



ANNUAL REPORT 2025

EUROSPINE, the Spine Society of Europe

"We have used Spine Tango since 2011 with over 12,000 patients on the system. We have published research, measured our own performance and changed our practice due to the information we have gained from the system. It is a vital part of our everyday practice."

Tim Pigott, former Consultant Neurosurgeon, Walton Centre for Neurosurgery, United Kingdom

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FOREWORD ENRICO GALLAZZI

ADVANCING SPINE CARE: INNOVATION, COLLABORATION, AND A NEW CHAPTER

Dear EUROSPINE Colleagues and Members,

It is a great honour to present the 2025 Spine Tango Annual Report as the incoming Chair of the Spine Tango Committee. I would like to begin by expressing my sincere gratitude to Sabrina Donzelli for her outstanding leadership over the past three years, which has been instrumental in shaping Spine Tango into the internationally recognised registry it is today.

Together with the entire team, I extend our sincere gratitude to Pedro Dos Santos Silva, Georg Grohs, Bart Depreitere, and especially to Everard Munting, former President of EUROSPINE, in recognition of their longstanding dedication and significant contributions to Spine Tango.

I warmly welcome our new Committee members — Anas Dyab, Peter Obid, Michel Paul Johan Teuben, and Giovanni Viroli — who have joined with great enthusiasm and expertise, and whose contributions will be instrumental in this new chapter of Spine Tango's history.

This year has witnessed substantial progress across all aspects of the registry. A revised surgery form was introduced, featuring an updated data structure and a concise version designed to reduce clinical workload. Our visibility at the EUROSPINE Annual Meeting in Copenhagen reached unprecedented levels, and we are encouraged by the commitment of incoming President Yann-Philippe Charles, who has identified Spine Tango and research as key priorities. High-quality data constitute the foundation of every successful research project; Our collaboration with the Research Council has been strengthened, fostering the joint pursuit of high-calibre research and advancing the Society's mission in shaping the future of spine care.

Highlights of 2025 include the launch of a new add-on form for intraoperative neuromonitoring in collaboration with ISIN, a major milestone in the PREPARE project with Spine Tango data mapped to the OMOP Common Data Model, and the successful completion of the Spine Atlas Initiative's first global data call on lumbar degenerative spondylolisthesis. Research output continues to grow, with five new studies approved during the year. Finally, I wish to encourage each of our member and readers, to consider joining the Spine Tango Registry and submitting their research ideas with the registry's data!

The pages that follow detail each of these achievements. Thank you for your continued trust and support — together, we are building a stronger, data-driven future for spine care.

Warm regards,

Enrico Gallazzi

Spine Tango Committee Chair



A GLOBAL COMMITMENT TO DATA DRIVEN EXCELLENCE

Welcome to this year's Spine Tango Annual Report — a reflection of our continued commitment to advancing spine health through quality assurance, data and innovation. As an internationally recognised registry, Spine Tango acts as a common language for quality assurance in spine care, providing performance benchmarks and a growing, reliable evidence base for treatment worldwide.

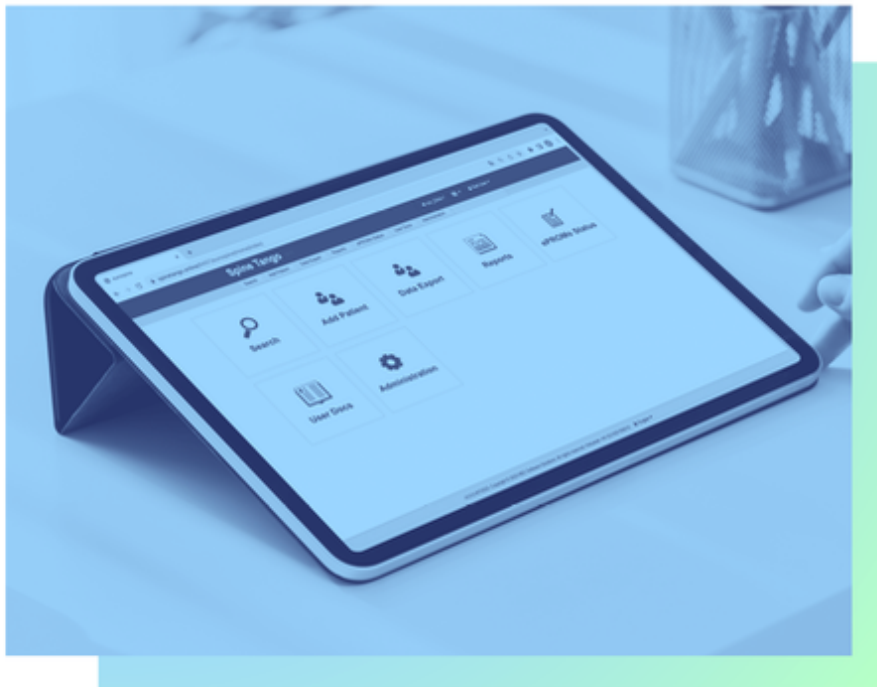
Driving progress in spine health through data and collaboration. Spine Tango is built on a mission to support healthcare professionals worldwide — surgeons and non-surgeons alike — in creating a consistent and transparent framework for evaluating spine treatments. Our focus is on standardised data collection and evaluation to promote informed treatment decision-making and outcomes improvements across the spine care community.

OUR VISION: IMPROVED OUTCOMES, ENHANCE PATIENT SAFETY

At the heart of Spine Tango is a vision to empower surgeons, hospitals, professional societies and implant manufacturers to continuously monitor and improve clinical outcomes and patient safety. By providing multilingual tools and fostering collaboration with implant manufacturers, we're helping to raise standards, drive innovation and deliver better care around the world.

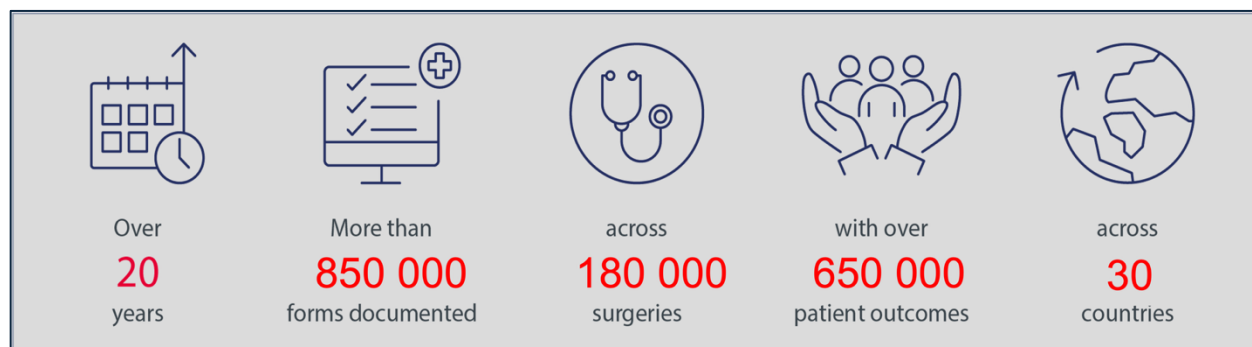
As you explore this report, you will discover collaborative achievements and insights. Spine Tango data empowers individuals, institutions and national societies to improve outcomes and prioritise patient safety.

Thank you for being part of this ongoing journey towards excellence in spine health.



SPINE TANGO 2025: PROGRESS AND INNOVATION UPDATE

FACTS & FIGURES 2025



Over the course of 2025, Spine Tango has continued to evolve, with meaningful progress across data structure, international engagement and interdisciplinary collaboration. These developments reflect our continued commitment to providing an efficient, user-friendly and clinically relevant registry for all participants. Each enhancement supports our mission to generate high-quality data that advances research, improves patient outcomes and empowers clinicians worldwide.

UPDATED DATA STRUCTURE WITH AN ADDITIONAL SIMPLIFIED FORM VERSION

A significant development in 2025 was the introduction of a new version of the *Spine Tango surgery form*, based on a comprehensively updated data structure. The previous version of the surgery form had served the registry faithfully for several years, but continued evolution in spinal classification systems and clinical practice made a further revision necessary. The primary goal of this update was to simplify data entry while preserving the most essential and clinically relevant information.

In the updated new form, careful attention was given to modern classification trends for spinal pathologies and treatments, ensuring that the data collected remains current and scientifically meaningful. Moreover, a short version of the new surgery form – reduced by approximately 20% – was also made available. This short form reduces the documentation burden on clinical teams, allowing them to focus on quality care while ensuring that the registry remains a rich and reliable source of data for research and quality assurance. The updated data structure was implemented in January 2025 and represents an important step forward in making Spine Tango an even more practical and accessible tool for busy clinical environments.

RECORD VISIBILITY AT THE EUROSPINE ANNUAL MEETING IN COPENHAGEN

Spine Tango achieved record levels of visibility at the 2025 EUROSPINE Annual Meeting in Copenhagen. With six dedicated sessions at the Science Corner and numerous Spine Tango-related presentations across the main stages, the registry demonstrated the breadth and depth of its contribution to the field of spine care.

This exceptional presence at the meeting reflects the growing recognition of Spine Tango as an essential platform for clinical research and quality assurance. We are particularly encouraged by the commitment of incoming EUROSPINE President Yann-Philippe Charles, who has identified Spine Tango and research as a key priority for his presidency. This institutional support is a strong signal of the registry's central role in advancing the EUROSPINE mission.

NEW ADD-ON FORM ON INTRAOPERATIVE NEUROMONITORING

A landmark collaborative achievement in 2025 was the development and launch of a new add-on form for intraoperative neuromonitoring. This form was developed in close collaboration with the International Society of Intraoperative Neurophysiology (ISIN) and represents a significant step forward in interdisciplinary data collection within the Spine Tango platform.

The neuromonitoring form is intended for use by neurophysiologists and neurologists who perform intraoperative monitoring, complementing the existing surgical data already captured in Spine Tango. The collaboration between EUROSPINE and ISIN has brought together the expertise of two international medical societies with the shared goal of gathering real-world evidence on the value and impact of neuromonitoring in spine surgery – an area where robust prospective data has historically been scarce.

This initiative reflects Spine Tango's growing role not only as a registry for surgical data, but as a platform capable of capturing the full multidisciplinary picture of modern spine care. All interested centres, neurophysiologists and neurologists are warmly invited to contribute to this important initiative and become co-authors of the resulting evidence.

THE SPINE ATLAS INITIATIVE: FIRST GLOBAL DATA CALL RESULTS



The Spine Atlas Initiative (SAI) was launched as a pioneering global effort to map spine pathologies, treatment variations and patient outcomes at an international scale. Leveraging the reach and credibility of Spine Tango and partner registries worldwide, the initiative aims to provide unprecedented insight into real-world spine care – identifying global trends, visualising practice variation and enabling meaningful comparisons across countries and healthcare systems.

FIRST DATA CALL (2025): A LANDMARK ACHIEVEMENT

The first global data call of the Spine Atlas Initiative focused on the surgical management of lumbar degenerative spondylolisthesis (LDS) – a highly prevalent and clinically significant condition for which treatment approaches vary considerably around the world. The data collection phase gathered structured information from spine units across more than 30 countries, resulting in a dataset of more than 1,600 real-world surgeries – one of the most comprehensive international datasets ever assembled on this condition.

For the first time, this initiative has enabled a high-resolution look at how treatment choices for lumbar degenerative spondylolisthesis differ between countries, institutions and healthcare systems. Preliminary analyses were presented at the EUROSPINE Annual Meeting in Copenhagen, generating significant interest from the clinical community. The data reveal substantial variation in the use of decompression alone versus fusion procedures, influenced by factors including patient age, patterns of spinal stenosis and local healthcare practices.

DATA CALL 2026: DEGENERATIVE CERVICAL MYELOPATHY

Building on the success of the first data call, the next Spine Atlas data call focusses on treatment strategies and variations in Degenerative Cervical Myelopathy (DCM) – a major cause of spinal cord dysfunction worldwide and a condition for which significant practice variation exists. The data collection period is scheduled to run between 1 February and 31 May 2026. Each participating unit will be asked to provide 9 mandatory and 6 optional parameters in a structured manner for each eligible patient treated during this period. The data call follows the overall SAI protocol by Herrmann et al. published in Brain & Spine (2025) and the specifics laid out in the DCM protocol.

WHY IT MATTERS

With spinal disorders on the rise globally, understanding how care varies between countries is more important than ever. The Spine Atlas Initiative is shaping future research, informing clinical practice guidelines and contributing to improved patient outcomes on an international scale. We celebrate this milestone and look forward to continued and expanding participation from spine units worldwide.

JOIN THE INITIATIVE

Be part of this pioneering global effort in spine care. Contribute your data, share your expertise and gain access to global benchmarking, research collaboration and international visibility. For more information, visit www.eurospine.org/spineatlas.

EU HORIZON PROGRAMME PROJECT: PREPARE

An outstanding achievement for Spine Tango is its central role in PREPARE – a four-year large-scale European consortium project funded under the EU’s Horizon Europe programme. The full title of the project is Personalised Rehabilitation via Novel AI Patient Stratification Strategies. PREPARE aims to use artificial intelligence methods to analyse Spine Tango and other medical data to develop predictions of patient outcomes and advance rehabilitation in spine care and beyond. This multi-stakeholder, interdisciplinary initiative is at the forefront of transforming rehabilitation care for chronic non-communicable diseases.

EUROSPINE’S INTEGRAL ROLE

EUROSPINE plays a central role in the PREPARE consortium, contributing decades of expertise in spinal disorders alongside one of its most valuable assets: the Spine Tango Registry. This comprehensive repository of anonymised, longitudinal clinical data – spanning surgical forms, patient-reported outcome measures and follow-up data – forms the backbone of the data driven approach at the heart of PREPARE.

The ultimate goal of the project is to develop tools that can be offered directly to treating physicians: supporting personalised treatment decisions, helping to communicate and navigate treatment options, managing patient expectations and enabling shared decision-making for optimal outcomes in spine care. EUROSPINE’s contributions span the conceptualisation of health data integration technology and computational models, the definition of requirements and validation of tools, the design of the overall research architecture, and the conduct of smaller studies to assess the usability and effectiveness of these tools.

A KEY MILESTONE: MAPPING TO THE OMOP COMMON DATA MODEL

In 2025, a major milestone was reached within the PREPARE project: Spine Tango data were successfully mapped to the OMOP Common Data Model (CDM). This internationally recognised standardised framework transforms registry data into a shared, interoperable structure, making it analysis-ready and directly comparable across participating sites and countries.

By aligning Spine Tango with the OMOP CDM, we have enabled federated analyses – allowing data to remain locally governed and secure while still being accessible for large-scale collaborative research. This approach supports reproducible, transparent research workflows and lays the technical foundation for scalable AI model development. It represents a significant step forward in making Spine Tango data accessible for the next generation of data-driven spine care research and demonstrates the registry’s capacity to contribute to some of the most ambitious scientific initiatives in the field.



SPINE TANGO COMMITTEE

In 2025, the Spine Tango Committee entered a new and exciting chapter, with significant changes in leadership and membership that will help shape the future strategic direction of the registry. These changes build on the important structural milestone achieved in 2025, when the Spine Tango Task Force was formally transitioned into a permanent standing committee within EUROSPINE – a development that strengthened the governance and long-term oversight of the registry.

WELCOMING THE NEW CHAIR AND NEW COMMITTEE MEMBERS

We are delighted to welcome **Enrico Gallazzi** of Italy as the new Chair of the Spine Tango Committee. Enrico brings with him a wealth of clinical and scientific expertise, and the Committee looks forward to his leadership and vision as Spine Tango continues to grow and evolve.

The Committee has also welcomed four new members who bring fresh perspectives and expertise from across Europe: **Anas Dyab** (Luxembourg), **Peter Obid** (Germany), **Michel Paul Johan Teuben** (Switzerland) and **Giovanni Viroli** (Italy). Their contributions will help ensure that Spine Tango continues to respond to the needs of the international spine care community and advances its scientific and clinical mission.

WITH GRATITUDE: FAREWELL TO DEPARTING MEMBERS

We extend our heartfelt thanks and deepest appreciation to the members who have concluded their service on the Spine Tango Committee. **Pedro Dos Santos Silva** (Portugal), **Georg Grohs** (Austria), **Bart Depreitere** (Belgium) and **Everard Munting** (Belgium) have each made outstanding and enduring contributions to the development of Spine Tango. Their dedication, expertise and commitment over many years have been instrumental in building the registry into what it is today, and their legacy will continue to be felt in the work of Spine Tango for years to come.

INTERNATIONAL SPINE REGISTRIES (ISR) WORKING GROUP

This working group consisting of representatives of different spine registries has been further working in 2025 on three policy papers dedicated to harmonisation of spine registries. The three selected topics were: 1) common core data structure, 2) common PROM, and 3) common approach for implant registration. All three policy papers were elaborated, and they will be published in the coming year. For more information visit www.spineregistries.com



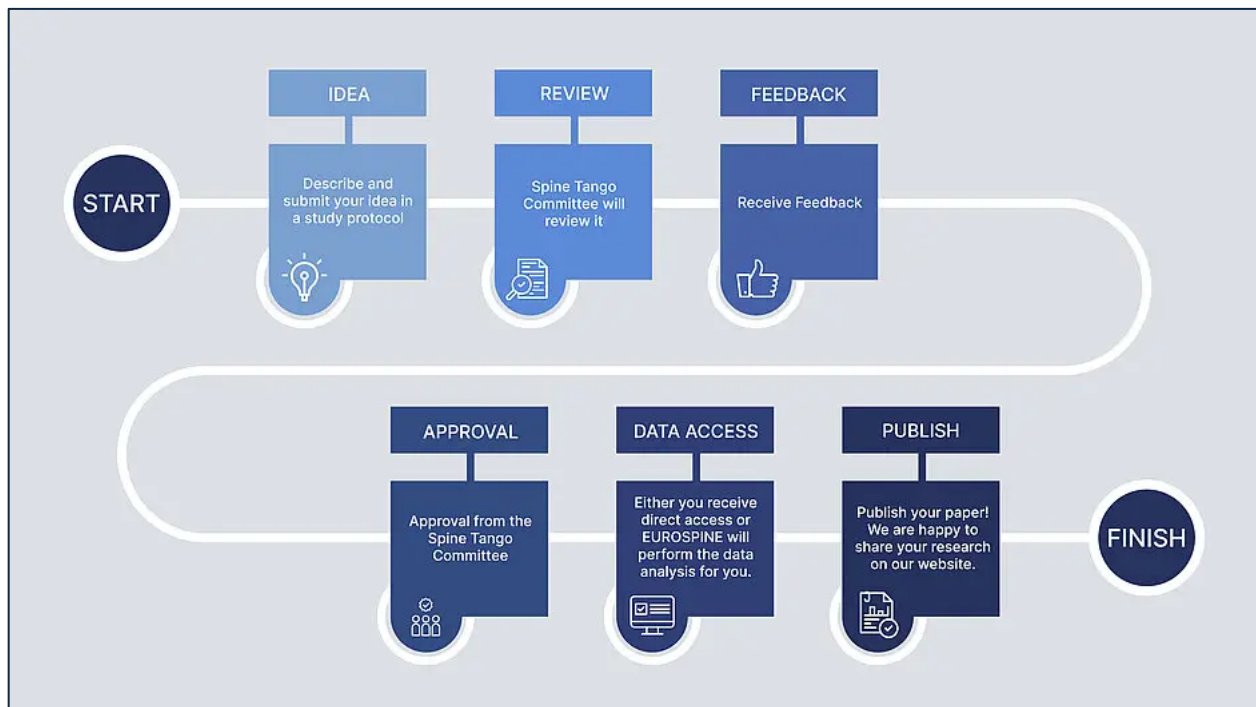
SPINE TANGO RESEARCH

The scientific impact of the Spine Tango Registry continues to grow, with research output expanding year on year. Publications drawing on Spine Tango data can be found on PubMed using the keyword “Spine Tango” and span a wide range of clinical topics, from surgical outcomes and complication rates to comparative effectiveness research and health system analyses.

In 2025, five new study requests using Spine Tango data were approved by the Committee, two of which were already presented at the 2025 Annual Meeting in Copenhagen. Each application was assessed in accordance with the terms and conditions for data use established by the Spine Tango

Committee, which are publicly available on the Spine Tango website. This structured process ensures that registry data is used responsibly, and that resulting research meets the highest scientific standards.

Spine Tango remains open to qualified researchers and academic institutions wishing to access anonymised pooled data for statistical and research purposes. Applications are welcomed from individuals and groups seeking to advance the evidence base for spine care, including those who have not previously contributed data to the registry.



LOOKING AHEAD: GOALS FOR 2026

We look forward to another exciting year for the registry, with several important initiatives planned for 2026. Key priorities include supporting the Spine Atlas data call on Degenerative Cervical Myelopathy, continuing to expand the number of registry participants and international collaborations, and carrying out research studies using Spine Tango data. We also aim to further develop the reporting capabilities of the registry – including implant and hospital reports – and to introduce a dedicated surgeon report. Building on the OMOP CDM milestone achieved in 2025, we will continue to advance the PREPARE project and explore new opportunities for AI-driven analysis of registry data.

We are grateful to all participating hospitals, clinicians and patients who make Spine Tango possible. Together, we are building a stronger, data-driven future for spine care.

SELECTED STATISTICS

WORLD MAP

The Spine Tango registry and the majority of participating hospitals are based in Europe. Hospitals from many other countries are or have previously been participating in the registry, as illustrated in the following three maps. This international distribution demonstrates the interest for a common language in the registration of spinal treatments and their outcomes, which in turn will help to further develop spinal care as well as harmonise and improve it.

All following maps are based on registry data collected up to 31 December 2025.

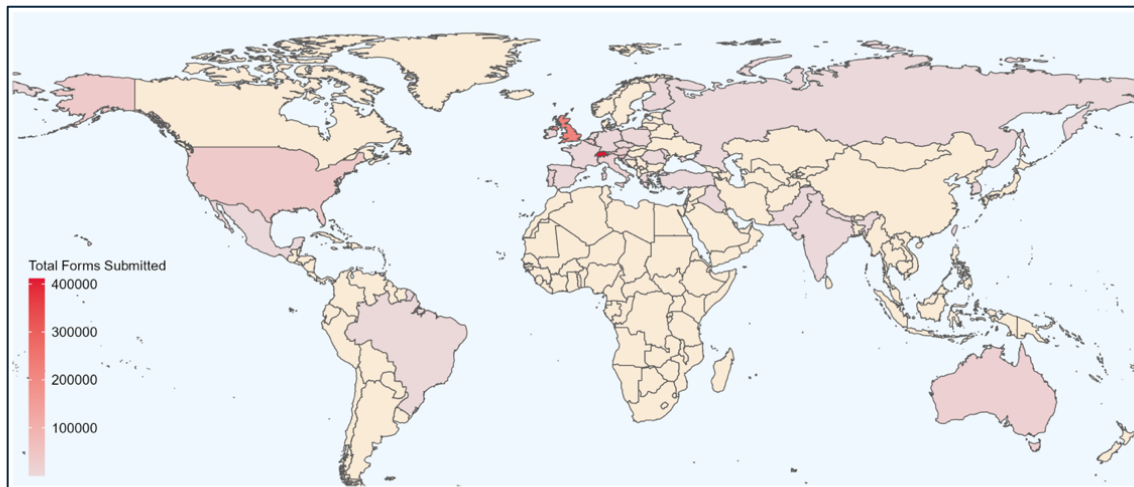


Figure 1. Global overview of origin of participants in the registry and submitted forms by country

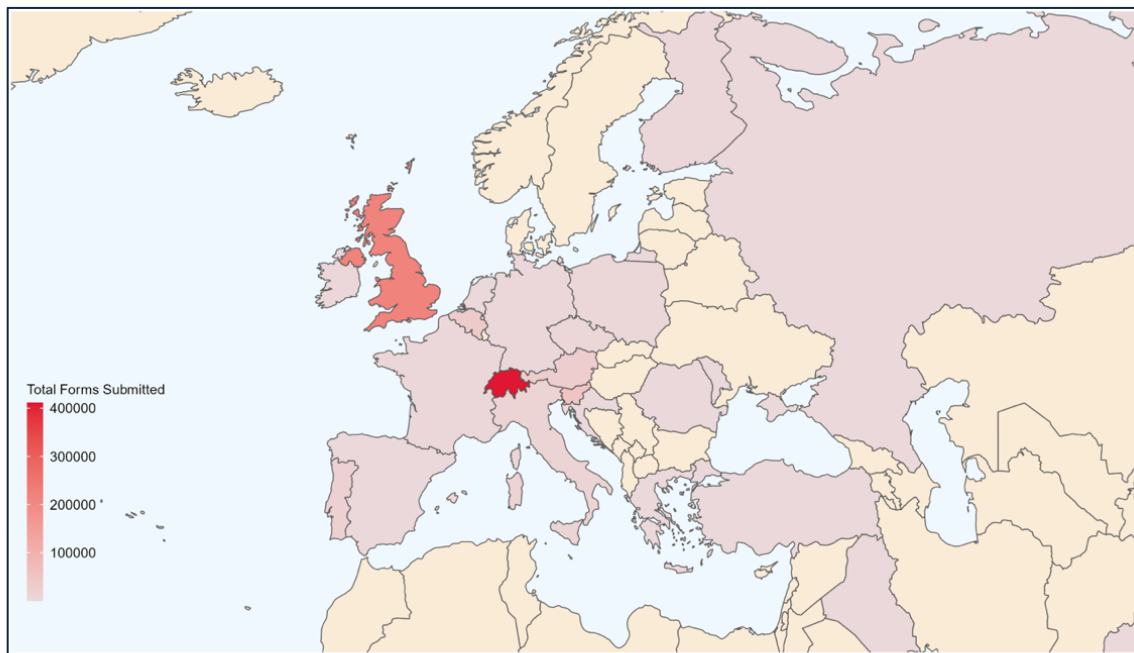


Figure 2. Overview of submitted forms of the participants by country in Europe

OVERALL DATA GROWTH BY FORM TYPE

The number of documented forms in the registry increases each year. After a significant drop in 2021, the number of documented forms in 2022 has picked up again. The drop in 2021 was probably related to the COVID 19 pandemic.

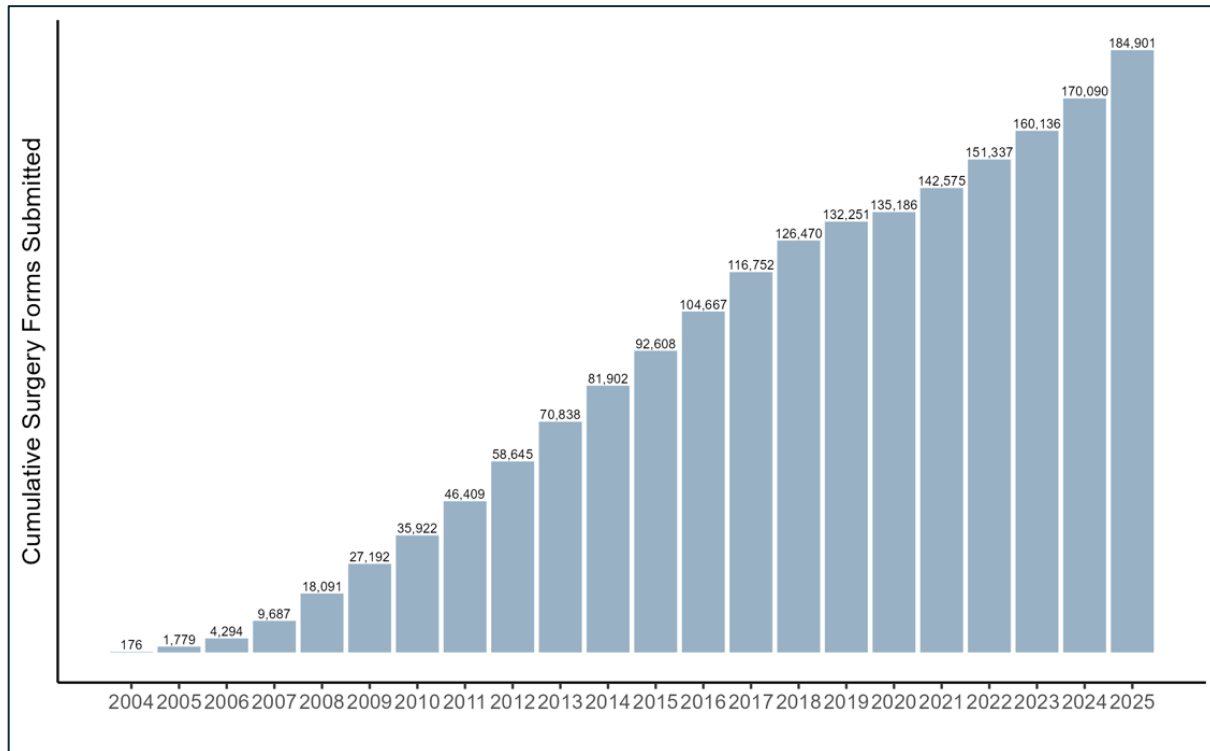


Figure 3. Cumulative Surgery forms

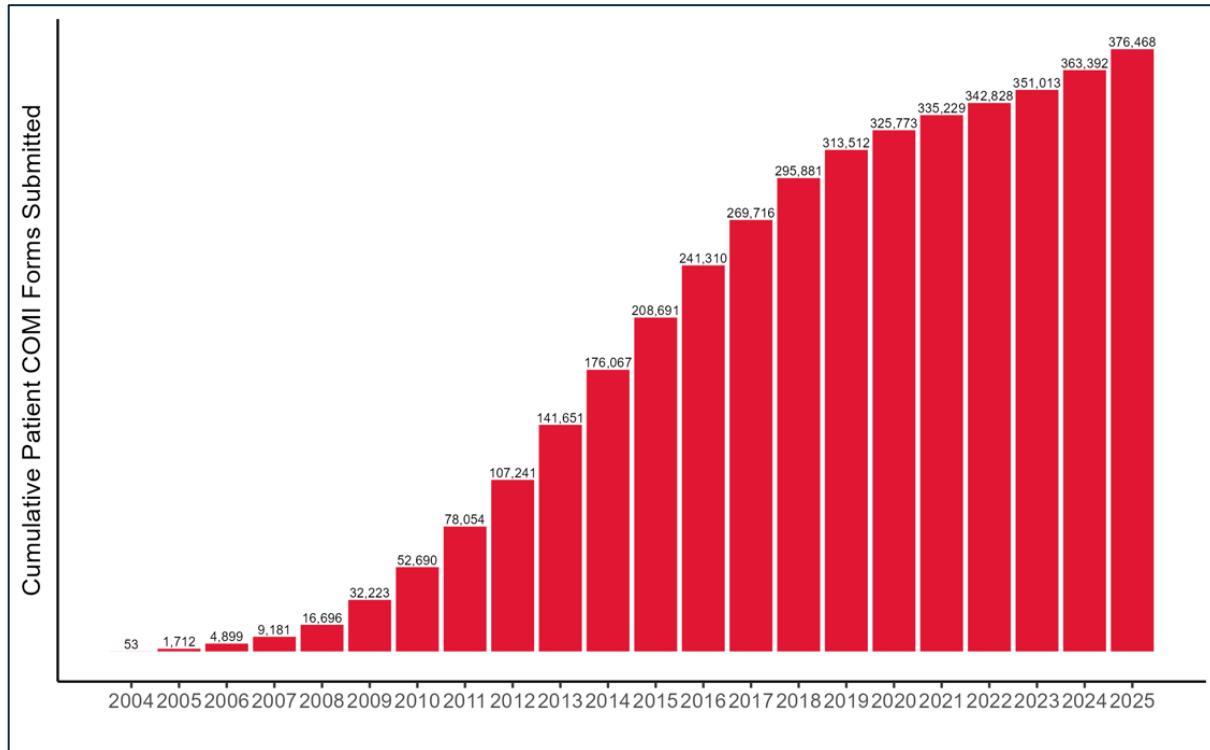


Figure 4. Cumulative COMI forms (both surgery and conservative COMI)

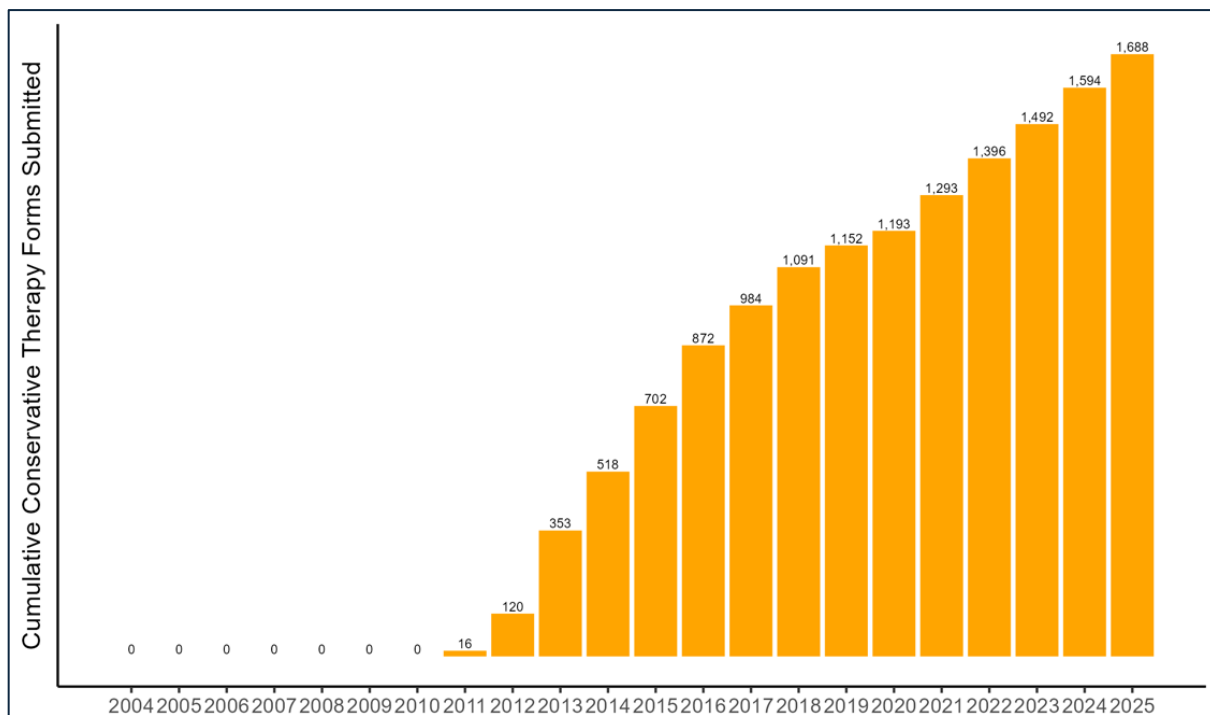


Figure 5. Cumulative Conservative treatment forms

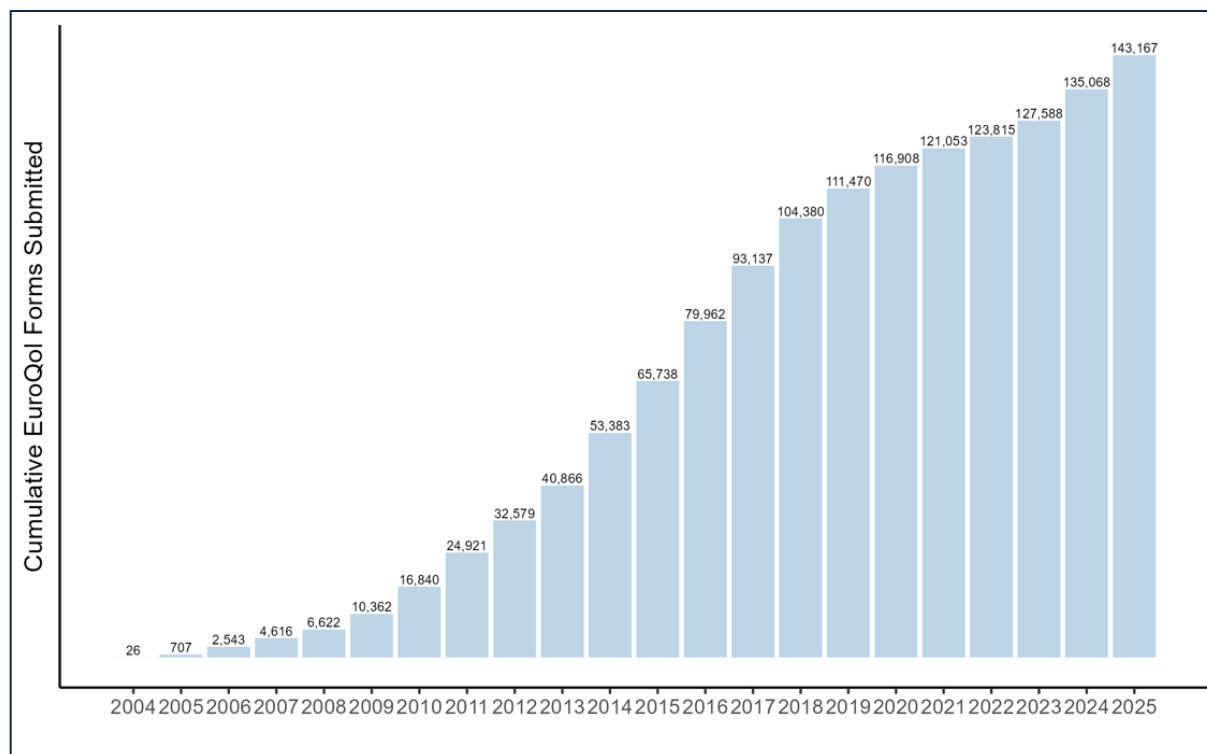


Figure 6. Cumulative EuroQol forms

PATIENT CHARACTERISTICS OF THE POOLED DATA

The figures presented in the following tables are based on 184,901 surgeries documented up to 31 December 2025.

Surgical Forms (N = 184,901)

Characteristic	Subgroup	Percent	Count
Age	< 40	13,8%	25,501
	40-49	15,3%	28,242
	50-59	19,7%	36,427
	60-79	42,4%	78,348
	> 80	8,9%	16,383
Gender	Male	47,6%	87'919
	Female	52,4%	96,956
	Other	0,0%	24
	Unknown	0,0%	2
Smoker (N = 134,722)	No	77,3%	69,814
	Yes	22,7%	20,444
	Unknown	(33,0%)	44,464
BMI (N = 126,541)	< 20	5,4%	6,774
	20-25	35,0%	44,281
	26-30	36,2%	45,785
	31-35	15,5%	19,661
	> 35	7,9%	10,040
	Unknown	(31,6%)	58'360
Number of segments affected	1	33,5%	61,826
	2-3	32,4%	59,714
	>= 4	34,1%	62,773
	Unknown	(0.3%)	588
Number of previous surgeries	0	68,0%	120,899
	1	20,5%	36,457
	>1	11,5%	20,350
	Unknown	(3.9%)	7,195

Table 1. Patient characteristics overview (unknown data is not included in the calculation of the other proportions)

MAIN PATHOLOGIES

The most frequent pathology seen in the registry is degenerative disease with around four fifth of the surgeries, followed by repeat surgery with 8.2% and other less frequent pathologies.

Pathology	Percent	Count
Degenerative disease	74,1%	137,029
Repeat surgery	8,2%	15,103
Fracture / trauma	4,4%	8,047
Pathological fracture	3,9%	7,122
Spondylolisthesis (non-degenerative)	3,1%	5,711
Tumour	2,1%	4,022
Non-degenerative deformity	2,1%	3,851
Other	1,0%	1,911
Infection	1,0%	1'858
Inflammation	0,1%	247

Table 2. Main pathologies tabular overview

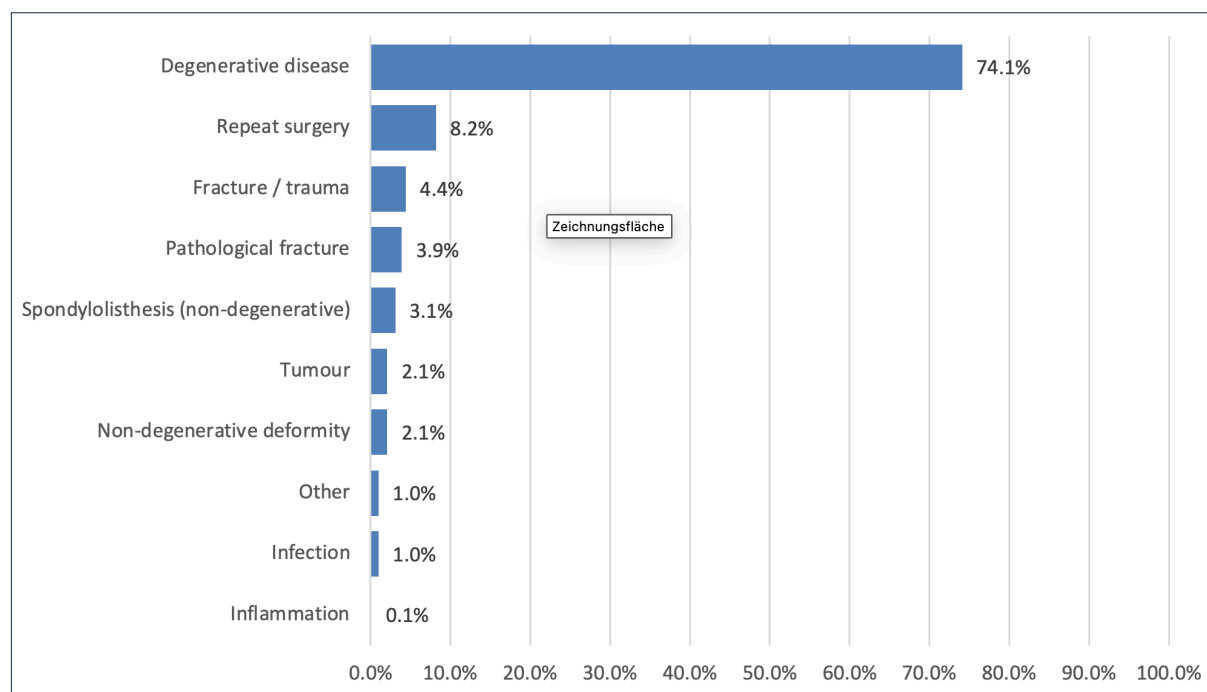


Figure 7. Main pathologies bar chart overview

Regarding the levels of intervention, most of the cervical surgeries take place at C5 (6.9%), followed by C6 (5.4%). Thoracic levels are rather rare with Th12 as the most frequent thoracic level at 4.3%. The three most treated spine levels remain to be L4 (39.1%) followed by L5 (29.2%) and L3 (20.1%).

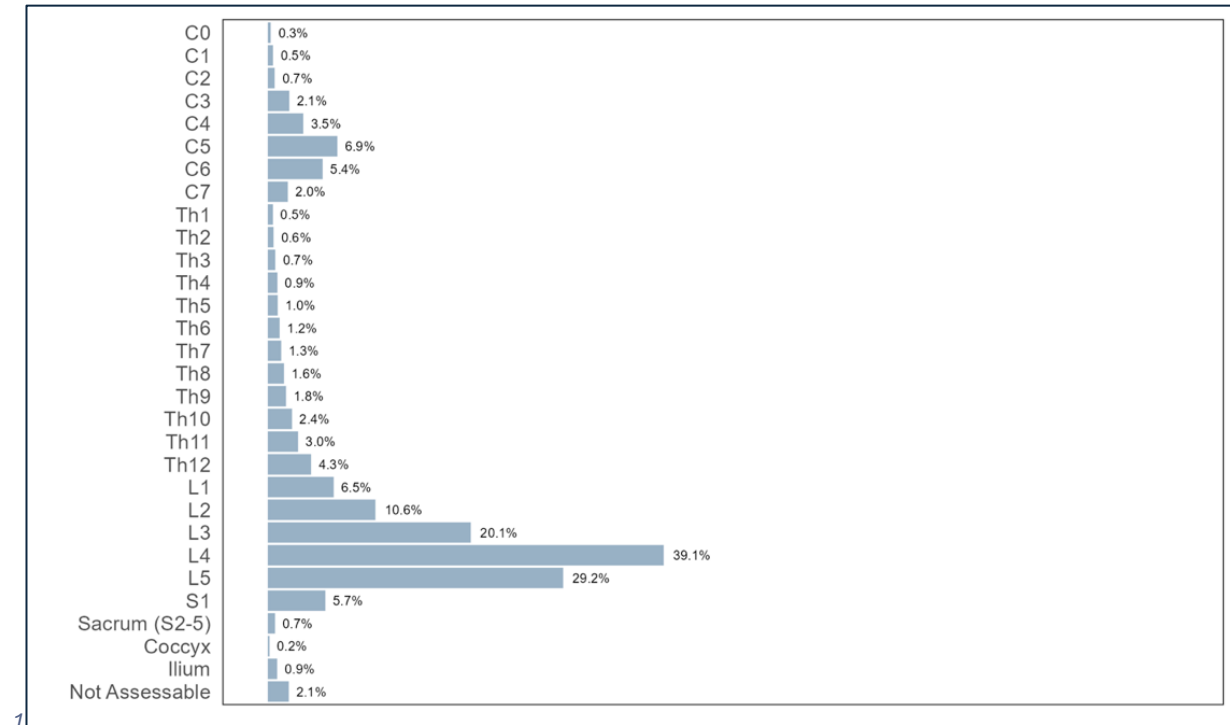


Figure 8. Levels of intervention

DESCRIPTIVE ANALYSIS OF SELECTED PATHOLOGIES

The authors of this annual report elected to describe some key characteristics of patient groups undergoing surgical treatment for one of the two most frequent pathologies: disc herniation and spinal stenosis.

DISC HERNIATION

33.9% of all documented surgeries in Spine Tango (N=62,591) were related to the treatment of disc herniation. The following Table 3 describes characteristics of this patient population.

PATIENT CHARACTERISTICS

Surgical forms (N = 62,591)

Characteristic	Subgroup	Percent	Count
Age	< 40	22,2%	13,920
	40-50	25,4%	15,878
	50-60	22,9%	14'319
	60-80	26,4%	16,525
	> 80	3,1%	1,949
Gender	Male	52,2%	32,688
	Female	47,8%	29,895
	Other	0,0%	8
Smoker (N = 44,076)	No	73,1%	19,619
	Yes	26,9%	7,237
	Unknown	(39,1%)	17,211
BMI (N = 40,174)	< 20	4,4%	1,757
	20-25	34,0%	13,644
	26-30	37,7%	15'160
	31-35	15,8%	6,326
	> 35	8,2%	3,287
	Unknown	(35,8%)	22,417
Number of segments affected	1	45,1%	28,247
	2-3	25,8%	16,127
	>= 4	29,1%	18,199
	Unknown	0,0%	18
Number of previous surgeries	0	77,2%	47,268
	1	16,7%	10,202
	> 1	6,1%	3,757
	Unknown	(2,2%)	1364

Table 3. Patient characteristics disc herniation (unknown data is not included in the calculation of the other proportions)

SURGICAL MEASURES

The following Figure 9 demonstrates proportions of key surgical measures over a time period of 19 years between 2007 and 2025. The distribution of the individual surgical measures remained rather stable over this time period with a slight but visible reduction of motion preserving stabilisation in the last decade.

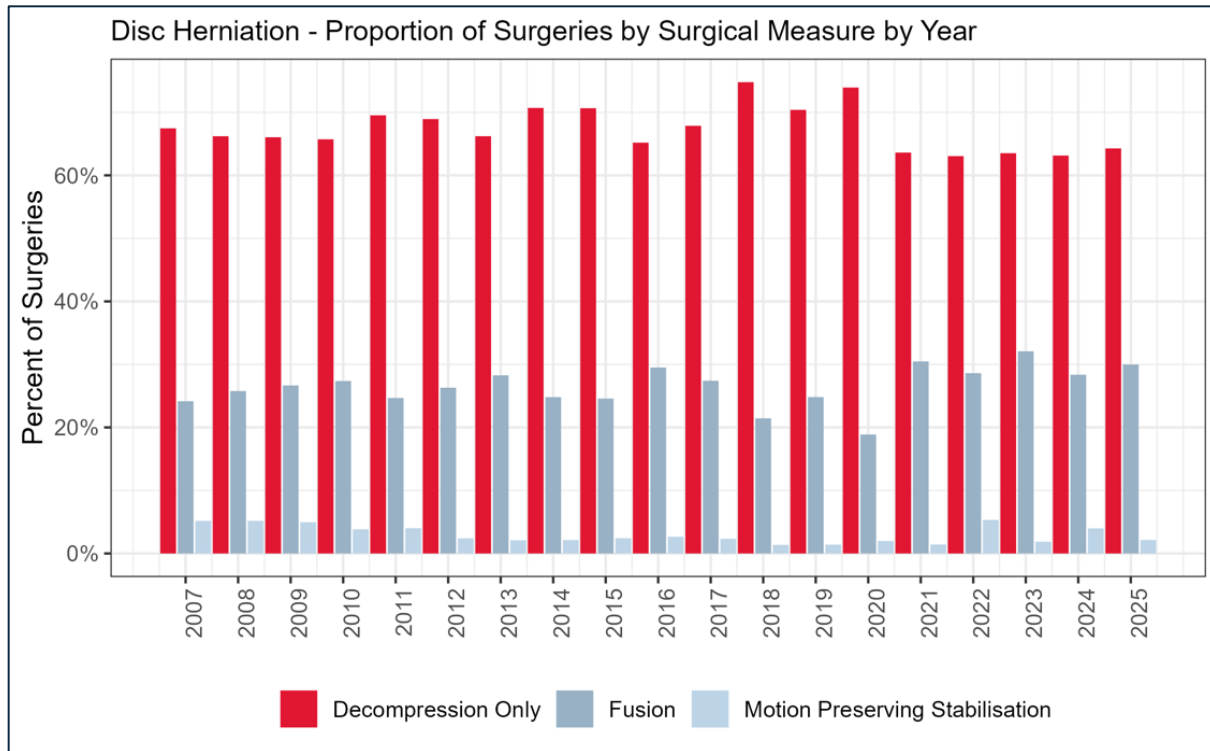


Figure 9. Proportion of surgeries by surgical measure by year

COMPLICATIONS

General complications were rather rare with the leading complication of kidney / urinary system in 0.24% of the surgeries (Figure 10).

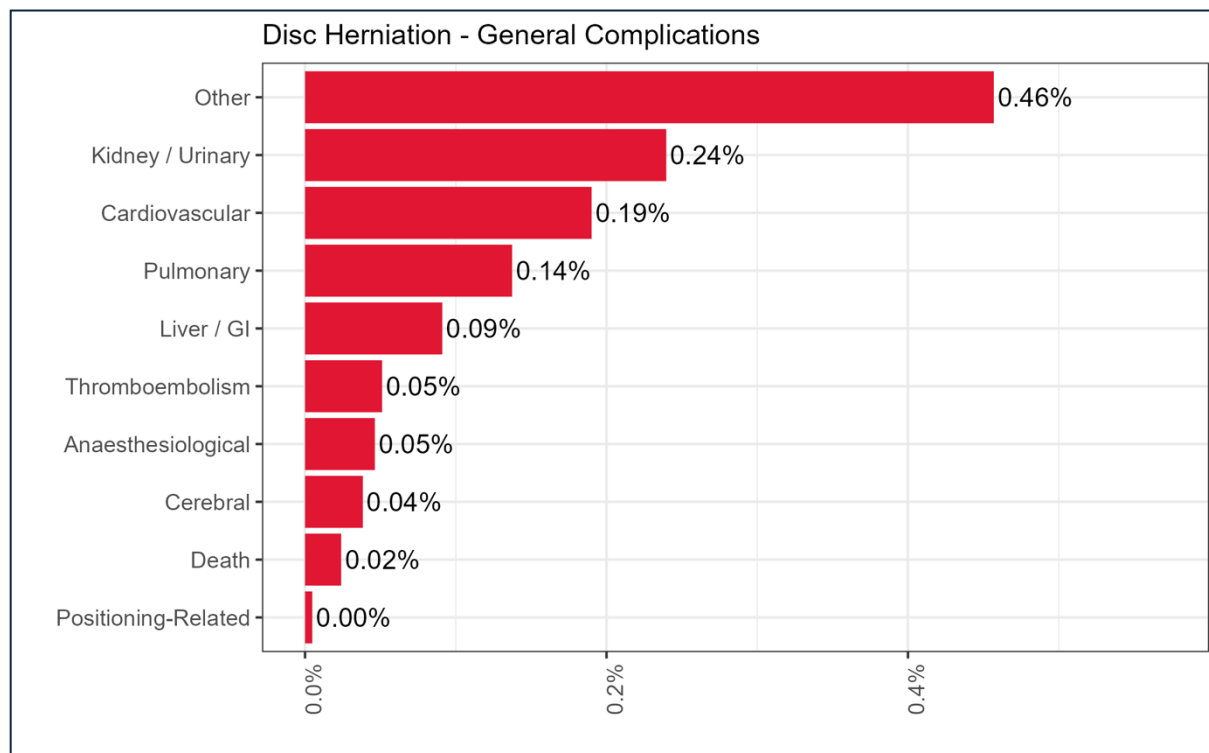


Figure 10. General complications for herniated disc cases

Surgical complications were more frequent with dural lesions documented in 2.97% of the surgeries (Figure 11). The next most frequent complications were neurological with motor disfunction, radiculopathy and sensory disfunction in 0,38%, 0,36% and 0,32%, respectively.

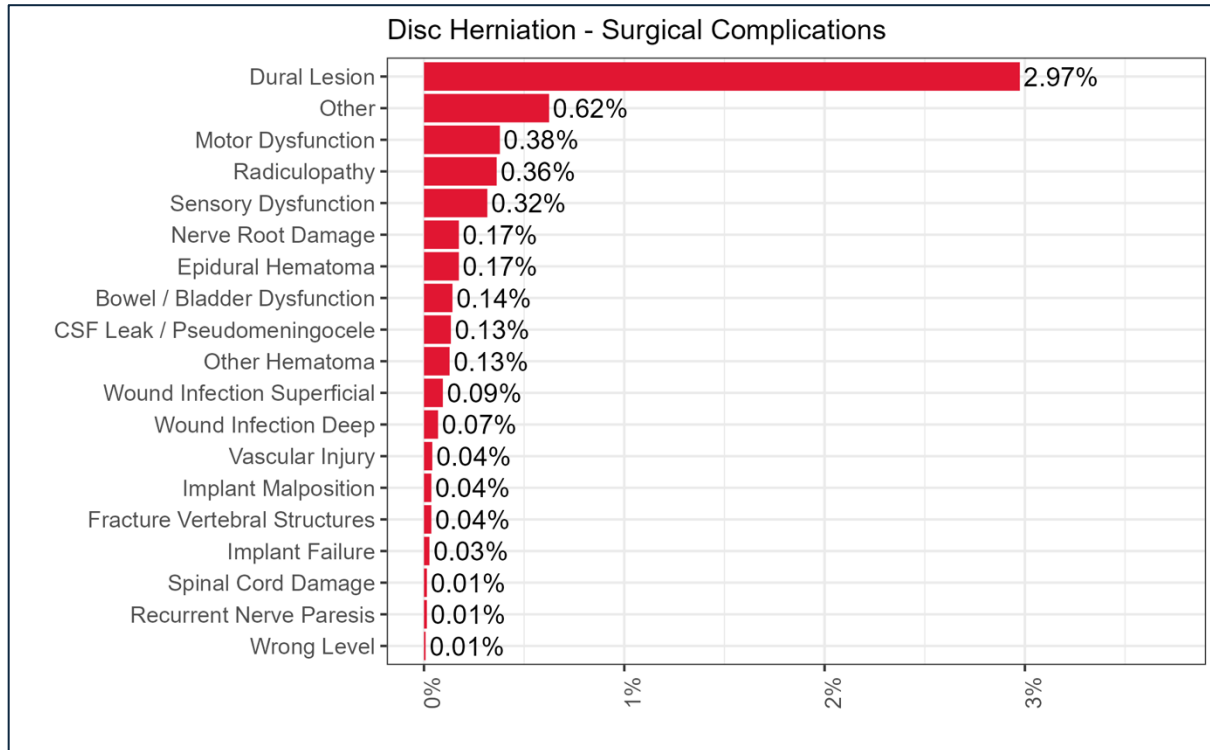


Figure 11. Surgical complications for herniated disc cases

OUTCOMES: COMI

In one fourth of all patients with disc herniation a baseline COMI form and a 3-month postoperative or a later COMI form were documented. This rate varies considerably between hospitals, depending on whether they collect COMI or not. The following Figure 12 to Figure 14 demonstrates the average preoperative and postoperative axial and peripheral pain levels as well as COMI score with 95% confidence intervals over the last 18 years. The curves were not adjusted by patient characteristics, surgical measures and follow-up interval, which are assumed to be relatively stable. Nevertheless, the figures have a descriptive character only and a conclusive interpretation requires more granular investigations.

Over this time period the preoperative axial pain has steadily increased from about 5 points to 6 points, while the postoperative axial pain is back to 3 points as in the early years. This finding of increasing preoperative axial pain points to a stable but still improving treatment indication. This is positive. The stable postoperative axial pain over the years demonstrates, however, that a better treatment indication does not necessarily result in a better postoperative axial pain level, but rather a greater improvement.

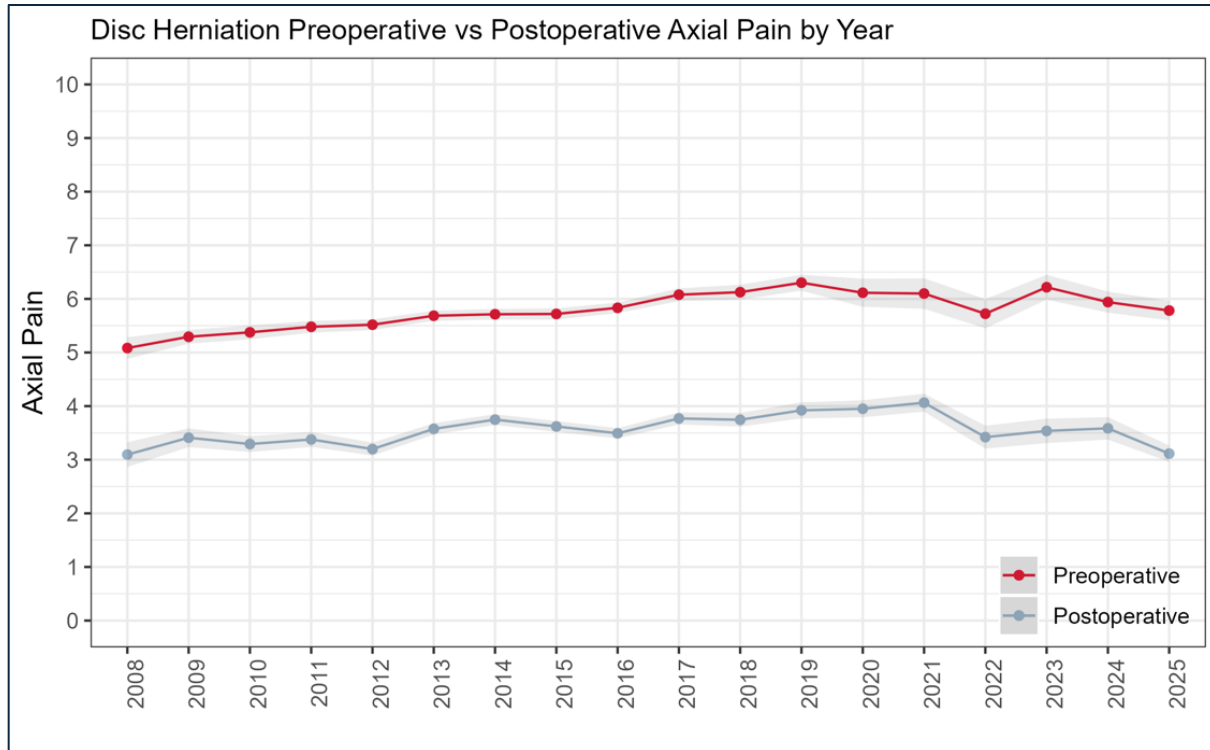


Figure 12. Preoperative and postoperative axial pain in disc herniation cases by year

Over this time period the preoperative peripheral pain stayed around 7 points, while the postoperative peripheral pain also stayed more or less stable around 3 points.

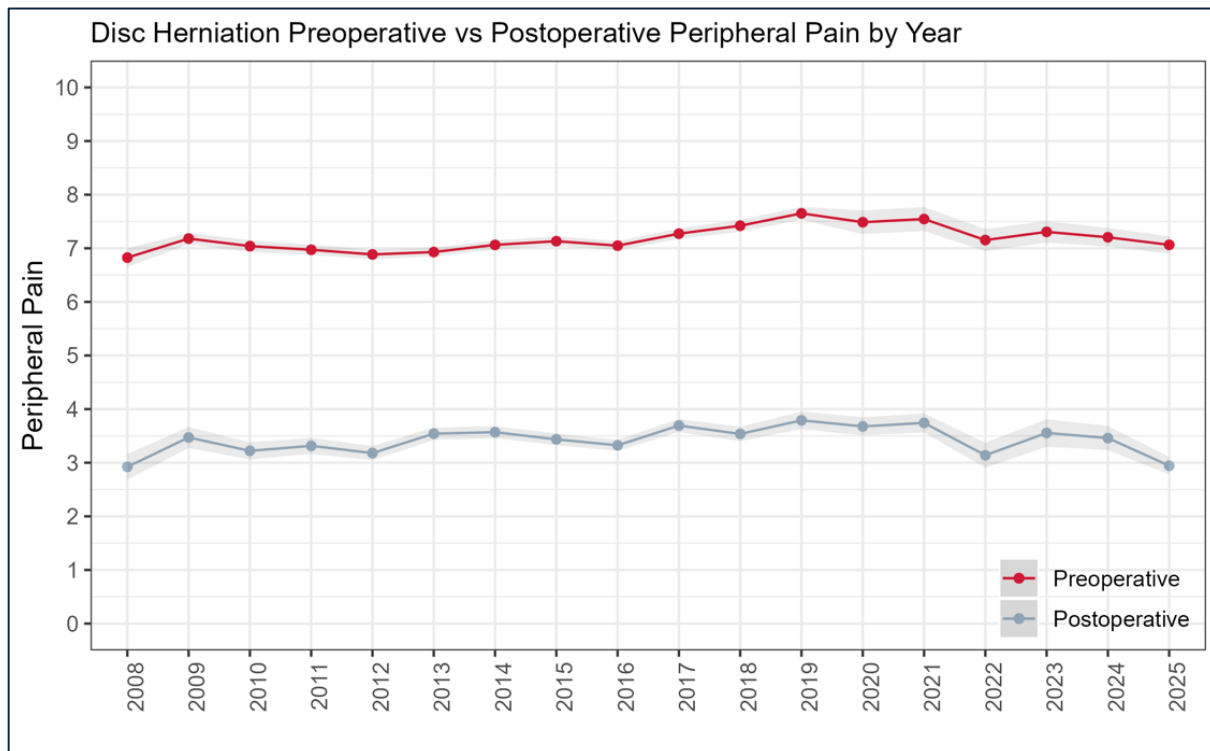


Figure 13. Preoperative and postoperative peripheral pain in disc herniation cases by year

Over this time period the COMI score preoperative and postoperative remained also stable around 8 and 4.5 points, respectively. No relevant trend both for preoperative and postoperative scores were observed over the whole time period.

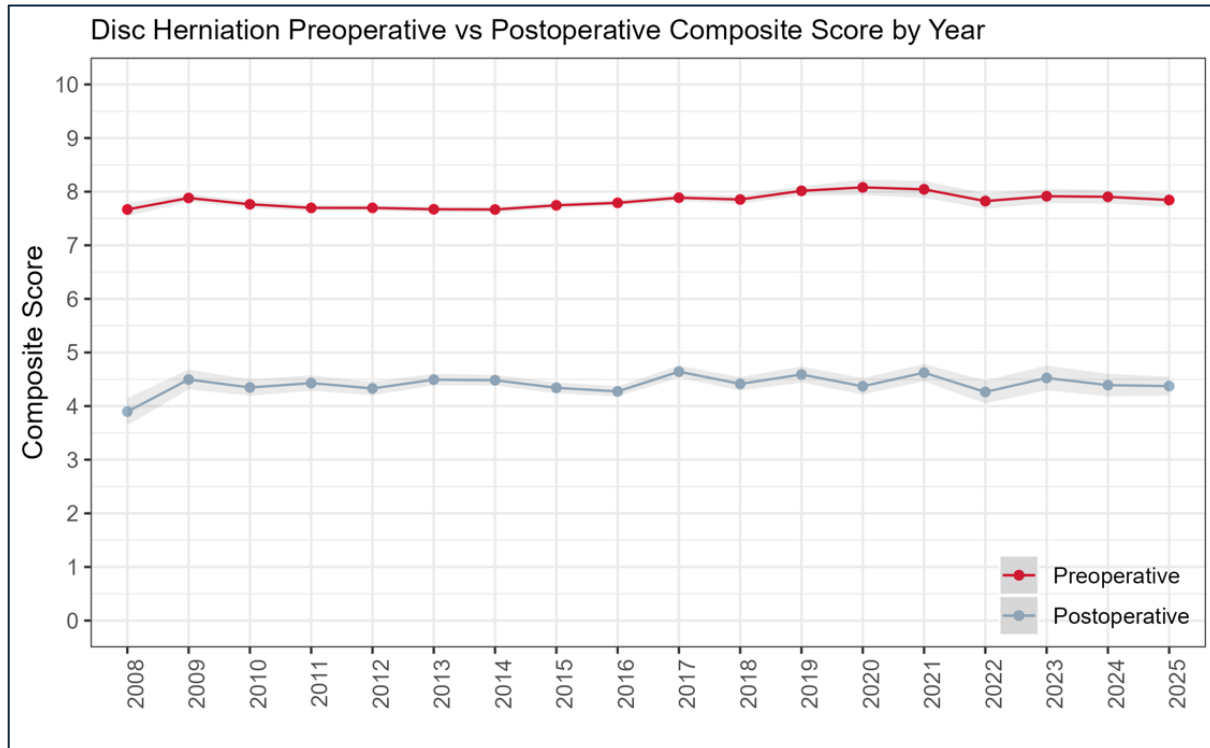


Figure 14. Preoperative and postoperative COMI score in disc herniation cases by year

SPINAL STENOSIS

43,3% of all surgeries documented in Spine Tango (N=80,070) were related to the treatment of spinal stenosis. The following Table 4 describes characteristics of this patient population.

PATIENT CHARACTERISTICS

Surgical Forms (N=80,070)

Characteristic	Subgroup	Percent	Count
Age	< 40	4,2%	3,328
	40-50	9,7%	7,750
	50-60	18,9%	15,158
	60-80	56,1%	44,892
	> 80	11,2%	8,942
Gender	Male	49,4%	39,567
	Female	50,6%	40,498
	Other	0,0%	5
Smoker (N = 62,665)	No	80,6%	33,073
	Yes	19,4%	7,950
	Unknown	(34,5%)	21,642
BMI (N = 42,754)	< 20	3,5%	1,511
	20-25	29,1%	12,446
	26-30	39,5%	16,900
	31-35	19,0%	8,128
	> 35	8,8%	3,769
	Unknown	(46,6%)	37,316
Number of Segments Affected (N = 63,061)	1	31,8%	20,080
	2-3	38,2%	24,078
	>= 4	29,9%	23,894
	Unknown	(21,2%)	17,009
Number of Previous Surgeries	0	74,0%	57,611
	1	18,2%	14,189
	> 1	7,8%	6,045
	Unknown	(2,8%)	2,225

Table 4. Patient characteristics spinal stenosis (unknown data is not included in the calculation of the other proportions)

SURGICAL MEASURES

The following Figure 15 demonstrates proportions of key surgical measures over a time period of 19 years between 2007 and 2025. The distribution of individual surgical measures changed over this time period, which is however primarily caused by the substantial proportion of fusions that were registered in the mandatory Swiss Implant Registry SIRIS and are being part of the international pooled data.

If excluding the last four years, the proportion of decompression alone was increasing and the proportion of fusions decreasing over time.

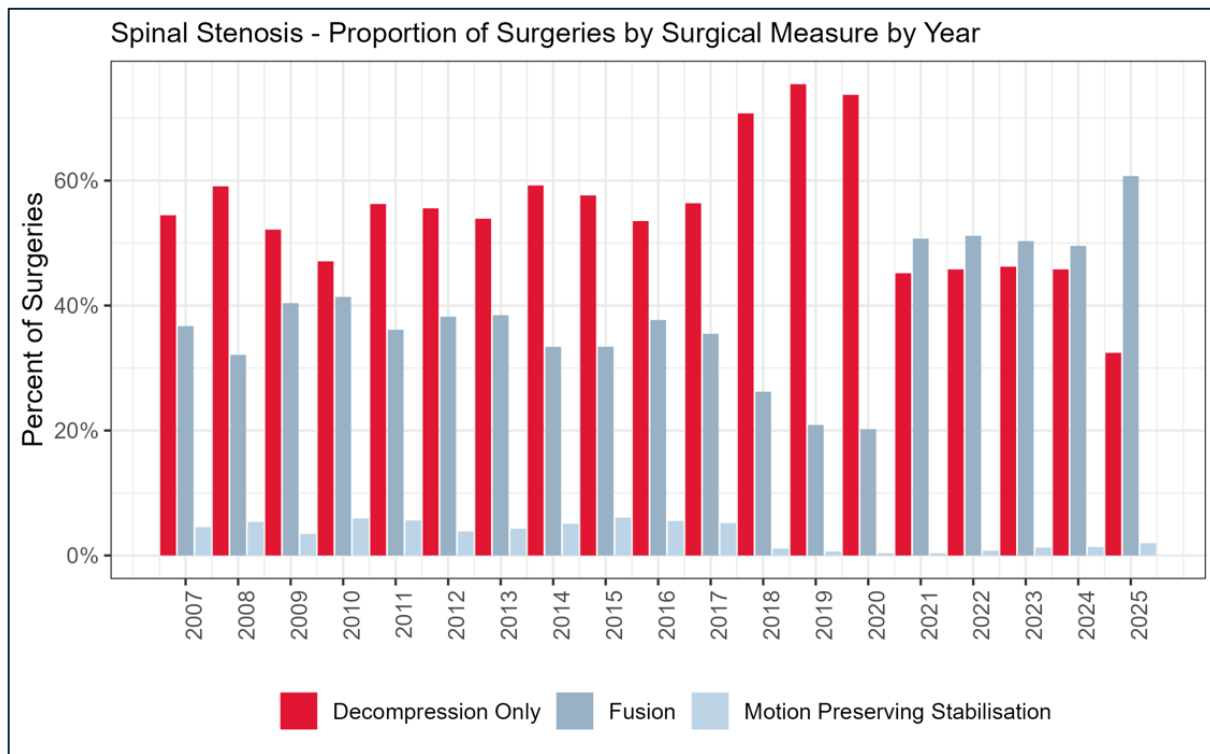


Figure 15. Proportion of surgeries by surgical measures by year

COMPLICATIONS

General complications were rather rare with the leading complication of kidney and urinary tract in 0,55% of the surgeries (Figure 16).

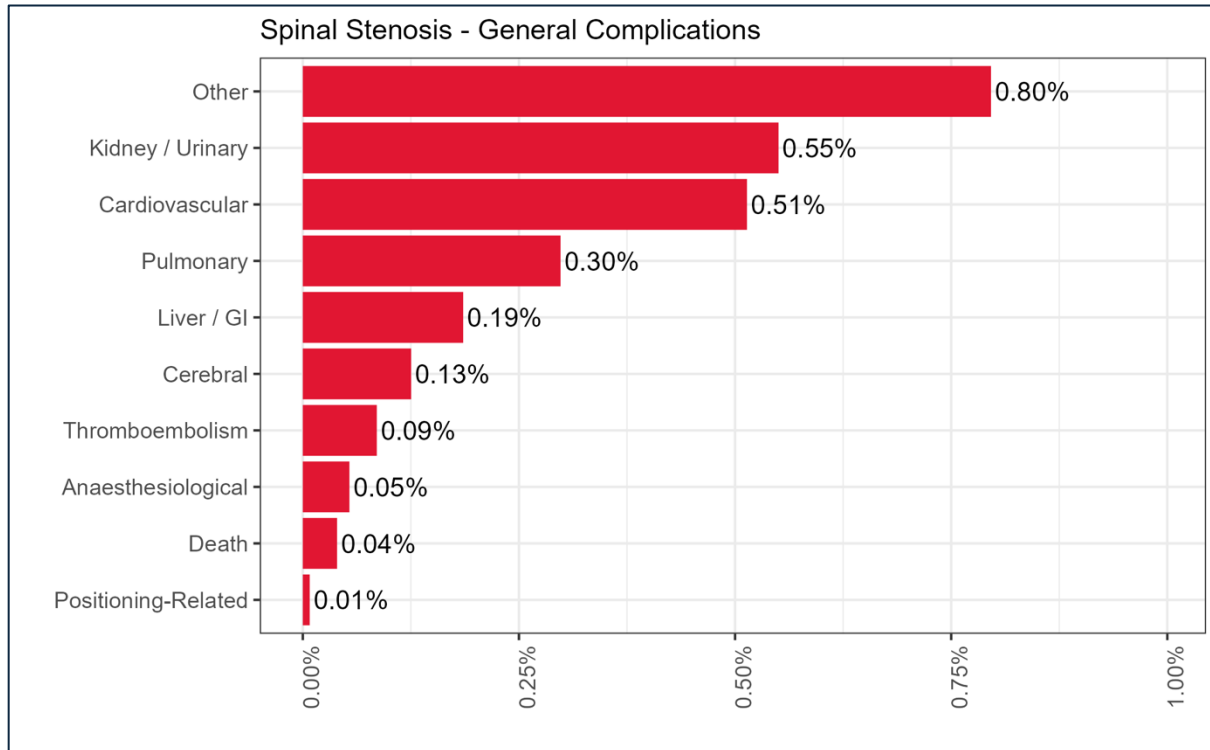


Figure 16. General complications for spinal stenosis cases

Surgical complications were more frequent with dural lesions documented in 4,56% of the surgeries (Figure 17). The next most frequent complications were neurological with motor dysfunction, epidural hematoma, radiculopathy and sensory dysfunction in 0,51%, 0,46%, 0,38% and 0,37%, respectively.

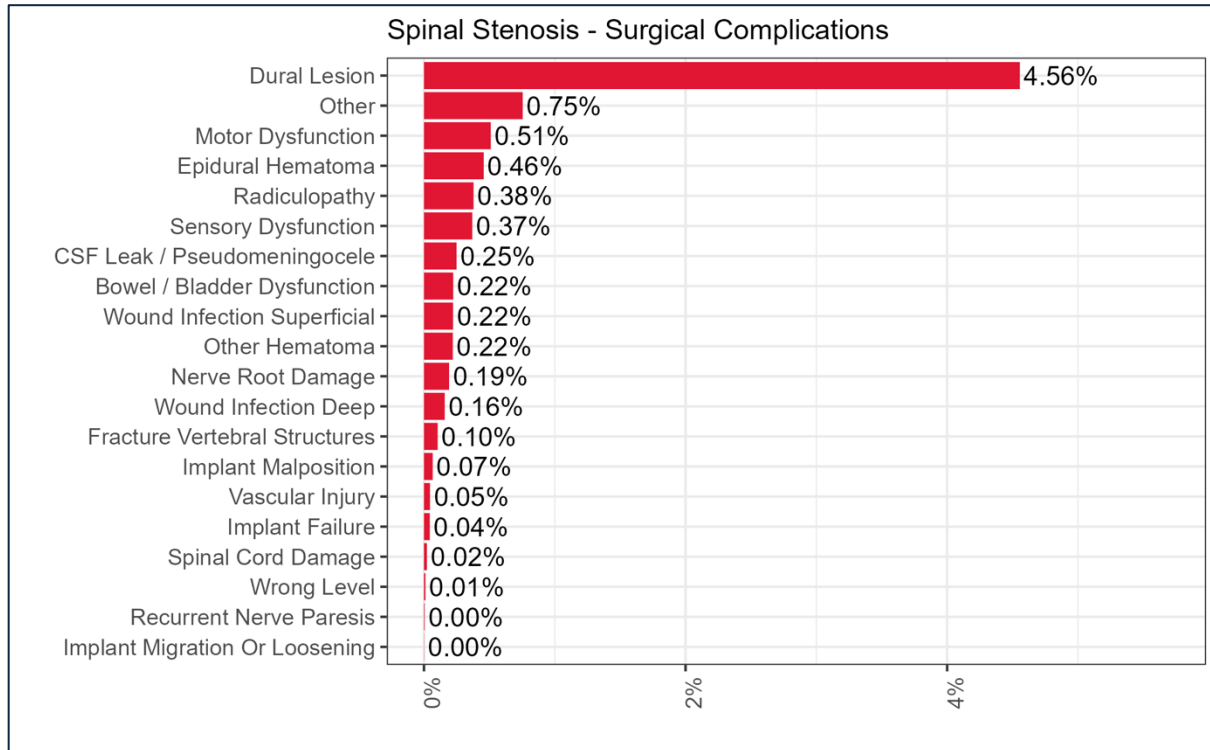


Figure 17. Surgical complications for spinal stenosis cases

OUTCOMES: COMI

In almost every third patient, a baseline COMI form and a 3-month postoperative or a later COMI form were documented. This rate varies considerably between hospitals, depending on whether they collect COMI or not. The following Figure 18 to Figure 20 demonstrates the average preoperative and postoperative axial and peripheral pain levels as well as COMI score with 95% confidence intervals over the last 18 years. The curves were not adjusted by patient characteristics, surgical measures and follow-up intervals, which are assumed to be relatively stable. The figures have a descriptive character only and a conclusive interpretation requires more granular investigations.

Over this time period the preoperative axial pain was rather stable around 6 points, while the postoperative axial pain remained also stable around 3,5 points. Thus, also for spinal stenosis rather stable levels of preoperative and postoperative axial pain were seen.

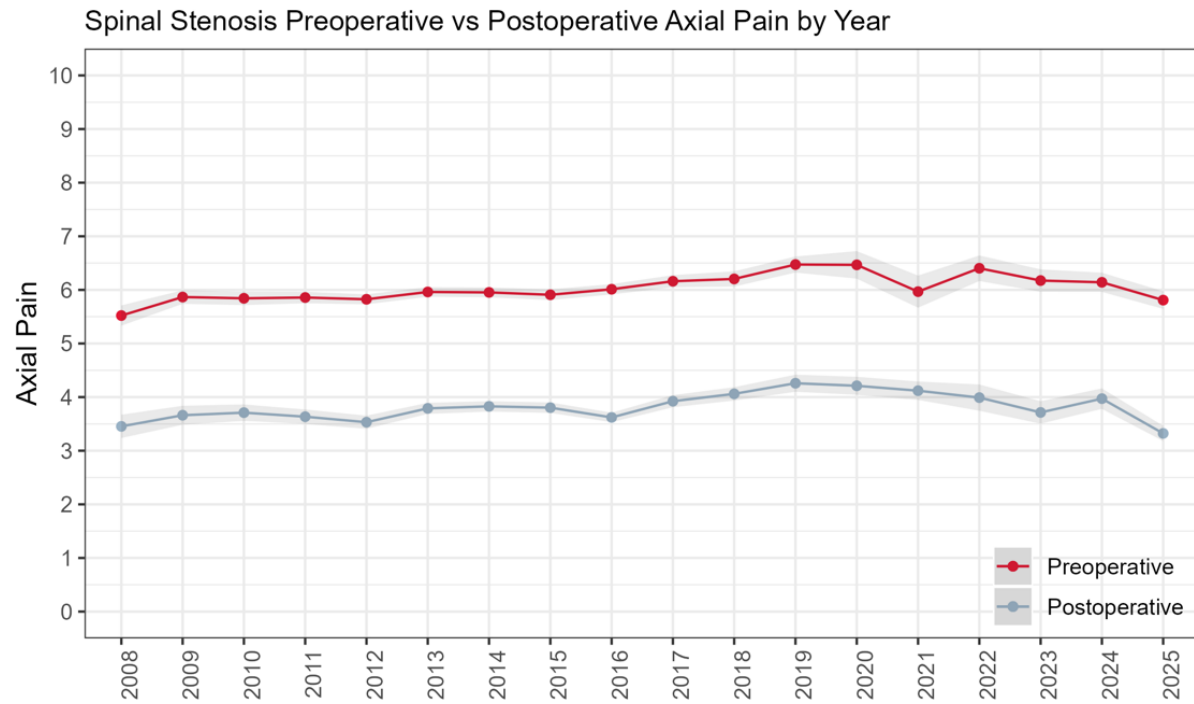


Figure 18. Preoperative and postoperative axial pain in spinal stenosis cases by year

Over this time period the preoperative peripheral pain remains stable between 6,5 and 7 points with one exception in 2019, when it went slightly higher than 7 points. The postoperative peripheral pain remains stable too mostly between 3,5 and 4,0 points.

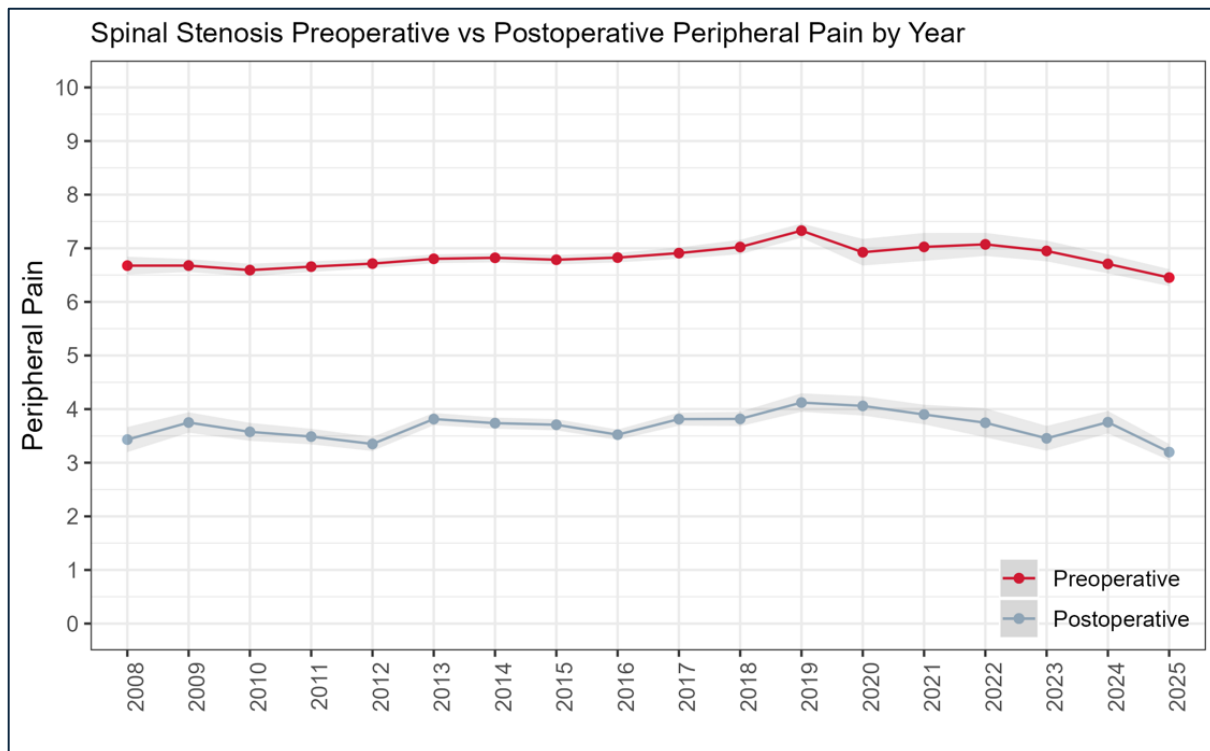


Figure 19. Preoperative and postoperative peripheral pain in spinal stenosis cases by year

Over this time period the preoperative and postoperative COMI scores remained stable around 7,5 and 4,5-5.0 points, respectively.

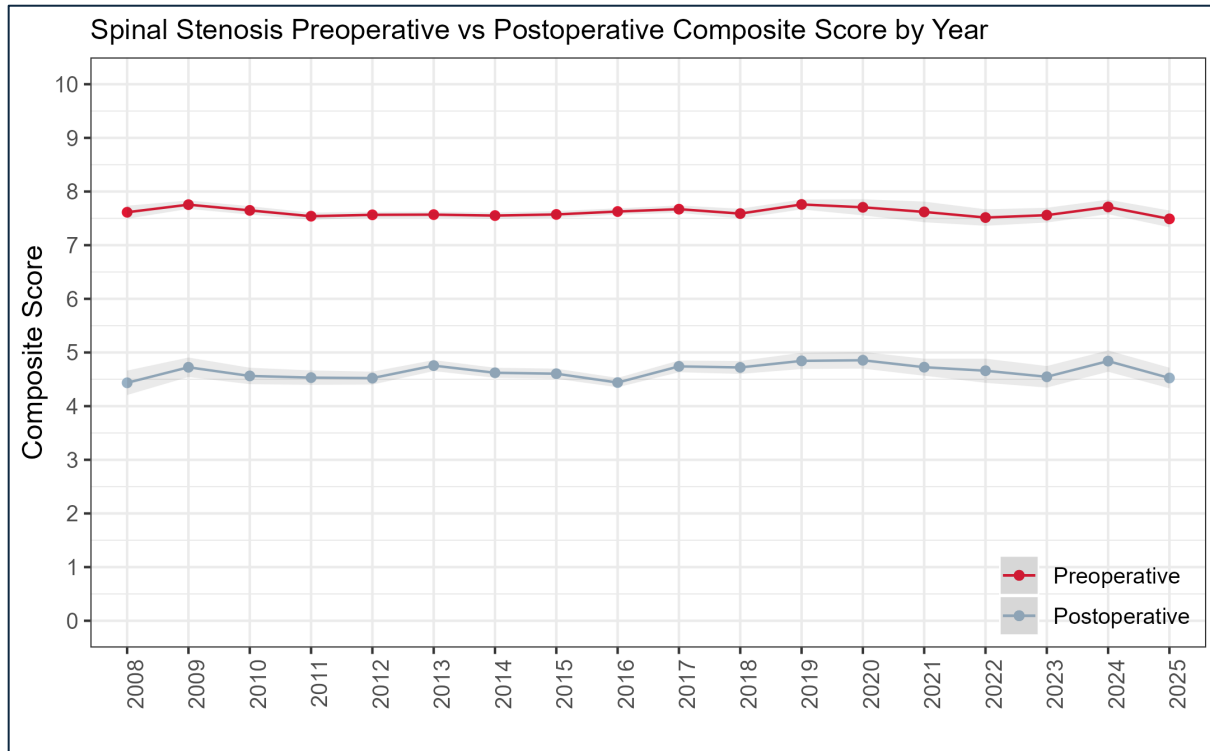


Figure 20. Preoperative and postoperative COMI score in spinal stenosis cases by year

SELECTED RESULTS ON CUMULATIVE REVISION RATES

The Kaplan-Meier (KM) curves for cumulative revisions rates have been calculated and stratified by selected characteristics. The analysis was performed based on the complete registry population of 184,901 surgeries.

The following Figure 21 and Figure 22 demonstrates cumulative revisions rates by age groups and smoking status of the patients.

Looking at the KM curves of age groups at 2 years postoperative, patients older than 70 years of age appears to have the highest cumulative revision rates, while the least rate is seen in patients younger than 50 years of age.

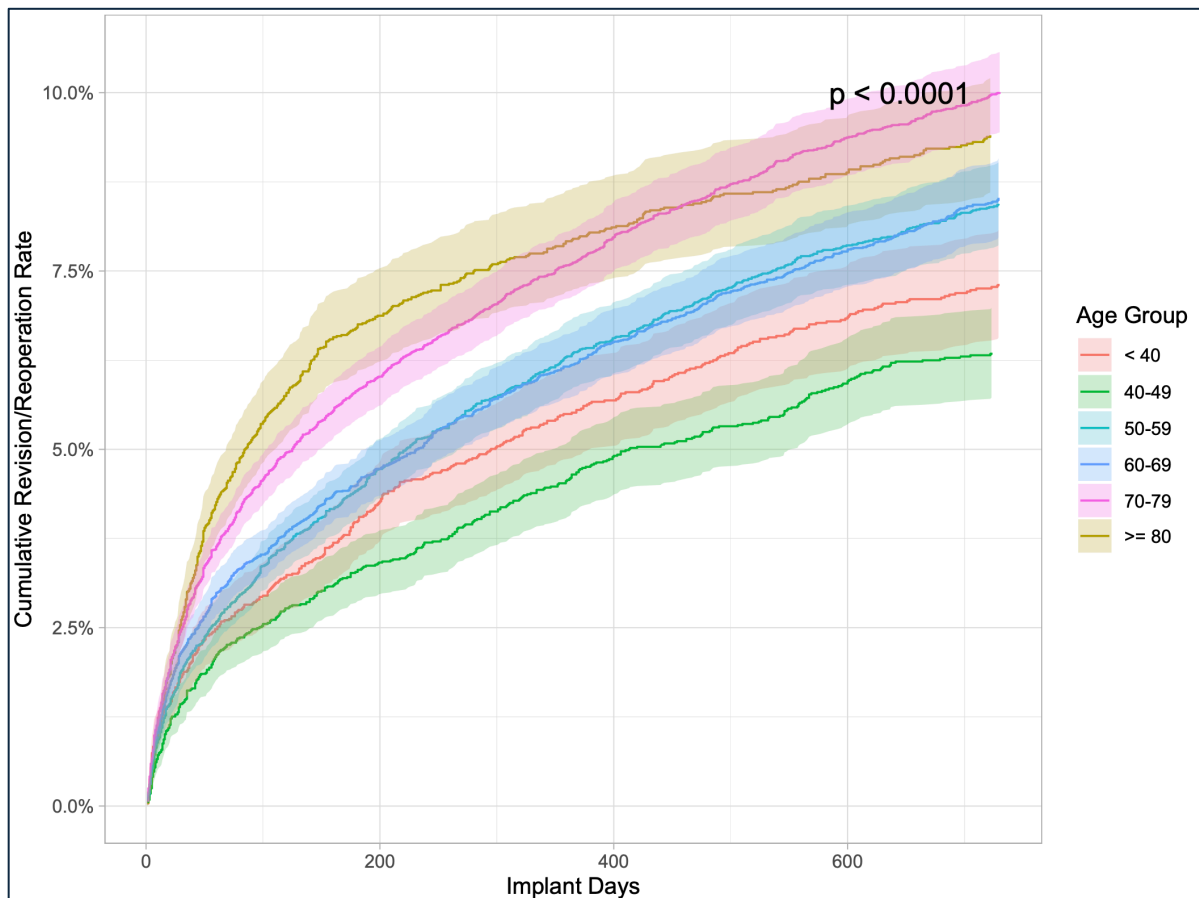


Figure 21. Cumulative revision rate by age group

While the curves for the smoking status “no” and “unknown” are distinct from each other, they both have significantly lower cumulative revision rates at 2 years than the smokers. The “unknown” subgroup seems to be a distinct patient population with an own cumulative revision rate. A more detailed analyses is required to explore the characteristics of this subgroup.

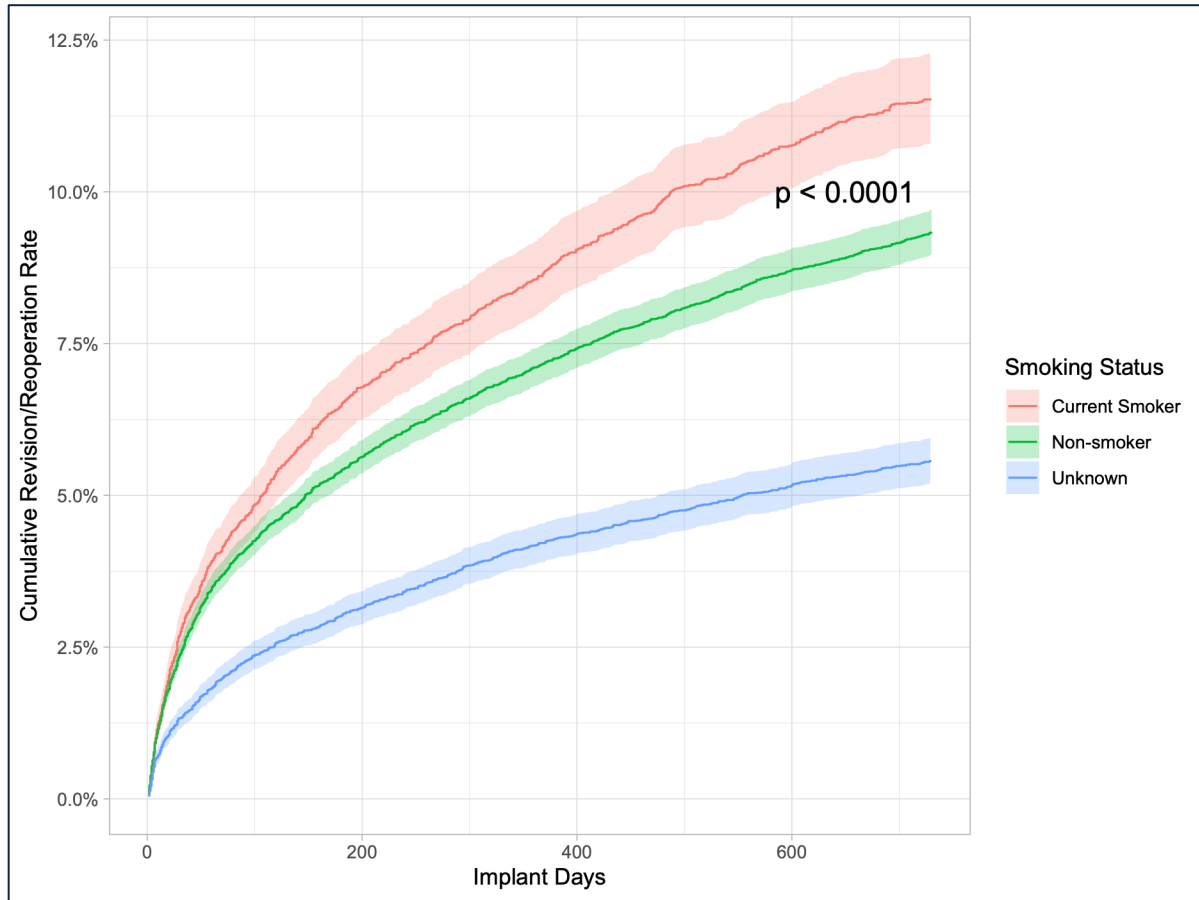


Figure 22. Cumulative revision rate by smoker status

The next Figure 23 demonstrates similar cumulative revisions rates for male and female patients. While the curves are parallel in principle, as slight deviation is seen toward the end of the 2nd postoperative year with female patients having a slightly higher rate.

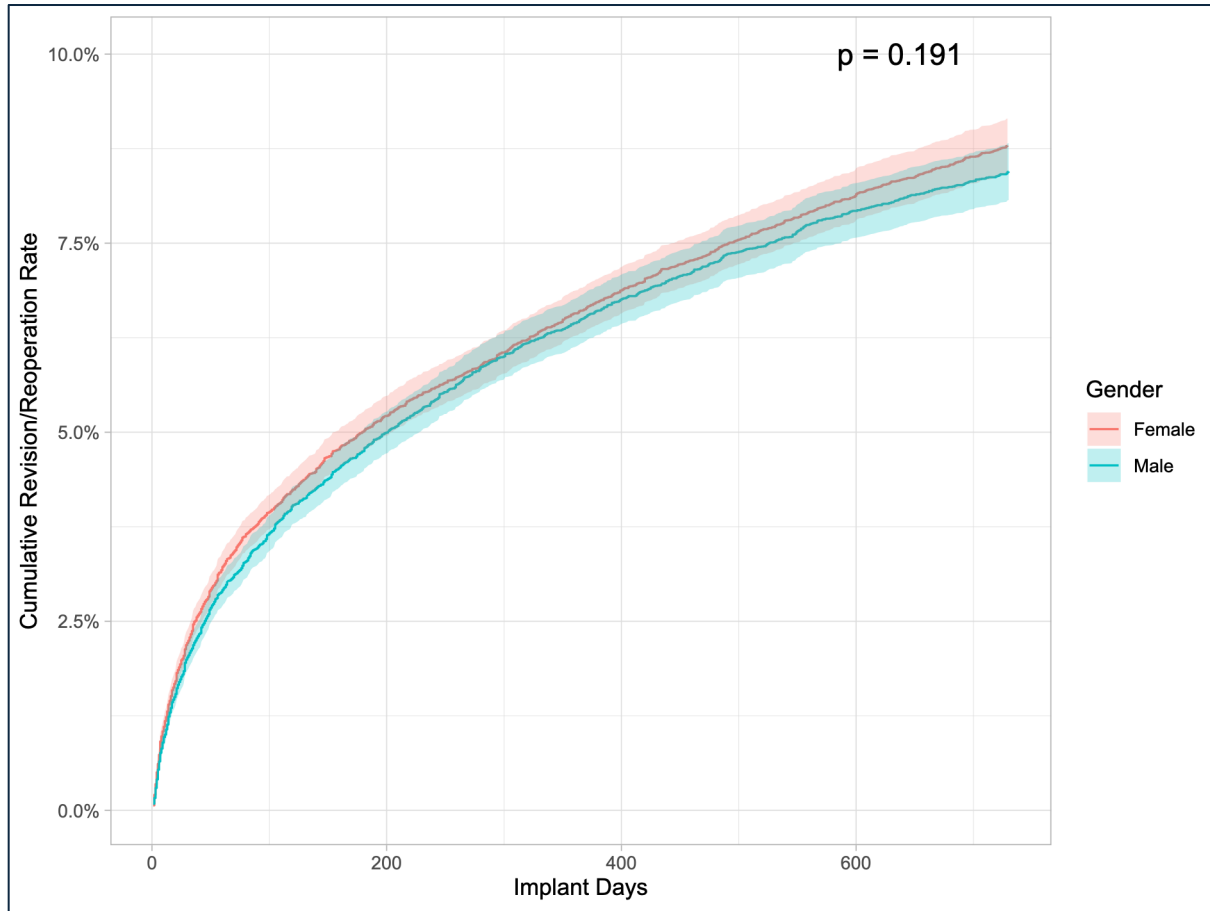


Figure 23. Cumulative revision rate by gender

The following stratification of cumulative revision rates by ASA in the Figure 24 shows a rather expected image with the highest cumulated revision rates for higher ASA. The ASA 5 category is excluded from the analysis due to low numbers.

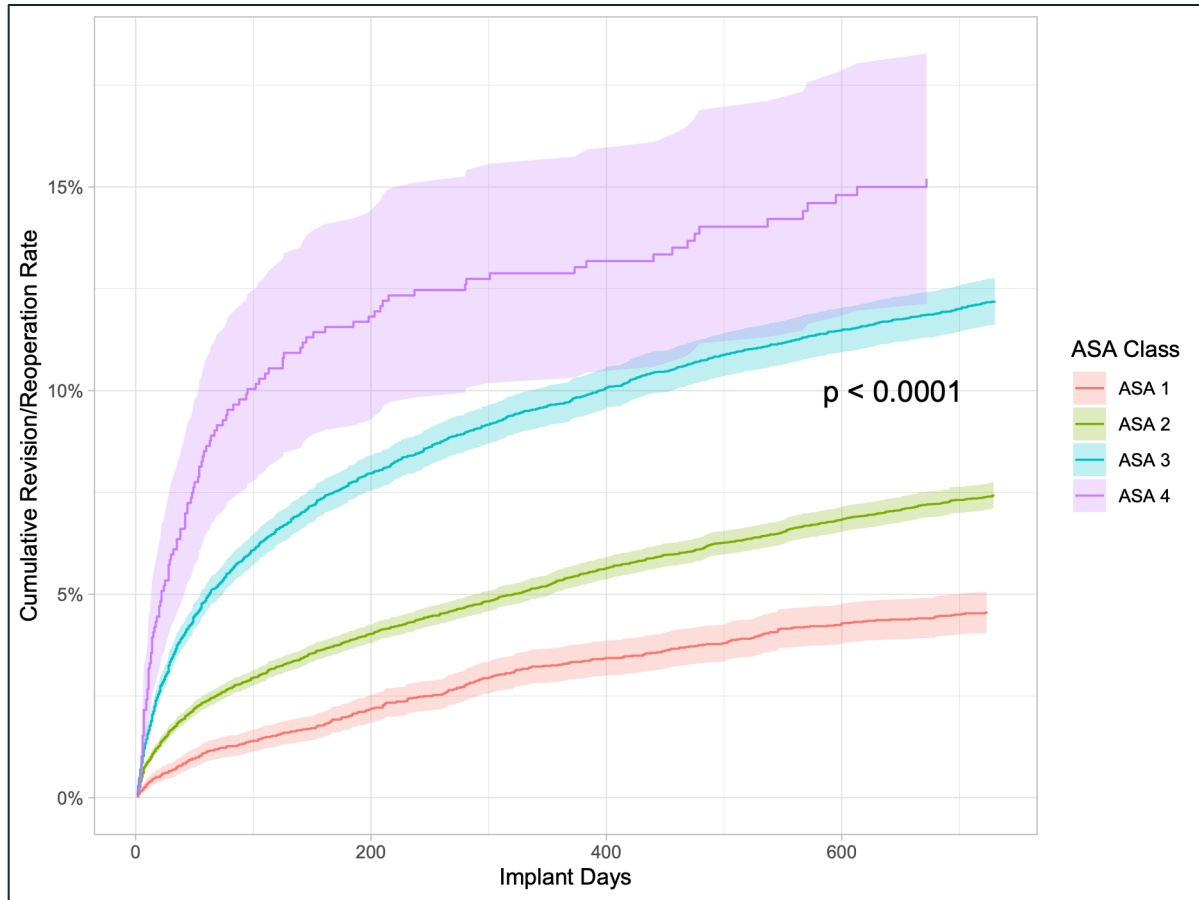


Figure 24. Cumulative revision rates by ASA category

The following Figure 25 shows the cumulative revision rates by Body Mass Index (BMI) group. The lower BMI groups shows lower rates in comparison with the BMI group >35.

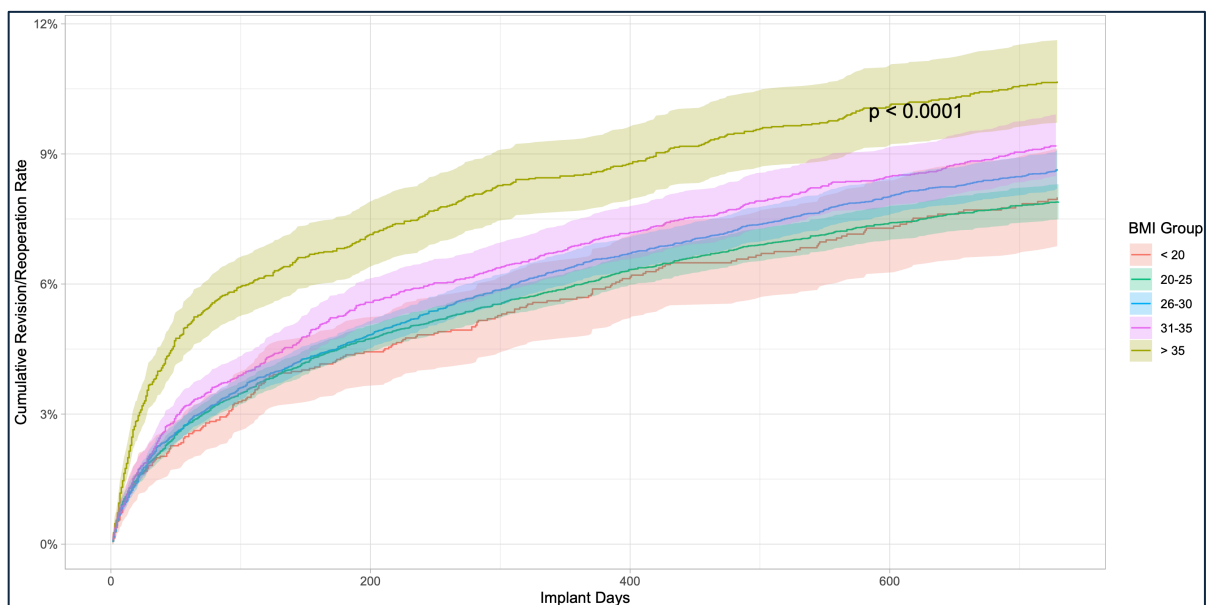


Figure 25. Cumulative revision rates by Body Mass Index (BMI) group

When we look at decompression alone, rigid stabilisation with or without additional surgical measures like fusion (Figure 26) then the subgroup with the rigid stabilisation appears to have significantly higher cumulative revision rate.

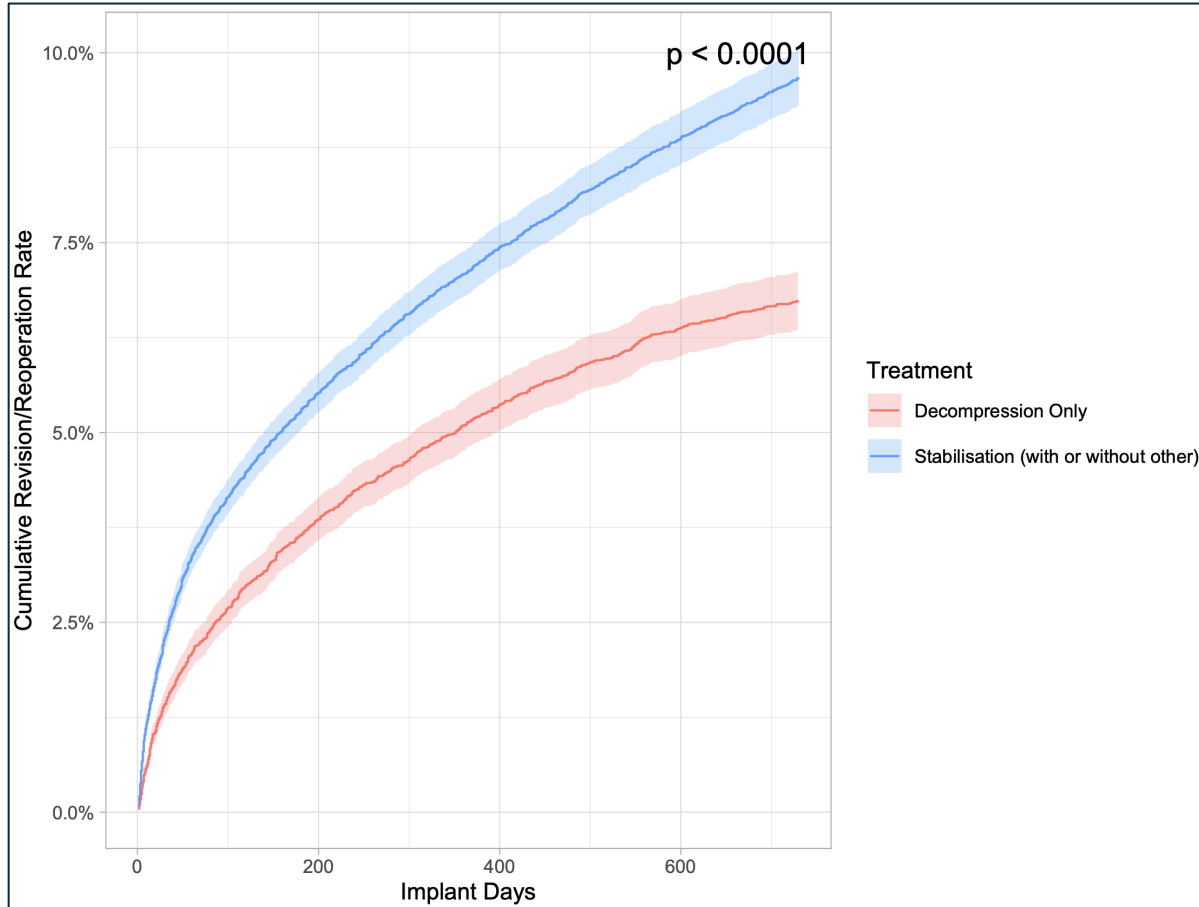


Figure 26. Cumulative revision rate by treatment type

SELECTED RESULTS ON PATIENT SATISFACTION BY COUNTRY AND SURGERY TYPE

The next analysis included all patients with lumbar spinal stenosis who were ≥ 18 years of age and had a preoperative and postoperative COMI form. The analysis assessed level of patient satisfaction (COMI item “Over the course of treatment for your back problem, how satisfied were you with your overall medical care in our hospital?”) with decompression alone and fusion surgeries, while adjusting for the case mix (age, gender, smoker status, ASA, and number of previous surgeries).

The following Figure 27 demonstrates a very similar level of satisfaction with the treatment of spinal stenosis after decompression alone as well as after fusion in the analysed countries.

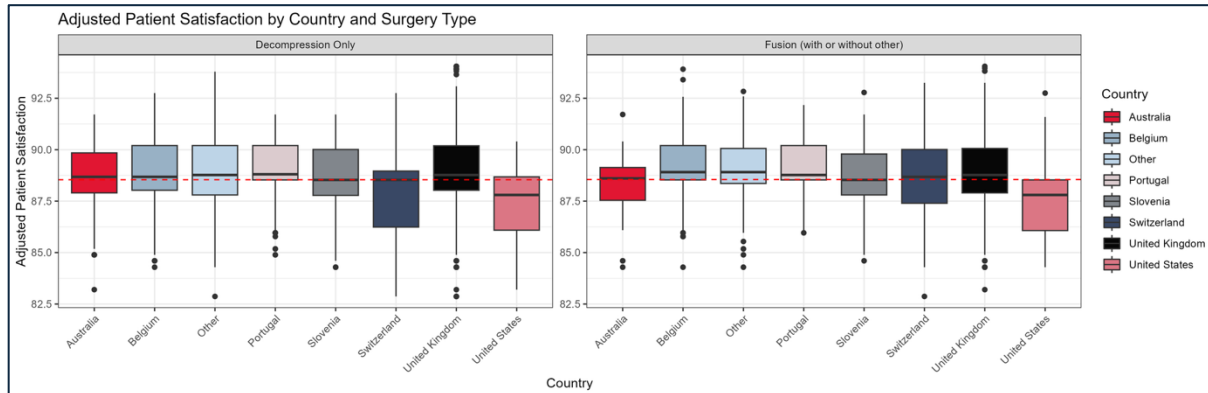


Figure 27. Patient satisfaction by country and surgery type for spinal stenosis

SELECTED RESULTS FROM IMPLANTS DATA ANALYSES

The following analysis demonstrates the revision rates by anonymised implant manufacturer, implant category and implant brand. The Figure 28 revisions with an implant-associated cause (like implant failure or loosening, implant malposition, hardware removal and similar).

The x-axis (horizontal) shows the number of expected revisions. This number of expected revisions is calculated for each implant manufacturer, category or brand, taking into account the total volume of operations, the age of the patients, their gender, smoking status, BMI, ASA category and the number of previous operations. This approach considers the different patient populations in the facilities and allows them to be compared with each other despite differences in patient populations.

The y-axis (vertical) shows the rate of actual revisions observed in relation to the expected revisions. The axis represents the rate of deviation between the observed and expected revisions. If the number of revisions observed is the same as expected, the implant manufacturer, category or brand has a standardised rate of 1. However, if twice as many revisions are observed as would actually be expected in the patient population, the implant manufacturer, category or brand has a standardised rate of 2.

The funnel-shaped control limits 95.0% (orange and light blue) and 99.8% (red and dark blue) of the overall average show the respective confidence interval. The determined number of revisions may fluctuate randomly within this range. The red dot above the control limits indicates an outlier with a significantly higher number of revisions than expected. The dark blue dot below the control limits is a downward outlier with a significantly lower number of dural lesions than expected, which may indicate under-reporting. The points in yellow and light blue between the 95.0% and 99.8% control limits indicate the implant manufacturer, category or brand that are in the borderline range for an outlier.

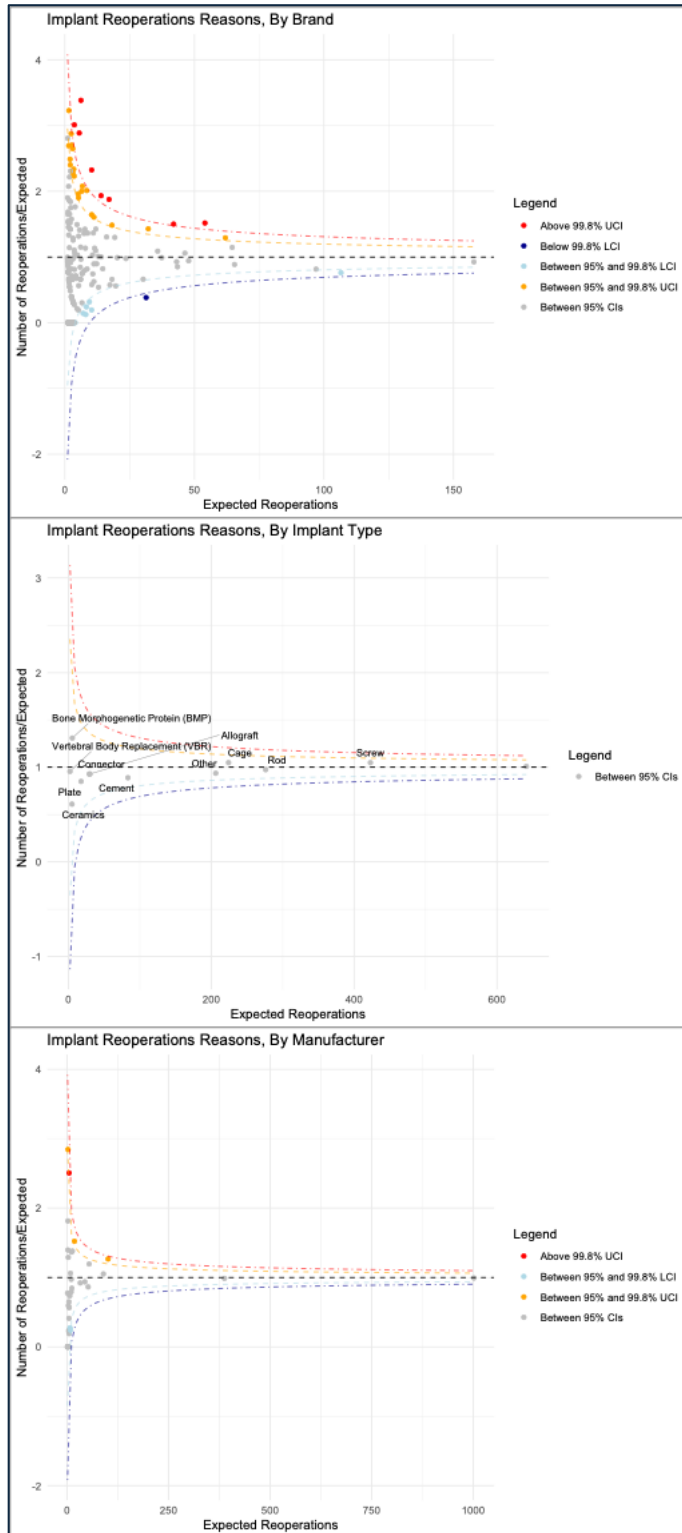


Figure 28. The rates of overall and implant-associated revisions by anonymised implant manufacturer, implant category and implant brand

When considering only the implant-associated causes of revision (Figure 28), some significant outliers become visible: one manufacturer and eight brands. These outliers are regularly assessed and will now be analysed in detail. If the results are reconfirmed, the manufacturers will be involved in a joint assessment.

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"To qualify and re-qualify for certification, EUROSPINE Surgical Spine Centres of Excellence (SSCoE) are required to monitor their treatment quality by collecting and evaluating pre- and postoperative data on all spine patients. EUROSPINE's Spine Tango offers powerful generic and customisable registry tools for the documentation and evaluation of spinal treatments."

Thomas R. Blatter, Past President EUROSPINE, Ingolstadt, Germany

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