Day surgery in Norway 2013–2017

A selection of procedures

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Foreword

The publication of this updated day surgery atlas is an important event for several reasons. The term day surgery covers health services characterised by different issues and drivers. While 'necessary care' is characterised by consensus about indications and treatment and makes up about 15% of the health services, 'preference-driven care' is based more on the preferences of the treatment providers and/or patients. The preference-driven services account for about 25% of health services. The final and biggest group, which includes about 60% of all health services, is often called supply-driven and can be described as 'supply creating its own demand'.

Day surgery is a small part of the public health service in terms of resource use. However, it is a service that can be used to treat more and more conditions, and it is therefore becoming increasingly important for both clinical and resource reasons. How day surgery is prioritised and delivered is very important to patient treatment and to the legitimacy of the public health service. Information about how this health service is distributed in the population therefore serves as an important indicator of whether we are doing our job and whether the regional health authorities are fulfilling their responsibility to provide healthcare to their region's population. It is becoming increasingly important to find more good measures of how this responsibility is being fulfilled over time, both for the population's sake and to enable us to prioritise.

The atlas provides good insight into the current practice in the field and whether there is considerable variation between geographical areas. In medical diagnostics and treatment, as in many other areas, there is 'more than one way to skin a cat'. We know that traditions differ and that people 'swear by' different ways of carrying out tasks - often with equally good results. At the same time, we know that there are harmful aspects to implementing treatment measures. That is why we need a good knowledge base for interventions. Knowledge about variation in professional practice is primarily intended to provide a basis for improvement efforts in the different specialist communities with a view to reducing unwarranted variation.

In light of this, I hope that the Norwegian Medical Association's campaign *Gjør kloke valg!*, which is a national follow-up of the *Choosing wisely* initiative, will boost efforts to reduce variation. Changes in professional practice also mean that individual professionals and professional communities will have to question their own way of doing things. It is understandable that this is not always easy.

Here in the Northern Norway Regional Health Authority, we have not done enough to follow up the results from the previous day surgery atlas. We are now in a better position to do so. The initiative from the medical community themselves, in the form of the Norwegian Medical Association's focus on overtreatment, means that the healthcare professionals are on board. Together with the authorities' attention, this should give us a better basis for addressing unwarranted variation and achieving more uniform practice, better prioritisation and a more equitable distribution of health services.

Bodø, 1 November 2018

Lars Vorland
Managing Director
Northern Norway RHA

Contents

Summary

The fundamental question that the healthcare atlases shed light on is whether health services are equitably distributed regardless of where people live. The first Norwegian healthcare atlas was published on 13 January 2015. It provided an overview of twelve of the most common surgical procedures that are normally carried out as day surgery in Norway, and it identified considerable variation for most of these procedures during the period 2011–2013.

This healthcare atlas describes developments in the use of and variation between the health trusts' hospital referral areas for the same twelve procedures during the period 2013–2017. The Norwegian Patient Registry is our main source of data. It contains information about publicly funded activity at public hospitals, private hospitals and specialists in private practice under public funding contracts.

What has happened since 2013?

Despite the attention that the variation identified in the day surgery atlas attracted among the medical community, the media and the political level following its publication in 2015, there is still significant variation between the health trusts' hospital referral areas in the use of day surgery procedures. For some procedures, particularly *shoulder surgery*, *aural ventilation tube insertion* and *droopy eyelid surgery*, the variation between hospital referral areas has actually increased.

Generally speaking, the number of day surgery procedures remained relatively stable during the period 2013–2017. There was a significant decrease in the two most debated procedures, namely *shoulder* and *meniscus surgery*. The benefit of these procedures was already under debate in the medical community, and the decrease had started before the publication of the day surgery atlas. There was a considerable increase in procedures for *haemorrhoids* and *droopy eyelids* from 2013 to 2017.

The day surgery atlas helped to put variation in the use of health services on the agenda, and its findings were followed up both in white papers and in the Ministry of Health and Care Services' assignment letters to the regional health authorities. There seem to have been few management initiatives to reduce variation following the publication of the day surgery atlas. The South-Eastern Norway Regional Health Authority had already started its work to reduce shoulder and meniscus surgery before the atlas was published. The Western Norway Regional Health Authority invited specialist communities to choose between a number of patient samples, procedures and indicators of variation with a view to implementing measures to reduce variation. None of the projects initiated by the regional health authorities targeted day surgery. After the publication of the day surgery atlas, the Central Norway Regional Health Authority monitored developments in the use of day surgery procedures and used this information in its dialogue with health trusts,

private hospitals and specialists in private practice under public funding contracts.

There are also examples of specialist communities in different health trusts changing their practice after the variation became known. These changes in practice appear to primarily be based on discussions in the national or local medical community.

It is some years now since the day surgery atlas was published and variation in the use of health services was put on the national health policy agenda. Change takes time. The results from the healthcare atlases are being used more than before, for example in the regional health authorities' planning. The Norwegian Medical Association's *Gjør kloke valg!* campaign is important in that it promotes discussion of the benefits of different examinations and treatments. It could also form the basis for a constructive approach to more systematic efforts to reduce unwarranted variation in the health service.

Chapter 1

Introduction

The first Norwegian healthcare atlas was published on 13 January 2015. It provided an overview of twelve of the most common surgical procedures that are normally carried out as day surgery in Norway (Balteskard, Deraas, et al. 2015). The atlas showed that there was a high degree of variation for most of the procedures. For nine of the twelve selected surgeries, the number of procedures per 100,000 population was more than twice as high in the hospital referral area with the highest frequency as in the one with the lowest frequency during the period 2011–2013. The benefit of some procedures, such as shoulder and meniscus surgery, was already being debated in the specialist communities before and at the time the day surgery atlas was launched.

The atlas attracted a lot of attention in the medical community, in the media and at the political level. The latter resulted in reducing the variation in the use of health services in Norway becoming a focus area, and the question of when an updated version of the atlas would be available was soon raised. Since the atlas was published in January 2015 and was based on data for the period 2011–2013, it is only since 2015 that the information from the atlas has had the potential to influence the number of and variation in the use of day surgery procedures in Norway. That is why we have not published a formal updated version of the atlas before. This healthcare atlas presents figures for the same twelve procedures for the period 2013–2017 and compares these figures with the original findings for the period 2011–2013. This means that we have gathered information about the extent of and variation in the use of day surgery procedures over a seven-year period. This makes it possible to identify trends in the development of day surgery in Norway, both before and after the publication of the day surgery atlas in 2015.

1.1 Intention and approach

The healthcare atlases published so far have endeavoured to identify variation in the population's use of health services seen in relation to the health trusts' responsibility to provide equitable health services regardless of where people live. There are several reasons for geographical variation in the use of health services - it can be a result of chance, differences in morbidity and composition of the patient groups, different preferences, or differences in medical practice and available treatment options. In order to determine whether observed variation is unwarranted, the healthcare atlases have emphasised on finding figures where the element of chance is as small as possible. This is why the descriptions of variation and usage are based on averages for periods of three or four years, and it is also why we present and emphasise stability over several years in our assessments of variation.

When we now present an updated version, our focus is therefore on change over time. How has the use of day surgery procedures developed after the period described in the day surgery atlas? And how has the variation developed - has it decreased, remained stable or increased? Can any changes be ascribed to administrative or medical measures implemented to change practice?

We examine how the use of day surgery procedures has developed by looking at developments in both the number of procedures and the number of procedures per 100,000 population (rates) during the period 2013–2017. As regards to how geographical variation has developed, the starting point is the variation identified in the 2015 atlas as the average for the three-year period 2011–2013. Changes are now assessed on the basis of the average annual variation during the period 2015–2017.

For some samples (*hand surgery, tonsillectomy, aural ventilation tube* and *varicose veins*), definitions have been changed in ways that will have a certain effect on both their scope and variation compared with the 2015 day surgery atlas. These changes are described in more detail in section 2.5 Sample. SKDE only has access to data for five years, which means that the material for the period 2011–2013 cannot be updated. For these samples, we will therefore compare the variation during the period 2015–2017 with the variation in 2013. This means that the element of chance will be greater at the beginning of the period for the four affected samples.

Chapter 2

Method

2.1 Data

2.1.1 The Norwegian Patient Registry (NPR)

The description of the use of specialist health services is based on data from the Norwegian Patient Registry (NPR). NPR has disclosed indirectly identifiable personal health data for the years 2013–2017 to SKDE pursuant to the provisions of the Personal Health Data Filing System Act Section 20 under a licence from the Norwegian Data Protection Authority dated 6 April 2016. Since 20 July 2018, the basis for the processing of data has been the General Data Protection Regulation Article 6(1) letter (e) and Article 9(2) letter (j). This healthcare atlas uses data from NPR to describe activity at public hospitals, publicly funded private hospitals and specialists in private practice under public funding contracts. SKDE has sole responsibility for the interpretation and presentation of the disclosed data. NPR has no responsibility for analyses or interpretations based on the data.

2.1.2 Statistics Norway (SSB)

Population figures for municipalities (Table 07459) and city districts (Table 10826) are taken from Statistics Norway's StatBank. In the analyses, the population figures are used as the denominator for the number of persons or events per 100,000 population, and for gender and age standardisation purposes.

2.2 Hospital referral areas

The regional health authorities have a responsibility to provide satisfactory specialist health services to the population in their catchment area (cf. the Specialist Health Service Act Section 2-1a and Section 2-2[1]). In practice, it is the individual health trusts and private providers under a contract with a regional health authority that provide and perform the public health services. Each health trust has a hospital referral area that includes specific municipalities or city districts. Different disciplines can have different hospital referral areas, and for some services, functions

[1] Specialised Health Services Act: https://www.lovdata.no/dokument/NL/lov/1999-07-02-61

are divided between different health trusts and/or private providers. The day surgery atlases use the general hospital referral areas for specialist health services for medical emergency care.

This healthcare atlas defines the hospital referral areas in a slightly different way than the 2015 day surgery atlas. We now have more detailed information about where patients from Oslo live, as we have access to both the municipality number and the city district number, while we only had information about the municipality number when preparing the day surgery atlas published in 2015. In the day surgery atlas, Oslo hospital referral area included the whole City of Oslo, while Akershus hospital referral area did not include the three city districts Grorud, Stovner and Alna. In this healthcare atlas, Akershus hospital referral area includes the three above-mentioned districts of Oslo, which had a total population of nearly 110,000 in 2017. The remaining city districts in Oslo have been divided into three hospital referral areas: OUS, Lovisenberg and Diakonhjemmet.

Table 2.1 shows the health trusts or hospitals for which hospital referral areas have been defined and the short versions of the names used in this healthcare atlas. Table A.1 in Appendix A contains a complete list of the municipalities and city districts that belong to the different hospital referral areas. With some exceptions,[2] the hospital referral areas are defined in the same way as in the annual SAMDATA reports (Rønningen et al. 2016).

Table 2.1: Hospital referral areas and short names used in the text and figures

Hospital referral area for	Short name
Northern Norway Regional Health Authority	
Finnmark Hospital Trust	Finnmark
University Hospital of Northern Norway Trust	UNN
Nordland Hospital Trust	Nordland
Helgeland Hospital Trust	Helgeland
Central Norway Regional Health Authority	
Helse Nord-Trøndelag health trust	Nord-Trøndelag
St. Olavs Hospital Trust	St. Olavs
Helse Møre og Romsdal health trust	Møre og Romsdal
Western Norway Regional Health Authority	
Helse Førde health trust	Førde
Helse Bergen health trust	Bergen
Helse Fonna health trust	Fonna
Helse Stavanger health trust	Stavanger
South-Eastern Norway Regional Health Authority	
Østfold Hospital Trust	Østfold
Akershus University Hospital Trust	Akershus
Oslo University Hospital Trust	OUS
Lovisenberg Diaconal Hospital	Lovisenberg
Diakonhjemmet Hospital	Diakonhjemmet
Innlandet Hospital Trust	Innlandet
Vestre Viken Hospital Trust	Vestre Viken
Vestforld Hospital Trust	Vestfold
Telemark Hospital Trust	Telemark
Sørlandet Hospital Trust	Sørlandet

[2] In this atlas, contacts for which the city district in Oslo is unknown have be assigned to OUS hospital referral area. The municipalities of Leksvik and Rissa (merged to form Indre Fosen municipality with effect from 2018) have been assigned to St. Olavs hospital referral area.

2.3 Population

Norway's average population during the period 2015–2017 was around 5.26 million people. Women made up 49.6% of the population, and the average age was 39.4 years (40.2 years for women and 38.6 years for men). The size of the population of the health trusts' hospital referral areas varied considerably, from nearly 509,000 people in Akershus to only 76,000 people in Finnmark (Figure 2.1). The proportion of women in the population varied between 51.1% and 48.5% in the different hospital referral areas. The average age varied from 42.3 years in Innlandet hospital referral area to 34.1 years in the Lovisenberg area.

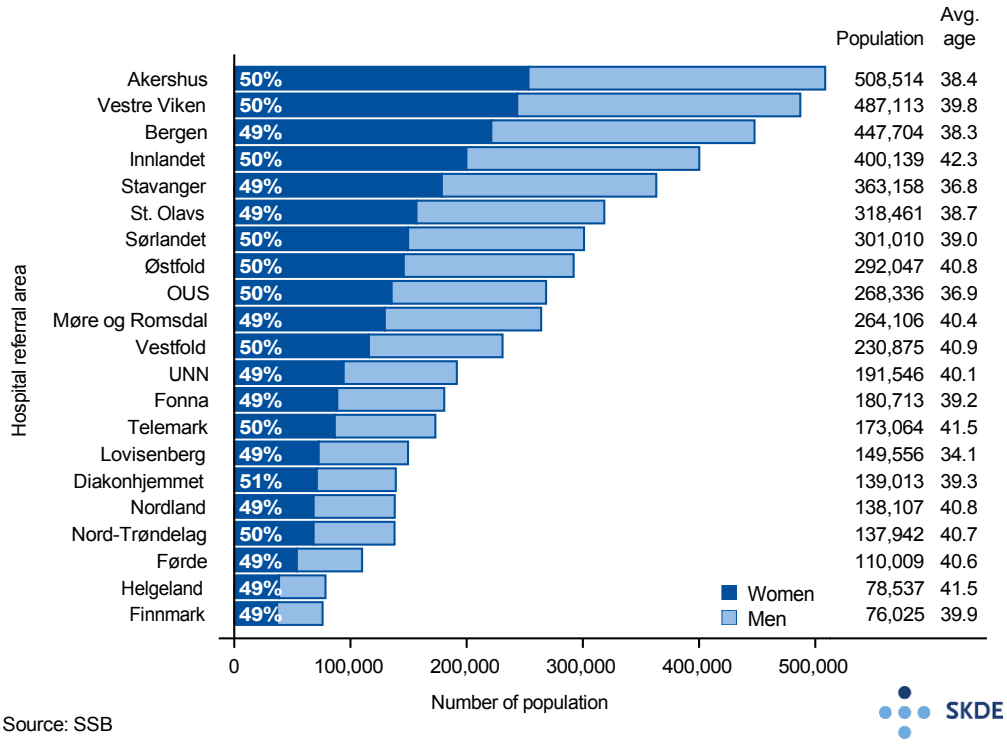


Figure 2.1: Gender distribution, average age and population in the different health trusts' hospital referral areas. Average for the years 2015–2017.

2.4 Adjustment for gender and age

In order to compare the number of events in different hospital referral areas and between years, the actual numbers have been adjusted for age and gender by standardisation. The standardisation was based on what is known as the direct method using the Norwegian population in 2016 as the reference population.[3] The analyses show the number of events per 100,000 population that the hospital referral areas would have had if the population composition had been the same all over Norway and remained unchanged from one year to the next, given the actual distribution of events in each gender and age group in the hospital referral areas.

The standardised number of events per 100,000 population in hospital referral area j (r_j) is calculated as follows:

[3] The age groups are defined in such a way that there are about the same number of events in each age group. The division into gender and age groups will therefore vary between different samples.

$$r_j = 100,000 \times \sum_{i=1}^{K} \frac{n_{ij}}{N_{ij}} \times a_i \tag{2.1}$$

with n_{ij} being the actual number of events in hospital referral area j and gender and age group i, N_{ij} being the population of hospital referral area j and gender and age group i, a_i being the national proportion that gender and age group i makes up of the Norwegian population in 2016, and K being the number of gender and age groups.

Proportions standardised for gender and age are presented in some analyses. In these cases, gender- and age-standardised numbers per 100,000 population are used in both the numerator and denominator.

2.5 Sample

The analyses in this report concern contacts with publicly funded specialist health services for patients who have undergone surgical procedures normally performed as day surgery during the period 2013–2017. All patients who have undergone a day surgery procedure have been included, regardless of age. Twelve such procedures were described in the day surgery atlas published in 2015. The procedures were identified using combinations of diagnosis codes (ICD-10), procedure codes (NCSP) and tariff codes from the normal tariff for specialists in private practice under public funding contracts. No distinctions were drawn based on how the services were actually organised in the different health trusts in terms of whether the procedure had been carried out as an inpatient, day patient or as an outpatient procedure. The reason for this choice was that we wanted to compare the use of a surgical procedure regardless of organisational differences.

Samples are usually defined on the basis of a set of relevant diagnosis codes in combination with clinical judgement. These selected diagnosis codes are used to identify the procedure codes used in connection with the conditions in question. Then we do the same in the opposite direction, and look at which diagnosis codes are found in combination with the most commonly used procedure codes. This method is used in order to try to identify as similar patient samples as possible, even though coding practices may vary between institutions or different procedures are used to treat the same condition. Specialists in private practice under public funding contracts do not always use procedure codes, but may use tariff codes from the normal tariff instead.[4] In such cases, it is assumed that a procedure corresponding to the tariff code has been performed. Miscoding does occur, but it is difficult to identify and even more difficult to compensate for. For example, a striking increase or decrease from one year to the next within a hospital referral area could reflect incorrect or lacking information about patients' municipality of residence or a change in an agreement between a regional health authority and a specialist in private practice under a public funding contract. We also find unexpected combinations of diagnosis and procedure codes. Individual assessments are done to determine whether combinations of diagnosis and procedure codes describe the procedure or patient sample is as expected. We take action if the combination of codes is not what we expected. We contact specialists in the different disciplines to quality-assure our coding proposals and discuss potential explanations for what may appear to be 'illogical' coding. This clinical contact is invaluable in terms of the quality of our patient

[4] The Norwegian regulations concerning coverage of expenses relating to medical examinations and treatment, the normal tariff, stipulate the fees that regular GPs and specialists in private practice under public funding contracts can charge for examinations and treatment.

samples. The specialists consulted during our work on this healthcare atlas are listed in Appendix B.

The principles used to identify samples in the 2015 day surgery atlas are largely the same in this update. Most specialists in private practice under public funding contracts receive their financial settlement through tariff codes from the normal tariff, which are reported to the Norwegian Health Economic Administration (HELFO). In the day surgery atlas, only tariff codes were used for the activities of specialists in private practice under public funding contracts. A few such specialists receive activity-based funding[5] for some of their activities, and procedure codes are a central element in this funding regime. This time, we have used both tariff codes and procedure codes to describe the activities of specialists in private practice under public funding contracts. This means that some more procedures are included, but not so many that it will have a significant effect on the results.

Some changes have been made to the definitions of some of the procedures that may have a greater effect, however. These changes were made because of changes in the systems of codes, a need for further information or errors or inaccuracies in the original samples. This means that the results for the affected samples will not be directly comparable with the results in the 2015 day surgery atlas. The samples in question are those for *selected hand surgery, tonsillectomy, aural ventilation tube* and *varicose veins*.

The changes from the 2015 day surgery atlas are as follows:

- **Selected hand surgery**
  - The codes for procedures relating to Dupuytren's contracture had been omitted, but are now included in the update for 2013–2017.
- **Tonsillectomy**
  - The sample included the removal of adenoids. Based on feedback from the Norwegian Tonsil Surgery Register, only surgery on tonsils is included in the update for the period 2013–2017. The following codes have been excluded from the update: procedure code EMB30 'Adenotomy' and tariff codes K02b 'Adenotomy' and K02d 'Adenotomy and paracentesis with ventilation tube'.
- **Aural ventilation tube**
  - A relevant tariff code from the normal tariff for specialists in private practice under public funding contracts had been omitted by mistake from the sample in the 2015 day surgery atlas. Tariff code 317b 'Paracentesis with ventilation tube' has now been included in the sample in the update for 2013–2017. This is the tariff code for paracentesis under local anaesthesia, and it is used for adult/elderly patients.
- **Varicose veins**
  - Several procedures have been removed from the surgical coding system and assigned new codes in a new radiological coding system since the day surgery atlas was published. This concerns PHV10x 'Endovenous obliteration of v. saphena magna', PHV12x 'Endovenous obliteration of v. saphena parva', PHV13x 'Endovenous obliteration of perforating veins of lower leg' and PHV14x 'Endovenous obliteration of perforating veins of thigh'. These codes are included in the update for 2013–2017.

[5] The activity-based funding system is a scheme through which the State funds the regional health services' somatic specialist health services, as well as outpatient services in the fields of mental healthcare and interdisciplinary specialised treatment for drug and alcohol problems (TSB).

– In addition, the following codes have been added to the sample: PHB13 'Ligature of perforating veins of lower leg', PHB14 'Ligature of perforating veins of thigh', PHB99 'Ligature of other vein' and PHD12 'Resection of v. saphena parva' in the update for 2013–2017.

The definitions of individual procedures are described in greater detail under the description of procedures in Chapter 3 Results.

2.6 Lacking or incomplete reporting to NPR

Specialists in private practice under public funding contracts sometimes fail to report all of their activities to NPR. Activities that have not been reported to NPR cannot be included in the analyses.

Contacts with missing gender, age and address is automatically excluded from analyses standardised for gender and age. We have excluded contacts for which gender (n=1) or age (n=66) is missing, but not contacts where we lack information about where the patient lives. For some of the years, the lack of information about municipality numbers for some or all of the activities of some specialists in private practice under public funding contracts is a significant problem. In order to avoid biased results, contacts for which no municipality number has been registered have been analysed as if the patient lived in the treatment provider's hospital referral area. For the eight samples where only a small share of activities were performed by specialists in private practice under public funding contracts, this applied to less than 0.1% of all contacts. Table C.1 in Appendix C provides an overview of the number and proportion of procedures per year broken down by the care levels inpatient, day/outpatient surgery and specialists in private practice under public funding contracts for the period 2015–2017.

Contacts with specialists in private practice under public funding contracts in the Oslo area for which municipality numbers are missing have been distributed as if the patients lived in the hospital referral areas of several health trusts in Southern and Eastern Norway in accordance with a certain distribution key. This distribution key assigns the activities of specialists in private practice under public funding contracts in the Oslo area to different hospital referral areas in proportion to those specialists' contacts for which the patient's municipality and city district number are registered. For the four samples with a significant number of contacts with specialists in private practice under public funding contracts, the municipality number was missing for a considerable proportion of some specialists' contacts (Table 2.2).

Table 2.2: Contacts with missing municipality numbers for the four samples with a significant number of contacts with specialists in private practice under public funding contracts

Sample	number of contacts over the five-year period	Percentage (%) of all contacts
Tonsillectomy	379	0.8
Aural ventilation tube	563	1.6
Age-related cataracts	2,429*	1.2
Droopy eyelids	1,197*	2.6

* Most of which with specialists in private practice under public funding contracts in Oslo in 2013.

2.7 Health services that are not publicly funded

NPR contains data for publicly funded specialist health services, including activities carried out by private hospitals and specialists in private practice under public funding contracts. No such information is available for specialist health services that are paid for in full by the patient or an insurance company. This means that only publicly funded day surgery procedures are included in this report. This could skew our descriptions of the number of day surgery procedures performed in the different hospital referral areas. The main reason for this is a strong increase in the number of people covered by private health insurance during the period from 2003 to 2017, cf. Figure D.1 in Appendix D.

The number of insured persons increased from 34,000 in 2003 to almost 530,000 in 2017. The majority of people insured were covered by group insurance policies during the period 2004–2014. Along with the increase in the number of insured persons, there has been a considerable increase in compensation payments under medical treatment insurance policies, from NOK 609 million in 2013 to NOK 982 million in 2017.[6].

Some of the day surgery procedures described in this atlas, orthopaedic procedures in particular, can be performed at private hospitals with funding from insurance companies. No information is available about where the people who have taken out group or individual health insurance live; but it is not inconceivable that their geographical distribution is uneven. Moreover, there is not any information available for the number of day surgery procedures paid for by private individuals or insurance companies. It is a limiting factor that no comprehensive overview of the use of health services exists.

2.8 Assessment of variation

A more thorough description of the assessment of variation in the use of health services can be found in the Healthcare Atlas for the Elderly in Norway (Balteskard, Otterdal, et al. 2017) and in the report *Indikatorer for måling av uberettiget variasjon* (SKDE 2016).

There is no single measurement that can tell us whether observed variation is large or small, or warranted or unwarranted. The ratio between the extremes is often used as an indication of whether the observed variation is large or small. If a certain event occurs twice as many times in one hospital referral area as in another, that will often be described as substantial variation. At the same time, the number of events must be taken into consideration. Small numbers mean a larger element of random variation.

The assessment of whether the variation observed is warranted or unwarranted is based on what it would be reasonable to expect if all the observed variation were warranted. For the procedures included in this healthcare atlas, it is reasonable to expect the population to have the same need for surgery regardless of where they live, and that all patients are given a chance to make informed choices regarding treatment options for their condition. If the health services are equitably distributed in the population, we would therefore expect little geographical variation in their use, other than random variation. When the observed variation does not tally with these expectations and the element of random variation is not too large taking variation from one year to the next and the size of the samples into account, we can assume that some of the observed variation is unwarranted. The term *unwarranted variation* refers to the part of the observed variation that is

[6] Figures from www.finansnorge.no.

not due to chance, patient preferences or differences in the underlying prevalence of the disease. The overall assessment includes elements of discretionary judgement.

For most of the samples, the starting point used to assess variation has been the average for the period 2011–2013 as presented in the 2015 day surgery atlas. For the samples *selected hand surgery*, *tonsillectomy*, *aural ventilation tube* and *varicose vein* surgery, we have based our assessments on the rates in 2013. We have compared this with the average for the period 2015–2017. This means that the element of chance will be greater at the beginning of the period for the four affected samples.

Chapter 3

Results

3.1 Shoulder surgery (acromion resection)

Strain on the muscles and tendons between the shoulder joint and the acromion (the rotator cuff) is a common complaint. Lack of space can cause acute and chronic shoulder pain and impair muscular function (impingement syndrome). It can often be challenging to make a precise diagnosis because different conditions may present with the same findings on clinical examination. The effect of surgical treatment is not scientifically well-documented (Paavola et al. 2018; Beard et al. 2018), and conservative treatment can be equally effective. Some patients who have osteophytes and/or calcification of ligaments and experience mechanical symptoms may benefit from surgery.

Sample

In this analysis, we have studied conventional shoulder surgery in the form of acromion resections. Acromion resection is defined by a primary or secondary diagnosis in code block M19 or M75 in combination with at least one of the procedure codes NBK12 or NBK13. For specialists in private practice under public funding contracts, contacts with the same diagnosis codes and procedure codes and/or tariff code K05c are included.

Development since 2013

The 2015 day surgery atlas showed extensive use of shoulder surgery and considerable variation between the health trusts' hospital referral areas surgery during the period 2011–2013. A total of 8,100 procedures (adjusted rate: 161 per 100,000) were performed in Norway in 2013. The number of procedures per 100,000 population was nearly four times as high for inhabitants of Møre og Romsdal hospital referral area as for those resident in the Stavanger area.

During the period 2015–2017, residents in Finnmark hospital referral area had 6.7 times as many procedures per 100,000 population as residents in the Lovisenberg area.

The number of acromion resections was reduced to 5,950 procedures (adjusted rate: 112 per 100,000) in 2017. This involved a reduction in activity at both public hospitals and publicly funded private hospitals, but the reduction was somewhat greater in the private than in the public

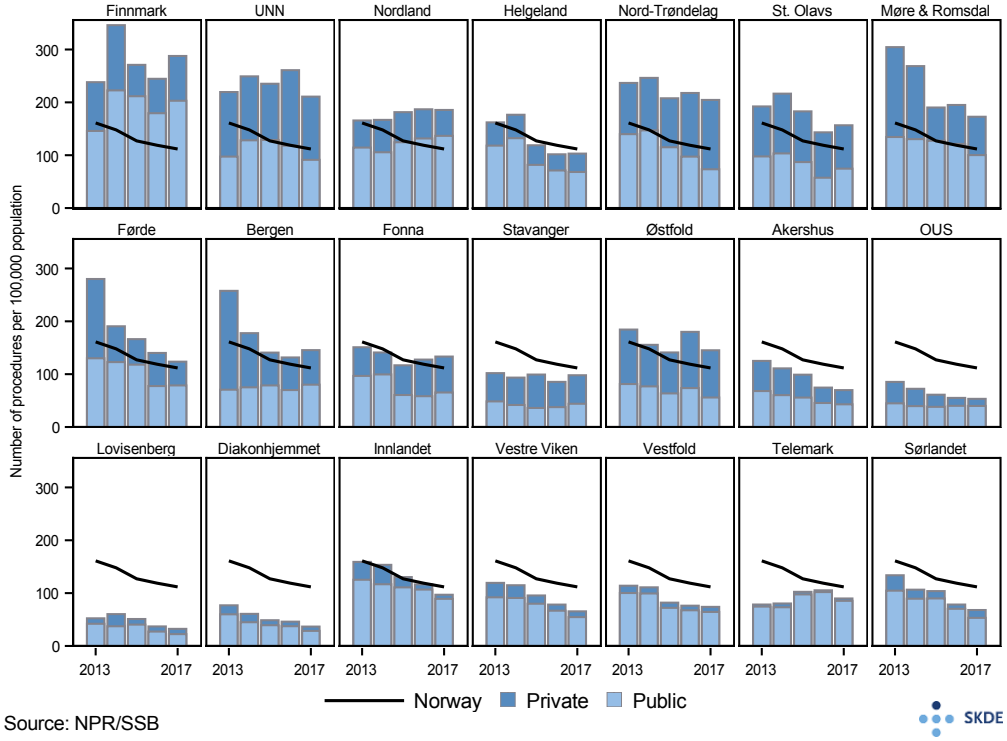


Figure 3.1: Acromion resections, development in the number of procedures per 100,000 population during the period 2013–2017, adjusted for gender and age. Broken down by hospital referral areas and public or private treatment providers.

hospitals. The reduction was particularly great for the population of the hospital referral areas that fall under the South-Eastern Norway Regional Health Authority, most of which saw a reduction of 35–50% per 100,000 population. Similar reduction rates were also found in the hospital referral areas of Bergen, Førde, Møre og Romsdal and Helgeland.

For most of the hospital referral areas, the decrease in shoulder surgery started before the day surgery atlas was published in 2015. Some specialist communities and regional health authorities had already been aware for some time of the extensive use of shoulder surgery. Also, more documentation became available to show that conservative treatment is as effective as surgical treatment.

Comments

The South-Eastern Norway Regional Health Authority has endeavoured to reduce the number of acromion resections, and their efforts have clearly been successful. Despite a considerable reduction in activity, it is clear that there is no consensus in the medical community about the indications for acromion resection. There was far greater variation between hospital referral areas in the use of acromion resections during the period 2015–2017 than during the period 2011–2013, and this health service does not appear to be equitably distributed in the population regardless of where people live.

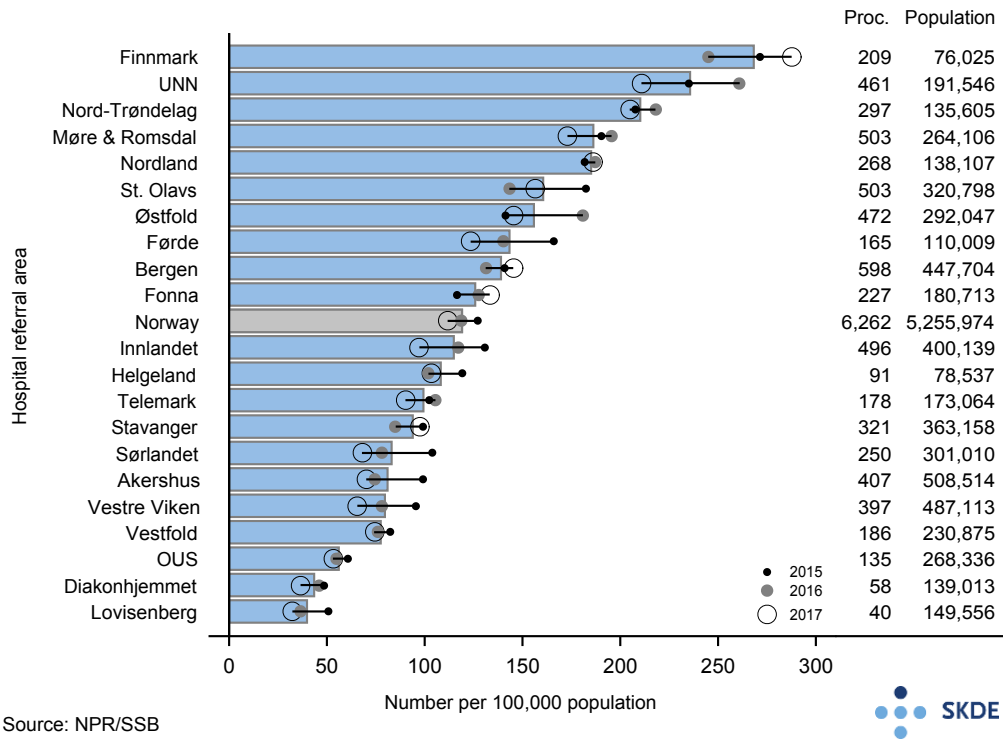


Figure 3.2: Number of acromion resections per 100,000 population, adjusted for gender and age. Average per year for the period 2015–2017.

3.2 Menisci

The menisci are fibrocartilage that protect the cartilage in the joint and help to stabilise the knee. The menisci can be damaged by an acute knee injury or as part of the development of arthrosis. Meniscus injuries in younger patients are treated with meniscus repair surgery or partial removal of the meniscus cartilage, depending on the type of injury. Such treatment is most effective in the case of acute injuries. Partial removal of the meniscus cartilage entails a risk of early development of arthrosis. Meniscus complaints in persons older than 50 are often the result of wear and tear. The effect of surgical treatment is not scientifically well-documented in this group of patients (Hohmann et al. 2018).

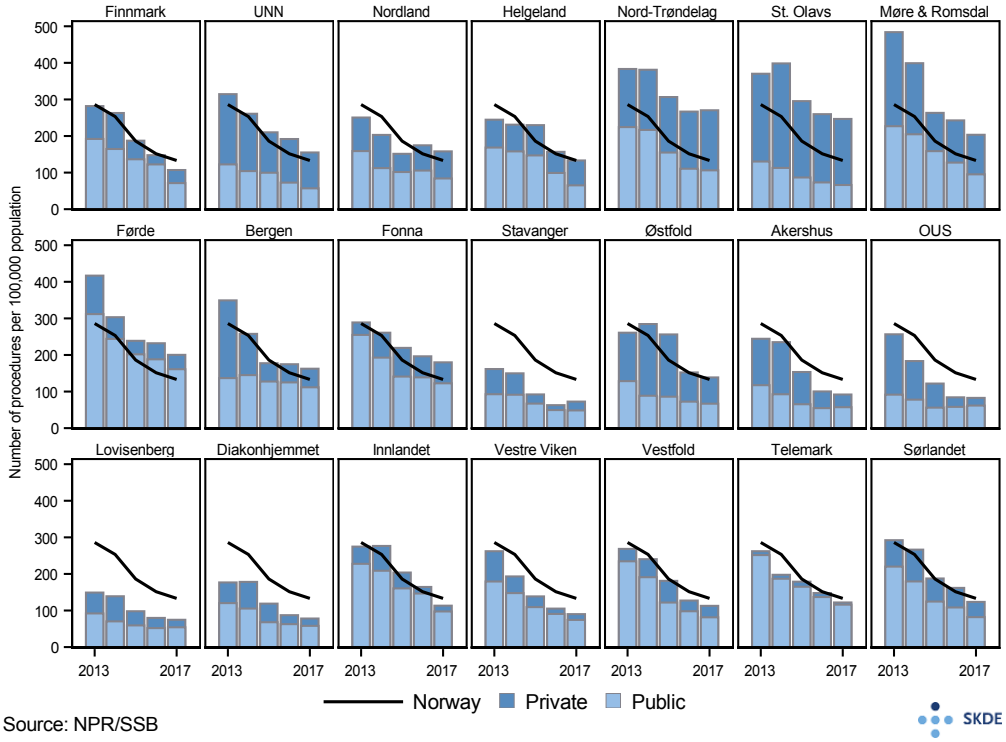


Figure 3.3: Menisci, development in the number of procedures per 100,000 population during the period 2013–2017, adjusted for gender and age. Broken down by hospital referral areas and public or private treatment providers.

Sample

Meniscus surgery is defined by a primary or secondary diagnosis of M23.2, M23.3 or S83.2 in combination with one or more procedure codes in code block NGD. For specialists in private practice under public funding contracts, contacts with the same diagnosis codes and procedure codes and/or tariff code K05b are included.

Development since 2013

The 2015 day surgery atlas showed extensive use of meniscus surgery and considerable variation between the health trusts' hospital referral areas. A total of 14,500 operations (adjusted rate: 286 per 100,000) were performed in Norway in 2013. During the period 2011–2013, inhabitants

of Møre og Romsdal hospital referral area underwent more than four times as many procedures per 100,000 population as those resident in the Stavanger area. The variation was otherwise moderate.

During the period 2015–2017, 3.7 times as many procedures per 100,000 population were performed in Nord-Trøndelag hospital referral areas as in the Stavanger area.

The number of meniscus operations in Norway dropped sharply from 2013 to 2017. In 2017, 7,000 procedures were performed (adjusted rate: 133 per 100,000), which is less than half the number in 2013. For Norway as a whole, the decrease was the same for publicly funded private hospitals and specialists in private practice under public funding contracts as it was for public hospitals. In the hospital referral areas OUS, Vestre Viken and Bergen, the biggest reduction in activity was at publicly funded private treatment providers, while the reduction was greatest at public hospitals in Vestfold, Helgeland and Sørlandet hospital referral areas.

There is consensus in the medical community that, as a rule, degenerative meniscus injuries in older patients will not normally be treated with surgery. The average age for patients undergoing meniscus surgery decreased by 4.7 years from 2013 to 2017, and the number of procedures performed on patients over 50 years of age was reduced by 63%, from 7,200 to 2,700. As a result of this, the proportion of meniscus surgery patients over the age of 50 was significantly reduced, particularly in the South-Eastern Norway Regional Health Authority's hospital referral areas. The proportion of patients who were older than 50 was nearly halved during this period in the hospital referral areas of Akershus, Sørlandet, OUS and Lovisenberg, while it remained relatively stable for Førde, UNN and Helgeland hospital referral areas.

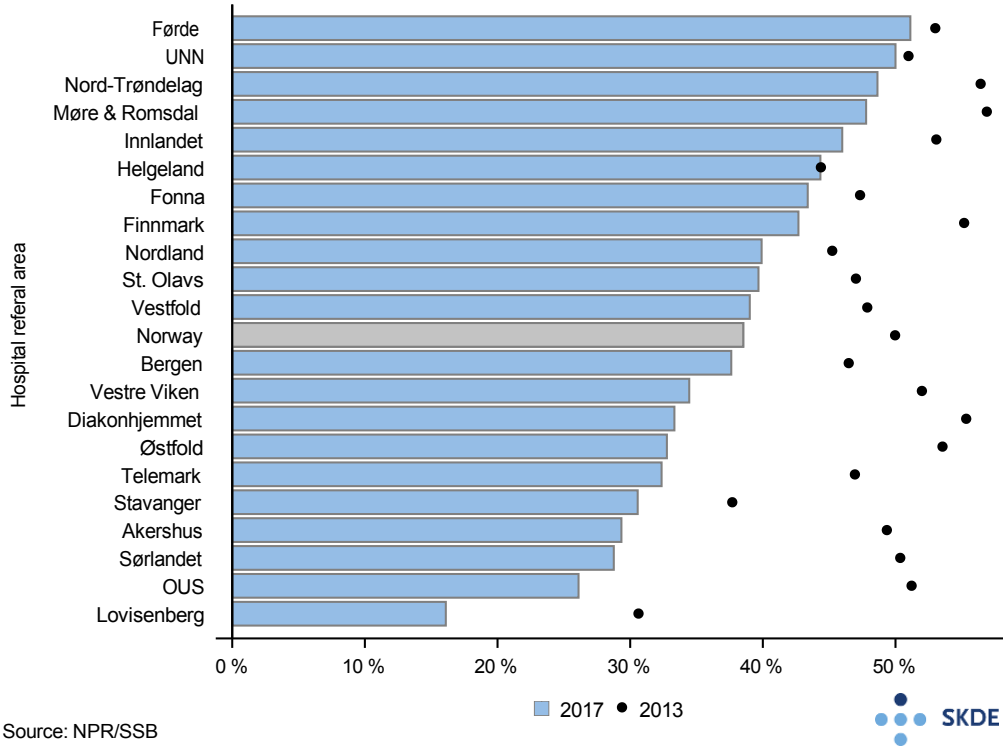


Figure 3.4: Proportion of meniscus surgery patients who were more than 50 years old in 2013 and 2017.

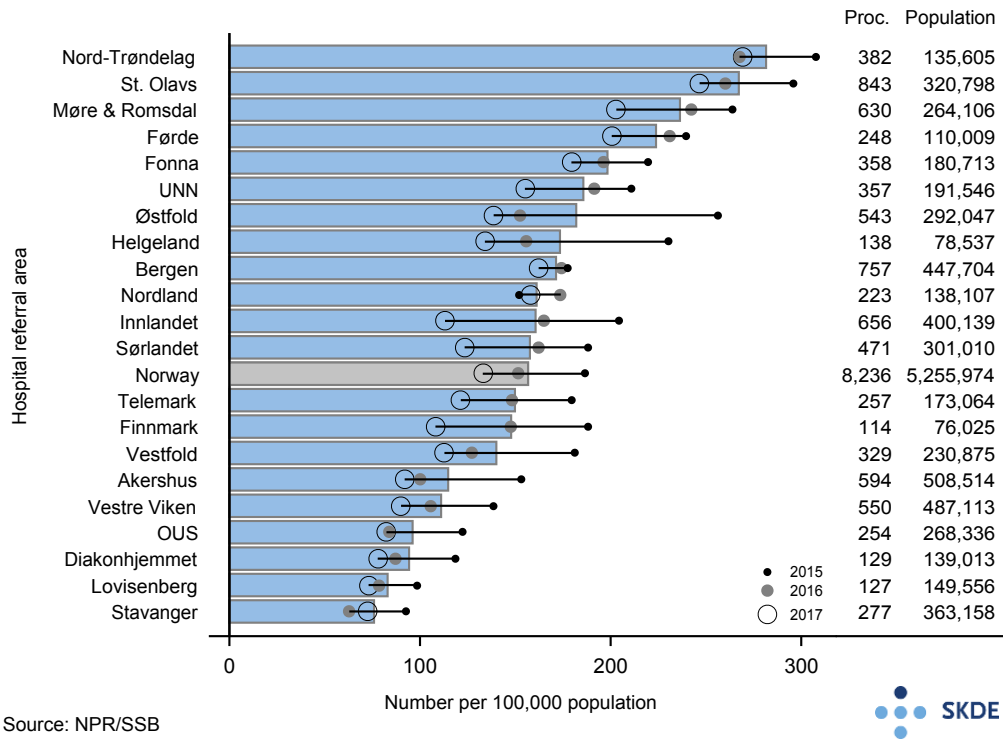


Figure 3.5: Number of meniscus operations per 100,000 population, adjusted for gender and age. Average per year for the period 2015–2017.

Comments

There was a considerable reduction in the use of meniscus surgery from 2013 to 2017, particularly for patients older than 50. This could indicate that far fewer operations were performed on patients with degenerative meniscus injuries in 2017 than in 2013, a development which is in line with medical recommendations. However, the proportion of older patients differed considerably between hospital referral areas. This is probably an important reason why the variation between hospital referral areas in the use of meniscus surgery was unwarranted also during the period 2015–2017.

3.3 Hallux valgus and hammer toe

Hallux valgus is a deformation of the big toe, which is angled towards the little toe. Hammer toe is when the innermost joint is bent upwards and the outermost downwards. It can be painful to wear shoes. The treatment consists of removing part of the bone near the joint. Screws are placed in the big toe and metal pins in the smaller toes to correct the angle.

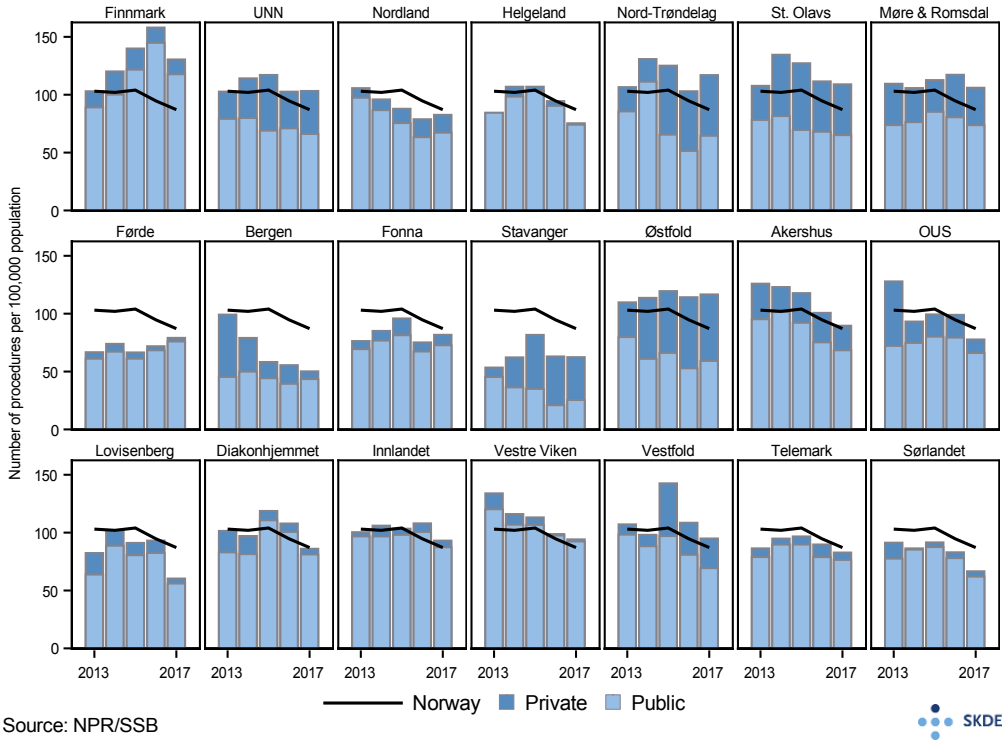


Figure 3.6: Hallux valgus and hammer toe, development in the number of procedures per 100,000 population during the period 2013–2017, adjusted for gender and age. Broken down by hospital referral areas and public or private treatment providers.

Sample

Surgery for hallux valgus and hammer toe is defined by a primary or secondary diagnosis of M20.1, M20.2, M20.3, M20.4, M20.5 or M20.6 in combination with one or more of the procedure codes NHG09, NHG44, NHG46, NHG49, NHK17, NHK18, NHK57 or NHK58.

For specialists in private practice under public funding contracts, contacts with the same diagnosis codes and procedure codes and/or tariff codes 134a, 134b or 140d are included.

Development since 2013

The 2015 day surgery atlas showed a fairly high geographical variation in surgical treatment of hallux valgus and hammer toe during the period 2011–2013. Inhabitants of Vestre Viken hospital referral area had more than twice as many procedures per 100,000 population than those in the Bergen area. The latter hospital referral area had Norway's lowest average rate per year during

the period 2011–2013, despite a doubling from 2012 to 2013. In 2013, just over 5,200 procedures (adjusted rate: 103 per 100,000) were performed in Norway.

From 2014, the rate decreased considerably again for inhabitants of Bergen hospital referral area, mainly as a result of reduced activity at publicly funded private hospitals and specialists in private practice under public funding agreements. During the period 2015–2017, the hospital referral areas of Førde, Stavanger and Bergen had the lowest number of procedures per 100,000 population in Norway. Finnmark hospital referral area experienced a clear increase in such procedures per 100,000 population from 2013 to 2016, mostly at public hospitals. Vestre Viken hospital referral area, which had the highest rate during the period 2011–2013, showed a steady decrease from 2013 to 2017. Other hospital referral areas had some variation from year to year, but no clear trends.

The ratio between the highest and lowest rates was 2.6. This was greater during the period 2015–2017 than during the period 2011–2013. If we exclude the extremes (Finnmark and Bergen hospital referral areas), there was little variation during the period 2015–2017.

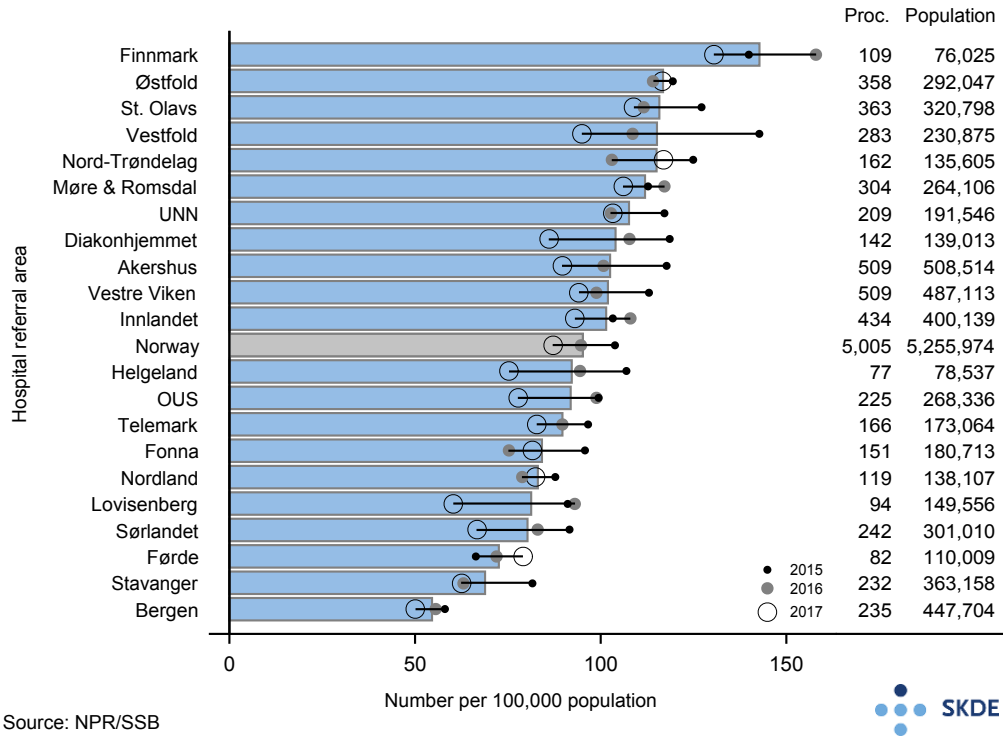


Figure 3.7: Number of procedures for hallux valgus and hammer toe per 100,000 population, adjusted for gender and age. Average per year for the period 2015–2017.

From 2015 to 2017, the number of procedures per 100,000 population for Norway as a whole decreased by 16%, and most of this reduction took place at public hospitals. In 2017, 4,600 procedures (adjusted rate: 87 per 100,000) were performed in Norway. A quarter of the procedures were performed by publicly funded private hospitals or specialists in private practice under public funding contracts.

Comments

It is assumed that the need for surgical treatment of hallux valgus and hammer toe is evenly distributed regardless of where in Norway people live. There was considerable variation between the health trusts' hospital referral areas in the number of procedures for hallux valgus and hammer toe per 100,000 population during the period 2015–2017. There was also some variation from year to year in some hospital referral areas. This suggests that the indications for these procedures may be unclear. The observed variation is therefore deemed to be unwarranted and could possibly be due to the fact that supply does have a certain influence on the use of such procedures.

3.4 Selected hand surgery

Selected hand surgery includes four conditions. *Dupuytren's contracture* is a condition that involves thickening and formation of cords in the palmar fascia that can result in one or more fingers becoming permanently bent. *Trigger finger* is a condition where swelling around the flexor tendon of a finger results in the finger becoming 'stuck' when moving or becoming stuck in a bent position. *Ganglion* is a fluid-filled cyst or lump, usually at the wrist, that can cause pain and reduced movement. *De Quervain's tenosynovitis* is an inflammation of the sheath covering the thumb's extensor tendons. It can cause pain in the wrist, particularly when gripping with the thumb.

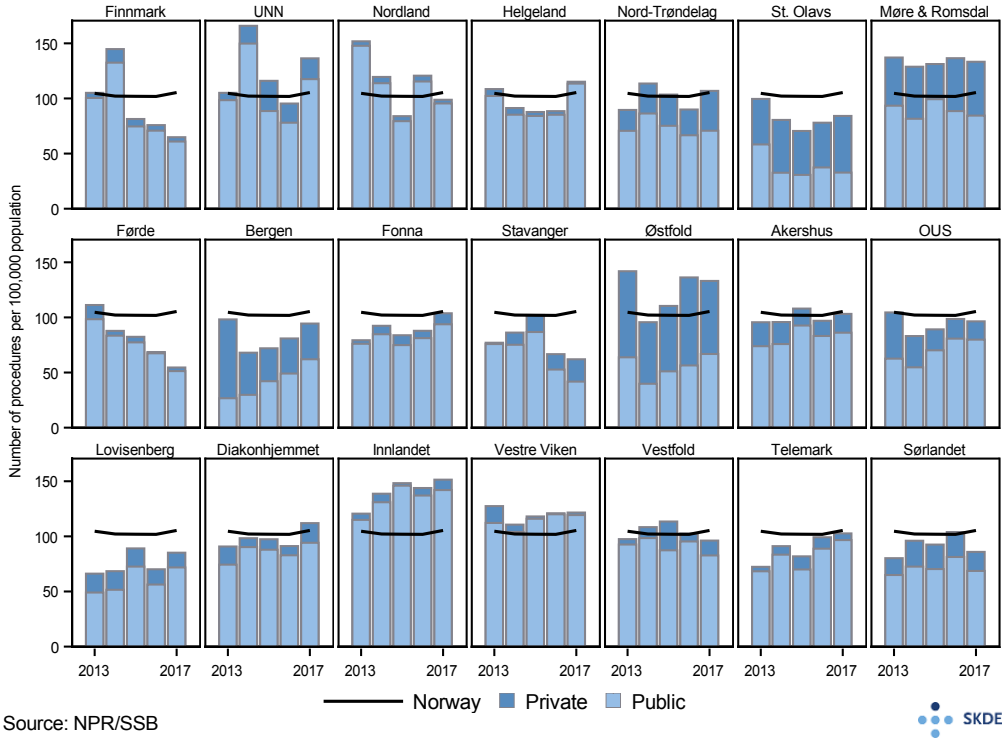


Figure 3.8: Selected hand surgery, development in the number of procedures per 100,000 population during the period 2013–2017, adjusted for gender and age. Broken down by hospital referral areas and public or private treatment providers.

Sample

Trigger finger: Surgery for trigger finger is defined by a primary or secondary diagnosis of M65.3 in combination with procedure code NDE12 or NDM49. For specialists in private practice under public funding contracts, contacts with the same diagnosis code and procedure codes and/or tariff code 140k are included.

Ganglion: Ganglion surgery is defined by a primary or secondary diagnosis of M67.4 in combination with procedure codes NDM39 or NDR09. For specialists in private practice under public funding contracts, contacts with the same diagnosis code and procedure codes and/or tariff code 140a are included.

Dupuytren's contracture: Surgery for Dupuytren's contracture is defined by a primary or sec-

ondary diagnosis of M72.0 in combination with procedure codes NDM09, NDM19 or NDM49. For specialists in private practice under public funding contracts, contacts with the same diagnosis code and procedure codes and/or tariff code 140c are included.

De Quervain's tenosynovitis: Surgery for De Quervain's tenosynovitis is defined by a primary or secondary diagnosis of M65.4 in combination with procedure code NDM49. For specialists in private practice under public funding contracts, contacts with the same diagnosis code and either the same procedure codes or tariff code 140k are included.

These four procedures are merged into one group called selected hand surgery in all our analyses.

Development since 2013

The 2015 day surgery atlas contained an error in the patient sample for hand surgery conditions. Procedures for Dupuytren's contracture had unfortunately been inadvertently omitted from the material due to a coding error. As a result of this, the figures for hand surgery in the atlas were too low, and the error also had some effect on the variation between hospital referral areas. For this reason, we will not comment further on the results from the 2015 day surgery atlas.

In 2013, just over 5,200 hand surgery procedures (adjusted rate: 105 per 100,000) were performed in Norway. The corresponding figure for 2017 was 5,600 (adjusted rate: 105 per 100,000). Despite a stable rate from 2013 to 2017 for Norway as a whole, there was variation from year to year, in some cases substantial variation, in certain hospital referral areas.

In Innlandet hospital referral area, the number of procedures per 100,000 population increased by approximately 25% from 2013 to 2017. During the same period, the number of procedures per 100,000 population decreased by 38% and 51%, respectively, in the hospital referral areas of Finnmark and Førde. These two areas had the lowest rates in Norway during the period 2015–2017.

The geographical variation between hospital referral areas was moderate during the period 2015–2017. Inhabitants of the Innlandet area had just over twice as many procedures per 100,000 population as inhabitants of Førde hospital referral area.

Comments

During the period 2015–2017, there was moderate variation in the number of hand surgery procedures per 100,000 population in different hospital referral areas. The need for hand surgery is assumed to be evenly geographically distributed in different parts of Norway, and the variation observed must therefore be deemed to be unwarranted.

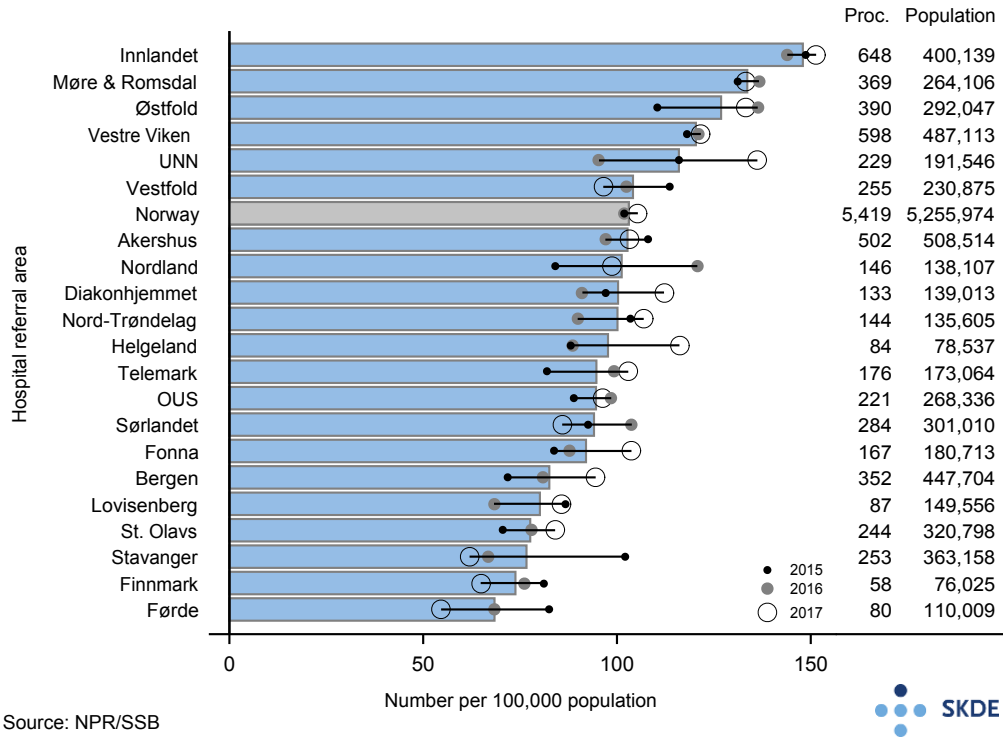


Figure 3.9: Number of procedures for selected hand surgery per 100,000 population, adjusted for gender and age. Average per year for the period 2015–2017.

3.5 Carpal tunnel syndrome

Carpal tunnel syndrome is due to pressure on the main nerve to the hand (nervus medianus). The condition is usually caused by processes that result in swelling around the tendons running through the carpal tunnel, so that the tendons press on the nerve. Typical symptoms include pain, numbness and tingling in the thumb, index finger, middle finger and the thumb side of the ring finger. The condition can heal spontaneously, and conservative treatment is usually the preferred option. Surgery is the best treatment option for patients with serious symptoms and/or problems. Surgery consists of partly or completely cutting the ligament that arches over the carpal tunnel to release pressure on the nerve.

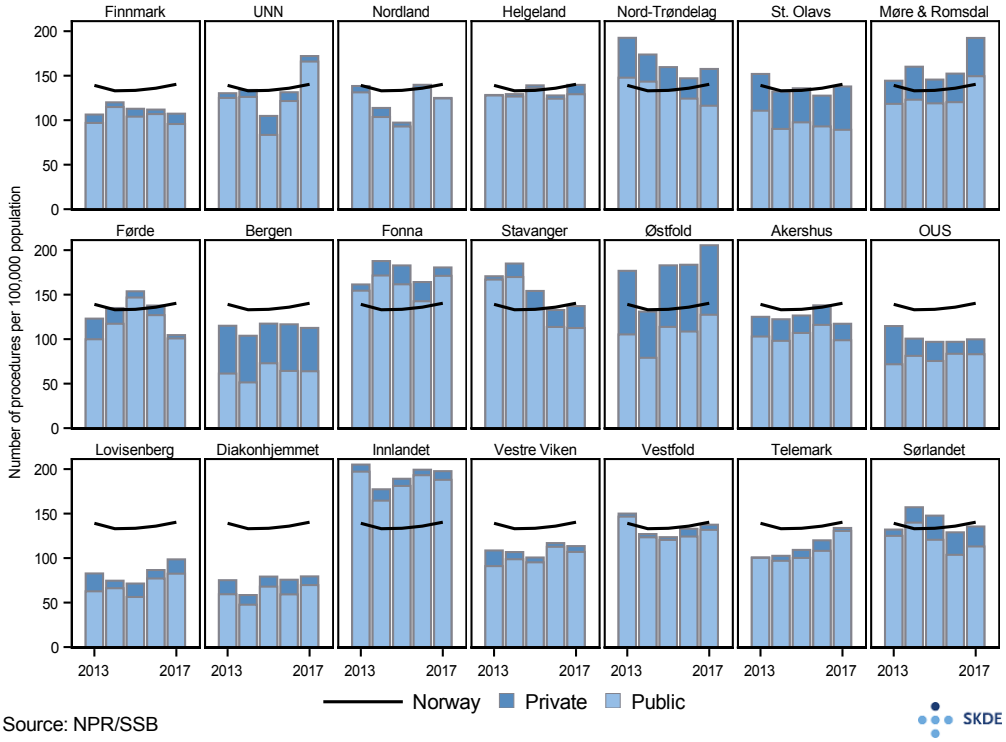


Figure 3.10: Carpal tunnel syndrome, development in the number of procedures per 100,000 population during the period 2013–2017, adjusted for gender and age. Broken down by hospital referral areas and public or private treatment providers.

Sample

Surgery for carpal tunnel syndrome is defined by a primary or secondary diagnosis of G56.0 in combination with one or more of the procedure codes ACC51, NDE11, NDE12, NDM19, NDM49 or NDL50. For specialists in private practice under public funding contracts, contacts with the same diagnosis code and procedure codes and/or tariff code 140i are included.

Development since 2013

The 2015 day surgery atlas showed moderate geographical variation in the use of surgical procedures for carpal tunnel syndrome. Residents in the hospital referral areas Innlandet, Stavanger, Nord-Trøndelag and Fonna had nearly twice as many procedures per 100,000 population during

the period 2011–2013 as those resident in Bergen and Oslo hospital referral areas. In Norway as a whole, just under 7,000 procedures (adjusted rate: 139 per 100,000) were performed in 2013.

There was still moderate geographical variation in surgical procedures for carpal tunnel syndrome during the period 2015–2017, when 2.5 times as many procedures per 100,000 population were performed on people living in Innlandet, Østfold and Fonna hospital referral areas as on those resident in the areas of OUS, Lovisenberg and Diakonhjemmet.

The number of procedures per 100,000 population remained stable for Norway as a whole from 2013 to 2017. Around 17% of the procedures were performed by publicly funded private hospitals or specialists in private practice under public funding contracts. In 2017, about 7,500 procedures (adjusted rate: 140 per 100,000) were performed.

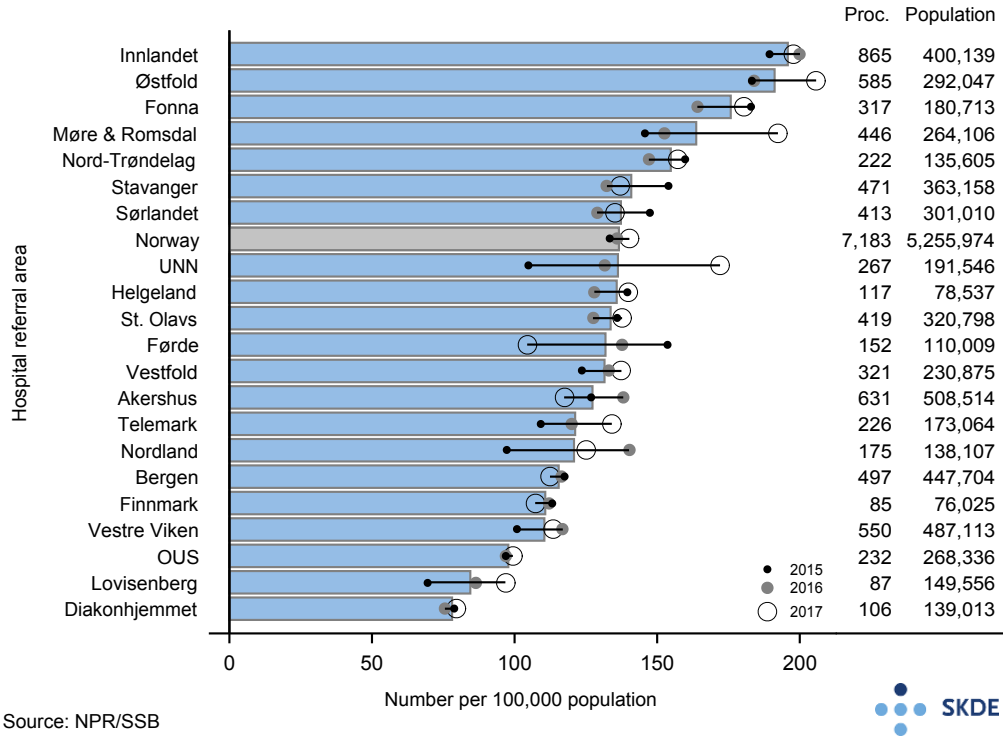


Figure 3.11: Number of procedures for carpal tunnel syndrome per 100,000 population, adjusted for gender and age. Average per year for the period 2015–2017.

In the hospital referral areas of Nord-Trøndelag and Stavanger, the number of procedures per 100,000 population gradually decreased from well above the national average in 2013 to around the national level in 2017. Telemark hospital referral area saw a gradual increase from below the national average in 2013 to the national level in 2017. Some other areas experienced considerable variation from one year to the next.

Comments

During the period 2015–2017, the variation in the number of surgical procedures for carpal tunnel syndrome per 100,000 population between the health trusts' hospital referral areas had increased. This suggests that the indications for these procedures may be unclear and that their use is to a certain extent governed by supply. The medical need for surgical procedures for carpal tunnel

syndrome is assumed to be more or less the same regardless of where people live. The observed variation is therefore deemed to be unwarranted.

3.6 Tonsillectomy

Tonsillectomy is one of the operations most commonly performed on children and young adults. The reason for a tonsillectomy (complete removal of the tonsils) is usually recurring or chronic throat infections. Tonsillotomy (partial tonsillectomy) is usually performed when the palatine tonsils are so big that they make sleeping or eating difficult. Tonsillotomy is less painful than tonsillectomy and carries a lower risk of bleeding in the days following the operation.

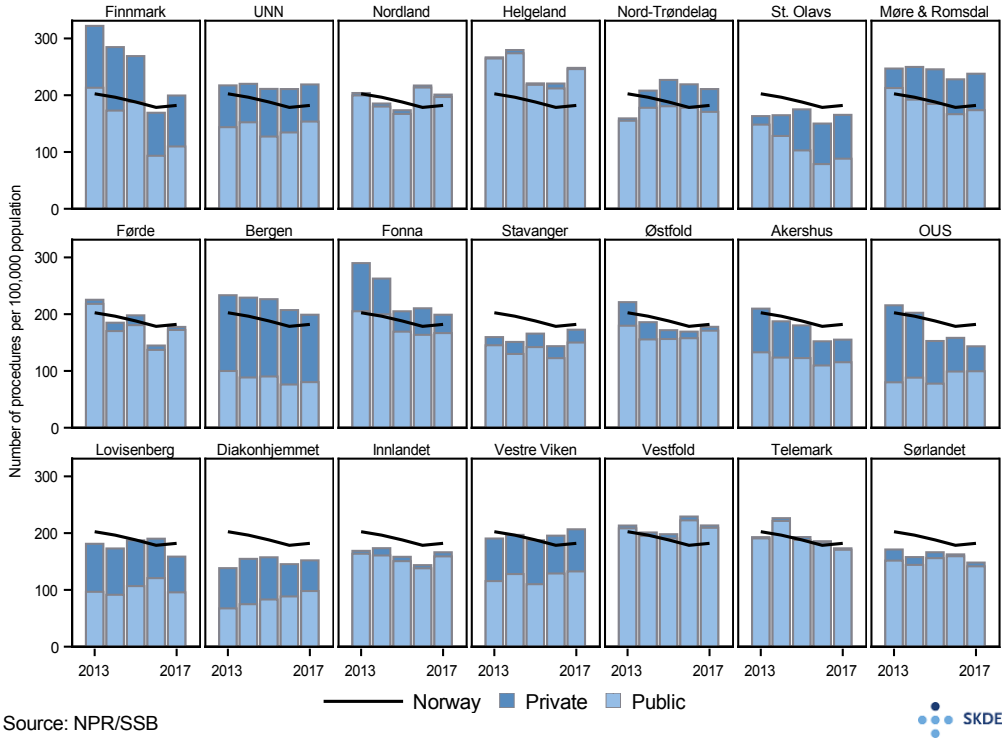


Figure 3.12: Tonsillectomy, development in the number of procedures per 100,000 population during the period 2013–2017, adjusted for gender and age. Broken down by hospital referral areas and public or private treatment providers.

Sample

Tonsillectomy is defined by a primary or secondary diagnosis in code block J35, or one of the diagnoses H65.2 and H65.3. When these diagnosis codes are found in combination with the procedure codes EMB10 or EMB20, the procedure is defined as a tonsillectomy. When these diagnose codes are found in combination with the procedure codes EMB12, EMB15, or EMB99, the procedure is defined as a tonsillotomy. For specialists in private practice under public funding contracts, contacts with the same diagnosis codes and procedure codes and/or tariff codes K02a, K02e, K02f or K02g, which all concern tonsillectomy, are included.

Development since 2013

The 2015 day surgery atlas included procedures on both the tonsils and adenoid tissue (the adenoids). Based on feedback from the Norwegian Tonsil Surgery Register, only procedures on tonsils are included in this healthcare atlas. For this reason, we will not comment further on

the results from the 2015 day surgery atlas. In 2013, just over 10,600 procedures (adjusted rate: 203 per 100,000) were performed on tonsils in Norway. In that year, more than twice as many procedures per 100,000 population were performed on inhabitants of Finnmark hospital referral areas as on those resident in the Diakonhjemmet area.

During period 2015–2017, 1.6 times as many procedures were performed on tonsils per 100,000 population in Møre og Romsdal hospital referral area as in the OUS and Diakonhjemmet areas. The total number of procedures per 100,000 population in Norway has decreased steadily from 2013 to 2016. In 2017, about 9,600 procedures (adjusted rate: 182 per 100,000) were performed. The number of procedures per 100,000 population remained stable or decreased in all hospital referral areas in Norway during this period. The greatest reduction was in Finnmark hospital referral area.

For Norway as a whole, 30% of tonsillectomies took place as inpatient procedures. The proportion varied from 64% in Nord-Trøndelag hospital referral area to 9% in the Østfold area (Appendix E).

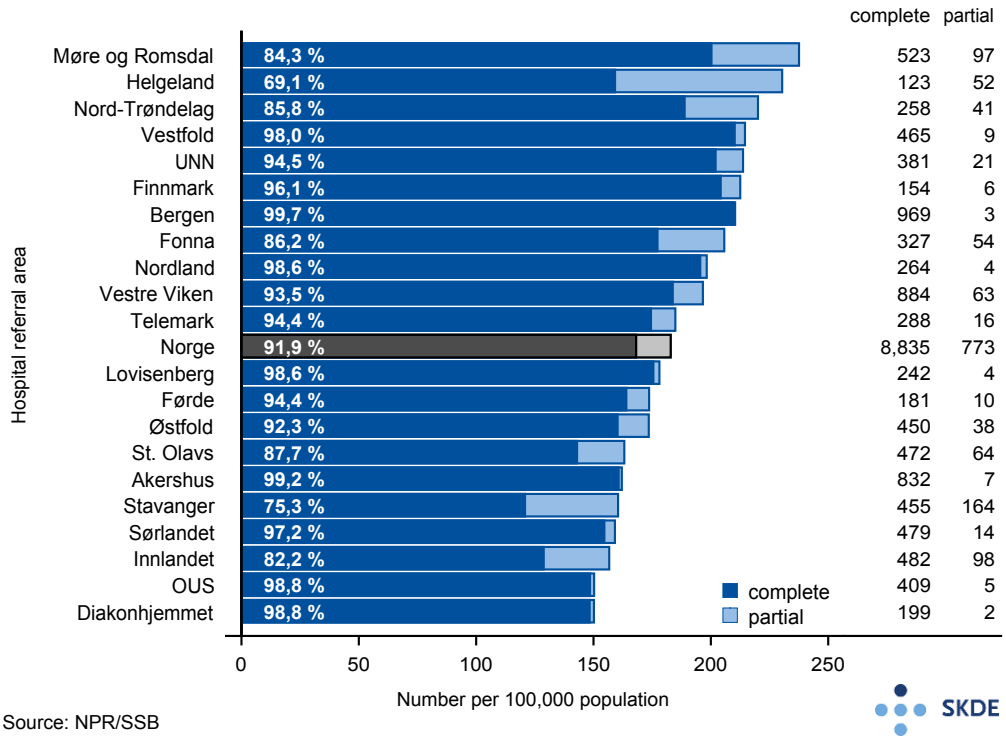


Figure 3.13: Tonsillectomy (complete and partial), per 100,000 population, adjusted for gender and age. Average per year for the period 2015–2017.

In Sweden, 44% of procedures performed on tonsils during the period 2013–2015 were tonsillotomies (Hallenstål et al. 2017). In Norway, a tonsillotomy procedure was used in about 10% of procedures performed on tonsils during the period 2015–2017. The proportion varies somewhat between hospital referral areas. The low number of tonsillotomies means that random variation can have a considerable impact.

Comments

The variation between the health trusts' hospital referral areas in the number of procedures performed on tonsils per 100,000 population was clearly lower during the period 2015–2017 than in 2013. The geographical variation between hospital referral areas is deemed to be low, and this health service appears to be reasonably equitably distributed in the population regardless of where people live.

3.7 Aural ventilation tube

Fluid in the middle ear restricts the movement of the eardrum and can result in hearing loss and delayed language development. If the condition is found in adults, their nasopharynx must be carefully examined for tumours. The build-up of fluid will normally resolve on its own within approximately three months. In the event of hearing loss or language problems of a certain duration, however, the condition can be treated by inserting a ventilation tube (grommet) in the eardrum. The effect of the procedure is individual and not scientifically well-documented.

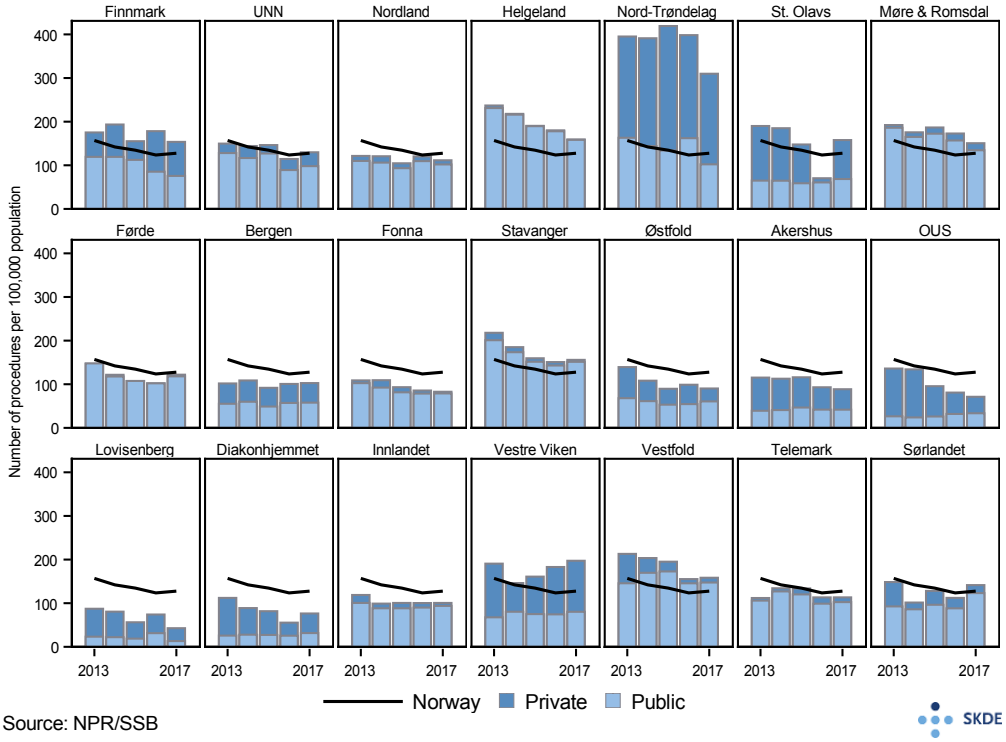


Figure 3.14: Aural ventilation tube, development in the number of procedures per 100,000 population during the period 2013–2017, adjusted for gender and age. Broken down by hospital referral areas and public or private treatment providers.

Sample

Aural ventilation tube insertion is defined by the procedure code DCA20. For specialists in private practice under public funding contracts, contacts with the same procedure code and/or tariff codes K02c, K02d, K02e, K02g or 317b are included. Tariff code 317b 'Paracentesis with ventilation tube' had been omitted by mistake from the 2015 day surgery atlas. This means that the sample in this atlas is not directly comparable with the sample from 2015. This tariff code is used for procedures carried out under local anaesthesia and therefore mainly applies to adults.

Development since 2013

In the 2015 day surgery atlas, tariff code 317b 'Paracentesis with ventilation tube' had been omitted from the definition of the sample by mistake. The tariff code identifies a specific type of procedure performed by specialists in private practice under public funding contracts. About 500

such procedures a year are carried out in Norway. For this reason, we will not comment further on the results from the 2015 day surgery atlas. In 2013, more than 8,200 aural ventilation tube insertions (adjusted rate: 157 per 100,000) were performed in Norway. In that year, 4.5 times as many procedures per 100,000 population were performed on residents of Nord-Trøndelag hospital referral area as in the Lovisenberg area.

The geographical variation in aural ventilation tube insertions was even greater during the period 2015–2017, when residents of Nord-Trøndelag had 6.5 times as many procedures per 100,000 population as those resident in Lovisenberg hospital referral area. If we exclude these extremes, there were still 2.5 times as many procedures per 100,000 population in Vestre Viken as in Diakonhjemmet hospital referral area.

For Norway as a whole, the number of aural ventilation tube insertions per 100,000 population was reduced by 19% from 2013 to 2017. In 2017, nearly 6,700 procedures (adjusted rate: 128 per 100,000) were performed. The reduction was greatest at publicly funded private hospitals and specialists in private practice under public funding contracts. The reason for the decrease in 2016 among the population of St. Olavs hospital referral area was that a specialist in private practice was on leave of absence that year.

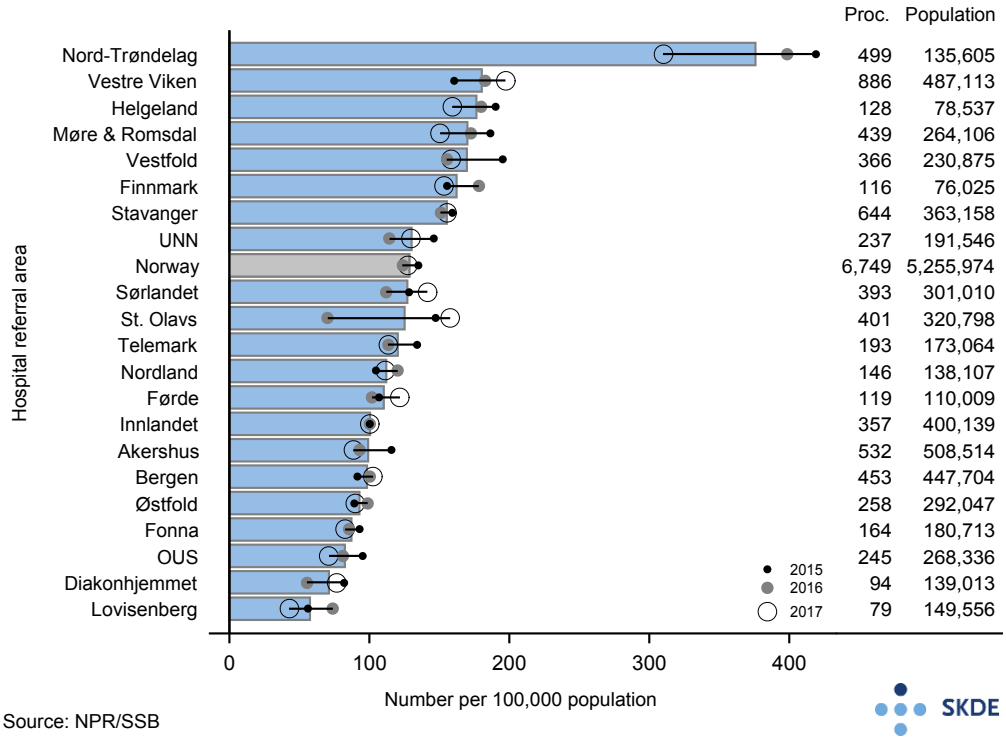


Figure 3.15: Number of aural ventilation tube insertion procedures per 100,000 population, adjusted for gender and age. Average per year for the period 2015–2017.

From 2013 to 2017, the number of aural ventilation tube insertions per 100,000 population remained stable or decreased in all hospital referral areas with the exception of Vestre Viken. Nord-Trøndelag hospital referral area had a very high rate until 2016, before a marked reduction took place in 2017.

Comments

From 2013 to 2017, the number of aural ventilation tube insertions per 100,000 population decreased in most hospital referral areas. However, the variation between areas was higher during the period 2015–2017 than it was in 2011–2013. This suggests that the specialist communities do not agree on the indications for aural ventilation tube treatment. The medical need for aural ventilation tubes is assumed to be more or less the same regardless of where in Norway people live. The observed variation is therefore deemed to be unwarranted.

3.8 Age-related cataracts

Cataracts are opacities in the lens of the eye that lead to impaired vision. Most patients develop cataracts as part of the aging process, but there are also hereditary and congenital causes. If left untreated, cataracts will result in blindness. The treatment consists of removing the old lens from the eye and replacing it with an artificial one. Surgery should be considered when the patient's visual function impairs activities of daily living. Patients are entitled to prioritised healthcare when vision in the patient's best eye is poorer than 50% of normal vision.

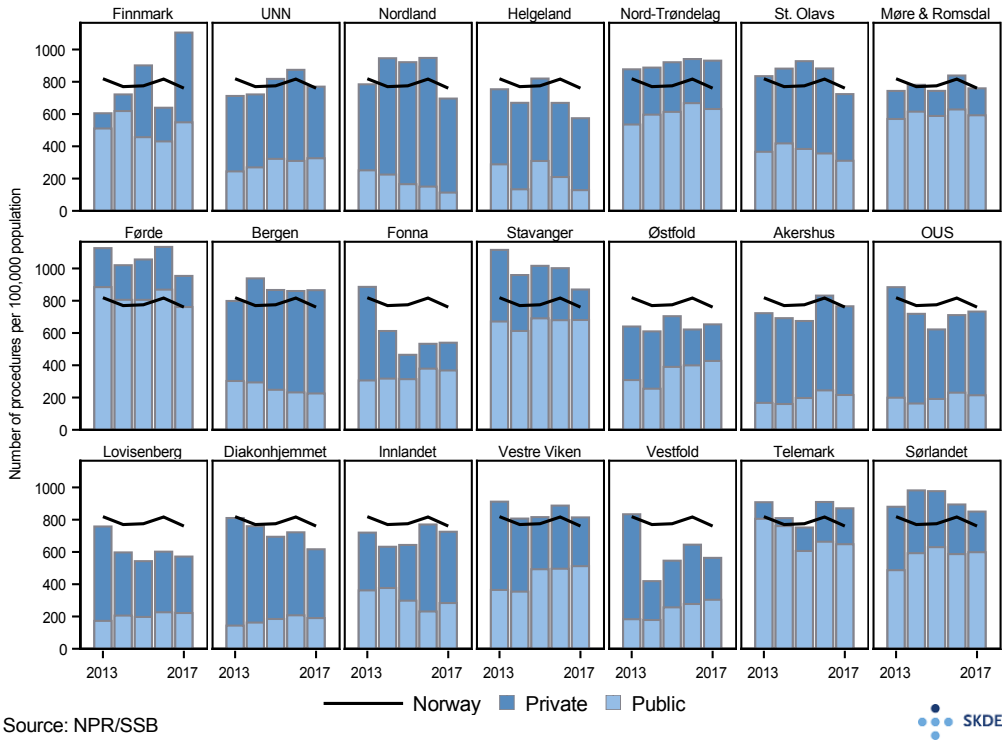


Figure 3.16: Cataract, development in the number of procedures per 100,000 population during the period 2013–2017, adjusted for gender and age. Broken down by hospital referral areas and public or private treatment providers.

Sample

Cataract surgery is defined by a primary or secondary diagnosis in code block H52 in combination with procedure code CJE 20. For specialists in private practice under public funding contracts, contacts with the same diagnosis codes and procedure code and/or tariff code K01a are included.

Development since 2013

The 2015 day surgery atlas showed geographical variation in surgical treatment of age-related cataracts during the period 2011–2013. The residents of the Stavanger area had 1.7 times more cataract operations per 100,000 population than inhabitants of Østfold hospital referral area. In 2013, just over 40,000 cataract procedures (adjusted rate: 819 per 100,000) were performed in Norway.

The geographical variation between hospital referral areas remained moderate during the period 2015–2017. Twice as many procedures per 100,000 population were performed on residents of the Førde area as on those resident in Fonna hospital referral area.

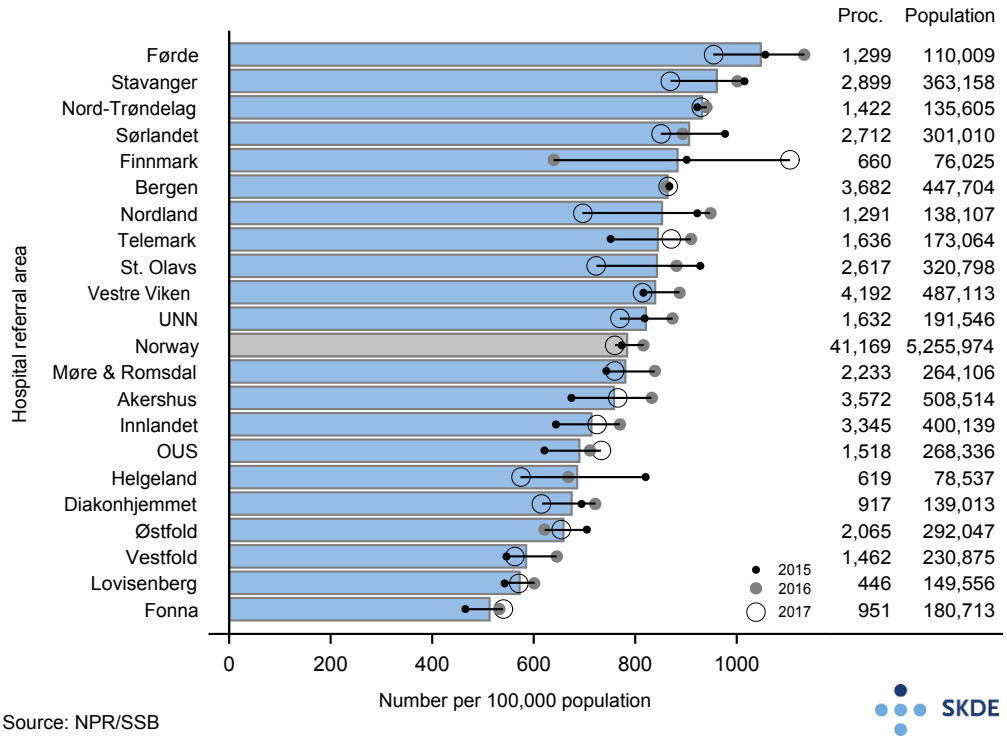


Figure 3.17: Number of procedures for cataracts per 100,000 population, adjusted for gender and age. Average per year for the period 2015–2017.

The number of operations for cataracts per 100,000 population in Norway per year remained more or less stable from 2013 to 2017, and half of the procedures were carried out by publicly funded private hospitals or specialists in private practice under public funding contracts. In 2017, just over 41,000 such procedures (adjusted rate: 760 per 100,000) were performed in Norway.

Most of the hospital referral areas' rates remained relatively unchanged from 2013 to 2017. There was considerable variation between years in the Finnmark area, but no clear trend towards a higher or lower number of procedures. The rates for Fonna and Vestfold hospital referral areas, however, fell considerably from 2013 to 2017. The main reason for this was the decrease in the number of operations for cataracts performed by publicly funded private hospitals and specialists in private practice under public funding contracts.

Comments

The variation between hospital referral areas in the number of operations for cataracts per 100,000 population was somewhat higher during the period 2015–2017 compared with the period 2011–2013. The difference was more than 500 procedures per 100,000 population. This indicates that the distribution of this health service not equitable. There is no known geographical variation in the prevalence of the condition, and the observed variation is therefore deemed to be unwarranted.

3.9 Droopy eyelids

Droopy eyelids are usually due to excess skin. The skin becomes less elastic with age, and the fat depots become more prominent. Droopy eyelids that have a significant effect on a patient's vision and/or field of vision entitle the patient to prioritised healthcare. The procedure is normally carried out under local anaesthesia by an ophthalmologist. Excess skin and underlying fat is usually removed from the upper eyelid by means of laser or radiofrequency surgery.

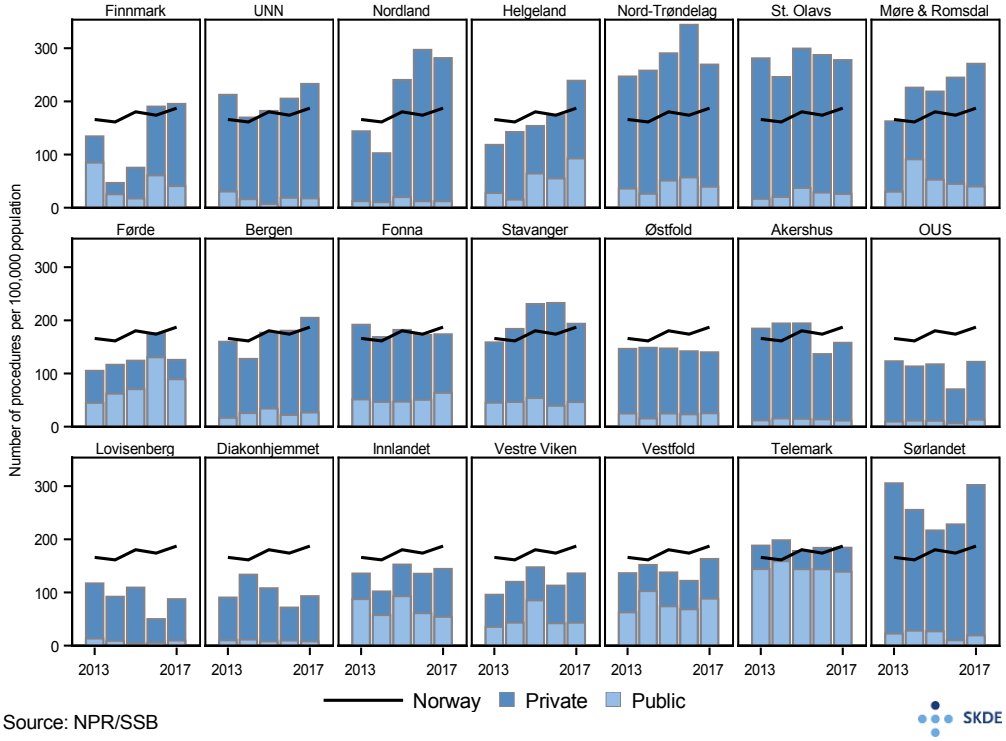


Figure 3.18: Droopy eyelids, development in the number of procedures per 100,000 population during the period 2013–2017, adjusted for gender and age. Broken down by hospital referral areas and public or private treatment providers.

Sample

Surgery for droopy eyelids is defined by a primary or secondary diagnosis of H02.3 in combination with one or more of the procedure codes CBB10 and CBB20. For specialists in private practice under public funding contracts, contacts with the same diagnosis codes and procedure codes and/or tariff codes K01d or K01e are included.

Development since 2013

The 2015 day surgery atlas showed considerable variation between the health trusts' hospital referral areas in the use of surgical procedures for droopy eyelids during the period 2011–2013. The inhabitants of Nord-Trøndelag and St. Olavs hospital referral areas had nearly three times as many procedures per 100,000 population as residents of the Oslo and Førde areas. Three out of four such procedures were performed by publicly funded private hospitals or specialists in private

practice under public funding contracts. In 2013, around 8,400 procedures (adjusted rate: 166 per 100,000) were performed in Norway.

The variation between hospital referral areas was even higher during the period 2015–2017 than during the period 2011–2013. The residents of Nord-Trøndelag and St. Olavs had well over three times as many procedures per 100,000 population as people residing in Lovisenberg and Diakonhjemmet hospital referral areas.

For Norway as a whole, the number of procedures for droopy eyelids increased to nearly 10,000 (adjusted rate: 187 per 100,000) in 2017. The increase was particularly steep in the hospital referral areas of Helgeland, Nordland and Møre og Romsdal. During the period 2013–2017, 68–74% of such procedures were performed by publicly funded private treatment providers, nearly all by specialists in private practice under public funding contracts. There was considerable variation between hospital referral areas in the percentage of droopy eyelid procedures performed at public hospitals.

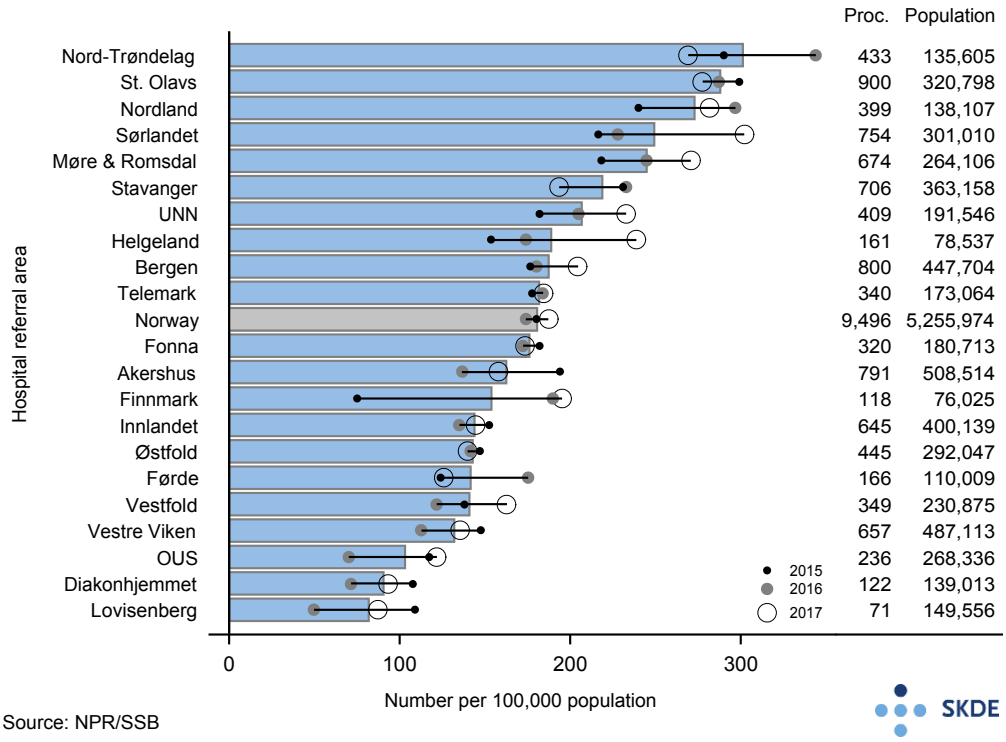


Figure 3.19: Number of procedures for droopy eyelids per 100,000 population, adjusted for gender and age. Average per year for the period 2015–2017.

Comments

There was greater variation between the health trusts' hospital referral areas in the number of procedures for droopy eyelids per 100,000 population during the period 2015–2017 than during the period 2011–2013. There is no known geographical variation in the prevalence of droopy eyelids, nor is it likely that differences in patient preferences or chance can fully explain the observed variation. The variation is therefore deemed to be unwarranted and could possibly be due to the fact that supply has a certain influence on the use of these procedures.

3.10 Inguinal hernia

An inguinal hernia is a protrusion in the groin where internal structures bulge through a weak point in the abdominal wall. Symptoms may include burning and discomfort, and a heavy sensation is also common. Surgery is indicated in children and young adults with inguinal hernia, but in adults only if they also experience pain. The procedure is carried out under local anaesthesia, as either open surgery or keyhole surgery.*JS: Do we have a preference to use keyhole or laparoscopic?*

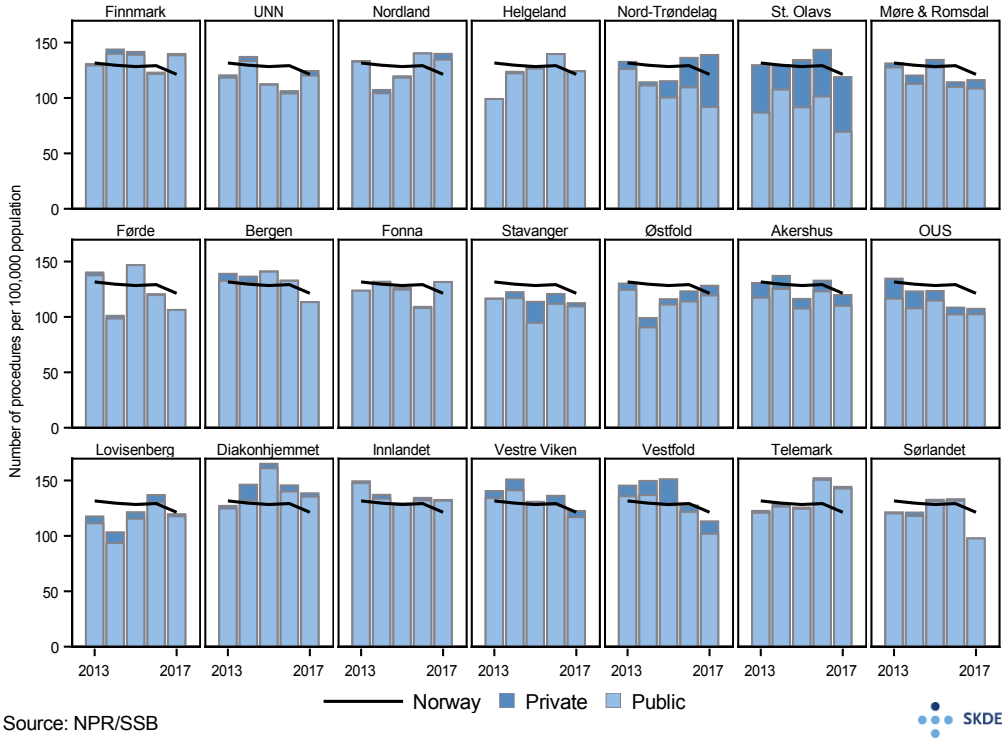


Figure 3.20: Inguinal hernia, development in the number of procedures per 100,000 population during the period 2013–2017, adjusted for gender and age. Broken down by hospital referral areas and public or private treatment providers.

Sample

Surgery for inguinal hernia is defined by a primary or secondary diagnosis in the code block K40 in combination with one or more of the procedure codes JAB00, JAB10, JAB11 and JAB30. For specialists in private practice under public funding contracts, contacts with the same diagnosis codes and procedure codes and/or tariff code 140e are included.

Development since 2013

The 2015 day surgery atlas showed little variation in the number of inguinal hernia repairs per 100,000 population between the health trusts' hospital referral areas. In 2013, nearly 6,600 procedures (adjusted rate: 132 per 100,000) were performed in Norway.

The geographical variation between hospital referral areas remained very low during the period 2015–2017. The number of procedures per 100,000 population varied from 150 for inhabitants of Diakonhjemmet hospital referral area to 113 for those resident in the OUS area. For Norway as a whole, 30% of inguinal hernia repairs took place as inpatient procedures. The proportion varied from 43% in the Finnmark area to 20% in Østfold hospital referral area (see Figure E.2 in Appendix E).

There was a small decrease in the total number of inguinal hernia operations per 100,000 population in Norway from 2013 to 2017. In most hospital referral areas, nearly all of these procedures took place at public hospitals. For Norway as a whole, only 6% of the procedures were performed at private hospitals, but the percentages for the hospital referral areas of Nord-Trøndelag and St. Olavs were significantly higher. In 2017, nearly 6,500 procedures (adjusted rate: 121 per 100,000) were performed.

For Norway as a whole, the proportion of operations performed using keyhole surgery increased steadily, from a third in 2013 to more than half in 2017.

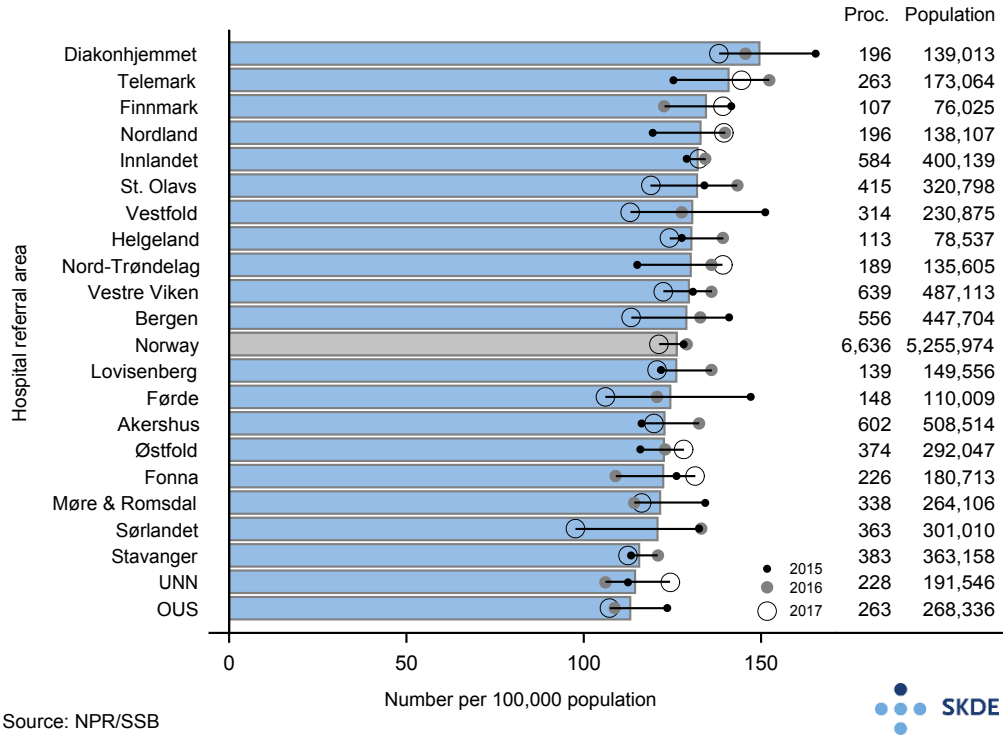


Figure 3.21: Number of procedures for inguinal hernia per 100,000 population, adjusted for gender and age. Average per year for the period 2015–2017.

None of the hospital referral areas had a clear increase or decrease in the number of inguinal hernia repairs per 100,000 population from 2013 to 2017, but there was some variation between years.

Comments

There was no significant change in the number of inguinal hernia repairs per 100,000 population or in the variation between the health trusts' hospital referral areas from the period 2011–2013 to the period 2015–2017. The variation in the rate of inguinal hernia repairs was low both between

hospital referral areas and between years during both periods. This indicates that there is consensus in the medical community about the indications for the procedure. The provision of this health service is deemed to be equitably distributed in the population regardless of where people live.

3.11 Varicose veins

Loss of venous elasticity and poor venous valve function in the legs give rise to varicose veins, which can cause pressure and a heavy sensation. In more severe cases, symptoms may include swelling, pain and leg ulcers. The decision to treat varicose veins surgically is made on the basis of their size and the degree of cosmetic discomfort, swelling and leg ulcers. Surgical removal or ligation has been the preferred form of treatment, but it is gradually being replaced by endovascular techniques using laser, radiofrequency or foam treatment. These new techniques appear to be as effective as conventional surgery.

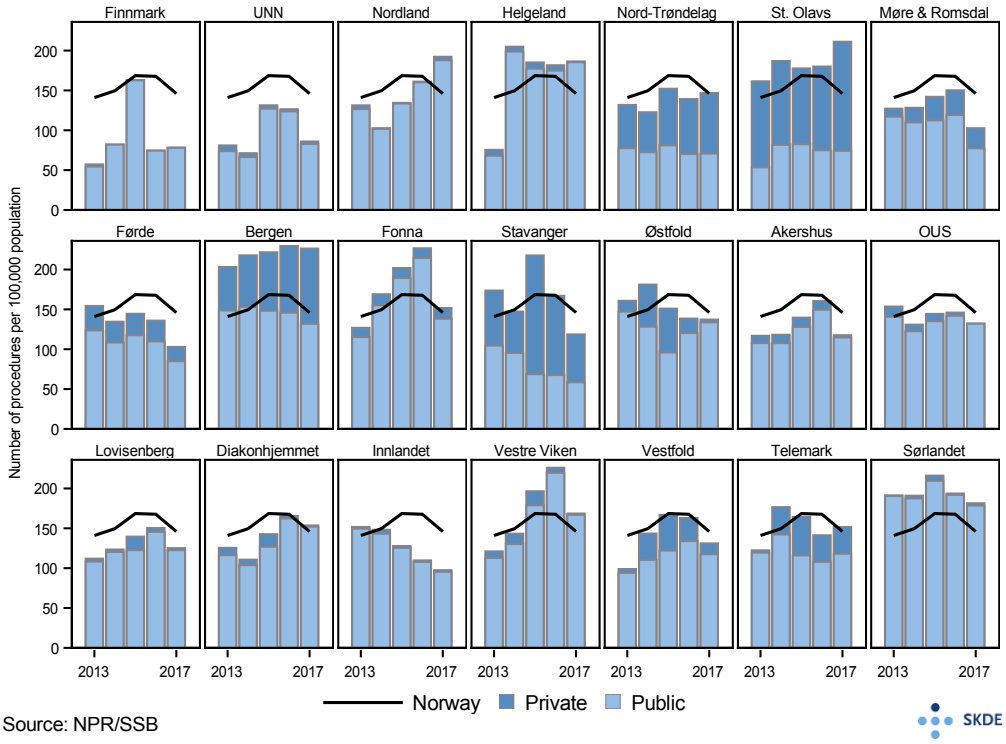


Figure 3.22: Varicose veins, development in the number of procedures per 100,000 population during the period 2013–2017, adjusted for gender and age. Broken down by hospital referral areas and public or private treatment providers.

Sample

The sample for varicose vein surgery has been redefined because the coding system has changed and new techniques are becoming more and more widespread. There is now a distinction between varicose vain procedures using conventional surgical methods (resection ('stripping') and ligation) and new techniques (endovascular methods to seal the vein from the inside using laser, radiofrequency or foam (sclerotherapy) treatment). The new methods produce results that are at least as good as conventional surgery with less discomfort and a lower risk of complications. However, it has not been determined whether they produce better results in the long term[7] (Nesbitt et al. 2014). In connection to this, we have included some codes in the sample that are not used much and that were not included in the 2015 day surgery atlas. This means that the figures in this atlas are not directly comparable with the figures in the original atlas, but the new codes

[7] www.uptodate.com/contents/overview-and-management-of-lower-extremity-chronic-venous-disease

will only lead to minor changes in the number of procedures and will have no significant impact on the variation shown in 2015.

Varicose vein surgery is defined by a primary or secondary diagnosis in code block I83 or code I87.2. When these diagnosis codes are found in combination with the procedure codes PHB10, PHB11, PHB12, PHB13, PHB14, PHB99, PHD10, PHD11, PHD12, PHD15 or PHD99, the procedure is defined as a conventional surgery. When they are combined with the procedure codes PHV10, PHV12, PHV13, PHV14, PHV99, PHV10X, PHV12X, PHV13X, PHV14X, TPH10 or PHX10, the procedure is defined as a new technique.

Development since 2013

This healthcare atlas defines the varicose vein surgery sample in a slightly different way than the 2015 day surgery atlas. The updated definition takes into account changes in the coding system and the increasing use of new techniques. For this reason, we will not comment further on the results from the 2015 day surgery atlas. In 2013, just over 7,100 varicose vein operations (adjusted rate: 141 per 100,000) were performed in Norway. That year, 3.5 times as many procedures per 100,000 population were performed on residents of Bergen hospital referral area compared with Finnmark.

The variation between hospital referral areas was lower during the period 2015–2017 than in 2013. Bergen hospital referral area had twice as many varicose vein operations per 100,000 population as Finnmark hospital referral area. For Norway as a whole, the number of procedures per 100,000 population increased from 2013 to 2015, and then decreased from 2016 to 2017. In 2017, just over 7,750 varicose vein operations (adjusted rate: 146 per 100,000) were performed in Norway.

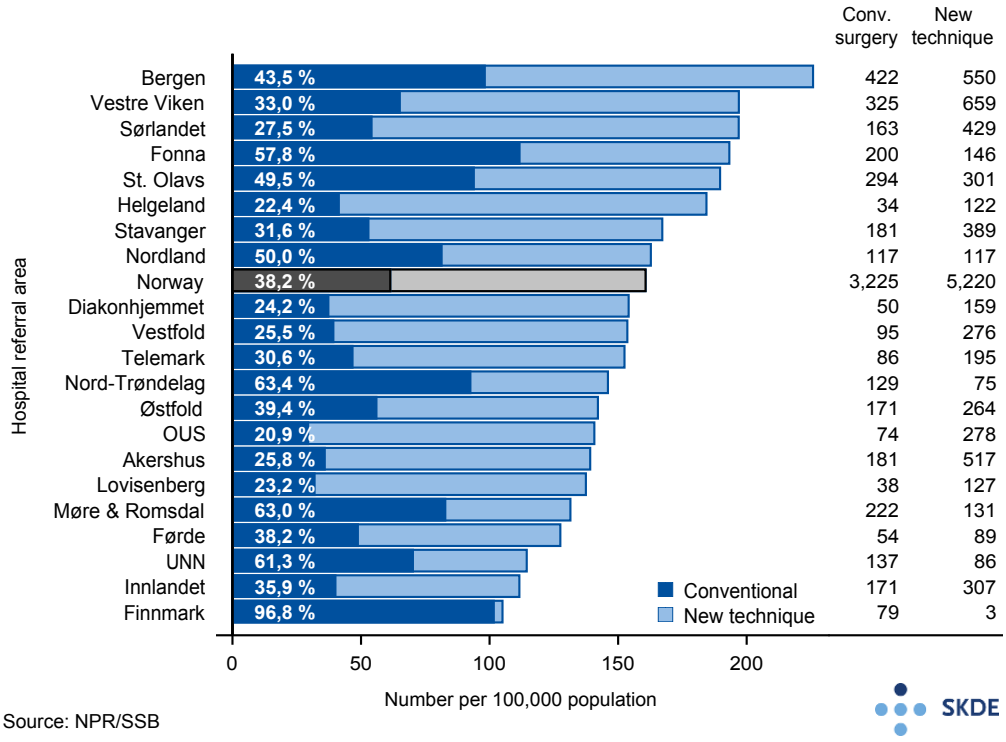


Figure 3.23: Treatment of varicose veins per 100,000 population, conventional surgery and new techniques, adjusted for gender and age. Average per year for the period 2015–2017.

There was a clear reduction in the number of varicose vein operations per 100,000 population in the hospital referral areas of Førde, Stavanger and Innlandet from 2013 to 2017. At the same time, there was a clear increase in the Nordland and Vestre Viken areas. Some hospital referral areas had significant variation from year to year. For Norway as a whole, around one-fifth of varicose vein operations were performed at private hospitals. The proportion varied considerably between hospital referral areas.

During the period 2015–2017, conventional surgery was used in 38% of varicose vein operations in Norway. The proportion varied from 97% in Finnmark hospital referral area to 21% in the OUS area.

Comments

There was still variation between hospital referral areas in the number of varicose vein operations per 100,000 population during the period 2015–2017, but it was much smaller than in the preceding period. There was great variation in the type of technique used. This suggests that the indications for such surgery may be unclear. There is no known geographical variation in the prevalence of varicose veins. The observed variation is therefore deemed to be unwarranted.

3.12 Haemorrhoids

Haemorrhoids are protrusions in the anal canal consisting of swollen veins and surrounding connecting tissue. Constipation, standing up for long periods of time, pregnancy and hard physical work predispose people to this condition. In addition to suppositories and ointments, haemorrhoids can also be treated by rubber band ligation or by constricting the blood supply. Tying off and removing the vessels is another technique that is used, particularly for complicated cases.

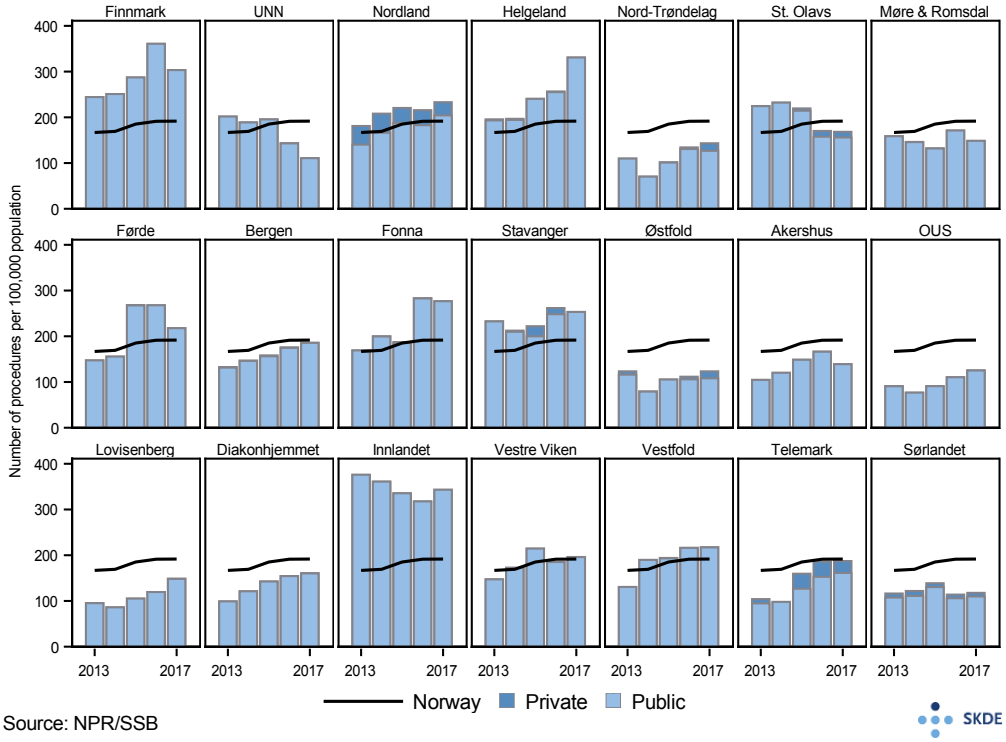


Figure 3.24: Haemorrhoids, development in the number of procedures per 100,000 population during the period 2013–2017, adjusted for gender and age. Broken down by hospital referral areas and public or private treatment providers.

Sample

Haemorrhoid procedures are defined by a primary or secondary diagnosis in code blocks K64 or I84 in combination with one of more of the procedures codes JHA00, JHA20, JHA30, JHB00, JHB10, JHB30 or JHB96. For specialists in private practice under public funding contracts, contacts with the same diagnoses and procedure codes and/or tariff code 140l are included.

Development since 2013

The 2015 day surgery atlas showed a great variation in haemorrhoid procedures between hospital referral areas in Norway during the period 2011–2013. The population of Innlandet hospital referral area had significantly more procedures for haemorrhoids per 100,000 population than residents of the other hospital referral areas. If we exclude this area, the variation is still considerable. People living in Finnmark hospital referral area, which had the second highest rate, had 2.6 times as many procedures for haemorrhoids per 100,000 population as residents of Nord-Trøndelag,

which had the lowest rate during the period 2011–2013. Very few procedures were performed by publicly funded private hospitals or specialists in private practice under public funding contracts. In 2013, nearly 8,500 procedures (adjusted rate: 167 per 100,000) were performed in Norway.

During the period 2015–2017, residents of Innlandet hospital referral area had over three times as many haemorrhoid procedures per 100,000 population as residents in the OUS area.

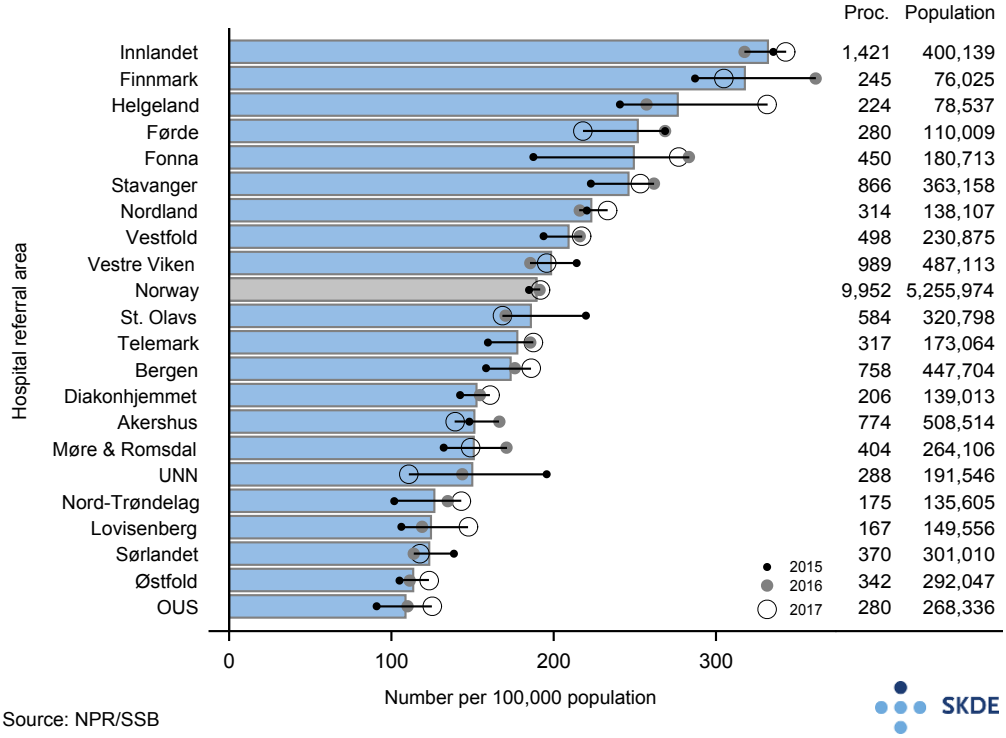


Figure 3.25: Number of procedures for haemorrhoids per 100,000 population, adjusted for gender and age. Average per year for the period 2015–2017.

For Norway as a whole, the number of procedures for haemorrhoids increased from 2013 to 2017. In 2017, just over 10,100 such procedures (adjusted rate: 192 per 100,000) were performed in Norway. The greatest increase was in Telemark hospital referral area, where the number of procedures per 100,000 population nearly doubled from 2013 to 2017. The number also increased for the hospital referral areas of Finnmark, Nordland, Helgeland, Førde, Fonna, Lovisenberg, Diakonhjemmet and Vestfold. There was a decrease in UNN, St. Olavs and Innlandet hospital referral areas. The vast majority of procedures for haemorrhoids took place at public hospitals during the period 2013–2017. Only in some hospital referral areas were a modest number of procedures performed by publicly funded private hospitals or specialists in private practice under public funding contracts.

Comments

From 2013 to 2017, the number of procedures for haemorrhoids per 100,000 population increased in most hospital referral areas. The variation between hospital referral areas was also higher during the period 2015–2017 than during the period 2011–2013. There is no known geographical variation in the prevalence of haemorrhoids, nor is it likely that differences in patient preferences or chance can fully explain the observed variation. The variation is therefore deemed to be unwarranted.

Chapter 4

Discussion

4.1 Extent and variation - what has happened since 2013?

4.1.1 Assessment of the development in variation

The 2015 day surgery atlas concluded that for nine of the twelve procedures, the health services were inequitably distributed. This attracted considerable attention both within and outside the health service. In the Hospital Speech for 2016, Minister of Health Høie pointed out that reducing variation is a focus area, and this objective was included in the Ministry of Health and Care Services' assignment documents to the regional health authorities for 2017. This updated day surgery atlas clearly shows that variation between hospital referral areas in the use of day surgery procedures has not decreased (Table 4.1). Based on the ratio between the highest and lowest rates, variation has in fact increased for five of the procedures, and the increase has been substantial for *shoulder surgery* and *aural ventilation tube insertion*.

4.1.2 Assessment of the development in the use of day surgery

Table 4.2 shows an overview of the development in the use of procedures normally performed as day surgery during the period 2013–2017. The general pattern, with some exceptions, is that the total figures are decreasing. There was already a considerable reduction in *shoulder surgery* and *meniscus surgery* before 2015. These were also the two procedures that received most attention following the publication of the day surgery atlas in 2015. Experts questioned the benefit of and the high number of such procedures. There has been a marked increase in surgery for *haemorrhoids* and *droopy eyelids*. Second only to *cataracts*, they are now the most frequent day surgery procedures, with about 10,000 performed each year. Overall, the number of day surgery procedures has decreased by 5%. Taking into account that the population has grown during this period, the actual reduction in the use of the procedures in question is higher.

A shift from inpatient to day surgery has been a health policy focus area. Table 4.3 shows the proportion of typical day surgery procedures performed on inpatients. For most procedures, this proportion decreased from 2013 to 2017. The exceptions to this trend are *meniscus surgery* and procedures for *hallux valgus and hammer toe*, where the proportion of inpatient procedures has increased. There was also great variation between hospital referral areas. For example, the probability of being admitted to hospital in connection with a *tonsillectomy* was nearly seven times higher for residents of Nord-Trøndelag hospital referral area than for residents in the Østfold

Table 4.1: Average number of procedures per year and the ratio between the highest and lowest rates (FT1) and between the second highest and second lowest rates (FT2) during the periods 2011–2013 and 2015–2017.

	2011–2013			2015–2017		
Procedure	Number	FT1	FT2	Number	FT1	FT2
Shoulder surgery (acromion resection)	7,222	3.8	3.4	6,262	6.7	5.4
Menisci	13,192	4.1	1.8	8,236	3.7	3.2
Hallux valgus and hammer toe	4,846	2.2	1.8	5,005	2.6	1.7
Selected hand surgery*	-	-	-	5,419	2.2	1.8
Carpal tunnel syndrome	6,573	2.1	1.9	7,183	2.5	2.3
Tonsillectomy*	-	-	-	9,609	1.6	1.5
Aural ventilation tube*	-	-	-	6,749	6.5	2.5
Age-related cataracts	36,084	1.7	1.6	41,169	2.0	1.7
Droopy eyelids	7,352	2.9	2.7	9,496	3.7	3.2
Inguinal hernia	6,338	1.2	1.2	6,636	1.3	1.2
Varicose veins*	-	-	-	8,445	2.2	1.8
Haemorrhoids	8,326	3.7	2.5	9,952	3.1	2.8

* The figures for 2011–2013 are not comparable with those for 2015–2017 because of differences in the way the samples were defined.

Table 4.2: Total number of procedures in Norway per year during the period 2013–2017

	Year					Changes
Procedure	2013	2014	2015	2016	2017	2013–2017
Shoulder surgery (acromion resection)	8,118	7,567	6,590	6,245	5,952	-26%
Menisci	14,569	13,076	9,709	7,958	7,041	-52%
Hallux valgus and hammer toe	5,217	5,236	5,404	4,978	4,633	-11%
Selected hand surgery	5,257	5,211	5,278	5,353	5,625	7%
Carpal tunnel syndrome	6,997	6,788	6,911	7,147	7,490	7%
Tonsillectomy	10,578	10,298	9,875	9,387	9,567	-10%
Aural ventilation tube	8,235	7,480	7,078	6,496	6,672	-19%
Age-related cataracts	39,772	38,361	39,543	42,943	41,033	3%
Droopy eyelids	8,412	8,273	9,375	9,152	9,971	19%
Inguinal hernia	6,572	6,587	6,631	6,792	6,484	-1%
Varicose veins	7,148	7,676	8,757	8,817	7,761	9%
Haemorrhoids	8,471	8,706	9,639	10,058	10,160	20%
Totalt	129,346	125,259	124,790	125,326	122,389	-5%

area (Figure E.1 in Appendix E). If the proportion of inpatients had been the same for Norway as a whole as in Østfold hospital referral area, we could have avoided nearly 2,000 hospital admissions every year. In connection with procedures for *inguinal hernia*, the probability of being admitted was more than twice as high for residents of Finnmark hospital referral area as for residents of Østfold (Figure E.2 in Appendix E). Overall, the analysis suggests that some work remains to be done to switch these elective surgical procedures from inpatient to day surgery.

Table 4.3: Proportion of inpatient admissions for procedures in Norway per year during the period 2013–2017

Procedure	Year 2013	2014	2015	2016	2017
Shoulder surgery (acromion resection)	13.9	14.6	15.3	14.3	12.4
Menisci	5.7	5.3	6.6	7.8	8.1
Hallux valgus and hammer toe	5.7	6.3	6.3	6.0	6.2
Selected hand surgery	2.8	2.7	2.0	1.8	1.1
Carpal tunnel syndrome	1.8	1.6	1.7	1.1	1.1
Tonsillectomy	33.5	30.9	30.5	29.6	29.3
Aural ventilation tube	6.8	6.5	7.1	6.6	6.6
Age-related cataracts	0.9	1.1	0.8	0.9	0.8
Droopy eyelids	0.0	0.1	0.1	0.1	0.1
Inguinal hernia	32.7	32.9	30.9	30.8	28.7
Varicose veins	6.4	5.1	3.9	2.2	1.8
Haemorrhoids	7.6	7.5	5.7	5.1	5.7

4.2 Is it possible to identify medical and administrative measures implemented with a view to changing practices?

We do not have a complete overview of medical or administrative measures implemented by regional health authorities or health trusts to help to reduce variation. One of the measures we know of is South-Eastern Norway Regional Health Authority's efforts to reduce the volume of *shoulder* and *meniscus surgery*. This work started before the day surgery atlas was published in 2015. Debate about this development continued after 2015, and the reduction in such procedures has continued, particularly in Eastern Norway. The Western Norway Regional Health Authority invited specialist communities to choose from about 50 patient samples, procedures or indicators of high variation from healthcare atlases and quality registers with a view to establishing measures to reduce variation. None of the projects initiated by the health trusts targeted day surgery, but the projects mostly resulted in reduced variation and improved quality. The Northern Norway Regional Health Authority's specialist community at Finnmarkssykehuset Hospital Trust initiated a project with physiotherapy as an alternative to *shoulder surgery*. A clear reduction in shoulder surgery was achieved, but Finnmark hospital referral area still had the highest rate in Norway during the period 2015–2017. The population of the Finnmark area also topped the list for *tonsillectomy*. The hospital referral area has reduced the number of such procedures considerably, and in 2017 the level had reached the national average. It is primarily public hospitals that have reduced their activity.

In Central Norway health region, the regional health authority has monitored the development of the twelve day surgery procedures since the publication of the day surgery atlas in 2015. Regional and local care pathways have been drawn up, and active use has been made of the figures in the procurement process for private hospital services. The effect of these efforts is shown e.g. in the use of *shoulder* and *meniscus surgery* in Møre og Romsdal, which had the highest rate in Norway for both these conditions during the period 2011–2013. Following an initiative from the local medical community, which pointed out the importance of ensuring that practice is in accordance with recent research, there has been a marked decrease in rates for these procedures for residents

of this hospital referral area.

To sum up, it appears that changes in practice that are reflected in the healthcare atlas have primarily been achieved through discussion in the medical community at the national or local level. It takes time to put in place channels and methods aimed at reducing variation and bringing about desirable changes in practice. This realisation and insight is perhaps the reason why both the South-Eastern Norway Regional Health Authority and the Northern Norway Regional Health Authority have recently made active use of the healthcare atlases in their long-term planning. Finally, it is a real challenge for those charged with managing the specialist health service that the right level/rate has not been determined, nor is it evident from best practice, for the procedures described in this atlas. The Norwegian Medical Association has started the *Gjør kloke valg!* campaign, which is a Norwegian version of the *Choosing Wisely* campaign. This programme contributes to active and systematic assessments by specialist communities of how beneficial tests and treatments are. This type of arena for discussing the benefit and extent of services may be a constructive way to engage in systematic change work.

4.3 Challenges and limitations in the data material

It is a challenge to present a cross-section of variation in the use of health services based on just a few years. Describing changes over a seven-year period, as we do in this atlas, is an even more demanding exercise. The reason for this is that the data material from the Norwegian Patient Registry is based on code systems that are constantly being updated and renewed. New treatments are introduced while others are phased out, and the statistical coding systems and the funding arrangements change over time. Our knowledge of how the different samples should be defined has developed since the first atlas was published. Over time, analytical techniques have become better at taking into account different coding practices for similar procedures or conditions. Cooperation with the specialist communities is a crucial part of this work. Our developing knowledge and closer dialogue with the specialist communities has resulted in some changes, with the result that some of the samples in the updated version are not comparable with those in the original version of the day surgery atlas.

4.3.1 Variation in coding practice

Surgical patient samples can be defined using either combinations of diagnosis and procedure codes or only procedure codes describing the procedure. It can be demanding to use the Norwegian Patient Registry (NPR) as a source to describe comparable activity. A single procedure or activity can be coded in different ways depending on local coding practices in the different health trusts. In other cases, different techniques or methods may be used to treat the same condition. The Office of the Auditor General of Norway has also found the quality of medical coding to be poor in most Norwegian health trusts. Many doctors receive insufficient training in basic coding principles, and as a result of this, different combinations of codes for the same clinical conditions can be found in NPR.[8] Simple procedures are performed by specialists in private practice under public funding contracts and should be coded in the same way as in other parts of the specialist health service, but they are often reimbursed by HELFO based on tariff codes from the normal

[8] The Office of the Auditor General's investigation of medical coding practice within the health enterprises. Document 3:5 (2016–2017).

tariff. Both procedure codes and tariff codes are now used for these specialists when defining the samples.

The procedure chosen to define the samples in this atlas aims to minimise the effect of variation in coding practices (see 2.5 Sample). We believe that this approach has enabled us to arrive at reasonably reliable estimates for the use of the different procedures, and that the remaining incorrect coding does not represent a threat to the conclusions in this report, even though we cannot, of course, rule out the possibility that we may have overlooked special code variants.

4.3.2 Assessment of the completeness of the data material

Not all specialists in private practice under public funding contracts report all their activities to NPR every year. Technical problems and other reasons could result in all or part of their activities not being included in the national basic data. In other cases, the specialist has been ill, has been on leave or for some other reason has treated fewer patients than normal. SKDE has no information about how large a proportion of activities carried out have not been reported to NPR. However, the majority of specialists in private practice under public funding contracts report all their activities to NPR every year.

NPR does not contain information about specialist health services that are paid for in full by the patient or an insurance company, and nor is such information available from other sources. There has been a steep increase in the number of people taking out insurance in recent years, cf. section 2.7 Health services that are not publicly funded. The healthcare atlases are primarily an attempt to map how the health trusts discharge their responsibility to provide equitable and satisfactory health services to the population in their hospital referral areas. The atlases therefore focus on specialist health services provided by public hospitals or publicly funded private hospitals and specialists in private practice under public funding contracts. Nevertheless, it would be interesting to investigate whether, in some parts of Norway, parts of the specialist health services are being moved out of the public health service as a possible result of the increase in the number of private insurance policies and the growth in insurance payments.

We note that the hospital referral areas located in and around Oslo have relatively low rates for orthopaedic procedures. It is conceivable that one of the reasons for this is that services for this part of the population are bought in the private market, either by private individuals or by insurance companies, to a greater extent than elsewhere in Norway.

4.4 Summary and conclusion

For most samples, we can present figures for the period 2013–2017 that are directly comparable with the figures for the period 2011–2013 that were presented in the day surgery atlas in 2015. We have changed our definitions of four samples during our work on this updated version. The reason for this is that we have corrected errors and inaccuracies, acquired more knowledge about the data source and taken advice from specialists. This presents some challenges in terms of comparability over time, but we believe that it will give us a more accurate picture of developments in volume and variation.

Reducing unwarranted variation in the health service has been a health policy focus area since 2016. Nonetheless, we find that the variation has increased. This shows that the road from overriding signals to actual changes in medical practice is a long one. Changes take time, and

before 2016, the ordinary management systems had not focused on variation in the use of health services. It is clear, however, that the use of procedures that are controversial in the medical community has been reduced, which demonstrates that desirable changes in practice that are supported by the specialist communities are being implemented. There is still no consensus about what the correct level is or shared understanding of which indications to use for many of the procedures discussed in this atlas.

Bibliography

Balteskard, L., T. Deraas, O. H. Førde, T. Magnus, F. Olsen, and B. Uleberg (2015). *Day surgery in Norway 2011–2013, a selection of procedures*. English version Sept. 2017, ISBN: 978-82-93141-26-6.

Balteskard, L., P. Otterdal, A. H. Steindal, T. Bakken, O. H. Førde, F. Olsen, L. Leivseth, and B. Uleberg (2017). *Healthcare atlas for the elderly in Norway*. Ed. by W. F. Sellæg and B. Vonen. English version Sept. 2017. ISBN: 978-82-93141-31-0.

Beard, D. J., J. L. Rees, J. A. Cook, I. Rombach, C. Cooper, N. Merritt, B. A. Shirkey, J. L. Donovan, S. Gwilym, J. Savulescu, J. Moser, A. Gray, M. Jepson, I. Tracey, A. Judge, K. Wartolowska, A. J. Carr, P. Ahrens, C. Baldwick, M. Brinsden, H. Brownlow, D. Burton, M. S. Butt, A. Carr, C. P. Charalambous, V. Conboy, L. Dennell, O. Donaldson, S. Drew, A. Dwyer, D. Gidden, P. Hallam, S. Kalogrianitis, C. Kelly, R. Kulkarni, T. Matthews, J. McBirnie, V. Patel, C. Peach, C. Roberts, D. Robinson, P. Rosell, D. Rossouw, C. Senior, B. Singh, S. Sjolin, G. Taylor, B. Venkateswaran, and D. Woods (2018). "Arthroscopic subacromial decompression for subacromial shoulder pain (CSAW): a multicentre, pragmatic, parallel group, placebo-controlled, three-group, randomised surgical trial". *Lancet* 391.10118, pp. 329–338.

Hallenstål, N., O. Sunnergren, E. Ericsson, C. Hemlin, A. C. Hessén Söderman, P. Nerfeldt, E. Odhagen, M. Ryding, and J. Stalfors (2017). "Tonsil surgery in Sweden 2013–2015. Indications, surgical methods and patient-reported outcomes from the National Tonsil Surgery Register". *Acta Otolaryngol.* 137.10, pp. 1096–1103.

Hohmann, E., V. Glatt, K. Tetsworth, and M. Cote (2018). "Arthroscopic Partial Meniscectomy Versus Physical Therapy for Degenerative Meniscus Lesions: How Robust Is the Current Evidence? A Critical Systematic Review and Qualitative Synthesis". *Arthroscopy* 34.9, pp. 2699–2708.

Nesbitt, C., R. Bedenis, V. Bhattacharya, and G. Stansby (2014). "Endovenous ablation (radiofrequency and laser) and foam sclerotherapy versus open surgery for great saphenous vein varices". *Cochrane Database Syst. Rev.* 7, p. CD005624.

Paavola, M., A. Malmivaara, S. Taimela, K. Kanto, J. Inkinen, J. Kalske, I. Sinisaari, V. Savolainen, J. Ranstam, and T. L. N. Jarvinen (2018). "Subacromial decompression versus diagnostic arthroscopy for shoulder impingement: randomised, placebo surgery controlled clinical trial". *BMJ* 362, k2860.

Rønningen, L., B. M. Huseby, B. Kalseth, H. Ødegaard, K. H. Mehus, M. Pedersen, M. Sitter, M. Darvik, P. B. Pedersen, R. Bremnes, S. M. Mortensen, S. Lilleeng, and T. R. Myrli (2016). *Samdata spesialisthelsetjenesten 2015, med definisjonsvedlegg*.

SKDE (2016). *Indikatorer for måling av uberettiget variasjon. Utredning fra SKDE for de regionale helseforetakene*. SKDE rapport, 4/16. ISBN: 978-82-93141-16-7.

Appendices

Appendix A

Hospital referral areas

Table A.1 shows which municipalities and city districts constitute the different health trust's hospital referral areas. Since the population figures for 2017 are actually the population figures as of 1 January 2018 as published by Statistics Norway, the hospital referral areas are defined on the basis of the municipality structure for 2018. In 2018, Rissa and Leksvik municipalities were merged to form Indre Fosen. In 2013–2017, Rissa belonged to St. Olavs hospital referral area, while Leksvik belonged to Nord-Trøndelag. In this healthcare atlas, all of Indre Fosen is allocated to St. Olavs hospital referral area. Health services used by the population of Leksvik will therefore be included under the St. Olavs area in this atlas, even though they technically belonged to Nord-Trøndelag hospital referral area during the period 2013–2017.

Table A.1: Hospital referral areas

Hospital referral area	Municipality/city district
Finnmark	2002 Vardø, 2003 Vadsø, 2004 Hammerfest, 2011 Kautokeino, 2012 Alta, 2014 Loppa, 2015 Hasvik, 2017 Kvalsund, 2018 Måsøy, 2019 Nordkapp, 2020 Porsanger, 2021 Karasjok, 2022 Lebesby, 2023 Gamvik, 2024 Berlevåg, 2025 Tana, 2027 Nesseby, 2028 Båtsfjord, 2030 Sør-Varanger
UNN	1805 Narvik, 1851 Lødingen, 1852 Tjeldsund, 1853 Evenes, 1854 Ballangen, 1902 Tromsø, 1903 Harstad, 1911 Kvæfjord, 1913 Skånland, 1917 Ibestad, 1919 Gratangen, 1920 Lavangen, 1922 Bardu, 1923 Salangen, 1924 Målselv, 1925 Sørreisa, 1926 Dyrøy, 1927 Tranøy, 1928 Torsken, 1929 Berg, 1931 Lenvik, 1933 Balsfjord, 1936 Karlsøy, 1938 Lyngen, 1939 Storfjord, 1940 Kåfjord, 1941 Skjervøy, 1942 Nordreisa, 1943 Kvænangen
Nordland	1804 Bodø, 1837 Meløy, 1838 Gildeskål, 1839 Beiarn, 1840 Saltdal, 1841 Fauske, 1845 Sørfold, 1848 Steigen, 1849 Hamarøy, 1850 Tysfjord, 1856 Røst, 1857 Værøy, 1859 Flakstad, 1860 Vestvågøy, 1865 Vågan, 1866 Hadsel, 1867 Bø, 1868 Øksnes, 1870 Sortland, 1871 Andøy, 1874 Moskenes
Helgeland	1811 Bindal, 1812 Sømna, 1813 Brønnøy, 1815 Vega, 1816 Vevelstad, 1818 Herøy, 1820 Alstahaug, 1822 Leirfjord, 1824 Vefsn, 1825 Grane, 1826 Hattfjelldal, 1827 Dønna, 1828 Nesna, 1832 Hemnes, 1833 Rana, 1834 Lurøy, 1835 Træna, 1836 Rødøy

Hospital referral area	Municipality/city district
Nord-Trøndelag	5004 Steinkjer, 5005 Namsos, 5019 Roan, 5020 Osen, 5034 Meråker, 5035 Stjørdal, 5036 Frosta, 5037 Levanger, 5038 Verdal, 5039 Verran, 5040 Namdalseid, 5041 Snåsa, 5042 Lierne, 5043 Røyrvik, 5044 Namsskogan, 5045 Grong, 5046 Høylandet, 5047 Overhalla, 5048 Fosnes, 5049 Flatanger, 5050 Vikna, 5051 Nærøy, 5052 Leka, 5053 Inderøy
St. Olavs	1567 Rindal, 5001 Trondheim, 5011 Hemne, 5012 Snillfjord, 5013 Hitra, 5014 Frøya, 5015 Ørland, 5016 Agdenes, 5017 Bjugn, 5018 Åfjord, 5021 Oppdal, 5022 Rennebu, 5023 Meldal, 5024 Orkdal, 5025 Røros, 5026 Holtålen, 5027 Midtre Gauldal, 5028 Melhus, 5029 Skaun, 5030 Klæbu, 5031 Malvik, 5032 Selbu, 5033 Tydal, 5054 Indre Fosen
Møre og Romsdal	1502 Molde, 1504 Ålesund, 1505 Kristiansund, 1511 Vanylven, 1514 Sande, 1515 Herøy, 1516 Ulstein, 1517 Hareid, 1519 Volda, 1520 Ørsta, 1523 Ørskog, 1524 Norddal, 1525 Stranda, 1526 Stordal, 1528 Sykkylven, 1529 Skodje, 1531 Sula, 1532 Giske, 1534 Haram, 1535 Vestnes, 1539 Rauma, 1543 Nesset, 1545 Midsund, 1546 Sandøy, 1547 Aukra, 1548 Fræna, 1551 Eide, 1554 Averøy, 1557 Gjemnes, 1560 Tingvoll, 1563 Sunndal, 1566 Surnadal, 1571 Halsa, 1573 Smøla, 1576 Aure
Førde	1401 Flora, 1411 Gulen, 1412 Solund, 1413 Hyllestad, 1416 Høyanger, 1417 Vik, 1418 Balestrand, 1419 Leikanger, 1420 Sogndal, 1421 Aurland, 1422 Lærdal, 1424 Årdal, 1426 Luster, 1428 Askvoll, 1429 Fjaler, 1430 Gaular, 1431 Jølster, 1432 Førde, 1433 Naustdal, 1438 Bremanger, 1439 Vågsøy, 1441 Selje, 1443 Eid, 1444 Hornindal, 1445 Gloppen, 1449 Stryn
Bergen	1201 Bergen, 1233 Ulvik, 1234 Granvin, 1235 Voss, 1238 Kvam, 1241 Fusa, 1242 Samnanger, 1243 Os, 1244 Austevoll, 1245 Sund, 1246 Fjell, 1247 Askøy, 1251 Vaksdal, 1252 Modalen, 1253 Osterøy, 1256 Meland, 1259 Øygarden, 1260 Radøy, 1263 Lindås, 1264 Austrheim, 1265 Fedje, 1266 Masfjorden
Fonna	1106 Haugesund, 1134 Suldal, 1135 Sauda, 1145 Bokn, 1146 Tysvær, 1149 Karmøy, 1151 Utsira, 1160 Vindafjord, 1211 Etne, 1216 Sveio, 1219 Bømlo, 1221 Stord, 1222 Fitjar, 1223 Tysnes, 1224 Kvinnherad, 1227 Jondal, 1228 Odda, 1231 Ullensvang, 1232 Eidfjord
Stavanger	1101 Eigersund, 1102 Sandnes, 1103 Stavanger, 1111 Sokndal, 1112 Lund, 1114 Bjerkreim, 1119 Hå, 1120 Klepp, 1121 Time, 1122 Gjesdal, 1124 Sola, 1127 Randaberg, 1129 Forsand, 1130 Strand, 1133 Hjelmeland, 1141 Finnøy, 1142 Rennesøy, 1144 Kvitsøy

Hospital referral area	Municipality/city district
Østfold	0101 Halden, 0104 Moss, 0105 Sarpsborg, 0106 Fredrikstad, 0111 Hvaler, 0118 Aremark, 0119 Marker, 0122 Trøgstad, 0123 Spydeberg, 0124 Askim, 0125 Eidsberg, 0127 Skiptvet, 0128 Rakkestad, 0135 Råde, 0136 Rygge, 0137 Våler, 0138 Hobøl
Akershus	0121 Rømskog, 0211 Vestby, 0213 Ski, 0214 Ås, 0215 Frogn, 0216 Nesodden, 0217 Oppegård, 0221 Aurskog-Høland, 0226 Sørum, 0227 Fet, 0228 Rælingen, 0229 Enebakk, 0230 Lørenskog, 0231 Skedsmo, 0233 Nittedal, 0234 Gjerdrum, 0235 Ullensaker, 0237 Eidsvoll, 0238 Nannestad, 0239 Hurdal, The following city districts in 0301 Oslo: 10 Grorud, 11 Stovner, 12 Alna
OUS	The following city districts in 0301 Oslo: 03 Sagene, 08 Nordre Aker, 09 Bjerke, 13 Østensjø, 14 Nordstrand, 15 Søndre Nordstrand, 17 Marka, Unknown city district Oslo
Lovisenberg	The following city districts in 0301 Oslo: 01 Gamle Oslo, 02 Grünerløkka, 04 St. Hanshaugen, 16 Sentrum
Diakonhjemmet	The following city districts in 0301 Oslo: 05 Frogner, 06 Ullern, 07 Vestre Aker
Innlandet	0236 Nes, 0402 Kongsvinger, 0403 Hamar, 0412 Ringsaker, 0415 Løten, 0417 Stange, 0418 Nord-Odal, 0419 Sør-Odal, 0420 Eidskog, 0423 Grue, 0425 Åsnes, 0426 Våler, 0427 Elverum, 0428 Trysil, 0429 Åmot, 0430 Stor-Elvdal, 0432 Rendalen, 0434 Engerdal, 0436 Tolga, 0437 Tynset, 0438 Alvdal, 0439 Folldal, 0441 Os, 0501 Lillehammer, 0502 Gjøvik, 0511 Dovre, 0512 Lesja, 0513 Skjåk, 0514 Lom, 0515 Vågå, 0516 Nord-Fron, 0517 Sel, 0519 Sør-Fron, 0520 Ringebu, 0521 Øyer, 0522 Gausdal, 0528 Østre Toten, 0529 Vestre Toten, 0533 Lunner, 0534 Gran, 0536 Søndre Land, 0538 Nordre Land, 0540 Sør-Aurdal, 0541 Etnedal, 0542 Nord-Aurdal, 0543 Vestre Slidre, 0544 Øystre Slidre, 0545 Vang
Vestre Viken	0219 Bærum, 0220 Asker, 0532 Jevnaker, 0602 Drammen, 0604 Kongsberg, 0605 Ringerike, 0612 Hole, 0615 Flå, 0616 Nes, 0617 Gol, 0618 Hemsedal, 0619 Ål, 0620 Hol, 0621 Sigdal, 0622 Krødsherad, 0623 Modum, 0624 Øvre Eiker, 0625 Nedre Eiker, 0626 Lier, 0627 Røyken, 0628 Hurum, 0631 Flesberg, 0632 Rollag, 0633 Nore og Uvdal, 0711 Svelvik, 0713 Sande
Vestfold	0701 Horten, 0704 Tønsberg, 0710 Sandefjord, 0712 Larvik, 0715 Holmestrand, 0716 Re, 0729 Færder
Telemark	0805 Porsgrunn, 0806 Skien, 0807 Notodden, 0811 Siljan, 0814 Bamble, 0815 Kragerø, 0817 Drangedal, 0819 Nome, 0821 Bø, 0822 Sauherad, 0826 Tinn, 0827 Hjartdal, 0828 Seljord, 0829 Kviteseid, 0830 Nissedal, 0831 Fyresdal, 0833 Tokke, 0834 Vinje
Sørlandet	0901 Risør, 0904 Grimstad, 0906 Arendal, 0911 Gjerstad, 0912 Vegårshei, 0914 Tvedestrand, 0919 Froland, 0926 Lillesand, 0928 Birkenes, 0929 Åmli, 0935 Iveland, 0937 Evje og Hornnes, 0938 Bygland, 0940 Valle, 0941 Bykle, 1001 Kristiansand, 1002 Mandal, 1003 Farsund, 1004 Flekkefjord, 1014 Vennesla, 1017 Songdalen, 1018 Søgne, 1021 Marnardal, 1026 Åseral, 1027 Audnedal, 1029 Lindesnes, 1032 Lyngdal, 1034 Hægebostad, 1037 Kvinesdal, 1046 Sirdal

Appendix B

Specialists consulted

- **Hebe Kvernmo**, senior consultant and professor, specialist in hand surgery and orthopaedic surgery, University Hospital of Northern Norway Trust
- **Lars Engebretsen**, senior consultant and professor, specialist in orthopaedic and general surgery, Oslo University Hospital Trust
- **Erlend Hallstensen**, chief senior consultant, specialist in diseases of the eye, Nordland Hospital Trust
- **Vegard Bugten**, senior consultant and associate professor, specialist in diseases of the ear, nose and throat, St. Olavs Hospital health trust
- **Sven Martin Almdahl**, senior consultant, specialist in thoracic surgery, University Hospital of Northern Norway Trust

Appendix C

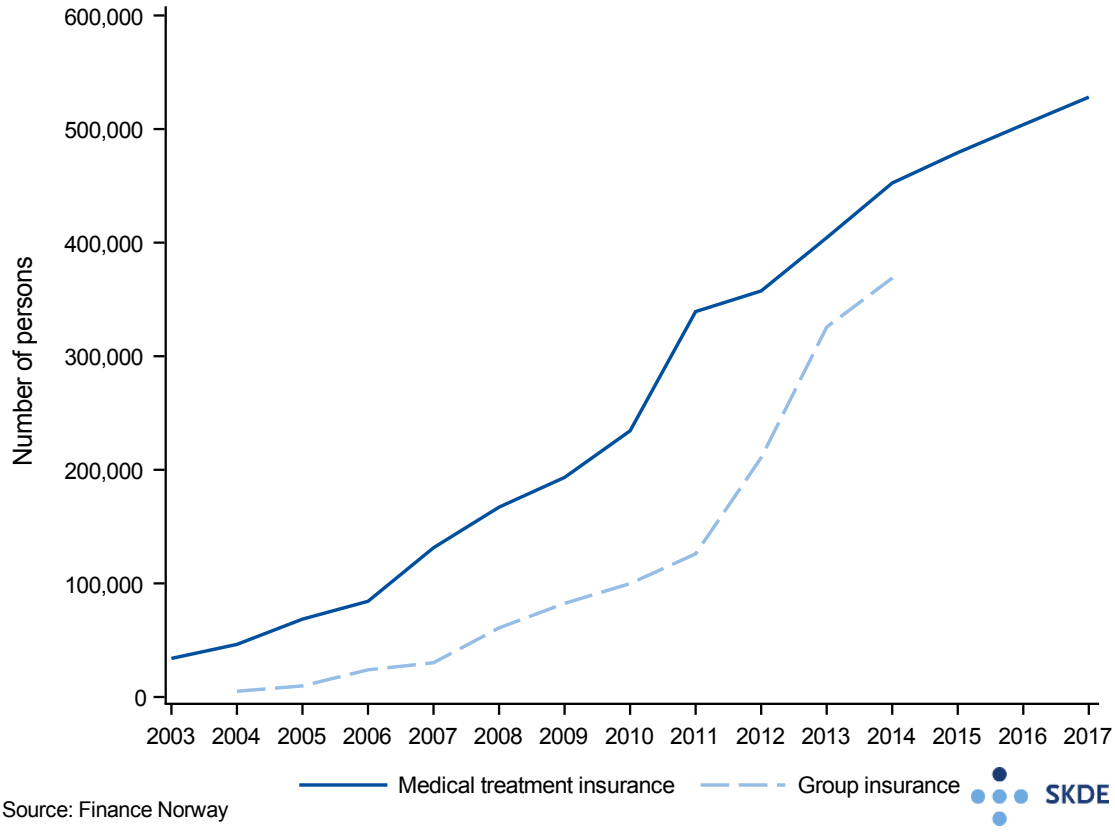
Number of procedures broken down by level of care

Table C.1: Number and proportion of procedures broken down by level of care. Average per year for the period 2015–2017.

	Inpatient		Day/outpatient		Spec. in priv. pract.		Total
Procedure	Number	Prop.(%)	Number	Prop.(%)	Number	Prop.(%)	Number
Shoulder surgery (acromion resection)	879	14.0	5220	83.4	163	2.6	6,262
Menisci	612	7.4	7,608	92.4	16	0.2	8,236
Hallux valgus and hammer toe	309	6.2	4,565	91.2	131	2.6	5,005
Selected hand surgery	88	1.6	5,005	92.4	325	6.0	5,419
Carpal tunnel syndrome	92	1.3	6,848	95.3	243	3.4	7,183
Tonsillectomy	2,863	29.8	4,879	50.8	1,868	19.4	9,610
Aural ventilation tube	458	6.8	4,133	61.2	2,157	32.0	6,749
Age-related cataracts	343	0.8	21,479	52.2	19,351	47.0	41,173
Droopy eyelids	7	0.1	2,684	28.3	6,809	71.7	9,499
Inguinal hernia	1,998	30.1	4,638	69.9	0	0.0	6,636
Varicose veins	225	2.7	8,217	97.3	3	0.0	8,445
Haemorrhoids	547	5.5	9,255	93.0	150	1.5	9,952

Appendix D

Number of persons insured

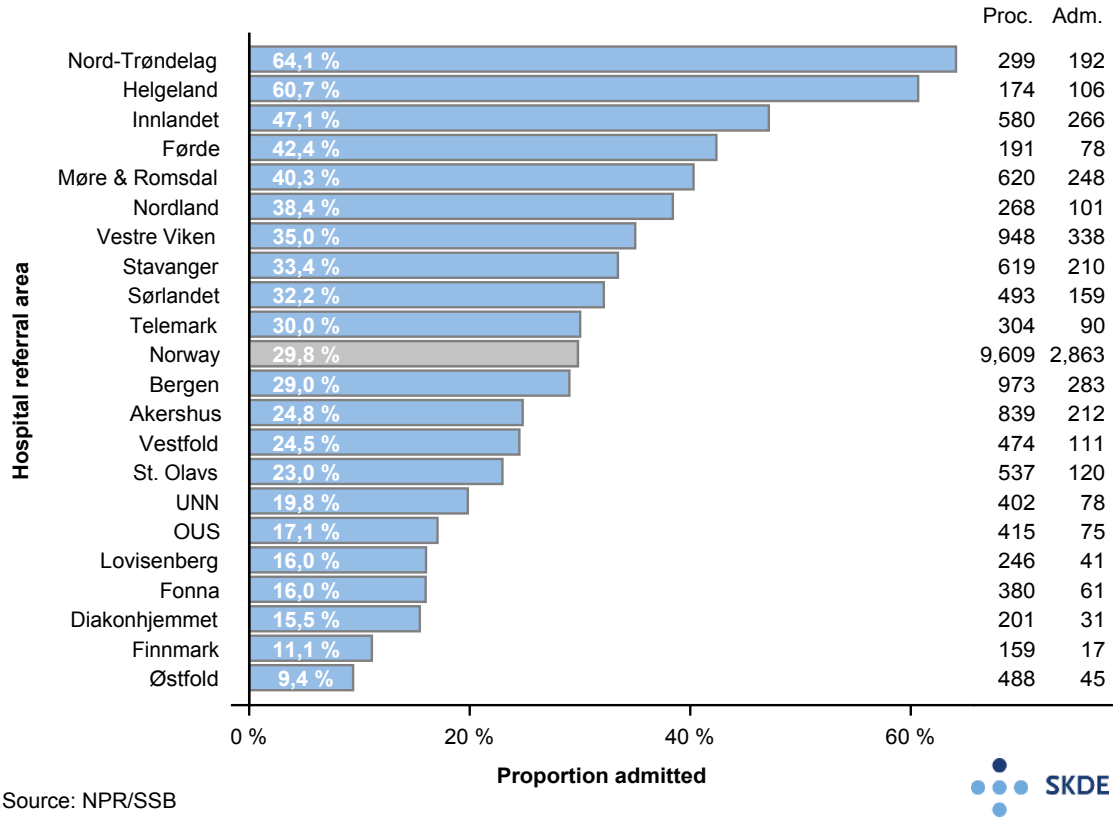


Source: Finance Norway

Figure D.1: Number of persons covered by medical treatment insurance policies in 2003–2017 and group insurance schemes in 2004–2014.

Appendix E

Proportion of patients admitted to hospital for tonsillectomies and inguinal hernia repairs



Source: NPR/SSB

Figure E.1: Admissions as a proportion of all tonsillectomies, adjusted for gender and age. Average per year for the period 2015–2017.

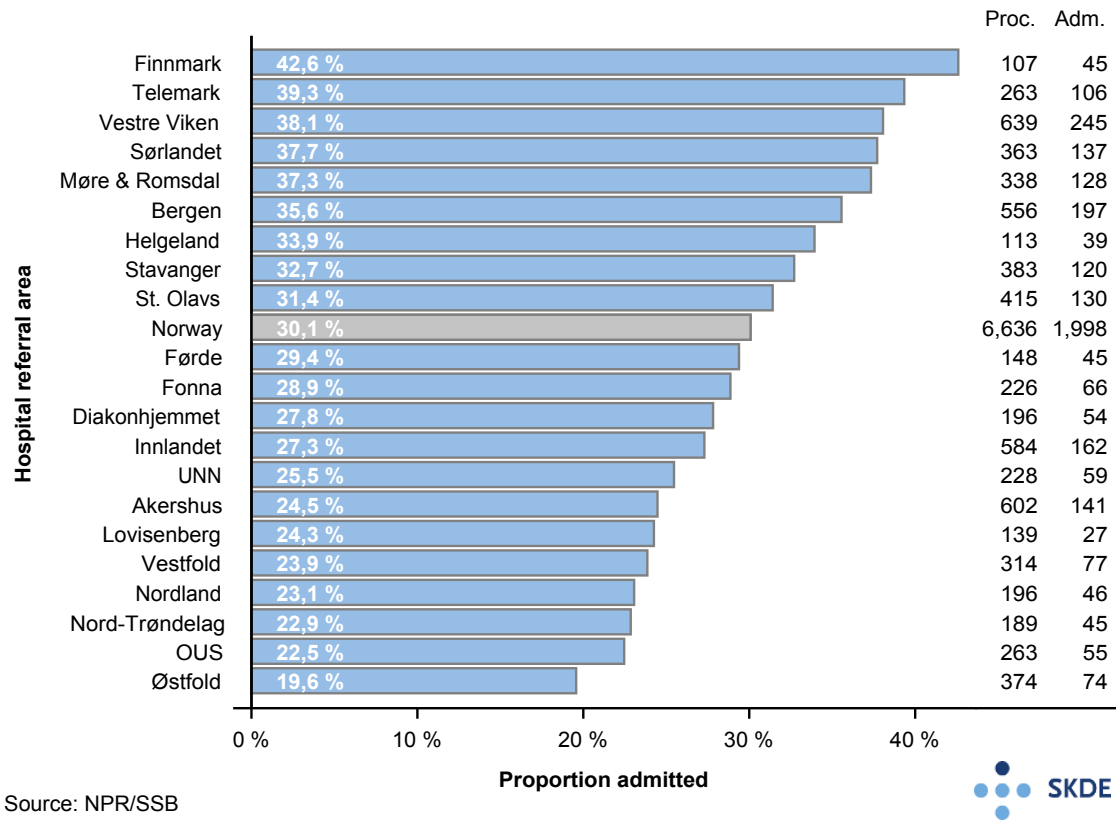


Figure E.2: Admissions as a proportion of all inguinal hernia repairs, adjusted for gender and age. Average per year for the period 2015–2017.

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