Key messages

Review of orthopaedic services

AUDIT SCOTLAND

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Auditor General for Scotland

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Key messages

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] People access orthopaedic services in a number of ways depending on their condition (Exhibit 1, overleaf).

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]

3. 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 care as a day case or in an outpatient setting.[3]

4. 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 nationally reported figure of up to 2.5 per cent of all activity being carried out privately is likely to be an underestimate.

5. 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.[4]

6. The NHS spent £373 million on orthopaedic services in 2008/09, which is four per cent of overall spending on health services in Scotland. 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.

Our study

7. 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.

8. Our 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.

9. In the study, we:

- analysed information available for Scotland on orthopaedic activity and costs
- 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).[5]

10. 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.

11. It is essential that NHS boards and the Scottish Government develop better information on costs, quality and activity to plan and deliver efficient services to a high quality. 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). Our *Improving public sector efficiency* report, published in February 2010, includes a good practice checklist which will also help NHS boards in improving efficiency and productivity.

Key messages

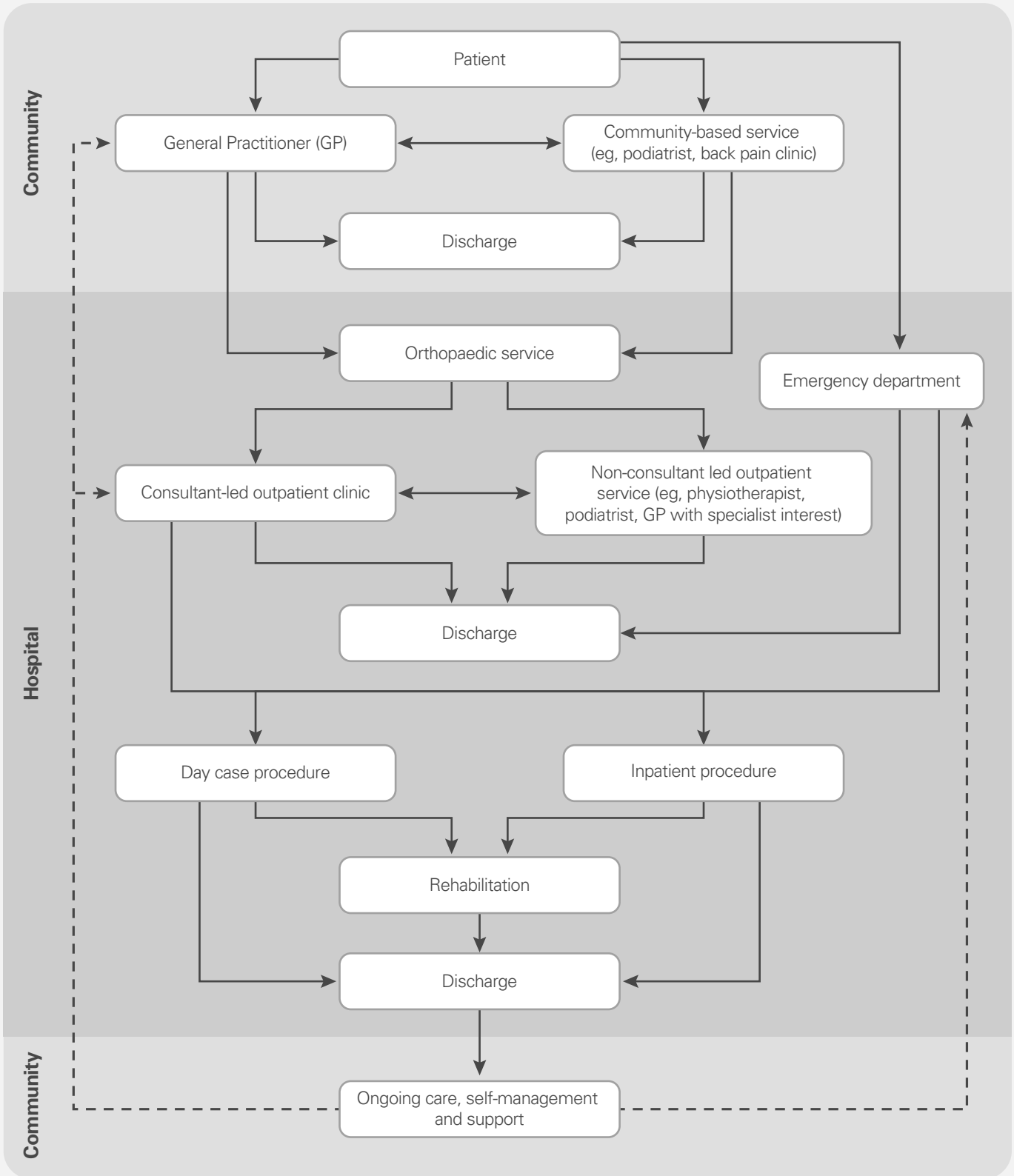
1 Waiting times for orthopaedic services have reduced considerably in recent years. This has been achieved by the NHS changing the way it delivers services and through additional activity funded by waiting times money from the SGHD. NHS boards are meeting national waiting times targets, but making further sustainable improvements to achieve the planned 18-week referral to treatment target will be challenging.

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; carpal tunnel release is surgery to relieve pain and weakness in the hand caused by pressure on a nerve in the wrist.
4 *Scottish Arthroplasty Annual Report* , ISD Scotland, 2009.
5 The Golden Jubilee National Hospital is part of NHS National Waiting Times Centre and ISD Scotland is part of NHS National Services Scotland.

Exhibit 1

Accessing orthopaedic services in Scotland

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



Source: Audit Scotland, 2010

12. Activity within orthopaedic services is high and continues to increase (Exhibit 2). Advances in technology mean that a wider range of procedures are available and surgeons can carry out more complex procedures. There is also pressure on orthopaedic services due to the high number of people with musculoskeletal problems, which account for one in four of all GP consultations in the UK.[6]

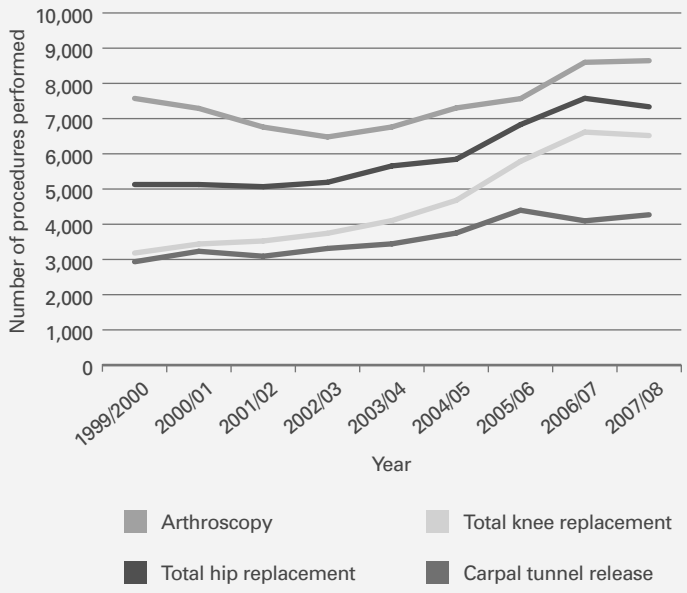
13. NHS boards have worked hard to achieve reductions in the time that orthopaedic patients wait to access services. In 2003, 66 per cent of inpatients and day cases and 83 per cent of outpatients were seen within 26 weeks of referral. By 2008, this had increased to 95 per cent of inpatients and day cases and 99 per cent of outpatients seen within 26 weeks of referral. In March 2009, all NHS boards were meeting the national waiting times target.[7, 8]

14. Consultants are central to the delivery of orthopaedic services and the role of other staff in delivering orthopaedic care has developed over time and contributed to a reduction in waiting times. In some areas, clinical nurse specialists, physiotherapists, podiatrists and GPs carry out clinics in hospitals and the community, for patients who do not need surgery but may benefit from treatments such as physiotherapy or medication.

Exhibit 2

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

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



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

15. The SGHD's Improvement Support Team (IST) works with NHS boards to help them improve the delivery, quality and efficiency of their orthopaedic services. The IST also leads a national programme to support achievement of the national waiting times target. The IST is working with NHS boards to improve data quality and develop benchmarking information.

16. Between 2005/06 and 2009/10, the Scottish Government allocated approximately £505 million to help reduce waiting times in all specialties.[9] 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. In 2008/09, almost £32 million of centrally allocated funding was spent to address waiting times in orthopaedic services (25 per cent of all waiting times money).

17. Due to the financial pressures facing public services, the Scottish Government is reducing the total waiting times money allocated to NHS boards from £151.3 million in 2009/10 to £102.8 million in 2010/11.[10] This reduction of £48.5 million includes £28.5 million which will now be included in NHS boards' overall funding allocations.

18. 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 is reduced.

6 *Joint Effects: The impact of Allied Health Professionals on orthopaedic and musculoskeletal service change in Scotland*, Scottish Executive, 2005.
7 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. Although NHS boards are reporting against the 15-week standard for each stage, they are currently working to 12-week targets in preparation for the waiting times target reducing in March 2010.
8 This excludes eight patients in NHS Lothian who were waiting longer than 15 weeks from an outpatient appointment to treatment.
9 *Scottish Budget Spending Review 2004*, Scottish Executive, 2004; S*cottish Budget Spending Review 2007*, Scottish Government, 2007.
10 *Scottish Budget: Draft Budget 2010-11*, Scottish Government, 2009.

2 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.

19. 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 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. Available information highlights areas where NHS boards can improve the efficiency of services, but cost and activity data and benchmarking information need to improve.

20. 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 no measures of patient outcomes once they have been discharged from hospital. Further detailed analysis is required on other procedures, particularly in NHS boards where rates of 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.

21. Levels of inpatient activity 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.[11]

22. The number of emergency orthopaedic cases has an impact on how NHS boards manage their workload and can also affect waiting times for patients with a planned admission. In 2007/08, emergency inpatient activity ranged from 7.0 per 1,000 of the population in NHS Fife to 14.5 in NHS Highland.

23. In 2007/08, there were just over 10,500 admissions to orthopaedic wards where patients received no main orthopaedic procedure. 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. Further investigation is required to clarify why these patients have been admitted to hospital and whether they could be better managed in the community. (See paragraphs 51 and 52 of the main report for more information.)

24. There is scope to make better use of resources in orthopaedic services. 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 produced a directory of around 160 procedures (including 21 orthopaedic procedures) which are suitable for same day care.[12]

25. The percentage of overall orthopaedic procedures carried out as same day care has increased over recent years, but levels vary across Scotland. 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.

26. 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. 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. (See paragraphs 53 to 58 of the main report for more information.)

27. 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 in NHS boards. If the NHS boards with a lower percentage of same day surgery for six common orthopaedic procedures were able to achieve the average for Scotland, then this would mean a saving of at least 2,840 bed days, which equates to around £1.1 million per year.[13]

28. NHS boards do not record outpatient procedures as comprehensively as inpatient and day case procedures. This information is required to help improve the efficiency of orthopaedic services. Audit Scotland

11 Based on inpatient discharges from *Hospital Operations/Procedures,* National Statistics Release, ISD Scotland, 2009.
12 *BADS Directory of Procedures 3rd Edition*, British Association of Day Surgery, June 2009.
13 This is a conservative estimate of savings based on saving one inpatient overnight stay per procedure for six common orthopaedic procedures, although in some cases the length of stay will be longer than this. The six procedures are: arthroscopy of the knee, anterior cruciate ligament (ACL) reconstruction, bunion removal, carpal tunnel release, dupuytren's fasciectomy and ganglion excision. (See pages 22 to 24 in the main report for definitions and further information.) The average inpatient overnight cost for orthopaedics provided by ISD Scotland for 2008/09 is £394.

has previously recommended that the SGHD, NHS boards and ISD need to urgently improve the recording of outpatient procedures.[14]

29. 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. Reducing the length of hospital stay, without compromising the quality of care for patients, helps NHS boards to make better use of available resources. There is scope to save an additional 20,600 bed days if the NHS boards 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.[15] The complexity of procedure (case-mix) may affect overall length of stay, but the average length of stay for individual procedures also varies by NHS board. (See paragraphs 47 to 50 of the main report for more information.)

30. 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 patients per bed in NHS Borders. 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.

3 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.

31. Although hospital activity in orthopaedic services has increased by 12 per cent over ten years, spend on orthopaedic services has increased by 68 per cent in real terms (Exhibit 3).

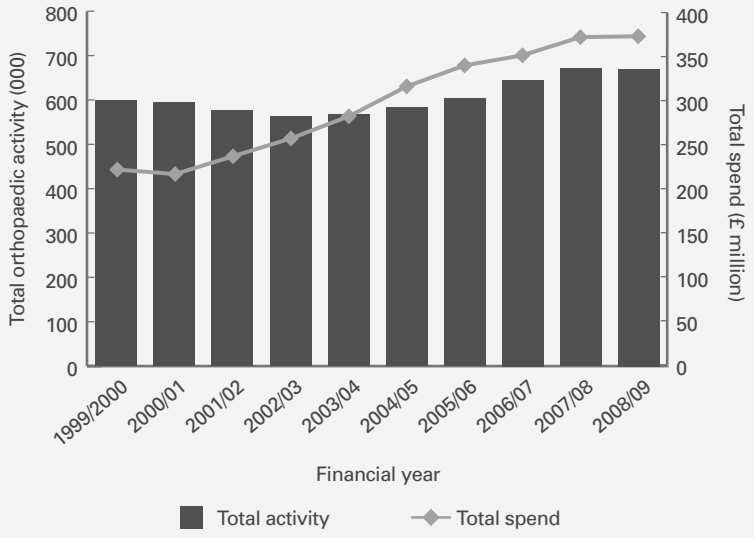
32. In 2008/09, a total of £373 million was spent on orthopaedic services across Scotland.[16] The majority is spent on inpatient care (79 per cent), followed by outpatient clinics (14 per cent) then day cases (seven per cent). These percentages vary in local NHS board areas. Access to community-based services for orthopaedic patients has increased over recent years but activity and cost data are only available for hospital services. (See paragraph 77 of the main report for more information.)

33. In 2008/09, the amount spent per head of population on orthopaedic services varies in cash terms by NHS board from around £49 per head in NHS Lanarkshire to £89 per head in NHS Tayside. Some variation in costs

Exhibit 3

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

14 *Day surgery in Scotland: Reviewing progress*, Audit Scotland, September 2008.
15 The average inpatient overnight cost for orthopaedics provided by ISD Scotland for 2008/09 is £394.
16 This includes £32 million provided to NHS boards for meeting waiting times targets.

may be due to complexity, but this does not appear to fully explain the differences. 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 whereas the allocation of indirect costs (overheads) by NHS boards are more variable. The direct cost per case for orthopaedics also varies by NHS board:

- Inpatient direct cost per case varies from £2,520 in NHS Highland to £3,457 in NHS Tayside and £5,631 at the Golden Jubilee.[17]

- Day case direct cost per case varies from £481 in NHS Highland to £1,331 in NHS Western Isles and £1,350 in NHS Tayside. (See paragraphs 85 and 86 of the main report for more information.)

34. The cost of surgical implants 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. NHS boards can reduce the cost of implants by minimising the different types of implants that are used. NHS National Procurement estimates that £2 million could be saved each year if NHS boards were able to standardise their purchasing of hip and knee implants.[18] (See paragraphs 91 and 92 of the main report for more information.)

35. 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 being used to underpin payments to hospitals based on the activity they undertake. Tariffs are produced in Scotland for a different purpose, for charging for treatment carried out by one NHS board for patients who live in another NHS board area, but the use of tariffs for this purpose is not currently mandatory. (See paragraphs 87 to 89 of the main report for more information.)

4 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.

36. Improving productivity means achieving more outputs for the same resources, or the same outputs for less resources, with no detrimental effect on quality. Based on available information, we have not been able to draw clear conclusions about 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).

37. 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 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. In 2008, national medical and dental workforce data were combined into a new database which, ISD Scotland reports, should lead to more accurate information being collected and reported. The reliability of workforce data prior to 2008 is unclear. Between 1999 and 2008, nationally reported consultant numbers increased by 49 per cent from around 136 to 202 whole time equivalent (WTE), whereas activity has increased by 12 per cent from 599,000 to 669,900 cases.

38. 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. Overall activity by consultant and other medical staff shows the same pattern.

39. 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 carried out per consultant ranged from 458 in NHS Dumfries and Galloway to 739 in NHS Forth Valley

- the number of inpatient and day cases per consultant and career grade doctor ranged from 356 in NHS Dumfries and Galloway to 739 in NHS Forth Valley.[19]

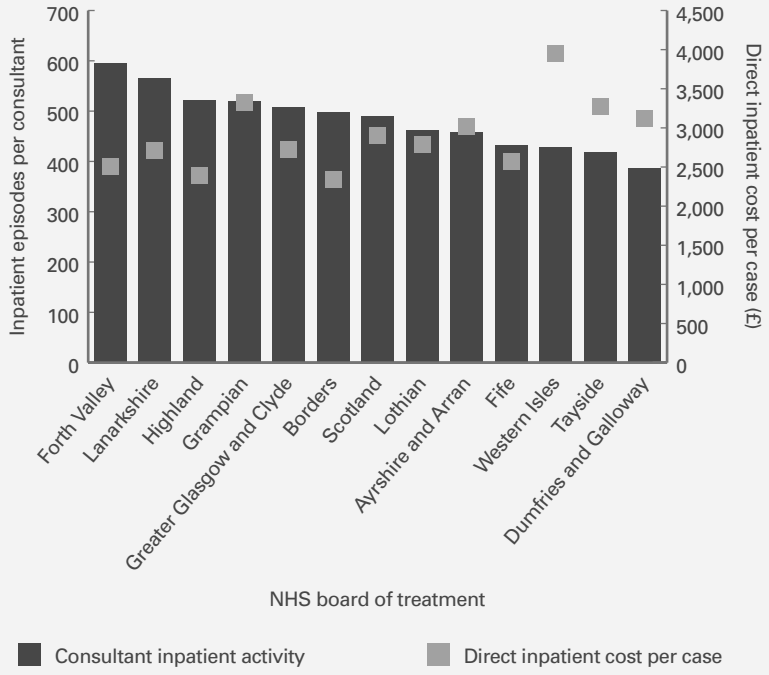
40. An additional 3,700 cases per year could be carried out if the NHS boards with lower activity were able to achieve the average for Scotland but this does not allow for case-mix (complexity) or specialist work being carried out in particular NHS boards.[20] (See paragraphs 69 to 73 of the main report for more information.)

17 Inpatient cost per case at the Golden Jubilee is high due to the majority of procedures being expensive hip and knee replacements and revisions.
18 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.
19 Not all NHS boards have career grade doctors working within orthopaedic services.
20 This excludes the Golden Jubilee as it has a different case-mix from other boards and its productivity depends on the referral patterns of the other boards.

Exhibit 4

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 excluded as it has higher costs than other boards as the majority of its cases are expensive hip and knee 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

41. Indicators suggest that NHS boards with higher levels of consultant activity have a lower cost per case (Exhibit 4). When reviewing activity levels, NHS boards should consider activity carried out by the wider orthopaedic team, such as specialist nurses and physiotherapists, as redesigning services and changing roles will affect overall productivity.

42. NHS Fife, Forth Valley and Grampian keep their planned and emergency orthopaedic activity separate. These boards tend to have higher levels of overall activity and lower overall costs. NHS Lanarkshire also has higher overall 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 paragraphs 74 to 76 of the main report for more information.)

43. 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 othopaedic procedure. NHS boards generally perform well against these measures, but our analysis shows that there does not appear to be a strong link between quality and levels of activity. NHS boards should regularly review measures of quality when attempting to improve activity to ensure that patient care is not adversely affected.

44. Complication rates in orthopaedic surgery are low and vary from 0.24 per cent in NHS Borders to 0.73 per cent in NHS Forth Valley and NHS Highland and 2.13 per cent in NHS Western Isles. The percentage of emergency readmissions to hospital within 28 days of discharge ranges from 2.7 per cent in NHS Fife to 5.8 per cent in NHS Dumfries and Galloway. Survival after 120 days following a hip fracture varies from around 77 per cent in NHS Forth Valley to 87 per cent in NHS Highland. (See paragraphs 93 to 96 of the main report for more information.)

45. As well as good quality clinical outcomes for patients following an operation or hospital stay, community services also play an important role in supporting patients who need orthopaedic care. For example, home care support following a hospital stay for hip fracture.

46. 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. We found no relationship between the level of intensive home care (ten hours or more per week) for people aged 65 and over in each NHS board and hospital length of stay or readmission rates for orthopaedic services.

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 in the main report to help improve the efficiency and effectiveness of orthopaedic services.

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