

Review of orthopaedic services



Prepared for the Auditor General for Scotland
March 2010

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Summary



Orthopaedics is an area of high spend and activity and there is scope to work more efficiently.



Background

1. Orthopaedics is a large, complex specialty which treats a high number of patients each year. Orthopaedic services provide treatment for people with injuries and conditions of the musculoskeletal system (the body's muscles and skeleton). Many orthopaedic conditions need surgery, such as joint replacements. Other conditions such as osteoporosis may require medication or rehabilitation.¹

2. In Scotland, there are around 76,200 inpatient admissions, 24,300 day cases and 569,400 outpatient appointments for orthopaedic services in a year.² Orthopaedic patients are mostly treated in hospitals as inpatients but an increasing number of procedures, such as arthroscopy and carpal tunnel release, are now carried out as same day surgery and do not require an overnight stay.³ Orthopaedic services deal with large numbers of emergency patients and this can affect the management of planned patients.⁴ In some areas NHS boards treat planned and emergency cases separately, which helps to minimise emergency cases affecting planned cases. NHS boards may refer complex or specialist procedures to large teaching hospitals and some orthopaedic work is carried out in private hospitals. Information on private activity is not routinely collected and the reported figure of up to 2.5 per cent of all activity being carried out privately is likely to be an underestimate.⁵

3. Older people use orthopaedic services more than younger people as they have higher rates of fracture and joint replacement. Around

78 per cent of hip replacements and 84 per cent of knee replacements were carried out on people aged over 60 in 2007/08.⁶

4. The NHS spent £373 million on orthopaedic services in 2008/09, which is four per cent of overall spending on health services in Scotland.⁷ Over the last ten years, funding has increased by 68 per cent in real terms (stripping out the effects of inflation over this period), consultant numbers have grown by 49 per cent and total activity (inpatient, day case and outpatient) has increased by 12 per cent.

About the study

5. We looked at how effectively the NHS in Scotland manages orthopaedic services, how much is spent and whether this represents value for money. We also assessed whether there is scope to improve the efficiency of orthopaedic services by comparing activity across Scotland and identifying areas of good practice where efficiencies have been made. It is difficult to accurately measure productivity due to limited information on cost, quality and activity, varying complexity of procedures (case-mix) and the different ways of providing services which may affect trend information over time.

6. This report focuses on orthopaedic services provided in hospitals and highlights examples of services provided in the community, such as orthopaedic clinics led by GPs or physiotherapists. We did not review the work of other departments that support orthopaedic services, such as diagnostics, rheumatology and anaesthetics.

7. In this study, we analysed information available for Scotland on orthopaedic activity and costs and requested minimal new information from NHS boards. We also interviewed staff at three NHS boards (Fife, Grampian and Tayside), the Golden Jubilee National Hospital, Information Services Division (ISD) Scotland and the Scottish Government Health Directorates (SGHD).⁸ See [Appendix 2](#) for full details of the methodology. We have highlighted issues for non-executive NHS board members to raise within their NHS boards, focused specifically on potential efficiency savings (see *Issues for non-executive NHS board members* on our website). We have summarised all the data used in the report by NHS board in a separate document *Summary of performance by NHS boards* on our website. Our *Improving public sector efficiency* report, published in February 2010, included a good practice checklist which will also help NHS boards to improve efficiency and productivity.⁹

8. There are some problems with the accuracy of national data on cost, quality and activity, but we have used available national information to assess the efficiency of orthopaedic services across Scotland. We gave NHS boards the opportunity to validate the data we have used in the report and to explain any variations in performance.

9. This report is structured into three main parts:

- Introduction ([Part 1](#)).
- Improving access for patients ([Part 2](#)).
- Value for money ([Part 3](#)).

1 Osteoporosis is a disorder in which bones thin and become brittle and more prone to fracture.

2 *Costs Book (R04X) Specialty summary by board, National Statistics Release*, Information Services Division (ISD) Scotland, 2009.

3 Arthroscopy is a procedure where a small camera is inserted into a joint to diagnose and treat joint disorders; and carpal tunnel release is surgery to relieve pain and weakness in the hand caused by pressure on a nerve in the wrist.

4 Emergency work can also be known as unscheduled or unplanned.

5 Audit Scotland analysis of ISD Scotland SMR01 data extracts, ISD Scotland, 2009.

6 *Scottish Arthroplasty Annual Report*, ISD Scotland, 2009.

7 The £373 million spent on orthopaedic services includes inpatients, day cases and outpatients at consultant-led or nurse-led clinics. It does not include any spend on patients treated in intensive care, high dependency units and rehabilitation facilities or any treatment provided in the community. It also includes £32 million of centrally allocated funding provided to the NHS boards for meeting waiting times targets.

8 The Golden Jubilee National Hospital is part of NHS National Waiting Times Centre and ISD Scotland is part of NHS National Services Scotland.

9 *Improving public sector efficiency – Good practice checklist for public bodies*, Audit Scotland, February 2010.

Key messages

- Waiting times for orthopaedic services have reduced considerably in recent years. This has been achieved by the NHS changing the way it delivers services and through additional activity funded by waiting times money from the SGHD. NHS boards are meeting national waiting times targets, but making further sustainable improvements to achieve the planned 18-week referral to treatment target will be challenging.
- There is variation across Scotland in the efficiency of orthopaedic services which is not fully explained by the resources available or by the types of procedures carried out. There is scope to use existing resources more efficiently and improve how these services are managed. Efficiency savings can be made by moving more inpatient care to day surgery or outpatients and by reducing length of stay in hospital.
- In 2008/09, £373 million was spent on orthopaedics, a 68 per cent increase in real terms over ten years. The average amount spent on inpatient and day cases and the amount spent per orthopaedic procedure vary significantly across Scotland. Savings can be made by more efficient purchasing of surgical implants.
- It is not possible to draw clear conclusions about productivity in orthopaedic services due to limitations in the data. Productivity indicators suggest that NHS boards which manage their planned and emergency activity separately have higher consultant activity and a lower cost per case.

Key recommendations

The Scottish Government and NHS boards should:

- develop better information on costs, quality and activity to plan and deliver efficient services to a high quality
- ensure that benchmarking information on cost and activity is collected to allow NHS boards to compare efficiency
- improve tariff information to support accurate costing and financial planning for orthopaedic services.

NHS boards should:

- monitor levels of day case and outpatient activity and look to deliver care in the most efficient and effective setting
- develop a better understanding of productivity, including activity, cost and quality indicators, to deliver efficient services
- monitor levels of activity for the whole orthopaedic team and take action where levels are low
- review performance against quality indicators to ensure patient care is not adversely affected by service changes
- use the Audit Scotland checklist detailed in [Appendix 3](#) to help improve the efficiency and effectiveness of orthopaedic services.

Part 1. Introduction



A number of services work together to deliver orthopaedic care to patients.



There have been considerable improvements in orthopaedic services in the last decade

10. The NHS in Scotland has made considerable improvements in how orthopaedic services are delivered which we describe throughout the report. Key improvements include:

- a reduction in waiting times from 26 weeks in 2003 to 12 weeks in 2010
- an increase in complex cases, such as hip and knee replacement and shoulder surgery, to meet increased demand due to an ageing population
- a reduction in length of stay for inpatients and an increase in same day surgery
- a number of national clinical audits which have provided information on outcomes and helped to improve access to theatres for elderly patients with hip fractures
- an increase in the provision of community-based services to reduce unnecessary hospital appointments.

11. Throughout the report we have focused on identifying potential areas for further improvement.

Orthopaedics is an area of high spend and activity

12. Expenditure on orthopaedic services in Scotland has steadily increased from around £178 million in 1999/2000 to over £373 million in 2008/09, a 68 per cent increase in real terms. This is the third highest spend on an acute specialty after general medicine (£482.4 million) and general surgery (£472.7 million). Expenditure on orthopaedics has remained at around four per cent of all NHS revenue expenditure over the last ten years.¹⁰

13. In 2008/09, there were around 76,200 inpatients, 24,300 day cases and 569,400 outpatient appointments for orthopaedic services. Total orthopaedic activity increased by just under 12 per cent between 1999/2000 and 2008/09, which is lower than the rate of increase in some other high volume specialties over the same period. For example, activity in urology increased by 23 per cent, although general surgery increased by only six per cent over the same period.

14. In the last ten years, the number of orthopaedic inpatients and outpatients increased by around 11 per cent and the number of day cases increased by over 50 per cent (from 15,900 to 24,300). There has also been an increase in the number of services provided in the community for orthopaedic patients. The number of day cases in most other specialties has reduced over this period, but this was offset in some specialties by an increase in the recorded number of outpatients where certain procedures can now be carried out.

A number of services work together to deliver orthopaedic care to patients

15. Patients generally access orthopaedic services through their GP referring them to an outpatient clinic or via hospital emergency departments. Most patients referred by a GP are added to consultants' outpatient waiting lists. However, in some areas extended scope practitioners (clinical nurse specialists, physiotherapists, podiatrists and GPs) carry out clinics in hospitals or in the community for patients who do not require surgery but may benefit from treatment such as physiotherapy or medication. Patients who require hospital treatment are placed on a waiting list for an inpatient or day case procedure. The rehabilitation support

offered to patients after an operation varies by NHS board, with some NHS boards having rehabilitation beds within hospitals and others providing rehabilitation in the community. Other community services play an important role in supporting patients who need orthopaedic care, for example homecare support and community nursing (Exhibit 1).

16. Orthopaedic services deal with planned and emergency patients.¹¹ The percentage of emergency cases varies by board but it can be as much as 50 per cent of the overall workload. NHS boards need to manage the orthopaedic service to ensure that emergency cases do not affect planned workloads. Three NHS boards in Scotland separate their planned and emergency activity in this way to minimise disruption to planned cases (NHS Fife, Forth Valley and Grampian). Orthopaedic emergency and planned activity can also be managed separately within the same site, for example NHS Lothian has two teams of orthopaedic surgeons – one for the planned workload and one for the emergency workload. Separation of planned and emergency workload has been recommended by the Royal College of Surgeons of England and the Welsh Assembly Government.^{12, 13}

17. NHS boards treat a number of patients who do not live in their board area and also send a number of patients for treatment in other NHS boards. For example, NHS boards may refer complex and specialist procedures to large teaching hospitals and emergency patients will receive treatment at the closest appropriate hospital. The referral of patients into and out of each NHS board has implications for service provision within each NHS board and should be considered alongside overall performance against activity, cost and quality indicators.

¹⁰ Revenue expenditure is money spent on the day-to-day operation of services. NHS boards also have a capital budget for capital programmes, such as new buildings.

¹¹ Emergency work can also be known as unscheduled or unplanned.

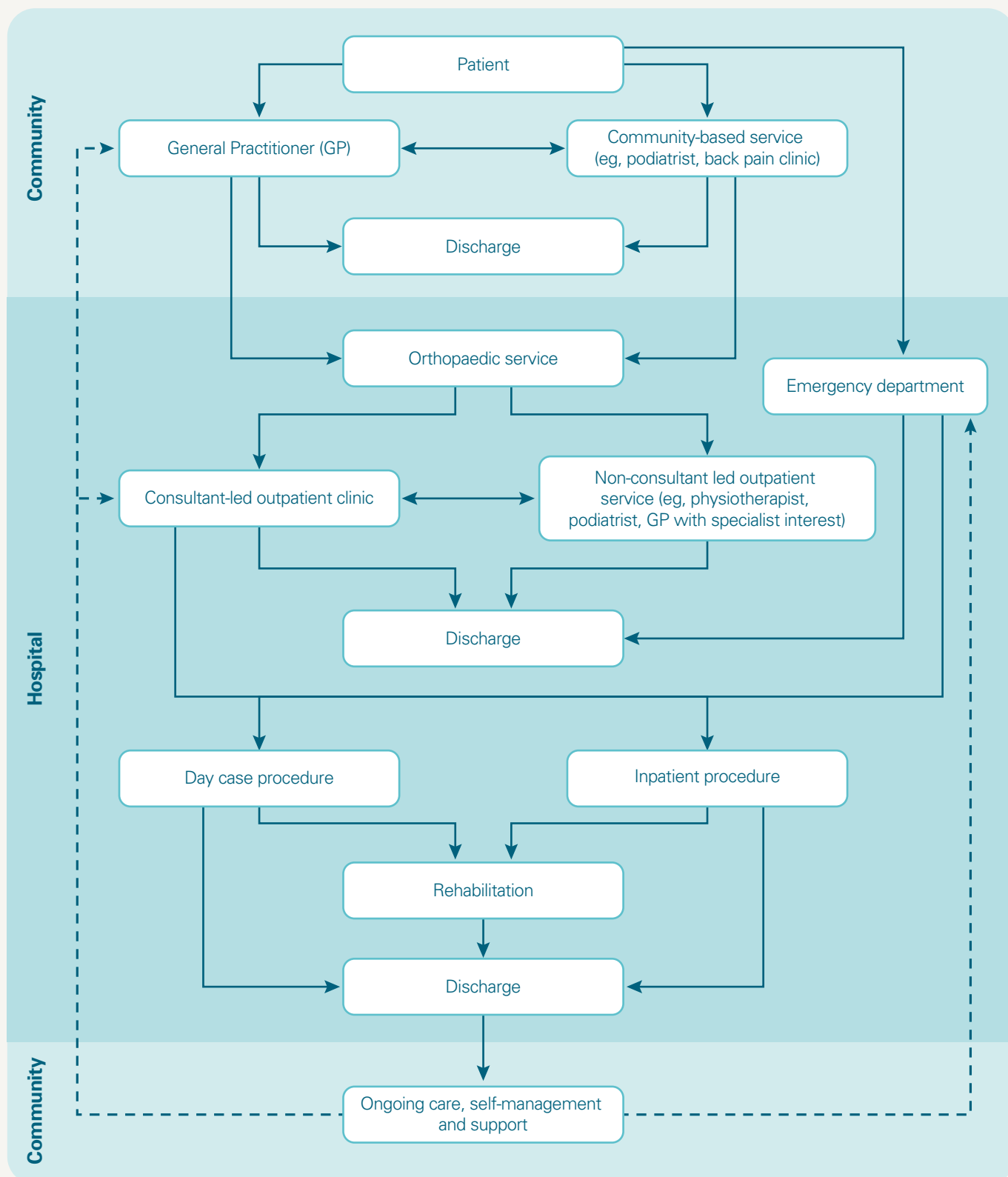
¹² *Separating emergency and elective surgical care: Recommendations for practice*, The Royal College of Surgeons of England, September 2007.

¹³ *An orthopaedic plan for Wales*, Welsh Assembly Government, July 2004.

Exhibit 1

Accessing orthopaedic services in Scotland

A number of services work together to deliver orthopaedic care to patients.



18. NHS boards with teaching hospitals (NHS Grampian, Greater Glasgow and Clyde, Lothian and Tayside) tend to treat a higher percentage of non-resident patients than other boards (Exhibit 2). NHS Borders, Greater Glasgow and Clyde, Highland and Lothian treat significant numbers of visitors from outside of Scotland. NHS Greater Glasgow and Clyde treats the largest percentage of non-resident patients with the majority of these patients referred from NHS Ayrshire and Arran, Highland, Lanarkshire and Western Isles. All orthopaedic patients from Argyll and Bute in NHS Highland are referred to NHS Greater Glasgow and Clyde and all patients from north-east Fife are referred to NHS Tayside. NHS Orkney and Shetland do not have dedicated orthopaedic services and the majority of their patients (around 70 per cent) are treated by NHS Grampian and the Golden Jubilee. NHS Lanarkshire refers the highest percentage of patients of any mainland board to the Golden Jubilee and a number of patients from NHS Fife, Grampian and Tayside are treated at the Scottish Regional Treatment Centre (SRTC).

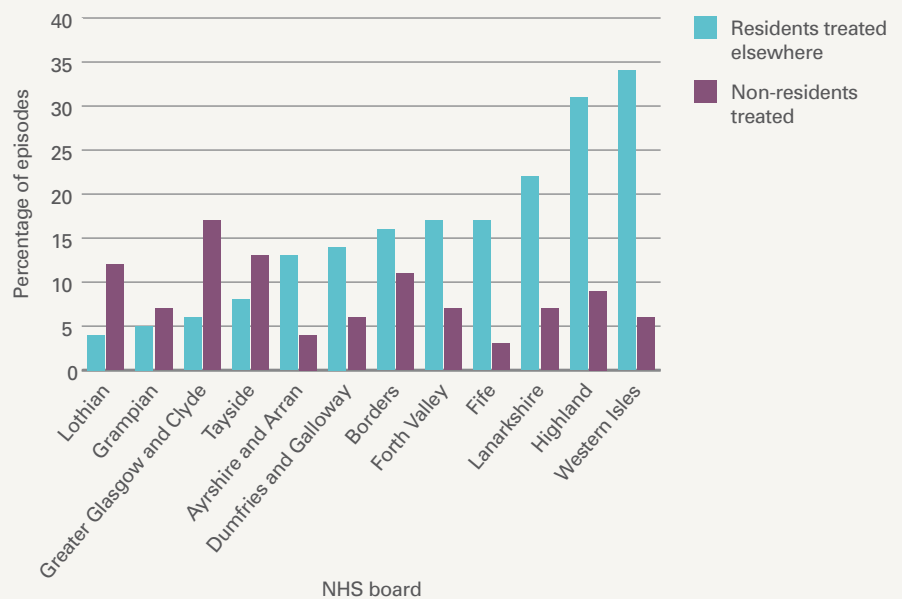
NHS boards refer patients to regional treatment centres and the private sector to reduce waiting times

19. In 2007, the Scottish Government introduced a new NHS waiting times target that no patient should wait longer than 18 weeks from referral to treatment by December 2011.¹⁴ Interim targets have been set to help NHS boards gradually reduce waiting times. From March 2009, patients should wait no longer than 15 weeks from GP referral to outpatient appointment and no longer than 15 weeks from an outpatient appointment to inpatient or day case treatment. From March 2010, this target reduces to patients waiting no longer than 12 weeks for each stage.

Exhibit 2

Percentage of orthopaedic patients treated outside NHS board of residence by NHS board, 2007/08

NHS boards treat a number of patients who do not live in their board area and also send a number of patients for treatment in other NHS boards.



Notes:

1. A hospital inpatient stay or day case can consist of a number of episodes of care. An episode may end as a result of a change of specialty, a change of consultant for medical reasons, a change in location or the end of treatment.
2. NHS Orkney and Shetland do not have a dedicated orthopaedic service and the majority of their patients (around 70 per cent) are treated in NHS Grampian and at the Golden Jubilee.

Source: Audit Scotland analysis of ISD Scotland SMR01 data extracts, ISD Scotland, 2009

20. The Scottish Executive purchased the Golden Jubilee from the private sector in June 2002 and established it as a national centre to help reduce the longest waiting times, including those in orthopaedics. In December 2006, a private company (Netcare) was contracted to provide additional orthopaedic services to NHS Fife, Grampian and Tayside at the SRTC in Tayside. In January 2010, the contract with Netcare ended and NHS Tayside now manages this facility. The SGHD is encouraging boards to phase out their use of the private sector, but some boards still send up to an estimated 2.5 per cent of activity to

private hospitals for treatment. We comment on NHS boards' use of the Golden Jubilee and the private sector in [Part 2](#).

Part 2. Improving access for patients



Waiting times in orthopaedic services have reduced significantly in recent years, but NHS boards will find it challenging to make further sustainable improvements.

Key messages

- Orthopaedic activity is high and continues to increase, with activity growing by 12 per cent in ten years.
- Waiting times for orthopaedic services have reduced considerably in recent years. This has been achieved by the NHS in Scotland changing the way it delivers services and through carrying out additional work funded by waiting times money from the SGHD.
- NHS boards are meeting national waiting times targets but making further sustainable improvements to achieve the planned 18-week referral to treatment target will be challenging.

Orthopaedic activity has increased in the last ten years

21. The most commonly performed orthopaedic procedures include arthroscopy, knee replacement, hip replacement and carpal tunnel release. The number of each of these procedures has increased overall over the last nine years. For example, arthroscopies have increased by 14 per cent from 7,573 to 8,645 procedures and carpal tunnel release surgery has increased by 45 per cent from 2,935 to 4,269 procedures ([Exhibit 3](#)).

22. The main issues affecting demand for orthopaedic services are an increasing older population, higher patient expectations and improvements in technology and available procedures. A wider range of procedures are now available and surgeons can carry out more complex procedures. For example, between 1999 and 2008 the annual number of knee replacements almost doubled (from 3,102 to 6,160) as did the number of knee revision procedures (from 211 to 421). The number of hip

replacements increased by 43 per cent (from 4,414 to 6,312) and shoulder replacements increased by 27 per cent (from 264 to 336).¹⁵ There is also pressure on orthopaedic services due to the high number of people with musculoskeletal problems. These account for one in four of all GP consultations in the UK.¹⁶

NHS boards have reduced waiting times by changing how they deliver services and carrying out additional activity

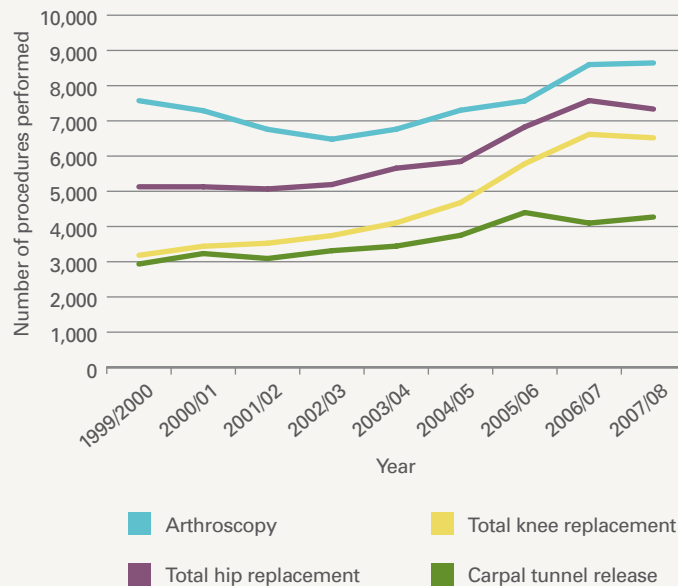
23. Since 2005/06, the Scottish Government has allocated money to NHS boards to help reduce waiting times. In 2008/09, approximately £139 million was allocated for use in all specialties. NHS boards have used this money to redesign services and carry out additional activity (for details on waiting times money [see paragraphs 79 to 81 in Part 3](#)). For example:

- NHS Fife has used waiting times money to set up a dedicated clinic which has helped to reduce the number of people waiting for upper limb procedures ([Case study 1](#)). It has also employed additional physiotherapists and occupational therapists to work on orthopaedic wards over the weekend so that patients can be discharged quicker.
- NHS Grampian has used waiting times money to employ additional staff to extend the working day and work at weekends to increase the number of procedures carried out each week.
- NHS Tayside has used waiting times money for the appointment of an additional consultant, hiring locum doctors and increasing weekend working.

Exhibit 3

Trends in common orthopaedic procedures, 1999/2000 to 2007/08

There has been a significant increase in the number orthopaedic procedures over the last nine years.



Source: *Hospital Operations/Procedures, National Statistics Release* and analysis of SMR01 activity, ISD Scotland, 2009

¹⁵ *Scottish Arthroplasty Project Annual Report*, ISD Scotland, 2009.

¹⁶ *Joint Effects: The impact of Allied Health Professionals on orthopaedic and musculoskeletal service change in Scotland*, Scottish Executive, 2005.

Case Study 1 – New ways of working to reduce waiting times for orthopaedic patients

Reducing the number of referrals to orthopaedic consultants, NHS Lanarkshire

During 2004, NHS Lanarkshire received two-year funding from the Scottish Executive's Centre of Change and Innovation. The NHS board used this funding to set up an Extended Scope Practitioner (ESP) service at Hairmyres hospital which was extended to the whole of NHS Lanarkshire in 2007. The ESP service aims to use the skills of specialist non-consultant staff to reduce orthopaedic waiting times and improve data quality and patient satisfaction.

The lead ESP screens all referrals to the orthopaedic department (approximately 1,000–1,200 per month) from GPs, consultants and other health professionals. Patients are then referred to a physiotherapy ESP, spinal ESP, podiatry ESP or to an orthopaedic consultant in accordance with an agreed protocol. Around a third of referrals are referred to the ESP service rather than to a consultant. Approximately ten per cent of the patients seen by an ESP are subsequently referred to an orthopaedic consultant.

The ESP service has helped to meet the national waiting times targets for orthopaedic outpatients by providing an additional 680 outpatient appointments per month. ESPs deal with approximately 98 per cent of back pain referrals, which allows consultants to focus on patients who are more likely to require surgery. Waiting times have reduced from around 87 weeks in May 2005 to around six to eight weeks to see an ESP, and 12 weeks to see a consultant in December 2009. The salary cost of this service is approximately £290,000 a year.

Treating patients in the community, NHS Greater Glasgow and Clyde

The Greater Glasgow Back Pain Service (GGBPS) started in September 2002 and is a community physiotherapy-led service available to all patients with lower back pain. The service consists of 13 clinical physiotherapy specialists who lead the management of lower back pain in the Greater Glasgow area of NHS Greater Glasgow and Clyde. The team also has direct access to dedicated clinical psychologists for patients with acute lower back pain at risk of developing chronic pain. The salary cost of this service is around £450,000 a year.

Patients are referred to the service by a GP, or they can self-refer, and around 700 new patients are seen each month. Some require the help of experts in pain management while others benefit from continuing exercise.

The service has reduced the number of back pain referrals to the orthopaedic service – only one per cent of back pain patients are referred for imaging or surgical opinion. The GGBPS has reduced the average waiting time for orthopaedic referral in one area from 42 to ten weeks, and 93 per cent of patients with acute back pain are seen by the service within two weeks.

Dedicated upper limb service, NHS Fife

To reduce the 84-week wait for the orthopaedic service in 2001, NHS Fife set up a dedicated upper limb team. This team is made up of the following healthcare professionals:

- one consultant orthopaedic surgeon
- one staff grade doctor/surgeon
- two upper limb specialist nurses
- ESPs in physiotherapy.

All upper limb work is directed through this specialist team. In 2007/08, the team dealt with around 5,700 outpatient appointments, 880 day cases and 200 inpatients.

Waiting times for access to the dedicated upper limb team is currently 12 weeks and are expected to reduce to nine weeks from March 2010. The cost of this service is approximately £400,000 a year.

24. Historically, orthopaedics has been one of the hospital specialties with the highest number of patients waiting for treatment. In September 2004, almost 14,000 patients were waiting for an orthopaedic outpatient appointment compared to 7,500 for ear, nose and throat surgery and 4,400 for plastic surgery.¹⁷

25. NHS boards have worked hard to achieve reductions in the time that orthopaedic patients wait to access services. In 2003, 66 per cent of inpatients and day cases and 83 per cent of outpatients were seen within 26 weeks of referral. By 2008, this had increased to 95 per cent of inpatients and day cases and 99 per cent of outpatients seen within 26 weeks of referral. In March 2009, all NHS boards were meeting the current waiting times target.^{18,19} Although NHS boards are reporting against the 15-week standard for each stage, they have been working to 12-week targets in preparation for the waiting times target reducing in March 2010.²⁰

Reducing the rate of return outpatient appointments will improve efficiency

26. In 2008/09, there were 536,000 outpatient appointments of which a third (190,600) were new outpatients. Outpatient figures from NHS board activity returns are approximately 33,000 less than outpatient figures included in the Costs Book, which ISD Scotland reports is likely to be due to coding discrepancies. Not all patients referred to orthopaedic services require surgery. Many are referred to another service or back to community services for management of their condition. We asked all NHS boards for the percentage of new patients who go on to have surgery and only three were unable to supply this information. The percentage of

new patients referred to orthopaedic services who then go on to have surgery varies from ten per cent in NHS Western Isles and 22 per cent in NHS Borders to 41 per cent in NHS Dumfries and Galloway (Exhibit 4).

27. The Scottish Government has set a national target for NHS boards to make efficiencies in outpatient appointments by reducing the number of return patients for every new appointment.²¹ Across Scotland, there

were 1.8 returning patients per new outpatient appointment in 2008/09 compared to 2.0 returning patients per new outpatient appointment in 1998/99. The current rate of 1.8 returning patients per new outpatient is the same as in England, but Wales has a higher rate of 2.2.^{22,23} In Scotland, the rate of return to new patients varies from 1.2 in NHS Borders to 2.4 in NHS Grampian (Exhibit 4). It might be expected that NHS boards with a lower rate

Exhibit 4

Percentage of orthopaedic outpatients who go on to receive surgery and rate of review to new orthopaedic outpatient appointment by NHS board, 2008/09

The percentage of patients who go on to have surgery and the rate of review patients per new outpatient varies by NHS board.

	Percentage of new outpatients receiving surgery (%)	Number of review patients for every new patient
NHS Scotland	–	1.8
Ayrshire and Arran	33	1.9
Borders	22	1.2
Dumfries and Galloway	41	1.6
Fife	Not able to provide	1.6
Forth Valley	Not able to provide	1.3
Grampian	32	2.4
Greater Glasgow and Clyde	Not able to provide	2.0
Highland	37	1.8
Lanarkshire	27	1.7
Lothian	32	1.7
Tayside	29	1.6
Western Isles	10	2.1

Note: Due to a number of NHS boards not being able to provide the percentage of new outpatients receiving surgery, it is not possible to calculate a Scotland average. NHS Orkney and Shetland are excluded from the table as they do not have a dedicated orthopaedic service.

Source: Audit Scotland, 2009 and *Outpatient and A&E Summary (derived from SMR00 returns)*, National Statistics Release, ISD Scotland, 2009

¹⁷ *Tackling waiting times in the NHS in Scotland*, Audit Scotland, February 2006.

¹⁸ From March 2009, patients should wait no longer than 15 weeks from GP referral to outpatient appointment and no longer than 15 weeks from an outpatient appointment to inpatient or day case treatment. From March 2010, these targets reduce to patients waiting no longer than 12 weeks for each stage.

¹⁹ This excludes eight patients in NHS Lothian who were waiting longer than 15 weeks from an outpatient appointment to treatment.

²⁰ When a delivery date for a target has been reached that target becomes a standard.

²¹ The overall national target is for NHS boards to deliver agreed improved efficiencies for first outpatient did not attend (DNA) rates, emergency inpatient average length of stay, review to new outpatient attendance ratio and day case rate by March 2011.

²² Analysis carried out on *Hospital Episode Statistics*, NHS Information Centre for Health and Social Care, 2009.

²³ *Consultant-led outpatient clinics by specialty*, StatsWales, 2009.

of return appointments to new outpatients would also have a higher percentage of patients going on to have surgery as they have a higher percentage of new referrals, but the data do not show this relationship.

28. NHS boards have more control over their planned activity and a high number of fracture clinics will have an impact on overall workload. We asked NHS boards to separate planned and fracture orthopaedic clinic activity. Nine NHS boards were able to provide a split, with the percentage of fracture clinic activity ranging from 11 per cent of all orthopaedic clinic activity in NHS Highland to 45 per cent in NHS Lanarkshire.²⁴ NHS boards with a higher level of emergency work will find it more difficult to plan their orthopaedic services and there may be more disruption to their planned work.

29. The percentage of people who did not attend (DNA) new orthopaedic outpatient appointments reduced slightly from 9.8 per cent in 1998/99 to 9.0 per cent in 2008/09 across Scotland. But 2008/09 showed a rise in DNA rates in five out of 14 NHS boards compared to the previous year. The current DNA rate is lower in England and Wales at 7.7 and 8.1 per cent respectively.^{25, 26} In 2008/09, DNA rates varied from 5.0 per cent in NHS Dumfries and Galloway to 12.5 per cent in NHS Lanarkshire (**Exhibit 5**). Reducing DNA rates along with reducing the rate of return appointments will improve efficiency in outpatient clinics. Audit Scotland's 2010 report on the management of new waiting list arrangements reviewed how NHS boards contact patients to make an appointment, but there did not appear to be any link between DNA rates and whether boards offer appointments to patients by letter or by phone.²⁷

Developing staff roles and community-based services can contribute to better use of consultants' time

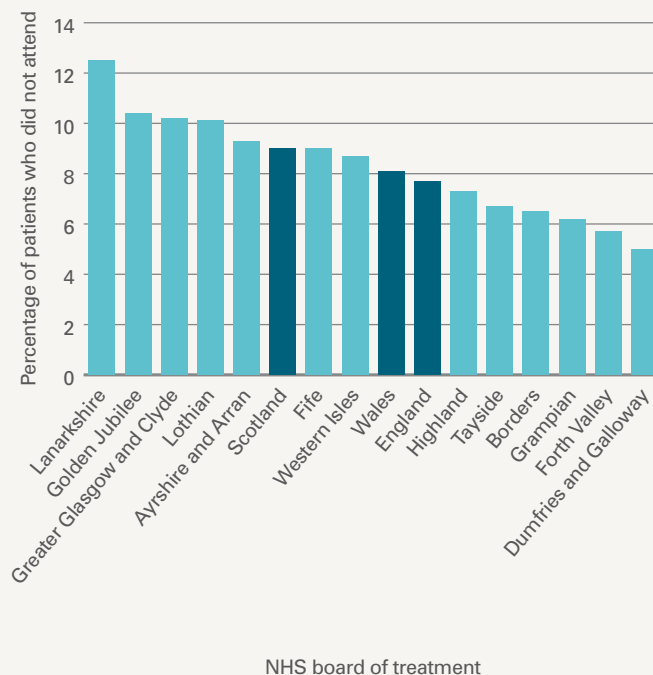
30. Changing staff roles have helped to reduce the length of time patients wait for orthopaedic services (**Case study 1, page 11**). In some areas, extended scope practitioners (ESPs) such as clinical nurse specialists, physiotherapists, podiatrists and GPs with a specialist interest are seeing orthopaedic patients in clinics in hospitals and the community. A range of models exist across Scotland,

and NHS Education Scotland is currently reviewing training and accountability arrangements for allied health professionals (AHPs) to ensure consistency in the care provided.²⁸ The SGHD is working with NHS boards to increase orthopaedic services delivered in the community and develop an agreed referral protocol for patients with musculoskeletal problems. This aims to help reduce the number of patients referred to hospital who are unlikely to require surgery and make better use of consultant time.

Exhibit 5

Percentage of orthopaedic patients who did not attend new outpatient appointments, 2008/09

The percentage of patients who did not attend new outpatient appointments is generally higher in Scotland than in England and Wales.



Source: *Outpatient and A&E Summary (derived from SMR00 returns)*, National Statistics Release, ISD Scotland, 2009

24 NHS Forth Valley, Greater Glasgow and Clyde and Lothian were not able to provide figures and Orkney and Shetland do not have a dedicated orthopaedic service.

25 Analysis carried out on *Hospital Episode Statistics*, NHS Information Centre for Health and Social Care, 2009. Note this is for all outpatient appointments, not just new appointments.

26 *Consultant-led outpatient clinics by specialty*, StatsWales, 2009.

27 *Managing NHS waiting lists – A review of new arrangements*, Audit Scotland, March 2010.

28 Allied health professionals are health professionals other than nurses and doctors including physiotherapists, podiatrists and occupational therapists.

The Golden Jubilee National Hospital provides additional capacity for NHS boards

31. The Golden Jubilee provides extra capacity to NHS boards to help to reduce waiting times. Its use varies by NHS board and there is scope to improve the management of referrals from NHS boards.

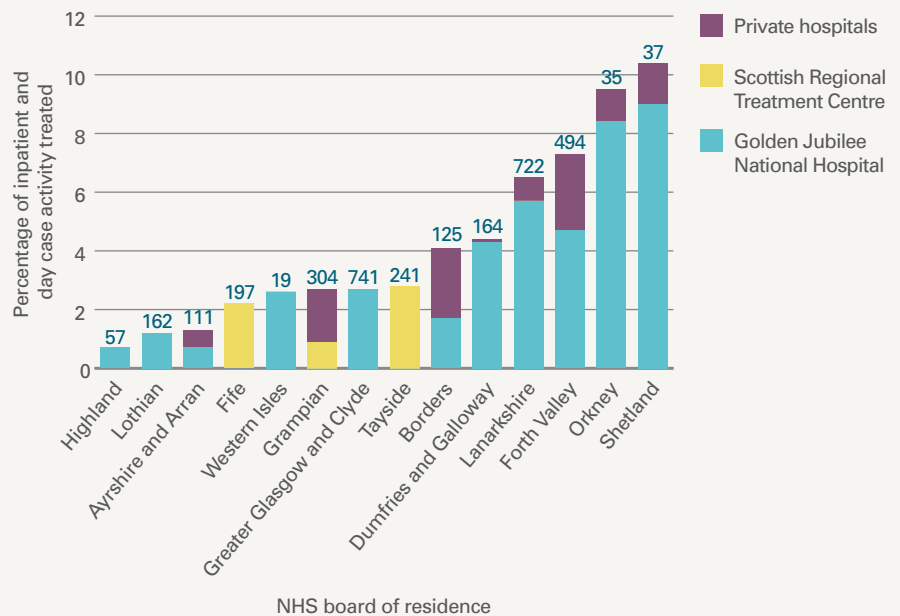
32. In relation to orthopaedics, the Golden Jubilee carries out mainly hip and knee operations and all NHS boards can send their patients for treatment. At the start of the financial year, each NHS board agrees with the Golden Jubilee how many procedures it will carry out for their patients. The SGHD funds the running costs of the Golden Jubilee and NHS boards pay only marginal costs for the patients they refer. This potentially provides a cost-effective option for NHS boards compared to paying staff overtime for additional activity in the evenings or weekends or sending patients to private hospitals, although we have not reviewed the value for money of this arrangement for the NHS as a whole. The Golden Jubilee is also able to offer some NHS boards the use of spare theatre sessions.

33. In 2007/08, the Golden Jubilee carried out 2,268 episodes.²⁹ Most of the Golden Jubilee's orthopaedic patients are referred from NHS Greater Glasgow and Clyde, Lanarkshire, Forth Valley, Dumfries and Galloway and Lothian. However, the highest percentage of patients were referred to the Golden Jubilee by NHS Grampian on behalf of NHS Orkney and Shetland (8.4 and 9.0 per cent respectively) ([Exhibit 6](#)). In 2009, the Golden Jubilee began piloting a service with NHS Dumfries and Galloway which now refers around 20 per cent of all new outpatients (1,000 patients) to the Golden Jubilee instead of only those already on the inpatient waiting list

Exhibit 6

Percentage of activity carried out at the Golden Jubilee National Hospital, Scottish Regional Treatment Centre and private hospitals by NHS board of residence, 2007/08

The amount of activity NHS boards send to the Golden Jubilee and the private sector varies.



Note: Numbers for the Golden Jubilee and the private sector by NHS board of residence are provided above the percentage bars (these numbers relate to stays in hospital which may consist of a number of episodes of care).

Source: Audit Scotland analysis of ISD Scotland SMR01 data extracts, ISD Scotland, 2009

for major joint surgery. This approach was taken to address long waiting times for outpatients in NHS Dumfries and Galloway. Instead of attending an outpatient appointment locally and then attending a second appointment at the Golden Jubilee, patients are referred directly to the Golden Jubilee, which reduces duplication of outpatient appointments and allows faster access to treatment.

34. The Golden Jubilee has reported that some NHS boards underestimate the number of patients they need to refer to meet waiting times targets. This results in additional referrals at

the end of the financial year which can be difficult to manage. In 2006, an Audit Scotland report on waiting times found that NHS boards did not always take up their agreed activity allocations at the Golden Jubilee and some consultants were unwilling to refer patients to the Golden Jubilee.³⁰ At that time we recommended that NHS boards and the Golden Jubilee needed to work together to improve the management of referrals. Our work suggests that there is still scope for better planning in how NHS boards agree referrals with the Golden Jubilee.

²⁹ A hospital inpatient stay or day case can consist of a number of episodes of care. An episode may end as a result of a change of specialty, a change of consultant for medical reasons, a change in location or the end of treatment.

³⁰ *Tackling waiting times in the NHS in Scotland*, Audit Scotland, February 2006.

The private sector provides some services for orthopaedic patients

35. In December 2006, a private company (Netcare) was contracted to provide additional orthopaedic services to NHS Fife, Grampian and Tayside at the Scottish Regional Treatment Centre (SRTC) in Tayside. Up to October 2009, the SRTC had carried out a total of 1,087 major procedures and 1,451 minor procedures for orthopaedic patients in NHS Fife, Grampian and Tayside. In January 2010, the contract with Netcare ended and NHS Tayside now manages this facility ([Exhibit 7, overleaf](#)). PricewaterhouseCoopers carried out a review of the implementation of the SRTC contract in 2008 and is due to report on the management of the contract shortly.³¹

36. Use of the private sector for the treatment of orthopaedic patients is minimal, but at a national level it is not known how many patients NHS boards refer to the private sector for treatment. From the information available (which is likely to be an underestimate) the percentage of all inpatient and day case episodes carried out in private hospitals (excluding SRTC use) ranges from zero in six NHS boards to around 2.5 per cent in NHS Borders and Forth Valley ([Exhibit 6](#)). NHS boards need to have a better understanding of spend on private work to identify if there are any potential savings to be made.

NHS boards will find it challenging to sustain improvements in waiting times

37. Continuing to meet waiting times targets will be challenging for NHS boards due to current financial pressures and the reduction in the waiting times target to 18 weeks from referral to treatment

by December 2011. The SGHD's Improvement Support Team (IST) is working with NHS boards to help them improve the delivery, quality and efficiency of their orthopaedic services. This includes developing agreed referral protocols for high volume orthopaedic procedures, improving data quality and developing benchmarking information. The IST also has an 18-week referral to treatment programme to support the new national waiting times target.

38. Audit Scotland's recent review of the management of the new waiting list arrangements looked at three specialties (orthopaedics outpatients, inpatients and day cases; dermatology outpatients; and oral surgery inpatients). The review highlighted that, in 2008, 12 per cent of orthopaedic inpatients (6,963) and six per cent of orthopaedic outpatients (11,537) were coded as 'treatment is no longer required' and were therefore removed from waiting lists ([Exhibit 8, page 17](#)).³² We recommended that NHS boards should review the reasons why patients are being removed from waiting lists due to treatment no longer required and ensure that patients are managed appropriately in line with new waiting times guidance.

39. NHS boards and ISD Scotland reported that some patients are recorded as no longer requiring treatment due to coding problems. For example, if a patient was transferred to the Golden Jubilee, this appeared as 'treatment no longer required' in ISD data returns. This problem has now been resolved. The review also found similar coding issues within NHS boards and inconsistencies in the definitions used and in the patients who are included in this category.³³

40. Although there have been improvements in reducing waiting times for orthopaedic services, it will be challenging for NHS boards to continue to meet the targets as target times continue to shorten, the number of older people rises and waiting times funding reduces ([see Part 3](#)). NHS boards need to look at more efficient ways of working and make more use of community-based services and ESPs where appropriate.

Waiting time targets in Scotland are different to those in England and Wales

41. Waiting times targets for referral and treatment are also in place in the rest of the UK. The waiting times target in Scotland will reduce in line with the target in England that no patient should wait longer than 18 weeks from referral to treatment by December 2011, but the information recorded in Scotland is different:

- In England, from 2009 no patient should wait longer than 18 weeks from GP referral to treatment. In September 2009, of the orthopaedic patients who required treatment, 88.6 per cent were admitted to hospital for treatment within 18 weeks and 96.4 per cent of patients who did not require inpatient or day case treatment were treated within 18 weeks.³⁴
- In Wales, by the end of 2009 no patient should wait longer than 26 weeks from GP referral to treatment. In September 2009, of the orthopaedic patients who required treatment, 83.5 per cent of orthopaedic patients were admitted to hospital for treatment within 26 weeks and 91.6 per cent of patients who did not require admission to hospital were treated within 26 weeks.³⁵

31 *Stracathro Regional Treatment Centre 10 month review*, PricewaterhouseCoopers, June 2008.

32 The code for 'treatment no longer required' is used for two main reasons: changes in the patient's circumstances (for example, when a patient gets better, decides not to go ahead with the treatment, chooses to be treated privately or moves away); and when the patient is referred to a different service such as physiotherapy.

33 Audit Scotland analysis of ISD Scotland *New Ways data warehouse*, 2008.

34 *NHS Referral to treatment (RTT) times data*, Government Statistical Service, 2009.

35 *Referral to treatment times by month*, StatsWales, 2009.

Exhibit 7

Scottish Regional Treatment Centre (SRTC)

Background

The SRTC was set up in November 2006 to help reduce waiting times in three NHS boards – Fife, Grampian and Tayside. NHS Tayside contracted Netcare UK, an independent healthcare company, to provide planned procedures at the SRTC for a range of specialties including orthopaedics, general surgery and plastic surgery. The SRTC was based at an NHS hospital (Stracathro) in Tayside. The shared operating theatre was used by the NHS during weekdays and by Netcare at evenings and weekends.

Contract and payments

Netcare was contracted to see and treat up to 8,000 patients across a number of specialties over a three-year period at a cost of £6.24 million per year.¹ Around 70 per cent of the value of the contract was for orthopaedic activity. At the beginning of the contract a period of time was allowed for setting up the centre before Netcare would accept referrals for major orthopaedic procedures, however, this took longer than expected and a contract variation was agreed.

The contract specified that NHS boards had to refer at least 90 per cent of the agreed value of planned major procedures and 95 per cent of planned minor procedures to SRTC.

NHS Tayside made monthly payments to Netcare based on 100 per cent of the referral contract value in anticipation that NHS boards would refer 100 per cent of the contract value. Every quarter a reconciliation of actual referral values and treatments was carried out and NHS Tayside received a debit from Netcare if referral values exceeded 100 per cent of the contract value and a credit if it fell below this.

Payments for the last two months of the contract are still to be finalised. NHS Tayside has paid £10.4 million to Netcare for orthopaedic activity carried out up to October 2009 and expects to pay a further £0.8 million for the remainder of the contract to bring the total to £11.2 million. This is £0.9 million less than the value of the agreed contract for orthopaedic activity (£12.1 million) but NHS Tayside has not been charged for this shortfall.

Pricing and cost service detail from SRTC contract for December 2006 to December 2009

Orthopaedic activity	Original contract		Amended contract	
	Total activity	Total value (£ million)	Total activity	Total value (£ million)
Joint replacement (includes hip and knee procedures and outpatient appointments)	1,626	11.00	1,478	10.00
Minor orthopaedic work (such as foot procedures, arthroscopies and outpatient appointments)	1,107	1.70	1,107	1.70
Outpatients	2,829	0.40	2,681	0.40
Total value		13.10		12.10

Referrals

Patients were screened by their NHS board and only appropriate (ie, low-risk) patients were sent to the SRTC for treatment. However, not all patients sent to the SRTC were appropriate, which resulted in a number of patients being referred back to their NHS board.

Future plans

In January 2010, the contract with Netcare ended and the SRTC is now managed by NHS Tayside with £5 million funding provided annually by the Scottish Government. Activity will continue to be provided for NHS Fife, Grampian and Tayside for a number of specialties. NHS Grampian and Tayside will continue to refer orthopaedic patients to SRTC. NHS Fife has increased its orthopaedic capacity over the last few years and is now in a position to treat all orthopaedic patients locally.

Note: 1. *Scottish Regional Treatment Centre-Stracathro, Contract documents*, Brodies LLP, 2006.

- Unlike in Scotland, the number of people who were on a waiting list but did not go on to receive treatment (treatment no longer required, patient declined treatment or patient died) is included in England and Wales data.

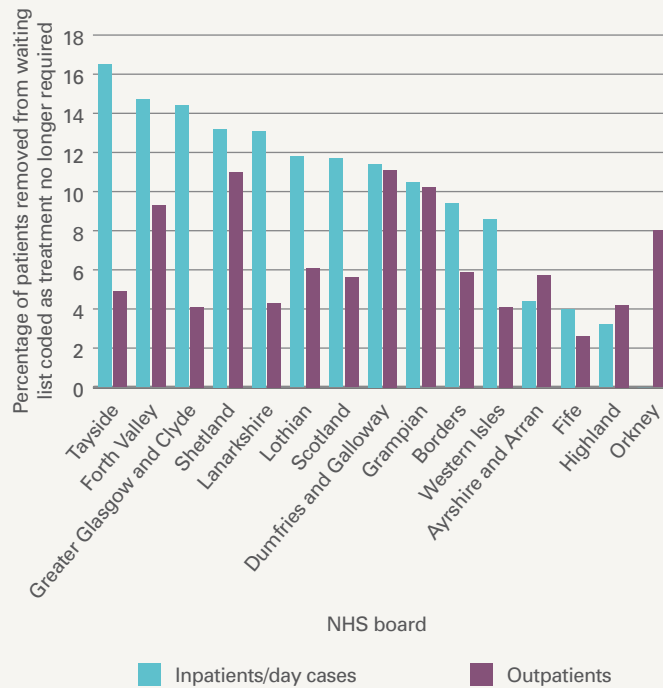
Recommendations

NHS boards should:

- find more efficient ways of providing orthopaedic services to help reduce waiting times, including reducing DNA rates and the rate of return appointments in outpatient clinics and making better use of community-based services
- work with the Golden Jubilee to better manage the referral of patients to this service
- ensure private activity and spend are recorded accurately and review this to establish whether care could be delivered more efficiently
- review the reasons why patients are coded as removed from the waiting list because treatment is no longer required and ensure that patients are managed appropriately and in line with new waiting times guidance.

Exhibit 8

Patients removed from orthopaedic waiting lists by NHS board, 2008
Hospitals are removing high numbers from waiting lists due to treatment coded as no longer being required.



Source: Audit Scotland analysis of ISD Scotland New Ways data warehouse, 2008

Part 3. Value for money



Activity and costs vary significantly across Scotland and there is scope to make efficiency savings. It is not possible to determine levels of productivity in orthopaedic services.

Key messages

- In 2008/09, £373 million was spent on orthopaedics, a 68 per cent increase in real terms over ten years. National information on how the NHS spends money on orthopaedic services is limited.
- The average amount spent on inpatient and day cases and the amount spent per orthopaedic procedure vary significantly across Scotland.
- Over the last ten years, orthopaedic activity and costs have increased but activity has not increased at the same rate as spend. Over the same period consultant activity has decreased and there is a lack of information on trends in quality indicators.
- It is not possible to draw clear conclusions about productivity in orthopaedic services due to limitations in the data. Productivity indicators suggest that NHS boards which manage their planned and emergency orthopaedic activity separately have higher consultant activity and a lower cost per case.
- NHS boards generally perform well against available quality measures but there does not seem to be a link between quality and levels of activity. There is also a lack of information on patient outcomes for orthopaedic surgery.

NHS boards are often unable to explain variation in the costs and performance of orthopaedic services

42. We have analysed information collected nationally on a range of efficiency measures for orthopaedic services. This information shows a high degree of variation across Scotland in cost, activity and where procedures are carried out, which often cannot be entirely explained by the resources available or the complexity of the procedures. NHS boards are often unable to explain reasons for variation in costs and performance.

43. Available information highlights areas where NHS boards can improve the efficiency of services, but cost and activity data and benchmarking information needs to improve. We have attempted to quantify where there is scope to make better use of resources, including improving the use of beds, staff and money.

44. We have compared performance in Scotland with England and Wales throughout the report where information is available, which is summarised in [Exhibit 9, overleaf](#).

NHS beds could be used more efficiently

45. There are 1,498 beds used by orthopaedic services across Scotland, which is just under six per cent of all hospital beds.³⁶ Across Scotland there is an average of 28 orthopaedic beds per 100,000 population, but the number of beds ranges from 21 beds per 100,000 population in NHS Lothian to 36 per 100,000 in NHS Grampian and 62 per 100,000 in Western Isles.^{37, 38}

46. Looking at throughput, the average number of patients treated per inpatient bed per year, helps to highlight how effectively NHS boards are using available beds. Throughput for orthopaedic beds has increased by 24 per cent over the last nine years, and in 2008/09 ranged from 23.8 patients per bed in NHS Western Isles and 40.3 patients in NHS Tayside to 61.8 patients in NHS Dumfries and Galloway and 62.0 patients in NHS Borders ([Exhibit 10, page 21](#)). This suggests that better use could be made of inpatient beds. There is scope to treat around 5,610 more inpatients if the NHS boards with lower throughput were able to increase this to the Scotland average of 51.5 patients per bed each year. To achieve this NHS boards will need to ensure adequate rehabilitation services are in place.

The NHS could save at least £8 million by further reducing length of stay and releasing bed days

47. Reducing the length of hospital stay for patients, without compromising the quality of care, is better for patients and helps NHS boards to make better use of available resources. Since 1999, although the number of orthopaedic inpatients has increased by 12 per cent, the number of orthopaedic beds has decreased by 12 per cent and the average length of stay has reduced from seven to six days. However, the length of time that patients stay in hospital following an orthopaedic procedure varies across Scotland. For overall orthopaedic activity, patients stay in hospital for an average of 5.2 days in NHS Greater Glasgow and Clyde compared to 7.7 days in NHS Forth Valley and 15.5 days in NHS Western Isles.

³⁶ This includes 40 beds at the Golden Jubilee and 32 paediatric beds at children's hospitals in Aberdeen, Edinburgh and Glasgow. NHS Shetland and Orkney do not have any dedicated orthopaedic beds.

³⁷ The bed provision per 100,000 population excludes the Golden Jubilee as it does not serve a specific local population.

³⁸ This does not take into account referral of patients into and out of each NHS board.

Exhibit 9

Comparison of orthopaedic performance indicators in Scotland, England and Wales

Performance across the UK is variable.

	Scotland	England	Wales
Waiting time target (as at March 2009)	15 weeks from GP referral to outpatient appointment and 15 weeks from an outpatient appointment to inpatient or day case treatment	18 weeks from referral to treatment	26 weeks from referral to treatment
Performance against waiting time target	All NHS boards achieving standard of 15 weeks for each stage and working to 12 weeks in preparation for target reducing in March 2010. (at March 2009)	88.6% (admitted patients) 96.4% (non-admitted patients) (at September 2009)	83.5% (admitted patients) 91.6% (non-admitted patients) (at September 2009)
Orthopaedic spend per head of population (2007/08) (£)	71	Not available separately	89
Outpatient DNA rates (2008/09) (%)	9.00	7.67	8.07
Outpatient review to new ratio (2008/09)	1.8	1.8	2.2
Population per orthopaedic consultant	25,561	30,539	26,000
Population per consultants and career grade	22,249	23,422	18,800

Source: Audit Scotland, 2010

48. The complexity of a procedure (case-mix) may affect overall length of stay. But the average length of stay for individual procedures also varies by NHS board, for example in 2007/08:

- the average length of stay for a knee replacement was 6.9 days, and ranged from 5.9 days at the Golden Jubilee and NHS Lothian to 10.0 days in NHS Western Isles and 10.1 days in NHS Dumfries and Galloway
- the average length of stay for a hip replacement was 7.1 days, and ranged from 6.2 days at the Golden Jubilee to 9.0 days in NHS Lanarkshire and 12.8 days in NHS Western Isles

- the average length of stay for a hip fracture was 35.9 days (this is the total length of stay including stay on an orthopaedics ward and transfer to rehabilitation), and ranged from 25.6 days in NHS Forth Valley to 46.6 days in NHS Lothian and 59.4 days in NHS Western Isles.^{39, 40}

49. The Golden Jubilee is using a particular approach for knee replacements, known as the Caledonian technique, which has been shown to reduce length of stay and could be rolled out across Scotland (Case study 2). The SGHD's Improvement and Support Team are supporting other NHS boards to redesign their services building on work on the Caledonian technique at

the Golden Jubilee. NHS Lothian is piloting this technique and other NHS boards are considering how it might be implemented in their area.

50. It might be expected that NHS boards with a shorter length of stay would be at risk of higher readmission and complication rates, but the available information does not show this to be the case. Length of stay is affected by the time spent in other specialties, including emergency departments and rehabilitation wards, and the availability of community health and social care services. NHS boards need to review the role of other services as well as orthopaedics in reducing overall length of stay. There is scope to save an additional 20,600 bed days if the NHS boards

39 Audit Scotland analysis of ISD Scotland SMR01 data extracts, ISD Scotland, 2009.

40 NHS Borders is excluded from the average length of stay figures as it had extreme outliers.

with a longer length of stay for knee replacement, hip replacement and hip fracture can reduce their average length of stay to the national average of 6.9, 7.1 and 35.9 days, with appropriate community health and social care services in place. This equates to a potential efficiency saving of just over £8 million a year.⁴¹

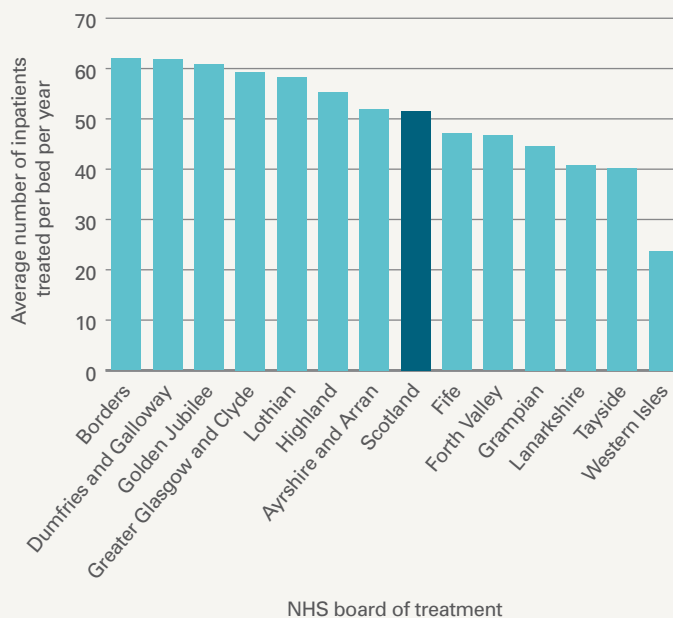
There is scope to increase same day surgery in some areas

51. There is a lack of information on patient outcomes for orthopaedic procedures other than those captured through the national clinical audits of joint replacement surgery. There are limited measures of patient outcomes once patients have been discharged from hospital. Further detailed analysis is required on other procedures, particularly in NHS boards where rates of surgical intervention differ significantly from the national average. This would provide information on the appropriateness of the surgical procedures being carried out and whether patients have benefited from receiving surgery. In England, the NHS is introducing Patient Reported Outcome Measures to help measure and improve the quality of care provided in some surgical specialties, including orthopaedic services. Patients are asked to complete a questionnaire about their health and quality of life before they have an operation, and about their health and the effectiveness of the operation afterwards.⁴²

52. Levels of inpatient activity (emergency and planned) vary among NHS boards. For mainland boards in 2007/08, activity ranged from 13.4 inpatients per 1,000 population in NHS Lanarkshire to 22.5 per 1,000 population in NHS Borders.⁴³ The number of emergency orthopaedic cases in a local area has an impact on how NHS boards manage their workload, and can also affect waiting times for planned admissions. In mainland boards in 2007/08, emergency inpatient activity ranged

Exhibit 10

Orthopaedic bed throughput by NHS board of treatment, 2008/09
Better use of available beds would help meet rising demand.



Note: NHS Orkney and Shetland do not have any dedicated orthopaedic beds.

Source: *Inpatient facilities by NHS board and specialty*, National Statistics Release, ISD Scotland, 2009

Case study 2 – Reducing length of hospital stay for knee replacements

The Golden Jubilee uses the Caledonian technique to help patients having knee replacement surgery to be mobile within hours of surgery. Following the joint replacement, a local anaesthetic is injected into the wound to provide pain relief for the patient over the 24 hours after surgery. As soon as the general anaesthetic has worn off the patient can move around, usually within a few hours after surgery, under the supervision of nurses and physiotherapists. Seventy per cent of patients are able to move around on the day of surgery. On average, patients are discharged on the fourth day after surgery, with only 29 per cent of patients requiring further outpatient physiotherapy. This technique also reduces post-operative complications such as swelling and lessens the need for physiotherapy after discharge.

Source: Audit Scotland, 2010

41 The average inpatient overnight cost for orthopaedics provided by ISD Scotland for 2008/09 is £394.

42 www.nhs.uk/NHSEngland/thenhs/records/proms/Pages/aboutproms.aspx

43 Based on inpatient discharges from *Hospital Operations/Procedures*, National Statistics Release, ISD Scotland, 2009.

from 7.0 per 1,000 of the population in NHS Fife to 14.5 in NHS Highland (Exhibit 11).⁴⁴

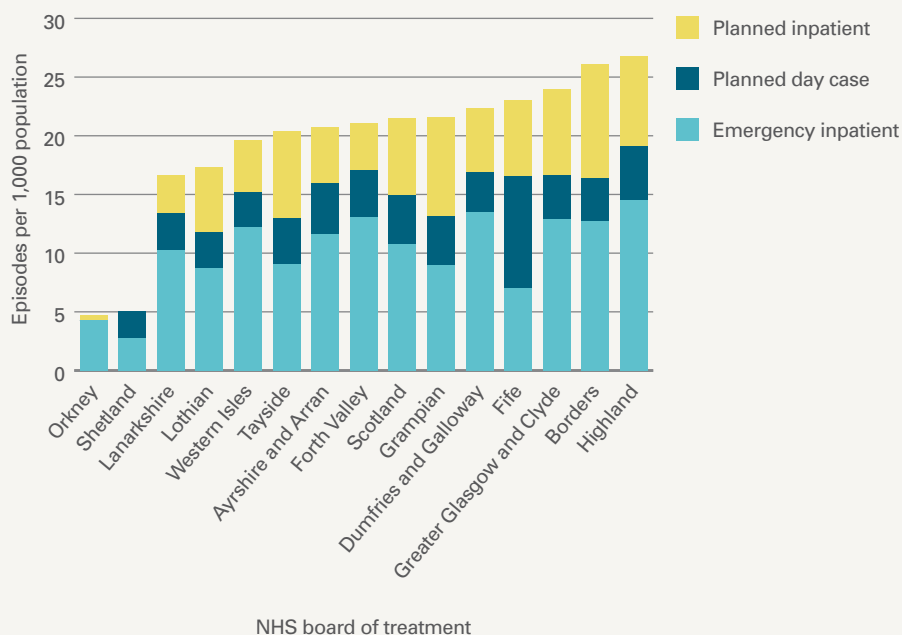
53. There is scope to make better use of resources in orthopaedic services through moving more inpatient care to same day surgery. Day surgery promotes more efficient use of resources, improved clinical outcomes and benefits for both patients and staff. Many orthopaedic procedures can now be carried out as same day care either as a day case or in an outpatient setting. This is better for patients as they spend a shorter time in hospital, and is also a more efficient use of resources. The British Association of Day Surgery has a directory of around 160 procedures (including 21 orthopaedic procedures) which are suitable for same day care.⁴⁵ Our 2008 report on day surgery highlighted that same day case rates were low for some procedures and recommended that NHS boards take action to increase this to the target levels.⁴⁶ For 2010/11, the Scottish Government has set a national target for NHS boards to deliver agreed improved efficiencies for same day surgery and pre-operative stay.

54. The percentage of total planned day cases carried out by NHS boards varies across Scotland. Day case activity ranges from 3.1 cases per 1,000 population in NHS Lothian and Lanarkshire to 9.6 cases in NHS Fife. NHS Fife has a dedicated day surgery unit and has focused on increasing the number of day cases, including carrying out a considerable percentage of its emergency activity as day cases.⁴⁷ This approach is an efficient use of resources as it frees up beds for planned patient care and can reduce the costs associated with overnight stays in hospital. However, day case activity rates are dependent on case-mix and NHS boards with a higher proportion of complex cases will not be able to achieve day case

Exhibit 11

Orthopaedic inpatient and day case activity per 1,000 population by NHS board of treatment, 2007/08

Levels of emergency and planned inpatient and day case activity vary across Scotland.



Note: These figures have been adjusted to remove scoliosis staff in NHS Lothian and to take account of the Argyll and Bute patients treated in NHS Greater Glasgow and Clyde and the north-east Fife patients treated in NHS Tayside. NHS Orkney and Shetland do not have dedicated orthopaedic services but some orthopaedic procedures are carried out within general surgery.

Source: *Mid-year population estimates*, General Register of Scotland (GROS); and Audit Scotland analysis of ISD Scotland SMR01 data extracts, ISD Scotland, 2009

rates as high as those with a less complex case-mix.

55. The percentage of overall orthopaedic procedures carried out as same day care for the most common procedures has increased over recent years, but levels vary across Scotland (Exhibit 12). For example, the SGHD recommends that 95 per cent of arthroscopies should be carried out as same day surgery. In 2008/09, there were around 7,200 arthroscopies of the knee and the percentage carried out by mainland boards as same day surgery ranged from 75 per cent in NHS Dumfries and Galloway to

92 per cent in NHS Forth Valley.

The percentage carried out in NHS Orkney and Shetland was 95 and 100 per cent but they have a low number of procedures.

56. Given the scope to move more procedures from inpatients to day cases there is the potential for efficiency savings to be made in inpatient costs by NHS boards. If the NHS boards with a lower percentage of same day surgery were able to achieve the same day surgery target for the six procedures set out in Exhibit 12, this would mean an additional 2,840 procedures could be

44 The Golden Jubilee does not have any emergency work and has 85 per cent planned inpatients and 15 per cent day cases.

45 *British Association of Day Surgery Directory of Procedures 3rd Edition*, British Association of Day Surgery, June 2009.

46 *Day surgery in Scotland: Reviewing progress*, Audit Scotland, September 2008.

47 This explains the low emergency inpatient activity and high day case activity in NHS Fife compared to other NHS boards.

Exhibit 12

Percentage of six common orthopaedic procedures carried out as same day surgery by NHS board of treatment, 2008/09

Targets for same day surgery are not being met for all procedures.

NHS board of treatment	Arthroscopy of the knee ¹ (%)	ACL reconstruction ² (%)	Bunion removal ³ (%)	Carpal tunnel release ⁴ (%)	Dupuytren's fasciectomy ⁵ (%)	Ganglion excision ⁶ (%)
Same day surgery target	95	25	85	99	95	95
Scotland	82	21	36	96	59	94
Ayrshire and Arran	82	4	33	99	54	99
Borders	82	n/a	45	99	54	100
Dumfries and Galloway	75	n/a	12	91	75	97
Fife	90	42	17	99	98	100
Forth Valley	92	50	66	94	84	97
Golden Jubilee	77	n/a	41	95	84	96
Grampian	78	2	21	97	40	92
Greater Glasgow and Clyde	78	33	39	94	58	92
Highland	78	n/a	19	95	14	92
Lanarkshire	86	5	53	98	84	95
Lothian	85	62	38	97	65	98
Orkney	95	n/a	100	100	100	100
Shetland	100	n/a	100	98	100	100
Tayside	76	10	24	92	45	90
Western Isles	86	n/a	0	95	71	92

Note:

1. Arthroscopy is a procedure where a small camera is inserted into a joint, such as the knee, to diagnose and treat joint disorders.
2. The ACL (anterior cruciate ligament) connects the bones at the front of the knee joint to provide stability and prevent excess movement. Some NHS boards do not carry out ACL reconstruction.
3. Bunions are a painful swelling of the bone at the base of the big toe which form when the big toe angles inwards towards the middle of the foot.
4. Carpal tunnel release is surgery to relieve pain and weakness in the hand caused by pressure on a nerve in the wrist.
5. Dupuytren's fasciectomy is a condition where scar-like tissue forms just beneath the skin of the fingers and the palm of the hand. Over time, the tissue can contract and force one or more fingers to curl up into the palm.
6. Ganglion excision is the removal of a small cyst that commonly appears around the wrist and fingers, and on the top of the foot around the ankle.

Source: BADS database, ISD Scotland, 2009

carried out on a same day basis rather than as an inpatient. This would result in an efficiency saving of at least £1.1 million.⁴⁸

Releasing resources

57. If same day care directly substitutes for inpatient surgery and inpatient beds are reduced, then cost savings will be achieved. However, in many cases these beds will be made available for other patients. If this happens, although cost savings are not achieved, resources are released that can be put to alternative use. For example, much of the surgical team's time will transfer from inpatient to day case treatment. In this situation total costs may stay the same or rise but more patients will have been treated in a less expensive way so the cost per case will fall. Both these scenarios are cost-effective; the reduction in the use of inpatient beds achieves a real cost reduction and the substitution of day case treatment for inpatient treatment makes the hospital more efficient.⁴⁹

58. NHS boards do not record outpatient procedures as thoroughly as inpatient and day case procedures. The percentage of orthopaedic procedures carried out in an outpatient setting which are recorded ranges from five per cent of all procedures coded in NHS Lothian to 23 per cent in NHS Ayrshire and Arran. This information is necessary to provide an accurate picture of efficiency to help improve orthopaedic services. Some of the inefficiencies shown in [Exhibit 11](#) could be due to NHS boards failing to accurately record outpatient procedures. Audit Scotland has previously recommended that the SGHD, NHS boards and ISD Scotland need to urgently improve the recording of outpatient procedures.⁵⁰

Theatre benchmarking information needs further development

59. Effective use of operating theatres is central to delivering efficient orthopaedic services. Some NHS boards have dedicated orthopaedic theatres whereas others share the use of operating theatres with other specialties, but they all have a finite capacity which needs to be carefully managed to make the best use of resources. A number of factors will affect how well theatre capacity is used, including the number of sessions allocated; the availability of theatre staff; whether sessions start and finish on time; the time in-between operations; and cancellations.

60. The Scottish Executive published a review of theatres in 2006 and a National Theatre Implementation Group (NTIG) has been set up to implement the recommendations in the report. The main findings were that:

- theatre services could potentially be used more efficiently by faster throughput of patients, resulting in shorter waiting times and reduced overtime costs
- performance information about theatre services differs across Scotland
- NHS boards do not describe theatre services consistently
- theatre services are generally not integrated within NHS boards' planning.⁵¹

61. NHS boards have started to collect benchmarking information on theatre utilisation for orthopaedic services but further work is required to improve information across Scotland. ISD Scotland is collating this information however, the quality

of data varies by NHS board, data are incomplete and different data definitions are in use, which makes benchmarking difficult. From available information on overall theatre use reported by ISD Scotland within the Costs Book, in 2007/08, theatres across Scotland were used around 60 per cent of the time (based on 41 hours per theatre per week) and just over 20 per cent of all theatre costs were orthopaedic theatre costs.

62. Following the review of theatres in 2006, NTIG has developed a national dataset and definitions for data submission by NHS boards. NTIG has overseen the implementation of an electronic theatre management system (Opera) to automatically collate national performance information which will replace the manual processes currently being used in many boards. The system is being piloted in NHS Greater Glasgow and Clyde and is planned to start rolling out to other boards from April 2010. Some NHS boards have developed frameworks for measuring performance against theatre utilisation and efficiency. NTIG is developing performance indicators to provide comparative information across Scotland. It is not clear when comparative theatre benchmarking information will be available for orthopaedic services across Scotland.

A better understanding of productivity is needed to deliver efficient services

63. NHS boards need a better understanding of how they use resources if they are to increase productivity without affecting the quality of services. This needs to be underpinned by a better understanding of activity, costs and quality. This is particularly important during a period of limited resources and the need for NHS boards to make efficiency savings is critical.⁵²

⁴⁸ This is a conservative estimate of savings based on saving one inpatient overnight stay per procedure, although in some cases the length of stay will be longer than this. The average inpatient overnight cost for orthopaedics provided by ISD Scotland for 2008/09 is £394.

⁴⁹ *Day surgery in Scotland: Reviewing progress*, Audit Scotland, September 2008.

⁵⁰ *Ibid.*

⁵¹ *National Theatres Project Final Report*, Scottish Executive, November 2006.

⁵² *Overview of the NHS in Scotland's performance 2008/09*, Audit Scotland, December 2009.

Based on available information, it is not possible to draw clear conclusions about productivity within orthopaedic services. Over the last ten years, orthopaedic hospital activity and spend have increased but activity has not increased at the same rate as spend. Over the same period, nationally reported consultant activity has decreased and there is a lack of information on trends in quality indicators. Community-based services are increasing but there is a lack of information available nationally on the level and type of services provided across Scotland.

64. The SGHD provides support to NHS boards through the NHS efficiency and productivity programme. This includes the national benchmarking programme (including NTIG and the development of clinical indicators to identify potential efficiency savings) and adopting lean management approaches to streamline services to make savings. The lean management approach was developed in the manufacturing sector and uses a variety of business tools to look at processes and identify where improvements can be made. A review of productivity and efficiency in the NHS in England found that productivity appears to be increasing, but primary care trusts are finding high demand for services challenging and there is limited progress in moving care out of hospitals into the community where it can sometimes be provided at a lower cost.⁵³

The reported number of consultants in orthopaedic services has increased by almost 50 per cent in ten years

65. Up to 2009, the British Orthopaedic Association (BOA) recommended that there should be one orthopaedic consultant per 25,000 population. However, in 2009 the BOA proposed new targets to reflect different ways of working and recommended there should be one consultant per 20,000 by 2015

and one consultant per 15,000 by 2020.⁵⁴ In 2008, national medical and dental workforce data were combined into a new database but the reliability of workforce data prior to 2008 is unclear. From nationally reported information, the number of orthopaedic medical staff in Scotland has increased by 45 per cent from 369.8 whole-time equivalent (WTE) in 1999 to 537.5 WTE in 2009. The reported number of consultants has also increased by 49 per cent (136 WTE in 1999 to 201.5 WTE in 2009).

66. Scotland has a higher ratio of orthopaedic consultants than England at one consultant per 25,561 population compared to one per 30,539. Other medical staff support consultants and can also carry out orthopaedic procedures, particularly career grade staff. The difference

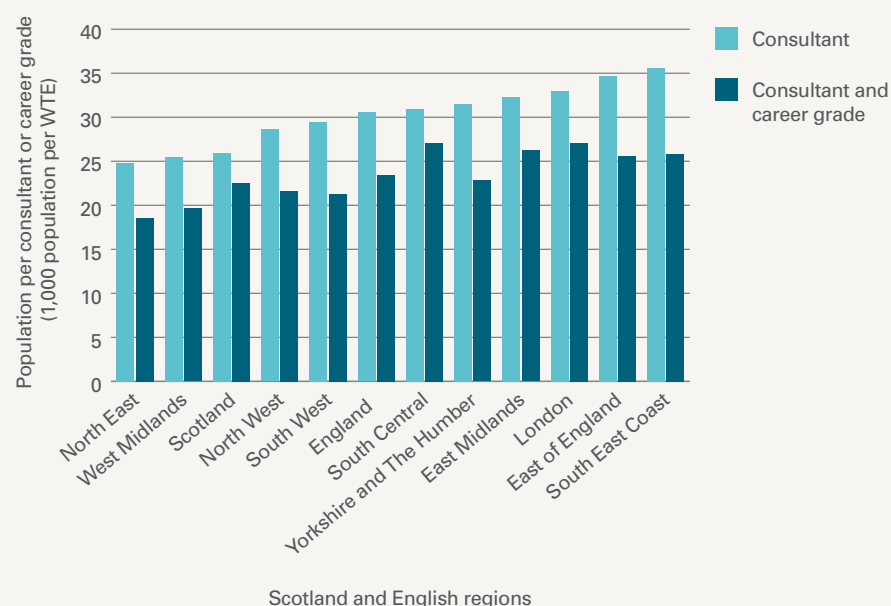
in ratio for consultant and career grades is smaller at one per 22,249 population compared to 23,422 in England. Compared to Strategic Health Authorities in England, which provide services to similar population sizes, Scotland has the third best consultant ratio per population but moves to fifth place when comparing consultant and career grade ratios (Exhibit 13). The European average is one consultant per 15,000 population, with only the Republic of Ireland and Romania significantly behind the UK figures.⁵⁵

67. There are around 202 WTE consultants and 336 WTE non-consultant grades in orthopaedic services in Scotland. The number of orthopaedic consultants varies from one consultant per 21,200 population in NHS Dumfries and

Exhibit 13

Population per orthopaedic consultant and career grades working in the UK, 2008

In Scotland there are fewer people per orthopaedic consultant and non-consultant medical staff than in most regions in England.



Source: *Medical and dental staff within each Strategic Health Authority by specialty and grade*, The Information Centre, Medical and Dental Workforce Census, 2008; *Medical and dental staff by specialty and grade*, National Statistics Release, ISD Scotland, 2009; *Mid-2008 Population Estimates: UK by countries and health authorities*, Office for National Statistics, 2009

⁵³ *More for less: are productivity and efficiency improving in the NHS?*, Audit Commission, November 2009.

⁵⁴ *British Orthopaedic Association Newsletter (BON)*, Issue 41, British Orthopaedic Association, Summer 2009.

⁵⁵ *Ibid.*

Galloway to one consultant per 32,900 population in NHS Fife (Exhibit 14). The number of consultants plus career grade staff varies from one per 16,100 population in NHS Borders to one per 29,100 population in NHS Lothian.⁵⁶

68. National data on the nursing workforce are not reported by specialty, therefore it is not possible to comment on the activity of this group of staff. However, there is information on clinical nurse specialists working in orthopaedic services. There are a total of 21 WTE clinical nurse specialists in Scotland – around half of these are in NHS Greater Glasgow and Clyde, which treats the largest percentage of non-resident patients.⁵⁷

It is not possible to determine levels of productivity in orthopaedic services

69. Improving productivity means achieving more outputs for the same resources, or the same outputs for less resources, with no detrimental effect on quality. We have not been able to make a clear judgement on levels of productivity in orthopaedic services due to:

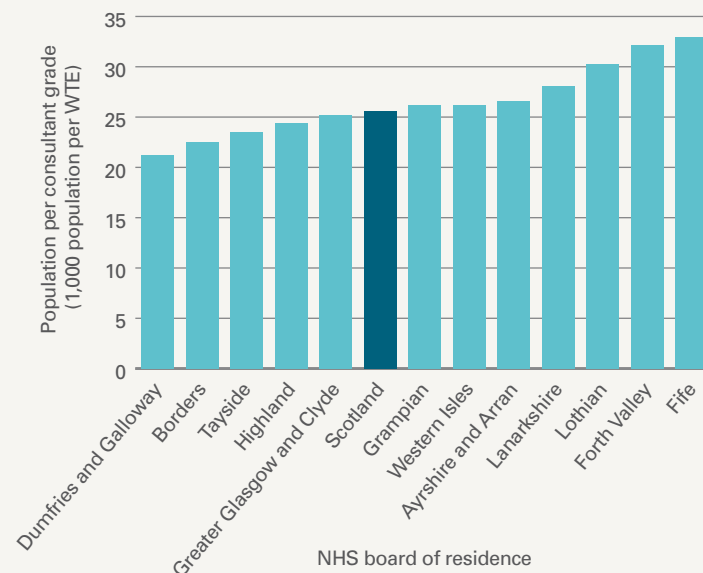
- widespread concerns about cost data
- inaccuracies in staffing data
- limited measures of quality
- the impact of other factors including the new consultant contract, the European Working Time Directive (EWTD) and Modernising Medical Careers (MMC).⁵⁸

70. Nevertheless, a key way of improving the productivity of services is the use of benchmarking information. We have used available data to help NHS boards look at how

Exhibit 14

Population per one WTE orthopaedic consultant by NHS board of residence, 2008

The number of consultants in orthopaedic services varies considerably across Scotland.



Note: These figures have been adjusted to remove scoliosis staff in NHS Lothian and to take account of the Argyll and Bute patients treated in NHS Greater Glasgow and Clyde and the north-east Fife patients treated in NHS Tayside.

Source: *Mid-year population estimates, General Register of Scotland (GROS); and Medical and dental staff by specialty and grade, National Statistics Release, ISD Scotland, 2009*

services are performing and highlight areas which require improvement. Orthopaedic consultant teams are carrying out fewer procedures per team than ten years ago, which reflects the overall picture for all consultant teams working in the NHS in Scotland. Between 1999 and 2008, nationally reported consultant numbers increased by 49 per cent from around 136 WTE to 202 WTE, whereas activity has increased by 12 per cent from 599,000 to 669,900 cases. However, from the information available, it is not possible to identify whether a procedure has been carried out by a consultant or a more junior doctor within the consultant team as all activity is recorded by the consultant.

71. We compared the number of orthopaedic inpatient and day cases carried out by doctors in each NHS board. Since 1999/2000, available information suggests that activity by consultant has fluctuated and has decreased overall, with a reduction between 2006/07 and 2007/08 (Exhibit 15). Overall activity by consultant and other medical staff shows the same pattern. However, during this time some NHS boards have shown an increase in activity (NHS Borders, Forth Valley and Tayside). In 2005, NHS Greater Glasgow doubled its activity at Glasgow Royal Infirmary by employing two additional consultants and changing how services are delivered (Case study 3).

⁵⁶ This is based on mid-2008 population figures; mid-2009 figures are not available until October 2010.

⁵⁷ *NHS Scotland Workforce Statistics, National Statistics Release, ISD Scotland, 2009.*

⁵⁸ *Consultant grade terms and conditions of service*, Scottish Executive, April 2005; *The European Working Time Directive – UK notification of derogation for doctors in training*, Department of Health, January 2009, www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_093940; *CEL 28 (2009) Reshaping the medical workforce guidance on projecting future medical requirements within clinical workforce 2009–2014*, Scottish Government, June 2009.

72. The work that different grades of doctors are allowed to do and the level of supervision they receive from consultants will influence activity levels. The *Scottish Audit of Surgical Mortality Report* shows that compared to other specialties, fewer orthopaedic consultants are present in theatre. This is partly due to higher numbers of trainee consultants who are able to carry out procedures, such as treating a fractured hip, without a consultant present.⁵⁹

73. In recent years, there have been a number of changes to the way doctors work and train which may affect activity, including the new consultant contract, the EWTD and MMC. Both the consultant contract and the EWTD have restricted the number of hours doctors are allowed to work in a week. MMC has changed junior doctor training, which means they are spending less time working on wards. The Scottish Government is encouraging consultants to do more front-line work and it is possible that consultants are carrying out more procedures while other doctors' activity decreases due to EWTD and MMC. However, improved information is required to gain a better understanding of orthopaedic activity.

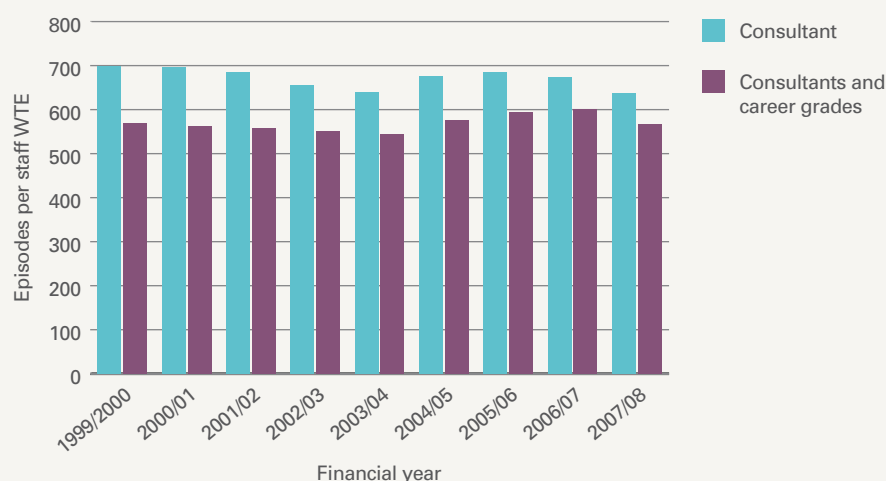
NHS boards which manage their emergency and planned activity separately have higher levels of activity and a lower cost per case

74. In 2007/08, the number of orthopaedic cases carried out by medical staff varied considerably by NHS board. For example:

- the number of inpatient and day cases per consultant ranged from 458 in NHS Dumfries and Galloway to 739 in NHS Forth Valley

Exhibit 15

Orthopaedic medical staff activity in Scotland, 1999/2000 to 2007/08
Activity has declined in recent years.



Source: Audit Scotland analysis of ISD Scotland SMR01 data extracts; and *Medical and dental staff by specialty and grade*, National Statistics Release, ISD Scotland, 2009

Case study 3 – Increasing activity in NHS Greater Glasgow

The Glasgow Royal Infirmary doubled its outpatient and surgical capacity in 14 months (from October 2004 to December 2005). ESPs, nurses and podiatrists now see the majority of new and return, planned and emergency outpatients this leaves consultants to deal with more complex cases. The number of patients booked per month in outpatients increased by over 100 per cent (from 350 to 850 a month).

This increased the number of patients added to the waiting list for surgery and additional surgical sessions were needed to manage the surgical waiting lists. The new outpatient system has allowed surgeons to replace an outpatient clinic with an elective theatre session each week. Together with flexible working practices and the addition of two consultants, this has doubled the surgical capacity.

The board calculates that these changes were achieved with approximately 50 per cent of the funds that would have been required to send the additional patients to the private sector.

Source: Audit Scotland, 2010

- the number of inpatient and day cases per consultant and career grade doctors ranged from 356 in NHS Dumfries and Galloway to 739 in NHS Forth Valley (Exhibit 16).⁶⁰

75. If the NHS boards with lower consultant activity (NHS Ayrshire and Arran, Dumfries and Galloway, Lothian, Tayside and Western Isles) were able to achieve the average activity for Scotland then this would mean an additional 3,700 cases could potentially be carried out per year.⁶¹ However, this does not allow for case-mix or specialist work being

carried out in particular NHS boards. The complexity of orthopaedic work compared to work carried out in other specialties varies by board. ISD has carried out work to compare complexity of different hospital specialties within boards. Orthopaedic activity in NHS Fife is five per cent less complex than their average activity across all specialties, whereas in NHS Lothian it is 57 per cent more complex.⁶² It might be expected that NHS boards with a higher percentage of complex cases would have lower activity, but data analysis does not consistently show this relationship.

76. Indicators suggest that NHS boards with higher levels of consultant activity have a lower cost per case (Exhibits 17 and 18, pages 29 and 30). NHS Dumfries and Galloway and Tayside have low levels of inpatient and day cases activity, and higher costs. NHS Fife, Forth Valley and Grampian keep their planned and emergency orthopaedic activity separate. These boards tend to have higher levels of activity and lower costs. NHS Lanarkshire also has higher inpatient and day case activity and lower costs. It redirects new outpatient referrals for patients who are unlikely to require surgery from consultants to other members of staff, such as physiotherapists (see Case Study 1 in Part 2, page 11). When reviewing activity levels, NHS boards should take into consideration activity carried out by the wider orthopaedic team, such as specialist nurses and physiotherapists, as redesigning services and changing roles will affect overall activity.

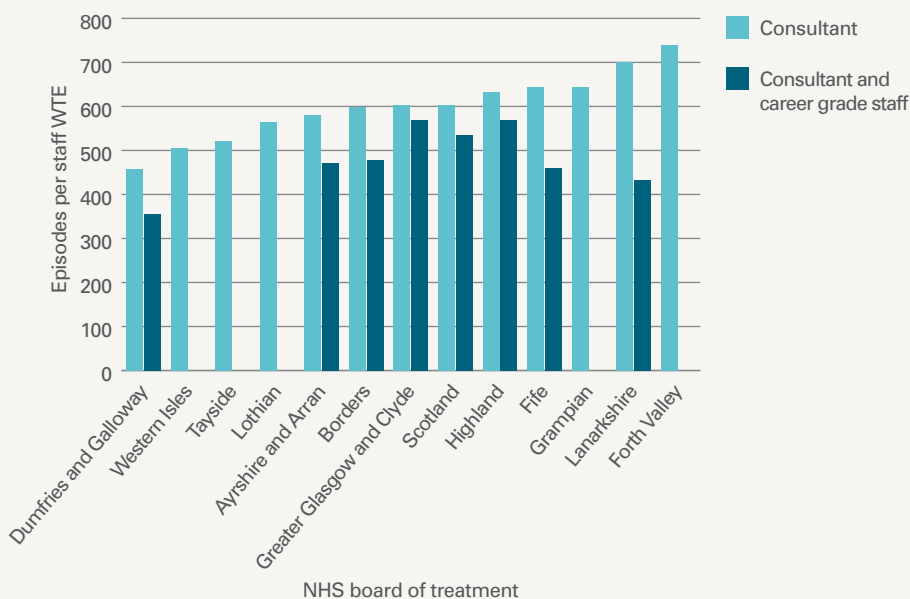
Orthopaedic spend has increased but activity has not increased at the same rate over the last ten years

77. Activity in hospital orthopaedic services has increased by 12 per cent over ten years and spend on orthopaedic services has increased by 68 per cent in real terms (Exhibit 19, page 31). However, spend has remained at around ten per cent of all hospital specialties and around four per cent of all NHS revenue expenditure. In 2008/09, a total of £373 million was spent on orthopaedic services across Scotland.⁶³ The majority is spent on inpatient care (79 per cent), followed by outpatient clinics (14 per cent) then day cases (seven per cent). These percentages vary in local NHS board areas. Access to community-based

Exhibit 16

Orthopaedic medical staff inpatient and day case activity by NHS board of treatment, 2007/08

Staff activity varies considerably across Scotland.



Note: Not all NHS boards have orthopaedic career grade staff. The activity calculation is based on all activity minus private activity, scoliosis carried out by the national service in NHS Lothian and HRG codes H27 and H28 (see Appendix 2 for further details). A large proportion of hand procedures in NHS Lothian and Tayside are carried out in other specialties.

Source: Audit Scotland analysis of ISD Scotland SMR01 data extracts; and *Medical and dental staff by specialty and grade, National Statistics Release, ISD Scotland, 2009*

60 Not all NHS boards have career grade doctors working within orthopaedic services.

61 This excludes the Golden Jubilee as it has a different case-mix than other NHS boards and its productivity depends on the referral patterns of the other boards.

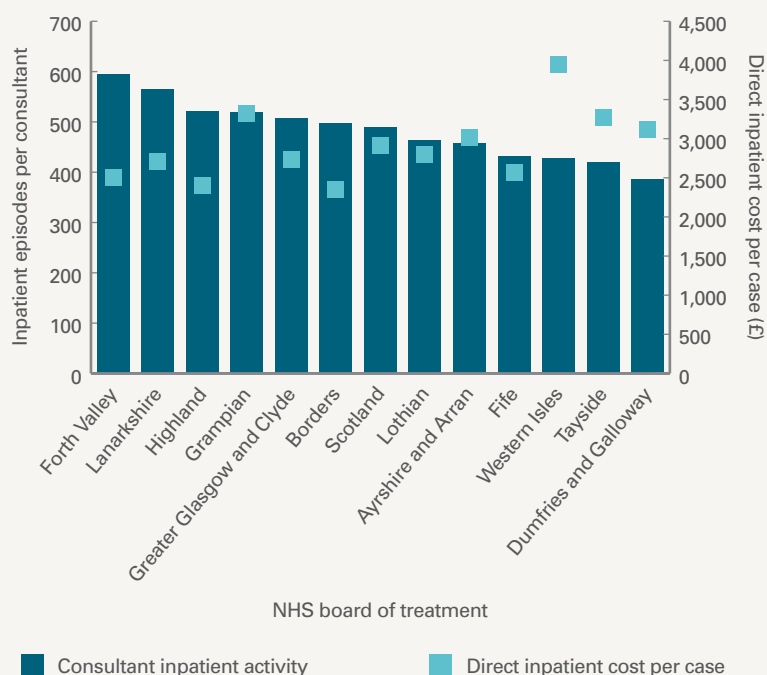
62 Analysis of Scottish tariff data, ISD Scotland, 2009. Complexity factors are calculated by costing all activity from all specialties in Scotland and calculating a national average cost per case. The complexity factors are the ratio of the cost of all activity within orthopaedic services at each NHS board to the national average cost for that activity.

63 This includes £32 million of centrally allocated funding provided to NHS boards for meeting waiting times targets.

Exhibit 17

Orthopaedic consultant inpatient activity compared with cost per case for inpatients by NHS board of treatment, 2007/08

Activity in orthopaedic services varies significantly across Scotland. NHS boards with higher consultant activity generally have lower costs per case for inpatients.



Note: NHS Orkney and Shetland are excluded as they do not have dedicated orthopaedic beds. The Golden Jubilee is not included as its costs are particularly high as the majority of its cases are expensive hip and knee joint replacements and revisions.

Source: Audit Scotland analysis of ISD Scotland SMR01 data extracts, *Scottish Health Services Costs SFR5.3 2008*; and *Medical and dental staff by specialty and grade, National Statistics Release, ISD Scotland, 2009*

services for orthopaedic patients has increased over recent years but activity and cost data are only available for hospital services.

78. The amount spent per head of population on orthopaedic services has increased from around £44 to £72 per head of population in real terms. In 2008/09, this varied by mainland NHS board in cash terms from around £49 per head in NHS Lanarkshire to £89 per head in

NHS Tayside ([Exhibit 20, page 32](#)). In 2007/08, spend per head of population on orthopaedic services in Scotland was £71 compared to £89 per head in Wales (comparable spend information is not available for orthopaedic services in England as it is included in the overall spend on musculoskeletal services).⁶⁴ As highlighted earlier in the report, the NHS in Wales is working to different waiting times targets to Scotland and there are lower did not attend

rates for new outpatients. However, the rate of returning outpatients per each new outpatient is higher than in Scotland. As well as improving benchmarking information across Scotland, the Scottish Government should benchmark services across the UK to compare efficiency.

At least £32 million was spent on reducing waiting times for orthopaedic services in 2008/09

79. Between 2005/06 and 2009/10, the Scottish Government allocated approximately £505 million to help reduce waiting times in all specialties.⁶⁵ It is not known how much of this has been spent on orthopaedics as boards allocated the funding based on local priorities and up to 2008/09 were not required to report on where it was spent. NHS boards have used waiting times money to carry out additional activity (within their own board and at the Golden Jubilee, SRTC and private hospitals) and redesign services.

80. In 2008/09, almost £32 million of centrally allocated funding was spent on addressing waiting times in orthopaedic services (25 per cent of all waiting times money). Two NHS boards did not spend any of this waiting times money directly on orthopaedics (NHS Orkney and Western Isles). However, the majority of boards spent the largest percentage of this funding on orthopaedic services. This varied from 11 per cent in NHS Lanarkshire to 66 per cent in NHS Dumfries and Galloway. Other categories with significant spend included theatres, diagnostics, emergency departments and anaesthetics. NHS boards also address waiting times through their own funding allocations.

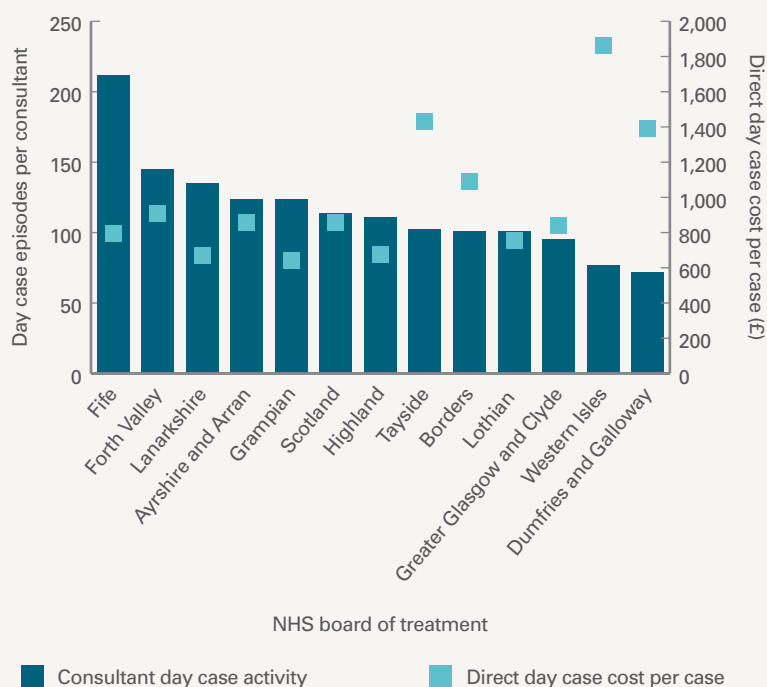
⁶⁴ *Mid-year population estimates*, StatsWales; Health Statistics and Analysis Unit, Welsh Assembly Government, 2009.

⁶⁵ *Scottish Budget Spending Review 2004*, Scottish Executive, 2004. This announced waiting times funding of £65 million per year over three years. *Scottish Budget Spending Review 2007*, Scottish Government, 2007. This announced a further £90 million funding per year over three years. The majority of the funding is allocated to NHS boards; however, funding has also been allocated to central initiatives, the Scottish Regional Treatment Centre, Golden Jubilee National Hospital and to special NHS boards.

Exhibit 18

Orthopaedic consultant day case activity compared with cost per case for day cases by NHS board of treatment, 2007/08

Activity in orthopaedic services varies significantly across Scotland. NHS boards with higher consultant activity generally have lower costs per case for day cases.



Note: NHS Orkney and Shetland are excluded as they do not have dedicated orthopaedic beds.

Source: Audit Scotland analysis of ISD Scotland SMR01 data extracts, *Scottish Health Services Costs SFR5.5 2008*; and *Medical and dental staff by specialty and grade, National Statistics Release, ISD Scotland, 2009*

81. Due to the financial pressures facing public services, the Scottish Government is reducing the total amount allocated to NHS boards to address waiting times from £151.3 million in 2009/10 to £102.8 million in 2010/11.⁶⁶ This reduction of £48.5 million includes £28.5 million, which will now be included in NHS boards' overall funding allocations. This will place additional pressures on NHS boards to meet waiting times targets.

The quality of cost information needs to improve

82. NHS boards submit information on how much they spend each year to the Scottish Government. This information is collated by ISD Scotland and is known as the Costs Book.⁶⁷ However, there are differences in the way that NHS boards record their costs locally and how costs are shown in the Costs Book. ISD Scotland provides guidance to NHS boards but it is not prescriptive and means that cost information is not provided on a consistent basis. The NHS efficiency and productivity programme is overseeing a review of the Costs Book and tariffs. A sub-

group was set up in September 2009 to review the guidance manual for the Costs Book with the aim of improving presentation of data within the Costs Book and consistency among NHS boards in how it is completed for 2009/10 cost data. Further work is planned on reviewing the overall quality of cost data for tariff and benchmarking information, but the timescales for this work are unclear.

83. Costs for orthopaedic services (and other specialties) contain direct costs and overhead costs. Direct costs are generally considered to be more accurate as they relate directly to the service, for example staff and theatre costs. Overhead costs include general costs such as hospital catering and laundry costs which are estimated for each specialty. We have used the direct cost element only when comparing orthopaedic costs among NHS boards.

84. The need for NHS boards in Scotland to understand cost information to plan and manage services efficiently is particularly important in the current financial climate. The Scottish Government currently produces average estimated costs for specific procedures, known as the Scottish National Tariff Project. Information on NHS costs is further developed in England. For example, in the NHS in England, tariffs are routinely used to underpin payments to hospitals based on the activity they undertake (Exhibit 21, page 33). Tariffs are produced in Scotland for a different purpose – charging for treatment carried out by one NHS board for patients who live in another NHS board area. The use of tariffs for this purpose is not currently mandatory.

Cost per inpatient and day case varies across Scotland

85. The average direct cost per case for orthopaedic inpatients for Scotland is £3,092. This varies in mainland boards from £2,520 in NHS Highland

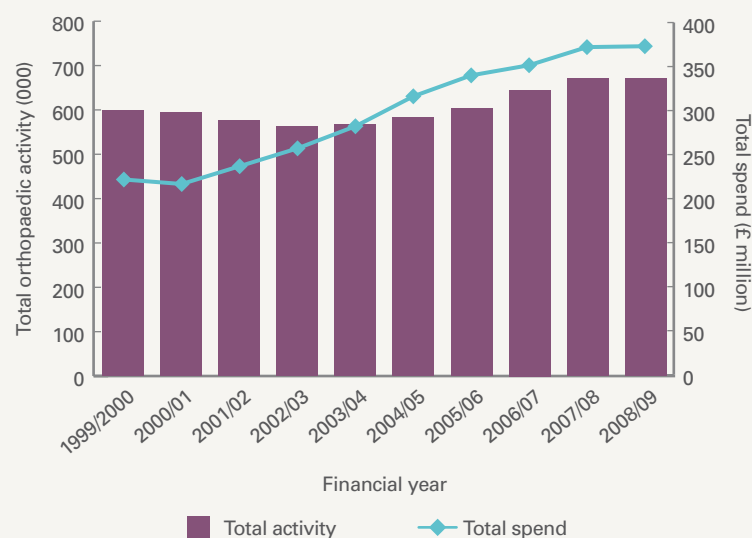
⁶⁶ *Scottish Budget: Draft Budget 2010-11*, Scottish Government, 2009.

⁶⁷ www.isdscotland.org/isd/797.html

Exhibit 19

Orthopaedic total hospital spend and activity, 1999/2000 to 2008/09

Orthopaedic activity has not increased at the same pace as total spend over the last ten years.



Notes:

1. Spend is in real terms and has been adjusted for inflation.
2. Activity is total activity for orthopaedic inpatients, day cases and outpatients. Activity for nurse-led outpatient clinics is only available from 2004/05; however, this information is still incomplete.
3. The spend on orthopaedic services includes inpatients, day cases and outpatients at consultant-led or nurse-led clinics. It does not include any spend on patients treated in intensive care, high dependency units and rehabilitation facilities or any treatment provided in the community.

Source: Costs Book (R04X); Hospital activity (SMR01) data and *NHS Scotland Workforce Statistics*, National Statistics Release, ISD Scotland, November 2009

to £3,457 in NHS Tayside and £5,631 at the Golden Jubilee (Exhibit 22, page 34). The average day case cost per case for Scotland is £835 and varies from £481 in NHS Highland to £1,331 in NHS Western Isles and £1,350 in NHS Tayside (Exhibit 23, page 34).

86. The main variation in costs among NHS boards is in theatre costs followed by nursing and medical staff costs. There is also considerable variation in hospital costs: inpatient direct cost per case ranges from £1,851 at Stracathro Hospital to £3,362 at Ninewells Hospital, both in NHS Tayside, and £4,188 at Western Isles General Hospital; and day case direct cost per case ranges from £440 at St John's Hospital in NHS Lothian to £1,416 at Perth Royal Infirmary in NHS Tayside. Some variation in hospital costs may be due to complexity, but this does not appear to fully explain the differences. For example, inpatient

and day case direct costs in NHS Fife are average where there is the least complex case-mix. There is no dedicated orthopaedic service in NHS Orkney or Shetland and, based on Western Isles' costs, providing a service in an island board is expensive compared to mainland boards.

The cost of orthopaedic procedures varies greatly across Scotland

87. The Scottish National Tariff Project was set up in November 2005 to create a list of prices for hospital procedures carried out by one NHS board for patients who live in another NHS board area. ISD Scotland is working on improving the tariffs and NHS boards are not currently required to use the tariffs for cross-boundary charging (Exhibit 21, page 33). However, the tariff information can be used to compare the cost of procedures among NHS boards. Costs are

calculated on the basis of healthcare resource groups (HRGs) which group procedures by complexity and cost. One overall cost is applied to each HRG. Some major procedures such as hip and knee replacements have an individual HRG cost allocated, but most other HRGs have a cost allocated for several procedures, such as hand procedures. The current tariff information is calculated using 2006/07 Costs Book and activity information using 2005/06 English average HRG costs to apportion costs across specialties and adjust for case-mix complexity.

88. The estimated cost per orthopaedic HRG varies significantly among boards. For example:

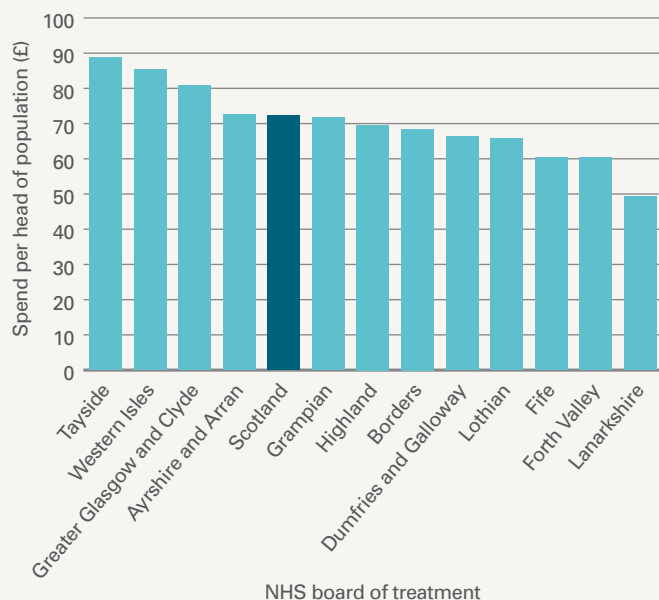
- the cost for a knee replacement operation ranges from £4,920 in NHS Fife to £8,000 in NHS Tayside and £9,817 in NHS Western Isles, and the cost of closed pelvis or lower limb fractures in over 70-year-olds ranges from £3,660 in NHS Borders to £5,592 in NHS Tayside and £6,602 in NHS Western Isles
- for the top five planned HRGs, NHS Fife has the lowest cost and NHS Western Isles has the highest cost, with NHS Tayside, Forth Valley, Ayrshire and Arran and Greater Glasgow and Clyde generally having high costs
- for the top five emergency HRGs, NHS Borders and Lothian had the lowest costs and NHS Tayside, Forth Valley and Western Isles have the highest costs (Exhibit 24, page 35).

89. Tariffs are calculated using direct and overhead costs which are more variable than direct costs. There are similar patterns across all procedures for low and high costs which suggest that some variation may be down to how overhead costs are allocated in each board. Also, the tariff costs take into account complexity of procedures and as expected the boards with a lower complexity factor tend to

Exhibit 20

Orthopaedic spend per head of population by NHS board of treatment, 2008/09

The amount spent per head of population varies by mainland board from £49 to £89.



Note: These figures have been adjusted to remove scoliosis staff in NHS Lothian and to take account of the Argyll and Bute patients treated in NHS Greater Glasgow and Clyde and the north-east Fife patients treated in NHS Tayside. NHS Orkney and Shetland do not have dedicated orthopaedic services although some activity is carried out locally in other specialties. Therefore, full cost information for orthopaedic activity is not reported in the Costs Book.

Source: *Mid-year population estimates*, General Register of Scotland (GROS); and *Scottish Health Services Costs R04X*, ISD Scotland, 2009

Standardising surgical implants used in orthopaedic procedures could save £2 million and help to improve outcomes for patients

91. NHS National Procurement was set up in November 2005 as part of the Scottish Executive's overall Public Procurement Reform Programme and is part of NHS National Services Scotland. A number of contracts are in place for commonly purchased and important goods and services within the NHS. There are three main contracts in place for the procurement of orthopaedic surgical implants and equipment: hip replacement, knee replacement and trauma.⁶⁸ NHS National Procurement negotiates standard prices and agreed discounts for all implants and equipment with various independent suppliers. NHS boards agree locally with each supplier the types and quantities of implants and equipment to be supplied.

92. The cost of surgical implants, such as an artificial hip, is significant for some orthopaedic procedures. The average cost of a hip implant in Scotland varies from £858 in NHS Lothian to £1,832 in NHS Forth Valley. The average cost of a knee implant varies from £1,166 at the Golden Jubilee to £1,950 in NHS Forth Valley and £2,060 in NHS Western Isles. The variation in cost is due to NHS boards using different suppliers and different types of hip and knee implants. NHS boards can reduce the cost of implants and standardise training by minimising the different types of implants that are used and purchasing implants that provide the best value for money based on cost and clinical effectiveness. This is also better in terms of service planning and efficiency. NHS National Procurement estimates that £2 million would be saved each year if NHS boards were able to standardise their purchasing of hip and knee implants.

have lower costs. Comparisons with English tariffs are not possible as different methodologies are used and a newer version of HRG cost analysis is in use in England. ISD Scotland is currently considering implementation of the newer version of HRG cost estimates for application of the Scottish National Tariff.

The amount NHS boards charge for treating non-resident patients is inconsistent and not always based on actual costs

90. Patients might be referred to a hospital in another NHS board for a number of reasons, for example specialist treatment is not provided at their local hospital. The percentage of patients treated outside their

NHS board of residence varies from four per cent in NHS Grampian and Lothian to 33 per cent in NHS Highland (due to all Argyll and Bute orthopaedic patients receiving treatment in NHS Greater Glasgow and Clyde). Each NHS board charges for treatment carried out on non-resident patients; however, in our fieldwork we found that the amount charged is inconsistent and not always based on actual costs. Some NHS boards are using historical service level agreements which do not reflect current practice. It is not compulsory for NHS boards to use Scottish tariffs, but some NHS boards are using tariffs to inform cross-boundary referral charging, for example NHS Grampian.

Exhibit 21

The development of tariffs in Scotland and England

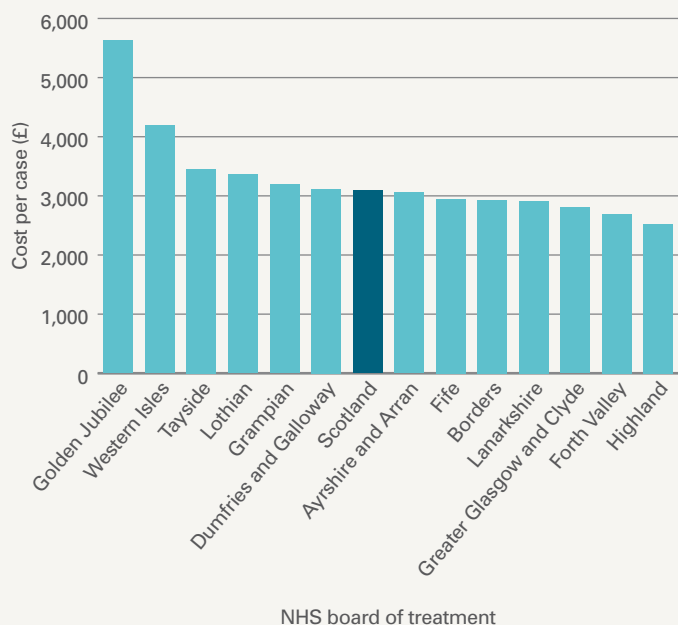
Tariffs are further developed in England.

	Scotland	England
The purpose of tariffs	Scottish tariffs have been developed to improve benchmarking and financial information, and create a set of standard pricing for service level agreements between NHS boards.	Tariffs underpin the payment system within the NHS in England. Payments in England are based on the work that NHS bodies carry out rather than an allocation formula. This system is known as Payment by Results.
	NHS boards are not required to use tariffs and there are no plans to make them mandatory. Tariffs have been developed for charging for cross-boundary activity between NHS boards.	Tariffs are mandatory in England and cover all activity, not just cross-boundary activity between NHS bodies.
	Scottish tariffs are based on 2006/07 Scottish Costs Book data, using 2005/06 English average cost weightings to apportion costs across specialties.	English tariffs are calculated based on English cost data.
Timeline		
2000	–	July – The NHS Plan is published, setting out the government’s intention to link the allocation of funds to hospitals to the activity they undertake. This system is known as Payment by Results. Tariffs are to be used to underpin the system.
2003	–	Tariffs introduced and tested in a sample of NHS bodies. Phased introduction of tariffs across the NHS in England over four years to 2007/08. 2006 – Independent review of the tariff setting process leading to an action plan for improvements.
2004	–	
2005	November – Scottish National Tariff Project set up to create a list of prices for hospital procedures carried out by NHS boards.	
2006	March – first set of Scottish National Tariffs published.	
2007	<i>Better health, better care</i> action plan published, which emphasises the need for further development of tariffs to help improve efficiency and effectiveness.	

Exhibit 22

Orthopaedic inpatient direct cost per case by NHS board of treatment, 2008/09

Inpatient direct costs range from £2,520 to £5,631.

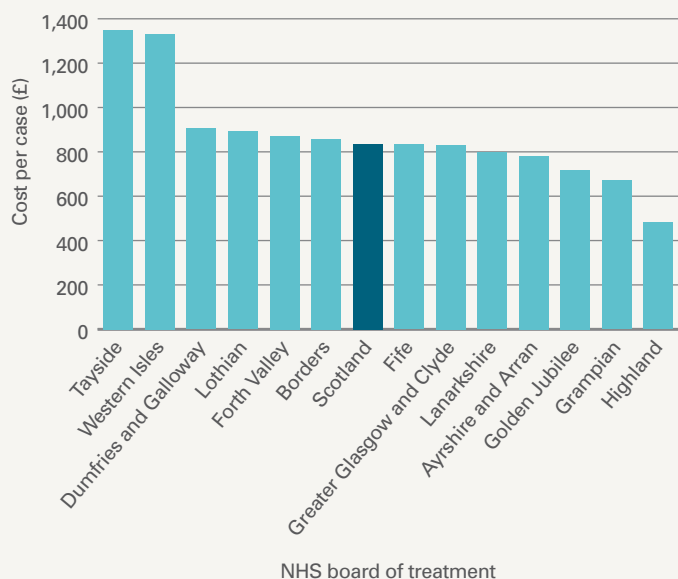


Notes: 1. The Golden Jubilee costs are particularly high as the majority of their cases are expensive hip and knee joint replacements and revisions.
 2. NHS Orkney and Shetland do not have a dedicated orthopaedic service.
 Source: Scottish Health Services Costs SFR5.3, ISD Scotland, 2009

Exhibit 23

Orthopaedic day case direct cost per case by NHS board, 2008/09

Day case direct costs range from £481 to £1,350.



Note: NHS Orkney and Shetland do not have a dedicated orthopaedic service.
 Source: Scottish Health Services Costs SFR5.5, ISD Scotland, 2009

There does not appear to be a strong link between quality and levels of activity

93. There are a number of quality measures which apply to orthopaedic services, including infection rates, complication rates, survival after a hip fracture and emergency readmission to hospital following an orthopaedic procedure. NHS boards generally perform well against these measures. In the activity section we highlighted a number of NHS boards with higher levels of activity and lower overall costs per case (NHS Fife, Forth Valley, Grampian and Lanarkshire). Our analysis of available data shows that there does not appear to be a strong link between quality and levels of activity ([Exhibit 25, page 36](#)).

94. There needs to be a better understanding of the relationships between activity and quality, and NHS boards should regularly review measures of quality when attempting to improve productivity to ensure that patient care is not adversely affected.

95. Complication rates in orthopaedic services are low. They vary from 0.24 per cent in NHS Borders to 0.73 per cent in NHS Forth Valley and Highland and 2.13 per cent in NHS Western Isles. Survival rates after a hip fracture vary by board and have fluctuated considerably within boards over the last ten years. For example, survival rates 120 days after a hip fracture have fluctuated in NHS Borders between 76 and 86 per cent over the last ten years. Survival rates have increased in all NHS boards over ten years except NHS Forth Valley and Lanarkshire, and rates have been consistently lower in NHS Forth Valley at around 78 per cent. NHS Highland has had consistently higher survival rates over the last ten years at around 84 per cent.

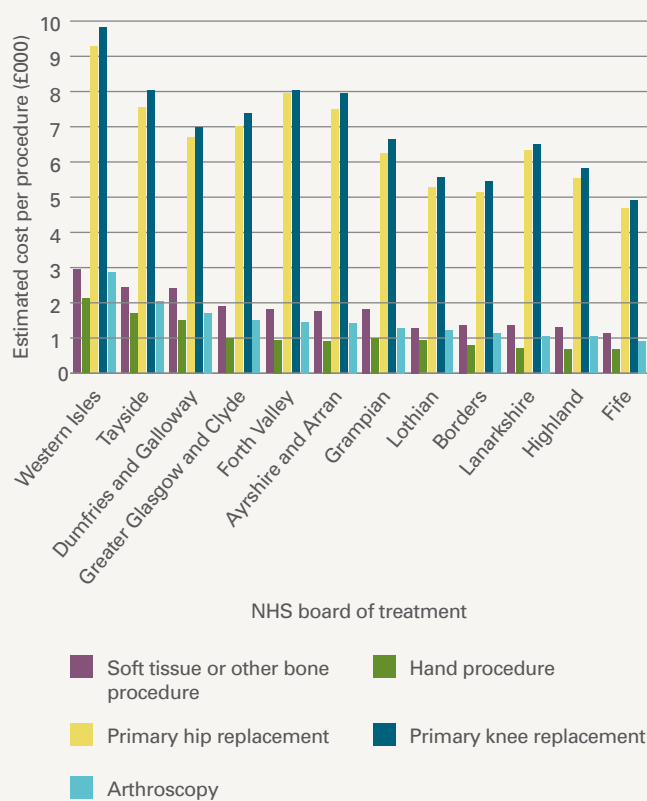
96. Overall, emergency readmission rates after an orthopaedic procedure vary from 2.7 per cent in NHS Fife to 5.8 per cent in NHS Dumfries and Galloway. For hip fractures, emergency

Exhibit 24

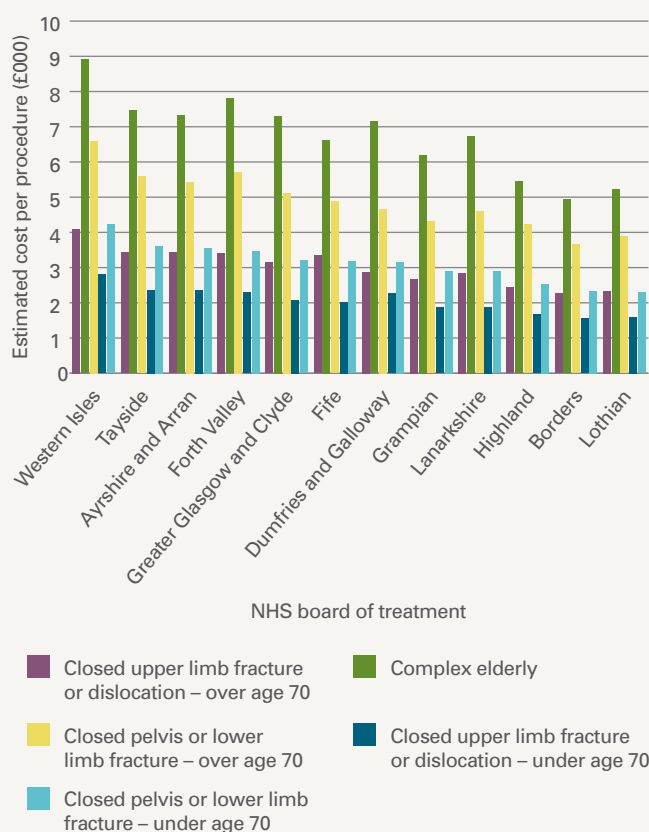
Cost per orthopaedic procedure for the top five planned and emergency groups of procedures by NHS board of treatment, 2007/08

The estimated cost per orthopaedic HRG varies significantly among boards.

Planned procedures



Emergency procedures



Note: Tariff costs are based on 2006/07 Costs Book data. Examples of procedures included in HRGs include: Soft tissue or other bone procedures (under age 70) – repair of tendon, drainage of bone; Hand procedures – carpal tunnel release, amputation of finger; Closed upper limb fractures or dislocations – fracture of forearm, dislocation of shoulder; Closed pelvis or lower limb fracture – dislocation of hip, multiple fracture of leg; Complex elderly – includes various procedures with additional complications due to age, frailty and other medical conditions.

Source: Audit Scotland analysis of ISD Scotland SMR01 data extracts and Scottish National Tariff data, ISD Scotland, 2009

readmission rates vary from around five per cent in NHS Borders to 14 per cent in NHS Greater Glasgow and Clyde. Rates of surgical site infections for hip replacements are low and the average for Scotland has gradually reduced from 2.1 per cent in 2003 to 0.8 per cent in 2008. This varied from no infections in NHS Western Isles to two per cent (13 patients) in NHS Lanarkshire.

Treating planned and emergency patients on different wards or hospital sites is thought to reduce the risk of infection. In NHS Fife, Forth Valley and Grampian where this happens, infection rates were 0.2, 1.2 and 0.4 per cent. However, it is difficult to draw a firm conclusion given the small percentages and numbers of patients involved ([Exhibit 25, overleaf](#)).

Performance against other national standards for orthopaedics is mixed

97. There is a national performance target for a maximum of a four-hour stay for patients in a hospital emergency department. However, in 2002, the Scottish Intercollegiate Guidelines Network (SIGN) recommended that hip fracture patients should be transferred to a ward within two hours.^{69, 70}

69 *Fair to All, Personal to Each: the next steps for NHSScotland*, Scottish Executive Health Department, 2004.

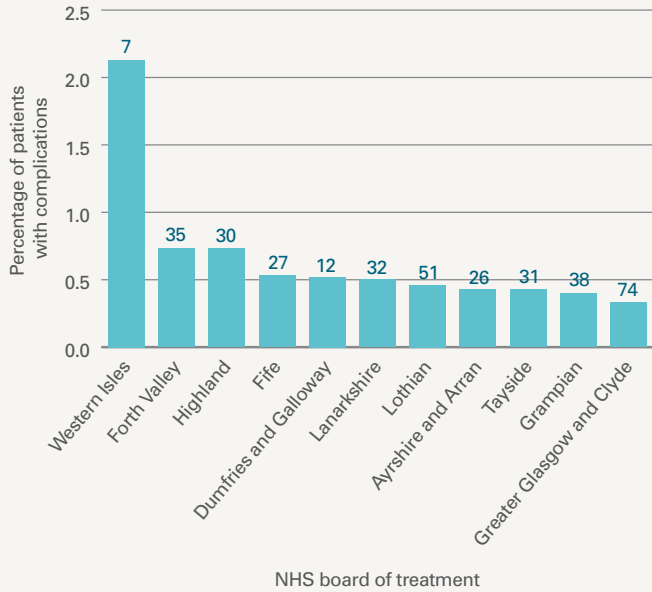
70 *SIGN 56 Prevention and Management of Hip Fracture in older people*, Scottish Intercollegiate Guidelines Network, January 2002.

Exhibit 25

Complication rates, survival rates after a hip fracture, hip replacement infection rates and emergency readmission rates for orthopaedic procedures by NHS board

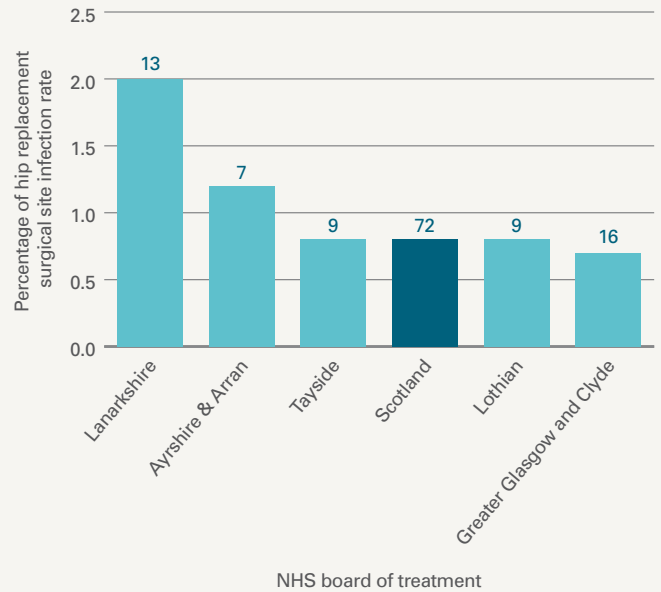
Complication rates, 2007/08

Complication rates are low, although the rate of complications in NHS Western Isles is higher than any of the mainland boards.



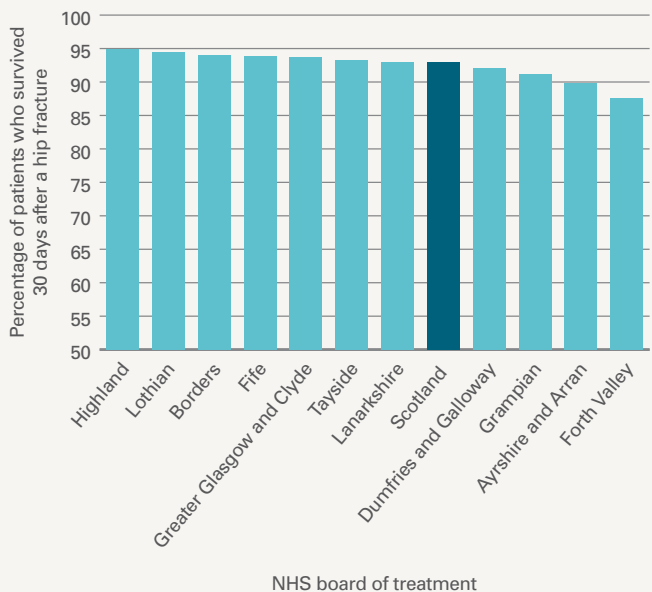
Infection rates for hip replacement, 2008

Infection rates for hip replacement are low across Scotland, although rates in NHS Lanarkshire and Dumfries and Galloway are higher than other NHS boards.



30-day survival rate after a hip fracture, 2007/08

There is good performance across Scotland for 30-day survival rates after a hip fracture.



120-day survival rate after a hip fracture, 2007/08

As expected, survival rates reduce 120 days after a hip fracture. NHS Forth Valley has the lowest rates for both 30-day and 120-day survival rates.

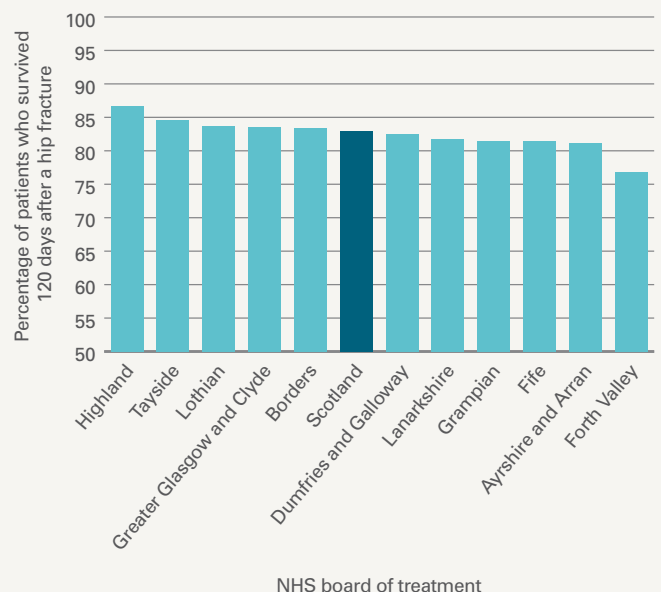
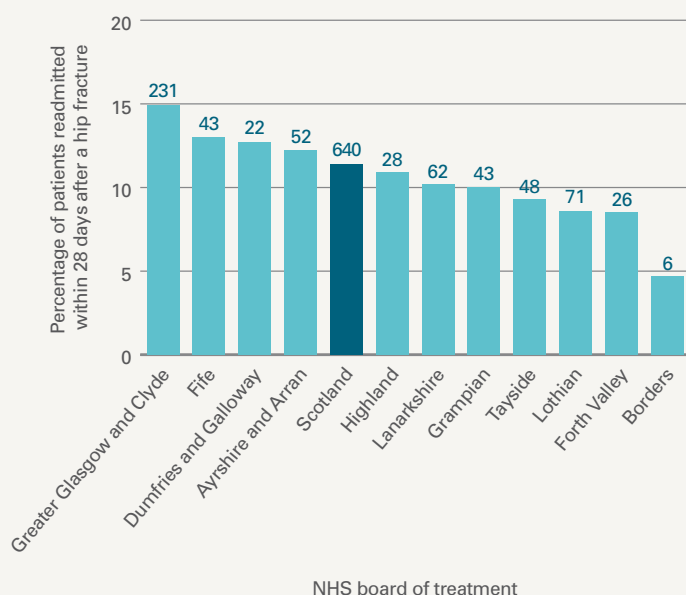


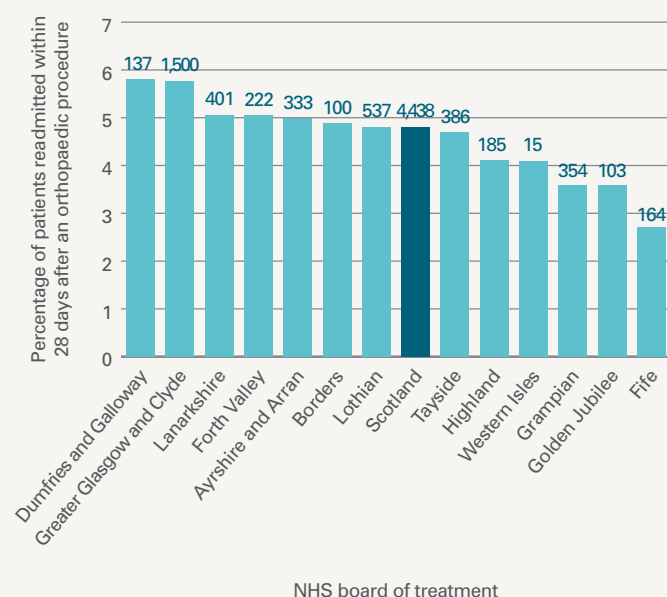
Exhibit 25 (continued)

Emergency readmission rates following a hip fracture, 2008/09



Emergency readmission rates following an orthopaedic procedure, 2008/09

Readmission rates vary across Scotland.



Note:

1. Numbers are provided above the percentage bars for the number of patients.
2. We have excluded boards from charts where the number of patients is five or less.
3. NHS Orkney and Shetland are excluded as they do not have a dedicated orthopaedic service. The Golden Jubilee and NHS Western Isles are excluded from the survival rate charts as they did not take part in the audit which collected this data. Data were also not collected for the Golden Jubilee on complication rates or readmission after a hip fracture as it does not treat emergency patients.

Source: *Orthopaedic complication rates*, ISD Scotland, 2009; *Scottish clinical indicators on the web linked data set (SMR01/SMR04/SOCRATES/GROS deaths)*, ISD Scotland, 2009; *Readmission rates*, ISD Scotland (SMR01) linked dataset; *Inpatient surgical site infection rates for hip arthroplasty 2003 to 2008*, NHS Health Protection Scotland, 2009

This target applies to both emergency departments and orthopaedic services and reflects how well they are managed and work together to achieve it. Achieving the target depends on the availability of beds to accommodate emergency patients. In 2008, 28 per cent of patients with a hip fracture were moved from an emergency department to a ward within two hours. This ranged from three per cent in NHS Lothian to 54 per cent in NHS Fife ([Exhibit 26, overleaf](#)). Sixty-five per cent of patients were transferred within three hours and 96 per cent within four hours.⁷¹ Audit Scotland is due to report on the performance of

emergency departments in meeting the needs of patients in August 2010.

98. Analysis of ISD Scotland activity data suggests that some patients may be moved to a ward unnecessarily. In 2007/08, there were just over 10,500 admissions to orthopaedic wards where patients received no main orthopaedic procedure.⁷² This represents 15 per cent of all orthopaedic hospital inpatient stays. Four out of five of these were emergency admissions and less than ten per cent were transferred to a different specialty. The majority remained in orthopaedics and the average length of stay was 7.1 days.

This varied from three days in NHS Forth Valley to 11.4 days in NHS Lothian. Orthopaedic patients may be admitted to hospital for observation or pain relief and some patients admitted for a procedure may have this cancelled for various reasons, such as being unfit for surgery. Further investigation is required to clarify why these patients have been admitted to hospital and whether they could be better managed in the community.

99. In 2004, the Scottish Executive introduced a target that 98 per cent of medically fit patients with a hip fracture should have surgery within 24 hours of safe operating time

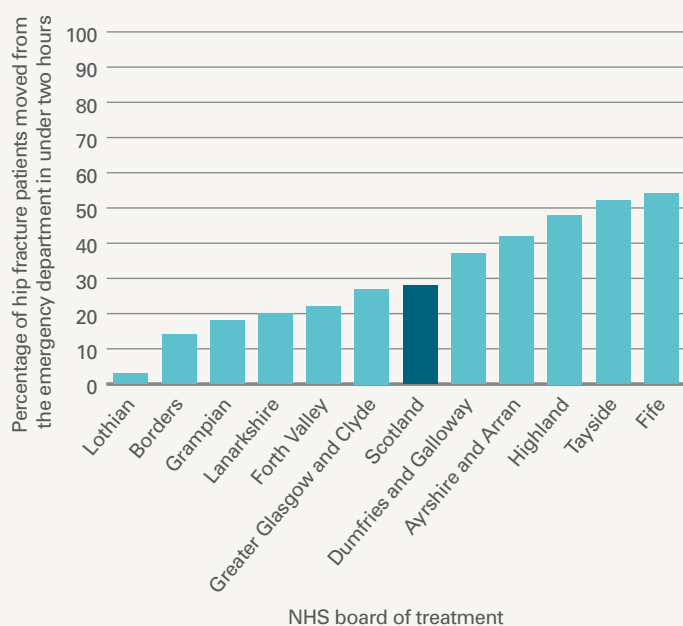
⁷¹ *Scottish Hip Fracture Audit report*, ISD Scotland, 2008.

⁷² In addition there were almost 2,000 day case admissions where patients received no main orthopaedic procedure. Patients may have received some minor treatments such as medication but this cannot be identified from the data.

Exhibit 26

Performance against SIGN recommendation that patients with hip fracture are transferred from emergency department to ward within two hours, by NHS board of treatment, 2008

Performance against hip fracture transfer from emergency department target varies by NHS board but is generally low.



Note: NHS Western Isles did not take part in this audit and Orkney and Shetland do not have a dedicated orthopaedic service.

Source: *Scottish Hip Fracture Audit*, ISD Scotland, 2009

(defined as 8am to 8pm) by the end of 2007.⁷³ In December 2008, 98.4 per cent of patients across Scotland were operated on within 24 hours. Three NHS boards (NHS Borders, Highland and Lanarkshire) did not meet this target but this related to a small number of patients. This is an improvement from 80.4 per cent of patients operated on within 24 hours in April 2006. This target is no longer being monitored nationally but NHS boards should continue to monitor this locally.

Community services contribute to good quality outcomes for patients

100. Community services play an important role in supporting patients after an operation or hospital stay for orthopaedic care and can affect how long patients stay in hospital. For example, patients may require support at home following a hospital stay for hip fracture or physiotherapy. AHPs, such as physiotherapists and podiatrists, support patients following orthopaedic surgery and some patients may need further care in a hospital or community rehabilitation unit before returning home.

101. Our study focused on orthopaedic services provided in hospitals, but we looked at some indicators of community care to assess how well services are joined up. For example, the average number of intensive homecare hours (ten hours or more per week) for people aged 65 and over for Scotland is 18 per 1,000 population (aged 65 and over) but ranges from around seven per 1,000 population in NHS Fife to 30 per 1,000 population in NHS Western Isles.⁷⁴ There is no relationship between the level of intensive homecare available in each NHS board with either hospital length of stay or readmission rates for orthopaedic services.

102. The Scottish Hip Fracture Audit reported on rehabilitation for hip fracture patients in 2009.⁷⁵ As might be expected, patients discharged straight home spent more time in acute orthopaedic care than those who were transferred to rehabilitation care. People living in care homes spent least time in acute orthopaedic care. For those patients discharged to rehabilitation care, the length of stay varied among hospitals. This may reflect different policies of transfer from orthopaedics to a rehabilitation unit within the same or another hospital. Some units operate an automatic transfer of patients with a hip fracture five days post-operatively while other units use rehabilitation for frailer patients who require further care before they are able to return home. The majority of hospitals which participated in the audit (17 out of 20) have a supported discharge team, all of which accept hip fracture patients, although only four support hip fracture patients back to a care home.

103. During our fieldwork, we found that there is variable access to rehabilitation and that there are

⁷³ *Fair to All, Personal to Each: the next steps for NHSScotland*, Scottish Executive Health Department, 2004.

⁷⁴ *Council Quarterly Key Monitoring Returns for 2007/08*, Scottish Government, 2009.

⁷⁵ *The patient journey post hip fracture: What constitutes rehabilitation? A report from the Scottish Hip Fracture Audit*, ISD Scotland, 2009.

particular issues for older people with other conditions who need additional general medical care. For example, in NHS Fife a geriatric orthopaedic rehabilitation unit is only accessible to patients living in east Fife and patients in west Fife receive rehabilitation in the orthopaedic ward which may affect the length of stay for these patients. NHS Grampian has a rehabilitation unit at Woodend Hospital staffed by community nurses for emergency patients only. NHS boards should review the provision of rehabilitation services to ensure the needs of orthopaedic patients are met and patients discharged to care homes receive sufficient support.

Recommendations

The Scottish Government and NHS boards should:

- develop better information on costs, quality and activity to plan and deliver efficient services to a high quality
- work with ISD Scotland to urgently improve the recording of outpatient procedures
- work with NHS National Procurement to standardise the purchasing of surgical implants and equipment to ensure the best value for money based on cost and clinical effectiveness
- ensure that benchmarking information on cost and activity is collected to allow NHS boards to compare efficiency
- improve tariff information to support accurate costing and financial planning for orthopaedic services.

NHS boards should:

- monitor levels of day case and outpatient activity and look to deliver care in the most efficient and effective setting
- develop a better understanding of productivity, including activity, cost and quality indicators, to deliver efficient services
- monitor levels of activity for the whole orthopaedic team and take action where levels are low
- review performance against quality indicators to ensure patient care is not adversely affected by service changes
- continue to monitor performance against the time taken for hip fracture patients to have surgery to ensure medically fit patients are being operated on with 24 hours of safe operating time
- identify and address any gaps in access to rehabilitation for orthopaedic patients
- use the Audit Scotland checklist detailed in [Appendix 3](#) to help improve the efficiency and effectiveness of orthopaedic services.

Appendix 1.

Membership of the project advisory group

Audit Scotland would like to thank the members of the advisory group for their advice and support throughout the study.

Member	Organisation
Diana Beard	Project Manager, Scottish Trauma Audit Group, Quality Improvement Programme, Information Services Division
Dr Valerie Blair	Allied Health Professional Programme Director, NHS Education Scotland
Julie Carter	Director of Finance, Golden Jubilee National Hospital
Iain Colthart	Information Officer, AHP Programme, NHS Education Scotland
Kathleen Duncan	Clinical Coordinator, Quality Improvement Programme, Information Services Division
Stephen Gallagher	Head of Improvement Support Team and Acting Lead of Efficiency and Productivity Team (up to November 2009), Scottish Government
Susan Groom	General Manager for Orthopaedics, NHS Greater Glasgow and Clyde
Colin Howie	Consultant orthopaedic surgeon, Lead Clinician, NHS Lothian and current chair of Scottish Trauma and Orthopaedic Committee
John Yates	Specialist Adviser, Retired Professor of Health Service Management, Birmingham University

Note: Members of the project advisory group sat in an advisory capacity only. The content and conclusions of this report are the sole responsibility of Audit Scotland.

Appendix 2.

Study methodology

We looked at how effectively the NHS in Scotland manages orthopaedic services, how much is spent and whether this represents value for money. We also assessed whether there is scope to improve the efficiency of orthopaedic services by comparing productivity across Scotland and identifying areas of good practice.

This report focuses on orthopaedic services provided in hospitals and highlights examples of services being provided in the community, such as orthopaedic clinics led by GPs or physiotherapists. We did not review the work of other departments that support orthopaedic services, such as diagnostics, rheumatology and anaesthetics.

In this study we analysed available information on orthopaedic activity and costs from a range of sources. The majority of the information we have used is published on the NHS Information Services Division (ISD Scotland) website. Specifically the published information used is as follows:

- *Costs Book (R04X) Specialty summary by patient type, National Statistics Release, ISD Scotland, 2000–09.* This was used for:
 - total orthopaedic expenditure, 1999/2000 to 2008/09
 - inpatient, day case and outpatient expenditure, 2008/09
 - inpatient, day case and outpatient activity, 1999/2000 to 2008/09. Activity is measured as number of discharges (inpatients), number of cases (day cases) and number of attendances (outpatients).
- *Hospital Operations/Procedures, National Statistics Release, ISD Scotland, 2009.* This was used for:
 - increase in the number of common orthopaedic procedures – 1999/2000 to 2007/08.
- *Outpatient and A&E Summary (derived from SMR00 returns), National Statistics Release, ISD Scotland, 2009.* This was used for:
 - new and review outpatient figures, 2008/09
 - did not attend (DNA) rates for new outpatient appointments, 2008/09.
- *Inpatient Facilities by NHS Board and Specialty, National Statistics Release, ISD Scotland, 2009.* This was used for:
 - orthopaedic bed throughput, 2008/09.
- *Medical and dental staff by specialty and grade, National Statistics Release, ISD Scotland, 2009.* This was used for:
 - number of orthopaedic consultants and career grade staff, 2008
 - cost and activity calculations.
 - for activity and cost data from 2007/08, the corresponding workforce data has been used (September 2007)
 - calculations involving population use mid-2008 figures, therefore September 2008 workforce data has been used.
- Some amendments have been made to published ISD workforce data following corrections made by some NHS boards during validation of the data:
 - NHS Greater Glasgow and Clyde changed from 44 to 48.2 consultants in 2006, 52 to 50.4 consultants in 2007 and 56.8 to 51.1 consultants in 2008
 - NHS Lothian changed from 30.3 to 27 WTE consultants in 2009 and from 23.4 to 29 WTE consultants in 2008
 - NHS Tayside changed from 17.3 to 16.3 WTE consultants in 2007 and from 18.6 to 18.3 WTE consultants in 2008; It also removed all career grade posts from 2006 onwards
 - NHS Western Isles added one WTE consultant for 2007
 - These changes were carried over into the consultant and career grade post totals.
- *NHS Scotland Workforce Statistics, National Statistics Release, ISD Scotland, 2009.* This was used for:
 - number of clinical nurse specialists, 2009.
- *Scottish Health Services Costs (SFR5.3), 2009.* This was used for:
 - direct inpatient costs per case, 2008/09.
- *Scottish Health Services Costs (SFR5.5), 2009.* This was used for:
 - direct day case costs per case, 2008/09.

- *Clinical indicators on the web linked data set*, ISD Scotland, 2009. This was used for:
 - rates of survival 30 days after a hip fracture
 - rates of survival 120 days after a hip fracture
 - emergency readmission rates within 28 days after an orthopaedic procedure
 - emergency readmission rates within 28 days after a hip fracture.
- *British Association of day surgery (BADs) data*, ISD Scotland, 2009. This was used for:
 - percentage of orthopaedic procedures carried out as same day surgery.

In addition to this, we commissioned ISD Scotland to provide information on:

- orthopaedic procedures (by age, patient type, gender and board of treatment)
- length of stay
- activity carried out in private hospitals
- costs
- waiting times.

The procedure information provided by ISD was categorised into healthcare resource groups (HRG). An HRG is a group of similar procedures that require similar levels of

healthcare resource (procedures that are similar in complexity and cost). There are around 65 orthopaedic HRGs (orthopaedic HRGs were identified as Chapter H codes from the HRG definitions manual).¹ Some major procedures such as hip and knee replacements are grouped into individual HRGs. However, the majority of HRGs contain several procedures, such as hand procedures or soft tissue procedures.

We used this additional analysis to calculate:

- percentage of activity carried out at the Golden Jubilee, SRTC and in private hospitals
- elective and emergency inpatient and elective day case activity per 1,000 population
- number of cases where patients were admitted to orthopaedics but no procedure was carried out
- consultant and other medical staff activity.

Consultant and other medical staff activity was calculated by using HRG activity provided by ISD, minus any HRG activity carried out in private hospitals. We also excluded the HRGs H27 and H28 (non-inflammatory bone or joint disorders) as only NHS Fife recorded any substantial activity under this HRG and NHS boards were unable to confirm what activity was included.

Based on our analysis of available information, five boards were selected as sample sites to investigate the data further. The boards (NHS Fife, Grampian, Greater Glasgow and Clyde, Tayside and the Golden Jubilee National Hospital) were selected to represent a mix in terms of size, cost and performance. However, we were not able to carry out fieldwork in NHS Greater Glasgow and Clyde within the required timescales. At the other four sites we collected additional data and interviewed a range of staff including service managers, finance managers and consultants to gain an understanding of the data.

We also interviewed staff at ISD Scotland, National Procurement and the Scottish Government Health Directorates (SGHD).

Appendix 3.

Self-assessment checklist for NHS boards

The checklist on these two pages sets out some of the high-level practical issues around orthopaedic services raised in this report. NHS boards should assess themselves against each statement and consider which statement most accurately reflects their current situation. This approach will enable boards to identify what actions need to be taken forward.

Issue	Assessment of current position						Comments
	No action needed	No but action in hand	Yes in place but needs improving	Yes in place and working well	Not applicable		
<p>We have reviewed orthopaedic services to find more efficient ways of reducing waiting times, including:</p> <ul style="list-style-type: none"> • reducing DNA rates • reducing the rate of return appointments in outpatient clinics • making better use of community-based services. 							
<p>We are working with the Golden Jubilee National Hospital to better manage the referral of patients to this service.</p>							
<p>We collect information on the cost and activity of orthopaedic work carried out privately and review this to establish whether care could be delivered more efficiently.</p>							
<p>We review the reasons why patients are coded as being removed from the waiting list because treatment is no longer required and manage patients appropriately in line with new waiting lists guidance.</p>							
<p>We are working with ISD to improve the accuracy of national information on cost and activity to ensure services are efficiently managed, including:</p> <ul style="list-style-type: none"> • recording of procedures carried out in outpatient clinics • improving the quality and consistency of cost information reported in the Costs Book • improving tariff information to support accurate costing and financial planning for orthopaedic services. 							

Issue	Assessment of current position						Comments
	No action needed	No but action in hand	Yes in place but needs improving	Yes in place and working well	Not applicable		
We are working with NHS National Procurement to standardise the purchasing of surgical implants and equipment to ensure the best value for money based on cost and clinical effectiveness.							
We are working with the Scottish Government to ensure benchmarking information on cost and activity is collected to allow comparison of efficiency with other NHS boards.							
We monitor levels of day case and outpatient activity and look to deliver care in the most efficient and effective setting.							
We are analysing activity, cost and quality indicators to develop a better understanding of productivity in order to deliver efficient services.							
We monitor levels of activity for the whole orthopaedic team, including consultants and other doctor grades, nurses, physiotherapists and podiatrists, and take action where levels are low.							
We review performance against quality indicators to ensure patient care is not adversely affected by service changes, such as an increase in activity.							
We monitor performance against the time taken for hip fracture patients to have surgery to ensure medically fit patients are being operated on within 24 hours of safe operating time.							
We have identified any gaps in access to rehabilitation for orthopaedic patients. We have an action plan in place to address these gaps.							

Review of orthopaedic services

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