Healthcare Waste Minimisation

a compendium of good practice
Healthcare Waste Minimisation
– a compendium of good practice
The cost of waste disposal is increasing. Both generation and disposal of any waste within a hospital trust not only increases costs, but also mean the need for additional resources in materials, space and staff time, so the “true” cost of waste for a trust can be much greater than at first apparent. Typically, it has been estimated that for most businesses the true cost of waste management is in the range of 4 to 10% of turnover, highlighting a very real need to reduce both resource costs and the environmental impact of the generation and disposal of waste.

Although generally waste is well managed within NHS trusts, a very few hospital trusts are actively engaged in waste minimisation programmes, while even fewer have embraced the challenge of waste prevention. There is an urgent need to galvanise trusts into pursuing waste minimisation and prevention techniques. One of the approaches proven most effective in achieving such aims is to recognise and promote to a wide audience existing examples of good practice in waste management and waste minimisation – hence this Compendium of Good Practice.

This Compendium provides an analysis of current waste management systems in operation within Hospital Trusts and detailed case studies of good waste minimisation practice. We would encourage all healthcare professionals to use this document as a source of advice and guidance for introducing a waste minimisation programme or to improve existing schemes.

There are good sound reasons for adopting these programmes. They will satisfy the requirement to have effective waste management in place in the Governance process. They can also help to reduce harmful effects on the environment and so contribute to an improvement in the health of the local population. They will demonstrate to all staff and patients a commitment to an ongoing programme of improvement. Furthermore, the act of minimising waste can reduce waste disposal costs releasing much-needed funds for reinvestment in direct patient care.

Even if your trust has started a waste minimisation programme, there is scope for further action. If you have not yet realised the potential benefits to be gained from waste minimisation, be assured that you are not alone. You will find in the Compendium, not only practical guidance, but also contact details of waste managers and estates professionals who are willing to share their experiences. You will also find a list of useful publications and guidance documents for reference purposes.

We acknowledge that there will be a continuing demand from trusts for support in their waste minimisation endeavours. The next step will be to help trusts prevent waste occurring in the first place. To this end, we aim to produce further information, based on a life cycle assessment, to help busy NHS trust managers to identify, evaluate and implement best practice in waste prevention. This further guide will be available by Summer/Autumn 2000.

The Lady Howe of Aberavon, CBE
Chairman, The BOC Foundation

Yvette Cooper
Parliamentary Under Secretary of State for Public Health

© Crown copyright 2000
Contents

Management summary  page 3

Appendix 1 – Full Case Study site visits  page 6
   Trusts (Main)
      Bassetlaw
      Birmingham Women's Hospital
      Manchester Royal Infirmary
      Macclesfield
      Leeds General
      Warneford
      Portsmouth (St James' Hospital)
      Portsmouth Hospitals NHS Trust
      Royal Preston
      University College Hospital
   Topics

Appendix 2 – Mini Case Studies  page 32
   Blackpool Victoria Hospital
   Central Sheffield University Hospital
   Hartlepool General
   Parkside Health Trust
   Plymouth Hospital
   Pontypridd & Rhondda
   Southend Community Care
   Topics

Appendix 3 – Analysis of current waste management within healthcare Trusts in England and Wales  page 39

Appendix 4 – Contacts and further information  page 52

Appendix 5 – Waste Minimisation Questionnaire sent to all NHS Trusts in England and Wales in April 1999  page 54

Appendix 6 – Steering Group Organisations and Membership  page 69

A PREVENTION GUIDE WILL BE AVAILABLE IN SUMMER 2000

Management summary

Project objectives

The objectives of the project were:

- to produce a good practice compendium to provide NHS trusts with information and guidance on waste management and minimisation.
- to identify how trusts are tackling the management and disposal of healthcare waste and highlight areas for improvement.

From this information, the project aimed to help trusts develop waste management and ultimately, waste minimisation strategies.

Methodology

A questionnaire was sent to all trusts in England and Wales to establish baseline information. A total of 94 questionnaires were returned, representing a 21 per cent response rate.

An analysis of the questionnaires was carried out to identify the extent of waste management and minimisation initiatives within the NHS. Each section of the questionnaire was evaluated separately and a full analysis report is included in the Appendix 3.

Examples of good practice plus policy and procedure development within NHS trusts were identified.

Site visits to trusts were carried out and case studies illustrating good practice were produced and incorporated into the Compendium of Good Practice.

Outcome

The primary output is the Compendium of Good Practice, providing guidance to enable trusts to improve the present position. There are four main advantages to be gained from in terms of the management of waste and initiatives to either recycle, re-use or minimise waste. These are:

- reduction in current and future costs associated with waste management;
- reduction of negative impacts on the environment, associated with disposal of waste, and compliance with the policy of greening the NHS;
- the streamlining of operational procedures, policy and compliance with mandatory and statutory obligations;
- the benefits associated with adopting best practice are not only financial but also ensuring legislative compliance.

Current practice analysis

Key findings from questionnaire analysis

| Case study No. | Trust has in place good organisational and management arrangements to manage waste, implemented some form of system for risk management, developed some policies and procedures to ensure effective movement, transport, storage and disposal systems and maintains records of compliance with guidance on statutory and mandatory regulations. | 1 |
| There is scope for improvement in waste elimination, re-use and recycling initiatives, sharing information, education and influencing of staff and partnership arrangements. Major improvements are possible in terms of developing waste minimisation strategies. | 3,5,10 |
| Senior management commitment is essential to ensure waste management is seen as a corporate issue and environmental matters are taken seriously within the Trust. Fifty-nine per cent of respondents have appointed a manager with responsibility for waste management. While 70 per cent of respondents have a waste management strategy, only 10 per cent have set targets for reducing waste. | 3,5,10 |
• Clinical waste is top of the list of the waste stream and subjected to the most critical audit and review. A number of respondents have implemented schemes to reduce clinical waste by ensuring domestic waste does not enter the incorrect stream.

• The survey showed 70 per cent of respondents currently operate a policy to ensure operational systems to manage waste disposal also cover clinical waste. However, respondent trusts provided only four examples of an environmental strategy policy.

• Recycling initiatives in the main cover the usual commodities, with paper and cardboard being the main items involved. 11 per cent of respondents have introduced re-use initiatives. Examples range from ventilation tubes in neonatal units to reusable bed pans and urinals.

• Both staff training and the provision of information relating to waste management needs to be more fully developed.

• Partnerships with other agencies, statutory bodies and suppliers are poorly developed. Specifically, opportunities exist for negotiation and partnership with suppliers to reduce the amount of packaging associated with procurement.

• Half of respondents had implemented some form of waste minimisation initiative.

• Overall, there was an extreme range of scores from the questionnaire analysis indicating that a number of trusts have scope to improve their performance not only in respect of waste minimisation but waste management generally.

Full case studies

1. Bassetlaw Hospital Community Services NHS – Partnerships
4. East Cheshire NHS Trust (Macclesfield) – Waste Stream Segregation
5. Leeds Teaching Hospitals NHS Trust – Recycling
6. Oxford Mental Health NHS Trust (Warneford) – Clinical Waste
7. Portsmouth Healthcare NHS Trust – Recycling
8. Portsmouth Hospitals NHS Trust – Waste Management Strategy
9. Preston Acute NHS Trust – Dedicated Waste Manager
10. University College London Hospitals NHS Trust – Clinical Waste

Additional studies

Mini case studies

1. Blackpool Victoria Hospital NHS Trust – Environmental Strategy
2. Central Sheffield University Hospitals NHS Trust (Western Park Hospital) – Clinical Waste
3. Hartlepool and East Durham NHS Trust (Hartlepool General Hospital) - Partnerships
4. Parkside Health NHS Trust – Environmental Strategy
5. Plymouth Hospitals NHS Trust (Derriford Hospital)– Recycling
6. Pontypridd and Rhondda NHS Trust – Partnerships
7. Southend Community Care Services NHS Trust – Domestic Waste

¹ For full case studies please see Appendix 1
² For mini case studies please see Appendix 2
This publication includes a number of case studies, illustrating examples of good practice within the NHS which could be adopted by any NHS trust, for example management initiatives, segregation and efficient disposal of waste to systems, policies to eliminate, recycle or minimise waste.

**Case study findings**

- Trusts are increasingly segregating clinical and domestic waste to reduce costs. Successful programmes adopt a team approach, including support from infection control backed up by staff training.

- Effective segregation of clinical and domestic waste was a starting point for further initiatives.

- Recycling initiatives were found to be the norm and included all conventional materials i.e. paper, cardboard, glass, scrap-metal, cans and toner cartridges.

- However, recycling has suffered from market volatility and income from these schemes was often variable. Although some schemes incurred costs, they remained revenue neutral due to overall cost reductions in landfill disposal charges.

- Positive benefits were achieved from a strategic approach to waste management, with trusts managing waste as a risk and interdepartmental co-operation between clinical, estates and facilities staff.

- A dedicated waste minimisation manager was a clear benefit.

- A “champion” for waste minimisation was needed in the organisation to deliver change.

- Waste management is a high profile activity but, waste minimisation is underdeveloped.

**Overall conclusions**

1. Most respondent trusts showed examples of good waste management.

2. Trusts focus on clinical waste due to management and organisational costs.

3. Segregation of clinical and domestic waste is the first step in the minimisation cycle.

4. Market conditions can undermine efforts to recycle if not managed.

**Recommendations**

1. Initiatives to raise environmental awareness and introduce effective waste minimisation programmes need to be reinforced.

2. Training and sharing of information with front line staff is essential in ensuring ongoing development of waste minimisation opportunities.

3. A significant amount of work on waste prevention still needs to be completed and is key to effective minimisation.

4. Improved waste management performance depends on regular evaluation.

5. Trusts would benefit from a “Waste and Environment” network, enabling them to share good practice.

6. There is an overwhelming need to achieve a more strategic approach to environmental issues within the NHS.
## Healthcare waste minimisation case studies

<table>
<thead>
<tr>
<th>TRUST</th>
<th>AREAS OF GOOD PRACTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Bassetlaw</strong></td>
<td>Clinical Waste, Housekeeping, Contracts, Composting, Staff Awareness, Paper recycling, Green Issues in Business, Greencode EMS</td>
</tr>
<tr>
<td><strong>2. Birmingham Women’s Hospital</strong></td>
<td>Clinical Waste, recycling Paper &amp; Glass, Partnership, Staff Awareness</td>
</tr>
<tr>
<td><strong>3. Manchester Royal Infirmary</strong></td>
<td>Team Work, Strategic Management, recycling, Waste Reduction, Segregation</td>
</tr>
<tr>
<td><strong>4. Macclesfield</strong></td>
<td>Segregation, recycling</td>
</tr>
<tr>
<td><strong>5. Leeds General</strong></td>
<td>Communication, Organisation, recycling, Cost Control, Site Design</td>
</tr>
<tr>
<td><strong>6. Warneford</strong></td>
<td>Clinical Waste Reduction, Cost Savings</td>
</tr>
<tr>
<td><strong>7. Portsmouth (St. James’ Hospital)</strong></td>
<td>Recycling, Partnership</td>
</tr>
<tr>
<td><strong>8. Portsmouth Hospitals NHS Trust</strong></td>
<td>Environmental Group, Audit, recycling, ISO 9002</td>
</tr>
<tr>
<td><strong>9. Royal Preston</strong></td>
<td>Waste Manager, Clinical Waste, Cost Savings, Training</td>
</tr>
<tr>
<td><strong>10. University College Hospital</strong></td>
<td>Communication, Cost Saving Clinical Waste, Recycling, Teamwork, Interdepartmental Co-operation</td>
</tr>
</tbody>
</table>

### MINI CASE STUDIES

<table>
<thead>
<tr>
<th>MINI CASE STUDIES</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1M Blackpool Victoria Hospital</strong></td>
<td>Environmental Strategy</td>
</tr>
<tr>
<td><strong>2M Central Sheffield University Hospital</strong></td>
<td>Clinical Waste Reduction</td>
</tr>
<tr>
<td><strong>3M Hartlepool General</strong></td>
<td>Partnership – Teesside Environmentally Aware Business Association (TEABA)</td>
</tr>
<tr>
<td><strong>4M Parkside Health Trust</strong></td>
<td>Waste Management Policy</td>
</tr>
<tr>
<td><strong>5M Plymouth Hospital</strong></td>
<td>Recycling</td>
</tr>
<tr>
<td><strong>6M Pontypridd &amp; Rhondda</strong></td>
<td>Welsh National Clinical Waste Consortium</td>
</tr>
<tr>
<td><strong>7M Southend Community Care</strong></td>
<td>Domestic Waste Costs Reduction</td>
</tr>
<tr>
<td>AREA OF GOOD PRACTICE</td>
<td>TRUST</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>AUDIT</td>
<td>PORTSMOUTH HOSPITAL NHS TRUST</td>
</tr>
<tr>
<td>CLINICAL WASTE</td>
<td>BASSETLAW</td>
</tr>
<tr>
<td></td>
<td>ROYAL PRESTON</td>
</tr>
<tr>
<td></td>
<td>PONTYPRIDD &amp; RHONDDA</td>
</tr>
<tr>
<td>COMPOSTING</td>
<td>BASSETLAW</td>
</tr>
<tr>
<td>CONTRACTS</td>
<td>BASSETLAW</td>
</tr>
<tr>
<td>COMMUNICATION</td>
<td>LEEDS GENERAL</td>
</tr>
<tr>
<td>COST CONTROL</td>
<td>LEEDS GENERAL</td>
</tr>
<tr>
<td>COST SAVING</td>
<td>WARNEFORD</td>
</tr>
<tr>
<td></td>
<td>SOUTHEND COMMUNITY CARE</td>
</tr>
<tr>
<td>DOMESTIC WASTE</td>
<td>SOUTHEND COMMUNITY CARE</td>
</tr>
<tr>
<td>ENVIRONMENTAL GROUP</td>
<td>BASSETLAW</td>
</tr>
<tr>
<td>ENVIRONMENTAL MANAGEMENT SYSTEM</td>
<td>BLACKPOOL VICTORIA HOSPITAL</td>
</tr>
<tr>
<td>ENVIRONMENTAL STRATEGY</td>
<td>BLACKPOOL VICTORIA HOSPITAL</td>
</tr>
<tr>
<td>HOUSEKEEPING</td>
<td>BASSETLAW</td>
</tr>
<tr>
<td>MANAGEMENT</td>
<td>MANCHESTER ROYAL INFIRMARY</td>
</tr>
<tr>
<td></td>
<td>UNIVERSITY COLLEGE HOSPITAL</td>
</tr>
<tr>
<td>PARTNERSHIP</td>
<td>BASSETLAW</td>
</tr>
<tr>
<td></td>
<td>HARTLEPOOL</td>
</tr>
<tr>
<td>AREA OF GOOD PRACTICE</td>
<td>TRUST</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>RECYCLING</td>
<td>BASSETLAW</td>
</tr>
<tr>
<td></td>
<td>BIRMINGHAM WOMEN’S HOSPITAL</td>
</tr>
<tr>
<td></td>
<td>MANCHESTER ROYAL INFIRMARY</td>
</tr>
<tr>
<td></td>
<td>MACCLESFIELD</td>
</tr>
<tr>
<td></td>
<td>LEEDS GENERAL</td>
</tr>
<tr>
<td></td>
<td>PORTSMOUTH (ST. JAMES’ HOSPITAL)</td>
</tr>
<tr>
<td></td>
<td>PORTSMOUTH HOSPITALS NHS TRUST</td>
</tr>
<tr>
<td></td>
<td>UNIVERSITY COLLEGE HOSPITAL</td>
</tr>
<tr>
<td></td>
<td>PLYMOUTH HOSPITAL</td>
</tr>
<tr>
<td>SEGREGATION</td>
<td>MANCHESTER ROYAL INFIRMARY</td>
</tr>
<tr>
<td></td>
<td>MACCLESFIELD</td>
</tr>
<tr>
<td>STAFF AWARENESS</td>
<td>BASSETLAW</td>
</tr>
<tr>
<td></td>
<td>BIRMINGHAM WOMEN’S HOSPITAL</td>
</tr>
<tr>
<td>TEAMWORK</td>
<td>MANCHESTER ROYAL INFIRMARY</td>
</tr>
<tr>
<td></td>
<td>PORTSMOUTH HOSPITALS NHS TRUST</td>
</tr>
<tr>
<td></td>
<td>UNIVERSITY COLLEGE HOSPITAL</td>
</tr>
<tr>
<td>TRAINING</td>
<td>ROYAL PRESTON</td>
</tr>
<tr>
<td>WASTE MANAGER</td>
<td>ROYAL PRESTON</td>
</tr>
<tr>
<td>WASTE MANAGEMENT POLICY</td>
<td>PARKSIDE HEALTH TRUST</td>
</tr>
</tbody>
</table>
Full case study site visits

1. BASSETLAW HOSPITAL AND COMMUNITY SERVICES NHS TRUST (BASSETLAW DISTRICT GENERAL HOSPITAL)

Area of good practice identified

- Segregation of clinical and domestic waste
- Improved monitoring of waste
- Reducing waste through contractual arrangements
- Composting of garden waste
- Increased staff awareness
- Paper recycling
- Incorporating “green” issues in business decisions

Waste minimisation area

Clinical waste reduction, waste segregation, recycling.

Type of trust

The Trust provides community, mental health and general hospital services to the Bassetlaw district. The Trust incorporates GP practices, community services and the District General Hospital in Worksop. The case study centred on the District General Hospital site.

Location of trust

Worksop, Bassetlaw.

Benefits achieved and description of good practice scheme

- Reduction in general waste from 340 tonnes annually in 1994 to 235 tonnes in 1998
- Between 18 and 20 tonnes of paper recycled each year
- Reduction in “fly tipping”
- 40% reduction in costs associated with general waste

The Trust chief executive was the driver for the introduction of environmental best practice with his desire to pursue green initiatives throughout the organisation. Green issues were incorporated into Trust objectives, resulting in the introduction of a number of initiatives and green issues have also been considered when making business decisions.

Building on these initiatives, Brian Gibbs (Director of Support Services) and Richard Penney (Property and Capital Development Manager), following a visit to Strathclyde University, chose to purchase the Greencode Environmental Management System. The Trust is the first in England to use this system which was designed specifically for the NHS.

For economic reasons the Trust’s coal fired boiler system was replaced with a decentralised gas system in 1996. Environmental factors were considered and although the Trust would have preferred a combined heat and power system, its capital cost outweighed any potential environmental benefits, although gas is considered a cleaner and more efficient fuel than coal.

The decentralised gas system did have a major environmental advantage as the coal ash produced by the previous system which went to landfill was no longer produced. Approximately one quarter (26 tonnes of 105 tonnes) of the reduction in general waste achieved by the Trust since 1994 is attributable to the removal of coal ash from the waste stream.

Environmental concerns influenced the Trust’s choice of clinical waste contractor. A company which incinerates waste in Sheffield was appointed, despite a higher per tonnage cost. Waste is incinerated by Sheffield City Council and some of the energy is recovered to provide heat to the city centre. Also Sheffield is closer to the Trust than other contractors’ incinerator sites such as Birmingham, and therefore the fuel used in transportation is minimised through this arrangement.

The Trust has purchased recycled paper, but costs have risen to the point where it is no longer justified. When recycled paper cost £800 more per annum than virgin paper, the Trust considered this an acceptable premium, but when the difference rose to £5000 in the current financial year, the Trust was unable to justify the revenue cost of specifying recycled paper.

A major scheme to remove office paper from the landfill waste stream was introduced in 1998. This has resulted in up to 20 tonnes of paper being recycled every year, with associated reductions in landfill costs. Recycle bins are provided around the site and shredders are provided in most offices. Using shredders enables restricted waste to be placed into the waste paper recycling stream.

The Trust pays rental for the paper skips but receives revenue for collected paper, dependent on the grade, and the scheme is considered revenue neutral.

The Trust has also rationalised the location of its waste skips and improved hygiene. Previously there had been problems with “fly tipping” and members of the public placing their waste in Trust skips. By reducing the number
of skips and siting the remainder in less public places this problem has been reduced considerably. The skips are also kept clean and tidy with waste segregated effectively.

![Figure 1: Shredded paper awaiting collection for recycling. 18 to 20 tonnes of paper are recycled per year](image)

In order to reduce the Trust’s landfill waste costs, grounds maintenance contractors were required to remove garden waste. However, garden waste continued to be placed in the general waste stream, until the introduction of a composting initiative eliminated this problem. Garden waste is now composted and recycled for further use within the hospital rather than being taken to landfill, so reducing costs.

Capital scheme contracts require contractors to remove all rubbish from site, cutting landfill waste and the Trust also requires sustainable materials to be used.

To reduce the amount of kitchen waste entering the general waste stream, meals are now delivered pre-prepared to site.

Scrap metal is segregated into a separate skip and sold to a scrap metal dealer.

Cardboard recycling has been investigated but as contractors require waste to be baled before they will collect, the Trust has decided that it cannot afford to introduce a bailer and allocate an operator to run the machine, therefore cardboard recycling does not take place.

Support services has not publicised waste minimisation policy widely, although articles in the risk management newsletter encourage staff to cut costs through minimising waste where possible.

Via these relatively simple initiatives the Trust has reduced the volume entering the landfill waste stream considerably and lowered associated costs.

![Figure 2: Rationalisation of skip provision has reduced “fly tipping” and improved hygiene](image)

### Resources needed and costs (revenue, time and opportunity costs), difficulties encountered and actions taken to overcome

The above initiatives were put in place by the Facilities department, in line with Trust objectives. Richard Penny (Property and Capital Development Manager) and Alan Sparkes (Energy Engineer) have been responsible for implementing the schemes, although their time has not been included in the project costings.

The volatile nature of the recycling market has proved a major obstacle to the introduction of green initiatives, with high costs preventing the use of recycled paper and the recycling of cardboard. This has been one of the major obstacles the Trust has had to overcome.

### Conclusion

The Trust now considers environmental factors when making business decisions. Major efforts to reduce the amount of waste going to landfill, allied to improved house keeping and initiatives such as the composting scheme, have effectively reduced the amount of waste disposed of via landfill.

Efforts to “buy green” have been hampered by increases in the price of recycled products, such as paper. While the Trust seeks to support environmental best practice wherever possible, cost considerations ultimately place constraints on the extent to which this is best value.

### Key personnel involved in waste management, minimisation and environmental initiatives

- Brian Gibbs (Director of Support Services)
- Richard Penny (Property and Capital Development Manager)
- Alan Sparkes (Energy Engineer).
2. BIRMINGHAM WOMEN’S HEALTHCARE NHS TRUST (BIRMINGHAM WOMEN’S HOSPITAL)

Area of good practice identified
- Segregation of clinical and domestic waste
- Recycling paper and glass
- Attempts to recycle cardboard
- Partnerships with waste contractors
- Increased staff awareness

Waste minimisation area
Clinical and domestic waste reduction plus recycling of paper and glass.

Type of trust
A single-hospital trust offering obstetric services for a large population, producing a great deal of clinical waste due to the nature of its services.

Location
Edgbaston, Birmingham.

Benefits achieved and description of good practice scheme
- 50 per cent reduction in domestic waste
- Reduction in clinical waste from 75 to 65 tonnes
- Partnerships with waste contractors
- Increased staff awareness

These achievements were the result of a three-month student placement researching the Trust’s waste management practices. Recommendations contained in this report were adopted in an attempt to reduce the amount of clinical and other waste sent for landfill.

The Trust now re-cycles glass, using a local contractor. Bins are rented by the Trust at a nominal charge of 30 pence weekly and the glass is collected free of charge.

Another element of the scheme was the introduction of a compactor to reduce volume of waste and therefore the number of trips to landfill. With domestic waste decreasing due to recycling, the compactor was replaced with a smaller model.

The introduction of clear sacks for bagging domestic waste has led to recycling of paper with the paper taken away free of charge.

Arrangements have been made with a local skip company to remove builders waste and with a dealer who removes scrap metal, free of charge.

Although the Trust segregates cardboard from normal domestic waste and is considering the introduction of a baler, there have been difficulties in finding a contractor who will take it free of charge. Negotiations are now taking place with a local supermarket in order to establish whether they would be prepared to include the Trust in their cardboard pick up arrangements.

Once the cardboard issue is resolved the Trust believes it will have optimised its reduction of domestic waste for landfill.

The Trust has been successful in raising staff awareness of waste issues and has involved waste contractors in this process. Trust risk manager Gavin Wilson has been instrumental in championing innovative initiatives to raise awareness.

Articles have appeared in the Trust newsletter and competitions (with prizes donated by waste contractors) have helped raise awareness amongst staff.

The Trust’s clinical waste contractor has provided posters to raise awareness not only of clinical waste but also recycling initiatives.

This contractor also carries out clinical waste audits on behalf of the Trust and provides training for the Trust’s nominated waste officers.

All of these initiatives are provided free of charge. Through good relationships with contractors the Trust has managed to improve waste management and raise staff awareness without expense. One contractor uses the Trust as a model site – the Trust allows visitors to be shown around the site and also carries out trials of new initiatives/products, receiving free training in return. The relationship is run as a partnership.

The Trust’s sharps supplier held a “Champagne Sharps” week, which involved the contractor carrying out an audit of each department’s sharps. Every department which achieved a 100 per cent “pass” received a bottle of champagne.

The risk manager’s view is that harnessing the support of both contractors and staff is vital in improving waste management performance.
Figure 3: Posters to raise awareness of waste issues have been produced in partnership with the Trust’s clinical waste contractor.
Resources needed and costs (revenue, time and opportunity costs), difficulties encountered and actions taken to overcome

Because contractors have taken such an active role in improving waste management arrangements, and contractors who will remove recycling material free of charge, the Trust has incurred few opportunity costs. The initiatives were prompted by the results of the student research placement, made possible through good relations with Aberystwyth University.

If the Trust does opt to purchase a cardboard baler, a capital investment of £3000–5000 would be required. The Trust pays a nominal rate for glass recycling bins.

Conclusion

The Trust has increased waste segregation levels and removed as much as possible from the landfill (domestic waste) stream.

The most significant factor in the approach adopted by the Trust is the nature of the partnership arrangements with waste contractors. This has resulted in innovative initiatives to raise staff awareness and measures such as waste audits.

These arrangements may not be possible in all trusts but the risk manager’s approach to getting contractors involved in the waste management process could be adopted to good effect by others.

Waste audits undertaken within trusts by waste stream

Clinical waste and sharps audits undertaken by Trust contractors, domestic waste audit undertaken during student placement.

Key personnel involved in waste management, minimisation and environmental initiatives

Gavin Wilson  (Risk Manager)
3. CENTRAL MANCHESTER HEALTHCARE NHS TRUST (MANCHESTER ROYAL INFIRMARY)

Area of good practice identified
- Interdepartmental team work in waste management
- Strategic co-ordinated approach to the management of waste
- Recycling of glass, paper, cardboard, scrap metal and cans
- Reduced amounts of waste going to landfill
- Improved segregation of clinical and domestic waste streams

Waste minimisation area
Recycling, clinical waste reduction.

Type of trust
Central Manchester Healthcare NHS Trust is a group of hospitals situated just south of the city of Manchester, incorporating Manchester Royal Infirmary, Saint Mary’s Hospital for Women and Children, Manchester Royal Eye Hospital and University Dental Hospital.

The hospitals, which treat approximately 500,000 patients a year, have a reputation for providing the highest standards of treatment and not only attract patients from local communities, but from all over the country. Specialist areas include cardiology and cardiac surgery, renal medicine and transplantation, obstetrics and gynaecology, ophthalmology, neo-natal services, rehabilitation and emergency medicine.

Location
Manchester City Centre.

Benefits achieved and description of good practice
- Reduced amounts of waste sent to landfill
- £14,200 saving in general waste landfill costs
- Reduced clinical waste
- 132 tonnes of paper recycled annually
- 84 tonnes of card recycled annually
- 22 tonnes of glass recycled annually
- 386 kilos of cans recycled annually

The Trust has adopted a more co-ordinated, strategic approach to managing waste in order to improve segregation, reduce risk and increase recycling.

By bringing together the Facilities Services Development Manager, Health and Safety Advisor, Environmental Manager, Infection Control, Domestic Manager and Fire Officer to discuss waste management, the Trust has ensured that the issue is dealt with effectively. While the Trust actively attempts to reduce waste and increase segregation, it has also taken the opportunity to reduce risks associated with handling waste, especially clinical waste. In addition, managers realise that efforts to segregate waste can lead to the creation of additional risks – again a co-ordinated approach ensures that these risks are minimised and managed effectively.

Waste reduction initiatives were introduced in advance of the decommissioning of the hospital incinerator in September 1995, beginning with a paper recycling scheme, with a contractor providing consumables free of charge. The Trust received £80 per tonne for the paper. The scheme took off to the extent that 1,000 recycling boxes were provided around the Manchester Royal Infirmary site.

The same contractor was a partner in a cardboard recycling programme. It provided a skip and the Trust leased a compactor – again generating an income of £80 per tonne.

However, the Trust does pay £40 per collection for glass and paper to go for recycling.

Efforts have also been made to reduce the risks associated with handling clinical waste. Closure of the hospital incinerator released funding for the purchase of 70 “Sulo” bins. These were sited close to sources of clinical waste, reducing the necessity for handling bags more than once. A lifting machine and two tugs were purchased to further reduce the risks of clinical waste handling whilst moving clinical waste on site.

Staff received training in the correct use of clinical waste bags to improve segregation. As part of its clinical governance measures, the Trust uses an audit tool, which covers the management of clinical waste, including correct segregation. This has led to nursing staff focusing on clinical waste as part of the infection control process, backed up by seminars and colourful posters placed around the site.

This type of co-ordinated approach ensures that clinical waste segregation is addressed with the help of infection control whilst simultaneously reducing risk associated with handling clinical waste through input from the health and safety advisor.

Two teams have been set up to deal with clinical and general waste. They carry out a rolling schedule of collections providing constant removal of waste from wards and departments to a central site.
Figure 4  The purchase of two tugs is one of a number of actions taken to reduce the risk of waste handling.

Clinical waste collections are made twice daily. Tonnage has been reduced from some 21 tonnes per week to approximately 17 tonnes, as a result of improved waste segregation, despite an increase in finished consultant episodes (in 1998/99) of 1054.

Project managers believe the Trust is now at a point where little more can be achieved in terms of segregation and recycling. Waste as an issue has been highlighted and remains on the agenda through the staff briefing system in which waste issues are included. Maintaining the standards achieved so far remains a challenge.

Resources needed and costs (revenue, time and opportunity costs), difficulties encountered and actions taken to overcome

Implementing these initiatives has required the input of Adrian Yates (Facilities Services Development Manager), Ken Wood (Health and Safety advisor), Nigel Teale (Environmental Manager) and Trish Dolan (Infection Control). These staff have many other responsibilities in addition to waste and have had to devote time to these issues at the expense of their other responsibilities.

There has been a capital outlay on items such as bins, lifting machinery, tugs and glass recycling bins, with compactors obtained on a leasing arrangement.

The uncertain nature of the recycling market means that the Trust now has to pay for cardboard and paper recycling, although the schemes are still considered viable. If there were to be further increases in the cost of recycling, the Trust may reach the point at which the schemes would be considered too expensive to continue.

Conclusion

By adopting a co-ordinated approach the Trust has made significant reductions in landfill waste, improved segregation between clinical and general waste and minimised associated risks.

While maintaining current levels of segregation and recycling remains a priority, addressing problems further up the waste hierarchy is considered the next logical step in reducing waste, for example reducing packaging in order to achieve “real waste minimisation”.

Waste audits undertaken within Trust by waste stream

Clinical, office, special, domestic, cardboard, paper and cans are all waste streams that have been audited.

Key personnel involved in waste management, minimisation and environmental initiatives

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adrian Yates</td>
<td>Facilities Services Development Manager</td>
</tr>
<tr>
<td>Ken Wood</td>
<td>Health and Safety Advisor</td>
</tr>
<tr>
<td>Nigel Teale</td>
<td>Environmental Manager</td>
</tr>
<tr>
<td>Trish Dolan</td>
<td>Infection Control</td>
</tr>
</tbody>
</table>

Each has had a different input that has helped produce a consistent approach which has been effective in implementing successful waste initiatives.

Cost savings (if available) and level of sustainability

Cost of general waste disposal to landfill in 1998/99 was £46,107, a saving of some £7000 on costs for 1996/97. In addition approximately 241 tonnes of waste was recycled during 1998/99, which would have cost £14,000 if disposed of as landfill.

Figure 5  386 kilos of cans are recycled per year. It is felt that the Trust has effectively segregated and recycled as much as is possible. The next step will be to minimise waste at source.
4. EAST CHESHIRE NHS TRUST (Macclesfield District General Hospital)

Area of good practice identified
- Waste stream segregation
- Recycling initiatives

Waste minimisation area
Recycling of cardboard, paper, cans and scrap metal.

Type of trust
Multi-service trust with 500 beds encompassing acute, community, psychiatric and learning disability services.

Location
Outskirts of Macclesfield.

Benefits achieved and description of good practice scheme
- £14,000 reduction in waste disposal costs.
- Reduced amount of waste to landfill

Before 1997 the Trust disposed of all non-clinical waste via skip to landfill. No segregation or compacting of domestic waste took place.

In an effort to improve waste management a number of measures were introduced from 1997 onwards. A compactor was provided in order to reduce both the volume of waste and frequency of trips to landfill.

A baler was introduced, together with a scheme encouraging porters to remove cardboard from domestic waste. The Trust found a contractor to remove the cardboard free of charge, resulting in a substantial reduction in the amount of waste going to landfill.

Office paper was also designated for recycling. This initiative centred on the administration block of Macclesfield District General Hospital, which generated the most waste paper. A contractor who removed the waste for a nominal administrative charge also provided consumables for the scheme – desk top collection boxes, office collection bins, plastic bags and 1100 litre bins for collection.

Confidential waste paper was also added to this stream after being shredded on site. The Trust now recycles 104 tonnes of office paper every year; again this helps reduce the amount of waste going to landfill, thereby reducing costs and environmental impact.
Drinks cans are recycled and bins are provided beside vending machines around the site. The contractor donates around £150 per year to the hospital charity for the cans collected and the Trust also receives a small amount of income for scrap metal, collected by another contractor.

A specialist company collects printer toners and cartridges – this generates around £100 per year for the Trust.

The table below sets out volume and costs of waste disposal, prior to and following the introduction of waste management schemes.  

<table>
<thead>
<tr>
<th>Weight of waste to landfill</th>
<th>Cost of landfill waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996/97</td>
<td>1996/97</td>
</tr>
<tr>
<td>540 tonnes per year</td>
<td>£33,000 per year</td>
</tr>
<tr>
<td>1998/99</td>
<td></td>
</tr>
<tr>
<td>381 tonnes per year</td>
<td>£18,810 per year</td>
</tr>
</tbody>
</table>

The Trust has reduced the amount of waste sent to landfill by some 168 tonnes per year, due to waste being taken out of the domestic waste stream and recycled. Costs have been reduced by £14,190.

Resources needed and costs (revenue, time and opportunity costs), difficulties encountered and actions taken to overcome

Andrew Hatton (Specialist Services Manager) conducted a waste audit and drew up a programme to improve waste management performance. The initiative has not required the introduction of additional resources.

There was some difficulty in locating contractors who would remove waste for recycling at low cost or free of charge, particularly for cardboard, but suitable local companies have now been found.

Conclusion

The Trust has successfully reduced the amount of domestic waste taken to landfill by segregating material for recycling from the domestic waste stream. This has resulted in cost savings and reduced environmental impact.

While there are no specific “follow-on” initiatives planned, the Trust is now looking at ways to improve segregation of clinical waste.

Key personnel involved in waste management, minimisation and environmental initiatives

Andrew Hatton (Specialist Services Manager).

Cost savings (if available) and level of sustainability

Sustainable cost savings of approximately £14,000.
5. LEEDS TEACHING HOSPITALS (LEEDS GENERAL INFIRMARY)

Area of good practice identified

- Communication to staff of the importance of “green” initiatives
- Organisational commitment to achieve objectives
- Recycling initiative 100% coverage
- Cost control
- Site design

Waste minimisation area

Recycling of cardboard

Type of trust

Acute Teaching.

Location

Leeds City Centre.

Benefits achieved and description of good practice scheme

- 52 tonnes of cardboard recycled every year
- Reduced landfill costs

All cardboard generated as waste on site is collected by contractors and sent for recycling. Cardboard is collected from all wards and departments and segregated at a main collection point. The cardboard is compacted on site and collected every other day.

Staff at ward and departmental level are responsible for ensuring that cardboard is placed in the domestic waste stream and broken down for collection. Each year, the Trust generates 52 tonnes of cardboard for recycling and a contractor is paid to remove it. Whilst this can be viewed as a “green premium” it does enable the Trust to remove cardboard from waste destined for landfill. Cost comparisons show the recycling scheme is still viable.

Resources needed and costs (revenue, time and opportunity costs), difficulties encountered and actions taken to overcome

To ensure an outside contractor would be interested in the scheme, it was necessary to devise an effective system which would enable the maximum amount of cardboard to be gathered. The design of the LGI site proved an asset here. The site is linked to the main disposal point by underground corridors, making it easier to transport waste around the site.

The scheme utilises existing staff and working methods. However facilities management staff were involved in the reorganisation of collection arrangements to ensure that waste was collected at times which met the needs of wards and departments. Revenue neutral, this initiative has the added advantage of freeing up compactor space on site for domestic waste, resulting in cost savings due to less domestic waste going for landfill.

Figure 8 Underground corridors make it easier to transport waste

Cardboard recycling originally provided income for the Trust but now the contractor is paid to remove the waste. This is because the price obtainable from recycling companies has dropped below an economic level, so finding and keeping a collector has been a major difficulty. Market research has been crucial in maintaining the initiative and will have a bearing on future cost saving environmental initiatives.

Another related difficulty is in sustaining involvement and commitment of staff at ward departmental level. Ongoing education and information sharing is essential, although staff are generally keen to co-operate where programmes are perceived as a green initiative and environmentally friendly. There is clear concern at an individual level about the need to conserve resources. At a corporate level the policy regarding recycling has board level support, another important factor.

Conclusion

Leeds Teaching Hospital has been involved in an initiative in West Yorkshire to form a “Hospital Waste Managers Association”. Five other trusts agreed to participate in the consortium under the umbrella of HEFMA 4 run along the lines of a Clinical Waste Consortium.

---

4 Health Estates Facilities Management Association
The objectives of the group were identified as follows:

- a common awareness of problems and effective solutions through sharing expertise and best practice;
- cost savings resulting from improved waste management;
- combining to make waste collection and recycling initiatives more economically viable;
- direct liaison with the Environment Agency to clarify trusts’ obligations in complying with disposal and environmental legislation.

The group has identified a number of cost-saving initiatives which highlight the importance of market research and the benefits of having a dedicated waste manager:

- Waste paper. If segregated, computer paper can generate income of £40-£60 per tonne. Paper forms a large proportion of the trusts’ waste and if recycled, free collection may be possible, leading to further savings.
- Toner cartridges. Can also provide income when recycled.

Key personnel involved in waste management, minimisation and environmental initiatives

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roger Samwell</td>
<td>General Manager Support Services</td>
</tr>
<tr>
<td>Beverly Pettigen</td>
<td>Property Support Services</td>
</tr>
</tbody>
</table>
6. OXFORD MENTAL HEALTHCARE NHS TRUST
(WARNEFORD HOSPITAL)

Area of good practice identified

- Fifty per cent reduction in clinical waste from just under 90 tonnes every year to just over 40 tonnes a year
- Annual savings of £23,000

Waste minimisation area

Reduction in clinical waste tonnage and associated costs due to improved segregation of waste streams.

Type of trust

Mental health hospital with 31 sites covering all aspects of mental healthcare.

Location

Outskirts of Oxford.

Benefits achieved and description of good practice scheme

- Reduction in clinical waste from approximately 90 to around 40 tonnes per year
- Savings of £23,000 a per year
- Increased staff awareness of the cost of clinical waste destruction or disposal
- Partnerships with Oxford Learning Difficulties and Community Trusts to increase economies of scale with respect to clinical waste destruction

This good practice scheme involved the raising of staff awareness to reinforce the message that clinical waste bags are for clinical waste only. This cut down the amount of clinical waste produced and the associated costs.

Provision of clinical waste bags was rationalised to reduce availability in non-clinical areas.

The group was able to use its combined bargaining power to tender for a more competitive waste collection contract.

Resources needed and costs (revenue, time and opportunity costs), difficulties encountered and actions taken to overcome

The initiative was carried out in-house with the aim of reducing costs associated with the processing of clinical waste.

The Trust Support Services Manager carried out training sessions with Housekeeping and Facilities staff on the correct handling and use of clinical waste bags.

The Estates Manager worked with clinicians and nursing staff on this issue and generally reinforced the aims of the scheme around the Trust including an audit of what was actually being placed in the bags.

The Trust Health and Safety Auditor worked with the Estates Manager to ensure that the initiative met health and safety standards.

The main difficulties the Estates Manager experienced were in trying to get the clinicians and particularly nurses to change their attitude towards the subject and use clinical waste bags for their correct purpose. Also the housekeepers and facilities staff were not comfortable trying to educate these staff in the correct use of the bags.

Conclusion

With strong backing for the scheme to improve segregation of domestic from clinical waste, the Estates Manager has overseen improved performance in this area of waste management, leading to significant cost savings enabling the department to remain in budget.

Waste audits undertaken within trusts by waste stream

Clinical waste audit undertaken.

Key personnel involved in waste management, minimisation and environmental initiatives

Graham Wheeler (Estates Manager, Warneford Hospital) in tandem with the Trust Support Services Manager.

Cost savings and level of sustainability

Sustainable cost savings of approximately £23,000 and rising.
7. PORTSMOUTH HEALTHCARE NHS TRUST (ST JAMES HOSPITAL)

Area of good practice identified

- Recycling of office paper, cardboard, mixed recyclables (aluminium cans, plastic bottles), metal
- Partnerships with Local Authority

Waste minimisation area

Recycling of paper, cardboard, aluminium cans, plastic bottles, metal.

Type of trust

Community-based health services including mental health, palliative care, child health, services for elderly people and the community.

Location

Portsmouth.

Benefits achieved and description of good practice scheme

- Eight tonnes of waste paper recycled each year
- 550 cubic metres of cardboard recycled each year
- 140 cubic metres of scrap metal recycled each year
- 600 litres of used cooking oil recycled
- 208 cubic metres of mixed recyclable waste recycled each year
- Landfill waste reduced by 40 per cent
- Increased staff awareness of waste reduction

The Trust instigated a successful recycling pilot study in mid-1998 in response to a District Audit report recommending the development of a structured waste recycling programme.

A “Green Group” was formed and £10,000 was allocated to fund the purchase of bins, protective clothing and additional staff (portering) time.

A contractor was sourced to collect waste paper and shredded paper, with another appointed to collect cardboard at a cost of £19 per skip.

The Trust sought to foster a partnership arrangement with Portsmouth Council and looked to the council to provide information on possible recycling methods. The council was appointed for a trial period to collect mixed recyclables (newspapers, magazines, thin cardboard, plastic bottles, drinks and food cans) at a cost of £20 per week. This proved to be very successful and the trial period has been extended. A dealer was found to remove scrap metal free of charge.

Through the introduction of these recycling initiatives the Trust has reduced its landfill waste output and helped reduce the impact of its activities on the environment. An extract from an internal report on the success of the first three months of the project (July–October 1998) by the Trust's Housekeeping Advisor, underlines the impact that the initiatives have had:

“Waste, equivalent in volume to a three bedroomed house has been recycled in this period….a significant achievement!”

These initiatives have been supported by a major staff information campaign. The “Green Group” placed articles in the Trust newsletter to raise the profile of waste management. In addition posters and stickers are placed in waste collection areas to reinforce the segregation message.

Raising the profile of waste issues requires information to be interesting and relevant and given in straightforward, jargon-free language, for example, the following article, which appeared in the Trust newsletter on behalf of the Green Group:

“Did you know that last year as a Trust we used over ¼ million paper clips? If these had been connected into a long chain they would stretch to over 9 km. That is equivalent to the distance from Southsea to Junction 11 on the M27 (Fareham Junction).

“So what happens to all those paper clips? A large majority of them end up in the bin attached to pieces of paper. If everyone in the Trust rescued one paper clip before it found itself in the bin then we would save over 1 million paper clips – enough to supply us for four years! So next time you receive a paperclip attached to a piece of paper, don’t bin it – re-use it.”

By pursuing a high profile staff awareness campaign the Trust has supported recycling initiatives started by the “Green Group” and helped modify staff behaviour.

---


6 Source: Fran Williams, Assistant Personnel Manager, Portsmouth Healthcare NHS Trust, article for inclusion in Communicate (Portsmouth Healthcare NHS Trust newsletter), 5 August 1999.
Informative posters are placed at waste collection points to raise staff awareness of waste issues.

Figure 9
Resources needed and costs (revenue, time and opportunity costs), difficulties encountered and actions taken to overcome

Trust Housing Advisor has backed the initiatives, while the Trust’s Green Group has helped develop a strategic approach pulling together representatives from several departments.

The introduction of a recycling scheme has not reduced costs, in fact annual costs for waste disposal have increased from £14,857 to £16,484. Recycling is not a cheaper option at this time but with increases in landfill tax the option is likely to become more competitive in the future.

Sourcing contractors to remove waste has been problematic as it has been difficult to find companies to remove waste free of charge. The Trust’s reaction to the situation has been to be prepared to pay a “green premium”, both in order to reduce its environmental impact and to have measures in place prior to predicted increases in landfill tax.

Conclusion

The Trust has actively sought to improve segregation and increase recycling. Supported by a concerted effort to improve staff awareness the initiative has been successful.

It is recognised that recycling is an expensive option due to the Trust’s geographical location. Despite this, recycling arrangements have been put in to place, with corresponding reductions in landfill waste.

The Trust has adopted a forward thinking approach in anticipation that higher landfill taxes will ultimately make the scheme more economically advantageous.

Key personnel involved in waste management, minimisation and environmental initiatives

The Trust has a Green Group which includes Health Promotion Nurses, NHS Supplies, the Trust Risk Advisor, Occupational Health Nurse, Administration Staff, Community Psychiatric Nurse, Estates Project Manager, Support Services Manager and Non-Executive Board member. Colin Saw, the Trust’s Housekeeping Advisor, has taken the lead in introducing initiatives.

Figure 10 An example of the reminder stickers placed on bins to ensure correct segregation
8. PORTSMOUTH HOSPITALS NHS TRUST

Area of good practice identified

- Environment group established
- Waste Management audit system
- Recycling initiatives
- Attainment of ISO 9002 (incorporating waste management)

Waste minimisation area

Management of waste and recycling of paper, cardboard and confidential waste, segregation of glass and plastic.

Type of trust

Portsmouth Hospitals is an acute trust, incorporating all medical and surgical specialities, with more than 1000 in-patient beds.

Location

Two main sites: St Mary's Hospital (551 beds) and Queen Alexandra Hospital (541 beds).

Benefits achieved and description of good practice

- Between 30 and 50 tonnes of waste recycled every year
- Waste management audit systems and monitoring reviews
- Staff awareness programme

Portsmouth Hospitals has established an Environmental Group which aims to:

- increase awareness of environmental issues amongst staff, visitors and contractors;
- encourage staff, visitors and contractors to be aware that their actions may have a detrimental effect on the environment;
- reduce waste by encouraging recycling and the use of recycled products, provided there is no conflict with medical policies and procedures or infection control guidelines;
- reduce usage of energy and water through better management of existing resources.

A waste management audit system has been established to monitor waste management systems for example, checking whether waste or recycling bins are locked, the quantity of waste in bins at collection, whether waste is tagged, any damage to bins, cleanliness and bin type. Any problems which are identified are highlighted to the relevant departmental or directorate manager and a notice of non-conformity may be issued. The manager responsible then reports on the action taken in response to the notice.

The Facilities Department has attained accreditation to ISO 9001. Waste management falls within this system and therefore a fully internally and externally audited procedure is provided. Within this system are procedures for progression of customer complaints that provides a framework for guaranteed complaint investigation and appropriate action as a result.

The staff newsletter regularly features important waste minimisation messages, such as “Waste Money not Effort”, or a reminder that domestic waste was still being placed in clinical waste bins.

Figure 11 Information about waste is provided to staff and contractors in keyring-size cards

Resources needed and costs (revenue, time and opportunity costs), difficulties encountered and actions taken to overcome

The Trust has experienced no increase in revenue or staffing as a result of adopting the strategic approach to waste management. The main priority was the need to communicate effectively with staff, raise awareness and gain their commitment to implementing the waste management strategy. The new system also had to meet the operational needs of particular specialities.

The training plan was designed to communicate the message directly to staff. This encouraged ownership of the strategy and was linked to audit systems which ensured records of compliance were kept. These statutory obligations were relevant both to the organisation as a whole and individual staff responsibilities.
Conclusion

The Trust has introduced a service-focused approach to waste management. Staff at all levels are involved in the process and aware of their responsibilities. However, a key element is that staff performance is measured to monitor compliance and enable continuous improvement. The entire waste management process is subject to ongoing audit and evaluation.

Waste audits undertaken within trust by waste stream

Clinical waste, industrial waste, commercial (office) waste, kitchen waste, cardboard, paper scrap metal, water effluent and energy.

Key personnel

The environmental group has been a lead influence, headed by the Trust’s Environmental Manager, while the Health and Safety group with management and staff representatives, has also been key in action planning. Infection Control has proved an effective discipline for monitoring improvements. Estates and portering staff were responsible for day to day operation and essential in the audit and reporting process.

The Trust is a member of the local Green Efficiency Group and it is proposed that a Trust representative will sit on the local Chamber of Commerce to promote environmental practice.
9. PRESTON ACUTE NHS TRUST (ROYAL PRESTON HOSPITAL)

Area of good practice identified
- Dedicated Waste Minimisation Officer
- Reductions In Clinical Waste
- Annual savings of £55,000
- Staff training

Waste minimisation area
Clinical waste reduction. Domestic waste reduction through recycling of cardboard, confidential and office paper, glass, plastic, newspapers, magazines and printer cartridges.

Type of trust
Acute trust employing approximately 4000 staff.

Location
Outskirts of Preston.

Benefits achieved and description of good practice scheme
- Reductions in clinical waste
- Annual savings of £55,000
- Enhanced public image
- Development of in-house expertise to the extent that the Trust is considering offering waste management consultancy services
- Sharing knowledge within the NHS and universities in the UK and abroad

A Trust-wide review of clinical waste management was conducted in the early 1990s. As a result a waste management group was established. Initial research identified a number of deficiencies, including a lack of staff training.

Intermittent training had proved ineffective in tackling waste management problems.

In 1994 the Trust submitted a research proposal: ‘Health Promotion Aspects of Storing, Collecting, Transporting and Disposing of Domestic and Clinical Waste’ as part of the World Health Organisation Health Promoting Hospitals Project. A full time Waste Minimisation Officer was appointed in 1996, funded by predicted savings in clinical waste disposal costs.

This post is considered key to the improvements that have been made at the Trust. The postholder is required to:
- provide training for clinical, nursing and support services staff in relation to the management of clinical and domestic waste;
- reduce the overall amount of waste produced;
- meet established targets in relation to the minimisation of waste and work with packaging and equipment manufacturers;
- establish waste minimisation, re-use and recycling programmes;
- manage the waste process from wards and departments through to final disposal.

Training is now provided for all staff, tailored to specific needs. Seminars are provided, handbooks are distributed and a series of informative posters are moved around the hospital on a road show basis.

Patients and visitors are reached via leaflets specifically targeting waste management as an issue. These leaflets explain the Trust’s reasons for having a waste management system:

"To protect the environment
To use less raw material
To comply with current legislation for the safe disposal of clinical waste."

![Figure 12: The incinerator at Preston Acute Trust – clinical waste is taken in from other trusts](image)
They also explain the measures in place within the hospital and give advice on how to dispose of clinical and domestic waste, glass and aerosols and batteries, and explain the hospital’s attempts to use recycled products.

The Trust has dramatically improved segregation of clinical and domestic waste and has achieved a 35 per cent reduction in volume. This has resulted in a saving of approximately £55,000.

Clinical waste is taken in from other trusts as a form of income generation. Some is incinerated on site but the incinerator was modified to comply with emissions regulations and no longer has the capacity to deal with additional volume. Therefore the Trust operates a licensed waste transfer station, arranging for contractors to remove the waste from site.

A scheme to reduce the amount of packaging on sterile, clinical products was so successful that it has led to changes in the way waste is segregated and disposed of in the main theatre with additional reductions in the amount of clinical waste produced. The Trust is also working on waste minimisation and related environmental projects with NHS Supplies.

Staff attitudes have developed to such an extent that additional recycling facilities for items such as newspapers and magazines are to be provided.

The Trust has recycling schemes in place for:

- Newspapers and magazines
- Printer cartridges
- Plastic
- Glass
- Office paper
- Cardboard

Approximately one tonne of baled cardboard is taken for recycling every week. It is removed at no cost to the Trust, which is currently breaking even in terms of the cost of segregation, storage and baling. If prices for cardboard were to increase there would be a point at which it would not be viable for the Trust to recycle this waste stream.

The Trust has benefited from these initiatives, for example waste disposal costs are reduced, environmental impact minimised, health and safety improved, as well as compliance with legislation. The Trust now provides waste management consultancy services as income generation and shares its knowledge and experiences with other trusts and organisations, both in the UK and abroad.

**Resources needed and costs (revenue, time and opportunity costs), difficulties encountered and actions taken to overcome**

Provision of a dedicated Waste Minimisation Officer (Sian Fisher). This post was funded from savings made in clinical waste management and is on a fixed term basis.

The initiative is supported by the Facilities and Services Directorate and Infection Control.

The Trust has also met the cost of printing leaflets and providing training aids to promote the initiative.

One of the initial challenges facing the Waste Minimisation Officer was enlisting the wholehearted support of Trust staff in implementing a full waste management and minimisation programme, a challenge which has been met successfully.

**Conclusion**

The Trust has made significant improvements in clinical waste management, resulting in considerable cost reductions. The introduction of a dedicated Waste Minimisation Officer has been key to this success, ensuring waste management as an issue was highlighted throughout the Trust.

In addition to its segregation of clinical and domestic waste, the Trust also recycles as much as possible from the domestic waste stream. The efforts of the Waste Minimisation Officer have ensured that these initiatives have been well supported by Trust staff. While the Trust seeks to recycle where possible there is recognition that it would not be viable for them to pay a “green premium” if market fluctuations force up the cost of a recycling programme.

The Trust has taken the opportunity to learn from other organisations and has shared its own expertise through attending conferences, hosting visitors from other trusts and creating partnerships with academic institutions. The Trust views its links with the World Health Organisation’s Health Promoting Hospitals Network as being of particular significance.

Preston Acute Hospitals NHS Trust is in the process of merging services with Chorley and South Ribble NHS Trust.
Future initiatives, therefore, will be centred on incorporating the policies and procedures of the two trusts and producing an equally effective system of waste management for Chorley.

Waste audits undertaken within trusts by waste stream

Clinical, domestic, special waste and cardboard and paper.

Key personnel involved in waste management, minimisation and environmental initiatives

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Howard Jackson</td>
<td>(Assistant Director of Facilities and Services)</td>
<td>01772 710200</td>
</tr>
<tr>
<td>Sian Fisher</td>
<td>(Waste Minimisation Officer)</td>
<td>01772 710208</td>
</tr>
</tbody>
</table>

All Trust staff are responsible for waste management and segregation as every employee produces waste in some form.

Cost savings (if available) and level of sustainability

Sustainable cost savings of approximately £55,000 per annum have been achieved due to reductions in clinical waste. Recycling initiatives have reduced landfill costs but these have not been highlighted separately.
10. UNIVERSITY COLLEGE LONDON HOSPITALS NHS TRUST (UNIVERSITY COLLEGE HOSPITAL AND THE MIDDLESEX HOSPITAL)

Area of good practice identified

- Staff communication programme in waste segregation
- Annual savings of £40,000 in clinical waste
- Recycling of all cardboard
- Small recycling schemes for cans, paper and glass
- Teamwork in the management of waste
- Interdepartmental co-operation in the segregation of clinical waste (support services and Infection Control)

Waste minimisation area

Reduction in tonnage of clinical waste produced and in processing costs, cardboard recycling.

Type of trust

Teaching trust with six sites including specialist units such as dentistry and tropical diseases. The focus of the visit was on the Middlesex Hospital site and the measures taken to improve segregation of domestic and clinical waste.

Location

Central London.

Benefits achieved and description of good practice scheme

- Reduction in clinical waste from 60 to 45 tonnes per year
- Annual savings in clinical waste of £40,000
- Recycling of approximately 40 bales of cardboard each week
- Small recycling schemes for cans, paper and glass

Following poor performance by a clinical waste contractor and a report from the District Audit Office, the management of clinical waste was targeted as an area for improvement. A reduction in clinical waste disposal costs of £40,000 a year has been achieved after the volume of clinical waste was cut from 60 tonnes a month to 45, within three months of the scheme being started.

Results were achieved through training staff in the correct use of clinical waste bags and shifting attitudes towards waste management. Staff were shown videos, articles were placed in the Trust newsletter and posters were placed next to clinical waste bins. Staff from Support Services and Infection Control undertook regular inspection tours to pick up on problems and educate staff. The support of Infection Control was seen as key in terms of getting the message across to nursing staff. Without this backing, Support Services staff felt they lacked the mechanisms necessary to influence the behaviour of nursing staff.

In addition, the provision of clinical waste bags was reviewed. Previously, clinical waste bags were provided in unnecessary areas, whereas the majority of clinical waste bags are now located in sluice rooms.

Security in the clinical waste store was improved with the installation of a CCTV camera. A new contractor was appointed to deal with clinical waste and performance improved as more regular collections were made. The Support Services team regularly audits clinical waste bags to check that they are correctly tagged, placed in locked containers and that the contractor is charging the Trust for the correct weight.

Savings made through reductions in clinical waste have been retained in the Estates budget. These funds have been used to improve patient accommodation – wards have been redecorated, walls washed, notice boards and new carpets provided and bathrooms refurbished. When staff saw the benefits gained from waste segregation they became more positive about the scheme.
The Trust’s newsletter has been used to raise the profile of waste amongst staff.

The waste management programme was enhanced by the formation of a Waste Team headed by Martin Moore (Waste Officer) who has day-to-day responsibility for the management and supervision of the waste operatives. (Porters involved in waste management have a separate uniform and are referred to as Waste Operatives). This approach created positive team spirit and has helped improve performance and retention of staff.

Efficient waste segregation has made it possible to target other waste streams for action. All cardboard is baled, with between 40 and 60 bales taken for recycling each week. This reduces the amount of waste taken as landfill but the Trust does have to pay for the cardboard to be removed.

There are also smaller-scale recycling schemes for cans, fluorescent tubes, paper and glass and the Trust also pays for these items to be collected.

Discarded pallets are sold to a contractor who also removes them from site.

With the success achieved in segregating clinical and domestic waste, the Trust is now seeking further improvements in segregating domestic waste. The use of clear bags to assist in this is under consideration.

Resources needed and costs (revenue, time and opportunity costs), difficulties encountered and actions taken to overcome

The initiative has required input from the Senior Nurse (Infection Control), Jackie Murray-Leonard, plus Environment and Hotel Services Manager Ita Catchpole and the Deputy Environment and Hotel Services Manager Chris Lees, to work on educating staff and developing attitudes.

When the waste management team was set up, it was resourced with existing members of staff.

Conclusion

The Trust has improved segregation of clinical and domestic waste, reducing clinical waste tonnage and associated costs. This was achieved by raising awareness amongst staff in order to improve waste stream segregation. This is backed up by ongoing monitoring of the waste management system, including audits of clinical waste sacks.
The formation of a Waste Management Team has helped improve team spirit and staff retention. A Private Finance Initiative capital scheme is planned for the Trust which will involve a contractor assuming responsibility for support services. It remains to be seen how this will affect waste management at the Trust in the future.

**Waste audits undertaken within trusts by waste stream**

Clinical waste audits were undertaken to establish correct weight charging by contractor.

**Key personnel involved in waste management, minimisation and environmental initiatives**

- Ita Catchpole (Environment and Hotel Services Manager)
- Chris Lees (Deputy Environment and Hotel Services Manager)
- Jackie Murray-Leonard (Senior Nurse Infection Control) and
- Martin Moore (Waste Officer)

worked as a team in changing staff perceptions and monitoring the clinical waste stream.

**Cost savings (if available) and level of sustainability**

Sustainable cost savings of around £40,000 annually have been achieved through reducing clinical waste. The state of the recycling market means that recycling cardboard actually costs the Trust money at present. Were market conditions to change, this could result in a saving also.
Appendix 2 – Mini case studies

1. BLACKPOOL VICTORIA HOSPITAL NHS TRUST

Environmental strategy

The Trust issues an annual report for staff focusing on environmental issues. Its environmental policy includes improvement in key target areas. The report is displayed in public areas for the benefit of patients, visitors and carers. The Board also receives an annual report on environmental issues.

Specific “green” groups have been established, including an Environmental Working Group and Waste Management Group. The Waste Management Group’s remit includes monitoring waste systems, identifying opportunities to save money, good practice initiatives, benchmarking performance, training and awareness for staff and communicating information to staff, patients and visitors.

The annual report was produced in partnership with companies in the waste management market. An example of the benefits that can be achieved through partnerships with the private sector.
The reduction of clinical waste costs by 15%

A survey at the Trust found that a considerable amount of the waste in the clinical waste stream was in fact packaging and paper.

Further investigation revealed that the majority of treatment areas did not have any domestic waste (black bag) containers, only clinical waste bags (yellow bags) contained in non-colour coded bins. All categories of waste were ending up in the clinical waste stream, attracting higher disposal costs.

Clinical waste was also being processed as special waste, another more expensive option. The Trust initiated an awareness campaign to clarify different types of waste, for example, domestic waste, clinical waste, special waste and hazardous waste.

New waste bins were purchased, from which colour-coded bags were suspended. These had two advantages, making it easier for staff to identify the type of waste which should be placed in the bags whilst enabling simple detection and removal of full bags.

Dual storage facilities were made available in all appropriate areas, clear instructions stating the type of waste to be deposited were attached to every container lid, which were colour-coded.

Definitions of special waste and separate storage facilities were also made available in all treatment rooms and similar areas.

Storage facilities were created on each ward to enable prompt removal of full waste bags to a secure segregation area. These ward storage bins are mobile to reduce manual handling of waste to a minimum.

The scheme began in July 1998 and the graph below illustrates results so far.

The Trust is also considering the removal of all paper from the domestic waste stream, as this could reduce disposal by 50 per cent. This in turn would alleviate pressure on landfill sites and reduce disposal costs.
3. HARTLEPOOL AND EAST DURHAM NHS TRUST
(HARTLEPOOL GENERAL HOSPITAL)

Teesside Environmentally Aware Business Association
(TEABA)

Hartlepool General Hospital has established a private sector partnership through its participation in TEABA.

TEABA has the following mission statement:

“Create a European ‘Centre of Excellence’ for achieving the environmental management standard of ISO 14001 with the Teesside Business Community.”

The scheme is funded by the European Regional Development Fund and members of the association benefit from the following services:

- a mentoring service to help members achieve ISO 14001;
- an environmental audit to ISO 14001 standard to identify potential areas for reducing environmental impact;
- an environmental review to produce a management report;
- unlimited use of CEDREC (an environmental legislation system) to help members remain “up to date” with legislation affecting their organisation;
- opportunities to attend seminars and events relating to the environmental impacts of member organisations.

The commercial elements of ISO 14001 which relate to the health sector are:

- reduction in investment risks;
- internationally recognised standard;
- opportunities for cost savings;
- demonstration of organisational commitment to safeguarding the environment.

TEABA illustrate the process of implementing an environmental management system for ISO 14001 certification as shown in the diagram below:

![Diagram of ISO 14001 implementation process](image-url)
The system contains the following components:

**Commitment**
- From senior managers throughout the organisation

**Environment policy**
- Commitment to compliance with statutory and regulatory demands.
- Commitment to continual improvement.
- Commitment to prevention of pollution.
- Available to the public.

**Planning**
- Identifying business activities which impact on the environment.
- Establishing access to relevant environmental legislation.
- Setting objectives and performance targets for environmental improvement.
- Producing a management programme in order to achieve objectives and targets.

**Implementation and operation**
- Providing resources for personnel.
- Defining roles and responsibilities.
- Identifying training needs and raising environmental awareness.
- Ensuring competence of staff.
- Communicating effectively – internally and externally.
- Documenting and controlling management system.
- Controlling operations which have environmental impacts.
- Planning for accidents or emergencies with environmental impacts.

**Checking and corrective action**
- Measuring accurately.
- Continually monitoring performance against target objectives.
- Continually ensuring legislative compliance.
- Taking corrective action in areas of non-compliance.
- Recording information on the operation of the environmental management system.
- Conducting audits.

**Management review**
- Senior managers checking that the system is adequate, appropriate and effective.
- Making any necessary changes to the system.

This case study demonstrates the potential benefits of a proactive approach linked with partnerships in the wider business commercial environment.
Waste management policy

Parkside Health NHS Trust introduced a Waste Management Policy to reduce the impact of its activities on the environment and to save money.

The Estates Administrator contacted waste disposal companies to ascertain the range of services offered. All offered waste recycling services and the Trust now recycles cardboard, white paper and aluminium cans.

The Waste Management Policy had a number of key aims:

- meeting the Trust’s statutory waste disposal obligations;
- reducing disposal costs;
- reducing the amount of waste produced;
- increasing waste recycling.

This required a review of:

- waste disposal procedures;
- financial considerations;
- information and training;
- legal and statutory requirements;
- environmental considerations.

The policy also specified actions that staff in the organisation could adopt to help minimise waste. An extract from the policy is shown below:

“Reducing the volume of waste arising from processes is critical to the successful implementation of the waste management policy. It is an ongoing procedure.”

Procedures for waste minimisation include:

- Fully re-use internal envelopes
- Avoid producing long computer printouts if shorter summaries will suffice
- Request suppliers to take back secondary packaging
- Avoid over-subscription to trade magazines, cancel duplicate issues
- Collapse all cardboard boxes before disposal
- Return printer toner cartridges complete with packaging for recycling
- Use jugs of milk and bowls of sugar instead of jiggers and sachets.

Recycling was seen as key to reducing the Trust's waste disposal costs. The policy included establishing waste co-ordinators at each Trust site to assist waste disposal officers in promoting the benefits of recycling amongst staff.
Recycling


Derriford Hospital featured in this report as a case study of household waste recycling. The hospital introduced the initiative in October 1995 and had effectively halved the cost of household waste disposal. Over the next 18 months the initiative grew to incorporate cardboard, glass, office paper, newspapers and magazines.

Trust managers have continued to highlight waste management and in March 1999 the Trust was maintaining a downtrend in waste per bed per year, the clinical waste indicator used by the Audit Commission. This was due to:

- application of the waste policy;
- a proactive approach to waste management;
- a programme of waste audits throughout the Trust.

The actual reduction showed an annual drop from 77 tonnes per head to 70 tonnes. This means a potential reduction in clinical waste equivalent to an annual saving of £9000.

Funds were still being generated by the recycling initiative, although income levels were falling. In 1998, £2773 was raised, equal to the disposal costs of 77 tonnes of black bag waste, effectively giving savings of £12,800.

Recycling of confidential waste, instead of incineration, also produced benefits, cutting the cost of disposal from £3.50 per bag to 57 pence, an annual saving of around £10,000.

The benefits achieved are attributed to the Trust’s investment in dedicated waste managers, its proactive approach and ongoing monitoring of waste, and environmental management initiatives, with results communicated across the Trust.

Welsh National Clinical Waste Consortium

Pontypridd and Rhondda NHS Trust is aiming to improve clinical waste segregation and encourage recycling of domestic waste. A hands-on approach to auditing clinical waste has been adopted, including audits of clinical waste bags and intensive staff training in correct segregation of waste.

The Trust is also a member of the Welsh National Clinical Waste Consortium. Welsh Trusts meet to discuss clinical waste issues, promote improved clinical waste segregation as part of its agenda and to use the combined bargaining power of Welsh Health Supplies to reduce disposal costs. The Environment Agency is also invited to attend consortium meetings.

The consortium occasionally addresses waste minimisation issues, but the reduction of clinical waste costs and effective monitoring of the performance of clinical waste contractors are the primary issues for the consortium. Sharing information and expertise amongst member organisations enables improvement in overall standards of clinical waste management.

The Trust’s membership of the consortium means additional bargaining power over clinical waste management.

Through pooling their knowledge and expertise, Welsh trusts are reaping the benefits of adopting a co-ordinated approach to waste management.
Reduction in domestic waste costs

The Trust undertook a review of domestic waste management, including staffing costs, rental of a compactor and waste removal charges. Consideration was also given to safety aspects of the system and the problems associated with storing waste on site for more than five days.

As a result, it was decided to segregate waste streams, make more use of recycling and alter the method of waste collection. Bins were placed in each ward and department to be emptied three times a week by a contractor and the Trust also contracted for the collection of paper and cardboard for recycling.

Total annual savings, from both the reduction in waste removal charges and the saving on compactor rental, amounted to £2500. The Trust was also able to reduce its portering budget.

Trust managers looked at other types of waste produced, for example, approximately 1000 spent fluorescent tubes a year were being disposed of via landfill. This not only releases harmful mercury but other by-products from the tubes, such as glass, brass and aluminium which could be recycled. Based on its commitment to preserving the environment the Trust contracted to recycle spent fluorescent tubes. This has meant only minimal savings on waste collection charges but the environmental benefits have been well received by staff.
Appendix 3 – Analysis of current waste management within healthcare trusts in England and Wales

Project summary and background

The project considered the necessity of reducing the amount of waste produced during the delivery of healthcare. This would require all trusts to assume responsibility for minimising the quantity of waste they produce through utilising good practice and raising awareness. Examples of good practice are contained in the Appendices.

A steering group was established, with representatives from the Environment Agency, NHS Supplies, Centre for Greening the NHS, Association of British Healthcare Industries, NHS Confederation, NHS Estates, Department of Health and The BOC Foundation. Additionally the Department of Health sponsored the printing and publication of the compendium.

This appendix summarises information gathered from NHS trusts, its subsequent analysis and resulting recommendations.

Objectives of the project

There were two main objectives associated with the research programme:

- To assess, via a questionnaire, the current status of waste management and related policies, procedures and systems within the NHS.
- To identify and promote good practice in waste management, systems and documentation.

The project considered all types of waste associated with the delivery of healthcare.

Methodology

A survey questionnaire was sent to 429 NHS trusts in England and Wales. Only 94 responses were received, which represents a 21% response rate. The questionnaire contained 43 questions.

From these responses, a number of good practice case studies were identified and are shown in the Appendices. They illustrate examples which could be adopted by any NHS Trust.

Findings

Summary of questionnaire responses (all trusts)

Figure One categorises responses to the questionnaire by Trust type, revealing a bias towards acute, teaching and multi-service trusts, with only one ambulance Trust replying. Although only 21 per cent of trusts responded, survey analysts were able to draw conclusions for each section of the questionnaire.

The questionnaire was designed to provide both quantitative and qualitative information. The qualitative information covered examples of policy, procedure, areas of good practice and waste minimisation initiatives. The quantitative information used a system where a positive response to a question attracted a standard score. If the question attracted a YES or NO answer the yes response was considered to be a correct response. To obtain 100 per cent all YES/NO questions had to be answered positively.

<table>
<thead>
<tr>
<th>Number of respondents by trust type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute</td>
</tr>
<tr>
<td>Teaching</td>
</tr>
<tr>
<td>Multi Service</td>
</tr>
<tr>
<td>Priority</td>
</tr>
<tr>
<td>Ambulance</td>
</tr>
<tr>
<td>'Unknown'</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>33</td>
</tr>
<tr>
<td>21</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>23</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

Figure One
The graph in Figure Two shows the range of scores recorded.

Ratings ranged widely, with scores of more than 70 per cent to less than 10 per cent. Initial predictions that the majority of trusts would attain 50 per cent or more were inaccurate, with the average score just 39 per cent.

Figures Three and Four provide a further analysis of this positive scoring, by each section and by trust type. The responses indicate that all trusts in the sample have effective waste management arrangements, a risk management strategy, together with proven movement, transport, storage and compaction systems supported by well-maintained records.

However, the sections related to elimination of waste, re-use and recycling initiatives, dissemination, communication, awareness and partnership, scores are generally poor, all below 25 per cent of the possible total. The conclusion was that trusts are managing waste and disposal systems well, but there are further achievements to come in terms of developing waste minimisation strategies.

Figure Five shows section scores according to trust type.

<table>
<thead>
<tr>
<th>Summary by trust type</th>
<th>Acute</th>
<th>Multi Service</th>
<th>Priority</th>
<th>Teaching</th>
<th>Ambulance</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall % score</td>
<td>47</td>
<td>40</td>
<td>29</td>
<td>40</td>
<td>21</td>
<td>45</td>
</tr>
<tr>
<td>Organisational and managerial arrangements</td>
<td>69</td>
<td>61</td>
<td>52</td>
<td>61</td>
<td>38</td>
<td>71</td>
</tr>
<tr>
<td>Waste audit reviews</td>
<td>42</td>
<td>39</td>
<td>22</td>
<td>39</td>
<td>0</td>
<td>45</td>
</tr>
<tr>
<td>Monitoring and evaluating</td>
<td>42</td>
<td>34</td>
<td>22</td>
<td>34</td>
<td>23</td>
<td>38</td>
</tr>
<tr>
<td>Risk management</td>
<td>63</td>
<td>60</td>
<td>33</td>
<td>60</td>
<td>80</td>
<td>53</td>
</tr>
<tr>
<td>Movement, transport, storage and compaction</td>
<td>76</td>
<td>70</td>
<td>54</td>
<td>70</td>
<td>25</td>
<td>88</td>
</tr>
<tr>
<td>Compliance records</td>
<td>64</td>
<td>65</td>
<td>38</td>
<td>65</td>
<td>18</td>
<td>62</td>
</tr>
<tr>
<td>Elimination of waste</td>
<td>30</td>
<td>19</td>
<td>17</td>
<td>19</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>Re-use and recycling initiatives</td>
<td>22</td>
<td>10</td>
<td>13</td>
<td>10</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>Dissemination, communication and awareness</td>
<td>23</td>
<td>17</td>
<td>15</td>
<td>17</td>
<td>0</td>
<td>28</td>
</tr>
<tr>
<td>Partnerships with other agencies, statutory bodies and suppliers</td>
<td>21</td>
<td>22</td>
<td>17</td>
<td>22</td>
<td>0</td>
<td>30</td>
</tr>
</tbody>
</table>
Figure Four

Percentage scored on each section by teaching trusts

Figure Five

Percentage scores for each section by trust type
Figures Six to Nine show the average percentage scored in each section by trust type. **Figure Six** represents acute trusts and it is interesting to note that these trusts score above the 25 per cent average in implementing waste elimination initiatives, with practical examples shown in the appendices. Waste audit reviews have been completed by 42 per cent of acute trusts, suggesting a link between such audits and effective waste elimination initiatives.

**Figure Seven** relates to multi service trusts. Again, case studies highlight those trusts which have endeavoured to reduce waste through partnerships with other organisations, particularly suppliers of goods and services. The higher scores were in the section covering risk management, movement of waste and compliance records.
Figure Eight relates to Priority trusts. They face unique problems in respect of the number of sites they have to manage. This highlights the importance of efficient organisational and management arrangements and a strategic approach to improving waste management.

Figure Nine relates to Teaching trusts. This shows a typical spread of scores representative of the total sample population.
Conclusions

From analysis of responses to the questionnaire, the following conclusions were made:

- Extreme ranges in performance were recorded (from 8 per cent to 72 per cent for the overall score) with few examples of waste minimisation programmes.
- The better results were not the best possible.
- Trusts are performing well in the area of management arrangements, risk management and movement and control of waste.
- Compliance with statutory and mandatory requirements covering waste management is generally very good.
- Waste elimination initiatives, communication and partnership activities were generally less good.
- Most trusts have implemented some form of recycling scheme but re-use initiatives are not common. This was attributed to problems such as finding a suitable waste contractor, insufficient market research by trusts and the costs of recycling waste.

Analysis by section (all trusts)

1. Organisational and managerial arrangements

This section contained eight questions to identify the arrangements each trust has made to maintain an effective waste management strategy and policies.

The main questions covered:

(i) levels of commitment from senior managers;
(ii) appointment of a waste and environmental manager;
(iii) adoption of an environmental policy;
(iv) setting targets for waste minimisation.

It provided a measure of the value attributed to environmental issues by each trust. Seventy per cent of respondents reported senior management commitment to waste management issues, while 59 per cent of trusts have appointed a manager responsible for waste management. Again, 70 per cent of trusts have a waste management strategy and associated policies but, within these strategies, only 10 per cent of trusts have actually set targets for waste minimisation. This would suggest that many trusts could enhance their overall waste management performance by setting such objectives.

Figure Ten shows the results of this section by trust type.
Trusts with effective monitoring procedures should find it easier to set improvement targets because they had a baseline against which performance could be measured. The section asked for information on process review (points at which waste is produced) and waste stream identification (analysis of the different types of waste produced).

Of responding trusts, 67 per cent had undertaken a waste audit incorporating a process review but only 28 per cent had included a waste stream profile and these showed the following waste stream component percentages:

<table>
<thead>
<tr>
<th>Waste stream</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical waste</td>
<td>93</td>
</tr>
<tr>
<td>Domestic</td>
<td>50</td>
</tr>
<tr>
<td>Special waste</td>
<td>43</td>
</tr>
<tr>
<td>Commercial waste (office waste)</td>
<td>40</td>
</tr>
<tr>
<td>Cardboard</td>
<td>37</td>
</tr>
<tr>
<td>Paper</td>
<td>37</td>
</tr>
<tr>
<td>Household</td>
<td>33</td>
</tr>
<tr>
<td>Waste stream identification</td>
<td>28</td>
</tr>
<tr>
<td>Scrap metal</td>
<td>23</td>
</tr>
<tr>
<td>Kitchen waste</td>
<td>23</td>
</tr>
<tr>
<td>Waste oils</td>
<td>17</td>
</tr>
<tr>
<td>Industrial waste</td>
<td>16</td>
</tr>
<tr>
<td>Cans</td>
<td>13</td>
</tr>
<tr>
<td>Brick rubble</td>
<td>10</td>
</tr>
<tr>
<td>Glass</td>
<td>10</td>
</tr>
<tr>
<td>Plastic</td>
<td>10</td>
</tr>
<tr>
<td>Inert waste</td>
<td>8</td>
</tr>
<tr>
<td>Solvents</td>
<td>7</td>
</tr>
<tr>
<td>Masonry</td>
<td>7</td>
</tr>
<tr>
<td>Wood</td>
<td>3</td>
</tr>
</tbody>
</table>

The table shows that clinical waste was the stream considered in the majority of reviews, with domestic waste featuring in half of the reviews. This is supported by statistics which show that many trusts have undertaken a review to ensure effective segregation of clinical and domestic waste. The basis of such a review is cost reduction as clinical waste removal costs are significantly higher than domestic waste costs. Whilst technically not reducing waste this does reduce expenditure in the overall waste disposal costs.

Figure Eleven provides an analysis of this section by trust type.

A clear trend identified in analysis of survey answers is that trusts have concentrated their efforts on clinical waste management. Because of the cost implications resulting from ineffective segregation, health and safety issues and the legal consequences resulting from poor disposal systems, clinical waste has a high profile.

Reference is made at this point to the Audit Commission report on the safe and economic management of hospital waste, ‘Getting Sorted’ (February 1997). The main recommendations of the report were:

- trusts to reduce costs through improved waste management;
- management of the risks associated with waste disposal;
- senior management to take the lead in policy development.

The fact that only 28 per cent of respondents had undertaken a waste stream review could indicate that not all trusts have yet made significant progress in implementing the Audit Commission Report.

This section shows that trusts have taken management action to audit waste streams. The main influencing factor has been financial rather than environmental, with trusts ensuring they were being charged correctly for clinical as opposed to domestic waste disposal.

3. Monitoring and evaluating

This section contained five questions on waste monitoring and evaluation together with performance information. The questions covered:

(i) which waste streams were actually monitored by trusts;
(ii) how information was used to evaluate performance.

It complements questions in the previous section about trusts’ arrangements to monitor waste streams. Although frequency was not recorded, monitoring exercises should be carried out regularly to be effective in identifying whether or not waste management strategies are producing on-going results and savings. A breakdown of waste streams from the trusts which responded positively to this section is shown below.
“Monitoring” can be defined as the compilation of information relating to waste streams. “Evaluating” is the process of drawing conclusions from this information which can then be used to alter procedures to enhance performance.

Again, the highest response rate for monitoring and evaluation was for clinical waste, with domestic waste next in the sample.

**Figure Twelve** provides an analysis by trust type.

This section suggests that where trusts have concentrated only on managing clinical waste, few improvements in overall waste minimisation have resulted. A similar approach to all categories of waste can generate firm improvements in performance. For example, recycling of cardboard and confidential and office waste prevents the need for incineration or landfill disposal. Items such as X-ray film fixer, toner cartridges and pharmacy bottles were also identified in the questionnaire returns.

4. **Risk management**

This included four questions on trusts which have undertaken a risk assessment associated with waste management systems and those which have introduced measures designed to reduce or eliminate risk.

The main questions addressed:

(i) waste management risk assessment;
(ii) systems in place to manage risk;
(iii) elimination of risks.

The measurement of risk management is considered crucial not only because of the amount of Health and Safety legislation which impacts directly upon waste management but the obvious importance of waste control in a healthcare environment. Some health and safety risks are clearly known and understood, for example needle stick (sharps) injuries.

Half of the respondents had undertaken a waste management risk assessment, with 67 per cent subsequently introducing risk reduction systems. The majority of respondent trusts (60 per cent) had also put in place arrangements to eliminate some risks altogether. This appears to indicate that some risks associated with waste management can be managed without carrying out a risk assessment specific to waste.

**Figure Thirteen** provides an analysis of this section by trust type.

Current good practice indicates that all trusts should undertake a waste management risk assessment. The survey suggests that around 50 per cent of trusts have not yet completed this process, so the benefits of the exercise need to be more widely promoted.
5. Movement, transport, storage, compaction

This section contained four questions on the effectiveness of existing operational policies and systems (for collection and disposal) which support the implementation of waste management and minimisation strategies.

The main questions focused on:
(i) operational policies covering collection and disposal;
(ii) compaction facilities;
(iii) dealing with redundant IT hardware and medical devices.

Most respondents (70 per cent) already had an operational policy, while 67 per cent had compaction facilities on site, an example of good practice in terms of reducing the volume of waste.

Figure Fourteen provides an analysis of this section by trust type.

Within the movement and disposal section trusts were asked how redundant IT equipment was disposed of. Most items were offered for sale as surplus assets or sold as scrap. One trust exchanged PC monitors with suppliers and some respondents re-used computer parts as spares for other equipment. One trust also returned ink and powder to suppliers for re-use.

Disposal of redundant medical devices followed a similar pattern, with items either declared as surplus and sold, or donated to charitable organisations for re-use outside the United Kingdom.

The respondents’ approach to the movement, transportation, storage and compaction of waste and redundant equipment appears to be well managed and demonstrates compliance with accepted practice.

6. Compliance records

This section requested information on levels of record keeping and corrective action taken in response to areas of non-compliance.

The questions covered:
(i) records of statutory compliance;
(ii) records of corrective actions.

Records of compliance with statutory obligations are regarded as essential evidence of good practice, particularly when the breadth of legislation relating to recycling and waste management is considered. Such records benefit a Trust by enabling it to demonstrate good management practice.

The areas in which respondents keep records of compliance are shown below:

<table>
<thead>
<tr>
<th>Compliance area</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health &amp; Safety at Work etc Act 1974</td>
<td>87</td>
</tr>
<tr>
<td>Special Waste Regulations 1992</td>
<td>83</td>
</tr>
<tr>
<td>Management of Health and Safety at Work Regulations 1992</td>
<td>77</td>
</tr>
<tr>
<td>Controlled Waste Regulations 1992</td>
<td>77</td>
</tr>
<tr>
<td>COSHH 1994</td>
<td>73</td>
</tr>
<tr>
<td>Waste Management Licensing Regulations 1994</td>
<td>73</td>
</tr>
<tr>
<td>Environmental Protection Act 1990</td>
<td>67</td>
</tr>
<tr>
<td>Environmental Protection (Duty of Care Regulations) 1991</td>
<td>60</td>
</tr>
<tr>
<td>Radioactive Substances Act 1993</td>
<td>53</td>
</tr>
<tr>
<td>Controlled Waste (Registration of Carriers and Seizure of Vehicles) Regulations 1991</td>
<td>53</td>
</tr>
<tr>
<td>The Carriage of Dangerous Goods by Road and Rail (Classification, Packaging and Labelling), and use of Pressure Receptacles Regulations 1996</td>
<td>40</td>
</tr>
</tbody>
</table>

Records of corrective action for compliance reasons were kept by 50 per cent of respondent trusts.

Figure Fifteen provides an analysis by trust type.

The respondents’ approach to the movement, transportation, storage and compaction of waste and redundant equipment appears to be well managed and demonstrates compliance with accepted practice.
The positive rate of between 87 per cent and 40 per cent demonstrates a wider range in compliance rates than might be expected, given the importance of this aspect of work control and management. Again, as with risk assessment, there are indications that such management action activity should be regarded as the norm rather than an exception and trusts reminded of the importance of reviewing overall management arrangements and strategy. This would require additional action for the 50 per cent of trusts which do not currently maintain such records.

The overall conclusion to be drawn is that trusts are doing well in terms of basic record keeping but there is scope for improvement. Trusts should institute their own audit systems and audit trail arrangements.

7. Elimination of waste

This was an important element of the questionnaire, gathering information on existing examples and future plans for waste minimisation initiatives.

The questions covered:

(i) implementation of initiatives to avoid or minimise waste;
(ii) partnerships with suppliers to reduce packaging;
(iii) savings achieved by waste minimisation initiatives.

Of the respondents, 50 per cent had implemented initiatives to avoid or minimise waste. trusts which have made significant progress in eliminating waste or introduced an innovative scheme are featured as case studies (see Appendices).

In addition, 30 per cent of respondents had, or planned to implement, schemes to reduce packaging in conjunction with suppliers.

Figure Sixteen provides an analysis of responses in this section by trust type.

One trust tackled the problem of reducing wasted food from patients’ meals by looking at portion sizing. One of its main objectives was to ensure patients were able to order their food as close as possible to meal times to reflect individual choice and appetite.

The level of positive responses was encouraging although the extent of waste minimisation initiatives within trusts range in scope and coverage. Waste elimination has been considered by most trusts but it is an area that still offers much scope for management initiatives to improve performance and national opportunities for development of strategic planning.

8. Re-use and recycling initiatives

This section contained five questions on methods of reusing or recycling consumable items which would otherwise enter the waste stream.

The main questions covered:

(i) re-use of items;
(ii) recycling schemes;
(iii) changes from disposable items to reusable commodities.

Re-use was defined as redeploying items so they do not enter the waste stream. Recycling was defined as the use or re-use of items, for any purpose, which would include material recovery or energy production. Only 11 per cent of respondents had introduced re-use facilities – mainly for cardboard and glass – while 21 per cent had introduced recycling initiatives. All were below 50 per cent, which may be indicative of the dramatic fluctuations in recycling markets especially cardboard and paper. The breakdown of items covered was as follows:

<table>
<thead>
<tr>
<th>Waste stream</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>50</td>
</tr>
<tr>
<td>Cans</td>
<td>33</td>
</tr>
<tr>
<td>Cardboard</td>
<td>30</td>
</tr>
<tr>
<td>Fluorescent tubes</td>
<td>17</td>
</tr>
<tr>
<td>Glass</td>
<td>13</td>
</tr>
<tr>
<td>Plastic</td>
<td>10</td>
</tr>
<tr>
<td>Water</td>
<td>0</td>
</tr>
</tbody>
</table>

Only 13 per cent of respondents had introduced schemes to substitute reusable or recycled items for disposable goods and just 3 per cent had been able to recycle clinical waste items.
Figure Seventeen details the percentage score for this section by trust type.

Re-use initiatives generated a low response rate in this survey and is an area that would benefit from a raised profile. One means of achieving this would be through sharing good practice across the National Health Service.

Recycling schemes exist in most trusts which have some form of recycling arrangements for example, bottle, can or paper banks as a minimum.

9. Dissemination, communication and awareness

This section measured corporate actions taken by trusts to support waste minimisation initiatives. It contained four questions.

The questions covered:

(i) staff training in waste minimisation by discipline and staff group;
(ii) provision of information on waste minimisation for staff;
(iii) contribution made by staff in waste minimisation.

Initiatives to promote waste minimisation and training staff involved in the waste management process are seen as indicators of good practice, ensuring policy is implemented correctly.

Staff at 15 per cent of respondent trusts had received training in waste minimisation and 13 per cent provide staff with information on how to minimise waste. In terms of staff groups this overall 15 per cent score was split as follows:

<table>
<thead>
<tr>
<th>Staff group</th>
<th>% Training</th>
<th>% Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing staff</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Domestic staff</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Porters</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Auxiliaries</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Training</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Professional and technical staff</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Staff in the community</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Medical staff</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Agency staff</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Laboratory staff</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Transport staff</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Others</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Ambulance staff</td>
<td>17</td>
<td>17</td>
</tr>
</tbody>
</table>

Target groups were nursing (including auxiliaries), domestic and portering staff, due to their direct role in waste disposal.

It is worth noting that a third of respondents had established a forum for staff suggestions on improving waste management performance. In many cases the forum was a Trust newsletter.

If any real benefit is to be gained from staff training, performance targets for waste minimisation must be communicated to staff but only 17 per cent of respondents currently do this.

Figure Eighteen details the percentage score for this section by trust type.

Relatively few trusts which have implemented staff training utilise induction training systems as a means of developing awareness. Staff involvement offers huge opportunities for ensuring organisational commitment, raising the profile of waste minimisation, the benefits of such initiatives and the importance of waste reduction measures. Staff members are often a major untapped resource in terms of ideas and commitment.
10. **Partnerships with other agencies, statutory bodies and suppliers**

This section contained three questions and evidence was sought regarding trusts’ wider perspective in respect of waste management and minimisation proposals.

The questions covered:

(i) existence of partnership initiatives and the organisations involved;
(ii) arrangements with suppliers to reduce waste.

Initiatives undertaken in conjunction with other bodies were key in bringing about shifts in policy, for example in persuading suppliers of goods and products to address waste minimisation at source. Other groups featured included the Environment Agency, local authorities, the private sector and other trusts.

Only 15 per cent of trusts had established partnership arrangements and the response rate was as follows:

<table>
<thead>
<tr>
<th>Trust Type</th>
<th>Response Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other trusts</td>
<td>23</td>
</tr>
<tr>
<td>The private sector</td>
<td>17</td>
</tr>
<tr>
<td>Local authorities</td>
<td>13</td>
</tr>
<tr>
<td>Environment Agency</td>
<td>7</td>
</tr>
</tbody>
</table>

**Figure Nineteen** provides information in respect of the percentage score for this section by trust type.

Respondents were asked to provide feedback on the publications, advice and guidance they had found most useful in the area of waste management and minimisation. Detailed below is a list of the responses received:

- **HSE Guidance of Clinical Waste**
- **Audit Commission report ‘Getting Sorted’**
- **Environmental Information Bulletins**
- **Waste Minimisation an Environmental Good Practice Guide**
- **Environment Agency – Industrial Commercial Waste Minimisation Directory**
- ‘Money for Nothing’ – Environment Agency
- Environment Agency – Waste Minimisation recycling directory
- BS7750 Greencode Environmental Protection Act
- Green Government
- NHS Estates – HTM 2065 ‘Healthcare waste management’
- The Waste Manager
- BS EN ISO 14001 Environmental Management Systems

The conclusion in terms of partnership development must be that benefits can be gained from pooling resources and expertise and that this can be both within and outside the National Health Service.

**Recommendations**

1. Trusts are managing their waste disposal systems competently, possibly in response to obligations to comply with the legislative framework relating to this area. However, there is extensive scope to develop programmes which raise environmental awareness and for the introduction of true waste minimisation projects.

2. A significant number of trusts have profiled waste streams to ensure clinical and domestic waste is effectively segregated and reduce overall waste disposal costs. Ongoing training and communication of information to front line staff was considered essential to maintain progress.

3. A significant amount of work remains in looking at waste prevention, which is a key to an effective waste minimisation programme. Few trusts have developed a strategy in respect of environmental management or taken specific action on waste minimisation.

4. There needs to be regular evaluation of waste management performance to ensure continuous improvement. This evaluation should be undertaken annually by each Trust as part of a progress report on work towards assisting the NHS in achieving its green objectives.

5. There would be benefit in establishing a “waste and environment” network, enabling trusts to share good practice. This would assist trusts in moving from the present position of good waste management practice and recycling initiatives to tackling waste minimisation.
Conclusion

If a trust is to be successful in implementing waste management and minimisation strategies there must be high level commitment to environmental issues and a “champion” within the area of waste management able to motivate and mobilise the rest of the organisation.

Trusts which are successful have spent time analysing waste streams to ensure clinical and domestic waste is effectively segregated. This has led to a situation where domestic waste can be further segregated and analysed to increase opportunities for re-use and recycling. This again reduces the amount of waste going for incineration or landfill and so has cost and environmental benefits.

However, one area of good practice which has the potential to be extended is in the re-use and recycling of items. Whilst cost savings, particularly by ensuring correct segregation of clinical waste, are available there can be both real and opportunity costs associated with recycling and reclaiming. The reduction of waste at source, before it enters any waste stream, is another area which has not yet been exploited. In particular, opportunities to reduce delivery packaging merit further investigation.

Lastly, it is worth noting that in the White Paper, ‘Saving Lives: Our Healthier Nation’, the Department of Health identified the workplace as a key factor in any programme to improve public health in England. One of the responsibilities emphasised in a healthy workplace initiative was the duty of employers to minimise the exposure of employees to hazards and to maximise risk control. Waste is a hazardous substance and is therefore covered by this guidance. Waste minimisation also has environmental benefits which should be pursued not just for organisational reasons but also public health considerations.
## Appendix 4 – Contacts and further information

### Contact list

The following is a list of contacts established at each of the trusts included as a case study:

<table>
<thead>
<tr>
<th>NHS Trust</th>
<th>Hospital</th>
<th>Location</th>
<th>Contact</th>
<th>Title</th>
<th>Contact No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bassetlaw Hospital &amp; Community Health NHS Trust</td>
<td>Bassetlaw</td>
<td>Worksop</td>
<td>Richard Penney</td>
<td>Property and Capital Development Manager</td>
<td>01909 502824</td>
</tr>
<tr>
<td>Birmingham Women's Healthcare</td>
<td>Birmingham Women's</td>
<td>Birmingham</td>
<td>Gavin Wilson</td>
<td>Risk Manager</td>
<td>0121 6272744</td>
</tr>
<tr>
<td>Blackpool Victoria Hospital</td>
<td>Blackpool Victoria</td>
<td>Blackpool</td>
<td>Mrs Carol Molyneux</td>
<td>Assistant Director of Facilities</td>
<td>01253 306995</td>
</tr>
<tr>
<td>Central Manchester Healthcare</td>
<td>Manchester Royal Infirmary</td>
<td>Manchester</td>
<td>Mr Adrian Yates</td>
<td>Facilities Service Development Manager</td>
<td>0161 2766256</td>
</tr>
<tr>
<td>East Cheshire</td>
<td>Macclesfield District General</td>
<td>Macclesfield</td>
<td>Andrew Hatton</td>
<td>Specialist Service Manager</td>
<td>01625 661932</td>
</tr>
<tr>
<td>Hartlepool &amp; East Durham</td>
<td>General Hospital</td>
<td>Hartlepool</td>
<td>John Bushnall</td>
<td>Assistant to Environmental Services Manager</td>
<td>01429 522419</td>
</tr>
<tr>
<td>The Leeds Teaching Hospitals</td>
<td>The General Infirmary at Leeds</td>
<td>Leeds</td>
<td>Mr S McGuire</td>
<td>General Manager – Support Services</td>
<td>0113 3926291</td>
</tr>
<tr>
<td>Oxfordshire Mental Healthcare</td>
<td>Warneford</td>
<td>Oxford</td>
<td>Graham Wheeler</td>
<td>Estates Manager</td>
<td>01865 223738</td>
</tr>
<tr>
<td>Parkside Health</td>
<td>St Charles’</td>
<td>London</td>
<td>Kim Diamond</td>
<td>Waste Advisor, Estates Administrator</td>
<td>0181 9624040</td>
</tr>
<tr>
<td>Plymouth Hospitals NHS Trust</td>
<td>Derriford</td>
<td>Plymouth</td>
<td>Ron Smith</td>
<td>Waste Manager</td>
<td>01752 763440</td>
</tr>
<tr>
<td>Pontypridd &amp; Rhondda NHS Trust</td>
<td>Llwwynia</td>
<td>Mid Glamorgan</td>
<td>Mr Alan Jones</td>
<td>Senior Manager, Estates Directorate</td>
<td>01443 440440</td>
</tr>
<tr>
<td>Portsmouth Healthcare</td>
<td>St James</td>
<td>Portsmouth</td>
<td>Colin Saw</td>
<td>Housekeeping Advisor</td>
<td>01705 894370</td>
</tr>
<tr>
<td>Portsmouth Hospitals</td>
<td>Queen Alexandra</td>
<td>Portsmouth</td>
<td>Mitch Thomas</td>
<td>Environment Manager</td>
<td>01705 286000</td>
</tr>
</tbody>
</table>
Further information on waste minimisation

The following is a list of useful sources of information with regard to waste minimisation and healthcare waste management in general:

- Environmental Technology Best Practice Programme (ETBPP) publications (Web Site http://www.etbpp.gov.uk)
  - (i) Saving Money through Waste Minimisation: Getting Started GS025
  - (ii) Waste Minimisation – Elements for Success ET080
  - (iii) Have You Accounted for Waste? ET033
  - (iv) Waste Minimisation Clubs – Setting them up for success GG122
  - (v) Green Efficiency Guide*
  - (vi) Waste Account IT 249 software*  
    * due for publication in 2000.
- Environmental and Energy Helpline (Tel: 0800 585794, Fax: 01235 463804)
- Greening Government Web Site:
  - Waste (http://www.environment.detr.gov.uk/greening/waste/waste.htm)
  - Green Procurement (http://www.environment.detr.gov.uk/greening/greenpro/greenpro.htm)

- Environment Agency staff are available to talk directly on issues of concern and to provide appropriate advice. Details on any aspect of the Agency’s work can be obtained from the local office of the Agency or by viewing the relevant section of our web site.

For general enquiries please call your local Environment Agency Office. If you are unsure who to contact, or which is your local office, please call our general enquiry line

ENVIRONMENT AGENCY GENERAL ENQUIRY LINE 0845 9333 111

The 24 hour emergency hotline number for reporting all environmental incidents relating to air, land and water

ENVIRONMENT AGENCY EMERGENCY HOTLINE 0800 80 70 60

Visit our web site at:
www.environment-agency.gov.uk

<table>
<thead>
<tr>
<th>NHS Trust</th>
<th>Hospital</th>
<th>Location</th>
<th>Contact</th>
<th>Title</th>
<th>Contact No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preston Acute Hospitals</td>
<td>Royal Preston Hospital</td>
<td>Preston</td>
<td>L W Jackson/ Sian Fisher</td>
<td>Assistant Director of Estate and Facilities/Waste Minimisation Officer</td>
<td>01772 716565</td>
</tr>
<tr>
<td>NHS Trust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sheffield University</td>
<td>Weston Park</td>
<td>Sheffield</td>
<td>Mark Hattersley</td>
<td>Estates Services &amp; Safety Manager</td>
<td>0114 2265120</td>
</tr>
<tr>
<td>Hospitals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southend Community</td>
<td>Runwell</td>
<td>Wickford</td>
<td>Penny Funnel</td>
<td>Hotel Services</td>
<td>01268 366000</td>
</tr>
<tr>
<td>Care Services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University College</td>
<td>Middlesex</td>
<td>London W1</td>
<td>Ita Catchpole/ Chris Lees</td>
<td>Environment &amp; Hotel Services Manager/Deputy Environment &amp; Hotel Services Manager</td>
<td>0207 3809107</td>
</tr>
<tr>
<td>London Hospitals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 5 – Waste minimisation questionnaire sent to all trusts in England and Wales in April 1999
WASTE MINIMISATION QUESTIONNAIRE
Please answer as many questions as possible and, where practicable, provide any additional comments and copies of relevant strategies, policies and procedures as highlighted within the form.

All information gathered will assist in the compilation of a ‘Compendium of Good Practice’ used to assist and inform the NHS as a whole.

**SECTION 1: Organisational and managerial arrangements**

*The questions in this section measure the arrangements each trust has in place to maintain an effective waste management strategy and policy, and the importance attributed to environmental issues and concerns within the trust.*

1. **Senior management commitment:** is waste management performance regularly discussed and reported upon within the trust? **YES/NO**
   
   If YES, state at what level in the organisation and in which formats (eg Trust Board as an annual report).
   
   __________________________________________________________
   __________________________________________________________

2. **Has the trust appointed a manager responsible for waste management issues or allocated a similar post?** **YES/NO**
   
   Please state whether this is a dedicated post **YES/NO**
   
   If YES, when were they appointed and what level of seniority do they hold within the organisation? (eg second in line post)
   
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

3. **Do you have a waste management strategy and policy?** **YES/NO**
   
   If YES, please attach a copy.
   
   Does this form part of a wider environmental policy? **YES/NO**

4. **Is the management of waste systems under one umbrella of management responsibility?** **YES/NO**
   
   If YES, which directorate or department is responsible for the management of the systems?
   
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

   If NO, which directorates or departments are involved in the management of waste? (and state for which component parts of the overall system)
   
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
5. **Does the strategy set targets for waste minimisation or overall levels as part of the aims and objectives?**

   Yes/No

   If Yes, what targets have been set?
   
   ____________________________________________________
   ____________________________________________________
   ____________________________________________________

6. **Does the waste management system enable ongoing improvement?**

   Yes/No

   If Yes, please give examples of the types of improvement achieved.
   
   ____________________________________________________
   ____________________________________________________
   ____________________________________________________

7. **Are there systems in place for monitoring waste management performance?**

   Yes/No

   Please state briefly the information which is regularly gathered and monitored within the trust (eg total amount of clinical and domestic waste disposal from all sites, waste recycled per annum etc).
   
   ____________________________________________________
   ____________________________________________________
   ____________________________________________________

8. **Do you have a waste segregation policy?**

   Yes/No
SECTION 2: Waste audit reviews

The questions in this section measure arrangements in place to regularly review waste management.

1. Has a waste audit been undertaken within the trust covering the following:

   1a  A process review \(^7\) YES/NO
   1b  Identification of process flow charts YES/NO

   If YES, please enclose copies of all relevant flow charts.

   1c  Waste stream identification \(^8\) YES/NO

   If YES, please tick the waste streams which have been audited:

   - **Clinical waste**
   - **Industrial waste:** Waste oils Solvents Scrap metal
   - **Commercial waste:** Office waste
   - **Special waste**
   - **Inert waste:** Masonry Brick rubble
   - **Domestic** Household
   - **Wood** Cardboard
   - **Glass** Paper
   - **Plastic** Cans
   - **Kitchen waste** Others: e.g. water, effluent and energy

2. Which of those streams has been the subject of improvement action plans?

3. Have costs and benefits (financial or others) been identified?

   Please detail:

   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________

\(^7\) Process review refers to identifying the points at which waste is produced.

\(^8\) Waste stream refers to the different types of waste produced.
SECTION 3: Monitoring and evaluating

This section seeks to measure the systems in existence to effectively monitor and evaluate (i) general waste management systems and (ii) plans to improve organisational performance.

1. Do you monitor any of the following waste streams? (please tick)

- Clinical waste
- Industrial waste: Waste oils Solvents Scrap metal
- Commercial waste: Office waste
- Special waste
- Inert waste: Masonry Brick rubble
- Domestic Household
- Wood Cardboard
- Glass Paper
- Plastic Cans
- Kitchen waste
- Others: (eg water, effluent and energy)

____________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________

2. Do you use this data to evaluate performance with regard to (please tick):

- Clinical waste
- Industrial waste: Waste oils Solvents Scrap metal
- Commercial waste: Office waste
- Special waste
- Inert waste: Masonry Brick rubble
- Domestic Household
- Wood Cardboard
- Glass Paper
- Plastic Cans
- Kitchen waste
- Others: (eg water, effluent and energy)

____________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________
3. Have you set targets to improve performance? YES/NO

If YES, please state which specific targets you have set and any performance indicators adopted to monitor performance.

______________________________________________________________________________________________
______________________________________________________________________________________________
______________________________________________________________________________________________

4. What improvements in waste minimisation performance have been achieved (e.g. waste reduction material recycled)?

Please detail below.

______________________________________________________________________________________________
______________________________________________________________________________________________
______________________________________________________________________________________________

5. How is data collected and managed? Is it (please tick):

Real data ☐     Sampled data ☐     Estimated data ☐

How is data maintained and analysed? (eg software or paper based)

Please detail below:

______________________________________________________________________________________________
______________________________________________________________________________________________
## SECTION 4: Risk management

*This section aims to measure the action taken to assess the risks associated with waste management systems and the subsequent risk reduction and elimination action taken following the risk assessment.*

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| 1. | Has a waste management risk assessment been carried out? **YES/NO**  
   | If YES, please provide a copy or summary. |
| 2. | Does this risk assessment take account of:  
   | Health and safety legislation (including COSHH)? **YES/NO**  
   | Environmental legislation? **YES/NO** |
| 3. | Have systems been put into place to reduce the risk? **YES/NO**  
   | If YES, please list examples of specific risk reduction actions. |
| 4. | Have some risks been eliminated? **YES/NO**  
   | If YES, please state which risks have been eliminated and how this was achieved. |
SECTION 5: Movement, transport, storage and compaction

This section aims to measure the effectiveness of the existing collection and disposal systems in place which support the implementation of the waste minimisation and management strategy.

1. Is there an operational policy for waste management and collection covering the storage of waste, compaction and removal of waste, and transportation on and off site? YES/NO

   If YES, please send a copy of the policy.

2. Do you have compaction facilities on site? YES/NO

   If YES, please state for which types of waste compaction applies.

   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

3. Is all waste management the responsibility of in-house staff? YES/NO

   If NO, to what extent has the service been out-sourced?

   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

   If the service has been out-sourced in whole or in part, please state what contract monitoring arrangements are in place.

   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

4. How do you deal with:

   Redundant IT hardware?

   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

   Redundant medical devices?

   __________________________________________________________
   __________________________________________________________
SECTION 6: Compliance records

This section gathers information on the level of record-keeping at trust level and the history of corrective action taken in response to any non-compliance.

1. Are records of compliance with statutory duties kept in respect of (please tick):
   - Health and Safety at Work etc Act 1974
   - Management of Health and Safety at Work Regulations 1992
   - Control of Substances Hazardous to Health Regulations 1994
   - Environmental Protection Act 1990
   - Controlled Waste Regulations 1992
   - Waste Management Licensing Regulations 1994
   - Special Waste Regulations 1996
   - Environmental Protection (Duty of Care) Regulations 1991
   - Controlled Waste (Registration of Carriers and Seizure of Vehicles) Regulations 1991
   - Radioactive Substances Act 1993
   - The Carriage of Dangerous Goods by Road and Rail (Classification, Packaging and Labelling), and use of Pressure Receptacles Regulations 1996
   - Others:

2. If you have a waste management policy, do you keep records of corrective action taken to comply with the duties your policy places on the organisation? YES/NO
SECTION 7: Elimination of waste

*This section seeks specific details of your proposals and plans to either avoid waste or minimise the amount of waste generated by the trust.*

1. Have you implemented any initiatives to avoid or minimise waste? YES/NO

   If YES, please provide a brief description of each initiative and indicate the date when it was introduced and the waste streams/emissions to which it was applied.

______________________________________________________________________________________________
______________________________________________________________________________________________
______________________________________________________________________________________________

2. What reductions were achieved against waste stream/emissions inventories in terms of:

(i) Percentage of current consumption

   Please detail

______________________________________________________________________________________________
______________________________________________________________________________________________
______________________________________________________________________________________________

(ii) Cost savings (£)

   Please detail

______________________________________________________________________________________________
______________________________________________________________________________________________
______________________________________________________________________________________________

Would this work be suitable for publication as a good practice case study? YES/NO

3. Do you have any proposals or plans for future initiatives? YES/NO

   If YES, please provide brief details of the main project plans.

______________________________________________________________________________________________
______________________________________________________________________________________________
______________________________________________________________________________________________

4. Have you implemented or do you plan to implement any schemes in conjunction with suppliers to reduce the amount of packaging? YES/NO

5. Have you quantified any savings in respect of waste elimination and if so, what is the value?

   Was this work done (please tick): in-house? [ ] by consultants? [ ]
SECTION 8: Re-use\(^9\) and recycling\(^{10}\) initiatives

*This section seeks information regarding the schemes and systems the trust has in place to either re-use or recycle consumable items which would otherwise become waste.*

1. Do you have in place reuse facilities and systems for:
   - Cardboard [ ]
   - Glass [ ]
   - Others (please list):
     -
     -
     -

2. Do you have in place recycling facilities and systems for:
   - Cardboard [ ]
   - Plastic [ ]
   - Paper [ ]
   - Glass [ ]
   - Cans [ ]
   - Fluorescent tubes [ ]
   - Water [ ]
   - Others (please list):
     -
     -
     -

3. Have you moved from disposable to reusable or recyclable items? YES/NO
   Are there any policies in place to support this? YES/NO
   If YES, please list:
     -
     -
     -

4. Have you recycled any articles from clinical waste? YES/NO
   If YES, please list and detail:
     -
     -
     -

5. Are there any initiatives to:
   a. Purchase recycled or part-recycled products? YES/NO
      If YES, please list types of product purchased.
      -
      -
      -
   b. Specify less toxic products? YES/NO
      If YES, please list the types of product specified.
      -
      -
      -

\(^9\) Re-use involves putting items back into use so that they do not enter the waste stream.

\(^{10}\) Recycling is the use and re-use of waste for original or some other purpose such as input material recovery or energy production.
SECTION 9: Dissemination, communication and awareness

This section measures the corporate action taken within the trust to assist in waste minimisation initiatives. These are proactive initiatives to promote waste minimisation awareness.

1. Is training provided to staff on how to minimise waste? YES/NO

If YES, please tick which staff receive training:

- Medical staff
- Nursing staff
- Auxiliaries
- Agency staff
- Domestic staff
- Porters
- Transport staff
- Laboratory staff
- Ambulance staff
- Professional and technical staff
- Staff in the community

Others:

______________________________________________________________________________________________
______________________________________________________________________________________________
______________________________________________________________________________________________

Please provide a brief description of the training which took place.

______________________________________________________________________________________________
______________________________________________________________________________________________
______________________________________________________________________________________________

2. Is information provided to staff on how to minimise waste? YES/NO

If YES, please tick which staff receive training:

- Medical staff
- Nursing staff
- Auxiliaries
- Agency staff
- Domestic staff
- Porters
- Transport staff
- Laboratory staff
- Ambulance staff
- Professional and technical staff
- Staff in the community

Others:

______________________________________________________________________________________________
______________________________________________________________________________________________
______________________________________________________________________________________________

Please provide a brief description of the information which was provided.

______________________________________________________________________________________________
______________________________________________________________________________________________
______________________________________________________________________________________________

3. Is there a forum for staff to suggest ways to improve waste management performance within the trust (eg staff suggestion scheme)? YES/NO

4. Have you communicated performance and targets for waste minimisation to staff? YES/NO
SECTION 10: Partnerships with other agencies, statutory bodies and suppliers

This section is interested in initiatives taken locally to work together with other bodies in waste minimisation and management projects.

1. Have you entered into partnership arrangements with any of the following in order to improve waste management performance? (please tick):
   - Other trusts
   - The private sector
   - Local authorities
   - Environment Agency

2. Have you entered into any discussions with major suppliers to reduce waste? YES/NO
   If YES, please expand.
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________

3. Which publications or guidance have you used or found most helpful in implementing waste minimisation? Please detail below.
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________

Thank you for taking the time to complete this questionnaire. Your assistance is very much appreciated. Please provide your name and contact number below to enable any follow-up contact from Capitec.

Name: ____________________________________________________________________________________________
Title: ____________________________________________________________________________________________
Address: __________________________________________________________________________________________
______________________________________________________________
______________________________________________________________
______________________________________________________________
Contact number: ____________________________________________________________________________________

Please return this questionnaire to: Mr Michael Rope
Project Co-ordinator
Capitec, Part of NHS Estates
FREEPOST NEA5740
Leeds
LS1 1YY
DEFINITIONS AND GUIDANCE TO FILLING IN THIS QUESTIONNAIRE

For the purpose of this questionnaire, the following healthcare waste definitions should be applied.

(a) Energy, air pollution and water should not be included in the project, as most of these aspects have already been addressed, in particular by the audit commission.

(b) Healthcare waste covers two areas, domestic and risk waste:

   Domestic waste – waste from kitchens, wards etc including packaging, flowers, newspapers etc.

   Risk waste – biological (recognisable) anatomical waste; chemical, toxic or pharmaceutical including cytotoxins; sharps (eg needles, scalpels, sharp broken materials); radioactive (refer to Radioactive Waste Directive(s)).

   Note –

   Risk waste can include special waste.
   Waste can be in solid or liquid form, usually in drums/bottles.
   Infectious waste is any healthcare waste known or clinically assessed to be at risk of being contaminated with biological agents.

Waste minimisation – minimisation can be achieved in a number of ways:

   prevention
   re-use (for the same purpose)
   recovery – re-use } for another product
     – recycling
     – burn with energy recovery
     – composting

The above system of waste minimisation is known as the "waste hierarchy".
Appendix 6 – Steering group organisations and membership

Steering group organisations

*The BOC Foundation was launched by The BOC Group in 1990 to support practical demonstrations of means of reducing pollution in the United Kingdom. To date it has awarded some 80 grants in the fields of contaminated land, water quality, air quality and waste management. It was an early supporter of waste minimisation demonstrations starting in 1993 with the Aire & Calder Project in Yorkshire. Since that time the Foundation has supported many similar initiatives not only in manufacturing industry but also in construction, farming and now in the NHS.

*NHS Estates is an Executive Agency of the Department of Health. The aim of the Agency is to help the NHS to improve patient care through better use of the healthcare estate. NHS Estates advises and supports Ministers and the Department of Health to develop and implement policies, strategies and systems which will modernise the procurement, operation and disposal of the estate and facilities management in the NHS. It also provides advice, guidance, training services and support to the NHS. Its regional teams support the NHS Executive Regional Offices on the performance management of the NHS trusts.

The Agency’s mission is ‘Optimum use of the estate for better healthcare’.

NHS Supplies is a special health authority, formed in 1991 as the purchasing and supply arm of the NHS in England. It influences around half of the £7 billion the NHS spends on goods and services each year.

It is the NHS’ own centre of expertise on supply issues, taking a strategic perspective on supply on behalf of the health service. It works with NHS trusts, health authorities and suppliers and 98 per cent of trusts choose to use NHS Supplies for some or all of their purchasing needs.

From 1 April 2000, NHS Supplies will evolve into two separate organisations. The existing wholesaling, distribution and logistics function will become the NHS Logistics Authority, while all other activities will be transferred to a new executive agency of the Department of Health, the NHS Purchasing and Supply Agency.

*The Association of British Health-Care Industries is the lead trade association for the Medical Systems and Devices industry. The association has 180 corporate members whose output is around 80% of the industry total.

* Members providing financial support

The association’s membership includes six special interest sections and five sector trade associations.

The association is active in representing its members in areas which include, medical device and environmental legislation and regulation, healthcare and procurement policy, international trade promotion and competitiveness.

It has an active Environment Committee since 1992 chaired by Dr George Howarth and its mission is to: “Promote the sensible development and fair application of environmental legislation to the medical device industry and to guide our members in applying environmental good practice.”

Environment Agency Since its investiture on 1 April 1996, the Environment Agency has pursued its aim of protecting and improving the environment and making a contribution towards the delivery of sustainable development through the integrated management of land, air and water.

Our vision is a better environment in England and Wales for present and future generations however, we cannot achieve this on our own. Forging successful working partnerships with those organisations which we regulate has been key to many of our achievements over the years, and the Agency looks to continue this approach.

As an Agency we have a wide range of responsibilities, many of which will impact upon the way businesses within the NHS operate. These responsibilities include:

- advice on waste management regulation;
- checking the movement and control of dangerous wastes;
- the duty of care and registration of waste carriers;
- waste minimisation, recycling and pollution prevention guidance;
- producer responsibility for packaging wastes;
- industrial process regulation;
- surface water and effluent discharges;
- licensing and controlling waste management sites;
- water abstraction licensing.

To help businesses understand and fulfil their regulatory and environmental obligations, we have produced a range of guidance and training materials which, in many instances not only give best environmental practice, but also show that real benefits in cost savings can be
achieved through the adoption of these practices. Agency staff are available to talk directly with NHS practitioners on issues of concern and to provide appropriate advice on any aspect of the Agency’s work.

NHS Confederation was formed in 1997 when the National Association of Health Authorities and trusts and the NHS Trust Federation merged. It is UK-wide with arrangements to provide a voice in England, Scotland, Wales and Northern Ireland.

The Confederation is dedicated to improving health policy and practice by:

- linking members in the development of policy and ideas;
- creating a range of opportunities for members’ views to be heard;
- encouraging agenda setting debate;
- campaigning for change;
- working in partnership with other organisations;
- building awareness and understanding of issues;
- providing a single reference point for expert comment;
- supporting NHS leadership and management.

In doing so, the Confederation aims to:

- inform and lead debate on the wider health agenda and the organisation of the NHS;
- promote relations between the NHS and others with whom it does business;
- improve understanding of NHS management, leadership and the need for adequate resources;
- inform the development of high quality services responsive to the needs of patients and with accountability to citizens.

Centre for Greening the NHS

This was formed within Oxford Regional Health Authority in 1991 as a response to the then junior health minister Stephen Dorrell commitment to “a cleaner, greener NHS”. The current base is at the Institute of Health Sciences in Oxford. Erica Ison is Director of the Centre, and has much support from Dr. Muir-Gray.

Department of Health

Additionally, the Department of Health’s support has enabled the compendium to be printed.
Project steering group members

Dr GEORGE HOWARTH (ABHI)  Chairman

LORRAINE BRAYFORD (NHS Estates Agency)
www.nhsestates.gov.uk

PAUL CHARLESWORTH (The BOC Foundation)

ANDY DAVEY (NHS Supplies)
Andy.Davey@doh.gsi.gov.uk
www.pasa.doh.gov.uk

JON FOREMAN (Environment Agency)
jon.foreman@environment-agency.co.uk
www.environment-agency.gov.uk

Dr MUIR GRAY (Health Sciences Institute)

ERICA ISON (Centre for Greening the NHS)

MICHAEL KREUZER (ABHI)
www.abhi.org.uk

PHILIP PARSONS (NHS Confederation)
www.nhsconfed.net

PROJECT CONSULTANCY  CAPITEC

QUESTIONNAIRE SOFTWARE  HASTAM