Approved Management Method *for* Clinical *and* Related Waste

COMPANION DOCUMENT 2007

Department of Tourism, Arts and the Environment
Environment Division

Tasmania
Explore the possibilities

The Approved Management Method for Clincial and Related Waste

(Minimum Requirements and Explanatory Notes)

ENVIRONMENT DIVISION
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ABBREVIATIONS

AMM	Approved Management Method
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
EMPCA	Environmental Management and Pollution Control Act
DTAE	Department of Tourism, Arts and the Environment
OHS	Occupational Health and Safety
AS/NZS	Australian and New Zealand Standard
PPE	Personal Protective Equipment
MSDS	Material Safety Data Sheet
DHHS	Department of Health and Human Services
HDPE	High Density Polyethylene
CJD	Creutzfeldt – Jakob disease
DOHA	(Australian) Department of Health and Ageing

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INTRODUCTION

What is Clinical and Related Waste?

Clinical and related waste is defined as 'controlled waste' under the *Environmental Management and Pollution Control Act 1994* (EMPCA) and is therefore subject to the relevant requirements of both EMPCA and the *Environmental Management and Pollution Control (Waste Management) Regulations 2000* (Waste Management Regulations). Clinical and related waste is generated from a variety of healthcare facilities and other associated settings (Table 1 and Figure1), and comprises a number of sub-categories, each with their own special handling and/or treatment and disposal requirements. Without correct handling, treatment and disposal these wastes have the potential to cause infection, injury, chemical contamination or public offence.

What is the Purpose of this Document?

This AMM was made by the Director of Environmental Management under Regulation 12A of the Waste Management Regulations and specifies minimum standards for management including; the definition and classification, segregation, safe packaging and labelling, storage, transport and disposal of clinical and related wastes arising from healthcare (or related) settings.

Part 1 of this document contains the *Approved Management Method (AMM) for Clinical and Related Waste* and explanatory notes. Each section contains the relevant legal requirements of the AMM (labelled: 'AMM REQUIREMENTS') along with additional recommended controls and explanatory notes.

Compliance with the requirements of the AMM satisfies the legal obligations under Regulation 6 (Management of Controlled Waste – General Responsibilities) of the Waste Management Regulations with respect to managing clinical and related waste. Practices other than outlined in this AMM require approval from the Director of Environmental Management, or other approval as specified in the regulations. The minimum legal requirements of this AMM are available in a separate format as Appendix 2.

Part 2 of this document focuses on organisational and occupational health and safety issues and provides guidance on formulating waste management strategies and conducting on-site waste management audits.

Adopting improved waste management practices and waste minimisation policies reduces risk to public health and safety and delivers many organisational benefits. By minimising waste, the potential to spread infection is reduced, a safer working environment is provided for healthcare workers and waste handlers, waste management and disposal costs are reduced, and assurances are provided to the public that waste management-related community health and environmental concerns are being noted and addressed.

A key to risk reduction and proper management of clinical and related waste is sound waste management planning. This includes the development and implementation of an appropriate site waste management strategy and waste management plan, which specifies the standards to be met, the measures to be taken to achieve compliance and proposed monitoring to support implementation. On-going education is also a critical element in the waste management planning process.

Table 1: PRODUCERS OF CLINICAL AND RELATED WASTE

- Blood banks and transfusion centres
- Clinics used for medical, dental, veterinary or similar purposes;
- Emergency services and centres;
- General practitioner centres and clinics
- Home healthcare activities
- Hospitals, medical research establishments
- Non-acute healthcare service providers such as
  - acupuncturists/alternative medicine institutions
  - dental hospitals and schools, surgeries and laboratories
  - funeral parlours and mortuaries
  - pharmaceutical manufacturing plants, hospital and community pharmacies
  - physiotherapists and podiatrists
  - day procedure clinics and other allied health service providers
  - nursing homes and hostels for the chronically sick
  - Needle Availability Programme
- Pathology, forensic and microbiological laboratories
- Tattooists, cosmetic piercers
- Veterinary hospitals, surgeries, laboratories and pet shops.

Responsibilities under the Approved Management Method for Clinical and Related Waste

All generators of clinical and related waste are responsible for the safe handling, transport and disposal of the waste in a manner that minimises risk to healthcare personnel, the community and the environment.

It is the responsibility of the waste generator to ensure compliance with the minimum standards specified in the AMM, including, but not limited to:

- Proper waste segregation, packaging, labelling and storage of waste;
- Provision of appropriately designed storage areas for wastes;
- Clear and unambiguous labelling of waste packages and storage areas;
- Use of approved waste contractors for collection and transport of waste;
- Clear communication with waste contractors and operators of waste facilities;
- Verification that the disposal facility is approved to accept the waste for treatment and/or disposal;
- Clear assignment of responsibilities in the waste management process;
- Adequate levels of training for all staff involved in the generation and handling of wastes, and
- Regular auditing and review of waste management practices.

Approved Management Method *for* Clinical *and* Related Waste

PART I

Section A – DEFINITIONS AND CLASSIFICATIONS

'Clinical and related waste' is a collective term applied to materials generated by the healthcare industry and other similar settings (refer to Table 1) which have the potential to cause infection, injury or public offence.

Clinical and related waste is a 'controlled waste' under the provisions of the EMPCA.

For the purposes of this AMM, the following definitions apply:

'Clinical Waste' which includes:

- Pathology and sampling waste directly involved in laboratory testing;
- Human anatomical waste;
- Blood and body fluids and materials or equipment containing human blood or body fluids;
- Animal tissue, carcasses or other associated animal waste arising from laboratory investigation, or from medical or veterinary research or treatment; and
- Discarded sharps (i.e. an object capable of cutting or penetrating the skin).

'Related Waste' which includes:

- Cytotoxic;
- Pharmaceuticals;
- Chemical; and
- Radioactive waste.

This AMM also specifies requirements in relation to the management of sanitary wastes and other wastes otherwise classified as "General Waste" for the purposes of disposal. Detailed definitions of each sub-category and exclusions from those sub-categories are contained within the following Tables 2 and 3. Other definitions may be found in the Glossary located at the back of this document.

Table 2: CLINICAL AND RELATED WASTE DEFINITIONS AND EXCLUSIONS

CLINICAL WASTE means waste generated in a clinical setting (refer Table 1) that is comprised of materials in one or more of the categories described below except where one or more of the listed exclusions applies.

1. CLINICAL WASTE

CLASSIFICATION	DESCRIPTION	EXCLUSIONS
1.1 Pathology and Sampling Waste	• All specimens and associated wastes directly involved in specimen processing. This category includes tissues, disposable bench protectors, gloves and aprons, vials, test strips and cards, solid wastes from auto-analysers, specimen collection containers, suspensions of micro-organisms in tissue culture, discarded blood and blood products, cultures and contaminated material such as growth media (nutrient agars, broths), used culture dishes and so on.	• Urine & faecal specimens discharged directly to sewer. • Hair, nails and teeth (unless contaminated with free-flowing blood) • Cultures prepared for consumption in the food industry • Effluent from laboratory auto-analysers where discharged directly to sewer (with prior approval from the relevant sewerage authority)
1.2 Human Anatomical Waste	• Human tissue, organs, limbs, biopsy specimens, foetuses and placentae.	• Hair, nails and teeth (unless contaminated with free-flowing blood) • Foetuses requested by parents for private burial • Placentae requested for home retention • Corpses[1]
1.3 Blood and Body Fluids	• Blood and blood products (such as sera and plasma) and other body fluids including excretions, exudates, suction fluids, fluid wastes emanating from dialysis, cerebrospinal, pleural, pericardial, peritoneal and amniotic fluids, and any fluid visibly contaminated with blood. • Materials and equipment heavily saturated with blood or body fluids, or containing free-flowing or expressible blood or body fluids. May include disposable gowns, dressings, gauze sponges, lavage tubes, drainage sets, surgical gloves and so on.	• Blood and body fluids disposed directly to sewer. • Sanitary waste[2] (Such as tampons, sanitary napkins, nappies, incontinence pads), unless from a person with, or suspected of having, a communicable disease, or undergoing cytotoxic drug therapy.
1.4 Animal Tissue and Carcasses	• Tissue, carcasses, bedding materials and other waste arising from animals used in chemical, drug or microbiological laboratory investigation, or for medical or veterinary research or treatment. This includes animal waste contaminated with infectious organisms or chemical residues, and materials contaminated with urine, faeces and/or vomitus where the animal has been in contact with an infectious organism.	• Animals used in educational institutions for dissection purposes.
1.5 Sharps	• Discarded items capable of cutting or penetrating the skin and includes syringes, needles, lancets, and scalpel blades, 'spikes' of intravenous sets, pasteur pipettes, microscope slides and coverslips, and broken glass. Hard plastic items such as broken plastic pipettes are also classified as 'sharps' waste. • This category includes sharps generated in the home or public places commonly referred to as 'Community Sharps'.	• Sharps contaminated with cytotoxic substances are to be managed as: Cytotoxic Waste. • Sharps contaminated with radioactive material are to be managed as: Radioactive Waste.

NOTE: *In addition to the specific categories of clinical and related waste identified in this AMM, any waste may be designated clinical or related waste by the Director of Public Health or other relevant government authority and must be handled and disposed of as directed.*

[1] The handling, transportation and disposal of corpses by burial or cremation is covered under the *Burial and Cremation (Handling of Human Remains) Regulations 2005*, *Burial and Cremation (Cremation) Regulations Amendment 2005* and *Burial and Cremation (Cemetery) Regulations 2005*. For further information please contact The Local Government Division within the Department of Premier and Cabinet. Further information on the handling, transport and disposal of human tissue for transplants, post mortem and research, please contact the Department of Health and Human Services.

[2] See requirements under 'General Waste'.

Table 2: Continued

RELATED WASTE means waste generated in a clinical or similar setting (refer Table 1) that constitutes, or is contaminated with, cytotoxic, pharmaceutical, chemical or radioactive material as described below, except where one or more of the listed exclusions applies.

2 RELATED WASTE

CLASSIFICATION	DESCRIPTION	EXCLUSIONS
2.1 Cytoxic	Material that is, or may be, contaminated with a cytotoxic drug (that is, one capable of impairing, injuring or killing cells) during the preparation, transport, or administration of chemotherapy. Includes cytotoxic drugs, vials, materials or equipment contaminated with cytotoxic drugs, as well as the sanitary waste from any person undergoing treatment with cytotoxic drugs[3].	• Urine, faeces and/or vomitus from patients undergoing cytotoxic drug therapy.
2.2 Pharmaceutical	Includes antibiotics, endocrine disruptors, medications, whether in vial, ampoule, tablet, inhaler or capsule form, arising from: – Pharmaceuticals that are returned by patients or discarded by the public; – Pharmaceuticals that are past their expiry date; – Pharmaceuticals discarded by the manufacturer due to failed quality control specifications or contaminated packaging; – Pharmaceuticals that are no longer wanted or required by the facility; – Waste generated during pharmaceutical manufacture and administration, and – Waste otherwise contaminated by pharmaceuticals.	• Non-hazardous materials such as, normal saline, dextrin, nutrient solutions and any intravenous fluids that do not have hazardous additives. • Materials containing trace quantities of pharmaceutical – for example, used plastic syringes with sharps removed; used intravenous sets with 'spikes' removed (managed as 'sharps') and empty pill bottles. • Urine, faeces and/or vomitus containing low levels of pharmaceutical or associated metabolic by-products from patients undergoing therapy.
2.3 Chemical Waste	Waste generated from the use of chemicals in medical and dental clinics, funeral parlours, veterinary, and laboratory procedures, including waste mercury and amalgams, waste solvents, waste chemical reagents, embalming and preserving fluids, spent photographic developing and fixing solutions (such as from X-rays), waste disinfectants and sterilising solutions.	• No exclusions
2.4 Radioactive Waste	Waste which is also a radioactive material as defined in section 6(3) of the *Radiation Protection Act 2005*.	• No exclusions

Table 3: GENERAL WASTE DEFINITIONS AND EXCLUSIONS

GENERAL WASTE means any waste that is not a 'controlled waste' and is not contaminated with a 'controlled waste' (such as clinical and related waste).

3 GENERAL WASTE

CLASSIFICATION	DESCRIPTION	EXCLUSIONS
3.1 Sanitary	• Disposable nappy and incontinence product waste as well as feminine hygiene sanitary products such as tampons and sanitary pads. Includes bulk sanitary waste generated from public areas or commercial premises, provided an appropriate disposal system is used.	• Sanitary waste from patients with, or suspected of having, a communicable disease must be segregated and managed as clinical waste. • Sanitary waste from any person receiving cytotoxic drugs must be segregated and managed as cytotoxic waste.
3.2 Plastics	• Such as single-use syringe barrels, drained dialysis bags and tubing sets, naso-gastric feeding tubing, bed liners and intravenous drip equipment not containing 'sharps'.	• Plastics contaminated with pharmaceutical, cytotoxic, radioactive or chemical material must be segregated and managed accordingly.
3.3 Miscellaneous	• Waste materials including paper, flowers, cardboard, textiles, packaging waste and organic waste such as garden waste, food, vegetable matter, wood fibre and other non-contaminated material.	• Medical records must be labelled 'Confidential' and managed through appropriate security measures.

[3] Cytotoxic drugs are toxic, being known to cause carcinogenic, mutagenic and teratogenic (causing foetal and/or neonatal abnormalities) effects in both laboratory animals and in humans. Clinical manifestations of toxicity may not become evident for a prolonged period of time. Additionally, these substances have a direct irritant effect on skin, eyes, mucous membranes and other tissue, and may cause local toxic, ulceration and/or allergenic reactions. For these reasons cytotoxic substances are classified separately from other pharmamceutical products and have particular handling, storage, transport and disposal requirements.

Section B – WASTE SEGREGATION AND PACKAGING

1. Colour Coding and Labelling

AMM REQUIREMENTS

1.1 Waste generators must ensure that clinical and related waste is segregated at source into discrete waste categories in accordance with the Australian and New Zealand Standard AS/NZS 3816:1998 *Management of Clinical and Related Wastes* (Table 4).

1.2 Waste generators must ensure clinical and related waste that presents as a 'mixed' waste stream is managed according to the highest risk category of its constituents.

1.3 Waste generators must ensure that waste containers used for the storage and transport of clinical and related waste are accurately labelled with details relating to the waste.

RECOMMENDED CONTROLS

> Clear signage should be placed above the containers, indicating items that may be placed in the containers and items that may not be placed in the containers.

> Staff should receive training and education in correct segregation and labelling procedures.

Table 4: COLOUR CODING AND LABELLING OF CLINICAL AND RELATED WASTES
(AS/NZ 3816:1998)

CLINICAL AND RELATED WASTES

Waste Category	COMMENTS	Container Colour Code	Container Type	Marking	Sign
Clinical	Foetuses knowingly obtained through medical procedures, regardless of appearance, and visually recognisable body tissues; such as limbs; not requiring legal burial; should be specifically packaged and labelled.	YELLOW	Plastic bag	Black Bioligial Hazard and clearly labelled as **'Biohazard'**	
Sharps	Waste generators must use sharps containers that comply with either AS 4031-1992 *Non-Reusable Containers for the Collection of Sharp Medical Items used in Healthcare Areas*, or AS/NZS: 4261-1994 *Reusable Containers for the Collection of Sharp Items used in Human or Animal Medical Applications*. Waste collection companies who supply, collect and/or service, reusable sharps containers should ensure compliance with AS/NZS 4478-1997 *Guide to the Reprocessing of Reusable Containers for the Collection of Sharp Items used in Animal Clinic/Medical Applications*.	YELLOW	Rigid-walled sharps container meeting appropriate Australian Standard		
Chemical	Chemical waste should be retained in their original labelled containers. If materials must be removed from their original containers, the receiving container must be compatible with the intended contents and must be fully labelled with specific chemical details, together with appropriate warning symbols.	*Not specified*	Appropriate container	*Not specified*	
Cytotoxic	Cytotoxic wastes must be packaged inside either; a heavy duty, puncture resistant, leak-proof container, or, a multi-walled paper bag with a poly-liner. Bag and container must have secondary containment for capture of spills during transit. Containers for the collection of cytotoxic waste are not to be re-used.	PURPLE	Containers and plastic bags (not re-usable)	White Telophase symbol and clearly labelled as **'Cytotoxic Waste'**	
Pharmaceutical	Pharmaceutical waste must be collected into tamper-proof containers designed to resist impact-rupture, capture spills, and prevent the removal of waste, once disposed.	*Not specified*	Tamper-proof containers	*Not specified*	
Radioactive	Radioactive waste must be packaged in accordance with the *Commonwealth Code of Practice for the Safe Transport of Radioactive Material (2001)*. The Health Physics Branch of DHHS should be contacted to ensure compliance with legislative requirements.	RED	Containers and plastic bags	Black Radioactive symbol and clearly labelled as **'Radioactive Waste'**	

Note: *The requirements for colour coding and labelling of clinical and related waste are subject to AS/NZS 3816:1998 and as such, may be amended from time to time.*

2. Containers and Packaging

AMM REQUIREMENTS

2.1 Waste generators must ensure that containers used for the disposal of clinical and related waste meet the requirements as specified by Standards Australia (where applicable) for each type of clinical and related waste generated.

2.2 Reusable rigid-walled containers (such as mobile garbage bins), must be resistant to leakage, impact rupture and corrosion.

2.3 Rigid-walled containers must have interiors of smooth impervious construction to contain spills and so they may readily be cleaned, sanitised and inspected.

2.4 All collection containers (including drums, plastic bags and sharps containers) must be securely sealed once filled.

2.5 Collection containers for pharmaceutical waste must be:

I. Tamper-proof;

II. Designed and constructed to contain any accidental spillage of liquid or ointment preparations through breakage or other foreseeable events;

III. Designed to cater for standard medicine containers while preventing their removal from the container once disposed of; and

IV. Lined with non-PVC plastic liners if they are to be incinerated.

2.6 Reusable containers must not be used for the collection of cytotoxic waste.

RECOMMENDED CONTROLS

> It is recommended that adequate containers in terms of type, number, and volume should be available for proper segregation procedures.

> Disposal containers should be placed as close as practicable to the source of waste generation.

> Containers may be attached to medication or procedure trolleys and should be placed in convenient positions in preparation and clean-up areas in wards and in laboratories.

> Once filled, biological hazard bags should be securely tied-off so as to minimise the potential for spillage and staff exposure to OHS risks.

> Containers and bags should be purpose-designed and be of sufficient strength or construction to safely contain and secure the waste. The opening should be wide enough to allow disposable materials to be dropped into the container by a single hand operation. The aperture should, under normal conditions of use, inhibit removal of contents. If retractable lids are incorporated, they should be designed so that there is never a need to push material into the container by hand.

> It is recommended that containers and bags be filled to a maximum of two-thirds of their capacity (shown by a capacity indicator), or 6kg, whichever is the lesser, and sufficient air space is permitted for the container or bag to be securely sealed once capacity is reached. Staples or other closure devices with sharp protuberances or edges should not be used to seal containers or bags.

> Reusable containers should be inspected after each use to make sure that they are clean, intact, and without leaks.

3. Waste Handling

AMM REQUIREMENTS

3.1 Waste generators must ensure that waste is correctly classified and segregated at source and managed in accordance with the relevant level of risk.

3.2 Clinical and related waste must not be manually compacted, mulched or shredded prior to disposal unless as part of an approved treatment process.

3.3 Wastes must be moved from point of generation or initial storage, to consolidated storage or treatment area, by means of solid-base garbage trolleys or handcarts designed to prevent leakage, reduce the need for manual handling and facilitate easy cleaning and disinfection.

3.4 Clinical and related wastes must be contained during transit off-site in purpose-designed bags, boxes, bins or drums. Containers and bags must be sealed prior to moving the waste to prevent accidental spills and contamination. Very wet waste must be contained in a manner that prevents or captures spills. The lid of the drum, box or garbage trolley must be able to be closed securely with a good seal to avert discharge of the contents.

3.5 Adequate supplies of absorbent and cleansing materials must be readily available in the area of preparation or administration of cytotoxic drugs, as well as in transit, to cater for accidental spills. Suitable materials include sawdust, commercially available absorption granules, detergents or cytotoxic spill kits. Waste that is, or might reasonably be expected to be, contaminated with cytotoxic material, must be treated as cytotoxic waste.

3.6 Chutes must not be used for the transport of clinical and related wastes.

RECOMMENDED CONTROLS

> Manual handling of the waste should be avoided at all times due to the risk of needle-stick injuries from sharps inadvertently placed into waste bags.

> The onsite movement of waste should avoid sensitive areas such as general patient and public areas, food preparation and dining areas, and heavy foot traffic areas.

> Regular collection rounds to prevent hazards associated with waste accumulation, constitute good housekeeping practice.

> Generators of clinical and related waste should ensure that staff:

- Are trained in safe handling practices, and identification of non-conforming waste loads;
- Have access to, wear, and are trained in the use of, appropriate personal protective equipment (PPE); and
- Adhere to established standardised procedures for waste collection, spill management, treatment and disposal operations, and in identifying and rectifying inappropriate practices.

> Internal facility practices should be reviewed periodically to:

- Optimise waste collection and transportation processes;
- Ensure spill management plans are appropriate to the level of risk;
- Eliminate excessive waste handling; and
- Promote safe work practices.

Section C – STORAGE

The following standards apply to storage areas of a healthcare facility or collection premises where clinical and related waste is accumulated awaiting collection by a contractor, and treatment and disposal facilities. Temporary storage areas such as those typically found at ward or departmental level need not comply with these standards.

1. On-Site Storage

AMM REQUIREMENTS

1.1 Clinical and related waste that cannot immediately be removed for treatment or disposal must be managed to avoid spills, noxious odours or offence.

1.2 Body parts must be immediately refrigerated until removed from the site.

1.3 Storage areas for clinical and related wastes must have an impervious base, be under cover, and bunded to prevent site run-off of spills and wastewater. The base and walls of the bunded area must be free of gaps and cracks.

1.4 Any wash water resulting from routine cleaning of collection containers, mobile garbage trolleys, storage areas and such like, must be directed to sewer or to an on-site wastewater treatment system.

1.5 Storage facilities must:

i. Be located away from patient and public access areas, food preparation and dining areas, windows opening into these areas and air conditioning intakes.

ii. Be segregated from areas used to store other materials;

iii. Be able to be locked to restrict access to unauthorised persons;

iv. Display appropriate signage (for example, "Clinical Waste" and the black, "Biohazard" symbol) and ensure wastes destined for different treatments are kept in separate labelled containers in appropriately signed areas;

v. Have adequate lighting and ventilation to prevent noxious odours, offence or nuisance;

vi. Have adequate spill containment measures within the storage area (such as bunding and/or a sump) to prevent off-site migration of spills,

vii. Be equipped with readily accessible spill clean-up equipment (spill kit) in all waste storage and waste loading/unloading handling areas;

viii. Be designed and fitted out to facilitate cleaning and disinfection, hygiene maintenance and post-spill decontamination, and

ix. Be vermin-proof and maintained in a clean and tidy condition.

1.6 Temporary storage containers and storage facilities for pharmaceutical waste must be secure.

1.7 All returned medications must be placed into a locked or otherwise secure container for immediate storage in an area separated from dispensary stock.

1.8 All drugs, poisons and other pharmaceutical preparations must at all times be separated from food, and animal or human contact, and must be incapable of mixing with or contaminating any foodstuffs should a container leak or break.

1.9 Pharmaceutical waste must not be compacted or mixed with other rubbish.

1.10 The handling and storage of radioactive wastes must be in accordance with the *Radiation Protection Regulations 2006*.

RECOMMENDED CONTROLS

> Clinical and related wastes should not be stored for extended periods at ambient temperatures. Waste should be stored in a manner that ensures it does not produce odour or public offence.

> Haphazard and insecure storage of returned or unwanted pharmaceuticals at pharmacies or transporters' facilities is not acceptable. Pharmaceutical collection containers should be handled by authorised personnel only.

> Workplace Standards Tasmania should be contacted to determine to what extent provisions of the Dangerous Goods legislation may apply to the storage of chemicals, to ensure compliance with any relevant requirements.

> Approval criteria for the management of radioactive wastes include, (but are not limited to), radiation shielding, placement of signage, and restriction of access to the store by unauthorised personnel. The overriding principle for the handling of radioactive waste (or other radioactive materials) is: any radiation doses received by personnel must be as low as reasonably achievable and below prescribed dose limits, in accordance with the *Radiation Protection Regulations 2006*. Further advice regarding radioactive materials may be sought from the Director of Public Health.

> Storage facilities should have adequate PPE to ensure the safety of workers involved in the handling of waste in accordance with occupational health and safety standards.

> Spill kits should be readily accessible, at the point of waste generation, and at other strategic points as necessary; and responsible staff trained in their use.

> Generators of small waste volumes may achieve compliance by using a suitable, labelled, rigid-walled container in accordance with the specifications stated in the previous section, which is kept in a secured area with restricted access.

2. Off-Site Storage

Major off-site storage facilities may require environment and planning approval prior to construction or substantial modification, and may require a permit to operate.

AMM REQUIREMENTS

2.1 Offsite bulking/transfer facilities which accept more than 100 tonnes per year of clinical and related waste for storage must be referred to the Director of Environmental Management as level 2 activities under the EMPCA.

2.2 Off-site storage of clinical and related waste below the Level 2 activity threshold must be referred to the local council.

Section D – TRANSPORT

All clinical and related waste is classified as 'controlled waste' and is therefore subject to the requirements of EMPCA and the Waste Management Regulations.

The transportation of controlled waste, 'for fee or reward', to receival facilities where they may be treated and subsequently disposed, is subject to the following standards.

1. Transport Containers

AMM REQUIREMENTS

1.1 Loose waste bags must be placed into secondary containers that are clearly marked as clinical and related waste for transport to receival facilities.

1.2 Containers used for the transport of clinical and related wastes must be:

i. 'Fit for purpose' with respect to strength, design (covered, sealed and rigid-walled), and construction,

ii. In good serviceable condition, with smooth, clean interiors, free from cracks, protuberances or defects that may damage packages during transit;

iii. Fully bunded and configured to collect and contain any liquid spills,

iv. Easy to clean and disinfect on a regular (weekly) basis, and

v. Subject to regular (weekly) inspections.

1.3 Clinical and related waste must not be compacted, unless compaction occurs during and/or following an approved treatment process.

2. Off-Site Transport

AMM REQUIREMENTS

2.1 It is the responsibility of the waste generator to engage the services of an approved controlled waste transporter where the transport activity is to be conducted for fee or reward.

2.2 The transport of clinical and related waste must be conducted in accordance with the terms and conditions of the approval issued by the Director of Environmental Management.

2.3 The waste generator must fully inform the transport contractors of the nature of all waste they are required to transport and whether it has been pre-treated, and be satisfied that the intended treatment and/or disposal facility is approved for the waste.

2.4 It is the responsibility of the waste generator (or an Agent acting on behalf of a waste generator) and waste transport contractors, to complete their relevant sections of all transport documentation.

RECOMMENDED CONTROLS

> Workplace Standards Tasmania should be contacted to ensure compliance with legislative requirements for the transportation of any clinical and related waste which may also be dangerous goods.

3. Road

AMM REQUIREMENTS

3.1 Vehicles for the transport of controlled waste must have the following:

i. An approved design, construction, material and strength for intended service;

ii. A lockable, fully enclosed load compartment, physically separated from the driver by a solid partition;

iii. Smooth and seamless walls and floor of the compartment for easy cleaning and disinfection, and, free of defects and protrusions which may damage containers and packages in transit;

iv. A bunded floor and/or drainage sump which can be emptied and cleaned; and

v. Provision of adequate and appropriate equipment and materials for spill management.

3.2 Routine cleaning of the vehicles must be carried out in a bunded area, with a sump drain connected to the sewerage system, or some equivalent means of collection and disposal incorporated.

3.3 Clinical and related waste that is also considered to be a dangerous good must be transported in accordance with the *Dangerous Goods Act 1998 (Tasmania)* and the *Australian Code for the Transport of Dangerous Goods by Road and Rail.* This includes displaying appropriate placarding at the front and rear of the vehicle in accordance with the Code.

4. Rail

AMM REQUIREMENTS

Waste transport by rail must be in accordance with the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (ADG Code), as amended from time to time.

5. Shipping

AMM REQUIREMENTS

Waste transport by sea must be in accordance with the *International Maritime Organisation (IMO) International Maritime Dangerous Goods Code (1995).*

6. Air Transport

AMM REQUIREMENTS

Waste transport by air must be in accordance with the *International Air Transportation Association (IATA) Dangerous Goods Regulations (2005).*

7. Interstate Transport

AMM REQUIREMENTS

7.1 The interstate transport of controlled wastes, including clinical and related waste, must be conducted in accordance with the requirements of the *National Environment Protection (Movement of Controlled Waste between States and Territories) Measure (NEPM) 2004.*

7.2 Waste generators that transport clinical and related wastes from Tasmania to another jurisdiction must obtain a prior Consignment Authorisation from the relevant authority in the receiving jurisdiction.

Considerations for approving the interstate transport of clinical and related wastes include:

> Where possible, wastes should be treated or disposed of in the State of origin;

> Waste will generally, not be permitted to be transported interstate for landfill;

> Waste may only be disposed of at facilities that have the appropriate approvals to operate in that jurisdiction;

> Whether the facility to which the controlled wastes are directed, is approved to receive such controlled wastes by the responsible agency of the State or Territory of destination; and

> Relevant environmental protection policies and legislation of the participating jurisdictions which will assist in meeting the desired environmental outcomes.

SECTION E – TREATMENT AND DISPOSAL

There are a number of proven technologies used internationally and nationally for the treatment and disposal of clinical and related wastes. The treatment and disposal method/s used will depend on a number of factors, including the source of the waste, the various components and therefore hazards associated with the waste stream, and the capabilities and limitations of the technology for the wastes to be treated. Waste producers should evaluate treatment alternatives for their safety, effectiveness, environmental impact, costs and compliance with required standards.

There is no single clinical waste treatment technology capable of treating all categories or types of clinical and related waste (Table 5 and Figure 1). It is the responsibility of the waste generator to have validated processes in place, ensuring the segregation of waste that is, incompatible or unsuitable, for the proposed treatment or disposal technology.

In no particular order, waste treatment and disposal options include:

> Approved landfill
> Autoclave (steam sterilisation) and shredding
> Chemical disinfection
> Grinding/shredding (sodium hypochlorite)
> Grinding/shredding (hydrogen peroxide and lime)
> Microwave disinfection and shredding
> Approved incineration
> Sewerage (with approval)

Newer treatment alternatives currently on the market include:

> Irradiation (for example, UV, Cobalt 60, electron beam);
> Thermal (such as; dry heat involving quartz infra-red or plasma pyrolysis);
> Other inactivation mechanisms (including electro-thermal deactivation).

1. Landfill Disposal

A state-wide ban on the disposal of untreated clinical and related waste to landfill facilities will take effect at the end of September 2008.

There are a number of drivers for the need to identify alternative, non-landfill treatment and disposal management options:

> An ongoing unwillingness of landfill facility operators to accept untreated waste;
> Recognition of OHS risks posed to waste transport and landfill facility operators;
> Increasing community concern that wastes be managed responsibly;
> A need to conserve landfill space into the future; and
> Undue reliance on at-source waste segregation practices to eliminate treatment and disposal risks.

AMM REQUIREMENTS

1.1 Untreated clinical and related waste may continue to be disposed of to an approved landfill facility until the end of September 2008 (except where otherwise specified in this AMM), only if the requirements of sections E.1.3 and E.3 are complied with.

1.2 From the 1st of October 2008, clinical and related waste may be disposed of to an approved landfill facility (except where otherwise specified in this AMM), only if the requirements of sections E.1.3 and E.3 are complied with, and provided that the waste is subject to prior treatment in accordance with the requirements of section E.2.

1.3 The following requirements apply to any landfill disposal of clinical and related wastes.

i. The waste must not contain; cytotoxic, pharmaceutical or chemical waste, unsterilised microbial cultures or suspensions in tissue culture and any equipment or materials which have contacted such, or recognisable human anatomical parts (collectively 'prohibited wastes').

ii. The waste must not comprise of, or include, liquid wastes (prior approval for disposal of liquid wastes to sewer should be sought from the relevant sewerage authority).

iii. Waste generators have systems in place to ensure the at-source segregation of prohibited wastes and that these systems are subjected to periodic review and audit.

AMM REQUIREMENTS cont.

iv. Managers of healthcare facilities that are likely to generate prohibited wastes must complete the *Self Audit Tool for Health Care Facilities* available from DTAE, or implement an equivalent audit system;

v The waste is disposed at an approved landfill facility, in accordance with all environmental management requirements pertaining to the management of that facility and with prior approval from the operator of that facility;

vi. Public access to the point of disposal of the waste is restricted during the active disposal period.

vii. The person or agent responsible for disposal must be appropriately trained. They must deposit the material at the lower edge of the working face of the landfill or in an excavation, and supervise immediate covering of the waste to a depth of one metre. Soil or other solid waste may be used as cover.

viii. The waste must disposed of in accordance with *Landfill Sustainability Guide 2004*.

RECOMMENDED CONTROLS

> Waste generators are encouraged to identify waste avoidance and waste minimisation opportunities and to identify treatment and disposal technologies in line with best practice environmental management.

2. Treatment

Treatment and disposal facilities may be subject to planning requirements under the relevant local government Planning Scheme. Additionally, the treatment of clinical and related waste may be classified as a Level 2 Activity ('Waste Depot') under EMPCA and therefore must be referred (prior to commencing construction, or upgrading existing facilities), to the Environmental Management and Pollution Control Board for formal environmental assessment and regulation.

AMM REQUIREMENTS

2.1 Any clinical and related waste treatment technology must meet the following minimum operational standards, as is appropriate to the waste being treated.

i. Elimination of biological hazard by rendering the waste non-infectious – treatment must achieve a ten thousand-fold or greater reduction (log10 kill rate = 4) in bacterial spores, and a million-fold or greater reduction (log10 kill rate = 6) in vegetative cells on test organisms appropriate for the treatment process.

ii. Elimination of any chemical hazard by destroying chemicals and pharmaceuticals.

iii. Be of proven technology for the particular waste stream to be treated, in terms of effectiveness, and for which the social and environmental risks are characterised and publicly available.

iv. Render sharps incapable of causing penetration injury.

v. Render the waste unrecognisable and inoffensive.

vi. Not result in unacceptable levels of hazardous or toxic by-products, or contribute to secondary environmental problems.

vii. Ideally achieve a significant volume and mass reduction.

viii. Have automatic controls and built-in fail-safe mechanisms.

ix. Constitute closed loop systems that ensure the waste cannot by-pass the treatment process.

x. Have continuous automatic monitoring and recording;

2.2 A hospital or other producer of clinical and related waste wishing to install on-site waste treatment equipment must contact the Director of Environmental Management for advice regarding legislative requirements of such activities.

3. Specific Treatment and Disposal Requirements

AMM REQUIREMENTS

3.1 Clinical Waste

3.1.1 Pathology and Sampling Waste

i. Pathology and sampling waste characterised as potentially containing micro-organisms which are pathogenic and transmissible, must be sterilised by suitable autoclave and/or disinfection process, before they leave the control of laboratory personnel. This includes any faecal or urine specimens not disposed directly to sewer.

ii. Effluent from large, automated, laboratory testing analysers may go straight to sewer, (prior approval for the disposal of liquid wastes to sewer should be obtained from the relevant sewerage authority).

3.1.2 Human Anatomical Waste[4]

i. Biopsy specimens and visually recognisable anatomical waste such as limbs and human tissue (other than that requiring legal burial) must be specifically packaged and labelled in accordance with the specified standards. (refer: section B)

ii. Anatomical waste – including unretained foetal or placental tissue – must only be disposed of by approved high temperature incineration, under supervision, or disposed of at an approved crematorium.

iii. Teeth containing amalgam (mercury) fillings must not be incinerated (refer: section E 3.2.3).

3.1.3 Blood and Body Fluids[4]

i. Bulk blood, body fluids (such as 24-hour urine collections) and liquids visibly contaminated with blood, and other body fluids must not be disposed of to landfill.

ii. Large volumes of blood, body fluids or other liquids visibly contaminated with blood, disposed to sewer, must have prior approval from the relevant sewerage authority.

iii. Materials or equipment containing free-flowing or expressible blood and/or body fluids (as defined in Table 2) must be disposed to an approved landfill.

3.1.4 Animal Tissue and Carcasses

i. Animal tissue and carcasses must be disposed of by approved high temperature incineration or to an approved landfill facility.

3.1.5 Sharps

i. Prior to treatment and/or disposal, discarded sharps must be contained within a sharps container that meets the packaging and labelling standards specified in this AMM (see: section B).

ii. Sharps must be disposed by approved high temperature incineration or to an approved landfill facility.

iii. Sharps contaminated with cytotoxic materials must be clearly labelled and disposed of in accordance with the relevant standards in this AMM.

iv. Sharps contaminated with radioactive materials must be clearly labelled and disposed of in accordance with the relevant standards in this AMM.

3.2 Related Waste

3.2.1 Cytotoxic Waste

i. All cytotoxic waste must be disposed of only by approved high temperature incineration. It must not be disposed of to sewer or landfill.

4 A number of wastes in these categories present low to negligible risks to waste handlers and the community, however the management and disposal of these wastes need to be conducted with public expectations and aesthetic considerations in mind.

AMM REQUIREMENTS

3.2.2 Pharmaceutical Waste[5]

i. All pharmaceutical waste, (including unwanted and out of date medicines, but excluding drugs of dependence or Schedule 8 pharmaceuticals), must be disposed of only by approved high temperature incineration. It must not be disposed of to sewer or landfill.

ii. Schedule 8 pharmaceuticals must be disposed of in accordance with the Poisons Act 1971 and subordinate legislation. Drugs scheduled under the *Standard for Uniform Schedule of Drugs and Poisons* (SUSDP) are subject to special arrangements.

iii. Liquids must be collected seperately from solid dose forms and must be retained in their original containers to ensure proper identification, and therefore suitable disposal.

iv. Used or partly used vials and ampoules must also be disposed of via sharps containers that are destined for incineration, or returned to a central pharmaceutical store for packaging and collection.

v. Non-flammable liquids that are uncontained (such as spills of antibiotic solutions) must be absorbed by surplus absorbents such as sawdust, cellulose or other granulated absorbents, subsequently placed in a compatible, moisture-resistant bag, plastic bag or other sealable combustible container for incineration.

vi. Liquids, semi-solid preparations or other substances considered an explosive hazard, or any other substance not suited to destruction by incineration must be identified and separated from the waste stream.

vii. Prior arrangements must be made with incineration facilities for the destruction of collected materials.

viii. Unwanted pharmaceuticals (other than Schedule 8 and cytotoxic drugs) may be returned, under supervision, to a community pharmacy for collection and disposal[6].

3.2.3 Chemical Waste

i. Disposal of chemical waste must be managed to avoid risks to public health, safety and the environment.

ii. Chemical waste must be disposed of in accordance with relevant public health, safety and environmental legislation.

iii. Chemical waste must not be disposed of to sewer unless explicitly approved by the relevant sewerage authority.

iv. Chemical waste must be appropriately contained within suitable containers, and chemicals from differing processes must not be mixed.

v. Chemical waste must be labelled with chemical name, total quantity and concentration of substance/s, appropriate risk and safety information, and dangerous goods labelling, as applicable.

vi. Mercury and other chemicals, such as esters of acrylic acid used in the preparation of restorative amalgams, must not be incinerated or disposed of via domestic waste disposal systems.

vii. After 1st of October 2008, dental practices must employ amalgam separators capable of at least 95% separation, to treat all wastewater streams containing mercury amalgam residues[7].

3.3.4 Radioactive Waste

i. The handling and storage of radioactive material and disposal of any such waste, must be in accordance with the *Radiation Protection Regulations 2006* and any requirements of the Department of Health and Human Services (DHHS).

5 The inappropriate management and disposal of pharmaceuticals can pose a safety hazard in the home and can have significant environmental effects. Oestrogen, even at low levels, can have a feminisation effect on male fish, which could cause great harm to future breeding populations of the affected species. Antibiotics have acute effects on bacteria, and can alter microbial community structures in nature thereby affecting the higher food chain. Their use in aquaculture results in eventual human consumption. Some antidepressants and drugs for obsessive-compulsive disorders have subtle, but possibly profound, effects on aquatic species, such as affecting the fighting behaviour of lobsters. Retinoids, have profound effects upon the development of various embryonic systems, especially in amphibians where retinoic acid receptors have been hypothesized to play a role in frog deformities. (Daughton & Ternes, 1999).

6 More information is available from the Return of Unwanted Medicines (RUM) website at: http://www.returnmed.com.au.

7 For more information on mercury and dental amalgam, please refer to the publication; *Dental Amalgam and Mercury in Dentistry (NHMRC, 1999)* at: http://www.nhmrc.gov.au/publications/synopses/d17syn.htm.

RECOMMENDED CONTROLS

> Chemical waste such as solvents and silver from x-ray processing waste should be reclaimed and recycled where practicable.

> Mercury-related dental waste should be returned to metal or precious metal recyclers for reclamation.

> The Health Physics Branch of the DHHS should be contacted to ensure compliance with legislative requirements for the management of radioactive waste. Other publications such as; *Code of Practice for the Disposal of Radioactive Wastes by the User* (NHMRC 1985) (currently under review) should also be consulted, and is available at: http://www.arpansa.gov.au/pubs/rps/rps1.pdf

Table 5: SUMMARY OF CLINICAL AND RELATED WASTE DISPOSAL OPTIONS

CLINICAL AND RELATED WASTES

WASTE TYPE (Segregated)	TREATMENT				DISPOSAL	
I. Clinical Waste	**Autoclave /Shredding**	**Chemical Disinfection /Shredding**	**Microwave Disinfection**	**HTI**	**Approved Landfill[8]**	**Sewer[9]**
(a) Pathology and sampling waste	Yes	Yes	Yes	Yes	Yes	No
(b) Recognisable Human Anatomical Waste	No	No	No	Yes	No	No
(c) Blood and Body Fluids	Yes	Yes	Yes	Yes	No free liquids	Yes (with approval)
(d) Animal Tissue and Carcasses	No	No	No	Yes	Yes	No
(e) Sharps	Yes	Yes	Yes	Yes	Yes	No
II. Related Waste						
(a) Cytotoxic	No	No	No	Yes	No	No
(b) Pharmaceutical	No	No	No	Yes	No	No
(c) Chemical[10]	No	No	No	Yes	No	No
(d) Radioactive	No	No	No	No	Yes[11]	Yes (with approval)

8 Until the end of September 2008.

9 Disposal to sewer is not suitable for solid clinical and related waste.

10 Chemical waste must be disposed of in accordance with relevant public health, safety and environmental legislation. Recovery options for chemical waste should also be explored.

11 Radioactive waste will continue to go to approved landfill after September 2008.

Section F – CLINICAL WASTE IN THE HOME AND COMMUNITY

Health services are increasingly being delivered in the home, through home visits by a variety of health professionals such as community nurses, doctors and palliative care staff. Additionally, many people self-manage their medical conditions, including those who are diabetic and those on home dialysis programs. There are also people in the general community that inject intravenous drugs at home and/or in public places.

Clinical and related waste generated in such a manner pose a similar risk to that generated in more, traditional clinical settings. Therefore, such wastes should be managed carefully to minimise the risk to patients, other family members, waste handlers, the general community and the environment.

The following sections outline the requirements for;

> The management of wastes arising from home visits conducted by medical carers;

> The management of home healthcare wastes generated by self-care, and

> The management of sharps in the general community setting.

1. Wastes arising from home healthcare visits

AMM REQUIREMENTS

This category includes clinical and related waste generated during home visits by health professionals such as community nurses, doctors and palliative care staff. The minimum requirements of this AMM for the management of clinical and related waste generated in this manner are the following;

1.1 The healthcare facility (such as hospitals and community health clinics) has primary responsibility for ensuring waste generated through home healthcare activities is properly managed.

1.2 Waste must be deposited into containers that comply with standards outlined in this AMM (refer: section B. 2) and the requirements of any relevant Australian Standard.

1.3 Waste must be labelled and colour-coded in accordance with the standards of this AMM (refer: section B. 1), sealed and secured in a rigid-walled container for transport and returned to the primary healthcare facility.

1.4 The waste must be managed and disposed of through the standard clinical and related waste streams in accordance with the individual facility's waste management plan.

1.5 Spill kits must be available in vehicles transporting waste, and the responsible staff trained in their correct use.

1.6 The healthcare provider must keep records of all wastes transported back to the primary healthcare facility, including dates, types of waste, quantity and disposal pathway.

2. Wastes arising from self-care

Patients who are required to self-manage their conditions at home should seek advice and assistance from their healthcare provider regarding good waste management practices, including the disposal of sharps or other devices used to penetrate the skin.

Patients who use sharps not provided by a healthcare facility must ensure that they are disposed of safely in the manner described for the disposal of Community Sharps.

Home dialysis (peritoneal and haemodialysis) liquid waste should, preferably, be emptied to sewer. The emptied dialysis bags and tubing should then be wrapped in newspaper and placed into household garbage. (Used haemodialysis bags and blood lines should be first flushed with saline.)

Colostomy, ileostomy and urostomy pouches and irrigation sets should be wrapped in newspaper before placing into household garbage. (In some cases, pouches may be designed so as to allow their contents to be emptied directly to sewer and the pouches then wrapped in newspaper before placing into household garbage.)

Wound dressings, swabs and any waste containing free-flowing or expressible blood or body fluids should be double-bagged before placing into household garbage.

Unwanted and out of date pharmaceuticals and medicines must be managed in accordance with the previously outlined requirements of this AMM (see: section E 3.2.2 'Pharmaceutical Waste').

3. Community Sharps

'Community Sharps' refers to rigid waste materials capable of penetrating the skin that are generated in non-clinical settings. This includes needles, syringes, and lancets used by people who self-manage their medical conditions at home, such as those with diabetes, various blood disorders, or other medical conditions that may require self-injection. 'Community Sharps' also include needles and syringes used by self injecting drug-users in the home and in public places.

Sharps should be placed into a container that is puncture-resistant and has a screw-top lid so as to pose no risk of injury to others as required by Section 35 of the *HIV/AIDS Preventative Measures Act 1993*. The use of commercial sharps containers that conform to Australian Standards as outlined in this AMM (refer: section B) is recommended. Glass bottles or jars should not be used due to the risk of breakage.

There are a range of organisations such as Diabetes Australia, some local councils, pharmacies and community health centres which may be able to provide information about suitable sharps containers and appropriate disposal.

When disposing of community sharps or any clinical or related waste, care must be taken to ensure the BIOLOGICAL HAZARD symbol is NOT mistaken for the RECYCLING symbol (aka 'Mobius Loop'), to enable correct disposal of wastes.

Section G – MANAGEMENT REQUIREMENTS FOR GENERAL WASTE

The General Waste category refers to the broad sector of sanitary, plastic and miscellaneous waste materials, that are not classified controlled wastes. With correct at-source segregation practices, the majority of the total waste volume generated in healthcare facilities and other clinical settings falls into the general waste category and may be managed accordingly.

General waste does not require special treatment prior to disposal and does not require approval to transport under EMPCA, or the Waste Management Regulations. Nonetheless, the Waste Management Regulations prohibit the use of land for disposal of general wastes without approval. This AMM does not apply to the disposal of general wastes and the contents of this section are advisory only.

1. Sanitary Waste

Under normal circumstances with good handling practices, the disposal of sanitary wastes at landfill facilities poses a low risk of infection through contact, inhalation or ingestion. Bulk quantities of sanitary wastes (that is, where the major component of a waste load can easily be identified as such) may however, cause offence to waste disposal personnel and the public.

RECOMMENDED CONTROLS

> Sanitary waste must be classified and managed in strict accordance with the standards specified in Table 6.

> Bulk loads of feminine hygiene sanitary products (such as tampons and sanitary pads), nappies and incontinence pads must be deposited in a designated area away from the general tipping face of a landfill facility. This designated area must not be accessible by the public, and the waste must, immediately upon receipt, be covered with a minimum of 300 mm of cover material. This requirement is based on a landfill facility having public access. Where public access is restricted, sanitary waste need not undergo supervised burial provided daily cover occurs.

> Due to the risks associated with inappropriate sharps disposal in public sanitary disposal receptacles, sanitary napkins and tampons collected from public areas of healthcare facilities, commercial premises and general public spaces, must be contained within an appropriate disposal system (that is, a rigid-walled, resealable container providing for disinfection). The container must be drained at the point of generation and the contents consolidated prior to disposal in a designated area away from the general tipping face that is not accessible to the public. The waste must be covered with a minimum of 300 mm of cover material, immediately upon receipt at the waste depot.

RECOMMENDED CONTROLS

> Although the transport of sanitary waste that has been classified as general waste is not subject to regulation under environmental legislation, it is recommended that specialist companies undertake the collection of sanitary waste.
As it is the responsibility of facility management or waste generator to ensure adequate segregation, it is advisable that premises generating sanitary waste develop procedures for managing this type of waste which provide clear guidance and information on how to handle, store, transport and dispose of the waste.

Table 6: MANAGEMENT PRACTICES FOR SANITARY WASTE

CRITERIA (source/characteristics)	WASTE CLASSIFICATION	DISPOSAL
Bulk sanitary waste	General	Supervised burial in an approved landfill in a designated area
Sanitary waste from any persons with, or suspected of having, a communicable disease	Clinical	Supervised burial in an approved landfill in a designated area. **+**
Sanitary waste from persons administered cytotoxic drugs	Cytotoxic	High temperature incineration

+ From 1st of October 2008, all clinical and related waste will require treatment before disposal to an approved landfill.

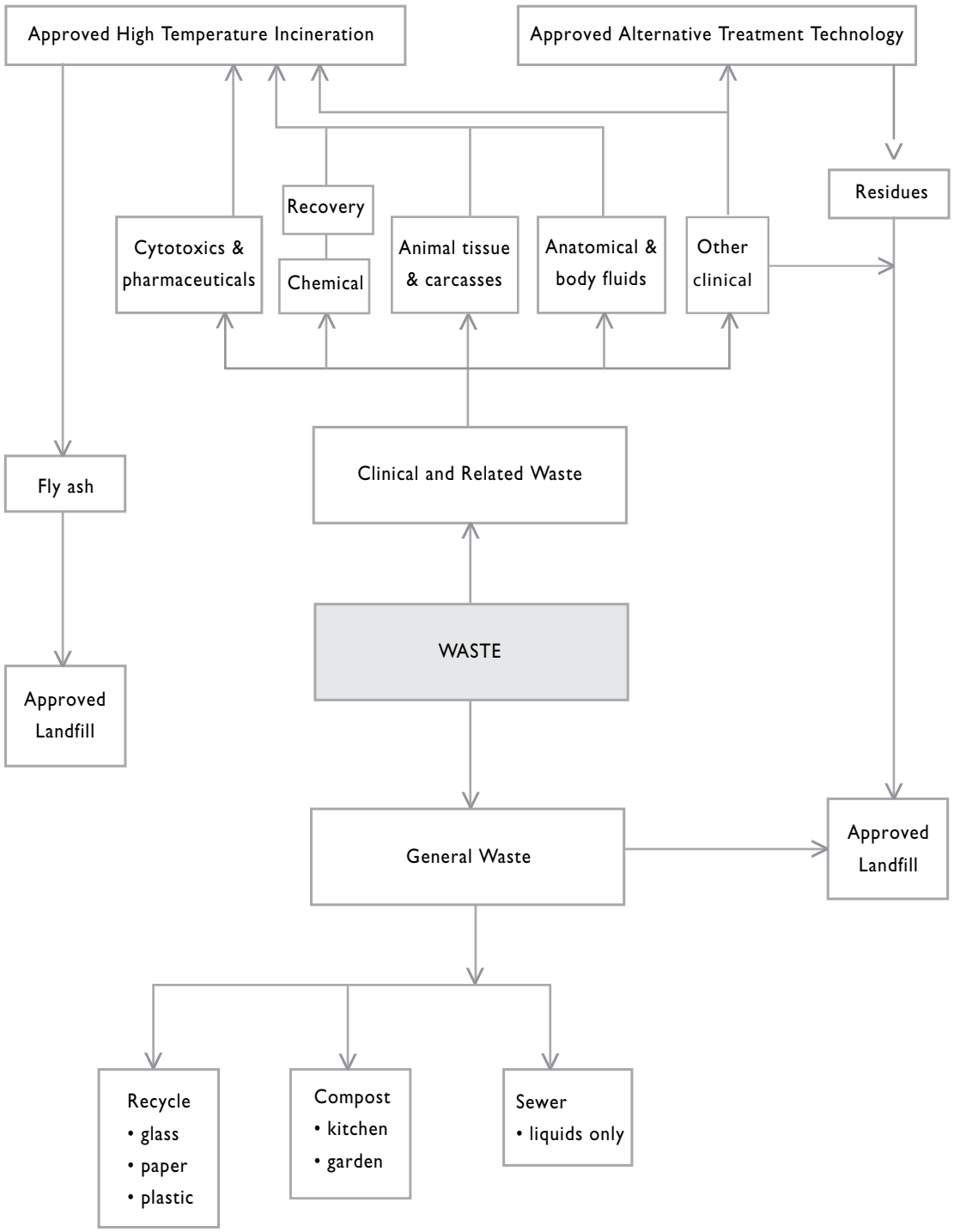
2. Plastic Waste and Miscellaneous

RECOMMENDED CONTROLS

- Appropriate bags meeting the relevant Australian Standard are to be used for packaging of general waste.
- Viable recycling options should be considered, where appropriate, for the various components of the waste stream. Where recycling options do not exist, non-contaminated paper, plastic and glass materials can be disposed of via the municipal waste collection service. Contaminated waste must be considered clinical or related waste and disposed of accordingly.
- Organic waste such as garden waste, food, vegetable matter, and wood fibre may be suitable for composting. All recyclable glass containers should be emptied of their contents and rinsed to remove contaminants prior to placing in a recycling bin
- Service and supply departments can remove much of the packaging materials before products are forwarded to wards or clinical areas. Office waste which has not been contaminated with clinical and related waste may be segregated into its major component streams of packaging, newspaper, office paper, cardboard, textiles etc., and recycled through appropriate avenues. Cardboard packaging materials and paper should be segregated, flattened or compacted, and baled for recycling.
- Confidential papers such as patient records and reports should be shredded before being placed in the recycling stream, or managed separately as "confidential wastes" and shredded and recycled off-site.
- A significant volume of plastic used in healthcare can be recycled, especially HDPE products such as sterile saline bottles. Plastics contaminated with clinical or related waste are unsuitable for recycling and should be disposed of accordingly.

Figure 1: WASTE OPTIONS FLOWCHART

(Source: Draft Guidelines for the Management of Clinical and Related Waste in Victoria – February 2004)



Organisational Issues

PART 2

1. Understanding the Waste Management Hierarchy

Driven by infection control concerns over the last 20 years, there has been a trend towards disposable single-use medical items. The disposal of these items can produce adverse environmental effects and dramatically increase the volume, bulk, difficulty and expense of waste disposal.

Responsible waste management, through waste minimisation and improved practices, is a key element of developing, implementing and maintaining sustainable business practices. As far as is practicable, without compromising safety or the provision of quality healthcare to patients, hospitals and related healthcare industries should be aiming to reduce waste by understanding where and how the waste is generated and working systematically to reduce the need for disposal.

Preference should be given to products that are reusable, are derived from renewable resources and which are made from, and packaged in, recyclable materials. Product alternatives which might be more cost effective, less hazardous to the environment or more compatible with existing waste management procedures should be investigated.

The waste management hierarchy (Figure 2), provides an order of preference for implementing waste management actions. The primary objective of the waste management hierarchy is to reduce potential hazards to human health and the environment by avoiding or minimising the generation of wastes which are hazardous. Secondary objectives are the efficient use and conservation of resources, a reduction in the need for disposal facilities, and improved cost efficiency through reduced waste disposal and material costs.

The ideal situation is to have closed loops in overall material flows with no useable materials lost as waste. Waste avoidance, therefore, should always be the preferred option. If waste cannot be avoided, practices which reduce the volume of waste requiring management should be employed through reuse or recycling. Failing that, waste should be safely disposed of.

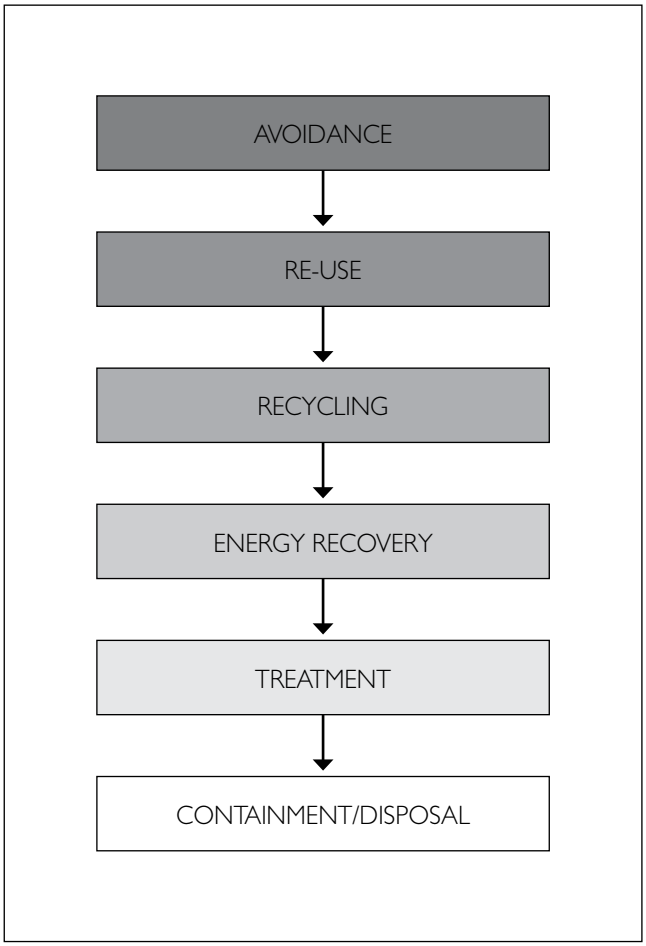


Figure 2: Waste Management Hierarchy

1.1 Waste Avoidance

Waste avoidance practices prevent the generation of waste and include the following.

1.1.1 Product Substitution

All products should be assessed before purchase for their potential to generate problematic wastes, result in toxic emissions, or be detrimental to the operation and maintenance of treatment facilities. Products already in use should also be periodically reviewed to assess product performance and waste disposal criteria

The product assessment process should involve:

> Evaluation of material safety data sheets (MSDS);

> Liaison with manufacturers and suppliers to determine the chemical composition of the product, potential for recycling, and potential waste output;

> Liaison with waste contractors regarding technical waste disposal advice

Frequently, a non-toxic, or biodegradable product can be substituted for one that is toxic or causes a special waste treatment problem. Where substitution cannot be achieved due to a limited range of products, manufacturers/ suppliers should be consulted to determine if the product can be modified. Simple product modifications to minimise contaminated waste streams include requesting the manufacturer and supplier to reduce unnecessary packaging, or replace polystyrene foam packaging with for example, recyclable corrugated paper packaging and requesting the manufacturer and supplier to remove any unnecessary packaging materials.

The reduced cost of disposal or the reduced exposure of workers to a toxic material can often justify the change.

1.1.2 Procedural Changes

Poor housekeeping practices, poorly maintained equipment, and inadequate planning can all contribute to waste generation. Simple changes to patient care procedures often result in significant waste reduction benefits. Examples include:

> Reducing to a minimum the number of different products used. Stream-lining product use mitigates shelf-life problems and reduces the number of partially used containers to dispose of;

> Buying in chemical product container sizes appropriate to the actual use. It can be less expensive to buy smaller containers of a perishable product than to purchase large volumes of a product at a lower unit cost and later have to dispose of the unused portion; and

> Reducing the inventory of hazardous materials to a minimum, and ensuring that old containers are rotated from the back of shelves to the front when new material is purchased. This effort will reduce the disposal of new materials whose shelf-life has expired.

1.2 Reuse and Recycling

Where waste cannot be avoided, the next best option is to reduce the amount of waste which requires management. Waste minimisation is the adoption of practices or processes which reduce, to the maximum extent feasible, the quantity of waste generated and/or the quantity of waste which requires subsequent treatment, storage or disposal. It includes any source reduction or recycling activity undertaken by a generator that results in the reduction of the total volume or quantity of waste requiring treatment or disposal. This does not include waste reduction that is achieved simply by dewatering or compaction.

Waste minimisation practices, therefore involve evaluating consumables for their reuse potential where it is safe and practicable to do so. Disposable items which have the potential for replacement with reusables include:

> "blueys" (plastic liners)

> dressings trays/suture trays

- suction systems
- drainage bottles
- disposable theatre wrap
- plastic aprons
- bed pans
- serviettes
- tray covers
- disposable batteries (with rechargeables)
- paper hand towels

There are significant opportunities for healthcare facilities to recycle non-contaminated waste otherwise destined for landfill. As with reuse, product recycling can minimise the total volume, and thereby cost, of waste requiring disposal. The following wastes should be separated from the total waste stream at source and targeted for recycling where possible:

- glass
- plastics (e.g. HDPE, PET, PVC, LDPE)
- aluminium cans
- paper and cardboard (confidential information such as patient records and reports must be shredded)
- ferrous and non-ferrous metals

Where contamination may have occurred, these items must be managed as clinical and related waste and should not be considered for re-use or recycling.

1.3 Energy Recovery

Some wastes have a high calorific value and can be used as an energy source, although wastes from healthcare facilities are unsuitable for this purpose.

1.4 Treatment & Disposal

Clinical and related waste that cannot be avoided or minimised should be treated before disposal. The requirements for treatment and disposal are specified in relevant sections of this AMM.

2. Waste Segregation

Waste segregation is essential for the proper management of clinical and related wastes. The underlying principle in any waste segregation program is to reduce the volume of waste which requires special treatment or costly off-site disposal, to facilitate recycling where appropriate, and to ensure the safety of personnel involved in handling, transport and treatment of the wastes.

A segregation program should be simple, time efficient and allow at-source separation of clinical and related waste components, non-hazardous and recyclable components of the waste stream. Properly segregated wastes should remain separated during handling, storage and transportation. Where waste streams are mixed, the waste must be managed according to the most hazardous component.

Minimum standards for segregation are specified in Section 2.1 of the AMM, and should be achieved through:

- Proper identification of material composition (MSDS information may be a useful reference);
- Ensuring that waste can be properly segregated at the source with due regard to OHS issues;
- Establishing identifiable colour coding, labelling and containment (in accordance with the Australia and New Zealand Environment Conservation Council (ANZECC) endorsed National Colour Coded Recycling System);
- Incorporating quick and efficient waste disposal methods into patient care procedures;
- Providing a suitable storage area at the point of waste generation;
- Education and training of personnel; and
- Effective communication between waste generators and waste handlers/disposal contractors that ensures mutual awareness of the facilitiy's segregation policies and protocols.

3. Waste Management Planning

To assist in meeting legislative obligations, each healthcare facility or Healthcare Region should develop a waste management strategy. A waste management strategy should:

> Clearly articulate management commitment to the principle of waste minimisation and the responsible management of residual waste;

> Clearly outline the categories of waste generated by the facility and the appropriate management procedures;

> Specify the allocation of resources and obligations with respect to implementing required actions;

> Provide for adequate and ongoing education and training for personnel involved in all stages and levels of waste management; and

> Be readily available to all staff.

A key element of a waste management strategy should be a comprehensive Waste Management Plan. The plan should be developed and implemented by an individual or waste management committee, and include an examination of issues related to waste generation, handling, storage, transport, spill management, treatment and disposal of all forms of waste, taking into account patient care and worker safety. All legislative requirements imposed by relevant authorities should be noted in the plan and incorporated into the facility's work practices. Good waste management planning should also undertake a review of purchasing policies and product use.

A waste management plan should be tailored to fit the organisation's needs by reflecting the specific issues facing the organisation, and is likely to contain the following:

> Environmental policies and objectives;

> Identification, assessment and evaluation of options for improved performance;

> Commitments, targets and contingency arrangements;

> Operational protocols and procedures;

> Performance monitoring and reporting, and

> Auditing protocols and arrangements for periodic review of the plan.

In developing a waste management plan, a facility should:

> Conduct a comprehensive baseline waste management audit that determines current performance in terms of safety, efficiency, environmental impact assessment, costs and regulatory compliance;

> Review purchasing and supply practices and consider potential waste avoidance, reuse and recycling measures;

> Examine the procedures and minimum requirements for waste segregation and packaging, storage and transport, treatment and disposal;

> Evaluate alternative treatment and disposal options;

> Investigate contractor arrangements;

> Develop risk management strategies, including spill management protocols, contingency arrangements and emergency procedures;

> Establish procedures and staff training programs for effective waste management that complies with required measures;

> Develop strategies for promoting the waste management plan within the organisation;

> Ensure a feed-back loop is incorporated into the plan; and

> Ensure regular monitoring of plan effectiveness and incorporate review mechanisms, including annual collection of waste type, volume, manner and frequency of removal, costs and injuries.

A suggested outline of a Waste Management Plan is given in Appendix 1.

4. Waste Management Audits

An integrated risk management (IRM) approach to waste management is useful in developing strategic decisions, which can be applied across all levels of a business or organisation to deliver desired management of waste objectives[12].

Auditing is an essential risk management tool and a baseline waste management audit should be conducted before developing or updating a waste management plan. The purpose of an audit is to determine current performance in terms of safety, efficiency, environmental impact, costs and regulatory compliance, to identify the quantities, types and sources of waste generated and to identify options for waste minimisation. An audit should ideally examine the current waste management system in detail to determine which aspects of the system are working effectively prior to any attempt to introduce a new system.

Information collated and assessed as part of a waste management audit should include:

- Types, volumes and/or weight and composition of waste generated;
- Hazard assessment;
- In-house procedures or processes generating waste (to identify potential elimination options);
- Points of generation, collection and storage sites;
- Waste segregation and packaging methods;
- Contents of waste containers;
- Waste storage and transport methods and records;
- Treatment and disposal methods and records;
- Documented contracts for waste collection, removal and disposal;
- Incidence and severity of waste handling injuries;
- Incidence and nature of spills and leaks;
- Costs of waste packaging, internal and external transport, treatment and disposal;
- Effectiveness of current waste segregation procedures;
- Effectiveness of education programs;
- The response mechanisms/procedures for spills and accidents;
- The relationship to current benchmarks or best practice management; and
- Quality improvement mechanisms.

5. Occupational Health and Safety

Under occupational health and safety legislation, generators of clinical and related waste are responsible for providing appropriate information, education and training to staff and ensuring that a safe work environment is developed and maintained. This requires approporiate risk identifcation, risk assessment and risk control measures to be implemented.

For guidance on risk assessment and management, please contact the Workplace Standards Tasmania Helpline
ph: 1300 366 322 (within Tasmania); or (03) 6233 7657
E-mail: wstinfo@justice.tas.gov.au

12 For further information regarding the principles and application of IRM see: AS/NZS 4360:2004 *Risk Management Set*, HB 203:2006 *Environmental Risk* and W-4590-2002 *Risk Management in Health Care 2nd Edition.*

REFERENCES

LEGISLATION

State

Dangerous Goods Act 1998

Environmental Management and Pollution Control Act 1994 (EMPCA)

Environmental Management and Pollution Control (Waste Management) Regulations 2000

HIV/AIDS Preventative Measures Act 1993

Poisons Act 1971 and subordinate legislation

Radiation Protection Act 2005

Radiation Protection Regulations 2006

Commonwealth

Quarantine Regulations 2000

National Environment Protection (Movement of Controlled Waste between States and Territories) Measure (NEPM) 1998

International

IATA Dangerous Goods Regulations 2005

CODES OF PRACTICE

Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code)

Code of Practice for the Disposal of Radioactive Waste by the User (1985), National Health and Medical Research Council (NHMRC)

Commonwealth Code of Practice for the Safe Transport of Radioactive Material (2001)

International Maritime Dangerous Goods Code 1995 (IMDG)

GUIDELINES

Infection control guidelines for the prevention of transmission of infectious diseases in the healthcare setting (2004)
Australian Government Department of Health and Ageing

Landfill Sustainability Guide (2004)
Environment Division, DTAE.

STANDARDS

AS 4031-1992 Non-Reusable Containers for the Collection of Sharp Medical Items used in Healthcare Areas

AS/NZS 4261-1994/Amdt 1:1997 Reusable Containers for the Collection of Sharp Items used in Human or Animal Medical Applications

AS/NZS 4478 -1997 Guide to the Reprocessing of Reusable Containers for the Collection of Sharp Items used in Animal Clinic/Medical Applications

AS/NZS 3816:1998 Management of Clinical and Related Wastes

AS/NZS 4360:2004 Risk Management Set

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W-4590-2002 Risk Management in Health Care 2nd Edition

Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP), Therapeutic Goods Administration, Australian Department of Health and Ageing

LITERATURE

Daughton, C.G., and Ternes, T.A., *Pharmaceuticals and Personal Care Products in the Environment: Agents of Subtle Change?* Environmental Health Perspectives, Volume 107, Supplement 6, December 1999.

Dental Amalgam and Mercury in Dentistry (1999), National Health and Medical Research Council (NHMRC)

GLOSSARY

Approved crematorium	A crematorium approved to operate under relevant Local Government legislation.
Approved high temperature incineration	Treatment technology involving destruction of waste by controlled burning at high temperatures. To be approved (in accordance with Regulation 12B (3) Waste Management Regulations) by the Director, such a facility must meet minimum operating standards, and must operate in accordance with the permit conditions pertaining to an individual facility.
Approved landfill facility	A landfill facility approved by the Director. The facility must operate in accordance with the permit conditions pertaining to an individual facility.
Approved treatment process	A waste treatment process in accordance with the requirements of this AMM, or other treatment process as approved by the Director.
Approved waste transporter	A waste transport business operator approved by the Director to transport the controlled waste category of clinical and related waste, or a transporter approved by another state or territory.
Autoclave	Refers to equipment used to sterilize microbial pathogens by applying super-heated steam under pressure. Commonly used for the sterilization of medical instruments, and laboratory waste.
Bund	A secure wall, ridge or depression of sufficient integrity to completely contain liquid within, or run-off from, waste stored within its confines. Designed to contain spillages and leaks and to facilitate clean-up operations.
Chemical inactivation	Use of chemicals to kill microbial agents present in waste. Typically, medical waste treatment technologies use sodium hypochlorite, chlorine dioxide, ozone, or enzymes as the agent of microbial inactivation. Critical to the use of any chemical is the ability of the chemical to reach all surfaces without interference from factors that may inhibit the chemical's performance.
Community sharps	Needles, syringes, lancets and similar equipment used in self healthcare activities (diabetes, dialysis etc), animal healthcare, and by self-injecting drug-users.
Composting	Biological decomposition of solid organic materials by micro-organisms.
Controlled waste	A substance that is a controlled waste as described by section 3 of EMPCA and further prescribed by Regulation 5 of the Waste Management Regulations.
Dangerous good	As defined by the Australian Dangerous Goods Code.
Dialysis	Includes both haemodialysis and peritoneal dialysis and refers to the medical treatment for eliminating wastes and extra fluids from the bloodstream when kidneys no longer function normally.
Disposal	Any method of dealing with waste that permanently removes it from human contact. This includes landfill and thermal treatment.
Disposal facility	Landfill, incinerator or other facility which receives waste for disposal.
Free-flowing or expressible	For blood, blood products or human body fluids, means blood, blood products or body fluids that are flowing, dripping or oozing liquid, or able to be squeezed from material.
General waste	Waste that is not a controlled waste.
Healthcare facilities	Premises used in the delivery of health services. These include hospitals, community health clinics and medical, veterinarian and dental practices. Such facilities are likely to produce waste of a medical or clinical nature.
Home healthcare waste	Clinical and related waste that is generated in a domestic setting by a visiting healthcare professional (e.g. doctor, nurse, veterinarian) in the normal course of their work. This type of waste is also generated from self-care activities such as performed by diabetics, and persons undergoing home dialysis or chronic pain management programs.
Infectious waste	Includes all waste known to be, or could potentially be, contaminated with pathogenic micro-organisms (e.g. bacteria, viruses, parasites) and which presents a potential infectious hazard to personnel handling it (e.g. waste disposal workers) and to the environment if appropriate precautions are not used.
Irradiation inactivation	Irradiation (non-ionising radiation) is commonly used to sterilise medical products by irradiating with high energy electrons generated by radioactive decay (cobalt or caesium) or by linear accelerator (electron beam).
Mobius loop	Internationally recognised symbol; denotes a product is made from recycled materials, and/or may be recycled.
Pathogens	Disease causing agents including viruses, toxins, bacteria and other micro-organisms.
Pharmaceutical	Relating to chemical drugs or medicines, their preparation and use.
Pouches	Refers to the pouch, or bag, worn by colostomy/Ileostomy/urostomy patients, on the outside of the body to collect bodily wastes that normally pass through the digestive system.
Prohibited waste	As defined on page 17 section E 1.3 i.
Recycling	The recovery of used products and their use as raw materials in the manufacture of new products, which may or may not be, similar to the original.

Residual waste	Refers to the waste remaining after applying the principles of reducing, re-using and recycling of wastes.
Reusable	Intended for reprocessing and subsequent reuse.
Sharps	Discarded objects or devices having acute rigid corners, edges, points or protuberances capable of cutting or penetrating the skin.
Spill kit	A collection of equipment and materials that can be used to clean-up spills or leaks of hazardous materials. The contents of a spill kit should be matched to the types of hazardous material spills that could occur (e.g. chemicals, radio-isotopes, biohazards). Spill kits can be assembled in-house from various components, or, commercial pre-packaged kits may be purchased.
Spill management	Refers to the mechanisms/procedures designed to minimise risk of spills and in the event of a spill, contain and clean-up.
Sterilization	A physical or chemical procedure to destroy all microbial life including highly resistant bacterial endospores.
Sump	A pit, pool or container designed to collect, capture or store water and other liquids.
Thermal inactivation	A process in which heat is applied to a waste load to kill microbial pathogens.
Waste	As described by section 3 of EMPCA.
Waste generator/producer	An individual, group or organisation at a facility which produces controlled waste.
Waste handlers	Personnel employed collecting, containing, transporting, storing, treating or disposing of waste.
Waste management	Management of the collection, recovery, and disposal of wastes, including options for waste reduction.
Waste minimisation	The adoption of practices or processes which reduce, to the maximum extent feasible, the quantity of waste generated and/or the quantity of waste subsequently requiring treatment, storage or disposal.
Waste segregation	Separation of the various waste components, ideally at the point of generation, into their relevant waste stream categories (clinical and related waste components, non-hazardous and recyclable components etc), for subsequent containment, transportation and disposal.
Waste stream	Flow or movement of wastes from point of generation (ward, clinic, hospital, household etc) to final disposal (landfill, incinerator, etc.). A waste stream may reduce significantly overtime as items are segregated for re-use and recycling, and recovered through resource recovery. Mixed waste streams must be managed according to the most hazardous waste component.

APPENDIX 1: DEVELOPING A WASTE MANAGMENT PLAN

1. Introduction

(a) Statement of Environmental Policy

A set of principles and goals which communicates a commitment to maintaining and improving environmental performance, and provides a framework for action and setting environmental targets and objectives, including a commitment to:

> pollution prevention

> managing environmental risk

> compliance with legal requirements

> minimising resources

> continual improvement

2. Definitions

3. Organisational Issues

(a) Number of beds in each department

(b) Occupied bed days

(c) Staff numbers

(d) Management Structure

(e) External Service Delivery (such as Home nursing)

4. Waste Management Overview and Management Strategies

(a) Overview of waste management:

> types, volumes and/or weight, composition of waste

> hazard assessment and categories of waste generated

> source of waste (including wastes generated from Home Health care programs)

(b) Waste audit protocols

(c) Waste minimisation activities

(d) Employer/Employee responsibilities

(e) Waste Management Committee

> membership

> terms of reference

> functions and responsibilities

> objectives (such as purchasing policy, environmental policy, communication, education and training)

5. Waste Segregation and Packaging

(a) Objectives and Targets

(b) Procedures and Future Actions

6. Waste Storage and Transport

(a) Objectives and Targets

(b) Procedures and Future Actions

7. Waste Treatment and Disposal

(a) Required Standards

(b) Procedures and Future Actions

8. OH&S Considerations and Training

(a) Personal Protective Equipment

(b) Procedures and Future Actions

9. Complaint Response, Contingency and Emergency Planning

(a) Staff contact details

(b) Waste Contractor details

(c) Complaint management protocol

(d) Incident response & spill management plans

10. Review, Monitoring and Reporting

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