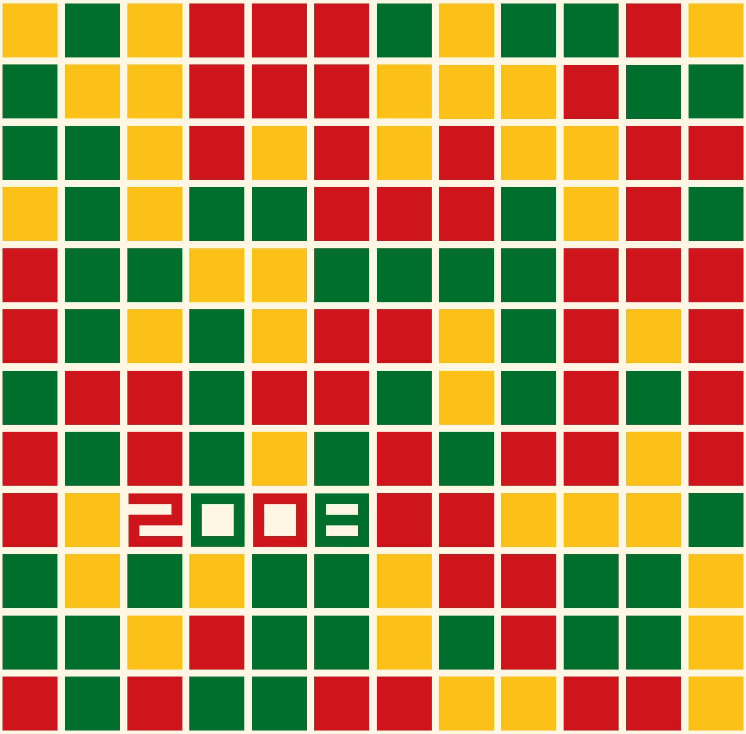
# Quality and Efficiency in Swedish Health Care

## Regional Comparisons

## 2008



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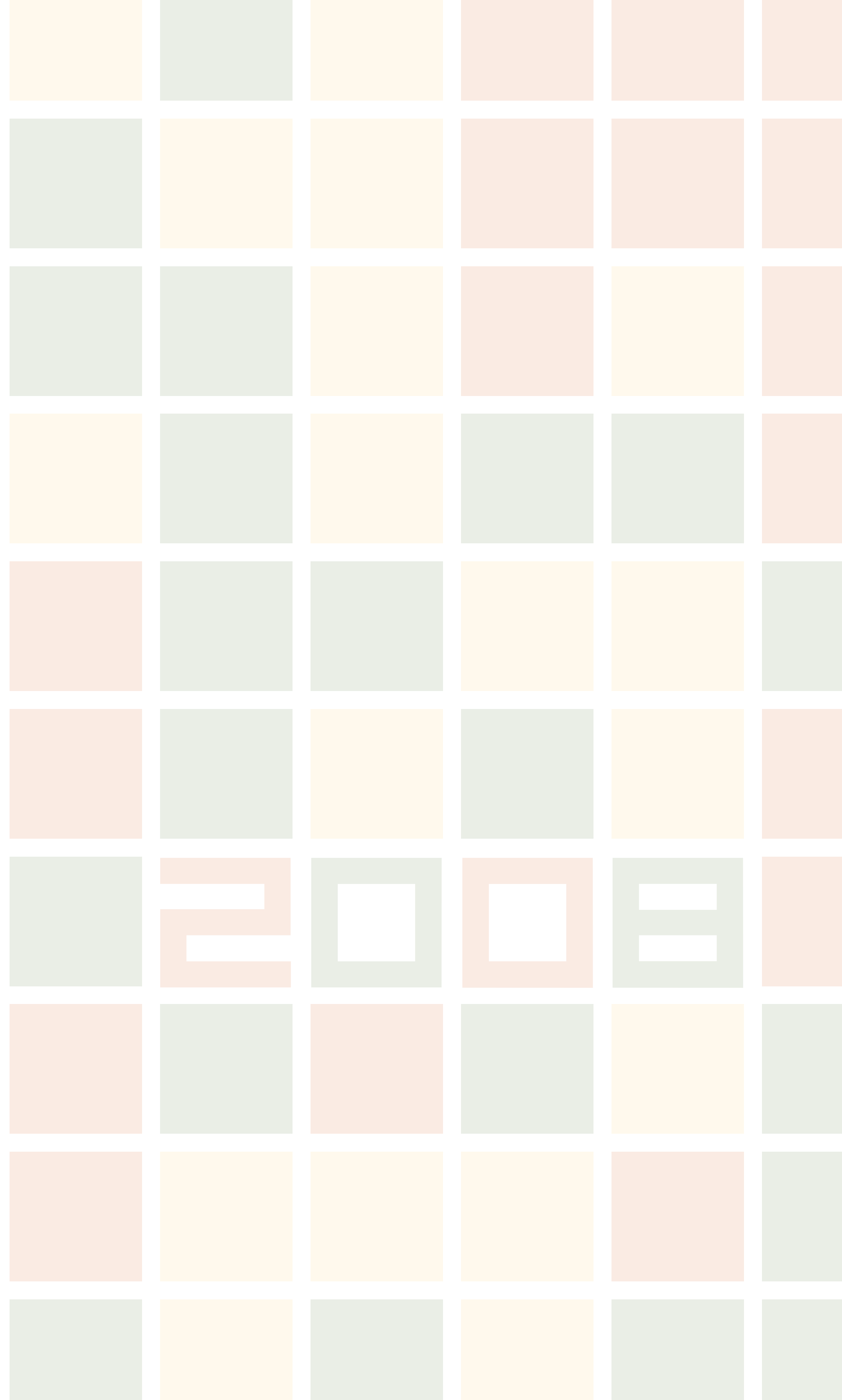
2008

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ISBN 978-91-7164-452-7

or

Swedish National Board of Health and Welfare, SE 120 88 Stockholm
phone: +46 8 779 96 66, fax: +46 8 779 96 67
socialstyrelsen@strd.se
www.socialstyrelsen.se/publicerat
Art. no. 2009-126-144

Swedish Association of Local Authorities and Regions
Swedish National Board of Health and Welfare
2008
2 000 copies
Production: Ordförrådet AB
Printing: åtta.45, Solna

# Preface

This is a abridged version of the third healthcare report in a series entitled *Quality and Efficiency in Swedish Health Care – Regional Comparisons*, published in October 2008. The series compares healthcare quality and efficiency in the 21 Swedish county councils and healthcare regions by using a set of national performance indicators. The first report was published in 2006 and the second in October 2007.

The purpose of publishing comparative data about healthcare performance is twofold. First, the comparisons are a way of informing and stimulating public debate on healthcare quality and efficiency. The public, as both patients and citizens, has a right to know about the results of the healthcare services that are available to it.

The second purpose is to stimulate and support local and regional efforts to improve healthcare services in terms of clinical quality and medical outcomes, as well as patient experience and efficient resource use. In county councils and healthcare regions, political representatives, managers and staff of primary care clinics and hospitals can use the comparisons to locate and pinpoint the strengths and weaknesses of their healthcare systems. Comparisons are a powerful way of driving performance improvement.

This series of healthcare comparisons is a joint, long-term project of the Swedish Association of Local Authorities and Regions (SALAR) and the Swedish National Board of Health and Welfare (NBHW). Future publications are planned based on the original set of indicators but modified or expanded with respect to the areas of health care that are covered.

The steering committee for the 2008 report was composed of Roger Molin and Agneta Rönn from SALAR and Anders Åberg and Mona Heurgren from the NBHW.

The working group for the report consisted of Max Köster, Karin Nyqvist and Rickard Ljung from the NBHW and Stefan Ackerby, Lena Bäckström, Lena Eckerström, Göran Garellick, Bodil Klintberg, Martin Lindblom from SALAR and also of Fredrik Westander, a consultant.

More people made contributions to the report; from NBHW Charlotte Björkenstam, Milla Bennis, Anna Lindam, Åsa Klint, Emma Björkenstam, Johan Fastbom, Örjan Ericsson, Gunilla Ringbäck, Bengt Haglund and Mats Talbäck. From SALAR Birgitta Edström, Berlith Persson, Tilsith Lacoutur and Erik Sätterberg contributed.

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Director General, Swedish
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*Håkan Sörman*

CEO, Swedish Association of
Local Authorities and Regions

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# Introduction

## Sweden – a decentralized health care system

In Sweden 21 county councils and regions are responsible for supplying their citizens with health care services. This includes hospital care, primary care and psychiatric care. A county council tax supplemented by a state grant is the main mean of financing the health care system. In addition to that small user fees are paid at the point of use. Long term care for the elderly is financed and organized by the municipalities. Each county council and region is governed by a political assembly, with its representatives elected for a four year period at every general election.

The county councils and regions are of different size. Stockholm, Västra Götaland and Skåne are considerably larger than the rest, with a population between one and two milllion each. Gotland is smallest, with about 60 000 inhabitants. Most of the other county councils have populations in the range 200–300 000 inhabitants.

Within the framework of national legislation and varying health care policy initiatives from the national government, the county councils and regions have substantial decision-making powers and obligations towards their citizens. The Swedish health care system is, in short, a decentralized system. This makes it natural to put focus on the performance of the county councils and regions.

## 101 indicators in a straightforward model of presentation

In this report, 101 quality and performance indicators are used to compare the county councils and regions. They are grouped and presented as follows:

| | | | |
|---|---|---|---|
| ● | A | Medical Results | 63 indicators |
| ● | B | Patient Experiences | 9 indicators |
| ● | C | Availability of care | 14 indicators |
| ● | D | Costs | 15 indicators |

The four areas are further presented in the beginning of each section. All indicators are listed in the content section in the beginning of the report. The model of presentation is straightforward. The results for all 21 counties and regions are presented in 101 figures, one per indicator. In some cases, notably in section A Medical Results, data for men and women are presented separately. For close to 20 indicators, the results are presented at hospital level, to illustrate the greater variation of outcomes between hospitals, compared to county council level. For eight indicators results are compared for patients with different socioeconomic status.

For almost all indicators the county councils and regions are ranked, from better outcomes to less good ones, corresponding to the top and the bottom of the figures, respectively. Exceptions to this model of presentation are due to concerns over the quality of data or more fundamental problems with the interpretation of results. In section D Costs, it should be noted that low health care costs per capita not per se is a desired result; instead costs and outcomes should be valued together.

The reader should observe that a good/bad relative outcome, in comparison to other county councils, not without qualifications is a good/bad absolute outcome. All county councils could have top results, for example in an international comparison – or vice versa. Variation of outcomes should be interpreted in the light of this observation.

Each indicator and figure is supplemented by a text, describing the data and commenting on the result as a whole as well as on the variation between county councils and regions. When possible, references to national clinical guidelines or other goals are made. In A Medical Resultats, and also in B Patient Expericence 95% – confidence intervals is used to illustrate statistical uncertainty, for most indicators.

The set of indicators is chosen to mirror the health care system as a whole as good as possible, given the obvious and grave restriction of varying data availability. Still, the main evaluative effort is the ranking per each indicator. For a number of reasons we have had no ambition to summarize all indicators and results into an overall ranking of quality and efficiency.

### Further material and contact persons

This report and all figures in the report can be downloaded in PDF format.

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For information about this report and ongoing work in the joint project *Quality and Efficiency in Swedish Health Care – Regional Comparisons*, write to

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# A

# Medical Results

# A Medical Results

Indicator group A Medical Results contains more than half of the indicators. To allow for an overview, the 63 indicators have been broken down into the following areas:

- Mortality, hospitalisation and vaccination
- Drug therapy
- Intensive care
- Cancer survival rate
- Maternal and neonatal care
- Diabetes care
- Psychiatric care
- Stroke care
- Cardiac care
- Orthopaedic care
- Kidney care
- Other treatment methods

## MORTALITY, HOSPITALISATION AND VACCINATION

This area contains seven indicators, one of which is new. All of the indicators are used internationally, though definitions and methods of measurement vary. The first three, which cover avoidable mortality and hospitalisation, are broad performance measures and concern a number of different groups of diseases. The number of MRSA infections is also a performance measure, while the other three are process measures that reflect preventive healthcare interventions – vaccination for children and against influenza for the elderly, as well as cervical cancer screening.

An important measure that is missing is mammogramme frequency. It is generally included in international comparisons. Data on the percentage of women who receive mammogrammes are available in all or most regions, but nationally coordinated and standardised data collection is lacking.

## A:1 • Policy-related avoidable mortality per 100 000 inhabitants

Since the mid-1980s, the EU has conducted a project to compare the healthcare systems of the various Member States by means of an avoidable mortality measure. The purpose of creating such a measure is to apply existing knowledge about the causes of certain diseases and the efficacy of various treatment methods. The studied population was limited to ages 1–74.

The avoidable mortality measure consists of death from a number of selected diagnoses and causes broken down into two groups, the first of which is presented here. It refers to diagnoses and causes of death that can be affected by broad policy interventions, such as campaigns for smoking cessation and improved alcohol habits. This indicator is referred to as policy-related avoidable mortality. The diagnoses and causes of death included in this indicator are lung cancer, oesophageal cancer, cirrhosis of the liver and motor vehicle accidents.

The actual number of policy-related avoidable deaths for 2003–2006 totalled 12 370, of whom 4 800 were women and 7 570 were men.

Figure A:1 shows the aggregate Swedish Association of Local Authorities and Regions (SALAR) 2003–2006 data concerning policy-related avoidable mortality among women and men per 100 000 inhabitants. The comparison is age-standardised, i.e., a correction has been made for regional differences in the age structure of the population. Lung cancer and motor vehicle accidents accounted for the greatest percentage of deaths measured by this indicator.

The regions varied significantly from around 20 women per 100 000 inhabitants in one group to just over 30 women per 100 000 inhabitants in another. Note that the Gotland region had large random variations due to its limited size.

Mortality for men was almost double that of women, ranging from approximately 35 to more than 50 deaths per 100 000 inhabitants. Despite variations, the result was greater for men in all regions.

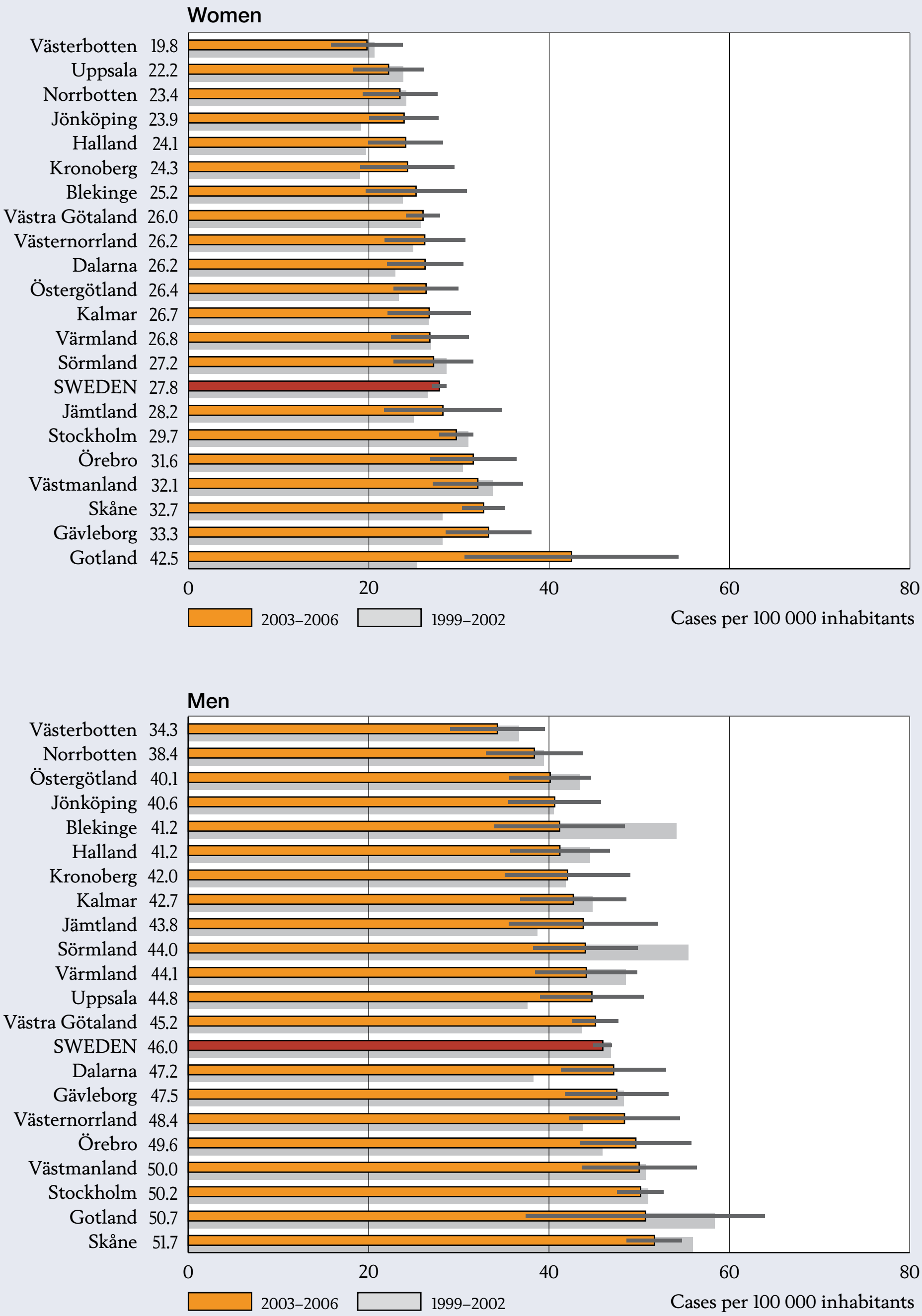


**Figure A:1** Policy-related avoidable mortality per 100 000 inhabitants, 2003–2006. Ages 1–74. Age standardised.

Source: Cause of Death Register, National Board of Health and Welfare

### A:2 • Healthcare-related avoidable mortality per 100 000 inhabitants

The second group of avoidable deaths consists of those from diagnoses that were selected because they were deemed possible to affect with various medical interventions by means of early detection and treatment. We refer to this indicator as healthcare-related avoidable mortality. Among the diagnoses included in this indicator are diabetes, appendicitis, stroke, gallstone disease and cervical cancer.

The actual number of healthcare-related avoidable deaths for 2003–2006 totalled 9 427, of whom 3 928 were women and 5 499 were men. Figure A:2 presents the number of deaths per 100 000 inhabitants by region and gender.

Stroke, diabetes and cervical cancer are major contributors to the healthcare-related avoidable mortality indicator. Variations among the regions were of approximately the same magnitude as for policy-related avoidable mortality.

Generally speaking, mortality rates were significantly higher for men than women, but the differences were smaller than in the case of policy-related avoidable mortality. The gender differences varied from region to region.

Partly because diagnostic methods may vary among the regions, the differences in healthcare-related avoidable mortality (particularly from diabetes) should be interpreted with a degree of caution.

No international comparisons have proceeded from a measure of healthcare-related avoidable mortality identical to the one used here. A similar comparison for 1998 among 19 countries found that Sweden had the lowest mortality rates. Sweden ranks poorer in comparisons that include deaths from myocardial infarction.

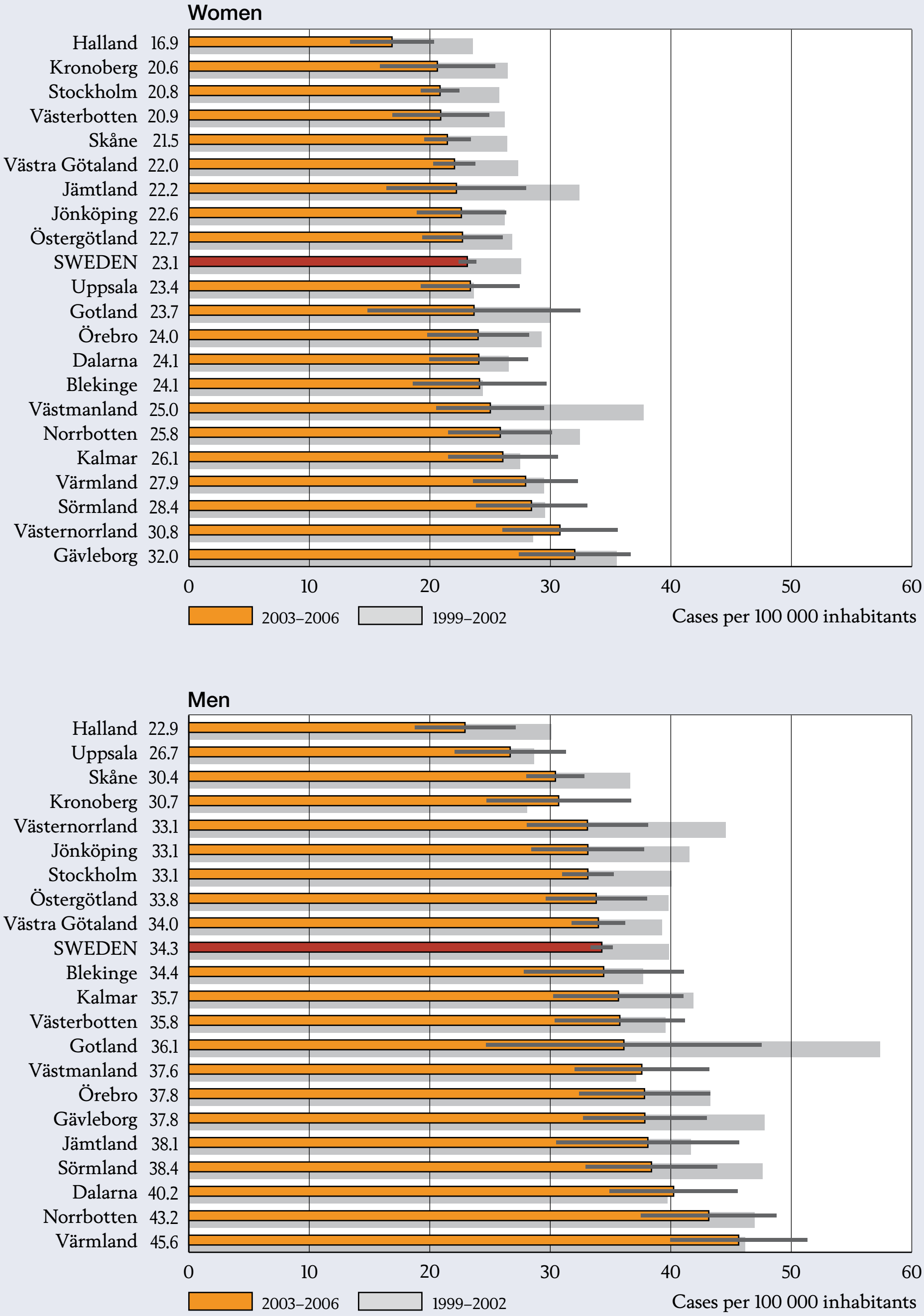


**Figure A:2** Healthcare-related avoidable mortality per 100 000 inhabitants, 2003–2006. Ages 1–74. Age standardised.

Source: Cause of Death Register, National Board of Health and Welfare

## A:3 • Avoidable hospitalisations per 100 000 inhabitants

The avoidable hospitalisations indicator measures efficiency, availability and treatment for selected conditions in outpatient care, such as preventive public health and primary care. The assumption is that unnecessary hospitalisations can be avoided if patients with the selected conditions receive proper outpatient care.

The avoidable hospitalisations indicator includes a number of selected diagnoses. First are diagnoses that reflect outpatient treatment of chronic or long-term conditions. The selected conditions are anaemia, asthma, diabetes, heart failure, hypertension, chronic obstructive lung disease and angina pectoris.

Second are several acute conditions for which proper treatment within a reasonable period of time should avert hospitalisation. The selected conditions are bleeding ulcers, diarrhoea, epileptic seizures, inflammatory diseases of female pelvic organs, pyelitis and ear, nose and throat infection.

Other countries use similar aggregate measures – the English literature often refers to ambulatory care sensitive conditions. There are many versions of the measure, primarily in terms of the diagnoses to be included. Sweden is currently participating in an OECD project aimed at establishing a measure to which all countries can agree.

Figure A:3 presents the number of people with avoidable hospitalisations per 100 000 inhabitants in 2007. The actual number of 112 000 included approximately the same number of women and men. The data are age-standardised. The fact that men exhibit higher rates is probably due to the selection of diagnoses rather than their having received poorer outpatient treatment.

Figure A:3 indicates each region's performance in 2007, which may be compared with the corresponding values for 2002 as shown in a shaded parallel bar. For the country as a whole, the number of avoidable hospitalisations declined during the period. The decrease applied to nearly every region, though to varying degrees.

Because the occurrence of certain diseases, and possibly the diagnostic and reporting methods used, varies from region to region, differences in avoidable hospitalisation should be interpreted with a degree of caution. The availability of hospital beds probably plays a role as well. If there are plenty of beds, the threshold for hospital admission is low, and vice versa.

While potentially avoidable hospitalisations will never be totally eliminated, the regional differences indicate that latitude exists for better outpatient care.

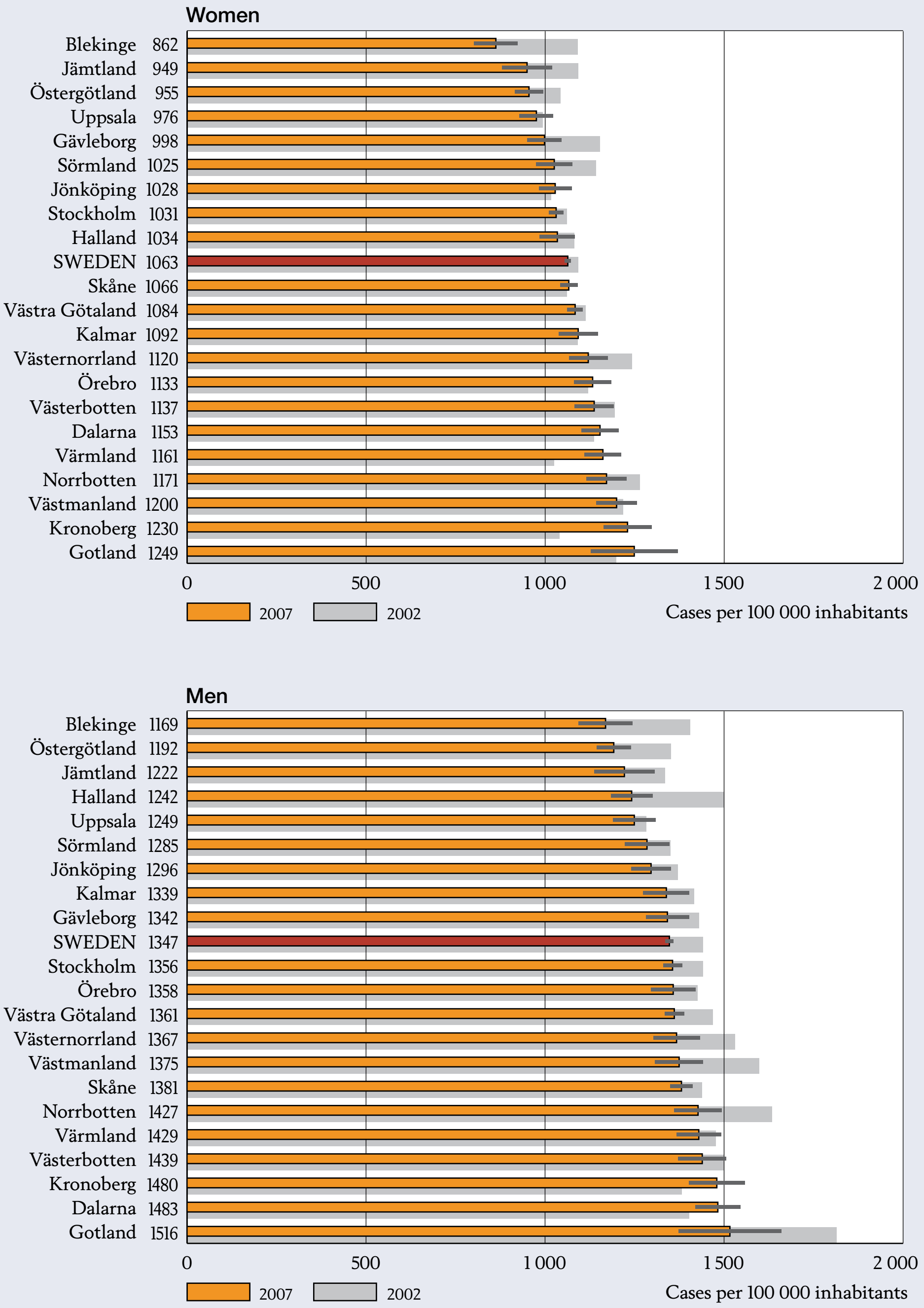


**Figure A:3** Patients with avoidable hospitalisations per 100 000 inhabitants, 2007. Age standardised.

Source: National Patient Register, National Board of Health and Welfare

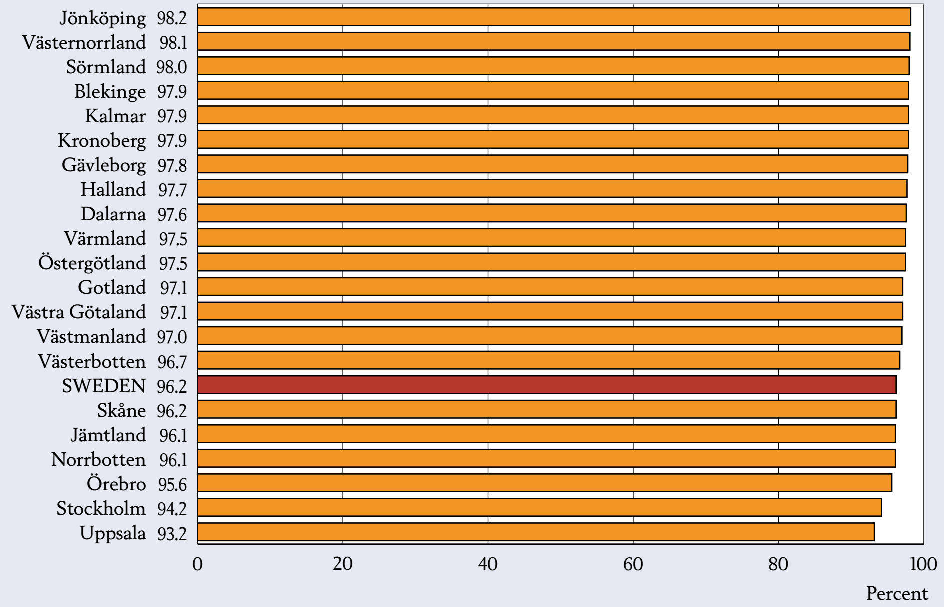


**Figure A:4** Vaccination of children – measles-mumps-rubella (MMR). Children born 2005, vaccination status reported in january 2008.

Source: Swedish Institute for Infectious Disease Control

## A:4 • Vaccination of children – measles-mumps-rubella (MMR)

After the combined MMR vaccine was introduced in 1982, reported cases of the three viral infections declined within a few years and are now uncommon in Sweden. To prevent the diseases from gaining a foothold, 90–95 percent of the population must be immune, either through vaccination or natural infection.

Vaccination data are kept by the paediatric care system and collected by the Swedish Institute for Infectious Disease Control. The Örebro and Uppsala regions have their own vaccination registers and report somewhat differently.

A large percentage of Swedish children are vaccinated compared to other countries. A total of 96.2 percent, or 99 315, of children born in 2005 had been vaccinated by January 2008. The great majority of regions had a vaccination frequency of 97–98 percent.

## A:5 • Vaccination of people age 65 and older, and other high-risk groups – influenza

Various groups – such as people age 65 and older, as well as those with chronic heart or lung disease or impaired immune system – are at higher risk of complications

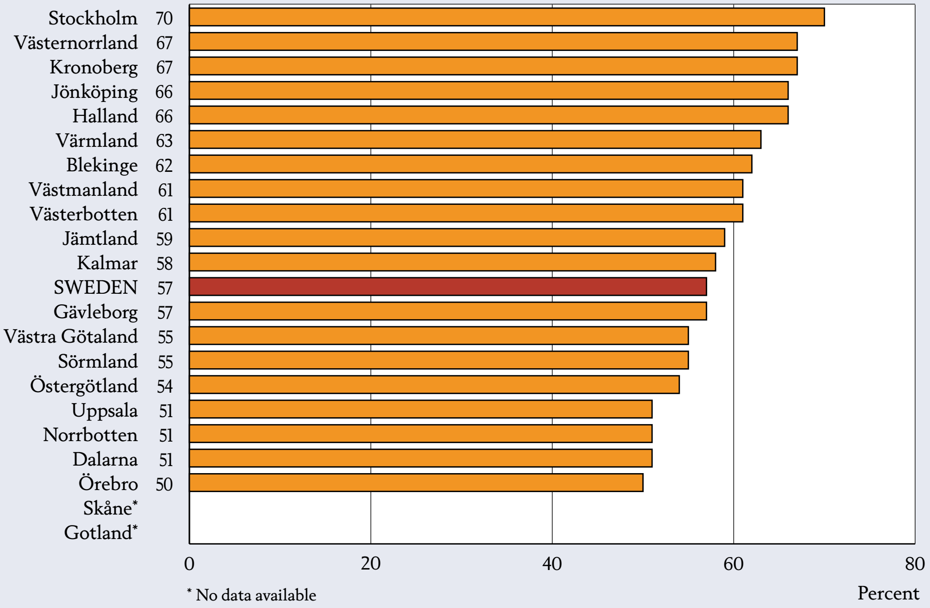


**Figure A:5** Vaccination of people age 65 and older, winter 2007/2008.

Source: Swedish Institute for Infectious Disease Control

from influenza. To avoid premature death and influenza-related care, flu vaccine must always be available to these groups

Figure A:5 shows the percentage of Swedes age 65 and older who were vaccinated against influenza during winter 2007–2008. The statistics are based on annual compilations by the various regional infectious disease control units. No data are available from Gotland and Skåne. The national percentage was estimated excluding those regions. Because there is currently no uniform national method for reporting the number of vaccinations, the comparison is associated with great uncertainty. Only Jönköping and Värmland have regular vaccination registers. A possible way to obtain comparable data on flu vaccination would be for each region to report to the Institute for Infectious Disease Control Sveac register.

## A:6 • Occurrence of methicillin-resistant Staphylococcus aureus (MRSA)

Staphylococcus aureus is among the most common bacteria in the skin and nasal passages, as well as the most frequent source of skin abscesses. While the bacterium does not usually have any ill effects, it can cause serious conditions such as meningitis and pneumonia, as well as blood poisoning (sepsis) and serious joint infections.

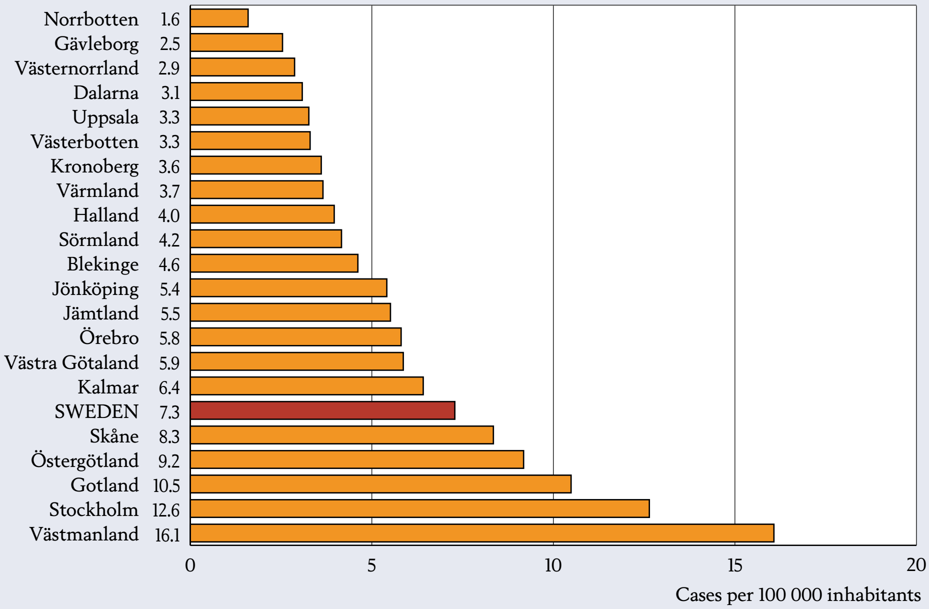


**Figure A:6** MRSA infection per 100 000 inhabitants, 2006–2007. Contracted in Sweden.

Source: Swedish Institute for Infectious Disease Control

Approximately 1 percent of all Staphylococcus aureus detected in Swedish laboratory cultures are methicillin-resistant Staphylococcus aureus (MRSA). Methicillin is the antibiotic normally prescribed for Staphylococcus infections.

Given the infection's resistance to antibiotics, treatment options are limited, more expensive, more resource-intensive and associated with additional side-effects. The source of most MRSA cases contracted in Sweden is outside of care facilities. But if MRSA infection is well established at a hospital or other care facility, the risk that it will spread is high and difficult to counteract. That places heavy demands on institutional hygiene routines.

A total of 1 127 MRSA cases, 658 of which were contracted in Sweden (domestic contagion), were reported in 2007. Since MRSA infection became subject to reporting in 2000, the number of cases has increased year by year. While partly reflecting actual occurrence in the population, the higher figures may also be due to more frequent testing. Domestic contagion showed a wide regional variation from 1.6 to 16.1 cases per 100 000 inhabitants in 2006–2007. MRSA infection has spread extensively in the Stockholm region since 2000, but domestic contagion fell somewhat from 2006 to 2007. The number of cases in Västmanland rose sharply from 2005 to 2007.

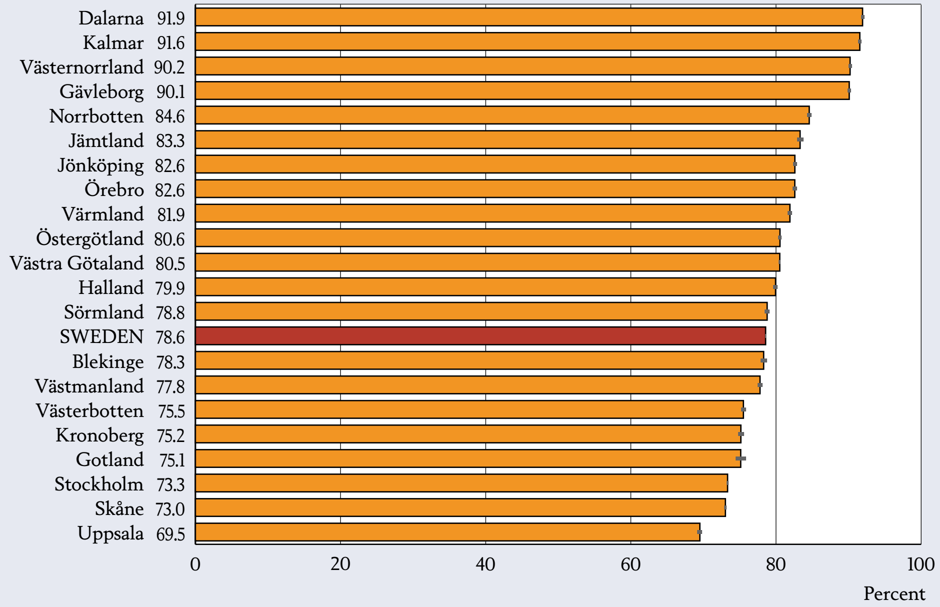


**Figure A:7** Cervical cancer screening among women aged 23–60, 2006. Weighted average.

Source: National Swedish Cervical Cancer Screening Register

## A:7 • Cervical cancer screening

The purpose of cervical cancer screening is to detect preliminary stages of the disease. In accordance with recommendations of the NBHW, women age 23–50 are to be offered cervical cancer screening every three years. The examinations are to be spaced farther apart after that and stop completely at the age of 60, given that older women run a very low risk of developing cell changes.

The National Quality Register for Cervical Cancer Screening compiles individual-based data on Pap tests from pathological and cytological laboratories throughout the country. The summary aims to provide a factual basis for assessing the scope of cervical cancer screening in Sweden, as well as it preventive effect.

Just under 700 000 Pap tests are performed each year, approximately 90 percent of which are in women age 23–60. Almost 70 percent of the tests are performed as part of the organised screening programme.

The participation rate refers to the percentage of women who have Pap tests after being called in for screening or due to some other reason. Calculation of the participation rate includes Pap tests taken by midwives after women have been called in for cervical cancer screening, as well as Pap tests taken by gynaecologists on clinical indication as follow-up after treatment or for preventive purposes.

A region can directly affect the participation rate through its system of calling women in for cervical cancer screening. Regions with high participation rates generally have a lower frequency of cervical cancer than regions with low participation rates. The greatest relative decline in cervical cancer over time is normally observed in regions with high participation rates. The prospects for persuading women to participate in cervical cancer screening vary from region to region. Generally speaking, the participation rate is lower in the urban areas and higher in northern Sweden than southern Sweden.

As shown by Figure A:7, the national participation rate for cervical cancer screening among women age 23–60 was 79 percent in 2006. That was below the target of 85 percent set by the EU. Only five regions met the target. Kalmar, Dalarna, Gävleborg and Västernorrland reached 90 percent or more, while nine regions were below 80 percent. The regions with the highest participation rates demonstrate that a significantly higher national average than the present 79 percent is achievable.

Thanks to participation by most Swedish women in cervical cancer screening, the disease has declined substantially and become uncommon. Cervical cancer is one of the most common forms of cancer in countries where few women receive Pap tests, generally affecting those in their 40s.

## DRUG THERAPY

The drug therapy group contains six indicators, three of which are new. Two indicators shed light on drug consumption by the elderly. They are the same as last year but have been supplemented with data on drugs dispensed through the ApoDos service. Because the analytic method has been altered accordingly, the results are not fully comparable with last year. Three indicators concern antibiotic therapy – the one that covers broad-spectrum antibiotics for urinary tract infection is the same as last year. One of the new indicators concerns children who are treated with penicillin V and a second one concerns the frequency of antibiotic therapy in the total population. The third new indicator looks at treatment with biological drugs for rheumatoid arthritis. The indicator on consumption of psychopharmacological drugs by the elderly is in the psychiatric care group.

The data on drug therapy was taken from the Prescribed Drug Register, with the exception of biological drug data, which were obtained from the Swedish Rheumatology Quality Register. The NBHW Prescribed Drug Register is based on data from the National Corporation of Swedish Pharmacies.

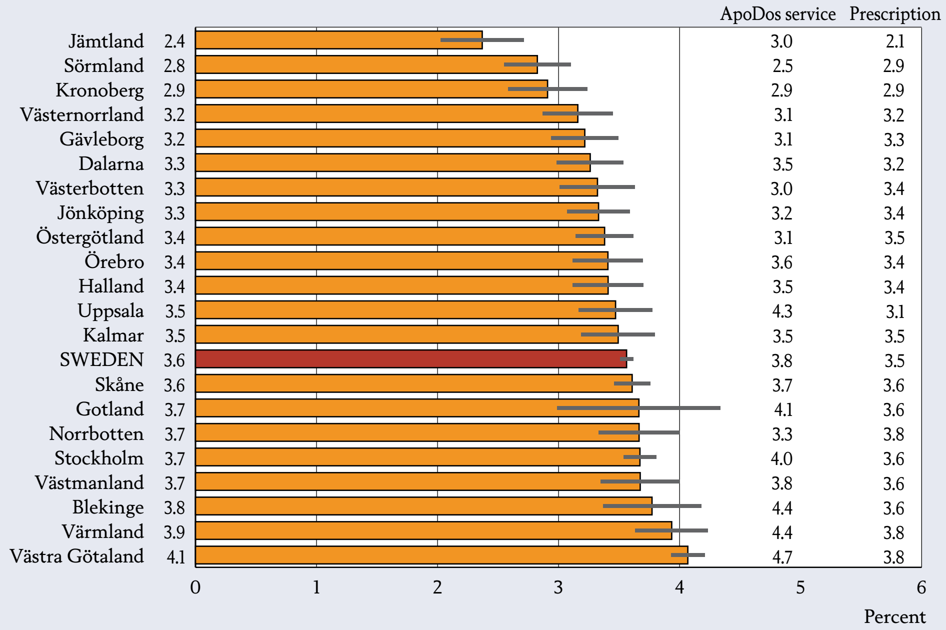


**Figure A:8** Drug-drug interactions that should be avoided in the elderly, October–December 2007.

Source: Prescribed Drug Register, National Board of Health and Welfare

## A:8 • Drug-drug interactions that should be avoided in the elderly

Class C and D are the clinically relevant drug-drug interactions, i.e., combinations of drugs that can have a significant impact on how each of them is metabolised or acts. According to FASS (the Swedish equivalent of the Physicians' Desk Reference), a Class D interaction "can lead to serious clinical consequences in terms of severe side-effects or lack of efficacy, or may otherwise be difficult to control with individual doses. Thus, the combination should be avoided."

Figure A:8 shows that the proportion of elderly who consumed drugs that pose the risk of Class D interactions was 3.6 percent in October-December 2007. The share of elderly who consumed such combinations of drugs ranged from 2.4 percent in Jämtland to 4.1 percent in Västra Götaland. Only elderly who consumed prescription drugs are included in the comparison.

The percentage presented in the bars concerns drugs dispensed through both the ApoDos service and prescriptions. Figure A:8 also shows the percentage of elderly who consumed drugs with Class D interactions in the ApoDos and prescription group. The percentage was marginally smaller for the prescription group. The regional variation was relatively small but somewhat greater in the ApoDos group,

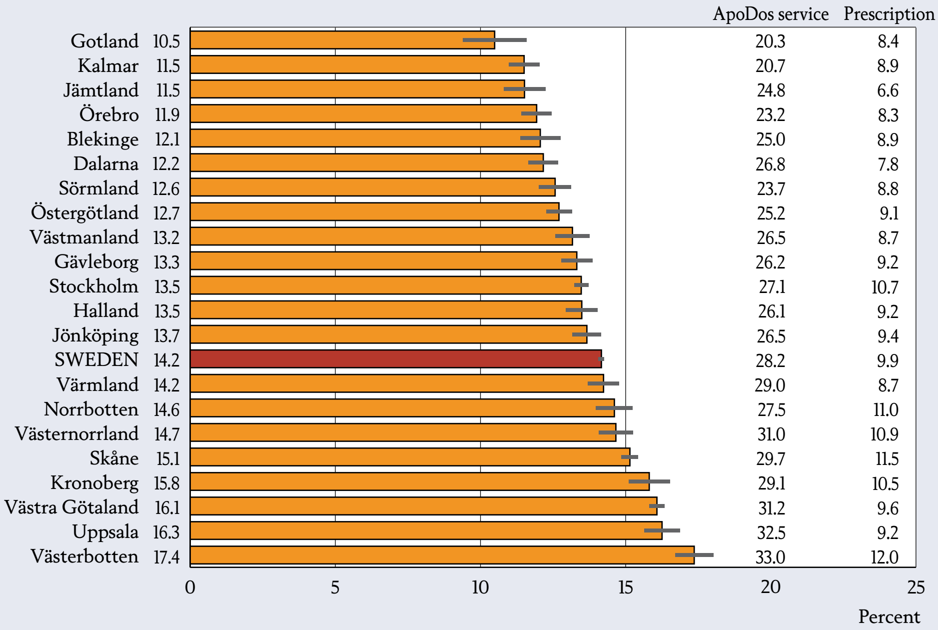


**Figure A:9** Polypharmacy – elderly who consume ten or more drugs, October–December 2007.

Source: Prescribed Drug Register, National Board of Health and Welfare

for which the share of elderly who consumed the drug combinations in question ranged from 2.5 percent to 4.7 percent.

Though not shown here, the percentages of elderly who received their drugs through the ApoDos service and by prescription varied among the different regions. Uppsala and Västra Götaland had the highest percentages of elderly who used the ApoDos service, whereas Stockholm had the lowest percentage. That is why drug consumption is broken down into the ApoDos and prescription groups. There has been some discussion to the effect that the ApoDos service, which offers considerable advantages for some patient populations, makes it easier for patients to start consuming new drugs without a review of their overall consumption. One possible source of error is that the Prescribed Drug Register does not capture consumption of drugs dispensed from storehouses at assisted living facilities. Nor does the register include non-prescription drugs or drugs prescribed as part of inpatient care.

## A:9 • Polypharmacy – elderly who consume ten or more drugs

Studies have demonstrated that polypharmacy (concurrent consumption of several drugs) is associated with non-compliance, higher costs, the risk of harmful drug-

drug interactions and drug-related hospitalisation. The scientific literature sometimes defines polypharmacy as the concurrent consumption of five or more drugs. Some studies of the elderly employ the consumption of ten or more drugs as a measure of excessive polypharmacy.

The proportion of elderly concurrently consuming ten or more drugs was approximately 14 percent in 2007, with a regional variation from just over 10 percent to 17 percent. The columns to the right of Figure A:9 show polypharmacy in the ApoDos and prescription group. A very high 28 percent of elderly in the ApoDos group used ten or more drugs, as opposed to 10 percent in the prescription group. The regional variation was significant, particularly in the ApoDos group (20–33 percent).

All regions have drug storehouses as part of home healthcare services or assisted living facilities that may have a particular impact on this indicator. Because home healthcare services are by definition included in outpatient care, drug consumption should be seen as part of the pharmaceutical benefits scheme. But since the consumption of drugs from storehouses is not entered in the Prescribed Drug Register, drug consumption in outpatient care is underestimated. However, in most cases these drugs are probably used on a temporary basis, in emergency situations or at short-term facilities. The impact of this kind of drug consumption on the comparison in Figure A:9 is difficult to assess.

In many of the report's other indicators, a large number of patients receiving drug therapy is regarded as a favourable result. But a large number of concurrent drug therapies can lead to adverse events. This indicator illustrates the importance of choosing therapies that proceed from an overall assessment of the individual patient's needs.

### A:10 • Occurrence of antibiotic therapy

There is a clear correlation between antibiotic consumption in a country and the percentage of resistant bacteria. Increasing antibiotic consumption may reach the point that serious infections can no longer be treated effectively. Sweden and the other Scandinavian countries have lower percentages of antibiotic consumption than the rest of Europe, but the figure has risen in Sweden over the past few years.

An average of one out of four inhabitants, or 2 342 000 altogether, picked up an antibiotic prescription in 2007. A total of 1 356 000 of them were women and 986 000 were men. Figure A:10 shows a relatively large regional variation, from 20 per 100 000 in Västerbotten to 28 per 100 000 in Stockholm. Generally speaking, fewer antibiotics are prescribed in northern Sweden. The increase in recent years includes nearly all regions, Uppsala being an exception. Antibiotic therapy has increased

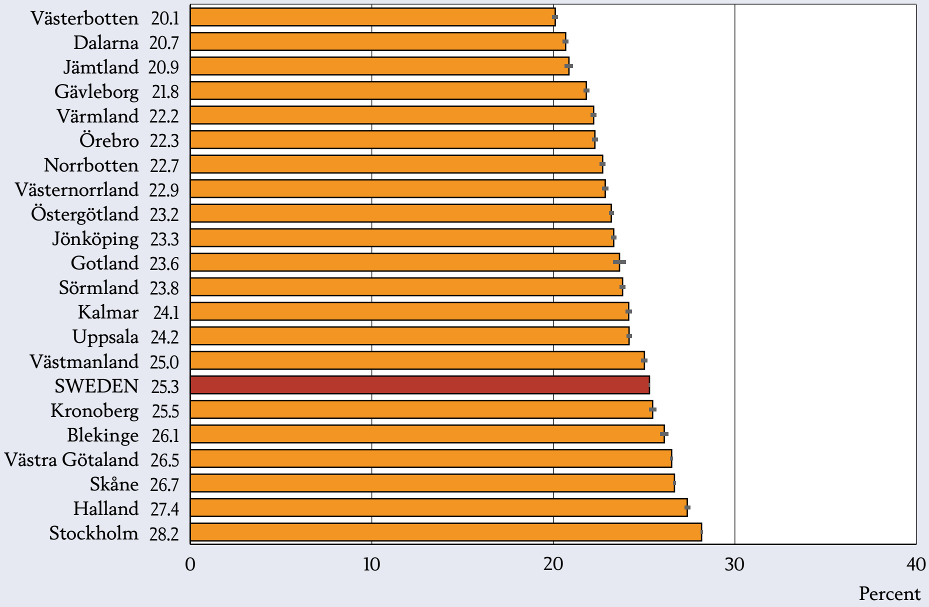


**Figure A:10** Occurrence of antibiotic therapy in the population, 2007. Age standardised.

Source: Prescribed Drug Register, National Board of Health and Welfare

most in the youngest age groups. While a low percentage of antibiotic prescriptions is desirable, the optimal level is difficult to establish.

## A:11 • Penicillin V in treatment of children with respiratory antibiotics

The prescription of antibiotics is rising most rapidly in children and adolescents. A total of 33 percent of all children age 6 and younger were given some type of antibiotic in 2007. Treatment of respiratory infections accounted for the greatest increase. Most such infections are due to viral infection and go away by themselves. Phenoxymethylpenicillin (penicillin V) is the first-line antibiotic therapy for respiratory infection deemed to have been caused by bacteria.

A:11 shows the percentage of children who received penicillin V among those whose first prescription during the year was for one of the antibiotics normally used to treat respiratory infection. Approximately 233 000 children were treated – 124 000 boys and 109 000 girls. The national proportion of those who received penicillin V was 70 percent, but there was a wide regional spread from 61 to 82 percent.

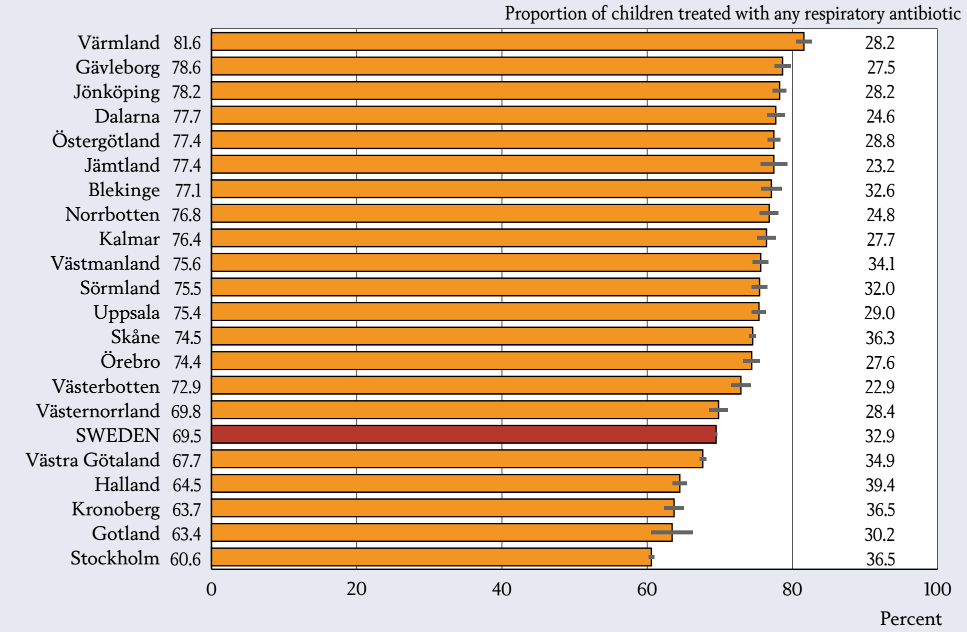


**Figure A:11** Penicillin V in treatment of children ages 0–6 with respiratory antibiotics, 2007. Age standardised.

Source: Prescribed Drug Register, National Board of Health and Welfare

The Prescribed Drug Register has no data on the indication for which the drug was prescribed. Thus, a source of error is that some of the reported prescriptions may have been for infections other than those of the respiratory tract.

## A:12 • Quinolone therapy in treatment with urinary tract antibiotics

Sweden and the other Scandinavian countries use a greater percentage of narrow-spectrum antibiotics, whereas Eastern and Southern Europe use a high percentage of broad-spectrum antibiotics. The lowest possible prescription of broad-spectrum antibiotics is generally desirable.

Quinolones are a family of broad-spectrum antibiotics that should normally be reserved for serious infections. The target of the Swedish Strategic Programme Against Antibiotic Resistance (Strama) and the Swedish Association of General Practice (SFAM) is that quinolones constitute no more than 10 percent of all prescriptions for urinary tract infection.

Quinolones as a percentage of all antibiotics prescribed for lower urinary tract infection were compared for all women age 18–64 who picked up a subscription for

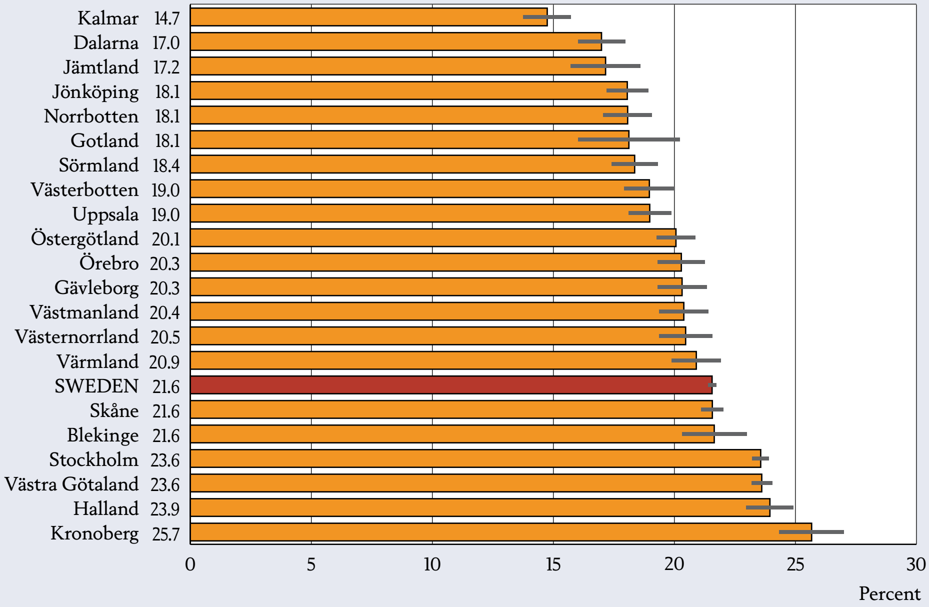


**Figure A:12** Fluoroquinolone therapy in treatment with urinary tract antibiotics, 2007. Women aged 18–64. Age standardised.

Source: Prescribed Drug Register, National Board of Health and Welfare

one of a selection of antibiotics in 2007. Of the more than 235 000 women included in the comparison, approximately 52 000 were prescribed quinolones.

A:12 demonstrates that all regions were higher than the Strama and SFAM recommendations, varying significantly from 15 to 26 percent. But the percentage of quinolone prescriptions was lower than in 2006, when the regional variation was 18–31 percent.

It is not possible to break the drugs down according to the indication for which they were prescribed. Thus, some of the prescriptions may have had other indications than lower urinary tract infection. But such prescriptions should represent a small percentage of the total and are not likely to differ much among the various regions. The analysis has not taken into consideration any regional differences in the occurrence of resistance.

## A:13 • Biological drugs for rheumatoid arthritis

Rheumatoid arthritis is a severe, often lifelong, disabling disease that mostly affects women, leading to poorer health-related quality of life and a shorter life expect-

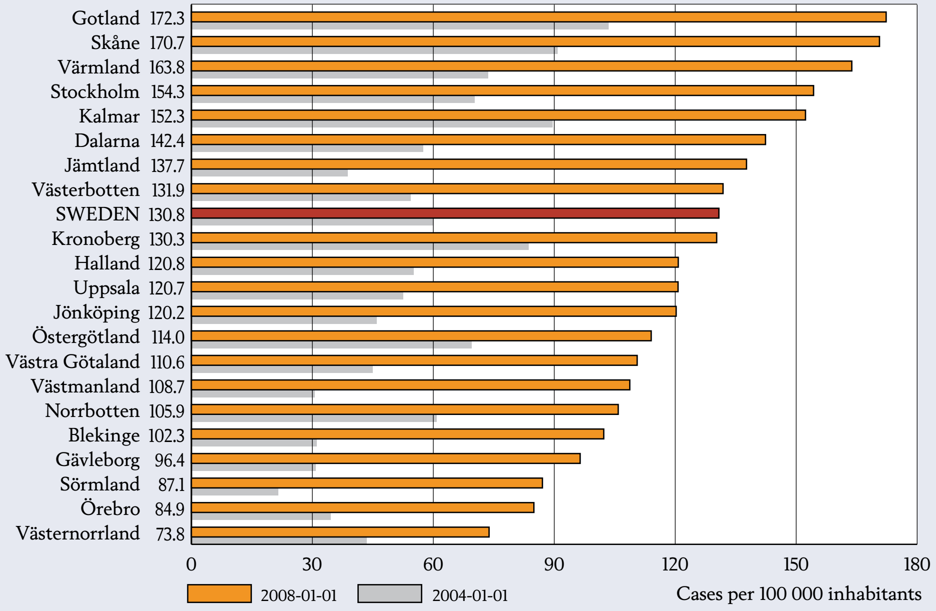


**Figure A:13** Patients on biological drugs for rheumatoid arthritis per 100 000 inhabitants, 1st January 2008.

Source: Swedish Rheumatoid Arthritis Registry

ancy. Previous palliative treatment has been replaced by new biological drugs that directly affect immune system mechanisms.

These drugs, which patients inject or receive as intravenous drip, can cause the disease to go into remission, but they also entail major costs for the various regions – 1.3 billion kronor in 2007. Patients often improve to the point that they can lead normal lives and return to work. Thus, the treatment is cost-effective, particularly in a broad socioeconomic analysis that includes indirect costs.

One key measure of care quality is that patients have equal access to treatment with biological drugs regardless of what region they live in. Another quality measure is the effect that drug therapy has on patient health. A comparison of access to treatment in different regions is presented here. The Rheumatology Quality Register also contains data on the patient-reported effect of biological drug therapy. Due to irregular access to the data, this indicator is not currently presented here.

Figure A:13 shows the number of patients per 100 00 inhabitants who were being treated with biological drugs on 1 January 2008. Only the population over age 18 was included. Regional data for the number under treatment on 1 January 2004 are also presented. The data were taken from the Rheumatology Quality Register. Patients were assigned to the region in which the clinic that treated them was located. A total of 12 678 of the 25 650 patients entered in the register were receiving biological drug therapy.

The number of biological drug patients has risen rapidly in recent years. The national average was 131 per 100 000 inhabitants, but the number ranged widely from 74 to 172, depending on the region. One reason for the variation may be that not all patients are entered in the register and that its participation rate varies from region to region.

The number of patients per 100 000 inhabitants who should be treated with biological drugs has not been established. Register data suggest that the effect for patients continues to be very good, even in regions where the greatest number are treated. That indicates that the drugs are being given to the right patients.

## INTENSIVE CARE

Two intensive care indicators, both new this year, are presented. One shows mortality after treatment at intensive care units and the other shows readmission to intensive care units.

Intensive care is defined as advanced surveillance, diagnosis and treatment when vital functions threaten to, or manifestly, fail. Severely ill patients, often with multiple life-threatening conditions, are cared for in a personnel-intensive and high-tech setting. Thus, intensive care is one of the most resource-intensive forms of health care. It cost an estimated 9–13 billion kronor, or 8–12 percent of all Swedish specialised medical care, in 2005.

Intensive care units (ICUs) treat approximately 40 000 patients every year. There were 86 ICUs in 2007, 67 of which were general intensive care units located at the great majority of district, county and university/regional hospitals. The remaining ICUs were specialised.

The main purpose of the Swedish Intensive Care Register (SIR), which started in 2001, is to support local quality and development efforts, as well as promote comparisons among the participating ICUs. The number of members rose to 64, 48 of which could submit data, in 2007. That represents a participation rate of 64 percent for district hospitals, 88 percent for county/central hospitals and 72 percent for regional hospitals. SIR estimates that it contained approximately 75 percent of all ICU intensive care events in 2007.

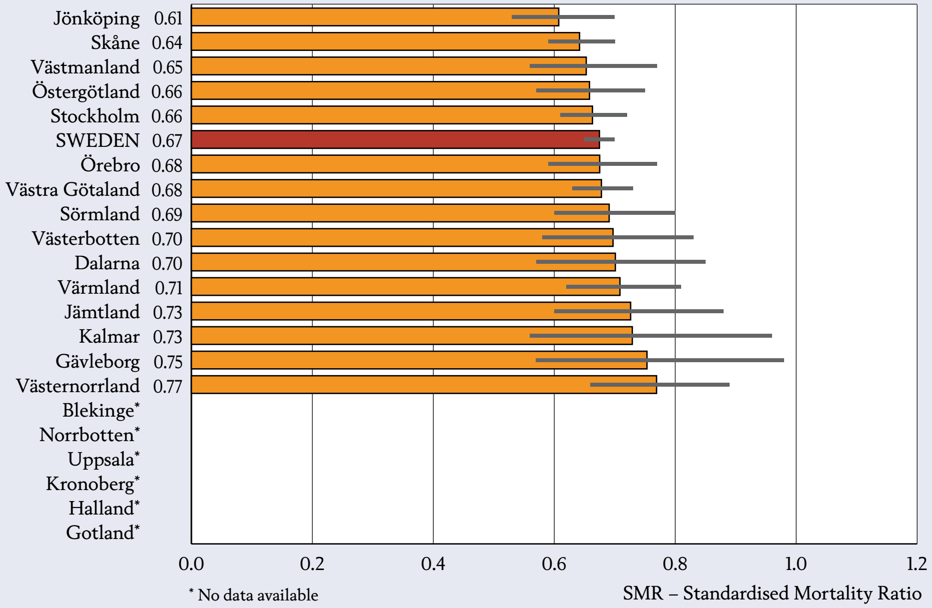


**Figure A:14** Standardised Mortality Ratio within 30 days after treatment at intensive care units, 2007.

Source: Swedish Intensive Care Registry

Sixteen ICUs that participate in SIR could not submit data, normally due to the county council's IT policy. All of the units were located in Uppsala, Kronoberg, Blekinge or Norrbotten. Four of the units have been members for a long time. It is vital that the obstacles to submitting data be removed.

## A:14 • Mortality after treatment at intensive care units

Figure A:14 shows the standardised mortality ratio (SMR), the ratio of observed mortality to expected mortality within 30 days after admission to an ICU. Standardisation and risk adjustment allow more correct comparisons of mortality, both over time and among different units. The SMR can be affected, given that the indicator reflects treatment throughout the care chain until 30 days after admission to the ICU.

But the SMR requires a nuanced interpretation – the best possible care and treatment for the sickest patients usually aims to preserve life. However, the best care and treatment may also involve refraining from or terminating an intensive care procedure. That may be the desired outcome of a terminal disease.

The Swedish APACHE risk adjustment system includes age, chronic disease, type of disease and severity of the acute disease. The risk of death within 30 days is calculated on the basis of these data.

The SMR is an important quality indicator that can provide a better, more sophisticated description of intensive care outcomes when combined with other indicators, such as how often patients drop out of or decline treatment. When consideration is paid to variations in data quality, patient characteristics not captured by APACHE, and chance, discrepancies in quality throughout the care chain are left to explain SMR differences.

The SIR targets an SMR of below 0.85. The lower the ratio, the better the result. The nationwide SMR for 2007 was 0.67, considerably below the target. The regional spread was 0.61–0.77. The six regions of Blekinge, Halland, Gotland, Kronoberg, Uppsala and Norrbotten had insufficient data to calculate the SMR. The 2007 ratio per ICU (hospital level) varied from 0.51 till 0.92. There was no gender difference.

Because incomplete or erroneous data collection can affect the SMR, it is important that data quality be assessed and protected. Thus, analysing non-participation is part of assessing the SMR. National non-participation in 2007 was above 16 percent, as opposed to SIR's target of below 10 percent. In addition to the six regions that had insufficient data, six regions fell short of the target. Non-participation in 2007 per ICU varied from 0% to 56%.

### A:15 • Readmission to intensive care units

It is well known that patients who are readmitted to the same ICU on an unscheduled basis shortly after discharge run a greater risk of dying. The SIR data for 2005–2006, which show a correlation between readmission within 72 hours and increased mortality, confirm that. For an ordinary 75-year-old, the risk of dying within 30 days rises from 15 to 23 percent. For that reason, the SIR presents the percentage of readmissions as a quality indicator. The percentage of readmissions may be partly affected by availability of ICU beds, as well as structured care after intensive care.

Figure A:15 shows the percentage of patients who were readmitted to an ICU on an unscheduled basis within 72 hours after discharge from the same ICU. SIR's target of readmission below 3 percent was included in its 2006 quality indicators. National readmission to the same ICU was 3.2 percent in 2007, with a regional variation of 1.8 to 6.4 percent. Östergötland, Stockholm and Örebro were well above the target. Four regions were unable to submit data.

The spread among hospitals/ICUs is not presented here but was greater than among regions. Readmission per ICU in 2007 varied from 0.5 to 9.1 percent.

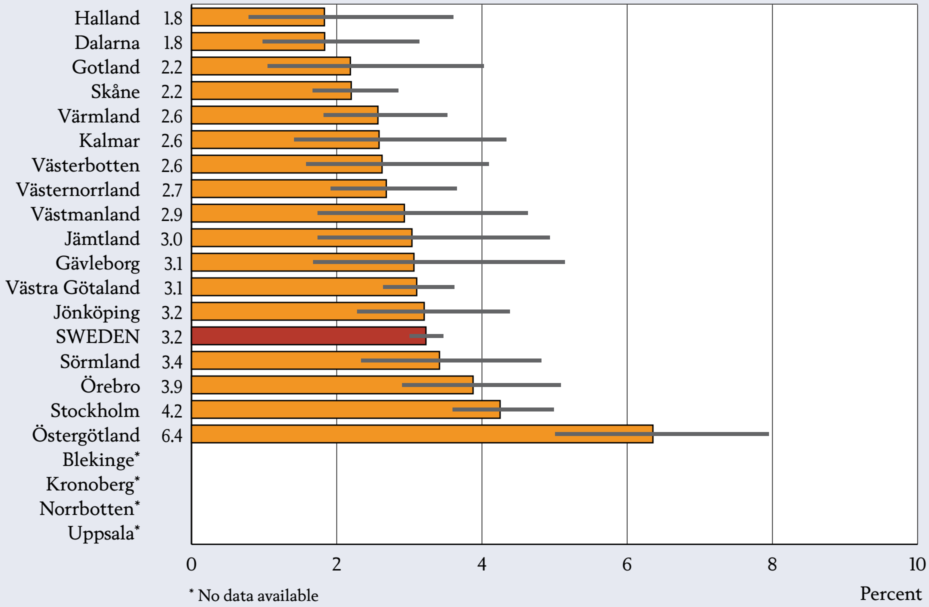


**Figure A:15** Unplanned readmission within 72 hours to intensive care units, 2007.

Source: Swedish Intensive Care Registry

## CANCER SURVIVAL RATE

Over 50 000 Swedes were diagnosed with cancer, the second most common cause of death, in 2006. But there are many survivors – at the end of 2006, approximately 160 000 Swedes were alive who had been diagnosed since 2002. The survival prevalence is expected to increase due to better diagnosis and treatment. Cancer care, particularly treatment methods and ensuring equal access to them, is frequently discussed. The government is putting together a plan to improve cancer care, and the NBHW introduced national guidelines in spring 2007 for certain forms of cancer.

We present six indicators of care for the four common forms of cancer: breast, colon, rectal and prostate. Three indicators concern five-year survival rates, one concerns active treatment and one concerns reoperations. This year's report includes a new indicator, which concerns time until treatment of head and neck tumours. The data for five-year survival rates are taken from the Swedish Cancer Registry, while the other data are taken from national healthcare quality registers.

## Cancer survival rates

Relative five-year survival rates were calculated for patients diagnosed with cancer in 2000–2006 and monitored until December 2006. Relative means that the rates represent a comparison with expected survival of people who were not diagnosed with cancer. A relative five-year survival rate of 50 percent indicates that half of the cancer patients would have been alive after five years if cancer had been the only possible cause of death. Any regional differences in average life expectancy have been taken into consideration. Patients were assigned to the region where they were entered in the population registry at the time of diagnosis.

Survival time refers to the period between diagnosis and death. The survival time can be extended by both early detection and proper care or other post-diagnostic developments. Thus, early detection leads to a longer survival time regardless of whether or not actual length of life increases. If early detection is at a stage in which the malignancy is easier to treat, thereby postponing death, both of the above factors come into play.

A comparative study of cancer survival rates in Europe was conducted as part of the 19-country EUROCARE-4 collaboration project. But because EUROCARE-4 relied on a different analytical method than used when calculating five-year survival rates, the data are not directly comparable with those presented here.

Sweden outperformed the average of the European countries that were studied when it came to the three types of cancer for which five-year survival rates are presented here. Swedish survival rates were almost 4 percent above the European average for colon and rectal (grouped as colorectal) cancer and approximately 7 percent above the European average for breast cancer. The Scandinavian countries (excluding Denmark, which did not participate in the study), are all on the same level, with the exception of Iceland, where the breast cancer survival rate is higher.

### A:16 • Colon cancer – relative five-year survival rates

Although colon and rectal cancer are commonly grouped together as colorectal cancer, their survival rates are presented separately here because of differences with respect to treatment and other factors..

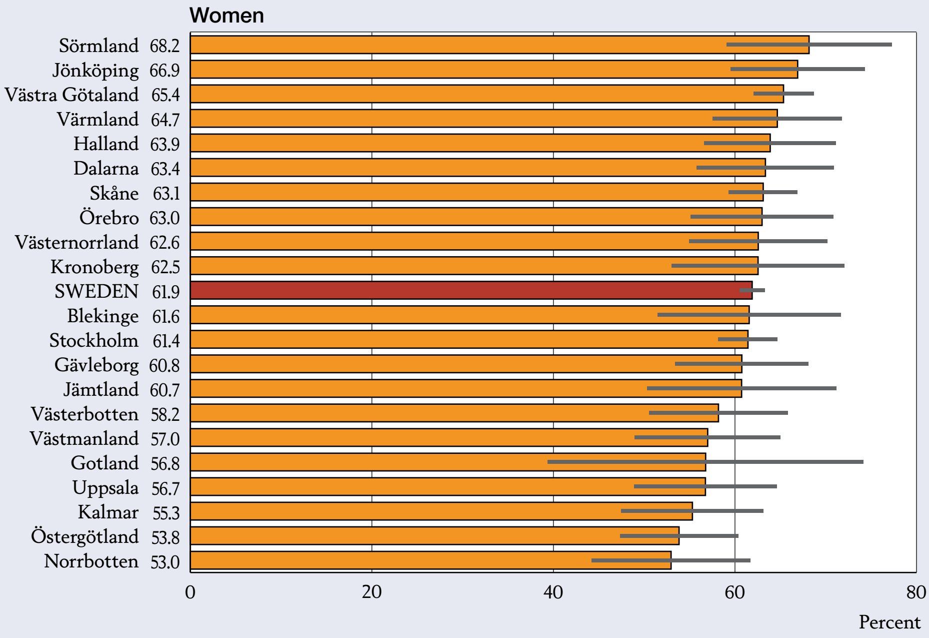
Colon cancer is one of the most common types of cancer. In 2006, colon cancer accounted for 7 percent of all cancer diagnoses in men and 8 percent in women. Approximately 3 700 people, a slight preponderance of whom were men, were diagnosed with colon cancer in 2006. Most of them were over age 70 and very few were younger than age 30. Total prevalence, i.e., the number people in the population who have been diagnosed with colon cancer, was almost 26 000 at the end of 2006. Just over 11 000 of them were diagnosed in 2002–2006. More than 1 800 people, evenly divided between women and men, died of colon cancer in 2006.

The relative five-year survival rate for Sweden as a whole was 56 percent among men and 62 percent among women. The regional variations were relatively large. The range was wider for men (44–67 percent) than women. Because the number of colon cancer cases is relatively small, the survival figures for some regions are associated with greater uncertainty. That is reflected in the broad confidence interval.

### A:17 • Rectal cancer – relative five-year survival rates

Colorectal cancer is among the most common types of cancer. Rectal tumours accounted for a somewhat larger share of all cancer diagnoses in men than women in 2006, though approximately 4 percent for both sexes. Approximately 2 000, or 1 out every 4 500, people were diagnosed in 2006. Rectal cancer usually develops after the age of 60. Given that symptoms often manifest early and people go to the doctor, many of them have a high chance of being cured. Approximately 800 people died of rectal cancer in 2006.

The relative five-year survival rate for Sweden as a whole was 57 percent among men and 60 percent among women. The regional spread was similar for the two sexes, with the exception of Blekinge, where women had a significantly higher survival rate than other regions. But the fact that many regions have few rectal cancer cases renders the survival figures less certain.



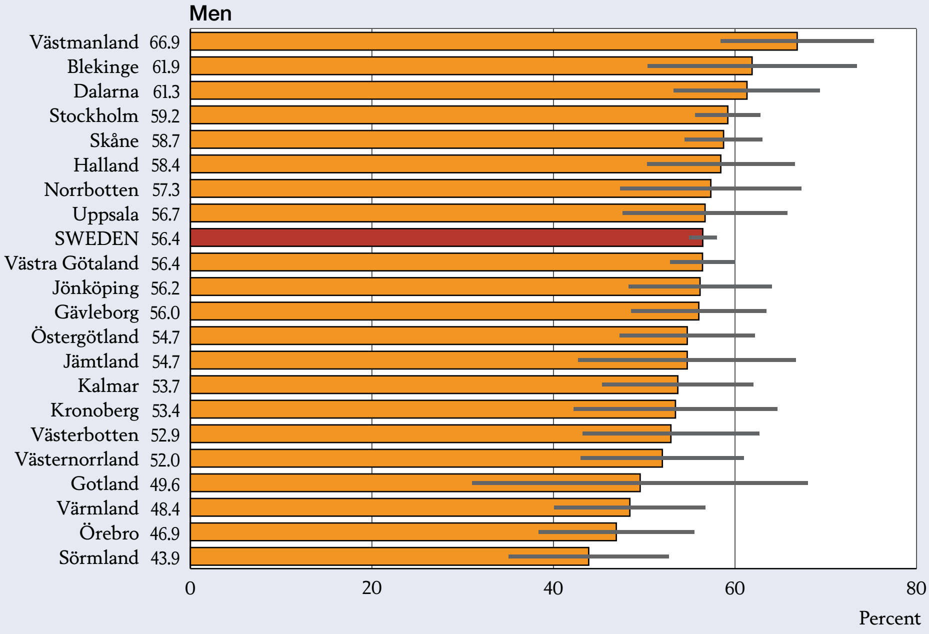


**Figure A:16** Colon cancer – relative five-year survival rates. Patients diagnosed 2000–2006 with follow-up until December 2006. Age standardised.

Source: Cancer Register and the Cause of Death Register, National Board of Health and Welfare

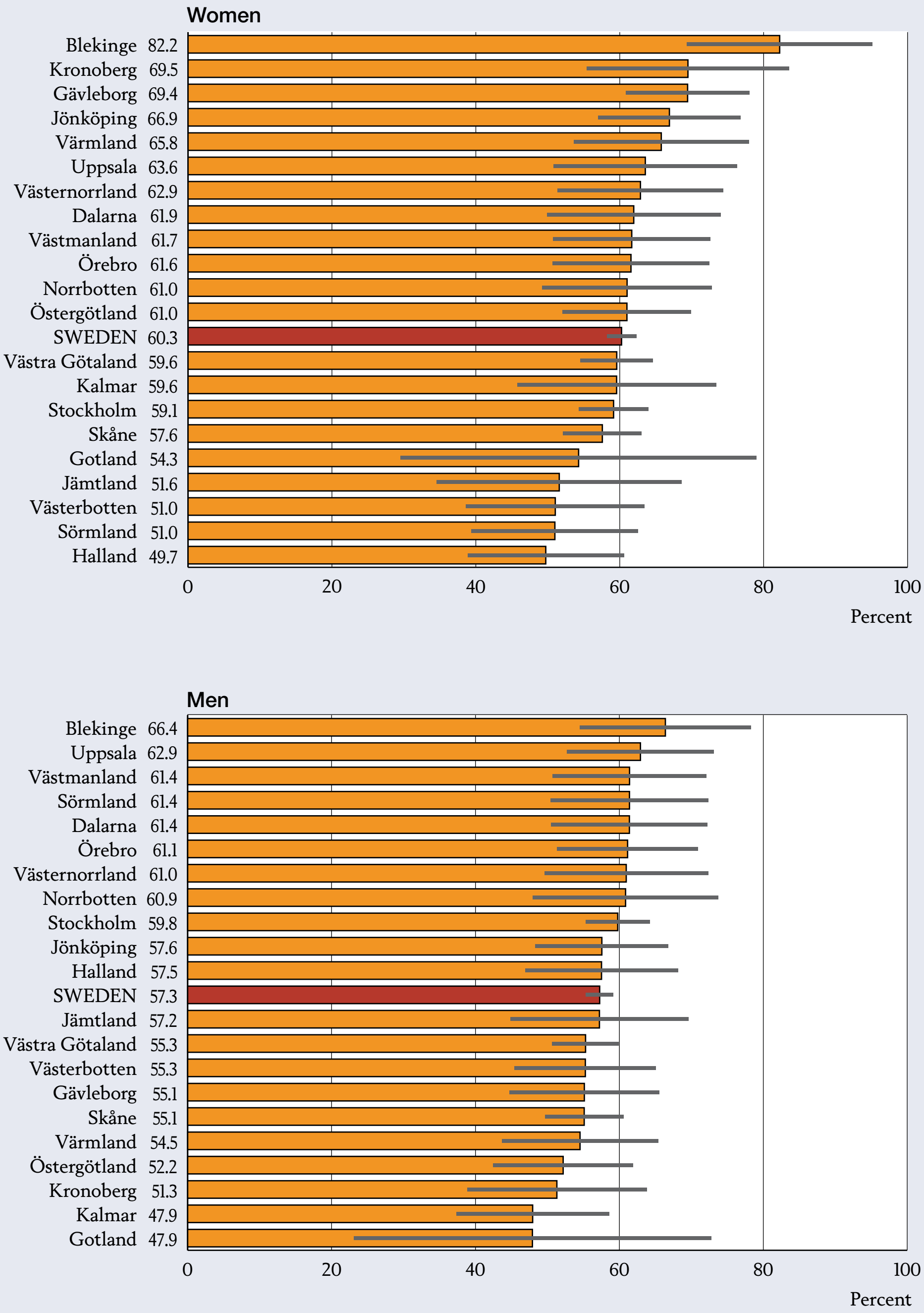


**Figure A:17** Rectal cancer – relative five-year survival rates. Patients diagnosed 2000–2006 with follow-up until December 2006. Age standardised.

Source: Cancer Register and the Cause of Death Register, National Board of Health and Welfare

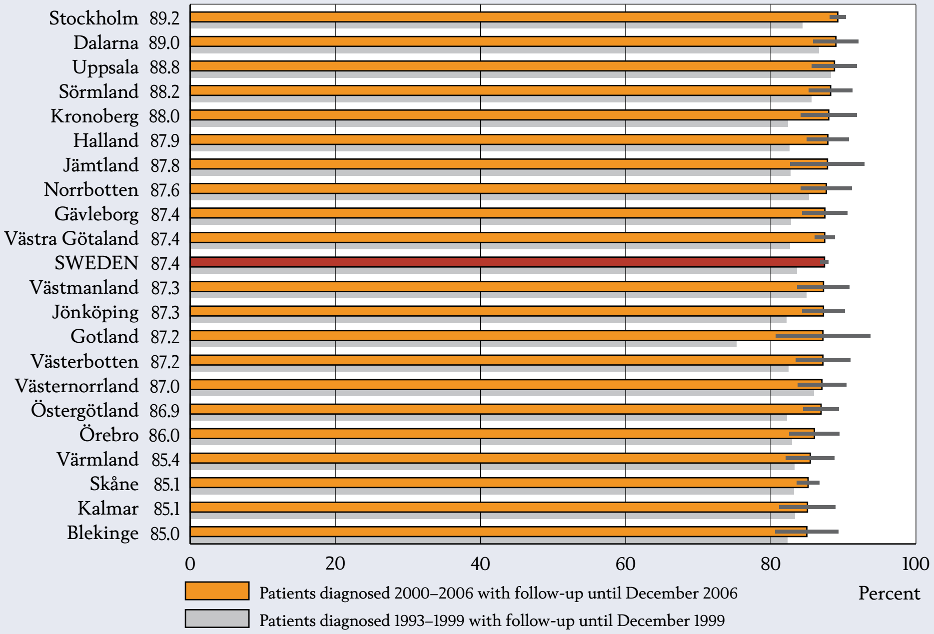


**Figure A:18** Breast cancer – relative five-year survival rates. Age standardised.

Source: Cancer Register and the Cause of Death Register, National Board of Health and Welfare

## A:18 • Breast cancer – relative five-year survival rates

Breast cancer is the single most common type of cancer among Swedish women, representing 29 percent of all diagnoses in 2006. Approximately 7 000 women are diagnosed with breast cancer each year. The risk of being diagnosed with breast cancer before age 75 is approximately 10 percent. Breast cancer is uncommon before 35–50, after which it increases with age. One out of every two breast cancer patients is diagnosed before age 65.

More than 80 000 women in the Swedish population have currently been diagnosed with breast cancer, and approximately 1 500 die each year. The incidence has been increasing, though slowly, for the past few decades. Male breast cancer occurs but is rare.

The five-year survival rate rose from 65 percent in the mid-1960s to 84 percent of women diagnosed in the mid-1990s. The current figure is 87 percent. The improvement is due to early detection by means of mammography screening, as well as better treatment methods.

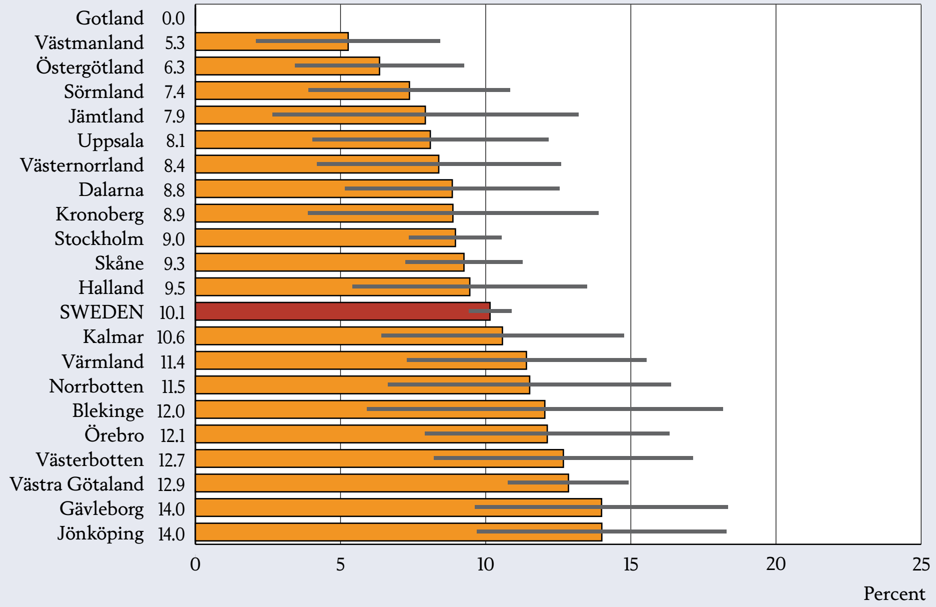


**Figure A:19** Rectal cancer – reoperation within 30 days, 2002–2006.

Source: Swedish Rectal Cancer Registry

While all regions now provide mammography screening, they differ in terms of when the service began and the age range of women who are called in for the examination. The extent to which women in the at-risk age groups receive mammogrammes is not currently being monitored at the national level.

Figure A:18 shows that regional five-year survival rates were in a narrow range of 85–89 percent. That suggests that the various regions provide fairly uniform breast cancer care. Previous analyses showed greater regional differences, partly because regions with poorer survival rates had not yet started mammography screening.

## A:19 • Reoperation for rectal cancer

The NBHW national guidelines contain a number of key quality indicators for treatment of rectal cancer. One of them is the percentage of reoperations within 30 days of initial surgery. The source is the Swedish Rectal Cancer Registry, which issues public reports of results on a hospital-by-hospital basis. The registry contains essentially all rectal cancer cases in Sweden.

The great majority of rectal cancer patients undergo surgery. Depending on the location and microscopic presentation of the individual tumour, as well as the condition of the patient, surgery can vary in terms of scope and risk. Complications can arise that require reoperation fairly soon after initial surgery. The frequency of reoperation may vary according to the procedures and reasons associated with initial surgery.

Treatment for rectal cancer in Sweden has palpably improved. The outcomes are considerably better than many other countries. But approximately one third of patients have some type of early complication, some of which require reoperation. The frequency of reoperation within 30 days for Sweden as a whole has remained unchanged at approximately 10 percent for a number of years. Although the number may appear to be high, it is not unusual compared with other countries.

Figure A:19 shows the percentage of reoperations in 2002–2006. Of 6 345 primary operations, 644 required additional surgery. There were major regional differences at the extremes. Three regions had reoperation rates of just under 5 percent, while the three highest regions approached 15 percent. No major gender differences emerged.

The differences among the regions do not necessarily mean that care is better or poorer in some of them. For instance, it is possible that some hospitals report minor interventions as reoperations, whereas others do not. The data have not been validated in that respect. See page 118 for hospital-level data.

### A:20 • Prostate cancer – active treatment of patients younger than age 65

Prostate cancer is the most common form of cancer among Swedish men. A total of 8 930 new cases of prostate cancer were reported in 2006. One in ten Swedish men develops the disease at some point during his life. Half were younger than 70 at the time of diagnosis, while almost 3 300 were younger than 65. Although the number of new cases has risen substantially in recent years, mortality rates have remained basically unchanged. The increase in the number of detected cancers was primarily due to more frequent diagnosis in men without symptoms. Age at the time of diagnosis has decreased accordingly. Despite its being a common disease, knowledge about optimal treatment at various stages is lacking.

Figure A:20 presents the percentage of men under age 65 with a localised medium-risk or high-risk tumour who received active primary treatment, i.e., prostatectomy or radiotherapy. The source of the data is the National Prostate Cancer Registry. The registry has a high participation rate throughout the country. The 2005 rate was 98 percent of all newly detected cases of prostate cancer in the National Cancer Registry. All units that diagnose and treat prostate cancer participate.

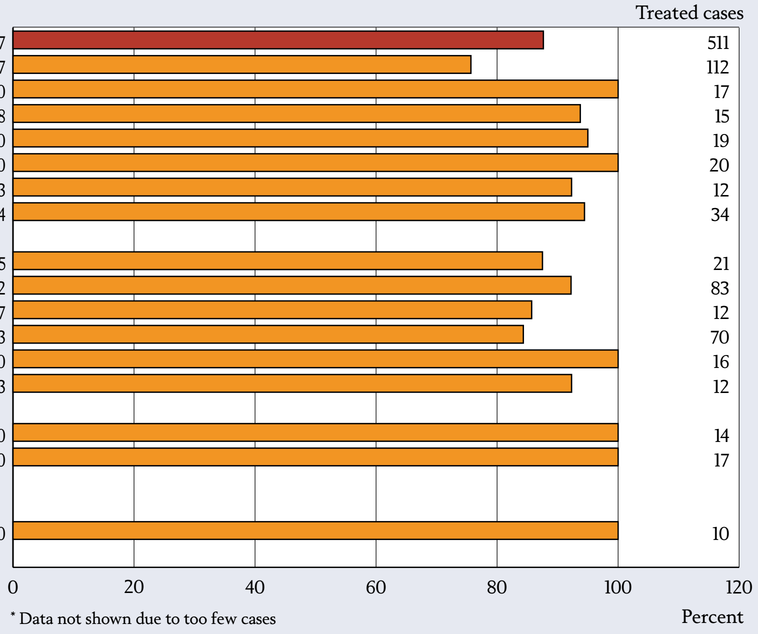


**Figure A:20** Prostate cancer – curative treatment of patients younger than age 65 with medium and high risk tumours, 2006.

Source: National Prostate Cancer Register of Sweden

This indicator is different than in previous reports. At the suggestion of those who maintain the registry, the selection criteria were narrowed to include only men younger than age 65 who had a localised low-differentiated tumour and whose serum concentration of prostate-specific antigen (PSA) was below 20 ng/ml. For such patients, it has been demonstrated that surgery reduces the risk of metastasis and death. Thus, a high percentage of them should be offered active treatment.

Given that biological, not chronological, age is decisive to treatment strategy, daily clinical practice should not recommend that all patients in this category receive active treatment. Moreover, individual patients may decline active treatment in order to avoid side-effects that reduce quality of life in favour of active monitoring. In that case, active treatment is not administered until there are signs that the disease has progressed. For the above reasons, 100 percent is not necessarily a target in this comparison. The national percentage of just above 90 percent is probably optimal. Regions that are substantially below 90 percent are presumably undertreating this patient population.

A total of 583 men, 511 of whom underwent treatment, met the criteria in 2006. Excluding the regions that had fewer than 5 case that fulfilled the inclusion crite-

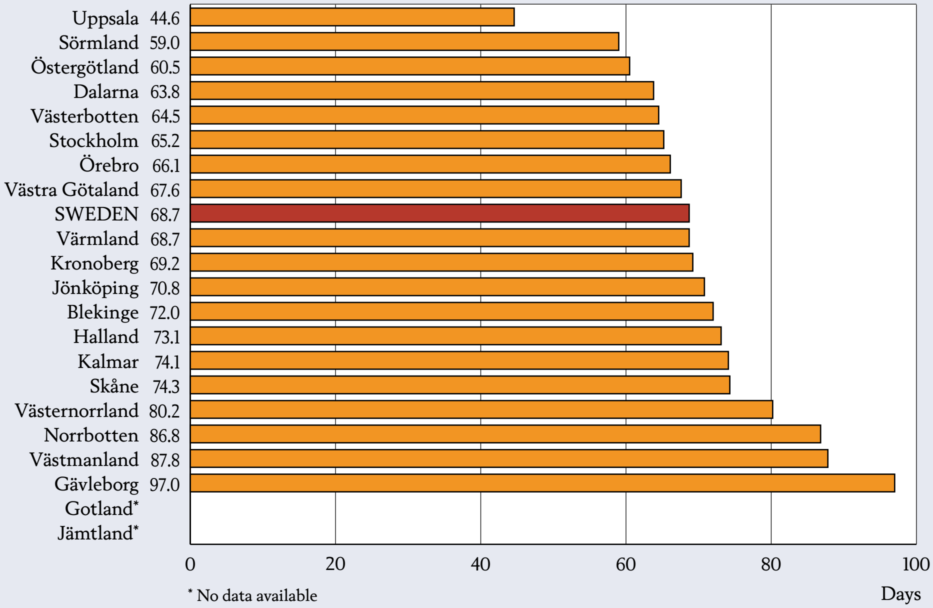


**Figure A:21** Time from the arrival of a referral until the commencement of treatment of head and neck tumours, 2002 – 15 October 2007.

Source: Swedish Quality Register of Otorhinolaryngology

ria, the variation was 76–100 percent. There were six regions in which fewer than 90 percent of men who met the criteria underwent treatment. The percentage of men with a medium-risk or high-risk tumour that were treated was fairly constant following the 89 percent figure in 2002. But the number of men in this population who underwent treatment rose from 274 in 2002 to 511 in 2006.

## A:21 • Time until treatment of head and neck tumours

Public discussion about waiting times for treatment often concerns care that is scheduled or for non-life-threatening conditions. Although cancer care is not acute in the ordinary sense of the word, it is important that the total time from suspicion of a tumour until completion of treatment be as short as possible. The time between a decision to treat or operate and the completion of the procedure is often emphasised. This indicator for malignant head and neck tumours reports on the time from the arrival of a referral until the commencement of treatment. That is a crucial period from the patient's point of view.

The source of the data is the Swedish Ear, Nose and Throat Care Quality Register. Most clinics in each region report the data used by this indicator. A comparison of participation rates when it comes to individual cancer cases has not been performed. Time until treatment of tumours is one of the quality measures reported on the register's website. The data for this indicator are taken directly from the website.

Figure A:21 shows the average number of days per region from the receipt of a referral until final treatment began. The measurement period extends from 1 January 2002 to the first half of October 2007. A total of 3 384 cases were included in the comparison. The regional breakdown was based on the location of the clinic rather than the patient's region of domicile.

The regional variation was very large, from just under 45 days for Uppsala at one end of the figure to 97 days for Gävleborg at the other end.

According to the register, the waiting time between pathoanatomical diagnosis (PAD) and the commencement of treatment accounted for almost half of the days in nearly all regions. Note that the long measurement period makes it impossible to draw strong conclusions about the total time until treatment in 2007 and other years.

## MATERNAL AND NEONATAL CARE

Five indicators are presented for maternal and neonatal care. The indicators cover induced abortion, foetal mortality, neonatal mortality, Apgar score under 7 and perineal tear during vaginal delivery. Results for some of the indicators may be due to circumstances that are difficult for the healthcare system to affect, while the relationship with clinical practice and its regional variations are clearer for other indicators. All of the indicators appeared in the 2007 report and have been updated with new data.

### A:22 • Induced abortion, both medical and surgical, prior to the 10th week of pregnancy

Approximately 37 000 abortions were performed in 2007, an increase from 2006. Some 27 600 of them were prior to the 10th week of pregnancy. The percentage of abortions prior to the 10th week rose by almost 2 percent from 2006 to 2007. Abortion is safer and more effective prior to the 10th week. Although abortion complications are uncommon, the risk increases with the term of pregnancy. Thus, it is important to minimise waiting times for abortions.

Prior to the 10th week of pregnancy, either a medical or surgical abortion can be performed. Surgery is most common after the 10th week. As a result, short waiting times are necessary to give the woman an opportunity to choose the method she

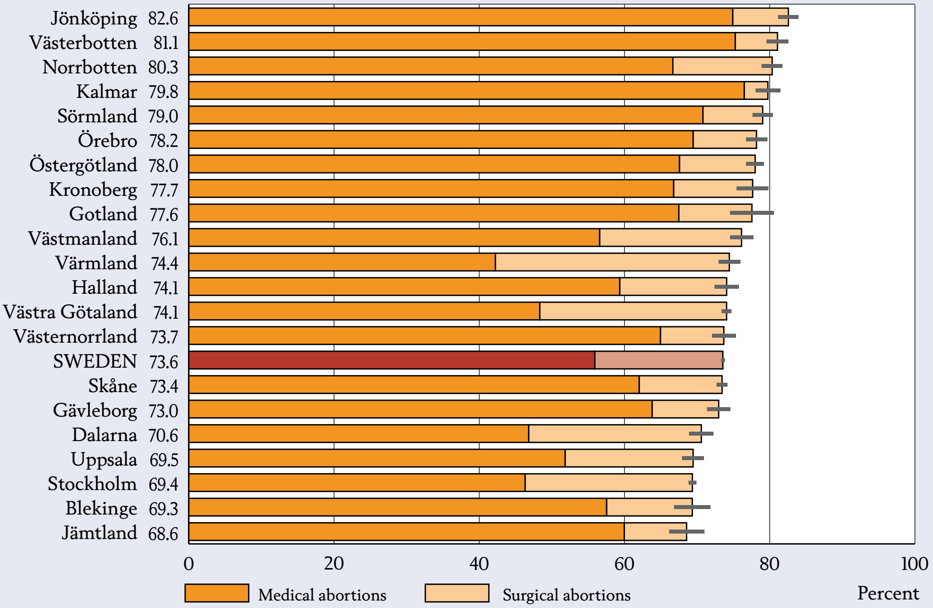


**Figure A:22** Induced abortion, both medical and surgical, prior to the 10th week of pregnancy, 2005–2007. Age standardised.

Source: Abortion statistics, National Board of Health and Welfare

prefers. Up to the 10th week, she can decide on the method herself as long as there are no medical obstacles.

Surgical abortion involves evacuation of the uterus under local or general anaesthesia. A medical abortion involves administering two rounds of drugs 2–3 days apart. The first round must be at a general hospital or other healthcare facility. The second round may be at home, assuming that certain criteria have been met.

A medical abortion may be performed immediately after a positive pregnancy test, while a surgical abortion is rarely performed before the 7th week of pregnancy. More than half of all abortions in Sweden over the past few years have been medical.

Figure A:22 shows the percentage of abortions, broken down by surgical and medical procedures, prior to the 10th week in 2005–2007. An average of 74 percent of all abortions were before the 10th week. The figure ranged from 69 to 83 percent among the different regions. The majority of abortions prior to the 10th week were medical, but there were large regional variations. The regions with the greatest percentage of abortions prior to the 10th week also had a very high percentage of medical abortions.

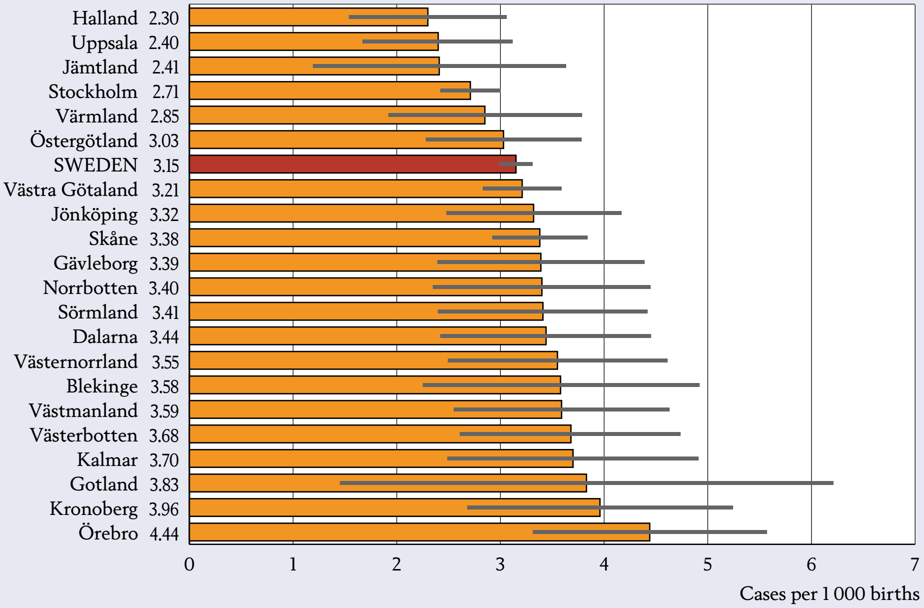


**Figure A:23** Foetal mortality rate per 1 000 births, 2002–2006. Age standardised.

Source: Medical Birth Register, National Board of Health and Welfare

## A:23 • Foetal mortality rate per 1 000 births

Foetal mortality is defined as the birth of a child without any signs of life after the 28th week of pregnancy. Foetal death may occur prior to or (the rarer case) during childbirth. Foetal abnormalities, infections, serious disease in the mother and complications in the placenta and/or umbilical cord are among the causes of foetal death. But no obvious cause can be identified in 10–15 percent of the cases.

There are between 300 and 400 foetal deaths in Sweden every year. The proportion of foetal deaths has declined by more than 50 percent since 1970. One factor that may cause the number of foetal deaths to rise is the increasing age of women at the time of childbirth. Women age 35 and older are at greater risk than those age 20–34. Primiparas (women bearing a child for the first time) are also at greater risk.

Smoking and overweight are the leading known preventable risk factors for intrauterine foetal death. By means of early monitoring and regular check-ups, the maternal care system should reduce the risk.

According to comparisons performed by WHO Europe, Sweden has a very low percentage of foetal deaths.

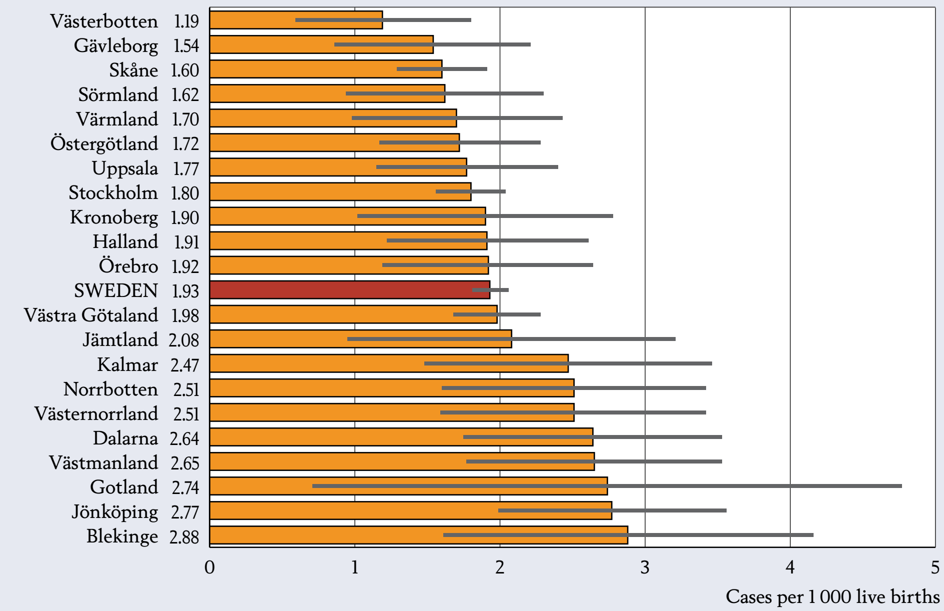


**Figure A:24** Neonatal mortality – infants dead within 28 days per 1 000 live births, 2002–2006. Age standardised.

Source: Medical Birth Register, National Board of Health and Welfare

Figure A:23 presents the number of foetal deaths per 1 000 births in 2002–2006. The national rate was 3.2 foetal deaths per 1 000 births. The variation among regions was a relatively large 2.3–4.4 foetal deaths per 1 000 births. The figure shows that the statistical uncertainty was high, given that the actual numbers were very small.

### A:24 • Neonatal mortality rate per 1 000 live births

The neonatal mortality rate measures the number of children who die within 28 days after birth. The rate may reflect the quality of both maternal and neonatal care. The neonatal mortality rate in Sweden has declined from over 5 per 1 000 live births in the early 1980s to 1.8–2.1 per 1 000 live births in the years presented here.

Sweden has a low neonatal mortality rate compared with other European countries. According to WHO Europe's compilations, Sweden was among the five countries with the lowest rates in the early 2000s.

Figure A:24 presents the number of neonatal deaths within 28 days per 1 000 live births in 2002–2006. Sweden as a whole had 1.9 neonatal deaths per 1 000 live births. The regional variation was a relatively wide 1.2–2.9. The statistical uncertainty was great, given that the actual numbers were very small.

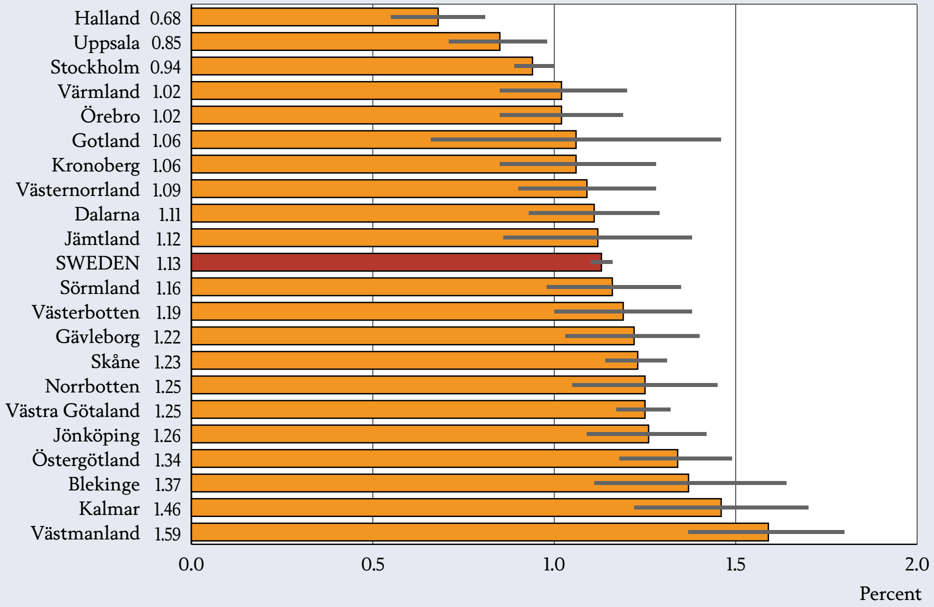


**Figure A:25** Proportion of newborns with Apgar score under 7 at 5 minutes, 2002–2006. Age standardised.

Source: Medical Birth Register, National Board of Health and Welfare

## A:25 • Percentage of newborns with Apgar score under 7

The Apgar score is a system for standardised assessment of the vitality of newborns. The newborn's heart rate, breathing, skin colouration, activity and muscle tone, and reflex irritability are rated on a scale of 0–2 at one minute, five minutes and ten minutes after birth. Thus, 10 is the highest possible Apgar score. A score below 7 at five minutes is normally defined as low.

A number of childbirth-related factors can lead to a low Apgar score at five minutes. Both mortality rates and the risk of serious neurological damage are greater in newborns with low Apgar scores at that point.

The smallest possible percentage of newborns with low Apgar scores is desirable. The national rate was just above 1 percent in 2002–2006, the period studied. The regional variation in newborns with low Apgar scores was 0.68–1.59 percent.

## A:26 • Third and fourth degree perineal tear during vaginal delivery

Perineal tear is a rupture that can occur during childbirth in the soft tissues between the vaginal opening and anus. The known risk factors for perineal tear are that the

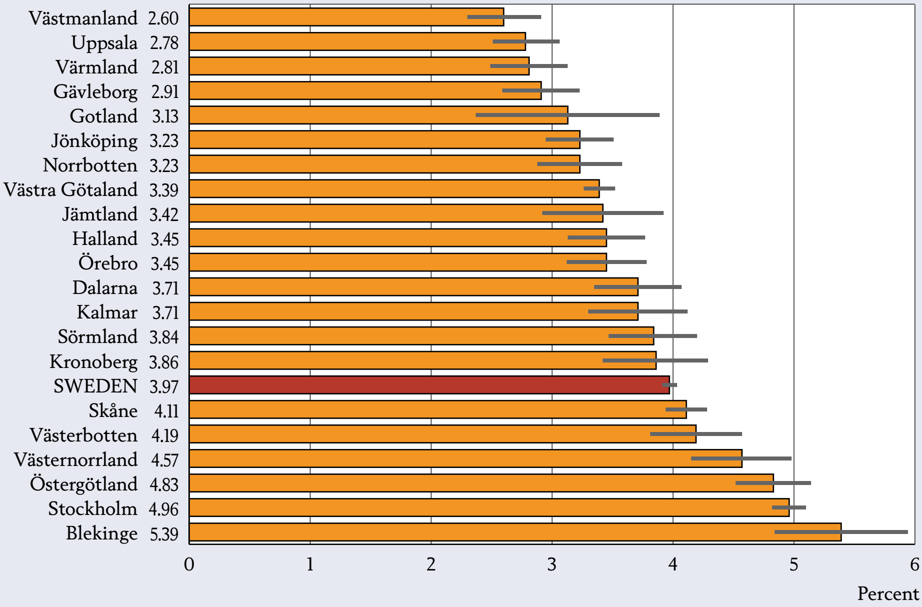


**Figure A:26** Third and fourth degree perineal tear during vaginal delivery, 2002–2006. Age standardised.

Source: Medical Birth Register, National Board of Health and Welfare

woman is giving birth for the first time, is bearing a large child, has a protracted delivery or has an assisted delivery (the use of forceps or a ventouse).

The percentage of perineal tears has increased in the past two decades. While not fully known, the cause may be the greater number of assisted deliveries and the increasing size of babies. Perineal tears that remain undetected or are insufficiently treated lead to serious health problems for the woman.

Perineal tears are classified according to their scope, third and fourth degree being the most extensive. Third and fourth degree perineal tears are generally sutured in the surgical ward, usually under spinal anaesthesia.

Most perineal tears heal well and the woman suffers no permanent harm. Nevertheless, they can lead to impaired mental and emotional wellbeing, including fears about incontinence, sexual performance and future pregnancy. Among the potential permanent complications are pain in the perineum, pain during intercourse and faecal incontinence.

In Sweden as a whole, 4 percent of vaginal deliveries were accompanied by third or fourth degree perineal tears. That translates into more than 3 000 women a year.

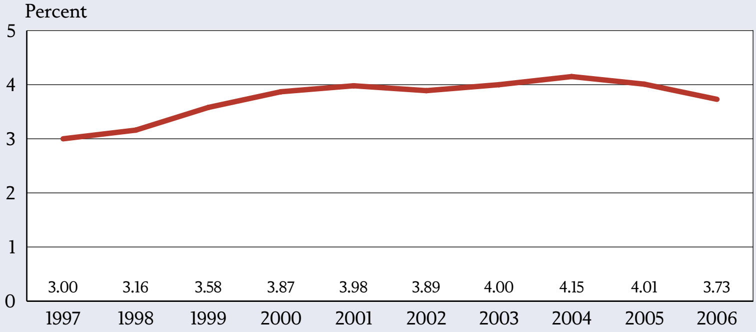


**Figure A:26**
**Sweden**

Third and fourth degree perineal tear during vaginal delivery. Age standardised.

Source: Medical Birth Register, National Board of Health and Welfare

Perineal tears ranged from 2.6 to 5.4 percent among the different regions in 2002-2006. See page 119 for hospital-level data.

The variation among hospitals and regions suggests that the number of perineal tears can be affected and the frequency of childbirth injury thereby significantly reduced.

## DIABETES CARE

Diabetes is a chronic disease that carries increased risk of other diseases. Over 350 000 Swedes, approximately 4 percent of the population, are estimated to have diabetes. Some 85-90 percent of them have adult (type 2) diabetes. The rest have juvenile (type 1) diabetes. For most diabetics, primary care constitutes their regular contact with the healthcare system. Others have contact with the healthcare system mainly through hospitals and medical clinics.

There are a number of well-established quality indicators, along with associated treatment goals, for diabetes care. Among them are blood sugar (HbA1c), blood pressure and cholesterol levels, as well as smoking. We present two indicators here with data from the National Diabetes Register (NDR) and two with data from the Prescribed Drug Register.

The NDR collects data about diabetes care from medical clinics and primary care facilities. The register estimates the national participation rate for 2007 at 44 percent, with relatively wide regional variations. Participation by primary care facilities has increased significantly in recent years. The figures that use NDR data also present the participation rate by region. When the participation rate is below 40 percent, the data are less certain.

The NDR data are for diabetic patients of all ages in primary care in 2007. For these indicators, we follow the presentation in the NDR's latest annual report. The report contains a quality index that ranks the regions according to five different measures. Both NDR indicators presented here are included in the index.

Goal fulfilment for the NDR indicators is specified in relation to the treatment guidelines and goals for blood pressure and blood sugar levels that the Swedish Association for Diabetology issues and that the NDR uses in its quality index. The NBHW is currently revising the national diabetes guidelines.

The Prescribed Drug Register is comprehensive when it comes to diabetics. But, as opposed to the NDR, the register does not provide data about goal fulfilment – such as cholesterol levels or blood pressure – for various treatment methods.

### A:27 • Diabetic patients in primary care who reach the goal for HbA1c levels

Figure A:27 shows the percentage of patients in primary care who reached the goal for blood sugar (HbA1c) levels. The treatment goal was an HbA1c level of 6.0 percent or below.

All of the approximately 140 000 patients in primary care who had been reported to the NDR were included. Given that one fourth of the regions had a participation rate below 40 percent, the modest difference among most of them should not be accorded excessive importance.

A total of 58 percent of patients nationwide reached the treatment goal, as opposed to 55 percent in 2006. The HbA1c treatment goal was reached by 58.9 percent of women and 57.5 percent of men.

Of the regions above the national average, Östergötland had the highest participation rate (75 percent) and thereby more reliable data. Of the other regions above the national average, Jönköping, Västra Götaland, Blekinge and Gävleborg also had high participation rates.

Dalarna, Värmland, Västernorrland, Kalmar and Norrbotten had lower participation rates. Kalmar and Norrbotten were below 40 percent, while the rest of those regions were considerably higher.

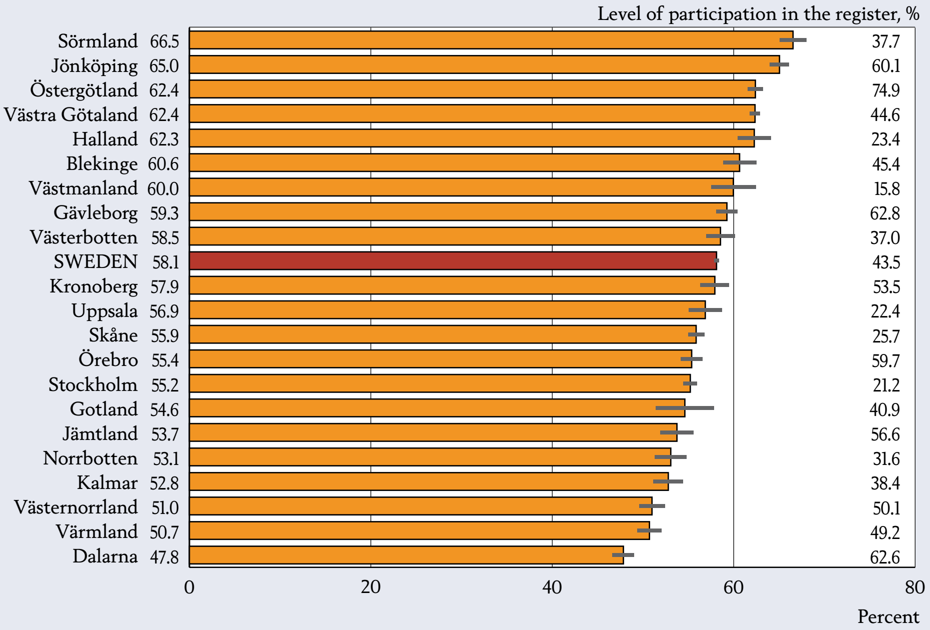


**Figure A:27** Diabetic patients in primary care who reach the goal for HbA1c (⩽6.0), 2007.

Source: Swedish National Diabetes Register

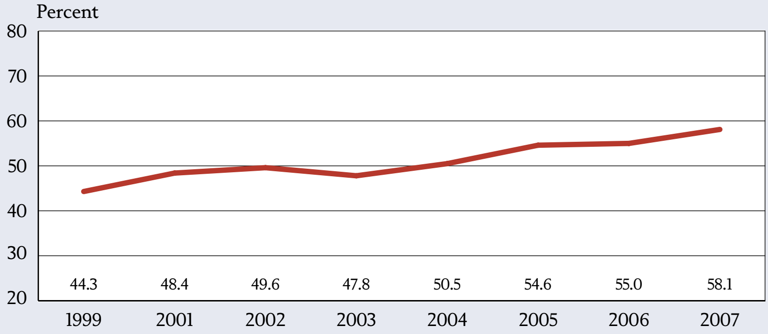


**Figure A:27 Sweden** Diabetic patients in primary care who reach the goal for HbA1c (⩽6.0).

Source: Swedish National Diabetes Register

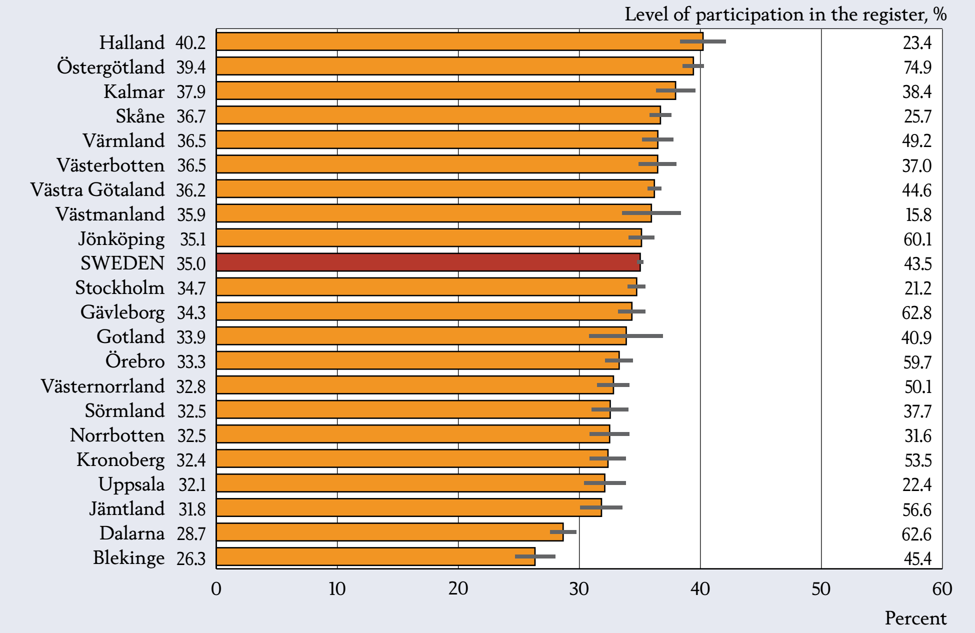


**Figure A:28** Diabetic patients in primary care who reach the blood pressure goal (≤130/80), 2007.

Source: Swedish National Diabetes Register

## A:28 • Diabetic patients in primary care who reach the blood pressure goal

According to various studies, diabetics run a 2–3 times increased risk of developing cardiovascular disease. A number of risk factors – including high blood sugar levels, hypertension and elevated blood lipids – are involved. The overall risk rises with the number of risk factors. The threshold for hypertension in diabetics has been set at 130/80 mm Hg. A total of 80–90 percent of all diabetics in primary care had hypertension, defined as those who took antiyhypertensives or were untreated with blood pressure above the threshold.

Figure A:28 shows the percentage of primary care patients in the NDR that reached the treatment goal of 130/80 mm Hg or below. All patients, whether or not they were treated for hypertension, were included.

Of the regions above the national average, Östergötland had the highest participation rate (75 percent) and thereby the more reliable data. Of the other regions above the national average, Värmland, Västra Götaland and Jönköping also had high participation rates. Blekinge, Dalarna and Jämtland had the lowest rates, all above 40 percent.

The proportion (35 percent) that reached the blood pressure goal in 2007 was substantially below the corresponding result for blood sugar levels (58 percent). But that represented an improvement from 33 percent in 2006. The blood pressure goal was reached by 36.4 percent of men and 33.4 percent of women nationwide.

These results are for all diabetics, regardless of whether they were receiving antihypertensive therapy. A total of 31 percent of diabetics receiving antihypertensive therapy reached the goal in 2007. That was somewhat lower than the percentage for all diabetics, though above the 25 percent result for 2006.

The low goal fulfilment points to undertreatment of the diabetic population. But it should be noted that the choice of treatment must be based on individual considerations. For the elderly and people with concurrent diseases, a number of different factors must be taken into account.

### A:29 • Diabetic patients receiving antihypertensive therapy

Hypertension is a known risk factor for cardiovascular disease in diabetics. Age, current blood pressure and changes in blood pressure are determinants of when drug therapy should begin. Physical activity and dietary modifications can lower blood pressure in many patients. High alcohol consumption should be avoided.

Figure A:29 is based on data from the Prescribed Drug Register. The first step identifies all diabetics in Sweden age 18 and older who picked up prescriptions for diabetes drugs in 2007. The next step examines the percentage of that population who received some kind of antihypertensive therapy. In addition, the percentage of all patients who received antihypertensive therapy with ACE inhibitors or Angiotensin II antagonists (ARBs) was identified. Those drugs are particularly effective as antihypertensive therapy in diabetic kidney disease, which a significant percentage of diabetics have, as well as certain other cases.

A total of 74.5 percent of diabetics nationwide received some kind of hypertensive therapy, which represented an increase from 2006. The regional variation was a narrow 72–79 percent. The spread was also modest (50–60 percent for almost all regions) when it came to treatment with ACE inhibitors and ARBs.

The small regional differences are a sign that diabetes care is of uniform quality in this respect. But in relation to the NDR goals, diabetic patients appear to be generally undertreated. The low goal fulfilment for blood pressure levels (see indicator A:28) suggests that to be the case. Revision of the national diabetes guidelines will provide some direction on this issue.

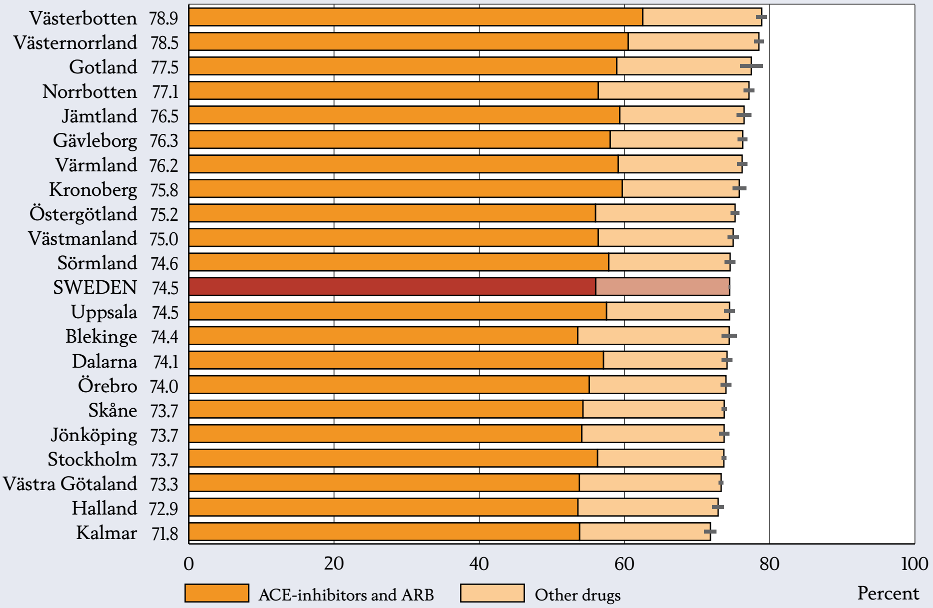


**Figure A:29** Diabetic patients with filled prescriptions for diabetes drugs receiving antihypertensive therapy, 2007. Aged 18 years and older. Age standardised.

Source: Prescribed Drug Register, National Board of Health and Welfare

## A:30 • Diabetic patients receiving lipid lowering drug therapy

A majority of patients with type 2 diabetes develop a lipid disorder at an early stage. The disorder, which consists of reduced levels of "good" cholesterol and elevated levels of "bad" cholesterol, is a contributing factor in cardiovascular disease. Increased physical activity, smoking cessation and dietary modifications have a favourable impact on lipid disorders and the risk of developing cardiovascular disease. Drug therapy against lipid disorders is particularly important in diabetic patients with multiple risk factors, such as hypertension, smoking, microalbuminuria (small quantities of albumin in the urine) and abdominal obesity.

Figure A:30 shows the percentage of patients in drug therapy who received lipid lowering drugs. The data, which were taken from the Prescribed Drug Register, cover diabetics age 40 or over who were in drug therapy. The national result was 54 percent. The great majority of regions were in the 50–60 percent interval, a relatively modest spread.

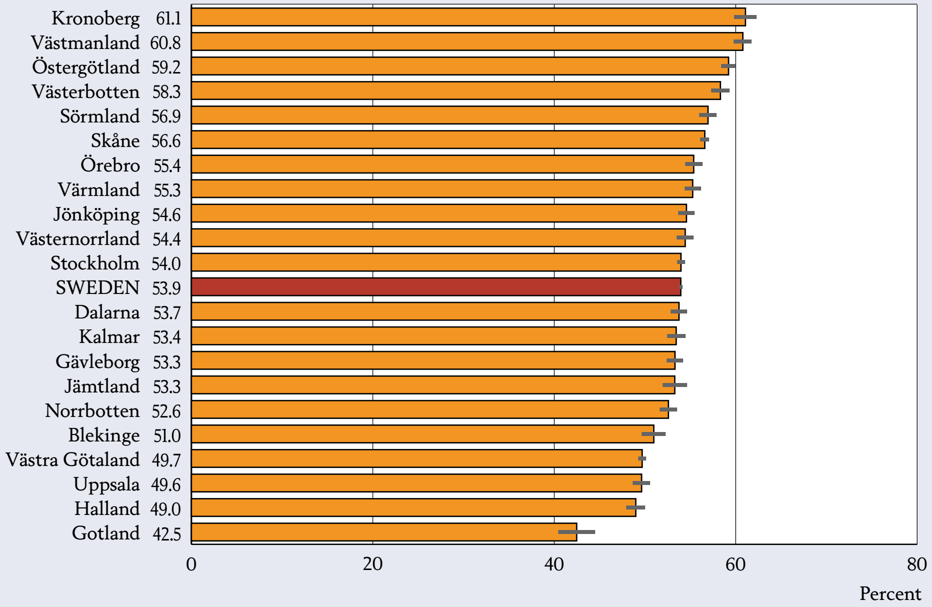


**Figure A:30** Diabetic patients with filled prescriptions for diabetes drugs receiving lipid lowering drug therapy, 2007. Aged 40 years and older. Age standardised.

Source: Prescribed Drug Register, National Board of Health and Welfare

The NDR's goal fulfilment data for cholesterol levels provide support in interpreting the results. According to the NDR, 43–44 percent of diabetic patients in primary care reached the goal for total cholesterol of <4.5 mmol/L and for LDL cholesterol of <2.5 mmol/L. That degree of goal fulfilment is unsatisfactory and points to undertreatment.

## PSYCHIATRIC CARE

Indicators for psychiatric care are in a group of their own. Four indicators are presented. Two of them concern drug therapy, one concerns suicide among the general population and one concerns improvement after commencement of treatment for eating disorders.

Access to relevant psychiatric data is decisive to developing more and better indicators. There are still major inadequacies in reporting from psychiatric clinics to mandatory national healthcare data registers, particularly when it comes to data about diagnosis and the number of visits in outpatient care. Although reporting to voluntary quality registers has improved, the participation rate is generally too low.

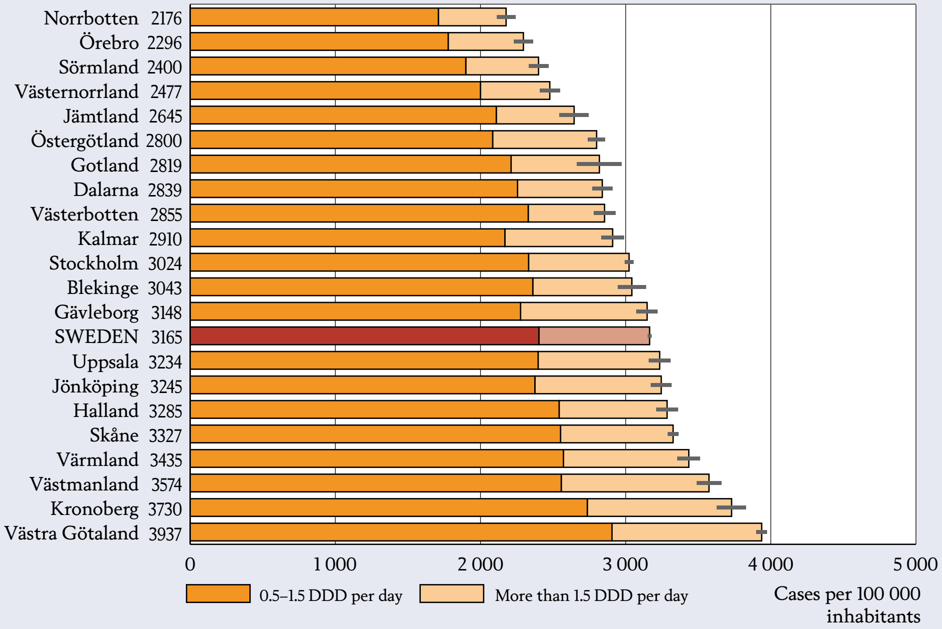


**Figure A:31** Regular treatment with anxiolytics and sedatives, 2007. Persons aged 20–79. Age standardised.

Source: Prescribed Drug Register, National Board of Health and Welfare

A final report (Swedish Government Official Records 2006:10) by the psychiatric coordinator recommended strong measures to develop systems for monitoring performance, improving registers and statistics, and assessing quality. Thus, the government is taking a number of initiatives in 2008 aimed at describing and improving psychiatric care. Part of that effort is the development of useful quality indicators.

The NBHW has undertaken many activities to improve data quality, including that which is reported to the national Patient Register. That includes immediacy, better reporting of diagnoses, institutionalisation and the ability to describe treatment by healthcare professionals other than doctors. In addition, the government and SALAR have agreed on a far-reaching initiative to develop new psychiatric quality registers, as well as to improve the participation rate and data quality of existing registers.

### A:31 • Regular  treatment with soporifics and sedatives

Benzodiazepines, which Sweden began to use in the 1960s, are the internationally accepted standard drugs for short-term treatment of pathological anxiety and temporary sleep disturbances. They are also used to one extent or another for treating milder types of worry and anxiety. Benzodiazepines are prescribed most often by general practitioners, as well as by psychiatrists and occasionally by internists.

Long-term, regular use of and high consumption of benzodiazepines can give rise to side-effects. For instance, cognitive ability may be affected. The drugs can also lead to aggressiveness, dependence and abuse. Termination of long-term treatment can cause a number of withdrawal symptoms, including rebound, i.e., intensification of the original problems of anxiety and insomnia.

Benzodiazepines are prescribed more often for women, in whom anxiety is more common than in men. Consumption of the drugs is also age-related. People above age 65 account for more than half of their use.

More than 300 000 Swedes picked up benzodiazepine prescriptions in 2007. Figure A:31 shows that the regional variation was significant at 2 176–3 937 per 100 000 inhabitants. The indicator reflects the number of regular users, i.e., those who averaged half of a normal daily dose of benzodiazepines per day. High consumption is defined as at least 1½ daily doses per day.

### A:32 • Polypharmacy – elderly who consume three or more psychopharmacological drugs

Concurrent treatment with three or more psychopharmacological drugs, either regularly or on demand, is an accepted indicator of polypharmacy. Concurrent consumption of multiple pharmacological drugs not only increases the risk of side-effects and drug-drug interactions, but may point to inadequate treatment of psychiatric conditions.

Figure A:32 presents the percentage of elderly in October–December 2007 who were prescribed drugs, three or more of which were pharmacological. Elderly who were not taking prescription drugs were not included. The total for this bar covers elderly who received drugs through both the ApoDos service and prescriptions. The percentage of each population who consumed three or more pharmacological drugs is also shown on the right side of the figure.

Close to 6 percent, or almost 27 000 elderly, were consuming three or more pharmacological drugs in 2007. Regional consumption ranged from 4 percent in Norrbotten to more than 7 percent in Västra Götaland.

A total of 16 percent of elderly using the ApoDos service consumed three or more pharmacological drugs, as opposed to 3 percent with prescriptions. The regional spread was due primarily to differences (from 9 to 19 percent) among those who used the ApoDos service (see the right-hand column of the figure).

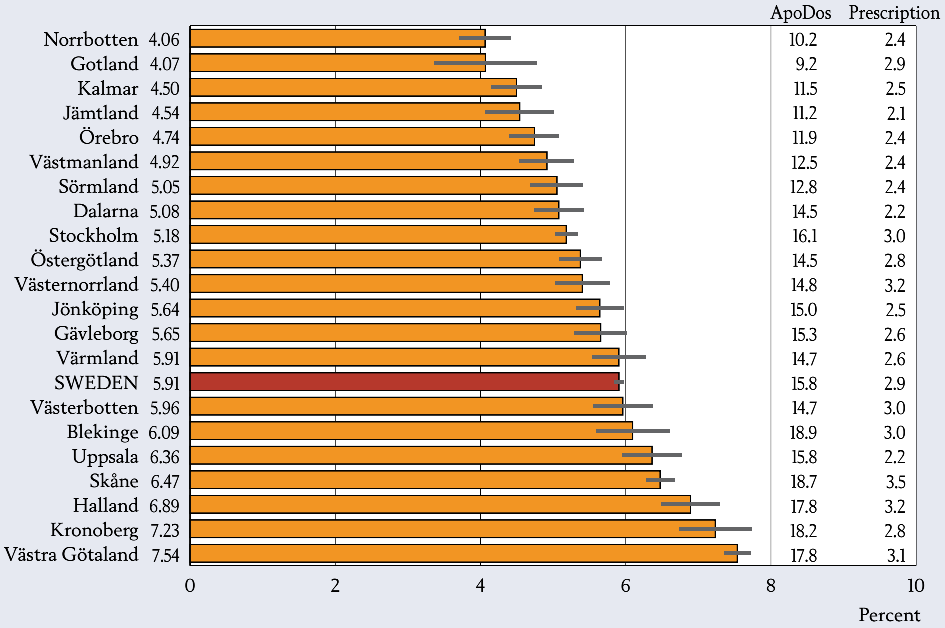


**Figure A:32** Polypharmacy – elderly who consume three or more psychopharmacological drugs, October–December 2007.

Source: Prescribed Drug Register, National Board of Health and Welfare

The percentages of elderly who received their drugs through the ApoDos service and by prescription are not shown here but varied among the different regions. Uppsala and Västra Götaland had the highest percentages of elderly who used the ApoDos service, whereas Stockholm had the lowest percentage. That is why drug consumption is broken down into the ApoDos and prescription groups. There has been some discussion to the effect that the ApoDos service, which offers considerable advantages for some patient populations, makes it easier for patients to start consuming new drugs without a review of their overall consumption. One possible source of error is that the Prescribed Drug Register does not capture the consumption of drugs dispensed from storehouses at assisted living facilities.

## A:33 • Suicide among the general population

A directive took effect on 1 February 2006 that specifies the duty pursuant to Sweden's Lex Maria system to report suicides committed within a month of the victim's last contact with the healthcare system. Among the inadequacies identified were that systematic suicide assessments were not performed, documentation was incomplete and units did not comply with the healthcare programmes of their regions.

Theoretically speaking, suicide after contact with the healthcare system is a conceivable indicator for assessing intervention efforts. But designing a relevant, reliable indicator is a difficult venture. Last year's presentation of suicide after inpatient care received a good deal of criticism. This year's indicator is a broader measure of suicide among the general population.

Sweden and the rest of northern Europe have medium suicide rates compared with the continent as a whole. Denmark and Finland have higher suicide rates than Sweden. The number of Swedes, particularly men, who commit suicide has declined since the early 1980s. But suicide is still more common among men than women. A total of 817 men and 379 women committed suicide in 2006. In addition, there were 190 deaths among men and 72 deaths among women with undetermined intent. Finally, approximately 8 000 people made one or more suicide attempts that came to the attention of the healthcare system.

Figure A:33 shows the number of suicides per 100 000 inhabitants in 2003–2006. Suicides and deaths with undetermined intent totalled 5 750 for the period. For women and men altogether, the regional variation was 12–19 cases per 100 000 inhabitants (not presented).

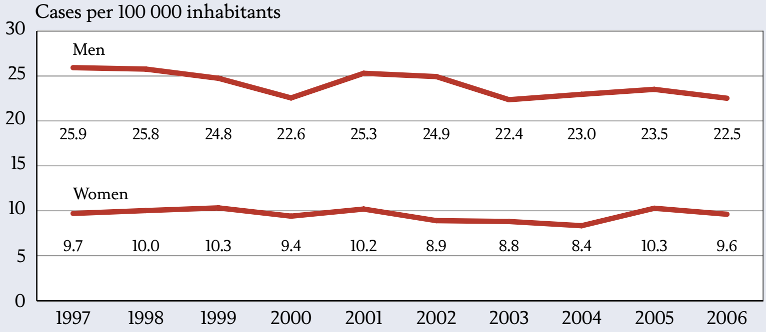


**Figure A:33**
**Sweden**

Suicide and death with unclear intent per 100 000 inhabitants. Age standardised.

Source: Cause of Death Register, National Board of Health and Welfare

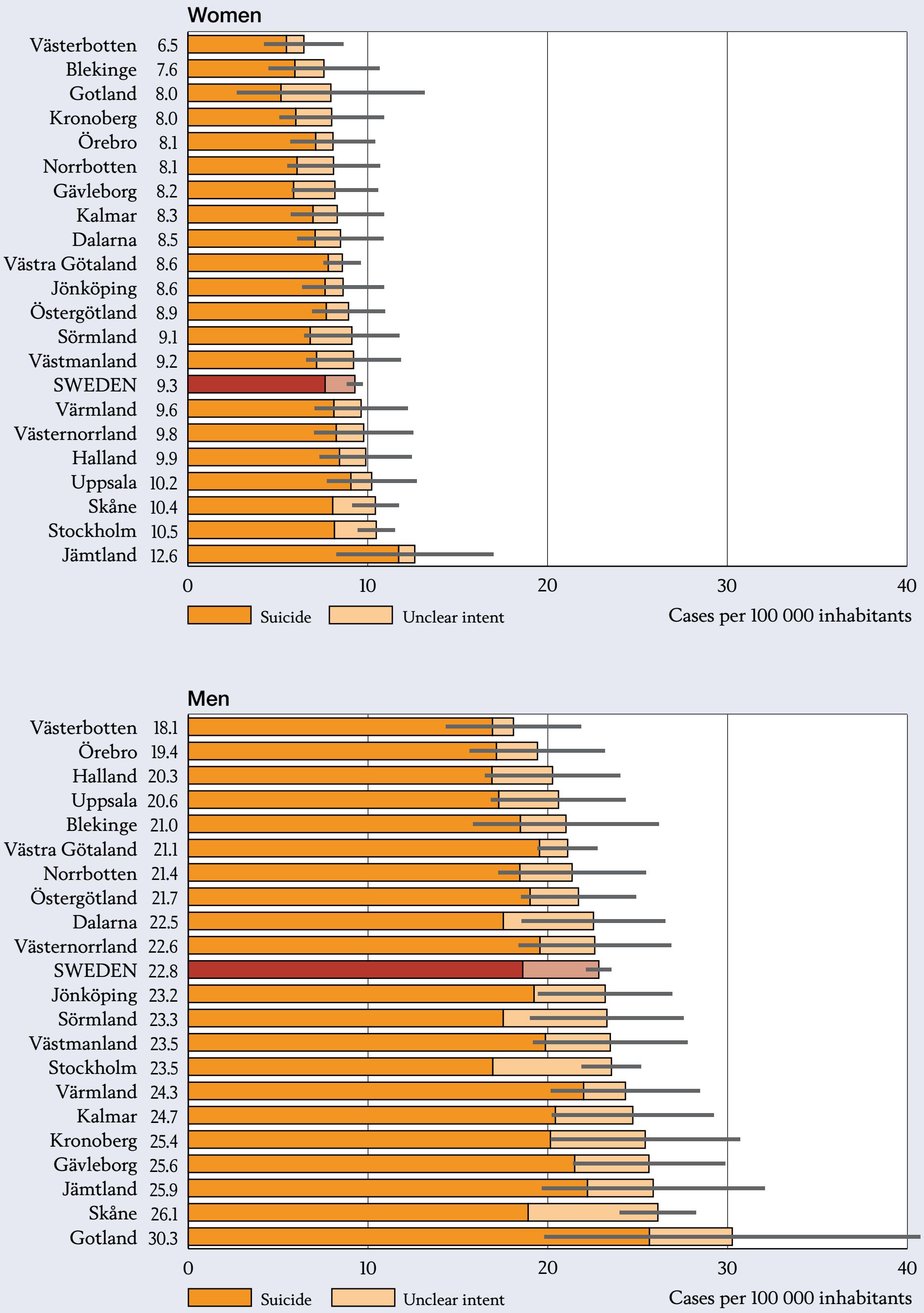
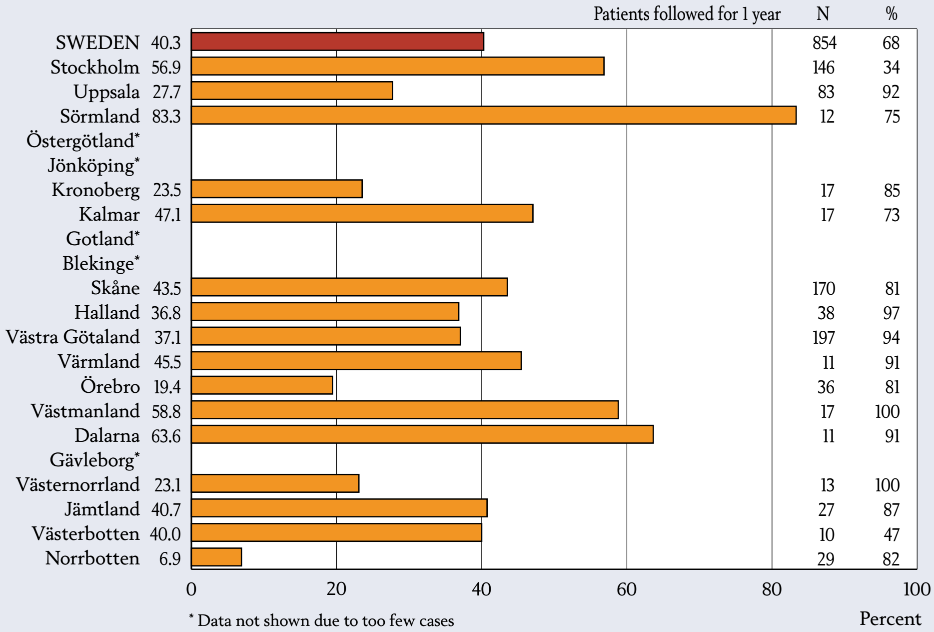


**Figure A:33** Suicide and death with unclear intent per 100 000 inhabitants, 2003–2006. Age standardised.

Source: Cause of Death Register, National Board of Health and Welfare



* Data not shown due to too few cases

**Figure A:34** Eating disorders – patients improved after one year, 2006.

Source: National Quality Register on Treatment of Eating Disorders

## A:34 • Eating disorders – treatment results after one year

Eating disorders usually begin in adolescence and frequently lead to recurring care episodes for a long time. At any point in time, 1.5 percent of adolescent girls and young women have anorexia nervosa (AN) or Bulimia nervosa (BN). Eating Disorder Not Otherwise Specified (EDNOS) is 3–4 times more common than AN and BN. Between 75 000 and 100 000 adolescent girls and young women may have some form of eating disorder. The percentage of people with eating disorders who are treated by child and adolescent psychiatric, general psychiatric or specialised eating disorder units is unknown. The percentage is probably below one third.

An eating disorder causes great suffering for the victim and is associated with substantially higher mortality rates than most other psychiatric conditions. The long course of the disease also has consequences for next of kin, as well as high social costs.

The National Quality Register on Eating Disorders (RIKSÄT) collects data on eating disorder treatment and its results. Of 31 specialised eating disorder units in Sweden, 30 report to RIKSÄT to one extent or another. Just over 6 600 treatments were reported in 1999–2007.

Figure A:34 presents the extent to which the patient's condition had improved one year after commencement of treatment. Improvement means that the patient was diagnosed either as still having an eating disorder but showing signs of progress or as no longer having an eating disorder.

A total of 1 243 patients whose first visit was in 2006 are included. Sixty nine percent, or 854, of all reported patients were monitored. Patients were generally assigned to their region of domicile. Only regions in which at least 10 patients were monitored are presented. A total of 40 percent of patients nationwide had improved after one year of treatment.

The regions are not ranked. Despite improvements in the number of treatments reported and the percentage of patients monitored, the number of patients remained small in some regions. In addition, only limited information is available about the uniformity of diagnostic methods. Thus, the ability to perform comparisons is limited as well. The reason for presenting this summary is to illustrate quality monitoring in psychiatric care.

## STROKE CARE

Stroke is one of the most common diseases. Between 30 000 and 35 000 Swedes, approximately an equal number of women and men, have strokes every year. More than 80 percent of the patients are above age 65. Stroke is the most frequent cause of neurological disabilities in adults, as well as the third most common cause of death, following myocardial infarction and cancer. The number of stroke cases has declined significantly since 2000.

Care events in which some type of stroke was the main diagnosis accounted for approximately 400 000 days of hospital care. Many patients have a substantial need for rehabilitation and care after discharge. Thus, stroke involves very large care and resource utilisation at municipal assisted living facilities and home help services.

Six stroke care indicators are presented here, all of which were included in last year's report. The two indicators that concern fatality rates after stroke were taken from the Patient Register (PAR) and the Cause of Death Register. One of the two indicators that were taken from the National Stroke Register concerns how stroke care is carried out, whereas the other indicator concerns results in terms of loss of function. The two final indicators describe secondary preventive interventions after stroke.

All hospitals that care for stroke patients during the acute phase participate in the National Stroke Register. More than 24 000 care events were entered in the register in 2007. In addition to keeping data about the acute phase, follow-up is performed after three months. Data from the National Stroke Register are classified according to the location of the hospital, not the patient's region of domicile.

In collaboration with the National Stroke Register, the NBHW monitors its participation rate against PAR on an annual basis. In 2007, PAR had upwards of 3 000 more stroke cases than the National Stroke Register. The National Stroke Register had a participation rate, which varied among regions and hospitals, of just under 82 percent in relation to PAR.

### A:35 • First-time stroke – 28-day case fatality rate

The OECD uses the case fatality rate for stroke as an indicator of healthcare quality in international comparisons. The measure presented here examines quality throughout the healthcare system: preventive, ambulance, acute and follow-up care.

Stroke is defined as all cases that include a diagnosis of cerebral haemorrhage, cerebral infarction or unspecified stroke in the inpatient section of the Cause of Death Register or Patient Register. Thus, both patients who were hospitalised and those who died without being hospitalised are included. The comparison includes only first-time stroke cases, i.e., people who did not have a stroke during the seven preceding years. They totalled just over 81 000 throughout the period studied.

In 2004–2006, approximately 22 percent, or almost 6 200 per year, of these stroke patients died within 28 days. After adjusting for differing age structures, the case fatality rate was similar for women and men. The national case fatality rate was somewhat lower than in 2001–2003. The rate declined in most regions, although to varying degrees. Västmanland, Dalarna and Skåne had the largest relative decreases for women and men combined.

Figure A:35 shows that there was some regional variation in the case fatality rate. Among the possible causes of the variation are diagnostic reliability, background factors such as concurrent diseases, social variables, random parameters and the propensity of the population to seek care. Care-related factors may include distance to satisfactory facilities, the efficiency of ambulance services and acute hospital care.

The case fatality rate for men varied from 15 to 28 percent. Kronoberg and Kalmar had the highest rates, as well as an increase from 2001–2003 (gray bars in the figures), while Uppsala and Västmanland had the lowest rates. The case fatality rate for women varied from 18 to 28 percent. Kronoberg and Värmland had the highest rates, while Västmanland and Västernorrland had the lowest. The case fatality rate for women in Västmanland declined significantly from 2001–2003.

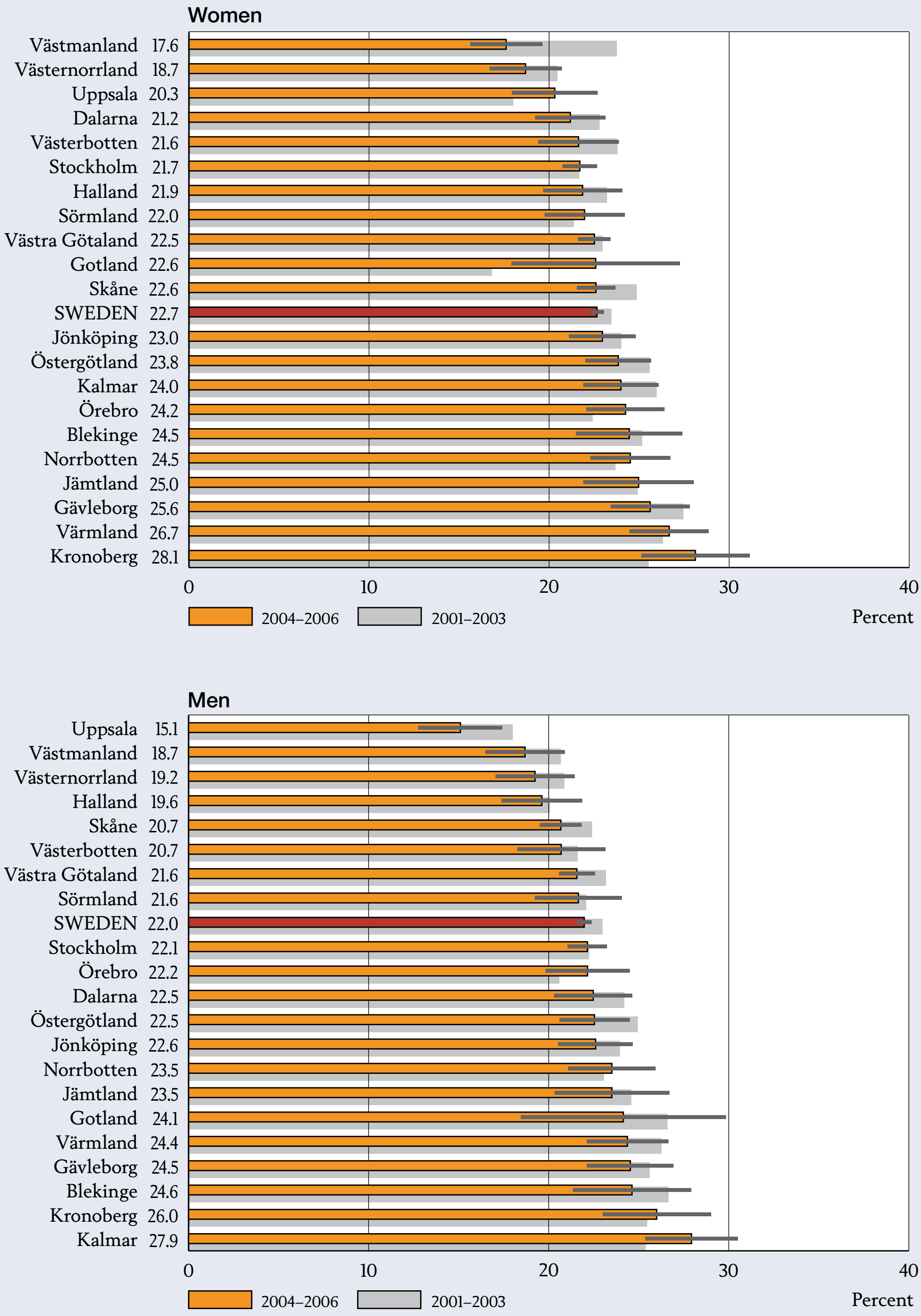


**Figure A:35** First-time stroke – 28-day case fatality rate, 2004–2006. Age standardised.

Source: Patient Register and the Cause of Death Register, National Board of Health and Welfare

## A:36 • Hospitalised first-time stroke – 28-day case fatality rate

This indicator reflects the 28-day case fatality rate for hospitalised stroke patients. The measure focuses on quality in acute and continuing care at hospital.

International comparisons by the OECD, the Nordic cooperation and other bodies use various measures of case fatality rates for stroke. Short-term survival exclusively among hospitalised stroke cases is a common measure and the only one that is available in many countries.

Approximately 30 000 of the more than 17 000 men and 18 000 women who have a stroke each year are hospitalised. An estimated 3 000–4 000 die without being hospitalised.

Stroke is defined as all cases in 2005–2007 that included a diagnosis of cerebral haemorrhage, cerebral infarction or unspecified stroke in the inpatient section of the Patient Register – in other words, initially hospitalised stroke cases. Only first-time stroke cases, i.e., people who did not have a stroke for the seven preceding years, are included. Of those cases, everyone age 20 and over is counted. The comparison covers approximately 72 000 cases altogether.

Figure A:36 shows that 15 percent of all hospitalised cases, an average of just under 3 500 people per year, died within 28 days after stroke. After adjusting for differing age structures, the national case fatality rate – both subsequent to hospital care and as a whole – was similar for women and men.

The regional case fatality rate among men hospitalised after stroke varied from over 11 percent in Uppsala to 21 percent in Kalmar. The rate in Gävleborg and Västerbotten decreased significantly from 2002–2004 (gray bars in the figure). Kalmar and Dalarna were two regions in which the rate increased. The regional variation for women was similar – 12 percent in Västmanland to 18 percent in Jämtland. The decline was greatest in Västmanland and Gävleborg, while the increase was greatest in Kronoberg and Sörmland.

See page 120 for hospital-level data.

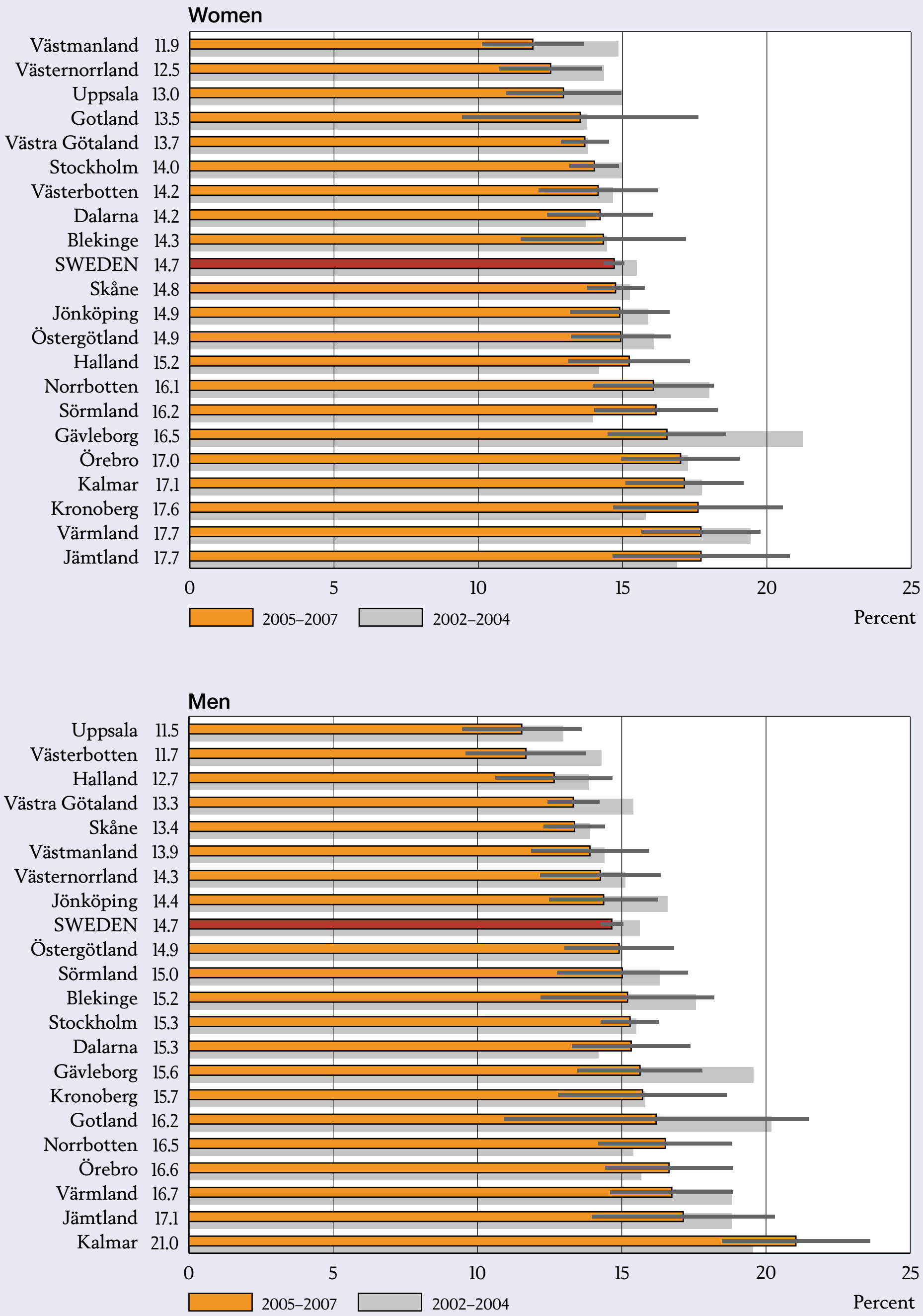


**Figure A:36** First-time stroke – 28-day case fatality rate, 2005–2007. Hospitalised cases. Age standardised.

Source: National Patient Register and the Cause of Death Register, National Board of Health and Welfare

## A:37 • Patients treated at a special stroke unit

According to the NBHW national guidelines, care during the acute phase of stroke is to be provided at special stroke units. There is a strong empirical basis for maintaining that care at well-functioning special stroke units reduces fatality rates, personal dependence and the need for institutional living. All stroke patients benefit, regardless of age, gender or severity of brain injury. Thus, the guidelines give top priority to care at a special stroke unit. Figure A:37 shows that there are rather large regional differences. At least 90 percent of patients were treated at special stroke units in five regions, while less than 80 percent were treated at special units in five other regions. See page 121 for hospital-level data.

Note that the percentage of patients treated at special stroke units according to the National Stroke Register should be related to participation rate, which is shown at the right side of the figure. Non-reported stroke cases may be assumed to have been treated at special units less often than reported cases. Thus, regions with a high percentage of patients treated at special units and a low participation rate appear to have a better rate than they actually do.

Gotland and Västerbotten are examples of such regions. Although the Stockholm region has a low reported percentage of patients treated at special stroke units, the real percentage is even less, given that its participation rate is relatively poor.

The proportion of patients treated at special stroke units was somewhat higher for men than women. According to the 2006 National Stroke Register annual report, men had almost a 10 percent better chance of being treated at a special stroke unit than women even after adjustments had been made for variables such as age, level of awareness and previous stroke. The average age of patients was somewhat lower at special stroke units (76) than ordinary outpatient clinics (79).

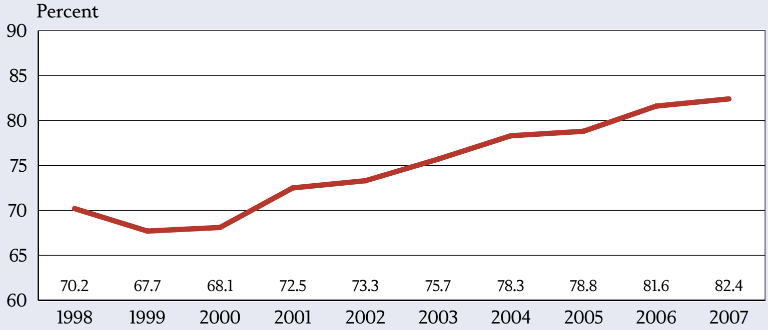


**Figure A:37**
**Sweden**

Patients treated at a special stroke unit.

Source: Swedish Stroke Register

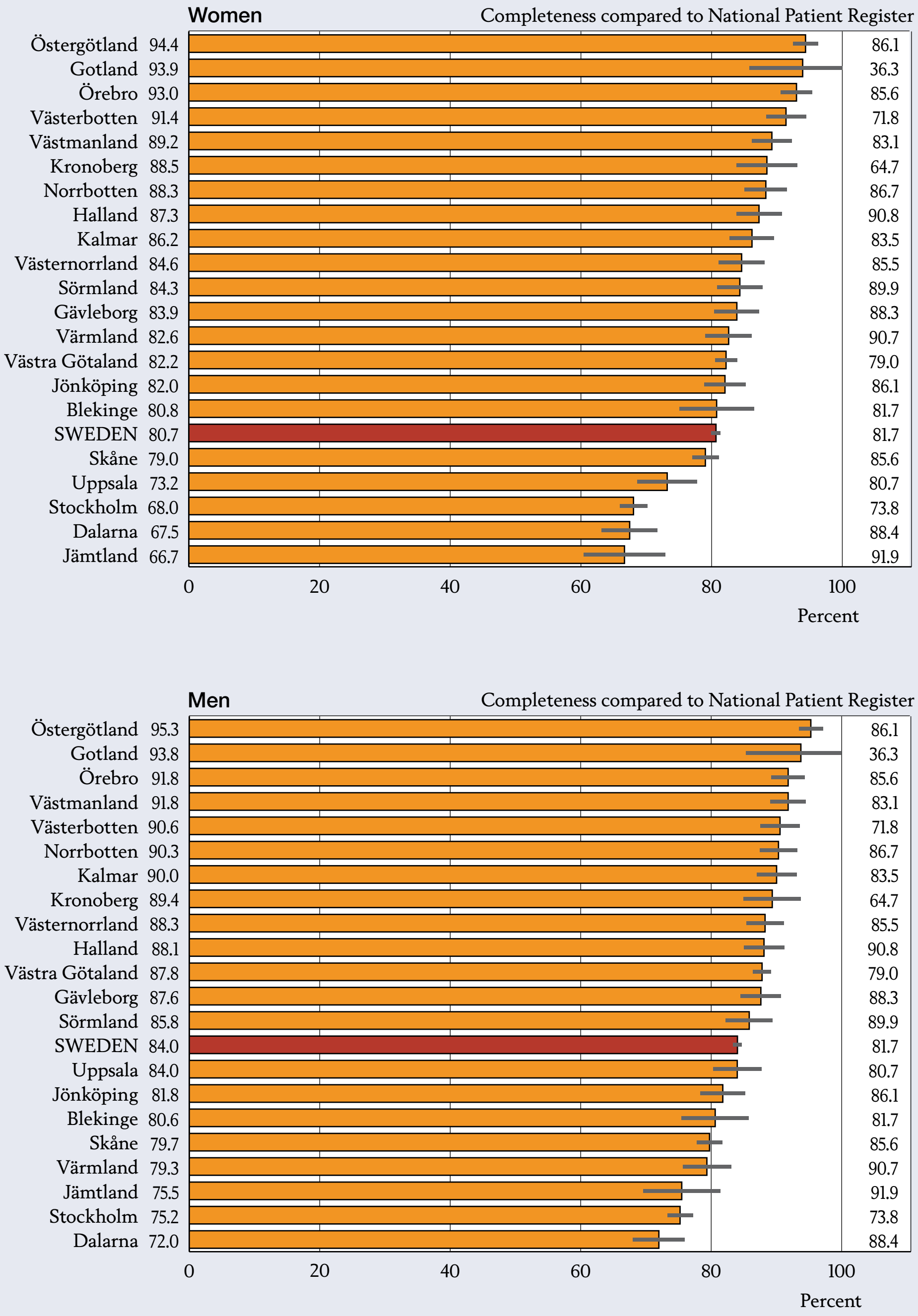


**Figure A:37** Patients treated at a special stroke unit, 2007.

Source: Swedish Stroke Register

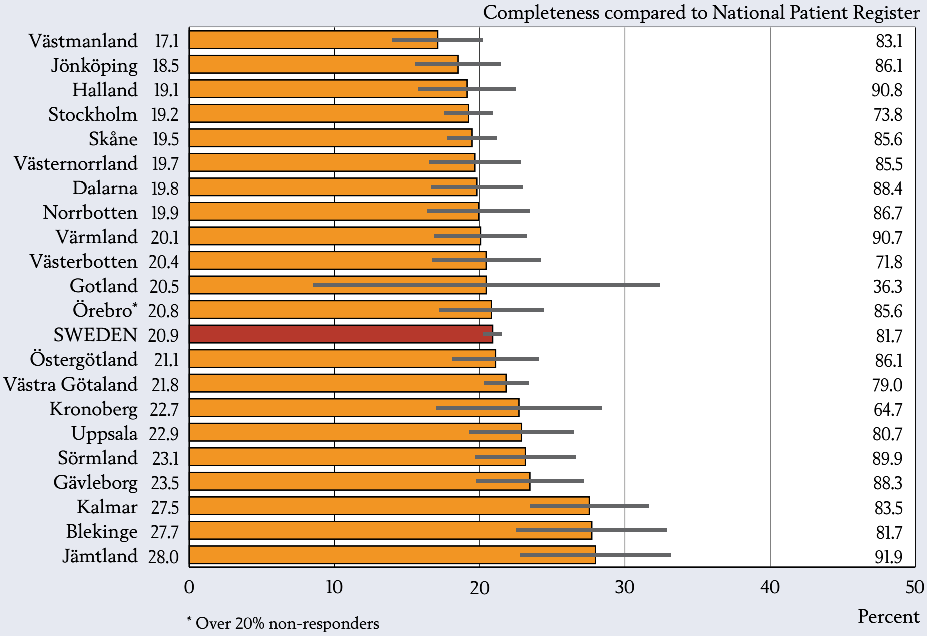


**Figure A:38** Stroke patients dependent on others for activities of daily living (ADL) ability three months after stroke, 2007.

Source: Swedish Stroke Register

## A:38 • Activities of daily living (ADL) ability three months after stroke

Stroke survivors recover pre-disease function to varying degrees. The National Stroke Register collects data about the dependence of patients on others for their personal ADLs three months after stroke. Personal ADLs refer to locomotion, toileting, dressing and undressing. As a quality indicator, the measure reflects healthcare interventions both during the acute phase and in ongoing rehabilitation after discharge from the acute care hospital.

Figure A:38 presents the percentage of patients who could handle their personal ADLs by themselves prior to stroke, who survived and who were dependent on others for these activities three months after the acute phase. The percentage of patients who were dependent showed a regional variation of 17–28 percent in 2007. The nationwide result was 21 percent. The percentage of Swedish stroke patients who are dependent on others for their personal ADLs at three-month follow-up has trended downward since 2003.

This measure should preferably be interpreted along with the percentage of survivors. Hospitals and regions achieve the best results when they have a high percentage of patients who survive and a high percentage who are independent when it

* Differs from the national average in the region-level diagrams due to a slightly different calculation formula.

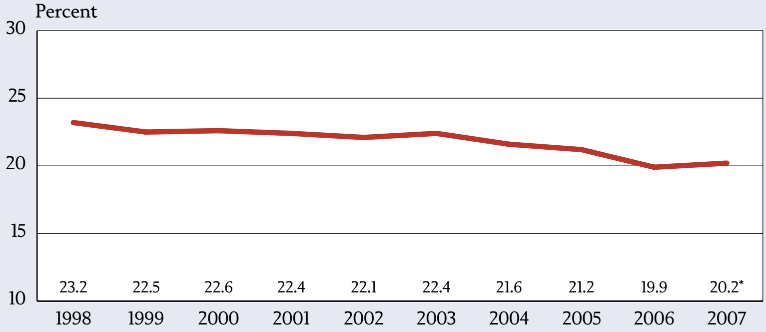


**Figure A:38**
**Sweden**

Stroke patients dependent on others for activities of daily living (ADL) ability three months after stroke.

Source: Swedish Stroke Register

comes to personal ADLs, i.e., recover their pre-disease function to a large degree. See page 122 for hospital-level data.

### A:39 • Anticoagulant therapy for stroke patients with atrial fibrillation

More than 90 000 Swedes have chronic atrial fibrillation. The condition is one of the most common causes of stroke. Approximately 6 000 Swedes have a stroke every year due to atrial fibrillation. It is also a key risk factor for stroke recurrence. Warfarin therapy after stroke (cerebral infarction) and for atrial fibrillation leads to a considerably lower risk for recurrence of stroke or for other cardiovascular disease.

Warfarin after stroke or for atrial fibrillation is a high-priority therapy in the national stroke guidelines. Essentially all of these patients should be given anticoagulant therapy, albeit after taking concurrent disease and very advanced age into consideration.

Figure A:39 presents the number of stroke patients with atrial fibrillation who received anticoagulant therapy. The data are based on the Patient Register and the Prescribed Drug Register. They concern almost 6 000 patients who were discharged from hospital after stroke in 2005–2006, as well as their drug consumption 12–18 months later. See page 123 for hospital-level data. Given that 45 percent of patients nationwide received therapy, undertreatment was substantial. But the issue must be discussed and interpreted in view of the fact that warfarin may be contraindicated in elderly patients due to variables such as dementia and tendency to fall.

Owing to differences in age standardisation, age grouping and follow-up times, this year's results are not comparable with those from last year's similar indicator.

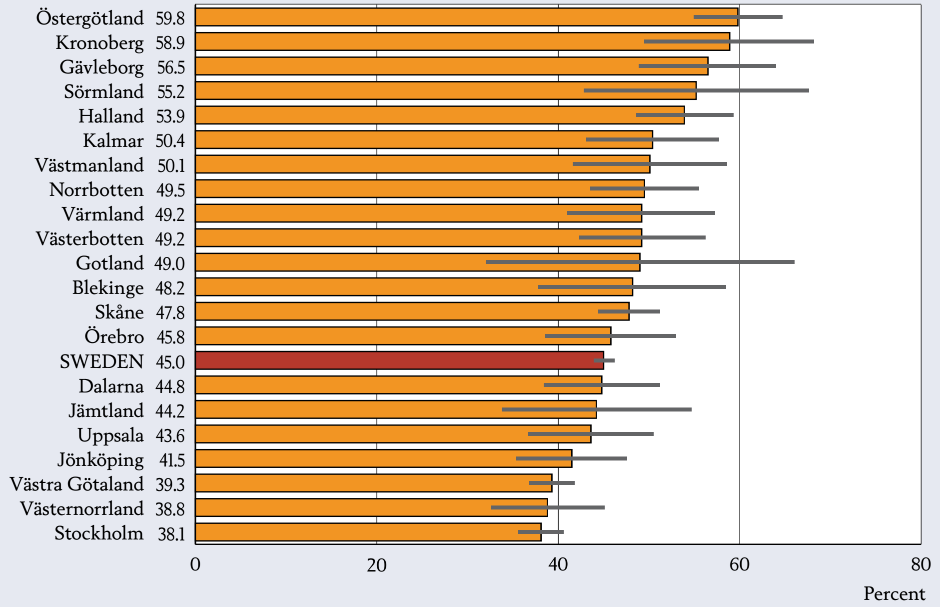


**Figure A:39** Anticoagulant therapy after 12–18 months for stroke patients with atrial fibrillation, 2005–2006. Age standardised.

Source: National Patient Register and the Prescribed Drug Register, National Board of Health and Welfare

## A:40 • Stroke – readmission within 365 days

The percentage of readmission to hospital among stroke patients can provide a measure of secondary preventive interventions after stroke. Among such interventions are influencing lifestyle by smoking cessation, dietary counselling, assistance with physical activity, drug therapy (antihypertensives, lipid lowering drugs and antithrombotics) and carotid endarterectomy.

Figure A:39 shows the percentage of patients who were readmitted to hospital after stroke within 365 days of their initial care episode. The calculations for the figure are based on approximately 82 000 people in the Patient Register who were treated in 2002–2006 for first-time stroke with the primary diagnosis of cerebral haemorrhage, cerebral infarction or unspecified stroke and who survived the first year after stroke. The Patient Register was monitored until the end of 2007.

Just under 10 percent of stroke patients, approximately the same for men and women, nationwide were readmitted for stroke or its late effects. The regional differences were generally modest, but more pronounced between 7 percent for Östergötland and 12 percent for Jönköping.

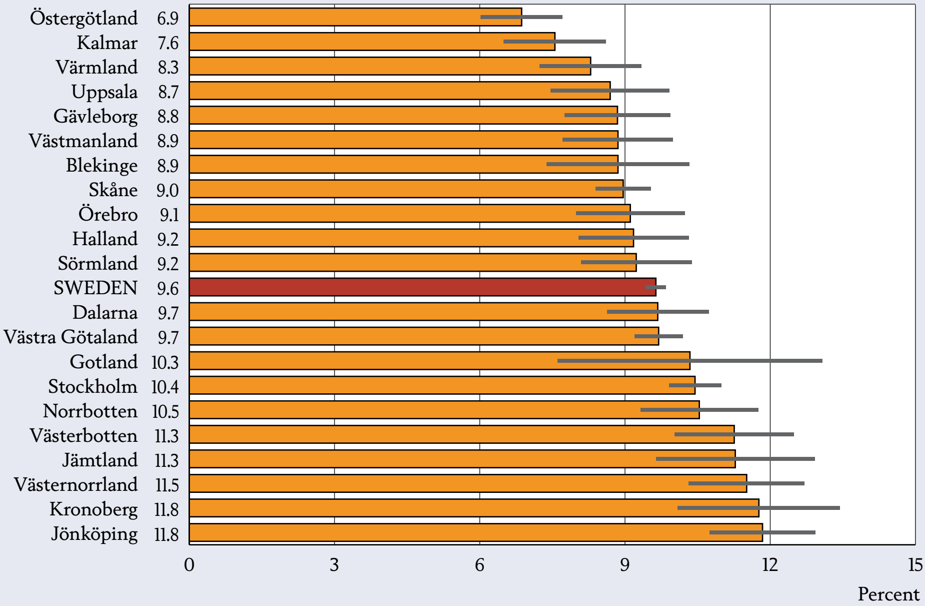


**Figure A:40** Stroke – readmission for stroke diagnose within 365 days, 2002–2006. Age standardised.

Source: National Patient Register, National Board of Health and Welfare

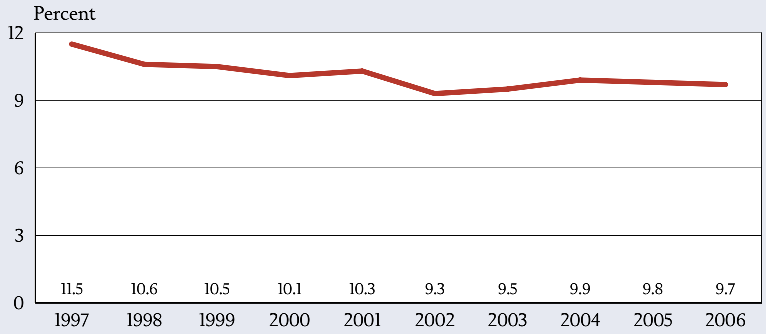


**Figure A:40**
**Sweden**

Stroke – readmission for stroke diagnose within 365 days. Age standardised.

Source: National Patient Register, National Board of Health and Welfare

The risk of stroke recurrence is significant. There is also a risk of relapse in another cardiovascular disease. The healthcare system's cumulative secondary preventive measures are vital and can probably affect the risk of recurrence. If each region is to monitor the impact of targeted measures and the like, repeated studies over time are required.

## CARDIAC CARE

Cardiovascular disease is the most common cause of death and among the most common causes of disability in Sweden. Acute myocardial infarction, of which there were more than 36 000 cases in 2006, is the cardiovascular disease that causes the most deaths. As the result of rapid changes in the care of acute myocardial infarction over the past ten years, fatality has declined substantially.

Eight indicators, one of which is new and one modified from last year, are presented here. Most of them concern myocardial infarction. Two indicators examine fatality within 28 days as a performance measure of myocardial infarction care. Four indicators measure process, reflecting how effectively myocardial infarction care handles treatment and secondary prevention. The indicator concerning waiting time for coronary artery bypass graft surgery has been modified. All scheduled cardiac surgery was previously included. The final indicator concerns readmission after hospitalisation for heart failure.

The Swedish Heart Intensive Care Admissions (RIKS-HIA) Quality Index is the data source for three of the indicators. RIKS-HIA contains data about the myocardial infarction patients admitted to cardiac intensive care units at hospitals. Almost all hospitals participate in the register, but each of them has myocardial infarction patients who are not reported. Thus, a collaborative effort of the NBHW and RIKS-HIA compared reporting to RIKS-HIA and the Patient Register (PAR) for 2005–2006.

A total of 40 percent of cases nationwide were reported to PAR and not to RIKS-HIA. Thus, over 12 000 myocardial infarction diagnoses per year were not reported to RIKS-HIA. That raises the question of how representative RIKS-HIA is for myocardial infarction care in the various regions. Inclusion of all categories of myocardial infarction patients in regional data could affect the results of the comparison.

One source of underreporting stems from the cases of acute myocardial infarction that are treated outside of cardiac intensive care units. RIKS-HIA actively solicits reporting of myocardial infarction care even when provided at ordinary internal medicine units. See Appendix 2 for the comparison between RIKS-HIA and PAR.

This year's presentation of RIKS-HIA data assigns patients to their region of domicile, not where the hospital is located, as was the case earlier. Thus, the results for the indicators based on RIKS-HIA cannot be directly compared with those of last year.

## A:41 • Myocardial infarction – 28-day case fatality rate

The 28-day case fatality rate is an internationally established indicator of how well the healthcare system handles acute care after myocardial infarction. The measure presented here examines quality throughout the healthcare system: preventive, ambulance, acute and follow-up care.

Figure A:41 compares regional results for 2004–2006 with those for 2001–2003. All diagnoses of myocardial infarction in the Cause of Death Register or the inpatient section of the Patient Register are included. Thus, both patients who were initially hospitalised and those who died without being hospitalised are covered.

Regional variations in case fatality rates may have several causes. In addition to diagnostic reliability, background factors such as concurrent diseases, social variables, random parameters, and the propensity of the population to seek care all have an impact. Direct care-related factors may include distance to an acute care hospital, the efficiency of ambulance services and acute hospital care.

The age-standardised 28-day case fatality rate declined by 10 percentage points for both women and men between 1990 and 2000. The figure indicates that the decrease has continued, though to varying degrees, in nearly every region during the 2000s.

Some 21 000 men and 15 500 women had myocardial infarctions in 2006. Almost one third of the patients died within 28 days after myocardial infarction, approximately 7 000 outside of acute care. For 2004–2006, men had the highest 28-day case fatality rate in Örebro and Kalmar, as well as the lowest rate in Västerbotten and Uppsala. Västerbotten experienced the biggest decline from 2001–2003. The regional age-standardised case fatality rate for men ranged from 24.5 to 38.1 percent.

Örebro and Kalmar had the highest case fatality rate for women as well. No significant decrease occurred in Örebro, Kalmar and some other regions. Women in Uppsala and Västmanland, along with Gotland (whose small population made for greater statistical uncertainty), had the lowest case fatality rate The rate fell appreciably for Dalarna and Västmanland women from 2001–2003. Age-standardised rates for women varied by just above 10 percentage points among the different regions.

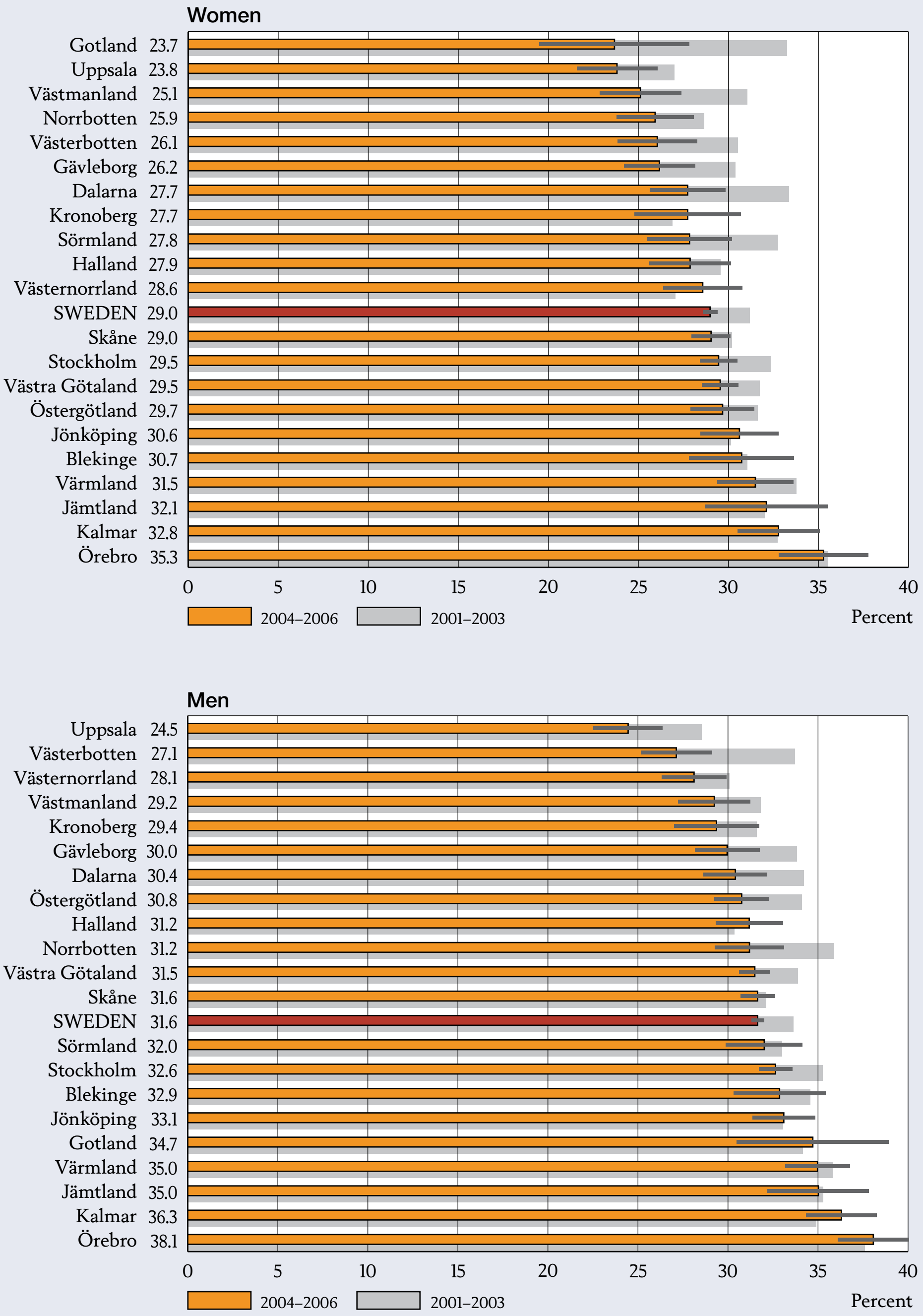


**Figure A:41** Myocardial infarction – 28-day case fatality rate, 2004–2006. Age standardised.

Source: National Patient Register and the Cause of Death Register, National Board of Health and Welfare

## A:42 • Myocardial infarction – 28-day case fatality rate – hospitalised patients

This measure focuses on the quality of acute treatment of myocardial infarction patients and continuing care at the hospital. The indicator is also well established internationally. In comparison with the other centres in 24 countries, the two Swedish centres that participated in WHO's MONICA project reported very low case fatality rates among hospitalised myocardial infarction patients. Short-term survival exclusively among hospitalised patients is the only measure that is available in many countries.

The comparison in Figure A:42 is based on all patients with a diagnosis of myocardial infarction who were initially hospitalised in 2005–2007. All cases in which the patient was age 20 or older were included. Age standardisation was performed in view of the differing gender and regional age structures. The shaded bar shows the corresponding result for 2002–2004. The same data appear on a per-hospital basis on page 124.

Approximately 17 000 men and 12 000 women were hospitalised in 2007. Among all hospitalised myocardial infarction patients in 2005–2007, almost 15 percent died within 28 days and one third within a year. With age standardisation, men had somewhat higher case fatality rates than women. The national case fatality rate had declined by 2 percentage points since 2002–2004.

Men in Örebro died most frequently after myocardial infarction and showed no improvement in terms of case fatality rate. The case fatality rate was also high for men in Värmland, Norrbotten and Halland and improved either slightly or not at all. The case fatality rate among men in Dalarna, Blekinge and Västmanland declined to the lowest of all regions.

Among women, who generally had lower case fatality rates after myocardial infarction than men, Gotland, Sörmland and Västerbotten improved significantly to age-standardised rates of 8–12 percent in 2005–2007. The case fatality rate for Gotland women was very low, only half that of men. The Gotland data was based on very small numbers of women. For instance, only 5 of 120 women died in 2007 within 28 days after having been hospitalised for myocardial infarction.

Thus, after taking the differing age structures into consideration, men showed higher case fatality rates following myocardial infarction than women, both in the category of everyone who had an infarction and the category of everyone who was hospitalised. But the gender difference was greater in the category of everyone who had an infarction. The gap between men and women was narrower for hospitalised patients.

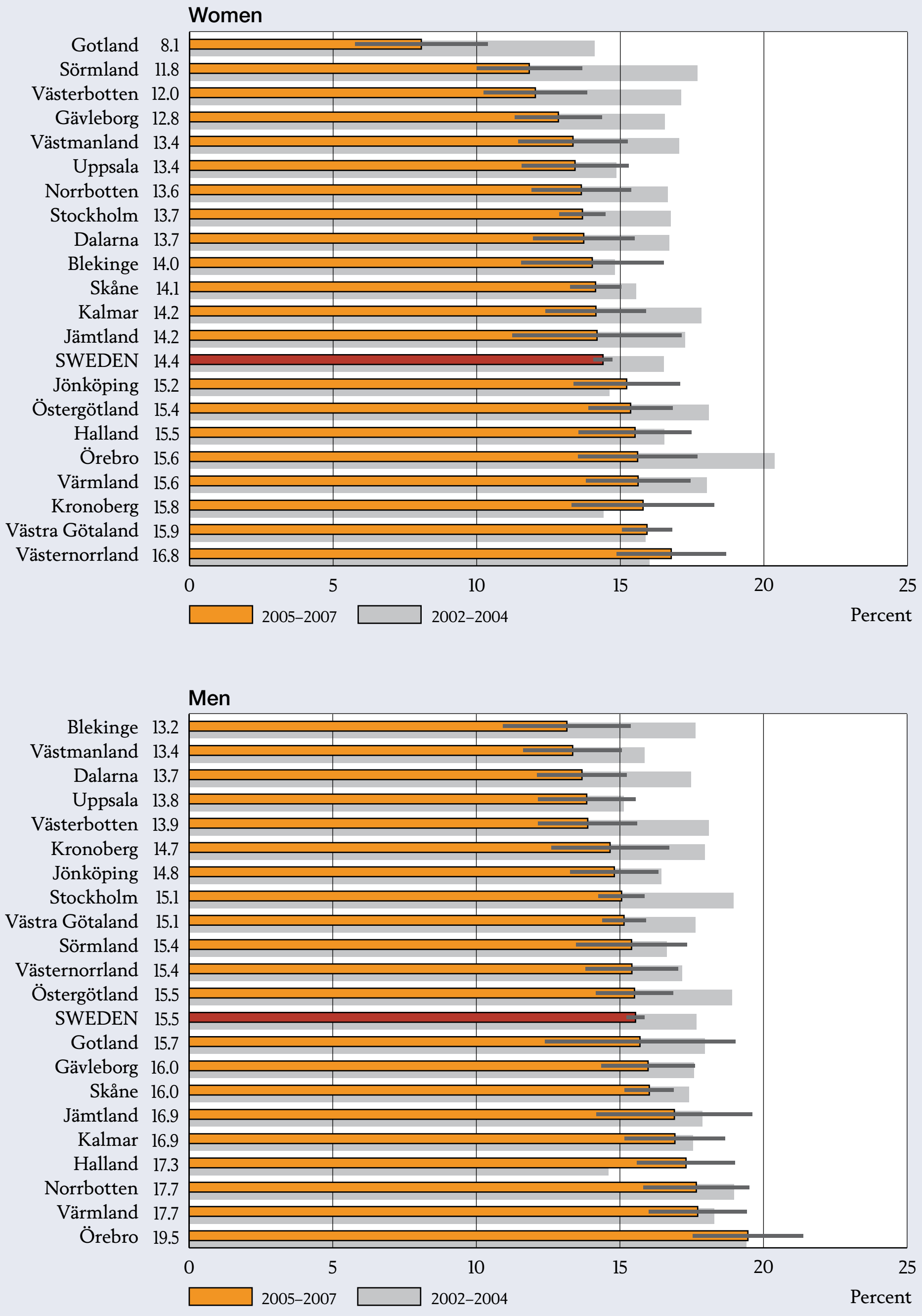


**Figure A:42** Myocardial infarction – 28-day case fatality rate – hospitalised patients, 2005–2007. Age standardised.

Source: National Patient Register and the Cause of Death Register, National Board of Health and Welfare

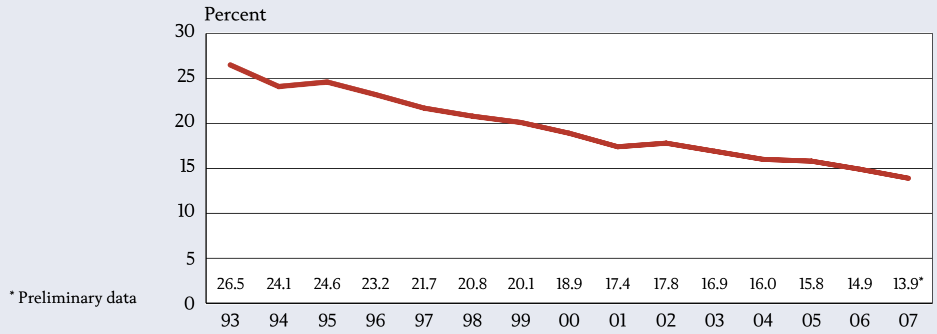


**Figure A:42**
**Sweden**

Myocardial infarction – 28-day case fatality rate
– hospitalised patients. Age standardised.

Source: National Patient Register and the Cause of Death Register, National Board of Health and Welfare

## A:43 • Reperfusion therapy for patients with ST-segment elevation myocardial infarction (STEMI)

Approximately 40 percent of all myocardial infarctions are STEMIs and 60 percent are not (NSTEMIs). The time between onset of symptoms and commencement of treatment is critical for STEMI patients. Prompt diagnosis and treatment have top priority. Thrombolysis was once the first-line therapy for STEMI. The use of primary percutaneous coronary intervention (PCI) has increased substantially over the past several years. Given that not all hospitals perform PCI, distance (time) is a factor when choosing a treatment strategy.

Figure A:43 shows the percentages of all patients with STEMI or left bundle branch block (LBBB) who were given acute reperfusion therapy. Reperfusion includes primary PCI, thrombolysis and – in a few cases – acute coronary artery bypass graft (CABG) surgery. The data were taken from RIKS-HIA for 2007. Almost 5 400 patients younger than age 80 were included in the comparison. Patients were assigned to their regions of domicile.

More than 72 percent of patients were treated nationwide. That represents the same level as 2006 but higher than previous years. The regional variation was 54–81 percent (not shown). Use of primary PCI has increased very rapidly in Sweden since 2003 but not as much in parts of the country where distances to hospitals pose an obstacle. Fewer women than men received reperfusion therapy. The regional variation was also greater for women than for men.

The RIKS-HIA quality index for hospitals in 2007 requires treatment of 85 percent of patients for a score of 1 and 80 percent for a score of 0.5. This comparison shows that three regions scored 0.5 and none scored 1.

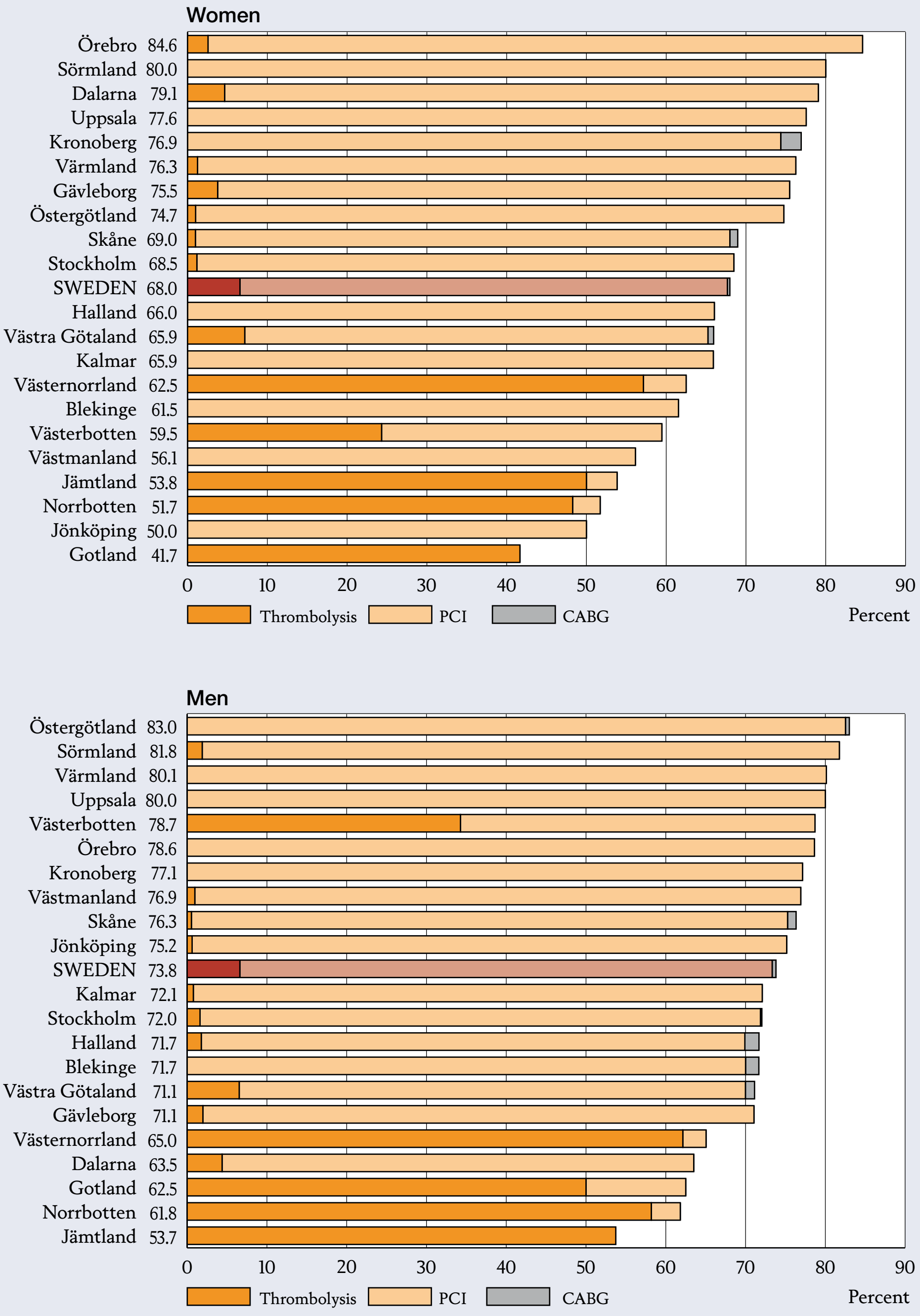


**Figure A:43** Reperfusion therapy for patients with ST-segment elevation myocardial infarction, 2007. Patients younger than 80.

Source: Register of Information and Knowledge about Swedish Heart Intensive Care Admissions

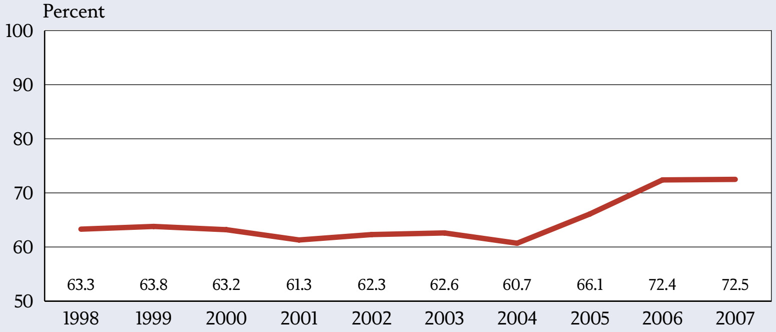


**Figure A:43**
**Sweden**

Reperfusion therapy for patients with ST-segment elevation myocardial infarction. Patients younger than 80.

Source: Register of Information and Knowledge about Swedish Heart Intensive Care Admissions

More than 1 500 patients, or almost 30 percent, were diagnosed with STEMI or LBBB but did not receive any of the therapies in question. The causes of this undertreatment have not been established. The distance to a hospital that performs PCI offers no explanation, given that thrombolysis therapy can be provided at any hospital with acute internal medicine units. The regional variation suggests that better treatment is possible for patients with this severe disease.

## A:44 • Coronary angiography after non-ST-segment elevation myocardial infarction

Coronary angiography is done to determine whether acute reperfusion therapy is to be performed by means of either PCI or CABG surgery. Early coronary angiography can considerably improve the prognosis for patients with NSTEMI. According to the national guidelines, the therapy has top priority in patients with two more of the following risk factors: older than 65, male, diabetes, previous myocardial infarction or other signs of serious lack of oxygen in the heart.

Figure A:44 shows the percentage of patients with NSTEMI and additional risk factors who received coronary angiography. The data cover 2007 and all patients under age 80. Women and men are reported separately. More than 6 700 patients are included in the comparison. See page 125 for hospital-level data.

A total of 74 percent of all women underwent or were scheduled for coronary angiography. The percentage has steadily increased since the early 2000s, though more slowly in recent years. The RIKS-HIA quality index for hospitals assigns scores for 75 percent and 80 percent. Four regions reached 80 percent and eleven reached 75 percent.

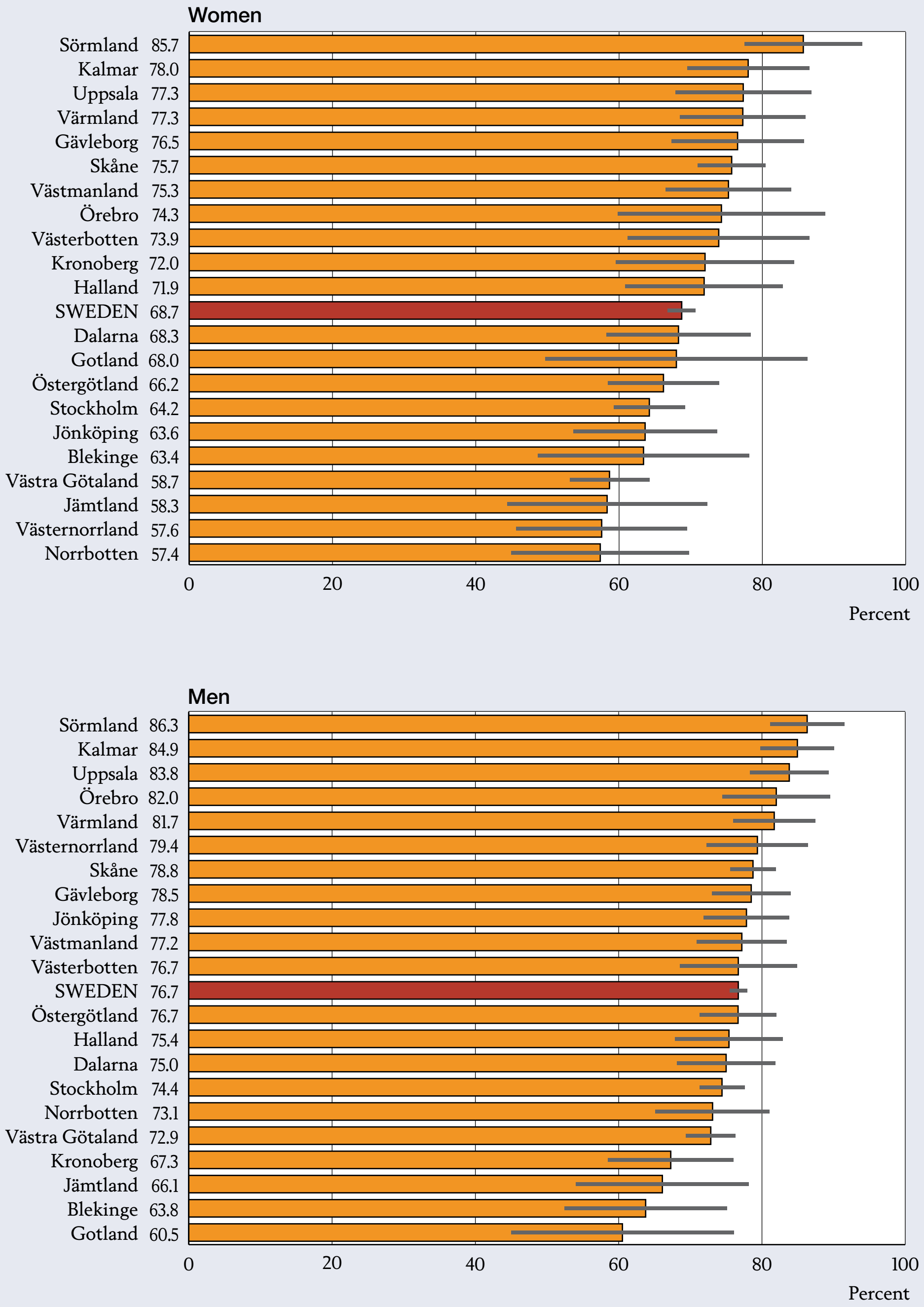


**Figure A:44** Coronary angiography after non-ST-segment elevation myocardial infarction, 2007. Patients younger than 80.

Source: Register of Information and Knowledge about Swedish Heart Intensive Care Admissions

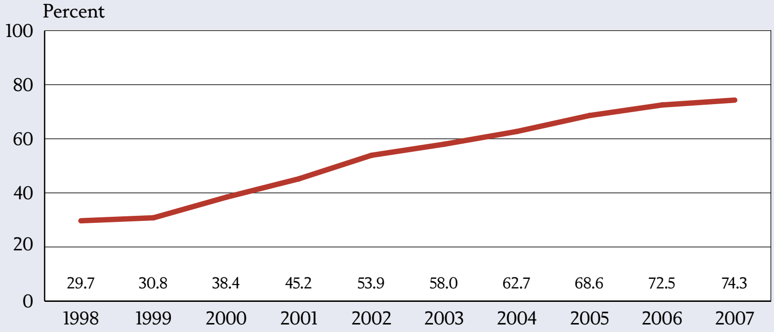


**Figure A:44**
**Sweden**

Coronary angiography after non-ST-segment elevation myocardial infarction. Patients younger than 80.

Source: Register of Information and Knowledge about Swedish Heart Intensive Care Admissions

There was an inverse relationship between age and the percentage of patients who were given coronary angiography. That may be due to contraindications, such as other diseases or conditions, that rendered it unnecessary or unsuitable. Age discrimination may also be involved for a type of examination that determines wither PCI or CABG surgery is required. The national percentage is 69 percent for women and 77 percent for men. The less frequent use of coronary angiography in women may be due to their more advanced age or the fact that scientific studies have found poorer treatment results for women with the methods that may be recommended on the basis of the examination.

## A:45 • Clopidogrel therapy after non-ST-segment elevation myocardial infarction

Upon discharge from hospital, patients receive a number of drugs aimed at minimising the risk that myocardial infarction will recur. Acetylsalicylic acid (ASA/aspirin) therapy is well established. Adjunctive clopidogrel therapy further reduces the risk of recurrence. Clopidogrel is now recommended for all patients who have NSTEMI, with the exception of those who have been prescribed warfarin or who will soon be undergoing CABG surgery. But an individual assessment must always be performed.

Figure A:45 shows the percentage of hospitalised NSTEMI patients who were given clopidogrel in 2007 More than 7 500 patients younger than age 80 were included in the comparison. See page 126 for hospital-level data.

A total of 82 percent of patients nationwide received clopidogrel. The percentage has risen rapidly since the early 2000s but slower in 2007.

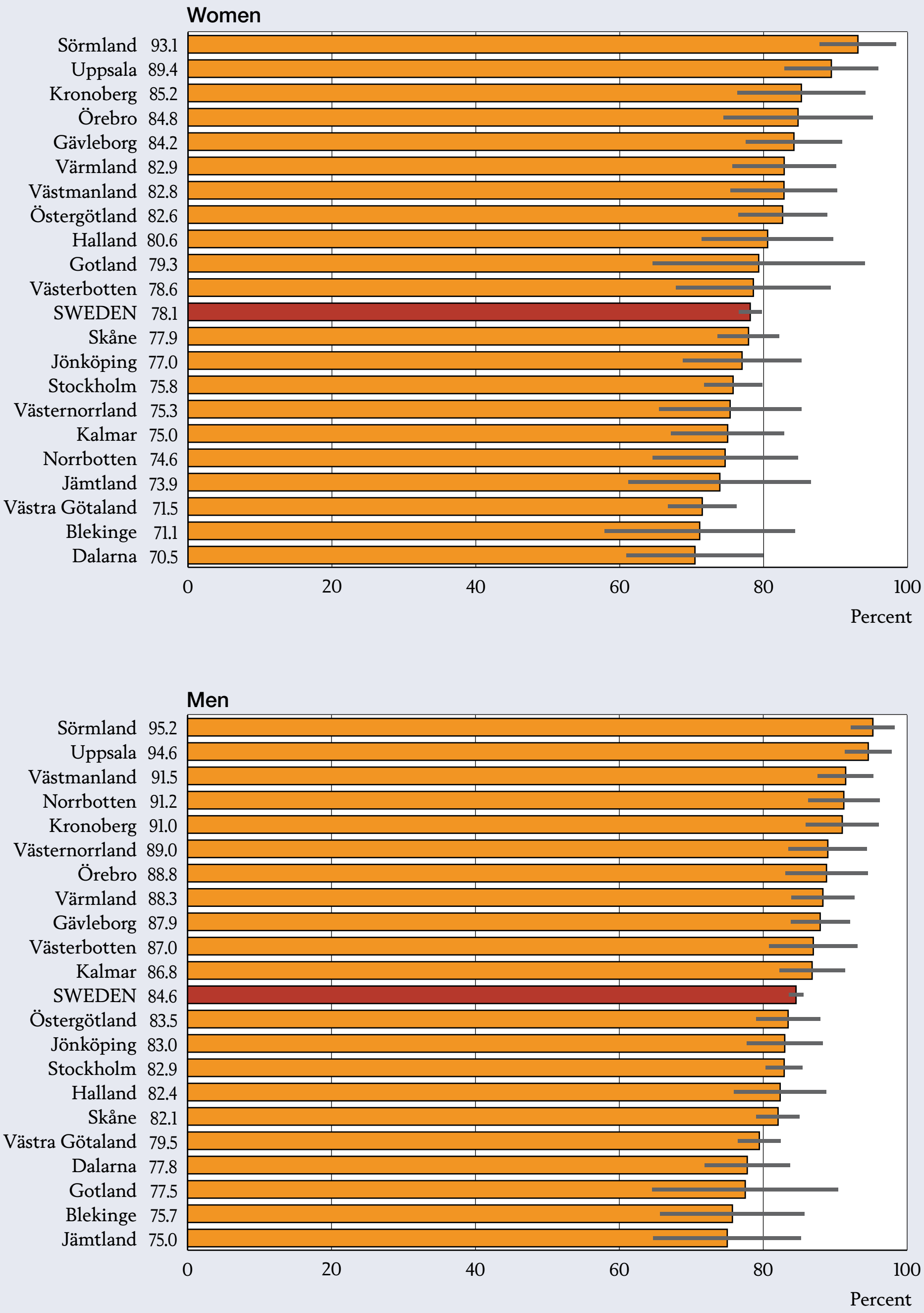


**Figure A:45** Clopidogrel therapy after non-ST-segment elevation myocardial infarction, 2007. Patients younger than 80.

Source: Register of Information and Knowledge about Swedish Heart Intensive Care Admissions

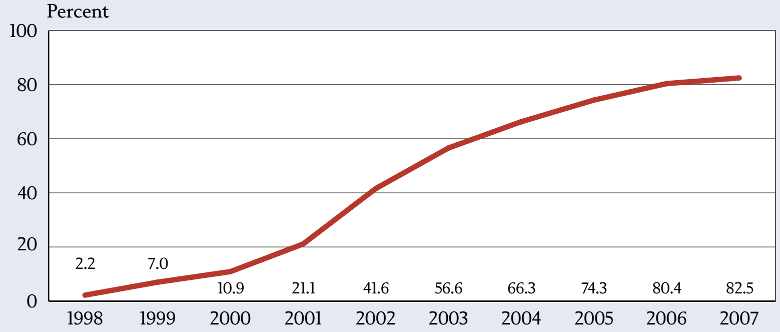


**Figure A:45**
**Sweden**

Clopidogrel therapy after non-ST-segment elevation myocardial infarction. Patients younger than 80.

Source: Register of Information and Knowledge about Swedish Heart Intensive Care Admissions

The RIKS-HIA quality index has scores for 85 and 90 percent. Uppsala and Sörmland both reached 90 percent. The regional differences were fairly wide but narrower than in 2006, given that a number of regions with relatively low percentages improved more than the others.

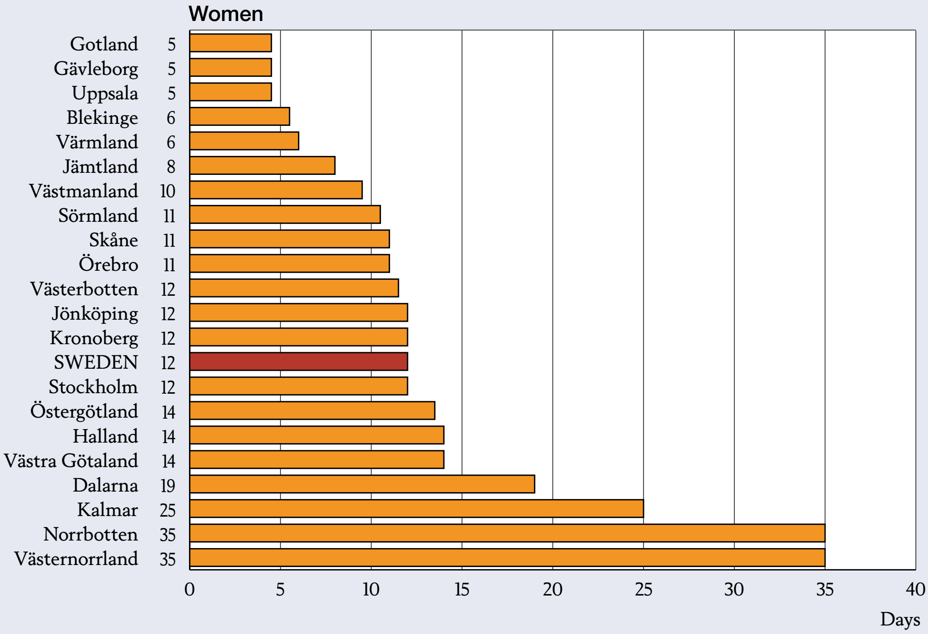
A total of 78 percent of women and 85 percent of men were treated. One reason is that women are given PCIs less often than men. Clopidogrel therapy is always used after PCI with stents.

## A:46 • Waiting time for coronary artery bypass graft

Data on waiting times for treatment of the most common diseases in non-acute care are reported to the Waiting Times in Health Care database. A number of national healthcare quality registers also collect waiting time data. The presentation of this indicator is based on the premise that a long waiting time for coronary artery bypass graft (CABG) surgery may entail a medical risk. The data are taken from the Swedish Cardiac Surgery Register for 2007. The participation rate was excellent, close to 100 percent.

Waiting time is the period from the date on which surgery is ordered until it is performed. The median waiting time is used. Almost 4 200 operations are included. Only a few regions have hospitals that perform CABG surgery. The statistics indicate how long patients from each region waited, regardless of where the surgery was performed. See page 127 for hospital-level waiting-time data.

Figure A:46 shows median waiting times in number of days. The national median waiting time was 14 days for men and 12 days for women. The national median waiting time for all patients has been essentially unchanged since 2004.



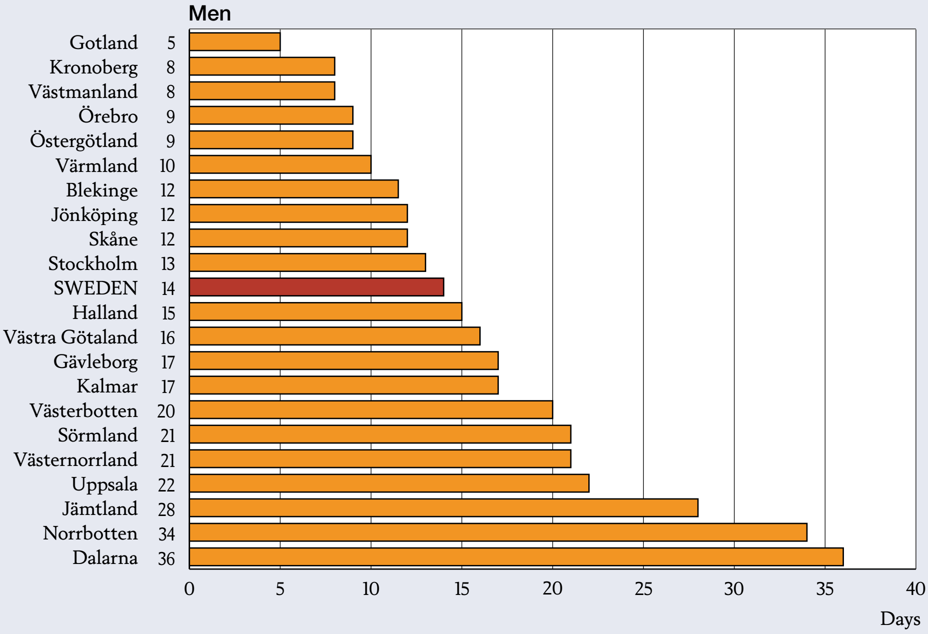


**Figure A:46** Waiting time for coronary artery bypass graft, 2007.

Source: Swedish Heart Surgery Register

The regional variations were significant. The median waiting time for men was 10 days or less in six regions, as opposed to 20 days or more in seven regions. The nationwide figure was similar for women and men, but men had a considerably longer wait than women in some regions, including Dalarna and Jämtland.

## A:47 • Lipid lowering drug therapy after myocardial infarction

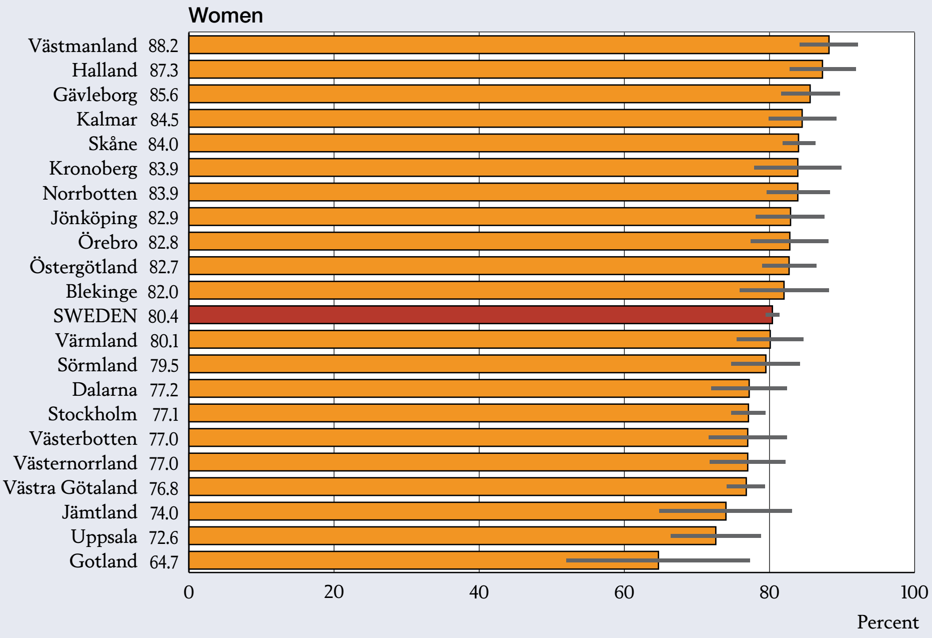
As is the case with stroke, elevated blood pressure and lipid levels after myocardial infarction are key risk factors for recurrence of cardiovascular disease. While a proper diet and lifestyle are integral to treatment, a considerable percentage of myocardial infarction patients need lipid lowering drug therapy. Statins lower lipid levels and thereby reduce the risk of new coronary artery stenosis. Low-cost statin therapy has high priority in the national guidelines.

RIKS-HIA collects data about the extent to which patients are prescribed lipid lowering drugs when discharged from hospital. This indicator presents instead the percentage of myocardial infarction patients who pick up prescriptions for these drugs during a certain period of time after hospitalisation. For that purpose, data from the Patient Register and Prescribed Drug Register have been combined. The results cover patients age 40–79 who were hospitalised for myocardial infarction in 2005 and 2006. The data are age-standardised. See page 128 for hospital-level data.

Figure A:47 shows the percentage of women and men who were treated with lipid lowering drugs after myocardial infarction. Just over 83 percent of men, somewhat more than women, were treated nationwide. Particularly for men, the regional variations were relatively modest.

The RIKS-HIA quality index for hospitals assigns scores for 90 percent and 95 percent. Given that no region reached 90 percent for either sex, patients appear to have been undertreated.

Proceeding from the alternate assumption that only patients with elevated cholesterol levels are to be treated would suggest that 80 percent receive lipid lowering drugs. In that case, patients would not have been undertreated on a nationwide basis.



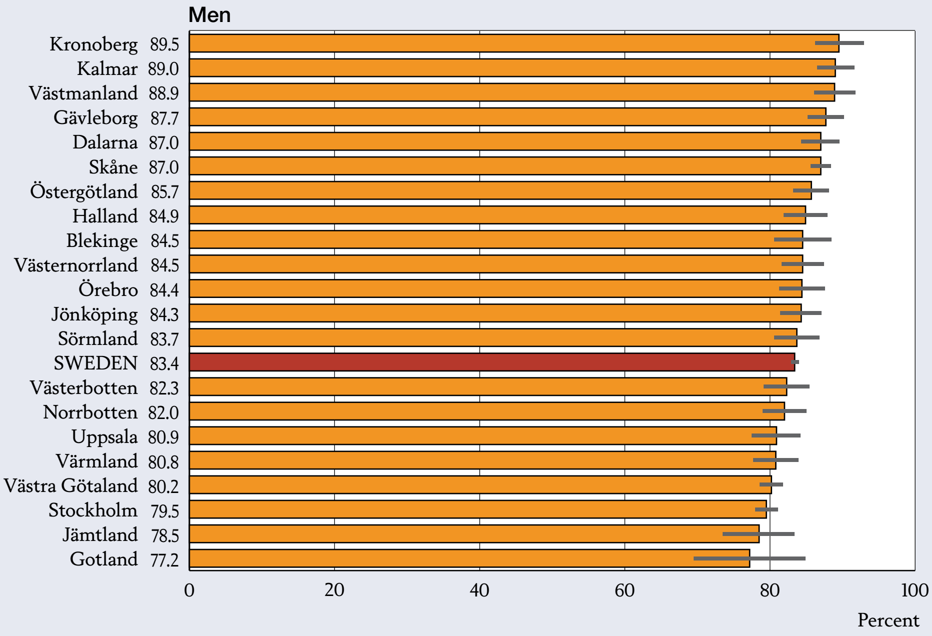


**Figure A:47** Lipid lowering drug therapy 12–18 months after myocardial infarction, 2005–2006. Patients aged 40–79. Age standardised.

Source: National Patient Register and the Prescribed Drug Register, National Board of Health and Welfare

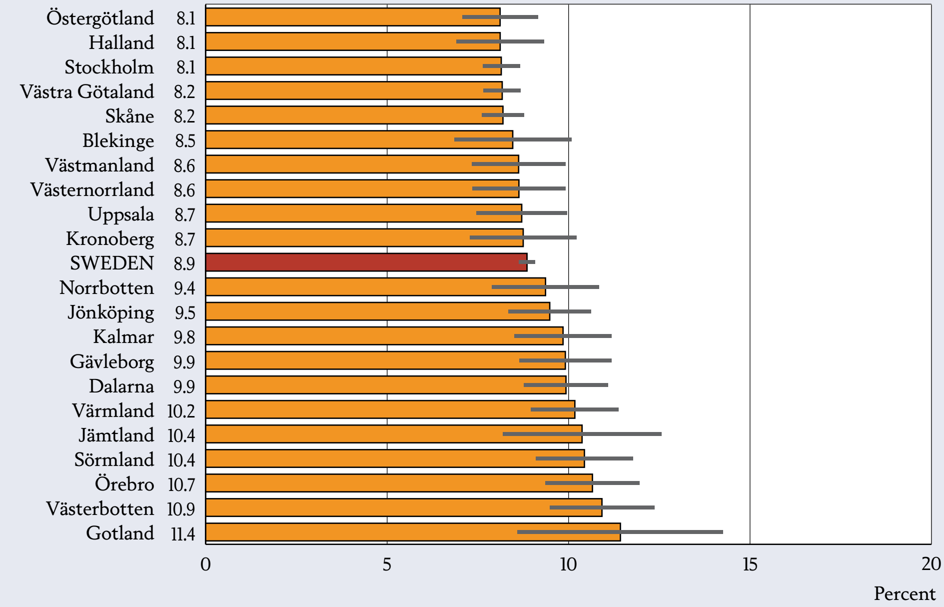


**Figure A:48** Heart failure – readmission within 30 days, 2004–2007. Age standardised.

Source: National Patient Register, National Board of Health and Welfare

## A:48 • Readmission after heart failure

Heart failure is a common chronic disease that may be a secondary effect of myocardial infarction. An estimated 200 000 people, more than 2 percent of the population, have symptomatic heart failure, and a similar number have latent heart failure. Heart failure is strongly age-related. Some 10 percent of people older than 80 have heart failure. The 5-year survival prognosis is a dismal 50 percent. Heart failure is treated primarily with drugs, but patients with a severe condition may receive a biventricular pacemaker.

Treating heart failure patients is expensive. DRG 127 Heart Failure and Shock identified over 30 000 inpatient care events in 2006, with a total of over 200 000 care days. Patients are frequently readmitted after hospitalisation for heart failure. Studies have found a readmission frequency of 30–40 percent within 3 months after discharge. Heart failure is a difficult disease to diagnose, particularly in its mild and moderate forms. Thus, the reported data are uncertain.

Figure A:48 shows the percentage of patients who were hospitalised for the primary diagnosis of heart failure in 2004–2007 and who were readmitted within 30 days of discharge. Only patients who were admitted with heart failure as the primary diagnosis are included. A low frequency of readmissions may suggest high-quality treatment of heart failure patients.

Approximately 9 percent of patients were readmitted nationwide. That corresponds to some 1 500 patients each year. The regional variation was modest at just over 7 percent to almost 13 percent. Regional differences in diagnostic criteria can affect the comparison. Thus, the results should be interpreted cautiously. But each region, particularly the individual hospitals, can study their own readmission frequency and assess opportunities for improvement. See page 129 for hospital-level data.

## ORTHOPAEDIC CARE

Diseases of the musculoskeletal system are the most common cause of pain, impaired working capacity and long-term sickness absence, as well as sickness and activity benefits. Approximately 22 percent of women and 15 percent of men age 16–84 report chronic musculoskeletal disease.

According to WHO's Global Burden of Disease study in 1997, osteoarthritis is a major disease in industrialised countries. Osteoarthritis is the second most common disease in women, and the fourth most common in men, younger than 60.

Nine orthopaedic care indicators are presented. They describe common and social resource-intensive diseases and treatments, including knee and hip replacement arthroplasty, hip fracture, surgery for herniated lumbar disc and drugs against post-fracture osteoporosis. The indicators are based on data from national quality registers and the Patient Register.

Approximately 60 000 orthopaedic operations are performed each year. Reliable data sources are currently lacking when it comes to traumatology associated with fracture surgery (except hip), a common group of acute care patients.

### A:49 • Knee arthroplasty – five-year risk of revision

Osteoarthritis of the knee is relatively uncommon in people younger than 50, and the incidence rises with age. Women, especially the elderly, develop osteoarthritis of the knee a good deal more often than men. Knee arthroplasty was performed approximately 10 500 times at 78 clinics in 2006. Women accounted for 60 percent of the total.

The data presented here are taken from the Swedish Knee Arthroplasty Register. They refer to all total knee arthroplasty procedures performed in 1997–2006 on osteoarthritis patients. Over 60 000 operations were performed during the observation period. The register contains data for units that perform knee arthroplasty in every region. Clinics are reported under the region in which they are located regardless of where their patients live.

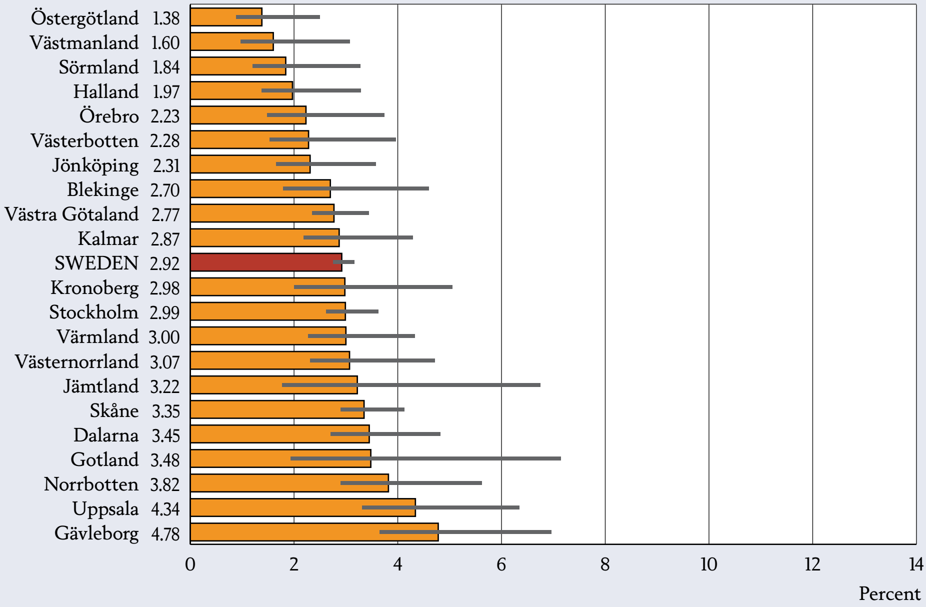


**Figure A:49** Total knee arthroplasty – five-year risk of revision, 1997–2006.

Source: Swedish Knee Arthroplasty Register

Figure A:49 shows the five-year risk of revision, regardless of cause. The nationwide risk for revision within five years was 2.9 percent. The rate ranged from approximately 1.5 percent in Östergötland and Västmanland to just over 4 percent in Uppsala and Gävleborg.

The frequency of complications was generally low, while random variations and differing patient demographics had a large impact on the results. Thus, the comparison should be interpreted cautiously. Gender-related variations are marginal. The results are encouraging in comparison with other countries that report similar statistics.

## A:50 • Total hip replacement arthroplasty – 10-year implant survival

All relevant clinics report to the Swedish Hip Replacement Arthroplasty Register. A recent check against the Patient Register at the individual level showed that the hip replacement register has a participation rate of 96 percent. The participation rate among the clinics was 100 percent for the indicators of implant survival and reoperation presented here. The rate is rising for the data on patient-reported outcome that form the basis of indicator A:52. These data are now reported by 74 of the country's 79 clinics.

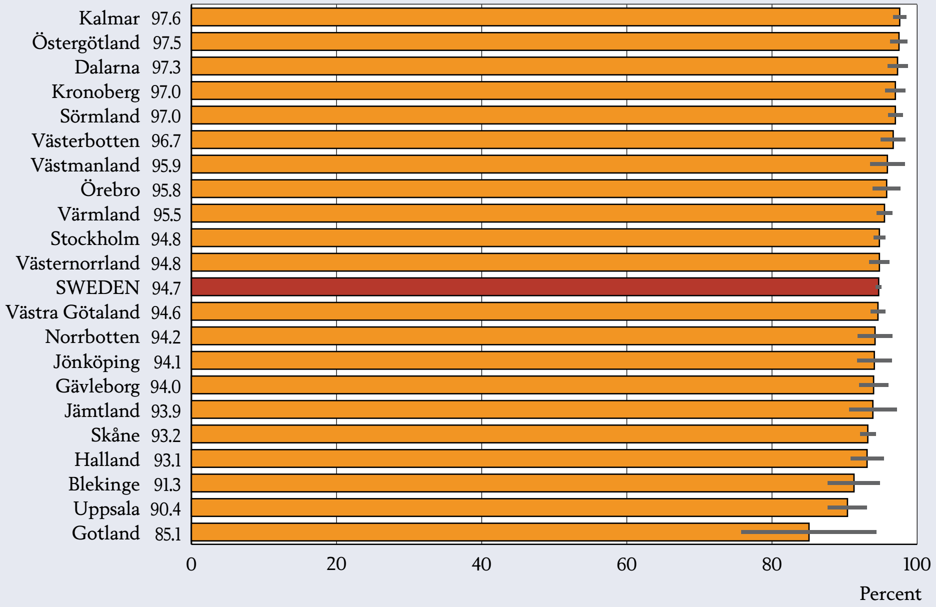


**Figure A:50** Total hip replacement arthroplasty – 10-year implant survival, 1998–2007.

Source: Swedish Hip Arthroplasty Register

Primary total hip replacement was performed 14 160 times in 2007, while there were 2 100 reoperations. More women than men underwent surgery.

Implant survival after surgery is a key quality measure. Surgery is regarded as having failed if a prosthesis component must be replaced or the entire implant removed. The Swedish Hip Replacement Arthroplasty Register has long monitored results with this quality indicator. The data presented here concern operations performed in 1998–2007, a narrow window and therefore more current than the previous report. More than 125 000 operations are included.

The implant survival rate of almost 95 percent is the highest in the world reported for a 10-year period. The regional variation was 85–98 percent. The 10-year survival rate for hip replacement arthroplasty is a "slow" quality indicator that partially describes historical outcomes but reflects long-term complications such as mechanical loosening of the implant. This quality measure is standard for all comparative analyses in the area.

Women's implants have a 96 percent 10-year survival rate, as opposed to 93 percent for men. Confirmed by many earlier studies, the gender difference is probably due

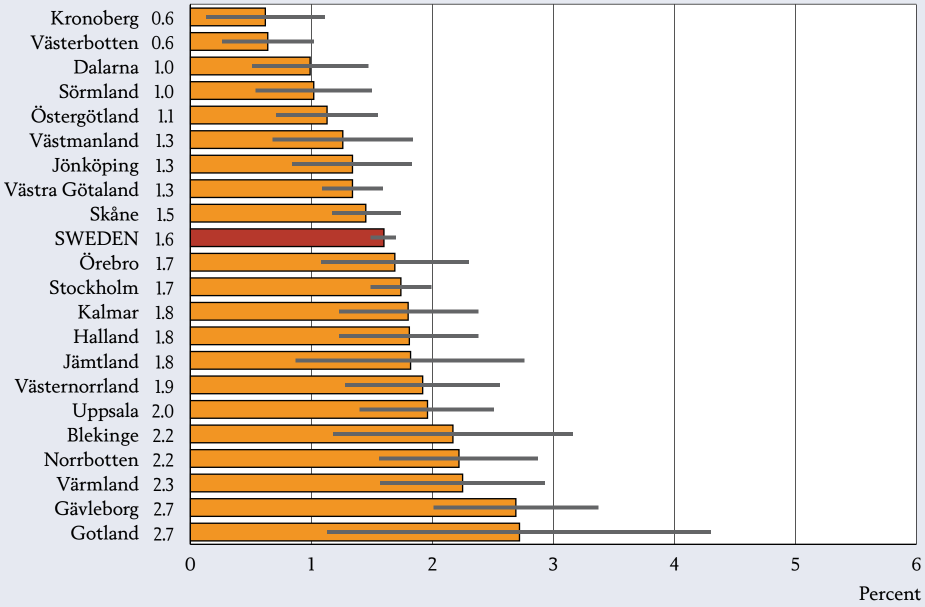


**Figure A:51** Reoperation within 2 years after total hip replacement arthroplasty, 2004–2007.

Source: Swedish Hip Arthroplasty Register

to the fact that men tend to engage in more strenuous physical activity, leading to greater long-term wear and tear on the prosthesis components.

The regional comparison includes all patients, who represent a wide range of risk factors and types of hospitals. The location of a clinic, not where the patient comes from, forms the basis of the regional data. Clinics collaborate to make sure that severe cases are sent to those with special expertise. Those clinics operate on patients who face greater surgical risks and thereby a higher frequency of complications. Interregional referrals may affect results. No correction has been made for that possibility here.

## A:51 • Reoperation after total hip replacement arthroplasty

Ten-year survival of hip prosthesis is a central quality variable, but indicators are also needed that can provide quicker feedback to clinics and that can spur them to launch improvement efforts without excessive delay.

One faster indicator concerns the percentage of reoperations within two years of initial surgery regardless of the cause. Reoperation is a broader concept than revision and includes all forms of additional surgery. The short follow-up time primarily reflects early and serious postoperative complications, such as deep infection and revision due to repeated dislocation of the hip prosthesis.

The percentage of reoperations presented in Figure A:51 is based on the 54 500 initial procedures performed in 2004–2007. Only surgically treated complications are included. The register does not capture infections or non-surgically treated total dislocations (luxations). If a patient is repeatedly reoperated on for the same complication, only a single complication is reported. Data for patients reoperated on at a clinic other than the primary one are still assigned to the primary clinic.

The complication rates are generally low. Patient demographics and random variation have a large impact on the results, i.e., whether there are any clear trends, which can only be evaluated over time.

A total of 1.6 percent of all patients nationwide had reoperations within two years. That represents 887 patients. Two regions had reoperation rates of approximately 0.6 percent, while five regions had rates above 2 percent. See page 130 for hospital-level data. During the observation period, the variation from hospital to hospital was larger at 0–5.1 percent. The size of that range renders the indicator more significant in terms of pointing to the need for improvement efforts.

### A:52 • Patient-reported outcome in total hip replacement arthroplasty

Decision makers, as well as national and international researchers, have steadily increased their focus on patient-reported outcomes of healthcare treatments and interventions in recent years. Such efforts are often referred to as Patient Reported Outcome Measures (PROMs).

The leading indicators for hip replacement arthroplasty are subjective pain and poor health-related quality of life. Thus, measuring and reporting these variables is important in order to optimise individual treatment, to measure the results in multiple dimensions and to conduct health economic studies. The Swedish Hip Replacement Arthroplasty Register has monitored patient-reported outcome of surgery since 2002. One of the measures is the EQ-5D instrument, which generates an index score for health-related quality of life.

All patients fill out a 10-question preoperative form. The same form, with an additional question concerning satisfaction, is sent to the patient a year later. The procedure is repeated after 6 and 10 years.

Figure A:52 shows the difference in the EQ-5D score, i.e., the improvement in health-related quality of life measured one year after surgery. This year's analysis covers 2002–2007 and includes 16 500 patients. At 0.24–0.45, the regional variation was unexpectedly large. Regions with low scores should look at the possible impact

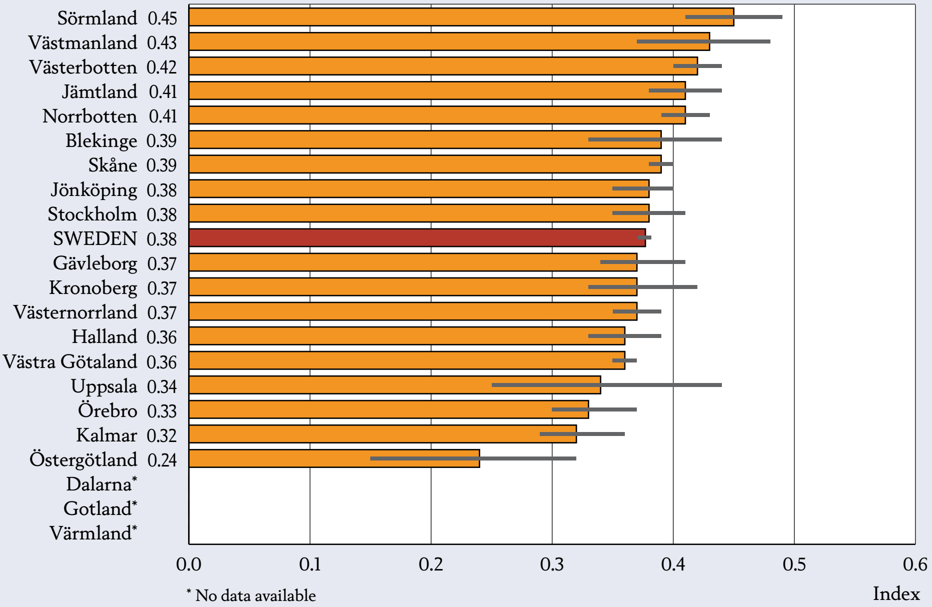


**Figure A:52** Total hip replacement arthroplasty – patient-reported outcome, 2002–2007. Improvement in EQ5D after one year.

Source: Swedish Hip Arthroplasty Register

of a greater focus on performing more operations. For instance, if healthier patients undergo surgery, the benefits will be lower. Little improvement in health-related quality of life will probably translate into poor cost-effectiveness when a proper health economic analysis is performed. While women have a lower preoperative quality of life than men, their improvement is somewhat greater after one year.

Värmland, Gotland and Dalarna follow the monitoring procedure but have not yet generated any one-year results. Thus, the figure shows no data for them. See page 131 for hospital-level data.

## A:53 Hip fracture – waiting time for surgery

All hip fracture patients are taken to an acute hospital and operated on, although the type of surgery varies. Because the actual fracture is not acutely life threatening, there may be a waiting time for surgery. The delay leads to a more protracted mobilisation period for patients, including longer time at hospital and throughout the care chain until return to their original residence. The risk of disorientation, bedsores, infections and other complications increases. Thus, the time between arrival at hospital and the commencement of surgery is a frequent international quality measure.

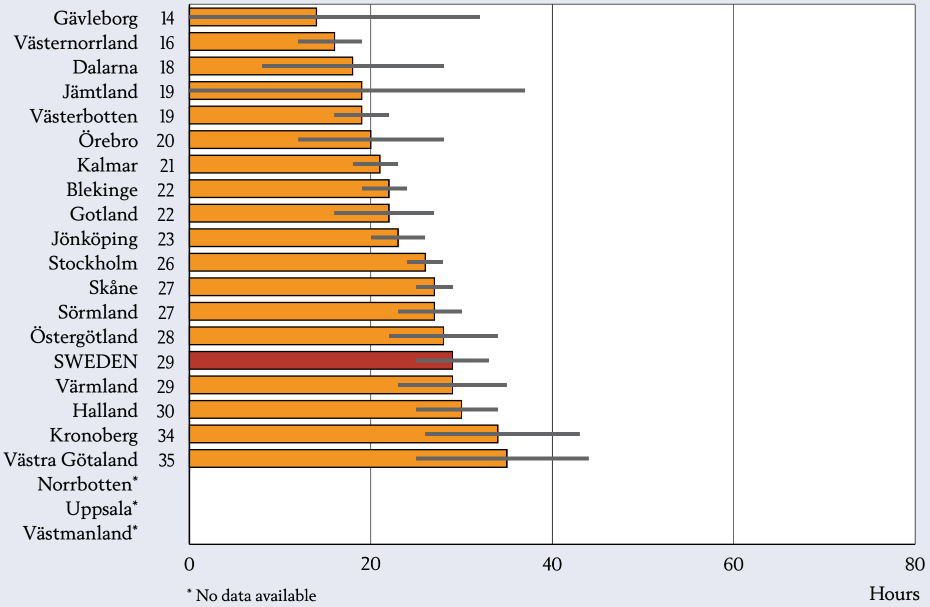


**Figure A:53** Hip fracture – waiting time for surgery, 2007.

Source: National Hip Fracture Registry

The source for indicator data is the National Hip Fracture Register (RIKSHÖFT). Clinics in almost all regions report to the register, though with varying participation rates. The results shown in Figure A:53 are based on 11 163 hip fracture patients. According to the Patient Register, 18 880 people were hospitalised for hip fractures in 2007. Västmanland, Uppsala and Norrbotten do not yet report to RIKSHÖFT. Appendix 2 compares the participation rate by region and hospital. See page 132 for hospital-level data.

Because many clinics transitioned to data entry based on date and time in 2007, this year's indicator is specified in hours instead of days. Given that time reports for hospitals that still specify fractions of days were converted to hours, the analysis is associated with a degree of uncertainty. An effort is under way to convince all hospital to use date and time.

The average waiting time for the entire country in 2007 was 29 hours, with a regional variation of 14–35 hours. Women wait longer than men in a number of regions. The NBHW 2003 guidelines recommend that surgery be performed as soon as possible on the day of admission. Some regions have waiting times much longer than

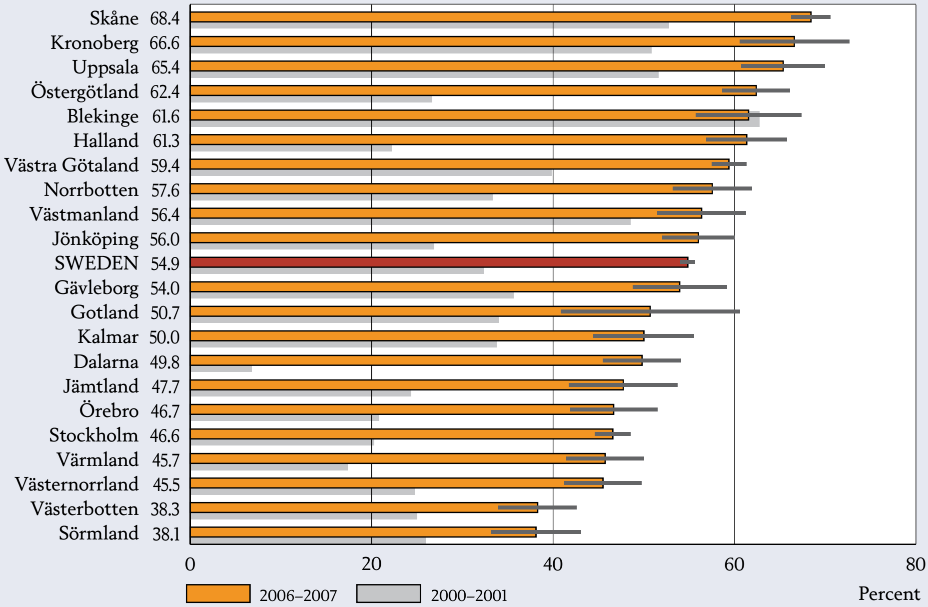


**Figure A:54** Patients 65 years and older operated with arthroplasty after femur fracture, 2006–2007. Age standardised.

Source: National Patient Register, National Board of Health and Welfare

24 hours, which can lead to a greater frequency of complications, given the delicacy of the condition.

The Swedish treatment model for hip fracture has radically changed over the past 6–7 years. A growing number of patients receive hip prostheses, placing an additional burden on orthopaedic surgery units. That probably increases waiting times. The potential for improvement is great, and most regions should review their procedures.

## A:54 • Arthroplasty for femur fracture

Femur fracture was previously treated by means of osteosynthesis. The surgery is quick and easy to perform but has a high frequency of complications – the fracture may slip or fail to heal, or the articular head may disappear due to a vascular lesion at the time of fracture.

Various studies have found that the insertion of a hip prosthesis leads to only 10 percent failure, as opposed to 40–50 percent after osteosynthesis. Arthroplasty also yields better outcomes for patients with dementia, a particularly vulnerable group.

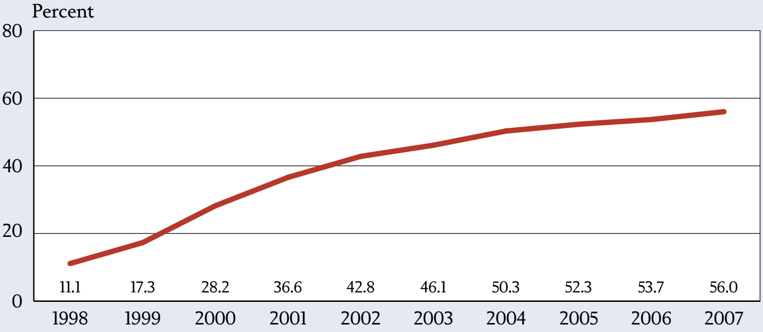


**Figure A:54**
**Sweden**

Patients 65 years and older operated with arthroplasty after femur fracture. Age standardised.

Source: National Patient Register, National Board of Health and Welfare

As a result of these findings, the Swedish treatment model has changed over the past decade. Between 65 and 75 percent of femur fracture patients should undergo hip arthroplasty. A half prosthesis is normally used, i.e., the socket is not replaced. But 30–35 percent of such fractures should still be treated with osteosynthesis, given that they are in younger patients or are not dislocated. Osteosynthesis offers advantages for younger patients. Considering its more limited nature, osteosynthesis may also be indicated when the patient has an acute, life-threatening disease.

Figure A:54 show the percentage of femur fracture patients age 65 or older who were given hip arthroplasty in 2006–2007. The source is the Patient Register. The comparison is based on 14 000 patients. Age standardisation was performed and only first-time cases were included. Where the patient lives, not the location of the clinic, forms the basis of regional reporting. The figure compares 2006–2007 with 2000–2001.

The nationwide percentage of femur fracture patients who received prostheses rose from 11 to 56 percent over the course of ten years. The regional variation was large, from 38 percent in Sörmland to 68 percent in Skåne. The greatest increase since 2000–2001 occurred in Dalarna and Halland, whereas the smallest increase was in Blekinge due to the fact that it had adopted the new treatment model at an early stage. Generally speaking, hip arthroplasty is underutilised.

Treating 70 percent of all femur fracture patients with prostheses places heavy demands on clinics, including reorganisation of on-duty services and requirements for surgical expertise. Another possible reason that some regions and clinics are not fully applying the new treatment model is that they feel the costs are too high. Hip arthroplasty requires longer surgery and greater prosthesis costs, but the consider-

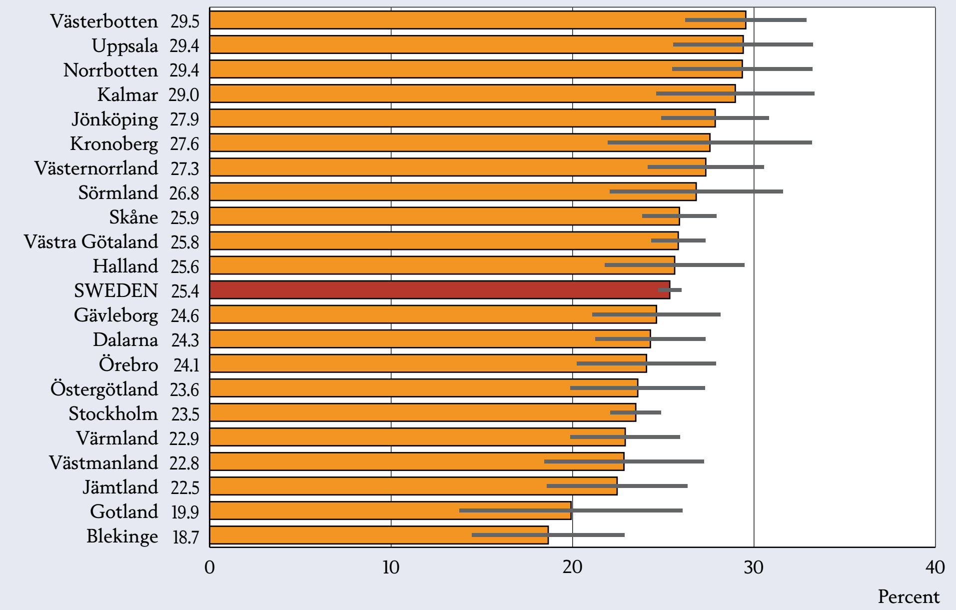


**Figure A:55** Women 65 years and older with fractures who were on osteoporosis drugs after 6–12 months, July 2005–June 2007. Age standardised.

Source: National Patient Register and the Prescribed Drug Register, National Board of Health and Welfare

ably lower frequency of reoperation compensates for these initial expenses. Primary hip arthroplasty also ensures less pain, easier rehabilitation and better health-related quality of life.

## A:55 • Drugs against post-fracture osteoporosis

Osteoporosis causes the bones to lose some of their strength. As a result, fractures can occur spontaneously or due to low-energy trauma, such as falls on the same level (slips and trips). Among the common fractures associated with osteoporosis are hip and pelvic fractures, collapsed vertebrae in the breast and lumbar region, certain knee fractures, and fractures of the upper arm (shoulder) and wrist.

Osteoporosis is uncommon before age 55, but the frequency increases rapidly with age. Women are primarily affected. More than 70 percent of 70-year-old women have osteoporosis. Approximately 25 percent of 65–70 year-old women have had a fracture. They run a greatly elevated risk of having another fracture in the future. Osteoporosis is underdiagnosed and undertreated.

Treatment with drugs that retard progression of osteoporosis is indicated for many patients. The Swedish Council on Technology Assessment in Health Care (SBU) and the Medical Products Agency have established several times over the past few years that drug therapy for elderly with osteoporosis and fractures is well documented and reduces the risk of additional fractures. Thus, it is important to study whether the diagnosis of osteoporosis is made and treated after older women receive care for a fracture.

Using the Patient Register and Prescribed Drug Register as sources, the question of whether women who had had fractures received drug therapy against osteoporosis was studied. Bisphosphonates, oestrogen, parathyroid hormone, calcium, vitamin D and combinations of them were included. Almost 22 000 women age 65 and older who had been hospitalised for a selection of fractures in July 2005 – June 2007 were monitored. The prescriptions that they picked up 6–12 months after hospitalisation were examined.

Figure A:55 shows that more than 25 percent of the women nationwide had been treated. Blekinge was the only region below 20 percent, while four regions were just below 30 percent.

More important than the regional variation is that there appears to be general undertreatment. Although no clear target has been established, drug therapy may be indicated for an estimated 50-70 percent of women with previous fractures. The NBHW is currently drawing up guidelines for care and treatment of musculoskeletal diseases, including osteoporosis. More definitive recommendations may emerge as a result.

### A:56 • Adverse events after knee and total hip replacement arthroplasty

More than 10 000 Swedes receive knee arthroplasty and approximately 14 000 receive total hip replacement arthroplasty every year. Such interventions, which are normally scheduled, represent a large percentage of non-acute orthopaedic services.

While the procedures are routine surgery these days, they are major operations that involve risks. Modern anaesthesiology and thorough pre-surgical medical assessment, as well as anti-infection and antithrombotic therapy, are key to assuring a low frequency of complications and mortality.

Readmission and death after surgery are common international quality indicators.

Readmission and death may be due to local surgery-related, as well as other medical, complications. Readmissions due to local complications are reported to the Swedish Knee and Hip Replacement Arthroplasty Registers. But the registers do not contain other medical complications.

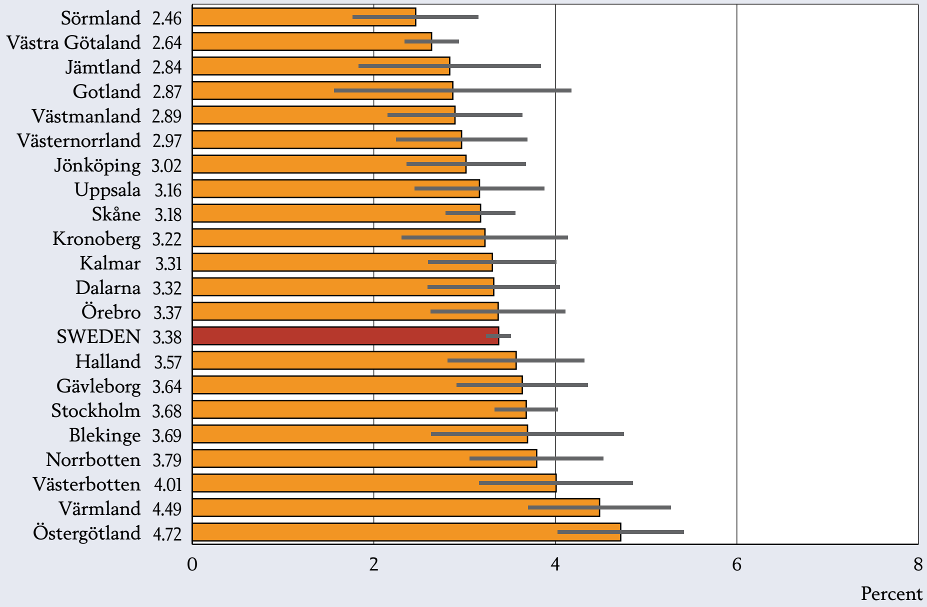


**Figure A:56** Adverse events within 30 days after knee and total hip replacement arthroplasty, 2005–2007. Age standardised.

Source: National Patient Register, National Board of Health and Welfare

A number of adverse events may be analysed using the Patient Register as a source. The indicator presented here should be regarded as part of the effort to design additional broad outcome measures that span a number of different treatments and diseases. Because the indicator is untested, the results should be interpreted with caution.

Figure A:56 presents the frequency of readmission and death within 30 days after knee and total hip replacement arthroplasty. More than 68 000 operations performed in 2005–2007 are included in the comparison. Among the causes chosen for readmission were prosthesis complications and common cardiovascular diseases such as myocardial infarction, angina pectoris, heart failure and stroke. Where the patient lives, not the location of the clinic, forms the basis of regional reporting.

An average of 3.7 percent of those who underwent surgery nationwide died or were readmitted with some kind of complication. Very few patients died. Specific prosthesis complications accounted for two thirds of the readmissions studied. At 2.5–4.7 percent, the regional variation was relatively wide. These adverse events affected women somewhat less often than men. The national frequency has trended downward over the past 10 years.

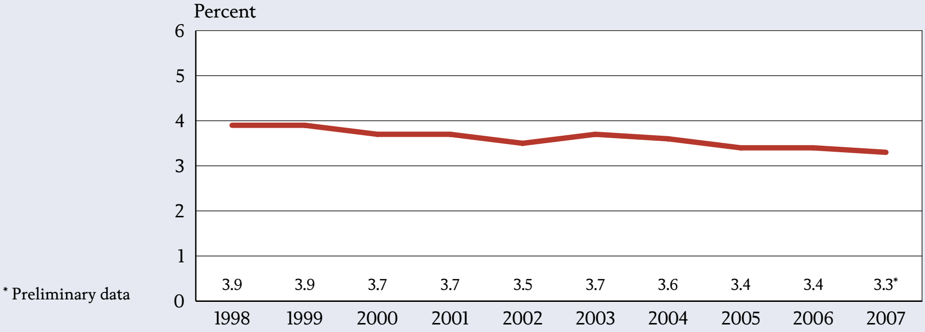


**Figure A:56**
**Sweden**

Adverse events within 30 days after knee and total hip replacement arthroplasty. Age standardised.

Source: National Patient Register, National Board of Health and Welfare

One interesting question is whether there is a correlation between short periods of care at the time of surgery and the frequency of readmission and death. Studies outside of Sweden have pointed in that direction. But our comparison found no such nationwide correlation over time. The average period of care has declined substantially without giving rise to a greater frequency of adverse events within 30 days. The question can be further analysed in other connections.

### A:57 • Improvement after surgery for herniated lumbar disc

More than 3 000 Swedes undergo surgery for herniated lumbar disc every year, which accounts for approximately 35 percent of all spinal surgery. Data about these operations are reported to the National Spine Register. Surgery for herniated lumbar disc is performed just as often at public and private clinics. The regional analysis below is based on the location of the clinic, not where the patient lives.

A herniated lumbar disc frequently leads to pronounced pain and low health-related quality of life. Thus, just as with many other musculoskeletal pain conditions, it is important to include patient-reported variables in an outcome analysis.

The National Spine Register measures health-related quality of life on the basis of the EQ-5D indicator, which is designed the same as A:52, i.e., the improvement in the index score after 1 year is reported as the follow-up variable.

The analysis is based on 1 536 patients. A total of 817 are included in the result, which means that 55 percent of patients who underwent surgery participated at 1-year follow-up. Because 37 clinics that used the register in 2006 are not presented, Figure A:57 does not include data for eight regions. The reason was that too few pa-

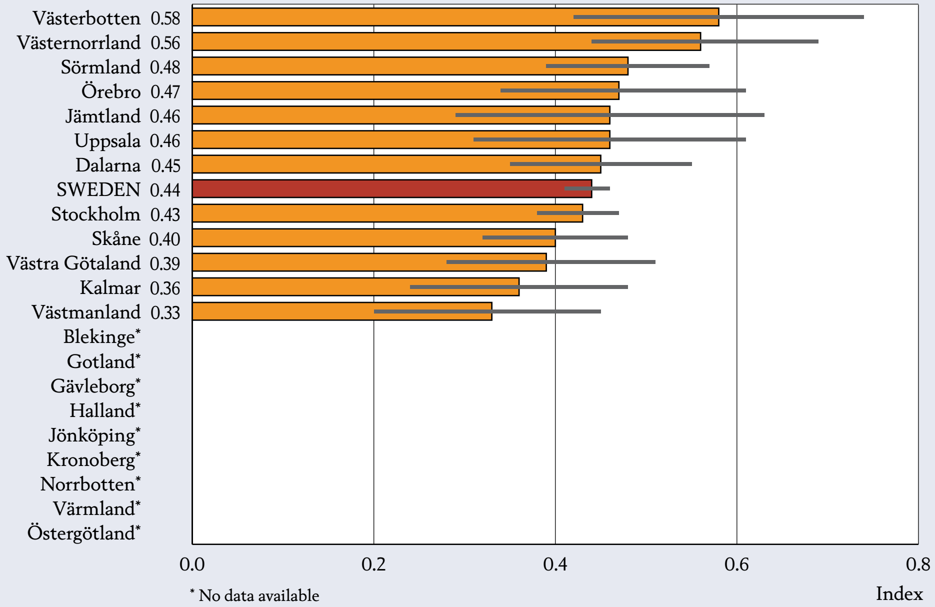


**Figure A:57** Patient reported improvement after surgery for herniated lumbar disc, 2006. Improvement in EQ5D after one year.

Source: Swedish Spine Register

tients with herniated lumbar disc were either operated on or reported. There must be at least 15 entries for the same patient both pre-surgery and after one year.

The regional variation in EQ-5D score improvement was 0.33–0.58. The discrepancy might indicate that the indication for herniated lumbar disc surgery differs from clinic to clinic. But it illustrates above all how important it is for all clinics to comprehensively report patient data both before and after surgery.

An important reason for publishing the comparison is to stress the significance of patient-reported outcomes in this type of analysis. Hopefully that will lead to a higher participation rate in the next report.

## KIDNEY CARE

More than 4 percent of Swedes have significantly impaired renal function. Most of them do not face any immediate danger, but the condition is associated with increased risk of severe cardiovascular disease or death. Only a small percentage develop kidney failure so severe that life-saving dialysis or transplant is needed. More than 1 100 people currently develop severe kidney failure each year. The total number of patients with treated, life-threatening kidney failure is almost 8 000, with a 3–4 percent annual increase. In terms of both new patients and those receiving treatment, Sweden's percentage is average for the EU-25 countries.

More than half of patients in treatment receive kidney transplants, whereas the rest are given dialysis. Sweden has a high percentage of transplants, surpassed only by Norway among neighbouring countries. Approximately three fourths of dialysis patients receive haemodialysis and the remainder receive peritoneal dialysis. Depending on what is included in the calculation, the total annual cost of Swedish dialysis and transplant care is estimated at 2–3 billion kronor. These patients would die if they were not treated.

Due to its high health-related quality of life and low mortality risk, kidney transplant is the best treatment. For medical reasons, transplant is appropriate for only one fourth of all new patients. Because of the shortage of kidneys from deceased donors, most suitable candidates must undergo dialysis for an average of 2–3 years before transplant.

Thus, available, high-quality dialysis treatment is both a life-sustaining method for patients who cannot receive transplants and a necessity if transplant services are to work properly.

Three indicators are presented, all based on the National Kidney Register (SNR). The SNR was formed in 2007 from a merger of the Swedish Register for Active Uraemia Care (SRAU, started in 1991) and the Swedish Dialysis Database (SDDB, started in 2002). Regional registers for earlier stages of chronic kidney disease were also incorporated. The SNR has a 100 percent participation rate at the clinic level and an excellent participation rate (95 percent) at the individual level.

### A:58 • Mortality in dialysis or kidney transplant

Figure A:58 shows the relative risk of dying from dialysis or kidney transplant for all patients who commenced treatment in 1998–2007. Including patients who survived for more than 90 days avoids the issue of incomplete or variable reporting at an earlier stage.

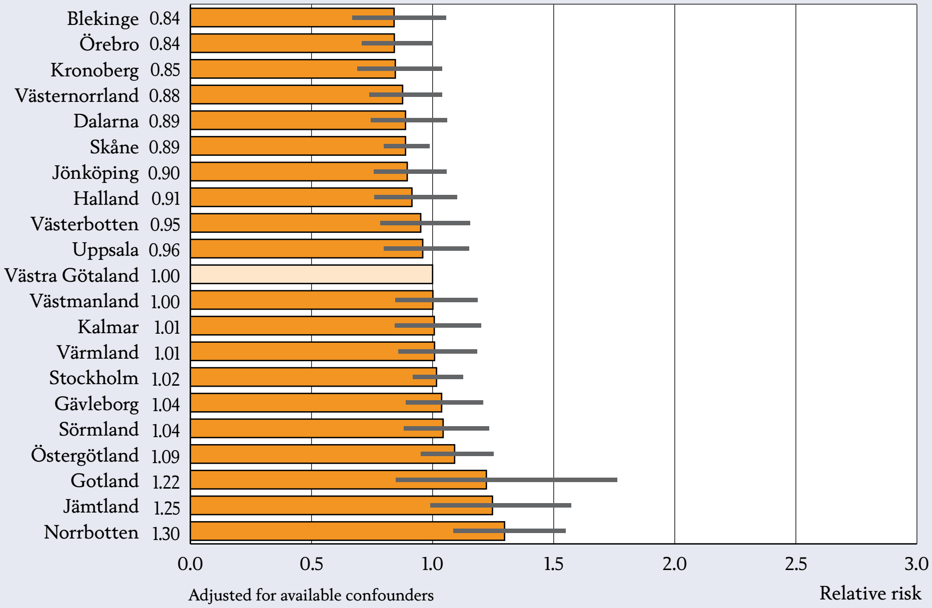


**Figure A:58** Relative risk of death in patients with renal failure, patients with start of treatment 1998–2007. Above 1.0 means a higher risk than Västra Götaland.

Source: Swedish Renal Registry

For the entire population, the absolute risk of dying during that period was 16.1 percent. The regional difference is based on relative risk, which was calculated using the multivariate statistical method. The patient population of the Västra Götaland region serves as the reference. In descending order, the variables that affect the risk of death are as follows: age at commencement of treatment, primary kidney disease group, primary treatment, blood malignancy, peripheral vascular disease, ischaemic heart disease, treated hypertension, year at commencement of treatment, other tumour, previous cerebrovascular disease and gender. Adjusted for these variables, the risk of death varied among the regions as presented in the figure.

Although dialysis and kidney transplant are life-saving procedures, they entail significant risk of death. To a large extent, the explanatory factors are not directly related to kidney failure and treatment, but age, concurrent disease, etc. But it is well known that differences in treatment practice among countries, regions and clinics affect outcomes. Even adjusted for risk markers, the likelihood of dying is several times higher among the dialysis population. Thus, outcomes improve among units that provide transplants as soon as possible. That is the reason that the analyses compare survival for all patients.

The analysis and interpretation are made more difficult by the well-known fact that the regions are highly heterogeneous when it comes to size, age structure and socioeconomic status. Furthermore, entry of risk factors/comorbidity in the SNR is not comprehensive. Finally, there are well-known regional differences in background mortality. Despite all these difficulties, survival data are so important that they should be presented. The evaluation must take the above reservations into consideration. The annual reports from the register show that the risk of dying has gradually declined for both dialysis and functioning transplants.

In some cases, the regional differences have been statistically established. Practice varies from clinic to clinic. Insofar as the differences stem from that variation, it must be emphasised that practice is constantly improving and that the deaths included in the analysis occurred up to 10 years ago.

At the national level, women have less of an additional risk than men. At the regional level, the risk of death differs significantly for women and men. Available data do not provide a clear explanation for that phenomenon. Differences in vascular access and dialysis needs are possible reasons. The SNR will perform a more in-depth analysis of the gender discrepancies.

### A:59 • Goal fulfilment for dialysis dose

A sufficient dialysis dose is a prerequisite for long-term wellbeing and low risk of dying. An insufficient dose leads to premature death. Measurement, monitoring and adjustment of the dose is central to the quality of haemodialysis treatment. The results presented in Figure A:59 come from the latest annual cross-sectional study and concern autumn 2007. See page 133 for hospital-level data.

On a national basis, approximately 80 percent of haemodialysis patients currently have three sessions per week. Approximately 10 percent have more than three sessions and 10 percent fewer than three. Given that a growing number of patients have more frequent sessions, the dose analysis must be based on the total for the week. The Kt/W standard measure uses a formula based on body weight and a blood sample before and after dialysis, the length of the session and the number of weekly sessions. Kt/W above 2 represents fulfilment of the daily dose target.

At the time of any particular measurement, there is a patient population that has significant residual renal function and thereby does not require a full dose. In addition, the goal is inappropriate for a certain population of dialysis patients. The distribution of these patients among clinics at the time of the cross-sectional study is unknown. Given the above considerations, 80–90 percent goal fulfilment at the regional level is regarded as optimal.

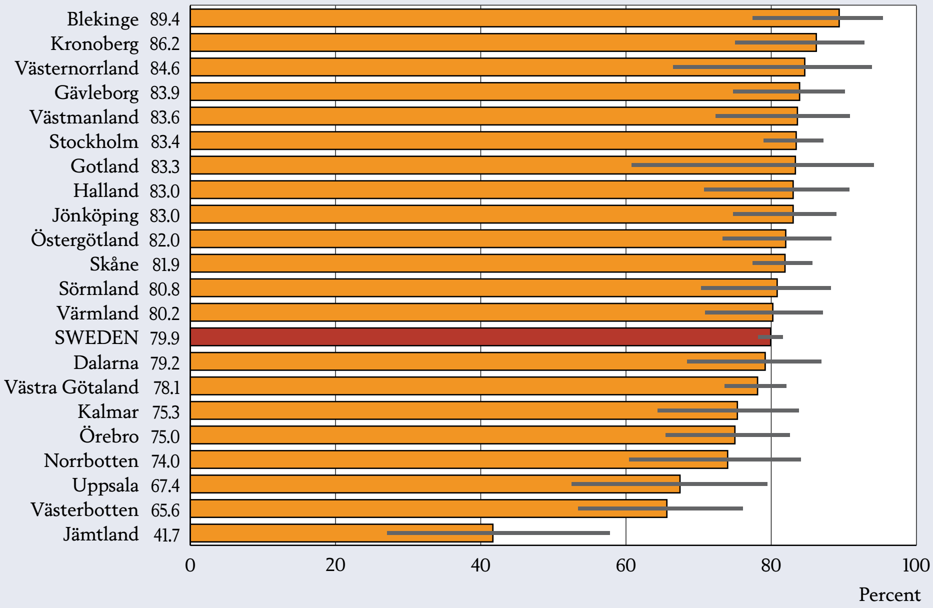


**Figure A:59** Goal fulfilment for dialysis dose, 2007.

Source: Swedish Renal Registry

Differences in patient populations are unlikely to explain the large variation that appears in the figure. Low dose results are primarily due to patients having only two sessions per week.

Nationally speaking, goal fulfilment is somewhat higher for women than men. But practice varies a great deal among clinics and regions. Recent research suggests that women require considerably higher doses than men. The goal will probably be raised for women.

## A:60 • Vascular access during dialysis

Vascular access, which may be accomplished in various ways, is a prerequisite for dialysis treatment. An artificial arteriovenous (AV) fistula is the best form of vascular access during dialysis. An arteriovenous graft (with synthetic vascular material) is somewhat poorer and entails a greater risk for occlusion and dysfunction, as well as a somewhat elevated risk of infection. The alternative to an AV fistula or AV graft is a central venous catheter (CVC), which has a much higher risk of serious infection, as well as reduced blood flow, leading to poorer dialysis efficacy.

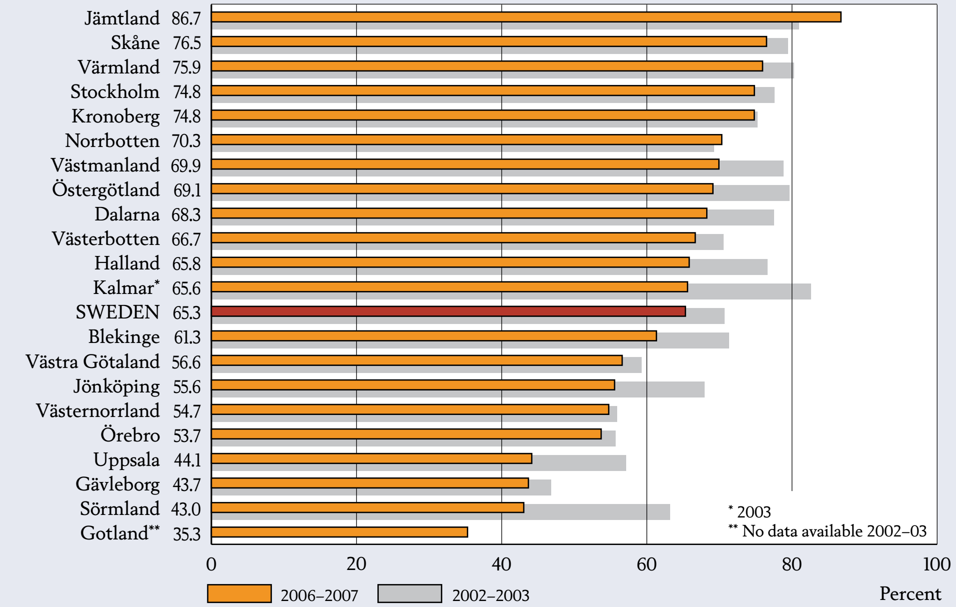


**Figure A:60** Proportion of hemodialysis patients with AV-fistula or AV-graft, 2006–2007.

Source: Swedish Renal Registry

Figure A:60 shows the number of patients in 2006–2007 who received dialysis with an AV fistula or AV graft. The corresponding percentages for 2002–2003 appear as shaded bars. The data are based on annual cross-sectional studies conducted by the SNR.

Given that well-functioning access is integral to satisfactory haemodialysis, it is a central indicator. The indicator also reflects the final result of a long care process that begins even before the commencement of dialysis. The indicator summarises a number of key dimensions of the total quality of kidney care – the availability of access surgery, as well as the degree to which dialysis units are able to ensure well-functioning access.

Unfortunately, the percentage of dialysis patients who received an AV fistula or AV graft declined from 2002 to 2007, while there was a corresponding undesirable increase in the percentage of dialysis catheters. See page 134 for hospital-level data.

The regional variations were large. The results point to unambiguous improvement potential at both the clinic and regional level. Well-functioning access practice places heavy demands on coordination among vascular surgery, interventional radi-

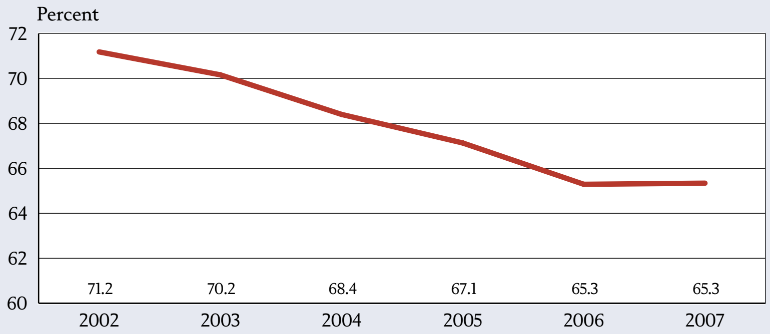


**Figure A:60**
**Sweden**

Proportion of hemodialysis patients with AV-fistula or AV-graft.

Source: Swedish Renal Registry

ology and kidney care. While no specific goal has been established for this indicator, a goal of 70–80 percent for an AV fistula or AV graft is fully reasonable in an unselected patient population.

The percentage of women who receive an AV fistula or AV graft is generally lower than men. Poorer anatomical prerequisites provide part of the explanation.

## OTHER TREATMENT METHODS

### A:61 • Reoperation for inguinal hernia

Inguinal hernia surgery is the most common general surgical procedure in Sweden. Almost 20 000 procedures are performed every year. Successful surgery is uncomplicated, requiring approximately one week of absence from work, followed by freedom from complaints. But inguinal hernia surgery can lead to recurrence of the hernia and severe chronic pain conditions. There was a time when close to 20 percent of all operated patients had a recurrence of hernia. Newer surgical methods and materials have sharply reduced the recurrence rate.

This indicator reflects the relative risk of reoperation per region after five years. Relative risk measures the risk of reoperation following recent inguinal hernia surgery at hospitals in a region compared with the risk at hospitals in the other regions.

The comparison is based on operations reported to the Swedish Hernia Register for 2003–2007. In order to present results that are as current as possible, only the last five years – and thereby fewer operations than in the previous report – are included. The location of the clinic, not the patient's region of domicile, determines how an operation is classified.

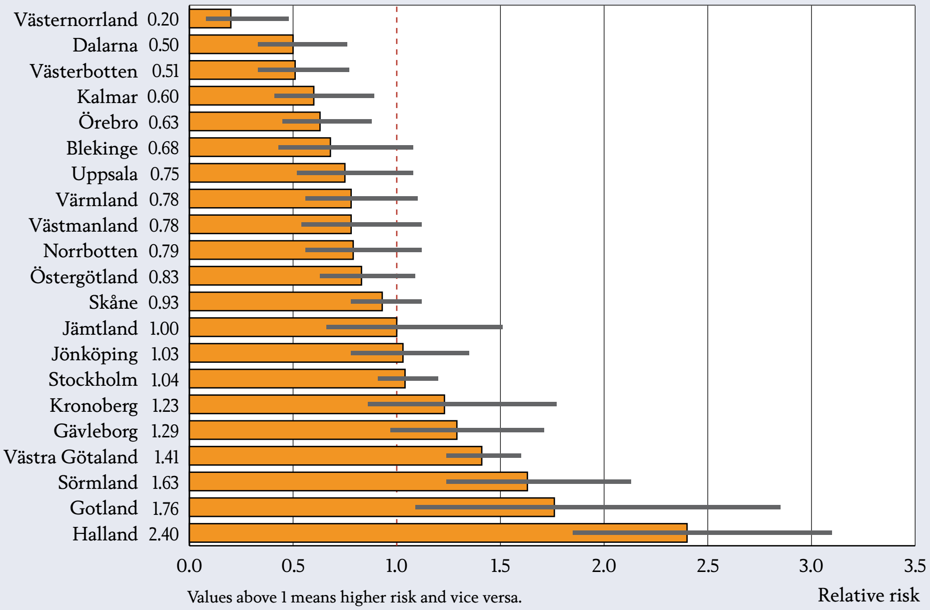


**Figure A:61** Relative risk of reoperation within 5 years for inguinal hernia, 2003–2007. Risk for each county council compared to all others.

Source: Swedish Hernia Register

Figure A:61 demonstrates significant regional differences. Västernorrland had the lowest relative risk, followed by Dalarna and Västerbotten. Gotland, and above all Halland, are at the bottom of the figure. The differences among regions and clinics indicate that Swedish inguinal hernia surgery still has considerable potential for improvement. See page 135 for clinic-level data.

## A:62 • Cataract surgery, visual acuity below 0.5 in the better seeing eye

More than 72 000 cataract operations were performed in 2007. The eyesight of a large percentage of the patients improved considerably. The data are taken from the National Cataract Register. According to the register, it currently has an excellent participation rate of over 98 percent of all surgery. Although mandatory, reporting of cataract surgery to the Patient Register is much poorer.

Data on the patient's visual acuity in the better seeing eye at the time of cataract surgery is a measure of its availability in the various regions. If a large percentage of the population is operated on for a number of years, the patients who have been operated on previously will see comparatively better prior to surgery. More operations on the other eye are also improving the results.

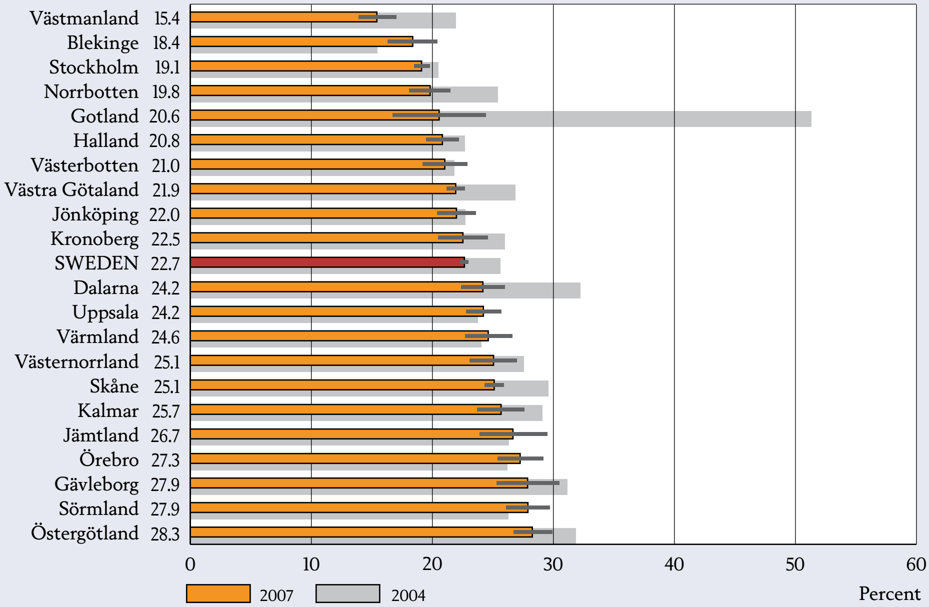


**Figure A:62** Cataract surgery – visual acuity below 0.5 in the better seeing eye, 2007.

Source: Swedish National Cataract Register

Figure A:62 shows the percentage of all operated patients who had visual acuity below 0.5 in the better seeing eye. The data are for 2007. The regional data are based on where the patient comes from regardless of where surgery was performed. See page 137 for clinic-level data.

Some of the regions, such as Blekinge and Stockholm, at the top of the figure were also high in 2005 and 2006. The largest percentage of patients with major visual defects were in Östergötland, Sörmland and Gävleborg.

Women generally had poorer vision at the time of surgery than men. The largest gender differences in 2007 were in Gotland and Kalmar. But men in Västerbotten had poorer vision than women at the time of surgery. Interpretation of the gender differences is rendered more difficult by disparities in other variables – such as age, surgery on the other eye and driving licence – among operated women and men. Furthermore, women were operated on 1.5 times as often as men.

The regional differences have been of the same magnitude for many years. As part of Sweden's healthcare guarantee programme, joint indicators have been developed

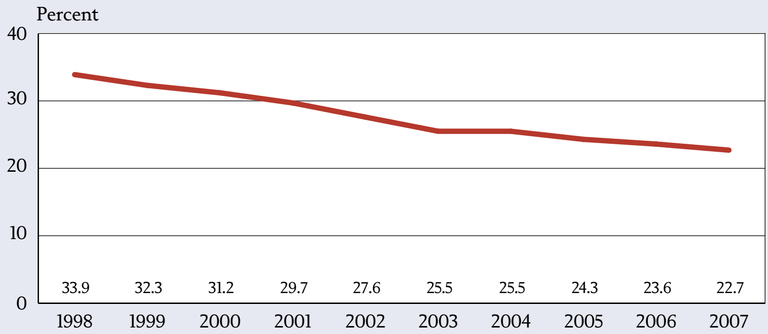


**Figure A:62**
**Sweden**

Cataract surgery – visual acuity below 0.5 in the better seeing eye.

Source: Swedish National Cataract Register

for when cataract surgery should be performed. The regional differences may narrow as a result – that occurred in 2007.

The long-term nationwide trend (see separate figure) shows that patients have better and better vision at the time of surgery. While that is good news for this patient population, it raises the question of how their needs should be prioritised in relation to other patient populations.

## A:63 • Improvement after septoplasty

Septoplasty is surgery to correct a deviated nasal septum. Just under 1 900 operations were reported to the Patient Register in 2007. Most ear, nose and throat clinics perform the procedure.

The main indications for the operation are nasal congestion and snoring. Nasal congestion can produce a number of secondary symptoms, including dryness of the mouth, snoring and fatigue. Nasal congestion can lead to considerably reduced health-related quality of life.

The source of the data is the Swedish Ear, Nose and Throat Care Quality Register. The comparison includes 4 580 patients monitored from 2003 to Mach 2006. The location of the clinic, not the patient's region of domicile, determines how an operation is classified.

Patients filled out a questionnaire six months after surgery concerning its outcome. Figure A:63 shows the percentage of patients who reported that they had improved or recovered completely. Approximately 75 percent of patients nationwide responded in that manner, with a regional variation of 63–91 percent. No gender difference in patient satisfaction was detected. But satisfaction increased with age.

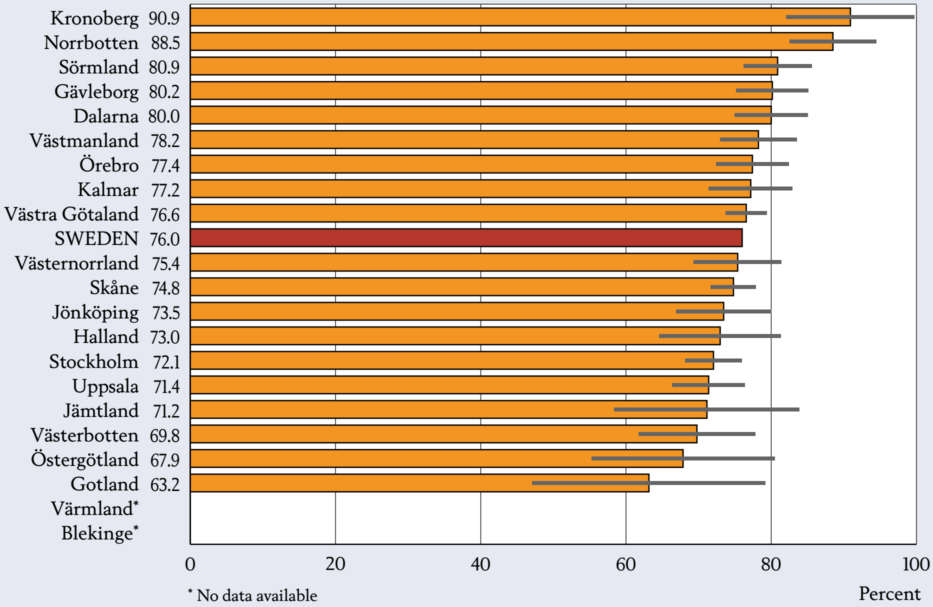


**Figure A:63** Improvement after septoplasty – patients reporting good or very good result after 6 months, 2003 – March 2006

Source: Swedish Quality Register of Otorhinolaryngology

The goal of the association of ear, nose and throat specialists is that at least 90 percent of patients report that they have improved or recovered completely. Thus, the spread and outcomes presented in Figure A:63 are poorer than what the representatives of the specialty expect or target. There is both a need and potential for improvement.

# Presentation of per-hospital data

Following is a presentation of per-hospital data for 19 indicators in the Medical Results group. The purpose is to illustrate the contributions of various hospitals to regional results, as well as variations among hospitals when no adjustments except age standardisation have been made.

The figures are presented by region without ranking the hospitals. The reason is to clarify that the outcome measures (such as case fatality rates and the percentage of perineal tears) are not to be considered quality indicators as presented here, given that no adjustment has been made for disease severity.

Even those that may be appropriate as quality indicators at the hospital level as well are presented by region without ranking. Among such indicators are A:44 and A:45, both of which concern cardiac care and have RIKS-HIA as their source.

Questions concerning patient mix and variations in participation rate may be illustrated with reference to the indicators of case fatality rates after hospitalisation for stroke and myocardial infarction. Patients who have a certain type of myocardial infarction are taken to a hospital other than the one closest to them. Thus, a hospital with a high percentage of patients who derive little benefit from active treatment may report high case fatality rates.

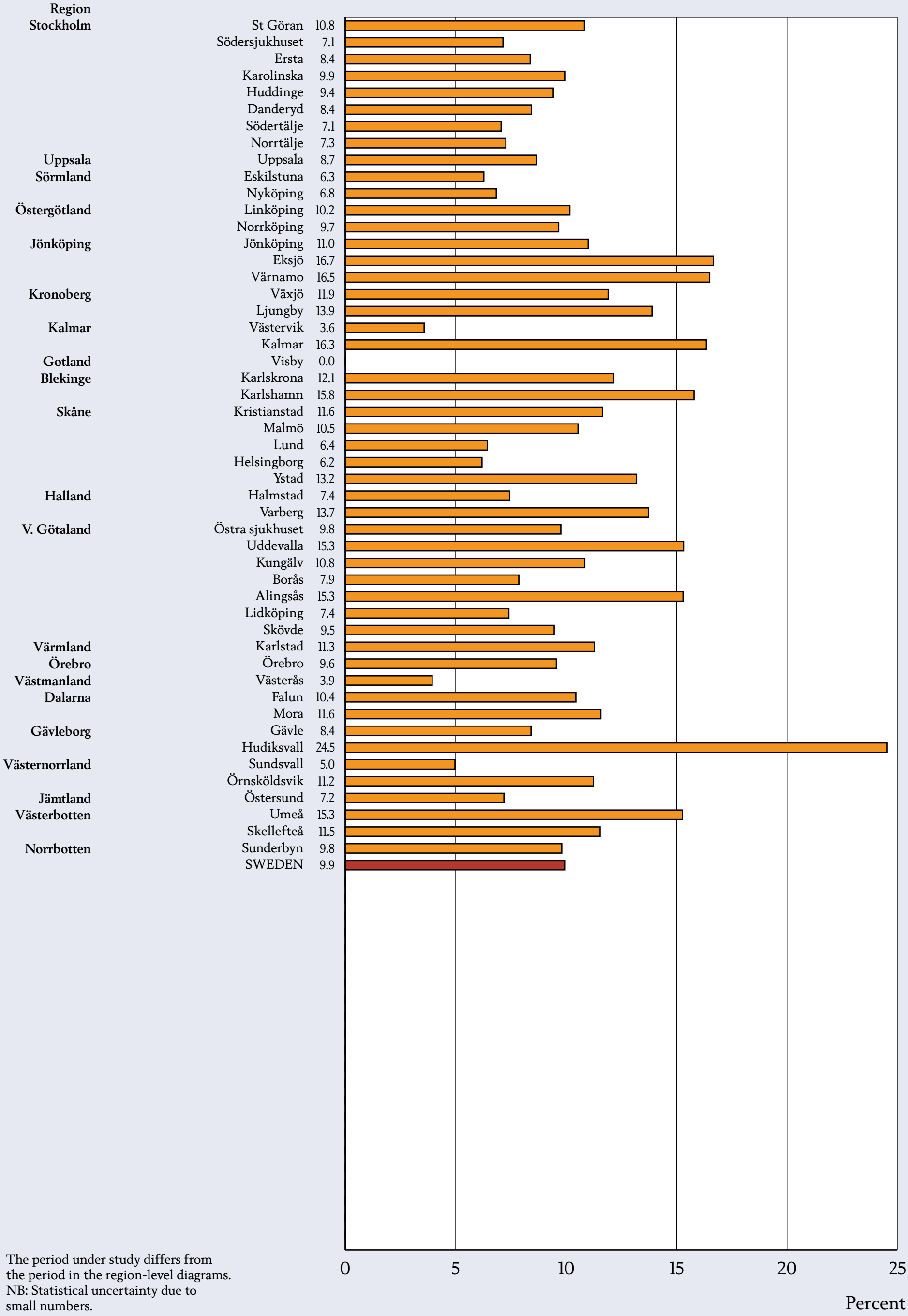
For stroke patients with short remaining life expectancy, practice with respect to hospital admission from home healthcare services or assisted living facilities may play a role. If they are hospitalised, reported case fatality rates rise, all else being equal.

The meticulousness with which hospitals diagnose patients following death may also affect outcomes. If stroke and myocardial infarction are diagnosed with differing degrees of frequency from hospital to hospital, reported case fatality rates will be affected. Particularly for small hospitals, only a few borderline cases are needed to affect reporting. Karlskoga Hospital is a possible example of that dynamic. The hospital reports significantly deviant results for indicator A:36, Hospitalised first-time stroke – 28-day case fatality rate. Part of the attempt to follow up on that deviation has been a review of reporting procedures for myocardial infarction diagnosis of both living and dead patients.

With one or two exceptions, the same designation and breakdown of hospitals has been used as in the original source. Among the sources are both healthcare data and quality registers. Sweden has not consistently applied the breakdown and designation of the units used by the various registers. As a result, the names of hospitals differ among the various indicators, and the units may be presented either collectively or separately, depending on the source.

The indicator is always the same but may occasionally be presented differently at the hospital level. Reoperation for rectal cancer is presented for a longer period of time. Indicators that have the Patient Register and Medical Birth Register as a source are presented here from the point of view of the producer. Patients are assigned to the hospital at which they were treated, regardless of where they lived. The same is true of RIKS-HIA-based indicators A:44 and A:45, as well as A:46, Waiting time for coronary artery bypass graft. No age standardisation has been performed for per-hospital presentation of indicators A:39 and A:47, which concern drug consumption after stroke and myocardial infarction respectively.

No confidence interval is specified, given that the purpose of the presentation does not require that precautionary measure. Readers should keep in mind that a large number of the indicators are associated with considerable statistical uncertainty for many hospitals, not only small ones.

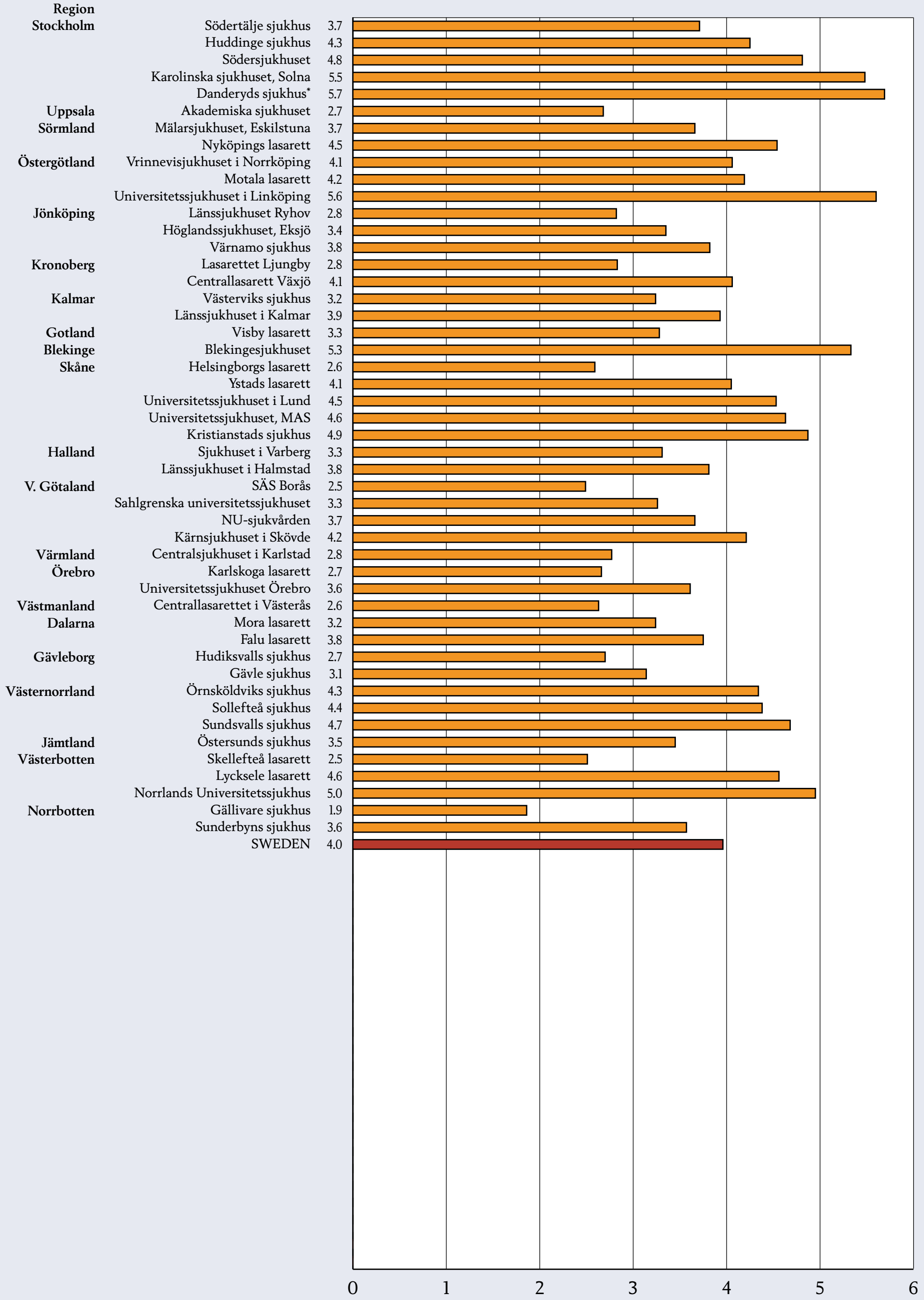


The period under study differs from
the period in the region-level diagrams.
NB: Statistical uncertainty due to
small numbers.

**Figure A:19**
**Hospitals**

Rectal cancer – reoperation within 30 days, 1998–2006.

Source: Swedish Rectal Cancer Registry



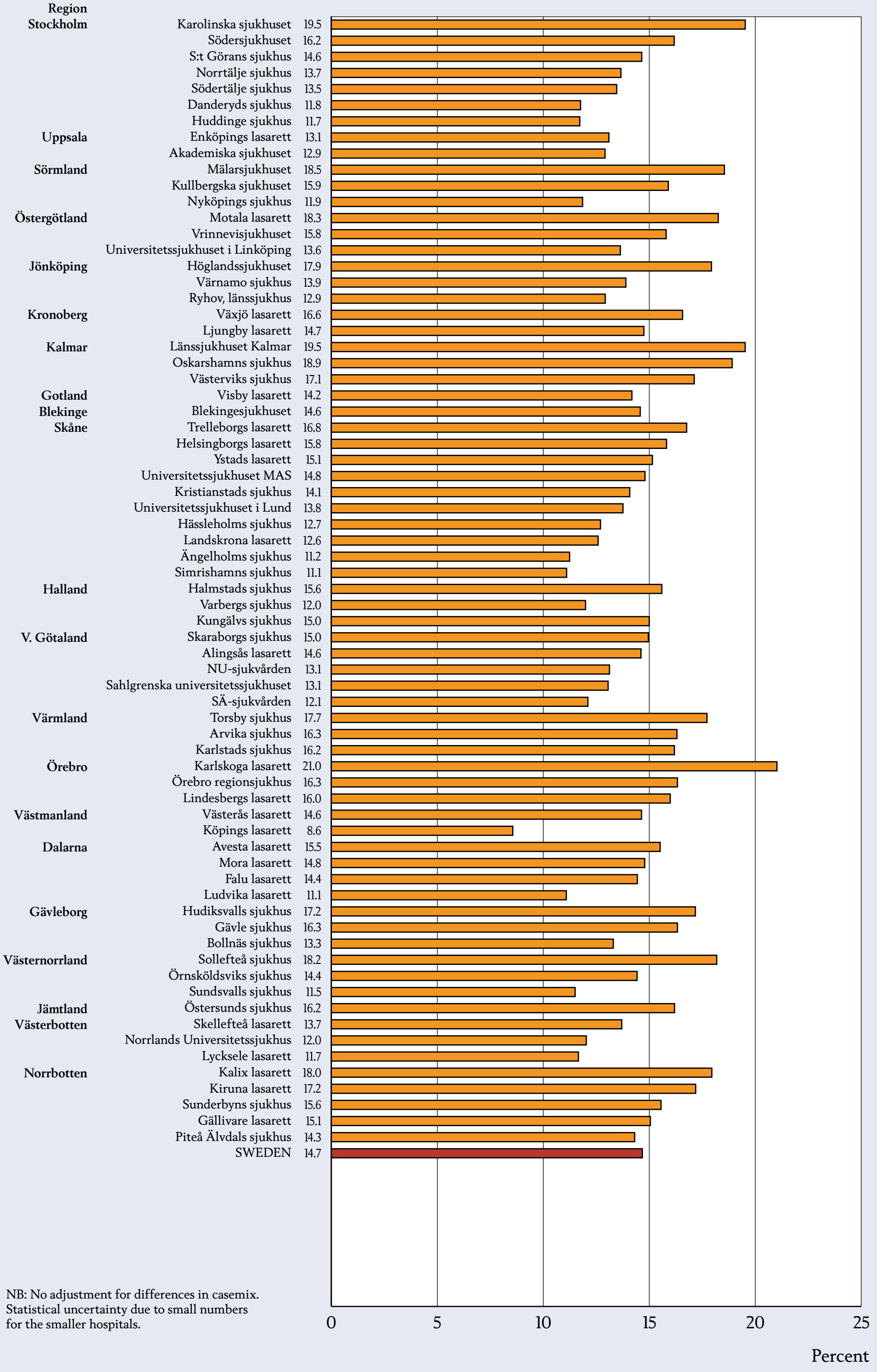
NB: statistical uncertainty due to small numbers for the smaller hospitals

* BB Stockholm and Danderyds sjukhus

**Figure A:26**
**Hospitals**

Third and fourth degree perineal tear during vaginal delivery, 2002–2006. Age standardised.

Source: Medical Birth Register, National Board of Health and Welfare

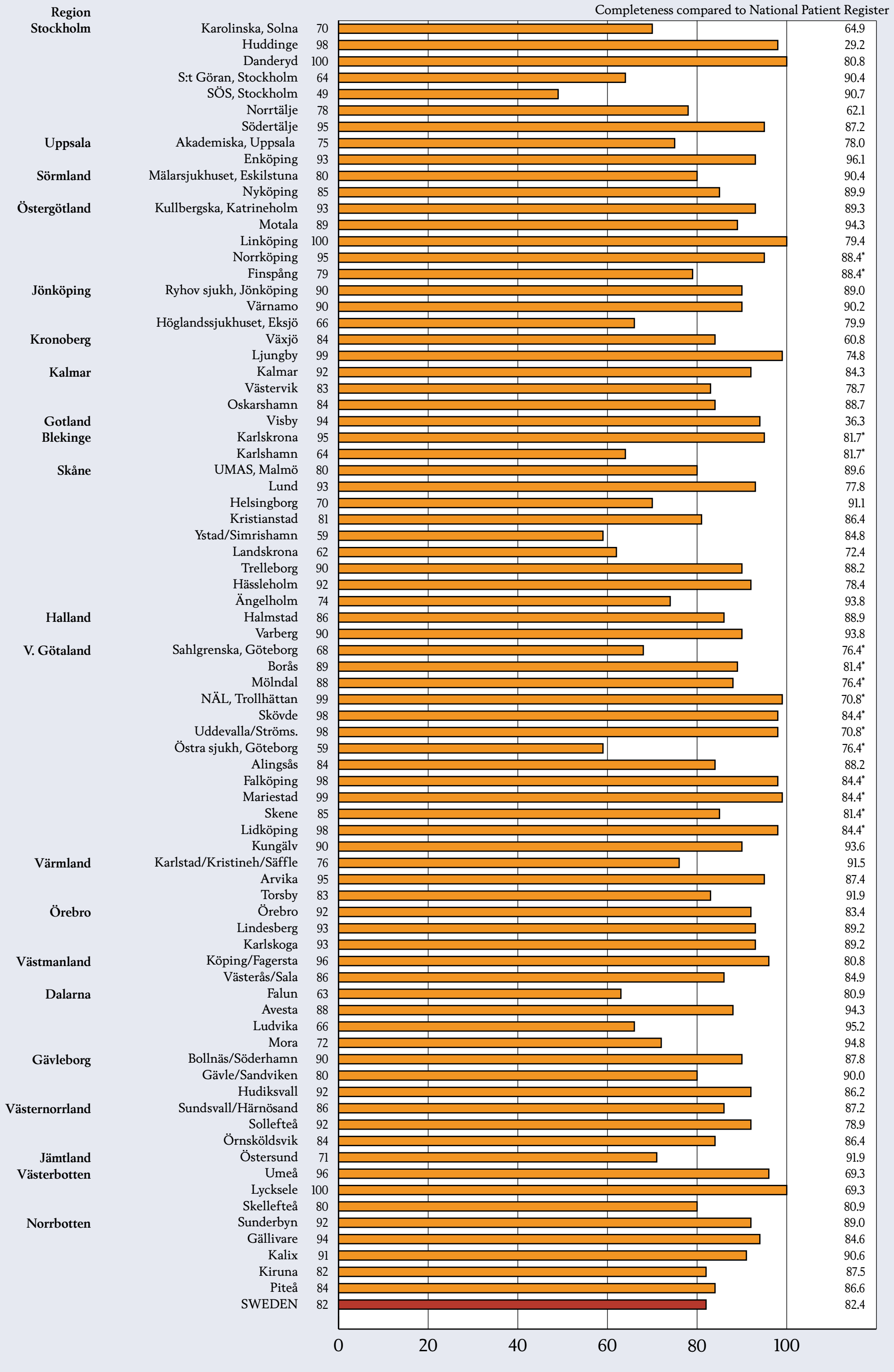


NB: No adjustment for differences in casemix.
Statistical uncertainty due to small numbers
for the smaller hospitals.

**Figure A:36**
**Hospitals**

First-time stroke – 28-day case fatality rate, 2005–2007.
Hospitalised cases. Age standardised.

Source: National Patient Register and the Cause of Death Register, National Board of Health and Welfare

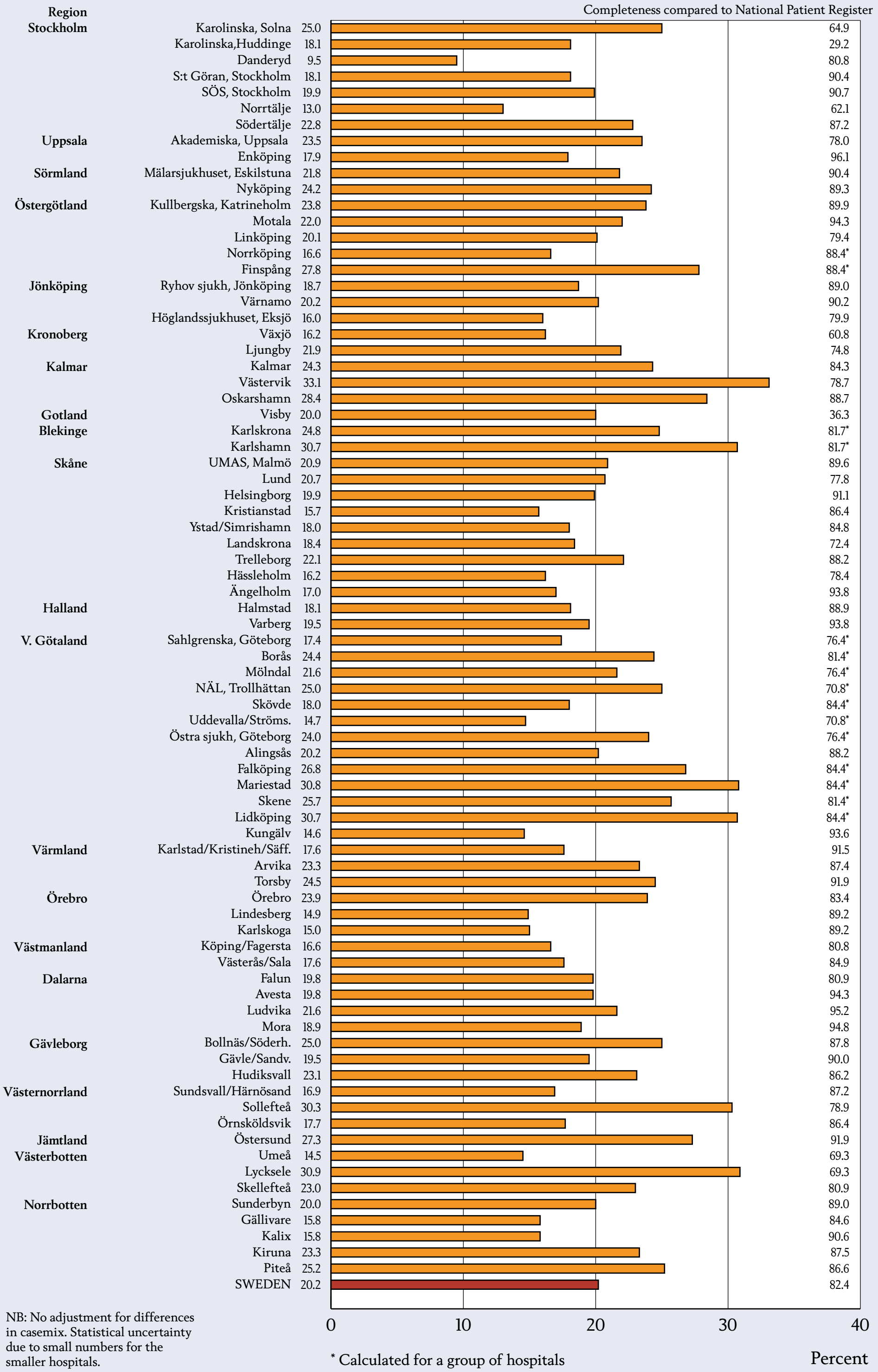


* Calculated for a group of hospitals

**Figure A:37**
**Hospitals**

Patients treated at a special stroke unit, 2007.

Source: Swedish Stroke Register



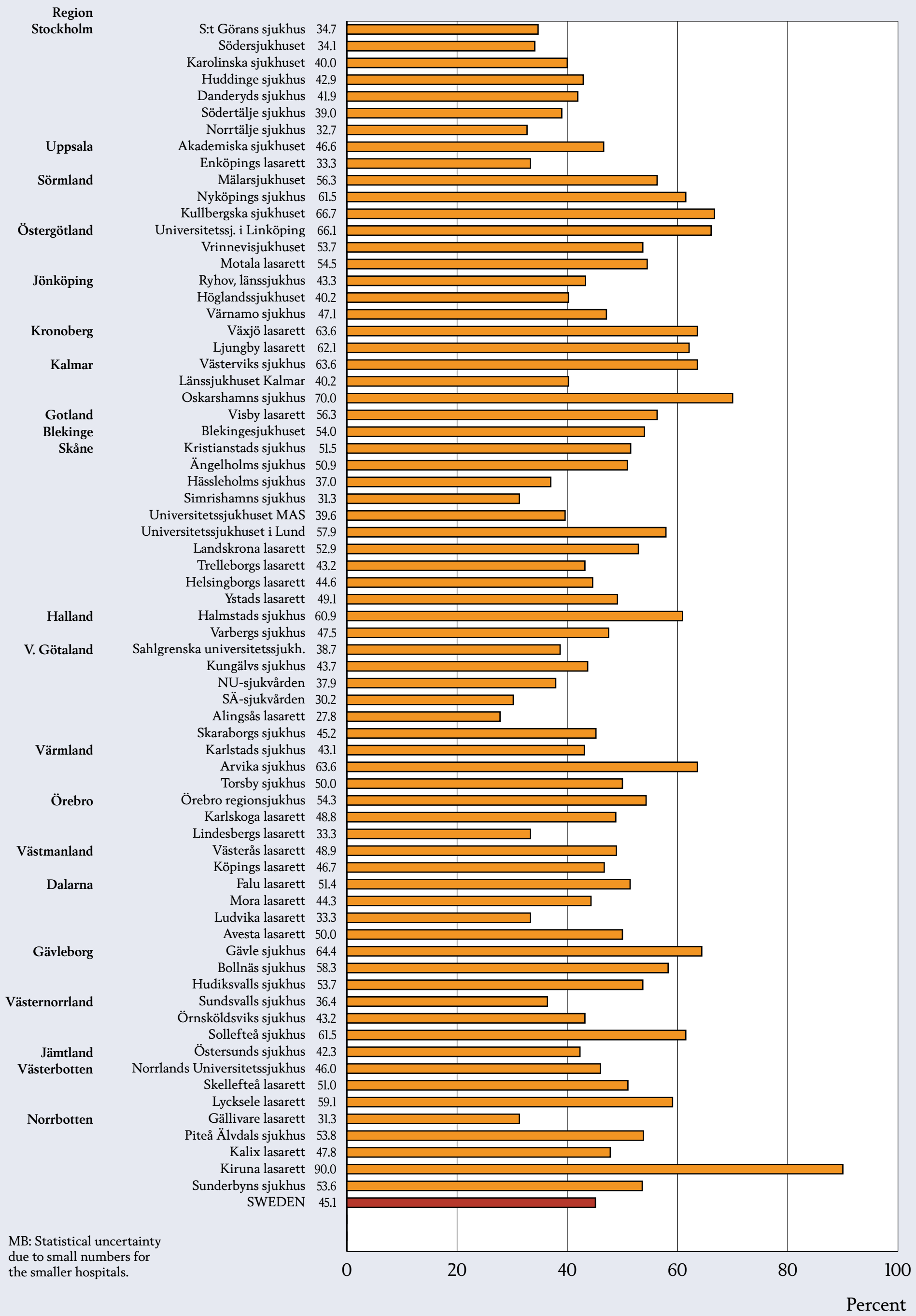
NB: No adjustment for differences in casemix. Statistical uncertainty due to small numbers for the smaller hospitals.

* Calculated for a group of hospitals

**Figure A:38**
**Hospitals**

Stroke patients dependent on others for activities of daily living (ADL) ability three months after stroke, 2007.

Source: Swedish Stroke Register

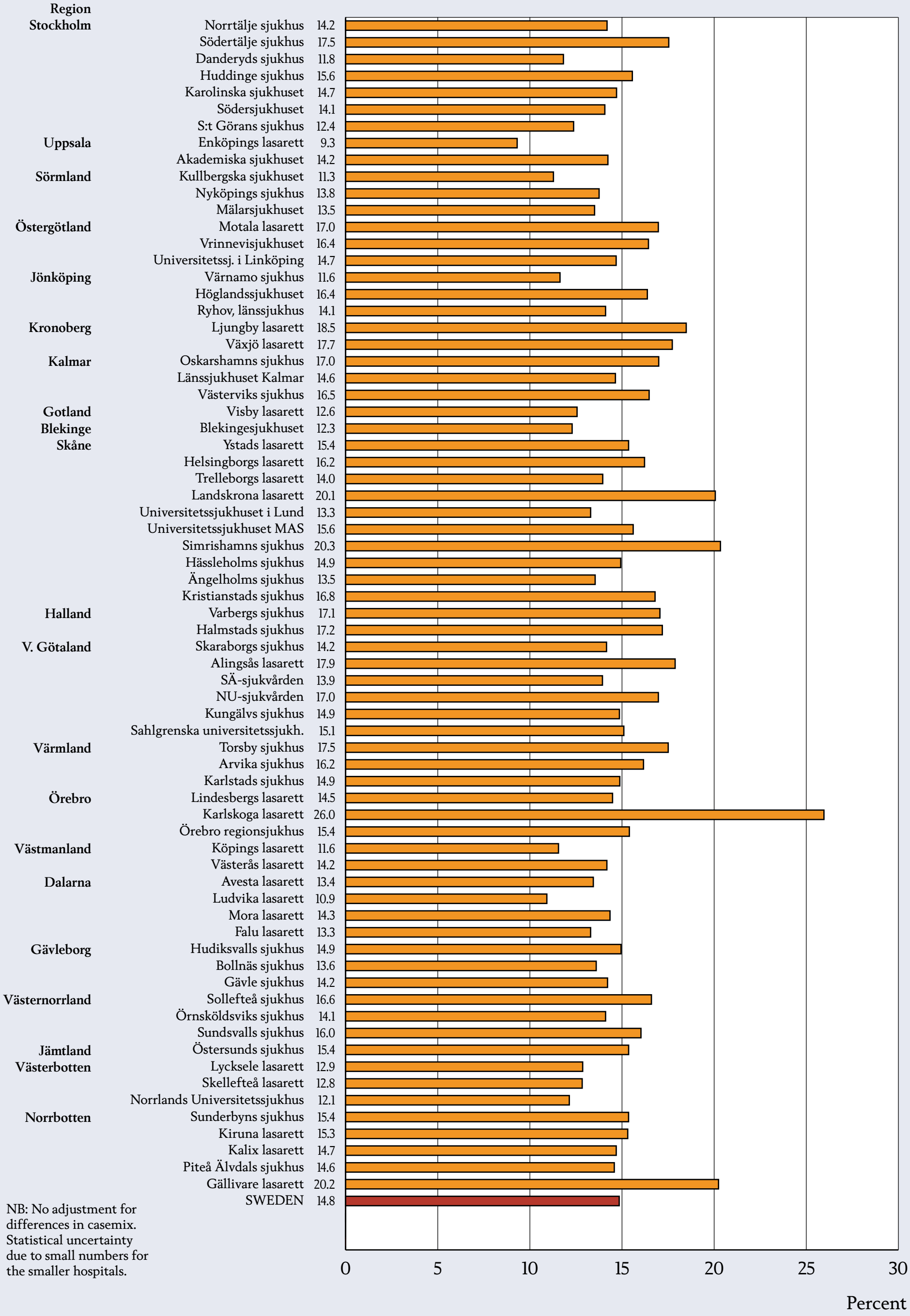


MB: Statistical uncertainty due to small numbers for the smaller hospitals.

**Figure A:39**
**Hospitals**

Anticoagulant therapy after 12–18 months for stroke patients with atrial fibrillation, 2005–2006. Age standardised.

Source: National Patient Register and the Prescribed Drug Register, National Board of Health and Welfare



NB: No adjustment for differences in casemix. Statistical uncertainty due to small numbers for the smaller hospitals.

**Figure A:42**
**Hospitals**

Myocardial infarction – 28-day case fatality rate – hospitalised patients, 2005–2007. Age standardised.

Source: National Patient Register and the Cause of Death Register, National Board of Health and Welfare

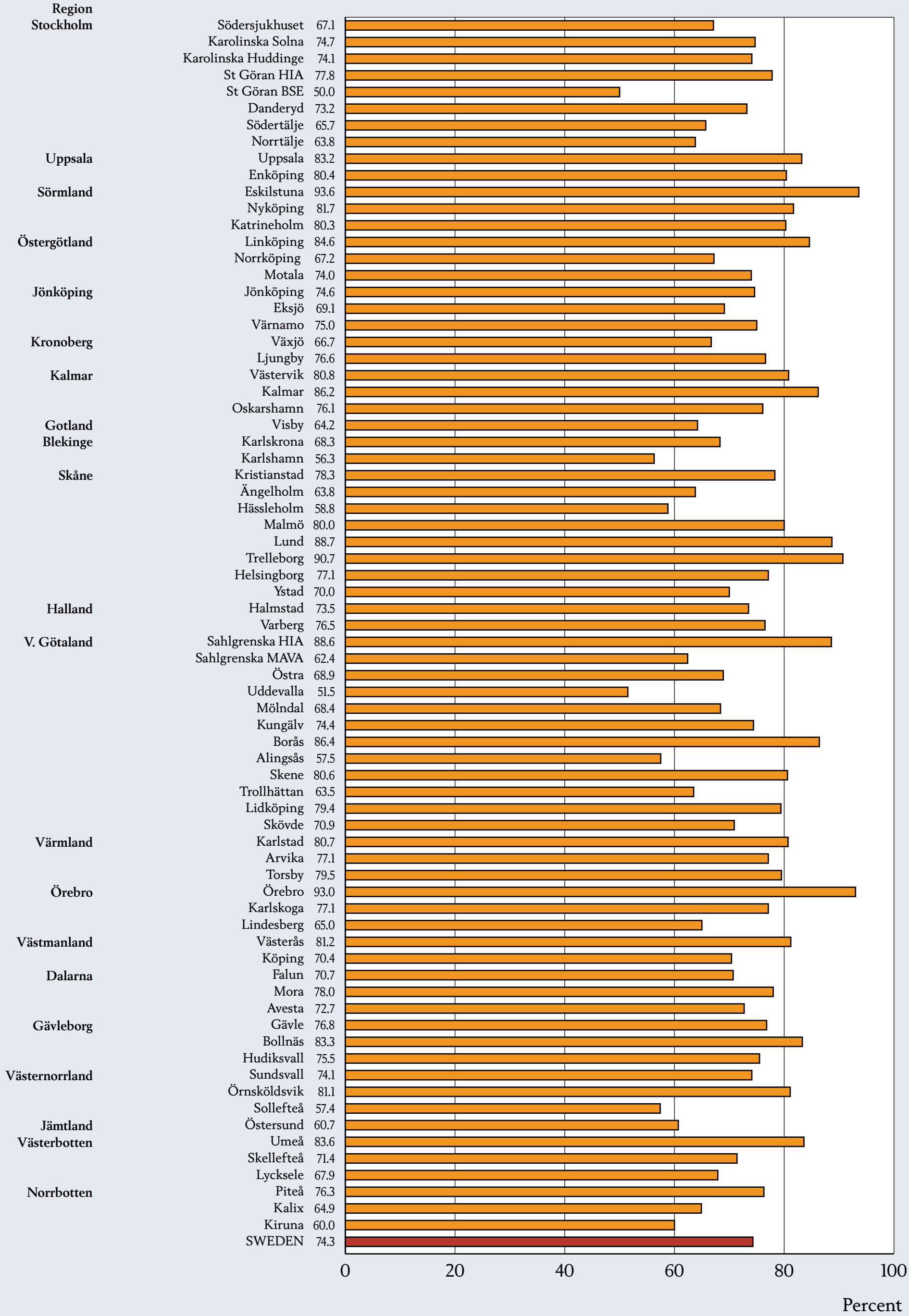


**Figure A:44**
**Hospitals**

Coronary angiography after non-ST-segment elevation myocardial infarction, 2007. Patients younger than 80.

Source: Register of Information and Knowledge about Swedish Heart Intensive Care Admissions

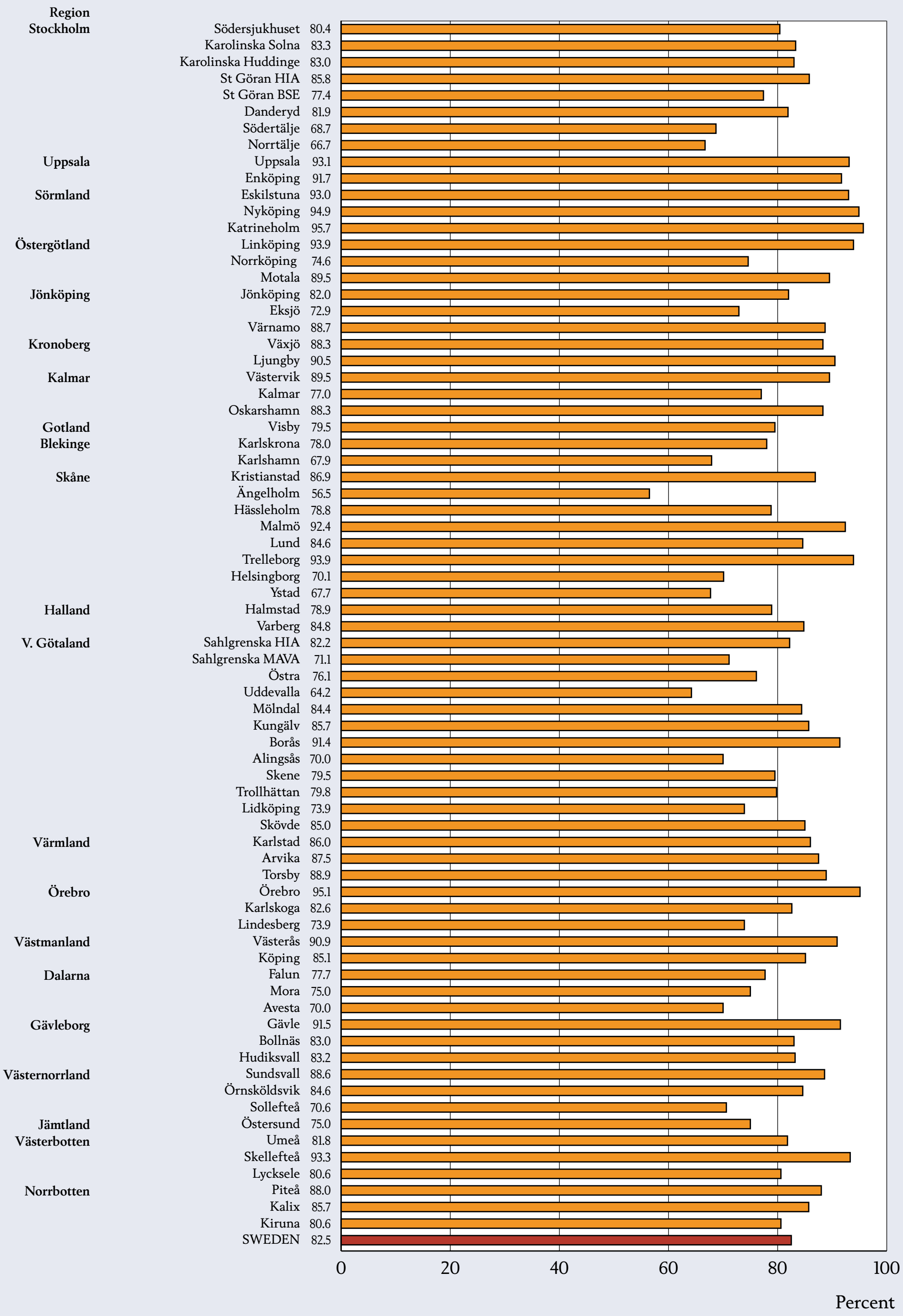


**Figure A:45**
**Hospitals**

Clopidogrel therapy after non-ST-segment elevation myocardial infarction, 2007. Patients younger than 80.

Source: Register of Information and Knowledge about Swedish Heart Intensive Care Admissions

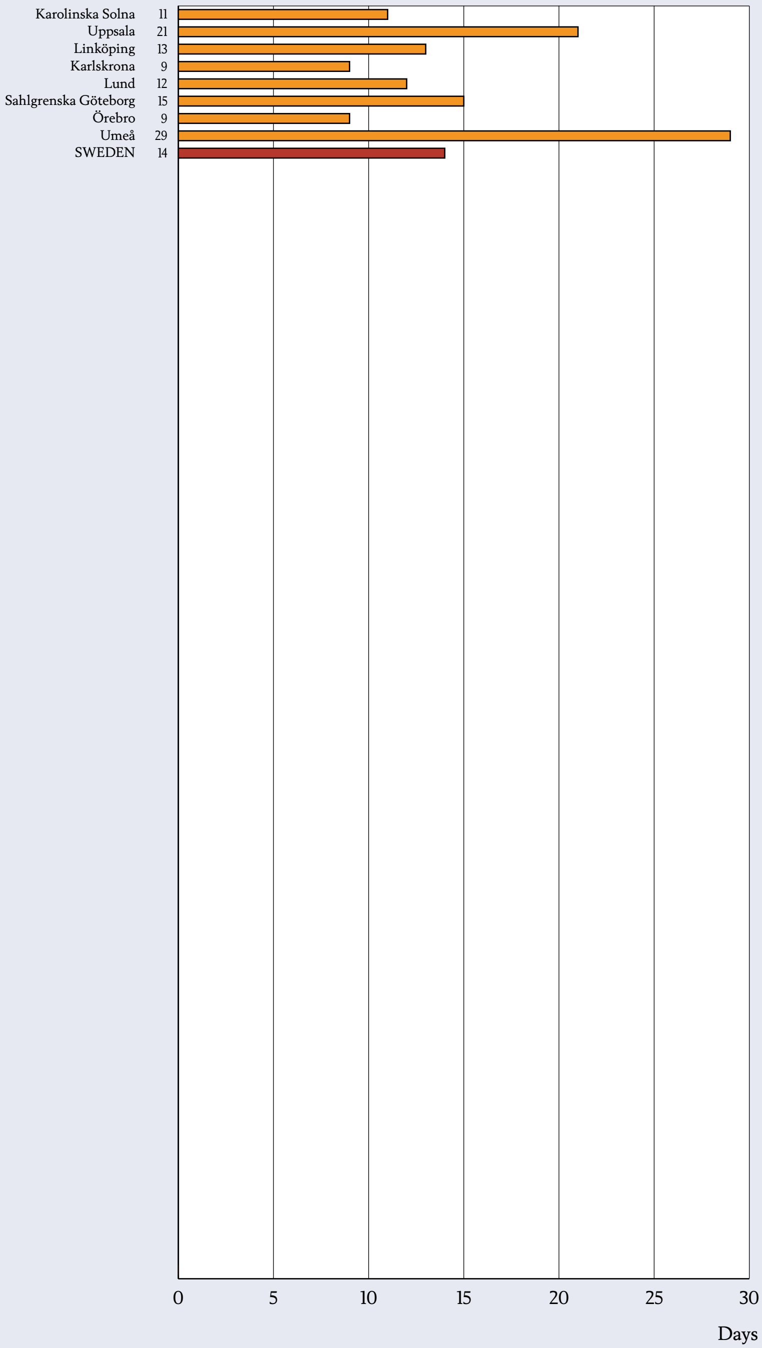


**Figure A:46**
**Hospitals**

Waiting time for coronary artery bypass graft, 2007.

Source: Swedish Heart Surgery Register

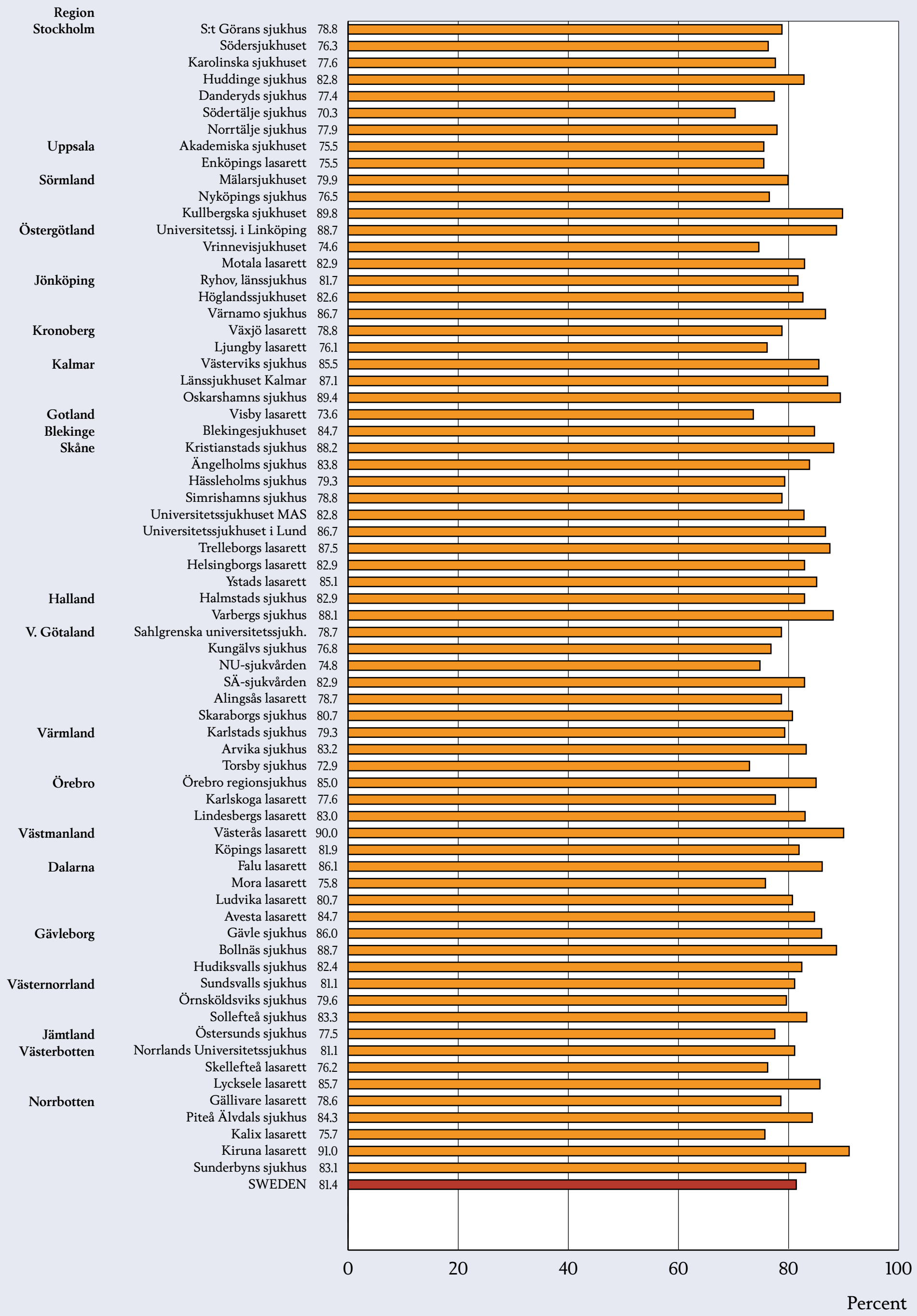


**Figure A:47**
**Hospitals**

Lipid lowering drug therapy 12–18 months after myocardial infarction, 2005–2006. Patients aged 40–79. Age standardised.

Source: National Patient Register and the Prescribed Drug Register, National Board of Health and Welfare

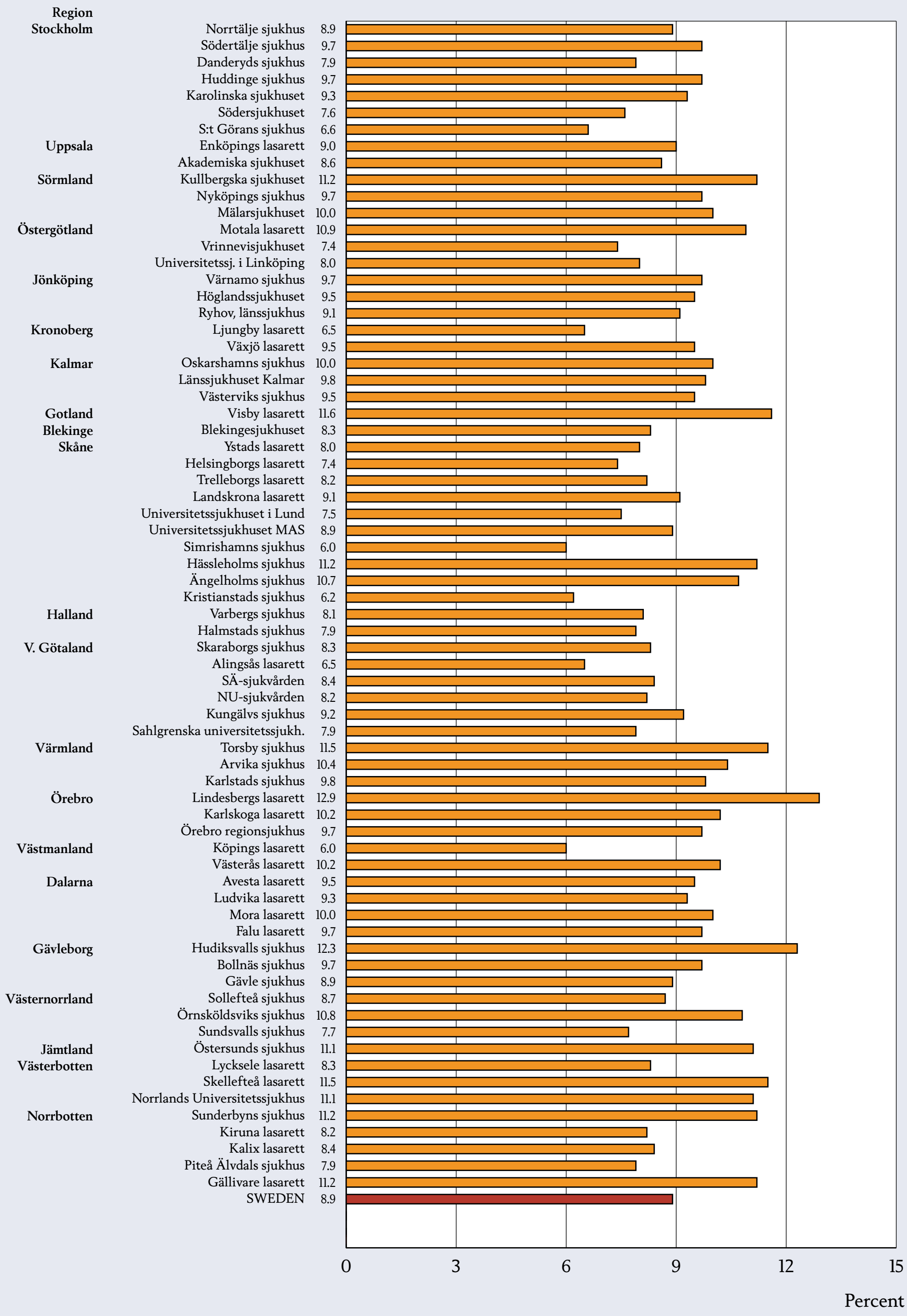


**Figure A:48**
**Hospitals**

Heart failure – readmission within 30 days, 2004–2007. Age standardised.

Source: National Patient Register, National Board of Health and Welfare

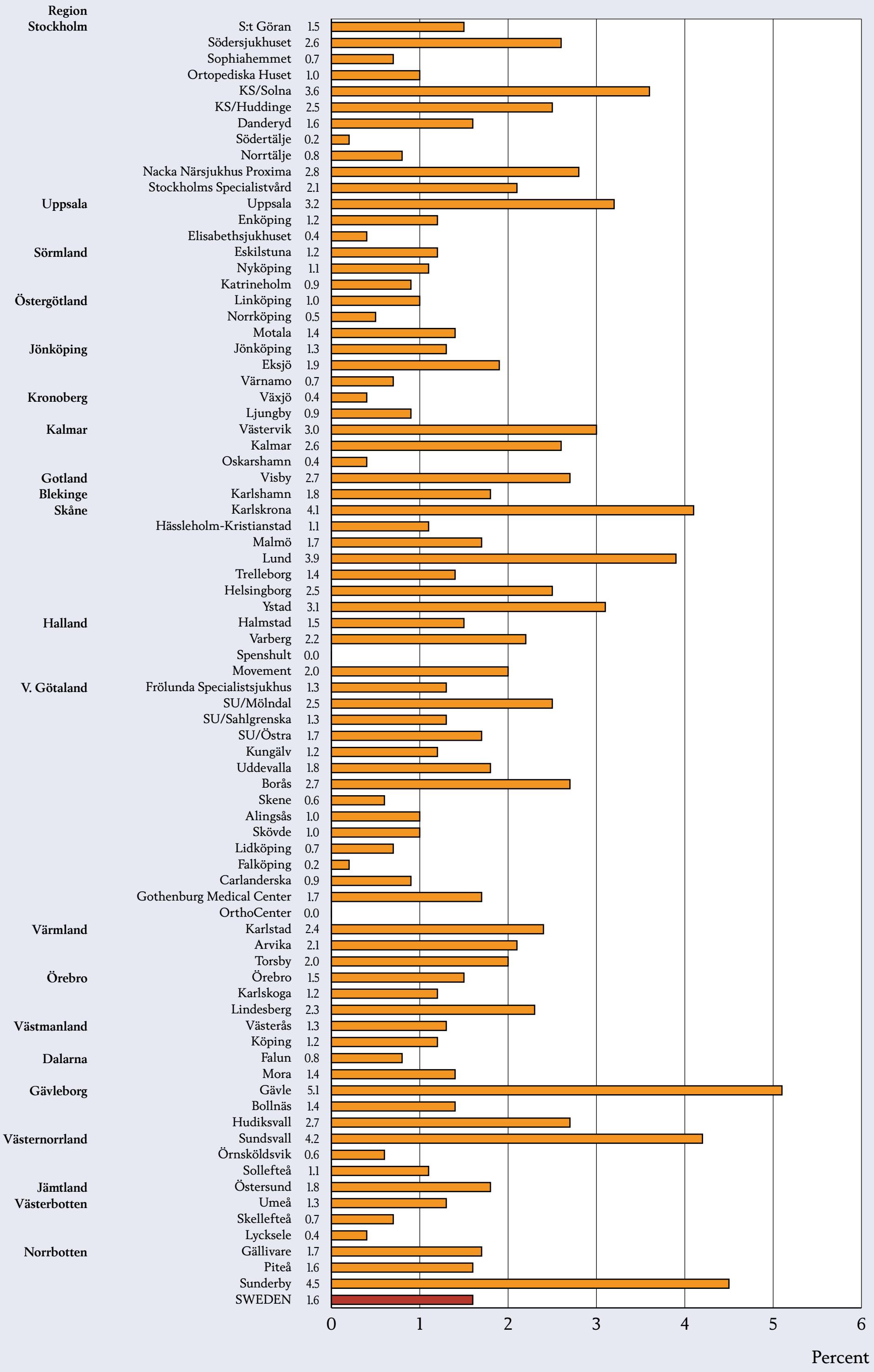


**Figure A:51**
**Hospitals**

Reoperation within 2 years after total hip replacement arthroplasty, 2004–2007.

Source: Swedish Hip Arthroplasty Register

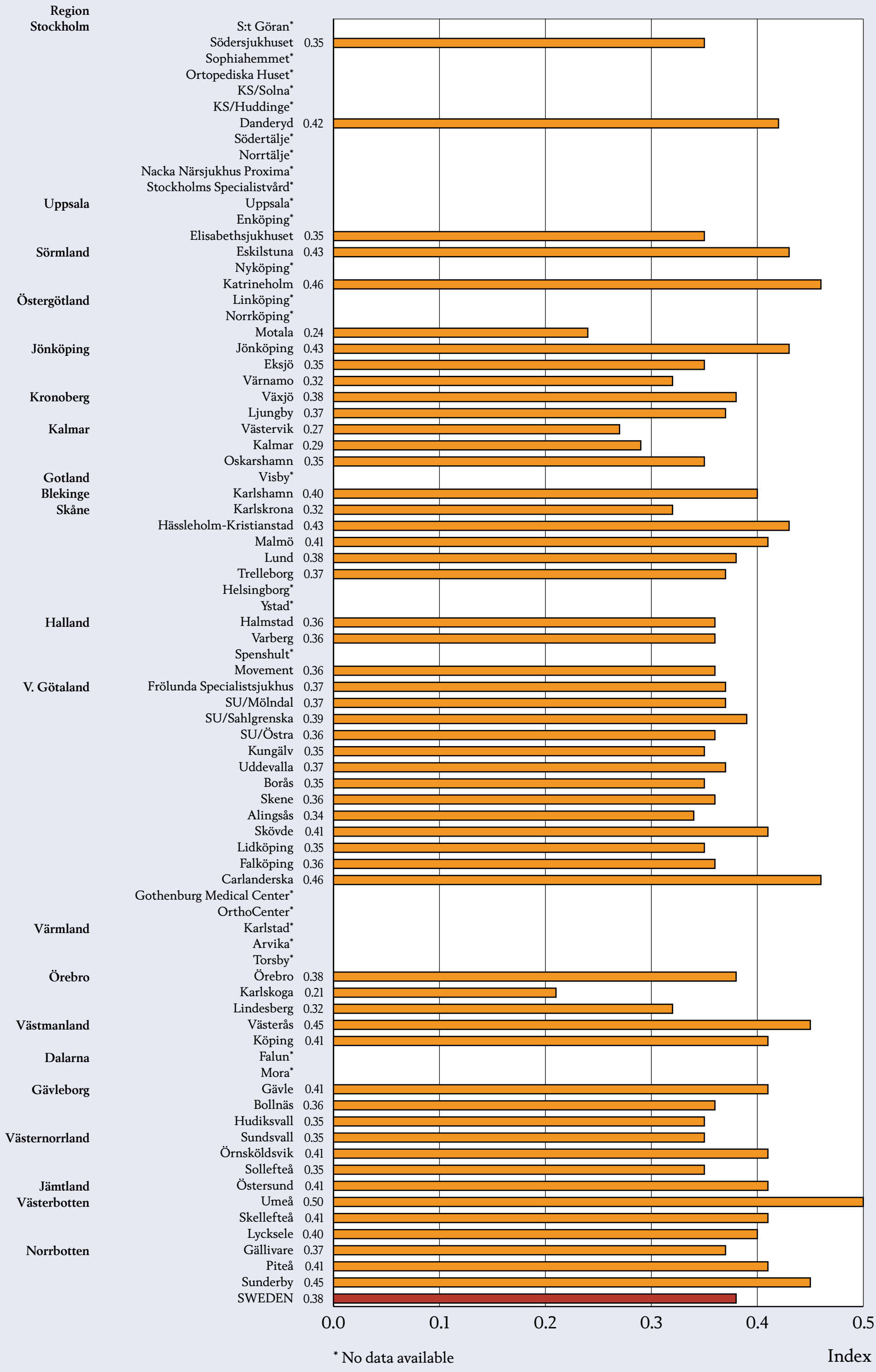
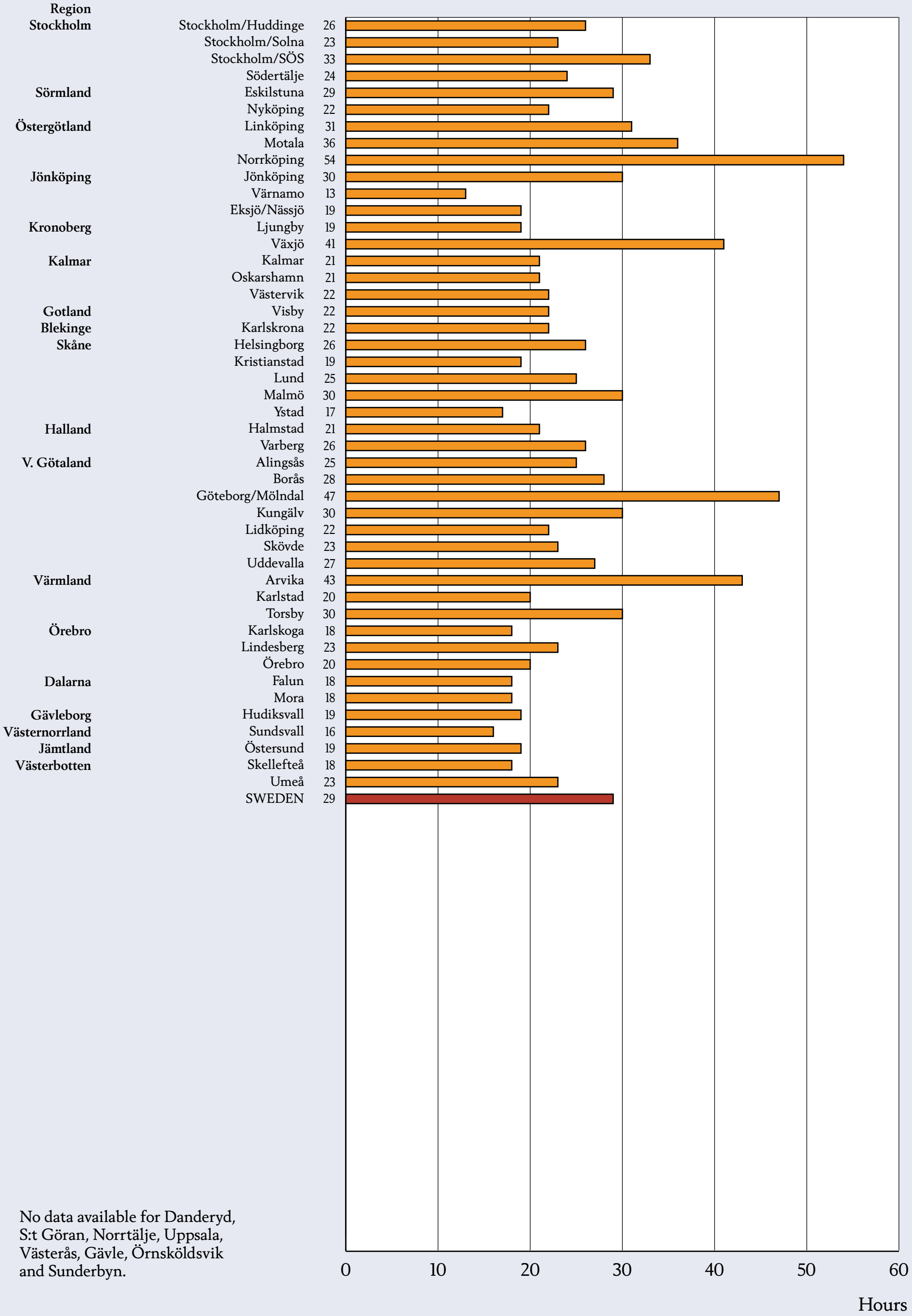


**Figure A:52**
**Hospitals**

Total hip replacement arthroplasty – patient-reported outcome. Improvement in EQ5D after one year, 2002–2007.

Source: Swedish Hip Arthroplasty Register



No data available for Danderyd, S:t Göran, Norrtälje, Uppsala, Västerås, Gävle, Örnsköldsvik and Sunderbyn.

**Figure A:53**
**Hospitals**

Hip fracture – waiting time for surgery, 2007.

Source: National Hip Fracture Registry

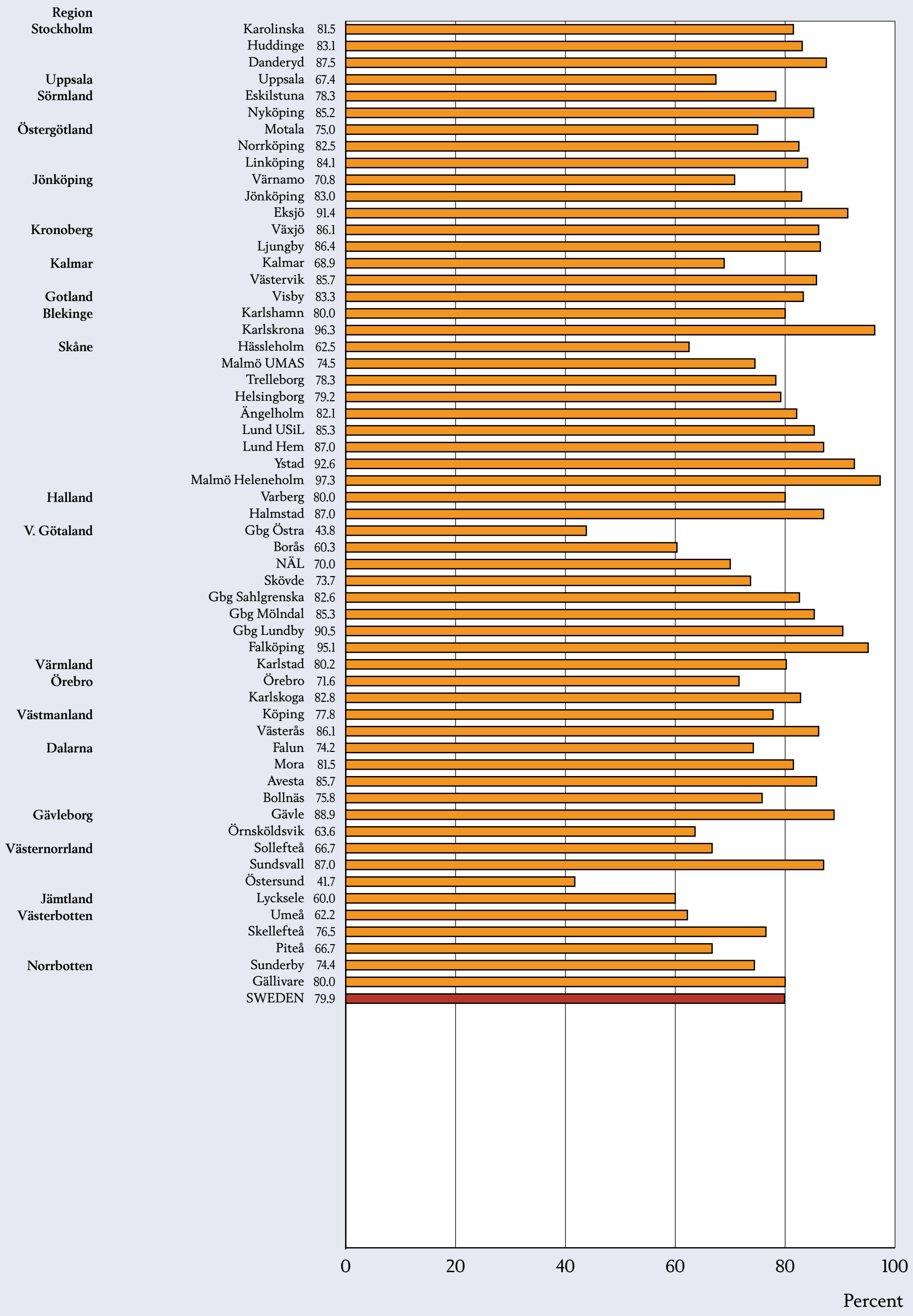


**Figure A:59**
**Hospitals**

Goal fulfilment for dialysis dose, 2007.

Source: Swedish Renal Registry

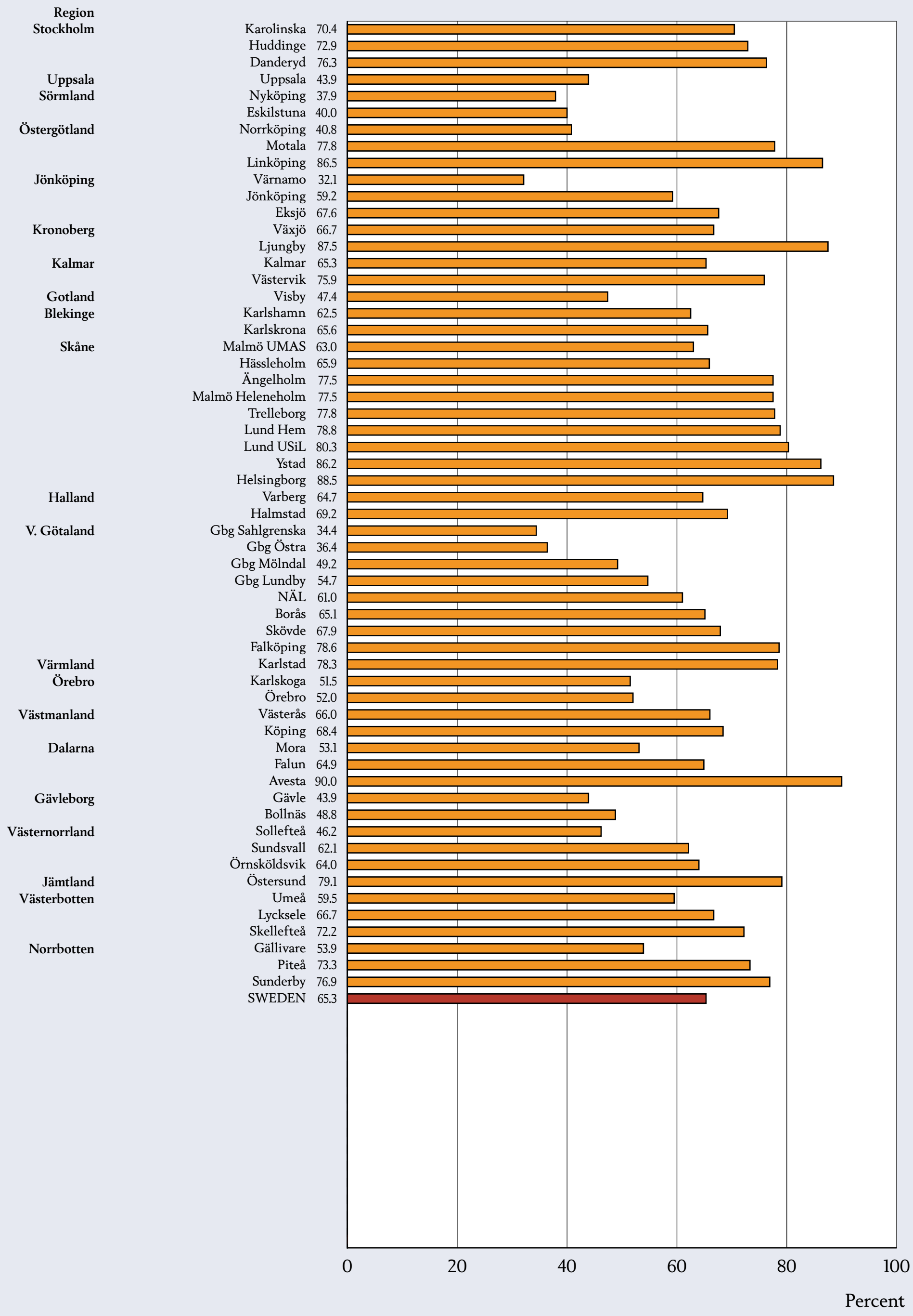


**Figure A:60**
**Hospitals**

Proportion of hemodialysis patients with AV-fistula or AV-graft, 2007.

Source: Swedish Renal Registry

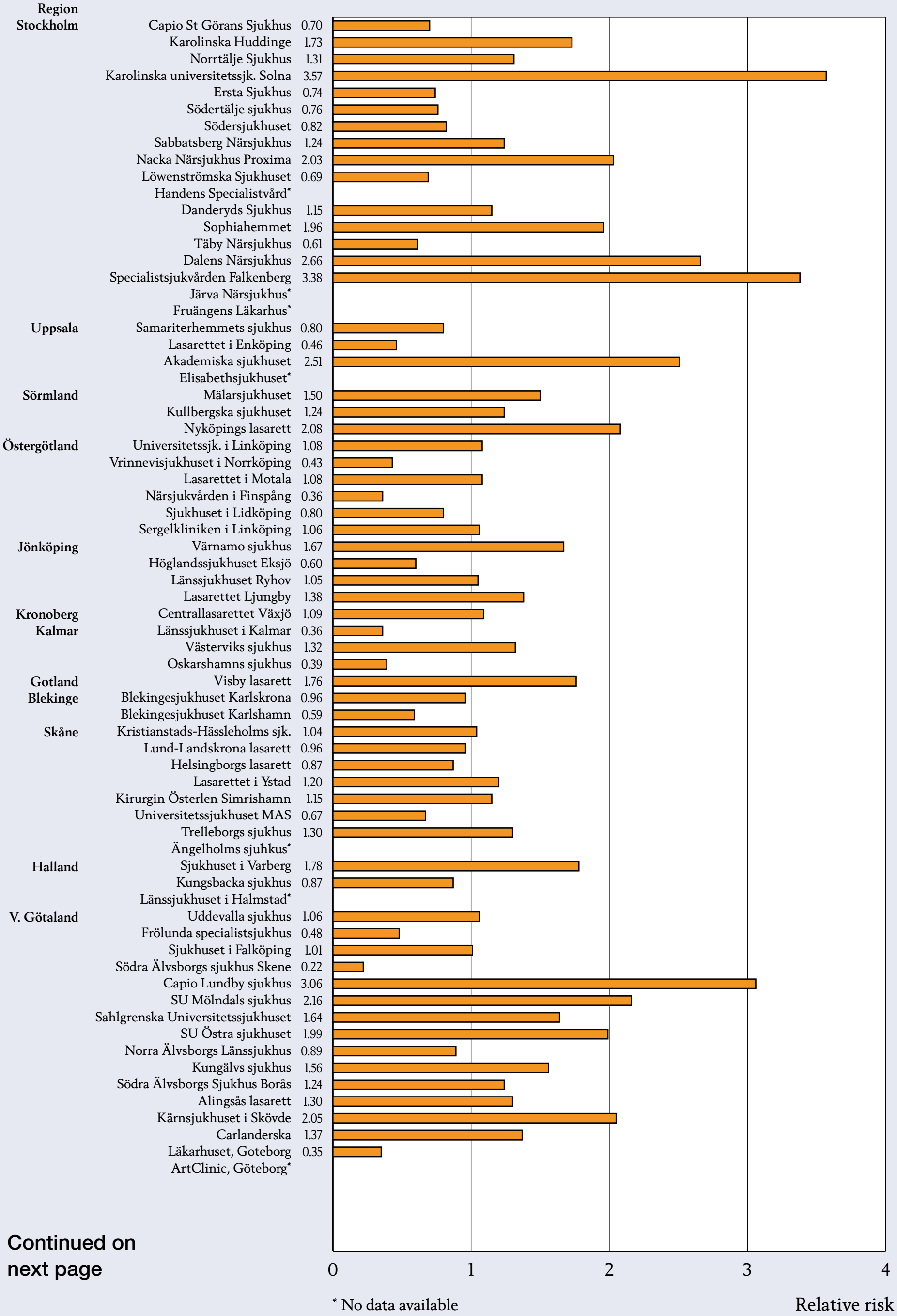


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**Figure A:61 Hospitals**

Relative risk of reoperation within 5 years for inguinal hernia, 2003–2007. Risk for each clinic compared to all others.

Source: Swedish Hernia Register

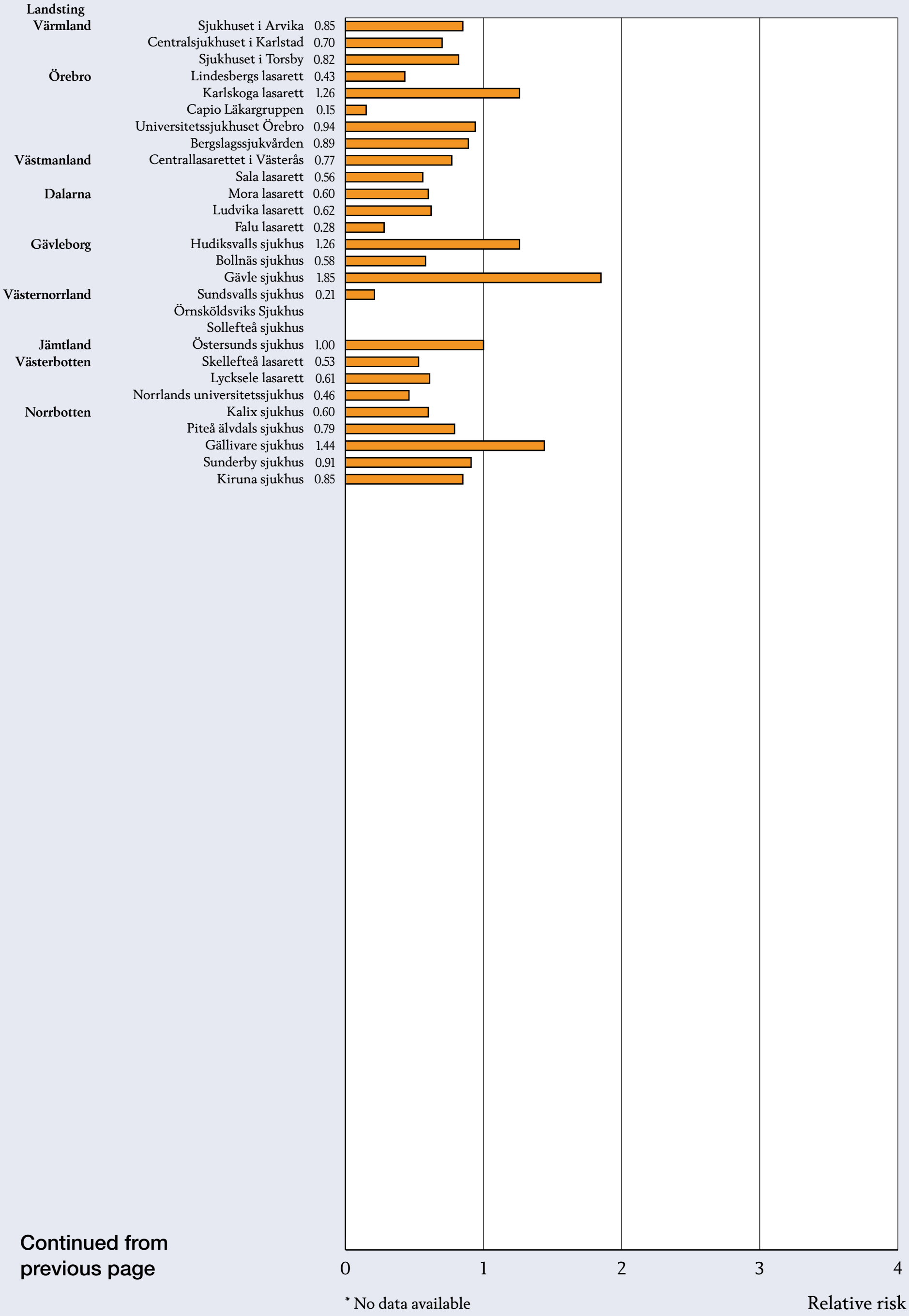

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**Figure A:61 Hospital**

Relative risk of reoperation within 5 years for inguinal hernia, 2003–2007. Risk for each clinic compared to all others.

Source: Swedish Hernia Register

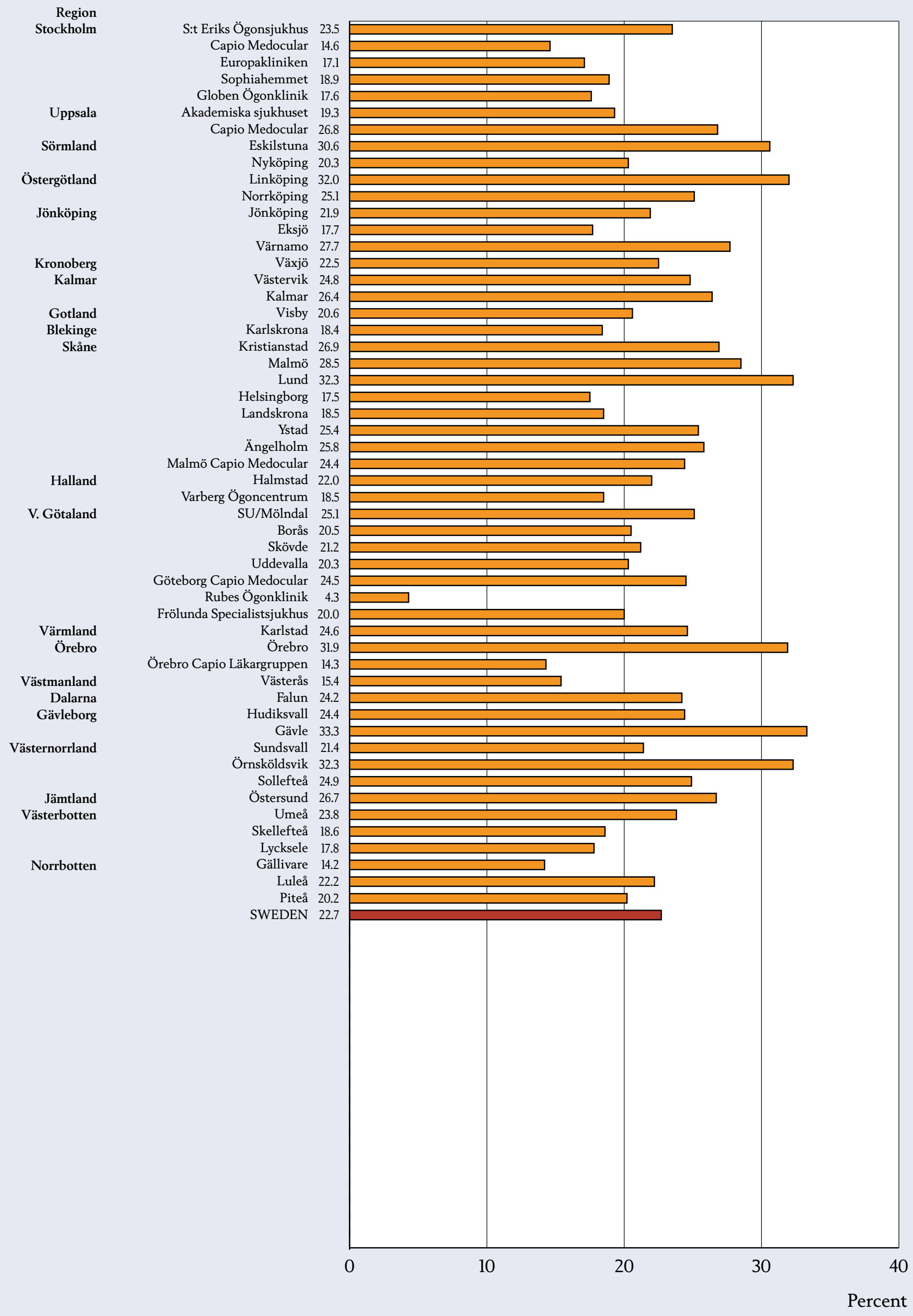


**Figure A:62**
**Hospitals**

Cataract surgery, visual acuity below 0.5 in the better seeing eye, 2007.

Source: Swedish National Cataract Register

## Socioeconomic analysis – some examples

Given the regional approach in *Open Comparisons*, equal access to high-quality health care is reflected from a geographic point of view. The question that is examined is whether healthcare quality differs from region to region. The gender-based reporting focuses on whether health care is provided in a gender-neutral manner. Here we will look at differences between the health care that is available to various socioeconomic groups.

We will offer eight examples of diseases and treatment methods for which there appear to be differences in the preventive measures and care to which various socioeconomic groups have access. All indicators were previous presented in the Medical Results group as comparisons among regions.

The eight examples have been chosen as representative of major groups of diseases or common healthcare interventions. But it needs to be stressed that they are merely examples, not a selection of indicators that describe social equality in Swedish health care.

We have focused on disparities among people with different countries of origin, as well as among groups with different educational backgrounds. The breakdown of the education variable varies from indicator to indicator.

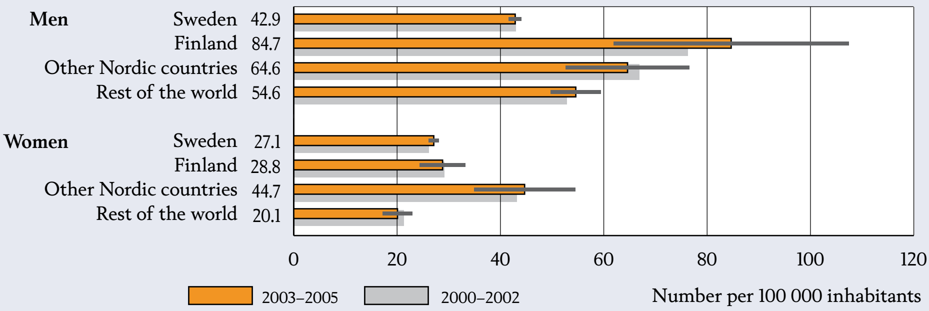


**Figure A:1** Policy-related avoidable mortality and country of origin per 100 000 inhabitants, 2003–2005. Ages 1–74. Age standardised.

Source: Cause of Death Register, National Board of Health and Welfare. LISA, Statistics Sweden.

## A:1 • Policy-related avoidable mortality and country of origin

Lung cancer and traffic accidents account for a large percentage of policy-related avoidable mortality. Men born outside Sweden have greater policy-related avoidable mortality than those born in Sweden, particularly men born in Finland, for whom the percentage is twice as great. The differences are not as significant for women. Variations in smoking and alcohol habits may be one of the reasons. The population born in other Scandinavian countries is generally small.

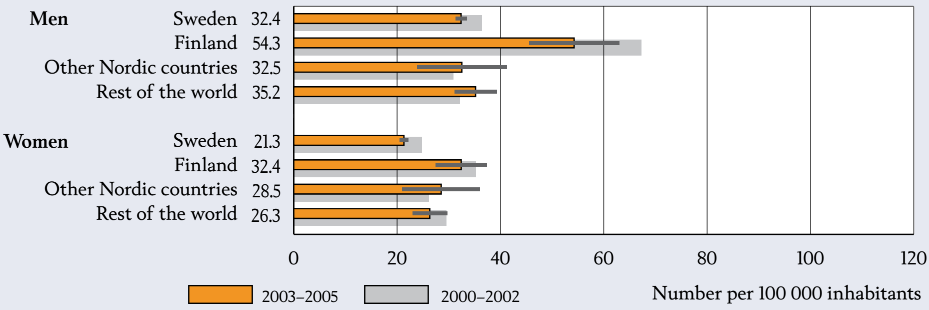


**Figure A:2** Healthcare-related avoidable mortality and country of origin per 100 000 inhabitants, 2003–2005. Ages 1–74. Age standardised.

Source: Cause of Death Register, National Board of Health and Welfare. LISA, Statistics Sweden.

## A:2 • Healthcare-related avoidable mortality and country of origin

People born in Finland have considerably higher healthcare-related avoidable mortality, primarily from diabetes and stroke, than those born in Sweden or outside Scandinavia. Variations in lifestyle and risk factors may be among the reasons. The population born in other Scandinavian countries is generally small.

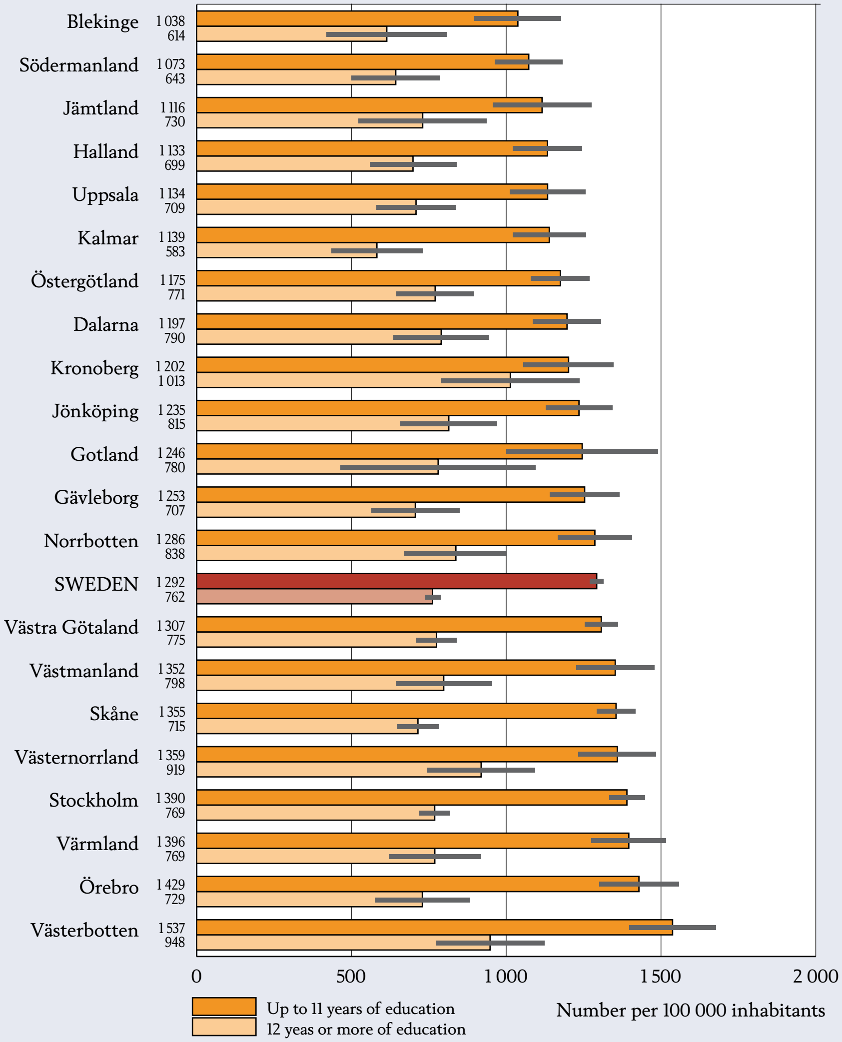


**Figure A:3**
**Women**

Patients with avoidable hospitalisations per 100 000 inhabitants, by educational groups, 2006. Patients aged 45–74. Age standardised.

Source: Cause of Death Register, National Board of Health and Welfare. LISA, Statistics Sweden.

## A:3 • Avoidable hospitalisations and education

For all regions, people with lower educational levels have a higher percentage of avoidable hospitalisation. Because such conditions should generally not be cared for at hospitals and there are no health data registers of primary care, we cannot determine the actual number of people in each education category who have received one of the analysed diagnoses. As a result, we perform a comparison with

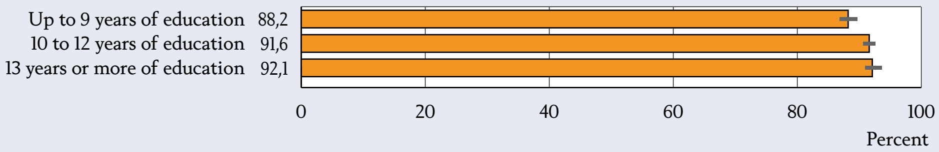


**Figure A:18** Breast cancer – relative five-year survival rates and education, 2001–2005, follow-up until Dec 2005. Women 45–74 years. Age standardised.

Source: Cause of Death Register, National Board of Health and Welfare. LISA, Statistics Sweden.

the population in each education category in a manner analogous to the use of the indicator at the regional level.

### A:18 • Breast cancer – relative five-year survival rates and education

Partially because they tend to have children at a later age, highly educated women develop breast cancer more often than others. But the figure shows that these women have higher five-year survival rates. Given that each education category has been related to its particular expected survival rate, the results are not affected by the fact that highly educated women generally have lower mortality rates in the overall population.

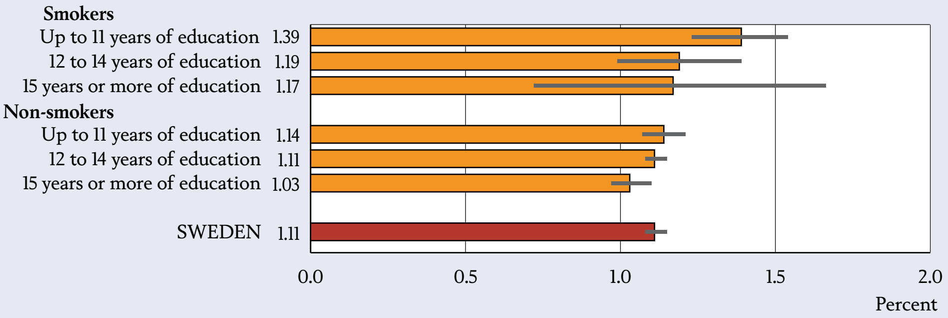


**Figure A:25** Percentage of newborns with Apgar score under 7, by maternal education and smoking, 2001–2005. Age standardised.

Source: Medical Birth Register, National Board of Health and Welfare. LISA, Statistics Sweden.

### A:25 • Percentage of newborns with Apgar < 7, education and smoking

The mother's smoking habits and educational level both affect the risk of a low Apgar score. The frequency of smoking is also clearly related to educational level. A total of 21 percent of pregnant women with low educational levels, 7.5 percent with medium educational levels, and 1.5 percent with high educational levels smoke.

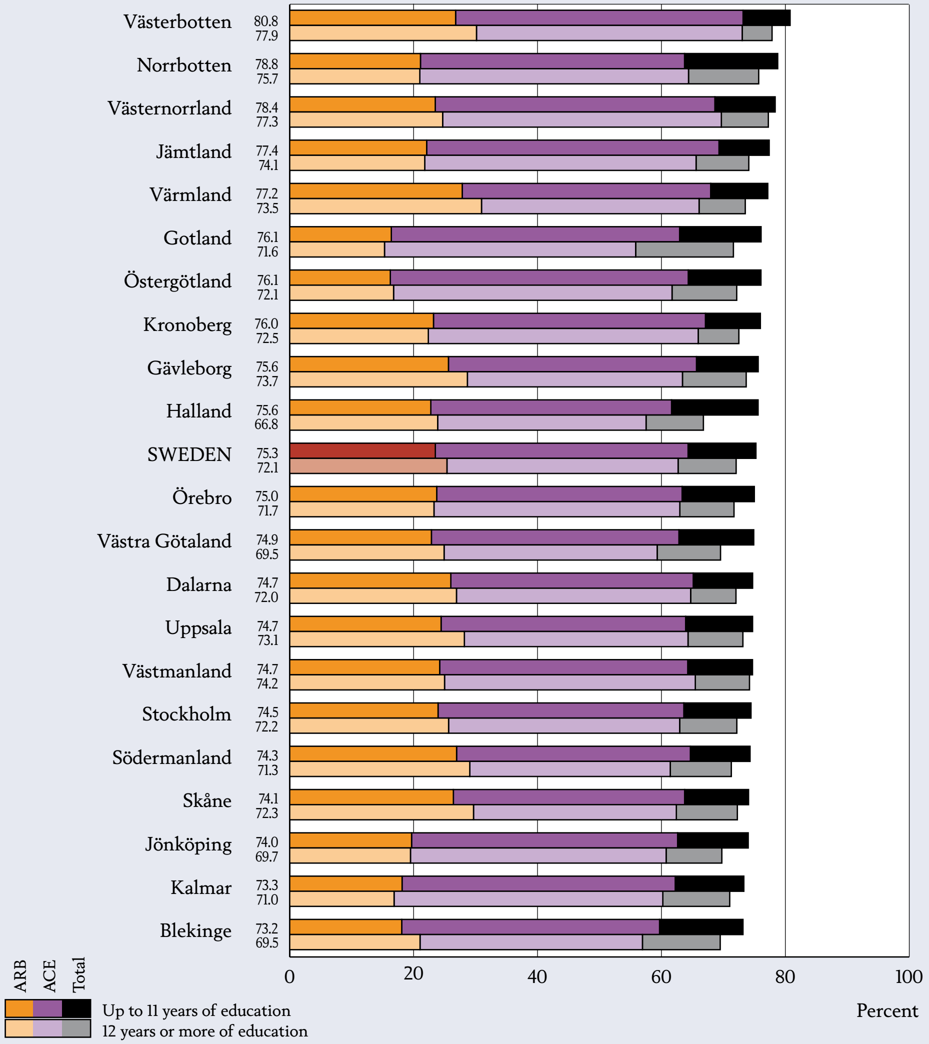


**Figure A:29** Diabetic patients receiving antihypertensive therapy by educational groups, 2006. Aged 45–74. Age standardised.

**Men**

Source: Prescribed Drug Register, National Board of Health and Welfare. LISA, Statistics Sweden

## A:29 • Diabetic patients receiving antihypertensive therapy, and education

Diabetic patients with low educational levels are more likely to receive some type of antihypertensive therapy. That probably reflects a higher frequency of risk factors other than diabetes for cardiovascular disease. But the differences are not nearly as clear – in some cases the opposite is true with respect to the new, more expensive ARBs. Such drugs appear to be prescribed more often to highly educated patients. See indicator D:13 on ARBs.

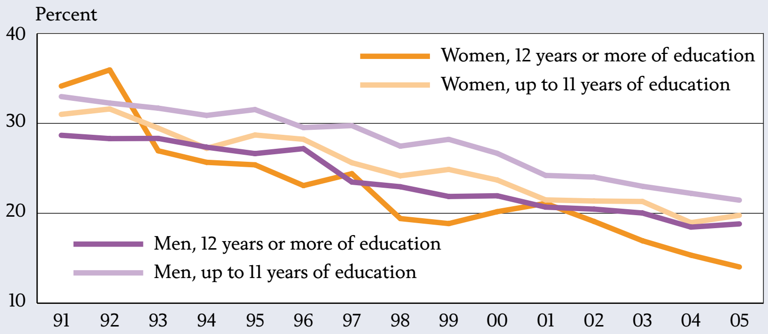


**Figure A:41** Myocardial infarction – 28-day case fatality rate, by education. Age 45–74. Age standardised.

Source: National Patient Register, Cause of Death Register, National Board of Health and Welfare. LISA, Statistics Sweden.

## A:41 • Myocardial infarction – 28-day case fatality rate, and education

Survival rates after myocardial infarction have substantially improved for both women and men over the past 15 years. People with lower educational levels still have higher case fatality rates than those with higher educational levels.

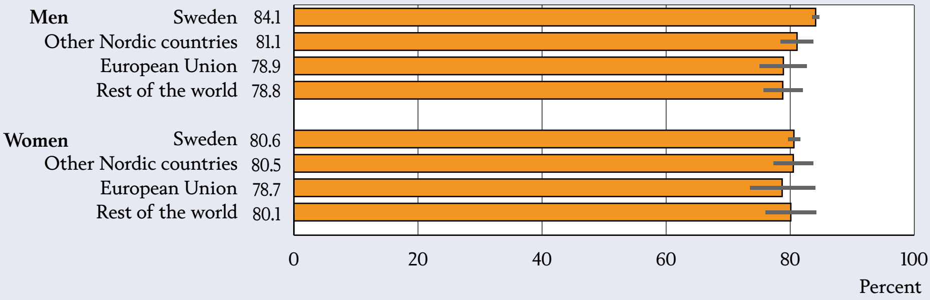


**Figure A:47** Lipid lowering drug therapy 12–18 months after myocardial infarction and country of origin, 2005–2006. Age 40–79. Age standardised.

Source: National Patient Register, Prescribed Drug Register, National Board of Health and Welfare. LISA, Statistics Sweden.

## A:47 • Lipid lowering drug therapy after myocardial infarction and country of origin

A majority of people who have myocardial infarction receive lipid lowering drug therapy, though men born in Sweden more often than those born elsewhere. Whether the difference is due to undertreatment of men born abroad or to variations in risk factors is difficult to determine. The breakdown by country of origin is somewhat different from that used for other indicators – the categories in this case are people born in Sweden, other Scandinavian countries and the EU-25 countries, and the rest of the world.

# B

# Patient Experience

# B Patient Experience

The *Patient Experience* group of indicators concerns the general perceptions that patients and the overall population have of health care. This section does not include the specific assessments that patients make about the outcome of a particular treatment. But some indicators of that type are presented in the *Medical Results* section, including patient-reported outcome after total hip replacement arthroplasty and ADL ability three months after stroke.

The indicators in the Patient Experience group are based on assessments by two different categories: the population in general and patients who have had contact with the healthcare system. Some of the indicators concern the overall ratings of patients with regard to their healthcare visits. Such indicators reflect actual patient experience. Other indicators shed light on additional issues, such as confidence among the general population in primary and hospital care. Thus, they do not necessarily reflect how well the healthcare system succeeded in its direct contact with patients.

The Healthcare Survey is the source of the data, which cover all of 2007. The purpose of the survey is to measure the attitudes, experience and knowledge of the general population when it comes to the healthcare system. The opinions and confidence that the general population has with regard to the healthcare system is a key marker of how well it is working. The data were collected through telephone calls with more than 43 000 randomly selected interviewees. More than half of the interviewees had healthcare visits as patients during the year. All regions participated except Gotland. The Swedish Association of Local Authorities and Regions (SALAR) presents a more comprehensive annual review of the results.

The Healthcare Survey data needs to be supplemented in order to ensure that monitoring of patient experience is more comprehensive. In collaboration with the regions, a project group at SALAR is preparing a national patient questionnaire, the primary purpose of which will be to provide health centres and hospitals with a tool to upgrade and improve the care they offer. The data can also be used to analyse and compare caregivers and regions.

The Patient Experience group also includes an indicator concerning how stroke patients perceived the hospital care they received at a general level. A previous indicator concerning the opinions of stroke patients about their rehabilitation has been deleted due to insufficient data quality. The data are for 2007. The source is the

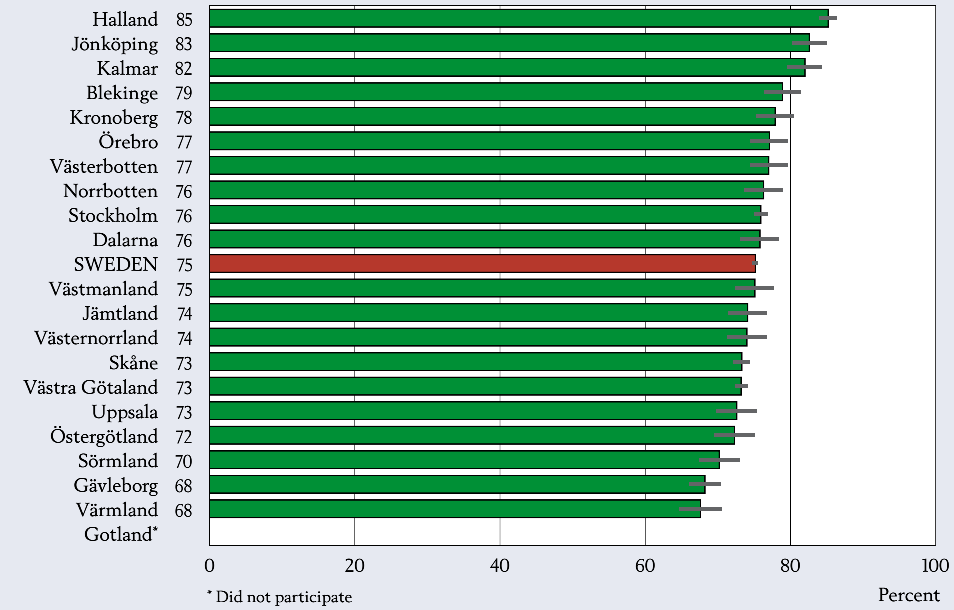


**Figure B:1** Proportion of the population who consider themselves to have access to the care they need, 2007.

Source: Population and Patient Survey, SALAR

National Stroke Register and the follow-up it conducts three months after the acute phase. The reason that more diagnosis-specific indicators are not presented is that data characterised by sufficient quality and participation rates are lacking.

## B:1, B:2, B:3 • General population – confidence in and availability of health care

Figure B:1 shows perceptions among members of the general population about their access to health care, regardless of whether they have had recent contact with the system or not.

A total of 75 percent of people nationwide agreed with the statement, “I have access to the health care I need” in 2007. The number of affirmative responses has risen steadily from 69 percent in 2004. There were age-related differences. Working-age people were significantly less likely than the rest of the population to say that they had access to the health care they needed.

The regional variation was 68–85 percent when it came to affirmative answers. Like last year, Halland, Jönköping and Kalmar had the highest percentages. At 68 percent, Gävleborg and Värmland still had the lowest percentages. For most regions,

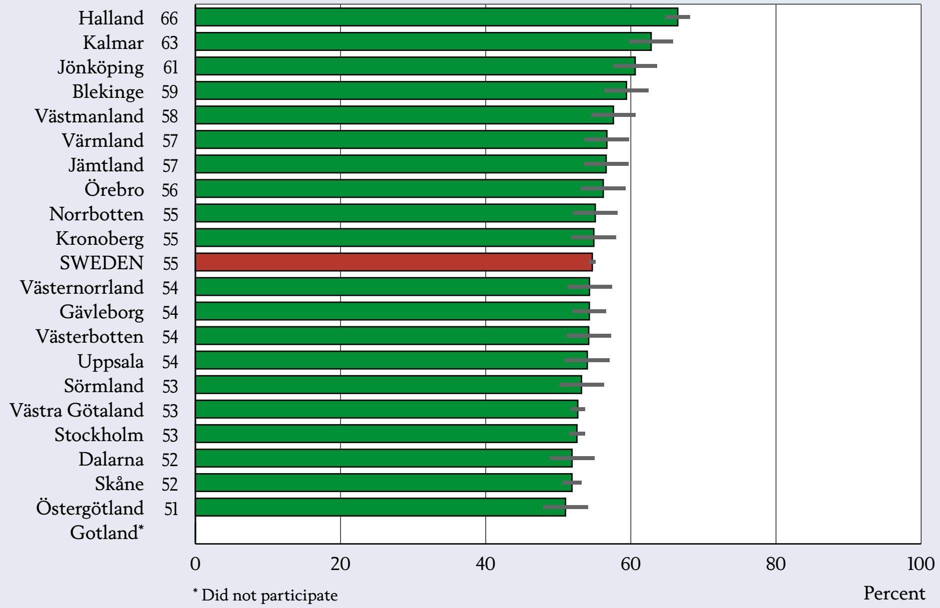


**Figure B:2** Proportion of the population with high or very high confidence in primary health care, 2007.

Source: Population and Patient Survey, SALAR

the differences between 2006 and 2007 were small. Dalarna, whose percentage of affirmative answers rose by 4 percentage points, and Västmanland, with a 3 percentage point increase, showed the biggest changes.

The next two figures also refer to perceptions among the general population. The question concerns overall confidence in care at health centres (including medical centres and general practitioner's offices) and hospitals.

Figure B:2 presents the results concerning confidence in primary care among the general population. A total of 55 percent of the respondents, an increase of 2 percentage points since 2006, said that they had a lot or quite a lot of confidence in care at health centres. The regional variation was 51–66 percent. Halland, Kalmar and Jönköping were again at the top.

Confidence in primary care was relatively unchanged for most regions from 2006 to 2007. The changes varied from -2 to +3 percentage points. Värmland, with a 6 percentage point increase, and Örebro, with a 5 percentage point increase, were the exceptions.

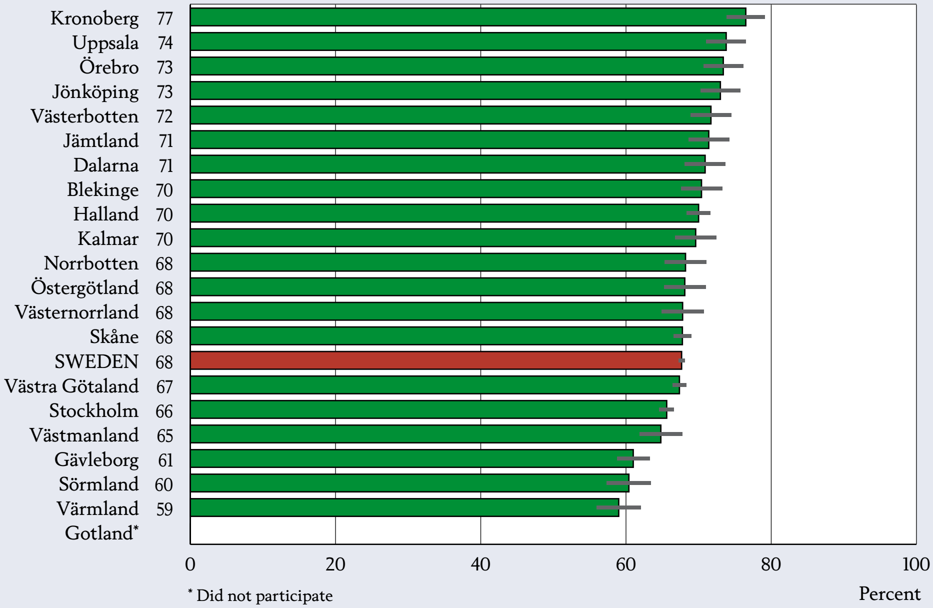


**Figure B:3** Proportion of the population with high or very high confidence in hospital care, 2007.

Source: Population and Patient Survey, SALAR

Like last year, the three large regions with metropolitan areas were below the national average. Regions where the general population had great confidence in primary care were also high when it came to "access to the care I need."

The question about confidence among the general population was also asked with respect to hospitals (see Figure B:3). The results were more favourable than for primary care. A total of 68 percent of the respondents had a lot or quite a lot of confidence in hospital care. That is 13 percentage points higher than for primary care. People in Uppsala and Dalarna were most likely to have greater confidence in hospital care, while people in Värmland and Halland were least likely.

At 77 percent, Kronoberg had the most people with a lot or quite a lot of confidence in hospital care. The gap between Kronoberg and Värmland, where people had the least confidence in hospital care, was 18 percentage points. The regional variation was somewhat greater for hospital care than for primary care. A few regions reported somewhat larger changes than the others. Confidence in hospital care increased by 3–5 percentage points in Östergötland, Uppsala, Kronoberg and Gävleborg from 2006 to 2007. Värmland had a decrease of 4 percentage points.

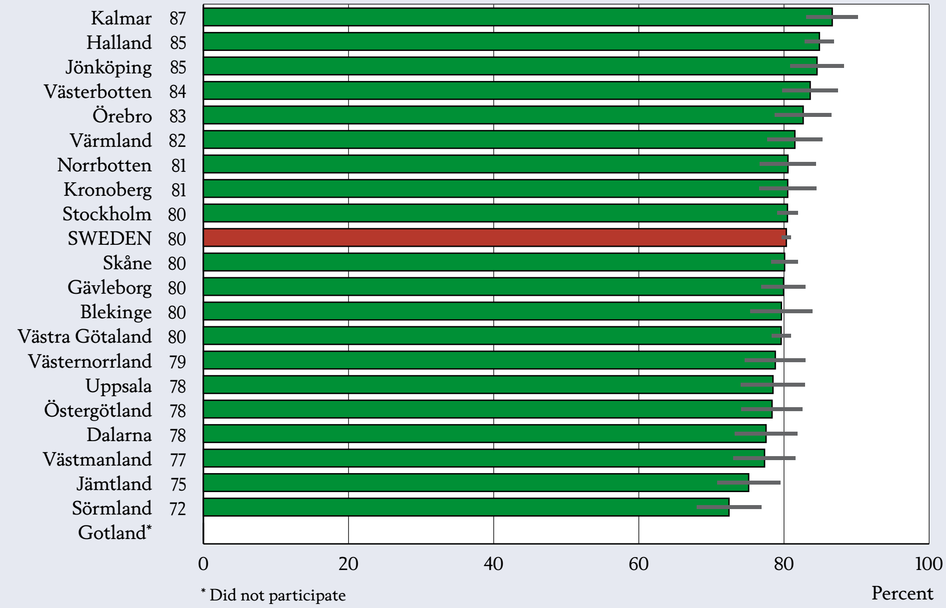


**Figure B:4** Proportion of patients who had a favourable perception of their latest visit at a primary care centre, 2007.

Source: Population and Patient Survey, SALAR

Patients had greater confidence in health care than did the general population. A total of 55 percent of the population had a lot or quite a lot of confidence in care at health centres and 68 percent in care at hospitals. The corresponding numbers for patients were 61 and 76 percent.

## B:4, B:5, B:6 • Patient ratings of visits

Overall patient ratings of their visits to the healthcare system are presented here. The Healthcare Survey defines a patient as someone who had a visit, either herself/himself or accompanying next of kin or a closely related person, at a health centre (or the equivalent) or a hospital during the past 12 months.

Figure B:4 shows the percentage of patients who had a favourable perception of their latest visit at a health centre (or the equivalent). Having a favourable perception means a rating of 4 or 5 on a 5-point scale. A total of 80 percent of the respondents nationwide had a favourable perception. The regional variation was 72-87 percent. Patients in Kalmar, Halland and Jönköping had the most favourable perceptions, while those in Jämtland and Sörmland had the least favourable. Favourable respons-

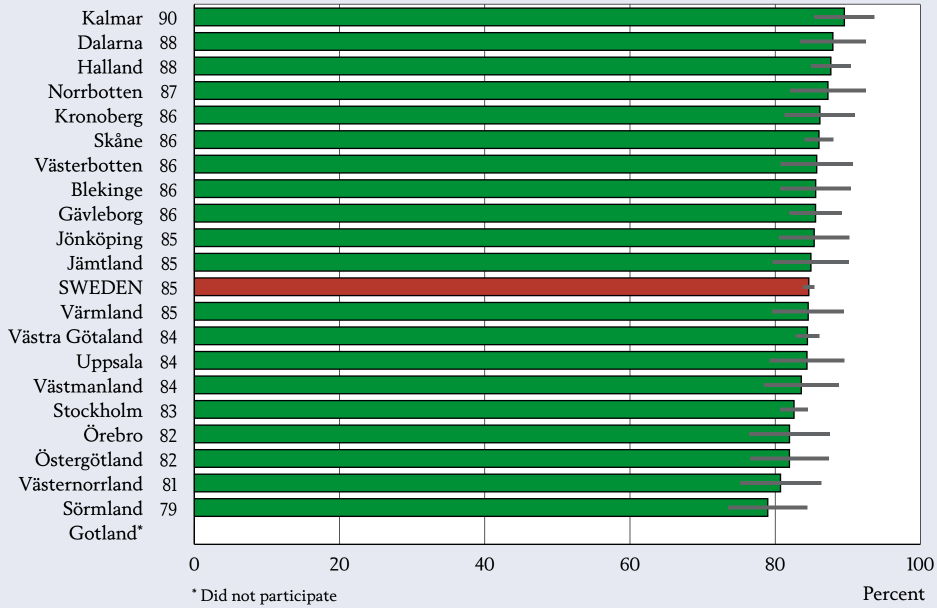


**Figure B:5** Proportion of patients who had a favourable perception of their latest visit at a at a hospital department or outpatient clinic, 2007.

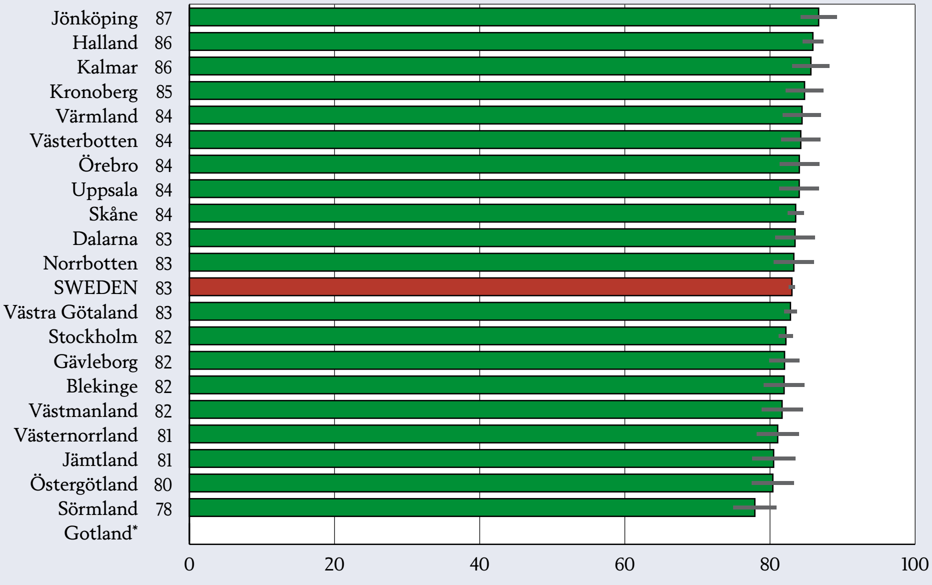
Source: Population and Patient Survey, SALAR

es increased the most in Värmland (9 percentage points) while decreasing the most in Blekinge, Jämtland and Sörmland (4 percentage points).

A total of 80 percent of patients who visited a health centre or the equivalent in 2007 rated it as either 4 or 5. That represents an increase from 75 percent in 2001. The improvement is due to the fact that patients who gave the visit a rating of 5 increased from 44 to 50 percent.

Figure B:5 shows the overall ratings of patients concerning their latest visit at a hospital department or outpatient clinic. Those who went to the emergency ward of a hospital were not included. A total of 85 percent of patients gave their visit a favourable rating overall. The regional differences were small. The national results have remained relatively unchanged in recent years.

Patients who visited a hospital were somewhat more favourable than those who visited a health centre. A total of 85 percent gave a favourable rating to their hospital visit, as opposed to 80 percent who had visited a health centre or the equivalent. Kalmar and Halland scored high in both comparisons, while Dalarna, which received high ratings for hospitals, did significantly poorer when it came to primary care.



* Did not participate

**Figure B:6** Proportion of patients who felt they received the help that they had expected during their visit, 2007.

Source: Population and Patient Survey, SALAR

Figure B:6 shows how patients responded to the statement that they had received the help that they had expected during their visit. The presentation refers to visits at both health centres and hospitals. A total of 83 percent agreed with the statement either wholly or in part. The regional variations were modest – less than 10 percentage points from the highest to lowest. All in all, 8 percent of the respondents said that they did not receive the help that they had expected (not reported). The change from 2006 was small in most regions. The greatest positive changes were in Jönköping (4 percentage points), as well as Kronoberg and Halland (3 percentages points). The percentage of Blekinge patients who received the help they had expected decreased by 6 percentage points.

## B:7, B:8 • Reasonable waiting times and phone availability in primary care

The Healthcare Survey asks people who have visited a health centre or the equivalent whether they felt that they had to wait a reasonable amount of time. Figure B:7 shows the percentages by region who answered in the affirmative. For the country as a whole, 79 percent of patients responded that their waiting time was reasonable, as opposed to 78 percent in 2006. Halland and Värmland patients answered in the

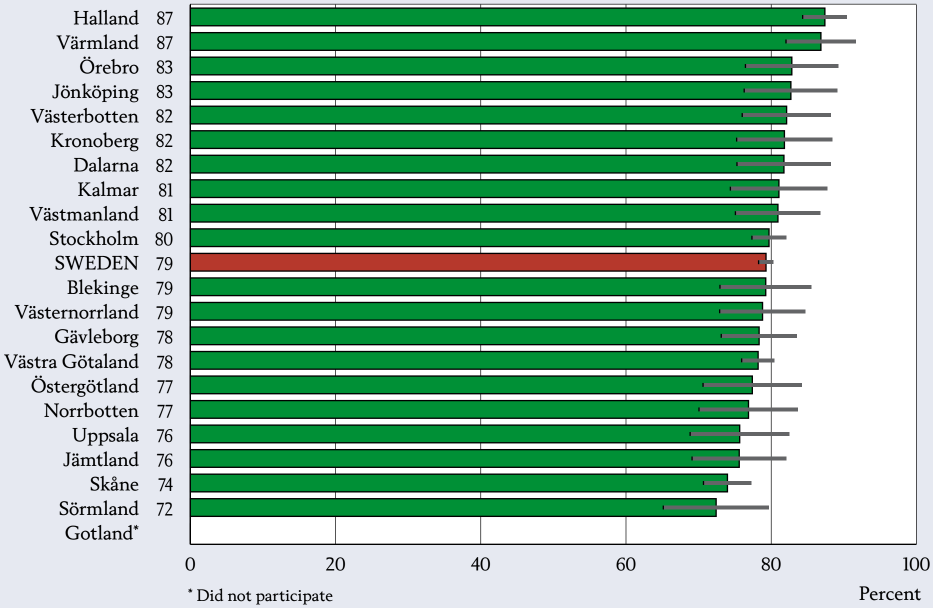


**Figure B:7** Proportion of patients who felt waiting-time to visit in primary care centre was acceptable, 2007.

Source: Population and Patient Survey, SALAR

affirmative most often. Dalarna (+9 percentage points) and Örebro (+8 percentage points) showed the biggest positive change. But there was a 6 percentage point decline in Kalmar patients who felt that they had to wait a reasonable amount of time.

The results may be compared with the availability of primary care in the follow-up on Sweden's healthcare guarantee programme, measured as the percentage of patients who were given a doctor's appointment within 7 days in March 2007 (published in the 2007 report). According to the follow-up on the guarantee programme, Halland was at the top in terms of both availability and the percentage of patients who felt that their waiting time was reasonable. Uppsala had the poorest availability and was among the regions with a relatively low percentage of patients who reported reasonable waiting times. Värmland patients were the second most satisfied with waiting times, even though availability according to the healthcare guarantee follow-up was below the nationwide result in March 2007. The opposite pattern held in Blekinge. Availability was substantially above average according to the follow-up, but the percentage of patients who felt that they had to wait a reasonable amount of time was average for the country as a whole. Such differences

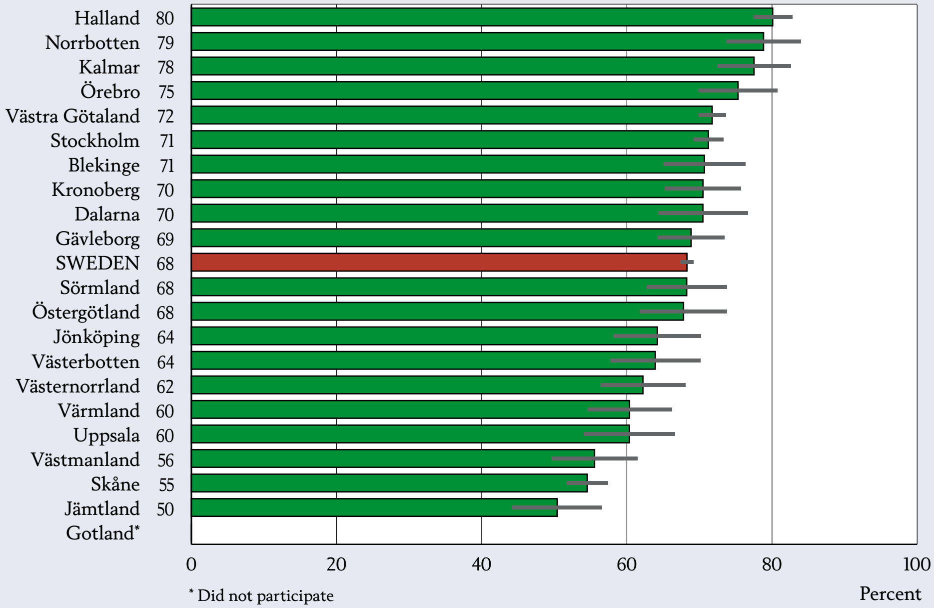


**Figure B:8** Proportion of patients who felt it easy or very easy to reach primary care centre by telephone, 2007.

Source: Population and Patient Survey, SALAR

suggest that factors other than actual waiting time also affect patient perceptions in this regard.

Telephone availability is integral to the accessibility of the healthcare system in general. One Healthcare Survey question is directed to patients who visited a health centre and phoned in advance. Figure B:8 shows the percentage of those patients who felt that it was easy or very easy to reach the centre by phone. A total of 68 percent of patients nationwide responded in that way in 2007, as opposed to 63 percent in 2006. The responses showed a clear positive trend from 50 percent in 2002 to 68 percent in 2007.

The regional variations were still large. Favourable responses in Norrbotten and Kalmar at the top were more than 20 percentage points higher than Västmanland, Skåne and Jämtland at the bottom. Halland, Örebro, Västra Götaland, Jönköping, Västernorrland, Värmland and Uppsala all showed major improvements, anywhere from 7 to 10 percentage points.

Section C *Availability* presents telephone availability in accordance with the March 2008 healthcare guarantee follow-up.

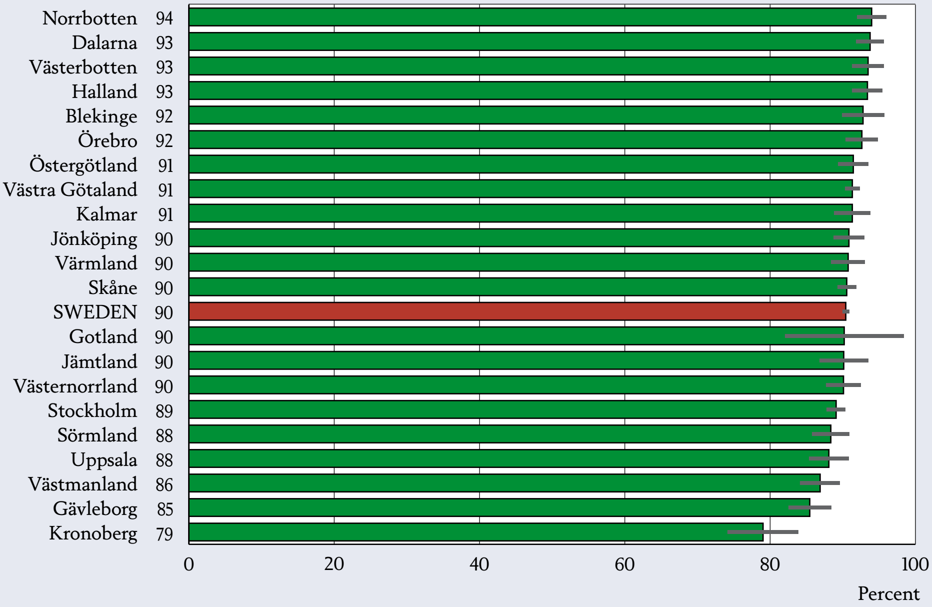


**Figure B:9** Proportion of stroke patients who were satisfied or highly satisfied with hospital care, 2007.

Source: Swedish Stroke Register

## B:9 • Stroke patient satisfaction with hospital care

The National Stroke Register follows up three months after the acute phrase. A questionnaire for patients and their families seeks to determine how satisfied they were with the care that they received. There are more questions about patient satisfaction than the one we present here.

Figure B:9 shows the level of patient satisfaction with hospital care. A total of 90 percent of the respondents were satisfied or highly satisfied. The nationwide responses have been approximately the same since 2001, peaking at 92 percent in 2004 and 93 percent in 2005.

Given the very favourable responses overall, the regional differences were modest, with one or two exceptions. Kronoberg's results were low, with such a large decline from 2006 to 2007 that data reporting problems should also be reviewed. Halland had distinctly poorer results in 2006 than 2007. It is important that the regions examine the trends over time in order to assess them and distinguish them from temporary deviations.

# C

# Time-related Availability

# C Time-related Availability

## The national healthcare guarantee as a target

The *Availability* group of indicators concerns time-related availability. The presented indicators are related to the national guarantee for all scheduled health care. There are still misconceptions concerning what the guarantee involves. The guarantee does not govern whether care is to be provided, or what kind. It governs only the time frame within which care that authorised staff have chosen after assessment, prioritisation and consultation with the patient is to be offered.

The targets are expressed as 0, 7, 90, 90 – the maximum waiting time in days for various steps in the healthcare process. Visits and treatment are to first be offered in the patient's region of domicile. If the region cannot do so within the applicable time frame, the patient is to be given information about seeking care with another provider. The region is to assist with all contact, and the patient is not to be burdened with extra costs.

Primary care is to offer contact on the phone or in person the same day (0). An appointment with a primary care doctor is to be offered within seven days (7). A scheduled visit to a specialised care unit is to be offered within 90 days after the date of the decision (90). An intervention is to be offered within 90 days after being ordered (90).

Availability trends for both primary and specialised care in accordance with the guarantee's time frame is regularly monitored at www.vantetider.se. Monitoring the guarantee is also part of the NBHW's mission from the government. The latest report, *Follow-up of the National Healthcare Guarantee*, was published in February 2008 at www.socialstyrelsen.se

The source of data on availability and waiting times is the joint national *Waiting Times in Health Care* database of the various regions. The efforts of the national reporting organisation ensure that data access and quality is relatively good. The response rate has improved greatly in recent years.

Two of the indicators presented in this section concern the availability of primary care. The other indicators involve visits and treatments within scheduled specialised care. A small selection of indicators for specific specialist areas and operations/procedures are presented. The data refer to the situation on 31 March 2008.

Long waiting times represent the healthcare problem with which citizens are most dissatisfied. Repeated follow-ups show that the healthcare system is not living up to the waiting time targets specified by the national guarantee programme (www.vantetider.se). Even in comparison with other countries, patients wait too long for doctor's appointments and scheduled treatment. Unfortunately, no fully comparable international availability data exist that reflect how well Sweden is performing compared with other countries. The differences are too great with respect to definitions of concepts, quality measures and measurement methodology.

## PRIMARY CARE

### C:1 • Percentage of patients who were given a doctor's appointment within a week

Waiting times for an appointment with a general practitioner are measured each March and October. The data are reported through an online system provided by SALAR. The data presented here are from the latest survey on 31 March – 4 April 2008. Last year's report was based on data from March 2007.

All health centres (or the equivalent) were expected to submit data. A total of 947 centres and private general practitioners with healthcare agreements participated in the survey. The national response rate was 92 percent. Seven regions had 100 percent response rates. Five regions had response rates below 90 percent. The results per centre appear at www.vantetider.se

More than 134 000 appointments covered by the healthcare guarantee were reported. Doctor's appointments for certificates of health or checkups/follow-ups were not included. When reporting waiting times, a health centre can specify whether the patient chose a doctor's appointment more than 7 days later when initially offered one within the 7-day limit. Such waiting times are excluded from the presentation.

Figure C:1 shows the percentage of patients who were given doctor's appointments within 7 days (the healthcare guarantee target) during the measurement period. The figure also presents response rate per region.

The survey reveals that an average of 91 percent of patients nationwide who were covered by the healthcare guarantee had a doctor's appointment within the time limit. The regional variation was 82–97 percent. Halland was at the top with 97 percent. The greatest improvements since March 2007 in the percentage of patients who received appointments within 7 days were in Värmland (+6 percentage points) and Örebro (+8 percentage points).

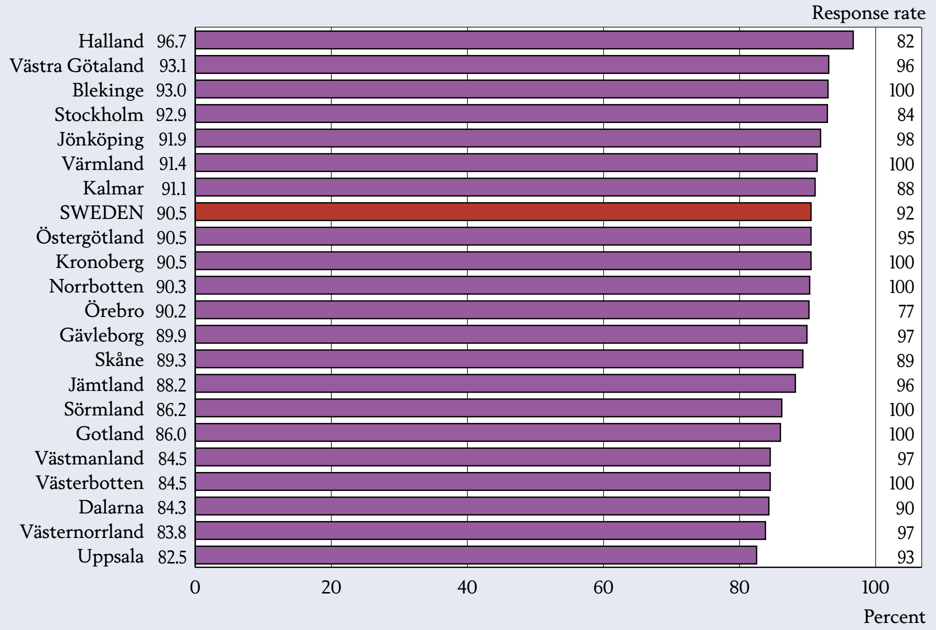


**Figure C:1** Percentage of patients who were given a doctor's appointment within a week, March 2008

Source: National database on Waiting Times, SALAR

No gender differences were apparent at the national level (not reported). A total of 90 percent of women and 91 percent of men were given doctor's appointments in accordance with the target. A total of 57 percent of the patients were women. The reporting (not in Figure C:1) also indicates the period within which other appointments were given. A total of 4 percent of all appointments nationwide were within 8–14 days after the patient had contacted the healthcare system. Thus, 95 percent of all patients were given appointments within 14 days.

## C:2 • Percentage of phone calls answered for counselling and/or making an appointment

Because telephone availability is a well-known problem in primary care, it is a prioritised area for follow-up and improvement efforts in every region.

Given that appointment procedures and telephone systems vary considerably among regions, as well as among caregivers within regions, how to monitor telephone availability over time and interpret the results in a comparable and reliable manner has been the subject of widespread discussion.

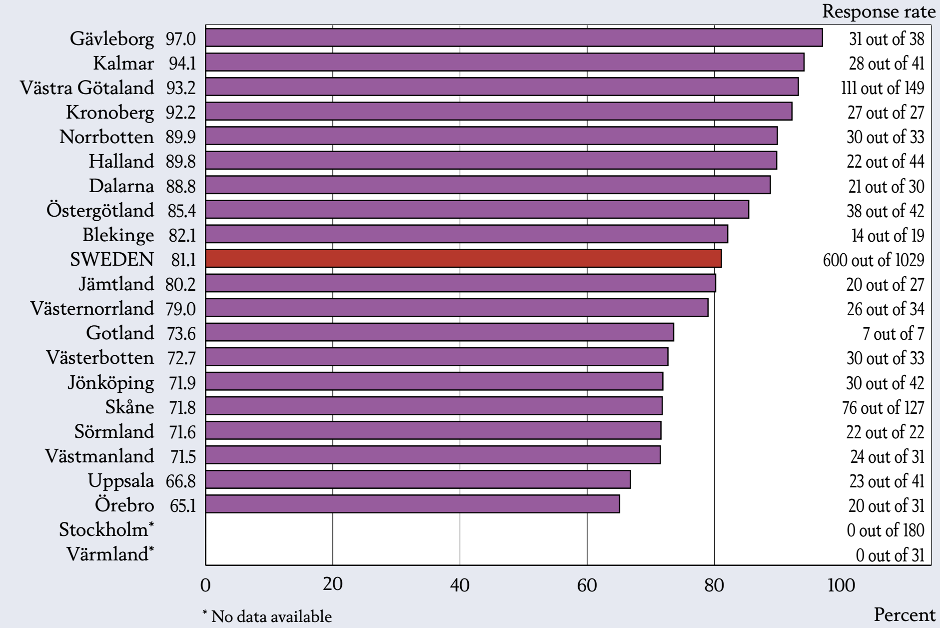


**Figure C:2** Percentage of phone calls answered for counselling and/or making an appointment, March 2008.

Source: National database on Waiting Times, SALAR

*The percentage of phone calls answered for counselling and/or making an appointment at a health centre or the equivalent* is the indicator that the regions jointly chose to follow for national comparisons and monitoring of the healthcare guarantee's intentions.

Follow-ups have shown that computerised systems contribute to improved accessibility and greater scope for monitoring telephone availability. Comprehensive expansion and quality improvements of computerised telephony systems are under way in all regions, but the degree of computerisation still varies.

The data currently presented have been obtained either from voice response systems with callback function or switchboards that offer the ability to monitor unanswered calls. Manual measurements are not included. The measurement period is all of March. Both the degree of computerisation and the percentage of phone calls answered varied from region to region. All health centres in Gotland, Kronoberg and Sörmland have computerised telephony systems.

The reporting includes all regions, with the exception of Stockholm and Värmland. Stockholm carries out manual measurements on a continual basis. Calls are made to all centres regardless of whether they have telephony systems or not. The results for Stockholm are presented at www.vardguiden.se. Värmland has been excluded from the presentation because its degree of computerisation is too low.

The percentage of calls answered varied from 65 to 97 percent in this measurement. Gävleborg was the region with the best telephone availability. The results are based on 31 of 38 health centres in the region.

A comparison between the percentage of patients who felt that it was easy to reach a health centre or its equivalent by phone in accordance with the Healthcare Survey (see indicator B:8) and telephone availability as gauged by this measurement reveals very poor agreement. For instance, Gävleborg had the best telephone availability (97 percent) according to this measurement, while 78 percent of the respondents in the Healthcare Survey said that it was easy to reach health centres by phone. On the other hand, the measurement showed that Örebro had the lowest telephone availability (65 percent), although 83 percent of patients said that reaching health centres by phone was easy. The Healthcare Survey was for 2007, whereas the measurement of actual telephone availability covers March 2008. But the above examples demonstrate that data can be contradictory. That confirms the view that interpreting the data requires knowledge of local conditions.

## SPECIALISED CARE

This section is based on data that are reported on a monthly basis to the national Waiting Times in Health Care database. The data cover availability, number of patients who waited, and waiting times for scheduled care in some 70 specialist and intervention areas. The sources of the data are informants or patient administrative systems. All regions participate. The response rate was over 90 percent in 18 of 21 regions for both visits and treatment (operations/interventions) in the March 2008 measurement.

Any waiting time that is the patient's own choice or that has a medical basis is excluded. Waiting patients are defined as those who either have or have not been scheduled for treatment, as long as a decision has been made to treat.

The various regions differ in terms of size and demographics. Thus, simply comparing the number of waiting patients would generate data that are difficult to interpret. In order to more easily monitor and visualise the current situation with regard to the healthcare guarantee and waiting times, the data are presented by means of two different kinds of indicators.

The first kind of indicator are those (C:3 and C:4) that show the number of patients per 1 000 inhabitants who waited longer than 90 days. The data are presented for

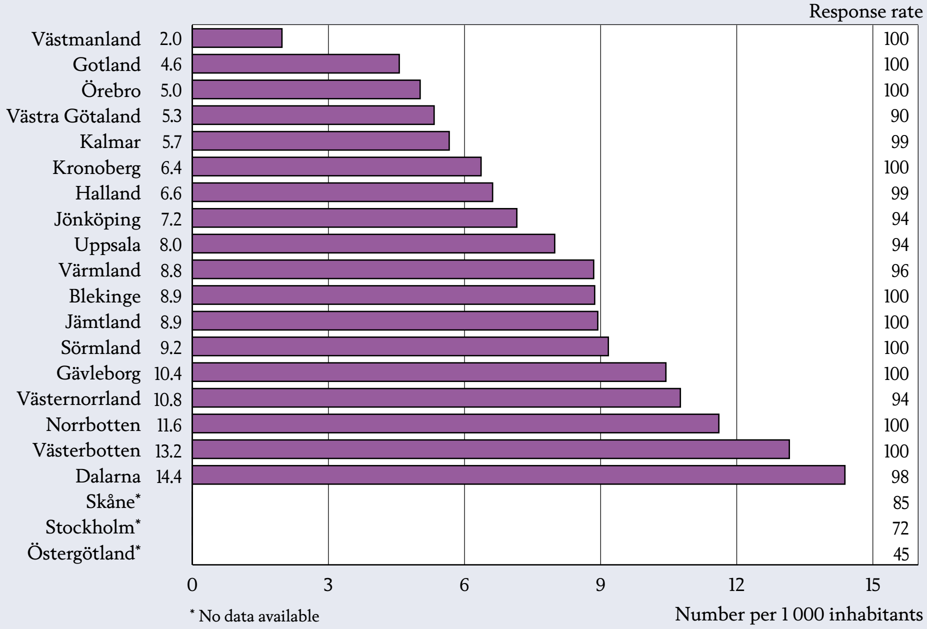


**Figure C:3** Patients per 1 000 inhabitants with waiting times longer than 90 days – specialist visits, 31 March 2008.

Source: National database on Waiting Times, SALAR

regions that had a response rate of at least 90 percent. The second kind of indicator are those (C:5 and C:6) that present the percentage of total waiting patients who waited longer than 90 days. These data are also presented for a selection of visits and treatments (C:7 to C:14).

Certain methodological difficulties must be taken into consideration. The criteria and medical indications that determine whether a patient will be placed on a waiting list or schedule may vary. Analyses have revealed that many patients who are on a healthcare waiting list would not necessarily benefit from any intervention or treatment. In other words, data about the number of waiting patients may be overstated. On the other hand, anything less than a 100 percent response rate understates the actual number of waiting patients.

### C:3, C:4 • Number of patients with waiting times longer than 90 days – specialist visits and treatment

The total number of patients on waiting lists/schedules for specialist visits rose from about 245 000 in 2007 to 278 000 in 2008. But the number of waiting patients for whom a decision had been made to perform surgery or commence treatment

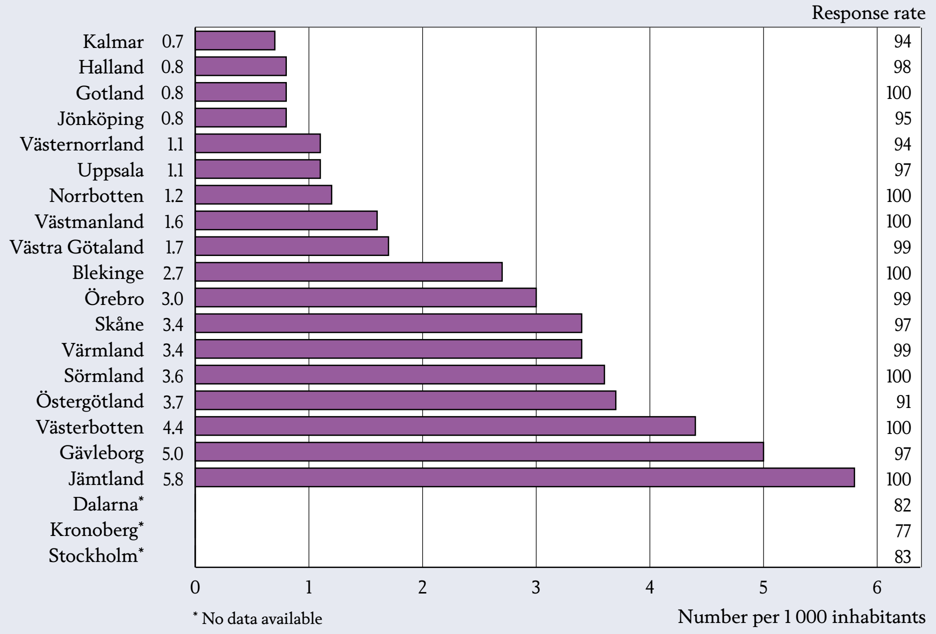


**Figure C:4** Patients per 1 000 inhabitants with waiting times longer than 90 days – specialist treatment, 31 March 2008.

Source: National database on Waiting Times, SALAR

remained approximately the same (80 000). When the measurement was made in March 2008, almost 23 000 patients nationwide had waited longer than 90 days for treatment, while 72 000 had waited longer than 90 days for a specialist visit. Those data include the measures monitored in the national Waiting Times in Health Care database.

Figures C:3 and C:4 indicate that fewer patients per 1 000 inhabitants were waiting for treatment than for specialist visits and that there was a large regional spread. Many of the regions – including Dalarna, Västerbotten and Norrbotten – that had large numbers of patients waiting for visits in the 2007 report showed similar results this year. With respect to the number of patients waiting for treatment (Figure C:4), Värmland was among the regions whose position improved from 2007 to 2008. The number of patients per 1 000 inhabitants who had waited for longer than 90 days had been cut almost in half.

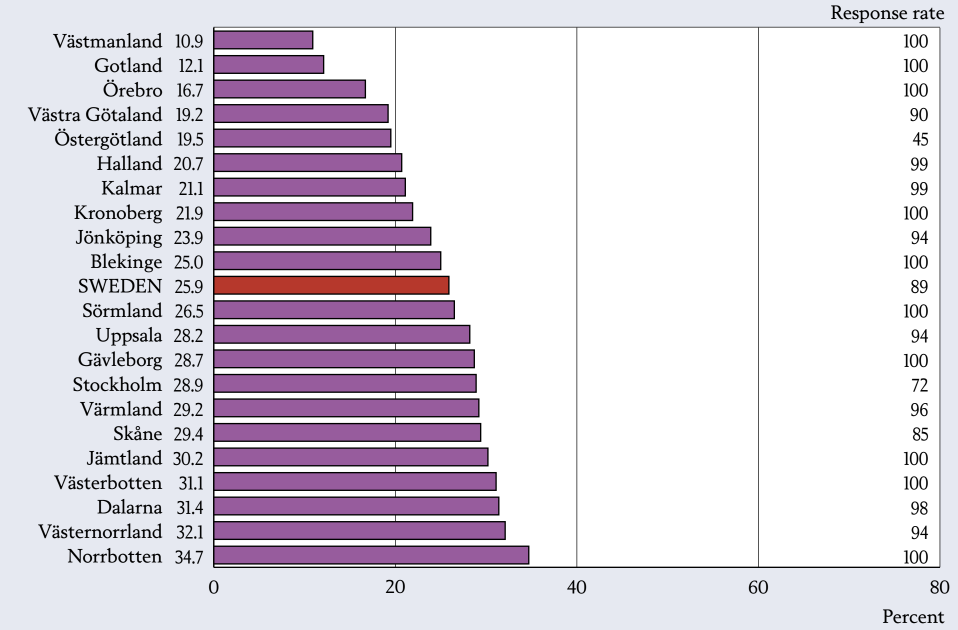


**Figure C:5** Proportion of patients with waiting times longer than 90 days of all on the waiting list – specialist visits, 31 March 2008.

Source: National database on Waiting Times, SALAR

## C:5, C:6 • Percentage of patients with waiting times longer than 90 days – all specialist visits and treatments

A national comparison for March 2007 to March 2008 shows that 25–30 percent of patients who were waiting for a scheduled visit or treatment had been waiting for longer than 90 days. The percentage was relatively constant throughout the year, with the exception of poorer results during summer 2007. A slightly favourable trend emerged in spring 2008, as reflected in Figures C:5 and C:6.

The regional variations were large. Figure C:5 shows that close to or more than 30 percent of patients had waited longer than 90 days in a large number of regions, while Västmanland and Gotland had the best results (just above 10 percent).

The variation is somewhat greater when it comes to treatments. Figure C:6 shows that a number of regions had a substantially lower percentage of patients who had waited longer than 90 days for treatment than the remaining regions.

Västra Götaland was among the regions that trended favourably over time with respect to both visits and treatments. See www.vantetider.se for these types of comparisons.

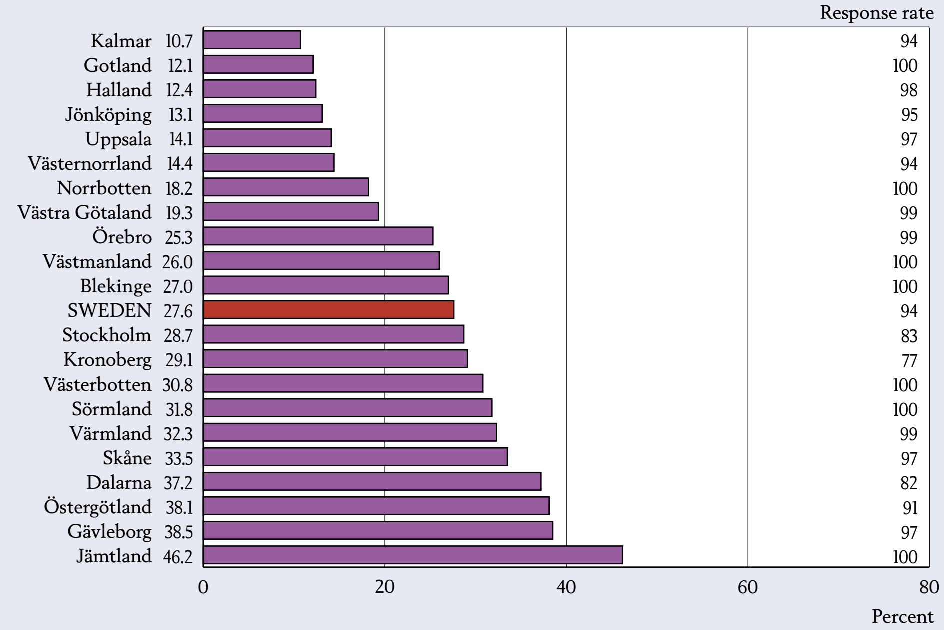


**Figure C:6** Proportion of patients with waiting times longer than 90 days of all on the waiting list – specialist treatment, 31 March 2008.

Source: National database on Waiting Times, SALAR

## C:7 to C:14 • Percentage of patients with waiting times longer than 90 days – selection of specialist visits and treatments

The figures for a selection of specific areas (C:7 to C:14) have been designed to illustrate the variations that also occur among areas of specialty, surgery and intervention. The approach emphasises that generalisations should not be made on the basis of the overall comparisons. A region might have good availability in certain areas although its overall results are unfavourable. The purpose of providing these examples is to convey the scope of waiting time reporting and the information it generates.

Child and adolescent, as well as adult, psychiatry was chosen because psychiatric care is a frequent topic of public discussion. Visits to dermatology and rheumatology clinics are also compared, given the scarcity of such specialists in many regions. The other indicators concern operations, chosen because they are performed frequently (inguinal hernia) or are resource-intensive (hip and knee replacement arthroplasty).

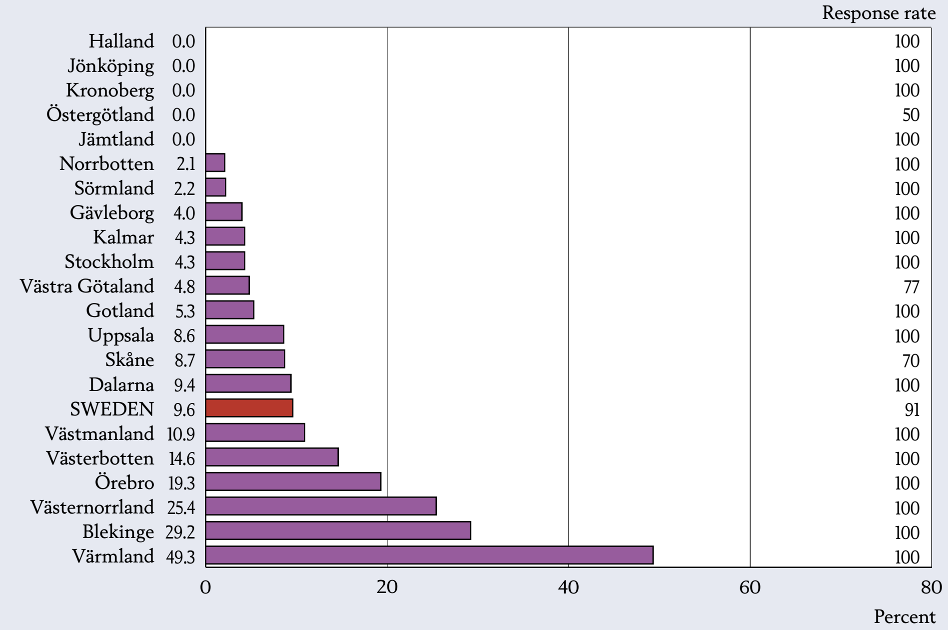


**Figure C:7** Visit to child psychiatric outpatient care – Proportion of patients with waiting times longer than 90 days of all on the waiting list, 31 March 2008.

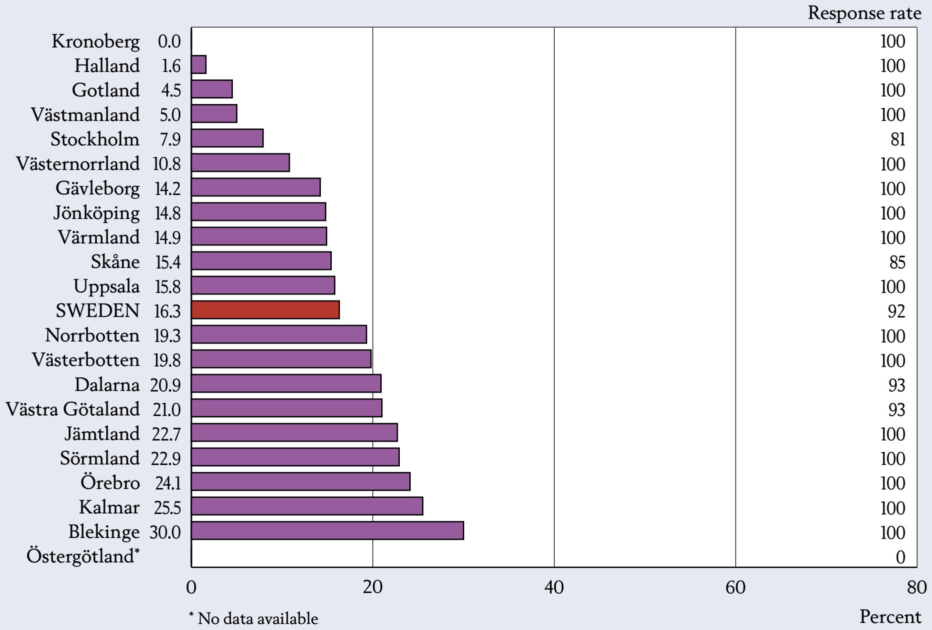
Source: National database on Waiting Times, SALAR

Figures C:7 to C:14 demonstrate the wide variation in regional results, from wholly satisfactory availability within the healthcare guarantee's limits to areas in which 60–70 percent of all waiting patients had waited longer than 90 days for a visit or treatment.

One example of good availability is the group of seven regions in which no patients waiting for gynaecological surgery had waited longer than 90 days. Surgery for benign prostatic hyperplasia is an example of the opposite tendency – many regions have a high percentage of waiting patients.

Each figure shows percentages for the extent to which the regions met the healthcare guarantee. The disadvantage of using percentages is that they conceal the number of patients involved. The number of patients on which Figures C:7 to C:14 are based varies greatly, both among specialty areas and among regions.

Of all patients nationwide who had waited for more than 90 days, just over 4 000 had waited to visit a dermatologist, while 730 had waited to visit a rheumatology clinic. More than 80 women had waited for a hysterectomy, and approximately

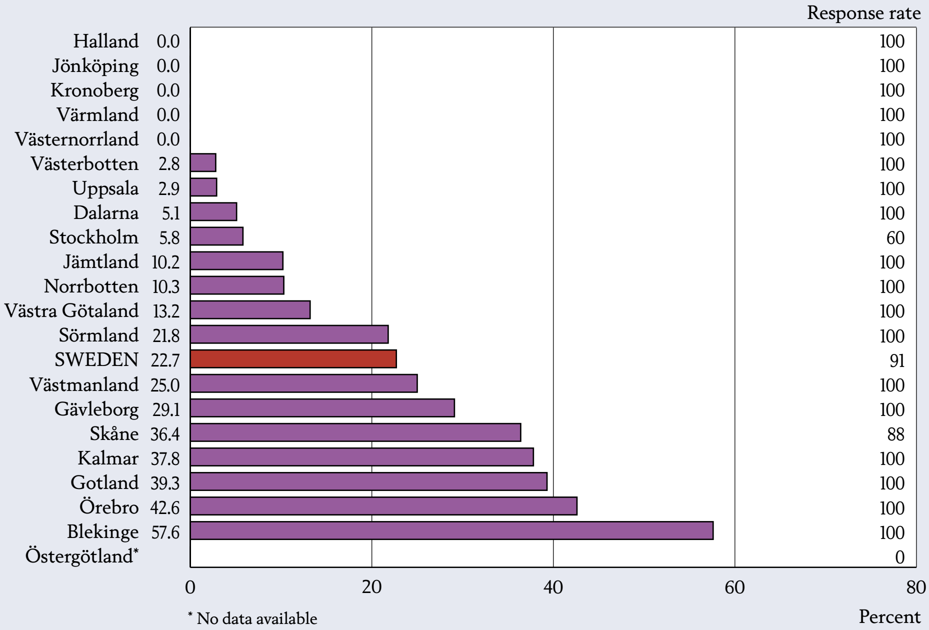


* No data available

**Figure C:8** Visit to psychiatric outpatient care – Proportion of patients with waiting times longer than 90 days of all on the waiting list, 31 March 2008.

Source: National database on Waiting Times, SALAR

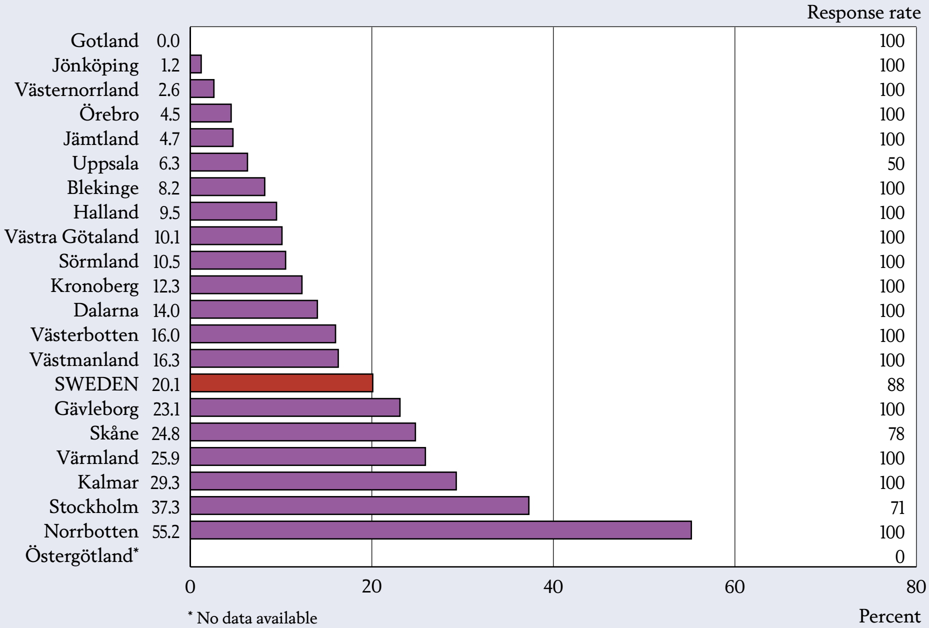
1 100 patients for inguinal hernia surgery, longer than the healthcare guarantee prescribes. The corresponding number for hip and knee replacement arthroplasty is just over 1 300. The availability of hip and knee replacement arthroplasty has been very inadequate for a number of years but has shown stable improvement over the past two years.



* No data available

**Figure C:9** Visit to reumathologist – Proportion of patients with waiting times longer than 90 days of all on the waiting list, 31 March 2008.

Source: National database on Waiting Times, SALAR



* No data available

**Figure C:10** Visit to dermatologist – Proportion of patients with waiting times longer than 90 days of all on the waiting list, 31 March 2008.

Source: National database on Waiting Times, SALAR

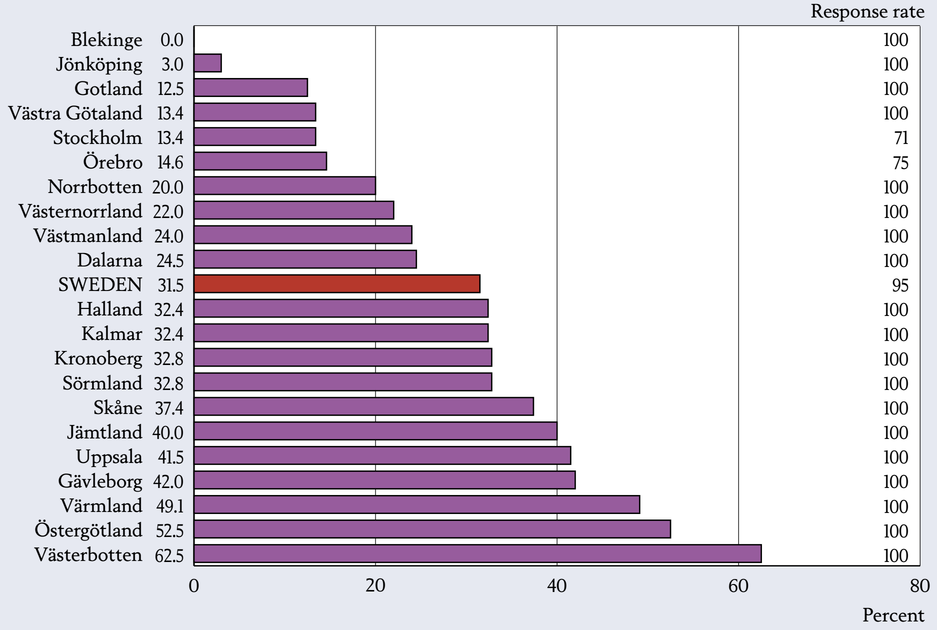


**Figure C:11** Operation for benign prostate hyperplasia – Proportion of patients with waiting times longer than 90 days of all on the waiting list, 31 March 2008.

Source: National database on Waiting Times, SALAR

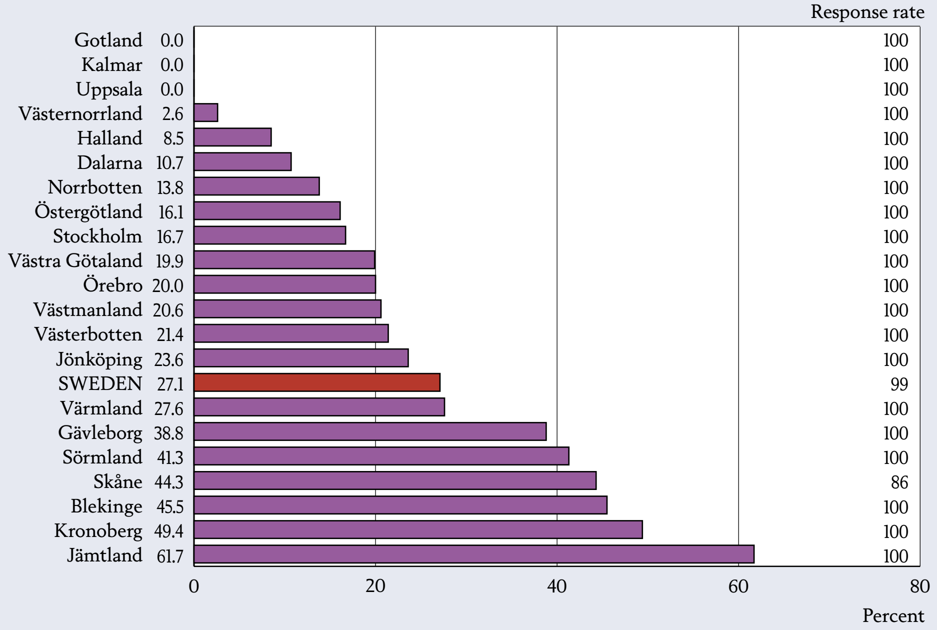


**Figure C:12** Operation for inguinal hernia – Proportion of patients with waiting times longer than 90 days of all on the waiting list, 31 March 2008.

Source: National database on Waiting Times, SALAR

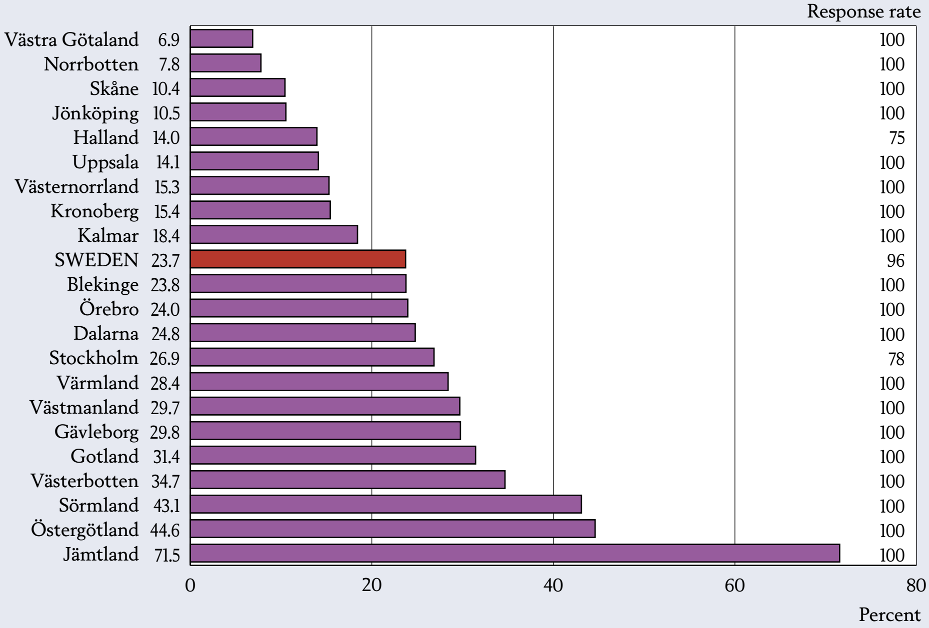


**Figure C:13** Operation for hip- and knee replacement – Proportion of patients with waiting times longer than 90 days of all on the waiting list, 31 March 2008.

Source: National database on Waiting Times, SALAR

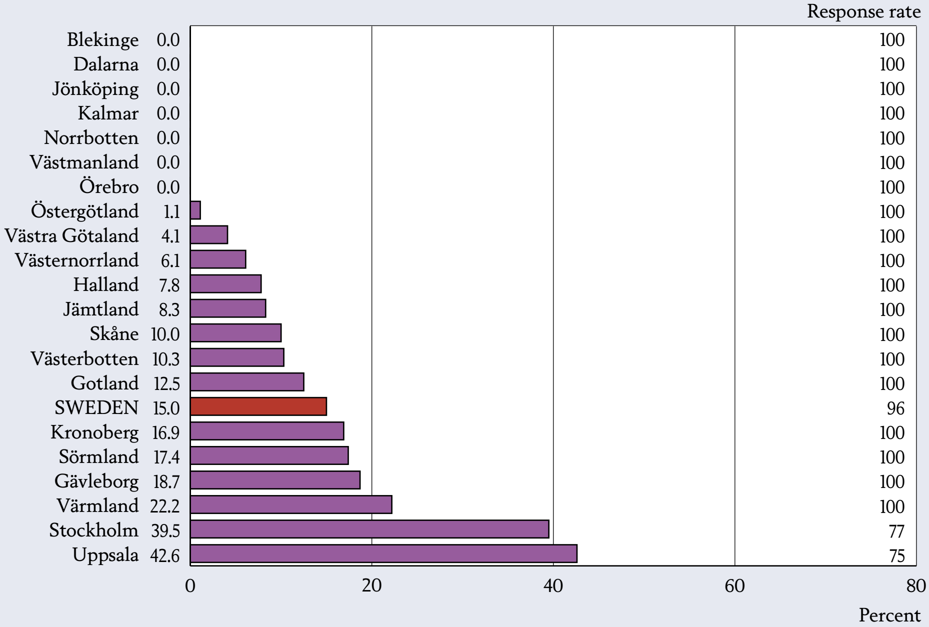


**Figure C:14** Operation for hysterectomy, prolapse of the uterus and incontinetia – Proportion of patients with waiting times longer than 90 days of all on the waiting list, 31 March 2008.

Source: National database on Waiting Times, SALAR

# D

# Cost

# D Cost

The indicators in sections A-C address how well each region meets various healthcare goals with respect to health, availability, respect for patients and needed care. Another overall objective of the healthcare system is that it operate efficiently. In other words, resources such as expertise and medical devices are to be used such that they best contribute to achieving these goals. Healthcare resources will always be scarce, and inefficiencies in their allocation among various units or within a particular unit will generate suboptimal total results.

One measure of a region's efficiency is the relationship of goal fulfilment and resources utilised, generally quantified as costs. Cost differences between regions or over time reflect not only resource discrepancies, but price and wage levels as well.

The healthcare cost data have been taken from the accounting statistics of the various regions. The costs are allocated to a number of sub-areas. But the cost data are not broken down to the extent that they can be directly attributed to the various results indicators. Thus, there is inadequate evidence to assess whether regional differences in the results for individual indicators are due to corresponding discrepancies in resources utilised or to efficiency issues. In order to be directly related to quality and results, costs must be reported for individual groups of diseases. That is possible for regions and hospitals that use the costs per patient (CPP) reporting system. The system, which is rapidly expanding, covered approximately 60 percent of all inpatient medical care for 2007. But CPP reporting does not currently permit any meaningful regional comparisons.

A total measure of efficiency would require a synthesis of the various indicators in a way that can be related to costs. While possible, such a synthesis would inevitably be arbitrary and dependent on the weight assigned to each particular indicator.

This section compares the various regions in terms of healthcare costs per capita and performance in several large sub-areas. The regions are also compared with respect to medical practice in several areas for which the choice of treatment method affects efficiency.

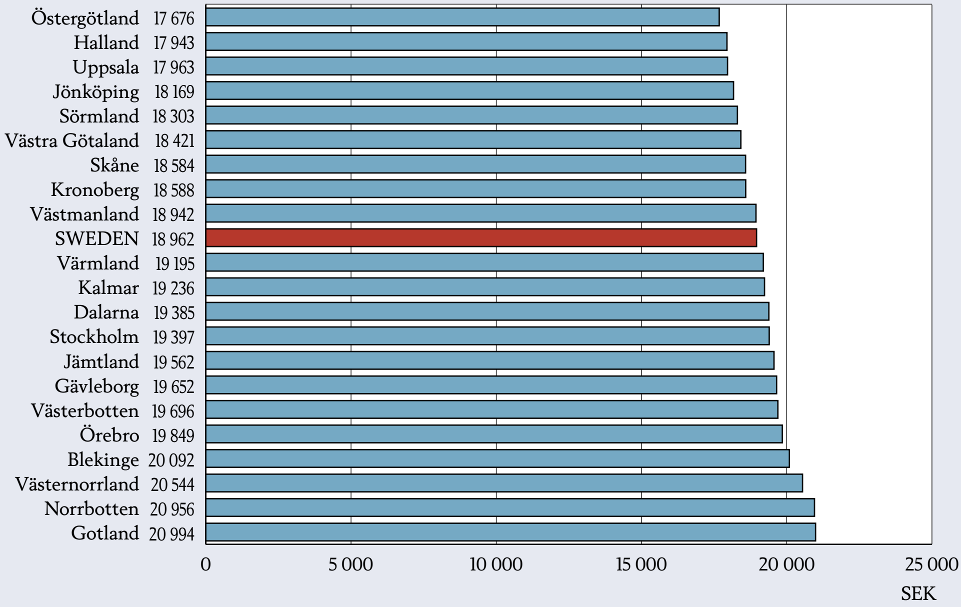


**Figure D:1** Health care cost per capita, 2007.

Source: Swedish Association of Local Authorities and Regions

## COST PER CAPITA

### D:1 • Health care cost per capita

Figure D:1 shows regional net healthcare costs per capita, excluding dental care. Costs for home healthcare services were also excluded, given that the responsibility of regions and local authorities varies throughout the country.

The figure shows costs from a consumption perspective. All of a region's healthcare costs for its inhabitants are included, even if care was administered in another region or by a private caregiver. Net costs are those that are financed by county council taxes, general government subsidies and net financial income. Patient fees and earmarked government subsidies are deducted.

With the above exclusions, regional healthcare costs averaged 19 000 kronor per capita in 2007. Gotland's costs per capita were 10 percent above average, whereas Östergötland's costs were 6 percent below average. The ranking of the regions is essentially the same as in last year's report. The biggest change is that Stockholm has moved from the fifth highest to the ninth highest region in terms of healthcare costs per capita.

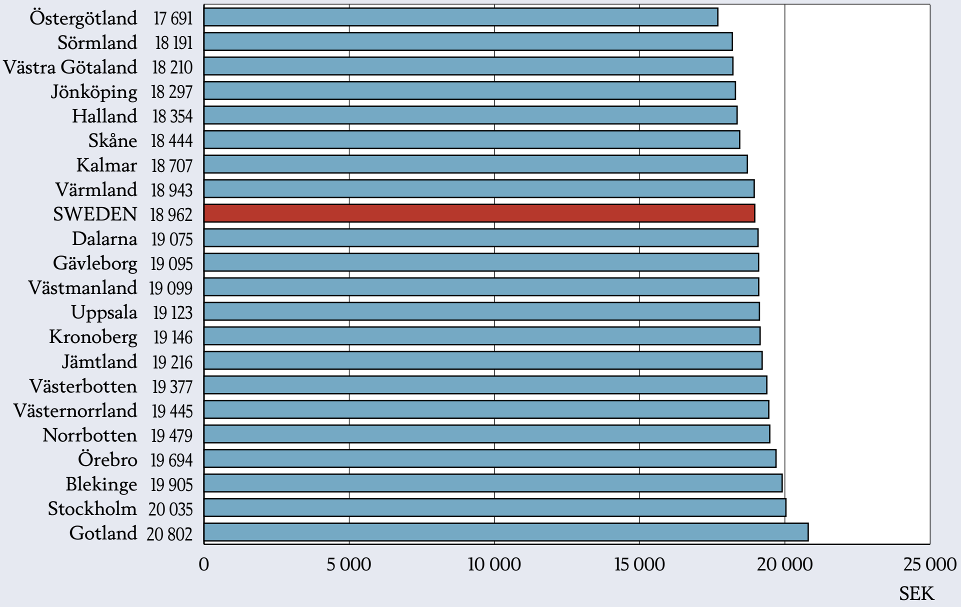


**Figure D:2** Structure-adjusted health care costs per capita, 2007.

Source: Swedish Association of Local Authorities and Regions

## D:2 • Structure-adjusted health care costs per capita

Healthcare costs cannot be identical in all regions. They have differing prospects for providing health care, while structural conditions affect costs. The age breakdown of the population and disease frequency are among those conditions. The system of economic equalisation for local governments strives to compensate for those factors. Within the limits of that system, a standard healthcare cost for each region is calculated every year. The standard cost is based on estimated average healthcare costs for the population, broken down by gender, age and socioeconomic status, as well as the cost of treating certain resource-intensive diagnoses. Differences among the standard costs of various regions are to reflect what, according to the equalisation model, stems from structural discrepancies that are beyond their control. A similar model forms the basis of allocating the government drug subsidy to the various regions in a way that reflects structural differences in pharmaceutical costs.

The ratio between a region's standard cost and government drug subsidy per capita and the national average is a measure of the role played by structural factors. Dividing the actual cost by that ratio yields a structure-adjusted cost, as presented in Figure D:2.

For instance, the Stockholm region has an actual cost of 19 397 kronor per capita, of which 2 634 is for drugs. According to the equalisation model, Stockholm's standard cost is approximately 3 percent below the national average. Given Stockholm's relatively young population, its cost would be lower than average assuming the same economic conditions as other regions. The government drug subsidy that Stockholm receives per capita is 4 percent below the national average. The structure-adjusted net cost is the sum of the product of 1.03 and healthcare costs excluding drugs and the product of 1.04 and drug costs.

The difference between actual and structure-adjusted costs is relatively large for some regions. The adjusted cost is 6.5 percent above the actual cost for Uppsala and 7 percent below the actual cost for Norrbotten. Thus, the relative cost for both regions largely reflects structural factors, such as differences in the age breakdown of the population. Norrbotten's actual cost per capita is 2 000 kronor above average, while its structure-adjusted cost is only 500 kronor above average. Uppsala's actual cost is approximately 1 000 kronor below average, whereas its adjusted cost is somewhat above average. Gotland's costs are high even after adjustment for the structural factors that the equalisation system takes into consideration. Similarly, Östergötland's actual and adjusted costs are both low.

Generally speaking, there is a relatively strong correlation between actual and structure-adjusted costs. Thus, structural factors can provide only a partial explanation of why regional costs vary.

The fact that the structure-adjusted cost per capita varies from region to region may reflect differing objectives or levels of healthcare efficiency. However, the variation may also be due to factors that regions have little control over but that the economic equalisation system does not take into account. Among such factors are regional wage differentials, which will be part of the equalisation effort as of 2008. Gotland's high costs are due partially to its unusual conditions as an island – for instance, its only hospital requires greater specialist expertise than the composition of its population would suggest.

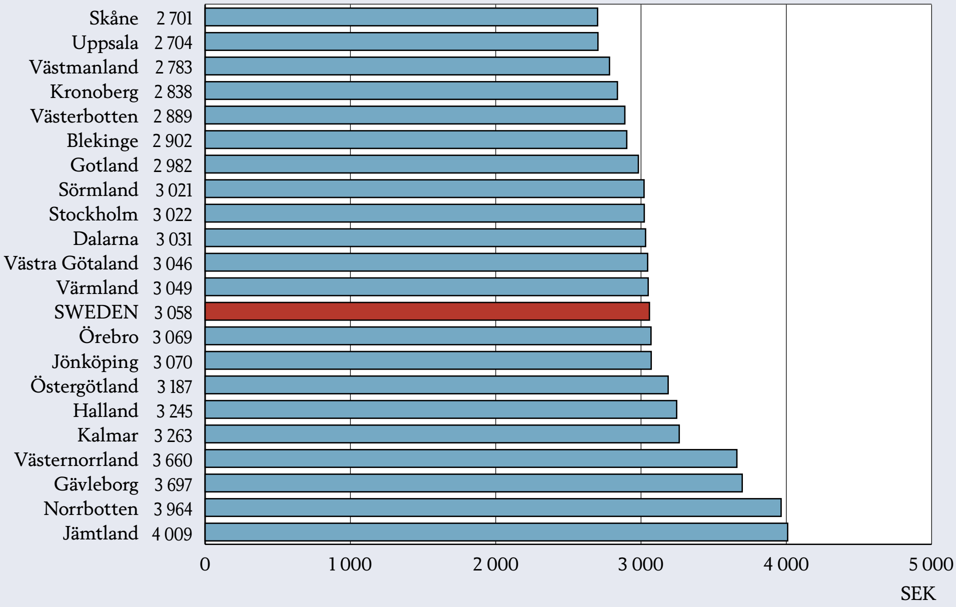


**Figure D:3** Primary care – cost per capita, 2007.

Source: Swedish Association of Local Authorities and Regions

## D:3, D:4, D:5 • Primary, medical and psychiatric care

The following figure shows the net cost per capita separately for primary care, specialised medical care and specialised psychiatric care. The comparison concerns actual net cost per capita without taking into consideration the differing prospects and needs of the various regions, given that the standard cost is calculated only for total healthcare costs. Similarly, costs for the pharmaceutical benefits scheme have been excluded because of considerable uncertainty about how they are allocated among the various main areas.

The per capita cost for primary care (D:3) averaged just over 3 000 kronor, corresponding to 16 percent of total healthcare costs, in 2007. The range was relatively wide, from 2 700 kronor in Skåne and Uppsala to more than 4 000 kronor in Jämtland.

Geographical differences among the regions have a major impact on the primary care costs required to maintain acceptable availability. The number of inhabitants per health centre varied from under 5 000 in Jämtland to 12 000 in Sörmland. Several sparsely populated regions – particularly Norrbotten, Västerbotten and Jämtland – have inpatient beds in primary care facilities, thereby boosting primary care

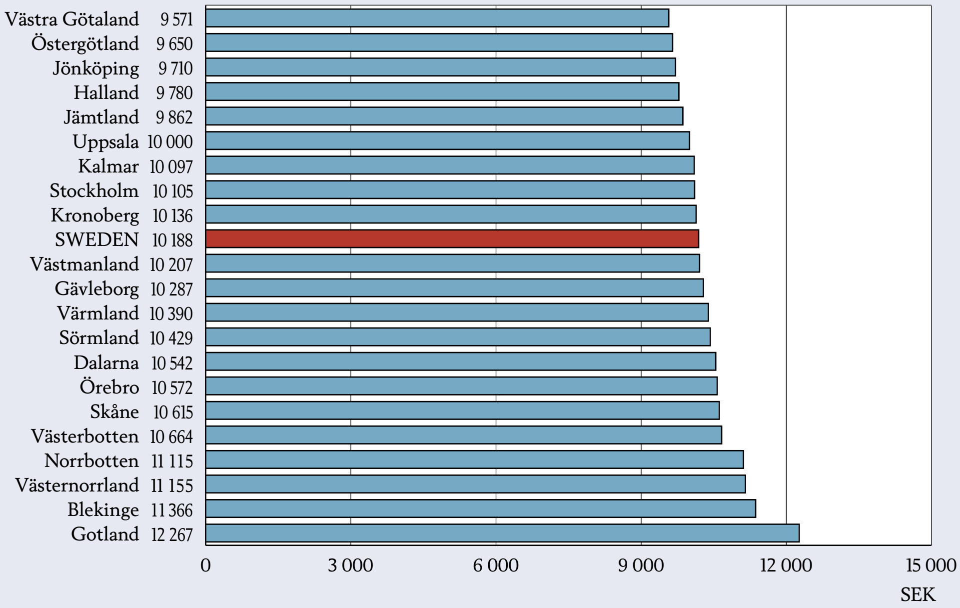


**Figure D:4** Specialised medical care – cost per capita, 2007.

Source: Swedish Association of Local Authorities and Regions

costs. The cost comparison is also partially affected by the fact that primary care has different missions from region to region.

Costs for specialised medical care (D:4), which accounts for an average of more than half of regional healthcare costs, were 10 200 kronor per capita in 2007. Relatively speaking, the regional cost differences are smaller for specialised medical care than other health care. But cost trends have varied considerably from region to region. Thus, Stockholm's costs were slightly below average, although they were the seventh highest in the previous report.

Stockholm had considerably higher costs than other regions when it came to specialised psychiatric care (D:5). One reason may be that mental ill-health is more widespread in a metropolitan environment. Age may also play a role. Stockholm has a young population, which tends to covary with greater use of psychiatric care. But that relationship is not unambiguous. Uppsala also has a young population, but its psychiatric care costs were close to the national average. Nevertheless, the gap between Stockholm and the rest of the country has narrowed over the past two years. Specialised psychiatric care costs rose relatively quickly in Västerbotten,

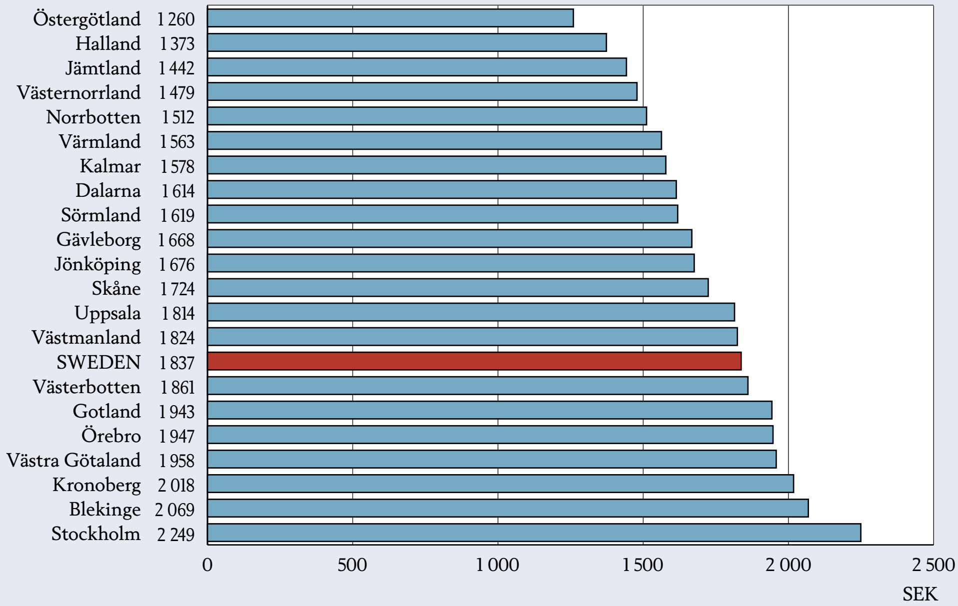


**Figure D:5** Specialised psychiatric care – cost per capita, 2007.

Source: Swedish Association of Local Authorities and Regions

Halland, Värmland and Gävleborg in 2007. The opposite was true for Östergötland, Jämtland, Dalarna and Stockholm.

## D:6 • Cost of health care – change from 2005 to 2007

Figure D:6 shows the change in total healthcare costs per capita from 2005 to 2007. The rate of increase refers to net costs in current prices, i.e., unadjusted for wage and price growth. To improve comparability, temporary restructuring costs are excluded.

The increase was highest for both years in Östergötland, the region with the lowest costs. Gotland, whose costs are the greatest, also experienced an increase that was higher than average.

Wage and price growth in terms of the county council price index averaged 5.6 percent during the period. In other words, 3.0 percentage points of the 8.6 percent national increase reflected new costs, whereas the rest reflected inflation. No wage and price growth data are available for individual regions. As a result, a similar adjustment is not feasible at the regional level.

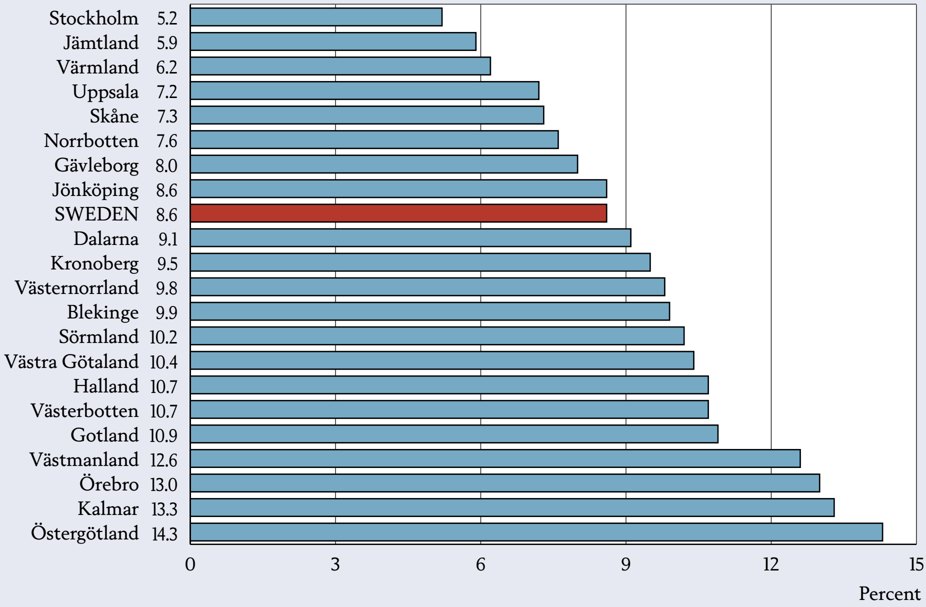


**Figure D:6** Cost of health care – change from 2005 to 2007.

Source: Swedish Association of Local Authorities and Regions

Costs for specialised medical care accounted for most of the substantial increase in Östergötland. Nevertheless, the region had the second lowest costs for this kind of care. Specialised medical care costs also rose rapidly in Gotland and Västerbotten. But their costs for primary care grew more slowly.

## D:7 • Adjusted drug cost per capita

Drugs account for 15 percent of regional healthcare costs, excluding dental care and home healthcare services. Patent expirations and generic substitution modified cost increases for several years. But the trend waned last year and costs for drugs rose at approximately the same pace as for other health care.

Figure D:7 describes the regional costs per capita for prescription drugs covered by the pharmaceutical benefits scheme. Costs for drugs administered as an integral part of hospital care are not included in the comparison. Some groups of drugs have been left out because regions have differing procedures for prescribing them or for administering them at hospitals. Similarly, costs for articles of consumption covered by the pharmaceutical benefits scheme have been excluded. The comparison included approximately 75 percent of costs covered by the scheme. The cost data

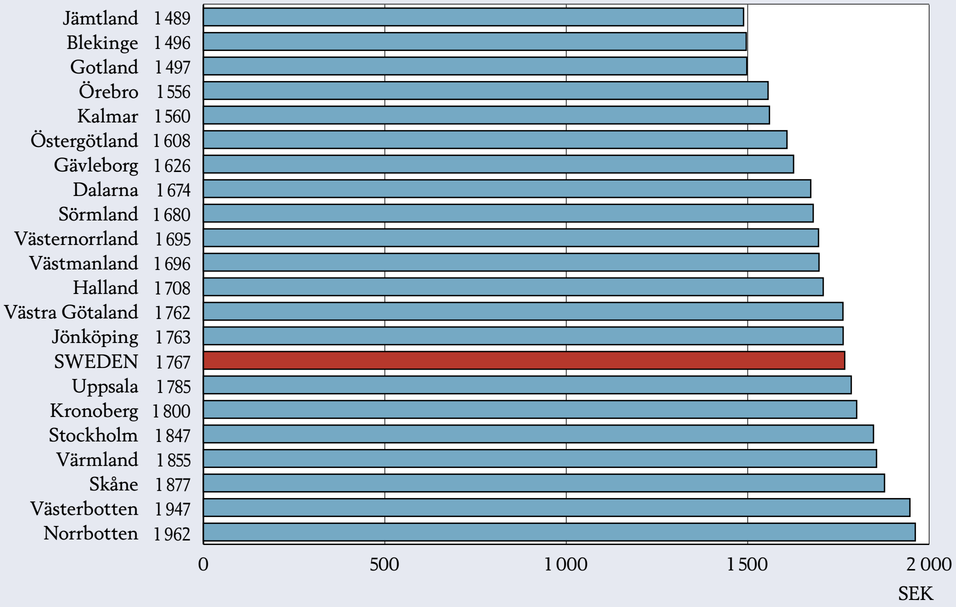


**Figure D:7** Adjusted drug cost per capita, 2007. Age and sex adjusted.

Source: Prescribed Drug Register, National Board of Health and Welfare.

are standardised for age and gender. But no adjustment has been made for varying disease frequencies among the regions. That may provide one explanation for cost differences.

## COST PER CARE EVENT OR VISIT

### D:8 • Cost per DRG weighted case – specialised medical care

Differences in healthcare costs per capita may be due either to variations in the amount of care that the populations of different regions consume or to the cost per care event or visit. Structure-adjusted cost (Figure D:2) considers the difference in the quantity of care consumption that reflects demographics and disease frequency. But other factors, such as accessibility and local traditions, can also lead to differences in consumption patterns. A more direct approach to measuring costs is to relate them to the number of care events and visits. A relevant measure of care events and visits must weight them such that attention is paid to the differing resource requirements associated with various diseases and interventions.

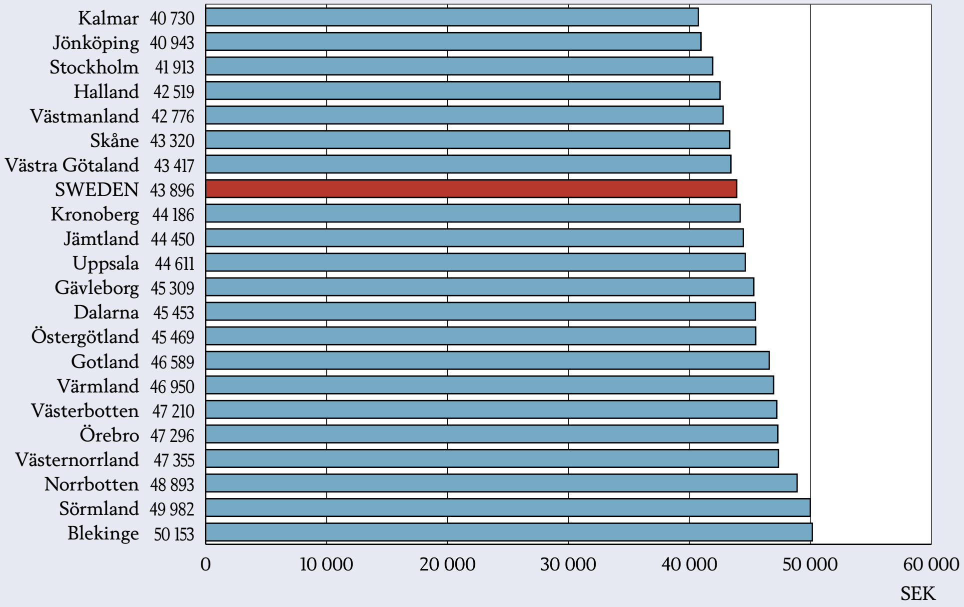


**Figure D:8** Cost per DRG point – specialised medical care, 2007.

Source: Swedish Association of Local Authorities and Regions

Such weighting is possible for specialised medical care. The NBHW Patient Register contains all care events and doctor's appointments in specialised medical care, including data about the patient's diagnosis and age. Thus, each event and appointment can be assigned a diagnosis-related group (DRG) weight. The DRG system classifies individual contacts with the healthcare system based on resource consumption and the medical issue involved. The data for calculating DRG weights are taken from the CPP database, which has cost statistics for individual contacts with the healthcare system, including the same information as the Patient Register.

Figure D:8 shows the cost per DRG weighted case for the care that inhabitants of each region received. That is an indicator of healthcare productivity, i.e., performance in relation to costs. Worth noting is that the indicator refers to cost per consumed DRG point. For instance, Gotland's cost per DRG weighted case is affected by the price of healthcare services that it purchases from other regions.

The calculation covers all specialised medical care, both inpatient and outpatient, in the various regions. This measure compares a region's net costs for inpatient and outpatient medical care with the care consumption of its inhabitants in both their own and other regions.

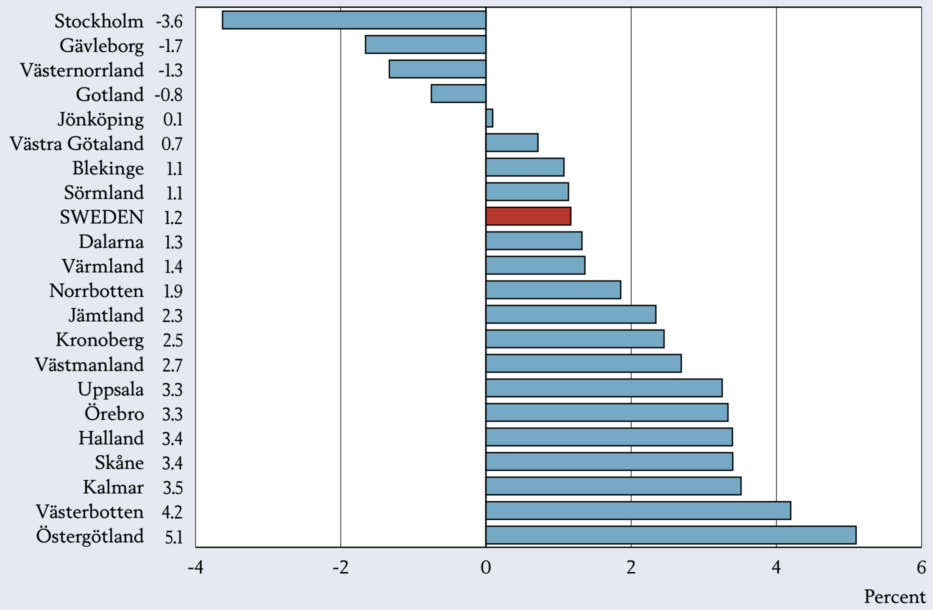


**Figure D:9** Change in cost per DRG weighted case – specialised medical care, 2005–2007.

Source: Swedish Association of Local Authorities and Regions

The apparent regional differences in cost per DRG weighted case may partly reflect measurement problems. The quality of primary classification of various treatment methods and diagnoses, particularly when it comes to outpatient care, still varies from region to region. There are also structural factors that have not been taken into consideration. Given variations in geographic conditions, wages and rents, not all regions can have the same costs. DRG adjusts for regional differences in patient mix, patient age and disease severity, but not for other factors.

## D:9 • Change in cost per DRG weighted case – specialised medical care

Figure D:9 shows the annual fixed-price change in cost per DRG point for specialised medical care from 2005 to 2007. Lower costs per DRG weighted case through the years reflect higher productivity, and vice versa

Generally speaking, fixed-price costs rose faster over the past three years than DRG weighted cases. Because the relatively rapid cost growth was not matched by additional care events or visits, productivity has declined. But there are large regional variations – for instance, Stockholm experienced a substantial increase and Östergötland a decrease.

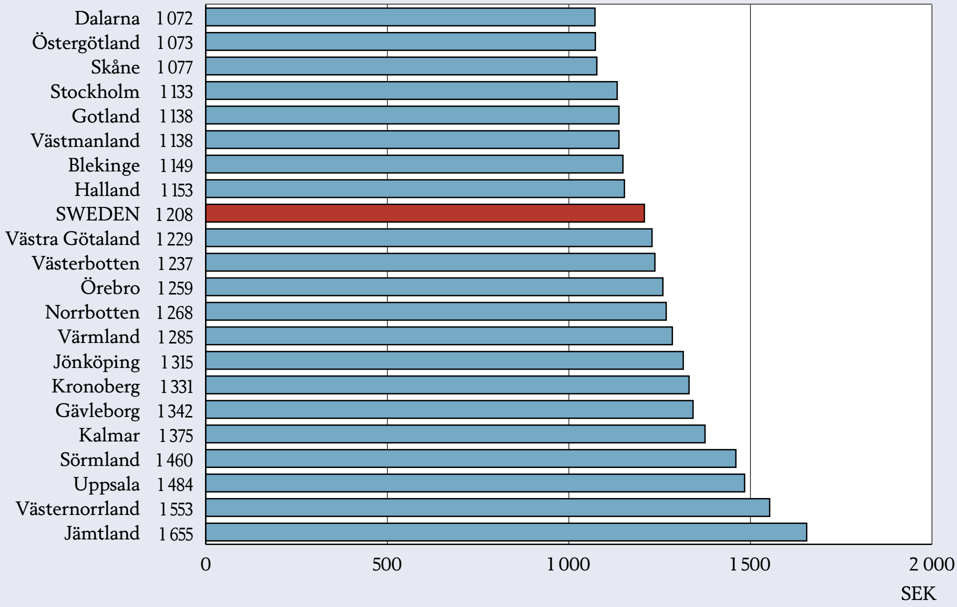


**Figure D:10** Cost per outpatient contact – primary care, 2007.

Source: Swedish Association of Local Authorities and Regions

The data are associated with a high degree of uncertainty. Some of the increase in consumed DRG points may be technical as a result of improved hospital reporting to the Patient Register. That is particularly true of outpatient care. That increases the reported benefits of healthcare consumption without adding any costs.

### D:10 • Cost per outpatient contact – primary care

Primary care lacks a counterpart to DRG points. Visits with various categories of primary caregivers are reported at the national level, but not data on diagnosis, age and the like. Thus, the care events and visits are not amenable to weighting in the same way as for specialised medical care.

Figure D:10 weights primary care visits on the basis of the kind of caregiver involved, as well as whether the visit is at an outpatient clinic or at home. For instance, visits with caregivers other than doctors are weighted as costing 40 percent of a doctor's appointment, while a phone consultation is weighted as costing one third of a visit at an outpatient clinic (not a doctor). The weighted number of visits is subsequently related to the cost of primary care in each region.

Figures D:3 and D:10 demonstrate that high primary care costs in Jämtland are largely due to the average cost per contact with the healthcare system, not the quantity of consumed care. But the number of contacts is decisive in Norrbotten, given that the cost per contact is not particularly high while the per-capita primary care cost is relatively high. Sörmland (few contacts, high cost for each) and Östergötland (many contacts, low cost for each), both of which have average total primary care costs, exhibit a similar dichotomy.

## COST-EFFECTIVE TREATMENT OPTIONS – CHOOSING AMONG EQUIVALENT DRUGS OR BETWEEN DAY-CASE AND INPATIENT SURGERY

Cost-effective treatment options are those that provide equal benefits at lower costs than others. We present two typical examples – choosing among equivalent drugs or between day-case and inpatient surgery.

This year's report presents five indicators, one of which is new. Three indicators deal with cost-effective choice of drugs, the new one involving antihypertensives. Two indicators concern the percentage of day-case operations.

When patent protection on an original drug expires, generics that contain the same active substance but are usually a good deal cheaper to start with may be marketed. If the Swedish Medical Products Agency rules that the generics are equivalent to the original in all respects, pharmacies may substitute one for the other.

Note that the discussion here does not concern the substitution process at pharmacies, but rather the prescribing doctor's choice among various closely related alternatives in a group of drugs. Although these alternative drugs are usually equivalent therapeutically, they cannot replace each other at pharmacies because they contain different substances. Due to price differences, major cost savings are often available by prescribing cheaper alternative drugs.

### D:11 • Percentage of reflux disease and gastric ulcer patients treated with omeprazole

Treatment of reflux disease and gastric ulcers is an area for which several closely related alternatives are available within one group of drugs. A new reflux disease and gastric ulcer drug containing esomeprazole was developed several years ago. Esomeprazole is similar to omeprazole, which is found in Losec – a well-known Swedish drug – and a number of other gastric ulcer medications. Esomeprazole, which is newer, is more than twice as expensive as the omeprazole alternative.

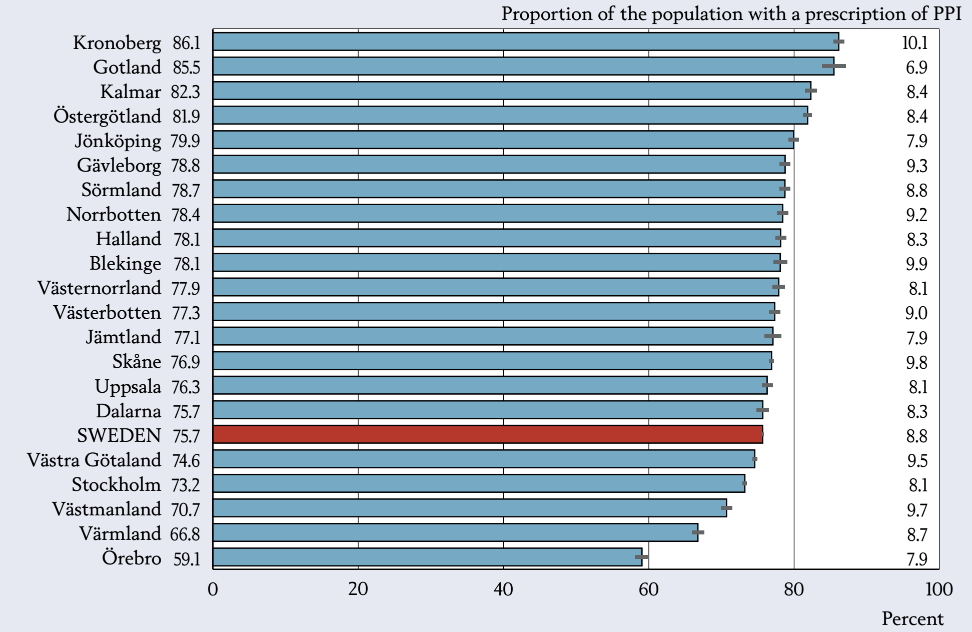


**Figure D:11** Percentage of reflux disease and gastric ulcer patients treated with omeprazole, 2007. Age-standardised.

Source: Prescribed Drug Register, National Board of Health and Welfare.

Using the Prescribed Drug Register, we have examined the prescription of proton pump inhibitors for gastric ulcers and reflux disorders. Omeprazole should be prescribed, given that it is cheaper and is deemed to be equally effective as the other preparations in most patients. Figure D:11 shows the percentage of patients given a prescription for a proton pump inhibitor in 2007 who received omeprazole the first time. The column to the right of the figure presents the percentage of the total population that picked up prescriptions for proton pump inhibitors.

The regional variation is large with respect to prescription of the cheaper omeprazole alternative but relatively small when it comes to proton pump inhibitors as a whole.

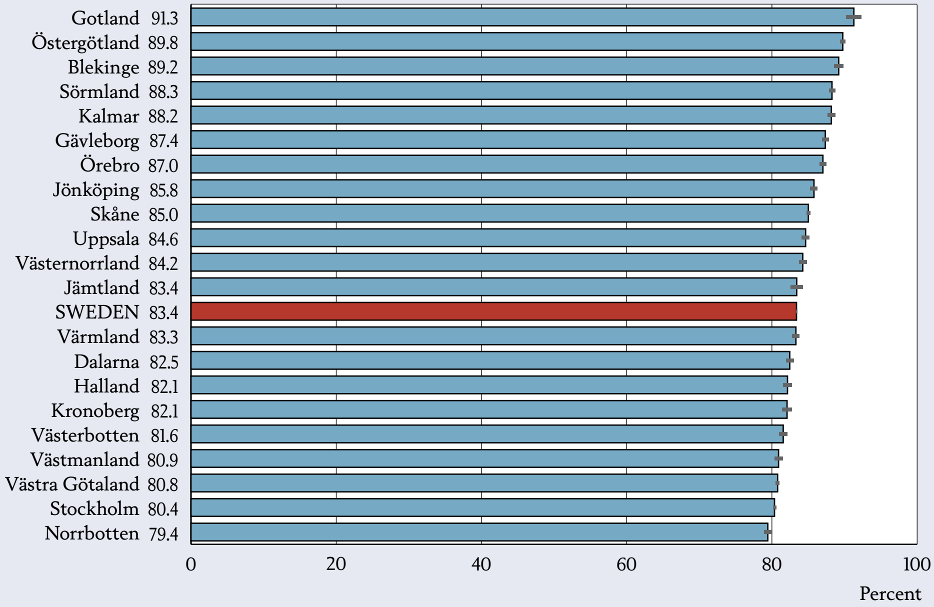


**Figure D:12** Percentage of low-cost statins prescribed for lipid lowering therapy, 2007. Age-standardised.

Source: Prescribed Drug Register, National Board of Health and Welfare.

## D:12 • Percentage of low-cost statins prescribed for lipid lowering therapy

The situation for lipid lowering drugs is similar to that for gastric ulcer treatment. There are older, cheaper preparations as well as new, more expensive ones with a similar basic substance and without unequivocally greater efficacy. The newer preparations are more than five times as expensive as the older alternatives. We have examined the choice among various high-cost and low-cost statins. The monitoring efforts of pharmaceutical committees rely on similar measures.

Figure D:12 shows the percentage of patients given a statin prescription in 2007 who received simvastatin or pravastatin the first time. Simvastatin and pravastatin are deemed to be equally effective as the other statins in most patients. Considering that they are considerably cheaper, they should be prescribed.

Nationwide, 83 percent of all patients given a statin prescription in 2007 received one of the cheaper alternatives. The regional differences were relatively modest – 79–91 percent of patients in each region received simvastatin or pravastatin. Although 100 percent prescription of the low-cost alternatives should not be regarded

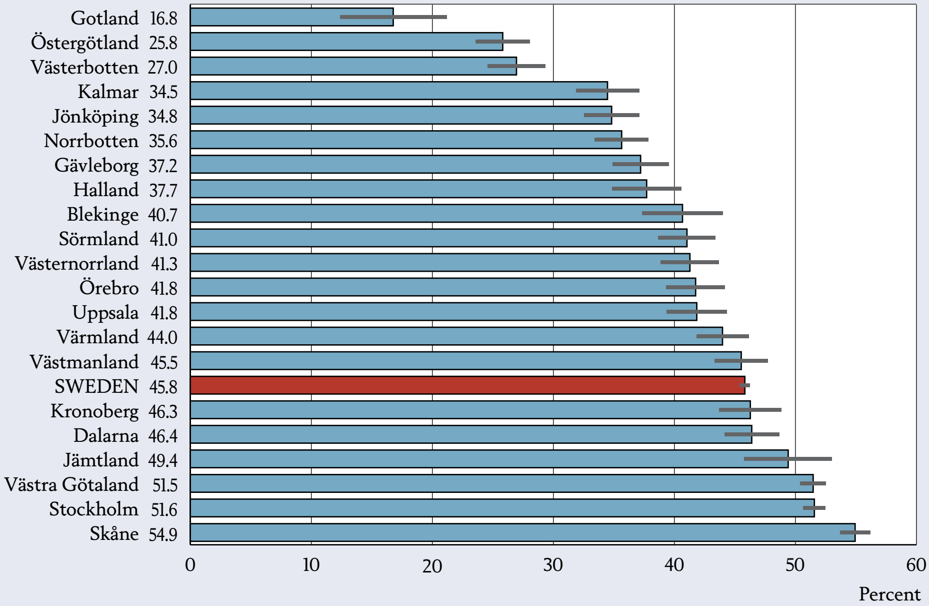


**Figure D:13** Percentage of first time angiotensin II receptor antagonists user who had not previously tried angiotensin converting enzyme inhibitors. Patients 30–79 years old. Age standardised.

Source: Prescribed Drug Register, National Board of Health and Welfare.

as a target, many regions would obtain considerable cost savings if their percentages were to increase.

## D:13 • Percentage of angiotensin II receptor antagonists prescribed for antihypertensive therapy

Sales of antihypertensives totalled 2.4 billion kronor in 2007. Angiotensin II receptor antagonists (ARAs) accounted for approximately 40 percent. ARA prices are too high for their general use to be as cost-effective as other well-documented, inexpensive drugs. All ARAs receive limited subsidies, i.e., only for patients who have tried but cannot use ACE inhibitors or as an adjunct to ACE inhibitors. These directives are in effect as of 1 September 2008 as specified by the Dental and Pharmaceutical Benefits Agency.

The indicator studies the extent to which new users of ARAs were previously treated with ACE inhibitors. The calculation is based on people who picked up an ARA prescription for the first time since 1 July 2005 between 1 July 2007 and 30 June 2008. Approximately 51 000 patients were treated with ARAs during the measurement period.

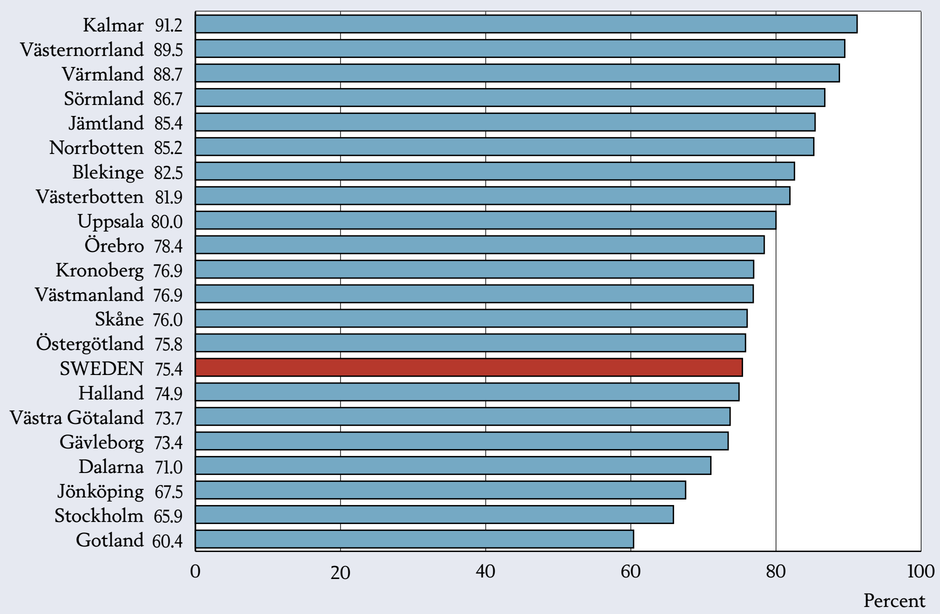


**Figure D:14** Inguinal hernia – percentage of day-case surgery, 2007.

Source: National Patient Register, National Board of Health and Welfare

A total of 23 499 patients nationwide, or 46 percent, used ARAs for the first time without having previously been prescribed ACE inhibitors. That clearly does not comply with the recommendations. The regional variation was a substantial 17–55 percent.

## D:14 • Inguinal hernia – percentage of day-case surgery

Inguinal hernia treatment brings up the question of choosing between day-case and inpatient surgery. The data are taken from the Patient Register for 2007. Almost 15 000 operations were reported to the register. Given that surgery performed by private outpatients clinics is underreported, that represents an understatement of the actual number.

Day-case operations accounted for more than 75 percent of all surgery nationwide. The regional variations were significant but not as great as for prolapse of the uterus.

According to the CPP database, day-case surgery averaged 10 400 kronor and inpatient surgery averaged 25 800 kronor in 2007. A greater percentage of day-case surgery could help minimise total costs.

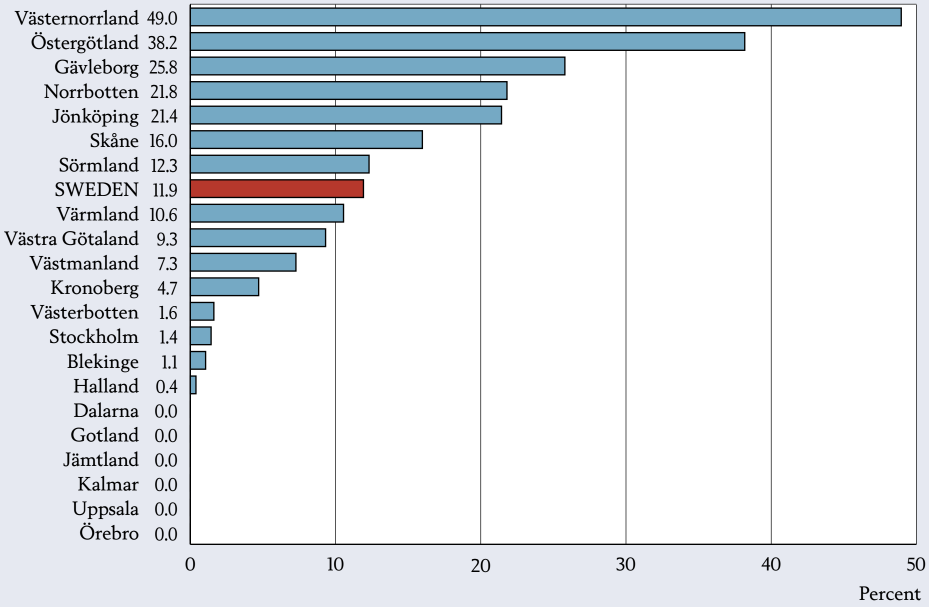


**Figure D:15** Prolapse of the uterus – percentage of day-case surgery, 2007.

Source: National Patient Register, National Board of Health and Welfare

## D:15 • Prolapse of the uterus – percentage of day-case surgery

Almost 5 900 women were operated on for prolapse of the uterus in 2007. Day-case surgery is appropriate, assuming that postoperative surveillance is available for enough hours and inpatient resources can be called on when necessary. The diagnosis of prolapse of the uterus is broad and can involve very different degrees of severity. The procedure may range from being simple and standard to being challenging for the surgeon and staff.

Severity, as well as the patient's age and general condition, all affect the length of the period of care and whether or not day-case surgery is a feasible option. As the variations in Figure D:13 reveal, other considerations also have a major impact on the percentage of day-case operations.

The data in the figure are taken from the Patient Register, based on each patient's region of domicile. There is no evidence to suggest that the general and health conditions of women differ radically from region to region. One factor that may have some bearing involves the indications for performing surgery. There are considerable regional differences in the number of women who were operated on in 2007 (see Appendix 3).

The regional variations in the percentage of day-case operations are so pronounced that local tradition and culture undeniably play a significant role. One region has almost 50 percent day-care surgery, whereas others rely almost entirely on inpatient surgery.

According to the CPP database, day-case surgery averaged 15 100 kronor in 2007, while inpatient surgery averaged 33 300 kronor. Thus, regions with a high percentage of inpatient surgery have the potential for substantial cost reductions.

# Appendix

# Description of Indicators

# A Medical Results

## MORTALITY, HOSPITALISATION AND VACCINATION

### A:1 Policy-related avoidable mortality per 100 000 inhabitants

**Measure** Number of deaths from diseases or accidents that could have been affected by health policy initiatives

**Description** The indicator shows the total number of healthcare-related avoidable deaths per 100 000 inhabitants age 1–74 in 2003–2006.

Policy-related avoidable deaths are those caused by diseases or accidents that could have been affected by health policy initiatives. The indicator includes deaths caused by lung cancer, oesophageal cancer, cirrhosis of the liver and motor vehicle accidents.

**Method of measurement** Data on the number of deaths in 2001–2004 were taken from the Cause of Death Register through the following codes.

| Cause of death | ICD–9 | ICD–10 | Age |
|---|---|---|---|
| Lung cancer | 162 | C34 | 1–74 |
| Oesophageal cancer | 150 | C15 | ” |
| Cirrhosis of the liver | 571 | K70, K73–K74 | ” |
| Motor vehicle accidents | E810–823 | V codes under Chapter XX that refer to motor vehicle accidents | ” |

The calculations were corrected for regional differences in the age structure of the population. Age standardised deaths per 100 000 inhabitants were calculated for each region based on the national population in 2001 as the standard. Patients were assigned to their region of domicile.

The number of deaths was aggregated for several years to increase statistical certainty.

The EU developed the avoidable deaths measure in the mid-1980s. The EU effort produced two atlases that presented regional differences among and within Member States. The measure was later modified and diseases such as oesophageal cancer were added to the policy-related indicators. Moreover, the analysis was limited to the 1–74 age group.

**Data sources** Cause of Death Register, Swedish National Board of Health and Welfare (NBHW)

**Sources of error** The data should be interpreted with a certain degree of caution, given that diagnostic methods may vary from region to region. Regions with small populations tend to have less stable results.

## A:2 Healthcare-related avoidable mortality per 100 000 inhabitants

**Measure**

Number of deaths from diseases or accidents that could have been affected by medical interventions

**Description**

The indicator shows the total number of healthcare-related avoidable deaths per 100 000 inhabitants age 1–74 in 2003–2006.

Healthcare-related avoidable deaths are those caused by diseases or accidents that could have been affected by medical interventions, early detection and treatment. The indicator includes deaths from diseases such as stroke, diabetes and cervical cancer (see complete list below).

**Method of measurement**

Data on the number of deaths in 2003–2006 were taken from the Cause of Death Register through the following codes:

| Cause of death | ICD–9 | ICD–10 | Age |
|---|---|---|---|
| Tuberculosis | 010–018, 137 | A15–A19, B90 | 1–74 |
| Cervical cancer | 180 | C53 | ” |
| Hodgkins disease | 201 | C81 | ” |
| Chronic rheumatic heart disease | 393–398 | I05–I09 | ” |
| Diabetes | 250 | E10–E14 | ” |
| Diseases of the respiratory system | 460–519 | J00–J99 | 1–14 |
| Asthma | 493 | J45–J46 | 1–74 |
| Appendicitis | 540–543 | K35–K38 | ” |
| Hernia of the abdominal cavity | 550–553 | K40–K46 | ” |
| Gallstones, as well as cholecystitis and other diseases of the gallblader and biliary tract | 574–575.1, 576.1 | K80–K81, K83.0 | ” |
| Hypertensive disease | 401–405 | I10–I15 | ” |
| Stroke | 430–438 | I60–I69 | ” |
| Complications of pregnancy, childbirth and the puerperium | 630–676 | O00–O99 | ” |
| Typhoid fever | 002.0 | A01.0 | ” |
| Pertussis | 033 | A37 | 1–14 |
| Tetanus | 037 | A35 | 1–74 |
| Measles | 055 | B05 | 1–14 |
| Osteomyelitis | 730 | M86–M87 | 1–74 |

The calculations were corrected for regional differences in the age structure of the population. Age-standardised deaths per 100 000 inhabitants were calculated for each region based on the national population in 2001 as the standard. Patients were assigned to their region of domicile.

The number of deaths was aggregated for several years to increase statistical certainty.

The EU developed the avoidable deaths measure in the mid-1980s. The EU effort produced two atlases that presented regional differences among and within Member States. The measure was later modified and diseases such as oesophageal cancer were added to the policy-related indicators.

**Data sources**

Cause of Death Register, Swedish National Board of Health and Welfare (NBHW)

**Sources of error**

The data should be interpreted with a certain degree of caution, given that diagnostic methods may vary from region to region. That is particularly true of diabetes. Regions with small populations tend to have less stable results.

## A:3 Avoidable hospitalisations per 100 000 inhabitants

**Measure**

Number of avoidable hospitalisations per 100 000 inhabitants in 2007

**Description**

The indicator includes avoidable hospitalisations caused by selected diseases. The first group of selected diagnoses were those that primarily illustrate how well outpatient care handles chronic or long-term conditions. The second group of selected diagnoses were several acute conditions for which proper treatment within a reasonable period of time could avert hospitalisation.

The indicator shows patients with avoidable hospitalisations per 100 000 inhabitants in 2007. Below is the complete list of conditions for which hospitalisation was deemed to be avoidable.

**Method of measurement**

The calculations were corrected for regional differences in the age structure of the population. Data were age-standardised based on the national population in 2000 as the standard.

Patients were assigned to their region of domicile.

The indicator includes the following diseases in accordance with ICD-10:

| **Diagnosis** | **ICD–10** |
|---|---|
| *Chronic conditions* | |
| Anaemia | D501, D508, D509 |
| Asthma | J45, J46 |
| Diabetes | E101–E108 (primary or secondary diagnosis)<br>E110–E118 (primary or secondary diagnosis)<br>E130–E138 (primary or secondary diagnosis)<br>E140–E148 (primary or secondary diagnosis) |
| Heart failure | I50, I110, J81 |
| Hypertension | I10, I119 |
| Chronic obstructive lung disease | J41, J42, J43, J44, J47 (primary diagnosis)<br>J20, along with J41, J42, J43, J44, J47 as secondary diagnosis |
| Angina pectoris | I20, I240, I248, I249 |
| *Acute conditions* | |
| Bleeding ulcer | K250, K251, K252, K254, K255, K256, K260, K261, K262, K264, K265, K266, K270, K271, K272, K274, K275, K276, K280, K281, K282, K284, K285, K286 |
| Diarrhoea | E86, K522, K528, K529 |
| Epileptic seizures | O15, G40, G41, R56 |
| Inflammatory diseases of female pelvic organs | N70, N73, N74 |
| Pyelitis | N390, N10, N11, N12, N136 |
| Ear, nose and throat infection | H66, H67, J02, J03, J06, J312 |

**Data sources**

Patient Register, Swedish National Board of Health and Welfare

**Sources of error**

Because the occurrence of certain diseases, and possibly the diagnostic methods used, varies from region to region, differences in avoidable hospitalisation should be interpreted with a degree of caution.

## A:4 Vaccination of children – measles-mumps-rubella (MMR)

| | |
|---|---|
| **Measure** | Percentage of children vaccinated against measles, mumps and rubella of all children born in 2005 and registered at child health centres. |
| **Description** | Combined measles-mumps-rubella (MMR) vaccine<br>*Numerator*: Number of children born in 2005 who had received MMR vaccine at least once by January 2008<br>*Denominator*: All children born in 2005 who were registered with the paediatric care system |
| **Method of measurement** | MMR vaccination data are kept by the paediatric care system (child health centre case notes) and collected by the Swedish Institute for Infectious Disease Control. The data refer to vaccination status in January 2008. |
| **Data sources** | Swedish Institute for Infectious Disease Control |
| **Sources of error** | The basic data were of good quality and had a high participation rate. |

## A:5 Vaccination of people age 65 and older, and other high-risk groups – influenza

| | |
|---|---|
| **Measure** | Percentage of people age 65 and older, and other high-risk groups, vaccinated against influenza during winter 2007–2008 |
| **Description** | *Numerator*: Number of people age 65 and older, and other high-risk groups, vaccinated against influenza during winter 2007–2008<br>*Denominator*: Number of people age 65 and older, and other high-risk groups, in each region |
| **Method of measurement** | Data were collected from the infectious disease control units of each region. The data consist of assessments made with various methods and documentation in the various regions – questionnaires for selection of people age 65 and older, and other high-risk groups, estimates by means of vaccine supply, registration in primary care, etc. |
| **Data sources** | Infectious disease control specialists in the various regions |
| **Sources of error** | The absence of a uniform method to calculate and assess the number of vaccinations given to people age 65 and older, and other high-risk groups, is a very large source of uncertainty. |

## A:6 Occurrence of methicillin-resistant Staphylococcus aureus (MRSA)

| | |
|---|---|
| **Measure** | Number of MRSA infections per 100 000 inhabitants in 2006–2007 |
| **Description** | Methicillin-resistant Staphylococcus aureus (MRSA) bacteria are resistant to methicillin, the antibiotic normally prescribed for Staphylococcus infections.<br>The indicator presents the average number of newly detected MRSA infections per 100 000 inhabitants of each region in 2006–2007.<br>The indicator includes only people who were infected in Sweden, whether at healthcare facilities or in the community. |

| | |
|---|---|
| **Method of measurement** | The occurrence of MRSA is subject to reporting, and all regions report newly detected cases to the Swedish Institute for Infectious Disease Control. Thus, the data are presented based on the region where the infection was reported or diagnosed rather than the person's domicile or whereabouts when infected. |
| **Data sources** | Swedish Institute for Infectious Disease Control |
| **Sources of error** | In addition to the actual number of people infected, the regional differences may reflect variables such as how often doctors suspect infection and take a culture. |

### A:7 Cervical cancer screening

| | |
|---|---|
| **Measure** | Percentage of women age 23–60 who underwent cervical cancer screening in 2006 |
| **Description** | *Numerator*: Number of women who underwent at least 1 cervical cancer screening during the past 3½ years (age 23–50) or 5½ years (age 51–60)<br>*Denominator*: Average female population in the corresponding age groups during the same periods of time |
| **Method of measurement** | The data are based on Pap tests taken by midwives after women have been called in for cervical cancer screening, as well as Pap tests taken by gynaecologists on clinical indication as follow-up after treatment or for preventive purposes.<br>The regional breakdown is based primarily on the tester's region and secondarily on the analysing laboratory's region. |
| **Data sources** | National Quality Register for Cervical Cancer Screening |
| **Sources of error** | A woman does not always live in the same region as that of the tester or laboratory. As a result, some regions may have a somewhat higher participation rate, while others have a somewhat lower participation rate. |

## DRUG THERAPY

### A:8 Drug-drug interactions that should be avoided in the elderly

| | |
|---|---|
| **Measure** | Percentage of people age 80 and older who use drugs that pose the risk of Class D drug-drug interactions |
| **Description** | Drug-drug interactions may arise from the concurrent consumption of certain combinations of drugs. Class C and D interactions (the latter of which is the more serious) are the clinically relevant drug-drug interactions. According to FASS (the Swedish equivalent of the Physicians' Desk Reference), a Class D interaction ”can lead to serious clinical consequences in terms of severe side-effects or lack of efficacy, or may otherwise be difficult to control with individual doses.”<br>*Numerator*: People age 80 and over who as of 31 December 2007 are deemed to have used at least one combination of drugs that poses the risk of Class D interactions<br>*Denominator*: All people age 80 and over who picked up at least one prescription drug in October–December 2007 |

**Method of measurement**

A current list of drugs was made for each person. Based on data extracted from the Prescribed Drug Register for the previous three months concerning date, quantity and dosage of each prescription picked up, drug consumption was estimated for October–December 2007. Calculating the prescribed dosage requires interpreting instructions that currently are entered in the register as comments only. Certain assumptions had to be made sometimes when data about dosage were incomplete or unavailable.

The Prescribed Drug Register contains all individual data concerning prescriptions that have been picked up under the pharmaceutical benefits scheme, i.e., as part of outpatient care.

Each prescription was assigned to the patient's region of domicile.

**Data sources**

Prescribed Drug Register, Swedish National Board of Health and Welfare

**Sources of error**

Because the Prescribed Drug Register does not include drugs prescribed in inpatient care, dispensed from a drug storehouse or bought on a non-prescription basis, consumption among the elderly may be understated. Given that the register contains data only for drugs picked up from a pharmacy, the reported quantity prescribed may be low. The method of estimating current drug consumption entails a degree of uncertainty, particularly in terms of interpreting dosage instructions.

## A:9 Polypharmacy – elderly who consume ten or more drugs

**Measure**

Percentage of people age 80 and older who consume ten or more drugs concurrently

**Description**

*Numerator*: People age 80 and older who are deemed to have consumed ten or more drugs concurrently as of 31 December 2007

*Denominator*: All people age 80 and over who picked up at least one prescription drug in October–December 2007

**Method of measurement**

See Indicator A:8

**Data sources**

Prescribed Drug Register, Swedish National Board of Health and Welfare

**Sources of error**

See Indicator A:8

## A:10 Occurrence of antibiotic therapy

**Measure**

Number of people who received antibiotic therapy in 2007

**Description**

The indicator describes the number of people who picked up antibiotics as a percentage of the total population.

*Numerator*: Number of people who picked up at least one prescription antibiotic in 2007

*Denominator*: The average population in 2007

**Method of measurement**

Age-standardised based on the national population in 2000 as the standard.

Patients were assigned to their region of domicile.

The data were based on antibiotics picked up from pharmacies, ATC code antibiotics (J01).

**Data sources** Prescribed Drug Register, Swedish National Board of Health and Welfare

**Sources of error** The Prescribed Drug Register does not include drugs prescribed in inpatient care, dispensed from a drug storehouse or purchased on a non-prescription basis.

## A:11 Penicillin V in treatment of children with respiratory antibiotics

**Measure** Children age 6 and younger treated with penicillin V as a percentage of all children treated with respiratory antibiotics in 2007.

**Description** Phenoxymethylpenicillin, also referred to as penicillin V or PcV, is a basic preparation for treating bacterial respiratory infection in outpatient care – in other words, penicillin should generally be used as a first-line treatment. The indicator assesses the percentage of children who received penicillin V as first-line treatment when prescribing respiratory antibiotics.

*Numerator*: Number of children age 6 and younger for whom the first prescription picked up in 2007 was penicillin V

*Denominator*: Number of children for whom at least one prescription for penicillin V, macrolides, cephalosporins or amoxicillin was picked up in 2007

Supplementary information in the column to the right of the figure in the report:

Percentage of children for whom at least one respiratory antibiotic was picked up in 2007

*Numerator*: Number of children treated with respiratory antibiotics in 2007

*Denominator*: Number of children in the population

**Method of measurement** The data in the numerator, penicillin V, have been defined as ATC code J01CE02 in the Prescribed Drug Register.

Respiratory antibiotics have been defined as penicillin V, macrolides, cephalosporins and amoxicillin.

ATC codes: J01CA04, J01CR02 J01FA01, J01FA06, J01FA09, J01FA10, J01DB01,J01DB05, J01DC02, J01DC08, J01DD14

Age-standardised based on the national population in 2000 as the standard.

Each prescription was assigned to the child's region of domicile.

**Data sources** Prescribed Drug Register, Swedish National Board of Health and Welfare

**Sources of error** The Prescribed Drug Register does not include drugs prescribed in inpatient care, dispensed from a drug storehouse or purchased on a non-prescription basis. The Prescribed Drug Register has no data on the indication for which the drug was prescribed.

## A:12 Quinolone therapy in treatment with urinary tract antibiotics

**Measure**

Percentage of women age 18–64 who received quinolone therapy for lower urinary tract infection in 2007

**Description**

Quinolones are the broad-spectrum antibiotics of ciprofloxacin and norfloxacin.

The indicator includes women age 18–64 who picked up an initial prescription sometime in 2007 for one of the two drugs.

*Numerator*: Number of women age 18–64 who picked up an initial prescription for quinolones sometime in 2007

*Denominator*: All women who picked up a prescription in 2007 to treat urinary tract infection consisting of one of the following drugs: ciprofloxacin, norfloxacin, pivmecillinam, trimetoprim or nitrofurantoin

**Method of measurement**

Data were age-standardised, i.e., calculations were corrected for regional differences in the age structure of the population.

Each prescription was assigned to the patient's region of domicile.

| Drug | ATC code |
|---|---|
| Ciprofloxacin | J01MA02 |
| Norfloxacin | J01MA06 |
| Pivmecillinam | J01CA08 |
| Trimetoprim | J01EA01 |
| Nitrofurantoin | J01XE01 |

**Data sources**

Prescribed Drug Register, Swedish National Board of Health and Welfare

**Sources of error**

The Prescribed Drug Register has no data on the indication for which the drug was prescribed. Because quinolones in particular may be prescribed for indications other than lower urinary tract infection, their percentage is overstated.

## A:13 Biological drugs for rheumatoid arthritis

**Measure**

Number of patients who received biological drugs for rheumatoid arthritis per 100 000 inhabitants in 2007

**Description**

Biological drugs refer to TNF-alpha inhibitors.

The number of patients refers to those with the diagnosis of rheumatoid arthritis who were being treated with biological drugs at the beginning of 2008. Only the population over age 18 was included.

**Method of measurement**

Number of patients with rheumatoid arthritis M05.9+M06.0 per 100 000 inhabitants who were being treated with biological drugs on 1 January 2008. Data cannot be presented for smaller units than regions because the hospitals have overlapping service areas.

The regional breakdown was based on the location of the clinics rather than the patient's region of domicile.

Population data from Statistics Sweden

**Data sources**

Swedish Rheumatology Quality Register (Artis database)

**Sources of error**

Possible underreporting to the register

# INTENSIVE CARE

## A:14 Mortality after treatment at intensive care units

**Measure**

Risk-adjusted mortality 30 days after arrival at an intensive care unit (ICU) in 2007

**Description**

Mortality was calculated in accordance with the standardised mortality ratio (SMR). The SMR is the ratio between observed mortality within 30 days after arrival at an ICU and expected risk-adjusted mortality.

Observed mortality = Number of deaths within 30 days after start of a care event at an ICU. The number of deaths was followed up each week through the Swedish Population Address Register Board (SPAR).

Expected mortality = number of expected deaths according to the Acute Physiology and Chronic Health Evaluation (APACHE). Calculated as the total mortality risk for all intensive care patients with complete risk adjustment.

**Method of measurement**

For each care event, actual mortality is captured through SPAR. Risk was adjusted in accordance with the APACHE II system modified for Swedish conditions (Swedish APACHE). The Swedish APACHE risk adjustment system includes age, chronic disease, type of acute disease (reason for admission), severity of the acute disease and operated status. The risk of death within 30 days (0.01–0.99) was calculated on the basis of these data.

The indicator includes intensive care patients treated at ICUs that were enrolled in the Swedish Intensive Care Register (SIR) and that submitted data. The data were obtained from the databases of each ICU as well as central coordination with SPAR once a week.

The regional breakdown was based on the location of the clinic rather than the patient's region of domicile.

**Data sources**

Swedish Intensive Care Register (SIR)

**Sources of error**

Many factors affect the SMR. For instance, the occurrence of those who decline or drop out of treatment in intensive care affects the SMR by increasing the number of deaths. The model for risk adjustment is also of great importance.

Incomplete or erroneous data collection can affect the SMR. Dropout for the country as a whole was more than 16% for the 2007 calendar year. There were no data for 5 regions. Dropout in 2007 per ICU varied from 0% to 56%.

## A:15 Readmission to intensive care units

**Measure**

Percentage of patients readmitted on an unscheduled basis to the same ICU within 72 hours in 2007

**Description**

The indicator describes the number of patients in 2007 who were readmitted to the same ICU within 72 hours for the same diagnosis.

*Numerator:* Number of intensive care events for which the patient was readmitted to the same ICU on an unscheduled basis within 72 hours of initial admission

*Denominator:* Number of first-time intensive care events in 2007 for patients released alive

**Method of measurement**

The indicator includes intensive care patients treated at ICUs that were enrolled in the Swedish Intensive Care Register (SIR) and that submitted data. Readmission was continually identified in the central database. The data were obtained from the database of each ICU.

The regional breakdown was based on the location of the clinic rather than the patient's region of domicile.

**Data sources**

Swedish Intensive Care Register (SIR)

**Sources of error**

If an ICU's patient administration support system cannot handle a related intensive care event when the clinic or unit changes, an excessively high value is arrived at. The system generates a new care event for each such switch during the course of intensive care. As a result, the number of intensive care events is erroneous and the number of readmissions is excessive.

For the 2007 calendar year, 4 regions (Blekinge, Kronoberg, Uppsala and Norrbotten) were unable to submit this kind of patient administration data.

## CANCER SURVIVAL RATE

### A:16 Colon cancer – relative five-year survival rates

**Measure**

Relative five-year survival rates for patients diagnosed with colon cancer

**Description**

The indicator shows relative five-year survival rates for patients age 89 and younger who were first diagnosed with colon cancer in 2000–2006.

Relative means that the rates represent a comparison with expected survival of people who had not been diagnosed with cancer. Survival was monitored up to and including December 2006.

**Method of measurement**

Data on the number of patients with colon cancer were taken from the National Cancer Registry in accordance with ICD–10 codes C18 and C19.

The relative method calculates survival after diagnosis using population-based cancer registers. Relative survival is the ratio between observed survival in the group that developed cancer and the expected survival of a population that is comparable in terms of the primary factors (gender, age and period of time in this case) that affect survival. A relative five-year survival rate of 50 percent indicates that half of the patients would have been alive after five years if colon cancer had been the only possible cause of death.

The calculations took any regional differences in average life expectancy into consideration. Patients were assigned to their region of domicile.

In order to increase the number of patients with follow-up of at least five years, the last seven available years of diagnosis were used.

Although colon and rectal cancer are commonly grouped together as colorectal cancer, their survival rates are presented separately here because of differences with respect to treatment and other factors.

**Data sources**

National Cancer Registry, Swedish National Board of Health and Welfare

**Sources of error**

The National Cancer Registry is well established and has mandatory reporting. The basic data are of excellent quality.

Although the calculation used patients from seven years of diagnosis, survival rates in regions with small populations were based on a limited number of patients. Random variations may thereby have influenced observed regional differences, as reflected in the wide confidence intervals.

## A:17 Rectal cancer – relative five-year survival rates

**Measure**

Relative five-year survival rates for patients diagnosed with rectal cancer

**Description**

The indicator shows relative five-year survival rates for patients age 89 and younger who were first diagnosed with rectal cancer in 2000–2006.

Relative means that the rates represent a comparison with expected survival of people who had not been diagnosed with cancer. Survival was monitored up to and including December 2006.

**Method of measurement**

Data on the number of patients with rectal cancer were taken from the National Cancer Registry in accordance with ICD-10 codes C20 and C21.

The relative method calculates survival after diagnosis using population-based cancer registers. Relative survival is the ratio between observed survival in the group that developed cancer and the expected survival of a population that is comparable in terms of the primary factors (gender, age and period of time in this case) that affect survival. A relative five-year survival rate of 50 percent indicates that half of the patients would have been alive after five years if rectal cancer had been the only possible cause of death.

The calculations took any regional differences in average life expectancy into consideration. Patients were assigned to their region of domicile.

In order to increase the number of patients with follow-up of at least five years, the last seven available years of diagnosis were used.

Although colon and rectal cancer are commonly grouped together as colorectal cancer, their survival rates are presented separately here because of differences with respect to treatment and other factors.

**Data sources**

National Cancer Registry, Swedish National Board of Health and Welfare

**Sources of error**

The National Cancer Registry is well established and has mandatory reporting. The basic data are of excellent quality.

Although the calculation used patients from seven years of diagnosis, survival rates in regions with small populations were based on a limited number of patients. Random variations may thereby have influenced observed regional differences, as reflected in the wide confidence intervals.

## A:18 Breast cancer – relative five-year survival rates

| | |
|---|---|
| **Measure** | Relative five-year survival rates for women diagnosed with breast cancer |
| **Description** | The indicator shows relative five-year survival rates for women age 89 and younger who were first diagnosed with breast cancer in 2000–2006.<br>Relative means that the rates represent a comparison with expected survival of people who had not been diagnosed with cancer. Survival was monitored up to and including December 2006. |
| **Method of measurement** | Data on the number of women with breast cancer were taken from the National Cancer Registry in accordance with ICD-10 code C50.<br>The relative method calculates survival after diagnosis using population-based cancer registers. Relative survival is the ratio between observed survival in the group that developed cancer and the expected survival of a population that is comparable in terms of the primary factors (gender, age and period of time in this case) that affect survival. A relative five-year survival rate of 50 percent indicates that half of the patients would have been alive after five years if breast cancer had been the only possible cause of death.<br>The calculations took any regional differences in average life expectancy into consideration. Patients were assigned to their region of domicile.<br>In order to increase the number of patients with follow-up of at least five years, the last seven available years of diagnosis were used. |
| **Data sources** | National Cancer Registry, Swedish National Board of Health and Welfare |
| **Sources of error** | The National Cancer Registry is well established and has mandatory reporting. The basic data are of excellent quality. |

## A:19 Reoperation for rectal cancer

| | |
|---|---|
| **Measure** | Percentage of reoperations within 30 days after primary surgery for rectal cancer |
| **Description** | *Numerator*: Number of reoperations performed in 2002–2006 within 30 days after primary surgery for rectal cancer<br>*Denominator*: All primary operations for rectal cancer in 2002–2006 reported to the register<br>Primary surgery refers to the first operation during the period. Surgery refers to anterior resection, abdomino-perineal resection or Hartmann procedure. |
| **Method of measurement** | Data were not corrected for patient mix.<br>Both data collection and reporting are under the auspices of oncological centres, and the register has a high participation rate.<br>Patients were assigned to the region in which the hospital was located rather than where they lived. |
| **Data sources** | National Rectal Cancer Registry |
| **Sources of error** | In addition to actual differences in the number of reoperations, regional variations may be due to data entry discrepancies. |

## A:20 Prostate cancer – active treatment of patients younger than age 65

| | |
|---|---|
| **Measure** | Percentage of men younger than 65 with a localised medium-risk or high-risk tumour who received active primary treatment in 2006 |
| **Description** | The indicator measures the percentage of men who received active treatment, i.e., radical prostatectomy or radiotherapy.<br>Number of patients with prostate cancer T1-2, Nx/N0, Mx/M0 with a Gleason score of 7–10 and PSA < 20 μg/l who received active primary treatment divided by the total number of patients in the group. In other words, patients with a localised medium-differentiated or low-differentiated tumour that did not show signs of metastasising beyond the prostate gland.<br>*Numerator:* Number of men younger than 65 with a localised medium-risk or high-risk tumour in 2006 who received active treatment<br>*Denominator:* All men younger than 65 with a localised medium-risk or high-risk tumour in 2006 who were entered in the National Prostate Cancer Registry |
| **Method of measurement** | Data were collected by the National Prostate Cancer Registry. The registry has a high participation rate. Treatment was assigned to the region in which the clinic was located rather than where the patient lived. |
| **Data sources** | National Prostate Cancer Registry |
| **Sources of error** | Possible reporting and data entry flaws may be sources of error. |

## A:21 Time until treatment of head and neck tumours

| | |
|---|---|
| **Measure** | Time between receipt of a referral and commencement of treatment for patients with head and neck tumours in 2002–2007 |
| **Description** | Head and neck tumours refer to malignant tumours of the ear, nose or throat.<br>The indicator describes the average number of days from the receipt of a referral until final treatment begins.<br>The measurement period extends from 1 January 2002 to October 2007. |
| **Method of measurement** | The regional breakdown was based on the location of the clinic rather than the patient's region of domicile. |
| **Data sources** | Swedish Ear, Nose and Throat Care Quality Register |
| **Sources of error** | Possible reporting and data entry flaws may be sources of error. |

# MATERNAL AND NEONATAL CARE

## A:22 Induced abortion, both medical and surgical, prior to the 10th week of pregnancy

| | |
|---|---|
| **Measure** | Percentage of abortions before the 10th week of pregnancy, broken down by medical and surgical abortions, in 2005–2007 |

| | |
|---|---|
| **Description** | A medical abortion involves administering two rounds of drugs 2–3 days apart. Surgical abortion involves evacuation of the uterus under local or general anaesthesia.<br>Only abortions performed before the 10th week of pregnancy were included.<br>*Numerator*: Number of abortions performed before the 10th week of pregnancy, broken down by medial and surgical abortions, in 2005–2007<br>*Denominator*: All abortions performed in 2005–2007 |
| **Method of measurement** | Each abortion was assigned to the woman's region of domicile.<br>Anonymised data on abortions that have been performed are reported to the Swedish National Board of Health and Welfare, primarily by gynaecology clinics and gynaecology departments at hospitals. The Board has a record of all legal abortions performed in Sweden since 1975. |
| **Data sources** | Abortion statistics, Swedish National Board of Health and Welfare |
| **Sources of error** | The basic data are of good quality. |

## A:23 Foetal mortality rate per 1 000 births

| | |
|---|---|
| **Measure** | Foetal mortality per 1 000 births in 2002–2006 |
| **Description** | Foetal mortality is defined as the birth of a child without any signs of life after the 28th week of pregnancy. Foetal death may occur prior to or (the rarer case) during childbirth.<br>Foetal mortality was calculated per 1 000 births for each region in 2002–2006. |
| **Method of measurement** | The calculations were corrected for regional differences in the age structure of the population. Data were age-standardised based on all women who gave birth in 2002–2006 as the standard population.<br>Each delivery was assigned to the woman's region of domicile.<br>Hospitals report foetal mortality data to the Swedish National Board of Health and Welfare on an annual basis. |
| **Data sources** | Medical Birth Registry, Swedish National Board of Health and Welfare |
| **Sources tof error** | Dropout in reporting to the Medical Birth Registry is an estimated 0.5–3 percent per year but is somewhat higher for neonatal deaths. |

## A:24 Neonatal mortality rate per 1 000 live births

| | |
|---|---|
| **Measure** | Neonatal mortality rate within 28 days per 1 000 live births in 2002–2006 |
| **Description** | The neonatal mortality rate measures the number of children who die within 28 days after birth.<br>Neonatal mortality was calculated per 1 000 live births for each region in 2002–2006. |
| **Method of measurement** | The calculations were corrected for regional differences in the age structure of the population. Data were age-standardised based on all women who gave birth in 2002–2006 as the standard population.<br>Each delivery was assigned to the woman's region of domicile. |

| | |
|---|---|
| **Data sources** | Medical Birth Registry, Swedish National Board of Health and Welfare |
| **Sources of error** | Dropout in reporting to the Medical Birth Registry is an estimated 0.5–3 percent per year but is somewhat higher for neonatal deaths. |

## A:25 Percentage of newborns with Apgar score under 7

| | |
|---|---|
| **Measure** | Percentage of newborns with Apgar score under 7 at five minutes |
| **Description** | The Apgar score (with a maximum of 10) is a system for standardised assessment of the vitality of newborns.<br>A score below 7 at five minutes is defined as low.<br>*Numerator*: Number of newborns in 2002–2006 with Apgar scores below 7 five minutes after birth<br>*Denominator*: Total live births in 2002–2006 |
| **Method of measurement** | The calculations were corrected for regional differences in the age structure of the population. Data were age-standardised based on all women who gave birth in 2002–2006 as the standard population.<br>Each delivery was assigned to the woman's region of domicile.<br>The newborn's heart rate, breathing, skin colouration, activity and muscle tone, and reflex irritability were rated on a scale of 0–2 at one minute, five minutes and ten minutes after birth. |
| **Data sources** | Medical Birth Registry, Swedish National Board of Health and Welfare |
| **Sources of error** | Dropout in reporting to the Medical Birth Registry is an estimated 0.5–3 percent per year but is somewhat higher for neonatal deaths. |

## A:26 Third and fourth degree perineal tear during vaginal delivery

| | |
|---|---|
| **Measure** | Percentage of third and fourth degree perineal tear during vaginal delivery in 2002–2006 |
| **Description** | Perineal tear is a rupture that can occur during childbirth in the soft tissues between the vaginal opening and anus. Perineal tears are classified according to their scope, third and fourth degree being the most extensive.<br>*Numerator*: Number of vaginal deliveries in 2002–2006 that gave rise to third or fourth degree perineal tears<br>*Denominator*: All vaginal deliveries in 2002–2006 |
| **Method of measurement** | The calculations were corrected for regional differences in the age structure of the population. Data were age-standardised based on all women who gave birth in 2002–2006 as the standard population.<br>Each delivery was assigned to the woman's region of domicile. |
| **Data sources** | Medical Birth Registry, Swedish National Board of Health and Welfare |
| **Sources of error** | Dropout in reporting to the Medical Birth Registry is an estimated 0.5–3 percent per year but is somewhat higher for neonatal deaths. |

# DIABETES CARE

## A:27 Diabetic patients in primary care who reach the goal for HbA1c levels

| | |
|---|---|
| **Measure** | Percentage of diabetic patients in primary care who reached the goal for HbA1c levels in 2007 |
| **Description** | HbA1c is a test that measures blood sugar levels in the blood. The treatment goal was an HbA1c level of 6 percent or below.<br>*Numerator*: Number of diabetic patients of all ages in primary care who reached the goal for blood sugar levels in 2007<br>*Denominator*: All diabetic patients reported to the National Diabetes Register in 2007 |
| **Method of measurement** | The National Diabetes Register (NDR) collects data on diabetes care from both medical and primary care clinics. Although the register has a participation rate of approximately 44 percent, the regional variations are substantial. The figure also presents the participation rate for each region.<br>Each patient was assigned to the region where treatment was administered.<br>The treatment goals are consistent with the targets and guidelines issued by the Swedish Association for Diabetology and used by the NDR. |
| **Data sources** | National Diabetes Register (NDR) |
| **Sources of error** | The main source of error stems from the relatively low and varying participation rates of different regions in the NDR. |

## A:28 Diabetic patients in primary care who reach the blood pressure goal

| | |
|---|---|
| **Measure** | Percentage of diabetic patients in primary care who reached the blood pressure goal in 2007 |
| **Description** | The treatment goal is defined as blood pressure equal to or lower than 130/80 mm Hg.<br>The indicator includes all patients, whether or not they were treated for hypertension.<br>*Numerator*: Number of diabetic patients of all ages in primary care who reached the treatment goal for blood pressure in 2007<br>*Denominator*: All diabetic patients reported to the National Diabetes Register in 2007 |
| **Method of measurement** | See Indicator A:21 |
| **Data sources** | National Diabetes Register (NDR) |
| **Sources of error** | See Indicator A:21 |

## A:29 Diabetic patients receiving antihypertensive therapy

**Measure** Percentage of diabetic patients receiving antihypertensive therapy in 2007

**Description** The number of diabetics receiving drug therapy is based on the Prescribed Drug Register and includes all those who picked up at least one prescription for a diabetes drug in 2007. The percentage of those patients who picked up an antiphyertensive prescription was studied. The percentage of those who picked up ACE inhibitors or angiotensin-receptor antagonists was reported separately.

*Numerator*: Number of diabetics age 18 and older receiving drug therapy who picked up at least one antihypertensive prescription in 2007 according to the Prescribed Drug Register

*Denominator*: All diabetics age 18 and older receiving drug therapy in 2007 according to the Prescribed Drug Register

**Method of measurement** Data were age-standardised, i.e., calculations were corrected for regional differences in the age structure of the population.

Patients were assigned to their region of domicile.

| Drug | ATC code |
|---|---|
| Diabetes drugs | A10 |
| Antihypertensives | C02, C03, C07, C08, C09 |
| ACE inhibitors, Angiotensin II antagonists | C09 |

**Data sources** Prescribed Drug Register, Swedish National Board of Health and Welfare

**Sources of error** The Prescribed Drug Register captures only diabetics who are prescribed tablets or insulin, not those who receive nutritional therapy only. The register has no data on the indication for which the drug was prescribed. Many of the other drugs may be prescribed for indications other than hypertension. Thus, the indicator does not directly measure the number of diabetics with hypertensive disease.

## A:30 Diabetic patients receiving lipid lowering drug therapy

**Measure** Percentage of diabetics receiving drug therapy who were given lipid lowering drugs

**Description** The number of diabetics receiving drug therapy is taken from the Prescribed Drug Register and includes all those who picked up at least one prescription for a diabetes drug in 2007. The percentage of those patients who picked up a prescription for a lipid lowering drug was studied.

*Numerator*: Number of diabetics age 40 and older receiving drug therapy who picked up at least one prescription for a lipid lowering drug in 2007

*Denominator*: All diabetics age 40 and older receiving drug therapy in 2007 according to the Prescribed Drug Register

**Method of measurement** Data were age-standardised, i.e., calculations were corrected for regional differences in the age structure of the population.

Patients were assigned to their region of domicile.

| Drug | ATC code |
|---|---|
| Diabetes drugs | A10 |
| Lipid lowering drugs | C10 |

**Data sources** Prescribed Drug Register, Swedish National Board of Health and Welfare

**Sources of error** The Prescribed Drug Register captures only diabetics who are prescribed tablets or insulin, not those who receive nutritional therapy only. The register has no data on the indication for which the drug was prescribed.

# PSYCHIATRIC CARE

## A:31 Regular treatment with soporifics and sedatives

**Measure** Number of people age 20–79 with regular and high use of soporifics or sedatives per 100 000 inhabitants

**Description** Benzodiazepines are the accepted standard drugs for short-term treatment of pathological anxiety and temporary sleep disturbances. They are also used to one extent or another for treating milder types of worry and anxiety.

The indicator describes the number of people who picked up prescriptions for benzodiazepines per 100 000 inhabitants in 2007.

Regular users:

*Numerator*: Number of people age 20–79 who picked up prescriptions for an average of 0.5 daily doses of benzodiazepines per day in 2007

*Denominator*: Number of people age 20–79 in the population in 2007

High consumers:

*Numerator*: Number of people age 20–79 who picked up prescriptions for an average of 1.5 daily doses of benzodiazepines per day in 2007

*Denominator*: Number of people age 20–79 in the population in 2007

**Method of measurement** Age-standardised based on the national population in 2000 as the standard.

Patients were assigned to their region of domicile.

ATC code for benzodiazepines: (N05BA, N05CD, N05CF)

**Data sources** Prescribed Drug Register, Swedish National Board of Health and Welfare

**Sources of error** The Prescribed Drug Register has no data on the indication for which the drug was prescribed. The register does not include drugs prescribed in inpatient care or dispensed from a drug storehouse.

## A:32 Polypharmacy – elderly who consume three or more psychopharmacological drugs

**Measure** Percentage of people age 80 and older who consume three or more psychopharmacological drugs concurrently

**Description** The indicator presents concurrent therapy with three or more psychopharmacological drugs, whether routinely or on demand.

*Numerator*: People age 80 and older who are deemed to have consumed three or more psychopharmacological drugs concurrently as of 31 December 2007

*Denominator*: All people age 80 and over who picked up at least one prescription drug in October–December 2007

**Method of measurement** A current list of drugs was made for each person. Based on data extracted from the Prescribed Drug Register for the previous three months concerning date, quantity and dosage of each prescription picked up, drug consumption was estimated for October–December 2007. Calculating the prescribed dosage requires interpreting instructions that currently are entered in the register as comments only. Certain assumptions had to be made sometimes when data about dosage were incomplete or unavailable.

The Prescribed Drug Register contains all individual data concerning prescriptions that have been picked up under the pharmaceutical benefits scheme, i.e., as part of outpatient care.

Each prescription was assigned to the patient's region of domicile.

**Data sources** Prescribed Drug Register, Swedish National Board of Health and Welfare

**Sources of error** Because the Prescribed Drug Register does not include drugs prescribed in inpatient care, dispensed from a drug storehouse or bought on a non-prescription basis, consumption among the elderly may be understated. Given that the register contains data only for drugs picked up from a pharmacy, the reported quantity prescribed may be low. The method of estimating current drug consumption entails a degree of uncertainty, particularly in terms of interpreting dosage instructions.

## A:33 Suicide among the general population

**Measure** Number of suicides and deaths with undetermined intent per 100 000 inhabitants in 2003–2006

**Description** The indicator includes the number of suicides and deaths with undetermined intent.

The indicator is presented by region per 100 000 inhabitants in 2003–2006.

**Method of measurement**

| Cause of death | ICD-10 code |
|---|---|
| Suicide | X60–X84 |
| Undetermined intent | Y10–Y34 |

Data were age-standardised based on the national population in 2000 as the standard.

Patients were assigned to their region of domicile.

**Data sources** Cause of Death Register, Swedish National Board of Health and Welfare

**Sources of error** The data should be interpreted with a certain degree of caution, given that diagnostic methods may vary from region to region.

## A:34 Eating disorders – treatment results after one year

**Measure** Percentage of patients with an eating disorder whose condition had improved one year after commencement of treatment in 2006

**Description** Improvement means that the patient was diagnosed either as still having an eating disorder but showing signs of progress at 1-year follow-up or as no longer having an eating disorder. Eating disorder refers to anorexia nervosa, bulimia nervosa or Eating Disorder Not Otherwise Specified (EDNOS).

*Numerator*: Number of eating disorder patients whose condition had improved one year after commencement of treatment

*Denominator*: All patients entered in the National Quality Register on Eating Disorders (RIKSÄT) who started treatment for the first time in 2006 and were followed up after one year

**Method of measurement** Of 31 specialised eating disorder units in Sweden, 30 report to RIKSÄT to one extent or another.

Patients were assigned to their region of domicile.

**Data sources** National Quality Register on Eating Disorders (RIKSÄT)

**Sources of error** Few patients were reported, and even fewer patients who were entered in the register were monitored. In addition to the low percentage of reported treatments, there are two other conceivable sources of error. In the first place, diagnostic methods may vary from region to region. In the second place, the comparison does not consider regional differences in the patient population due to factors such as the age groups treated and referral procedures.

# STROKE CARE

## A:35 First-time stroke – 28-day case fatality rate

**Measure** Percentage of patients who died within 28 days after first-time stroke in 2004–2006

**Description** 28-day case fatality rate after first-time stroke. A first-time stroke is one that occurs when the patient has not been diagnosed with a stroke for the previous seven years of the Patient Register. All other patients were excluded from the calculation. Stroke refers to cerebral haemorrhage, cerebral infarction or unspecified stroke.

All care events associated with a diagnosis of stroke in 2004–2006 in the inpatient section of the Patient Register or a death caused by a stroke during the previous 28 days were assigned to a stroke case. Both hospitalised and non-hospitalised patients were included.

The 28-day case fatality rate is measured on the basis of the Cause of Death Register, which contains data for everyone who has died.

*Numerator*: Number of first-time stroke patients who died within 28 days after stroke

*Denominator*: All patients who had first-time strokes in 2004–2006

**Method of measurement** The percentage of deaths within 28 days after stroke was age-standardised based on all stroke cases in 2000 as the standard population. The same standard population was used for women and men.

| Diagnosis | ICD-10 code |
|---|---|
| Stroke | I61, I63, I64 |

Patients were assigned to their region of domicile.

**Data sources** Patient Register and Cause of Death Register, Swedish National Board of Health and Welfare

**Sources of error** There was very little dropout of personal identity numbers in either the inpatient section of the Patient Register or in the Cause of Death Register. Variations in diagnostic criteria among the different regions may have affected the results.

## A:36 Hospitalised first-time stroke – 28-day case fatality rate

**Measure** Percentage of patients who were hospitalised and who died within 28 days after first-time stroke in 2005–2007

**Description** 28-day case fatality rate among patients hospitalised for first-time stroke. Stroke refers to cerebral haemorrhage, cerebral infarction or unspecified stroke. A first-time stroke is one that occurs when the patient has not been diagnosed with a stroke for the previous seven years of the Patient Register.

All care events associated with a diagnosis of stroke in 2005–2007 in the inpatient section of the Patient Register during the previous 28 days were assigned to a stroke case.

The 28-day case fatality rate is measured on the basis of the Cause of Death Register, which contains data for everyone who has died.

*Numerator*: Number of first-time stroke patients who were hospitalised and who died within 28 days after stroke

*Denominator*: All patients who were hospitalised after first-time stroke in 2005–2007

**Method of measurement** The percentage of deaths within 28 days after stroke was age-standardised based on all stroke cases in 2000 as the standard population. The same standard population was used for women and men.

| Diagnosis | ICD-10 code |
|---|---|
| Stroke | I61, I63, I64 |

Patients were assigned to their region of domicile.

**Data sources** Patient Register and Cause of Death Register, Swedish National Board of Health and Welfare

**Sources of error** See Indicator A:35

## A:37 Patients treated at a special stroke unit

**Measure** Percentage of stroke patients treated at a special stroke unit in 2007

**Description** A special stroke unit is an organised inpatient care unit that exclusively (or almost exclusively) treats stroke patients and that is run by an interdisciplinary team of stroke experts. For more details, refer to the National Guidelines for Stroke Care.

*Numerator*: All stroke patients who were treated at a special stroke unit that met the prevailing criteria in 2007

*Denominator*: All stroke patients entered in the National Stroke Register in 2007

**Method of measurement** The National Stroke Register collects data about patient status at the time of stroke, during hospitalisation and a telephone survey, ordinarily after three months. All acute care hospitals, and certain other units, that treat stroke patients participate.

Treatment was assigned to the region in which the clinic was located rather than where the patient lived.

**Data sources** National Stroke Register

**Sources of error** One source of error may have been regional variations in the participation rate, i.e., not all stroke patients were entered in the National Stroke Register. Another source of error may have been that a unit that failed to meet the criteria was included.

## A:38 Activities of daily living (ADL) ability three months after stroke

**Measure**

Percentage of stroke patients who were dependent on others for their personal ADLs three months after the acute phase in 2007

**Description**

Personal ADLs refer to locomotion, toileting, dressing and undressing.

*Numerator*: Number of stroke patients in 2007 who were dependent on others for all of their personal ADLs three months after the acute phase

*Denominator*: All stroke patients entered in the National Stroke Register in 2007 who had been independent of others for their personal ADLs before stroke and who were alive three months after stroke

**Method of measurement**

The National Stroke Register collects data about patient status at the time of stroke, during hospitalisation and at 3-month follow-up. All acute care hospitals, and certain other units, that treat stroke patients participate.

Treatment was assigned to the region in which the clinic was located rather than where the patient lived.

Data were based on the same statistics as in the National Stroke Register report, but the percentages may have differed depending on how dropout was handled. Cases for which no data were available where excluded from the denominator but included in the National Stroke Register report.

**Data sources**

National Stroke Register

**Sources of error**

One source of error is that not all stroke patients are entered in the National Stroke Register.

Furthermore, some stroke patients drop out at 3-month follow-up.

Finally, there may be some dropout when it comes to a particular variable at 3-month follow-up. The dropout rate was approximately 3 percent in 2007 for the variable of dependence on others for personal ADLs.

Interpreting dependence on others for the 3 ADLs is also associated with a degree of uncertainty. Furthermore, stroke patients are often elderly and, like family members or caregivers, have varying ability to respond to the survey.

## A:39 Anticoagulant therapy for stroke patients with atrial fibrillation

**Measure**

Percentage of stroke patients age 40 and older with atrial fibrillation who received anticoagulant therapy in 2005–2006

**Description**

The indicator includes patients whose primary diagnosis was stroke and whose secondary diagnosis was atrial fibrillation. Patients were regarded as having been given anticoagulant therapy if they picked up a prescription for Waran.

*Numerator*: Number of stroke patients age 40 and older with atrial fibrillation in 2005–2006 who picked up an anticoagulant (Waran) prescription within 12–18 months after discharge from hospital

*Denominator*: All patients who had at least one care event with stroke as the primary diagnosis and atrial fibrillation as the secondary diagnosis in 2005–2006

**Method of measurement**

Data on the number of patients with stroke as the primary diagnosis and atrial fibrillation as the secondary diagnosis were taken from the inpatient section of the Patient Register. The population includes people who had at least one care event in 2005–2006 and who were alive on 30 June 2008. Data were taken from the Prescribed Drug Register concerning anticoagulant (Waran) prescriptions that these people picked up within 12–18 months after discharge from hospital (calculated from the first care event during the period, i.e., at some point between 1 January 2006 and 30 June 2008).

| **Diagnosis** | **ICD-10 code** |
|---|---|
| Stroke | I63, I64 |
| Atrial fibrillation | I48 |
| **Drug** | **ATC code** |
| Waran | B01AA03 |

The percentages were age-standardised. Each care event was assigned to the patient's region of domicile at the time.

**Data sources**

Patient Register and Prescribed Drug Register, Swedish National Board of Health and Welfare

**Sources of error**

There was very little dropout of personal identity numbers in the inpatient section of the Patient Register. Variations in diagnostic criteria among the different regions may have affected the size of the stroke population. Because the Prescribed Drug Register does not include drugs dispensed from a drug storehouse in an assisted living facility or bought on a non-prescription basis, consumption among the elderly may be understated. Given that the register contains data only for drugs picked up from a pharmacy, the reported quantity prescribed may be low.

## A:40 Stroke – readmission within 365 days

**Measure**

Percentage of patents readmitted for stroke within 365 days in 2002–2006

**Description**

Percentage of patients readmitted to inpatient care within 365 days after a consecutive care episode with stroke as the initial primary diagnosis. Only first-time stroke was monitored. A first-time stroke is one that occurs when the patient has not been diagnosed with a stroke for the previous seven years of the Patient Register.

A patient was regarded as having been readmitted when the primary diagnosis was stroke or the late effects of stroke. Readmissions were counted only once regardless of how many times the patient was readmitted during the 365-day period.

*Numerator*: Number of patients who were readmitted to inpatient care at least once within 365 days with stroke or the late effects of stroke as the primary diagnosis

*Denominator*: Number of estimated first-time care events with stroke as the primary diagnosis in 2002–2006

**Method of measurement**

The percentage of readmissions after stroke was age-standardised based on all stroke cases in 2000 as the standard population.

| **Diagnosis** | **ICD-10 code** |
|---|---|
| Stroke | I61, I63, I64, I69 |

Patients were assigned to their region of domicile.

**Data sources**

Patient Register, Swedish National Board of Health and Welfare

**Sources of error**

There was very little dropout of personal identity numbers in the inpatient section of the Patient Register. Variations in diagnostic criteria among the different regions may have affected the results.

# CARDIAC CARE

## A:41 Myocardial infarction – 28-day case fatality rate

**Measure**

Percentage of patients who died within 28 days after myocardial infarction in 2004–2006

**Description**

Percentage of all cases of acute myocardial infarction who died within 28 days.

All care events with a diagnosis of acute myocardial infarction in the inpatient section of the Patient Register or a death with acute myocardial infarction as the cause within 28 days were assigned to a case of acute myocardial infarction. The indicator also includes patients who were not hospitalised.

The 28-day case fatality rate is measured on the basis of the Cause of Death Register, which contains data for everyone who has died.

*Numerator*: Number of cases who died within 28 days after myocardial infarction

*Denominator*: All cases of myocardial infarction in 2004–2006

**Method of measurement**

The percentage of deaths within 28 days after myocardial infarction was age-standardised based on all acute myocardial infarction cases in 2000 as the standard population. The same standard population was used for women and men.

| Diagnosis | ICD-10 code |
|---|---|
| Myocardial infarction | I21, I22 |

Patients were assigned to their region of domicile.

**Data sources**

Patient Register and Cause of Death Register, Swedish National Board of Health and Welfare

**Sources of error**

There was very little dropout of personal identity numbers in either the inpatient section of the Patient Register or in the Cause of Death Register. Variations in diagnostic criteria among the different regions may have affected the results.

## A:42 Myocardial infarction – 28-day case fatality rate – hospitalised patients

**Measure**

Percentage of patients who were hospitalised and who died within 28 days after myocardial infarction

**Description**

Percentage of patients who died within 28 days out of all cases of acute myocardial infarction hospitalised in 2005–2007.

All care events with a diagnosis of acute myocardial infarction in the inpatient section of the Patient Register within 28 days were assigned to a case of acute myocardial infarction.

The 28-day case fatality rate is measured on the basis of the Cause of Death Register, which contains data for everyone who has died.

*Numerator*: Number of hospitalised cases who died within 28 days after myocardial infarction

*Denominator*: All hospitalised cases of myocardial infarction in 2005–2007

**Method of measurement** The percentage of deaths within 28 days after myocardial infarction was age-standardised based on all acute myocardial infarction cases in 2000 as the standard population. The same standard population was used for women and men.

| Diagnosis | ICD-10 code |
|---|---|
| Myocardial infarction | I21, I22 |

Patients were assigned to their region of domicile.

**Data sources** Patient Register and Cause of Death Register, Swedish National Board of Health and Welfare

**Sources of error** There was very little dropout of personal identity numbers in either the inpatient section of the Patient Register or in the Cause of Death Register. Variations in diagnostic criteria among the different regions may have affected the results.

## A:43 Reperfusion therapy for patients with ST-segment elevation myocardial infarction (STEMI)

**Measure** Percentage of patients younger than 80 with ST-segment elevation myocardial infarction who received reperfusion therapy in 2007

**Description** The indicator covers all patients who had ST-segment elevation myocardial infarction (STEMI, ICD-10 codes I21, I22, I23) or left bundle branch block (LBBB) upon arrival at intensive care. Reperfusion therapy includes primary percutaneous coronary intervention (PCI), thrombolysis therapy and coronary artery bypass graft (CABG) surgery. Angiography for the purpose of PCI when PCI is not performed is also included.

The indicator and population are identical with those used in the Register of Information and Knowledge about Swedish Heart Intensive Care Admissions (RIKS-HIA) Quality Index (see the RIKS-HIA 2007 annual report).

*Numerator*: Number of patients younger than 80 with STEMI or LBBB who received acute reperfusion therapy in 2007

*Denominator*: All patients younger than 80 with STEMI or LBBB who were entered in the RIKS-HIA database in 2007

**Method of measurement** The data were collected by means of the RIKS-HIA protocol. See the RIKS-HIA website and annual report.

Where the patient lives, not the location of the clinic, forms the basis of regional reporting. That represents a change from presentations in previous years and from the RIKS-HIA annual report.

**Data sources** Register of Information and Knowledge about Swedish Heart Intensive Care Admissions (RIKS-HIA)

**Sources of error** Almost all hospitals in the country participate (most of those that did not participate in 2007 were in the Norrbotten region). But the percentage of myocardial infarction patients reported to RIKS-HIA varies among regions and hospitals.

The nationwide participation rate was approximately 60 percent. The rate was probably a good deal higher for STEMI. But that was not examined on a large scale.

## A:44 Coronary angiography after non-ST-segment elevation myocardial infarction

| | |
|---|---|
| **Measure** | Percentage of patients younger than 80 with non-ST-segment elevation myocardial infarction (NSTEMI) who underwent or were scheduled for coronary angiography in 2007 |
| **Description** | The indicator includes patients younger than 80 who were hospitalised for NSTEMI (ICD-10 codes I21, I22, I23)<br>The indicator and population are the same as in the RIKS-HIA Quality Index for Hospitals in 2007. To be included, patients must have been discharged alive and had at least one of the following: pulmonary rales grade 2–3, left ventricular ejection fraction (LVEF) <50%, diabetes, reduced ST-segment elevation on the ECG at arrival or previous myocardial infarction.<br>*Numerator*: Number of patients younger than 80 with NSTEMI who underwent or were scheduled for coronary angiography at the time of the care event<br>*Denominator*: All patients younger than 80 with NSTEMI who were entered in the RIKS-HIA database in 2007 |
| **Method of measurement** | See Indicator A:43 |
| **Data sources** | Register of Information and Knowledge about Swedish Heart Intensive Care Admissions (RIKS-HIA) |
| **Sources of error** | See Indicator A:43 |

## A:45 Clopidogrel therapy after non-ST-segment elevation myocardial infarction

| | |
|---|---|
| **Measure** | Percentage of hospitalised patients who received clopidogrel therapy for NSTEMI in 2007 |
| **Description** | The indicator includes patients (ICD-10 codes I21, I22, I23) with NSTEMI who were discharged alive from hospital. The other criteria are that the patient did not have bleeding complication during the care event, was not taking Waran at discharge and did not have coronary artery bypass graft (CABG) surgery scheduled.<br>Clopidogrel therapy refers to Plavix, Ticlid or another antiplatelet – alone or in combination with acetylsalicylic acid (ASA/aspirin) – at the time of discharge.<br>*Numerator*: Number of hospitalised patients younger than 80 with NSTEMI who received clopidogrel therapy at the time of discharge, per region in 2007<br>*Denominator*: All patients younger than 80 with NSTEMI who were entered in the RIKS-HIA database in 2007 |
| **Method of measurement** | See Indicator A:43 |
| **Data sources** | Register of Information and Knowledge about Swedish Heart Intensive Care Admissions (RIKS-HIA) |
| **Sources of error** | See Indicator A:43 |

## A:46 Waiting time for coronary artery bypass graft

**Measure** Median waiting time between decision to operate and coronary artery bypass graft (CABG) surgery in 2007

**Description** The indicator refers to the number of days between the decision to operate and CABG surgery.

Average waiting time is presented as the median value by region for 2007.

The indicator includes all CABG patients who were entered in the Swedish Cardiac Surgery Register for 2007.

As opposed to the reporting of previous years, which covered all cases of surgery in the register, only this type of surgery is included.

**Method of measurement** Median waiting time is the most frequently reported.

The indicator reflects how long patients from each region waited regardless of where surgery was performed. Patients were assigned to their region of domicile.

While cardiac surgery is not available in all regions, patients from each region are referred to the centres that perform the procedure.

**Data sources** Swedish Cardiac Surgery Register

**Sources of error** The register's participation rate for this variable is excellent, almost 100 percent.

The number of observations in some regions may be low for particular years, leading to statistical uncertainty.

## A:47 Lipid lowering drug therapy after myocardial infarction

**Measure** Percentage of myocardial infarction patients age 40–79 who received lipid lowering drug therapy after 12–18 months in 2005–2006

**Description** *Numerator*: Number of myocardial infarction patients age 40–79 in 2005–2006 who picked up prescriptions for lipid lowering drugs (statins) 12–18 months after discharge from hospital

*Denominator*: All patients hospitalised for myocardial infarction in 2005–2006

**Method of measurement** Data on the number of patients with at least one care event for myocardial infarction were taken from the inpatient section of the Patient Register. The population includes people who had at least one care event in 2005 or 2006 and who were alive on 30 June 2008.

| Diagnosis | ICD-10 code |
|---|---|
| Myocardial infarction | I21, I22 |

For these patients, data were taken from the Prescribed Drug Register for those who picked up a prescription for lipid lowering drugs (ATC C10A) 12–18 months after discharge from hospital, i.e., at least once from 1 January 2006 to 30 June 2008.

The percentages were age-standardised. Each prescription was assigned to the patient's region of domicile at the time.

**Data sources** Patient Register and Prescribed Drug Register, Swedish National Board of Health and Welfare

**Sources of error** There was very little dropout of personal identity numbers in the inpatient section of the Patient Register. Variations in diagnostic criteria among the different regions may have affected the size of the population. Because the Prescribed Drug Register does not include drugs dispensed from a drug storehouse in an assisted living facility or bought on a non-prescription basis, consumption among the elderly may be understated. Given that the register contains data only for drugs picked up from a pharmacy, the reported quantity prescribed may be low.

## A:48 Readmission after heart failure

**Measure** Percentage of heart failure patients readmitted for heart failure within 30 days from 2004 through September 2007

**Description** Consecutive care events were combined into episodes. They were linked either when the discharge date coincided with the admission date of a subsequent care event or the register showed a transfer the day after discharge.

Only care events at acute care hospitals were included when constructing episodes.

Episodes for which the primary diagnosis was heart failure and the patient had not been treated for the primary diagnosis of heart failure during the previous 365 days were monitored.

In addition, only patients who did not die during the follow-up period were included.

*Numerator*: Number of heart failure patients in accordance with the above definition who were readmitted for heart failure within 30 days after discharge

*Denominator*: All heart failure patients in accordance with the definition

**Method of measurement** The data were obtained from the inpatient section of the Patient Register.

| Diagnosis | ICD-10 code |
|---|---|
| Heart failure | I50, I110, I420 |

Corrections for age distribution in the regions were performed by means of age standardisation based on heart failure patients in 2000 as the standard. The same standard population was used for women and men.

Patients were assigned to their region of domicile.

**Data sources** Patient Register, Swedish National Board of Health and Welfare

**Sources of error** There were presumably regional differences in terms of the categories of heart failure patients admitted to hospital, as well as treated in outpatient or primary care.

The use and reliability of diagnosis for heart failure may vary among caregivers.

# ORTHOPAEDIC CARE

## A:49 Knee arthroplasty – five-year risk of revision

| | |
|---|---|
| **Measure** | Risk of revision within 5 years after knee arthroplasty in 1997–2006 |
| **Description** | Revision may be due to patient-related factors, an unfortunate choice of prosthesis or surgical technique.<br>The indicator describes the cumulative revision frequency within 5 years after total knee arthroplasty to treat gonarthrosis. Cumulative risk for revision (percentage) within 5 years in accordance with Kaplan-Meier survival analysis (survival minus 1). Revision refers to reoperation during which at least one prosthesis component is removed, added or replaced.<br>The indicator is based on primary operations in which total knee arthroplasty is performed to treat gonarthrosis. Treatment code NGB40 and ICD-10 code M17.0. |
| **Method of measurement** | Revision is assigned to the region of the hospital in which primary surgery was performed. Revision may have been performed in another region. The Swedish Knee Arthroplasty Register contains data for hospitals and clinics from every region.<br>The register's participation rate is good. |
| **Data sources** | Swedish Knee Arthroplasty Register |
| **Sources of error** | The compilation was based on descriptive data that did not take regional variations in age, risk of revision or number of patients into consideration. The results reflect surgery performed over the course of 10 years, i.e., not necessarily the current situation. Furthermore, differences among hospitals with respect to the difficulty of surgery may have had an impact on the results, while the fact that there were relatively few revisions may have caused occasional forgotten revisions to have a relatively large impact on the results. |

## A:50 Total hip replacement arthroplasty – 10-year implant survival

| | |
|---|---|
| **Measure** | Percentage of prostheses in total hip replacement arthroplasty that survived for 10 years (1998–2007) |
| **Description** | Survival refers to the number of years after primary surgery before the prosthesis must be replaced. Failure is defined as surgery in which at least one prosthesis component is replaced, or in which the entire prosthesis is replaced or removed.<br>The indicator includes all surgery performed in 1998–2007 and entered in the Swedish Hip Replacement Arthroplasty Register. All patients are covered, regardless of age or the underlying reason for surgery. |
| **Method of measurement** | The Kaplan-Meier method was used to calculate prosthesis survival.<br>All relevant Swedish clinics report data for primary total hip replacement arthroplasty to the Swedish Hip Replacement Arthroplasty Register.<br>Each operation was assigned to the region in which the clinic was located rather than where the patient was living. |
| **Data sources** | Swedish Hip Replacement Arthroplasty Register |
| **Sources of error** | The participation rate for this variable is excellent. Differing regional age structures and underlying reasons for the operation may affect the results. The results may also be affected by inter-hospital task allocation with respect to the location of complicated, high-risk operations. |

## A:51 Reoperation after total hip replacement arthroplasty

| | |
|---|---|
| **Measure** | Percentage of reoperations within 2 years after total hip replacement arthroplasty in 2004–2007 |
| **Description** | *Numerator*: Number of reoperations, regardless of the reason, within two years after total hip replacement arthroplasty – refers to all types of additional surgery (a broader concept than revision) after the index operation<br>*Denominator*: All hip replacement arthroplasty procedures entered in the Swedish Hip Replacement Arthroplasty Register in 2004–2007 |
| **Method of measurement** | Only complications treated surgically (reoperated) are included. Infections treated with antibiotics or non-surgical total dislocations (luxations) were not included. Multiple reoperations for the same reason were regarded as one. Reoperations at a non-primary clinic or region were assigned to the primary clinic or region.<br>Each operation was assigned to the region in which the clinic was located rather than where the patient was living. |
| **Data sources** | Swedish Hip Replacement Arthroplasty Register |
| **Sources of error** | See Indicator A:50 |

## A:52 Patient-reported outcome in total hip replacement arthroplasty

| | |
|---|---|
| **Measure** | Patient-reported outcome in total hip replacement arthroplasty in 2002–2007. Improvement in accordance with the EQ-5D index at 1-year follow-up |
| **Description** | The indicator reflects patient-reported health-related quality of life in accordance with the EQ-5D index one year after total hip replacement arthroplasty compared with pre-surgery. The data are for 2002–2007. |
| **Method of measurement** | The Swedish Hip Replacement Arthroplasty Register monitors the patient-reported outcome of surgery. All patients fill out a 10-question preoperative form. Patient-reported health-related quality of life is based on the EQ-5D index (five questions), generating a weighted total score from -0.594 to 1.0. The same questionnaire that is used prior to surgery is sent to the patient one year later with an additional question about level of satisfaction.<br>The difference between the scores on the two occasions is reported as improvement in health-related quality of life in accordance with the EQ-5D index.<br>Each operation was assigned to the region in which the clinic was located rather than where the patient was living. |
| **Data sources** | Swedish Hip Replacement Arthroplasty Register |
| **Sources of error** | Variations in patient mix (severity of disease, concurrent diseases, etc.) may affect the results. The register contains individual-based demographic variables (case mix). The variables are presented per clinic in the register's annual report. The variables should always be stated and considered when performing an in-depth analysis in order to compare various EQ-5D outcomes. |

## A:53 Hip fracture – waiting time for surgery

**Measure** Waiting time for hip fracture surgery after admission to hospital in 2007

**Description** The indicator describes the number of hours of waiting time at an acute care hospital from admission until hip fracture surgery is performed. The indicator presents the average waiting time per region for all hip fracture patients in 2007.

To be included, patients must have been age 50 or older and have fractures that were not associated with metastasis or other pathological bone change.

**Method of measurement** Data on average waiting time for surgery are based on the date and time of admission and the operation. Because many clinics transitioned to data entry based on date and time in 2007, this year's indicator is specified in hours instead of days.

Patients were assigned to the acute hospital at which they were operated. Hip fracture patients are elderly and not very mobile.

**Data sources** National Hip Fracture Register (RIKSHÖFT)

**Sources of error** Because time reports for hospitals that still specify fractions of days were converted to hours, the analysis is associated with a degree of uncertainty. Data from three regions were lacking for the measurement period.

## A:54 Arthroplasty for femur fracture

**Measure** Percentage of patients age 65 and older who received arthroplasty for femur fracture in 2006–2007

**Description** Patients were included if they were age 65 or older and had first-time femur fracture that was the primary diagnosis. The analysis covered those who were given hemiarthroplasty, arthroplasty or traditional osteosynthesis.

*Numerator:* First-time femur fractures in people age 65 and older that were treated with arthroplasty

*Denominator:* All femur fractures in people age 65 and older that were treated with arthroplasty or osteosynthesis

**Method of measurement** The data were obtained from the inpatient section of the Patient Register.

| **Diagnosis** | **ICD-10 code** |
|---|---|
| | S720 (Icd9:820A, 820B, 820W, 820X) |
| **Operations** | **Intervention code** |
| | Primary arthroplasty: NFB<br>Osteosynthesis or other surgery for femur fracture: NFJ39–NFJ99 |

Corrections for age distribution in the regions were performed by means of age standardisation based on hip fracture patients in 2000 as the standard. The same standard population was used for women and men.

Patients were assigned to their region of domicile.

**Data sources** Patient Register, Swedish National Board of Health and Welfare

**Sources of error** Possible regional differences in coding practice

## A:55 Drugs against post-fracture osteoporosis

**Measure**

Percentage of women age 60 and older with post-fracture osteoporosis who received drug therapy 6–12 months after fracture in 2005–2007

**Description**

Women age 60 and older who were hospitalised with the primary diagnosis of hip, knee, lumbar spine, pelvic, thoracic spine, wrist or shoulder fracture were monitored with respect to drugs against osteoporosis for 6–12 months after hospitalisation. Only the first care event since 1998 with one of the diagnoses was included.

*Numerator*: Women age 60 and over who were hospitalised for the first time for one of the above diagnoses and who received drug therapy against osteoporosis within 6–12 months after hospitalisation

*Denominator*: Women age 60 and over who were hospitalised for the first time for one of the above diagnoses

**Method of measurement**

The data were obtained from the inpatient section of the Patient Register.

| **Diagnosis** | **ICD-10 code** |
|---|---|
| | S321–S328, S525, S526, S422, S423, S22, S720–S724,S821 |
| **Drug** | **ATC code** |
| | G03C, M05B, H05A, A11C, A11JB |

Corrections for age distribution in the regions were performed by means of age standardisation based on female fracture patients in 2000 as the standard.

Patients were assigned to their region of domicile.

**Data sources**

Patient Register and Prescribed Drug Register, Swedish National Board of Health and Welfare

**Sources of error**

There may be regional differences in the use of hospitalisation for these diagnoses.

## A:56 Adverse events after knee and total hip replacement arthroplasty

**Measure**

Adverse events within 30 days after knee or total hip replacement arthroplasty in 2005–2007

**Description**

All patients are included who underwent knee or total hip replacement arthroplasty. They were monitored with respect to complications related to surgery or specific to knee or hip arthroplasty.

*Numerator*: Patients who received knee or total hip arthroplasty and had an adverse event within 30 days after discharge

*Denominator*: All patients who received knee or total hip arthroplasty

**Method of measurement**

| **Operations** | **Intervention code** |
|---|---|
| | NGB09, NGB19, NGB29, NGB39, NGB49, NFB29, NFB39, NFB49 |
| **Adverse events** | **ICD–10 code** |
| Complications associated with surgery, as well as those specific to knee or total hip replacement arthroplasty | T810, T813, T814, L899, T840, T845, S730, T933, M243, T814, T845, I803, I269, M243, M244, T840, T845, M243, T840, T814, T845, I803, I269, M243, M244, T840, Y845 |
| Cardiovascular, pneumonia, urinary retention | I, J819, J15, J18, J13, R33 |
| Death, all causes | |

Corrections for age distribution in the regions were performed by means of age standardisation based on knee and total hip replacement arthroplasty patients in 2000 as the standard.

Patients were assigned to their region of domicile.

**Data sources** Patient Register, Swedish National Board of Health and Welfare

**Sources of error** Complications detected and treated during the primary care event are not counted as adverse events.

## A:57 Improvement after surgery for herniated lumbar disc

**Measure** Patient-reported outcome of herniated lumbar disc surgery in 2006. Improvement in accordance with the EQ-5D index at 1-year follow-up.

**Description** Quality of life was measured in accordance with the EQ-5D instrument. The instrument presents quality of life as an ascending ratio from -0.59 to 1.00. The indicator covers patients who responded to EQ-5D questionnaires both preoperatively and one year later.

The indicator includes patients of all ages who were operated on at a clinic that performed herniated lumbar disc surgery, M51.1, in 2006.

**Method of measurement** For a clinic to be included, at least 15 patients had to be represented. 15 of 37 clinics that used the register in 2006 are not included. They were excluded either because they performed too few herniated lumbar disc operations or reported too few of the patients on whom they operated (at least 15 entries for each patient must have been made both preoperatively and after one year).

The indicator includes private clinics, which perform a large percentage of herniated lumbar disc operations in Sweden, within the framework of the regions in which they are active. Thus, patients are included in the statistics of the region in which they were operated on regardless of where they lived.

**Data sources** National Spine Register

**Sources of error** Clinics vary in terms of case mix, i.e., patients differ in their ability to benefit from surgery. Age, gender, period of pain prior to surgery, sickness absence and length of sickness absence are among such circumstances. Similarly, the type of payment at private clinics (insurance/private or public financing) may affect case mix. That is reflected in differences with respect to reported health-related quality of life immediately prior to surgery at the various clinics (0.09–0.41 during the 2006 measurement period). Such factors can have a major impact on results. When comparing regions, the fact that large private clinics are assigned to the region in which they are located should be taken into consideration. Thus, data may be misleading.

# KIDNEY CARE

## A:58 Mortality in dialysis or kidney transplant

| | |
|---|---|
| **Measure** | Relative risk of death in dialysis or kidney transplant among patients who started treatment in 1998–2007. Value above 1.0 = higher risk than Västra Götaland region, and vice versa |
| **Description** | The indicator describes the relative risk of death in all dialysis or kidney transplant. The indicator is based on the number of deaths of all patients who survived more than 90 days after commencement of treatment, broken down by region and related to the number of person-years per region, adjusted for risk factors, in 1998–2007. |
| **Method of measurement** | Relative risk was calculated in accordance with the Cox proportional hazards regression model. Following are the variables, recorded at the commencement of treatment, that affect the risk of death in descending order: age, primary kidney disease group, blood malignancy, peripheral vascular disease, ischaemic heart disease, treated hypertension, year, other tumour and past cerebrovascular disease. Adjusted for these variables, the risk of death varied among regions as presented.<br>To ensure reasonably stable results, data were accumulated for the past ten years (1998–2007). Only patients treated for more than 90 days were included in the analysis. The patient population of the Västra Götaland region serves as the reference. Value above 1.0 = higher risk than Västra Götaland region, and vice versa.<br>Because the analysis was performed in the patient population that survived for more than 90 days, the problem was avoided of incomplete or varying reporting of those who started with acute treatment and/or died during that period. |
| **Data sources** | National Kidney Register (SNR) |
| **Sources of error** | The analysis was rendered more difficult by the well–known fact that the regions are highly heterogeneous when it comes to size, age breakdown and socioeconomic status. Furthermore, entry of risk factors/comorbidity in the SNR is not comprehensive. |

## A:59 Goal fulfilment for dialysis dose

| | |
|---|---|
| **Measure** | Percentage of patients who reached the goal (standardised Kt/V >2) for dialysis dose in 2007 |
| **Description** | The indicator is based on the annual cross-sectional survey in autumn 2007. The variables are urea before and after dialysis, weight before and after dialysis, duration of dialysis and number of dialysis session per week. Standardised Kt/V is a marker of the efficacy of a single dialysis session. The goal is fulfilled if the value is above 2. The data include the entire patient population receiving chronic haemodialysis at the time of the cross-sectional survey. |
| **Method of measurement** | Standardised Kt/V is based on renal Kt/V, the accepted measure for a single dialysis session, and compensates for the number of sessions per week. Because a growing number of patients are on a personalised dialysis schedule, dose assessment must be based on the weekly total rather than a single session.<br>The measure is standardised to the patient's body size. Patients were reported for the dialysis clinic at which they were treated, which was almost always in their region of domicile. |
| **Data sources** | National Kidney Register |
| **Sources of error** | Possible differences in patient mix – but it is unlikely that the large variation in the results would be due to that. |

## A:60 Vascular access during dialysis

| | |
|---|---|
| **Measure** | Percentage of haemodialysis patients with an AV fistula or AV graft in 2006–2007 |
| **Description** | The best type of access to the bloodstream during haemodialysis is an arteriovenous (AV) fistula inserted by using the patient's vessels. An AV graft has inherent problems, primarily a recurring tendency for clogging and dysfunction, as well as increased risk of infection. But surveillance and various interventions can counteract these disadvantages. The alternative to an AV fistula or AV graft is a venous catheter, which has the clear disadvantage of a much higher risk of serious infection, as well as reduced blood flow leading to poorer dialysis efficacy.<br>Current access at the time of the annual cross-sectional survey in autumn 2007. All participating patients were included. |
| **Method of measurement** | Patients were reported for the dialysis clinic at which they were treated, which was almost always in their region of domicile. |
| **Data sources** | National Kidney Register |
| **Sources of error** | Possible regional differences in patient mix |

# OTHER TREATMENT METHODS

## A:61 Reoperation for inguinal hernia

| | |
|---|---|
| **Measure** | Relative regional risk for reoperation within 5 years after inguinal hernia surgery in 2003–2007 |
| **Description** | Relative risk measures the risk of reoperation following recent inguinal hernia surgery at hospitals in a region compared with the risk at hospitals in the other regions. The indicator includes all inguinal hernia surgery reported in 2003–2007. |
| **Method of measurement** | All inguinal hernia surgery reported to the Swedish Hernia Register was monitored until such time as a reoperation was performed in the same groin. Based on these data, the risk of reoperation in the same groin could be calculated in relation to the amount of time that had passed since primary surgery.<br>Each reoperation was assigned to the clinic's region rather than where the patient was living. |
| **Data sources** | Swedish Hernia Register |
| **Sources of error** | The register has a relatively good participation rate. Some clinics operate on more inguinal hernia patients who require greater technical resources. |

## A:62 Cataract surgery, visual acuity below 0.5 in the better seeing eye

| | |
|---|---|
| **Measure** | Percentage of cataract patients who had visual acuity below 0.5 dioptres in the better seeing eye at the time of surgery in 2007 |
| **Description** | *Numerator*: Number of cataract patients who had visual acuity below 0.5 dioptres in the better seeing eye at the time of surgery in 2007<br>*Denominator*: Total number of patients who received cataract surgery that was entered in the National Cataract Register for 2007 |

| | |
|---|---|
| **Method of measurement** | Nearly 80 000 cataract operations, representing nearly all those performed in Sweden, are entered in the National Cataract Register every year.<br>Patients were assigned to their region of domicile. |
| **Data sources** | National Cataract Register |
| **Sources of error** | The basic data are deemed to be of good quality. |

## A:63 Improvement after septoplasty

| | |
|---|---|
| **Measure** | Percentage of patients who had improved wholly or significantly 6 months after septoplasty from 2003 to March 2006 |
| **Description** | Septoplasty is surgery to correct a deviated nasal septum. All septoplasty is included, whether with or without conchotomy.<br>All patients in the country were included who received septoplasty due to nasal congestion and were monitored after surgery from 2003 to March 2006. |
| **Method of measurement** | For some procedures, including septoplasty, the register sends out a questionnaire six months later to gauge patient satisfaction.<br>44 clinics of an estimated 47 possible reported results.<br>The location of the clinic, not the patient's region of domicile, determines how an operation is classified. |
| **Data sources** | Swedish Ear, Nose and Throat Care Quality Register |
| **Sources of error** | No data were obtained for the Värmland or Blekinge regions. |

# SOCIOECONOMIC ANALYSIS – SOME EXAMPLES

## Educational level and country of origin

| | |
|---|---|
| **Measure** | Breakdown by educational level and country of origin |
| **Description** | The following are used for all indicators that include educational level.<br>SUN2000NIVA from Statistics Sweden to create the various education categories.<br>1 Pre-upper secondary education less than 9 years<br>2 Pre-upper secondary education, 9 years<br>3 Upper secondary education, no more than 2 years<br>4 Upper secondary education, 3 years<br>5 Post-upper secondary education, less than 3 years<br>6 Post-upper secondary education, 3 years or more (excluding postgraduate work)<br>7 Postgraduate work<br>*/9 No data available<br>Reporting for various educational levels is based on people age 45–74. Low and high educational level are normally defined as follows:<br>Low educational level = compulsory school up to 2 years of upper secondary school<br>High educational level = 3 years of upper secondary school and higher education<br>The breakdown varies somewhat by indicator, depending on the underlying data.<br>Data on country of origin are obtained from Statistics Sweden.<br>Data on smoking are taken from the Medical Birth Register. |

# B Patient Experience

## B:1 General population – availability of health care

| | |
|---|---|
| **Measure** | Percentage of the general population who reported having access to the care that they needed |
| **Description** | The indicator shows perceptions among members of the general population about their access to health care regardless of whether they have had recent contact with the system or not.<br>*Numerator*: Number of selected members of the general population in 2007 who agreed wholly or in part with the statement that they had access to the health care that they needed<br>*Denominator*: Total number of interviewees in the 2007 sample of the general population |
| **Method of measurement** | The data are based on telephone interviews with more than 43 000 selected members of the general population age 18 and older. The study consisted of four annual rounds, each of which involved 250 interviews in each region. In order to improve statistical reliability, the sample was larger in some regions. |
| **Data sources** | Healthcare Survey, Swedish Association of Local Authorities and Regions (SALAR) |
| **Sources of error** | The response rate was approximately 70 percent in each region. |

## B:2 General population – confidence in primary care

| | |
|---|---|
| **Measure** | Percentage of the general population who reported having a lot or quite a lot of confidence in the care provided by health centres or the equivalent |
| **Description** | The indicator reflects confidence among members of the general population in primary care regardless of whether or not they had recent contact with a health centre.<br>*Numerator*: Number of selected members of the general population in 2007 reporting that they had a lot or quite a lot of confidence in the care provided by health centres<br>*Denominator*: Total number of interviewees in the 2007 sample of the general population |
| **Method of measurement** | See Indicator B:1 |
| **Data sources** | Healthcare Survey, Swedish Association of Local Authorities and Regions (SALAR) |
| **Sources of error** | The response rate was approximately 70 percent in each region. |

## B:3 General population – confidence in hospital care

| | |
|---|---|
| **Measure** | Percentage of the general population who reported having a lot or quite a lot of confidence in the care provided by hospitals |

| | |
|---|---|
| **Description** | The indicator reflects confidence among members of the general population in care and treatment regardless of whether or not they had recent contact with a hospital.<br>*Numerator*: Number of selected members of the general population in 2007 reporting that they had a lot or quite a lot of confidence in the care provided by hospitals<br>*Denominator*: Total number of interviewees in the 2007 sample of the general population |
| **Method of measurement** | See Indicator B:1 |
| **Data sources** | Healthcare Survey, Swedish Association of Local Authorities and Regions (SALAR) |
| **Sources of error** | The response rate was approximately 70 percent in each region. |

## B:4 Patient ratings of their most recent visit at a health centre

| | |
|---|---|
| **Measure** | Percentage of patients who had a favourable perception of their latest visit at a health centre or the equivalent |
| **Description** | Patients refer to people who had visited, themselves or accompanying next of kin or a closely related person, a health centre (or the equivalent) during the past 12 months.<br>Having a favourable perception means a rating of 4 or 5 on a 5-point scale.<br>*Numerator*: Number of people in 2007 who had a favourable perception of their latest visit at a health centre<br>*Denominator*: Total number of interviewees in 2007 who had visited a health centre |
| **Method of measurement** | The data are based on telephone interviewees who stated that they had visited a health centre. The survey included more than 43 000 selected interviewees age 18 and older. |
| **Data sources** | Healthcare Survey, Swedish Association of Local Authorities and Regions (SALAR) |
| **Sources of error** | The response rate was approximately 70 percent in each region. |

## B:5 Patient ratings of their most recent visit at a hospital

| | |
|---|---|
| **Measure** | Percentage of patients who had a favourable perception of their latest visit at a hospital |
| **Description** | Patients refer to people who had visited, themselves or accompanying next of kin or a closely related person, a department or outpatient clinic of a hospital during the past 12 months.<br>Having a favourable perception means a rating of 4 or 5 on a 5-point scale.<br>*Numerator*: Number of people in 2007 who had a favourable perception of their latest visit at a hospital<br>*Denominator*: Total number of interviewees in 2007 who had visited a department or outpatient clinic of a hospital |
| **Method of measurement** | The data are based on telephone interviewees who stated that they had visited a hospital. The survey included more than 43 000 selected interviewees age 18 and older. |

| | |
|---|---|
| **Data sources** | Healthcare Survey, Swedish Association of Local Authorities and Regions (SALAR) |
| **Sources of error** | The response rate was approximately 70 percent in each region. |

## B:6 Patient perception of whether they received the help they expected during their visit

| | |
|---|---|
| **Measure** | Percentage of patients who felt that they had received the help they expected during their visit |
| **Description** | Patients refer to people who had visited, themselves or accompanying next of kin or a closely related person, some type of outpatient clinic during the past 12 months.<br>*Numerator*: Number of people in 2007 who agreed wholly or in part with the statement that they had received the help they expected during a visit at a health centre or hospital<br>*Denominator*: Total number of interviewees in 2007 who visited a health centre or hospital |
| **Method of measurement** | The data are based on telephone interviewees who stated that they had visited some type of outpatient clinic. The survey included more than 43 000 selected interviewees age 18 and older. |
| **Data sources** | Healthcare Survey, Swedish Association of Local Authorities and Regions (SALAR) |
| **Sources of error** | The response rate was approximately 70 percent in each region. |

## B:7 Patients who reported having had a reasonable waiting time for a visit at a health centre

| | |
|---|---|
| **Measure** | Percentage of patients who felt that their waiting time for a visit at a health centre had been reasonable |
| **Description** | Patients refer to people who had visited, themselves or accompanying next of kin or a closely related person, a health centre (or the equivalent) during the past 12 months.<br>*Numerator*: Number of patients in 2007 who felt that their waiting time for a visit at a health centre or the equivalent was reasonable<br>*Denominator*: Total number of interviewees in 2007 who had visited a health centre or the equivalent |
| **Method of measurement** | The data are based on telephone interviewees who stated that they had visited a health centre or the equivalent. The survey included more than 43 000 selected interviewees age 18 and older. |
| **Data sources** | Healthcare Survey, Swedish Association of Local Authorities and Regions (SALAR) |
| **Sources of error** | The response rate was approximately 70 percent in each region. |

## B:8 Patient perception of the availability of health centres by phone

| | |
|---|---|
| **Measure** | Percentage of patients who felt that it was easy to reach health centres or the equivalent by phone |
| **Description** | *Numerator*: Number of interviewees in 2007 who felt that it was easy or very easy to reach health centres or the equivalent by phone<br>*Denominator*: Total number of interviewees in 2007 who had visited a health centre or the equivalent and who had phoned ahead of time |
| **Method of measurement** | The survey included more than 43 000 selected interviewees age 18 and older. The indicator includes only interviewees who had visited or phoned a health centre. |
| **Data sources** | Healthcare Survey, Swedish Association of Local Authorities and Regions (SALAR) |
| **Sources of error** | The response rate was approximately 70 percent in each region. |

## B:9 Stroke patient satisfaction with hospital care

| | |
|---|---|
| **Measure** | Percentage of stroke patients reporting that they were satisfied or highly satisfied with the hospital care they had received |
| **Description** | *Numerator*: Number of patients in 2007 who responded in a questionnaire three months after the acute stage of stroke that they were satisfied or highly satisfied with the hospital care they had received<br>*Denominator*: Total number of stroke patients who responded to the questionnaire in 2007 |
| **Method of measurement** | Follow-up by the National Stroke Register includes a questionnaire that allows patients to express their views three months after the acute stage of stroke concerning various aspects of the care they have received. All acute care hospitals that treat stroke patients participate. The data collected from the various hospitals are analysed each year.<br>Data were assigned to the region in which the clinic was located rather than where the patient was living. |
| **Data sources** | National Stroke Register |
| **Sources of error** | The percentage of stroke cases reported to the register varied from region to region. The response rate to the patient questionnaire also exhibited regional differences but totalled 90 percent nationwide. |

# C Time-related Availability

## PRIMARY CARE

### C:1 Percentage of patients who were given a doctor's appointment within a week

**Measure**

Percentage of patients who were given a doctor's appointment within seven days in primary care in March 2008

**Description**

The indicator reflects the number of patients who were given an appointment at a primary care clinic within seven days in relation to the total number of reported appointments covered by Sweden's healthcare guarantee.

The waiting time runs from the date on which the patient contacted the health centre and was given an appointment until the date of the appointment.

A doctor's appointment is defined as an occasion on which a patient sees a doctor for either a previously unknown health problem or an unexpected or substantial change/deterioration of a previously known health problem. Occasions on which a patient sees a doctor to check up on or monitor a known health problem or to obtain a medical certificate are not included. The indicator excludes patients who waited longer than offered.

*Numerator*: Number of patients who were given appointments at a primary care clinic within seven days on 31 March – 4 April 2008

*Denominator*: Total number of reported appointments at primary care clinics on 31 March – 4 April 2008

**Method of measurement**

All health centres or the equivalent report data on waiting times in calendar days per patient. Private primary care clinics with healthcare agreements are also included. Only appointments at primary care clinics during ordinary office hours are reported.

The measurement has been performed for five consecutive days each March and October starting in 2006. The data are reported online using a specially designed tool.

**Data sources**

Waiting Times in Health Care database, Swedish Association of Local Authorities and Regions (SALAR)

**Sources of error**

The percentage of patients who are given appointments within seven days is dependent on how long in advance they can receive an appointment. Some health centres make appointments only a limited number of days in advance.

Availability data are misleading for health centres where patients can make an appointment for the same day only and must phone again the next day if all time slots are already filled.

The extent to which the health centres report occasions on which the patient chooses a later appointment than the earliest one offered is also unclear because that information is usually not recorded when the appointment is made.

## C:2 Percentage of phone calls answered for counselling and/or making an appointment

| | |
|---|---|
| **Measure** | Percentage of phone calls answered for counselling and/or making an appointment at health centres or the equivalent during normal hours |
| **Description** | The indicator describes the percentage of phone calls answered out of all calls over the course of 1 month.<br>Telephone availability includes only calls for counselling and/or making an appointment that are received through computerised telephony. Availability is measured by the total number of calls that are made to the advertised phone number and the number that are answered.<br>Primary care is to offer assistance, either by phone or with an appointment the same day that the health centre is contacted.<br>*Numerator*: Number of calls answered on 1–31 March 2008<br>*Denominator*: All calls made on 1–31 March 2008 |
| **Method of measurement** | All health centres or the equivalent reported data on the total number of calls made and the number answered for the measurement period. Private primary care clinics with healthcare agreements are also included. Telephone availability is reported during normal hours only. Incoming calls in the evening, at night or on weekends when the health centre is closed are excluded.<br>Thus, only a limited percentage of availability is monitored.<br>The data are reported online using a specially designed tool. Only measurement through computerised telephony, not manual measurement, is included. |
| **Data sources** | Waiting Times in Health Care database, Swedish Association of Local Authorities and Regions (SALAR) |
| **Sources of error** | The data reported have been obtained either from computerised telephony systems (voice response systems with callback function) or switchboards that offer the ability to monitor unanswered calls. Because system settings and staffing vary a great deal, the results are not fully comparable but are only one indication of telephone availability. |

## C:3–C:14 Number of patients with waiting times longer than 90 days – initial visit or treatment (surgery/procedure) in scheduled specialised care

| | |
|---|---|
| **Measure** | Percentage of the total number of waiting patients and of the number of patients per 1 000 inhabitants who waited longer than 90 days for their initial visit or for treatment (surgery/procedure) in scheduled specialised care.<br>A special selection of visit and procedure areas is reported separately. |
| **Description** | The indicator describes the percentage of the total number of waiting patients and of the number of patients per 1 000 inhabitants who had waited longer than 90 days on 31 March 2008.<br>The indicator covers patients in scheduled specialised care for whom a decision concerning a visit or treatment had been made in accordance with specific indications and with the concurrence of the patient.<br>The indicator includes patients whose visit was postponed by the clinic. The indicator excludes patients who waited at least 14 days longer than offered, either by their own choice or for medical reasons. |
| **Method of measurement** | County councils report data concerning publicly financed scheduled specialised care services, i.e., services provided under the auspices of the county councils and private caregivers with agreements whose offering meets the selection criteria of the database.<br>The database for specialised care does not contain patient-specific data, but consists of aggregate data that are collected chiefly from patient and care administrative systems.<br>The database's offering covers almost all (85–90 percent) scheduled services, while the healthcare guarantee applies to all scheduled care.<br>Data on the number of waiting patients per 1 000 inhabitants are reported only for regions with a response rate of at least 90 percent. |
| **Data sources** | Waiting Times in Health Care database, Swedish Association of Local Authorities and Regions (SALAR) |
| **Sources of error** | Low response rates from some regions and/or service areas narrow the scope for making accurate comparisons.<br>The criteria and medical indications that determine whether a patient will be put on a waiting list or schedule may vary and compromise comparability. |

# D Costs

## COST PER CAPITA

### D:1 Healthcare cost per capita

| | |
|---|---|
| **Measure** | County council costs for health care per capita in Swedish kronor in 2007 |
| **Description** | The costs do not include dental care.<br>Costs for home healthcare services have been excluded, given that the responsibilities of regions vis-à-vis local authorities vary.<br>Cost refers to net costs, i.e., costs less income. Net costs are those that are financed by county council taxes, general government subsidies and net financial income. Costs for private care and care provided by another county council are included. Costs for services that one county council sells to another one are not included.<br>Cost is presented in Swedish kronor per capita on 31 December 2007. |
| **Method of measurement** | Annual questionnaires to all county councils concerning accounting information on costs and income for various services. An interregional breakdown of services, VI 2000, defines and limits health care, dental care, home healthcare services, etc. A joint chart of accounts defines types of costs and income. |
| **Data sources** | A report entitled ”Statistics on Health Care and Regional Development 2007”, Swedish Association of Local Authorities and Regions (SALAR).<br>Population data, Statistics Sweden |
| **Sources of error** | The data quality is good, but the county councils have certain problems isolating home healthcare services since they are incorporated into other health care. Including home healthcare services would further compromise comparability.<br>Attempts at interpretation should note that the indicator does not consider the differing needs of the populations of various regions. |

### D:2 Structure-adjusted healthcare cost per capita

| | |
|---|---|
| **Measure** | County council costs for health care in kronor per capita in 2007 adjusted for structural factors in accordance with the system for cost equalisation among the county councils |
| **Description** | The indicator describes healthcare costs adjusted for factors that the county council cannot affect, including the age breakdown of the population, frequency of disease, etc.<br>The measure is the actual net cost per inhabitant in accordance with D:1, excluding drugs, divided by the ratio of the standard cost for healthcare in the region and the corresponding standard cost for the country. That is added to drug costs divided by the ratio of the region’s government drug subsidy per capita and the average government subsidy. |

**Method of measurement**

Expected net cost in accordance with the needs index (standard cost) is calculated each year by the system of economic equalisation for local authorities. Standard cost represents the cost per capita in the region, taking into consideration sparsely populated areas and the prevalence of certain groups with heavy healthcare needs, as well as population differences with respect to age, employment, income and housing. The standard cost is based on the national average for each subgroup. Regional differences in standard cost are intended to reflect the cost significance of these structural disparities. The difference between a region's standard cost and the standard cost for the country represents a corresponding subsidy or charge in fiscal cost equalisation.

The government subsidy for drugs is allocated among the regions in accordance with a model similar to the one for health care. The ratio of the government subsidy per capita for the region and the national average represents structural differences in the occurrence of disease that affect expected drug costs.

**Data sources**

Financial and service statistics according to VI 2000, Swedish Association of Local Authorities and Regions (SALAR)

Patient Register, Swedish National Board of Health and Welfare population data, Statistics Sweden

**Sources of error**

The model for calculating standard cost does not capture all structural factors that affect costs.

## D:3 Net cost per capita – primary care

**Measure**

County council costs for primary care per capita in Swedish kronor in 2007

**Description**

Primary care includes general practitioners, nurses, maternal and paediatric care, physical therapy, occupational therapy, emergency services, etc. according to the definition in VI 2000.

Costs for home healthcare have been excluded, given that the responsibilities of regions vis-à-vis local authorities vary.

Costs for the pharmaceutical benefits scheme are excluded, given that county councils do not consistently report costs for the unit that receives patients.

Cost is defined as net cost, i.e., costs less income (see detailed explanation under Indicator D:1).

Cost is presented in Swedish kronor per capita on 31 December 2007.

**Method of measurement**

See description under indicator D:1.

**Data sources**

See description under indicator D:1.

**Sources of error**

See description under indicator D:1.

## D:4 Net cost per capita – specialised medical care

| | |
|---|---|
| **Measure** | County council costs for specialised medical care per capita in Swedish kronor in 2007 |
| **Description** | Specialised medical care includes short-term medical and surgical care, as well as rehabilitation and geriatrics. Both inpatient and outpatient services are included. The area is defined in VI 2000.<br>Costs for home healthcare services have been excluded, given that the responsibilities of regions vis-à-vis local authorities vary.<br>Costs for the pharmaceutical benefits scheme are excluded, given that county councils do not consistently report costs for the unit that receives patients.<br>Cost is defined as net cost, i.e., costs less income (see detailed explanation under Indicator D:1).<br>Cost is presented in Swedish kronor per capita on 31 December 2007. |
| **Method of measurement** | See description under indicator D:1. |
| **Data sources** | See description under indicator D:1. |
| **Sources of error** | See description under indicator D:1. |

## D:5 Net cost per capita – specialised psychiatric care

| | |
|---|---|
| **Measure** | County council costs for specialised psychiatric care per capita in Swedish kronor in 2007 |
| **Description** | Specialised psychiatric care includes general, child and adolescent, and forensic psychiatry. Both short-term and long-term care are included. The area is defined in VI 2000.<br>Costs for home healthcare services have been excluded, given that the responsibilities of regions vis-à-vis local authorities vary.<br>Costs for the pharmaceutical benefits scheme are excluded, given that county councils do not consistently report costs for the unit that receives patients.<br>Cost is defined as net cost, i.e., costs less income (see detailed explanation under Indicator D:1). Cost is presented in Swedish kronor per capita on 31 December 2007. |
| **Method of measurement** | See description under indicator D:1. |
| **Data sources** | See description under indicator D:1. |
| **Sources of error** | See description under indicator D:1. |

## D:6 Cost of health care – change from 2005 to 2007

| | |
|---|---|
| **Measure** | Percentage change in county council costs per capita from 2005 to 2007 |
| **Description** | The costs do not include dental care.<br>Costs for home healthcare services have been excluded, given that the responsibilities of regions vis-à-vis local authorities vary.<br>Restructuring costs have been excluded.<br>The cost is calculated per capita.<br>Cost refers to net costs, i.e., costs less income (see more detailed description under Indicator D:1).<br>The cost trend is calculated as the total percentage change per capita from 2005 to 2007. The rate of increase refers to net costs in current prices, i.e., unadjusted for wage and price growth.<br>*Numerator*: Cost per capita on 31 December 2005<br>*Denominator*: Cost per capita on 31 December 2007 |
| **Method of measurement** | See description under indicator D:1. |
| **Data sources** | See description under indicator D:1. |
| **Sources of error** | See description under indicator D:1. |

## D:7 Adjusted drug cost per capita

| | |
|---|---|
| **Measure** | Cost per capita for drugs covered by the pharmaceutical benefits scheme in 2007 |
| **Description** | The indicator describes the cost in kronor per capita for prescription drugs that are covered by the pharmaceutical benefits scheme. Costs for the following drugs are excluded: B01AB heparin group, B03XA other drugs for anaemia, J06BA human normal immunoglobulin, L01 cytostatic/cytotoxic drugs, L04AB TNF alpha blockers. Costs for articles of consumption are not included. |
| **Method of measurement** | Age and gender standardisation based on the national population in 2006 |
| **Data sources** | Prescribed Drug Register, Swedish National Board of Health and Welfare |
| **Sources of error** | No adjustments were made for any regional variation in the frequency of disease. |

# COST PER CARE EVENT OR VISIT

## D:8 Cost per DRG point – specialised medical care

| | |
|---|---|
| **Measure** | County council costs in Swedish kronor per DRG point in specialised medical care for 2007 |
| **Description** | Specialised medical care includes short-term medical and surgical care, as well as rehabilitation and geriatrics. The indicator includes inpatient, outpatient and home healthcare services. The area is defined in VI 2000.<br>Costs for home healthcare services are included.<br>Costs for the pharmaceutical benefits scheme are excluded, given that county councils do not consistently report costs for the unit that receives patients.<br>Cost is defined as net cost (see detailed description under Indicator D:1).<br>Care events or visits are expressed as consumed DRG points. Total DRG points represent the sum of the products of each contact with the healthcare system and the weight assigned to the particular contact. |
| **Method of measurement** | Net cost is adjusted for the purchase and sale of specialised medical services among county councils in order to match up the data that are used.<br>Total DRG points are calculated on the basis of care events and visits consumed by county councils adjusted for the weight that has been assigned to each contact. All care events, along with doctor's appointments in DRG groups 003O–720O, are aggregated in NordDRG and thereby assigned a DRG group and weight in accordance with the latest available classification and weight list. The remaining visits are broken down into caregiver category and service area and assigned a standard weight for each group.<br>The weights for NordDRG are calculated from the national Cost Per Patient (CPP) database, which contains actual costs per care event for almost 50 percent of inpatient services in 2007.<br>The care events and visits are taken from national patient registers and SALAR's visit statistics.<br>Contacts and costs that cannot be linked to a particular region are assigned to the nationwide results. |
| **Data sources** | A report entitled "Statistics on Health Care and Regional Development 2007", Swedish Association of Local Authorities and Regions (SALAR).<br>Patient Register, Swedish National Board of Health and Welfare<br>CPP database, Swedish Association of Local Authorities and Regions (SALAR)<br>Statistical processing, Swedish Association of Local Authorities and Regions (SALAR) |
| **Sources of error** | DRG points are calculated on the basis of the primary entries, generally with respect to diagnosis and intervention, of individual contacts with the healthcare system. Thus, errors in basic coding may affect results, though only marginally. DRG adjusts for regional differences in patient mix, patient age and disease severity, but not for other factors. The Patient Register is well established in inpatient care, but inadequacies remain when it comes to outpatient care. |

## D:9 Change in cost per DRG point – specialised medical care

| | |
|---|---|
| **Measure** | Cost per DRG point, annual change in specialised medical care from 2005 to 2007 |
| **Description** | Costs for home healthcare services are included. Costs for the pharmaceutical benefits scheme are excluded, given that county councils do not consistently report costs for the unit that receives patients.<br>Cost is defined as net cost (see detailed description under Indicator D:1).<br>Care events or visits are expressed as consumed DRG points. Total DRG points represent the sum of the products of each contact with the healthcare system and the weight assigned to the particular contact (see detailed description under Indicator D:7).<br>The annual change is defined as the average of the changes from 2004 to 2005 and 2005 to 2006. |
| **Method of measurement** | Net cost is adjusted for the purchase and sale of specialised medical services among county councils in order to match up the data that are used. The costs are inflation-adjusted to the County Council Price Index (LPI).<br>The latest available version of NordDRG and actual DRG weights are used for each year. |
| **Data sources** | See Indicator D:7 |
| **Sources of error** | See Indicator D:7 |

## D:10 Cost per outpatient contact – primary care

| | |
|---|---|
| **Measure** | County council costs per weighted outpatient contact in primary care in 2006 |
| **Description** | See the description under Indicator D:3 for a definition of primary care.<br>Costs for home healthcare services have been excluded, given that the responsibilities of regions vis-à-vis local authorities vary.<br>Costs for the pharmaceutical benefits scheme are excluded, given that county councils do not consistently report costs for the unit that receives patients.<br>Cost is defined as net cost (see detailed description under Indicator D:1).<br>Weighted outpatient contact includes the number of visits (clinic, home, etc.) and phone calls (only one if they take the place of a visit) with a doctor or other caregiver. The contacts are aggregated based on average resource consumption. |
| **Method of measurement** | Outpatient contacts are weighted according to place (phone or clinic), the type of caregiver involved, and the category for which they are reported (such as occupational therapy or general practitioner's care).<br>The various types of visits and phone calls are weighted according to average resource consumption. Contacts with doctors and other caregivers are weighted similarly. A home visit corresponds to 2 visits at a clinic, and a phone call corresponds to 1/3 of a visit at a clinic. A visit with a non-doctor corresponds to 40 percent of a visit with a doctor. The outpatient contacts are then weighted according to the average cost per contact for each category (general practitioner's care, nursing care, etc). |
| **Data sources** | Financial and service statistics according to VI 2000, Swedish Association of Local Authorities and Regions (SALAR) |

**Sources of error** There is some uncertainty with regard to breaking down outpatient contacts by type of visit, as well as to phone call data. The statistics are relatively new, and reporting is not yet complete in all regions.

In terms of cost calculations, county councils have certain problems isolating home healthcare services since they are incorporated into other health care.

# COST-EFFECTIVE TREATMENT OPTIONS – CHOOSING AMONG EQUIVALENT DRUGS OR BETWEEN DAY-CASE AND INPATIENT SURGERY

## D:11 Percentage of reflux disease and gastric ulcer patients treated with omeprazole

**Measure** Percentage of reflux disease and gastric ulcer patients treated with omeprazole in 2007

**Description** The indicator presents the number of patients who were prescribed omeprazole as a percentage of all those who were prescribed a proton pump inhibitor.

*Numerator*: Number of reflux disease and gastric ulcer patients who were given omeprazole as their first prescription in 2007

*Denominator*: Total number of patients who were prescribed some type of proton pump inhibitor as their first prescription in 2006

The indicator is based on prescriptions that were picked up at a pharmacy.

**Method of measurement** For each drug, the data were taken from the Prescribed Drug Register and concerned the first time that a patient picked up a prescription.

| Drug | ATC code |
|---|---|
| Omeprazole | A02BC01 |
| Proton pump inhibitors | A02BC |

Each prescription was assigned to the patient's region of domicile.

The column to the right of the figure also presents the percentage of the total population that picked up prescriptions for proton pump inhibitors.

**Data sources** Prescribed Drug Register, Swedish National Board of Health and Welfare

**Sources of error** Using the first prescription that the patient picked up during the year offers an approximate, but not exact, comparison of the various drugs.

## D:12 Percentage of low-cost statins prescribed for lipid lowering therapy

**Measure** Percentage of low-cost statins prescribed for lipid lowering therapy in 2007

**Description** The indicator presents the number of patients who were prescribed simvastatin or pravastatin as a percentage of all those who were prescribed statins.

*Numerator*: Number of patients whose first prescription in 2007 was simvastatin or pravastatin for lipid lowering therapy

*Denominator*: Total number of patients who were prescribed some type of statin for lipid lowering therapy in 2006

| | |
|---|---|
| **Method of measurement** | For each drug, the data were taken from the Prescribed Drug Register and concerned the first time that a patient picked up a prescription. |

| Drug | ATC code |
|---|---|
| Simvastatin | C10AA01 |
| Pravastatin | C10AA03 |
| Statins | C10AA |

Each prescription was assigned to the patient's region of domicile.

| | |
|---|---|
| **Data sources** | Prescribed Drug Register, Swedish National Board of Health and Welfare |
| **Sources of error** | Using the first prescription that the patient picked up during the year offers an approximate, but not exact, comparison of the various drugs. |

## D:13 Percentage of angiotensin II receptor antagonists prescribed for antihypertensive therapy

| | |
|---|---|
| **Measure** | Percentage of new angiotensin II receptor antagonist (ARA) users who had not previously been prescribed ACE inhibitors, 2007 |

**Description**

All ARAs receive limited subsidies, i.e., only for patients who have tried but cannot use ACE inhibitors or as an adjunct to ACE inhibitors. The new directive is in effect as of 1 September 2008 as specified by the Dental and Pharmaceutical Benefits Agency.

The indicator studies the extent to which new users of ARAs were previously treated with ACE inhibitors. The calculation is based on people who picked up an ARA prescription for the first time since 1 July 2005 between 1 July 2007 and 30 June 2008.

*Numerator:* Number of people who picked up an ARA prescription between 1 July 2007 and 30 June 2008 and who had not used ARAs or ACE inhibitors since 1 July 2005

*Denominator:* Number of people age 30–79 who picked up an ARA prescription between 1 July 2007 and 30 June 2008 and who had not used ARAs since 1 July 2005

| | |
|---|---|
| **Method of measurement** | The data were obtained from the Prescribed Drug Register for prescriptions picked up at a pharmacy. |

| Drug | ATC code |
|---|---|
| ARA | C09C, C09D |
| ACE | C09A, C09B |

Age-standardised based on new users of ARAs as the standard. Patients were assigned to their region of domicile.

| | |
|---|---|
| **Data sources** | Prescribed Drug Register, Swedish National Board of Health and Welfare |
| **Sources of error** | The register has no data on the indication for which the drug was prescribed. |

## D:14 Inguinal hernia – percentage of day-case surgery

**Measure** Percentage of day-case surgery for inguinal hernia in 2007

**Description** The indicator reflects the number of day-case operations as a percentage of all surgery for inguinal hernia.

*Numerator*: Number of day-case operations for inguinal hernia in 2007

*Denominator*: Total number of operations for inguinal hernia in 2007, including inpatient care

**Method of measurement** The indicator is based on the number of operations, which is not necessarily the same as the number of patients operated on.

| Diagnosis | ICD-10 code | Intervention code |
|---|---|---|
| Inguinal hernia | K40.2, K40.9 | JAB |

Each operation was assigned to the patient's region of domicile (describes consumption rather than production).

**Data sources** Patient Register, Swedish National Board of Health and Welfare

**Sources of error** Reporting to the outpatient section of the Patient Register is incomplete. That may partially affect the results. Dropout in some regions is due to the failure of private caregivers to report to the register. Because some county councils have system errors, their intervention codes were not reported at the time of the care event.

## D:15 Prolapse of the uterus – percentage of day-case surgery

**Measure** Percentage of day-case surgery for prolapse of the uterus in 2007

**Description** The indicator reflects the number of day-case operations as a percentage of all surgery for prolapse of the uterus.

*Numerator*: Number of day-case operations for prolapse of the uterus in 2007

*Denominator*: Total number of operations for prolapse of the uterus in 2007, including inpatient care

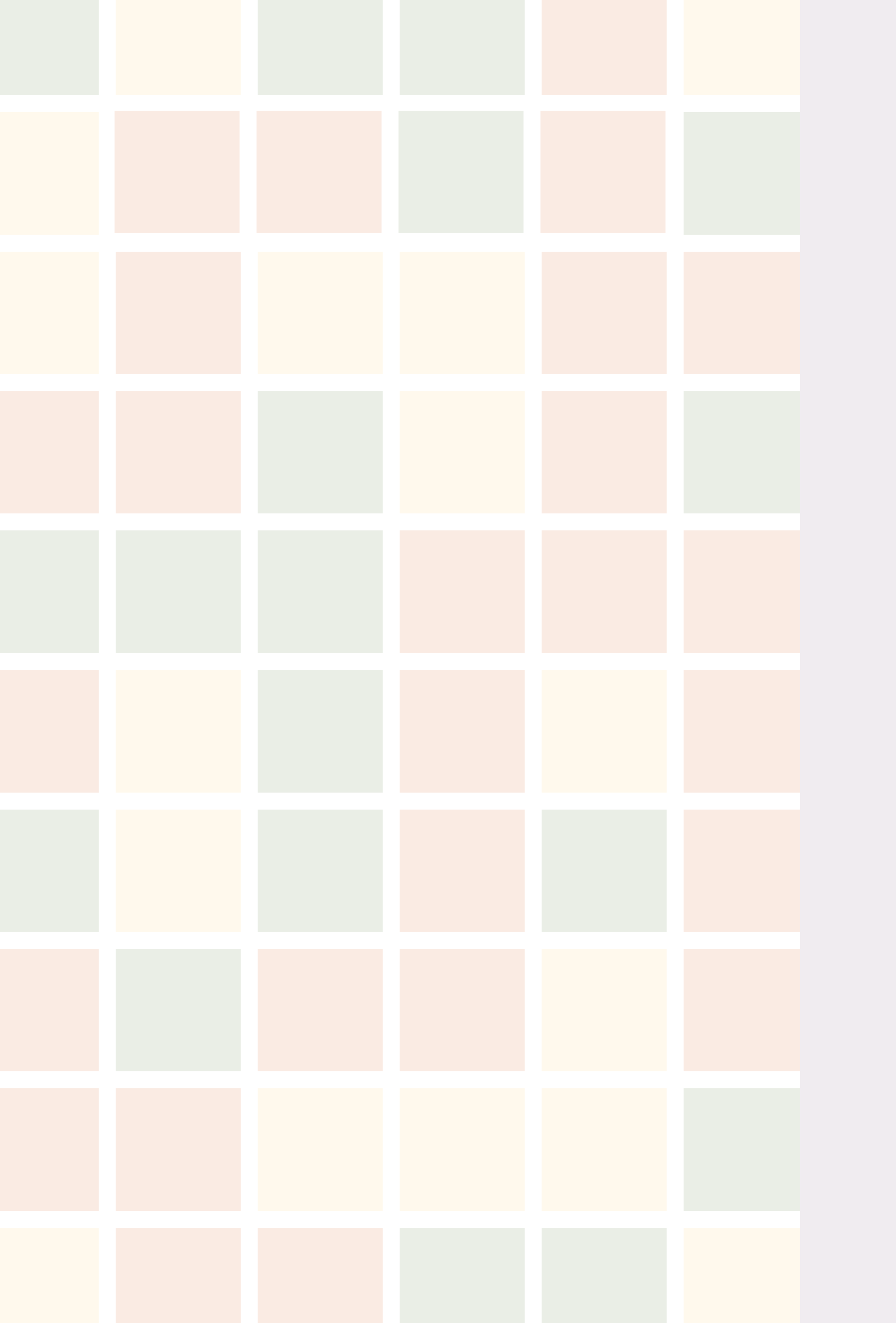
**Method of measurement** The indicator is based on the number of operations, which is not necessarily the same as the number of patients operated on.

| Diagnosis | ICD-10 code | Intervention code |
|---|---|---|
| Prolapse of the uterus | N81.1–N81.6, N81.9, N88.4, N99.3 | LEF |

Each operation was assigned to the patient's region of domicile (describes consumption rather than production).

**Data sources** Patient Register, Swedish National Board of Health and Welfare

**Sources of error** Reporting to the outpatient section of the Patient Register is incomplete. That may partially affect the results. Dropout in some regions is due to the failure of private caregivers to report to the register. Because some county councils have system errors, their intervention codes were not reported at the time of the care event.



# Quality and Efficiency in Swedish Health Care
# Regional Comparisons 2008

This is the third annual report in a series called *Quality and Efficiency in Swedish Healthcare – Regional Comparisons*. In this series, health care quality and efficiency in the 21 Swedish health care regions is compared, by using a set of national performance indicators. The first report was published in 2006.

One purpose of the comparisons is to inform and stimulate the public debate on health care quality and efficiency. A second purpose is to stimulate and support local and regional efforts to improve health care services, both in terms of clinical quality and medical outcomes, and in terms of patient experience and efficient use of resources.

Swedish Association of Local Authorities and Regions
ISBN 978-91-7164-452-7

Swedish National Board of Health and Welfare
Art. nr. 2009-126-144

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of Local Authorities
and Regions

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