



Royal College  
of Physicians



**Less waste, more health:**  
A health professional's  
guide to reducing waste

## Foreword

Good waste management is critical to reducing the negative environmental impacts of an NHS organisation, and applying best practice in their field helps to reduce operational costs which can be reinvested back into critical front line patient care.

Clinical staff especially have a critical role to play in helping their NHS organisation better manage their waste and the practical solutions set out in this report should be adopted at scale across the system. Senior clinical leaders should work with their teams to start identifying the simple changes they can make today that will deliver efficiencies and better outcomes for our environment both now and in the future.

NHS Improvement also has a critical role to play in supporting NHS providers to implement this report's recommendations. Through our national procurement programme, we are purchasing safe, high-quality everyday hospital consumables on behalf of the whole NHS. Not only does this maximise the NHS's purchasing power to secure better deals, this also streamlines deliveries and help reduce waste by only ordering volumes the NHS needs for its patients.

We are also supporting trusts to deliver £150m annual efficiency savings by 2020–21 with a substantial contribution arising from identifying better waste management opportunities and implementing better waste management practices. This includes adopting new technologies and supporting staff and patients to implement the principles of the circular economy. This work runs alongside other critical areas such as ensuring our buildings are healthy, resilient and energy and water efficient, as well as building staff capability across the whole NHS.

The fantastic work of NHS providers, which feature across this report, demonstrates that change is possible and that it delivers tangible results. I hugely welcome this report and the excellent work by Royal College of Physicians to drive this agenda forward. I now look to clinical leaders to make these simple changes and deliver for our patients and the environment.



**Dr Kathy McLean**

Executive Medical Director and Chief Operating Officer  
NHS Improvement

The NHS is currently facing a number of critical challenges: unprecedented financial pressures, an increasingly stretched workforce – whose wellbeing and productivity is key to quality of care – and a requirement to reduce our carbon emissions by 80% by 2050. Many initiatives, such as *Choosing Wisely*, have highlighted areas of inefficiency and waste. The Carter review suggested £2 billion could be saved by 2020 through smart procurement and medicines optimisation.

What we use and how we dispose of it has an impact not only on the NHS's finances but the environment and population health. This document explains how, as health professionals, we can positively influence societal health and wellbeing by thinking about how we procure and dispose of medical supplies. These simple changes will not only make significant financial savings (that can be reinvested into patient care), but also make steps towards improving efficiency and easing the demand on our services.

Over the past year we have collected examples from our members of 'waste' they have observed in their daily professional lives. Recurrent themes emerged around over-requesting of blood tests, a lack of focus on reducing printing and paper use, and missed opportunities to recycle waste and refuse.

Every purchase has hidden environmental and social impacts throughout its life cycle, as well as obvious financial costs. The manufacture and disposal of healthcare related goods have associated CO<sub>2</sub> emissions, which are known to contribute to climate change, negatively impacting human health.

The NHS has made a commitment in line with the 2008 Climate Change Act to reduce carbon emissions by 80%. Ambitions on how to achieve this are set out in the NHS Carbon reduction strategy, *Saving Carbon Improving Health*. Significant effort will be required to ensure current emissions are reduced, as well as countering rising emissions associated with increasing demand on the NHS.



what we use and how we dispose of it has an impact on **NHS finances, the environment and population health**

## Background

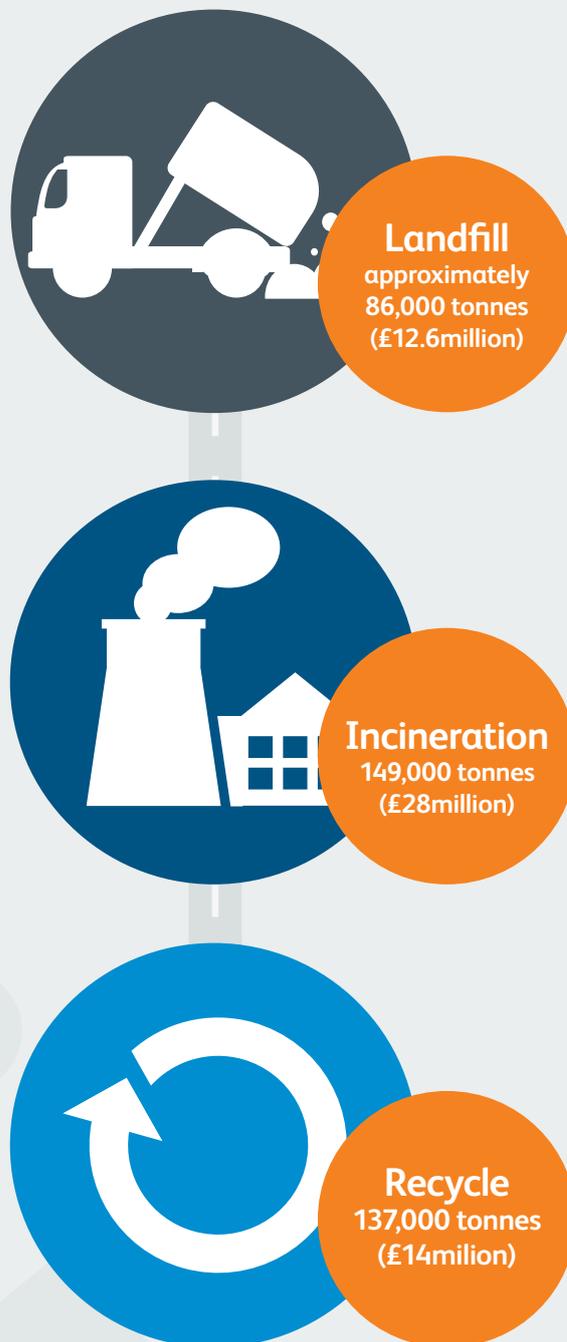
The latest analyses show that procurement accounts for almost 60% of the NHS's overall carbon footprint.<sup>1</sup> The majority is generated by the production, transportation and disposal of pharmaceutical and medical devices / instruments. Although the NHS has slowly been reducing its relative carbon footprint in line with targets, it remains the largest public sector emitter of greenhouse gases. Every year the NHS produces the same amount of carbon as over 800,000 space shuttle launches.<sup>2</sup>

In England, there are 165 hospital trusts with a combined expenditure of over £4.6 billion per annum on medical supplies and other consumables. The aggregated purchasing power of the NHS presents a unique opportunity to positively influence industry. Improving environmental practices in manufacturing and distribution will minimise impacts on environmental factors such as air quality, ultimately improving health. Redirecting or minimising waste can also secure financial savings that can be reinvested into patient care.

As one of the largest global employers, and with one million patient contacts every 36 hours, the NHS can influence societal behaviours and attitudes towards resource and environmental stewardship. Similar cultural shifts have been demonstrated through the BMA ethical procurement campaign, which improved employee working conditions in developing world factories linked to the supply of NHS goods.<sup>3</sup>

The NHS has a duty to improve efficiency and reduce CO<sub>2</sub> emissions, ensuring that healthcare today doesn't compromise health and healthcare availability in the future. To achieve this, all NHS staff must become resource advocates, procuring, using and disposing of all resources in the most efficient way.

## Current figures



Source: Hospitals Estates and Facilities Statistics. ERCI data 2016/17

# Recommendations

## Waste management

- 1 All staff must place products nearing expiration in the most accessible position when replenishing stock.
- 2 Every patient contact should be taken as an opportunity to check medication compliance, to minimise the need to dispose of unused medication.
- 3 All trusts should develop and promote facilities that allow the public to return medical equipment that is no longer required.
- 4 All NHS wards / departments / trusts should aim to maximise the reuse and recycling of resources as a default option, diverting waste from landfill or incineration where possible.
- 5 All trusts should educate staff about appropriate waste segregation and minimisation and display aide memoires to reinforce messaging.

## Principles of purchasing

- 6 Healthcare staff and procurement teams need to work together to minimise over-purchasing and unnecessary expiration of unused equipment, prioritising waste prevention.
- 7 The NHS must leverage its purchasing power and high reputation to mandate all suppliers to disclose and improve their approach to sustainable development and carbon management.
- 8 When choosing a product for use in a healthcare setting, whole-life cycle costs and environmental impacts should be taken into account during the decision-making process.
- 9 Environmentally friendly product alternatives that don't compromise patient care or staff safety should be favoured.



## Cultural influence

- 10 Every member of the NHS workforce should be encouraged and enabled to take action in their workplace.
- 11 NHS organisations should support their staff by promoting increased awareness, conducting behavioural change programmes, low carbon travel and supporting the use of ICT.
- 12 Local healthcare communities should work together to educate patients about appropriate antibiotic use and medication disposal.



# General principles

People's health is influenced by social, economic, environmental and cultural factors, often termed the 'wider determinants of health'. These factors play just as important a role as access to – and delivery of – healthcare in determining overall health outcomes. As professionals in health we therefore have a duty to ensure we are optimising all of these factors when we interact and deliver care.

The NHS is the largest public sector contributor of greenhouse gases in the UK and we must lead by example and make considerable effort to reduce its environmental impact. As health professionals working within the NHS we can do this by looking at resources and identifying where:

- > purchasing of resources can be **reduced**
- > resources can be safely **reused**
- > resources no longer of use can be **recycled**.

Disposal of domestic and clinical waste, through landfill and incineration, is financially and environmentally costly. Improving procurement efficiency and reducing waste will improve the sustainability of the NHS by:

- > saving money that can be reinvested into patient care
- > improving short- and long-term patient health by reducing greenhouse gas emissions associated with medical equipment production, transport and disposal
- > stewarding limited natural resources that are becoming depleted
- > helping meet the legal duty of the NHS to cut carbon emissions, as detailed in the *Climate Change Act 2008* and *NHS carbon reduction strategy*.



## Reduce

The best financial and environmental option is to avoid producing waste in the first place. This saves on both purchasing and disposal costs. In order to do this, trusts need to optimise the operations and procurement efficiency.

Careful purchasing and stock management can prevent waste being generated from over-purchasing and unnecessary expiration of unused medical equipment. This can lead to dramatic savings in procurement cost, waste costs and environmental impact.

All healthcare staff have a role to play. The NHS and other organisations should work with healthcare staff to develop practices that improve efficiency without compromising patient care. Healthcare facilities should reduce waste generation by adapting their purchasing and stock control strategies, and training staff in appropriate waste disposal.



### a) Streamlined purchasing

The first step to improving procurement efficiency and stock management is to review current purchasing patterns against use. Often there are opportunities to update purchase orders to reflect changes in clinical practice or preferences.

Reviews can lead to financial and environmental savings by stopping orders of equipment that are unnecessary or outdated. Equally, effective stock rotation ensures that items closest to their 'use by date' are used first, preventing unnecessary spoilage.

Repeat prescriptions often suffer from similar inefficiencies, with unused medications repeatedly being dispensed and discarded. It is estimated that £300 million worth of unused dispensed medicines are discarded each year in the UK.<sup>4</sup>

Pharmaceutical procurement represents 21% of the total carbon footprint of the NHS. Pharmaceutical residues are consistently entering the environment through improper disposal. The impact of this on our environment, and subsequently our health, is now a matter of great concern.

Health Care Without Harm Europe's new guide, *How doctors can help reduce pharmaceutical pollution*, contains advice on simple practices that can reduce pharmaceutical waste. These include guidance on prudent antibiotic prescribing, such as prescribing small packages until compliance is established. It also urges doctors to educate patients about their purchasing and disposal behaviour.

### b) Environmental swaps

One of the most pressing impacts of environmental degradation is worsening human health.

Private and commercial sector businesses have identified significant financial benefits to reviewing their supply chain and internal systems through a sustainable lens. This also has large benefits for the environment and local communities.<sup>5</sup>

Environmentally conscious healthcare items are being produced which can be swapped into practice. These items minimise their carbon footprint by rethinking what materials are used, how they are processed and how they can be disposed. The result is a more environmentally considerate product while maintaining quality, safety and usability.

The UK government and EU Commission have developed standard sustainable specifications for procurers to use for commonly purchased products. More specific to the NHS, toolkits like the *SDU Procuring for Carbon Reduction* can guide in-house procurement professionals through a process of identifying and understanding carbon emissions when buying goods and services.

The drive to constantly reduce costs often favours the cheapest short-term option, but this can often have a disproportionately high lifetime carbon cost. When considering a purchase, an understanding of whole lifecycle costs and the potential environmental impact is necessary.



## Recommendations

- > All staff must place products nearing expiration in the most accessible position when replenishing stock.
- > Healthcare staff and procurement teams need to work together to minimise over-purchasing and unnecessary expiration of unused equipment, prioritising waste prevention.
- > The NHS must leverage its purchasing power and high reputation to mandate all suppliers to disclose and improve their approach to sustainable development and carbon management.
- > Every patient contact should be taken as an opportunity to check medication compliance, to minimise the need to dispose of unused medication.
- > Local healthcare communities should work together to educate patients about appropriate antibiotic use and medication disposal.

### Case study: Central delivery of acid for haemodialysis



Bradford Hospital's Dialysis Unit changed to a central delivery of acid for haemodialysis, replacing weekly deliveries of 6 litre plastic cans of dialysate acid solution.

The individual cans could only be used for single patient, so despite varying flow rate prescriptions (800ml/min or 500ml/min) there was always an element of wasted solution. Per annum, it was estimated that one-third of the hospital's total annual order was wasted, and 29,540 empty cans (each weighing 143grams) were disposed of through clinical waste (£500 per ton).

The cans were also delivered on pallets that could not be stacked, requiring either a large amount of storage space or frequent deliveries.

Centralised delivery pumped the dialysate acid solution directly into a holding tank that was piped directly to all the dialysis machines. This reduced the frequency of deliveries and removed the £2,363 per year cost associated with the disposal of empty cans.

Installation of the holding tanks (one for main acid and one for low calcium), a pressurised loop delivery system and other minor adaptations totalled £43,900, which would take two years to offset.

<b>Per annum savings</b>	£23,072	16.03 tonnes CO <sub>2</sub> e
<b>Equivalentents</b>	One band 4/5 nurse salary*	Driving 39,289 miles

Adapted from Centre of Sustainable Healthcare Green Nephrology Resources

\*Salary rates taken from RCN 2017 NHS pay scales

### Case study bio box: Medicinal waste disposal



Newcastle Upon Tyne (NUTH) introduction paper-based Bio-bins® for the disposal of medicinal waste, instead of plastic purple topped rigid yellow containers.

The traditional rigid plastic containers are heavy, and it is estimated that the disposal of the containers alone accounts for 30–40% of the trust's incineration bill. The Bio-bins® offered a cheaper and more environmentally friendly alternative allowing for more to be delivered at any one time.

The Bio-bins® were placed in high usage areas to test performance before it was rolled out across the trust. Roll out was accompanied by full on-site training, supporting material, instructional videos and technical support from the supplier.

The Bio-bin is 96% paper. This is a more sustainable material that produces less harmful gases when incinerated at disposal. It is also 50% lighter than the equivalent plastic container, reducing transport emissions and waste incineration emissions. NUTH's trials demonstrated financial savings through reduced price per unit and a significant saving from a reduction in waste being incinerated (30 tonne annual reduction in waste equating to £13,500).

<b>Per annum savings</b>	£13,500**	66 tonnes CO <sub>2</sub> e
<b>Equivalents</b>	Part time band 5/6 nurse salary*	Driving 161,756 miles

Adapted from Sustainable Development Unit case study

\*\*Salary rates taken from RCN 2017 NHS pay scales

\*\*Savings from reduction in unit cost omitted

### Case study paper: NHS paper procurement



Many NHS organisations in England procure paper through the NHS supply chain core stationery list. Of the 3.6 million reams of paper procured through NHS supply chain, only 29,000 produced from recycled sources.

One ton of virgin paper requires 98 tons of resources to produce.

If the NHS procurement through NHS supply chain in 2016/17 had been from 100% recycled sources, the carbon emissions associated with manufacturing would have been nearly halved!

Unfortunately, NHS organisations are facing financial strain and virgin paper is currently cheaper. Therefore the commercial argument for the procurement of virgin, opposed to recycled, paper outweighs the NHS's corporate responsibility to reduce its environmental impact.

The '*How to buy paper a low carbon way*' tool is available on the NHS Sustainable Development Unit website, should you wish to establish the impact of the paper procured by your organisation.



## Reuse

Where waste cannot be avoided, the next most environmentally favourable option is reuse. Preparation for reuse can range from a quick check over and clean (eg crutches), to major repair or restoration (eg diagnostic equipment).

In healthcare there has been a significant move towards single-use equipment, in order to minimise cross infection risks. The MHRA advises against reusing single-use items because the necessary processes to deem the item 'safe and fit for intended purpose' again cannot be guaranteed.<sup>6</sup> Patient safety should not be compromised because of financial or environmental considerations. However, opportunities do exist to reuse medical items that don't have direct patient contact or implications.

### Case study: Health equipment amnesty



NHS West Suffolk launched a campaign encouraging local inhabitants to hand back NHS equipment no longer required. In one month over 8,500 items were returned, including crutches (£12.70 per pair), commodes, adjustable wheeled frames and air mattresses (£1,650 per mattress).

Crutches, walking sticks and frames are listed in the Sustainable Development Unit's top 20 priority items. These items are thought to account for more than 70% of the footprint of procured items, in terms of expenditures and carbon footprint.

Savings per month

£608,500

If all CCGs achieved similar results  
£128 million worth of equipment  
could be recouped.



## Recommendations

- > When choosing a product for use in a healthcare setting, whole life cycle costs and environmental impacts should be taken into account during the decision-making process.
- > Environmentally friendly product alternatives that don't compromise patient care or staff safety should be favoured.
- > Develop and promote facilities that allow the public to return medical equipment that is no longer required.



### Case study: Reusable sharps box



The majority of healthcare facilities use disposable plastic containers for sharps disposal. These are sealed in the clinical area in which it is being used and sent for incineration with their contents.

NHS Lanarkshire trailed a reusable sharps system in the Diabetes Centre at Monklands Hospital. This was to replace the disposable plastic container, which is usually sealed and incinerated at the end of its use.

The reusable sharps system is a pre-assembled unit, available in multiple sizes. The containers are delivered to site by a clinical waste contractor and used and sealed in a way to their disposable counterparts. Once full and sealed they are collected and returned to the clinical waste disposal facility. Here they are emptied, heat treated and inspected before being returned for re-use. The decanted sharps waste is destroyed at the facility under the appropriate regulations.

The reusable sharps containers can be used up to 500 times each opposed to single-use. Financial savings are dependent on the size of trust but can result from reduced waste for incineration (cost associated with weight) and removed need to replenish single use containers. Harmful gases produced during incineration of the container are also reduced, and it has been suggested that staff needlestick injuries have also fallen because containers are less likely to be overfilled.

Adapted from NHS Scotland: Waste Prevention and Re-use guide



# Recycle

Healthcare waste is segregated into a number of streams according to how it needs to be treated or disposed of: domestic waste, offensive (or hygiene) waste, clinical, and hazardous waste. All waste streams fit in two broad categories: infectious or non-infectious. Infectious waste is defined as anything that may pose a risk of infection to any living thing it may come into contact with, and therefore requires incineration.

NB Purple and blue colour codes do also exist for cytotoxic / cytostatic and medicinal waste respectively.<sup>7</sup>

The correct management of healthcare waste minimises the risk of the spread of infection and is an important part of infection control practices. Any failure in the segregation of infectious waste from non-infectious waste means that the entire waste stream needs to be treated as infectious waste.

After segregation, infectious waste (the most common is clinical waste) requires expensive treatment and disposal. Clinical waste costs are typically 3.5 times the cost of managing domestic waste. Estimates vary, but published data suggests as much as 50% of the clinical waste stream has been misclassified and is suited for treatment / recovery as domestic waste.<sup>8,9,10</sup>

Non-infectious				Infectious
				
<b>Recycling</b>	<b>Domestic waste</b>	<b>Offensive (hygiene) Waste</b>	<b>Clinical waste</b>	<b>Hazardous (anatomical) waste</b>
Clear	Black	Yellow and black	Yellow/Orange	Red
Cardboard, paper, plastic,	Packaging, tissues, disposable cups/cans, sandwich wrappers	Sanitary protection eg colostomy bags, incontinence pads, nappies Protective clothing not contaminated with bodily fluids	Gloves, dressings, bandages, aprons contaminated with infectious bodily fluids	Blood preserves, organs or body parts
Recycling	Landfill, incineration or energy from waste	Recycled, deep landfill, incineration or energy from waste	Incineration or treatment prior to landfill	Incineration
 <b>£144</b> per tonne	 <b>£142</b> per tonne	 <b>£241</b> per tonne	 <b>£337-457</b> per tonne	

\*Costs taken from Royal College of Nursing. Freedom of Information follow up report on management of waste in the NHS.



## Recommendations

- > All NHS wards / departments / trusts should aim to maximise the reuse and recycling of resources as a default option. Diverting waste from landfill or incineration where possible.
- > Trusts should educate staff about appropriate waste segregation and minimisation, and display aide memoires to reinforce messaging.
- > Every member of the NHS workforce should be encouraged and enabled to take action in their workplace.
- > NHS organisations should support their staff by promoting increased awareness, conducting behavioural change programmes, low carbon travel and supporting the use of ICT.

### Case study: improving waste segregation within a Welsh trust



A Welsh trust reviewed their waste segregation practices and determined that only one-third of waste disposed of clinical waste was truly clinical waste.

Clinical waste trolleys were introduced to replace clinical waste bins on wards. The trolleys are used when carrying out near-patient clinical procedures only, and then removed from the ward once the procedure was complete. This prevented the use of the clinical waste bins for domestic waste disposal.

The trial suggested there was potential to divert 15 tonnes of non-clinical waste to the domestic waste stream, resulting in significant financial savings. Introduction of an offensive waste stream in key areas with high incontinency wastes is predicted to save up to £85,000 per annum. Depending on your waste provider investment to introduce a new waste stream is expected to be minimal.

Queen Victoria NHS trust (East Grinstead) expected to save £30,000 and 40 tonnes of CO<sub>2</sub> per year by correctly segregating waste. This would reduce the hospital annual clinical waste disposal costs by a third (annual expenditure of £90,000) and associated carbon emission by 25%.

<b>Per annum savings</b>	£85,000 min
<b>Equivalents</b>	Three band 5 nurses*

Adapted from NHS Scotland: Waste Prevention and Re-use guide and Sustainable Development Unit case study  
\*Salary rates taken from RCN 2017 NHS pay scales

### Case study: PVC recycling - RECOMED



PVC is widely used material in medical equipment. It is estimated that each of the 1,500 hospitals in the UK produce approximately 2,250 tonnes of PVC waste, which could be recycled. Initial pilots identified PVC anaesthetic masks, oxygen masks and tubing as the most frequently used medical PVC items in a hospital. There is a low infection risk with PVC oxygen masks and tubing, so they can be classed as non-hazardous waste and are therefore suitable for recycling.

RECOMED is a PVC take back scheme running currently in five trusts across the UK. It brings together members of staff from clinical teams, facilities, estates and environmental services to identify high usage areas of PVC products that could be redirected to recycling at the point of disposal.

Since starting the scheme over 5,000kg of non-infectious PVC medical items have been recycled, half of which was in the last year alone. RECOMED containers are placed in high volume use areas and taken to central waste collection areas once full, to await collection by RECOMED.

RECOMED containers, communication material and collections are provided to participating trusts. Financial savings are made because plastic that would previously have gone into clinical or offensive waste is instead recycled, and the environmental impact from incineration or landfill is removed. The collected plastic is shredded and supplied to a specialist recycler who produce 100% recycled horticultural products (eg tree ties).

Currently RECOMED only recycle 100% PVC. However, a proposal to expand to scheme has been submitted, so hopefully this can be considered in the future.

Adapted from Sustainable Development Unit case study



## What is the RCP doing?

The RCP is committed to working to promote and integrate sustainability across the healthcare economy, to ensure it is embedded into immediate and long-term planning and service design. We believe that this will help to improve patient care, increase productivity and reduce waste and pollution.

We will promote the role of sustainable healthcare principles in delivering environmental and financial savings while maintaining excellence in patient care.

If you would like to find out more about our sustainable healthcare programme, please contact us at: [sustainability@rcplondon.ac.uk](mailto:sustainability@rcplondon.ac.uk) or visit our website at [www.rcplondon.ac.uk/projects/healthcare-sustainability](http://www.rcplondon.ac.uk/projects/healthcare-sustainability).

Share your sustainability ideas and examples through the *Tell us your story* initiative.

- <sup>1</sup> Sustainable Development Unit. *Carbon Footprint update for NHS England in 2015*. London: SDU, 2016.2 [www.treehugger.com/renewable-energy/what-is-the-carbon-footprint-of-the-space-program.html](http://www.treehugger.com/renewable-energy/what-is-the-carbon-footprint-of-the-space-program.html)
- <sup>3</sup> BMA. *Ethical Procurement – what are the issues?* [www.bma.org.uk/collective-voice/influence/international/global-justice/fair-medical-trade/ethical-procurement-issues](http://www.bma.org.uk/collective-voice/influence/international/global-justice/fair-medical-trade/ethical-procurement-issues)
- <sup>4</sup> Trueman P, *et al*. Evaluation of the scale, causes and costs of waste medicines. The York Health Economics Consortium and The School of Pharmacy. University of London: 2010.
- <sup>5</sup> [http://planareport.marksandspencer.com/M&S\\_PlanAReport\\_2017\\_FullReport.pdf](http://planareport.marksandspencer.com/M&S_PlanAReport_2017_FullReport.pdf)
- <sup>6</sup> MHRA. *Single-use medical devices: implications and consequences of reuse*. London: 2013.
- <sup>7</sup> Department of Health. Environment and sustainability. *Health Technical Memorandum 07-01: Safe management of healthcare waste*. London: DH, 2013. [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/167976/HTM\\_07-01\\_Final.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/167976/HTM_07-01_Final.pdf)
- <sup>8</sup> RCN Guidance. *The management of waste from health, social and personal care* [www.rcn.org.uk/professional-development/publications/pub-004187](http://www.rcn.org.uk/professional-development/publications/pub-004187)
- <sup>9</sup> NHS Scotland. Waste prevention and re-use guide ([www.resourceefficientscotland.com/sites/default/files/NHSScotland%20Waste%20Prevention%20and%20Re-use%20Guide.pdf](http://www.resourceefficientscotland.com/sites/default/files/NHSScotland%20Waste%20Prevention%20and%20Re-use%20Guide.pdf))
- <sup>10</sup> Hutchins D, White S. Coming round to recycling. *BMJ* 2009;338:746–8.
- <sup>11</sup> The NHS Confederation. *Taking the temperature: Towards an NHS response towards global warming*. London: NHS Confederation, 2007.



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Royal College of Physicians  
11 St Andrews Place  
Regent's Park  
London NW1 4LE

[www.rcplondon.ac.uk](http://www.rcplondon.ac.uk)



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