Better equipped to care?

Follow-up report on managing medical equipment

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AUDIT SCOTLAND

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Main findings

We did not follow up the more operational aspects of managing medical equipment, where our baseline work highlighted widespread good practice.

Our follow-up audit of the management of medical equipment involved all trusts[1], health boards[2] and the Scottish Executive Health Department (SEHD). We have reviewed progress across Scotland since we published good practice guidelines and recommendations in our 2001 report, *Equipped to Care*[3]. We did not follow-up the more operational aspects of managing medical equipment, where our baseline work highlighted widespread good practice. We focused on the main performance issues arising from our baseline study, and found that:

- There are still significant risks for patients where medical equipment is not managed well, and there remains substantial room for improvement across Scotland.

- There is limited strategic involvement in the management of medical equipment at both national and local levels, so the SEHD and NHSScotland cannot be sure that any gaps between equipment needs and resources are being addressed. Trust boards need sufficient investment to replace medical equipment as it ages and to meet changes in services and technology.

- Progress is being made on risk management at local level to support the delivery of high quality care. Overall, trusts follow good practice for most key areas of medical equipment policy. This includes policies for acquiring and using medical equipment. But trusts need to do more to show how they are managing the risks associated with operator error and maintenance.

- Trusts lack the information to manage their medical equipment effectively. This means that it is still not possible to provide a clear picture of key aspects of the cost, availability and use of medical equipment, and benchmarking is impossible.

1 The term 'trust' includes island health boards throughout this report.
2 During the course of this audit, the structure of NHSScotland began to evolve towards NHS boards with operating divisions. Our recommendations reflect these new arrangements.
3 *Equipped to Care. Managing Medical Equipment in the NHS in Scotland.* Audit Scotland, March 2001. Key points from the executive summary of this report are in Appendix 1.

Part 1. Introduction

1.1 In this chapter we outline:

- the importance of managing medical equipment
- our baseline audit
- the scope of our follow-up audit.

Why medical equipment is important

1.2 Medical equipment is essential to good patient care. It is used in the care of every patient and by most front-line staff. Some equipment is used for diagnosis, including X-ray and laboratory equipment. Other equipment is used to treat patients, including radiotherapy machines, operating department and rehabilitation equipment. The increasing sophistication of medical equipment can provide benefits to patients through better clinical outcomes and new, less invasive techniques. There are also benefits to the NHS, including shorter hospital stays and the ability to treat more patients.

1.3 Managing medical equipment is complex. Ensuring that the right piece of equipment is in the right place at the right time, together with trained staff to use it, is a major challenge. The range of staff involved in managing medical equipment means that good coordination is required. Risks to patients and staff can arise if medical equipment is not available when needed, not fully functional and safe, or not used properly. Failure to manage these risks can result in poor quality patient care and lead to clinical negligence claims.

1.4 The investment in medical equipment is substantial. Medical equipment includes high cost, low volume items such as CT or MRI scanners[4] and low cost, high volume items such as blood pressure monitors. Both types need to be managed well. Equipment can be financed by capital procurement or lease for high cost items, and through revenue expenditure for low cost items.

1.5 Management information continues to be inadequate, so it is still not possible to provide a clear picture of key aspects of medical equipment and assurances of value for money. We had to make special arrangements to collect and coordinate basic management data. Medical equipment purchased from capital in 2001/02 is estimated at over £60 million with a further £25 million purchased from revenue funds. More than £44 million is spent on maintenance each year covering equipment with an estimated replacement value of more than £630 million[5].

Our baseline study

1.6 Our baseline study was carried out at local level on behalf of the Accounts Commission and so the national position, including the SEHD role, was outwith its scope. Although not all trusts, health boards and the SEHD were included in this audit, our key findings and recommendations were for all those with a role in ensuring good planning and management of NHSScotland medical equipment.

4 Descriptions of selected examples of equipment can be found in Appendix 2.
5 See Exhibits 14 and 15 for expenditure details.

1.7 In *Equipped to Care* we highlighted that trusts were good at managing many operational aspects of medical equipment. For example, we found that finance departments ensure compliance with EU procurement legislation and standing financial instructions. And clinicians reported satisfaction with response times for equipment repairs.

1.8 But we also drew attention to three key weaknesses where the management of medical equipment could be improved:

- lack of strategic involvement
- high exposure to risks
- lack of adequate information for managing medical equipment.

The follow-up audit

1.9 We did not follow-up the more operational aspects of managing medical equipment where our baseline work highlighted widespread good practice. Instead, we focused on the main areas of weakness highlighted above.

1.10 The follow-up audit was carried out in trusts, health boards[6] and the SEHD. During the course of this audit, the structure of NHSScotland began to evolve towards NHS boards with operating divisions. Although our findings relate to the previous NHSScotland structure, our recommendations reflect these new arrangements.

1.11 Our audit approach was developed in consultation with a study advisory panel (see Appendix 3 for membership of the group).

1.12 In December 2002, we asked trusts to complete a self-assessment questionnaire. This focused on the main areas where scope for improvement was highlighted in our baseline report. External auditors validated the completed questionnaires.

1.13 External auditors also carried out a limited review at the 12 mainland health boards about their strategic role in relation to medical equipment. And we looked at the SEHD's strategic role in relation to medical equipment.

1.14 The main messages arising from our follow-up audit relate to:

- strategic management (Part 2)
- risk management (Part 3)
- management information (Part 4, and included in Parts 2 and 3).

1.15 Our key recommendations are highlighted at the end of each chapter and these supplement local actions plans.

6 Our follow-up audit did not include the special health boards.

Part 2. Strategic management of medical equipment

Main findings

Strategic management of medical equipment needs to be given a higher priority at national and local levels. Responsibility for medical equipment is not always clear and policymakers still view medical equipment only as an operational issue.

We believe that there are some limitations in the way the SEHD holds NHSScotland to account for planning and providing medical equipment to meet local needs in line with national strategies. Health boards have not made clear what information they require from trusts for performance monitoring purposes.

Approximately two-thirds of trust boards cannot show that their investment programmes are based on realistic forward planning for medical equipment or that investment is sufficient to meet clinical governance requirements or service priorities.

All trusts lack the information to manage their medical equipment effectively. This means that it is still not possible to provide a clear picture of key aspects of the cost, availability and use of medical equipment, and benchmarking is impossible.

2.1 This chapter looks at strategic involvement in medical equipment at national and local levels.

Why strategic input is needed

2.2 A strategic overview of medical equipment is needed to make sure:

- the current level and condition of medical equipment is broadly known
- current and future needs for medical equipment are properly assessed, so that the level and type of medical equipment in use is in line with national and local healthcare strategies, and supports planned service developments
- priorities for meeting equipment needs are agreed and resourced
- day-to-day management of medical equipment is carried out effectively.

This will help ensure patient and staff safety, support quality of care and achieve value for money.

2.3 Robust information is needed to support the planning and governance of medical equipment at national and local level to show whether:

- levels of equipment are adequate for identified healthcare needs
- rolling programmes of equipment replacement and additional investment are adequate
- health & safety requirements are met
- financial management is rigorous and is used to support effective management of equipment
- benchmarking is being used by NHSScotland organisations as part of their performance management processes
- value for money is being achieved.

Exhibit 1

Examples of SEHD input to the management of medical equipment for cancer care

1. Setting up a national group to look at Positron Emission Tomography (PET)[7] scanners in response to a report by the Health Technology Board for Scotland (HTBS)[8].
2. Commissioning a national programme for breast screening which is managed through the National Services Division[9] (NSD) and which has a rolling programme to replace mobile screening vans and associated mammography equipment.
3. Spending about £1.4 million through NSD to introduce Liquid Based Cytology into the cervical screening programme, which included equipment and training.

Source: SEHD, 2003

Strategic management at national level

Planning, needs assessment and resource allocation

2.4 At a national level, the SEHD's involvement is needed to ensure that medical equipment is available to support national strategies and clinical priorities.

2.5 Most responsibility for planning, needs assessment and resource allocation is delegated to health boards to allow them to decide local priorities. The SEHD is generally only directly involved in local plans to invest in medical equipment when a business case needs to be approved[10]. Most funds are distributed to health boards as part of their overall allocation[11].

2.6 However, the SEHD can get involved where national policy issues impact on medical equipment requirements, for example, for cancer services (Exhibit 1). The aim of this approach is to ensure that the clinical and operational aspects of delivering care for cancer patients can be delivered as a whole package.

Accountability at national level

2.7 The SEHD's role is to ensure that health boards are discharging their delegated responsibilities effectively. As part of this, the SEHD has newly introduced a requirement to disclose forward capital investment in medical equipment as part of the financial planning regime that supports the local health plans.

2.8 There are also arrangements in place for safety and clinical governance issues to be considered at national level. For example:

- The SEHD expects medical equipment to be operated in line with manufacturers' instructions as well as meeting any regulatory requirements such as the radiological protection regulations covering imaging devices.
- The SEHD has agreed to work with the National Institute for Clinical Excellence in England to develop proposals to regulate the use of new surgical instruments or existing instruments in new and innovative procedures.
- The Chief Medical Officer has overall responsibility for the safety and efficacy of medical equipment. The Medicines and Healthcare products Regulatory Agency (MHRA) regulates this on a UK-wide basis.
- The SEHD has delegated responsibility for inspecting the quality of the healthcare system to NHSQIS, and their standard setting and review of a specific clinical area can involve medical equipment.

7 A nuclear medicine imaging technique.
8 Now part of NHSScotland Quality Improvement Scotland (NHSQIS).
9 NSD is part of the NHSScotland Common Services Agency.
10 NHS HDL (2002) 40, Capital Planning and Approval Processes.
11 The allocation is made through the Arbuthnott formula, adjusted for cross-boundary flows and weighted to take account of regional specialist services.

2.9 The SEHD believes it discharges its role in holding NHSScotland to account for its management of medical equipment by addressing it within policy areas such as cancer. The department's aim is to ensure that the clinical and operational aspects of delivering care for cancer patients can be delivered in a holistic way. In our view, the SEHD's approach has some limitations:

- It tends to focus on new and high cost items. But the level and state of the existing stock of medical equipment including low cost items also needs to be addressed. The new requirement about disclosing capital investment will only give a partial view as it does not cover low cost, high volume items.

- Items of medical equipment are often used across policy areas; for example, MRI scanners are used to help diagnose a range of conditions, not just cancer.

- It does not enable SEHD to hold NHS boards to account for the overall planning and provision of medical equipment to meet local needs in line with national strategies. Medical equipment is not directly covered by the Performance Assessment Framework (PAF) and is not routinely covered in Accountability Reviews.

The approach also contrasts with the Department of Health (DOH) in England which has introduced a specific standard for managing medical devices as part of its controls assurance requirements for the NHS.[12]

We recommend that the SEHD should take a coordinated approach to the governance of medical equipment and specify its reporting requirements. This would enable the department to routinely monitor the mangement of all medical equipment, not just items bought from capital, in Accountability Review meetings.

Strategic management at local level

2.10 Health boards have a strategic role in managing medical equipment but are not involved in day-to-day operational matters. They need to be sure that their trusts have the medical equipment to deliver appropriate care for the local population, in line with national policies and clinical priorities. This means proper arrangements need to be put in place to ensure clarity of responsibility, adequate needs assessment, appropriate prioritisation of expenditure, and performance management and reporting.

Planning, needs assessment and resource allocation

2.11 Health boards and over three-quarters of trust boards continue to view medical equipment only as an operational issue. (Exhibit 2 highlights the six trust boards that were able to demonstrate important aspects of strategic involvement). Policymakers, overall, are not involved in medical equipment needs assessments, performance monitoring and management, and in ensuring access to sufficient resources to meet patient need. For example, only about half of trust boards have needs assessment reports and medical equipment investment programmes on their agendas. And approximately two-thirds of trust boards cannot show that their investment programmes are based on realistic forward planning for medical equipment or that investment is sufficient to meet clinical governance requirements or service priorities.

Accountability at local level

2.12 There is seldom an individual or group with overall responsibility for medical equipment throughout the health board area. But examples of good practice in accountability arrangements are beginning to emerge. For example, in Dumfries & Galloway, a member of the new NHS board has been given lead responsibility for medical equipment and it is developing an area-wide 'Equipped to Care Committee'.

2.13 In *Equipped to Care* we recommended that responsibility for medical equipment be delegated to someone on the trust board supported by a multidisciplinary group. At trust level, almost half still have no executive director responsible for medical equipment (Exhibit 2), and a third of trusts do not have a broad-based committee (or area-wide alternative) that deals with more than equipment funding bids. A broad-based medical equipment committee is one that is involved in planning, needs assessment and other aspects of medical equipment management.

2.14 Performance monitoring of medical equipment is limited at local level. Neither health boards nor trust boards have made clear their performance reporting requirements. Three-quarters of trusts had not submitted any type of formal report about medical equipment to their health board, and when they do, these tend to be about financial issues such as major capital expenditure or public private partnership projects. Also, trust reporting to trust boards tends to focus on finance rather than quality of care, (Exhibit 3 overleaf).

12 Medical Devices Management Standard, Department of Health, October 2001 (revised 2003).

Exhibit 2

Important aspects of strategic involvement in medical equipment by trust boards

Only six trust boards were able to demonstrate these five important aspects of strategic involvement.

Trust & Island Health Boards	There is an executive director with specific overall responsibility for medical equipment management.	There is a broad-based medical equipment committee (trust or area).	There are reporting arrangements and accountabilities for medical equipment which are clear.	We have received a report(s) on progress towards implementing the good practice guidelines in *Equipped to Care*.	We can demonstrate a formal medical equipment investment programme, which enables realistic forward planning.
Argyll & Clyde Acute Hospitals Trust	✓	✓	✓	✗	✗
Ayrshire & Arran Acute Hospitals Trust	✓	✓	✓	✓	✓
Ayrshire & Arran PCT	✓	✓	✓	✓	✓
Borders General Hospitals Trust	✓	✓	✗	✓	✗
Borders PCT	✗	✗	✗	✗	✗
Dumfries & Galloway Acute Hospitals Trust	✗	✓	✓	✗	✓
Dumfries & Galloway PCT	✗	✓	✓	✗	✓
Fife Acute Hospitals Trust	✓	✓	✓	✗	✗
Fife PCT	✓	✓	✓	✓	✗
Forth Valley Acute Hospitals Trust	✗	✓	✓	✓	✓
Forth Valley PCT	✗	✗	✗	✗	✗
Grampian PCT	✗	✗	✗	✓	✗
Grampian University Hospitals Trust	✓	✓	✓	✓	✓
Greater Glasgow PCT	✓	✓	✗	✗	✗
Highland Acute Hospitals Trust	✓	✓	✓	✓	✗
Highland PCT	✗	✗	✓	✗	✗
Lanarkshire Acute Hospitals Trust	✓	✗	✓	✗	✗
Lanarkshire PCT	✓	✓	✓	✓	✓
Lomond & Argyll PCT	✓	✓	✓	✗	✗
Lothian PCT	✗	✓	✗	✗	✓
Lothian University Hospitals Trust	✓	✓	✓	✓	✗
North Glasgow University Hospitals Trust	✗	✓	✗	✓	✓
Renfrewshire & Inverclyde PCT	✗	✗	✓	✗	✗
South Glasgow University Hospitals Trust	✗	✓	✓	✓	✓
Tayside PCT	✓	✓	✗	✗	✗
Tayside University Hospitals Trust	✓	✓	✓	✓	✓
Yorkhill Trust	✓	✓	✓	✓	✓
West Lothian Healthcare Trust	✗	✗	✓	✗	✗
Western Isles Health Board	✓	✗	✗	✗	✗
Shetland Health Board	✗	✗	✓	✗	✓
Orkney Health Board	✗	✓	✗	✗	✗

Source: Audit Scotland, 2003

Exhibit 3

Trust staff reporting to trust boards on medical equipment matters

Overall, trust boards are better informed of medical equipment financial matters than they are of clinical governance issues. Seven trust boards had not received any reporting at all for key clinical governance issues.

	Medical equipment matters	Percentage reporting
Clinical governance reporting to trust boards	• Risk analyses	58%
	• Policies & procedures	55%
	• Needs assessment	48%
	• Training	45%
	• Quality assurance, including accreditation	32%
Financial reporting to trust boards	• Expenditure: capital	97%
	revenue	65%
	• Funding bids	87%
	• Depreciation levels	71%
	• Medical equipment replacement programme	55%

Source: Audit Scotland, 2003

2.15 But some health boards take a more active interest in medical equipment management performance. For example, Lothian Health Board requires post implementation reviews of specific projects, and medical equipment is on the agenda for their trust accountability reviews. Ayrshire & Arran, Dumfries & Galloway and Grampian Health Boards followed up the recommendations from *Equipped to Care* with their local trusts to ensure that medical equipment is being managed effectively. And examples of good practice in accountability at trust level include five trust boards having received the reports about medical equipment clinical governance matters highlighted in Exhibit 3: Ayrshire & Arran Acute Hospitals Trust, Fife Acute Hospitals Trust, Greater Glasgow PCT, Lanarkshire Acute Hospitals Trust and Yorkhill Trust.

Recommendations

National

1. The SEHD should consider introducing a specific medical equipment management standard to provide assurances that proper strategic and operational practices are in place.

2. The SEHD should improve governance and accountability for medical equipment by using performance information to inform Accountability Reviews. This should include seeking assurances that any gaps between equipment needs and resources are being addressed.

Local

3. NHS boards should assign responsibility for all aspects of medical equipment in the area to an executive board member, supported by a multidisciplinary group. This would help ensure that medical equipment is available to deliver care in line with national strategies and clinical priorities.

4. NHS boards should ensure that their operating divisions have processes in place to assess their medical equipment needs and agree priorities. They should also ensure that medical equipment investment programmes are based on realistic forward planning.

5. NHS boards should specify their reporting requirements for medical equipment and monitor operating division performance regularly.

6. Operating divisions should ensure that responsibility for medical equipment is clear throughout their organisations.

Part 3. Risk management

Main findings

The SEHD should do more to help NHSScotland reduce risk exposure. The national risk management scheme, CNORIS, has not brought about the reduction in risk expected when we published *Equipped to Care*.

The SEHD should make better use of information from existing national information systems, including the Adverse Incident reporting scheme, to identify risks and keep local health services informed of them.

Some trusts are still relying heavily on old equipment. Trust boards need sufficient investment to replace medical equipment as it ages and to meet changes in services and technology.

Progress is being made on risk management at local level. Overall, trusts follow good practice for most key areas of medical equipment policy, including managing clinical incidents involving medical equipment.

But trusts need to do more to show how they are managing risks associated with operator error and maintenance. For example, trusts must improve the management of staff training, such as systematically planning and recording the training received by healthcare staff for using medical equipment.

3.1 In this chapter, we review the national arrangements to help risk management of medical equipment at local level. We then focus on the local level by examining risk management arrangements and specific medical equipment risks.

Good risk management processes are essential

3.2 The aims of risk management are to avoid harming patients and staff, and to limit financial risk.

3.3 Using medical equipment carries risks:

- a patient, user, carer or professional can be injured as a result of a medical device failure or its misuse
- a patient's treatment can be interrupted or compromised by a medical device failure
- a misdiagnosis can be made due to medical device failure, resulting in inappropriate treatment
- a patient's health can deteriorate due to a medical device failure[13].

Our baseline report included a series of recommendations and a good practice checklist to improve medical equipment risk management in NHSScotland. This checklist is based on guidance from the former Medical Devices Agency[14].

13 Controls Assurance, Medical Devices Management Standard, Department of Health, 2003.
14 Now, Medicines and Healthcare products Regulatory Agency (MHRA).

Exhibit 4
Summary of CNORIS Healthcare Risk Management Standards

Standard Level	Summary of CNORIS Healthcare Risk Management Standards
One	Focuses on corporate ownership of risk through effective policies and procedures.
Two	Seeks evidence of implementation throughout the organisation and addresses operational issues, in particular, challenging the organisation to strive for continual improvement.
Three	Necessitates a high degree of integration into culture and activities, and requires evidence that the organisation has dynamic risk management systems in operation, evidenced by continual improvement.

Source: CNORIS Risk Management Standards, SEHD, July 2001

Supporting risk management at national level

3.4 The SEHD has a supporting role in managing risk at local level so that common problems are identified and action is taken to avoid recurrence. In England, the DOH has introduced a Medical Devices Management Standard as part of its controls assurance system for the NHS. The system provides the DOH with assurances that the risks associated with the acquisition and use of medical devices are minimised[15]. The outcomes of trust controls assurance assessments are published on the DOH website. In addition, the DOH publishes a summary of trust reported medical equipment risks. There is no equivalent in Scotland.

3.5 This section looks at the SEHD national risk management scheme (CNORIS)[16], and the national Incident Reporting and Investigation Centre.

The national risk management scheme (CNORIS)

3.6 The national risk management scheme for NHSScotland, CNORIS, is a compulsory insurance scheme covering clinical and non-clinical risks. Risks are assessed against an agreed set of standards. CNORIS operates on three levels (Exhibit 4). Levels two and three can give real assurances that formal risk management procedures work, including those for medical equipment. Although CNORIS does not have a specific standard for medical equipment, aspects are included in some standards. For example, the Clinical Incident Reporting and Management Standards cover the use of medical equipment[17].

3.7 By December 2002, only two-thirds of trusts and island health boards had achieved the minimum standard, CNORIS level one. Very few trusts had applied for level two, and no trust had achieved it. Therefore, trusts were not able to use their CNORIS level rating to demonstrate that they had effective risk management processes in place.

3.8 The SEHD has decided to change the national risk management scheme from 1 April 2004[18]. The Healthcare Risk Management Standards established by CNORIS are being merged with the NHSQIS Generic Clinical Governance Standards[19]. Like CNORIS, NHSQIS does not have a specific standard for medical equipment, but some standards refer to it. There is now an opportunity for NHSScotland to consider implementing a specific medical devices management standard along the lines introduced by the DOH[20].

The national Incident Reporting and Investigation Centre

3.9 The SEHD set up a national Incident Reporting and Investigation Centre[21] within Scottish Healthcare Supplies (SHS)[22]. SHS investigates adverse incidents that involve the

15 The standard includes 31 criteria of good practice for managing medical equipment.
16 Clinical Negligence and Other Risks (Non-clinical) Indemnity Scheme (CNORIS), NHS MEL(1999)86.
17 CNORIS Risk Management Standards, SEHD, July 2001.
18 NHS HDL(2003)29. Clinical negligence and other risks indemnity scheme (CNORIS): integration of standards with NHSQIS generic clinical governance standards.

Exhibit 5

An example of Scottish Healthcare Supplies, Hazard Notice to NHSScotland

Risk of misconnection and over-compression

SHS recently issued a Hazard Notice where an incident had been reported in which a patient was injured as a result of continuous high pressure being applied for some time to both legs by a sequential pressure device. The device is used to apply pressure to the lower limbs to help prevent deep vein thrombosis, for example, after surgery. The Notice advised that if a connection is damaged, the tubing set should be discarded.

Warning: Do not attempt to repair or replace broken tubing connectors as hazardous inflation of the sleeves may occur.

Source: Scottish Healthcare Supplies, 2003

use of medical devices within NHSScotland on behalf of the SEHD. Trusts must report on potential and actual problems covering, for example: design and construction; user instructions, ease of operation and staff training; and technical or economic performance. SHS issues top priority Hazard Notices (Exhibit 5) as well as standard Safety Action Notices to help prevent problems occurring in the future. SHS also liaises with MHRA to keep NHSScotland up to date on problems identified elsewhere in the UK.

3.10 Currently, these adverse incident data are not centrally analysed or reviewed according to type of medical equipment incident, such as equipment failure or operator error. More use could be made of this management information to improve the management of medical equipment across NHSScotland. SHS is now looking at a system to generate trend data of this type by April 2004.

Risk management and risk exposure at local level

3.11 NHS boards need to satisfy themselves that medical equipment risks are being managed appropriately. However, there are no formal reporting requirements on medical equipment at local level, so it is not clear how boards know the extent of risk exposure. With the abolition of trusts, NHS boards have the opportunity to ensure that arrangements are consistent and comprehensive across their areas. In this section, we examine arrangements for managing medical equipment risks at local level, and specific medical equipment risks.

Risk management arrangements

Risk management strategies

3.12 Given the importance of medical equipment in the provision of patient care, local risk management strategies should include planning and using medical equipment. But 42% of trust risk management strategies included medical equipment only in a partial way, and a further 13% do not cover medical equipment at all. The PCTs in Forth Valley, Argyll & Clyde and Lothian particularly need to develop their risk management strategies to cover medical equipment.

Trust compliance with formal medical equipment policies

3.13 Trusts have made progress in agreeing formal policies on acquiring and using medical equipment (Exhibit 6 overleaf). The implementation of these policies helps to limit risk exposure. For example, a policy on commissioning new equipment would set out what needs to be done when a device is first put into service: equipment registers need updating, staff may need training and a timetable of planned preventive maintenance needs to be established. Compliance with the formal policy limits risk by helping to ensure consistency in approach and that all necessary tasks

19 Formerly Clinical Standards Board for Scotland Generic Clinical Governance Standards.
20 Controls Assurance, Medical Devices Management Standard, Department of Health, England, October 2001 (revised 2003).
21 NHS MEL(1995)74. Reporting of adverse incidents and defective equipment.
22 Part of the Common Services Agency of NHSScotland.

Exhibit 6

Trust implementation of formal medical equipment policies

Trust staff mostly comply with formal policies for acquiring, commissioning and using medical equipment, but there were four clear exceptions:

- Orkney Health Board could only demonstrate good practice for purchasing decisions, meeting health & safety requirements and reporting critical incidents[1].
- Lothian PCT could only demonstrate good practice for reporting critical incidents, meeting health & safety requirements, and using personal electronic equipment.
- Forth Valley Acute Hospitals Trust and Highland PCT could only demonstrate good practice for about half of the key policy areas audited.

	Medical equipment policies	Percentage of trusts demonstrating implementation
Acquiring medical equipment	• Purchasing decisions	77%
	• Standardising on models of equipment	77%
	• Involving clinicians throughout the process	74%
Commissioning medical equipment	• Acceptance testing (eg, electrical testing)	90%
	• Registering on inventories	87%
	• Decommissioning of equipment	81%
Using medical equipment	• Reporting critical incidents	100%
	• Health & safety requirements	97%
	• Personal electronic equipment (eg, mobile phones) in clinical areas	87%
	• Maintenance and fault reporting	84%
	• Training	74%
	• Modified equipment	71%

1 Critical incidents include clinical and non-clinical incidents where patient safety is at risk.

Source: Audit Scotland, 2003

are completed. Overall, trusts could show that they generally follow good practice for most key areas of medical equipment policy. But there were four clear exceptions: Orkney Health Board, Lothian PCT, Forth Valley Acute Hospitals Trust and Highland PCT.

Specific medical equipment risks

3.14 The main risks to patient and staff safety when using medical equipment arise from inappropriate training and maintenance[23]. Trusts can reduce these risks by standardising on makes and models. There are also other risks associated with the financial management of equipment, including relying on older equipment that may need to be replaced at short notice and failing to make adequate provision to replace equipment.

Training

3.15 According to the MDA[24], operator error is the most common cause of incidents involving medical equipment. But only half of trusts could provide assurance that those operating diagnostic or therapeutic equipment have a sufficient understanding of it to do so in a safe and efficient manner.

3.16 Training is a key element in reducing these risks. Training is provided in a range of ways, including by equipment manufacturers and in-house trainers, all of which needs to be recorded and managed. But two-thirds of trusts cannot identify their investment in medical equipment training. Therefore it is not clear how these trust boards know how much training is required and if they are making sufficient investment in training. Also, Argyll & Clyde NHS, Forth Valley Acute Hospitals Trust, Highland PCT, Lothian PCT, Orkney Health Board and Shetland Health Board could not demonstrate from their training records that they adhere to medical equipment training policies. These training policies generally state the requirement to maintain records to demonstrate the medical equipment training received by healthcare professionals for using specific medical equipment.

Maintenance

3.17 The other main risk to patient safety is equipment problems as a result of inadequate maintenance[25]. Trusts need to identify and plan for the level of maintenance required for medical equipment and monitor its delivery. Equipment suppliers and manufacturers, and NHS teams[26], all provide trust equipment maintenance.

3.18 Four trusts could not identify their spend on maintenance and a further 15 could only provide partial data[27]. No trust is involved in maintenance benchmarking, so it is unclear how trusts could provide assurances that they are making best use of their maintenance resources.

3.19 While almost three-quarters of the trusts had undertaken a formal review of medical equipment since trust reorganisation in 2001, almost half of trusts with in-house maintenance did not include staffing levels and skills as part of this review. Therefore, it is not clear how these trust boards know that their investment in the in-house maintenance team is appropriate.

3.20 External accreditation to a recognised quality standard for NHS maintenance teams can provide assurances of a quality service (Exhibit 7). But accreditation for in-house maintenance is not widespread. Of the 23 trusts with in-house maintenance provision, only six are externally accredited, although some others have partial accreditation. But Dumfries & Galloway Acute & Maternity Hospitals Trust, Fife Acute Hospitals Trust, Forth Valley Acute Hospitals Trust, Highland Acute Hospitals Trust, Lothian University Hospitals Trust, Yorkhill Trust, plus the three island health boards, all have in-house maintenance with no external accreditation.

Standardisation

3.21 As well as reducing safety risks, standardising equipment can help reduce the cost of servicing and spares, and there may be benefits from bulk purchasing. Exhibit 8 demonstrates that there is still considerable scope for further standardisation across NHSScotland. Older models of equipment may explain this. But five trusts - Fife Acute Hospitals Trust, Forth Valley Acute Hospitals Trust, Forth Valley PCT, Renfrewshire & Inverclyde PCT and Tayside University Hospitals Trust – were not actively pursuing a policy of standardisation for key items.

23 Medical device and equipment management for hospital and community based organisations, Medical Devices Agency (MDA) (now MHRA), 1998.
24 Now, MHRA.
25 The term maintenance is used in this report to cover all associated activities of repair, planned preventative maintenance, servicing, reconditioning, modification and refurbishment, MHRA, 2000.
26 For example, most acute trusts also provide maintenance services to other parts of the NHS.
27 From the data available, about 38% of spend on medical equipment maintenance is for in-house maintenance.

Exhibit 7

Medical devices and equipment management: repair and maintenance provision

Quality Assurance Standards:
User organisations should only use a service provider who can demonstrate compliance with relevant quality system standards, for example, BS EN 46002 or BS EN ISO 9002. Such systems provide a framework on which service providers can build the necessary structures to ensure their work is of the nature and quality intended.

Source: Medical Devices Agency (now MHRA), 2000

Exhibit 8

Number of different models for selected examples of medical equipment

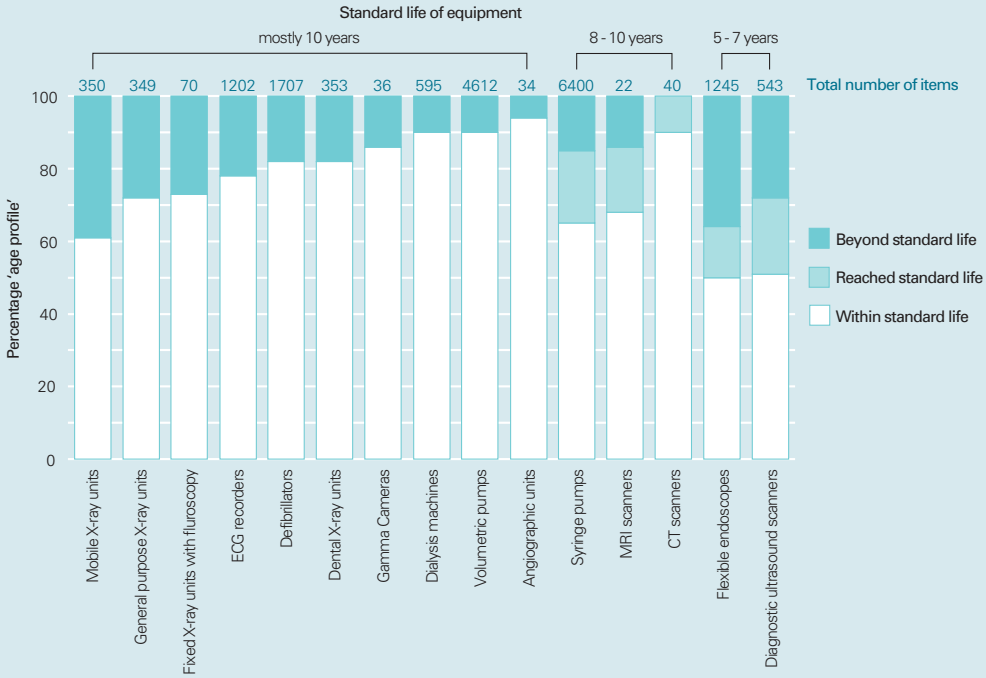
Trusts are not always following good practice for standardising models of equipment.

Source: Audit Scotland, 2003

Exhibit 9

'All Scotland' age profiles for selected examples of medical equipment

Approximately 25% of these items of medical equipment are older than the standard life.



Source: Audit Scotland, 2003

Note: Includes trust data where complete age profiles were provided.

Planning to replace ageing medical equipment

3.22 NHS boards need to ensure that they invest sufficiently in their medical equipment replacement programmes.

3.23 Potentially, there are risks to quality of care and financial risks when medical equipment is older than its standard life. Equipment becomes obsolete in different ways, for example, when maintenance costs become excessive, spares are not available, equipment becomes unreliable and when new technology offers significant advantages.

Although the standard life varies with the type of equipment, for many items it is between 7-10 years, based on assumptions about levels of usage, availability of spares, service support and new equipment improvements[28]. Twenty-five percent of the medical equipment that we looked at is outwith its standard life, Exhibit 9.

3.24 Depreciation can be a useful indicator to assess whether or not the annual spend on medical equipment is adequate because it should reflect the standard life of equipment. Equipment is typically written down for financial purposes, over 5, 10 or 15 years through depreciation[29]. In *Equipped to Care*, we drew attention to a shortfall between depreciation and the capital investment that had been made in medical equipment. And we concluded that trusts would face increasing problems due to systematic underinvestment.

3.25 In 2001/02, capital expenditure in 42% of trusts fell short of depreciation levels, particularly in PCTs, indicating that their capital investment is not keeping pace with estimated replacement requirements. And for acute trusts where there are larger numbers of equipment on the fixed asset register, on average 37%[30] of equipment still in use has no value on the fixed asset register[31]. NHS boards need to be aware of the financial risks involved in placing so much reliance on old equipment, which may need to be replaced at short notice when it can no longer be adequately maintained[32].

Spending up at year end

3.26 In *Equipped to Care,* we drew attention to the potential for inefficient spending on medical equipment. This happens when trusts, for example, 'spend up' for year end cash management purposes rather than purchasing on the basis of rational selection and prioritisation.

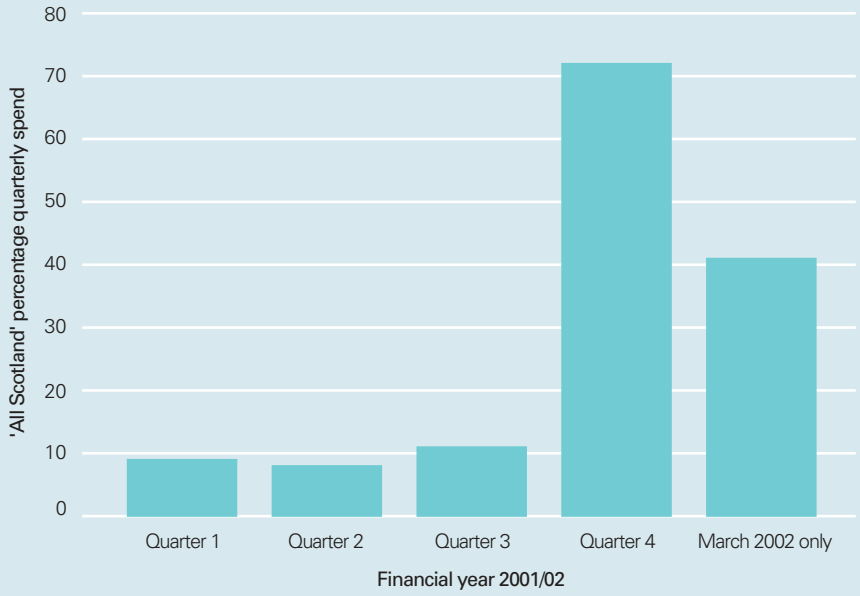
3.27 Fourteen trusts cannot provide a profile of the timing of their revenue expenditure. All trusts can, however, provide the profile for capital expenditure, demonstrating that most medical equipment capital expenditure continues to take place

28 Advice from Medical Equipment Managers, Study Advisory Panel, 2003.
29 The estimated value of the equipment used up in the year.
30 The range was 11% - 62%.
31 Note: Where equipment is working well, can be maintained and is still fit for purpose, there is no need to replace it.
32 Part 4 provides trust-specific age profiles for selected equipment, and depreciation levels for 2001/02.

Exhibit 10

'All Scotland' timing of medical equipment capital expenditure

Almost three-quarters of capital expenditure on medical equipment occurred in the final quarter.



Source: Audit Scotland, 2003

towards the end of the financial year (Exhibit 10). There may be some legitimate reasons for this pattern of expenditure – for example, to comply with EU procurement legislation – but trusts should avoid spending simply for cash management purposes. Altogether, for 2001/02, 72% of trust medical equipment capital expenditure was in the last quarter of the financial year, with 41% of capital expenditure being in March alone. Only Orkney Health Board, Forth Valley PCT, Borders General Hospitals Trust and Ayrshire & Arran PCT had less than 50% of capital expenditure in the last quarter.

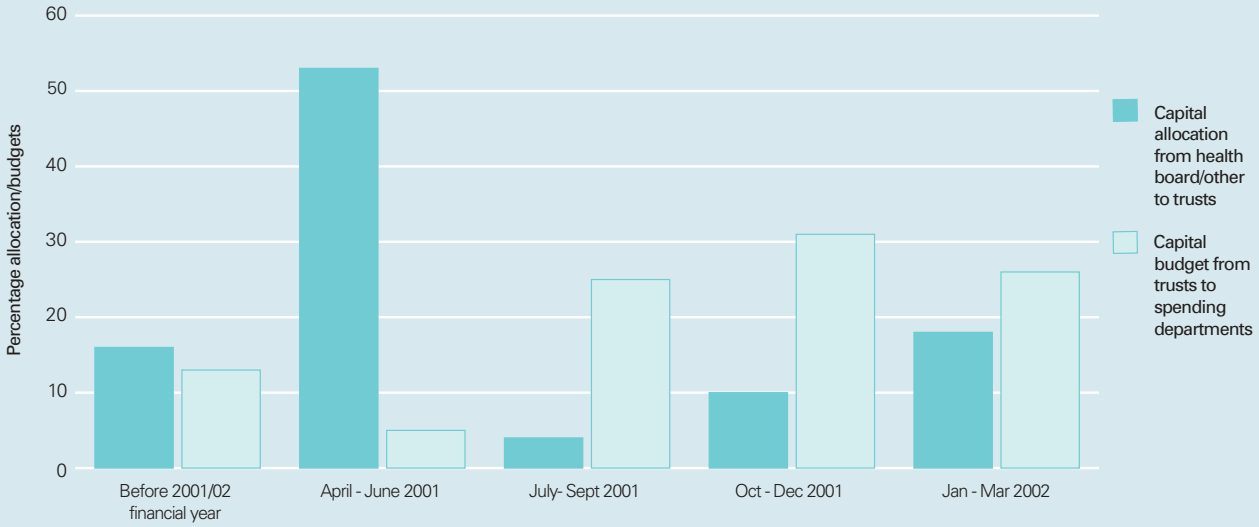
3.28 We investigated whether this could be explained by late allocations from health boards or whether the problem was at trust level in terms of notifying spending departments of their budgets. We found that only about half of trusts could provide details of when they received allocations from health boards. And one third could not tell us when they had issued medical equipment budgets to spending departments.

For the trusts that were able to show the timing of medical equipment capital allocations and budgets, the overall position is summarised in Exhibit 11, which shows 57% of the budget being issued to spending departments late in the year. There are risks to the quality of care, and value for money, where medical equipment expenditure is poorly planned or rushed at the end of the financial year.

Exhibit 11

'All Scotland' timing of medical equipment capital allocations and budgets

The timing of trust capital budgets to spending departments is especially late in the financial year.



Source: Audit Scotland, 2003

Exhibit 12

Example of financial benefits gained by collaborating over medical equipment procurements

- North Glasgow University Hospitals Trust collaborated with Forth Valley and led the procurement of anaesthetic machines and ventilators. This saved Forth Valley an estimated £62,000.
- North Glasgow University Hospitals Trust led a collaboration with South Glasgow University Hospitals Trust and Yorkhill Trust for the installation of a common platform for digital radiology systems, with an estimated saving of £235,000 for the trusts involved.

Source: Audit Scotland, 2003

Collaborating on procurement

3.29 Reduced costs can also be achieved by collaborating with other parts of NHSScotland to obtain discounts. And joint procurement to enhance spending efficiencies is an SEHD priority. Collaborating over procurement also has other benefits, such as developing product expertise.

3.30 Eighty-four percent of trusts have collaborated with Scottish Healthcare Supplies (SHS) when procuring medical equipment. For example, for the financial year ending March 2003, SHS purchased equipment to the value of £16.6 million on behalf of others through special projects, including a CT scanner, diagnostic imaging equipment, and dental equipment. Trusts sometimes also collaborate with each other and an example of the financial benefits realised is in Exhibit 12. However, this kind of procurement arrangement is not common. And four trusts do not collaborate with SHS or other trusts on medical equipment procurement: Ayrshire & Arran PCT, Forth Valley PCT, Renfrewshire & Inverclyde PCT and West Lothian Healthcare Trust. Our follow-up audit of managing supplies in NHSScotland will review new developments in NHSScotland procurement arrangements[33].

Recommendations

National

7. The SEHD should ensure that the new national risk management scheme addresses the risks associated with medical equipment.

8. The SEHD should rationalise and make use of the data from existing national systems that cover medical equipment, including adverse incidents, clinical risk incidents and occupational health & safety.

Local

9. NHS board risk management strategies should explicitly include medical equipment.

10. NHS boards should discuss medical equipment risks and performance information at performance reviews with operating divisions.

11. Operating divisions should ensure that they manage risks, particularly in relation to:

- training, by ensuring that all staff expected to use equipment are appropriately trained and that this is properly recorded
- maintenance, by ensuring that the split between different types of service provider is evidence based and that in-house teams are adequately resourced
- forward investment programmes, by ensuring that these are realistic in terms of meeting formally assessed medical equipment needs.

12. Divisional management teams should ensure that they have the information needed to manage medical equipment effectively and to minimise risk.

33 *In Good Supply? Managing Supplies in the NHS in Scotland*, October 2001. A baseline audit report by Audit Scotland.

Part 4. Information to support management

Main findings

NHSScotland cannot demonstrate that it is making best use of its medical equipment resources for patient care because of a lack of information.

Where data do exist, their quality is variable and they are not always used to best effect.

From the data we were able to obtain, it is clear that substantial variations remain among trusts for important aspects of medical equipment.

4.1 This chapter looks at:

- why management information is important
- the main sources of medical equipment data
- the quality of management data
- using the data.

Why management information is important

4.2 Trusts need to know what equipment they have and where that equipment is for operational purposes to ensure that equipment is in the right place at the right time for patient care. Management information is also required to support the planning, management and governance of medical equipment at local and national levels, as highlighted already in Parts 2 and 3 of this report.

Sources of medical equipment data

4.3 Good management information relies on the availability of robust, consistent data. Much of that data is needed at trust level, to be aggregated, when required, for area and national purposes. The main sources for the data are trust medical equipment maintenance registers and financial asset registers. All trusts maintain registers for financial and maintenance purposes, but where a device is (or should be) on both registers, the data are not always consistent. Exhibit 13 shows the percentages of trusts which could readily identify key data for individual items of equipment from their registers. Overall, Forth Valley PCT, Lothian PCT, Tayside PCT, Western Isles Health Board and Orkney Health Board had registers with less complete data for individual items of medical equipment.

4.4 Four trusts were not able to demonstrate readily from their registers, their complete inventory of equipment – Western Isles Health Board, Orkney Health Board, Lothian University Hospitals Trust and Lothian PCT. And Tayside University Hospitals Trust had particular problems demonstrating from registers, the current location of equipment.

Exhibit 13

Ready access to key management information held on registers for individual items of medical equipment

Most trusts have ready access to key management information for individual items of medical equipment.

Management information held for individual medical equipment items	Percentage of trusts able to readily identify the information	Trusts not able to readily identify the information
Current location of medical equipment items, eg, by serial number	97%	Tayside University
Model	100%	
Make	100%	
Supplier	100%	
Purchase /Acquisition date	94%	Lothian PCT and Tayside PCT
Purchase cost	87%	Forth Valley PCT, Lothian PCT, Renfrewshire & Inverclyde PCT and Western Isles Health Board
Expected /Standard life	90%	Forth Valley PCT, Tayside PCT and Western Isles Health Board
Annual depreciation	90%	Forth Valley PCT, Tayside PCT and Western Isles Health Board
Estimated replacement cost for items > £5,000	90%	Forth Valley PCT, Lothian PCT and Western Isles Health Board
Preventive maintenance and repairs	90%	Tayside PCT, Western Isles Health Board and Orkney Health Board
Service histories	90%	Tayside PCT, Western Isles Health Board and Orkney Health Board

Source: Audit Scotland, 2003

Exhibit 14

Summary of important medical equipment management information

Type of information	Summary for data provided	Trusts not able to demonstrate information
Financial information	**For financial year 2001/02**	
Total expenditure	**£71,480,000**	
Capital expenditure*	£60,801,000	
Revenue expenditure	£3,811,000	7 PCTs, 5 acute trusts and 1 other body
Lease expenditure	£6,868,000	1 acute and 2 other bodies/ not relevant for 13 trusts
Total replacement value (excluding replacement value for leased equipment)	**£483,731,000**	
Medical equipment replacement values for items on the fixed asset register	£377,745,000	5 PCTs, 2 acute trusts and 1 other body 3 provided partial data
The estimated replacement value of the medical equipment which is >£500 & <£5,000 including VAT	£105,986,000	1 PCT, 1 acute trust and 2 other bodies
Net Book Value	£190,635,000	1 other body
The level of depreciation held on fixed asset registers	£32,311,000	
Maintenance expenditure	**£23,150,000**	**3 PCTs and 1 other body 15 provided partial data**
Commercial third party	£13,955,000	
In-house department	£8,730,000	
Other NHS	£465,000	
Investment in training	32% of Trusts can identify their investment in training for the use of medical equipment	10 PCTs, 6 acute trusts and 5 other bodies
Leasing agreements	18 trusts have leasing agreements £34,435,000 is the estimated value of equipment leased across trusts	Not relevant for 13 trusts
Other management information		
Monitoring usage of major items of equipment	18 trusts have systems in place to monitor major items of medical equipment	Not relevant for some PCTs
Performance indicators	32% of trusts have formally specified a range of medical equipment performance indicators (PIs) that they keep under review	10 PCTs, 6 acute trusts and 5 other bodies
Benchmarking initiatives	36% of trusts are actively engaged in formal medical equipment benchmarking initiatives with similar organisations	7 acute trusts, 9 PCTs and 4 other bodies

Source: Audit Scotland, 2003

Note: To be interpreted in conjunction with Exhibit 16 which highlights data quality information.
* A third of capital expenditure was for Lothian University Hospital Trust 2001/02.

Exhibit 15

Gaps in basic financial management data and estimated 'All Scotland' position

Financial management data	Data provided by trusts for financial year 2001/02 £million	Trusts not able to provide information	Estimated 'All Scotland' position[34] £million
Revenue expenditure	**£11**	7 PCTs; 5 acute; 1 other body	**£25**
Replacement values[35]			
• Capital[36]	**£378**	5 PCTs; 2 acute; 1 other body	**£510**
• Revenue[37]	**£106**	1 PCT; 1 acute; 2 other bodies	**£120**
Maintenance expenditure	**£23**	3 PCTs; 1 other; 15 partial data	**£44**

Source: Exhibit 14

Quality of management information

4.5 Given the importance of medical equipment, it is vital that decisions are made based on sound information. But we found both gaps and quality issues in the supporting data.

Gaps in the data

4.6 It is still not possible to provide a clear picture of key aspects of medical equipment held in NHSScotland (Exhibit 14 opposite). Overall, Lomond & Argyll PCT, Dumfries & Galloway PCT, Highland PCT, Tayside University Hospitals Trust and Western Isles Health Board had poorer access to summary management information for their holdings of medical equipment. And Renfrewshire & Inverclyde PCT had difficulty in providing collated management information for our 2002 trust questionnaire.

4.7 For example, there were gaps in basic financial management data, 2001/02 (Exhibit 14). The main gaps in financial data are:

- 42% of trusts were not able to provide total figures for their revenue expenditure on medical equipment. So the figure of £11 million (including lease expenditure), which was identified through the audit, significantly understates the 'All Scotland' position, which we estimate at £25 million (Exhibit 15).
- Trusts should be aware of replacement values for medical equipment so that they can make realistic provision for it in their investment programmes. But eight trusts could not provide their estimated replacement value for medical equipment purchased from capital and four trusts could not give it for equipment bought from revenue. So the £378 million and £106 million reported by trusts, significantly understate the 'All Scotland' position which we estimate at £630 million. Trusts also lease medical equipment with a replacement value estimated at £34.5 million.
- It is important to ensure that there is sufficient investment in maintenance for medical equipment because this, along with training, has the greatest impact on device safety. But four trusts could not provide their maintenance figures, and 15 trusts could only provide partial data, so the £23 million reported by trusts understates the 'All Scotland' position which we estimate at over £44 million[38].

34 These estimates are extrapolated from the trusts that did provide the required information on the basis that the rest would have a similar profile.
35 Trusts also estimated the replacement value of leased equipment at £34.5 million, 2001/02.
36 This covers items held on the fixed asset register.
37 This covers items with a purchase value of >£500 and < £5,000, including VAT.
38 Estimated at 7% of the 'grossed up' replacement value, as advised by the Medical Equipment Managers on our Study Advisory Panel (Exhibit 15).

Reliability of the data

4.8 External auditors assessed the quality of data that were provided by trusts and we found that data reliability varied among trusts and among data types. For the majority of data categories reviewed, trusts were able to demonstrate, overall, that they had robust data (Exhibit 16). In particular, financial management data, where available, were mostly reliable. Trusts with more reliable management data, overall for medical equipment are: Argyll & Clyde Acute Hospitals Trust, Ayrshire & Arran Acute Hospitals Trust, Yorkhill Trust, West Lothian Healthcare Trust, Shetland Health Board and Lanarkshire Acute Hospitals Trust. But several trusts could only provide estimates that could not be substantiated for some key data. There is room for improvement, in particular, in the reliability of medical equipment management data for: Greater Glasgow PCT, Lothian PCT, Forth Valley PCT, Fife PCT and Orkney Health Board.

Using the management information

4.9 Management information only adds value if it is reported and used. Agreed PIs can be a useful tool to support benchmarking and performance management. But the SEHD and health boards do not use medical equipment PIs for this purpose. Ten trusts make use of PIs for medical equipment, but these are mostly limited to operational aspects of medical physics teams. For example, North Glasgow University Hospitals Trust uses some medical equipment PIs of this type, which are reviewed at their ISO-accredited bioengineering meetings. These include statistics on utilisation for equipment in imaging, radiotherapy and laboratories; and equipment installations with more than four service calls in six months.

4.10 Some informal comparisons are made at the Scottish Medical Equipment Manager meetings. However, without agreed PIs, benchmarking initiatives between similar organisations are impossible. The lack of an agreed minimum data set to provide management information for medical equipment means that it is difficult for NHSScotland to demonstrate that it is using its resources well. We had to make special arrangements to collect and coordinate basic management data. From the data we did obtain, we have provided some provisional benchmarking data (Exhibits 17 - 21 following). And these highlight continued unexplained variations among trusts.

4.11 Exhibits 17 - 21 provide examples of PIs that would be useful for managing medical equipment. As a minimum, we would expect trusts to benchmark medical equipment in terms of: age profile; investing in medical equipment to maintain and improve levels of equipment; the level of equipment available; and, spend on maintaining the equipment.

4.12 The substantial variations shown in the Exhibits need to be explained by trusts. Some variation will be explained by the use of estimates and incomplete (partial) data, or by differences in accounting procedures as discussed in the explanatory notes to Exhibits. Once data issues of this kind have been identified and addressed, the remaining variations would reflect real differences between trusts. Meanwhile, the Exhibits should be interpreted with care. It is important to resolve the data issues as quickly as possible so that real differences between trusts can be shown and the benchmarking results can then be used to inform the development of good practice.

Age profiles (Exhibit 17)

4.13 The age of key items of equipment varies substantially between trusts and some trusts are relying heavily on equipment that is beyond its standard life.

Exhibit 16

Auditor data quality ratings for validated trust medical equipment management data

The quality of some medical equipment management data needs to improve.

Quality rating descriptions
Reliable: Where auditors found responses to be reliable, ie, based on actuals or **generally reliable** with some based on estimates.

Estimated: Responses based on estimates.

No clear audit trail for the data.

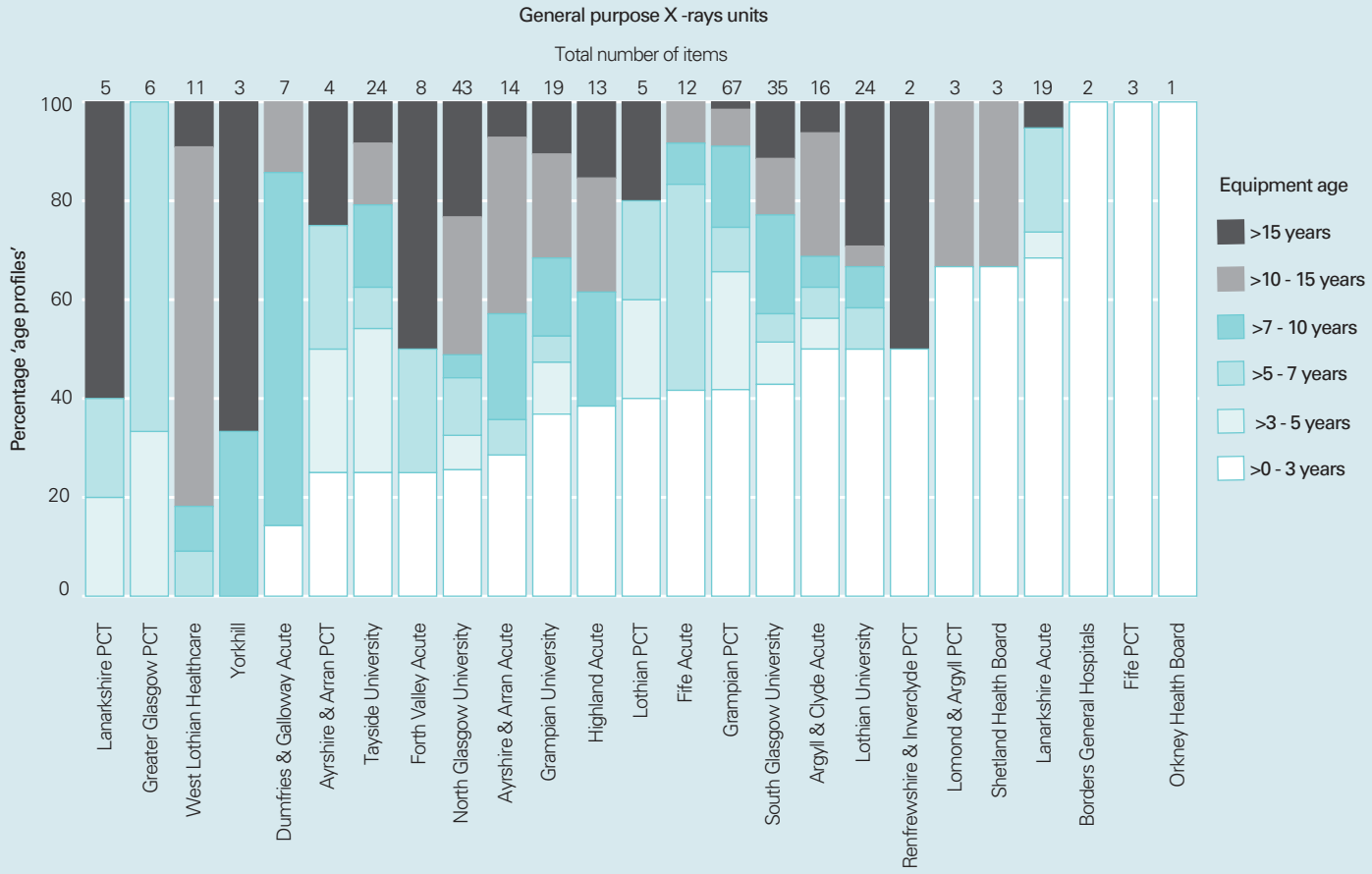
Data	Overall quality rating	No clear audit trail for the data
Net Book Value	Reliable	Greater Glasgow PCT
Depreciation	Reliable	
*Replacement value on fixed asset register	Mostly reliable and 1 estimated	
Replacement value for items >£500 and <£5,000	Mixture of reliable and estimated	Orkney Health Board
Leasing data	Mixture of reliable and estimated	
*Timing of medical equipment allocations	Mixture of reliable and estimated	Fife PCT, Forth Valley PCT, Lanarkshire PCT and Lothian PCT
*Timing of medical equipment expenditure	Mostly reliable and 1 estimated	Fife PCT, Forth Valley PCT, Lothian University, Lothian PCT and Western Isles Health Board
*Maintenance expenditure	Mixture of reliable and estimated	Ayrshire & Arran PCT, Dumfries & Galloway Acute, Fife PCT, Forth Valley PCT, Greater Glasgow PCT and Orkney Health Board
Financial benefits for collaborating over procurement	Mixture of reliable and estimated	Lomond & Argyll PCT, Greater Glasgow PCT, Highland Acute and Orkney Health Board
Investment in training	Mixture of reliable and estimated	Grampian PCT and South Glasgow University
*Age profiles of equipment	Mixture of reliable and estimated	Orkney Health Board
Standardisation	Mostly reliable and 1 estimated	Greater Glasgow PCT
Systems for monitoring usage of major items of equipment	Mixture of reliable and estimated	Highland Acute and Lothian PCT

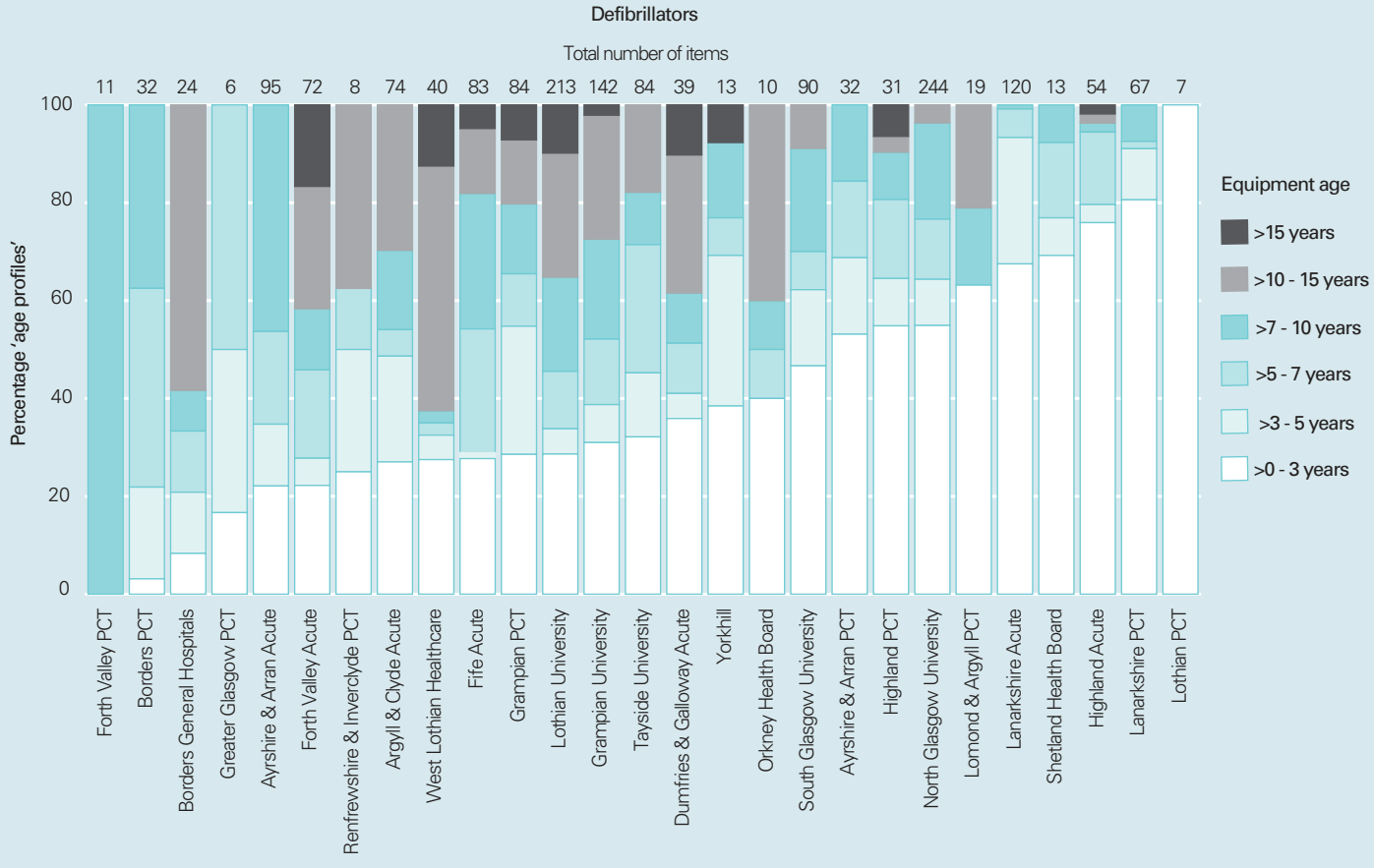
Source: Audit Scotland, 2003

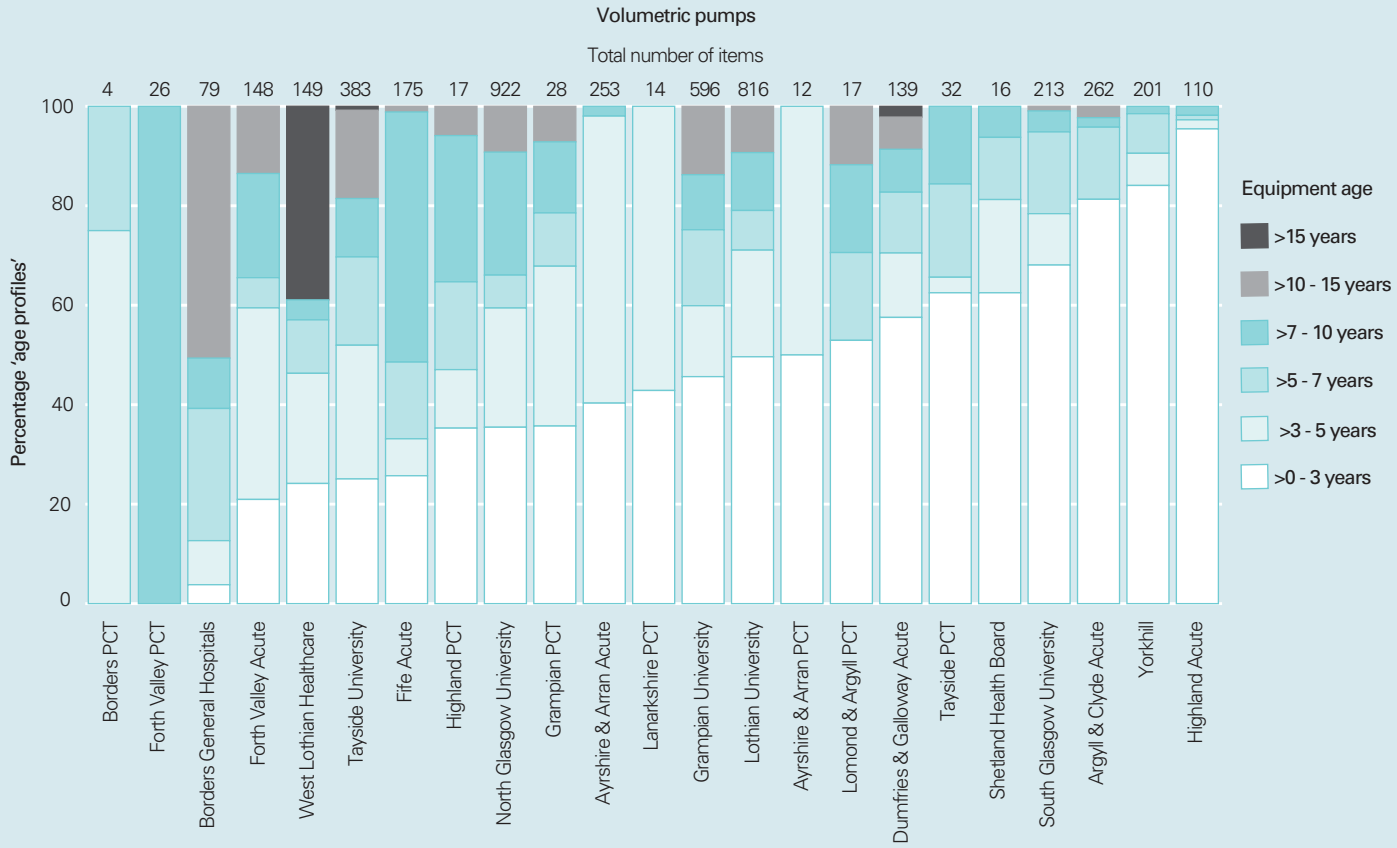
Note: To be interpreted in conjunction with Exhibit 14, which highlights where management data were/not available.
* Where partial data was provided by some trusts.

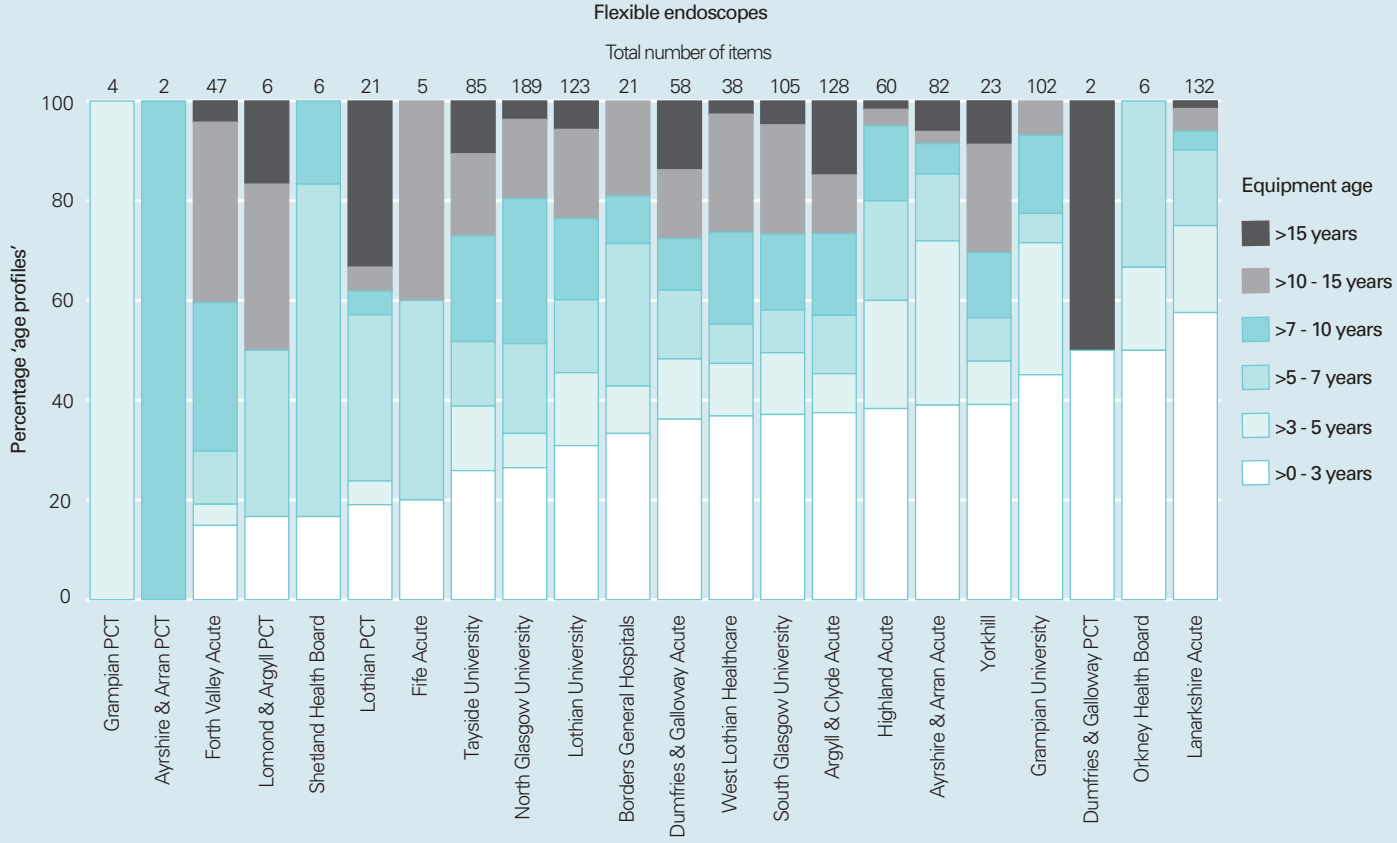
Exhibit 17

Age profiles for selected examples of medical equipment by trust









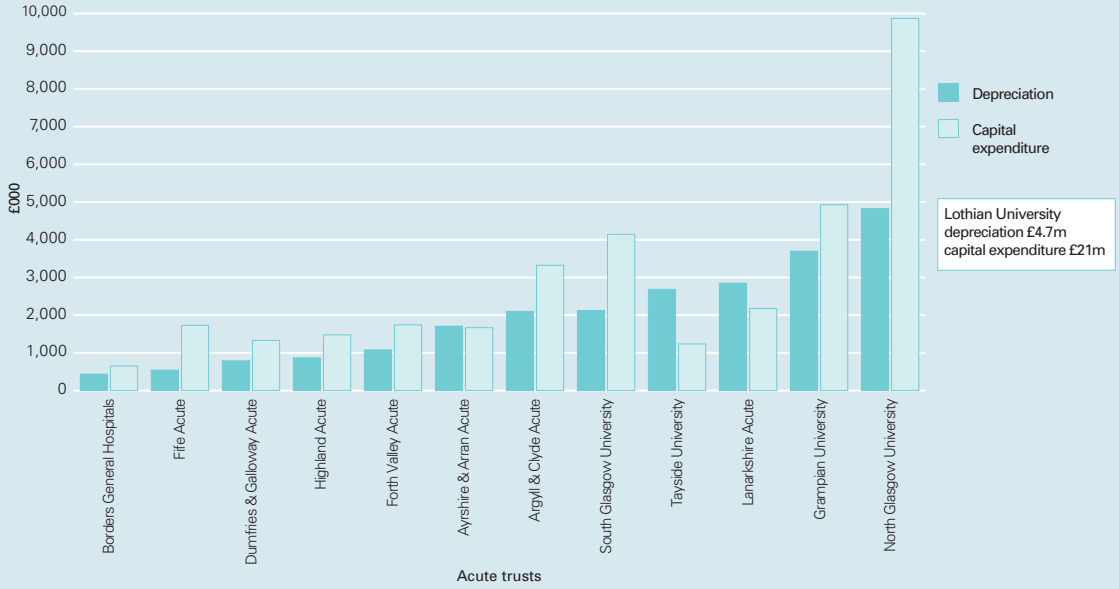
Source: Audit Scotland, 2003

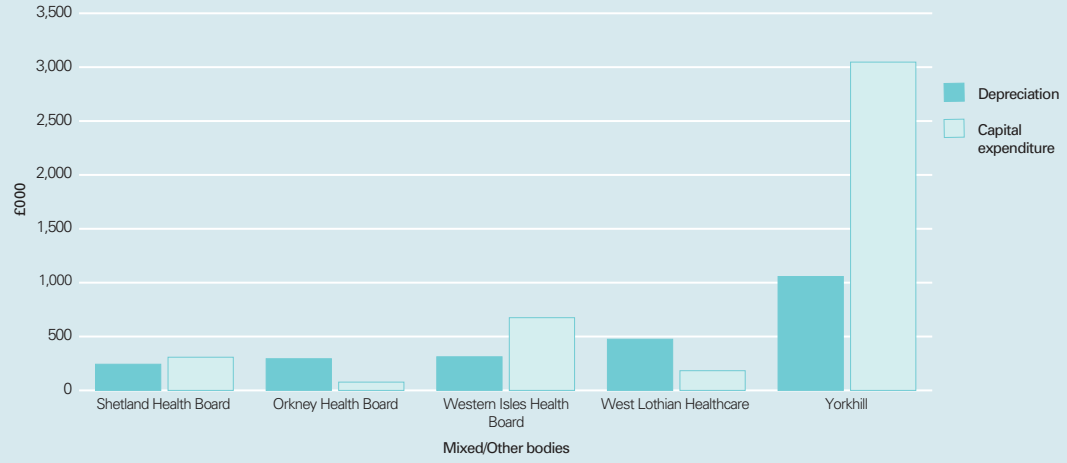
Note: Only includes trust data where complete ages profiles were provided. Certain items of equipment were not relevant for some trusts.

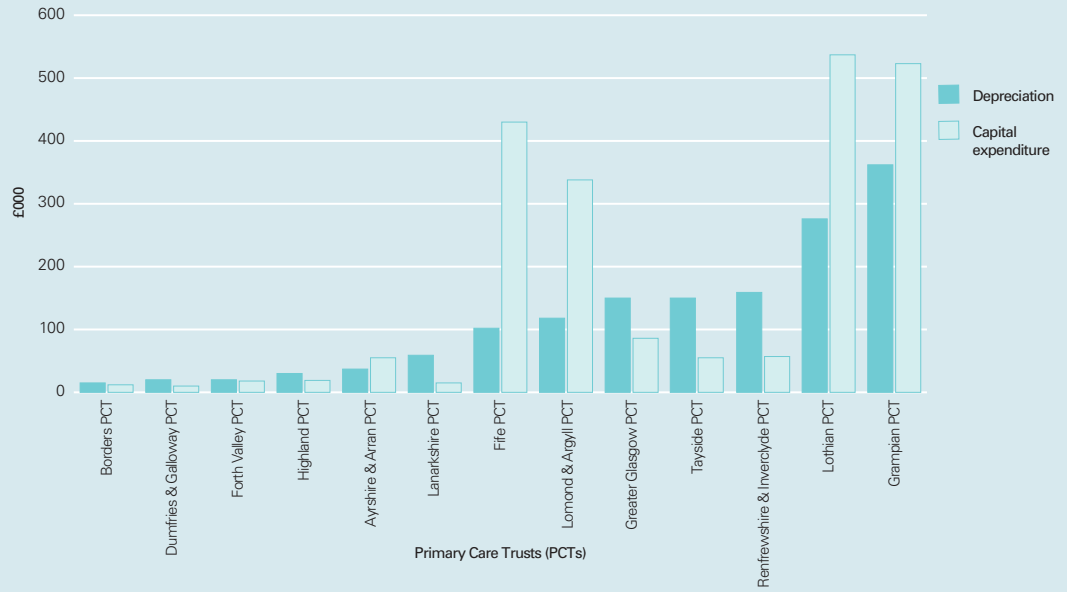
Exhibit 18

Capital expenditure and depreciation of medical equipment by trust

In 2001/02, capital expenditure for medical equipment did not always match depreciation





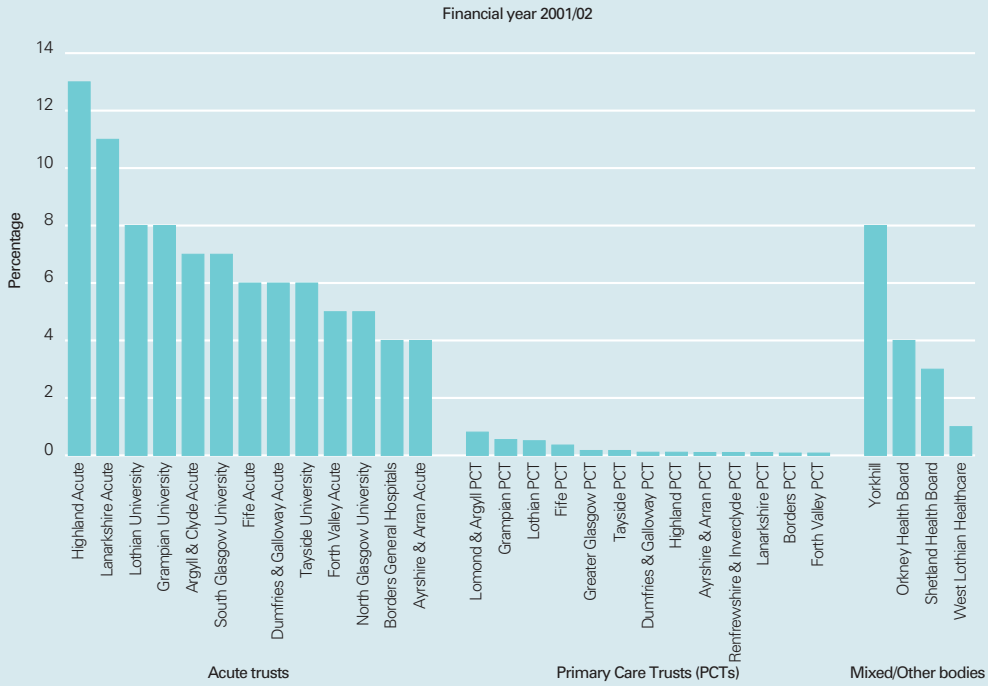


Source: Audit Scotland, 2003

Note: These graphs show a one-year snapshot of expenditure and depreciation. Financial year 2001/02.

Exhibit 19

Total Net Book Value of medical equipment held by trusts as a percentage of trust operating income



Source: Audit Scotland, 2003

Note: Net Book Value of medical equipment on fixed asset register. To be interpreted in conjunction with explanatory notes below. For operating income, see Appendix 4.

Investing to maintain and improve levels of equipment (Exhibit 18)

Capital

4.14 Depreciation information helps to assess whether or not the expenditure on equipment purchased from capital is sufficient at least to cover 'replacement' equipment[39]. It needs to be presented as trend data so that fluctuations in investment are seen in context. We have only provided a one-year snapshot because trend data are not routinely available. If 2001/02 reflects the trend, then investment in at least 42% of trusts is insufficient to replace equipment and maintain existing levels of equipment, far less improve them. While Exhibit 18 shows that acute trusts appear to be performing better than PCTs, this has to be seen in the context that, on average, 37% of equipment still in use has no value on their fixed asset register.

Revenue

4.15 Annual expenditure on medical equipment funded from revenue also needs to be shown as trend data to ensure that investment in low cost/ high volume items is adequate to meet service requirements.

Net Book Value[40] (Exhibit 19)

4.16 Net Book Value as a percentage of trust operating income is a measure that can be used to indicate trust levels of medical equipment provision. For example, Exhibit 19 shows that there is a three-fold difference between acute trusts, but some of this might be explained by differences in the way trusts depreciate their medical equipment and record equipment on fixed asset registers.

Replacement value[41] (Exhibit 20)

4.17 Replacement value as a percentage of trust operating income is another way of measuring trust levels of medical equipment provision. Exhibit 20 shows replacement value of medical equipment as a percentage of operating income, for capital and revenue. Again, this highlights the degree of variation between trusts that were able to provide replacement values. There are many gaps in the data and some figures are based on estimates.

Maintenance spend (Exhibit 21)

4.18 We would expect maintenance spend to be related to trust replacement values and these data are shown in Exhibit 21. This shows that there are still substantial variations in how much trusts spend on the maintenance of their medical equipment. However, some replacement values are estimated, as described previously, and the majority of trusts could only give incomplete data on maintenance expenditure (Exhibit 14).

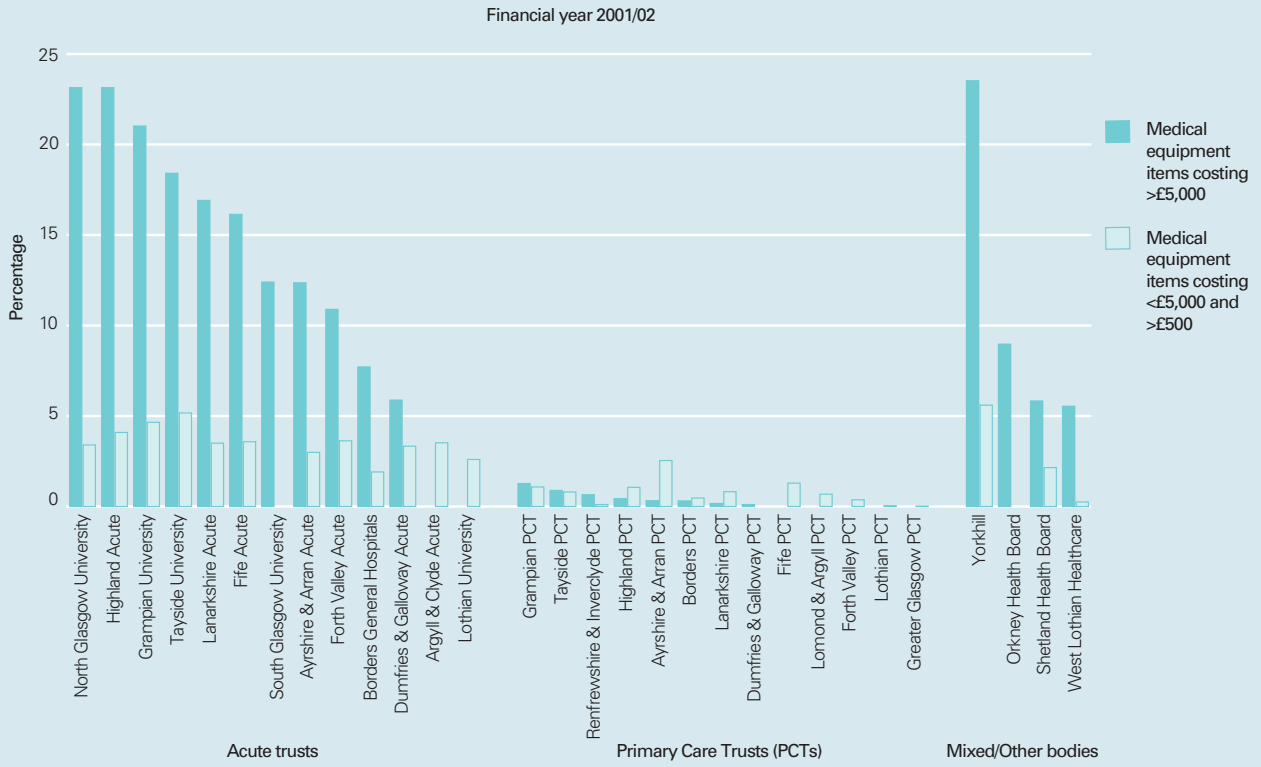
39 It is not always possible or meaningful to separate expenditure between 'replacement' equipment and 'new' equipment purchased to, for example, provide an increased level of service.

40 The estimated value of the equipment after depreciation has been taken into account.

41 The estimated investment the organisation would require to replace the equipment.

Exhibit 20

Replacement value for *capital and **revenue medical equipment items as a percentage of trust operating income

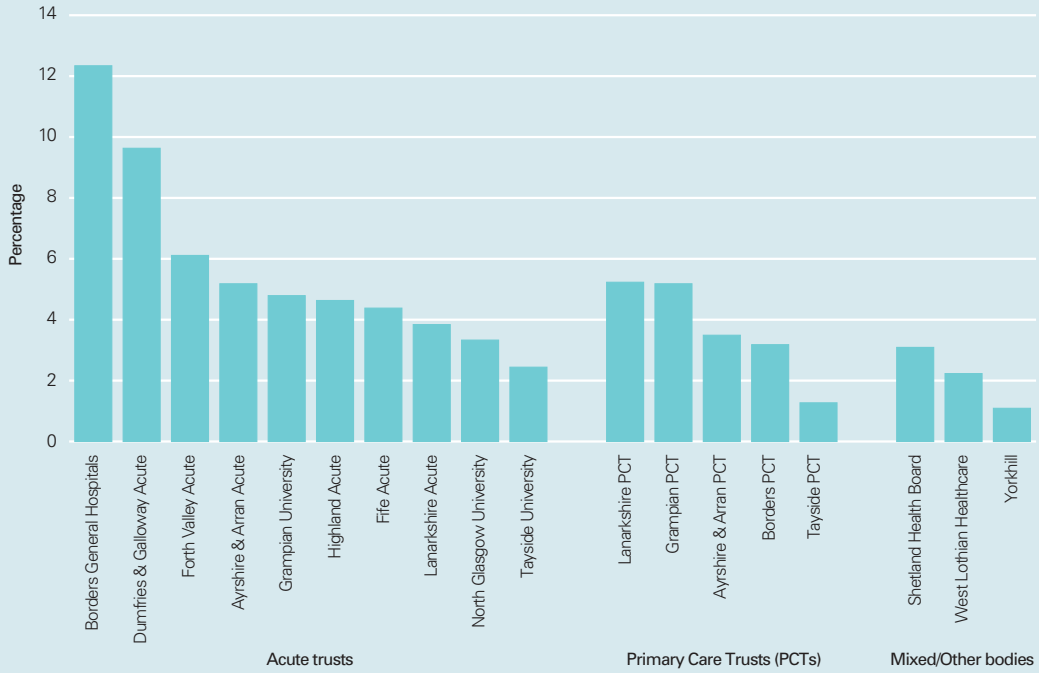


Source: Audit Scotland, 2003
*Medical equipment items originally costing ≥£5,000.
**Medical equipment items originally costing <£5,000 and >£500.

Note: Eight trusts did not provide replacement value for capital items and four trusts did not provide estimated replacement value for revenue items. To be interpreted in conjunction with explanatory notes on previous page.
For operating income, see Appendix 4.

Exhibit 21

Maintenance expenditure as a percentage of total replacement value by trust



Source: Audit Scotland, 2003

Note: Only includes trusts that gave maintenance expenditure and replacement values, many of which are estimated. Some data are partial. To be interpreted in conjunction with explanatory notes previous page.

Recommendations

(Also, see recommendations in Parts 2 and 3.)

National

13. The SEHD should ensure that a minimum data set for managing medical equipment is agreed and implemented.

14. The SEHD should make use of this performance information to inform Accountability Reviews and other performance monitoring processes.

Local

15. Operating divisions should ensure that the information held on medical equipment registers meets agreed minimum data set requirements, is up to date, accurate and easily accessible. Regular reviews of the availability, reliability and consistency of data should be undertaken by operating divisions.

16. NHS boards should ensure this medical equipment performance information is used to assess whether the local area is making best use of its medical equipment resources for patient care.

Appendix 1

Equipped to Care: Managing Medical Equipment in the NHS in Scotland, 2001

Key points and conclusion from the executive summary of this report.

Key points

Trusts are responsible for managing a significant investment in medical equipment. In 1997/98:

- the total value of medical equipment was in the region of £170 million
- expenditure on new and replacement equipment was £25 million
- expenditure on maintenance was around £20 million.

Despite its financial significance, and the important implications for clinical governance if medical equipment is not managed well, few trust boards take an active role in:

- determining priorities for the acquisition of medical equipment
- examining trust procurement practices
- monitoring training, usage and maintenance issues.

There continues to be scope for improvements in the combined purchasing of medical equipment:

- we were unable to obtain information from trusts on the uptake of national contracts
- a substantial amount of equipment is purchased at a local level without consideration given to the potential benefits of aggregating purchases.

Trusts are managing many of the operational medical equipment issues well …

- finance departments are ensuring compliance with EU procurement legislation and Standing Financial Instructions
- multidisciplinary involvement in procurement is commonplace
- clinicians reported satisfaction with response times for equipment failure, so interruptions to services are rare.

… but some trusts are exposing themselves to unnecessary risks:

- data on total expenditure (capital and revenue) are not available from national financial returns
- Audit Scotland had to obtain information by surveying trusts direct
- not all trusts could easily provide basic information on expenditure and usage.

… although our snapshot data indicated that:

- there are variations in trust expenditure on medical equipment, and the level of equipment available, not fully explained by differences in type of trusts
- expenditure on new and replacement equipment is failing to match depreciation.

Conclusion

There is room for improvement in the management of medical equipment. A common theme throughout the study was inadequate management information and reporting systems. In particular, given its strategic importance and clinical governance considerations, it is disappointing that, at many trusts, board members do not have access to robust information which would help them set priorities and manage the risks associated with medical equipment. For example, they need to ensure that they are aware of and understand the implications of any shortfall between depreciation and the combined capital and revenue purchases. Board members should ensure that responsibility for medical equipment is delegated to someone on the trust board. In turn, they should ensure that good practice guidelines (outlined in the main baseline report) are implemented and monitored.

Appendix 2

Definition of medical equipment used in this audit

Medical devices are all instruments, apparatus, appliances, materials or other articles, used for the purposes of diagnosis, prevention, monitoring, treatment or alleviation of disease or injury or handicap. Medical devices do not include estates related equipment such as catering and laundry equipment. Medical devices do not include hospital computing equipment unless the IT equipment is linked to patient connected medical equipment, or laboratory equipment or is part of a Picture Archiving Communication System.

Medical equipment is a subset of medical devices. We have defined medical equipment as all devices that are connected to the patient as part of their treatment and care in hospitals and health centres, and devices used for diagnostic, therapeutic and laboratory purposes.

Medical equipment does not include consumable medical devices such as syringes and dressings.

Medical equipment excluded from this audit were: equipment located within Sterile Supply Units (ie, in Theatre Sterile Supplies Unit (TSSU) or Central Sterile Supply Departments (CSSDs)); plant, including operating lights, piped gas systems; small operating instruments processed through TSSU; implanted devices (eg, pacemakers); "normal" beds, trolleys, chairs, wheelchairs, and low cost rehabilitation equipment (eg, crutches).

Examples of medical equipment included in this audit are described overleaf:

Groups of Equipment	Description
Imaging Equipment Equipment that gives a picture of physiological structures, eg, X-ray, Ultrasound, MRI, CT, Gamma Cameras. See below. Some of these items represent high cost items, for example, CT and MRI. Imaging equipment includes:	
CT Scanners	Computerised Tomography Scanner. Uses a thin beam of X-rays rotated around the body to computer generate an image of a 'slice' through the body. Found in X-ray Departments. Costs around £600,000.
Diagnostic Ultrasound Scanners	Uses high frequency sound waves 'bounced' off body structures to produce images of organs. Found in X-ray Departments, Cardiology, Obstetrics, Urology Departments / Units. Costs from £15,000 to £150,000.
MRI Scanner	Magnetic Resonance Imaging Scanner. Using magnetic fields, the hydrogen nucleus within the body are caused to spin, giving away their location to the scanner. The scanner builds up an image of the density of the spinning nucleus. Shows detailed images of for example, sections of the brain. Found in X-ray Departments. Cost around £1,000,000.
Gamma Cameras	Gamma cameras detect and build up a picture of gamma radiation emanating from the patient. The patient is usually injected with a radioactive gamma emitter that concentrates in parts of the patient's body that are growing actively such as tumours. This gives an image based on the biological activity rather than structure. These will be found in Radiology or Medical Physics Departments and will cost about £300,000.
Other X-ray Equipment	
Angiographic Units	Uses X-rays and opaque dyes to produce moving images of blood flow. This finds blockages and abnormalities in blood vessels. These can be treated with tools passed through the veins and the radiologist / cardiologist can treat the problem while observing the screen. Found in X-ray Departments. Cost around £800,000.
Dental Units	Used to take X-rays of the teeth. Found in most dental clinics. Cost around £5,000. More complex dental units can cost £30,000.
General Purpose X-ray Units	This is the basic kit of an X-ray Department. Takes images of most parts of the body. Costs from £40,000.
Fixed Units with Fluoroscopy	These take moving images for barium swallows and enemas. Found in many X-ray Departments. Cost around £330,000.
Mobile Units	Basic X-ray machines on wheels – goes to wards, theatres, A&E etc. Costs around £30,000.

IV Systems	
Intra-venous systems are used for accurately controlling the injection of drugs into the patient. They are usually syringe drivers or infusion pumps. Some may be specially designed for a particular purpose – anaesthetic agents, epidurals etc. IV Systems include:	
Syringe Pumps (routine)	Syringe pumps are normally used to deliver small quantities of drug with a high degree of accuracy. The drug is contained in a syringe. These will be found in most wards, theatres and intensive care. Costs will be between £1,000 and £2,000.
Volumetric Pumps (routine)	Volumetric pumps control the delivery of larger quantities of drugs or fluids. They can also pump at greater rates than a syringe driver. These will also be found in most wards and departments. Cost is upwards of £2,000.
Other Medical Equipment	
Defibrillators	Delivers an electric shock to a fibrillating heart to restore normal beating. This is emergency equipment found in most hospital wards and departments. Also carried by ambulances. Costs between £1,500 and £9,000.
Dialysis Machines (haemodialysis)	This is an artificial kidney. Patients will be connected to these three times a week for about 6 hours at a time to 'clean' the blood. Found in Renal Units. Cost around £14,000.
ECG Recorders	Produces a trace of the electrical activity of the heart. The trace can be used to diagnose heart disease. Found in ECG Departments, some wards and A&E. Costs from £2,000 to £8,000.
Flexible Endoscopes	Used to look inside the body. Modern equipment has a video camera at the tip; older equipment uses a fibre optic bundle to take the picture from the tip to a microscope at the eyepiece. The tips can be steered by the operator and tools can be passed through to take biopsies, stop bleeding etc. Small instruments can look into the bladder, sinuses, airway and lungs. Larger instruments are passed into the stomach and into the colon. Individual instruments cost between £8,000 and £28,000. A complete set-up including video monitor, light source, video processor and some flexible endoscopes would cost about £150,000.

Source: MHRA; and Medical Equipment Managers on our Study Advisory Panel, 2003.

Appendix 3

Study Advisory Panel

Mike Nieman Aberdeen Royal Infirmary, Grampian	Trust Medical Equipment Manager on baseline study advisory panel, and Scottish Medical Equipment Manager Group nominee
Mike Sik Crosshouse Hospital, Ayrshire & Arran	Scottish Medical Equipment Manager Group nominee
Robin Pollock Raigmore Hospital, Highland	Scottish Medical Equipment Manager Group nominee
Michael Baxter Head of Private Finance and Capital Unit, SEHD	SEHD nominee, finance specialist
Brian Howarth Audit Scotland	Senior Audit Manager, involved in baseline audit
Miles Moorhouse Director, Scottish Healthcare Supplies, CSA	On baseline study advisory panel, supplies specialist
Charles Swainson Lothian University Hospitals Trust	Medical Director on baseline study advisory panel, and Trust Chief Executive nominee

Appendix 4

Trust Operating Income 2001/02	
Acute Trusts	**£000**
Argyll & Clyde	171,220
Ayrshire & Arran	163,866
Borders General Hospitals	44,074
Dumfries & Galloway	60,000
Fife	112,441
Forth Valley	111,000
Grampian University	236,705
Highland	87,768
Lanarkshire	232,726
Lothian University	381,792
North Glasgow University	438,582
South Glasgow University	202,051
Tayside University	233,000
Primary Care Trusts (PCT)	
Ayrshire & Arran	196,538
Borders	65,000
Dumfries & Galloway	93,676
Fife	194,304
Forth Valley	163,096
Grampian	305,000
Greater Glasgow	470,000
Highland	139,347
Lanarkshire	297,000
Lomond & Argyll	94,583
Lothian	344,177
Renfrewshire & Inverclyde	165,472
Tayside	251,000
Mixed/Other Bodies	
Yorkhill	86,815
Orkney Health Board	24,577
Shetland Health Board	30,000
Western Isles Health Board	44,517
West Lothian Healthcare	142,492

Source: Audit Scotland Trust Survey, 2002

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Audit Scotland
110 George Street
Edinburgh EH2 4LH

Telephone
0131 477 1234
Fax
0131 477 4567

www.audit-scotland.gov.uk

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