Data, analysis, perspectives | No. 7, 2017

Back Surgery

Place of residence determines if patients are admitted to hospital, receive conservative treatment, or undergo an operation

- **Inpatient care is booming:** More than 600,000 patients with back complaints were admitted to hospital – a third more than in 2007
- **More and more operations:** The number of surgical interventions on the spine has increased by 71 percent since 2007
- **Major regional differences:** There is up to a 13-fold difference in case numbers between districts with respect to hospital stays and back surgery
- **Many hospital stays are avoidable:** Improved outpatient emergency care can help avoid hospital admissions, particularly with a diagnosis of back pain
- **Governance and planning inadequate:** Up to now, governance mechanisms have failed to prevent increases in case volume and regional differences

Healthcare Fact Check | BertelsmannStiftung

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Over the course of their life, almost everyone suffers from back pain; many eventually seek out a physician. However, in Birkenfeld (in Rhineland-Palatinate) or Hamm (in North Rhine-Westphalia), it is six times more likely that a patient will be admitted to hospital because of back pain than in Heidelberg or Oldenburg. The regional differences are even greater with respect to complex spinal surgery: patients from the district of Fulda have spinal fusion surgeries performed up to 13 times more often than patients from Frankfurt an der Oder.

Major regional differences are always a clear indicator of care that is not responsive to the needs of patients, and of deficiencies in healthcare structures. The major regional differences in the treatment of patients with back problems cannot be explained purely by medical or sociodemographic factors, such as the demographic structure. For almost ten years, the National Disease Management Guideline for Low Back Pain (Nationale Versorgungsleitlinie Kreuzschmerz) has attempted to address the underuse, overuse and misuse of treatments in this area.

In the second part of its Back Fact Check, the Bertelsmann Stiftung has taken a closer look at the development of inpatient care for patients with back problems. The first part of the fact check (see Spotlight Healthcare No. 5/2016) has already shown that X-rays and other forms of diagnostic imaging are conducted too frequently and too early on. Now, the Berlin-based IGES institute has evaluated publically available data from 2007 to 2015 on the number of hospital stays and spine operations. Inpatient and operative measures are often very strenuous for patients, and usually more expensive than other therapies. In addition, surveys indicate that the results of treatment commonly fail to meet patients' expectations.

As was the case with diagnostic imaging, major regional differences can be seen in this fact check – for both surgical interventions and hospital stays. The study looks at the causes and influencing factors that potentially play a role. The most important results are presented in this Spotlight.

> "The indication for an operation is less clear for patients with disc problems or degenerative diseases than is often assumed."
>
> Advisory Council for the Concentrated Action in Health Care, Report 2000/2001, Volume III, number 219

More and more patients with back complaints are being admitted to hospital

The number of hospital stays due to problems with the spine or back (ICD codes M40-M54) increased by 154,000 to 611,000 cases per year from 2007 to 2015. This represents an increase of 34 percent, as compared to an increase of 12 percent for all inpatient care over the same period of time.

The principal diagnosis of back pain (M54) reviewed by the fact check increased particularly drastically – by 73 percent, to 200,000 inpatient cases across Germany in 2015. Of the three further primary diagnoses selected for the fact check (see box, page 3), major growth was also demonstrated for cases of spondylosis (M47) and other spondylopathies (M48), although for other intervertebral disc disorders (M51) the 147,000 hospital admissions in 2015 were only marginally above the 2007 figure (see Figure 1).

More and more operations on the spine

The increase in hospital stays has also been accompanied by an even greater increase in the number of surgical interventions on the intervertebral discs or the spine. In the period from 2007 to 2015, these increased by 71 percent, from 452,000 to 772,000. Of the three interventions reviewed by the Bertelsmann Stiftung, this increase was particularly marked with respect to the excision of vertebral bone causing a narrowing of the spinal canal. The number of these

Diagnoses and surgical interventions for back disorders

For this Back Fact Check, data from around five million inpatient treatments from 2007 to 2015 were analyzed. The analysis looked at all patients that were admitted to full inpatient care with one of the following ICD 10 primary diagnosis (excluding traumatological and inflammatory conditions, as well as cervical spine disorders):

- M47: Spondylosis (degeneration of joints in the spine)
- M48: Other spondylopathies (changes in the structure of the spine, often with a narrowing of the spinal canal)
- M51: Other intervertebral disc disorders
- M54: Dorsalgia (back pain)

For the operations, the following three surgical interventions / procedures (OPS codes) were examined (note that a number of procedures can be performed during a single operation):

- OPS 5-831: Discectomy (excision of spinal disc tissue)
- OPS 5-836: Spondylodesis (spinal fusion surgery)
- OPS-5-839.6: Laminectomy (excision of vertebral bone on the vertebral canal causing a narrowing of the spinal canal)

laminectomies (OPS 5-839.6) increased by around 130 percent – from 48,000 interventions in 2007 to 111,000 in 2015. The increase was particularly notable in Thuringia, where the number of these operations tripled over eight years.

Over the same period of time, spinal fusion surgeries (OPS 5-836) increased by 57 percent, from 46,000 to 72,000. Spinal fusion surgeries were performed most frequently in Hesse and Thuringia – almost twice as often in places like Saxony or Bremen (see Figure 2). Patients from both of these federal states were also admitted to hospital more frequently with the corresponding diagnosis of other spondylopathies (M48). High rates of surgery and increases in case volume of up to 80 percent for spinal fusion surgeries were also reported in Saarland and Hamburg.

Hospital stays with a primary diagnosis of M47, M48, M51 or M54

Cases in thousands, 2007 to 2015, population aged 15 and over

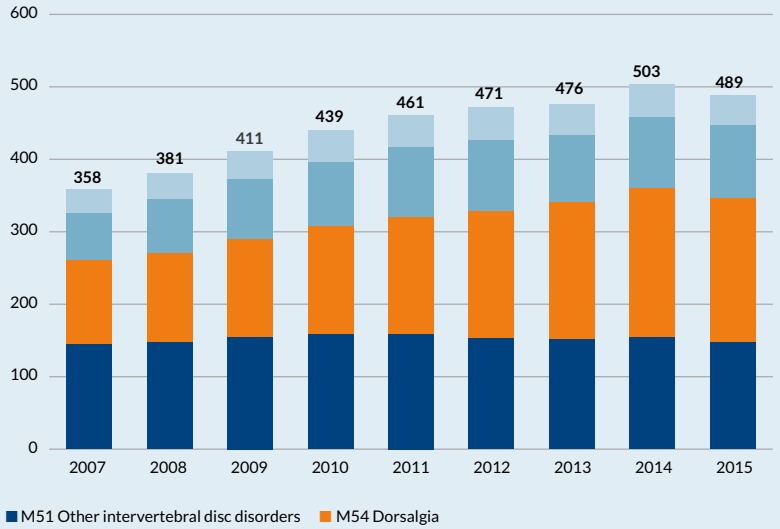

Figure 1 | Source: German Federal Statistical Office, calculations by IGES 2017, Healthcare Fact Check 2017

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Frequency of spinal fusion surgeries (OPS 5-836) and their relative change between 2007/2008 and 2014/2015

Cases per 100,000 inhabitants, directly standardized on the population of 2014 according to age group, population aged 15 and older

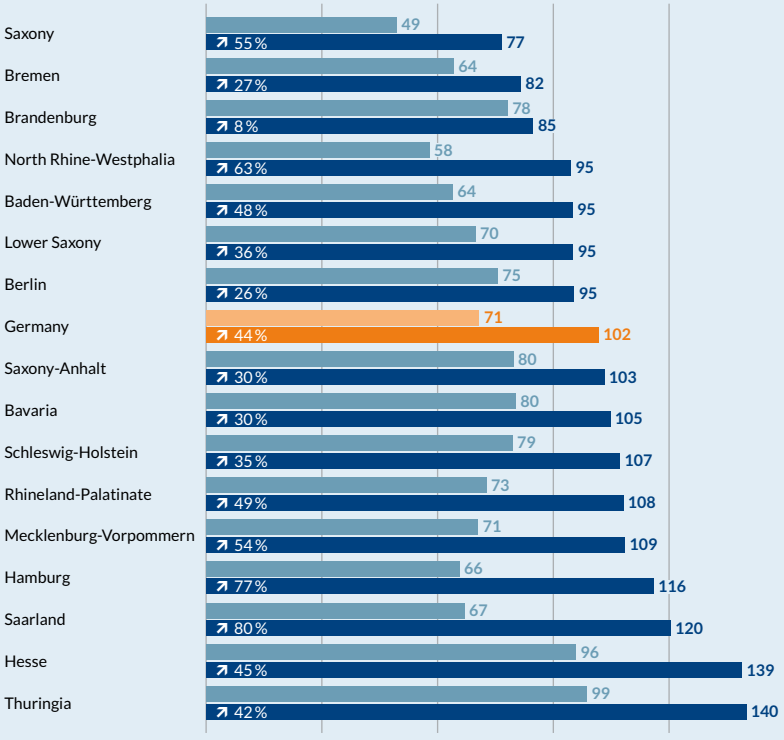

Figure 2 | Source: German Federal Statistical Office, calculations by IGES 2017, Healthcare Fact Check 2017

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Major regional differences

The comparison of 16 federal states and 402 German cities and districts shows clear differences in hospital stays and surgical interventions on backs. For example, people with back problems in Saarland go to hospital twice as often as those from Baden-Württemberg. The probability of receiving inpatient care in the former, standardized by age and sex, is around 32 percent higher than the federal average. North Rhine-Westphalia is 19 percent above the federal average, while the city-states of Hamburg, Berlin and Bremen, as well as Baden-Württemberg, lie between 30 to 37 percent below the federal average.

The highest increases since 2007 were recorded by Hesse (+47 percent) and Saarland (+45 percent). In contrast, the standardized rate of hospital visits in Hamburg and Schleswig-Holstein increased over the same period of time by only around six and eight percent respectively. In Bremen, there was even a slight decrease (see Figure 3).

Hospital stays due to a primary diagnosis of M47, M48, M51 or M54, and their relative change between 2007/2008 and 2014/2015

Cases per 100,000 inhabitants, directly standardized on the population of 2014 according to age group and sex, population aged 15 and older

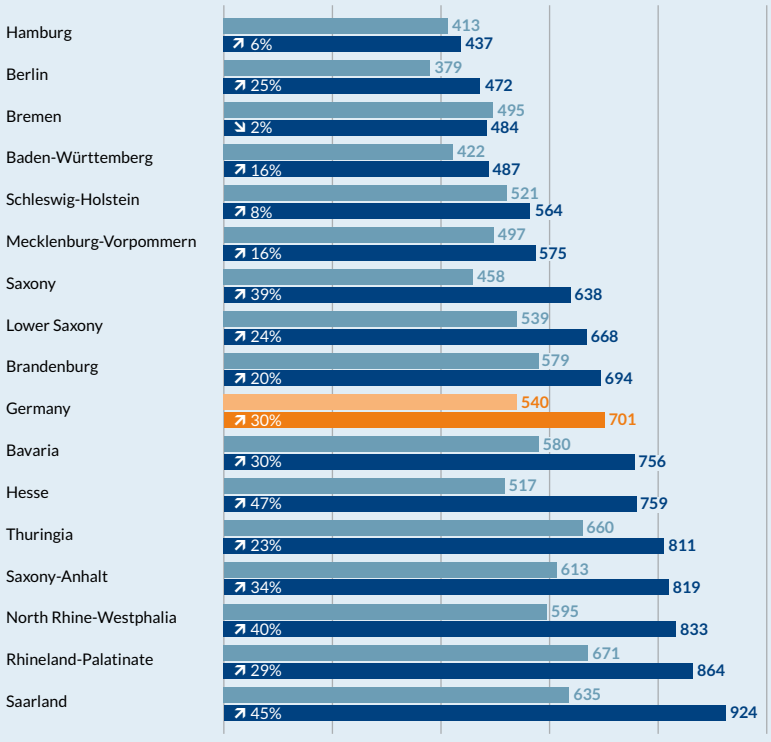

Figure 3 | Source: German Federal Statistical Office, calculations by IGES 2017, Healthcare Fact Check 2017

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Many hospital stays are avoidable

As the Back Fact Check analyses show, patients with the broad diagnosis of back pain (M54) are admitted as inpatients particularly frequently. Often, they stay only one, two, or three days, and do not undergo surgery or receive special therapy for pain. Their brief inpatient stay is primarily for radiological diagnostics. These inpatient stays incur high costs in comparison to outpatient care, and are generally unnecessary.

Hospital stays occur particularly frequently in Saxony-Anhalt, Thuringia and Rhineland Palatinate. Bavaria recorded the highest growth since 2007. There, almost twice as many patients were admitted to a hospital with the primary diagnosis of back pain than eight years previously.

Schleswig-Holstein stands out due its particularly low rate of hospital stays. Since 2007, there has been a relatively small increase of 32 percent of the diagnosis of back pain (in comparison to the 63 percent increase in the federal average). Inpatient cases with a diagnosis of intervertebral disc disorders or spondylosis actually decreased. One reason for this could be the differing healthcare structures (see box, page 4).

Regional patterns are intensifying

The differences in care are much more pronounced between the 402 German cities and districts than they are between the German federal states. They have also increased since 2007: then, the difference between the district with the lowest rate of hospital admissions and that with the highest rate

Emergency practices prevent hospital stays

Since 2007, emergency practices have been established across 30 hospital locations in Schleswig-Holstein. Because of this, barely any patients have been admitted to inpatient treatment outside of the normal practice business hours. As the Bertelsmann Stiftung analyses show, admission rates are below the federal average in almost all cities and districts in Schleswig-Holstein. The example illustrates how to leverage the potential to avoid inpatient care for patients who would be served just as well by outpatient care.

was a factor or 4.9 – today it is 6.3. For spinal fusion surgeries, the quotient between the highest and lowest rates increased from 7.8 to 13.2.

In the district of Birkenfeld (in Rhineland Palatinate), patients with back pain are admitted to hospital around four times as often as in Ludwigsburg (in Baden-Württemberg), while patients from Unna are admitted three times more frequently than in Ulm. In the districts of Fulda and Hersfeld-Rotenburg (both in Hesse), patients undergo spinal fusion surgery around five times more often than those in Ravensburg (Baden-Württemberg) or in Essen; and even 13 times more frequently in comparison to Frankfurt an der Oder. The city of Hamm tops North Rhine-Westphalia with respect to this very complex intervention. In some districts of North Hesse, the removal of vertebral bone structures takes place up to seven times more frequently than in Marburg-Biedenkopf or in Leipzig (see Figures 4 and 6).

By and large, districts where the number of hospital stays and operations for back problems were particularly high in 2007/2008 still have a high caseload today. This treatment pattern has also spread to neighboring districts: North Hesse, East Hesse, and the bordering West Thuringia now form a major interconnected area in which almost all cities and districts have very high rates of hospital admissions and operations (see Figure 5).

Local structures further regional misuse of treatments

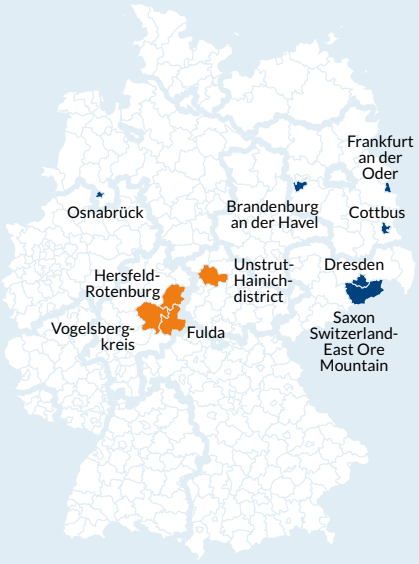
There are a number of possible reasons for the regional differences in care: the physicians, structures, cooperation between practices and hospitals, indications, and commercial interests are as individual and distinct as the patients themselves.

According to the Bertelsmann Stiftung study, the number of hospital beds, general practitioners, orthopedists and inpatient wards only have a minor demonstrable statistical influence on the care provided to back patients. This also applies to social indicators, such as the unemployment rate or the proportion of pensioners on social security, as well as the type of district (from major city to rural). All of these objective factors can statistically account for around only ten percent of the regional differences in back care. As such, it can be assumed that other influencing factors are playing the decisive role.

There is good scientific evidence that regional differences are always particularly large when

Back surgery: Where do operations take place most frequently?

Surgical interventions per 100,000 inhabitants, 2014/2015, directly standardized on the population of 2014 according to age group, population aged 15 and older



	Most frequently:	Least frequently:
Discectomies (OPS 5-831) 199 Federal average		
	567 Hersfeld-Rotenburg	85 Saxon Switzerland-East Ore Mountains
	514 Fulda	87 Cottbus
	461 Unstrut-Hainich-district	91 Dresden
Spinal fusion surgeries (OPS 5-836) 102 Federal average		
	355 Fulda	27 Frankfurt an der Oder
	284 Hersfeld-Rotenburg	50 Cottbus
	266 Vogelsbergkreis	51 Osnabrück
Laminectomies (OPS 5-839.6) 155 Federal average		
	549 Fulda	40 Frankfurt an der Oder
	404 Hersfeld-Rotenburg	43 Brandenburg an der Havel
	390 Vogelsbergkreis	52 Cottbus

Figure 4 | Source: German Federal Statistical Office, calculations by IGES 2017, Healthcare Fact Check 2017

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Expansion of laminectomies (OPS 5-839.6) in North Hesse, East Hesse, and West Thuringia between 2007/2008 and 2014/2015

Change in frequency of procedures by region, from 2007/2008 to 2014/15 (in percent), and frequency of surgical interventions per 100,000 inhabitants in comparison to the federal average (color scheme), directly standardized on the population of 2014, population aged 15 and older

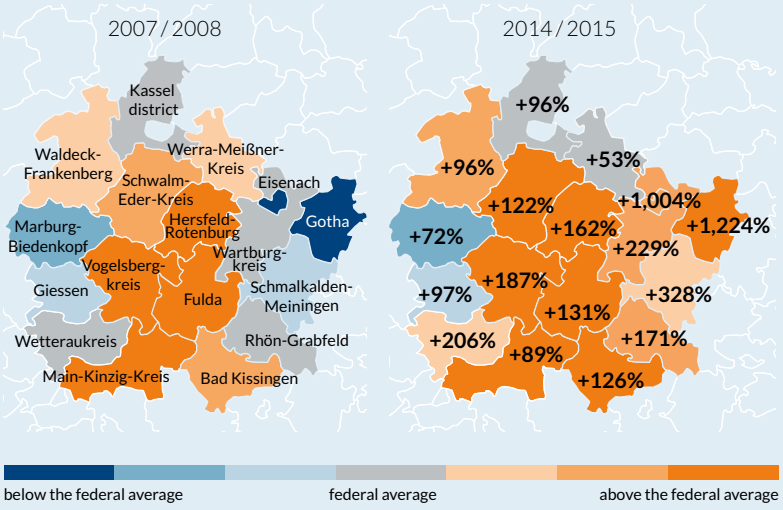

Figure 5 | Source: German Federal Statistical Office, calculations by IGES 2017, Healthcare Fact Check 2017

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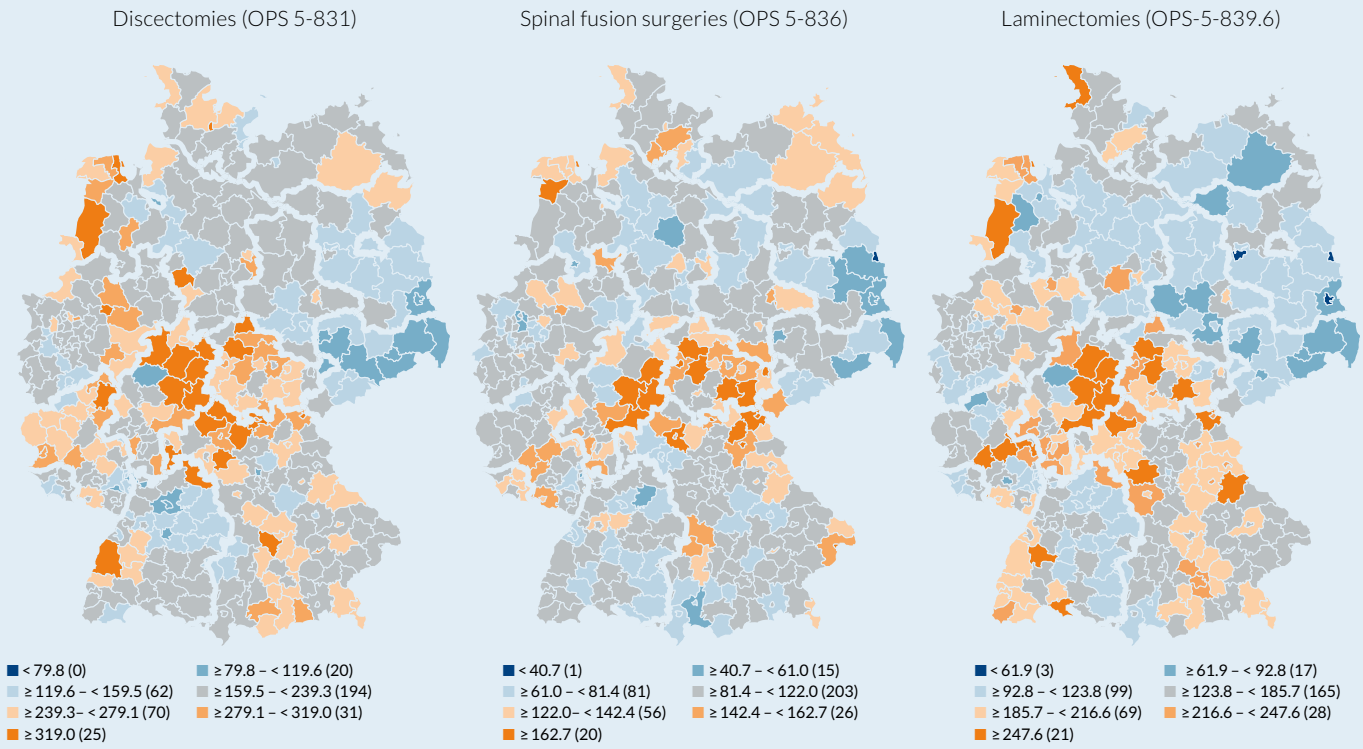
Frequency of selected surgical procedures

Per 100,000 inhabitants, 2014/2015, directly standardized on the population of 2014 according to age group, population aged 15 and older



The figures for individual districts can be viewed and compared using the interactive map tool at faktencheck-gesundheit.de/de/faktenchecks/faktencheck-ruecken/interaktive-karte/operative-eingriffe/

Figure 6 | Source: German Federal Statistical Office, calculations by IGES 2017, Healthcare Fact Check 2017

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there are no clear medical guidelines, such as is the case with specific low back pain. The less reliable the evidence base, the greater the scope for local particularities. When this is the case, local care patterns emerge – surgical signatures. The extreme difference in providing care for patients with back trouble in Germany may also have its origin in the regionally predominant care practices of local providers.

Governance mechanisms are failing

The drastic increase in services treating back disorders can have many structural and infrastructural causes. Financial incentives, attractive reimbursements, and budget allowances drive the increase in case volume as well as patient expectations, marketing, and poor coordination of the service providers. In the past, technological progress and the need to amortize equipment have, at times, led to hospitals intentionally giving more patients inpatient treatment than medically necessary.

Attempts to shape the care provided for back disorders through better planning and governance to make it more responsive to patient needs and to influence to development of case volumes have not met with much success thus far. One reason for this is that the German federal states have largely left it to the health insurance funds and hospitals to agree on case volumes and reimbursements for the inpatient treatment of back disorders, instead of also making determinations regarding hospital planning.

An attempt has been made to appropriately reimburse surgical interventions on the spine with the further development of the German DRG catalogue (flat rates per case). However, this has not prevented an increase in case volumes. Up to now, quality issues and the question of whether the operation is the best course of action for the patient have largely been left unconsidered. Accounting audits conducted by the Medical Service of the Health Insurance Funds (Medizinischen Dienstes der Krankenkassen, MDK) in 2010 on the necessity and duration of inpatient

611,000 hospital admissions due to back disorders were recorded in 2015

2,115 A daily average of surgical interventions on the back were performed in 2015. In 2007, there were 1,238

The rate of spinal fusion surgeries was **13** times higher in districts with the highest rate as compared to districts with the lowest rate. This difference was only 7.8 in 2007

stays found issues with around half of the cases reviewed.

Recently, a decision was made to reduce reimbursements for back disorders by around six percent from 2017 on. The Hospital Structure Act (Krankenhausstrukturgesetz – KHSG), which came into effect in December 2015, permits such reductions in reimbursements if there are indications that increases in case volumes are economically motivated.

Up to now, there have been no minimum case volumes for services relating to disorders of the spine or back, so centralization focused on a few service providers has not taken place. Nor are there yet any criteria for the indication-based necessity for and quality of diagnostic and operational services. The Federal Joint Committee (Gemeinsame Bundesausschuss, G-BA) of physicians, health insurance funds and hospitals has, to date, not exercised its regulatory competence here. In addition, spine operations have not yet been classified as "tendentially common interventions (mengenanfällige Eingriffe)," so patients with statutory health insurance are not entitled to a second medical opinion prior to the operation. However, obtaining a second medical opinion has been proven to significantly influence the type of treatment and frequency of operations.

Patient welfare should be the ethical standard for hospitals

A goal of medical and health policy should be to reduce undesirable differences in care. This issue is complex in Germany, due to the federalist and self-governing organization of the healthcare complex. It is made additionally difficult by inadequate governance mechanisms for regional units, districts and cities. This makes the ethical obligation even greater for all participants to ensure care that respects patient preferences and responds to their needs, as well as to avoid unnecessary stresses and risks. Patient welfare should also be the ethical standard for hospitals, argues the German Ethics Council (Deutsche Ethikrat), who last year, among other measures, called for the development of reimbursement models to prevent unnecessary surgical interventions, as well as for hospital planning that is aligned with patient welfare.

The analyses on hospital stays due to back pain and surgical interventions were conducted by the Berlin-based IGES Institute, based on DRG statistics and special analyses of the German Federal Statistical Office. The regional data are based on place of residence, and are directly standardized.

faktencheck-ruecken.de (in German)

Recommendations for action

Establish local transparency – align planning and governance with patient welfare

As early as its report of 2000/20001, the Advisory Council for the Concentrated Action in Health Care determined an "overuse of surgical procedures" and a "frequent diagnosis of a need for an intervention." To date, all attempts to counter this have met with no success – quite the converse: the number of inpatient treatments has increased drastically. At the same time, the type of care received today depends even more upon patients' place of residence than it did ten years ago. The following measures should be taken to reduce regional differences:

Highlight regional differences

- Establish greater regional transparency to highlight where care is not responsive to the needs of patients.
- Provide feedback regarding unusual case volumes for regions directly to the involved hospitals and physicians, so as to improve the type and extent of services provided.

Employ guidelines and better inform patients

- Professional medical associations should develop evidence-based guidelines; the medical indications should be an explicit element of these.
- Practices and hospitals should enshrine the guidelines in the day-to-day provision of patient care.
- Physicians should clearly convey to their patients the benefits and risks of prospective treatments, as well as potential alternatives, independent of financial interests.

Change structure planning and financing

- Strengthen prospective, cross-sector, quality oriented approaches in hospital planning, and promote the specialization of hospitals.
- Establish emergency practices throughout Germany in order to avert unnecessary inpatient admissions.
- Reduce financial incentives to prevent an increase in case volumes, and reward quality financially.

Healthcare Fact Check

SPOTLIGHT GESUNDHEIT is an initiative of the "Improving Healthcare – Informing Patients" program at the Bertelsmann Stiftung. Published several times a year, SPOTLIGHT HEALTHCARE addresses topical issues in healthcare. The Bertelsmann Stiftung is committed to promoting a healthcare system relevant to public needs. Through its projects, the Stiftung aims to ensure the provision of needs-based and sustainable high-quality healthcare in which patients are empowered by access to readily understandable information.

The Healthcare Fact Check project takes an in-depth look at a variety of issues throughout the year with the goal of improving the efficient use of limited resources and aligning healthcare services with patients' needs.

Further information:
www.bertelsmann-stiftung.de/healthcare-fact-check
www.faktencheck-gesundheit.de (in German)

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