

Auditor-General's Report

Performance Audit

Managing Hospital Waste

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Foreword

Waste is an unavoidable by-product of many human activities.

Some waste is benign; some is hazardous to people or the environment. Some waste has no commercial value; some represents a potential asset. Regardless, the generation and disposal of waste should be managed efficiently and effectively.

Because waste is a by-product, management may not give it the attention that they give to their agencies' core services. Often, waste handling and management is allocated to people who are least able to change the practices that make waste.

Yet effective management seeks to reduce waste and manage its disposal in an environmentally friendly and cost-effective way.

While this audit examined how certain hospitals manage the waste they generate, many of the comments in the report can equally apply to other agencies. In particular:

- agencies need to understand how their activities generate waste
- people who create waste must be actively involved in ensuring it is managed in ways that are safe, appropriate and cost-effective.

I commend the report for the attention of all agencies.

R J Sendt
Auditor-General

December 2002

Executive Summary

Executive Summary

Waste

Waste is an unavoidable by-product of health care.

Some waste is hazardous to people and the environment. Other waste can cause infection or offence. However, most hospital waste is no more dangerous than domestic waste generated by the community at large.

Effective management seeks to avoid or reduce waste. Waste, once created, should be separated into distinct 'streams', so that similar wastes can be handled and disposed of having to regard to health, safety, the environment and cost.

The Audit

The audit examined:

- how the public health sector manages waste
- the arrangements established by the Department of Health and two Area Health Services (AHSs) including four public hospitals to manage waste
- general and clinical waste, which are the most prevalent types of hospital waste.

The Area Health Services reviewed are:

- Central Sydney AHS, which includes Royal Prince Alfred and Concord hospitals
- Mid Western AHS, which includes Orange and Cowra hospitals.

The scope and objectives of the audit and descriptions of the sites visited are outlined in Appendices 1 and 2.

Audit Opinion

In 1998 NSW Health developed *Waste Management Guidelines* to promote continuous improvement in waste management across the public health sector.

Systematic implementation of the *Guidelines* was impeded in 1999-2000 by resistance from the waste industry and transport workers. Since then, NSW Health has not actively promoted waste management in public hospitals.

As a consequence Area Health Services (AHSs) and hospitals have developed separate and individual responses to waste management. This has resulted in:

- inconsistent management of waste by public hospitals
- inappropriate segregation of waste
- additional costs of waste disposal.

The four hospitals examined have reduced their output of waste and increased the amount of material that is recycled.

The Mid Western AHS hospitals, Orange and Cowra, have implemented the *Guidelines*. Amongst other improvements this has reduced their expenditure on waste.

In contrast, Central Sydney AHS hospitals have not implemented the *Guidelines*. Royal Prince Alfred and Concord are spending more on waste. These hospitals are disposing of general waste (as defined by the *Guidelines* and environmental regulation) into the more expensive clinical waste stream.

Audit Findings

The *Guidelines*

NSW Health agreed to a ‘temporary’ moratorium on implementation of *Guidelines* in 2000. The moratorium remains in force today.

Without further direction from NSW Health, AHSs have adopted separate and different approaches to waste management.

Due to the moratorium, NSW Health does not collect, monitor or benchmark waste performance information across NSW as provided for in the *Guidelines*.

... *disparate approaches to managing waste*

Mid Western AHS has experienced less resistance from external parties and has implemented the *Guidelines* and monitors the performance of hospitals against them

In contrast, Central Sydney AHS has not:

- implemented the *Guidelines*
- provided its hospitals with alternative waste stream definitions and related procedures.
- monitored the waste performance of hospitals, which have developed their own solutions to managing waste.

... *the amount of waste is declining*

All four hospitals reduced waste last year through improved procurement, work practices and recycling. Overseas and local studies have demonstrated the potential for hospitals to reduce waste further.

Limited markets for the sale of recycled materials are creating difficulties, particularly in rural areas.

... but costs are rising

The cost of waste disposal is rising at RPA and Concord because more material is entering the expensive clinical waste stream.

These hospitals treat blood-free incontinence pads, nappies, oxygen masks and tubing as clinical waste. In contrast, Cowra and Orange dispose of these wastes in accordance with the *Guidelines* and at one tenth of the cost of clinical waste.

... classifying waste

Three of four hospitals monitor compliance with their respective systems for classifying waste. RPA does not. An analysis of a sample of clinical waste at RPA in October 2001 found that 60% could have been disposed of as general waste at one tenth of the cost.

... people

Good practice is enhanced when people responsible for generating the waste are involved in its management. The Waste Management Committees at Cowra, Orange and Concord hospitals include representatives from nurse education, infection control, operating theatres and other clinical departments. Such wider representation is absent at RPA.

Concord, Cowra and Orange hospitals have developed, monitored and reviewed plans to improve waste management. RPA does not have a waste management plan.

... facilities

To manage waste efficiently and effectively, buildings need to be purpose built to permit, for example, secure storage of clinical waste, recycling, washing of waste bins and weighing of waste.

RPA and Orange do not have adequate handling and storage practices. Consequently:

- clinical waste is stored in open, overflowing bins in unsecured areas
- double handling of waste is normal practice
- waste streams are mixed during temporary storage and transport
- staff handling waste suffer higher levels of injury.

Waste management at RPA and Orange is constrained by congested layout of the sites and the lack of space for bins and storage.

New facilities will help address these problems but effective waste management planning is needed up front and during commissioning.

Recommendations

It is recommended that NSW Health review its strategy and approach to improve waste management across public sector hospitals.

In doing so we recommend:

NSW Health

- clarify the status of the *Guidelines*, and in particular the definitions of clinical and general waste
- work with key players to improve understanding of how to manage risks associated with different hospital wastes.

AHS and hospitals

- ensure that the managers of staff who generate waste are part of the waste management team. People who are in a position to change hospital practices need to be involved in waste management
- ensure that waste management is incorporated in the planning and commissioning of new facilities.

Response from the NSW Health Department

NSW Health has reviewed the findings of the Performance Audit – Managing Hospital Waste. The report provides some useful insights into the management of waste in the NSW Hospital system, and reveals an increasing trend in waste generation, particularly of clinical waste, which requires higher levels of treatment.

A response to each of the recommendations is set out below:

Recommendation

NSW Health review its strategy and approach to improving waste management across public sector hospitals.

Agreed. NSW Health will develop a plan for the management of hospital wastes within NSW Public Hospitals. This plan will include a clarification of definitions of clinical waste, re-issue of the Waste Management Guidelines and the development of a steering group within NSW Health to oversee the implementation of these guidelines.

Recommendation

Clarify the status of the Waste Management Guidelines, and in particular the definitions of clinical and general waste.

Agreed. The moratorium on the implementation of the Waste Management Guidelines has now been lifted.

As the Report points out, the definition of clinical waste needs to be clarified before the guidelines can be fully implemented. The current definition of clinical waste is too broad. Disposal costs for clinical waste are ten times higher than for general waste. The current definition includes all waste which is “likely to cause offence” – a definition which may include any hospital waste. NSW Health has written to the EPA in October, 2002 suggesting amendments to the definition. NSW Health is advised by the EPA that they will have to consult with stakeholders to approve definitional changes. The definition of what is, and what is not clinical waste is a critical factor in determining waste segregation practice. NSW Health has resolved to clarify this definition as a matter of priority. The NSW Health/EPA strategic Liaison Group will add this issue to its current work program. The process of finalising the definition should not impede the development of structures within hospitals to manage waste more effectively.

Recommendation **Work with key players to improve understanding of how to manage risks associated with different hospital wastes.**

Agreed. The report reinforces the relevance of the Waste Management Guidelines. It underscores the need for an effective Waste Management Committee (WMC), a Waste Management Plan, and performance indicators based upon systems for monitoring waste outputs.

The report proposes some useful performance indicators of waste management performance, specifically the amount, costs and type of waste per occupied bed day. From the limited review done by the Audit Office there is a clear increasing trend in clinical waste in metropolitan hospitals. The causes of this increase need to be identified and managed.

NSW Health will establish a steering group to oversee the implementation of the Waste Management Guidelines in Area Health Services throughout NSW. The utility of the inclusion of waste management indices within existing performance management systems with Area Health Services will be explored.

Recommendation **AHS and hospitals:**

- **ensure that the managers of staff who generate waste are part of a waste management team. People who are in a position to change hospital practices need to be involved in waste management**
- **ensure that waste management is incorporated into the planning and commissioning of new facilities.**

Agreed. The report makes the point that WMCs vary in their composition and effectiveness. The report notes that all four hospitals visited had WMCs which met regularly, but did not always include staff in a position to change waste segregation practice. These issues will be referred to the steering committee to be established by NSW Health.

Within the NSW Health system, waste minimisation will reduce costs and have clear environmental benefits. The reports shows that waste minimisation initiatives are in place in many hospitals, but that these initiatives have had little impact on the growth in waste volumes and costs. There is scope for system wide improvements in waste minimisation and this issue needs elaboration in a review of the Waste Management Guidelines, and oversight from the proposed Steering Committee.

In response to this recommendation, Central Sydney Area Health Service has advised that it will initiate actions to ensure that senior managers, who are in a position to change practices, are involved in waste management; and that it has incorporated waste management in the planning, construction and commissioning of new facilities. Mid Western Area Health Service has advised that its Waste Management Committee consists of a wide cross section of staff; and that, with the development of its Environmental Management Plan, waste management issues will be included in the future planning and development of facilities.

(signed)

*Robyn Kruk
Director-General*

Dated: 4 December 2002

1. Introduction

1.1 Why is it Important to Manage Hospital Waste?

... waste is unavoidable and costly

Waste is an unavoidable by-product of health care. It needs to be managed to:

- promote public health and infection control
- protect the safety and health of waste workers
- minimise damage to the environment
- avoid unnecessary costs.

Some hospital waste, such as used syringes and radioactive material, is dangerous to people and the environment. Clinical waste, including human tissue, laboratory cultures and material containing blood can cause infection or offence.

However, most waste produced by hospitals is no more dangerous than domestic waste. In addition, hospitals produce large amounts of recyclable material including paper, packaging, glass and plastic. Definitions of the various waste streams are included in Appendix 3.

... the response to waste has evolved

Before the 1990s most hospital garbage was regarded as 'contaminated' and incinerated on hospital grounds.

Little emphasis was given to the separation of waste into distinct streams to facilitate its disposal.

Over the last decade hospitals have been required to conform to tighter environmental regulation. Hospital incinerators have, for example, been decommissioned.

As the law on disposing of waste has become more stringent, the costs of disposal have increased.

... it is important to segregate waste carefully.

Clinical waste, for example, costs approximately ten times that of general waste to dispose of. For this reason hospitals need to ensure that general waste is not mixed with clinical waste.

Equally, clinical waste should not be mixed with general waste for the sake of public health, breaches of which may give rise to prosecution.

Principles of Good Waste Management

Good waste management requires:

- an awareness of how waste is created
- clear accountability to manage waste
- the avoidance and minimisation of waste and the promotion of recycling and re-use
- the segregation of different types of waste to support cost-effective handling, storage, transport and disposal.

2. Organisational Arrangements

2.1 Does the Health Sector have Adequate Arrangements to Manage Waste?

The Guidelines NSW Health sets policy for the public health sector, while the Board of each Area Health Service (AHS) is responsible for the conduct and management of the hospitals under its control.

In 1998 NSW Health issued the *Waste Management Guidelines for Health Care Facilities* (the *Guidelines*) which:

- are generally consistent with better practice
- were developed in consultation with the Environment Protection Authority, WorkCover and health workers
- are endorsed by NSW regulation and provide prescriptive guidance on how to manage and dispose of different types of hospital waste
- require all public hospitals to implement a uniform approach to waste management
- require AHSs to monitor hospital waste management performance
- provide that NSW Health will collect AHS data for comparison and benchmarking.

The *Guidelines* reflect current scientific, medical and environmental opinion in that most hospital waste, with proper handling, poses no greater risk than domestic waste. Hospital waste should not, therefore, be automatically regarded as “contaminated”.

The *Guidelines* define various streams of hospital waste including:

- clinical waste, which is waste that has the potential to cause injury, infection or offence
- sanitary waste such as incontinence pads, drained dialysis waste and disposable nappies. Sanitary waste is not classified as clinical but as general waste.¹

... the Guidelines were resisted The waste industry and transport workers resisted the practices contained in the *Guidelines* for the handling waste. These groups:

- objected to the potential risk of infection and the offensive nature of sanitary waste and
- argued that such waste should be incinerated.

¹ The NSW Health approach to sanitary waste is consistent with:

- *Guidelines for Waste Management in the Health Care Industry*. National Health and Medical Research Council. 1999.
- *Code of Practice for Clinical and Related Wastes*. ANZ Waste Management Industry Group. 2002.
- *Report to the Industrial Relations Committee of NSW: OHS Issues in the Management of Waste*. WorkCover. 2001.

During 1999 and 2000, industrial action threatened the removal of hospital waste from some metropolitan hospitals. In addition, Waste Services NSW refused to accept sanitary waste at metropolitan transfer stations and landfills. These threats were averted by three developments:

- NSW Health placed a moratorium on further implementation of the *Guidelines* by AHSs. The moratorium was introduced as a short term measure but remains in force today
- some AHSs changed the tender specifications for waste removal requiring employers to train transport workers in safe waste handling procedures
- Waste Services NSW established a new category of *Special Health Care Facility Waste* for loads that contain sanitary waste. Such waste is accepted only at specified landfills where it is handled separately to avoid direct contact with workers and machinery.

In 2001, WorkCover found the ongoing moratorium was contributing to inconsistent waste management across AHS and hospitals including:

- incorrect segregation of waste
- inappropriate filling of rubbish receptacles.

NSW Health has advised the Audit Office that it is reviewing the definition of clinical waste in conjunction with the Environment Protection Agency.

Audit Findings

Since agreeing to the moratorium, NSW Health has not progressed better practice in waste management by the public health sector. For example, NSW Health has not implemented the *Guidelines* provision to:

- collect and monitor information on waste from AHSs and hospitals
- benchmark waste management performance across NSW.

As a consequence AHSs and hospitals have developed separate and individual approaches to waste management.

NSW Health does not have systems to identify either the amount of waste being generated by the public health sector in NSW, or the cost of managing that waste.

There is a lack of communication across the public health sector about initiatives and opportunities to improve waste management.

2.2 Local Arrangements

Good practice requires that organisations develop arrangements for the management of waste.

In this context AHSs are accountable for the management of waste by hospitals and each hospital is required to manage waste in accordance with better practice.

The following table summarises the arrangements in place at the sites visited during the audit.

Organisational Arrangements	Mid Western AHS	Orange	Cowra	Central Sydney AHS	RPA	Concord
Policy	✓	✓	✓	✓	✓	✓
Effective Waste Management Committee	✓	✓	✓			✓
Waste Management Procedures	✓	TBI	✓			✓
Waste Management Plan	✓	✓	✓	✓		✓
Waste Management Performance Indicators	✓	✓	✓	TBI	TBI	✓
Waste Management Information	?	✓	✓	?	✓	✓
TBI: developed and To Be Implemented						

Policy

AHS

Mid Western AHS policy requires hospitals to:

- comply with the *Guidelines*, and
- develop and implement management systems that facilitate the monitoring of waste and support accountability.

The policy is supported by a generic waste management plan that has been adapted by hospitals to meet local circumstances.

The Central Sydney AHS policy does not adopt the *Guidelines* but requires:

- hospitals to develop and implement local policies and procedures to manage waste
- waste to be reduced while ensuring a high standard of health care
- unavoidable waste to be managed using the most environmentally appropriate means available.

Central Sydney AHS advises that it will require its hospitals to:

- review waste management practices
- assess compliance with the *Guidelines*
- document any variations so that operational risk is minimised.

Hospitals

Orange, Cowra, Concord and RPA hospitals have waste management policies.

**Waste
Management
Committee**

Good practice requires that:

...management should establish a committee with representation from key area/departments to assist in the implementation and monitoring of waste management. ... it must be ensured that specific personnel are appointed with waste management and infection control expertise [*NSW Health Guidelines*].

AHSs

Both AHSs have Waste Management Committees (WMCs) that meet regularly. The WMCs include representatives from the AHS and from the hospitals.

Senior clinicians regularly attend the WMC at Mid Western AHS, but not at Central Sydney AHS where the membership consists mainly of corporate and domestic service managers.

Central Sydney AHS advises that it will review the membership and functioning of its WMC and ensure appropriate representation and attendance.

Hospitals

All four hospitals have WMCs that meet regularly.

Clinicians and educators are an integral part of waste management at Concord, Cowra and Orange. The audit found that this promoted improvement and allowed issues to be explored and resolved and decisions to be effectively disseminated.

In contrast, waste management at RPA is primarily left to domestic service and housekeeping staff. Those responsible for generating waste and representatives from infection control and nurse education rarely attend committee meetings.

Waste Management Procedures

Mid Western AHS has waste management procedures based on the *Guidelines*.

AHSs

Central Sydney AHS has not adopted the Guidelines or provided its hospitals with alternative definitions of waste streams and related procedures. Some units within the AHS have developed independent and inconsistent working definitions and procedures for managing waste.

Hospitals

Concord and Cowra hospitals have established procedures for waste management. Concord's procedures, for example, are included in its Hospital Manual and actively communicated to all staff through ongoing training, videos, posters and signage. The procedures give guidance on:

- the definition of the various waste streams
- how waste is to be handled
- responsibilities of all staff members.

Orange is currently implementing procedures to address shortcomings in waste management.

RPA has yet to define waste streams and develop related procedures.

Central Sydney AHS advises that Concord's waste management training program is being implemented in all of the AHS's facilities.

Waste Management Plan

Good practice requires that:

all generators of clinical and related waste are responsible for the safe management of such waste. Each generating organisation should have a comprehensive waste management plan as part of an overall environmental management strategy. The larger the organisation, the more comprehensive this plan should be [*National Guidelines for Waste Management in the Health Industry*].

AHSs

Both AHSs have developed waste management plans.

Hospitals

With the exception of RPA, the largest hospital examined, all of the hospitals examined have waste management plans.

Concord's waste minimisation and management plan, for example, establishes strategies, initiatives and measurable targets that are monitored and reviewed annually.

Central Sydney AHS advises that it will require RPA to develop a waste management plan.

Performance Indicators

Mid Western AHS

Mid Western AHS monitors hospital performance using the standardised tools that accompanied the *Guidelines*, namely the:

- *Waste Management Numerical Profile*
- *Segregation Audit*.

The *Waste Management Numerical Profile* is used by the Mid Western AHS to assess the performance of each of its hospitals annually in respect of waste:

- management
- policy
- waste minimisation
- education
- occupational and public health and safety
- handling, containment and transformation.

Cowra scored 71 per cent in the last *Profile*. The AHS recognised the hospital's proactive approach and achievements in waste management. Cowra's unit managers report to the hospital *Waste Management Committee* every quarter on strategies taken to further improve waste minimisation and management.

Orange scored 51 per cent in the last *Profile*. Waste storage and employee awareness were found to be unsatisfactory while improvement was needed to waste minimisation. The hospital's Waste Management Committee is addressing these issues and has revised the waste management plan and procedures.

Mid Western AHS uses the *Segregation Audit* to physically audit each hospital's general and clinical waste and evaluate compliance with segregation procedures. The segregation performance of Cowra and Orange is discussed in section 3 *Waste Awareness* of this report.

Central Sydney AHS

Central Sydney AHS does not monitor waste management although its Waste Management Committee encourages good practices by hospitals across the AHS. Hospitals in the AHS:

- agreed, in 2002, to adopt common performance indicators
- report on performance of these indicators to the AHS Waste Management Committee.

The audit observed, however, inconsistency and errors in the initial reports.

**Waste
Management
Information**

All four hospitals monitor and report to their respective AHS on the amount of waste generated.

The reports are not, however, standardised and are not captured electronically, with the exception of a stand-alone system at Mid Western AHS. Central Sydney AHS advises that it will assess the costs and benefits of establishing a computer-based system to monitor waste.

3. Waste Awareness

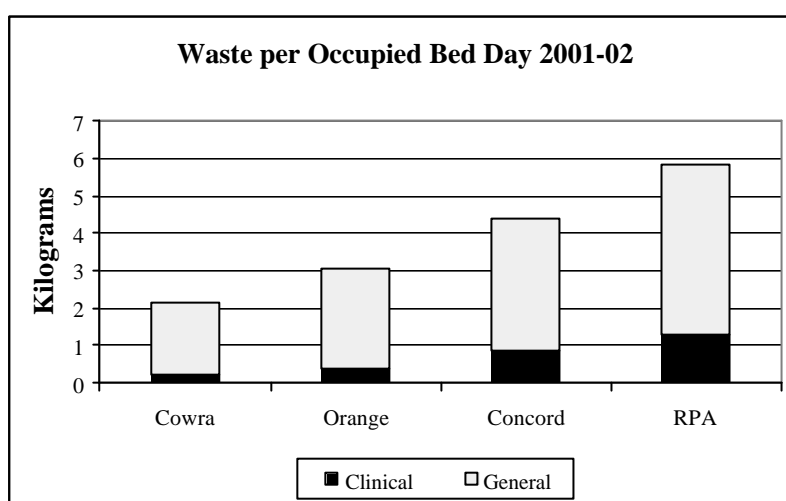
3.1 What Waste do Hospitals Generate?

In order to manage waste, organisations need to know what, where and how waste is created.

Waste volumes

The exhibit below shows the variation in the amount of waste generated by the four hospitals for each occupied bed day.

In NSW the amount of waste per bed is directly related to the size of the hospital. The reasons for this are unclear but a similar relationship between hospital size and waste volume per bed has been noted in German studies.²



Notes:

- Performance in terms of occupied bed day was chosen as the most useful comparator throughout this report. The audit recognises that this does not reflect different levels of other activities such as day surgery, research and laboratories.
- All graphs exclude waste diverted to reuse or recycling.

... measuring waste

The Environment Protection Authority (EPA) requires hospitals to weigh clinical waste before its removal by contractors.

Of the hospitals visited, Cowra weighs clinical and kitchen wastes while only Concord weighs all waste.

RPA will be able to meet the EPA requirement at its new premises. Orange is yet to address its obligation to weigh clinical waste.

Hospitals without weighing facilities are forced to rely on contractors for information about the amount of waste generated.

² Dettenkofer, M., et al. 2000. Environmental Auditing in Hospitals. *Environmental Management* Vol. 25, No. 1, pp105-113.

Such hospitals

- have limited management information about waste
- may incur avoidable costs, if the contractor does not accurately weigh waste.

3.2 How Much is Spent on Waste Disposal?

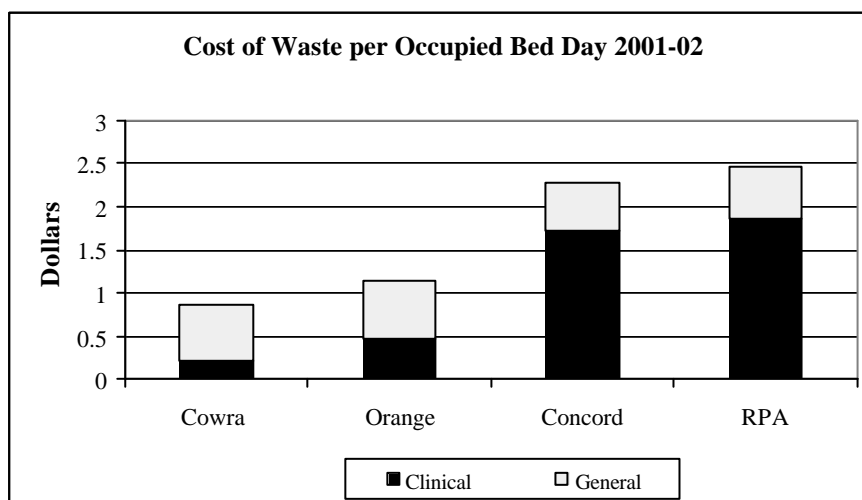
The Cost of Waste

NSW Health operates 210 general hospitals. The AHSs advise that the four hospitals examined during the audit spend the following amounts on waste disposal in 2001-02. These costs represent payments to contractors for the removal of waste and do not include internal costs such as the wages of hospital waste handlers.

- Cowra \$10,306
- Orange \$95,580
- Concord \$348,071
- RPA \$755,257

Central Sydney and Mid-Western AHSs monitor expenditure for waste removal through centralised financial systems but have no electronic systems to monitor waste volumes across their hospitals.

The four hospitals have provided data from which the cost of waste disposal for each occupied bed was calculated. This information is shown in the following exhibit.



Hospitals pay a similar amount for general waste (around 60 cents per bed day) even though the larger hospitals produce twice the waste as the smallest hospital. Concord and RPA are able to achieve economies by compacting general waste on site.

3.3 Segregating Waste

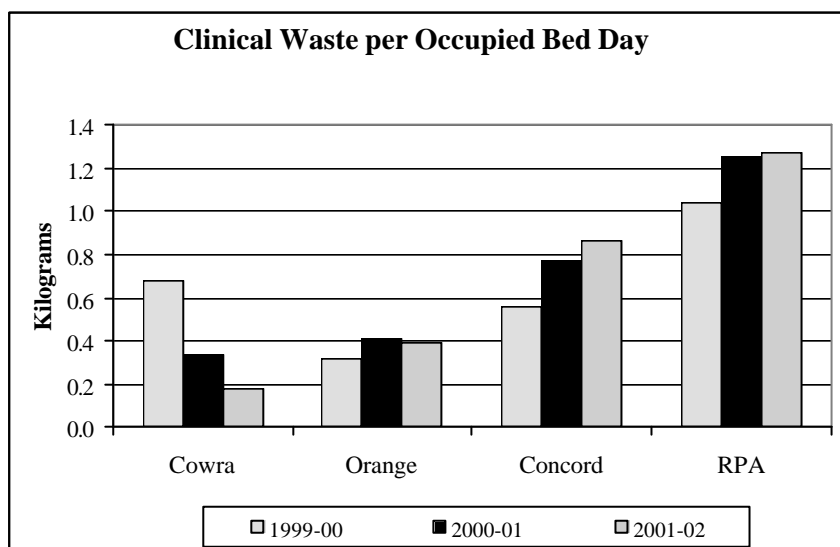
... it is important to differentiate between waste types

Clinical waste, at ten times the cost of general waste, is the most important cost driver.

Clinical waste accounts for over 20% of all waste generated at RPA and Concord, compared to 10% at Cowra. This is partly because major hospitals undertake complex medical treatments that generate more clinical waste.

The way waste is classified also contributes to the higher volumes of clinical waste at RPA and Concord. Appendix 4 summarises the variation in how hospitals define waste.

The following graph depicts how clinical waste volumes at the four hospitals have changed over the last three years.



Mid Western AHS

Mid Western AHS has implemented the *Guidelines* developed by NSW Health.

In doing so Mid Western hospitals have reduced the types and the amount of waste entering the clinical waste stream. Cowra, for example, has reduced its clinical waste by 74% since 1999-2000.

Central Sydney AHS

In contrast, Central Sydney AHS has not implemented the *Guidelines*. Factors contributing to this are:

- the refusal of the metropolitan land-fill operator (NSW Waste Services) to accept certain materials as general waste
- the moratorium agreed to by NSW Health
- complaints and disputes between transport workers and individual hospitals.

As a result, RPA and Concord place more materials (regarded as general waste by the *Guidelines*) into the clinical waste stream including:

- sanitary waste such as incontinence pads, nappies, drained dialysis and urine tubing and bags (RPA and Concord)
- oxygen masks and drainage, oxygen and intravenous tubing and bags even though free of blood (Concord).

This is done to:

- allow the remaining general waste, which accounts for the majority of waste, to be disposed of economically through transfer stations without the risk of rejection
- avoid the need to create and resource a waste stream additional to the general and clinical streams. To do so would require more training, bins, floor space and waste handlers.

In adopting the above approach, RPA and Concord do not use the compromise waste category of *Special Health Care Facility Waste* agreed by NSW Health and Waste Services NSW.

These hospitals have not documented their reasons for this decision.

***Audit
Observations***

The Audit Office has estimated that the current approach of RPA and Concord is cost-effective when the volume of ‘special’ waste is less than 25% of the clinical waste stream.

Beyond this point it would be more economical to combine ‘special’ and general waste streams and incur higher charges for disposal at designated landfills. The estimates are included in Appendix 5.

The Audit Office recommends that AHS assist hospitals to analyse their waste streams to support segregation decisions.

3.4 Monitoring Segregation

Good practice requires that organisations physically examine waste to ensure that it is correctly segregated.

Classifying and Tracking Waste

As discussed above, NSW hospitals classify waste differently. Nevertheless, regular waste audits supported by managerial review can improve compliance with local policies in order to:

- reduce health and safety risks to staff, the public and waste workers by ensuring that clinical and other hazardous waste does not enter the general waste stream
- save money by ensuring that general waste (as defined by the hospital) is not included in the clinical waste stream which is more expensive to dispose of
- improve environmental outcomes by removing recyclable materials from the waste stream.

Concord hospital audits a sample of general and clinical waste each day. The auditors are members of the waste management team with appropriate training, equipment, resources and operating procedures.

Tracking of the waste and ongoing communication with, and education of, medical staff responsible for creating waste has achieved effective levels of segregation.

The following exhibit contains the results of audits conducted by Concord during 2001-02.

2001-02 Results of Concord Waste Audits

138 kilograms of general waste was audited each month.
75.8% was general, 21% recyclable and 3.2% clinical waste.

160 kilograms of clinical waste was audited each month
95% was clinical, 2.7% general and 2.3% recyclable waste

The 2002-03 waste management plan sets higher targets for segregation quality.

RPA, Orange and Cowra do not have the people or the facilities necessary to conduct such regular waste audits.

Mid Western AHS Each year Mid Western AHS staff audit one day's general and clinical waste at each hospital. In addition, the infection control teams at Cowra and Orange audit one day's clinical waste once or twice a year.

The general waste stream at Cowra and Orange is comparatively free of other types of waste. However, segregation of the clinical waste stream could be improved. In 2001, for example:

- Orange's audited clinical waste included 13.5% general waste. It also contained 2 syringes which are hazardous waste and should have been disposed of separately
- Cowra's clinical waste included 44% general waste. This is partly attributable to some staff maintaining the metropolitan practice of treating sanitary waste as clinical waste
- the results of the audits were communicated to the departments that generated the waste so that corrective action could be taken.

RPA

No segregation audits of general or clinical waste have been conducted at RPA.

In October 2001 the clinical waste contractor conducted an off-site audit of 12 bags (27.9kg) of clinical waste. Over 60% of this waste could have been disposed of as general waste.

While this result may not be representative of segregation performance at RPA, it appears that:

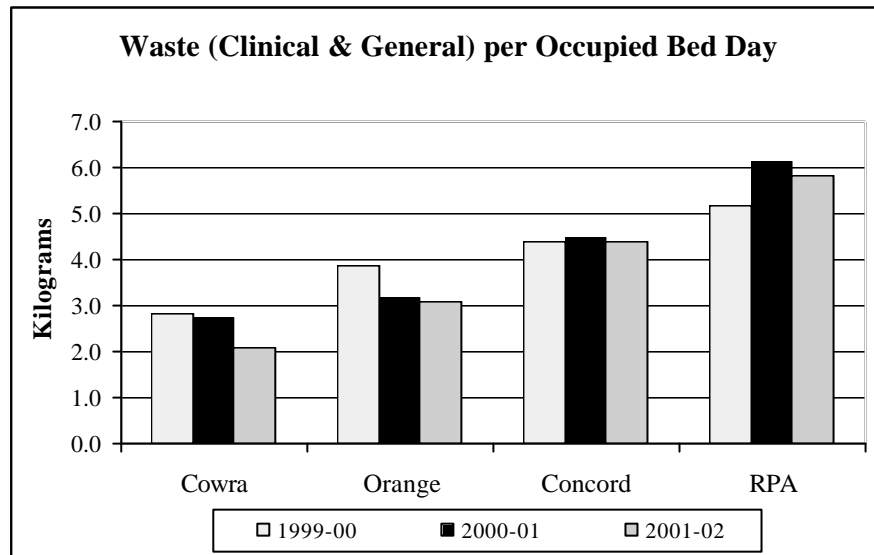
- no follow up occurred with the areas that had segregated the waste incorrectly
- no audits of clinical waste have occurred since October 2001
- RPA could save more than \$200,000 a year if it generated 60% less clinical waste.

4. Reducing Waste

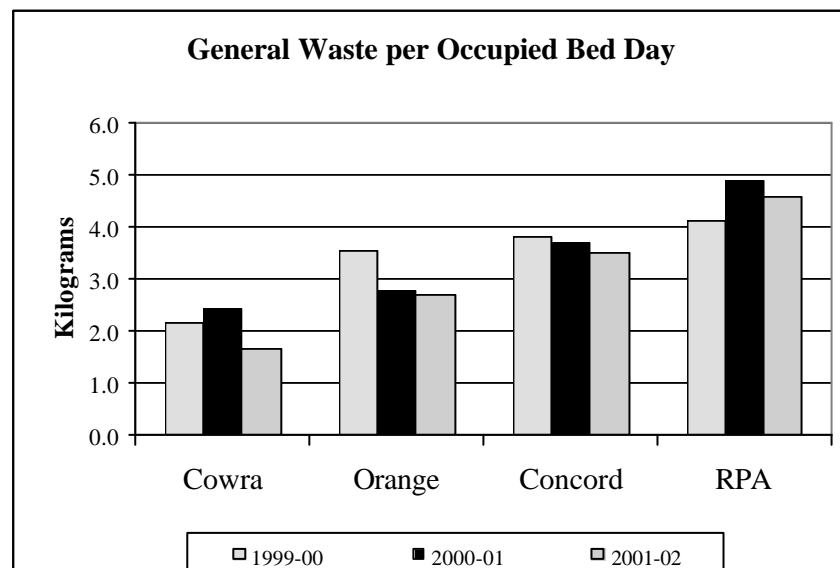
4.1 Are Hospitals Reducing Waste?

Cowra, Orange, Concord and RPA hospitals reduced waste in 2001-2002 as shown in the following exhibit.

Waste avoidance, reduction and greater use of recycling contributed to the decline.



The improvements are more noticeable when general waste is considered separately. Concord, Orange and Cowra have reduced general waste over the last three years.



4.2 Initiatives

Waste Avoidance	<p>NSW Health, AHSs and hospitals evaluate their products for environmental impact and negotiate with suppliers to reduce waste. Successes include:</p> <ul style="list-style-type: none">▪ the use of recyclable plastic in the manufacture of Baxter bottles, which are used in vast quantities for saline and other solutions▪ the use of re-usable containers for sharps by all four hospitals.
Recycling	<p>Typically the hospitals began recycling paper in their office areas.</p> <p>All four hospitals are now extending their recycling programs to other parts of the hospital system and to other materials. For example:</p> <ul style="list-style-type: none">▪ Concord recycles 3.3 tons of paper and cardboard a week▪ RPA recycles 12,240 litres of glass, aluminium and plastic containers a month, an increase of 240% since 2001▪ Cowra reuses sterile packaging for trolley sheets saving linen costs▪ RPA and Concord are installing banks of ‘street furniture’ at food outlets in their new facilities for the recycling of aluminium, glass and plastic. <p>A pilot study at Concord in 2002 indicated that an additional 13 per cent of general waste from wards could be readily recycled.</p>
Further Initiatives	<p>The Concord <i>Waste Minimisation Plan for 2002-03</i> provides for:</p> <ul style="list-style-type: none">▪ the introduction of cloth towels (where appropriate under infection control guidelines)▪ the introduction of alternative products for sterile packaging. This is projected to deliver savings of \$83,000 to Central Sydney AHS▪ the removal of unnecessary general waste bins to promote recycling.

4.3 Constraints

Hospitals reported constraints on reducing waste further, including:

- a limited number of environmentally friendly products on State contract
- the move to ‘cook-chill’ meals constrains the opportunity to reduce food waste (hospitals need to focus on ordering the right number and size of meals)
- the market for recycled materials is limited. This is most keenly felt in rural areas; however, metropolitan hospitals are stockpiling used batteries and fluorescent tubes for which a market has yet to be identified.

4.4 Opportunities

Studies from other jurisdictions indicate the potential for greater efficiencies even in major hospitals.

One of Germany’s largest and most advanced hospitals, Freiburg University, has an international reputation for best practice in environmental management.

Freiburg University Hospital has demonstrated that large teaching hospitals providing complex medical procedures can reduce the amount of waste produced.

With 1,709 beds Freiburg Hospital is over twice the size of RPA yet it produces less waste per day as indicated in the following table.

	Freiburg	RPA
Number of Beds Occupied Per Day	1,337	632
Clinical Waste per Occupied Bed Day	0.31kg	1.27kg
General Waste per Occupied Bed	4.93kg	4.57kg
Total Waste per Occupied Bed	5.24kg	5.84kg

5. Handling Waste

5.1 Do Hospitals Handle, Store and Dispose of Waste Appropriately?

Good practice suggests:

- appropriate handling begins when waste is created
- the person responsible for generating the waste should place the waste in a designated container
- waste should be stored and transported safely and efficiently to the point of disposal with minimum handling.

‘Sharps’

In the public health environment, medical staff are required to place used needles (‘sharps’) into secure, designated containers. This practice should eliminate needle-stick injuries to waste handlers.

At Concord, Orange and Cowra hospitals there have been no needle-stick injuries to waste handlers over the last two years. In contrast, handlers at RPA suffered three sharps injuries between February and August 2002.

Clinical Waste

All the hospitals examined use yellow bags and bins for clinical waste. The hospitals monitor the placement of containers to ensure the correct containers are available when and where needed.

The Audit Office observed acceptable waste management practices at Concord and Cowra. At these hospitals clinical waste is handled once when it is put in a bin. At Concord the bin is locked before being moved to a secure storage area to await collection by a contractor.

Concord and Cowra have tracking systems that identify the source of waste. This supports the monitoring of:

- waste volumes
- the segregation of waste into various streams at the unit level
- and is used to inform continuous improvement.

At RPA and Orange, the constraints of the existing buildings and reliance upon double handling contribute to waste handling practices that are less than adequate.

At Orange bags of clinical waste are mixed with bags of general waste. The hospital’s sole waste handler:

- loads both waste streams onto an open trolley
- transfers the trolley to the waste area
- unloads the clinical waste by hand and
- carries the waste into a cool room where it is stored in bins.

The cool room at Orange hospital is unlocked and its small size prevents closure of the bins. The bins were seen to be overflowing with clinical waste bags.

We observed no system at Orange to identify the source of the waste.

At RPA we observed that:

- most of the older buildings do not have designated rooms for the temporary storage of waste
- bags of clinical waste are collected using trolleys and bins and reloaded by hand into larger bins, some of which were open and located on the balconies of wards
- waste is gathered from over thirty major buildings and transported through congested service tunnels, car parks and across a main public road to the perimeter of the campus
- bins are not locked until collected by the contractor
- systems only allow waste to be tracked to its approximate source
- construction work to modernise RPA is disrupting waste handling.

General Waste

The handling of general waste follows a similar pattern.

Concord uses bins, level routes and mechanical devices to minimise handling and reduce the risk of injury. More congested hospitals tend to 'double-handle' and 'repack' waste to larger bins.

RPA does not have adequate facilities to wash general waste bins and dirty bins were observed.

5.2 Occupational Health and Safety

Occupational Health and Safety (OH&S) is addressed in waste management plans and procedures at Concord and Cowra. These hospitals performed well in the OH&S assessments for waste management and have maintained a zero level of injury to waste handlers.

Orange has recently developed a waste management plan and related procedures. Implementation will require training and modification of equipment and waste storage areas.

RPA waste handlers suffered at least eight injuries during 2001-02.

Contributory factors are that RPA does not have:

- a waste management plan and procedures
- effective systems to review waste handling incidents, risks and injuries.

Central Sydney AHS advises that RPA will review the involvement of supervisor and senior management input into accident investigation in order to improve current practices.

5.3 Facility Planning

To manage waste efficiently and effectively, buildings need to be purpose built to permit, for example, secure storage of clinical waste, recycling, washing of waste bins and weighing of waste.

Central Sydney AHS is modernising and rebuilding its hospitals through the Resource Transition Program, a major \$390 million project.

RPA anticipates that the relocation to new facilities in 2002-03 will remove many of the barriers to improved waste management. For example:

- RPA will decommission the older facilities with the worst waste handling practices
- new facilities will provide departments with the space and opportunity to better manage waste and reduce manual handling.

The new building at RPA will also include a central waste dock with facilities for:

- secure storage of clinical waste
- plant to compact general and paper waste
- recycling
- bin washing
- scales to weigh waste before collection by the contractor.

The Audit Office suggests that:

- planning be done up front to ensure that better waste management practices are put in place as new facilities are commissioned
- the generators of waste are accountable for the waste they produce.

Appendices

Appendix 1 Audit Scope and Objectives

Audit Objective	The objective of the audit was to determine whether adequate policies and procedures are in place for the management of hospital waste in accordance with better practice.
Audit Scope	<p>The audit examined the arrangements at the three largely autonomous levels of the public health sector:</p> <ul style="list-style-type: none">▪ NSW Health which sets the policy for the sector▪ the Area Health Services which are responsible for the conduct and management of hospitals in accordance with government policy▪ hospitals, which provide care and in doing so create waste. <p>The audit focused upon the minimisation and management of clinical and general waste, which are the most prevalent forms of waste generated by hospitals.</p> <p>The audit did not examine the structure of the waste and recycling industries or the merits of particular definitions of waste.</p> <p>The audit did not concentrate upon the health sector's compliance with environmental laws and regulation.</p>
Audit Criteria	<p>The audit developed criteria to test whether agencies are managing hospital waste in a way that achieves health, safety, environmental and cost objectives.</p> <ol style="list-style-type: none">1. Do agencies have organisational arrangements to manage hospital waste?2. Do agencies know what waste is being generated?3. Are agencies acting to reduce and avoid waste?4. Are agencies handling waste appropriately?
Audit Methodology	<p>The audit methodology included:</p> <ul style="list-style-type: none">▪ research of literature on hospital waste management▪ discussions with representatives of the Environment Protection Authority, WorkCover NSW, Waste Service NSW and Resource NSW▪ review of agency documentation▪ visits to two Area Health Services and four hospitals.
Acknowledgement	The Audit Office thanks the employees of NSW Health, Central Sydney and Mid Western Area Health Services and RPA, Concord, Orange and Cowra hospitals for their cooperation and assistance during the audit.
Audit Team	Michael Johnston and Denis Streater
Audit Cost	(estimate \$95,000)

Appendix 2 **Audit Sample**

The audit examined waste management arrangements at two Area Health Services and four hospitals. The hospitals were chosen to reflect the diversity of NSW hospitals in terms of location, size and services provided.

Central Sydney Area Health Service

Central Sydney AHS serves 500,000 people living in Sydney's inner west.

With over 8,580 staff and facilities including 10 hospitals the Central Sydney AHS performed more than 131,700 inpatient treatments in 2000-01.

A major modernisation and refurbishment of Central Sydney AHS hospitals is underway through the Resource Transition Program.

Royal Prince Alfred

Royal Prince Alfred at Camperdown provides an extensive range of specialist services including cardiology, obstetrics and gynaecology, cancer, respiratory medicine, neurology, liver and kidney transplants.

RPA is very large with nearly 3,500 staff EFT³. On an average day RPA has 632 occupied beds. The main campus contains over 30 major buildings on a congested site bisected by the busy Missenden Road.

The high level of diverse activity, the physical layout of the site and the disruption caused by the major building works underway are significant challenges to waste management.

Concord

Concord is a principal referral and teaching hospital that provides a comprehensive range of services. Specialities include burns, colorectal and laparoscopic surgery, molecular biology and genetic laboratory, aged and extended care and gastroenterology.

Concord is large with over 2,000 staff (EFT). On an average day Concord has 422 occupied beds.

Mid Western Area Health Service

The Mid Western AHS serves the 175,000 residents of the central west. The AHS covers an area from the foot of the Blue Mountains to Lake Cargelligo, approximately 7% of the State.

With 2,363 staff (FTE) and facilities including 22 acute hospitals, the Mid Western AHS admitted 43,854 inpatients in 2000-01.

Orange Base Hospital

Orange is a major rural referral hospital that offers a range of services including emergency, intensive care/coronary care/high dependency unit, operating theatres, general surgery and gynaecology.

It employs 501 staff (EFT) and on an average day has 142 occupied beds.

The facility is ageing and planning is underway for redevelopment.

³ All staff numbers are expressed in terms of the Equivalent Full Time number ie three nurses working half the normal hours would equal 1.5 EFT.

Cowra

Cowra is a district hospital providing acute and nursing home type care to the 8,500 residents of the town and a surrounding rural population of 3,000. The services provided include medical surgical, obstetrics, emergency, paediatric, palliative care, mental health, x-rays, pathology, ultrasound and dental.

The hospital employs 97 staff (FTE) and on an average day accommodates 27 in-patients.

Appendix 3 Definitions of Waste Streams under the *Guidelines*

Clinical Waste	<p>The <i>Guidelines</i> define clinical waste as waste that has the potential to cause sharps injury, infection or offence. When packaged and disposed of appropriately there is virtually no public health significance. Clinical waste concerns the following types of waste (unless treated to standards approved by the Director General of NSW Health) :</p> <ul style="list-style-type: none"> ▪ sharps ▪ human tissue (excluding hair, teeth and nails) ▪ bulk body fluids and blood ▪ disposable material and equipment visibly soiled with or containing blood ▪ laboratory specimens and cultures ▪ animal tissues, carcasses or other waste arising from laboratory investigation or for medical or veterinary research. <p>Although sharps are defined as clinical waste in the <i>Guidelines</i>, hospitals manage sharps waste separately as required by the <i>Protection of the Environment Operations Act 1997</i>.</p>
Related Wastes	The <i>Guidelines</i> also list other health care waste streams that require separate management.
<i>Chemical Waste</i>	Includes mercury, cyanide, azide, formalin and solvents, which are subject to special disposal requirements.
<i>Cytotoxic Waste</i>	Waste that is contaminated with material toxic to cells. Such waste is generated by anti-cancer treatments and must be incinerated.
<i>Liquid Waste</i>	Includes grease trap waste, lubricating oil and waste normally discharged to the sewer. Liquid wastes are governed by separate regulations and disposal arrangements in NSW.
<i>Organic Products</i>	Includes wood, garden, food, vegetable and natural fibrous material waste and biosolids, which are capable of composting.
<i>Pharmaceutical Waste</i>	Includes expired or discarded pharmaceuticals and materials contaminated with pharmaceuticals as specified under the <i>Poisons and Therapeutic Goods Act 1966</i> .
<i>Radioactive Waste</i>	<p>Waste that is radioactive. It is produced, for example, during nuclear medicine, and may be in solid, liquid or gaseous form and be included in the body waste of patients. Separate Acts and regulations govern its management.</p> <p>Medical radioactive waste typically has a short half-life. Once lead shielded and allowed to decay to a safe level it is no longer deemed to be radioactive waste.</p>
<i>Recyclable Waste</i>	Material capable of being remanufactured or reused. Items are considered recyclable if facilities are available to collect and reprocess them.
General Waste	<p>The <i>Guidelines</i> define general waste as:</p> <p style="padding-left: 40px;">Any waste not included above and which is not being composted, recycled, reprocessed or re-used. This stream included incontinence pads, drained dialysis wastes, sanitary waste and disposal nappies.</p>

Appendix 4 Variation in How Hospitals Manage Waste

A: Clinical Waste

Material	Guidelines	Orange	Cowra	RPA	Concord
Bulk body fluids and blood Disposable material and equipment visibly soiled with blood Laboratory specimens and cultures Animal tissues, carcasses or other waste arising from laboratory investigation or for medical or veterinary research	Clinical	Clinical	Clinical	Clinical	Clinical
Human tissue (excluding hair, teeth and nails)	Clinical	Burgundy bins separate stream	Burgundy bins separate stream	Burgundy bins separate stream	Burgundy bins separate stream
Blood free	Sanitary waste-incontinence pads			Clinical	Clinical
	Drained dialysis and urine bags			Clinical	Clinical
	Oxygen masks and tubing				Clinical
	IV lines and empty IV bags				Clinical

B Recycling Programs

Material	Orange	Cowra	RPA	Concord
Cans	Kitchen only	Yes	Yes	Yes
Fluid (Baxter) bottles	as PET only	as PET only	Yes	Yes
Glass	Kitchen only	Yes	Yes	Yes
Non-soiled blue sheets		Yes		
Paper, cardboard	Yes	Yes	Yes	Yes including tissues, cups, plates
PET Bottles	Some-limited outlets	Some-limited outlets	Yes	Yes
Plastic wrapping				Yes
Reusable containers for sharps waste	Yes	Yes	Yes	Yes
Solvents				Yes

Appendix 5 Costs of Waste Disposal Options

The following exhibit examines alternatives available to metropolitan hospitals unable to apply the *Guidelines* because of practical restrictions on what can be disposed of as general waste.

The analysis is based upon information from Concord relating to waste volumes and disposal rates for 2001-02.

Concord disposed of 533 tons of general waste through a NSW Waste Services Transfer Station at a notional cost of \$109 per ton.

This general waste did not include a range of 'special' wastes (regarded as general waste by the *Guidelines*). These special wastes were included in the 131.7 tons of clinical waste disposed of by Concord. Concord pays \$930 per ton to dispose of clinical waste.^c

Waste Service NSW has offered a compromise arrangement that would allow the disposal of "Special Health Care Facility Waste" at designated landfills on the outskirts of Sydney. The notional cost of such an arrangement would be \$167 per ton.

Concord has two alternatives available:

1. Current arrangement- 2 streams of clinical (including special) and general waste
2. Waste Services proposal- 2 streams of clinical and Special HCF (including general) waste.

The third possibility of establishing 3 streams of clinical, general and Special HCF waste is not feasible because of the additional resources that would be required within the hospital.

The Audit Office estimates that the current arrangement is cost effective when the special waste accounts for less than 25% of the clinical waste stream.

Disposal of General Waste at a Transfer Station (Current Method)

Charge per ton of General Waste	\$88 ^c
Charge per average trip of 7 tons	\$616 ^c
Charge per load to the transfer station	\$150 ^c
Average cost per load (7 tons)	\$766
Notional cost per ton	\$109

Disposal of 'Special' HCF Waste at Designated Landfill on Sydney's outskirts

Charge per ton of Special HCF Waste	\$103 ^c
Charge per average trip of 7 tons	\$718 ^c
Charge per load to landfill	\$450 ^c
Average cost per load (7 tons)	\$1,168
Notional cost per ton	\$167

Total General Waste generated by Concord	533 tons ^c
Cost of disposal at transfer station	\$58,352
Cost of disposal at landfill	\$88,897
Savings from disposal at transfer station	\$30,545

This saving would buy the disposal of 32.844 tons of clinical waste at \$930 per ton. 32.844 tons represents 25% of the clinical waste generated by Concord.

Notes: ^c indicates information provided by Concord.
other values are calculated by the Audit Office

Appendix 6

Useful References

Policies and Guidelines

Australian and New Zealand Clinical Waste Management Industry Group. 2002. *Industry Code of Practice for Clinical and Related Wastes- 3rd edition*.

ecoRECYCLE Victoria. 1998. *Trim Your Wasteline. A Guide to managing waste in hospitals*.

Environment Agency (England and Wales). 2001. *Technical Guidance on Clinical Waste Management Facilities*.

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Audits and Reviews

Audit Commission (England and Wales). 1997. *Getting Sorted. The Safe and Economic Management of Hospital Waste*.

Audit Scotland. 2001. *Waste Management in Scottish Hospitals*.

Dettenkofer, M., et al. 2000. Environmental Auditing in Hospitals. *Environmental Management Vol. 25, No. 1, pp105-113*.

Environmental Working Group (USA). 1998. *Greening Hospitals: An analysis of pollution prevention in America's top hospitals*.

NHS Estates (England and Wales). 2000. *Reducing food waste in the NHS*.

NHS Purchasing and Supply Agency (England and Wales). 2001. *Strategic Report into the activities of the NHS Purchasing and Supply Agency in the waste management market*.

WorkCover. 2001. *Report to the Industrial Relations Committee of NSW: OHS Issues in the Management of Waste*.

Useful Websites

www.ecorecycle.vic.gov.au

Victorian government site with hospital waste management resources.

www.sustainablehospitals.org www.ewg.org

Non-profit USA sites promoting environmentally responsible health care.

www.wastenews.com

USA waste industry newsletter.

www.wmaaa.asn.au

Waste Management Association of Australia.

**Performance Audits by
the Audit Office of New South Wales**

Performance Auditing

What are performance audits?

Performance audits are reviews designed to determine how efficiently and effectively an agency is carrying out its functions.

Performance audits may review a government program, all or part of a government agency or consider particular issues which affect the whole public sector.

Where appropriate, performance audits make recommendations for improvements relating to those functions.

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Performance audits provide independent assurance to Parliament and the public that government funds are being spent efficiently and effectively, and in accordance with the law.

They seek to improve the efficiency and effectiveness of government agencies and ensure that the community receives value for money from government services.

Performance audits also assist the accountability process by holding agencies accountable for their performance.

What is the legislative basis for Performance Audits?

The legislative basis for performance audits is contained within the *Public Finance and Audit Act 1983, Division 2A*, (the Act) which differentiates such work from the Office's financial statements audit function.

Performance audits are not entitled to question the merits of policy objectives of the Government.

Who conducts performance audits?

Performance audits are conducted by specialist performance auditors who are drawn from a wide range of professional disciplines.

How do we choose our topics?

Topics for a performance audits are chosen from a variety of sources including:

- ❑ our own research on emerging issues
- ❑ suggestions from Parliamentarians, agency Chief Executive Officers (CEO) and members of the public
- ❑ complaints about waste of public money
- ❑ referrals from Parliament.

Each potential audit topic is considered and evaluated in terms of possible benefits including cost savings, impact and improvements in public administration.

The Audit Office has no jurisdiction over local government and cannot review issues relating to council activities.

If you wish to find out what performance audits are currently in progress just visit our website at www.audit@nsw.gov.au.

How do we conduct performance audits?

Performance audits are conducted in compliance with relevant Australian standards for performance auditing and our procedures are certified under international quality standard ISO 9001.

Our policy is to conduct these audits on a "no surprise" basis.

Operational managers, and where necessary executive officers, are informed of the progress with the audit on a continuous basis.

What are the phases in performance auditing?

Performance audits have three key phases: planning, fieldwork and report writing.

During the planning phase, the audit team will develop audit criteria and define the audit field work.

At the completion of field work an exit interview is held with agency management to discuss all significant matters arising out of the audit. The basis for the exit interview is generally a draft performance audit report.

The exit interview serves to ensure that facts presented in the report are accurate and that recommendations are appropriate. Following the exit interview, a formal draft report is provided to the CEO for comment. The relevant Minister is also provided with a copy of the draft report. The final report, which is tabled in Parliament, includes any comment made by the CEO on the conclusion and the recommendations of the audit.

Depending on the scope of an audit, performance audits can take from several months to a year to complete.

Copies of our performance audit reports can be obtained from our website or by contacting our publications unit.

How do we measure an agency's performance?

During the planning stage of an audit the team develops the audit criteria. These are standards of performance against which an agency is assessed. Criteria may be based on government targets or benchmarks, comparative data, published guidelines, agencies corporate objectives or examples of best practice.

Performance audits look at:

- processes
- results
- costs
- due process and accountability.

Do we check to see if recommendations have been implemented?

Every few years we conduct a follow-up audit of past performance audit reports. These follow-up audits look at the extent to which recommendations have been implemented and whether problems have been addressed.

The Public Accounts Committee (PAC) may also conduct reviews or hold inquiries into matters raised in performance audit reports.

Agencies are also required to report actions taken against each recommendation in their annual report.

To assist agencies to monitor and report on the implementation of recommendations, the Audit Office has prepared a Guide for that purpose. The Guide, *Monitoring and Reporting on Performance Audits Recommendations*, is on the Internet at www.audit.nsw.gov.au/guides-bp/bpplist.htm

Who audits the auditors?

Our performance audits are subject to internal and external quality reviews against relevant Australian and international standards.

The PAC is also responsible for overseeing the activities of the Audit Office and conducts reviews of our operations every three years.

Who pays for performance audits?

No fee is charged for performance audits. Our performance audit services are funded by the NSW Parliament and from internal sources.

For further information relating to performance auditing contact:

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Performance Audit Branch
(02) 9285 0051
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Performance Audit Reports

No.	Agency or Issue Examined	Title of Performance Audit Report or Publication	Date Tabled in Parliament or Published
64*	Key Performance Indicators	<ul style="list-style-type: none"> ▪ <i>Government-wide Framework</i> ▪ <i>Defining and Measuring Performance (Better practice Principles)</i> ▪ <i>Legal Aid Commission Case Study</i> 	31 August 1999
65	Attorney General's Department	<i>Management of Court Waiting Times</i>	3 September 1999
66	Office of the Protective Commissioner Office of the Public Guardian	<i>Complaints and Review Processes</i>	28 September 1999
67	University of Western Sydney	<i>Administrative Arrangements</i>	17 November 1999
68	NSW Police Service	<i>Enforcement of Street Parking</i>	24 November 1999
69	Roads and Traffic Authority of NSW	<i>Planning for Road Maintenance</i>	1 December 1999
70	NSW Police Service	<i>Staff Rostering, Tasking and Allocation</i>	31 January 2000
71*	Academics' Paid Outside Work	<ul style="list-style-type: none"> ▪ <i>Administrative Procedures</i> ▪ <i>Protection of Intellectual Property</i> ▪ <i>Minimum Standard Checklists</i> ▪ <i>Better Practice Examples</i> 	7 February 2000
72	Hospital Emergency Departments	<i>Delivering Services to Patients</i>	15 March 2000
73	Department of Education and Training	<i>Using computers in schools for teaching and learning</i>	7 June 2000
74	Ageing and Disability Department	<i>Group Homes for people with disabilities in NSW</i>	27 June 2000
75	NSW Department of Transport	<i>Management of Road Passenger Transport Regulation</i>	6 September 2000
76	Judging Performance from Annual Reports	<i>Review of eight Agencies' Annual Reports</i>	29 November 2000
77*	Reporting Performance	<i>Better Practice Guide A guide to preparing performance information for annual reports</i>	29 November 2000
78	State Rail Authority (CityRail) State Transit Authority	<i>Fare Evasion on Public Transport</i>	6 December 2000
79	TAFE NSW	<i>Review of Administration</i>	6 February 2001
80	Ambulance Service of New South Wales	<i>Readiness to Respond</i>	7 March 2001
81	Department of Housing	<i>Maintenance of Public Housing</i>	11 April 2001
82	Environment Protection Authority	<i>Controlling and Reducing Pollution from Industry</i>	18 April 2001

No.	Agency or Issue Examined	Title of Performance Audit Report or Publication	Date Tabled in Parliament or Published
83	Department of Corrective Services	<i>NSW Correctional Industries</i>	13 June 2001
84	Follow-up of Performance Audits	<i>Police Response to Calls for Assistance The Levying and Collection of Land Tax Coordination of Bushfire Fighting Activities</i>	20 June 2001
85*	Internal Financial Reporting	<i>Internal Financial Reporting including a Better Practice Guide</i>	27 June 2001
86	Follow-up of Performance Audits	<i>The School Accountability and Improvement Model (May 1999) The Management of Court Waiting Times (September 1999)</i>	14 September 2001
87	E-government	<i>Use of the Internet and related technologies to improve public sector performance</i>	19 September 2001
88*	E-government	<i>e-ready, e-steady, e-government: e-government readiness assessment guide</i>	19 September 2001
89	Intellectual Property	<i>Management of Intellectual Property</i>	17 October 2001
90*	Better Practice Guide	<i>Management of Intellectual Property</i>	17 October 2001
91	University of New South Wales	<i>Educational Testing Centre</i>	21 November 2001
92	Department of Urban Affairs and Planning	<i>Environmental Impact Assessment of Major Projects</i>	28 November 2001
93	Department of Information Technology and Management	<i>Government Property Register</i>	31 January 2002
94	State Debt Recovery Office	<i>Collecting Outstanding Fines and Penalties</i>	17 April 2002
95	Roads and Traffic Authority	<i>Managing Environmental Issues</i>	29 April 2002
96	NSW Agriculture	<i>Managing Animal Disease Emergencies</i>	8 May 2002
97	State Transit Authority Department of Transport	<i>Bus Maintenance and Bus Contracts</i>	29 May 2002
98	Risk Management	<i>Managing Risk in the NSW Public Sector</i>	19 June 2002
99	E-government	<i>User-friendliness of Websites</i>	26 June 2002
100	NSW Police Department of Corrective Services	<i>Managing Sick Leave</i>	23 July 2002

No.	Agency or Issue Examined	Title of Performance Audit Report or Publication	Date Tabled in Parliament or Published
101	Department of Land and Water Conservation	<i>Regulating the Clearing of Native Vegetation</i>	20 August 2002
102	E-government	<i>Electronic Procurement of Hospital Supplies</i>	25 September 2002
103	NSW Public Sector	<i>Outsourcing Information Technology</i>	23 October 2002
104	Ministry for the Arts Department of Community Services Department of Sport and Recreation	<i>Managing Grants</i>	4 December 2002
105	Department of Health including Area Health Services and Hospitals	<i>Managing Hospital Waste</i>	December 2002

* Better Practice Guides

Performance Audits on our website

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