care areas should be cleaned with detergent solution when they are visibly dusty or soiled. Window curtains should be regularly changed in addition to being cleaned when soiled or exposed to MROs. Sinks and washbasins should be cleaned with a detergent solution on a regular basis as set by facility policy.

Frequently touched surfaces

Frequently touched surfaces can be cleaned with a detergent solution designed for general purpose cleaning. The exact choice of detergent will depend on the nature of the surface and the likely degree of contamination. Detergent-impregnated wipes may be used to clean single pieces of equipment and small surface areas. This method is not normally used for general cleaning and should not be considered a replacement for clean cloths and detergent solution.

RECOMMENDATION:

Routine cleaning of surfaces

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

Use of disinfectants

In acute-care settings where there is uncertainty about the nature of soiling on the surface (e.g. blood or body fluid contamination versus routine dust or dirt) or the presence of MROs (including *C. difficile*) or other infectious agents requiring transmission-based precautions (e.g. pulmonary tuberculosis) are known or suspected, surfaces should be physically cleaned with a detergent solution, followed or combined with a TGA-registered disinfectant with label claims specifying its effectiveness against specific infectious organisms. This process must involve either:

- a physical clean using detergent followed by a chemical disinfectant (2-step clean) i.e. clean with detergent, then clean with a disinfectant
- a physical clean using a detergent and chemical disinfectant (2-in-1 clean) i.e. a combined detergent/disinfectant wipe or solution could be used if this process involves mechanical/manual cleaning
- physical (mechanical or manual) cleaning is the most important step in cleaning. Sole reliance on a disinfectant without mechanical/manual cleaning is therefore not recommended.

In office-based practice and less acute patient-care areas (e.g. long-term care facilities) the risk of contamination, mode of transmission and risk to others should be used to determine whether disinfectants are required.

High-level disinfectants or liquid chemical sterilants are not appropriate for general cleaning; such use is counter to manufacturers' instructions for these hazardous chemicals. Instrument disinfectants should not be used for surface disinfection. Alcohol should not be used to disinfect large environmental surfaces given the risk of additional hazards such as flammability.

Shared clinical equipment

While shared clinical equipment comes into contact with intact skin only and is therefore unlikely to introduce infection, it can act as a vehicle by which infectious agents are transferred between patients (Microbiological Advisory Committee to the Department of Health 2006).

Surface barriers (e.g. clear plastic wrap, bags, sheets, tubing or other materials impervious to moisture) help prevent contamination of surfaces and equipment. Surface barriers on equipment (e.g. computer keyboards) need to be placed carefully to ensure that they protect the surfaces underneath and should be changed or cleaned between patients. If surface barriers are unable to be used, cleaning clinical surfaces, including equipment, still applies.

From NHMRC pp. 70–1

RECOMMENDATION:

Cleaning of shared clinical equipment

- Clean touched surfaces of shared clinical equipment between patient uses with detergent solution.
- Exceptions to this should be justified by risk assessment.

Surface barriers

Use surface barriers to protect clinical surfaces (including equipment) that are:

- touched frequently with gloved hands during the delivery of patient care
- likely to become contaminated with blood or body substances
- difficult to clean.

Exceptions to this should be justified by risk assessment.

Cleaning implements and solutions

Part of the cleaning strategy is to minimise contamination of cleaning solutions and cleaning tools. Proper procedures for effective use of mops, cloths, and solutions should be followed:

- Prepare cleaning solutions daily, or as needed, and replace with fresh solution frequently, according to facility policy.
- Clean mops and cloths after use and allow to dry before reuse or use single-use mop heads and cloths.

Table B1.11: Choosing cleaning/disinfection products

When choosing an appropriate product, the following factors should be considered:	
■	the product is approved by TGA for use in that particular circumstance
■	the intended purpose of the product as per manufacturer's instructions
■	that manufacturer's instructions are able to be complied with in the facility
■	the suitability of the product to the surface or setting
■	the practical application of using the product or technology with available resources, including trained staff
■	the effectiveness of the product against particular organisms including microbiological activity and contact time to kill microorganisms.

Carpet

Carpets in public areas and in general patient-care areas should be vacuumed daily with well-maintained equipment fitted with high efficiency particulate air (HEPA) filters to minimise dust dispersion (see also Section C6.2.3). After a spill has been removed as much as possible (see Section B1.4.3), the carpet should be cleaned using the hot water extraction method which is recognised by AS/NZS 3733:1995 to minimise chemical and soil residue.

Carpets should undergo thorough cleaning on a regular basis, as set by facility policy, using a method that minimises the production of aerosols, leaves little or no residue and is recommended by Australian Standards and manufacturer's recommendations.

Checking, auditing and environmental sampling

Healthcare facilities use a variety of systems to ensure that cleaning standards are met. These include checklists, colour coding to reduce the chance of cross infection, cleaning manuals, model cleaning contracts, infection control guidance, and monitoring strategies.

From NHMRC p. 72

B1.4.3 Management of blood and body substance spills

Prompt removal of spots and spills of blood and body substance followed by cleaning and disinfection of the area contaminated is a sound infection control practice and meets occupational health and safety requirements (Sehulster & Chinn 2003).

Process of spills management

Strategies for decontaminating spills of blood and other body substances (e.g. vomit, urine) differ based on the setting in which they occur and the volume of the spill:

- In patient-care areas, healthcare workers can manage small spills by cleaning with detergent solution.
- For spills containing large amounts of blood or other body substances, workers should contain and confine the spill by doing any of the following:
 - removing visible organic matter with absorbent material (e.g. disposable paper towels)
 - removing any broken glass or sharp material with forceps
 - soaking up excess liquid using an absorbent clumping agent.

Appropriate PPE should be worn at all times.

If spillage has occurred on soft furnishings, a detergent solution can be used to clean the area thoroughly. Do not clean soft furnishings with a disinfectant such as sodium hypochlorite. Soft furnishings can also be wet vacuumed. Following cleaning of soft furnishings, every effort must be made to air the room to allow drying of the furnishing before reuse.

Alcohol solutions should not be used to clean spillages (HPS 2006).

From NHMRC p. 73

Table B1.12: Management of blood or body substance spills

Spot cleaning	■ Select appropriate PPE
	■ Wipe up spot immediately with a damp cloth, tissue or paper towel
	■ Discard contaminated materials
	■ Perform hand hygiene
Spills	■ Select appropriate PPE
	■ Where available, especially for larger spills, cover area of the spill with an absorbent clumping agent and allow to absorb
	■ Use disposable scraper and pan to scoop up absorbent material and any unabsorbed blood or body substances
	■ If not available, wipe up spill immediately with absorbent material
	■ Place contaminated items and/or absorbent material into impervious container or plastic bag for disposal
	■ Discard contaminated materials
	■ Clean the area with warm detergent solution using disposable cloth, sponge or mop
	■ Wipe the area with sodium hypochlorite and allow to dry
	■ Perform hand hygiene

The use of sodium hypochlorite is not necessary for routinely managing spills but it may be used in specific circumstances. There is evidence supporting the use of sodium hypochlorite to inactivate various bloodborne and gastrointestinal viruses, and bacteria such as *C. difficile* (HPS 2008). The consideration to use sodium hypochlorite should be based on risk assessment of the environment, the spill, risk of transmission of disease, and the surface area and potential hazards with using the product.

Sonographers should follow their workplace protocols on the use of sodium hypochlorite for cleaning of the physical environment, and follow the manufacturer's instructions for use of the product in all circumstances.

If a disinfectant is required, particularly during the implementation of transmission-based precautions, a TGA-registered hospital-grade disinfectant must be used. The disinfectant chosen should have label claims against the organism of concern.

From NHMRC p. 74

RECOMMENDATION:

Site 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 towels 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.

Spill kit

A spill kit should be readily available in each clinical area and should include a scoop and scraper, single-use gloves, protective apron, surgical mask and eye protection, absorbent agent, clinical waste bags and ties, and detergent. All parts should be disposable to ensure that cross-contamination does not occur.

B1.4.4 Putting it into practice

Individual actions for reducing the risk:

- Make sure you are familiar with facility policies on routine cleaning.
- Familiarise yourself with the cleaning frequencies outlined in Section B5.1 (*NHMRC p. 159*).
- Report any concerns you have about hygiene.
- Consider ways to involve patients in monitoring the cleanliness of the patient-care area (e.g. through comment books on the ward or a short questionnaire to be filled in before discharge).

From NHMRC p. 75

For a list of additional resources on B1.4 Routine management of the physical environment, see *NHMRC p. 76*.

B1.5 Reprocessing of reusable instruments and equipment

This section gives core principles for reprocessing of reusable instruments and equipment in any healthcare setting. Healthcare facilities should develop local policies and procedures relevant to their setting and may also need to consult relevant Australian standards and discipline-specific guidelines for further advice on reprocessing requirements.

B1.5.1 What are the risks?

In all healthcare settings, reusable instruments and equipment should be handled in a manner that will prevent patient, healthcare worker and environmental contact with potentially infectious material.

Principles of reprocessing reusable instruments and equipment include (TGA 1998):

- All reusable medical devices and patient-care equipment used in the clinical environment should be reprocessed according to their intended use and manufacturer's advice.
- Only TGA-registered reusable medical devices should be used; before purchase, healthcare facilities should ensure that manufacturer's reprocessing instructions are provided and are able to be followed by the healthcare facility.
- Single-use medical devices should not be reprocessed.
- If a healthcare facility takes a decision to reprocess single-use devices, the facility must be licensed by the TGA.

B1.5.2 Assessing the degree of risk

Any instrument or piece of equipment that is to be reused requires reprocessing – cleaning, disinfection and/or sterilisation. The minimum level of reprocessing required for reusable instruments and equipment depends on the individual situation (i.e. the body site and the nature by which the instrument will be used).

The approach to disinfection and sterilisation of patient-care items and equipment devised by Spaulding over 30 years ago has been retained and refined and is still successfully used by infection control professionals and others when planning methods for disinfection or sterilisation (Rutala & Weber 2008). The system is based on instruments and items for patient care being categorised into critical, semi-critical and non-critical, according to the degree of risk for infection involved in use of the items.

Table B1.13: Categories of items for patient care

Critical	These items confer a high risk for infection if they are contaminated with any microorganism and must be sterile at the time of use. This includes any objects that enter sterile tissue or the vascular system, because any microbial contamination could transmit disease. <i>For example, sterile transducer covers should be used for intraoperative procedures.</i>
Semi-critical	These items come into contact with mucous membranes or non-intact skin, and should be single use or sterilised after each use. If this is not possible, high-level disinfection is the minimum level of reprocessing that is acceptable. <i>For example, intracavity ultrasound transducers must be disinfected with a TGA approved high-level disinfectant. Please refer to the ASA guideline on the disinfection of intracavity ultrasound transducers, found at www.a-s-a.com.au.</i>
Non-critical	These items come into contact with intact skin but not mucous membranes. Thorough cleaning is sufficient for most non-critical items after each individual use, although either intermediate or low-level disinfection may be appropriate in specific circumstances.

Computers and personal digital assistants (PDAs) used in patient care should be included in policies for cleaning non-critical items. Although keyboard covers and washable keyboards that can be easily cleaned are in use, the infection control benefit of these items and optimal management are yet to be determined.

From NHMRC pp. 78–9

B1.5.3 Cleaning

Cleaning is the removal of foreign material (e.g. soil and organic material) from objects and is normally accomplished using detergent solution. Cleaning to remove organic material must always precede high-level disinfection and sterilisation of critical and semi-critical instruments and devices as residual proteinaceous material reduces the effectiveness of the disinfection and sterilisation processes. If an item cannot be cleaned, it cannot be disinfected or sterilised.

Instruments should be cleaned as soon as practical after use (e.g. preferably at the point of use) before soiled materials become dried onto the instruments. Dried or baked materials on the instrument make the removal process more difficult and the disinfection or sterilisation process less effective or ineffective.

Instruments that can be disassembled must be disassembled before the cleaning and the disinfection/sterilisation process.

Cleaning is done manually for fragile or difficult-to-clean instruments and in areas without automatic units. The two essential components of manual cleaning are:

- friction – rubbing/scrubbing the soiled area with a soft brush
- fluidics – use of fluids to remove soil and debris from internal channels after brushing and when the design does not allow the passage of a brush through a channel.

Healthcare workers should wear appropriate PPE for the task. Care should be taken to prevent splashes to mucous membranes or penetration of the skin by sharp instruments.

Cleaning agents

The manufacturer's instructions will guide the type of cleaning agent required. This is usually neutral pH or mildly alkaline as such solutions generally provide the best material compatibility profile, and good soil removal and mildly acidic solutions may damage instruments.

As with all chemicals, enzymes must be rinsed from the equipment or adverse reactions could result.

From NHMRC pp. 79–80

Checking effectiveness of cleaning

Australian Standards (AS 2945:2002) outline specific test methods to check the effectiveness of cleaning to verify manual and automated processes. At a minimum, all instruments should be individually inspected (with magnification where possible) and be visibly clean.

When assessing if inspection of instruments with magnification is possible and appropriate, sonographers should consider the level of risk in their workplace of cross-transmission of infectious agents.

B1.5.4 Disinfection

Disinfection is a process that inactivates non-spore-forming infectious agents, using either thermal (moist or dry heat) or chemical means. Items need to be cleaned before being disinfected.

Instruments should be removed from the disinfectant after reprocessing and stored dry. To preserve the surfaces of the instruments, dissimilar metals should be separated before cleaning.

- *Chemical disinfection* can be achieved with a compatible TGA-registered instrument-grade disinfectant. Please refer to the *ASA guideline on the disinfection of intracavity ultrasound transducers* found at www.a-s-a.com.au for clear guidelines on high-level disinfection of semi-critical ultrasound transducers, including a list of TGA approved high-level disinfectants. In most instances, each product is designed for a specific purpose; therefore, users should read labels carefully to ensure the correct product is selected for the intended use and applied efficiently.

Disinfection is not a sterilising process. Wherever possible, sterilise items to be used in semi-critical sites or employ single-use items. A sterile transducer cover should be used in any instance in which the transducer may come in contact with critical body sites.

From NHMRC p. 80

B1.5.6 Storage and maintenance

Equipment and instrument surfaces should be regularly examined for breaks in integrity that would impair either cleaning or disinfection/sterilisation. Equipment that no longer functions as intended or cannot be properly cleaned and disinfected or sterilised should be repaired or discarded.

Table B1.14: General criteria for reprocessing and storage of equipment and instruments in healthcare settings

Level of risk	Process	Examples	Storage
Semi-critical: Contact with intact mucous membranes or non-intact skin	<ul style="list-style-type: none"> ■ Clean thoroughly as soon as possible after using ■ If the equipment will not tolerate steam, use a high-level chemical disinfectant 	Intracavity transducers	Store to prevent environmental contamination
Non-critical: Contact with intact skin	<ul style="list-style-type: none"> ■ Clean as necessary with detergent solution ■ If decontamination is necessary, disinfect with compatible low or intermediate level TGA registered disinfectant after cleaning 	Transducers (excluding intracavity)	Store in a clean, dry place to prevent environmental contamination

From NHMRC p. 81

B1.5.7 Putting it into practice

Individual actions for reducing risk:

- Become familiar with standards and facility protocols on cleaning, disinfecting and sterilising.
- Use the appropriate product for the situation and use it as directed.
- Participate in education sessions and professional development sessions on reprocessing instruments and equipment, particularly when new sterilising or disinfecting equipment is introduced.

From NHMRC p. 82

For a list of additional resources on B1.5 *Reprocessing of reusable instruments and equipment*, see NHMRC p. 83.

B1.6 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.

Table B1.15: Steps in respiratory hygiene and cough etiquette

Anyone with signs and symptoms of a respiratory infection, regardless of the cause, should follow or be instructed to follow respiratory hygiene and cough etiquette as follows:

- Cover the nose/mouth with disposable single-use tissues when coughing, sneezing, wiping and blowing noses.
- 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/social 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.

From NHMRC p. 84-5

For information on B2 *Transmission-based precautions*, see **NHMRC p. 91**.

For information on B3 *Management of multi-resistant organisms and outbreak situations*, see **NHMRC p. 111**.

For information on B4 *Applying standard and transmission-based precautions during procedures*, see **NHMRC p. 133**.

For information on B5.1 *Recommended routine cleaning frequencies for clinical, patient, and resident areas in acute settings*, see **NHMRC p. 159**.

For a list of B5.5 *General infection control resources*, see **NHMRC p. 188**.

Part C: Organisational support

For information on C1 Management and clinical governance, see *NHMRC p. 193*.

C2 Staff health and safety

C2.1 Roles and responsibilities

To ensure the safety of everyone in the facility, both employers and employees have a responsibility in relation to infection prevention and control and occupational health and safety.

C2.1.1 Responsibilities of healthcare facilities

Workplace Health and Safety Acts for the various states and territories place a duty of care on employers to ensure workplace health and safety, including where occupational infectious disease hazards exist.

As part of its IPC program, each healthcare facility should develop, implement and document effective policies and procedures related to staff health and safety, including strategies to prevent occupational exposure to infection hazards; prevent occupational risks from chemicals or processes used for recommended infection prevention and control activities; and implement healthcare worker immunisation programs for infectious agents they may encounter in the course of their duties.

At the start of their employment, all healthcare workers should be informed of the facility's policy on health screening and be counselled, as appropriate, about their work placement in accordance with these policies. As personal and organisational circumstances change over time, reassessment and additional education may be necessary. Similarly, training institutions should inform healthcare students before their course admission about policies and procedures for staff health and safety and their implications, and provide counselling for students who may be prohibited from completing any requirements of their course due to transmissible infections.

Healthcare workers' privacy and civil rights must always be respected and not breached.

From NHMRC p. 203

Positive measures should be undertaken to implement and sustain appropriate infection prevention and control. There are five measures of protection:

- health status screening (see Section C2.2.1 – *NHMRC p. 205*)
- education on safe work practices that minimise the transmission of infection (see Section C3 – *NHMRC p. 215*)
- safe systems of work, with workplaces designed to allow clinical practice that minimises transmission of infection (see Section B4 – *NHMRC p. 133*)
- physical protection, involving the use of PPE (see Section B.1.2) and immunisation (Section C2.2.2 – *NHMRC p. 207*)
- reporting systems for compliance and identifying breaches of infection prevention and control protocols.

C2.1.2 Responsibilities of healthcare workers

Healthcare workers have an obligation to always follow specific established infection prevention and control policies as part of their contract of employment. This includes reporting their infectious status if it places others at risk, as well as any known potential exposures to blood and/or body substances. Failure to follow infection prevention and control policies and procedures may be grounds for disciplinary action. Some states/territories have statutory infection prevention and control requirements for healthcare workers.

Healthcare workers with infections should seek appropriate medical care from a doctor qualified to manage their condition. Where there is a risk of a healthcare worker transmitting infection to a patient or other healthcare

worker (e.g. if he or she is infected with an acute or other transmissible infection, carries a bloodborne virus, or has a predisposing skin condition), the healthcare worker should be counselled about work options and either rostered appropriately or provided with equipment, information and facilities to enable him or her to perform their duties without placing others at risk.

The appropriate work option will depend on the specific circumstances:

- Healthcare workers with symptoms of acute infection (e.g. vomiting, diarrhoea, flu symptoms) should not come to work for the specified exclusion period (see Section C2.3 – *NHMRC p. 209*).
- In some jurisdictions, healthcare workers who carry a blood-borne virus are legally obliged to declare their infectious status.

Healthcare workers should be aware of their requirements for immunisation against infectious diseases and maintain personal immunisation records.

Healthcare workers in specific circumstances (e.g. pregnant healthcare workers) may be particularly susceptible to some infections and should work with occupational health and safety officers to ensure their safety (see Section C2.4).

Education about safe work practices is discussed in Section C3 – (*NHMRC p. 215*).

From NHMRC p. 204

C2.4 Healthcare workers with specific circumstances

Healthcare facilities need to assist healthcare workers experiencing circumstances that place them at greater risk of infection to develop management plans that ensure their wellbeing.

Where a healthcare worker is known to be particularly susceptible to healthcare associated infections, work duties are assessed to ensure that the welfare of that person, patients and other healthcare workers is safeguarded. This may involve appropriate work placements, adjustments or restrictions, or deployment to a role involving less risk. Healthcare workers in this situation may require counselling on what tasks they can perform, what they should avoid and the possible impact of their work on their health.

C2.4.1 Pregnant healthcare workers

Employers should provide information on the risks associated with pregnancy and should assist pregnant healthcare workers to avoid infectious circumstances that may present a risk to her or the baby. It is the responsibility of pregnant healthcare workers to advise their doctor and employer of their pregnancy; this information must remain confidential.

All pregnant healthcare workers should adhere to standard and transmission-based precautions and ensure that they are appropriately vaccinated. However, pregnant healthcare workers should be given the opportunity to avoid patients with specific infections.

For more information, refer to Section 2.3.2 of the *Australian Immunisation Handbook*.

C2.4.2 Immunocompromised healthcare workers

Healthcare workers with immune deficiencies are more at risk of acquiring infections. The type of employment they can undertake should include only duties that will minimise their exposure to infections. Predisposing conditions include neutropenia, disseminated malignancy and infections that produce immunodeficiency (e.g. HIV).

Refer to Section 2.3.3 of the *Australian Immunisation Handbook* for guidance on the immunisation of immunocompromised healthcare workers.

C2.4.3 Healthcare workers with skin conditions

Skin integrity is the ultimate barrier to transmission of infectious agents. When staff members have damaged skin or weeping skin conditions (e.g. allergic eczema, psoriasis, exfoliating dermatitis), they may be readily colonised by healthcare associated microorganisms and may become a vehicle for disseminating these organisms. Healthcare workers in this situation should be identified by personal history screening when they start employment, and need to be informed of the risks they may pose to patients.

Any damaged skin must be appropriately covered before healthcare workers carry out procedures. Consideration must be given to providing these staff members with appropriate, individual PPE such as specific types of gloves, hand hygiene product and moisturising lotion.

From NHMRC p. 211

End of extracts from: National Health and Medical Research Council (2010). *Australian Guidelines for the Prevention and Control of Infection in Healthcare*. Canberra: Australian Government.

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NHMRC resources

Please refer to the NHMRC Australian Guidelines for the Prevention and Control of Infection in Healthcare (2010) webpage for further information on this publication and additional resources:
www.nhmrc.gov.au/guidelines/publications/cd33

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