Reducing Waste in Irish Healthcare Facilities

Results, guidance, and tips from a waste prevention programme.

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The Green Healthcare Programme (GHCP) aims to help healthcare facilities become more resource efficient, prevent/reduce waste and cut costs. The Green Healthcare Programme is an initiative of the Environmental Protection Agency under the National Waste Prevention Programmme and the BeGreen umbrella.

The programme was run on a pilot basis in the Southern region in 2009 and rolled-out across the country in 2010. To date the GHCP has provided more than 100 individual surveys to over 30 healthcare facilities, including acute hospitals and primary community continuing care (PCCC) facilities, both public and private. The acute hospitals involved in the programme represent 50% of the total acute beds in Ireland.

Detailed surveys that assess waste management, food provision and utility provision were undertaken in the participating facilities. Through these surveys, and the follow-up work directly with the hospitals, the GHCP has developed an in-depth knowledge of how best to reduce waste and save money in healthcare facilities and has achieved impressive results.

The GHCP continues to support participating facilities and has developed a number of guidance documents, which are combined in this booklet, including:

Benchmarks - providing hospitals with valuable information upon which they can rate themselves and act

Case Studies - based on actual work done in Irish hospitals, to reduce costs and waste

Best Practice Guides - providing hospitals with valuable assistance in achieving best practice in waste reduction

How-To Guides - giving step by step instruction to hospitals to reduce costs and become more resource efficient

Factsheets - offering valuable information on an range of waste-related topics in Irish hospitals

Staff can use this guidance on a day-to-day basis in their work, to prevent waste and reduce costs. Two separate booklets have been developed for the subject areas of food waste and all other waste (healthcare risk waste, recycling, mixed general landfill waste). This is intended to allow distribution of the information to the most appropriate staff members e.g. food waste booklet to the catering department, and other waste booklet to facility managers, waste management or environmental personnel.

GHCP also facilitates the Green Healthcare Network, an online forum whereby healthcare professionals can share best practice and support each other (see website for details on how to join.)

All the guidance documents contained herein and more information about the programme can be found at **www.greenhealthcare.ie**

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

REDUCING FOOD WASTE IN IRISH HEALTHCARE FACILITIES

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Overview of Programme & Main Findings

The Green Healthcare programme (GHCP) aims to improve resource efficiency and help prevent and reduce waste and emissions from healthcare facilities in Ireland.

To date, the programme has worked with 30 healthcare facilities, including acute hospitals and primary community continuing care (PCCC) facilities, with almost 100 individual surveys undertaken. The acute hospitals involved in the programme to date represent 50% of the total acute beds in Ireland - a very representative profile of Irish hospitals.
This comprehensive programme has been able to provide answers to the following:

- **What is the average quantity of waste generated in Irish hospitals?**
- **How much of this waste can be prevented or better managed in a more sustainable and cheaper route?**
- **What potential cost savings can be made by preventing and better managing this waste?**

Outcomes from the Green Healthcare Programme

IN THE 30 PARTICIPATING FACILITIES

FOOD WASTE - Reducing food prepared but not consumed

Potential tonnage	Estimated costs
1700 p.a.	€2.8 million - €3.9 million p.a.

HEALTHCARE RISK WASTE - Diverting non risk-items from health-care risk waste

Potential tonnage	Estimated costs
400 - 1000 p.a.	€400,000 - €700,000 p.a.

MAXIMISING RECYCLING - Diverting recyclables from general landfill waste

Potential tonnage	Estimated costs
1,900 - 2,800 p.a.	€190,000 - €290,000 p.a.

ESTIMATE FOR ALL ACUTE HOSPITALS NATIONALLY

FOOD WASTE - Reducing food prepared but not consumed

Potential tonnage	Estimated costs
2900 p.a.	€5.2 million - €7.2 million p.a.

HEALTHCARE RISK WASTE - Diverting non risk-items from healthcare risk waste

Potential tonnage	Estimated costs
770 - 2000 p.a.	€800,000 - €1,300,000 p.a.

MAXIMISING RECYCLING - Diverting recyclables from general landfill waste

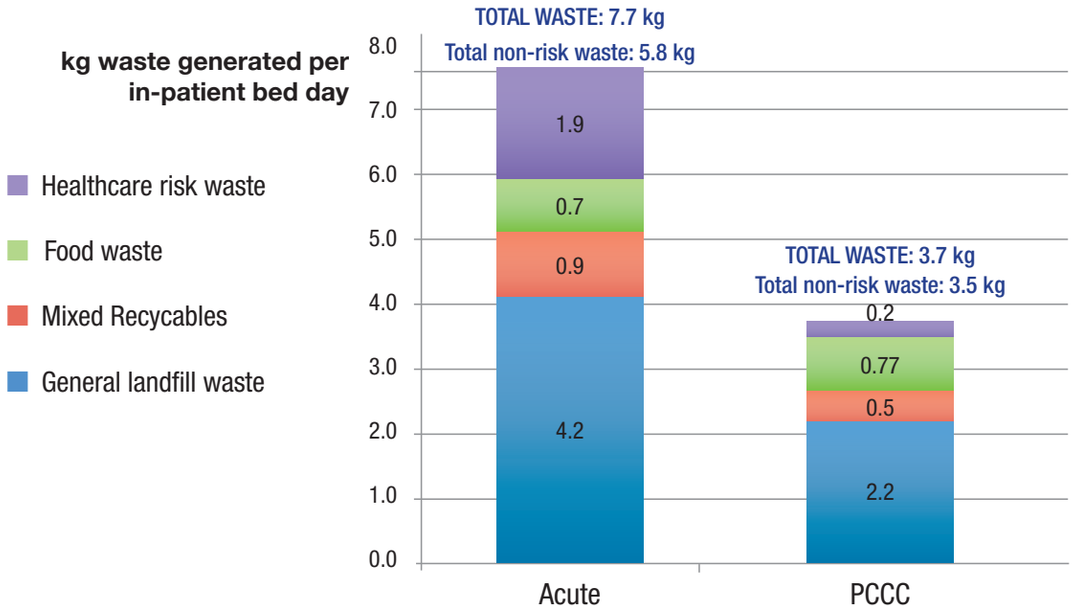
Potential tonnage	Estimated costs
3,700 - 5,400 p.a.	€370,000 - €550,000 p.a.

The values identified in this table are costs. The actual savings that can be achieved will be a sub-set of these, and are dependent on the materials accepted for recycling by waste contractors, commitment of management, involvement of staff, and the provision of resources to assist in waste prevention measures.

Average waste generation benchmark

A waste benchmark expresses the quantity of material used or generated per unit of hospital activity, in an average facility. Waste benchmarks (kg waste per in-patient bed day) have been generated for each waste stream for both acute and PCCC facilities.

These benchmarks allow a healthcare facility to identify if they produce more or less waste than the average GHCP facility. If a hospital greatly exceeds these benchmarks, it may need to consider the reasons for this and implement improvement options.



The GHCP undertook detailed work to determine what unit of activity was best to use in the generation of a waste benchmark. Units such as staff numbers (WTE), bed numbers and in-patient bed days were included in a statistical analysis.The best correlation or relationship between waste and activity was observed where the benchmark was expressed in terms of in-patient bed days.

Food waste

The GHCP carried out a number of detailed food waste surveys in both acute hospitals and PCCC facilities to determine the type and quantity of food waste generated in Irish healthcare facilities. The surveys recorded the quantity and type of food that was provided to patients, disposed of as waste, and by correlation eaten by patients. This allows an overall assessment of the effectiveness of the food delivery system. Key outputs in relation to food waste include:

Waste benchmark

- An average acute hospital generates approximately 0.73 kg food waste per in-patient bed day, while the average PCCC facility generates a similar value of approximately 0.77 kg food waste per in-patient bed day.

Cost of food waste

- Certain food waste has no monetary value e.g. chicken bones. Other food waste, which could be avoided through better management of food provision does have a value - if it was not prepared the hospital would not have to purchase the food!
- Work undertaken in a number of Irish healthcare facilities found, that on average, this valuable food waste costs **€2.15 per kg** to purchase.
- If food waste with no value is included, a cost of **€1.30 per kg** applies to overall food waste (as collected by your waste contractor).

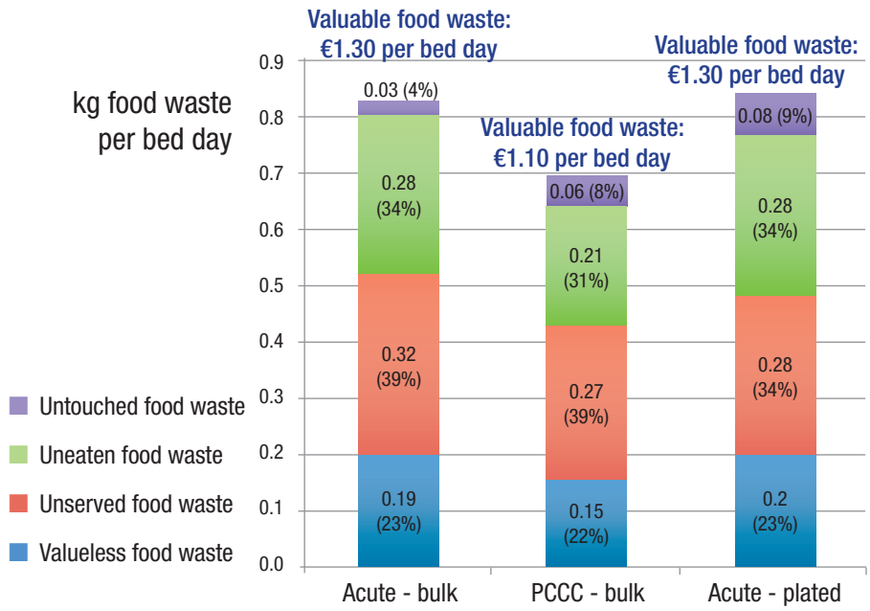
  These costs are just the costs to purchase the food. It does not include the staff costs to prepare the food, the utilities to cook the food and the cost of disposal. If these are included the true cost is much higher.

Preventable food waste

- The surveys found that a significant proportion of the food that is prepared is not provided to or consumed by patients. Instead it is disposed of as valuable food waste (unserved, uneaten or untouched).
- The proportion that is eaten varied slightly between the different types of food provision system used. Between 45% and 51% of the food provided was eaten by the patients in acute hospitals, with the value increasing to 63% in PCCC facilities.

This graph shows the breakdown between the different types of food waste generated. The associated cost of this food waste is also included.

The graph is based on the findings from a select number of GHCP facilities, accounting for the variation with the total food waste benchmark.



How to read the graph:

On average, bulk food systems in acute facilities generated 0.32 kg of unserved food waste per bed day, representing 39% of the total food waste generated. Uneaten food was generated in the next largest quantity with 0.28 kg of uneaten food waste generated per bed day, followed by valueless food waste representing 23% of total food waste. As expected, untouched food waste represented the smallest proportion of food waste, with 0.03 kg of untouched food waste generated per bed day.

Healthcare Risk Waste

The large cost difference between the disposal of waste as general landfill and healthcare risk waste (€700 per tonne), means there is real potential to make cost savings by ensuring that only material that is healthcare risk waste is disposed of in this waste stream.

The GHCP reviewed the contents of the healthcare risk waste bags to determine the type of materials within the bags. The surveys observed that, on average, only 66% of the waste in the bags was comprised of materials contaminated with bodily fluids, 19% of the bag was clean packaging, with the remaining 15% of the bag being clean non-contaminated materials that may not be risk waste.

Other key information determined from the programme includes:

Healthcare risk waste benchmark: Acute hospital - 1.9 kg per in-patient bed day
PCCC facility - 0.2 kg per in-patient bed day

€

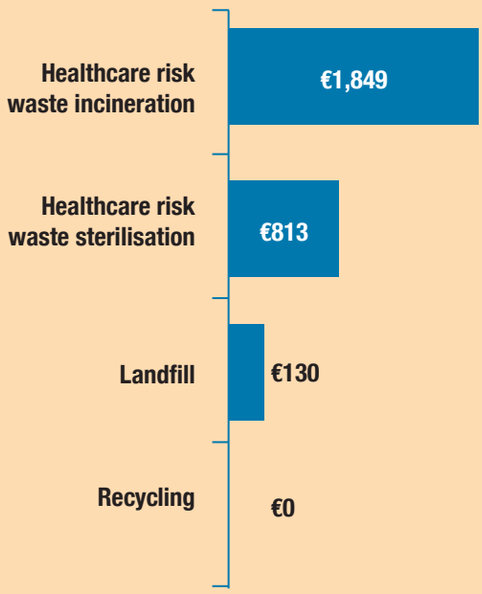
In acute hospitals, average savings in the region of between €15,000 and €27,000 per annum in each hospital could be achieved by diverting 'non-risk' and 'potentially may not be risk' material from the healthcare risk waste stream.

For PCCC facilities, which produce much lower levels of healthcare risk waste, the average savings could be in the region of up to €2,000 - €6,000 per annum in each facility.

How much does it cost to incorrectly dispose of non-risk waste in the healthcare risk waste stream?

The graph to the right shows that it costs nearly €700 more per tonne to dispose of waste as healthcare risk waste, rather than as landfill waste. It costs over €1,000 more to dispose of waste as special (incineration) healthcare risk waste. Putting non-risk waste incorrectly into the healthcare risk waste stream can cost your facility a lot of money!

Typical costs for different waste disposal routes (€/tonne, 2012)



General landfill waste

General landfill waste accounts for **61%** of all waste (excluding food waste) generated in acute hospitals in Ireland, while it accounts for **69%** in Primary, Community and Continuing Care (PCCC) facilities. So it is an important area to look at when trying to improve waste management and make cost savings. Other key information determined from the programme includes:

Waste benchmark: Acute hospital - 4.2 kg per in-patient bed day
PCCC facility - 2.2 kg per in-patient bed day

On average, **32%** of the general landfill waste bags surveyed in acute hospitals was recyclable material. In PCCC facilities only **16%** of the waste was recyclable material.

In acute hospitals, average savings in the region of €7,500 per annum per hospital could be achieved by diverting commonly accepted recyclables from the landfill stream. If the waste contractor accepts additional recyclable material, commonly generated in the healthcare sector, the potential average savings increase to €11,500 per annum.

For PCCC facilities the average savings could be in the region of up to €1,000 - €1,500 per annum.

What makes up general landfill waste?

The graphics below outline the five most common items found in general landfill waste bags.

Significant savings can be made by implementing measures to prevent or reduce the generation of such materials, and by improving waste segregation; to ensure the material is put in the correct waste stream.

FACT SHEETS

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FACTSHEET

Healthcare Risk Waste

Soft clinical waste bags
(51% of total clinical waste)

Rigid and sharps bins
(46% of total clinical waste)

Anatomical and cytotoxic bins
(3% of total clinical waste)

This factsheet provides an outline of the healthcare risk waste generated in Irish acute hospitals - where healthcare risk waste is generated, what is in healthcare risk waste, and what savings can be made through better management of healthcare risk waste. The information within this factsheet is based on the results of waste surveys carried out in over 50% of acute hospitals in Ireland.

What materials should be disposed of as healthcare risk waste?

- Items contaminated with blood
- Items contaminated with body fluids other than faeces, urine or breast milk, e.g. pus, sputum or perinatal fluid
- Contaminated waste from patients with transmissible infectious diseases
- Incontinence wear - only from patients with known enteric pathogens e.g. salmonella, rotovirus
- Other healthcare infectious waste from treatment areas as covered by definition of infectious waste

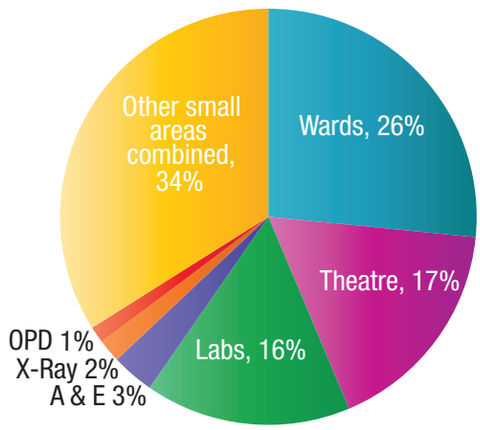
(Department of Health Guidelines)

Nationally, savings of between €800,000 and €1,300,000 per annum could be made in acute hospitals, by ensuring that only healthcare risk waste is put into the healthcare risk waste stream.

Two types of healthcare risk waste is generated in Irish healthcare facilities:

- **Regular healthcare risk waste** (soft yellow bags, sharps & rigid bins) - sterilised and disposed of in Ireland (2010: 9,171 tonnes)
- **Cytotoxic and anatomical healthcare risk waste** (sharps bins & rigid bins) - sent for incineration abroad (2010: 712 tonnes)

Main sources of healthcare risk waste



Combined, the in-patient wards, theatre and labs account for 60% of the healthcare risk waste generated in acute healthcare facilities.

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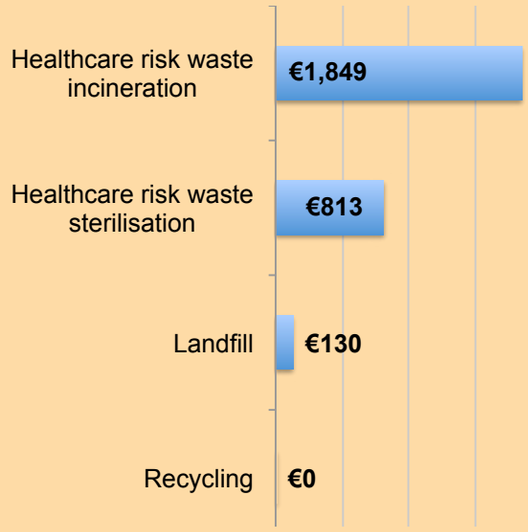
PREVENTING WASTE & SAVING MONEY

An example of clean composite packaging in a clinical risk waste bin

How much does it cost to incorrectly dispose of non-risk waste in the healthcare risk waste stream?

Putting non-risk waste incorrectly into the healthcare risk waste stream can cost your facility a lot of money! The graph below shows that it costs nearly €700 more per tonne to dispose of waste as healthcare risk waste, rather than as landfill waste. It costs over €1,000 more to dispose of waste as special healthcare risk waste.

Approximate costs for different waste disposal routes (€/tonne, 2012)



What is in soft healthcare risk waste bags?

As part of the Green Healthcare Programme, healthcare risk waste bags from over 50% of national acute facilities were surveyed to determine their contents. The contents were grouped into three categories:

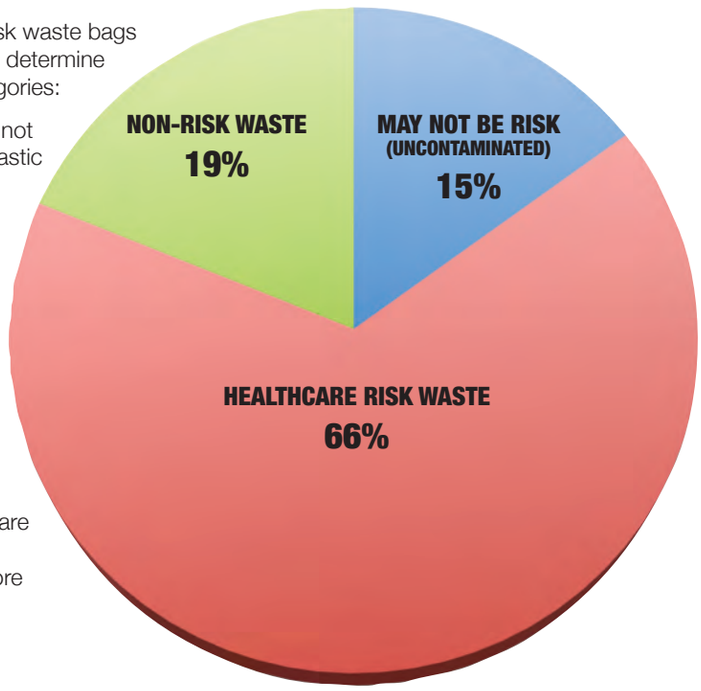
Non-risk waste: non-clinical material, which is clean and not contaminated with blood or bodily fluid, e.g. cardboard, plastic packaging, magazines, paper, etc.*

May not be risk (uncontaminated): clinical material which may not, in fact, be risk waste as it is clean/ uncontaminated, e.g. clean table covers, clean gowns, unused medical materials, etc.*

Healthcare risk waste: All other contaminated waste.

*** While some materials may be from isolation rooms, and thus classified as clinical risk waste, it is unlikely that this accounts for all of this average level of 19% across all bags surveyed.**

Non-risk material may also be placed into the rigid healthcare risk waste bins. These bins could not be examined as part of the surveys, as they are sealed in the medical area, before disposal.



FACTSHEET

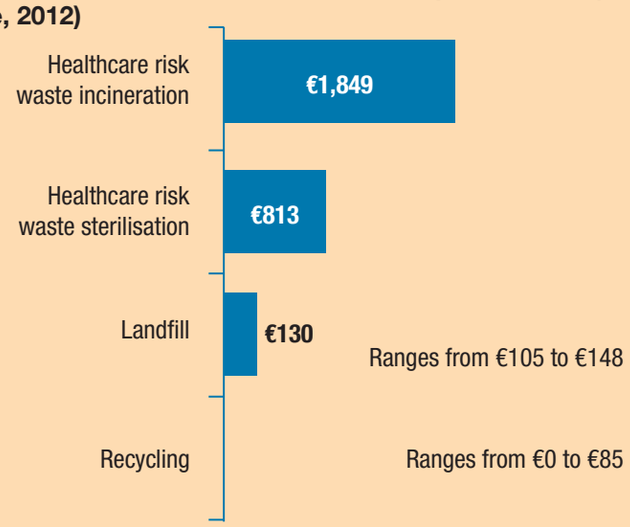
General Landfill Waste

This factsheet outlines what is in the general landfill waste (also known as household or domestic waste) generated in Irish hospitals. This information is based on a series of waste surveys carried out under the EPA's Green Healthcare Programme.

Some simple facts about general landfill waste produced in Irish hospitals:

- It is estimated that all hospitals in Ireland combined produce 17,000 tonnes of general landfill waste per year.
- General landfill waste accounts for 61% of all waste (excluding food waste) generated in acute hospitals in Ireland, while it accounts for 69% in Primary, Community and Continuing Care (PCCC) facilities.
- On average in acute facilities 32% of the general landfill waste bags was found to be recyclable material. In PCCC facilities 16% of the waste is recyclable material. This is despite segregated recyclable collection being carried out in the majority of hospitals.

Approximate costs for different waste disposal routes (€/tonne, 2012)



You can save on your waste disposal costs by separating recyclables from the general landfill stream and segregating for recycling. It is nearly always cheaper to dispose of materials as mixed dry recyclables rather than as landfill waste (as shown in the figure above).

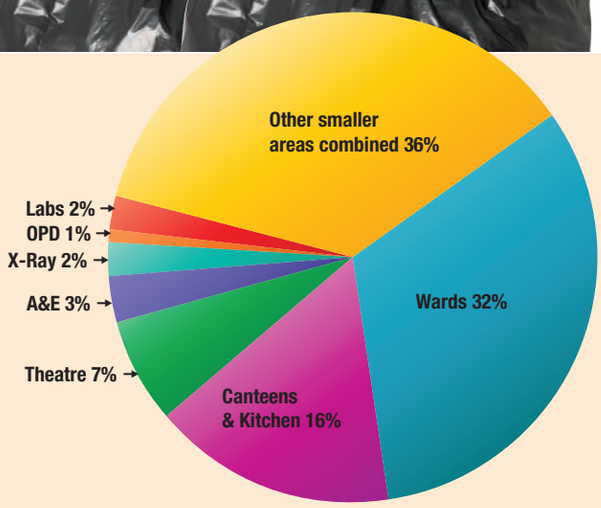
The Green Healthcare Programme found, that on average, the acute hospitals participating in the programme could make savings of up to €7,500 by diverting commonly accepted recyclables from the landfill stream. If the waste contractor accepts additional recyclable material, commonly generated in the healthcare sector, the potential average savings increase to €11,500 per annum. For community hospitals the savings could be in the region of up to €1,000 to €1,500 per annum.

€ Nationally, savings of between €380,000 and €550,000 per annum could be made in acute hospitals, by ensuring that recyclables are kept segregated from general landfill waste.

Main sources of general landfill waste

Combined, the in-patient wards, catering (canteen & kitchen), theatre and A&E account for nearly 60% of the general landfill waste produced in acute healthcare facilities.

So its important to focus waste improvement options on these areas.



What happens to general landfill waste when it leaves your healthcare facility?

The majority of general landfill waste from hospitals is sent to landfill, although in recent times waste contractors have been required to process waste through materials recovery facilities. This separates some materials for recycling or energy recovery.

Remember landfill charges per tonne still apply to all of the waste placed in your landfill/general waste compactor or wheelie bin.

Food waste is the most preventable of all types of waste.

General landfill waste bags contain on average 15% food waste. This waste should be segregated for composting or other recovery.

For more information on food waste prevention visit the food waste section on the Green Healthcare website.

Want to determine if you produce more general landfill waste than other acute hospitals or PCCC facilities? Have a look at the waste generation benchmarks in the **FACTSHEET: Overview of Programme & Main Findings**

What makes up general landfill waste?
These graphics outline the five most common items found in general landfill waste bags

ACUTE HOSPITALS

- Recyclables (combined materials) 32%
- Tissues 18%
- Food waste 15%
- Nappies & Incontinence wear 6%
- Plastic disposable gloves 5%

PCCC FACILITIES

- Nappies & Incontinence wear 29%
- Tissues 18%
- Food waste 17%
- Recyclables (combined materials) 16%
- Non risk clinical type materials 4%

FACT SHEETS

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BEST PRACTICE

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BEST PRACTICE GUIDE

Waste Bin Provision & Placement

Ensuring that your healthcare facility provides the right type of bin, in the right location, is essential to reduce the quantity of waste being incorrectly managed. Systematically looking at the number, type and location of bins in your facility, area by area, can help identify improvements. This Best Practice Guide outlines measures which should be observed in the provision of waste bins.

Are the correct types of bins provided?

Talk to relevant staff in the area and determine the type and quantity of waste that is normally generated in the area. Only provide a waste bin if that waste is generated. Try not to consider 'just in case' scenarios. For example, don't provide a healthcare risk waste (HCRW) bin, if healthcare risk waste only needs to be disposed of occasionally.

If there is the possibility of reasonable quantities of recyclable materials being generated, consider providing a recycling bin.

Is the right number of bins provided?

Is more than one of each type of bin, particularly landfill bins provided? This may be the case in large rooms. Waste bins are regularly emptied, usually once a day or more, so consider if one bin is enough? Multiple bins require cleaning staff to spend more time emptying bins, lining bins with bags and cleaning bins.

Provide the right sized bin

If only small quantities of healthcare risk waste and general landfill waste are generated, then it may be sufficient to provide a small bin. Bulky recyclable material cannot then be incorrectly placed in the general landfill bin or HCRW bin.

Place the bin in the right location

The general landfill waste and recycling bins should be placed as close to the main area of waste generation as possible. This is to limit the distance that staff have to travel with waste.

Use clear instructional signage

Staff are often willing to recycle, just like at home, but are unsure what can be recycled in a healthcare facility.

Signage should be used to highlight to staff what can and cannot be placed in each type of waste bin. All instructional signage should be simple and use pictures or symbols rather than words. People recognise pictures quicker than words; making it easier to recognise suitable materials. Pictures are also helpful to overcome language barriers with international staff.

All signage should be consistent across the different areas of the hospital, especially where staff move between different departments. All signage should be developed in line with infection control requirements.

Have a look at the sample signage, as shown here, on the Green Healthcare Programme website.

Focus on the position of the Healthcare Risk Waste (HCRW) bin

Specific observations apply to the position of the HCRW bin, as follows:

Good practice in provision of bins:

HCRW bin positioned away from hand wash sink (left); small HCRW bin used in area with small level of healthcare risk waste generation (right).

DO place the HCRW bin:

Next to a general landfill waste or recycling bin. Staff have to make a decision on which bin to use. Make sure to place the general landfill or recycling bin closer to the main source of waste generation.

Bad practice in provision of bins:

Clockwise from top left: HCRW bin used as a doorstop; HCRW bin nearest hand wash sink; HCRW bin in multi-bed public access ward.

DO NOT place the HCRW bin:

Next to a hand wash sink as paper towels are usually thrown into the nearest bin, whether it is the correct bin or not. Place a general landfill bin or recycling bin next to the sink instead.

Near the entrance to a room, especially where the door is continually open - it may be used by someone in the corridor. This does not apply in an isolation room, where the bin is used for the collection of PPE (gloves, gowns, aprons, etc).

For similar reasons do not use a HCRW bin as a door stop.

If retained in publicly accessible areas e.g. multi bed rooms, do not place within easy access of patient beds. Patients and visitors will generally place waste into the nearest bin.

BEST PRACTICE GUIDE

Healthcare Risk Waste Reduction in the Theatre

The EPA's Green Healthcare Programme (GHCP) found that, on average, 20% of the healthcare risk waste bags generated in acute hospitals come from the theatre. So it is an important location to look at when trying to reduce the quantity of healthcare risk waste generated in a healthcare facility. This Best Practice Guide outlines actions to minimise the quantity of waste, particularly healthcare risk waste, generated in the theatre.

How do you reduce the quantity of healthcare risk waste generated in your theatre?
The measures can be classed into three groups:

❶ Prevent the generation of waste

The best option for managing waste, recyclables and healthcare risk waste, is to prevent the waste being generated in the first place.

Prevention options will not only reduce the quantity of waste produced and the associated cost, but may also provide additional costs savings e.g. through reduced purchasing.

❷ Review the healthcare risk waste classification policy

Waste may be unnecessarily classified as healthcare risk waste.

❸ Increase the segregation of recyclables and minimise the non-risk waste content in the healthcare risk waste

A significant proportion of the waste generated in the theatre is in the form of recyclable materials, mainly packaging. There is a big potential to increase recycling levels in the theatre, and so reduce the associated waste management costs. The healthcare facility should try to maximise the quantity of material segregated in recycling bags.

1 Prevent the generation of waste

Generation of unused materials

In theatres a set list of material and instruments (a surgical kit) is prepared for each procedure. Certain materials may no longer be used due to a change in the procedure or the instruments used. Additionally, a number of a material may be provided 'just in case'.

Sterilised and prepared theatre kits

For hygiene reasons, any material that is not used in a theatre procedure cannot be removed for subsequent use, and is disposed of. To prevent the generation of these unused materials, the theatre should consider the following:

- Consult with anaesthetists, nursing and other staff who manage the waste, to determine the common items that are unused after procedures.
- Review the unopened material left after a procedure. Include clean material which may have been removed from its packaging, but not actually used. Start with the most common procedures first. Review a number of the procedures to determine if the material is commonly unused.
- Do different surgeons have different preferences for instruments in the surgical kit? Can a standardised list be generated for each procedure?
- Is sterile water for irrigation provided in larger volumes than is needed for a procedure? The unused liquid must be disposed of, representing a double cost to the facility. Can smaller containers of fluid be provided for the procedure?
- A list of materials that may be suitable for removal from each surgical kit can then be produced. Remember to look at surgical kits that are bought in pre-prepared by suppliers. Consult with the suppliers to remove the unwanted materials and review costs accordingly.

  Staff may be uneasy with the removal of a material from the surgical kit. Any materials removed from the surgical kit, can be provided in a nearby location within easy access if needed.

The review of the materials in kits and what actually is used, should also be applied to minor procedure kits and suture kits used in wards and clinics.

Tried and Tested!

A hospital in the US reviewed the materials provided in their surgical kits. By removing the materials that were no longer used, the hospital reduced waste by 2.4 tonnes and saved the equivalent of €64,000 per annum.

2 Review the healthcare risk waste classification policy

In general, for the majority of hospitals, all waste that has been in contact with the patient on the operating table, but may not be contaminated with blood or bodily fluid, is automatically classified as clinical waste. This includes table covers, gowns, etc. This automatic classification should be reviewed to determine if this type of material could instead be classified as non-risk waste.

This automatic classification may reduce the time staff spends on managing waste. Materials are often left on the cover, the cover gathered together and it and its contents placed into the healthcare risk waste (HCRW) bin. However, this practice significantly increases the cost of waste disposal.

Reduce use of disposable materials

Where possible, the hospital should try to replace disposable single-use instruments, gowns, aprons and covers used in the theatre, with reusable alternatives.

- Single-use materials are heavily packaged. Reducing the usage of single-use instruments will also reduce the quantity of packaging to be managed.
- Disposable gowns and covers are bulky and fill up waste bags quickly. Studies carried out in other countries, have found that staff members can prefer the comfort of reusable gowns and aprons*.
- Reusable instruments are cleaned and sterilised in-house or externally. The cost of sterilising instruments in the Central Sterile Services Department, or externally should be considered when reviewing the use of disposable instruments.

* *CliniCum; The magazine for Managers in the Hospital, December 2010*

Waste prevention measures in other juristictions: Use of reusable rigid sterilisation cases

Sterilisation wrapping (plastic and paper) is generated in large volumes in the theatre. This wrapping (often blue) is bulky and quickly fills up waste bags. Reusable aluminium cases are used for the sterilisation of instruments in a number of US facilities. The system significantly reduced the cost of purchasing and disposing of wrapping, with a number of additional benefits (reduced tear or puncture of kits and subsequent re-sterilisation need, storage container for used materials). The payback period for the cost of purchasing equipment was in the region of only 2.5 years.

3 Increase the segregation of recyclables and minimise the non-risk waste content in the healthcare risk waste

Mobile recycling bin (centre of photo) - brought to theatre preparation area to encourage segregation of recyclables. Pedal operated mobile bins with lids also avaiable.

Remove the clinical bin from the area when not needed

Prior to the commencement of the procedure, when instruments and materials are being prepared, remove the HCRW bin from the area or move to a position where it is not readily accessible. If the bin is not available, staff cannot incorrectly place material in the bin.

Provide enough recycling bins

Recycling bins should be provided in all areas where recyclables are generated (operating theatre, preparation rooms, etc.).

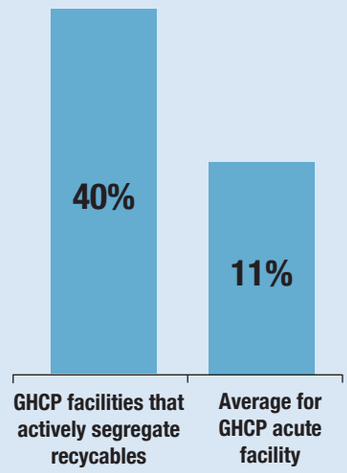
A GHCP facility with a high level of recycling in the theatre, uses a mobile recycling bin (stand with open bag). The stand can be moved close to the area(s) where preparation of materials takes place. Having the bin closer to the staff makes segregation easier, as staff do not have to carry loose packaging to a fixed bin.

Where space is limited in the theatre during the procedure, the mobile stand can be removed prior to the start of the procedure. Another option is to line one of the HCRW bin or general landfill waste bin with a clear bag. All packaging is placed into this bag during preparation, with the clear bag removed prior to the start of the procedure.

Maximise the segregation of recyclable materials before the start of the procedure

Maximising the quantity of packaging on materials that is removed and segregated before the start of a procedure, reduces the potential for packaging to be contaminated and treated as healthcare risk waste. Unpacking material before the procedure also reduces the time that staff have to spend preparing materials during the procedure (when their time is most valuable).

Level of recycling in theatres



In those GHCP facilities that actively segregated recyclables in the theatre, 40% of the total theatre waste was recycled. In other GHCP facilities, on average, only 11% of the waste was recycled.

Large volume of packaging on materials stored in a theatre scrub room

EASE OF THE SEGREGATION OF NON-RISK MATERIALS INTO GENERAL LANDFILL AND RECYCLING BAGS		
BEFORE THE PROCEDURE	**DURING THE PROCEDURE**	**AFTER THE PROCEDURE**
EASY Material is definitely not contaminated. All waste should only be placed into the recycling or general landfill bins.	**MEDIUM** Large number of staff in the theatre, and work requirements, may restrict the ability of relevant staff to move waste to the correct bin. The relevant bins should be placed in the vicinity of the staff most likely to manage the waste.	**DIFFICULT** Staff are usually under time pressure to empty and clean the theatre. Generally, all disposable waste is left on the operating table or instrument stand covers. The covers are gathered up and all waste is disposed of as healthcare risk waste. Instead staff should quickly review the materials to determine if contaminated and dispose of in the correct bin.

SEGREGATE RECYCLABLES: Ensure staff know what can be placed in the recycling bags.

Following consultation with the facility's waste contractor and/or suppliers, a list of what can be placed in the recycling bags should be generated and provided to all staff.

Materials (once clean) which are generally suitable for inclusion in mixed recycling bags in theatres include:

- Packaging, including
  - plastic and paper composite packaging (both hard plastic and plastic film) e.g. peel pouch plastic film
  - rigid plastic packaging
  - cardboard
  - paper packaging
- Plastic containers from surgical kits e.g. graduated containers, trays, etc.

Selected facilities only:

- CSSD wrapping
- Table coverings and gowns – in line with the theatre's clinical waste classification policy

BEST PRACTICE GUIDE

Maximise Recycling and Reduce Landfill Waste

This BEST PRACTICE guide outlines actions to reduce the quantity of recyclables disposed of in the general landfill and clinical risk waste streams. These best practice measures have been observed in a number of healthcare facilities, which have corresponding low levels of recyclables in the landfill/ clinical waste streams.

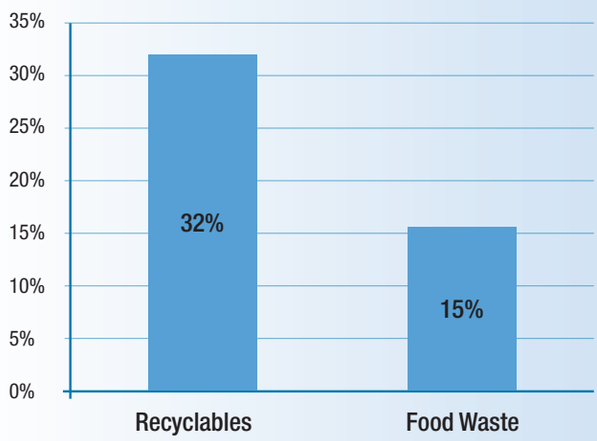
How do you reduce the quantity of general landfill waste generated in your facility?

General landfill waste (a.k.a. general waste, mixed waste, or residual waste) is generated in all areas of the hospital. It is usually the type of waste produced in the largest quantity in healthcare facilities. So it is an important type of waste to look at in terms of reducing waste generation and costs.

General landfill waste bags were surveyed or characterised in the majority of Green Healthcare Programme (GHCP) participating acute hospitals. The figure to the right shows that, on average, across all facilities, nearly half (47%) of the landfill waste stream was composed of recyclables and food waste.

Your facility can reduce the quantity of landfill waste generated, by removing or diverting the recyclable materials and food waste from the landfill waste bins.These materials should instead be placed into a separate recycling bin, or food waste bin for composting or other such recovery. Generally, recycling and food waste streams cost less to manage per tonne than disposing of in the landfill waste stream.

How much of the landfill waste stream can be removed and managed better elsewhere?



Poportion of the general waste bags that was attributable to recyclables and food waste (across all facilities surveyed)

The Green Healthcare Programme found, that on average, the acute hospitals participating in the programme could make savings in the region of €7,500 by diverting commonly accepted recyclables from the landfill stream. If the waste contractor accepts additional recyclable material, commonly generated in the healthcare sector, the average savings increase to €11,500 per annum. For community hospitals the average savings could be in the region of €1,000 to €1,500 per annum.

First thing to do - review your current recycling policy & system

Is there a clear recycling policy in place in your facility?

Is there a recycling policy in place in your facility, and is it supported by management? If the policy is supported by hospital management it will provide greater impetus for areas of the hospital to actively segregate recyclables.

Are mixed recycling bags used in your facility?

Cardboard is generally segregated in all facilities, as it is produced in large volumes and is easily recognised as recyclable. By separately collecting and baling cardboard a revenue can also be received.

Lots of other materials generated in your facility may also be recycled (e.g. paper, plastics, composite packaging). By using a mixed recycling bag for such materials, you can place all recyclables in one bag, reducing the space needed for multiple bins.

What resources for recycling are available in your facility?

If you plan to increase recycling, ensure that you have enough space in your waste holding area to hold a compactor or extra bins, to store the recyclables.

Determine what can be placed in mixed recycling bags

Consult with your waste contractor, and suppliers where necessary, to determine what materials are suitable for inclusion in mixed recycling bags.

Everyday recyclable materials, which are recycled at home, are accepted in recycling bags (cardboard, plastic containers, newspaper, office paper, etc.). There are a number of additional materials generated in healthcare facilities which may be accepted in the recycling bag, composite packaging (peel pouch type packaging. Look at the table below for an outline of what is generally accepted in mixed recycling bags from healthcare facilities.

Materials generally accepted in mixed recycling bags from healthcare facilities		
Packaging (clean and uncontaminated)		Other materials (selected facilities)
Rigid plastic e.g. milk & drink bottles, irrigation fluid bottle	**Plastic film**	**Composite coverings** Comprised of more than one material (paper and plastic). Paper covers with heavy plastic coating may not be accepted
Paper packaging, newspaper, magazines and office paper	**Metal packaging** e.g. aluminium cans, tin cans	
Composite packaging Comprised of more than one type of material e.g. paper and plastic. Plastic may be rigid or film	**Plastic containers** e.g. graduated bowls, suture kit trays	**CSSD wrapping** Wrapping used on sterilised kits. Wrapping can be paper based or paper/plastic composite
Cardboard e.g. glove box		

Look at the type of waste generated and review the general landfill and clinical waste bins provided.

If no landfill or clinical waste is generated in an area, make sure to remove these bins.

The more bins you provide in your facility, the more work needed to empty, re-line, and clean bins. If only small quantities are generated, then provide a small bin.

If the waste is only generated in one area of the room then move the bin to this location. For example, if only hand towels from the handwash sink are disposed of in the landfill waste bin, then place the bin next to the handwash basin.

For example, in one facility, the anaesthetist produces small quantities of clinical waste, but is not provided with a clinical waste bin. The waste is removed by nursing staff and placed in another bin. This reduces the work associated with emptying and replacing the bag in a barely filled bin.

Example of the correct provision of bins in the corridor of a ward. A large quantity of recyclables and a small quantity of general landfill waste are produced in the area. The corridor is thus provided with a large recycling and small general landfill waste bin.

Undertake a waste bin placement survey Do this in the different areas of your facility, to determine if the right bins are provided in the right location. See the **How-To: Undertake a bin placement survey** on the Green Healthcare website for more information. **www.greenhealthcare.ie**

Important steps to ensure your recycling bins are properly used

Make it clear what can be placed in the recycling bags:

Compile a clear list of the materials that are accepted in the mixed recycling bags, and provide this to staff ahead of the roll-out of the bags and campaign. Outline that all other material should be placed in the general landfill waste bag.

Particular types of recyclable materials may be found in large quantities or only in certain areas, e.g. large plastic containers in dialysis, CSSD wrapping in theatres, paper table covers in clinics etc. So you may only have to outline these materials on the list for these areas.

At the start of the programme, instructional signage may need to be placed on or above bins. As staff become used to the recycling system and what is acceptable in the bins; the signage may be removed from medical areas, in line with infection control best practice. University teaching hospitals may need to retain signage due to the high turnover of students. The signs should be retained on bins in areas with high public footfall (e.g. waiting rooms, corridors) to assist the public to correctly use the bins.

Important steps to ensure your recycling bins are properly used - continued

Ensure recycling bags are placed in the right location:

Ensure a recycling bin is provided in those areas where large volumes of packaging are generated (e.g. clean preparation rooms in wards, store rooms, etc.).

Within the room or area, position the bag where the recyclable material is generated (e.g. near workbench or near storage cupboard), rather than at the entrance to the room. Staff won't then have to carry the bulky recyclables a distance to the bin.

Make the recycling bins easy to use:

Consider using mobile bins where high volumes of recycling are generated in different areas at different times. For example, in a theatre, packaging is generated in the preparation area before the procedure and in the vicinity of the operating table during the procedure. The mobile bin can be moved to another area when needed.

Mobile bins are also beneficial if space is limited in connecting rooms (e.g. theatres, out-patients clinics and preparation rooms), and it is not possible to provide a recycling bin in each room. The mobile bin can be moved between the rooms, as needed. This also reduces the investment required for the purchase of bins.

A mobile recycling bin in use near an equipment preparation area.

Use different colour bins for each type of waste:

Where possible use different coloured bins for each type of waste. People recognise colours and symbols quicker than reading words - so by using different colours staff can quickly recognise what type of waste should be placed in the bin.

Suggested colours are:

CLINICAL: Yellow
(clinical bins are generally always provided in yellow)

GENERAL LANDFILL: White

RECYCLING: Green

Ideally general landfill and recycling waste bags should be clear plastic to allow staff to view the contents of the bag. They can then determine if the bag could be recycled. If available and economically viable, consider using clear green waste bags for recyclables. The use of coloured bags makes it easier for portering staff to identify the type of waste, especially when they manage different waste bags. Segregating all recyclables on the ward is only worthwhile if porters place the waste bags into the right compactor.

Where budgets for the purchase of different coloured bins are restricted, or a stockpile of bins are available, then consider using different colour identifying signs for each type of bin. For example the recycling bin sign should have green colouring and the general landfill a white or black colouring.

Commercial facilities can also recondition bins (spray paint) for other use, e.g. yellow HCRW bin to green recycling bin.

Important steps to ensure your recycling bins are properly used - continued

Prevent contamination with liquid and food:

Food or liquid waste (e.g. coffee) can easily contaminate a mixed recycling bag so badly that it has to be disposed of as landfill waste.

In areas where quantities of food or liquid waste are generated (e.g. areas providing food, waiting rooms with drink facilities, etc.), consider providing a food waste bin or liquid waste bin, to prevent the contamination of the mixed recycling bags.

The segregation of the food and liquid waste will also reduce the contamination of general landfill waste bags. These bags can leak during transport, resulting in possible cleaning and slippage issues.

In general, segregated food waste is also cheaper to dispose of than when the food is disposed of in the landfill waste stream.

Did you know...

Recyclables have a value.

Recyclables can be traded as resources on the open market, with waste contractors selling recyclables to recycling processors. The value of these materials varies, but can range from around €50 per tonne for low grade plastic film, to €850 per tonne for aluminium (March 2012).

For those materials with a high value, the waste contractor may offer a rebate (or money back) for clean, segregated material. For example, clean cardboard can attract a rebate in the region of €30 per tonne.

As recyclables have a value, waste contractors may collect recyclables for no charge per tonne, but charge for collecting the material (charge per lift of bin or compactor).

So, where possible, it is important to maximise the segregation of each type of material. For example, if cardboard is segregated, the hospital will receive money, but not if the cardboard is placed in the mixed recycling bag.

Keep this in mind when negotiating charges in your waste management contract.

Skips waste money!

Skips have been found to encourage the mismanagement of waste. Due to their size, recyclables can easily be thrown into the skip. Open skips allow rainwater to enter the skip, which is then absorbed by absorbent materials (e.g. cardboard). As skips are charged by weight, this can significantly increase your costs.

Example of a badly used skip containing WEEE and recyclables (cardboard, metal and plastic) - significant proportion can be recycled

Important to note is that WEEE should not be landfilled by law. The waste management contractor may sort out the materials at their own facility, but you will still get charged landfill rates for all of the weight of the skip.

BEST PRACTICE

GreenHealthcare

BEST PRACTICE GUIDE

Healthcare Risk Waste Reduction

This Best Practice Guide outlines actions to reduce the quantity of non-risk waste disposed of as healthcare risk waste. The information has been gathered through work undertaken with a number of Green Healthcare Programme hospitals, who have been observed to operate best practice measures.

Can you reduce the quantity of healthcare risk waste generated in your hospital?

The correct management of healthcare risk waste minimises the risk of the spread of infection. Consequently, healthcare risk waste is sterilised or incinerated when disposed of, at a much higher cost than that for landfilling the waste.

Healthcare risk waste bags were characterised in a number of Irish acute healthcare facilities which participated in the Green Healthcare Programme. These surveys found, that on average, **19%** of the healthcare risk waste bags was obvious non-risk material (packaging and non-clinical items). An additional **15%** of the bags was comprised of materials, which were uncontaminated, and may not be healthcare risk waste.

Simply put, your facility can reduce the quantity of healthcare risk waste it generates, by avoiding non-risk waste being incorrectly placed in the healthcare risk waste stream.

What is healthcare risk waste (HCRW)?

Healthcare risk waste is waste from healthcare facilities, which poses a risk due to its potentially infectious nature.

It includes wastes such as sharps, anatomical waste, blood, and items contaminated with blood or other bodily fluids (excluding faeces & urine). Cytotoxic drugs (used in cancer treatment) or other pharmaceuticals are also handled as healthcare risk waste.

Healthcare risk waste is generated in the treatment of patients isolated with infectious or transmissible conditions.

Healthcare risk waste is also generated in the everyday treatment of patients e.g. dressings, alcohol wipes, tissues, etc., that are contaminated with blood or other bodily fluids.

BEST PRACTICE: Important FIRST steps, to reduce the quantity of non-risk waste incorrectly placed in the healthcare risk waste stream

STEP 1: Review your facility's healthcare risk waste classification policy

In conjunction with infection control, consider reviewing what your facility classifies as clinical risk waste.

This is particularly the case for waste generated in isolation rooms (see overleaf). Examples of materials that are often automatically classified as healthcare risk waste include incontinence wear, clean gloves and clean table or stand covers.

STEP 2: Ensure staff know what is and is not healthcare risk waste

It might sound obvious, but ensure that staff are aware of what should be disposed of as healthcare risk waste.

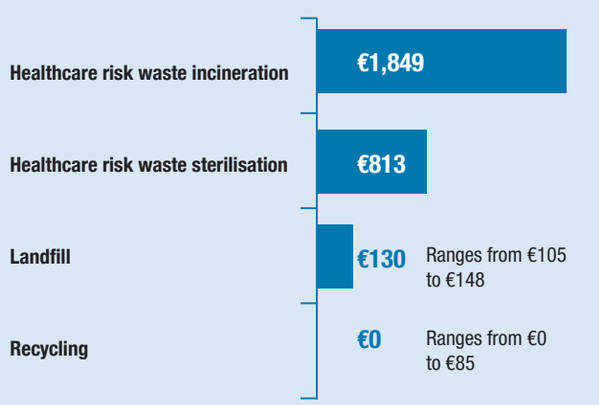
Regular training is essential to keep staff up-to-date with any changes to the classification of healthcare risk waste. Training of new staff on segregation policies is essential, and should include important information, such as the large cost difference between disposing of waste as healthcare risk waste and general landfill waste (see graph below).

STEP 3: Remove healthcare risk waste (HCRW) bins from public access areas e.g. multi-bed wards

In the main, patients and visitors are not aware of the difference between healthcare risk waste and general landfill waste - particularly in terms of the significant disposal cost differential. Consequently, they may incorrectly dispose of waste in the HCRW bin. This has been observed in surveys undertaken in healthcare facilities.

Removing HCRW bins from public areas of wards and confining them to utility rooms, eliminates the potential for misuse, and also limits the number of areas where healthcare risk waste is stored.

Typical costs for different waste disposal routes (€/tonne, 2012)



Empty, everyday medication containers, incorrectly disposed of in a healthcare risk waste bin in a PCCC facility (community hospital)

Best practice for the provision of healthcare risk waste bins

In each area, consider:

Is a healthcare risk waste (HCRW) bin actually required?

If little or no healthcare risk waste is generated in an area, then consider not providing a HCRW bin (yellow bin). Any healthcare risk waste generated can be disposed of in a HCRW bin in a nearby area.

Try not to consider 'just in case' scenarios. For example, don't provide a HCRW bin, if healthcare risk waste is to be disposed of only every so often.

Provide the right sized bin

Where a HCRW bin is needed, but only small quantities are generated, then a smaller bin (e.g. 20 litres) may be sufficient instead of the standard 70 litre bin.

Cleaning procedures require bins to be emptied on a regular basis, regardless of how full the bags are. Due to hygiene and visual reasons, staff are unlikely to overfill bins, and are more likely to place bulky non-risk packaging in another bin, rather than filling up a small HCRW bin.

Reusable waste bins for sharps, liquids and wet waste

In the majority of healthcare facilities, disposable rigid plastic bins are used for the disposal of sharps (sharps bins) and liquid and wet waste (rigid bins fitted with absorbent material). The plastic bins, which are sealed in the ward or medical area for safety, are disposed of with the contents.

The clinical waste contractor has recently introduced reusable rigid waste bins to a limited number of healthcare facilities. These waste bins are managed and removed from the medical areas by waste contractor staff. The bins are brought to the waste contractor's facility, where they are emptied, sterilised and returned for reuse in the healthcare facility. This reduces the number of rigid waste bins disposed of as healthcare risk waste.

Place the healthcare risk waste (HCRW) bin in the right location

The position of the HCRW bin in the room, and in relation to other bins is important. Specific observations apply, as outlined below:

DO PLACE THE HCRW BIN

Next to a general landfill waste or recycling bin. Staff have to make a decision on which bin to use. Make sure to place the general landfill or recycling bin closer to the main source of waste generation.

DO NOT PLACE THE HCRW BIN

Next to a hand wash sink as paper towels are usually thrown into the nearest bin, whether it is the correct bin or not. Place a general landfill bin or recycling bin next to the sink instead.	Near the entrance to a room, especially where the door is continually open - it may be used by someone in the corridor. This does not apply in an isolation room, where the bin is used for the collection of PPE (gloves, gowns, aprons, etc). For similar reasons do not use a HCRW bin as a door stop.	If retained in publicly accessible areas e.g. multi bed rooms, do not place within easy access of patient beds. Patients and visitors will generally place waste into the nearest bin.

Healthcare risk waste bin incorrectly used as a door stop.

Bin placement survey

Consider undertaking a waste bin placement survey, in the different areas in your facility to determine if the right bins are provided in the right location. Look inside the clinical bins - is all waste inside definitely clinical?

See the **How-To**: **Undertake a waste bin placement survey guide** for more information.

Healthcare risk waste bin in a multi-bed public access ward. Non risk waste was observed in the bin. Best to remove to a staff only area.

See the **BEST PRACTICE: Healthcare Risk Waste Reduction in the Theatre** for more information on minimising healthcare risk waste in your theatre

Keep stock levels low in isolation rooms

When a patient is discharged, a deep clean of the isolation room is undertaken. All disposable materials and supplies remaining in the room are generally disposed of as healthcare risk waste.

Stocking procedures should ensure that the minimum quantity or number of supplies is provided in isolation rooms. Ideally, all materials required by medical personnel should be brought into the isolation room on an 'as needed' basis.

Unopened, sealed disposable material disposed of as healthcare risk waste, following cleaning of isolation room.

Review the classification of waste generated from isolation rooms

In most hospitals it is a common infection control policy to treat all waste generated in isolation rooms as healthcare risk waste. Even the clean waste generated by the patient (e.g. magazines, drink bottles, etc.) is treated as healthcare risk waste.

A significant number of patients isolated in hospitals have contact spread conditions (i.e. non droplet or airborne transmittable conditions). Thus the patient's own waste would pose minimal risk in the spread of the infection. The healthcare facility should consider treating this waste as regular landfill waste or recycling.

Recently published guidance documents on the Health Protection Surveillance Centre website regarding the diagnosis, prevention and control of particular infectious conditions make reference to this. For example in the "*Guidelines for Control and Prevention of Multi-Drug Resistant organisms (MDRO) Excluding MRSA in the Healthcare Setting*" it states "The majority of waste from a room where a patient has a MDRO should be considered non-risk waste e.g. gloves and aprons, unless contaminated with blood or infectious body substances."

The facility should consider adding a landfill waste bin to the isolation room to collect the large volume of non-risk waste generated in the room.

Consider removing the HCRW bins from certain isolation rooms

Healthcare facilities could consider removing the HCRW bins from isolation rooms used for the isolation of patients with contact spread conditions (i.e. non droplet or airborne transmittable conditions).

All waste generated in the treatment of the patient e.g. dressings, wipes, tissues, etc. and all waste contaminated with blood or infectious body substances, is treated as HCRW as normal. Where gloves and aprons are contaminated with blood or bodily fluids they are also treated as HCRW. This HCRW is placed into a sealable small yellow waste bag and transferred to a HCRW bin in the ante-room or ward dirty utility room. This removes the need for a HCRW bin in the room.

All other waste generated in the isolation room is treated as regular landfill waste or recycling.

A number of facilities in the Green Healthcare Programme reviewed their healthcare risk waste classification policy for waste from isolation rooms. As a result, the quantity of healthcare risk waste generated was reduced, with no increase in the spread of infectious conditions.

For more information have a look at the **SVPH Healthcare Risk Waste Reduction Case Study** on the Green Healthcare website.

Just because waste is generated in a clinical area, does not automatically make it Healthcare Risk Waste!

HOW-TO GUIDES

GreenHealthcare epa

HOW-TO GUIDE

Set up a Waste Prevention and Improvement Programme

This How-To Guide provides guidance on the steps to set up a waste prevention and segregation improvement programme in your healthcare facility. This programme can help reduce waste generation levels and waste management costs. All statistics and costs referenced in this document have been gathered from waste surveys carried out under the Green Healthcare Programme (GHCP).

The Green Healthcare Programme has developed a **Benchmarks & Savings** worksheet to help you analyse your waste generation data and determine possible cost savings. This worksheet should be used in conjunction with this guide, particularly Step 1. Download it from the How-To Guides section of the Green Healthcare Programme website **www.greenhealthcareprogramme.ie/resources/how-to-guides**

STEP 1: Analyse your waste generation data and determine possible cost savings

Step 1A: Determine the quantity of each type of waste generated in your facility per annum

Record the quantity of general landfill waste, healthcare risk waste, food waste and recyclables generated in your facility for one year. Your facility's waste manager or accounts department can provide you with waste generation and cost data.

Step 1B: Do you generate more or less waste than other facilities?

Dividing your annual waste tonnage by the number of annual bed days, you will generate a waste benchmark for your facility (kg per bed day). Perform this calculation for each type of waste. Compare your benchmarks with the values in Table 1 to see if you produce more or less waste than the average for facilities in the Green Healthcare Programme. If your facility greatly exceeds these values, then you may need to consider why!

Table 1 - Waste generation benchmarks

	Landfill waste	Recycling	Food	Healthcare risk waste	TOTAL		
					NON RISK (landfill + recycling + food)	HEALTHCARE RISK WASTE	TOTAL
	kg per bed day				kg per bed day		
Acute	4.21	0.88	0.74	1.92	5.83	1.92	7.75
PCCC (Primary community & continuing care)	2.23	0.48	0.77	0.23	3.48	0.23	3.71

Step 1C: Estimate the possible quantity of divertable materials in the general landfill waste and healthcare risk waste stream

Table 2 outlines the average proportion of divertable material in the healthcare risk waste (soft bags only) and general landfill waste streams. Divertable means waste that is more appropriately, and often more cheaply, managed in a different stream.

ⓘ Your facility's waste may contain higher or lower levels of divertable materials in the waste, than shown in Table 2. To determine the actual level in your waste you will need to undertake a characterisation or survey of your waste.

Apply the proportions to the annual waste tonnage, to determine an estimate of the quantity of materials that potentially could be diverted from the waste stream.

ⓘ The proportion of divertable material in the healthcare risk waste stream in Table 2, is for soft healthcare risk waste bags only. Ensure you multiply your healthcare risk waste total tonnage by the percentage for soft bags included in Table 2. This is to exclude rigid bins which have not been characterised.

See the **How-To undertake a detailed waste survey guide** for more information

Table 2 - Proportion of divertable material in waste streams

Landfill waste		Healthcare risk waste (soft waste bags only)			
% of waste that is recyclable material		Proportion of waste that is non-risk material		Proportion of waste that is possibly non-risk material	
Acute	PCCC	Acute	PCCC	Acute	PCCC
32%	16%	19%	18.5%	15%	16%
		Breakdown between clinical soft bags and rigid bins		Acute	PCCC
			Soft bags	54%	66%
			Rigid bins	46%	34%

Step 1D: Calculate the possible cost savings achievable, by the diversion of materials from the healthcare risk waste and general landfill waste

Determine what your facility is currently paying per tonne for the following:

Disposal by landfill.....(L)
Recycling.....(R)
Healthcare risk waste (regular) .....(C)
Food waste.....(F)

Calculate the cost difference if the material was diverted and managed in another waste stream, as follows:

Landfill to recycling.....(L - R)
Landfill to food waste.....(L - F)
Healthcare risk waste to landfill .....(C - L)
Healthcare risk waste to recycling.....(C - R)

Apply this cost difference to the quantity of material that could possibly be diverted, as calculated in Step 1C.

Where costs are not readily available, use the cost range information in Table 3 as a guideline.

NOTE: The management of materials (landfill or recycling) in a compactor generally incurs a charge per tonne of materials disposed/recycled, monthly rental costs and a charge each time the compactor is lifted and emptied.

Where large volumes of recyclables are diverted from landfill, the use of a recycling compactor instead of wheelie bins may be required. Additional rental and lift charges will apply.

Where a recycling compactor is already in use, the transfer of the extra recyclables from the landfill compactor to the recycling compactor will not result in additional lift charges.

The transfer of non-risk waste from the healthcare risk waste stream will result in some additional lift charges. This will be small relative to the potential savings in the waste not being handled as healthcare risk waste.

Table 3 -Example waste management charges

LANDFILL WASTE		
	Max	Min
Compactor	€148 per tonne	€105 per tonne
MIXED RECYCLING		
	Max	Min
Compactor	€85 per tonne	€0 per tonne
Wheelie bin	€12.50 per lift	€6 per lift
Rebate achieved for compacted mixed dry recyclables	€15 per tonne (One GHCP facility only)	
Rebate achieved for compacted cardboard	€10 - €30 per tonne	
FOOD WASTE		
	Max	Min
Per tonne	€130	€120
Per lift (240 Litre bin)	€12.75	€10
HEALTHCARE RISK WASTE		
Healthcare risk waste	€813 per tonne	
Special healthcare risk waste	€1,849 per tonne	
All prices excluding VAT, 2012		

Example Calculation

A facility that could potentially divert 67 tonnes of mixed recyclables from the general landfill waste stream.

Using the prices per tonne outlined in Table 3, a cost difference of €105 applies (landfill €105 - €0 recycling).

This leads to potential savings of €7,000 per annum (€105 * 67 = €7,035).

STEP 2: Look specifically at food waste generated in your facility

Food waste surveys undertaken in the GHCP observed food waste to be an area with significant potential for waste prevention. There will always be a certain amount of food waste which has no value and is relatively unavoidable, for example chicken bones, onion skins, etc. However, much of the food waste produced does have a value and should be focused upon for reduction. The surveys found that that just over 70% of all food waste is valuable food waste.

A conservative estimate is that on average, the cost to purchase food is just over €2 per kilogramme or €2,000 per tonne. So food waste with value, costs a minimum of €2,000 per tonne. Reducing the quantity of food waste generated in your facility represents a real opportunity to make significant savings.

See the guidance documents and food waste section on the GHCP website for guidance on how to prevent the generation of valuable food waste.

STEP 3: Outline the possible cost savings to management

Outlining the possible cost savings to management may assist in obtaining their commitment to the programme, including the provision of funding for equipment to help your programme (e.g. bins, signage, etc.)

STEP 4: Set up a green team

The team should ideally have a representative from infection control, waste management & portering, nursing & medical staff and catering. Try to include staff from the largest waste generating areas (typically theatre, wards & catering).

STEP 5: Review your facility's current waste segregation policies

With regard to the hospital's current general waste and healthcare risk waste segregation policies, ask the following questions:

- Are they clear and understandable?
- Is it clear to staff what materials should be placed in the mixed recycling bins?
- Is it clear what materials should only be treated as healthcare risk waste (HCRW) i.e. materials contaminated with blood or bodily fluids. Is all waste generated in isolation rooms for patients with contact spread conditions automatically treated as HCRW?
- Have the policies been communicated to all staff including new staff and students - will they require training?

Based on the answers to these questions the policies may need to be reviewed. This will ensure that your facility maximises the quantity of recyclables segregated and minimise the quantity of material incorrectly disposed of as healthcare risk waste.

STEP 6: Make waste segregation easy

Making waste segregation easier will help to prevent the mismanagement of waste, and save money. Some measures include:

Only provide the correct type of bin in each area If healthcare risk waste (HCRW) is not generated in an area, then don't provide a HCRW bin in that area. This stops the misplacement of landfill waste and recyclables in the healthcare risk waste bin.

Put the waste bin in the correct location
For example, healthcare risk waste bins should not be placed next to a hand wash sink; to prevent the misplacement of tissue paper in the bin.

Clear signage
All instructional signage should be simple, and use pictures or symbols rather than words. People recognise pictures quicker than words, helping staff to quickly recognise if the material is accepted in the bag.

Where possible look at the measures in each area of the hospital. For more info see the guides below on Guidance section of the Green Healthcare website

BEST PRACTICE: Waste bin provision and placement

HOW-TO: Undertake a waste bin placement survey guide

STEP 7: Engage staff

Staff may initially be apprehensive about any changes in waste management. Listen to staff concerns and queries and, where applicable, take these into account.

In particular engage with staff who are heavily involved in waste management and who will be key to successfully implementing any changes (e.g. porters, nursing staff in theatres, etc.).

Facilities involved in the Green Healthcare Programme case studies commented that once the system was up and running, staff become actively involved, often suggesting further improvements.

STEP 8: Implement improvements in a trial area

Trialling any changes in a small number of areas will help you to iron out any issues or problems staff may experience.

Consider choosing a department where a member of the green team works, as they are likely to act as a champion and help to implement changes.

Following the trial, survey staff to determine any improvements you can make, when implementing the changes in other hospital areas.

STEP 9: Measure improvements

Where possible, measure the quantity of each type of waste generated before and after the improvement measures have been implemented. This will help you to determine the quantity of waste diverted from the healthcare risk waste and general waste stream, and the associated cost savings.

Identified actual savings will help to give your programme momentum and commitment from staff and management.

STEP 10: Communicate results

Showing the results of the programme to staff can encourage them to continue implementing improvements. Outlining improvements in terms that staff can readily identify (e.g. cost savings, staff hours saved), will help them to understand how the improvements benefit them.

Regular updates on staff newsletters or staff notice boards are a perfect way of communicating information to staff.

Remember to also communicate the results to management to help you get continuing commitment and funding for bins, signage, etc.

Ensure your waste collection system represents the best value for your facility!

Waste contractors charge each time your waste compactor is collected, so ensure it is only collected when full. If you use wheelie bins you are most likely charged per lift of the bin. Ensure the bins are only collected when full. Wheelie bin compactors that compress the waste in the bin (so more can fit in for the same cost) are available.

If you use a number of wheelie bins that are collected frequently, it may be more economical to use a waste compactor. Look at the difference in waste disposal cost (€ per tonne), but also consider the extra compactor rental and lift costs when determining if it will save your facility money.

Competition between wards has been observed to be a real motivator among staff. In the initial stages of the programme, consider putting a competition or award scheme for the wards in place, to encourage staff involvement.

HOW-TO GUIDE

Undertaking a Detailed Waste Survey

Looking at the type of materials that make up your waste will give you an idea of the level of materials incorrectly placed in both the general landfill and healthcare risk waste streams. By implementing often simple improvement options, you can reduce these levels and thus the quantity of healthcare risk waste and general landfill waste generated in your facility. This HOW-TO guide outlines how to undertake a detailed waste survey in your facility.

Typical setup during a detailed waste survey

Types of waste surveys you can undertake in your hospital

There are generally two types of surveys that can be undertaken in a healthcare facility:

- Detailed waste survey
- Bin placement survey

The more detailed a survey you undertake the more information you will get for your facility, but the more work it requires (staff days & resources).

The **detailed waste survey** will identify the major sources of waste, provide an overall idea of the mismanagement of waste in your facility, and highlight the areas with particularly bad management. You can then focus your often limited resources on these areas first e.g. undertaking a bin placement survey.

The **bin placement survey** highlights improvement options in each area, by reviewing how the waste could be mismanaged in terms of the provision and placement of bins.

Two main tasks to be undertaken in a detailed waste survey:

1. Determine where the waste comes from:

Record the quantity, of each type of waste, generated in each area.

2. Determine what type of materials (e.g. recyclables, food waste, healthcare risk waste, etc.) are in the waste:

Segregate or separate the waste into different materials and weigh.

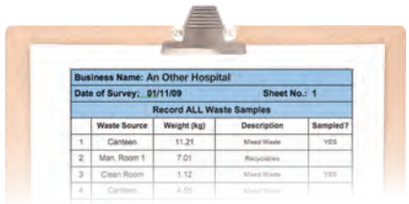
IMPORTANT TO NOTE: General landfill waste and healthcare risk waste need to be looked at separately

What do I need to undertake a detailed waste survey?

Examples of industrial weighing scales. Larger flat scales, suitable for weighing a large wheelie bin

Industrial weighing scales - if possible obtain a low base scales, that can weigh 150 kg or above, to allow the weighing of full wheelie bins. These scales can generally be rented from suppliers.

Personal Protective Equipment - it is important to wear sharp proof or puncture resistant gloves at all times. Overalls and gowns (to protect clothes), safety shoes, glasses and masks are also recommended.



Business Name: An Other Hospital

Date of Survey: 01/11/09 Sheet No.: 1

Record ALL Waste Samples

	Waste Source	Weight (kg)	Description	Sampled?
1	Canteen	11.21	Mixed Waste	YES
2	Man. Room 1	7.01	Recyclables	
3	Clean Room	1.12	Mixed Waste	YES
4	Canteen	4.55	Mixed Waste	

Record sheets (available on Green Healthcare website) - to record the weights data.

Storage bins or containers (approximately 15 - 18) - for segregation of different waste materials.

Table - waste bags can be placed on the table; makes it easier to segregate the waste.

Camera for photos - to document the findings of the survey, and help assist the preparation of reports.

Staff with appropriate inoculations - only staff, who have appropriate inoculations against infections that can be transmitted through the handling of healthcare risk waste, should be involved in the survey. Consult your Health & Safety Officer or relevant staff member.

Step 1: Decide over how many days you want to undertake the survey, and if you want to look at the entire hospital or just one area at a time.

How many days?
Do you want to look at the quantity of waste generated for one day or two days? The more days you monitor, the more representative your results will be, but the more work it requires. Most surveys undertaken in the Green Healthcare Programme were one day surveys. If you opt to undertake the survey for one day, choose a day that best represents the normal activity of your facility. Mid week is often chosen, as there can be higher numbers of discharges at the end of the week or outpatient appointments at the start of the week.

Entire hospital or one area at a time?
You can undertake the survey for the entire hospital, at one time, or solely focus on known large waste generating areas. Focusing on the entire hospital at once is work intensive for a short period but will give you a good overall picture of waste generation.

Step 2: Identify the source of the waste

It is important that all of the waste bags generated in the hospital are tagged to identify their source. Three examples of how to tag the waste bags generated in your facility are outlined below. Which option you pick will depend on the activities in your facility.

Knowing the source of the waste is a critical step and you need to ensure buy in from management so that relevant staff know in advance what is required of them on the day.

OPTION 1

Cleaners tag all waste bags as new bags are put into the bins:

Easiest and recommended option.

OPTION 2

Waste porters collect waste from only one area at a time:

Porters are instructed to collect waste from one area at a time. This option could delay the collection of waste, resulting in the build up of waste.

OPTION 3

Waste porters tag waste bags as they are being collected:

In general waste porters collect full or partially full wheelie bins from waste rooms and add waste from smaller areas to the top. Consequently waste porters may have to remove the bags from the wheelie bins to tag them, which may be unlikely to occur.

Cleaning staff can be provided with tags pre-printed with ward area names. Alternatively staff can use a roll of plain stickers and a marker, and write the area name themselves. This option is preferred, as staff cannot run out of tags for a particular area. If you have a small number of areas in your facility, you may be able to use a different colour sticker for each area.

It might seem like a good idea to use the healthcare risk waste identifying tags to identify the source of the healthcare risk waste bags. However substantial time is needed to write down the 6-digit numbers and to trace back the numbers using the tag number log. Additionally during the survey, when you will not be able to trace back the numbers, you may unwittingly not set aside samples from all areas.

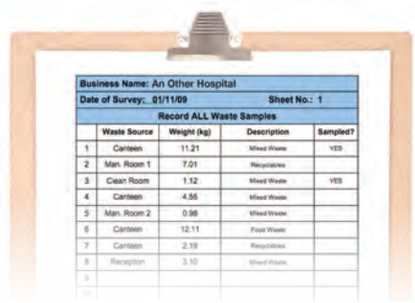
Step 2 will not be required, where you look at one area at a time (e.g. known large waste generation areas), as waste is usuallly only collected from one area each day.

Step 3: Weigh the quantity of waste from each area

Look at each bag for the identifying tag to determine where the waste was generated. Place the bags or bins on the scales to determine the weight.

Record the following on the Waste Survey: weight record sheet (shown below):

- area
- type of waste (see box to right)
- weight of the waste



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1	Canteen	11.21	Mixed Waste	YES
2	Man. Room 1	7.01	Recyclables	
3	Clean Room	1.12	Mixed Waste	YES
4	Canteen	4.55	Mixed Waste	
5	Man. Room 2	0.98	Mixed Waste	
6	Canteen	12.11	Food Waste	
7	Canteen	2.19	Recyclables	
8	Reception	3.10	Mixed Waste	
9				
10				

Porters will generally present general landfill, healthcare risk waste and recycling waste in separate bins. Very rarely will the different types of waste be co-mingled.

Where possible try to group the waste from the different areas together before weighing. This will allow you to put multiple bags on the scales at once.

This is where it is beneficial to collect waste from only one area at a time, as you will not have to check every bag for its source. If only one type of waste is in the bin (e.g. general landfill bags), and if it fits, you can place the bin directly on the scales. Subtract the weight of the empty bin to determine the weight of the waste, without removing all the bags from the bin.

The majority of individual bags are small in size (usually much less than 10 kg). However, watch out for heavy items and handle appropriately, if at all. Ensure manual handling training has been completed as appropriate.

NOTE: If you collect waste from one place at a time, you will need to tag the bags that you put aside for subsequent sampling.

Step 4: Set aside samples of waste from the different areas

During the weighing process set aside samples of the waste bags (general landfill and soft healthcare risk waste bags) from each of the areas, for later assessment. Try to source the bags throughout the day to get the correct profile of the waste.

Pick bags that best represent the type of waste that you have been seeing while weighing. Place your samples in an empty wheelie bin to keep everything tidy.

If you have recorded waste bags with high food waste content, make sure to put samples of these bags aside.

Make sure to put enough bags from the main waste generating areas aside. It is always easier to dispose of extra bags than to try and get more bags later.

TIP: It can be beneficial to note how many bags you have put aside from each of the areas, to ensure you have enough bags.

Record the type of waste

It is important to record the type of waste to get the most information from the survey.

Healthcare risk waste:

Record whether a soft bag, rigid bin (tall or small), or sharps bin (e.g. 1.8 litre or 25 litre). Record the cytotoxic and anatomical waste separately. The easiest method to record this type of clinical waste, is to record the colour of the bin; black is anatomical and purple is cytotoxic.

General landfill waste:

If clear bags are used, have a quick look at the contents of the bag.

Make sure to identify if the bag has a high content of particular materials such as food waste or incontinence wear. Bags with a large food waste content may have originated from catering areas e.g. ward kitchens. These bags would not be representative of the overall waste from the area, and if segregated (see later) and included with the other waste, would distort the results.

Recycling:

Record the different types of recyclables generated separately (e.g. mixed recycling bags, cardboard, loose plastic film etc.).

When weighing the mixed recycling bags, have a quick look at the content of the bags. You can see the level of non-recyclable materials in the recycling bags. This will help you to decide if the recycling bags are being used correctly.

Step 5: Determine the contents of the waste

The contents of the bags should be determined and entered into the Waste Survey: waste composition sheet (as shown below). You will need to sample the general landfill and healthcare risk waste bags separately - perhaps one type in the morning and the other in the evening. There are two methods for determining the contents of the waste bags;

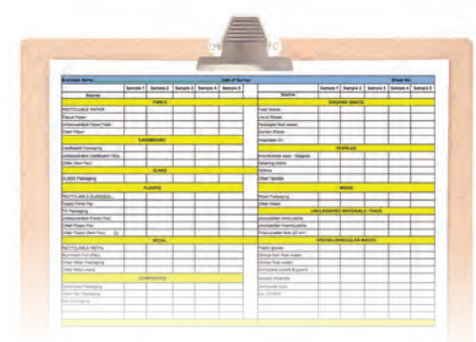
Option 1: Segregation of materials (Recommended - accurate results)

Take the sample bag from an area, open it up and segregate or separate the contents into the different materials. Each type of material is placed into a separate bin. For example place all the tissue paper into one bin, all recyclable paper into another bin, all gloves into another bin, etc.

Each bin is then weighed separately and the weight recorded.

To make it easier, tare or zero the scales, with the weight of an empty bin, so you don't have to subtract the weight of the bin later.

Make sure to take photos of recyclable materials or other interesting materials observed in the waste bags surveyed.



Option 2: Visual guesstimate (Saves time but not accurate)

Where time and staff is limited, the bags can be visually assessed for content (e.g. 10% paper, 20% tissue paper, etc.).

This guesstimate by its nature will be volumetric, so make sure to take the densities into consideration when converting to weights (e.g. 5% metal by volume will generally weigh more than 20% office paper by volume).

The results from this method should be taken cautiously.

Always be aware, particularly in the case of healthcare risk waste bags, for the potential presence of sharps. The PPE mentioned earlier should be worn at all times.

Following the segregation of healthcare risk waste bags, the healthcare risk waste should be placed into a new bag. Ensure you attach the identifying tag to the new bag, to allow trace-back of the bag.

How to use the information from the survey

Following completion of your waste survey, you will need to to analyse the data you have gathered.

Part 1: Quantity
Total the quantity of waste generated by each area.
Total each type of waste separately.

Analysing this information, you can see those areas that produce the largest quantity of waste. This information is beneficial when assessing what areas to focus your waste management resources upon.

This analysis is best undertaken in Excel, to allow the development of graphs.

Part 2: Composition
Take the information from the segregation of the bags and input into the electronic **Waste Survey: Calculation sheet**. A separate document outlines how to use this worksheet.

HOW-TO GUIDES

GreenHealthcare

HOW-TO GUIDE

Undertaking a Bin Placement Survey

Looking at the type of materials that make up your waste will give you an idea of the level of materials incorrectly placed in both the general landfill and healthcare risk waste streams. By implementing often simple improvement options, you can reduce these levels and thus the quantity of healthcare risk waste and general landfill waste generated in your facility. This HOW-TO guide outlines how to undertake a bin placement survey in your facility.

What do I need to undertake a bin placement survey?

- Agreed **co-operation of staff** from the area - make an appointment with relevant staff to ensure that they are available to assist you
- **Note pad and pen** - to record observations and make notes

- **Camera** - take pictures to document findings and help assist you in preparing reports

Types of waste surveys you can undertake in your hospital

There are generally two types of surveys that can be undertaken in a healthcare facility:

1. Detailed waste survey

The detailed waste survey, will give you an overall idea of the degree of waste mismanagement in your facility, but also highlight the areas with particularly bad management. You can then focus your often limited resources on these areas first e.g. undertaking a bin placement survey.

2. Bin placement survey

The bin placement survey highlights improvement options in each area, by reviewing how the waste could be mismanaged in terms of the provision and placement of bins.

The more detailed a survey you undertake the more information you will get for your facility, but the more work it requires (staff days & resources).

Step 1: Acquire the co-operation of staff

It is important that a member of staff from the area you intend to survey is available to accompany you, to answer any questions you may have. The staff member will need to answer questions on the normal activities undertaken in each area of the ward, types of waste generated and the waste classification policies. For this reason a more senior staff member e.g. CNM would be most appropriate.

Make sure to undertake the survey at an **appropriate time**. If you undertake the survey just after the bags in the bin have been changed, then you won't be able to see the contents of the bin and determine normal activity.

Step 2: Look at each type of room in the ward or area

Where possible visit all of the rooms in the ward or area being surveyed. However rooms can often be occupied or in near continual use (e.g. operating theatres). Wards or treatment areas will often have a number of each type of room e.g. single room, multi-bed ward. In this case look at an example room, check with staff if there is anything different in the other rooms, and apply your results from the example room for all.

Step 3: Determine the normal activities undertaken in the room

Ask the staff member the following questions:

- What activities are normally undertaken in the room?
- What types of waste are normally generated in the room?
- Is healthcare risk waste disposed of in the room?
- Is recyclable packaging likely to be generated in the room or is it removed in another area. For example in some facilities packaging is removed from equipment and materials in the clean utility room, while in other facilities the packaging is removed at the patient bed. In the latter case a recycling bin may be needed in the dirty sluice/utility room.

This will help you to determine the types of waste that are likely to be generated in the room, what can and cannot be recycled, and correspondingly the types of bins needed.

Room with very large volume of recyclable packaging - not provided with recycling bin

Step 4: Review the bins currently provided in the room

Observe the following in relation to each type of bin provided in the room.

(a) **Number of bins provided:** If more than one of each type of bin is provided - note how many.

(b) **Size of the bin: Large or small.** It may be easier just to note if the bin is small.

(c) **Location of the bins in the room:** Note where the bin is placed (e.g. near the hand wash sink, at entrance to the room, etc). Also note if it is beside another bin.

Example of waste bins provided in a dirty sluice/ utility room

Step 5: Observe what materials are in each bin

Look into each bin and note if the wrong type of material is in the bin. For example, note if clean cardboard or plastic packaging is in a healthcare risk waste (HCRW) bin. Where possible take some photos to support your observations.

The staff member can also help identify any existing problems with the type of bins or their use by staff.

Useful tip when taking photos... Following the survey, it may be difficult to remember in what room the different photos were taken. A useful tip is to take a picture of the room name or number before you enter each room. You will then know, that all photos after this, were taken in that room.

Step 6: Observe the instructional signage and guidance provided in the room

Have a quick look at the type of instructional guidance provided in the rooms. This may be in the form of signage on walls or stickers on bins. Determine the following:

- Is the signage clear, understandable, and located in the right location? Is it clear what can and cannot be placed in the recycling and HCRW bins
- Are the different bins distinguishable and identifiable i.e. is it clear which bin is the recycling bin

You may only need to undertake Step 6 in a small number of wards as you will find the results are consistently the same. This will give you an overall feel for the signage, and whether it needs to be improved.

Step 7: Make a note of other aspects of activities in the room

Make sure to note any other pieces of information that will affect the management of waste in the area e.g. is there limited space for additional bins in the room.

Step 8: Review the results of the survey and determine the following for each room in each area

Following the survey ensure to analyse the information recorded for each area. It can be useful to put the findings of the survey into an excel worksheet or word document report

- **Can any of the bins be removed?** Focus particularly on the HCRW bins.
- **Are additional bins needed?** If a lot of recyclable packaging is generated in the area, is there space to add a recycling bin?
- **Can a smaller bin be provided instead?** Cleaning procedures generally require that waste bins be emptied a set number of times a day, regardless of whether they are full. It is not uncommon to see a large waste bag, containing only a single piece of tissue paper, being disposed of. Considering providing a small waste bin in areas where small volumes of the waste is generated.

  This is particularly important for healthcare risk waste. If there is limited space in the bin, staff will be less inclined to fill it up with material that is not risk waste.

- **Can the bin be moved to a better location in the room to prevent misuse?** This is particularly important for the HCRW waste bin.

  Is it positioned next to the handwash sink? Paper hand towels may be accidentally thrown in.

  Is it near the entrance to a room, where the door is usually kept open (e.g. dirty utility room)? Landfill waste and recyclable material may be thrown in by passersby. This does not apply for isolation rooms.

- **Is the instructional signage clear?** Or does it need to be improved!

Clinical waste bin incorrectly placed next to hand wash sink - contained high level of paper handtowels

Ensure you review the **BEST PRACTICE GUIDE: Waste bin provision & placement**, on the Green Healthcare website to get guidance on the correct provision of bins in your facility.

How to record the information from your survey.

Each healthcare facility and each room within the facility is different. Your facility may not have any recycling bins in place or provide a recycling bin in each room. Small bins may not be used in any part of your facility, or they may be commonly used. So it can be difficult to use one template document to record the information observed during the bin placement survey. A template may be too restrictive and be awkward to use.

As you undertake the surveys in different areas, you will find the way you record the information will develop naturally.

For example if you do not have many small bins, the number of general waste bins noted would all be large. If any small bins are then noted, you may record it in brackets next to the total value.

The EXAMPLE below shows how to record the information observed during the survey.

Example!

Clean sluice room (a.k.a clean utility room, clean preparation room)

Materials used in the treatment of patients are sourced and prepared in the room. All materials needed are placed on a disposable cardboard tray. All large materials are unpacked in the room, with other materials unpacked near the patient.

Large volumes of packaging generated in the room, with the only general landfill waste produced being paper towels from the one hand wash sink in the room.

Hospital policy requires that all waste, particularly healthcare risk waste, is disposed of in the dirty sluice room, to prevent cross contamination.

Each room used for isolation is provided with its own healthcare risk waste bin.

Suggestion of how to record this information during the survey

Room: Clean Sluice Room

1. All waste from patient procedures disposed of in dirty sluice room.
2. No healthcare risk waste disposed of in room.
3. Large volumes recycling generated.
4. General waste mostly paper towels. No instructional signage in room.
5. No recycling bin provided.

Current bins:

General - 2
- one near entrance - high levels of cardboard and plastic film.
- one near handwash basin (SMALL) - mostly hand towels

Clinical - 1
near entrance to the room, beside the large general waste bin - large proportion of non-contaminated material in bin.

Recommended bins:

General - 1 (Large)
Place near handwash sink.
Consider replacing with small bin if volumes allow.
Provide instructional waste signage in room; on or near bin.

Recycling - 1
place near work bench where materials unpacked.

Remove all healthcare risk waste bins from room - in line with hospital policy to dispose of all healthcare risk waste in dirty sluice room

CASE STUDIES

GreenHealthcare epa

CASE STUDY Midlands Regional Hospital - Tullamore

Minimising Healthcare Risk Waste and Maximising Recycling in the Theatre

Midlands Regional Hospital Tullamore is a 237 bed acute hospital providing a wide range of services including general and emergency medicine, surgery, and oncology services. Midlands Hospital Tullamore joined the Green Healthcare Programme (GHCP) in 2011 with a focus on waste segregation and clinical waste minimisation.

This case study outlines the steps taken by the hospital to implement a successful programme in their Theatre to minimise healthcare risk waste and increase recycling, including:

- Training of staff and highlighting of cost savings
- Clear identification of what can be placed in recycling bins
- Healthcare risk waste classification procedures
- Positioning of all waste bins

Start Up of the Waste Segregation Programme

The hospital identified the need to reduce the quantity of healthcare risk waste (HCRW) and general landfill waste being produced by the hospital each year. Following consultation with waste portering staff, who handle the waste each day, the theatre was identified as one of the largest sources of waste. Thus, the theatre was selected as an ideal area to start a waste reduction and segregation improvement programme.

With commitment from hospital management and led by the hospital's Building Maintenance Officer and Theatre CNM1, a trial was undertaken in one theatre. Following a successful trial, the system was then rolled out across all theatres.

Key points for implementing a successful waste segregation programme

Make sure recycling bins are in the right location and easy to use:

Recycling bags on mobile stands are used in the theatre, to allow easy movement of the bin to where it is needed. The stand is moved to the preparation area, where equipment and materials are unpacked, prior to the procedure. All packaging is easily placed straight into the recycling bag. The stand is then moved closer to the operating table for use during the procedure.

Review the number, position and size of general landfill and healthcare risk waste bins:

Assess whether the bin is needed (remove), is too big for the area (use smaller bin) or in the right location (move to better spot). For example the anaesthetist produces small quantities of healthcare risk waste, but is not provided with a HCRW bin. The waste is removed by nursing staff and placed in another bin. This reduces the work in emptying a barely filled bin.

Outline clearly to staff what can be placed in the recycling bin:

Consult with your waste contractor and suppliers as to what materials are suitable for inclusion in the recycling bags. Compile a clear list of these materials and provide to all staff. At the start of the programme, the list may need to be placed on or above the bins (in line with hygiene requirements, to remind staff what can be placed in the recycling bin.

Minimisation of healthcare risk waste:

The hospital treats all materials contaminated with blood and bodily fluids as healthcare risk waste, and tries to minimise uncontaminated waste being incorrectly treated as healthcare risk waste. In general, disposable covers (e.g. operating table) and gowns, which may be in contact with the patient, are automatically treated as healthcare risk waste, whether contaminated or not. Where a double layer has been used, the hospital assesses the lower layer for contamination and, if clean treats, as recycling.

Staff - essential part of the programme

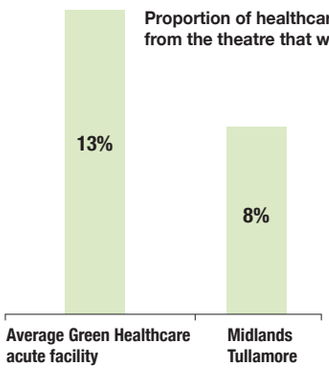
Ensure all staff are aware of the segregation programme. Generally, nursing, portering and anaesthesiology staff manage the majority of waste in the theatre, so focus training on these staff. When initially trialled staff were wary of the programme, but having a key member of the green team in the department, allowed problems to be quickly addressed. Staff are now pro-actively involved, even suggesting improvements.

Highlight potential cost savings to motivate staff

There is a large cost difference between the disposal of waste as healthcare risk waste and as landfill/recycling. When this was highlighted to staff, it was observed to be a real motivation in implementing the programme.

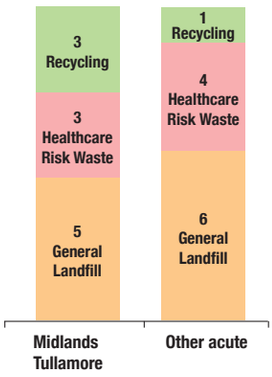
Results of the programme and comparison with the average acute facility

Information gathered through waste surveys carried out under the Green Healthcare programme



Proportion of healthcare risk waste bags from the theatre that was non-risk waste

The healthcare risk waste bags surveyed from the theatre contained over 38% less non-risk waste than other hospital theatres. This shows a higher level of segregation of non-risk waste in the theatre.



Number of bins in operating theatre and preparation rooms

Comparing Midlands Tullamore with another acute facility with a similar theatre layout and size. Midlands Tullamore provides the same number of bins, but fewer HCRW and general landfill waste bins. As a result there is greater segregation of recyclables.

Across the hospital, Midlands Tullamore produces 0.5 kg less healthcare risk waste per bed day than the average GHCP facility. This equates to savings in the region of €26,000 per annum, compared to the average acute facility.

Acknowlegement The Green Healthcare Programme would like to thank Mary Slattery (CNM1), Joe Duffy (Building Maintenance Officer) and Midlands Tullamore hospital for their assistance in developing this case study.

CASE STUDY Cork University Hospital

Maximising recycling and minimising healthcare risk waste in the theatre

Cork University Hospital (CUH) is one of the largest acute teaching hospitals in the country with 850 beds.
The hospital provides a wide range of services including emergency medicine, general medicine and surgery, oncology and radiotherapy services. CUH has 9 operating theatres with typically 60 to 80 procedures per week. CUH was one of the original participants in the Green Healthcare Programme (GHCP), with survey work undertaken in 2009 and 2010.

This case study outlines the key steps taken by the hospital to implement a successful waste minimisation and segregation programme in their theatre department, including:

- **Commitment from management to the implementation of the programme**
- **Training and commitment of staff**
- **Clear identification of what can be placed in recycling bins**
- **Positioning of all waste bins**
- **Highlighting cost savings**

Setting up the waste segregation programme - commitment needed!

As with any successful initiative, the theatre's waste segregation programme was started by an environmental champion from within the department. A consultant anaesthetist observed that large quantities of recyclable material were being incorrectly disposed of in the landfill and healthcare risk waste bags. Aware of the beneficial environmental effect of recycling, and the large cost difference between the disposal of healthcare risk waste and landfill/recycling waste, a simple question was asked - could recycling bags be used in the theatre?

Management provided commitment to the programme and with the assistance of the hospital's waste office, clinical nurse manager and other interested staff, a trial of the recycling programme was undertaken in Theatre 9 in 2008.

The trial found that the level of landfill and healthcare risk waste waste greatly reduced. At all times the correct segregation of healthcare risk waste was maintained. Following the success of the trial, the programme was reviewed to incorporate improvements observed, and rolled out across the other 8 theatres in the department.

Influence of the theatre recycling programme on the rest of the hospital

The introduction of recycling bags in the theatre greatly increased the volume of recycling in the hospital.

As a result, the mixed dry compactor in use by the hospital had to be collected much more frequently.

Key points for implementing a successful waste segregation programme

Make it clear what can be placed in the recycling bin:

Consult with your waste contractor and suppliers, to determine what materials will be accepted in the recycling bags.

Before the initial trial CUH's waste officer provided examples of all waste packaging to the waste contractor. All clean packaging, sterilised equipment wrapping, and office paper is accepted in the recycling bags in CUH.

Compile a clear list of the materials that are acceptable and supply to staff before the start of the programme, as in the CUH trial. Outline that all other material should be placed in the general landfill waste bag and if healthcare risk waste, in the healthcare risk waste (HCRW) bin.

At the start of the programme instructional signage may need to be placed on or above bins to assist staff. As staff become used to the recycling system and what is acceptable in the bins, the signage can be removed, in line with infection control best practice.

Review the number and type of general landfill and HCRW bins provided:

Ensure that all the healthcare risk waste and general landfill waste bins are actually needed. Where surplus to requirements, remove the waste bin to prevent the placement of waste in the wrong bin e.g. recyclables in the HCRW bin.

Ensure waste bins are placed in the right location:

Ensure the recycling bins are provided in areas where large volumes of packaging are generated. Always place the HCRW bin near another type of bin; staff have to think about where to place the waste, and are more likely to place the waste in the correct bin.

Use colour coded bins:

Where possible use different coloured bins or bags for each type of waste, allowing staff to easily identify the correct bin to use.

Staff - essential part of the programme

Ensure that all staff are aware of the waste segregation system. Generally, nursing, portering staff and anaesthetists, manage the majority of waste from the theatre, so focus training on these staff.

Highlight cost savings to staff:

CUH noted that a real motivator for the programme was highlighting to staff the huge cost difference between the disposal of waste as healthcare risk waste and by landfill/recycling.

Ensure the system will be suitable before investing in equipment:

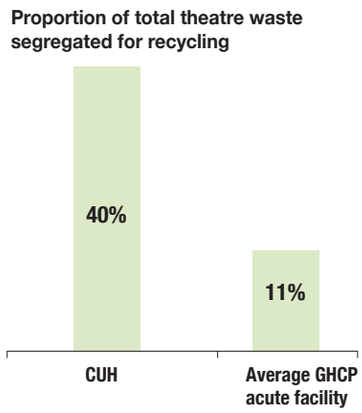
The surgical department requires the use of silent close bins. During the trial existing bins with clear signage were used as recycling bins. The hospital didn't invest in new equipment before knowing if the recycling system would work.

Results of the programme and comparison with the average acute facility

Information gathered through waste surveys carried out under the Green Healthcare programme

The work undertaken by CUH theatre staff results in a significant quantity of recyclables being segregated. A survey by GHCP showed that 40% of the total waste generated in the CUH theatre department (general, healthcare risk waste and recycling) is being segregated for recycling. This is compared to an average value of 11% in theatres in other GHCP acute facilities.

If CUH's recycling level was as low as the average value, their waste disposal costs for the theatre would increase by a minimum of €5,000 per annum.



CASE STUDY St. Vincent's Private Hospital

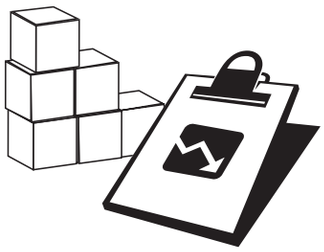
Clinical Waste Reduction in Isolation Rooms and other areas of the Hospital

St. Vincent's Private Hospital (SVPH) is a 232 in-patient bed acute hospital providing a wide range of oncology, diagnostic imaging and surgical and medical services. SVPH joined the Green Healthcare Programme (GHCP) in late 2011 with work undertaken in early 2012. The hospital has actively implemented improvements recommended by the programme team.

Prior to joining the programme the hospital had implemented a number of good practice measures to reduce the quantity of healthcare risk waste (HCRW) it generates and these are outlined in this case study.

Removal of clinical waste bins from all publicly accessible areas and the majority of isolation rooms

Review of clinical waste classification procedure for waste from isolation rooms



Low stock levels in isolation rooms

Removal of all clinical waste bins from publicly accessible areas (e.g. wards)

In general, patients and visitors will not be aware of the difference between healthcare risk waste and landfill waste. This often leads to non-risk waste being incorrectly placed in HCRW bins. This has been observed in numerous surveys carried out in the medical areas of healthcare facilities under the GHCP.

With this in mind, SVPH has removed all HCRW bins from publicly accessible areas (e.g. corridors, ward rooms etc.). In addition, this step has a positive hygiene control aspect, as healthcare risk waste is stored in only a small number of areas.

Review of healthcare risk waste classification procedures for waste from isolation rooms

In most hospitals, a common hygiene control procedure is that all waste generated in isolation rooms is treated as healthcare risk waste. Consequently, all waste generated by the patient (e.g. magazines, drink bottles, etc.) is treated as healthcare risk waste. The majority of patients isolated in hospitals have contact spread conditions (i.e. non droplet or airborne transmittable conditions). Thus, the patient's own waste would pose little risk in the spread of infection.

SVPH recognised that this practice resulted in considerable quantities of materials being unnecessarily treated as healthcare risk waste.

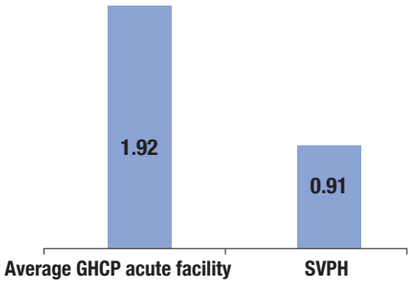
A HCRW bin is not provided in isolation rooms used for the treatment of patients isolated with contact spread infections. All healthcare risk waste generated in the treatment of patients is removed from the room (see box to right) with all other waste generated in the patient room treated as landfill waste or mixed recycling.

Where a patient is isolated for droplet or airborne transmitted conditions, the clinical waste bin is retained in the room with all waste treated as healthcare risk waste.

Results of the SVPH waste survey and comparison withthe average acute facility

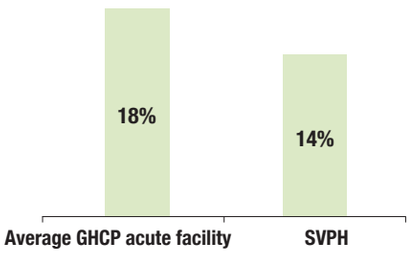
Information gathered through waste surveys carried out under the Green Healthcare programme (GHCP)

kg of healthcare risk waste produced per bed day



SVPH produced 1 kg less clinical waste per bed day than the average acute facility in the Green Healthcare Programme. The good practices result in savings of €58,000 per annum for SVPH, compared to the average acute facility.

Proportion of clinical risk waste bags that was non-risk waste



The healthcare risk waste bags surveyed from the theatre contained 22% less non-risk waste than the average for other acute hospitals in the GHCP. This shows a higher level of segregation of non-risk waste in the hospital.

Management of healthcare risk waste

All healthcare risk waste (waste contaminated with bodily fluids) that is generated in the treatment of patients, including those isolated for contact spread conditions, is placed in a small yellow bag. This bag is then sealed and disposed of in a HCRW bin in the ward utility room.

Use of reusable HCRW bins

SVPH uses reusable bins for the storage of sharps and healthcare risk waste containing liquid. This has reduced the weight and number of HCRW bins disposed.

Maintaining low stock levels of materials in isolation rooms

A stock (e.g. box) of healthcare materials (e.g. gloves, gauzes) is often stored in a room or area. Upon the discharge of a patient from an isolation room, all equipment is sanitised and tagged and all disposable material, including unopened or unused materials, is disposed of as healthcare risk waste. Cleaning staff and infection control staff identified that substantial amounts of materials were being wasted in this manner.

Healthcare materials are no longer stored in isolation rooms and are brought in as needed. Where a material needs to be stored in the room, the stock level is kept to a minimum and replenished from the ward store room. As a result, the quantity of unused materials that is disposed of as healthcare risk waste has been greatly reduced.

CASE STUDY University Hospital Galway

Healthcare Risk Waste Reduction Programme

University Hospital Galway (UHG) is a large acute hospital providing a comprehensive range of services to emergency and elective patients on an inpatient, outpatient and day care basis. The hospital has 558 inpatient and 106 day case beds. UHG is part of Galway University Hospitals.

The hospital joined the Green Healthcare Programme (GHCP) in 2010. The GHCP undertook detailed survey work in the hospital, which generated a number of waste reduction recommendations. A food waste survey was repeated in 2013 to identify savings achieved.

This case study outlines the waste reduction measures implemented by University Hospital Galway and the associated savings achieved.

Healthcare Risk Waste

Comparing the first 7 months of 2013 with the same period in 2012: **16 Tonnes Decrease**

27 TONNES (8%) DECREASE PER ANNUM

UHG has implemented a number of measures to reduce the quantity of HCRW generated onsite, with the main measures including:

- Change to the segregation of waste in source isolated rooms
- Active implementation of change in segregation policy and training of staff at ward level
- Introduction of the 'Bio Systems' waste management system throughout the hospital

Change to the segregation of waste in source isolated rooms:

Up to March 2012, as in the majority of hospitals in Ireland, all waste generated in rooms used for the source isolation of patients was treated as Healthcare Risk Waste (HCRW). HCRW or waste contaminated with blood or bodily fluids will be generated through the treatment of these isolated patients. A significant majority of the waste generated in these rooms is in the form of non-contaminated domestic type waste (e.g. newspapers, papers, plastic, paper towels, etc.), which can be considered as non-risk waste[1].

The hospital's Environmental & Waste Management Co-ordinator recognised that this domestic waste may be unnecessarily disposed of as HCRW, at a significant cost to the hospital.

A project team comprising of the Environmental & Waste Management Co-ordinator and the hospital's Infection Control department was set up. A new waste classification system, which had been implemented in another acute hospital, was considered.

The HCRW bin is removed from the isolation room and only a landfill bin provided. All materials contaminated with blood or bodily fluid, and other materials automatically disposed of as HCRW, is placed into a small yellow bag with the staff member's gloves and other personal protective equipment (PPE). The bag is then sealed and removed from the room to the Dirty Utility Room. All other domestic waste is disposed of in clear bags in the landfill bin, which are closed within the rooms and conveyed to the waste holding area.

The system was trialled in one area and found to operate successfully with no associated negative impacts. In May 2013 the system was rolled out across the hospital.

Note: Where the patient is isolated for a more serious contagious condition, or in the event of an outbreak (e.g. norovirus), all waste is treated as HCRW and the original system reverted to. The landfill bin is replaced with a HCRW bin or the landfill bin is lined with a HCRW bag.

[1] As referenced in the guidelines for the control and prevention of a number of infectious diseases issued by Health Protection Surveillance (HPSC), http://www.hpsc.ie/hpsc/Publications

Active implementation of change in segregation policy and training of staff at ward level:

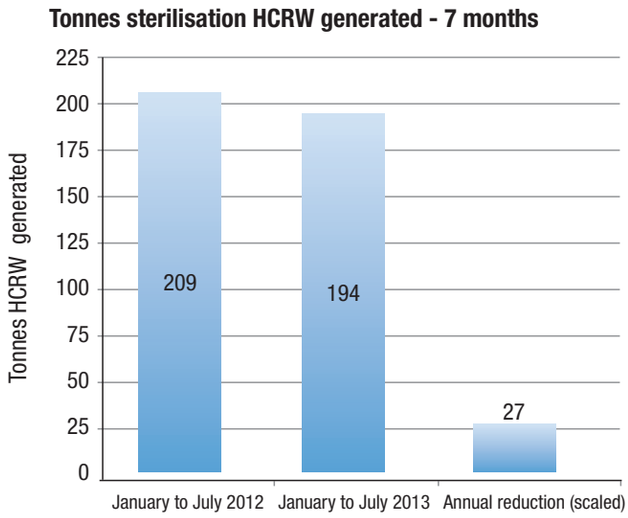
The project team realised that in order for this system to be implemented successfully, it was essential that staff were trained on and fully aware of the new system. Communication was sent to all staff to inform them of the change to the system. The project team actively trained staff at a ward level and targeted ward staff, healthcare staff and cleaning staff. This ward level training was undertaken over a two-month period.

Introduction of the 'Bio Systems' waste management system:

The 'Bio Systems' waste management service incorporates the use of reusable containers for the collection of sharps and liquid HCRW. The full containers are removed to a waste treatment facility, sterilised and returned to the facility for re-use. This reduces the quantity of disposable sharps containers being purchased and disposed of as waste. In addition to the waste reduction aspect, staff outlined a preference for the system, for the reduction in the potential for needle stick injury that the system offers.

Other advantages of new system:

- Healthcare risk waste is only stored in one area of the ward. This reduces the potential for mismanagement in multiple areas.
- Rather than having waste present in smaller volumes in waste bags in multiple areas, the sole healthcare risk waste bag is filled at a faster pace and more frequently removed to the waste storage area. This reduces the time that waste is sitting in an area, including reducing the potential for offensive smell.



Healthcare Risk Waste

Comparing the level of HCRW generated in the first **7 months** of 2013 with that generated in 2012, the hospital generated **16 tonnes of HCRW**. **Scaled for a year that is 27 less tonnes of HCRW generated, a significant reduction of 8%.**

These waste reduction measures have resulted in notable cost savings for the hospital. The hospital continues to work on measures to reduce the quantity of waste it produces even further.

CASE STUDIES

GreenHealthcare

CASE STUDY Temple St. Children's University Hospital

Waste Prevention and Diversion of Recyclables 2010-2012

Temple Street Children's University Hospital (CUH) was established in 1872 as a hospital for the poor children of Dublin. Today the hospital is one of the major paediatric hospitals catering for children from all over the country.

CUH initiated a Sustainable Waste Management Programme in 2004 and has been actively implementing waste, water and energy use reduction measures since. The commitment and support of the hospital's executive has been an important factor in the success of the programme and the move to more sustainable waste management.

As a reflection of CUH's continual work on sustainability and environmental issues they won the Green Awards Green Healthcare Award in 2011 and 2012.

The hospital joined the Green Healthcare Programme (GHCP) in 2010. The hospital has actively considered and implemented the recommendations of the GHCP, and is one of the most active participants of the programme.

This case study outlines the improvements made by CUH during their involvement in the Green Healthcare Programme. These improvements are in addition to those made by the hospital before joining the programme. These improvements have not only impacted on the hospital's sustainability but also resulted in significant cost savings for the hospital.

OVERALL RESULTS: - Estimated reduction in quantity of waste produced per annum and associated cost savings per annum - comparison between 2010 and 2012 surveys

Healthcare Risk Waste	**0.23** kg per bed day Reduction in waste per in-patient bed day	**7** tonnes Waste reduction per annum	**€5,700** Associated cost savings (2012 costs[1])
Landfill	**0.4** kg per bed day Reduction in waste per in-patient bed day	**12** tonnes Waste reduction per annum	**€1,300** Associated cost savings (2012 costs[1])
Food Waste	**0.1** kg per bed day Reduction in waste per in-patient bed day	**11** tonnes Waste reduction per annum	**€18,500** Associated cost savings (2012 costs[1])
Healthcare Risk Waste Special	**0.03** kg per bed day Increase	**0.9** tonnes Increase	**€1,700** Cost increase
	Total annual savings achieved through continual review of waste management systems and staff awareness -		**€23,800**

[1]Excluding VAT

Previous measures implemented by the hospital have resulted in additional savings of €21,000 per annum.

Healthcare Risk Waste

Waste reduction per annum:
6 Tonnes -

Regular risk waste reduction: **7 Tonnes**

Special waste increase **1 Tonne**

Estimated cost savings:
€4,000

BENCHMARK:

Before
Green Healthcare Programme
2.49 kg of waste per in-patient bed day

After
Green Healthcare Programme
2.29 kg of waste per in-patient bed day

8% REDUCTION

As far back as 2008 the hospital identified the potential to reduce the quantity of HCRW generated by the hospital. The hospital identified two reasons why materials were being incorrectly disposed of as HCRW, as follows:

- Certain materials incorrectly automatically classified as HCRW
- Classification of all waste from isolation rooms as HCRW

Through work undertaken by the hospital's microbiologist and infection control team, in consultation with national and WHO guidelines, the HCRW classification policy was reviewed and changed in 2009.

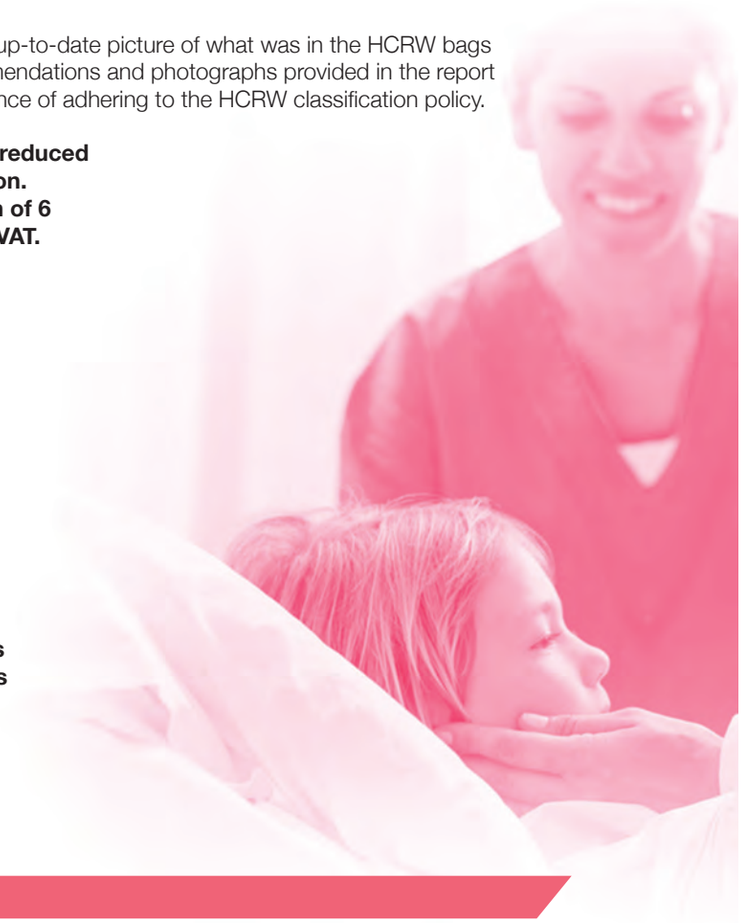
All isolation rooms are now provided with a HCRW bin and landfill waste bin. Only materials contaminated with blood are now classified as HCRW. For patients with gastroenteritis, materials contaminated with faeces are also classified as HCRW. For patients with Category 3 or 4 pathogens, all waste generated by and in the treatment of the patient is treated as HCRW.

The revision to the classification policy resulted in the quantity of HCRW being reduced by 11 tonnes in 2010, resulting in savings of €21,000. These are in addition to the savings identified earlier.

The Green Healthcare Programme's HCRW survey provided an up-to-date picture of what was in the HCRW bags generated in the hospital in 2010. The hospital used the recommendations and photographs provided in the report to implement a new awareness drive among staff of the importance of adhering to the HCRW classification policy.

Between 2010 and 2012, the quantity of HCRW generated reduced from 2.49 to 2.29 kg per in-patient bed day, an 8% reduction. Based on the 2012 activity this corresponds to a reduction of 6 tonnes per annum and savings of €4,000 per annum excl. VAT.

In 2012, a re-survey of the contents of the HCRW bags in one ward observed that the proportion of the bag that was comprised of recyclable non contaminated clean materials reduced from 46% to 9% - a significant reduction!



Recycling & Landfill Waste

Waste reduction per annum:
12 tonnes

Estimated cost savings:
€1,300

BENCHMARK:

Before
Green Healthcare Programme
7.14 kg per in-patient bed day

After
Green Healthcare Programme
6.74 kg of waste per in-patient bed day

6% REDUCTION

Before the hospital commenced its Sustainable Waste Management Program in May 2004 the hospital recycled only **11%** of its waste (excluding non-risk waste). A business case was made to the hospital executive to change this and the following steps were implemented:

- A compactor was purchased to store mixed dry recyclables
- A staff member was assigned the responsibility of waste management
- An awareness drive among staff was put in place

The recycling rate increased to **38%** just one month later – a significant improvement. This shows if the facilities are provided staff will use them.

The hospital now recycles almost all materials including cardboard, plastics, paper, composite packaging, metal, glass, etc.

Since joining the GHCP the quantity of landfill waste generated in the hospital has reduced even further. As with the HCRW the hospital used the recommendations provided in the GHCP report to implement a new awareness drive among staff of the importance of segregating the recyclables.

Between 2010 and 2012, the quantity of landfill reduced from 7.14 to 6.74 kg per in-patient bed day, a 6% reduction. Based on the 2012 activity this corresponds to a reduction of 12 tonnes per annum and savings of €1,300 per annum excl. VAT.

In 2012, a re-survey of the contents of the landfill bags in a number of wards observed that the proportion of the landfill bag that was comprised of recyclables reduced by up to 82%!

Energy Use

A 'left on' equipment survey was carried out by the GHCP at the weekend, when offices, most labs, and week-day clinics are closed. The findings of this survey revealed that the hospital could reduce its electricity usage by at least 120,000 kWh per annum and annual cost by €9,100 if staff were to turn off equipment at night and weekends.

A significant re-development currently being undertaken at the site involves the installation of two new low pressure hot water boiler plant rooms. It is expected that this will save approximately €150k per annum in energy costs.

During the redevelopment a number of leaks were found onsite. In one area, a substantial leak of hot water to ground was found - a double cost of treating and heating the water.

The hospital employs the SEAI Energy Map to monitor and manage its energy use.

www.seai.ie/energymap

Water

A key component of the hospital's Sustainable Waste Management Programme is the area of water use. The hospital recognised that implementing water reduction measures would not only improve sustainability and reduce costs, but also help to ensure water supply to the hospital. In recent years the hospital has implemented a number of key projects including:

- Major leak detection and repair project
- Retrofit of a number of taps, reducing the flow from up to 25 litres/min to 6 litres/min
- Upgrade of pipe quality and insulation to reduce risk of future leaks or burst pipes
- Ongoing research onto the potential re-use of water generated during the Reverse Osmosis process used in hospital activities e.g. Sterile Services Department

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