Our thanks are extended to the Whitely Corporation for providing the 2019 update to these guidelines.
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PREAMBLE

These guidelines were first published in 1992 by the Australian Funeral Directors Association (AFDA) in conjunction with the Standing Committee on Infection Control (SCIC) of the Department of Human Services Victoria and with the involvement of the Australian Workers Union (Victorian Branch). State Wide Services, the Department of Human Services Victoria Advisory Committee on Hospital Waste Disposal and the Water Authorities Association of Victoria also approved the first edition of the guidelines.

The funeral industry is grateful to these people for their excellent work performed on an honorary basis and in addition to their usual work.

A subsequent review in the early 2000s was undertaken, but was never finalised, by a committee comprising representatives of the Victorian Advisory Committee on Infection Control (VACIC) of the Department of Human Services Victoria, staff from both the Cemeteries & Crematoria and Bloodborne Viruses/Sexually Transmissible Infections (BBV/STI) Programs of the Department of Human Services Victoria, the Australian Workers’ Union (Victorian Division), and the Australian Funeral Directors Association (AFDA).

This 2008 Edition was revised and published by the AFDA to give the guidelines a more national focus and therefore relevant to all their Members.

These guidelines recommend procedures that incorporate infection control measures designed to prevent accidental infection in employees in the funeral industry. They do not cover procedures to be used in autopsies or during embalming. The Australian Institute of Embalmers Pty Ltd (AIE) have produced Funeral Industry Infection Control Guidelines Part D Procedures for Embalming.

There is a section on General Information which sets out the general principles for infection prevention and control in the funeral industry.

The guidelines are divided into four parts.

Part A Infectious hazards and infection control principles: consists of general information on infections, how infections are spread, how they can be prevented and some specific information on infections particularly relevant to the funeral industry.

Part B Procedures for the transport of human remains: provides information on infection control procedures associated with the transport of human remains.

Part C Procedures for basic human remains preparation and encoffining: has infection control information related to the preparation and encoffining of human remains.

Appendices Is a series of appendices providing more detailed information on the areas covered in Parts A, B and C.

A Glossary is provided at the beginning of these guidelines.

These Guidelines should be available for employees in each part of the industry and should form the basis for training programs and continuing education in infection prevention and control.
GENERAL INFORMATION

FUNERAL INDUSTRY POLICIES AND PROCEDURES

Infection control guidelines used in the funeral industry are no different to those used in health care settings. All areas of health care have requirements specific to their activities which are all based on the national infection control guidelines “Infection control guidelines for the prevention of transmission of infectious diseases in the health care setting” – National Health & Medical Research Council (NHMRC) 1996 and the 2nd edition published in 2004 by the Communicable Diseases Network Australia (CDNA).

The health care industry has a two-tiered system, that is, Standard and Additional Precautions. Standard Precautions provide protection for both the health care worker and patient. Additional Precautions are for specific situations where standard precautions would not be sufficient, such as an infectious disease spread by airborne, droplet, direct or indirect contact transmission, or by a combination of transmission routes.

Funeral industry infection prevention and control guidelines must take into account that:

“Each and every human remains that a funeral service employee comes into contact with must be considered potentially infectious”.

Funeral industry infection control guidelines are work practices required to create the highest level of infection control and prevention and include good occupation health and safety practices related to infection control. They include good hygiene practices, particularly the washing and drying of hands prior to and after contact with all human remains.

The use of personal protective equipment (PPE) is situation dependant and should include the use of gloves, gowns, plastic aprons, face masks, eye protection (face shield or goggles) and boots (to be worn only in mortuary areas). Refer to Appendix 2 for expanded details on the use of PPE.

These guidelines also include the appropriate handling and disposal of sharps and other contaminated (formerly referred to as infectious) waste, and the use of aseptic techniques.

These infection control guidelines are required for the safe handling and transportation of all human remains, regardless of potential infectious status and in the handling of:

- Blood;
- All other body fluids, secretions and excretions (excluding sweat), regardless of whether they contain visible blood;
- Non-intact skin;
- Mucous membranes;
- Dried blood; and
- Any other body substances, including saliva.

Training and education
Training and education is an important part of the initial and ongoing improvement in professional practice in the funeral industry. Employees involved in the transfer of human remains should receive training and continuing education in the following areas:

(a) Infection hazards and the principles of infection control.
(b) Use of PPE.
(c) Lifting and general occupational health and safety.
(d) Situation assessment.
(e) Certification of death, hospital and coroner’s court procedures. (Not covered in these guidelines)
GLOSSARY

Additional Precautions:  
Additional (transmission-based) precautions are used for those patients known or suspected to be infected by epidemiologically important pathogens, spread by airborne or droplet transmission or by direct or indirect contact with skin or a contaminated surface.

AIDS:  
Acquired Immunodeficiency Syndrome. AIDS is a severe disease resulting from HIV infection with a collection of clinical manifestations, indicative of immune system disturbance, including infections and tumours.

Creutzfeldt-Jakob disease (CJD):  
This is a rare and fatal degenerative disorder of the central nervous system. It is characterised by microscopic vacuoles in the brain, astrocytosis and loss of neurones.

HIV:  
Human Immunodeficiency Virus. This is a bloodborne virus that destroys vital cells in the immune system.

HEP A:  
Hepatitis A virus.

HBV/ HCV:  
Hepatitis B virus/Hepatitis C virus. Infection with these viruses can result in liver disease (Hepatitis or Cirrhosis) and both viruses are found in blood and other body fluids.

Meningococcal Disease:  
Is a rare but serious illness usually appearing as septicaemia or meningitis. It is caused by bacteria called ‘meningococci’. There are a number of different groups of meningococci and most meningococcal disease is caused by either Serogroup B or Serogroup C. There is a vaccine for serogroup C.

Meningitis:  
Meningitis is an inflammation/infection of the protective layers of the brain and spinal cord.

Septicaemia:  
Septicaemia (or blood poisoning) can be caused by a number of different bacteria which is widespread throughout the body causing systemic illness.

Standard Precautions:  
These are work practices required for the basic level of infection control. They include good hygiene practices, the use of protective barriers and appropriate handling and disposal of infectious waste including sharps.

Tb:  
Tuberculosis or *Mycobacterium tuberculosis* caused by the mycobacterium tuberculosis bacterial complex. Lung disease is the most common form of the disease. Untreated tuberculosis may pose a considerable risk to staff.

Validation:  
The documented procedure for obtaining, recording and interpreting the results required to establish that a process will consistently yield a product complying with predetermined specifications.
PART A

INFECTION PREVENTION & CONTROL AND INFECTIOUS DISEASES

1 General

1.1 Everybody has microorganisms both internally and on the skin. In death these microorganisms die but some may continue to be an infection risk for a short period of time after death. Some of these organisms can cause infection, but the risk will be reduced if basic hygiene and infection control procedures are established and performed by the person handling human remains. To minimise any post-mortem growth of microorganisms, all human remains should be placed in a mortuary refrigerator as soon as possible after death at 4 Degrees Celsius (4°C). All refrigerators should be constantly monitored (preferably electronically) and the temperatures documented.

The cause of death for many people is an infection (e.g. pneumonia), due to microorganisms widely spread throughout the community. Even though these infections can sometimes be spread to employees from living people, the risks of infection from handling human remains following death (from an infection) is very low. For most blood borne diseases (like Hepatitis C or HIV) the risk of infection is extremely small as the viruses are quite fragile and blood carrying infectious particles has to quickly enter the bloodstream before it could cause infection.

However, because of the risk of pathogenic microorganisms, all human remains must be regarded as potentially infectious. Standard precautions should be used when handling all human remains. Refer to Appendix 1.

1.2 Blood and body fluids/substances commonly leak from body orifices, surgical and autopsy incisions and breaches of the skin such as drain tube wounds or burns. However, leakage can be minimised if the human remains are well sealed. Refer to Appendix 9.

The risk of infection increases on contact with blood, body fluids and airborne pathogens. This is particularly so for employees involved in performing autopsies, transfers of human remains, embalming and preparation of human remains. These guidelines do not include procedures used in autopsies or during embalming.

Refer to:
- AIE Funeral Industry Infection Control Guidelines Part D Procedures for Embalming;
- Federal Government Guidelines for the Facilities and Operations of Hospital and Forensic Mortuaries

1.3 The Australian Government Department of Health and Ageing defines the national notifiable diseases. Many of these are listed because of their public health implications, rather than their infectivity to employees, so this listing does not necessarily indicate risk to those handling human remains.

2 Principles and Practice

Standard and, where necessary, Additional Precautions should be used at all times.

2.1 All employees should observe basic hygiene practices at all times. These include hand washing after handling human remains, after removing gloves, after going to the toilet and before eating, drinking or smoking.

2.2 Eating, drinking or smoking is not permitted in areas used for preparing human remains or in vehicles used to transport human remains.
2.3 All cuts and abrasions, particularly on the hands and arms should be covered with a waterproof occlusive dressing. If the employee has extensive skin lesions, medical advice should be sought concerning temporary reassignment of duties.

2.4 All employees should be provided with appropriate protective equipment to protect their normal apparel from contamination with blood or body fluids/substances (Part B, Section 3.0 and Part C, Section 1.2).

2.5 Personal protective equipment (PPE) must be worn if contact with blood and body fluids/substances is likely to occur (Part B, Section 3.0 and Part C, Section 1.2).

2.6 Procedures to be followed in the event of an occupational exposure such as accidental skin penetration or other sharps injury, splashes onto mucous membranes of blood/body fluid/substance are described in Appendix 6.

These include first aid measures, a record of the incident/injury, reporting the incident/injury to the employer, and medical advice including counselling and blood testing of the employee.

Specialist infectious diseases advice should also be sought regarding treatment and the need for post exposure prophylaxis (PEP).

Accurate reporting of all incidents/injuries is important for possible WorkCover claims.

2.7 All employees should be immunised against tetanus, diphtheria, poliomyelitis and Hepatitis A and B. Currently vaccines are not available for HCV or HIV.

2.8 Tuberculin skin testing (TST) should be performed prior to, or within four weeks of, commencing employment. Regular TST screening should be performed as for health care employees based on risk assessment. The requirement for chest x-ray is based on TST results and clinical assessment.

2.9 All employees must be provided with access to infection control information relevant to the funeral industry including written policies and procedures describing safe work practices (these Guidelines).

2.10 Where possible, all unnecessary invasive procedures on human remains (suturing, puncturing etc.) should be avoided. At present the mouth is usually closed using a mandibular/nasal suture (Part C, Section 3.7) and particular care should be taken during this procedure to avoid accidental skin penetration.

2.11 Areas used for the preparation of human remains should be designed and equipped for hygienic practices (Appendix 7). It is important that walls, floors, tables and all other equipment are made from impervious, easily cleaned materials. Funeral companies must provide adequate storage areas for instruments, cleaning materials, equipment for disinfection and sterilization, hand-washing facilities, properly installed drainage and plumbing for effluents, appropriate ventilation, first aid and chemical spill kits. Work areas must be well lit. Employees should have separate change and toilet areas with hand washing and shower facilities. Eating, drinking and smoking are not permitted in areas used for the preparation of human remains.

3 Transmission

3.1 Transmission of infection may be through one or more of the following routes:

(i) Contact: For example, *staphylococcal* infections. Contact is through either direct or indirect contact.
   a) Direct – from hand to hand
   b) Indirect – from hand to surface to hand; from surface to hand.

(ii) Droplet: For example, the common cold or influenza, through coughing or sneezing. Droplets which travel for approximately 1 metre before dropping to horizontal surfaces.
(iii) **Airborne:** For example, Tuberculosis or Measles. Viruses or bacteria may remain in the atmosphere (air) for long periods (2 or more hours) of time.

To minimize the risk of transmitting airborne microorganisms, cover the mouth and nose of the human remains with cloth/waterproof sheeting or the employee should wear an appropriate face mask that covers both the mouth and nose and have a degree of moisture resistance. This physical barrier may distress immediate family members but the potential risk of infection outweighs this. The family should be given an explanation prior to any action by employees.

Airborne microorganisms from *Mycobacterium tuberculosis* may be dislodged from the respiratory tract (of the deceased) by compression upon the thoracic or abdominal cavity or both. Therefore, employees handling human remains should carefully handle move, lift and carry the human remains.

3.2 **Droplet and airborne transmission** are sometimes referred to as respiratory transmission or the term “respiratory precautions” may be used to denote droplet and airborne transmission. Droplet and contact transmission generally ‘go together’. Both droplet and airborne microorganisms, sometimes referred to as ‘aerosols’, may be either inhaled or ingested.

3.3 **Other means of transmission** where funeral industry employees may become infected although the risk is low include the following:

a) **Ingestion of microorganisms:**
Many disease-causing organisms may be carried in the human bowel, even though the person has had no symptoms of disease. Faecal soiling of human remains and their wrappings is a common occurrence. Faecal contamination of an employee’s hands, food or cigarettes, may result in the ingestion of disease-causing microorganisms.

Hepatitis A is an example of an infection (viral) transmitted by ingestion of infective microorganisms in food or from the hands of infective persons who have prepared the food.

Aerosols from the lungs of human remains may also be inhaled or ingested.

b) **Penetration of microorganisms through the skin or mucous membranes (mouth, nose or eyes):**
The skin is a natural barrier to infection. Some bacteria found on the skin, in the mouth or the upper respiratory tract are capable of causing localized infection and occasionally generalized disease.

Bloodborne viruses (BBVs) such as Hepatitis B and C and HIV/AIDS (Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome) can be transmitted through blood-to-blood contact.

Skin can be breached by accidental skin puncture or by having open cuts or sores, abrasions, burns or “weeping” skin diseases.

All employees should cover open cuts/sores, abrasions, burns or “weeping” skin diseases with waterproof occlusive dressings. Medical attention should be sought for ongoing skin problems.

Accidental skin penetration can occur when handling sharp objects contaminated with blood or body fluids/substances such as needles, trocars, knives and saws; sharp body parts such as bone, teeth and occupational hazards such as protruding coffin nails.

Accidental splashes of blood or body fluids/substances into the eyes, nose or mouth (mucous membranes) can also transmit infection.
4 Specific infectious diseases

4.1 Bloodborne viruses (BBVs).

Bloodborne viruses include hepatitis B and hepatitis C and human immunodeficiency virus.

There is an increased risk of acquiring hepatitis B or hepatitis C (HBV/HCV) rather than HIV following accidental inoculation of contaminated blood through a skin wound or the mucous membranes. This is because HBV and HCV are present in the blood in much higher concentrations than the HIV/AIDS virus.

The risk of acquiring HBV infection following a needlestick injury ranges from 2% to 4.0%. HCV is at 3-10%. A similar exposure to HIV is estimated to result in HIV infection 0.3% of the time (CDNA Guidelines 2004, Chapters 23, pp3 & 28, pp15).

There is limited knowledge about the survival of HIV and HBV outside the body. In certain experimental fluids HIV can persist for up to 15 days at room temperature but after drying the virus is rapidly inactivated and undetectable after 1-3 days (Centres for Disease Control, MMWR 1981; 36 (Sup 2): 12s). HBV can persist in dry blood for some months.

Some information is available on the survival of HIV or HBV in the body after death. In one study, HIV was isolated from the blood (and other tissues) taken from human remains which had been refrigerated at 6°C for at least six days, but the period required to grow the virus suggested that it was present in low concentrations. This study also showed that HIV could be grown for at least 14 days from human splenic tissue that had been stored at room temperature. (Nyberg, et al, American Journal of Clinical Pathology, 1990, 94:422).

Other studies have reported the isolation of viable HIV from necropsy material in three cases, two and a half, three and a half and 11 days after death (Ball et al., Lancet 1991 338:63).

All available evidence indicates that the risk of acquiring HIV infection as a result of handling human remains and involvement in autopsies is very low (HIV Infection and Autopsies, AIDS Task Force, Australia, January 1988). Subsequent experience in Australia and overseas has not provided any reasons to alter this opinion.

NB Risk will be minimised if the appropriate precautions are taken.

The risk of acquiring a BBV is not restricted to the handling of those who have died from one of these infections. The spread of BBVs in the community means there are increasing numbers of people who may be carriers, be in an asymptomatic or ‘window’ period. It is for this reason that standard/additional precautions are used to reduce the risk of infections irrespective of the specified cause of death.

4.2 Tuberculosis (Tb)

There is less risk to employees from aerosols (airborne or droplet transmission) from the lungs of the deceased than from the living. There may be a significant risk to autopsy room staff from human remains with unsuspected tuberculosis (Lundgren et al., Tubercle, 1987 68:147). Tubercle bacilli have been recovered from various sites in a post-mortem room for up to 24 hours after autopsy on a tuberculous cadaver (Hedvall, Am. Rev. Tub. 1940. 41:770).

The risk of aerosol exposure to tuberculosis and other lung infections is lower for employees involved only in the transport and routine preparation of human remains. When employees are in close contact with the upper airways of the deceased during lifting or if the body is dropped during lifting, causing a forceful expulsion of residual air from the lungs the nose and mouth of the deceased, employees or both should be covered (Part B, Section 7.1.2).

4.3 Meningococcal disease

Meningococci are common bacteria, and about one in ten people ‘carry’ them at the back of the throat or nose. Carriers are usually young adults but less often older people
and young children. Meningococci are only found in people, and never in animals or the general environment. Almost all adults carry these bacteria without ill effects. Being a carrier has been demonstrated to provide protection against dangerous meningococci. People become carriers without knowing they have the bacteria and will get rid of it naturally without treatment after a few weeks or months.

The disease is difficult to spread. Meningococci cannot live for more than a few seconds outside the human body; therefore, they cannot be picked up from water supplies, swimming pools, buildings or factories. Only regular, close, prolonged household and intimate contact spread the bacteria. Close contacts in residential accommodation, such as student halls of residence and military camps, may be at greater risk of meningococcal disease.

Preparation of the human remains, and embalming procedures may pose an increased risk.

Standard and additional precautions apply including PPE.

4.4 Creutzfeldt-Jakob disease (CJD)

Creutzfeldt-Jakob disease is a rapidly progressive disease-causing damage to the brain. It is one of a group of rare diseases that affect humans and animals, known as transmissible spongiform encephalopathies or prion diseases. CJD is characterised by dementia and walking difficulties. Death can occur up to two years after the first symptoms; however, most people die within six months. There is no treatment or cure.

CJD is the main human form of prion diseases and these human prion diseases include:

a) Classical or Sporadic CJD which causes 85 to 90% of cases, that is, the disease strikes people at random.

b) Genetic or Familial CJD which causes approximately 13% of cases worldwide. It is extremely rare and is an inherited disease.

c) Healthcare acquired CJD has occurred worldwide as a result of a number of medical treatments; these include the use of human pituitary hormone for infertility or short stature; the use of dura mater grafts to repair damaged dura mater (membrane covering the brain) in brain surgery, transplants of corneal (grafts) and exposure to contaminated neurosurgical instruments.

d) Variant CJD is the human form of bovine transmissible spongiform encephalopathy (BSE). BSE occurs in cattle and most likely caused by transmission of the sheep disease Scrapie through the food chain to cattle and then to humans through eating infected meat products.

e) Kuru is a human prion disease found only in the central highlands of New Guinea and transmitted through the practice of ritual cannibalism of infected deceased relatives. This practice has now ceased.

The risk to employees is contact with neural tissue (brain and spinal cord) during autopsy or embalming. Standard and additional precautions apply during these procedures.

Transmission of CJD is very rare and requires direct inoculation of infected blood or body fluids/substances into high-risk tissues. PPE should be used and standard/additional precautions practiced dependant on the circumstances such as leakage of blood or body fluids/substances from neural tissues. Single use PPE is essential as normal cleaning processes are insufficient to destroy the prion (the protein causing CJD).

Appendix 10 has additional information on this rare but fatal disease and the precautions required.
PART B

PROCEDURES FOR THE TRANSPORT OF HUMAN REMAINS

The following procedures are recommended for the safe transport of human remains:

- From the place of death (or autopsy) to the funeral director’s premises
- To, and from, hospitals and coronial centres (carried out under police contract)
- For other purposes such as donation of human remains for medical research.

All human remains are regarded as potentially infectious (Refer to Part A). Human remains may be loosely wrapped in a body bag or waterproof sheeting if leakage of blood or body fluids/substances is likely to occur (Appendix 9).

Employees involved in the handling of human remains should participate in education programs to ensure they are familiar with infection control policies and procedures including the application of standard and additional precautions and proper lifting techniques associated with transmission of airborne infection.

1 General Principles for Handling Human Remains

1.1 The following policies and procedures for handling and transport apply to all human remains regardless of their infectious status.

Viewing of all human remains may not be possible.

Standard precautions must be followed including the washing of hands and the wearing of gloves. Additional precautions must be followed where required. Refer to Appendices 1 - 4.

1.2 All human remains should be handled with care and respect, due deference being given to ethnic and religious customs.

1.3 Handling of human remains should comply with the requirements of relevant Commonwealth and State legislation (refer to Appendix 11).

1.4 "Infection Risk" labels are not necessary as all human remains are regarded as potentially infectious (Part A, Section 1.1).

1.5 Particular care must be taken to avoid causing unnecessary distress to relatives and friends.

2 Recommendations for transport vehicles

2.1 The vehicle stretcher compartment should be sealed and separate from the driving/passenger compartment.

2.2 The stretcher compartment should be designed for ease of cleaning and disinfection after each use to remove any potential contamination.

2.3 Proper facilities for securing the stretcher are required.

2.4 Stretchers should be designed for light easy handling, be made of leak proof washable material and be appropriate for the task.

2.5 Transfer vehicles should carry suitable quantities of PPE (Appendices 2, 5 and 8), plus equipment for cleaning and disinfection of spills (Part B, Section 4.0). Replacement stocks should be kept at the Funeral Director’s base.
3 **Personal Protective Equipment for transfer employees**
(Appendix 2)

3.1 Transfer employees should behave, and dress projecting an image of dignity and solemnity. For initial contacts with relatives/friends of the deceased, a business suit or company approved uniform is appropriate.

3.2 During the handling of human remains (wrapped or unwrapped) the personal clothes of transfer employees should be protected by the use of appropriate PPE.

3.3 Gloves are designed to prevent direct contact of the hands with blood and body fluids/substances. They cannot completely prevent penetration injuries from needles or other sharp objects (Part A, Section 2.5 and 2.6). Reinforced gloves should be used for clearing debris or removing human remains from situations such as wrecked motor vehicles, where sharp objects are more likely to occur. Single use gloves should not be washed, disinfected or reused because they deteriorate decreasing their barrier effectiveness.

3.4 Single use gloves must be worn when handling all human remains (wrapped or unwrapped), blood, blood-stained fluids or articles, or when handling surfaces contaminated with blood or body fluids/substances.

3.5 If hands become contaminated with blood or body fluids they should immediately be washed thoroughly with liquid soap and warm water at the nearest available hand basin. Contamination will result from the accidental tearing or puncture of gloves. If hand washing facilities are unavailable, an alcohol-based hand rub solution should be used for hand cleansing and hands washed and dried as soon as practicable (Appendix 3).

3.6 Gloves must be changed immediately they are torn or punctured during transfer procedures, and after handling each human remains (wrapped or unwrapped). Hands should be washed and dried before replacing gloves (Appendix 4).

3.7 Gloves must be removed to minimise contamination of the employee's skin with the outer surface of the glove. Tuck the fingers of one gloved hand under the cuff of the other glove and remove without touching uncovered skin. The remaining glove is removed by, tucking the bare fingers of the non-gloved hand under the upper glove edge and pulling it off without touching its outside surface. Gloves should be disposed of appropriately. Hands should be washed and dried immediately after gloves are removed and before removing the stretcher from the house or site (Part A, Section 2.1 and Part B, Section 1.1).

The technique for donning and removing gloves is described in Appendix 4.

3.8 In selecting appropriate PPE the following should be considered:

a) The probability of exposure to blood or body fluids/substances.

b) Assess the location of the human remains and the risk of exposure to blood and body fluids/substances. Employees should wear appropriate PPE (Appendix 2) before any transfer procedures.

For example, the possibility of exposure when handling human remains decomposed mutilated in an accident, suicide or murder (Part B, Section 7.0), have "skin slip" with fluid sacs is greater than handling human remains with minor lacerations or cuts.

3.9 Masks and protective eyewear or face shields may be required, to prevent blood contamination of the mucous membranes of the mouth, nose and eyes. These devices should be worn when splashing of blood or body fluid/substances is anticipated, such as decomposition, mutilation and massive bleeding.

3.10 Waterproof aprons and protective over-shoes or rubber boots may also be required in circumstances where there are large volumes of blood or body fluids/substances, or water contaminated with these substances. The fabrics used in standard re-useable
gowns are insufficient for protecting clothes of employees from splashes of blood or body fluids/substances.

3.11 Hands should be washed and dried thoroughly after removal and disposal of PPE.

4 Cleaning and Disinfection

4.1 Areas or equipment contaminated with blood or body fluids/substances should be cleaned and disinfected/sterilized as described below. This includes stretchers and other re-usable items.

4.2 Chemical disinfection is not necessary for general cleaning. Cleaning using warm water and detergent will be sufficient in most instances.

Sodium hypochlorite solutions, or similar, may be used in specific situations such as a major blood or body fluid/substance spill where granules absorb the spill. General cleaning can then occur.

Some chemical disinfectants are used as ‘fixatives’ in the funeral industry. They should not be used as cleaning or disinfecting agents. These include glutaraldehyde and formaldehyde which have occupational health and safety issues unless handled properly. Materials Safety Data Sheets for each chemical being used must be made available at the point of use. Occupational health and Safety (OHS) spill kits should also be available at the point of use.

Sodium hydroxide (Caustic Soda) may be used if CJD is suspected. Refer to Appendix 10 and the CDNA guidelines for use. It must not be used as a substitute for incineration or steam sterilization of reusable items.

There are some items of equipment that cannot be sterilized due to their inability to withstand pressure gradients or are unable to be immersed. These should be cleaned using a lint free cloth dampened in warm water and detergent, wiped over, rinsed using a lint free cloth dampened in warm water and dried using a lint free cloth. Alcohol 70% should be wiped over the item using a lint free cloth.

If chemical disinfection is necessary it should be a chlorine based solution (sodium hypochlorite) with 10,000ppm of available chlorine, or similar. Sachets of granules are available commercially.

Disinfectant solutions must be freshly prepared as required as their effectiveness is limited once diluted (24 hours).

Disinfectant solutions are affected by light, heat and heavy metals, are irritating to the skin and may corrode metals.

DO NOT mix formalin (an aqueous solution of formaldehyde) with chlorine disinfectants, because formaldehyde reacts with any source of free chlorine to produce a potent cancer producing agent called bis-(chloromethyl) ether. Chemicals should not be mixed together unless the MSDS indicates this and it is necessary to do so.

There is also the possibility of the production of toxic gases if chlorine disinfectants are mixed with acid or ammonia cleaning agents (Centres for Disease Control, Morbidity and Mortality Weekly Report. 1991; 40:619-629).

Note: When phenolic-based chemicals or glutaraldehyde are used then cleaning blood or body fluid/substance spills with a phenolic-based disinfectant may be preferable.

4.3 Dedicated equipment (mop, cleaning bucket, cleaning agents, neutralizers, paper towels and gloves) must be readily available for spills management and stored at the point of use. This is particularly important in human remains preparation areas such as mortuary, human remains storage, loading bays and transfer vehicles (Appendix 5).
5 Laundering/Linen Services

5.1 Transfers
Re-useable clothes contaminated with blood or body fluids/substances must be placed in plastic bags and tied securely to prevent leakage. The bags must be transported to the Funeral Director’s base in the stretcher compartment of the transfer vehicle. Wearing single use gloves place the linen directly into the washing machine or linen bags for commercial cleaning.

Normal laundry practices are sufficient to decontaminate linen. Linen not contaminated with blood or body fluids/substances may be placed in ordinary laundry bags and processed normally.

Australian/New Zealand standard AS/NZS 4146 Laundry Practice should be followed.

The management of household linen is usually the responsibility of the family or friends of the deceased person.

6 Waste Disposal

6.1 Clinical (formerly referred to as “infectious”) waste defined by the National Health and Medical Research Council Guidelines 1999 includes:

(a) Sharps: Single use and reusable items such as syringes, needles, lancets, and scalpel blades capable of penetrating the skin. Contaminated single use glass materials must be disposed of sharps.

(b) Human tissue

(c) Human blood and body fluids other than urine or faeces. This applies particularly to large volumes of blood or body fluids/substances.

(d) Materials or equipment containing human blood or body fluids other than urine or faeces. This applies to materials and equipment, which are contaminated with blood or other body fluids/substances.

(e) Urine or faeces, or materials or equipment containing urine or faeces, where there is visible blood.

6.2 Contaminated single use sharp items and rags, cloths, paper towels or other equipment and human tissue, must be treated as potentially infectious.

6.3 Waste that is not in the infectious waste category can be disposed of by means of the local municipal waste system.

6.4 Waste disposal and sharps containers must be specifically dedicated and appropriate for that function. Sharps containers must be in accordance with Australian Standards AS4031: 1992 Non-reusable containers for the collection of sharp medical items used in health care areas and its Amendment 1:1996; AS/NZS 4261:1994 Reusable containers for the collection of sharp items used in human and animal medical applications and its Amendment 1:1997. Refer to Appendix 11.

6.5 Clinical waste (other than sharps) must be placed in plastic bags (labelled “Clinical Waste”, marked with the biohazard logo) and securely tied.

The recommended method for disposal of clinical waste is by incineration in a facility approved by the Environment Protection Authority (EPA) for this purpose. Clinical waste transported from the Funeral Director’s base to a waste disposal facility must comply with the relevant EPA regulations as documented in the EPA “Manual for the management and disposal of biomedical wastes” publication Number 268 (1993).

The responsibility for the proper disposal of clinical waste is that of the generator of the waste.
Blood, internal body fluids, urine and faeces may be disposed of via the local sewer. The disposal of bulk volumes of blood in this manner should always be approved by the sewerage authority involved. Any person proposing to discharge bulk volumes of blood via the sewer must first apply to the local sewerage authority for permission. This enables the relevant authority to determine whether a Trade Waste Agreement or pre-treatment facilities are necessary.

Large volumes of blood (200ml or more) are placed in the sewer should be diluted very well (at least fourfold) with tap water. This also applies when large volumes of fluid containing chemicals are disposed of via the sewer.

7 Procedures for transfer of human remains

7.1 General

7.1.1 Occupational Exposure – Sharps injury and splashes
An important hazard for employees involved in the transport of human remains is accidental skin puncture with sharp objects possibly contaminated with the deceased person’s blood (Part A, Sections 2.6 and 2.7). A variety of sharp objects (Part A, Section 3.2 (b) and Part B, Sections 3.3 and 3.8) may be encountered, particularly if the person has medical devices in situ. Transfer workers should always check carefully for such objects on or about the human remains before attempting to lift or move the remains. For example, needles may be hidden under bed linen. Should an employee receive an occupational exposure or sharps injury, follow the recommendations in Part A, Section 2.7 and Appendix 6.

7.1.2 Airborne Transmission of Microorganisms
The human remains may require wrapping in waterproof sheeting to contain leakage or if leakage is likely to occur (Appendix 9).

Employees should cover the face (specifically the mouth and nose) of the human remains prior to any type of movement. This barrier should ensure that airborne microorganisms that might be expelled from the respiratory tract will be effectively blocked. This barrier could be in the form of a cloth or face mask that filters to 0.3 microns (Part A, Section 3.1 (iii) and Appendix 2).

Employees should take care when moving the remains. There must be no compression placed upon either the thoracic or abdominal cavity during any portion of the transfer; compression of these cavities could dislodge microorganisms, forcing them from the deceased’s respiratory tract. Any movement of the remains must be performed gently and with full coordination of members of the transfer team.

Transfer workers should explain every task of the transfer completely to the immediate family prior to taking any action including the use of PPE or covering the face of the deceased.

7.1.3 Chemically hazardous cases
The body of a deceased person who has been in contact with potentially hazardous chemicals or has an irritating odour should not be handled until the chemical has been identified. The funeral director/manager should be notified.

The manufacturer of the chemical (if known) should be contacted and the Material Safety Data Sheet (MSDS) obtained prior to proceeding. If required, additional equipment/information should also be obtained.

Appropriate personal protective equipment (PPE) should be used. The remains may then be managed as for routine transport/preparation.

The body should be clearly labelled “Chemical Hazard” and placed in a bag in the refrigerator.
7.1.4 Human remains prepared by hospitals and institutions are not hazard free (wrapped or unwrapped) and precautions recommended for other transfers are to be carried out.

7.1.5 When checking for the presence of jewellery and to place identification tags on the human remains use standard precautions (single use gloves) to open the wrapping on human remains transferred from health care services. Document the presence or absence of jewellery or clothing. All those checking should sign the documentation.

7.2 Transport

7.2.1 Routine

a) Employees should enter the house or other site to inspect the place of death and the human remains. The permission of relatives/police is required before entering the premises.

b) The area and human remains should be viewed to assess possible hazards (Part B, Section 3.8), the need for plastic sheeting and problems with entry/exit. The relatives should be asked about special circumstances and/or their requirements regarding clothing, jewellery and bed linen.

c) Employees should put on appropriate PPE (Part B, Section 3.0 and Appendix 2).

d) Employees should bring the prepared stretcher into the house/area and place it in the best position to affect the transfer of the human remains. Where possible avoid contamination with blood or body fluids/substances.

e) The human remains should be checked for sharps hazards (Part B, Section 6.1). Place identification tag(s) on the human remains (and/or verify any existing identification tags). Remove any property if requested and document.

f) Employees need to assess the human remains in relation to exudates and decide whether the body needs to be contained in a body bag or wrapped in waterproof plastic sheeting in order to contain exudates. Before wrapping the human remains in a body bag or waterproof sheeting, wounds or other areas may require covering with waterproof dressings or waterproof sheeting to prevent leakage of fluids. The technique for wrapping is detailed in Appendix 9.

The routine use of body bags or waterproof sheeting for wrapping human remains is not recommended. The reasons for this are:

(i) It hastens putrefaction.
If human remains are totally wrapped, the plastic creates an insulation barrier, preventing natural heat from escaping the human remains and conversely limits the cooling effect of refrigeration.

(ii) Fluid inside wrapping can accumulate.
Condensation occurs inside the sheeting, increasing the volume of body fluids to be managed when it is removed.

(iii) It applies pressure on the human remains
Decomposition, being a chemical reaction, results in production of gas, usually first evident in the abdomen. If the abdomen cannot swell because of the plastic constriction, fluid purge will be forced from the mouth and/or nose.

(iv) It disfigures the human remains.
Noses are often squashed and lines created on the skin of face and hands are often impossible to eradicate prior to viewing.

(v) It is aesthetically unacceptable.
People may associate plastic wrapping with disposal of rubbish or for discarding something of little worth and find this treatment of a deceased human very offensive.
It inhibits the jewellery/clothing check. Funeral employees must check for the presence/absence of jewellery on first contact with the human remains. Unwrapping the remains may increase the potential infection risk.

It contributes to waste disposal problems.

g) Employees must then remove all their protective attire. Single use items are placed in appropriate waste disposal bags and re-useable linen in laundry bags as indicated (Part B, Sections 5.0 and 6.0). These bags are sealed with ties.

h) Employees should wash their hands at the earliest opportunity, either at the premises (if practicable) or later at the transport vehicle using an alcohol-based hand rub solution (Part B, Section 3.5).

i) Should there be a request for a last viewing of the human remains before removal from the premises, standard precautions should be used. This includes wearing of single use gloves to open and close wrapping around the upper part of the human remains. Wrappings should be opened for viewing without the family/relatives being present unless this is contradictory to ethnic or religious customs.

j) The human remains should be placed in the transport vehicle and the stretcher secured in place. Bags containing laundry and waste are stored in the vehicle stretcher compartment.

k) At the Funeral Director’s base, routine administrative procedures are completed.

The human remains should be removed from the stretcher in the mortuary and placed on a trolley, table or refrigerator as appropriate. The human remains should be placed in a refrigerator as soon as possible.

Complete sealing of the human remains contributes to putrefaction, therefore open the upper surface of the wrapping to allow body heat to escape and cooling to reach the human remains.

Bags containing laundry waste should be stored in appropriate areas (Part C, Section 4.7).

During lifting of the human remains, single use gloves must be worn and employees must wash and dry their hands after removing and disposing of gloves.

l) The stretcher compartment should be cleaned and disinfected. Protective attire should be worn (Part B, Section 3.0 and Appendix 2).

m) Used items should be replaced in the transfer vehicle supply box (Appendix 8).

7.2.2 Non-routine

In the following cases, permission from police and/or state coroner is required before employees can remove the human remains. Delays may occur for photography and other forensic work to be completed.

a) Autopsy cases

This type of transfer is carried out from hospitals and Coronial facilities. There is an increased risk of blood and body fluid contamination in these cases and an increased sharps hazard risk from protruding bones. If a body bag or waterproof sheeting wrap is necessary, refer to Appendix 9.

b) Infectious cases

The use of standard and additional precautions when handling all human remains applies (Part A, Section 2 and Appendix 1).

c) Suicide cases
(i) Death by gunshot
Blood and body fluids/substances (tissue) may be scattered over a large area of a room or in a small area such as a car. PPE is necessary (Part B, Section 3.0 and Appendix 2).

(ii) Death by hanging
These cases involve removing the human remains particularly in confined spaces, rather than posing a particular infectious hazard to workers.

(iii) Death by poisoning and/or drugs
Poison may be present creating a potential hazard or in the deceased’s vomitus and/or the possibility of sharps hazards.

(iv) Death by drowning
Decomposition, skin slip and access to the human remains may cause problems. Employees require full PPE when removing human remains from a watery site.

(v) Mutilative forms of death
This includes death by falling and transport accidents. PPE is required.

d) Murder cases and suspicious deaths
Decomposition, gross blood or body fluid/substance spills at the scene or subsequent to a post-mortem. Full PPE may be required.

e) Accident cases
These may be decomposed, have gross blood of body fluid/substance spills at the scene or subsequent to a post-mortem. Full PPE may be required.

In vehicular accidents there is an increased risk of sharps injury.

8 Training and education

Employees involved in the transfer of human remains should receive training and continuing education in the following areas:

(a) Infectious hazards and the principles of infection control.
(b) Use of PPE.
(c) Lifting and general occupational health and safety.
(d) Situation assessment.
(e) Certification of death, hospital and coroner’s court procedures.
1 **Transfer of human remains from cool-room to mortuary table**

1.1 The general principles in Part B, Sections 1 and 6 for handling of human remains apply.

1.2 Mortuary employees should put on appropriate PPE in a separate change room (Part A, Section 2). PPE will depend on the anticipated exposure to blood and other body discharges. Single use gloves and other PPE such as waterproof aprons, overshoes, goggles and masks must always be worn to protect the employee and their personal clothing (Part B, Section 3).

1.3 The human remains should be lifted gently onto the mortuary table/bench/trolley. Mechanical lifting equipment should be used if available. When manual lifting is required sufficient staff to safely move the remains is necessary. Do not place the human remains onto the table violently, as this could expel aerosols (droplet nuclei) from the lungs or promote discharge of body fluids.

2 **Unwrapping of human remains**

2.1 If necessary, use deodorisers that absorb odours from a fixed position or can be dropped onto the wrappings. Do not use sprays. Spraying of wrappings prior to removal is unnecessary (as standard precautions should be used) and may increase occupational hazards to employees through the inhalation or ingestion of disinfectant and other contaminated aerosols.

2.2 If waterproof wrapping is present it should be removed by cutting it into manageable sections with scissors. Scissors can cause accidental skin puncture (occupational exposure). Body bags should be unzipped before removal.

2.3 Waterproof wrapping should be disposed of into a clinical waste bag (Part B, Section 6).

2.4 Re-useable cloth wrappings should be placed in a laundry container and processed normally.

2.5 Residual rigor mortis should be relieved by manipulation of the joints in their normal articulation, taking care to avoid injury from hazards such as sharp bony protrusions.

2.6 Clothing for reuse should be checked for necessary laundering. Retained clothing should be labelled and stored prior to returning to the family. Clothing not required should be disposed of as clinical waste.

3 **Mortuary procedures for the preparation of human remains**

3.1 Dentures should be removed, cleaned dried and replaced. Avoid potential injury caused by a jagged tooth or sharp dental devices.

3.2 Soiled dressings, swabs, catheters, bandages, etc. are removed from the human remains. These are disposed of as infectious waste (Part B, Section 6). Recognisable medical equipment (e.g. catheters) should not be placed with ordinary municipal garbage, but are disposed of as clinical waste. The responsibility for final disposal of all waste remains that of the waste generator.

3.3 The human remains should be washed with liquid soap and warm water (avoiding aerosol and/or droplet creation), rinsed and dried. If required, embalming is performed at this stage of preparation. Refer to Part D, Procedures for Embalming.
3.4 If required, shaving is carried out next. There is an increased risk of accidental skin puncture during shaving. Razors should be single use and disposed of as sharps. If reusable razors are used, the blades should be disposed of as sharps and the handles must be cleaned and sterilized before re-use.

3.5 Hair should be washed and dried. An electric hair drier may be used.

3.6 All body cavities should be packed with cotton wool coated with massage cream. These cavities include the nostrils and other body orifices such as the anus and vagina. This packing will retard "wicking" of body fluids. Alternatively, incontinence pads can be used in the perineal area.

3.7 The mouth should be closed appropriately, usually by suturing with single use needles. This procedure has a high risk for potential injury from sharps. Needles should be held using needle holders (clamping forceps). If sharps injury occurs, follow the procedures outlined in Part A, Section 2.6 and Appendix 6.

3.8 The eyes should be closed; they may require drying and the insertion of celluloid eye-caps.

3.9 Cosmetic procedures may be necessary such as the application of lipstick, face powder, rouge and eyeliner. Minimise the potential for accidental skin punctures.

3.10 The human remains should be dressed in clothing supplied or in a breasting.

3.11 The human remains should be lifted into the coffin/casket and moved to the storage area. Safe lifting procedures must be followed. In some instances, the human remains are returned to storage and encoffined later.

Care should be taken when placing human remains into a coffin, to prevent potential skin penetration injury to employees from sharps protruding from the coffin interior.

4 Mortuary Cleaning, Waste Disposal and Laundering

4.1 The preparation areas including the preparation table, floor and drains should be washed thoroughly with detergent and warm water, rinsed and dried. Disinfection with sodium hypochlorite solution may be necessary. (Part B, Section 4).

Where walls or other areas have blood or body fluids/substances they should be spot cleaned by washing in detergent and warm water, rinsed and dried. Walls should be cleaned down once every 3 months. Unlike horizontal surfaces vertical surfaces do not accumulate dirt and constant cleaning will remove the surface making the walls more liable to cracking and/or contamination.

4.2 Blood-stained fluids and disinfectant solutions should be well diluted before discharge into the sewer (Part B, Section 6.6). Human tissue and disposable sharps are infectious waste and must be disposed of appropriately (Part B, Section 6).

4.3 Single use PPE must be disposed of as infectious waste (Part B, Section 6). Contamination does not have to be visible to exist and all items are considered potentially infectious.

4.4 Wear single use gloves when handling contaminated re-useable linen and place in a laundry bag for routine laundering (Part B, Section 5).

4.5 Single use sharp items such as needles, lancets, intravenous spikes, scalpel blades and broken glass or plastic items are a potential infection risk (Part A, Section 3.2).

All single use sharps must be placed in a sharps container immediately after use. Sharps containers must be placed as close to the point of use as possible.

Needles must never be removed from syringes after use and must be discarded intact into a sharps container.
Needles should not be purposely bent or broken by hand. Resheathing of needles is not permitted.

Needle nippers should not be used.

Sharps containers must comply with Australian Standards (Part B, Section 6.4). Sharps containers should be large enough to cope with the volume of sharps. Varying sizes may be required to accommodate items of medical equipment removed from the human remains.

They must be impermeable to fluid, made of puncture resistant materials with a close fitting lid to prevent spillage, labelled “Sharps” and “Clinical Waste”, have rigid walls and display the biohazard logo.

Sharps must be placed into the sharps container by dropping the sharp end in first, at the point of use by the person using the item. Sharps must never be pushed into the container and the container must never be overfilled.

When the container is nearly full, it must be firmly closed and disposed of as clinical waste (Part B, Section 6.1). There is no need to disinfect the container before disposal.

4.6 On completion of all cleaning and disinfection procedures and the disposal of waste and laundry, employees should remove all PPE, avoiding contamination of clothing and dispose of it into either a clinical waste or laundry bag before removing gloves (Part B, Section 5). Employees must thoroughly wash and dry hands.

4.7 Receptacles for linen, general and infectious waste should be stored in suitable storage areas. When moving receptacles from the mortuary room for storage employees should avoid soiling the walls or door handles with contaminated equipment or gloves. Clean, single use gloves should be worn.

Containers that are washable, rigid and puncture proof with close-fitting lids should used for all used items (either for disposal or for cleaning) and should be placed as close to the point of use as possible.

5 Cleaning and disinfection of equipment

Refer to Appendix 11 for more detailed information on cleaning, disinfection and sterilisation.

For all cleaning procedures PPE including heavy-duty household gloves, waterproof aprons and face/eye protection should be worn. Refer to Appendix 2.

Needles should never be re-used. Reusable equipment should be cleaned in a washer/disinfector. During manual cleaning, sharp objects should be cleaned individually with no other item in the sink.

Manual cleaning procedures should minimise the risk of accidental skin penetration and the generation of aerosols and splashing by keeping all items being cleaned below the water surface.

Re-useable equipment should be cleaned immediately after use. If cleaning cannot be performed immediately after use, items should be soaked in warm water to prevent soils becoming ‘fixed’ making cleaning more difficult.

Items should be dried using a lint free cloth. Do not dry items in ambient air as this will attract contaminants.

All reusable items should be sterilized after cleaning using a bench-top (or other) steam sterilizer. After cleaning and sterilization, instruments should be dried using a lint free cloth and suitably stored in a clean compartment. Place items in closed puncture proof containers.
Items may be packaged prior to sterilization and be kept sterile until use, if required. The sterilizer must have a drying cycle if packaged items are to be sterilized. For all sterilization matters refer to Australian/New Zealand Standard AS/NZS 4815:2001 (Appendix 12.3).
APPENDICES

1 STANDARD AND ADDITIONAL PRECAUTIONS

These are measures used in infection control to reduce the risk of the transmission of infective agents from person to person or, person to object to person. That is, standard precautions are designed to reduce the risk of transmission of microorganisms from both recognised and unrecognised sources of infection.

1.1 Standard Precautions

Standard precautions are work practices required for the basic level of infection control. They include:

- Good hygiene practices, particularly washing and ‘pat’ drying of hands before and after personal contact;
- The use of protective barriers which may include gloves, gowns, plastic aprons, masks, eyeshields or goggles; and
- The appropriate handling and disposal of sharps and other contaminated or infectious waste;

Standard precautions are recommended when managing all procedures regardless of their perceived infectious status, and in the handling of:

- Blood
- All other body fluids, secretions and excretions (excluding sweat), regardless of whether they contain visible blood;
- Non-intact skin and mucous membranes

1.2 Additional Precautions

Additional (transmission-based) precautions are used for those known or suspected to be infected by epidemiologically important pathogens, spread by airborne or droplet transmission or by direct or indirect contact with skin or contaminated surfaces.

Contact precautions are work practices which reduce the risk of the transmission of microorganisms from contaminated environmental surfaces or by direct or indirect contact with a person during care. The routine use of gloves, gowns, plastic aprons, stringent hand-washing techniques and the appropriate cleaning and sterilization of equipment will reduce the risk of transmission of microorganisms.

1.3 Use of Standard and Additional precautions (examples only)

The level of precautions will always depend on the individual situation. For example:

- a) Transfers
  - (i) Routine: transfer from the deceased’s home
  - (ii) Non-routine: transfer from river site to respective State Coroner’s mortuary facilities

- b) Preparation
  - (i) Limited: washing and dressing the human remains
  - (ii) Extensive: repairing facial damage involving the potential use of sharp items or preparation after autopsy

- c) Embalming
  
  Both standard and additional precautions are used as embalming involves the use of sharp items and chemicals, and the likelihood of splashes of blood and body fluids/substances.

- d) Autopsy
  
  Both standard and additional precautions are used as autopsy involves the increased potential for splashes of blood and body fluids/substances and the creation of aerosols from the use of saws and examination of tissues in ‘difficult to access’ parts of the body. It also involves the use of sharp items.
### Table 1.1 Use of Standard and Additional Precautions

<table>
<thead>
<tr>
<th>Activity</th>
<th>Standard precautions</th>
<th>Additional Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transferring</td>
<td>Routine transfers</td>
<td>Non-routine transfers</td>
</tr>
<tr>
<td>Preparing</td>
<td>Limited preparation</td>
<td>Extensive preparation</td>
</tr>
<tr>
<td>Embalming</td>
<td>Essential</td>
<td>Essential</td>
</tr>
<tr>
<td>Autopsy</td>
<td>Essential</td>
<td>Essential</td>
</tr>
</tbody>
</table>
2 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Barrier protection equipment used to practice standard precautions is referred to as Personal Protective Equipment (PPE).

2.1 Requirements
Each situation will require different PPE. PPE used in the practice of Standard Precautions consists of:

- Single use Gloves: non-sterile for all situations in the funeral industry. Heavy-duty utility gloves are used for cleaning;
- Eye and/or facial protection: glasses, goggles, face shields;
- Face masks: designed for protection against respiratory pathogens (particulate filter masks) and/or splashes and aerosols/droplets. Face masks are made for differing functions. Refer to Table 2.1 in Section (iii) of this appendix for additional information on face masks. All face masks should comply with Australian Standards;
- Protective clothing and equipment: aprons and gowns;
- Footwear: protection from dropped sharps and spills.

i) Gloves
- Gloves must be worn when contamination of the hands with blood or body fluids, or contact with mucous membranes is likely to occur
- Gloves should be changed after each procedure.
- Wear gloves (clean, single-use, non-sterile gloves are adequate) when undertaking procedures or handling potentially contaminated items.
- Remove gloves immediately after use, wash and dry hands. Ensure hands do not touch potentially contaminated environmental surfaces or items to avoid transfer of microorganisms to other people or environments.
- Gloves should be seen only as an adjunct to hand washing. Hands should be washed before and after glove use.
- Gloves that provide protection against sharps such as mesh or Kevlar should be worn where there is an increased risk of sharps injury, such as motor vehicle accidents.
- Refer to Appendix 4 for information on how to don and remove gloves.

ii) Eye Protection (Glasses/Goggles) and/or Face Shields
- Wear eye protection or face shields when it is anticipated that blood or other body fluids may be splashed or sprayed onto the mucous membranes (eyes).
- Protective eyewear or face shields must be worn during all procedures where potential for splashing or spraying of blood or body fluids is liable to occur.
- The eyewear should comply with AS/NZS 1337: 1992, be optically clear, antifog and distortion free, be close fitting and have side shields.
- Reusable eye protection must be cleaned after each use.

iii) Single-use Face Masks and Respiratory Devices (Masks)
- Masks must be worn during all procedures where potential for splashing or spraying of blood or body fluids is likely or where airborne infection may occur.
- The mask should best meet the requirements of a particular situation, that is, the type of body substances that may be encountered or the type of activity being undertaken. The types of mask available are either for general or more specialized purposes. They have differing particulate filter properties and may have fluid resistance properties in addition.
- Surgical type masks with fluid resistance properties, with or without a face shield, are suitable for general use where splashing is liable to occur.
- Respiratory type masks are designed to filter at 0.3 microns and are suitable for situations where Tuberculosis is known or suspected. They must be fitted for size to ensure a firm fit.
- Masks should be closefitting, that is, tied firmly and cover both the nose and mouth. They should not be touched during wear and be removed (by touching the ties only) as soon as practicable on becoming soiled or moist.
- They must not be worn around the neck.
### Table 2.2 Examples of Face Masks and their Uses

<table>
<thead>
<tr>
<th>General Purpose Mask</th>
<th>Submicron Mask</th>
<th>Fluid Resistant Mask</th>
</tr>
</thead>
<tbody>
<tr>
<td>For general purpose medical procedures where the wearer is not at risk of blood or body fluid splash</td>
<td>For tasks where the funeral industry employee is not at risk of blood or body fluid splash but requires a mask with submicron filter efficiencies (airborne transmission)</td>
<td>For all funeral industry procedures or in any area where the employee is at risk of blood or body fluid splash and requires a fluid resistant mask with submicron filter efficiencies.</td>
</tr>
</tbody>
</table>

Adapted from AS 4381:2002

iv) Gowns and Plastic Aprons

- Gowns and plastic aprons must be worn to protect clothing and skin from contamination with blood or body fluids/substances.
- Where splashing from large amounts of blood or body substances is likely then impermeable or fluid resistant gowns must be worn.
- Protective clothing should be removed as soon as possible and bagged for laundering or disposal.
- Wear a clean gown when performing procedures or if it is anticipated that clothing will have substantial contact with the human remains, environmental surfaces and/or items, if the remains has wound drainage not contained by a dressing.
- Remove the gown when the procedure is completed. After gown removal, ensure that clothing does not contact potentially contaminated environmental surfaces in order to avoid transfer of microorganisms to other people or environments.
- Waterproof coveralls may also be required including head covering.

v) Footwear

- Footwear should be enclosed to protect against falling items including sharps and other contaminated items or blood or body fluids/substance spills.
- Waders/gumboots may also be required.
### Table 2.3  Examples of Standard/Additional Precautions and the use of PPE

<table>
<thead>
<tr>
<th>PPE</th>
<th>Standard Precautions</th>
<th>Additional Precautions Required</th>
<th>Cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gloves</td>
<td>Latex, neoprene or nitrile gloves. Protective gloves such as mesh should be worn in situations of increased risk of sharps injury.</td>
<td>For all manual contact with the human remains, equipment and the immediate environmental surfaces</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>For all manual contact with the human remains, equipment and the immediate environmental surfaces</td>
<td>0.3µm particulate mask for transferring human remains with known or suspected Tb only.</td>
<td>Nil</td>
</tr>
<tr>
<td>Mask</td>
<td>Nil</td>
<td>Protect the face if splashes are likely</td>
<td>Nil</td>
</tr>
<tr>
<td>Goggles</td>
<td>Nil</td>
<td>Protect the eyes if splashes are likely</td>
<td>Protect the eyes if splashes are likely</td>
</tr>
<tr>
<td>Head Shields</td>
<td>Nil</td>
<td>Protect the eyes if splashes are likely</td>
<td>Protect the eyes if splashes are likely</td>
</tr>
<tr>
<td>Face Shields</td>
<td>Nil</td>
<td>Protect the eyes if splashes are likely</td>
<td>Protect the eyes if splashes are likely</td>
</tr>
<tr>
<td>Overgowns</td>
<td>Nil</td>
<td>If substantial contact with the human remains, items in contact with the human remains and the immediate vicinity.</td>
<td>Nil</td>
</tr>
<tr>
<td>Plastic Aprons</td>
<td>Nil</td>
<td>If substantial contact with the human remains and the immediate vicinity.</td>
<td>Nil</td>
</tr>
<tr>
<td>Overshoes</td>
<td>Nil</td>
<td>If substantial contact with the human remains and the immediate vicinity.</td>
<td>Nil</td>
</tr>
<tr>
<td>Coveralls</td>
<td>Nil</td>
<td>If substantial contact with the human remains and the immediate vicinity.</td>
<td>Nil</td>
</tr>
<tr>
<td>Waterproofs</td>
<td>Nil</td>
<td>If the human remains location is wet such as a river or substantial blood spillage has occurred.</td>
<td>Nil</td>
</tr>
<tr>
<td>Waterproof boots or waders</td>
<td>Nil</td>
<td>If the human remains location is wet such as a river or substantial blood spillage has occurred.</td>
<td>Nil</td>
</tr>
</tbody>
</table>
3 HAND CARE and HANDWASHING PROCEDURES

3.1 Broken Skin
Broken skin or infected, exposed parts of the operator’s body should be covered with a waterproof dressing that completely covers the affected area. If a cut or abrasion is on the hand single use gloves should be worn during procedures.

3.2 Handwashing
Handwashing is the single most important hygiene measure in preventing the spread of infection (Larson 1996). The role of hands in the spread of infection has long been recognized. Unbroken skin is the best defence against infection because it provides a perfect barrier. The purpose of hand washing is to reduce microorganisms that may be present. Unless the fingernails are visibly dirty a nailbrush should not be used as it may cause breaks in the skin through brushing which is too vigorous.

Good hand washing facilities are essential and should be close to where procedures are performed. Hands free taps are required for premises carrying out high-risk procedures such as human remains preparation and embalming. Liquid soap dispensers using single use cassettes are recommended as they do not permit a ’topping up’ process and minimise the risk of contamination. The dispenser and pump nozzle (if used) should be washed and dried thoroughly before being refilled.

Handwashing should occur before and after significant contact with human remains and after all activities likely to cause contamination.

Significant contact includes:
- Contact during transfer procedures
- Preparation of the human remains for encoffining
- Embalming
- Viewing procedures

Activities that can cause contamination include:
- Handling equipment/instruments soiled with blood or body fluids/substances.
- Direct contact with body secretions/excretions
- Going to the toilet.

a) When to wash hands:
- before and after contact with human remains
- after contact with blood or body fluids/substances,
- after using a tissue/handkerchief,
- after smoking,
- after going to the toilet,
- before and after eating or preparing food,
- after answering the phone and before returning to the human remains.

Gloves are not a substitute for handwashing. Hands should be washed before and after wearing gloves.

b) How to wash hands (See Diagram 3.1):
- First wet hands with warm running water and use mild liquid soap (1 pump measure is sufficient).
- Rub hands vigorously as you wash them (for a minimum of 15 to 20 seconds).
- Wash hands all over including:
  - backs of hands,
  - wrists,
  - between fingers, and
  - under fingernails;
- Thoroughly pat hands dry with paper towel. Hands should be ‘pat’ dried as rubbing causes friction, which may lead to skin breakdown such as ‘cracked skin’ or dermatitis.

c) Hand creams and lotions should be applied regularly during the day to provide protection and assist in the prevention of chapped and cracked skin.
d) Alcohol-based chlorhexidine hand rub solutions may be used as an adjunct to handwashing when handwashing facilities are not available or inadequate. Visible soil must be removed by handwashing. Alcohol-based gels are not as effective as alcohol-based liquids but the latter may have a drying effect.

**Diagram 3.1 Routine Handwashing Technique**
Source AS/NZS 4815:2001. (Permission is being sought from Standards Australia for the use of this diagram)

![Diagram of handwashing technique]

- **Procedure 1**: Wet hands and wrists. Apply soap.
- **Procedure 2**: Right palm over left, left over right.
- **Procedure 3**: Palm to palm, fingers interlaced.
- **Procedure 4**: Back fingers to opposing fingers interlocked.
- **Procedure 5**: Rotational rubbing of right thumb clasped in left palm and vice versa.
- **Procedure 6**: Rotational rubbing backwards and forwards with tops of fingers and thumb of right hand in left and vice versa.

**NOTE:** Repeat procedures 1-6 until the hands are clean. Rinse hands and pat dry.
4 PROCEDURES FOR DONNING/REMOVING GLOVES

4.1 General
Gloves are not a substitute for handwashing. Hands should be washed before and after wearing gloves.

Gloves should be worn when contact will be made with the human remains as part of standard precautions. Single use gloves should be used. Single use gloves should be replaced if they become damaged (torn or punctured).

The type of gloves worn should be appropriate to the task:
- Non sterile gloves – for procedures involving transfers and preparation of the human remains and embalming; and
- General purpose utility (heavy-duty) gloves – for general cleaning.

Vinyl gloves should not be used as they are more likely to have large holes and are more prone to tearing.

Single use gloves should be removed carefully to avoid contamination of hands or other surfaces. They must not be washed or reused.

General purpose, heavy-duty utility gloves may be reused but should be washed in detergent, rinsed well and stored dry. They should be replaced if they are torn, cracked peeling or showing signs of deterioration.

4.2 Latex allergy/sensitivity
Some employees may develop allergy or sensitivity to latex gloves. This is likely to be due to contact with latex proteins that may not have been adequately removed during the manufacturing process. In the presence of sweat or moisture, these proteins may become adsorbed onto the lubricant powder used in the latex gloves.

It has been suggested that latex allergy is directly linked to the wearing of powdered latex gloves, particularly the aerosolisation of latex proteins in glove powder. Research has not yet proved conclusively that changing to powder free gloves will reduce the incidence or development of latex allergy.

Employees who have a proven latex allergy/sensitivity to latex gloves should use either latex gloves that are powder-free, or latex alternatives such as Neoprene or Nitrile.

All employees should ensure that they wash their hands thoroughly, rinse off soap residues and pat dry hands.

Never:
- Apply liquid soap to dry hands
- Don gloves over wet hands, or
- Neglect to wash hands after removing gloves.

4.3 Procedure to Don or Remove Gloves

a) To don gloves:
- Place the fingers of one hand under a ‘cuff’ of the glove.
- Insert the fingers of the opposite hand into the glove and push fingers into the glove fingers.
- At the same time pull up on the cuff of the glove and release the cuff.
- Repeat for the other hand.

b) To remove gloves:
- Gloves must be removed in a manner that minimises contamination of the employee’s skin with the outer surface of the glove.
- Tuck the fingers of one gloved hand under the cuff of the other glove and remove without touching the skin.
- The remaining glove is removed by, tucking the bare fingers of the ungloved hand under the upper glove edge and pull it off without touching its outside surface.
• Gloves should be disposed of appropriately.
• Hands should be washed and dried immediately after gloves are removed.

**Note**
Appendix 3 has information on handwashing.
Refer to the following diagrams for donning and removing gloves.

### 4.4 Donning Gloves

Open packet onto clean surface.
Open inner packet exposing the gloves with the palms uppermost.

Pick up the first glove (left hand glove for right-handed people and right hand glove for left-handed people) by the cuff, touching only the inside portion of the cuff (that will be against your skin when the glove is on).

While holding the cuff in one hand, slip your other hand into the glove (keeping the glove fingers pointed towards the floor to keep the fingers open). Be careful not to touch anything and hold the gloves above your waist level.

**Note:** If the first glove is not fitted correctly, wait until the second glove is on before making any adjustments using the fingers of one glove to adjust the other glove.
When wearing sterile gloves, touch the sterile parts of the glove only.

Pick up the second glove by sliding the fingers of the gloved hand under the cuff of the second glove.

When wearing sterile gloves be careful not to contaminate the gloved hand with the ungloved hand as the second glove is being put on.
4.4 Removing Gloves

Put the second glove on the ungloved hand by maintaining a steady pull through the cuff.

Adjust the glove fingers until the fit is comfortable.

Grasp one of the gloves (left hand glove for right-handed people and right hand glove for left-handed people) near the cuff and pull it partway off. The glove will turn inside out. It is important to keep the first glove partially on your hand before removing the second glove to protect you from touching the outside surface of either glove with your bare (and relatively uncontaminated) hands.

Leaving the first glove over your fingers, grasp the second glove near the cuff and pull it partway off. The glove will turn inside out. It is important to keep the second glove partially on your hand to protect you from touching the outside surface of the first glove with your bare (and relatively uncontaminated) hands.

Pull off the two gloves at the same time, being careful to touch only the inside surfaces of the gloves with your bare hands.

Dispose of gloves into an infectious waste bag.
5 SPILLS MANAGEMENT

5.1 General
Funeral premises should have policies and procedures in place to manage spills of blood and body fluids/substances or chemicals.

Spills are classed as drops, small (up to 10cm) and large (greater than 10cm).


5.2 Spill Kits
The items below can be kept in a washable rigid puncture proof container with close fitting lid
- Utility gloves suitable for cleaning that are disposed of
- Paper towels for cleaning up the spill and for cleaning
- Leak proof bags for disposal of waste materials
- A specifically labelled scraper and pan for cleaning up
- Sachets of granular sodium hypochlorite (10,000ppm available chlorine)
- Masks and eye protection
- A respiratory protection device for protection against inhalation of powder from sodium hypochlorite granules or aerosols generated during cleaning.
- Spill kits and sachets of sodium hypochlorite granules are also available commercially for both blood and chemical spills.

5.3 Procedure
- Standard precautions apply
- Don PPE
- Spills should be cleared up before cleaning the area and the generation of aerosols should be avoided
- Sodium hypochlorite will only be required in special circumstances and must be mixed as required or mixed fresh daily. For most spills general cleaning procedures are sufficient
- Clean up spills as soon as possible and do not let the area remain ‘wet’ as it will become a hazard. Put up signs if necessary
- Remove all sharps and place in sharps container
- Wipe up spill with paper towels
- Wash area using warm water and detergent
- Rinse area and dry thoroughly
- Place all cleaning materials into a plastic bag and tie securely
- Dispose of contaminated waste into infectious waste container
- Wash and dry hands
- Restock the spills kit
6 OCCUPATIONAL EXPOSURE TO BLOOD AND BODY FLUIDS OR SUBSTANCES

All blood and body fluids/substances are considered potentially infectious.

6.1 Immediate action
Penetrating injuries should be flushed under running water then washed with soap and water immediately, pat dried and covered with a waterproof dressing. Apply pressure over the dressing if bleeding is profuse.

Splashes into the eyes, nose or mouth should be gently irrigated immediately with copious amounts of warm water or saline.

A medical practitioner should assess all occupational exposures as soon as possible, regardless of the seriousness of the injury. All occupational exposures should be documented.

6.2 Documentation
All occupational exposures should be recorded. Details should include:
- the employee’s name,
- date and type of injury
- treatment given (including referral for medical advice)
- source (the deceased if known or other source)
- a description of the incident

All occupational exposures should be reported to the supervisor/head of the mortuary.

6.3 Medical assessment and treatment
Pre-test counselling is compulsory and testing is essential in all cases of occupational exposure related to HIV. Post-test counselling is compulsory if the test result is positive. All test results should be delivered during a post-test counselling session.

The source individual (the deceased) should be treated as ‘source unknown’ for the purpose of testing, as consent is required to test the source (if known) for blood borne viruses (BBVs).

The medical practitioner should obtain advice from an infectious diseases physician regarding the need for post exposure prophylaxis (treatment).

6.4 Pre- and post-test counselling
Pre- and post-test counselling includes:
- Advice on the risk levels for infection
- The possible need for specific preventative treatment
- The need for additional testing for BBVs at 3 and 6 months
- Discussion on safe sex practices until the final BBV test results (at 6 months) are known to be negative.

6.5. Post exposure prophylaxis (PEP)
The medical practitioner, in conjunction with an infectious diseases physician, will discuss the need for PEP having regard for the type of injury, the relative risks involved, the BBV status of the source individual (if known) and any relevant medical history of the affected individual. This may include anti-retroviral drugs (for HIV), HBV immunoglobulin or a booster of hepatitis B vaccine. A course of hepatitis B immunisation should be commenced if the affected individual has not been immunised previously.

Employees should consult their medical practitioner immediately should any sign of infections occur at the site of injury or contamination, or if symptoms of a general infection occur in the following 2-3 weeks.
7 STANDARDS FOR PREMISES, EQUIPMENT & VEHICLES

AFDA Members should read this Appendix in conjunction with the latest edition of the AFDA Required Standards for Premises, Equipment & Vehicles.

Infection control principles form the basis of these guidelines to ensure:
- Occupational health and safety standards;
- Public health standards; and
- Community expectations of facilities which meet the needs and wishes of bereaved people

7.1 Mortuary Preparation Areas & Public Areas of Premises
The mortuary shall be physically separated from all public areas of the building in which it is sited but may be integral with the construction of the remainder of the building. Vehicle access should be covered and not accessible to the public.

A human remains preparation area shall be located in the mortuary area.

7.2 Service Connections
The mortuary shall be connected to a permanent water supply in compliance with the standards of the local water supply authority.

A physical discontinuity in the water supply shall be fitted to outlets to which hydro aspirators are, or could be, connected.

The mortuary shall be connected to a water sewerage system approved by the local authority.

7.3 Preparation Area Requirements
The physical requirements for buildings are:
- A floor area, not less than 9.3 square metres.
- A ceiling height, not less than 2.4 metres measured above the finished floor level.
- All surfaces including floors, walls, partitions and benches should be constructed of smooth impervious washable materials.
- Floors should be graded to floor drain(s) with removable covers that prevent solids from entering the sewerage system.
- All joints between floors, walls, partitions, ceiling, ventilation grilles, fittings, pipe work, windows and light fittings should be sealed with impervious material and all joins between floors/walls/partitions should have a covering of 50 millimetres radius to facilitate cleaning procedures.
- External windows that open to the outside must be fitted with fly-proof screens.
- External doors must be fitted with self-closing fly-screen doors to prevent the entry of insects and vermin.

7.4 Fittings & Equipment
- At least one basin with an adequate supply of hot and cold water supplied through a single outlet and fitted with knee, sensor remote or foot operated taps for hand washing.
- Mortuary table/s and fixtures should be constructed of smooth impervious materials designed to facilitate drainage and cleaning.
- Refrigerated human remains storage should have sufficient capacity for the storage of at least two adult human remains.
- The refrigerated human remains storage facilities shall be maintained permanently at an internal temperature of 4ºC (plus or minus 2ºC). This should be monitored constantly and documented.
- Refrigerators must not be turned off.
- The refrigerated human remains storage facilities shall not be used for any other purpose.
- All refrigeration surfaces should be of impervious materials with washable surfaces.
- In areas of the mortuary where chemicals are used, an approved eye-wash station must be installed.
- First aid kits.
- Reusable equipment cleaning and sterilizing facilities
Chemicals for disinfection such as sodium hypochlorite should be stored correctly and have material data safety sheets (MSDS) for each chemical.

Power outlets designed for use in "wet areas".

### 7.5 Waste Disposal
Impervious, puncture proof containers, with close fitting lids, shall be provided in the human remains preparation room for the reception and storage of all solid wastes arising from the preparation of human remains and the screenings from floor drains.

All solid wastes shall be identified for safe management of infectious wastes and disposed of as clinical (infectious) waste.

"Sharps" must be placed in an approved sharps container and disposed of as infectious waste.

### 7.6 Toilet and Shower Facilities
The employee hand basin, toilet and shower facilities must not be used for any other purposes.

Toilets specifically for employees working in the mortuary are essential.

Shower facilities with an adequate supply of hot and cold water supplied through a single outlet, are essential.

Hand basins with an adequate supply of hot and cold water supplied through a single outlet should be adjacent to each toilet.

Toilet and shower facilities shall have an approved air lock between those facilities and other parts of the premises.

### 7.7 Lighting & Ventilation
Lighting should be of sufficient lux (intensity) consistent with mortuary human remains preparation procedures and should, preferably, incorporate natural lighting.

Ventilation should be installed in the human remains preparation area for the removal of offensive odours and fumes as part of the premises design. Ventilation should meet Australian standards.

Airconditioning should be set to provide 15 to 20 air changes per hour. This may be increased to 20 to 25 in areas where increased amounts of chemicals are used such as in embalming areas.

Fresh air should enter near ceiling level with air extraction as near as possible to floor level.

### 7.8 Vehicle Area
An enclosed vehicle reception area or garage shall be provided adjacent to, and with direct access to, the human remains preparation room.

Vehicle area design shall ensure that the transfer of uncoffined human remains, to or from any vehicle in the area, is screened from public view.

### 7.9 Alternate Premises
Funeral operators must only use premises that comply with the required standards for equipment and facilities set out in these Guidelines for the storage, preparation and/or embalming of human remains.

### 7.10 Funeral Vehicles
a) Hearse
Funeral Directors must have a well-presented roadworthy hearse. It need not be specifically built as a hearse but must have an efficient operating roller device and coffin/casket clamping facility.
b) Transfer Vehicle
Transfer vehicles should be suitable for the purpose. They must be fitted with blinds, treated windows or suitable screening to ensure that human remains are blocked from external view.

The vehicle stretcher compartment should be sealed and separate from the driving/passenger compartment.

c) Dual Purpose Vehicles
Both transfer vehicles and hearses may be used for either purpose provided they meet the necessary standards.

d) Exclusive Use for Transport of human remains
A funeral director shall not permit the rear compartment of any vehicle used for the transport of human remains, to be used for any other purpose.

e) Transport of young children
Station wagons or sedan cars may be used for transporting the remains of a stillborn child or a child up to the age of 3 years.

f) Vehicle Cleanliness
A vehicle used for the transport of human remains shall be thoroughly and routinely cleaned and disinfected as necessary (that is, after a blood or body fluid/substance spill), immediately upon its return to the mortuary; and before sale or other disposal of the vehicle.

7.11 Embalming
Embalming of human remains shall only be carried out at a mortuary that complies with embalming standards.

Embalming shall be carried out by persons with a current certificate of proficiency, recognised by the Australian Institute of Embalming.
8 TRANSFERRING HUMAN REMAINS

Equipment Required

a) Single use gloves.
b) Heavy-duty gloves, for example, made of either leather or Kevlar material.
c) Protective overgarments (torso and limbs).
d) Overshoes (waterproof).
e) Waterproof aprons.
f) Masks and eye protection such as goggles, face shield type mask or head shield.
g) Water, liquid soap and paper towels or an alcohol-based hand wash solution.
h) General and ‘infectious’ laundry bags.
i) Plastic laundry bags (with ties) for blood contaminated linen to contain leakages.
j) General and infectious waste bags with ties.
k) Paper towels for cleaning.

m) Sodium hypochlorite sachets and water or made up solution (discard each twenty-four hours).

n) A first aid kit, which includes band-aids, bandages, saline or sterile water for flushing eyes.
o) Packs of padding, plastic, etc. suitable for dressing wounds on human remains or preventing leakage.
p) Containers for transporting babies.

q) Body bag or waterproof sheeting.
r) Transfer (slide/slip) boards.
s) Linen for wrapping human remains (Refer to Appendix 9).
9 TECHNIQUE for the WRAPPING of HUMAN REMAINS

9.1 Waterproof Sheeting
The sheeting should be white, opaque, low-density polyethylene sheeting and of suitable strength. It should be 300 cm long and 150 cm wide. Suitable sheeting is commercially available.

PVC (polyvinyl chloride) plastic should not be used because it creates greater environmental hazards when incinerated.

9.2 Method
- Place the waterproof sheeting on top of stretcher.
- Move the remains onto the stretcher
- Fold the sheeting over the feet.
- Fold the sheeting over the head.
- Fold the sheeting from right and left sides over the remains.
- Tape sheeting in place using waterproof adhesive tape.

9.3 Technique
The human remains should be placed on the waterproof sheet which should be long enough to fold covering the head, neck and chest and the feet and lower legs at either end.

The sides are drawn up and taped across the knees and the base of the ribs using waterproof adhesive tape.

An alternative is to use loosely tied cloth strips.

Safety pins must not be used due to the potential sharps hazard when transferring and to avoid tearing.

Ensure the outside of the sheeting is clean and intact. Wipe over if contamination or spillage occurs (Part B, Section 4).

Tears or punctures should be repaired with waterproof adhesive tape.

Lay the sheeting loosely over the face and chest, with hands resting on the abdomen.

A pillow or head-rest should be placed under the head, beneath the sheeting.

The human remains may be wrapped in linen.

This technique allows immediate access to the head area by folding back the sheet to enable identification or viewing and jewellery checks to be made. Avoid total cocooning of the remains by allowing heat to escape thus retarding natural putrefactive changes.

Babies and small children may be placed in aesthetically acceptable waterproof sheeting or a waterproof-lined container with a well-fitting lid. With babies and children, particular care must be taken to consider the emotional distress of parents when preparing the human remains for transport.

Preparation of babies and children, for transport, in the absence of relatives is recommended.
CREUTZFELDT-JAKOB DISEASE (CJD)

10.1 General
Funeral premises should have policies and procedures in place such as standard and additional precautions and for known cases of Creutzfeldt-Jakob Disease (CJD).

Creutzfeldt-Jakob Disease is a rare but fatal disease. There are two main types of CJD:
- Classical or familial CJD
- Variant CJD

There are other forms of transmissible spongiform encephalopathies (TSEs) that rarely occur in Australia.

Variant CJD has not occurred in Australia and is transmitted by the ingestion of bovine spongiform encephalopathies (BSEs) infected beef cattle, fed with infected feed.

Transmission generally requires direct inoculation of infected tissues into high-risk tissues for transmission to occur although sporadic cases occur.

The population at risk of spreading CJD can be divided into two groups. The high-risk group is likely to have higher concentrations of infectivity present.

The risk in the funeral industry depends on whether potentially infective blood or body substances or tissues are liable to leak or are already exposed.

Normal cleaning, disinfection and sterilization measures are not sufficient to destroy the prion that causes the disease.

Therefore use single use:
- Personal Protective Equipment (PPE)
- Equipment
- Linen

10.2 Personal protective Equipment (PPE)
Single use PPE is essential if fluid/substance leakage from the brain or spinal cord (neural tissue) is likely to occur.

PPE should be disposed of as infectious waste. It must be marked for incineration.

10.3 Linen
Linen (single use or reusable) used to transfer or cover the human remains must be treated as infectious waste and marked for incineration.

10.4 Equipment
Single use items should be used whenever possible. Use of reusable articles is not recommended.

Swabs, dressings, linen, needles etc used during procedures should be single use and must be disposed of as infectious waste and marked for incineration.

Reusable items can be sterilized using steam sterilization using a special cycle (Chapter 13, CDNA Guidelines) but it is recommended that single use items be used for all activities associated with preparation of the human remains.
**Table 10.1  Risk Categories for CJD**

<table>
<thead>
<tr>
<th>High Risk Group</th>
<th>Low Risk Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Those with proven CJD</td>
<td>• Anyone with undiagnosed progressive neurological illness with or without dementia</td>
</tr>
<tr>
<td>• Those with clinically suspected CJD</td>
<td>• All members of a family with a strong family history of undiagnosed denting or neurological illness</td>
</tr>
<tr>
<td>• Asymptomatic carriers of pathogenic mutations occurring within the context of familial CJD</td>
<td>• Recipients of cadaver derived pituitary hormones (growth hormone and gonadotrophins) between 1959 and 1985.</td>
</tr>
<tr>
<td>• All members of a family with familial CJD in whom the genotype is undetermined or uncertain</td>
<td>• Recipients of dura mater homografts or transdural surgery between 1972 and 1989 or for neurosurgical patients for whom the use of dura mater homografts cannot be excluded by patient records</td>
</tr>
</tbody>
</table>

**Table 10.2  Levels of Tissue Infectivity**

<table>
<thead>
<tr>
<th>Infectivity category</th>
<th>Tissues</th>
<th>Secretions and excretions</th>
</tr>
</thead>
</table>
| **High infectivity sites:** Demonstrated or predicted to be consistently infectious | • Brain  
• Pituitary gland  
• Spinal cord  
• Eye – retina, optic nerve and possibly the cornea |  
Cerebro-spinous fluid (CSF) |
| **Low infectivity sites:** Demonstrated or predicted to be infectious, but not consistently | • Dorsal root ganglia  
• Kidney  
• Liver  
• Lung  
• Lymph nodes/spleen  
• Placenta  
• Trigeminal ganglia  
• Uterus |  
Faeces  
Milk  
Nasal mucous  
Saliva  
Semen  
Serous exudate  
Sweat  
Tears  
Urine |
| **No infectivity:** Have not been demonstrated to be infectious | • Adipose tissue  
• Adrenal gland  
• Blood  
• Bone marrow  
• Gingival tissue  
• Heart muscle  
• Intestine  
• Peripheral nerve  
• Prostate  
• Skeletal muscle  
• Testes  
• Thyroid gland |  
Faeces  
Milk  
Nasal mucous  
Saliva  
Semen  
Serous exudate  
Sweat  
Tears  
Urine |


11 CLEANING, DISINFECTION AND STERILISATION

11.1 REUSABLE INSTRUMENTS AND EQUIPMENT

For an excellent reference on the cleaning, disinfection and sterilisation of used items, see AS/NZS 4187:2003 Cleaning, disinfecting and sterilising reusable medical and surgical instruments and equipment, and maintenance of the associated environments. It provides clear instructions for all steps in the reprocessing of reusable items.

11.1.1 Instrument & equipment categories/Risk management

Instruments and equipment, together with their cleaning, disinfection and sterilisation requirements, can be classified into categories based on their intended use. Table 11.1 provides examples of the instrument types, procedures and cleaning processes required. Use a risk analysis approach to assess the risks for each instrument or item of equipment.

Table 11.1 Suggested level of risk associated with a particular procedure/site (examples only)

<table>
<thead>
<tr>
<th>Risk</th>
<th>Procedure</th>
<th>Cleaning/disinfection/sterilisation</th>
</tr>
</thead>
</table>
| High      | • Penetration of sterile or mucosal tissue with a sharp instrument, such as a scalpel, scissors or needle  
            • Accidental breaks of intact skin, such as shaving or occupational exposure | Clean, sterilise                                   |
| Intermediate | • Contact with intact mucosa such as the respiratory tract or non-intact skin | Clean, dry, disinfect (as necessary), rinse off disinfectant with distilled water, dry (Alcohol evaporates, so does not require rinsing.) |
| Low       | • Intact skin                                   | Clean, dry                                          |

Disposal or cleaning (and sterilisation) is required for intermediate- and low-risk categories if items are contaminated with blood, body fluids or substances.

11.1.2 Cleaning procedures

*General*

- Wear personal protective equipment while cleaning (including heavy utility gloves) and clean all items before their first use.
- Remove used items from their transport containers and sort them according to the appropriate cleaning method.
- Clean instruments and tray immediately after a procedure. (If cleaning cannot be performed immediately, then instruments should be covered in warm water to prevent soils from becoming fixed, which would make cleaning difficult.)
- Do not leave instruments soaking for longer than one hour. Instruments that cannot be immersed should be cleaned immediately.
- Protect the tips of sharp reusable items from damage during cleaning and clean carefully to avoid a sharps injury to the employee.

*Cleaning process*

- Rinse under warm running water to remove organic material. Do not use either very hot or very cold water because this will fix the soil to the item, making it more difficult to clean.
- Fill the sink with warm water and liquid detergent (preferably low-foaming, nonabrasive, noncorrosive, biodegradable, free-rinsing, nontoxic detergent of a mild alkaline formulation). Common household detergents should not be used because they have high-foaming properties and their residue is difficult to rinse off.
- Follow the manufacturer’s instructions for detergent use. (Material safety data sheets contain information on the formulation, use and suitability of particular detergents.)
- Ensure all employees are familiar with each chemical used in cleaning items.
- Use cleaning products containing enzymes, which break down proteins in organic matter, only if suitable for the item. (They are not recommended for routine use.)
- Use products containing enzymatic matter according to standard precautions, and wear nitrile-type gloves.
• Note that cannulated (hollow or lumened) items are a particular challenge to clean. Immersion in an ultrasonic cleaner may assist in the manual cleaning by removing or loosening soils.
• Note that reusable tubing is also a challenge to cleaning and has the potential to generate infectious aerosols. Use single-use tubing instead.

Mechanical cleaning should be used using a suitable washer disinfecter that meets Australian Standards (a household dishwasher is not suitable). Manual cleaning may be the best method for some premises. Manual cleaning is used when items require care in their handling and are not suited to mechanical cleaning methods (for example, an ultrasonic cleaner). Ultrasonic cleaners may be used for some parts of the manual process (depending on the fragility of the item).

**Ultrasonic cleaners**

Ultrasonic cleaners work by producing high-frequency, high-energy sound waves that cause organic material to dislodge and drop to the bottom of the tank. Use only a manufacturer-recommended detergent because others may limit the effectiveness of the ultrasonic cleaner. Cannulated items may require additional manual cleaning, because these items are not always successfully cleaned in an ultrasonic cleaner. Cannulated items should be brushed thoroughly and rinsed before being carefully placed into the ultrasonic tank, to ensure air is not trapped within the lumen. They should be brushed again on removal (using a clean brush) to remove loosened debris. Ultrasonic cleaners do not sterilise or disinfect instruments, but they provide a safe and effective means of cleaning most reusable instruments before sterilisation.

It is important that the cleaner is tested (via an aluminium foil test) each day to ensure the correct operation of the ultrasonic transducer. Do not submerge fingers or body parts into the fluid of an operating ultrasonic tank because the energy will damage joint tissues and result in long-term arthritic conditions. A notice should be attached to each ultrasonic cleaner, stating ‘while operating the ultrasonic cleaner, do not submerge fingers or other body parts into the fluid’. Keep the ultrasonic cleaner lid on during the operation to reduce the emission of high-frequency sounds to a safe level, because they may damage hearing (and also to contain aerosols emitted from the surface of the cleaning fluid, which can pollute the surrounding atmosphere and be a source of airborne organisms). Table 11.2 summarises the steps.

<table>
<thead>
<tr>
<th>Table 11.2</th>
<th>Summary of steps in manual and ultrasonic cleaning</th>
</tr>
</thead>
</table>

**Manual cleaning**

1. Put on personal protective equipment, including heavy-duty household gloves.
2. Separate items according to the method of cleaning.
3. Rinse items in warm running water to remove soil.
4. Dismantle or fully open items to ensure all parts are present.
5. Immerse items (a few at a time) in the sink with warm water and detergent.
7. Keep each item low in the sink (below the surface) to prevent splashing and the formation of aerosols.
8. Rinse items in warm to hot running water.
9. Dry items with a lint-free cloth.
10. Inspect the item for cleanliness and completeness.
11. Do not reassemble the items before thermal disinfection or sterilisation.

**Ultrasonic cleaning**

Follow steps 1–4 for manual cleaning

5. Operate the machine to degas the solution.
6. Immerse items in the ultrasonic cleaner (which is filled with warm water and detergent).
7. Keep the lid on during the operation to prevent aerosols and splashing.
8. Rinse items in warm-to-hot running water.
9. Dry items with a lint-free cloth.
10. Inspect the item for cleanliness and completeness.

Items that cannot be fully immersed should be wiped over using a lint-free cloth dampened in warm water and detergent, then rinsed and dried. Alternatively, a 70% ethanol alcohol solution may be used to chemically disinfect the item.
Ultrasonic transducer performance test (aluminium foil test)

This test is designed to test the transducer function of the ultrasonic cleaner.

- Cut a strip of aluminium foil that is approximately the width of the tank and twice its depth.
- Fill the ultrasonic cleaner tank, add detergent and degas the tank (see the manufacturer’s instructions).
- Lower the foil vertically into the tank until it almost touches the bottom of the tank. (Do not immerse hands.)
- Operate the ultrasonic cleaner for 10 seconds (without the lid).
- Remove the foil and inspect it for an even distribution of perforations and pitting. If pitting or perforations are uneven, then the ultrasonic cleaner should be checked for faults or serviced.
- An uneven distribution of perforations and pitting of the aluminium foil indicate that the ultrasonic cleaner is not functioning at maximum efficiency and should not be used until it has been serviced.

Figure 11.1   Aluminium foil test:
Wire frames for supporting sheets of aluminium foil

Drying instruments/equipment

Do not dry items in ambient air (for example, on a bench) because this will allow airborne contamination. Equipment wiped over with a 70% alcohol solution should be wiped dry before storage. Use a lint-free cloth to dry items. Paper towelling is not appropriate because it is not lint free.

Do not handle cleaned items or packaging materials if a hand cream/lotion has been recently used; wash hands first. Hand creams/lotions, especially oil based ones, will leave marks that may attract contaminants and provide an impenetrable barrier to steam. Once items are dry, they may be handled with clean, ungloved hands.

Offsite sterilisation

Instruments being sterilised offsite must be cleaned and packaged before being transported in a clean, closed puncture-proof container. Loose instruments should be transported in a clean, closed puncture-proof container ensuring they are not damaged in transit. Some offsite sterilising services may wish to do the packaging; in this case, cleaning is still necessary before transport.

11.1.3 Disinfection

General

Instruments used on intact skin may be washed and stored in a dry place, but instruments that penetrate the skin must undergo cleaning and sterilisation. The use of disinfectants does not replace the need for good cleaning practices, and all items/equipment/surfaces must be thoroughly cleaned before disinfection. Disinfectants should be used only when equipment or the environment is contaminated with blood or other body substances. Detergent solution is sufficient for perspiration. Disinfectants can become easily contaminated and are a potential source of infection. Solutions should be labelled appropriately (with the name, date and dilution strength). Do not mix detergent or disinfectant solutions because they may react with each other and, in
doing so, reduce their effectiveness or cause harm. Some disinfectants, such as those producing chlorine, must be freshly prepared.

**Use of bleach (sodium hypochlorite)**
- All references to ‘bleach’ (sodium hypochlorite) throughout the guidelines relate to household-grade bleach products with a concentration of 40,000 parts per million (ppm) of available chlorine (ppm avCl) or 4% avCl.
- To dilute bleach for a 1:4 dilution, add 1 cup of bleach (250 millilitres) to 3 cups of warm water (750 millilitres).
- Prepare bleach solution as required, or prepare daily (label bottle) as its effectiveness deteriorates rapidly.
- To prevent deterioration, store bulk bleach containers in dark cool areas (and strictly adhere to use-by dates on bleach products).
- Wear gloves when handling bleach, because it can cause skin irritation.
- If splashing occurs, rinse the affected area immediately, following the instructions contained in section 3.3.
- Rinse bleach solution from all surfaces, because bleach is corrosive.
- Dry surfaces.

It is not necessary to routinely use bleach or other disinfectants.

**Disinfection processes**
Chemical disinfection should be used only for items for which sterilisation and thermal disinfection are not suitable—for example, items unable to be immersed in water (thermal) or unable to withstand high-pressure gradients (sterilisation). Items that can be fully immersed but are unable to withstand high-pressure gradients may be disinfected in a suitable chemical disinfectant solution if necessary. Thermal disinfection is recommended for items that can be immersed but are not required to be sterile at the time of use.

Due to the misuse and overuse of chemical disinfectants, many microorganisms have become, or are becoming, resistant to them. For this reason, the routine use of disinfectants is not recommended.

Items of equipment should be immersed in a chemical disinfectant solution only for the time specified by the manufacturer. They should be removed and rinsed with distilled water before being dried and stored. Chemical disinfectant solutions should be discarded immediately after use. The container should have a close-fitting lid. Spray bottles are not a suitable method of disinfecting equipment because the aerosols produced do not come into contact with all parts of the equipment.

Premises which choose to use chemical disinfectants as part of their practices should consider each chemical and its use carefully, and follow the manufacturer’s instructions. (Table 11.1 provides a guide for when a disinfection process [thermal or chemical] can be used.)

**Thermal disinfection**
Thermal disinfection uses heat and water (moist heat) at temperatures that destroy most organisms. It is the most cost-effective and efficient method of disinfection. It is only suitable for items that can be fully immersed in water at high temperatures. All items must be fully immersed for the entire time once the water boils. Additional items must not be added during this boiling stage.

**Table 11.3 Time/temperature ratios for thermal disinfection**

<table>
<thead>
<tr>
<th>Surface temperature (°C)</th>
<th>Minimum disinfection time (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>1</td>
</tr>
<tr>
<td>80</td>
<td>10</td>
</tr>
<tr>
<td>75</td>
<td>30</td>
</tr>
<tr>
<td>70</td>
<td>100</td>
</tr>
</tbody>
</table>

Thoroughly clean and dry items before any thermal disinfection process is used.
**Chemical disinfection**
- All items that can be fully immersed in water may be disinfected in a chemical disinfectant solution.
- All items should be cleaned and dried before chemical disinfection.
- Fully immerse all immersible items for the time specified by the item/equipment and chemical manufacturer, then rinse them with distilled water and dry with a lint-free cloth.
- Wipe over nonimmersible items with a 70% alcohol solution (using a lint-free cloth), then dry them.

It is essential to dry items fully after cleaning (before either wiping or immersing the item in a chemical disinfectant) because any moisture will dilute the solution, making it ineffective. Wiping instruments with disinfectants before use does not sterilise them. Instruments must not be stored in disinfectants before or after cleaning or sterilising.

**Suitable equipment disinfectants**
Suitable disinfectants are those with the following strengths:
- 70% w/w ethyl alcohol
- 80% v/v ethyl alcohol
- 60% v/v isopropyl alcohol.

Observe the use-by dates on all disinfectants, including those on decanted containers.

**11.1.4 Use and storage of chemicals**
Many chemical products used in personal care and body art procedures have the potential to harm the health of the operator and client if they are not labelled, handled and stored with care. To protect the operator and the client, consider the following practices:
- Ensure premises are well ventilated.
- Only use drop-on or brush-on products.
- Try to avoid aerosol products.
- Wear gloves when decanting or mixing products such as chemicals because they should not come into contact with the skin of the employee.
- Label all solutions decanted from bulk containers, and date them with the day of decanting and a use-by date if applicable.
- Do not eat, drink or smoke in areas where chemicals are stored or used, because food and drink may absorb emitted vapours that can be flammable. (A specific staff room should be set aside for breaks and the consumption of food.)
- After handling chemicals, wash hands before consuming food or drink, because chemical residues on the hands will contaminate food and will be ingested.
- Label all chemical containers, secure their lids and store them in a cool area away from gas appliances.
- Secure chemicals to prevent unauthorised access.
- Remember that cotton wool and similar articles soaked with chemicals will be present in waste, so fumes will be dispersed into the room if not adequately contained. Remove waste regularly from the immediate area to a larger, covered bin.

Funeral directors and employees should request (from manufacturers/suppliers of chemicals) material safety data sheets relating to the safe handling, storage and first aid requirements for chemical products. All employees should refer to these sheets for advice and keep copies on the premises at the point of use.

Glutaraldehyde (sold under various names) is an instrument-grade disinfectant that is also used as a fixative. There are major occupational health and safety requirements for the use of this product, such as the required use of personal protective equipment and elaborate air removal systems.

**11.1.5 Packaging and labelling**

**General**
This section outlines the process for steam-under-pressure sterilisation as the recommended process for the funeral industry. Read and implement the section on cleaning and disinfection before commencing any part of the sterilisation process.
Sterilisation is a validated process used to render an item free of all forms of viable microorganisms. Unless items are processed under controlled conditions, they will have microorganisms on them and, by definition, are nonsterile. The purpose of sterilisation is to destroy all of these microbiological contaminants.

Sterilisation requires special training and skills to select the correct steam sterilisation process for the processed item, validate the sterilisation process and monitor each cycle. Skill, knowledge and understanding are required to interpret when the sterilisation cycle parameters (time, temperature and pressure) have been met, to interpret changes in both the chemical and biological indicators used to monitor the sterilisation process, and to decide the actions required to correct cycle failures. It is recommended that a funeral premises, unless its employees have received adequate training, should purchase sterilisation services from an appropriate local provider.

Steam is the most widely used and appropriate method of sterilisation in the funeral industry. Steam sterilisation occurs when a combination of heat and moisture is maintained at a pre-set, temperature-pressure-time relationship. It coagulates cell proteins and efficiently kills all microorganisms, including spores. The available latent heat generated is responsible for the rapid destruction of microorganisms. It is nontoxic and more economical than other sterilisation methods.

**Packaging**

Do not handle cleaned items or packaging materials after recent use of a hand cream/lotion; wash hands first. Hand creams/lotions, especially oil-based ones, will leave marks that will attract contaminants and provide an impenetrable barrier to steam.

Items to be used sterile should be cleaned, dried and placed on fully perforated metal or plastic trays to allow steam to penetrate all parts of the package and its contents. Trays should be inserted into the package with the contents clearly visible through the laminate side of the packaging. Tray inserts to hold items in position are also available.

The tray can be used as a sterile surface during a procedure when either the paper or laminate side is fully removed. The use of an instrument tray may prolong the life of instruments, as they are less likely to move around. Suitable fully perforated trays are readily available in various sizes and tip protectors that are steam penetrable are also readily available.

**Materials**

The correct type and method of packaging must be used for the type of steriliser available; for example, sterilisers without a drying cycle must not be used for packaged items. Many different types of packaging are available, such as laminate/paper (pouches) or all-paper bags. All laminate/paper or all-paper packaging is single-use only. Nylon packaging is not suitable for use in a steam steriliser. Hollowware (bowls) should be packaged separately from instruments, with the opening facing the paper side of the laminate/paper packaging (pouches) to allow air to escape.

If drapes are used, then they should be single-use and packaged separately from all other items. Sterile single-use drapes are available commercially. Items should not be too heavy for the type of packaging used, because they may break the package, particularly if they are also sharp. Packages should not be overfilled. Bundling of items in the bottom of a package may inhibit air removal and steam penetration.

Do not use rubber bands around packages (or items within packages), because air/moisture will be trapped during sterilisation. The use of rubber bands to hold sterile packages together can cause crinkling and creasing that can weaken the paper packaging and compromise sterility. Items with ratchets/clips should not be sterilised in the locked position. Leaving items open allows steam to penetrate all surfaces during the sterilising process. If the integrity of a sterilised package is compromised, then the items should be completely reprocessed, commencing with the cleaning process. Packages must not be re-labelled and re-sterilised.
**Labelling**
Packaging must be dated and labelled immediately before being sterilised. Do not use a sharp pen or ‘Biro’ pen because it will damage the packaging material. Water-based ink pens should not be used, because they will ‘run’ during sterilisation. Each item being sterilised should have an identifying code for tracing steriliser faults if required. This code should be recorded on the sterilisation monitoring record.

If items are not for immediate sterilisation, then the package must be dated only when the package is to be sterilised. Care should be taken to keep these packages separate from sterile items: they should be stored in a separate, clearly labelled cupboard or covered container. Best practice is always to sterilise items as soon as possible after packaging.

**Sealing**
The most suitable packages are usually a laminate/paper material, and they are self-sealing, use steriliser indicator tape or a heat-sealing unit. Steriliser indicator tape can be used to seal a package (usually a paper bag type). Steriliser indicator tape should be pressure sensitive and clearly demonstrate a colour change after the sterilising process. The opening of a non-self-seal bag/pouch is to be folded over two or three times with the indicator tape so it is long enough to completely seal the front with a small fold to the back (see figure 4).

A heat-sealing unit may be used for sealing both laminate/paper and paper bags. Inspection of the package after heat sealing is essential to ensure the seal is complete, especially if pouch-type packaging is used, because air can be trapped inside and cause a ‘popping’ of the seal during sterilisation. A heat-sealing unit requires cleaning and servicing to ensure an efficient sealing action. The unit should be checked before sealing to ensure the temperature setting is correct. Scorching occurs if the temperature is too high, resulting in the packaging not withstanding the sterilisation process; if the temperature is too low, then sealing is defective and the sterility of the article is compromised.

Staples, string, nonadhesive tape, masking tape and elastic bands are not suitable as sealing agents.
- They do not provide a complete seal.
- They cause compression within the package, particularly during the sterilisation process.
- They cause damage to the outer packaging.
- They do not act as external indicators.

All packages should be checked after sterilisation to ensure integrity of the seal.

**Figure 11.2  Sequential procedure for sealing bags with adhesive tape**

(a) Kraft bleached paper heat seal bag  
(b) Corners may be mitred
Sterilisation

General
The following equipment will not sterilise items, so do not use any of these items.

- Microwave ovens
- Incubators
- Boiling water units
- Household ovens
- Dishwashers
- Pressure cookers.
- Ultraviolet cabinets
- Ultrasonic cleaners
- Other similar units, such as pie warmers
- Glass (heat) bead ‘sterilisers’

Steam sterilisation
Follow the manufacturer’s instructions for steriliser use, because each steriliser is designed to achieve specific sterilisation cycle parameters (time/temperature/pressure) that should not be altered without the manufacturer’s agreement. Time, temperature and pressure settings reflect the type of load content and packaging materials to be used.

Sterilisers without a drying cycle must not be used for packaged items, but sterilisers with a drying cycle can be used. Sterilisers should have a sterilisation cycle process recorder/printer that monitors cycle parameters because this saves the proprietor/operator time during the sterilisation process. If a process recorder printer is not fitted, then every sterilising cycle must be monitored every 10 seconds and the time, pressure and temperature of every cycle must be recorded. Existing sterilizers, without process recorder/printers, should be upgraded or replaced to ensure automatic parameter (time/temperature/pressure) monitoring.

Table 1.4  Time/temperature/pressure relationships (parameters)

<table>
<thead>
<tr>
<th>Temperature (°C)</th>
<th>KiloPascal</th>
<th>Millibar</th>
<th>psi *</th>
<th>Holding time (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>121</td>
<td>103</td>
<td>1030</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>126</td>
<td>138</td>
<td>1380</td>
<td>20</td>
<td>10</td>
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<tr>
<td>132</td>
<td>186</td>
<td>1860</td>
<td>27</td>
<td>4</td>
</tr>
<tr>
<td>134</td>
<td>203</td>
<td>2060</td>
<td>30</td>
<td>3</td>
</tr>
</tbody>
</table>

* psi = pounds per square inch.
Total processing time includes penetration time and holding time, plus a safety factor. Penetration time is the time taken for all parts of the load (inside the packaging) to reach the required sterilising temperature after the temperature has been reached in the sterilising chamber. These times and temperatures are based on the assumption that all items within the chamber are completely clean.

Steam sterilisers use gravity to remove air from the chamber by displacing it with steam. This is a relatively slow process, but some sterilisers have built-in mechanisms that assist this process by either pulsing additional steam into the chamber or using a vacuum and a pulsing action to withdraw the air.

Sterilisers with a drying cycle use the internal chamber heat to dry items, but this only works when the door of the steriliser chamber is closed. This means the door must not be opened during the drying cycle. Some benchtop sterilisers require a switch to be moved to initiate this drying stage.

Packaged items that are still damp at the end of this drying stage must not be considered sterile and must be reprocessed. Check both cycle parameters and the method of chamber loading to ascertain the cause of cycle failure. The number of items per load should be limited to allow the sterilising cycle to work effectively.

Cannulated items and reusable tubing
These items and tubing pose a particular challenge to the sterilisation process with possible air (cannulated items) or air/water (tubing) entrapment during the sterilisation cycle. Air remaining in the steriliser chamber and/or cannulated items/tubing will prevent effective sterilisation, leading to sterilisation failure. Water remaining in reusable tubing will wet the packaging, rendering the tubing nonsterile. The use of single-use tubing is recommended.

Chemical and biological indicators
These indicators are designed to detect failure of the sterilisation process by monitoring one or more process parameters. The funeral director or employee should check with the steriliser manufacturer to ascertain the most appropriate type of indicator (chemical/biological) to be used, following AS/NZS 4187:2003. The type of indicator chosen will depend on the type of steriliser, packaging or cycle parameters, including the presence or absence of a process recorder/printer, and on whether loads have been validated.

Chemical indicators
The manufacturer’s instructions should be followed when using chemical indicators. The employee should discuss the most appropriate indicator for use (with both steriliser and indicator manufacturers), taking into account the types of item being sterilised, the type of packaging and the type of steriliser being used.

Chemical indicators are divided into six classes, and various indicators are available (Table 11.5). They should not be used, however, as a substitute for a permanent record of the sterilisation process. The exposed indicator may alter with time (for example, it may fade) and it is not reliable for record-keeping, so the result should be documented.

Chemical indicators should be used according to their classification, and a chemical indicator failure should be investigated to establish the cause before continuing to use the steriliser. Items from a sterilisation cycle with a failed chemical indicator must be re-cleaned and re-packaged before being re-sterilised.
Table 11.5 Classes of chemical indicators and their use

<table>
<thead>
<tr>
<th>Class</th>
<th>Test for</th>
<th>Example of indicator</th>
<th>How used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>Evidence of a process</td>
<td>Indicator tape</td>
<td>With a single item—external indicator.</td>
</tr>
<tr>
<td>Class 2</td>
<td>Specific tests of the process</td>
<td>Air removal or bowie dick test</td>
<td>Specific tests as per AS 4187:1998</td>
</tr>
<tr>
<td>Class 3</td>
<td>A specific parameter</td>
<td>Temperature</td>
<td>For one critical parameter essential to the sterilisation process</td>
</tr>
<tr>
<td>Class 4</td>
<td>More than one parameter</td>
<td>Temperature and time</td>
<td>For two or more critical parameters essential to the sterilisation process</td>
</tr>
<tr>
<td>Class 5</td>
<td>Integrating indicators</td>
<td>Time, temperature and moisture</td>
<td>React to all critical parameters over a specified range of sterilisation cycles, based on stated microorganism inactivation</td>
</tr>
<tr>
<td>Class 6</td>
<td>Emulating indicators</td>
<td>Cycle verification (134ºC for 3.5 minutes in steam)</td>
<td>React to all critical parameters over a specified range of sterilisation cycles, based on the steriliser settings</td>
</tr>
</tbody>
</table>

Biological/enzymatic indicators
This type of indicator monitors the microbial killing power of the sterilisation process. Biological/enzymatic indicators may include bacterial spores, bacterial spores coated with an enzyme preparation, or enzymes extracted from bacterial spores. For steam sterilisation, the preferred test organism is *Geobacillus stearothermophilus* (formerly *Bacillus stearothermophilus*).

As a minimum biological/enzymatic indicators must be used after the installation of the steriliser, after major repairs and as part of validation procedures. Failures, when growth is detected, must be investigated before continued use of the steriliser. Items from a sterilisation cycle process with a failed biological/enzymatic indicator must be re-cleaned and re-packaged before being re-sterilised.

Incubation of biological/enzymatic indicators should be according to the manufacturer’s instructions. (Incubation kits are available from manufacturers.) An indicator not exposed to the sterilisation process is incubated as a control for the exposed biological/enzymatic indicator. A permanent record of these results should be kept on file.

Loading the steriliser
Correct loading of the steriliser is essential for effective sterilisation: correct loading techniques permit efficient air removal from the chamber, total steam penetration and saturation of all items, allow drainage of condensate, assist in the drying stage and reduce damage to packaging. In effect, correct loading maximises efficient steriliser use. Items should not exceed the boundaries of the loading tray within the chamber and should not touch the walls of the chamber (because this will bring them into contact with condensate on the chamber walls).

Hollowware (bowls) should be tilted on their side to permit drainage of both air and condensation during the sterilisation process, and linen should be loaded so the layers are vertical for efficient air removal and steam penetration. Hollowware or instrument packages should not be loaded above linen because any condensation will wet the linen/packaging, making it difficult for steam to penetrate the linen/packs and sterilise the items.

Packaging of laminate/paper design should be positioned on its edge, with each package surface being paper to laminate. Do not place too many packages together because air removal and steam penetration may be compromised; however, they may be laid flat on the loading tray in a single layer with the paper side downwards on the tray surface. Items to be processed unpackaged may be laid directly on the loading tray in a single layer, but do not over fill the tray with items.

Unloading the steriliser
Sterilisers with a drying cycle
Once the sterilising (including drying stage) cycle is complete, the load should be removed immediately from the chamber and visually inspected to ascertain that the
load is dry, that the indicators used have changed to the required colour and that the
seals are intact. Unpackaged items should not be directly handled, because this would
render the item unsterile. All other parameters (time, temperature, pressure) must be
checked, then recorded and signed as correct by the operator removing the load.

Items should be placed in an area where disturbance is minimal, to cool down. Forced
cooling is not permitted because it will compromise the integrity of the item and its
packaging. Items should not be placed on solid surfaces during this cooling phase,
because condensation will result from vapour still inside the package. Wet packaging,
dropped items or nonintact seals mean the item cannot be considered sterile and must
be re-cleaned, re-packaged and re-sterilised.

**Sterilisers without a drying cycle**

Removal of these items depends on whether the item is intended for immediate use or
for storage. Items for immediate use as sterile items must be removed using sterile
gloves (the non-touch [aseptic] technique). Items for storage should be dried with a
sterile single-use lint-free cloth before being stored.

It should be noted that unpackaged, stored items must not be used as sterile items and
must be processed prior to use.

**Storage of sterile items**

All sterilised packaged items should be stored in a way that will prevent contamination
and damage to packaging. Storage may be in cupboards with close-fitting doors and
smooth washable surfaces, or in washable plastic containers with close-fitting lids.
Cupboards and containers should be dust free, used only for sterile items. Cupboards
should be cleaned and dried weekly, and the cleaning process should not compromise
sterility of the item.

Ultraviolet cabinets are **not** suitable storage places. The ultraviolet rays act only on
surfaces that they contact, and they damage packaging compromising sterility.
Cardboard boxes are not suitable containers for storage of sterile items because they
are porous, cannot be cleaned and may harbour harmful microorganisms. Items
purchased sterile from commercial sources require similar storage conditions to those
items sterilised in-house.

Sterile stock is event related, and influential factors include the shelf life of the type of
packaging material used, the type of storage and handling conditions (the likelihood of
product material deterioration and package design).

All premises should develop a system of stock rotation based on either the date of
sterilisation or the steriliser load number. Packaging is considered nonsterile and
unsuitable for use when: it is incorrectly wrapped; it has been opened or damaged; it is
still wet after the sterilising cycle; it has been placed on a wet surface; it is placed or
dropped onto a contaminated surface such as the floor; or there is no indication that it
has been through a sterilising process.

Factors that compromise sterile stock include incorrect cleaning procedures in storage
areas, the presence of moisture and condensation, climatic extremes, excessive
exposure to sunlight or other sources of ultraviolet light, vermin or insects,
inappropriate packaging materials, incomplete sealing of packaging, the presence of
sharp objects or rough handling causing damage, and incorrect handling during
transportation.

### 11.1.7 Monitoring/maintenance

**Sterilisers**

Sterilisers require commissioning on installation before being used. Commissioning
involves testing the steriliser cycle parameters for performance on-site. Performance
testing (or validation) of the sterilising cycle parameters must be undertaken on
installation, after routine servicing, after major repairs and when validating steriliser
loads and packaging materials. Routine calibration testing must be performed at least
every six months.
Monitoring of the sterilising process includes the cycle parameters (time, temperature, pressure), chemical indicators (results) and/or biological/enzymatic indicators (results), load contents and load number, date and time. Steriliser service records must be maintained, including those completed during calibration testing.

Sterilisers should be cleaned weekly and when soiled, and maintained in strict accordance with the manufacturer’s recommendations. The chamber drain should be kept clear and the recording device should function correctly. All gauges should be accurate and the door gasket should be intact.

Benchtop sterilisers should have their internal water reservoir emptied on a minimum weekly basis. The reservoir and pipes should be regularly cleaned.

The loading trays should be cleaned daily and the steriliser should be cleaned when cool enough to permit the chosen cleaning agent to work efficiently and to prevent occupational health and safety hazards.

_Ultrasonic cleaners_
Ultrasonic cleaners should be cleaned daily. The base plate, gaskets, water strainers and filters must be checked and cleaned, and a daily performance test is essential to check the transducer function.

Ultrasonic cleaners should be operated and maintained according to the manufacturer’s instructions. Ultrasonic cleaners must comply with AS 2773.1:1998 Ultrasonic cleaners for health care facilities, Part 1: Nonportable and with AS 2773.2-1999 Ultrasonic cleaners for health care facilities, Part 2: Benchtop. All cleaning equipment should be nonabrasive, and washed and dried after use.

_Heat-sealing units_
Heat-sealing units should be cleaned weekly and tested daily to ensure the operating temperature is correct. The package seal must be checked before and after sterilisation.

11.1.8Records
Records of all steriliser cycles and monitoring indicators such as chemical or biological/enzymatic indicators and steriliser printouts should be kept. All results should be documented as monitoring indicators/printouts may fade over time.

11.1.9Validation of steriliser loads
Validation is a process that must be documented. It includes identification of the steriliser, the process parameters (time, temperature, pressure), steriliser chamber characteristics (such as hot and/or cold spots), the types of item being routinely sterilised, and details of the cleaning and packaging processes used with the items being sterilised.

Three successful, consecutive and identical loads are required for a demonstrated validated cycle, although routine monitoring of the steriliser cycle is still required. Validation must be repeated if changes occur in the type of packaging used, major servicing of the steriliser is performed, the package contents are changed, or the routine load or cycle parameters are changed.

11.2 THE ENVIRONMENT

11.2.1Cleaning up after a procedure
After completing any procedure, carry out the following steps:
- Place all contaminated single-use sharp instruments into a sharps container immediately after a skin-penetration procedure has been performed.
- Place all reusable skin penetration instruments, or other reusable instruments contaminated with blood, into the container labelled ‘dirty instruments for cleaning and sterilisation.’
- Place all reusable instruments from low- and medium-risk procedures into a container labelled ‘dirty instruments for cleaning.’
- Place the containers in the area set aside for cleaning.
- Do not store instruments or needles in chemical disinfectant either before or after cleaning, sterilisation or thermal disinfection.
• Dispose of all used single-use items (such as applicators, paper toweling and protective coverings from surfaces) into the clinical and related waste bin.
• Place used linen into a washable leak-proof receptacle with a close-fitting lid labelled ‘dirty linen’ and launder.
• Remove and dispose of gloves in the clinical and related waste bin, then wash hands and thoroughly pat dry.
• Care should be taken when handling sharp instruments to avoid potential sharps injuries.

11.2.2 Routine cleaning of work surfaces
General-purpose utility gloves should be worn for general cleaning procedures. Utility gloves may be reused but should be washed in detergent after use and stored in a dry place, or replaced if torn, cracked, peeling or showing signs of deterioration.

Employees should use gloves robust enough to stand general cleaning and not tear. Vinyl gloves should not be used, because they are more likely to develop large holes and are prone to tearing.

Following client treatment, all work surfaces used, for example, procedure couches/chairs, solariums, benches and tables, should be washed with warm water and detergent, rinsed and dried using a clean lint-free single-use cloth. Additionally, at the end of each working day, wash all visibly soiled surfaces with warm water and detergent. Rinse and dry using a clean lint-free single-use cloth.

11.2.3 Cleaning standards for change/shower rooms and toilets
Cleaning requires surfaces to be free from smudges, smears, body fats and mineral deposits. Surfaces include plumbing fixtures, tiles and other polished surfaces. Sanitary disposal units should be regularly emptied.
12 REFERENCES, GUIDELINES AND STANDARDS

12.1 References

Ball et al., Lancet 1991 338:63

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Lundgren et al., Tubercle, 1987 68:147

Nyberg et al., American Journal of Clinical Pathology, 1990 94:422


12.2 Guidelines

Communicable Diseases Network Australia (CDNA), 2004

National Health and Medical Research Council (NHMRC), 1999
National Guidelines for Waste Management in the Health Care Industry

Environment Protection Authority (EPA)

12.3 Standards

AS/NZS 4815:2001
Office-based health care facilities not involved in complex patient procedures and processes-Cleaning, disinfecting and sterilizing reusable medical and surgical instruments and equipment, and maintenance of the associated environment.

AS/NZS 4146:2000
Laundry practice

AS 1668.2:2002
The use of ventilation and air-conditioning in buildings. Part 2: Ventilation design for indoor air contaminant control.

AS 1668.2 Supplement 1:2002
The use of ventilation and air-conditioning in buildings. Part 2: Ventilation design for indoor air contaminant control.

AS 4381:2002
Single-use face masks for use in health care
AS/NZS 1715:1994
Selection, use and maintenance of respiratory protective devices

AS 4031:1992
Non-reusable containers for the collection of sharp medical items used in health care areas

AS/NZS 4261:1994
Reusable containers for the collection of sharp items used in human and animal medical applications

AS/NZS 3816:1998
Management of clinical and related wastes

AS/NZS 4179:1997
Single-use sterile surgical rubber gloves-specifications

AS/NZS 4011:1997
Single-use examination gloves-specifications

Single-use examination gloves-specifications

AS 2773.1:1998
Ultrasonic cleaners for health care facilities, Part 1: Nonportable

AS 2773.2-1999
Ultrasonic cleaners for health care facilities, Part 2: Benchtop.
Funeral Industry
Infection Control Guidelines
Part D
Procedures for Embalming

2008 Edition
(Revised 2019)
PREAMBLE

Part D Procedures for Embalming were updated by the Australian Institute of Embalming Pty Ltd (AIE) with the support of the members of the AIE, Company Secretary Mr Ron Foley and Chairman Mr Don Sweet.

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Theses guidelines are a supplement to Parts A, B and C and should be used in conjunction with those Parts.

Part D refers particularly to procedures associated with embalming.

The supplement should also be seen as a basis for funeral industry training programs and continuing education.

GENERAL INFORMATION

The description of the various procedures used in embalming the human body (Section 9.0 and Section 10.0) is not intended to be comprehensive, but to provide a general outline so that important infection hazards can be identified. Incorporated in this description are recommended practices designed to reduce the risk accidental infection amongst workers in the funeral industry. Other non-infectious hazards for embalmers, such as toxic effects due to exposure to chemicals, are not addressed. Material safety data sheets which document procedures for the safe handling of each chemical used, should be made available to embalmers and their assistants. These guidelines should be read in conjunction with relevant Federal, State, Territory and Local Government Regulations.

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PART D

PROCEDURES FOR EMBALMING

1 Definition of Embalming

Embalmng has been defined "as a process of chemically treating the dead human body to reduce the presence and growth of micro-organisms, to retard organic decomposition, and to restore an acceptable physical appearance". ("Embalming, History, Theory and Practice". Robert G. Mayer Ed.; Appleton and Lange, Norwalk, Connecticut/San Mateo, California, 1990).

2 Purpose of Embalming

Since the 1980's, the frequency of embalming has increased considerably. This is due to an increased awareness of the physical and chemical changes within the deceased human remains as well as an increase in viewings and the need to make viewing more hygienic and presentable. The main reasons for embalming are:

a) To allow the long-distance transfer of bodies within and outside Australia, particularly by airlines, so that they do not arrive in a decomposed and/or unsanitary state. There is a legal requirement for a body to be embalmed if it is to be transferred overseas.

b) To allow more time for the planning and arrangement of the funeral, particularly if relatives and friends need to travel long distances to attend. (Note: Bodily decomposition and putrefaction continues even when the body is refrigerated, although at a decreased rate.)

c) To allow the body to be viewed under optimal conditions. Embalming improves the appearance of a body devastated by disease, or one disfigured by therapeutic procedures, and it reduces post-mortem changes such as staining and lividity. Viewing of the body occurs more frequently nowadays and this is believed to aid the grieving process for relatives and friends.

d) To deodorise unpleasant odours and improve the overall sanitary condition of the body.

e) To aid long term preservation of the body for other reasons e.g. above ground crypt internment, requirements of individual cemeteries, bodies that will be ‘laying in state’.

3 Basic Embalming Process

Essentially, embalming consists of three processes:

a) **Arterial embalming**, a process whereby a disinfecting and preserving fluid is injected into a large artery and then blood is flushed out of the circulatory system by opening a vein. One or more points maybe used for arterial injection depending on the circumstances (see 9.8).

b) **Cavity embalming**, describes the process by which the contents of hollow organs in the abdomen and thorax are aspirated by means of a trocar (a metal rod with a sharp tip) inserted through the abdominal wall and this is followed by the injection of cavity fluid.

c) **Supplemental embalming**. This may be necessary to treat areas which have not received arterial fluid or received insufficient amounts of preservative solution during arterial injection. Supplemented methods of embalming include both hypodermic embalming and surface embalming.
Hypodermic embalming is the sanitation and preservation of a local area by subcuticular injection of a suitable solution. The solution may be injected by a hypodermic needle, syringe, or an infant trocar attached by tubing to a pressurised embalming machine.

Surface embalming can be applied to external skin surfaces such as when treating bed sores, or to internal surfaces such as within the thoracic or abdominal cavity of an autopsied body. Surface embalming is achieved by the application of a suitable preserving chemical by using a pack of cotton wool (or similar material).

4 The Hazards of Embalming

Embalmers are exposed to the risk of sharps injuries through the frequent use of instruments (scalpels, needles, scissors, trocars etc) which are used in embalming and which are contaminated by blood and other body fluids, or by skin injury by sharp body parts (particularly rib ends) in bodies which have been subjected to autopsy (see Part A, Section 3.0).

b) There is a risk of blood splashing onto the mucous membranes of the mouth, nose or eyes with its attendant risks (see Part A, Section 4.1).

c) Blood and other internal body fluids could contaminate cuts, abrasions or weeping skin lesions of embalmers if these are not adequately covered. (see Part A, Section 3.0).

d) There is exposure to airborne pathogens and exposure to radioactive material.

Therefore:

(i) Embalming should be carried out only by properly trained and accredited funeral industry staff (see Appendix 7, Section 7.11), or by trainees closely supervised by accredited embalmers.

(ii) Embalming should be performed without undue haste or distraction and with the utmost care to avoid accidental sharp injury or blood splashing.

(iii) The embalmer should be provided with the necessary equipment by their employer to protect themselves adequately. P.P.E

5 Contra-indications to Embalming

5.1 The fact that a person has died due to an infection is, in the majority of cases, not a contra-indication to embalming.

5.2 Infection control principles apply equally to all bodies whether an infection was associated with the death of a person or not.

The risk of acquiring a blood-borne virus disease is not restricted to the handling or embalming of patients who have died from one of these infections (see Part A, Section 4.1).

5.3 There are three groups of patients in which embalming is contra-indicated and should not be carried out routinely because of the extreme infection hazard and the possibility of very serious disease for embalmers.

a) Viral Haemorrhagic Fevers.
Several virus diseases which could be imported into Australia and which are collectively called viral haemorrhagic fevers because of their major clinical
features are designated as quarantinable diseases by the Commonwealth of Australia. They include Lassa fever, Marburg virus disease, Ebola virus disease and Crimean-Congo Haemorrhagic fever. Disease due to one of these viruses has not occurred in Australia to date. Because of the high mortality sometimes associated with these diseases and because they can be transmitted from person to person, particularly by sharps injuries, it is very likely that quarantine medical advisers would recommend against body preparation and embalming, and that immediate encoffining and sealing of the coffin after death should be carried out by the medical/nursing staff involved.

b) Creutzfeldt-Jacob Disease (CJD).
CJD is a rapidly progressive brain disease that is always fatal. Death can occur up to two years from the onset of symptoms but most people die within 4-6 months. CJD is the main human form of prion disease. Prions are abnormal forms of protein that cannot be eradicated by normal sterilisation. They are able to reproduce on their own and become ineffective. They induce the abnormal folding of normal cellular proteins in the brain causing brain damage. There is no treatment or cure. The symptoms of CJD are rapidly progressive memory loss, dementia, and difficulty with speech, balance co-ordination, seizures and incontinence. The symptoms are caused by the death of the brain nerve cells. Full time nursing care is needed in the end stages and death is usually from pneumonia.

CJD affects approximately one in every million people. In Australia this would likely equal approximately 20 cases per year. It is most common in people aged 60-65 but the recently recognised “variant” CJD (vCJD-1996) is more common in younger people. There are four types of CJD – sporadic (approximately 90% of all cases), familial, iatrogenic and variant.

There have been ten cases of health care acquired CJD in Australia. Five deaths have been after treatment with pituitary extract hormone and five deaths were caused by Dura grafting brain surgery. There has been no funeral industry acquired CJD death in Australia. However the risk is still there given it is a transmissible disease and it’s resilience to sterilization. Embalming should NOT be performed on either suspected or diagnosed CJD cases unless there re very important reasons for doing so. If it is required advice should be sought from relevant health authorities.

c) Patients dying of infections where the attending medical practitioner recommends against embalming.

On rare occasions, the attending medical officer or relevant health authority may recommend that embalming should not be carried out on a patient dying from a particular infection because of the unacceptable infection risk to the embalming staff. Examples of such infections are pulmonary or extensive cutaneous anthrax or multi-drug resistant tuberculosis.

6 Embalming Room

6.1 The minimum requirements for body preparation areas, as detailed in Appendix 7 also apply to the embalming room.

6.2 Because of the particular hazards to embalming staff (infectious and chemical, see Section 4.0), additional safe-guards are necessary in rooms used for embalming.

6.3 The room must be so designed that there is continuous fresh airflow from ceiling to floor level and the airflow is directed away from the embalmer, so that exposure to airborne micro-organisms and chemicals is minimised.

The embalming room should contain only the minimum number of fittings, instruments and equipment necessary to perform the procedures. This reduction of items within the room assists in cleaning and reduces the number of surfaces upon which contaminated material could accumulate.
Note: The embalming room should not be used as a storage area.

6.4 The need for all surfaces of the interior of the room, benches, tables, trays, cupboards, etc to be constructed, of imperious materials with a smooth unbroken finish capable of being readily cleansed, is emphasised. Blood is discharged from the body during the embalming process and thereby, could accidentally contaminate many parts of the embalming room, though procedures to minimise this should be instituted (see Section 9.17). Therefore, all surfaces must be such that they are easily cleaned and not present any possible cutting edges which may provide a trauma hazard to embalming staff that carry out the cleaning of the room. Particular care should be taken with the construction of the embalming table or trolley. These should be constructed of a non porous material, preferably stainless steel, and all edges of the table/trolley and mobile or permanent body rests should be rounded and not present a cutting hazard during cleaning.

6.5 All materials and equipment that could be required during a particular embalming should be placed ready for use on an easily accessible bench, trolley or open shelves, to minimise the need to open cupboards with gloved hands possibly contaminated with blood during the embalming process and to reduce walking far from the table/trolley during embalming.

6.6 The surface of the embalming room floor, in addition to being constructed of impervious material with a smooth unbroken surface and uniformly graded to discharge fluids to a floor drain, should also be prepared of non-slip materials to reduce slipping accidents.

6.7 A constant flow of low pressure water should be available to flush blood and other bodily fluids off the embalming table/trolley. If water is provided by hose from a tap in the room, the hose should either drop down to the table from the ceiling or be conveniently placed close to the table. Water supply may also be plumbed into the embalming table. This is recommended to avoid the potentially dangerous cluttering of the floor adjacent to the embalming table by water hoses, and to minimise soiling of hoses.

6.8 A slop-hopper should be present in the room and be so placed to be readily accessible for the discharge of materials aspirated from body cavities by suction (see Section 9.22) and for the discharge of other waste fluids from embalming procedures. If suction for cavity aspiration is venturi operated from the tap at the slop-hopper then, preferably, hoses connecting to the trocar also should be placed so that they avoid cluttering the floor near the table/trolley. Venturi operated suction devices connected to the water supply should have a back flow prevention device fitted which is approved by the local water authority. The disposal of bulk volumes of blood by means of a slop-hopper should always be approved by the sewerage authority involved (see Part B, Section 6.6), and also disposal should be so designed as to avoid splashing and creation of aerosols. The aspirator discharge level should be below the water level in the slop-hopper. An appropriate (perspex) clear cover is recommended.

6.9 Facilities should be available in the room for cleaning and drying instruments. A double stainless steel sink preferably with a corrugated draining bench, is a minimum requirement. Brooms, mops, buckets etc used for the internal cleaning of the embalming room must be stored in suitable racks and/or cupboards in the room.

6.10 Adequate and safe storage areas for the chemicals used for embalming must be provided in the room. If hazardous chemicals are stored in the building, appropriate Environmental Protection Authority HAZCHEM signs must be affixed.

6.11 A concentrated source of light should be available so that the operator can see clearly the areas of the body which are penetrated during embalming. It is preferable for the source of the light to be a mobile one originating from one or more suitable fixtures on the ceiling, again to avoid cluttering around the table/trolley and possible soiling of a floor based light source.

6.12 Suitable containers for the disposal of sharps, infectious waste, other disposable waste and items for laundering should be held in the embalming room (see Part C, Section 4.0).
6.13 At least one wash-basin should be present in the room, providing hot and cold water and soap solution, all preferably delivered by non hand-operated controls. Hand washing must only be carried out at hand-wash basins and not at sinks used for mortuary purposes. A paper dispenser (plus pedal-type waste bin) or an automatically operated hand dryer should be adjacent to the wash basin(s).

6.14 The embalming room should be close to the area where the bodies are stored. Ideally, refrigerated storage areas should open onto the embalming room for easy access.

6.15 Unauthorised access to the embalming room should not be allowed. The number of people in attendance should be usually restricted to embalmers and their assistants/trainees. All persons involved with embalming must be well versed in the principles of infection control for funeral industry workers (see Part A, Section 2.0).

7 Protective Clothing/Equipment for Embalmers and their Assistants/Trainees

7.1 The basic needs have been described in Part C, Section 1.2. However, the embalming process involves the release of blood from the body and thereby the possibility of spillage or splashing of blood outside the confines of the embalming table/trolley. There is, thereby, the real possibility of contamination of clothing with blood or other body fluids. Gloves (disposable), waterproof aprons, washable boots, protective glasses, splash-proof masks and disposable gowns must be worn by all persons involved in the embalming process. To reduce the risk from needle-stick injury, double gloving must always be employed. The outer glove should be as thick as practicable without compromising required dexterity. If any glove is damaged, it must be replaced immediately. If skin injury occurs refer to item 7.2. Masks must be splash-proof to protect the mouth and nose and should meet the relevant Australian Standard. Alternatively, a face visor may be used in place of eye goggles and mask.

If the patient has died of a particularly infectious respiratory disease such as tuberculosis, special particulate filter masks should be considered. It is essential for all personnel involved in embalming procedures to wear special garments in place of their ordinary street wear. Ideal apparel is a long sleeved boiler suit, or operating suit, which should be donned before entry into the embalming room. If this suit is soiled in any way during the embalming process, it should be laundered at the completion of each work period. Gloves, aprons, boots, goggles, masks and disposable gowns should be removed in the embalming room and suitably disposed of, or washed and stored, as the case may be. The boiler suit or other similar apparel should be removed immediately after leaving the embalming room and then hung up in a suitable cupboard or put in a laundry basket. If by some mishap there has been considerable blood spillage/splashing and blood has somehow soaked through the boiler suit onto the embalmer's skin, then he/she should shower and wash as soon as practicable (see Appendix 7, Section 7.6).

7.2 The procedures recommended following accidental skin injury or the splashing of blood or other body fluids onto mucous membranes should be followed (see Part A, Section 2.6 and Appendix 6).

8 Principles for the Safe Handling of Sharp Instruments

8.1 The overriding principles in formulating procedures for the safe use of sharp instruments is that they must be readily available within easy reach; they must be readily visible to the operator when they are picked up and the need to turn around to select an instrument should be avoided; sharp instruments should not be handed to another person; and blunt instruments must be separated from sharp ones. The embalmer must personally pick up the instrument under direct vision, slowly and carefully and replace the instrument in a similar manner. These principles are of prime importance to minimise the likelihood of accidental sharps injury.

8.2 Ideally, surgical instruments should be available on a (stainless steel) tray in front of the embalmer in a similar fashion to the presentation of instruments to a surgeon in an operating theatre. Instruments should be placed on the tray in two groups - one for sharp ones and the other for blunt ones. It may also be more efficient to place each
group of instruments in their order of anticipated use. The tray used for sharp instruments should be lined with some material so that the instruments do not slip around and so they can be lifted more easily from the tray.

8.3 Where practicable, disposable instruments should be used. In many cases, especially with scalpel handles and forceps, re-usable stainless steel instruments which are stronger, are still preferable. However, scalpel blades should always be disposed of in appropriate sharps containers after use (see Part C, Section 4.5). Blades should be carefully removed from the scalpel handle by means of a forceps or specially designed blade remover at the conclusion of each embalming session. Under no circumstances should hands come in contact with the blade.

8.4 Other disposable non-sharp instruments which maybe used should be discarded into an infectious waste container (Part B, Section 6.5) after the embalming is completed.

8.5 If a re-usable instrument has been used for the last time during a particular embalming, it should be placed directly into a stainless steel bowl or dish containing water and detergent to facilitate cleaning later. This bowl should be within the embalmer’s direct frontal vision. The habit of dipping instruments, particularly sharp ones, into water (or even into a disinfectant, which would be ineffective at the short exposures used) during embalming to clean instruments, is extremely hazardous with regard to sharps injuries. It is preferable to provide extra instruments if soiling of instruments is a problem during embalming, so that each instrument is used only once.

8.6 After each use, instruments should be replaced on the instrument tray or discarded into the bowl/dish (if not required again) but not be placed on the body or on the embalming table/trolley, which could lead to accidental sharps injury.

8.7 If an instrument falls to the floor it is preferable to carefully move it aside by foot to be picked up later, rather than risking a sharps injury by picking it up during procedures.

8.8 Ligatures should be cut into suitable lengths and placed on the instrument trolley before embalming procedures begin, rather than unnecessarily cutting them with possibly blood contaminated instruments during embalming.

9 **Steps in Standard Embalming**

These differ from those used when an autopsy has been performed on the body (see Section 10.0) and complement the body preparation procedures described in Part C, Section 3.0.

9.1 Materials and equipment should be made ready for use (see Section 6.5).

9.2 The body should be gently placed on the table/trolley (see Part C, Section 1.3).

9.3 The surgical instruments and materials required for the embalming procedures to be undertaken should be set out ready for use.

9.4 The body is washed down or sprayed with a disinfectant solution. Particular attention is taken with all orifices which are swabbed by means of a cotton swab held in forceps. Care must be exercised with the deceased’s mouth to avoid accidental laceration of the embalmer’s hands by sharp teeth.

9.5 Rigor mortis, if present, must be relieved prior to arterial injection in order to remove extravascular resistance and to correctly position the body. It can be relieved by gently flexing, extending, bending and rotating the joints, and by massaging the muscles. It is recommended that this stage be done during washing as the soap lubricates and reduces chances of skin slip.

9.6 The facial features are set. The eyes are cleansed with a disinfectant and closed. Eye-caps, gauze, or some suitable material can be inserted under the eyelids to maintain the normal contour of the eye. The lips are brought together using a suitable method of mouth closure (e.g., needle and suture, needle injector, dental tie, etc). If the jaws
have not been closed by mandibular/nasal suture already (see Part C, Section 3.7), this is now done. The potential danger of accidental needle-stick injury during this procedure is emphasised. It is sometimes technically difficult to hold the needle with a needle-holder during this suturing procedure and often the needle is manipulated by the gloved hand - in this case great care must be taken. The jaws are usually drawn together but often they are not securely fastened because of the possibility of purge erupting during the embalming. When purge occurs, it is necessary for cleaning and disinfecting purposes to have access to the throat, mouth and nasal passages during and after embalming.

9.7 A moisturising cream is massaged onto the hands, arms, neck and face of the body, care being taken to avoid accidental laceration to the embalmer's gloved hands by any sharp objects (finger-nails, teeth, ear rings etc). All areas likely to be exposed during viewing are so treated to lessen dehydration.

9.8 Arterial embalming (Section 3.0a) is usually then commenced. Before commencing arterial injection the embalmer makes an analysis/assessment of the case to determine the procedures necessary to successfully embalm the body. However, this may need to be modified according to the success of the embalming operation. Some factors which influence the degree of arterial embalming are the desired duration of preservation of the body and the state of the body before embalming.

9.9 Arterial embalming may take place at one or multiple points according to the assessed need by the embalmer. Often injection through both common carotid arteries, both axillaries arteries, both femoral arteries and various combinations of these and other smaller arteries is necessary to thoroughly embalm the case. Apart from anatomical considerations, which are outside the scope of these guidelines, the procedure for each arterial injection is basically the same. Therefore, common carotid artery injection only is described.

9.10 The right common carotid artery is usually selected as the only, or the first, point for arterial embalming.

9.11 An incision is made on the inner side of the right clavicle (collar bone), great care being taken in picking up and discarding the sharp instrument used (see 8.1). The right common carotid artery and the right internal jugular vein are located by blunt dissection with blunt forceps or other convenient instruments, and raised to the skin’s surface by means of a blunt hook.

9.12 Suitable thread ligatures are placed around both vessels so that they can be easily located.

9.13 A sharp instrument (scissors or scalpel) is used to make a small incision into the right common carotid artery. Once again great care should be exercised in the handling of these blood contaminated instruments.

9.14 A cannula is inserted downwards into the right common carotid artery and secured in place by a tight ligature around the artery or by special locking forceps.

9.15 The cannula is usually attached to tubing conveying the arterial fluid which has been poured into the embalming machine. The type, concentration, colour, etc., of the arterial fluid has already been determined by the embalmer (Section 9.1) according to the assessed needs for a particular case. Injection then begins. The arterial fluid could then be injected by hydrostatic pressure but nowadays purpose built pumps are used which incorporate a large reservoir to mix and measure the fluid, and variable pressure and flow rate controls. Obviously, the embalming table/trolley must be within reasonable distance of the bench that holds this piece of equipment. The flow rates and fluid pressures used vary according to the embalmer's preferred technique and also may be determined in part by the state of the vascular system in the body.

9.16 After a variable period of time, depending on the factors mentioned (Section 9.15), pressure builds up in the vascular system and distension of superficial veins on the extremities can be noted. The embalmer often encourages distribution into the tissues by massaging the skin of the body in the direction of venous flow. The potential hazard
of sharp injuries due to exposed bone, ear studs, dentures, teeth (mislaid instruments in autopsy cases), intra muscular and intravenous needles left in situ by medical staff etc, must be appreciated and due care taken. During this process there is usually a considerable lessening of lividity and change in skin colour. After a period of time depending on the variables in injection technique and after one or more litres of fluid has been injected, the right internal jugular vein is ready to be opened. (Some embalmers open the vein at the same time as they open the artery).

9.17 The embalmer pulls the ligature around the now distended right internal jugular vein so that it collapses. The vein is then partly cut by a sharp instrument (scissors or scalpel) and the tension on the ligature is released so that blood flows out of the vein. To facilitate better drainage, angular spring forceps are often inserted into the right internal jugular vein. Usually the pressure at which blood comes out of the vein is not high, nevertheless, there is a real hazard of blood spurting out onto the embalmer's face, clothes or onto the floor. The wearing of protective glasses and mask or a facial visor is essential and great care should be exercised to avoid splashes of blood. The blood from the vein is then left to flow onto the table/trolley from where it is washed by a continual flow of running water under the body to be discharged to the sewerage system. Alternatively, a drainage tube is inserted into the right internal jugular vein which is connected to a discharge hose and this will tend to diminish the risk of splashing and soiling of the body. It is at the point when the jugular vein is opened, that the embalmer is exposed to the greatest hazards of blood aerosol and splashing. Excess amounts of blood around the upper body should be carefully swabbed or rinsed off.

9.18 Injection of the body continues and amounts of up to 9-10 litres or over may be used. Blood-stained fluid continues to flow from the right internal jugular vein but now it is heavily mixed with the injected fluid. It is quite wrong to believe that the injected fluid has now disinfected the blood, as there will have been insufficient contact time for this to occur. Therefore, infection control procedures must continue during the whole embalming process. Before arterial injection is ceased, the cannula is removed from the carotid artery and repositioned, facing upwards into the head so that the head and brain can be perfused for a period.

9.19 During injection, purging of fluids from the mouth or nose (and sometimes other orifices) may occur. The fluid usually dribbles out and these orifices then require further careful cleansing.

9.20 When the embalmer assesses that the arterial injection is complete, the embalming machine is stopped. The cannula is removed from the right common carotid artery; both ends of the opened carotid artery and of the opened jugular vein are ligated. The incision is swabbed. Particular care is taken in all of these stages with the handling of the sharp instruments involved.

9.21 The incision site in the neck (and at other sites if multiple points have been selected for arterial injection) is then closed. Prior to this a form of sealant is usually introduced into the open site. Historically, closure of the wound has always been by means of suturing with thread. In areas where the wound could be exposed during body viewing, such as the neck, great care is taken to under sew the incision to make it less obvious.

This use of a needle (even with a needle-holder) again presents another sharps injury hazard for the embalmer and due care and caution should be taken.

9.22 Cavity embalming is then carried out. A small incision (about 1 centimetre wide) is made to one side of the umbilicus. A long metal trocar is introduced through the abdominal wall into the abdominal (peritoneal) cavity. The trocar is connected via a hose to the suction device part of which should be made of transparent material so that the quantity and type of aspirate can be readily determined by the embalmer. The suction device is usually venturi activated by water flow at a tap, ideally at a slop-hopper, into which the aspirate is discharged (see Part B, Section 6.6). The trocar is inserted through the diaphragm and the organs of the thoracic cavity are aspirated; this is followed by aspiration of the organs of the abdominal cavity. The trocar is then removed, wiped clean with disinfectant soap and re-inserted through the same incision to aspirate the pelvic cavity. The trocar is then withdrawn from the abdominal and
pelvic cavities and in doing so the embalmer usually wipes the end to clean it of excess blood and other materials. Paper towelling or cotton material is often used to wipe the instrument by hand. This procedure is hazardous in that the operator's hand could easily be injured by the sharp end of the trocar. The end of this instrument should be wiped with cleaning material held by an appropriate instrument or washed under low pressure cold running water. The trocar is then placed in a suitable receptacle for later cleaning and disinfecting. Later the hose can be cleaned by reverse flushing (see 1.3). Cavity fluid is then introduced by trocar into the abdomen. The fluid is either allowed to run into the thoracic and abdominal cavities by gravity feed, or by some other mechanical means. The volume needed being assessed by the embalmer (usually one litre or more is required depending on the size and state of the body). This trocar is removed and cleaned and disinfected as before. All materials for disposal which are contaminated with blood or other internal body fluids are infectious waste and should be disposed of accordingly (see Part B, Section 6.5). The abdominal incision is then sealed. This can be sutured or conveniently closed by applying a trocar button by means of a special stainless steel applicator. The deceased then has their final washing, shampooing and rinsing and thoroughly dried.

9.23 The body is then prepared for viewing (see Part C, Section 3.0).

10 Embalming of a Body which has been subjected to Autopsy

This is a more difficult procedure because of the disruption of normal anatomy and sometimes the resultant inaccessibility of vessels. In addition, the embalming of such bodies presents further sharp hazards from exposed bones after autopsy or from surgical instruments inadvertently left in the body, and the need to use multiple arterial perfusion sites. It is obvious that extra care must be taken with this form of embalming.

10.1 Initial steps are similar to those described for standard embalming (see 9.1 - 9.7)

10.2 All sutures are removed from the head, trunk and from any other site which may have been opened during the autopsy, taking care to avoid a sharps injury. Some dangerous infectious agents can persist in human tissues for many days, or even months (see Section 5.3 b and Part A, Section 4.1), so that great care should always be taken, even if the autopsy had been conducted days, or even weeks, previously.

10.3 Excised viscera are often contained in a plastic bag which was placed in the body cavity at the time of autopsy. This bag is removed and the viscera are treated with cavity embalming fluid or paraformaldehyde powder and then placed in a suitable container such as a covered bucket, whilst the embalming process is continued. It is noted that there could be hazards associated with further cutting such as risks of sharps injury when cutting the organs and intestine as well as the risk associated with the splashing of blood, fluid and faeces.

10.4 Arterial embalming is carried out in a similar manner to that described above (9.8 - 9.21). If the common carotid arteries are difficult to locate it may be necessary to inject through the external carotid, facial and internal carotid arteries on each side. The vertebral arteries may also need injecting to ensure the tissue at the back of the neck is embalmed. The upper extremities are injected through the subclavian arteries and the lower extremities via the common or external iliac arteries. Return of perfusing fluid by the veins may only be detected by venous drainage in relevant anatomical areas. Venous drainage should be aspirated during the process.

10.5 Depending on the degree of embalming required (see 9.8), supplemental embalming maybe necessary (see 3.0). In this process, embalming fluid is injected into areas where arterial injection has failed to penetrate, or adequately penetrate, the tissues. Sites which may require injection by means of a needle and syringe or trocar may be the buttocks, trunk walls, shoulders and back of the neck. All of these steps increase the hazard of accidental sharp injury to the embalmers. Occasionally the inside of the abdominal or thoracic cavity is cut or scoured with a scalpel or other sharp instrument to facilitate penetration of embalming compounds. The hazard of these manoeuvres is compounded by the proximity of sharp bone ends.
10.6 The cranial, thoracic and abdominal cavities are aspirated and dried. The internal walls may be coated with autopsy gel. Care should be taken to avoid damage to the embalmer's hands. Where possible towelling should be held by an instrument and autopsy gel should be applied by an applicator and not by gloved hands alone.

10.7 The bag containing the treated viscera is sealed and replaced in the body cavity. Alternatively, the organs are replaced loose and packed in a suitable drying and preservative compound.

10.8 Body cavities may require packing with cotton wool or other appropriate material to restore normal body contours.

10.9 The body incisions are resealed. Historically, this has been done by suturing with linen thread using a needle, preferably held by a needle holder. This is a needle-stick hazard which should be avoided if possible (see 9.21).

10.10 The body is finally cleaned and prepared for viewing as described previously (see Part C, Section 3.0).

11 Cleaning of the Embalming Room

11.1 Details of cleaning, waste disposal and laundering recommendations are described in Part C, Section 4.0 and Part B, Section 4.0.

11.2 The embalming table/trolley should be thoroughly washed and disinfected after each use and care taken to avoid hand injury when wiping any sharp edges on the table (see Section 6.4).

11.3 All tubing used (for injection and cavity aspiration) must be washed by flowing water and then flushed with freshly prepared disinfectant.

11.4 Care must be taken to avoid mixing formaldehyde-based fluids with chlorine disinfectants (see Part B, Section 4.2).

11.5 The floors of the embalming room should be scrubbed and disinfected after each embalming session by a scrubbing machine using detergent and hot water. Mop heads, brushes and pads of scrubbing machines should be changed daily and washed and dried before reuse (see Part B, Section 4.0).

12 Cleaning and Sterilisation of Equipment

12.1 Basic principles for the safe cleaning of re-usable equipment are detailed in Part C, Section 5.0. Proper cleaning is an essential prerequisite to sterilisation/disinfection because organic material (blood and body tissues) can inactivate disinfectants.

12.2 Autoclaving (a process which uses steam under increased pressure destroys all organisms including bacterial spores producing what is called sterilisation) is now recommended for all re-usable embalming instruments. The less satisfactory alternative is disinfection (a process which fails to kill bacterial spores) which can be achieved by:

a) Chemical disinfectants. The only one suitable in this setting is a freshly prepared solution of hypochlorite (see Part B, Section 4.0), but this has the disadvantages that it corrodes stainless steel instruments on repeated use and it requires a holding time of 10-30 minutes to be effective.

b) Boiling. This is an effective method of killing most viruses and bacteria (not spores) and the time for disinfection varies from 10-30 minutes depending on the size of the instrument. However, the water must be boiling when the instruments are added and remain boiling all the time; if instruments are added at different times, no instrument should be removed until an appropriate time has lapsed since the last instrument was added; the duration should be long
enough to ensure that all parts of the instrument reach boiling point. Because all of these variables need strict controlling, boiling is not as reliable as autoclaving.

12.3 Small autoclaves are available which could be suitably installed in the embalming.

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<tr>
<th>Operating temperature (degrees Celsius)</th>
<th>Pressure</th>
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<tr>
<td></td>
<td>kPa</td>
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<td>121</td>
<td>101.3</td>
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<td>126</td>
<td>138</td>
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<td>203</td>
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Operators of autoclaves should follow the appropriate Australian Standards which describe the correct procedures for the use of steam sterilisers.

12.4 Note the limitations of autoclaving in CJD (see Section 5.3, b).

13 **Handwashing/Glovewashing**

13.1 The importance of handwashing in infection control is emphasised (see Part A, Section 2.1).

13.3 Soiled gloves should be thoroughly washed before removing them and hands should be thoroughly washed after glove removal, and also before leaving the embalming room.