

Cardiology services



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Auditor General for Scotland

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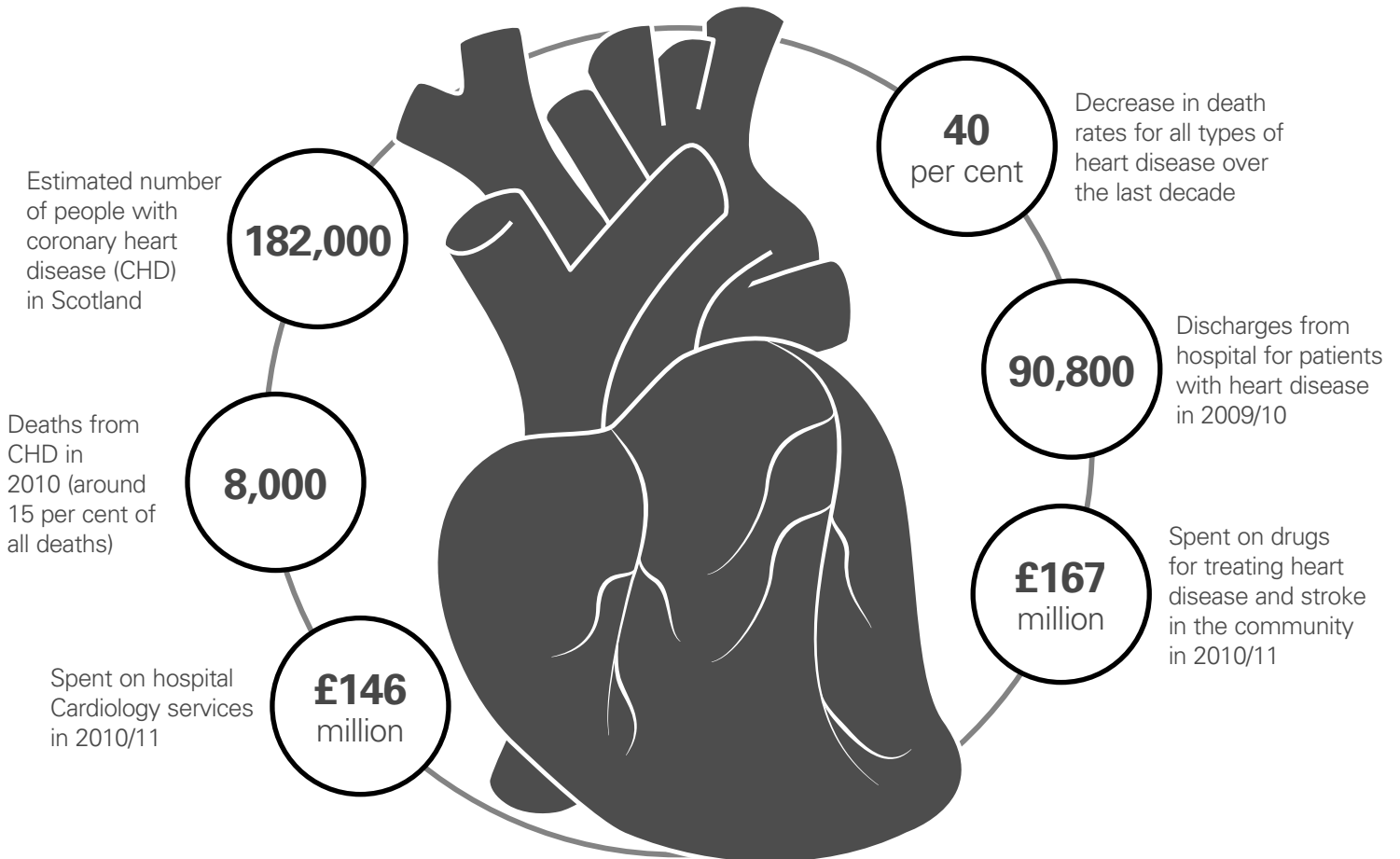
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Summary

Key facts



Death rates from heart disease have fallen but it remains the second highest cause of death in Scotland after cancer.

Background

1. Coronary heart disease (CHD) is a preventable disease which killed over 8,000 people in Scotland in 2010 (around 15 per cent of all deaths).^{1,2} It is the second highest cause of death in Scotland after cancer. Death rates from all types of heart disease have reduced by around 40 per cent over the last ten years.³ A number of factors increase the risk of heart disease, including smoking, family history of heart disease, diabetes, ethnic background, high blood pressure, high cholesterol, age, physical inactivity and being overweight.⁴ Many of these risks are preventable but the NHS and the wider public sector face significant challenges in tackling poor diet, smoking, physical inactivity and increasing levels of obesity in Scotland and need to work together to address these.⁵

2. Rates of heart disease in Scotland are the highest in Western Europe and are higher for men, some ethnic groups and people living in deprived areas. An estimated 3.3 per cent of the population has CHD (over 182,000 people).⁶ The rate is higher in men (4.2 per cent) than in women (2.5 per cent), and is strongly related to age. An estimated 16 per cent of the Scottish population aged over 75 has CHD. Rates of heart attack are higher in South Asian men, with rates of hospital admission for heart attack higher (7.7 per 1,000 population) than

the general population (5 per 1,000 population).⁷ In some more deprived areas, around 25 per cent of men aged 75 and over have CHD.⁸

3. Cardiology is a hospital specialty that treats people with heart disease.⁹ In 2009/10, there were 39,000 discharges from Cardiology wards, 10,300 day cases and 120,900 outpatient appointments.¹⁰ However, most patients with heart disease are not admitted to a Cardiology ward and there were a total of 90,800 discharges for patients with heart disease from all wards, including General Medicine and Geriatric Medicine.¹¹

4. Cardiology has the third highest spending of all medical specialties after General Medicine (£480 million) and Geriatric Assessment (£298 million). Reported spending on hospital Cardiology services has been steadily increasing over recent years, from around £80 million in 2002/03 to almost £146 million in 2010/11.^{12,13} This represents around a 50 per cent increase in real terms. However, spending on Cardiology is an underestimate as not all relevant costs are recorded under the Cardiology specialty. Some NHS boards include some or all of their costs under General Medicine. In addition, Cardiology staff are involved in caring for patients treated in other wards and this is not included in Cardiology costs.

About the audit

5. We looked at how effectively the NHS in Scotland manages Cardiology services, how much is spent and whether patients across Scotland have the same access to services. We also assessed whether there is scope to improve the efficiency of Cardiology services by comparing activity across Scotland and identifying areas of good practice where efficiencies have been made. It is however difficult to assess value for money across all aspects of Cardiology services as NHS boards have different ways of providing services and because of inconsistencies in how NHS boards record activity and costs.

6. Our report focuses on Cardiology services provided in hospitals, including those provided by the Golden Jubilee National Hospital.¹⁴ In addition to Cardiology activity, we looked at all hospital activity for heart disease patients being looked after in other wards. We did not look in detail at the work of other services that provide a lot of care for patients with heart disease, such as Cardiac Surgery, General Medicine and the Scottish Ambulance Service, but we examined some issues to do with how hospital Cardiology services work with these services. We also looked at some examples of activity and prevention work that take place in the community, mostly through GPs and their teams.

- 1 CHD is caused by narrowing of the coronary artery which means there is not enough blood circulation to heart muscle and surrounding tissue and can lead to a heart attack, angina or sudden death. Heart disease is a more general term that includes all heart disease, so in addition to CHD, it includes conditions such as heart failure, abnormal heart rhythms, and congenital and hereditary heart disease.
- 2 *Registration data*, National Records of Scotland, 2011.
- 3 *Age-sex standardised rates from Heart Disease Table MC1*, Information Services Division (ISD) Scotland, November 2011.
- 4 *Keep your heart healthy*, British Heart Foundation, December 2007.
- 5 *Overview of the NHS in Scotland's performance 2010/11*, Audit Scotland, December 2011.
- 6 *Heart Disease Table PV1*, ISD Scotland, February 2011.
- 7 *Record linked retrospective cohort study of 4.6 million people exploring ethnic variations in disease: myocardial infarction in South Asians*, CM Fischbacher et al., *BMC Public Health*, 7:142, 2007.
- 8 *Coronary Heart Disease Annual Summary Publication*, ISD Scotland, February 2011.
- 9 A hospital specialty covers a specific area of activity such as Dermatology and General Medicine. NHS staff working in specialties have specialist knowledge of the clinical area and usually work in a ward or outpatient clinic dedicated to that specialty.
- 10 ISD Scotland measures activity in hospital wards by inpatient discharges which is the point that marks the end of stay in a ward. A day case is when a patient goes into hospital for treatment and leaves on the same day.
- 11 *Number of discharges (Episodes) to specialty SMR01 and Outpatient and A&E summary SMR00*, ISD Scotland, December 2010 and *Heart Disease Table AC1*, ISD Scotland, February 2011
- 12 This includes costs for Coronary Care Units and Paediatric Cardiology services.
- 13 Cost data for Cardiology as a separate specialty are only available from 2002/03. These include costs for Paediatric Cardiology services and Coronary Care Units (CCU) which treat people with serious heart conditions who need special care, for example people who have had a heart attack.
- 14 The Golden Jubilee National Hospital is part of the NHS National Waiting Times Centre.

7. We analysed available information on Cardiology activity and costs and requested minimal new information from NHS boards. The bulk of the data analysis relates to 2009/10 but we have included data for 2010/11 where possible. We interviewed staff at three NHS boards (Fife, Greater Glasgow and Clyde, and Highland), the Golden Jubilee National Hospital, Information Services Division (ISD) Scotland, National Procurement, the Scottish Ambulance Service, the Scottish Cardiac Society and the Scottish Government.¹⁵ We also carried out patient focus groups and a separate report on these is available on our website. We have tried to minimise the use of technical terms and have included a Glossary in Appendix 1. We provide more information about our methodology in Appendix 2 and members of our advisory group are listed in Appendix 3. We have prepared a self-assessment checklist for NHS boards to use when considering how to improve their performance and this is available on our website.

8. Healthcare Improvement Scotland reviewed NHS boards' performance against its clinical standards for heart disease and published local reports for NHS boards and an overview report in September 2011.^{16, 17} This was the first large-scale review to measure performance against clinical standards and national guidelines for heart disease in Scotland. We worked closely with Healthcare Improvement Scotland throughout our audit to avoid duplication of work and have made use of the findings from its review in our report.

9. This report is structured into three main parts:

- Introduction (Part 1)
- Delivering quality services (Part 2)
- Value for money (Part 3).

Key messages

- More people in Scotland are surviving heart disease with death rates falling by around 40 per cent over the last decade. Waiting times for the two main Cardiology procedures have also gone down.
- Rates of heart disease in Scotland are the highest in Western Europe and are higher for men, some ethnic groups and people in deprived areas. Comprehensive evidence is not yet available on the impact of measures in Scotland that aim to prevent heart disease, such as health checks for high-risk patients, but there are plans to evaluate their impact. This evidence would help inform the Scottish Government and NHS boards' priorities for spending on preventative services.
- More could be done to ensure all patients get the services they need, including those who may benefit from cardiac rehabilitation, those at risk of stroke, heart failure patients and people who have had a severe heart attack.
- There is scope to make efficiency savings of at least £4.4 million in a number of areas such as using less expensive tests, reducing length of stay, increasing day case rates and making savings in prescribing and procurement. In outpatients, there is scope to improve referral processes, reduce demand and increase the number of available appointments. These efficiency savings are a conservative estimate as we have not been able to calculate savings in a number of areas due to limitations in the data.

Key recommendations

The Scottish Government and NHS boards should:

- continue to improve the evidence base on the impact and cost effectiveness of measures to help prevent heart disease and use this evidence to identify priorities for spending to help improve outcomes and address inequalities, particularly in deprived areas
- ensure that consistent and accurate activity, workforce, cost and quality information is available and shared nationally to allow NHS boards to monitor their performance, compare services and identify potential improvements in value for money.

NHS boards should:

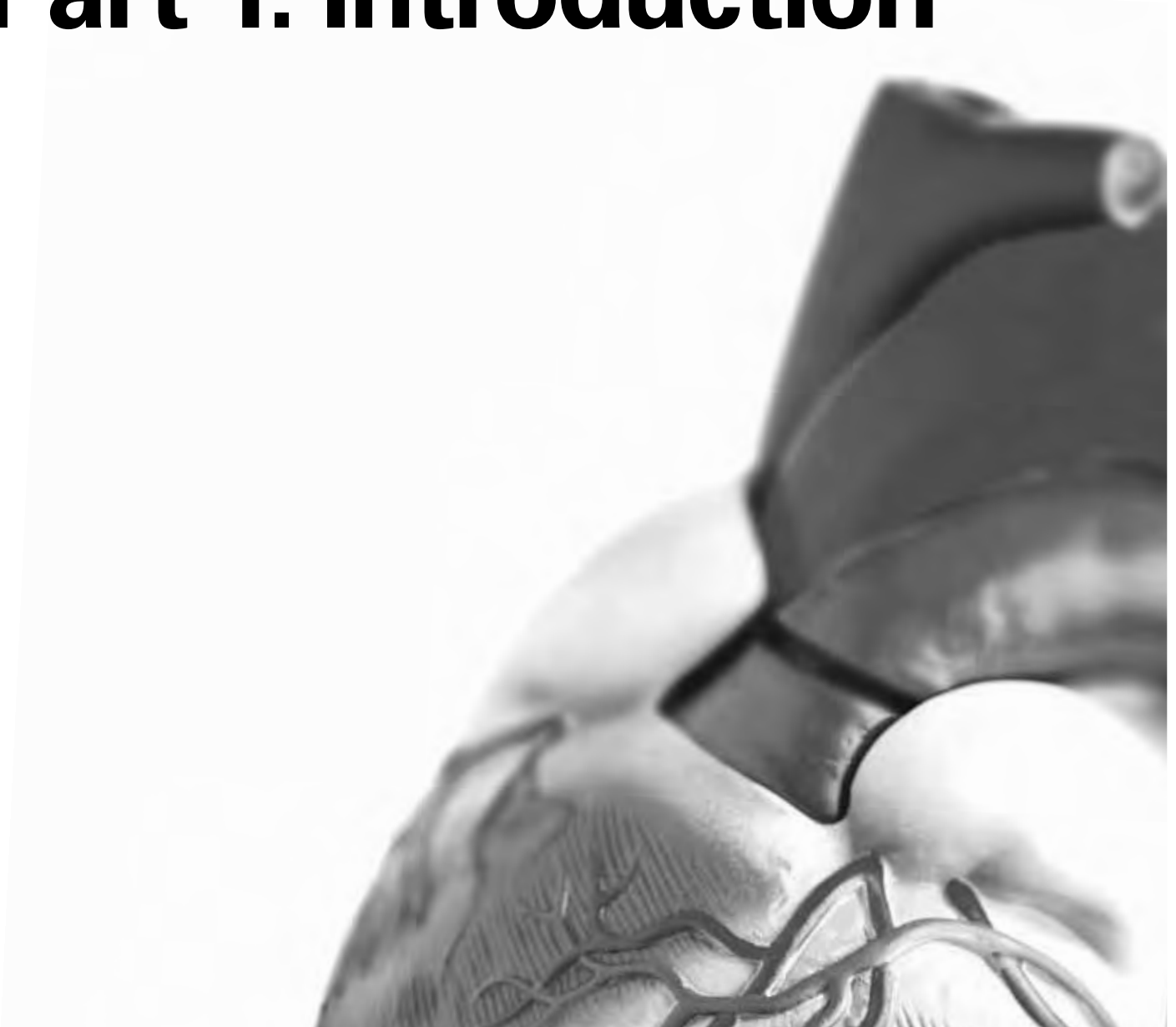
- work with regional planning groups to ensure their strategic plans to develop and monitor services meet patients' needs and address gaps in services
- implement Healthcare Improvement Scotland's recommendations on improving services for patients with heart failure and ensure that patients at risk of stroke are prescribed appropriate drugs
- examine variation in Cardiology services, including tests provided for heart disease, length of stay, day case rates, prescribing, procurement and outpatients, to ensure services are being provided in the most efficient way and identify scope for improving efficiency
- use the Audit Scotland checklist available on our website to help improve the efficiency and effectiveness of Cardiology services.

¹⁵ ISD Scotland and National Procurement are part of NHS National Services Scotland.

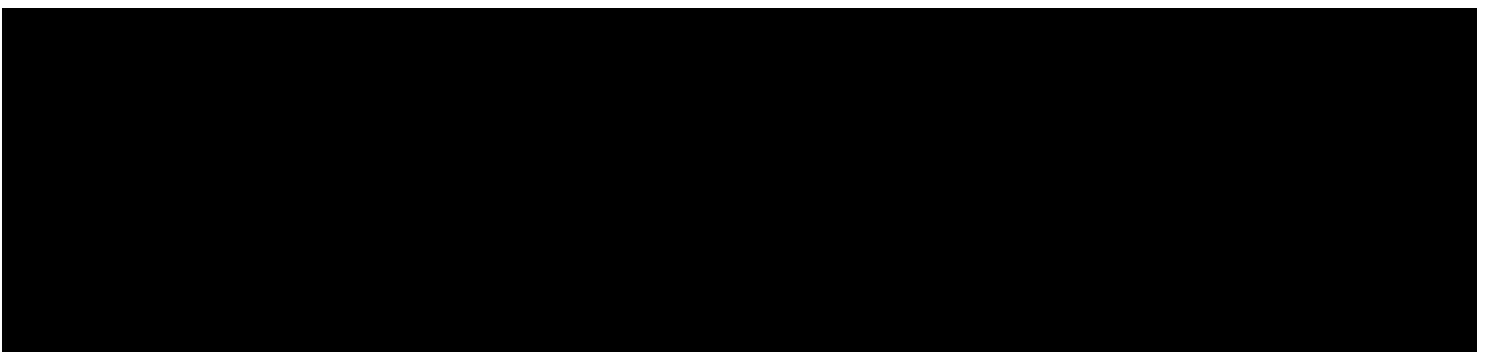
¹⁶ *Heart disease improvement programme: National Overview – Take Heart*, Healthcare Improvement Scotland, September 2011.

¹⁷ *Heart disease improvement programme: Summary Local Reports – NHS Scotland*, Healthcare Improvement Scotland, September 2011.

Part 1. Introduction



The treatment of heart disease is an area of high spending and activity, and a number of services work together to provide complex models of care in hospital and the community.



Key messages

- The treatment of heart disease is an area of high spending and activity and a number of services work together to provide complex models of care in hospital and the community.
- Reported spending on Cardiology services was £146 million in 2010/11, an increase of 50 per cent over the past eight years. This is an under-estimate due to inaccuracies and gaps in the data.
- There are over 660,000 consultations for heart disease in general practice annually. In 2010/11, £167 million was spent on drugs for treating heart disease and stroke in the community, an increase of ten per cent over the last decade.
- In 2009, the Scottish Government published a national action plan that aims to improve services for people with heart disease, prevent disease and tackle health inequalities. Initially there was slow progress in implementing the plan but the Scottish Government and NHS boards are now working to address this.

Heart disease covers a range of conditions that can be treated in different ways

10. The treatment of heart disease is a complex area. An explanation of some of the main conditions, tests and treatments is provided in Exhibit 1.

11. The most common reason for patients with suspected heart disease to be admitted to hospital is for chest pain (38,000 inpatient discharges and day cases), followed by a heart attack (21,270), atrial fibrillation (11,392), heart failure (11,226) and angina (10,346). Hospital discharges for chest pain increased by almost 40 per cent between 2000/01 and 2009/10 from around 27,500 to 38,000.¹⁸ Since 2007/08, hospital discharges for heart attacks have been increasing due to the change in definition of a heart attack and hospitals using more sensitive tests.¹⁹

12. Patients admitted to hospital with chest pain may or may not have a heart condition and further tests and investigations will be required to determine the cause of the chest pain. A considerable amount of Cardiology activity in hospital does not involve a procedure; many patients are admitted to hospital for treatment that is not available in the community and it may involve tests, observation and medical treatment such as prescribed medicines. Common Cardiology tests and treatments include angiography, angioplasty and fitting various devices, such as a pacemaker.

A number of services work together to deliver care to patients with heart disease

13. Patients are referred to Cardiology services for a variety of reasons, such as an emergency admission to hospital for a heart attack or for tests in an outpatient setting to confirm a heart condition. Some patients may attend a hospital emergency department and an acute medical assessment unit before being transferred to a Cardiology ward (Exhibit 2, page 8).

14. Patients with more severe and complex heart disease are generally treated in Cardiology wards. Most Cardiology departments include a Coronary Care Unit for people with serious heart conditions who need special care, for example people who have had a heart attack. However, many patients are also treated in other specialty wards, such as General Medicine wards, but Cardiology staff may still be involved in their treatment. In the island boards, patients with heart disease are treated in General Medicine by consultants or GPs with a specialist interest in Cardiology and then referred to Cardiology wards in hospitals in mainland boards if they need specialist treatment. However, some patients will require surgery to treat their condition, such as a coronary artery bypass graft (CABG), which is carried out in Cardiac Surgery by a cardiac surgeon.

15. The range of tests and treatments provided in each NHS board varies across Scotland. Some Cardiology services are also provided on a regional basis, such as angioplasty for people with heart attacks (Case Study 1, page 9). Cardiac rehabilitation is also provided to some patients within a hospital or in the community to help them recover physically and mentally following a heart attack or Cardiology treatment, such as having a pacemaker fitted. The Golden Jubilee National Hospital provides national Cardiology services for a number of conditions, including advanced heart failure and congenital heart disease. It also provides regional services for NHS boards in the West of Scotland.

¹⁸ Audit Scotland analysis of ISD Scotland SMR01 extracts, 2011 and *Heart Disease Table AC1*, ISD Scotland, February 2011.

¹⁹ A number of sensitive and specific diagnostic tests (biomarkers) have been introduced in recent years to allow more accurate diagnosis of heart attack. These tests measure the amounts of proteins and enzymes (troponin and creatinine kinase) released into the blood when part of the heart muscle is damaged.

Exhibit 1**Summary of the main heart conditions, tests and treatments**

The table describes some of the main conditions, tests and treatments provided to patients with heart disease.

Common heart conditions	Definition
Angina	Heaviness or tightness in the chest due to narrowing of the arteries to the heart restricting blood flow to the heart.
Atrial fibrillation	The most common type of abnormal heart rhythm (arrhythmia) where the heart beats very rapidly and can cause unpleasant palpitations and sometimes breathlessness.
Heart attack Also known as myocardial infarction (MI)	When one of the coronary arteries becomes blocked by a blood clot and part of the heart muscle is starved of oxygen, causing damage to the heart.
Heart failure	When the heart is unable to adequately pump blood throughout the body. It can be caused by a number of other heart conditions. This is a life-limiting condition that people can live with for a number of years and can require a considerable amount of medical care.

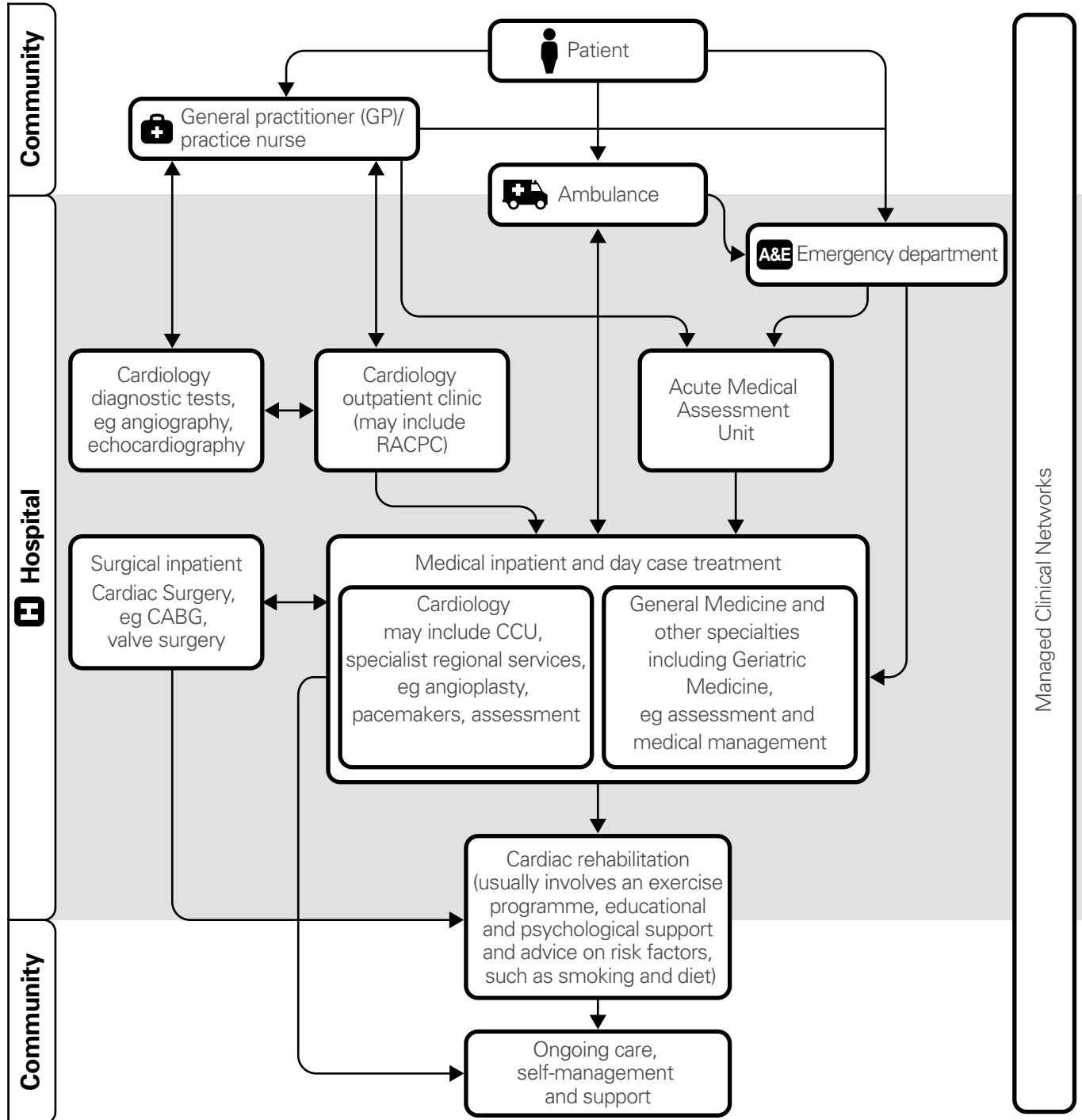
Common tests or treatments for heart disease	Definition
Angiography	An X-ray picture of the arteries that shows if they have become narrowed. A coronary angiography looks at the arteries of the heart. Where we use the term angiography throughout the report it refers to a coronary angiography.
Angioplasty Also known as percutaneous cardiac intervention (PCI) or revascularisation	A treatment to widen a narrowed artery. A catheter (a fine, flexible, hollow tube) is passed into an artery in the groin or arm. A small balloon is inflated in the coronary artery in the heart to flatten a blockage caused by fatty deposits or a blood clot. A stent (a short tube of expandable mesh, like a scaffold) is then usually inserted to keep the artery open. This treatment is provided to people who have had a heart attack, or are at risk of having one, and people with angina. Where we use the term angioplasty throughout the report it refers to a coronary angioplasty.
Coronary artery bypass graft (CABG) surgery Also known as revascularisation	A major operation to bypass a narrowed section or sections of coronary arteries and improve the blood supply to the heart. This is carried out in Cardiac Surgery by a cardiac surgeon. The numbers undertaken are reducing as more patients are now receiving an angioplasty instead, a less invasive and less expensive treatment.
Defibrillator Also known as implantable cardiac defibrillator (ICD)	A device which is implanted within the chest. It monitors the heart rhythm, senses if there is a severe disturbance in heart rhythm (arrhythmia) and if necessary delivers an electrical impulse or an electrical shock to stop the abnormal rhythm. A defibrillator may be used in combination with a pacemaker.
Echocardiography	An ultrasound picture of the heart which shows the structure of the heart and how it is working. It is used in assessing various conditions including heart failure and after a heart attack.
Pacemaker	A device which is implanted in the chest to stimulate contractions of the heart to correct an irregular, fast or slow heartbeat. There are a number of different types of pacemakers depending on the condition and which parts of the heart are affected.

Note: All the terms listed in the table relate to Cardiology, except CABG surgery which is carried out in Cardiac Surgery.
Source: Adapted from *The heart – technical terms explained*, British Heart Foundation, January 2007

Exhibit 2

Accessing Cardiology services in Scotland

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



Note: RACPC is a rapid access chest pain clinic, which is an outpatient clinic with priority access for patients with suspected heart-related chest pain; CCU is a Coronary Care Unit which provides specialist care for severely ill patients, such as those who have had a heart attack; Managed Clinical Networks involve staff from community and hospital settings working together with patients and the voluntary sector to improve services for heart disease patients.
Source: Audit Scotland

The treatment of heart disease is an area of high spending and activity

Estimated spending on Cardiology has increased over the last decade

16. Estimated spending on hospital Cardiology services, including Coronary Care Units, was at least £146 million in 2010/11. However, this is an underestimate as not all costs associated with Cardiology are recorded under the Cardiology specialty:

- Six NHS boards include some or all of their Cardiology costs under General Medicine and do not identify them separately (NHS Ayrshire and Arran, Borders, Highland, Orkney, Shetland, and Western Isles). This means their reported costs for Cardiology are much lower than actual costs.
- Cardiology staff also provide advice and care for heart disease patients admitted to other hospital wards, particularly General Medicine and Geriatric Medicine. In 2009/10, a total of 90,800 discharges for heart disease were recorded for all wards.²⁰ Treatment provided to patients in other wards by Cardiology staff is not well recorded and these costs are generally not included in Cardiology costs.

17. Reported spending on hospital Cardiology services increased from around £80 million in 2002/03 to around £146 million in 2010/11. This represents around a 50 per cent increase in real terms (Exhibit 3, overleaf).²¹ The percentage increase in reported Cardiology spending seems to be higher than for overall hospital specialty spending. For all specialties, excluding long-stay, spending increased by around 40 per cent in real terms from £2.4 billion in 2002/03 to £4 billion in 2010/11.²² Possible reasons for higher increases in Cardiology spending include:

Case study 1

Examples of treatment provided to heart patients

A 70-year-old woman in Edinburgh goes to her GP as she has been feeling tired, breathless and has swollen ankles. She had a heart attack when she was 62, previously smoked and is overweight. Based on her age and symptoms, her GP suspects she may have heart failure and refers her to the local hospital for an echocardiogram, a recommended initial test, which will provide a detailed picture of her heart to help assess the extent of the heart failure. Her GP also refers her to a Cardiology outpatient clinic to discuss the results and treatment with a consultant cardiologist. She is prescribed some drugs at the outpatient clinic to treat her heart failure and a follow-up outpatient appointment is arranged for three months time. She is referred back to her GP for ongoing care and is also referred to a heart failure nurse in the community for further advice and support. However, a few weeks later she becomes rapidly unwell and her GP refers her to hospital. She is first seen in the emergency department and then transferred to an acute medical assessment unit for further assessment. After an overnight stay she is transferred to a General Medicine ward for a few days for further tests and to review her medication. A cardiologist comes to see her while she is in the General Medicine ward to provide specialist advice and discuss the options for ongoing treatment.

A 60-year-old man in Ayr is suddenly taken ill at home. He experiences intense chest pain which radiates down his left arm and breathing is becoming increasingly difficult. His wife calls NHS 24 for advice and staff there arrange for an ambulance to go to his home urgently. The paramedic who arrives at his house uses an electrocardiogram to assess the rhythm and activity of his heart and the results suggest he is having a severe heart attack. The paramedic immediately phones the nearest hospital that provides treatment for heart attacks, Hairmyres Hospital in Lanarkshire (treatment for heart attacks is provided in six regional centres across Scotland), to confirm the diagnosis and let them know they are bringing the patient to the hospital. On arrival at the hospital, he is taken straight to the Cardiology department where he undergoes an angioplasty to remove the blockage from his artery which is causing the heart attack. He is transferred back to Ayr Hospital the next day and remains in the hospital for a few days before being discharged home. He is referred to a cardiac rehabilitation programme in Ayr and back to his GP for ongoing treatment, including medication to prevent a further heart attack. He is also followed up one month later at a Cardiology outpatient clinic in Ayr Hospital.

Source: Audit Scotland

- an increase in inpatient activity in Cardiology wards
- an increase in activity being included in Cardiology rather than General Medicine costs
- an increase in the number and types of tests and treatments available for patients and advances in technology.

20 *Heart Disease Table AC1*, ISD Scotland, February 2011.

21 Cost data for Cardiology as a separate specialty are only available from 2002/03. This includes costs for Paediatric Cardiology services.

22 *Costs Book (R04X) Specialty summary by board*, ISD Scotland, November 2011.

A considerable amount of care for patients with heart disease is provided in the community

18. In general practice, there were an estimated 321,500 consultations for CHD, 56,500 consultations for angina and 279,400 consultations for cardiac arrhythmias in 2009/10.^{23, 24} There are several drugs to treat and prevent heart disease, including statins for controlling cholesterol and beta-blockers for slowing down a fast heart rate. The majority of drugs for heart disease are prescribed by GPs.

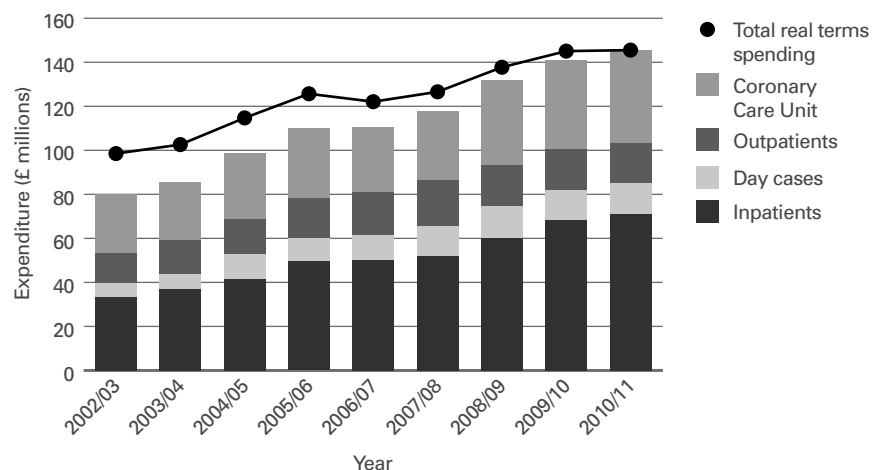
19. In 2010/11, around £167 million was spent on cardiovascular drugs within the community (almost 15 per cent of the total community drugs bill). Most of these drugs are prescribed to treat heart conditions but some may be used to treat other conditions, such as stroke. This is an increase of ten per cent in the last decade from £150 million in 2000/01. Spending reached a peak of £232 million in 2003/04. The decrease in prescribing costs since then is due to a number of drugs becoming cheaper when patents come to an end and NHS boards using more cost-effective drugs (Exhibit 4).²⁵

20. The number of GP prescriptions for cardiovascular disease increased by 61 per cent from 15.3 million in 2000/01 to 24.7 million in 2010/11.²⁶ In 2010/11, the highest amount spent on any single drug in the community (£43 million) was on a statin (atorvastatin).²⁷ The most commonly prescribed drugs by number of items were aspirin (primarily prescribed to help prevent cardiovascular disease) and another statin (simvastatin) – 3 million and 2.9 million items prescribed respectively.²⁸

Exhibit 3

Trends in reported spending on Cardiology services in Scotland, 2002/03 to 2010/11

Spending on hospital Cardiology services, including Coronary Care Units, has steadily increased over the last decade.



Note: Spending on Cardiology services is an under-estimate as not all costs are recorded under the Cardiology specialty (see paragraph 16). Real terms spending takes into account inflation, which is why there is a gap between the trend line for total real terms spending and the bars for actual expenditure.

Source: *Costs Book (R04X) Specialty summary by board*, ISD Scotland, November 2010

National work is under way to improve services for people with heart disease

21. In the mid-1990s, the Scottish Executive identified heart disease, along with stroke, as a national priority. Since then there have been a number of national strategies and targets aimed at preventing heart disease, improving treatment and reducing waiting times.²⁹ The most recent action plan published in 2009 aims to improve services for people with heart disease or who have had a stroke, prevent cardiovascular disease and tackle health inequalities.³⁰ The

action plan includes 32 actions with varying target dates up to the end of 2011 for improvements in:

- prevention and health
- delivering cardiac tests and treatments
- coordinating the introduction of new technologies
- access to and patient experience of cardiac rehabilitation
- heart failure services

23 The number of consultations for cardiac arrhythmias is likely to be an under-estimate as this includes consultations by practice nurses only. GPs will also see a number of patients with this condition.

24 *Practice Team Information*, ISD Scotland, 2010.

25 When a pharmaceutical company first develops a drug it will normally apply for a patent which means that it can only be sold by that company for a certain number of years.

26 *Prescription Cost Analysis for financial year 2010/11*, ISD Scotland, June 2011.

27 Gross ingredient cost is the cost of reimbursement to community pharmacy for drugs and appliances before deduction of any discount.

28 *Top 10 drugs for financial year 2010/11*, ISD Scotland, June 2011.

29 *The Acute Services Review*, Scottish Office Department of Health, June 1998; *Coronary Heart Disease/Stroke Taskforce Report*, Scottish Executive Health Department, 1999; *Coronary Heart Disease and Stroke Strategy for Scotland*, Scottish Executive Health Department, October 2002; *Coronary Heart Disease and Stroke in Scotland Strategy Update*, Scottish Executive Health Department, December 2004; *Better Health, Better Care: Action Plan for NHSScotland*, Scottish Government, December 2007; *Better Coronary Heart Disease and Stroke Care: A consultation document*, Scottish Government, July 2008.

30 *Better Heart Disease and Stroke Care Action Plan*, Scottish Government, June 2009.

- adult congenital cardiac services
- palliative care
- supporting people with inherited cardiac conditions and high cholesterol.

22. Specific examples of actions within the plan include:

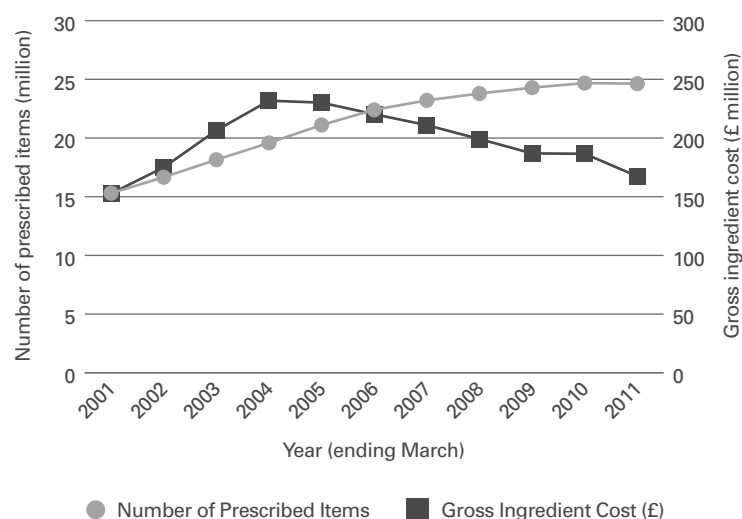
- training all GPs and practice nurses to support patients to make positive changes to their lifestyles
- NHS boards undertaking a needs assessment of cardiac rehabilitation services for all eligible patients to identify priorities and allocate appropriate resources
- NHS boards undertaking a needs assessment of nurse specialists delivering care to heart failure patients, including the potential for delivering out-of-hours cover
- collaboration between cardiac and palliative care Managed Clinical Networks (MCNs) to ensure they implement boards' palliative care delivery plans.³¹

23. The Scottish Government has set up a National Advisory Committee on Heart Disease to monitor NHS boards' performance against the 2009 action plan. Initially there was slow progress in addressing the targets but since 2010, the Scottish Government has taken a more strategic lead in implementing the action plan with the appointment of a lead clinician for Scotland and a national coordinator. Following the review of the heart disease clinical standards in 2011,

Exhibit 4

Trends in GP prescribing for cardiovascular disease, Scotland, 2001–11

The number of prescriptions for cardiovascular disease has increased by two-thirds over the last decade while the costs rose by a tenth.

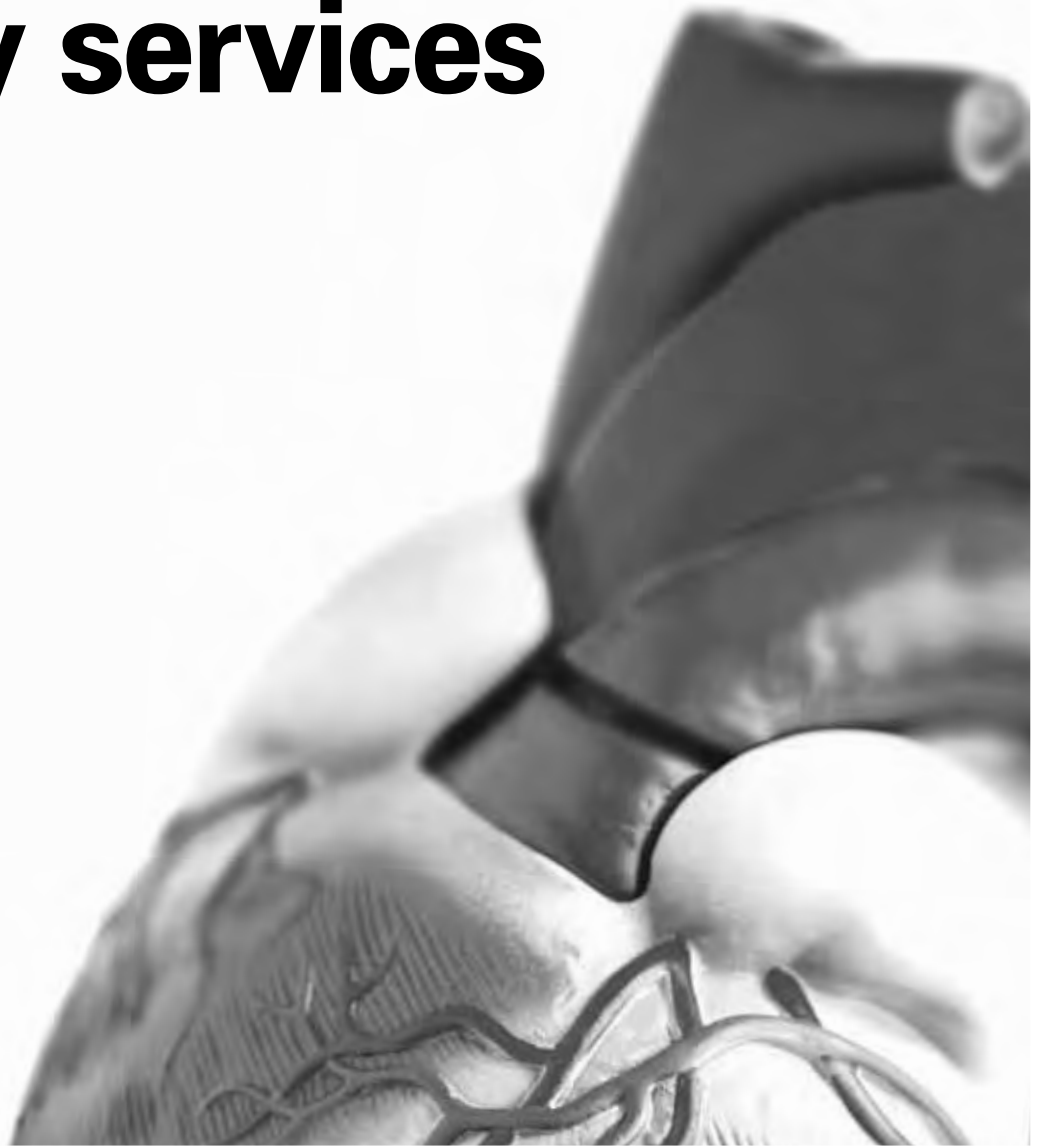


Source: Table G1: Cardiovascular Prescribing, years ending 31st March 2001–11, Prescribing Information System, ISD Scotland, November 2011

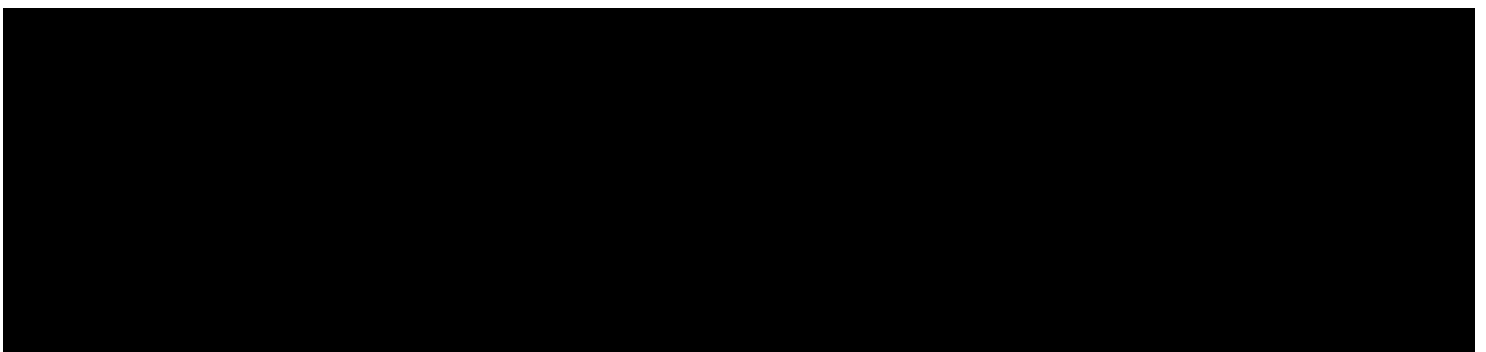
Healthcare Improvement Scotland is developing a number of indicators to allow the Scottish Government and NHS boards to measure and monitor their performance against the clinical standards. The Scottish Government is also working with MCNs to identify gaps in services and prioritise work and to agree definitions and indicators for measuring progress against the action plan. This will inform revised timescales for specific actions within the action plan that were not met within the original target dates.

³¹ Most NHS boards in Scotland have a cardiac Managed Clinical Network (MCN) which aims to improve services for people with heart disease and ensure that patients have the same access to good quality healthcare. MCNs have a role in integrating care across community and hospital settings, quality improvement and performance management, obtaining and negotiating agreement over clinical and other service issues. They also act as the planning forum for the board for matters relating to the treatment and prevention of heart disease.

Part 2. Delivering quality services



More patients are getting Cardiology treatments but more could be done to ensure all patients get the services they need.



Key messages

- More people in Scotland are surviving heart disease with death rates falling by around 40 per cent over the last decade. Waiting times for the two main Cardiology procedures have also gone down.
- More patients are getting Cardiology treatments and the type of treatment they are getting is changing, including less invasive and less expensive treatments.
- More could be done to ensure all patients get the services they need, including those who may benefit from cardiac rehabilitation, those at risk of stroke, heart failure patients and people who have had a severe heart attack.
- People in more deprived communities are not always getting the same level of treatment as the rest of the population which may affect their outcomes.
- Rates of heart disease in Scotland are the highest in Western Europe and are higher for men, some ethnic groups and people in deprived areas. Comprehensive evidence is not yet available on the impact of measures in Scotland that aim to prevent heart disease, such as health checks for high-risk patients but there are plans to evaluate their impact. This evidence would help inform the Scottish Government and NHS boards' priorities for spending on preventative services.

Care and outcomes for heart patients have improved

24. Over the last decade, the NHS in Scotland has made a number of improvements for heart disease patients. More patients are getting more effective treatment, death rates have reduced, people are living longer after treatment and waiting times have fallen. However, there is still inequity in some groups as rates of heart disease and deaths are higher for people living in deprived areas but procedure rates for this group are lower.³²

25. Death rates from all heart disease have fallen by around 40 per cent over the last 11 years (from 216.8 to 129 deaths per 100,000 population), and death rates from heart attack have fallen by almost 50 per cent (from 107.4 to 55.7 deaths per 100,000 population) (Exhibit 5). Death

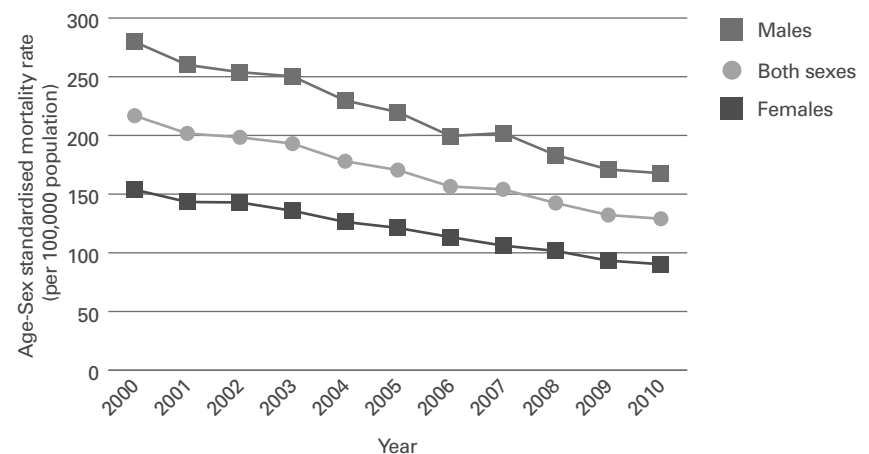
rates are higher for men, people aged 75 and over and people living in the most deprived areas. In general, Scottish rates of heart disease have been the highest in Western Europe over the last 50 years. The gap remained the same until the early 1990s when it started to narrow for both men and women.³³

26. Rates of new cases of CHD have also been decreasing over the past decade, falling by almost a third over the period 2000/01 to 2009/10.³⁴ Over the same period, rates of heart attacks decreased by 45 per cent (7,326 to 4,577 heart attacks).³⁵ The percentage of people who are still alive 30 days after emergency admission to hospital improved between 2000/01 and 2009/10, from 83.1 to 89 per cent for patients who had a heart attack, and from 82.4 to 85.5 per cent for patients with heart failure.³⁶

Exhibit 5

Death rates for all heart disease per 100,000 population, Scotland, 2000–10

Death rates for all heart disease in Scotland have been steadily decreasing over the last ten years.



Source: Table MC1: Trends in mortality 2000–10, Registrar General for Scotland, Death Records, ISD Scotland, November 2011

32 Heart Disease Statistics Update – Year ending 2010, ISD Scotland, February 2011.

33 Scottish Mortality in a European Context – 1950–2000: An analysis of comparative mortality trends, Scottish Public Health Observatory, ISD Scotland.

34 Age-sex standardised rates from Heart Disease Table IC1, ISD Scotland, February 2011.

35 Age-sex standardised rates from Heart Disease Table MC1, ISD Scotland, November 2011.

36 Heart Disease Table S1, ISD Scotland, November 2011.

27. The recent Healthcare Improvement Scotland review of clinical standards for heart disease highlights good care for many patients, including:

- the ambulance service reaches 71 per cent of patients with suspected heart attack within eight minutes with equipment and drugs to treat a heart attack
- once diagnosed with CHD, the prescribing of drugs to prevent a second heart attack is high
- over 90 per cent of patients discharged from Cardiology wards are given advice on symptoms, diet, drugs and exercise.

The treatments available for heart patients have improved

28. More patients are getting Cardiology treatments and the type of treatment they are getting is changing. There are two main procedures for CHD patients with narrowed arteries who are at risk of a heart attack or have had a heart attack:

- Angioplasty – a catheter is passed into an artery in the groin or arm, a small balloon is inflated in the artery in the heart to flatten a blockage and a stent is then usually inserted to keep the artery open.
- Coronary artery bypass graft (CABG) surgery – major cardiac surgery to bypass a narrowed section or sections of coronary arteries and improve the blood supply to the heart.

29. Angioplasty is carried out in Cardiology and is a less invasive and less expensive treatment than CABG surgery. Over the last ten years, the rate of angioplasty has doubled (from 54.3 to 106.4 per 100,000 population) compared to a 40 per cent reduction in CABG surgery (from 51.8 to 29.7 per 100,000 population) (Exhibit 6). This has provided a number of benefits to both patients and the NHS. In addition to more patients receiving treatment overall, fewer are having to undergo major surgery. Also, the average length of stay for angioplasty (four days) is shorter than CABG surgery (nine days). However, some patients may require more than one angioplasty and for patients with more than one narrowed artery CABG may be a less expensive option overall.

30. Over the last ten years, the number of people having either angioplasty or CABG surgery (collectively known as revascularisation) increased by around 50 per cent (from 5,782 to 8,502). The NHS has been able to carry out these additional 3,000 treatments for around the same amount of money (almost £57 million) due to more angioplasty being carried out. Angioplasty is around a quarter of the cost of CABG surgery (£4,012 for angioplasty compared to £15,880 for CABG surgery).³⁷

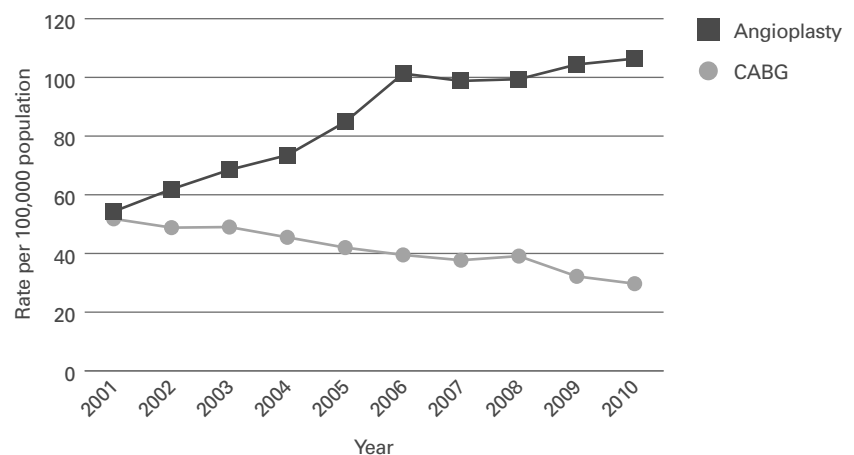
Patients have identified areas for improving the quality of care

31. Care and outcomes have improved for patients with heart disease but patients have identified areas for further improvements in services. In 2008, the British Heart Foundation (BHF) published a report on issues identified by patients on

Exhibit 6

Rates of angioplasty and coronary artery bypass graft (CABG) surgery per 100,000 population, Scotland, 2001–10

Rates of CABG (a more invasive and more expensive procedure) have reduced over the last decade as angioplasty (a less invasive and less expensive procedure) have increased.



Note: Data for 2010 are provisional.
 Source: Table OC1: Trends in numbers of procedures; years ending March: 2001–10. SMR01, ISD Scotland, February 2011.

the implications of living with CHD. Key issues related to treatment and aftercare, access to cardiac rehabilitation and the importance of support and continuity of care.³⁸ BHF and Chest Heart and Stroke Scotland (CHSS) have been working together for over six years to deliver Hearty Voices Scotland. This aims to provide people across Scotland with the skills, confidence and knowledge needed to speak on behalf of heart patients and carers and help to improve health services provided to heart patients.

32. Case Study 2 summarises the findings from focus groups carried out with Cardiology patients as part of our audit. A copy of the full report can be found on our website and includes details on the methodology and findings. The focus groups were managed by CHSS and BHF.

NHS boards are meeting waiting times targets for Cardiology

33. The Scottish Government set a national target for patients with heart disease that they should wait no longer than 16 weeks for treatment from the time they are referred to a rapid access chest pain clinic (RACPC), or after they have been seen in an outpatient clinic by a heart specialist who has recommended treatment. Patients referred to a RACPC should be seen within five working days. However, due to a lack of systems to collect information on the patient's overall wait, waiting times are instead reported for four groups of cardiac tests and treatments which cover both Cardiology and Cardiac Surgery (angiography, revascularisation, valve surgery and all other cardiac treatment). Data on patients seen at RACPC or other outpatient clinics are not collected consistently by boards and these are not published.³⁹ NHS boards set local targets for each group of tests and treatments to ensure they are meeting the overall 16-week target.

Case study 2

Summary of focus groups with Cardiology patients

Participants were generally positive about the treatment and care they have received but identified a number of areas for improvement based on their experience of Cardiology services over the last two years. Participants identified improving communication and information about their condition and treatment as the most important issue for them and felt that addressing this would affect many aspects of how services are provided. This includes clearer information on what tests and treatments patients are getting and when they will get them; consistent information about what drugs they need to treat their heart disease; and better follow-up after treatment by hospital Cardiology services and general practice.

Participants raised a number of issues under three key stages of referral, treatment and follow-up. They raised concerns around delays in diagnosis and referral to specialist services, including symptoms of heart disease not being picked up by GPs or NHS 24 and GPs' reluctance to refer patients to Cardiology services. In some cases patients felt that this resulted in an unnecessary emergency situation, worsening of their condition and distress for the patient and their family.

Although no participants felt they had waited excessive lengths of time for treatment, several reported experiencing stress from the uncertainty of not knowing how long they would have to wait, timescales for treatment changing and lack of information on treatment plans. Some also described experiences of NHS staff not checking patient allergies, giving wrong or unsuitable medication contrary to advice in their medical notes and conflicting information and treatment provided by different staff, particularly with regards to medication. Some patients found that discharge from hospital was not well managed with the information provided by staff unclear, jargon used and long waits for drugs. Participants felt that this could be improved if clearer information was provided about follow-up arrangements and there was a single point of contact for any issues after discharge.

Follow-up after hospital treatment was the stage where participants raised the most issues, including lack of information on what follow-up would be provided and by whom, lack of follow-up by their GP practice, lack of medication review and specific services not being provided that should have been. Lack of continuity in the staff seen and information provided at Cardiology outpatient clinics, particularly at the initial follow-up appointment, were raised as concerns. The main issue was that appointments were often with staff not familiar with the patient's history and it seemed that they had not properly read their notes. Participants felt the ideal solution would be to see the same clinician each time but were realistic that this could not always happen. However, they felt that the NHS could be clearer that they may not always see the same consultant, for example stating this on the appointment letter, and that it is important that other staff not familiar with their case have access to the required information during the clinic appointment.

Source: Focus groups with Cardiology patients managed by CHSS and BHF on behalf of Audit Scotland

³⁸ 100 Voices – The experiences of one hundred heart patients, British Heart Foundation, 2008.

³⁹ Inpatient, Day case and Outpatient stage of treatment waiting times – Monthly & quarterly data to 30 September 2011, ISD Scotland, November 2011.

34. Waiting times for the four main cardiac tests and treatments have reduced. For example, for the two targets most relevant to Cardiology:

- angiography – nine out of ten patients were waiting up to four weeks in 2010/11 compared to 15 weeks in 2002/03 (the number of people seen reduced by a quarter over this time to 6,900)
- revascularisation (treatment with angioplasty or CABG surgery) – nine out of ten patients were waiting up to eight weeks in 2010/11 compared to 35 weeks in 2002/03 (the number of people seen increased by over 50 per cent to 3,200).^{40, 41, 42}

35. All NHS boards met quarterly waiting times targets for cardiac procedures for the quarter ending 30 September 2011, apart from two patients who waited longer than the local target for angiography.⁴³ Data for the last quarter of 2011 are due to be published in February 2012. In 2009/10, Scotland had the shortest waiting times for both angiography and angioplasty compared to the rest of the UK. In Scotland, nine out of ten patients waited an average of 5.5 weeks for angiography while patients in Northern Ireland had the longest wait of over 14 weeks. In Scotland, nine out of ten patients waited just under eight weeks for angioplasty while patients in Wales had the longest wait of almost 15 weeks.⁴⁴

36. NHS boards were also working towards meeting the new target that came into place at the end of 2011 that requires patients to be treated

within 18 weeks from the time they are referred by their GP. This new 18-week referral to treatment target replaces the four cardiac targets. It is too early to comment on performance against this target as data are still being collected. In England, a target for 18 weeks from referral to treatment is already in place and at March 2011 around 95 per cent of Cardiology patients were seen within the target time.⁴⁵

37. During our fieldwork we found that some NHS boards were finding it difficult to join up information on the total time patients waited from referral through to treatment. This can be complex as patients can be treated in different wards, hospitals or even NHS boards. Several boards identified particular areas of pressure in meeting the new waiting times target, such as patients needing electrophysiology tests for abnormal heart rhythms and pacemaker checks. NHS boards were providing additional resources to these areas to try to bring down overall Cardiology waiting times.

More could be done to ensure all patients get the services they need

38. The Scottish Government has set out recommendations for improving services in the national heart disease and stroke action plan.⁴⁶ NHS boards are responsible for implementing most of the actions through their cardiac MCNs which involve community and hospital staff working together with patients and the voluntary sector. Regional planning groups also have a role in planning and delivering services which span more than one board area.⁴⁷ The Scottish Government has

set up a National Advisory Committee on Heart Disease to monitor NHS boards' performance against the action plan (paragraph 23). Work is ongoing to implement the national action plan but there remain gaps in some services for people with heart disease.

It is not clear that all patients who would benefit from cardiac rehabilitation are receiving it

39. Cardiac rehabilitation is recommended for patients who have had treatment for a heart condition and has been shown to help patients recover.⁴⁸ It can take place in hospital or in the community and generally involves an exercise programme and educational and psychological support and advice on risk factors, such as smoking and diet. The Healthcare Improvement Scotland review found that after a heart attack, 79 per cent of patients were referred to cardiac rehabilitation programmes (60 per cent of patients completed the programme). However, it is not clear if patients with other heart conditions who would benefit from cardiac rehabilitation following hospital treatment are being referred to these programmes to the same extent. This includes patients with conditions such as heart failure and those who have had an angioplasty or cardiac surgery. ISD Scotland is continuing to collect information about cardiac rehabilitation and looking at ways to improve information on all patients being referred. The Scottish Government has also committed to work with BHF and CHSS to try to identify ways to improve access for patients and information on all patients being referred.

40 From 1 January 2008, the Scottish Government introduced new guidance for waiting times. Previously patients who were unavailable for treatment for medical or social reasons, such as having another medical condition which needs to be treated first or being on holiday, were removed from the waiting list and could lose their guarantee of a maximum waiting time. The new system introduces the concept of a waiting time clock to calculate the time that patients wait and excludes periods when the patient is unavailable for treatment for medical or social reasons.

41 Data for the quarter ending 31 March 2011 exclude NHS Grampian due to technical difficulties in implementing a new patient management system.

42 Audit Scotland analysis of cardiac waiting times data provided by ISD Scotland, June 2011.

43 *Inpatient, Day case and Outpatient stage of treatment waiting times – Monthly & quarterly data to 30 September 2011*, ISD Scotland, November 2011.

44 *United Kingdom Health Statistics 2010, Edition 4*, Office for National Statistics, November 2010.

45 *Hospital waiting times and list statistics*, Department of Health, 2011.

46 *Better Heart Disease and Stroke Care Action Plan*, Scottish Government, June 2009.

47 There are three cardiac regional planning groups in Scotland which coordinate planning and delivery of services across each region: North of Scotland (NHS Highland, Grampian, Shetland, Orkney and Western Isles); West of Scotland (NHS Ayrshire and Arran, Dumfries and Galloway, Greater Glasgow and Clyde and Lanarkshire, and the Golden Jubilee National Hospital); South-east and Tayside (NHS Borders, Fife, Forth Valley, Lothian and Tayside).

48 *SIGN 57 Cardiac Rehabilitation: A national clinical guideline*, Scottish Intercollegiate Guidelines Network, January 2002.

Heart disease patients at risk of stroke are not always getting appropriate drugs

40. Some people with heart disease are also at risk of stroke. For example, people with atrial fibrillation have an increased risk of developing a blood clot within the heart and if this breaks off it can cause a stroke. Blood-thinning medication, such as warfarin, should be prescribed to patients with atrial fibrillation at high risk of stroke as a preventative measure. But the Healthcare Improvement Scotland review found that this was not done for almost half of patients. It also found that around a third of patients at low risk of stroke were inappropriately being prescribed warfarin which puts them at risk of complications unnecessarily.

41. Healthcare Improvement Scotland has recommended a systematic review of prescribing of recommended drugs for all patients with atrial fibrillation in the community. A new indicator will be included in the Quality and Outcomes Framework (QOF) from March 2012 aimed at improving risk assessment and treatment of atrial fibrillation patients.⁴⁹

The NHS needs to improve services for people with heart failure

42. Heart failure is a life-limiting condition and people can live with disabling symptoms for a number of years. It occurs when the heart is unable to adequately pump blood throughout the body and can be caused by a number of other heart conditions. Healthcare Improvement Scotland's review indicated that heart failure patients are not always receiving appropriate care:

- low numbers of patients are receiving recommended tests, including electrocardiograms (ECGs) (21 per cent) and echocardiography (58 per cent); however, most patients are receiving evidence-based drug treatments
- the level of implantation of cardiac resynchronisation therapy (CRT) devices (a type of pacemaker recommended for some heart failure patients) of around seven per million population is low compared to other European countries and is significantly lower than in England
- few patients are on a palliative care register (two per cent).⁵⁰

43. A considerable amount of care for heart failure patients is provided in the community, including specialist heart failure services. The Better Heart Disease and Stroke Care Action Plan recommends that there is one whole-time equivalent (WTE) Specialist Heart Failure Nurse per 100,000 population. This equates to around 51 WTE across Scotland but does not include any adjustment for remote and rural areas which would increase the number required. In 2008, there were 50.7 WTE heart failure nurses and this reduced to 46.85 WTE in 2011. Caseloads vary from 50 patients per one WTE in NHS Shetland to 140 patients per one WTE in NHS Forth Valley. Posts are funded partly by the NHS and from other sources, mainly the BHF. There is pressure on funding for these posts – NHS Orkney no longer has a specialist heart failure nurse service and other boards, such as NHS Borders and Grampian, are facing uncertainty about funding.⁵¹

44. Heart failure nurses reported that they are receiving many referrals of patients who, if supported sooner by other services, may well not have deteriorated to the level of requiring specialist support. Given the pressure on these specialist services there is limited capacity to deliver education and share their skills and expertise with other community staff to ensure heart failure patients are receiving the support they need.⁵²

45. There is some evidence that heart failure nurses can save the NHS money through reduced hospital readmissions. The BHF found in one area in England that 18 per cent of patients seen by a heart failure nurse were readmitted to hospital compared to 97 per cent of patients not seen by a heart failure nurse. Patients seen by a heart failure nurse who were readmitted to hospital had a shorter length of stay (8.6 nights compared to 11.6 nights for those not seen by a heart failure nurse). The BHF calculated that heart failure nurses have the potential to save an estimated £1,826 per patient seen, which takes into account the cost of the heart failure nurse post.⁵³

46. The Healthcare Improvement Scotland review found a number of gaps in heart failure services. It recommended that NHS boards should have multidisciplinary services that include a heart failure nurse and collect information to allow monitoring and to help improve the services delivered to patients with heart failure.

49 The QOF was introduced in 2004 and is a system for paying general practices for the care provided to patients relating to particular long-term conditions and for funding quality improvements.

50 The Audit Scotland report *Review of palliative care services in Scotland*, published in August 2008, highlighted the importance of palliative care for people with all types of life-limiting conditions and that services were primarily cancer-focused. It recommended that processes should be in place within the NHS to ensure that all patients with life-limiting conditions receive appropriate palliative care.

51 *Scottish Heart Failure Nurse Forum Audit*, 2011.

52 Ibid.

53 *The development and impact of the British Heart Foundation and Big Lottery Fund heart failure specialist nurse services in England*, The University of York, April 2008.

Treatment for heart attack patients has improved but challenges remain to extend access to the most effective treatment across Scotland

47. There are a number of Cardiology treatments for patients with a heart attack. These need to be provided within a short timescale for patients with a severe heart attack. In 2010/11, the ambulance service estimated that around 3,700 patients were taken to hospital with a severe heart attack requiring immediate treatment. The most effective treatment for heart attack patients is angioplasty and it is recommended that patients with a severe heart attack get this within 90 minutes of diagnosis. This treatment is known as a primary percutaneous coronary intervention (primary PCI).⁵⁴ Angioplasty is also the most effective treatment for people with less severe heart attacks but it does not have to be provided within such a short timescale.⁵⁵

48. Over the last five years, the NHS has gradually introduced services for patients with a heart attack in six regional centres across Scotland (Lothian, Golden Jubilee, Grampian, Lanarkshire, Tayside and Highland).⁵⁶ Some patients with a severe heart attack are unable to receive primary PCI treatment due to where they live, such as patients over 40 minutes' travel time from the nearest regional centre providing treatment. This mainly affects patients in NHS Dumfries and Galloway, the island boards and some parts of Highland and other remote and rural parts of Scotland. In addition, NHS Grampian did not provide out-of-hours cover until the end of 2011 and NHS Highland does not provide any out-of-hours cover.

49. Patients who are not able to receive primary PCI treatment are treated with drugs to help dissolve a blood clot that is blocking an artery and restore blood flow in the affected arteries (thrombolysis). Patients should get these drugs immediately and this is often carried out by ambulance staff prior to hospital admission. Some patients may still receive an angioplasty once they are admitted to hospital if the drugs have not been effective. This angioplasty treatment is known as a rescue percutaneous coronary intervention (rescue PCI).

50. Both primary PCI and thrombolysis are effective in treating severe heart attacks by unblocking coronary arteries, although primary PCI has been shown to be far more effective than thrombolysis for reducing deaths, stroke, further heart attacks and the need for heart surgery.⁵⁷ However, due to the geography of Scotland and the way services are currently provided across Scotland, it is not possible for all patients to receive the most effective treatment (Exhibit 7).

51. NHS boards are measuring performance against targets for primary PCI treatment but not the percentage of patients with a severe heart attack who receive this treatment. The Healthcare Improvement Scotland review found that few NHS boards provide either primary PCI or thrombolysis within the required time for all patients with severe heart attacks. The percentage of patients receiving primary PCI in different boards varies due to geography and services in some regional centres are still developing. The Scottish Government is reviewing

the current model. It is considering whether the target times should be extended taking into account more recent evidence that suggests the time from diagnosis to a primary PCI could be extended to 120 minutes. This would potentially allow most severe heart attack patients in Scotland to receive the most effective treatment.

52. Across Europe, different targets are in place and the average time from diagnosis to receiving a primary PCI varies from 60 to 177 minutes (an average of 118 minutes in the UK). The percentage of patients with severe heart attacks receiving primary PCI ranges from five to 92 per cent (24 per cent in the UK).⁵⁸

Procedure rates are low in the UK compared to other European countries

53. There is no clear guidance on recommended rates of Cardiology procedures. These vary among countries in the UK and overall the UK tends to have lower rates of all interventions compared to other European countries. In 2009, 226 primary PCIs per million population were carried out in Scotland, which was similar to England at 230 but Wales was much lower at 116.⁵⁹ Some European countries have much higher rates of primary PCI.⁶⁰ Northern, Western, and Central Europe have well-developed services offering primary PCI treatment, rather than thrombolysis, to 60 to 90 per cent of all patients with a severe heart attack, compared to 24 per cent in the UK. The highest rates are in countries in which almost all PCI centres offer 24/7 primary PCI services. It is difficult to compare the primary PCI rates with death rates as countries use different methods to calculate them.⁶¹

54 *SIGN 93 Acute Coronary Syndromes: A national clinical guideline*, Scottish Intercollegiate Guidelines Network, February 2007.

55 We are using the term severe heart attack to describe what is known clinically as STEMI (ST segment elevation myocardial infarction) and less severe heart attack to describe NSTEMI (non-ST segment elevation myocardial infarction). STEMI is where blood flow to the heart has been interrupted and NSTEMI is where there is a partial blockage in a coronary artery but some blood is still able to flow to the heart muscle.

56 *Better Heart Disease and Stroke Care Action Plan*, Scottish Government, June 2009.

57 These services for treating patients with heart attacks are known as optimal reperfusion therapy.

58 'Reperfusion therapy for ST elevation acute myocardial infarction in Europe: description of the current situation in 30 countries', Widimsky et al., *European Heart Journal*, 2010; 31:943-57.

59 *BCIS Audit Returns Adult Interventional Procedures: January to December 2009*, British Cardiac Interventional Society, October 2010.

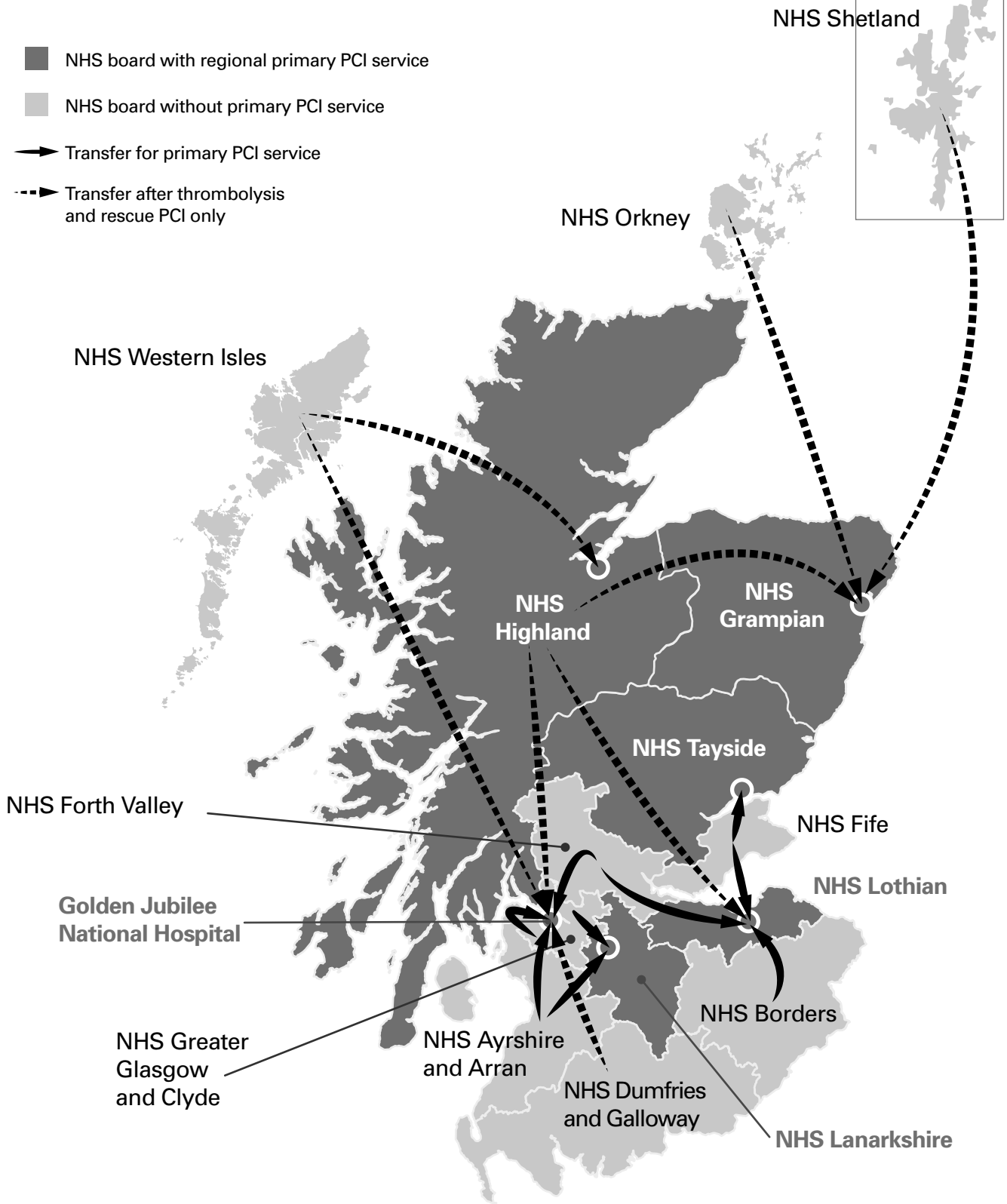
60 Croatia, Hungary, Denmark, Lithuania and Estonia carry out 400-599 primary PCIs per million population and Germany, Poland, Czech Republic and Sweden carry out over 600 primary PCIs per million population.

61 'Reperfusion therapy for ST elevation acute myocardial infarction in Europe: description of the current situation in 30 countries', Widimsky et al., *European Heart Journal*, 2010; 31:943-957.

Exhibit 7

Regional services for patients with a heart attack in Scotland

Six regional centres across Scotland provide services for people with a heart attack.



Note: NHS Grampian did not provide out-of-hours cover until the end of 2011 and is working to longer target times for primary PCI compared to other centres. NHS Highland does not provide any out-of-hours cover. Source: Audit Scotland

NHS boards and the Golden Jubilee need to work together to ensure patients are referred to specialist national services appropriately

54. Due to small numbers of patients and the specialist nature of the treatment, some services are provided on a national basis by the Golden Jubilee, including the Scottish Advanced Heart Failure Service and the Scottish Adult Congenital Cardiac Service. Use of these services varies by NHS boards and there is scope to improve the balance of referrals from NHS boards to ensure patients across Scotland are receiving the most appropriate care. For example, referrals to the Scottish Advanced Heart Failure Service are predominantly from NHS boards in the West of Scotland, with the addition of NHS Tayside. Patients aged 65 and under with severe heart failure should be referred to the national service for consideration of heart transplantation or treatment to improve recovery (ventricular assist device) when conventional treatment such as drugs or complex pacemakers are not suitable. A national advanced heart failure strategy was published in March 2011 and the Golden Jubilee has been raising awareness with NHS boards to increase referrals of patients who meet the criteria early so they are well enough to receive appropriate treatment.⁶²

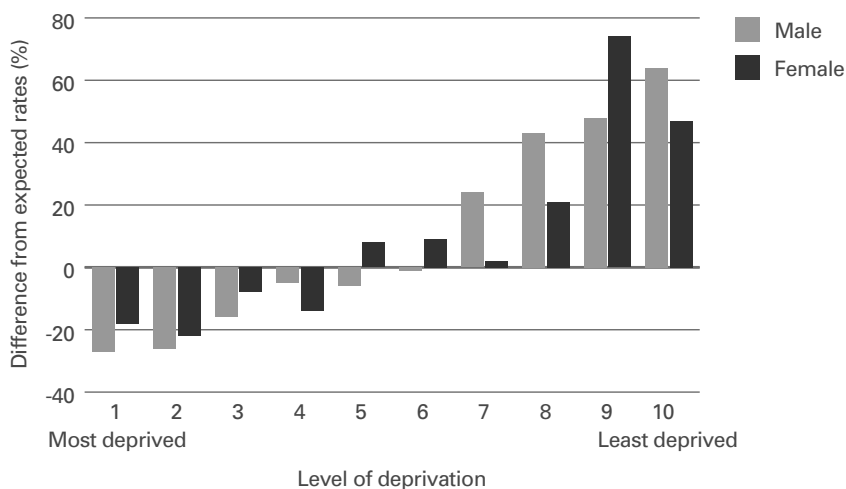
Procedure rates are lower in more deprived areas in Scotland

55. ISD Scotland has examined rates of revascularisation (treatment with angioplasty or CABG surgery) by NHS board, and compared these against the rates that would be expected when age, sex and level of disease

Exhibit 8

Observed versus expected revascularisation (angioplasty and CABG) rates by deprivation category in Scotland, 2008/09

There are fewer procedures being carried out for people in more deprived areas.



Note: Deprivation categories are based on the Scottish Index of Multiple Deprivation (SIMD). Data are plotted from the highest level of deprivation (SIMD 1) to lowest levels of deprivation (SIMD 10). A negative percentage difference represents lower levels of procedure being carried out than would be expected based on the age, sex and level of disease in each category of deprivation

Source: Table DC2, Mortality adjusted ratios for CABG and Angioplasties, SMR01, ISD and National Records of Scotland

(using CHD death rates) are taken into account. Its analysis shows that fewer of these treatments are being carried out for people in more deprived areas – from over 20 per cent less treatments than would be expected in the most deprived area to over 60 per cent more treatments than would be expected in the least deprived areas (Exhibit 8). This was first highlighted in a national report published by the Scottish Executive in 2001, and implies a lower level of access to these treatments for people in more deprived areas.⁶³

56. Research has shown that there may be a number of reasons for people from more deprived areas having lower rates of treatment. One

six-year study that reviewed around 5,500 patients in Glasgow who had a heart attack found that people in more deprived areas were more likely to have a heart attack, less likely to reach hospital alive and more likely to die during the heart attack, therefore reducing the opportunity to receive hospital treatment. Reasons for people in more deprived areas not reaching hospital in time may be due to poorer awareness of the symptoms of a heart attack and higher rates of sudden death from a heart attack for people who smoke.⁶⁴ NHS boards should monitor access to procedures by different groups of the population to help ensure that all patients have appropriate and timely treatment.

⁶² Summary of Scottish National Advanced Heart Failure Service Strategy, NHS National Waiting Times Centre, March 2011.

⁶³ Coronary heart disease/stroke taskforce report, Scottish Executive, 2001.

⁶⁴ 'Effect of socioeconomic group on incidence of, management of, and survival after myocardial infarction and coronary death: analysis of community coronary event register', C Morrison et al, *British Medical Journal*, 314, 1997.

A number of measures aim to prevent heart disease but evidence of their impact on outcomes is limited

57. A number of factors increase the risk of heart disease, including smoking, family history of heart disease, diabetes, ethnic background, high blood pressure, high cholesterol, age, physical inactivity and being overweight.⁶⁵ Many of these risk factors can be controlled or reduced to either prevent heart disease occurring or prevent existing heart disease becoming worse. The risks of heart disease are well known and services should be more targeted to address these risks. There have been improvements in outcomes for heart disease patients but rates of disease and deaths are still higher in the most deprived areas of Scotland and higher in Scotland compared to many other European countries. More evidence is required on the impact of measures aimed at preventing heart disease to help the Scottish Government, NHS boards and other partners make decisions on where to target and prioritise spending.

58. The Scottish Government's 2011 spending review outlined a three per cent real terms decrease in total NHS funding in the five years to 2014/15.⁶⁶ In June 2011, the Christie Commission recommended changes in the way public services are provided to address reduced resources along with demographic and social pressures. It proposed that future public spending on interventions could be reduced by focusing on a preventative approach and recommended prioritising preventative measures to reduce demand and lessen inequalities.⁶⁷

59. A number of measures are in place to help prevent heart disease and there is some evidence on their effectiveness. Several drugs are used to prevent heart disease or further heart attacks, such as statins and aspirin. The number of GP prescriptions for cardiovascular disease increased by 61 per cent in the last decade. Further information on rates of prescribing is presented in Part 3.

60. In 2007, an assessment of CHD clinical guidelines provided estimates of the resources required to implement key recommendations and the potential cost saving and benefits for patients. The main benefits of implementing the guidelines were associated with people at risk of heart disease and stroke being identified, provided with lifestyle advice and prescribed statins. By prescribing statins to people at risk of heart disease and to people who already have heart disease, it is estimated the NHS in Scotland can save almost £13 million per year from avoiding 37,000 days spent in hospital.⁶⁸

61. The QOF has a number of indicators related to heart disease, including blood pressure and cholesterol checks, smoking cessation and prescribing drugs to treat heart disease. Few studies have looked at cost effectiveness of the QOF but one that focused on a small subset of indicators found that QOF incentive payments are likely to be cost effective to varying degrees for most indicators and increase the number of patients being treated, although the cost of administering the QOF scheme was not taken into account.⁶⁹ For example, treating CHD patients with aspirin increases costs

in the short term but is cost effective in the long term as savings are made through reducing hospital admissions. Prescribing betablockers (drugs that slow the heartbeat that are used to treat angina and some other heart conditions) is a low-cost treatment that improves outcomes and quality of life for patients.

62. There is evidence that legislation in Scotland to ban smoking in enclosed public places has improved respiratory and cardiovascular health since it was introduced in 2006. A year after the legislation was implemented, hospital admissions for heart attacks decreased by 17 per cent, compared with only a four per cent decrease in England where there was no such legislation at that time. This compares with an annual reduction in Scottish admissions for heart attack of three per cent per year in the decade before the ban.⁷⁰ Although smoking in adults decreased gradually from 30.7 per cent in 1999 to 24.2 per cent in 2010, this was still higher than the Scottish Government's national target of 22 per cent by 2010.

63. Since 2009/10, following the introduction of the Better Heart Disease and Stroke Care Action Plan, the Scottish Government has a national target to carry out an agreed number of cardiovascular health checks in the most deprived areas in Scotland where rates of heart disease and deaths are highest (Keep Well programme). The health checks are focused on the main risk factors, particularly blood pressure, cholesterol, smoking and diabetes, with the aim of delaying the onset and progression of cardiovascular disease.

65 *Keep your heart healthy*, British Heart Foundation, December 2007.

66 *Scotland's spending review 2011 and draft budget 2012/13*, Scottish Government, 2011.

67 *Report on the future delivery of public services by the commission chaired by Dr Campbell Christie*, Scottish Government, June 2011.

68 *Management of Coronary Heart Disease: A national clinical and resource impact assessment*, Scottish Intercollegiate Guidelines Network, February 2007.

69 'Value for money and the Quality and Outcomes Framework in primary care in the UK NHS', S Walker et al., *British Journal of General Practice*, May 2010.

70 'Smoke-free Legislation and Hospitalizations for Acute Coronary Syndrome', JP Pell et al., *New England Journal of Medicine*, 359(5):482-91, 2008.

64. In 2010/11, all NHS boards exceeded their individual targets of increasing the number of these checks and a total of 41,107 were carried out across Scotland. It is not clear yet what the overall impact of these checks has been on the rates of heart disease, hospital admissions and deaths, although death rates have reduced in the 15 per cent most deprived areas and the gap between the national average and the most deprived areas has narrowed slightly. NHS Health Scotland has commissioned an evaluation of the impact of the programme on outcomes during 2012 to 2015.

65. In November 2011, the Scottish Government announced that over £200 million will be spent over the following three years on preventing the ill health caused in part by alcohol misuse, smoking and obesity, including £35 million on rolling out the Keep Well programme to all 40-64 year olds living in deprived communities.⁷¹ Audit Scotland plans to carry out a performance audit in 2012/13 on progress in tackling health inequalities in Scotland.

Recommendations

The Scottish Government and NHS boards should:

- monitor rates of the main Cardiology procedures, compare these by board and by different groups, particularly in more deprived areas, and with other countries, and review whether variation is warranted or if action needs to be taken to ensure patients are receiving the most appropriate treatment

- continue to improve the evidence base on the impact and cost effectiveness of measures to help prevent heart disease and use this evidence to identify priorities for spending to help improve outcomes and address inequalities, particularly in deprived areas.

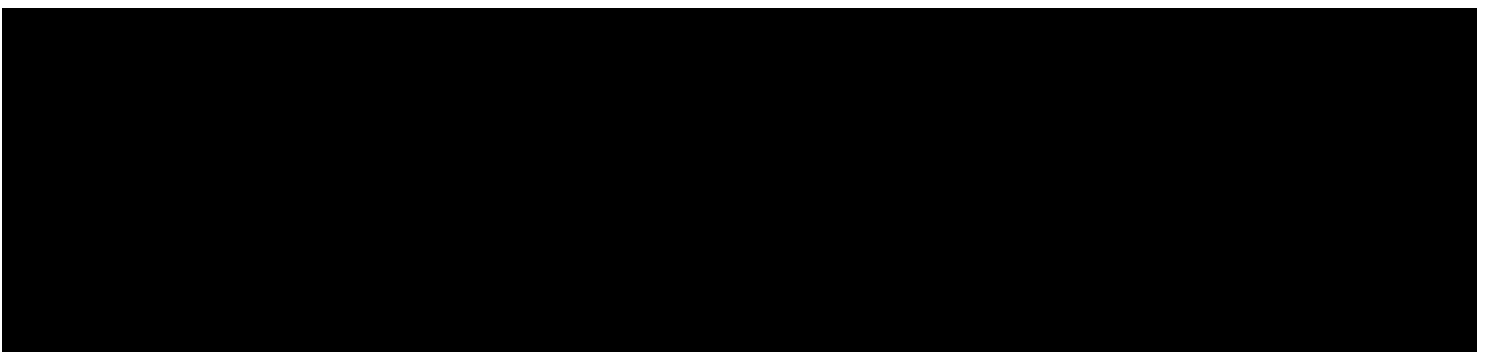
NHS boards should:

- ensure that all staff providing care to heart disease patients are aware of the main issues raised by patients and work with Chest Heart and Stroke Scotland, British Heart Foundation, other relevant groups and patients to address these locally
- ensure patient systems are joined up within and between NHS boards to monitor overall waiting times across the complex pathway for Cardiology patients
- work with regional planning groups to ensure their strategic plans to develop and monitor services meet patients' needs and address gaps in services
- ensure patients are referred to regional and national services for the most appropriate treatment if it is not available locally
- implement Healthcare Improvement Scotland's recommendations on improving services for patients with heart failure and ensure that heart patients at risk of stroke are prescribed appropriate drugs.

Part 3. Value for money



There is scope to deliver Cardiology services more efficiently.



Key messages

- Demand for Cardiology services is growing at the same time as there are increasing pressures on public sector funding. The NHS needs to ensure it is providing services as efficiently as possible.
- There is scope to make efficiency savings of at least £4.4 million in a number of areas such as using less expensive tests, reducing length of stay, increasing day case rates and making savings in prescribing and procurement. In outpatients, there is scope to improve referral processes, reduce demand and increase the number of available appointments. These efficiency savings are a conservative estimate as we have not been able to calculate savings in a number of areas due to limitations in the data.
- Cardiology is an area of significant spending, but limitations in cost and activity data make it difficult for the Scottish Government and NHS boards to compare performance, assess whether these services are providing value for money and identify potential improvements in efficiency.

Improving efficiency in Cardiology services is important to meet increasing demand

66. The number of people having Cardiology treatments is increasing, particularly for older people and people are also living longer with heart conditions. The number of people aged 65 and over in Scotland is projected to rise by around 22 per cent over ten years (from 879,000 in 2010 to 1,075,000 in 2020), and by around 63 per cent over 25 years (to 1,431,000 in 2035).⁷² Increases in demand and developments

in treatments will put increasing pressure on Cardiology services at a time of reducing resources across the public sector. It is important for NHS boards to assess value for money and identify scope for improving efficiency. This needs to be supported by reliable information on cost, activity and quality.

67. Efficiency savings are:

- providing the same for less – lower costs of delivery while maintaining service quality, for example providing more treatments as day cases or reducing length of stay for patients in Cardiology wards
- providing more for the same – improving the quality and/or quantity of service within existing budgets, for example providing more revascularisation (angioplasty and CABG surgery) where appropriate to CHD patients for the same amount of money.

NHS boards could provide patients with less invasive and less expensive tests

68. There are a number of standard tests that produce different types of images of the heart structure, arteries and flow of blood to the heart. These are used to diagnose heart conditions and assess any damage to the heart:

- Electrocardiography (also known as ECG, used to measure electrical activity of the heart) and echocardiography (uses ultrasound to produce an image of the structure of the heart) are both standard tests for heart disease.
- In other cases it is necessary to get an image of the heart under pressure (stress echocardiography, usually involving the patient being given a drug to make the heart work harder).

- Some boards have access to nuclear imaging which involves the use of radioactive material to produce an image of the heart.
- In some cases, different non-invasive tests are required to get a clearer image of the structure of the heart (MRI scan) or of the arteries (CT coronary angiography – using a CT scanner).

69. In addition to these tests, angiography can also be used to provide images of the arteries in the heart. This involves inserting a catheter into the artery and is more invasive for patients than a scan. Angiography is often required for patients who have confirmed heart disease to get a detailed view of damage to the arteries prior to treatment. But it should not necessarily be used as the first test for all patients, such as those presenting with chest pain for example, as less invasive and less expensive tests can be used to rule out heart disease in many patients.

70. There is some variation in the types of diagnostic tests provided by NHS boards. All boards have local access to ECG and echocardiography. However, stress echocardiography, CT coronary angiography and cardiac MRI scanning are not available in all boards. There is evidence that boards that do not provide some or all of these less expensive and non-invasive tests have higher rates of angiography (NHS Highland, Borders, Lanarkshire, Grampian, Dumfries and Galloway, and Ayrshire and Arran). Where boards do not have diagnostic tests provided locally, patients are referred to another board for this treatment if appropriate (Exhibit 9).

71. NHS boards should review the range of tests for patients with heart disease provided locally and explore potential efficiencies to be made by providing more non-invasive tests, such as stress echocardiography, CT coronary angiography and cardiac MRI scans as the first test rather than

angiography when appropriate. Most boards will have the equipment within radiology departments to provide these tests. But boards may have to invest in staff training and software for the specific heart disease tests and ensure they have sufficient capacity within the radiology department which will incur initial costs. Some patients may still require angiography

following a less invasive test but there is potential to reduce the number of patients requiring angiography if less invasive tests are used as first-line investigations to screen patients requiring further treatment.

72. For example, NHS Lanarkshire is producing a business case for providing more non-invasive tests locally and the

estimated cost of purchasing software for a CT coronary angiography service is £20,000. In addition, there would be costs for training a radiographer and for a consultant cardiologist or radiologist to supervise and report the scans. The estimated cost of a CT coronary angiography scan is around £330 compared to £1,398 for standard angiography.⁷³ Based on these costs,


Exhibit 9

Tests for heart disease provided locally compared to rates of angiography by NHS board

NHS boards that do not provide some or all of the key tests locally (stress echocardiography, CT coronary angiography and cardiac MRI) tend to have higher rates of angiography.

NHS board of residence	Stress echo cardiography	CT coronary angiography	Cardiac MRI	Nuclear Cardiology imaging	Angiography	Average rate of angiography per 100,000 population (2007/08 – 2009/10)	Number of angiography procedures carried out (2009/10 only)
Highland						406	1,291
Borders						386	413
Lanarkshire						347	1,900
Grampian						340	1,801
Dumfries and Galloway						338	503
Ayrshire and Arran						317	1,114
Greater Glasgow and Clyde						303	3,561
Forth Valley						282	855
Lothian						281	2,298
Fife						264	864
Tayside						228	846

 Available in local NHS board

 Not available in local NHS board, patients referred to another board if required

Notes:

- The rate of angiography is calculated as the mean activity divided by the mean population over the three-year period 2007/8 to 2009/10.
- The number of angiographies carried out in 2009/10 is by board of residence. In some boards this is not carried out locally and patients will travel to another board area for the test.
- The Scottish average rate of angiography is 311 per 100,00 population.
- In NHS Tayside, stress echocardiography, CT coronary angiography and cardiac MRI are not funded by the board but a small number of each test are undertaken in consultation with Radiology and also through research projects. The Golden Jubilee also provides a number of tests (echocardiography, CT coronary angiography, cardiac MRI and angiography) but does not serve a single board population.
- Island boards have been excluded from the table as there is limited opportunity for increasing non-invasive tests as they do not generally have CT or MRI scanners.

Source: Imaging survey data from Lead Clinician for Heart Disease Scotland and Audit Scotland analysis of ISD Scotland SMR01 extracts, 2011

efficiency savings of £0.5 to £0.8 million could be made across Scotland if the number of standard angiography procedures was reduced by 10–15 per cent in the boards with higher rates by providing more CT coronary angiography. This would also be better for patients as it would reduce the need for more invasive tests with no impact on their outcomes. It would also reduce the need for patients to travel to other boards for tests that are not provided locally.

The NHS could make efficiency savings of around £1.5 million a year by reducing length of stay for some heart conditions

73. Beds in General Medicine and other specialties are used for treating heart patients and Cardiology staff are often involved in their care. However, this activity is not generally included in Cardiology bed numbers within national statistics, which means Cardiology activity is generally under-recorded. It has not been possible to get detailed information on how long patients are staying on different wards as part of their overall hospital stay. Instead we have looked at total length of stay in hospital across all wards for a number of heart conditions and procedures and found that this varies by NHS board.⁷⁴

74. For all heart patients admitted to hospital for treatment, heart failure patients account for the most days spent in hospital (Exhibit 10). Heart failure patients also have the longest length of stay, a median of eight days.⁷⁵ Heart attack patients account for the second highest amount of bed days and there is some variation in

length of stay by NHS board from the Scottish median of five days (Exhibit 11).

75. If NHS boards can address variation in length of stay this would mean more patients could be treated using the same resources. There is scope to save an additional 4,700 days in hospital if the mainland NHS boards with a longer median length of stay for heart failure, heart attack, angina and atrial fibrillation can reduce their median length of stay to the national median. This equates to a potential efficiency saving of around £1.5 million a year.⁷⁶

76. Overall length of stay for heart attack varies by board, and boards in remote and rural areas tend to have a longer length of stay. For patients

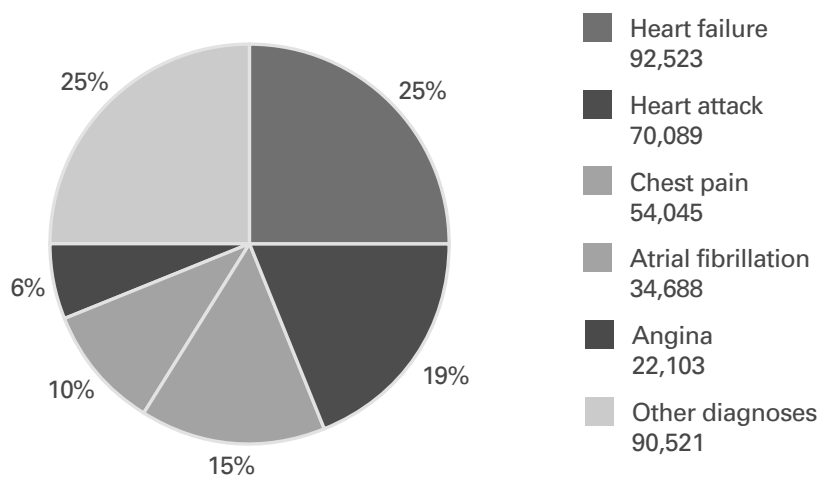
in these areas, length of stay for emergency admissions includes transfer times to main hospitals providing Cardiology treatment, such as transfer from island boards to mainland boards.

77. Activity data do not distinguish between the most severe type of heart attack and less severe heart attacks.^{77, 78} NHS boards have advised us that patients with more severe heart attacks tend to have a shorter length of stay than other heart attack patients, typically around two to three days compared with the average of five days for all heart attack patients. Treatment needs to be administered immediately in patients with a severe heart attack to unblock the coronary artery quickly, whereas patients with less severe heart attacks can be

Exhibit 10

Percentage of days spent in hospital by diagnosis, 2009/10

Over 40 per cent of days spent in hospital are for patients with heart failure and heart attacks.



Note: Data are included where patients had only the one specified condition. This accounts for 84 per cent of all heart disease patients.

Source: Audit Scotland analysis of ISD Scotland SMR01 extracts, 2011

74 Patients may be treated in a different board to where they live and the length of stay figures presented here are for the whole hospital stay which may involve transfers between hospitals and boards.

75 We have used median to calculate average length of stay which is the mid-point of the data. It is more reliable than using the mean as it is not skewed by outliers.

76 The average inpatient overnight cost for 2009/10 from the Costs Book, ISD Scotland is £321.

77 In October 2010, ISD Scotland issued an additional diagnosis code to allow severe and less severe heart attacks to be distinguished. Use of this code is still incomplete in some areas and ISD Scotland is working with NHS boards to implement it fully. Guidance on how the code should be applied can be found here: http://www.isdscotland.org/Products-and-Services/Terminology-Services/Clinical-Coding-Guidelines/coding-guidelines-october10_26_amended.pdf

78 We are using the term severe heart attack to describe what is known clinically as STEMI (ST segment elevation myocardial infarction) and less severe heart attack to describe NSTEMI (non-ST segment elevation myocardial infarction). STEMI is where blood flow to the heart has been interrupted and NSTEMI is where there is a partial blockage in a coronary artery but some blood is still able to flow to the heart muscle.

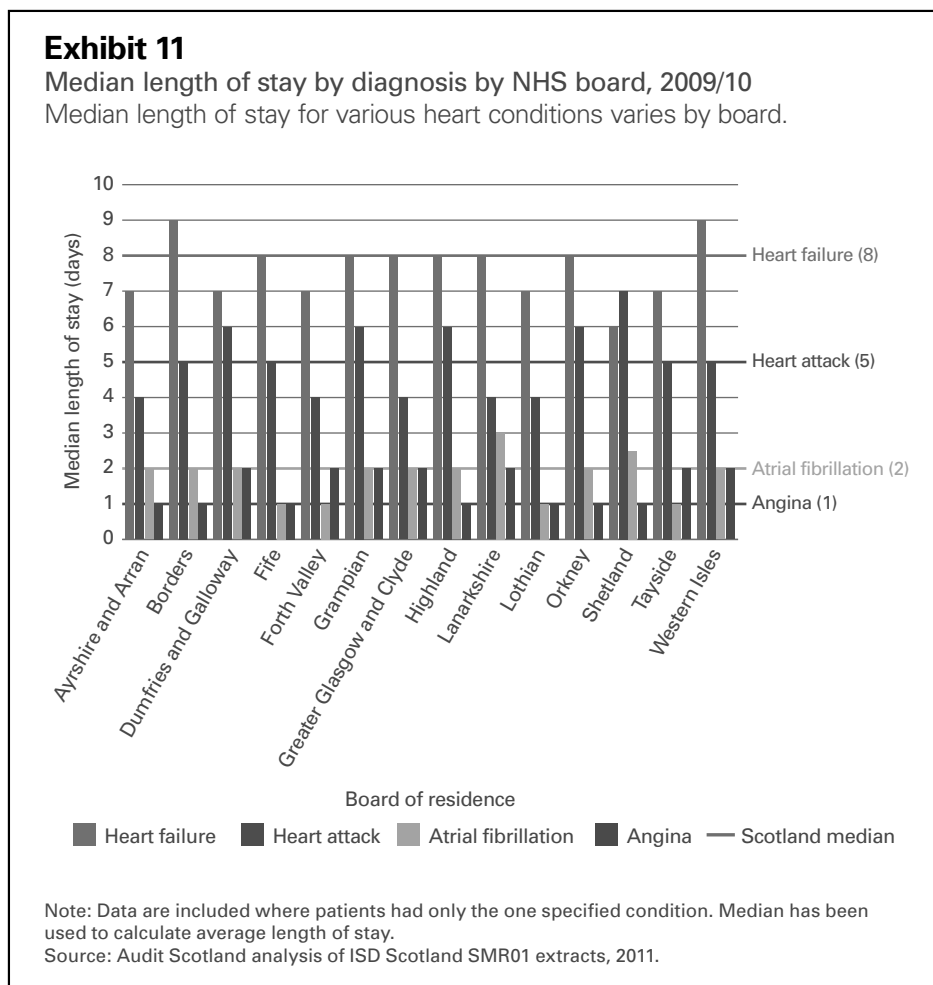
admitted to hospital and then wait a few days for treatment due to the less critical nature of their condition. However, as the data do not distinguish between different types of heart attack, length of stay for different heart attack patients cannot be properly monitored or compared across NHS boards.

78. For atrial fibrillation and angina patients, length of stay is shorter and there is less variation among NHS boards. Only NHS Shetland and Lanarkshire had a longer stay for atrial fibrillation than the median average of two days (2.5 and three days respectively). All NHS boards had a length of stay of one or two days for angina (the national median length of stay was one day). Chest pain is the most common reason for patients to be admitted with suspected heart disease. However, it only accounted for 15 per cent of days spent in hospital for all heart patients and the median length of stay was one day in all NHS boards.

Further efficiency savings could be made by reducing length of stay for some Cardiology procedures

79. There is scope to save an additional 3,000 bed days if the NHS boards with a longer length of stay for angiography, angioplasty and pacemakers can reduce their average length of stay to the national median. However, use of beds for procedures overlaps significantly with the 4,700 days saving calculated for reducing length of stay for some heart conditions and it is difficult to determine the efficiency saving in addition to £1.5 million this would produce.

80. Angiography, angioplasty and pacemakers account for the majority of days spent in hospital for patients admitted for a Cardiology procedure. The median length of stay for angiography for Scotland is four days but varies considerably by NHS board



from one to 7.5 days. For angioplasty, the median length of stay for Scotland is three days, ranging from one to four days and eight days in NHS Shetland. For patients receiving both an angiography and an angioplasty there is less variation. The median length of stay for Scotland is four days but for residents from NHS Orkney and Shetland it is seven and nine days respectively. For pacemakers, the median length of stay for Scotland is three days but this varies considerably by NHS board from two to ten days (Exhibit 12, overleaf).⁷⁹

81. NHS boards have already made efficiency savings by increasing the rate of angioplasty and reducing the rate of CABG surgery which has reduced the overall number of

days patients spend in hospital and the length of stay for patients (see paragraphs 28 to 30 in Part 2).

NHS boards could increase the percentage of procedures carried out as day cases

82. There is scope to make better use of resources in Cardiology services through carrying out more procedures as day cases, where clinically appropriate, rather than patients having to stay in hospital overnight. This is better for patients as they spend less time in hospital, and is also a more efficient use of resources as beds are freed up for other patients.⁸⁰ Currently there is no guidance or targets for the percentage of Cardiology procedures that should be carried out as a day case.

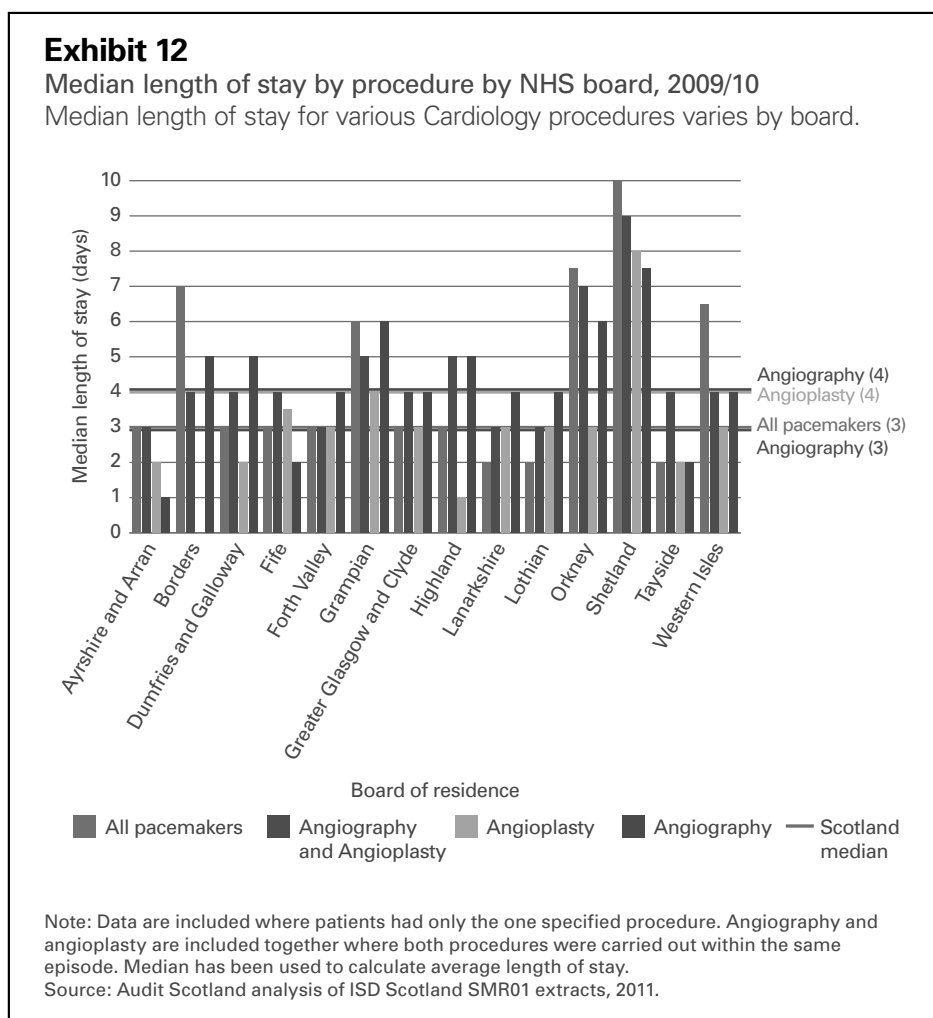
⁷⁹ Pacemakers include all types of pacemakers under OPCS codes K60 and K61 with the majority of pacemakers recorded as: single chamber, dual chamber, renewal and a general implantation category (Office of Population, Censuses and Surveys (OPCS) classification of surgical operations and procedures).

⁸⁰ *Day surgery in Scotland – reviewing progress*, Audit Scotland, September 2008.

83. The Golden Jubilee and seven of the 14 NHS boards carry out angiography. Our analysis shows that the majority do over 80 per cent of angiography as day cases, apart from NHS Tayside and Lothian where around 60 per cent are done as day cases (Exhibit 13). However, there are inconsistencies in how NHS boards record these data. ISD Scotland records day cases separately from inpatients and defines a day case as a planned stay in hospital which does not involve an overnight stay. But some boards are using different definitions, such as including a stay in hospital of less than 24 hours as a day case even if it included an overnight stay and some boards are recording stays of less than 24 hours as inpatient stays. This will affect the accuracy and comparability of day case activity across Scotland. Issues with data recording were even more apparent when we looked at angioplasty activity and we have been unable to include this in the report as these could not be resolved.

84. There is scope for some boards to carry out more procedures as day cases if they are able to perform at the same rate as the national average. For angiography, an additional five per cent of cases (483) could be carried out as day cases if NHS Lothian and Tayside were able to increase to the national average of 80 per cent.

85. Although we have been unable to include comparable day case data for angioplasty, we found some examples of good practice in our fieldwork. At the Golden Jubilee, the majority of patients receiving angioplasty are treated as a day case unless there are complications. Around 95 per cent of angioplasty patients have the procedure carried out through an artery in their arm (radial) rather than in their groin (femoral) as, although more difficult to perform, patients are less likely to have bleeding and bruising and have a quicker recovery period. Patients are discharged home and followed up the next day by telephone to make sure they are not



experiencing any problems as a result of the procedure.

86. There is less scope to provide other procedures as day cases as patients often require an overnight stay so that staff can monitor them or check their fitted devices are in place and working before they are discharged from hospital. However, from our analysis it appears there is still some variation in the percentage of these other procedures carried out as day cases. For example, NHS Grampian has higher rates than most other NHS boards with 17 per cent of pacemakers fitted as day cases compared to a Scottish average of five per cent; and 69 per cent of ablation (a procedure used to correct certain types of heart-rhythm disorders) carried out as day cases compared to a Scottish average of 30 per cent.

87. NHS boards should work with ISD Scotland to ensure that day case activity is being recorded consistently to allow comparison of day case rates across Scotland. NHS boards should also review day case rates for Cardiology procedures and identify if there is scope to increase this.

Outpatient clinics could be used more efficiently

88. From 2008/09 to 2010/11, the Scottish Government had a target for NHS boards to deliver agreed improved efficiencies in outpatient clinics for:

- Did not attend (DNA) rates for first outpatient attendances – patients referred to an outpatient clinic who fail to turn up and do not contact the hospital to let them know they will not be attending. This is the waste of an appointment that could have been used by another patient.

- Review to new outpatient attendance rates – patients may be asked to return to an outpatient clinic for follow-up but the number of follow-up appointments can vary by consultant and board. The national target requires NHS boards to limit the number of follow-up appointments and to allow specialists to see more new patients.

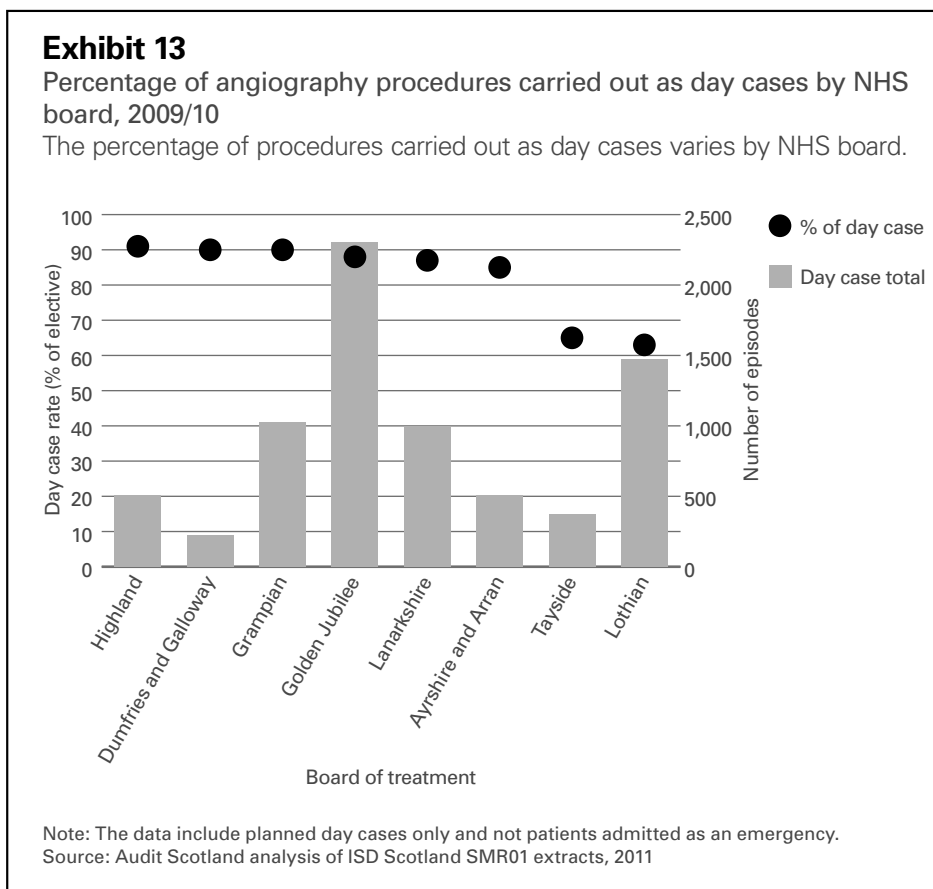
Improving return to new rates will improve efficiency

89. Individual targets for boards are agreed with the Scottish Government depending on current performance. The average return to new rate for Cardiology outpatients is 1.4 return patients for every one new patient, ranging from 0.6 in NHS Dumfries and Galloway to over 2.0 in NHS Ayrshire and Arran, Borders, Fife, Forth Valley and Lanarkshire (Exhibit 14, overleaf). If NHS boards with the higher return to new rates can reduce these then it would allow Cardiology staff to see more new patients with suspected heart disease.

Patients failing to attend Cardiology outpatient clinics cost the NHS £1.6 million in wasted outpatient consultations

90. In 2009/10, 4,151 patients failed to attend a new appointment and 9,443 patients failed to attend a return appointment across all NHS boards. This equates to a cost of £1.6 million to the NHS for wasted Cardiology outpatient consultations, although the return appointment numbers are likely to be an under-estimate which means the cost is likely to be higher.⁸¹ If NHS boards address this then it would allow Cardiology staff to see more patients in outpatient clinics.

91. More patients fail to attend return Cardiology outpatient appointments compared to new appointments and the percentage of patients failing to attend varies by NHS board. The average DNA rate for new patients



is eight per cent and ranges from three per cent in NHS Dumfries and Galloway to 11.5 per cent in NHS Greater Glasgow and Clyde. The average rate for return patients is 13 per cent and ranges from four per cent in NHS Dumfries and Galloway to 18.5 per cent in NHS Lanarkshire (Exhibit 15, page 31). Across Scotland, the percentage of patients failing to attend outpatient appointments is higher in more deprived areas and on average around 17 per cent in the most deprived areas compared to around eight per cent in the least deprived areas.

Good practice in improving efficiency in outpatient clinics should be shared across Scotland

92. Audit Scotland's review of telehealth highlighted some examples of boards using telehealth to improve patients' healthcare and quality of life while making cost savings.⁸² For example, using video-conferencing to

link a Cardiology clinic in Mid Argyll Hospital with a consultant cardiologist in Glasgow Royal Infirmary reduced the distance patients in Argyll needed to travel by an average of 165 miles. Evaluations of telehealth initiatives in Scotland have found that patients' experiences have been positive. Patients using video-conferencing to access a Cardiology outpatient service said the local appointment was more relaxed than travelling to a busy distant hospital and also meant less time off work.

93. The Scottish Government is planning to work with NHS boards to reduce demand for outpatient clinics as part of the Efficiency and Productivity Framework, including managing more patients with long-term conditions in the community. We found examples of this approach already happening in some NHS boards (Case Study 3, page 32).

81 The average cost of a Cardiology outpatient appointment is £119 – R04opX: *Specialty Outpatient Summary, Costs Book*, ISD Scotland, November 2010.

82 *A review of telehealth in Scotland*, Audit Scotland, October 2011.

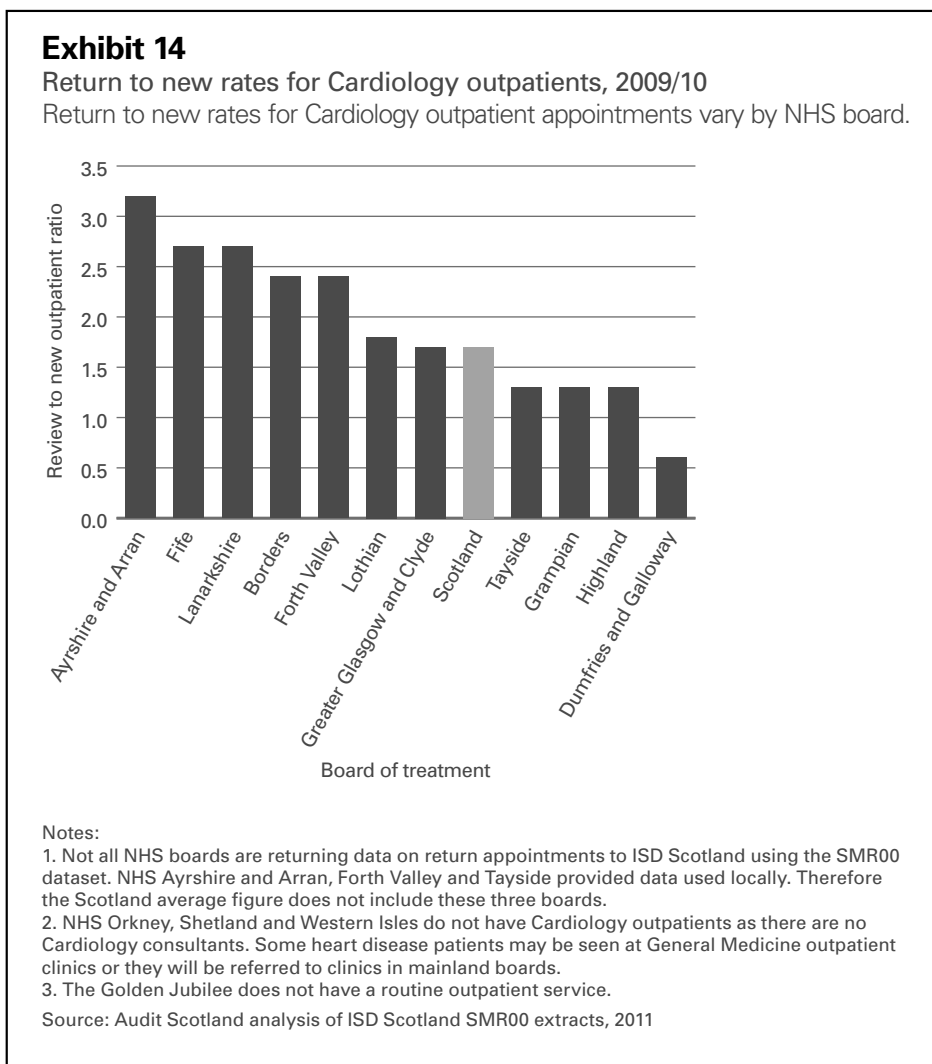
National procurement contracts are achieving savings but more cash savings could be made by NHS boards

94. NHS National Procurement has a number of contracts in place for commonly purchased and important goods and services within the NHS. There are a number of contracts relevant to Cardiology services, including contracts for drugs, stents and pacemakers. NHS National Procurement negotiates standard prices and agreed discounts with various independent suppliers. For the stents and pacemakers contracts, NHS boards agree locally with each supplier the types and quantities of equipment to be supplied. Items on these contracts vary in price and there may be good clinical reasons to use a more expensive item. However, there is variation across Scotland in purchasing within the contracts and there is scope for NHS boards to make further cash savings.

95. The national contract for cardiovascular and respiratory drugs covers many of the drugs used in hospital to treat stroke and respiratory disease, as well as heart disease. The contract is estimated to make annual cash savings of £368,000 across Scotland based on overall spending of around £2.2 million. This includes significant cash savings from Cardiology drugs:

- Clopidogrel (prescribed after a recent heart attack, stroke or angioplasty to prevent blood clots) – £109,000 (82 per cent reduction in cost compared to before the contract was in place).
- Bisoprolol (a beta-blocker) – £58,000 (85 per cent reduction).

96. A wider range of cheaper options has become available for both these drugs due to more companies supplying the drugs. Because it is



dealing with higher volumes, NHS National Procurement is able to agree better discounted prices with a number of companies than could be achieved by a single NHS board.

97. The national contract for stents (used during an angioplasty to keep the coronary artery open) includes bare metal stents which range from £70 to £125 each depending on supplier, and drug-eluting stents which range from £315 to £340.⁸³ Annual spending on drug-eluting stents was £2.4 million in 2010/11 and NHS National Procurement estimates this will reduce to £1.9 million in 2011/12. Spending on bare metal stents is expected to reduce from £600,000 to

£500,000. Within the national contract there are limited opportunities for boards to make further savings by using less expensive drug-eluting stents. However, there is potential to make further cash savings across Scotland of around £137,500 (25 per cent of the overall cost) for bare metal stent purchases if NHS boards used the suppliers providing stents at £70 per unit as NHS Lanarkshire has, with around 80 per cent of its stents at this lower price.

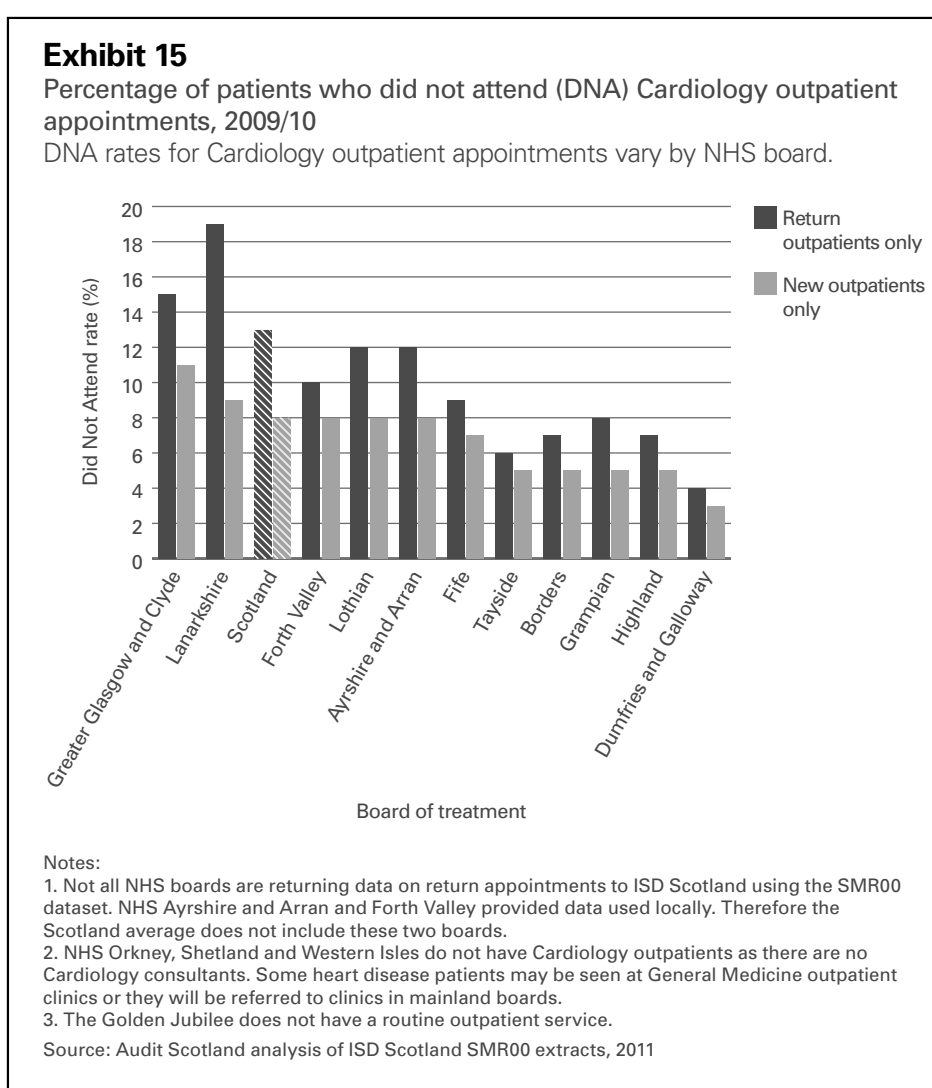
98. UK guidance recommends the use of drug-eluting stents for those patients who are at high risk of requiring further interventions if a conventional bare metal stent is used

⁸³ A stent is a short tube of expandable mesh, like a scaffold, which is inserted at the part of the artery which is to be widened by angioplasty. A drug-eluting stent is a stent which has been coated with medication to help prevent the artery closing off again.

instead.⁸⁴ The rate of drug-eluting compared to bare metal stents depends on local clinical policy and preference, and varies across the six regional centres in Scotland. Higher rates of drug-eluting stents will increase costs. NHS Highland and Grampian have the highest rates at 79 and 72 per cent respectively with the Golden Jubilee and NHS Lothian, the centres that use the most stents, with the lowest rates at less than 50 per cent. The overall rate for the UK is 67 per cent.⁸⁵

99. There are a number of contracts in place for pacemakers, defibrillators and associated electrical leads. These are estimated to make annual cash savings of £624,000 across Scotland based on overall spending of around £9.2 million. Within the contract for pacemakers there is considerable variation in the average cost of different types of pacemakers. For example, the average cost of dual chamber pacemakers ranges from £1,118 in NHS Fife to £1,882 in NHS Highland, and for defibrillators (ICDs) this ranges from £8,470 at the Golden Jubilee to £10,333 in NHS Highland. There is potential for NHS boards to make further cash savings of £350,000 on pacemakers, defibrillators and leads (five per cent of the overall cost) if the boards with the higher average costs for each item were able to reduce to the national average.

100. NHS National Procurement has achieved annual cash savings of £1.5 million for three drug and equipment contracts related to Cardiology services. We have identified at least a further £0.5 million of cash savings for NHS boards if they made further efficiencies.



There is scope to prescribe more cost-effective drugs

101. Drugs for cardiovascular disease account for around 15 per cent of the overall community drugs bill and the number of GP prescriptions has increased by 61 per cent over the last decade to 25 million in 2010/11. However, NHS spending on cardiovascular drugs has been reducing since 2004 due to a number of drugs becoming cheaper and NHS boards using more cost-effective drugs (see paragraphs 18 to 20 and Exhibit 4 in Part 1).⁸⁶

102. Statins, used for controlling cholesterol, are one of the most commonly prescribed types of drug for people with heart disease or at risk of developing it. The NHS spent around £70.7 million on statins in 2010/11 and the level of prescribing per population varied by NHS board. We compared statin prescribing rates against disease rates and population cholesterol levels and could find no link between higher prescribing rates and lower disease rates or cholesterol levels.

⁸⁴ *Drug-eluting stents for the treatment of coronary artery disease*, National Institute for Health and Clinical Excellence (NICE), July 2008.

⁸⁵ *BCIS Audit Returns Adult Interventional Procedures: January to December 2009*, British Cardiac Interventional Society, October 2010.

⁸⁶ *Top Ten Drugs by Cost and Volume*, ISD Scotland, September 2010.

Case study 3

Improving efficiency in outpatient clinics

Improving referral to rapid access chest pain clinics

All NHS boards have rapid access chest pain clinics which allow patients with chest pain to be seen at an outpatient clinic more quickly. However, NHS boards have experienced high demand for these clinics and reported inappropriate referrals from GPs. NHS Ayrshire and Arran, Fife, Greater Glasgow and Clyde and Highland have introduced measures to reduce demand and increase the appropriateness of referrals; including:

- electronic referral systems with clear referral criteria
- chest pain nurses vetting referrals
- GP telephone referral to discuss symptoms and make an appointment for a suitable date and time during the consultation with a patient. This reduces the chance of patients failing to attend.

Reducing demand for outpatient clinics

Patients may have a number of follow-up outpatient appointments after their initial referral or following a hospital stay or procedure. The number of return appointments can vary depending on the consultant and more patients fail to attend for return appointments than for new appointments.

- NHS Greater Glasgow and Clyde is reducing the number of return outpatient appointments by referring stable heart patients back to GPs for ongoing review. In 2010/11, the return to new rate reduced from 1.7 to 1.2 per one new patient.
- NHS Lanarkshire is reducing the number of new patients by encouraging GPs to refer patients directly for hospital tests before referring them to an outpatient clinic. If the tests are clear then patients may not need to attend an outpatient clinic and go back to the GP for reassurance, further investigation or ongoing management. If the patient does attend an outpatient clinic, the consultant will have the results of the tests available which expedites further management and care for the patient. Heart valve patients requiring an annual echocardiogram can have these tests without having to attend an outpatient appointment first. If the test is clear, the GP and patient are informed and the patient does not need to attend an outpatient clinic.

Increasing capacity in outpatient clinics

Outpatient clinics are often led by specialist Cardiology nurses, or sometimes other staff. This frees up consultant cardiologists to see more complex cases, increases the number of available appointments and improves the skills and knowledge in other staff. Most NHS boards have nurse-led rapid access chest pain clinics and some have nurse-led clinics for other conditions, such as heart failure and acute coronary syndrome. Some examples of other non-consultant clinics include:

- In NHS Highland, in addition to nurse-led clinics for atrial fibrillation and rapid access chest pain, there is an aortic stenosis surveillance clinic to review patients with CHD. The clinic is jointly run by a specialist Cardiology nurse and an echocardiographer. The clinic has been shown to be more clinically efficient and is also likely to be cost effective as patients do not need to be seen by a consultant cardiologist, saving consultant time, standardising care and potentially reducing the number of echocardiograms requested.¹
- In NHS Lanarkshire, patients who have had a heart attack are seen by cardiac rehabilitation nurses for follow-up. At one of the three hospitals (Hairmyres) atrial fibrillation clinics are nurse-led – this is being rolled out to the other two hospitals during 2012.
- In NHS Shetland, there is a joint defibrillator (ICD) clinic led by a specialist nurse and a technical member of staff (Physiological Measurements Officer) with support provided by the Head of Physiological Measurements at Aberdeen Royal Infirmary using telehealth.

Note: 1. 'Establishing an aortic stenosis surveillance clinic', D Turpie et al., *British Journal of Cardiology*, November 2010, 17: 286-9.
Source: Audit Scotland fieldwork, 2011

103. There are a number of statins available to NHS boards. The two main statins prescribed by boards are:

- simvastatin – a generic drug since 2003 which costs £2.31 per item and accounts for around 55 per cent of all statins prescribed in Scotland
- atorvastatin – due to come off patent in May 2012 and costs £37.52 per item (but cheaper options will become available once the patent expires) and accounts for around 33 per cent of all statins prescribed in Scotland.^{87, 88}

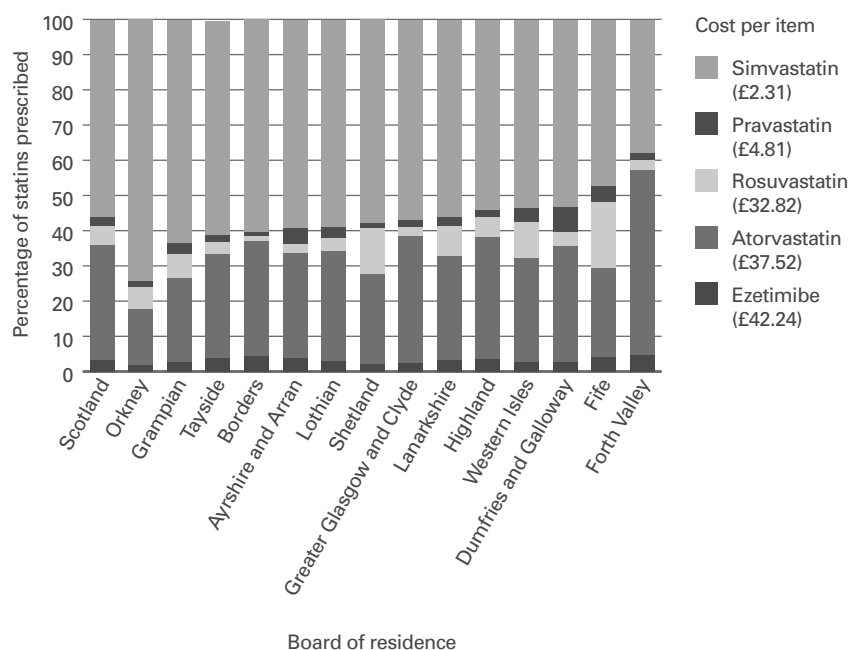
104. Both simvastatin and atorvastatin have comparable outcomes for patients and atorvastatin should only be prescribed for patients with established heart disease when a high dose is required. Patients at risk of a developing heart disease should be started on simvastatin.⁸⁹ However, variation in prescribing rates affects overall spending on statins within each NHS board. In mainland boards, the prescribing of the more expensive drug (atorvastatin) ranges from 24 per cent in NHS Grampian to 52 per cent in NHS Forth Valley. In NHS Fife, a higher percentage of another expensive statin (rosuvastatin) is prescribed – 19 per cent compared to the national average of 5.5 per cent (Exhibit 16). NHS Grampian and Lothian have the lowest cost for statins at around £10,000 per 1,000 population and NHS Forth Valley has the highest cost at over £22,000 per 1,000 population.

105. A prescribing group in the West of Scotland looked at improving cost effectiveness in prescribing and provided recommendations for boards in the West of Scotland in December 2009. The Scottish Government shared this with all boards across Scotland and asked them to review prescribing locally and address any unwarranted variation. However, the

Exhibit 16

Percentage of various statins prescribed in the community by NHS board, 2010/11

The percentage of inexpensive statins prescribed by NHS boards varies and this impacts on the cost of statins per 1,000 population.



Note: The percentage of statins prescribed is based on Defined Daily Dose (DDD) for each statin. DDD is defined by the World Health Organisation (WHO) as the assumed average maintenance dose per day for a drug used on its main indications in adults. DDDs are commonly used as a proxy measure of how many patients in the population are taking a particular drug and this allows for some comparison between Health Boards.

Source: Audit Scotland analysis of ISD Scotland cardiovascular prescribing by statin and Prescribing Health Board, 2010/11

prescribing data for 2010/11 show that there is still considerable variation in prescribing by NHS boards and further scope for making efficiency savings. Audit Scotland plans to carry out a performance audit on GP prescribing in 2012/13.

Performance information is improving but there is scope to do more

106. It is important for NHS boards to maintain quality when looking at the scope to improve value for money through identifying efficiency savings and redesigning services. It can be difficult to identify appropriate

measures of quality and outcomes but the NHS has been doing a lot more work over recent years to try to tackle this within Cardiology services and across the NHS:

- One of the main aims of the Scottish Government's Healthcare Quality Strategy is that the most appropriate treatments, interventions, support and services are provided at the right time to everyone who would benefit, and that wasteful or harmful variation is eradicated. The strategy proposes 12 quality outcomes to measure progress against the main aims, however these require further

87 When a pharmaceutical company first develops a drug it will normally apply for a patent which means that it can only be sold by that company for a certain number of years. Once the patent expires, other companies can sell the drug under their own brand and these are known as generic drugs.

88 Prescription Cost Analysis for financial year 2010/11, ISD Scotland, July 2010.

89 Risk estimation and the prevention of cardiovascular disease, Scottish Intercollegiate Guidelines Network, February 2007.

development. A national target for improvement in the quality of healthcare experience is under development for 2011/12.⁹⁰

- Following the review of the clinical standards for heart disease, Healthcare Improvement Scotland is developing a number of indicators to enable ongoing measurement and monitoring of the clinical standards.⁹¹ Healthcare Improvement Scotland is also working with ISD Scotland to provide boards with the data analysis from its recent review to help them improve services.
- Healthcare Improvement Scotland and ISD Scotland are leading a medical profile project which aims to improve information on the care of patients in hospital medical specialties through better use of Scotland-wide datasets. The first medical profile will be provided to NHS boards in March 2012. Heart attack, heart failure and angioplasty are covered within the medical profiles and indicators include death rates following emergency admission to hospital, average length of hospital stay and emergency readmission.

107. The Scottish Government is developing indicators to measure and compare boards' progress against the heart disease action plan. This includes prioritising areas within the action plan requiring further work and agreeing definitions on how these will be measured and reported by NHS boards to ensure consistency and comparable data.

108. Most NHS boards in Scotland submit data for Cardiology activity to UK clinical audits. Comparative information is provided to consultant cardiologists, for example procedure

rates and some productivity measures. However, in our fieldwork we found that this information does not tend to be shared or discussed more widely. This information would be helpful for hospital managers to allow them to compare performance and to share good practice across Scotland. For example, comparative data from across the UK are available on angioplasty, including procedure rates, the rates of angioplasty per consultant, the percentage carried out as day cases, complications and demographic information on patients treated.⁹²

There are gaps in cost and activity information

109. It is difficult to compare Cardiology costs across NHS boards due to inaccuracies and inconsistencies in the published data (see paragraphs 16 and 17 in Part 1). Not all costs and activity are included in Cardiology with some recorded under General Medicine and other specialties. For example, from our fieldwork we found that:

- NHS Highland is finding it difficult to quantify Cardiology costs and it is currently included in its overall General Medicine costs.
- NHS Fife only includes Cardiology activity from one of the two hospitals providing Cardiology services and the activity from the other hospital is included in General Medicine costs
- NHS Greater Glasgow and Clyde has recently increased the number of dedicated Cardiology beds to increase the number of patients with heart disease seen by specialist Cardiology staff but it has not yet analysed the impact this has had on Cardiology costs or outcomes for patients.

110. Costs per procedure can be estimated using the Scottish National Tariff, a list of estimated national average prices for groups of similar hospital procedures. The tariff was developed to assist NHS boards in negotiating agreements for charging for treatments carried out by one NHS board for patients who live in another NHS board area. NHS boards are not currently required to use the tariffs for cross-boundary charging. The costs information used to produce the tariffs is based on hospital specialty costs and tariffs for cardiac procedures are affected by differences in the way NHS boards record their costs. This includes costs recorded under General Medicine instead of Cardiology and adjustments made for the use of high cost facilities such as intensive care, high dependency and cardiac care units. This means it is difficult to produce comparable tariff prices and use of the tariff for costing Cardiology procedures is limited.⁹³ The Scottish Government is piloting a new, more detailed costing information system and exploring options to replace the current tariff system during 2012.

It is difficult to determine the level of Cardiology staffing in NHS boards

111. NHS boards hold some information locally on the Cardiology workforce but it is not used or recorded consistently. This makes comparisons between NHS boards, including productivity measures, and regional and national planning of Cardiology services difficult. Exact figures of the number of Cardiology consultants and nurses working in Scotland are not clear. Published figures by ISD Scotland are generated from information entered by NHS boards into the Scottish Workforce Information Standard System (SWISS) and in many instances these do not reflect the same information captured

90 *The Healthcare Quality Strategy for NHSScotland*, Scottish Government, May 2010.

91 Healthcare Improvement Scotland is developing a number of heart disease indicators in consultation with NHS boards. Boards are also in the process of implementing processes which aim to reduce length of stay in hospital and readmission rate of patients admitted to hospital with a primary diagnosis of heart failure, known as a heart failure care bundle, part of the Scottish Patient Safety Programme. Further information on both of these can be found in Appendices 1 and 2 of Healthcare Improvement Scotland's *Heart disease improvement programme: National Overview – Take Heart* published in September 2011.

92 *BCIS Audit Returns Adult Interventional Procedures: January to December 2009*, British Cardiac Interventional Society, October 2010.

93 <http://www.isdscotland.org/Health-Topics/Finance/Scottish-National-Tariff/>

on local NHS board systems. ISD Scotland should work with boards to address these data quality issues.

112. NHS boards have advised us that published figures for Cardiology consultants (66 headcount and 60.5 WTE at September 2009) are an under-estimate and we have not been able to identify and agree revised numbers with the boards. The majority of NHS boards have provided us with amended figures for specialist nurses which are all higher than the published figures (a total of 126.2 WTE specialist Cardiology nurses compared with the published figure of 67.6 WTE) at September 2010. Estimating the Cardiology workforce can be difficult due to staff with split duties and staff working across more than one specialty. ISD Scotland publishes data on the number of specialist Cardiology nurses but not the wider Cardiology workforce, including ward nurses, physiotherapists and technicians involved in treating patients with heart disease.

113. From the information that is available, the number of medical staff and specialist nurses working in Cardiology has increased over the last decade. All medical staff have increased by 35 per cent from 110.4 to 149.4 WTE. Cardiology specialist nurses have increased by 88 per cent from 36.0 to 67.6 WTE and the number of cardiac rehabilitation nurses has stayed around the same at 51.2 WTE.⁹⁴

The NHS needs to improve how it monitors activity, costs, quality and performance to assess value for money

114. The Healthcare Improvement Scotland review of clinical standards for heart disease has provided the most complete picture of Cardiology services in Scotland so far. However,

NHS boards had limited information for some measures. In addition, as highlighted throughout the report, Cardiology activity and costs are not accurately or consistently recorded. The level and model of Cardiology services provided by NHS boards vary, and not all Cardiology activity and costs are recorded under the Cardiology specialty which makes it difficult to compare services. Therefore, we have not been able to make a clear judgement on value for money across all aspects of Cardiology services.

115. Cardiology procedures are an important part of treatment for heart patients but this makes up a small part of the overall activity. The majority of activity consists of diagnosis, assessment and medical management, such as reviewing medication or carrying out tests and this activity is not easily measurable. This will also be the case for other medical specialties. General Medicine is by far the largest medical hospital specialty but it includes activity and costs for a number of sub-specialties that are difficult to separate and overlap with other specialties. This does not provide NHS boards with meaningful information and is problematic for them monitoring individual specialties.

116. NHS boards need good information about cost, activity and quality so they can make decisions about how best to use their resources. This is particularly important at a time of reducing public finance, changing demography and rising demand and expectations. Limitations in Cardiology data mean that productivity is difficult to measure.

117. Audit Scotland's 2010 report on orthopaedic services recommended that NHS boards need a better understanding of how they use resources if they are to increase

productivity without affecting the quality of services.⁹⁵ This also applies to Cardiology services.

Recommendations

The Scottish Government and NHS boards should:

- review how outpatient clinics are provided and identify ways to avoid unnecessary hospital appointments, reduce the number of patients failing to attend appointments and ensure good practice in improving efficiency is shared across Scotland
- ensure that consistent and accurate activity, workforce, cost and quality information is available and shared nationally to allow NHS boards to monitor their performance, compare services and identify potential improvements in value for money.

NHS boards should:

- examine variation in Cardiology services, including length of stay, day case rates, prescribing and procurement, to ensure services are being provided in the most efficient way and identify scope for improving efficiency
- work with ISD Scotland to ensure that day case activity is being recorded consistently to allow comparison of day case rates across Scotland
- review the costs and benefits of providing less expensive and non-invasive tests for heart disease.

⁹⁴ *Hospital, community and public health services and Nursing and midwifery workforce information*, Scottish Workforce Information Standard System, at September 2010, ISD Scotland, 2011.

⁹⁵ *Review of orthopaedic services*, Audit Scotland, 2010.

Appendix 1.

Glossary of terms

Acute medical assessment unit	A short-stay department that is available in some hospitals. It is intended to assess patients and then discharge them or transfer them to another ward. It may be part of the emergency department or a separate unit.
Angina	Heaviness or tightness in the chest due to narrowing of the arteries to the heart restricting blood flow to the heart.
Angiography	An X-ray picture of the arteries that shows if they have become narrowed. A coronary angiography looks at the arteries of the heart. Where we use the term angiography throughout the report it refers to a coronary angiography.
Angioplasty Also known as percutaneous cardiac intervention (PCI) or revascularisation	A treatment to widen a narrowed artery. A catheter (a fine, flexible, hollow tube) is passed into an artery in the groin or arm. A small balloon is inflated in the coronary artery in the heart to flatten a blockage caused by fatty deposits or a blood clot. A stent (a short tube of expandable mesh, like a scaffold) is then usually inserted to keep the artery open. This treatment is provided to people who have had a heart attack, or are at risk of having one, and people with angina. Where we use the term angioplasty throughout the report it refers to a coronary angioplasty.
Atrial fibrillation	The most common type of abnormal heart rhythm (arrhythmia) where the heart beats very rapidly and can cause quite unpleasant palpitation and sometimes breathlessness.
Cardiac rehabilitation	The process by which patients with heart disease, in partnership with a multidisciplinary team of health professionals, are encouraged and supported to achieve and maintain optimal physical and psychosocial health. It can take place in hospital or in the community and generally involves an exercise programme, educational and psychological support and advice on risk factors, such as smoking and diet.
Cardiac resynchronisation therapy (CRT)	A pacemaker used to treat heart failure patients when the heart ventricles are beating out of time with each other. It has three leads – one to the atrium, one to the left ventricle and one to the right ventricle. CRT makes the heart better able to pump and improves symptoms but it is not a cure for heart failure.
Cardiac Surgery	Surgical procedures on the heart and/or vessels that are carried out by cardiac surgeons.
Cardiovascular	The term used to describe both heart disease and stroke.
Congenital heart conditions	Conditions where there are abnormalities of the structure of the heart or major blood vessels. These abnormalities are present at birth and some may be hereditary.
Coronary artery bypass graft (CABG) surgery Also known as revascularisation	A major operation to bypass a narrowed section or sections of coronary arteries and improve the blood supply to the heart. This is carried out in Cardiac Surgery by a cardiac surgeon. This treatment is reducing as more patients are now receiving an angioplasty instead, a less invasive and less expensive treatment. However, some patients may require more than one angioplasty.
Coronary care unit (CCU)	A specialist unit in a hospital for people with serious heart conditions, for example people who have had a heart attack.
Coronary heart disease (CHD)	CHD is caused by a narrowing of the coronary artery which means there is not enough circulation to heart muscle and surrounding tissue and can lead to a heart attack, angina or sudden death.
Defibrillator Also known as an implantable cardioverter defibrillator (ICD)	A device which is implanted within the chest. It monitors the heart rhythm, senses if there is a severe disturbance in heart rhythm (arrhythmia) and if necessary delivers an electrical impulse or an electrical shock to stop the abnormal rhythm. A defibrillator may be used in combination with a pacemaker.

Echocardiogram	An ultrasound picture of the heart which shows the structure of the heart and how it is working. It is used in assessing various conditions including heart failure and after a heart attack.
Electrophysiology	Hospital department that carries out specialist tests for abnormal heart rhythms and pacemaker checks. Tests are carried out by a cardiologist with specialist knowledge of electrical problems in the heart.
General Medicine	A hospital specialty that manages people with a range of medical conditions.
Heart attack Also known as myocardial infarction (MI)	When one of the coronary arteries becomes blocked by a blood clot and part of the heart muscle is starved of oxygen, causing damage to the heart. There are two types of heart attack: STEMI (ST segment elevation myocardial infarction) and NSTEMI (non-ST segment elevation myocardial infarction). STEMI is where blood flow to the heart has been interrupted and NSTEMI is where there is a partial blockage in a coronary artery but some blood is still able to flow to the heart muscle.
Heart failure	When the heart is unable to adequately pump blood throughout the body. It can be caused by a number of other heart conditions. This is a life-limiting condition and people can live with disabling symptoms for a number of years and require a considerable amount of medical care.
Hospital specialty	A hospital specialty covers a specific area of clinical activity, usually based on a particular part of the body, group of diseases, age group or diagnostic technique. Most specialties are either medical – treatment with drugs and other non-surgical treatment – or surgical – treatment with surgery (other examples of hospital specialties include Neurology, Dermatology, Cardiac Surgery, General Medicine, Geriatric Medicine and Radiology). NHS staff working in these specialties have specialist knowledge of the clinical area and usually work in a ward or outpatient clinic dedicated to that specialty.
Managed Clinical Network (MCN)	Most NHS boards in Scotland have a cardiac MCN which aims to improve services for people with heart disease and ensure that patients have the same access to good-quality healthcare. MCNs have a role in integrating care across community and hospital settings, improving quality and managing performance, and obtaining and negotiating agreement over clinical and other service issues. They also act as the planning forum for the board for matters relating to the treatment and prevention of heart disease.
Pacemaker	A device which is implanted in the chest to stimulate contractions of the heart to correct an irregular, fast or slow heartbeat. There are a number of different types of pacemakers depending on the condition and which parts of the heart are affected.
Rapid access chest pain clinic (RACPC)	An outpatient clinic with priority access for patients with suspected heart-related chest pain.
Revascularisation	A procedure that restores blood flow to the heart, including angioplasty and coronary artery bypass graft (CABG) surgery.
Stent	A stent is a short tube of expandable mesh, like a scaffold, which is inserted at the part of the artery which is to be widened by angioplasty. A drug-eluting stent is a stent which has been coated with medication to help prevent the artery closing off again.
Thrombolysis	Drug treatment to help dissolve a blood clot that is blocking an artery and restore blood flow in the affected artery.
Valve surgery	Heart valve surgery treats diseased or damaged valves which affect the flow of blood in the heart. It involves repairing or replacing one or more heart valves that may be diseased or damaged to eliminate or improve symptoms. It may prevent permanent damage to the heart.
Ventricular assist device (VAD)	Mechanical hearts that can assist a failing heart by pumping blood around the body, and as a result can markedly improve the quality of life. VADs can be used short-term or long-term and can be used to help patients recover or support them until a heart transplant becomes available.

Further information on heart disease and technical terms can be found on the CHSS and CHF websites: www.chss.org.uk/heart/ and www.bhf.org.uk/publications.aspx

Appendix 2.

Audit methodology

Data analysis

Published data

In this audit we carried out a literature review and analysed available data on Cardiology activity and costs from a range of sources. The majority of the published data we have used is on the Information Services Division (ISD) Scotland website www.isdscotland.org and information was taken from:

- Heart disease statistics
- Scottish Health Service Costs (Costs Book)
- Scottish National Tariff
- Prescribing and medicines
- Hospital, community and public health services and Nursing and midwifery workforce information.

The Audit Commission also provided us with some comparative information for Cardiology services in England.

ISD data on Cardiology activity

We commissioned ISD Scotland to provide detailed information on:

- Cardiology inpatient and day case activity within hospitals from 2002/03 to 2009/10
- Patient continuous inpatient stays involving a Cardiology diagnosis at some point during their stay from 2002/03 to 2009/10
- Cardiology outpatient data 2002/03 to 2009/10.

Cardiology inpatient and day case episode activity were from the SMR01 (Scottish Morbidity Records, Hospital Inpatients and Day cases) dataset.¹ The episodes identified had a main ICD-10 (International Classification of Diseases version 10) diagnosis code of:

- Acute Rheumatic Fever (I00-I02)
- Chronic Rheumatic Heart Disease (I05-I09)
- Hypertensive Diseases (I10-I15)
- Coronary Heart Diseases (I20-I25). This category was further subdivided into:
 - Angina Pectoralis (I20)
 - Myocardial infarction (I21 and I22)
 - Remaining coronary heart disease
- Pulmonary heart and circulatory disease (I26-I28)
- Other heart disease (I30-I52) subdivided into:
 - Atrial Fibrillation and Flutter (I48)
 - Other cardiac arrhythmias (I49)
 - Heart Failure (I50)
- Remaining Other Heart Disease
- Atherosclerosis of aorta (I70)
- Abnormalities of heartbeat (R00)
- Cardiac murmurs and other cardiac sounds (R01).
- Chest pain (R07)

All the inpatient and day case episodes included information on age, deprivation, patient and admission type, specialty, board of residence, hospital of treatment and Cardiology procedures. Specific Cardiology procedures we looked at were:

- Angiography K63,K65,U102,U105
- Angioplasty K49,K501,K75
- Defibrillators (ICD) K59
- Pacemakers K60-K61
- Cardiac Resynchronisation Therapy (CRT) K60.7,K61.7
- Ablation K57.1, K57.5, K62.2, K62.3
- CABG K40-K46
- Valve Surgery K25-K35.

Additionally, the episodes could have any number of other procedures carried out that were not flagged and a further flag for episodes with no procedure coding was added to investigate the non-procedural and medical management involved in this specialty.

Data were also provided as Continuous Inpatient Stays (CIS). Each CIS represents the entire inpatient or day case stay in a hospital or several hospitals for a person from point of first admission to final discharge. These CIS data had the procedure and diagnosis coding as above but could have multiple diagnoses as the patient underwent tests during their stay. These CIS data also included the length of the entire stay in hospital from first admission to final discharge.

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

Length of stay analysis was carried out using CIS where there was only a single diagnosis or a single procedure code included. This was to ensure we were not including activity where the diagnosis was changing during the course of the stay. An exception was where angiography and angioplasty were coded within a stay because these are commonly carried out within a single episode.

Consultant workforce data

Due to inaccuracies with the consultant cardiologist workforce data, ISD carried out some work on our behalf to try to obtain a more accurate workforce figure by checking the number of consultants in Scotland on the General Medical Council (GMC) specialist register for Cardiology. We were able to get headcount by NHS board from the GMC register (122 consultants) but it involved some double-counting where consultants work in more than one board and it did not distinguish if locums were involved. We asked NHS boards to check these figures and provide WTE equivalents but this proved problematic as not all boards recognised the GMC register headcount figures or were able to give accurate WTE equivalent figures for the point in time we were looking at (September 2010).

ISD Scotland also provided some more detailed information on:

- Cardiac waiting times
- Cardiovascular prescribing.

We obtained data from National Procurement for NHS contracts for the following Cardiology contracts:

- Pacemaker and ICD devices
- Cardiovascular and Respiratory disease drugs
- Stents.

Fieldwork with NHS boards and other stakeholders

We carried out a data check with all NHS boards to check the accuracy of the data available on Cardiology services and allowed an opportunity for NHS boards to provide any further comments or information including good practice examples for the case studies in our report. The final information to be included in our report was also validated with all NHS boards.

We carried out interviews at three NHS boards (Fife, Highland, Greater Glasgow and Clyde) and at the Golden Jubilee National Hospital. These boards were selected to represent a range of service delivery models, treatment population sizes and geographic issues. Interviews in each board were held with a range of staff including a service manager, finance manager, Cardiology consultant, specialist Cardiology nurse and MCN manager to gain a greater understanding of the data, the services provided in their board and to identify good practice in providing more efficient services.

We also interviewed staff at ISD Scotland, National Procurement, Healthcare Improvement Scotland, the Scottish Ambulance Service, the Scottish Cardiac Society and the Scottish Government.

We commissioned Chest Heart and Stroke Scotland and British Heart Foundation to carry out focus groups with patients who had been in contact with Cardiology services in the last two years in three areas (Lothian, Tayside and Highland). A separate report is available on our website.

Appendix 3.

Project advisory group

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

Member	Organisation
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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.

Cardiology services

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