NHS National Services Scotland

Standard Infection Control Precautions Literature Review:
Safe Disposal of Waste

Version: 4.0
Owner/Author: Infection Control Team
Review Date: Financial year 2023/24

ARHAI Scotland
Antimicrobial Resistance and Healthcare Associated Infection

DOCUMENT CONTROL SHEET

Key Information:		
Title:	Standard Infection Control Precautions (SICPs) Literature Review: Safe Disposal of Waste	
Date Published/Issued:	July 2020	
Date Effective From:	July 2020	
Version/Issue Number:	4.0	
Document Type:	Literature Review	
Document status:	Final	
Author:	**Name:**	Nadia Palma and Emma Young 2020, Laura Macdonald 2015
	Role:	Healthcare Scientist and Healthcare Scientist Practitioner (Health Protection)
	Division:	HPS
Owner:	Infection Control	
Approver:	Susie Dodd and Annette Rankin	
Approved by and Date:	July 2020	
Contact	**Name:**	Infection Control Team
	Tel:	0141 300 1175
	Email:	nss.hpsinfectioncontrol@nhs.net

Version History:
This literature review will be updated as new evidence emerges

Version	Date	Summary of changes	Changes marked
1.0	January 2012	Final for publication	
2.0	April 2014	Final for publication	
2.1	September 2015	Draft for consultation	
3.0	September 2015	Updated after review of current literature	
4.0	June 2020	Updated using two-person NIPCM methodology. The question set was reviewed. The following objective has been added: • What is the definition of a sharp in health and care settings?	

Approvals – this document requires the following approvals.

Version	Date Approved	Name	Job Title	Division
4.0	July 2020	Steering (Expert Advisory) Group for SICPs and TBPs)		
3.0	September 2015	Steering (Expert Advisory) Group for SICPs and TBPs)		
2.0	April 2014			
1.0	January 2012	Steering (Expert Advisory) Group for SICPs and TBPs		

HPS ICT Document Information Grid	
Purpose:	To inform the Standard Infection Control Precaution (SICPs) section on the Safe Disposal of Waste in the National Infection Prevention and Control Manual
Target audience:	All NHS staff involved in the prevention and control of infection in NHS Scotland.
Circulation list:	Infection Control Managers, Infection Prevention and Control Teams, Public Health Teams
Description:	This literature review examines the available professional literature on waste and its management in health and care settings.
Update/review schedule:	Updated in real time, with changes made to recommendations as required.
Cross reference:	National Infection Prevention and Control Manual (NIPCM) http://www.nipcm.scot.nhs.uk/ Standard Infection Control Precautions Literature Review: Occupational exposure management (including sharps) Appendix 9 – Best Practice Management of Blood and Body Fluid Spillages
Update level:	Practice – **No significant change to practice** Research – **No significant change to practice**

Contents

1. Objectives

The aim of this review is to examine the extant scientific literature on the safe disposal and management of waste for standard infection prevention and control purposes in health and care settings.

The specific objectives of the review are to determine:

- Are there any legislative/mandatory requirements for the handling and disposal of waste for infection prevention and control purposes?
- Are there standard definitions/categories of waste in health and care settings?
- How should different categories of waste be segregated?
- Should colour coding of waste be applied in health and care settings?
- Are there specific standards for different waste bags/receptacles in health and care settings?
- How should waste be handled in health and care settings?
- What is the definition of a sharp in health and care settings?
- How and where should sharps boxes be used in health and care settings?
- How should liquid waste (including blood and body fluids) be managed in health and care settings?
- How should different types of waste be labelled or tagged in health and care settings?
- How should waste be transported in health and care settings?
- How should waste be stored prior to disposal in health and care settings?
- How should waste spillages be managed to prevent and control infection?

2. Methodology

This systematic literature review was produced using a defined two-person methodology as described in the National Infection Prevention and Control Manual: Methodology.

3. Discussion

3.1 Implications for practice

Are there any legislative/mandatory requirements for the handling and disposal of waste for infection prevention and control purposes?

Waste generated or produced in health and care settings is regarded as a controlled waste and hence is subject to a raft of legislation/regulation at both national and international level. The prevention and control of infection runs throughout much of this legislation, however there is no single specific piece of legislation/regulation which explicitly governs the management/disposal of waste in health and care settings with the purpose of preventing or controlling infection. Specific standards or legislation relating to particular aspects of waste management/disposal are presented throughout the review in the appropriate section, however there is a core of general legislation/regulations which relate to waste in health and care settings including the:

- Health and Safety at Work etc. Act (1974)[1]
- Control of Substances Hazardous to Health (2002 as amended) regulations[2]
- Environmental Protection Act 1990 (including Duty of Care Regulations)[3, 4]
- The Controlled Waste (England and Wales) Regulations 2012[5]
- The Waste (Scotland) Regulations 2012[6]
- The Special Waste Regulations 1996 (as amended)[7]
- The Environmental Protection (Duty of Care) (Scotland) Regulations 2014[8] and
- The European Waste Catalogue List of Waste (EWC 2002)[9].

Waste management in NHSScotland health and care settings must also comply with:

- CEL 2 (2012): A Policy on Sustainable Development for NHSScotland 2012[10] and
- CEL 14 (2013): NHSScotland Waste Management Action Plan 2013-2016[11]. (Now covered by DL (2017) 03: NHSScotland Waste Management Action Plan 2016-2020).[12]

Health Facilities Scotland has interpreted and synthesised this legislation/regulation and has produced Scottish Health Technical Note 3 (SHTN 3),[13-16] a suite of waste management guidance which applies across NHSScotland. Elsewhere in the UK, refer to Health Technical Memorandum 07-01 (HTM07-01)[17] guidance.

Are there standard definitions/categories of waste in health and care settings?

NHSScotland produces a large variety of wastes which can be broadly classified into five 'core' waste streams, as outlined in SHTN 3.[13-16] They are:

- **Healthcare (including clinical) waste**: Waste produced as a direct result of healthcare activities. Healthcare waste can be divided into three sub-categories:
    - **Infectious healthcare (clinical) waste:** Waste that presents a known or potential risk of infection. Healthcare waste generated from healthcare premises, or produced by healthcare workers in the community is considered to be infectious unless categorised otherwise on the basis of a risk assessment.
    - **Medicinal healthcare (clinical) waste:** Expired, unused, spilt, and contaminated pharmaceutical products, drugs, vaccines, and sera that are no longer required and need to be disposed of appropriately. This category includes cytotoxic and cytostatic medicines.
    - **Offensive/hygiene waste:** Waste that may cause offence to persons coming into contact with it, but does not present a risk of infection. This was previously known as sanpro waste. Examples of offensive/hygiene waste include incontinence products and other waste produced from human hygiene, sanitary waste and nappies.[18]
- **Other (non-healthcare) special wastes**: Waste with hazardous characteristics produced from support (non-healthcare) activities, such as paints, batteries and waste electrical and electronic equipment (WEEE).
- **Source-segregated recyclates:** Glass, paper, card, plastics, cans and other metals suitable for recycling.
- **Food waste:** Unwanted food from patients, staff and visitors.
- **Residual waste:** The fraction of waste that remains once all special waste, recyclates and food have been removed at source. This is typically described as 'black bag' or 'domestic' waste.

How should different categories of waste be segregated?

A number of non-systematic reviews, low level-evidence studies and guidance from NICE were identified that emphasise the importance of segregating waste at source.[19-22] Several of these also highlight the importance of providing appropriate signage, as well as the importance of providing education and training to staff to support segregation of waste.

Glass, paper, card, plastics, cans and other metals suitable for recycling would commonly have been disposed of as domestic waste in the past, however there has been a legislative requirement for producers of domestic waste (other than occupiers of domestic properties) to segregate this waste (source-segregated recyclates) at source since 1st January 2014.[6, 15]

Unwanted food from patients, residents, staff and visitors to health and care premises would commonly have been disposed of as domestic waste or macerated and disposed of into the public sewer in the past, however as of 1st January 2016 there is a legislative requirement for

most producers of domestic waste (other than occupiers of domestic properties) to segregate this waste (food waste) at source (see SHTN 3 Part C for specific exceptions to this requirement).[6, 15]

The specific details of how waste should be segregated in NHSScotland are outlined in detail in SHTN 3 Parts A and C[13, 15] elsewhere in the UK, refer to Health Technical Memorandum 07-01 (HTM07-01)[17] guidance.

Should colour coding of waste be applied in health and care settings?

A limited volume of non-systematic reviews[22-24] and an RCN guideline[25] were identified regarding the application of colour coding to waste management. All three reviews consistently recommend that colour coding should be used in healthcare settings. Segregation of waste at the point of production into suitably colour-coded and labelled packaging is vital to good waste management as it supports correct handling, storage and disposal, thus minimising the risk of infection.[13, 15]

SHTN 3 outlines a colour coding segregation system, which although not mandatory for NHSScotland, represents accepted best practice and ensures, at a minimum, compliance with current legislations.[13-16] A similar colour-coding segregation system is outlined in the Health Technical Memorandum 07-01 (HTM07-01)[17] which applies to England and Wales. Elements of this colour coding system are advocated in the guidance for prevention and control of infection in care homes published by the Department of Health, however this guidance was developed for England and there are some differences.[26]

- **Orange lid/bag:** For Infectious (clinical) waste known or suspected to contain pathogens classified as Category B (UN3291). Orange stream waste should be treated to render it safe prior to final disposal. Orange lidded sharps boxes are used for containing sharps including used syringes and vials. Orange lidded leak-proof bins are used for solidified infectious liquids (including blood), tube and suction sets, unrecognisable tissue waste and dialysis waste. Orange bags are used for non-sharp potentially infectious items including low hazard laboratory wastes, dressings, swabs, disposables and other potentially infectious clinical wastes.[13-16, 26]
- **Light blue bag**: For microbiological cultures and pathogenic laboratory wastes that must be autoclaved on site before being disposed of via the orange stream.[13-16]
- **Yellow lid**: Yellow lidded leak-proof bins are used for items that require disposal by incineration. Some boards use this type of container for anatomical waste or medicinal wastes. This practice is acceptable as long as the container is clearly marked.[13-16]
  Violet/purple lid: Violet/purple lidded leak-proof bins are used for chemotherapy medicinal waste (cytotoxic and cytostatic medicines). Violet/purple lidded sharps boxes are used for sharps, including used syringes and vials, contaminated with chemotherapy wastes (cytotoxic and cytostatic medicines). This waste is usually incinerated.[13-16]
- **Blue lid:** Blue lidded leak-proof bins are used for pharmaceutical products (non-chemotherapy medicinal wastes). Blue lidded leak-proof sharps box for full or partially discharged syringes, vials or giving sets. This waste is usually incinerated.[13-16]

- **Red lid:** Red lidded leak-proof bins are used for a variety of waste streams that require specialist storage and treatment including recognisable anatomical waste, contaminated metal parts (joints etc.) and infectious chemical wastes. Waste streams should not be mixed, as waste must be appropriately treated, recovered or disposed of depending on stream.[13-16]
- **Red lid (white or red body):** Red lidded leak-proof bins with white or red bodies are used for amalgam or amalgam contaminated items.[13-16]
- **Red lid (red body):** Red lidded leak-proof bins with red bodies are used for chemical wastes.[13-16]
- **Clear bag:** Clear plastic bags inside a colour-coded recycling bin are used for source segregated mixed dry recyclates and source segregated single recyclate streams.[13-16]
- **Clear bag or black bag:** Clear plastic bags or black plastic bags inside a colour coded bin for residual waste are used for waste remaining after all source-segregated recyclates have been removed.[13-16, 26]
- **Yellow and black striped bag ('tiger stripe'):** For offensive/hygiene waste. Small quantities of offensive/hygiene waste can be disposed of in the municipal waste stream, usually in black bags. A dedicated offensive/hygiene waste service is typically required when offensive/hygiene waste is generated in quantities of 7kg or more in any collection interval i.e. the municipal waste stream should not contain more than 7kg of offensive/hygiene waste per uplift. Producers are advised to discuss their requirement for a dedicated offensive/hygiene waste uplift service with their waste management contractor before implementation.[17, 18, 26]

The colour coding system for source-segregated recyclates is outlined in SHTN 3 Part C.[15]

Are there specific standards for different waste bags/receptacles in health care settings?

Receptacles for waste should be fit-for-purpose, of a suitable size, and placed in convenient locations, preferably as close to the point of production as possible. A range of approved colour-coded primary packaging and colour-coded bins is available via a national contract from NSS Procurement team. These products meet the requirements of the NHSScotland best practice colour-coding system, and have been assessed and meet fire standard and infection control requirements.[16]

Evaluation of receptacle suitability should be made at Board level taking into consideration local circumstances.[16]

How should waste be handled in health care settings?

SHTN 3 states that healthcare waste should be segregated at the point of production, be placed in appropriate waste receptacles, sacks, bags or holders as close to the point of production as possible and:

- Filled to no more than ¾ full

- Should weigh no more than 4kg
- Should be securely sealed and clearly labelled. Plastic ties or ratchet-type closures are recommended for healthcare waste sacks
- Should be collected at an appropriate frequency to avoid accumulation of disposal bags[15, 16, 27]
- Infectious waste, excluding sharps, should be collected no less than once a week unless the waste is refrigerated.[15]

The guidance further advises on how to seal waste bags:

- Hold by the neck and twist until tight
- Fold the neck of the bag over to form a 'swan neck'
- Place a plastic tie or ratchet-type closure healthcare waste identification tag, or equivalent, around the folded neck and tighten until a sturdy seal has been made.[16]

This is supported in guidance published by the Department of Health on the prevention and control of infection in care homes.[26]

What is the definition of a sharp in health and care settings?

The Health and Safety (Sharp Instruments in Healthcare) Regulations 2013 ("the Sharps Regulations") define the terms "medical sharp" and "safer sharp". A medical sharp is defined as "an object or instrument necessary for the exercise of specific healthcare activities, which is able to cut, prick or cause injury".[28] Examples include needles, syringes with needles attached, broken glass ampoules, scalpel and other blades, stitch cutters and the patient end of an infusion set.[15, 17, 21, 23, 25, 27] A safer sharp is defined as "a medical sharp that is designed and constructed to incorporate a feature or mechanism which prevents or minimises the risk of accidental injury from cutting or pricking the skin".[28]

Refer to the National Infection Prevention and Control Manual Literature Review Occupational exposure management (including sharps) for more information on sharps.

How and where should sharps boxes be used in health and care settings?

Used sharps should be immediately disposed of at the point of use into a sharps disposal container conforming to current standards. [20, 23, 25, 27, 29-31] Current standards for sharps boxes are UN3291 and BS EN ISO 23907-1:2019[31]

Guidance produced by the National Institute for Health and Care Excellence[20] (NICE) and the epic3[30] evidence based guidelines for the prevention and control of healthcare associated infections make a number of recommendations in relation to the safe use and storage of sharps disposal containers, some of which are supported in SHTN 3 and other non-systematic reviews. The key recommendations are that sharps disposal containers:

- Should be colour-coded and fit for purpose[15]
- Should not be used for any purpose other than the safe disposal of sharps[15, 20]
- Should not be used for disposal of liquids[15, 20]

- Should be located in a safe upright position that avoids spillage when in use[20, 30]
- Should be located at a height that allows the safe disposal of sharps[20, 30]
- Should not be placed on the floor or at low levels[25, 29]
- Should never be placed on top of high surfaces[29]
- Should be located out of the reach of children[25, 30] and positioned safely away from public access areas[20, 21, 30]
- Should be temporarily closed when not in use[20, 30]
- Should not be filled above the fill line (usually ¾ full)[16, 20, 30]
- Should be disposed of when the fill line is reached[30]
- Should be disposed of every 3 months, even if not full[15, 17, 20]
- Should be signed and dated on assembly and disposal[25]
- Should not be placed into a bag for disposal[14]

SHTN 3 makes recommendations on the use and disposal of sharps boxes for sharps waste generated in the community. The guidance states that used sharps waste generated in the community through self-administration, such as the use of insulin by people with diabetes, is not considered infectious waste. Prescribers are required to provide the necessary equipment and instruction to ensure safe disposal: this may include a needle-clipping device and/or a sharps box. Black sharps boxes (typically less than 0.5 litre capacity) are available for domestic/personal use.[16]

How should liquid waste (including blood and body fluids) be managed in health and care settings?

No peer-reviewed evidence was identified on the management of liquid wastes in health and care settings.

Liquid waste including blood and body fluids are considered hazardous as they may contain infectious microorganisms[32, 33] therefore it should be managed by trained staff wearing appropriate PPE e.g. disposable gloves and apron.[13-17] However, additional PPE (e.g. eye and face protection) may be required on the basis of a risk assessment e.g. risk of splash or spray of liquid waste to staff's skin, eyes and mucous membranes.[32] After handling of waste, used PPE should be disposed of into the appropriate healthcare waste stream and hand hygiene should be performed.

SHTN 3 recommends that liquid waste or solidified liquid waste should be placed in a rigid leak-proof receptacle for disposal.[15] The guidance further notes that many infectious waste treatment facilities require infectious liquid wastes (such as blood and other body fluids) to be solidified prior to removal, and producers of waste should seek guidance from their waste contractor regarding this.[15]

SHTN 3 notes that the majority of sharps boxes are for disposal of sharps only, and must not be used for disposal of liquids.[15]

SHTN 3 also outlines the recommended procedures for disposing of liquid orange stream healthcare waste. In general, liquid wastes are normally placed into orange stream rigid containers and self-setting compounds or gel are added to stabilise the waste as liquid waste cannot be sent for disposal to a landfill site.[13, 15]

The guidance states that blood, albumin, plasma bags and transfusion waste, including contaminated liquids and tubing, should be packaged as follows:

For small or *ad hoc* arisings:

- the liquid substance should be placed into an appropriate orange stream rigid container using self-setting compounds or gel to solidify the waste; or
- the liquid substance should be placed in a bag, bottle container or similar primary package then into an appropriate orange stream rigid container, using self-setting compounds or gel to solidify the waste.

For large or recurring arisings:

- liquid waste substances should be placed in bags, suction units, bottle containers or other similar primary packages, then such multiple containers or suction units placed into a 35 litre size or a 60 litre size waste bin container, using self-setting compounds or gel to solidify the waste;
- the waste bin container should be closed when three quarters full and a self-adhesive “Blood or Contaminated Liquid Waste” label placed on the bin lid and over the existing bin label; or
- the liquid waste substance or the suction unit should be rendered safe by use of a self-setting compound or gel, then placed into the box supplying the suction unit. The box with multiple blood bags, bottle containers or suction units should be placed into a 35 litre size or a 60 litre size waste bin container;
- the waste bin container should be closed when three quarters full and a self-adhesive ‘Blood or Contaminated Liquid Waste’ label placed on the bin lid and over the existing bin label.[15]

SHTN 3 states that for removal from the site, containers and boxes should then be placed into a dedicated orange stream bulk container (typically a 240 litre size wheeled bin) provided by the waste contractor. The wheeled bin should be suitably marked as containing blood or contaminated liquids. Containers or boxes containing blood or contaminated liquids should not be mixed with other orange stream waste or any other wastes.[15]

How should different types of waste be labelled or tagged in health and care settings?

SHTN 3 states that segregation of waste at the point of production into suitably colour-coded and labelled packaging is vital to good waste management.[13-15] The recommendation that healthcare waste must be suitably labelled is supported in guidance on the prevention and control of infection in primary and community care published by NICE, and in guidance on the prevention and control of infection in care homes published by the Department of Health.[20, 26]

SHTN 3 recommends that waste container labels should clearly state the following in order to ensure that everyone in the waste management chain is aware of the contents and manages the waste appropriately:

- a description of the waste
- appropriate United Nations (UN) number(s) and hazard symbol, if the waste is classified as dangerous goods
- the appropriate treatment or disposal route
- the source of the waste
- the date of discard of the waste[13, 15]

How should waste be transported in health and care settings?

This review did not identify any peer-reviewed evidence that examines the transportation of waste within health and care settings from point of use to bulk/intermediate storage, therefore it is not possible to make an evidence based recommendation on this question.

SHTN 3 recommends that where secondary receptacles are used to transport primary waste receptacles, for example the use of large wheeled bins containing sacks, these must also be fit-for-purpose and colour-coded.[13]

SHTN 3 advises that arrangements should be made to transport waste routinely from ward level to a storage area pending collection by a waste contractor.[16] It is also highlighted within SHTN 3 that waste contractor's wheeled bins should not be brought into the clinical setting or through publically accessible areas.

SHTN 3 further advises that on roads to which the public do not have access, dedicated trucks, trolleys, tugs or wheeled containers are needed to transport waste receptacles to storage areas. To prevent contamination, they should not be used for any other purpose. They need to be designed and constructed so that they:

- are easy to clean and drain;
- contain any leakage from damaged receptacles or containers;
- are easy to load and unload;
- do not offer harbourage for insects or vermin, and
- do not allow particles of waste to become trapped on edges or crevices.[15, 16]

SHTN 3 recommends that containers for on-site transport need to be steam-cleaned or disinfected following leakages or spills, and at regular intervals: if containers are heavily used, cleaning is likely to be required at least weekly.[15]

SHTN 3 Part C provides further information on transport of waste outside of healthcare settings.[15]

How should waste be stored prior to disposal in health and care settings?

There is a lack of evidence in the scientific literature examining the central storage of waste prior to uplift for disposal. The review identified three studies in England that provide evidence relevant to the storage of waste in health and care settings.[34-36] The results of an environmental sampling study showed no contamination with MRSA, *C. difficile*, VRE and MSSA within the physical environment if waste was handled properly but as other organisms have been found at key points of contact, it has been suggested that waste should be stored outside clinical or care areas to avoid risk of cross transmission.[36] Blenkharn's studies showed that waste carts in UK hospitals did not always comply with regulations/legislations and that waste was being stored inappropriately at some sites presenting risk of spillages and cross infection, unauthorised access, fire and environmental contamination.[34, 35]

The review identified three studies; two non-systematic reviews[21, 23] and one expert opinion,[22] as well as a guideline[27] that address the central or bulk storage of healthcare waste. Along with the recommendations made within SHTN 3,[13, 15] there is some consensus on requirements for waste storage facilities. They should be:

- well-lit and ventilated[13, 15, 27]
- sited away from food preparation and general storage areas, and from routes used by the public[13, 15]
- fully enclosed and secure[13, 15, 21, 22]
- provided with separate storage for sharps receptacles and waste medicines, which may need a higher degree of security to prevent unauthorised access[13, 15]
- sited on a well-drained, impervious hard-standing[13, 15]
- readily accessible, but only to authorised people[13, 15, 21, 27]
- kept locked when not in use[13, 15, 21]
- secure from entry by animals and free from insect or rodent infestations[13, 15, 23, 27]
- provided with wash-down facilities[13, 15]
- provided with washing facilities for employees[13, 15]
- provided with appropriate fire protection or suppression[13, 15]
- clearly marked with warning signs[13, 15]
- provided with separate, clearly labelled areas for waste that requires, rather than is destined for, different treatment or disposal options[13, 15]
- provided with access to first-aid facilities[13, 15]

Department of Health guidance on the prevention and control of infections in care home settings also states that storage should be in a well-drained area, with impervious hard standing and wash-down facilities.[26]

How should waste spillages be managed to prevent and control infection?

No evidence on management of waste spillages was identified in the peer-reviewed scientific literature, and as such no evidence-based recommendation can be made.

Department of Health Guidance on the prevention and control of infections in care homes recommends that accidental spillages of waste in bulk storage areas should be cleaned up immediately.[26]

SHTN 3[15] recommends that employers need clear written procedures for dealing with spillages which:

- specify the reporting and investigation procedures;
- specify the use of a safe system of work for clearing up waste spillages;
- set out appropriate requirements for decontamination;
- specify the protective clothing to be worn

SHTN 3 also recommends that spill kits are available to help ensure correct action in the event of a waste spillage, and should be available at waste disposal sites and in all vehicles carrying healthcare waste. Employers should also provide appropriate equipment for collecting spilled waste and placing it in new receptacles. Sharps must not be picked up by hand. Spilled waste and any absorbent materials need to be placed in an infectious waste receptacle for disposal.[15]

3.2 Implications for research

There is limited scientific research on this topic, however this is not considered a research priority because the safe management of waste in health and care settings is subject to regulations, legislation and national guidance developed by waste management experts. Studies have shown that the standards of clinical waste management in UK hospitals are variable and poor practices have been identified leading to safety concerns as well as risk of acquired infection through unauthorized/inappropriate access to clinical waste. Further research to improve the safe management of waste would be beneficial to protect patients, staff, the public and the environment.

Management of waste in the community and home care settings continues to be relatively neglected in comparison to management of waste in hospital settings. In the context of the integration of health and social care, it may be beneficial if this was given more attention.

4. Recommendations

This review makes the following recommendations based on an assessment of the extant scientific literature on waste disposal and management in health and care settings:

Are there any legislative/mandatory requirements for the handling and disposal of waste for infection prevention and control purposes?

There is no direct legislation which governs the handling of waste in the health and care setting for the purposes of preventing and controlling infection. There is, however, a raft of legislation/regulation which stipulates that healthcare waste is a controlled waste and therefore must be managed accordingly.

This legislation has been synthesised and interpreted in Scottish Health Technical Note 3 (SHTN 3), a suite of waste management guidance, which applies across NHSScotland. Elsewhere in the UK, refer to Health Technical Memorandum 07-01 (HTM07-01) guidance.

Are there standard definitions/categories of waste in health and care settings?

The five core waste streams in health and care settings are outlined in SHTN3:

- **Healthcare (including clinical) waste**: Waste produced as a direct result of healthcare activities. Healthcare waste can be divided into three sub-categories:
    - **Infectious healthcare (clinical) waste:** Waste that presents a known or potential risk of infection. Healthcare waste generated from healthcare premises, or produced by healthcare workers in the community is considered to be infectious unless categorised otherwise on the basis of a risk assessment.
    - **Medicinal healthcare (clinical) waste:** Expired, unused, spilt, and contaminated pharmaceutical products, drugs, vaccines, and sera that are no longer required and need to be disposed of appropriately. This category includes cytotoxic and cytostatic medicines.
    - **Offensive/hygiene waste:** Waste that may cause offence to persons coming into contact with it, but does not present a risk of infection. This was previously known as sanpro waste. Examples of offensive/hygiene waste include incontinence products and other waste produced from human hygiene, sanitary waste and nappies.
- **Other (non-healthcare) special wastes**: Waste with hazardous characteristics produced from support (non-healthcare) activities, such as paints, batteries and waste electrical and electronic equipment (WEEE).
- **Source-segregated recyclates:** Glass, paper, card, plastics, cans and other metals suitable for recycling.
- **Food waste:** Unwanted food from patients, residents, staff and visitors.

- **Residual waste:** The fraction of waste that remains once all special waste, recyclates and food have been removed at source. This is typically described as 'black bag' or 'domestic' waste.

(Mandatory)

How should different categories of waste be segregated?

Healthcare waste should be segregated at source across all health and care settings in Scotland. Appropriate signage, and education and training of staff should be provided to support waste segregation.

(Mandatory)

There has been a legislative requirement to segregate glass, paper, card, plastics, cans and other metals suitable for recycling (source-segregated recyclates) at source since 1st January 2014.

(Mandatory)

From 1st January 2016, there is a legislative requirement to segregate food waste at source.

(Mandatory)

Should colour coding of waste be applied in health and care settings?

Colour coding of waste should be used in health and care settings. It is vital to good waste management as it supports correct handling, storage and disposal, thus minimising risk of infection.

SHTN3 outlines a colour coding segregation system, which although not mandatory for NHSScotland, represents accepted best practice and ensures, at a minimum, compliance with current regulations:

- **Orange lid/bag:** For Infectious (clinical) waste known or suspected to contain pathogens classified as Category B (UN3291). Orange stream waste may be treated to render it safe prior to final disposal. Orange lidded sharps boxes are used for containing sharps including used syringes and vials. Orange lidded leak-proof bins are used for solidified infectious liquids (including blood), tube and suction sets, unrecognisable tissue waste and dialysis waste. Orange bags are used for non-sharp potentially infectious items including low hazard laboratory wastes, dressings, swabs, disposables and other potentially infectious clinical wastes.
- **Light blue bag**: For microbiological cultures and pathogenic laboratory wastes that must be autoclaved on site before being disposed of via the orange stream.
- **Yellow lid**: Yellow lidded leak-proof bins are used for items that require disposal by incineration. Some boards use this type of container for anatomical waste or medicinal wastes. This practice is acceptable as long as the container is clearly marked.

- **Violet/purple lid:** Violet/purple lidded leak-proof bins are used for chemotherapy medicinal waste (cytotoxic and cytostatic medicines). Violet/purple lidded sharps boxes are used for sharps, including used syringes and vials, contaminated with chemotherapy wastes (cytotoxic and cytostatic medicines). This waste is usually incinerated.

- **Blue lid:** Blue lidded leak-proof bins are used for medicinal products (non-chemotherapy medicinal wastes). Blue lidded leak-proof sharps box for full or partially discharged syringes, vials or giving sets. This waste is usually incinerated.
- **Red lid:** Red lidded leak-proof bins are used for a variety of waste streams that require specialist storage and treatment including recognisable anatomical waste, contaminated metal parts (prosthetic joints etc.) and infectious chemical wastes. Waste streams should not be mixed, as waste must be appropriately treated, recovered or disposed of depending on stream.
- **Red lid (white or red body):** Red lidded leak-proof bins with white or red bodies are used for amalgam or amalgam contaminated items.
- **Red lid (red body):** Red lidded leak-proof bins with red bodies are used for chemical wastes.
- **Clear bag:** Clear plastic bags inside a colour-coded recycling bin are used for source segregated mixed dry recyclates e.g. paper and plastic, and source segregated single recyclate streams.
- **Clear bag or black bag:** Clear plastic bags or black plastic bags inside a colour coded bin for residual waste are used for waste remaining after all source-segregated recyclates have been removed.
- **Yellow and black striped bag ('tiger stripe'):** For offensive/hygiene waste. Small quantities of offensive/hygiene waste can be disposed of in the municipal waste stream, usually in black bags.

(Category C)

Are there specific standards for different waste bags/receptacles in health and care settings?

A range of approved colour-coded primary packaging and colour-coded bins is available via a national contract from NSS Procurement team. These products meet the requirements of the NHSScotland best practice colour-coding system, and have been assessed and meet fire standards and infection prevention and control requirements.

Evaluation of receptacle suitability should be made at Board level taking into consideration local circumstances.

(Category C)

How should waste be handled in health and care settings?

Healthcare waste bags should be filled to no more than ¾ full, should weigh no more than 4kg, and should be securely sealed. To seal waste bags:

- hold by the neck and twist until tight
- fold the neck of the bag over to form a 'swan neck'
- place a plastic tie or ratchet-type closure healthcare waste identification tag around the folded neck and tighten until a sturdy seal has been made.

(Category C)

When handling waste in health and care settings:

- never touch the waste receptacle itself while disposing of items; receptacles must be hands free/pedal operated and hard bodied
- never overfill waste receptacles and ensure that they remain upright at all times
- never retrieve items from waste receptacles
- never reopen sealed receptacles
- when handling sealed waste receptacles ensure that suitable personal protective equipment (PPE) is worn based on the level of perceived risk. Heavy duty gloves may be necessary if large quantities of waste/waste receptacles are being handled
- after handling waste, used PPE should be disposed of appropriately
- hand hygiene should be performed

(Category C)

What is the definition of a sharp in health and care settings?

A medical "sharp" is an object or instrument necessary for the exercise of specific healthcare activities which is able to cut, prick or cause injury e.g. needles, scalpel, blades.

A "safer sharp" is a medical sharp that is designed and constructed to incorporate a feature or mechanism which prevents or minimises the risk of accidental injury from cutting or pricking the skin.

(Mandatory)

How and where should sharps boxes be used in health and care settings?

Sharps boxes must conform to UN 3291/BS EN ISO 23907-1:2019 and be located as close as possible to the point of use.

(Mandatory)

The key recommendations are that sharps disposal containers:

- Should be colour-coded and fit for purpose
- Should not be used for any purpose other than the safe disposal of sharps
- Should not be used for disposal of liquids
- Should be located in a safe upright position that avoids spillage when in use
- Should be located at a height that allows the safe disposal of sharps
- Should not be placed on the floor or at low levels
- Should never be placed on top of high surfaces
- Should be located out of the reach of children and away from public access areas
- Should be temporarily closed when not in use
- Should not be filled above the fill line (usually ¾ full)
- Should be disposed of when the fill line is reached
- Should be disposed of every 3 months, even if not full
- Should be signed and dated on assembly and disposal
- Should not be placed into a bag for disposal

(Category B)

Prescribers are required to provide needle-clipping devices and/or sharps boxes as necessary for the disposal of sharps waste generated in the community through self-administration of medication. Black sharps boxes (typically less than 0.5 litre capacity) are available for domestic/personal use.

(Category C)

How should liquid waste (including blood and body fluids) be managed in health and care settings?

Appropriate PPE should be worn e.g. disposable gloves/apron. If splashing/spray is likely to occur other additional PPE should be worn (e.g. eye and face protection). After handling waste, used PPE should be disposed of into the appropriate healthcare waste stream and hand hygiene should be performed.

(Category C)

Liquid waste or solidified liquid waste should be placed in a rigid leak-proof receptacle for disposal. Many infectious waste treatment facilities require infectious liquid wastes (such as blood and other body fluids) to be solidified prior to removal, and producers of waste should seek guidance from their waste contractor regarding this.

(Category C)

The majority of sharps boxes are designed for the disposal of sharps only, and must not be used for disposal of liquids.

(Category C)

In general, liquid wastes are normally placed into orange stream rigid containers and self-setting compounds or gel are added to stabilise the waste.

Blood, albumin, plasma bags and transfusion waste, including contaminated liquids and tubing, should be packaged as follows:

For small or *ad hoc* arisings:

- the liquid substance should be placed into an appropriate orange stream rigid container using self-setting compounds or gel to solidify the waste; or
- the liquid substance should be placed in a bag, bottle container or similar primary package then into an appropriate orange stream rigid container, using self-setting compounds or gel to solidify the waste.

For large or recurring arisings:

- liquid waste substances should be placed in bags, suction units, bottle containers or other similar primary packages, then such multiple containers or suction units placed into a 35 litre size or a 60 litre size waste bin container, using self-setting compounds or gel to solidify the waste
- the waste bin container should be closed when 3/4 full and a self-adhesive “Blood or Contaminated Liquid Waste” label placed on the bin lid and over the existing bin label or
- the liquid waste substance or the suction unit should be rendered safe by use of a self-setting compound or gel, then placed into the box supplying the suction unit. The box with multiple blood bags, bottle containers or suction units should be placed into a 35 litre size or a 60 litre size waste bin container

- the waste bin container should be closed when three quarters full and a self-adhesive 'Blood or Contaminated Liquid Waste' label placed on the bin lid and over the existing bin label.

(Category C)

For removal from the site, containers and boxes should then be placed into a dedicated orange stream bulk container (typically a 240 litre size wheelie bin) provided by the waste contractor. The wheelie bin should be suitably marked as containing blood or contaminated liquids. Containers or boxes containing blood or contaminated liquids should not be mixed with other orange stream waste or any other wastes.

(Category C)

How should different types of waste be labelled or tagged in health and care settings?

Healthcare waste should be appropriately labelled in health and care settings.

(Category B)

Waste receptacle labels should clearly state the following:

- a description of the waste;
- appropriate United Nations (UN) number(s) and hazard symbol, if the waste is classified as dangerous goods;
- the appropriate treatment or disposal route;
- the source of the waste;
- the date of discard of the waste

(Category C)

How should waste be transported in health and care settings?

Where secondary receptacles are used to transport primary waste receptacles, for example the use of large wheeled bins containing sacks, these must also be fit-for-purpose and colour-coded.

(Category C)

SHTN3 advises that arrangements should be made to transport waste routinely from the care area to a storage area pending collection by a waste contractor.

(Category C)

SHTN3 further advises that on roads to which the public do not have access, dedicated trucks, trolleys, tugs or wheeled containers are needed to transport waste receptacles to storage areas. To prevent contamination, they should not be used for any other purpose. They need to be designed and constructed so that they:

- are easy to clean and drain;
- contain any leakage from damaged receptacles or containers;
- are easy to load and unload;
- do not offer harbourage for insects or vermin, and
- do not allow particles of waste to become trapped on edges or crevices.

SHTN3 recommends that containers for on-site transport need to be steam-cleaned or disinfected following leakages or spills, and at regular intervals: if containers are heavily used, cleaning is likely to be required at least weekly.

(Category C)

When transporting waste receptacles around the health and care setting:

- Suitable PPE should be worn based on the level of perceived risk.
- Receptacles should be handled with care and held away from the body.
- Bags should only be handled by the neck and must not be dragged or thrown.
- After handling waste PPE should be correctly disposed of and hand hygiene performed.

(Category C)

Trolleys, carts or any other containers used for transporting waste must be kept clean and have clear cleaning schedules – especially when spillages of blood and/or body fluids may contaminate them.

(Category C)

How should waste be stored prior to disposal in health and care settings?

All healthcare waste must be stored in an area which is secure against unauthorised access by persons or animals, which is protected from the elements, and in containers that comply with relevant regulations.

(Category B)

Waste should not be allowed to accumulate in corridors, wards, or other places accessible to unauthorised personnel or members of the public.

(Category C)

Receptacles for healthcare (including clinical) waste and other special wastes should be located away from areas of public access.

(Category C)

Storage areas should be secure, located away from public areas, and sufficient in size to allow packaged waste to be segregated.

(Category C)

Where wheeled bins are used they should remain secure and locked at all times except when being filled by staff.

(Category C)

Bulk storage areas in healthcare premises or at a licensed or permitted transfer, treatment or disposal facilities should be:

- well-lit and ventilated
- sited away from food preparation and general storage areas, and from routes used by the public
- fully enclosed and secure;
- provided with separate storage for sharps receptacles and waste medicines, which may need a higher degree of security to prevent unauthorised access;
- sited on a well-drained, impervious hard-standing;
- readily accessible, but only to authorised people;
- kept locked when not in use;
- secure from entry by animals and free from insect or rodent infestations;
- provided with wash-down facilities;
- provided with washing facilities for employees;
- provided with appropriate fire protection or suppression;
- clearly marked with warning signs;
- provided with separate, clearly labelled areas for waste that requires, rather than is destined for, different treatment or disposal options;
- provided with access to first-aid facilities.

(Category C)

How should waste spillages be managed to prevent and control infection?

Accidental spillages of waste should be cleaned up immediately.

(Category C)

Employers should have clear written procedures for dealing with spillages which:

- specify the reporting and investigation procedures;
- specify the use of a safe system of work for clearing up waste spillages;
- set out appropriate requirements for decontamination;
- specify the protective clothing to be worn.

(Category C)

Spill kits should be available to help ensure correct action in the event of a waste spillage, and should be provided at waste disposal sites and in all vehicles carrying healthcare waste. Employers should also provide appropriate equipment for collecting spilled waste and placing it in new receptacles.

(Category C)

In the event of a waste spillage, the responsible person (trained staff) should:

- Don appropriate PPE and safely gather the waste and place into an appropriate receptacle of the same waste stream.
- Manage spillages of blood/body fluids by following Infection Control Precautions as outlined in the National Infection Prevention and Control Manual, refer to Appendix 9 for the flowchart
- Manage any exposed sharps by following Standard Infection Control Precautions as outlined in the National Infection Prevention and Control Manual

(Category C)

References

1. Her Majesty's Stationery Office. Health and Safety at Work etc*. Act 1974*. Her Majesty's Stationery Office, 1974.
2. Health and Safety Executive. The Control of Substances Hazardous to Health Regulations 2002 (as Amended) Approved Code of Practice and Guidance. L5 (Sixth Edition) ed.: HSE Books London, 2013.
3. Her Majesty's Stationery Office. Environmental Protection Act*. 1990*. London: Her Majesty's Stationery Office, 1990.
4. Her Majesty's Stationery Office. The Environmental Protection (Duty of Care) Regulations *1991*. London: Her Majesty's Stationery Office, 1991.
5. Her Majesty's Stationery Office. The Controlled Waste (England and Wales) Regulations*. 2012*. London: Her Majesty's Stationery Office, 2012.
6. The Scottish Parliament. The Waste (Scotland) Regulations 2012. In: Parliament TS, (ed.). 2012.
7. Her Majesty's Stationery Office. The Special Waste Regulations 1996 (as amended). Her Majesty's Stationery Office, 1996.
8. The Environmental Protection (Duty of Care) (Scotland) Regulations 2014. 2014.
9. European Union. European waste catalogue list of waste. *2002*. Brussels, European Union 2002.
10. The Scottish Government. *CEL 2 (2012):* A Policy on Sustainable Development for NHSScotland *2012. 25-1-2012*. Edinburgh: The Scottish Government, 2012.
11. The Scottish Government. *CEL 14 (2013):* NHSScotland Waste Management Action Plan *2013-2016. 10-07-2013*. Edinburgh: The Scottish Government, 2013.
12. The Scottish Government. DL (2017) 03: NHSScotland Waste Management Action Plan 2016-2020. Edinburgh: The Scottish Government, 2017.
13. Health Facilities Scotland. Scottish Health Technical Note 3 NHSScotland Waste Management Guidance Part A: Summary of requirements - best practice overview. Health Facilities Scotland, 2015.
14. Health Facilities Scotland. Scottish Health Technical Note 3 NHSScotland Waste Management Guidance Part B: Waste management policy template. Health Facilities Scotland, 2015.
15. Health Facilities Scotland. Scottish Health Technical Note 3 NHSScotland Waste Management Guidance Part C Compendium of Regulatory Requirements.: Health Facilities Scotland, 2015.
16. Health Facilities Scotland. Scottish Health Technical Note 3 NHSScotland Waste Management Guidance *Part D: Guidance and example text for waste procedures*. Health Facilities Scotland, 2015.

17. Department of Health. Health Technical Memorandum 07-01: Safe management of healthcare waste (HTM 07-01*)*. 2013.

18. Scottish Environmenal Protection Agency and Care Inspectorate. SEPA Guidance: Management of hygiene waste produced as a result of personal care. Scottish Environmenatal Protection Agency (SEPA), 2013.

19. Muhlich M, Scherrer M and Daschner FD. Comparison of infectious waste management in European hospitals. Journal of Hospital Infection 2003; 55: 260-268. Comparative Study.

20. National Institute for Health and Clinical Excellence. *NICE Clinical Guideline 139:* Prevention and control of healthcare-associated infections in primary and community care, updated 2017. NICE, 2012.

21. Hall S. Part 34b: infection control: legal aspects & audit tools. Practice Nurse 2007; 33: 52-58.

22. Fisher MG. Perioperative practitioners. Does waste segregation and disposal within your theatre meet the required legal standard? Journal of perioperative practice 2013; 23: 127-128.

23. Griffith R and Tengnah C. Legal regulation of clinical waste in the community. British journal of community nursing 2006; 11: 33-37. Review.

24. Saunders S. Practical measures to ensure health and safety in theatres. Nursing Times 2004; 100: 32-35.

25. Sunley K, Gallagher R, Reidy P, et al. Essential practice for infection prevention and control*:* RCN guidance for nursing staff. Royal College of Nursing, 20 Cavendish Square, London, W1G 0RN: Royal College of Nursing, 2017.

26. Department of Health and Health Protection Agency. Department of Health and Health Protection Agency. Prevention and control of infection in care homes - an information resource: Department of Health. Department of Health, 2013.

27. Sehulster L and Chinn RYW. Guidelines for environmental infection control in health-care facilities: recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). MMWR: Morbidity & Mortality Weekly Report 2003; 52: 1-43.

28. The Health and Safety (Sharp Instruments in Healthcare) Regulations 2013 (SI 2013/645), http://www.legislation.gov.uk/uksi/2013/645/pdfs/uksi_20130645_en.pdf (2013, accessed February 26, 2020).

29. Aziz AM, Ashton H, Pagett A, et al. Sharps management in hospital: an audit of equipment, practice and awareness. British Journal of Nursing 2009; 18: 92-98.

30. Loveday HP, Wilson JA, Pratt RJ, et al. Epic3: National evidence-based guidelines for preventing healthcare-associated infections in nhs hospitals in england. Journal of Hospital Infection 2014; 86: S1-S70.

31. The British Standards Institution 2019. BS EN ISO 23907-1:2019 BSI Standards Limited 2019, 2019.

32. Health and Safety Executive. Blood borne viruses - methods of decontamination, https://www.hse.gov.uk/biosafety/blood-borne-viruses/methods-of-decontamination.htm (accessed February 14, 2020 2020).

33. Health and Safety Executive and Advisory Committee on Dangerous Pathogens. Advisory Committee on Dangerous Pathogens Protection against blood-borne infections in the workplace: HIV and Hepatitis. Health and Safety Executive, 2008.

34. Blenkharn JI. Standards of clinical waste management in UK hospitals. Journal of Hospital Infection 2006; 62: 300-303.

35. Blenkharn JI. Potential compromise of hospital hygiene by clinical waste carts. Journal of Hospital Infection 2006; 63: 423-427.

36. Tudor TL, Woolridge AC, Phillips CA, et al. Evaluating the link between the management of clinical waste in the National Health Service (NHS) and the risk of the spread of infections: A case study of three hospitals in England. International Journal of Hygiene and Environmental Health 2010; 213: 432-436.

Appendix 1: Grades of recommendation

Final recommendations are given a grade to highlight the strength of evidence underpinning them, the NIPCM grades of recommendations are as follows:

Grade	Descriptor	Levels of evidence
Mandatory	Recommendations' that are directives from government policy, regulations or legislation	N/A
Category A	Based on high to moderate quality evidence	SIGN level 1++, 1+, 2++, 2+, AGREE strongly recommend
Category B	Based on low to moderate quality of evidence which suggest net clinical benefits over harm	SIGN level 2+, 3, 4, AGREE recommend
Category C	Expert opinion, these may be formed by the NIPC groups when there is no robust professional or scientific literature available to inform guidance.	SIGN level 4, or opinion of NIPC group
No recommendation	Insufficient evidence to recommend one way or another	N/A