NHS
Quality Improvement Scotland

clinical indicators 2005

SBN 1-84404-384-3

First published December 2005

Information contained in this report has been supplied by NHS Boards, or taken from current NHS Board sources, unless otherwise stated, and is believed to be reliable on publication.

www.nhshealthquality.org

Contents

Foreword

Collecting and publicly reporting data allowing comparisons to be made among different health care providers continues to be a widely accepted approach to improving the quality of healthcare. Earlier this year, for example, The Nuffield Trust published a chartbook[1] on the quality of care throughout the UK. Like this series of indicator reports, the chartbook provides a basis for communication among the varied stakeholders (eg clinicians, managers, commissioners of services) who seek to improve the quality of patient care.

My foreword to last year's indicators report emphasised that while the production and publication of clinical indicators is increasingly widespread, the main challenge lies in ensuring that these data lead to improvements in the quality of care provided for patients. Scotland has a well-established track record in using clinical data, and this year NHS Quality Improvement Scotland has taken steps that will further increase the beneficial impact of such data.

During 2005, we commissioned a leading academic expert to produce a research review paper, drawing on the worldwide literature to outline the main issues and challenges in using clinical indicators for quality improvement.[2] This review – which is available on our website (www.nhshealthquality.org) – will allow us to learn from others' experience and expertise, and ensure that our approach is based on the best evidence available. The paper addresses two broad issues, namely i) the production of robust and interpretable data, and ii) embedding this information in systems that will encourage usage of the data.

We have set up and are now working with a group comprising experts from the health service and members of the public, to ensure that our own activities are shaped by this evidence and also reflect the way in which healthcare is delivered in Scotland.

Another notable development in 2005 has been the implementation of the Freedom of Information (Scotland) Act 2002. This Act ensures that any person requesting information from a public body, such as ourselves, will receive that information (subject to certain exemptions).

NHS Quality Improvement Scotland supports, and is fully committed to, the principles of this Act. In fact, this series of indicator reports led the way in Europe in the public release of such information. We will continue to publish clinical indicators, and encourage other NHSScotland organisations to use such information appropriately and effectively – with the ultimate aim of improving the delivery and outcomes of patient care.

Lord Naren Patel

Chairman, NHS Quality Improvement Scotland

1 Leatherman S and Sutherland K (2005). The quest for quality in the NHS – A chartbook on quality of care in the UK. Radcliffe Publishing, Oxford, Seattle.

2 Measuring and reporting the quality of health care: issues and evidence from the international research literature. A discussion paper prepared for NHS Quality Improvement Scotland by H. Davies in consultation with The Scottish Research Network in Health Care Management. www.nhshealthquality.org

Introduction

Since the early 1990s, the Clinical Outcomes Group has sought to produce reports that cover a balanced mix of health and healthcare issues – and this year is no exception.

This report presents a suite of indicators on chronic obstructive pulmonary disease (the preferred term for a number of respiratory conditions characterised by obstruction of the airways), which is now the second most common cause of acute medical admission in the UK. Heart failure is another common cause of acute admission to hospital, and a similar package of indicators is included in the report.

In addition, there is a suite of indicators on health problems associated with excessive alcohol consumption. Data on multiple emergency admissions of older people, and about cancer, are also presented.

This report complements other initiatives that provide data to help the health service improve the delivery and outcomes of patient care. For example, earlier this year the Scottish Executive published a sexual health strategy and action plan[1], and data about sexually transmitted infections in Scotland were published just last month.[2]

One priority area on which it has proved difficult to produce robust indicators is mental health. This is because, in comparison with data about 'physical' health, information on mental health remains fragmented and poorly developed. Strategies for improving the quality of both mental health information[3] and services[4] were published earlier this year, and the Clinical Outcomes Group will now embark upon the production of a suite of indicators on mental health. Indicators for a range of other topics will also be published next year.

Last year's indicators report drew attention to the impact that social deprivation has on the health of Scottish children. The effect of social deprivation is again examined in this report, using a new method for measuring deprivation called the Scottish Index of Multiple Deprivation.

While the previous publications in this series have been titled *Clinical Outcome Indicators Reports*, this document is titled *Clinical Indicators Report*. This is because the report presents not only outcome indicators (eg rate of death from heart failure), but also process indicators (eg drug prescribing trend for treatment of heart failure). Both types of measure can provide valuable (and complementary) insights into the delivery of patient care, and a review recently commissioned by NHS Quality Improvement Scotland provides an excellent summary of the relative advantages and disadvantages of process and outcome measures.[5]

Many people have contributed a great deal of hard work and expertise to the production of this report. In particular, we would like to thank the data analysts and medical writers who produced the various chapters, and also the experts from the health service who provided us with valuable feedback on an earlier draft of the indicators.

Dr Dorothy Moir

Chairman, Clinical Outcomes Group

1 Scottish Executive. Respect and responsibility. Strategy and action plan for improving sexual health. Edinburgh: Scottish Executive, 2005.

2 Sexually Transmitted Infection Epidemiology Advisory Group. Setting the Scene. Sexually transmitted infection, including HIV, in Scotland, 2004. Health Protection Scotland and Information Services Division, Scotland, November 2005. Available from www.hps.scot.nhs.uk

3 Scottish Executive. Consultation paper: A mental health information strategy for Scotland. Edinburgh: Scottish Executive, 2005.

4 NHS Quality Improvement Scotland. Improving mental health services in Scotland: developing a strategic framework for quality improvement. Edinburgh: NHS Quality Improvement Scotland, 2005.

5 Measuring and reporting the quality of health care: issues and evidence from the international research literature. A discussion paper prepared for NHS Quality Improvement Scotland by H. Davies in consultation with The Scottish Research Network in Health Care Management. www.nhshealthquality.org

Setting the scene

NHS Quality Improvement Scotland (NHS QIS) was set up by the Scottish Parliament in 2003 to take the lead in improving the quality of care and treatment delivered by NHSScotland. NHS QIS does this by setting standards and monitoring performance, and by providing NHSScotland with advice, guidance and support on effective clinical practice and service improvements.

What is the purpose of this report?

The Clinical Outcomes Group was set up in 1992 to produce comparative clinical indicators for the health service in Scotland (it is a committee of NHS QIS, and formerly of the Clinical Resource and Audit Group which is itself now part of NHS QIS). The indicators are published in annual reports, which include a range of measures covering a wide spectrum of health and healthcare-related topics. This is the eleventh report produced by the Clinical Outcomes Group.

The aims of the report are two fold. Firstly, it provides information that, when used carefully, can help NHSScotland to improve the quality of care provided to patients. Secondly, the report helps to contribute to public accountability in the NHS by providing information on a variety of health and healthcare topics in an open and transparent manner.

This report is accompanied by a short guide, which highlights the key messages for both the general public and health service staff.

What information is included in this report?

This report covers a wide range of health and healthcare topics. Some topics have already been included in previous reports (eg alcohol misuse, colorectal cancer), whereas others are covered for the first time (eg chronic obstructive pulmonary disease, multiple emergency admissions of older people). The indicators included in previous reports are listed in Appendix C.

For each topic, a summary box contains information on background and general findings (some of which are included in the accompanying booklet). This is followed by an introduction to the health or healthcare issue outlining the indicator(s) that will be examined, a description of the data source and analysis methods, and a results section presenting the data together with a discussion of key findings.

What are indicators and how should they be used?

An indicator is a measure that provides a picture about a specific aspect of health or healthcare, including clinical outcomes, at a particular time. For example, an indicator in a previous report was survival rate following emergency admission to hospital with acute myocardial infarction (heart attack).

Used carefully and in the appropriate context, indicators can contribute to quality improvement within NHSScotland, by highlighting variations which can then be investigated and, where necessary, appropriate action taken.

However, interpreting the indicators remains difficult. This is because apparent variation in an indicator may be due to a number of factors, which may or may not include the quality of care provided. It is important to re-emphasise that *no conclusions should be drawn immediately*, from any of the comparisons in this report, about the quality/effectiveness of the services provided for patients by different NHSScotland organisations or in different regions of the country.

Some important points to remember when using indicators are outlined in the box below. A more detailed guide to interpreting indicators can be found in the introduction from the 1999 report. This report and further information about the production of indicators (eg what standardisation is and why this is important) are available on the Clinical Indicators Support Team website (www.show.scot.nhs.uk/indicators).

Guidance on how to, and how not to, use indicators

Indicators do:

- provide useful clues and evidence about the quality of care or performance
- focus attention on variations whose existence might otherwise have remained unsuspected – variations which, at the very least, may be worthy of further investigation
- fulfil a monitoring role to highlight potentially poor performance
- illustrate past performance which may provide an insight into current practice
- highlight possible examples of good practice
- represent only one component of a comprehensive and concerted effort to ensure that NHSScotland provides high standards of care.

Indicators do not:

- include patients' views about their health, treatment or outcome
- provide definitive proof about performance or quality of care
- constitute a 'league table' of performance
- justify taking action in the absence of corroborative evidence.

Web-based indicators

To contribute to quality improvement in a meaningful and beneficial way, indicators must be statistically robust, and must also be used in a mature and effective way. Factors that will influence how indicators are used in practice include how up-to-date the data are, how easy it is for end users to access the data – and having done so how well equipped they are for utilising the data. The way in which indicators are made available will clearly influence how they are used in practice.

The Scottish indicators have been presented in a series of reports published about once a year. The specific topics included are chosen to reflect health and healthcare issues at that time, and change from year to year. Some indicators have been produced repeatedly, such as survival after admission to hospital for hip fracture, included in five of the previous reports. Other topics are covered less frequently (eg proportion of first births by caesarean section).

Four of the more established indicators have been redeveloped specifically for publication on the internet. It is hoped that this will increase their use in the routine monitoring of care. This is because web-based publication allows the indicators to be updated more frequently (every six months) using the most up-to-date data available (the delay in printing a report is removed), while at the same time making them widely available.

The indicators updated on the internet can be accessed on the website of the Clinical Indicators Support Team: www.show.scot.nhs.uk/indicators.

The web-based indicators were last updated on 29 July 2005, and will next be updated at the end of January 2006. Publishing more indicators on the internet is just one of the options that will be considered in order to increase the impact of such data.

Frequently asked questions

Where do the data for indicators come from?

When a person comes into contact with the health service in Scotland, selected details about their health and healthcare are routinely recorded. Personal health information is kept in the individual's medical case record folder or on a computer. When a person is in hospital, some of this information is recorded in a national database and this is the key source of information used to produce indicators.

The information recorded both enables appropriate care of the person and improves healthcare for other people across Scotland (eg it helps NHSScotland to check that services are running efficiently and to plan services for the future).

How is personal information protected?

The confidentiality and security of all personal information are regarded with utmost importance by NHSScotland. A number of measures are taken to protect patient confidentiality, eg all staff working in the NHS abide by a strict code of practice which protects patient confidentiality. In addition, the Data Protection Act gives each individual important rights about how their personal information is used.

Further details about personal information, including a guide for patients on these rights and how NHSScotland uses personal health information, can be found at the website:
www.scotconsumer.org.uk/hris

Does this report include 'league tables'?

No. The indicators are not league tables and must not be used as a basis for inappropriate and premature conclusions about which NHSScotland organisations provide the best healthcare. The reasons for this are outlined above.

What changes can be expected as a result of publishing this report?

The data presented in this report will highlight areas that local NHSScotland services will want to explore further. In some cases, this may lead to changes in clinical practice or in the way services are organised and managed, resulting in a higher quality of care being provided for patients.

What happens if the results suggest more resources are needed?

Sometimes improvements in the quality of care can be made without additional resources. Realistically, more resources are sometimes needed to improve existing services, and each NHSScotland organisation will review this locally taking into account all the evidence available and competing demands.

Why do some data appear out of date?

Sometimes it is helpful to provide data for a number of years so that the health service can monitor its performance over a longer period of time, ie to establish whether performance is improving, worsening or staying the same. At other times, the available data are not as current as would be liked.

What will the public make of this information?

This report contains detailed information about health and healthcare across Scotland and is aimed primarily at health service staff with expertise in the relevant area. However, this information may also be of interest to the increasingly informed public, and the key findings for each indicator are presented in a summary at the beginning of each section and in the short guide that accompanies this report.

1 Chronic obstructive pulmonary disease

Background

- Chronic obstructive pulmonary disease (COPD) is the preferred term for a number of respiratory conditions, which are characterised by obstruction of the airways. COPD is most commonly caused by smoking and results in a chronic productive cough, breathlessness on exertion, or wheeze.
- Airways obstruction in COPD is largely irreversible. However, pharmacological treatment such as long and short-acting adrenoceptor agonists and inhaled corticosteroids has been shown to stabilise the disease, reduce exacerbations, and improve symptoms, exercise tolerance and health-related quality of life. In addition, oxygen therapy is an important part of treatment for some people with COPD. This is most effectively provided by use of an oxygen concentrator.
- A guideline for the management of COPD was updated by the National Institute for Clinical Excellence in 2004. The results of the largest UK COPD audit were published in 2004 by the Royal College of Physicians and the British Thoracic Society.
- This section presents data on death, emergency admission, survival one year after emergency admission and consultation with general practice as a result of COPD. Trends in the prescribing of drugs used for treating COPD (adrenoceptor agonists and inhaled corticosteroids), and the use of home oxygen, are also presented.

Key findings

- Nationally, the rate of death from COPD for people aged 45 years and over was relatively stable between 1994–1995 and 2003–2004, fluctuating at about 13.5 per 10,000 population. People from the most deprived areas (quintile 5) were more likely to die from COPD than people from the least deprived areas (quintile 1) (23.5 compared with 7.3 per 10,000 population respectively).
- The Scottish rate of emergency admission for COPD gradually increased from 48.0 to 66.7 per 10,000 population between 1994-1995 and 2003–2004. The greatest increases in rates of emergency admission were seen in females aged 65 years and over. Deprivation was linked to emergency admissions for COPD, with the rate for quintile 5 five times greater than that for quintile 1.
- Nationally, the rate of survival one year after emergency admission to hospital for COPD was relatively stable and fluctuated at around 71% between 1993 and 2003. The rate of survival decreased as people became older. Deprivation had little effect on one-year survival for COPD.
- In a sample practice population, the rate of patients consulting the general practice team for COPD generally increased with age. The greatest increases were seen in people aged 55 years and over. The rate of patients consulting for COPD rose with increasing deprivation.
- Nationally, the rate of adrenoceptor agonists and inhaled corticosteroids dispensed in the community increased steadily, from 24,754 defined daily doses (DDDs) per 1,000 population in 1995 to 31,877 DDDs per 1,000 population in 2004.
- Throughout Scotland, there was an increasing trend in the use of home oxygen (oxygen therapy equipment and oxygen concentrators) between 1999 and 2004. For example, the rate of oxygen concentrators dispensed rose from 4.0 per 10,000 population in 1999 to 6.2 per 10,000 population in 2004. Over 3,000 concentrators were in use at homes in Scotland at the end of 2004.

Introduction

Chronic obstructive pulmonary disease (COPD) is the preferred collective term for a number of respiratory conditions that are characterised by obstruction of the airways, including emphysema, chronic bronchitis, chronic obstructive airways disease and some cases of chronic asthma.[1,2] Airflow obstruction is usually progressive and largely irreversible.[3]

Smoking causes more than 95% of cases of COPD, contributing substantially to the increasing incidence of COPD.[1] Other risk factors include occupational exposure to toxins and environmental pollution.[2] The prevalence of COPD increases with age.[2] It is estimated that the disease affects between 1% and 4% in a UK population where 40% are aged 45 years or older.[4] This places a significant financial burden on the NHS, with estimated annual costs of £500 million per year directly associated with the disease.[1,3] Furthermore, unlike most chronic diseases, the prevalence of COPD continues to rise.[3]

People with COPD may experience a chronic productive cough, with breathlessness on exertion, or wheeze.[3] These symptoms can be physically disabling and have a considerable impact on quality of life. It has been reported that many cases of COPD are diagnosed when the disease has reached advanced stages.[5] Diagnosis is complicated by the lack of symptoms in the early stages of disease and the symptoms of COPD are similar to those of other chronic conditions such as asthma.[5] People with early COPD may also associate coughing and shortness of breath with active smoking, and therefore delay seeking medical attention.[1] The majority of people with COPD are diagnosed in their fifties.[3] Diagnosis is based on an assessment of signs and symptoms, and confirmation of the presence of airflow obstruction by spirometry.[3] After diagnosis, the 10-year survival rate is approximately 50%.[6]

While COPD cannot be fully reversed by pharmacological measures and lifestyle changes, these are important interventions in improving symptoms, reducing exacerbations and stabilising the disease. The first UK guideline was issued by the British Thoracic Society in 1997; this was updated by the National Institute for Clinical Excellence in 2004.[3,7] Cessation of smoking is one of the most important interventions in managing COPD, as it reduces the rate of decline of airflow obstruction which can slow disease progression and improve survival.[3,8] Due to the nature of the disease, certain symptoms may predominate at different times and pharmacological management often needs to be adjusted accordingly.[3] Bronchodilators, such as inhaled short or long-acting adrenoceptor agonists and anticholinergics, are central to pharmacological treatment of COPD. Inhaled corticosteroids may also form part of treatment for COPD. Although they are not licensed for use alone in COPD, they can be prescribed in combination with long-acting adrenoceptor agonists; this has been shown to improve symptoms and reduce exacerbations. In addition, certain combinations of bronchodilators and inhaled corticosteroids can be effective when a single therapy is not working well.

Oxygen therapy is also an important part of treatment for some people with COPD, eg people with severe COPD who have documented evidence of hypoxaemia. This is most effectively provided by the use of an oxygen concentrator. Using cylinders to deliver oxygen may also be appropriate in some circumstances, although this is a more expensive method. Prior to 2004, it was recommended that patients in Scotland who required oxygen for more than 15 hours per day should be provided with an oxygen concentrator. In April 2004, this changed to a threshold of 8 hours per day and may be reduced further in future, following a review starting in 2005.

COPD is the second most common cause of acute medical admission in the UK, accounting for up to one in eight admissions.[3,9] Acute exacerbations of the symptoms often require emergency hospital admission and indicate a worsening of prognosis. Re-admission is also common.[8] In 2004, the Royal College of Physicians and the British Thoracic Society jointly published the results of the largest COPD audit which included data for England, Wales, Northern Ireland and Scotland. It found that 31% of patients who were discharged were re-admitted to hospital within 90 days. Furthermore, mortality within the same period in COPD patients was particularly high at 15%.[9]

COPD also places a significant burden on primary care, with general practitioner (GP) consultation rates for COPD at least double those for angina.[3,9] It is estimated that on average a GP will have 200 patients with COPD, some of whom remain undiagnosed, and every year a GP will suspect 20 new cases of COPD.[3,9] Since the ongoing management of COPD patients is mostly undertaken by primary care teams, several clinical indicators relating to diagnosis and management have been included in the General Medical Services contract, eg recording of smoking status, referral to specialist service for smoking cessation, and monitoring of respiratory function.[10]

This section presents data on death, emergency admission, survival one year after emergency admission, and consultation with general practice as a result of COPD. Trends in the prescribing of adrenoceptor agonists and inhaled corticosteroids, and the use of home oxygen, are also presented.

Data and methods

Death, emergency admission and survival

Definition of indicator

The following indicators are presented for people aged 45 years and over:

- rates of death where the main cause is COPD
- rates of emergency admission to hospital with a primary diagnosis of COPD
- rates of survival one year after an emergency admission to hospital with COPD.

Data source

Information for these indicators was derived from two data sources:

- the General Register Office for Scotland [GRO(S)], which records data on death (including cause of death)
- the national Scottish Morbidity Record (SMR01), which records information on hospital discharges from general/acute specialties. An SMR01 record is completed each time a patient is discharged from an episode of care.

Establishing survival for at least 365 days is based on linkages from SMR01 records to the GRO(S) death records. This process takes account of any deaths occurring after discharge from hospital.

The codes for identifying death and emergency admission as a result of COPD are outlined in Table 1-1.

Table 1-1 Codes indicating a diagnosis of COPD

Diagnosis	ICD-9	ICD-10
Bronchitis, not specified as acute or chronic	490	J40
Chronic bronchitis	491	
Simple and mucopurulent chronic bronchitis		J41
Emphysema	492	J43
Chronic airways obstruction, not elsewhere classified	496	
Other chronic obstructive pulmonary disease		J44

Two sources were used for population data:

- GRO(S)

  GRO(S) mid-year population estimates were used to give Scotland and NHS Board of residence population estimates from June 1994 to June 2003. These data were used in the analysis of 10-year annual trends.
- 2001 census data

  2001 census populations at data-zone level were used when considering the deprivation profile and the standardised admission and death rates. Data zones are groups of census output areas with populations of between 500 and 1,000 residents, which contain households with similar social characteristics.[11]

Deprivation quintiles were based on the Scottish Index of Multiple Deprivation (SIMD), which was calculated in 2004.[12] Quintiles were assigned to population and admission and death records using postcodes to link the information.

Analyses of data

People aged 45 years and over were selected for all analyses.

Crude annual death rates and emergency admission rates were produced for Scotland, by age group and sex, for the period 1 April 1994 to 31 March 2004. The selection was based on date of registration for deaths and date of discharge for emergency admissions. The rates were calculated by dividing the total number of deaths or emergency admissions for COPD in each year, age group and sex by the corresponding GRO(S) mid-year population estimate.

For one-year survival data, outcome was defined as survival for at least 365 days after admission. Each patient admitted with COPD was counted once within each year, regardless of the number of times they were admitted for COPD within that period. This avoids any double counting of the same COPD patients; for example, this might occur when a patient is transferred within a hospital and a new SMR01 is generated. Patients who died from COPD without being admitted to a hospital for this condition were not included in the survival analysis.

Crude annual one-year survival rates were produced for Scotland, by age group and sex, for the period 1 April 1993 to 31 March 2003. The selection was based on date of first emergency admission for each patient within each year. To allow a follow up of 365 days, only patients admitted up to 31 March 2003 were included. The rates were calculated by dividing the total number of patients admitted as an emergency for COPD who survived for at least a year by the total number of patients admitted as an emergency for COPD in each year, age group and sex.

Crude death rates and emergency admission rates were produced for Scotland by deprivation quintile for the period 1 April 2003 to 31 March 2004. The rates were calculated by dividing the total number of deaths or emergency admissions between 1 April 2003 and 31 March 2004 in each deprivation quintile by the total population resident in that particular deprivation quintile, according to the 2001 census. For one-year survival rates, the total number of patients who survived for at least a year after an emergency admission for COPD between 1 April 2002 and 31 March 2003 in each deprivation quintile was calculated. To calculate crude rates, this figure was then divided by the total number of patients admitted as an emergency for COPD in that deprivation quintile.

NHS Board rates of death, emergency admission and one-year survival after emergency admission for COPD across the three-year period ending March 2004 were indirectly standardised for age, sex and deprivation quintile, taking the total for Scotland over this three-year period as the reference. Further details of the indirect standardisation process can be found in Annex 7 of the 2002 Clinical Outcome Indicators report.[13]

An estimate of the statistical significance of the standardised rate can be obtained from the 95% confidence interval. If the confidence interval does not include the Scottish rate, the difference in COPD death, emergency admission or one-year survival rates recorded for a particular population is said to be 'statistically significant' compared with the standard population. For example, for an NHS Board rate of 85 per 1,000 population with a 95% confidence interval of 80–90, the difference from a standard population (ie Scotland) with a rate of 72 per 1,000 population is deemed to be statistically significant, since the range 80–90 does not include the value for the standard population (72).

Limitations of data

The analysis of emergency admission data was based on the total number of emergency admissions with a primary diagnosis of COPD. A number of patients had multiple emergency admissions for COPD within the same financial year, as seen in Table 1-2.

Table 1-2 Patients with one or more emergency admission to hospital for COPD within the year ending 31 March 2004

Number of admissions per patient per year	Number of patients	Cumulative percentage
1	7,269	74.7
2	1,485	90.0
3	527	95.4
4	199	97.4
5	249	100.0

It should be noted that data were only available for patients who were admitted to acute hospitals. Patients who were only treated in an accident and emergency (A&E) department were therefore not included in this indicator. Some hospitals may admit patients directly to a ward while others are more likely to treat patients in A&E only. Hospitals operating a policy of direct admissions to a medical assessment unit may yield higher admission figures than hospitals admitting all patients via A&E. Differences in admission policies among acute hospitals may therefore partly explain some of the variation across NHS Boards.

It is likely that the emergency admission rates for NHS Boards would also be influenced by factors relating to hospital access, such as rurality.

It should be noted that low levels of emergency admission are not necessarily associated with a better quality of care. An emergency admission may be the most appropriate form of care in some circumstances.

Presentation of data

Crude annual rates of death from COPD are presented by age group and sex for the 10 financial year periods from 1 April 1994 to 31 March 2004 in Figure 1-1 and Table 1-4. Crude rates of death are presented by deprivation quintile for the financial year ending March 2004 in Figure 1-2. Standardised rates of death are presented for each NHS Board of residence in Figure 1-3 and Table 1-5, using the aggregated data for the three-year period ending 31 March 2004.

Crude annual emergency admission rates for COPD are presented by age group and sex for the 10 financial year periods from 1 April 1994 to 31 March 2004 in Figure 1-4 and Table 1-6. Crude emergency admission rates are presented by deprivation quintile for the financial year ending March 2004 in Figure 1-5. Standardised emergency admission rates are presented for each NHS Board of residence in Figure 1-6 and Table 1-7, using the aggregated data for the three-year period ending 31 March 2004.

Crude annual one-year survival rates are presented by age group and sex for the financial years from 1 April 1993 to 31 March 2003 in Figure 1-7 and Table 1-8. Crude one-year survival rates are presented by deprivation quintile in Figure 1-8. Standardised one-year survival rates are presented for each NHS Board of residence in Figure 1-9 and Table 1-9, using the aggregated data for the three-year period ending 31 March 2004.

General practice consultations for COPD

Definition of indicator

Rate of patients consulting the general practice team with a diagnosis of COPD. (Hereafter referred to as patient rate).

Rate of general practice team consultations with a diagnosis of COPD. (Hereafter referred to as consultation rate).

Data source

Two data sources were used for this analysis:

- ISD Scotland Practice Team Information (PTI)

  PTI data are collected from a sample of 45 Scottish general practices (covering approximately 6% of the Scottish population), and consist of detailed information on each face-to-face consultation between a patient and a clinician in the general practice (this can be either a GP, a practice or district nurse, or a health visitor). At each consultation, the GP can record up to 10 diagnoses (‘morbidities’), while the nursing disciplines can record up to four activities (each with up to four associated morbidities) using Read codes. Each Read code is recorded as either a first ever occurrence, a repeat occurrence or an ongoing diagnosis. From this, it was possible to calculate patient and consultation rates for COPD.
- Community Health Index (CHI) registration at 30 September 2003

  CHI data were used to determine the size of the population (in PTI sample practices and in Scotland) by age, sex and deprivation category.

Deprivation quintiles were based on SIMD, which was calculated in 2004.[12]

The PTI data include information on age and sex. Deprivation classes were assigned to individual patients by linking the PTI data with the SIMD file, based on the postcode of the patient. Whenever the patient postcode was missing, the average deprivation quintile for the practice was used.

Analyses of data

In the sample, the number of patients and consultations for COPD was estimated based on face-to-face consultations with any member of the general medical practice team (eg GP, practice or district nurse, health visitor) in the financial year ending March 2004.

Patients and consultations were counted based on the diagnosis recorded in the PTI dataset. The PTI dataset does not record a 'primary' or 'secondary' diagnosis. All diagnoses were therefore included in this analysis.

Patient rates were calculated as the total number of (different) patients seen in the financial year ending March 2004 with a recorded diagnosis of COPD divided by the total number of patients registered with the PTI practices. Similarly, consultation rates were calculated as the total number of individual consultations in the financial year ending March 2004 (excluding telephone consultations, but including several consultations with different clinicians on the same day) divided by the total number of patients registered with the practices in the PTI sample.

Rates were subsequently multiplied by 1,000 to obtain values per 1,000 population and then multiplied by the Scottish population in order to estimate the number of consultations and patients with a recorded diagnosis of COPD in Scotland.

To adjust for differences in age, sex and deprivation between the PTI sample population and the total Scottish population, the method of direct standardisation was applied. For the tables showing rates by age and sex, data were standardised by deprivation. For tables showing rates by deprivation category, data were standardised by age and sex.

Limitations of data

This analysis was based on a sample of 45 practices that collected the full PTI dataset in the financial year ending March 2004, which includes approximately 6% of the Scottish population. Although standardisation can take account of differences in the distribution of age, sex and deprivation between the PTI sample and Scotland, there might well be other factors that influence the prevalence of the conditions.

These figures were based on patients contacting a member of the practice team for COPD within the year of interest. COPD patients who only contacted the practice team for another condition or were seen in secondary care only were not included. These figures are therefore likely to underestimate the true prevalence of COPD in Scotland.

Patient and consultation rates were derived using population estimates based on the number of people registered with a general medical practice. Any person not registered with a practice irrespective of the reason was not included in the population totals. Conversely, any person not yet removed from the practice register was included. The latter category is likely to be larger than the former because there is a stronger incentive to be registered with a medical practitioner (for access to medical care). Therefore, the population estimates are likely to be slightly overestimated, resulting in a slight underestimation of patient and consultation rates.

Presentation of data

The rate of patient and practice team consultations for COPD in the financial year ending March 2004 are shown in Table 1-10, standardised for deprivation and presented by age and sex (see also Figure 1-10 and Figure 1-11).

The rate of patient and practice team consultations for COPD in the financial year ending March 2004 are shown in Table 1-11, standardised for age and sex and presented by deprivation quintile (see also Figure 1-12).

Prescribing of adrenoceptor agonists and inhaled corticosteroids and use of home oxygen

Definition of indicator

Trends in prescribing of long and short-acting adrenoceptor agonists and inhaled corticosteroids.

Trends in the use of home oxygen (oxygen therapy equipment and oxygen concentrators).

Data source

Three data sources were used in these analyses:

- Prescribing Information System (PIS) Data Warehouse, held by NHS National Services Scotland

  The PIS Data Warehouse contains detailed information on NHS prescriptions dispensed in Scotland, such as the medicine name, strength, formulation and quantity. The database includes all prescriptions dispensed in the community regardless of where they were written, and those written in Scotland but dispensed elsewhere in the UK. It does not contain information on prescriptions that are dispensed within hospitals.

  GPs write the vast majority of prescriptions, with the remainder written mainly by nurses and dentists. Prescriptions are dispensed by community pharmacies, dispensing doctors and a small number of specialist appliance suppliers.

  The database is populated with information supplied by the Practitioner Services Division which is responsible for the processing and pricing of all prescriptions dispensed in Scotland.

  Oxygen therapy equipment (oxygen sets and cylinders) is owned by a pharmacy contractor and supplied on loan to patients. All community pharmacists and dispensing doctors are classed as pharmacy contractors. In order to supply oxygen and oxygen therapy equipment to NHS patients, they must be listed in the NHS Board's pharmaceutical list. A pharmacist contractor who provides an oxygen therapy service for NHS patients must be prepared to hold oxygen therapy equipment on their premises and be responsible for the safe delivery and installation of the oxygen and equipment in the patient's home.

  Portable oxygen cylinders can also be prescribed, however they are not included in this report, as data are only available from April 2004. In addition, the small quantities of liquid oxygen used in Scotland were not studied.

- Oxygen System Database, held by NHS National Services Scotland

  The Oxygen Concentrator Service provides patients suffering from respiratory problems with a convenient oxygen supply in their homes. Scottish Healthcare Supplies (SHS) manage a national contract (awarded by the Scottish Executive Health Department) to provide patients with an oxygen concentrator 24 hours per day. They co-ordinate the installation process between the respiratory consultant, the contractor and the patient, and ensure the overall performance of the contract.14 Only respiratory consultants have the authority to prescribe concentrators.

  Prior to 2004, it was recommended that patients in Scotland who required oxygen more than 15 hours per day should be provided with an oxygen concentrator. In April 2004, this changed to a threshold of 8 hours per day[15] and may be reduced further in the future, following a review starting in 2005.

  SHS store information on oxygen concentrators provided to patients in Scotland in the Oxygen System Database. Additionly, in April 2004 SHS sent a questionnaire to all patients who had a concentrator and they had a response rate of approximately 65%. Details of the patients' sex, age, ethnicity and disabilities were recorded.

- General Register Office for Scotland [GRO(S)]

  GRO(S) mid-year population estimates from June 1999 to June 2004 were used to calculate Scotland and NHS Board of residence population rates.

Analyses of data

Respiratory medicines are available in many different strengths and formulations, which make it difficult for direct comparison. The defined daily dose (DDD) is therefore used. The World Health Organization (WHO) describes the DDD as 'the assumed average maintenance dose per day for a drug used for its main indication in adults'.[16] The DDD methodology was developed by the WHO Collaborating Centre for Drug Statistics Methodology to convert and standardise readily available volume data from sales statistics or pharmacy inventory data (quantity of packages, tablets or other dosage forms) into medically meaningful units.[17] The DDD then takes into account the strength, form and quantity of drug given to the patient. However, a disadvantage of the DDD is that it can only be used for medicines of single medical ingredients.

Data for adrenoceptor agonists and inhaled corticosteroids for the years 1995 to 2004 were obtained from the prescribing information database for the whole of Scotland. The number of DDDs per 1,000 population was then calculated.

NHS Board crude annual rates of oxygen cylinders dispensed per 1,000 population were calculated by dividing the total number of cylinders dispensed per year and NHS Board by the corresponding GRO(S) mid-year population estimate. Oxygen sets consist of the valve, pressure gauge, cap and outlet. These give a good estimation of the numbers of new patients for any given year, as patients tend to retain the equipment. Due to the smaller numbers involved, the rates of oxygen cylinders dispensed with sets were calculated per 10,000 population (rather than 1,000 population).

The rates of oxygen concentrators in use per NHS Board of residence and year were calculated by subtracting the cumulative number of concentrators removed from the cumulative number of concentrators installed since the system was introduced and up to the year in question.

The annual trends in crude rates of oxygen concentrator use were derived by dividing the number of concentrators in use per year by the corresponding GRO(S) mid-year population estimate. Because of the small numbers involved, the figures were calculated per 10,000 population.

The rates of oxygen concentrator use by age and sex were calculated by dividing the number of patients that participated in the 2004 questionnaire in each sex and age group by the GRO(S) mid-year population estimate in the corresponding sex and age group.

Limitations of data

There is considerable overlap in the prescribing of adrenoceptor agonists (both long and short acting) and inhaled corticosteroids for COPD and asthma. As the indication for use is not available on the prescribing information database, it was not possible to distinguish between the two types of patients. Therefore, the trends described cannot be attributed to treatment of COPD exclusively.

Presently, only the minimum amount of information is collected on the prescribing information database from the community-dispensed prescription to facilitate reimbursement payment to pharmacies. No patient-specific data are kept and therefore no information on age, sex or indication for medication is available for analysis.

Since personal data are not recorded on the prescribing information database, the data for adrenoceptor agonists, corticosteroids and home oxygen therapy equipment could not be standardised for age, sex or deprivation.

The Oxygen Concentrator Service holds some personal information that could not be used for confidentiality and technical reasons. The 2004 questionnaire held details of the patients' sex, age, ethnicity and disabilities. However, the response rate (approximately 65%) was not high enough to enable standardisation.

Portable oxygen was excluded from the analysis as processing only commenced through the Data Capture Validation and Pricing System from April 2004.

The rates of oxygen concentrator use per 10,000 population (presented in Figure 1-16 and Table 1-15) should be viewed with caution because the number of concentrators reflects very closely, but not entirely, the number of patients who use them. This can occur for the following reasons:

- over 90% of patients in Scotland have only one oxygen concentrator delivered to their home. Removal of a concentrator is usually (but not always) as a result of a patient dying. Children, for example, often recover from their respiratory problem and no longer need to use oxygen.
- in some NHS Boards, the number of concentrators will be much higher than the number of patients because of multiple use of concentrators. For example, it is common practice to deliver more than one concentrator to patients that live on the Scottish islands because of the problems associated with attending a breakdown.

Table 1-3 shows the number of patients in each NHS Board area who had more than one oxygen concentrator in July 2005 and the percentage of single concentrators based on the total number of concentrators in use. There is significant variation across NHS Boards.

Table 1-3 Multiple and single use of oxygen concentrators by NHS Board of residence in July 2005

NHS Board of residence	Number of concentrators	Multiple use			Singles	Singles % of all concentrators
		Doubles	Triples	Quadruples		
Scotland	**3,382**	**137**	**7**	**2**	**3,079**	**91.0**
Argyll & Clyde	271	21	3		220	81.2
Ayrshire & Arran	311	7	2		291	93.6
Borders	77	1			75	97.4
Dumfries & Galloway	170	3	1		161	94.7
Fife	220	5			210	95.5
Forth Valley	149	5			139	93.3
Grampian	246	8			230	93.5
Greater Glasgow	603	10		1	579	96.0
Highland	153	19			115	75.2
Lanarkshire	351	3			345	98.3
Lothian	464	12		1	436	94.0
Orkney	23	9			5	21.7
Shetland	17	8			1	5.9
Tayside	264	5	1		251	95.1
Western Isles	63	21			21	33.3

Source: Oxygen System Database, SHS.

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

It is likely that some of the patterns observed will be influenced by small numbers, particularly in the Island NHS Boards.

Concentrator use is also likely to be influenced by the accessibility of respiratory consultants since concentrator use must be authorised by a consultant. It is possible that a change in consultant may have a significant effect on rates of oxygen concentrator use.

Presentation of data

Figure 1-13 shows the trends in adrenoceptor agonist and inhaled corticosteroid prescribing by NHS Board and year (see also Table 1-12).

Dispensed quantities of oxygen therapy equipment are provided for the financial years 1999–2000 to 2003–2004 by NHS Board, split into the number of cylinders dispensed (in Figure 1-14 and Table 1-13) and the number of cylinders dispensed with sets (in Figure 1-15 and Table 1-14).

Figure 1-16 and Table 1-15 show the number of oxygen concentrators in use at the end of each calendar year from 1999 to 2004 as a proportion of the total population in each NHS Board area. Figure 1-17 shows the rates of oxygen concentrator use by age and sex in 2004.

Results and discussion

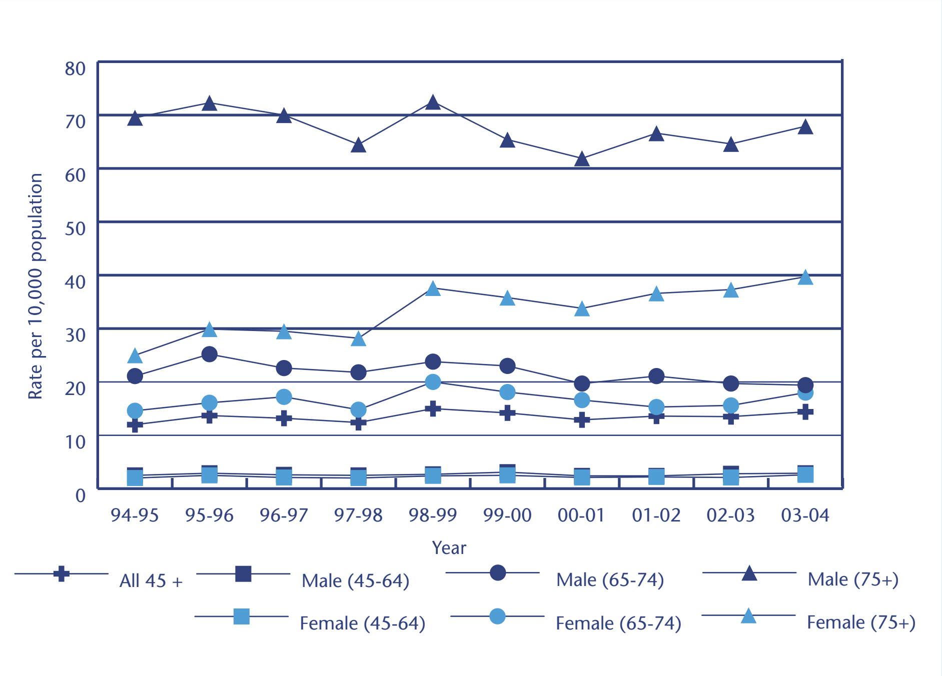
10-year annual trends in rates of death by age group and sex

Nationally, the rate of death from COPD for people aged 45 years and over was relatively stable between 1994–1995 and 2003–2004, fluctuating at about 13.5 per 10,000 population (see Figure 1-1). The rates of death were relatively stable across age groups and sex, with the exception of females aged 75 years and over. In this age group, the rate for females increased from 25.0 per 10,000 population in 1994–1995 to 39.7 per 10,000 population in 2003–2004.

Rates of death from COPD increased as people became older. For example, in 2003–2004, the rate of death was 2.9 per 10,000 population for males and 2.6 per 10,000 population for females in the 45–64 year age group compared with 67.9 per 10,000 population for males and 39.7 per 10,000 population for females in the 75+ year age group.

The rates of death were higher in males than females in all age groups and the sex differences increased with age. There was a marked difference in rates of death between males and females in the 75+ year age group.

Figure 1-1 Trends in rates of death for people aged 45 years and over with a primary cause of death of COPD by age group and sex for the period 1 April 1994 to 31 March 2004



Source: GRO(S) (death registrations and mid-year population estimates).

Table 1-4 Trends in rates of death (per 10,000 population) for people aged 45 years and over with a primary cause of death of COPD by age group and sex for the period 1 April 1994 to 31 March 2004

	Year (Apr-Mar)									
	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04
Males										
45-64	2.5	2.9	2.6	2.5	2.7	3.1	2.4	2.4	2.8	2.9
65-74	21.1	25.2	22.6	21.8	23.8	23.0	19.7	21.1	19.7	19.4
75+	69.5	72.3	70.0	64.5	72.5	65.4	61.9	66.6	64.6	67.9
Females										
45-64	2.0	2.5	2.1	2.0	2.4	2.5	2.1	2.2	2.1	2.6
65-74	14.6	16.1	17.2	14.8	20.0	18.1	16.6	15.3	15.6	18.0
75+	25.0	29.9	29.5	28.2	37.6	35.8	33.8	36.6	37.3	39.7

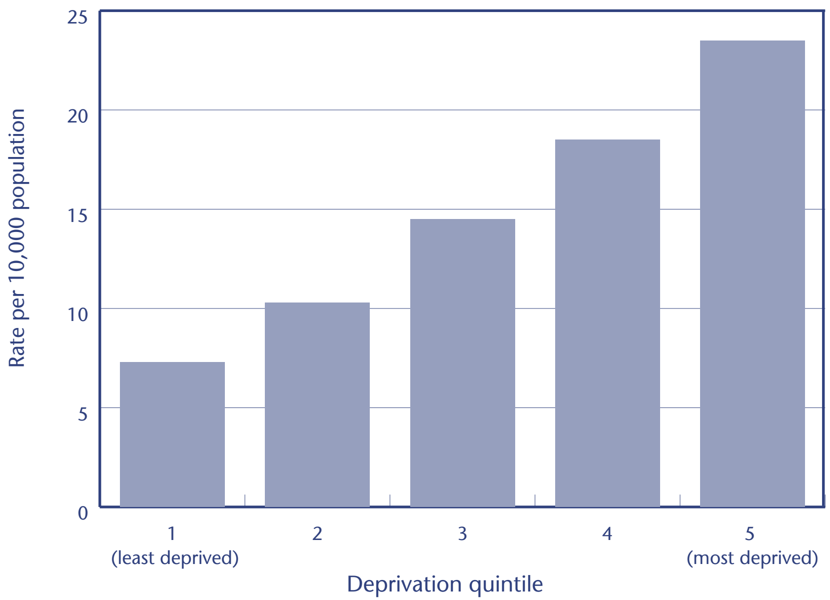
Source: GRO(S) (death registrations and mid-year population estimates).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Rates of death by deprivation

In 2003–2004, the rate of death from COPD rose with increasing deprivation (see Figure 1-2). The rate of death from COPD for people from the least deprived areas (quintile 1) was 7.3 per 10,000 population, rising to 23.5 per 10,000 population for people from the most deprived areas (quintile 5).

Figure 1-2 Rates of death for people aged 45 years and over with a primary cause of death of COPD by deprivation quintile for the period 1 April 2003 to 31 March 2004



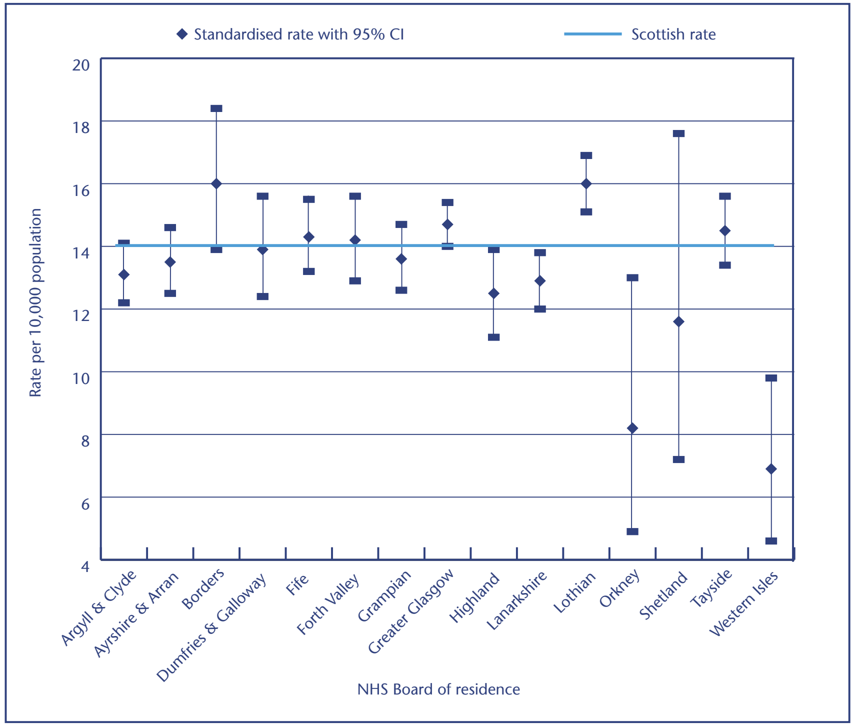
Source: GRO(S) (death registrations and 2001 census population).

Comparison of rates of death across NHS Boards

Figure 1-3 shows that there was some variation across NHS Boards in terms of the standardised rates of death (see also Table 1-5). Four NHS Boards had rates of death that were significantly lower than the Scotland rate (14.0 per 10,000 population). NHS Lothian had a rate of 16.0 per 10,000 population, which was significantly higher than the national rate.

Rates for NHS Boards with a smaller population base could be unreliable and should be viewed with caution, as demonstrated by the wider confidence intervals.

Figure 1-3 Rates of death for people aged 45 years and over with a primary cause of death of COPD by NHS Board of residence, standardised by age, sex and deprivation shown as a total for the three year period ending 31 March 2004



Source: GRO(S) (death registrations and 2001 census population).

Table 1-5 Rates of death for people aged 45 years and over with a primary cause of death of COPD by NHS Board of residence, standardised by age, sex and deprivation shown as a total for the three year period ending 31 March 2004

NHS Board of residence	Annual Population[a]	Total deaths in 3 years	Rate per 10,000 population		95% Confidence Intervals	
			Crude	Standardised	Lower	Upper
Scotland	**2,043,208**	**8,606**	**14.0**			
Argyll & Clyde	174,372	725	13.9	13.1	12.2	14.1
Ayrshire & Arran	158,018	677	14.3	13.5	12.5	14.6
Borders	48,611	208	14.3	16.0	13.9	18.4
Dumfries & Galloway	68,504	287	14.0	13.9	12.4	15.6
Fife	143,450	592	13.8	14.3	13.2	15.5
Forth Valley	113,337	452	13.3	14.2	12.9	15.6
Grampian	208,122	677	10.8	13.6	12.6	14.7
Greater Glasgow	331,346	1,776	17.9	14.7	14.0	15.4
Highland	91,295	304	11.1	12.5	11.1	13.9
Lanarkshire	213,689	862	13.4	12.9	12.0	13.8
Lothian	293,928	1,245	14.1	16.0	15.1	16.9
Orkney	8,520	18	7.0	8.2	4.9	13.0
Shetland	8,767	22	8.4	11.6	7.2	17.6
Tayside	168,836	731	14.4	14.5	13.4	15.6
Western Isles	12,413	30	8.1	6.9	4.6	9.8

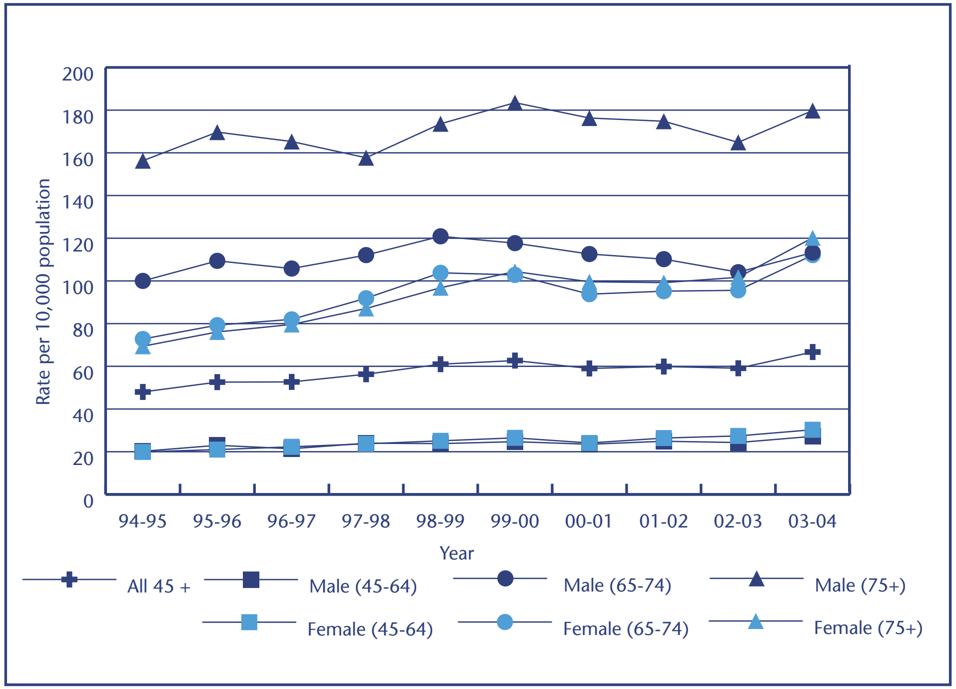
Source: GRO(S) death registrations and 2001 census population.

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

10-year annual trends in emergency admission rates by age group and sex

Nationally, there has been a gradual increasing trend in the rate of emergency admission for COPD, from 48.0 per 10,000 population in 1994–1995 to 66.7 per 10,000 population in 2003–2004 (see Figure 1-4 and Table 1-6). This trend was observed across all age groups.

Figure 1-4 Trends in emergency admission rates for people aged 45 years and over with a primary diagnosis of COPD by age group and sex for the period 1 April 1994 to 31 March 2004



Source: ISD Scotland (SMR01) and GRO(S) (mid-year population estimates).

The greatest increases in rates of emergency admission for COPD were seen in females aged 65 years and over. Between 1994–1995 and 2003–2004, there was an increase of about 40 per 10,000 population for females aged 65–74 years and about 50 per 10,000 population for females aged 75 years and over.

While emergency admission rate for males were higher than for females in most age groups and years, the gap had narrowed at the end of the ten year period. By 2003-2004, the only significant difference was for those aged 75 years and over with rates of 179.8 per 10, 000 population for males and 120.2 per 10, 000 population for females.

Table 1-6 Trends in emergency admission rates (per 10,000 popultion) for people aged 45 years and over with a primary diagnosis of COPD by age group and sex for the period 1 April 1994 to 31 March 2004

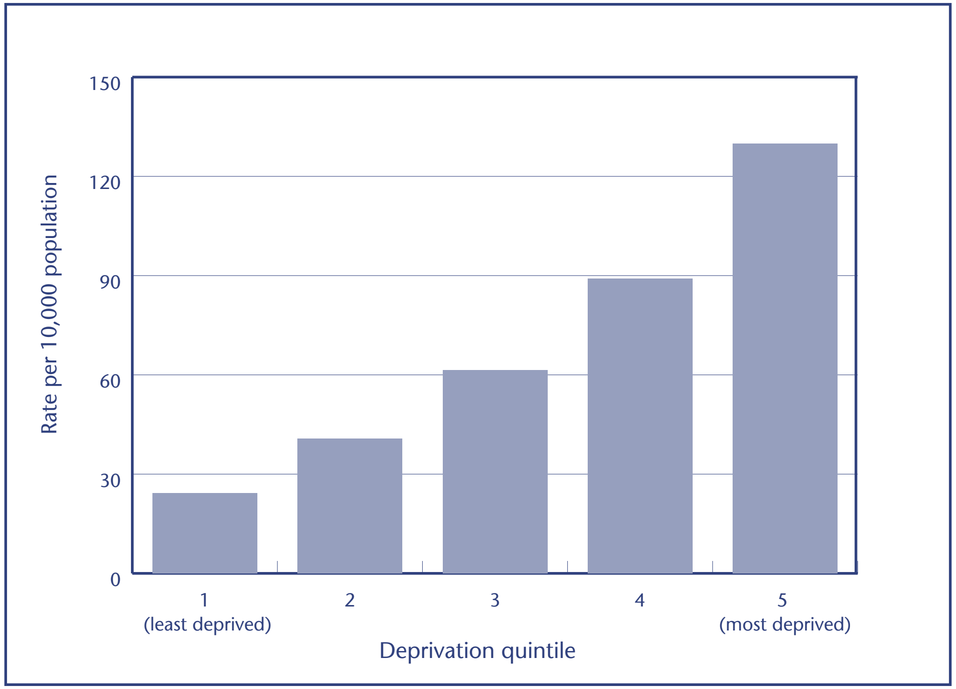
	Year (Apr-Mar)									
	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04
Males										
45-64	20.2	23.0	21.4	24.0	23.8	24.7	23.5	24.9	24.3	27.2
65-74	100.0	109.4	105.8	112.1	120.9	117.7	112.6	110.2	104.1	113.3
75+	156.3	169.7	165.3	157.7	173.6	183.5	176.3	174.8	164.9	179.8
Females										
45-64	19.9	21.0	22.3	23.7	25.1	26.5	24.1	26.4	27.4	30.3
65-74	72.8	79.3	82.0	91.9	103.8	102.8	93.8	95.2	95.6	112.1
75+	69.4	76.1	79.6	87.1	96.8	104.4	99.6	99.2	101.7	120.2

Source: ISD Scotland (SMR01) and GRO(S) (mid-year population estimates).

Rates of emergency admission by deprivation

Deprivation was linked to emergency admissions for COPD. In 2003–2004, the national rate of emergency admission for the most deprived areas was five times the rate for the least deprived areas (129.9 per 10,000 population compared with 24.3 per 10,000 population respectively) (see Figure 1-5).

Figure 1-5 Emergency admission rates for people aged 45 years and over with a primary diagnosis of COPD by deprivation quintile for the period 1 April 2003 to 31 March 2004



Source: ISD Scotland (SMR01) and GRO(S) (2001 census population).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Comparison of rates of emergency admission across NHS Boards

Figure 1-6 shows that there was considerable variation across NHS Boards in terms of the standardised rates of emergency admission for COPD (see also Table 1-7). Eight NHS Boards had a rate that was significantly lower than the Scottish rate (62.7 per 10,000 population), while three NHS Boards had a rate that was significantly higher than the national rate.

Rates for NHS Boards with a smaller population base could be unreliable and should be viewed with caution, as demonstrated by the wider confidence intervals.

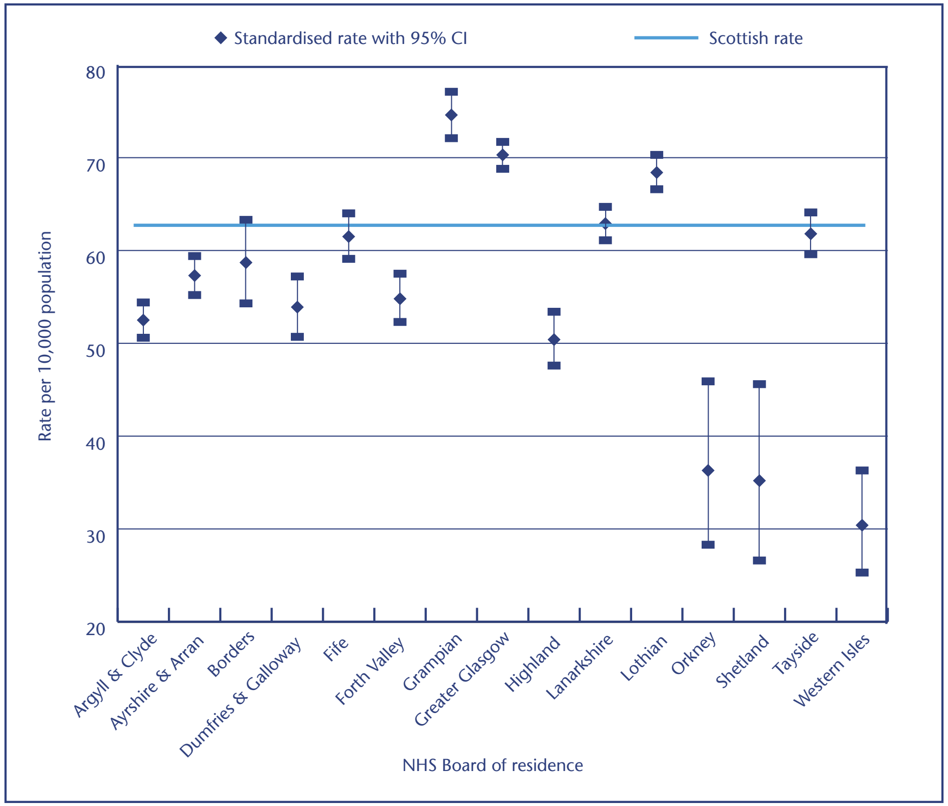
Table 1-7 Emergency admission rates for people aged 45 years and over with a primary diagnosis of COPD by NHS Board of residence, standardised by age, sex and deprivation shown as a total for the three year period ending 31 March 2004

NHS Board of residence	Annual Population[a]	Total admissions in 3 years	Rate per 10,000 population		95% Confidence Intervals	
			Crude	Standardised	Lower	Upper
Scotland	**2,043,208**	**38,446**	**62.7**			
Argyll & Clyde	174,372	3,015	57.6	52.5	50.6	54.4
Ayrshire & Arran	158,018	2,939	62.0	57.3	55.2	59.4
Borders	48,611	655	44.9	58.7	54.3	63.3
Dumfries & Galloway	68,504	1,052	51.2	53.9	50.7	57.2
Fife	143,450	2,453	57.0	61.5	59.1	64.0
Forth Valley	113,337	1,745	51.3	54.8	52.3	57.5
Grampian	208,122	3,345	53.6	74.6	72.1	77.1
Greater Glasgow	331,346	9,163	92.2	70.3	68.8	71.7
Highland	91,295	1,173	42.8	50.4	47.6	53.4
Lanarkshire	213,689	4,620	72.1	62.9	61.1	64.7
Lothian	293,928	5,068	57.5	68.4	66.6	70.3
Orkney	8,520	70	27.4	36.3	28.3	45.9
Shetland	8,767	57	21.7	35.2	26.6	45.6
Tayside	168,836	2,966	58.6	61.8	59.6	64.1
Western Isles	12,413	125	33.6	30.4	25.3	36.3

a mid-year population estimates.

Source: ISD Scotland (SMR01) and GRO(S) (2001 census population).

Figure 1-6 Emergency admission rates for people aged 45 years and over with a primary diagnosis of COPD by NHS Board of residence, standardised by age, sex and deprivation shown as a total for the three year period ending 31 March 2004



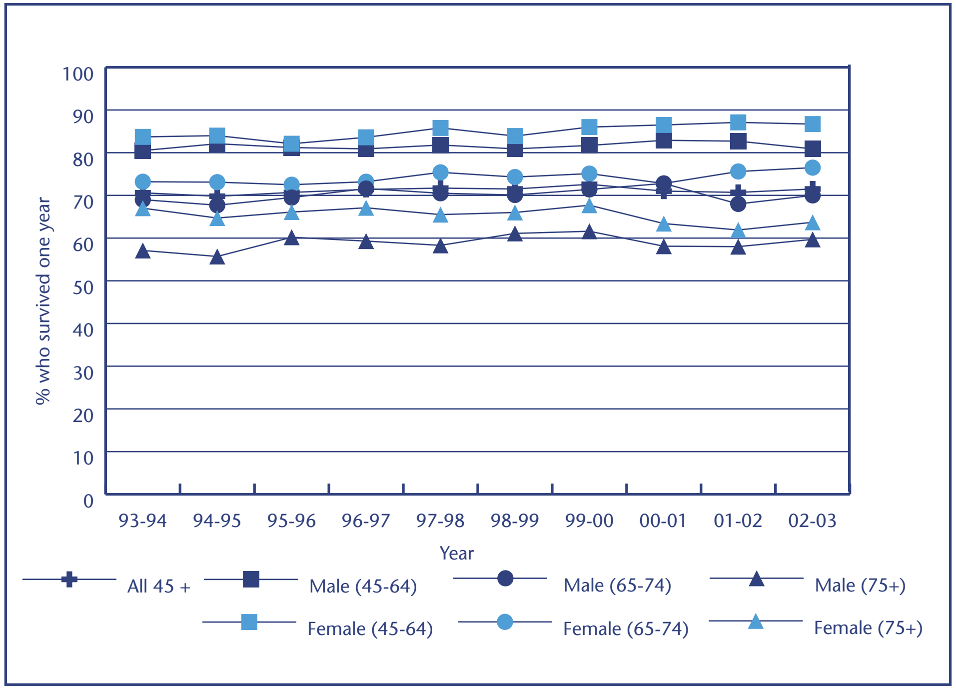
Source: ISD Scotland (SMR01) and GRO(S) (2001 census population).

10-year annual trends in one-year survival rates by age group and sex

Nationally, the one-year survival rate for COPD was relatively stable, fluctuating at around 71% between 1993 and 2003 (see Figure 1-7 and Table 1-8). This trend was observed across all age groups and sex.

One-year survival rates decreased as people became older. For example, in 2002–2003, the rate was 80.9% for males and 86.7% for females in the 45–64 year age group and 59.7% for males and 63.7% for females in the 75+ year age group. Females had better one-year survival rates than males in all age groups.

Figure 1-7 Trends in survival rates one year after an emergency admission for people with a primary diagnosis of COPD by age group and sex for the period 1 April 1993 to 31 March 2003



Source: ISD Scotland (SMR01) and GRO(S) (death registrations and mid-year population estimates).

Table 1-8 Survival rates (% who survived) one year after an emergency admission for people with a primary diagnosis of COPD by age group and sex for the period 1 April 1993 to 31 March 2003

	Year (Apr-Mar)									
	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03
Males										
45-64	80.5	82.1	81.2	80.9	81.8	80.9	81.7	82.9	82.7	80.9
65-74	69.0	67.7	69.5	71.6	70.5	70.1	71.4	72.8	68.0	70.0
75+	57.1	55.7	60.2	59.3	58.3	61.1	61.6	58.1	58.0	59.7
Females										
45-64	83.7	84.0	82.1	83.6	85.8	83.9	86.0	86.5	87.1	86.7
65-74	73.2	73.1	72.5	73.2	75.4	74.3	75.1	72.8	75.6	76.5
75+	67.0	64.7	66.1	67.1	65.5	66.0	67.7	63.4	61.9	63.7

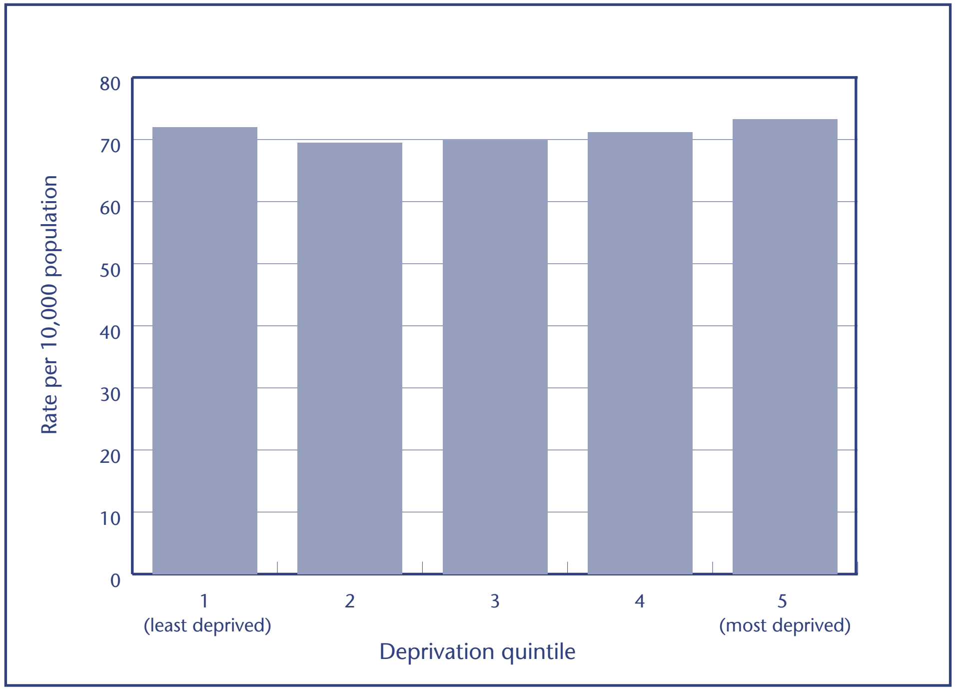
Source: ISD Scotland (SMR01) and GRO(S) (death registrations and mid-year population).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

One-year survival rates by deprivation

As seen in Figure 1-8, deprivation had no clear effect on the Scottish one-year survival rate for COPD in 2002–2003.

Figure 1-8 Survival rates one year after an emergency admission for people with a primary diagnosis of COPD by deprivation quintile for the period 1 April 2002 to 31 March 2003



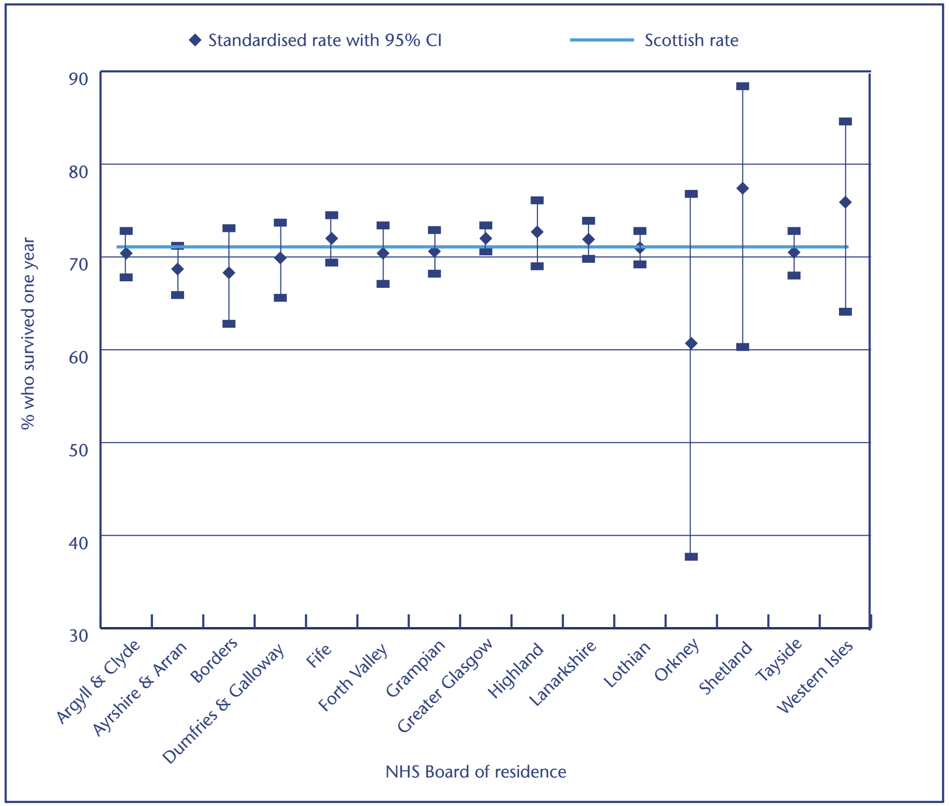
Source: ISD Scotland (SMR01) and GRO(S) (death registrations and mid-year population estimates).

Comparison of one-year survival rates across NHS Boards

There was little variation among NHS Boards in terms of standardised one-year survival rates for COPD (see Figure 1-9 and Table 1-9). None of the NHS Boards had a rate that was significantly different from the Scotland rate.

Rates for NHS Boards with a smaller population base could be unreliable and should be viewed with caution, as demonstrated by the wider confidence intervals.

Figure 1-9 Survival rates one year after an emergency admission for people with a primary diagnosis of COPD by NHS Board of residence, standardised by age, sex and deprivation, shown as a total for the three-year period ending 31 March 2003



Source: ISD Scotland (SMR01) and GRO(S) (death registrations and 2001 census population).

Table 1-9 Survival rates one year after an emergency admission (% who survived) for people with a primary diagnosis of COPD by NHS Board of residence, standardised by age, sex and deprivation, shown as a total for the three-year period ending 31 March 2003

NHS Board of residence	Total admissions in 3 years	Survived 1 year after admission	Rate per 10,000 population		95% Confidence Intervals	
			Crude	Standardised	Lower	Upper
Scotland	**24,404**	**17,347**	**71.1**			
Argyll & Clyde	1,935	1,370	70.8	70.4	67.8	72.8
Ayrshire & Arran	1,746	1,202	68.8	68.7	65.9	71.2
Borders	461	307	66.6	68.3	62.8	73.1
Dumfries & Galloway	687	470	68.4	69.9	65.6	73.7
Fife	1,571	1,102	70.1	72.0	69.4	74.5
Forth Valley	1,126	785	69.7	70.4	67.1	73.4
Grampian	2,011	1,406	69.9	70.6	68.2	72.9
Greater Glasgow	5,841	4,281	73.3	72.0	70.6	73.4
Highland	814	576	70.8	72.7	69.0	76.1
Lanarkshire	2,699	1,966	72.8	71.9	69.8	73.9
Lothian	3,417	2,420	70.8	71.0	69.2	72.8
Orkney	47	29	61.7	60.7	37.7	76.8
Shetland	50	38	76.0	77.4	60.3	88.4
Tayside	1,909	1,329	69.6	70.5	68.0	72.8
Western Isles	90	66	73.3	75.9	64.1	84.6

Source: ISD Scotland (SMR01) and GRO(S) (death registrations and 2001 census population).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

General practice consultations for COPD

In general, the rate of patients in PTI practices consulting for COPD increased as people became older. The greatest increases in patient rates were seen in people aged 55 years and over (see Table 1-10 and Figure 1-10). This trend was seen in both males and females. In males, the rate increased from 27.3 per 1,000 population for the 55–64 year age group to 58.1 per 1,000 population for the 65–74 year age group and rose further to 70.4 per 1,000 population for the 75+ year age group. In females, patient rates rose from 32.5 per 1,000 population to a peak at 54.6 per 1,000 population for the 65–74 year age group; this was followed by a slight decrease in the rate for the 75+ year age group to 45.1 per 1,000 population. The only notable difference in patient rates for COPD between males and females was in the 75+ year age group (see Table 1-10). These broad trends were observed for the rate of consultation for COPD with any member of the general practice team (see Table 1-10 and Figure 1-11).

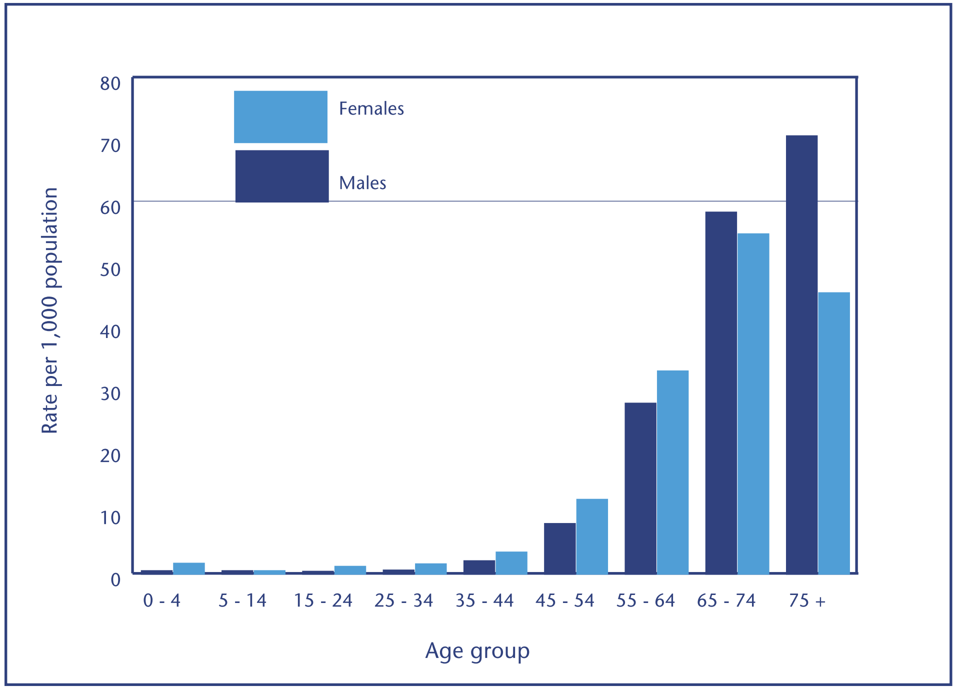
Table 1-10 COPD patients and consultations with the general practice team[a] (rates and estimated numbers in Scotland) in the year ending March 2004, by sex and age group, standardised by deprivation

	Patients		Consultations	
Age group	Rate per 1,000 population	Estimated number in Scotland	Rate per 1,000 population	Estimated number in Scotland
Males				
0 - 4	0.3	37	0.3	37
5 - 14	0.3	83	0.3	100
15 - 24	0.2	72	0.2	72
25 - 34	0.4	168	0.6	236
35 - 44	1.9	846	2.8	1,218
45 - 54	7.9	2,872	15.5	5,687
55 - 64	27.3	8,189	64.8	19,467
65 - 74	58.1	12,080	145.7	30,306
75 +	70.4	9,295	193.0	25,480
Females				
0 - 4	1.5	198	2.0	262
5 - 14	0.3	98	0.5	145
15 - 24	1.0	333	1.8	606
25 - 34	1.4	496	1.4	516
35 - 44	3.3	1,378	5.2	2,190
45 - 54	11.8	4,149	24.3	8,580
55 - 64	32.5	9,965	73.8	22,601
65 - 74	54.6	13,501	137.1	33,866
75 +	45.1	10,581	116.7	27,387

a Includes consultations with GP, practice nurse, district nurse and health visitor.

Source: PTI, ISD Scotland (based on 45 PTI practices, year ending March 2004)
CHI, ISD Scotland (as at 30 September 2003).

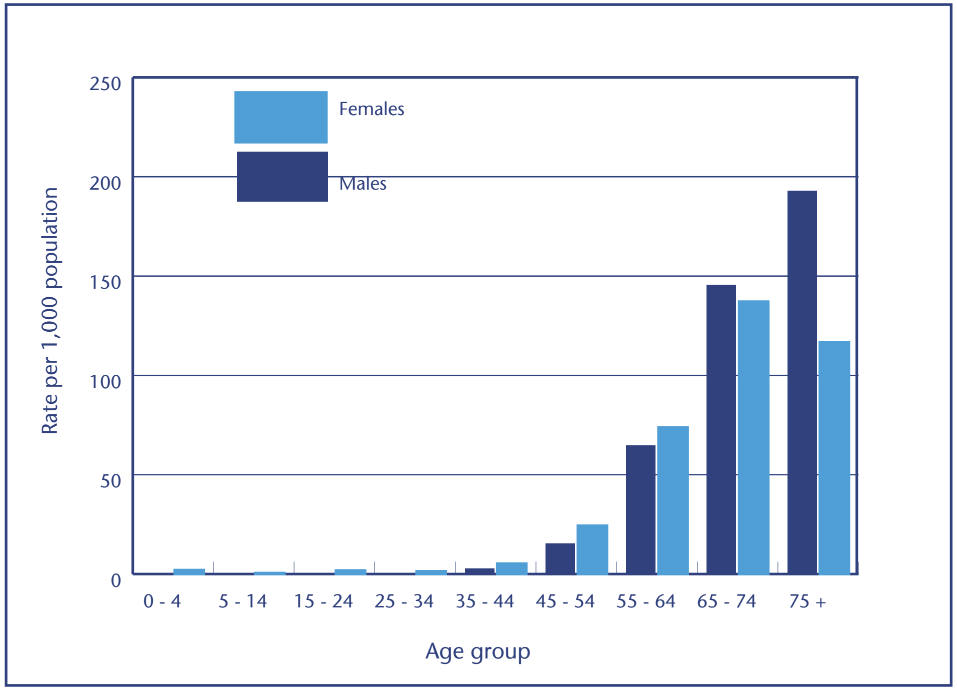
Figure 1-10 General practice team[a] COPD patient rates in the year ending March 2004, by sex and age group, standardised by deprivation



a Includes consultations with GP, practice nurse, district nurse and health visitor.

Source: PTI, ISD Scotland (based on 45 PTI practices, year ending March 2004)
CHI, ISD Scotland (as at 30 September 2003).

Figure 1-11 General practice team[a] COPD consultation rates in the year ending March 2004, by sex and age group, standardised by deprivation



a Includes consultations with GP, practice nurse, district nurse and health visitor.

Source: PTI, ISD Scotland (based on 45 PTI practices, year ending March 2004)
CHI, ISD Scotland (as at 30 September 2003).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Figure 1-12 shows that the rate of patients consulting any member of the general practice team for COPD and the rate of practice team consultations generally increased as the level of deprivation rose (from 5.0 per 1,000 population to 24.0 per 1,000 population, and from 14.3 per 1,000 population to 54.1 per 1,000 population respectively) (see also Table 1-11).

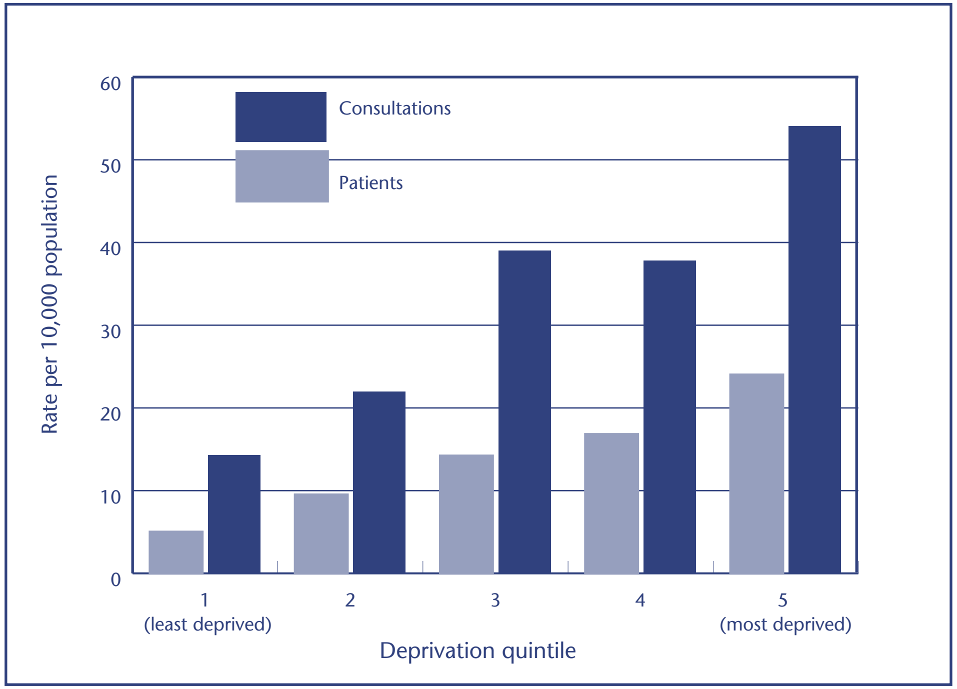
Table 1-11 COPD patients and consultations with the general practice team[a] (rates and estimated numbers in Scotland) in the year ending March 2004, by deprivation, standardised by age and sex

	Patients		Consultations	
SIMD quintile	Rate per 1,000 population	Estimated number	Rate per 1,000 population	Estimated number
1 (least deprived)	5.0	5,272	14.3	15,189
2	9.5	10,031	22.0	23,210
3	14.2	14,994	39.0	41,186
4	16.8	17,942	37.8	40,260
5 (most deprived)	24.0	26,138	54.1	58,945

a Includes consultations with GP, practice nurse, district nurse and health visitor.

Source: PTI, ISD Scotland (based on 45 PTI practices, year ending March 2004)
CHI, ISD Scotland (as at 30 September 2003).

Figure 1-12 COPD patients and consultations with the general practice team[a] in the year ending March 2004, by deprivation, standardised by age and sex



a Includes consultations with GP, practice nurse, district nurse and health visitor.

Source: PTI, ISD Scotland (based on 45 PTI practices, year ending March 2004)
CHI, ISD Scotland (as at 30 September 2003).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Prescribing of adrenoceptor agonists and inhaled corticosteroids

Throughout Scotland, the rate of adrenoceptor agonists and inhaled corticosteroids dispensed in the community increased steadily, from 24,754 DDDs per 1,000 population in 1995 to 31,877 DDDs per 1,000 population in 2004 (see Figure 1-13 and Table 1-12). This represents approximately a 29% increase. This increasing trend was observed across NHS Boards.

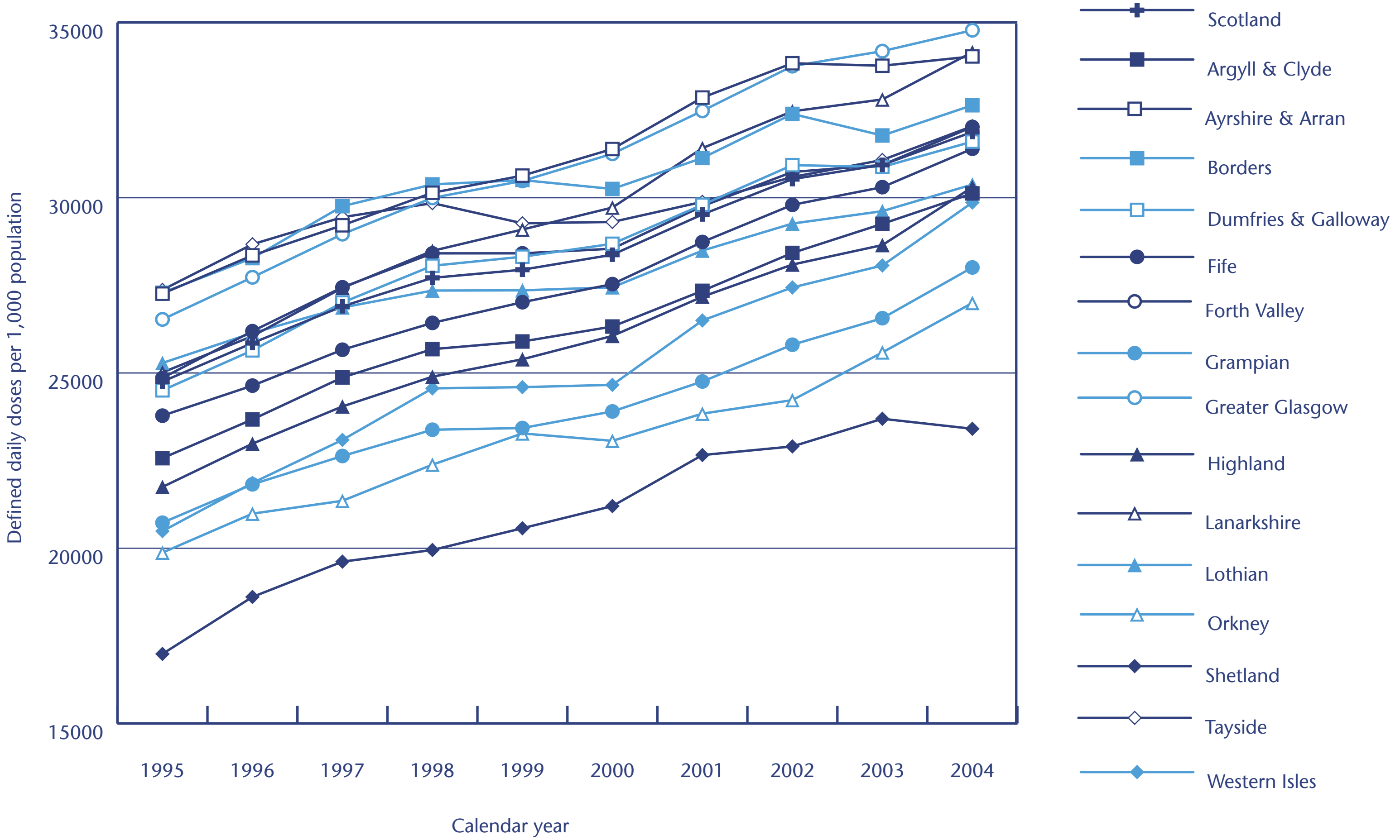
There was variation across NHS Boards in the level of adrenoceptor agonist and inhaled corticosteroid prescribing. However, the rates are not standardised and there could be significant differences in case-mix between NHS Boards. By 2004, levels of prescribing adrenoceptor agonists and inhaled corticosteroids were above 34,000 DDDs per 1,000 population for three NHS Boards (Ayrshire & Arran, Greater Glasgow and Lanarkshire) while levels were below 30,000 DDDs per 1,000 population for NHS Grampian and the three Island Boards (Orkney, Shetland and Western Isles). Rates for the Islands could be unreliable due to the smaller population base.

Table 1-12 Trends in adrenoceptor agonists and inhaled corticosteroids prescribing per 1,000 population by NHS Board for the period 1995 to 2004

	Defined Daily Doses per 1,000 Population									
	Calendar Year									
NHS Board	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Scotland	**24,754**	**25,854**	**26,902**	**27,714**	**27,946**	**28,374**	**29,523**	**30,532**	**30,938**	**31,877**
Argyll & Clyde	22,569	23,675	24,873	25,680	25,898	26,325	27,344	28,425	29,255	30,124
Ayrshire & Arran	27,263	28,355	29,214	30,142	30,631	31,391	32,858	33,837	33,766	34,032
Borders	27,289	28,278	29,759	30,380	30,504	30,251	31,134	32,391	31,776	32,639
Dumfries & Galloway	24,505	25,645	27,010	28,059	28,317	28,686	29,799	30,930	30,879	31,602
Fife	24,858	26,193	27,445	28,413	28,414	28,546	29,759	30,735	30,935	32,021
Forth Valley	23,782	24,639	25,663	26,429	27,019	27,536	28,737	29,797	30,302	31,398
Grampian	20,727	21,823	22,631	23,381	23,429	23,903	24,757	25,806	26,563	28,011
Greater Glasgow	26,529	27,731	28,962	29,996	30,480	31,254	32,479	33,755	34,182	34,780
Highland	21,748	22,982	24,045	24,894	25,391	26,057	27,176	28,093	28,649	30,300
Lanarkshire	25,015	26,052	27,427	28,484	29,093	29,720	31,415	32,466	32,804	34,153
Lothian	25,285	26,141	26,869	27,352	27,358	27,444	28,491	29,263	29,617	30,377
Orkney	19,874	20,986	21,353	22,384	23,275	23,064	23,840	24,226	25,587	26,998
Shetland	16,984	18,610	19,617	19,949	20,570	21,202	22,658	22,904	23,693	23,408
Tayside	27,372	28,672	29,445	29,846	29,272	29,309	29,883	30,591	31,078	32,041
Western Isles	20,488	21,862	23,091	24,561	24,596	24,661	26,499	27,440	28,067	29,863

Source: PIS Data Warehouse, ISD Scotland and GRO(S) (mid-year population estimates)

Figure 1-13 Trends in adrenoceptor agonists and inhaled corticosteroids prescribing per 1,000 population by NHS Board for the period 1995 to 2004



Source: PIS Data Warehouse, ISD Scotland and GRO(S) (mid-year population estimates)

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Use of home oxygen

Nationally, there was a gradual increasing trend in the rate of oxygen cylinders dispensed, from 28.3 per 1,000 population in 1999–2000 to 33.4 per 1,000 population in 2003–2004 (see Figure 1-14 and Table 1-13).

There was variation across NHS Boards in terms of the rate of oxygen cylinders dispensed. However, the rates are not standardised and there could be significant differences in case-mix between NHS Boards.

The levels of oxygen cylinders dispensed were above 55 per 1,000 population for two NHS Boards (Dumfries & Galloway, and Greater Glasgow) and less than 15 per 1,000 population for two NHS Boards (Western Isles and Borders) in 2003–2004. Rates for the Islands could be unreliable due to the smaller population base.

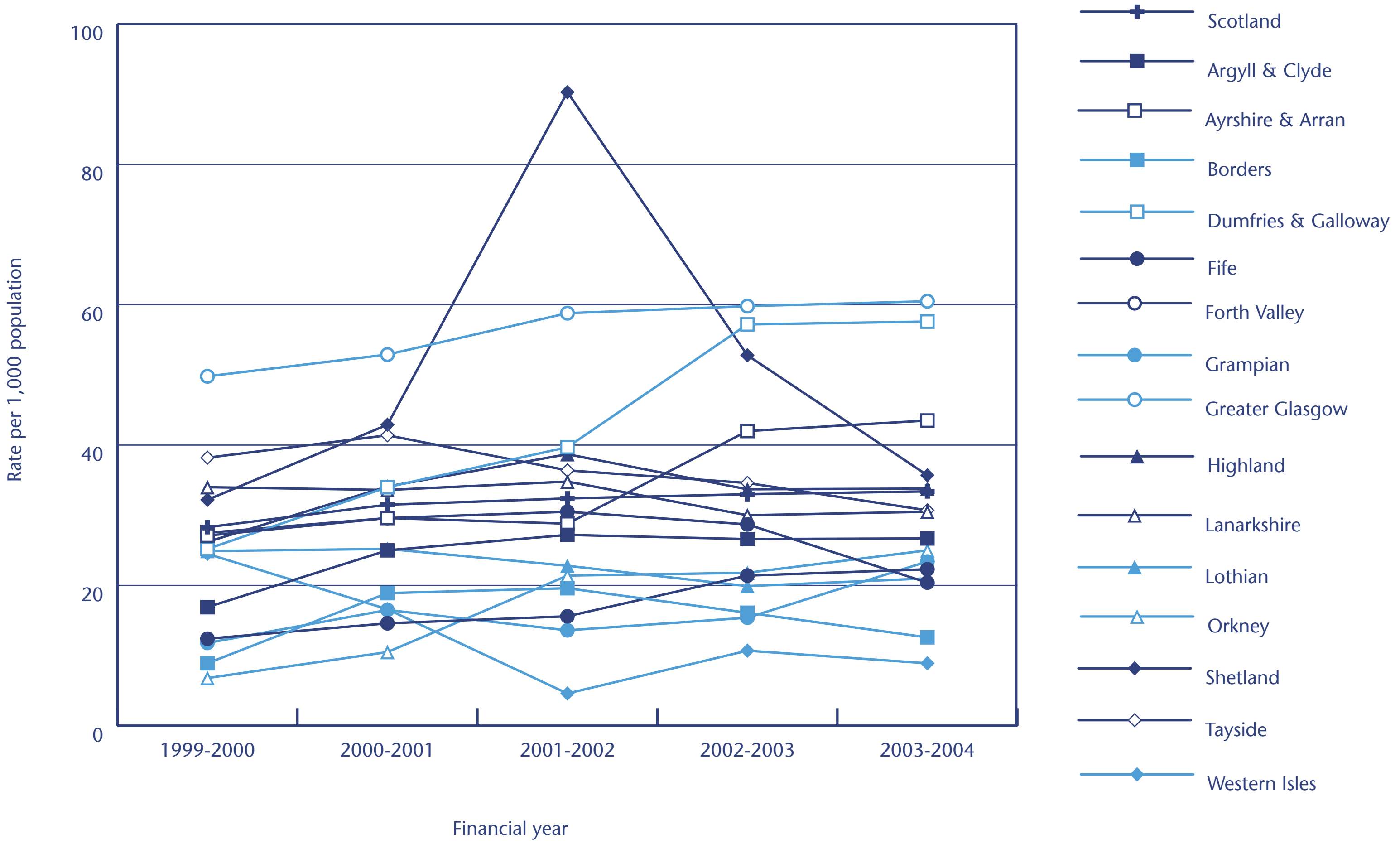
The use of home oxygen should be considered in the context of the rising rates of death and emergency admissions for COPD (see Figure 1-1 and Figure 1-4).

Table 1-13 Trends in oxygen cylinders dispensed per 1,000 population by NHS Board for the period 1 April 1999 to 31 March 2004

	Oxygen cylinders dispensed (rate per 1,000 population)				
	Financial Years				
NHS Board	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Scotland	**28.3**	**31.5**	**32.4**	**33.0**	**33.4**
Argyll & Clyde	16.9	25.0	27.2	26.6	26.7
Ayrshire & Arran	27.1	29.6	28.8	42.0	43.5
Borders	8.9	18.9	19.6	16.1	12.6
Dumfries & Galloway	25.2	34.0	39.7	57.2	57.6
Fife	12.4	14.6	15.6	21.4	22.3
Forth Valley	27.5	29.6	30.5	28.7	20.4
Grampian	11.8	16.5	13.6	15.4	23.4
Greater Glasgow	49.8	52.9	58.8	59.8	60.5
Highland	26.2	34.1	38.7	33.7	33.8
Lanarkshire	34.0	33.6	34.8	30.0	30.5
Lothian	24.9	25.2	22.8	19.9	21.0
Orkney	6.8	10.5	21.4	21.8	25.0
Shetland	32.2	42.9	90.3	52.8	35.7
Tayside	38.2	41.4	36.4	34.6	30.7
Western Isles	24.5	16.6	4.6	10.7	8.9

Source: PIS Data Warehouse, ISD Scotland and GRO(S) (mid-year population estimates)

Figure 1-14 Trends in oxygen cylinders dispensed per 1,000 population by NHS Board for the period 1 April 1999 to 31 March 2004



Source: PIS Data Warehouse, ISD Scotland and GRO(S) (mid-year population estimates)

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

As seen in Figure 1-15 and Table 1-14, the Scottish rate for oxygen cylinders dispensed with sets dipped in 2000–2001 to 10.5 per 10,000 population, then increased to 16.3 per 10,000 population in 2003–2004. There was some variation in the rate of oxygen cylinders dispensed with sets across NHS Boards. By 2003–2004, NHS Dumfries & Galloway dispensed notably more oxygen cylinders with sets (45.9 per 10,000 population) than other NHS Boards.

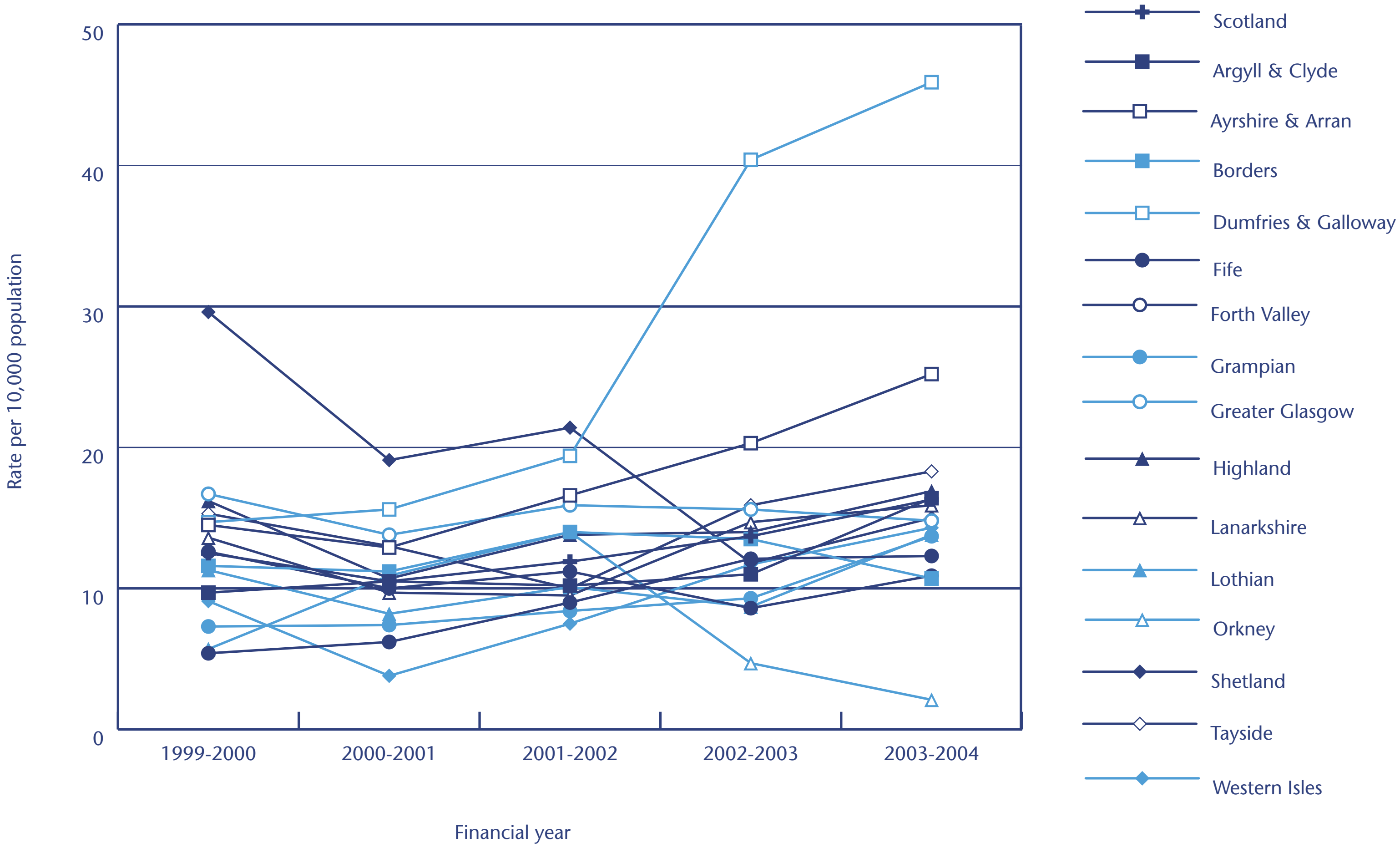
The use of home oxygen should be considered in the context of the rising rates of death and emergency admissions for COPD (see Figure 1-1 and Figure 1-4).

Table 1-14 Trends in rates of oxygen cylinders dispensed with set per 10,000 population by NHS Board for the period 1 April 1999 to 31 March 2004

	Oxygen cylinders with set dispensed (rate per 10,000 population)				
	Financial Year				
NHS Board	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Scotland	**12.5**	**10.5**	**11.9**	**13.7**	**16.3**
Argyll & Clyde	9.7	10.5	10.2	11.0	16.4
Ayrshire & Arran	14.5	12.9	16.6	20.3	25.2
Borders	11.6	11.2	14.0	13.5	10.7
Dumfries & Galloway	14.7	15.6	19.4	40.4	45.9
Fife	5.4	6.2	9.0	12.1	12.3
Forth Valley	12.6	10.0	11.2	8.6	10.9
Grampian	7.3	7.4	8.4	9.3	13.7
Greater Glasgow	16.7	13.8	15.9	15.6	14.8
Highland	16.2	10.7	13.8	14.0	16.9
Lanarkshire	13.6	9.7	9.5	14.7	15.9
Lothian	11.3	8.2	10.1	8.7	13.8
Orkney	5.7	10.9	14.0	4.7	2.1
Shetland	29.6	19.1	21.4	11.8	15.0
Tayside	15.3	13.0	10.0	15.9	18.3
Western Isles	9.1	3.8	7.5	11.7	14.3

Source: PIS Data Warehouse, ISD Scotland and GRO(S) (mid-year population estimates)

Figure 1-15 Trends in rates of oxygen cylinders dispensed with set per 10,000 population by NHS Board for the period 1 April 1999 to 31 March 2004



Source: PIS Data Warehouse, ISD Scotland and GRO(S) (mid-year population estimates)

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Nationally, there was a steady increase in oxygen concentrator use, from 4.0 per 10,000 population in 1999 to 6.2 per 10,000 population in 2004 (see Figure 1-16 and Table 1-15). This increasing trend was observed across NHS Boards.

There was variation across NHS Boards in the level of oxygen concentrator use. In 2004, levels of oxygen concentrator use were above 11.0 per 10,000 population for three NHS Boards (Dumfries & Galloway, Orkney and Western Isles). For the remaining NHS Boards, oxygen concentrator use was less than 8.0 per 10,000 population. However, rates for the Island NHS Boards should be viewed with caution, due to their smaller population base and also their higher percentage of patients with more than one concentrator installed in their homes.

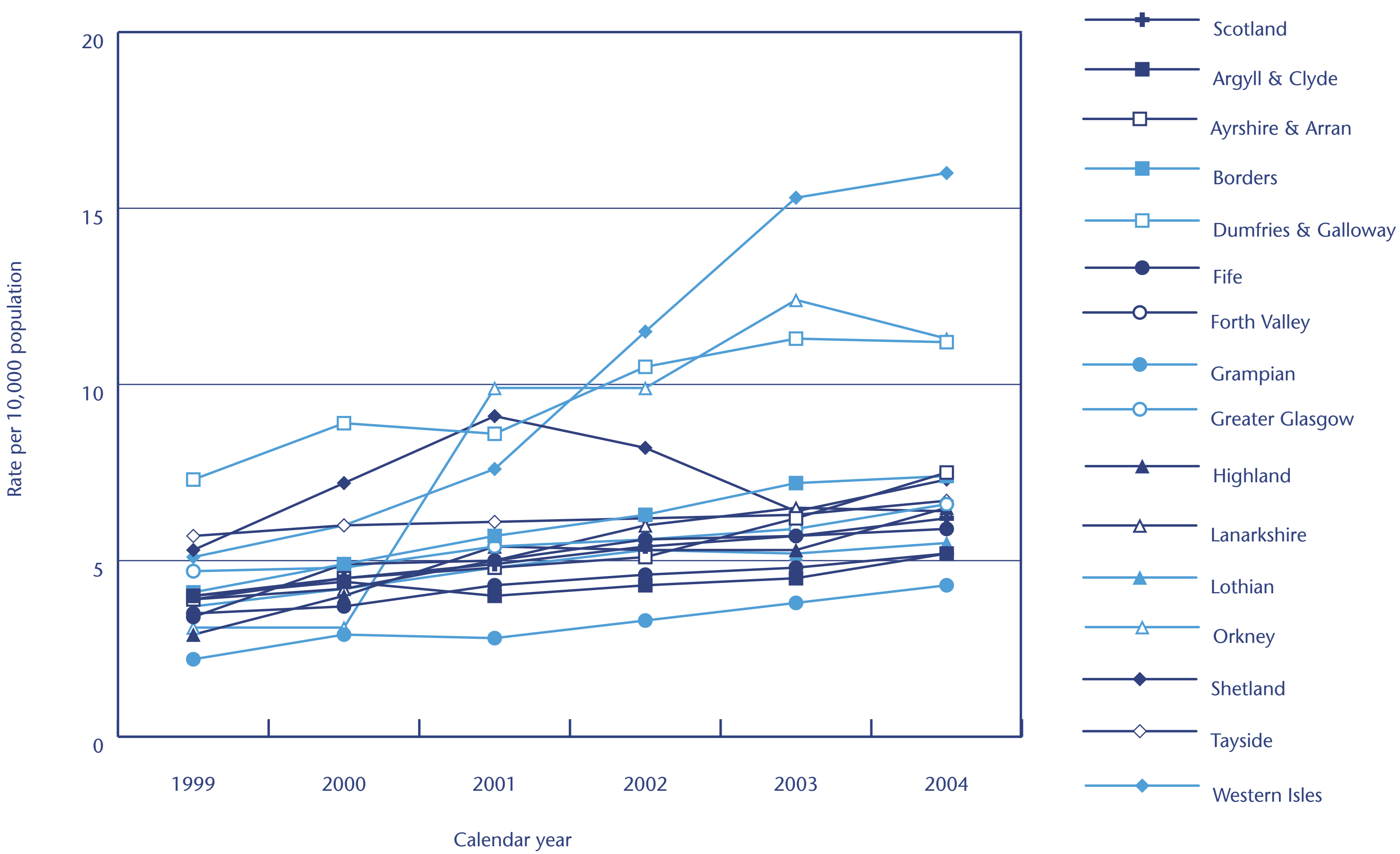
The use of home oxygen should be considered in the context of the rising rates of death and emergency admissions for COPD (see Figure 1-1 and Figure 1-4).

Table 1-15 Trends in rates of oxygen concentrators in use by NHS Board at the end of each calendar year from 1999 to 2004

	Oxygen concentrators used (rate per 10,000 population)					
	Calendar Year					
NHS Board	1999	2000	2001	2002	2003	2004
Scotland	**4.0**	**4.5**	**4.9**	**5.4**	**5.7**	**6.2**
Argyll & Clyde	4.0	4.4	4.0	4.3	4.5	5.2
Ayrshire & Arran	3.9	4.5	4.8	5.1	6.2	7.5
Borders	4.1	4.9	5.7	6.3	7.2	7.4
Dumfries & Galloway	7.3	8.9	8.6	10.5	11.3	11.2
Fife	3.4	4.9	5.0	5.6	5.7	5.9
Forth Valley	3.5	3.7	4.3	4.6	4.8	5.2
Grampian	2.2	2.9	2.8	3.3	3.8	4.3
Greater Glasgow	4.7	4.8	5.4	5.6	5.9	6.6
Highland	2.9	4.0	5.4	5.3	5.3	6.5
Lanarkshire	3.9	4.2	5.0	6.0	6.5	6.4
Lothian	3.7	4.2	4.8	5.3	5.2	5.5
Orkney	3.1	3.1	9.9	9.9	12.4	11.3
Shetland	5.3	7.2	9.1	8.2	6.4	7.3
Tayside	5.7	6.0	6.1	6.2	6.3	6.7
Western Isles	5.1	6.0	7.6	11.5	15.3	16.0

Source: Oxygen System Database SHS and GRO(S) (mid-year population estimates)

Figure 1-16 Trends in rates of oxygen concentrators in use by NHS Board at the end of each calendar year from 1999 to 2004

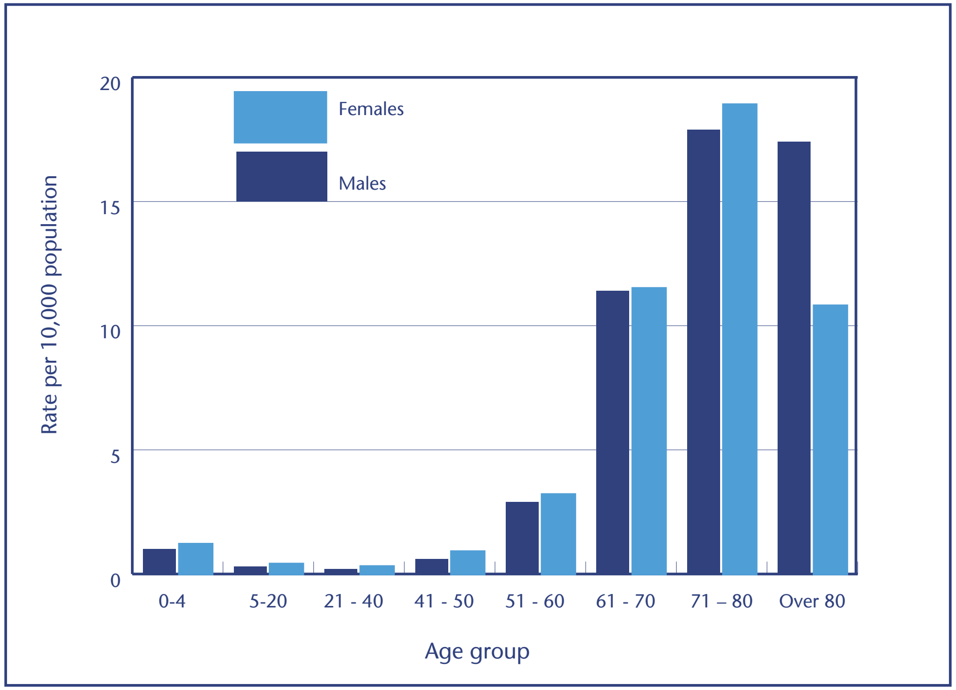


Source: Oxygen System Database SHS and GRO(S) (mid-year population estimates)

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Oxygen concentrator use rose with increasing age (see Figure 1-17). The largest increases in rates of oxygen concentrator use were seen in people aged 61 years and over, with the rate peaking in the 71–80 year age group at 17.9 per 10,000 population in males and 18.9 per 10,000 population in females. There were no marked differences in rate of oxygen concentrator use between males and females, except in the oldest age group (80+ years). In this age group, the rate was 17.4 per 10,000 population for males and 10.8 per 10,000 population for females in 2004.

Figure 1-17 Rates of oxygen concentrator use by age and sex for patients who responded to the 2004 questionnaire[a]



a Respondents account for approximately 60% of all concentrator users

Source: Scottish Healthcare Supplies (oxygen concentrator users questionnaire 2004)

References

1 www.brit-thoracic.org.uk

2 www.gpnotebook.co.uk

3 National Institute for Clinical Excellence (NICE). Management of chronic obstructive pulmonary disease in adults in primary and secondary care. Clinical guideline 12. NICE: London, 2004.

4 www.jr2.ox.ac.uk/bandolier/band113/b113-3.html

5 www.dotpharmacy.co.uk

6 www.jr2.ox.ac.uk/bandolier/band98/b98-2.html

7 British Thoracic Society (BTS). BTS guidelines on the management of COPD. Thorax 1997, 52 (Supplement 5): S1-S28.

8 www.prodigy.nhs.uk/guidance.asp?gt=COPD

9 www.rcplondon.ac.uk/college/ceeu/copd/nationalCOPDaudit2003report.pdf

10 www.bma.org.uk/ap.nsf/Content/QualityIndicators/$file/QualOutFram0804.pdf

11 www.scotland.gov.uk/library5/society/sndata-01.asp

12 www.scotland.gov.uk/library5/society/siomed-00.asp

13 www.show.scot.nhs.uk/indicators/Outcomes/OutcomesReport2002.pdf

14 www.show.scot.nhs.uk/csa/publications/annrep0304.pdf

15 www.show.scot.nhs.uk/sehd/mels/HDL2004_01.pdf

16 www.who.int/medicines/library/qsm/icdra99/icdra99_util.shtml

17 Strom B. Pharmacoepideimiology. Toronto: Wiley press, 1994.

Background

- Heart failure is a condition in which the heart is unable to adequately deliver blood, and therefore oxygen, to the body. Symptoms include breathlessness, fatigue, and fluid retention.
- Heart failure affects 1–2% of the population and has become increasingly common, due to an ageing population and more people surviving a heart attack.
- Heart failure is a potentially life-threatening condition, but it can be treated effectively if it is diagnosed early. The Scottish Intercollegiate Guidelines Network has published guidance on the diagnosis and treatment of heart failure. In 2005, NHS Quality Improvement Scotland issued advice on the use of simple blood tests that can help establish if a person has heart failure.
- This section presents data on heart failure for the period 1994 to 2004 – specifically, rates of death, emergency admission to hospital, survival one year after an emergency admission, and consultation with the general practice team. Trends in the prescribing of angiotensin-converting enzyme (ACE) inhibitors and beta-blockers (drugs used to treat coronary heart disease, high blood pressure and heart failure) are also examined.

Key findings

- Nationally, rates of death from heart failure for people aged 45 years and over peaked at 6.3 per 10,000 population in 1996–1997, then decreased gradually to 3.0 per 10,000 population in 2003–2004. Rates of death were highest in people aged 75 years and over. Nationally, rates of death from heart failure were lowest for the least deprived areas (quintile 1) at 2.1 per 10,000 population, but broadly similar for quintiles 2 to 5 at about 3.5 per 10,000 population in 2003–2004.
- The Scottish rate for emergency admission as a result of heart failure decreased from 46.8 per 10,000 population in 1994–1995 to 33.1 per 10,000 population in 2003–2004. The largest decreases in rates of emergency admission were seen in people aged 65 years and over. The rate of emergency admission for people with heart failure rose with increasing deprivation, from 21.4 per 10,000 population in quintile 1 to 47.0 per 10,000 population in quintile 5 in 2003–2004.
- Nationally, the rate of survival one year after emergency admission for heart failure fluctuated at around 55% between 1993–1994 and 2002–2003. The rate of survival one year after an emergency admission decreased as people became older. Deprivation had little effect on the Scottish one-year survival rate.
- In a sample practice population, the rate of patients consulting for heart failure increased with age, with the vast majority of patients aged 65 years and over. Deprivation had no clear effect on the rate of patients consulting for heart failure.
- The rate of prescribing ACE inhibitors and beta-blockers (drugs recommended for the treatment of heart failure or its common causes) increased between 1995 and 2004. For example, the rate of ACE inhibitors dispensed increased approximately five fold, from 7,679 defined daily doses (DDDs) per 1,000 population in 1995 to 36,008 DDDs per 1,000 population in 2004.

Introduction

Heart failure is a complex condition in which the heart is unable to pump blood adequately around the body.[1] Heart failure is most commonly caused by coronary heart disease and hypertension.[2] It is the end stage of all types of heart disease, and causes significant morbidity and mortality.[3] Heart failure is associated with a poorer prognosis than a heart attack and most common types of cancer, with the exception of lung cancer.[4] People with heart failure are also reported to have a poorer quality of life than people with other chronic conditions.[1]

Heart failure affects 1–2% of the UK population and has become increasingly prevalent.[1] This is due to an ageing population (the occurrence of heart failure increases rapidly with age) and more people surviving a heart attack but left with residual heart damage.[5]

The symptoms of heart failure include breathlessness and fatigue during activity or at rest, and fluid retention; these symptoms vary in severity.[6] As these symptoms are relatively non-specific, heart failure can be difficult to diagnose. Many people in the early stages of heart failure do not have symptoms. Other people display the typical symptoms of heart failure, but further investigations show that these are being caused by another condition, such as lung disease.[7] An accurate diagnosis of heart failure therefore requires clinical judgement and further investigations such as an electrocardiogram, B-type natriuretic peptide testing and echocardiography.[3,6] One study has shown that only about half of people diagnosed with heart failure by their general practitioner (GP) have the condition confirmed by echocardiography.[8]

Heart failure is a potentially fatal condition, but it can be treated effectively if it is diagnosed early. The National Institute for Clinical Excellence (NICE),[9] (based on the guideline by the National Collaborating Centre for Chronic Conditions)[10] and the Scottish Intercollegiate Guidelines Network (SIGN)[11] have published guidance on the diagnosis and treatment of heart failure. Recommended pharmacological treatments for heart failure, although not specific for this condition, include angiotensin-converting enzyme (ACE) inhibitors, beta-blockers, diuretics, spironolactone, digoxin and angiotensin II receptor antagonists. ACE inhibitors are considered to be one of the treatments of choice for heart failure and have been shown to significantly improve survival in patients with heart failure. There is also evidence that beta-blockers improve the life expectancy of people with heart failure.[10] Prescribing of both ACE inhibitors and beta-blockers for heart disease are included as clinical indicators in the General Medical Services contract.[12] Non-pharmacological measures in the treatment of heart failure are also important and both sets of guidance advocate dietary changes, exercise, smoking cessation and moderation in alcohol intake. Clinical standards for secondary prevention following a heart attack were also published by the Clinical Standards Board for Scotland (now part of NHS QIS),[13] and in 2005 NHS QIS issued advice on the use of simple blood tests that can help establish if a person has heart failure.[13]

Heart failure currently places an enormous burden on primary and secondary healthcare services. UK re-admission rates for people with heart failure are also high and are estimated to be as much as 50% over a three-month period. Uncontrolled symptoms, non-compliance with drug treatments or dietary measures, high alcohol intake and psychological problems are common causes for re-admission, many of which can be prevented and managed in primary care.[14]

In response to the concerning levels of heart disease among the Scottish population, this condition has been the focus of several policy documents. The 1999 White Paper, Towards a Healthier Scotland, set a national target for reducing coronary heart disease-related premature mortality by 50% in people under the age of 75 years between 1995 and 2010; this target has recently been increased to 60%.[15,16] In 2002, the Scottish Executive set out The Coronary Heart Disease and Stroke Strategy for Scotland, to address issues relating to equity of access to care, primary and secondary prevention, and service issues.[17]

This section presents data on death, emergency admissions, survival one year after emergency admission and consultation with general practice as a result of heart failure. Trends in the prescribing of ACE inhibitors and beta-blockers are also examined.

Data and methods

Death, emergency admission and survival

Definition of indicator

The following indicators are presented for people aged 45 years and over:

- rates of death where the main cause is heart failure
- rates of emergency admission to hospital with a primary diagnosis of heart failure
- rates of survival one year after an emergency admission to hospital with heart failure.

Data source

Information for these indicators was derived from two data sources:

- the General Register Office for Scotland [GRO(S)], which records data on death (including cause of death)
- the national Scottish Morbidity Record (SMR01), which records information on hospital discharges from general/acute specialties. An SMR01 record is completed each time a patient is discharged from an episode of care.

Establishing survival for at least 365 days is based on linkages from SMR01 records to the GRO(S) death records. This process takes account of any deaths occurring after discharge from hospital.

The codes for identifying death and emergency admission as a result of heart failure are outlined in Table 2-1.

Table 2-1 Codes indicating a diagnosis of heart failure

Diagnosis	ICD-9	ICD-10
Heart failure	428	I50

Two sources were used for population data:

- GRO(S)

  GRO(S) mid-year population estimates were used to give Scotland and NHS Board of residence population estimates from June 1994 to June 2003. These data were used in the analysis of 10-year annual trends.
- 2001 census data

  2001 census populations at data zone level were used when considering the deprivation profile and the standardised admission and death rates. Data zones are groups of census output areas with populations of between 500 and 1,000 residents, which contain households with similar social characteristics.[18]

Deprivation quintiles were based on the Scottish Index of Multiple Deprivation (SIMD), which was calculated in 2004.[19] Quintiles were assigned to admission and death records using postcodes.

Analyses of data

People aged 45 years and over were selected for all analyses.

Crude annual death rates and emergency admission rates were produced for Scotland, by age group and sex, for the period 1 April 1994 to 31 March 2004. The selection was based on date of registration for deaths and date of discharge for emergency admissions. The rates were calculated by dividing the total number of deaths or emergency admissions for heart failure in each year, age group and sex by the corresponding GRO(S) mid-year population estimate.

For one-year survival data, outcome was defined as survival for at least 365 days after admission. Each patient admitted with heart failure was counted once within each year, regardless of the number of times they were admitted for heart failure within that period. This avoids any double counting of the same heart failure patients; for example, this might occur when a patient is transferred within a hospital and a new SMR01 is generated. Patients who died from heart failure without being admitted to a hospital for this condition were not included in the survival analysis.

Crude annual one-year survival rates were produced for Scotland, by age group and sex, for the period 1 April 1993 to 31 March 2003. The selection was based on date of first emergency admission for each patient within each year. To allow a follow up of 365 days, only patients admitted up to 31 March 2003 were included. The rates were calculated by dividing the total number of patients admitted as an emergency for heart failure who survived for at least a year by the total number of patients admitted as an emergency for heart failure in each year, age group and sex.

Crude death rates and emergency admission rates were produced for Scotland by deprivation quintile for the period 1 April 2003 to 31 March 2004. The rates were calculated by dividing the total number of deaths or emergency admissions between 1 April 2003 and 31 March 2004 in each deprivation quintile by the total population resident in that particular deprivation quintile, according to the 2001 census. For one-year survival rates, the total number of patients who survived for at least a year after an emergency admission for heart failure between 1 April 2002 and 31 March 2003 in each deprivation quintile was calculated. To calculate crude rates, this figure was then divided by the total number of patients admitted as an emergency for heart failure in that deprivation quintile.

NHS Board rates of death, emergency admission and one-year survival after emergency admission for heart failure across the three-year period ending March 2004 were indirectly standardised for age, sex and deprivation quintile, taking the total for Scotland over this three-year period as the reference. Further details of the indirect standardisation process can be found in Annex 7 of the 2002 Clinical Outcome Indicators report.[20]

An estimate of the statistical significance of the standardised rate can be obtained from the 95% confidence interval. If the confidence interval does not include the Scottish rate, the difference in heart failure death, emergency admission or one-year survival rates recorded for a particular population is said to be 'statistically significant' compared with the standard population. For example, for an NHS Board rate of 85 per 1,000 with a 95% confidence interval of 80–90, the difference from a standard population (ie Scotland) with a rate of 72 per 1,000 is deemed to be statistically significant, since the range 80–90 does not include the value for the standard population (72).

Limitations of data

The analysis of emergency admission data was based on the total number of emergency admissions with a primary diagnosis of heart failure. A number of patients had multiple emergency admissions for heart failure within the same financial year, as seen in Table 2-2.

Table 2-2 Patients with one or more emergency admission to hospital for heart failure within the year ending March 2004

Number of admissions per patient per year	Frequency	Cumulative percent (%)
1	5133	86.1
2	658	97.2
3	116	99.1
4	30	99.6
5 and over	23	100.00

Source: ISD Scotland (SMR01).

It should be noted that data were only available for patients who were admitted to acute hospitals. Patients who were treated in an accident and emergency (A&E) department only were therefore not included in this indicator. Some hospitals may admit patients directly to a ward while others are more likely to treat patients in A&E only. Hospitals operating a policy of direct admissions to a medical assessment unit may yield higher admissions figures than hospitals admitting all patients via A&E. Differences in admission policies among acute hospitals may therefore partly explain some of the variation across NHS Boards.

It is likely that the emergency admission rates for NHS Boards would also be influenced by factors relating to hospital access, such as rurality.

Following rules established by the World Health Organization (WHO) to ensure international comparability, GRO(S) encourages the identification of the 'underlying' cause of death. Where heart failure is recorded on a death certificate, more specific information regarding the cause which led to the heart failure is actively sought by GRO(S). Around 90% of death certificates which mention heart failure as a cause of death will not have heart failure assigned as the underlying cause.

Presentation of data

Rates of death, emergency admission and survival one year after admission are presented for the following age groups: 45–64 years, 65–74 years, and 75 years and over.

Crude national annual rates of death are presented by age group and sex for people aged 45 years and over for the 10-year period from 1994–1995 to 2003–2004 in Figure 2-1 and Table 2-3. Crude rates of death are presented by deprivation quintile for the financial year ending 2004 in Figure 2-2. Standardised rates of death are presented for each NHS Board of residence in Figure 2-3 and Table 2-4, using aggregated data for the three-year period ending 31 March 2004.

Crude national annual emergency admission rates are presented by age group and sex for people aged 45 years and over for the 10-year period from 1994–1995 to 2003–2004 in Figure 2-4 and Table 2-5. Crude emergency admission rates are presented by deprivation quintile for the financial year ending 2004 in Figure 2-5. Standardised emergency admission rates are presented for each NHS Board of residence in Figure 2-6 and Table 2-6, using aggregated data for the three-year period ending 31 March 2004.

Crude national annual one-year survival rates are presented by age group and sex for people aged 45 years and over for the 10-year period from 1993–1994 to 2002–2003 in Figure 2-7 and Table 2-7. Crude one-year survival rates are presented by deprivation quintile for the financial year 2002–2003 in Figure 2-8. Standardised one-year survival rates are presented for each NHS Board of residence in Figure 2-9 and Table 2-8, using aggregated data for the three-year period ending 31 March 2004.

General practice consultations for heart failure

Definition of indicator

Rate of patients consulting the general practice team with a diagnosis of heart failure. (Hereafter referred to as patient rate).

Rate of general practice team consultations with a diagnosis of heart failure. (Hereafter referred to as consultation rate).

Data source

Two data sources were used for this analysis:

- ISD Scotland Practice Team Information (PTI)

  PTI data are collected from a sample of 45 Scottish general practices (covering approximately 6% of the Scottish population), and consist of detailed information on each face-to-face consultation between a patient and a clinician in the general practice (this can be either a GP, a practice or district nurse or a health visitor). At each consultation, the GP can record up to 10 diagnoses ('morbidities'), while the nursing disciplines can record up to four activities (each with up to four associated morbidities) using Read codes. Each Read code is recorded as either a first ever occurrence, a repeat occurrence or an ongoing diagnosis. From this, it was possible to calculate patient and consultation rates for heart failure.
- Community Health Index (CHI) registration at 30 September 2003

  CHI data were used to determine the size of the population (in PTI sample practices and in Scotland) by age, sex and deprivation category.

Deprivation quintiles were based on SIMD, which was calculated in 2004.[18]

The PTI data include information on age and sex. Deprivation classes were assigned to individual patients by linking the PTI data with the SIMD file, based on the postcode of the patient. Whenever the patient postcode was missing, the average deprivation quintile for the practice was used.

Analyses of data

In the sample, the number of patients and consultations for heart failure was estimated based on face-to-face consultations with any member of the general medical practice team (eg GP, practice or district nurse, health visitor) in the financial year ending March 2004.

Patients and consultations were counted based on the diagnosis recorded in the PTI dataset. The PTI dataset does not record a 'primary' or 'secondary' diagnosis. All diagnoses were therefore included in this analysis.

Patient rates were calculated as the total number of (different) patients seen in the financial year ending March 2004 with a recorded diagnosis of heart failure, divided by the total number of patients registered with the PTI practices. Similarly, consultation rates were calculated as the total number of individual consultations in the financial year ending March 2004 (excluding telephone consultations, but including several consultations with different clinicians on the same day) divided by the total number of patients registered with the practices in the PTI sample.

Rates were subsequently multiplied by 1,000 to obtain values per 1,000 population and then multiplied by the Scottish population in order to estimate the number of consultations and patients with a recorded diagnosis of heart failure in Scotland.

To adjust for differences in age, sex and deprivation between the PTI sample population and the total Scottish population, the method of direct standardisation was applied. For the tables showing rates by age and sex, rates were standardised by deprivation. For tables showing rates by deprivation category, data were standardised by age and sex.

Limitations of data

This analysis was based on a sample of 45 practices that collected full PTI data in the year ending March 2004, which includes approximately 6% of the Scottish population. Although standardisation can take account of differences in the distribution of age, sex and deprivation between the PTI sample and Scotland, there might well be other factors that influence the prevalence of the conditions.

These figures were based on patients contacting a member of the practice team for heart failure within the year of interest. Heart failure patients who only contacted the practice team for another condition or were seen in secondary care only were not included. These figures are therefore likely to underestimate the true prevalence of heart failure in Scotland.

However, in some people with typical symptoms of heart failure further investigations might suggest another causal condition. Studies have shown that only about half of those diagnosed with heart failure by their GP have the condition confirmed by further tests.

Patient and contact rates were derived using population estimates based on the number of people registered with a general medical practice. Any person not registered with a practice irrespective of the reason was not included in the population totals. Conversely, any person not yet removed from the register was included. The latter category is likely to be larger than the former because there is a stronger incentive to be registered with a medical practitioner (for access to medical care). Therefore, the population estimates are likely to be slightly overestimated, resulting in a slight underestimation of patient and consultation rates.

Presentation of data

The rate of patients consulting for heart failure and the practice team consultation rate for diagnoses of heart failure in the financial year ending March 2004 are shown in Table 2-9, standardised for deprivation and presented by age and sex. The consultations may be with either the GP, practice or district nurse, or health visitor. The practice team patient and consultation rates by age and sex are also illustrated in Figure 2-10 and Figure 2-11 respectively.

Table 2-10 and Figure 2-12 show the patient rate for heart failure and full practice team consultation rate in the financial year ending March 2004 by deprivation quintile and standardised for age and sex.

Prescribing of ACE inhibitors and beta-blockers

Definition of indicator

Trends in prescribing ACE inhibitors.

Trends in prescribing beta-blockers.

Data source

The Prescribing Information System (PIS) Data Warehouse, held by NHS National Services Scotland, contains detailed information on NHS prescriptions dispensed in Scotland, such as the medicine name, strength, formulation and quantity. The database includes all prescriptions dispensed in the community regardless of where they were written, and those written in Scotland but dispensed elsewhere in the UK. It does not contain information on prescriptions that are dispensed within hospitals.

GPs write the vast majority of prescriptions, with the remainder written mainly by nurses and dentists. Prescriptions are dispensed by community pharmacies, dispensing doctors and a small number of specialist appliance suppliers.

The database is populated with information supplied by the Practitioner Services Division, which is responsible for the processing and pricing of all prescriptions dispensed in Scotland.

Analyses of data

The defined daily dose (DDD) is used to enable direct comparisons of different strengths and formulations of medicines. WHO describes the DDD as 'the assumed average maintenance dose per day for a drug used for its main indication in adults'.[21] The DDD methodology was developed by the WHO Collaborating Centre for Drug Statistics Methodology to convert and standardise readily available volume data from sales statistics or pharmacy inventory data (quantity of packages, tablets or other dosage forms) into medically meaningful units.[22] The DDD then takes into account the strength, form and quantity of drug given to the patient. However, a disadvantage of the DDD is that it can only be calculated for medicines of single medical ingredients.

Data for both ACE inhibitors and beta-blockers for the years 1995 to 2004 were obtained from the prescribing information database for the whole of Scotland. For each indicator, the number of DDDs per 1,000 population (as defined by the GRO(S) mid-year estimates) was then calculated.

Limitations of data

Presently, only the minimum amount of information is collected from the community-dispensed prescription to facilitate reimbursement payment to pharmacies. No patient-specific data are kept and therefore no information on age, sex or indication for medication is available for analysis.

As a result, the data could not be standardised for age, sex or deprivation. It is also important to note that ACE inhibitors and beta-blockers are not prescribed exclusively for heart failure. They can also be used to treat coronary heart disease and high blood pressure.

Presentation of data

Figure 2-13 shows trends in prescribing of ACE inhibitors by NHS Board and year (see also Table 2-11). Figure 2-14 shows trends in prescribing of beta-blockers by NHS Board and year (see also Table 2-12).

Results and discussion

10-year annual trends in rates of death by age group and sex

Figure 2-1 shows that Scottish rates of death from heart failure for people aged 45 years and over peaked at 6.3 per 10,000 population in 1996–1997, then decreased gradually to 3.0 per 10,000 population in 2003–2004.

As seen in Figure 2-1 and Table 2-3, rates of death were highest in the oldest age group (75+ years). Among people aged 75 years and over, rates of death peaked at 33.0 per 10,000 population for females and 27.4 per 10,000 population for males in 1996–1997; from this point onwards, there has been a downward trend in rates of death, with a levelling off since 2001. The rates of death were less than 4 per 10,000 population for 65–74 year olds and less than 0.5 per 10,000 population for 45–64 year olds during the 10-year period.

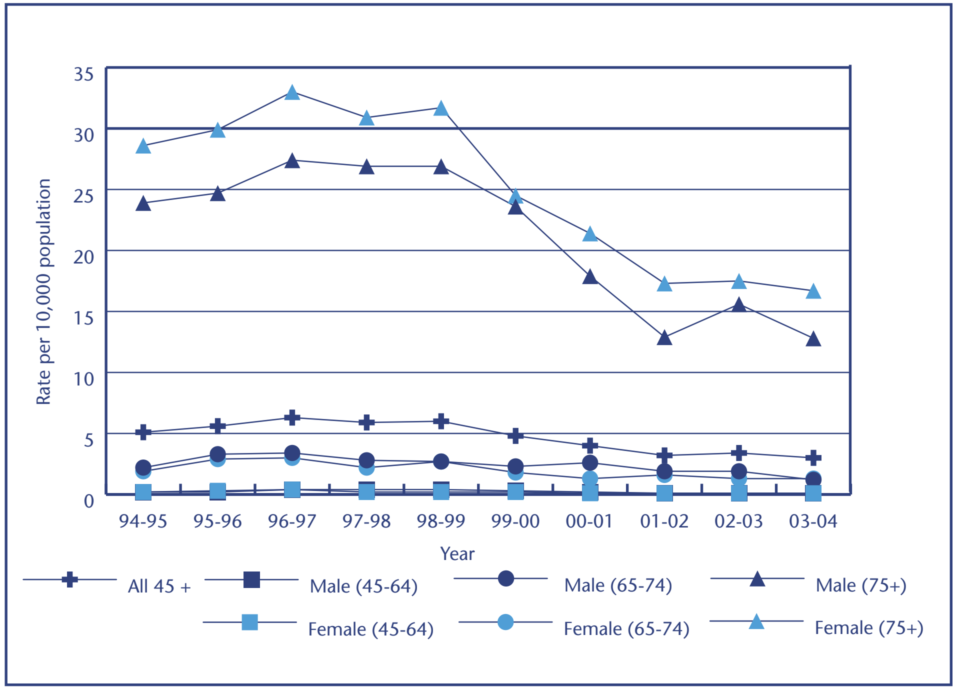
Table 2-3 Trends in rates of death (per 10,000 population) for people aged 45 years and over with a primary cause of death of heart failure by age group and sex for the period 1 April 1994 to 31 March 2004

	Year (Apr-Mar)									
	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04
Males										
45-64	0.2	0.2	0.4	0.4	0.4	0.3	0.2	0.1	0.1	0.1
65-74	2.2	3.3	3.4	2.8	2.7	2.3	2.6	1.9	1.9	1.2
75+	23.9	24.7	27.4	26.9	26.9	23.6	17.9	12.9	15.6	12.8
Females										
45-64	0.2	0.3	0.4	0.2	0.2	0.2	0.1	0.1	0.1	0.1
65-74	1.9	2.9	3.0	2.2	2.7	1.8	1.3	1.6	1.3	1.3
75+	28.6	29.9	33.0	30.9	31.7	24.5	21.4	17.3	17.5	16.7

Source: GRO(S) (death registrations and mid-year population estimates).

In the oldest age group, crude rates of death were higher in women than in men. In the 45–64 and 65–74 year age groups, there was no marked difference between males and females in terms of the rate of death.

Figure 2.1 Trends in rates of death for people aged 45 years and over with a primary cause of death of heart failure by age group and sex for the period 1 April 1994 to 31 March 2004

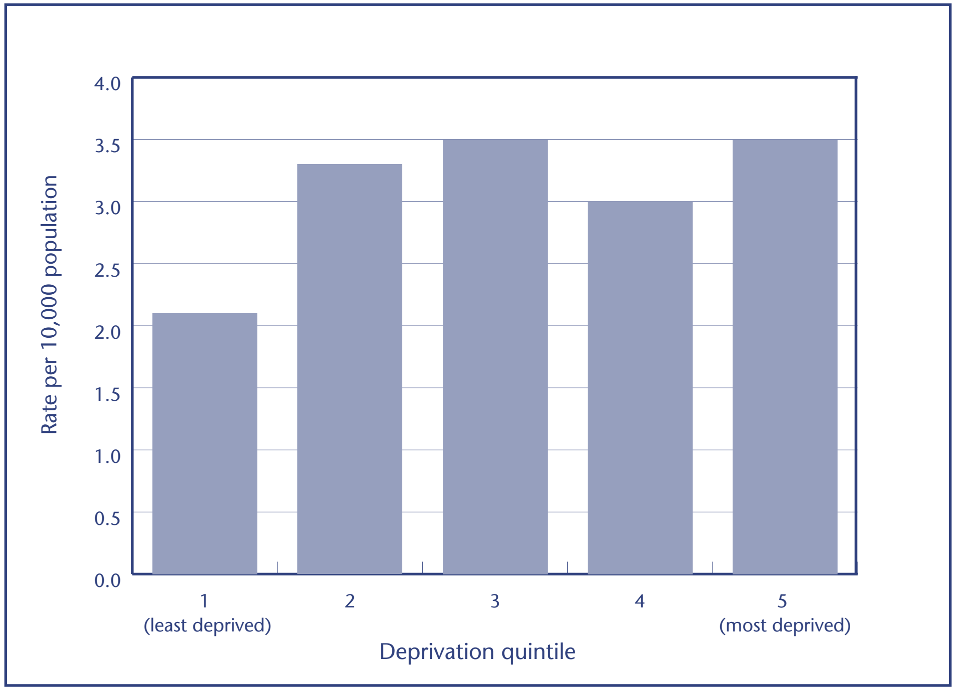


Source: GRO(S) (death registrations and mid-year population estimates).

Rates of death by deprivation

In 2003–2004, national rates of death from heart failure were lowest for the least deprived areas (quintile 1) at 2.1 per 10,000 population, but broadly similar for quintiles 2 to 5 at about 3.5 per 10,000 population (see Figure 2-2).

Figure 2.2 Rates of death for people aged 45 years and over with a primary cause of death of heart failure by deprivation quintile for the period 1 April 2003 to 31 March 2004



Source: GRO(S) (death registrations and mid-year population estimates).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Comparison of rates of death across NHS Boards

There was some variation across NHS Boards of residence in terms of their standardised rates of death (see Figure 2-3 and Table 2-4). Ayrshire & Arran (3.9 per 10,000 population), Tayside (4.0 per 10,000 population) and Lanarkshire (4.1 per 10,000 population) had rates of death that were significantly higher than the Scotland rate (3.2 per 10,000 population). Forth Valley (2.0 per 10,000 population) and Lothian (2.8 per 10,000 population) had significantly lower rates of death than the national average.

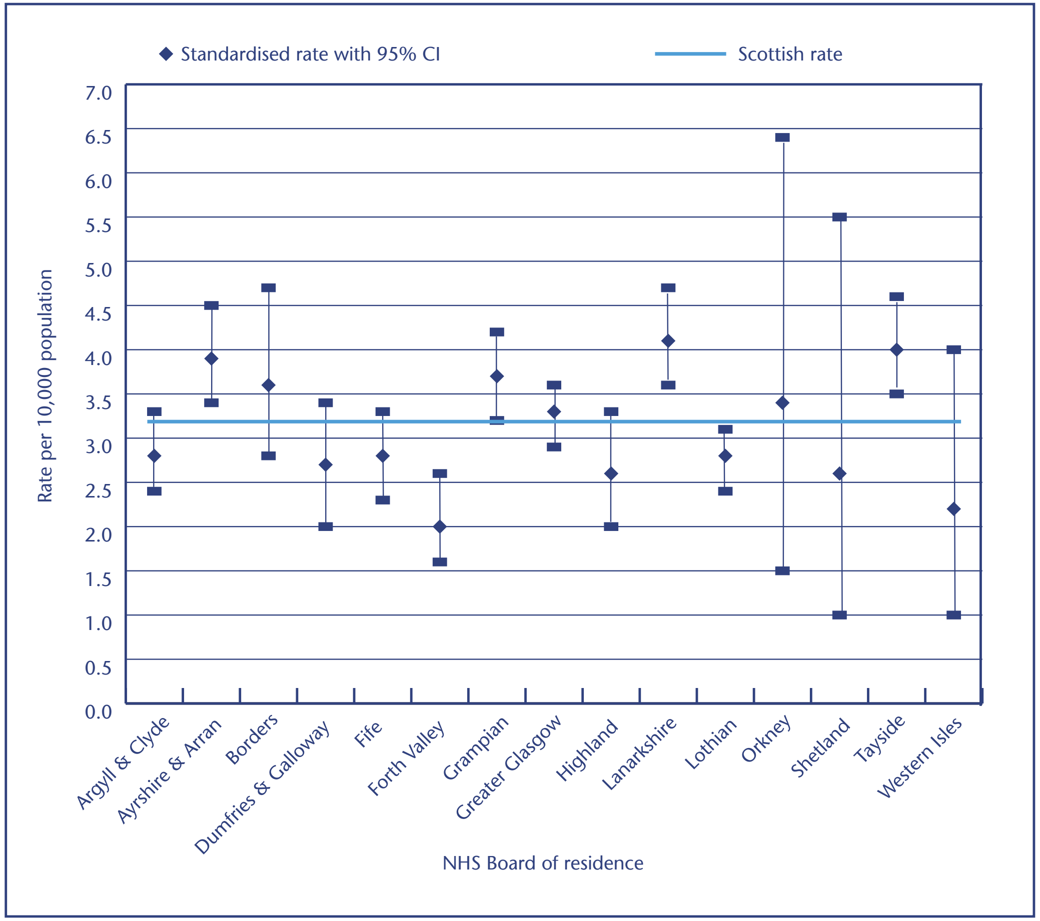
Table 2-4 Rates of death (per 10,000 population) for people aged 45 years and over with a primary cause of death of heart failure by NHS Board of residence, standardised by age, sex and deprivation shown as a total for the three-year period ending 31 March 2004

NHS Board of residence	Annual Population[a]	Total deaths in 3 years	Rate per 10,000 population		95% Confidence Intervals	
			Crude	Standardised	Lower	Upper
Scotland	**6,129,624**	**1,983**	**3.2**			
Argyll & Clyde	523,116	145	2.8	2.8	2.4	3.3
Ayrshire & Arran	474,054	186	3.9	3.9	3.4	4.5
Borders	145,833	59	4.0	3.6	2.8	4.7
Dumfries & Galloway	205,512	57	2.8	2.7	2.0	3.4
Fife	430,350	121	2.8	2.8	2.3	3.3
Forth Valley	340,011	65	1.9	2.0	1.6	2.6
Grampian	624,366	219	3.5	3.7	3.2	4.2
Greater Glasgow	994,038	345	3.5	3.3	2.9	3.6
Highland	273,885	69	2.5	2.6	2.0	3.3
Lanarkshire	641,067	227	3.5	4.1	3.6	4.7
Lothian	881,784	239	2.7	2.8	2.4	3.1
Orkney	25,560	9	3.5	3.4	1.5	6.4
Shetland	26,301	7	2.7	2.6	1.0	5.5
Tayside	506,508	225	4.4	4.0	3.5	4.6
Western Isles	37,239	10	2.7	2.2	1.0	4.0

a 2001 census population

Source: GRO(S) (death registration and 2001 census population).

Figure 2.3 Rates of death for people aged 45 years and over with a primary cause of death of heart failure by NHS Board of residence, standardised by age, sex and deprivation shown as a total for the three-year period ending 31 March 2004



Source: GRO(S) (death registration and 2001 census population).[a]

10-year annual trends in rates of emergency admission by age group and sex

For people aged 45 years and over, rates of emergency admission for heart failure decreased from 46.8 per 10,000 population in 1994–1995 to 33.1 per 10,000 population in 2003–2004 (see Figure 2-4 and Table 2-5). Overall, there has been a steady downward trend in emergency admission rates for heart failure over the last 10 years across all age groups and gender.

The largest decreases in rates of emergency admission were seen in the 65–74 and 75+ year age groups. In males and females aged 75 years and over, there was a decrease of about 40 per 10,000 population between 1994–1995 and 2003–2004. This compares with a decrease of about 20 per 10,000 population over the same period for patients aged 65–74 years.

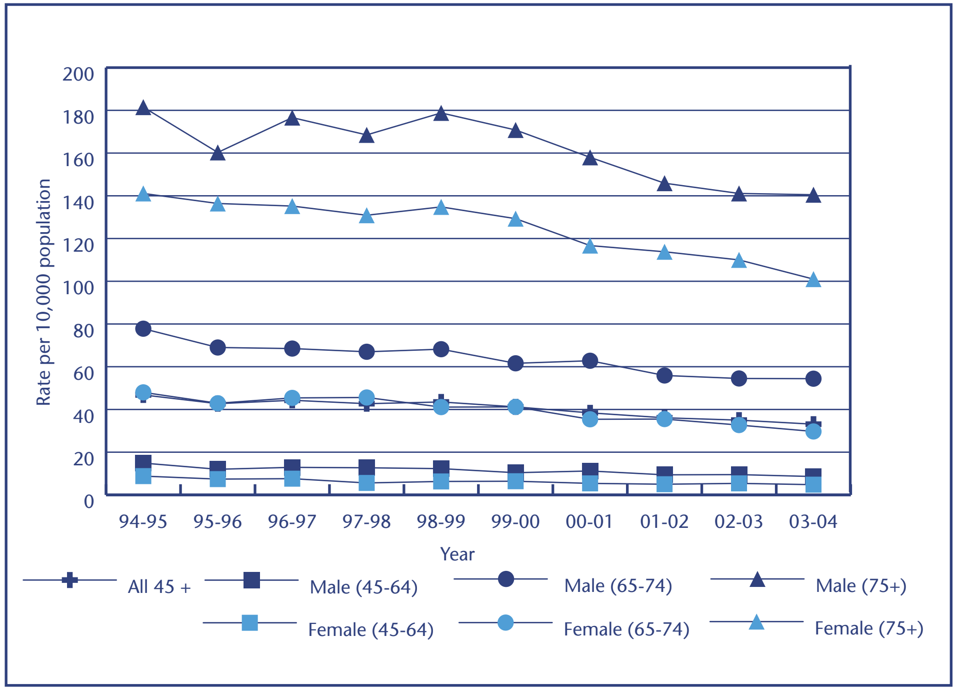
Table 2-5 Trends in emergency admission rates (per 10,000 population) for people aged 45 years and over with a primary diagnosis of heart failure by age group and sex for the period 1 April 1994 to 31 March 2004

	Year (Apr-Mar)									
	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04
Males										
45-64	14.9	12.0	12.9	12.7	12.3	10.4	11.2	9.4	9.5	8.6
65-74	77.8	69.0	68.5	67.0	68.2	61.6	62.8	55.9	54.5	54.4
75+	181.5	160.3	176.6	168.5	178.8	170.8	158.0	145.9	141.1	140.5
Females										
45-64	8.8	7.4	7.6	5.6	6.3	6.4	5.4	5.0	5.4	4.8
65-74	48.0	42.9	45.4	45.6	41.1	41.2	35.4	35.5	32.7	29.7
75+	141.1	136.4	135.2	130.9	134.8	129.3	116.7	113.8	110.0	101.0

Source: ISD Scotland (SMR01) and GRO(S) (mid-year population estimates).

Rates of emergency admission increased as people became older. In addition, for all age groups, emergency admission rates were greater for men than for women. For example, in 2003–2004, the rate was 54.4 per 10,000 population for males and 29.7 per 10,000 population for females in the 65–74 year age group, and 140.5 per 10,000 population for males and 101.0 per 10,000 population for females in the 75+ year age group.

Figure 2.4 Trends in emergency admission rates for people aged 45 years and over with a primary diagnosis of heart failure by age group and sex for the period 1 April 1994 to 31 March 2004



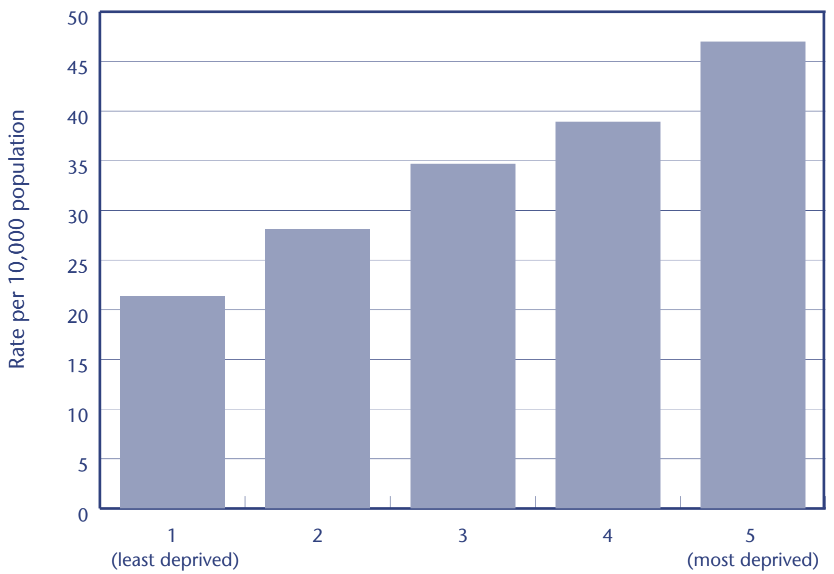
Source: ISD Scotland (SMR01) and GRO(S) (mid-year population estimates).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Rates of emergency admission by deprivation

Nationally, the rate of emergency admission for patients aged 45 years and over with heart failure rose with increasing deprivation. In 2003–2004, the rate increased from 21.4 per 10,000 population in quintile 1 to 47.0 per 10,000 population in quintile 5 (see Figure 2-5).

Figure 2.5 Emergency admission rates for people aged 45 years and over with a primary diagnosis of heart failure by deprivation quintile for the period 1 April 2003 to 31 March 2004



Source: ISD Scotland (SMR01) and GRO(S) (2001 census population).

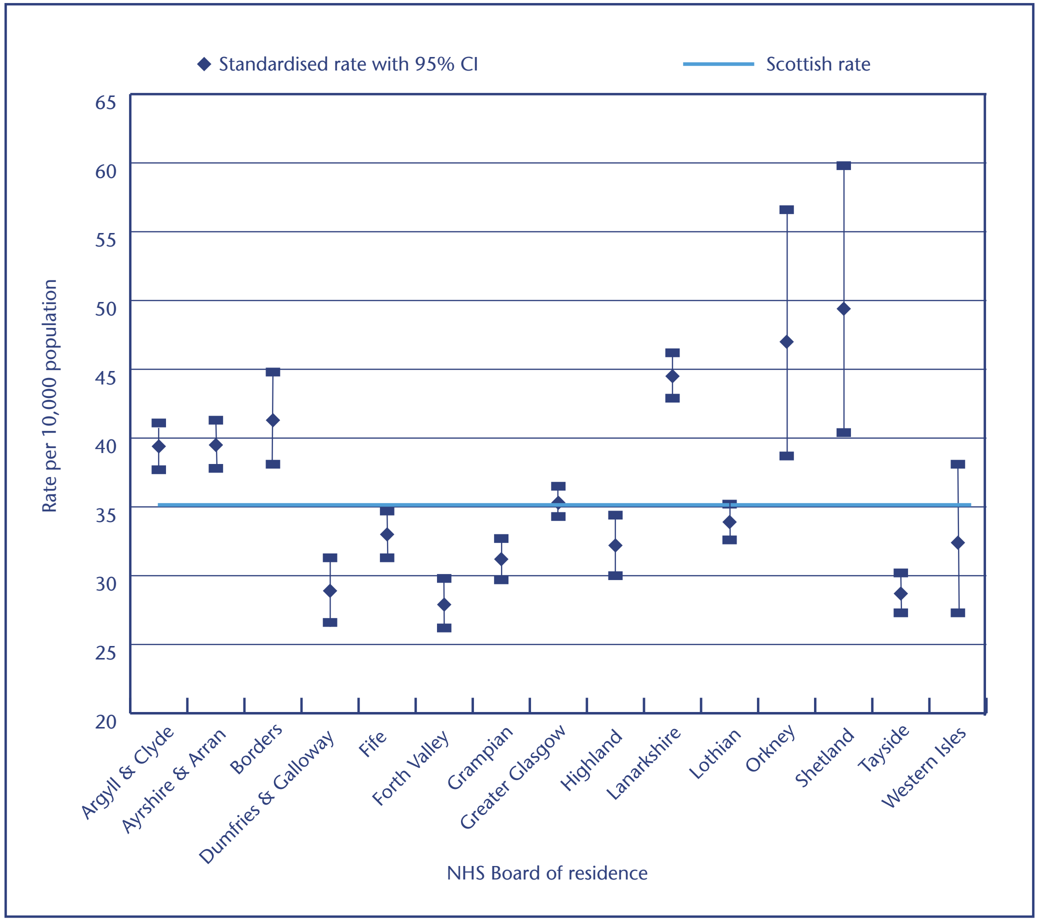
Comparison of rates of emergency admission across NHS Boards

There was variation across NHS Boards of residence in terms of their standardised emergency admission rates (see Figure 2-6 and Table 2-6).

Six NHS Boards had emergency admission rates that were significantly lower than the Scotland rate (35.2 per 10,000 population). Six NHS Boards had emergency admission rates that were significantly higher than the Scotland rate.

It is possible that variations in the emergency admission rates among different NHS Board areas may be due to variations in the underlying prevalence of heart failure, or to variations in admission policies.

Figure 2.6 Emergency admission rates for people aged 45 years and over with a primary diagnosis of heart failure by NHS Board of residence, standardised by age, sex and deprivation shown as a total for the three-year period ending 31 March 2004



Source: ISD Scotland (SMR01) and GRO(S) (2001 census population).

Table 2-6 Emergency admission rates (per 10,000 population) for people aged 45 years and over with a primary diagnosis of heart failure by NHS Board of residence, standardised by age, sex and deprivation shown as a total for the three-year period ending 31 March 2004

NHS Board of residence	Annual Population[a]	Total admissions in 3 years	Rate per 10,000 population		95% Confidence Intervals	
			Crude	Standardised	Lower	Upper
Scotland	**6,129,624**	**21,562**	**35.2**			
Argyll & Clyde	523,116	2,129	40.7	39.4	37.7	41.1
Ayrshire & Arran	474,054	1,953	41.2	39.5	37.8	41.3
Borders	145,833	586	40.2	41.3	38.1	44.8
Dumfries & Galloway	205,512	613	29.8	28.9	26.6	31.3
Fife	430,350	1,395	32.4	33.0	31.3	34.7
Forth Valley	340,011	902	26.5	27.9	26.2	29.8
Grampian	624,366	1,686	27.0	31.2	29.7	32.7
Greater Glasgow	994,038	4,003	40.3	35.3	34.3	36.5
Highland	273,885	824	30.1	32.2	30.0	34.4
Lanarkshire	641,067	2,844	44.4	44.5	42.9	46.2
Lothian	881,784	2,776	31.5	33.9	32.6	35.2
Orkney	25,560	112	43.8	47.0	38.7	56.6
Shetland	26,301	106	40.3	49.4	40.4	59.8
Tayside	506,508	1,490	29.4	28.7	27.3	30.2
Western Isles	37,239	143	38.4	32.4	27.3	38.1

a 2001 census population.

Source: ISD Scotland (SMR01) and GRO(S) (2001 census population)

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

10-year annual trends in one-year survival rates by age group and sex

For people aged 45 years and over, the one-year survival rate for heart failure fluctuated at around 55% between 1993 and 2003 (see Figure 2-7).

The rate of survival one year after an emergency admission decreased as people became older. For example, in 2002–2003, the rate was 73.2% for males and 72.0% for females in the 45–64 year age group compared with 48.2% for males and 51.4% for females in the 75+ year age group (see Figure 2-7).

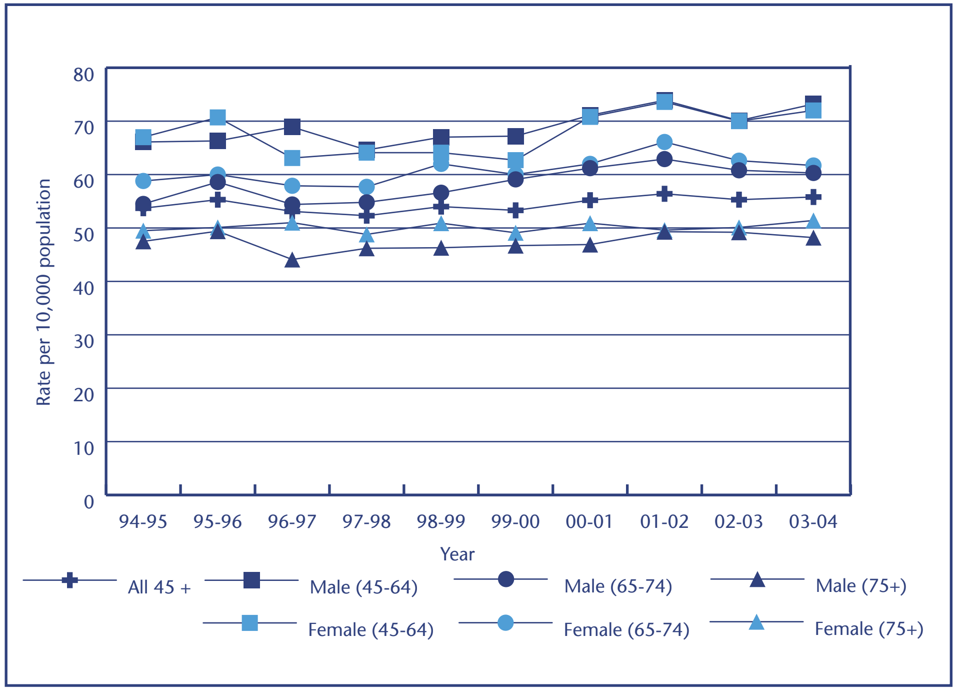
For all age groups, there were no marked differences in one-year survival rates between males and females across the 10-year period.

Table 2-7 Trends in survival rates one year after an emergency admission (% who survived) for people aged 45 years and over with a primary diagnosis of heart failure by age group and sex for the period 1 April 1993 to 31 March 2003

	Year (Apr-Mar)									
	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03
Males										
45-64	66.1	66.3	68.9	64.6	67.0	67.2	71.1	73.9	70.1	73.2
65-74	54.5	58.6	54.4	54.8	56.6	59.1	61.2	62.9	60.8	60.3
75+	47.5	49.4	44.1	46.2	46.3	46.7	46.9	49.3	49.2	48.2
Females										
45-64	67.0	70.7	63.1	64.1	64.1	62.7	70.8	73.6	70.0	72.0
65-74	58.8	60.0	57.9	57.7	62.0	60.0	62.0	66.1	62.6	61.7
75+	49.5	50.1	51.0	48.8	50.9	49.1	50.9	49.6	50.1	51.4

Source: ISD Scotland (SMR01) and GRO(S) (mid-year population estimates).

Figure 2.7 Trends in survival rates one year after an emergency admission for people aged 45 years and over with a primary diagnosis of heart failure by age group and sex for the period 1 April 1993 to 31 March 2003

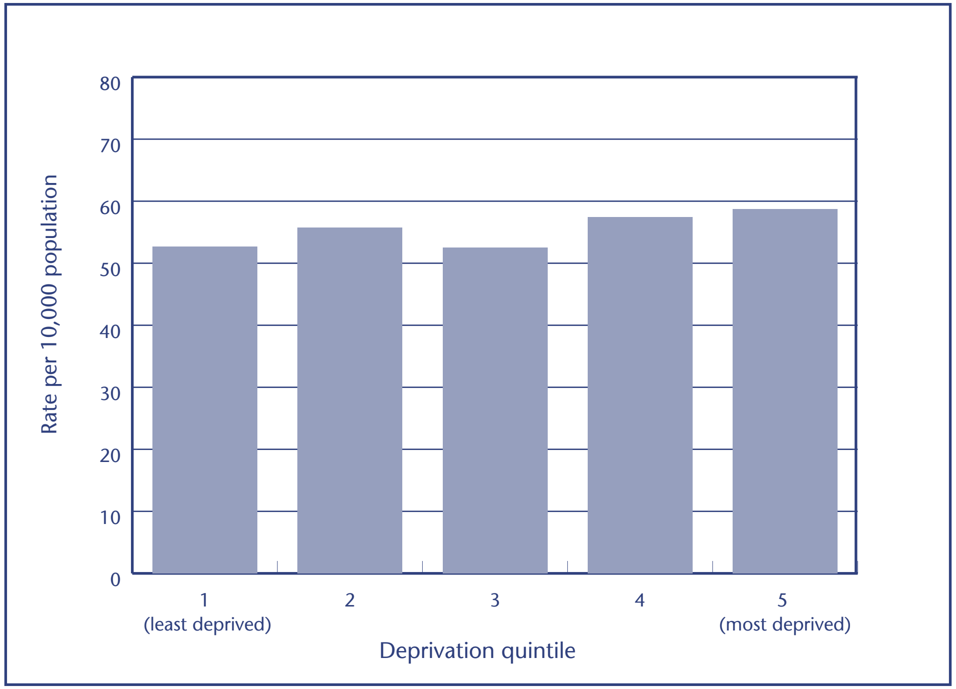


Source: ISD Scotland (SMR01) and GRO(S) (mid-year population estimates).

One-year survival rates by deprivation

In 2002–2003, deprivation had no clear effect on the Scottish survival rate one year after an emergency admission for heart failure (see Figure 2-8).

Figure 2.8 Survival rates one year after an emergency admission for people aged 45 years and over with a primary diagnosis of heart failure by deprivation quintile for the period 1 April 2002 to 31 March 2003



Source: ISD Scotland (SMR01) and GRO(S) (death registrations and 2001 census population).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Comparison of one-year survival rates across NHS Boards

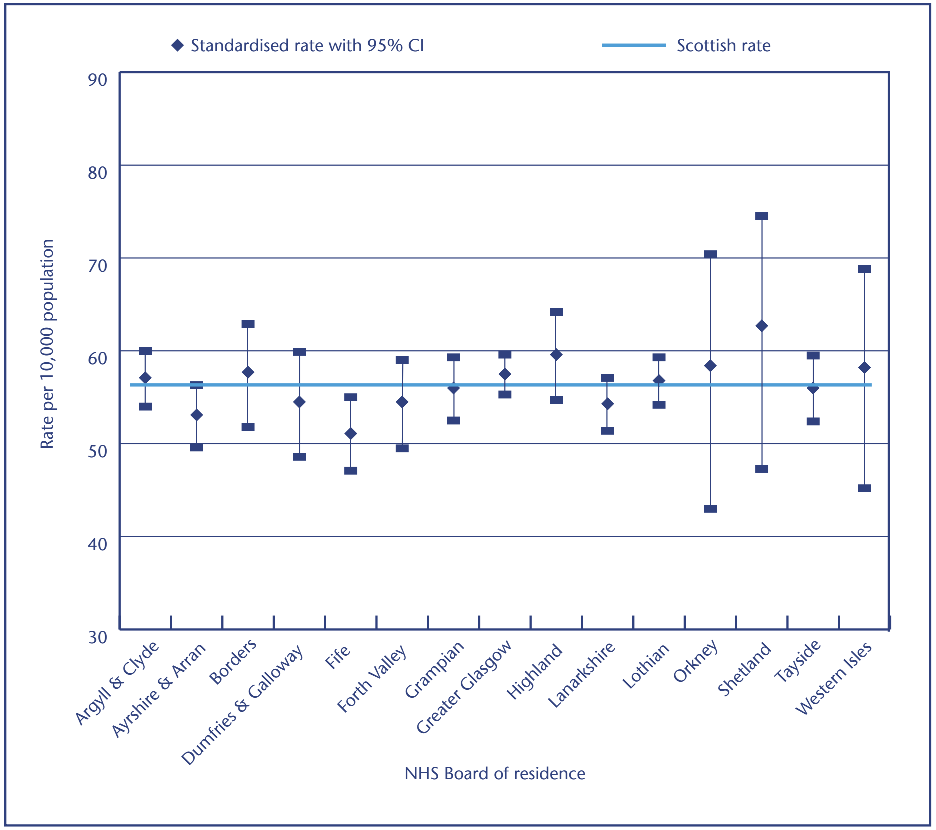
As seen in Figure 2-9, one-year survival rates were broadly similar across NHS Board areas. One NHS Board (Fife, 51.1%) had a one-year survival rate that was significantly lower than the Scottish rate (55.9%) (see also Table 2-8).

Table 2-8 Survival rates one year after an emergency admission (% who survived) for people aged 45 years and over with a primary diagnosis of heart failure by NHS Board of residence, standardised by age, sex and deprivation shown as a total for the three-year period ending 31 March 2003

NHS Board of residence	Total admissions in 3 years	Survived 1 year after admission	Rate per 10,000 population		95% Confidence Intervals	
			Crude	Standardised	Lower	Upper
Scotland	**18,972**	**10,596**	**55.9**			
Argyll & Clyde	1,845	1,060	57.5	57.1	54.0	60.0
Ayrshire & Arran	1,665	888	53.3	53.1	49.6	56.3
Borders	518	288	55.6	57.7	51.8	62.9
Dumfries & Galloway	550	292	53.1	54.5	48.6	59.9
Fife	1,222	623	51.0	51.1	47.1	55.0
Forth Valley	809	445	55.0	54.5	49.5	59.0
Grampian	1,448	795	54.9	56.0	52.5	59.3
Greater Glasgow	3,655	2,125	58.1	57.5	55.3	59.6
Highland	692	405	58.5	59.6	54.7	64.2
Lanarkshire	2,303	1,278	55.5	54.3	51.4	57.1
Lothian	2,598	1,463	56.3	56.8	54.2	59.3
Orkney	92	53	57.6	58.4	43.0	70.4
Shetland	86	54	62.8	62.7	47.3	74.5
Tayside	1,370	760	55.5	56.0	52.4	59.5
Western Isles	119	67	56.3	58.2	45.2	68.8

Source: ISD Scotland (SMR01) and GRO(S) (death registrations and 2001 census population).

Figure 2.9 Survival rates one year after an emergency admission for patients aged 45 years and over with a primary diagnosis of heart failure by NHS Board of residence, standardised by age, sex and deprivation shown as a total for the three-year period ending 31 March 2003



Source: ISD Scotland (SMR01) and GRO(S) (death registrations and 2001 census population).

Consultation for heart failure in general practice

The rate of patients in PTI practices consulting for heart failure increased with age, with the vast majority of patients aged 65 years and over (see Table 2-9 and Figure 2-10). This trend was seen in both males and females. For males, the patient rate rose from 6.5 per 1,000 population for the 55–64 year age group to 19.6 per 1,000 population for the 65–74 year age group and further increased to 52.7 per 1,000 population for the 75+ year age group. For females, the rate increased from 4.5 per 1,000 population for the 55–64 year age group to 14.6 per 1,000 population for the 65–74 year age group, and then to 44.5 per 1,000 population for the 75+ year age group. These broad trends were also observed for the consultation rates for heart failure (see Table 2-9 and Figure 2-11).

Across all age groups, males were more likely to consult a member of the general practice team for heart failure than females (see Figure 2-10). This was also true for the consultation rates for heart failure, with the exception of the 75+ year age group. In this age group, females consulted the general practice team more frequently than males (149.1 per 1,000 population compared with 131.5 per 1,000 population respectively) (see Figure 2-11).

Table 2-9 Heart failure patients and consultations with the general practice team[a] (rates and estimated numbers in Scotland) in the year ending March 2004, by age and sex and standardised by deprivation

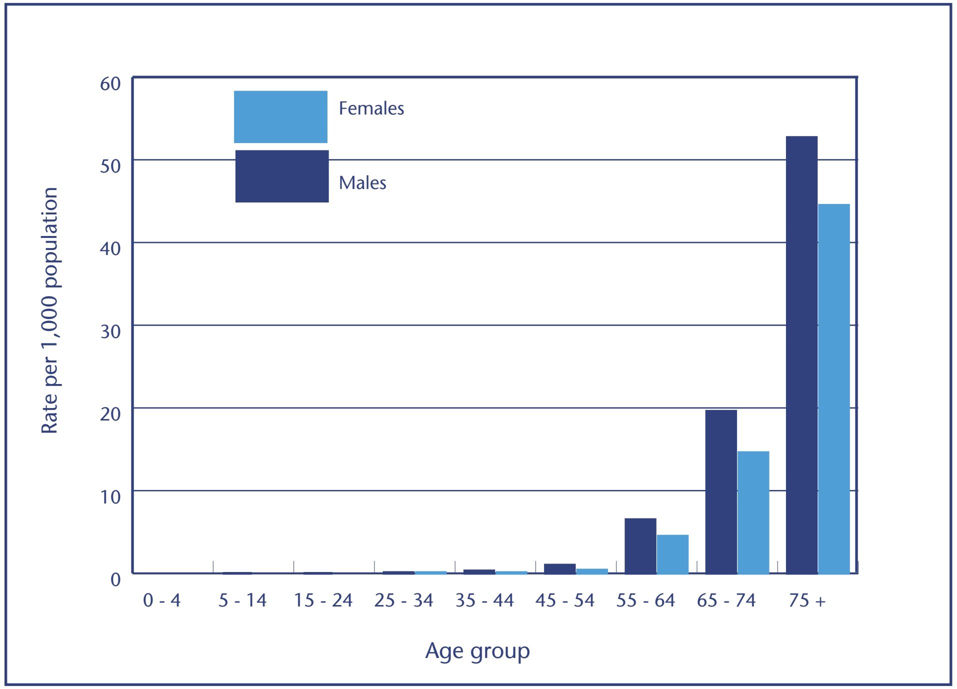
	Patients		Consultations	
Age group	Rate per 1,000 population	Estimated number in Scotland	Rate per 1,000 population	Estimated number in Scotland
Males				
0 - 4	0.0	0	0.0	0
5 - 14	0.0	13	0.0	13
15 - 24	0.0	15	0.1	30
25 - 34	0.1	35	0.1	55
35 - 44	0.3	137	0.4	192
45 - 54	1.0	376	2.7	988
55 - 64	6.5	1,950	14.5	4,359
65 - 74	19.6	4,077	55.1	11,460
75 +	52.7	6,954	131.5	17,368
Females				
0 - 4	0.0	0	0.0	0
5 - 14	0.0	0	0.0	0
15 - 24	0.0	0	0.0	0
25 - 34	0.1	18	0.1	36
35 - 44	0.1	52	0.4	156
45 - 54	0.4	157	0.7	259
55 - 64	4.5	1,393	10.1	3,081
65 - 74	14.6	3,600	30.2	7,474
75 +	44.5	10,445	149.1	34,995

a Included consultations with GP, practice nurse, district nurse and health visitor.

Source: PTI, ISD Scotland (based on 45 PTI practices, year ending March 2004)
CHI, ISD Scotland (as at 30 September 2003).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

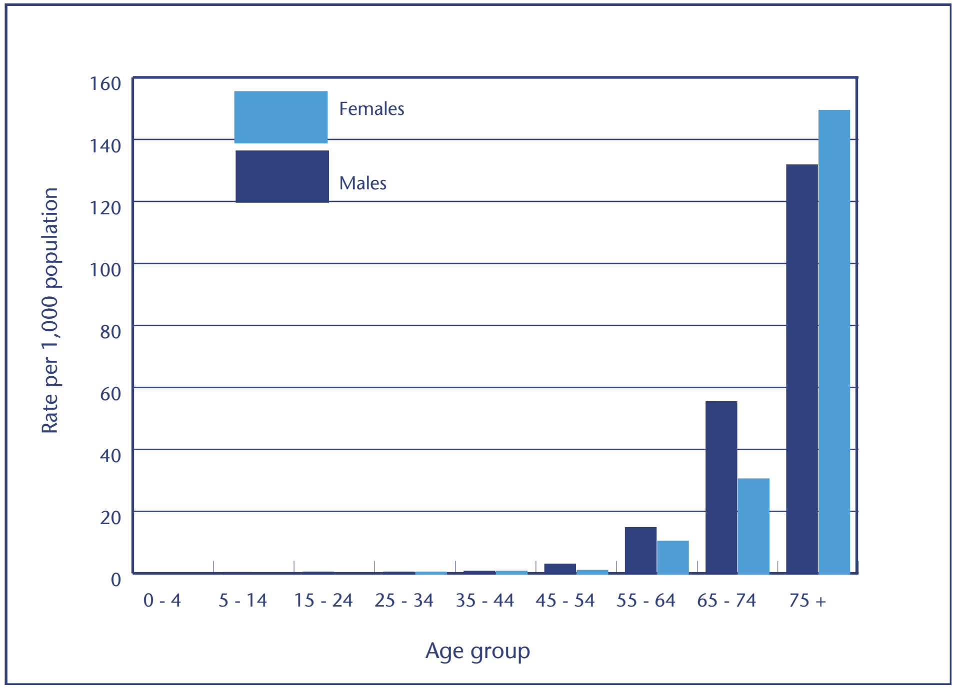
Figure 2-10 General practice team[a] heart failure patient rates in the year ending March 2004, by age and sex and standardised by deprivation



a Included consultations with GP, practice nurse, district nurse and health visitor.

Source: PTI, ISD Scotland (based on 45 PTI practices, year ending March 2004)
CHI, ISD Scotland (as at 30 September 2003).

Figure 2.11 General practice team[a] heart failure consultation rates in the year ending March 2004, by age and sex and standardised by deprivation



a Included consultations with GP, practice nurse, district nurse and health visitor.

Source: PTI, ISD Scotland (based on 45 PTI practices, year ending March 2004)
CHI, ISD Scotland (as at 30 September 2003).

Table 2-10 showed that deprivation had no clear effect on the rate of patients consulting for heart failure. However, people in the most deprived areas (quintile 5) consulted a member of the general practice team for heart failure more often than people in the least deprived areas (quintile 1) (23.2 per 1,000 population compared with 9.3 per 1,000 population respectively) (see Figure 2-12).

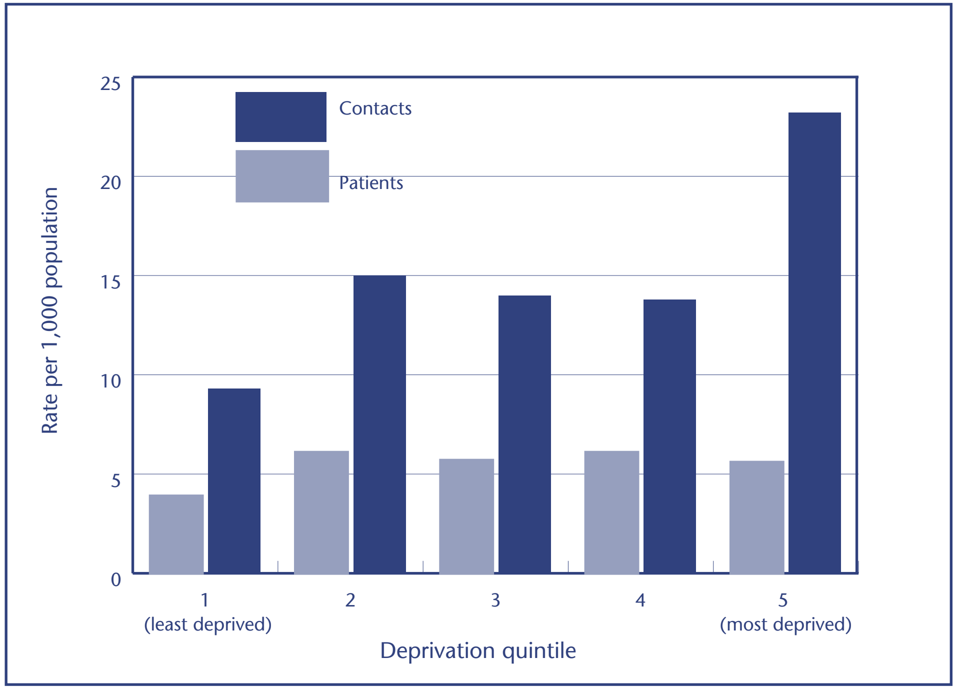
Table 2-10 Heart failure patients and consultations with the general practice team[a] (rates and estimated numbers in Scotland) in the year ending March 2004, by deprivation and standardised by age and sex

	Patients		Consultations	
SIMD quintile	Rate per 1,000 population	Estimated Number	Rate per 1,000 population	Estimated Number
1 (least deprived)	3.9	4,166	9.3	9,910
2	6.1	6,404	15.0	15,894
3	5.7	6,046	14.0	14,759
4	6.1	6,516	13.8	14,740
5 (most deprived)	5.6	6,106	23.2	25,280

a Included consultations with GP, practice nurse, district nurse and health visitor.

Source: PTI, ISD Scotland (based on 45 PTI practices, year ending March 2004)
CHI, ISD Scotland (as at 30 September 2003).

Figure 2-12 Heart failure patient and consultation rates with the general practice team[a] in the year ending March 2004, by deprivation and standardised by age and sex



a Included consultations with GP, practice nurse, district nurse and health visitor.

Source: PTI, ISD Scotland (based on 45 PTI practices, year ending March 2004)
CHI, ISD Scotland (as at 30 September 2003).

Prescribing of ACE inhibitors

Nationally, there was a gradual increase in the rate of ACE inhibitors dispensed between 1995 and 2000 and a marked rise in the rate from 2000 onwards. The rate of ACE inhibitors dispensed increased approximately five fold across the ten-year period, from 7,679 DDDs per 1,000 population in 1995 to 36,008 DDDs per 1,000 population in 2004. This marked increase was also seen across NHS Boards (see Figure 2-13 and Table 2-11).

From 2000, there was increasing variation among NHS Boards in the rate of ACE inhibitors dispensed; such that by 2004, the highest level of prescribing was greater than 40,000 DDDs per 1,000 population for two NHS Boards (Dumfries & Galloway and Forth Valley) and less than 30,000 DDDs per 1,000 population for three NHS Boards (Shetland, Borders and Lothian).

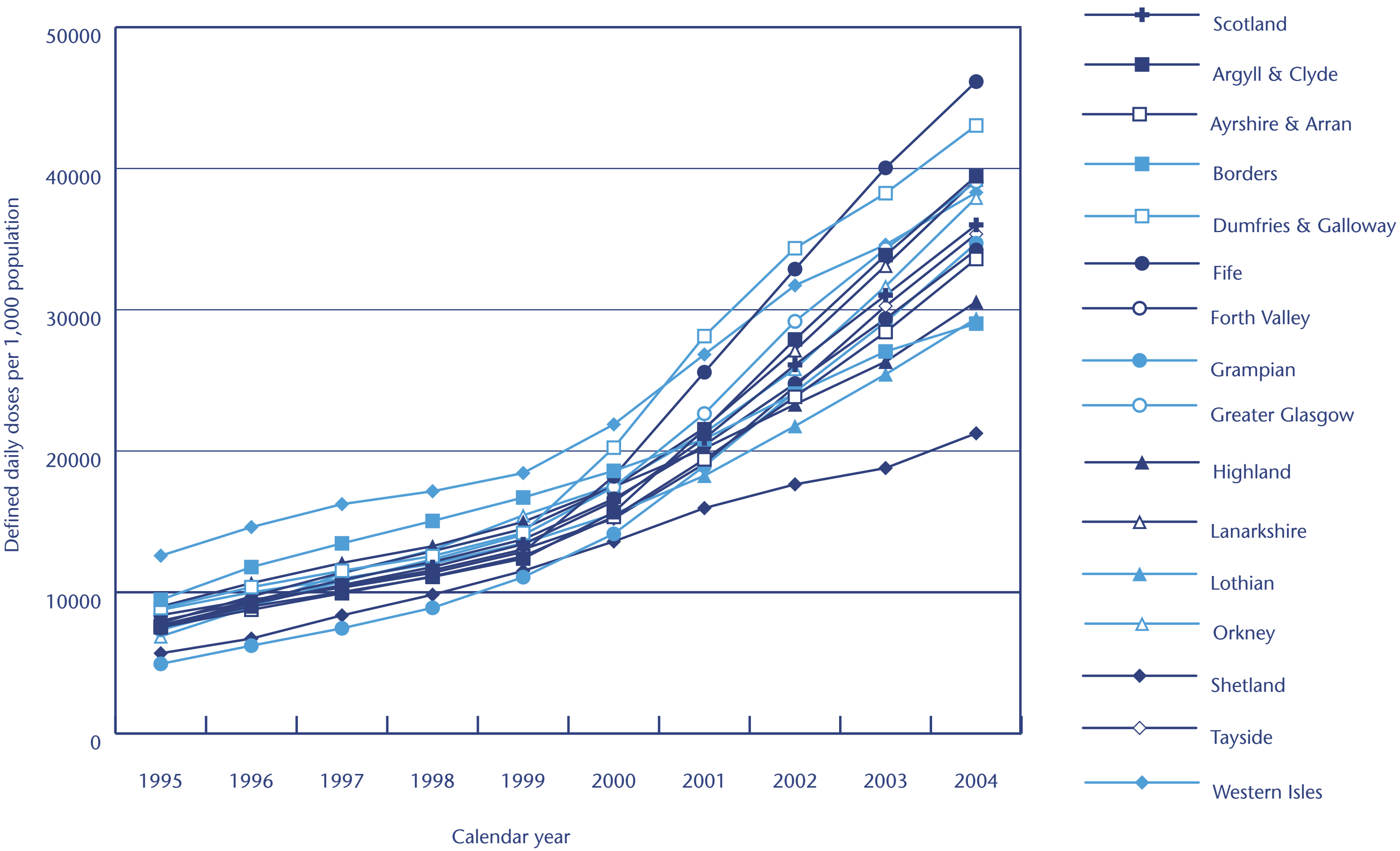
In 1999, a SIGN guideline on the diagnosis and treatment of heart failure due to left ventricular systolic dysfunction was published. It is recommended that in the absence of specific contraindications, all patients should be considered for treatment with an ACE inhibitor.[11]

Table 2-11 Trends in ACE inhibitor prescribing per 1,000 population by NHS Board for the period 1995 to 2004

NHS Board	Defined Daily Doses per 1,000 Population									
	Calendar Year									
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Scotland	**7,679**	**9,190**	**10,508**	**11,792**	**13,403**	**16,431**	**20,891**	**26,097**	**31,026**	**36,008**
Argyll & Clyde	7,617	8,999	10,018	11,088	12,384	15,670	21,540	27,896	33,867	39,453
Ayrshire & Arran	7,522	8,764	9,933	11,127	12,549	15,336	19,408	23,834	28,420	33,592
Borders	9,471	11,785	13,462	15,050	16,709	18,597	20,834	24,063	27,045	29,019
Dumfries & Galloway	8,880	10,363	11,521	12,562	14,203	20,237	28,134	34,354	38,250	43,042
Fife	7,464	9,381	10,867	12,152	13,746	16,618	20,422	24,778	29,364	34,230
Forth Valley	8,382	9,473	10,324	11,382	12,858	18,206	25,577	32,877	40,043	46,151
Grampian	4,931	6,221	7,449	8,900	11,069	14,136	18,940	24,184	29,131	34,710
Greater Glasgow	7,341	9,038	10,774	12,323	14,060	17,441	22,645	29,177	34,310	39,058
Highland	8,988	10,651	12,079	13,260	14,991	17,470	20,185	23,299	26,322	30,563
Lanarkshire	7,824	9,708	11,399	12,907	14,489	17,437	21,631	27,133	33,117	39,229
Lothian	8,759	9,996	10,964	12,023	13,466	15,532	18,249	21,766	25,427	29,376
Orkney	6,882	8,970	11,330	12,992	15,444	17,571	21,289	25,815	31,667	37,935
Shetland	5,683	6,722	8,367	9,829	11,513	13,597	15,959	17,640	18,793	21,253
Tayside	7,977	9,352	10,441	11,557	13,038	15,214	19,104	24,576	30,261	35,359
Western Isles	12,589	14,614	16,240	17,152	18,438	21,885	26,833	31,723	34,603	38,300

Source: PIS Data Warehouse (ISD Scotland) and GRO(S) (mid-year population estimates).

Figure 2-13 Trends in ACE inhibitor prescribing per 1,000 population by NHS Board for the period 1995 to 2004



Source: PIS Data Warehouse (ISD Scotland) and GRO(S) (mid-year population estimates).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Prescribing of beta-blockers

With the exception of a dip between 1999 and 2000, the rate of beta-blocker prescriptions dispensed in Scotland increased steadily from 12,817 DDDs per 1,000 population in 1995 to 18,788 DDDs per 1,000 population in 2004 (see Figure 2-14 and Table 2-12). This increasing trend was noted in many NHS Board areas.

There was some variation among NHS Boards in the rate of beta-blocker prescriptions dispensed. By 2004, the level of beta-blocker prescribing was greater than 22,000 DDDs per 1,000 population for two NHS Board areas (Western Isles, and Dumfries & Galloway) and less than 17,000 DDDs per 1,000 population for two NHS Boards (Grampian and Shetland).

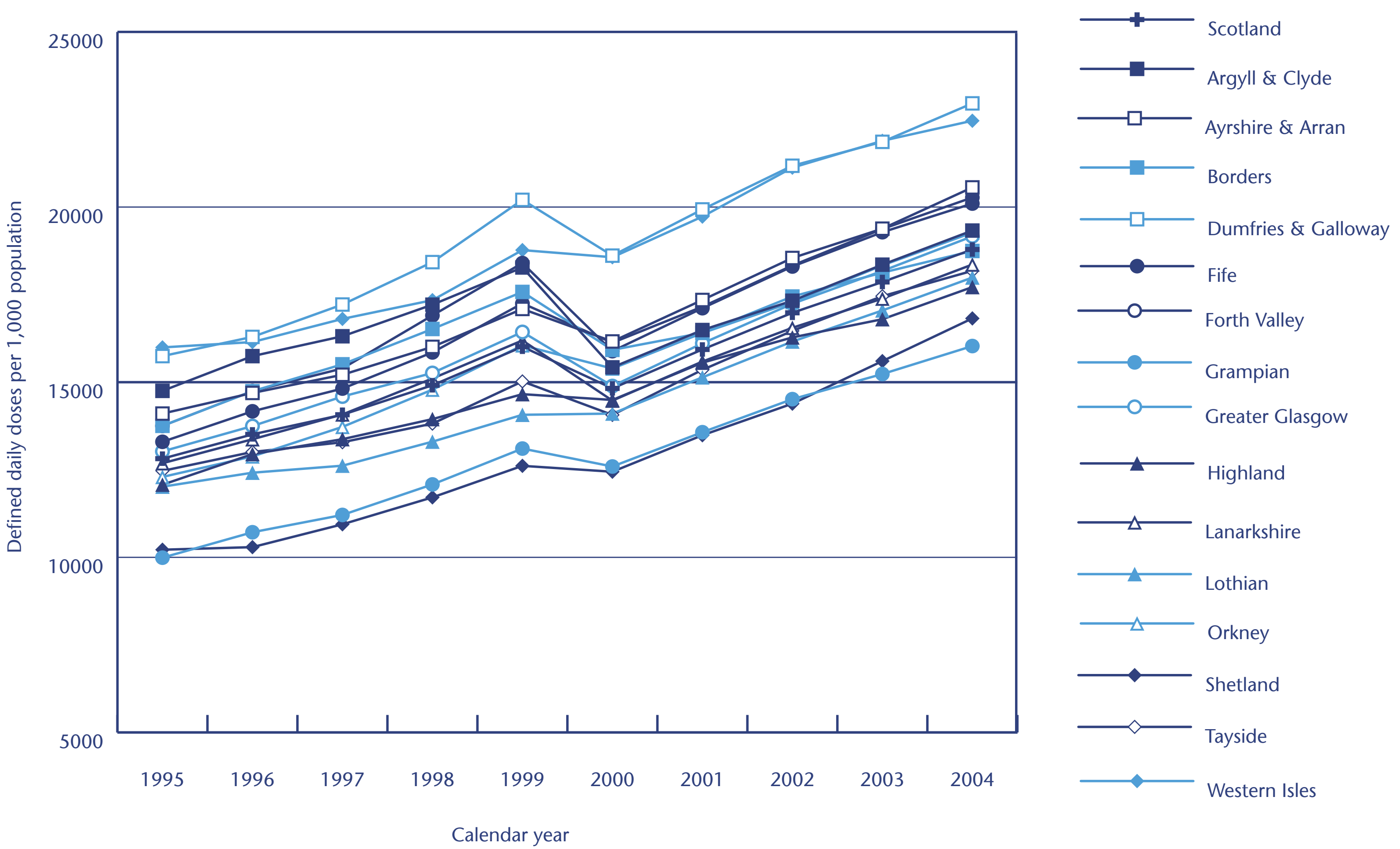
The SIGN guideline also gave guidance on the use of beta-blockers in heart failure. It advocated that people with clinically stable heart failure, who were already treated with diuretics and/or digoxin and an ACE inhibitor, should be considered for treatment with a beta-blocker.[11]

Table 2-12 Trends in beta-blocker prescribing per 1,000 population by NHS Board for the period 1995 to 2004

Prescribing NHS Board	Defined Daily Doses per 1,000 Population									
	Calendar Year									
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Scotland	**12,817**	**13,510**	**14,071**	**14,912**	**16,012**	**14,823**	**15,934**	**16,981**	**17,861**	**18,788**
Argyll & Clyde	14,752	15,744	16,311	17,213	18,275	15,423	16,489	17,326	18,355	19,329
Ayrshire & Arran	14,104	14,693	15,212	16,009	17,091	16,163	17,347	18,546	19,383	20,561
Borders	13,754	14,742	15,511	16,519	17,577	15,922	16,408	17,446	18,127	18,746
Dumfries & Galloway	15,745	16,293	17,217	18,428	20,206	18,613	19,932	21,179	21,862	22,960
Fife	13,298	14,169	14,818	15,850	17,249	16,126	17,155	18,331	19,374	20,273
Forth Valley	13,752	14,747	15,393	16,905	18,401	15,886	17,113	18,303	19,282	20,100
Grampian	9,990	10,716	11,210	12,081	13,105	12,593	13,572	14,516	15,233	16,032
Greater Glasgow	13,024	13,748	14,591	15,262	16,433	14,889	16,109	17,239	18,176	19,164
Highland	12,073	12,947	13,373	13,946	14,658	14,493	15,557	16,278	16,798	17,715
Lanarkshire	12,686	13,371	14,079	15,106	16,192	14,474	15,589	16,553	17,386	18,359
Lothian	12,017	12,416	12,616	13,302	14,069	14,104	15,138	16,160	17,048	17,988
Orkney	12,295	12,881	13,724	14,787	16,052	15,390	16,404	17,285	18,335	19,271
Shetland	10,217	10,291	10,943	11,712	12,612	12,444	13,485	14,387	15,602	16,821
Tayside	12,468	13,008	13,285	13,817	15,022	14,066	15,353	16,465	17,456	18,179
Western Isles	15,993	16,146	16,807	17,342	18,771	18,567	19,727	21,125	21,891	22,464

Source: PIS Data Warehouse (ISD Scotland) and GRO(S) (mid-year population estimates).

Figure 2-14 Trends in beta-blocker prescribing per 1,000 population by NHS Board for the period 1995 to 2004



Source: PIS Data Warehouse (ISD Scotland) and GRO(S) (mid-year population estimates).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

References

1 Scottish Executive. Coronary heart disease/stroke task force report. Edinburgh: The Stationery Office, 2001.

2 www.prodigy.nhs.uk/guidance.asp?gt=Heart%20failure

3 Craig J, Bradbury I, Cummins E, Downie S, Foster L, Stout A. The use of B-type natriuretic peptides (BNP and NT-proBNP) in the investigation of patients with heart failure. Health technology assessment report 6. Glasgow: NHS Quality Improvement Scotland, 2005.

4 Stewart S, MacIntyre K, Capewell S, McMurray JJV. 2001. More malignant than cancer? Five-year survival following a first admission for heart failure. Eur J Heart Fail, 3(3): 315–322.

5 Stewart S, MacIntyre K, Hole DJ, Capewell S, McMurray JJV. 2003. Heart failure and the ageing population: An increasing burden in the 21st century? Heart, 89(1): 49–53.

6 Remme W, Swedberg K and Task Force for the diagnosis and treatment of chronic heart failure ESoC. 2001. Guidelines for the diagnosis and treatment of chronic heart failure. Eur Heart J, 22(17): 1527–1560.

7 www.nhshealthquality.org/nhsqis/files/21411%20NHSQIS%20Heart%20Failure.pdf

8 Wright SP, Doughty RN, Pearl A, Gamble GD, Whalley GA, Walsh HJ, Gordon G, Bagg W, Oxenham H, Yandle T, Richards M, Sharpe N. 2003. Plasma-amino-terminal pro-brain natriuretic peptide and accuracy of heart failure in diagnosis in primary care: a randomised controlled trial. J Am Coll Cardiol, 42(10): 1793–1800.

9 National Institute for Clinical Excellence. Management of chronic heart failure in adults in primary and secondary care. London: NICE, 2003.

10 The National Collaborating Centre for Chronic Conditions. Chronic heart failure. National clinical guideline for diagnosis and management in primary and secondary care. London: Royal College of Physicians, 2003.

11 Scottish Intercollegiate Guidelines Network. Diagnosis and treatment of heart failure due to left ventricular systolic dysfunction. Edinburgh: SIGN, 1999.

12 www.bma.org.uk/ap.nsf/Content/QualityOutcomes?$file/QualOutFram0804.pdf

13 Clinical Standards Board for Scotland. Secondary prevention following acute myocardial infarction. Edinburgh: CSBS, 2000.

14 Department of Health. Coronary heart disease. National service framework. London: DOH, 2000.

15 The Scottish Office. Towards a healthier Scotland. A White Paper on health. Edinburgh: The Stationery Office, 1999.

16 Scottish Executive. 2004 Strategy update. Coronary heart disease and stroke in Scotland. Edinburgh: Scottish Executive, 2004.

17 Scottish Executive. Coronary heart disease and stroke strategy for Scotland. Edinburgh: Scottish Executive, 2002.

18 www.scotland.gov.uk/library5/society/sndata-01.asp

19 www.scotland.gov.uk/library5/society/siomed-00.asp

20 www.show.scot.nhs.uk/indicators/Outcomes/OutcomesReport2002.pdf

21 www.who.int/medicines/library/qsm/icdra99/icdra99_util.shtml

22 Strom B. Pharmacoepidemiology. Toronto: Wiley press, 1994.

Background

- Excessive alcohol consumption gives rise to a significant health issue in Scotland. The Scottish Executive set a national target to reduce the proportion of people exceeding the weekly 'sensible limits' of drinking from 33% to 31% for men between 1995 and 2005 and to 29% by 2010, and from 13% to 12% for women between 1995 and 2005 and to 11% by 2010.
- There is a spectrum of alcohol-related problems arising from different patterns of drinking. Each has a varying degree of risk associated with the amount of alcohol consumed and the rate and duration of consumption.
- Excessive alcohol consumption has serious health and social consequences. Short-term health problems include intoxication, with the risk of personal injury and uncharacteristic behaviour. Long-term high levels of drinking cause serious damage to the liver and the cardiovascular, nervous and gastrointestinal systems. The risk of developing cancer and mental illness is increased. Suicide also becomes more likely. Social problems associated with alcohol include violence, industrial or driving accidents, crime, family stress and break-up, financial difficulties and social exclusion.
- This section presents data on emergency admission to hospital for a number of health conditions that are either directly related to alcohol misuse (acute intoxication and harmful use, and alcoholic liver disease) or that are highly attributable to alcohol misuse (chronic liver disease (including cirrhosis), chronic pancreatitis and oesophageal varices). There are other health conditions associated with excessive alcohol consumption (eg alcohol related brain damage) that are not covered in this report.

Key findings

- Nationally, the rate of emergency admission for acute intoxication and harmful use increased between 1996–1997 and 2003–2004. This was particularly notable for males, with the rate rising from 40.3 to 56.5 per 10,000 population over this period. Rates were greater for males than females, and highest in the 45–64 year age group for both sexes.
- Rates of emergency admission for alcoholic liver disease increased between 1996–1997 and 2003–2004. The emergency admission rate for males was more than double that for females. For both males and females, the admission rate was notably higher for those aged 45–64 years compared with all other age groups.
- Nationally, the rate of emergency admission due to chronic liver disease (including cirrhosis) almost doubled between 1996–1997 and 2003–2004. The rate for males rose from 1.3 to 2.5 per 10,000 population, and the rate for females increased from 0.8 to 1.6 per 10,000 population. Rates of emergency admission for chronic liver disease were highest for people aged 45 years and over.
- Over the eight year period, the rate of emergency admission due to chronic pancreatitis increased. This was particularly notable for males, with the rate rising from 2.5 to 4.5 per 10,000 population between 1996–1997 and 2003–2004. Rates were higher for males than females, and greatest for people under 65 years of age.
- Between 1996–1997 and 2003–2004, there was a small increase in rates of emergency admission for oesophageal varices. The emergency admission rate for males was about double that for females. Rates of emergency admission for oesophageal varices were consistently highest for people aged 45 years and over.
- Social deprivation had a notable impact on rates of emergency admission for all these health conditions associated with excessive alcohol consumption. For all indicators presented here, rates of emergency admission rose with increasing deprivation.

Introduction

While moderate alcohol intake can be compatible with a healthy lifestyle, excessive drinking has serious health, social and economic consequences. Alcohol problems are a significant health issue in Scotland and impose a substantial financial burden on Scottish society at £1.1 billion.[1] Tackling alcohol misuse is therefore a priority of the Scottish Executive. The national target, set in 1999, is to reduce the proportion of people exceeding the weekly 'sensible limits' from 33% to 31% for men between 1995 and 2005 and to 29% by 2010, and from 13% to 12% for women between 1995 and 2005 and to 11% by 2010.[2] The scale of the problem has been highlighted in the Scottish Executive's Plan for Action on Alcohol Problems.[3] The Plan sets out a broad range of measures to reduce alcohol-related harm in Scotland. Key priorities within this Plan include reducing binge drinking and harmful drinking by children and young people which are becoming increasingly prevalent.

There is a spectrum of alcohol-related problems, arising from different patterns of drinking. Each has a varying degree of risk associated with different levels or patterns of alcohol consumption, which may be complicated by physical dependence. Sensible drinking is considered low risk and is defined as drinking less than 4 units for men and 3 units for women per day, and two alcohol-free days per week. While there is no commonly agreed definition of 'binge drinking', one definition is drinking over half of the weekly recommended number of units on one occasion (that is, more than 10 units for men and 7 units for women). Hazardous or 'at-risk' drinking is defined as drinking more than 5 units for men and 3 units for women daily and if sustained, increases the risk of developing alcohol-related damage. Harmful drinking is a pattern of drinking that is associated with damage to mental or physical health. Alcohol dependence is characterised by a compulsion to drink alcohol, difficulty in controlling alcohol-taking behaviour, physiological symptoms of withdrawal, evidence of tolerance to alcohol, gradual neglect of alternative interests as a result of drinking and persistent use of alcohol despite awareness of its harmful effects.[4,5,6]

Recent statistics indicate that 44% of men and 27% of women aged over 16 years were drinking in excess of the recommended daily benchmarks, with 26% of men and 10% of women drinking more than double these limits. Approximately two in five men and one in seven women aged 16–74 years drank hazardously. In Scotland, one in eight men and one in 24 women had some degree of alcohol dependence.[7] Deaths relating to alcohol misuse have more than doubled between 1990 and 1999, and continue to rise.[6]

The health consequences of drinking beyond the recommended daily limits are considerable. Alcohol consumption can lead to short-term problems such as intoxication where functions such as speech, thinking or ability to walk or drive are impaired. Excessive alcohol consumption can have long-term effects and cause serious damage to the cardiovascular system (hypertension, stroke, coronary heart disease), the liver (cirrhosis, alcoholic hepatitis), the nervous system (seizure, alcoholic dementia), and gastrointestinal system (pancreatitis, upper gastrointestinal bleeding, oesophageal varices). It can also cause cancer (eg of the liver, mouth, pharynx, larynx and oesophagus). These effects are not only confined to harmful drinking or alcohol dependence but may result from drinking outwith recommended limits. Alcohol consumption during pregnancy can harm the unborn baby. Psychiatric illness (anxiety disorders, depression) is common in heavy drinkers. Often high levels of drinking can be in response to depressive illness or lead to depressive illness. Alcohol is also associated with a large number of suicides or attempted suicides.[5,6]

Excessive alcohol consumption can result in a variety of social problems including violence or aggressive behaviour (domestic or otherwise), crime (theft, homicide), breakdown of relationships, family stress, risky sexual behaviour, workplace absenteeism and accidents, financial difficulties, homelessness and social exclusion.[3,5,6] Drink driving is also an important consequence, resulting in one in six deaths on Scotland's roads.[7]

About a third of alcohol-related problems resolve without treatment. However, the remainder require treatment.[6] Alcohol problems are treated by a variety of interventions provided in a wide range of settings, depending on the level of alcohol consumption and alcohol-related problems. Brief interventions aimed at reducing alcohol intake are effective; they can be carried out by a variety of agencies and typically involve assessment and counselling. Motivational interviewing is the most common brief intervention. Detoxification is the planned withdrawal of alcohol and requires careful management. Relapse is common after detoxification and various pharmacological and psychosocial interventions can be used to prevent relapse. Self-help groups can also be valuable for problem drinkers.

This section presents data on emergency admission to hospital for acute intoxication and harmful use, and for alcoholic liver disease. These conditions are directly related to alcohol misuse. Trends are also presented for some conditions that are highly attributable to alcohol misuse and often require emergency admission, specifically chronic liver disease including cirrhosis (damage to the liver), chronic pancreatitis (inflammation of the pancreas) and oesophageal varices (abnormal widening of the veins in the oesophagus which may lead to bleeding).[8] There are other health conditions associated with excessive alcohol consumption (eg alcohol related brain damage) but that are not covered in this report.

Data and methods

Definition of indicator

The following indicators are presented:

- rates of emergency admission to hospital for people with a primary or secondary diagnosis of acute intoxication and harmful use
- rates of emergency admission to hospital for people with a primary or secondary diagnosis of alcoholic liver disease
- rates of emergency admission to hospital for people with a primary or secondary diagnosis of chronic liver disease including cirrhosis (excluding known viral causes, cancers and oesophageal varices)
- rates of emergency admission to hospital for people with a primary or secondary diagnosis of chronic pancreatitis
- rates of emergency admission to hospital for people with a primary or secondary diagnosis of oesophageal varices.

Data source

Information on emergency admissions was derived from Scottish Morbidity Records (SMR01). All admissions occurring between 1 April 1996 and 31 March 2004 for those resident in Scotland were included.

The codes indicating a diagnosis of acute intoxication and harmful use, alcoholic liver disease, chronic liver disease including cirrhosis, chronic pancreatitis, and oesophageal varices are outlined in Table 3-1. Diagnoses were coded using the International Classification of Diseases Tenth Revision (ICD10).

Table 3-1 ICD10 codes indicating a diagnosis of acute intoxication and harmful use, alcoholic liver disease, chronic liver disease including cirrhosis, chronic pancreatitis and oesophaegal varices

Diagnosis	ICD-10
Codes indicating a diagnosis of acute intoxication and harmful use:	
Acute intoxication	F10.0
Harmful use	F10.1
Codes indicating alcoholic liver disease:	K70
Which includes:	
Alcoholic fatty liver	K70.0
Alcohol hepatitis	K70.1
Alcoholic fibrosis and sclerosis	K70.2
Alcoholic cirrhosis of the liver	K70.3
Alcoholic hepatic failure	K70.4
Alcoholic liver disease unspecified	K70.9
Codes indicating a diagnosis of chronic liver disease and cirrhosis:	
Toxic liver disease with chronic persistent hepatitis	K71.3
Toxic liver disease with chronic lobular hepatitis	K71.4
Toxic liver disease with chronic active hepatitis	K71.5
Toxic liver disease with fibrosis and cirrhosis of liver	K71.7
Chronic hepatic failure	K72.1
Granulomatous hepatitis, not elsewhere classified	K75.3
Other specified inflammatory liver diseases	K75.8
Fatty (change of) liver, not elsewhere classified	K76.0
Hepatic veno-occlusive disease (excludes Budd-Chiari syndrome)	K76.5
Portal hypertension	K76.6
Hepatorenal syndrome (excludes following labour and delivery)	K76.7
Codes indicating a diagnosis of chronic pancreatitis:	
Alcohol-induced chronic pancreatitis	K86.0
Other chronic pancreatitis	K86.1
Code indicating a diagnosis of oesophageal varices	I85

Two sources were used for population data:

- General Register Office for Scotland [GRO(S)]

  GRO(S) mid-year population estimates were used to give Scotland and NHS Board of residence population estimates from June 1996 to June 2003. These data were used in the analysis of eight-year annual trends.

- 2001 census data

  2001 census populations at data zone level were used when considering the deprivation profile and the standardised admission and death rates. Data zones are groups of census output areas with populations of between 500 and 1,000 residents, which contain households with similar social characteristics.[9]

Deprivation quintiles were based on the Scottish Index of Multiple Deprivation (SIMD), which was calculated in 2004.[10] Quintiles were assigned to admission and death records using postcodes.

Analyses of data

All emergency admissions where a selected primary or secondary diagnosis had been recorded (as detailed in Table 3-1) were included in the analyses.

Crude annual emergency admission rates for each diagnosis were produced for Scotland, by sex and age group, for the period between 1 April 1996 and 31 March 2004. The rates were calculated by dividing the total number of emergency admissions for the particular diagnosis in each year, sex and age group by the corresponding GRO(S) mid-year population estimate.

For some indicators, data on people aged 24 years and younger are not reported by sex and age group as numbers were too small. However, these data are included in the 'all ages' totals.

Crude emergency admission rates for each diagnosis were produced for Scotland by deprivation quintile. These rates were calculated by dividing the total number of emergency admissions between 1 April 2003 and 31 March 2004 in each deprivation quintile by the total population resident in that particular deprivation quintile, according to the 2001 census.

NHS Board rates of emergency admission across the three-year period from 1 April 2001 to 31 March 2004 were indirectly standardised for age, sex and deprivation quintile, taking the total for Scotland over this three-year period as the reference. Further details of the indirect standardisation process can be found in Annex 7 of the 2002 Clinical Outcome Indicators report.[11]

An estimate of the statistical significance of the standardised rate can be obtained from the 95% confidence interval. If the confidence interval does not include the Scottish rate, the difference in emergency admission rates recorded for a particular population is said to be ‘statistically significant’ compared with the standard population. For example, for an NHS Board rate of 85 per 1,000 population with a 95% confidence interval of 80–90, the difference from a standard population (ie Scotland) with a rate of 72 per 1,000 population is deemed to be statistically significant, since the range 80–90 does not include the value for the standard population (72).

Limitations of data

SMR01 forms are returned to ISD by all acute hospitals in Scotland. The form collects patient-based data on inpatient and day-case episodes in general and acute wards. It should be borne in mind that numbers refer to episodes rather than patients and a number of episodes can be attributed to an individual patient.

Caution is also necessary when interpreting these figures. The recording of alcohol-related diagnoses may vary from hospital to hospital. Where an alcohol problem is suspected but unconfirmed, it may not be recorded by the hospital. In SMR01 records, F10 (mental and behavioural disorders due to use of alcohol) is one of the most commonly omitted ICD10 codes in the secondary position. A recent audit of coding found it to be under-recorded by about 16%.[12]

It should be noted that data were only available for patients who were admitted to acute hospitals. Patients who were treated in an accident and emergency (A&E) department only were therefore not included in these indicators. Some hospitals may admit patients while others are more likely to treat them in A&E only. Hospitals that operate a policy of direct admissions to a medical assessment unit may yield higher admissions figures than hospitals that admit all patients via A&E. Differences in acute hospital admission policies may therefore partially explain some of the variation across NHS Boards.

It is likely that the emergency admission rates for NHS Boards would also be influenced by factors relating to hospital access, such as rurality.

For some indicators, data on people aged 24 years and younger are not reported by sex and age group as numbers were too small.

Presentation of data

For acute intoxication and harmful use emergency admissions, crude annual rates for Scotland are presented by sex and age group for the eight-year period from 1996–1997 to 2003–2004 in Figure 3-1 and Table 3-2. Crude rates are presented by deprivation quintile for the year ending 31 March 2004 in Figure 3-2. Standardised rates are presented for each NHS Board of residence in Figure 3-3 and Table 3-3, using aggregated data for the three-year period ending 31 March 2004.

For alcoholic liver disease emergency admissions, crude annual rates for Scotland are presented by sex and age group for the eight-year period from 1996–1997 to 2003–2004 in Figure 3-4 and Table 3-4. Crude rates are presented by deprivation quintile for the year ending 31 March 2004 in Figure 3-5. Standardised rates are presented for each NHS Board of residence in Figure 3-6 and Table 3-5, using aggregated data for the three-year period ending 31 March 2004.

For chronic liver disease (including cirrhosis) emergency admissions, crude annual rates for Scotland are presented by sex and age group for the eight-year period from 1996–1997 to 2003–2004 in Figure 3-7 and Table 3-6. Crude rates are presented by deprivation quintile for the year ending 31 March 2004 in Figure 3-8. Standardised rates are presented for each NHS Board of residence in Figure 3-9 and Table 3-7, using aggregated data for the three-year period ending 31 March 2004.

For chronic pancreatitis emergency admissions, crude annual rates for Scotland are presented by sex and age group for the eight-year period from 1996–1997 to 2003–2004 in Figure 3-10 and Table 3-8. Crude rates are presented by deprivation quintile for the year ending 31 March 2004 in Figure 3-11. Standardised rates are presented for each NHS Board of residence in Figure 3-12 and Table 3-9, using aggregated data for the three-year period ending 31 March 2004.

For oesophageal varices emergency admissions, crude annual rates for Scotland are presented by sex and age group for the eight-year period from 1996–1997 to 2003–2004 in Figure 3-13 and Table 3-10. Crude rates are presented by deprivation quintile for the year ending 31 March 2004 in Figure 3-14. Standardised rates are presented for each NHS Board of residence in Figure 3-15 and Table 3-11, using aggregated data for the three-year period ending 31 March 2004.

Results and discussion

Eight-year annual trends in emergency admission rates as a result of acute intoxication and harmful use by sex and age group

There was an increasing trend in the Scotland rate of emergency admission due to acute intoxication and harmful use. The greatest increase in rates of emergency admission was for males, from 40.3 per 10,000 population in 1996–1997 to 56.5 per 10,000 population in 2003–2004. This trend was seen to a much lesser extent in females, with a slight increase from 13.2 per 10,000 population in 1996–1997 to 17.2 per 10,000 population in 2003–2004 (see Figure 3-1, Table 3-2).

Age affected rates of emergency admission for acute intoxication and harmful use. This effect became more marked across the eight-year period and was most notable in males. The rates were highest for both males and females in the 45–64 year age group; for example, in 2003–2004, the rate was 89.6 per 10,000 population for males and 25.6 per 10,000 population for females.

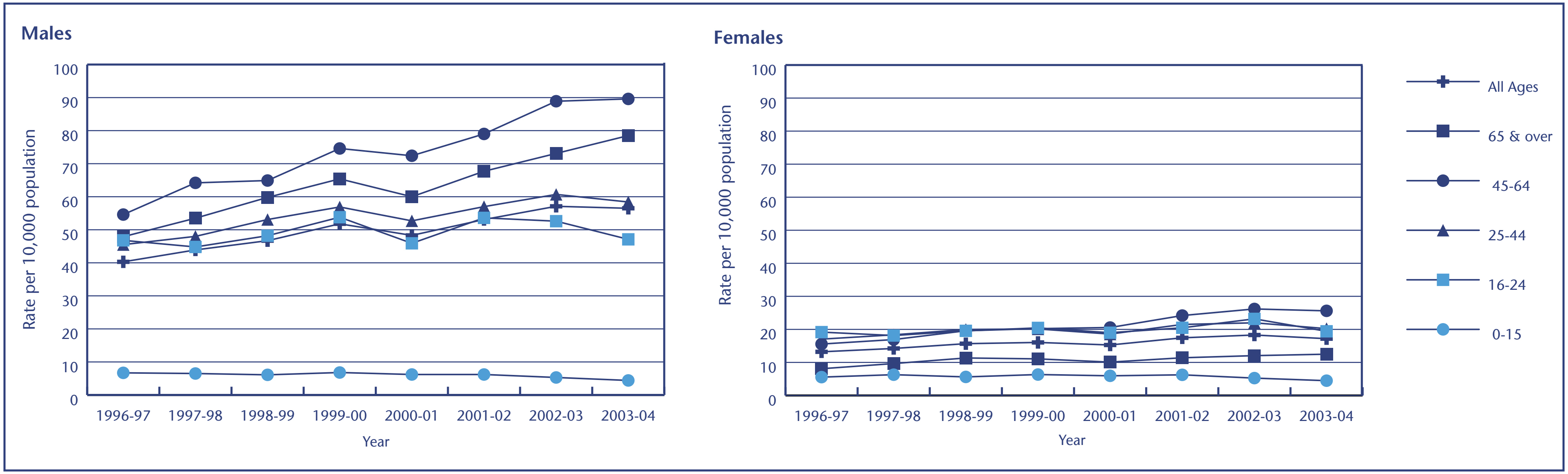
With the exception of the youngest age group (0–15 years), males were more likely to be admitted as an emergency for acute intoxication and harmful use than females. In 2003–2004, the rate of emergency admissions for acute intoxication and harmful use was more than three times higher for males compared with females (56.5 per 10,000 population compared with 17.2 per 10,000 population respectively).

Table 3-2 Trends in emergency admission rates for people with a primary or secondary diagnosis of acute intoxication and harmful use by age group, for the period 1 April 1996 to 31 March 2004

	Emergency admissions (rate per 10,000 population)							
	Year (Apr-Mar)							
	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
Males								
0-15	6.7	6.5	6.1	6.8	6.2	6.2	5.3	4.4
16-24	46.8	44.8	48.2	53.8	45.9	53.6	52.6	47.1
25-44	45.5	48.0	53.1	56.9	52.7	57.0	60.7	58.4
45-64	54.6	64.2	64.9	74.6	72.4	79.0	88.9	89.6
65 & over	47.9	53.5	59.8	65.4	60.0	67.7	73.1	78.5
All Ages	40.3	43.9	46.7	51.8	48.3	53.1	57.1	56.5
Females								
0-15	5.6	6.3	5.6	6.3	6.0	6.2	5.3	4.5
16-24	19.2	18.1	19.6	20.4	19.0	20.5	23.2	19.4
25-44	17.0	18.4	20.0	20.1	18.6	21.5	22.0	20.2
45-64	15.6	16.9	19.6	20.2	20.6	24.2	26.2	25.6
65 & over	8.1	9.7	11.3	11.1	10.1	11.4	12.1	12.5
All Ages	13.2	14.2	15.7	16.0	15.3	17.4	18.3	17.2

Source: ISD Scotland (SMR01) and GRO(S) (mid-year population estimates).

Figure 3-1 Trends in emergency admission rates for people with a primary or secondary diagnosis of acute intoxication and harmful use by sex and age group, for the period 1 April 1996 to 31 March 2004



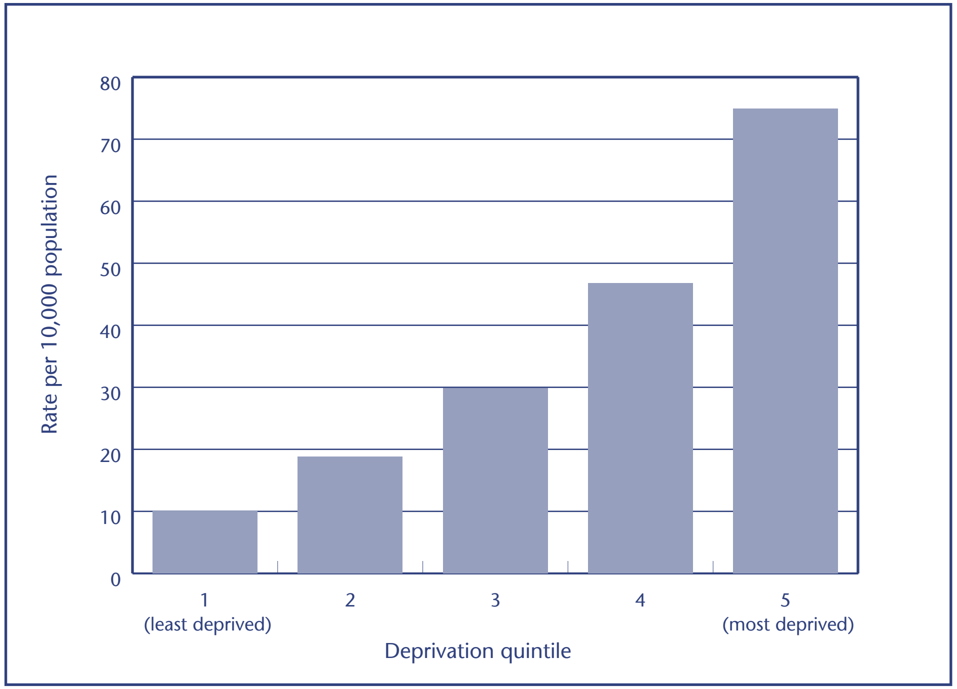
Source: ISD Scotland (SMR01) and GRO(S) (mid-year population estimates).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Emergency admissions for acute intoxication and harmful use by deprivation

In 2003–2004, the rate of emergency admissions for acute intoxication and harmful use increased with increasing deprivation, from 10.0 per 10,000 population in quintile 1 (least deprived) to 74.9 per 10,000 population in quintile 5 (most deprived) (see Figure 3-2).

Figure 3-2 Emergency admission rates for people with a primary or secondary diagnosis of acute intoxication and harmful use by deprivation quintile, for the period 1 April 2003 to 31 March 2004



Source: ISD Scotland (SMR01) and GRO(S) (mid-year population estimates).

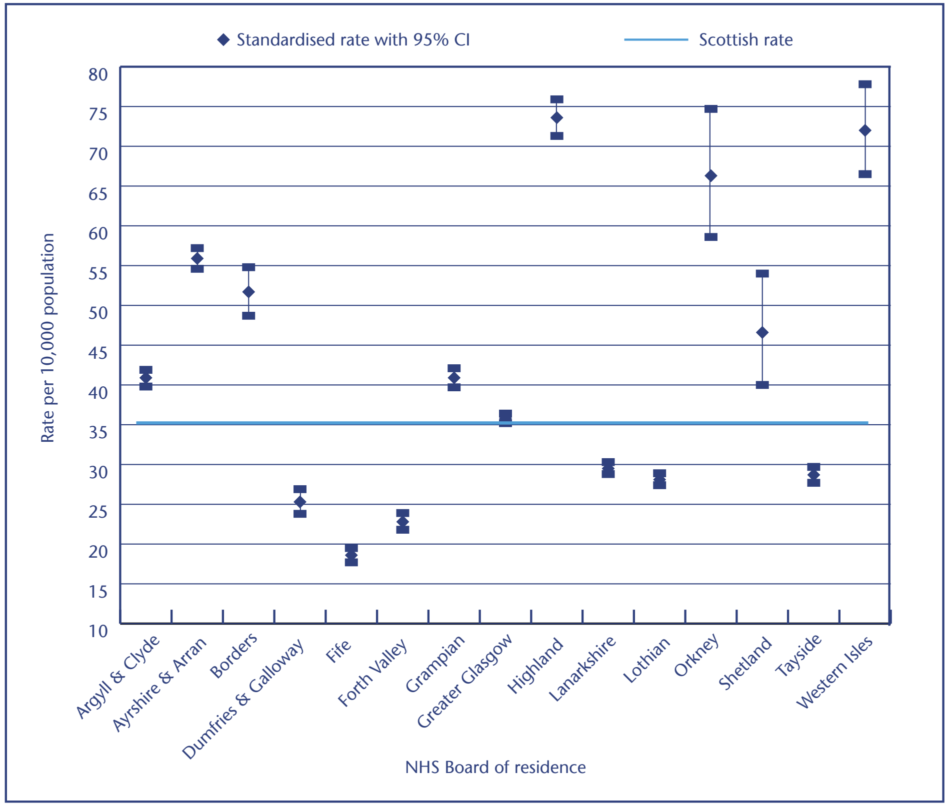
Comparison of acute intoxication and harmful use emergency admission rates across NHS Boards

Standardised rates of emergency admissions for acute intoxication and harmful use varied considerably across NHS Boards (see Figure 3-3, Table 3-3).

Eight NHS Boards had an emergency admission rate that was significantly higher than the Scottish rate (35.9 per 10,000 population). Six NHS Boards had an emergency admission rate that was significantly lower than the Scottish rate.

Variations among NHS Boards in emergency admission rates for acute intoxication and harmful use can be due to a range of factors including differences in underlying prevalence as well as admission policies.

Figure 3-3 Emergency admission rates for people with a primary or secondary diagnosis of acute intoxication and harmful use by NHS Board of residence, standardised by age, sex and deprivation, shown as a total for the three-year period ending 31 March 2004



Source: ISD Scotland (SMR01) and GRO(S) (2001 census population).

Table 3-3 Emergency admission rates for people with a primary or secondary diagnosis of acute intoxication and harmful use by NHS Board of residence, standardised by age, sex and deprivation, shown as a total for the three-year period ending 31 March 2004

NHS Board of residence	Annual Population[a]	Total admissions in 3 years	Rate per 10,000 population		95% Confidence Intervals	
			Crude	Standardised	Lower	Upper
Scotland	**5,062,011**	**54,469**	**35.9**			
Argyll & Clyde	420,132	5,875	46.6	40.9	39.8	41.9
Ayrshire & Arran	368,149	6,968	63.1	55.9	54.6	57.2
Borders	106,764	1,120	35.0	51.7	48.7	54.8
Dumfries & Galloway	147,765	1,044	23.6	25.3	23.8	26.9
Fife	347,685	1,749	16.8	18.6	17.7	19.5
Forth Valley	280,130	1,804	21.5	22.8	21.8	23.9
Grampian	526,473	4,271	27.0	40.9	39.7	42.1
Greater Glasgow	868,087	12,291	47.2	35.8	35.2	36.4
Highland	208,914	3,974	63.4	73.6	71.3	75.9
Lanarkshire	551,591	5,923	35.8	29.5	28.8	30.3
Lothian	778,367	5,266	22.6	28.1	27.4	28.9
Orkney Islands	19,245	267	46.2	66.3	58.6	74.7
Shetland Islands	21,988	176	26.7	46.6	40.0	54.0
Tayside	390,219	3,108	26.5	28.7	27.7	29.7
Western Isles	26,502	633	79.6	72.0	66.5	77.8

a GRO(S) 2001 census population.

Source: ISD Scotland (SMR01) and GRO(S) (2001 census population).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Eight-year annual trends in rates of emergency admission for alcoholic liver disease by sex and age group

Rates of emergency admission due to alcoholic liver disease increased between 1996–1997 and 2003–2004. The rate increased from 7.3 per 10,000 population in 1996–1997 to 12.6 per 10,000 population in 2003–2004 for males, and from 3.1 per 10,000 population in 1996–1997 to 5.6 per 10,000 population in 2003–2004 for females (see Figure 3-4, Table 3-4).

There was an effect of age on rates of emergency admission for alcoholic liver disease and this became more marked across the eight-year period. The rates were higher for both males and females in the 45–64 year age group compared with all other age groups. In 2003–2004, for males, the rate was 30.6 per 10,000 population for 45–64 year olds compared with 9.3 per 10,000 population for 25–44 year olds. For females, the rate was 14.5 per 10,000 population for 45–64 year olds compared with 4.6 per 10,000 population for 25–44 year olds.

Across the eight-year period, the rate of emergency admissions for alcoholic liver disease for males was more than double that for females.

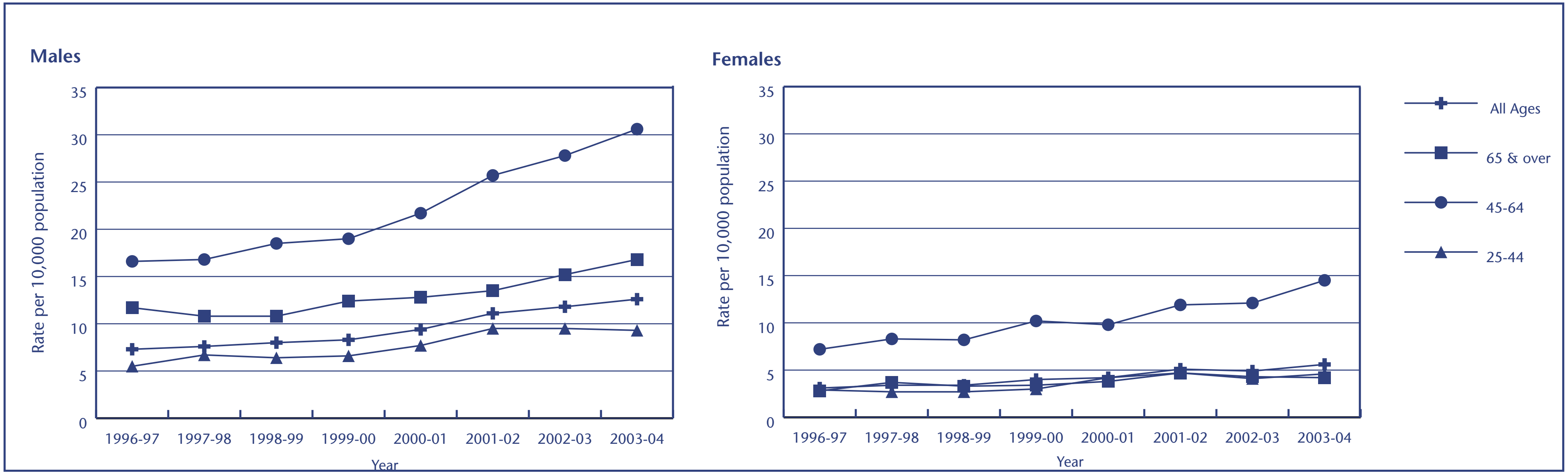
Table 3-4 Trends in emergency admission rates for people with a primary or secondary diagnosis of alcoholic liver disease by sex and age group[a] for the period 1 April 1996 to 31 March 2004

	Emergency admissions (rate per 10,000 population) Year (Apr-Mar)							
	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
Males								
25-44	5.5	6.7	6.4	6.6	7.7	9.5	9.5	9.3
45-64	16.6	16.8	18.5	19.0	21.7	25.7	27.8	30.6
65 & over	11.7	10.8	10.8	12.4	12.8	13.5	15.2	16.8
All Ages	7.3	7.6	8.0	8.3	9.4	11.1	11.8	12.6
Female								
25-44	2.9	2.7	2.7	3.0	4.2	4.7	4.1	4.6
45-64	7.2	8.3	8.2	10.2	9.8	11.9	12.1	14.5
65 & over	2.8	3.7	3.3	3.4	3.8	4.7	4.3	4.2
All Ages	3.1	3.4	3.4	4.0	4.2	5.1	4.9	5.6

a Data for patients under 25 are not presented due to small numbers, however they are included in the 'all ages' total.

Source: ISD Scotland (SMR01) and GRO(S) (mid-year population estimates).

Figure 3-4 Trends in emergency admission rates for people with a primary or secondary diagnosis of alcoholic liver disease by age group[a], for the period 1 April 1996 to 31 March 2004



a Data for patients under 25 are not presented due to small numbers, however they are included in the 'all ages' total.

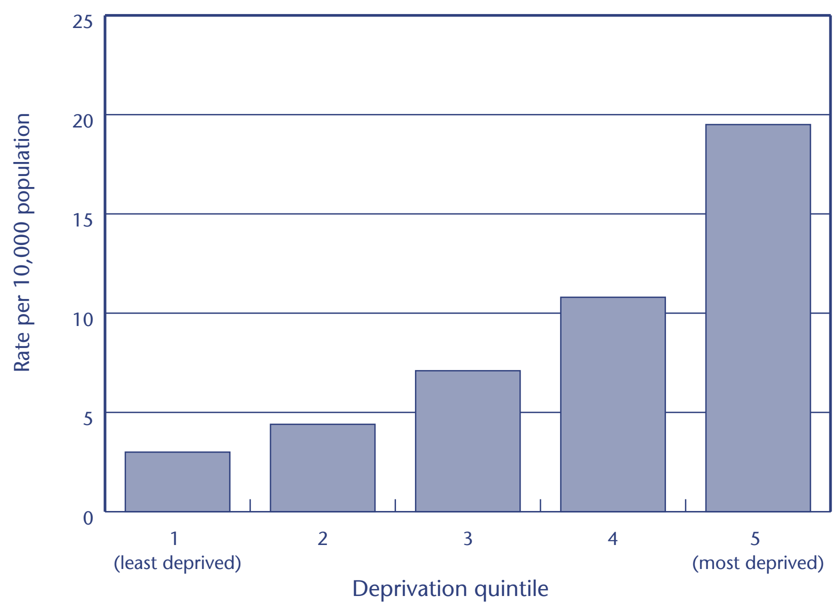
Source: ISD Scotland (SMR01) and GRO(S) (mid-year population estimates).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Emergency admissions for alcoholic liver disease by deprivation

Deprivation had a marked effect on the rate of emergency admission for alcoholic liver disease. In 2003–2004, people in quintile 5 were more than six times more likely to be admitted as an emergency for alcoholic liver disease compared with people in quintile 1 (19.5 per 10,000 population compared with 3.0 per 10,000 population respectively) (see Figure 3-5).

Figure 3-5 Emergency admission rates for people with a primary or secondary diagnosis of alcoholic liver disease by deprivation quintile for the period 1 April 2003 to 31 March 2004



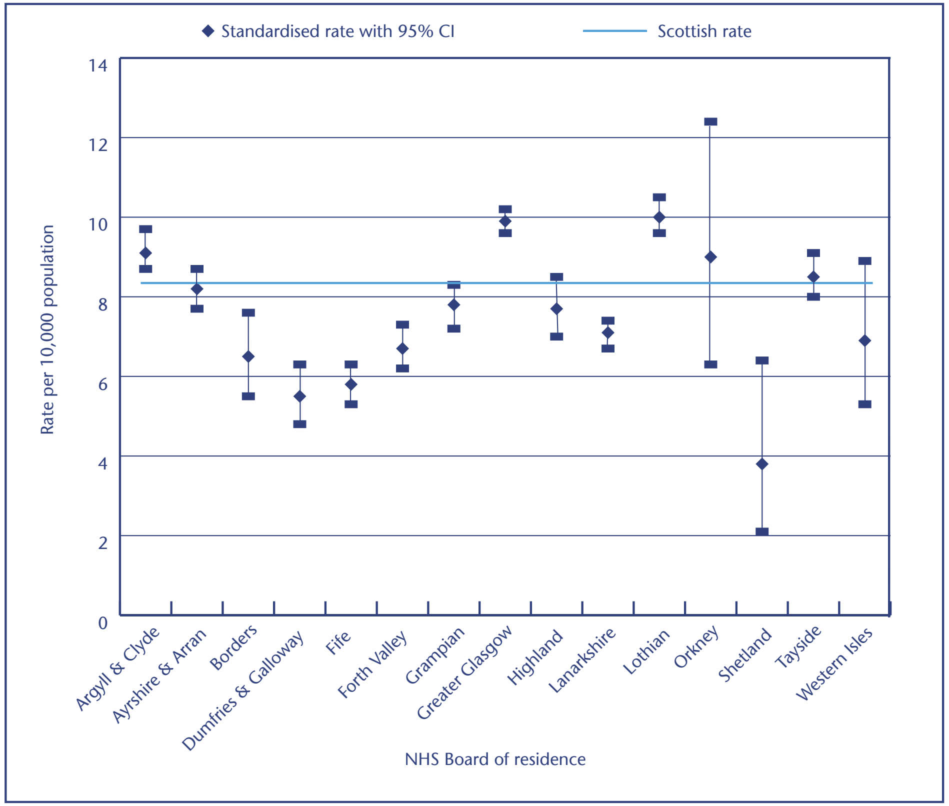
Source: ISD Scotland (SMR01) and GRO(S) (2001census population).

Comparison of rates of emergency admission for alcoholic liver disease across NHS Boards

There was variation in the standardised rates of emergency admission for alcoholic liver disease across NHS Boards (see Figure 3-6, Table 3-5). Three NHS Boards had an emergency admission rate that was significantly higher than the Scottish rate (8.4 per 10,000 population). Seven NHS Boards had an admission rate for alcoholic liver disease that was significantly lower than the Scottish rate.

Variations among NHS Boards in emergency admission rates for alcoholic liver disease can be due to a range of factors including differences in underlying prevalence as well as admission policies.

Figure 3-6 Emergency admission rates for people with a primary or secondary diagnosis of alcoholic liver disease by NHS Board of residence, standardised by age, sex and deprivation, shown as a total for the three-year period ending 31 March 2004



Source: ISD Scotland (SMR01) and GRO(S) (2001census population).

Table 3-5 Emergency admission rates for people with a primary or secondary diagnosis of alcoholic liver disease by NHS Board of residence, standardised by age, sex and deprivation, shown as a total for the three-year period ending 31 March 2004

NHS Board of residence	Annual Population[a]	Total admissions in 3 years	Rate per 10,000 population		95% Confidence Intervals	
			Crude	Standardised	Lower	Upper
Scotland	**5,062,011**	**12,721**	**8.4**			
Argyll & Clyde	420,132	1,346	10.7	9.1	8.7	9.7
Ayrshire & Arran	368,149	1,045	9.5	8.2	7.7	8.7
Borders	106,764	146	4.6	6.5	5.5	7.6
Dumfries & Galloway	147,765	235	5.3	5.5	4.8	6.3
Fife	347,685	543	5.2	5.8	5.3	6.3
Forth Valley	280,130	527	6.3	6.7	6.2	7.3
Grampian	526,473	791	5.0	7.8	7.2	8.3
Greater Glasgow	868,087	3,396	13.0	9.9	9.6	10.2
Highland	208,914	423	6.7	7.7	7.0	8.5
Lanarkshire	551,591	1,418	8.6	7.1	6.7	7.4
Lothian	778,367	1,814	7.8	10.0	9.6	10.5
Orkney Islands	19,245	37	6.4	9.0	6.3	12.4
Shetland Islands	21,988	14	2.1	3.8	2.1	6.4
Tayside	390,219	926	7.9	8.5	8.0	9.1
Western Isles	26,502	60	7.5	6.9	5.3	8.9

a GRO(S) (2001census population).

Source: ISD Scotland (SMR01) and GRO(S) (2001census population).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Eight-year annual trends in rates of emergency admission for chronic liver disease (including cirrhosis) by sex and age group

Across the eight-year period, the Scotland rate of emergency admission due to chronic liver disease (including cirrhosis) almost doubled. For males, the rate rose from 1.3 per 10,000 population in 1996–1997 to 2.5 per 10,000 population in 2003–2004. For females, it increased from 0.8 to 1.6 per 10,000 population over the same period (see Figure 3-7, Table 3-6).

The rates of emergency admission for the two oldest age groups (65+ and 45–64 year olds) were more than double those in the youngest age group (25–44 year olds); for example, in 2003–2004, the rates were 4.5 and 5.1 compared with 1.8 per 10,000 population respectively for males, and 2.6 and 3.2 compared with 1.0 per 10,000 population respectively for females.

Across all age groups, males were more likely to be admitted as an emergency for chronic liver disease (including cirrhosis) than females over the eight-year period.

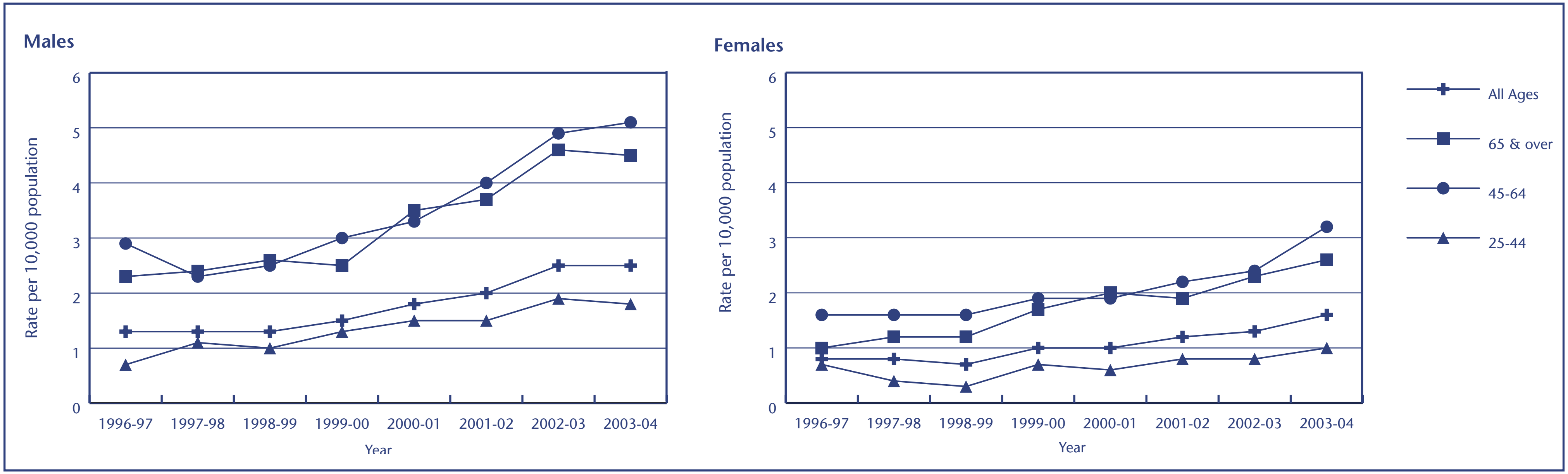
Table 3-6 Trends in emergency admission rates for people with a primary or secondary diagnosis of chronic liver disease by sex and age group[a] for the period 1 April 1996 to 31 March 2004

	Emergency admissions (rate per 10,000 population) Year (Apr-Mar)							
	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
Males								
25-44	0.7	1.1	1.0	1.3	1.5	1.5	1.9	1.8
45-64	2.9	2.3	2.5	3.0	3.3	4.0	4.9	5.1
65 & over	2.3	2.4	2.6	2.5	3.5	3.7	4.6	4.5
All Ages	1.3	1.3	1.3	1.5	1.8	2.0	2.5	2.5
Females								
25-44	0.7	0.4	0.3	0.7	0.6	0.8	0.8	1.0
45-64	1.6	1.6	1.6	1.9	1.9	2.2	2.4	3.2
65 & over	1.0	1.2	1.2	1.7	2.0	1.9	2.3	2.6
All Ages	0.8	0.8	0.7	1.0	1.0	1.2	1.3	1.6

a Data for patients under 25 are not presented due to small numbers, however they are included in the 'all ages' total.

Source: ISD Scotland (SMR01) and GRO(S) (mid-year population estimates).

Figure 3-7 Trends in emergency admission rates for people with a primary or secondary diagnosis of chronic liver disease by age group[a] for the period 1 April 1996 to 31 March 2004



a Data for patients under 25 are not presented due to small numbers, however they are included in the 'all ages' total.

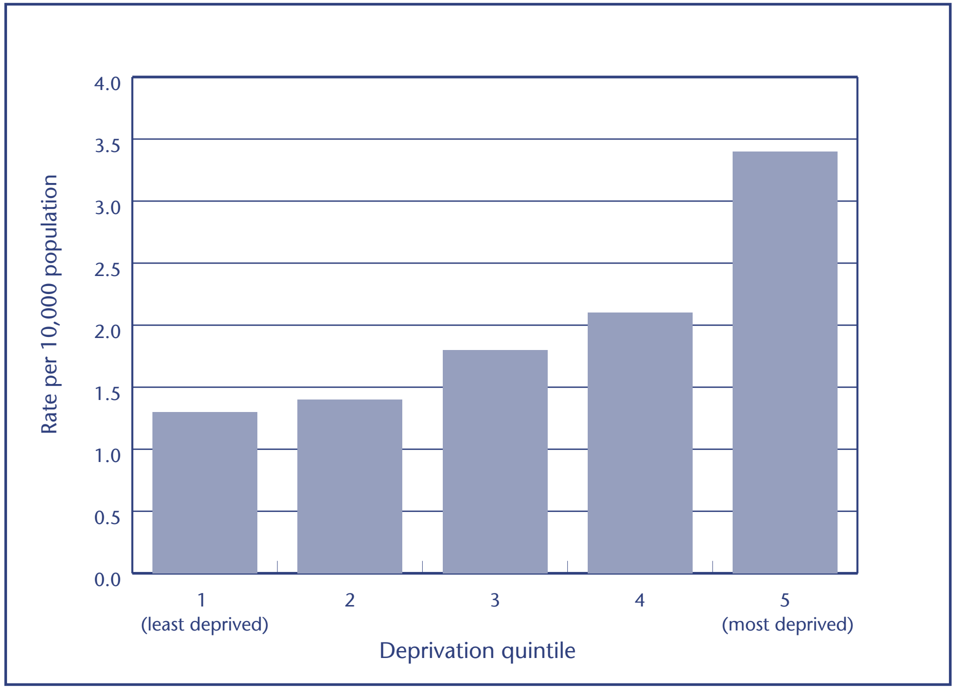
Source: ISD Scotland (SMR01) and GRO(S) (mid-year population estimates).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Emergency admission rates for chronic liver disease (including cirrhosis) by deprivation

The rate of emergency admissions for chronic liver disease (including cirrhosis) increased with increasing deprivation. In 2003–2004, it rose from 1.3 per 10,000 population in quintile 1 to 3.4 per 10,000 population in quintile 5 (see Figure 3-8).

Figure 3-8 Emergency admission rates for people with a primary or secondary diagnosis of chronic liver disease by deprivation quintile for the period 1 April 2003 to 31 March 2004



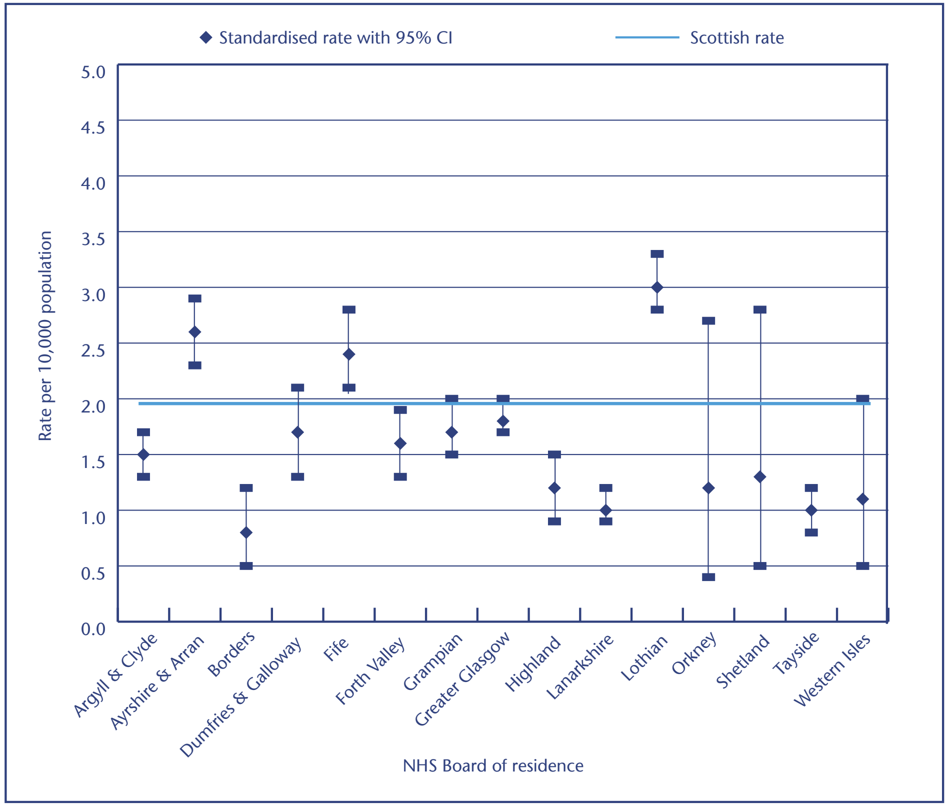
Source: ISD Scotland (SMR01) and GRO(S) (2001 census population).

Comparison of emergency admission rates for chronic liver disease (including cirrhosis) across NHS Boards

The standardised rates of emergency admission for chronic liver disease (including cirrhosis) varied across NHS Boards (see Figure 3-9, Table 3-7). The emergency admission rates for three NHS Boards (Lothian, Ayrshire & Arran, and Fife) were significantly higher than the Scottish rate (1.8 per 10,000 population). Five NHS Boards (Argyll & Clyde, Highland, Lanarkshire, Tayside and Borders) had admission rates that were significantly lower than the Scottish rate.

Variations among NHS Boards in emergency admission rates for chronic liver disease (including cirrhosis) can be due to a range of factors including differences in underlying prevalence as well as admission policies.

Figure 3-9 Emergency admission rates for people with a primary or secondary diagnosis of chronic liver disease by NHS Board of residence, standardised by age, sex and deprivation, shown as a total for the three-year period ending 31 March 2004



Source: ISD Scotland (SMR01) and GRO(S) (2001 census population).

Table 3-7 Emergency admission rates for people with a primary or secondary diagnosis of chronic liver disease by NHS Board of residence, standardised by age, sex and deprivation, shown as a total for the three-year period ending 31 March 2004

NHS Board of residence	Annual Population[a]	Total admissions in 3 years	Rate per 10,000 population		95% Confidence Intervals	
			Crude	Standardised	Lower	Upper
Scotland	**5,062,011**	**2,756**	**1.8**			
Argyll & Clyde	420,132	207	1.6	1.5	1.3	1.7
Ayrshire & Arran	368,149	314	2.8	2.6	2.3	2.9
Borders	106,764	21	0.7	0.8	0.5	1.2
Dumfries & Galloway	147,765	77	1.7	1.7	1.3	2.1
Fife	347,685	241	2.3	2.4	2.1	2.8
Forth Valley	280,130	126	1.5	1.6	1.3	1.9
Grampian	526,473	215	1.4	1.7	1.5	2.0
Greater Glasgow	868,087	552	2.1	1.8	1.7	2.0
Highland	208,914	69	1.1	1.2	0.9	1.5
Lanarkshire	551,591	192	1.2	1.0	0.9	1.2
Lothian	778,367	605	2.6	3.0	2.8	3.3
Orkney Islands	19,245	6	1.0	1.2	0.4	2.7
Shetland Islands	21,988	6	0.9	1.3	0.5	2.8
Tayside	390,219	115	1.0	1.0	0.8	1.2
Western Isles	26,502	10	1.3	1.1	0.5	2.0

a GRO(S) (2001 census population).

Source: ISD Scotland (SMR01) and GRO(S) (2001 census population).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Eight-year annual trends in rates of emergency admission as a result of chronic pancreatitis by sex and age group

There was an increasing trend in the Scotland rate of emergency admission due to chronic pancreatitis. The greatest increase in rates of emergency admission was for males, from 2.5 per 10,000 population in 1996–1997 to 4.5 per 10,000 population in 2003–2004. This trend was seen to a much lesser extent in females, with a slight increase from 0.9 per 10,000 population in 1996–1997 to 1.4 per 10,000 population in 2003–2004 (see Figure 3-10, Table 3-8).

For males, the rates of emergency admission for the two youngest age groups (25–44 and 45–64 year olds) were more than double those for the oldest age group (65+ year olds); these were 6.9 and 7.9 per 10,000 population compared with 2.8 per 10,000 population respectively in 2003–2004. For females, the rates for these age groups were 2.0, 2.3 and 1.3 per 10,000 population respectively.

Across all age groups, males were more likely to be admitted as an emergency for chronic pancreatitis than females over the eight-year period. In 2003–2004, the rate of emergency admissions for males was treble that for females.

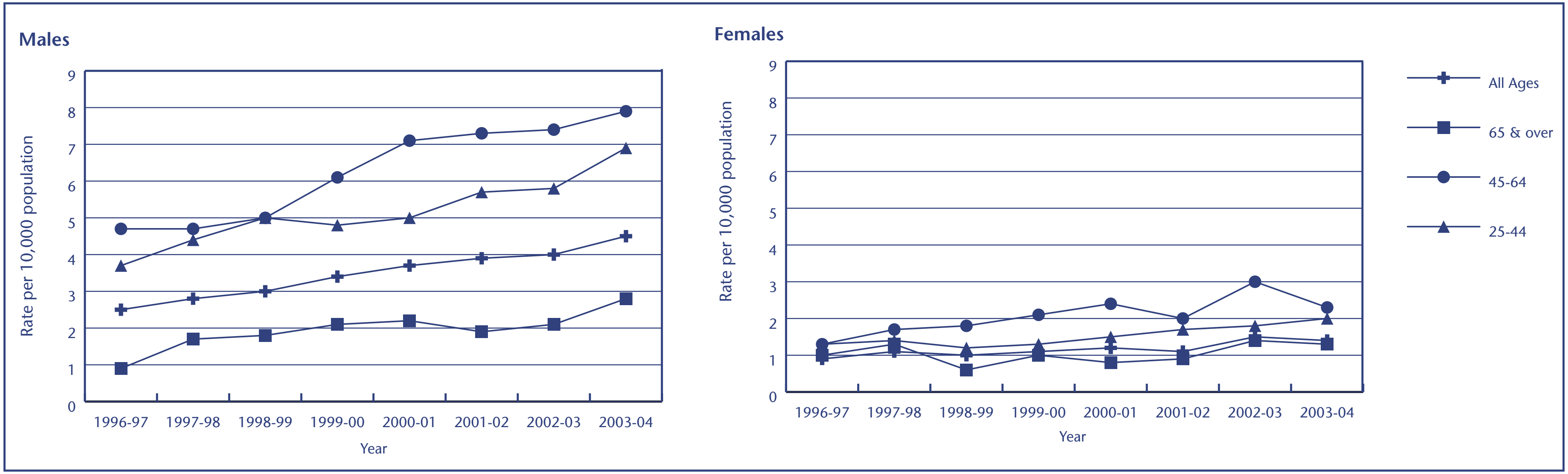
Table 3-8 Trends in emergency admission rates for people with a primary or secondary diagnosis of chronic pancreatitis by sex and age group[a] for the period 1 April 1996 to 31 March 2004

	Emergency admissions (rate per 10,000 population) Year (Apr-Mar)							
	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
Males								
25-44	3.7	4.4	5.0	4.8	5.0	5.7	5.8	6.9
45-64	4.7	4.7	5.0	6.1	7.1	7.3	7.4	7.9
65 & over	0.9	1.7	1.8	2.1	2.2	1.9	2.1	2.8
All Ages	2.5	2.8	3.0	3.4	3.7	3.9	4.0	4.5
Females								
25-44	1.3	1.4	1.2	1.3	1.5	1.7	1.8	2.0
45-64	1.3	1.7	1.8	2.1	2.4	2.0	3.0	2.3
65 & over	1.0	1.3	0.6	1.0	0.8	0.9	1.4	1.3
All Ages	0.9	1.1	1.0	1.1	1.2	1.1	1.5	1.4

a Data for patients under 25 are not presented due to small numbers, however they are included in the 'all ages' total.

Source: ISD Scotland (SMR01) and GRO(S) (mid-year population estimates).

Figure 3-10 Trends in emergency admission rates for people with a primary or secondary diagnosis of chronic pancreatitis by age group[a] for the period 1 April 1996 to 31 March 2004



a Data for patients under 25 are not presented due to small numbers, however they are included in the 'all ages' total.

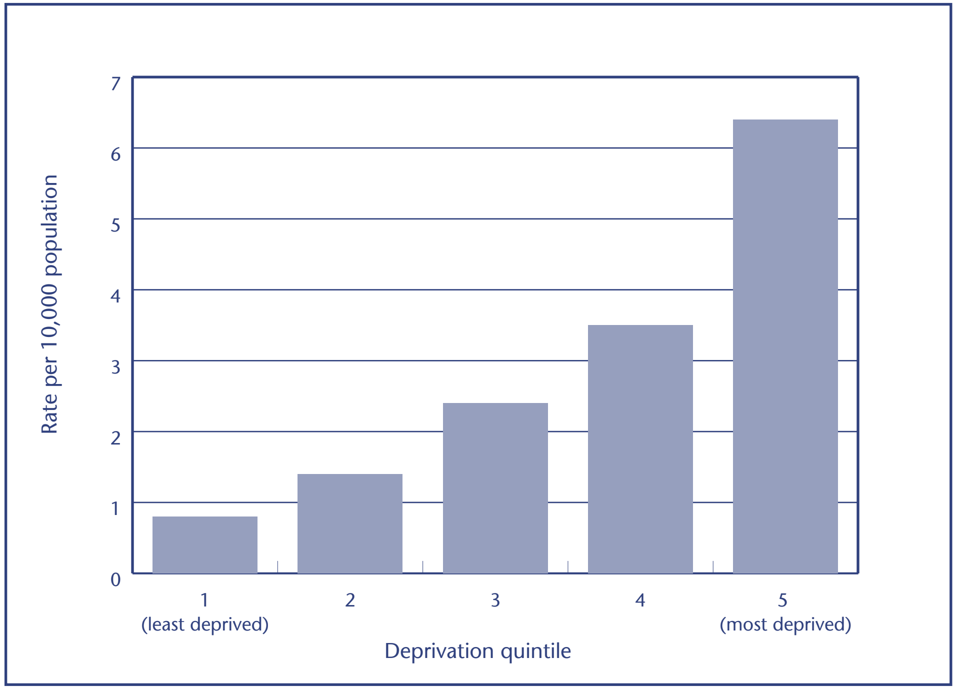
Source: ISD Scotland (SMR01) and GRO(S) (mid-year population estimates).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Chronic pancreatitis emergency admissions by deprivation

Deprivation had a marked effect on the rate of emergency admission for chronic pancreatitis, with the rate in quintile 5 eight times greater than that in quintile 1 in 2003–2004 (6.4 per 10,000 population compared with 0.8 per 10,000 population respectively) (see Figure 3-11).

Figure 3-11 Emergency admission rates for people with a primary or secondary diagnosis of chronic pancreatitis by deprivation quintile, for the period 1 April 2003 to 31 March 2004



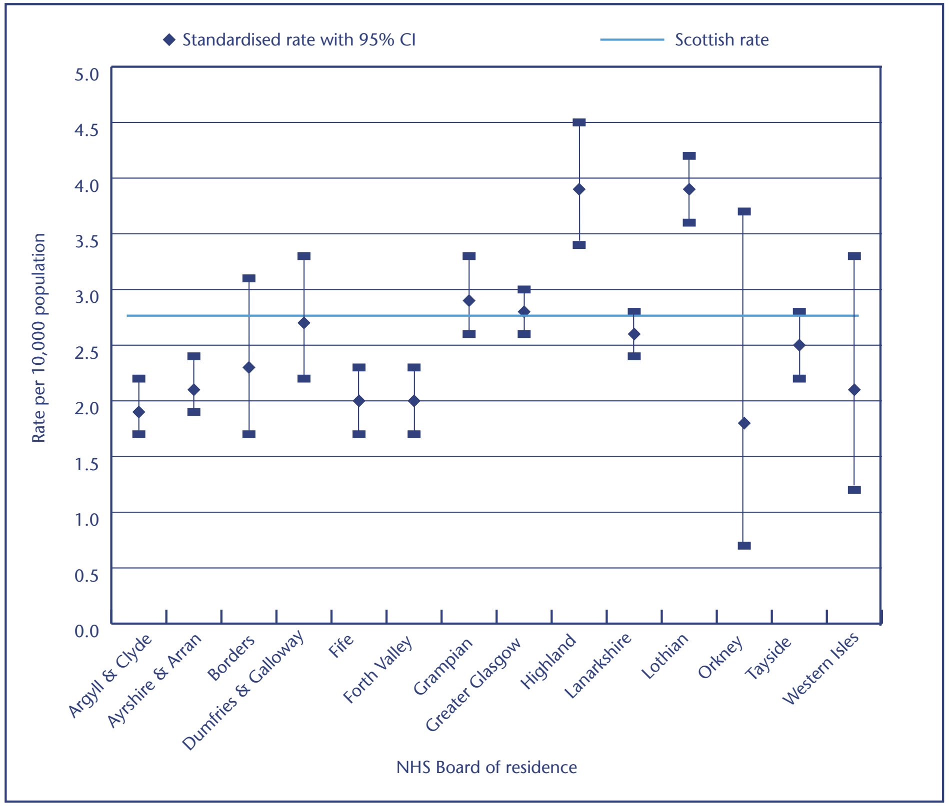
Source: ISD Scotland (SMR01) and GRO(S)(2001 census population)

Comparison of rates of emergency admissions for chronic pancreatitis across NHS Boards

There was variation in the standardised rates of emergency admission for chronic pancreatitis across NHS Boards (see Figure 3-12, Table 3-9). The emergency admission rates for Lothian and Highland (both 3.9 per 10,000 population) were significantly higher than the Scottish rate (2.7 per 10,000 population). Argyll & Clyde (1.9 per 10,000 population), Fife (2.0 per 10,000 population), Forth Valley (2.0 per 10,000 population) and Ayrshire & Arran (2.1 per 10,000 population) had emergency admission rates for chronic pancreatitis that were significantly lower than the Scottish rate.

Variations among NHS Boards in emergency admission rates for chronic pancreatitis can be due to a range of factors including differences in underlying prevalence as well as admission policies.

Figure 3-12 Emergency admission rates for people with a primary or secondary diagnosis of chronic pancreatitis by NHS Board of residence[a], standardised by age, sex and deprivation, shown as a total for the three-year period ending 31 March 2004



a Data for Shetland are not presented due to small numbers.

Source: ISD Scotland (SMR01) and GRO(S)(2001 census population).

Table 3-9 Emergency admission rates for people with a primary or secondary diagnosis of chronic pancreatitis by NHS Board of residence[a], standardised by age, sex and deprivation, shown as a total for the three-year period ending 31 March 2004

NHS Board of residence	Annual Population[b]	Total admissions in 3 years	Rate per 10,000 population		95% Confidence Intervals	
			Crude	Standardised	Lower	Upper
Scotland	**5,062,011**	**4,069**	**2.7**			
Argyll & Clyde	420,132	282	2.2	1.9	1.7	2.2
Ayrshire & Arran	368,149	270	2.4	2.1	1.9	2.4
Borders	106,764	50	1.6	2.3	1.7	3.1
Dumfries & Galloway	147,765	112	2.5	2.7	2.2	3.3
Fife	347,685	183	1.8	2.0	1.7	2.3
Forth Valley	280,130	156	1.9	2.0	1.7	2.3
Grampian	526,473	293	1.9	2.9	2.6	3.3
Greater Glasgow	868,087	969	3.7	2.8	2.6	3.0
Highland	208,914	211	3.4	3.9	3.4	4.5
Lanarkshire	551,591	530	3.2	2.6	2.4	2.8
Lothian	778,367	715	3.1	3.9	3.6	4.2
Orkney Islands	19,245	7	1.2	1.8	0.7	3.7
Tayside	390,219	269	2.3	2.5	2.2	2.8
Western Isles	26,502	18	2.3	2.1	1.2	3.3

a Data for Shetland are not presented due to small numbers.
b GRO(S)(2001 census population).

Source: ISD Scotland (SMR01) and GRO(S) (2001 census population).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Eight-year annual trends in rates of emergency admission for oesophageal varices by sex and age group

There was a small increase in the Scottish rates of emergency admission for oesophageal varices over the eight-year period. For males, the rate rose from 1.2 per 10,000 population in 1996–1997 to 1.8 per 10,000 population in 2003–2004. For females, it increased from 0.6 to 0.8 per 10,000 population over the same period (see Figure 3-13, Table 3-10).

For males, the rates of emergency admission for the two oldest age groups (65+ and 45–64 year olds) were more than double those in the youngest age group (25–44 year olds); these were 3.4 and 3.9 per 10,000 population compared with 1.2 per 10,000 population respectively in 2003–2004. For females, the rates for these age groups were 1.2, 1.6 and 0.7 per 10,000 population respectively.

Over the eight-year period, rates of emergency admission due to oesophageal varices for males were about double those for females.

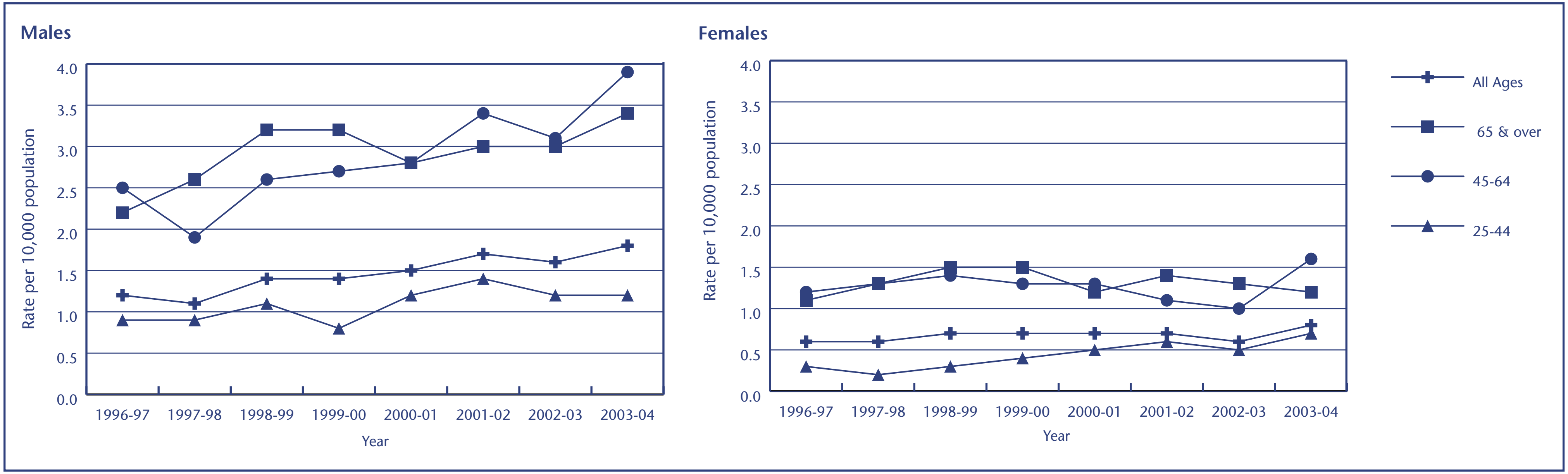
Table 3-10 Trends in emergency admission rates for people with a primary or secondary diagnosis of oesophageal varices by sex and age group[a] for the period 1 April 1996 to 31 March 2004

	Emergency admissions (rate per 10,000 population) Year (Apr-Mar)							
	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
Males								
25-44	0.9	0.9	1.1	0.8	1.2	1.4	1.2	1.2
45-64	2.5	1.9	2.6	2.7	2.8	3.4	3.1	3.9
65 & over	2.2	2.6	3.2	3.2	2.8	3.0	3.0	3.4
All Ages	1.2	1.1	1.4	1.4	1.5	1.7	1.6	1.8
Females								
25-44	0.3	0.2	0.3	0.4	0.5	0.6	0.5	0.7
45-64	1.2	1.3	1.4	1.3	1.3	1.1	1.0	1.6
65 & over	1.1	1.3	1.5	1.5	1.2	1.4	1.3	1.2
All Ages	0.6	0.6	0.7	0.7	0.7	0.7	0.6	0.8

a Data for patients under 25 are not presented due to small numbers, however they are included in the 'all ages' total.

Source: ISD Scotland (SMR01) and GRO(S) (mid-year population estimates).

Figure 3-13 Trends in emergency admission rates for people with a primary or secondary diagnosis of oesophageal varices by age group[a] for the period 1 April 1996 to 31 March 2004



a Data for patients under 25 are not presented due to small numbers, however they are included in the 'All Ages' total.

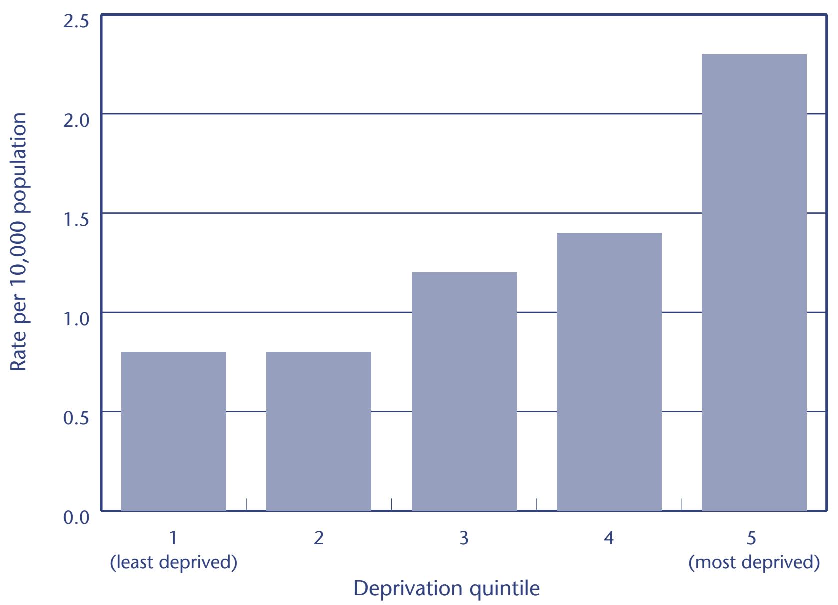
Source: ISD Scotland (SMR01) and GRO(S) (mid-year population estimates).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Emergency admissions for oesophageal varices by deprivation

In 2003–2004, the rate of emergency admissions for oesophageal varices in quintile 5 was almost treble that for quintile 1 (2.3 per 10,000 population compared with 0.8 per 10,000 population respectively) (see Figure 3-14).

Figure 3-14 Emergency admission rates for people with a primary or secondary diagnosis of oesophageal varices by deprivation quintile for the period 1 April 2003 to 31 March 2004



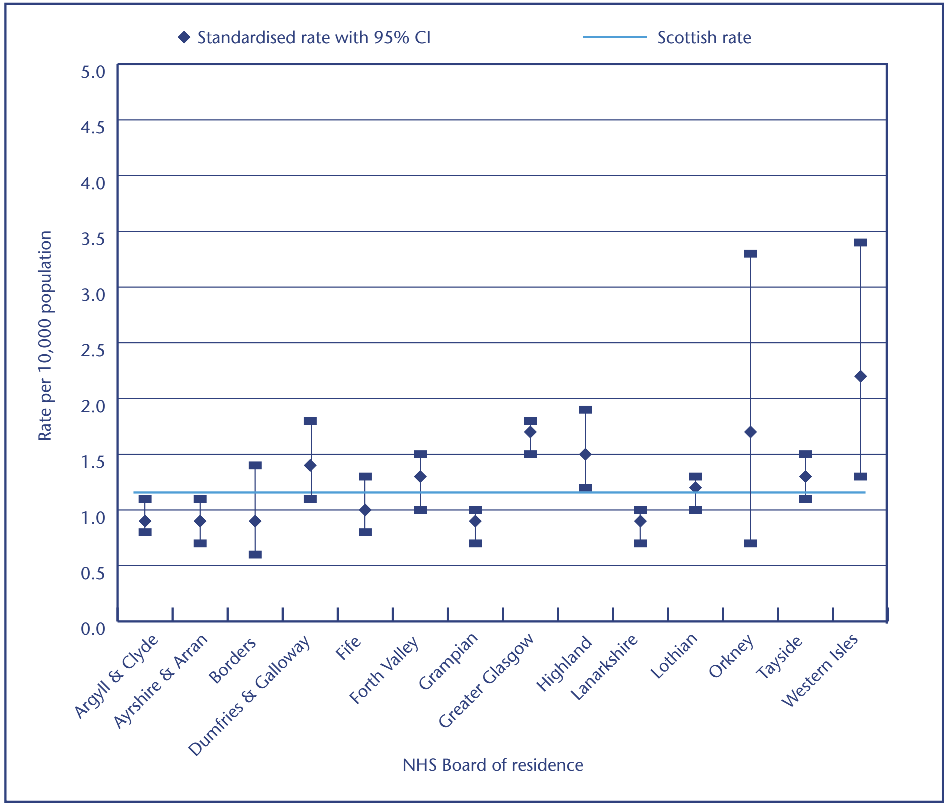
Source: ISD Scotland (SMR01) and GRO(S) (2001 census population).

Comparison of rates of emergency admission for oesophageal varices across NHS Boards

Standardised rates of emergency admissions for oesophageal varices varied across NHS Boards (see Figure 3-15, Table 3-11). The emergency admission rates for Western Isles (2.2 per 10,000 population) and Greater Glasgow (1.7 per 10,000 population) were significantly higher than the Scottish rate (1.2 per 10,000 population). Argyll & Clyde, Ayrshire & Arran, Grampian and Lanarkshire (all 0.9 per 10,000 population) had emergency admission rates that were significantly lower than the Scottish rate.

Variations among NHS Boards in emergency admission rates for oesophageal varices can be due to a range of factors including differences in underlying prevalence as well as admission policies.

Figure 3-15 Emergency admission rates for people with a primary or secondary diagnosis of oesophageal varices by NHS Board of residence[a], standardised by age, sex and deprivation, shown as a total for the three-year period ending 31 March 2004



a Data for Shetland are not presented due to small numbers.

Source: ISD Scotland (SMR01) and GRO(S) (2001 census population).

Table 3-11 Emergency admission rates for people with a primary or secondary diagnosis of oesophageal varices by NHS Board of residence[a], standardised by age, sex and deprivation, shown as a total for the three-year period ending 31 March 2004

NHS Board of residence	Annual Population[b]	Total admissions in 3 years	Rate per 10,000 population		95% Confidence Intervals	
			Crude	Standardised	Lower	Upper
Scotland	**5,062,011**	**1,811**	**1.2**			
Argyll & Clyde	420,132	133	1.1	0.9	0.8	1.1
Ayrshire & Arran	368,149	107	1.0	0.9	0.7	1.1
Borders	106,764	25	0.8	0.9	0.6	1.4
Dumfries & Galloway	147,765	64	1.4	1.4	1.1	1.8
Fife	347,685	101	1.0	1.0	0.8	1.3
Forth Valley	280,130	102	1.2	1.3	1.0	1.5
Grampian	526,473	104	0.7	0.9	0.7	1.0
Greater Glasgow	868,087	524	2.0	1.7	1.5	1.8
Highland	208,914	88	1.4	1.5	1.2	1.9
Lanarkshire	551,591	162	1.0	0.9	0.7	1.0
Lothian	778,367	227	1.0	1.2	1.0	1.3
Orkney Islands	19,245	8	1.4	1.7	0.7	3.3
Tayside	390,219	145	1.2	1.3	1.1	1.5
Western Isles	26,502	19	2.4	2.2	1.3	3.4

a Data for Shetland are not presented due to small numbers.
b GRO(S) 2001 census population.

Source: ISD Scotland (SMR01) and GRO(S) (2001 census population).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

References

1 Scottish Executive. Cost to society of alcohol misuse in Scotland: An update to alcohol misuse in Scotland, trends and costs. Edinburgh: Scottish Executive, 2004.

2 Scottish Executive. Towards a healthier Scotland. Edinburgh: Scottish Executive, 1999.

3 Scottish Executive. Plan for action on alcohol problems. Edinburgh: Scottish Executive, 2002.

4 Scottish Intercollegiate Guidelines Network. The management of harmful drinking and alcohol dependence in primary care. A national clinical guideline. Edinburgh: SIGN, 2003.

5 Slattery J, Chick J, Cochrane M, Craig J, Godfrey C, Kohli H, Macpherson K, Parrott S, Quinn S, Single A, Tochel C, Watson H. 2003. Prevention of relapse in alcohol dependence. Health technology assessment report 3. Glasgow: Health Technology Board for Scotland, 2003.

6 www.prodigy.nhs.uk/guidance.asp?gt=Alcohol%20-%20problem%20drinking

7 Information Services, NHS National Services Scotland. Alcohol statistics 2005. NHS National Services Scotland, 2005.

8 Information Services, NHS National Services Scotland, Personal communication, July 2005.

9 www.scotland.gov.uk/library5/society/sndata-01.asp

10 www.scotland.gov.uk/library5/society/siomed-00.asp

11 www.show.scot.nhs.uk/indicators/Outcomes/OutcomesReport2002.pdf

12 www.isdscotland.org/isd/files/SMR01%20National%20Report.pdf

Background

- Steadily rising emergency admissions contribute to the current NHS pressures. Recurrent emergency admissions within a single year are one of the factors contributing to the increased numbers of admissions. Older people account for the largest proportion of inpatient admissions. There have been growing numbers of older people who experience multiple emergency admissions. These people may particularly suffer from multiple or chronic conditions.
- Recurrent emergency admissions among older people highlight the need to provide co-ordinated and integrated patient-centred care. Community health partnerships are currently being introduced to provide better, integrated care systems.
- The Scottish Executive and Convention of Scottish Local Authorities set a target in the financial year 2004–2005 to reduce multiple (two or more) emergency admissions in people aged 65 years and over by 20% by the end of the financial year 2008–2009.
- Multiple emergency admissions are defined here as people who are admitted to hospital as an emergency inpatient two or more times in a single financial year. This section presents data on the proportion of people aged 65 years or over who experienced multiple emergency admissions to hospital for the financial years 1994–1995 to 2003–2004. Trends in average length of stay are also examined.

Key findings

- Nationally, there was a steadily increasing trend in the proportion of people aged 65 years and over who experienced multiple emergency admissions, from 354 per 10,000 population in 1994–1995 to 447 per 10,000 population in 2003–2004. There was considerable variation among NHS Boards of residence in rates of multiple emergency admission.
- Multiple emergency admissions increased as people became older and were greater for males than females. For example, in 2003–2004, the rate was 352 per 10,000 population for males and 262 per 10,000 population for females in the 65–74 year age group compared with 1,058 per 10,000 population for males and 828 per 10,000 population for females in the 85+ year age group.
- The rate of multiple emergency admission for people aged 65 years and over rose with increasing deprivation. In 2003–2004, it increased from 346 per 10,000 population for the least deprived areas (quintile 1) to 567 per 10,000 population for the most deprived areas (quintile 5).
- Nationally, the average length of stay decreased for both males and females aged 65 years and over who experienced multiple emergency admissions, from 14.7 days in 1994–1995 to 13.7 days in 2003–2004. There was considerable variation across NHS Boards of residence in standardised average length of stay.
- Patients who experienced multiple emergency admissions tended to have a shorter average length of stay than those who experienced a single emergency admission (13.7 days compared with 15.7 days in 2003–2004 respectively).
- The average length of stay for people aged 65 years and over who experienced multiple emergency admissions rose with increasing age and was greater for females than males.
- Deprivation had no clear effect on average length of stay for people aged 65 years and over who experienced multiple emergency admissions.

Introduction

Steadily rising emergency admissions are contributing to increasing pressures for the National Health Service (NHS). Older people account for the largest proportion of inpatient admissions.[1] In 2004, approximately 40% of all Scottish emergency admissions were for patients aged 65 years and over.[2] Rising emergency admissions have occurred due to several separate trends: a sustained increase in emergency admission rates in people aged 80 years and over, stabilised length of stay among older age groups compared with a decreasing trend noted in all other age groups, and demographic changes. Furthermore, there have been growing numbers of older people who experienced multiple emergency admissions (in this case, people who were admitted to hospital as an emergency four or more times in a five-year period).[1,3] These trends include a large number of diagnoses.[1] More recently, attention has focused on multiple emergency admissions within a shorter time period and for this section, multiple emergency admissions are defined as people who are admitted to hospital as an emergency two or more times in a single financial year. This measure of admissions differs from the traditional and widely-used 28-day re-admission rate used previously in this series of Clinical Outcome Indicators reports.

Increased ill health among older people and justifiable expectations for health and healthcare interventions are unlikely to have been responsible for this rise. International evidence indicates that the health of older people has improved and continues to do so. Instead, social issues and the organisation of the healthcare system may be underlying contributory factors. These include a decline in informal care provided by families and a shortage of NHS long-stay beds and residential care places. This has resulted in an increase in the number of frail older people who live alone in the community. With the greater need for formal care of older people, there has been an increased demand for care from primary and social care sectors. These have been unable to deal with this extra pressure and the care of patients is consequently channelled towards the acute care sector, in the form of emergency admissions. These patients may particularly suffer from multiple or chronic conditions. In many ways, multiple emergency admissions among older people highlight the need to provide co-ordinated and integrated patient-centred care, involving many secondary care specialties, primary care and social care services. Fragmentation of the health and social care systems in the past has made the provision of this type of care difficult.[1]

The 1998 Acute Services Review Report highlighted the need for NHSScotland to explore alternatives to hospital admission and management of medical emergencies.[4] More recent policy documents, such as Partnership for Care and the National Framework for Service Change in the NHS, emphasised the importance of partnership working and integration of healthcare systems, and the statutory guidance described the creation of community health partnerships (CHPs).[5,6,7] CHPs are currently being phased in to improve the planning and delivery of services across primary and specialist services and social care in order to provide better integrated care systems.[7] Improving outcomes for patients and their carers is also an important task for CHPs. The Scottish Executive and Convention of Scottish Local Authorities have set several national and local user outcomes and local improvement targets in the Joint Future Agenda.[8] One of these targets is to reduce the proportion of people aged 65 years and over who are admitted to hospital as an emergency inpatient two or more times in a single year by 20% by the end of the financial year 2008–2009 compared with 2004–2005.[9] The Framework recommends that through CHPs, NHS Boards provide a systematic approach to managing patients with long-term conditions.

This section presents data on the proportion of people aged 65 years and over who experienced two or more emergency admissions to hospital within a single financial year for the years 1994 to 2004. Trends in average length of stay are also examined.

Data and methods

Definition of indicator

Proportion of people aged 65 years and over who experienced two or more (multiple) emergency admissions within a single financial year.

Average length of stay for people aged 65 years and over who experienced two or more (multiple) emergency admissions within a single financial year.

Data source

Emergency admissions were identified from Scottish Morbidity Records (SMR01). SMR01 records are linked at Information Services Division (ISD), NHS National Services Scotland so that patient histories can be formed, even when patients are admitted to different specialties and hospitals.

Two sources were used for population data:

- General Register Office for Scotland [GRO(S)]

  GRO(S) mid-year population estimates were used to give Scotland and NHS Board of residence population estimates from June 1994 to June 2003. These were used to produce 10-year annual trends.
- 2001 census data

  2001 census populations at data-zone level were used when considering the deprivation profile and the standardised rates. Data zones are groups of census output areas with populations of between 500 and 1,000 residents, which contain households with similar social characteristics.[10]

Deprivation quintiles were based on the Scottish Index of Multiple Deprivation (SIMD), which was calculated in 2004.[11] Quintiles were assigned to population and admission records using postcodes to link the information.

Analyses of data

For Scotland, crude annual rates of multiple emergency admission were produced by dividing the total number of patients who experienced multiple (two or more) emergency admissions in each year by the GRO(S) mid-year population estimate in that particular year.

The average length of stay for patients experiencing multiple emergency admissions was also produced for Scotland. These were calculated by dividing the total number of days that patients who experienced multiple emergency admissions were in hospital in each year by the number of hospital stays they had in that particular year. 'Whole stay' lengths of stay were considered in this analysis rather than 'episode-based' lengths of stay; the patient was followed through from admission into the system to discharge from the system, regardless of the number of SMR01 episodes. The only exception was that time spent in geriatric long-stay beds was excluded.

Emergency admissions occurring between 1 April 1994 and 31 March 2004 were included in both of these analyses. Admission rates and average length of stay were produced for the following age groups: 65–74 years, 75–84 years, and 85 years and over. These trends were produced separately for males and females.

Crude rates of multiple emergency admission and average length of stay for people aged 65 years and over were also produced by deprivation quintile. Emergency admissions occurring between 1 April 2003 and 31 March 2004 were included in these analyses.

For each NHS Board, rates of multiple emergency admission and average length of stay were averaged across the three-year period from 1 April 2001 to 31 March 2004 and indirectly standardised for age, sex and deprivation quintile. For standardisation of multiple emergency admission rates, the total number of patients in Scotland who experienced multiple emergency admissions over this three-year period was used as the reference. For standardisation of average length of stay, the total number of hospital stays for people who had experienced multiple emergency admissions was used as a reference. Further details of the indirect standardisation process can be found in Annex 7 of the 2002 Clinical Outcome Indicators report.[12]

An estimate of the statistical significance of the standardised rate can be obtained from the 95% confidence interval. If the confidence interval does not include the Scottish rate, the difference in multiple emergency admission rates recorded for a particular population is said to be 'statistically significant' compared with the standard population. For example, for an NHS Board multiple emergency admission rate of 85 per 1,000 population with a 95% confidence interval of 80–90, the difference from a standard population (ie Scotland) with a rate of 72 per 1,000 population is deemed to be statistically significant, since the range 80–90 does not include the value for the standard population (72).

Limitations of data

It should be noted that data were only available for patients who were admitted to acute hospitals. Therefore, patients who were only treated in an accident and emergency (A&E) department were not included in this indicator. Some hospitals may admit patients directly to a ward while others are more likely to treat patients in A&E only. Hospitals operating a policy of direct admissions to a medical assessment unit may yield higher admissions figures than hospitals admitting all patients via A&E. Differences in admission policies among acute hospitals may therefore partly explain some of the variation across NHS Boards.

It is likely that the emergency admission rates for NHS Boards would also be influenced by factors relating to hospital access, such as rurality.

It should be noted that low levels of emergency admission are not necessarily associated with a better quality of care. An emergency admission may be the most appropriate form of care in some circumstances.

It is also important to note that the number of emergency admissions and the average length of stay are influenced by the number of acute hospital beds available in each NHS Board area. These data are presented in Table 4-1. Bed numbers were identified using ISD(S)1 data. The ISD(S)1 scheme provides routine quarterly aggregate information for monitoring activity in hospitals, and activity carried out in health centres and clinics in NHSScotland. It gives no information about the relationship between availability of beds and potential demand for beds at particular points in time.

Table 4-1 Average available staffed acute[a] beds[b] by NHS Board area for the period from 1 April 2000 to 31 March 2004

NHS Board	Number of beds				Beds per 10,000 population			
	2001	2002	2003	2004	2001	2002	2003	2004
Scotland	**17,711**	**17,676**	**17,571**	**17,363**	**35**	**35**	**35**	**34**
Argyll & Clyde	1,402	1,394	1,337	1,273	33	33	32	31
Ayrshire & Arran	1,175	1,201	1,205	1,209	32	33	33	33
Borders	379	384	372	381	35	36	34	35
Dumfries & Galloway	423	421	425	419	29	29	29	28
Fife	844	848	837	818	24	24	24	23
Forth Valley	725	733	724	702	26	26	26	25
Grampian	1,921	1,892	1,879	1,856	37	36	36	35
Greater Glasgow	4,008	4,011	3,995	3,976	46	46	46	46
Highland	845	853	874	872	40	41	42	41
Lanarkshire	1,665	1,640	1,620	1,606	30	30	29	29
Lothian	2,525	2,569	2,531	2,478	32	33	32	31
Orkney	59	61	63	63	31	32	33	32
Shetland	58	58	58	58	26	26	27	26
Tayside	1,516	1,458	1,499	1,495	39	38	39	39
Western Isles	165	152	153	158	62	58	59	60

a Acute care refers to specialties primarily concerned in the surgical, medical and dental sectors. Specifically excluded are the obstetric, psychiatric and long-stay sectors.
b Includes joint-user and contractual hospitals.

Source: ISD Scotland (Form ISD(S)1).

The definition of a multiple emergency admission used in this section may underestimate the actual number of multiple emergency admissions, particularly when two admissions straddle different financial years. For example, a person who has been admitted twice in a three-month period which spans two financial years is not counted as a multiple emergency admission.

Presentation of data

Crude national annual rates of multiple emergency admission are presented by age group and sex for the 10 financial year periods from 1994–1995 to 2003–2004 in Figure 4-1 and Table 4-2.

Crude rates of multiple emergency admission for people aged 65 years and over are presented by deprivation quintile for the financial year 2003–2004 in Figure 4-2. It should be noted that a small number of records were excluded from this presentation since a deprivation quintile could not be assigned to them.

Standardised rates for people who experienced multiple emergency admissions are presented for each NHS Board of residence in Figure 4-3 and Table 4-3, using three-year aggregated data from 1 April 2001 to 31 March 2004.

Average length of stay for people who experienced multiple emergency admissions are presented by age group and sex for the 10 financial year periods from 1994–1995 to 2003–2004 in Figure 4-4 and Table 4-4. For comparison, these trends in average length of stay are also presented for patients who experienced only one emergency admission in a single-year period in Figure 4-5 and Table 4-5.

Average length of stay for people aged 65 years and over who experienced multiple emergency admissions is presented by deprivation quintile for the financial year 2003–2004 in Figure 4-6. Again, it should be noted that a small number of records were excluded from this presentation since a deprivation quintile could not be assigned to them.

Standardised average length of stay for people aged 65 years and over who experienced multiple emergency admissions is presented for each NHS Board of residence in Figure 4-7 and Table 4-6, using the three-year aggregated data from 1 April 2001 to 31 March 2004.

Results and discussion

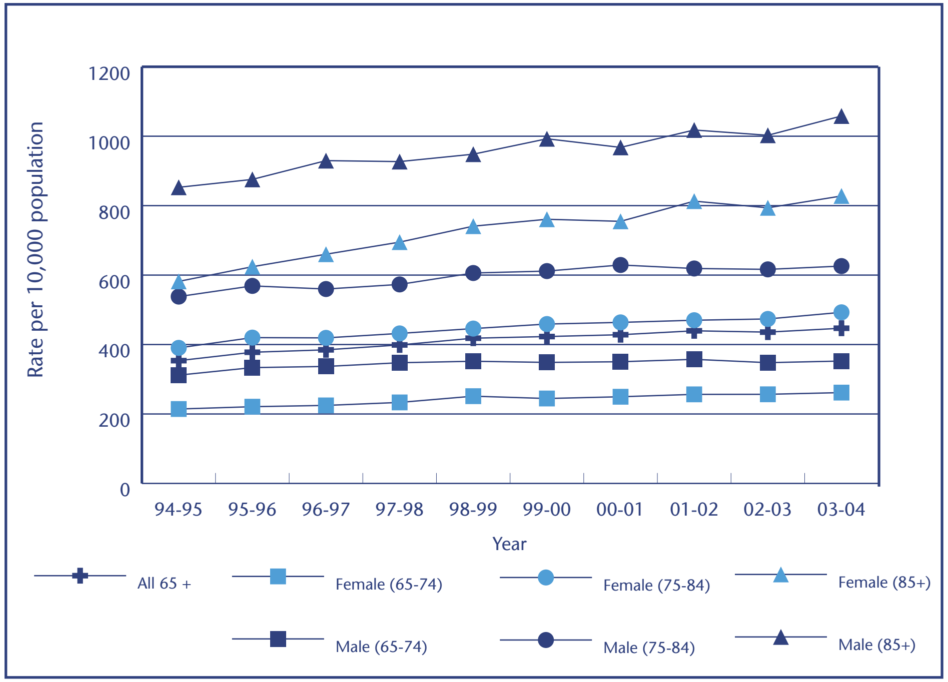
10-year annual trends in rates of multiple emergency admission by age group and sex

Nationally, there was a steadily increasing trend in the proportion of people aged 65 years and over who experienced multiple emergency admissions, from 354 per 10,000 population in 1994–1995 to 447 per 10,000 population in 2003–2004 (see Figure 4-1). This trend was evident for both males and females.

The rate of increase was most marked in the 85+ year age group. Among this age group, the rate increased from 853 per 10,000 population in 1994–1995 to 1,058 per 10,000 population in 2003–2004 for males, and from 582 per 10,000 population to 828 per 10,000 population for females over the same period (see Table 4-2). This trend was seen to a lesser extent in other age groups (see Figure 4-1).

As seen in Figure 4-1, rates of multiple emergency admission increased as people became older. In addition, for all age groups, males had a higher rate of multiple emergency admission than females. For example, in 2003–2004, the rate was 352 per 10,000 population for males and 262 per 10,000 population for females in the 65–74 year age group and 1,058 per 10,000 population for males and 828 per 10,000 population for females in the 85+ year age group.

Figure 4-1 Trends in rates of multiple emergency admission for people aged 65 years and over by age group and sex for the period 1 April 1994 to 31 March 2004



Source: ISD Scotland (SMR01) and GRO(S) (mid-year population estimates).

Table 4-2 Trends in rates of multiple emergency admission (per 10,000 population) for people aged 65 years and over by age group and sex for the period 1 April 1994 to 31 March 2004

Year	65–74 years		75–84 years		85+ years	
	Males	Females	Males	Females	Males	Females
1994–1995	312	214	538	390	853	582
1995–1996	334	221	569	420	876	624
1996–1997	337	225	560	419	930	660
1997–1998	348	233	573	432	927	695
1998–1999	352	251	606	446	948	741
1999–2000	349	245	612	459	993	761
2000–2001	350	250	629	464	968	755
2001–2002	357	257	619	470	1,018	813
2002–2003	348	257	616	474	1,003	794
2003–2004	352	262	626	493	1,058	828

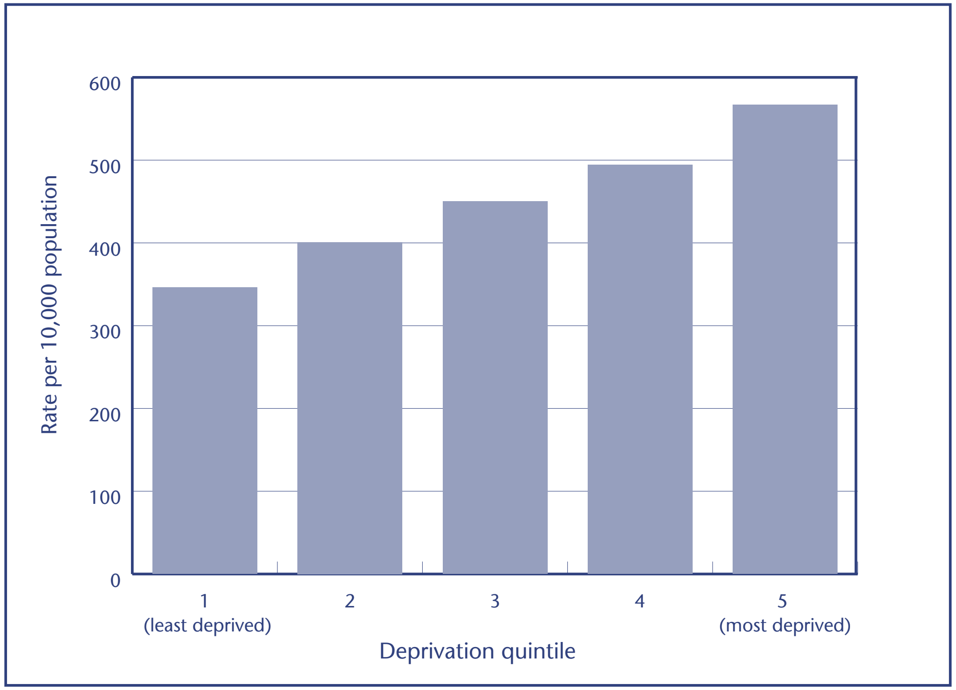
Source: ISD Scotland (SMR01) and GRO(S) (mid-year population estimates).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Rates of multiple emergency admission by deprivation

In 2003–2004, the rate of multiple emergency admission for people aged 65 years and over rose with increasing deprivation, from 346 per 10,000 population for the least deprived areas (quintile 1) to 567 per 10,000 population for the most deprived areas (quintile 5) (see Figure 4-2).

Figure 4-2 Rates of multiple emergency admission for people aged 65 years and over by deprivation quintile for the year ending March 2004



Source: ISD Scotland (SMR01) and GRO(S) 2001 census population.

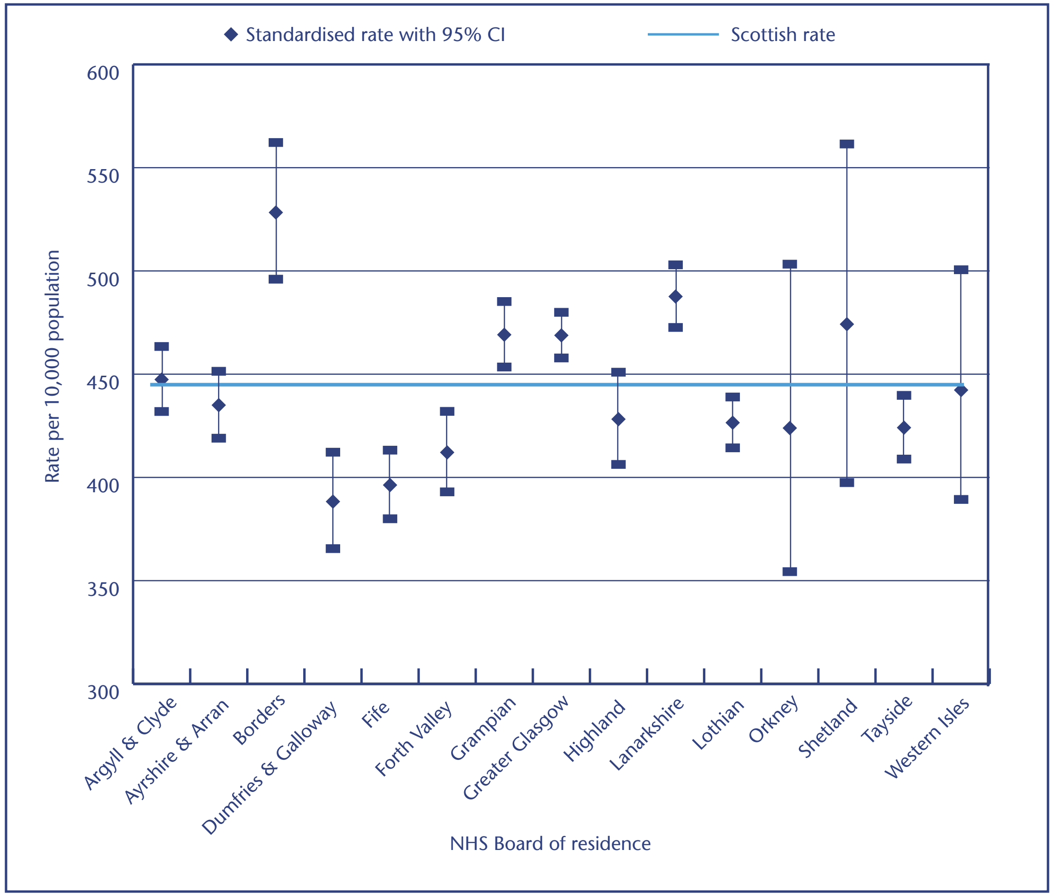
Comparison of multiple emergency admission rates across NHS Boards

As seen in Figure 4-3, there was considerable variation among NHS Boards of residence in terms of their standardised rates of multiple emergency admission in the over 65 year age group (see also Table 4-3).

Several NHS Boards showed significant variation from the Scottish rate (445 per 10,000 population). Five NHS Boards (Dumfries & Galloway, Fife, Forth Valley, Lothian and Tayside) had rates of multiple emergency admission in the over 65 year age group that were significantly lower than the Scottish rate. Four NHS Boards (Borders, Grampian, Greater Glasgow and Lanarkshire) had rates of multiple emergency admission in the over 65 year age group that were significantly higher than the Scottish rate.

It is possible that variations in the rates of multiple emergency admission in the over 65 year age group among different NHS Board areas may be due to variations in admission policies, or to variations in the provision of care for elderly patients in the primary care setting.

Figure 4-3 Rates of multiple emergency admission for people aged 65 years and over by NHS Board of residence, standardised by age, sex and deprivation for the period 1 April 2001 to 31 March 2004



Source: ISD Scotland (SMR01) and GRO(S) 2001 census population.

Table 4-3 Rates of multiple emergency admission for people aged 65 years and over by NHS Board of residence, standardised by age, sex and deprivation for the period 1 April 2001 to 31 March 2004

NHS Board of residence	Annual Population[a]	People with two or more admissions[b]	Rate per 10,000 population		95% cofidence intervals	
			Crude rate	Standardised	Lower	Upper
Scotland	**804,900**	**35,836**	**445**			
Argyll & Clyde	67,648	3,133	463	447	432	463
Ayrshire & Arran	62,620	2,797	447	435	419	451
Borders	20,149	996	494	528	496	562
Dumfries & Galloway	28,331	1,079	381	388	366	412
Fife	56,466	2,209	391	396	380	413
Forth Valley	42,811	1,740	406	412	393	432
Grampian	78,955	3,394	430	469	453	485
Greater Glasgow	137,085	6,956	507	469	458	480
Highland	34,675	1,432	413	428	406	451
Lanarkshire	79,015	4,006	507	488	473	503
Lothian	115,012	4,645	404	426	414	439
Orkney	3,220	131	406	424	354	503
Shetland	3,085	135	437	474	397	561
Tayside	70,583	2,933	415	424	409	440
Western Isles	5,245	251	479	442	389	501

a GRO(S) 2001 census population
b Total number of patients per year averaged over the 3 year period.

Source: ISD Scotland (SMR01) and GRO(S) 2001 census population.

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

10-year annual trends in average length of stay as a result of multiple emergency admissions by age group and sex

Nationally, there was a steadily decreasing trend in the average length of stay for both males and females aged 65 years and over who experienced multiple emergency admissions, from 14.7 days in 1994–1995 to 13.7 days in 2003–2004 (see Figure 4-4, Table 4-4).

For both males and females, average length of stay for people who experienced multiple emergency admissions rose with increasing age. For all age groups across the 10-year period, average length of stay was consistently greater for females than males. For those aged 85 years and over, the average length of stay was 16.2 days for males and 19.5 days for females in 2003–2004. This compared with 10.0 and 11.0 days for 65–74 year old males and females respectively.

People aged 65 years and over who experienced multiple emergency admissions tended to have a shorter average length of stay than people who experienced a single emergency admission (13.7 days compared with 15.7 days in 2003–2004 respectively) (see Figure 4-4 and Figure 4-5). This trend was most notable in the 85+ year age group; for example, average length of stay was 16.2 and 19.5 days for males and females who experienced multiple emergency admissions respectively compared with 21.2 and 24.0 days for males and females who experienced a single emergency admission in the year 2003–2004 (see Table 4-4 and Table 4-5).

Multiple emergency admissions

Table 4-4 Trends in average length of stay (days) for people aged 65 years and over who experienced multiple emergency admissions by age group and sex for the period 1 April 1994 to 31 March 2004

Year	65–74 years		75–84 years		85+ years	
	Males	Females	Males	Females	Males	Females
1994–1995	11.4	12.9	14.1	16.6	16.9	21.0
1995–1996	11.0	12.1	13.4	16.3	17.0	20.2
1996–1997	10.8	12.3	13.6	16.2	16.9	20.7
1997–1998	10.2	11.9	13.5	16.1	16.8	20.4
1998–1999	10.2	11.4	13.2	15.7	16.8	19.9
1999–2000	10.2	11.4	13.2	15.7	16.5	19.4
2000–2001	10.0	11.5	12.9	15.6	16.7	20.1
2001–2002	10.2	11.5	13.6	15.9	16.9	19.9
2002–2003	10.2	11.3	13.2	15.8	16.6	19.9
2003–2004	10.0	11.0	12.8	15.7	16.2	19.5

Source: ISD Scotland (SMR01).

Single emergency admissions

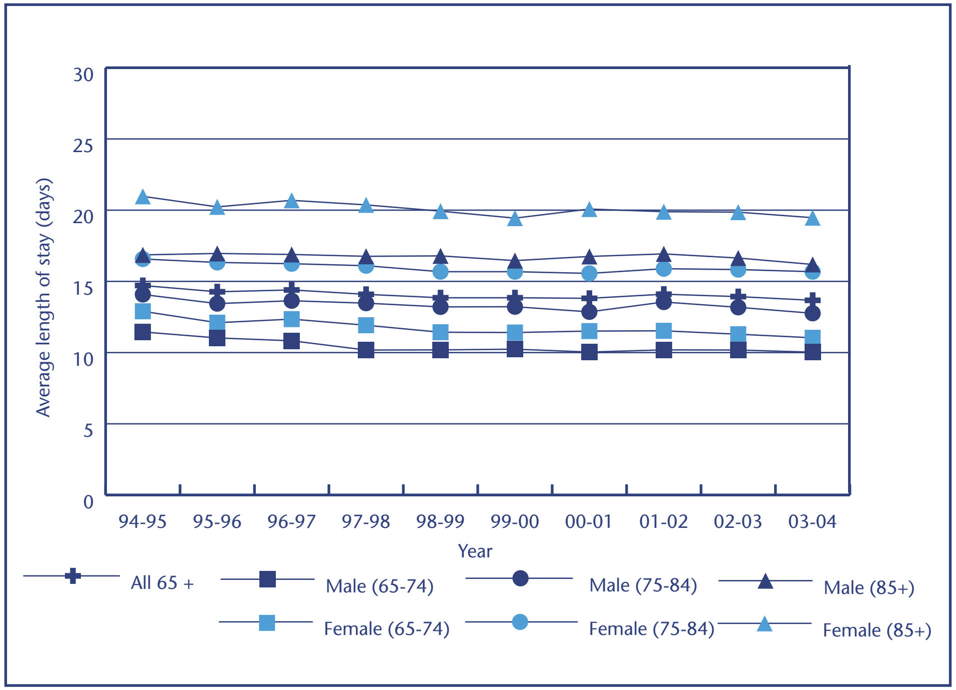
Table 4-5 Trends in average length of stay (days) for people aged 65 years and over who experienced a single emergency admission by age group and sex for the period 1 April 1994 to 31 March 2004

Year	65–74 years		75–84 years		85+ years	
	Males	Females	Males	Females	Males	Females
1994–1995	12.1	13.4	16.6	19.3	21.3	24.8
1995–1996	11.6	12.2	15.8	18.2	22.0	24.4
1996–1997	11.3	12.4	15.9	18.9	21.3	24.9
1997–1998	11.3	12.1	15.7	18.6	20.3	25.0
1998–1999	11.3	11.6	15.5	18.9	20.9	24.8
1999–2000	10.9	11.5	15.2	17.9	21.2	25.3
2000–2001	10.8	11.2	15.9	18.4	21.6	25.6
2001–2002	10.8	11.6	16.1	18.4	21.7	25.7
2002–2003	11.0	11.1	15.7	18.2	20.8	24.8
2003–2004	10.3	10.7	15.2	18.0	21.2	24.0

Source: ISD Scotland (SMR01).

Multiple emergency admissions

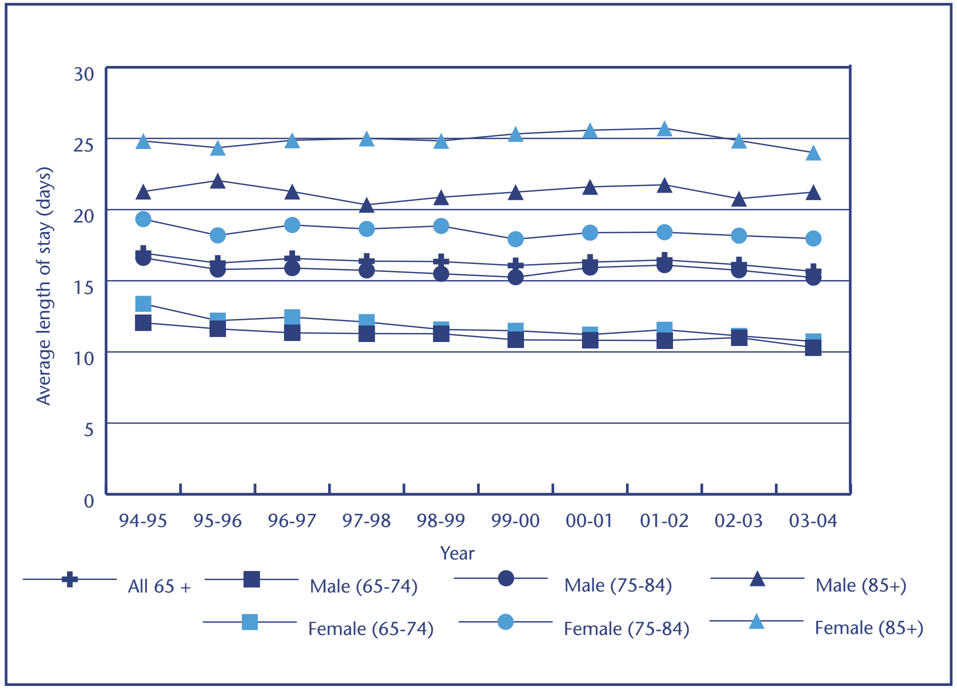
Figure 4-4 Trends in average length of stay (days) for people aged 65 years and over who experienced multiple emergency admissions by age group and sex for the period 1 April 1994 to 31 March 2004



Source: ISD Scotland (SMR01).

Single emergency admissions

Figure 4-5 Trends in average length of stay (days) for people aged 65 years and over who experienced a single emergency admission by age group and sex for the period 1 April 1994 to 31 March 2004



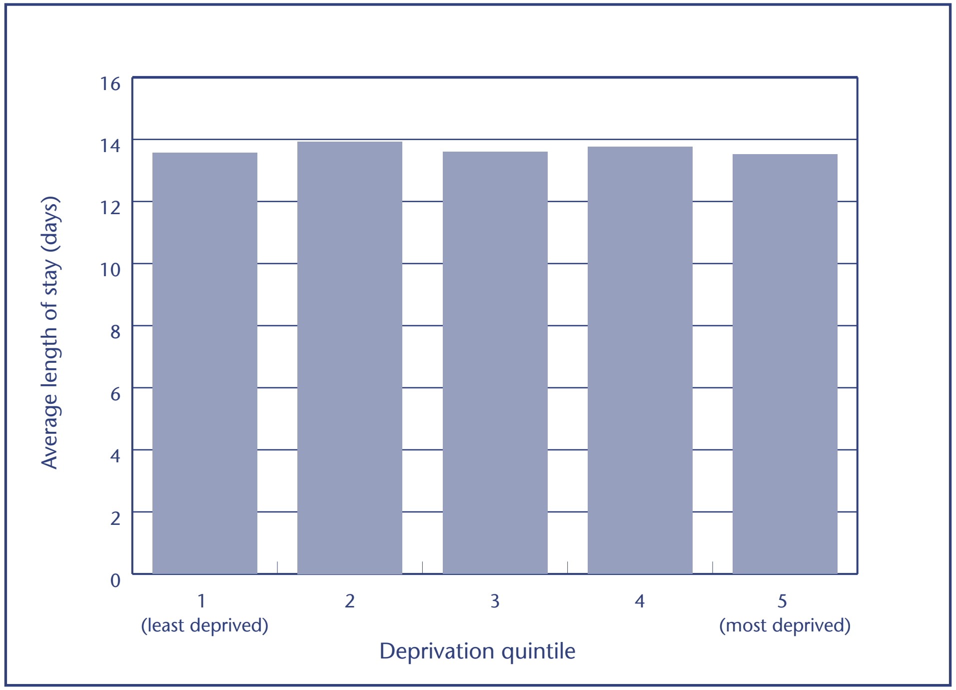
Source: ISD Scotland (SMR01).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

Average length of stay by deprivation

There was no clear relationship between average length of stay for people aged 65 years and over who experienced multiple emergency admissions and deprivation for the year ending March 2004 (see Figure 4-6).

Figure 4-6 Average length of stay (days) for people aged 65 years and over who experienced multiple emergency admissions by deprivation quintile for the year ending March 2004

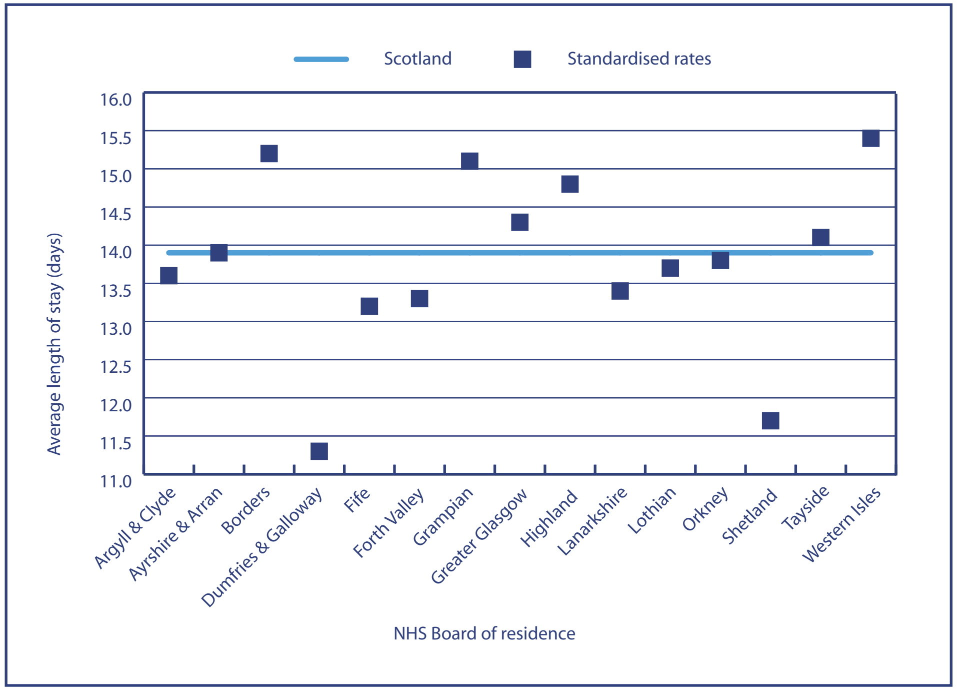


Source: ISD Scotland (SMR01).

Comparison of average length of stay across NHS Boards

There was considerable variation among NHS Boards of residence in terms of standardised average length of stay for people aged 65 years and over who experienced multiple emergency admissions (see Figure 4-7 and Table 4-6). Due to the large numbers of patient bed days, the confidence intervals for each NHS Board are extremely narrow and cannot be displayed on the chart.

Figure 4-7 Average length of stay (days) for people aged 65 years and over who experienced multiple emergency admissions by NHS Board of residence, standardised by age, sex and deprivation for the period 1 April 2001 to 31 March 2004



Source: ISD Scotland (SMR01).

Confidence intervals are too narrow to show in a chart - please refer to Table 4-6 for details.

Table 4-6 Average length of stay for people aged 65 years and over who experienced multiple emergency admissions by NHS Board of residence, standardised by age, sex and deprivation for the period 1 April 2001 to 31 March 2004

NHS Board of residence	Stays in hospital[a]	Total number of bed days[b]	Average length of stay (days)		95% confidence intervals	
			Crude	Standardised	Lower	Upper
Scotland	**277,852**	**3,862,442**	**13.9**			
Argyll & Clyde	24,207	327,362	13.5	13.6	13.5	13.6
Ayrshire & Arran	21,905	304,660	13.9	13.9	13.9	14.0
Borders	7,763	119,936	15.4	15.2	15.1	15.2
Dumfries & Galloway	8,313	95,032	11.4	11.3	11.2	11.3
Fife	16,767	220,685	13.2	13.2	13.2	13.3
Forth Valley	13,302	174,442	13.1	13.3	13.2	13.4
Grampian	26,350	398,755	15.1	15.1	15.0	15.1
Greater Glasgow	54,355	774,711	14.3	14.3	14.2	14.3
Highland	10,964	162,678	14.8	14.8	14.7	14.8
Lanarkshire	31,428	414,962	13.2	13.4	13.4	13.4
Lothian	35,637	488,206	13.7	13.7	13.6	13.7
Orkney	962	13,550	14.1	13.8	13.6	14.1
Shetland	1,076	12,747	11.8	11.7	11.5	11.9
Tayside	22,826	323,815	14.2	14.1	14.0	14.1
Western Isles	1,997	30,901	15.5	15.4	15.2	15.6

a Total number of hospital stays in the 3-year period.
b Total number of bed days in the 3-year period.

Source: ISD Scotland (SMR01).

References

1 Kendrick S, Conway M. Increasing emergency admissions among older people in Scotland: A whole system account. Whole system project, Working paper 1. Edinburgh: Information and Statistics Division, 2003.

2 Information Services Division, NHS National Services Scotland, personal communication, August 2005.

3 Clinical Resource and Audit Group. Clinical outcome indicators. Edinburgh: Scottish Executive Health Department, 2000.

4 Scottish Office. Acute services review report. Edinburgh: The Stationery Office, 1998.

5 Scottish Executive. Partnership for care. Edinburgh: Scottish Executive, 2003.

6 Scottish Executive. National framework for service change in the NHS in Scotland. Edinburgh: Scottish Executive, 2005.

7 Scottish Executive. Community health partnerships. Statutory guidance. Edinburgh: Scottish Executive, 2004.

8 www.scotland.gov.uk/Resource/Doc/1095/0001837.pdf

9 www.scotland.gov.uk/library5/finance/srtn04-05.asp

10 www.scotland.gov.uk/library5/society/sndata-01.asp

11 www.scotland.gov.uk/library5/society/siomd-00.asp

12 www.show.scot.nhs.uk/indicators/Outcomes/OutcomesReport2002.pdf

Background

- Colorectal cancer, also known as bowel cancer, is the uncontrolled and disordered growth of cells within the large bowel. It is the third most commonly diagnosed cancer in Scotland in both men and women.
- The risk of colorectal cancer is substantially greater for men than women and increases considerably with age. The main recognised risk factors for colorectal cancer are genetic factors, dietary factors, obesity, lack of physical activity and long-term smoking.
- The most common symptoms of colorectal cancer are a change of bowel habit and rectal bleeding. Early diagnosis is important in determining options for treatment. There are published guidelines on the management of colorectal cancer and standards to improve the quality of care for people with colorectal cancer.
- There is evidence that screening for colorectal cancer can reduce mortality by around 20%. A decision has been taken by the Scottish Executive Health Department to implement a national screening programme.
- This section presents data on incidence, mortality and survival for colorectal cancer.

Key findings

- The incidence rate for patients diagnosed with colorectal cancer between 1998 and 2000 in Scotland was 53.9 per 100,000 population. The mortality rate from colorectal cancer between 2001 and 2003 was 23.0 per 100,000 population.
- Relative survival at 3 years after diagnosis was 57.8%, with only NHS Greater Glasgow (53.5%) and NHS Tayside (52.8%) having a survival rate that was statistically significantly lower than this figure. The highest survival was in NHS Grampian (61.7%).
- After adjusting for other factors such as disease stage at time of diagnosis, there were no significant differences between each NHS Board and Scotland, apart from NHS Lothian where patients had a significantly higher chance of survival compared with Scotland as a whole.

Introduction

Colorectal cancer, also known as bowel cancer, is the uncontrolled and disordered growth of cells within the large bowel. It is the third most commonly diagnosed cancer in Scotland in both men and women with approximately 3,500 people diagnosed in 2001. Approximately 1,600 people in Scotland die of the disease each year.[1]

The risk of colorectal cancer increases substantially with age and 95% of new cases in Scotland each year are in people aged over 50 years.[1] The main recognised risk factors for colorectal cancer are genetic factors, dietary factors (vegetables and fibre are probably protective, red meat may increase risk), obesity, lack of physical activity and long-term smoking.[2]

The most common symptoms of colorectal cancer are a change of bowel habit and rectal bleeding. Tumour stage is an important prognostic factor (Dukes' or TNM classification[2]) and if diagnosed at an early stage, the probability of curing colorectal cancer is increased for the patient. However, delays can occur in two ways. Firstly, patients delay in presenting to primary care. Secondly, delays in diagnosis occur as the symptoms can be the same as those for other common, less serious conditions, making colorectal cancer sometimes difficult to recognise.

Early diagnosis is also important in determining options for treatment. The Scottish Intercollegiate Guidelines Network and the National Institute for Health and Clinical Excellence have published guidance on the management of colorectal cancer.[2,3] Standards for colorectal cancer were published by the Clinical Standards Board for Scotland in 2001 to improve the quality of care for people with colorectal cancer.[4] Recently, the National Institute for Health and Clinical Excellence published referral guidelines for suspected cancer, which includes guidance on referral of patients with symptoms suggestive of colorectal cancer.[5] Work is currently underway to update the Scottish Executive Health Department (SEHD) Scottish Referral Guidelines for Cancer, published in 2002.

The incidence rate of colorectal cancer among men in Scotland has increased steadily since the late 1980s while mortality rates have decreased from a peak in the early 1990s. Among women, the incidence rate has changed little since the mid-1970s while mortality rates have declined gradually over the same period.[1] From an international perspective, the incidence of and mortality from colorectal cancer are moderately high compared with many countries with available data.[6,7]

Survival from colorectal cancer in Scotland has increased substantially over the last 30 years. For both men and women, the relative survival at one year has increased from around 42% in 1977–1981 to 72% in 1997–2001. Over the same time period, the five-year relative survival for both sexes has increased from 24% to 50%.[1]

Historically, in common with the rest of the UK, survival from colorectal cancer appears to have been less favourable in Scotland compared with many European countries.[8] Although there are many possible factors that could explain these survival differences, there is at least some evidence that patients in the UK may have more advanced disease at the time of diagnosis.[9]

Tackling cancer is one of NHSScotland’s priorities. In 2004, the SEHD published a formal overarching framework ‘Bowel Cancer Framework for Scotland’ to provide a national focus and to help ensure collaboration in service provision.[10] In 2005, Audit Scotland reviewed the management of bowel cancer services and made recommendations for the SEHD, the Bowel Cancer Framework Group and NHS Boards.[11]

Research has demonstrated that screening for colorectal cancer can reduce mortality by around 20%.[2] Findings from a Scottish colorectal cancer screening pilot which began in 2000 in Tayside, Grampian and Fife suggest that population-based faecal occult blood test screening is feasible and likely to be effective.[12] A second round of screening using the faecal occult blood test has commenced and a decision has been taken by the SEHD to implement a national screening programme. Other initiatives include the Bowel Cancer Awareness Project (BCAP), a community-based project operating in Lanarkshire and Forth Valley NHS Board areas. BCAP aims to raise awareness of the signs and symptoms of bowel cancer with men and women aged 50 years and over, and to encourage them to seek help earlier.[13] Most people with symptoms that could be attributable to colorectal cancer do not have the disease. Nonetheless, because colorectal cancer is common, there is a need to investigate large numbers of people to exclude cancer, placing even more of a burden on NHS resources.

This section presents data on the incidence, mortality and survival from colorectal cancer, providing an update on the data presented in the Clinical Outcome Indicators Report in 2000.[14]

Data and methods

Definition of indicator

Relative three-year survival for patients diagnosed with colorectal cancer in 1998–2000.

Adjusted relative three-year survival (expressed as hazard ratios) for patients diagnosed in 1998–2000.

Data have also been presented on incidence and mortality for colorectal cancer to provide context.

Data source

The indicators in this section were derived from Scottish Cancer Registry records held at ISD Scotland. Estimates of co-morbidity were based on SMR01 records, also held at ISD Scotland.

General Register Office for Scotland [GRO(S)] gave permission to use 1991 and 2001 census population and mortality data.

The Scottish Index of Multiple Deprivation (SIMD) was used to estimate deprivation.[15]

Analyses of data

Incidence and mortality rates were calculated using numbers of diagnoses and deaths of patients resident in each NHS Board area and the GRO(S) mid-year population estimates. These were then directly standardised to the European standard population.[16]

Relative survival at 3 years was studied for patients diagnosed between 1998 and 2000. Relative survival takes account of deaths from all causes and is the ratio of the observed survival to that expected for a group of people in the general population similar to the patient group with respect to age, sex and calendar period of observation.[17] Relative survival is useful for comparing survival from cancer across NHS Boards, adjusting for underlying mortality in each Board. However it does not take account of factors such as tumour stage, grade of tumour, tumour morphology or deprivation.

In addition, regression modeling was used to study adjusted relative survival, based on the hazard of dying from colorectal cancer within 3 years of diagnosis.[18] The hazard ratios and confidence intervals were derived from a statistical model with adjustments for age at diagnosis, sex, deprivation category, tumour sub-site, tumour morphology, Dukes' stage, grade of differentiation (the degree of abnormality of cancer cells), screening status and co-morbidity.

Deprivation was estimated using SIMD quintiles.

Tumour subsite groupings were as follows:

- proximal colon C18.0-C18.4
- distal colon C18.5-C18.7
- rectosigmoid and rectum C19-C20
- unknown C18.8-C18.9.

Tumour morphology groupings were as follows:

- polyp-related 8210/3, 8221/3, 8261/3, 8263/3
- poor prognosis morphologies 8020/3, 8480/3, 8481/3, 8490/3
- other morphologies.

Co-morbidity was estimated using information on the cumulative time (bed days) the patient had spent as a hospital inpatient in the 5 years prior to the cancer diagnosis. To avoid the potential confounding effect of hospitalisation caused by the colorectal cancer prior to definitive diagnosis, bed days in the 6 months immediately prior to diagnosis were disregarded. Bed days in the previous 5 years were split into ordinal categories: no bed days; 1–4 bed days; 5–10 bed days; or more than 11 bed days.

Patients were included in the survival analysis provided they met the inclusion criteria:

- colorectal cancer registrations with date of diagnosis during 1998-2000
- aged 15 to 99 years at diagnosis
- first primary malignant tumours
- individuals resident in Scotland with known NHS Board area of residence and known SIMD quintiles
- cases not registered by death certificate only
- follow up complete to 31 December 2003.

Follow up for death was complete to 31 December 2003. Any cases still alive at this date or with a date of death after 31 December 2003 were censored (information relating to them beyond 31 December 2003 was not included).

Since the hazard ratios are estimates and their accuracy is related to the number of patients included in each analysis, confidence intervals are presented. Where the Scottish hazard ratio lies outside the confidence interval for a particular NHS Board, there is a strong possibility that the deviation is due to factors other than random variation in the data. However, it should be noted that the application of multiple tests of statistical significance increases the likelihood of an apparently significant difference arising simply through chance.

Limitations of data

There are a number of factors that can influence comparisons of population-based survival from cancer.[19] For example:

- data quality factors: completeness of ascertainment of cases, accuracy of registration, completeness of follow up, percentage of registrations based on information derived from death certificates alone
- host factors: genetics, age, sex, socio-economic status, race and/or ethnicity, co-morbidity, competing causes of death, immunological status, nutritional status, behaviour (including awareness of symptoms, willingness to consult and acceptance of treatment)
- tumour-related factors: extent or stage of disease, site (and sub-site) of tumour, tumour morphology, tumour biology
- healthcare-related factors: screening (lead time and length bias), diagnostic facilities, accuracy of diagnosis and determination of prognostic factors, treatment facilities, quality of treatment (including management of any adverse consequences of treatment), follow-up care
- miscellaneous factors: unmeasured or unknown prognostic factors (residual confounding), random (chance) variation.

While some of these factors have been taken into account in the survival analysis, many have not and so any apparent variation in outcomes does not necessarily reflect a difference in the quality of care.

Results are presented for Scotland as a whole and for the 12 mainland NHS Boards based on their resident populations. However, in some cases the NHS Board of residence might not be the same as the NHS Board of treatment and some patients may well be treated in more than one Board area.

Survival estimates for Orkney, Shetland and Western Isles could not be calculated due to the small numbers involved.

Presentation of data

Age and sex-standardised incidence and mortality rates for colorectal cancer in Scotland are shown in Table 5-1. This table also shows relative three-year survival presented by NHS Board of residence for patients diagnosed in 1998–2000.

Hazard ratios derived from a relative survival model are shown for each NHS Board and compared with Scotland in Table 5-2 and Figure 5-1.

Results and discussion

Incidence and mortality

The total number of new cases diagnosed in the three-year period from 1998 to 2000 was 10,324. This represents an age and sex-standardised incidence rate of 53.9 per 100,000 population. The highest incidence rate was in the Western Isles at 64.7 per 100,000 population, and the lowest rate was in Forth Valley at 48.4 per 100,000 population.

The overall age and sex-standardised mortality rate for Scotland for colorectal cancer between 2001 and 2003 was 23.0 per 100,000 population. Forth Valley had the highest mortality rate at 25.2 per 100,000 population, and Orkney had the lowest at 18.2 per 100,000 population.

Survival at NHS Board level

Nationally, the overall relative survival at 3 years was 57.8%. Grampian had the highest three-year survival (61.7%) and Tayside had the lowest (52.8%). Of all the NHS Boards, only Greater Glasgow (53.5%, 95% CI 50.6–56.4) and Tayside (95% CI 49.0–56.5) had a statistically significantly lower survival than Scotland overall. None of the NHS Boards had a relative survival that was statistically significantly higher than the Scotland figure.

The wide confidence intervals reflect substantial variability in survival estimates due to relatively small numbers. It is important to note that variations in survival between NHS Boards may reflect differences in case-mix that have not been adjusted for in this analysis, including stage of disease at diagnosis.

Hazard ratios at NHS Board level

An NHS Board with a hazard ratio greater than 1.00 has an increased hazard of death (ie lower survival) compared with Scotland. If the lower confidence interval is also greater than 1.00, the increased hazard of death is said to be significant.

After adjustment for case-mix, none of the NHS Boards showed a significantly increased risk of death compared with Scotland (Figure 5-1). However, the risk of death in Lothian is significantly lower (ie survival is higher) than Scotland (0.84, 95% CI 0.75–0.95, p=0.01). This observation is consistent with analysis relating to a previous period of diagnosis[20], making it less likely to be a chance finding. It could still be explained by other factors, such as insufficient adjustment for all relevant confounding factors. Among other reasons, it has been suggested that a longstanding tradition of surgical audit in Lothian might account for more favourable outcomes.[21]

Table 5-1 Colorectal cancer incidence, mortality and survival by NHS Board

NHS Board of residence	Number of new cases (1998–2000)	Incidence rate[a] (1998–2000)	Number of deaths (2001–2003)	Mortality rate[a] (2001–2003)	Relative three-year survival with 95% CI (period of diagnosis 1998–2000)[b]	
Argyll & Clyde	850	52.4	372	21.5	58.5	54.4–62.5
Ayrshire & Arran	793	53.4	345	21.5	59.8	55.4–63.9
Borders	259	52.1	139	24.4	54.1	46.2–61.3
Dumfries & Galloway	321	49.4	167	23.3	54.0	47.2–60.2
Fife	734	55.4	329	22.2	57.8	53.4–62.0
Forth Valley	495	48.4	283	25.2	56.6	51.1–61.7
Grampian	1,121	59.4	491	24.2	61.7	58.1–65.0
Greater Glasgow	1,676	52.2	811	24.6	53.5	50.6–56.4
Highland	466	55.6	211	22.8	60.4	54.7–65.6
Lanarkshire	935	49.2	446	21.9	54.3	50.4–58.0
Lothian	1,480	53.4	645	22.0	60.6	57.5–63.6
Orkney	50	60.2	16	18.2	n/a	n/a
Shetland	47	62.3	24	24.6	n/a	n/a
Tayside	1,017	60.5	431	23.9	52.8	49.0–56.5
Western Isles	80	64.7	32	23.1	n/a	n/a
Scotland	**10,324**	**53.9**	**4,742**	**23.0**	**57.8**	**56.7–59.0**

a Rate per 100,000 standardised for age and sex to the European Standard Population.
b Follow-up to the end of 2003.

Source: ISD Scotland (Scottish Cancer Registry) and GRO(S) (death registration).

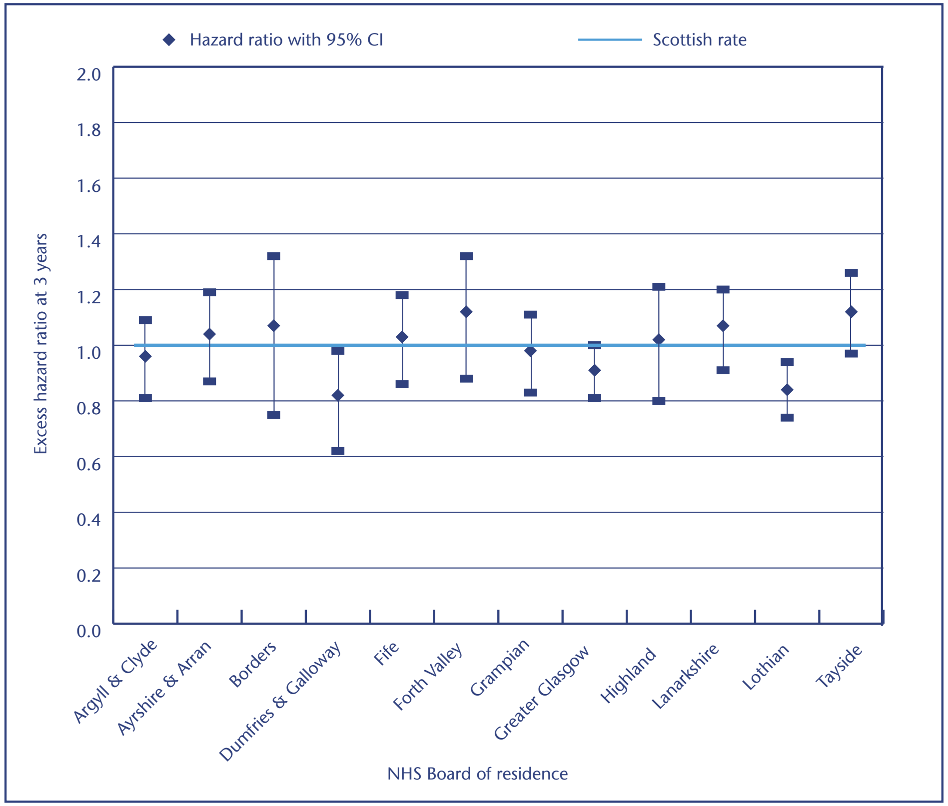
Table 5-2 Colorectal cancer: hazard ratio of death within 3 years of diagnosis (period of diagnosis 1998–2000) by NHS Board[a,b]

NHS Board of residence	Hazard ratio	95% CI	p-value
Argyll & Clyde	0.96	0.83–1.11	0.55
Ayrshire & Arran	1.04	0.89–1.21	0.61
Borders	1.07	0.83–1.39	0.60
Dumfries & Galloway	0.82	0.66–1.02	0.08
Fife	1.03	0.88–1.20	0.72
Forth Valley	1.12	0.93–1.36	0.24
Grampian	0.98	0.85–1.13	0.78
Greater Glasgow	0.91	0.82–1.01	0.09
Highland	1.02	0.84–1.25	0.83
Lanarkshire	1.07	0.93–1.22	0.34
Lothian	0.84	0.75–0.95	0.01
Tayside	1.12	0.98–1.27	0.09
Scotland	**1.00**		

a Follow-up to the end of 2003.
b Adjusted for age, sex, SIMD, tumour sub-site, tumour morphology, Dukes' stage, grade of differentiation, screening status and co-morbidity (hospital bed-days in the period 6 months to 5 years prior to diagnosis).

Source: ISD Scotland (Scottish Cancer Registry) and GRO(S) (death registration).

Figure 5-1 Colorectal cancer: hazard ratio of death within 3 years of diagnosis (period of diagnosis 1998–2000) by NHS Board[a,b]



a Follow-up to the end of 2003.
b Adjusted for age, sex, SIMD, tumour sub-site, tumour morphology, Dukes' stage, grade of differentiation, screening status and co-morbidity (hospital bed-days in the period 6 months to 5 years prior to diagnosis).

Source: ISD Scotland (Scottish Cancer Registry) and GRO(S) (death registration).

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

References

1 www.isdscotland.org/cancer_information

2 Scottish Intercollegiate Guidelines Network. Management of Colorectal Cancer (SIGN publication No. 67). Edinburgh: SIGN, 2003.

3 National Institute for Health and Clinical Excellence. Guidance on the use of irinotecan, oxaliplatin and raltitrexed for the treatment of advanced colorectal cancer. London: NICE, 2005. www.nice.org.uk

4 Clinical Standards Board for Scotland. Clinical Standards for Colorectal Cancer. Edinburgh: Clinical Standards Board for Scotland, 2001.

5 National Institute for Health and Clinical Excellence. Referral guidelines for suspected cancer. London: NICE, 2005.

6 Parkin DM, Whelan SL, Ferlay J, Teppo L, Thomas DB. Cancer Incidence in Five Continents (volume VIII). IARC Scientific Publications No. 155. Lyon: International Agency for Research on Cancer, 2002.

7 WHO Mortality Database, www-dep.iarc.fr

8 Sant M, Aareleid T, Berrino F, Bielska Lasota M, Carli PM, Faivre J, Grosclaude P, Hédelin G, Matsuda T, Møller H, Möller T, Verdecchia A, Capocaccia R, Gatta G, Micheli A, Santaquilani M, Roazzi P, Lisi D, and the EUROCARE Working Group. 2003. EUROCARE-3: survival of cancerpatients diagnosed 1990-94 – results and commentary. Ann Oncol, 14(suppl 5): v61-v118.

9 Gatta G, Capocaccia R, Sant M, Bell CMJ, Coebergh JWW, Damhuis RA, Faivre J, Martinez-Garcia C, Pawlega J, Ponz De Leon M, Pottier D, Raverdy N, Williams EMI, Berrino F. Understanding variations in survival for colorectal cancer in Europe: a EUROCARE high resolution study. Gut. 2000;47:533-538.

10 Scottish Executive Health Department. Cancer in Scotland. Action for Change. Bowel Cancer Framework for Scotland. Edinburgh: SEHD, 2004.

11 Audit Scotland. A Review of Bowel Cancer Services: An Early Diagnosis. March 2005.

12 The UK CRC Screening Pilot Evaluation Team. Evaluation of the UK colorectal cancer screening pilot. Final Report. (February 2003, revised May 2003).

13 www.show.scot.nhs.uk/bcap/

14 www.show.scot.nhs.uk/indicators/Outcomes/OutcomesReport2000.pdf

15 Scottish Executive. Scottish Index of Multiple Deprivation 2004 Summary Technical Report. www.scotland.gov.uk/library5/society/siomd-00.asp

16 Waterhouse J, Muir C, Correa P, Powell J. Cancer Incidence in Five Continents, (volume III). IARC Scientific Publication No. 15. Lyon: International Agency for Research on Cancer,1976.

17 Hakulinen T. 1982. Cancer survival corrected for heterogeneity in patient withdrawal. Biometrics, 38: 933-42.

18 Dickman PW, Sloggett A, Hills M, Hakulinen T. 2004. Regression models for relative survival. Stat Med, 23: 51-64.

19 Black RJ, Sankaranarayanan R, Parkin DM. Interpretation of population-based cancer survival data. Cancer Survival in Developing Countries, IARC Scientific Publications No. 145. Lyon: International Agency for Research on Cancer, 1998.

20 Scottish Cancer Intelligence Unit. Trends in Cancer Survival in Scotland, 1971-1995. Edinburgh: Information & Statistics Division, 2000.

21 Nixon SJ. 2002. Surgical audit activity may improve long-term survival in cancer patients: an observation from ‘Trends in Cancer Survival in Scotland 1971-1995’. Health Bulletin (Edinburgh), 60: 44-47.

Background

- Prostate cancer is the uncontrolled and disordered growth of cells within a small gland at the base of the male bladder. Prostate cancer is the second most common cancer among men in Scotland.
- The causes of prostate cancer are not known. Age is the strongest risk factor but family history, ethnicity and diet are also risk factors.
- Prostate cancer may be aggressive or slow growing. Localised prostate cancer is not usually associated with symptoms and often the first sign of prostate cancer is evidence of metastases (ie the cancer has spread).
- A blood test which measures the level of prostate specific antigen (PSA) can be used to screen asymptomatic men for prostate cancer. However, PSA screening has not been proven to reduce mortality and is not routinely offered to men in Scotland.
- This section presents data on incidence, mortality and survival for prostate cancer.

Key findings

- The total number of new cases of prostate cancer diagnosed in Scotland over the period 1998–2000 was 6,030. Nationally, the incidence rate was 71.5 per 100,000 population.
- The mortality rate for Scotland for prostate cancer between 2001 and 2003 was 26.6 per 100,000 population.
- Relative survival three years after diagnosis was 79.4%. Two NHS Boards (Forth Valley and Lothian) had significantly higher survival than the Scotland figure. After adjusting for other factors such as grade of differentiation at time of diagnosis, there were no significant differences across NHS Boards.

Introduction

Prostate cancer is the uncontrolled and disordered growth of cells within a small gland at the base of the male bladder. In Scotland, prostate cancer is the second most commonly diagnosed cancer in men, with the lifetime risk of developing prostate cancer estimated to be 1 in 15.[1] In 2001, just over 2,000 people were newly diagnosed with the disease.

The causes of prostate cancer are not known but there are many potential risk factors associated with the disease. Age is the strongest risk factor but family history, ethnicity and diet are also risk factors.[2] Prostate cancer may be aggressive or slow growing. Localised prostate cancer is not usually associated with symptoms and often the first sign of prostate cancer is evidence of metastases (ie the cancer has spread).[2]

A blood test which measures the level of prostate specific antigen (PSA) can be used to screen asymptomatic men for prostate cancer. If the level of PSA in the blood is raised, this may indicate that prostate cancer is present and can lead to early diagnosis when potentially curative treatment can be offered. However, the PSA test has limitations. For example, many men with elevated PSA will not have prostate cancer and PSA screening will fail to detect prostate cancer in some men who do have this cancer.[2] As yet, it is not clear whether or not this test confers benefit to men actually diagnosed with prostate cancer by prolonging their life as opposed to merely bringing forward their time of diagnosis (from which their survival time is calculated).[3]

In 2001, the Scottish Executive Health Department (SEHD) advised general practitioners (GPs) that men who ask for a PSA test are eligible for a test and any follow up necessary from the NHS, upon provision of full information to ensure informed choice.[4] However due to the lack of good evidence of benefit from PSA screening, it is not offered routinely to men in Scotland in the way that mammography is offered to women. The SEHD cancer strategy, Cancer in Scotland: Action for Change, states that a population-based prostate cancer screening programme will be introduced if and when new research leads to screening and treatment techniques being sufficiently developed to support it.

The incidence rate of prostate cancer in Scotland increased dramatically between 1991 and 1996 but has fallen slightly since then. The mortality rate from prostate cancer increased gradually between 1980 and the mid-1990's and has fallen slightly since then. Prostate cancer was the cause of 786 deaths recorded in Scotland in 2003.[5]

Survival from prostate cancer in Scotland after one and five years has increased substantially over the last 30 years. This may be due partly to the introduction of PSA testing resulting in the diagnosis of tumours at an earlier stage.

The incidence of prostate cancer in Scotland is only moderate compared with other countries with available data.[6] Historically, in common with the rest of the UK, survival from prostate cancer appears to have been less favourable in Scotland compared with many European countries, especially those reporting a high incidence of the disease.[7] However, mortality from prostate cancer in Scotland lies in the middle of the range of rates recorded by a wide selection of countries.[8] It is difficult to interpret differences in incidence of and survival from prostate cancer among countries because the extent to which PSA testing is applied in each country is likely to influence the time of diagnosis and hence survival time.

This section presents data on incidence, mortality and survival for prostate cancer.

Data and methods

Definition of indicator

Relative three-year survival for people diagnosed with prostate cancer between 1998 and 2000.

Adjusted relative three-year survival (expressed as hazard ratios) for people diagnosed between 1998 and 2000.

Data have also been presented on the incidence and mortality of prostate cancer to provide context.

Data source

The indicators were derived from Scottish Cancer Registry records held at ISD Scotland. Estimates of co-morbidity were based on SMR01 records, also held at ISD Scotland.

The General Register Office for Scotland [GRO(S)] gave permission to use the 1991 and 2001 census population and mortality data.

The Scottish Index of Multiple Deprivation (SIMD) was used to estimate deprivation.[9]

Analyses of data

Incidence and mortality rates were calculated using numbers of diagnoses and deaths of patients resident in each NHS Board area and the GRO(S) mid-year population estimates. These were then directly standardised to the European standard population.[10]

Relative survival at three years was studied for patients diagnosed between 1998 and 2000. Relative survival takes account of deaths from all causes and is the ratio of the observed survival to that expected for a group of people in the general population similar to the patient group with respect to age and calendar period of observation.[11] Relative survival is useful for comparing survival from cancer across NHS Boards, adjusting for underlying mortality in each Board. However it does not take account of factors such as grade of tumour or deprivation.

In addition, regression modeling was used to study adjusted relative survival, based on the hazard of dying from prostate cancer within three years of diagnosis.[12] The hazard ratios and confidence intervals were derived from a statistical model with adjustments for age at diagnosis, deprivation category, grade of differentiation and co-morbidity.

Grade of differentiation (the degree of abnormality of cancer cells) was calculated using either the Gleason score or ICD-O/UICC, depending on which method of grading was available for the patient. Groupings were created as follows[13]:

- Gleason score 2, 3 and 4, or ICD-O/UICC grade 1
- Gleason score 5, 6 and 7, or ICD-O/UICC grade 2
- Gleason score 8, 9 and 10, or ICD-O/UICC grades 3 and 4.

Co-morbidity was estimated using information on the cumulative time (bed days) the patient had spent as a hospital inpatient in the 5 years prior to the cancer diagnosis. To avoid the potential confounding effect of hospitalisation caused by the prostate cancer prior to definitive diagnosis, bed days in the 6 months immediately prior to diagnosis were disregarded. Bed days in the previous 5 years were split into ordinal categories: no bed days; 1–4 bed days; 5–10 bed days; or more than 11 bed days.

Patients were included in the survival analysis provided they met the inclusion criteria:

- prostate cancer registrations with date of diagnosis during 1998-2000
- aged 15 to 99 years at diagnosis
- first primary malignant tumours

- individuals resident in Scotland with known NHS Board area of residence and SIMD quintiles
- cases not registered by death certificate only
- follow up complete to 31 December 2003.

Follow-up for death was complete to 31 December 2003. Any cases still alive at this date or with a date of death after 31 December 2003 were censored (information relating to them beyond 31 December was not included).

Since the hazard ratios are estimates and their accuracy is related to the number of patients included in each analysis, confidence intervals are presented. Where the Scottish hazard ratio lies outside the confidence interval for a particular NHS Board, there is a strong possibility that the deviation is due to factors other than random variation in the data. However, it should be noted that the application of multiple tests of statistical significance increases the likelihood of an apparently significant difference arising simply through chance.

Limitations of data

There are a number of factors that can influence comparisons of population-based survival from cancer.[14] In prostate cancer, the most influential of these is likely to be the use of PSA testing.

While some prognostic factors have been taken into account in the survival analysis, many – including the impact of PSA testing – have not, and so any apparent variation in outcomes does not necessarily reflect a difference in the quality of care.

There is evidence that use of the PSA test varies to some extent across Scotland.[15] Thus, variations in detection rates, as opposed to genuine variations in risk, seem to account for at least some of the observed variations in incidence across NHS Boards. In turn, this makes survival comparisons very difficult to interpret. An NHS Board with high use of PSA testing is likely to detect a higher proportion of 'indolent' prostate cancers earlier than they would otherwise present clinically, leading inevitably to more favourable survival statistics regardless of whether there is any postponement of the time of death. Against this background, survival is probably a poor indicator of quality of prostate cancer treatment.

Prostate cancer mortality is arguably less susceptible to some of the biases that apply to survival data, but is also of limited value as an outcome indicator of treatment services because it is determined not only by the probability of surviving from the disease, but also by the risk of developing the disease in the first place.

Results are presented for Scotland as a whole and for the 12 mainland NHS Boards based on their resident populations. However, in some cases the NHS Board of residence might not be the same as the NHS Board of treatment and some patients may well be treated in more than one Board area.

Survival estimates for Orkney, Shetland and Western Isles could not be calculated due to the small numbers involved.

Presentation of data

Age-standardised incidence and mortality rates for prostate cancer are presented by NHS Board in Table 6-1. This table also shows relative three-year survival presented by NHS Board of residence for patients diagnosed in 1998–2000.

Hazard ratios derived from a relative survival model are shown for each NHS Board and compared with Scotland in Table 6-2 and Figure 6-1.

Results and discussion

Incidence and mortality rates

The total number of new cases of prostate cancer diagnosed in the three-year period from 1998 to 2000 was 6,030 (see Table 6-1). This represents an age-standardised incidence rate of 71.5 per 100,000 population. The highest incidence rate was in Highland at 101.9 per 100,000 population, and the lowest rate was in Orkney at 54.2 per 100,000 population.

The overall age-standardised mortality rate for Scotland for prostate cancer between 2001 and 2003 was 26.6 per 100,000 population (see Table 6-1). Western Isles had the highest mortality rate at 31.8 per 100,000 population, and Lothian had the lowest rate at 24.8 per 100,000 population.

Survival at NHS Board level

Nationally, the relative survival from prostate cancer at 3 years was 79.4% (see Table 6-1). Three-year survival ranged from 71.0% to 88.1%. NHS Forth Valley (88.1%, 95% CI 81.6–92.4) and NHS Lothian (85.2%, 95% CI 81.4–88.2) had a statistically significantly higher survival than Scotland overall. None of the NHS Boards had a relative survival that was significantly lower than the Scotland figure.

The wide confidence intervals reflect substantial variability in survival estimates due to relatively small numbers. It is important to note that variations in survival across NHS Boards may reflect differences in case-mix that have not been adjusted for in this analysis.

Hazard ratios at NHS Board level

An NHS Board with a hazard ratio greater than 1.00 has an increased hazard of death (ie lower survival) compared with Scotland. If the lower confidence interval is also greater than 1.00, the increased hazard of death is said to be significant.

After adjusting for other factors such as grade of differentiation at time of diagnosis, none of the NHS Boards showed a risk of death that was significantly different to Scotland overall (see Figure 6-1 and Table 6-2).

However, it was not possible to adjust for all important prognostic factors such as tumour stage at the time of diagnosis. Unfortunately, tumour stage for prostate cancer is not always available from the medical records.[16]

Table 6-1 Prostate cancer incidence, mortality and survival by NHS Board

NHS Board of residence	Number of new cases (1998–2000)	Incidence rate[a] (1998–2000)	Number of deaths (2001–2003)	Mortality rate[a] (2001–2003)	Relative three-year survival with 95% CI (period of diagnosis 1998–2000)[b]	
Argyll & Clyde	480	68.2	188	26.1	73.9	68.2–78.8
Ayrshire & Arran	457	69.8	209	30.3	76.7	71.8–81.5
Borders	147	67.6	65	27.1	71.0	60.2–79.4
Dumfries & Galloway	204	64.8	84	25.5	75.7	66.6–82.6
Fife	373	62.9	168	27.1	79.5	72.9–84.6
Forth Valley	371	81.6	125	26.4	88.1	81.6–92.4
Grampian	684	81.1	233	26.2	81.5	77.1–85.2
Greater Glasgow	850	61.6	373	27.0	74.6	70.0–78.5
Highland	378	101.9	119	30.7	76.9	70.4–82.2
Lanarkshire	511	61.9	215	25.2	75.7	70.2–80.4
Lothian	1,006	83.0	321	24.8	85.2	81.4–88.2
Orkney	20	54.2	12	30.1	n/a	n/a
Shetland	26	78.3	9	25.2	n/a	n/a
Tayside	486	64.8	197	25.1	79.1	73.4–83.7
Western Isles	37	66.8	18	31.8	n/a	n/a
Scotland	**6,030**	**71.5**	**2,336**	**26.6**	**79.4**	**77.9–80.8**

a Rate per 100,000 standardised for age to the European Standard Population.
b Follow-up to the end of 2003.
n/a not available

Source: ISD Scotland (Scottish Cancer Registry) and GRO(S) (death registration).

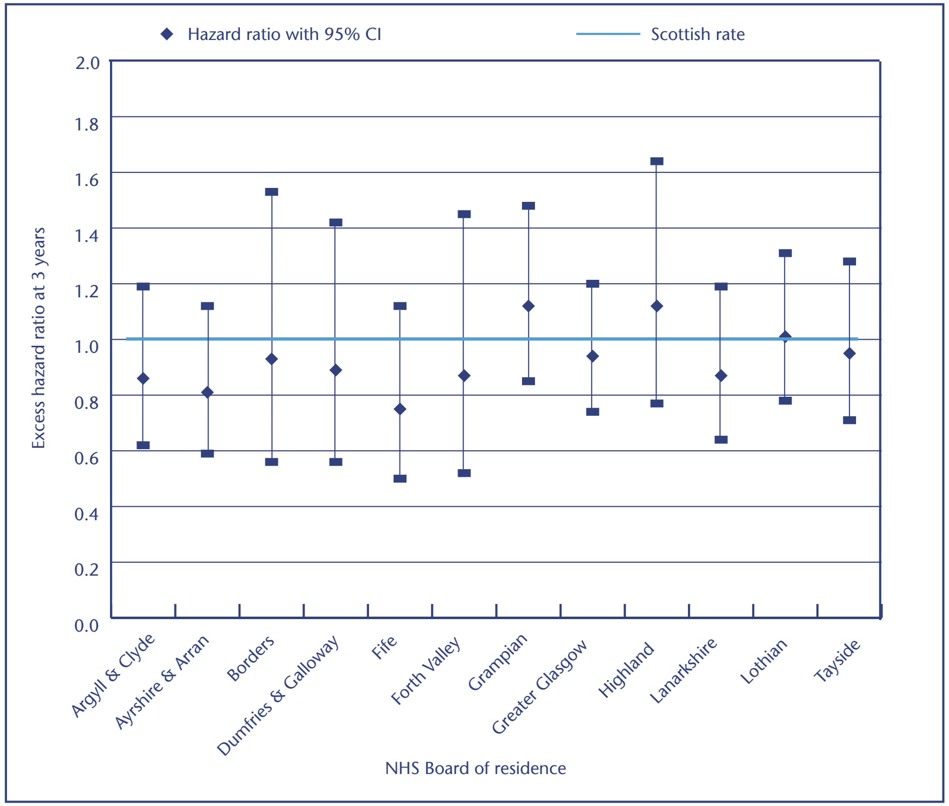
Table 6-2 Prostate cancer: hazard of death within 3 years of diagnosis (period of diagnosis 1998–2000) by NHS Board[a,b]

NHS Board of Residence	Hazard ratio	95% CI	p-value
Argyll & Clyde	0.86	0.62–1.19	0.37
Ayrshire & Arran	0.81	0.59–1.12	0.21
Borders	0.93	0.56–1.53	0.77
Dumfries & Galloway	0.89	0.56–1.42	0.63
Fife	0.75	0.50–1.12	0.16
Forth Valley	0.87	0.52–1.45	0.59
Grampian	1.12	0.85–1.48	0.44
Greater Glasgow	0.94	0.74–1.20	0.62
Highland	1.12	0.77–1.64	0.55
Lanarkshire	0.87	0.64–1.19	0.39
Lothian	1.01	0.78–1.31	0.94
Tayside	0.95	0.71–1.28	0.75
Scotland	**1.00**		

a Follow-up to the end of 2003
b Adjusted for age, SIMD, grade of differentiation and co-morbidity (hospital bed days in the period 6 months to 5 years prior to diagnosis).

Source: ISD Scotland (Scottish Cancer Registry) and GRO(S) (death registration).

Figure 6-1 Prostate cancer: hazard of death within 3 years of diagnosis (period of diagnosis 1998–2000) by NHS Board[a,b]



a Follow-up to the end of 2003
b Adjusted for age, SIMD, grade of differentiation and co-morbidity (hospital bed days in the period 6 months to 5 years prior to diagnosis.

Source: ISD Scotland Scottish Cancer Registry and GRO(S) death registration.

Warning: All data presented in this report should be interpreted in accordance with the guidance given at the start of this document (see page iv).

References

1 ISD, NHS National Services Scotland. *Cancer in Scotland.* Scottish Cancer Registry. www.isdscotland.org/isd/files/Cancer_in_Scotland_summary_m.pdf

2 Watson E, Jenkins L, Bukach C, Austoker J. 2002.*The PSA test and prostate cancer: information for primary care.* NHS Cancer Screening Programmes. Sheffield.

3 Fong Y, Milani S, Spaller S, Djavan B. 2005. Prostate-specific antigen testing in the new millennium. *BJU International*. **95**(9):1167-1168.

4 Scottish Executive Health Department. 2001. *Prostate Specific Antigen (PSA) Testing for Prostate Cancer.* SEHD/CMO(2001)20. 20 December 2001. Edinburgh: SEHD.

5 www.isdscotland.org/cancer_information

6 Parkin DM, Whelan SL, Ferlay J, Teppo L, Thomas DB. 2002. Cancer Incidence in Five Continents (volume VIII). IARC Scientific Publications No. 155. Lyon: International Agency for Research on Cancer.

7 Sant M, Aareleid T, Berrino F, Bielska Lasota M, Carli PM, Faivre J, Grosclaude P, Hédelin G, Matsuda T, Møller H, Möller T, Verdecchia A, Capocaccia R, Gatta G, Micheli A, Santaquilani M, Roazzi P, Lisi D, and the EUROCARE Working Group. 2003. EUROCARE-3: survival of cancerpatients diagnosed 1990-94 – results and commentary. Ann Oncol, 14(suppl 5): v61-v118.

8 WHO Mortality Database, www-dep.iarc.fr

9 www.scotland.gov.uk/library5/society/siomd-00.asp

10 Waterhouse J, Muir C, Correa P, Powell J. Cancer Incidence in Five Continents, (volume III). IARC Scientific Publication No. 15. Lyon: International Agency for Research on Cancer,1976.

11 Hakulinen T (1982). Cancer survival corrected for heterogeneity in patient withdrawal. Biometrics, 38: 933-42.

12 Dickman PW, Sloggett A, Hills M, Hakulinen T. 2004. Regression models for relative survival. Stat Med, 23: 51-64.

13 National Institute for Clinical Excellence. 2002. Improving outcomes in urological cancers: The manual. NICE: London.

14 Black RJ, Sankaranarayanan R, Parkin DM. 1998. Interpretation of population-based cancer survival data. Cancer Survival in Developing Countries. IARC Scientific Publications No 145. Lyon: International Agency for Research on Cancer.

15 Brewster DH, Fraser LA, Harris V, Black RJ. 2000. Rising incidence of prostate cancer in Scotland: increased risk or increased detection? BJU Int. 85: 463-472.

16 Howard GCW, Thomson CS, Stroner PL, Goodman CM, Windsor PM, Brewster DH. 2001. Patterns of referral, management and survival of patients diagnosed with prostate cancer in Scotland during 1988 and 1993: results of a national, retrospective population-based audit. BJU Int, 87: 339-347.

Appendix A

Membership of Clinical Outcomes Group

Dr Dorothy Moir, Chairman
Director of Public Health, NHS Lanarkshire

Mr Marc Bransby-Zachary
Consultant Orthopaedic Surgeon, South Glasgow University Hospitals Division

Dr Denise Coia
Consultant Psychiatrist, Greater Glasgow Primary Care Division. NHS Quality Improvement Scotland Board Member (until March 2005)

Professor Tom Fahey
Professor of Primary Care Medicine, Tayside Centre for General Practice

Dr Allan Gunning
Chief Operating Executive for Patient Services, NHS Ayrshire & Arran

Mr Douglas Harper
Consultant Surgeon, NHS Grampian (until June 2005)

Professor Zygmunt Krukowski
Consultant Surgeon, NHS Grampian (from June 2005)

Professor Gordon Lowe
Professor of Vascular Medicine/Consultant Physician, North Glasgow University Hospitals Division. Chairman, Scottish Intercollegiate Guidelines Network

Dr Catriona MacDonald
Consultant in Public Health Medicine, NHS Argyll & Clyde

Dr Hilary MacPherson
Consultant Obstetrician and Gynaecologist, Forth Valley Acute Hospitals Operating Division

Dr James Paton
Reader in Paediatric Respiratory Disease, The Yorkhill Division, NHS Greater Glasgow

Dr Ian Pullen
Psychiatric Advisor, Scottish Executive Health Department

Dr Jim Shimmins
Lay representative (until October 2005)

Ms Jacqui Simpson
Director of Nursing, NHS Lothian (until October 2005)

Mrs Pamela Warrington
Deputy Chief Pharmacist

Ms Jennifer Waterton
Research Manager, Chief Scientist Office

Information Services Division of NHS National Services Scotland

Dr Margaret MacLeod
Principal Statistician

Ms Ana Rodriguez
Senior Information Analyst

NHS Quality Improvement Scotland

Mrs Susan Downie
Medical Writer

Dr Harpreet Kohli
Medical Advisor and Head of Health Services Research and Assessment Unit

Dr Donald Morrison
Clinical Performance Data Co-ordinator

Dr Jill Nelson
Head of Clinical Effectiveness Co-ordination Unit

Mrs Emma Riches
Medical Writer

Ms Annie Wright
Comminication Officer

Appendix B

Glossary of abbreviations

A&E	accident and emergency
ACE	angiotensin-converting enzyme
BCAP	Bowel Cancer Awareness Project
CHI	Community Health Index
CHP	community health partnership
CI	confidence interval
COPD	chronic obstructive pulmonary disease
DDD	defined daily dose
GP	general practitioner
GRO(S)	General Register Office for Scotland
ICD	International Classification of Diseases
ISD	Information Services Division
NICE	National Institute for Health and Clinical Excellence
NHS	National Health Service
NHS QIS	NHS Quality Improvement Scotland
PIS	Prescribing Information System
PSA	prostate specific antigen
PTI	Practice Team Information
SEHD	Scottish Executive Health Department
SHS	Scottish Healthcare Supplies
SIGN	Scottish Intercollegiate Guidelines Network
SIMD	Scottish Index of Multiple Deprivation
SMR	Scottish Morbidity Record
WHO	World Health Organization

Appendix C

Clinical Outcome Indicators Reports 1993–2005

Indicator		1993	1994	1995	1996	1998	1999	2000	2002	2003	2004	2005
1	Pregnancy under the age of 16		■	■				■			■	
2	Therapeutic abortion rates		■	■								
3	Childhood incidence of measles		■									
4	Cervical cancer mortality		■	■		■						
5	Suicide rate		■	■			■					
6	Rate of emergency admission for diabetic ketoacidosis		■	■								
7	Longer in-patient stays for children with asthma		■	■								
8	30-day survival after admission for hip fracture	■	■	■			■		■			
9	Discharge home within 56 days of admission with hip fracture	■	■	■								
10	30-day survival after admission for acute myocardial infarction	■	■	■			■		■			
11	Re-operation within one year of transurethral prostatectomy	■	■	■								
12	Emergency re-admission within 28 days of discharge from medical specialty	■	■	■								
13	30-day survival after admission for stroke		■	■			■		■			
14	Discharge home within 56 days of admission for stroke		■	■								
15	Psychiatric inpatients: death within one year of discharge		■	■								
16	Psychiatric inpatients aged 65+: death within one year of discharge		■	■								
17	Psychiatric inpatients: suicide within one year of discharge		■	■								
18	Proportion of first births by caesarean section				■			■				
19	Vaginal delivery after caesarean section				■			■				
20	Babies admitted to a neonatal unit				■			■				
21	28-day emergency re-admission: removal of tonsils/adenoids				■							
22	D & C rates in women under 40				■			■				
23	Use of medical methods for early termination of pregnancy				■			■				
24	Survival with cancer of the trachea, bronchus and lung				■				■			
25	Survival with cancer of the large bowel				■							
26	Breast cancer				■		■					
27	Survival with cancer of the ovary				■					■		
28	28 day emergency re-admission: elective operation for cataract				■							
29	28 day emergency re-admission: emergency appendectomy				■							
30	28 day emergency re-admission: elective prostatectomy				■							
31	28 day emergency re-admission: elective hysterectomy				■							
32	28 day emergency re-admission: elective total hip replacement				■							
33	Survival with cancer of the stomach					■						
34	Survival with cancer of the cervix uteri					■						

Indicator		1993	1994	1995	1996	1998	1999	2000	2002	2003	2004	2005
35	Cardiac procedures: standardised procedure ratios for coronary angiography, angioplasty and CABG											
36	Breast feeding											
37	Smoking during pregnancy											
38	Registration with general dental practitioner											
39	Decayed, missing and filled teeth in children age 5 years											
40	Colorectal cancer											
41	Emergency admissions											
42	Primary care indicators: prescribing and immunisation rates											
43	Mortality within 30 days of elective surgery											
44	Emergency readmission rates within 7 and 28 days of discharge											
45	Alcohol problems											
46	120-day survival after admission for hip fracture											
47	Completeness of SMR01 data											
48	Obesity in children											
49	Kidney disease: treatment of anaemia in patients on haemodialysis											
50	Ovarian cancer											
51	28-day emergency re-admission: abdominal and pelvic surgery											
52	28-day emergency re-admission: lower limb arthroplasties											
53	Teenage pregnancies											
54	Emergency admission to hospital for children with asthma											
55	Emergency admission to hospital for children with diabetes											
56	Body mass index in children											
57	Unintentional injuries for children											
58	Depression and anxiety in the postnatal period											
59	Stillbirths and neonatal deaths											
60	Prescribing in children											
61	Chronic obstructive pulmonary disease											
62	Heart failure											
63	Multiple emergency admissions of older people											
64	Prostate cancer											

The first report, published in December 1992, considered the nature and potential of outcome measures, but did not include any specific data.

You can read and download this document from our website.
We can also provide this information:

- by email
- in large print
- on audio tape or CD
- in Braille, and
- in community languages.

NHS Quality Improvement Scotland

Edinburgh Office
Elliott House
8-10 Hillside Crescent
Edinburgh EH7 5EA

Phone: 0131 623 4300
Textphone: 0131 623 4383

Glasgow Office
Delta House
50 West Nile Street
Glasgow G1 2NP

Phone: 0141 225 6999
Textphone: 0141 241 6316

Email: comments@nhshealthquality.org
Website: www.nhshealthquality.org

This document is produced from elemental chlorine-free material and is sourced from sustainable forests