NHSScotland

Waste Prevention and Re-use Guide

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RESOURCE EFFICIENT SCOTLAND

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A programme from ZERO WASTE SCOTLAND

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Contents

Executive Summary

This Guide has been produced by Resource Efficient Scotland as a practical resource for NHSScotland Health Boards.

The Resource Efficient Scotland programme is funded by the Scottish Government and managed by Zero Waste Scotland. The programme is a single energy and resource efficiency advisory service for Scottish business, third sector and public sector organisations that aims to reduce overheads through improved energy, material resource and water efficiency and in doing so it will help cut carbon across public and private sector organisations. This holistic approach to low carbon transition ultimately aims to help more businesses to reduce their emissions, save money and increase their competitiveness.

What is waste prevention?

NHSScotland should be committed to managing waste at the highest position within the waste hierarchy; prioritising the prevention of waste and re-use of items before recycling, energy recovery and disposal.

Prevention of waste is the preferred option of the waste hierarchy, and includes all measures taken before a substance, material or product has become waste. By not generating waste in the first place, the need to handle, transport, treat and dispose of waste is eliminated.

Waste prevention represents a significant financial opportunity for NHSScotland. Inefficiently managing waste costs NHSScotland organisations money that could otherwise be spent on direct patient care. In 2012, NHSScotland organisations spent £11,114,186 on the management of waste, £7,611,680 on the disposal of clinical waste and £3,502,506 on the disposal of domestic waste and recyclable waste. By reducing the amount of waste produced, significant savings can be made through the avoidance of waste disposal costs.

All healthcare and support services staff have a role to play in this process and should be committed to waste prevention.

Who is this guide for?

This guide provides practical advice and guidance on implementing effective waste prevention systems within NHS facilities. It is aimed at hospital and healthcare staff including senior management, waste management officers, sustainability officers and any others interested in promoting resource efficiency in a healthcare environment.

Using this guide

Waste prevention actions should be prioritised according to their potential to prevent or divert tonnage and to reduce carbon dioxide equivalent emissions. The guide focuses on the waste prevention opportunities for a number of key waste streams.

The guide is set out as follows:

- **Section 1: Background**
  Defines waste prevention and outlines the waste prevention drivers including economic, environmental, social and legislative
- **Section 2: Strategic approach to waste prevention**
  Sets the priority actions through an understanding of the composition of the domestic waste stream
- **Section 3: Waste segregation**
  Outlines how NHS Boards can realistically aim to decrease clinical waste by at least 15% through improved segregation practices
- **Section 4: Food waste**
  Explains the sources and reasons for food waste within healthcare facilities. Outlines the key steps in a food waste audit. Opportunities to reduce food waste in wards and hospital restaurants
- **Section 5: Paper hand towels**
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  The importance of an internal monitoring system for furniture waste. Re-use and deployment opportunities for furniture waste
- **Section 9: Construction**
  Outlines the minimum reporting standards for construction waste. Good site waste prevention and re-use practices
- **Section 11: Waste Prevention Plan**
  Explains how to produce a Waste Prevention Plan to prioritise prevention and re-use actions

Look out for other examples and key information in the text, identified by:

- **Green box** highlighting relevant examples of good practice; and
- **Blue box** presenting audit guidelines.

1 Introduction

This Guide has been produced by Resource Efficient Scotland as a practical resource for NHSScotland Health Boards.

This Guide provides practical advice and guidance on implementing effective waste prevention systems within NHS facilities. It is aimed at hospital and healthcare staff including senior management, waste management officers, sustainability officers and any others interested in promoting resource efficiency in a healthcare environment.

1.1 What is waste prevention?

The revised Waste Framework Directive[1] defines waste prevention as: *"measures taken before a substance, material or product has become waste that reduce:*

- *The quantity of waste, including through re-use of products or the extension of lifespan of products;*
- *The adverse impacts of generated waste on the environment and human health; or*
- *The content of harmful substances in materials and products*".

The Waste Framework Directive states that re-use is any operation by which products or components that are not waste are used again for the same purpose for which they were conceived. There are two important points to note, re-use involves products or components that are not considered waste and the activity must involve re-use of products or components for their original purpose. Consequently, re-use activities fall under the category of waste prevention.

The revised Waste Framework Directive defines preparing for re-use as checking, cleaning or repairing products or components which have become waste so that they can be re-used for their original purpose without further reprocessing.

Although preparing for re-use activities do not fall under the category of waste prevention, the Scottish Government considers that recognition needs to be given to the degree of priority that such activities have in the waste hierarchy.

1.2 The waste hierarchy

As non-renewable resources become harder to source and the demand for materials that are needed to support the economy grows, NHSScotland needs to adopt a structured way of thinking about the management of resources. The waste hierarchy is internationally recognised as the best means to structure resource efficiency and waste prevention efforts.

The waste hierarchy, as shown in Figure 1.1, illustrates how priority should be given to the way we deal with waste. NHSScotland should be committed to managing waste at the highest position within the waste hierarchy; prioritising the reduction of waste and re-use of items before recycling, energy recovery and disposal.

Prevention of waste is the preferred option of the waste hierarchy, and includes all measures taken before a substance, material or product has become waste. By not

[1] EU Waste Framework Directive (2008/98/EC)

generating waste in the first place, the need to handle, transport, treat and dispose of waste is eliminated.

Preventing waste being generated at source through careful purchasing and better utilisation of materials is the best way to make dramatic savings to waste costs and reduce the impact on the environment. All healthcare staff have a role to play in this process and should be trained in waste prevention. The focus should be on working with healthcare staff to change practices to use fewer materials. Healthcare facilities can also take measures to reduce the production of waste through adapting their purchasing and stock control strategies.

Where waste cannot be prevented, the next favourable option in order of environmental benefit would be to look for opportunities to prepare for re-use. The degree of preparation for re-use can range from a quick check over and clean, to major repair or restoration. It can include:

- Items requiring little or no checking or cleaning, which are ready for distribution; and
- Items requiring refurbishment or restoration. This is the process of maintenance or repair of an item, either aesthetically or mechanically.

NHS Boards should consider whether any products or goods can be re-used, either internally or by another organisation.

Figure 1.1The Waste Hierarchy

1.3 Waste prevention drivers

There are a number of drivers for improving resource efficiency including economic, environmental, social and legislative.

1.3.1 Economic drivers

Inefficiently managing waste costs NHSScotland organisations money that could otherwise be spent on direct patient care. Undertaking actions or measures which minimise the amount of waste produced and make best use of resources makes business sense. Waste prevention represents a significant financial opportunity for NHSScotland.

The cost of dealing with domestic waste is rising significantly. Once waste is destined for landfill, organisations must pay an additional tax on top of waste management charges and this price is rising at a rate of £8 per tonne per year, as shown in Table 1.1. VAT is also charged on the costs of waste disposal including the landfill tax element. The Landfill Tax Escalator is intended to encourage organisations to reduce the amount of waste they send to landfill. The current legislation runs to 2014 and the rate will not fall below £80 per tonne until at least 2020.

Table 1.1 The Landfill Tax Escalator

Year	Landfill tax per tonne (£)
2010	48
2011	56
2012	64
2013	72
2014	80

In Scotland, clinical waste is heat treated then landfilled or incinerated when disposed of, at a much higher cost than that for landfilling the waste. Table 1.2 outlines the average waste disposal costs for NHSScotland organisations[2]. On average, it costs £298 more per tonne to dispose of waste as clinical waste rather than as domestic waste.

Table 1.2 Average waste disposal costs (2012/13)

Year	Average waste disposal cost (£)
Recyclable waste	75
Domestic waste	122
Clinical waste	420

In 2012, NHSScotland organisations spent £11,114,186 on the management of waste[3], £7,611,680 on the disposal of clinical waste and £3,502,506 on the disposal of domestic waste and recyclable waste. By reducing the amount of waste produced, significant savings can be made through the avoidance of waste disposal costs.

[2] HFS environmental Monitoring and Reporting Tool data, 2012/13.
[3] HFS environmental Monitoring and Reporting Tool data, 2012/13.

1.3.2 Environmental drivers

Avoiding sending waste to landfill (through both waste prevention and re-use) helps to reduce environmental impacts such as greenhouse gas emissions that contribute to climate change. Preventing waste being produced in the first instance has an additional environmental advantage in minimising not only the loss of natural resources within the products itself but also the energy and natural resources used in manufacturing of the product. In addition the collection and transportation of waste uses significant amounts of energy, produces pollution and can aggravate transportation issues such as congestion.

1.3.3 Social drivers

Waste prevention activities can also increase skills, jobs and social justice. A shift to more highly skilled, craft-based production methods and increased repair and maintenance work will provide more employment opportunities to offset the reduced demand for new products.

Staff will appreciate their organisation's efforts to reduce waste and become more environmentally conscious. Environmental action in the workplace can lead to improved attitudes toward work. Staff will feel like a valuable part of the effort as they are encouraged to contribute and participate in improved environmental behaviours.

There is also a potential for positive public relations. Improved resource efficiency can put NHSScotland organisations in a leadership role as a responsible corporate member of the local community in meeting waste management regulations.

1.3.4 Legislative drivers

Environmental legislation affects every organisation in Scotland particularly with regard to waste. There are a number of strategies, policies and pieces of legislation which have been introduced with the objective of moving waste up the hierarchy in particular to prevent waste arisings.

Safeguarding Scotland's Resources[4]

In order to meet the requirements of the 2008 Waste Framework Directive, all EU states are required to produce a Waste Prevention Plan by 2014.

The 'Safeguarding Scotland's Resources' Programme sets out plans for to reduce levels of waste generated in Scotland and create a circular economy. The document is essentially Scotland's waste prevention plan and sets an overall target for 7% reduction in all waste by 2017 and a longer term vision of a 15% reduction in all waste by 2025[5].

Zero Waste Plan[6]

The Scottish Government launched Scotland's Zero Waste Plan in June 2010. The Zero Waste Plan sets out the Scottish Government's vision for a zero waste society. Zero waste means reducing the unnecessary use of raw materials, re-using products where possible and recovering value from products when they reach the end of their lives through recycling, composting or energy recovery.

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[4] Scottish Government (2013). *Safeguarding Scotland's Resources: Blueprint for a more resource efficient and circular economy.*

[5] From a 2011 baseline of 13.24 million tonnes

[6] See www.scotland.gov.uk/Topics/Environment/waste-and-pollution/Waste-1/wastestrategy for more information [accessed 12/08/2013]

The Zero Waste Plan is comprehensive and includes a number measures to reduce waste and gain maximum value, including:

- Landfill bans for specific wastes;
- Separate collections of recyclables and food waste;
- Challenging targets for recycling of 70% of all waste types with a maximum of 5% permitted in landfill by 2025;
- Restrictions on the use of energy from waste facilities; and
- Target to recycle or prepare for re-use, 70% of construction and demolition waste by 2020.

It envisages the development of a Waste Prevention Programme for all waste types, "*ensuring that the prevention and re-use of waste is central to all Scotland's actions and policies*[7]*"*.

The Waste (Scotland) Regulations 2012[8]

The Waste (Scotland) Regulations 2012 deal with the practical implementation of provisions within the Zero Waste Plan. In particular:

- Businesses (including hospitals[9]) to present dry recyclable materials (glass, metals, plastics, paper and card) for collection from 1st January 2014;
- Materials collected separately for recycling to be banned from going to landfill or incineration from 1st January 2014;
- Waste producers involved in food manufacture, preparation, or retail are to separate food waste for recycling from 1st January 2014, unless they are a hospital or they produce less than 50kg of food waste per week, in which case they have until 1st January 2016 to comply;
- Food waste disposal to be banned from entering the public drain or sewer from 1st January 2016; and
- Biodegradable municipal waste to be banned from going to landfill, from 1st January 2021.

Waste Hierarchy Guidance[10]

This Waste Hierarchy Guidance forms part of a suite of documents produced to support the implementation of the Zero Waste Plan and the Waste (Scotland) Regulations 2012.

If an organisation produces, keeps or manages waste, it needs to take all reasonable steps to apply the waste hierarchy. Organisations must first prevent the waste arising and then take steps to prepare the waste for re-use and engage in 'high quality' recycling before other recycling and recovery activities are considered.

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[7] Scottish Government (2010). *Scotland's Zero Waste Plan*.

[8] See www.zerowastescotland.org.uk/content/waste-scotland-regulations for more information [accessed 12/08/2013]

[9] Hospitals, as defined in section 108 of the National Health (Scotland) Act 1978(b). For purposes of clarity and practicality, "hospital" means - a) any institution for the reception and treatment of persons suffering from illness, (b) any maternity home, and (c) any institution for the reception and treatment of persons during convalescence or persons requiring medical rehabilitation, and any institution for providing dental treatment maintained in connection with a dental school, and includes clinics, dispensaries, and out-patient departments maintained in connection with any such home or institution, and "hospital accommodation" shall be construed accordingly.

[10] See www.scotland.gov.uk/Publications/2013/04/7548 for more information [accessed 12/08/2013]

For each waste stream, organisations must ensure they are taking the necessary steps to apply the waste hierarchy.

1.3.5 NHSScotland

NHSScotland's Waste Management Action Plan (2013-2016)[11] states that all NHS Boards should review all waste-related procedures and create a single overarching policy covering prevention of waste at source and re-use and recovery of materials. This policy should apply to all sites where healthcare services are delivered. The policy should clearly identify Waste Management Officers (either Board based or location based) and their role.

In addition, the Plan states that all NHS Boards should have robust waste training in place including information about the Board's waste prevention policies. To support existing training packages, Resource Efficient Scotland have developed a series of slides and support notes which are available to NHS Boards from HFS.

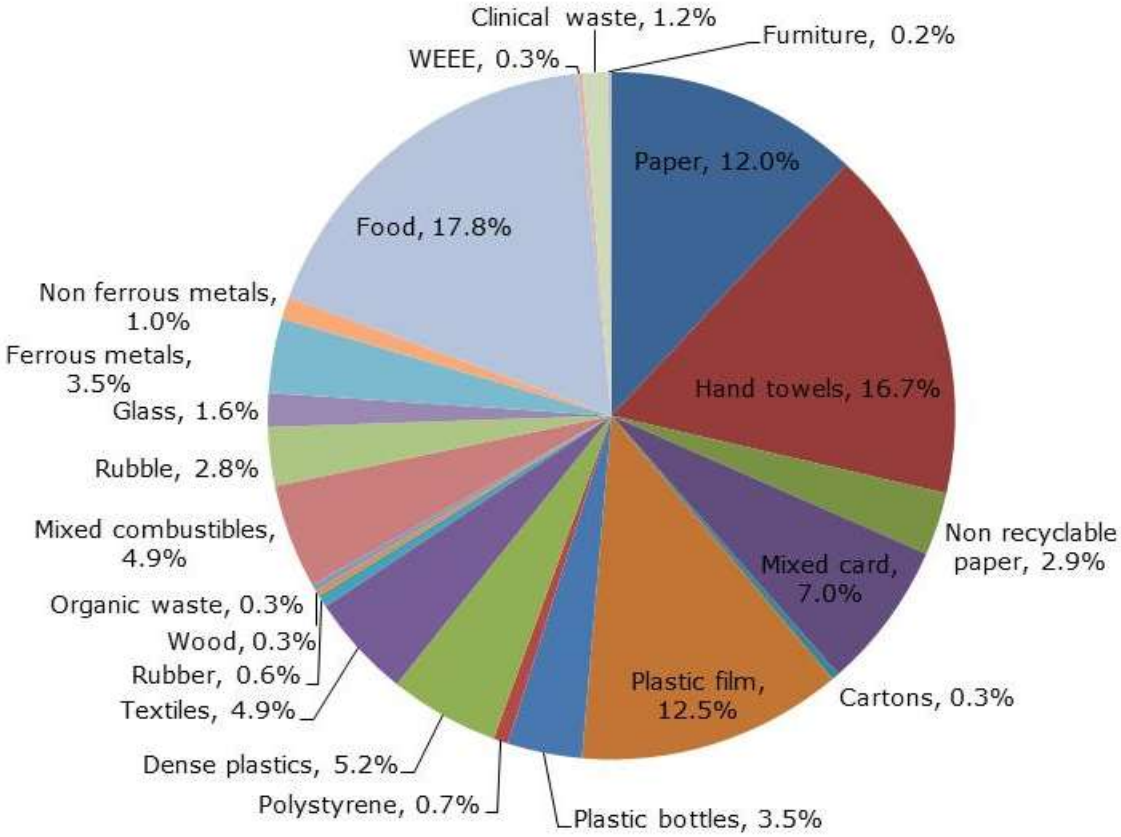
[11] Health Facilities Scotland (2013). *NHSScotland Waste Management Action Plan 2013 – 2016.*

2 Strategic approach to waste prevention

Waste prevention actions should be prioritised according to their potential to prevent or divert tonnage and to reduce carbon dioxide equivalent emissions. Therefore the composition of the domestic waste stream needs to be evaluated in order to identify key materials to target.

The annual waste data returns for 2012/13 submitted by NHS Boards identified that an estimated 25,100 tonnes of domestic waste was produced in Scotland[12]. Figure 2.1 below shows the estimated composition of the domestic waste stream broken down by material stream[13]. Please note the paper category will include white paper, coloured paper, mixed office paper, newspapers and magazines. The mixed card category will include corrugated cardboard and light cardboard packaging.

Figure 2.1 Composition of domestic waste stream by weight



[12] HFS environmental Monitoring and Reporting Tool data, 2012/13.
[13] Zero Waste Scotland (2012). *Indicative Composition of Residual Waste at Hospitals.*

The waste streams accounting for the highest proportion by weight are:

- Food waste (17.8%);
- Paper hand towels (16.7%);
- Plastic film (12.5%);
- Paper (12.0%);
- Mixed card (7.0%);
- Dense plastic (5.2%); and
- Textiles (4.9%).

Food waste (4,468 tonnes) is the single largest material stream present in the domestic waste, followed by paper hand towels (4,192 tonnes). Plastic film (3,138 tonnes) is the third largest material stream followed by paper (3,012 tonnes).

The composition of the clinical waste stream should also be considered in order to identify key materials to target through waste prevention. The Waste Minimisation Guidance Note issued by NHSScotland drew upon baseline data gathered through waste audits at several hospitals across Scotland. The results found that in the acute sector, the clinical waste stream included 30% misclassified domestic waste and 13% misclassified hygiene waste[14]. For community hospitals, the clinical waste stream included 29% misclassified domestic waste and 47% misclassified hygiene waste. Other studies have also shown that up to 30% of an average clinical waste bag is comprised of hygiene waste[15].

The waste prevention priorities undoubtedly need to be food waste, paper hand towels, paper, packaging (including mixed card and plastics) and textiles. Other elements which have the potential to be subject to waste prevention work include furniture and construction waste. NHSScotland should also focus on improving the segregation of domestic waste, recyclable waste and hygiene waste from the clinical waste stream.

[14] NHSScotland Property and Environment Forum (2004). *The Waste Minimisation Guidance Note.*
[15] Scottish and Northern Ireland Forum for Environmental Research (2007). *Best Practice Guidance for the Management of Hygiene Waste for Key Producers in Northern Ireland and Scotland.*

3 Waste segregation

Segregating waste at the point of production is critical to the safe management of health care waste. Segregation not only helps to control the costs associated with waste but also ensures that the correct pathways are adopted for the storage, transport and disposal of waste.

For more information on the waste management requirements placed on NHSScotland organisations refer to the Scottish Health Technical Note 3 (SHTN3) waste management guidance documents[16].

3.1 Healthcare (including clinical) waste

Healthcare waste is the term used to describe waste generated directly from healthcare activities. Healthcare waste is segregated at source by healthcare professionals into a number of waste streams based on the most appropriate treatment and disposal route. Healthcare waste includes:

- Clinical wastes such as potential infectious wastes, sharps and waste medicines;
- Hygiene wastes;
- Laboratory wastes; and
- Dental amalgam and other healthcare compounds and chemicals.

Items such as packaging and food waste generated at ward level should not be classified as healthcare waste as they are part of the domestic waste stream.

A large percentage of the healthcare waste stream is treated as special (hazardous) waste, although not all of it. Hygiene wastes are segregated at source and although require separate collection and disposal they do not pose a risk of infection and are not considered hazardous.

NHSScotland uses a colour coded segregation system to segregate healthcare waste into four streams based on the most appropriate management route:

- Orange stream - suitable for heat treatment;
- Yellow stream - requires disposal by incineration;
- Yellow / purple stream - requires disposal in specialist incineration facilities; and
- Red stream - subject to special treatment/recovery requirements.

For comprehensive guidance on the classification of healthcare waste in line with NHSScotland best practice refer to the SHTN3 waste management guidance document, Part C: Regulatory Compendium[17]. For guidance on the classification and assessment of clinical waste as special (hazardous) waste refer to Technical Note W2 Interpretation of the definition and classification of hazardous waste[18].

[16] Health Facilities Scotland (2013). Scottish Health Technical Note 3. NHSScotland Waste Management Guidance. Part A Summary of Requirements - Best Practice Overview. Part B Waste Management Policy Template. Part C Waste Management Procedures Template.
[17] Health Facilities Scotland (2013). Scottish Health Technical Note 3. NHSScotland Waste Management Guidance. Part C Waste Management Procedures Template.
[18] Environment Agency, Northern Ireland Environment Agency, Natural Resources Wales, Scottish Environmental Protection Agency (2013). Technical Guidance WM2. Hazardous Waste. Interpretation of the definition and classification of hazardous waste. 3rd Edition.

3.2 The importance of waste segregation

The correct disposal of health care waste starts within each department and ward, and requires proper understanding from the healthcare professionals. Any failure in the segregation of clinical waste from non-clinical waste will mean that the entire waste stream will need to be treated as clinical waste.

The correct management of clinical waste minimises the risk of the spread of infection and is an important part of infection control practices. Once segregated clinical waste requires expensive treatment and disposal and the cost to NHSScotland is significant. Clinical waste typically costs are typically 3½ times the cost of managing domestic waste suitable for recycling and recovery.

Estimates vary but published data suggests as much as 50% of the clinical waste stream has been misclassified and is suited for treatment/recovery as domestic waste[19]. This will include:

- Non-clinical materials which are clean and not contaminated with blood or bodily fluid e.g. cardboard, plastics, packaging and office paper; and
- Materials which are clean and uncontaminated e.g. clean sterile wrap[20].

Table 3.1 outlines the average waste disposal costs for NHSScotland organisations[21]. It costs £298 more per tonne to dispose of clinical waste rather than as domestic waste. Significant savings can be made through the avoidance of clinical waste disposal costs by improving segregation practices.

Table 3.1 Waste disposal costs by waste stream (2012/13)

Year	Average waste disposal cost (£)
Recyclable waste	75
Domestic waste	122
Clinical waste	420

In 2012/13, NHSScotland produced 17,996 tonnes of clinical waste costing approximately £7.56 million in disposal costs. Healthcare facilities can realistically aim to decrease clinical waste by at least 15% through improved segregation practices. NHSScotland organisations could make minimum savings of £800,000 by ensuring only clinical waste is disposed of via the clinical waste stream.

3.3 Reducing the quantity of clinical waste generated in a healthcare facility

Many healthcare facilities can reduce the quantity of clinical waste they generate by avoiding domestic waste being incorrectly placed in the clinical waste stream. NHS Boards should develop waste segregation programs to improve segregation practices.

[19] Royal College of Nursing (2007). RCN Guidance. *Safe Management of health care waste.*
[20] Excluding materials from isolation rooms that should always classified as clinical waste
[21] HFS environmental Monitoring and Reporting Tool data, 2012/13.

The opportunities for reducing the quantity of clinical waste will not come from the 'grey areas' where it is difficult to determine whether the item is potentially infectious. There are significant opportunities for clinical waste reduction through segregating recyclables including packaging, paper, cardboard and plastics.

The segregation methods should be clearly set out in the NHS Board's waste management policy.

Improving waste segregation within a Welsh Trust

In 2011, a review of waste segregation within a Welsh Trust identified opportunities to improve waste management. It was determined that only one third of hospital waste disposed of as clinical waste was truly clinical waste. An innovative scheme was introduced to reduce the amount of healthcare waste produced, prevent storage of clinical waste on ward bed areas, and reduce infection control risks.

Trolleys replaced clinical waste bins from wards, helping to prevent disposal of domestic waste as clinical waste. The trolleys are used when carrying out near-patient clinical procedures only, and then removed from the ward once the procedure was complete. The trial suggested that there was potential to divert 15 tonnes of non-clinical waste to the domestic waste stream resulting in significant cost savings from reduced disposal costs.

In addition, it was identified that there could be a potential saving of £85,000 per annum through the introduction of an offensive waste stream in key areas with high incontinency wastes. Staff training was delivered to the Trust through a number of short focussed workshops to raise employee awareness of the importance of using the correct bins for different types of waste.

3.3.1 Ensure staff understand what should be classed as clinical waste

Healthcare facilities need to ensure that staff are aware of what should be disposed of as clinical waste. Regular training is essential to keep staff up-to-date with any changes to the classification of clinical waste.

It is essential that new staff receive training on segregation policies as well as information on the cost difference between disposing of clinical waste, domestic waste and recyclable waste.

Removing clinical waste bins from ward areas

In December 2012, a Trust in the North of England trialled a 'bag to bed to bin' system in two hospital wards. All clinical waste bins were removed from the ward areas, leaving only black bag waste bins. Bag dispensers were placed on the ward, usually next to the Danicentres. These dispensers contain orange bags and hygiene waste bags. When a clinician visits the patient, they collect their gloves, aprons and the clinical waste bag. All clinical waste produced at the bedside is placed in the bag and then the bag is tied and taken directly to the dirty sluice area. This removes all clinical waste immediately from the ward area, reducing the chance of infections spreading. During the trial of the two areas, it was found that the orange bag waste was reduced by 50%, hygiene waste by 30%, and black bag increased by 100%. This system has now been implemented in most areas in the hospital.

3.3.2 Remove clinical waste bins from public access areas

Patients and visitors are not aware of the difference between clinical waste and domestic waste, particularly in terms of the significant cost difference. Consequently they may incorrectly dispose of waste in the clinical waste bin. Patients and visitors could also be exposed to potentially infectious waste items. Clinical waste bins should be removed from public areas including multi-bed wards and corridors.

In order to eliminate the potential for misuse, some healthcare facilities confine clinical waste bins to areas like dirty utility rooms, sluice rooms and treatment rooms.

Figure 3.1 – Clinical waste and domestic waste bins (NHS Grampian and NHS Lothian)

3.3.3 Optimise clinical waste bin placement

Each department should review the positioning of clinical waste bins and optimise clinical waste bin placement. The review should address the following questions:

- Is a clinical waste bin required.

If clinical waste is not generated in an area, the department should remove the clinical waste bin. 'Just in case' scenarios should not be considered.

- Is the clinical waste bin the right size.

Where a clinical waste bin is needed but only small quantities of clinical waste are generated then a smaller bin (e.g. 20 litres) may be a sufficient size. The department should determine clinical waste generation rates and provide bins of the right size to match those needs.

- Is the clinical waste bin in the right location.

The position of the clinical waste bin is important. A clinical waste bin should not be placed next to a sink as paper hand towels are usually disposed of into the nearest bin, whether it is the right bin or not. A domestic waste bin should be positioned near a sink. A clinical waste bin should not be positioned near the entrance to a room or within a clean utility room.

- Are the domestic waste bins emptied in a timely manner.

Ensure domestic waste bins are emptied in a timely manner. This will ensure overfilled domestic waste bins will not result in improper use of a clinical waste bin.

Carrying out a bin audit

Carry out regular departmental bin audits to assess whether the waste segregation practices are working. The audit should include the clinical waste stream, domestic waste stream, confidential paper waste stream and recyclable waste stream.

- Determine the activities undertaken in each room – what activities take place in the room and what types of waste are generated in the room. Understanding the type of waste that is generated, will help determine the types of bins that are required;
- Identify the number, type, size and location of waste bins in each room. Bin placement should depend upon where the waste is generated. Consider whether any bins can be removed or whether any additional bins are needed;
- Ensure that each waste bin is colour-coded and has a bin label on the lid. Each department should also have instructional signage on the waste disposal routes. Consider whether the signage is clear;
- Observe what materials are in each bin. This should be done visually, without putting hands inside the containers. Note if the wrong type of materials are in the waste bins. Take pictures of good and bad practice and utilise these pictures for training purposes;
- Question the staff about how they would dispose of different items to ensure the correct segregation practices are being followed e.g. paper hand towels, cardboard packaging, patient records, unused medical items and gloves not contaminated with potentially infectious body fluids.

3.3.4 Provide clear signage

Clear signage should be provided on all waste bins. All signage should be simple and use pictures rather than words. People recognise pictures quicker than words, helping staff to quickly recognise if the material is accepted.

All departments should place labels on bin lids and, where possible, posters above the bins. The posters should clearly outline which types of waste should be disposed of as clinical waste, domestic waste or recyclable waste. Bin labels, signage and bins should match by colour for each waste stream.

Figure 3.2 – Bin labels and signage (NHS Ayrshire and Arran and NHS Grampian)

Using re-useable sharps containers in NHS Lanarkshire

In the majority of healthcare facilities, disposable plastic containers are used for the disposal of sharps. The plastic sharps bins, which are sealed in the ward or clinical area, are disposed of with the contents.

NHS Lanarkshire has trialled the re-usable sharps system within the Diabetes Centre at Monklands Hospital. The re-usable sharps system comprises a pre-assembled, re-usable 7 litre sharps container available in five sizes. The containers are delivered to the centre by the clinical waste contractor. When full the containers are sealed by hospital staff, transported to the clinical waste storage area and collected by the clinical waste contractor.

The sharps containers are returned to the clinical waste disposal facility, where they are emptied, heat treated and returned for re-use in the healthcare facility. The decanted sharps waste is destroyed at the facility under the appropriate regulations. The re-usable sharps containers are inspected before they are returned to hospital in a ready-to-use condition. The sharps containers have been approved by the NHS Lanarkshire infection control team and the sterilisation process has been validated.

The re-useable sharps containers can be used up to 500 times each as opposed to the traditional route of being disposed of after a single use. By switching to re-usable sharps containers, NHS Boards can reduce costs and eliminate the waste associated with single-use containers while adhering to infection control standards. Re-usable sharps can also help to reduce the risk of needlestick injuries for employees[1].

When considering the introduction of re-useable sharps containers, it is recommended that NHS Boards consult with key stakeholders including Infection Control, Laboratory Staff, Pharmacy Staff, Nursing staff and Facilities Staff.

3.3.5 Ensure staff know what can be placed in each bin

A list of what can be placed in the recycling bins should be provided to all staff. Each NHS Board should check with their non-clinical waste contractor for a list of materials suitable for recycling.

Materials which are generally suitable for inclusion in recycling will include:

- Plastic and paper combined packaging;
- Polyethylene (PE) and polypropylene (PP) plastic film waste e.g. shrink wrap and stretch wrap;

- Plastic bags;
- High-density polyethylene (HDPE) plastic bottles;
- Polyethylene terephthalate (PET or PETE) plastic bottles;
- Corrugated cardboard boxes;
- Light card packaging;
- Paper e.g. white office paper and coloured paper;
- Metals e.g. aluminium beverage cans and containers and other metal containers;
- Clear and coloured glass not contaminated with pharmaceutical products;
- Plastic bottles used for saline solutions;
- Uncontaminated plastic containers e.g. graduated containers and trays; and
- Plastic IV giving bags and tubing that are not contaminated with blood, body fluids or medicinal products[22].

Materials which are generally suitable for inclusion in the domestic waste bin include:

- Gowns and gloves not contaminated with blood and body fluids;
- Paper hand towels not contaminated with blood and body fluids;
- Splints not contaminated with blood and body fluids;
- Uncontaminated blue couch roll;
- Sterilisation tray wrap; and
- Polystyrene packaging.

Improving the segregation of waste

In October 2009, a Trust in the South East of England decided to be more sustainable with its waste management systems. The Trust carried out a waste audit looking at the segregation of clinical waste and domestic waste.

It was found that one of the main reasons waste was not being segregated properly was down to confusion over the classification of clinical waste. A communications campaign was developed to help staff understand how to dispose of clinical waste correctly.

The audit highlighted that more domestic waste bins should be placed in operating theatres, where a large amount of the clinical waste was produced. In addition, steps were taken to correctly dispose of the high levels of packaging from deliveries coming into the hospital.

In the first 6 months of the new waste scheme being brought in, the hospital saw a reduction in clinical waste of between 10 and 15% compared to the previous whole year figures, resulting in annual savings of £30,000.

3.4 Reducing the quantity of clinical waste produced in operating theatres

A significant proportion of clinical waste generated in hospitals comes from the operating theatres. It is an important location to consider when reducing the quantity of clinical waste generated in a healthcare facility.

Operating theatres have not historically been a target for recycling schemes due in part to the notion of the operating theatre being a closed unit where an additional layer of sorting would be seen as something that could interrupt patient flow or surgical procedures.

[22] Check that your non-clinical waste contractor will accept uncontaminated plastic IV bags and tubing

Identifying unused materials in dialysis treatment

Dialysis is the most common treatment for end-stage kidney disease and single-use pre-packaged products have enabled an increase in its availability. However, this has led to high levels of packaging waste which is often disposed of as clinical waste.

The dialysis unit at the Queen Margaret Hospital in Dunfermline provides over 13,000 treatments per year. The unit moved towards providing filtration using machines. For every dialysis session, a one litre bag of normal saline was used to re-infuse the patient's blood at the end of the treatment. This bag would be opened and attached to a giving set at the start of the treatment (ready for use should the patient suffer a hypotensive episode during their dialysis treatment), despite the fact that the newer machines were able to prepare sterile fluid directly from the machine.

When it came to re-infusing the patients' blood at the end of the treatment, only 200mls of this fluid would typically be required. The remaining 800mls of normal saline, the plastic bag containing it, the plastic giving set and bicarbonate bag were then disposed of through the clinical waste stream.

The use of saline and giving sets was reduced by stopping the unnecessary practice of hanging a bag for emergencies in favour of using the online facilities for emergencies and re-infusion. This saved not only the carbon embodied in their manufacture, but also the emissions associated with their disposal.

A bag of normal saline was costing the dialysis unit £0.52, whilst a single giving set was costing £0.35. During the course of the 10,764 treatments provided per year, the use of online fluid resulted in annual savings of £ 9,364 in procurement costs.

3.4.1 Generation of unused materials

Operating theatres use a variety of different kits and custom packs compiled for specific surgery types. Often, not all of the items in a particular kit or pack will be used for a given surgical procedure, and for infection control reasons, any material that is not used cannot be removed for subsequent use and is disposed of.

This represents significant inefficiency in terms of waste generated and associated impacts but also ignores the cost to purchase additional equipment for the next procedure.

To prevent the generation of these unused materials, the operating theatre should consider the following:

- Consult with clinical staff who manage the waste to determine the common items that are unused after procedures;
- Review any unopened material left after a procedure. This should include any clean materials which may have been removed from its packaging but not actually used;
- Produce a list of materials that may be suitable for removal from each surgical kit; and
- Send information to applicable Commodity Advisory Panels (CAPs) managed by National Procurement to discuss the potential removal of unwanted materials and review costs accordingly.

By updating surgical kits to only include the necessary items while still meeting clinical preferences, NHS Boards can prevent unnecessary waste. The review of the materials should also be applied to minor procedure kits and kits used in wards and clinics.

3.4.2 Reduce use of disposable materials

Many of the products clinical staff use are disposable even when a suitable re-usable product is available. Convenience is an important factor for clinical staff, in terms of access to high-quality products and disposal of the remains. Raising awareness among clinical staff to understand the connection between the health of the environment and the health of the patient is critical.

Where possible, NHS Boards should try to replace disposable single-use instruments, gowns and aprons used in theatres with re-usable alternatives. Single-use materials are heavily packaged, reducing the usage of single-use instruments will also reduce the quantity of packaging to be managed.

The cost of sterilising instruments, availability of central sterilising units and infection control guidelines should be considered when reviewing the use of disposable instruments.

Minimising packaging waste from procedure packs

The Royal Liverpool and Broadgreen University Hospitals NHS Trust (RLBUH) is one of the largest and busiest hospitals in the North of England. It has more than 5,600 staff and sees more than 600,000 patients per annum.

The Trust operates over two sites in Liverpool and carries out more than 13,000 procedures in 19 theatres every year. The Trust wanted to reduce the amount of time medical teams took to prepare for each patient in order to improve turnaround times. One area highlighted was the number of items required per operation and the amount of time it took to unwrap them.

Before an operation takes place theatre staff have to get the required items out of stock and set them out for each procedure. Unwrapping each item is time consuming and requires good stock management to ensure items are readily available. This is important for patient safety and the smooth running of the theatre.

The Trust worked with a supplier of surgical devices to create a series of procedure packs which could be used across all theatres. This moved away from individually supplied and wrapped items to 21 specially designed pre-prepared packs containing the core items required for a given procedure. The Trust has almost halved the set up time per operation which has led to its theatres being used more efficiently. The procedure packs also improved consistency for items used during procedures, and has simplified stock management and the reordering process. This is again saving staff time. The packs have also helped to reduce packaging waste.

Taking simple action by increasing the use of theatre packs has resulted in the Trust saving £175,000 per year (based on staff time saving). It also reduced the volume of associated packaging waste by 90% (around 2.6 tonnes) helping the Trust to reduce its carbon footprint by five tonnes.

3.4.3 Reduce sterilisation wrap

Disposable wrap used for the sterilisation of instruments before surgery can comprise a large portion of waste within the operating theatres. This wrapping will include plastic and paper materials. This wrapping is bulky and often disposed of in the clinical waste stream rather than the domestic waste stream[23].

Staff should assess whether sterilisation wrap can be disposed of within the domestic waste stream rather than the clinical waste stream.

Figure 3.3 – Sterilisation wrap

3.4.4 Correct segregation of waste

A significant proportion of packaging waste from a single surgical procedure is generated before the patient even enters the operating theatre. This means that the material is not contaminated and does not have to be treated as clinical waste.

Prior to commencing the surgical procedure, when instruments and materials are being prepared, the clinical waste bins should be moved to a position where they are not readily accessible. If a clinical waste bin is not available, staff cannot incorrectly place domestic waste or recyclable material in the clinical waste bin. Recycling bins should be provided in all areas where recyclables are generated e.g. preparation rooms.

The quantity of packaging removed and segregated before the start of a procedure should be maximised to reduce the potential for packaging to be contaminated and treated as clinical waste.

[23] Some sterilisation wrap may be used to wrap used surgical instruments upon completion of the operation. On unpacking at the Central Decontamination Unit, the sterilisation wrap should be disposed of in the clinical waste stream

Reducing the quantity of clinical waste in renal units

The dialysis unit at the Queen Margaret Hospital in Dunfermline provides over 13,000 treatments per year. The hospital established a Green Nurse role to promote awareness and education on environmental issues in the workplace.

The Green Nurse found there was a lack of formalised waste management procedures pre and post dialysis treatments. 2.9kg of waste was generated per dialysis treatment, or 40.3 tonnes per year. At the start of 2010, all of this waste was disposed of in the clinical waste stream.

By 2011, the unit had reduced clinical waste from 100% to 31%, with 69% being directed into the domestic waste stream because it was not contaminated with blood or bodily fluids. This included plastic packaging bottles and bicarbonate bags.

Bicarbonate is added to the dialysate throughout the treatment and is provided in bags. The unit realised that these bags could be placed in the domestic waste stream after each treatment.

3.5 Segregation of hygiene waste

The term hygiene waste is used to describe waste that is non-infectious and does not require specialist treatment or disposal but may be offensive to those who are exposed to the waste. This waste stream is often referred to as offensive waste or sanpro. Examples of hygiene waste include:

- Incontinence products;
- Nappies;
- Sanitary waste; and
- Catheter and stoma bags.

The hygiene waste stream should not include any of the following:

- Sharps;
- Body parts, organs or blood products;
- Waste chemicals; and
- Medicinal waste that consists of pharmaceutically-active substances.

There is currently limited data on the volume of hygiene waste produced by NHS Boards. However evidence from Audit Scotland suggests that hygiene waste could account for approximately 30% of the clinical waste stream in acute hospitals and approximately 80% of the clinical waste stream in community hospitals[24].

The majority of healthcare facilities in Scotland do not routinely segregate hygiene waste from clinical waste. Therefore the introduction of this segregation practice will require investment in both staff time and training to ensure that the practice is introduced in a safe and controlled manner. In addition, robust risk assessment protocols are required where hygiene waste is segregated from clinical waste in a healthcare setting.

[24] Audit Scotland (2005). *Waste management in Scottish hospitals.*

Guidance from SEPA outlines that if risk assessment demonstrates no risk of infection during handling or disposal then hygiene waste can go untreated to deep landfill. However due to the offensive nature of the waste, adequate controls need to be in place[25].

Figure 3.4 – Hygiene waste bin (NHS Lothian)

3.5.1 Risk assessment

A risk assessment should be carried out by clinical staff to identify and segregate clinical waste and hygiene waste. The risk assessment should be developed with the assistance of the infection control staff.

The risk assessment should take into account the following:

- Is the patient being treated for a disease where the infectious agent or toxin could be present in hygiene waste?
- Has the patient received medication which may pose a hazard if excreted and contained within hygiene waste e.g. chemotherapy drugs or low level radioactive materials?
- Is the patient showing any symptoms which may render their hygiene waste as infectious and therefore clinical waste?

Many infectious diseases can be transmitted from contaminated hygiene waste. It is therefore important that staff are aware of possible infection risks posed and are able to identify and segregate potentially infectious hygiene waste at source and treat as clinical waste. Risk assessments should be undertaken on a daily basis or more frequently if the patients' status changes.

3.5.2 Potential financial savings

The identification and segregation of hygiene waste at source can result in financial savings. The cost of disposing of waste in 2012-13, averaged £420 per tonne for clinical waste compared to £330 for hygiene waste[26]. The cost of clinical waste disposal is approximately £90 greater than hygiene waste disposal. However, evidence from trials undertaken by NHS Grampian has shown that the cost differential can be much higher.

[25] www.sepa.org.uk/waste/waste_regulation/clinical_waste.aspx [accessed 18/08/2013]
[26] HFS environmental Monitoring and Reporting Tool data, 2012/13. Hygiene waste cost data provided by NHS Lothian

In 2012/13, NHSScotland produced 17,147 tonnes of orange stream clinical waste. The potential savings from the reclassification of hygiene waste based on 30% of clinical waste being segregated as hygiene waste is approximately £462,969. However financial savings will be much greater for community hospitals.

3.5.3 Segregation of hygiene waste

In order to segregate clinical waste and hygiene waste in a healthcare environment, it is recommended that separate colour coded bins are used. There is no regulatory requirement to use dedicated hygiene waste bins however the use of dedicated colour coded bins help staff to ensure that the waste is managed appropriately.

Space for the hygiene waste bins can often be a problem but with the potential financial savings associated with improved segregation, it is worth considering the advantages of changing practices and waste storage areas to accommodate the extra bins required, especially in community hospitals and certain wards in acute hospitals.

The waste should be handled using personal protective equipment, is segregated from other domestic waste into bags specifically for hygiene waste and labelled using a colour coded identification tag. The waste must be held in a secure place on site to await collection.

3.5.4 Staff training

Staff segregating waste must be provided with clear instructions on the segregation process and should be provided with appropriate training so they are familiar with the range of waste containers used and understand their role in ensuring that hygiene waste is segregated, packaged and disposed of appropriately. All relevant information about hygiene waste and individual patients should be communicated to all staff at the start of a shift. Hygiene waste segregation flowchart posters should be displayed throughout the ward.

Segregation of hygiene waste

NHS Lothian has introduced the segregation of hygiene waste at sites where the waste accounts for a high proportion of the clinical waste stream. This has included elderly units, disability units and mental health units.

NHS Lothian worked closely with Infection Control to develop clear guidance for the segregation of hygiene waste including risk assessments, waste handling instructions and control measures. Risk assessments are completed for every ward or department segregating hygiene waste.

Astley Ainslie Hospital in Edinburgh has managed to divert approximately 8 tonnes of hygiene waste from the clinical waste stream per month, equating to 95% of all clinical waste produced on site. This has resulted in annual savings in the region of £9,400.

3.5.5 Prevention of hygiene waste

NHS Boards should consider where product substitutions can be used to minimise the amount of hygiene waste generated. The use of re-usable nappies in place of disposable nappies can significantly reduce the amount of hygiene waste generated on maternity and children's wards.

4 Food waste

Controlling food waste is one of the most important challenges faced by hospital catering departments.

Each year, NHSScotland produces approximately 28 million meals for patients in around 200 hospitals[27]. A review of catering waste across the NHS Boards indicated that on average 8% of all patient meals are surplus to requirements i.e. these meals are never served to patients but discarded as waste[28]. A further survey on food waste production revealed between 25 - 30% of waste arises as leftovers from meals that are served to patients. The findings also showed that a high percentage of waste arises from discarded pre-packed foods and single portion items e.g. sandwiches, butter and jam. Subsequently, a significant proportion of the 28 million patient meals produced by NHSScotland each year could end up as waste[29]. These figures do not include food waste from meals served to NHSScotland staff, outpatients or visitors to hospital restaurants. NHSScotland organisations employ almost 115,000 staff and treat up to 30,000 inpatients a day.

NHSScotland pays for food waste through disposal costs but also through the cost of the wasted food, staff preparation time and staff handling time. In 2010/11, NHSScotland spent approximately £35,500,000 on food and drink[30]. While it is not practical to reduce food waste to zero, NHS Boards should focus on food waste prevention as there is a potential to generate substantial savings.

Figure 4.1 – Food waste in a hospital kitchen

4.1 Sources of food waste

Food waste within healthcare facilities may occur at any, or all, of the following stages:

- Food preparation residues e.g. vegetables peelings and meat trimmings;
- Over preparation of items in the kitchen e.g. prepared food portions that cannot be re-used or frozen;
- Spoiled and out of date food;
- Unserved meals at ward level. This will include food provided in bulk that is not served to patients and left in containers at the end of the service. It will also include plated food that was never touched or consumed in any part;
- Uneaten food left on patients plates after a meal is finished; and

[27] Glasgow Caledonian University (2006). *A Review of Catering Waste from NHSScotland.*
[28] Audit Scotland (2006). *Catering for patients, a follow-up report.*
[29] Glasgow Caledonian University (2004). *An Evaluation of Healthcare Waste from NHSScotland.*
[30] The Scottish Government (2012). *Estimates of Public Sector Procurement Expenditure on Food and Drink in Scotland.*

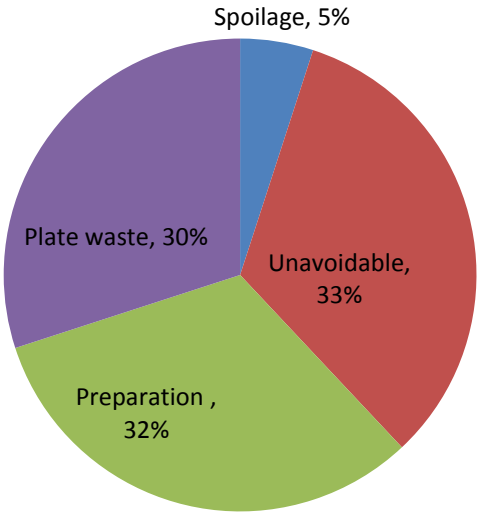
- Food left at end of service in hospital restaurants and cafes.

Research has found that 66% of food waste produced in the healthcare sector is avoidable i.e. food waste that was edible and could have been eaten if it had been better portioned, managed, stored or prepared[31].

Unavoidable food waste is food waste that is not, and has not been, edible under normal circumstances (e.g. meat bones, egg shells, pineapple skin, tea bags, potato skins from chip production).

Figure 4.2 outlines the avoidable and unavoidable food waste in the hospitality sector.

Figure 4.2 – Avoidable and unavoidable food waste in the hospitality sector



One of the main opportunities for waste prevention is the reduction of avoidable food waste. 32% of food is wasted during the preparation stage, 30% of food is wasted from unserved meals and uneaten food left on plates and 5% of food is classed as spoilage.

It is important to remember that plate waste in healthcare facilities is usually much higher than other Hospitality and Food Service subsectors. In healthcare facilities, plate waste can be two or three times higher than in restaurants, cafés and schools[32].

[31]WRAP (2010). T*he Composition of Waste Disposed of by the UK Hospitality Industry.*
[32]Edwards J and Hartwell H. (2003). Is there such a thing as 'reasonable' or acceptable levels of food wastage in hospital food services? Food Service Technology.

4.2 Reasons for food wastage

Food waste levels can be affected by a number of factors including service related reasons, food related reasons, and other reasons.

Service related reasons for patients' not eating food include:

- Meals missed due to non-urgent activities or treatments during mealtimes;
- Lack of awareness of the meal's arrival;
- Negative attitudes of those serving the food;
- Poorly presented meals;
- Too much or too little food on the plate;
- Incorrect items delivered;
- Physical problems including food placed out of each and need for feeding assistance; and
- Limited menu choice.

Food related reasons for patients' not eating food include:

- Cultural or personal food preferences;
- Absence or presence of seasoning;
- Dishes are unfamiliar or inadequately described on the menu;
- Food is not served at the correct temperature;
- Unpleasant, unfamiliar or inappropriate colours or textures;
- Poor quality or incorrect preparation; and
- Portion sizes too large.

Other reasons for patients' not eating food include:

- Meal time inappropriate;
- Ward environment;
- Insufficient time to eat; and
- Meal interruptions.

4.3 Food waste audit

In order to understand where savings can be made the first stage is to identify where the food waste is being generated. The best way to do this is to carry out a food waste audit. A food waste audit will help identify:

- The types of food waste produced;
- Where food wastes occurs;
- Why food waste occurs;
- The volumes of food waste and costs involved; and
- Priority areas for reducing food waste.

The steps for carrying out a food waste audit are based on available materials from the WRAP Online Resource Centre for small hospitality businesses[33] and the Unilever Wise up to Waste Toolkit[34].

[33] http://hafsva.wrap.org.uk/home [accessed 12/08/2013]

Food waste should be measured where it occurs, such as:

- Spoilage from kitchen e.g. waste from over purchasing and the stock room, fridge and freezers;
- Spoilage from ward e.g. waste from ward fridge;
- Waste from preparation e.g. any waste produced during the meal preparation;
- Patient plate waste e.g. any uneaten plate waste that comes back from the patients;
- Plate waste from restaurants and cafes; and
- Unserved meals.

4.3.1 Gather the required equipment

There are two main ways to measure food waste, the weighing method and the volume method. The weighing method involves collecting the food waste in containers and weighing the containers. If the catering department does not have access to accurate weighing scales, they should use the volume method. The volume method involves collecting the food waste in containers and then using the known volume of the containers to estimate the weight.

For the weighing method, the following equipment is required:

- Container to collect food waste in, approximately 5 litre to 10 litre;
- Kitchen scales that can weigh up to 10kg; and
- Recording sheets for each of the areas where food waste is typically generated.

For the volume method, the following equipment is required:

- Container to collect food waste in, approximately 5 litre to 10 litre;
- If the size of the container is unknown, fill it up with water using a large measuring jog and record how many litres the container can hold; and
- Recording sheets for each of the areas where food waste is typically generated.

4.3.2 Train staff

It is important that all relevant staff understand why the food waste audit is being carried out and what is required of them. The audit process is designed to be simple and quick and to minimise any impact on staff activities. Staff required to participate will include those involved in the catering department and ward based staff.

It is recommended that a briefing session is delivered to all relevant staff. This should take place two days before the audit. Staff should be informed that they should not change any of their daily working practices and not dispose of food waste before the survey team has weighed it. A briefing session will help reassure staff that the survey will only determine the quantity of waste generated in each area and that they are not being audited or checked.

4.3.3 Measure waste

The food delivery system should be considered when measuring food waste e.g. bulk or plated, and where the food waste is disposed of e.g. central location or in wards. For example, in many facilities using centrally plated systems, breakfast is provided in bulk containers to the ward, where it is plated. Other food such as cereal and bread may also be

[34] www.unileverfoodsolutions.co.uk/our-services/your-kitchen/waste_toolkit [accessed 12/08/2013]

provided by the ward kitchen. In such cases, the main work required will need to be undertaken in the ward kitchen. Therefore food will need to be measured in the main kitchen, ward kitchens and dining room.

Ideally the survey should be carried out for all wards or, if resources are limited, in a selected number of representative wards. The selected wards should be representative of normal activity. Compile a list of all of the areas that dispose of food waste and group the areas by floor or building to make it easier to identify the areas to visit.

On the audit days, waste monitors should supervise all staff to ensure that food waste is being separated, weighed and recorded correctly on the monitoring sheets. Measure the different wastes by weighing or counting the numbers of bins or buckets. Food waste can be heavy, so use a container that can be lifted easily.

For meals provided in bulk or supplied from the ward kitchen:

- Weigh each bulk container of food provided to the ward. Record this quantity of prepared meals;
- After all of the meals are plated, re-weigh each bulk container of food. Record this quantity as unserved meals; and
- For meal components supplied in bulk from the ward kitchen measure the weight of the container before the start of service and at the end of service, to determine the quantity of these foods provided.

For meals centrally plated and delivered to the wards:

- After the plated meals have been provided to the patients, record any unserved meals. Try to determine the reasons for these meals not being provided to a patient. Record the weight of these meals as unserved food;
- Ensure that all plates are collected from the patients and returned to the ward kitchen without being cleared. Check each plate and put aside any meals that are still sealed or have not been touched in any part. Record the quantity of these meals as unserved meals; and
- Collect and weigh the food on the remaining patient plates. Scrape the food into a container and then weigh the container. Record this quantity as uneaten food.

Other key areas to consider:

- Ensure all food waste bins are empty at the start of the survey. Request staff check all bins are empty before breakfast preparation commences;
- Always check that the food waste weight has been recorded in kilograms. Most digital scales will offer an option to record weights by ounces;
- Weigh or count the number of food waste bins in each area after each of the meals and record the value on the worksheet;
- Check the number of meals ordered for each ward and the number of patients actually eating at each meal. This will allow an assessment of the waste generated per patient in each area;
- Check with staff when the bin has been emptied during the day e.g. after each meal or once at the end of the day. This is to ensure no double counting of any food waste;

- While undertaking the food waste survey, ask staff not to place tissues and liquids (e.g. milk and tea) in the food waste bin and place in a separate container; and
- Record the number and type of accompaniments that are unopened after each meal. Where possible also record the number of accompaniments provided (if a set amount is provided on each tray).

Ensure all recyclable waste is put into a separate bin for recycling.

4.3.4 Decide how long to collect data

Ideally a food waste audit should be conducted for at least three days to get more accurate data of the food service operations. It is important that a food waste audit is carried out over a 'typical' period. This will give a more realistic snap shot of the food waste.

4.3.5 Calculating the food waste

For the container method, calculate the equivalent weight. Multiply the total volume of waste by 0.55 (a standard factor used to convert volume to weight). For example, if a 5 litre bin was used and it is filled 5 times, then the weight is estimated as (5 litres x 5 bin fills) x 0.55 = 13.75 kg

For the weighing method, remember to subtract the weight of the empty food waste bin to get the actual quantity of food waste generated.

If the food waste bin is only emptied once a day, make sure to subtract the weight recorded at the earlier meal, to get the actual waste generated at each meal. Likewise, if there was food waste in the bin at the start of the day, subtract this from the breakfast value.

4.3.6 Analyse the data

The information gathered during the food waste audit should be analysed. Some important things to consider when analysing data include:

- The number of patients in each ward can vary. So make sure to express the food waste quantity per patient for each meal in each area;
- Expressing the results in easy to read graphs may help convey the results to others; and
- Investigate any potential issues with the relevant ward or department. Is there a consistent level of waste generated per patient? What is the reason for a ward or area having a very high level of food waste generation compared to others?

Carrying out a food waste audit – summary steps

1. Gather the required equipment

You will need a container to collect food waste in (approximately 5 litre to 10 litre), kitchen scales that can weigh up to 10kg and recording sheets.

2. Train catering and ward based staff

Deliver a briefing session to all catering and ward based staff two days before the audit.

3. Measure the food waste

Compile a list of all of the areas that dispose of food waste and group the areas by floor or building. The survey should be carried out for all wards or, if resources are limited, in a selected number of representative wards.

All food waste should be separated, weighed and recorded correctly on the monitoring sheets. Ideally a food waste audit should be conducted for at least three days to get more accurate data of the food service operations. It is important that a food waste audit is carried out over a 'typical' period. This will give a more realistic snap shot of the food waste.

4. Analyse the data

The information gathered during the food waste audit should be analysed. Is there a consistent level of waste generated per patient? What is the reason for a ward or area having a very high level of food waste generation compared to others?

4.4 How to reduce food waste in wards

The following approaches could lead to cost-effective improvements to reduce food waste within healthcare facilities.

Figure 4.3 – Hospital meal tray

4.4.1 Training of food service delivery staff

All staff with responsibility for serving of food should be appropriately trained and able to demonstrate competence in the following:

- Food service including meal ordering;
- Food safety;
- Basic nutrition;
- Communication skills;
- Customer care;
- Team working; and
- Health and safety.

It is important that staff are able to offer advice on menu choices, suitability of products for vegetarians and special diets. All ward staff should review what patients normally eat, whether they require assistance to eat and whether they have any special dietary needs.

4.4.2 Monitoring the meal ordering system

It is important to check staff are using the meal ordering system correctly. Important aspects to investigate include:

- Are the numbers of portions and meals ordered by each ward translated into the quantity of food sent to each ward?
- Are the menus actually used to generate the number of meals required?
- Is there enough assistance for patients, particularly elderly patients to correctly complete the meal menus?
- Do ward staff check that meal menus are properly completed before being sent to the main kitchen?

4.4.3 Meal ordering times

Hospital should reduce the time between patients ordering their meal and the receipt of the meal. All catering services should aim to have patients ordering their meals as close to the meal time as possible and no more than two meals in advance.

Some healthcare facilities operate a system of confirming the number of meals required just a couple of hours before the meal is due to be served e.g. update the kitchen staff prior to an agreed cut-off time with any changes to meal orders. This helps cut down potential waste by matching patients to food requirements.

4.4.4 Portion sizes

A portion size indicates the weight of food from a particular recipe served within a meal. Section 4.3 outlines some of the factors that lead to patients leaving food on the plate.

A reduction in the portion size (with any necessary increase in the energy and nutrient-density of meals) can encourage an increased intake for patients with a decreased appetite. This can ensure patients are not over-whelmed by a large meal, are more likely to eat what is provided and therefore help to reduce plate wastage. Please note that any changes in portion sizes for patient meals should always be agreed with and monitored by dieticians[35].

All healthcare facilities should provide a choice of large, standard and small portions. It should be clear how the patients can select the required portion size on the meal ordering system. An explanation of the portion sizes should be included on the menu.

Where necessary, training should be provided to food service staff on which utensils should be used for serving different recipes, dishes and food items, for the particular portion sizes.

[35]NHS Quality Improvement Scotland Clinical Standards (2010). *Food, Fluid and Nutritional Care in Hospitals.*

Food waste prevention measures

Mayo General Hospital is a 265 inpatient bed acute hospital providing a wide range of inpatient and outpatient services. The hospital operates a cook chill system where food is prepared in the main catering kitchen, chilled and then provided in bulk containers to individual ward kitchens. The chilled food is heated to serving temperature in trolleys and then plated to patient's requirements.

The hospital has achieved low levels of food waste by introducing a number of good practice initiatives.

The hospital produces 0.38kg less segregated food waste per bed day than the average acute facility in Ireland. This equates to estimated savings of 33 tonnes of food waste or cost savings of £55,000 per annum compared to the average acute facility.

Ordering of food

The hospital provides clear menus with meal size highlighted in bold text to make it more obvious to patients. This ensures the patient gets the meal size they would like and that excess food is not provided.

Ward staff collect the menus from patients and compile the number of portions of each meal option that are required. A single staff member collects this information from all of the wards. This same member of staff communicates the orders to the chef and relevant staff in the main kitchen, and fills the ward trolleys with the required orders at each meal.

Provision of food

Hospital staff have undertaken considerable work to ensure that the correct meal size is provided to patients to meet their nutritional requirements, in line with national guidelines. Food provided in pieces (e.g. chicken and fish) is bought in pre-prepared or prepared onsite to the correct size. Catering staff pre-portion food made in bulk (e.g. lasagne and cottage pie).Where necessary, the hospital provides only the required number of portions to the wards in a smaller container.

Accompaniment options on menus

The hospital provides space in their menus for patients to outline what accompaniments they require.

4.4.5 Protected Mealtime Policy

Protected Mealtimes are an important part of creating a ward environment that encourages patients to eat and enjoy their meals. Protected Mealtimes are periods over a mealtime when all other non-urgent activities and treatments are stopped to allow patients to eat their meals without being interrupted by other activity and to give ward staff the time needed to help those who need assistance. Research shows that patients who are not interrupted and receive appropriate service and support during mealtimes are happier, more relaxed, eat more and therefore waste less food[36].

[36] PPI Forum (2006). *Food Watch.*

Clinical staff must ensure that delivery of essential clinical care is not compromised. Non-essential activity may include:

- Routine medication administration;
- Routine observations of the clinically stable patient;
- Routine investigations including diagnostics;
- Routine ward visits;
- Pharmacist visits to patients;
- Cleaning of the surrounding area;
- Bedmaking; and
- Ad hoc visiting.

Nursing staff must use clinical judgement when considering what constitutes essential or urgent activity, for example:

- Patients that require urgent medical assessment;
- Diagnostic tests such as CT scan or ultrasound;
- Preparing patients for planned procedures;
- Patients requiring pain control; and
- Urgent patient transfers and admissions.

Protected Mealtimes may only be possible in certain wards where patient movements are limited compared to short term stay wards such as maternity or assessment wards.

In order to effectively implement Protected Mealtimes, NHS Boards should:

- Conduct an observational audit of the meal delivery service at ward level;
- Discuss the results with relevant stakeholders including ward teams;
- Outline staff roles during Protected Mealtimes;
- Establish changes in practices required (e.g. times of ward rounds, times of routine drugs rounds, staff breaks and any other activities that routinely happen at meal times);
- Consider whether visiting times need to be changed;
- Obtain agreement from those involved and set a start date for a phased introduction;
- Provide information to patients, relatives, staff and other departments; and
- Review Protected Mealtimes with staff regularly.

The Protected Mealtime should last one hour. This includes 15 minutes to prepare patients and the ward for the meal service and 45 minutes for the meal, post meal clearance and rest time.

4.4.6 Accompaniments

Accompaniments can be perishable (e.g. butter) or non-perishable (e.g. sugar, salt, pepper, jam and ketchup). In many healthcare facilities multiples of each accompaniment will be automatically placed on trays.

For infection control reasons, any unused accompaniments cannot be re-used and are automatically disposed of at the end of the meal service. Though each individual accompaniment may be inexpensive, when the number of accompaniments disposed of over

an entire year is determined, the disposal of unused accompaniments can be considerable and expensive. To reduce the number of unused accompaniments disposed of:

- Issue accompaniments on request from the food trolley;
- Use individual containers for non-perishable accompaniments. These containers can be left on trays and re-stocked as required; and
- Reduce the number of accompaniments issued with each tray.

4.4.7 Improve the quality and presentation of food

Meals may be the highest quality but the value is lost unless the patient actually consumes them. Presentation and delivery can have a big impact on food waste. It is important that an appropriate number of staff are available to serve meals promptly and without delay.

Healthcare facilities should consider implementing a red-tray system. A red tray provides a clear signal that the patient requires extra help at mealtimes because of difficulties with eating or simply because they are not eating enough. The system depends on nursing and catering staff understanding and communicating with each other about what is needed when operating the red-tray system.

Reducing food waste on maternity wards

Maternity patients often miss the set meal times and may go without food for long periods.

Within one hospital in the North of England, the catering contractor introduced a system to enable patients on ante-natal and post-natal wards to order 24 hours a day, seven days per week. The patient is able to order food from a menu choosing from salads, hot meals and beverages. All the hot meal choices are supplied through a cook freeze catering system and all cold meal choices are prepared in the kitchen and then transferred to the ward in insulated trolleys.

On admission, the ordering system is explained to each patient. They are encouraged to order when they are ready to eat. Meals can be served within 15 minutes of ordering.

Once the order is placed, the meal is taken from the freezer and microwaved using a barcode system. The dish is then placed on the tray ready for delivery to the patient. If the order is sandwiches they are taken out of the packaging and salads are taken from selection which have been prepared in advance and left in the ward kitchen fridge.

Prior to the launch, ward staff and midwives were reluctant to provide meals for patients when catering staff were off duty, as they were not trained in food service. The new system has minimised food waste. Wastage on the old maternity unit was 26%. Now it has been virtually eliminated as the new system enables the patient to order what they want and when they want to eat it.

4.4.8 Communication between staff

Food waste caused by unserved meals is usually the result of poor communication between ward based teams and catering teams. Responsibilities for the ordering and serving of patient meals do vary in different NHS Boards but all staff providing food and nutritional care to patients have a responsibility to manage and reduce food waste effectively.

A lack of ownership by ward based teams during mealtimes may result in delays in serving food, incorrect meals or incorrect portion sizes. This may discourage patients to eat and therefore lead to an increase in food waste. Clear ownership will result in an improved food service, and the key responsibilities should be outlined for all staff including nurses, ward housekeepers, ward based staff, support workers, doctors, catering staff and portering staff.

To help reduce food wastage, nursing staff and ward based staff should:

- Provide the catering department with timely information affecting meal orders e.g. patient movements, admissions, discharges and changes in condition that may affect diet or ability to eat;
- Limit patient meal orders to only those patients who are on the ward and able to eat;
- Encourage and assist patients to choose their own meal and portion size;
- Observe the principles of Protected Mealtimes;
- Cancel or divert meals for patients no longer in the ward;
- Do not give menu cards to patients if discharge is expected;
- Avoid ordering extra portions of food 'to be safe'; and
- Investigate food wastage by recording food waste.

To help reduce food wastage, catering staff should:

- Confirm the number of meals ordered with each ward immediately prior to meal service; and
- Provide high quality food;
- Present food attractively;
- Adhere to agreed portion sizes.

Staff with responsibility for the distribution of food should:

- Deliver meals in accordance with a mealtime schedule that takes account of patients' needs and ward routines;
- Ensure that an appropriate number of staff are available to serve meals promptly and without delay;
- Place meals within the patient's reach and provide assistance with eating food; and
- Distribute food as quickly as possible.

4.5 How to reduce food waste from bulk food systems

4.5.1 Pre-portioning

Healthcare facilities operating bulk food systems should target any unserved food remaining in the bulk containers after serving.

Bulk food systems should use pre-portion meal components. This will assist serving staff and ensure that the required food is provided and the correct portion size is given. For food with high sauce content the number of portions per container size should be determined e.g. a full large container delivers 12 portions. The number of portions provided in the container should be communicated to serving staff so they do not provide extra large portions and run out of food. For solid food the contents of the tray should be pre-portioned in the main kitchen.

For less popular food, a small number of portions may be ordered by a ward. Within healthcare facilities, food is usually prepared in large trays and often a whole tray is provided to each ward. The catering department should consider providing the required number of portions in smaller containers.

4.5.2 Correct portions in bulk containers

A high level of wastage is often observed for food provided in bulk containers such as porridge and soup. These foods are often provided in bulk even if a plated food system is used within the hospital. The foods are often seen as being low cost so higher wastage is seen as more acceptable. Yet large savings can be achieved through better portioning when the annual spend on the food is considered.

Generally bulk containers are filled to the same level even though the number of portions required by the wards can vary significantly. Staff should provide the correct number of portions by either noting the volume of the bulk container that a set number of portions should occupy or note the weight that a set number of portions would represent.

Reducing waste through compostable products

On an average day, the Royal Bournemouth Hospital's catering department serves just over 2,000 meals. In 2008, the Royal Bournemouth Hospital catering unit switched from conventional packaging to a range of compostable products including hot cups and lids, cold cups for drinks and desserts, napkins, cutlery, takeaway boxes and sandwich bags. After use, the packaging is disposed of together with food waste, and organically recycled into compost within six weeks. Compostable products are designed for commercial food waste recycling.

The catering unit set up recycling points in the dining room and carried out an educational week to highlight the benefits of the compostable products. They have found that the compostable packaging was cost neutral compared to non-eco suppliers. Food waste and compostable disposables are collected twice weekly and taken to the local waste treatment facility for composting.

Since introducing the compostable products, the catering unit has reduced the waste going to landfill by 50%. The hospital carried out an audit in 2011 and found that the switch to compostable eco packaging had saved 4.7 tonnes of carbon, 5.3 tonnes of virgin material and 11.3 tonnes for used packaging diverted from landfill.

4.6 How to reduce waste in hospital restaurants

4.6.1 Counter food

Counter food can be a significant source of waste. The hospital restaurant should set out less food at the start of the food service and replenish the cold counter more often throughout the meal service.

4.6.2 Preparing food close to the end of service

The catering department should not prepare food too close to the end of meal service. Staff and visitors should be encouraged to purchase what is already prepared and available.

Hospitality and Food Service Agreement

Zero Waste Scotland launched a Voluntary Agreement with the hospitality and food service sector in 2012. This agreement includes targets across the hospitality and food service sector as a whole.

Hospitality businesses do not have to sign up to the agreement (it is voluntary), but those that do will be asked to: w

1. A waste prevention target: Reduce food and associated packaging waste arisings by 5% by the end of 2015; and
2. A waste management target: increase the overall rate of food and packaging waste being recycled, sent to anaerobic digestion or composted to at least 70% by the end of 2015.

The Agreement is flexible to allow any size of organisation to sign up, from multi-national companies to smaller businesses, from sector wholesalers and distributors to trade bodies.

See www.zerowastescotland.org.uk for more information.

4.7 Sustainable Procurement

Sustainable procurement provides a framework for using economic power in ways that benefit society, the economy and the environment. It is about looking beyond short-term costs to make more decisions based on whole-life costs including social and environmental implications. It offers the opportunity to encourage manufacturers, suppliers and contractors to develop environmentally and socially preferable goods and services at competitive prices.

Zero Waste Scotland has developed a Facilities Management Procurement Toolkit to provide information, guidance and templates to assist organisations with improvements to the resource efficiency of the Facilities Management Services[37].

Table 4.1 outlines possible model approaches for sustainable procurement of catering services that could be used by NHSScotland organisations.

Table 4.1 Approaches for sustainable procurement

Waste reduction plan	Regular collaboration with client / users to provide input into menu design Monitor and respond to seasonal variations in demand for certain foods Provide alternative portion sizes Design menus to allow for left over materials to be incorporated into next day's offerings
Segregation of food and packaging waste	Clear labelling of waste receptacles within kitchens and stores Clear instructions to staff on waste management Careful segregation and storage of waste fractions prior to and during collection Collaboration with suppliers to provide re-usable packaging, take-back of packaging materials and optimisation of packaging without impacting food quality and safety
Sign up to the Hospitality and Food Service Agreement	Reduction in food and associated packaging waste arisings by 5% by the end of 2015

Table 4.2 outlines example high level Key Performance Indicators that could be applied within catering services.

Table 4.2 Service standards for resource efficient procurement

Food wastage	% (by weight) of food purchased that is waste Total waste from catering kg/meal served or kg/patient
Food waste recycled	% of total food waste composted or anaerobically digested (by weight) % of packaging waste recycled (by weight) % of % total recycled waste
Food waste to landfill	% of food waste sent to landfill (by weight)
Packaging waste	Tonnes of packaging waste
Packaging waste to landfill	Tonnes of packaging waste to landfill

[37] See www.wrap.org.uk/content/fm-client-procurement-toolkit-0 for more information

5 Paper hand towels

NHSScotland organisations produce approximately 4,192 tonnes of disposable paper hand towels[38], costing £511,424 in disposal costs.

5.1 Hand hygiene

Effective hand hygiene plays a major part in reducing infection in healthcare facilities. Within clinical areas hands must be cleaned:

- Immediately before every episode of direct patient contact or care, including aseptic procedures;
- Immediately after every episode of direct patient contact or care;
- Immediately after any exposure to body fluids;
- Immediately after any other activity or contact with a patient's surroundings that could potentially result in hands becoming contaminated;
- Immediately after removal of gloves;
- Immediately before preparing, handling and eating food; and
- Immediately after emptying bins.

Anecdotal evidence from clinical staff suggests that they wash their hands up to 40 times during any one shift.

Wet surfaces transfer microorganisms more readily than dry ones, it is therefore extremely important that healthcare staff dry their hands after hand washing. Furthermore, failure to adequately dry hands can, over time, lead to skin irritation/damage. Current guidance from Health Protection Scotland recommends that, within a clinical setting, hands should be dried with disposable paper towels.

5.2 Air dryer

A number of studies have suggested that air dryers are unsuitable for hand drying in clinical settings as:

- They may act to disperse microorganisms via the airborne route;
- They are less effective than paper towels;
- They have the potential to increase bacterial counts on the hands; and
- They are potentially too noisy.

Health Protection Scotland state that due to the degree of risk relating to air dryers in the clinical setting, they are not recommended for use within clinical departments within healthcare facilities[39]. However they do state that future research should be carried out to determine the risk posed by the use of air dryers in the clinical environment as well as their effectiveness especially given the development of new air dryer technologies.

It is recommended that energy efficient air dryers are used in public toilets and non-clinical areas to minimise paper towel use. The use of efficient air dryers in clinical areas should be reviewed following any new guidance from Health Protection Scotland.

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[38] Zero Waste Scotland (2012). *Indicative Composition of Residual Waste at Hospital.*
[39] Health Protection Scotland (2012). Standard Infection Control Precautions Literature Review. *Hand Hygiene: Hand washing in the hospital setting.*

5.3 Disposal of paper hand towels in clinical areas

The ability of an anaerobic digestion or in-vessel composting system to process a high volume of paper hand towels will vary depending on the facility, therefore each NHS Board should check with their non-clinical waste management contractor regarding the best disposal route for paper hand towels.

6 Paper

Paper is a major purchasing and disposal cost for NHSScotland, yet it can be reduced by following the principles of the waste hierarchy. Common paper items will include high grade paper, white office paper, computer printer paper, coloured office paper, newspapers, magazines and other mixed paper.

The majority of healthcare facilities in Scotland currently provide recycling facilities for paper waste. However the prevention of paper waste is the preferred option of the waste hierarchy, followed by re-use. By not generating paper waste in the first place, the need to handle, transport and recycle the paper waste is eliminated.

The following section provides guidance on how to prevent paper waste.

6.1 At a work station

- Reduce the page count of documents by narrowing margins and eliminating white space;
- Use electronic communications where possible. Ensure all staff are comfortable with new technology and provide training where necessary;
- Provide memos, documents, reports and briefings online or circulate them amongst staff rather than providing multiple copies;
- Minutes from meetings should be distributed and saved electronically;
- Add reminders on email signatures to avoid printing;
- Encourage staff not to print e-mails unless necessary;
- When printing a document, do not print the pages that are not needed;
- Avoid printing draft copies. If this is unavoidable, print two pages to an A4 sheet;
- Review and edit files on screen rather than on paper, use the on-screen print preview feature before printing;
- Consider wide format monitors or dual screens that make reviewing documents on-screen easier; and
- Where documents need to be printed, use line spacing of no more than 1.5.

6.2 At a printer

- Ensure that all printers are set to double-sided format as default;
- Set networked printers to send scans to the email inbox or shared folder instead of printing by default;
- Collect all paper that has been printed on one side and re-use it for printing in draft or for scrap message pads;
- Provide simple guidelines for all staff so they can operate the photocopier correctly;
- Put reminder posters near printers and photocopiers to remind staff to reduce printing where possible; and
- Carry out regular paper audits prior to the collection of recycled paper to assess re-used paper against once used paper.

6.3 Elsewhere in the department

- Reduce confidential waste costs by ensuring that the non-confidential paper collection is secure and give clear instructions to staff as to which material is strictly confidential;
- Re-use envelopes wherever possible especially for sending information internally;
- Post meeting agendas on a projection screen;
- Display information covered in meetings on a projector screen; and
- Increase the recycled content of purchased office paper.

7 Packaging waste

Clinical staff use hundreds of products daily in the course of providing health care. Goods are generally received at the NHS National Procurement National Distribution Centre at Larkhall in bulk and re-packaged in smaller quantities for distribution to the NHS Boards. Common packaging waste includes corrugated cardboard boxes, polyethylene terephthalate (PET or PETE) plastic containers, polystyrene packaging, wood (shipping pallets), metals (aluminium containers, tin containers and other metal containers) and high-density polyethylene (HDPE) plastic containers.

The disposal of packaging waste is a significant expense for NHSScotland organisations. Packaging waste accounts for 35.6% of the domestic waste stream[40], costing over £1 million in waste disposal costs. This does not take into account any clean packaging waste that has been misclassified as clinical waste.

Packaging can be defined as materials used for the containment, protection, handling and delivery of goods. A certain amount of packaging will always be required to protect products against damage. Packaging materials are also used by clinical departments to store, protect and maintain the sterility of supplies and equipment.

Packaging waste is mostly generated in five key areas in a hospital – main hospital stores, ward level stores, pharmacy, operating theatre stores and catering stores. The packaging can be divided into three broad categories:

- Primary packaging is the wrapping or containers handled by the healthcare staff;
- Secondary packaging is the term used to describe larger cases or boxes that are used to group quantities of primary packaged goods for distribution to healthcare facilities; and
- Transit packaging refers to the wooden pallets, board and plastic wrapping and containers that are used to pack the groups into larger loads for transport and facilitate the loading and unloading of goods.

Figure 7.1 – Cardboard and plastic packaging (NHS Highland and NHS Greater Glasgow and Clyde)


7.1 Issues with packaging waste

Packaging waste can be problematic in terms of storage, internal movement and fire risk. Hospitals that are actively segregating packaging waste (e.g. plastics and cardboard) often find that the large quantities produced, coupled with the bulky nature of the material, result in the need to divert disproportionate staff time to its management.

[40]Zero Waste Scotland (2012). *Indicative Composition of Residual Waste at Hospitals.*

The benefits of packaging reduction include the usual economic savings made in sustainable waste management (e.g. via diversion from landfill), however there are also many additional hidden benefits. These include the reduction in staff resources needed to manage the waste in hospitals and the need to store materials in hospitals. Resource Efficient Scotland research found that every tonne of cardboard generated requires an average 33 hours of staff resource to manage it[41].

The majority of healthcare facilities currently recycle certain packaging waste materials including cardboard. However the best way to address packaging waste is to try pushing further up the waste hierarchy and look at waste prevention.

Figure 7.2 – Cardboard and plastic packaged products (NHS Tayside)

7.2 Packaging audit

As the vast majority of goods delivered to healthcare facilities originate from the NHS National Procurement National Distribution Centre opportunities to design out waste should be investigated. Each NHS Board should carry out a packaging audit to provide information about the types and volumes of packaging being used.

The NHS Board should set up a working group with representatives from key departments including clinical staff, domestic services staff and the infection control team. The working group should ascertain the quantity and type of materials purchased regularly e.g. the top 20 items supplied through the National Distribution Centre. The goods should be assessed in order to identify those products that have excessive or unnecessary forms of primary, secondary or transit packaging.

If excessive packaged goods are identified, the NHS Board should work closely with the Commodity Advisory Panels (CAPs) and National Procurement to specify packaging preferences and negotiate with suppliers to minimise packaging waste.

Procurement can have a direct impact on the generation of packaging waste. A reduction in packaging waste could be achieved if NHSScotland works closely with their suppliers to:

- Adopt innovative approaches to reduce the amount of packaging on items delivered;
- Ensure goods have minimal packaging;
- Ensure that packaging can be re-used; and
- Ensure that packaging can be recycled or returned to the supplier.

Packaging take-back schemes and the use of re-usable transit packaging are increasingly provided by suppliers of goods and services although not necessarily widely promoted. In

[41] Zero Waste Scotland (2013). *Improving current waste management practice in Acute hospitals*.

addition, extended producer responsibility action by retailers can help to reduce the amount of packaging waste generated by products sold to NHSScotland, increase the recyclability of products and packaging and increase use of recycled content.

Identifying packaging waste

Research carried out at University Hospital Crosshouse identified the most frequently ordered and delivered items (by cost) to the hospital from the National Distribution Centre. The information helped map the origin of packaging waste and identified potential areas for targeted waste prevention.

The information in Table 7.1 illustrates the top nine items by expenditure ordered by University Hospital Crosshouse. Key items that were identified for potential packaging reduction included paper hand towels, hygiene waste products, thermometer probes, protective gloves, hand cleaning fluids and cleaning wipes.

Table 7.1 Top items ordered by University Hospital Crosshouse

Description		Pack	Monthly quantity	Monthly packaging waste
Wipe patient dry contiwash regular	Dry patient cleansing wipes	1 x 50	2,311	Small plastic packets
Probe neonatal oxisensor II pulse	Adult oxygen senor probe	Pack of 24	5	Small cardboard box
Towel hand white 1ply 212mm x 200mm	White hand towels	Case 15	175	175 cardboard boxes or polythene bags
Wipe detergent clinitex bucket	Multi surface detergent wipes	1 x 225	685	685 plastic buckets
Glove exam nitrile N/S 6N small	Disposable gloves	1 x 200	455	455 small cardboard boxes
Glove exam nitrile N/S 6N medium	Disposable gloves	1 x 200	950	950 small cardboard boxes
Glove exam nitrile N/S 6N large	Disposable gloves	1 x 200	415	415 small cardboard boxes
Standard flow disposable with extension set	Fluid warming system	1 x 10	45	45 plastic packets
Bionector S connection system needlefree	Intravenous connectors	Box of 50	100	100 small cardboard boxes

7.3 Reducing packaging waste

Areas such as operating theatres often use multiple packs of individually sealed equipment as part of a procedure. Where possible, healthcare staff should be encouraged to order appropriate pack sizes for clinical procedures or purchase products in bulk.

Each department should ensure they introduce a robust stock control system to prevent wastage of products which exceed their shelf life.

7.4 Re-using packaging waste

The most direct way to recover packaging and reduce its environmental impact is by re-using it in its original form. While there has been some effort by suppliers to use re-usable crates for delivery, significant amounts of secondary and transit packaging continue to bring large volumes of waste into healthcare facilities. Contractual terms should ensure suppliers minimise the amount of packaging used to protect their products.

NHSScotland should work with suppliers to arrange for returning packaging materials such as crates, cardboard boxes and pallets for re-use and request that deliveries should be delivered in returnable containers.

7.5 Staff training

Clinical staff are the biggest direct users of resources and have a key role to play in ensuring that resources are used effectively and efficiently. Regular training is essential to ensure staff understand the importance of waste prevention and use materials carefully to avoid generating unnecessary waste.

Reducing plastic packaging waste in renal departments

University Hospital Crosshouse has managed to significantly reduce the quantity of plastic packaging waste produced on site, working closely with clinical staff within the renal department.

The dialysis unit was previously supplied with 6 litre plastic cans of dialysate acid solution through weekly orders. These were delivered on pallets and could not be stacked to save on storage space.

As dialysis patients are prescribed different flow rates (either 800ml/min or 500ml/min) there is generally always an element of acid wastage. This was costly and inefficient as some patient dosages translated to the opening of more than one container. Where one container had been opened for one patient, it could not be used for another patient.

In 2011, the renal unit proposed a move to central acid delivery. This is where acid is delivered to the dialysis unit in bulk load and pumped into holding tanks. This acid is then distributed to all dialysis machines via a piped loop system with outlets at each dialysis station.

The key benefits include a significant reduction in plastic packaging waste, acid waste and cost savings related to buying the product in bulk.

7.6 Sustainable procurement

Zero Waste Scotland has developed a Facilities Management Procurement Toolkit to provide information, guidance and templates to assist organisations with improvements to the resource efficiency of the Facilities Management Services[42].

National Procurement should develop generic specifications for packaging materials relevant for each supply category. This may include:

- Primary, secondary and tertiary packaging should contain a minimum recycled material content;
- Where possible, returnable crates or similar containers are used;
- Where returnable containers are not possible, the manufacturer should take back used packaging (and deal with all duty of care implications); and
- Packaging should be used that matches what the local infrastructure can recycle. If this is not possible there should be a requirement to take back used packaging.

[42] See www.wrap.org.uk/content/fm-client-procurement-toolkit-0 for more information

8 Textiles

NHSScotland organisations disposes of approximately 1,230 tonnes of textile waste in the general waste stream[43], costing £150,048 in disposal costs. The disposal costs are likely to be significantly higher if textile waste from site-based laundries and central laundries is considered.

Textile waste prevention includes direct re-use of clothing without the need for repair. NHSScotland organisations can reduce textile waste by increasing the lifetimes of textiles. Evidence suggests that 50% of uniforms and textiles disposed of by businesses are usable without repair[44].

A study of Salvation Army textile re-use and recycling operations established that the re-use (collection, sorting, baling and distribution) of 1 tonne of polyester or cotton garments uses between 1.8% and 2.6% of the energy required for the manufacture of these goods from virgin materials[45]. The benefits of both re-use and preparing for re-use include significant savings in water use, energy use, raw materials and greenhouse gas emissions. For example, it takes 7,000-29,000 litres of water to produce 1kg of cotton fibres[46].

Re-usable textiles are an environmentally preferable choice over virgin textile items. Re-usable textiles can also provide cost savings to NHSScotland organisations by reducing the amount of waste and therefore the associated waste disposal costs.

8.1 Measuring textile waste

NHS Boards should develop an internal asset tracking system to determine the quantity of textile waste available for re-use. This will involve working closely with site based laundry services, central laundry services, uniform distribution services and linen stores. In addition, each NHS Board should record the number of new uniforms purchased annually in relation to staff numbers.

Textile repair in NHS Grampian

Textiles repair is practiced at the Mile End laundry site at Foresterhill. Sheets are repaired where possible, then down cycled into smaller sheets for use in paediatric wards. The sheets are then down cycled into small pieces of cloth that can be used within the engineering department.

[43] Zero Waste Scotland (2012). *Indicative Composition of Residual Waste at Hospital.*
[44] Cooper, T. (2004). *Inadequate life? Evidence of consumer attitudes to product obsolescence*, Journal of Consumer Policy.
[45] ERM (2002). *Streamlined Life Cycle Assessment of Textile Recycling*.
[46] DEFRA (2011). *Applying the Waste Hierarchy.*

8.2 Staff uniforms

The disposal of uniforms presents a unique challenge to NHSScotland as they will replace tonnes of clothing every year. Currently, there is no single system for the collection and disposal of staff uniforms across Scotland, and uniforms are passed on to a local textile recycler or end up in the domestic waste stream.

8.2.1 Extending the lifetime of uniforms

Where possible, NHS Boards should extend the lifetime of staff uniforms. They should ensure that staff uniforms are mended (where practical preferably in-house) as often as possible before disposal is considered as a last resort.

8.2.2 Re-using staff uniforms

NHS Boards should work with organisations to re-use textiles. This may include donating old uniforms to charities or third sector organisations. The NHS Board will need to consider the removal of the NHSScotland logo from the uniform. Research carried out was found that the most visable option is overprinitng the logo using heat seals[47].

If no re-use opportunities are available, NHS Boards should recycle textiles with the income generated either donated to charity or retained by the Board for reinvestment[48].

A proactive return of uniform policy should be adopted for when individuals leave NHSScotland employment to increase the supply of uniforms for re-use.

8.2.3 Leasing staff uniforms

NHS Boards should work with National Procurement to consider leasing or hiring staff uniforms instead of buying the uniforms outright. The leasing company would be responsible for all alternations, repairs and replacements. Leasing uniforms would also encourage the re-use of garments of employees who leave.

Uniform re-use

Teams from an NHS Trust in the East of England donated around 100 staff nurse and auxiliary uniforms and health masks to the charity Aid to Hospitals Worldwide (A2HW). The uniforms were no longer required by the Trust however they were able to be put to good use by health staff in developing countries, helping them to care for patients hygienically.

8.3 Bed curtains

Some healthcare facilities use single use paper based bedside curtains in clinical departments. These bedside curtains are bulky and often incorrectly disposed of in the clinical waste stream. If the bed curtains are not contaminated with blood or body fluids[49], they should be disposed of in the domestic waste stream.

[47] Uniform Reuse Resource Report (2012). Logo removal in corporatewear to enhance re-use potential.
[48] For more information on re-use and recycling services for textiles, visit the Zero Waste Scotland Business Re-use and Recycling Directory, www.zerowastescotland.org.uk/content/business-support-tools
[49] Excluding materials from isolation rooms that should always classified as clinical waste

Where possible, NHS Boards should try to replace disposable bedside curtains with re-usable alternatives. Single-use materials are heavily packaged, reducing the usage of single-use curtains will also reduce the quantity of packaging to be managed.

The cost of laundering bedside curtains (including transport impacts) should be considered when reviewing the use of disposable alternatives.

8.4 Gowns and aprons

Gowns and aprons should be worn when it is anticipated that there may be exposure to blood, body fluids, secretions or excretions through close contact with a patient or otherwise.

Disposable surgical gowns and aprons are routinely disposed of as clinical waste after a single surgical procedure. Where possible, NHS Boards should try to replace disposable single-use gowns and aprons with re-usable alternatives. Single-use materials are heavily packaged, reducing the usage of single-use textiles will also reduce the quantity of packaging to be managed.

Re-usable gowns are acceptable for use in the operating theatres and certain other non-theatre settings (e.g. clean rooms and minor surgery rooms) if they are properly laundered after use.

Please note that NHS Boards should carry out a risk assessment and gain clinical consensus before introducing re-usable aprons and gowns in other hospital environments. The cost of transporting and laundering gowns and aprons should be considered when reviewing the use of disposable alternatives.

8.5 Sustainable Procurement

Zero Waste Scotland has developed a Facilities Management Procurement Toolkit to provide information, guidance and templates to assist organisations with improvements to the resource efficiency of the Facilities Management Services[50].

Table 8.1 outlines possible approaches for improved procurement of textile and laundry services that could be used by NHSScotland organisations.

Table 8.1 Approaches for sustainable procurement

Increased durability and re-use	Extending the time over which the uniform or linen is used Minimisation of damage to the textiles by the user Re-use textile or uniform for another function following original use
Select materials for low temperature washing and low energy drying	Efficient use of water during laundry processes; reduced wash and dry cycle times Reduced wash temperatures Re-use or capture the heat from the waste water and disinfection processes

[50] See www.wrap.org.uk/content/fm-client-procurement-toolkit-0 for more information

Table 8.2 outlines example high level Key Performance Indicators that could be applied within textile and laundry services.

Table 8.2 High level Key Performance Indicators

Materials	% textiles recycled or re-used – year on year improvement % of recycled content in textiles – year on year increase in percentage
Energy	Energy Star rated washers and dryers – year on year improvement in % of total units used Electricity consumption is use Kwh/kg washer/annum
Carbon	Conversion of energy consumption in Greenhouse Gas emissions kg carbon dioxide equivalent/kg washed/annum
Water use	Average number of washes per unit – year on year increase required

9 Furniture

Across NHSScotland organisations, furniture will include:

- Ward furniture including bedside chairs, over-bed tables, hospital beds, bedside lockers, seating and tables for waiting rooms, dining areas, staff rooms and recliner seating for rehabilitation areas;
- Office furniture including tables, chairs, storage units, shelves and filing cabinets; and
- Residential furniture including lounge seating, tables, chairs, beside cabinets, storage units, bedroom furniture, beds and residential furniture for care settings.

Furniture within a healthcare setting typically has a service life of four to nine years but is often replaced due to aesthetic reasons, corporate reasons and infection control requirements rather than loss of functionality.

The environmental impact of furniture largely occurs during manufacture and disposal, in particular the production and treatment of raw materials used. Re-use and deployment of furniture should be considered to extend the product's life to reduce this overall environmental impact.

9.1 Quantity of furniture waste

Resource Efficient Scotland research has identified that a lack of data on furniture waste arisings is a barrier to setting up re-use and deployment schemes for furniture[51]. Assessing the volume of material resource available by a NHS Board should be the first key step in resource deployment.

Each NHS Board should develop an internal tracking system to determine the quantity of furniture available for re-use and redeployment, in terms of:

- Furniture type;
- Number of furniture items; and
- Weight of items. Where these are unable to be determined, weights can be estimated from average weight listings[52].

Where possible, a visual assessment should also be carried out to determine the quality of the furniture to assess potential for re-use and redeployment. Furniture could be categorised according to an assessment of quality e.g. re-usable in current condition, re-usable after minor repair, re-usable after major repair or not repairable but recyclable.

This will provide a clear guide on the current conditions of the furniture for redeployment and re-use either internally or externally to third party organisations. This step will also define and summarise any commercially sensitive issues for consideration e.g. confidential items.

[51] Zero Waste Scotland (2012). *Review of provisions for re-use and redeployment of resources within the Public Sector in Scotland.*
[52] Furniture Re-use Network (2010). *Average Weights Database.*

9.2 In-house re-use and deployment options

NHS Boards should operate an internal re-use scheme and offer furniture for redeployment across the Board. Internal redeployment options should be considered before external options are explored as this will promote the sustainable re-use and redeployment of resources as well as avoiding or reducing the procurement costs.

Matching the supply and demand of furniture with the needs and wants of departments will rely on effective communications. It is essential that staff are aware of the disposal route for unwanted furniture. NHS Boards should consult with staff about the re-use scheme and provide up to date information on the scheme. This should include a step by step guide explaining how to use the scheme. Regular communications should be issued to staff listing available furniture. Internal communication channels may include newsletters, emails and intranet facilities.

The NHS Board's procurement system should link with the re-use scheme. Before a purchase request is authorised, the system should be check to ensure the item being requested is not already available. If surplus furniture is available within the NHS Board, this should be used before considering purchasing new furniture.

NHS Boards should also consider operating a refurbishment policy, and repair furniture when practically and financially viable. Infection control consensus will be central to a refurbishment policy. External organisations can provide furniture renovation services.

If NHS Boards adopt an in-house re-use and redeployment system, the procurement spend savings and waste disposal savings should be reported to provide feedback to staff on how well they are doing, thank them for their efforts and urge them to continue to use the system. It should also stress that infection control guidelines are not compromised and the system is endorsed by infection control.

Furniture re-use in NHS Ayrshire and Arran

Based on the success of an informal staff bulletin page on the NHS Board intranet advertising personal items for sale or collection free of charge, a system was developed by the Procurement Team of NHS Ayrshire and Arran to offer furniture and other surplus/unwanted goods for redeployment across the Board.

All staff have access to the system, and can log in to advertise and view available items. When staff make requests for the purchase of new items, they are directed by the purchasing system and the purchasing team to check that the same item is not advertised for re-use by another member of staff or department. Only once the system has been checked, and evidence provided if no alternative is available within the Board, is the purchase request authorised.

The scheme has saved money on purchase of new items for the hospital and has resulted in avoided waste disposal costs.

9.3 External re-use and deployment options

A number of private sector and third sector organisations offer external re-use and deployment services. These organisations often have effective asset tracking systems and are capable of providing detailed monitoring statistics of items diverted for re-use.

This can be achieved in a number of ways:

- Distributions through principal re-use organisation - These mainly involve Third Sector Organisations that process a vast range of materials including office furniture, IT equipment and textiles for re-use; and
- Internet based exchange forums - a business-led initiative helping to connect businesses from different sectors to improve resource efficiency and reduce waste.

NHS Tayside Furniture Re-use Scheme

WARPit is an online portal which provides a platform for organisations to redistribute resources. This system can be used for any unwanted resources including furniture, electrical items, specialist items (such as medical research and laboratory equipment), fixture and fittings and office consumables such as unused inkjet cartridges and stationery.

The tool allows departments to locate and procure spare or unwanted resources within the organisation, reducing procurement spend and waste disposal costs, as well as minimising waste and reducing associated carbon emissions.

In June 2013, NHS Tayside signed up with the WARPit re-use scheme along with a number of other public sector organisations in Tayside (including Dundee City Council, Perth and Kinross Council, Angus Council, Police Scotland and the Scottish Fire and Rescue Service).

All NHS Tayside staff are able to access the online system through the intranet and are actively encouraged to use it for all their procurement needs.

Items that are suitable for re-use are uploaded onto WARPit and an expiration date is set for when the items must be claimed and removed by. The contributors who want to give resources are linked up with recipients within NHS Tayside that require the resource.

Collection of items is the responsibility of the recipient. If the item is not claimed in the set time, they are passed onto external partner organisations e.g. wider Tayside public sector organisations and charities.

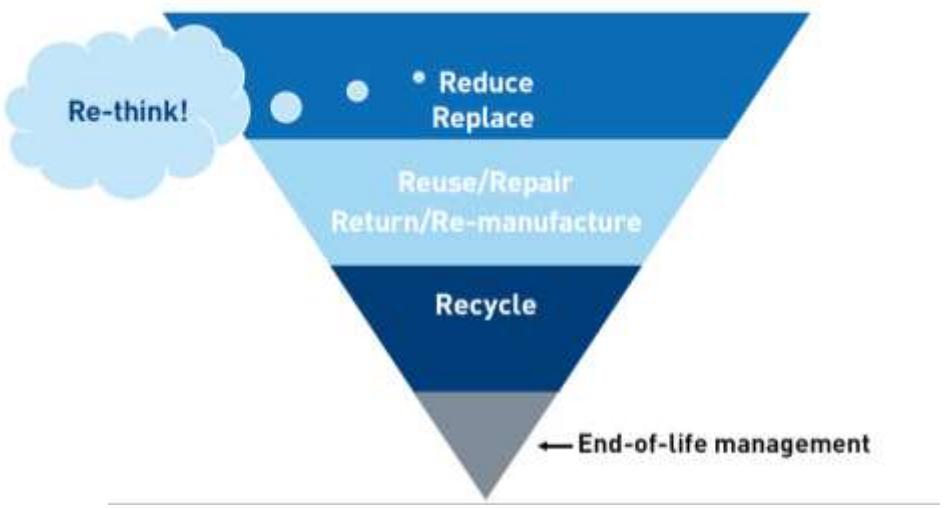
Any electrical items are assessed by the NHS Tayside facilities team to ensure they are suitable for inclusion on the portal e.g. certain medical equipment. In the first month, the portal has demonstrated significant savings on purchasing and waste disposal costs, as well as avoiding landfill and carbon emissions. In the first two weeks, NHS Tayside diverted 308kg of waste from landfill with savings of £1,291 (already saving more than the annual subscription fee).

9.4 Sustainable Procurement

9.4.1 The Procurement Hierarchy

The principles of the waste hierarchy can be applied to procurement activity to create a Procurement Hierarchy, as shown in Figure 9.1. The Procurement Hierarchy encourages organisations and individuals to apply the principles of the waste hierarchy at the earliest possible stage of the acquisition process[53].

Figure 9.1 The Procurement Hierarchy



NHS Boards should initially consider whether the furniture is really needed. If the furniture is required, NHS Boards should consider whether existing furniture available within the Board can be re-used, repaired or re-manufactured. The last option should be to buy new furniture.

9.4.2 Approaches for sustainable procurement

The re-use of products should form part of NHSScotland's procurement strategy, NHS Boards should be supported by National Procurement to buy pre-used items and preference should be given to re-used and recycled content in the tender process (with appropriate infection control and fire safety guarantees).

Zero Waste Scotland has developed a Facilities Management Procurement Toolkit to provide information, guidance and templates to assist organisations with improvements to the resource efficiency of the Facilities Management Services[54].

Table 9.1 outlines possible approaches for sustainable procurement of furnishing services that could be used by NHSScotland organisations.

[53] See www.zerowastescotland.org.uk/scotlandprocurement for more information
[54] See www.wrap.org.uk/content/fm-client-procurement-toolkit-0 for more information

Table 9.1 Approaches for sustainable procurement

Service based contract	Consider leasing or hiring of furniture. This reduces capital expenditure, spreading the cost of furnishing over an extended period. Certain organisations may experience taxation benefits
Recycled content	Consider furniture with higher % recycled content
Re-use of furniture by internal redeployment	Investigate opportunities to redeploy existing furniture within the organisation, prior to purchasing new
Recovery of used furniture for re-use by others	There are a number of organisations which recover used furniture for reconditioning and redeployment within the UK or beyond

Table 9.2 outlines example high level Key Performance Indicators that could be applied within furnishing services.

Table 9.2 Service standards for resource efficient procurement

Waste	Average age of furniture (by type) on disposal % of removed furniture that is re-used % of furniture recycled Kg waste furniture generated per annum
Packaging	Annual tonnes of packaging waste per furniture movements requiring packaging
Materials	% of recycled content in furniture procured
Carbon	Kg CO_2e total embodied carbon per kg furniture

10 Construction

Healthcare construction waste is defined as any waste that is generated as a result of some form of construction, demolition or renovation that is taking place in a healthcare setting. Construction waste materials include:

- Ceiling tiles;
- Asphalt;
- Bricks and blocks;
- Carpet;
- Concrete;
- Insulation;
- Paint;
- Window glass;
- Wood;
- Plasterboard;
- Metal;
- Timber;
- Plastic; and
- Ceramic.

There is a significant on-going construction programme across NHSScotland organisations, whether a new build, a refurbishment project or minor maintenance works. Construction and demolition waste can be a significant contribution to landfill and is a costly and often unnecessary by-product of construction work.

Minimising waste is the responsibility of all staff and contractors to ensure that the impact of waste is managed as early as possible in the project lifecycle. This includes addressing avoidance of waste techniques at the design stage and progressively working through construction to avoid unnecessary waste creation.

Halving Waste to Landfill

The 'Halving Waste to Landfill' commitment is a UK wide initiative, which is being driven forward and promoted to the construction sector in Scotland by Zero Waste Scotland.

The commitment encourages signatories to adopt and implement standards for good practice in reducing waste, recycling more and increasing the use of recycled and recovered materials in all new-build and refurbishment construction activities. The key area where this will be achieved is through setting a target of improvement in waste prevention, minimisation, re-use and recycling and embedding this target into the procurement process. Subsequently the supply chain will act to support the NHS Board in achieving its targets with clear, commercial and environmental benefits resulting.

The Halving Waste to Landfill initiative can assist NHS Boards by putting in place processes for designing out waste, forecasting waste, target setting and accurate reporting.

See www.zerowastescotland.org.uk/content/halving-waste-landfill-what-it for more information.

10.1 Reporting and targets

As construction clients, NHS Boards should:

- Set clear and actionable requirements for reducing, re-using and recovering construction, demolition and excavation waste in their policies, strategies and procurement documentation; and
- Ensure that contractors measure and report on performance.

10.1.1 Reporting

As a minimum, reporting should include:

- Construction waste sent for disposal in a landfill facility;
- Construction waste collected for recycling / recovery; and
- Construction waste sent for disposal in an incineration (including energy from waste facility).

As good practice, NHS Board should also report 'waste produced' (tonnes/£100k of project spend), 'waste diverted' (tonnes/£100k of project spend) and the recycled content in the build by value.

If an NHS Board is unable to currently provide this information, an action plan should be developed to ensure reporting of the data in the future.

10.1.2 Targets

The following targets are recommended as good practice for procured construction, demolition and excavation projects:

- Recover 70% of construction waste, aiming to exceed 80%;
- Recover 80% of demolition and excavation waste, aiming to exceed 90%; and
- 10% of new build and refurbishment project materials (by value) should originate from recycled content, aiming to exceed 15%.

10.2 Sustainable procurement

Include requirements to minimise the environmental impact caused by any construction works within the project brief and the tender documents for the contractor services and construction works.

In particular, the contractors should consider means to minimise construction waste from the inception to the completion of the project, through the initial brief, design process, materials selection, construction techniques and operational methods.

Examples of specific requirements may include an inclusion within the Scope of Services for the appointment of designers, a requirement to comply with WRAP's Designing Out Waste Guidance Document[55]. This guide encourages designers to design out waste by signing up to the key principles design teams can use during the design process to reduce waste.

[55] See www.wrap.org.uk/content/designing-out-waste-design-team-guide-buildings-0 for more information

Saving money through a reduction in construction waste

The Barrhead Health and Social Care Centre is a £11m NHS Greater Glasgow and Clyde development in Barrhead, Glasgow. The new centre has an approximate gross floor area of 5,700m² over three floors with a partial basement.

Smart procurement

NHS Greater Glasgow and Clyde set waste targets for the project and reviewed the contract wording to incorporate WRAP's model procurement requirements on waste and recycled content.

Minimising over ordering

Over-ordering was avoided by using good practice wastage rates in the Bill of Quantities. The structural steel subcontractor carried out a survey of the frame and ordered materials according to this quantity to minimise wastage.

Waste segregation

The forklift driver and the forklift driver banksman were given joint responsibility for managing the skips, ensuring no cross-contamination of segregated skips. By allocating appropriate resources to skip management, responsibility was seen as part of the day-to-day job requirements.

A system was implemented where the sub-contractors could be charged for any cross-contamination of skips or general untidiness on site.

Savings

The project achieved an estimated net saving of 0.8% through waste reduction and segregation.

By pursuing targeted reductions in specific materials wastage rates, an estimated saving of £69,300 was achieved. The project achieved an estimated disposal cost saving of £48,800.

10.3 Good site waste prevention and re-use practice

The following good practice can apply to refurbishment projects, repair works or minor maintenance works.

10.3.1 Before starting construction works

Before commencing work, walk around the site and think about what could effectively be re-used or recycled rather than just being disposed of in a skip.

Think about the materials that can be stored and re-used in their present state such as bricks, paving slabs or roofing slates and tiles. Consider if there are any materials that could be salvaged and re-used on site after processing, for instance concrete or bricks for use as hardcore. If there is not a future requirement for the materials, consider whether they can be donated or sold to a used building retailer or charitable organisation for re-use.

Identify any special or unusual features such as period doors and windows, ironmongery, unusual gutters, hoppers or downpipes that may have a resale value if salvaged.

10.3.2 During construction works

Make sure that all of the project team are trained and fully aware of the waste prevention and re-use objectives.

Plan the sequence in which materials are to be removed and stored to be re-used or leave site.

10.3.1 On completion of construction works

Identify whether there any leftover materials that were not used on this project that can be stored and re-used on another project.

11 Waste Prevention Plan

All NHSScotland organisations should develop a Waste Prevention Plan (WPP) to prioritise waste prevention and re-use actions for the key opportunities as outlined in this guide:

- Improved segregation of health care waste;
- Food waste;
- Paper hand towels;
- Paper;
- Packaging waste including cardboard and plastics;
- Textiles;
- Furniture; and
- Construction waste.

The WPP should detail the specific activities the NHS Board will take forward to reduce the overall waste arisings and improve resource efficiency. The waste prevention and re-use activities should be prioritised, according to:

- The ease with which action can be taken;
- The cost of the particular type of waste that is being produced; and
- The proportion of materials being wasted.

This WPP should be a working document. It should be reviewed and updated as waste data become available or targets are met. It should be revised at least annually to ensure the legal compliance register is up-to-date and the targets remain relevant.

The key chapters to include in a WPP are outlined below, along with a brief description of what should be included in each chapter. For more information on how to write a WPP, visit www.resourceefficientscotland.com.

11.1 Foreword

The WPP should include a foreword from Senior Management that demonstrates organisational support, and should include:

- A statement on the NHS Board's commitment to the plan;
- SMART (Specific, Measureable, Achievable, Relevant and Time-bound) targets for improvement e.g. reduce overall waste tonnage by 10% by 2014, all staff aware of the WPP by 2014; and
- A financial commitment e.g. we shall commit to allocating a budget in addition to the required staff time, on a spend-to-save basis to allow for staff training and capital investment where necessary to invest in future resource efficiency initiatives.

11.2 Organisation background

The organisation background section should provide a brief overview of the NHS Board including number of sites, number of healthcare staff, number of beds, number of food production areas within the sites etc.

It should also provide details of the key stakeholders and their responsibilities as they relate to waste e.g. senior management, waste management officer, catering manager, domestic services supervisor and facilities manager.

11.3 Baseline performance

The baseline performance section should provide a brief overview of the NHS Board's performance including setting a baseline for waste generation and resource use. It should include simple graphs to help to visualise the data. Table 11.1 outlines the suggested headings for the baseline data table.

Table 11.1 Baseline data table example

Site location	Waste stream	Total waste arisings over period(kg)

Key Performance Indicators (KPIs) should be listed that will be used to track performance against the overall targets. Where possible, these should link with the KPIs in the State of the Estate report. Possible KPIs may include:

- Each NHS Board recycles its wastes in accordance with the requirements of the Waste (Scotland) Regulations;
- Each NHS Board separates its wastes in accordance with the requirements of the Waste (Scotland) Regulations;
- Each NHS Board clinical waste production meets an agreed best practice benchmark level;
- Each NHS Board's domestic waste production meets an agreed best practice benchmark level; and
- Each NHS Board will work towards a year on year reduction in both clinical waste and domestic waste.

11.4 Implementation plan and benefits

The WPP should include an implementation plan to ensure sufficient resource and support is provided in order to achieve or exceed these targets. The implementation plan should detail the specific waste prevention and re-use actions for the key opportunities. The implementation plan should include:

- Responsible person
- Timescales and milestones
- Estimated savings
- Qualitative benefits e.g. estimated financial or tonnage savings. These outcomes should help reach the SMART targets.

Table 11.2 outlines the suggested headings for the implementation plan.

Table 11.2Implementation plan example

Opportunity	Actions required	Date to be completed	Relevant sites	Responsible person	£ saving	Waste saving

11.5Legislation

The WPP should contain a compliance register outlining the current legislation and whether the NHS Board is currently complaint. This should link with the NHS Board's Corporate Greencode legal register.

The register should include the Waste (Scotland) Regulations, Waste Electrical & Electronic Equipment Regulations, Waste Batteries (Scotland) Regulations, Special Waste Regulations, Waste Information (Scotland) Regulations and the Controlled Waste Regulations and Environmental Protection (Duty of Care) Regulations.

Table 11.3 outlines the suggested headings for the compliance register.

Table 11.3 Compliance register example

Ref	Relevant legislation	Currently applicable?	Is the NHS Board currently compliant?	Provide evidence of compliance

11.6Appendices

The appendices can be used to document any additional data to supplement details in the main WPP plan. This may include further details about the waste generation and resource use, as outlined in Table 11.4.

Table 11.4 Current waste disposal routes table example

Waste stream	Current treatment / disposal route	Description of data collection method	Person responsible for collection	Alternative contact

The appendices should also include details of the current waste contractors for each waste stream, as outlined in Table 11.5.

Table 11.5 Waste contractor table example

Waste stream	Contractor	Contact details	Contract reference	Valid to	Review of Waste Carrier License	Notes

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