



REPORT

2025

Norwegian National Network for Arthroplasty and Hip Fractures

Norwegian Arthroplasty Register
Norwegian Hip Fracture Register
Norwegian Knee Ligament Register
Norwegian Paediatric Hip Register

Helse Bergen HF, Department of Orthopaedic Surgery,
Haukeland University Hospital
<https://helse-bergen.no/nrl>

ISBN: 978-82-91847-30-6
ISSN: 2704-2618 (Printed version)
3084-1046 (Online)

How to cite this report in scientific publications:

Furnes O, Gjertsen JE, Kristensen TB, Inderhaug E, Gundersen T, Hole RM, Krukhaug Y, Dybvik E, Stensvik S, Kvinnesland IA, Mulpuri KA, Solberg M, Fenstad AM. Norwegian National Network for Arthroplasty and Hip Fractures. Annual Report 2025. ISBN: 978-82-91847-30-6. Available at www.helse-bergen.no/nrl

CONTENTS

Introduction	5
Norwegian Arthroplasty Register	
Total hip arthroplasty	9
Knee prostheses	89
Elbow prostheses	195
Ankle prostheses	203
Finger joint prostheses	207
Wrist prostheses	213
Carpometacarpal prostheses (CMC I)	217
Toe joint prostheses	219
Shoulder prostheses	233
Norwegian Hip Fracture Register	285
Norwegian Knee Ligament Register	375
Norwegian Pediatric Hip Register	429
List of publications	494
Surgery forms	506

ANNUAL REPORT 2025

The annual report presents results and descriptive statistics for operations up to and including 2024 from our four registries. For further details, please refer to the preface in each register's individual report.

Results adapted for the public are published annually on June 15 on the website of the Norwegian Advisory Unit for Medical Quality Registries: www.kvalitetsregistre.no. Some of these results are also included in this annual report.

The report is distributed electronically to all orthopedic surgeons in Norway. Printed copies may be requested from the registry. On our website (<http://www.helse-bergen.no/nrl>), all annual reports are available in both Norwegian and English, along with references to scientific articles and conference presentations. Most of the articles are also electronically accessible through the website. We publish most of our results on implants and surgical methods in peer-reviewed scientific journals, where material and methods can be described in detail, and where strengths, limitations, and the implications of our findings can be discussed. Please see the reference list at the end of this report.

Reoperations and Periprosthetic Fractures

Osteosyntheses for periprosthetic fractures where the implant is not replaced should be reported for all joints. Classification of periprosthetic fractures around hip prostheses has been reported to the registry for many years. Classification of periprosthetic fractures around knee prostheses has now also been introduced. In short: **all reoperations** related to a prosthetic joint must be reported, including closed reductions. To enable future validation of such reoperations against the Norwegian Patient Registry (NPR), laterality must be reported to NPR. It is therefore important to ensure that the laterality code **ZXA** is reported to NPR.

Quality and Competence Network

In 2023, the Advisory Unit was renamed to the Norwegian National Network for Arthroplasty and Hip Fractures. This is defined as a professional, interregional collaboration where the partners share responsibility for dissemination of expertise, with one professional environment coordinating activities. The network aims to contribute to equitable high-quality healthcare and to reduce unwanted variation in treatment. Its primary task is to promote knowledge transfer by ensuring that existing and new knowledge from research and quality registries is implemented across all regions. The network also provides professional advice to registry owners and national health authorities. We have appointed four regional partners (nodes): Marianne Westberg (*South-Eastern Norway Regional Health Authority*), Knut Erik Mjaaland (*South-Eastern Norway*), Lars Gunnar Johnsen (*Central Norway*), and Cato Kjærvik (*Northern Norway*). Their work is already well established.

Quality Improvement

We encourage active use of data from the national quality registries in both small- and large-scale quality improvement projects at hospitals. To meet the authorities' requirements that registry data should be applied in improvement efforts, an annual reporting form will be distributed to contact persons at each hospital. The form will collect information on local projects where registry data has been used.

Registry-Based Randomized Controlled Trials (R-RCTs)

We would like to highlight our ongoing registry-based randomized controlled trials (R-RCTs). These studies are organized so that once patients have been included and operated on, follow-up is managed by the registry, requiring no additional work for either patient or surgeon. The ALBA study, in which patients undergoing primary total knee arthroplasty (TKAs) are randomized to bone cement with or without antibiotics, began inclusion in January 2021. As of April 30, 2025, a

total of 4,896 TKAs had been included. We aim for inclusion of 9,172 TKAs, and we encourage all hospitals to participate in inclusion and for those already participating to increase the proportion of knee replacements included.

The Norwegian Knee Ligament Register is conducting an R-RCT where patients are randomized to either early surgery or active rehabilitation—with the option to cross over to later surgery. All major hospitals in Norway are participating. The first patient was included in May 2021, and we are now collecting 2-year follow-up data for the first inclusions. Patient recruitment is expected to be completed in 2025.

Hospital Reports

Hospital-specific annual reports, containing data from each individual hospital, will, as in previous years, be sent electronically to our hospital contacts and to the CEOs of each health trust during October. We encourage contacts to share the reports with their administration and staff, and to verify that the number of registered procedures and the data is correct. The reports should be used for local quality improvement. Any errors in the hospital-specific reports should be reported to us.

Completeness of reporting

The completeness of reported procedures is published every two years for each registry. Hospitals with low reporting rates must review their reporting procedures. Some hospitals have low reporting rates for revision surgeries.

Electronic Reporting in MRS

For the Norwegian Knee Ligament Register, paper forms for reporting were discontinued as of January 1, 2024.

In 2024, **67%, 58%, 99%, 82%, and 92%** of all primary elbow, ankle, shoulder, knee, and hip arthroplasties, respectively, were reported electronically directly through the MRS solution. We aim to implement electronic reporting for hand/wrist, finger, and toe arthroplasties during autumn 2025/winter 2026.

In the **Pediatric Hip Register**, all patients are recorded electronically by the surgeons. We highlight that hip surgeries in adults related to pediatric hip disorders (osteotomies, arthroscopic procedures, open joint-preserving surgeries) should be reported in the Pediatric Hip Register.

For the **Hip Fracture Register**, a digital operation form in MRS was introduced in 2022, and almost 90% of surgical forms from surgeons were digitally registered in 2024. We encourage all hospitals to transition to electronic registration. The new digital discharge form was introduced in 2023, but so far, few hospitals report discharge data to the registry. This form will serve as the basis for several new quality indicators, and we hope that more hospitals will adopt it. The form does not necessarily need to be completed by an orthopedic surgeon; at some hospitals, nurses or administrative personnel complete it. See the preface to the Hip Fracture Register for more information.

We have engaged a consultant responsible for training hospital staff in digital registration and PROM (Patient-Reported Outcome Measures) reporting. Instructions available <http://www.helse-bergen.no/nrl>).

PROM Reporting

Digital registration of patient-reported outcome measures (PROM) for hip, knee, and shoulder arthroplasties has been implemented at 49 hospitals, while 2 hospitals use their own solutions to export data to the registry. The proportion of completed preoperative PROM questionnaires remains low, with a slight increase from 2023 to 2024: from 46% to 47% for primary knee arthroplasties, 41% to 45% for primary hip arthroplasties, and 36% to 37% for primary shoulder arthroplasties. This topic

was addressed at the Norwegian Orthopaedic Association's Autumn Meeting Symposium in 2024, and we urge hospitals to facilitate the collection of preoperative PROM data from patients undergoing hip, knee, shoulder, elbow, and ankle arthroplasty. The goal is for all patients at all hospitals to complete PROM questionnaires prior to surgery. Please ask your patients before surgery whether they have completed the digital PROM questionnaire. Patients will automatically receive PROM questionnaires via Helsenorge.no at 1, 6, and 10 years postoperatively. The advisory board has approved 80% preoperative PROM registration as a benchmark for good performance at individual hospitals. This is published as an indicator on the hospital dashboard. Only six hospitals achieved this target in 2024, indicating that most hospitals still have work to do.

PROM questionnaires for hip fracture patients are sent out by the registry at 4 months, 1 year, and 3 years after surgery. It is now also possible for digitally active patients to complete these electronically via Helsenorge.no. For ACL patients, preoperative questionnaires are completed, and PROMs are sent out at 2, 5, and 10 years postoperatively. Since 2023, an extended self-registration of activity level—both desired and actual participation before and after treatment—has been introduced. We refer to the Norwegian Knee Ligament Register report for the first published epidemiological data on this topic.

Consent

We would like to remind all hospitals that the Norwegian Data Protection Authority requires that consent forms be signed by patients before procedures are reported to the registries, and that these forms are stored in a secure archiving system.

Since 2021, the Hip Fracture Register has been approved as a registry with an opt-out model, meaning patients are not required to sign a written consent form. However, an information leaflet about the registry must be distributed to patients. Hospitals must ensure that the opt-out option is genuine and that patients are properly informed about registration in the Hip Fracture Register.

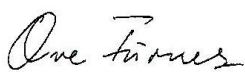
Website and social media

The Network and associated registries have their own website: <http://www.helse-bergen.no/nrl>, and a dedicated Facebook page: <https://www.facebook.com/leddregisteret/>, which we encourage everyone to visit and follow. A QR code linking to these pages is available on the back of this year's report. These platforms will be used to share information about published studies and other important updates from the registries.

Thank You!

We extend our gratitude to all orthopedic surgeons across the country for their excellent reporting to the registries. We also appreciate the valuable collaboration with registry contacts at each hospital, the Advisory Boards, the Regional Nodes, the Norwegian Orthopaedic Association, Helse Bergen, Western Norway Regional Health Authority, Central Norway Regional Health Authority, Northern Norway Regional Health Authority, South-Eastern Norway Regional Health Authority, the Norwegian Advisory Unit for Medical Quality Registries at SKDE and the Regional Centre for Clinical Quality Registries in Western Norway Regional Health Authority, Central Norway Regional Health Authority's IT department (HEMIT) and Western Norway Regional Health Authority's IT department, equipment suppliers, the University of Bergen, the Norwegian Patient Register (NPR), the Norwegian Institute of Public Health, the Directorate of Medical Products (DMP), the Norwegian Directorate of Health, and the Ministry of Health and Care Services for their collaboration and support.

Bergen, June 2025



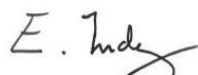
Ove Furnes
Senior Consultant Ortho Surgeon
Professor
Head of National Network
Head of Arthroplasty Register
Responsible for knee arthroplasties



Jan-Erik Gjertsen
Senior Consultant Ortho Surgeon
Professor
Head of Hip Fracture Register



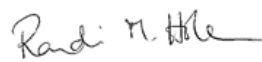
Torbjørn Kristensen
Consultant Ortho Surgeon
Responsible for hip arthroplasties



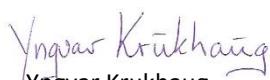
Eivind Inderhaug
Consultant Ortho Surgeon
Professor
Head of Knee Ligament Register



Trude Gundersen
Consultant Ortho Surgeon
Associate professor
Head of Paediatric Hip Register



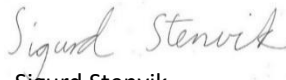
Randi Margrete Hole
Senior Consultant Ortho Surgeon
Responsible for shoulder



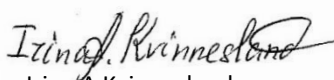
Yngvar Krukhaug
Consultant Ortho Surgeon
Associate professor
Responsible for elbow/hand/finger



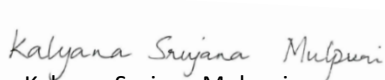
Eva Dybyvik
Biostatistician/researcher



Sigurd Stenvik
Biostatistician/researcher



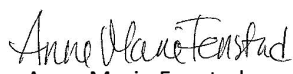
Irina A Kvinnesland
IT consultant



Kalyana Srujana Mulpuri
IT consultant



Mikal Solberg
Consultant



Anne Marie Fenstad
Biostatistician/researcher
Deputy Head National Network

CONTENTS

Norwegian Arthroplasty Register

Total Hip Arthroplasty (THA)

Highlights from 2024	10
Introduction.....	11
Survival of total hip prostheses, fixations.....	15
Survival of total hip prostheses, approach/articulation/head sizes	18
Survival curves for all hospitals individually	20
One stage bilateral THA operations.....	21
Fixation for women over 75 years.....	21
Number of primary operations in hip 2024.....	22
Percentage non-revised patients two years after operations.....	23
Percentage non-revised patients ten years after operations	25
Durability of THA 2013-2024.....	28
How to interpret the THA results.....	29
Portion of women over 75 years with cemented stem in 2024	30
Portion of patients with wear resistant cup materials in 2024.....	31
Portion of patients with antibiotic prophylaxis as given by the guidelines in 2024..	32
Portion of patients receiving well documented hip stem in 2024.....	33
Portion of patients receiving well documented hip cup in 2024	34
Registration by format in 2024	35
Annual numbers of THA.....	37
Incidence and status of THA	38
Reasons for primary operations	39
Crowe classification	39
Age by year of operation	40
Reasons for revisions.....	41
Type of revision	44
Bone transplantation in revisions	45
Bone loss in revisions	46
Surgical approach	47
Fixation in primary operations	49
Fixation in revisions.....	51
Type of fixation and bone transplantation in revisions	52
Bone cements	53
Cemented primary prostheses	54
Uncemented primary prostheses	55
Hybrid primary prostheses	56
Acetabular implants.....	57
Femoral implants.....	59
The 7 most used implants at primary operations the last 5 years	61
Femoral head diameter	62
Dual Mobility articulation	63
ASA classification.....	63
Articulations.....	64
Vancouver classification.....	65
Thrombosis prophylaxis	66
Use of drain	67
Joint gap.....	67
Suture technique	68
Fibrinolysis inhibitor.....	69
Duration of surgery.....	70
PROM in the hip arthroplasty register	72
PROM for all hospitals individually.....	74
Completeness analysis 2021-2023.....	87



Hip prostheses



Primary operations
Revisions

Reported
1987-2024

261,039
39,761

Reported
in 2024

11,337
1,096

Completeness

94.5%

Primary operations

86.5%

revisions

19

Published
Papers



2

PhDs



23

Podium
Presentations



60

Hospitals reported

99%

Of the hospitals



Research

Periprosthetic joint infections

We studied trends of surgical site infection and periprosthetic joint infection after primary total hip arthroplasty in two national health registers 2013-2022.



Find us:

<https://helse-bergen.no/nrl>

<https://www.facebook.com/leddregisteret>

[Nasjonalt servicemiljø for medisinske kvalitetsregistre](#)

Results and activities

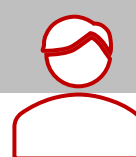
Quality indicators

- 96.1% 10-years survival
- 95.5% well documented cups
- 100% well documented stems
- 92.8% wear resistant cup materials
- 89.5% proportion of cemented stems in women >75 years



ePROM

electronic patient reported data



17,766

pre-op
ePROM

51

Participating
hospitals

19,509

post-op
ePROM

ANNUAL REPORT HIP ARTHROPLASTIES

There has been a steady increase in the number of hip arthroplasties year by year, and in 2024, for the first time, more than 11,000 primary hip arthroplasties were performed in Norway. The incidence of hip arthroplasty is slightly increasing, but the calculation does not consider changes in the population; a larger proportion of the population is now in the “arthroplasty age group.”

In 2024, a total of 12,830 hip arthroplasties were reported: 11,337 primary procedures, 1,096 revisions, 153 reoperations, and 244 closed repositions. The Hip Arthroplasty Register has now surpassed 300,000 registrations in total.

Over the past year, the proportion of revisions has fortunately decreased to less than 9% (compared to 14% in 2015). The likely reason for this is that Norwegian hospitals and surgeons have made good choices over the past 10–15 years. Implants that were shown to have poorer results (most recently the cemented Reflection cup without cross-linked polyethylene and the Titan stem) were discontinued more than 15 years ago, and most patients who received these implants and developed problems (early loosening and/or wear) have now either been revised or are deceased. Most suppliers have also adopted more durable cross-linked polyethylene, which has further reduced wear, loosening, and revisions. We conduct annual reviews of the results for all implants used in Norway and have not identified any new implants with poor outcomes. Hip arthroplasties are considered well-documented when implant survival exceeds 95% at 10 years. In 2024, 100% of patients in Norway received well-documented stems and 95.7% received well-documented cups. At the same time, we encourage surgeons to contribute to innovation and the development/trial of new methods, but this should take place in a controlled setting (research, quality projects) so that outcomes are monitored, and not unnecessarily many patients are exposed to a method before the results are known.

The results of hip arthroplasty are good. Patients operated with a primary arthroplasty in the period 2012–2024 have an estimated 10-year implant survival of 96.1% (Figure A.31). Differences between hospitals are small. Some hospitals score lower, and these should review their results to assess whether anything can or should be changed. We are available to provide data to assist in this process.

SURGICAL TRENDS:

- **Periprosthetic fracture.** While the overall number of revisions after hip arthroplasty has decreased, reoperation or revision due to periprosthetic fracture has increased in recent years. In 2024, 278 cases were registered compared with 259 the year before.
- **Surgical approach.** 74% are operated using a posterior approach, 22% with direct anterior or anterolateral. A direct lateral approach was used in 107 patients (0.9%). The posterior approach also dominates in revisions (72%).
- **Head size.** 32 mm is the standard, but 36 mm is clearly increasing and is now used in 30% of those receiving a conventional articulation. Larger head sizes are practically not used.
- **Fixation.** There is increased use of uncemented cups, mainly due to the rising popularity of the classic hybrid (cemented stem and uncemented cup), which accounted for 30% in 2024. Among women over 75 years, uncemented stems were used in 10%. This latter group should generally receive a cemented stem.
- **Articulation.** Metal heads against cross-linked polyethylene dominate. About 15% receive a ceramic head.
- **Dual mobility articulations.** These are increasingly used in primary arthroplasty and were applied in 12% of primary operations in 2024. The use of modular DM cups is particularly

increasing. The modular DM concept is new and not very well documented, and caution is therefore advised. Conventional DM cups have shown results comparable to standard articulations in NARA studies with medium-term follow-up.

All hospitals now report either fully or partially electronically, through the MRS or by exporting data from their own registration system. The electronic form collects essentially the same information as the former paper form, with a few exceptions:

1. **All reoperations related to the arthroplasty must be reported**, including those that do not involve exchange or removal of the implant.
2. **Closed reposition of prosthesis dislocations** must also be reported, only a very simplified registration form is completed.
3. **We now collect data on joint space**; 70% of patients had <2 mm joint space in 2024.
4. **We register the method of skin closure**; 38% used continuous skin suture, 25% intracutaneous suture, and 21% staples.
5. **We register whether screws are used in uncemented cups**, and if so, how many. The screws should not be scanned.
6. **We register the use of a cement restrictor/plug**, and this must be scanned.

PROM registration is still incomplete. We ask hospitals to facilitate the registration of preoperative PROM. The simplest way to achieve this is to send the PROM questionnaire together with the invitation to surgery, so that the patient completes it before attending the preoperative assessment. PROM follow-up after surgery is handled automatically through the MRS, and helsenorge.no. If assistance is needed with the organization of preoperative PROM collection, please contact the register (Mikal; +47 905 83 174). A broader selection of PROM results is presented in this report, also at the hospital level.

PUBLICATIONS 2024/25

Terjesen T and Wensaas A reported good long-term outcomes in 50% of hips with mild and moderate chronic slipped capital femoral epiphysis treated with *in situ* fixation. The study included 93 hips followed for 50 years. *JB JS Open Access*. 2025 Apr 18;10(2):e24.0012.

Furnes O and Fenstad AM co-authored an article in *Nature*. The Norwegian Arthroplasty Register contributed by identifying individuals with osteoarthritis who underwent joint replacement surgery in the HUNT Study (the Nord-Trøndelag Health Survey), as well as by providing genetic data from a cohort of patients with loose and stable hip arthroplasties. The study highlights many existing drugs that could theoretically be repurposed for osteoarthritis, though clinical trials are, of course, required first. In addition, the findings open possibilities for developing new drugs based on the results. The study also provides valuable insights into the biological processes underlying the development of osteoarthritis. Work on this study began in 2008—demonstrating that such research takes time.

Lutro O et al demonstrated that administering four doses of systemic antibiotic prophylaxis did not reduce the risk of prosthetic joint infection compared with 1 to 3 doses in primary joint replacement surgery. Cefazolin (a first-generation cephalosporin) with the longest half-life showed the lowest risk of infection. *Acta Orthop*. 2025 Mar 4;96:217–225.

Karlsen ØE et al reported a decline in surgical site infections and reoperations for prosthetic joint infection between 2013 and 2022. They also showed excellent completeness of 95% for reporting 30-day reoperations due to infection to the Norwegian Arthroplasty Register, compared with the

mandatory NOIS (Norwegian Surveillance System for Antibiotic Use and Healthcare-Associated Infections). *J Hosp Infect.* 2025 May;159:148-155.

Pakarinen O et al found in a NARA study that articulations with metal-on-crosslinked polyethylene, ceramic-on-crosslinked polyethylene, and ceramic-on-ceramic bearings showed comparably high implant survival rates for up to 10 years, and all can be considered safe alternatives. *J Arthroplasty.* 2025 Feb;40(2):437–442.

Roerink AMC et al reported that men have a higher risk of revision due to infection than women after primary hip, knee, and shoulder arthroplasty. No difference was found for ankle replacements. These elevated relative risks persisted in fully adjusted analyses and throughout the 10-year postoperative follow-up in a study including 4,800,000 implants. *Acta Orthop.* 2024 Dec 10;95:730–736.

Rognsvåg T et al showed that approximately one-third of THA/TKA patients have low digital health literacy (eHL), and low eHL was associated with poorer quality of life. *Acta Orthop.* 2024 Nov 25;95:677–684.

French JMR et al reported that national hip and knee arthroplasty registries show generally excellent hospital coverage (complete in 10 of 14 registries) and completeness of reporting (96.5% for primary procedures and 88.5% for revisions) over the past two decades. *Acta Orthop.* 2024 Nov 18;95:654–660.

Venäläinen MS et al compared different machine learning strategies based on 262,356 observations from the Nordic Arthroplasty Register Association (NARA) dataset. *ACR Open Rheumatol.* 2024 Oct;6(10):669–677.

Hals OM et al studied attitudes toward physical activity in people in Norway with primary total hip or knee arthroplasty. *Fysioterapeuten.* 2024 Aug 20.

Nordbø JV et al found that most THA patients reported a level of leisure-time physical activity that met general physical activity recommendations. THA patients were more physically active in their leisure time than a control group representing the general population. *Acta Orthop.* 2024 May 30;95:268–274.

Kirkeboe RL et al found that total hip arthroplasty (THA) after acetabular fracture can be performed with acceptable implant survival, although with an increased risk of revision compared with primary osteoarthritis. The results also indicate that prior operative fracture treatment does not increase the risk of THA revision compared with nonoperatively treated cases. *Hip Int.* 2024 May;34(3):396–401.

Gjertsen JE et al reported that the Quality Improvement Project resulted in a significant increase in the use of cemented stems and a reduced risk of reoperations and revisions. *Acta Orthop.* 2024 Feb 23;95:130–137.

Thanks for excellent reporting!

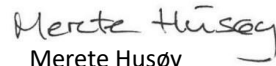
Bergen, June 2025



Torbjørn Kristensen
Surgeon
Responsible Hip arthroplasty



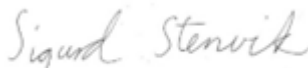
Anne Marie Fenstad
Biostatistician



Merete Husøy
Consultant



Irina A. Kvinnesland
It-consultant



Sigurd Stenvik
Biostatistician



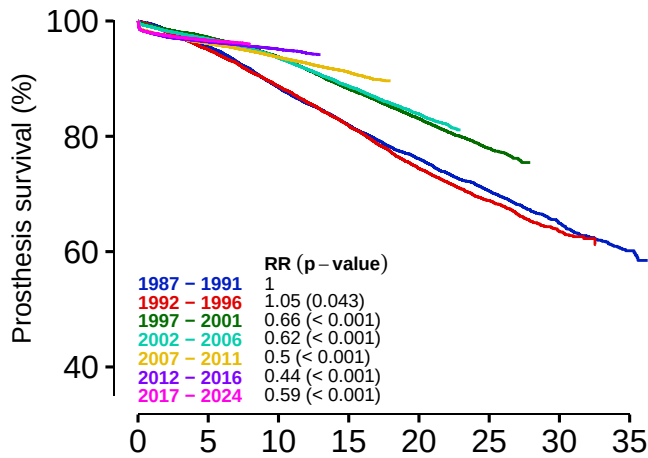
Kalyana Srujana Mulpuri
It-consultant

Survival of total hip prosthesis

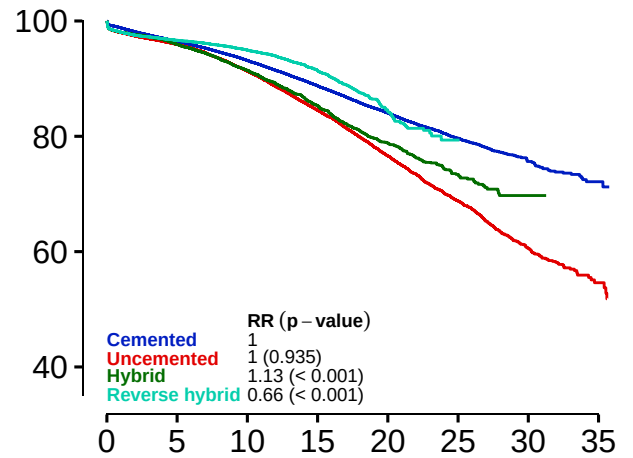
1987–2024

Norwegian Arthroplasty Register

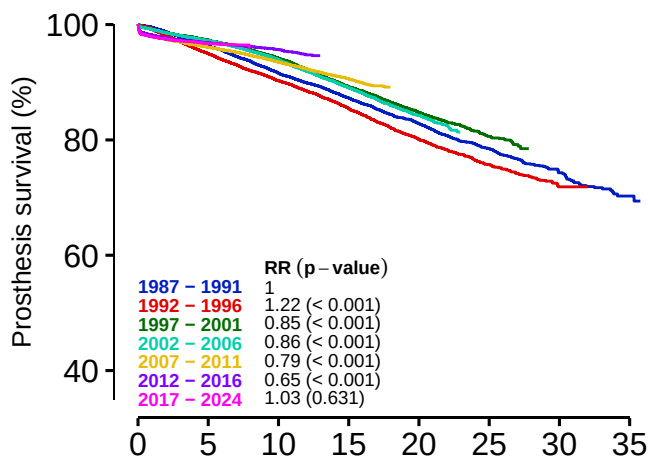
A.1) All



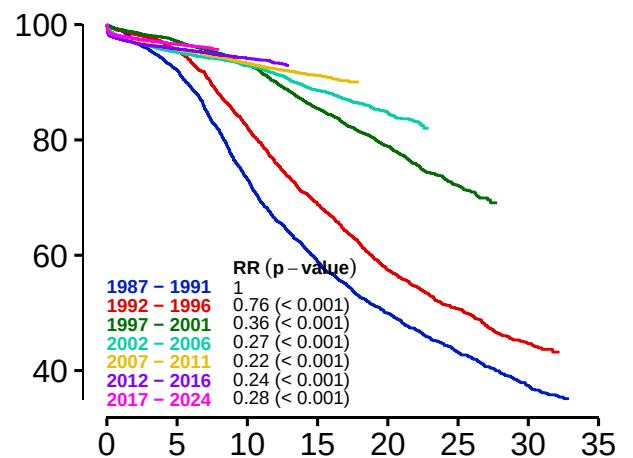
A.2) Fixation



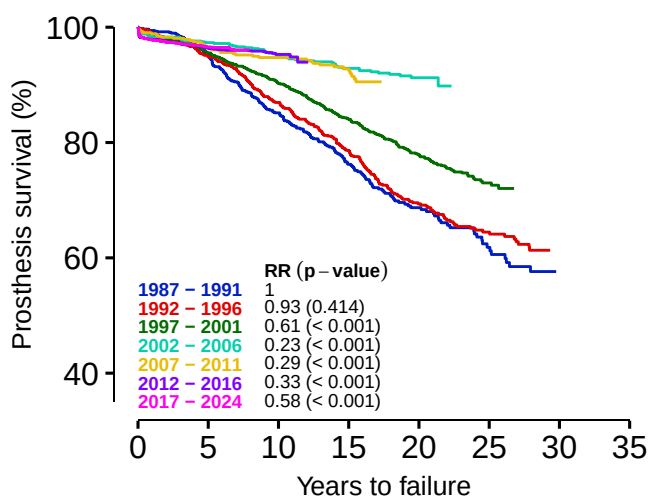
A.3) Cemented



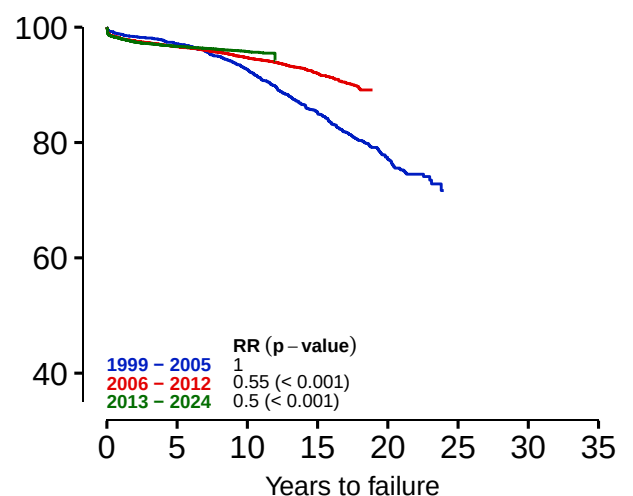
A.4) Uncemented



A.5) Hybrid



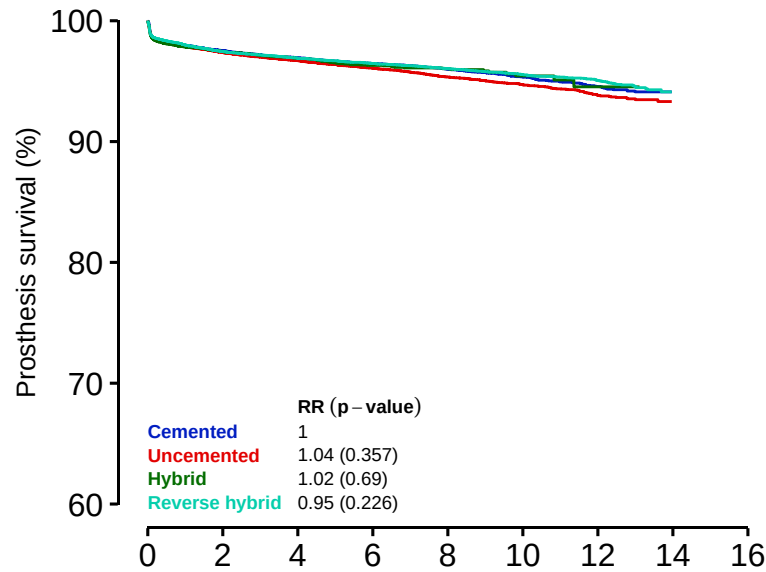
A.6) Reversed hybrid



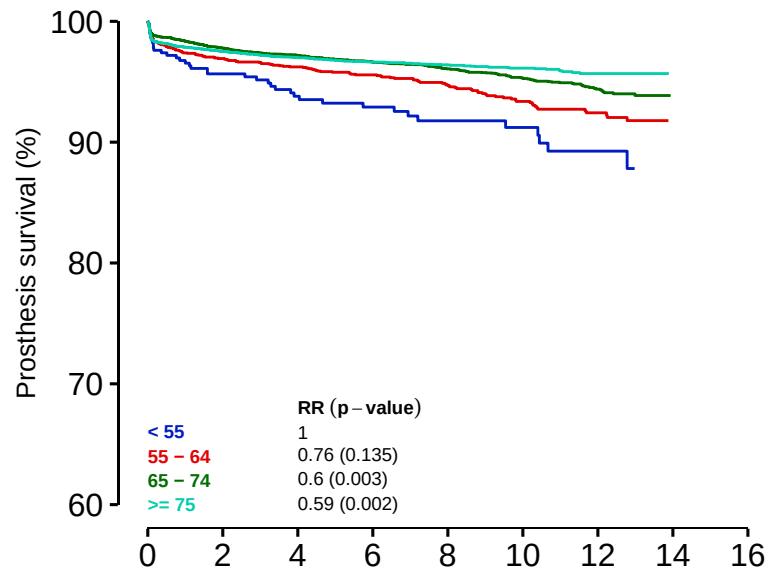
Survival of total hip prosthesis

2011–2024

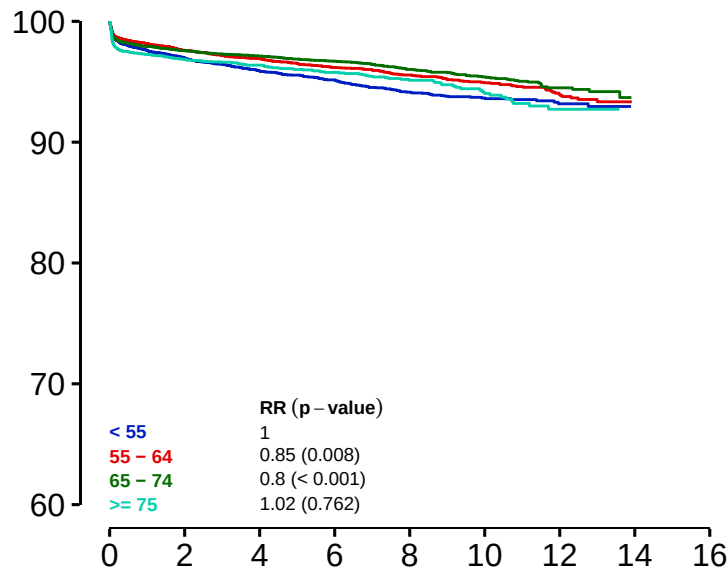
A.7) Fixation



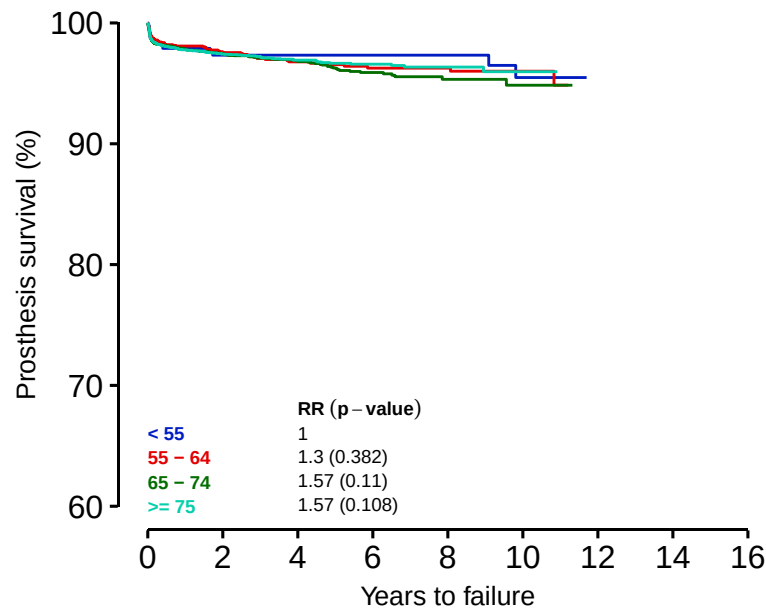
A.8) Cemented



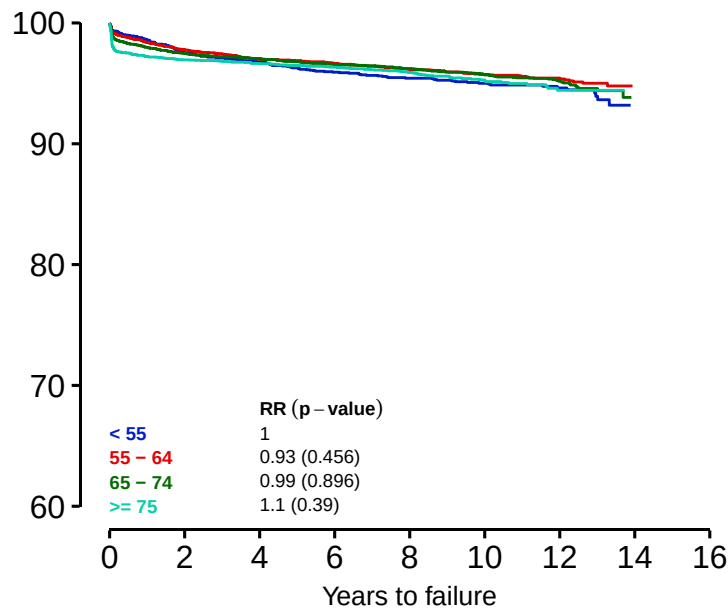
A.9) Uncemented



A.10) Hybrid



A.11) Reversed hybrid

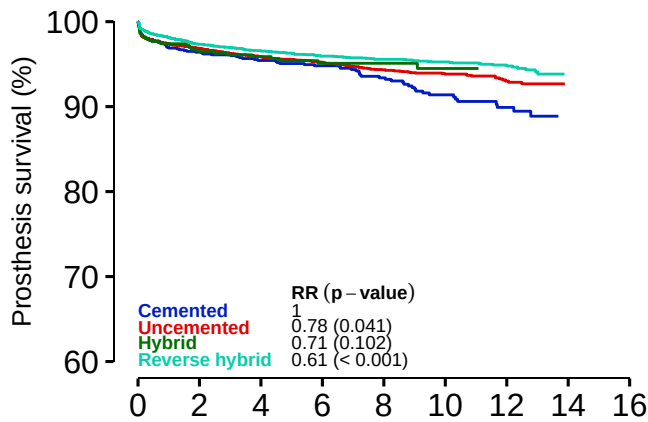


Survival of total hip prosthesis

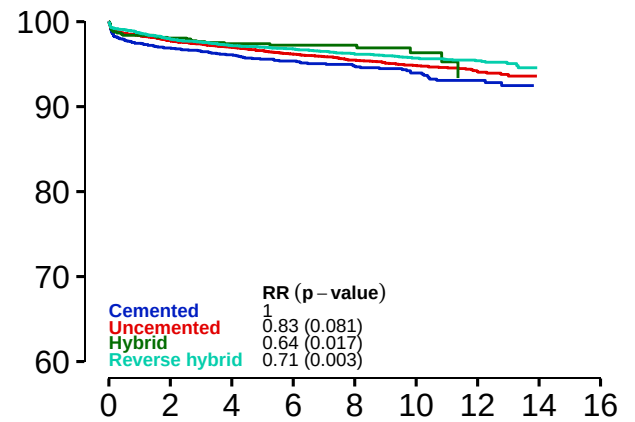
2011–2024

Norwegian Arthroplasty Register

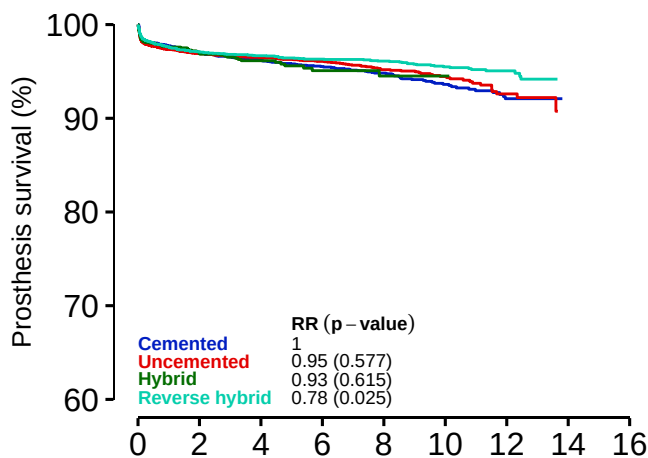
A.12) Different fixations men
Under 65 years



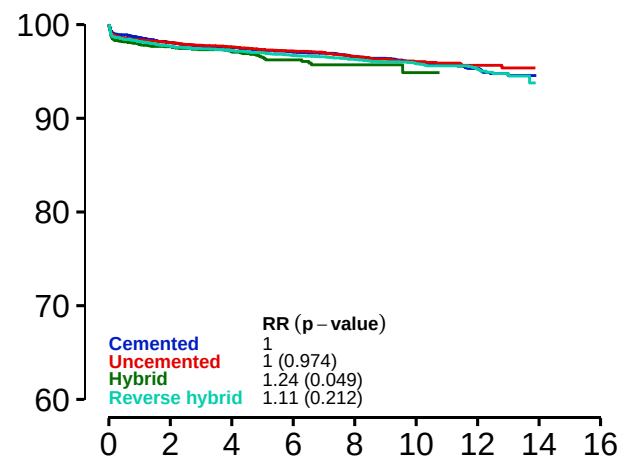
A.13) Different fixations women
Under 65 years



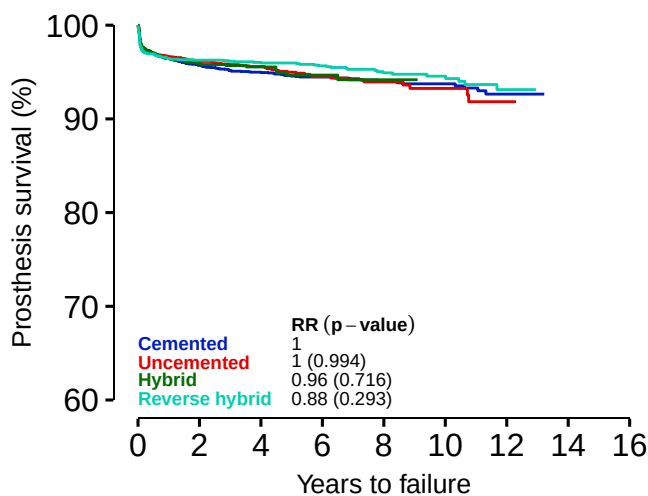
A.14) 65 – 74 years



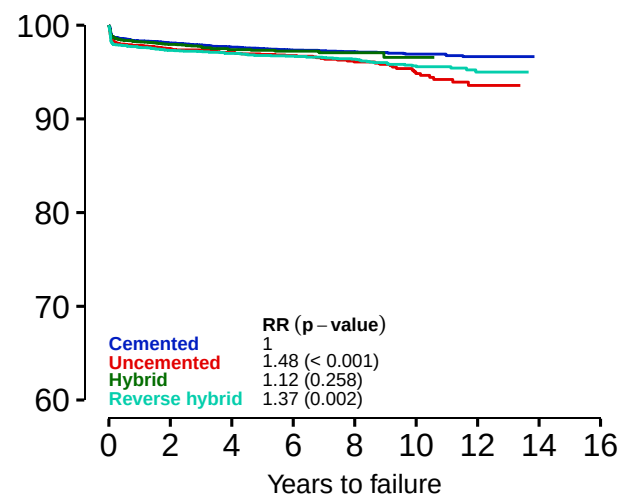
A.15) 65 – 74 years



A.16) Over 75 years



A.17) Over 75 years



Hip

17

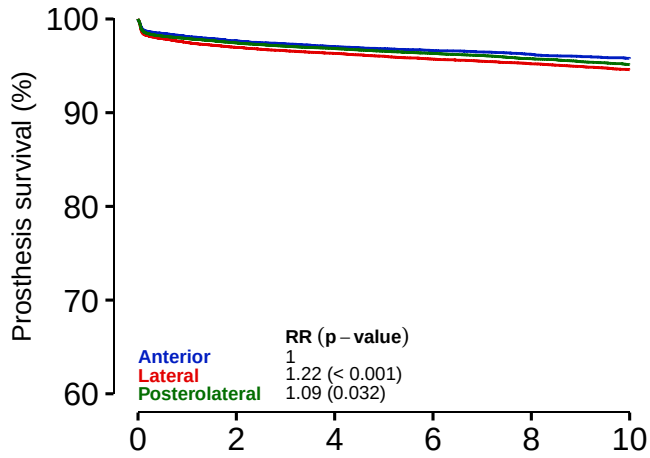
Kaplan-Meier survival curves. Risk ratio (RR) is adjusted for diagnosis.

Survival estimate is given as long as more than 50 prostheses are at risk.

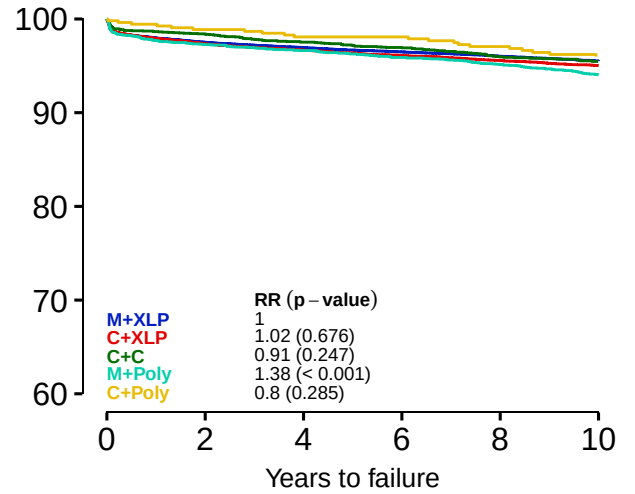
There is some uncertainty tied to the risk estimates from the Cox-analyses as the assumption of proportional hazard does not hold for all models.

Survival of total hip prosthesis 2011–2024

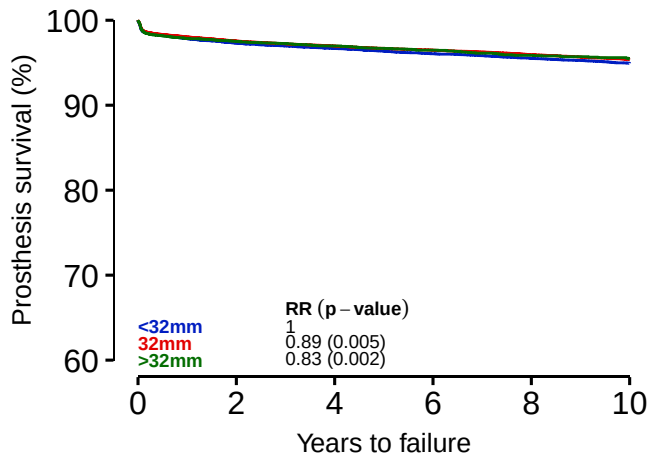
A.18) Approach



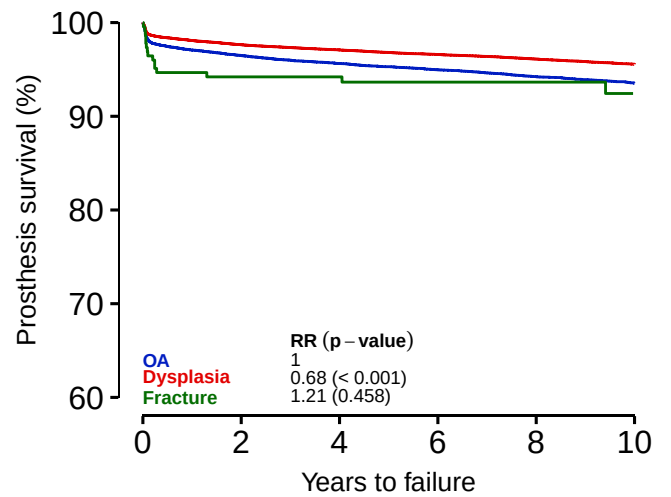
A.19) Articulation (without dual mobility)



A.20) Head size (without dual mobility or metal on metal)



A.21) OA, dysplasia and fracture

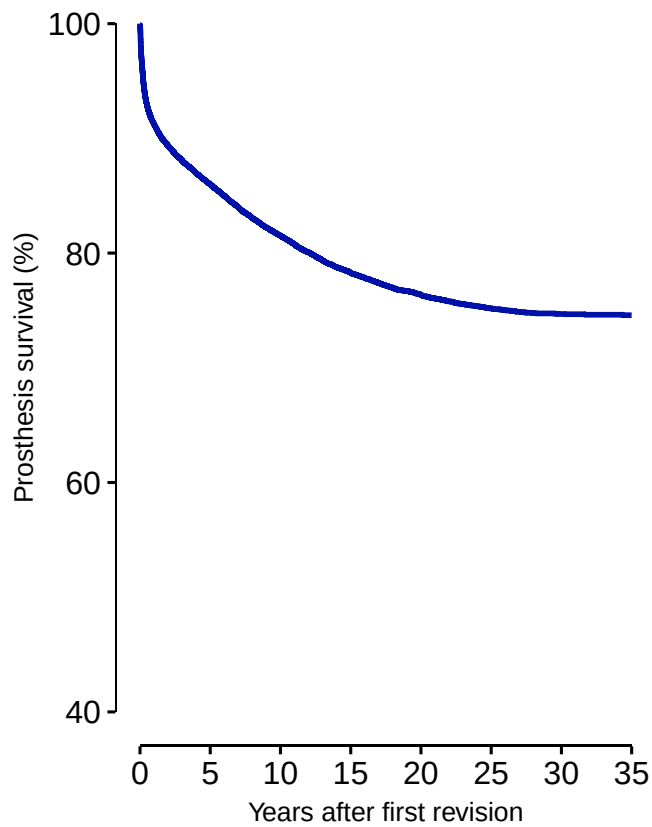


Survival curves for revision of hip prosthesis

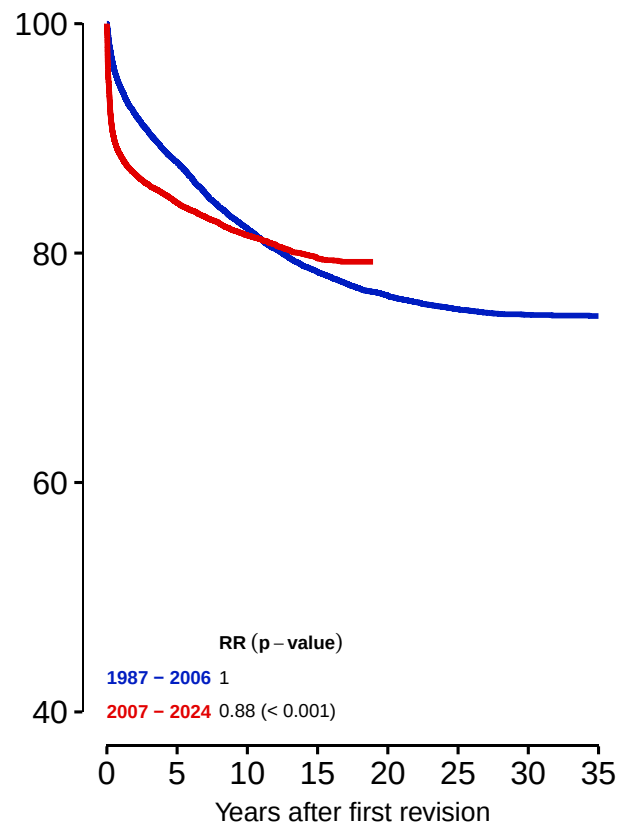
1987 – 2024

Norwegian Arthroplasty Register

A.22) All

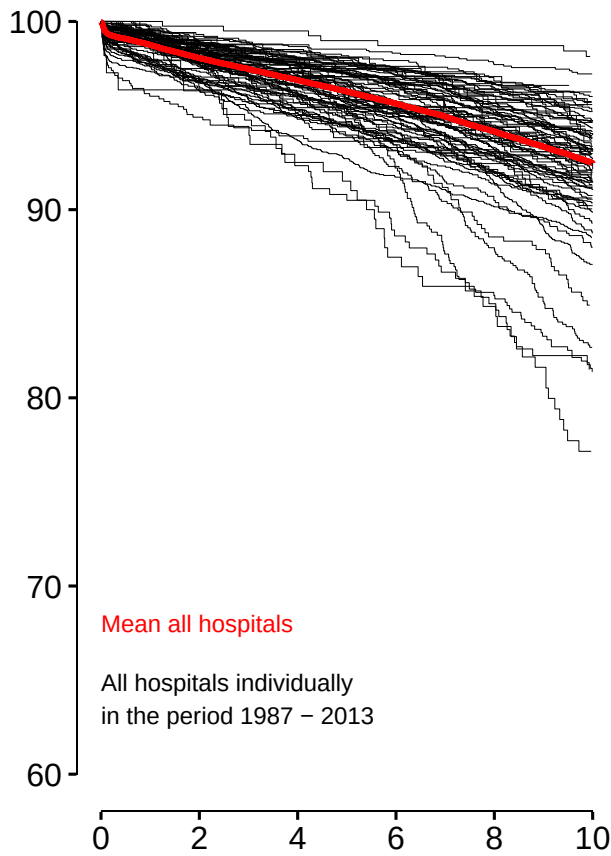


A.23) Two time-periods

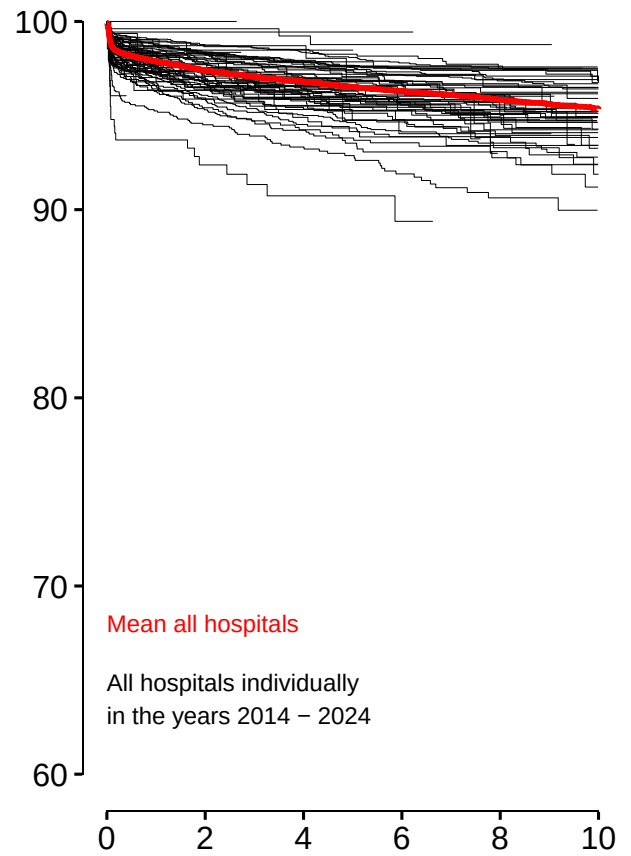


Survival curves for all hospitals individually

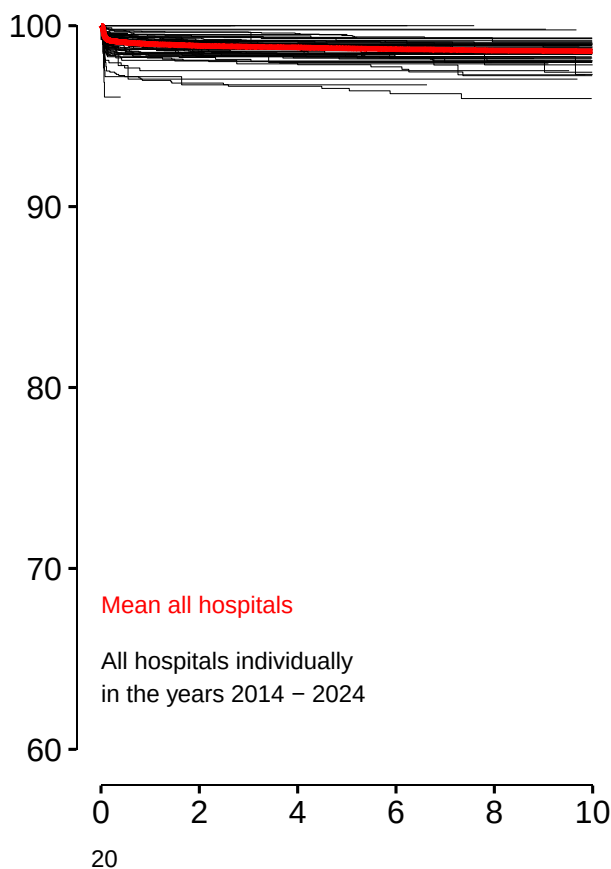
A.24) All hospitals in the years 1987 – 2013



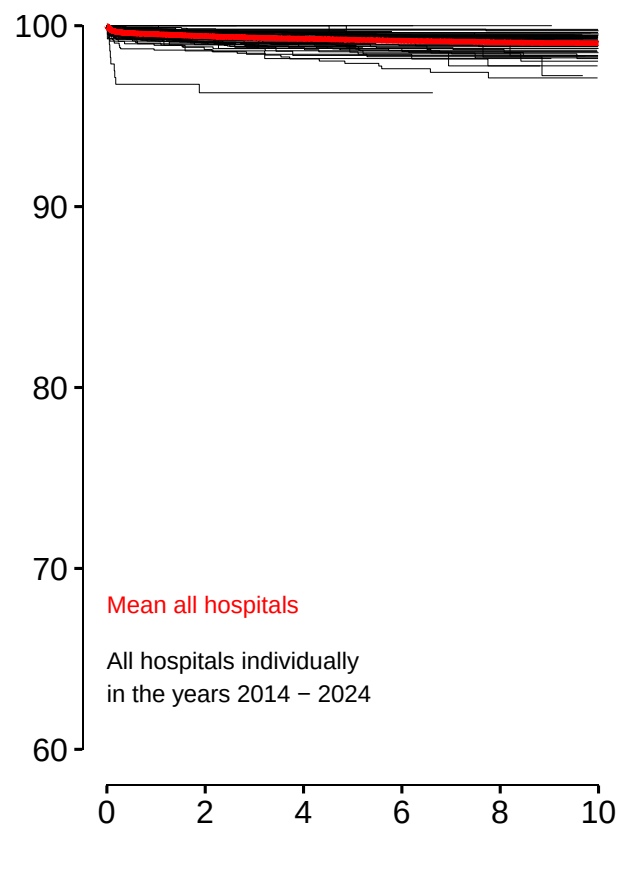
A.25) All hospitals in the years 2014 – 2024



A.26) Endpoint revision due to infection,
2014 – 2024



A.27) Endpoint revision due to dislocation,
2014 – 2024



One stage bilateral hip prosthesis operations

Year	1987-2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Sum:
Number of patients	326	28	32	47	72	70	100	97	108	96	85	1061

A one stage bilateral operation is an operation where the patient is operated on both hips during the same operation or on the same day. Only primary operations are included.

FIGURE A.28: Fixation for women over 75 years, 1987 to 2024

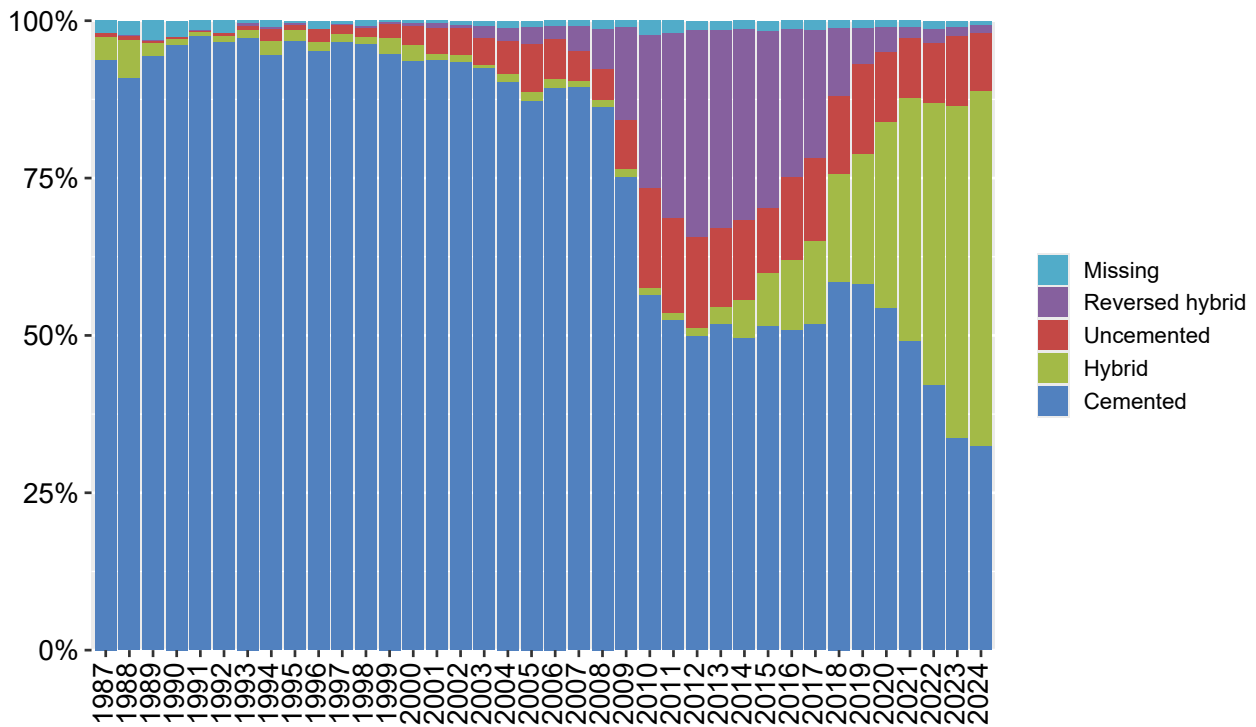


FIGURE A.29: Number of primary THA operations, 2024

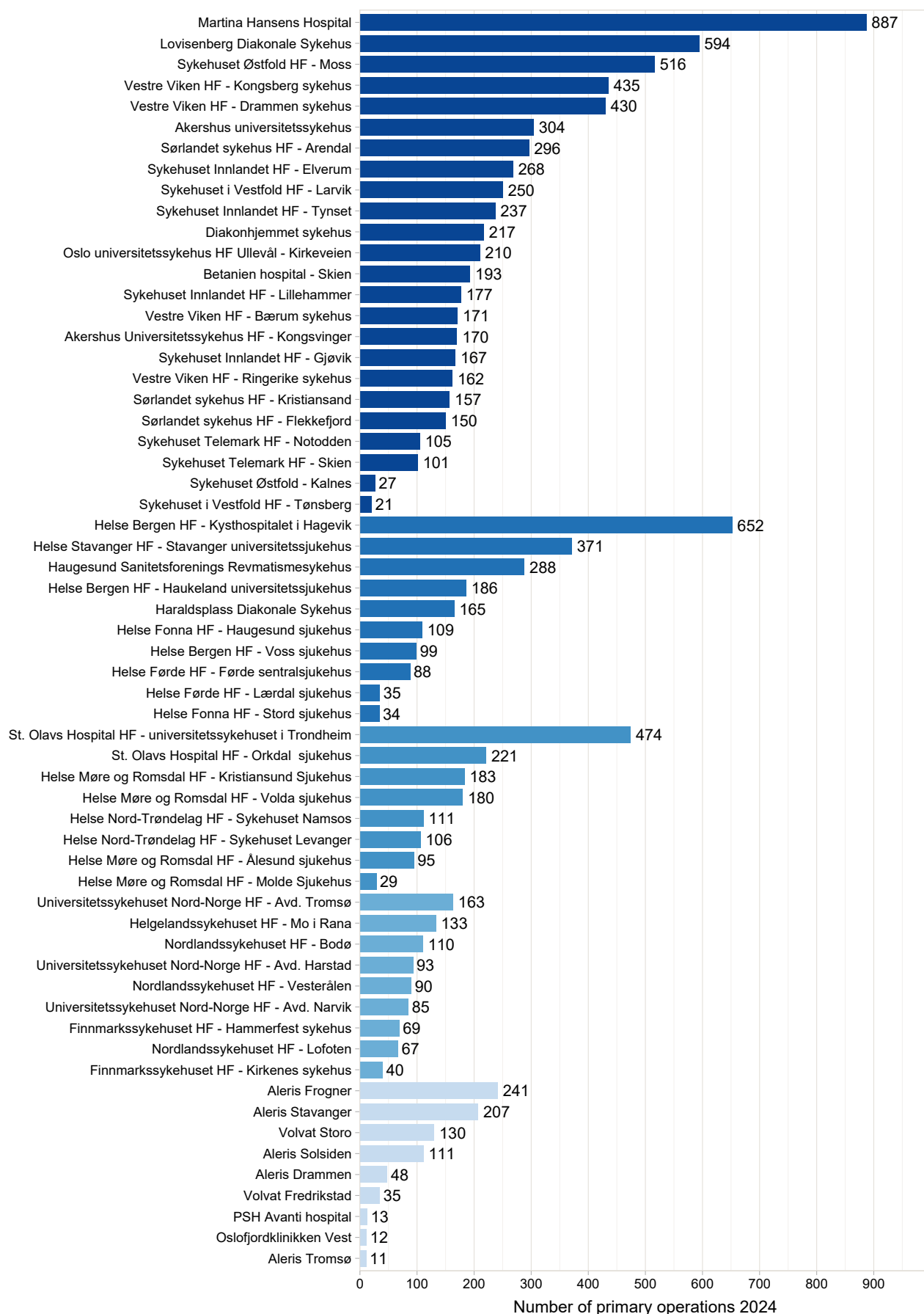


FIGURE A.30: Percentage non-revised standard patients two years after operations in 2018-2024



*All hospitals that fulfills the criteria to be included in the figure.

Kaplan-Meier estimates of percentage non-revised standard patients after two years with 95 % confidence interval. Endpoint is all revisions. Standard patients are patients between 55 and 85 years old, with ASA class 1 or 2 and with primary osteoarthritis at primary operation. Reoperations, i.e. revision operations without insertion, removal or replacement of the prosthesis, are excluded. Included are all patients operated on in the years 2018 to 2024. Only hospitals with operations in 2024 and with more than 50 operations from 2018 to 2024 are included. A further requirement is that the hospital must have at least 30 patients followed up for more than two years. Only hospitals with completeness of at least 80 % or undefined¹ for revisions from 2018 to 2023 are included. See section «How to interpret the hospital-based results:».

¹Undefined completeness happens when there are zero revisions in NPR and NRL.

FIGURE A.31: Percentage nonrevised standard patients two years after operations in 2018-2024 in hospitals with completeness of reporting <80% of revisions

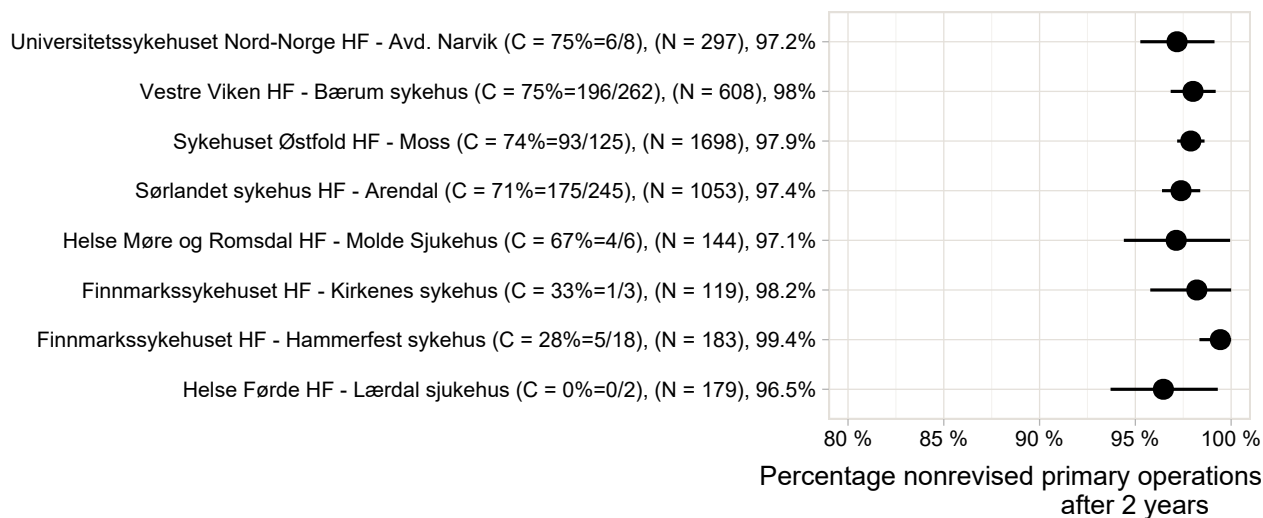
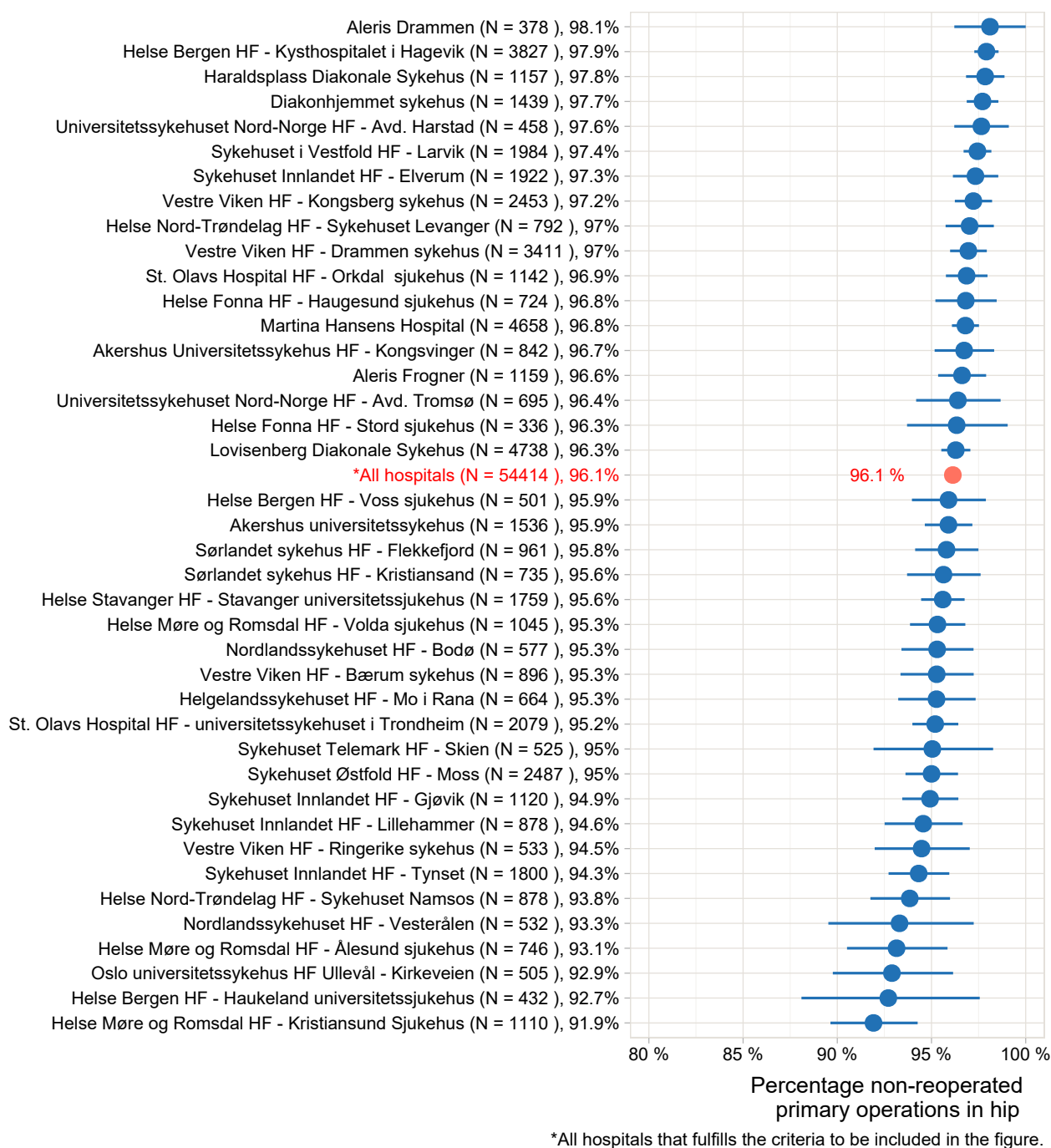


Figure A.31 shows hospitals that fulfill the criteria in figure A.30 except 80% completeness. Completeness is given with a big C. The numerator is the total number of revision registered at NRL and the denominator is the total number of revision registered at NRL or NPR.

FIGURE A.32: Percentage non-revised standard patients ten years after operations in 2013-2024



Kaplan-Meier estimates of percentage non-revised standard patients after ten years with 95 % confidence interval. Endpoint is all revisions. Standard patients are patients between 55 and 85 years old, with ASA class 1 or 2 and with primary osteoarthritis at primary operation. Reoperations, i.e. revision operations without insertion, removal or replacement of the prosthesis, are excluded. Included are all patients operated on in the years 2013 to 2024. Only hospitals with operations in 2024 and with more than 50 operations from 2013 to 2024 are included. A further requirement is that the hospital must have at least 30 patients followed up for more than ten years. Only hospitals with completeness of at least 80 % for revisions from 2013 to 2023 are included.

See section «How to interpret the hospital-based results:».

FIGURE A.33: Percentage nonrevised standard patients ten years after operations in 2013-2024 in hospitals with completeness of reporting <80% of revisions

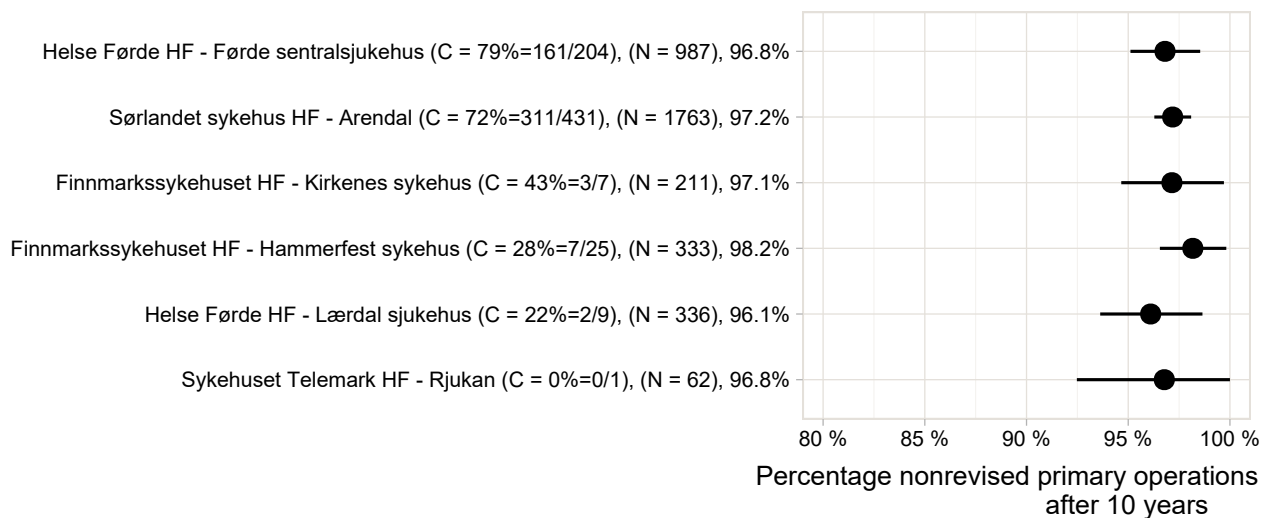
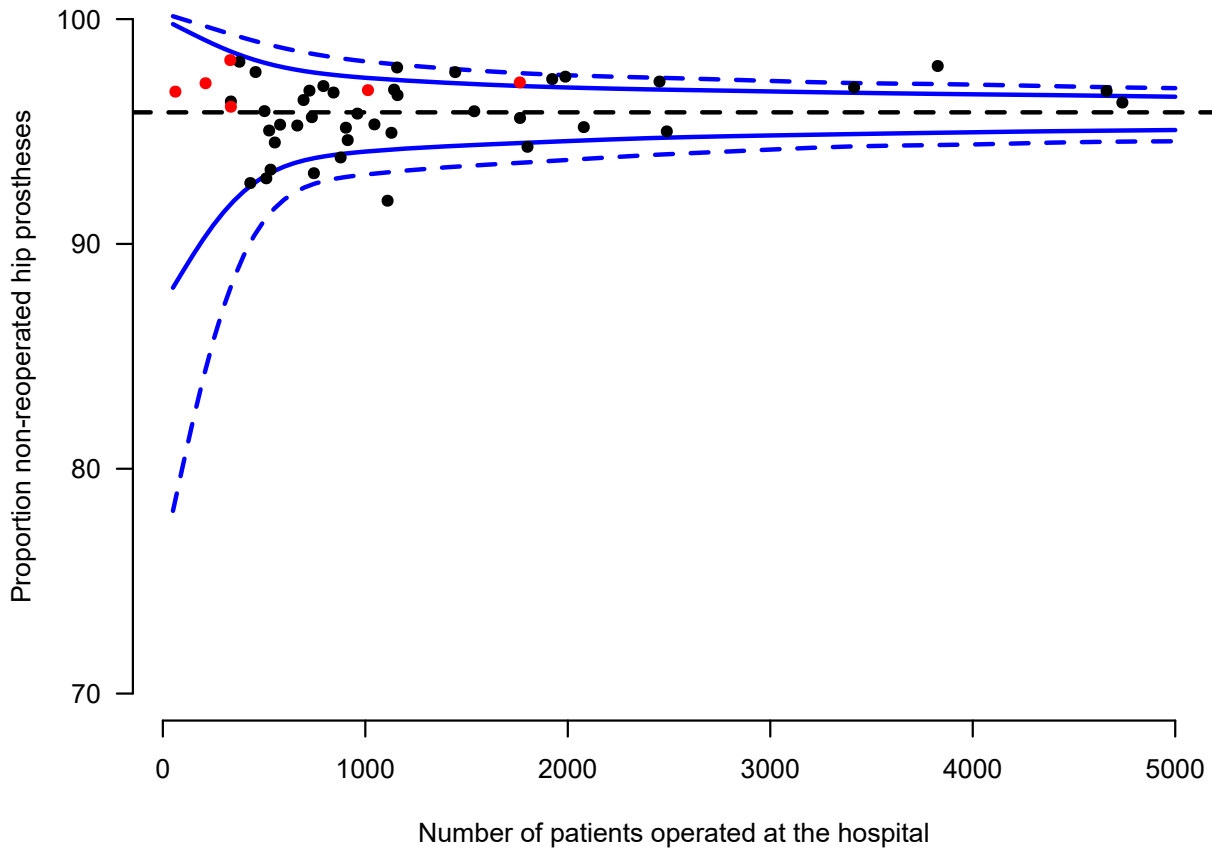


Figure A.33 shows hospitals that fulfill the criteria in figure A.32 except 80% completeness. Completeness is given with a big C. The numerator is the total number of revision registered at NRL and the denominator is the total number of revision registered at NRL or NPR.

FIGURE A.34: Funnel plot, percentage non-revised standard patients ten years after operations in 2013-2024



Each point shows the percentage non-revised prostheses after 10 years for standard patients operated from 2013 to 2024 at Norwegian hospitals. Hospitals that have reported less than 80% of reoperations (2008- 2020) are marked in red in the figure. Some hospitals are excluded. This can be due to that less than 50 hip prostheses have been operated in the period, that fewer than 10 patients have been followed up for more than 10 years, or that the hospital don't have any operations in 2024. The solid blue lines show the interval where 95 % of the Norwegian patients will be. The dotted blue lines show the interval where 99.8 % of the patients will be. Points to the right represents hospitals with many operations (see the x-axis). Points above or below the dotted lines are regarded as outliers with exceptionally good or exceptionally bad results respectively.

All of the black points in the funnel plot correspond to a hospital in figure [A.32](#). By choosing any point, and using the corresponding values for “Number of patients” and “Proportion non-reoperated” on the x and y axis respectively, the hospital belonging to the point can be found in figure [A.32](#).

FIGURE A.35: Durability of THA 2013-2024

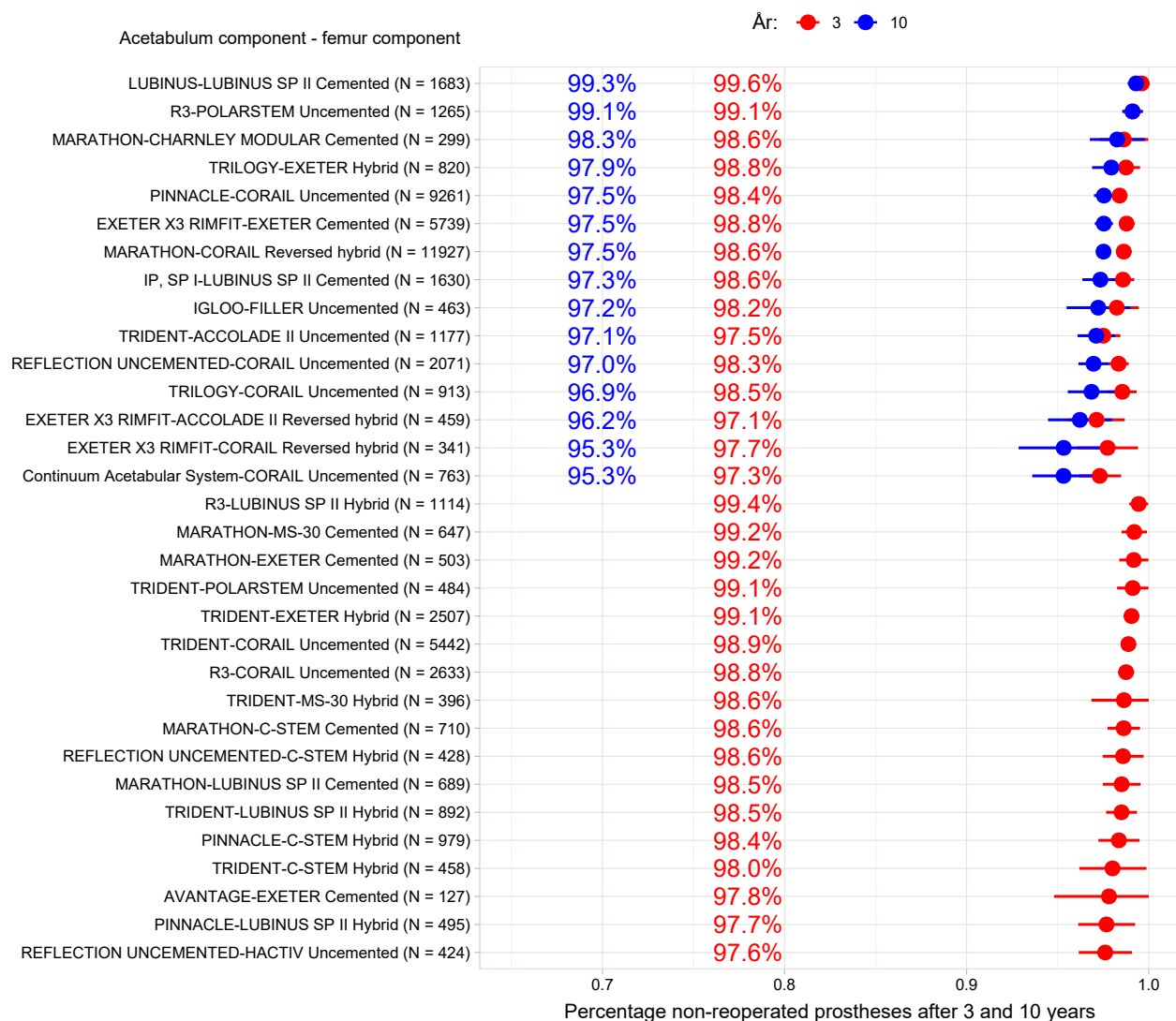


Figure A.35 shows the estimated Kaplan-Meier percentage at three and ten years for different combinations of hip prostheses. We have only included combinations used in 500 or more operations in 2013-2024. A further requirement for inclusion in the figure is that there must still be at least 50 examples of the combination at three and ten years respectively. Only standard patients from 2013 to 2024 have been included, and the number of prostheses will therefore be below 500 in some cases. A standard patient is aged 55-85 years, has ASA class 1 or 2 and was diagnosed with primary osteoarthritis at primary surgery. Using standard patients provides a more homogenous group of patients, and we believe that this makes the results more comparable.

Endpoint is all revision operations, except infections and reoperations without insertion, removal or replacement of the prosthesis. As recommended in Report No. 6/2002 from the Norwegian Centre for Health Technology Assessment (SMM), "Choice of Implants in Primary Total Arthroplasty in Norway", most health trusts will require ten-year documentation on the prosthesis. The results in this report must be compared with results in our publications, where we can account for materials and methods and discuss strengths and weaknesses and the significance of the findings.

How to interpret the hospital-based results: When hospitals are ranked by percentage of revisions, results must be interpreted with caution, as there may be many reasons for different revision percentages:

1. Hospitals that are more rigorous in reporting their complications and reoperations to the Register could have unfairly negative results in the analyses.
2. If surgeons at one hospital are more diligent in facilitating check-ups for patients than at other hospitals, and thus discover more complications, this could lead to unfortunate results even though this hospital is doing a better job than other hospitals.
3. If the waiting time for reoperations is longer in some hospitals than others, the longer wait could erroneously lead to better results than those of hospitals with a short waiting time.
4. If the surgeons at one hospital have a higher threshold for recommending reoperation than at other hospitals and thus prolong patients' problems, it will give skewed statistical results.
5. Poor hospital results from an earlier period will remain with the hospital, even though the hospital may have acted upon previous problems by switching to better prostheses and improving procedures and surgical skills.

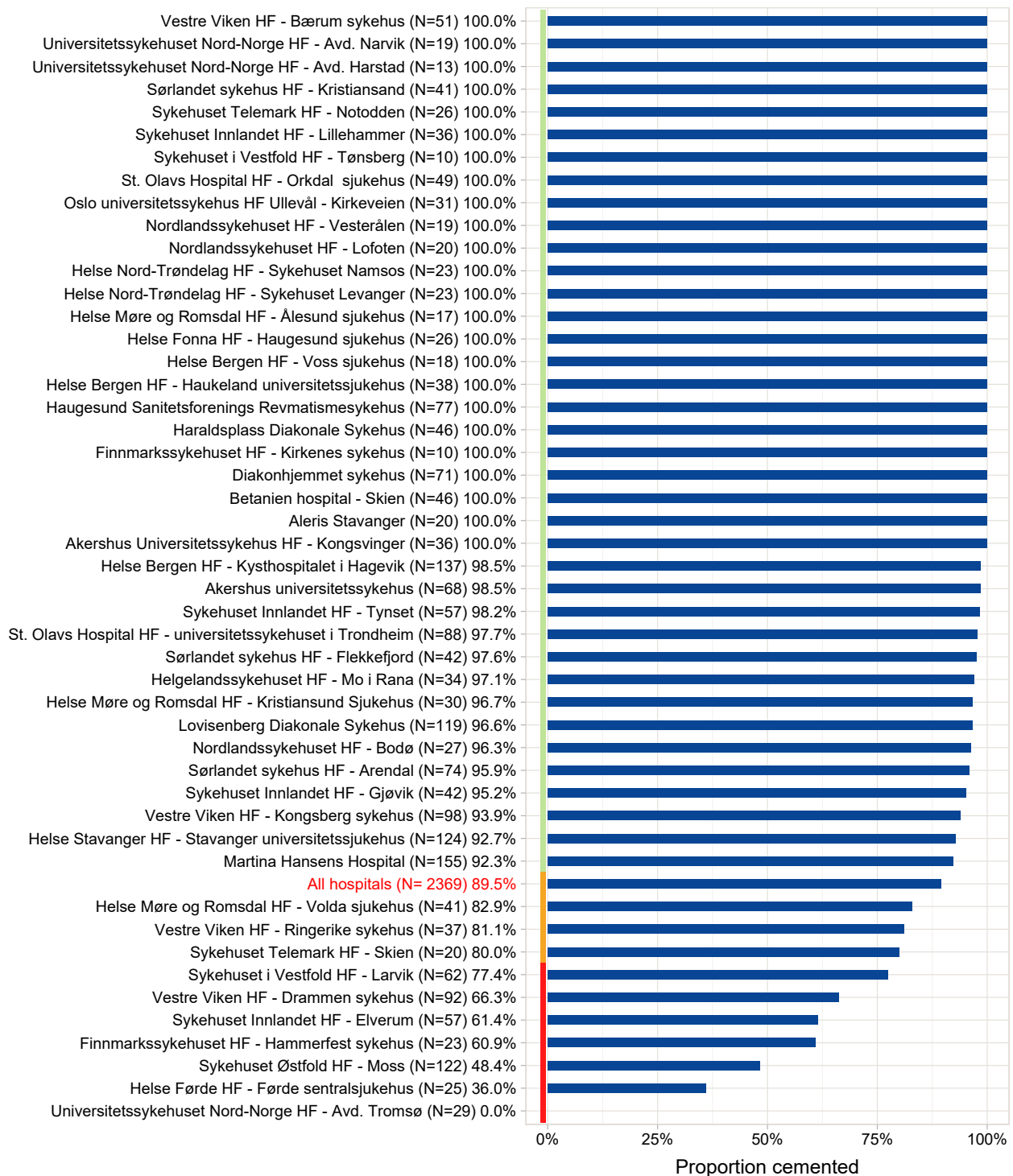
The NAR was designed to compare the results of implants and surgical procedures nationwide. To compare quality in hospitals is complex, because some hospitals operate on more patients with poor prognosis than other hospitals, and because many hospitals, especially the small ones, have so few reoperations that the statistics are weak, and are further weakened by some hospitals' low completeness. This issue is explained in the following papers: *Ranstam J, Wagner P, Robertsson O, Lidgren L. "Health-care quality register outcome-orientated ranking of hospitals is unreliable." J Bone Joint Surg Br. 2008 and Ranstam J, Wagner P, Robertsson O, Lidgren L. "Ranking in health care results in wrong conclusions". Läkartidningen. 2008 Aug 27-Sep 2;105(35):2313-4.*

It is a well-known phenomenon in quality assurance that if those who report their complications accurately receive a lower ranking because of this, the reporting may eventually deteriorate.

How to interpret the prosthesis results: When prostheses are ranked by percentage of revisions, results must be interpreted with caution, as there may be many reasons for different revision percentages. We mainly publish prosthesis results in scientific journals and presentations where we account for materials and methods and discuss strengths and weaknesses and the significance of the findings (<https://helse-bergen.no/nrl>).

1. A poor result for a particular prosthesis may be caused by a learning curve for its use.
2. In publications, we adjust for differences in patient groups such as age, sex, diagnosis, and fixation. Some prostheses and materials tend to be used in younger and more active patients. Such patients may wear out the prosthesis faster. The degree of activity has not been recorded in the register until recently.
3. The results are more reliable when used in many patients (>3000) and several hospitals (>5).
4. Scientific papers discuss the reason for revision of the prosthesis.
5. National registers are observational studies and cannot normally explain the reasons for the results of a particular group of prostheses. The results must be compared with those of experimental studies and randomized controlled trials. Furthermore, the results must be reproduced in other studies and registers before being considered valid.

FIGURE A.36: Proportion of women over 75 years with cemented stem in 2024



The figure shows that some hospitals use cemented femoral stems in all women over 75 years, others differentiate and some choose uncemented femoral stems for all these patients. The Register recommends using a cemented stem for this patient group. On a national level, 89.5 % of femoral stems were cemented in women over 75 years of age.

FIGURE A.37: Proportion of patients with wear resistant cup materials (cross-linked polyethylene/ceramic) in 2024

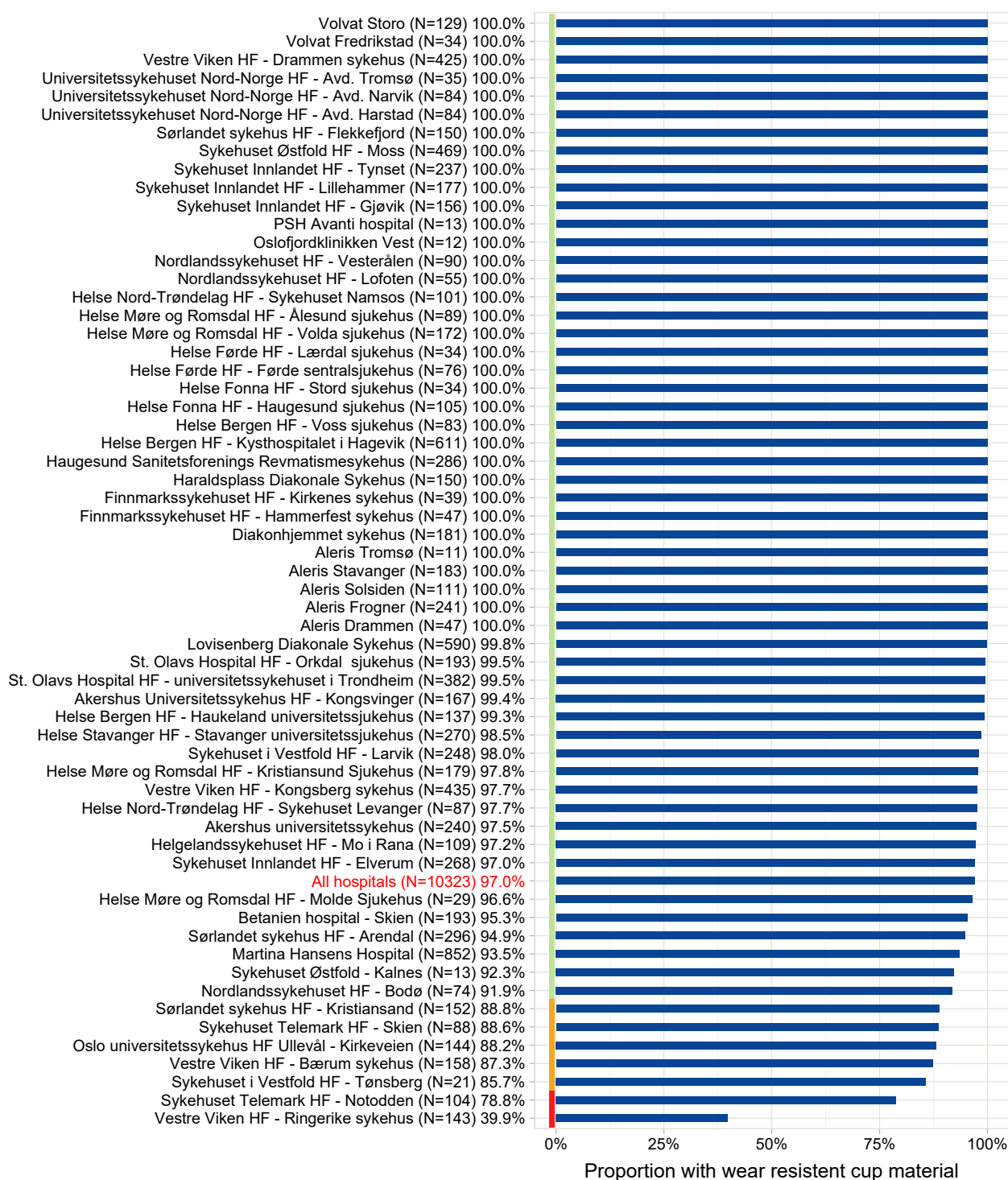
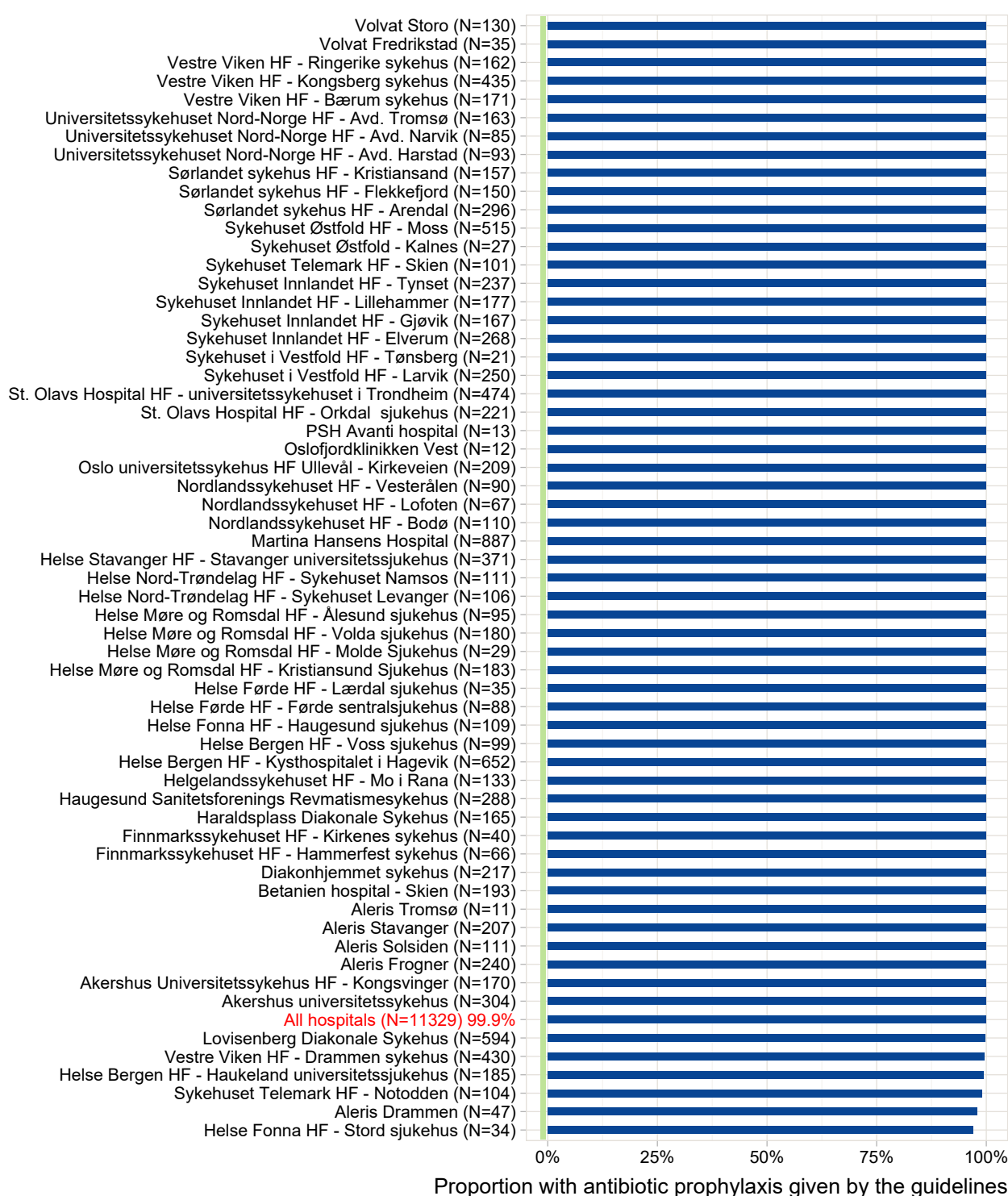


Figure A.37 shows that most patients at all hospitals receive hip prostheses with wear-resistant joint surfaces (Nationally: 97 %). The use of ordinary polyethylene is justified in certain patients who do not need a prosthesis lasting longer than 10-15 years.

A special type of cups (Dual Mobility (DM) cups) are still delivered with conventional polyethylene. The hospitals in the lower part of the figure uses these cups. It is not clear from literature that it is necessary to use cross-linked polyethylene in DM cups.

FIGURE A.38: Proportion of patients with antibiotic prophylaxis as given by the guidelines in 2024



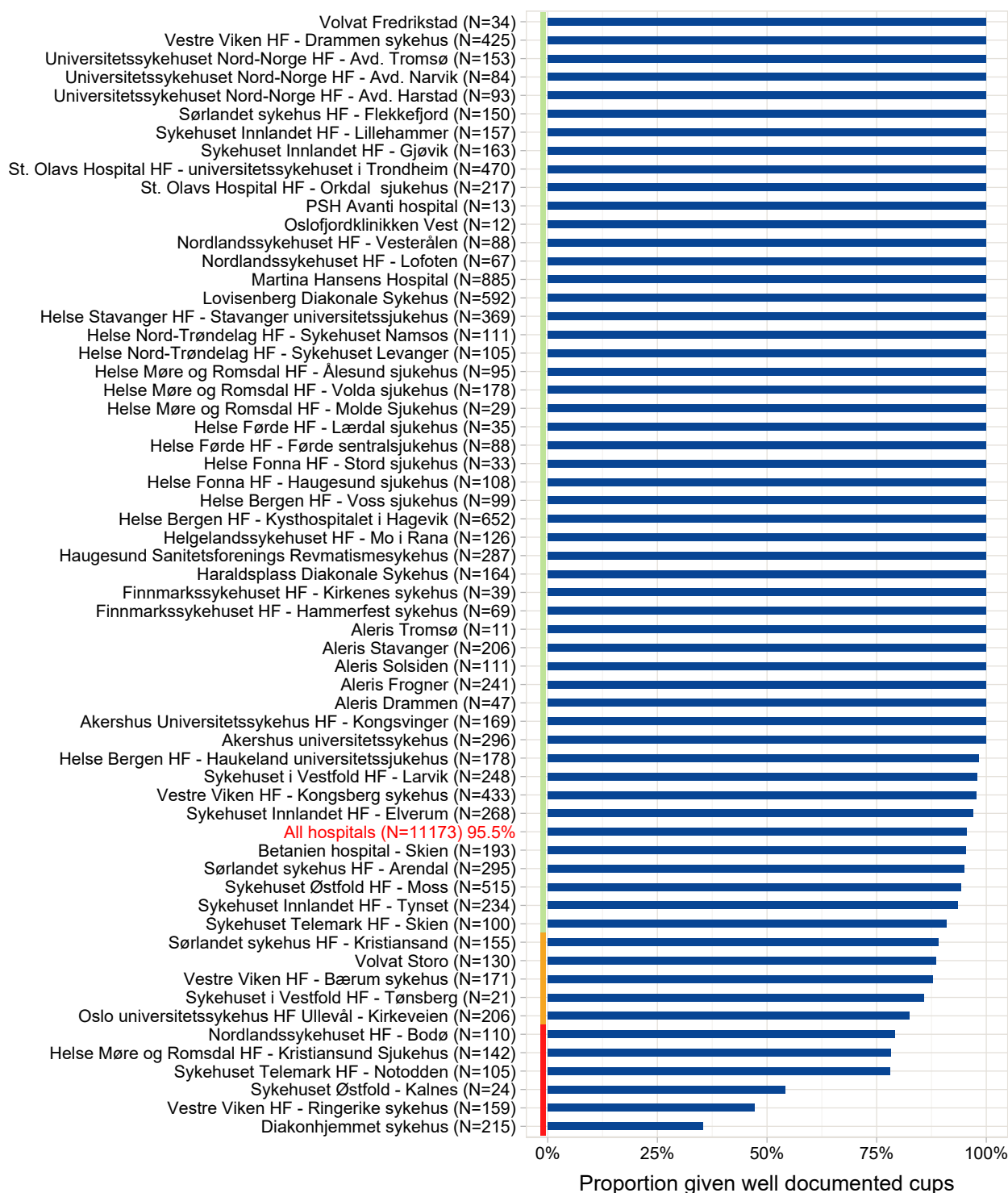
Antibiotica prophylaxis was administered according to the guidelines in 98.8% of all operations. A low score (at the bottom of the figure) does not mean that patients have not received antibiotics; it generally means that they were given antibiotics in a manner contrary to the guidelines. Some hospitals have several cases of inaccurate reporting, which means the hospitals will perform poorly in the figure, even if they do administer antibiotic prophylaxis according to guidelines. When reporting electronically this inaccuracy will be strongly reduced.

FIGURE A.39: Proportion of patients receiving well documented hip stem in 2024



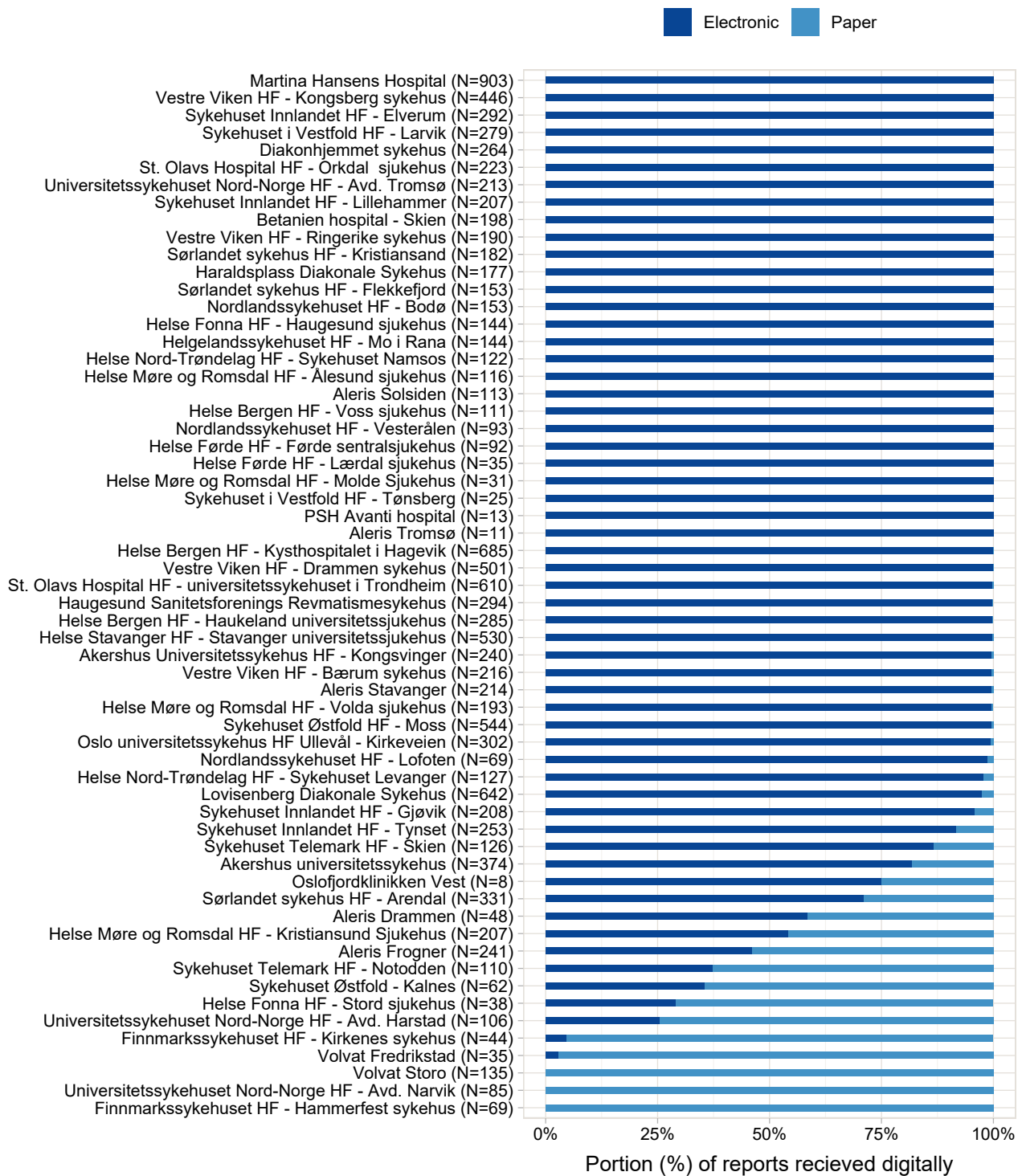
The overwhelming majority of all inserted hip stems are well documented. On a national level, 100 % of all hip prostheses use well documented hip stems. All hospitals have been asked to report these prostheses to the registry so that they could be excluded from the above presentation.

FIGURE A.40: Proportion of patients receiving well documented hip cups in 2024



On a national level, 95.5 % of all hip prostheses use well documented hip cups. Some hospitals fall short of satisfying the requirements. This is partly due to hospitals use of newer cups in ongoing clinical trials. All hospitals have been asked to report these prostheses to the registry so that they could be excluded from the above presentation.

FIGURE A.41: Form registration by format in 2024, all operations



National average for electronic form registration in 2024 is 91.6% (11786 in 12871).

TOTAL HIP ARTHROPLASTY

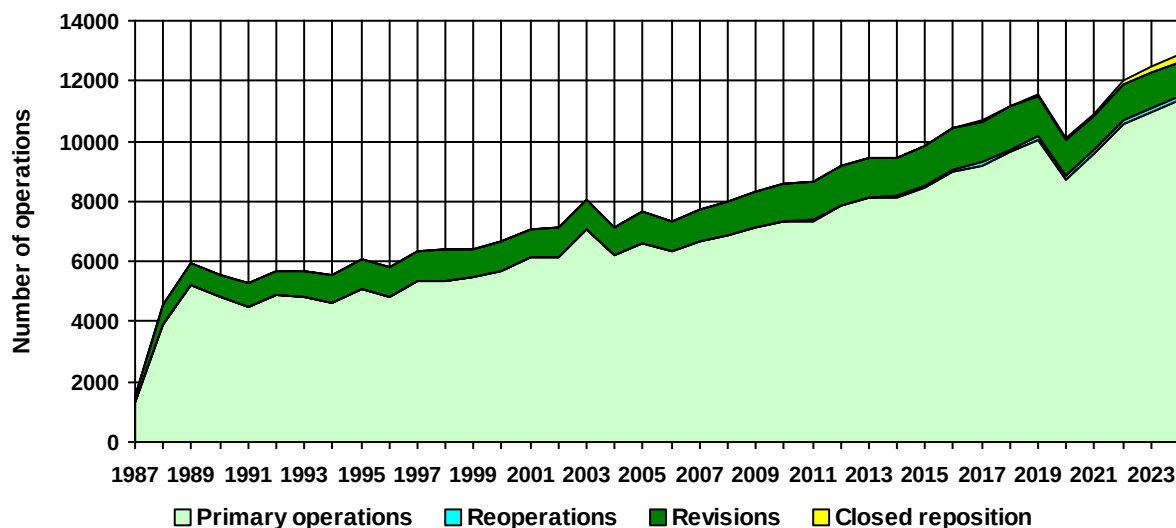
Table 1: Annual numbers of operations

Year	Primary operations *	Reoperations **	Closed reposition	Revisions	Total
2024	11 350 (88,3%)	133 (1,0%)	249 (1,9%)	1 117 (8,7%)	12 849
2023	10 956 (87,8%)	117 (0,9%)	177 (1,4%)	1 230 (9,9%)	12 480
2022	10 585 (88,2%)	138 (1,1%)	110 (0,9%)	1 168 (9,7%)	12 001
2021	9 598 (87,8%)	117 (1,1%)	73 (0,7%)	1 141 (10,4%)	10 929
2020	8 725 (86,4%)	101 (1,0%)	35 (0,3%)	1 241 (12,3%)	10 102
2019	10 043 (86,8%)	107 (0,9%)	44 (0,4%)	1 371 (11,9%)	11 565
2018	9 610 (86,0%)	122 (1,1%)	40 (0,4%)	1 398 (12,5%)	11 170
2017	9 176 (85,9%)	110 (1,0%)	32 (0,3%)	1 361 (12,7%)	10 679
1987-16	181 146 (85,7%)	244 (0,1%)	27 (0,0%)	29 953 (14,2%)	211 370
Total	261 189 (86,2%)	1 189 (0,39%)	787 (0,3%)	39 980 (13,2%)	303 145

* In addition, there were reports 219 primary hemi prostheses done for other reasons than hip fractures.

**Reoperation where prosthetic parts were not changed or removed such as soft tissue debridements for infected prosthesis, where prosthetic parts were not changed and osteosyntheses of fractures.

Figure 1: Annual numbers of operations



54,6 % of all operations were performed on the right side. 65,7 % performed in women.
Mean age at primary surgery was 68,8 years, 69,7 years for women and 67,1 years for men.

Incidence

Figure 2a: Incidence of primary hip prostheses

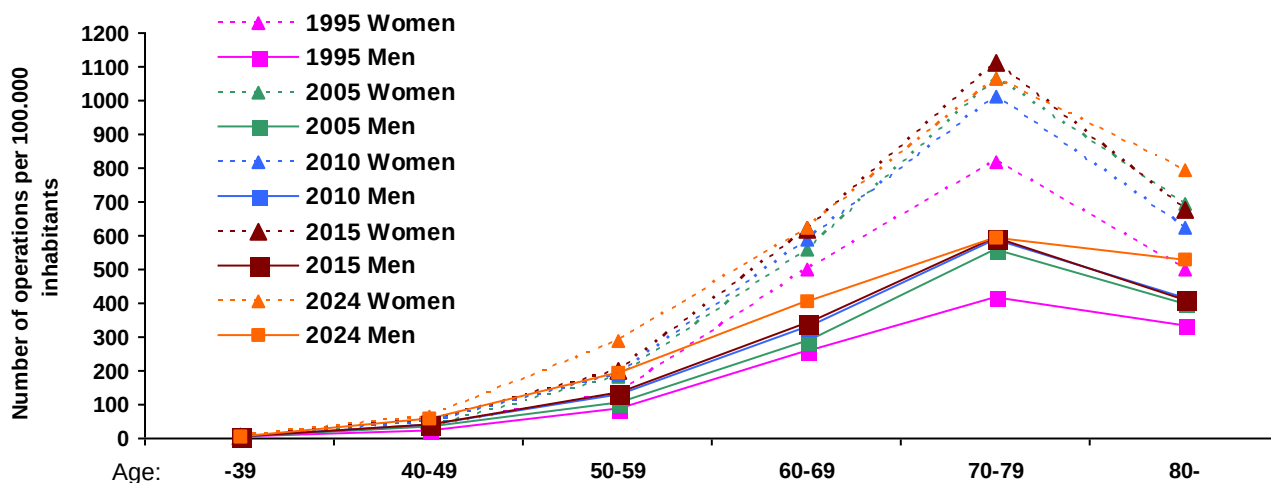


Figure 2b: Annual incidence of all primary hip prostheses

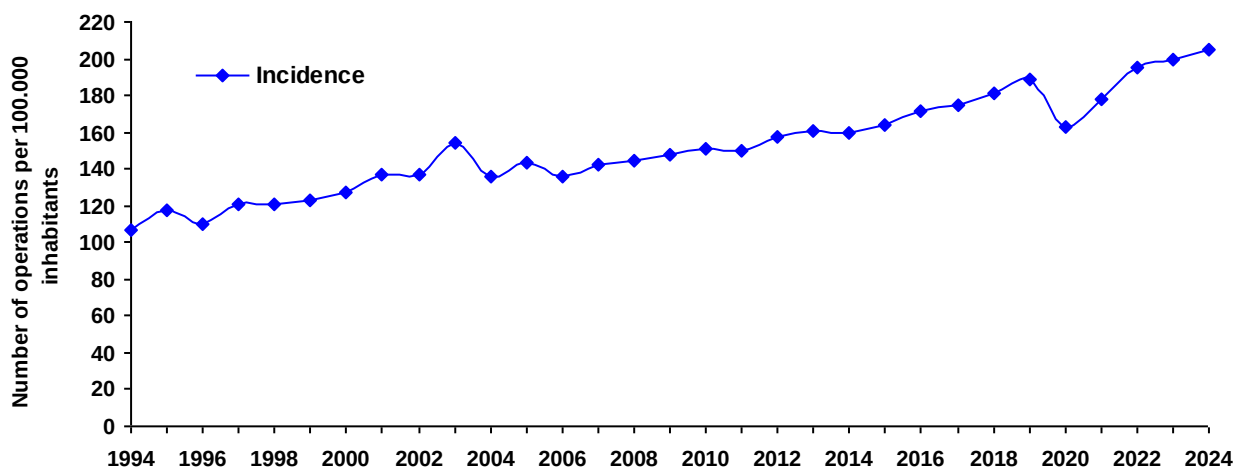
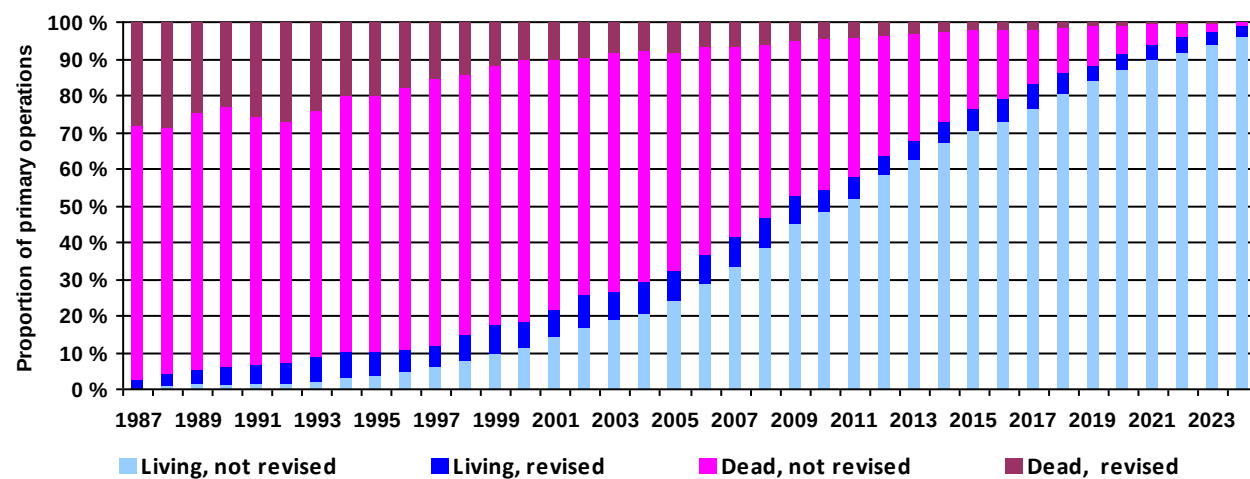


Figure 2c: Status of hip replacement surgery in the period 1987-2024 per 31.12.2024



Reasons for primary operations

Table 2a:

Year	Primary osteoarthritis	Rheumatoid arthritis	Sequelae after hip fracture	Congenital dysplasia *	Cong. dysplasia with dislocation	Epiphysiol./Perthes' disease	Spondyloarthropathy	Acute fracture of the femoral neck	Avascular necrosis of the femoral head	Sequelae after acetabular fracture	Other	Missing information
2024	9 159	83	235	1 008	1	94	26	507	445	4	416	1
2023	8 924	104	227	785	6	92	25	572	354	5	410	5
2022	8 548	107	257	790	6	90	24	548	327	15	346	15
2021	7 813	92	244	608	15	83	9	526	267	15	271	14
2020	6 902	103	271	615	6	74	18	526	222	25	235	25
2019	7 937	88	312	664	17	94	20	619	301	30	299	22
2018	7 628	97	298	653	24	112	21	574	266	23	282	9
2017	7 301	108	299	679	19	105	26	404	272	34	282	13
2011-16	38 742	774	2 129	3 719	86	603	168	1 629	1 156	147	1 201	121
2006-10	26 596	696	2 148	2 556	125	477	111	748	817	86	737	116
2001-05	24 253	821	2 771	2 232	132	405	130	398	465	66	463	83
1987-00	45 567	2 352	8 224	4 999	709	874	303	299	425	197	1 270	621
Totalt	199 370	5 425	17 415	19 308	1 146	3 103	881	7 350	5 317	647	6 212	1 045

Diseases are not mutually exclusive. More than one reason for operation is possible

Table 2b: Crowe Classification *

Year	Grade 1	Grade 2	Grade 3	Grade 4	Missing	Total
2024	803	73	13	8	109	1 006
2023	565	48	6	2	37	658
2022	102	6	1	0	198	307
Total	1 470	127	20	10	344	1 971

* Congenital dysplasia classification. Electronic registration started during 2022.

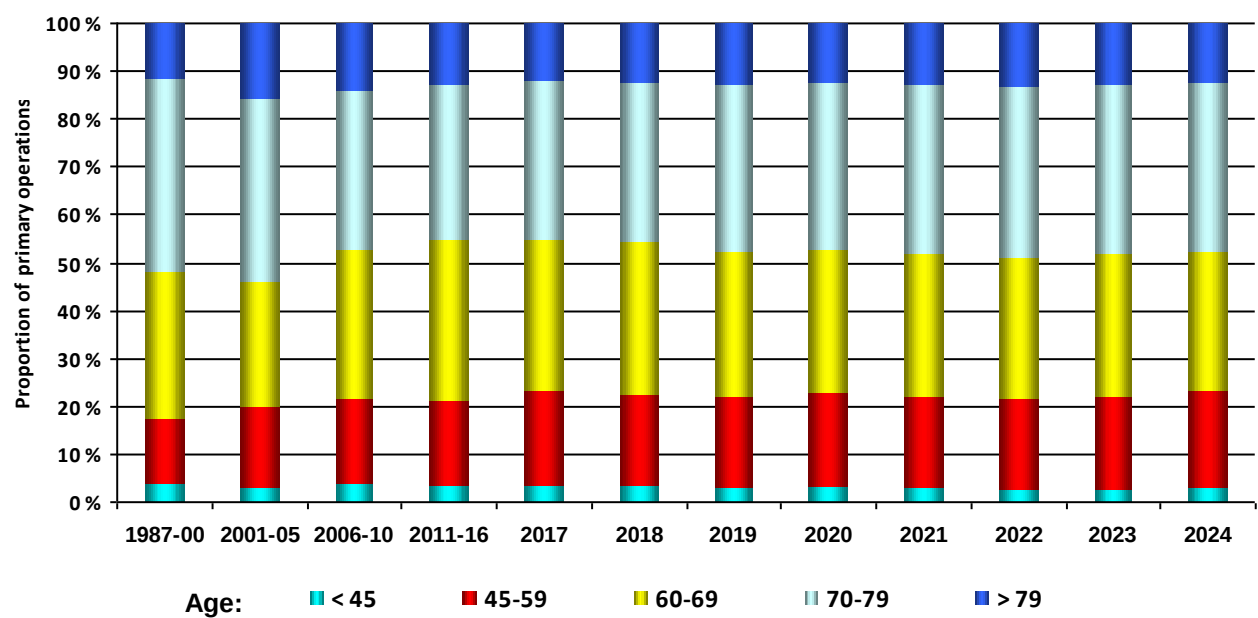
Grade 1:= less than 50% subluxation

Grade 2:= hip has between 50% and 75% subluxation

Grade 3:= hip has between 75% and 100% subluxation

Grade 4:= hip has more than 100% subluxation

Figure 3: Age by year of operation



Reasons for revisions

Table 3a:

Year of revision	Loosening of acetabular component	Loosening of femoral component	Dislocation (revision)	Deep infection	Periprosthetic fracture (revision)	Pain	Osteolysis acet, no loosening	Osteolysis femur, no loosening	Polyethylene wear	Implant fracture	Gluteal failure	Prolonged wound drainage	Other	Missing information
2024	227	124	216	199	159	22	1	2	65	30	4	31	101	0
2023	257	145	228	224	164	31	4	6	60	27	6	23	84	2
2022	247	153	199	177	191	76	17	11	44	27	13	14	86	3
2021	276	175	194	175	124	126	27	20	31	21	7	4	53	2
2020	340	187	195	207	137	141	37	27	37	31	10	4	60	8
2019	361	222	191	200	148	144	35	16	34	34	12	5	72	2
2018	332	215	186	209	128	144	47	29	38	38	15	4	74	5
2017	360	210	198	212	126	135	33	33	33	28	18	4	67	7
2011-16	2 256	1 520	1 045	997	671	785	281	224	251	141	53	4	415	20
2006-10	1 723	1 268	808	526	338	520	203	192	255	25	9	0	379	22
2001-05	1 569	1 419	534	274	258	306	123	161	236	10	0	0	497	21
1987-00	4 216	4 938	681	434	421	659	79	152	212	72	0	0	834	45
Total	12 164	10 576	4 675	3 834	2 865	3 089	887	873	1 296	484	147	93	2 722	137

Revision causes are not mutually exclusive. More than one reason of revision is possible. Only the first revision is counted. Only revisions where both primary and revisions are reported are counted. A revision is defined as a reoperation where the implant or part of the implant is changed, added or removed.

Figure 4a: Reasons for first revision

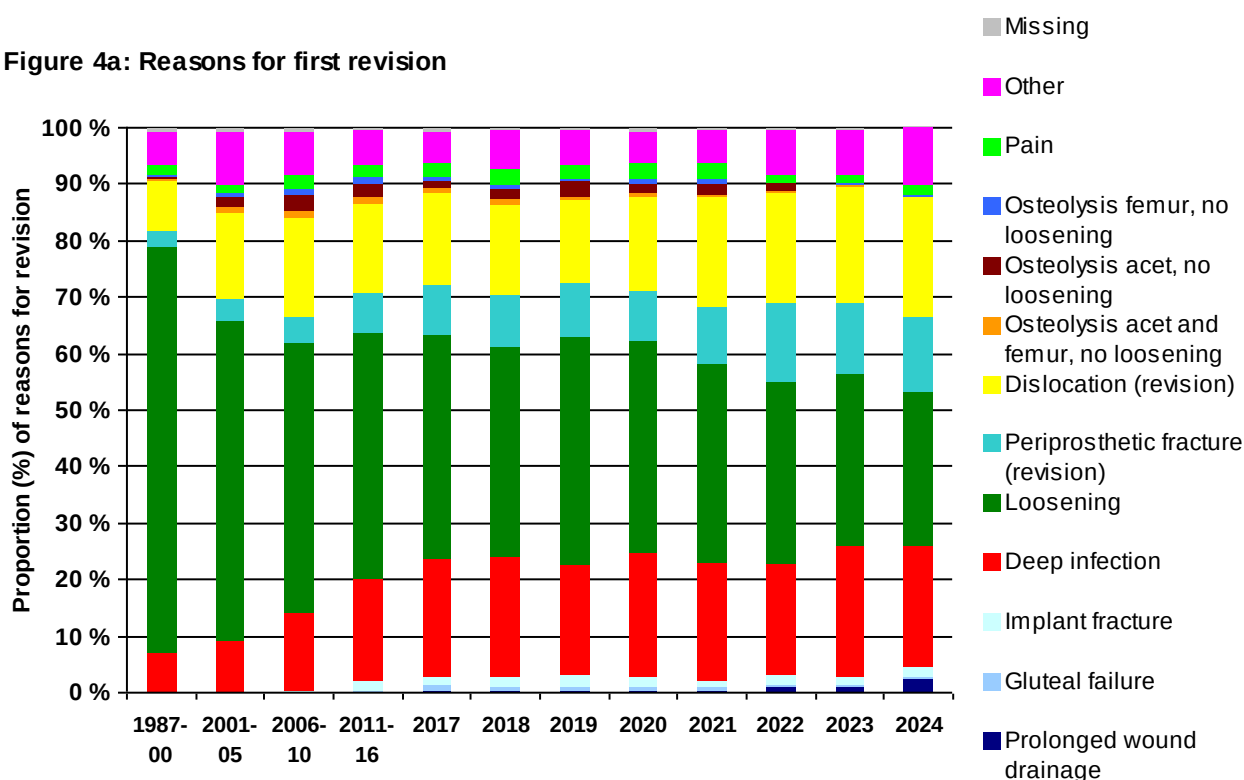
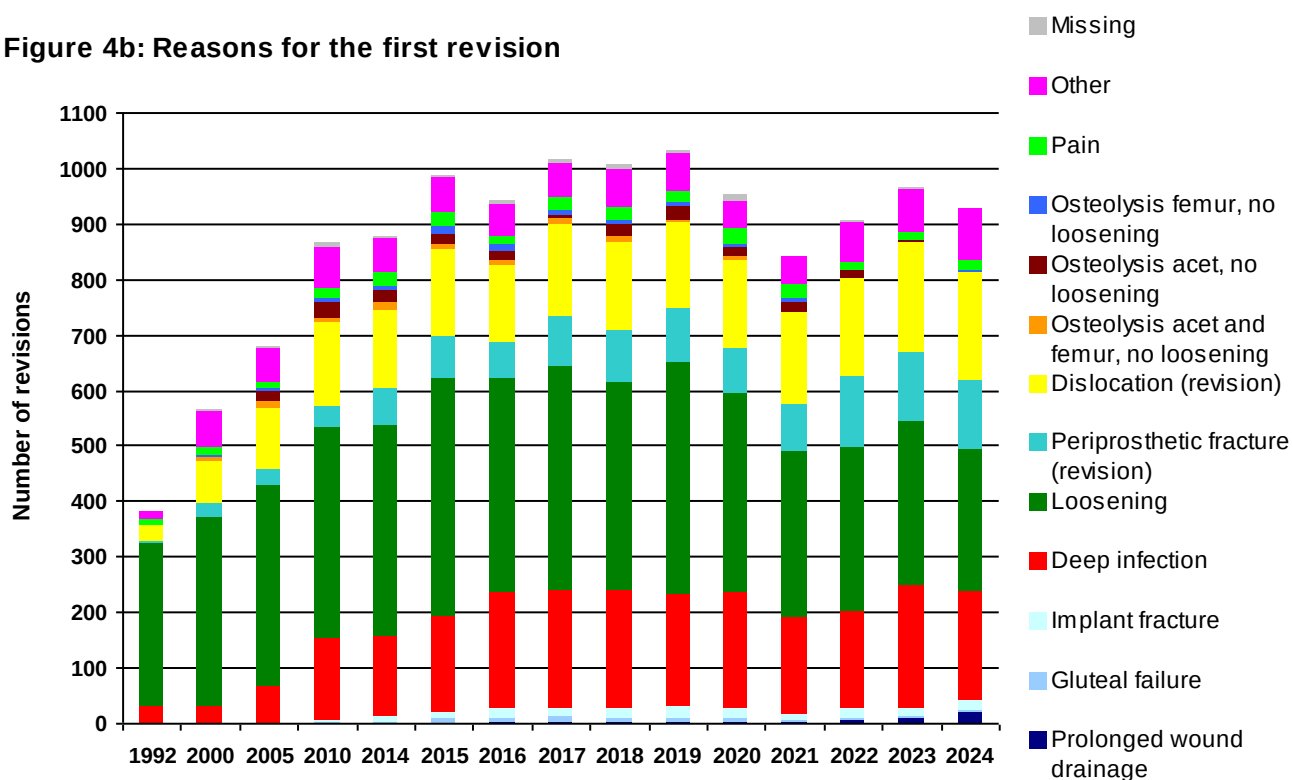


Figure 4b: Reasons for the first revision



The graph is hierarchical, i.e. if a reoperation is marked both "Deep infection" and "Loosening", only "Deep infection" is counted. Only the first reoperation is counted.

Only revisions where both primary and revisions are reported are counted. A revision is defined as a reoperation where the implant or part of the implant is changed, added or removed.

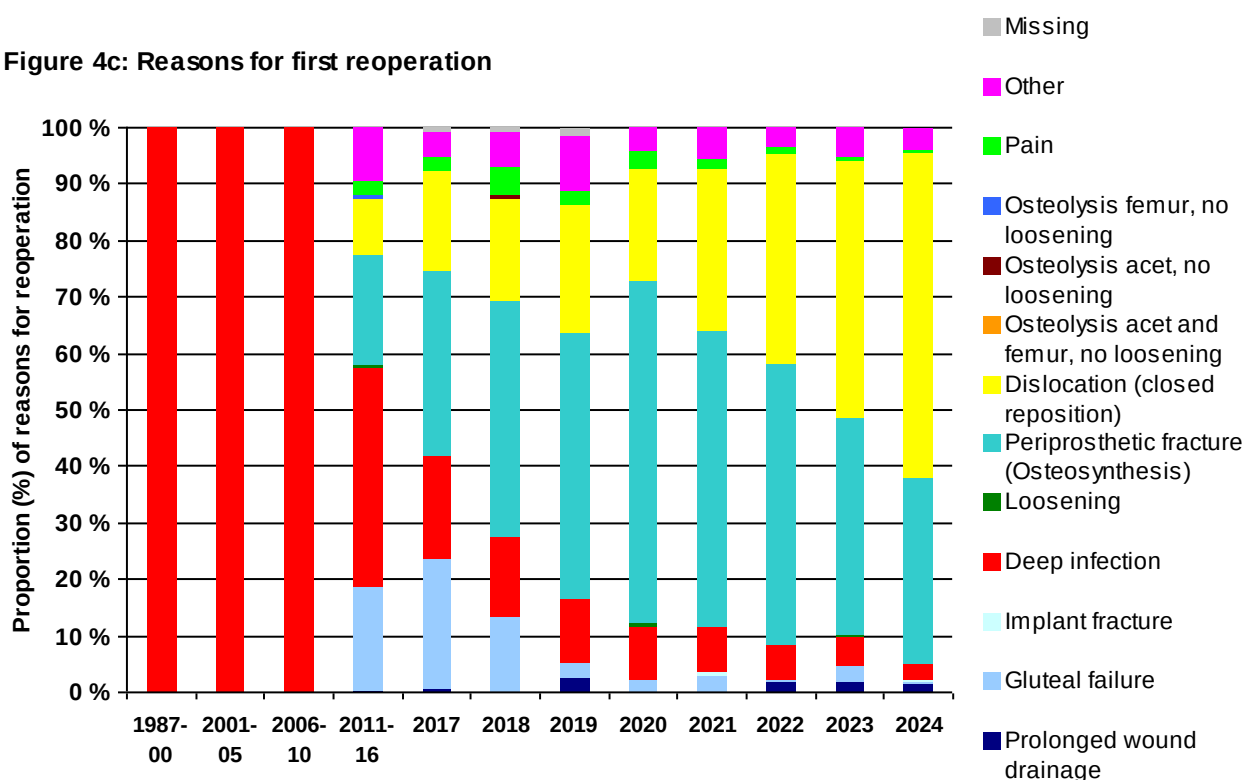
Reasons for reoperations

Table 3b:

Year of reoper.	Loosening of acetabular component	Loosening of femoral component	Dislocation (closed reposition)	Deep infection	Periprosthetic fracture (Osteosynthesis)	Pain	Osteolysis acet., no loosening	Osteolysis femur, no loosening	Polyethylene wear	Implant fracture	Gluteal failure	Prolonged wound drainage	Other	Missing information
2024	1	0	202	10	119	2	0	0	0	1	1	5	9	0
2023	1	2	112	13	95	4	0	0	0	0	8	4	9	0
2022	0	1	90	15	120	5	0	0	0	0	1	4	4	0
2021	1	0	51	15	94	4	0	0	0	1	5	0	11	0
2020	1	0	27	13	83	7	0	0	0	0	3	0	7	0
2019	0	0	34	17	72	9	0	0	0	0	4	4	12	2
2018	1	1	28	22	67	15	1	0	0	0	21	0	10	1
2017	1	1	23	24	43	13	0	1	0	0	30	1	6	1
2011-16	3	2	27	105	53	17	0	2	0	1	50	1	27	0
2006-10	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2001-05	0	0	0	1	0	0	0	0	0	0	0	0	0	0
1987-00	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Total	9	7	594	238	746	76	1	3	0	3	123	19	95	4

Reoperation causes are not mutually exclusive. More than one reason of reoperation is possible. Only the first reoperation is counted. Reoperations are defined as reoperations where the implant is not removed or parts are not added, like osteosyntheses of periprosthetic fractures.

Figure 4c: Reasons for first reoperation



The graph is hierarchical, i.e. if a reoperation is marked both "Deep infection" and "Loosening", only "Deep infection" is counted. Only the first reoperation is counted. Reoperations are defined as reoperations where the implant is not removed or parts are not added, like osteosyntheses of periprosthetic fractures.

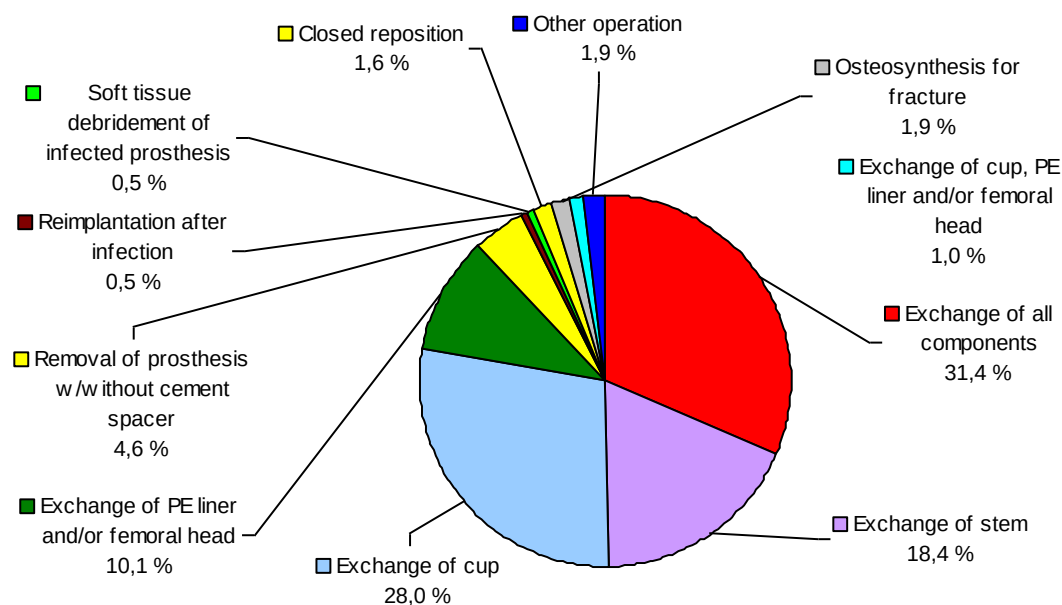
Type of revision

Table 5:

Type of revision	1987-14	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Exchange of femoral stem and head	4 189	142	103	144	146	132	121	95	131	111	95	5 409
Exchange of stem, PE liner, head	234	16	16	28	28	35	19	22	26	30	26	480
Exchange of acetabular cup	3 021	155	122	160	143	185	200	150	135	144	148	4 563
Exchange of femoral head	839	92	98	96	93	80	67	54	60	50	44	1 573
Exchange of femoral head and acetabular cup	2 904	198	218	189	199	159	143	105	115	95	65	4 390
Exchange of all components	7 962	226	248	228	204	200	189	204	179	208	170	10 018
Exchange of PE liner only	77	7	1	3	8	7	8	8	6	8	17	150
Exchange of PE liner and femoral head	730	60	59	74	75	87	65	76	87	101	95	1 509
Exchange of acetabular cup, PE liner and/or head	158	16	19	14	15	13	8	12	23	33	21	332
Removal of prosthesis or cement spacer	887	22	8	11	13	5	6	5	9	11	12	989
Removal of prosthesis and insertion of cement spacer	113	38	46	38	43	40	36	39	32	31	32	488
Insertion of new prosthesis (after Girdlestone)	144		1									145
Soft tissue debridement of infected prosthesis	58	9	13	16	13	13	7	6	13	7	10	165
Muscle resonance and transposition	10	15	19	35	18	5	8	4	4	5	1	124
Osteosynthesis for fracture	1		31	35	46	63	66	83	99	82	113	619
Resemented	5	2	1	2		1						11
Closed reposition	1	1	19	22	28	34	27	40	78	99	147	496
Other operation	102	25	32	21	26	15	14	13	16	29	24	317
Missing information	118	3	4	4	4	2	4	4	3	3		149
Total	21 553	1 027	1 058	1 120	1 102	1 076	988	920	1 016	1 047	1 020	31 927

More than one cause of reoperation is possible. Only the first reoperation is counted.

Figure 5:



Bone transplantation in revisions

Table 6: Acetabular cup

Year	Yes	No	Bone impaction ¹	Missing	Total
2024	381 (30,9 %)	843 (68,4 %)	0 (0 %)	8 (0,6 %)	1 232
2023	328 (24,6 %)	921 (69 %)	4 (0,3 %)	81 (6,1 %)	1 334
2022	106 (8,2 %)	1 000 (76,9 %)	26 (2 %)	168 (12,9 %)	1 300
2021	44 (3,5 %)	895 (70,9 %)	39 (3,1 %)	285 (22,6 %)	1 263
2020	41 (3,1 %)	914 (69 %)	52 (3,9 %)	318 (24 %)	1 325
2019	61 (4,2 %)	954 (65,1 %)	70 (4,8 %)	380 (25,9 %)	1 465
2018	50 (3,3 %)	964 (63,4 %)	76 (5 %)	430 (28,3 %)	1 520
2017	66 (4,5 %)	961 (65,4 %)	83 (5,6 %)	360 (24,5 %)	1 470
2011-16	592 (7,3 %)	5 263 (65 %)	737 (9,1 %)	1 507 (18,6 %)	8 099
2006-10	599 (10,6 %)	3 317 (58,9 %)	1039 (18,5 %)	672 (11,9 %)	5 627
2001-05	877 (18,1 %)	2 948 (60,8 %)	757 (15,6 %)	263 (5,4 %)	4 845
1987-00	2 997 (25,9 %)	7 674 (66,4 %)	657 (5,7 %)	237 (2 %)	11 565
Total	6 142 (15 %)	26 654 (64,9 %)	3 540 (8,6 %)	4 709 (11,5 %)	41 045

Table 7: Femoral stem

Year	Yes	No	Bone impaction ¹	Missing	Total
2024	210 (17 %)	1 014 (82,3 %)	0 (0 %)	8 (0,6 %)	1 232
2023	171 (12,8 %)	1 071 (80,5 %)	2 (0,2 %)	87 (6,5 %)	1 331
2022	55 (4,3 %)	1 050 (81,7 %)	3 (0,2 %)	177 (13,8 %)	1 285
2021	20 (1,6 %)	919 (74,5 %)	4 (0,3 %)	290 (23,5 %)	1 233
2020	32 (2,6 %)	891 (71,2 %)	4 (0,3 %)	325 (26 %)	1 252
2019	33 (2,4 %)	953 (68,9 %)	5 (0,4 %)	393 (28,4 %)	1 384
2018	26 (1,8 %)	955 (66,8 %)	4 (0,3 %)	445 (31,1 %)	1 430
2017	45 (3,2 %)	957 (69 %)	7 (0,5 %)	377 (27,2 %)	1 386
2011-16	457 (5,7 %)	5 369 (66,9 %)	75 (0,9 %)	2 120 (26,4 %)	8 021
2006-10	662 (11,9 %)	3 425 (61,5 %)	309 (5,5 %)	1 177 (21,1 %)	5 573
2001-05	774 (16 %)	3 175 (65,5 %)	551 (11,4 %)	348 (7,2 %)	4 848
1987-00	2 561 (22,1 %)	7 890 (68,2 %)	877 (7,6 %)	240 (2,1 %)	11 568
Total	5 046 (12,4 %)	27 669 (68,2 %)	1 841 (4,5 %)	5 987 (14,8 %)	40 543

¹ Registration of "Bone impaction" started in 1996.

Bone loss in revisions

Table 8: Acetabular cup

Year	Type I	Type IIA	Type IIB	Type IIC	Type IIIA	Type IIIB	Missing	Total
2024	55	116	76	54	58	25	288	672
2023	85	119	71	66	43	24	357	765
2022	116	97	65	37	40	13	351	719
2021	230	178	68	46	37	23	212	794
2020	279	164	98	41	42	24	220	868
2019	234	198	110	54	62	19	250	927
2018	310	173	93	48	49	20	264	957
2017	311	166	99	62	55	9	256	958
2011-16	1 394	1 177	616	456	355	143	1 393	5 534
2006-10	1 038	800	444	389	319	128	1 057	4 175
2001-05	240	137	87	74	59	23	209	829

Bone loss in revision - acetabulum (Paprosky Classification):

- Type I: Hemispheric acetabulum without edge defects. Intact posterior and anterior column. Defects in anchoring holes that do not destroy the subchondral bone plate.
- Type IIA: Hemispheric acetabulum without major edge defects, intact posterior and anterior column, but with small metaphyseal fractures again.
- Type IIB: Hemispheric acetabulum without major edge defects, intact posterior and anterior column, but with small metaphyseal fractures again and some lack of support superiorly.
- Type IIC: Hemispheric acetabulum without major edge defects, intact posterior and anterior column, but with defect in medial wall.
- Type IIIA: Significant component migration, osteolysis and bone loss. Bone loss from 10 o'clock until 2.
- Type IIIB: Significant component migration, osteolysis and bone loss. Bone loss from 9 o'clock until 5.

Table 9: Femoral stem

Year	Type I	Type II	Type IIIA	Type IIIB	Type IV	Missing	Total
2024	67	98	26	12	11	304	518
2023	93	94	23	16	10	346	582
2022	143	64	31	17	6	313	574
2021	246	97	45	16	8	204	616
2020	232	111	52	11	5	216	627
2019	256	133	59	10	7	237	702
2018	296	123	59	15	10	246	749
2017	275	140	51	13	8	219	706
2011-16	1 231	945	438	117	34	1 349	4 114
2006-10	819	748	337	89	42	979	3 014
2001-05	210	152	72	23	10	163	630

Bone loss in revision - femoral stem (Paprosky Classification):

- Type I: Minimal loss of metaphyseal bone and intact diaphysis.
- Type II: Major loss of metaphyseal bone, but intact diaphysis. Significant
- Type IIIA: loss of metaphyseal bone without possibility of proximal mechanical support. Over 4 cm of intact corticalis in the isthmus area.
- Type IIIB: Significant loss of metaphyseal bone without possibility of proximal mechanical support. Below 4 cm of intact corticalis in the isthmus area.
- Type IV: Significant loss of metaphyseal bone without possibility of proximal mechanical support. Wide isthmus with little possibility of cortical support.

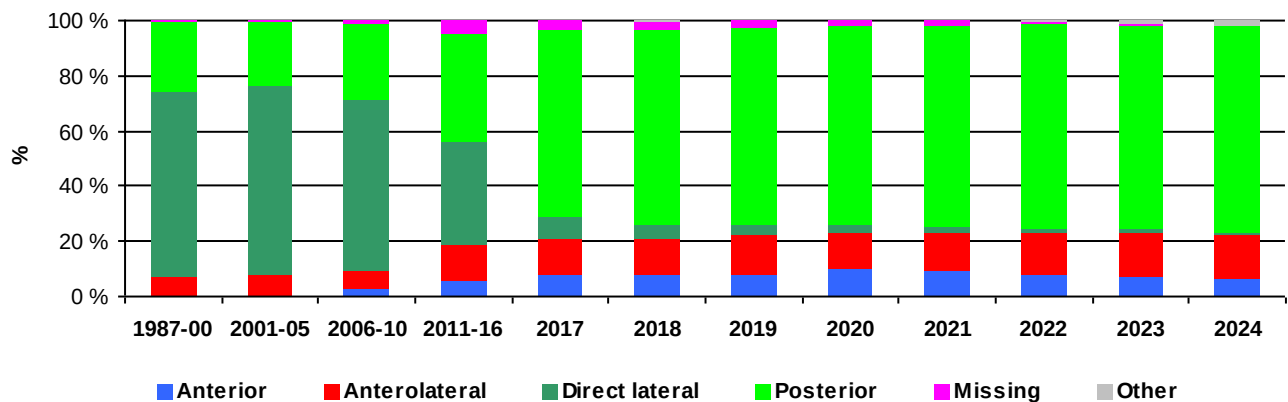
Registration of bone loss started in 2005

Surgical approach

Table 10: In primary operations *

Year	Anterior	Anterolateral	Direct lateral	Posterior	Other	Missing information	Total
2024	751 (6,6 %)	1 748 (15,4 %)	107 (0,9 %)	8 435 (74,3 %)	284 (2,5 %)	25 (0,2 %)	11 350
2023	816 (7,4 %)	1 723 (15,7 %)	117 (1,1 %)	8 060 (73,6 %)	188 (1,7 %)	52 (0,5 %)	10 956
2022	823 (7,8 %)	1 609 (15,2 %)	172 (1,6 %)	7 798 (73,7 %)	54 (0,5 %)	129 (1,2 %)	10 585
2021	915 (9,5 %)	1 296 (13,5 %)	192 (2 %)	6 981 (72,7 %)	0 (0 %)	214 (2,2 %)	9 598
2020	862 (9,9 %)	1 171 (13,4 %)	237 (2,7 %)	6 257 (71,7 %)	10 (0,1 %)	188 (2,2 %)	8 725
2019	794 (7,9 %)	1 423 (14,2 %)	414 (4,1 %)	7 108 (70,8 %)	23 (0,2 %)	281 (2,8 %)	10 043
2018	771 (8 %)	1 249 (13 %)	465 (4,8 %)	6 803 (70,8 %)	41 (0,4 %)	281 (2,9 %)	9 610
2017	713 (7,8 %)	1 170 (12,8 %)	753 (8,2 %)	6 177 (67,3 %)	4 (0 %)	359 (3,9 %)	9 176
2011-16	2 787 (5,7 %)	6 222 (12,7 %)	8 286 (37,4 %)	9 077 (39,1 %)	37 (0,1 %)	2 437 (5 %)	48 846
2006-10	1 035 (3 %)	2 053 (6 %)	1 322 (62,2 %)	9 282 (27,1 %)	36 (0,1 %)	544 (1,6 %)	34 272
2001-05	47 (0,1 %)	2 403 (7,5 %)	2 114 (68,7 %)	7 391 (23 %)	60 (0,2 %)	184 (0,6 %)	32 199
1987-00	157 (0,2 %)	4 378 (6,7 %)	4 263 (67,2 %)	6 652 (25,3 %)	42 (0,1 %)	337 (0,5 %)	65 829
Total	10 471 (4 %)	26 445 (10,1 %)	108 442 (41,5 %)	110 021 (42,1 %)	779 (0,3 %)	5 031 (1,9 %)	261 189

Figure 6: In primary operations *

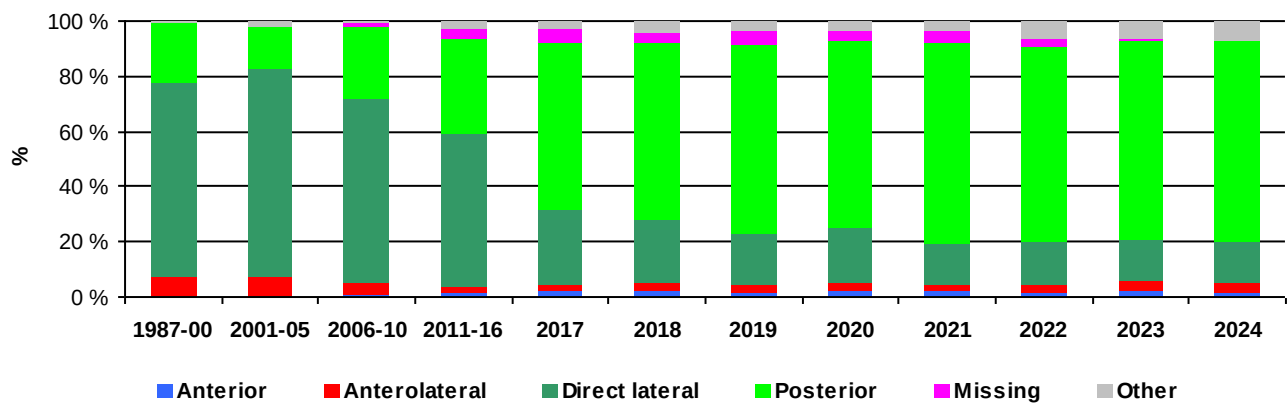


* Anterior: Operative approach between sartorius and tensor
 Anterolateral: Operative approach between glut. medius and tensor
 Direct lateral: Operative approach transgluteal
 Posterior: Operative approach behind gluteus medius

Table 11: In revisions *

Year	Anterior	Anterolateral	Direct lateral	Posterior	Other	Missing information	Total
2024	21 (1,7 %)	41 (3,3 %)	189 (15,1 %)	901 (71,9 %)	93 (7,4 %)	9 (0,7 %)	1 254
2023	32 (2,4 %)	42 (3,1 %)	211 (15,6 %)	967 (71,6 %)	83 (6,1 %)	16 (1,2 %)	1 351
2022	23 (1,7 %)	37 (2,8 %)	201 (15,3 %)	925 (70,3 %)	88 (6,7 %)	41 (3,1 %)	1 315
2021	29 (2,3 %)	26 (2 %)	194 (15,1 %)	921 (71,7 %)	50 (3,9 %)	64 (5 %)	1 284
2020	33 (2,4 %)	36 (2,7 %)	272 (20,2 %)	899 (66,7 %)	52 (3,9 %)	55 (4,1 %)	1 347
2019	26 (1,7 %)	35 (2,3 %)	285 (19,1 %)	1 013 (67,9 %)	58 (3,9 %)	75 (5 %)	1 492
2018	34 (2,2 %)	47 (3,1 %)	344 (22,5 %)	973 (63,6 %)	63 (4,1 %)	69 (4,5 %)	1 530
2017	29 (1,9 %)	35 (2,3 %)	409 (27,4 %)	902 (60,4 %)	39 (2,6 %)	80 (5,4 %)	1 494
2011-16	94 (1,2 %)	197 (2,4 %)	4 496 (55,3 %)	2 787 (34,3 %)	232 (2,9 %)	322 (4 %)	8 128
2006-10	43 (0,8 %)	227 (4 %)	3 805 (67,4 %)	1 444 (25,6 %)	44 (0,8 %)	85 (1,5 %)	5 648
2001-05	13 (0,3 %)	331 (6,8 %)	3 654 (75,1 %)	721 (14,8 %)	91 (1,9 %)	57 (1,2 %)	4 867
1987-00	28 (0,2 %)	764 (6,6 %)	8 220 (71 %)	2 460 (21,2 %)	50 (0,4 %)	55 (0,5 %)	11 577
Total	405 (1 %)	1 818 (4,4 %)	22 280 (54 %)	14 913 (36,1 %)	943 (2,3 %)	928 (2,2 %)	41 287

Figure 7: In revisions *



* Anterior: Operative approach between sartorius and tensor
 Anterolateral: Operative approach between glut. medius and tensor
 Direct lateral: Operative approach transgluteal
 Posterior: Operative approach behind gluteus medius

Fixation in primary operations

Figure 8a: All patients

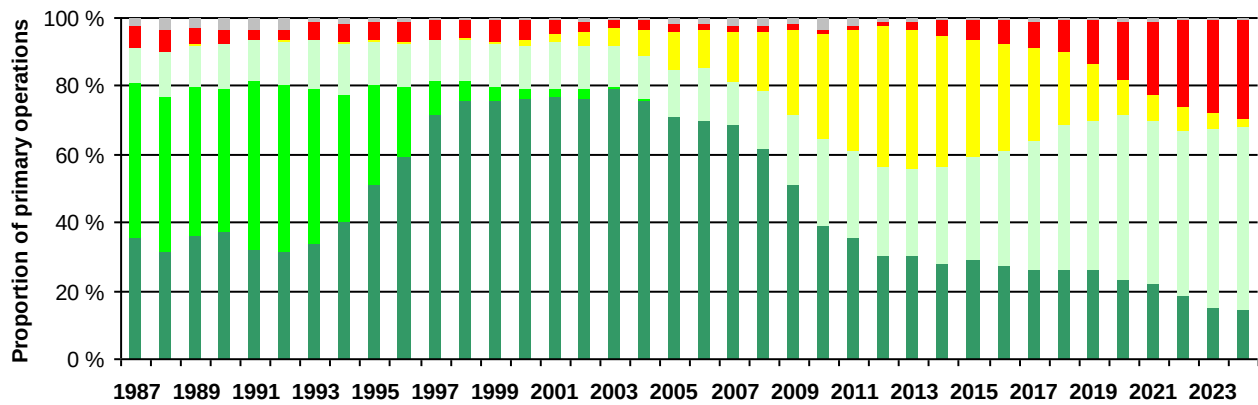
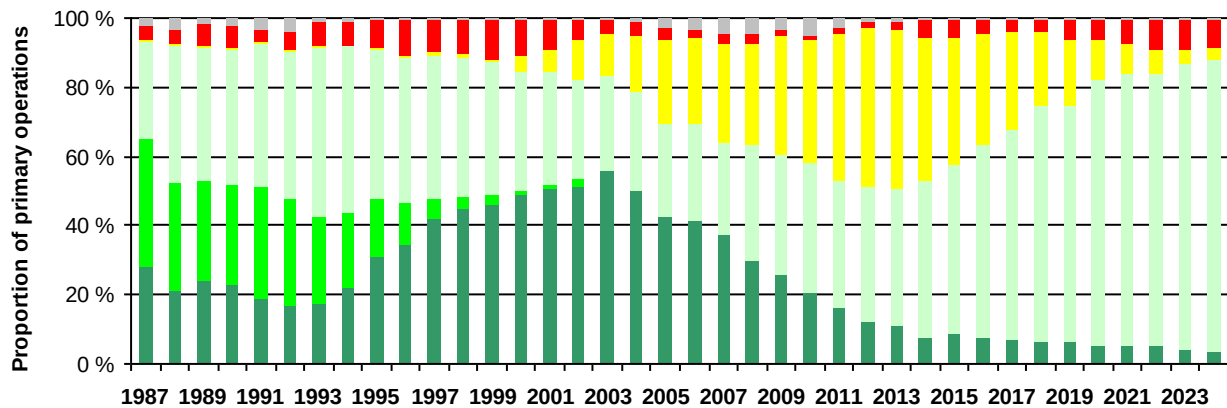


Figure 8b: Patients under 65 years old



- Missing information / Other
- Hybrid (cemented femur)
- Reverse hybrid (cemented acetabulum)
- Uncemented acetabulum and femur
- Cemented acetabulum and femur without antibiotic
- Cemented acetabulum and femur with antibiotic

Fixation in primary operations (cont.)

Figure 8c: Patients between 65 years and 75 years old

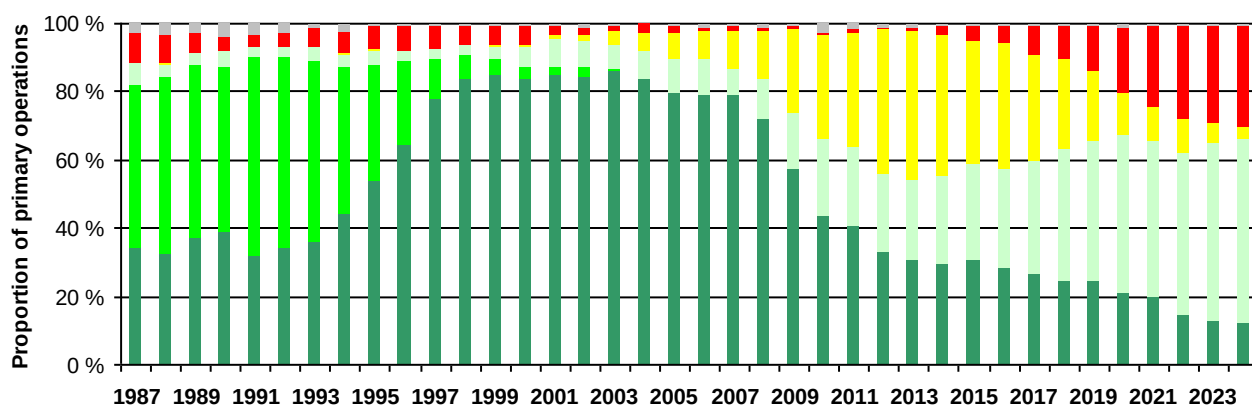
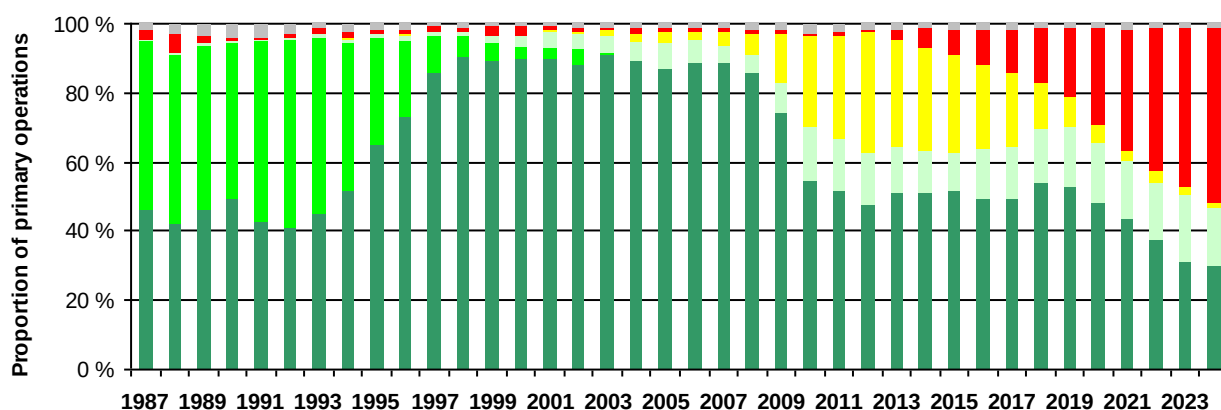


Figure 8d: Patients over 75 years old



- Missing information / Other
- Hybrid (cemented femur)
- Reverse hybrid (cemented acetabulum)
- Uncemented acetabulum and femur
- Cemented acetabulum and femur without antibiotic
- Cemented acetabulum and femur with antibiotic

Fixation in revisions

Figure 9: Acetabular cup - All patients

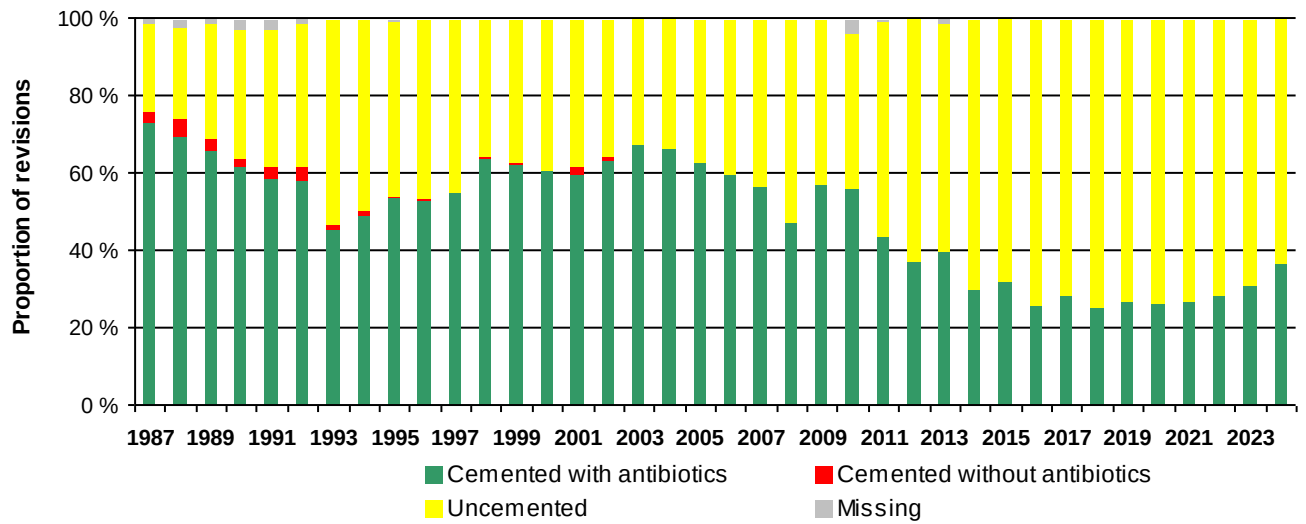
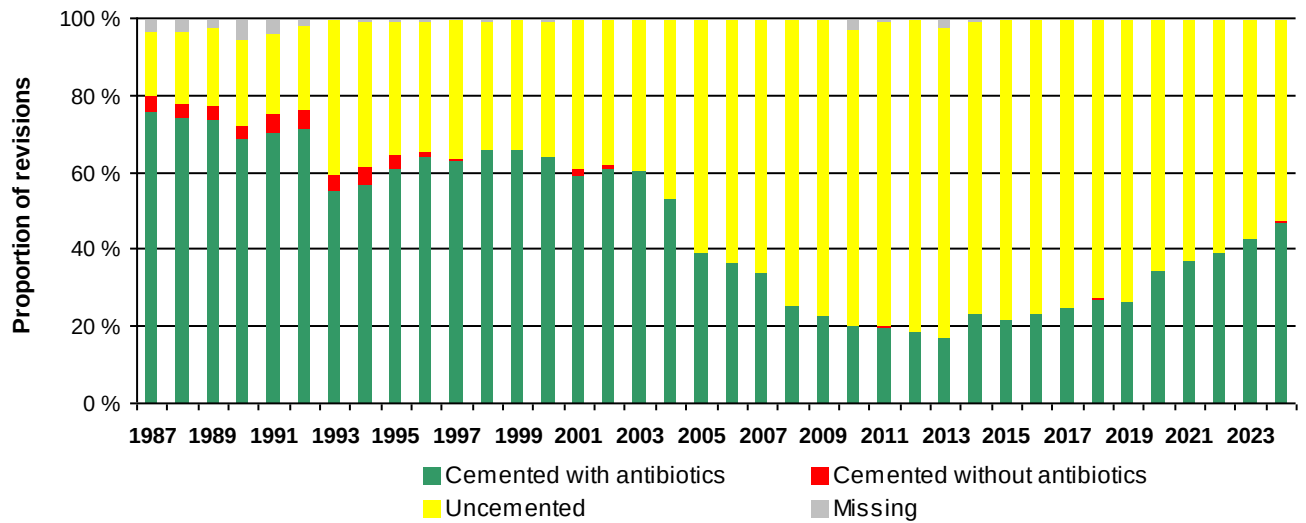


Figure 10: Femoral stem - All patients



Type of fixation and bone transplantation in revisions

Table 12: Acetabular cup

	Cemented					Uncemented				
	Bone impaction	Bone transpl.	No	Missing	Total	Bone impaction	Bone transpl.	No	Missing	Total
2024	0%	61%	39%	0%	268	0%	37%	63%	0%	463
2023	1%	44%	52%	2%	263	0%	31%	65%	4%	589
2022	5%	18%	73%	5%	226	3%	10%	77%	10%	572
2021	8%	6%	75%	11%	215	4%	5%	72%	19%	584
2020	9%	2%	73%	17%	230	5%	5%	71%	19%	639
2019	11%	5%	69%	15%	251	6%	7%	66%	22%	687
2018	12%	5%	61%	22%	237	7%	5%	65%	23%	701
2017	16%	7%	56%	20%	258	5%	7%	73%	16%	658
2011-16	30%	8%	52%	10%	1 838	5%	12%	69%	14%	3 493
2006-10	43%	8%	43%	6%	2 114	7%	23%	64%	6%	1 681
2001-05	33%	19%	47%	2%	2 109	6%	37%	53%	4%	1 154
1987-00	11%	24%	64%	1%	4 728	4%	57%	38%	2%	3 121
Total	22%	18%	56%	5%	12 737	5%	25%	60%	10%	14 342

Table 13: Femoral stem

	Cemented					Uncemented				
	Bone impaction	Bone transpl.	No	Missing	Total	Bone impaction	Bone transpl.	No	Missing	Total
2024	0%	30%	70%	0%	219	0%	41%	59%	0%	239
2023	0%	20%	77%	3%	235	0%	29%	64%	6%	304
2022	1%	7%	87%	6%	195	0%	8%	79%	12%	305
2021	2%	1%	84%	13%	178	0%	4%	76%	19%	304
2020	1%	2%	80%	16%	169	0%	5%	72%	22%	319
2019	1%	1%	79%	19%	145	0%	4%	72%	24%	402
2018	1%	0%	73%	26%	149	0%	4%	71%	24%	411
2017	3%	3%	76%	18%	130	0%	7%	74%	19%	398
2011-16	7%	3%	67%	23%	655	1%	13%	72%	14%	2 509
2006-10	33%	7%	50%	10%	650	3%	28%	61%	8%	1 718
2001-05	33%	10%	56%	1%	1 377	7%	43%	48%	3%	1 116
1987-00	12%	15%	71%	1%	5 685	7%	61%	30%	1%	2 490
Total	14%	12%	69%	5%	9 787	3%	30%	58%	10%	10 515

Registration of "Bone impaction" started in 1996

Cements used in the acetabulum and femur

Table 14: In primary- and revision surgeries

Cements	1987-16	2017	2018	2019	2020	2021	2022	2023	2024	Total
Boneloc	1 353	0	0	0	0	0	0	0	0	1 353
Cemex System Genta FAST	1 578	0	0	1	0	0	0	0	0	1 579
Cemex system genta ID green	18	197	204	139	3	0	0	0	0	561
Cemex w/gentamicin	969	0	0	1	3	0	0	0	0	973
CMW I	5 110	0	0	0	0	0	0	0	0	5 110
CMW I w/gentamicin	3 341	0	0	0	0	0	0	0	0	3 341
CMW II	15	0	0	0	0	0	0	0	0	15
CMW III	1 956	0	0	0	0	0	0	0	0	1 956
CMW III w/gentamicin	189	0	0	0	0	0	0	0	0	189
Copal G+ V	35	24	32	93	86	88	98	84	68	608
Copal w/gentamicin+clindamycin	31	13	23	41	42	29	45	56	28	308
Optipac Refobacin Bonecement R	14 798	1 633	1 180	88	0	3	52	65	0	17 819
Optipac Refobacin Bonecement R-3	0	0	0	131	120	139	119	116	158	783
Optipac Refobacin Revision	75	13	1	0	0	0	0	0	0	89
Palacos	6 990	0	0	0	0	0	0	0	0	6 990
Palacos E-Flow (low viscosity)	99	0	0	0	0	0	0	0	0	99
Palacos R + G	30 880	1 666	1 541	1 018	529	570	523	296	268	37 291
Palacos R+G pro	63	789	2 081	3 751	3 559	3 965	4 463	4 487	4 780	27 938
Palacos w/gentamicin	62 764	0	1	0	0	0	0	0	0	62 765
Palamed G (gentamicin)	13	0	0	0	0	0	0	0	0	13
Refobacin Bone Cement R	11 451	913	59	1	0	0	0	0	0	12 424
Refobacin Revision	411	70	24	5	0	0	6	0	0	516
Refobacin Revision-3	0	0	35	38	30	37	26	32	39	237
Refobacin-Palacos	2 386	0	0	0	0	0	0	0	0	2 386
Simplex	7 147	0	0	0	0	0	1	0	0	7 148
Simplex unknown	827	0	0	0	0	0	0	0	0	827
Simplex w/erythr.+colistin	2 598	0	0	0	0	0	0	0	0	2 598
Simplex w/Tobramycin	8 041	488	503	491	333	390	435	415	214	11 310
SmartSet GHV	159	0	0	0	0	0	0	0	0	159
SmartSet GHV Genta. Smartmix	370	179	99	117	33	1	0	0	0	799
SmartSet HV	15	0	0	0	0	0	0	0	0	15
Vancogenx	10	5	4	10	6	7	0	7	5	54
Vancogenx-HV	0	0	0	0	0	2	3	4	11	20
Annet (n<10)	20	1	0	0	1	2	10	4	5	43
Missing information	557	66	60	112	90	21	56	56	100	1 118

Cemented primary prostheses

Table 15: (The 45 most common combinations of cup and stem)

Cup	Stem	1987-16	2017	2018	2019	2020	2021	2022	2023	2024	Total
CHARNLEY	CHARNLEY	40 366									40 366
EXETER	EXETER	12 987									12 987
EXETER X3 RIMFIT	EXETER	6 695	992	1 044	1 009	633	567	482	325	201	11 948
REFLECTION CEM. ALL POLY	SPECTRON-EF	9 741									9 741
IP	LUBINUS SP II	5 837	217	203	222	157	183	217	179	210	7 425
TITAN	TITAN	6 986									6 986
CONTEMPORARY	EXETER	4 757	1		3	4					4 765
LUBINUS	LUBINUS SP II	772	214	201	228	227	271	178	150	253	2 494
SPECTRON	ITH	2 405									2 405
MARATHON	CHARNLEY MODULAR	1 618	26		2	13					1 659
MARATHON	EXETER	616	197	244	241	95	59	66	15	18	1 551
MARATHON	C-STEM	205	118	180	249	250	235	128	121	50	1 536
KRONOS	TITAN	1 496									1 496
MARATHON	LUBINUS SP II	287	40	41	110	184	215	234	229	133	1 473
MARATHON	MS-30	34	72	115	167	197	219	269	178	88	1 339
ELITE	TITAN	1 237									1 237
ELITE	CHARNLEY	932									932
REFLECTION CEM. ALL POLY	ITH	927									927
REFLECTION CEM. ALL POLY	BIO-FIT	905									905
WEBER ALLO PRO	MS-30	813									813
AVANTAGE	EXETER	349	32	65	71	74	72	55	56	36	810
ELITE	EXETER	778									778
ZCA	CPT	756									756
CHARNLEY	CHARNLEY MODULAR	672									672
POLARCUP	LUBINUS SP II	78	25	16	45	55	77	79	92	137	604
IP	LUBINUS	587									587
ELITE	ELITE	579									579
CHARNLEY	EXETER	571									571
TITAN	FJORD	523									523
ELITE	CHARNLEY MODULAR	521									521
SPECTRON	SP I	432									432
MODULAR HIP SYSTEM	BIO-FIT	430									430
AVANTAGE	LUBINUS SP II	18	4	7	12	20	39	74	113	135	422
MARATHON	CORAIL	309	28	25	14	5	18	6	9	8	422
EXCEED ABT CEMENTED SYS	MS-30		65	97	97	38	73	38	9	4	421
SPECTRON	TITAN	414									414
CHARNLEY	C-STEM	378									378
CHARNLEY	ELITE	375									375
OPERA	SPECTRON-EF	356									356
ELITE	MS-30	339									339
PEARL	TITAN	285									285
EXCEED ABT CEMENTED SYS	CPT		106	113	64						283
MODULAR HIP SYSTEM	ITH	277									277
SPECTRON	BIO-FIT	226									226
IP	SP I	214									214
Other	Other	3 122	247	157	121	84	73	136	205	376	4 521

Uncemented primary prostheses

Table 16: (The 45 most common combinations of cup and stem)

Cup	Stem	1987-16	2017	2018	2019	2020	2021	2022	2023	2024	Total
PINNACLE	CORAIL	2 802	1 241	1 675	1 742	1 634	1 762	1 861	2 136	1 981	16 834
TRIDENT	CORAIL	547	241	303	659	1 068	1 317	1 687	1 955	2 077	9 854
REFLECTION UNCEMENTED	CORAIL	4 719	219	427	182	277	189	10	2		6 025
R3	CORAIL	615	568	519	463	334	382	428	488	555	4 352
TRILOGY	CORAIL	2 741	270	200	329	148	58	73	81	57	3 957
IGLOO	FILLER	3 365	108	121	136	46	3				3 779
TROPIC	CORAIL	2 676									2 676
R3	POLARSTEM	409	50	14	25	108	164	315	440	702	2 227
TRIDENT	ACCOLADE II	418	116	174	234	216	248	157	168	103	1 834
Continuum Acetabular System	CORAIL	825	88	41	48	78	84	71	48	34	1 317
ATOLL	CORAIL	1 282									1 282
DURALOC	CORAIL	1 072									1 072
TRIDENT	POLARSTEM	123	60	59	121	93	74	116	88	129	863
REFLECTION UNCEMENTED	HACTIV	316	187	184	95						782
BICON-PLUS	ZWEYMÜLLER	590									590
REFLECTION UNCEMENTED	SECURFIT	518									518
TRILOGY	SCP/UNIQUE	512									512
R3	FILLER	210	114	96	44						464
TRILOGY	HACTIV	451			8						459
GEMINI	PROFILE	407									407
G7 MDM	CORAIL					2	26	120	123	129	400
BICON-PLUS	HACTIV	387									387
DURALOC	PROFILE	333									333
REFLECTION UNCEMENTED	OMNIFIT	307									307
DURALOC	SCP/UNIQUE	267									267
TRILOGY	FILLER	263									263
TRABECULAR METAL	CORAIL	98	26	26	35	28	16	11	8	4	252
REFLECTION UNCEMENTED	SCP/UNIQUE	249	2								251
ENDLER	ZWEYMÜLLER	247									247
EUROPEAN CUP SYSTEM	TAPERLOC	240									240
PLASMACUP	BICONTACT	232									232
AVANTAGE	CORAIL	122	10	12	25	14	15	12	13	5	228
LMT	TAPERLOC	227									227
TRIDENT	ABG II	214									214
TI-FIT	BIO-FIT	175									175
REFLECTION UNCEMENTED	SL-PLUS MIA	173									173
SECURFIT	OMNIFIT	166									166
ABG I	ABG I	165									165
HARRIS/GALANTE	HARRIS/GALANTE	158									158
ABG II	ABG II	155									155
COXA	FEMORA	155									155
PARHOFER	PARHOFER	152									152
BICON-PLUS	CORAIL	150									150
TRIDENT	FURLONG EVOLUTION	5	4	8	12	14	32	40	14	19	148
REFLECTION UNCEMENTED	PROFEMUR GLADIATOR	143									143
Other	Other	3 708	185	251	232	180	265	199	183	263	5 466

Hybrid primary prostheses

Table 17: Hybrid primary prostheses. (The 20 most common)

Cup (uncemented)	Stem (cemented)	1987-16	2017	2018	2019	2020	2021	2022	2023	2024	Total
TRIDENT	EXETER	158	13	178	460	558	657	746	730	709	4 209
TRIDENT	LUBINUS SP II	11	21	14	65	214	310	395	538	465	2 033
TRILOGY	EXETER	1 287	259	171	60	32	26	18	4		1 857
R3	LUBINUS SP II	203	142	145	95	80	144	228	280	396	1 713
PINNACLE	C-STEM	3	2	25	94	121	237	365	387	384	1 618
TRIDENT	C-STEM	1			4	24	108	248	275	374	1 034
PINNACLE	LUBINUS SP II	7	5	28	36	108	153	154	177	282	950
TROPIC	TITAN	894									894
REFLECTION UNCEMENTED	C-STEM	91	108	124	146	198	143				810
TRIDENT	MS-30	1	1	4	39	68	121	103	205	214	756
MORSCHER	MS-30	703									703
TRILOGY	CHARNLEY	395									395
ENDLER	TITAN	346									346
PINNACLE	EXETER	22	7	20	8	21	44	106	84	10	322
REFLECTION UNCEMENTED	LUBINUS SP II	200		22	9	4	5	2			242
G7 MDM	LUBINUS SP II						13	59	71	83	226
AVANTAGE	EXETER	85	26	24	19	12	12	16	10	5	209
PINNACLE	MS-30		1	5	7	9	18	17	53	48	158
DURALOC	CHARNLEY	154									154
REFLECTION UNCEMENTED	BIO-FIT	145									145
Other	Other	1 817	144	134	229	60	78	258	201	297	3 218

Table 18: Reverse hybrid primary prostheses. (The 20 most common)

Cup (cemented)	Stem (uncemented)	1987-16	2017	2018	2019	2020	2021	2022	2023	2024	Total
MARATHON	CORAIL	16 551	2 187	1 819	1 497	796	653	631	346	181	24 661
ELITE	CORAIL	2 679									2 679
REFLECTION CEM. ALL POLY	CORAIL	1 308	31	7	2	7	3	5			1 363
TITAN	CORAIL	987									987
EXETER X3 RIMFIT	ACCOLADE II	408	121	116	62	1	1	3	5	8	725
CONTEMPORARY	CORAIL	684									684
KRONOS	CORAIL	640									640
EXETER X3 RIMFIT	CORAIL	435	54	24	21	11	8	14	23	18	608
REFLECTION CEM. ALL POLY	HACTIV	477									477
REFLECTION CEM. ALL POLY	FILLER	261	2								263
AVANTAGE	CORAIL	128	14	20	10	7	12	24	16	12	243
IP	CORAIL	211	1	3	4				2	1	222
EXETER	CORAIL	174									174
EXETER	ABG II	173									173
REFLECTION CEM. ALL POLY	TAPERLOC	162									162
EXETER X3 RIMFIT	ABG II	148									148
EXETER X3 RIMFIT	FILLER	130	7		2						139
CHARNLEY	CORAIL	118									118
MARATHON	KAR/Corail Revision	67	10	8	6	3	2	5	1		102
ELITE	SCP/UNIQUE	99									99
Other	Other	1 365	83	51	66	56	49	66	58	90	1 884

Acetabular cups in primary operations

Table 19: (The 45 most common)

Cup	1987-14	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
CHARNLEY	43 209											43 209
MARATHON	13 992	3 045	3 000	2 762	2 495	2 331	1 555	1 414	1 354	908	493	33 349
TRIDENT	793	441	548	546	783	1 625	2 301	2 950	3 561	4 020	4 184	21 752
PINNACLE	2 058	398	519	1 286	1 810	1 949	1 906	2 231	2 528	2 876	2 799	20 360
REFLECTION CEM. ALL POLY	14 083	36	33	34	8	17	15	10	20	12	15	14 283
EXETER X3 RIMFIT	4 652	1 571	1 635	1 178	1 185	1 099	648	580	550	451	401	13 950
EXETER	13 519											13 519
REFLECTION UNCEMENTED	6 465	798	435	520	834	452	495	349	13	2		10 363
R3	320	308	829	885	808	692	523	699	995	1 252	1 737	9 048
TITAN	8 816											8 816
IP	6 521	315	267	220	211	228	159	183	218	181	212	8 715
TRILOGY	5 452	517	582	576	374	468	196	87	114	97	61	8 524
ELITE	7 849	5	2									7 856
CONTEMPORARY	5 501	15	3	1		3	4					5 527
IGLOO	3 300	124	169	110	121	136	47	3				4 010
TROPIC	3 823											3 823
SPECTRON	3 652											3 652
AVANTAGE	892	98	158	190	182	223	191	223	232	249	235	2 873
LUBINUS	326	253	213	215	205	230	230	279	185	155	263	2 554
KRONOS	2 193											2 193
DURALOC	1 983											1 983
POLARCUP	259	64	49	91	99	183	185	193	220	206	305	1 854
ATOLL	1 491											1 491
Continuum Acetabular System	194	320	348	98	50	60	83	89	75	49	35	1 401
BICON-PLUS	1 212	1										1 213
ZCA	1 063											1 063
EXCEED ABT CEMENTED SYS	47	32	23	206	274	179	42	75	38	9	5	930
MODULAR HIP SYSTEM	878											878
MORSCHER	843											843
G7 MDM							2	48	304	231	257	842
WEBER ALLO PRO	830											830
ENDLER	662											662
BIRMINGHAM HIP RESURFACI	523											523
GEMINI	510											510
OPERA	457											457
TRABECULAR METAL	76	35	54	41	44	57	34	34	24	21	14	434
EUROPEAN CUP SYSTEM	332											332
BI-MENTUM								3	36	79	213	331
TI-FIT	312											312
PEARL	287											287
PLASMACUP	283											283
LMT (Uncemented)	275											275
HARRIS/GALANTE	252											252
PE-PLUS	247											247
MÜLLER TYPE	242											242
Other	2 779	65	81	204	121	106	101	145	106	145	109	3 962

Acetabular cups in revisions

Table 20: (The 45 most common)

Cup	1987-14	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
CHARNLEY	2 864			1								2 865
AVANTAGE	1 310	86	76	90	97	91	118	88	114	112	96	2 278
TRIDENT	197	94	88	111	169	228	268	260	310	303	220	2 248
TRABECULAR METAL	700	160	204	158	153	155	111	85	56	66	46	1 894
TROPIC	1 885											1 885
PINNACLE	780	97	111	115	134	114	119	88	58	87	75	1 778
TRILOGY	1 384	65	59	46	42	24	29	21	9	14	14	1 707
ELITE	1 600											1 600
POLARCUP	418	132	118	129	111	123	89	101	94	91	95	1 501
MARATHON	705	94	66	60	46	45	35	24	15	18	12	1 120
EXETER	943				1							944
REFLECTION CEM. ALL POLY	909	4	2				1					916
REFLECTION UNCEMENTED	482	74	35	41	28	26	20	23	13	11	14	767
IGLOO	489	15	25	18	17	20	3					587
TITAN	527											527
R3	19	20	61	79	67	31	27	34	15	20	45	418
ATOLL	396											396
IP	258	5	3	4	1	1	1	2	4	1	3	283
Continuum Acetabular System	13	51	66	37	37	38	15	7	2	1	1	268
CONTEMPORARY	240											240
EXETER X3 RIMFIT	104	29	29	9	5	11	6	6	7	13	8	227
KRONOS	225											225
CHRISTIANSEN	196											196
SPECTRON	189											189
DURALOC	136	9	2	6	5	7	6	6	4	1		182
G7 MDM							3	28	38	45	53	167
BI-MENTUM								6	29	45	57	137
OPERA	101											101
HARRIS/GALANTE	99											99
ZCA	96											96
MODULAR HIP SYSTEM	95											95
CAPTIV	71		7									78
BICON-PLUS	54	2	1	5	4	5	4			1	1	77
EUROPEAN CUP SYSTEM	73											73
LMT (Uncemented)	67											67
ENDLER	66											66
HG II	53											53
MORSCHER	51											51
TRIDENT ALL POLY	11	2	2	2	1	2		5	4	8	12	49
GEMINI	47											47
SECURFIT	45											45
REGENEREX RINGLOC	40						1					41
OCTOPUS	40											40
NOVAE							6	12	14	7		39
TI-FIT	36											36
Other	460	2	5	16	18	17	9	2	10	13	17	569

Femoral stems in primary operations

Table 21: (The 45 most common)

Stem	1987-14	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
CORAIL	33 558	4 459	4 759	5 031	5 171	5 080	4 432	4 601	5 045	5 406	5 283	82 825
CHARNLEY	42 531											42 531
EXETER	24 976	1 850	1 894	1 553	1 838	1 928	1 475	1 481	1 589	1 291	1 089	40 964
LUBINUS SP II	6 170	780	786	670	682	895	1 073	1 465	1 681	1 898	2 197	18 297
TITAN	12 188											12 188
SPECTRON-EF	10 655	3	1	2	6	6	10	4	7	16	7	10 717
C-STEM	543	76	203	250	360	585	643	768	808	858	957	6 051
FILLER	3 988	262	287	245	235	196	94	70	1			5 378
MS-30	1 876	17	21	144	227	320	329	459	638	555	491	5 077
ITH	3 723											3 723
POLARSTEM	418	110	97	111	112	169	219	253	470	570	942	3 471
CHARNLEY MODULAR	2 702	154	46	28		2	13					2 945
ACCOLADE II	247	314	342	266	305	325	262	312	165	173	111	2 822
HACTIV	1 434	150	281	242	204	134						2 445
CPT	1 116	1	2	440	262	175	1			1	1	1 999
BIO-FIT	1 993											1 993
SCP/UNIQUE	1 370	28	35	11		1	1	1				1 447
ZWEYMÜLLER	1 102											1 102
ELITE	1 030											1 030
OMNIFIT	890											890
PROFILE	890											890
ABG II	826	23										849
TAPERLOC	787											787
SP I	780											780
FJORD	652											652
LUBINUS	624										1	625
SECURFIT	558											558
CPS-PLUS	496											496
KAR/Corail Revision	223	29	42	39	24	37	21	17	20	23	19	494
BICONTACT	443											443
LMT (Cemented)	417											417
FURLONG EVOLUTION	4	19	19	36	32	32	25	41	56	27	38	329
ABG I	304											304
PROFEMUR GLADIATOR	171				33	20	11					235
TI-FIT	221											221
MÜLLER TYPE	213											213
RESTORATION	53	8	9	2	6	20	18	18	17	19	18	188
SL-PLUS MIA	177										8	185
FEMORA	182											182
BI-METRIC	155	7	16	1								179
HARRIS/GALANTE	169											169
FURLONG	41	16	19	23	18	15			3	14	19	168
PARHOFER	159											159
ARCOS	8	7	9	9	7	11	17	20	7	16	27	138
KAREY	136											136
Other	1 469	95	38	13	40	38	25	24	25	32	85	1 884

Femoral stems in revisions

Table 22: (The 45 most common)

Stem	1987-14	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
KAR/Corail Revision	2 659	138	103	99	90	106	76	69	57	71	74	3 542
CHARNLEY	2 982	1			1							2 984
EXETER	1 898	77	78	68	84	84	91	95	100	98	89	2 762
CORAIL	1 508	51	66	57	50	45	40	44	45	64	35	2 005
RESTORATION	406	70	55	36	73	51	62	52	51	44	33	933
CPT	488	7	6	23	18	9	1	8	2	5	5	572
TITAN	538											538
LUBINUS SP II	213	16	9	17	30	28	34	34	43	53	51	528
FJORD	476											476
FILLER	366	10	19	19	16	19	6	10	2	5		472
ARCOS	33	27	32	42	41	26	51	54	61	45	59	471
TTHR	330	21	24	24	16	19	6	7		1	1	449
SPECTRON-EF	370	3	2	1		2	3		5	3	2	391
ELITE	352											352
REEF	327											327
REVITAN	61	36	31	38	33	34	15	14	10	11	5	288
MP RECONSTRUCTION	137	17	12	14	14	10	10	6	17	18	9	264
C-STEM	14	3	12	11	14	19	26	26	31	52	46	254
Securus	22	11	19	20	20	39	34	20	16	10	5	216
ANATOMIC BR	192											192
ITH	192											192
REACTIV	79	13	27	14	9	13	2	3	2	6	2	170
BIO-FIT	167											167
HACTIV	110	13	9	10	8	7						157
BI-METRIC	135		2	2								139
PRIUS	2	11	17	8	22	9	6	9	23	20	3	130
RECLAIM	23	12	12	6	10	5	10	6	16	9	11	120
TAPERLOC	115											115
MS-30	34		2	4	4	4	9	9	11	7	5	89
ZWEYMÜLLER	83											83
Profemur	77											77
ECHELON	68											68
SP I	66											66
SCAN HIP	59											59
LUBINUS	51											51
HARRIS/GALANTE	44											44
CHARNLEY MODULAR	34	3	5	1								43
FEMORA	43											43
PARHOFER	43											43
POLARSTEM	11		1	4	1	4	3	5	1	3	9	42
MRP-TITAN				6	18	12	2	1	1	1		41
PROFEMUR GLADIATOR	39											39
AURA	38											38
LANDOS (Reconstruction)	33											33
MUTARS	4	8	5	2	1	2	3	3	3	2		33
Other	374	4		4		2	3	7	5	4	5	408

The 7 most common primary prostheses in last 5 years

Table 23a: Acetabular cup

2020	2021	2022	2023	2024
TRIDENT (2 301)	TRIDENT (2 950)	TRIDENT (3 561)	TRIDENT (4 020)	TRIDENT (4 184)
PINNACLE (1 906)	PINNACLE (2 231)	PINNACLE (2 528)	PINNACLE (2 876)	PINNACLE (2 799)
MARATHON (1 555)	MARATHON (1 414)	MARATHON (1 354)	R3 (1 252)	R3 (1 737)
EXETER X3 RIMFIT (648)	R3 (699)	R3 (995)	MARATHON (908)	MARATHON (493)
R3 (523)	EXETER X3 RIMFIT (580)	EXETER X3 RIMFIT (550)	EXETER X3 RIMFIT (451)	EXETER X3 RIMFIT (401)
REFLECTION * (495)	REFLECTION * (349)	G7 MDM (304)	AVANTAGE (249)	POLARCUP (305)
LUBINUS (230)	LUBINUS (279)	AVANTAGE (232)	G7 MDM (231)	LUBINUS (263)

Table 23b: Femoral stem

2020	2021	2022	2023	2024
CORAIL (4 432)	CORAIL (4 601)	CORAIL (5 045)	CORAIL (5 406)	CORAIL (5 283)
EXETER (1 475)	EXETER (1 481)	LUBINUS SP II (1 681)	LUBINUS SP II (1 898)	LUBINUS SP II (2 197)
LUBINUS SP II (1 073)	LUBINUS SP II (1 465)	EXETER (1 589)	EXETER (1 291)	EXETER (1 089)
C-STEM (643)	C-STEM (768)	C-STEM (808)	C-STEM (858)	C-STEM (957)
MS-30 (329)	MS-30 (459)	MS-30 (638)	POLARSTEM (570)	POLARSTEM (942)
ACCOLADE II (262)	ACCOLADE II (312)	POLARSTEM (470)	MS-30 (555)	MS-30 (491)
POLARSTEM (219)	POLARSTEM (253)	ACCOLADE II (165)	ACCOLADE II (173)	ACCOLADE II (111)

Table 23c: Combinations of cup and stem

2020	2021	2022	2023	2024
PINNACLE + CORAIL (1 634)	PINNACLE + CORAIL (1 762)	PINNACLE + CORAIL (1 862)	PINNACLE + CORAIL (2 143)	TRIDENT + CORAIL (2 093)
TRIDENT + CORAIL (1 068)	TRIDENT + CORAIL (1 317)	TRIDENT + CORAIL (1 691)	TRIDENT + CORAIL (1 964)	PINNACLE + CORAIL (1 989)
MARATHON + CORAIL (801)	MARATHON + CORAIL (672)	TRIDENT + EXETER (766)	TRIDENT + EXETER (733)	TRIDENT + EXETER (721)
EXETER X3 RIMFIT + EXETER (633)	TRIDENT + EXETER (666)	MARATHON + CORAIL (637)	TRIDENT + LUBINUS SP II (540)	R3 + POLARSTEM (721)
TRIDENT + EXETER (558)	EXETER X3 RIMFIT + EXETER (568)	EXETER X3 RIMFIT + EXETER (484)	R3 + CORAIL (488)	R3 + CORAIL (555)
R3 + CORAIL (334)	R3 + CORAIL (382)	R3 + CORAIL (430)	R3 + POLARSTEM (466)	TRIDENT + LUBINUS SP II (469)
REFLECTION * + CORAIL (277)	TRIDENT + LUBINUS SP II (315)	TRIDENT + LUBINUS SP II (401)	PINNACLE + C-STEM (393)	R3 + LUBINUS SP II (397)

* UNCEMENTED

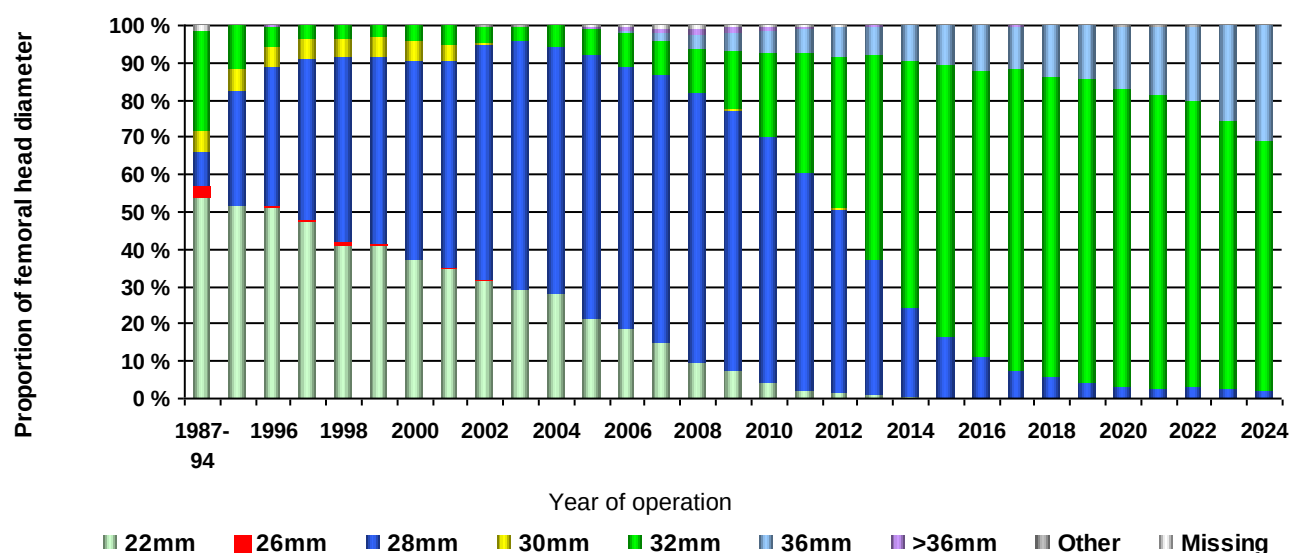
**' MODULAR

Femoral head diameter (No dual mobility has been taken).

Table 24: In primary operations and revisions

Year	22 mm	26 mm	28 mm	30 mm	32 mm	36 mm	>36 mm	Other	Missing	Total
2024	18		187		7 062	3 186			19	10 472
2023	20		262		7 422	2 614	1	2	15	10 336
2022	13		304		7 788	1 981	3	23	20	10 132
2021	10		259		7 414	1 729	4	10	16	9 442
2020	14		267		7 044	1 489	7	11	18	8 850
2019	21		418	2	8 449	1 471	11		6	10 378
2018	10		573		8 223	1 363	6	4	10	10 189
2017	7		720		7 873	1 137	9	2	17	9 765
2016	9		1 083	1	7 375	1 188	1	2	14	9 673
2015	22		1 508		6 748	948	5	2	8	9 241
2014	57		2 094	1	5 866	808	4	3	10	8 843
2013	82	2	3 224	1	4 853	677	3	5	18	8 865
2012	148		4 214	3	3 503	671	25	4	24	8 592
2011	158		4 783		2 610	522	52	1	22	8 148
2010	348		5 347	3	1 833	490	82	1	27	8 131
2009	598	2	5 529	4	1 242	386	115	1	47	7 924
2008	732	2	5 495	2	882	281	134	2	62	7 592
2007	1 081		5 316	2	665	148	112	2	62	7 388
2006	1 287	6	4 908	3	639	58	60	5	33	6 999
2005	1 563	9	5 171		522	4	41	2	24	7 336
2004	1 931	26	4 527	7	393		4	3	5	6 896
2003	2 257	24	5 121	13	309		1	10	14	7 749
2002	2 173	16	4 317	62	275		2	22	13	6 880
2001	2 385	18	3 811	317	344		1	3	11	6 890
2000	2 392	6	3 426	347	269			3	7	6 450
1999	2 546	26	3 105	337	198			2	6	6 220
1998	2 507	66	3 038	306	225				1	6 143
1997	2 860	24	2 627	297	226		6	1	7	6 048
1996	2 863	7	2 102	287	306	1	15		4	5 585
1995	3 014	4	1 821	342	673		7		5	5 866
1987-94	19 598	1 126	3 429	2 084	9 676	1	91		509	36 514
Total	50 724	1 364	88 986	4 421	110 907	21 153	802	126	1 054	279 537

Figure 11: In primary operations and revisions



Dual Mobility articulation

Table 25 In primary operation

Prosthesis	1987-16	2017	2018	2019	2020	2021	2022	2023	2024	Total
AVANTAGE	1 149	191	182	223	191	222	213	243	234	2 848
TRIDENT MDM	75	35	53	108	182	276	414	479	486	2 108
POLARCUP	372	91	98	183	186	193	205	199	303	1 830
BI-MENTUM						3	36	78	212	329
G7 MDM						11	57	70	90	228
NOVAE					10	25	28	55		118
Restoration Anatomic Cup	10	4	1	4		4	5	1		29
CAPTIV	19									19
ACE								2	4	6
Other (n<5)	2									2
Total	1 627	321	334	518	569	734	958	1 127	1 329	7 517

Table 26 In revisions

Prosthesis	1987-16	2017	2018	2019	2020	2021	2022	2023	2024	Total
AVANTAGE	1 546	121	108	107	136	104	135	136	122	2 515
POLARCUP	716	141	123	129	100	106	108	122	122	1 667
TRIDENT MDM	127	44	100	152	202	202	235	245	182	1 489
G7 MDM					3	23	33	42	48	149
BI-MENTUM						6	29	45	57	137
Restoration Anatomic Cup	54	28	11	4		3	11	1	2	114
NOVAE					6	12	14	7		39
CAPTIV	10									10
GYROS	10									10
ACE							2	1	3	6
Other (n<5)			1							1
Total	2 463	334	343	392	447	456	567	599	536	6 137

ASA classification

Figure 12: Primary operations

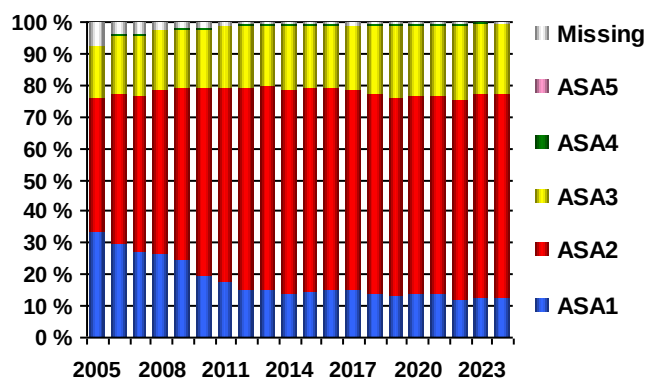
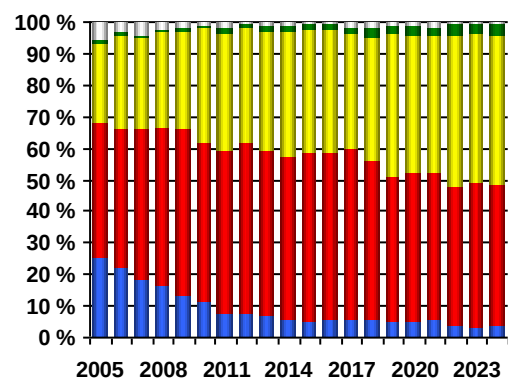


Figure 13: Revisions



ASA 1 = Healthy patients who smoke less than 5 cigarettes a day.

ASA 2 = Patients with an asymptomatic condition who are kept under medical control (f.ex. hypertension), or with diet (f. ex. diabetes mellitus type 2), and otherwise healthy patients who smoke five cigarettes or more daily.

ASA 3 = Patients having a condition that can cause symptoms. However, patients are kept under medical control (f. ex. moderate angina pectoris and mild asthma).

ASA 4 = Patients with a condition that is out of control (f. ex. heart failure and asthma).

ASA 5 = A moribund patient who is not expected to survive the operation.

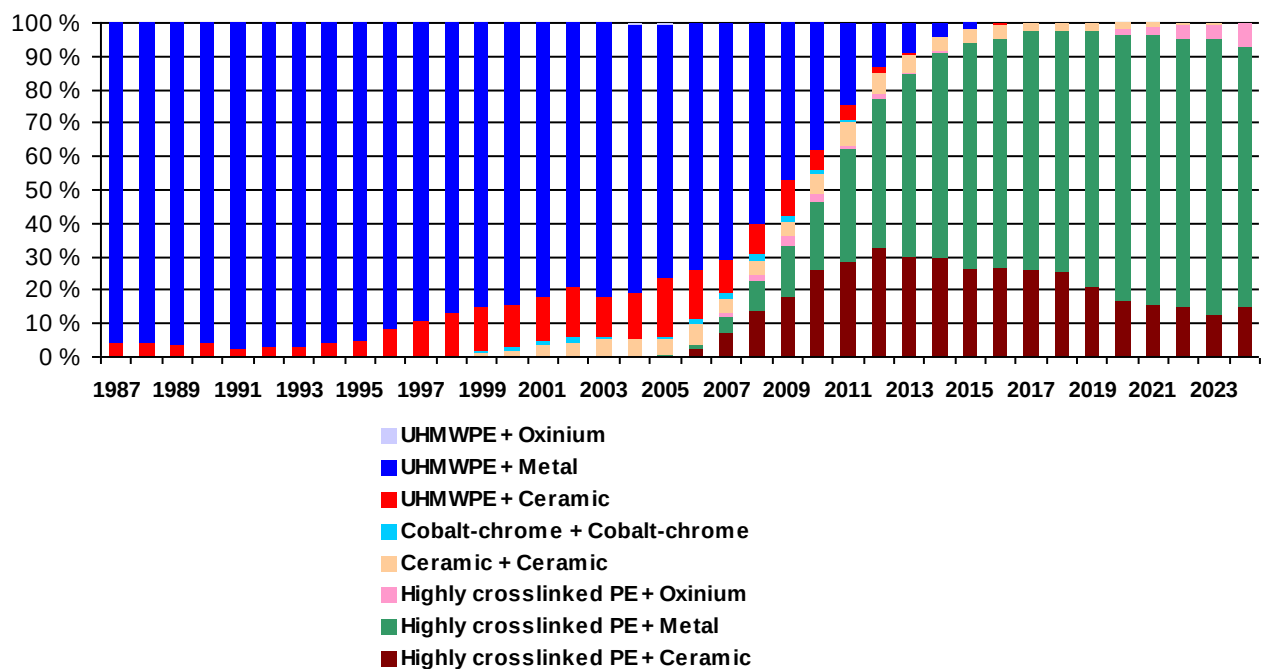
Registration of ASA classification started in 2005

Articulations (except dual mobility)

Table 27: In primary operations - All patients

Cup + Femoral head	1987-16	2017	2018	2019	2020	2021	2022	2023	2024	Total
Highly crosslinked PE + Cobalt-chrome	25 361	5 774	6 195	6 853	6 196	6 853	7 371	7 853	7 589	80 045
UHMWPE + Steel	71 309	0	0	0	0	0	0	0	0	71 309
UHMWPE + Cobalt-chrome	33 767	13	8	21	18	2	3	6	6	33 844
Highly crosslinked PE + Alumina	14 124	860	696	293	149	153	82	58	47	16 462
Highly crosslinked PE + Alumina/Zirconium ¹	4 209	1 423	1 688	1 672	1 207	1 227	1 340	1 149	1 466	15 381
UHMWPE + Alumina	10 919	0	0	0	0	0	0	0	0	10 919
Highly crosslinked PE + Steel	4 570	493	427	422	266	263	314	239	173	7 167
Alumina + Alumina	3 790	1	0	0	0	0	0	0	0	3 791
Alumina/Zirconium + Alumina/Zirconium ¹	1 917	218	205	193	118	122	44	30	10	2 857
Highly crosslinked PE + Oxinium	771	2	2	21	161	211	387	428	683	2 666
UHMWPE + Titanium	1 908	0	0	0	0	0	0	0	0	1 908
UHMWPE + Zirconium	1 402	0	0	0	0	0	0	0	0	1 402
Cobalt-chrome + Cobalt-chrome	1 045	0	0	0	0	0	0	0	0	1 045
UHMWPE + Alumina/Zirconium ¹	346	0	0	0	0	0	0	4	1	351
Titanium + Alumina	151	1	0	0	0	0	0	0	0	152
Highly crosslinked PE + Titanium	83	0	0	0	0	0	0	0	0	83
UHMWPE + Oxinium	77	0	0	0	0	0	0	0	0	77
Titanium + Alumina/Zirconium ¹	36	5	1	4	1	0	2	1	1	51
Missing	3 450	52	45	23	30	23	36	34	31	3 724
Other (n<50)	175	2	1	1	0	1	3	0	2	185
Total	179 410	8 844	9 268	9 503	8 146	8 855	9 582	9 802	10 009	253 419

Figure 14: In primary operations



¹Alumina/Zirconium = Aluminum oxide and zirconium oxide composite.

Periprosthetic femur fractures (Vancouver Classification)

Table 28: Vancouver classification for periprosthetic femoral stem fractures operated with or without replacement of the prosthesis - including osteosynthesis

	With replacement of the prosthesis					Without replacement of the prosthesis					Missing
	Type A	Type B1	Type B2	Type B3	Type C	Type A	Type B1	Type B2	Type B3	Type C	
2024	13	4	100	25	1	13	54	22	9	23	2
2023	16	6	94	32	8	23	36	15	4	15	12
2022	21	8	86	50	6	14	47	23	2	24	33
2021	6	5	66	25	5	14	40	16	2	12	31
2020	7	9	62	28	2	14	25	16	7	8	43
2019	12	11	67	39	1	11	31	10	5	11	30
2018	12	6	71	25	4	10	22	14	2	6	44
2017	14	7	48	25	1	8	15	2	3	5	50
2016	17	1	24	23		7	11	6		4	70
2015			1			1					143

Thrombosis prophylaxis

Figure 15: Primary operations

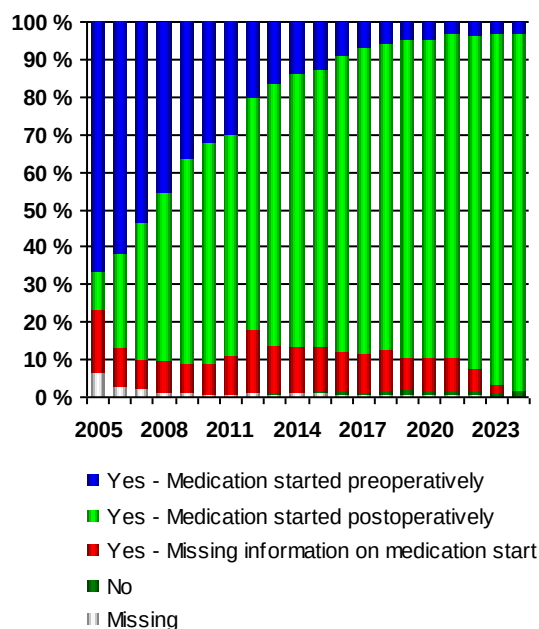
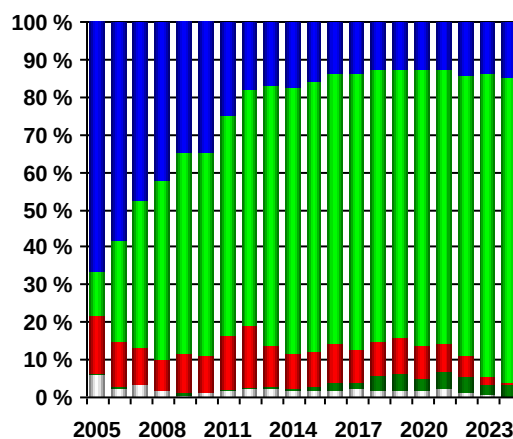


Figure 16: Revisions



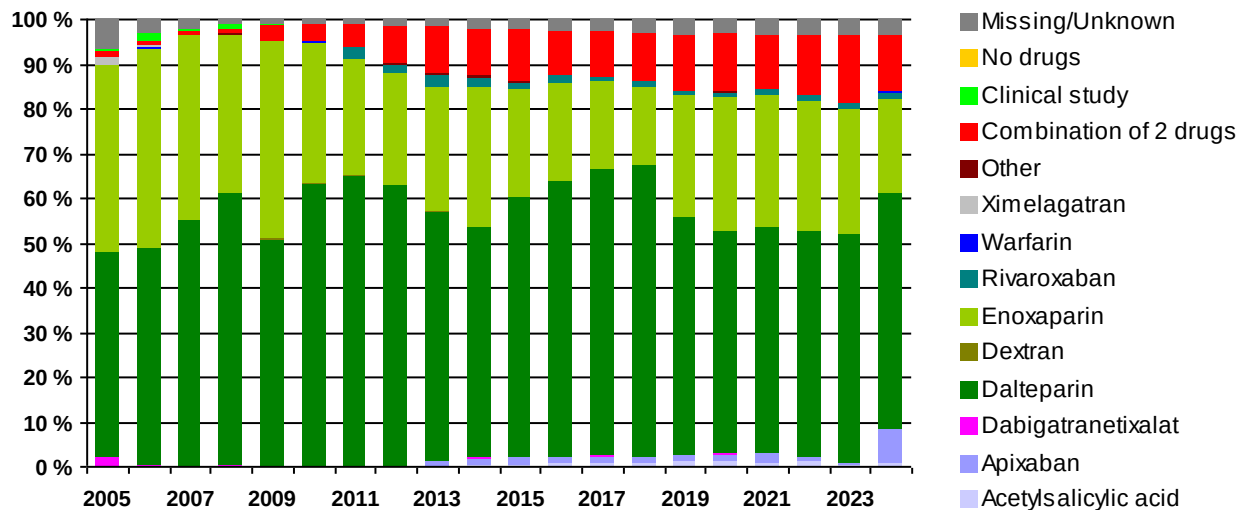
Registration of thrombosis prophylaxis started in 2005

Thrombosis prophylaxis

Table 29: All operations

Drugs	2005-14	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Acetylsalicylic acid (Albyl-E, Globoid, Acetyratio, Magnyl E)	0,1 %	0,6 %	0,8 %	0,9 %	1,0 %	1,1 %	1,1 %	1,1 %	1,4 %	0,6 %	0,9 %
Apixaban (Eliquis)	0,3 %	1,5 %	1,5 %	1,6 %	1,4 %	1,3 %	1,8 %	1,9 %	0,7 %	0,4 %	7,7 %
Dabigatranetixalat (Re-Novate, Pradaxa)	0,3 %	0,1 %									
Dalteparin (Fragmin)	56,2 %	58,4 %	61,6 %	64,1 %	64,9 %	53,7 %	50,1 %	50,6 %	50,6 %	50,9 %	52,5 %
Dextran (Macrodex, Dextran)	0,1 %										
Enoxaparin (Klexane)	34,3 %	24,1 %	22,0 %	19,6 %	17,6 %	26,8 %	29,7 %	29,7 %	29,1 %	28,3 %	21,3 %
Rivaroxaban (Xarelto)	1,1 %	1,5 %	1,5 %	1,1 %	1,1 %	1,0 %	0,9 %	1,0 %	1,2 %	1,3 %	1,0 %
Warfarin (Marevan)	0,1 %	0,1 %									0,6 %
Ximelagatran (Exanta, Malagatran)	0,2 %										
Other							0,1 %	0,1 %	0,1 %		
Combination of 2 drugs	4,9 %	11,5 %	10,0 %	10,2 %	10,9 %	12,5 %	13,0 %	12,2 %	13,3 %	14,8 %	12,4 %
Clinical study	0,4 %										
No drugs											
Missing/Unknown	1,9 %	2,2 %	2,6 %	2,5 %	2,9 %	3,4 %	3,2 %	3,4 %	3,5 %	3,6 %	3,7 %
Total	84 330	9 878	10 467	10 690	11 182	11 570	10 118	10 947	12 013	12 494	12 857

Figure 17: Drugs - All operations



Registration of thrombosis prophylaxis started in 2005

Thrombosis prophylaxis

Table 30: Duration - All operations

Year	Days:	1-7	8-14	15-21	22-28	29-35	>35	No drugs	Missing	Total
2024		4 108	6 444	920	18	295	30	0	1 040	12 855
2023		4 026	5 345	852	6	1 056	29	0	1 179	12 493
2022		3 227	4 821	872	14	1 137	18	0	1 923	12 012
2021		2 695	4 614	783	21	950	16	0	1 861	10 940
2020		2 533	3 997	767	42	1 115	13	1	1 649	10 117
2019		2 656	4 472	919	118	1 411	14	0	1 978	11 568
2018		2 172	4 029	1 026	176	1 860	19	0	1 899	11 181
2017		1 457	3 927	1 003	542	1 911	25	0	1 825	10 690
2016		1 427	3 483	1 114	732	2 046	22	0	1 643	10 467
2015		1 439	2 882	725	943	2 338	26	0	1 524	9 877
2014		1 402	2 277	578	904	2 944	45	0	1 305	9 455
2013		1 431	1 408	598	1 481	3 231	63	0	1 254	9 466
2012		1 163	1 594	702	1 496	3 088	34	0	1 096	9 173
2011		698	1 745	693	1 397	3 198	40	1	885	8 657
2005-10		5 327	13 449	5 616	3 592	13 157	591	19	5 818	47 569

Registration of thrombosis prophylaxis started in 2005

Table 31: Use of drain in all operations

Year	Yes	No	Missing	Total
2024	100	10 642	1 853	12 595
2023	71	8 735	1 113	9 919
2022	49	4 112	348	4 509
2021	3	917	77	997
Total	223	24 406	3 391	28 020

Registration started during 2021

Table 32: Joint gap in primary operation (mm)

Year	0 mm	1 mm	2 mm	> 2 mm	Missing	Total
2024	5 088	2 840	1 212	772	1 434	11 346
2023	3 766	2 316	1 031	640	1 060	8 813
2022	1 584	904	415	322	677	3 902
2021	102	91	24	30	173	420
Total	10 540	6 151	2 682	1 764	3 344	24 481

Electronic registration started during 2021

Table 33: Suture technique in all operations

Year	Continuous skin suture	Single skin suture	Intracutaneous skin suture	Clip	Glue	Other	Total
2024	4 956	699	3 268	2 811	1 347	17	13 098
2023	4 029	901	2 553	2 229	834	39	10 585
2022	2 101	722	1 231	470	59	1	4 584
2021	69	96	232	6	0	0	403
Total	11 155	2 418	7 284	5 516	2 240	57	28 670

Electronic registration started during 2021. More than one suture technique is possible.

Figure 18: Suture technique in all operations

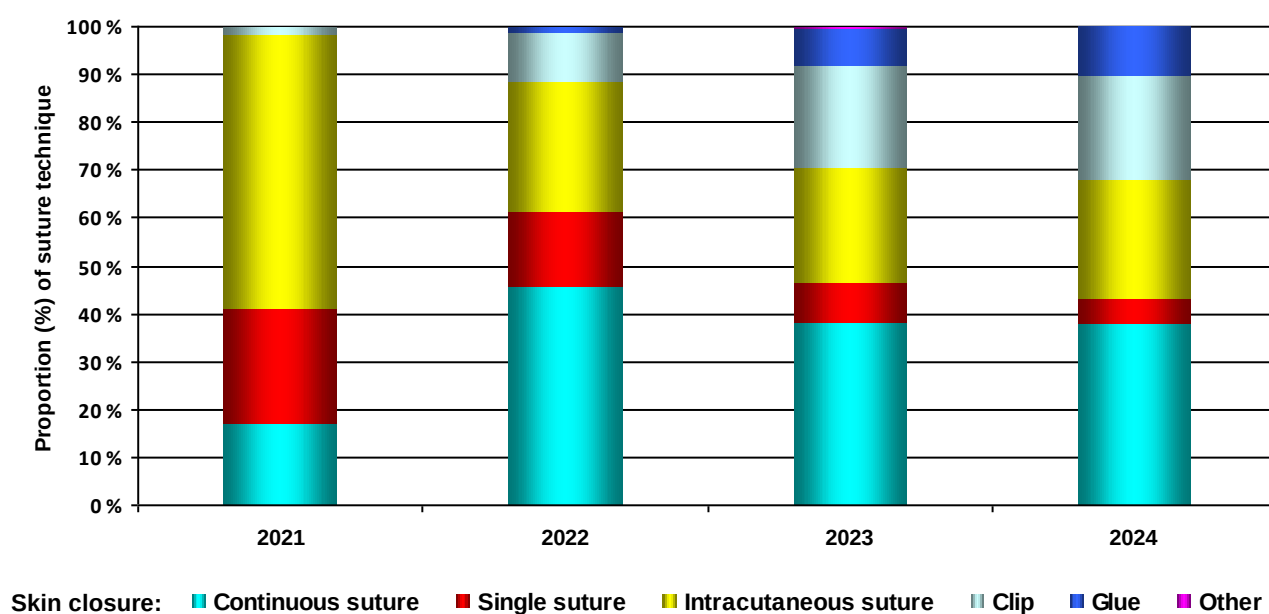
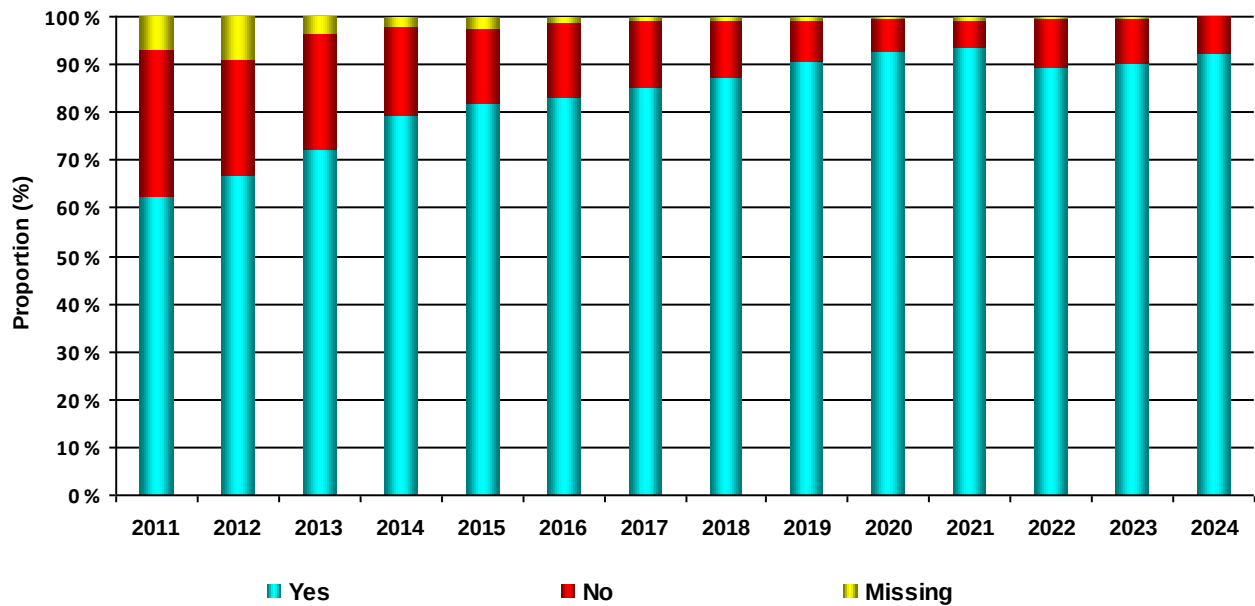


Table 34: Fibrinolysis inhibitor in all operations

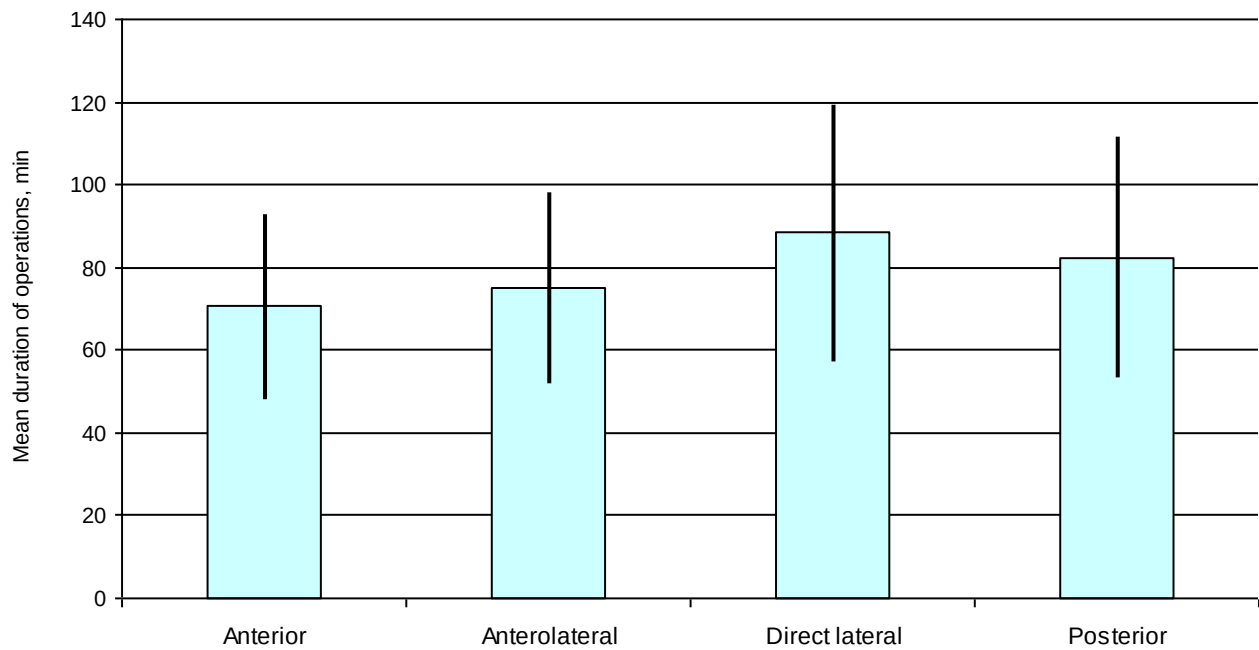
Year	Yes	No	Unknown/Missing	Total
2024	11 568	994	20	12 582
2023	11 082	1 179	35	12 296
2022	10 382	1 173	62	11 617
2021	10 132	627	87	10 846
2020	9 300	695	53	10 048
2019	10 406	1 030	74	11 510
2018	9 698	1 312	113	11 123
2017	9 063	1 495	79	10 637
2016	8 654	1 645	118	10 417
2015	8 036	1 566	251	9 853
2014	7 461	1 749	214	9 424
2013	6 806	2 249	371	9 426
2012	6 128	2 198	828	9 154
2011	2 623	1 303	299	4 225
Total	121 339	19 215	2 604	143 158

Registration started during 2011

Figure 19: Fibrinolysis inhibitor in all operations

Duration of surgery (for the last 10 years)

Figure 20: Duration of surgery for the different types of surgical approaches (primary operation)



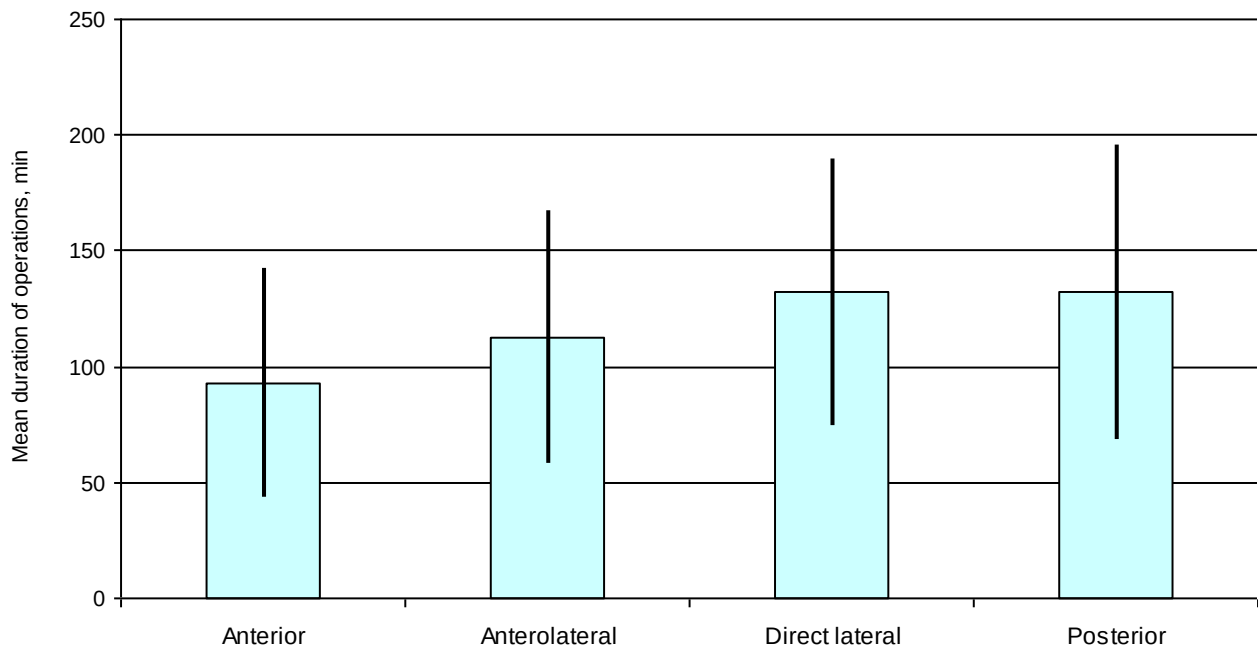
The vertical bars indicate the mean duration $\pm$ a standard deviation.

Table 35: Duration of surgery for the different types of surgical approaches (primary operation)

Surgical approach	Total	Mean duration of operations (minutes)	Standard deviation
Anterior	7 917	71	22
Anterolateral	14 599	75	23
Direct lateral	9 142	88	31
Posterior	69 092	82	29

Duration of surgery (for the last 10 years)

Figure 21: Duration of surgery for the different types of surgical approaches (reoperation)



The vertical bars indicate the mean duration $\pm$ a standard deviation.

Table 36: Duration of surgery for the different types of surgical approaches (reoperation)

Surgical approach	Total	Mean duration of operations (minutes)	Standard deviation
Anterior	284	93	49
Anterolateral	395	113	55
Direct lateral	4 006	132	58
Posterior	9 032	132	63

PROM in the Hip Arthroplasty Register

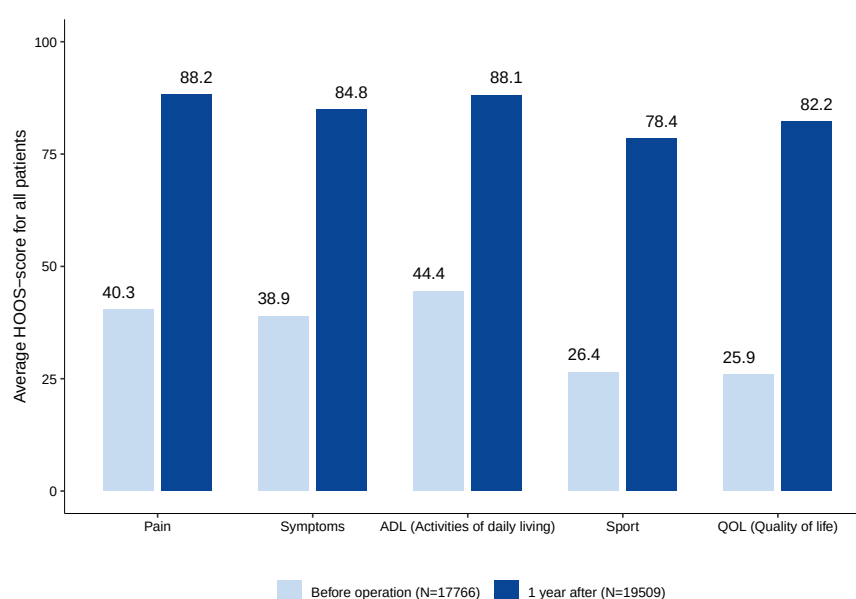
The Hip Arthroplasty Register has been collecting electronically patient-reported data (Patient Reported Outcome Measures (PROM)) since 2019. The register aims to place more emphasis on patients' self-perceived quality of life and joint function before and after operation. Patients fill out an electronic questionnaire before operation and at 1, 6, and 10 years after operation. The data we collect from the patients will be compiled with the data reported by the surgeon for the same patient group. This will allow us to focus on function and quality of life in addition to any potential revision of the prosthesis.

A total of 17,766 forms have been filled out before primary hip prosthesis operation, and 19,509 one year after operation (these are the numbers for all primary operations from 2019 onwards). In 2024, 51 hospitals submitted preoperative PROM forms, but many hospitals have low reporting rates for pre-operative PROM. The goal is to increase this proportion to >80%. A total of 1,321 paper forms were submitted from 42 hospitals; the rest were registered digitally. All hospitals will receive their own results in the hospital report. Please feel free to contact our consultant Mikal Solberg at mikal.solberg@helse-bergen.no if you have any questions about electronic registration of PROM.

Patient demographics	Before operation	1 year after
Number of forms (n)	17766	19509
Men (%)	37.5	38.6
Median age (min-max)	68 (16-99)	67 (14-94)
Body Mass Index mean (SD)	28.1 (20.1)	27.6 (8.5)
Drinking alcohol n (%)	13896 (78.2)	16134 (82.7)
Smoking n (%)	1421 (8)	1655 (8.5)
Diabetes n (%)	764 (7.2)	1287 (7.3)
Education upper secondary school or higher n (%)	9614 (54.1)	11062 (56.7)
Working n (%)	4269 (24)	6289 (32.2)
Living alone n (%)	4545 (25.6)	5157 (26.4)
Activity score UCLA activity* mean (SD)	4.6 (2)	5.9 (2)
State of health** (VAS) mean (SD)	57.1 (20.4)	76 (17.8)
Charnley (Category) Class A	12858 (72.4)	13654 (70)
Charnley (Category) Class B	3636 (20.5)	3562 (18.3)
Charnley (Category) Class C	1262 (7.1)	2293 (11.8)

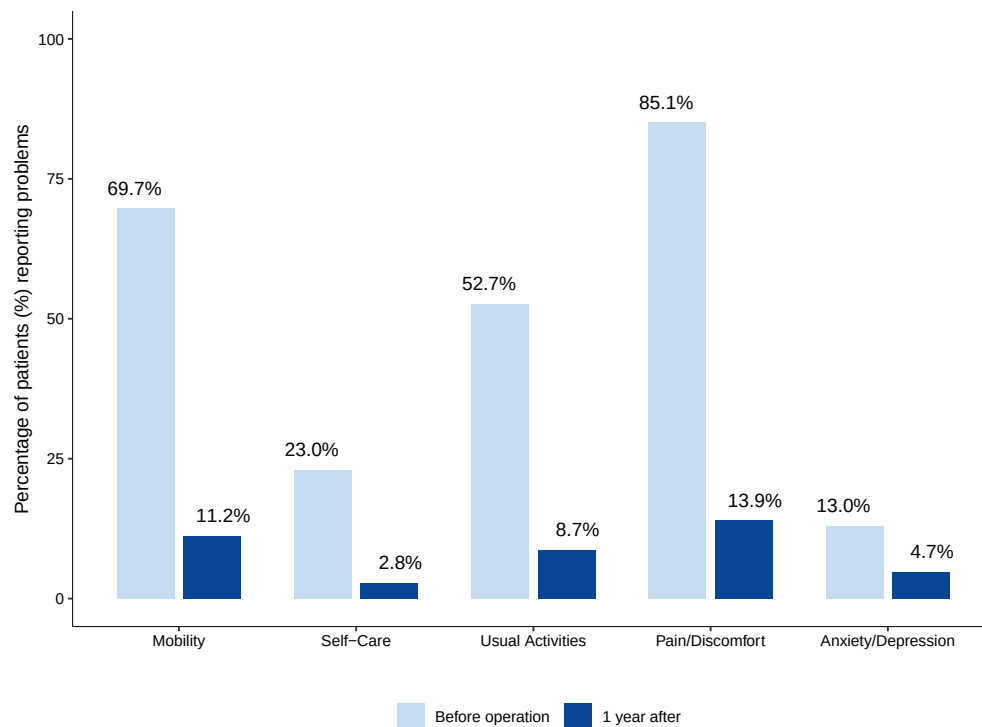
*Best possible score is 10, **100 is the best possible health

Figure A.42: Average HOOS score before/after primary operation*



*100 is the best possible score

Figure A.43: Proportion reporting moderate, severe, or very severe problems with mobility, self-care, usual activities, or reporting pain or anxiety before/after the primary operation (EQ-5D-5L)



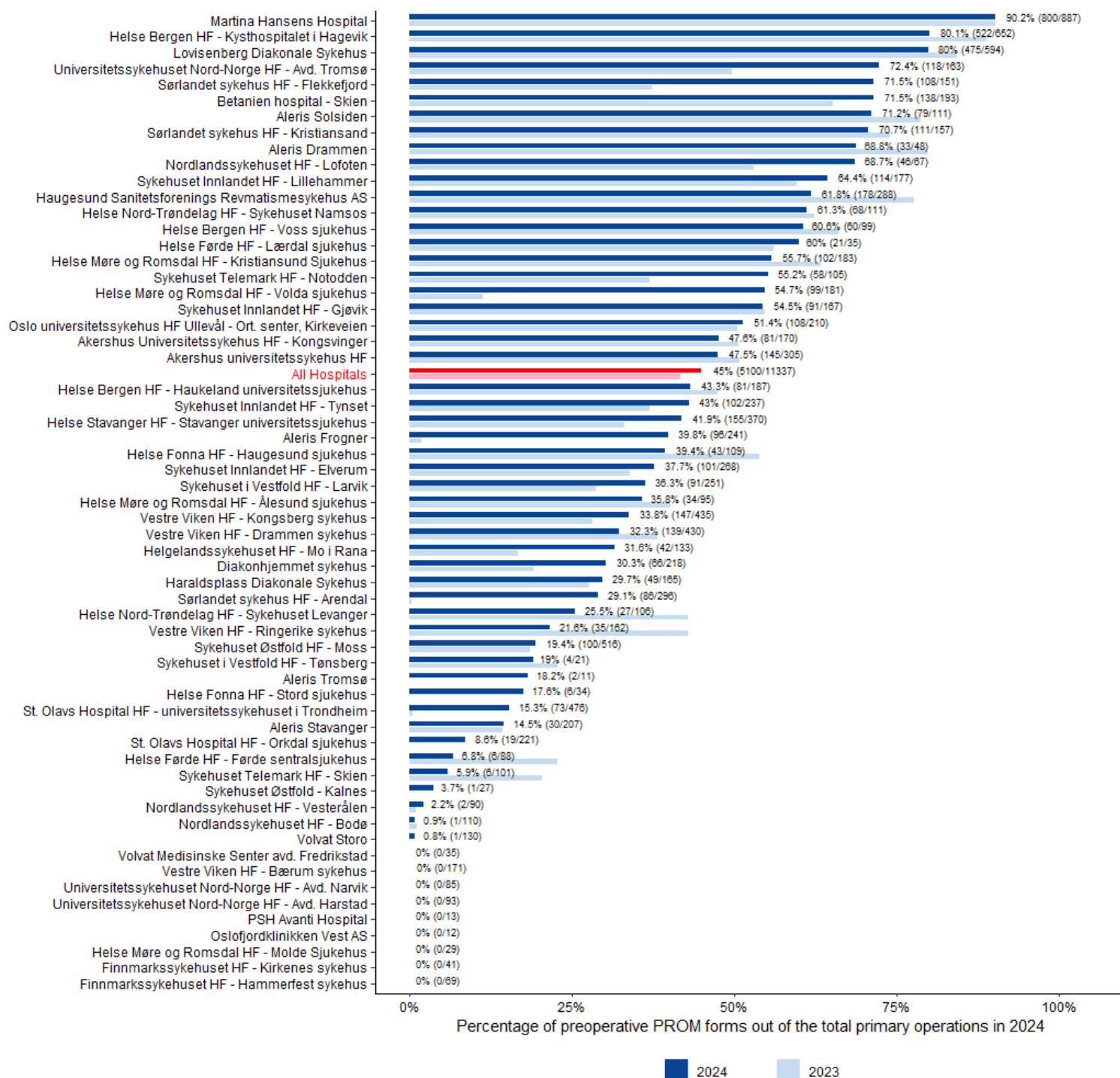
Health Authority	Reporting Hospitals (2024)	Number of Preoperative Forms (2024)
Central Norway	7/8	422
Northern Norway	5/9	209
South-Eastern Norway	23/24	3107
Western Norway	10/10	1121
Private	6/9	241

** A total of 5100 preoperative forms were completed out of the 11337 primary operations in 2024*

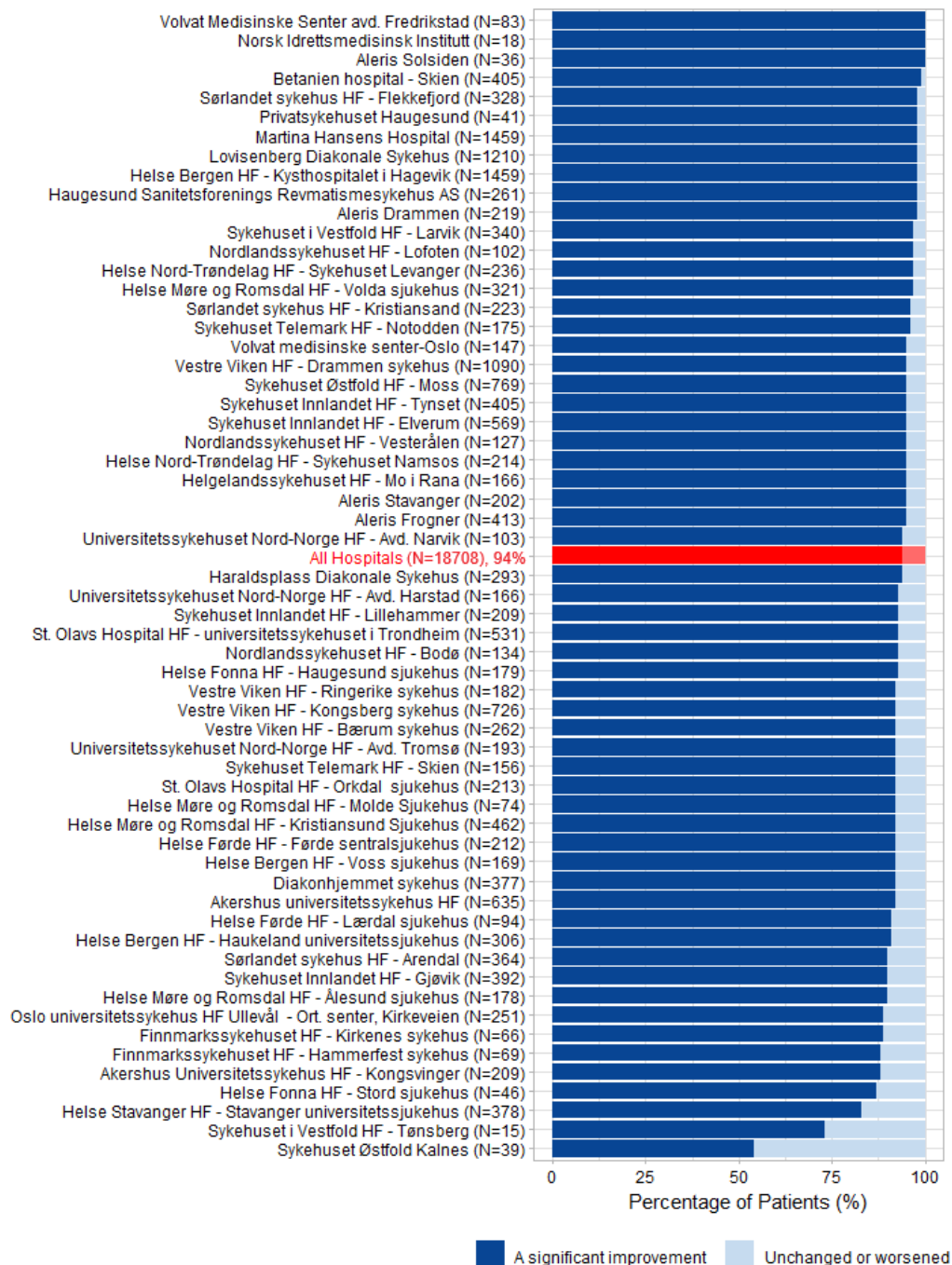
Health Authority	Reporting Hospitals (2023)	Number of Preoperative Forms (2023)
Central Norway	6/8	352
Northern Norway	5/9	129
South-Eastern Norway	22/24	2855
Western Norway	9/10	1077
Private	4/7	139

** A total of 4552 preoperative forms were completed out of the 10906 primary operations in 2023*

Figure A.44: Proportion of primary hip prosthesis operations where a preoperative PROM form is completed

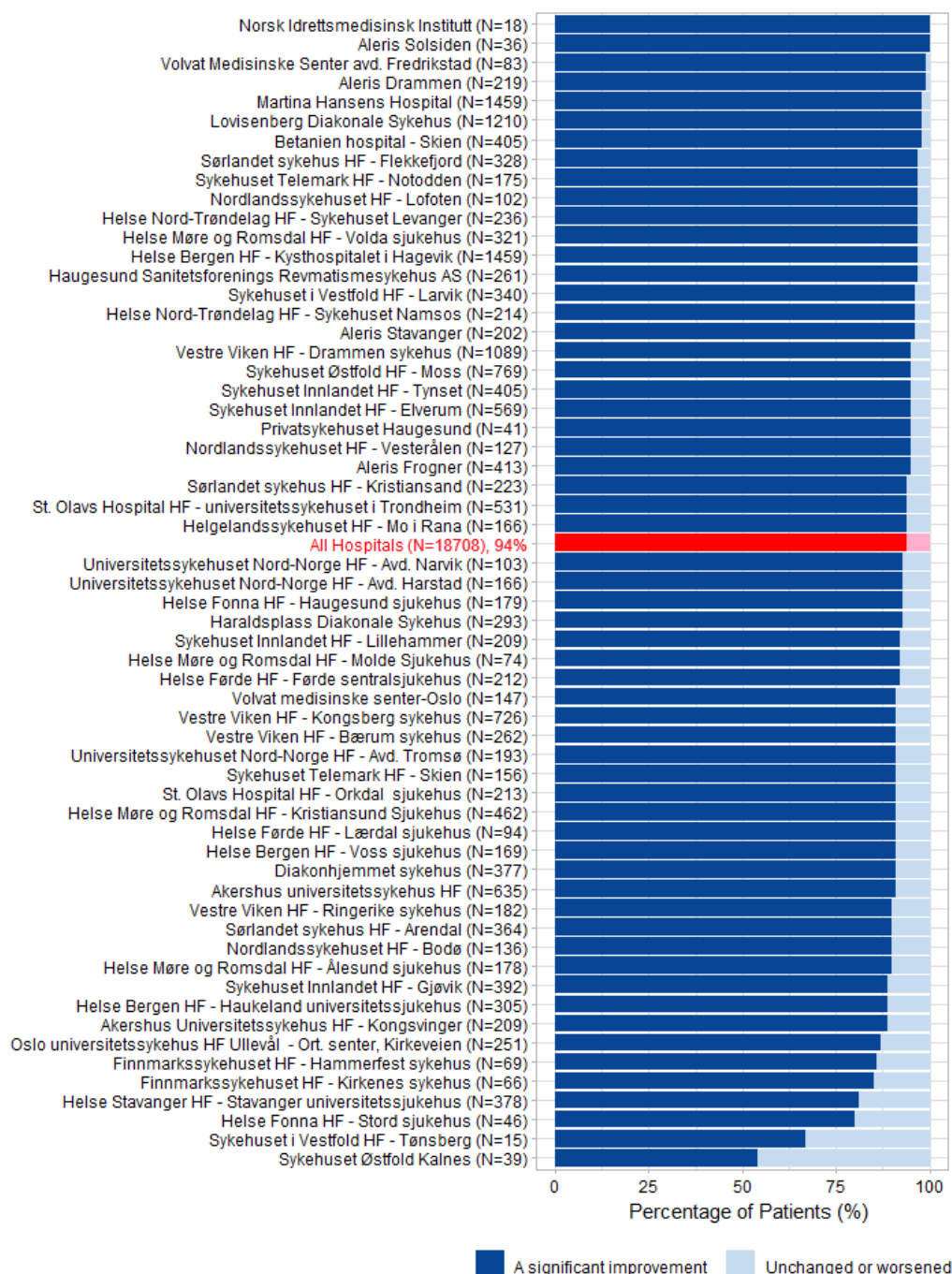


The diagram above shows the hospitals that have submitted preoperative PROM forms either on paper, digitally via the web solution in MRS, or through their own solution. Reporting is still low, but some hospitals seem to have taken steps to improve reporting. The proportion of preoperative PROM was 41.7% in 2023 and 45% in 2024. We would like to remind you that any questions regarding reporting in MRS can be sent to the registry.

Figure A.45: Anchor questions for HOOS-PAIN 1 year after the primary operation, 2019-2024

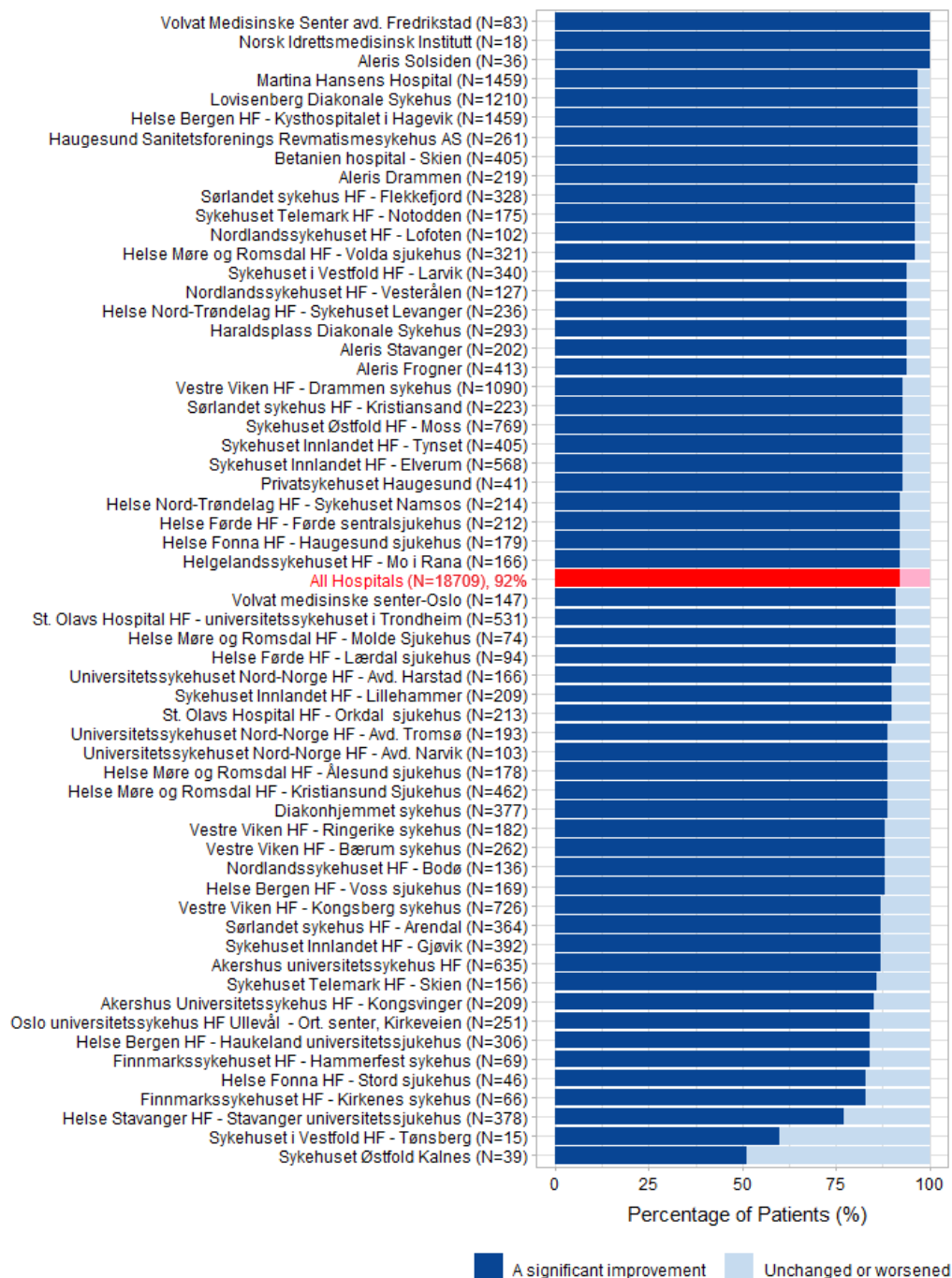
The patients answered the question, "How do you experience your hip pain now, compared to before the operation?" The options "Less, a significant improvement" and "Slightly less, enough to be a significant improvement" are included in the dark blue category in the figure as "a significant improvement." The other options "Very little change, not enough to be a significant improvement," "Unchanged," "Very little change, not enough to be a significant worsening," "Slightly worse, enough to be a significant worsening," and "Worse, a significant worsening" are included in the light blue category "Unchanged or worsened." Hospitals with fewer than 10 responses are excluded from the figure.

Figure A.46: Anchor questions for HOOS-SYMPTOMS 1 year after the primary operation, 2019-2024



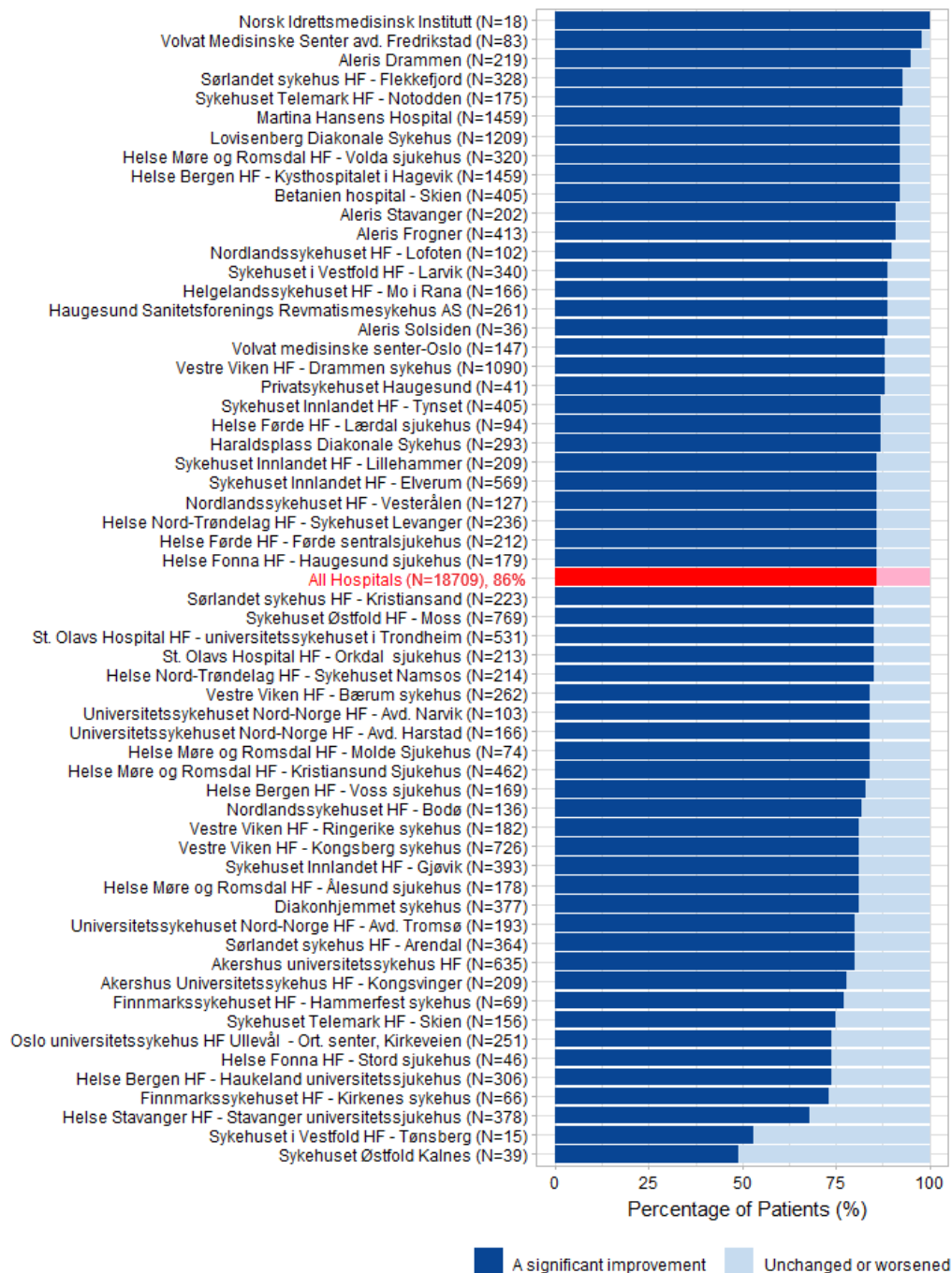
The patients answered the question, "How do you experience other symptoms in the hip now compared to before the operation (stiffness, clicking, and reduced mobility)?" The options "Less, a significant improvement" and "Slightly less, enough to be a significant improvement" are included in the dark blue category in the figure as "a significant improvement." The other options "Very little change, not enough to be a significant improvement," "Unchanged," "Very little change, not enough to be a significant worsening," "Slightly worse, enough to be a significant worsening," and "Worse, a significant worsening" are included in the light blue category "Unchanged or worsened." Hospitals with fewer than 10 responses are excluded from the figure.

Figure A.47: Anchor questions for HOOS-ACTIVITIES IN DAILY LIFE 1 year after the primary operation, 2019-2024



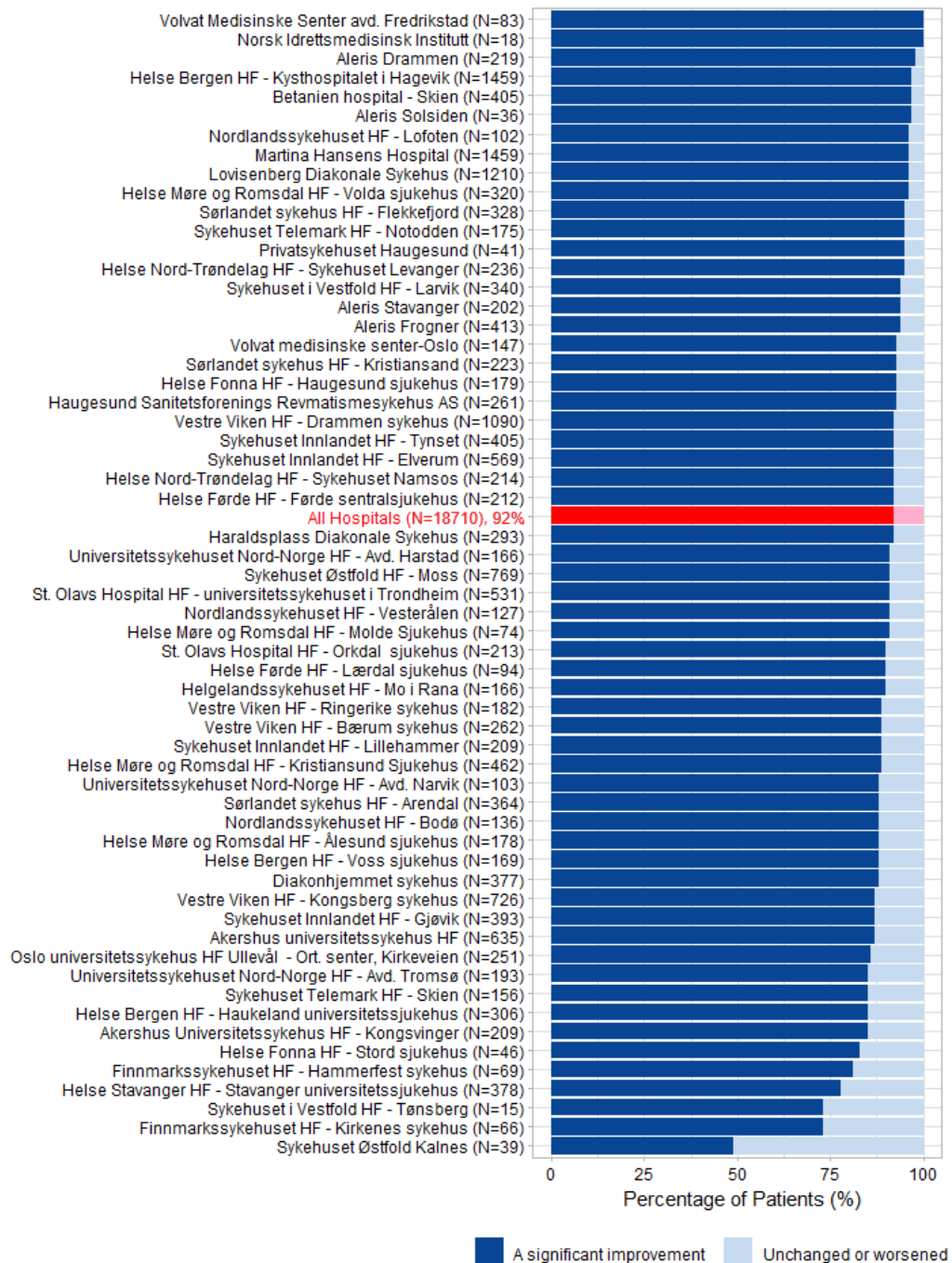
The patients have answered the question, "How is your ability to perform daily activities now compared to before the operation (sitting, standing, walking, stair climbing, putting on/taking off socks, household chores, etc.)?" The options "Better, a significant improvement" and "Slightly better, enough to be a significant improvement" are included in the dark blue category in the figure as "a significant improvement." The other options "Very little change, not enough to be a significant improvement," "Unchanged," "Very little change, not enough to be a significant worsening," "Slightly worse, enough to be a significant worsening," and "Worse, a significant worsening" are included in the light blue category "Unchanged or worsened." Hospitals with fewer than 10 responses are excluded from the figure.

Figure A.48: Anchor questions for HOOS-SPORT 1 year after primary operation, 2019-2024



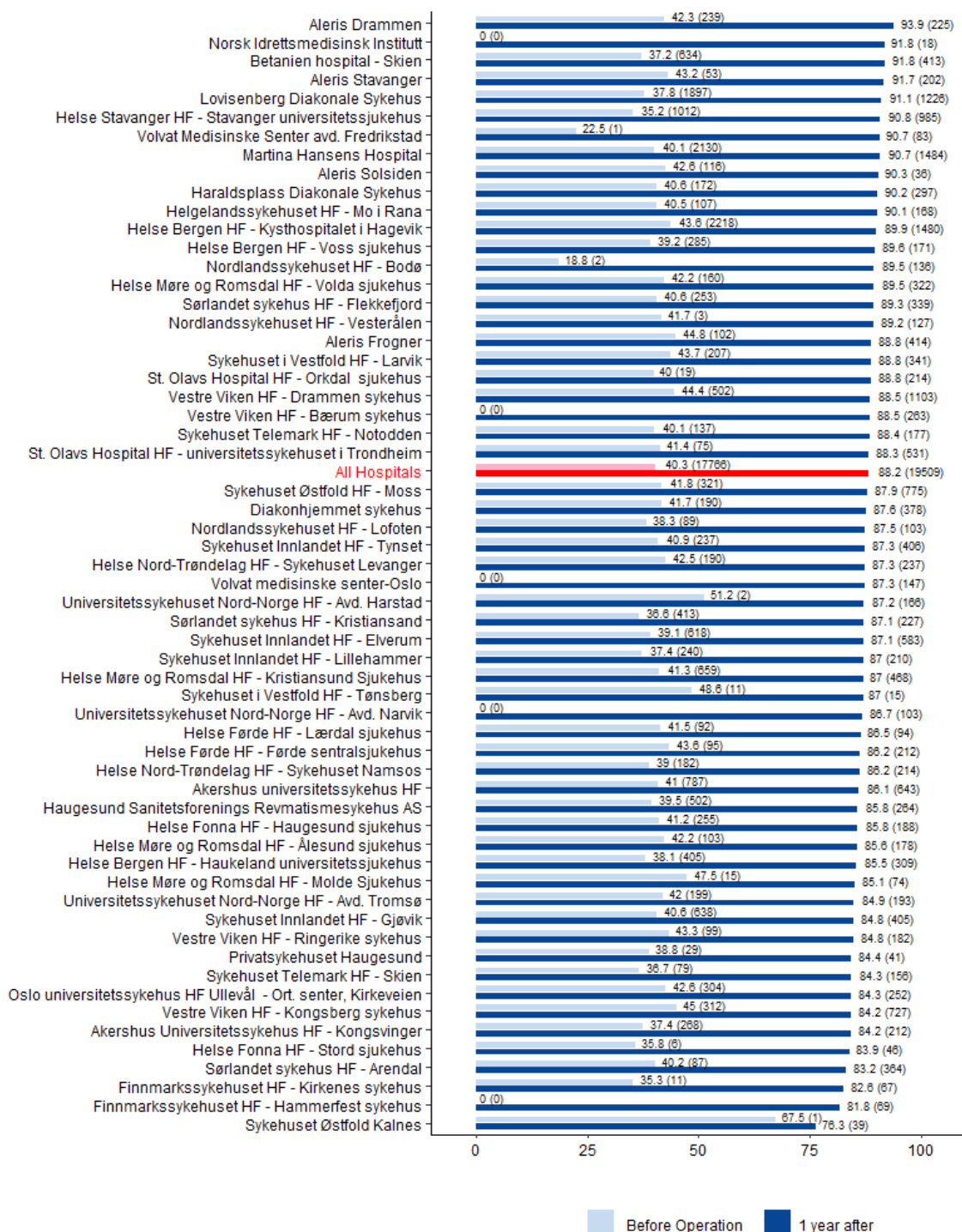
The patients have answered the question, "How is your ability to perform sports and leisure activities now compared to before the operation (running, squatting, twisting and pivoting on the operated leg)?" The options "Better, a significant improvement" and "Slightly better, enough to be a significant improvement" are included in the dark blue category in the figure as "a significant improvement." The other options "Very little change, not enough to be a significant improvement," "Unchanged," "Very little change, not enough to be a significant worsening," "Slightly worse, enough to be a significant worsening," and "Worse, a significant worsening" are included in the light blue category "Unchanged or worsened." Hospitals with fewer than 10 responses are excluded from the figure.

Figure A.49: Anchor questions for HOOS-QUALITY OF LIFE 1 year after the primary operation, 2019-2024



The patients have answered the question, "How is your quality of life related to your hip now compared to before the operation (degree of trust in your hip, lifestyle changes, how often you are reminded of hip problems)?" The options "Better, a significant improvement" and "Slightly better, enough to be a significant improvement" are included in the dark blue category in the figure as "a significant improvement." The other options "Very little change, not enough to be a significant improvement," "Unchanged," "Very little change, not enough to be a significant worsening," "Slightly worse, enough to be a significant worsening," and "Worse, a significant worsening" are included in the light blue category "Unchanged or worsened." Hospitals with fewer than 10 responses are excluded from the figure.

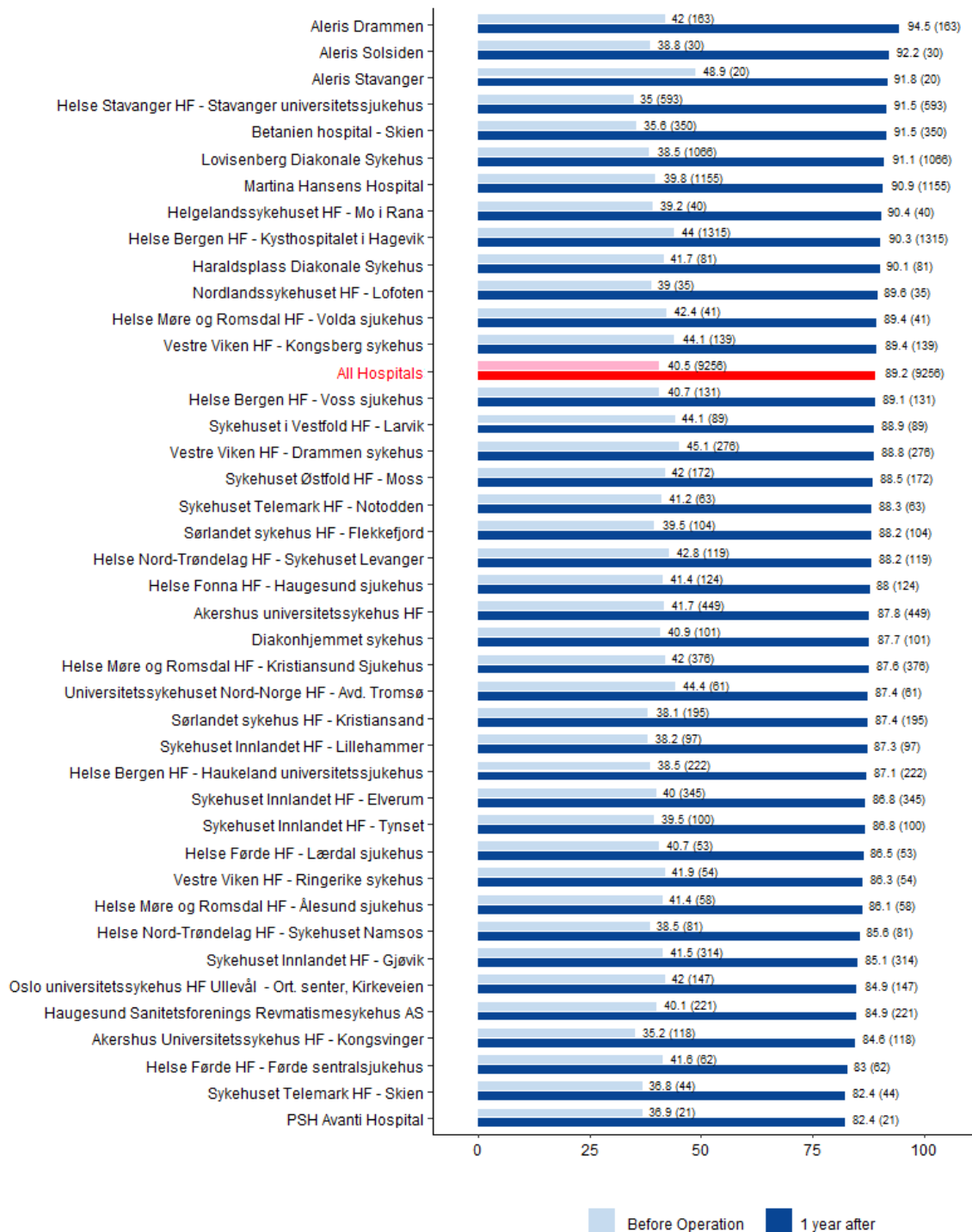
Figure A.50 (a): Average HOOS-PAIN score for all primary operations before and 1 year after operation * (Number of completed forms)



* 100 is the best possible score

Hospitals with fewer than 10 responses are excluded from the figure.

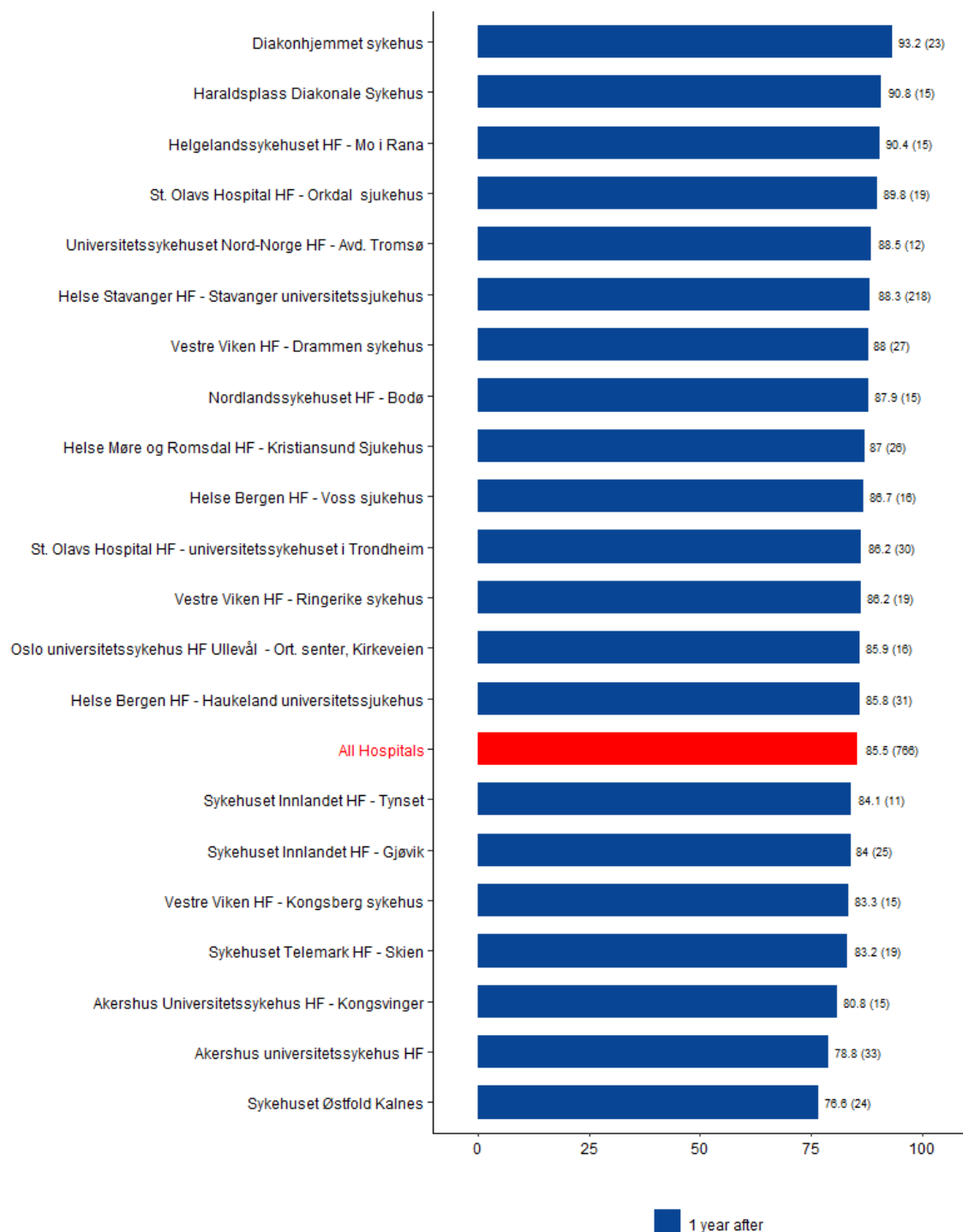
Figure A.50 (b): Average HOOS-PAIN score for all primary operations before and 1 year after operation (PROM forms mapped for the same operation) * (Number of completed forms)



* 100 is the best possible score

Hospitals with fewer than 10 responses are excluded from the figure.

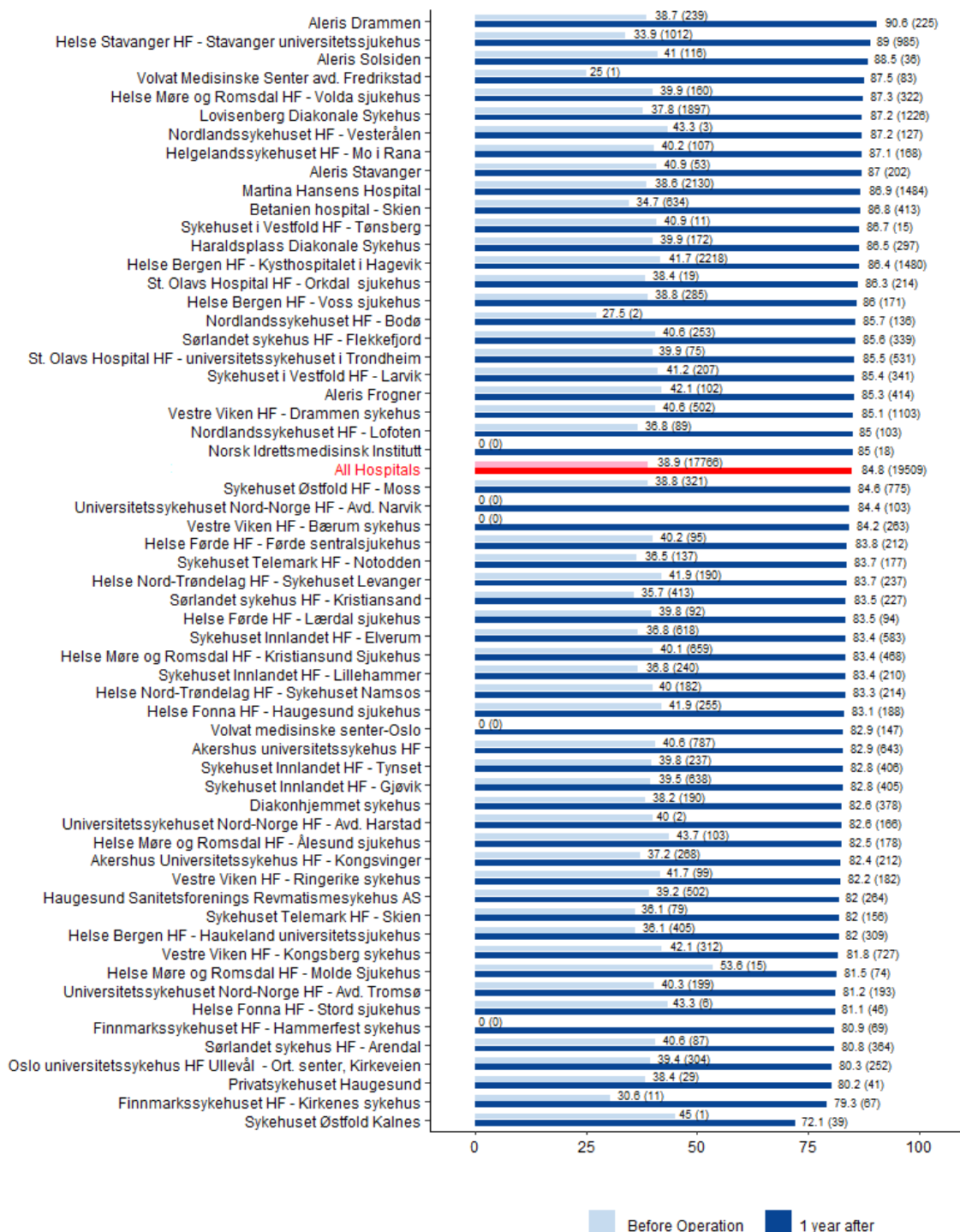
Figure A.50 (c): Average HOOS-12 PAIN score for all primary operations before and 1 year after operation with acute fracture * (Number of completed forms)



* 100 is the best possible score

Hospitals with fewer than 10 responses are excluded from the figure.

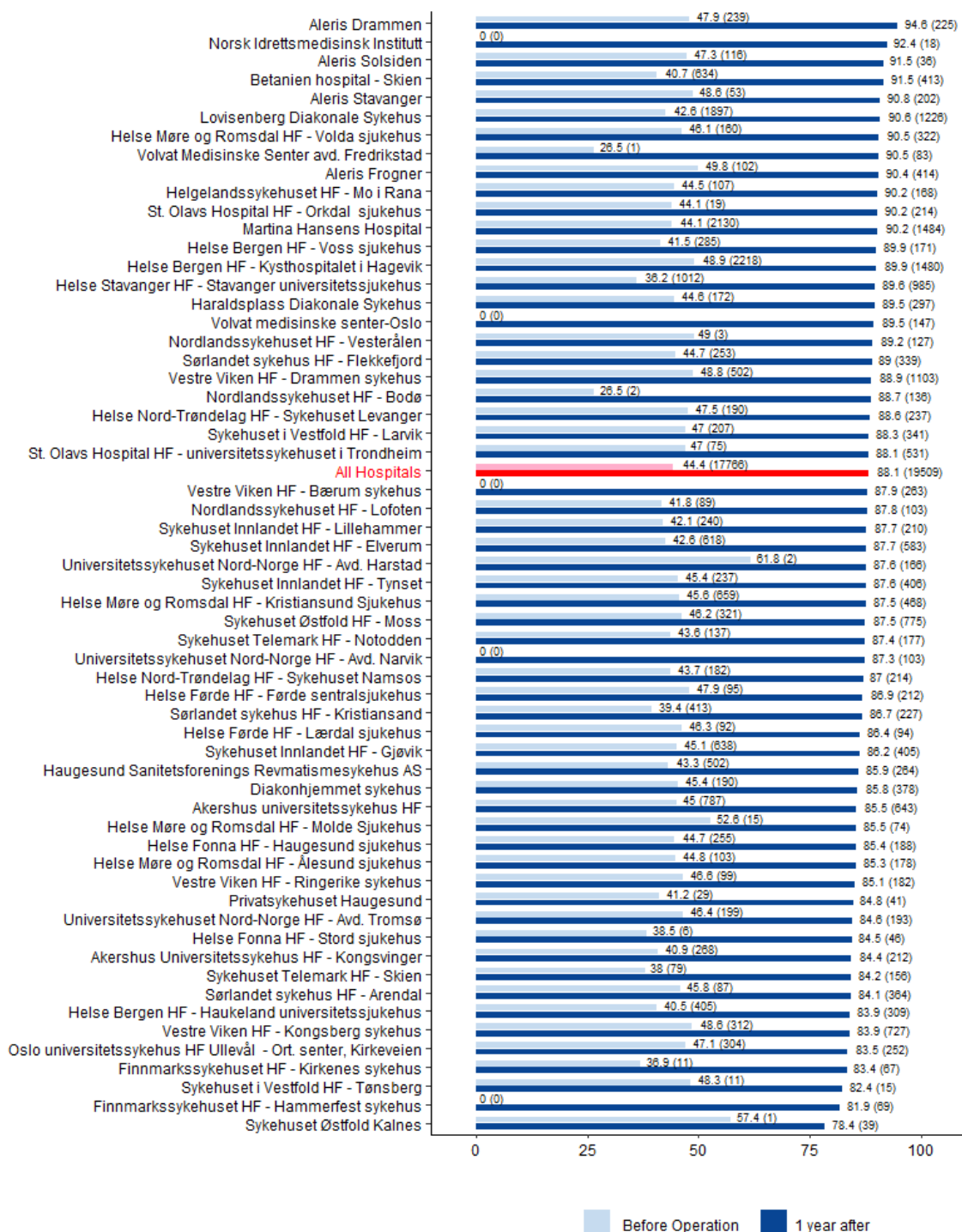
Figure A.51: Average HOOS-SYMPTOMS score for all primary operations before and 1 year after operation * (Number of completed forms)



* 100 is the best possible score

Hospitals with fewer than 10 responses are excluded from the figure.

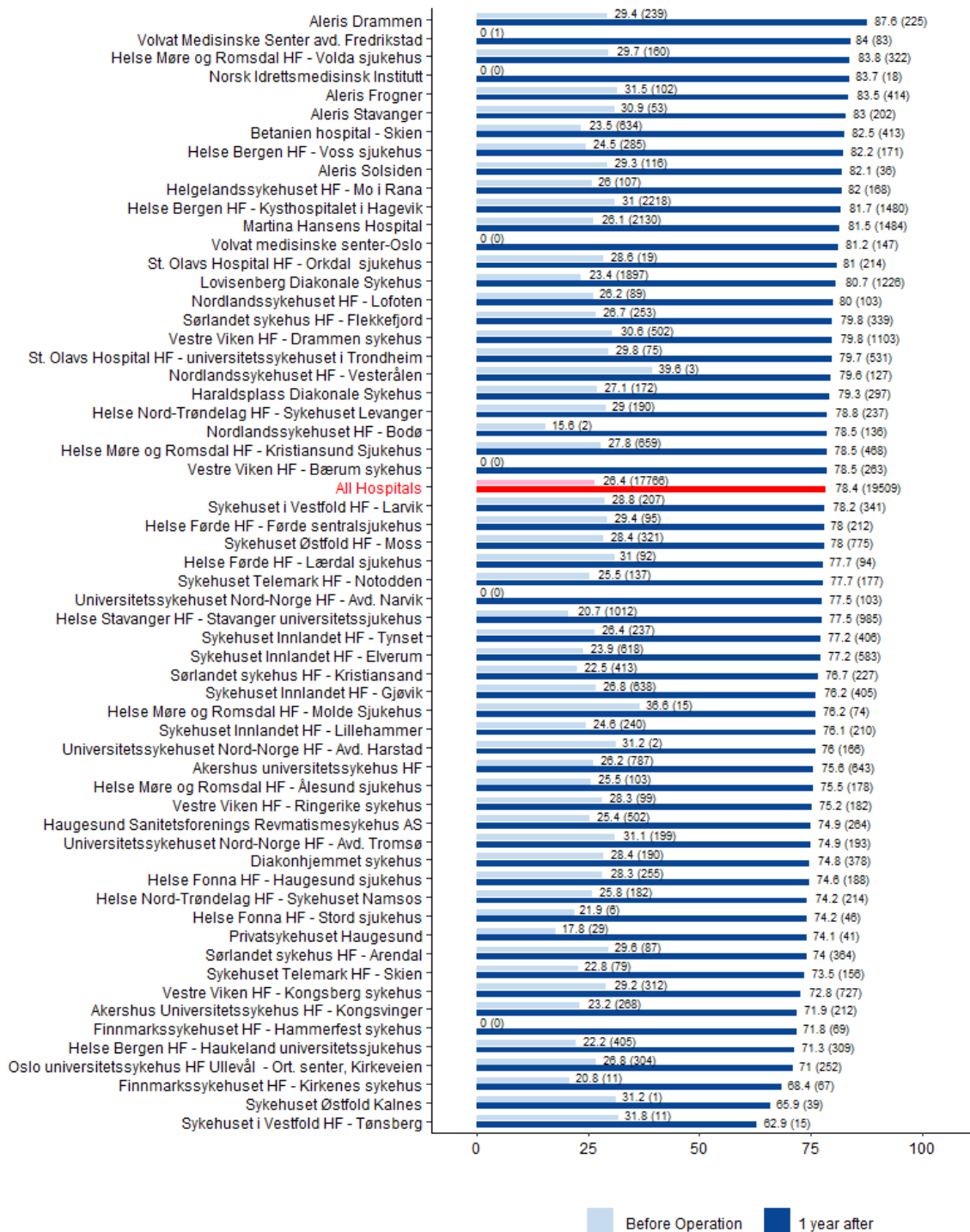
Figure A.52: Average HOOS-ACTIVITIES IN DAILY LIFE score for all primary operations before and 1 year after operation * (Number of completed forms)



* 100 is the best possible score

Hospitals with fewer than 10 responses are excluded from the figure.

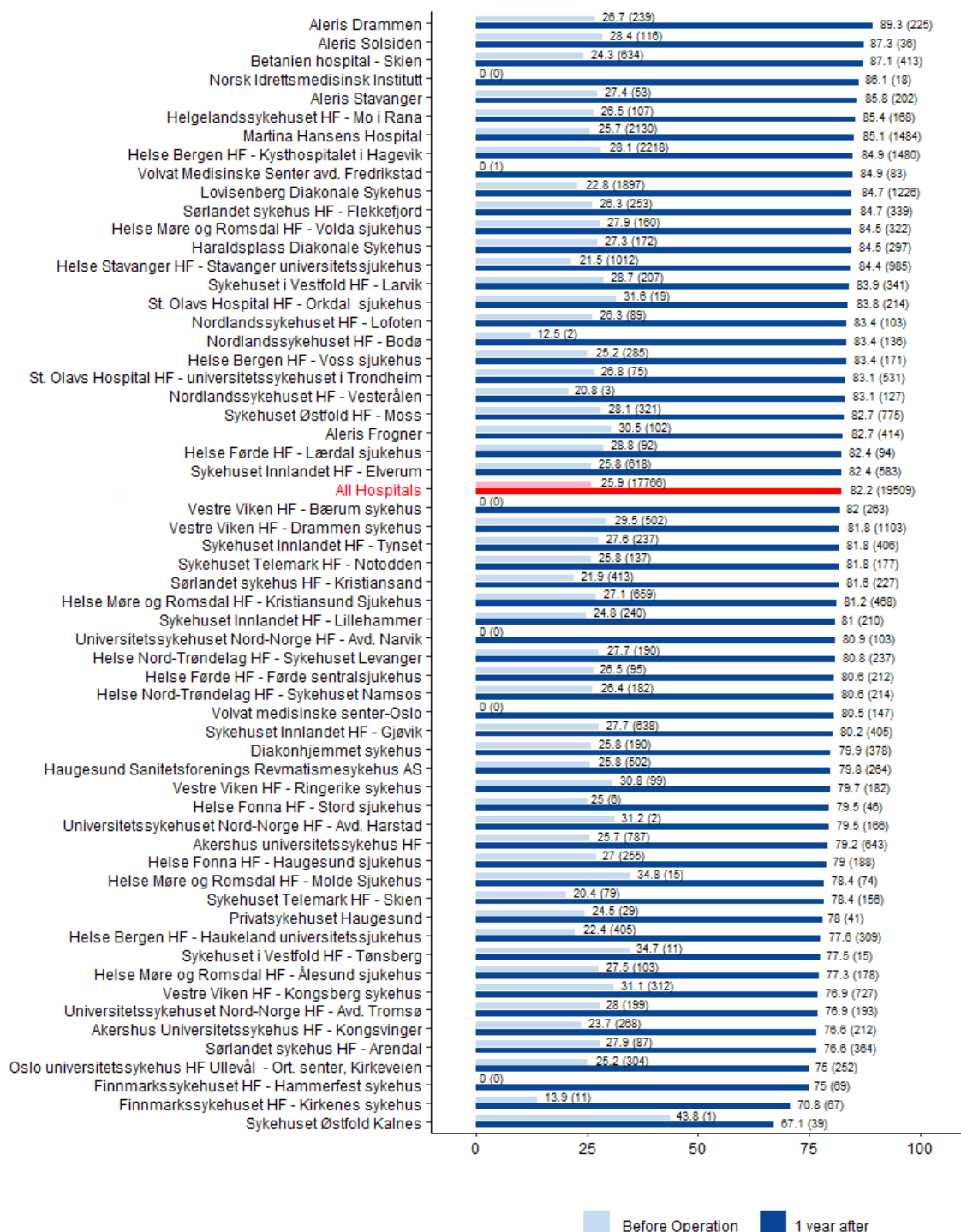
Figure A.53: Average HOOS-SPORT score for all primary operations before and 1 year after operation * (Number of completed forms)



* 100 is the best possible score

Hospitals with fewer than 10 responses are excluded from the figure.

Figure A.54: Average HOOS-QUALITY OF LIFE score for all primary operations before and 1 year after operation * (Number of completed forms)



* 100 is the best possible score

Hospitals with fewer than 10 responses are excluded from the figure.

Completeness of reporting analysis for the Norwegian Arthroplasty Register, 2021-2023

A completeness of reporting analysis for the Norwegian Arthroplasty Register has been conducted by combining the data in the Register with data from the Norwegian Patient Register (NPR). The report and analysis were prepared by the NPR in collaboration with the Norwegian Arthroplasty Register (NAR). There are separate statistics on primary operations and revisions.

NCSP codes for combining data from NPR hospital stays and the Hip Arthroplasty Register

Type	Code	Description
Primary operation with or without	NFB 20	Primary total prosthetic replacement of hip joint not using cement
	NFB 30	Primary total prosthetic replacement of hip joint using hybrid technique
	NFB 40	Primary total prosthetic replacement of hip joint using cement
	NFB 7y	Primary implantation of reconstruction prosthesis
	NFB 99	Other Primary prosthetic replacement in hip joint
Revision (level 1)	NFC 2y	Secondary implantation of total prosthesis in hip joint not using cement
	NFC 3y	Secondary implantation of total prosthesis in hip joint using hybrid technique
	NFC 4y	Secondary implantation of total prosthesis in hip joint using cement
	NFC 7y	Secondary implantation of reconstruction prosthesis
	NFC 99	Other secondary prosthetic replacement in hip joint
	NFU 1y	Removal of total prosthesis from hip joint

Formulas for completeness of reporting

$$\text{Completeness rate NRL} = \frac{\text{Only NRL} + \text{both registries}}{\text{Only NPR} + \text{Only NRL} + \text{both registries}}$$

$$\text{Completeness rate NPR} = \frac{\text{Only NPR} + \text{both registries}}{\text{Only NPR} + \text{Only NRL} + \text{both registries}}$$

Primary operations. In 2021-2023, 32452 primary hip replacements were reported to one or both of the registers. 94.5 % of these were reported to the NAR while 93.2 % were reported to the NPR. Completeness of reporting varies much between the different hospitals. For hospitals with a low completeness of reporting rate for the Norwegian Arthroplasty Register, either the form was not sent to the NAR or other interventions than hip arthroplasties were incorrectly coded with NFB 20/30/40.

Procedure codes to be used for primary operations: NFB 20 - NFB 30 - NFB 40

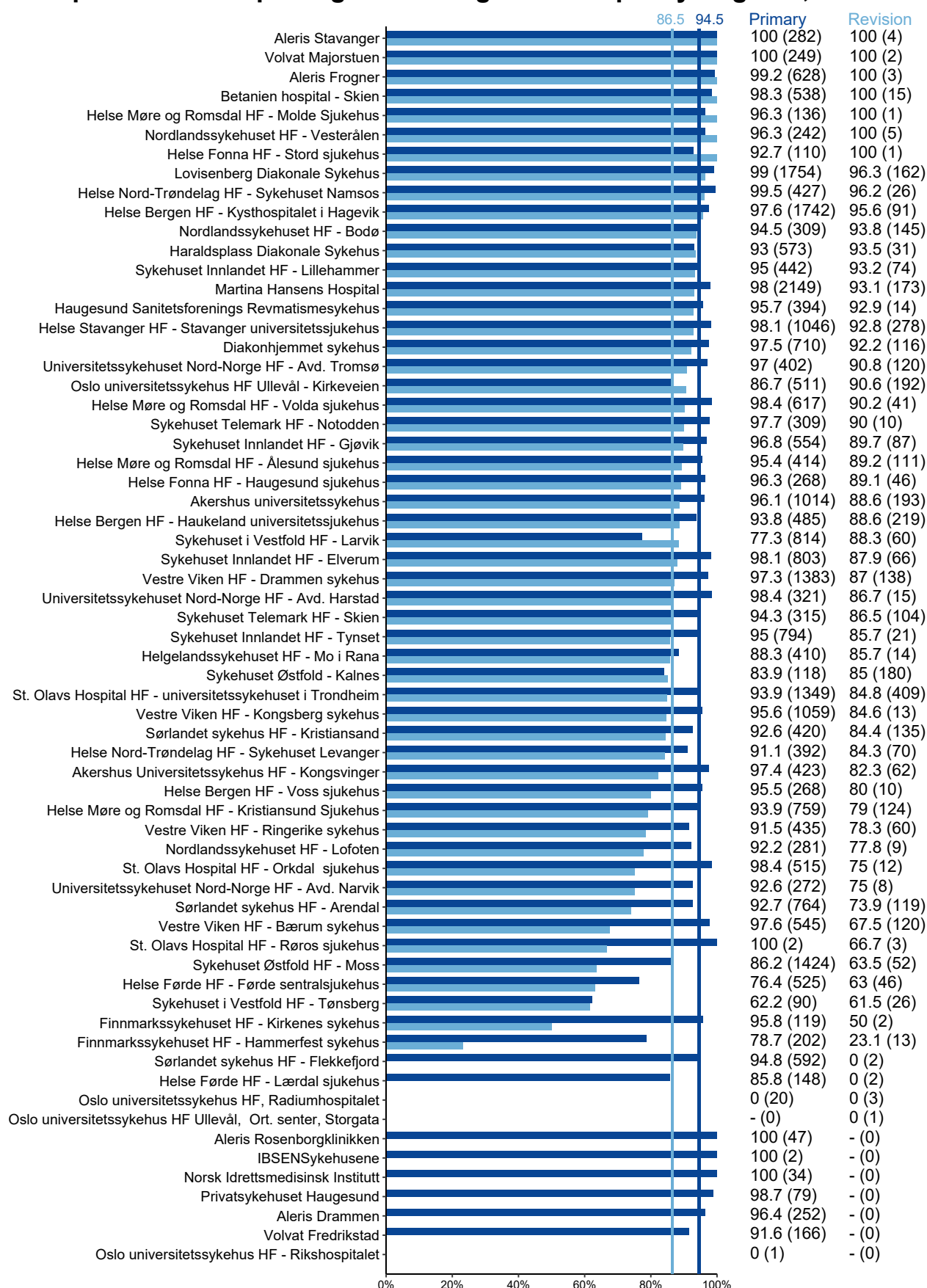
Revision operations. In 2021-2023, 4060 revisions were reported to one or both of the registers. 86.5 % of these were reported to the NAR while 83.8 % were reported to the NPR (revision level 1). Completeness of reporting varies much between the different hospitals. A low completeness of reporting rate may mean that the revision form was not sent to the NAR, or that other interventions than removal, replacement or insertion of a secondary prosthesis were incorrectly coded with NFC 2/3/4/99 or NFU1. The analysis shows that a number of revision forms are missing in cases where the prosthesis was removed without a new one being inserted in the same operation; in such cases, a form should be submitted both when the prosthesis is removed and when any new insertion is performed.

Procedure codes to be used for revision operations:

NFC2*- NFC3*- NFC4*- NFC99 - NFU1*

New: From 2012, revisions due to infection, even where parts of the prosthesis are not removed or replaced, are to be reported on the form to the NAR. These must be coded **NFS 19 or NFS 49 with the additional code NFW 69.**

Completeness of reporting for Norwegian Arthroplasty Register, 2021-2023



Dark blue bars and first number to the right of the bars gives completeness of reporting for primary operations. Light blue bars and second number to the right of the bars gives completeness of reporting for revision operations. The numbers in brackets gives the number of operations registered at both NAR and NPR. Vertical lines shows the national averages.

CONTENTS

Knee prostheses

Highlights from 2024	90
Introduction.....	91
Survival curves for knee prostheses	99
Survival curves for all hospitals individually	105
One stage bilateral knee prosthesis operations	107
Number of primary operations in knee 2024	108
Percentage non-revised patients two years after operations.....	109
Percentage non-revised patients ten years after operations	111
Durability of total knee prostheses 2013-2024.....	114
Portion of patients receiving well documented total knee prostheses in 2024	115
Registration by format in 2024	116
Annual numbers knee prostheses.....	117
Incidence and status of knee arthroplasty	118
Age by year of primary operation	119
Types of knee prostheses	121
Classification in primary total prostheses.....	122
Reasons for primary operations	124
Fixation.....	126
The 8 most common primary total prostheses 2018-2023.....	128
Knee prostheses brands	133
Reasons for revisions.....	141
Type of revision	152
ASA classification.....	155
Thrombosis prophylaxis	156
Fibrinolysis Inhibitor	160
Intraoperative complications	160
Previous operation in relevant joints	160
Mini-invasive surgery	161
Computer navigation	162
Cement.....	163
Systemic antibiotic prophylaxis	165
Patient specific instruments	166
Drain.....	166
Tourniquet	167
Weight, height and BMI	167
Ahlbäck's grading of osteoarthritis	167
Joint space in mm	168
Robot-assisted surgery	168
Surgical approach	168
Anesthesia.....	168
Local infiltration anesthesia.....	169
Peripheral nerve block	169
Closure of primary knee prostheses	169
Bone loss classification in reoperations	170
Fracture of bone (near the prosthesis) in reoperated knee prostheses	171
Duration of surgery	172
PROM in the knee arthroplasty register	174
PROM from all hospitals individually.....	176
Completeness analysis 2021-2023.....	188



Nasjonalt
Register
for
Leddproteser

Highlights from

2024

Knee prostheses



Primary operations
Revisions

Registered
1987-2024

136,056
11,656

Registered
in 2024

9,033
621

Completeness

95.3%

primary operations

91.4%

revisions

14

Published
Papers



1

PhD



11

Podium
Presentations



Find us:

<https://helse-bergen.no/nrl>

<https://www.facebook.com/leddregisteret>

[Nasjonalt servicemiljø for medisinske kvalitetsregistre](#)

59
Hospitals reported
98%
Of the hospitals



Research

Risk of arthroplasty after focal cartilage lesions:

Long-term
outcomes of arthroscopically
verified focal cartilage lesions
in the knee: A 19-year
multicenter follow-up with
PROMs.

Results and activities

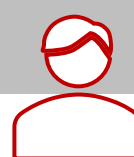
Quality indicators

- 85.6% well documented prostheses
- 82.2 % electronic registered in 2024
- 98.3 % non-revised standard patients at 2 years
- 96.0 % non-revised standard patients at 10 years



ePROM

electronic patient reported data



14,906
pre-op
ePROM

51

participating
hospitals

15,760
post-op
ePROM

ANNUAL REPORT KNEE and OTHER JOINTS

For the period 1994–2024, data have been recorded on a total of 148,246 knee arthroplasties and 15,464 arthroplasties in other joints. In 2024, 9,033 primary knee arthroplasties were performed, representing a 3.9% increase from 2023. This is the highest number of primary knee arthroplasties ever recorded. The number of knee revision arthroplasties was 621, corresponding to 6.4%, and this marks a positive downward trend from 8.3% in 2017.

Reoperations and periprosthetic fractures

Osteosyntheses for periprosthetic fractures where the prosthesis is not revised must be reported for all joints. A classification system for periprosthetic fractures in the knee has been introduced.

We also ask that you report MUA (manipulation under anesthesia) as well as all other procedures involving wound, soft tissue, or bone, where the prosthesis or prosthetic components are not exchanged, implanted, or removed. In short, **ALL reoperations related to a prosthetic joint must be reported.**

In order to enable future validation against the Norwegian Patient Registry (NPR), the operated side must be reported to NPR. You must therefore ensure that the laterality code **ZXA** is transferred to NPR.

Early revision within 2 years in the knee

We have now divided the tables (15a,b, 16a,b,c, 17a,b and corresponding figures 18a,b,c, 19a,b,c,d,e, and 20a,b,c) into revision (exchange, removal, or insertion of prosthetic components) and reoperation (procedures where prosthetic components are not exchanged, removed, or inserted). In addition, we have created a new table (16b) and figures (19c and d) for revisions within 2 years for total knee arthroplasties without a patellar component. Almost half (50%) of all revisions occur within the first 2 years. With this, we aim to draw attention to these early revisions.

Causes of revision within 2 years can be studied together with Figure B.30: proportion of unrevised total knee arthroplasties at 2 years. At 2 years, infection is the most frequent cause of revision, followed by instability, pain, progression of osteoarthritis, loose tibial component, and arthrofibrosis. Many of these revisions can likely be attributed to poor surgical technique and poor indication for revision surgery.

Key factors for improving outcomes include proper patient selection, infection prevention measures, correct choice of prosthesis stabilization, use of sound techniques for component positioning, good balancing, appropriate cementing technique (Refsum et al. 2019, Dyrhovden G. 2017), and correct indication for revision. Revisions with *pain alone* as the sole indication should be avoided. The indication for insertion of a patellar component as a revision procedure must be carefully evaluated, considered, and discussed with the patient.

Electronic reporting

From mid-November 2023, it became possible to report digitally for elbow and ankle arthroplasties. This also includes PROM reporting for patients, using the QuickDASH and SEFAS scores, respectively. Digital reporting for hand/wrist and finger as well as toe arthroplasties has been delayed due to capacity issues at HEMIT and is now planned for implementation during autumn 2025/winter 2026. We have discontinued registration of spinal disc prostheses, as these are to be registered in the Norwegian Spine Registry.

PROM

We ask hospitals to facilitate PROM registration prior to surgery for patients undergoing hip, knee, shoulder, elbow, and ankle arthroplasty. We recommend that the PROM questionnaire be sent to patients together with their surgical admission notice. If the preoperative PROM is completed, or if the surgeon has registered the operation digitally, patients will automatically receive follow-up questionnaires one year after surgery.

An overview of results for EQ-5D-5L and KOOS combined, as well as KOOS results by hospital and the proportion of patients who have achieved a clinically important improvement in the operated knee joint, is presented in the results section of this report. These results demonstrate good outcomes for knee arthroplasty, although slightly less favorable than for hip arthroplasty one year after surgery.

We have also compiled an overview of the proportion of patients with preoperative PROM registration at each hospital. Currently, 6 hospitals have achieved over 80% preoperative PROM registration, and hospitals are therefore encouraged to increase their efforts to improve preoperative PROM coverage. Patients should be asked at the preoperative assessment whether they have completed the questionnaire. Hospitals can use these data for quality assurance, research, and clinical improvement. Instructions on how to get started can be found here helse-bergen.no/nrl.

The ALBA study – knee arthroplasty: with or without antibiotics in bone cement

The ALBA study is now in its 5th year of patient inclusion. We are investigating whether antibiotics in bone cement prevent prosthetic joint infection following primary knee arthroplasty. The study protocol has been published (Leta T. 2021). The registration form is the same as for electronic reporting of knee arthroplasty procedures, and includes a built-in randomization function.

The study started in January 2021, and as of June 1, 2025, a total of 5,027 knees had been included. We hope that all hospitals will participate in the study. Please contact us if your hospital has not yet started inclusion. Instructions are available on our website.

Description of practice – knee arthroplasty

Most total knee arthroplasties are cemented or hybrid cruciate-retaining (CR) prostheses. This type of prosthesis is reported with good outcomes in all national registries. The proportion of posterior-stabilized (PS) prostheses has increased in recent years, accounting for 10% of all primary total knee arthroplasties in 2024. It is possible that PS inserts have replaced the use of deep-dish inserts in patients with posterior cruciate ligament deficiency, in which case this practice may be justified.

Several registry studies have shown higher revision rates for PS knees compared to CR knees, particularly due to loosening. Some studies have demonstrated slightly better flexion with PS knees, so this must be weighed against the increased risk of revision.

The use of uncemented total knee arthroplasties has increased in recent years, but this trend has reversed over the past two years. As shown in the curves in the results section, outcomes so far appear to be good for uncemented prostheses in Norway. However, two Nordic NARA studies reported higher revision rates with uncemented total knee arthroplasties across all age groups (Niemeläinen M. 2020, Irmola T. 2021), consistent with findings from other registries.

The use of patellar components in knee arthroplasty is increasing (13.8% in 2024). The NICE guidelines in the UK recommend the use of a patellar component in total knee arthroplasty, as this appears to reduce reoperations. This is likely because surgeons can offer implantation of a patellar component to patients who report anterior knee pain. In Norway, however, we have not observed any difference in revision risk (Figure B.13).

The use of rotating platforms (mobile bearing) in total knee arthroplasty has declined, consistent with both Norwegian and international registry studies that show somewhat higher revision rates with this type of prosthesis (Paxton E. 2011, Gøthesen Ø. 2014, Namba R. 2014, Gøthesen Ø. 2017).

The use of cross-linked polyethylene has increased in recent years in total knee arthroplasty. In 2024, 43% of primary knee arthroplasties used cross-linked polyethylene. So far, no improved outcomes have been observed in Norway, but follow-up time is still relatively short (10 years). Data from Australia show either improved or similar outcomes beyond 10 years of follow-up, depending on implant brand. It therefore appears safe to use cross-linked polyethylene in knee arthroplasty.

The proportion of unicompartmental knee arthroplasties (UKA) has gradually increased and now accounts for 17.1% of all primary knee arthroplasties. There is still much international debate regarding the use of UKA. In the US, UKA is rarely used, while in the UK the NICE guidelines now recommend offering it to suitable patients. Nearly 40% of UKAs in Norway are uncemented, a proportion that has been increasing since 2020.

In a recently published article from our registry (Skåden Ø. 2023), we found more early periprosthetic fractures, infections, and polyethylene fractures/dislocations in uncemented compared with cemented UKA. We also observed less femoral component loosening with the new cemented Oxford partial compared with the cemented Oxford III. We concluded that it appears safe to use the new cemented Oxford partial, but that the uncemented variant should be used with caution, as we have observed many early revisions. In Norway, 94% of UKAs are mobile bearing. Registry studies from Australia and England indicate better outcomes with fixed bearing.

In the electronic registration form we now collect information on height and weight, use of robotic surgery, knee joint approach, closure technique, anesthesia, osteoarthritis grade according to Ahlbäck classification, bone loss classification in revisions, and classification of periprosthetic fractures. We also record stems, augments, and cones with product numbers. Tables 43–57 present these new variables. For 2024, 10% of patients had normal weight, 31% were overweight, 21% had obesity grade 1, and 2.2% had obesity grade 3 (BMI over 40) according to WHO classification. There is strong evidence that patients with obesity benefit from knee arthroplasty to the same extent as normal-weight patients, and obesity should not be used as a reason to deny prosthetic surgery.

We observe that 9% of patients have Ahlbäck grade 1 osteoarthritis, i.e., not bone-on-bone osteoarthritis. These patients have an increased risk of being dissatisfied with the operation and should receive extra thorough information about this (Olsen U. 2022 and 2023). The vast majority of patients with knee osteoarthritis should complete courses and training through AktivA (<https://aktivmedartrose.no/>) or equivalent, before surgery is considered, and it is likely that patients with Ahlbäck grade I osteoarthritis have an additional benefit from, or need for, this type of education and exercise program.

In 2024, 425 (4.7%) knee arthroplasties were performed with robotic assistance, representing a substantial increase from 139 in 2023. Computer navigation alone was used in 6% of total knee arthroplasties. A medial parapatellar approach was used in 90% of cases, 70% of patients received spinal anesthesia, and 13.0% received general anesthesia, an increase from 2022. Local infiltration analgesia (LIA) was used in 78% of knees, peripheral nerve blocks in 36%, 67% were closed with staples, and 22% with continuous skin sutures. Bone loss classification (Anderson) and Mayo fracture classification for tibia and patella, as well as Rorabeck and Lewis classification for the femur, have been introduced.

Quality of knee arthroplasty surgery in Norway

Survival curves show a gradual improvement in outcomes for knee arthroplasties since 1994, using revision surgery as the endpoint. In the period 2014–2024, there has been a pleasing improvement in outcomes for unicompartmental knee arthroplasties. In a study based on our registry data, hospitals performing more than 100 knee arthroplasties per year had fewer revisions than hospitals with lower procedure volumes (Badawy M. 2013). Unicompartmental knee arthroplasties should be concentrated at fewer hospitals (Badawy M. 2014) to reduce the risk of revision.

Documentation of knee prostheses

We present the proportion of patients receiving well-documented knee prostheses at individual hospitals (Figure B.37). In consultation with the advisory board, we have chosen the ODEP (Orthopaedic Data Evaluation Panel–UK) 10A classification as the standard for a prosthesis to be considered well-documented. This corresponds to documentation of $\geq 93\%$ prosthesis survival at 10 years. The long-term goal is 10A*, corresponding to $\geq 95\%$ survival.

Prostheses used in REK-approved studies, revision prostheses, and prostheses with stems have been excluded. In 2019, 61% of patients received well-documented knee prostheses, increasing to 88% in 2024. This is likely due to increased awareness among surgeons, but also because some prostheses (e.g., Legion) now have 10-year documented outcomes from the Australian registry, and Persona and Attune knee prostheses have 2-year RSA results.

We note that some hospitals choose to use prostheses that cannot be classified as well-documented. We hope that hospitals review their practices in relation to procurement contracts within the health trusts, ensure that the prostheses used comply with the agreements, and remain aware of the registry's position on procurement processes for joint prostheses, which can be found on our website. Documentation is published at helse-bergen.no/nrl.

We present 3-year and 10-year survivorship of the most commonly used knee prostheses in Norway for the period 2013–2024 (for prostheses used in more than 500 cases) (Figures B.35 and B.36). None of the prostheses currently in use show poor outcomes, but several prosthesis combinations lack 10-year data from Norway and/or other countries. A more detailed overview of prosthesis survivorship for devices used in 2024 is available in an Excel file at helse-bergen.no/nrl.

Completeness of reporting

In this report, we present the completeness of reporting for primary and revision operations for the years 2021–2023. The data show a slight decline in reporting of both primary and revision arthroplasties for hips and knees. This may be due to the transition to electronic reporting from 2021, reaching nearly full electronic reporting by December 2023. Completeness of reporting for primary and revision hip arthroplasties was 94.5% and 86.5% for 2021–2023, compared with 97% and 90.8% for 2019–2020. Completeness of reporting for primary and revision knee arthroplasties was 95.3% and 91.4% for 2021–2023, compared with 96.5% and 93% for 2019–2020. The register contacts hospitals in January to remind them to complete draft forms and has created instructions on how to check the MRS against the surgical log. Hospitals need to establish good routines for data registration.

Some hospitals have low reporting of revision operations. This can result in a falsely high estimate of prosthesis survival for the hospital. In the figures showing the proportion of unrevised arthroplasties after 2 and 10 years (Figures B.30–B.33), we have excluded hospitals with less than 80% completeness of reporting of revision operations.

We remind hospitals that arthroplasties in the elbow, ankle, hand, fingers, and toes should be reported. For these procedures, the reporting rate is lower than for other joints. We encourage hospitals to review their reporting routines if the rate is low.

Hospital results

We present selected hospital-level results. The proportion of unrevised total knee arthroplasties after 2 years (operated 2018–2024) and 10 years is shown for standard patients during the period 2013–2024. Standard patients are aged 55–85 years, with ASA class 1 or 2, and have primary osteoarthritis. We also present funnel plots for the proportion of unrevised prostheses after 10 years for standard patients operated during the same period. The funnel plots take into account the number of knee arthroplasties performed at each hospital.

Hospitals with a revision risk more than 3 standard deviations (99.8%) above the national average should be considered at high risk for revision and should review their routines (Figure B.34). Four hospitals that previously had a high proportion of revisions have already received letters urging them to review their routines. These hospitals have reported on their practices, reviewed internal procedures, and initiated improvement measures. We hope these actions will yield results in the long term, but poor outcomes from 10 years ago will continue to influence data for several years.

Currently, there are two hospitals with a high proportion of revisions, and the advisory board has endorsed encouraging these hospitals to develop an improvement plan.

Elbow

A total of 2,207 elbow arthroplasties have been registered, with 70 new cases in 2024, approximately the same number as in 2023. Of the 70 procedures, 34 were radial head prostheses, 6 hemiarthroplasties, and 16 total elbow arthroplasties. In total, 13 revisions and 1 reoperation were performed in 2024. Previously, total elbow prostheses and several of the other small joint prostheses were mainly used in patients with rheumatoid arthritis; today, fractures and fracture sequelae are the most common diagnoses. All hemiarthroplasties and radial head prostheses in 2024 were used in fracture patients.

At some hospitals, hemiarthroplasties are now used as an alternative to total elbow arthroplasty in supracondylar and intracondylar humeral fractures. In all total elbow arthroplasties, both humeral and ulnar components were cemented. In recent years, the Discovery prosthesis has been the most commonly used for total elbow arthroplasties, and the Latitude EV prosthesis for hemiarthroplasties. The use of radial head prostheses has declined somewhat over the past two years: 34 were implanted in 2024, a marked decrease from 55 in 2022.

Finger and hand

A total of 4,054 MCP finger prostheses have been reported, with 34 procedures (primary and revision combined) in 2024. Of these, 27 were primary procedures and 7 were revisions. There has been a substantial decline in the use of MCP prostheses, from over 300 annually in the 1990s to around 30 per year today. The number of MCP prostheses has been stable since 2017. This decline is likely due to the effectiveness of modern medical treatment for rheumatoid arthritis. For PIP finger prostheses, reporting has increased from 3 primary prostheses in 2009 to 25 in 2024. These prostheses are used in patients with osteoarthritis and fractures. In total, 239 PIP prostheses have been implanted or revised across all years.

We have registered 738 wrist prostheses overall, of which 56 were reported in 2024 (38 primary and 18 revisions). The number of reported wrist prostheses has increased over the past two years.

A total of 1,314 carpometacarpal (CMC I) thumb prostheses have been reported. The annual number of primary procedures was around 30, but reporting has increased significantly from 47 in 2022 to 286 in 2024. Almost all of these are implanted for osteoarthritis.

Completeness of registration for hand and finger prostheses is unfortunately low, likely due to misclassification or ambiguity in NOMESKO coding reported to NPR. We are currently attempting to validate reporting to the Norwegian Arthroplasty Register and the Norwegian Patient Registry at selected hospitals.

Ankle

A total of 2,108 ankle prostheses have been reported, with 82 reported in the past year, of which 67 were primary procedures. This is an increase from 27 primary procedures reported in 2022.

Prosthesis survival for ankle arthroplasty in Norway was 81% at 5 years and 69% at 10 years for patients operated on between 1994 and 2021 (Sundet M. 2023). Younger patients (<60 years) had particularly poor outcomes. Results were somewhat better toward the end of the study period.

There is, however, good reason to be cautious with ankle arthroplasty. We believe that decisions regarding arthroplasty versus arthrodesis are complex and should be centralized to a few specialized hospitals. In 2024, ankle arthroplasties were performed at six hospitals for both primary and revision procedures. All prostheses are uncemented, as has been the practice for the past 15 years. The FDA has reported a high incidence of polyethylene fractures in the STAR ankle prosthesis, which has not been used in Norway since 2013.

Toe joint prostheses

A total of 1,560 toe joint prostheses have been reported. There has been a marked decline since 2006, when approximately 80 primary toe prostheses were reported annually, compared with 1 primary procedure in 2023 and none in 2024. Most of these prostheses were previously implanted in patients with rheumatoid arthritis.

Summary of key scientific findings in the past year

In a study by Lutro and colleagues (Lutro O. 2025), it was shown that 1, 2, or 3 doses of systemic antibiotic prophylaxis were not inferior to 4 doses on the day of surgery for preventing postoperative wound infection after total hip, total knee, and hemiarthroplasty following hip fracture. Cefazolin, which has the longest half-life, was associated with the lowest risk of periprosthetic joint infection (PJI). This study has formed the basis for changes to the Norwegian Directorate of Health's guidelines on antibiotic prophylaxis in arthroplasty, expected to be published in 2025.

A study published in *Nature* (Hatzikotoulas K. 2025) used data from the Norwegian Arthroplasty Register and the HUNT Study (Helseundersøkelsene i Nord-Trøndelag). The study, led by Professor Ele Zeggini at the Helmholtz Institute in Munich, included genetic information from nearly two million people worldwide. It provides novel insights into which genes influence the risk of developing osteoarthritis, identifying over 900 genetic loci associated with the disease. Ten percent of these loci code for proteins that are already targets of approved drugs, potentially enabling faster development of new treatments.

A study from the NARA collaboration compared hinged, fully stabilized, and minimally stabilized total knee arthroplasties across the four Nordic countries (von Hintze J. 2025). The study showed that the use of hinged (RHK) and fully stabilized (CCK) knees increased between 2000 and 2017, particularly in Finland. The 15-year revision rate was between 11% and 14%, with little difference between RHK and CCK. The higher risk compared with minimally stabilized knees (CR and PS) is likely due to the more complex nature of the surgery.

A study from AHUS examined the effect of BMI on revision risk 3–9 years after primary total knee arthroplasty and found that BMI did not influence the risk of revision. BMI should therefore not be used as a reason to deny prosthetic surgery (Mikaelsen JR. 2024).

The registry has collaborated with a research group at NTNU in an EU project mapping patients' attitudes toward physical activity after hip and knee arthroplasty (Hals OM. 2024). Patients who had been physically active prior to surgery had the most positive attitudes toward physical activity, whereas higher age, higher body weight, and the use of walking aids were associated with less positive attitudes.

Several cartilage surgery cohorts from Norway have been linked with the knee arthroplasty register (Birkenes T. 2023). The incidence of knee arthroplasty after 20 years was 19%. Deep lesions, older age at cartilage surgery, higher BMI at follow-up, cartilage transplantation (ACI), and more than one cartilage lesion were associated with subsequent knee arthroplasty. Fifty-eight knee arthroplasty patients with prior surgery for focal cartilage lesions were compared with 116 matched knee arthroplasty patients without cartilage lesions (control group). Previous cartilage surgery was associated with worse patient-reported outcomes after knee arthroplasty (Birkenes T. 2024).

In a large international meta-analysis of cement with and without antibiotics involving 10 participating registries, no difference was found in the risk of revision surgery due to infection one year after primary cemented total knee arthroplasty. A total of 1.9 million knees were studied (Leta T. 2024). In the same cohort, the number of doses of systemic antibiotic prophylaxis was evaluated. A single preoperative dose did not result in more infections than multiple doses. It appears safe to use one dose of systemic antibiotic prophylaxis before total knee arthroplasty, regardless of whether the cement contains antibiotics (Leta T. JBJS Open Access 2024).

Bergvad and colleagues (Bergvad IB. 2025) culturally adapted and validated the Norwegian version of the Goodman Satisfaction Score (GSS-NO) using patients from the registry. The score was valid and reliable for Norwegian-speaking patients after hip and knee arthroplasty.

The NAR contributed to a large international study examining sex differences in the risk of infection after hip, knee, shoulder, and ankle arthroplasty. The study included almost 5 million implants from 9 registries. Men had a 60% increased risk of infection after hip arthroplasty, a twofold increased risk after knee arthroplasty, and a 4.5-fold increased risk after shoulder arthroplasty, with no difference for ankle arthroplasty (Roerink AMC. 2025).

The register also contributed data on reporting completeness for our hip and knee registry in an international study including 14 national arthroplasty registries (French JMR. 2024). Our coverage was among the best. Methods for calculating coverage vary between registries, and our method using personal identification number and date of surgery was particularly highlighted. If hospitals can report the side code ZXA to the Norwegian Patient Registry (NPR), completeness of reporting analyses will become even easier to perform.

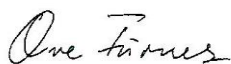
The register contributed data to an article describing member registries in ISAR (International Society of Arthroplasty Registries). The purpose is to increase knowledge about existing registries, facilitate data access, improve transparency, harmonization, and reporting (Lübbeke A. 2025).

Finally, the register contributed data for mapping digital health literacy among hip and knee arthroplasty patients, as part of Turid Rognsvåg's PhD thesis. One-third of hip and knee arthroplasty patients had low digital health literacy (eHL). Low eHL was associated with poorer quality of life measured by EQ-5D-5L (Rognsvåg T. 2024).

We congratulate Thomas Birkenes (cartilage surgery and knee arthroplasty) and Turid Rognsvåg (knee arthroplasty) on successfully defending their PhD theses.

We thank all hospitals for good reporting, but please remember to report procedures on the small joints of the hand and feet. Osteosynthesis for periprosthetic fractures, where the prosthesis is not removed or revised, should be reported for all joint prostheses. Hospitals may designate a contact person for each joint if desired. We also welcome proposals for research projects and look forward to collaborative research.

Bergen, June 2025



Ove Furnes
Senior Consultant Ortho Surgeon
Professor
Head of National Network
Head of Knee Arthroplasty



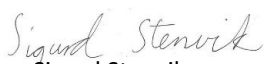
Torbjørn Kristensen
Senior Consultant Ortho Surgeon
Substitute for Geir Hallan
Head of Ankle/foot/hip
Arthroplasty



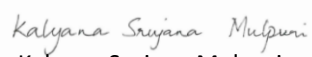
Yngvar Krukhaug
Senior Consultant Ortho Surgeon
Associate Professor
Head of Elbow/hand/finger
Arthroplasty



Irina A Kvinnesland
IT-consultant



Sigurd Stenvik
Biotatistician/researcher



Kalyana Srujana Mulpuri
IT-consultant



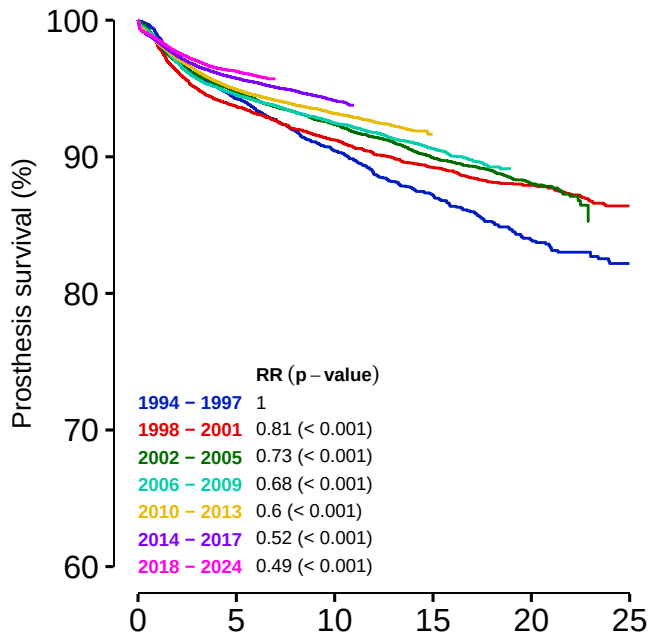
Anne Marie Fenstad
Biostatistician/researcher
Deputy Head of National Network

Survival curves for knee prosthesis

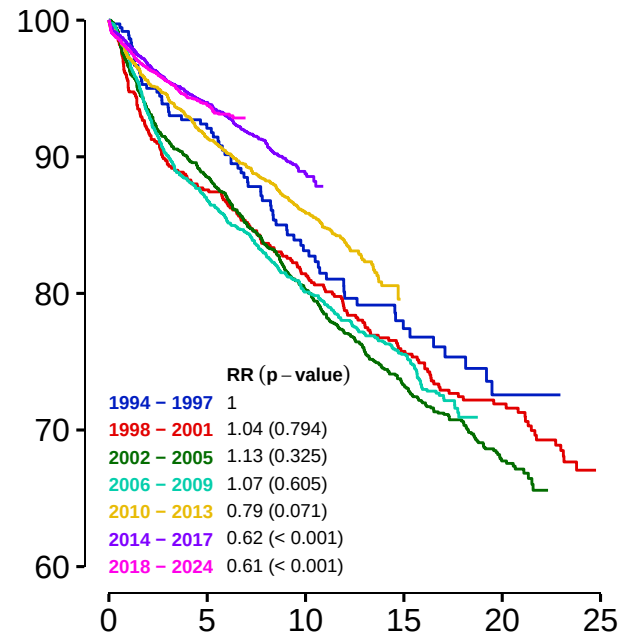
1994–2024

Norwegian Arthroplasty Register

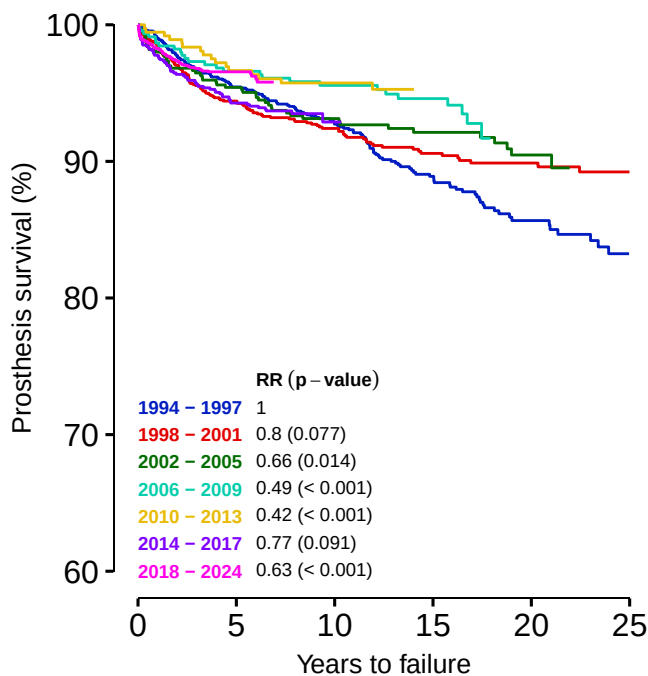
B.1) All



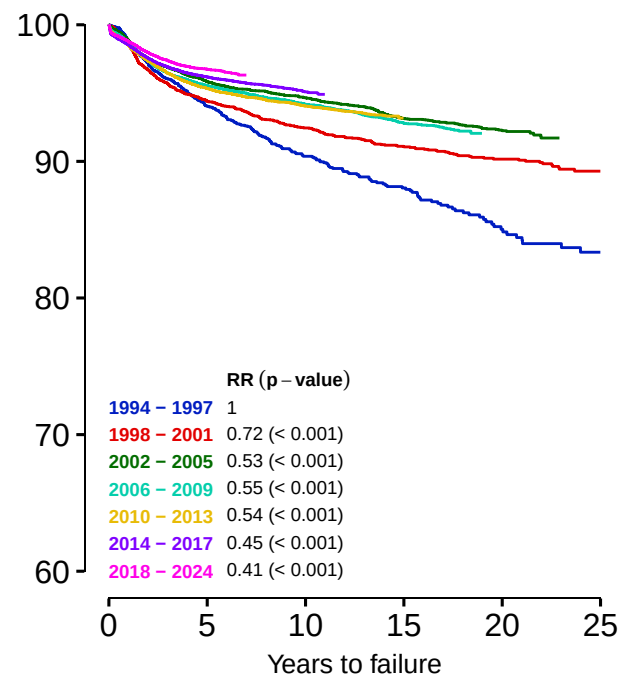
B.2) Unicondylar



B.3) Total with patella



B.4) Total without patella



Kaplan–Meier survival curves. Survival estimate is given as long as > 50 prostheses are at risk.

Risk ratio (RR) estimates adjusted for age, sex and diagnosis.

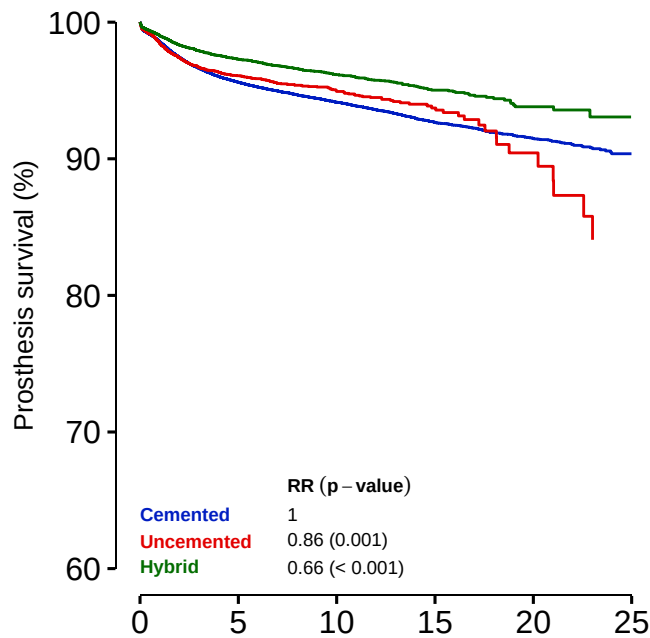
There is some uncertainty tied to the risk estimates from the Cox-analysis as the assumption of proportional hazard does not hold for all models.

Survival curves for knee prosthesis – Fixation

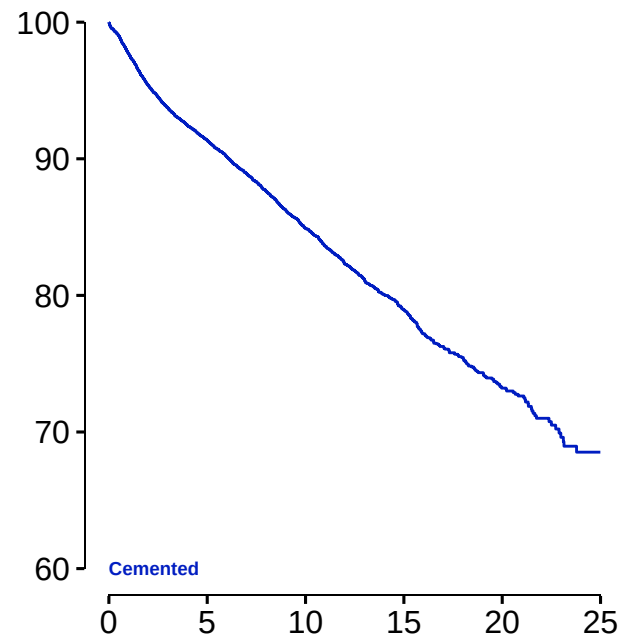
Report 2025

1994 – 2024

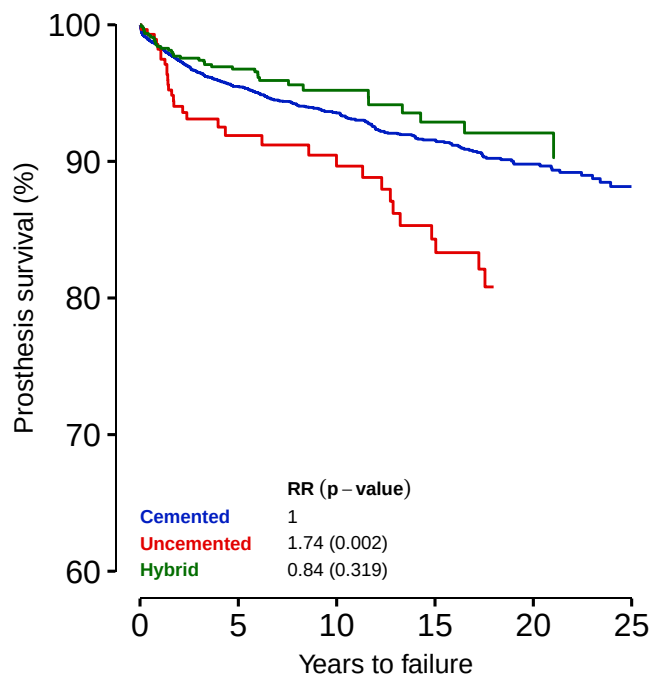
B.5) Total prosthesis



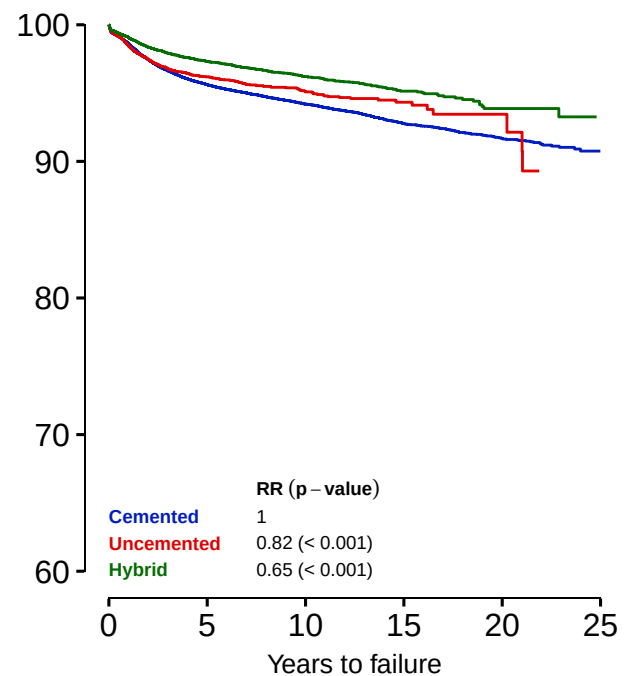
B.6) Unicondylar



B.7) Total with patella



B.8) Total without patella



Kaplan-Meier survival curves. Survival estimate is given as long as > 50 prostheses are at risk.

Risk ratio (RR) estimates are adjusted for age, sex and diagnosis.

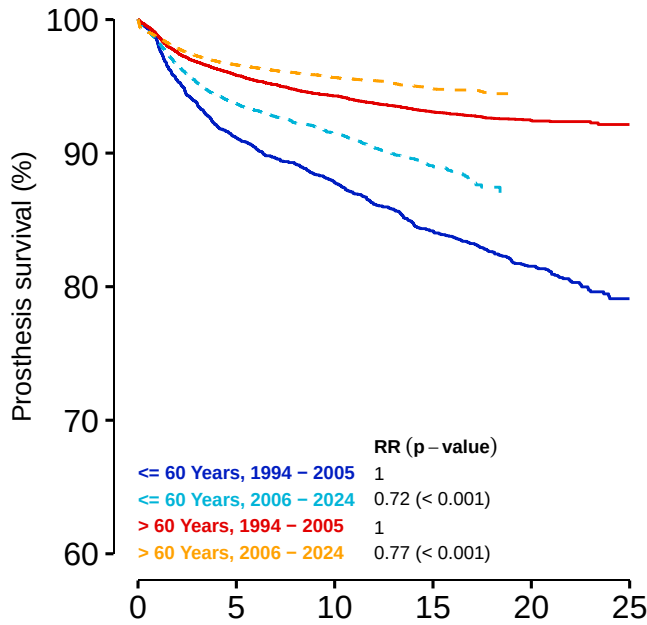
There is some uncertainty tied to the risk estimates from the Cox-analysis as the assumption of proportional hazard does not hold for all models.

Survival curves for knee prosthesis – Age

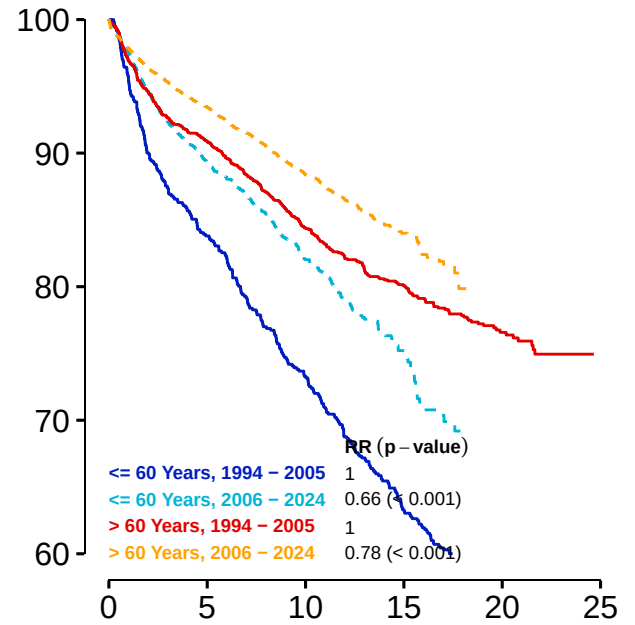
1994 – 2024

Norwegian Arthroplasty Register

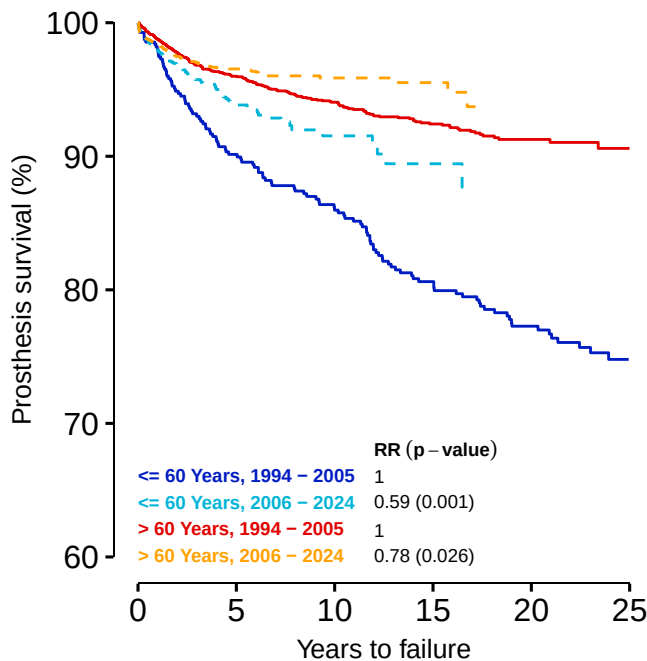
B.9) Total prosthesis



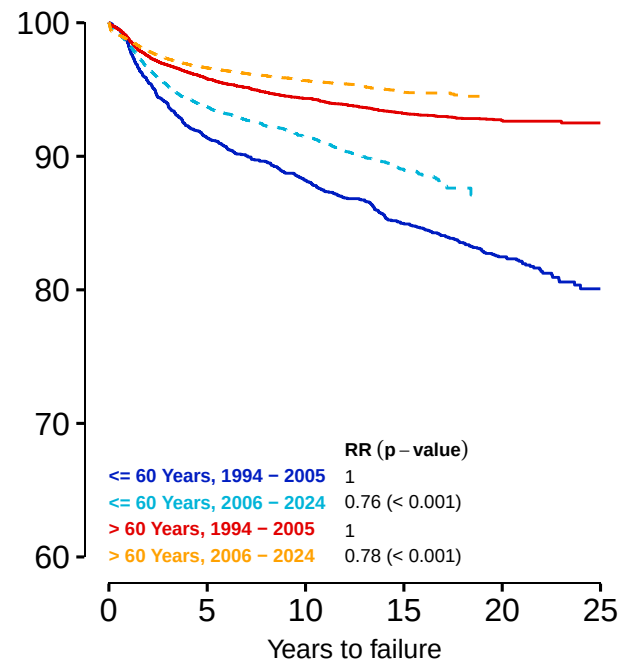
B.10) Unicondylar



B.11) Total with patella



B.12) Total without patella



Kaplan-Meier survival curves. Survival estimate is given as long as > 50 prostheses are at risk.

Risk ratio (RR) estimates adjusted for age, sex and diagnosis.

For figures B.9–12 two Cox-regressions have been fit; one for each age group. the years 1994–2005 is used as reference in both models.

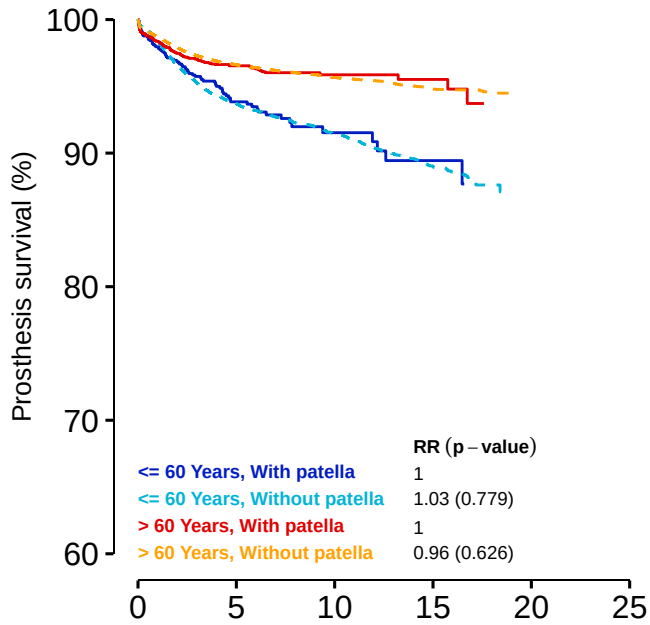
There is some uncertainty tied to the risk estimates from the Cox-analysis as the assumption of proportional hazard does not hold for all models.

Survival curves for knee prostheses

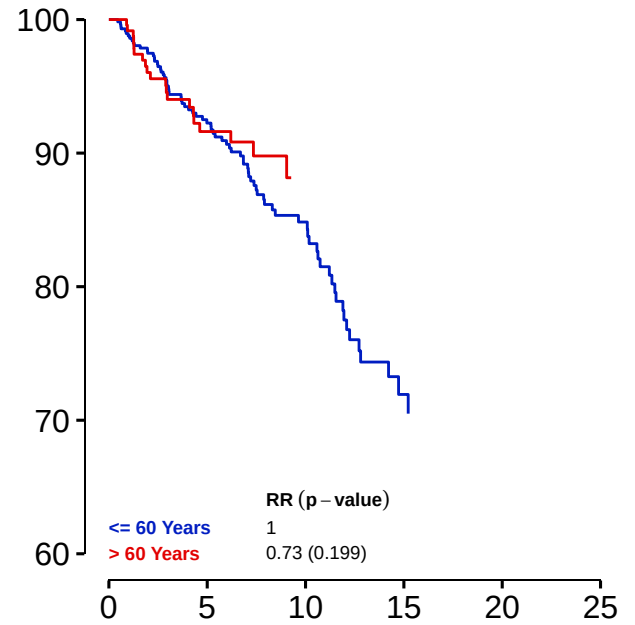
Report 2025

1994 – 2024

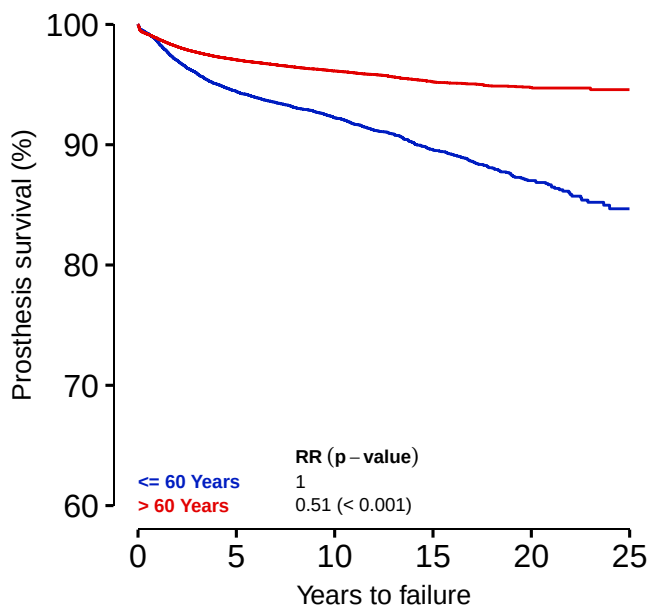
B.13) Total, 2006 – 24



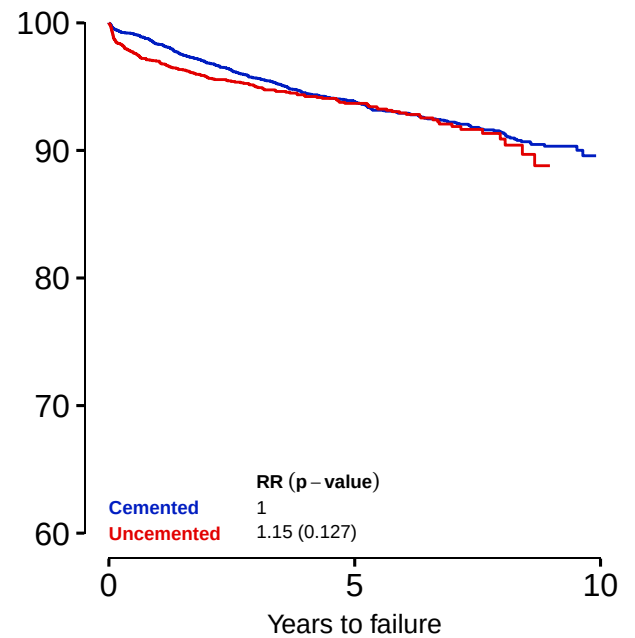
B.14) Patellofemoral



B.15) Total prostheses without patella where insertion of patella doesn't count as a revision



B.16) Unicondylar prostheses cemented | uncemented



Kaplan-Meier survival curves. Survival estimate is given as long as > 50 prostheses are at risk.

Risk ratio (RR) estimates adjusted for age, sex and diagnosis.

For figure B.13 two Cox-regressions have been fit; one for each age group. the years 1994–2005 is used as reference in both models.

There is some uncertainty tied to the risk estimates from the Cox-analysis as the assumption of proportional hazard does not hold for all models.

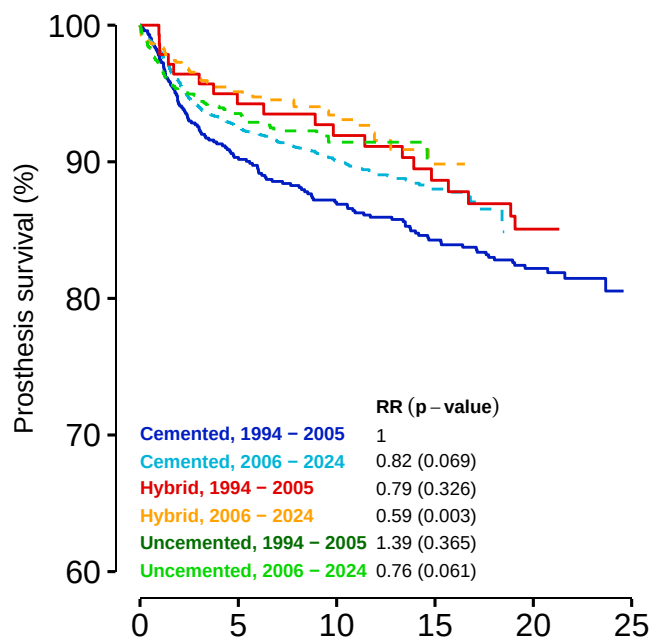
Knee

Survival curves for total prostheses in knee without patella component

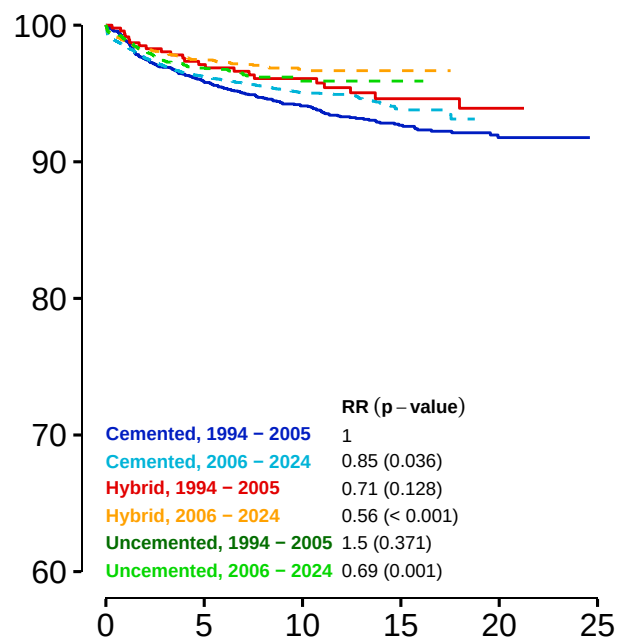
1994 – 2024

Norwegian Arthroplasty Register

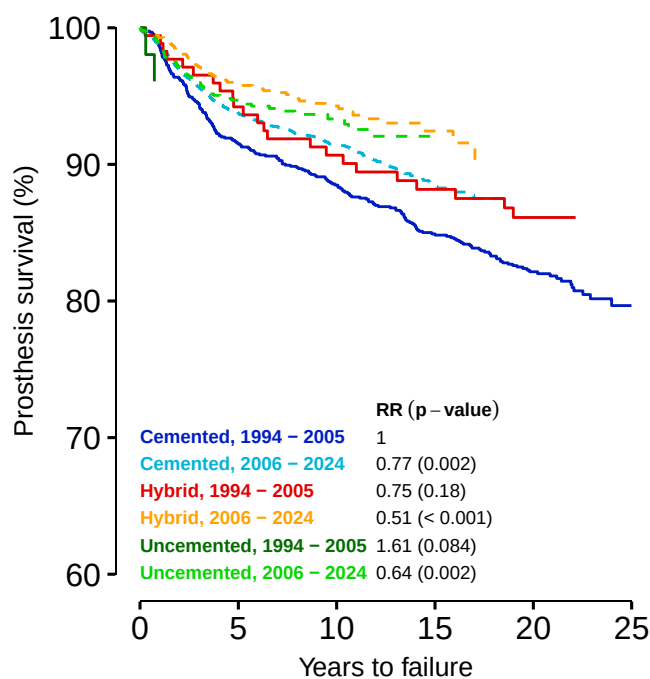
B.17) Men, under 60 years



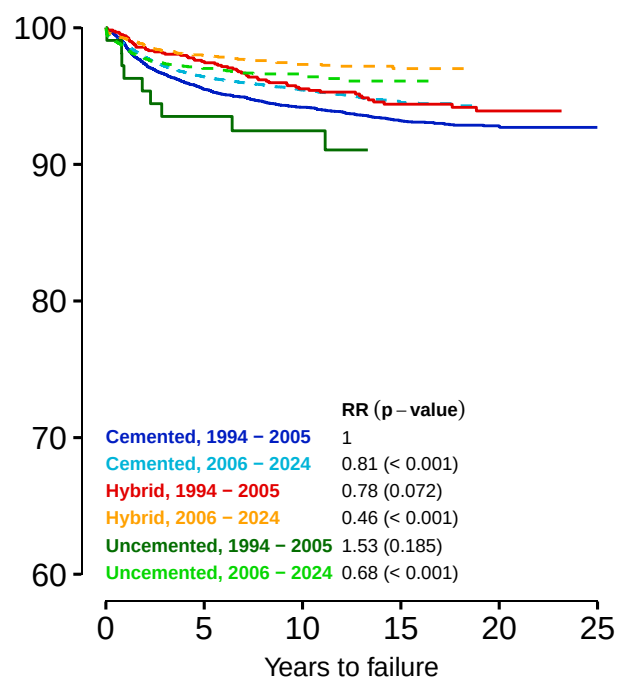
B.18) Men, over 60 years



B.19) Women, under 60 years



B.20) Women, over 60 years



Kaplan-Meier survival curves. Survival estimate is given as long as > 50 prostheses are at risk.

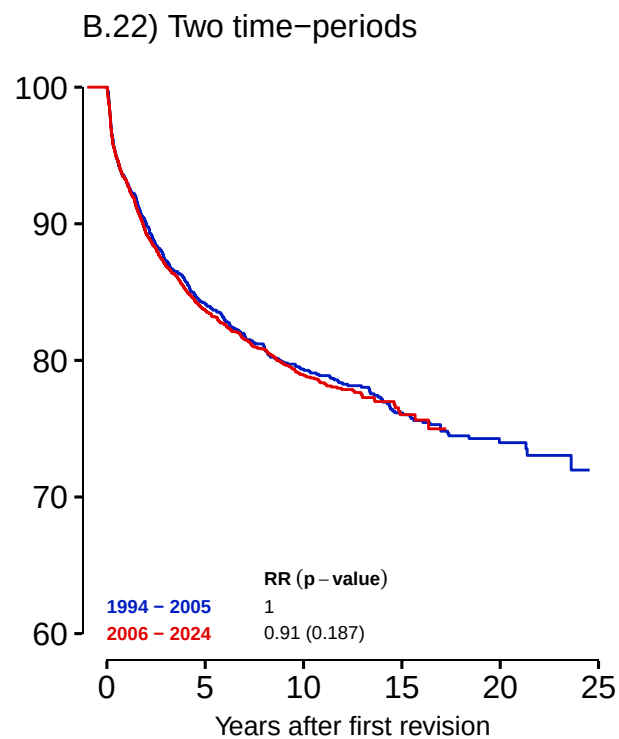
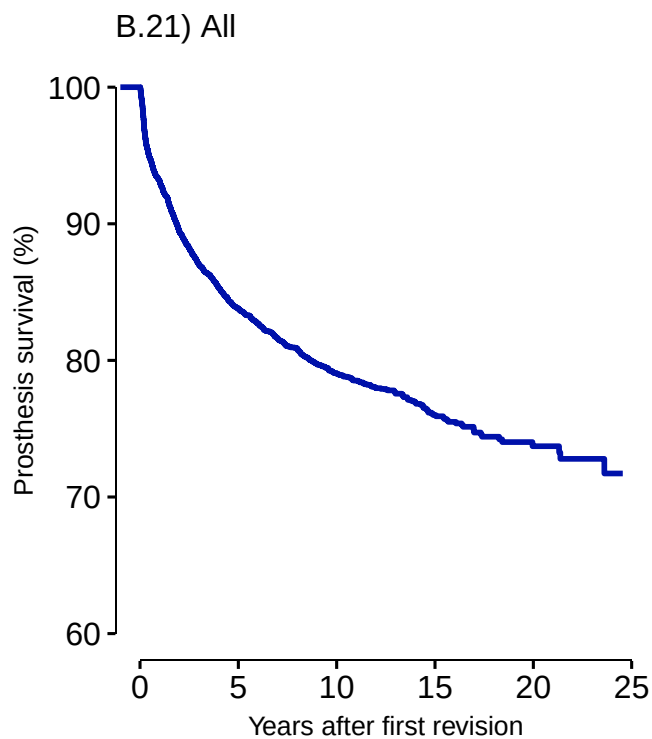
Risk ratio (RR) estimates are adjusted for age, sex and diagnosis.

There is some uncertainty tied to the risk estimates from the Cox-analysis as the assumption of proportional hazard does not hold for all models.

Survival curves for revisions of knee prostheses

Report 2025

1994 – 2024



Kaplan–Meier survival curves. Survival estimate is given as long as > 50 prostheses are at risk.

Risk ratio (RR) estimates adjusted for age, sex and diagnosis.

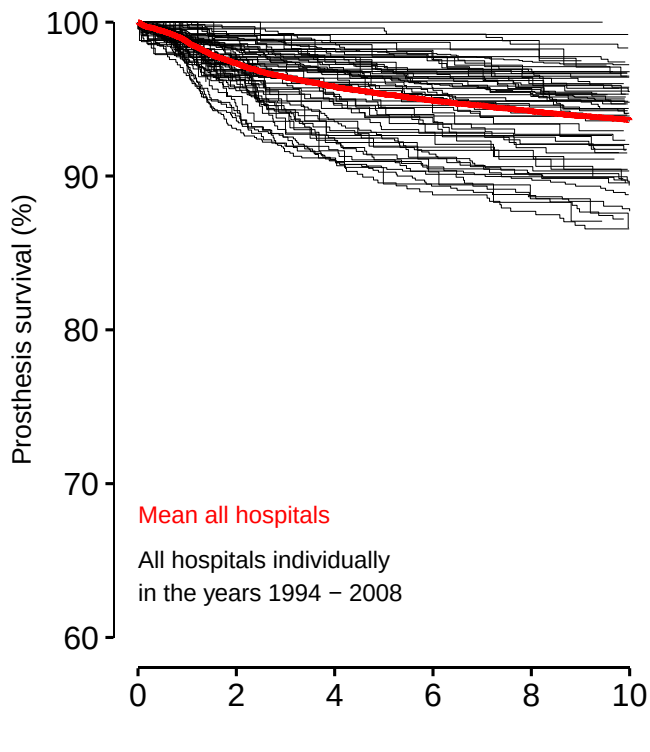
There is some uncertainty tied to the risk estimates from the Cox-analysis as the assumption of proportional hazard does not hold for all models.

Knee

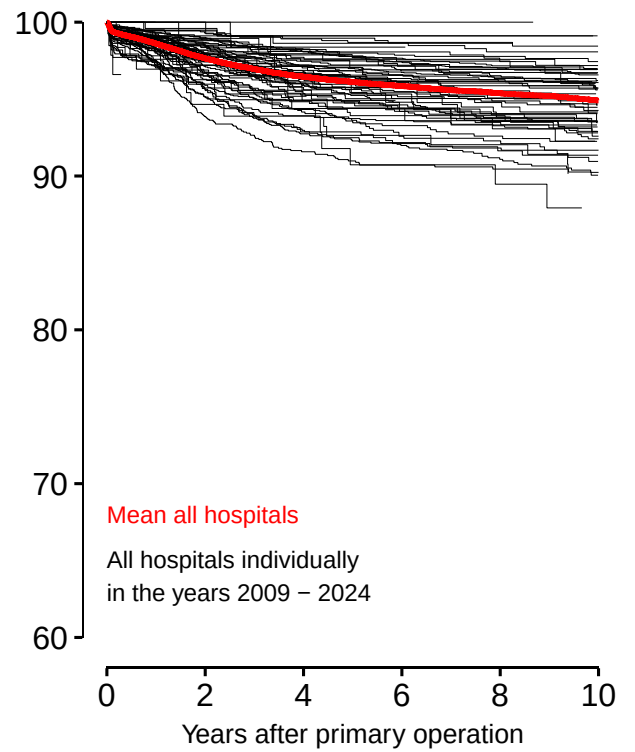
Survival curves for total knee prostheses

Norwegian Arthroplasty Register

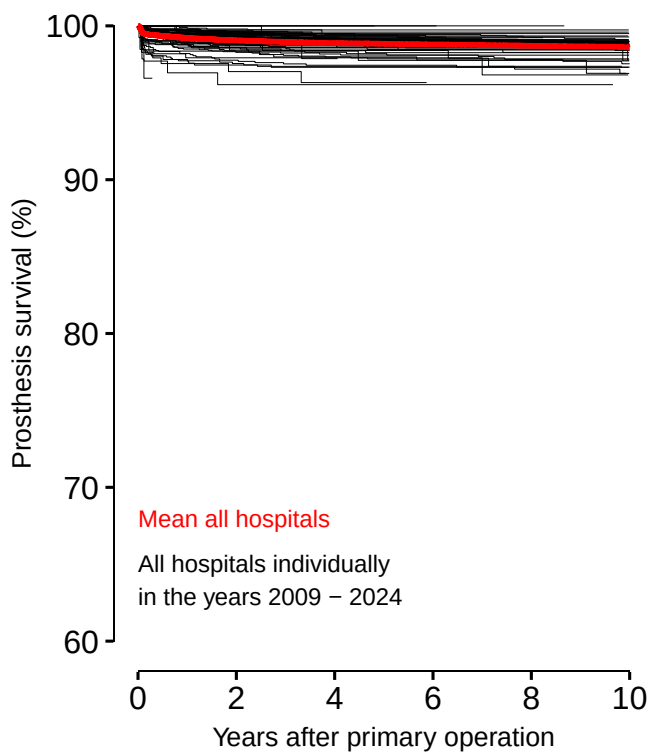
B.23) All hospitals in the years 1994 – 2008



B.24) All hospitals in the years 2009 – 2024



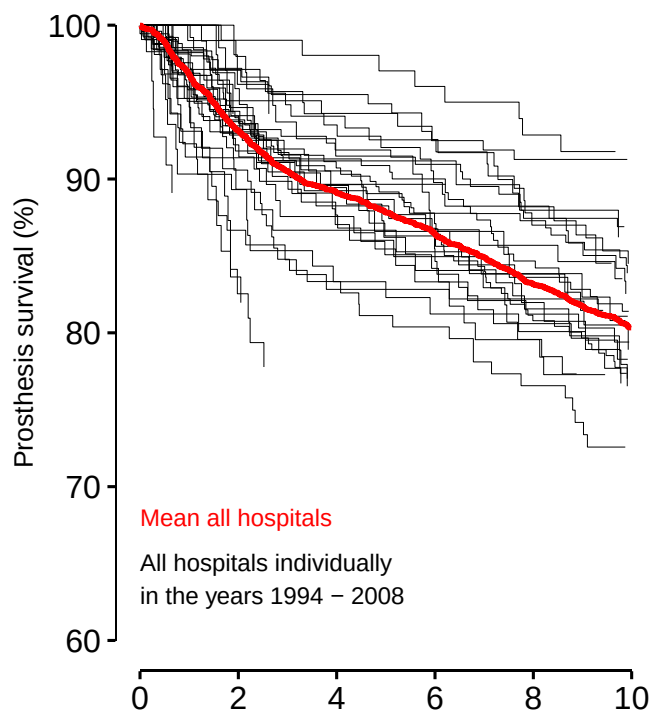
B.25) Endpoint revision for infection, 2009 – 2024



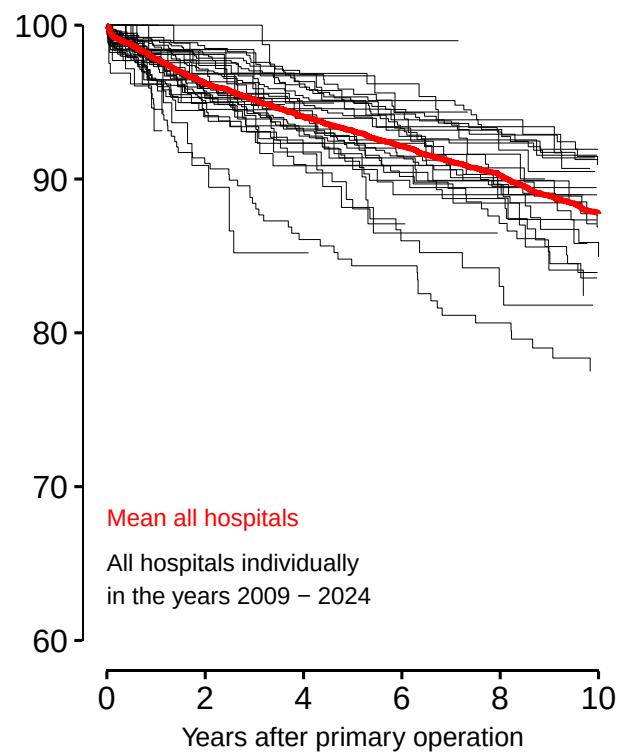
Survival curves for unicondylar knee prostheses

Report 2025

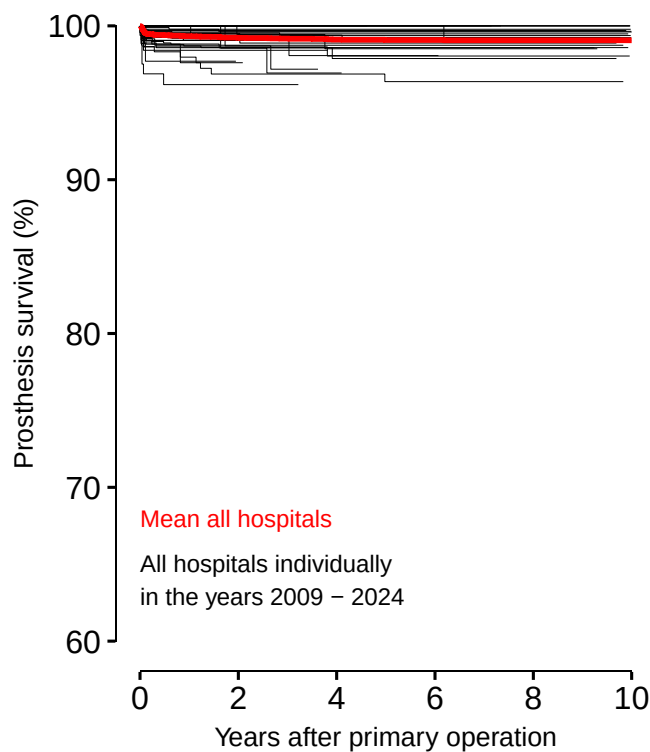
B.26) All hospitals in the years 1994 – 2008



B.27) All hospitals in the years 2009 – 2024



B.28) Endpoint revision for infection, 2009 – 2024



One stage bilateral operation in knee arthroplasty

Year	1994-2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Sum:
Number of patients	167	50	79	74	74	88	109	89	69	85	82	966

A one stage bilateral operation is an operation where the patient is operated on both knees during the same operation or on the same day. Only primary operations are included.

FIGURE B.29: Number of primary operations in knee at each hospital 2024

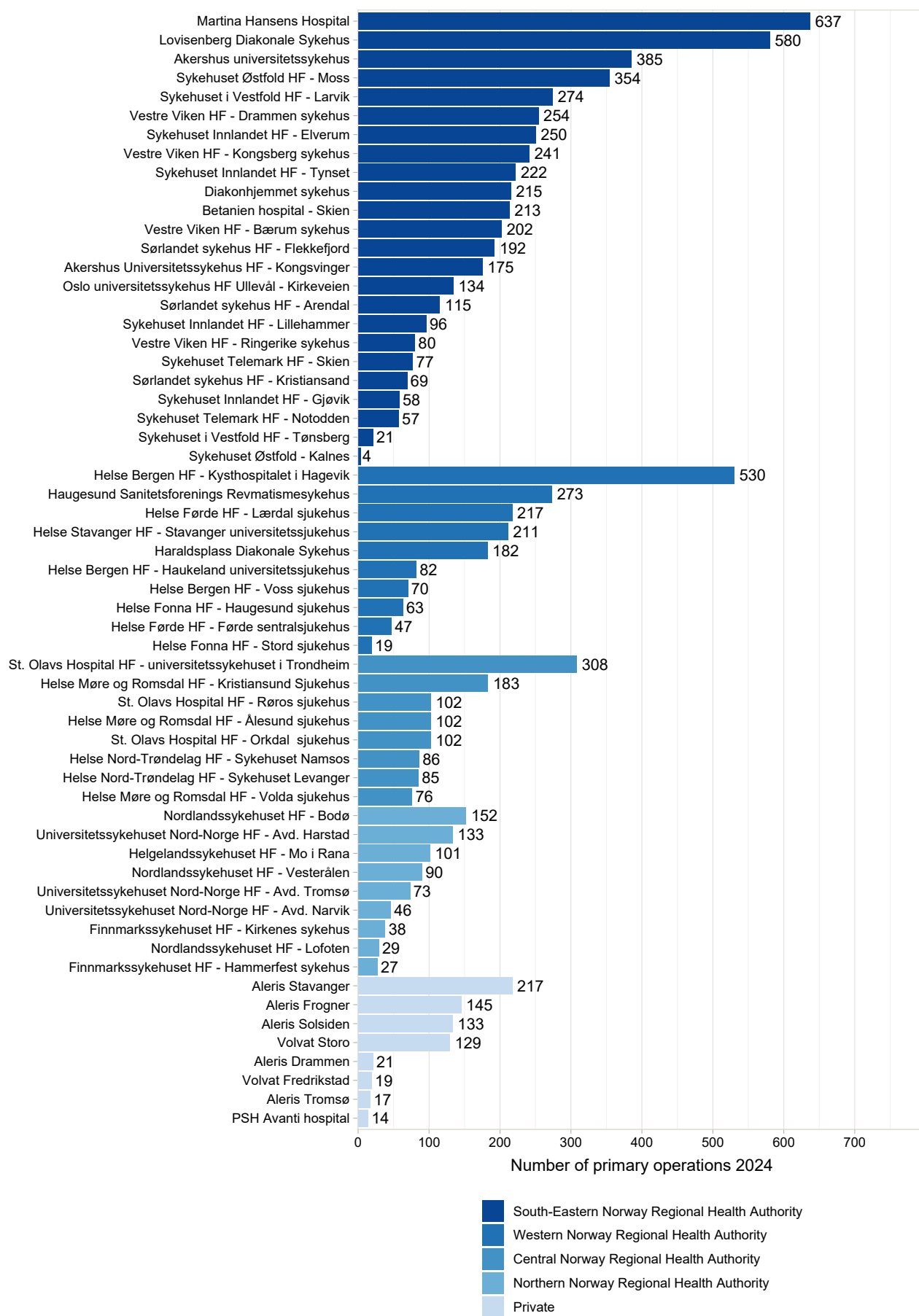
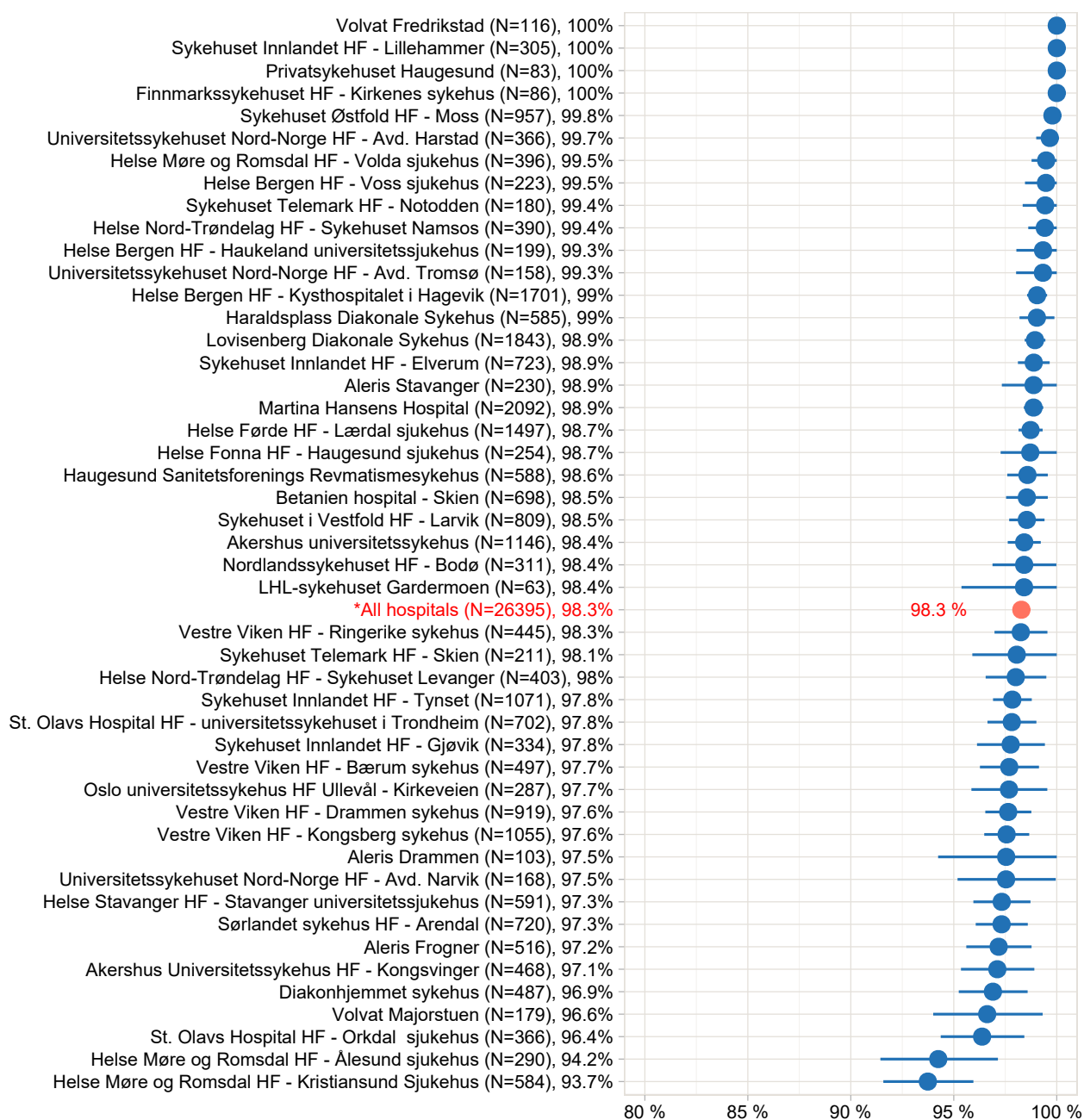


FIGURE B.30: Percentage non-revised standard knee replacements, two years after operations in 2018-2024



Percentage non-reoperated primary operations in the knee

*All hospitals that fulfills the criteria to be included in the figure.

Kaplan-Meier estimates of percentage non-revised standard patients after two years with 95 % confidence interval. Standard patients are patients between 55 and 85 years old, with ASA class 1 or 2, with idiopathic arthrosis at primary operation and with total prostheses. Endpoint is all revisions. Reoperations, i.e. revision operations without insertion, removal or replacement of the prosthesis, are excluded. Included are all patients operated on in the years 2018 to 2024. Only hospitals with operations in 2024 and with more than 50 operations from 2018 to 2024 are included. A further requirement is that the hospital must have at least 30 patients followed up for more than two years. Only hospitals with completeness of at least 80 % or undefined¹ for revisions from 2018 to 2023 are included.

¹Undefined completeness happens when there are zero revisions in NPR and NRL.

FIGURE B.31: Percentage nonrevised standard patients two years after operation in 2018-2024 in hospitals with completeness of reporting <80% of revisions

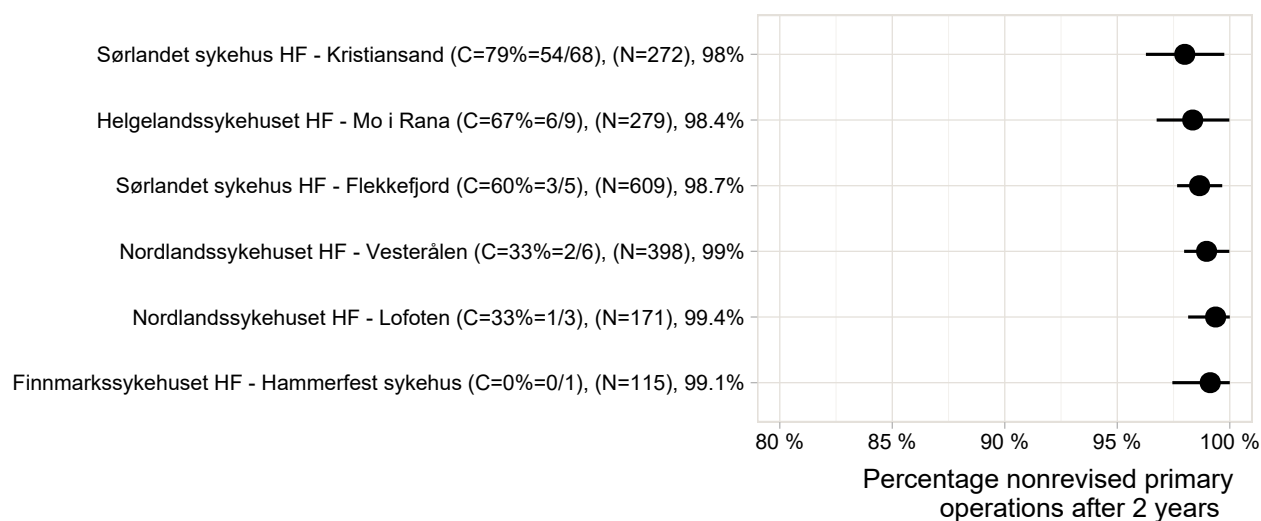
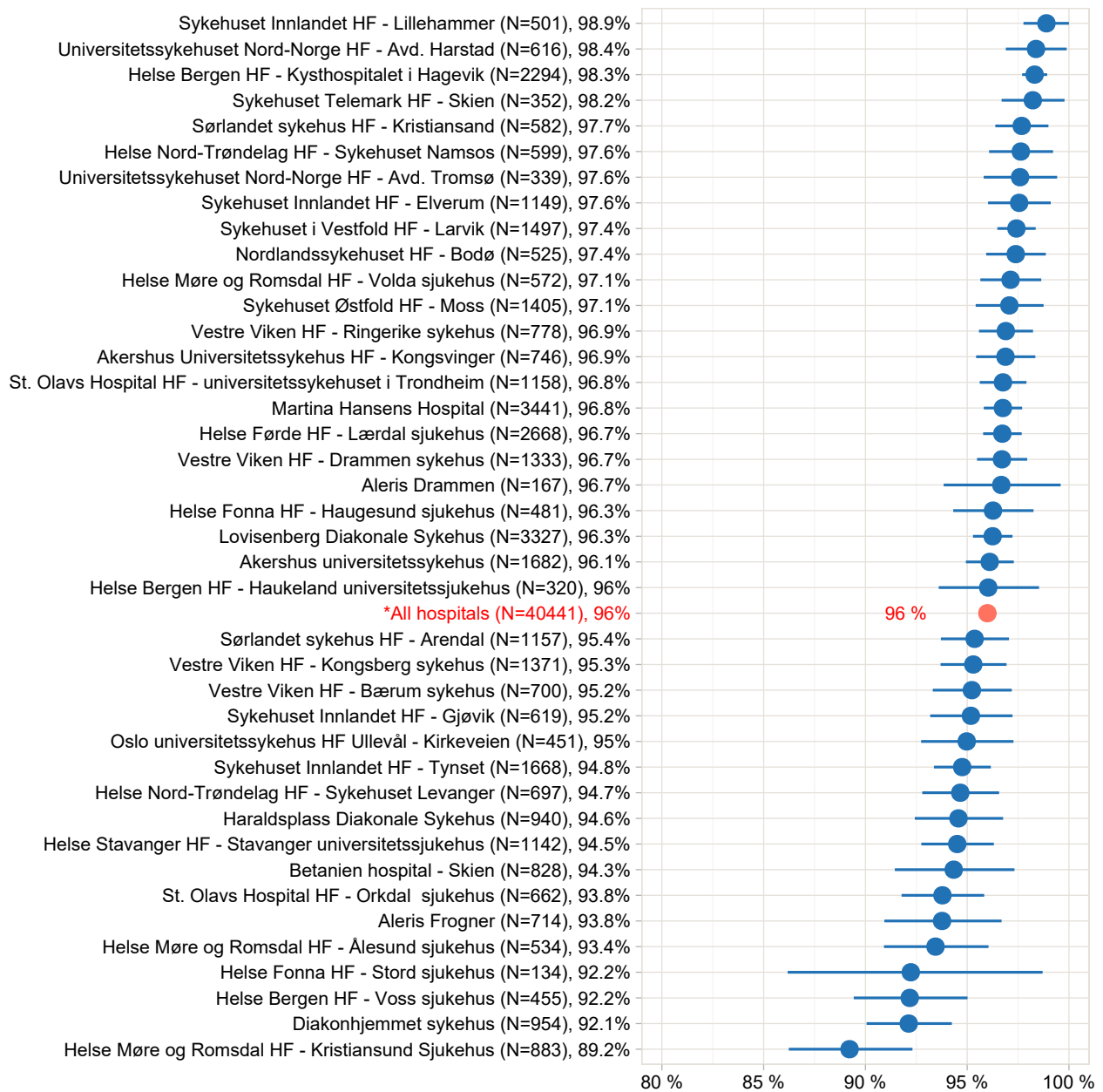


Figure B.31 shows hospitals that fulfill the criteria in figure B.30 except 80% completeness. Completeness is given with a big C. The numerator is the total number of revision registered at NRL and the denominator is the total number of revision registered at NRL or NPR.

FIGURE B.32: Percentage non-revised standard patients ten years after operations in 2013-2024



Percentage non-reoperated primary operations in knee

*All hospitals that fulfills the criteria to be included in the figure.

Kaplan-Meier estimates of percentage non-revised standard patients after ten years with 95 % confidence interval. Standard patients are patients between 55 and 85 years old, with ASA class 1 or 2, with idiopathic arthrosis at primary operation and with total prostheses. Endpoint is all revisions. Reoperations, i.e. revision operations without insertion, removal or replacement of the prosthesis, are excluded. Included are all patients operated on in the years 2013 to 2024. Only hospitals with operations in 2024 and with more than 50 operations from 2013 to 2024 are included. A further requirement is that the hospital must have at least 30 patients followed up for more than ten years. Only hospitals with completeness of at least 80 % for revisions from 2008 to 2023 are included.

See “How to interpret the hospital-based results” page 22.

FIGURE B.33: Percentage nonrevised standard patients ten years after operation in 2013-2024 in hospitals with completeness of reporting <80% of revisions

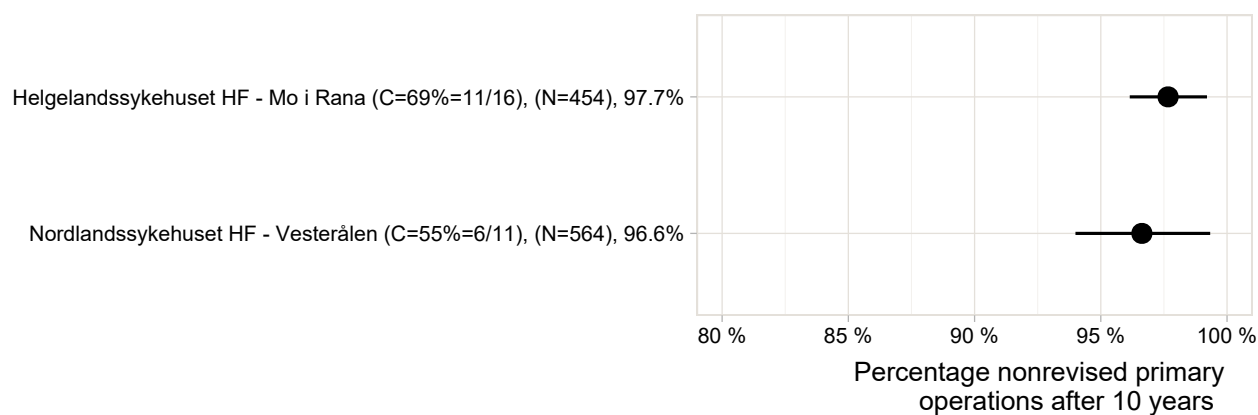
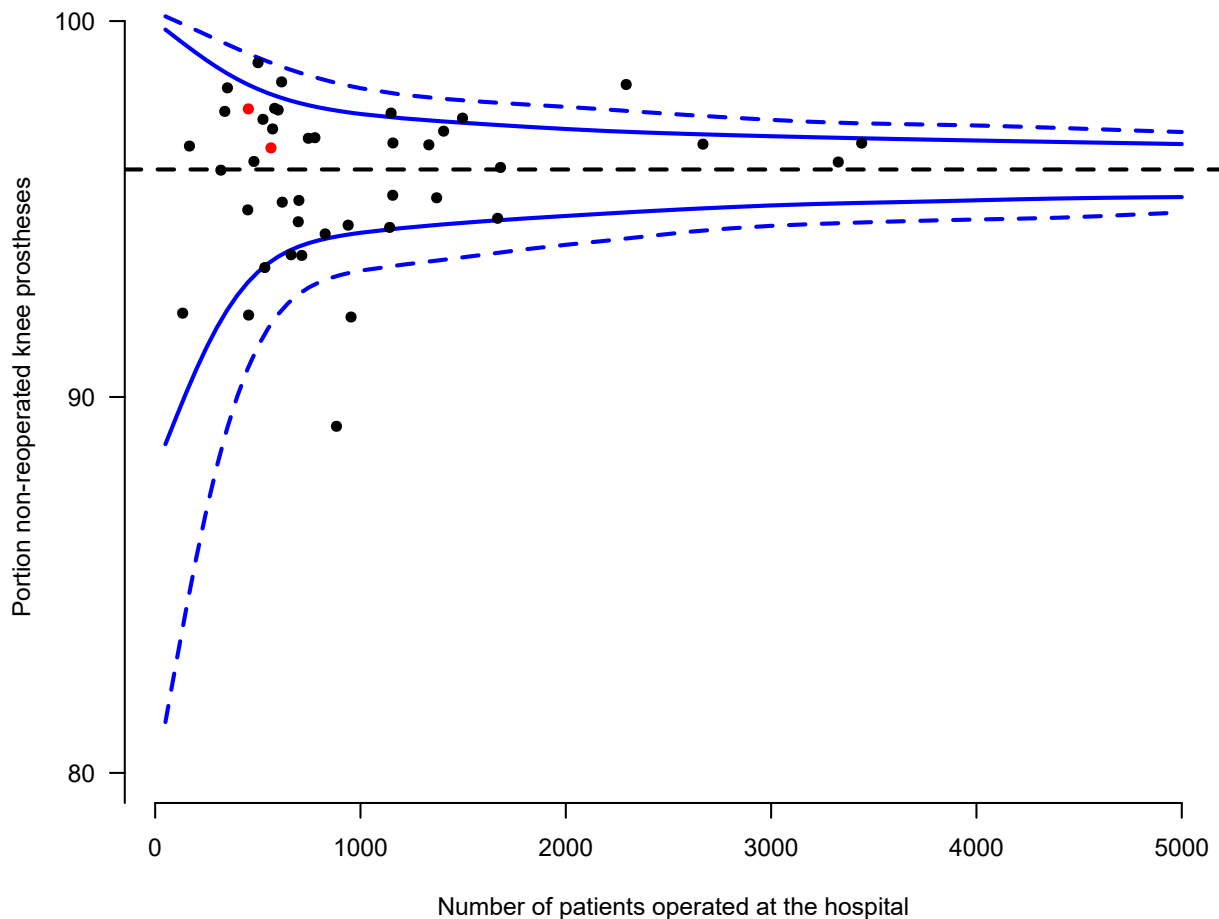


Figure B.33 shows hospitals that fulfill the criteria in figure B.32 except 80% coverage. Completeness is given with a big C. The numerator is the total number of revision registered at NRL and the denominator is the total number of revision registered at NRL or NPR.

FIGURE B.34: Funnel plot, percentage non-revised standard patients ten years after operations in 2013-2024



Each point shows the percentage non-revised prostheses after 10 years for standard patients operated from 2013 to 2024 at Norwegian hospitals. Hospitals that have reported less than 80% of reoperations (2008- 2020) are marked in red in the figure. The same hospitals are in figure B.33. Some hospitals are excluded. This can be due to less than 50 knee prostheses operated in the period, that fewer than 30 patients have been followed up for more than 10 years, or that the hospital don't have any operations in 2024. The solid blue lines show the interval where 95 % of the Norwegian patients will be. The dotted blue lines show the interval where 99.8 % of the patients will be. Points to the right represents hospitals with many operations (see the x-axis). Points above or below the dotted lines are regarded as outliers with exceptionally good or exceptionally bad results respectively.

All of the black points in the funnel plot correspond to a hospital in figure B.32. By choosing any point, and using the corresponding values for “Number of patients” and “Portion non-reoperated” on the x and y axis respectively, the hospital belonging to the point can be found in figure B.32. The two hospitals with points below the dotted lines have inferior results. One of the hospitals has inserted patella components in many reoperations due to pain. This is a small reoperation, but can be beneficial for some patients with much pain. The threshold for inserting a patella component will therefore influence the number of reoperations at the hospital.

FIGURE B.35: Percentage non-reoperated total prostheses in knee after 3 and 10 years, 2013-2024.

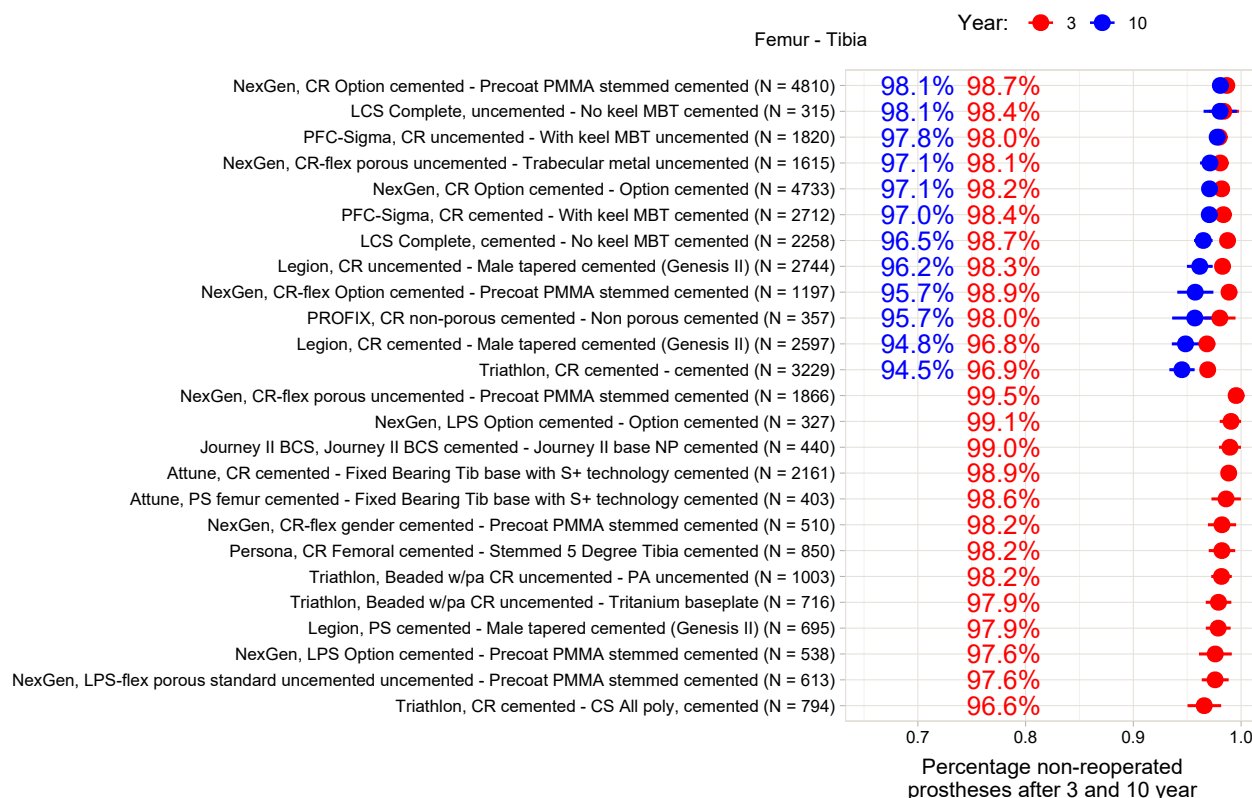


FIGURE B.36: Percentage non-reoperated uni prostheses in knee after 3 and 10 years, 2013-2024.

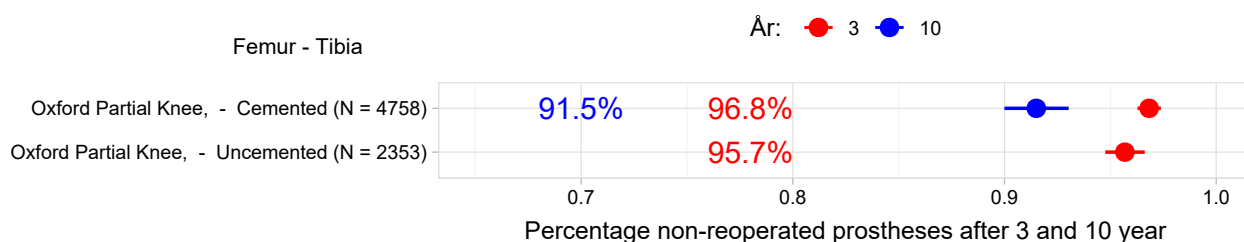
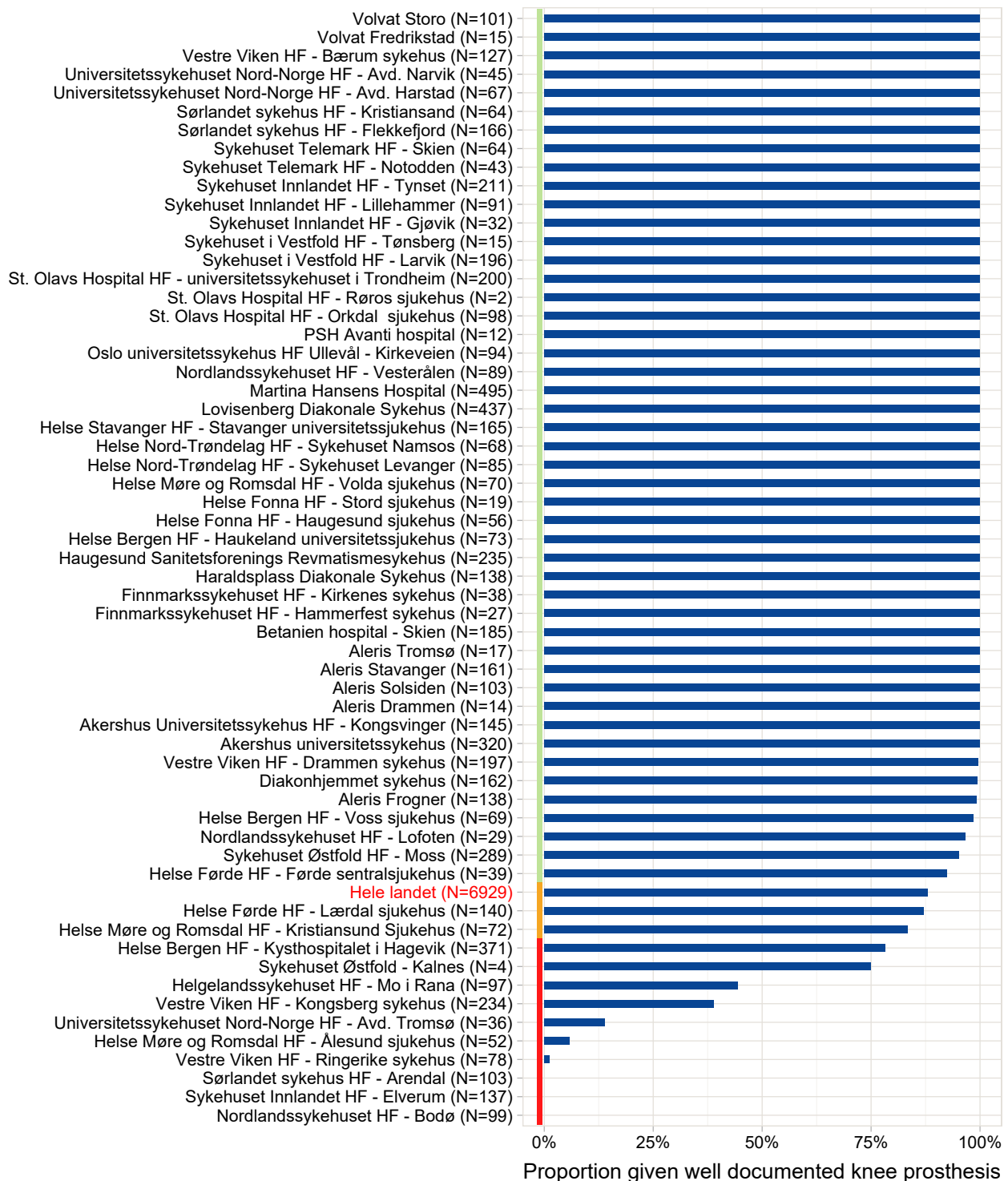


Figure B.35 and B.36 shows the estimated Kaplan-Meier percentage at three and ten years for different combinations of knee prostheses. We have only included combinations used in 500 or more operations in 2013-2024. A further requirement for inclusion in the figure is that there must still be at least 50 examples of the combination at three and ten years respectively. Only standard patients from 2013 to 2024 have been included, and the number of prostheses will therefore be below 500 in some cases. A standard patient is aged 55-85 years, has ASA class 1 or 2 and was diagnosed with idiopathic osteoarthritis at primary surgery. Using standard patients provides a more homogenous group of patients, and we believe that this makes the results more comparable. Endpoint is all revision operations, except infections and reoperations without insertion, removal or replacement of the prosthesis.

LCS and Profix knee prosthesis is no longer in use.

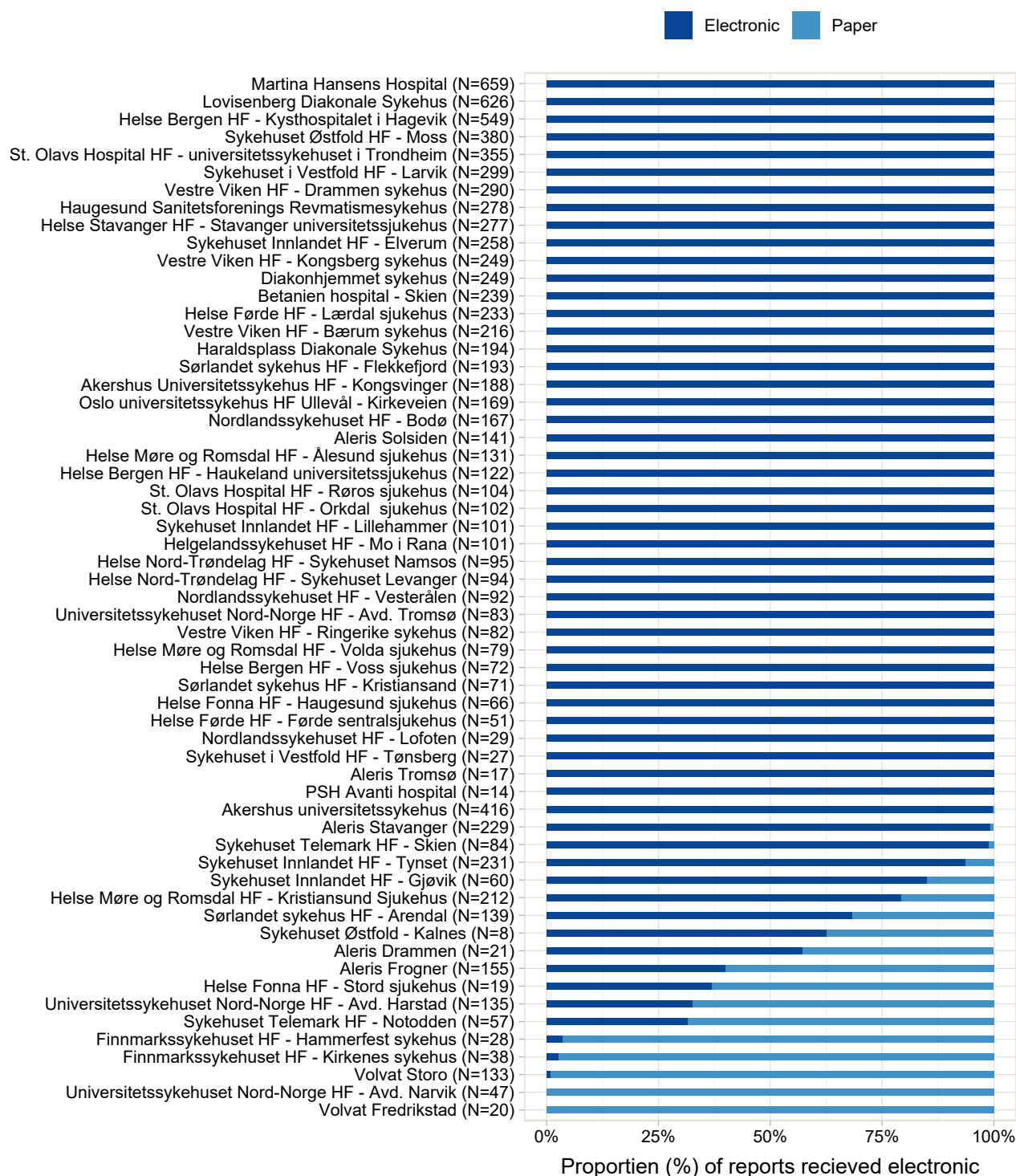
See section “How to interpret the prosthesis results” page 25.

FIGURE B.37: Portion of patients receiving well documented knee prosthesis by hospital and nationally in 2024



Most inserted knee replacements are well documented. In 2024 88.0% of all prosthetics was well documented which is a huge increase from 51,5% in 2019. Most hospitals that do not use well documented prosthetics use un-documented combinations of components and fixations within the well documented prosthetic-brands. Documentation is based on 10 year survival in line with the standards set by ODEP(Orthopaedic Data Evaluation Panel-UK). More information on documentation can be found on our web-page. We are grateful to hear any comments or corrections.

FIGURE B.38: Format of reporting 2024, all primary and revisions/reoperations



National average for electronic form registration in 2024 is 93.6% (9148 in 9774).

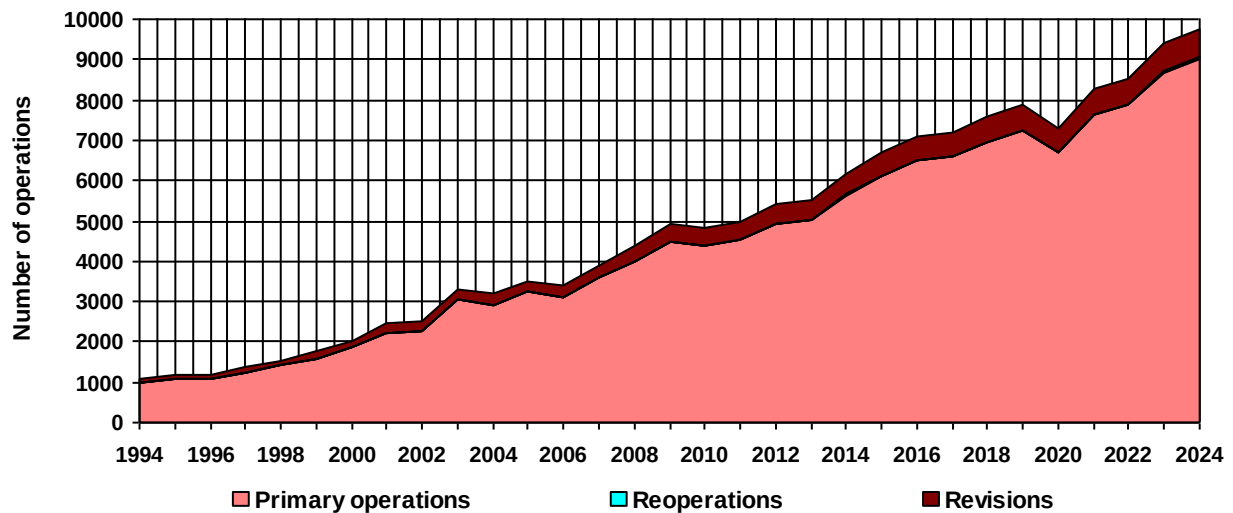
KNEE PROSTHESES

Table 1: Annual numbers of operations

Year	Primary operations	Reoperations *	Revisions	Total
2024	9 033 (92,6%)	103 (1,06%)	621 (6,4%)	9 757
2023	8 694 (92,4%)	87 (0,92%)	632 (6,7%)	9 413
2022	7 874 (92,5%)	73 (0,86%)	565 (6,6%)	8 512
2021	7 637 (92,2%)	56 (0,68%)	592 (7,1%)	8 285
2020	6 706 (92,0%)	41 (0,56%)	545 (7,5%)	7 292
2019	7 256 (91,8%)	35 (0,44%)	614 (7,8%)	7 905
2018	6 933 (91,2%)	32 (0,42%)	634 (8,3%)	7 599
2017	6 581 (91,3%)	29 (0,40%)	602 (8,3%)	7 212
2016	6 514 (91,5%)	26 (0,37%)	578 (8,1%)	7 118
1994-15	68 828 (91,6%)	52 (0,07%)	6 273 (8,3%)	75 153
Total	136 056 (91,8%)	534 (0,36%)	11 656 (7,9%)	148 246

* Reoperation where prosthetic parts were not changed or removed such as soft tissue debridements for infected prosthesis, where prosthetic parts were not changed and osteosyntheses of fractures.

Figure 1a: Annual numbers of operations



52,9 % of all operations were performed on the right side. 60,1 % performed in women.
 Mean age at primary surgery was 68,5 years, 69 years for women and 67,8 years for men.
 Mean age at primary surgery was 70,2 years in 1994, 70,8 years for women and 68,3 years for men.
 Mean age at primary surgery was 68,9 years in 2024, 68,9 years for women and 68,9 years for men.

Incidence

Figure 2a: Incidence of primary knee prostheses

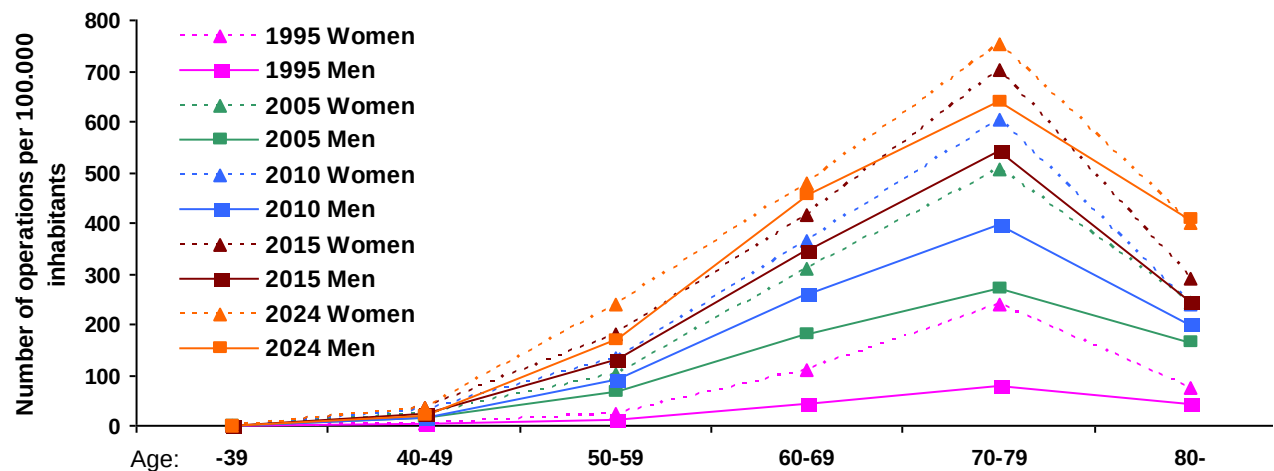


Figure 2b: Annual total incidence of primary knee prostheses for men and women

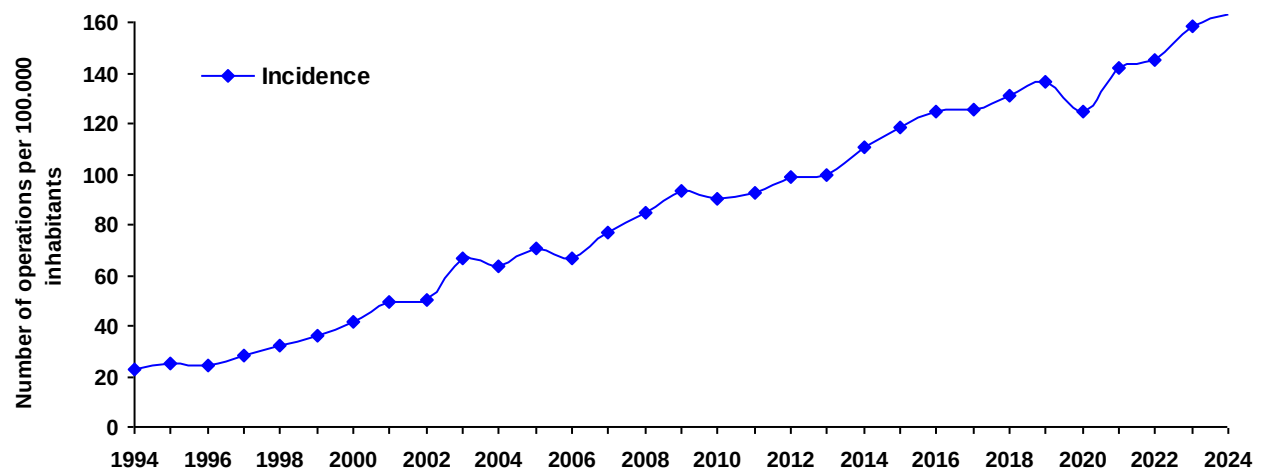


Figure 2c: Status for knee replacement surgery patients in the period 1994-2024 per 31.12.2024

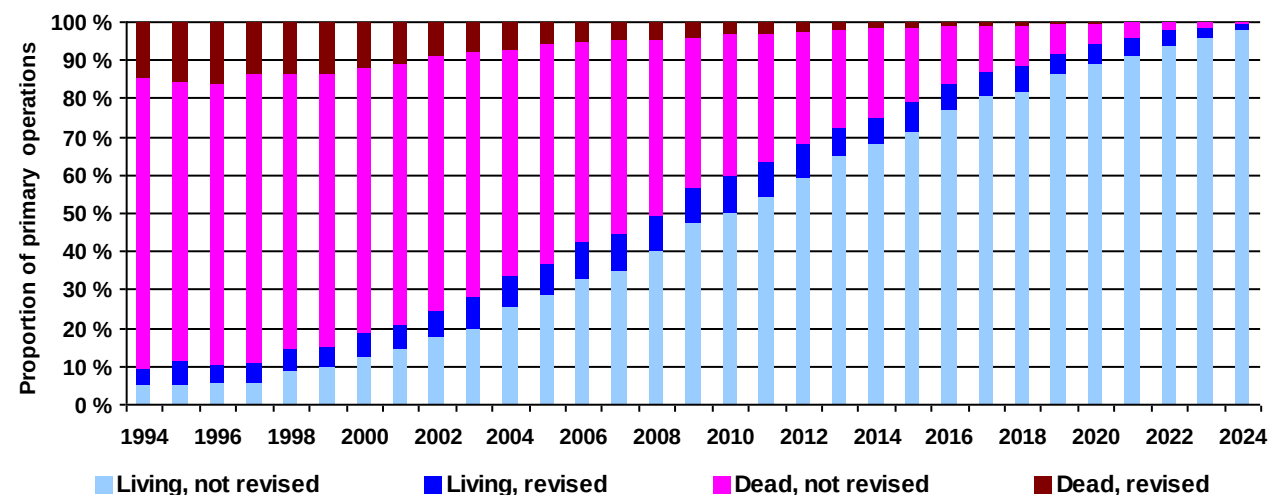


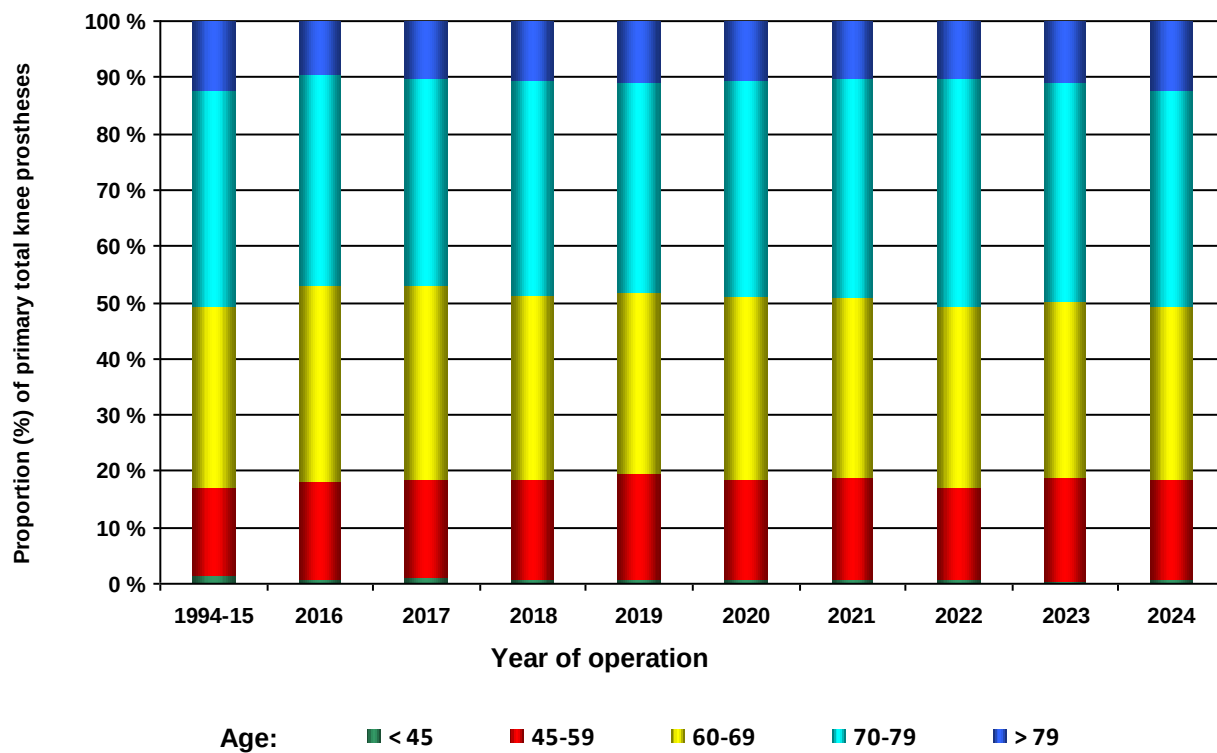
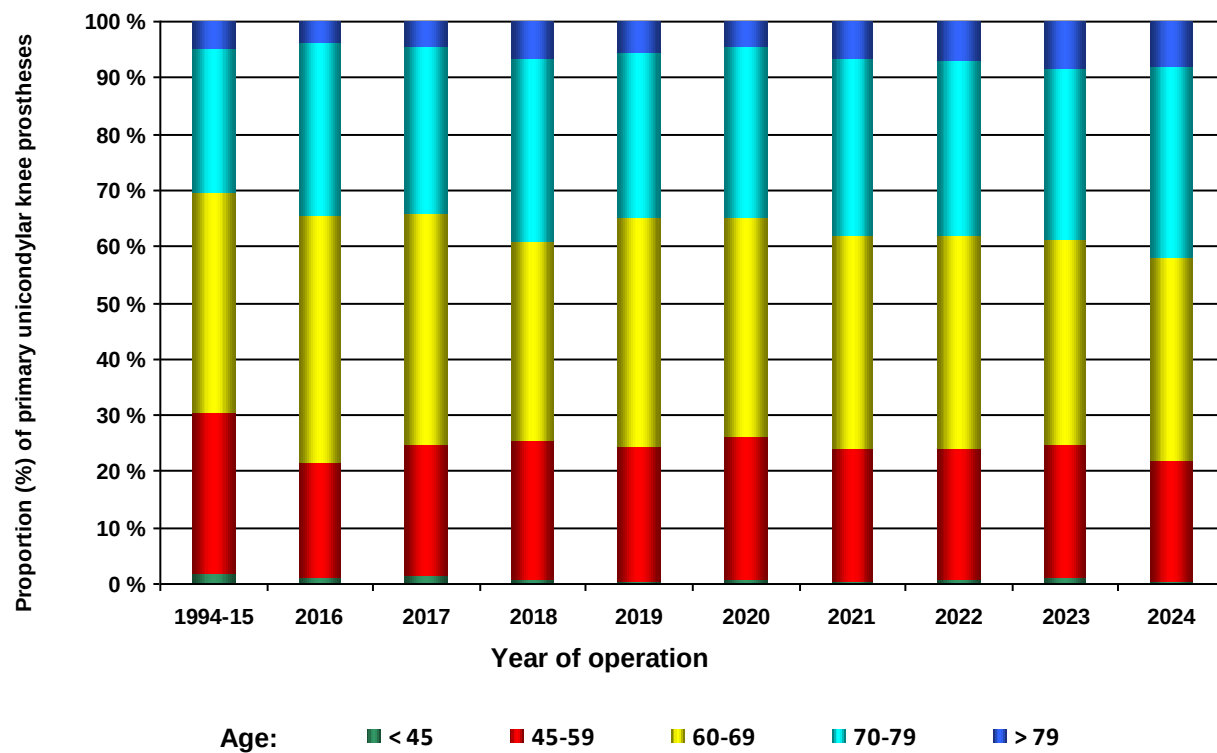
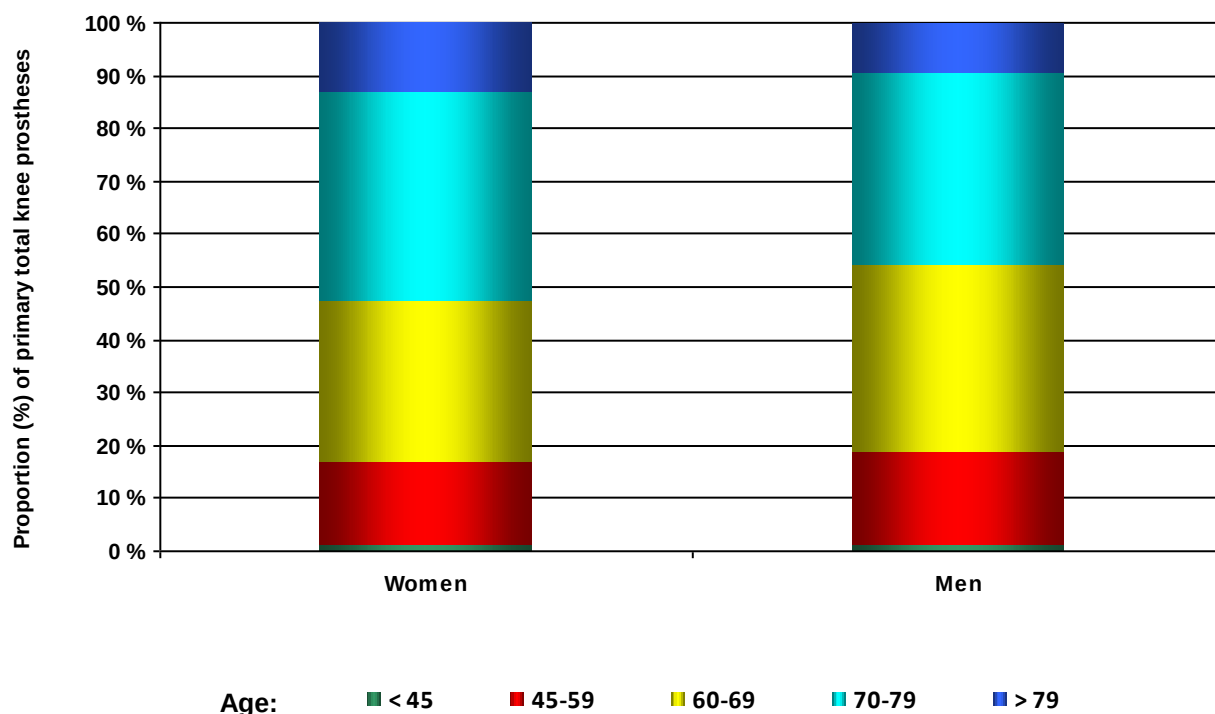
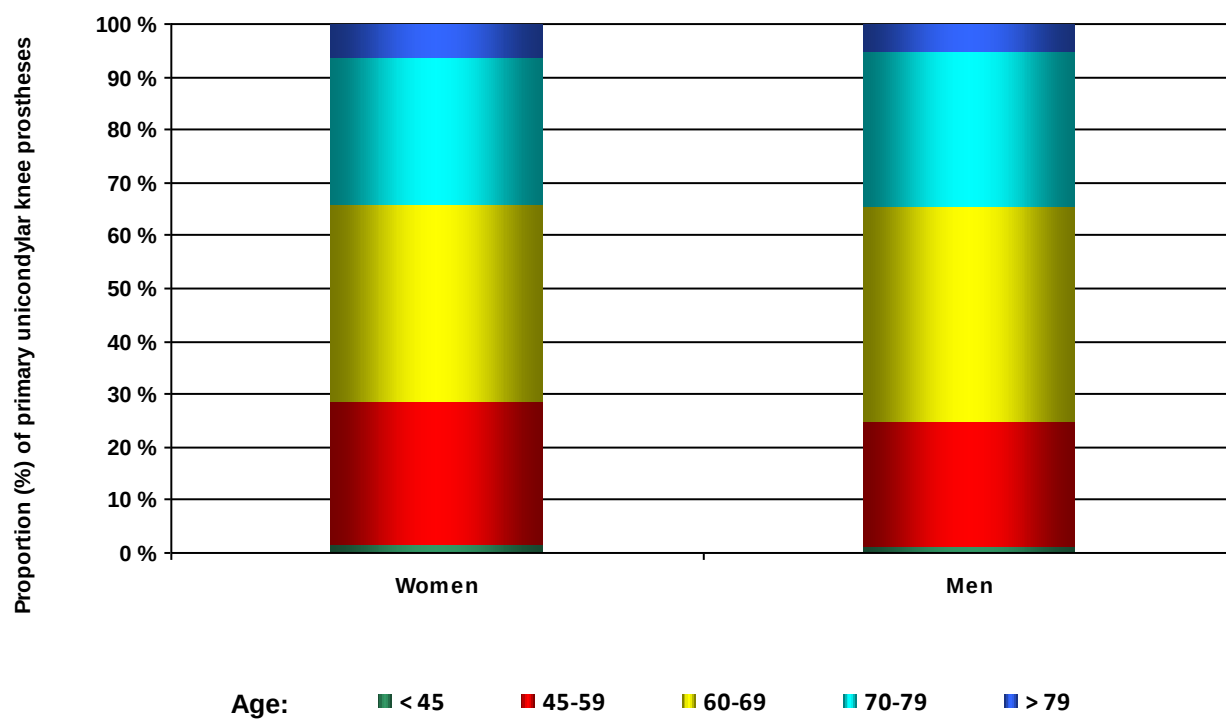
Figure 3: Age at the insertion of primary total knee prostheses**Figure 4: Age at the insertion of primary unicondylar knee prostheses**

Figure 5: Age and sex at the insertion of primary total knee prostheses**Figure 6: Age and sex at the insertion of primary unicondylar knee prostheses**

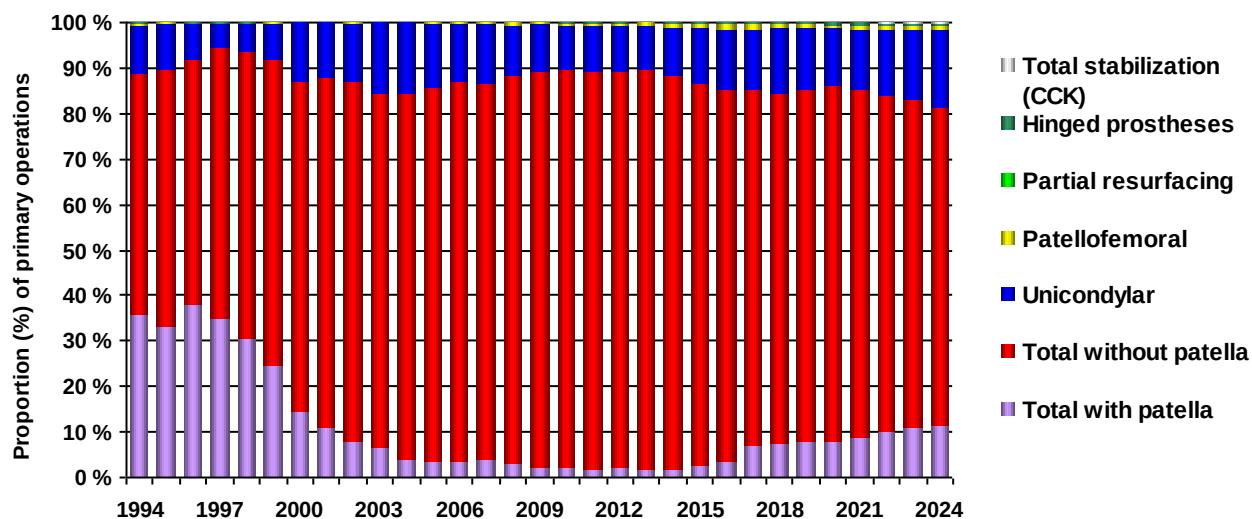
Types of knee prostheses

Table 2: Primary operations

Year	Total with patella	Total without patella	Unicondylar	Patello-femoral	Partial resurfacing	Hinged * prostheses	Total stab. (CCK)	Total
2024	1 014 (11,2%)	6 320 (70,0%)	1 546 (17,1%)	60 (0,7%)		53 (0,6%)	39 (0,4%)	9 033
2023	944 (10,9%)	6 268 (72,1%)	1 348 (15,5%)	57 (0,7%)		47 (0,5%)	30 (0,3%)	8 694
2022	789 (10,0%)	5 803 (73,7%)	1 139 (14,5%)	69 (0,9%)		54 (0,7%)	20 (0,3%)	7 874
2021	659 (8,6%)	5 834 (76,5%)	1 006 (13,2%)	71 (0,9%)		54 (0,7%)	4 (0,1%)	7 628
2020	526 (7,8%)	5 247 (78,2%)	842 (12,6%)	44 (0,7%)	1 (0,0%)	46 (0,7%)		6 706
2019	586 (8,1%)	5 588 (77,0%)	995 (13,7%)	53 (0,7%)		33 (0,5%)		7 255
2018	504 (7,3%)	5 337 (77,0%)	1 001 (14,4%)	58 (0,8%)		31 (0,4%)	1 (0,0%)	6 932
2017	454 (6,9%)	5 152 (78,3%)	868 (13,2%)	75 (1,1%)		32 (0,5%)		6 581
2016	221 (3,4%)	5 329 (81,8%)	863 (13,2%)	68 (1,0%)	1 (0,0%)	32 (0,5%)		6 514
1994-15	4 599 (6,7%)	56 068 (81,5%)	7 684 (11,2%)	300 (0,4%)	1 (0,0%)	173 (0,3%)		68 827
Total	10 296 (7,6%)	106 946 (78,6%)	17 292 (12,7%)	855 (0,6%)	3 (0,0%)	555 (0,4%)	94 (0,1%)	136 044

* Indicated by the surgeon on the report form

Figure 7a: Primary operations



Classification of stability and modularity in primary total prostheses (with and without patella component)

Table 3a:

Year	-----CR-----		-----UC-----		MP *	-----PS-----		CCK	Rotating platform	Hinged * prostheses	Segmental prostheses	Total
	All poly	MT	All poly	MT		All poly	MT					
2024	1	5 081	143	659	361	0	729	40	323	51	3	7 418
2023	1	4 935	217	583	187	0	817	58	420	42	3	7 282
2022	0	4 105	182	460	139	0	893	41	778	47	5	6 661
2021	0	4 158	207	240	121	1	772	36	946	50	4	6 548
2020	21	3 699	224	234	129	1	607	33	821	43	3	5 819
2019	92	4 024	11	175	233	1	606	34	989	28	4	6 206
2018	1	3 579	0	137	269	1	567	27	1 244	28	3	5 870
2017	0	3 201	0	130	331	0	543	43	1 348	31	1	5 637
2016	4	3 165	0	95	408	0	470	21	1 370	27	5	5 578
2015	2	3 140	0	37	332	0	348	23	1 403	30	3	5 326
2014	2	3 077	0	34	251	0	150	23	1 416	18	2	4 988
2013	1	2 876	0	149	102	0	78	31	1 254	8	1	4 522
2012	5	2 465	0	266	42	0	39	18	1 490	16	1	4 403
2011	5	1 833	0	528	43	0	22	12	1 491	17	2	4 080
2010	3	1 740	0	605	29	0	32	7	1 429	15	3	3 963
2009	3	1 812	0	613	38	0	19	10	1 421	3	2	3 989
1994-08	9	16 645	0	1 410	93	0	305	88	9 177	44	2	29 482
Total	150	69 535	984	6 355	3 108	4	6 997	545	27 320	498	47	117 772

CR = Posterior cruciate retaining

MS = Minimally stabilized = Posterior cruciate retaining prosthesis and deep dish

UC = Ultra congruent (dished)

* MP = Medial Pivot knee has no all poly

PS = Posterior cruciate stabilizing prostheses

CCK = Constrained Condylar Knee = high level stabilized

MT = Metal backed tibia

All poly = All polyethylene tibial component

* Information taken from the catalogue number of prostheses

Figure 7b:

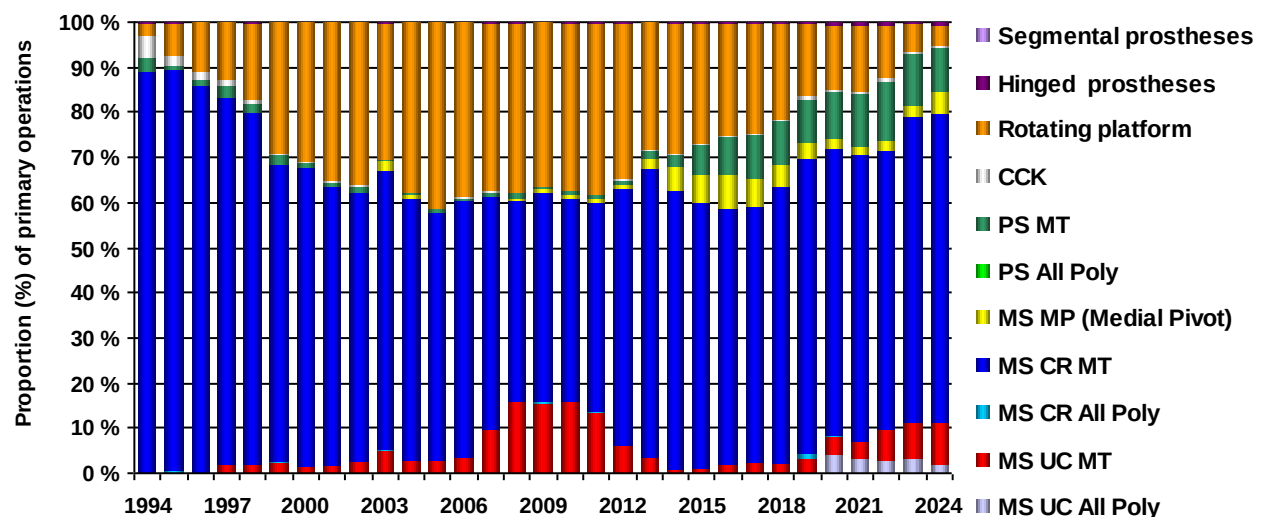


Table 3b: Classification of stability and modularity in revision total prostheses (with and without patella component)

	----- MS -----					----- PS -----						
	-----CR-----		-----UC-----			All poly	MT	CCK	Rotating platform	Hinged * prostheses	Segmental prostheses	Total
Year	All poly	MT	All poly	MT	MP *	All poly	MT	CCK	Rotating platform	Hinged * prostheses	Segmental prostheses	Total
2024	0	113	0	36	14	0	91	81	65	67	6	474
2023	0	100	0	37	11	0	97	83	63	93	13	497
2022	0	93	0	30	9	0	96	73	53	86	7	447
2021	0	101	0	19	11	0	89	80	71	80	7	459
2020	0	85	0	11	10	0	93	109	62	58	4	432
2019	1	88	0	30	18	0	106	93	81	72	9	498
2018	1	109	0	25	15	0	104	118	93	42	2	509
2017	0	87	0	17	20	0	124	76	89	63	2	478
2016	0	72	0	23	15	0	91	72	80	72	7	432
2015	0	82	0	29	16	0	97	55	75	59	7	420
2014	0	79	0	19	16	0	57	71	90	56	6	395
2013	1	74	0	56	0	0	61	77	87	29	3	388
2012	0	66	0	68	10	0	40	51	102	29	1	369
2011	1	77	0	52	2	0	21	63	98	22	1	341
2010	0	60	0	81	1	0	12	69	94	12	0	332
2009	0	58	0	77	4	0	13	46	121	21	0	346
1994-08	1	636	0	330	4	1	211	125	639	60	0	2 124
Total	5	1 980	0	940	176	1	1 403	1 342	1 963	921	75	8 941

CR = Posterior cruciate retaining

MS = Minimally stabilized = Posterior cruciate retaining prosthesis and deep dish

UC = Ultra congruent (dished)

* MP = Medial Pivot knee has no all poly

PS = Posterior cruciate stabilizing prostheses

CCK = Constrained Condylar Knee = high level stabilized

MT = Metal backed tibia

All poly = All polyethylene tibial component

* Information taken from the catalogue number of prostheses

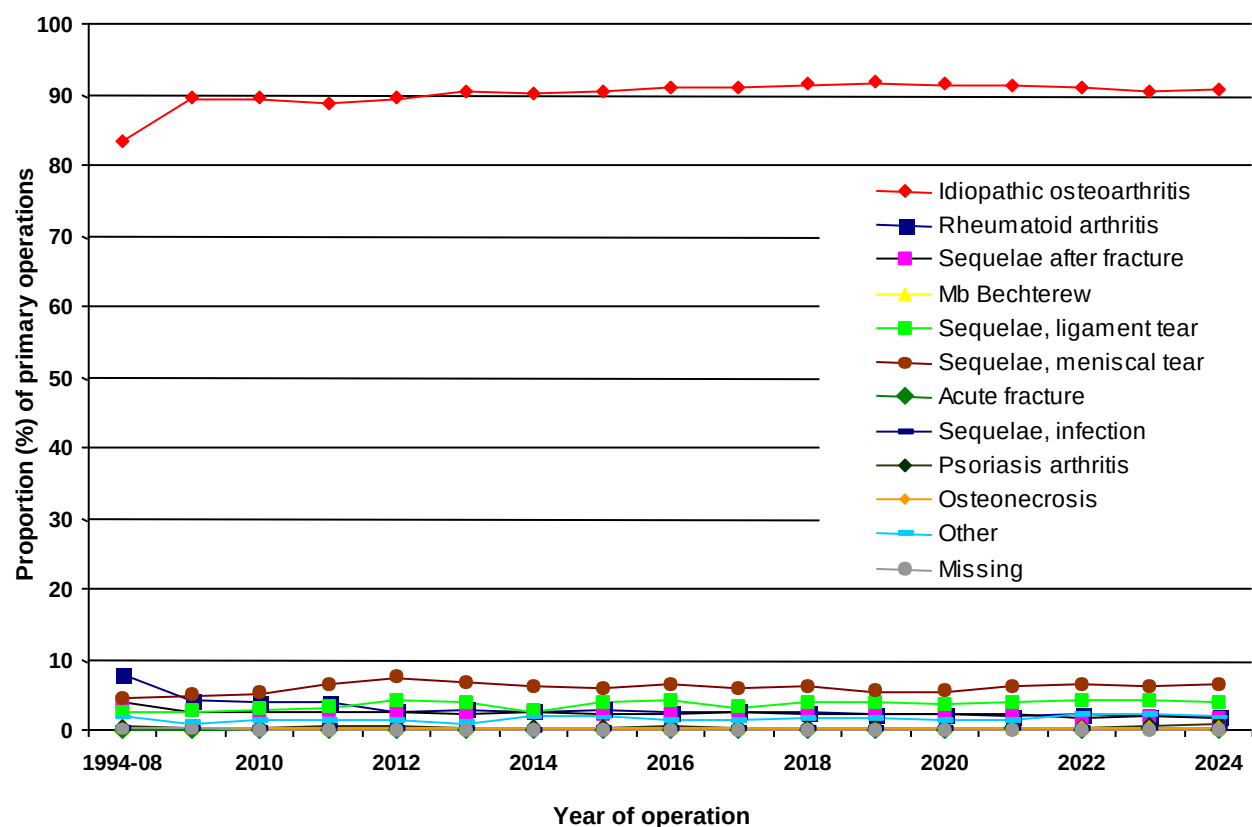
Reasons for primary operations - Total knee prostheses

Table 4:

Year	Idiopathic osteoarthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechterew	Sequelae, ligament tear	Sequelae, meniscal tear	Acute fracture	Sequelae, infection	Psoriasis arthritis	Osteonecrosis	Other	Missing
2024	6 735	143	132	17	293	471	7	17	74	41	151	0
2023	6 593	139	146	16	302	455	22	20	62	34	160	6
2022	6 066	147	119	17	274	427	9	26	41	29	146	3
2021	5 972	134	141	15	254	410	10	14	30	23	100	4
2020	5 320	130	130	22	216	332	5	11	28	20	86	0
2019	5 694	134	145	14	239	350	7	13	29	16	101	0
2018	5 376	146	139	13	235	365	5	13	28	13	96	0
2017	5 134	159	153	19	191	339	3	18	39	14	78	0
2016	5 076	139	126	18	232	368	2	11	40	15	86	0
2015	4 811	166	122	16	205	321	1	18	36	10	107	2
2014	4 504	142	126	22	144	308	3	7	30	16	94	2
2013	4 088	145	96	11	174	311	1	17	29	9	45	4
2012	3 951	127	111	15	184	332	2	13	33	11	61	4
2011	3 625	163	115	12	137	262	1	20	35	10	55	2
2010	3 552	157	103	13	119	217	2	9	25	9	57	3
2009	3 580	167	118	11	117	200	2	13	25	7	46	10
1994-08	24 681	2 309	1 160	123	724	1 335	29	120	191	79	624	99
Total	104 758	4 647	3 182	374	4 040	6 803	111	360	775	356	2 093	139

Diseases are not mutually exclusive. More than one reason for operation is possible

Figure 8:



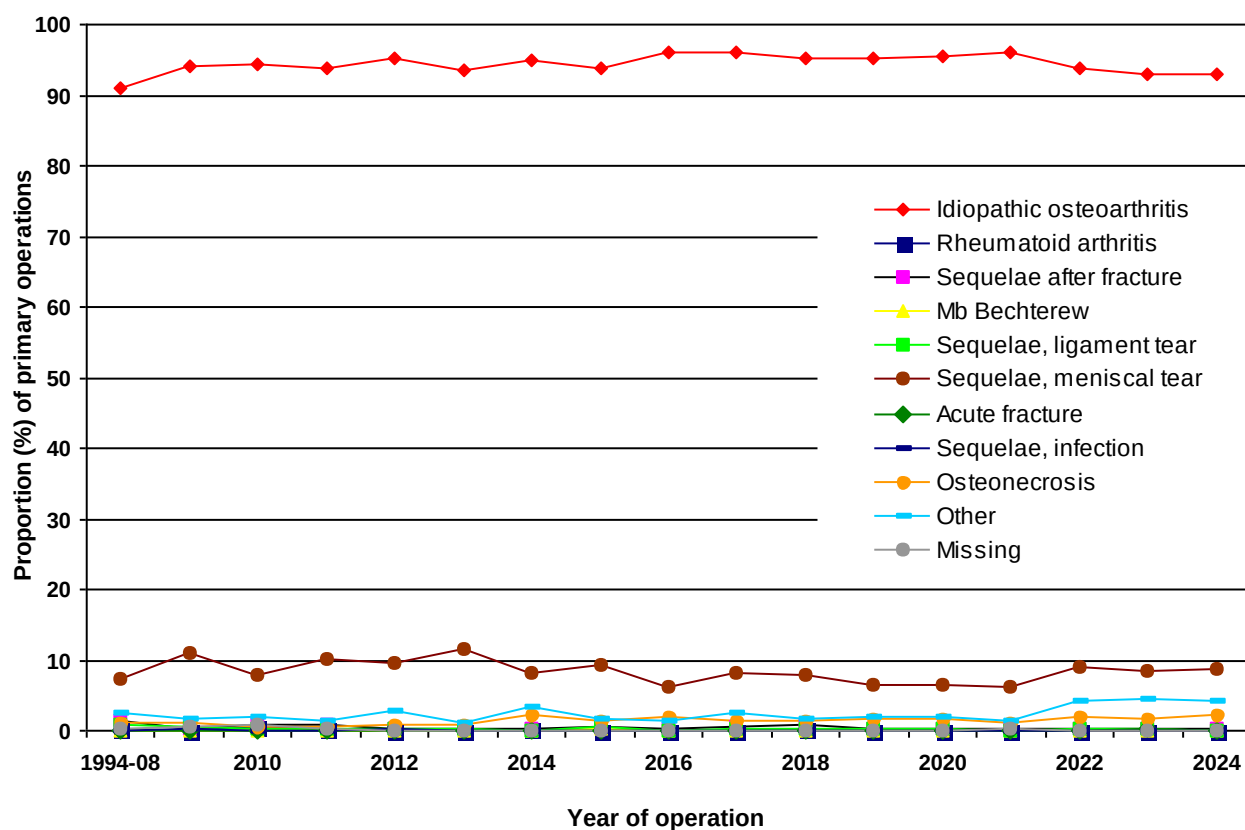
Reasons for primary operations - Unicondylar knee prostheses

Table 5:

Year	Idiopathic osteoarthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechterew	Sequelae, ligament tear	Sequelae, meniscal tear	Sequelae, infection	Osteonecrosis	Other	Missing
2024	1 435	0	3	0	0	137	2	37	67	0
2023	1 254	0	5	1	2	113	0	21	59	0
2022	1 067	0	2	0	2	104	1	22	49	0
2021	966	0	2	1	0	61	0	11	13	2
2020	804	0	3	0	2	54	0	14	17	0
2019	948	1	2	0	2	64	0	18	20	0
2018	954	2	8	0	2	80	0	14	18	0
2017	833	1	4	0	3	71	0	13	22	0
2016	830	1	2	1	1	54	1	16	13	0
2015	706	0	4	2	5	70	0	11	13	0
2014	575	2	2	0	0	50	0	13	20	0
2013	446	0	1	0	1	55	0	4	6	0
2012	452	0	1	0	1	46	1	4	13	0
2011	412	1	4	0	1	45	0	3	6	1
2010	391	2	3	0	1	33	0	2	8	3
2009	435	0	1	0	2	51	1	5	8	2
1994-08	3 689	9	53	4	31	301	3	51	99	17
Total	16 197	19	100	9	56	1 389	9	259	451	25

Diseases are not mutually exclusive. More than one reason for operation is possible

Figure 9:



Use of cement - Primary total knee prostheses

Figure 10: Femur

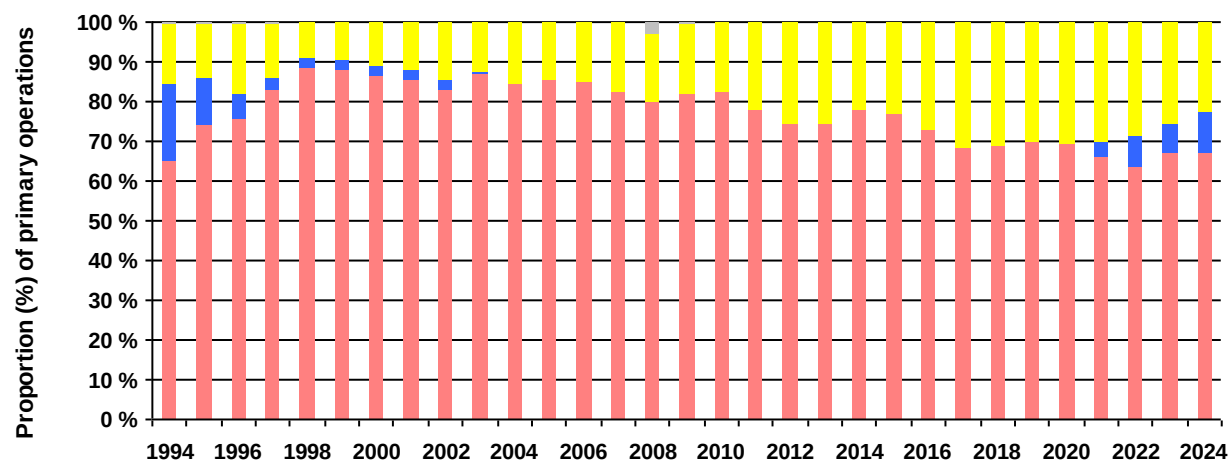


Figure 11: Tibia

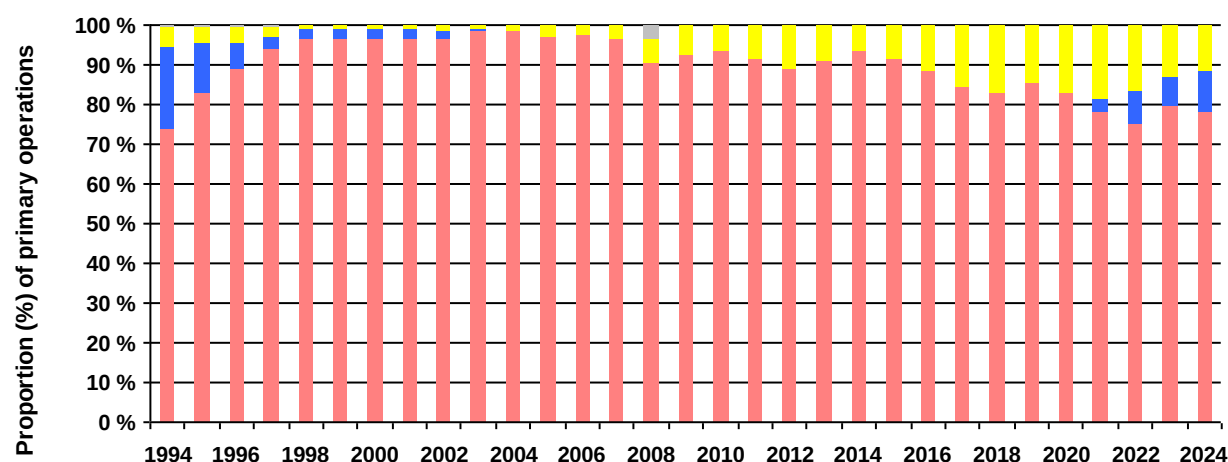
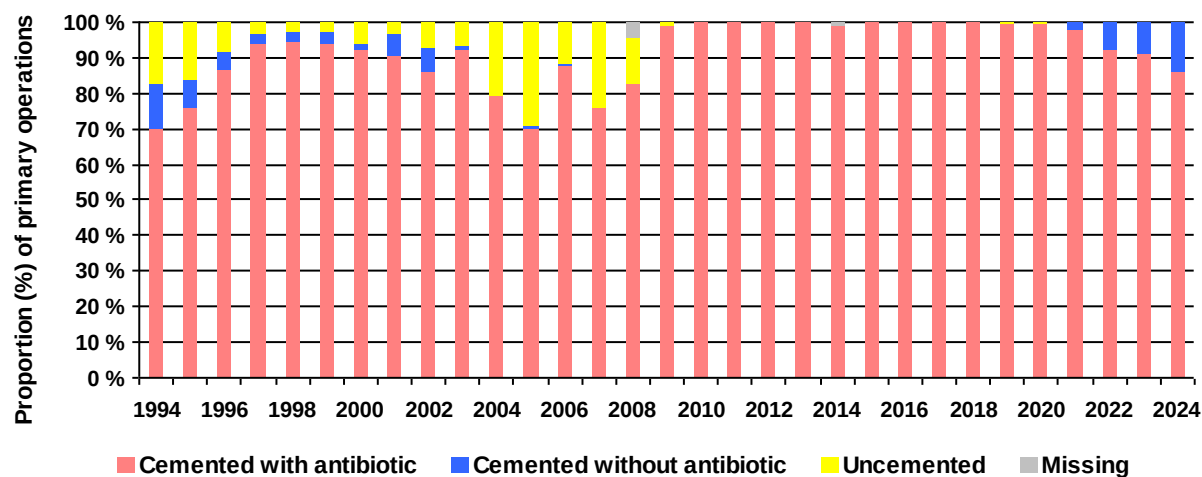


Figure 12: Patella



Use of cement in total knee prostheses

Figure 13: Primary operations

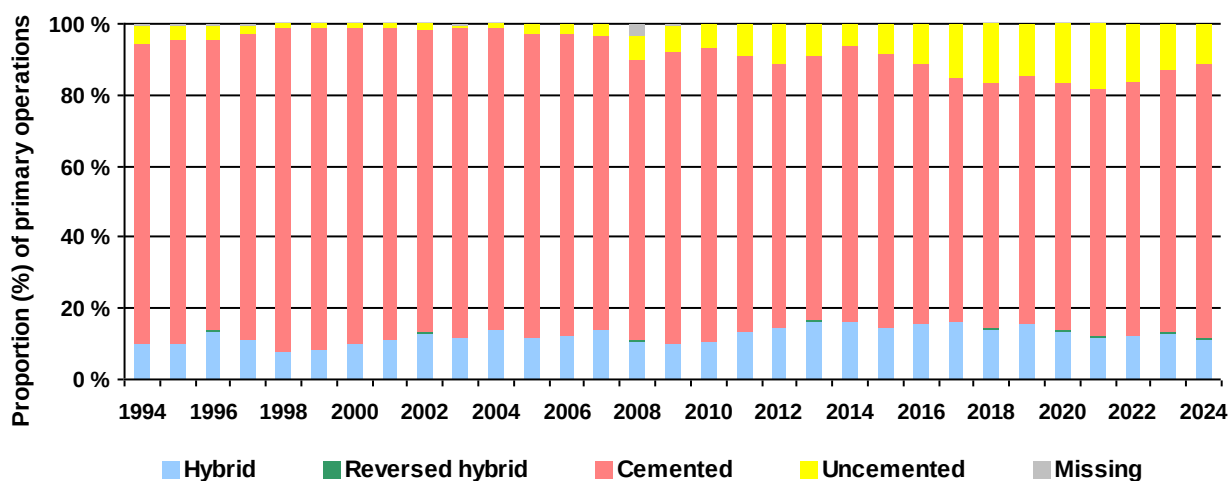
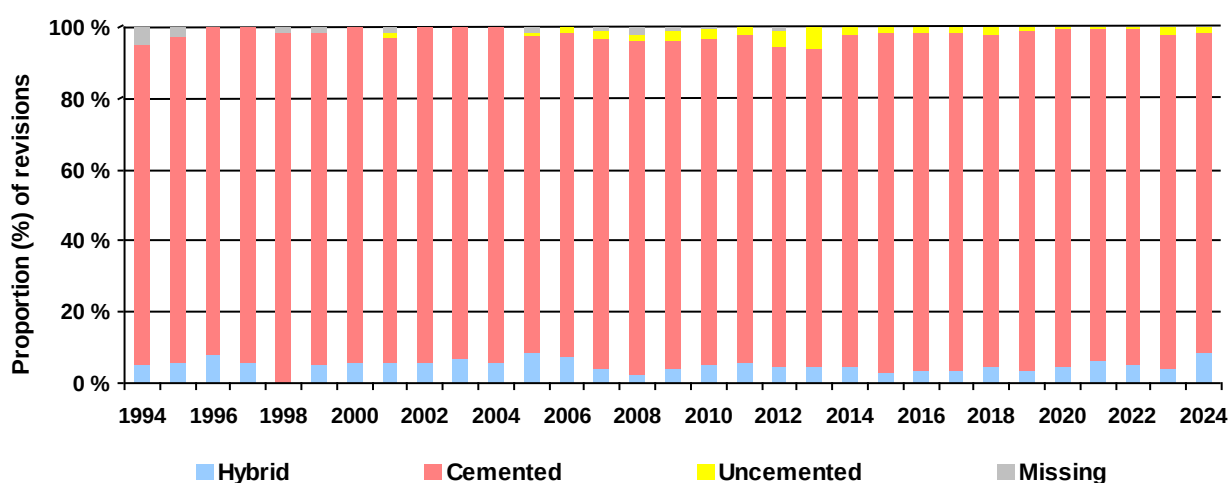
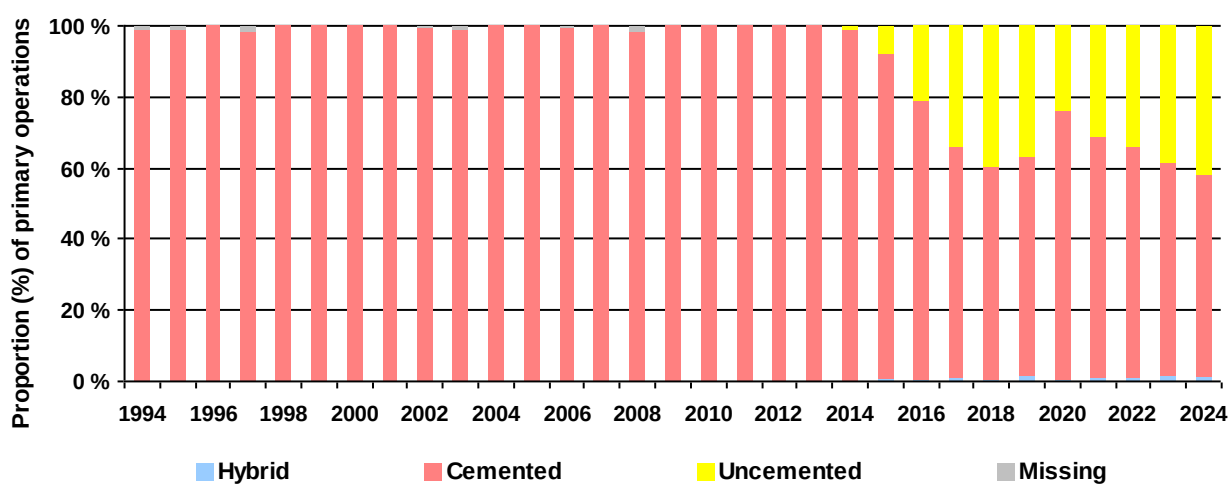


Figure 14: Revisions



Use of cement in unicondylar knee prostheses

Figure 15: Primary operations



The 8 most common primary total prostheses (with and without patella component) in 2018-2024

Table 6:

Product	Cemented *	Uncemented *	Hybrid	All poly	Rotating platform	Stabilization				Total
						HXLPE	MS	PS	CCK	
NexGen	13 700	1 970	2 631	0	0	2 790	15 847	2 250	256	18 317
Triathlon	5 093	2 466	162	986	0	6 691	7 483	204	52	7 728
Legion	4 677	3	2 303	5	0	870	5 734	1 254	93	6 995
Attune	3 980	598	193	0	627	4 767	4 143	635	0	4 772
PFC-Sigma	2 582	1 737	376	113	4 201	0	4 591	38	43	4 698
Persona	1 094	58	333	0	0	658	1 485	1	1	1 486
LCS Complete	575	0	78	0	652	0	649	1	3	653
Journey II BCS	592	0	0	0	0	587	43	549	0	592

Hybrid = Uncemented femur and cemented tibia

All poly = All polyethylene tibial component

HXLPE = Highly cross linked polyethylene

MS = Minimally stabilized = Posterior cruciate retaining prostheses and deep dish

PS = Posterior cruciate stabilizing prostheses

CCK = Constrained Condylar Knee = high level stabilized

* Surgeon's report for fixation

Table 6 A: Femur component

Product: NexGen (31)

Product Category	Cemented *	Uncemented *	Stabilization			Total
			MS	PS	CCK	
CR Option	8 397	0	8 401	0	0	8 401
CR-flex porous usementert	70	3 633	3 705	0	0	3 705
LPS Option	1 322	0	0	1 325	0	1 325
CR-flex Option	1 268	1	1 270	0	0	1 270
CR Flex Precoat	1 222	2	1 225	0	0	1 225
CR-flex gender	677	0	677	0	0	677
LPS-flex porous standard	7	577	0	584	0	584
LCCK Option	255	0	0	0	255	255
CR-flex porous	9	239	248	0	0	248
CR Precoat	207	0	207	0	0	207
LPS-flex Option	183	8	0	191	0	191
CR Porous usementert	2	83	85	0	0	85
LPS-flex gender	54	0	0	54	0	54
LPS-Flex Tivanium	20	1	0	21	0	21
LPS macro Option	18	0	0	18	0	18
Annet	5	1	0	6	0	6
Ukjent	23	3	0	0	0	26

Product: LCS Complete (48)

Product Category	Cemented *	Uncemented *	Stabilization			Total
			MS	PS	CCK	
Sementert	556	0	0	0	0	556
Usementert	12	78	0	0	0	90
Annet	3	0	0	0	3	3
Ukjent	1	0	0	1	0	1

Product: PFC-Sigma (49)

Product Category	Cemented *	Uncemented *	Stabilization			Total
			MS	PS	CCK	
CR sementert	2 491	0	2 494	0	0	2 494
CR usementert	5	2 084	2 089	0	0	2 089
Revision	43	1	0	0	0	44
PS	38	0	0	38	0	38
Ukjent	2	4	0	0	0	6

Product: Triathlon (58)

Product Category	Cemented*	Uncemented *	Stabilization			Total
			MS	PS	CCK	
CR sementert	4 863	2	4 871	0	0	4 871
Beaded w/pa CR usementert	6	2 595	2 601	0	0	2 601
PS sementert	194	0	0	194	0	194
TS sementert	48	0	0	0	48	48
Ukjent	11	2	0	0	0	13

Product: Legion (62)

Product Category	Cemented*	Uncemented *	Stabilization			Total
			MS	PS	CCK	
CR sementert	3 369	1	3 375	0	0	3 375
CR usementert	35	2 286	2 322	0	0	2 322
PS sementert	1 206	2	0	1 184	25	1 209
PS Oxinium sementert	48	0	0	48	0	48
CR Oxinium sementert	32	1	33	0	0	33
Annet	1	1	1	0	1	2

Product: Journey II BCS (75)

Product Category	Cemented*	Uncemented *	Stabilization			Total
			MS	PS	CCK	
Journey II BCS	547	0	0	547	0	547
Journey II CR	51	0	51	0	0	51

Product: Attune (83)

Product Category	Cemented*	Uncemented *	Stabilization			Total
			MS	PS	CCK	
CR Cemented	3 371	0	3 371	0	0	3 371
CR Cementless	2	784	786	0	0	786
PS femur Cemented	733	2	0	735	0	735
PS Cementless	0	7	0	7	0	7

Product: Persona (84)

Product Category	Cemented*	Uncemented *	Stabilization			Total
			MS	PS	CCK	
CR Femoral	1 089	3	1 093	0	0	1 093
CR Femoral Porous, Trabecular Metal	6	388	394	0	0	394
Annet	1	0	0	1	0	1

MS = Minimally stabilized = Posterior cruciate retaining prostheses and deep dish

PS = Posterior cruciate stabilizing prostheses

CCK = Constrained Condylar Knee = high level stabilized

* Surgeon's report for fixation

Table 6 B: Tibia**Product: NexGen (31)**

Product Category	Cemented *	Uncemented *	All poly	Total
Precoat PMMA stemmed sementert	13 160	3	0	13 169
Option sementert	2 988	0	0	2 988
Trabecular metal usementert	7	2 009	0	2 017
Precoat AP wedge stemmed	99	0	0	99
Annet	0	4	0	4
Ukjent	19	3	0	22

Table 6 B: Tibia**Product: LCS Complete (48)**

Product Category	Cemented *	Uncemented *	All poly	Total
No keel MBT* sementert	639	0	0	639
MBT* revision	10	0	0	10
Annet	3	0	0	3

* MBT = Mobile bearing tray

Product: PFC-Sigma (49)

Product Category	Cemented *	Uncemented *	All poly	Total
With keel MBT* sementert	2 360	3	0	2 363
With keel MBT* usementert	1	1 748	0	1 749
Mod.Tib Tray	347	0	0	347
MBT* revision	114	4	0	118
All poly	113	0	113	113
Annet	2	0	0	2
Ukjent	1	4	0	5

* MBT = Mobile bearing tray

Product: Triathlon (58)

Product Category	Cemented *	Uncemented *	All poly	Total
Sementert	4 079	1	0	4 085
PA Usementert	3	1 377	0	1 380
Tritanium baseplate	6	1 113	0	1 119
CS All poly, sementert	985	0	985	985
Universal sementert	137	0	0	137
Annet	1	0	1	1
Ukjent	17	3	0	20

Product: Legion (62)

Product Category	Cemented *	Uncemented *	All poly	Total
Male tapered sementert (Genesis II)	6 961	1	0	6 968
Porous HA tibial base w/o holes usementert	1	16	0	17
Annet	5	0	5	5
Ukjent	5	0	0	5

Product: Journey II BCS (75)

Product Category	Cemented *	Uncemented *	All poly	Total
Journey II base NP	591	0	0	591

Product: Attune (83)

Product Category	Cemented *	Uncemented *	All poly	Total
FB Tib base with S+ technology	3 976	2	0	3 978
RP Tib base Cementless	1	596	0	598
FB Tib base	163	1	0	164
RP Tib base	16	0	0	16
RP Tib base with S+ technology	8	0	0	8

Table 6 B: Tibia**Product: Persona (84)**

Product Category	Cemented *	Uncemented *	All poly	Total
Stemmed 5 Degree Tibia	1 425	0	0	1 425
Two-Peg Trabecular Metal Tibia	0	57	0	57
Annet	1	0	0	1

All poly = All polyethylene tibial component

MS = Minimally stabilized = Posterior cruciate retaining prostheses and deep dish

PS = Posterior cruciate stabilizing prostheses

CCK = Constrained Condylar Knee = high level stabilized

* Surgeon's report for fixation

Table 6 C: Tibia Insert**Product: NexGen (31)**

Product Category	Rotating platform	HXLPE	Stabilization			Total
			MS	PS	CCK	
CR-Flex	0	0	13 111	0	0	13 111
CR-Prolong	0	2 667	2 667	0	0	2 667
LPS-FlexFixed	0	0	0	2 124	0	2 124
LCCK	0	0	0	0	215	215
LPS-flex	0	120	0	121	0	121
CR	0	0	13	0	0	13
Annet	0	0	0	1	0	1
Ukjent	0	0	0	0	0	36

Product: LCS Complete (48)

Product Category	Rotating platform	HXLPE	Stabilization			Total
			MS	PS	CCK	
Rotating platform RP	647	0	647	0	0	647
Annet	3	0	0	0	3	3

Product: PFC-Sigma (49)

Product Category	Rotating platform	HXLPE	Stabilization			Total
			MS	PS	CCK	
Rotating platform RP-CV	4 123	0	4 123	0	0	4 123
CRVD	0	0	349	0	0	349
Revision TC3	43	0	0	0	43	43
Revision STB	36	0	0	36	0	36
Annet	0	0	1	0	0	1
Ukjent	0	0	0	0	0	6

Product: Triathlon (58)

Product Category	Rotating platform	HXLPE	Stabilization			Total
			MS	PS	CCK	
CR-X3 HXLPE, EtO sterilized	0	2 976	2 976	0	0	2 976
CS-X3 HXLPE, EtO sterilized	0	1 607	1 607	0	0	1 607
CR-X3 HXLPE	0	1 240	1 240	0	0	1 240
CS-X3 HXLPE	0	657	657	0	0	657
PS-X3 HXLPE	0	153	0	153	0	153
PS	0	0	0	42	0	42
TS-X3 HXLPE, EtO sterilized	0	22	0	0	22	22
TS-X3 HXLPE	0	19	0	0	19	19
Annet	0	0	4	0	0	4
Ukjent	0	17	0	0	0	17

Table 6 C: Tibia Insert**Product: Legion (62)**

Product Category	Rotating platform	HXLPE	Stabilization			Total
			MS	PS	CCK	
CR standard	0	0	4 594	0	0	4 594
Dished	0	0	814	0	0	814
PS	0	0	0	629	0	629
PS high flex	0	550	0	550	0	550
CR-highflex HXLPE	0	306	306	0	0	306
Constrained	0	0	0	0	78	78
Ukjent	0	14	0	0	0	14

Product: Journey II BCS (75)

Product Category	Rotating platform	HXLPE	Stabilization			Total
			MS	PS	CCK	
Journey II BCS, XLPE	0	544	0	544	0	544
Journey II CR	0	43	43	0	0	43

Product: Attune (83)

Product Category	Rotating platform	HXLPE	Stabilization			Total
			MS	PS	CCK	
CR FB insert	0	3 531	3 531	0	0	3 531
PS FB insert	0	733	0	733	0	733
CR RP insert	617	617	617	0	0	617
PS RP insert	11	11	0	11	0	11

Product: Persona (84)

Product Category	Rotating platform	HXLPE	Stabilization			Total
			MS	PS	CCK	
CR Articular Surface	0	0	616	0	0	616
Medial congruent bearing	0	504	504	0	0	504
UC Articular Surface	0	0	209	0	0	209
CR Articular Surface, VE	0	86	86	0	0	86
UC Articular Surface, VE	0	67	67	0	0	67
Annet	0	1	1	0	1	2

HXLPE = Highly cross linked polyethylene

MS = Minimally stabilized = Posterior cruciate retaining prostheses and deep dish

PS = Posterior cruciate stabilizing prostheses

CCK = Constrained Condylar Knee = high level stabilized

Total prostheses

Table 7a: Cemented femoral prostheses in primary operations *

Prosthesis	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
NexGen	8 335	2 047	1 794	1 857	2 143	1 631	1 759	1 838	2 232	2 280	25 916
LCS Complete	9 655	567	558	314	140	93	25				11 352
Profix	9 880	1									9 881
Triathlon	1 626	449	404	381	502	802	798	879	981	779	7 601
Legion	615	324	343	397	453	468	760	815	833	968	5 976
PFC-Sigma	1 149	473	455	548	479	327	431	365	214	215	4 656
Attune		44	122	424	484	465	561	562	765	847	4 274
LCS	4 164										4 164
AGC Universal	3 112										3 112
Genesis I	3 100										3 100
Duracon	2 575										2 575
AGC Anatomic	1 725										1 725
Persona		12	78	60	72	126	85	91	185	477	1 186
Tricon -C with Pro-Fit	1 079										1 079
Vanguard TM	837	42	2								881
Journey II BCS	76	57	31	6	35	81	98	151	143	85	763
E-motion	461										461
Kinemax	411										411
NexGen Rotating Hinge	102	25	29	25	23	29	34	38	35	44	384
Advance	310										310
Scorpio	126										126
Evolution Medial-Pivot	10	19	26	42	1						98
GMK Sphere		18	16	3			1		3	22	63
Legion Hinge Knee	3	5	1	3	5	4	10	6	5	6	48
Tricon M	47										47
AGC Dual	43										43
Search	40										40
ATTUNE-REVISION						1	2	11	9	13	36
S-ROM Rotat. Hinge	2		2	1	1	8	8	6	3	2	33
Interax I.S.A.	24										24
RT-Plus Modular	16				1						17
Other (n<15)	62	2	1	1	2	4	1	2	3	6	84
Total	49 585	4 085	3 862	4 062	4 341	4 039	4 573	4 764	5 411	5 744	90 466

Table 7b: Uncemented femoral prostheses in primary operations *

Prosthesis	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
NexGen	871	652	814	815	724	678	751	652	563	367	6 887
Profix	4 785										4 785
Legion	949	448	421	367	419	360	255	255	319	317	4 110
PFC-Sigma	743	280	283	314	443	420	478	355	71	8	3 395
Triathlon	203	57	203	257	259	293	418	476	447	450	3 063
LCS Complete	2 120	51	55	51	15		12				2 304
Attune						1		69	357	368	795
LCS	653										653
Persona					2	26	51	68	83	163	393
Tricon M	288										288
Genesis I	192										192
Duracon	164										164
Interax I.S.A.	81										81
GMK Sphere							10	19	21		50
Kotz	29										29
Other (n<15)	23			1	1	1	1			1	28
Total	11 101	1 488	1 776	1 805	1 863	1 779	1 976	1 894	1 861	1 674	27 217

* Surgeon's report for fixation

Total prostheses

Table 8a: Cemented femoral prostheses in revisions *

Prosthesis	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
NexGen LCCK Option	355	80	79	86	59	62	36	42	45	42	886
NexGen Rotating Hinge	195	53	39	27	64	48	52	63	66	46	653
NexGen	248	26	38	42	37	37	26	33	43	40	570
Profix	557										557
Legion	52	30	46	53	62	50	57	46	62	59	517
LCS Complete	367	16	23	24	17	10	3				460
Triathlon TS	86	6	20	28	31	37	31	29	30	35	333
PFC-Sigma	44	27	15	26	30	17	33	23	18	13	246
Genesis I	207										207
LCS	172										172
Triathlon	52	11	11	12	8	11	11	17	21	18	172
Legion Hinge Knee	8	8	9	5	3	6	21	18	18	14	110
Scorpio TS	76										76
LCS Complete VVS	59	5	1	4		1					70
Vanguard TM	67										67
Duracon	64										64
AGC Dual	62										62
AGC Universal	62										62
ATTUNE-REVISION						5	9	11	16	20	61
S-ROM Rotat. Hinge	17	3	7	6	2	1	1	3	5	4	49
Profix constrained	45										45
Attune		2		1	2	1	3	8	11	15	43
Legion constrained	26	3	1	2	1			1	1		35
Dual Articular 2000	30										30
RT-Plus Modular	22						1				23
Tricon -C with Pro-Fit	20										20
AGC Anatomic	19										19
Scorpio	18										18
E-motion	16										16
Kinemax	16										16
Journey II BCS		2	7	1	2		1		1	1	15
Other (n<15)	89		3	2	3	1	2	5	4	7	116
Total	3 051	272	299	319	321	287	287	299	341	314	5 790

Table 8b: Uncemented femoral prostheses in revisions *

Prosthesis	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Profix	79										79
LCS Complete	55	2	1	2	2						62
PFC-Sigma	13	3	4	7	6	5	5	6	8	3	60
Legion	12	5	4	5	1	4	6	1	2	2	42
NexGen	8	1	7	4	4	1	5	4	1	2	37
Triathlon		1		1	2		1	4	2	7	18
LCS Complete VVS	17										17
Other (n<15)	34	3	1	2			1	2	6	13	62
Total	218	15	17	21	15	10	18	17	19	27	377

* Surgeon's report for fixation

Table 9a: Cemented tibial prostheses in primary operations *

Prosthesis	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
NexGen	8 817	2 363	2 206	2 227	2 521	1 959	2 150	2 240	2 630	2 547	29 660
Profix	13 756	1									13 757
LCS Complete	10 633	618	615	366	155	94	37				12 518
Legion	1 562	772	764	762	867	826	1 011	1 070	1 150	1 286	10 070
Triathlon	1 758	458	408	399	521	812	808	887	1 004	797	7 852
PFC-Sigma	1 276	506	465	567	620	393	486	410	241	221	5 185
AGC Universal	4 510										4 510
LCS	4 351										4 351
Attune		44	122	424	483	453	545	551	821	890	4 333
Genesis I	3 284										3 284
Duracon	2 704										2 704
Persona		12	78	61	74	152	127	150	250	613	1 517
Tricon II	1 346										1 346
Vanguard TM	836	42	2								880
Journey II BCS	77	57	31	6	35	81	98	152	143	77	757
E-motion	468										468
Kinemax	411										411
NexGen Rotating Hinge	101	25	29	26	23	29	34	38	35	44	384
LCS Universal	372										372
AGC Anatomic	330										330
Advance	310										310
ATTUNE-REVISION					1	12	18	36	38	49	154
Scorpio	126										126
Interax I.S.A.	106										106
Evolution Medial-Pivot	10	19	26	42	1						98
GMK Sphere		18	16	3			1		3	22	63
Legion Hinge Knee	3	5	1	3	5	4	11	6	5	6	49
Search	40										40
AGC Dual	28										28
RT-Plus Modular	16				1				1		18
Other (n<15)	78	2	1	1	2	3	1	8	4	19	119
Total	57 309	4 942	4 764	4 887	5 309	4 818	5 327	5 548	6 325	6 571	105 800

Table 9b: Uncemented tibial prostheses in primary operations *

Prosthesis	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
NexGen	387	340	402	447	349	350	359	248	164	102	3 148
PFC-Sigma	619	247	273	298	303	361	431	315	47	4	2 898
Triathlon	69	50	199	239	241	283	408	467	424	432	2 812
LCS Complete	1 093	1									1 094
Profix	905										905
Attune						2		49	269	282	602
LCS	142										142
Tricon II	66										66
Persona							9	9	17	22	57
GMK Sphere							10	19	21		50
Duracon	29										29
Kotz	27										27
Legion	3	2		2	5	3	4	2	1		22
Other (n<15)	13				1		1			1	16
Total	3 353	640	874	986	899	999	1 222	1 109	943	843	11 868

* Surgeon's report for fixation

Table 10a: Cemented tibial prostheses in revisions *

Prosthesis	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
NexGen	623	114	124	132	97	94	61	72	85	82	1 484
LCS Complete	587	25	33	38	21	14	5	2			725
Profix	685	1	1								687
NexGen Rotating Hinge	191	51	39	25	62	48	52	64	64	45	641
Legion	89	38	48	64	57	47	58	41	58	59	559
Triathlon	143	20	31	44	43	49	44	52	56	57	539
PFC-Sigma	42	32	22	31	32	21	38	29	24	17	288
Genesis I	257										257
LCS	232										232
Duracon	117										117
Legion Hinge Knee	8	8	9	5	3	6	22	18	18	14	111
Scorpio	98										98
ATTUNE-REVISION				1		9	13	17	23	35	98
AGC Universal	77										77
Vanguard TM	67										67
AGC Dual	59										59
Tricon II	57										57
Other (n<50)	188	4	1	4	7	2	5	9	10	21	261
Total	3 520	293	318	344	322	290	298	304	338	330	6 357

Table 10b: Uncemented tibial prostheses in revisions *

Prosthesis	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
LCS Complete	67										67
PFC-Sigma	14	1	6	8	3	1	1	1	7	2	44
NexGen	3	1	1	1		3	1		2	3	15
Other (n<15)	14	5			1		1	1	1	7	30
Total	98	7	7	9	4	4	3	2	10	12	156

Table 10c: Tibia insert prostheses in revisions *

Foring tibia insert prosthesis	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
NexGen	574	123	140	125	108	93	91	93	80	87	1 514
Profix	948	13	11	12	12	4	8	5	2	4	1 019
LCS Complete	771	34	45	45	30	26	9	3	3	3	969
NexGen Rotating Hinge	209	59	43	31	73	55	61	66	77	47	721
Legion	83	45	57	70	72	53	69	59	74	82	664
NexGen LCCK Option	186	52	46	76	44	50	31	29	36	37	587
Triathlon	106	15	23	32	34	27	31	47	63	71	449
Genesis I	336	1									337
PFC-Sigma	56	26	33	28	32	26	36	28	24	15	304
Triathlon TS	76	10	18	27	33	32	17	16	5		234
Duracon	203	2		4	2			1			212
LCS Universal	176										176
Legion constrained	26	8	11	14	17	21	20	13	20	8	158
LCS	148	1	1		1						151
PFC-Sigma TC3	23	14	8	17	15	10	21	13	15	11	147
Attune		2	2	7	9	13	15	14	23	32	117
Legion Hinge Knee	8	9	9	5	3	6	23	20	19	15	117
Scorpio TS	91										91
Tricon II	90										90
LCS Complete VVS	65	4	1	3	1	1					75
Vanguard TM	63	1	3		1						68
ATTUNE-REVISION						4	6	8	17	24	59
S-ROM Rotat. Hinge	20	5	9	8	2	1	1	3	5	4	58
Other (n<50)	353	12	21	11	11	13	20	32	36	31	540
Total	4 611	436	481	515	500	435	459	450	499	471	8 857

* Surgeon's report for fixation

Table 10d: Material in tibia insert for total prostheses in primary operations

Prosthesis	Material	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Advance	Uhmwpe	308										308
AGC	Uhmwpe	4 849										4 849
AGC Dual	Uhmwpe	36										36
Attune	HXLPE		44	122	424	484	467	560	631	1 120	1 210	5 062
ATTUNE-REVISION	HXLPE							2	12	9	14	37
Dual Articular 2000	Uhmwpe	4										4
Duracon	Uhmwpe	2 751										2 751
E-motion	Uhmwpe	468										468
Evolution Medial-Pivot	Uhmwpe	10	19	26	42	1						98
Freemann/Samuelson	Uhmwpe	4										4
Genesis I	Uhmwpe	3 284										3 284
GMK Sphere	Uhmwpe		18	16	3			11	19	24	22	113
INTERAX I.S.A.	Uhmwpe	103										103
Journey II BCS	HXLPE	77	57	31	6	35	81	97	149	142	77	752
Kinemax	Uhmwpe	410										410
LCS	Uhmwpe	4 482										4 482
LCS Complete	Uhmwpe	11 755	618	613	365	155	93	37				13 636
LCS Universal	Uhmwpe	383										383
Legion	HXLPE	49	18	44	62	104	57	147	156	165	179	981
Legion	Uhmwpe	1 510	752	720	701	768	772	868	915	988	1 105	9 099
MAXIM	Uhmwpe	5										5
MG II	Uhmwpe	1										1
Mutars	Uhmwpe	11			1	1	3		1			17
NexGen	HXLPE	358	292	493	498	522	311	336	337	407	376	3 930
NexGen	Uhmwpe	8 864	2 411	2 115	2 172	2 348	1 998	2 173	2 154	2 386	2 270	28 891
NexGen Rotating Hinge	Uhmwpe	102	24	29	25	23	29	34	38	34	44	382
Persona	HXLPE						4	53	74	150	377	658
Persona	Uhmwpe		12	78	61	74	148	83	85	117	258	916
PFC-Sigma	Uhmwpe	1 894	753	738	865	922	747	909	720	285	223	8 056
PROFIX	Uhmwpe	14 684	1									14 685
RT-Plus Modular	Uhmwpe	16				1						17
Scan Knee	Uhmwpe	8										8
Scorpio	HXLPE	18										18
Scorpio	Uhmwpe	109										109
Search	Uhmwpe	40										40
S-ROM Rotating Hinge	Uhmwpe	2		2	1	1	8	8	5	3	1	31
Triathlon	HXLPE	1 609	499	601	633	743	862	1 000	1 163	1 208	1 082	9 400
Triathlon	Uhmwpe	220	9	6	5	19	233	215	192	222	146	1 267
Tricon II	Uhmwpe	1 410										1 410
Vanguard 360 Revision	Uhmwpe	2										2
Vanguard TM	Uhmwpe	497	42	2								541
Total		60 333	5 569	5 636	5 864	6 201	5 813	6 533	6 651	7 260	7 384	117 244

* Surgeon's report for fixation

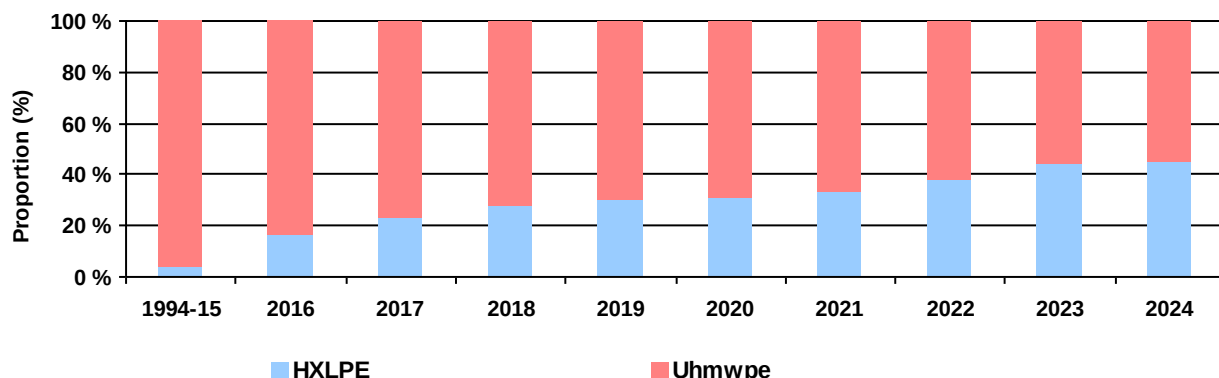
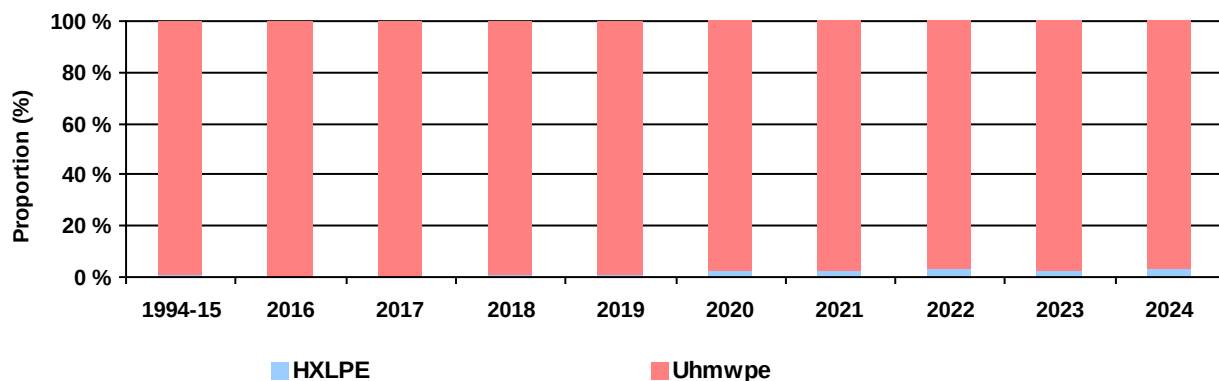
Figure 16: Material in tibia insert for total prostheses in primary operations

Table 10e: Material in tibia insert for unicondylar knee prostheses in primary operations

Prosthesis	Material	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Genesis UNI	Uhmwpe	231										231
iBalance UKA	Uhmwpe				12		10	9				31
Journey Uni	Uhmwpe	5	6	2								13
LINK Schlitten UNI	Uhmwpe	79	17	14	8	11	7	6	6	5	8	161
Miller-Galante UNI	Uhmwpe	161										161
Oxford Partial Knee	Uhmwpe	1 213	634	557	763	952	803	960	1 083	1 288	1 470	9 723
Oxford UNI II	Uhmwpe	46										46
OXFORD UNI III	Uhmwpe	5 171	201	292	204							5 868
Persona Partial Knee	HXLPE					11	19	26	37	28	35	156
Preservation Uni	Uhmwpe	69										69
Sigma High Performance Uni	HXLPE	40	3	1	5						12	61
Triathlon PKR - UNI	HXLPE	3										3
Total		7 018	861	866	992	974	839	1 001	1 126	1 321	1 525	16 523

* Surgeon's report for fixation

Figure 17: Material in tibia insert for unicondylar knee prostheses in primary operations

Unicondylar knee prostheses

Table 11a: Cemented femoral prostheses in primary operations *

Prosthesis	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Oxford Partial Knee	1 202	631	551	576	592	606	633	699	769	836	7 095
OXFORD UNI III	5 113	18	1								5 132
Genesis UNI	332										332
Miller-Galante UNI	294										294
MOD III uni	198										198
Preservation Uni	166										166
LINK Schlitten UNI	79	17	14	8	11	7	6	6	5	8	161
Persona Partial Knee					11	18	26	37	28	36	156
Sigma High Performance Uni	40	3	1	5						12	61
Journey Uni	43	7	2								52
Duracon uni	50										50
Oxford UNI II	45										45
iBalance UKA				12		10	9				31
ZUK (Unicondylar)	27										27
Other (n<15)	20						2	1	6	1	30
Total	7 609	676	569	601	614	641	676	743	808	893	13 830

Table 11b: Uncemented femoral prostheses in primary operations *

Prosthesis	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Oxford Partial Knee	70	187	299	399	380	200	322	396	528	652	3 433
Other (n<15)									11	1	12
Total	70	187	299	399	380	200	322	396	539	653	3 445

Table 12a: Cemented tibial prostheses in primary operations *

Prosthesis	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Oxford Partial Knee	1 206	628	545	574	602	602	642	698	774	835	7 106
OXFORD UNI III	5 108	24	3	1							5 136
Genesis UNI	332										332
Miller-Galante UNI	282										282
MOD III uni	199										199
Preservation Uni	165										165
LINK Schlitten UNI	79	17	14	8	11	7	6	6	5	8	161
Persona Partial Knee					11	19	26	37	28	36	157
Sigma High Performance Uni	40	3	1	5						12	61
Journey Uni	43	7	2								52
Duracon uni	49										49
Oxford UNI II	46										46
iBalance UKA				12		10	9				31
ZUK (Unicondylar)	27										27
Other (n<15)	18						2	1	18	2	41
Total	7 594	679	565	600	624	638	685	742	825	893	13 845

Table 12b: Uncemented tibial prostheses in primary operations *

Prosthesis	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Oxford Partial Knee	70	184	303	401	371	204	319	397	523	652	3 424
Total	70	184	303	401	371	204	319	397	523	652	3 424

* Surgeon's report for fixation

Patellofemoral prostheses

Table 13a: Cemented femoral prostheses in primary operations *

Prosthesis	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
NexGen PFJ Gender	93	50	53	45	35	30	60	58	43	44	511
Journey PFJ	143	18	17	10	16	11	10	11	11	16	263
Patella Mod III / II	29										29
LCS PFJ	18										18
iBalance PFJ				3	2	3					8
Legion			5								5
Other (n<5)	12								1		13
Total	295	68	75	58	53	44	70	69	55	60	847

Patellofemoral femoral prostheses in primary operations are all cemented

Table 13b: Uncemented femoral prostheses in primary operations *

Prosthesis	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Journey PFJ							1				1
Total	0	0	0	0	0	0	1	0	0	0	1

Table 14a: Cemented patella prostheses in primary operations *

Prosthesis	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
NexGen PFJ Gender	92	49	53	45	34	30	60	57	26	42	488
Journey PFJ	141	18	22	10	16	11	11	11	11	16	267
Patella Mod III / II	31										31
NexGen	1	1			1			1	20	2	26
LCS PFJ	11										11
iBalance PFJ				2	2	3					7
Other (n<5)	11										11
Total	287	68	75	57	53	44	71	69	57	60	841

Table 14b: Uncemented patella prostheses in primary operations *

Prosthesis	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
LCS PFJ	6										6
LCS Complete	1										1
Total	7	0	0	0	0	0	0	0	0	0	7

* Surgeon's report for fixation

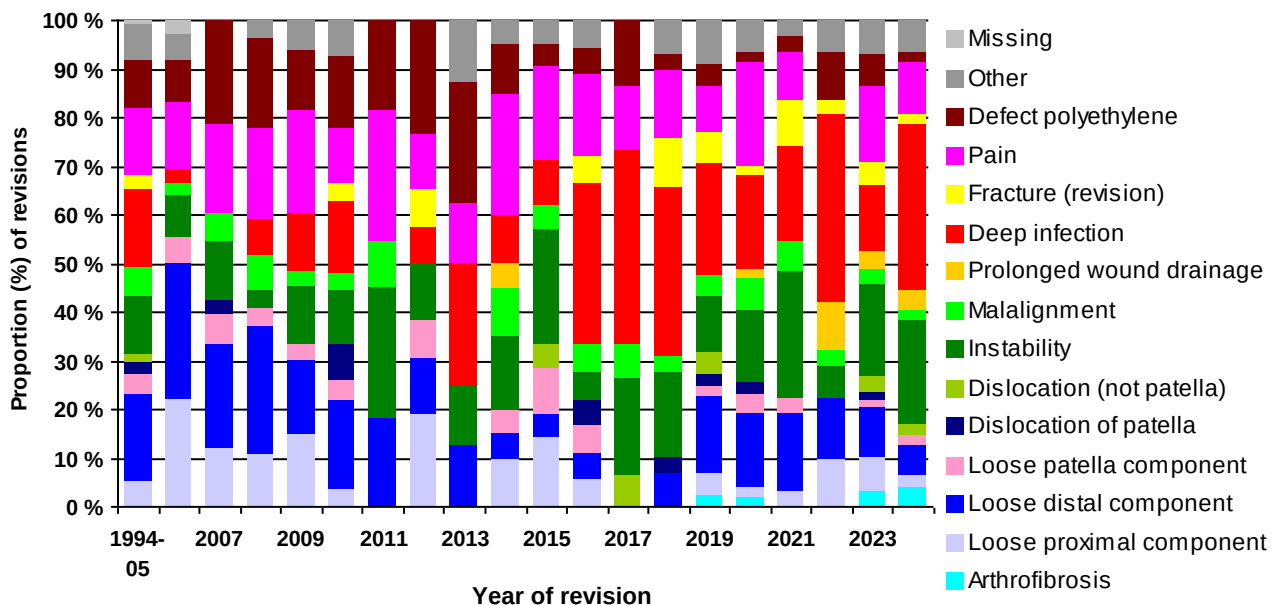
Reasons for revisions

Table 15a: Reasons for revisions of primary total knee prostheses with patella component

Year of revision	Loose proximal comp.	Loose distal comp.	Loose patella comp.	Dislocation of patella	Dislocation (not patella)	Instability	Malalignment	Deep infection	Prolonged wound drainage	Periprosthetic fracture (revision)	Pain	Defect polyethylene	Arthrofibrosis	Other	Missing
2024	1	3	1	0	1	10	1	16	2	1	5	1	2	3	0
2023	4	6	1	1	2	11	2	8	2	3	9	4	2	4	0
2022	3	4	0	0	0	2	1	12	3	1	0	3	0	2	0
2021	1	5	1	0	0	8	2	6	0	3	3	1	0	1	0
2020	1	7	2	1	0	7	3	9	1	1	10	1	1	3	0
2019	2	7	1	1	2	5	2	10	0	3	4	2	1	4	0
2018	0	2	0	1	0	5	1	10	0	3	4	1	0	2	0
2017	0	0	0	0	1	3	1	6	0	0	2	2	0	0	0
2016	1	1	1	1	0	1	1	6	0	1	3	1	0	1	0
2015	3	1	2	0	1	5	1	2	0	0	4	1	0	1	0
2014	2	1	1	0	0	3	2	2	1	0	5	2	0	1	0
2013	0	1	0	0	0	1	0	2	0	0	1	2	0	1	0
2012	5	3	2	0	0	3	0	2	0	2	3	6	0	0	0
2011	0	2	0	0	0	3	1	0	0	0	3	2	0	0	0
2010	1	5	1	2	0	3	1	4	0	1	3	4	0	2	0
2009	5	5	1	0	0	4	1	4	0	0	7	4	0	2	0
2008	3	7	1	0	0	1	2	2	0	0	5	5	0	1	0
2007	4	7	2	1	0	4	2	0	0	0	6	7	0	0	0
2006	8	10	2	0	0	3	1	1	0	0	5	3	0	2	1
1994-05	17	58	14	8	5	38	20	51	0	10	45	31	0	24	3
Total	61	135	33	16	12	120	45	153	9	29	127	83	6	54	4

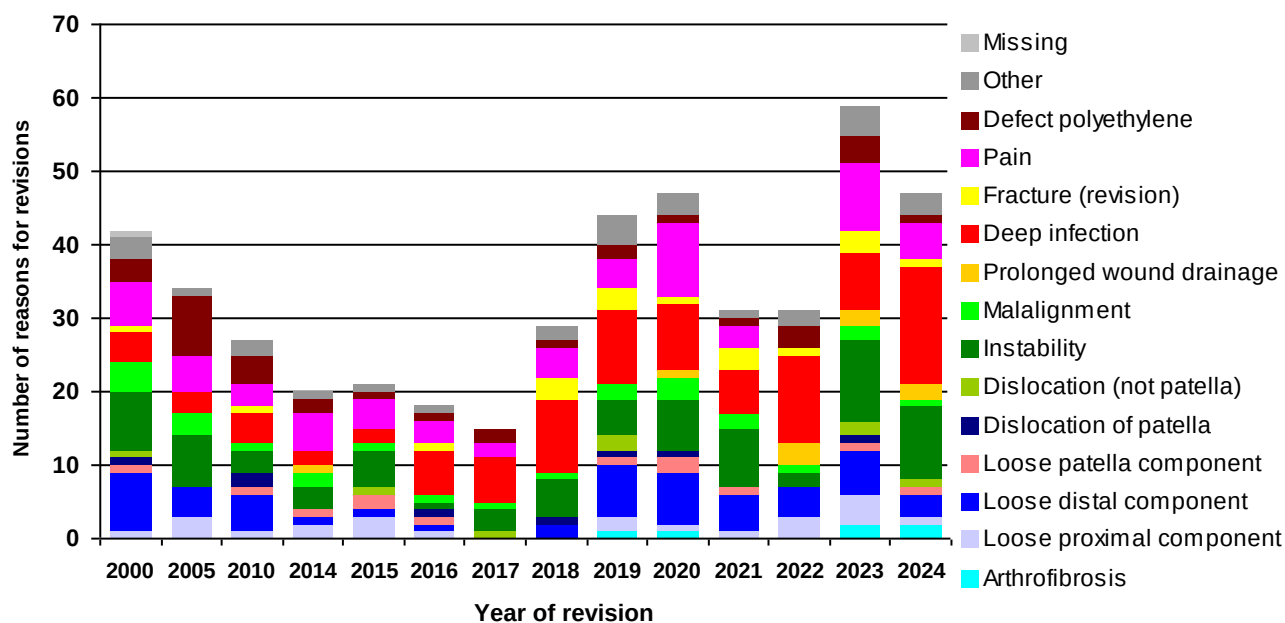
Revision causes are not mutually exclusive. More than one reason for revision is possible. Only the first revision is counted. Only revisions where both primary and revisions are reported are counted. A revision is defined as a reoperation where the implant or part of the implant is changed, added or removed.

Figure 18a: Reasons for revisions of primary total knee prostheses with patella component



Reasons for revisions

Figure 18b: Reason for first revision of primary total prostheses with patella component



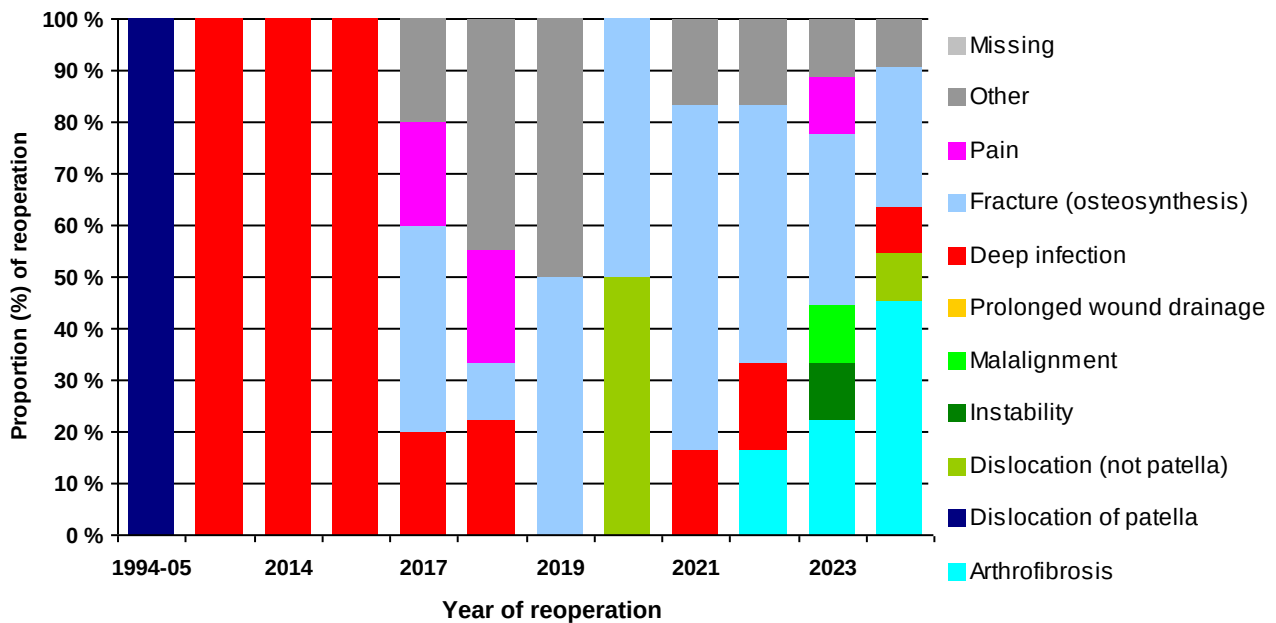
Reasons for reoperations

Table 15b: Reasons for reoperations of primary total knee prostheses with patella component

Year of reoperation	Dislocation of patella	Dislocation (not patella)	Instability	Malalignment	Deep infection	Prolonged wound drainage	Periprosthetic fracture (osteosynthesis)	Pain	Arthrofibrosis	Other	Missing
2024	0	1	0	0	1	0	3	0	5	1	0
2023	0	0	1	1	0	0	3	1	2	1	0
2022	0	0	0	0	1	0	3	0	1	1	0
2021	0	0	0	0	1	0	4	0	0	1	0
2020	0	1	0	0	0	0	1	0	0	0	0
2019	0	0	0	0	0	0	1	0	0	1	0
2018	0	0	0	0	2	0	1	2	0	4	0
2017	0	0	0	0	1	0	2	1	0	1	0
2016	0	0	0	0	1	0	0	0	0	0	0
2014	0	0	0	0	1	0	0	0	0	0	0
2013	0	0	0	0	1	0	0	0	0	0	0
1994-05	1	0	0	0	0	0	0	0	0	0	0
Total	1	2	1	1	9	0	18	4	8	10	0

Reoperation causes are not mutually exclusive. More than one reason for reoperation is possible. Only the first reoperation is counted. Reoperations are defined as reoperations where the implant is not removed or parts are not added, like osteosyntheses of periprosthetic fractures.

Figure 18c: Reasons for reoperations of primary total knee prostheses with patella component



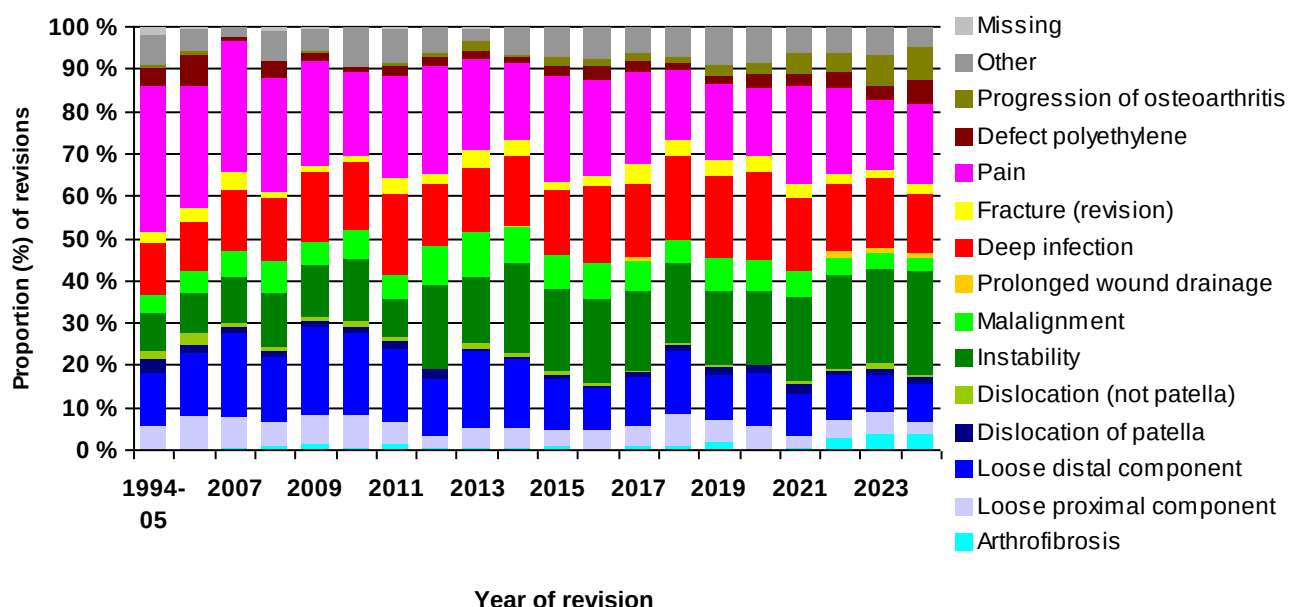
Reasons for revisions

Table 16a: Reasons for revisions of primary total knee prostheses without patella component

Year of revision	Loose proximal comp.	Loose distal comp.	Dislocation of patella	Dislocation (not patella)	Instability	Malalignment	Deep infection	Prolonged wound drainage	Periprosthetic fracture (revision)	Pain	Defect polyethylene	Progression of osteoarthritis	Arthrofibrosis	Other	Missing
2024	11	34	7	2	92	12	53	4	10	71	21	31	14	17	0
2023	21	36	6	6	91	15	68	5	7	67	14	31	15	26	0
2022	16	43	5	1	88	17	63	5	9	81	14	19	11	24	0
2021	12	44	12	3	90	26	77	2	16	104	13	22	3	28	0
2020	21	46	6	0	63	27	74	1	13	58	12	10	0	31	0
2019	21	42	7	3	69	31	77	0	16	71	7	12	8	35	0
2018	33	68	6	1	84	26	88	0	16	74	8	6	4	31	0
2017	21	49	4	3	79	30	73	3	20	91	13	8	3	25	0
2016	19	39	3	3	81	33	74	1	9	92	13	8	0	30	0
2015	15	47	3	3	73	30	58	1	7	95	9	10	3	26	0
2014	16	60	2	4	75	31	59	2	14	67	4	2	2	24	0
2013	15	58	1	5	49	34	48	0	14	68	6	8	2	9	1
2012	8	42	7	0	60	28	45	0	7	77	8	2	2	19	0
2011	16	54	5	3	29	17	60	0	12	75	6	3	5	26	1
2010	21	51	4	4	38	19	43	0	3	52	4	0	1	25	0
2009	20	60	4	2	36	16	47	0	5	71	6	1	4	15	1
2008	15	39	4	3	32	19	39	0	3	69	11	0	2	18	2
2007	13	33	3	1	19	10	25	0	7	53	2	0	1	4	0
2006	14	26	3	5	16	9	20	0	6	50	13	1	0	9	1
1994-05	51	109	29	15	77	38	106	0	27	299	36	8	0	61	16
Total	379	980	121	67	1 241	468	1 197	24	221	1 685	220	182	80	483	22

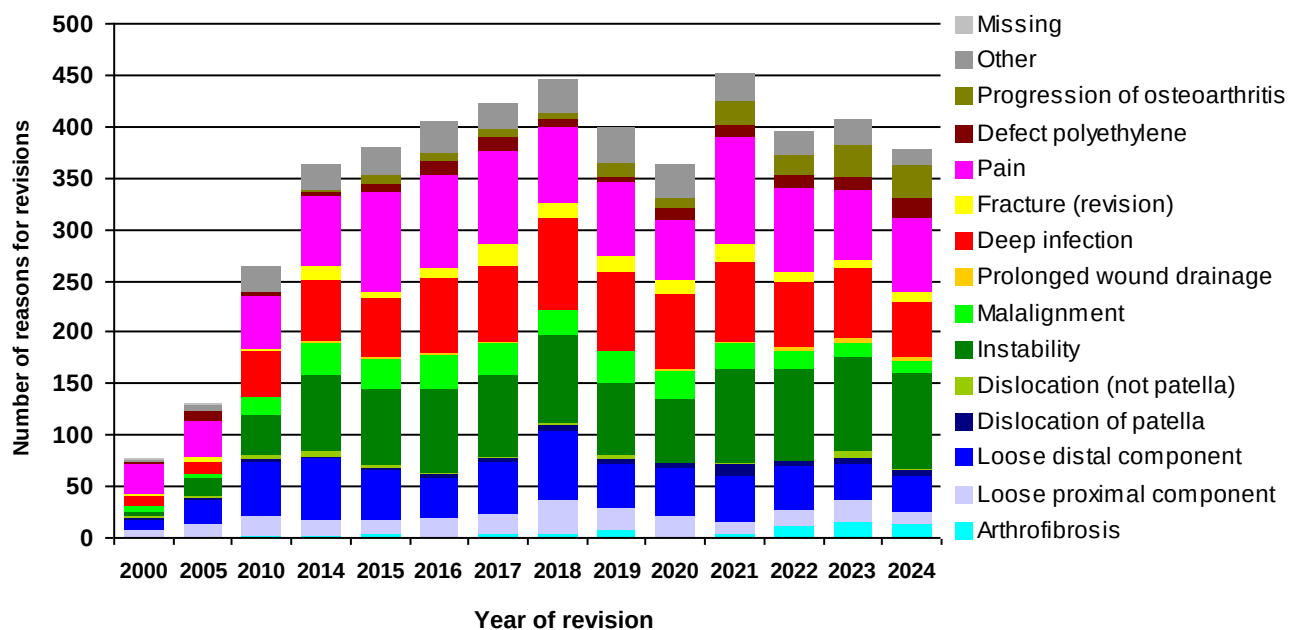
Revision causes are not mutually exclusive. More than one reason for revision is possible. Only the first revision is counted. Only revisions where both primary and revisions are reported are counted. A revision is defined as a reoperation where the implant or part of the implant is changed, added or removed.

Figure 19a: Reasons for revisions of primary total knee prostheses without patella component



Reasons for revisions

Figure 19b: Reason for first revision of primary total prostheses without patella component



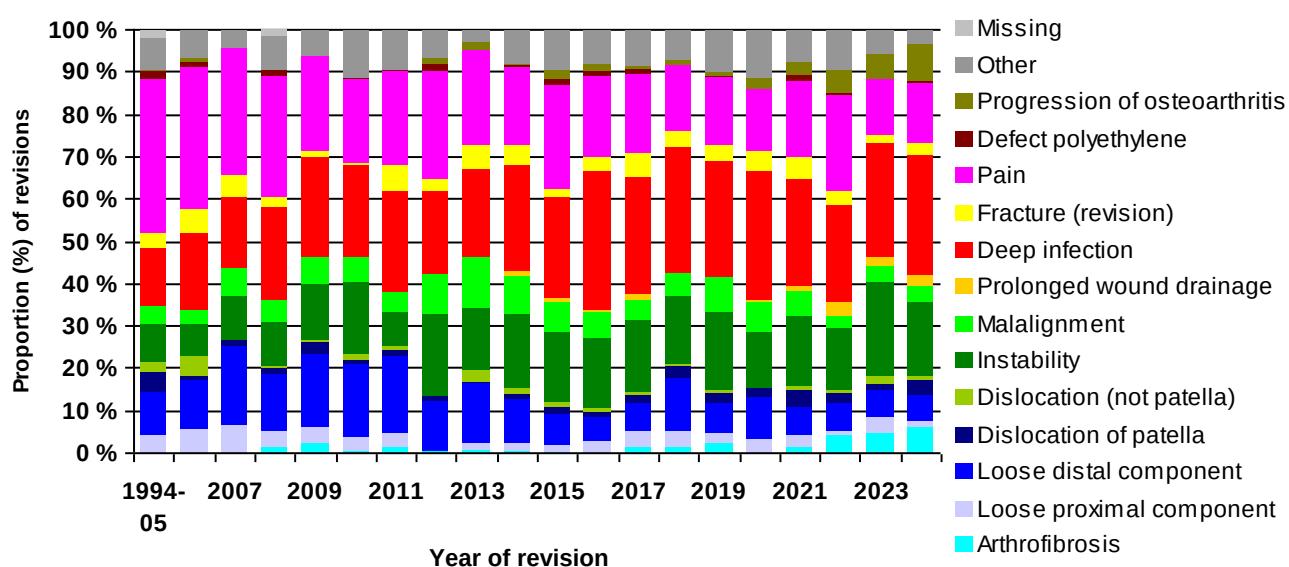
Reasons for revision in the first 2 years after primary surgery

Table 16b: Reasons for revisions of primary total knee prostheses without patella component

Year of revision	Loose proximal comp.	Loose distal comp.	Dislocation of patella	Dislocation (not patella)	Instability	Malalignment	Deep infection	Prolonged wound drainage	Periprosthetic fracture (revision)	Pain	Defect polyethylene	Progression of osteoarthritis	Arthrofibrosis	Other	Missing
2024	2	9	6	1	26	6	42	4	4	21	1	13	9	5	0
2023	7	12	3	4	41	7	50	5	4	25	0	11	9	11	0
2022	2	11	4	1	25	5	39	5	6	38	1	9	7	16	0
2021	5	14	8	2	33	12	51	2	10	36	2	7	3	15	0
2020	5	16	3	0	21	11	48	1	7	23	0	4	0	18	0
2019	4	14	4	2	36	16	53	0	7	31	1	2	5	19	0
2018	7	26	6	1	32	11	60	0	8	31	0	3	3	14	0
2017	8	14	4	2	35	10	59	3	12	39	2	2	3	18	0
2016	5	11	2	2	31	11	61	1	6	36	2	3	0	15	0
2015	2	13	2	3	28	12	41	1	3	42	2	4	1	16	0
2014	3	20	2	3	32	17	47	2	8	34	1	1	1	15	0
2013	2	26	1	5	27	22	38	0	10	41	0	4	2	5	0
2012	0	22	3	0	37	18	37	0	6	48	4	2	1	13	0
2011	6	35	3	2	15	9	47	0	11	43	1	0	3	18	0
2010	5	26	2	2	26	9	33	0	1	30	1	0	1	17	0
2009	6	28	4	1	21	11	38	0	2	36	0	0	4	10	0
2008	5	19	2	1	14	7	31	0	3	40	2	0	2	11	2
2007	6	18	1	0	10	6	16	0	5	28	0	0	0	4	0
2006	5	11	1	4	7	3	17	0	5	31	1	1	0	6	0
1994-05	23	60	25	14	49	25	76	0	22	203	11	3	0	42	11
Total	108	405	86	50	546	228	884	24	140	856	32	69	54	288	13

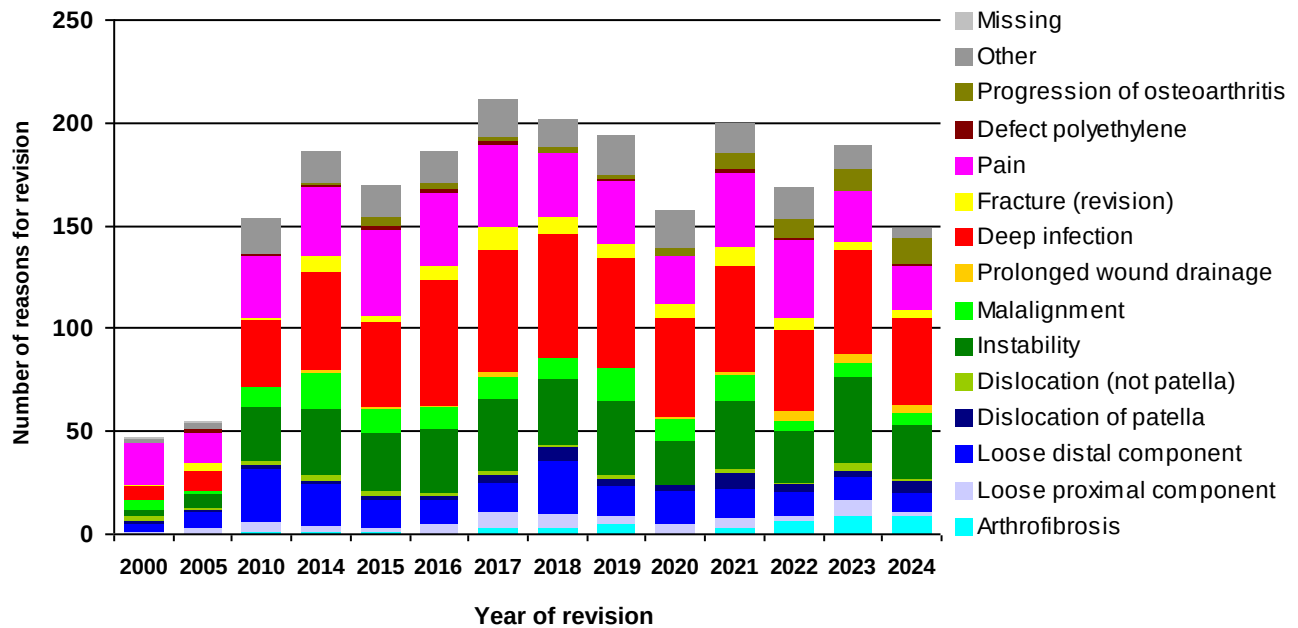
Revision causes are not mutually exclusive. More than one reason for revision is possible. Only the first revision is counted. Only revisions where both primary and revisions are reported are counted. A revision is defined as a reoperation where the implant or part of the implant is changed, added or removed.

Figure 19c: Reasons for revisions of primary total knee prostheses without patella component



Reasons for revision in the first 2 years after primary surgery

Figure 19d: Reason for first revision of primary total prostheses without patella component



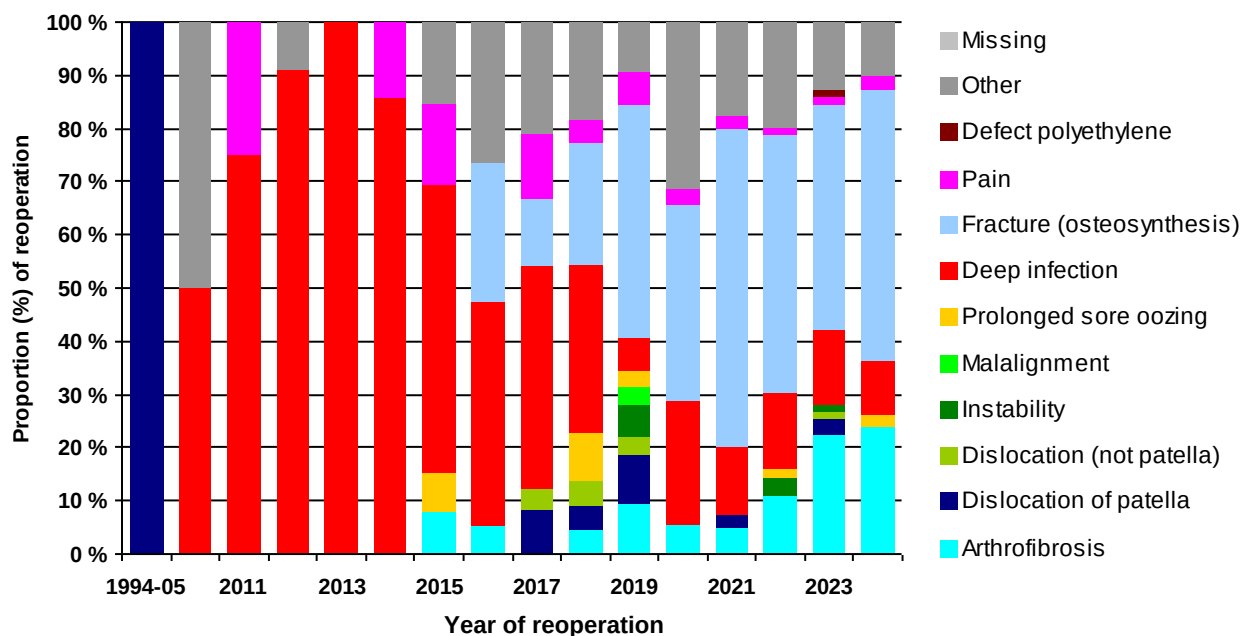
Reasons for reoperations

Table 16c: Reasons for reoperations of primary total knee prostheses without patella component

Year of reoperation	Dislocation of patella	Dislocation (not patella)	Instability	Malalignment	Deep infection	Prolonged wound drainage	Periprosthetic fracture (osteosynthesis)	Pain	Defect polyethylene	Arthrofibrosis	Other	Missing
2024	0	0	0	0	8	2	41	2	0	19	8	0
2023	2	1	1	0	10	0	30	1	1	16	9	0
2022	0	0	2	0	8	1	27	1	0	6	11	0
2021	1	0	0	0	5	0	24	1	0	2	7	0
2020	0	0	0	0	8	0	13	1	0	2	11	0
2019	3	1	2	1	2	1	14	2	0	3	3	0
2018	1	1	0	0	7	2	5	1	0	1	4	0
2017	2	1	0	0	10	0	3	3	0	0	5	0
2016	0	0	0	0	8	0	5	0	0	1	5	0
2015	0	0	0	0	7	1	0	2	0	1	2	0
2014	0	0	0	0	6	0	0	1	0	0	0	0
2013	0	0	0	0	4	0	0	0	0	0	0	0
2012	0	0	0	0	10	0	0	0	0	0	1	0
2011	0	0	0	0	3	0	0	1	0	0	0	0
2009	0	0	0	0	1	0	0	0	0	0	1	0
1994-05	1	0	0	0	0	0	0	0	0	0	0	0
Total	10	4	5	1	97	7	162	16	1	51	67	0

Reoperation causes are not mutually exclusive. More than one reason for reoperation is possible. Only the first reoperation is counted. Reoperations are defined as reoperations where the implant is not removed or parts are not added, like osteosyntheses of periprosthetic fractures.

Figure 19e: Reasons for reoperations of primary total knee prostheses without patella component



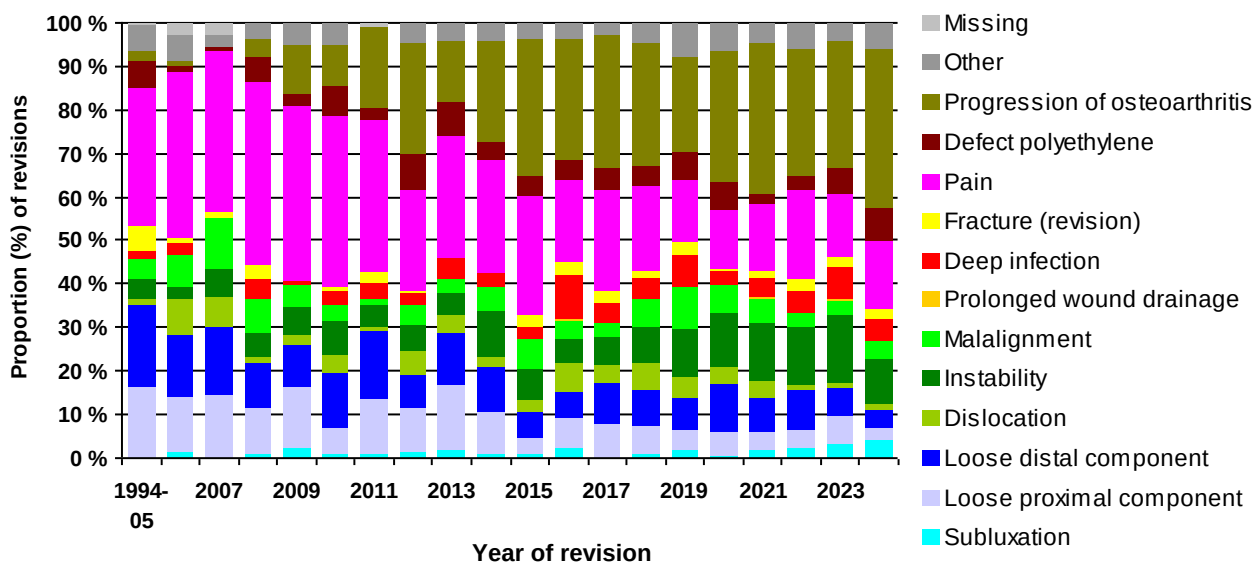
Reasons for revisions

Table 17a: Reasons for revisions of primary unicondylar knee prostheses

Year of revision	Loose proximal comp.	Loose distal comp.	Dislocation	Instability	Malalignment	Deep infection	Prolonged wound drainage	Periprosthetic fracture (revision)	Pain	Defect polyethylene	Progression of osteoarthritis	Subluxation	Other	Missing
2024	6	10	3	24	9	11	0	5	36	17	83	9	13	0
2023	13	14	3	33	6	16	1	5	31	12	62	7	9	0
2022	8	16	3	24	6	9	0	5	37	6	53	4	11	0
2021	6	12	6	20	8	7	1	2	23	4	52	3	7	0
2020	8	17	6	19	10	5	0	1	21	10	46	1	10	0
2019	9	13	9	20	18	13	0	6	26	12	40	3	14	0
2018	12	15	12	16	12	9	0	3	37	8	53	2	9	0
2017	12	15	7	10	5	7	0	4	37	8	48	0	4	0
2016	9	8	9	7	5	13	1	4	25	6	36	3	5	0
2015	5	8	4	10	9	4	0	4	37	6	43	1	5	0
2014	14	15	3	15	8	4	0	0	37	6	33	1	6	0
2013	18	14	5	6	4	6	0	0	33	9	17	2	5	0
2012	13	10	7	8	6	3	0	1	30	11	33	2	6	0
2011	15	18	1	6	2	4	0	3	41	3	22	1	0	1
2010	7	15	5	9	4	4	0	1	46	8	11	1	6	0
2009	20	14	3	9	7	1	0	0	57	4	16	3	7	0
2008	12	12	2	6	9	5	0	4	48	7	5	1	4	0
2007	11	12	5	5	9	0	0	1	28	1	0	0	2	2
2006	9	10	6	2	5	2	0	1	27	1	1	1	4	2
1994-05	53	60	4	15	14	6	0	19	102	20	7	0	19	2
Total	260	308	103	264	156	129	3	69	759	159	661	45	146	7

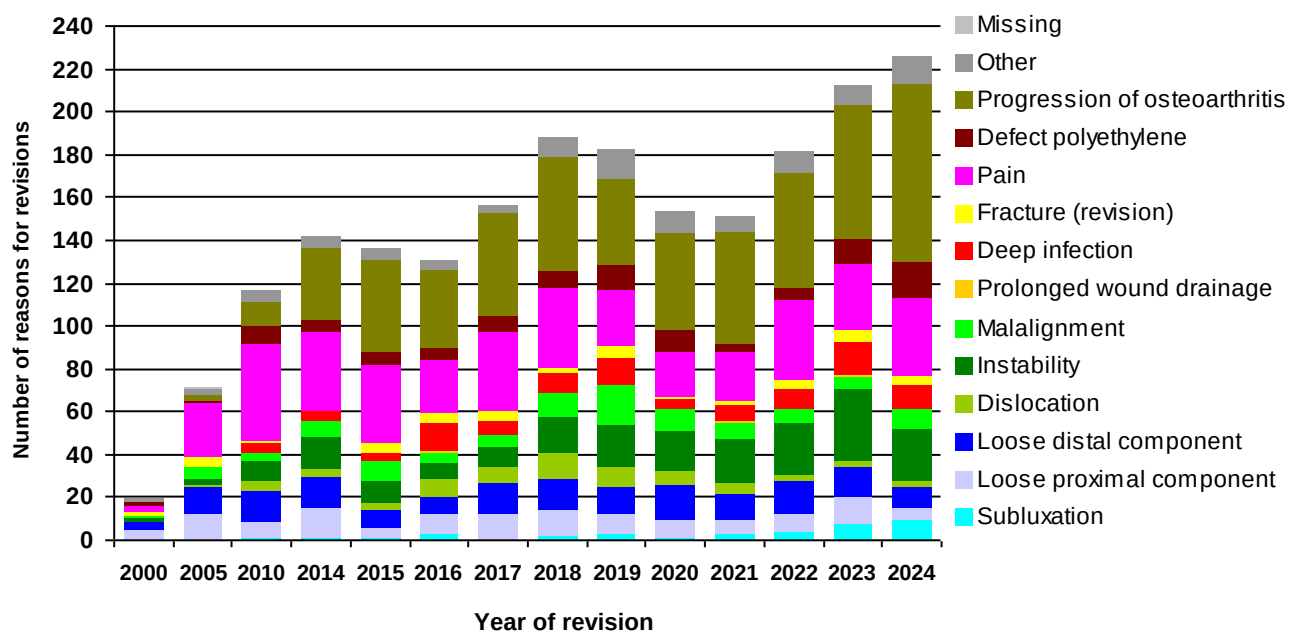
Revision causes are not mutually exclusive. More than one reason for revision is possible. Only the first revision is counted. Only revisions where both primary and revisions are reported are counted. A revision is defined as a reoperation where the implant or part of the implant is changed, added or removed.

Figure 20a: Reasons for revisions of primary unicondylar knee prostheses



Reasons for revisions

Figure 20b: Reason for first revision of primary unicondylar knee prostheses



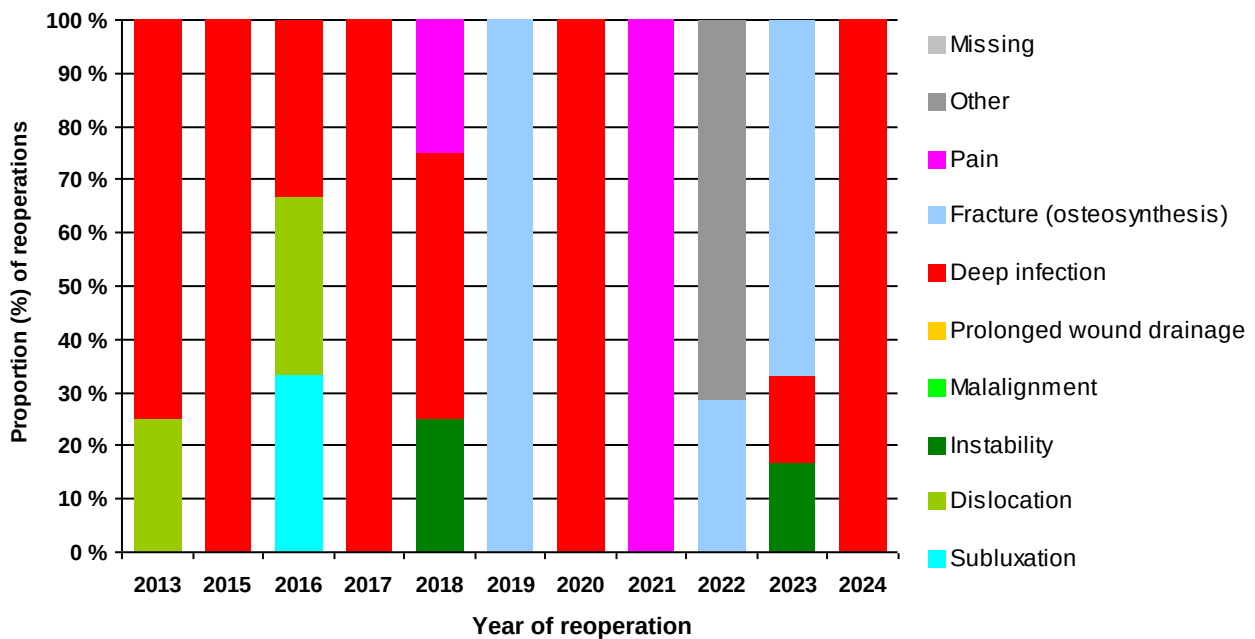
Reasons for reoperations

Table 17b: Reasons for reoperations of primary unicondylar knee prostheses

Year of reoperation	Dislocation	Instability	Malalignment	Deep infection	Prolonged wound drainage	Periprosthetic fracture (osteosynthesis)	Pain	Subluxation	Other	Missing
2024	0	0	0	1	0	0	0	0	0	0
2023	0	1	0	1	0	4	0	0	0	0
2022	0	0	0	0	0	2	0	0	5	0
2021	0	0	0	0	0	0	2	0	0	0
2020	0	0	0	1	0	0	0	0	0	0
2019	0	0	0	0	0	1	0	0	0	0
2018	0	1	0	2	0	0	1	0	0	0
2017	0	0	0	1	0	0	0	0	0	0
2016	1	0	0	1	0	0	0	1	0	0
2015	0	0	0	3	0	0	0	0	0	0
2013	1	0	0	3	0	0	0	0	0	0
Total	2	2	0	13	0	7	3	1	5	0

Reoperation causes are not mutually exclusive. More than one reason for reoperation is possible. Only the first reoperation is counted. Reoperations are defined as reoperations where the implant is not removed or parts are not added, like osteosyntheses of periprosthetic fractures.

Figure 20c: Reasons for reoperations of primary unicondylar knee prostheses



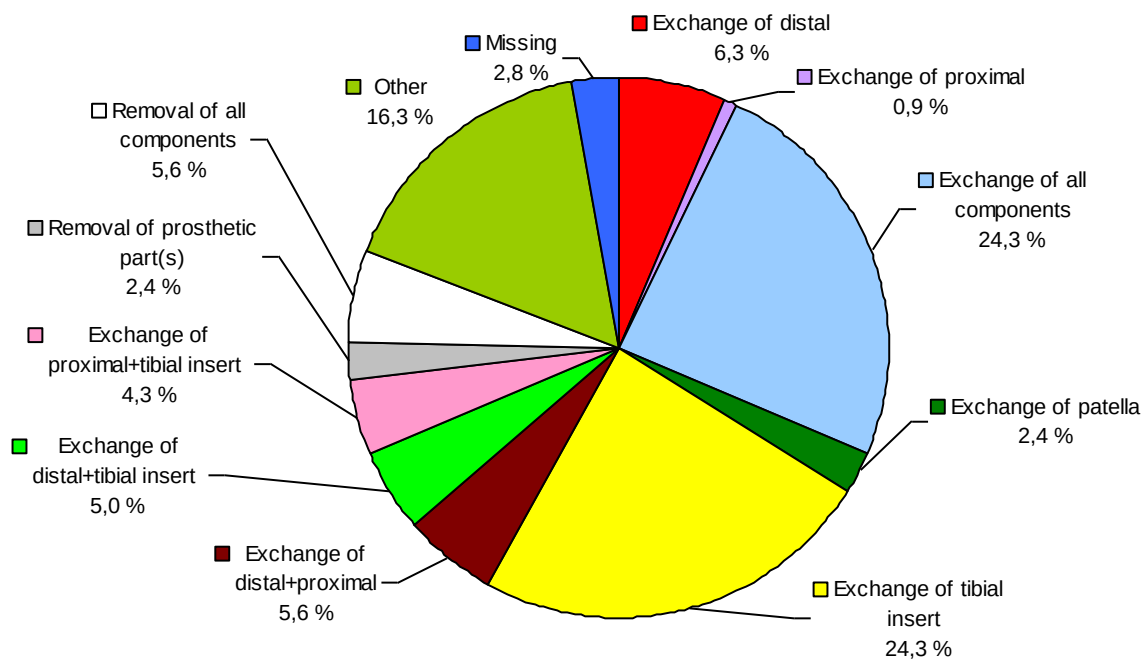
Type of revision *

Table 18: Total knee prostheses with patella in first reoperation after primary surgery

Year of primary operation	Exchange of distal	Exchange of distal+tibial insert	Exchange of distal+ proximal	Exchange of whole prosthesis	Exchange of patella	Exchange of tibial insert	Exchange of proximal	Exchange of proximal+tibial insert	Removal of whole prosthesis	Removal of prosthetic part(s)	Other	Missing	Total
2024			1	1		11							15
2023				4		11							16
2022				4		9		2			1		17
2021				3	1	8				1	5	1	20
2020		1		1		6		1			3		13
2019		2		5		8		2			9	1	27
2018		5		5		6		4			1		22
2017		4		3		7		3			5	1	23
2016	1	2		2		8					5		18
2015					2	1					4		7
2014		2		1		3					2	1	9
2013				1		2						1	4
2012		1	1	2		1							5
2011						3					1		4
2010				1		1					1		3
2009						3		1			2	1	7
2008				2		1		1	1			1	6
2007				2		2				1			5
2006		1		2	1			1			1		7
1994-05	33	9	28	92	9	40	5	8	29	11	48	8	324
Total	34	27	30	131	13	131	5	23	30	13	88	15	552

* Both revisions and reoperations are counted.

Figure 21: Total knee prostheses with patella in first reoperation after primary surgery



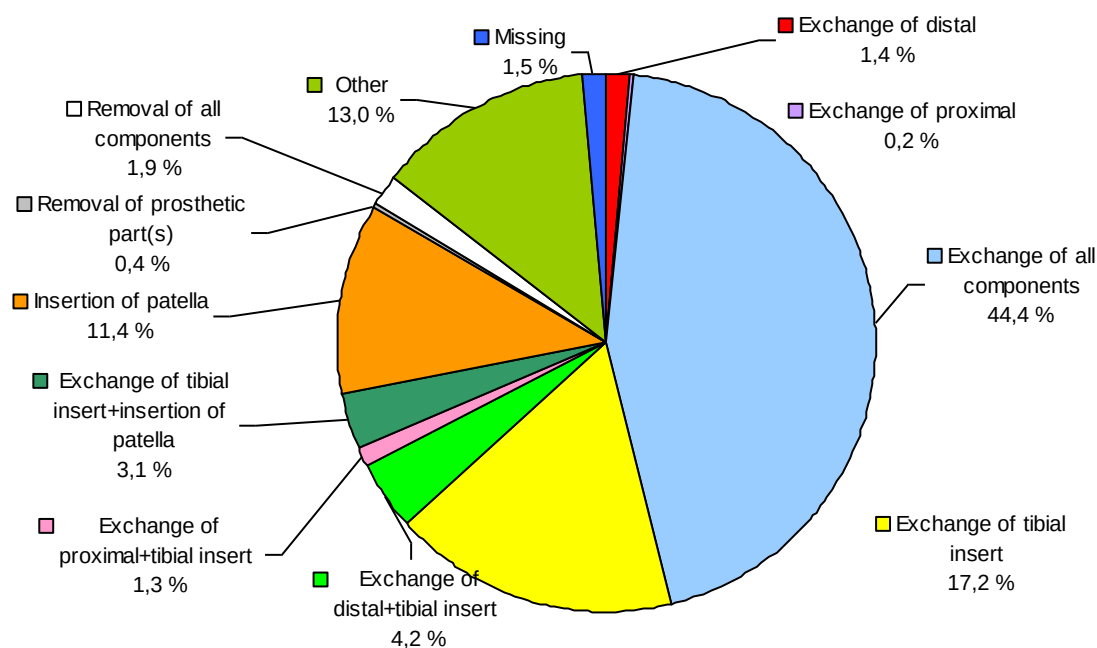
Type of revision *

Table 19: Total knee prostheses without patella in first reoperation after primary surgery

Year of primary operation	Exchange of distal + proximal	Exchange of distal+tibial insert	Exchange of whole prosthesis	Exchange of tibial insert+ins. patella	Exchange of tibial insert	Exchange of proximal+tibial insert	Removal of whole prosthesis	Removal of prosthetic part(s)	Insertion of patella	Osteosynthesis	Other	Missing	Total
2024	1	2	5	1	25		1		2	2	11	3	53
2023	2	2	6	1	43	5	2		7		24	3	95
2022	2	1	63	9	33	3			13	5	33	5	167
2021		7	95	13	58	4			28	1	24	2	232
2020		5	68	8	47	6			35	6	32	3	210
2019	2	5	86	9	49	7			20	8	45	1	232
2018		8	112	10	76	6			25	10	32	2	281
2017		17	85	11	72	9			26	5	30	5	260
2016		10	121	15	64	2	2		13	11	60	8	306
2015		8	128	12	76	4			41	6	48	5	328
2014		15	140	20	64	1	9	1	25	11	29	4	319
2013	1	11	168	11	56	5	2	1	23	9	28	8	323
2012	1	22	193	13	53		5	1	19	11	36	6	360
2011	1	24	199	11	66	2	8		30	11	41	6	399
2010	2	24	190	8	47	2	5	2	38	10	29	4	361
2009	4	22	195	3	55	6	9	1	30	10	31	3	369
2008	2	21	156	9	54	2	9	2	22	8	29	2	316
2007	2	14	155	6	36	2	6	2	21	6	27	3	280
2006	6	11	133	5	21	3	10	1	25	9	16	1	241
1994-05	83	55	707	36	170	18	63	13	325	11	126	25	1 632
Total	109	284	3 005	211	1 165	87	131	24	768	150	731	99	6 764

* Both revisions and reoperations are counted.

Figure 22: Total knee prostheses without patella in first reoperation after primary surgery



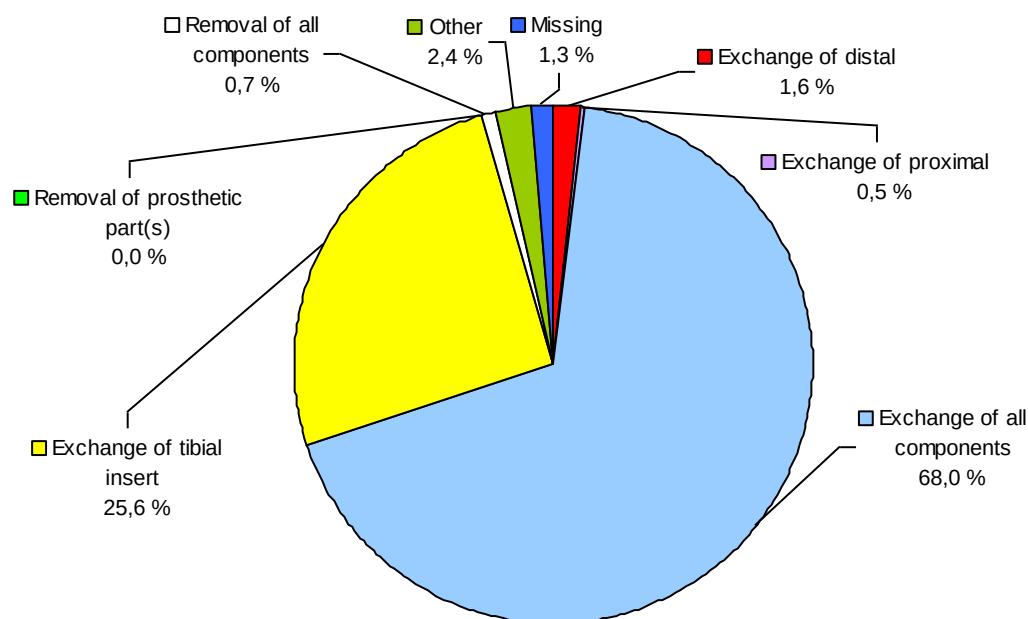
Type of revision *

Table 20: Unicondylar prostheses in first reoperation after primary surgery

Year of primary operation	Exchange of distal	Exchange of whole prosthesis	Exchange of tibial insert	Exchange of proximal	Removal of whole prosthesis	Removal of prosthetic part(s)	Other	Missing	Total
2024		6	24					1	31
2023		14	36				1		51
2022	1	17	24				1		43
2021		27	28						55
2020	1	33	20				1		55
2019	4	46	48				2		100
2018		53	40	1			1	1	96
2017	1	41	40					1	83
2016	1	53	32				7	1	94
2015	1	65	26				2	1	95
2014	2	61	12		1		4		80
2013		37	24		1		3		65
2012	2	61	22	1	1			1	88
2011	1	61	18	1			3	1	85
2010		73	26				5	1	105
2009		81	28		1		2		112
2008	1	83	24		2			1	111
2007		111	14	1	2		7	2	137
2006	1	92	16	1	1		5	2	118
1994-05	21	607	108	6	8	1	14	18	783
Total	37	1 622	610	11	17	1	58	31	2 387

* Both revisions and reoperations are counted.

Figure 23: Unicondylar prostheses in first reoperation after primary surgery



ASA classification all knee prostheses

Table 21: Primary operations all knee prostheses

Year	ASA 1	ASA 2	ASA 3	ASA 4	ASA 5	Missing	Total
2024	730	6 341	1 928	11		23	9 033
2023	784	6 116	1 742	16		36	8 694
2022	713	5 432	1 621	19		89	7 874
2021	720	5 149	1 604	11		153	7 637
2020	624	4 513	1 404	10		155	6 706
2019	720	4 811	1 520	7		198	7 256
2018	709	4 611	1 438	7		168	6 933
2017	668	4 410	1 275	13		215	6 581
2016	707	4 391	1 236	12		168	6 514
2015	683	4 153	1 189	7		88	6 120
2014	587	3 912	1 058	8		75	5 640
2013	551	3 520	896	5	1	68	5 041
2012	667	3 276	902	8		62	4 915
2005-11	5 291	16 313	5 038	41	2	685	27 370

Table 22: Revisions

Year	ASA 1	ASA 2	ASA 3	ASA 4	ASA 5	Missing	Total
2024	31	443	237	7		6	724
2023	44	420	237	12		6	719
2022	26	358	235	6		13	638
2021	25	333	246	13		31	648
2020	30	320	202	12		22	586
2019	27	369	210	11		32	649
2018	39	365	224	11		27	666
2017	50	354	192	5	1	29	631
2016	27	358	184	2		33	604
2015	35	314	180	7		20	556
2014	50	297	137	2		13	499
2013	45	292	133	0		12	482
2012	52	287	136	3		15	493
2005-11	517	1 193	641	8		107	2 466

Figure 24: Primary operations

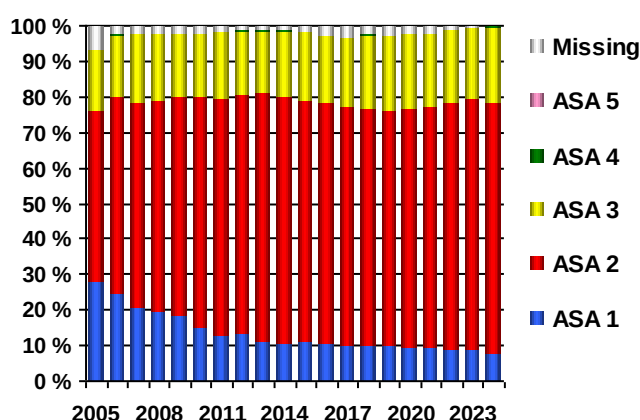
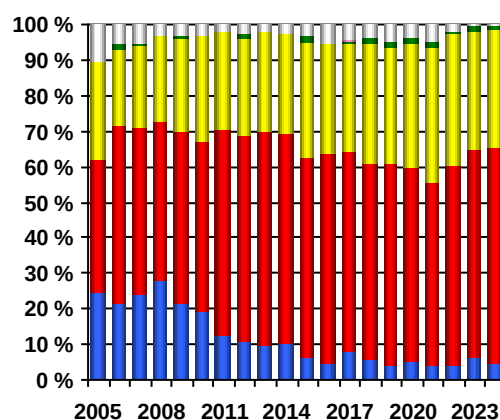


Figure 25: Revisions



ASA 1 = Healthy patients who smoke less than 5 cigarettes a day.

ASA 2 = Patients with an asymptomatic condition who are kept under medical control (f.ex. hypertension), or with diet (f. ex. diabetes mellitus type 2), and otherwise healthy patients who smoke five cigarettes or more daily.

ASA 3 = Patients having a condition that can cause symptoms. However, patients are kept under medical control (f. ex. moderate angina pectoris and mild asthma).

ASA 4 = Patients with a condition that is out of control (f. ex. heart failure and asthma).

ASA 5 = A moribund patient who is not expected to survive the operation.

Registration of ASA classification started in 2005

Thrombosis prophylaxis

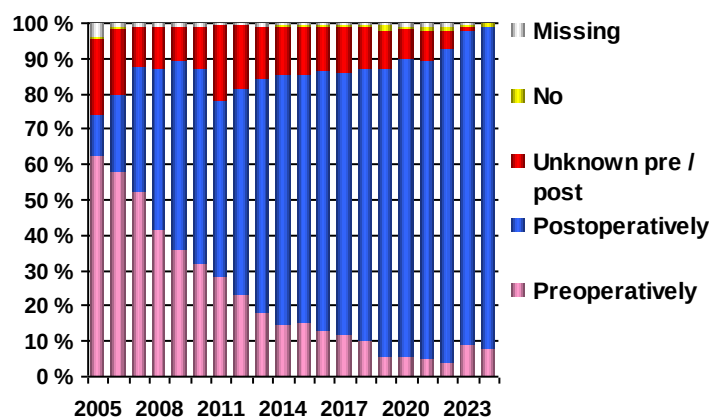
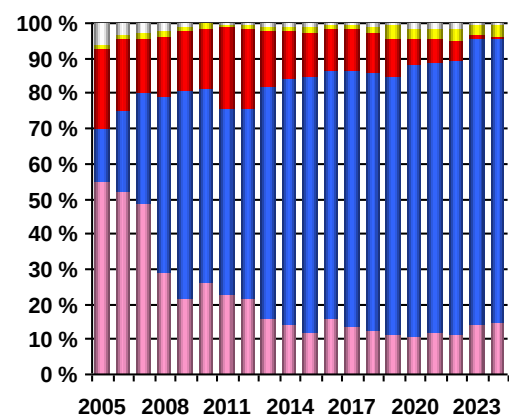
Table 23: Primary operations

Year	Preoperatively	Postoperatively	Unknown* pre / post	No	Missing	Total
2024	688	8 219	17	108	1	9 033
2023	783	7 705	93	79	34	8 694
2022	318	6 971	426	88	71	7 874
2021	399	6 402	683	81	72	7 637
2020	391	5 622	567	67	59	6 706
2019	407	5 892	805	101	51	7 256
2018	712	5 309	834	48	30	6 933
2017	778	4 896	826	51	30	6 581
2016	846	4 793	787	59	29	6 514
2015	931	4 299	816	29	45	6 120
2014	811	4 013	763	25	28	5 640
2013	909	3 352	716	10	54	5 041
2012	1 131	2 879	871	7	27	4 915
2005-11	11 645	11 236	4 069	66	354	27 370

Table 24: Revisions

Year	Preoperatively	Postoperatively	Unknown* pre / post	No	Missing	Total
2024	108	584	2	27	3	724
2023	101	587	7	21	3	719
2022	72	496	37	21	12	638
2021	78	496	45	17	12	648
2020	62	454	43	18	9	586
2019	73	478	70	23	5	649
2018	83	488	77	11	7	666
2017	84	460	75	7	5	631
2016	97	426	72	7	2	604
2015	65	407	68	11	5	556
2014	70	350	67	7	5	499
2013	77	317	77	6	5	482
2012	105	268	111	6	3	493
2005-11	826	1 098	462	30	50	2 466

* Missing information on medication start

Figure 26: Primary operations

Figure 27: Revisions


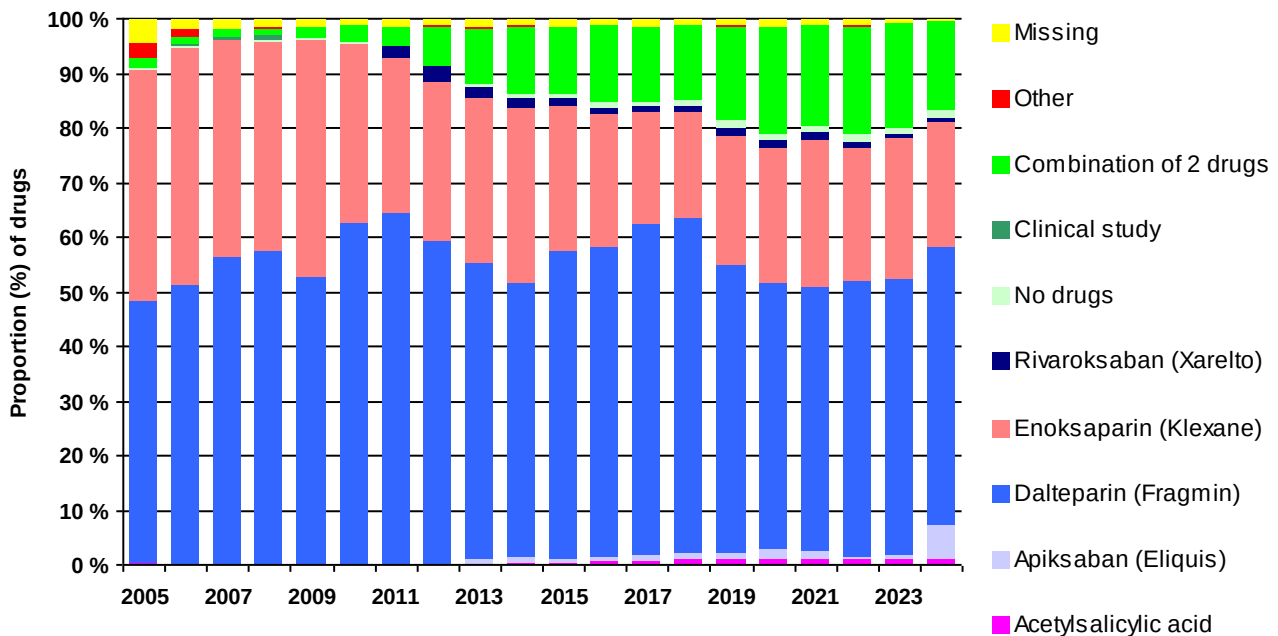
Registration of thrombosis prophylaxis started in 2005

Thrombosis prophylaxis

Table 25a: Drugs - All operations

Drugs	2005-14	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Acetylsalicylsyre (Albyl-E, Globoid, Acetyratio, Magnyl E)	0,1%	0,4%	0,6%	0,9%	1,0%	1,0%	1,0%	0,9%	1,0%	1,0%	1,1%
Apiksaban (Eliquis)	0,3%	0,9%	1,0%	1,1%	1,3%	1,1%	1,9%	1,7%	0,6%	0,7%	6,0%
Dalteparin (Fragmin)	55,8%	56,2%	56,5%	60,6%	61,5%	52,7%	48,7%	48,2%	50,4%	50,8%	51,0%
Enoksaparin (Klexane)	35,1%	26,8%	24,4%	20,2%	19,2%	23,7%	25,0%	26,9%	24,4%	25,5%	23,0%
Rivaroksaban (Xarelto)	1,1%	1,4%	1,1%	1,1%	1,1%	1,3%	1,2%	1,4%	1,3%	0,8%	0,9%
Ximelagatran (Exanta, Malagatran)	0,3%										
No drugs	0,3%	0,6%	0,9%	0,8%	0,8%	1,6%	1,2%	1,2%	1,3%	1,1%	1,4%
Clinical study	0,2%										
Combination of 2 drugs	5,0%	12,3%	14,2%	13,9%	13,9%	17,3%	19,6%	18,5%	19,8%	19,5%	16,2%
Other	0,2%	0,1%	0,0%	0,1%	0,0%	0,0%	0,0%	0,0%	0,0%	0,1%	0,2%
Missing	1,6%	1,5%	1,2%	1,3%	1,1%	1,3%	1,4%	1,2%	1,3%	0,6%	0,2%
Total	46 906	6 676	7 118	7 212	7 599	7 905	7 292	8 285	8 512	9 413	9 757

Figure 28: Drugs



Thrombosis prophylaxis

Table 25b: Combination of 2 drugs - All operations

Drugs	2005-14	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Enoxaparin + Apixaban	19,4%	27,6%	33,8%	33,5%	26,6%	49,1%	47,7%	48,2%	35,9%	29,8%	26,5%
Dalteparin + Apixaban	10,2%	17,4%	21,3%	29,8%	28,5%	12,4%	13,8%	17,6%	27,8%	31,8%	28,7%
Enoxaparin + Acetylsalicylic acid	27,1%	18,3%	17,8%	15,8%	14,4%	16,3%	16,4%	13,3%	16,8%	19,4%	23,4%
Dalteparin + Rivaroxaban	0,9%	3,2%	2,6%	4,4%	1,6%	6,9%	9,9%	13,5%	14,9%	14,4%	17,4%
Dalteparin + Dabigatranetixalat	19,8%	22,4%	14,3%	3,7%	2,2%	0,1%		0,1%		0,3%	0,1%
Dalteparin + Acetylsalicylic acid	2,9%			4,4%	15,2%	11,5%	10,4%	5,0%	1,1%	0,9%	0,2%
Enoxaparin + Rivaroxaban	2,9%	7,3%	7,3%	6,8%	8,0%	2,0%	0,1%	0,1%	0,1%	1,7%	0,6%
Enoxaparin + Dabigatranetixalat	0,6%	1,7%	1,5%	1,3%	3,0%	1,4%	1,7%	2,0%	2,1%	0,8%	1,0%
Dalteparin + Warfarin	8,6%	1,0%	0,7%	0,1%	0,2%	0,1%			0,1%		0,2%
Enoxaparin + Warfarin	4,0%	0,9%	0,4%	0,1%	0,1%			0,1%	0,1%		0,1%
Enoxaparin + Dextran	2,2%										
Dalteparin + Enoxaparin	0,4%							0,1%	0,1%		0,1%
Acetylsalicylic acid + Missing/Unknown									0,7%		
Enoxaparin + Missing/Unknown										0,4%	0,2%
Acetylsalicylic acid + Apixaban										0,1%	0,5%
Dalteparin + Missing/Unknown								0,1%	0,2%	0,1%	0,1%
Enoxaparin + Clopidogrel	0,1%		0,1%								0,3%
Dalteparin + Clopidogrel	0,1%	0,1%	0,1%							0,1%	0,2%
Apixaban + Missing/Unknown									0,2%	0,1%	0,1%
Dalteparin + Dextran	0,3%										
Enoxaparin + Edoxaban										0,1%	0,1%
Dalteparin + Edoxaban											0,2%
Enoxaparin + Acetylsalicylic acid and dipyridamol	0,1%										
Rivaroxaban + Missing/Unknown											0,1%
Acetylsalicylic acid + Clopidogrel						0,1%					
Acetylsalicylic acid + Ticagrelor	0,0%										
Acetylsalicylic acid and dipyridamol				0,1%							
Clopidogrel + Apixaban											0,1%
Dabigatranetixalat + Missing/Unknown									0,1%		
Dalteparin + Clinical study	0,0%										
Dalteparin + Dipyridamol										0,1%	
Dalteparin + Fondaparinux	0,0%										
Dalteparin + Heparin	0,0%										
Dalteparin + Prasugrel	0,0%										
Dalteparin + Ximelagatran		0,1%									
Dextran + Apixaban	0,0%										
Dextran + Clopidogrel	0,0%										
Enoxaparin + Dipyridamol									0,1%		
Enoxaparin + Heparin						0,1%					
Enoxaparin + Hydroxyethylstivelse					0,1%						
Enoxaparin + Ximelagatran	0,0%										
Fondaparinux + Rivaroxaban			0,1%								
Warfarin + Fondaparinux	0,0%										
Ximelagatran + Pyrazolidon	0,0%										
Total	2 353	821	1 008	1 002	1 059	1 368	1 431	1 530	1 703	1 834	1 583

Thrombosis prophylaxis

Table 26: Duration - All operations

Year	Days:	1-7	8-14	15-21	22-28	29-35	>35	No drugs	Missing	Total
2024		2 991	5 950	113	13	102	22	135	431	9 757
2023		3 052	5 147	131	21	462	18	100	490	9 421
2022		2 532	4 009	131	13	463	16	109	1 240	8 513
2021		2 017	3 574	178	9	385	13	98	2 011	8 285
2020		2 274	3 155	235	11	572	5	85	955	7 292
2019		2 198	3 319	394	29	692	9	124	1 140	7 905
2018		1 690	3 210	442	142	803	5	59	1 248	7 599
2017		1 185	3 202	502	281	781	13	58	1 190	7 212
2016		1 178	3 162	551	314	718	38	66	1 091	7 118
2015		1 018	2 390	977	326	866	143	40	916	6 676
2014		975	1 797	1 024	370	1 065	153	32	723	6 139
2013		733	1 595	1 005	398	1 002	120	16	654	5 523
2012		584	1 633	1 205	335	890	96	13	652	5 408
2005-11		2 936	9 015	6 693	1 385	4 911	278	96	4 522	29 836

Registration of thrombosis prophylaxis started in 2005

Fibrinolysis Inhibitor

Table 27: Drugs - Primary operations

Drugs	2010-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Cyclokapron (Tranexamic acid)	18 881	5 755	5 819	6 191	6 720	6 297	7 196	7 486	8 298	8 662	81 305
Missing	497	63	84	72	66	68	66	54	82	103	1 155
Total	19 378	5 818	5 903	6 263	6 786	6 365	7 262	7 540	8 380	8 765	82 460

Registration of fibrinolysis inhibitor started in 2010

Perioperative complications

Table 28: For primary total prostheses (the 10 most common complications)

Type	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Patella tendon rupture / Avulsion fractures / ligament rupture / tendon injury	141	15	6	11	19	17	9	7	14	13	252
Fracture	146	12	10	7	8	7	16	10	6	12	234
Rupture / damage MCL (medial colateral ligament)	61	10	19	18	22	20	17	12	18	13	210
Technical problem with cement	61		1	5	3	2	6	2	13	11	104
Problem due to difficult anatomy	39	3	2	4	5		4	8	15	16	96
Adm. failure (missing comp. etc.)	39	4	3	7	3	1	2	3	6	3	71
Failure of instruments	49	1		1				1	5	10	67
Blood tourniquet failing	47			1	1	6	1	2		4	62
Anesthesia problems	37	1	3	3			4	1	5	8	62
Blødning (Uvanlig stor)	22	1	2	2	1	2	4	5	2	4	45
Other periop. compl.	298	26	20	21	23	17	29	20	23	10	487

Previous operation in relevant joint

Table 29: For primary total prostheses

Type	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Meniscus	7 153	882	737	764	703	637	796	868	910	982	14 432
Osteotomy	2 430	137	111	108	151	113	139	124	136	131	3 580
Arthroscopy (diagnostic)	1 551	194	166	149	93	78	83	87	88	89	2 578
Cruciate Ligament	925	188	119	143	144	146	165	192	236	258	2 516
Osteosynthesis of intraarticular joint fracture	1 220	98	114	107	109	85	91	87	105	86	2 102
Synovectomy	1 331	41	51	41	32	33	32	41	38	40	1 680
Artrodesis	27	2	1	1			2				33
Other previous op.	1 076	86	120	146	123	125	160	193	268	248	2 545

Mini-invasive surgery

Table 30: Primary operations - Total knee prostheses

Year	Yes	No	Missing	Total
2024	10 (0%)	7 167 (98%)	157 (2%)	7 334
2023	3 (0%)	7 104 (99%)	105 (1%)	7 212
2022	5 (0%)	6 201 (94%)	386 (6%)	6 592
2021	18 (0%)	5 160 (79%)	1 315 (20%)	6 493
2020	8 (0%)	5 336 (92%)	429 (7%)	5 773
2019	8 (0%)	5 715 (93%)	452 (7%)	6 175
2018	14 (0%)	5 351 (92%)	477 (8%)	5 842
2017	9 (0%)	5 035 (90%)	562 (10%)	5 606
2016	10 (0%)	4 964 (89%)	576 (10%)	5 550
2015	5 (0%)	4 632 (87%)	657 (12%)	5 294
2014	2 (0%)	4 324 (87%)	647 (13%)	4 973
2013	10 (0%)	3 791 (84%)	716 (16%)	4 517
2012	16 (0%)	3 688 (84%)	685 (16%)	4 389
2005-11	106 (0%)	22 490 (93%)	1 514 (6%)	24 110

Figure 29: Primary operations - Total knee prostheses

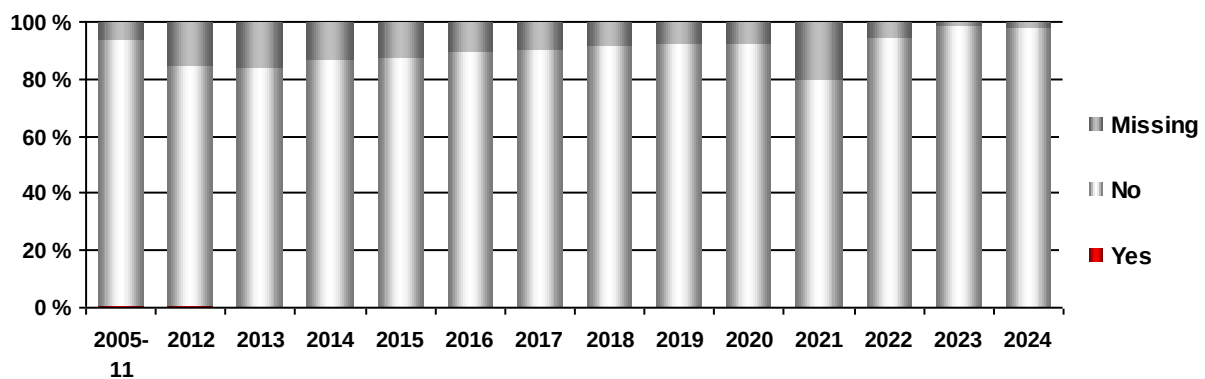


Table 31: Primary operations - Unicondylar knee prostheses

Year	Yes	No	Missing	Total
2024	464 (30%)	1 036 (67%)	46 (3%)	1 546
2023	466 (35%)	873 (65%)	9 (1%)	1 348
2022	438 (38%)	649 (57%)	52 (5%)	1 139
2021	392 (39%)	473 (47%)	141 (14%)	1 006
2020	320 (38%)	495 (59%)	27 (3%)	842
2019	358 (36%)	575 (58%)	62 (6%)	995
2018	409 (41%)	556 (56%)	36 (4%)	1 001
2017	382 (44%)	429 (49%)	57 (7%)	868
2016	318 (37%)	486 (56%)	59 (7%)	863
2015	285 (38%)	399 (53%)	69 (9%)	753
2014	240 (40%)	280 (46%)	85 (14%)	605
2013	224 (47%)	167 (35%)	86 (18%)	477
2012	199 (42%)	222 (47%)	54 (11%)	475
2005-11	1 353 (44%)	1 580 (51%)	144 (5%)	3 077

Registration of MIS started in 2005

Computernavigation

Table 32: Primary operations - Total knee prostheses

Year	Yes	No	Missing	Total
2024	447 (6%)	6 696 (91%)	191 (3%)	7 334
2023	487 (7%)	6 633 (92%)	92 (1%)	7 212
2022	455 (7%)	5 795 (88%)	342 (5%)	6 592
2021	495 (8%)	5 560 (86%)	438 (7%)	6 493
2020	472 (8%)	4 855 (84%)	446 (8%)	5 773
2019	514 (8%)	5 227 (85%)	434 (7%)	6 175
2018	597 (10%)	4 793 (82%)	452 (8%)	5 842
2017	569 (10%)	4 520 (81%)	517 (9%)	5 606
2016	584 (11%)	4 413 (80%)	553 (10%)	5 550
2015	475 (9%)	4 167 (79%)	652 (12%)	5 294
2014	443 (9%)	3 882 (78%)	648 (13%)	4 973
2013	390 (9%)	3 404 (75%)	723 (16%)	4 517
2012	416 (9%)	3 291 (75%)	682 (16%)	4 389
2005-11	3 421 (14%)	19 253 (80%)	1 436 (6%)	24 110

Figure 30: Primary operations - Total knee prostheses

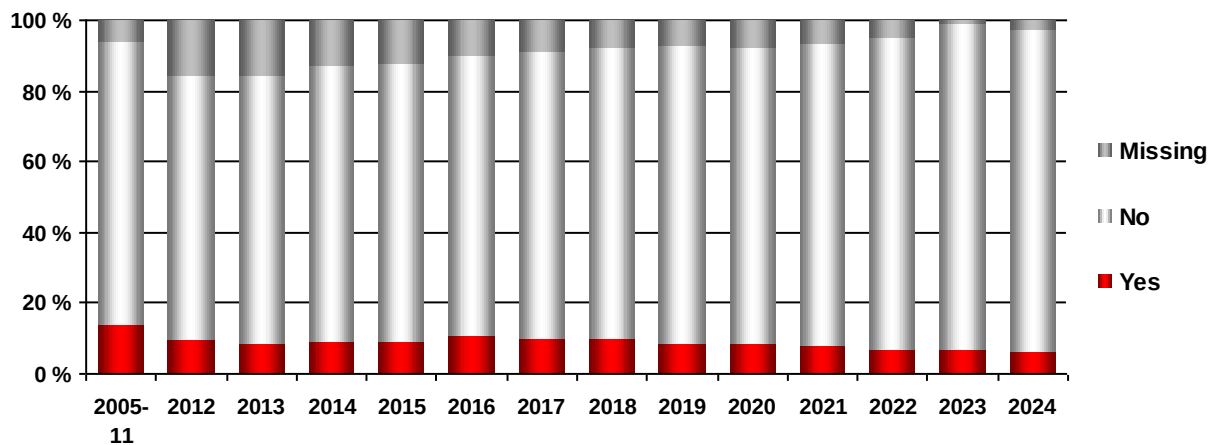


Table 33: Primary operations - Unicondylar knee prostheses

Year	Yes	No	Missing	Total
2024	1 (0%)	1 494 (97%)	51 (3%)	1 546
2023	1 (0%)	1 331 (99%)	16 (1%)	1 348
2022	3 (0%)	1 093 (96%)	43 (4%)	1 139
2021	2 (0%)	968 (96%)	36 (4%)	1 006
2020	3 (0%)	813 (97%)	26 (3%)	842
2019	0	930 (93%)	65 (7%)	995
2018	1 (0%)	962 (96%)	38 (4%)	1 001
2017	0	810 (93%)	58 (7%)	868
2016	0	800 (93%)	63 (7%)	863
2015	4 (1%)	681 (90%)	68 (9%)	753
2014	0	518 (86%)	87 (14%)	605
2013	0	389 (82%)	88 (18%)	477
2012	0	419 (88%)	56 (12%)	475
2005-11	47 (2%)	2 880 (94%)	150 (5%)	3 077

Registration of CAOS started in 2005

Cements used in total knee prostheses

Table 34: Primary operations - Femur

Cement	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Palacos R+G pro	5	15	364	1 546	2 949	3 210	3 723	3 885	4 582	4 783	25 062
Palacos R + G	14 489	1 437	1 007	961	634	393	396	303	249	204	20 073
Optipac Refobacin Bonecement R	9 826	1 850	1 469	1 487	484				1	1	15 118
Palacos m/gentamicin	14 675										14 675
Refobacin Bone Cement R	5 692	556	889	49	1						7 187
SmartSet GHV Genta. Smartmix	1 037	277	247	217	244	302	197				2 521
Cemex m/gentamycin	1 751	149	92	43	24	4	1				2 064
Palacos R							190	457	453	665	1 765
Optipac Refobacin Bonecement R-3				2	260	373	248	244	311	221	1 659
Refobacin-Palacos	1 571										1 571
Simplex m/Tobramycin	674										674
Palacos	424										424
Bone Cement R-3							46	88	82	94	310
Cemex System Genta FAST	203										203
Simplex	183								1		184
CMW I m/gentamicin	169										169
Copal G+ V	12	2	11	6	6	6	13	18	12	11	97
CMW I	53										53
Other (n<50)	156	3	10	12	12	18	8	11	15	21	266
Mangler	63										63
Total	50 983	4 289	4 089	4 323	4 614	4 306	4 822	5 006	5 706	6 000	94 138

Table 35: Primary operations - Tibia

Cement	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Palacos R+G pro	7	40	1 136	2 333	4 034	4 177	4 738	4 989	5 833	5 951	33 238
Palacos R + G	20 306	2 258	1 149	1 101	731	435	452	321	265	213	27 231
Palacos m/gentamicin	17 809										17 809
Optipac Refobacin Bonecement R	10 714	1 984	1 539	1 573	481				1	1	16 293
Refobacin Bone Cement R	6 133	572	938	47							7 690
SmartSet GHV Genta. Smartmix	1 049	279	247	217	244	303	199				2 538
Cemex m/gentamycin	1 902	150	91	43	24	4	1				2 215
Palacos R							190	457	454	666	1 767
Optipac Refobacin Bonecement R-3				2	273	362	240	238	296	223	1 634
Refobacin-Palacos	1 627										1 627
Simplex m/Tobramycin	679										679
Palacos	452										452
Bone Cement R-3							46	88	99	124	357
Cemex System Genta FAST	284										284
CMW I m/gentamicin	194										194
Simplex	186								1		187
Copal m/gentamicin+clindamycin	3			1	1		2	25	78	72	182
Copal G+ V	19	3	13	6	7	5	27	39	17	19	155
CMW I	54										54
Other (n<50)	174	3	17	13	13	17	8	6	4	2	257
Mangler	70										70
Total	61 662	5 289	5 130	5 336	5 808	5 303	5 903	6 163	7 048	7 271	114 913

Cements used in unicondylar knee prostheses

Table 36: Primary operations - Femur

Cement	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Palacos R + G	2 666	364	169	131	172	129	154	130	19	28	3 962
Palacos R+G pro	1	6	110	214	321	413	473	565	730	807	3 640
Palacos w/gentamicin	2 211										2 211
Optipac Refobacin Bonecement R	1 122	222	176	250	62						1 832
Refobacin Bone Cement R	848	81	111								1 040
Optipac Refobacin Bonecement R-3					57	99	54	47	54	58	369
Refobacin-Palacos	269										269
Simplex w/Tobramycin	223										223
Cemex w/gentamicin	63										63
Cemex System Genta FAST	63										63
SmartSet GHV	42	2	1	6	1						52
Simplex	40										40
Other (n<20)	75	1	2		1		1	1	5		86
Total	7 623	676	569	601	614	641	682	743	808	893	13 850

Table 37: Primary operations - Tibia

Cement	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Palacos R + G	2 677	366	170	130	172	129	154	130	19	28	3 975
Palacos R+G pro	1	6	108	214	331	410	476	564	746	807	3 663
Palacos w/gentamicin	2 205										2 205
Optipac Refobacin Bonecement R	1 116	223	175	250	62						1 826
Refobacin Bone Cement R	838	81	109								1 028
Optipac Refobacin Bonecement R-3					57	99	54	47	54	58	369
Refobacin-Palacos	266										266
Simplex w/Tobramycin	218										218
Cemex w/gentamicin	63										63
Cemex System Genta FAST	62										62
SmartSet GHV	42	2	1	6	1						52
Simplex	39										39
Other (n<20)	70	1	2		1		1	1	6		82
Total	7 597	679	565	600	624	638	685	742	825	893	13 848

Antibiotic prophylaxis

Table 38: Primary operations

Drugs	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Cefalotin (Keflin)	55 655	5 640	5 642	4 722	605	468	968	1 226	1 365	1 458	77 749
Cefazolin (Cephazolin)	40		339	1 670	5 919	5 764	6 243	6 210	6 872	7 177	40 234
Klindamycin (Dalacin, Clindamycin)	1 952	341	346	405	365	303	335	364	351	308	5 070
Cefuroksim (Zinacef, Cefuroxim, Lifurox)	3 959	1			74	1		1			4 036
Kloksacillin (Ekvacillin)	2 383	23	1	1	200	109	18		1	1	2 737
Dikloksacillin (Diclocil, Dicillin)	1 684	3	1	1			1				1 690
Imipenem (Tienam)	51										51
Cefaleksin (Keflex, Cefalexin)	21				5						26
Vankomycin (Vancomycin, Vancocin)	7		3		3	1	1	2	1	2	20
Benzylpenicillin (Penicillin G)	20										20
Erytromycin (Ery-max, Abbotcin)	17										17
Cefotaksim (Claforan)	2	1	2			4	3		1		13
Ciprofloksasin (Ciproxin)	8	2									10
Combination of 2 drugs	2 522	462	223	107	57	26	32	41	79	81	3 630
Other (n<10)	27	5	1			2	1	1		1	38
Missing	480	36	23	27	28	28	35	29	24	5	715
Total	68 828	6 514	6 581	6 933	7 256	6 706	7 637	7 874	8 694	9 033	136 056

Table 39: Revisions

Drugs	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Cefalotin (Keflin)	3 945	356	355	277	20	28	49	76	80	72	5 258
Cefazolin (Cephazolin)	1		25	158	380	341	383	366	445	468	2 567
Klindamycin (Dalacin, Clindamycin)	268	27	27	35	42	22	39	34	33	27	554
Cefuroksim (Zinacef, Cefuroxim, Lifurox)	327	1		1	4	1			2		336
Kloksacillin (Ekvacillin)	177	15	9	15	24	20	22	12	16	11	321
Dikloksacillin (Diclocil, Dicillin)	224	5	4	9	1		4	1	1	1	250
Vankomycin (Vancomycin, Vancocin)	147	14	10	8	7	11	7	5	8	5	222
Benzylpenicillin (Penicillin G)	40	4	7	5	4	6	1	5	1		73
Cefotaksim (Claforan)	5		3	2	1	1	4	4	2	3	25
Ampicillin (Pentrexyl, Pondocillin, Doktacilin)	13		1	1	1	1		1			18
Ciprofloksasin (Ciproxin)	9	1	1			2		1	1		15
Combination of 2 drugs	942	139	150	104	111	96	90	74	64	61	1 831
Annet - MRS (Annet - MRS)							1	1		1	3
Other (n<10)	28	1	1	2	3	1	1	1	1	2	41
Missing	199	41	38	49	51	56	47	57	65	73	676
Total	6 325	604	631	666	649	586	648	638	719	724	12 190

Patient specific instruments

Table 40:

Year	Yes	No	Missing	Total
2024	1	9 413	343	9 757
2023	3	9 188	222	9 413
2022	2	7 857	653	8 512
2021	4	7 517	764	8 285
2020	6	6 691	595	7 292
2019	5	7 220	680	7 905
2018	6	6 858	735	7 599
2017	1	6 313	898	7 212
2016	5	6 204	909	7 118
2015	14	5 434	1 228	6 676
2014	21	4 802	1 316	6 139
2013	25	4 032	1 466	5 523
2012	87	3 686	1 635	5 408
2011	64	1 438	3 478	4 980

Registration started in 2011

Drain

Table 41:

Year	Yes	No	Missing	Total
2024	64	9 386	307	9 757
2023	130	9 045	238	9 413
2022	210	8 081	221	8 512
2021	296	7 681	308	8 285
2020	531	6 360	401	7 292
2019	698	6 600	607	7 905
2018	1 010	5 830	759	7 599
2017	1 338	4 950	924	7 212
2016	1 632	4 613	873	7 118
2015	1 843	4 170	663	6 676
2014	1 876	3 478	785	6 139
2013	1 708	2 922	893	5 523
2012	1 850	2 505	1 053	5 408
2011	928	951	3 101	4 980

Registration started in 2011

Table 42: Torniquet

Year	Yes	No	Mean Time (min) *	Missing	Total
2024	5 027	3 881	62	120	9 028
2023	4 633	4 004	64	56	8 693
2022	4 568	3 043	65	50	7 661
2021	3 905	2 384	68	38	6 327
2020	3 873	2 446	70	34	6 353
2019	4 075	2 145	69	93	6 313
2018	1 900	710	70	99	2 709
Total	27 981	18 613	66	490	47 084

Registration started in 2018. There are 490 forms with missing registration

* Mean duration of tourniquet time

Table 43a: Weight and height for primary

Year	Mean weight (kg)	Mean height (cm)	Weight missing (total)	Height missing (total)	Total
2024	87,0	172,0	2 387	2 396	9 033
2023	87,2	173,0	1 157	1 161	7 311
2022	86,9	171,9	243	245	3 641
2021	86,0	170,9	63	64	1 317
2020	90,4	166,0	0	0	5

Reported by surgeon. Electronic reporting started during 2020. Total 3850 forms missing weight registration and 3866 forms missing height registration

* Mean for the patients where weight or height is given

Table 43b: Classification of BMI

Year	1	2	3	4	5	6	Total
2024	15 (0,2%)	932 (14,0%)	2 801 (42,2%)	1 920 (28,9%)	764 (11,5%)	203 (3,1%)	6 635
2023	15 (0,2%)	876 (14,3%)	2 472 (40,2%)	1 833 (29,8%)	754 (12,3%)	197 (3,2%)	6 147
2022	8 (0,2%)	476 (14,0%)	1 366 (40,2%)	1 057 (31,1%)	386 (11,4%)	103 (3,0%)	3 396
2021	4 (0,3%)	191 (15,2%)	514 (41,0%)	361 (28,8%)	138 (11,0%)	45 (3,6%)	1 253
2020	0	0	1 (20,0%)	2 (40,0%)	2 (40,0%)	0 (0,0%)	5

WHO's classification of BMI (body mass index)

1 - Less than 18.5 is underweight

2 - 18.5 - 24 is normal weight

3 - 25 - 29 is overweight

4 - 30 - 34 is obesity degree 1

5 - 35 - 39 is obesity degree 2

6 - 40 and over is obesity degree 3

Table 44: Ahlbäck's grading of osteoarthritis grade 1-5 for all primary prostheses

Year	GRADE1	GRADE2	GRADE3	GRADE4	GRADE5	Missing	Total
2024	839 (9,3%)	2 366 (26,2%)	2 905 (32,2%)	1 505 (16,7%)	127 (1,4%)	1 291 (9,3%)	9 033
2023	741 (10,1%)	1 597 (21,8%)	2 530 (34,6%)	1 552 (21,2%)	158 (2,2%)	733 (10,1%)	7 311
2022	419 (11,5%)	878 (24,1%)	1 356 (37,2%)	745 (20,5%)	79 (2,2%)	164 (11,5%)	3 641
2021	215 (16,3%)	330 (25,1%)	440 (33,4%)	203 (15,4%)	28 (2,1%)	101 (16,3%)	1 317
2020	2 (40,0%)	1 (20,0%)	1 (20,0%)	1 (20,0%)	0	0 (40,0%)	5
Total	2 216	5 172	7 232	4 006	392	2 289	21 307

Electronic registration started during 2020

Table 45: Joint gap in mm for all primary prostheses

Year	0	1	2	3	4	5	6	>= 7	Missing	Total
2024	5 535 (61,2%)	1 264 (14,0%)	591 (6,5%)	175 (1,9%)	56 (0,6%)	18 (0,2%)	2 (0,0%)	5 (0,1%)	1 387 (15,3%)	9 038
2023	4 560 (62,3%)	1 040 (14,2%)	525 (7,2%)	172 (2,4%)	54 (0,7%)	21 (0,3%)	6 (0,1%)	5 (0,1%)	928 (12,7%)	7 316
2022	2 364 (64,9%)	520 (14,3%)	300 (8,2%)	84 (2,3%)	30 (0,8%)	9 (0,2%)	1 (0,0%)	1 (0,0%)	332 (9,1%)	3 642
2021	738 (56,0%)	197 (14,9%)	143 (10,8%)	53 (4,0%)	20 (1,5%)	10 (0,8%)	2 (0,2%)	2 (0,2%)	152 (11,5%)	1 319
2020	1 (20,0%)	2 (40,0%)	2 (40,0%)						0	5
Total	13 198	3 023	1 561	484	160	58	11	13	2 799	21 320

Electronic registration started during 2020

Table 46: Robot-assisted surgery for all primary prostheses

Year	Robot assisted		Robot type				Missing	Total
	No	Yes	NAVIO	CORI	ROSA	VELYS		
2024	7 905 (87,5%)	425 (4,7%)		121	88	215	703	9 033
2023	6 805 (93,1%)	139 (1,9%)	14	125			367	7 311
2022	3 262 (89,6%)	109 (3,0%)	101	8			270	3 641
2021	1 151 (87,4%)	54 (4,1%)	54				112	1 317
2020	5 (100,0%)	0					0	5
Total	19 128	727	169	254	88	215	1 452	21 307

Electronic registration started during 2020

Table 47: Surgical approach for all primary prostheses

Year	Parapatellar medially	Parapatellar laterally	Subvastus	Other	Missing	Total
2024	8 176	47	42	6	762	9 033
2023	6 947	42	12	18	292	7 311
2022	3 580	27	1	13	20	3 641
2021	1 253	5	3	1	55	1 317
2020	5	0	0	0	0	5
Total	19 961	121	58	38	1 129	21 307

Electronic registration started during 2020

Table 48: Anesthesia for all primary prostheses

Year	General	Epidural	Spinal	Other	Missing	Total
2024	1 189	58	6 361	18	1 407	9 033
2023	943	53	5 407	8	900	7 311
2022	470	43	2 545	2	581	3 641
2021	129	14	1 064	0	110	1 317
2020	1	0	4	0	0	5
Total	2 732	168	15 381	28	2 998	21 307

Electronic registration started during 2020

Table 49: Local infiltration anesthesia for all primary prostheses

Year	Yes	No	Missing	Total
2024	7 059	1 228	746	9 033
2023	5 925	1 032	354	7 311
2022	3 055	557	29	3 641
2021	1 043	234	40	1 317
2020	4	1	0	5
Total	17 086	3 052	1 169	21 307

Electronic registration started during 2020

Table 50: Peripheral nerve block primary

Year	Yes	No	Missing	Total
2024	3 020	5 254	759	8 274
2023	2 380	4 583	348	6 963
2022	1 235	2 144	262	3 379
2021	409	802	106	1 211
2020	3	2	0	5
Total	7 047	12 785	1 475	21 307

Electronic registration started during 2020

Closure of primary knee prostheses

Table 51: Skin closed for all primary prostheses

Yeas	Extension	Flexion	Both extended and flexed	Other	Missing	Total
2024	222	6 822	1 219	2	768	9 033
2023	272	5 536	1 134	2	367	7 311
2022	172	3 236	140	48	45	3 641
2021	100	1 125	2	31	59	1 317
2020	1	4	0	0	0	5
Total	767	16 723	2 495	83	1 239	21 307

Electronic registration started during 2020

Table 52: Suture technique

Year	Continuous skin suture	Single skin suture	Intracutaneous skin suture	Clips	Glue	Strips	Subcutaneous	Other	Missing	Total
2024	1 800	44	1 215	5 620	970	2	0	6	35	8 276
2023	1 632	60	714	4 879	995	13	57	1	33	6 943
2022	1 142	57	165	2 285	78	0	0	2	18	3 601
2021	243	13	20	1 057	6	0	0	4	5	1 310
2020	2	0	0	3	0	0	0	0	0	5
Total	4 819	174	2 114	13 844	2 049	15	57	13	91	20 135

Electronic registration started during 2020

Bone loss Classification of operations according to Anderson classification *

Table 53: Femur Classification

Year	Type 1	Type 2A	Type 2B	Type 3	Total
2024	32 (38,1%)	18 (21,43%)	25 (29,8%)	9 (10,7%)	84
2023	20 (44,4%)	7 (15,56%)	10 (22,2%)	8 (17,8%)	45
2022	7 (50,0%)	3 (21,43%)	1 (7,1%)	3 (21,4%)	14
2021	4 (50,0%)	1 (12,50%)	3 (37,5%)	0	8
Total	63 (41,7%)	29 (19,21%)	39 (25,8%)	20 (13,2%)	151

Electronic registration started during 2020. Currently registered classified 151

Table 54: Tibia Classification

Year	Type 1	Type 2A	Type 2B	Type 3	Total
2024	35 (41,7%)	21 (25,00%)	19 (22,6%)	9 (10,7%)	84
2023	23 (54,8%)	6 (14,29%)	3 (7,1%)	10 (23,8%)	42
2022	5 (38,5%)	6 (46,15%)	2 (15,4%)	0	13
2021	3 (37,5%)	3 (37,50%)	1 (12,5%)	1 (12,5%)	8
Total	66 (44,9%)	36 (24,49%)	25 (17,0%)	20 (13,6%)	147

Electronic registration started during 2020. Currently registered classified 147

Fracture of bone (near the prosthesis) of reoperated knee prostheses *

Table 55: Femur Classification (Rorabeck and Lewis)

Year	Yes	Femur - I	Femur - II	Femur - III	Total
2024	44	3 (7,9%)	29 (76,32%)	6 (15,8%)	38
2023	32	3 (10,0%)	19 (63,33%)	8 (26,7%)	30
2022	9	0	5 (71,43%)	2 (28,6%)	7
2021	1	0	0	0	0
Total	86	6 (8,0%)	53 (70,67%)	16 (21,3%)	75

Electronic registration started during 2020. Currently registered 86 (75 classified).

Table 56: Tibia Classification

Year	Ja	Tibia- I			Tibia- II			Tibia- III			Tibia-IV			Total
		a	b	c	a	b	c	a	b	c	a	b	c	
2024	14	4	4	1	1	1	0	3	0	0	0	0	0	14
2023	8	3	2	0	0	2	0	0	1	0	0	0	0	8
Total	22	7	6	1	1	3	0	3	1	0	0	0	0	22

Electronic registration started during 2020. Currently registered 22 (22 classified).

Table 57: Patella Classification (Mayo)

Year	Yes	Patella - I	Patella - II	Patella - III		Total
				a	b	
2024	2	1	0	1	0	2
2023	2	0	1	1	0	2
2021	1	0	0	0	0	0
Total	5	1	1	2	0	4

Electronic registration started during 2020. Currently registered 5 (4 classified).

* More than one reason for reoperation is possible. Only the first reoperation is counted.

Duration of surgery

Table 58: Duration of surgery for the primary total prostheses TKA (min)

Year	< 40	40 - 60	61 - 70	71 - 90	91 - 100	101 - 120	> 120	Missing	Total
2024	48	1 231	1 369	2 724	817	823	306	16	7 334
2023	59	1 151	1 286	2 648	867	821	336	44	7 212
2022	33	1 029	1 147	2 471	744	727	302	139	6 592
2021	45	1 058	1 070	2 284	776	751	390	119	6 493
2020	26	839	891	2 038	685	809	343	142	5 773
2019	43	871	1 047	2 008	730	868	437	171	6 175
2018	14	764	845	1 917	761	931	419	191	5 842
2017	8	684	919	1 905	636	855	414	185	5 606
2016	1	635	876	1 918	661	875	416	168	5 550
2015	2	527	854	1 800	654	919	415	123	5 294
2014	0	431	668	1 726	641	963	427	117	4 973
2013	3	432	556	1 530	626	833	433	104	4 517
2012	10	465	540	1 473	564	817	399	121	4 389
2011	1	357	531	1 385	535	754	407	92	4 062
2010	4	298	460	1 239	533	811	498	102	3 945
2009	3	334	485	1 266	516	797	491	94	3 986
1994-08	30	2 151	2 454	8 735	3 994	7 063	4 370	704	29 501

Figure 31: Duration of surgery for the primary total prostheses TKA (min)

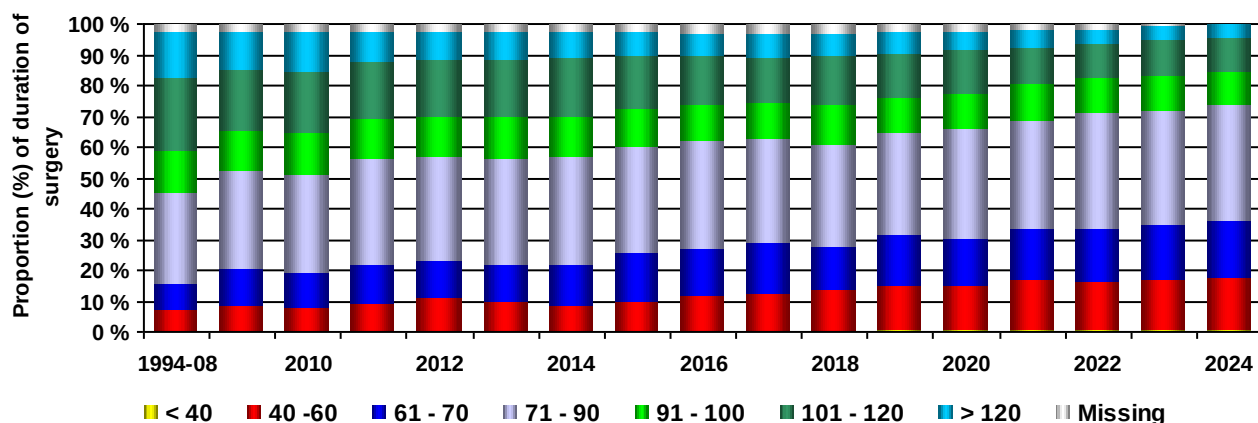
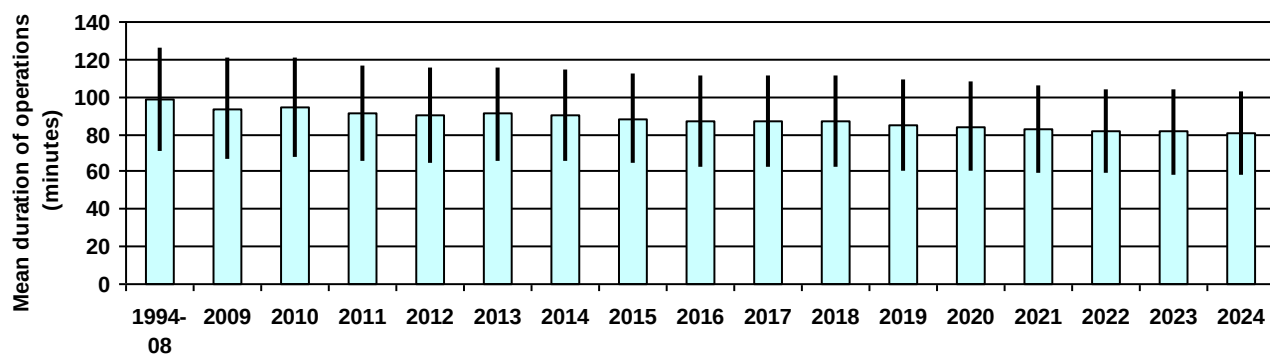


Figure 32: Duration of surgery for the primary total prostheses TKA (min)



The vertical bars indicate the mean duration $\pm$ a standard deviation.

Duration of surgery

Table 59: Duration of surgery for the primary unicondylar prostheses UKA (min)

Year	< 40	40 - 60	61 - 70	71 - 90	91 - 100	101 - 120	> 120	Missing	Total
2024	47	706	342	356	49	43	1	2	1 546
2023	27	648	277	309	45	31	6	5	1 348
2022	18	503	240	252	45	47	8	26	1 139
2021	8	408	230	234	64	39	6	17	1 006
2020	9	301	200	232	41	39	5	15	842
2019	93	317	211	268	41	31	9	25	995
2018	63	393	183	249	45	32	12	24	1 001
2017	34	348	149	219	60	33	9	16	868
2016	12	288	190	253	45	47	4	24	863
2015	8	188	176	253	52	62	4	10	753
2014	2	112	145	231	49	48	7	11	605
2013	0	51	115	209	42	42	6	12	477
2012	0	39	98	225	49	45	6	13	475
2011	0	35	65	205	63	46	10	15	439
2010	1	23	81	174	58	54	8	15	414
2009	0	42	70	194	63	64	19	11	463
1994-08	5	531	589	1 540	474	625	202	92	4 058

Figure 33: Duration of surgery for the primary unicondylar prostheses UKA (min)

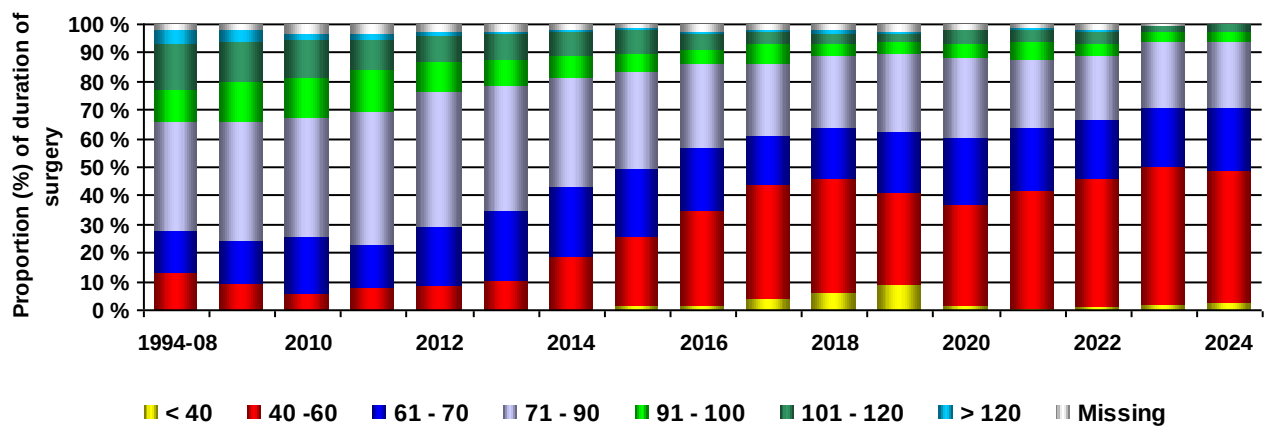
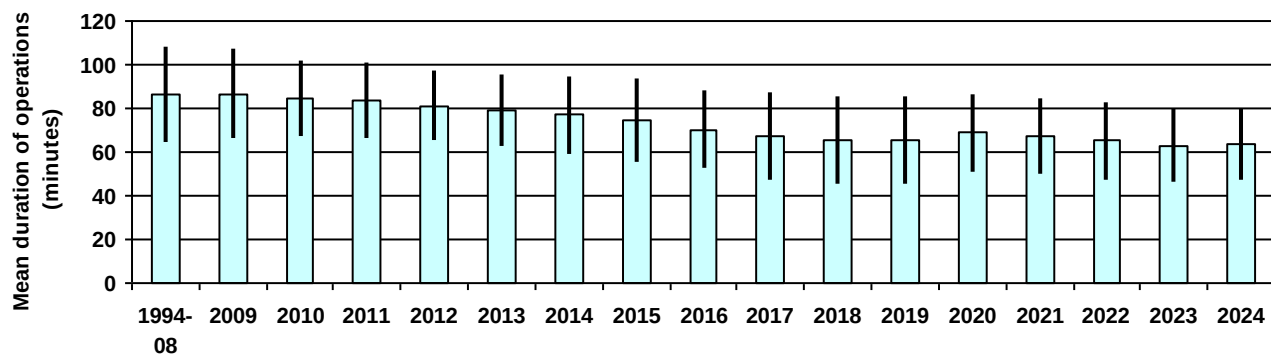


Figure 34: Duration of surgery for the primary unicondylar prostheses UKA (min)



The vertical bars indicate the mean duration $\pm$ a standard deviation.

PROM in the Knee Arthroplasty Register (combined for unicondylar, patellofemoral, and total knee prostheses)

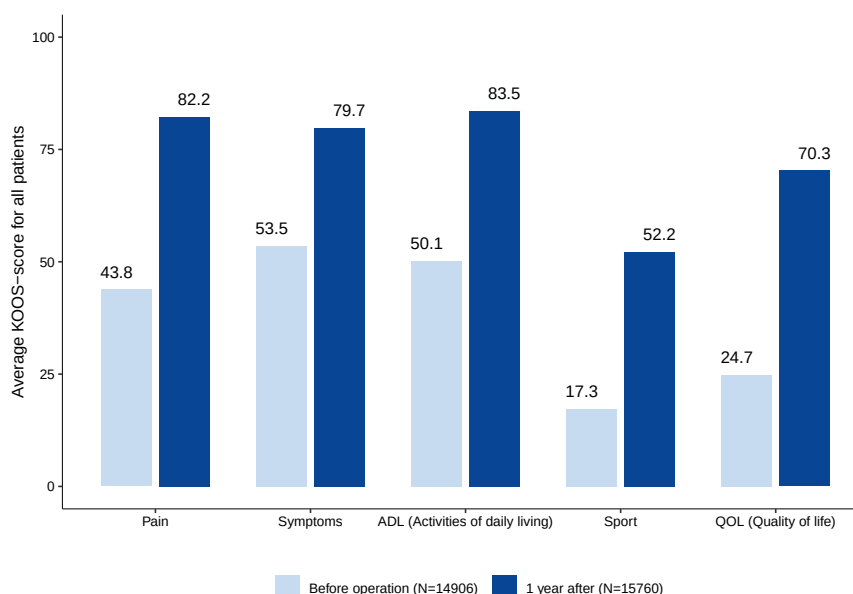
The Knee Arthroplasty Register has had electronic collection of patient-reported data (Patient Reported Outcome Measures (PROM)) since 2019. The register aims to place more focus on patients' self-perceived quality of life and joint function before and after operation. Patients fill out an electronic questionnaire before operation and 1, 6, and 10 years after operation. The data we collect from the patients will be compiled with the data reported by the surgeon for the same patient group. This will give us the opportunity to focus on function and quality of life in addition to any potential revision of the prosthesis.

A total of 14,906 forms have been filled out before primary knee prosthesis operation, and 15,760 one year after operation (these figures include all primary uni and total knee prostheses from 2019 onwards). In 2024, 51 hospitals submitted preoperative PROM forms, but many hospitals have low reporting rates for preoperative PROM. The goal is to increase this proportion to >80%. A total of 1,452 paper forms were submitted from 33 hospitals; the rest were registered digitally. All hospitals will receive their own results in the hospital report. Please feel free to contact our consultant Mikal Solberg at mikal.solberg@helse-bergen.no if you have any questions regarding electronic registration of PROM.

Patient demographics	Before operation	1 year after
Number of forms (n)	14906	15760
Men (%)	44.4	46.1
Median age (min-max)	68 (25-98)	67 (20-94)
Body Mass Index mean (SD)	30.1 (30.9)	29.1 (4.9)
Drinking alcohol n (%)	11841 (79.4)	13009 (82.5)
Smoking n (%)	935 (6.3)	1014 (6.4)
Diabetes n (%)	864 (9)	1426 (9.8)
Education upper secondary school or higher n (%)	7596 (51)	8382 (53.2)
Working n (%)	3936 (26.4)	4759 (30.2)
Living alone n (%)	3320 (22.3)	3641 (23.1)
Activity score UCLA activity* mean (SD)	5 (1.9)	5.8 (1.9)
State of health** (VAS) mean (SD)	61.4 (18.8)	73.6 (17.5)
Charnley (Category) Class A	7231 (48.5)	8625 (54.7)
Charnley (Category) Class B	6101 (40.9)	4904 (31.1)
Charnley (Category) Class C	1536 (10.3)	2229 (14.1)

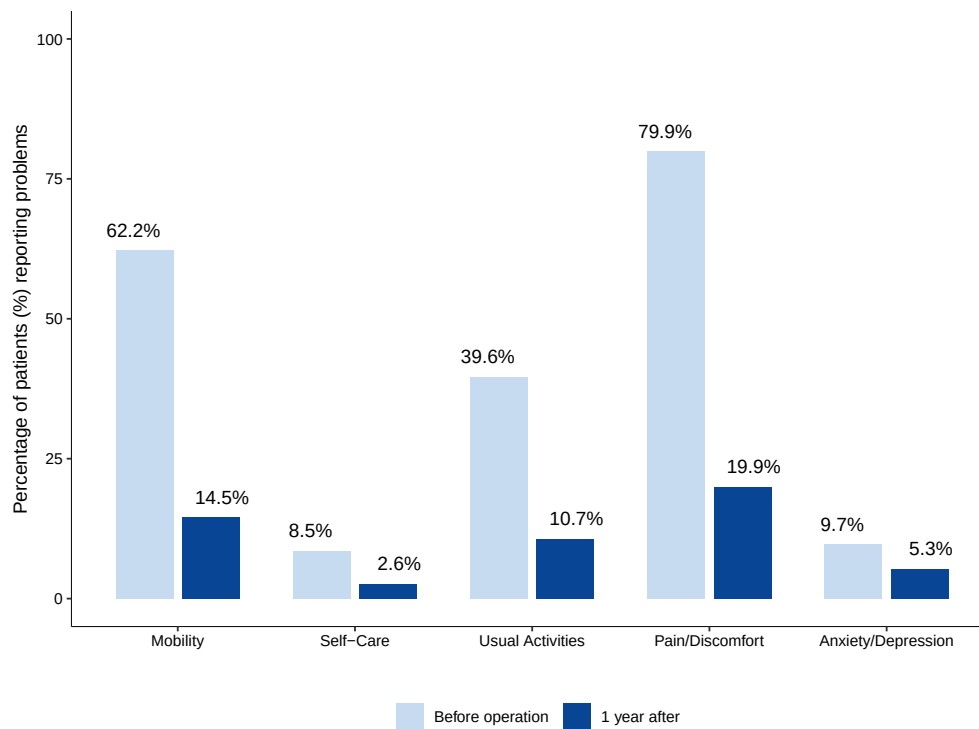
*Best possible score is 10, **100 is the best possible health

Figure B.39: Average KOOS score before/after the primary operation*



*100 is the best possible score

Figure B.40: Proportion reporting moderate, severe, or very severe problems with mobility, self-care, usual activities, or reporting pain or anxiety before/after the primary operation (EQ-5D-5L)



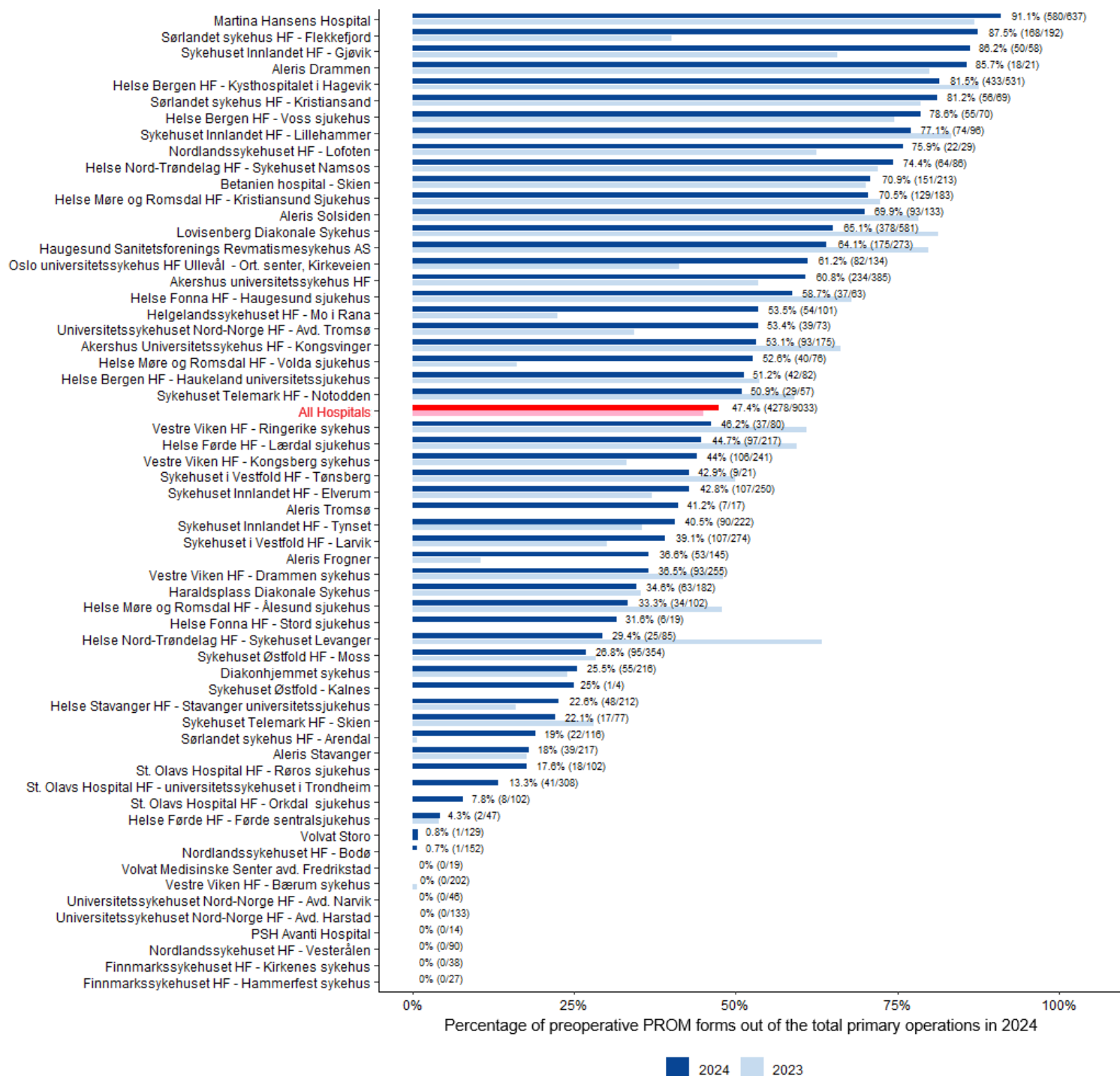
Health Authority	Reporting Hospitals (2024)	Number of Preoperative Forms (2024)
Central Norway	8/8	359
Northern Norway	4/9	116
South-Eastern Norway	23/24	2634
Western Norway	10/10	958
Private	6/8	211

**A total of 4278 preoperative forms were completed out of the 9033 primary operations in 2024.*

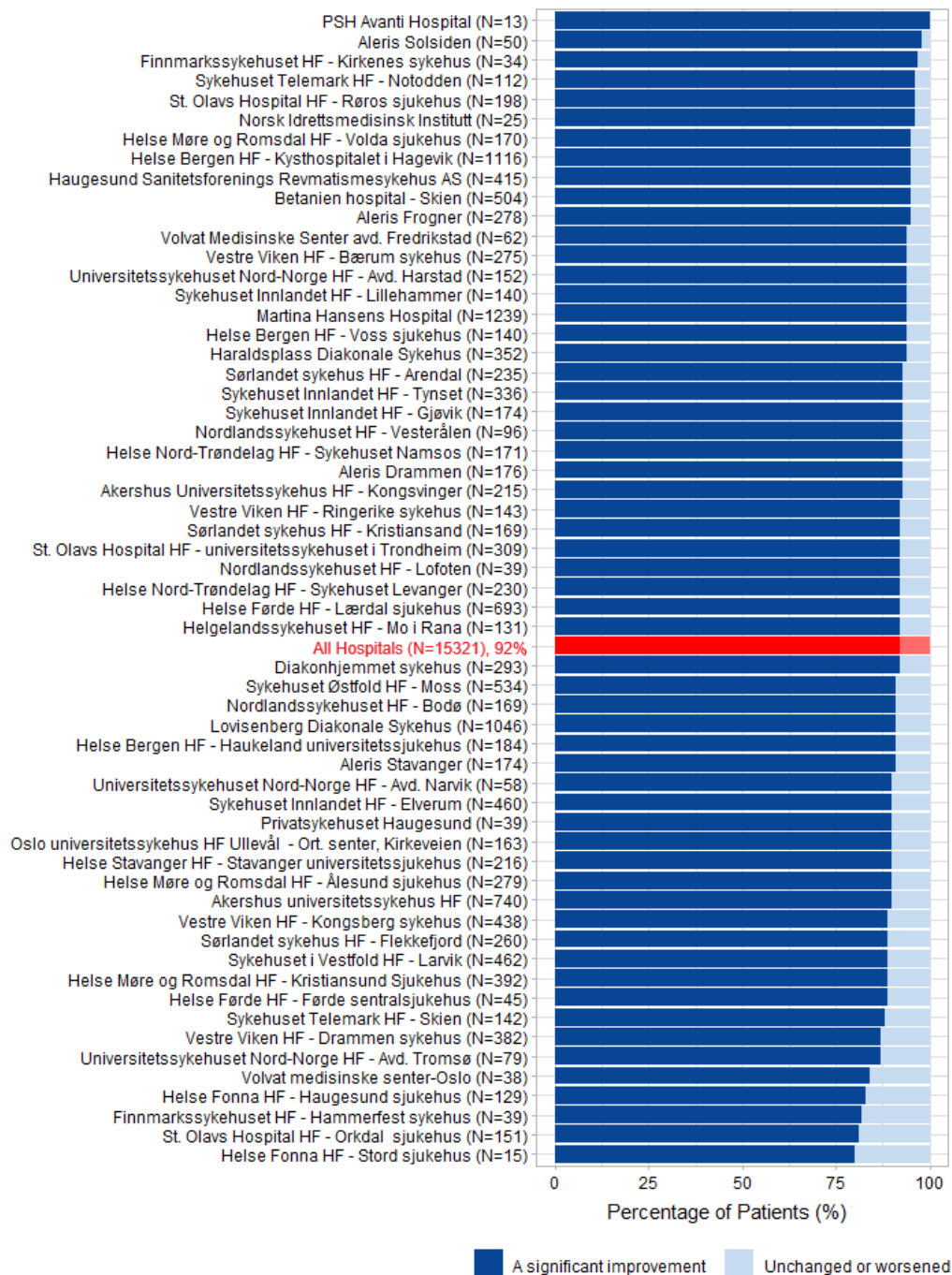
Health Authority	Reporting Hospitals (2023)	Number of Preoperative Forms (2023)
Central Norway	5/8	340
Northern Norway	3/9	62
South-Eastern Norway	23/24	2398
Western Norway	9/10	984
Private	4/7	136

**A total of 3920 preoperative forms were completed out of the 8694 primary operations in 2023.*

Figure B.41: Proportion of primary knee prosthesis operations where a preoperative PROM form is completed

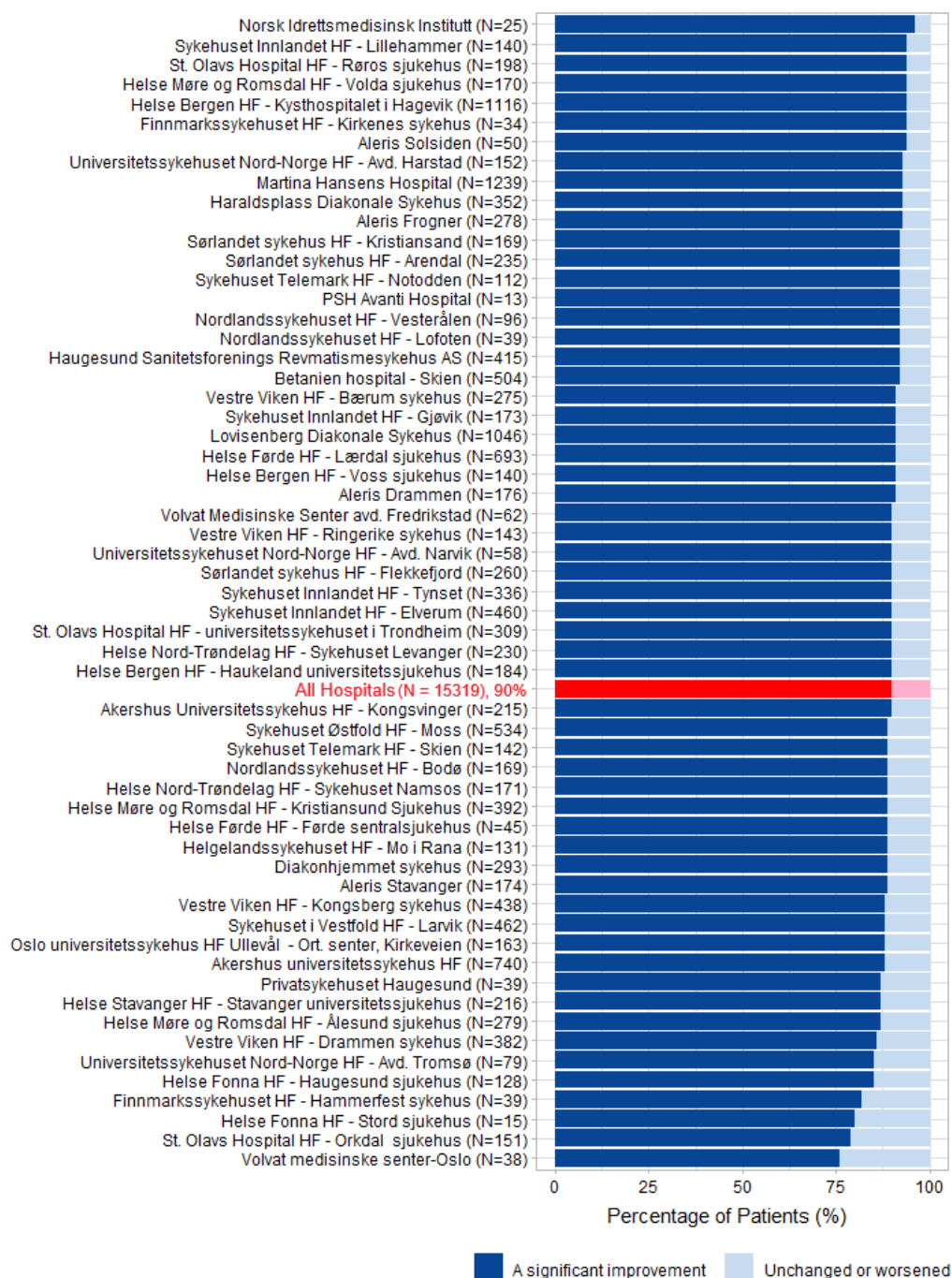


The diagram above shows the hospitals that have submitted preoperative PROM forms either on paper, digitally via the web solution in MRS, or through their own system. Reporting is still low, but some hospitals appear to have taken steps to improve it. The proportion of preoperative PROM was 45% in 2023 and 47.4% in 2024. We would like to remind you that any questions regarding reporting in MRS can be sent to the registry.

Figure B.42: Anchor questions for KOOS-PAIN 1 year after the primary operation, 2019-2024

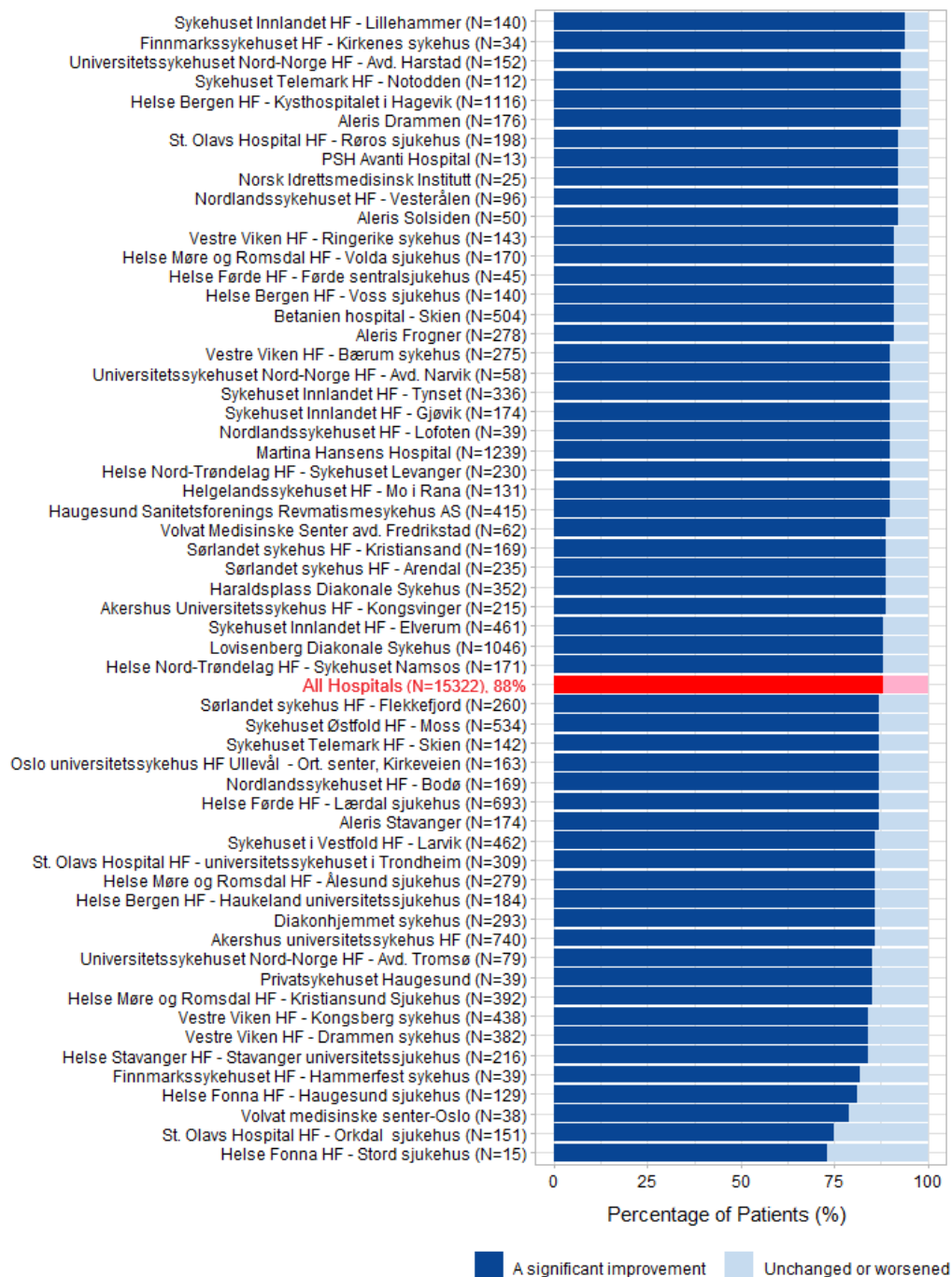
The patients have responded to the question "How do you experience knee pain now compared to before the operation?". The options "Less, a significant improvement" and "Slightly less, enough to be a significant improvement" are included in the dark blue category in the figure as "a significant improvement". The other options "Very slight change, not enough to be a significant improvement", "Unchanged", "Very slight change, not enough to be a significant worsening", "Slightly worse, enough to be a significant worsening", and "Worse, a significant worsening" are included in the light blue category "Unchanged or worsening". Hospitals with fewer than 10 responses are excluded from the figure.

Figure B.43: Anchor questions for KOOS-SYMPTOMS 1 year after the primary operation, 2019-2024

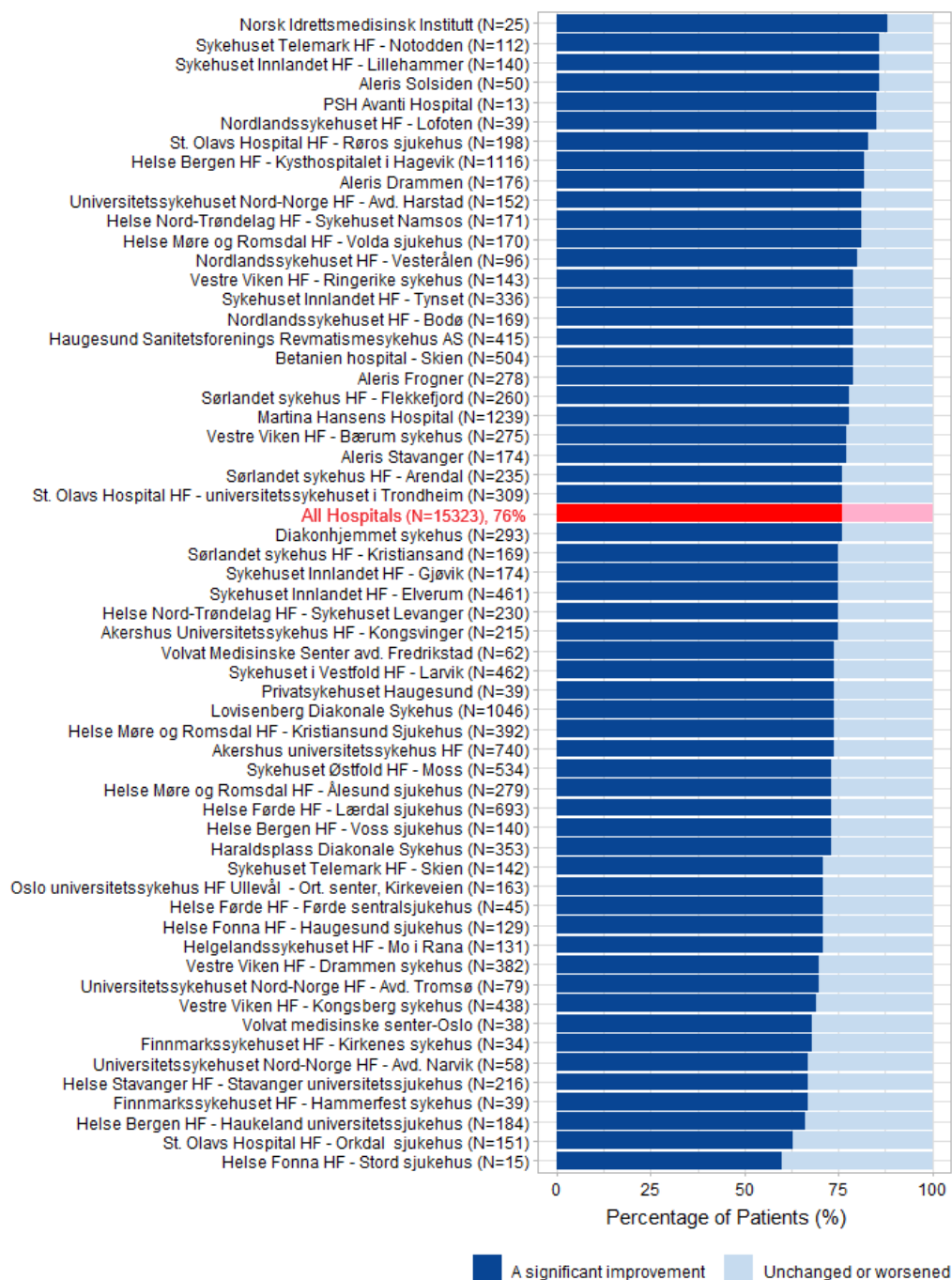


The patients have answered the question "How do you experience other symptoms in the knee now compared to before the operation (stiffness, clicking, and reduced mobility)?" The options "Less, a significant improvement" and "Slightly less, enough to be a significant improvement" are included in the dark blue category in the figure as "a significant improvement". The other options "Very slight change, not enough to be a significant improvement", "Unchanged", "Very slight change, not enough to be a significant worsening", "Slightly worse, enough to be a significant worsening", and "Worse, a significant worsening" are included in the light blue category "Unchanged or worsening". Hospitals with fewer than 10 responses are excluded from the figure.

Figure B.44: Anchor questions for KOOS-ACTIVITIES IN DAILY LIFE 1 year after the primary operation, 2019-2024

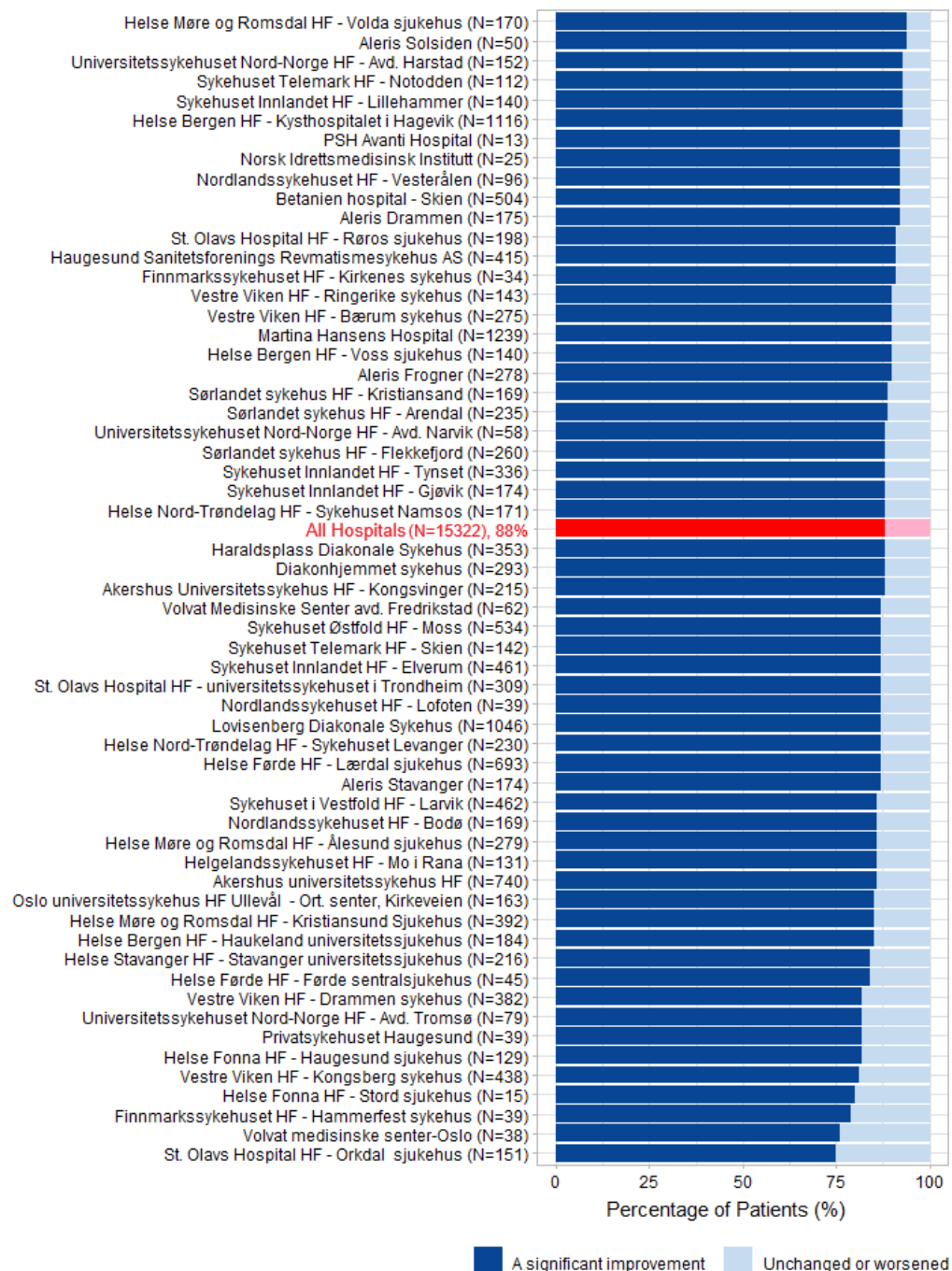


The patients have answered the question "How is your ability to perform daily activities now compared to before the operation (sitting, standing, walking, stair climbing, putting on/taking off socks, household chores, etc.)?". The options "Better, a significant improvement" and "Slightly better, enough to be a significant improvement" are included in the dark blue category in the figure as "a significant improvement". The other options "Very slight change, not enough to be a significant improvement", "Unchanged", "Very slight change, not enough to be a significant worsening", "Slightly worse, enough to be a significant worsening", and "Worse, a significant worsening" are included in the light blue category "Unchanged or worsening". Hospitals with fewer than 10 responses are excluded from the figure.

Figure B.45: Anchor questions for KOOS-SPORT 1 year after primary operation, 2019-2024

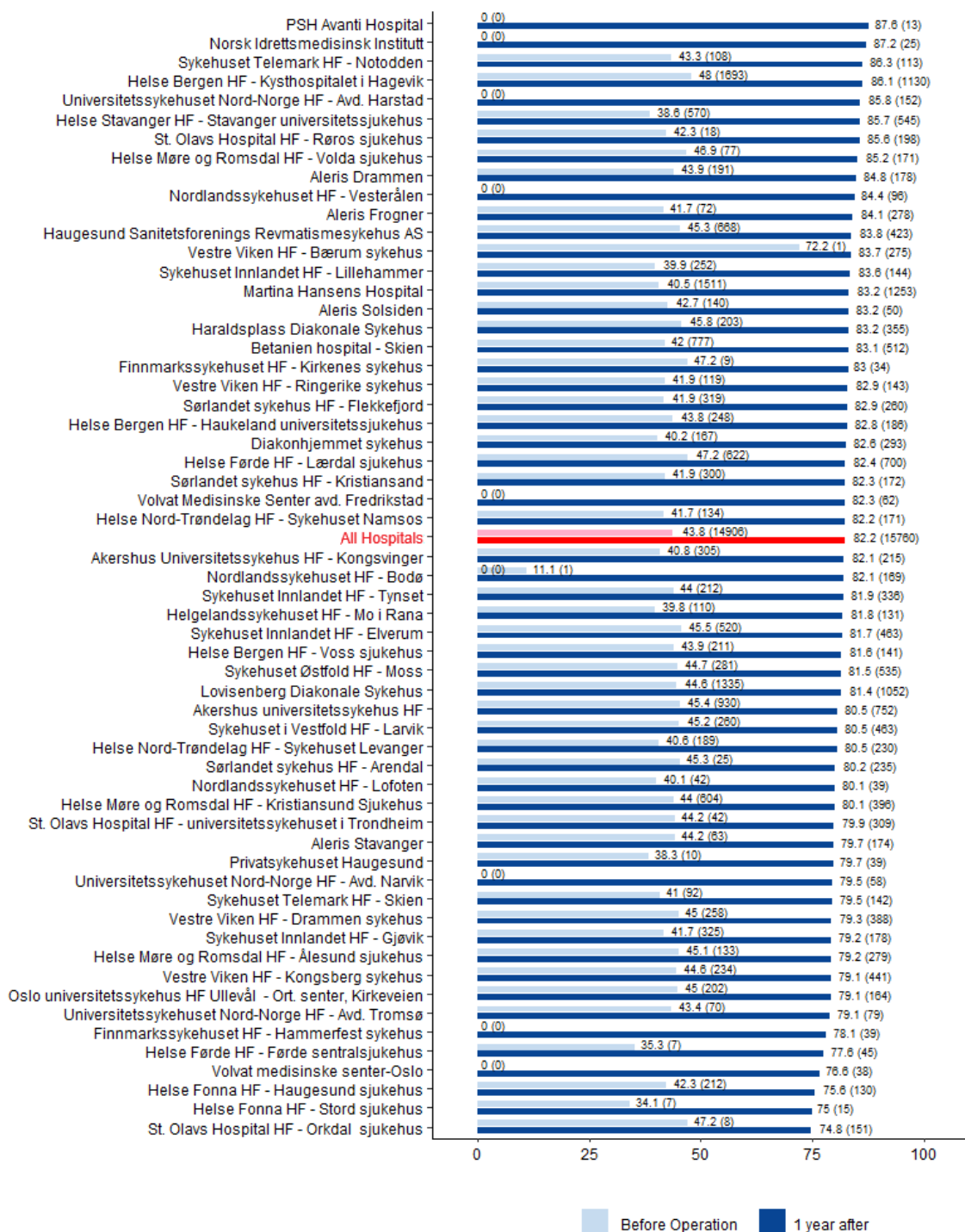
Patients have responded to the question "How is your ability to perform sports and leisure activities now compared to before the operation (running, squatting, twisting and turning on the affected leg)?" The options "Better, a significant improvement" and "Slightly better, enough to be a significant improvement" are included in the dark blue category in the figure as "a significant improvement". The other options "Very slight change, not enough to be a significant improvement", "Unchanged", "Very slight change, not enough to be a significant worsening", "Slightly worse, enough to be a significant worsening", and "Worse, a significant worsening" are included in the light blue category "Unchanged or worsening". Hospitals with fewer than 10 responses are excluded from the figure.

Figure B.46: Anchor questions for KOOS-QUALITY OF LIFE 1 year after the primary operation, 2019-2024



Patients have responded to the question "How is your quality of life related to your knee now compared to before the operation (in terms of how much you trust your knee, lifestyle changes, how often you are reminded of knee problems)?". The options "Better, a significant improvement" and "Slightly better, enough to be a significant improvement" are included in the dark blue category in the figure as "a significant improvement". The other options "Very slight change, not enough to be a significant improvement", "Unchanged", "Very slight change, not enough to be a significant worsening", "Slightly worse, enough to be a significant worsening", and "Worse, a significant worsening" are included in the light blue category "Unchanged or worsening". Hospitals with fewer than 10 responses are excluded from the figure.

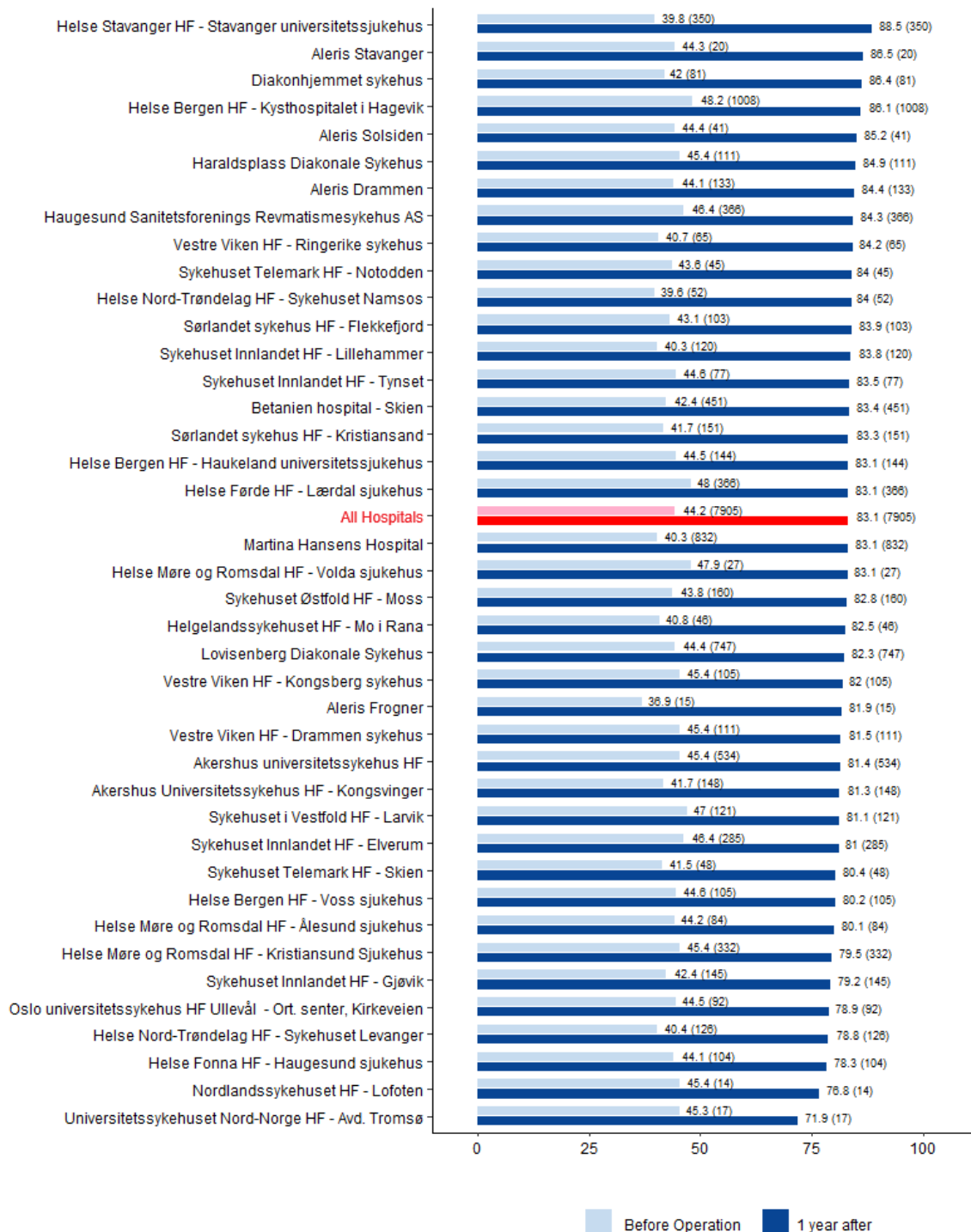
Figure B.47 (a): Average KOOS-PAIN score for all primary operations before and 1 year after operation * (Number of completed forms)



* 100 is the best possible score

Hospitals with fewer than 10 responses are excluded.

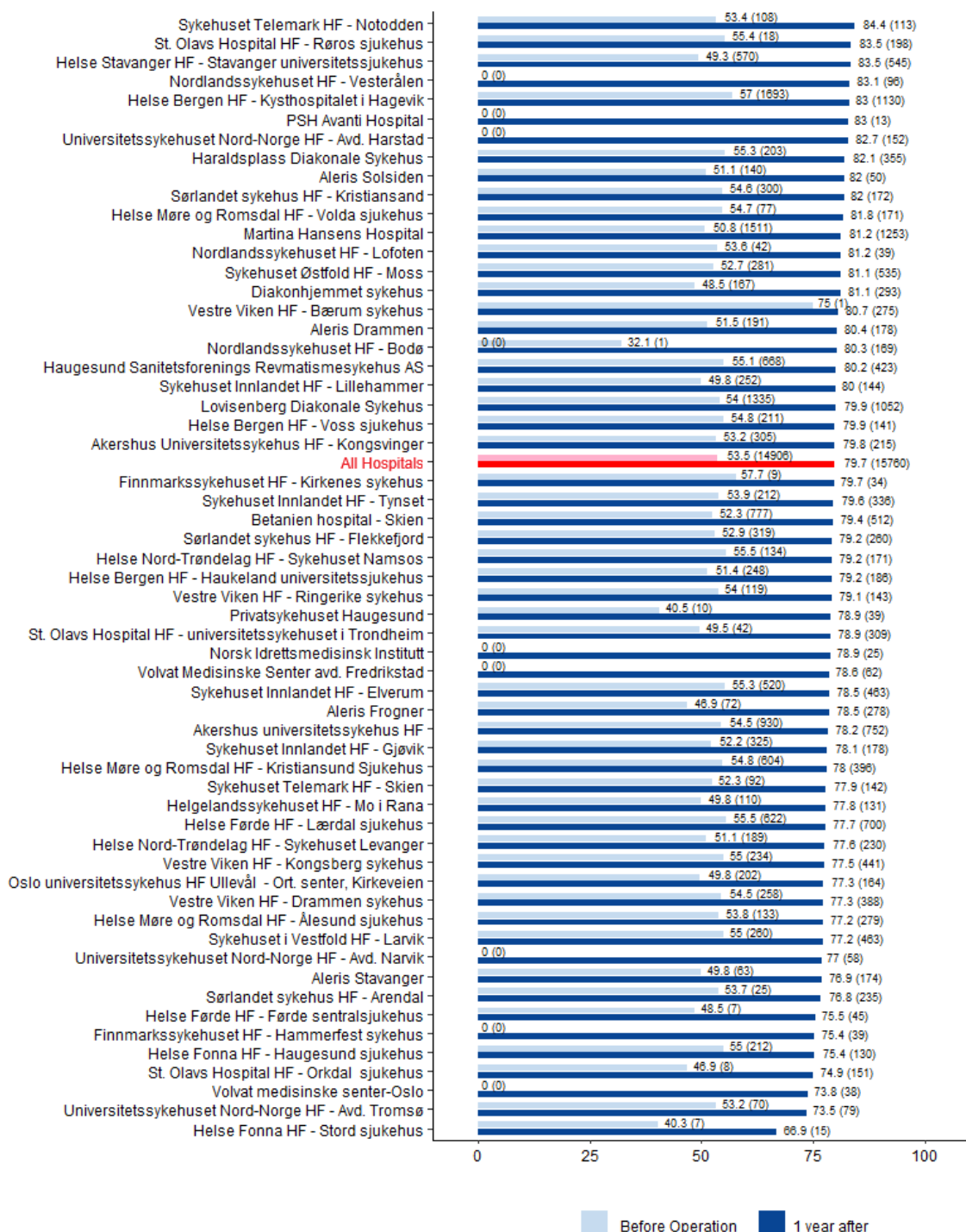
Figure B.47 (b): Average KOOS-PAIN score for all primary operations before and 1 year after operation (PROM forms mapped for the same operation) * (Number of completed forms)



* 100 is the best possible score

Hospitals with fewer than 10 responses are excluded.

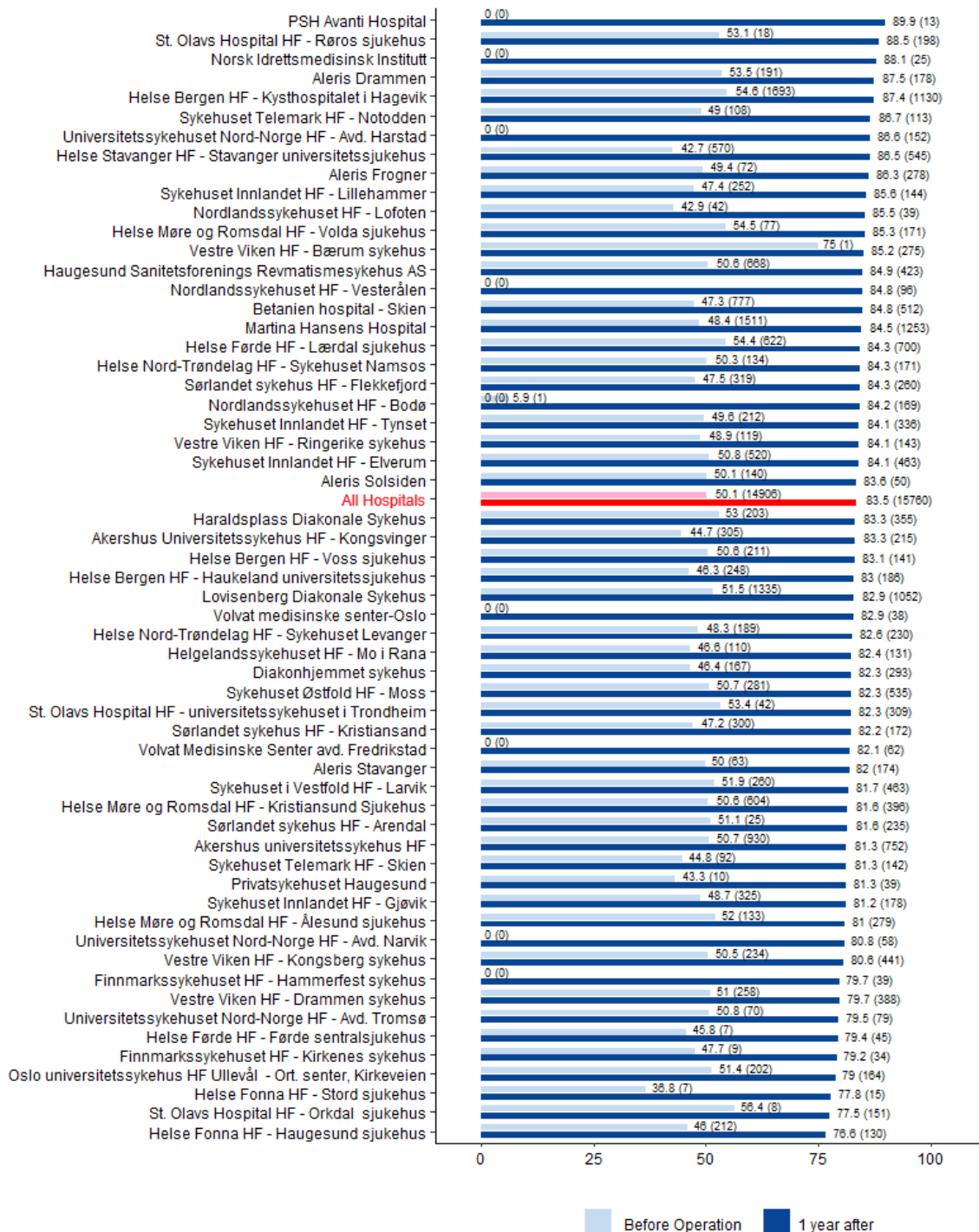
Figure B.48: Average KOOS-SYMPTOMS score for all primary operations before and 1 year after operation * (Number of completed forms)



* 100 is the best possible score

Hospitals with fewer than 10 responses are excluded.

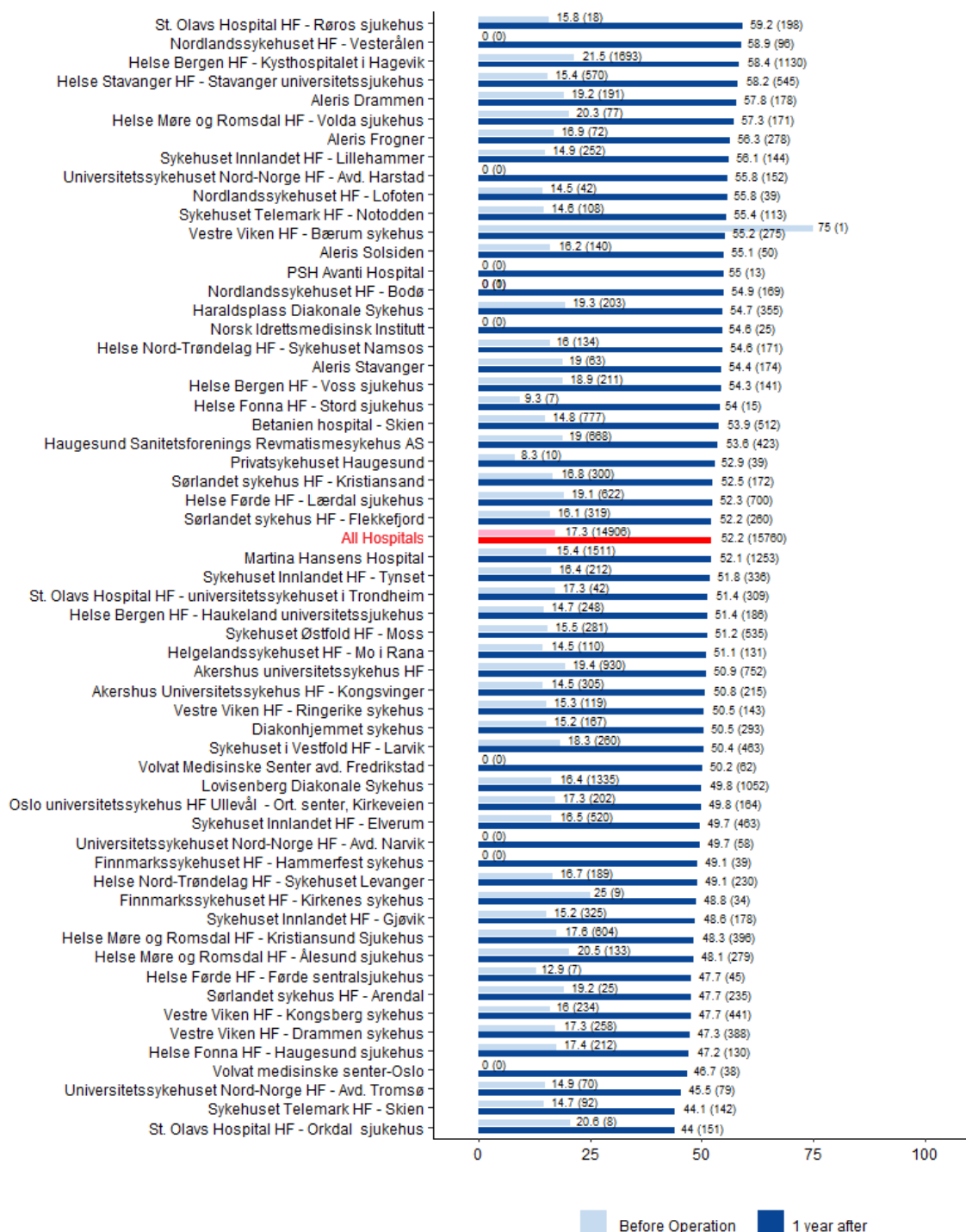
Figure B.49: Average KOOS-ACTIVITIES IN DAILY LIFE score for all primary operations before and 1 year after operation * (Number of completed forms)



* 100 is the best possible score

Hospitals with fewer than 10 responses are excluded.

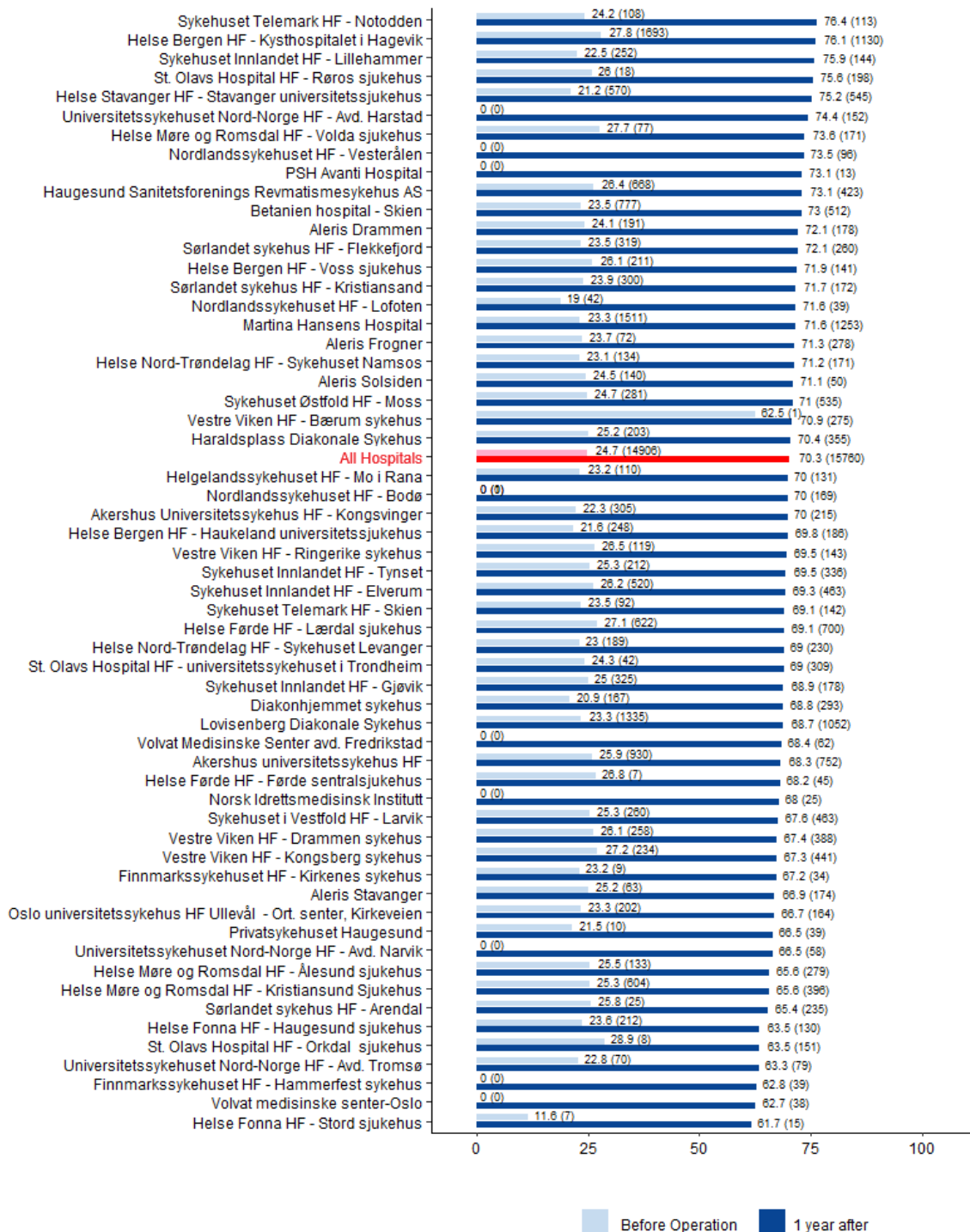
Figure B.50: Average KOOS-SPORT score for all primary operations before and 1 year after operation * (Number of completed forms)



* 100 is the best possible score

Hospitals with fewer than 10 responses are excluded.

Figure B.51: Average KOOS-QUALITY OF LIFE score for all primary operations before and 1 year after operation * (Number of completed forms)



* 100 is the best possible score

Hospitals with fewer than 10 responses are excluded.

Completeness of reporting analysis for the Knee Arthroplasty Register, 2021-2023

A completeness of reporting analysis for the Knee Arthroplasty Register has been conducted by combining the data in the Register with data from the Norwegian Patient Register (NPR). The report and analysis were prepared by the NPR in collaboration with the Knee Arthroplasty Register (NAR). There are separate statistics on primary operations and revisions.

NCSP codes for combining data from NPR hospital stays and the Knee Arthroplasty Register

Type	Code	Description
Primary operation	NGB 0y	Primary partial prosthetic replacement of knee joint not using cement
	NGB 1y	Primary partial prosthetic replacement of knee joint using cement
	NGB 20	Primary total prosthetic replacement of knee joint not using cement
	NGB 30	Primary total prosthetic replacement of knee joint using hybrid technique
	NGB 40	Primary total prosthetic replacement of knee joint using cement
	NGB 7y	Primary implantation of reconstruction prosthesis
With or without	NGB 99	Other Primary prosthetic replacement in knee joint
Revision (level 1)	NGC 0y	Secondary implantation of partial prosthesis in knee joint not using cement
	NGC 1y	Secondary implantation of partial prosthesis in knee joint using cement
	NGC 2y	Secondary implantation of total prosthesis in knee joint not using cement
	NGC 3y	Secondary implantation of total prosthesis in knee joint using hybrid technique
	NGC 4y	Secondary implantation of total prosthesis in knee joint using cement
	NGC 7y	Secondary implantation of reconstruction prosthesis
	NGC 99	Other secondary prosthetic replacement in knee joint
	NGU 0y	Removal of partial prosthesis from knee joint
	NGU 1y	Removal of total prosthesis from knee joint

Formulas for completeness of reporting

$$\text{Completeness rate NAR} = \frac{\text{only NAR} + \text{both registers}}{\text{only NPR} + \text{only NAR} + \text{both registers}}$$

$$\text{Completeness rate NPR} = \frac{\text{only NPR} + \text{both registers}}{\text{only NPR} + \text{only NAR} + \text{both registers}}$$

Primary operations. In 2021-2023, 25137 primary knee replacements were reported to one or both of the registers. 95.3% of these were reported to the NAR while 93.3% were reported to the NPR. Completeness of reporting varies much between the different hospitals. For hospitals with a low completeness of reporting rate for the Knee Arthroplasty Register, either the form was not sent to the NAR or other interventions than knee arthroplasties were incorrectly coded with NGB 0*/NGB 1*/NGB 20/NGB 30/NGB 40.

Procedure codes to be used for primary operations:

NGB 0* - NGB 1* - NGB 20 - NGB 30 - NGB 40 - NGB 7*

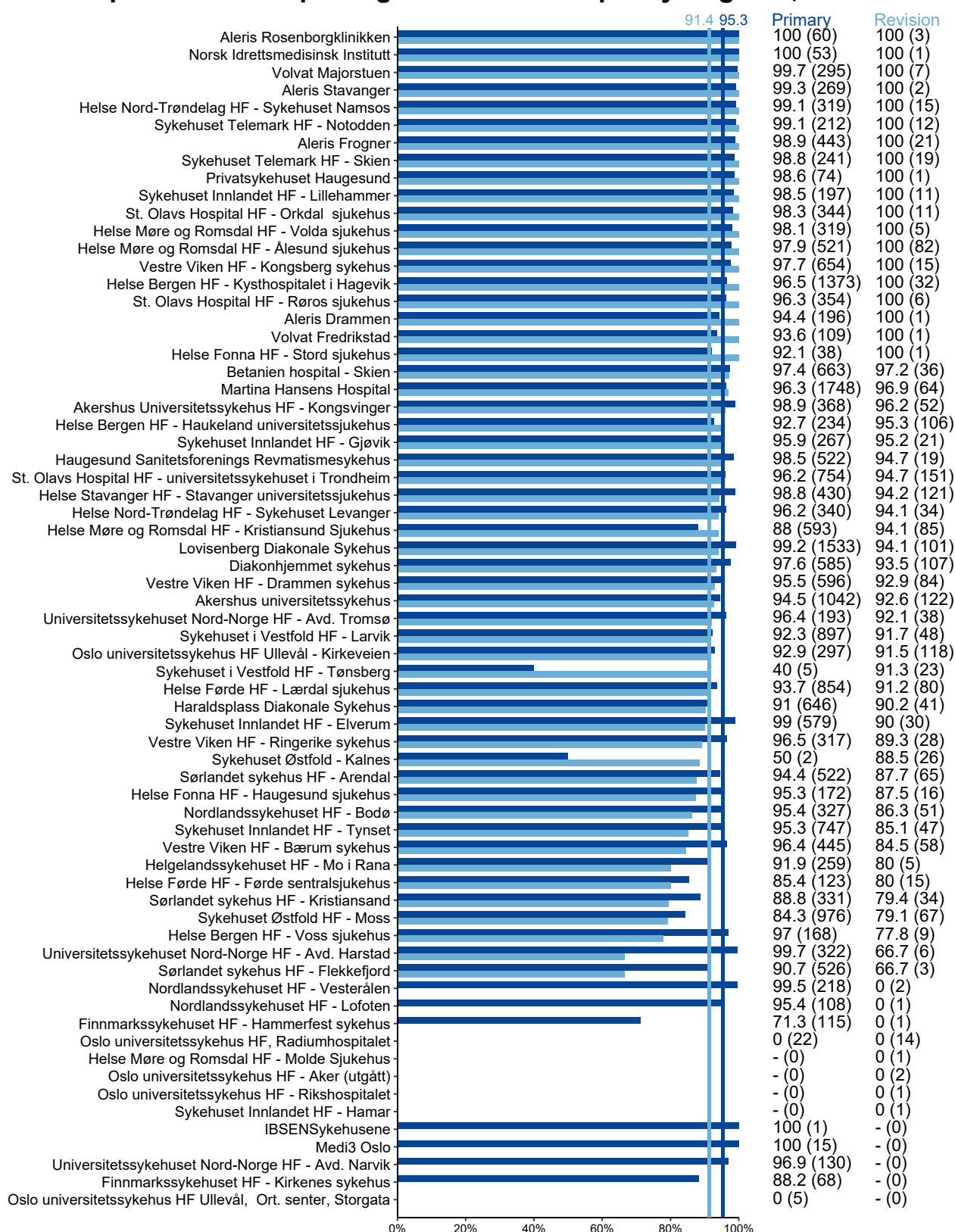
Revision operations. In 2021-2023, 2180 revisions were reported to one or both of the registers. 91.4% of these were reported to the NAR while 80.1% were reported to the NPR (revision level 1). Completeness of reporting varies much between the different hospitals. A low completeness of reporting rate may mean that the revision form was not sent to the NAR. The analysis shows that a number of revision forms are missing in cases where the prosthesis was removed without a new one being inserted in the same operation; in such cases, a form should be submitted both when the prosthesis is removed and when any new insertion is performed.

Procedure codes to be used for revision operations:

NGC 0* - NGC 1* - NGC 2* - NGC 3* - NGC 4* - NGB 7* - NGC 99 - NGU 0* - NGU 1*

New: From 2012, revisions due to infection, even where parts of the prosthesis are not removed or replaced, are to be reported on the form to the NAR. These must be coded NGS 19 or NGS 49 with the additional code NGW 69.

Completeness of reporting for Knee Arthroplasty Register, 2021-2023



Dark blue bars and first number to the right of the bars gives completeness of reporting for primary operations. Light blue bars and second number to the right of the bars gives completeness of reporting for revision operations. The numbers in brackets gives the number of operations registered at both NAR and NPR. Vertical lines shows the national averages.

CONTENTS

Prostheses in other joints

Survival of joint prostheses	192

Elbow prostheses

Annual number of prostheses	195
Diagnosis in primary operations	196
Fixation	197
Implant brands.....	199
Reasons for revisions	200

Ankle prostheses

Annual number of prostheses	203
Diagnosis in primary operations	203
Fixation	204
Implant brands.....	205
Reasons for revisions	206

Finger joint prostheses

Annual number of prostheses	207
Diagnosis for primary operations	208
Fixation	209
Implant brands.....	211
Reasons for revisions	212

Wrist prostheses

Annual number of prostheses	213
Diagnosis in primary operations	213
Fixation	214
Implant brands.....	215
Reasons for revisions	215

Carpometacarpal prostheses (CMC I)

Annual number of prostheses	217
Diagnosis in primary operations	217
Fixation	218
Implant brands.....	218
Reasons for revisions	218

Toe joint prostheses

Annual number of prostheses	219
Diagnosis in primary operations	219
Fixation	220
Implant brands.....	221
Reasons for revisions	221

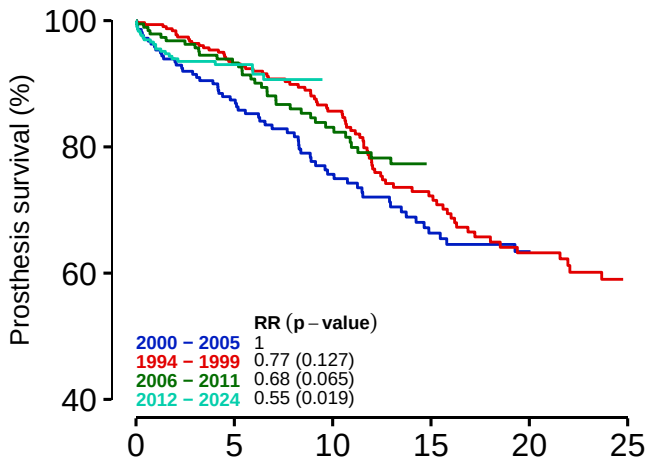
Completeness analysis

Completeness of reporting total prosthesis in elbow 2021-23	222
Completeness of reporting prosthesis in ankle 2021-23.....	224
Completeness of reporting prosthesis in finger 2021-23	226
Completeness of reporting prosthesis in wrist 2021-23	228
Completeness of reporting prosthesis in toe 2021-23	230

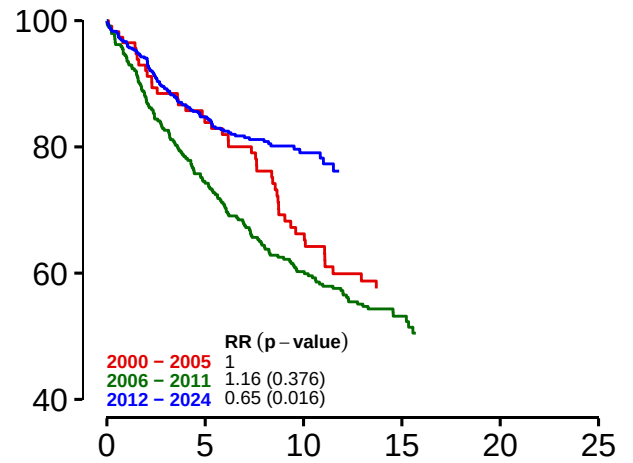
Survival curves for joint prosthesis

1994–2024

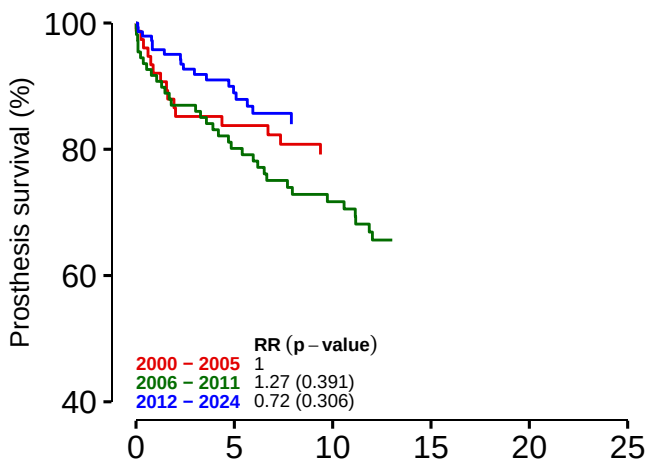
C.1) Total prosthesis in elbow*



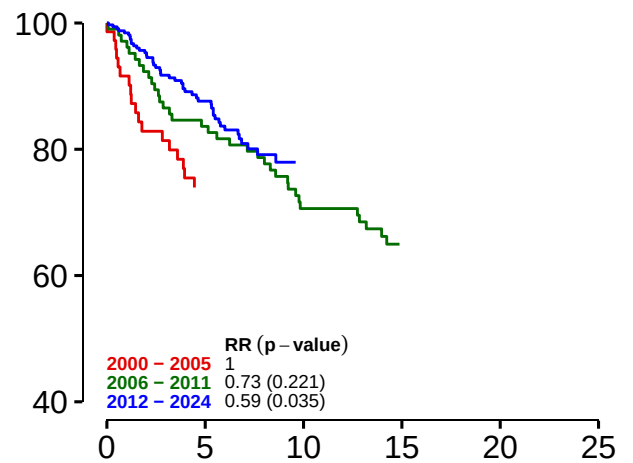
C.2) Ankle prosthesis, without rheumatoid arthritis



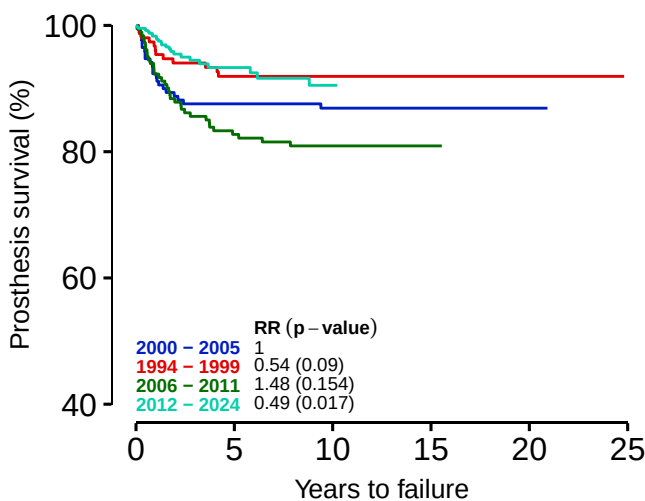
C.3) Ankle prosthesis, only rheumatoid arthritis prostheses



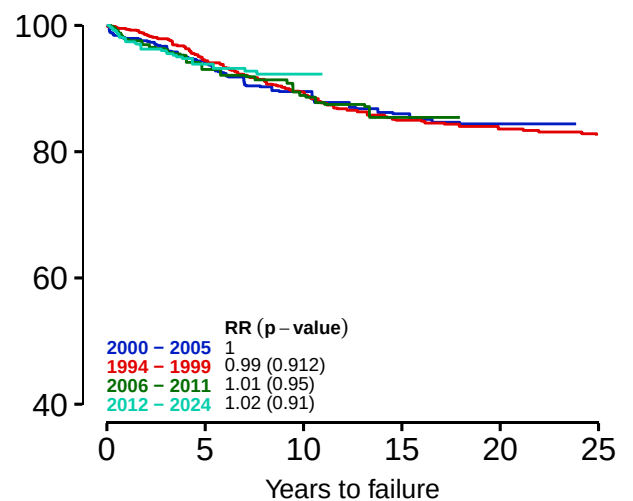
C.4) Wrist prosthesis



C.5) Carpometacarpal prosthesis (CMC I)



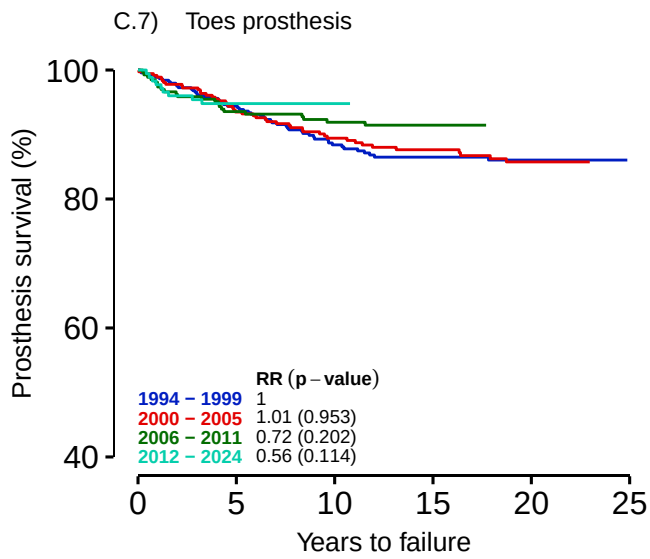
C.6) Finger prosthesis (MCP)



Survival curves for joint prosthesis

1994–2024

Norwegian Arthroplasty Register



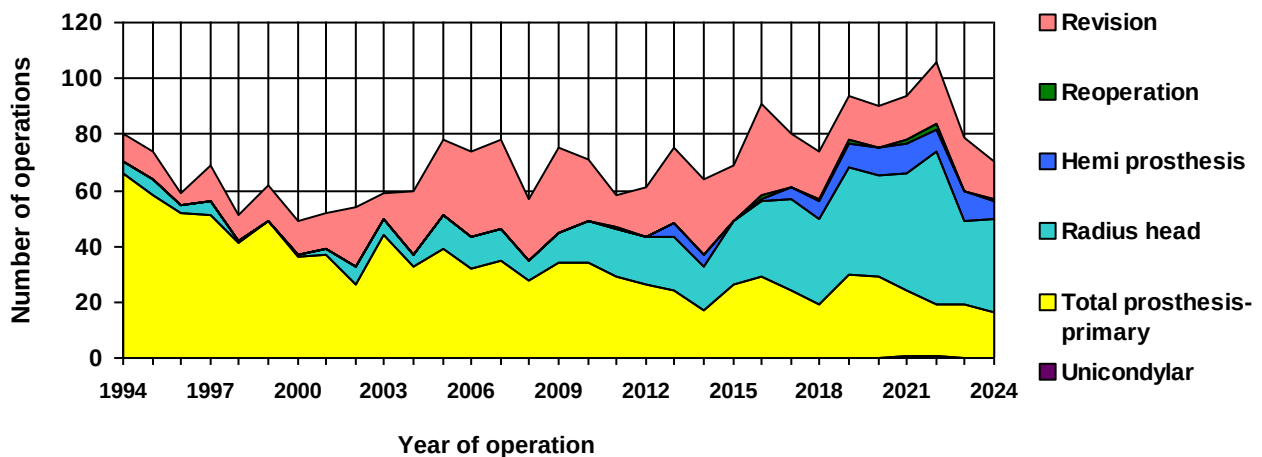
ELBOW PROSTHESES

Table 1: Annual number of prostheses

Year	Primary operations							Revisions	Total
	Hemi prosthesis	Total prosthesis	Caput radii	Unicondylar	Reoperations*				
2024	6 (8,6%)	16 (22,9%)	34 (48,6%)		1 (1,4%)		13 (18,6%)	70	
2023	11 (13,9%)	19 (24,1%)	30 (38,0%)				19 (24,1%)	79	
2022	8 (7,5%)	18 (17,0%)	55 (51,9%)	1 (0,9%)	2 (1,9%)		22 (20,8%)	106	
2021	11 (11,7%)	23 (24,5%)	42 (44,7%)	1 (1,1%)	1 (1,1%)		16 (17,0%)	94	
2020	10 (11,1%)	29 (32,2%)	36 (40,0%)				15 (16,7%)	90	
2019	9 (9,6%)	30 (31,9%)	38 (40,4%)		1 (1,1%)		16 (17,0%)	94	
2018	6 (8,1%)	19 (25,7%)	31 (41,9%)		1 (1,4%)		17 (23,0%)	74	
2017	4 (5,0%)	24 (30,0%)	33 (41,3%)				19 (23,8%)	80	
2016	1 (1,1%)	29 (31,9%)	27 (29,7%)		1 (1,1%)		33 (36,3%)	91	
2015		26 (37,7%)	23 (33,3%)				20 (29,0%)	69	
2014	4 (6,3%)	17 (26,6%)	16 (25,0%)				27 (42,2%)	64	
2013	5 (6,7%)	24 (32,0%)	19 (25,3%)				27 (36,0%)	75	
2012		26 (42,6%)	17 (27,9%)				18 (29,5%)	61	
2011		29 (50,0%)	17 (29,3%)		1 (1,7%)		11 (19,0%)	58	
2010		34 (47,9%)	15 (21,1%)				22 (31,0%)	71	
2009		34 (45,3%)	11 (14,7%)				30 (40,0%)	75	
1994-08		627 (65,6%)	80 (8,4%)				249 (26,0%)	956	
Total	75 (3,4%)	1 024 (46,4%)	524 (23,7%)	2 (0,1%)	8 (0,4%)		574 (26,0%)	2 207	

* Reoperation where prosthetic parts were not changed or removed (soft tissue debridements for infected prosthesis, prosthetic parts were not changed)

Figure 1: Annual numbers of operations



51,2 % of all operations were performed on the right side. 72,7 % performed in women. Mean age: 62,2 years.

Table 2: Elbow disease in primary operations - Total prostheses

Year	Idiopathic osteo- arthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechte- rew	Sequelae ligament tear	Acute fracture	Sequelae after infection	Other	Missing
2024	2	7	5			2		1	
2023	4	7	7		2	4	1	3	
2022	3	6	4		1	5			
2021	2	9	6			6	2		
2020	3	9	9			9	1	3	
2019	1	12	6		1	12		2	
2018	1	9	5			3		2	
2017	1	9	10			6		1	
2016	3	18	4			6			
2015	1	13	4			8		2	
2014		13	4			2			
2013	2	9	6		1	7		3	
2012	1	16	5			4		1	
2011	4	18	6			3		1	
2010	6	19	5			2		4	
2009	1	18	6		1	7	1	6	
1994-08	33	525	44	6	1	19	2	27	7
Total	68	717	136	6	7	105	7	56	7

Diseases are not mutually exclusive. More than one reason for operation is possible.

Table 3: Elbow disease in primary operations - Hemiprostheses

Year	Idiopathic osteo- arthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechte- rew	Sequelae ligament tear	Acute fracture	Sequelae after infection	Other	Missing
2024						6			
2023						11			
2022						8			
2021			1			10			
2020			1			9			
2019						9			
2018	1		1			5			
2017						4			
2016						1			
2011-15		1	2			7			
Total	1	1	5	0	0	70	0	0	0

Diseases are not mutually exclusive. More than one reason for operation is possible.

Table 4: Elbow disease in primary operations - Radius head prostheses (Caput radii)

Year	Idiopathic osteo- arthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechte- rew	Sequelae ligament tear	Acute fracture	Sequelae after infection	Other	Missing
2024			3			31		1	
2023	1		3			25		1	
2022	2		5			48			
2021			3			39			
2020	1		3			32		1	
2019			6		2	32			
2018			1			29		1	
2017		1	4			29			
2016			3			23		1	
2015			5			20		1	
2014	1		3			12			
2013	1					19			
2012	1		3			13			
2011	2		2			13			
2010			2			13			
2009						11			
1994-08	4	13	19			42		6	1
Total	13	14	65	0	2	431	0	12	1

Diseases are not mutually exclusive. More than one reason for operation is possible.

Table 5: Elbow disease in primary operations - Unicondylar prostheses

Year	Idiopathic osteo- arthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechte- rew	Sequelae ligament tear	Acute fracture	Sequelae after infection	Other	Missing
2022			1						
2021	1								
Total	1	0	1	0	0	0	0	0	0

Diseases are not mutually exclusive. More than one reason for operation is possible.

Use of cement in elbow prostheses

Table 6a: Primary operations - Humerus - Total prostheses

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
2024	16 (100,0%)				16
2023	18 (94,7%)		1 (5,3%)		19
2022	16 (88,9%)		1 (5,6%)	1 (5,6%)	18
2021	23 (100,0%)				23
2020	29 (100,0%)				29
2019	30 (100,0%)				30
2018	19 (100,0%)				19
2017	24 (100,0%)				24
2016	29 (100,0%)				29
2015	25 (96,2%)		1 (3,8%)		26
2014	16 (94,1%)			1 (5,9%)	17
2013	22 (91,7%)		2 (8,3%)		24
2012	23 (88,5%)		3 (11,5%)		26
2011	26 (89,7%)		1 (3,4%)	2 (6,9%)	29
2010	30 (88,2%)		4 (11,8%)		34
2009	29 (85,3%)		4 (11,8%)	1 (2,9%)	34
1994-08	363 (57,9%)	95 (15,2%)	164 (26,2%)	5 (0,8%)	627
Total	738 (72,1%)	95 (9,3%)	181 (17,7%)	10 (1,0%)	1 024

Table 6b: Primary operations - Humerus - Hemiprotheses

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
2024	6 (100,0%)				6
2023	11 (100,0%)				11
2022	8 (100,0%)				8
2021	10 (90,9%)		1 (9,1%)		11
2020	9 (90,0%)		1 (10,0%)		10
2019	8 (88,9%)		1 (11,1%)		9
2018	6 (100,0%)				6
2017	4 (100,0%)				4
2016	1 (100,0%)				1
2014	3 (75,0%)			1 (25,0%)	4
2013	5 (100,0%)				5
Total	71 (94,7%)		3 (4,0%)	1 (1,3%)	75

Use of cement in elbow prostheses

Table 6c: Primary operations - Humerus - Unicondylar prostheses

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
2022			1 (100,0%)		1
2021			1 (100,0%)		1
Total			2 (100,0%)		2

Table 7a: Primary operations - Ulna/radius - Total prostheses

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
2024	16 (100,0%)				16
2023	18 (94,7%)		1 (5,3%)		19
2022	17 (94,4%)		1 (5,6%)		18
2021	23 (100,0%)				23
2020	28 (96,6%)		1 (3,4%)		29
2019	30 (100,0%)				30
2018	19 (100,0%)				19
2017	24 (100,0%)				24
2016	29 (100,0%)				29
2015	26 (100,0%)				26
2014	16 (94,1%)		1 (5,9%)		17
2013	23 (95,8%)		1 (4,2%)		24
2012	22 (84,6%)		4 (15,4%)		26
2011	28 (96,6%)			1 (3,4%)	29
2010	34 (100,0%)				34
2009	31 (91,2%)		1 (2,9%)	2 (5,9%)	34
1994-08	504 (80,4%)	96 (15,3%)	23 (3,7%)	4 (0,6%)	627
Total	888 (86,7%)	96 (9,4%)	33 (3,2%)	7 (0,7%)	1 024

Table 7b: Primary operations - Radius - Radius head prosthese

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
2024			34 (100,0%)		34
2023	1 (3,3%)		29 (96,7%)		30
2022	5 (9,1%)		50 (90,9%)		55
2021	6 (14,3%)		36 (85,7%)		42
2020	5 (13,9%)		31 (86,1%)		36
2019	9 (23,7%)		29 (76,3%)		38
2018	3 (9,7%)		28 (90,3%)		31
2017	5 (15,2%)		28 (84,8%)		33
2016	7 (25,9%)		20 (74,1%)		27
2015	5 (21,7%)		18 (78,3%)		23
2014	6 (37,5%)	1 (6,3%)	7 (43,8%)	2 (12,5%)	16
2013			19 (100,0%)		19
2012	2 (11,8%)		15 (88,2%)		17
2011	12 (70,6%)		4 (23,5%)	1 (5,9%)	17
2010	10 (66,7%)		1 (6,7%)	4 (26,7%)	15
2009	6 (54,5%)		5 (45,5%)		11
1994-08	29 (36,3%)		49 (61,3%)	2 (2,5%)	80
Total	111 (21,2%)	1 (0,2%)	403 (76,9%)	9 (1,7%)	524

Prostheses used in elbow prostheses - Total prostheses

Table 8: Primary operations - Humerus

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Discovery	179	16	5	1	1		2	9	15	13	241
Norway	180										180
Kudo	162										162
IBP	136										136
Nexel	4	13	19	17	28	22	21	7	1	1	133
GSB III	77										77
NES	54										54
Latitude EV	2					6		1	3	2	14
Mutars	8			1	1	1		1			12
IBP Reconstruction	5										5
Coonrad/Morrey	5										5
Other(n < 5)	5										5
Total	817	29	24	19	30	29	23	18	19	16	1 024

Table 9: Primary operations - Ulna/radius

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Discovery	179	16	5	1	1		2	9	15	13	241
Norway	179										179
Kudo	162										162
IBP	136										136
Nexel	4	13	19	17	28	22	21	7	1	1	133
GSB III	77										77
NES	55										55
Latitude EV	2					6		1	3	2	14
Mutars	8			1	1	1		1			12
IBP Reconstruction	5										5
Coonrad/Morrey	5										5
Other (n < 5)	5										5
Total	817	29	24	19	30	29	23	18	19	16	1 024

Prostheses used in elbow prostheses - Hemiprotheses

Table 10: Primary operations - Humerus

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Latitude EV	1				4	10	11	8	11	6	51
Latitude Anatomic hemi	8	1	4	6	5						24
Total	9	1	4	6	9	10	11	8	11	6	75

Prostheses used in elbow prostheses - Radius head prostheses

Table 11: Primary operations - Radius

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Acumed anatomic radial head	50	13	12	17	20	17	24	34	9	14	210
Explor	19	10	17	14	16	15	5				96
EVOLVE (Proline)	5		3		2	1	12	21	21	20	85
rHead	62	1	1								64
Radial Head	29										29
Silastic H.P. 100	20										20
Link radius	10										10
Other (n < 5)	3	3				3	1				10
Total	198	27	33	31	38	36	42	55	30	34	524

Prostheses used in elbow prostheses - Unicondylar prostheses

Table 12: Primary operations- Unicondylar prostheses

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Lateral Resurfacing Elbow							1	1			2
Total							1	1			2

Reasons for revisions in elbow prostheses

Table 13a: Reasons for revisions in elbow primary total prostheses

Year of revision	Loose proximal comp.	Loose distal comp.	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Progression of osteoarthritis	Other	Missing
2024											1	
2023	1	2	1	1					1		2	
2022	2	1			1				3		2	
2021					1	1	1					
2020				1				1	3		4	
2019	1	1		1		1	1	1	3		2	
2018	2	1		2			2		3		1	
2017	2	3		1		1	4		4		2	
2016	2	3				3		1	2		3	
2015	3	3	1	1		2		1	6		1	
2014	4	3		1		1	1		3		2	
2013	2	1		2		2	1		7		2	
2012		1		1		2			3		6	
2011	2	3	1	1			2	1	2		2	
2010	1	5	2	2			5	1	2		2	
2009	6	5		1	1		2	3	4		4	
1994-08	23	23	14	11	7	7	9	21	7		9	
Total	51	55	19	26	8	21	28	31	53	0	45	0

More than one reason for revision is possible. Only the first reoperation is counted.

Reasons for revisions in elbow prostheses

Table 13b: Reasons for revisions in elbow primary hemiprotheses

Year of revision	Loose proximal comp.	Loose distal comp.	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Progression of osteoarthritis	Other	Missing
2024	1					1						
2023	1											
2022				1							1	
2021	1											
2020						1						
2019	1			1								
2014					1							
Total	4	0	0	2	1	2	0	0	0	0	1	0

More than one reason for revision is possible. Only the first reoperation is counted.

Table 13c: Reasons for revisions in elbow primary radius head prostheses (Caput radii)

Year of revision	Loose proximal comp.	Loose distal comp.	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Progression of osteoarthritis	Other	Missing
2024		2									1	
2023		5			1							
2022											1	
2021		1					1	2		1	3	
2020							1	1		2		
2019		1						1			1	
2018								2			1	
2017							1					
2016		1	1		1					1		
2014		1						1			1	
2011								1			1	
1994-08		2										
Total	0	13	1	0	2	0	3	8	0	4	9	0

More than one reason for revision is possible. Only the first reoperation is counted.

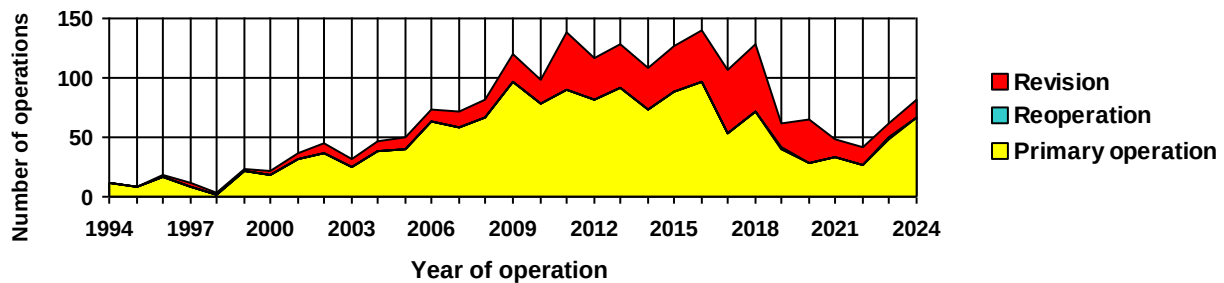
ANKLE PROSTHESES

Table 1: Annual number of operations

Year	Primary operations	Reoperations *	Revisions	Total
2024	67 (81,7%)		15 (18,3%)	82
2023	49 (79,0%)		13 (21,0%)	62
2022	27 (65,9%)		14 (34,1%)	41
2021	33 (68,8%)		15 (31,3%)	48
2020	29 (44,6%)		36 (55,4%)	65
2019	40 (64,5%)	1 (1,6%)	21 (33,9%)	62
2018	71 (55,0%)	1 (0,8%)	57 (44,2%)	129
2017	54 (50,5%)		53 (49,5%)	107
2016	97 (69,3%)		43 (30,7%)	140
2015	89 (70,1%)		38 (29,9%)	127
2014	74 (68,5%)		34 (31,5%)	108
2013	92 (71,9%)		36 (28,1%)	128
2012	82 (70,7%)		34 (29,3%)	116
2011	90 (65,2%)		48 (34,8%)	138
2010	79 (79,8%)		20 (20,2%)	99
2009	96 (80,0%)		24 (20,0%)	120
1994-08	446 (83,2%)		90 (16,8%)	536
Total	1 515 (71,9%)	2 (0,1%)	591 (28,0%)	2 108

* Reoperation where prosthetic parts were not changed or removed (soft tissue debridements for infected prosthesis, prosthetic parts were not changed)

Figure 1: Annual numbers of operations



56,8 % of all operations were performed on the right side. 52,8 % performed in women. Mean age: 60,8 years.

Table 2: Ankle disease in primary operations

Year	Idiopathic osteoarthritis	Rheumatoid arthritis	Sequelae after fracture	Bechterew Mb.	Sequelae ligament tear	Acute fracture	Sequelae of infection	Other	Missing
2024	10	6	23	2	21			5	
2023	7	8	14		20			2	
2022	9	7	5		5			3	
2021	3	9	12		7		1	1	
2020	7	8	2		8		1	4	
2019	4	9	13		10			6	
2018	20	15	17	1	18	1	1	6	
2017	14	12	17	1	8		1	5	
2016	24	14	28	1	31			6	
2015	22	18	25	2	18			11	
2014	21	11	27	1	10			5	
2013	36	20	25	1	16			2	1
2012	21	8	44		9			2	
2011	32	18	35		5		1	3	
2010	22	20	29		9			5	
2009	31	26	28		13		1	1	
1994-08	107	174	125	6	23		2	34	1
Total	390	383	469	15	231	1	8	101	2

Diseases are not mutually exclusive. More than one reason for operation is possible.

Use of cement in ankle prostheses

Table 3: Primary operations - Tibia

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
2024			67 (100,0%)		67
2023			49 (100,0%)		49
2022			27 (100,0%)		27
2021			33 (100,0%)		33
2020			29 (100,0%)		29
2019			39 (100,0%)		39
2018			69 (97,2%)	2 (2,8%)	71
2017			54 (100,0%)		54
2016			97 (100,0%)		97
2015			89 (100,0%)		89
2014			74 (100,0%)		74
2013			91 (100,0%)		91
2012			82 (100,0%)		82
2011			90 (100,0%)		90
2010			79 (100,0%)		79
2009	5 (5,2%)		89 (92,7%)	2 (2,1%)	96
1994-08	24 (5,4%)	10 (2,2%)	408 (91,5%)	4 (0,9%)	446
Total	29 (1,9%)	10 (0,7%)	1 466 (96,9%)	8 (0,5%)	1 513

Table 4: Primary operations - Talus

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
2024			67 (100,0%)		67
2023			49 (100,0%)		49
2022			27 (100,0%)		27
2021			33 (100,0%)		33
2020			29 (100,0%)		29
2019			40 (100,0%)		40
2018			70 (98,6%)	1 (1,4%)	71
2017			54 (100,0%)		54
2016			97 (100,0%)		97
2015			89 (100,0%)		89
2014			74 (100,0%)		74
2013			91 (100,0%)		91
2012			82 (100,0%)		82
2011			90 (100,0%)		90
2010			79 (100,0%)		79
2009	5 (5,2%)		89 (92,7%)	2 (2,1%)	96
1994-08	26 (5,8%)	11 (2,5%)	406 (91,0%)	3 (0,7%)	446
Total	31 (2,0%)	11 (0,7%)	1 466 (96,8%)	6 (0,4%)	1 514

Prostheses used in ankle prostheses

Table 5: Primary operations - Tibia

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
STAR	616										616
Salto Talaris	173	81	28	35							317
INFINITY			2	11	29	28	28	25	47	64	234
Mobility	101										101
TM Total Ankle	6	16	22	20	8	1	5	2	2	3	85
CCI	78										78
Norwegian TPR	32										32
Rebalance	15										15
Salto Mobile	12										12
Hintegra	11										11
Integra Cadence			2	4	2						8
AES	3										3
Total	1 047	97	54	70	39	29	33	27	49	67	1 512

Table 6: Primary operations - Talus

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
STAR	616										616
Salto Talaris	167	80	27	35							309
INFINITY			2	11	29	25	25	23	47	63	225
Mobility	101										101
TM Total Ankle	6	16	22	20	8	1	5	2	2	3	85
CCI	78										78
Norwegian TPR	32										32
Rebalance	15										15
Salto Mobile	12										12
Hintegra	11										11
INBONE II						3	3	2		1	9
Salto XT	6	1	1								8
Integra Cadence			2	4	2						8
AES	3										3
Talus Hemicap					1						1
Total	1 047	97	54	70	40	29	33	27	49	67	1 513

In 2019, 1 form was registered with another type of prosthesis (partial resurfacing)

Prostheses used in ankle prostheses

Table 7: Primary operations - Tibia Insert in total prostheses

Prostheses	Material	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
STAR	Uhmwpe	616										616
Salto Talaris	Uhmwpe	172	81	28	35							316
INFINITY	Uhmwpe			2	11	29	28	28	25	47	63	233
Mobility	Uhmwpe	101										101
TM Total Ankle	HXLPE	6	16	22	20	8	1	5	2	2	3	85
CCI	Uhmwpe	77										77
Rebalance	Uhmwpe	15										15
Salto Mobile	Uhmwpe	12										12
Hintegra	Uhmwpe	11										11
Integra Cadence	HXLPE			2	4	2						8
AES	Uhmwpe	3										3
Salto XT	Uhmwpe	1										1
Total		1 014	97	54	70	39	29	33	27	49	66	1 478

Reasons for revisions in ankle prostheses

Table 8:

Year of revision	Loose proximal comp.	Loose distal comp.	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Osteolysis	Poor mobility	Other	Missing
2024							1	3	6	3	1		
2023	2	2					2	3	6	1			
2022	1	1				2		2	4			3	
2021	2			1	1	2	2	2	4	1			
2020	7	8	1	1	3	1	2	11	4	1		2	
2019		2		1		2	1	6	4	2		3	
2018	9	8		1	7	4	3	19	14	1			
2017	8	8		2	8		1	23	8	7		5	
2016	10	10		2	1	1	2	13	4	2	1		
2015	5	5			6	1		13	9	6			
2014	11	9		1	3	1		9	8				
2013	5	2	1	3	8	2	1	14	16	3			
2012	6	3		2	1	2	1	12	9	1		1	
2011	6	6	1	5	4	1	1	16	8		1	2	
2010	2	1		2	3	1	2	10	3		3		
2009	5	2	1	4	7	3	1	8	3				
1994-08	31	25	1	9	17	5	2	26	8		1	6	
Total	110	92	5	34	69	28	22	190	118	28	7	22	0

More than one reason for revision is possible. Only the first reoperation is counted.

FINGER JOINT PROSTHESES

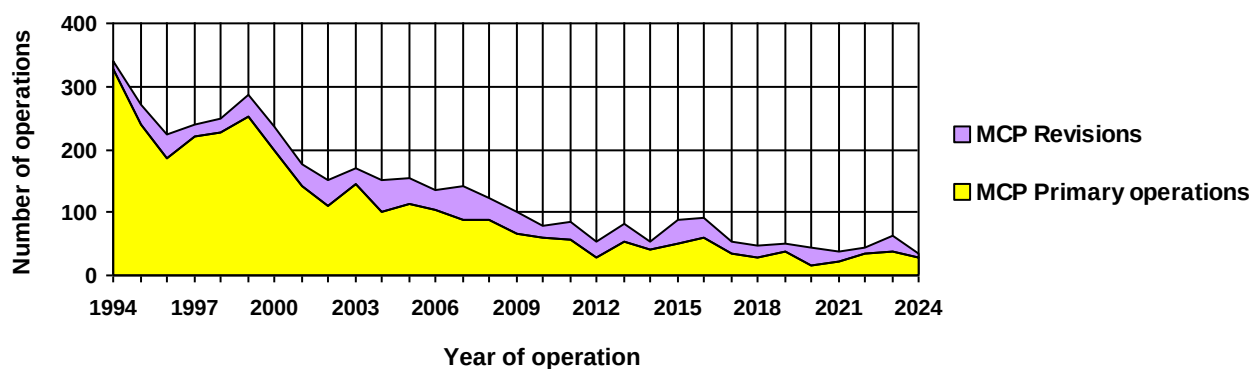
Table 1: Annual number of operations - MCP

Year	Primary operations	Revisions	Total
2024	27 (79,4%)	7 (20,6%)	34
2023	39 (61,9%)	24 (38,1%)	63
2022	36 (81,8%)	8 (18,2%)	44
2021	22 (56,4%)	17 (43,6%)	39
2020	16 (35,6%)	29 (64,4%)	45
2019	37 (75,5%)	12 (24,5%)	49
2018	28 (59,6%)	19 (40,4%)	47
2017	34 (61,8%)	21 (38,2%)	55
2016	61 (67,0%)	30 (33,0%)	91
2015	50 (56,8%)	38 (43,2%)	88
2014	40 (74,1%)	14 (25,9%)	54
2013	55 (67,9%)	26 (32,1%)	81
2012	27 (50,9%)	26 (49,1%)	53
2011	57 (66,3%)	29 (33,7%)	86
2010	60 (76,9%)	18 (23,1%)	78
2009	66 (66,0%)	34 (34,0%)	100
1994-08	2 534 (83,2%)	513 (16,8%)	3 047
Total	3 189 (78,7%)	865 (21,3%)	4 054

Table 2: Annual number of operations - PIP

Year	Primary operations	Revisions	Total
2024	25 (96,2%)	1 (3,8%)	26
2023	25 (92,6%)	2 (7,4%)	27
2022	12 (85,7%)	2 (14,3%)	14
2021	15 (93,8%)	1 (6,3%)	16
2020	16 (100,0%)	0	16
2019	14 (93,3%)	1 (6,7%)	15
2018	10 (83,3%)	2 (16,7%)	12
2017	6 (100,0%)	0	6
2016	3 (75,0%)	1 (25,0%)	4
2015	5 (100,0%)	0	5
2014	4 (100,0%)	0	4
2013	6 (100,0%)	0	6
2011	3 (100,0%)	0	3
2010	6 (100,0%)	0	6
2009	3 (100,0%)	0	3
1994-08	62 (81,6%)	14 (18,4%)	76
Total	215 (90,0%)	24 (10,0%)	239

Figure 1: Annual number of operations



61,6 % of all operations were performed on the right side. 87,3 % performed in women. Mean age: 61,5 years.

Reasons for primary operations

Table 3: MCP prostheses - Finger disease

Year	Idiopathic osteoarthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechterew	Sequelae ligament tear	Acute fracture	Sequelae of infection	Other	Missing
2024	7	19					1	1	
2023	2	32						5	
2022	5	30				1	1	1	
2021	5	16		1					
2020	1	15							
2019	4	28					1	4	
2018	4	22		1			1	1	
2017	5	27						2	
2016	4	57						2	
2015	4	43		1				2	
2014		31					1	8	
2013		53	1					3	
2012		25	1					1	
2011	1	50						6	
2010	3	54	1					2	
2009	2	62						2	
1994-08	60	2 407	13	9	1	1	2	65	3
Total	107	2 971	16	12	1	2	7	105	3

More than one reason for primary operation is possible

Table 4: PIP prostheses - Finger disease

Year	Idiopathic osteoarthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechterew	Sequelae ligament tear	Acute fracture	Sequelae of infection	Other	Missing
2024	22	1	2					1	
2023	20		5						
2022	11		1						
2021	13	2							
2020	14	3	1						
2019	10	2	2					1	
2018	7	1	2						
2017	6								
2016	1						2		
2015	3		2						
2014	3		2						
2013	1	5							
2011		2	1						
2010	1	2	2		1			1	
2009	2						1		
1994-08	27	27	5		1	3		6	1
Total	141	45	25	0	2	3	3	9	1

More than one reason for primary operation is possible

Use of cement in MCP prostheses

Table 5: Primary operations - Proximal

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
2024			15 (100,0%)		15
2023			27 (100,0%)		27
2022			25 (100,0%)		25
2021			12 (100,0%)		12
2020			11 (100,0%)		11
2019			24 (100,0%)		24
2018			16 (100,0%)		16
2017			21 (100,0%)		21
2016	1 (2,2%)		44 (97,8%)		45
2015	1 (3,0%)		31 (93,9%)	1 (3,0%)	33
2014			33 (97,1%)	1 (2,9%)	34
2013			52 (98,1%)	1 (1,9%)	53
2012			27 (100,0%)		27
2011			57 (100,0%)		57
2010			59 (100,0%)		59
2009			66 (100,0%)		66
1994-08	3 (0,1%)	2 (0,1%)	2 514 (99,5%)	8 (0,3%)	2 527
Total	5 (0,2%)	2 (0,1%)	3 034 (99,4%)	11 (0,4%)	3 052

Table 6: Primary operations - Distal

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
2022			2 (100,0%)		2
2019			1 (100,0%)		1
2016			2 (100,0%)		2
2014			1 (100,0%)		1
2011			2 (100,0%)		2
2010			1 (100,0%)		1
2009			1 (100,0%)		1
1994-08			30 (100,0%)		30
Total			40 (100,0%)		40

Use of cement in PIP prostheses

Table 7: Primary operations - Proximal

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
2024			20 (100,0%)		20
2023			24 (100,0%)		24
2022			11 (100,0%)		11
2021			13 (100,0%)		13
2020			10 (100,0%)		10
2019			12 (100,0%)		12
2018			8 (100,0%)		8
2017			5 (100,0%)		5
2016			3 (100,0%)		3
2015			3 (100,0%)		3
2014			4 (100,0%)		4
2013			5 (83,3%)	1 (16,7%)	6
2011			2 (66,7%)	1 (33,3%)	3
2010			6 (100,0%)		6
2009			3 (100,0%)		3
1994-08			60 (98,4%)	1 (1,6%)	61
Total			189 (98,4%)	3 (1,6%)	192

Table 8: Primary operations - Distal

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
2024			15 (100,0%)		15
2023			19 (100,0%)		19
2022			11 (100,0%)		11
2021			13 (100,0%)		13
2020			9 (100,0%)		9
2019			10 (100,0%)		10
2018			8 (100,0%)		8
2017			5 (100,0%)		5
2016			2 (100,0%)		2
2014			1 (100,0%)		1
2011			2 (100,0%)		2
2010			2 (100,0%)		2
1994-08			22 (95,7%)	1 (4,3%)	23
Total			119 (99,2%)	1 (0,8%)	120

Finger prostheses

Table 9: MCP prostheses in primary operations - Proximal

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Silastic HP 100	1 961	1	2		2						1 966
Avanta	555		3								558
Silastic HP 100 II	105	41	16	16	19	11	12	22	24	7	273
NeuFlex	198										198
Ascension MCP	30	2						1		1	34
KeriFlex								1	3	7	11
MCS	6										6
TACTYS					1			1			2
HAPY					2						2
SR Avanta		1									1
Moje	1										1
Total	2 856	45	21	16	24	11	12	25	27	15	3 052

Table 10: MCP prostheses in primary operations - Distal

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Ascension MCP	28	2						1			31
MCS	6										6
TACTYS					1			1			2
Moje	1										1
Total	35	2			1			2			40

Table 11: PIP prostheses in primary operations - Proximal

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
TACTYS		2	5	7	5	6	12	8	11	1	57
Silastic HP 100	27					1					28
CapFlex PIP					4	1	1	3	8	11	28
Ascension PIP PyroCarbon	23			1	1	2					27
SR Avanta	20	1			2						23
NeuFlex	7										7
KeriFlex									5	2	7
HAPTic										6	6
MCS	4										4
Avanta	4										4
Moje	1										1
Total	86	3	5	8	12	10	13	11	24	20	192

Table 12: PIP prostheses in primary operations - Distal

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
TACTYS		2	5	7	5	7	12	8	11	1	58
CapFlex PIP					4	1	1	3	8	11	28
Ascension PIP PyroCarbon	23			1	1	1					26
MCS	4										4
HAPTic										3	3
Moje	1										1
Total	28	2	5	8	10	9	13	11	19	15	120

Finger prostheses - Reasons for revisions

Table 13: MCP prostheses - Reasons for revisions

Year of revision	Loose proximal comp.	Loose distal comp.	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Fractured/defect component	Other	Missing
2024								1		2	2	
2023		1		1				2	2	1	2	
2022								1		1	2	
2021	4				1					9	3	
2020									4	10	3	
2019			2	2	2		2	5		4		
2018				3	1		3	4		2		
2017			1	1			1	2		4	4	
2016			5	1	4		2	6	5		9	
2015	5	2		4		1		15	8	4	9	
2014		1		1					2		4	
2013				4	12			8		6	4	
2012				2				10	3	6	7	
2011					4	2		8		5	7	
2010	1	1	1				2	3		2	5	
2009	1	2	3	1	1	3		5	3	13	5	
1994-08	5	19	26	62	69	8	20	117	10	108	155	17
Total	16	26	38	82	94	14	30	187	37	177	221	17

Revision reasons are not mutually exclusive. More than one reason for revision is possible. Only the first reoperation is counted.

Table 14: PIP prostheses - Reasons for revisions

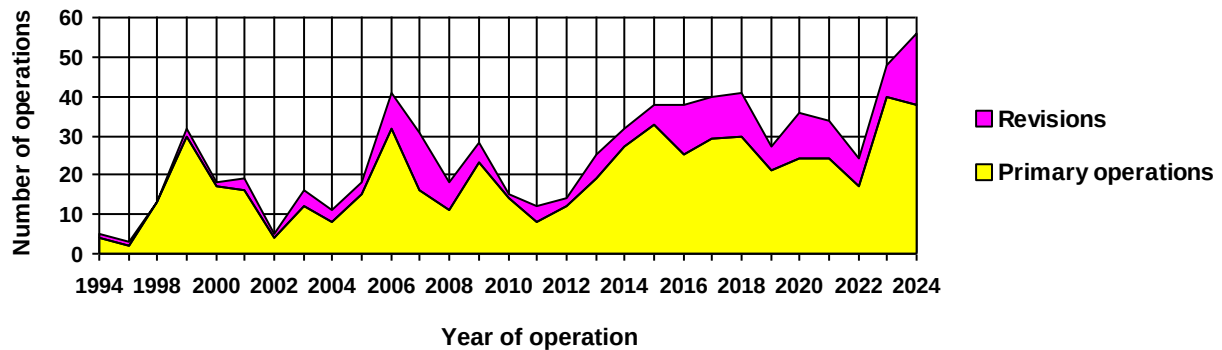
Year of revision	Loose proximal comp.	Loose distal comp.	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Fractured/defect component	Other	Missing
2024								1				
2023								1			1	
2022								1		1		
2021								1				
2019											1	
2018	1								1			
2016	1											
1994-08	4	3	1	2	2			3		1	6	
Total	6	3	1	2	2	0	0	7	1	2	8	0

Revision reasons are not mutually exclusive. More than one reason for revision is possible. Only the first reoperation is counted.

WRIST PROSTHESES

Table 1: Annual number of operations

Year	Primary operations	Revisions	Total
2024	38 (67,9%)	18 (32,1%)	56
2023	40 (83,3%)	8 (16,7%)	48
2022	17 (70,8%)	7 (29,2%)	24
2021	24 (70,6%)	10 (29,4%)	34
2020	24 (66,7%)	12 (33,3%)	36
2019	21 (77,8%)	6 (22,2%)	27
2018	30 (73,2%)	11 (26,8%)	41
2017	29 (72,5%)	11 (27,5%)	40
2016	25 (65,8%)	13 (34,2%)	38
2015	33 (86,8%)	5 (13,2%)	38
2014	27 (84,4%)	5 (15,6%)	32
2013	19 (76,0%)	6 (24,0%)	25
2012	12 (85,7%)	2 (14,3%)	14
2011	8 (66,7%)	4 (33,3%)	12
2010	14 (93,3%)	1 (6,7%)	15
2009	23 (82,1%)	5 (17,9%)	28
1994-08	180 (78,3%)	50 (21,7%)	230
Total	564 (76,4%)	174 (23,6%)	738

Figure 1: Annual number of operations


57,3 % of all operations were performed on the right side. 56 % performed in women. Mean age: 57,3 years.

Table 2: Wrist disease in primary operations

Year	Idiopathic osteo-arthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechterew	Sequelae ligament tear	Acute fracture	Sequelae after infection	Other	Missing
2024	12	11	7		7			4	
2023	12	8	9		9			4	
2022	4	1	5		6			1	
2021	3	3	10		8			2	
2020	3	2	8		8			4	
2019	4	3	9		3			2	
2018	5	3	7		10			7	
2017	2	3	11		12	1	1	4	
2016	5		10		10	1		1	
2015	4	2	13		10			7	
2014	7	1	11		9			3	
2013	4	3	5		3		1	3	
2012	3	5	2		2			1	
2011	1	3	4					2	
2010		4	4		4			2	
2009	4	5	9		4		1	1	
1994-08	18	117	23	1	4			18	1
Total	91	174	147	1	109	2	3	66	1

Diseases are not mutually exclusive. More than one reason for operation is possible.

Use of cement in wrist prostheses

Table 3: Primary operations - Proximal

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
2024			33 (97,1%)	1 (2,9%)	34
2023			36 (100,0%)		36
2022			17 (100,0%)		17
2021			20 (100,0%)		20
2020			18 (100,0%)		18
2019			6 (100,0%)		6
2018			21 (100,0%)		21
2017			27 (100,0%)		27
2016			25 (100,0%)		25
2015			31 (96,9%)	1 (3,1%)	32
2014			27 (100,0%)		27
2013			19 (100,0%)		19
2012			11 (91,7%)	1 (8,3%)	12
2011			8 (100,0%)		8
2010			14 (100,0%)		14
2009			21 (91,3%)	2 (8,7%)	23
1994-08	7 (3,9%)	1 (0,6%)	170 (95,0%)	1 (0,6%)	179
Total	7 (1,4%)	1 (0,2%)	504 (97,3%)	6 (1,2%)	518

Table 4: Primary operations - Distal

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
2024			38 (100,0%)		38
2023			40 (100,0%)		40
2022			17 (100,0%)		17
2021			24 (100,0%)		24
2020			24 (100,0%)		24
2019			21 (100,0%)		21
2018			30 (100,0%)		30
2017			29 (100,0%)		29
2016			25 (100,0%)		25
2015			33 (100,0%)		33
2014			27 (100,0%)		27
2013			19 (100,0%)		19
2012			12 (100,0%)		12
2011			8 (100,0%)		8
2010			14 (100,0%)		14
2009			20 (95,2%)	1 (4,8%)	21
1994-08	9 (5,3%)		160 (94,7%)		169
Total	9 (1,6%)		541 (98,2%)	1 (0,2%)	551

Wrist prostheses

Table 5: Primary operations - Proximal

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Motec Wrist	131	12	9	19	1	17	17	13	29	29	277
Biax	90										90
Remotion Wrist	42	8	6		2	1	2	2			63
Scheker Radio-ulnar	10	3	8	2	3		1	2	7	5	41
Elos ¹	23										23
Uhead (Druj)	8	2	4								14
Silastic ulnar head	7										7
Eclipse radio-ulnar	2										2
TMW	1										1
Total	314	25	27	21	6	18	20	17	36	34	518

Table 6: Primary operations - Distal

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Motec Wrist	131	12	9	19	1	17	17	13	29	29	277
Biax	89										89
Remotion Wrist	43	8	6		2	1	2	2			64
Scheker Radio-ulnar	8	3	8	2	3		1	2	7	5	39
Herbert UHP				6	7	5	3		2	1	24
Elos ¹	23										23
RCPI			2	3	8	1	1		2	3	20
Uhead (Druj)	8	2	4								14
TMW	1										1
Total	303	25	29	30	21	24	24	17	40	38	551

Table 7: Reasons for revisions

Year of revision	Loose proximal comp.	Loose distal comp.	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Other	Missing	Total
2024		5		2				9		4		20
2023		2		1				5	1	1		10
2022	1	1		1				3		3		9
2021	1	5			1			3	1	1		12
2020	3	1						4		1		9
2019	2				1			2	1	1		7
2018	2	4					1	3		2		12
2017	3	5			1			3		1		13
2016		4	2	1		2		3	1			13
2015		2		1		1		1	1			6
2014		1						1		2		4
2013		1			1			2	1	1		6
2012					1			1				2
2011		2			1	1		2				6
2010										1		1
2009		2		1	1			2				6
1994-08	5	21	2	3	7	5		12	1	3		59
Total	17	56	4	10	14	9	1	56	7	21	0	195

Revision reasons are not mutually exclusive. More than one reason for revision is possible. Only the first reoperation is counted.

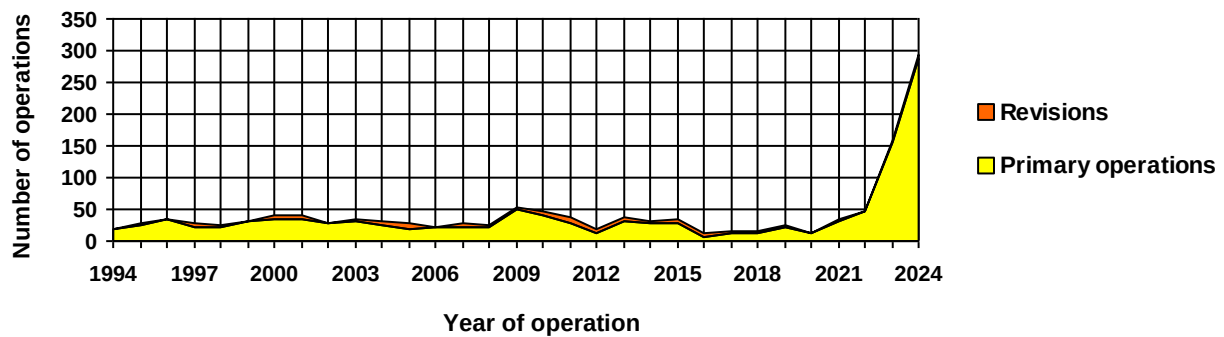
¹Elos are 3 different development models of Motec Wrist. Motec Wrist was previously sold under the name Gibbon.

CARPOMETACARPAL PROSTHESES (CMC I)

Table 1: Annual number of operations

Year	Primary operations	Revisions	Total
2024	286 (97,3%)	8 (2,7%)	294
2023	156 (98,7%)	2 (1,3%)	158
2022	47 (97,9%)	1 (2,1%)	48
2021	30 (90,9%)	3 (9,1%)	33
2020	12 (85,7%)	2 (14,3%)	14
2019	21 (87,5%)	3 (12,5%)	24
2018	13 (86,7%)	2 (13,3%)	15
2017	14 (87,5%)	2 (12,5%)	16
2016	5 (45,5%)	6 (54,5%)	11
2015	27 (81,8%)	6 (18,2%)	33
2014	27 (84,4%)	5 (15,6%)	32
2013	30 (81,1%)	7 (18,9%)	37
2012	14 (73,7%)	5 (26,3%)	19
2011	27 (75,0%)	9 (25,0%)	36
2010	41 (85,4%)	7 (14,6%)	48
2009	49 (92,5%)	4 (7,5%)	53
1994-08	389 (87,8%)	54 (12,2%)	443
Total	1 188 (90,4%)	126 (9,6%)	1 314

Figure 1: Annual number of operations



47,9 % of all operations were performed on the right side. 78 % performed in women. Mean age: 62,5 years.

Table 2: Carpometacarpal disease in primary operations

Year	Idiopathic osteoarthritis	Rheumatoid arthritis	Sequelae after fracture	Bechterew Mb.	Sequelae ligament tear	Acute fracture	Sequelae of infection	Other	Missing
2024	281	4	2		1			4	
2023	154	1		1	1	1			
2022	46		1						
2021	28	2							
2020	12								
2019	19				2				
2018	13								
2017	14								
2016	3	2							
2015	25	1				1			
2014	24	2						1	
2013	23	5		1				1	
2012	13	1							
2011	26		1						
2010	37	4							
2009	47	2						1	
1994-08	279	93	2	4				18	
Total	1 044	117	6	6	4	2	0	25	0

Diseases are not mutually exclusive. More than one reason for operation is possible.

Use of cement in carpometacarpal prostheses

Table 3: Primary operations - Proximal (Single-component)

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
2024			286 (100,0%)		286
2023			156 (100,0%)		156
2022			47 (100,0%)		47
2021	1 (3,3%)		29 (96,7%)		30
2020			12 (100,0%)		12
2019			21 (100,0%)		21
2018			13 (100,0%)		13
2017			14 (100,0%)		14
2016			5 (100,0%)		5
2011-15			124 (99,2%)	1 (0,8%)	125
2005-10			168 (97,1%)	5 (2,9%)	173
1994-04	3 (1,0%)		301 (98,7%)	1 (0,3%)	305
Total	4 (0,3%)		1 176 (99,1%)	7 (0,6%)	1 187

Carpometacarpal prostheses - Prosthesis brand

Table 4: Primary operations - Proximal (Single-component)

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
TOUCH								19	113	277	409
Swanson Silastic Trapezium	364	2	1	1							368
Moovis				4	7	8	27	28	41	7	122
Swanson Titanium Basal	72										72
Motec	55										55
Elektra	53	2									55
Motec II	47										47
ARPE		1	9	8	10	4	2				34
Avanta Trapezium	7										7
Pyrocardan					4		1				5
Custom made	5										5
BRIDGE									2	2	4
IVORY			4								4
Total	603	5	14	13	21	12	30	47	156	286	1 187

Reasons for revisions

Table 5:

Year of revision	Loose proximal comp.	Loose distal comp.	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Other	Missing
2024	2					1	1			2	
2023					1				1		
2021	1			1							
2020									1		
2019			1	1					1		
2018	2					1					
2017			1								
2016	3							1			
2015	4		1	1		1		3			
2014	2		2							1	
2013	3		4					1			
2012	4		1					1			
2011	7		2				1	5			
2010	4		2	1		1		3			
2009	1		2					1		1	
1994-08	2		23	6				31	1	8	1
Total	35	0	39	10	1	4	2	46	4	12	1

Revision reasons are not mutually exclusive. More than one reason for revision is possible. Only the first reoperation is counted.

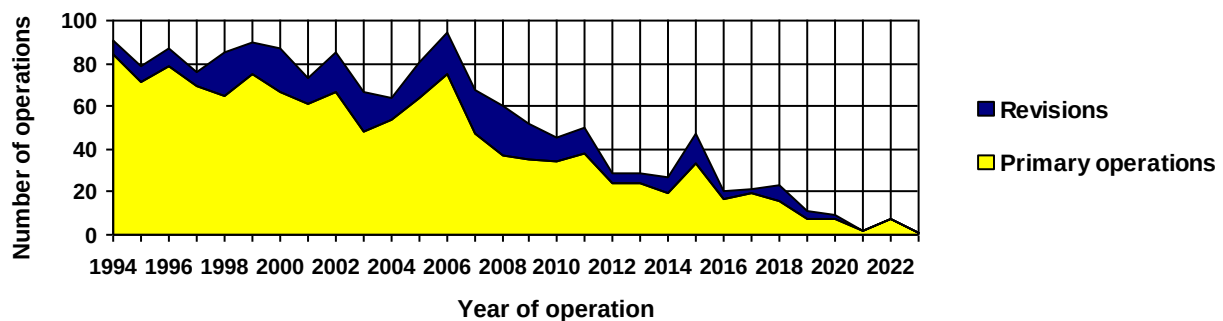
TOE JOINT PROSTHESES

Table 1: Annual number of operations *

Year	Primary operations	Revisions	Total
2023	1 (100,0%)		1
2022	7 (100,0%)		7
2021	2 (100,0%)		2
2020	7 (77,8%)	2 (22,2%)	9
2019	7 (63,6%)	4 (36,4%)	11
2018	16 (69,6%)	7 (30,4%)	23
2017	19 (90,5%)	2 (9,5%)	21
2016	17 (85,0%)	3 (15,0%)	20
2015	33 (70,2%)	14 (29,8%)	47
2014	19 (70,4%)	8 (29,6%)	27
2013	24 (82,8%)	5 (17,2%)	29
2012	24 (82,8%)	5 (17,2%)	29
2011	38 (76,0%)	12 (24,0%)	50
2010	34 (75,6%)	11 (24,4%)	45
2009	35 (67,3%)	17 (32,7%)	52
1994-08	963 (81,1%)	224 (18,9%)	1 187
Total	1 246 (79,9%)	314 (20,1%)	1 560

* No reported primary toe joint prostheses or surgeries in 2024

Figure 1: Annual number of operations



52,5 % of all operations were performed on the right side. 82,9 % performed in women. Mean age: 60,2 years.

Table 2: Toe disease in primary operations

Year	Idiopathic osteoarthritis	Rheumatoid arthritis	Sequelae after fracture	Bechterew Mb.	Sequelae ligament tear	Acute fracture	Sequelae of infection	Other	Missing
2023	1		1						
2022	6	1							
2021	2								
2020	6							1	
2019	7								
2018	11	3	1					1	
2017	14	3						2	
2016	14	3						1	
2015	22	5	2					4	
2014	10	9							
2013	11	11	1					1	
2012	15	9							
2011	18	16						4	
2010	13	20	1	1	1	1	1	8	
2009	12	20		1				2	
1994-08	144	743	15	8	1		1	64	4
Total	306	843	21	10	2	1	2	88	4

Diseases are not mutually exclusive. More than one reason for operation is possible.

Use of cement in toe joint prostheses

Table 3: Primary operations - Proximal

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
2023			1 (100,0%)		1
2022			7 (100,0%)		7
2021			2 (100,0%)		2
2020			7 (100,0%)		7
2019			7 (100,0%)		7
2018			16 (100,0%)		16
2017			19 (100,0%)		19
2016			16 (100,0%)		16
2015			31 (96,9%)	1 (3,1%)	32
2014			19 (100,0%)		19
2013			24 (100,0%)		24
2012			24 (100,0%)		24
2011			35 (92,1%)	3 (7,9%)	38
2010			34 (100,0%)		34
2009			35 (100,0%)		35
2008			37 (100,0%)		37
2007			46 (100,0%)		46
2006			74 (98,7%)	1 (1,3%)	75
2005			64 (100,0%)		64
2004	1 (1,9%)		53 (98,1%)		54
2003	1 (2,1%)		47 (97,9%)		48
2002	1 (1,5%)		65 (97,0%)	1 (1,5%)	67
2001	1 (1,6%)		60 (98,4%)		61
2000	2 (3,0%)		65 (97,0%)		67
1999			75 (100,0%)		75
1998			65 (100,0%)		65
1997			69 (100,0%)		69
1996			79 (100,0%)		79
1995			71 (100,0%)		71
1994			82 (97,6%)	2 (2,4%)	84
Total	6 (0,5%)		1 229 (98,9%)	8 (0,6%)	1 243

Table 4: Primary operations - Distal

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
2015			1 (100,0%)		1
2013			1 (100,0%)		1
2012			1 (100,0%)		1
2011			2 (100,0%)		2
2010			5 (100,0%)		5
2009			7 (100,0%)		7
2008			4 (100,0%)		4
2007			5 (100,0%)		5
2006			13 (100,0%)		13
2005			6 (100,0%)		6
2004			7 (100,0%)		7
2002			4 (100,0%)		4
2001	1 (9,1%)		10 (90,9%)		11
2000	1 (6,7%)		14 (93,3%)		15
1999	1 (9,1%)		10 (90,9%)		11
1998			2 (100,0%)		2
Total	3 (3,2%)		92 (96,8%)		95

Toe joint prostheses

Table 5: Primary operations - Proximal

Prostheses	2002-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Silastic HP 100	925	4	6	4				7	1		947
LPT	102	12		6	6	2					128
Toefit-plus	52										52
Sutter	26										26
Biomet Total Toe	25										25
Moje	18										18
LaPorta	14										14
Epyc	1		10								11
HAPY			3	6							9
CARTIVA					1	5	2				8
Swanson Titanium	5										5
Total	1 168	16	19	16	7	7	2	2	1	0	1 243

Table 6: Primary operations - Distal

Prostheses	2002-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Toefit-plus	52										52
Biomet Total Toe	25										25
Moje	18										18
Total	95	0	0	0	0	0	0	0	0	0	95

Reasons for revisions

Table 7:

Year of revision	Loose proximal comp.	Loose distal comp.	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Progression of osteoarthritis	Other	Missing
2020						1		1			1	
2019		1						3		2	1	
2018					3	1	1	3	3		3	
2017	1							1			1	
2016								1		1		
2015				1	3			2	5		1	
2014		1		1	2			1	2	1		
2013					1			3	2			
2012								2			3	
2011					1			2	1		2	
2010		2			1	2		3	2		3	
2009					2	2		6	2		3	
1994-08	4	17	5	13	56	21	3	96	5	1	67	8
Total	5	21	5	15	69	27	4	124	22	5	85	8

Revision reasons are not mutually exclusive. More than one reason for revision is possible. Only the first reoperation is counted.

An error was discovered in the completeness analyses for elbow prostheses, and updated analyses have not yet been conducted.
Therefore, this section has been removed from the report.

An error was discovered in the completeness analyses for elbow prostheses, and updated analyses have not yet been conducted.
Therefore, this section has been removed from the report.

Completeness of reporting analysis for the Ankle Arthroplasty Register, 2021-2023

A completeness of reporting analysis for the Ankle Arthroplasty Register has been conducted by combining the data in the Register with data from the Norwegian Patient Register (NPR). The report and analysis were prepared by the NPR in collaboration with the Ankle Arthroplasty Register (NAR). There are separate statistics on primary operations and revisions.

NCSP codes for combining data from NPR hospital stays and the Ankle Arthroplasty Register

Type	Code	Description
Primary operation	NHB 0y	Primary partial prosthetic replacement of ankle joint not using cement
	NHB 1y	Primary partial prosthetic replacement of ankle joint using cement
	NHB 20	Primary total prosthetic replacement of ankle joint not using cement
	NHB 30	Primary total prosthetic replacement of ankle joint using hybrid technique
	NHB 40	Primary total prosthetic replacement of ankle joint using cement
	NHB 99	Other primary prosthetic replacement in ankle joint or foot
Revision (level 1)	NHC 0y	Secondary implantation of partial prosthesis in ankle joint not using cement Excludes: Of component of total prosthesis
	NHC 1y	Secondary implantation of partial prosthesis in ankle joint using cement Excludes: Of component of total prosthesis
	NHC 2y	Secondary implantation of total prosthesis in ankle joint not using cement Includes: Of component of total prosthesis
	NHC 3y	Secondary implantation of total prosthesis in ankle joint using hybrid technique Includes: Of component of total prosthesis
	NHC 4y	Secondary implantation of total prosthesis in ankle joint using cement
	NHU 0y	Removal of partial prosthesis from ankle joint
	NHU 1y	Removal of total prosthesis from ankle joint

Primary operations. From 2021-2023, 140 primary total ankle arthroplasties were reported to one or both of the registers. 71.4% were reported to the NAR while 95% were reported to the NPR. Completeness of reporting varies much between the different hospitals. For hospitals with a low completeness of reporting rate for the NAR, either the form was not sent, or other interventions than ankle arthroplasties were incorrectly coded with NHB 0*/NHB 1*/NHB 20/NHB 30/NHB 40.

Procedure codes to be used for primary operations:

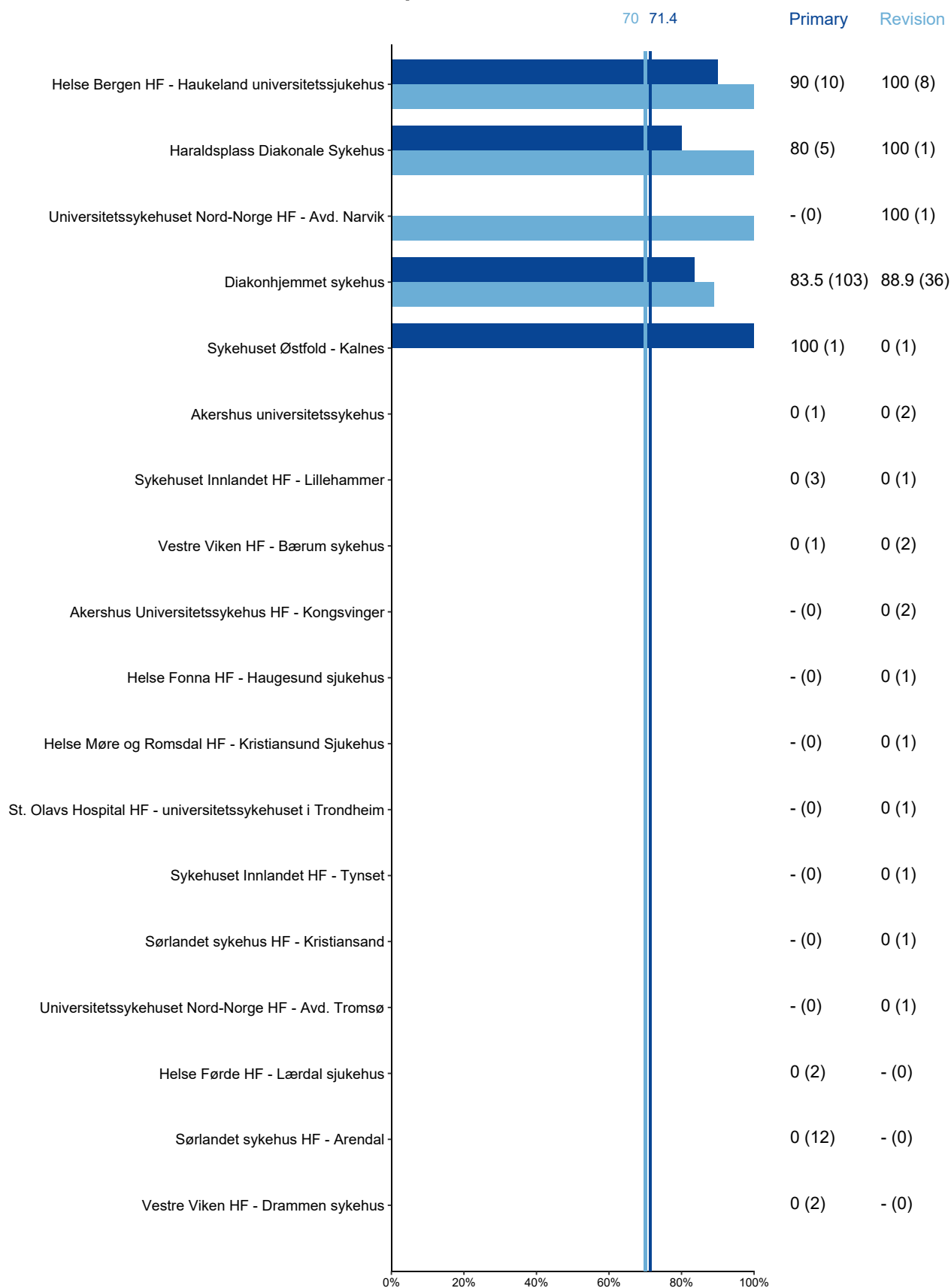
NHB 0* - NHB 1* - NHB 20 - NHB 30 - NHB 40

Revision operations. From 2021-2023, 60 revisions were reported to one or both of the registers. 70% of these were reported to the NAR, while 88.3% were reported to the NPR (revision level 1). Completeness of reporting varies much between the different hospitals. A low completeness of reporting rate may mean that the form was not sent in. It appears that a number of revision forms are missing in cases where the prosthesis was removed without a new one being inserted in the same operation; in such cases, a form should be submitted both when the prosthesis is removed and when any new insertion is performed or an arthrodesis is performed.

Procedure codes to be used for revision operations, level 1:

NHC 0* - NHC 1* - NHC 2* - NHC 3* - NHC 4* - NHC 99 - NHU 0* - NHU 1*

Completeness of reporting for primary operations and revisions, Ankle prosthesis, 2021-2023



Dark blue bars and first number to the right of the bars gives completeness of reporting for primary operations. Light blue bars and second number to the right of the bars gives completeness of reporting for revision operations (level 1). The numbers in brackets gives the number of operations registered at both NAR and NPR. Vertical lines shows the national averages.

Completeness of reporting analysis for the Finger Arthroplasty Register, 2021-2023

A completeness of reporting analysis for the Finger Arthroplasty Register has been conducted by combining the data in the Register with data from the Norwegian Patient Register (NPR). The report and analysis were prepared by the NPR in collaboration with the Finger Arthroplasty Register (NAR). There are separate statistics on primary operations and revisions.

NCSP codes for combining data from NPR hospital stays and the Finger Arthroplasty Register

Type	Code	Description
Primary operation	NDB 8y	Primary prosthetic replacement of joint of finger or metacarpal
	NDB 99	Other primary prosthetic replacement in other joint of hand
Revision (level 1)	NDC 8y	Secondary prosthetic replacement in joint of finger or metacarpal
	NDU 2y	Removal of prosthesis from other joint of hand

Primary operations. From 2021-2023, 279 primary total finger arthroplasties were reported to one or both of the registers. 34.1% were reported to the NAR while 98.6% were reported to the NPR. Completeness of reporting varies much between the different hospitals. For hospitals with a low completeness of reporting rate for the NAR, either the form was not sent, or other interventions than finger arthroplasties were incorrectly coded with NDB 8y.

Procedure codes to be used for primary operations:

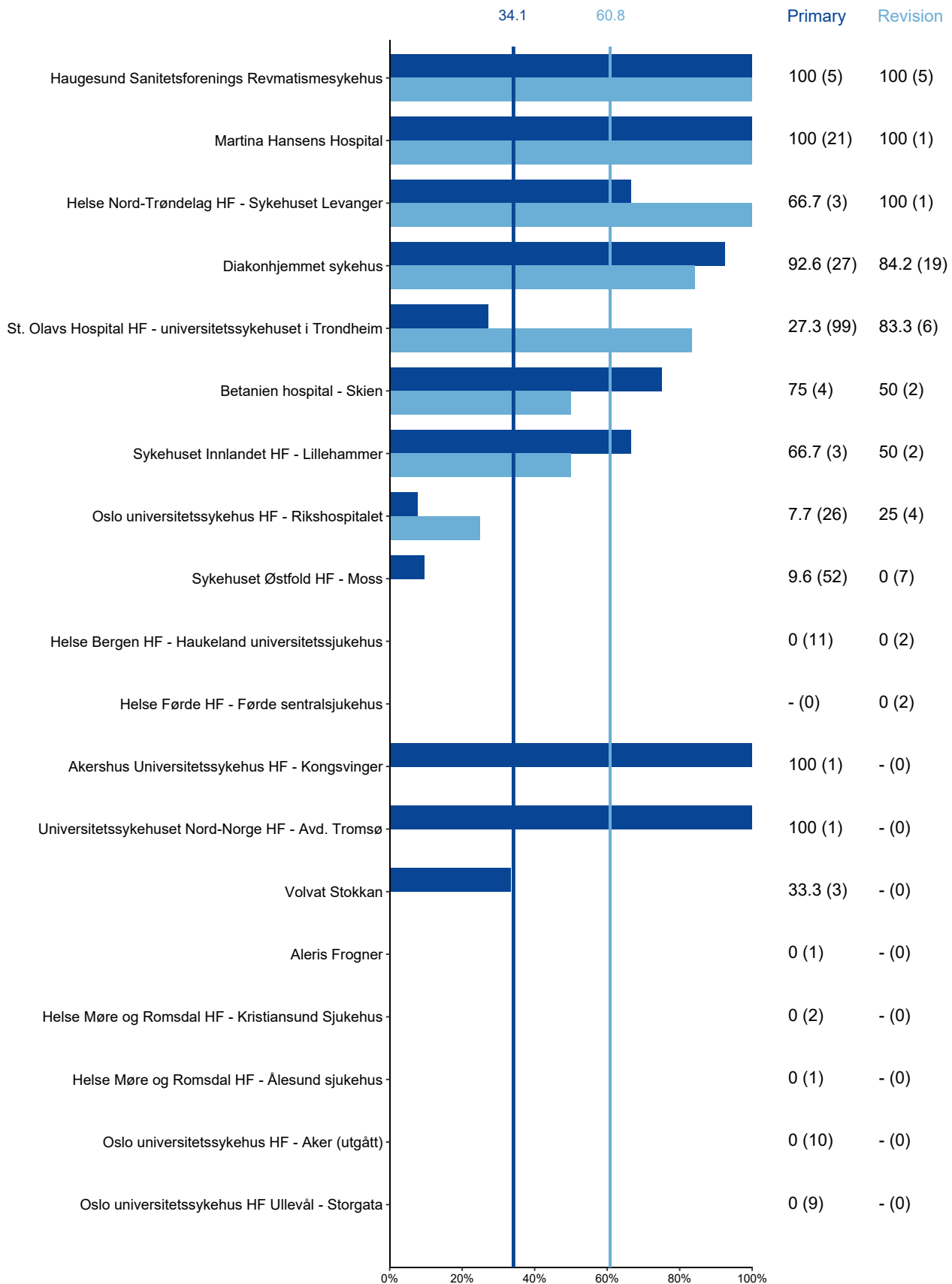
NDB 8y

Revision operations. From 2021-2023, 51 revisions were reported to one or both of the registers. 60.8% of these were reported to the NAR, while 90.2% were reported to the NPR (revision level 1). Completeness of reporting varies much between the different hospitals. A low completeness of reporting rate may mean that the form was not sent in. It appears that a number of revision forms are missing in cases where the prosthesis was removed without a new one being inserted in the same operation; in such cases, a form should be submitted both when the prosthesis is removed and when any new insertion is performed or an arthrodesis is performed.

Procedure codes to be used for revision operations, level 1:

NDC 8y – NDU 2y

Completeness of reporting for primary operations and revisions, Finger prosthesis, 2021-2023



Dark blue bars and first number to the right of the bars gives completeness of reporting for primary operations. Light blue bars and second number to the right of the bars gives completeness of reporting for revision operations (level 1). The numbers in brackets gives the number of operations registered at both NAR and NPR. Vertical lines shows the national averages.

Completeness of reporting analysis for the Wrist/Carpus/Distal radioulnar Joint Arthroplasty Register, 2021-2023

A completeness of reporting analysis for the Wrist/Carpus/Distal radioulnar Joint Arthroplasty Register has been conducted by combining the data in the Register with data from the Norwegian Patient Register (NPR). The report and analysis were prepared by the NPR in collaboration with the Wrist/Carpus/Distal radioulnar Joint Arthroplasty Register (NAR). There are separate statistics on primary operations and revisions.

NCSP codes for combining data from NPR hospital stays and the Wrist/Carpus/Distal radioulnar Joint Arthroplasty Register

Type	Code	Description
Primary operation	NDB 0y	Primary partial prosthetic replacement of joint of wrist not using cement
	NDB 1y	Primary partial prosthetic replacement of joint of wrist using cement
	NDB 2y	Primary total prosthetic replacement of joint of wrist not using cement
	NDB 3y	Primary total prosthetic replacement of joint of wrist using hybrid technique
	NDB 4y	Primary total prosthetic replacement of joint of wrist using cement
	NDB 5y	Primary interposition prosthesis in joint of wrist
	NDB 99	Other primary prosthetic replacement in other joint of hand
Revision (level 1)	NDC 0y	Secondary implantation of partial prosthesis in joint of wrist not using cement Excludes: Of component of total prosthesis
	NDC 1y	Secondary implantation of partial prosthesis in joint of wrist using cement Excludes: Of component of total prosthesis
	NDC 2y	Secondary implantation of total prosthesis in joint of wrist not using cement Includes: Of component of total prosthesis
	NDC 3y	Secondary implantation of total prosthesis in joint of wrist using hybrid technique Includes: Of component of total prosthesis
	NDC 4y	Secondary implantation of total prosthesis in joint of wrist using cement
	NDC 5y	Secondary implantation of interposition prosthesis in joint of wrist
	NDU 0y	Removal of partial prosthesis from joint of wrist
	NDU 1y	Removal of total prosthesis from joint of wrist
	NDU 2y	Removal of prosthesis from other joint of hand
	NDC 99	Other secondary prosthetic replacement in other joint of hand

Primary operations. From 2021-2023, 375 primary total wrist/carpus/distal radioulnar joint arthroplasties were reported to one or both of the registers. 78.9% were reported to the NAR while 68.3% were reported to the NPR. Completeness of reporting varies much between the different hospitals.

Procedure codes to be used for primary operations:

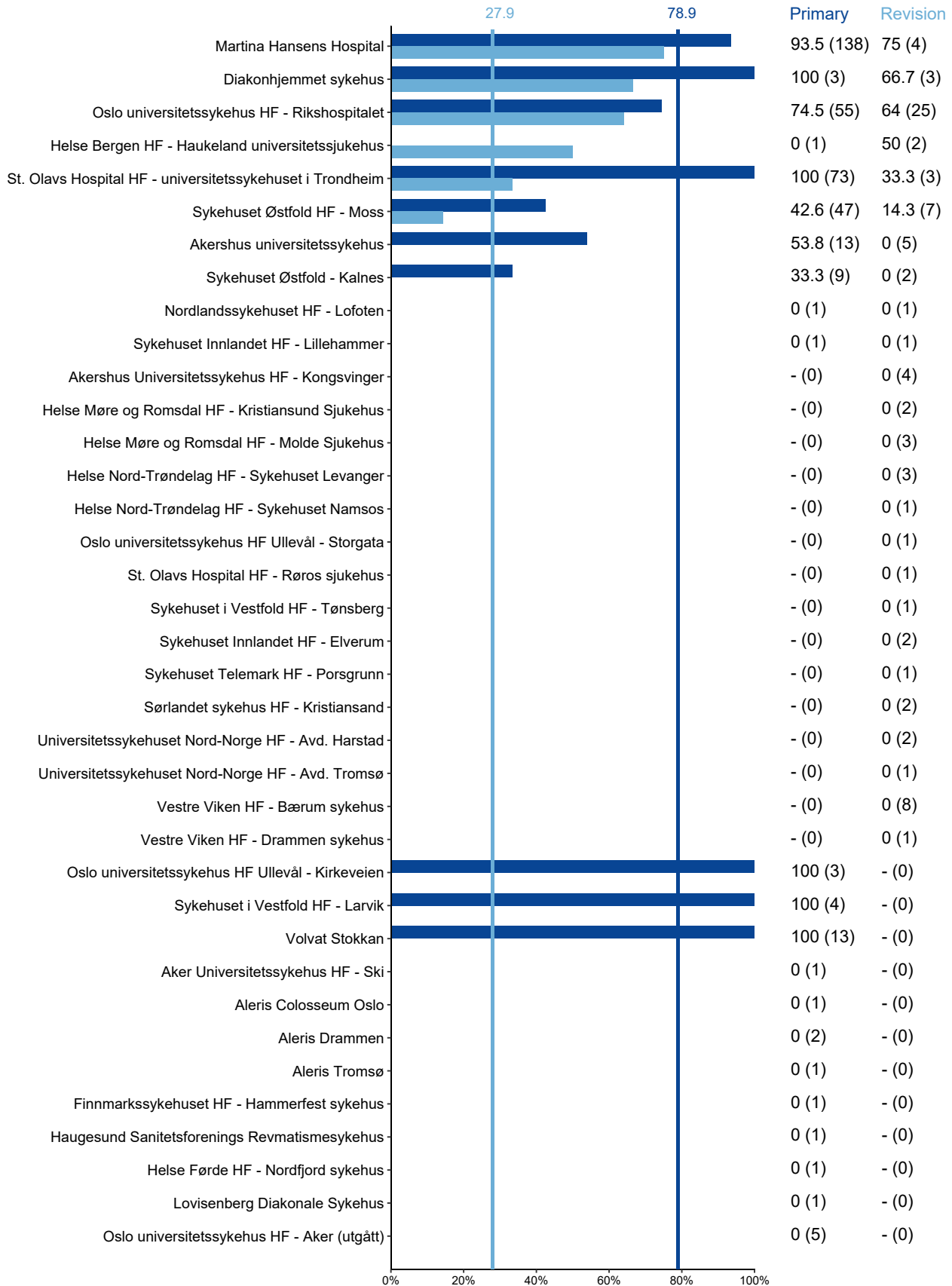
NDB 0* - NDB 1* - NDB 2* - NDB 3* - NDB 4*

Revision operations. From 2021-2023, 86 revisions were reported to one or both of the registers. 27.9% of these were reported to the NAR, while 87.2% were reported to the NPR (revision level 1). Completeness of reporting varies much between the different hospitals. A low completeness of reporting rate may mean that the form was not sent in. It appears that a number of revision forms are missing in cases where the prosthesis was removed without a new one being inserted in the same operation; in such cases, a form should be submitted both when the prosthesis is removed and when any new insertion is performed or when a arthrodesis is performed

Procedure codes to be used for revision operations, level 1:

NDC 0* - NDC 1* - NDC 2* - NDC 3* - NDC 4* - NDC 5*

Completeness of reporting for primary operations and revisions, Wrist/Carpus/Distal radioulnar Joint prosthesis, 2021-2023



Dark blue bars and first number to the right of the bars gives completeness of reporting for primary operations. Light blue bars and second number to the right of the bars gives completeness of reporting for revision operations (level 1). The numbers in brackets gives the number of operations registered at both NAR and NPR. Vertical lines shows the national averages.

Completeness of reporting analysis for the Toe Arthroplasty Register, 2021-2023

A completeness of reporting analysis for the Toe Arthroplasty Register has been conducted by combining the data in the Register with data from the Norwegian Patient Register (NPR). The report and analysis were prepared by the NPR in collaboration with the Toe Arthroplasty Register (NAR). There are separate statistics on primary operations and revisions.

NCSP codes for combining data from NPR hospital stays and the Toe Arthroplasty Register

Type	Code	Description
Primary operation	NHB 6y	Primary prosthetic replacement of first metatarsophalangeal joint
	NHB 7y	Primary prosthetic replacement of other metatarsophalangeal joint
	NHB 8y	Primary prosthetic replacement of other joint of foot
	NHB 99	Other primary prosthetic replacement in joint of ankle or foot
Revision (level 1)	NHC 6y	Secondary prosthetic replacement of first metatarsophalangeal joint
	NHC 7y	Secondary prosthetic replacement of other metatarsophalangeal joint
	NHC 8y	Secondary prosthetic replacement in other joint of foot
	NHC 99	Other secondary prosthetic replacement in joint of ankle or foot
	NHU 2y	Removal of prosthesis from other joint of foot

Primary operations. From 2021-2023, 19 primary total toe arthroplasties were reported to one or both of the registers. 52.6% were reported to the NAR while 63.2% were reported to the NPR. Completeness of reporting varies much between the different hospitals. For hospitals with a low completeness of reporting rate for the NAR, either the form was not sent, or other interventions than toe arthroplasties were incorrectly coded with NHB 6y/NHB 7y/NHB 8y.

Procedure codes to be used for primary operations:

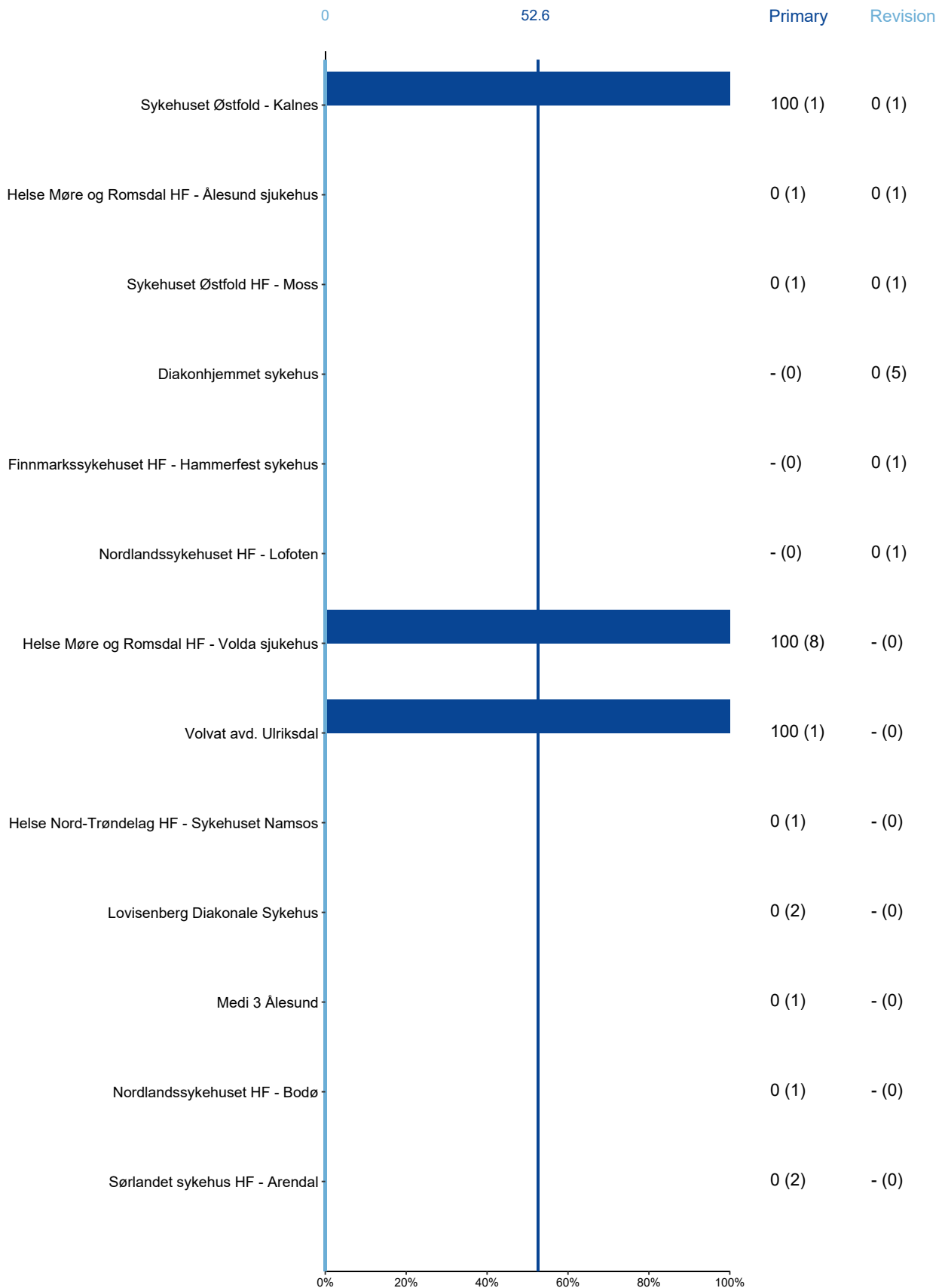
NHB 6y - NHB 7y - NHB 8y

Revision operations. From 2021-2023, 10 revisions were reported to one or both of the registers. 0% of these were reported to the NAR, while 100% were reported to the NPR (revision level 1). Completeness of reporting varies much between the different hospitals. A low completeness of reporting rate may mean that the form was not sent in. It appears that a number of revision forms are missing in cases where the prosthesis was removed without a new one being inserted in the same operation; in such cases, a form should be submitted both when the prosthesis is removed and when any new insertion is performed or an arthrodesis was performed.

Procedure codes to be used for revision operations, level 1:

NHC 6y - NHC 7y - NHC 8y - NHU 2y

Completeness of reporting for primary operations and revisions, Toe prosthesis, 2021-2023



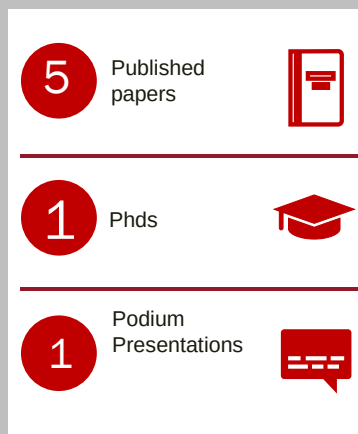
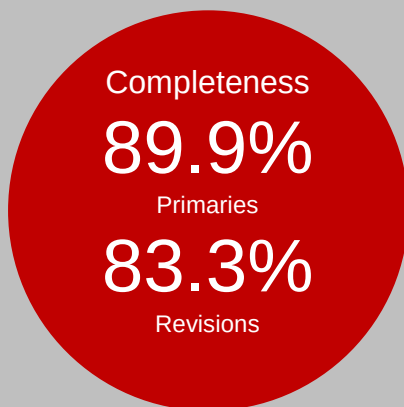
Dark blue bars and first number to the right of the bars gives completeness of reporting for primary operations. Light blue bars and second number to the right of the bars gives completeness of reporting for revision operations (level 1). The numbers in brackets gives the number of operations registered at both NAR and NPR. Vertical lines shows the national averages.

CONTENTS

Shoulder prostheses

Highlights from 2024	234
Introduction.....	235
Survival curves for shoulder prostheses	236
Number of primary operations in 2024	237
Form registration by format in 2024	238
Annual number of prostheses	239
Types of prostheses	240
Age by year of operation	241
Stemmed shoulder prostheses	242
Anatomic stemmed total shoulder prostheses	243
Resurfacing shoulder hemiprostheses	243
Reversed stemmed total shoulder prostheses.....	244
Stemless hemiprostheses	244
Stemless total shoulder prostheses	244
Reversed stemless total shoulder prostheses	245
Reasons for primary operations	246
Use of cement in shoulder prostheses	251
Prosthesis brand	254
Reasons for revisions	260
ASA classification	263
Thrombosis prophylaxis	264
Previous operation in relevant joints	264
Surgical approach	265
Glenoid type	265
PROM for shoulder prostheses	266
PROM for all hospitals individually	270
Completeness of reporting prosthesis in shoulder 2021-23.....	282

Shoulder prostheses



Research

Focus on results for reverse prostheses with a stem, which increased most in use (78% of primary operations in 2024).



Find us:

<https://helse-bergen.no/nrl>
<https://www.facebook.com/leddregisteret>
 Nasjonalt servicemiljø for medisinske kvalitetsregistre

Initiated activities

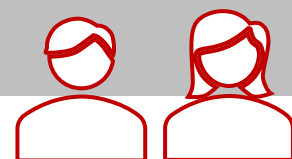
Important findings and projects

- 90.7% survival at 10 years (all prostheses)
- The most common reason for revision is infection and dislocation
- 23% are operated due to acute fracture
- 27% have previous rotator cuff reconstruction



ePROM

Electronic patient reported data



889
pre-op
ePROM

20
participating
hospitals

1,371
post-op
ePROM

37.4% fill out pre-op PROM

ANNUAL REPORT SHOULDER ARTHROPLASTY

During the period 1994–2024, a total of 16,150 shoulder arthroplasty procedures were registered. In 2024, 1,205 primary shoulder arthroplasties were performed, and an additional 85 revision procedures were reported (6.6%). The completeness of reporting for primary procedures from 2021 to 2023 was 89.9%, and 83.3% for revisions. Electronic reporting of shoulder arthroplasties is well established; in 2024, 99% of procedures were submitted electronically.

In this year's report, we present PROM data for shoulder arthroplasties. For elective procedures, both preoperative and 1-year postoperative results are presented, whereas for acute fractures, only 1-year results are reported. Anchor questions, where patients themselves assess whether the improvement is significant, are also reported only for elective procedures. The total WOOS score shows an improvement in the average score from 44% preoperatively to 79.3% one year postoperatively for elective arthroplasties, while acute fractures have a slightly lower 1-year WOOS score of 73%. We encourage hospitals to continue their efforts in establishing robust routines for collecting preoperative PROM scores, as reporting in this area can still be improved.

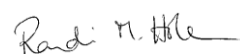
The trend in the use of reverse shoulder arthroplasties continues, with 78.2% of all primary shoulder arthroplasties in 2024 being reverse total arthroplasties. The use of reverse implants has also become more common in cases of primary osteoarthritis. This is supported by a recent study from the English registry (Valsamis 2024), which compared revision risk, reoperations, complications, and costs. However, orthopedic surgeons should be aware of the increased risk of revision for reverse arthroplasties in men and in the youngest age group (<60 years). Furthermore, the Swedish registry demonstrates that the best functional outcomes in osteoarthritis patients are achieved with anatomical total arthroplasties. Survival curves for both reverse and anatomical total arthroplasties show improvement in recent time periods, and the 10-year survival rate exceeds 90% for both types.

Reverse shoulder arthroplasties show good long-term outcomes, and a recently published registry study (Hole 2024) demonstrates that the implants currently used in Norwegian hospitals have a 10-year implant survival rate exceeding 90%. Instability remains the leading cause of revision, and the risk of revision due to instability or dislocation has not decreased in recent time periods. This risk is particularly high in cases of arthroplasty following fracture sequelae. For reverse arthroplasty due to proximal humerus fracture, there is a significantly higher risk of revision when using an uncemented humeral component, and we recommend the use of cemented stems in these patients. Infection is the second most common cause of revision, and a new study led by Birte Roang-Winjum is now underway to investigate the risk of revision due to infection in patients with a history of cuff surgery.

The incidence of shoulder arthroplasty in Norway is increasing, although it remains lower than in both Sweden and Denmark. The growing number of procedures and the collection of PROM data provide a solid foundation for future research projects and quality improvement initiatives. We encourage all hospitals to utilize their own data in improvement efforts, and we strongly support the active use of registry data in research projects.

We would like to thank all shoulder surgeons across the country for their excellent reporting!

Bergen, June 2025



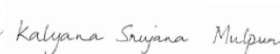
Randi Hole
Head of Shoulder



Anne Marie Fenstad
Biostatistician



Sigurd Stenvik
Biostatistician



Kalyana Srujana Mulpuri
It-consultant



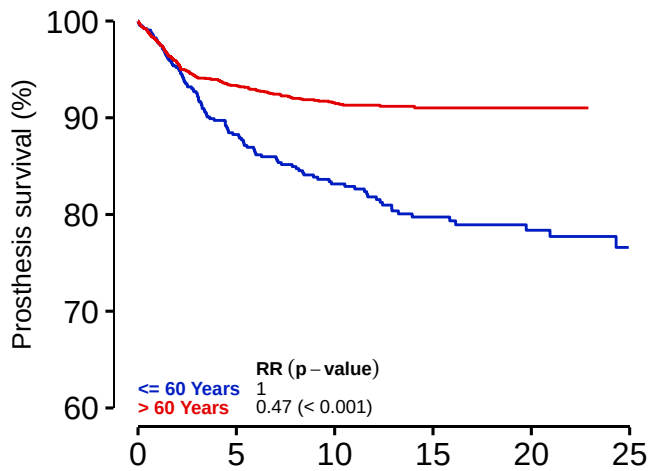
Irina Kvinnesland
It-consultant

Survival curves of shoulders prosthesis

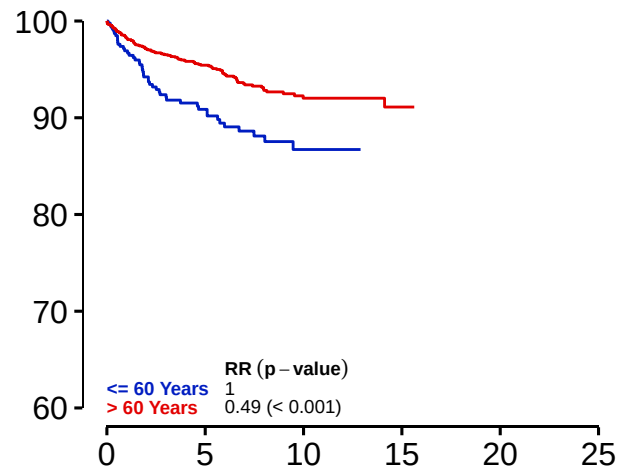
Report 2025

1994–2024

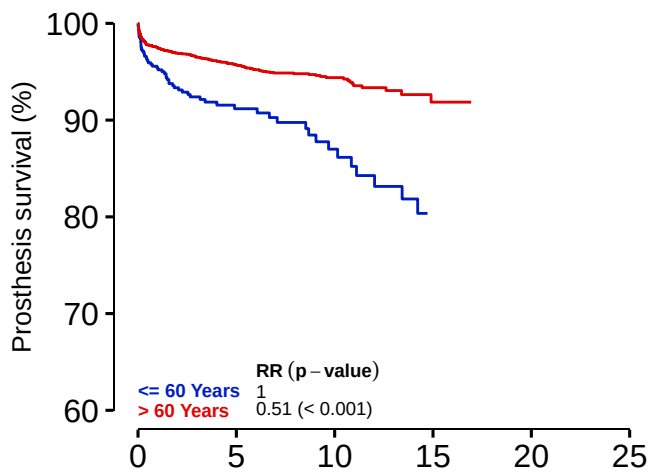
C.8) Hemi prosthesis, stemmed



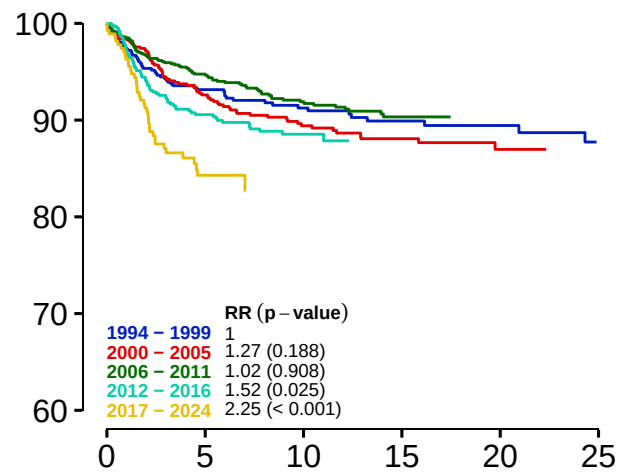
C.9) Anatomical total prosthesis, stemmed



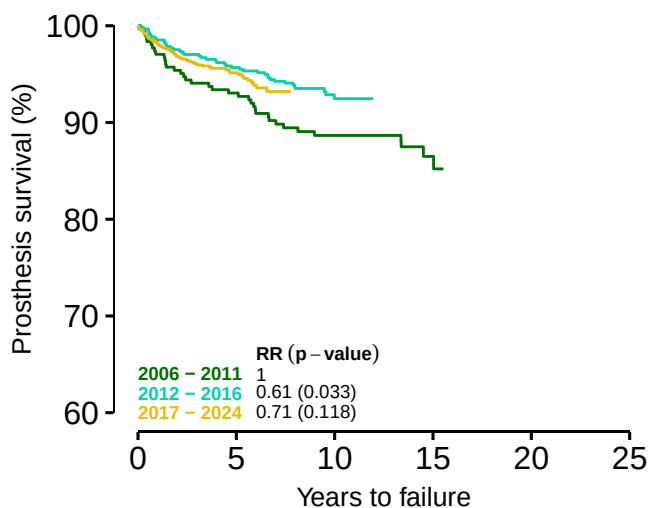
C.10) Reversed total prosthesis, stemmed



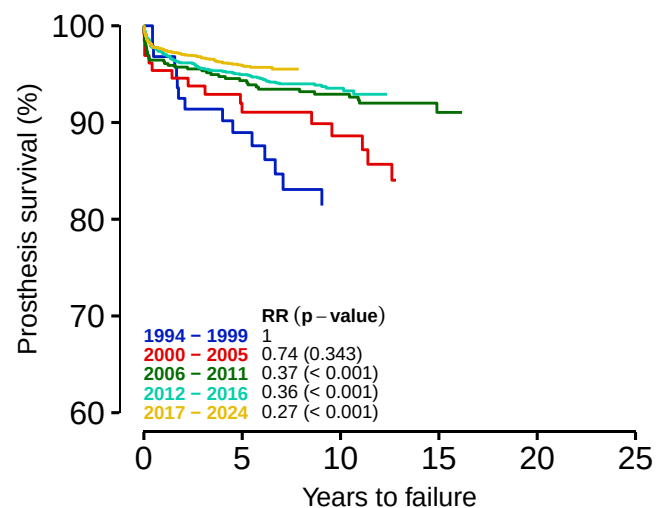
C.11) Hemi prosthesis, stemmed

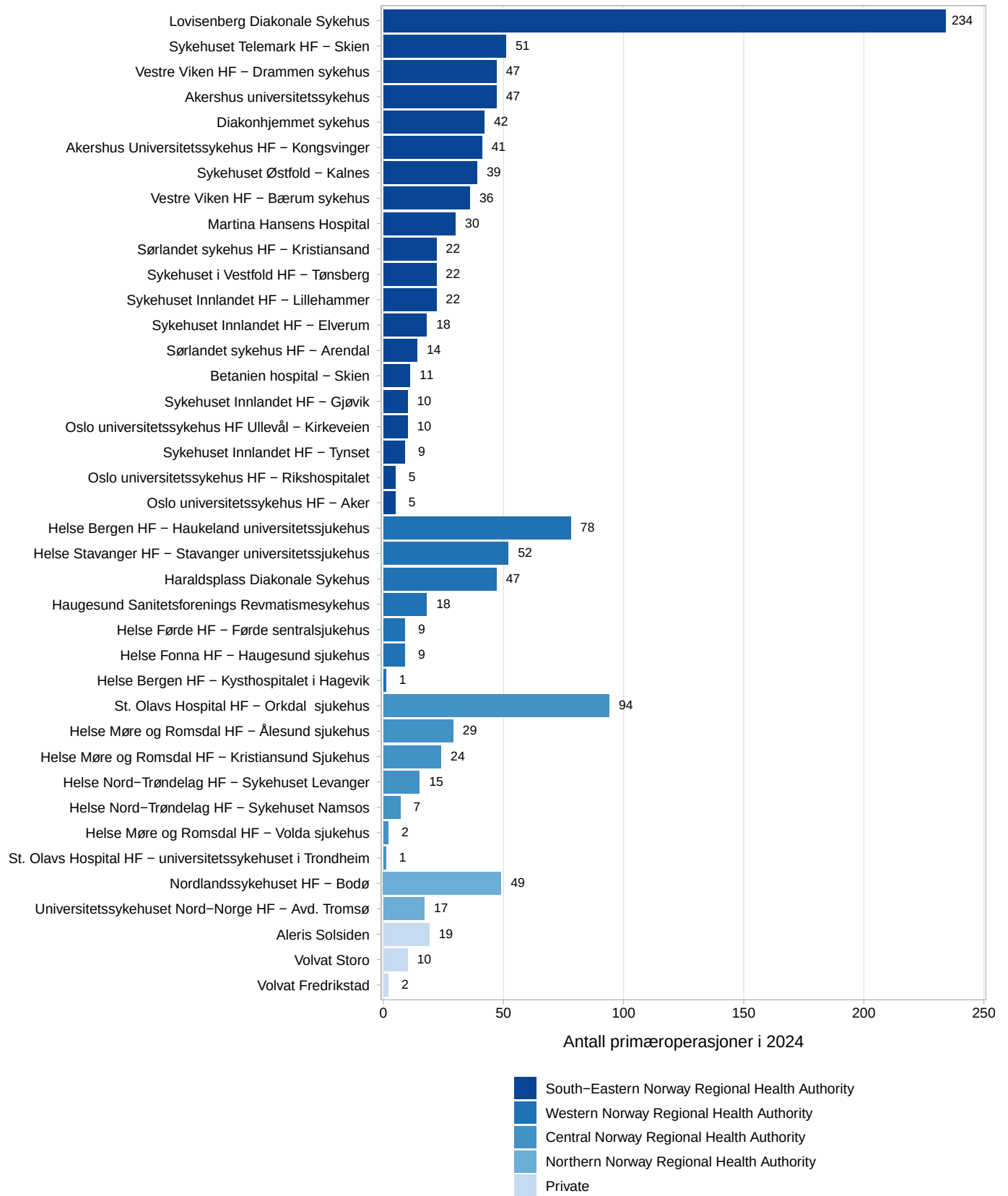


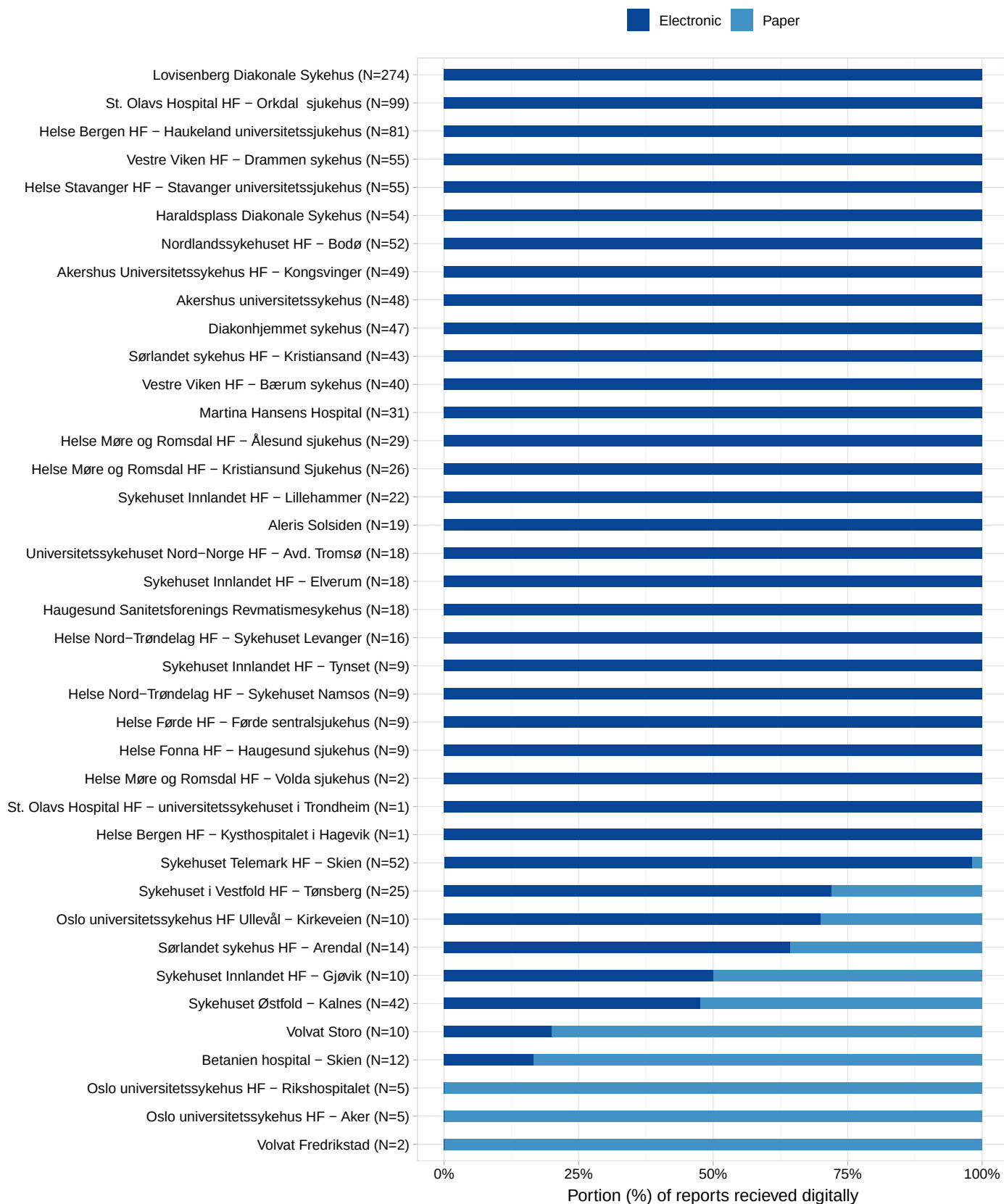
C.12) Anatomical total prosthesis, stemmed



C.13) Reversed total prosthesis, stemmed



Figur C.14: Number of primary operations in shoulder in 2024

Figur C.15: Reporting format in 2024, all shoulder operations

National average for electronic form registration in 2024 is 94,5% (1248 av 1321).

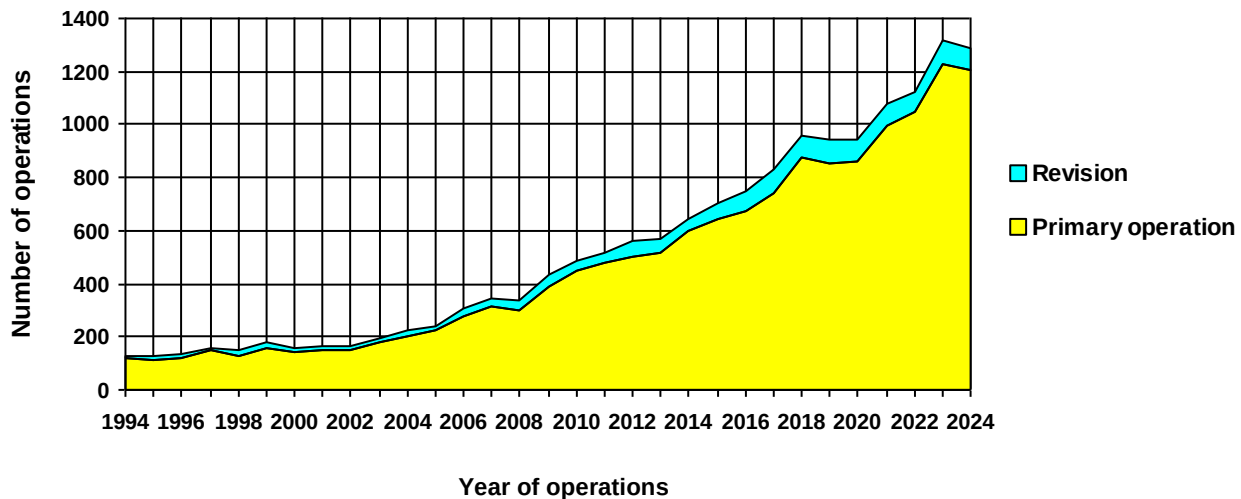
SHOULDER PROSTHESES

Table 1: Annual number of shoulder prosthesis operations

Year	Primary operations	Reoperations *	Revisions	Total
2024	1 205 (93,3%)	1 (0,1%)	85 (6,6%)	1 291
2023	1 227 (93,2%)	1 (0,1%)	89 (6,8%)	1 317
2022	1 050 (93,3%)	2 (0,2%)	74 (6,6%)	1 126
2021	999 (92,4%)		82 (7,6%)	1 081
2020	861 (90,5%)	4 (0,4%)	86 (9,0%)	951
2019	854 (90,5%)	1 (0,1%)	89 (9,4%)	944
2018	878 (91,8%)		78 (8,2%)	956
2017	743 (89,6%)	1 (0,1%)	85 (10,3%)	829
2016	673 (90,3%)		72 (9,7%)	745
1994-15	6 309 (91,3%)	3 (0,0%)	598 (8,7%)	6 910
Total	14 799 (91,6%)	13 (0,1%)	1 338 (8,3%)	16 150

* Reoperation where prosthetic parts were not changed or removed (soft tissue debridements for infected prosthesis, prosthetic parts were not changed)

Figure 1: Annual number of operations - All prostheses



53,7 % of all operations were performed on the right side 67,7 % performed in women. Mean age: 70,3 years.

Figure 2a: Prostheses - all operations

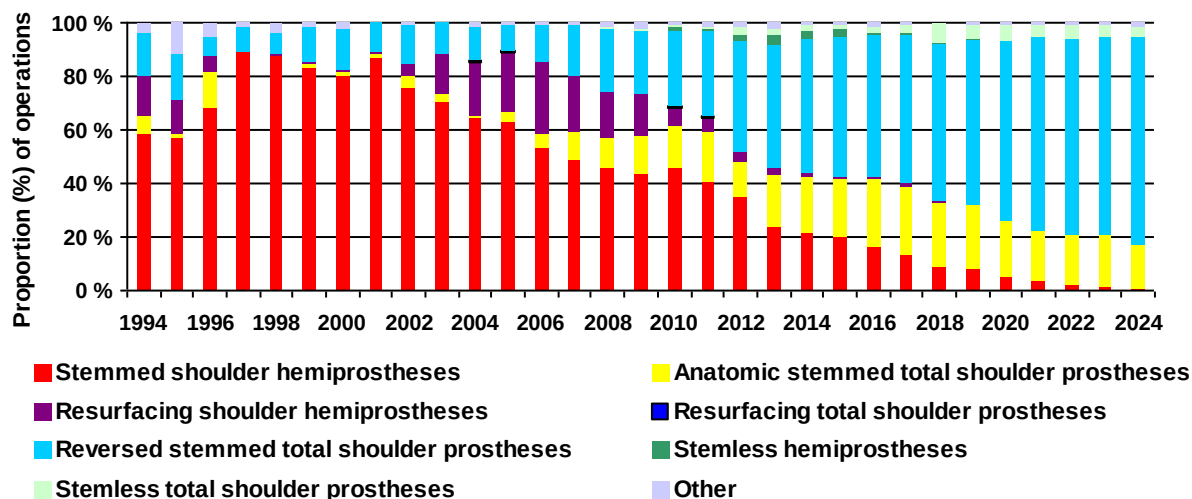


Figure 2b: Prostheses - Idiopathic osteoarthritis

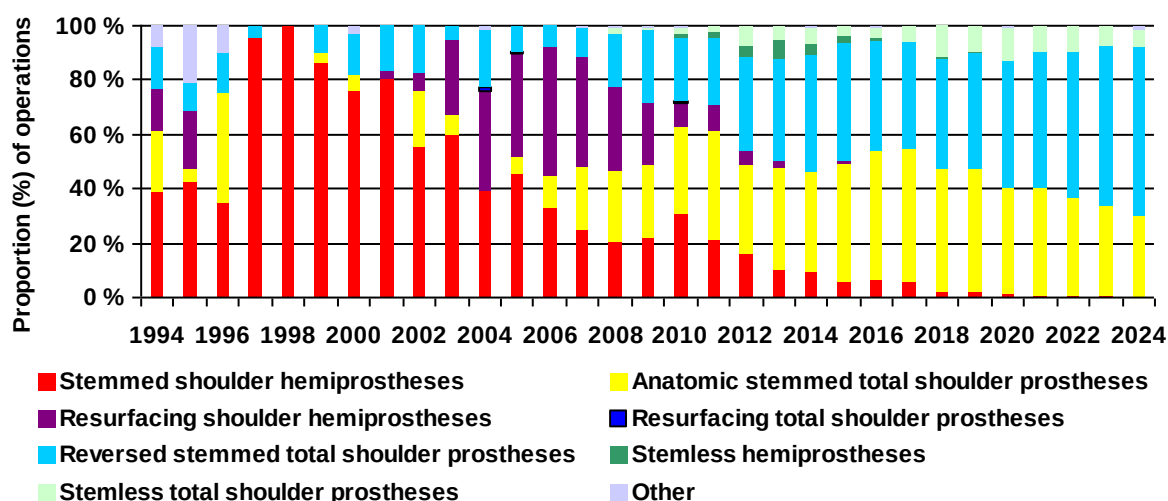


Figure 2c: Prostheses - Acute fracture

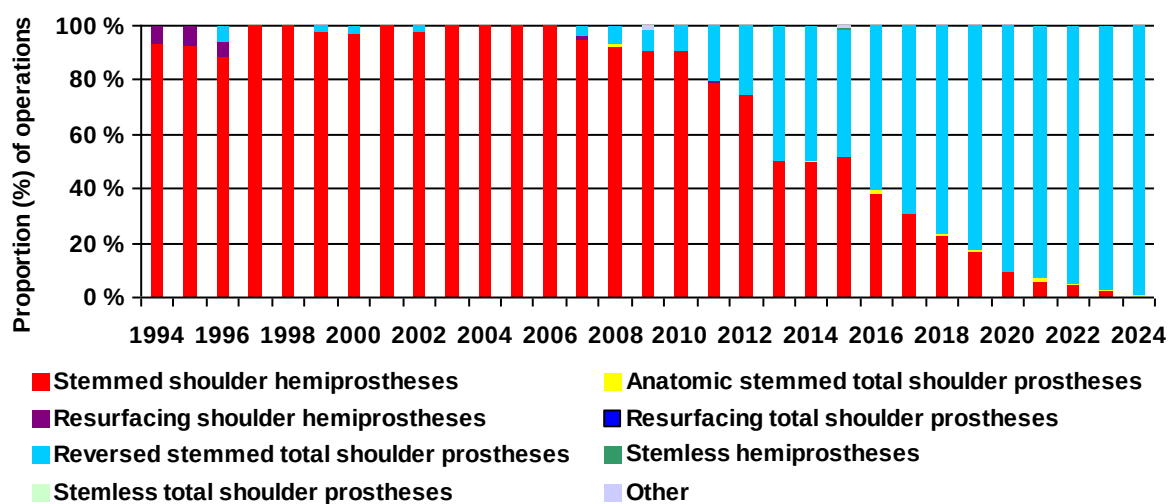


Figure 3: Age at the insertion of primary anatomic total prostheses

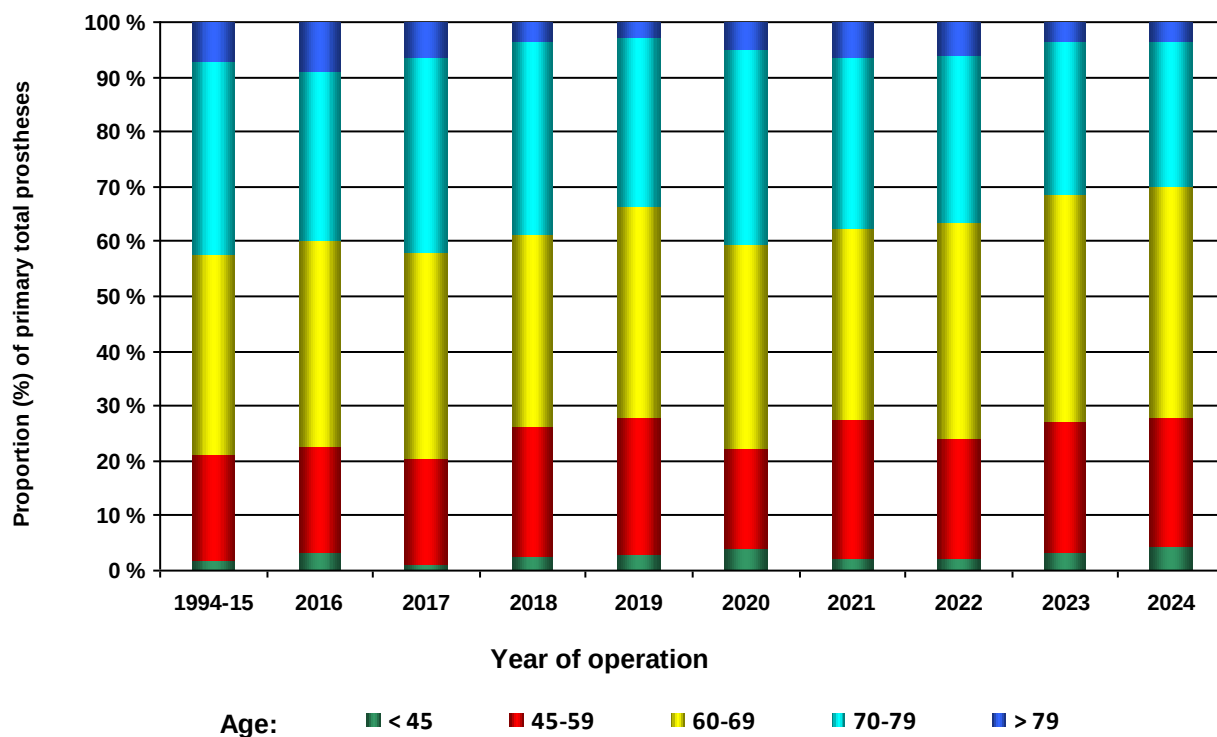


Figure 4: Age at the insertion of primary reversed total prostheses

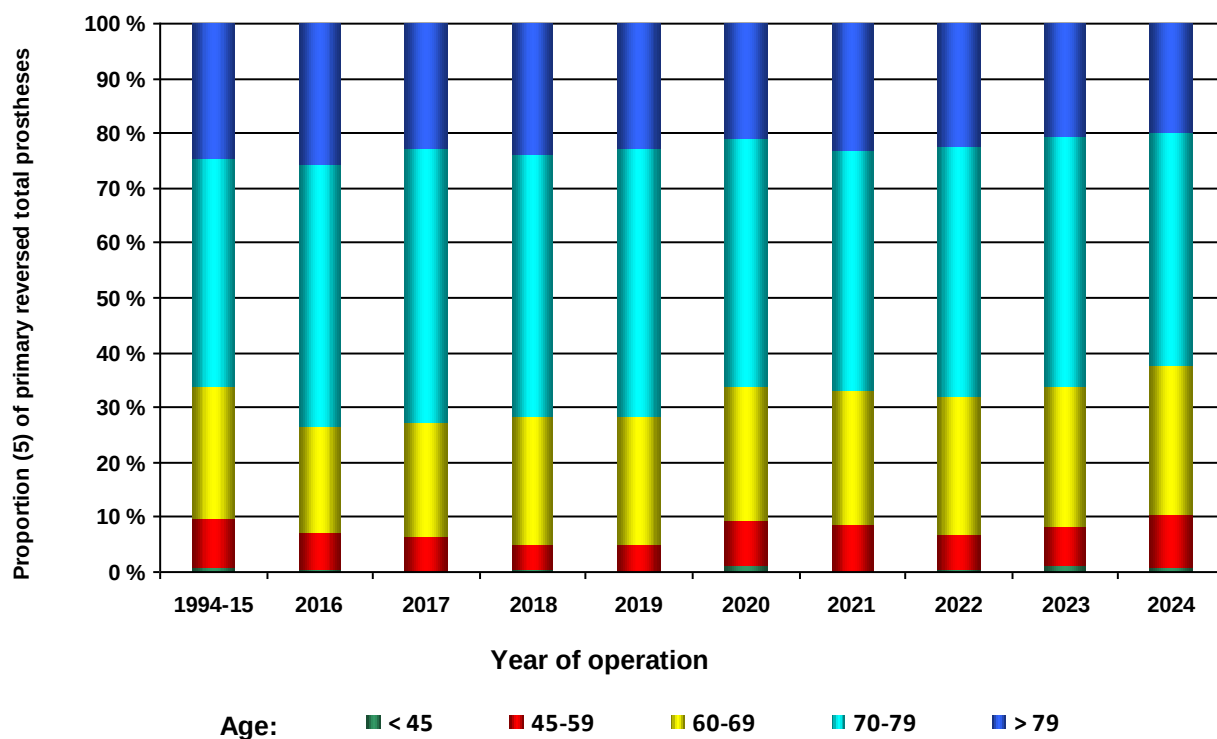


Figure 5: Age at the insertion of primary hemiprostheses

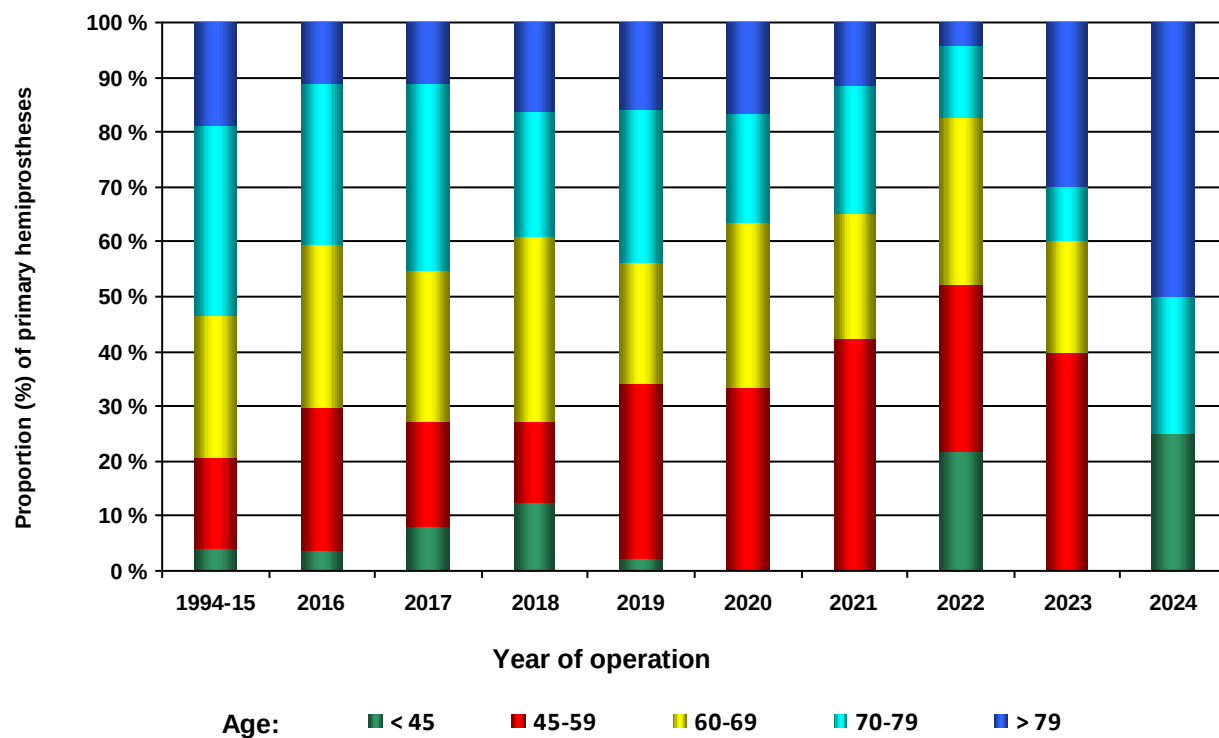


Table 2: Annual number of operations - Stemmed shoulder hemiprostheses

Year	Primary operations	Reoperations *	Revisions	Total
2024	4 (50,0%)		4 (50,0%)	8
2023	10 (41,7%)	2 (8,3%)	12 (50,0%)	24
2022	21 (65,6%)	1 (3,1%)	10 (31,3%)	32
2021	25 (64,1%)		14 (35,9%)	39
2020	30 (60,0%)	2 (4,0%)	18 (36,0%)	50
2019	48 (64,9%)		26 (35,1%)	74
2018	67 (74,4%)		23 (25,6%)	90
2017	87 (76,3%)	1 (0,9%)	26 (22,8%)	114
2016	100 (80,6%)		24 (19,4%)	124
1994-15	2 937 (92,1%)	1 (0,0%)	251 (7,9%)	3 189
Total	3 329 (88,9%)	7 (0,2%)	408 (10,9%)	3 744

* Reoperation where prosthetic parts were not changed or removed (soft tissue debridements for infected prosthesis, prosthetic parts were not changed)

Figure 6: Annual number of operations - Stemmed hemiprostheses

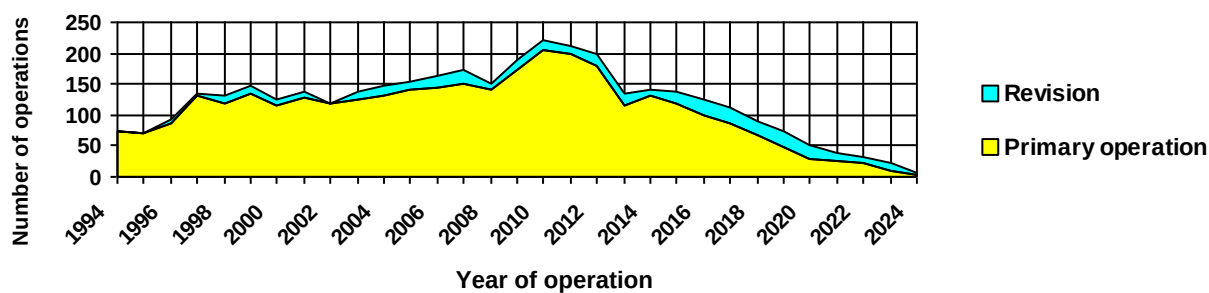
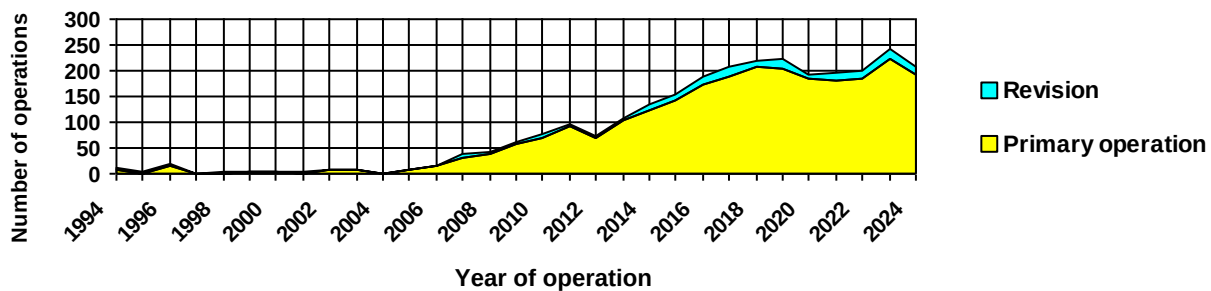


Table 3: Annual number of operations - Anatomic stemmed total shoulder prostheses

Year	Primary operations	Revisions	Total
2024	191 (91,8%)	17 (8,2%)	208
2023	222 (91,0%)	22 (9,0%)	244
2022	183 (91,5%)	17 (8,5%)	200
2021	181 (91,9%)	16 (8,1%)	197
2020	183 (94,3%)	10 (5,2%)	194
2019	202 (91,0%)	20 (9,0%)	222
2018	209 (94,6%)	12 (5,4%)	221
2017	190 (91,8%)	17 (8,2%)	207
2016	172 (92,0%)	15 (8,0%)	187
1994-15	792 (91,1%)	77 (8,9%)	869
Total	2 525 (91,9%)	223 (8,1%)	2 749

Figure 7: Annual number of operations - Anatomic stemmed total shoulder prostheses**Table 4: Annual number of operations - Resurfacing shoulder hemiprostheses**

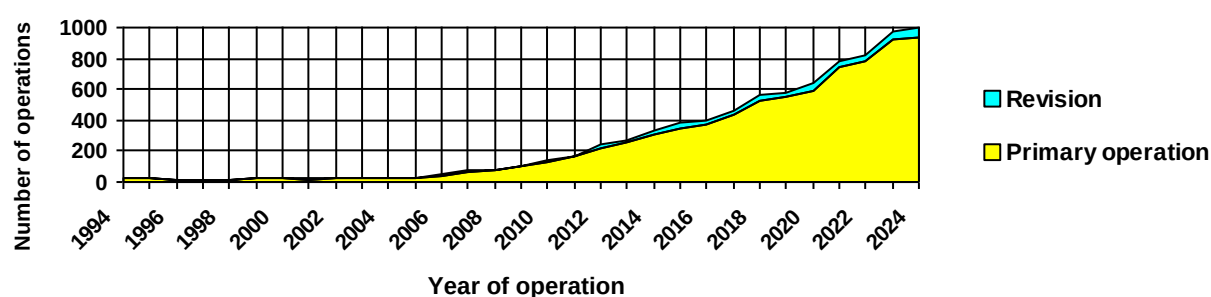
Year	Primary operations	Revisions	Total
2024		3 (100,0%)	3
2023		3 (100,0%)	3
2022		1 (100,0%)	1
2021		6 (100,0%)	6
2020		4 (100,0%)	4
2019		3 (100,0%)	3
2018		9 (100,0%)	9
2017		10 (100,0%)	10
2016		11 (100,0%)	11
1994-15	480 (84,2%)	90 (15,8%)	570
Total	480 (77,4%)	140 (22,6%)	620

Table 5: Annual number of operations - Resurfacing total shoulder prostheses

Year	Primary operations	Revisions	Total
1994-15	4 (80,0%)	1 (20,0%)	5
Total	4 (80,0%)	1 (20,0%)	5

Table 6: Annual number of operations - Reversed stemmed total shoulder prostheses

Year	Primary operations		Reoperations *		Revisions		Total
2024	942	(94,4%)	1	(0,1%)	55	(5,5%)	998
2023	929	(95,7%)	1	(0,1%)	41	(4,2%)	971
2022	785	(95,6%)	1	(0,1%)	35	(4,3%)	821
2021	741	(94,4%)			44	(5,6%)	785
2020	586	(91,8%)	5	(0,8%)	47	(7,4%)	638
2019	545	(93,5%)	1	(0,2%)	37	(6,3%)	583
2018	525	(92,1%)	2	(0,4%)	43	(7,5%)	570
2017	439	(94,0%)			28	(6,0%)	467
2016	378	(95,0%)	1	(0,3%)	19	(4,8%)	398
1994-15	1 922	(92,6%)	1	(0,0%)	152	(7,3%)	2 075
Total	7 792	(93,8%)	13	(0,2%)	501	(6,0%)	8 306

Figure 8: Annual number of operations - Reversed stemmed total shoulder prostheses**Table 7: Annual number of operations - Stemless hemiprostheses**

Year	Primary operations		Revisions		Total
2024			1	(100,0%)	1
2023			2	(100,0%)	2
2022	2	(100,0%)			2
2021	1	(33,3%)	2	(66,7%)	3
2020			2	(100,0%)	2
2019	2	(33,3%)	4	(66,7%)	6
2018	7	(77,8%)	2	(22,2%)	9
2017	1	(33,3%)	2	(66,7%)	3
2016	8	(100,0%)			8
1994-15	70	(89,7%)	8	(10,3%)	78
Total	91	(79,8%)	23	(20,2%)	114

Table 8: Annual number of operations - Stemless total shoulder prostheses

Year	Primary operations		Revisions		Total
2024	46	(88,5%)	6	(11,5%)	52
2023	50	(87,7%)	7	(12,3%)	57
2022	46	(85,2%)	8	(14,8%)	54
2021	44	(89,8%)	5	(10,2%)	49
2020	53	(98,1%)	1	(1,9%)	54
2019	46	(92,0%)	4	(8,0%)	50
2018	60	(89,6%)	7	(10,4%)	67
2017	26	(92,9%)	2	(7,1%)	28
2016	14	(82,4%)	3	(17,6%)	17
1994-15	72	(96,0%)	3	(4,0%)	75
Total	457	(90,9%)	46	(9,1%)	503

Table 9: Annual number of operations - Reversed stemless total shoulder prostheses

Year	Primary operations		Revisions		Total
2024	11	(100,0%)			11
2023	14	(93,3%)	1	(6,7%)	15
2022	13	(92,9%)	1	(7,1%)	14
2021	7	(87,5%)	1	(12,5%)	8
2020	9	(75,0%)	3	(25,0%)	12
2019	11	(100,0%)			11
2018	10	(100,0%)			10
2016	1	(100,0%)			1
1994-15	12	(75,0%)	4	(25,0%)	16
Total	88	(89,8%)	10	(10,2%)	98

Reasons for primary operations

Table 10: Shoulder disease in primary operations

Year	Idiopathic osteo-arthritis	Rheumatoid arthritis	Sequelae after fracture	Osteo-necrosis	Instability/sequelae after dislocation	Acute fracture	Sequelae after infection	Rotator cuff arthropathy	Other	Missing
2024	629	22	88	0	37	276	2	237	134	0
2023	644	19	70	4	40	313	10	213	117	3
2022	485	24	106	3	19	300	6	186	74	0
2021	414	24	101	1	31	295	4	182	38	2
2020	392	23	95	2	33	228	6	121	35	0
2019	396	26	109	0	34	209	4	129	21	0
2018	408	45	102	1	41	212	5	131	22	0
2017	332	40	104	0	29	167	4	124	22	0
2016	294	39	97	3	23	168	3	85	12	0
1994-15	2 251	951	1 019	31	159	1 692	39	280	226	16
Total	6 245	1 213	1 891	45	446	3 860	83	1 688	701	21

Diseases are not mutually exclusive. More than one reason for operation is possible.

Table 11: Shoulder disease in primary operations - Stemmed shoulder hemiprotheses

Year	Idiopathic osteo-arthritis	Rheumatoid arthritis	Sequelae after fracture	Osteo-necrosis	Instability/sequelae after dislocation	Acute fracture	Sequelae after infection	Rotator cuff arthropathy	Other	Missing
2024	2	0	0	0	0	0	0	1	1	0
2023	3	0	1	0	0	6	0	0	1	0
2022	3	0	2	0	1	13	0	1	3	0
2021	4	1	0	0	1	18	0	1	2	0
2020	6	0	1	0	1	21	1	1	0	0
2019	10	0	2	0	0	36	0	0	2	0
2018	8	0	8	0	0	48	1	3	6	0
2017	19	4	10	0	1	52	1	1	6	0
2016	18	1	11	1	1	64	0	2	3	0
1994-15	565	450	534	18	16	1 335	10	9	115	10
Total	638	456	569	19	21	1 593	13	19	139	10

Diseases are not mutually exclusive. More than one reason for operation is possible.

Figure 9: Shoulder disease in primary operations - Stemmed shoulder hemiprotheses

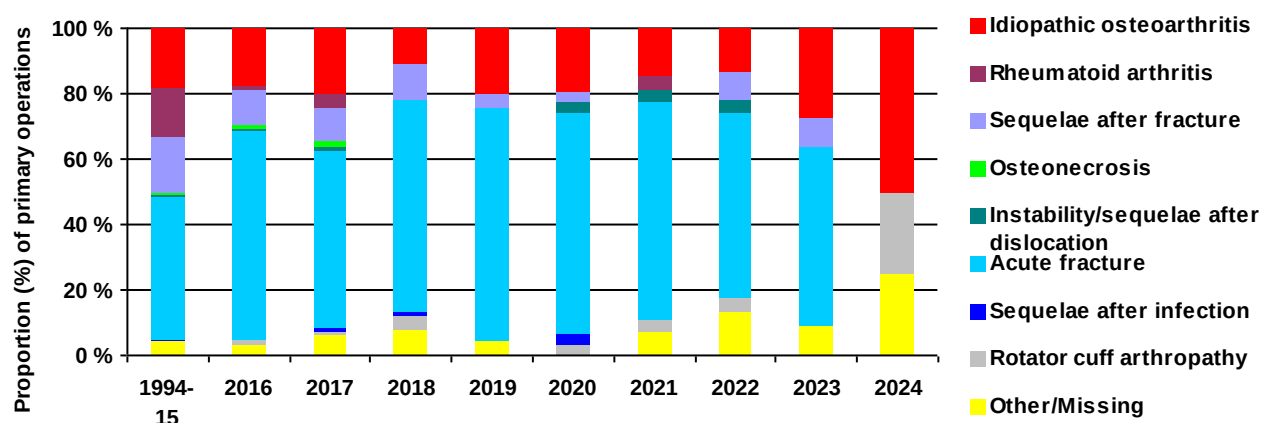
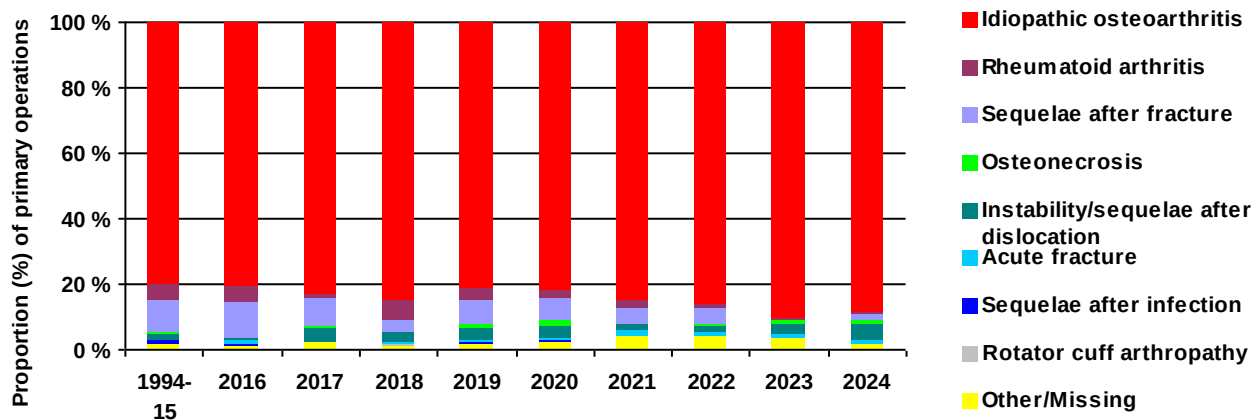


Table 12: Shoulder disease in primary operations - Anatomic stemmed total shoulder prostheses

Year	Idiopathic osteo- arthritis	Rheumatoid arthritis	Sequelae after fracture	Osteo- necrosis	Instability/seq- uelae after dislocation	Acute fracture	Sequelae after infection	Rotator cuff arth- ropathy	Other	Missing
2024	182	1	3	0	10	2	0	0	4	0
2023	212	2	0	0	6	4	0	0	8	0
2022	170	3	9	1	4	2	0	1	8	0
2021	158	4	9	0	4	3	0	0	8	0
2020	152	5	12	0	7	1	1	1	4	0
2019	175	7	16	0	8	1	1	0	4	0
2018	185	13	8	0	7	1	0	2	2	0
2017	161	3	16	0	8	0	0	0	5	0
2016	142	8	20	0	1	2	1	0	2	0
1994-15	644	37	77	2	14	1	5	0	16	1
Total	2 181	83	170	3	69	17	8	4	61	1

Diseases are not mutually exclusive. More than one reason for operation is possible.

Figure 10: Shoulder disease in primary operations - Anatomic stemmed total shoulder prostheses**Table 13: Shoulder disease in primary operations - Resurfacing shoulder hemiprostheses**

Year	Idiopathic osteo- arthritis	Rheumatoid arthritis	Sequelae after fracture	Osteo- necrosis	Instability/seq- uelae after dislocation	Acute fracture	Sequelae after infection	Rotator cuff arth- ropathy	Other	Missing
1994-15	299	124	36	4	11	4	3	5	16	3
Total	299	124	36	4	11	4	3	5	16	3

Diseases are not mutually exclusive. More than one reason for operation is possible.

Table 14: Shoulder disease in primary operations - Resurfacing total shoulder prostheses

Year	Idiopathic osteo- arthritis	Rheumatoid arthritis	Sequelae after fracture	Osteo- necrosis	Instability/seq- uelae after dislocation	Acute fracture	Sequelae after infection	Rotator cuff arthr- opathy	Other	Missing
1994-15	4	0	0	0	0	0	0	0	1	0
Total	4	0	0	0	0	0	0	0	1	0

Diseases are not mutually exclusive. More than one reason for operation is possible.

Table 15: Shoulder disease in primary operations - Reversed stemmed total shoulder prostheses

Year	Idiopathic osteo- arthritis	Rheumatoid arthritis	Sequelae after fracture	Osteo- necrosis	Instability/seq- uelae after dislocation	Acute fracture	Sequelae after infection	Rotator cuff arthr- opathy	Other	Missing
2024	391	14	84	0	22	273	2	232	122	0
2023	373	17	68	3	30	303	9	207	101	3
2022	258	17	95	1	12	284	6	182	59	0
2021	206	17	90	1	25	274	4	180	28	2
2020	183	17	80	1	22	206	4	114	26	0
2019	169	16	87	0	21	172	2	121	11	0
2018	160	31	79	0	24	163	4	123	9	0
2017	133	33	74	0	17	115	2	123	10	0
2016	120	28	62	2	19	102	2	82	7	0
1994-15	605	329	355	7	108	351	21	264	78	1
Total	2 598	519	1 074	15	300	2 243	56	1 628	451	6

Diseases are not mutually exclusive. More than one reason for operation is possible.

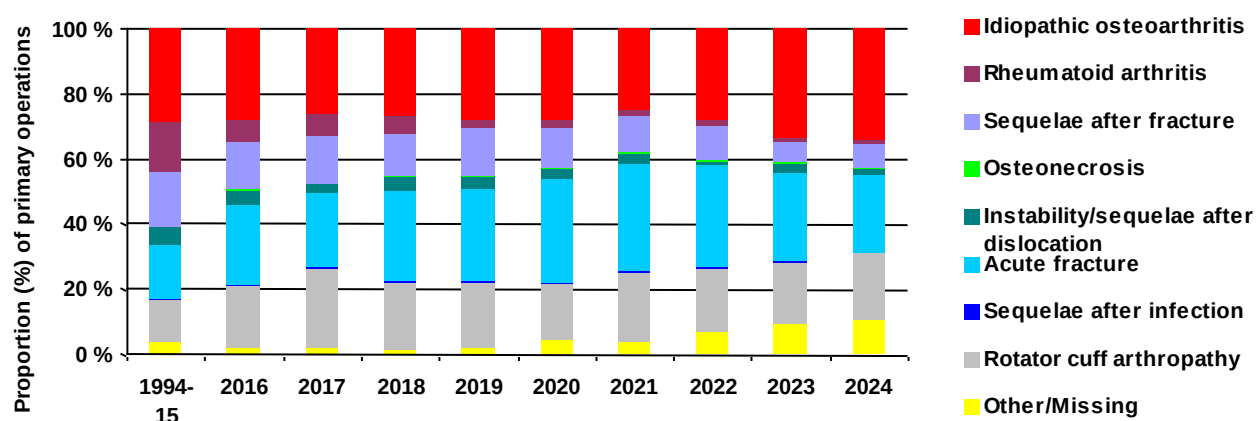
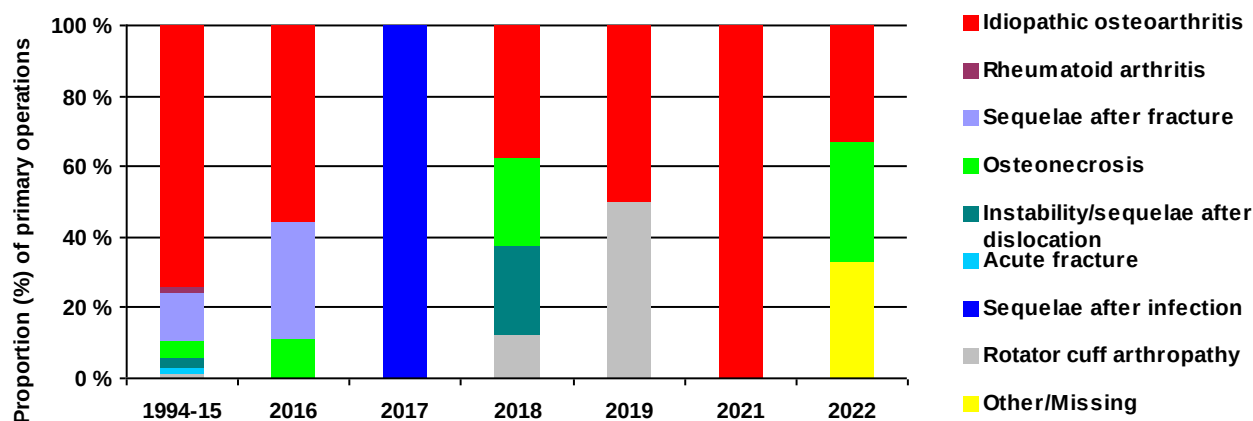
Figure 11: Shoulder disease in primary operations - Reversed stemmed total shoulder prostheses

Table 16: Shoulder disease in primary operations - Stemless shoulder hemiprotheses

Year	Idiopathic osteo-arthrititis	Rheumatoid arthritis	Sequelae after fracture	Osteo-necrosis	Instability/sequelae after dislocation	Acute fracture	Sequelae after infection	Rotator cuff arth-ropathy	Other	Missing
2022	1	0	0	0	0	0	0	0	1	0
2021	1	0	0	0	0	0	0	0	0	0
2019	1	0	0	0	0	0	0	1	0	0
2018	3	0	0	0	2	0	0	1	0	0
2017	0	0	0	0	0	0	1	0	0	0
2016	5	0	3	0	0	0	0	0	0	0
1994-15	55	1	10	0	2	1	0	1	0	0
Total	66	1	13	0	4	1	1	3	1	0

Diseases are not mutually exclusive. More than one reason for operation is possible.

Figure 12: Shoulder disease in primary operations - Stemless shoulder hemiprotheses**Table 17: Shoulder disease in primary operations - Stemless total shoulder prostheses**

Year	Idiopathic osteo-arthrititis	Rheumatoid arthritis	Sequelae after fracture	Osteo-necrosis	Instability/sequelae after dislocation	Acute fracture	Sequelae after infection	Rotator cuff arth-ropathy	Other	Missing
2024	40	1	1	0	4	0	0	1	3	0
2023	46	0	0	0	4	0	1	0	4	0
2022	45	1	0	0	2	1	0	0	2	0
2021	40	0	2	0	1	0	0	1	0	0
2020	48	0	1	0	3	0	0	1	2	0
2019	37	0	3	0	5	0	1	1	3	0
2018	47	1	5	1	8	0	0	0	3	0
2017	19	0	4	0	3	0	0	0	1	0
2016	9	1	1	0	2	0	0	1	0	0
1994-15	61	3	3	0	5	0	0	0	0	0
Total	392	7	20	1	37	1	2	5	18	0

Diseases are not mutually exclusive. More than one reason for operation is possible.

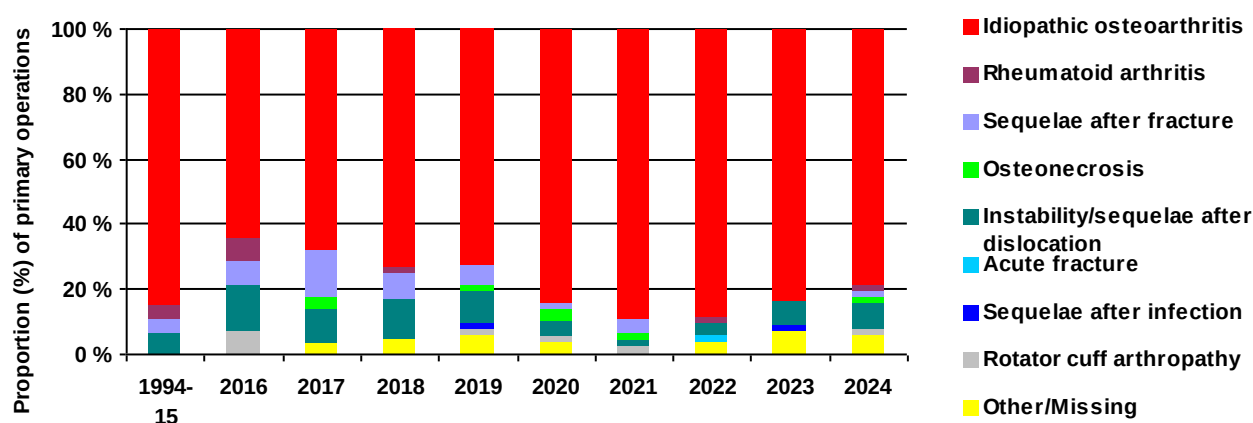
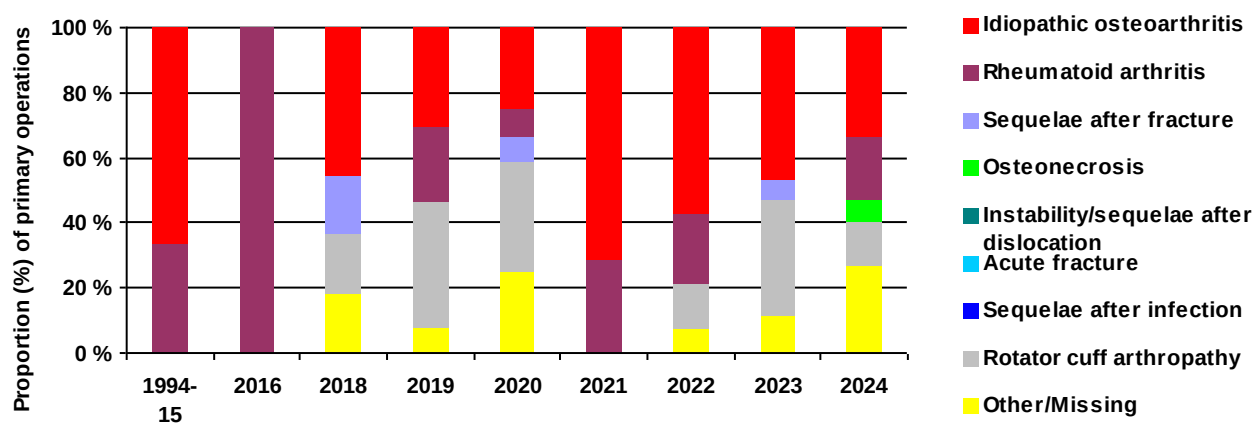
Figure 13: Shoulder disease in primary operations - Stemless total shoulder prostheses

Table 18: Shoulder disease in primary operations - Reversed stemless total shoulder prostheses

Year	Idiopathic osteo- arthritis	Rheumatoid arthritis	Sequelae after fracture	Osteo- necrosis	Instability/sequelae after dislocation	Acute fracture	Sequelae after infection	Rotator cuff arthropathy	Other	Missing
2024	5	3	0	0	0	0	0	2	4	0
2023	8	0	1	1	0	0	0	6	2	0
2022	8	3	0	1	0	0	0	2	1	0
2021	5	2	0	0	0	0	0	0	0	0
2020	3	1	1	1	0	0	0	4	3	0
2019	4	3	0	0	0	0	0	5	1	0
2018	5	0	2	0	0	0	0	2	2	0
2016	0	1	0	0	0	0	0	0	0	0
1994-15	8	4	0	0	0	0	0	0	0	0
Total	46	17	4	3	0	0	0	21	13	0

Diseases are not mutually exclusive. More than one reason for operation is possible.

Figure 14: Shoulder disease in primary operations - Reversed stemless total shoulder prostheses

Use of cement in shoulder prostheses

Figure 15: Stemmed shoulder hemiprostheses - Primary operations - Humerus

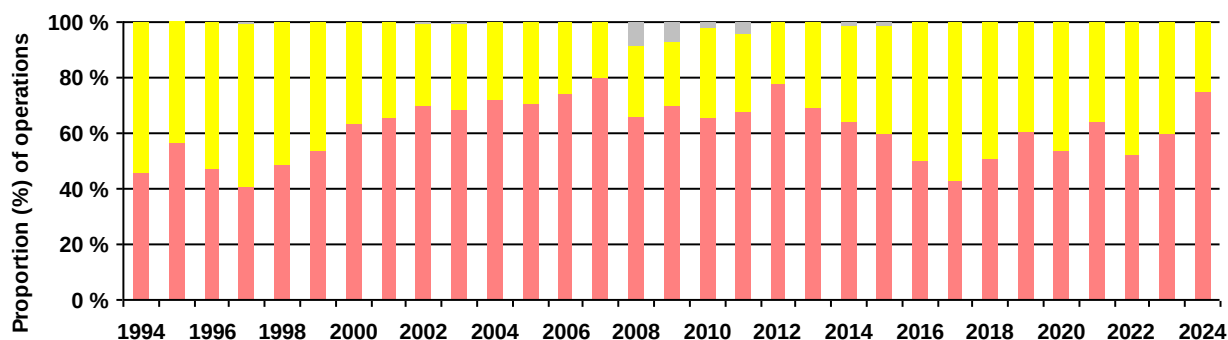


Figure 16: Anatomic stemmed total shoulder prostheses - Primary operations - Glenoid

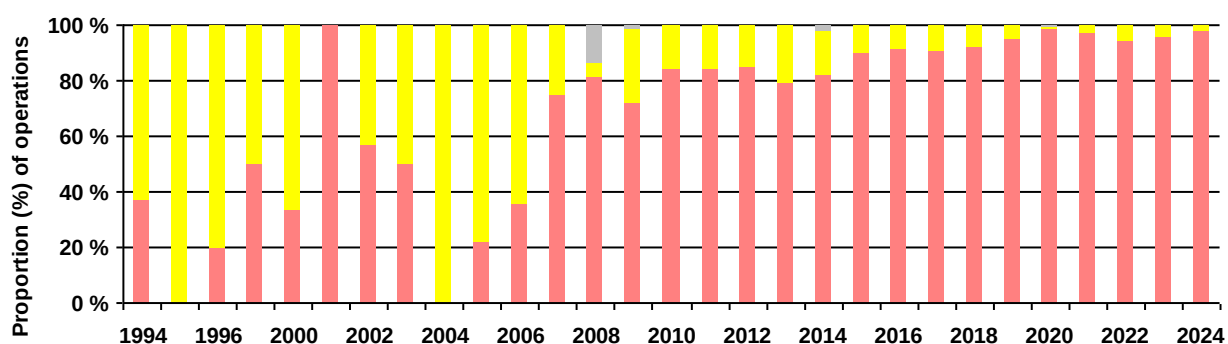


Figure 17: Anatomic stemmed total shoulder prostheses - Primary operations - Humerus

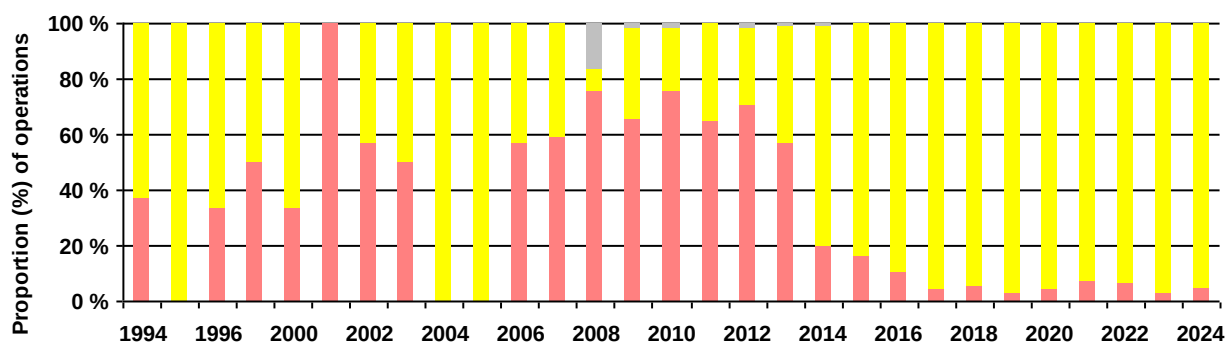


Figure 18: Resurfacing shoulder hemiprostheses - Primary operations - Humerus

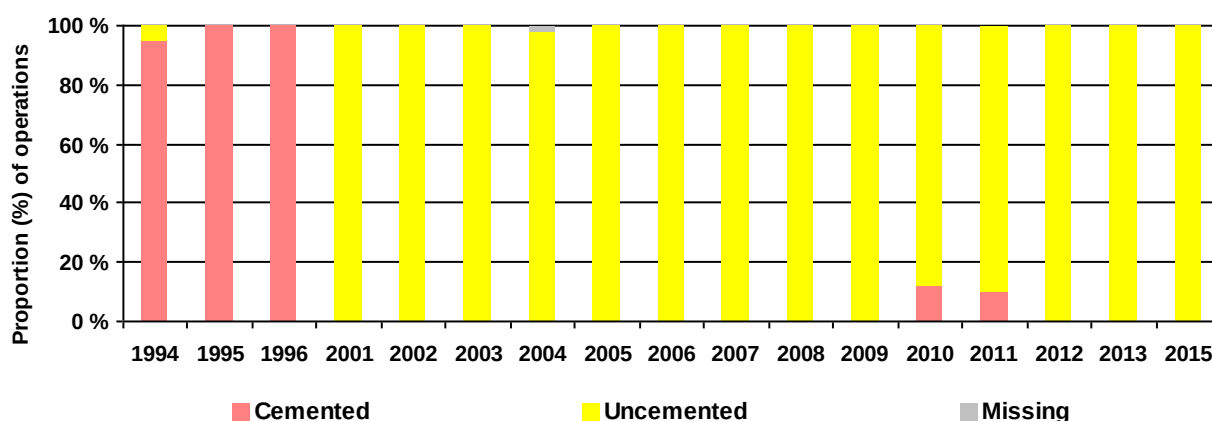


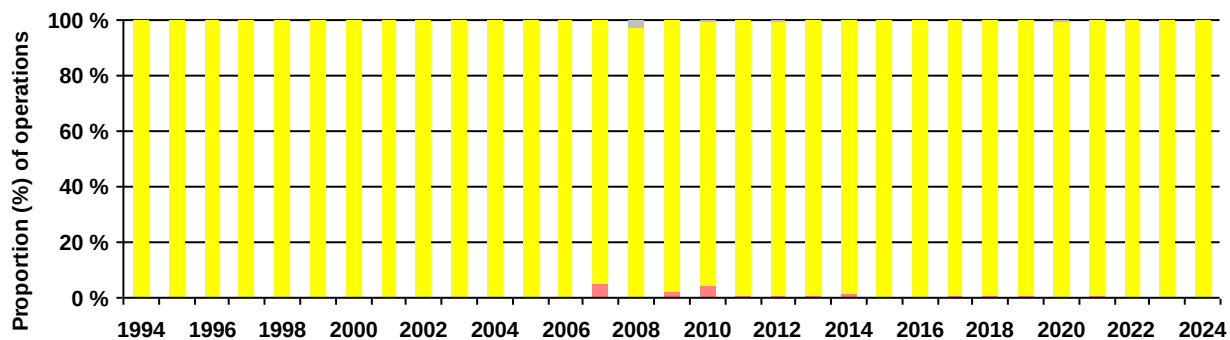
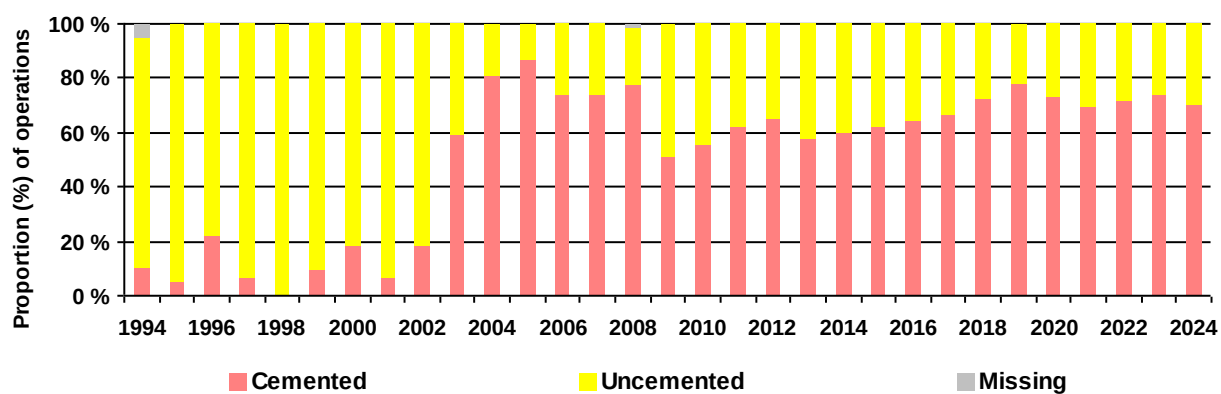
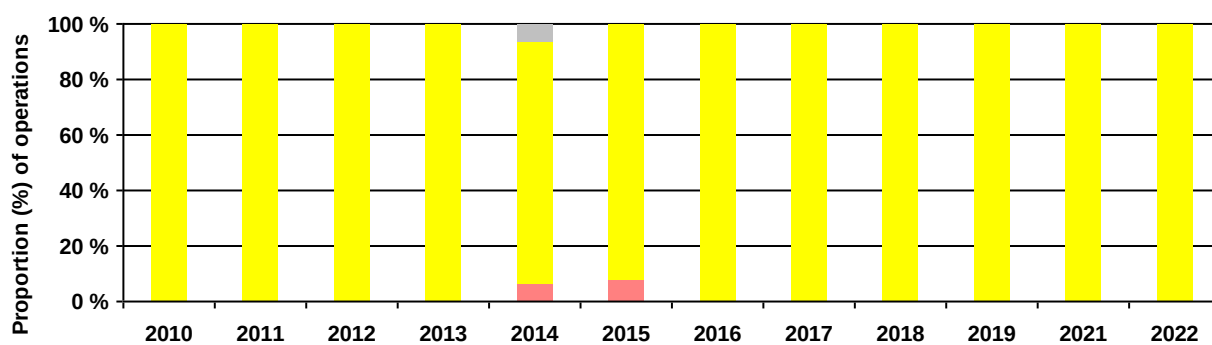
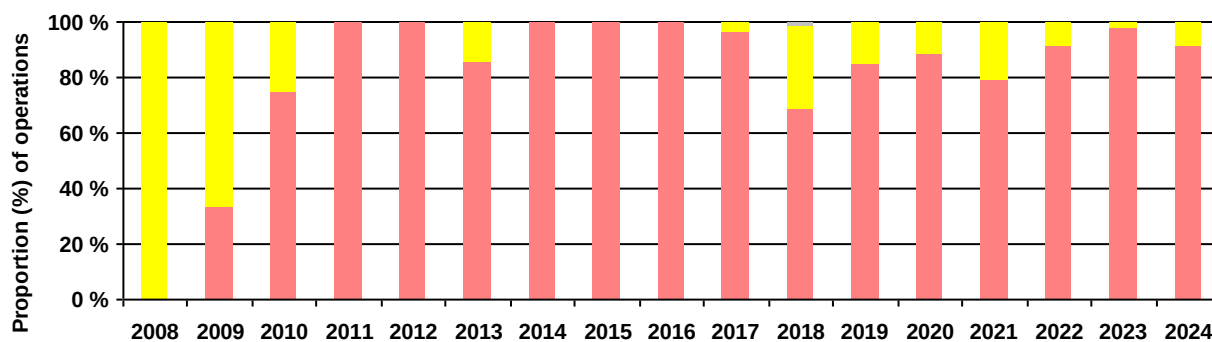
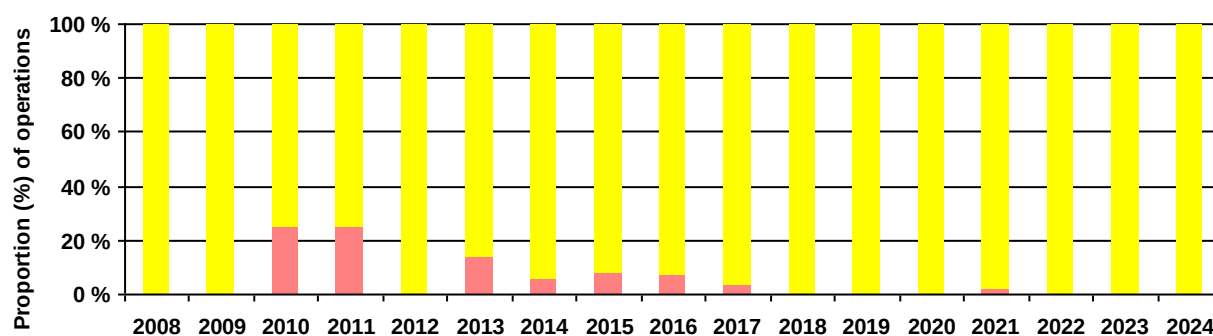
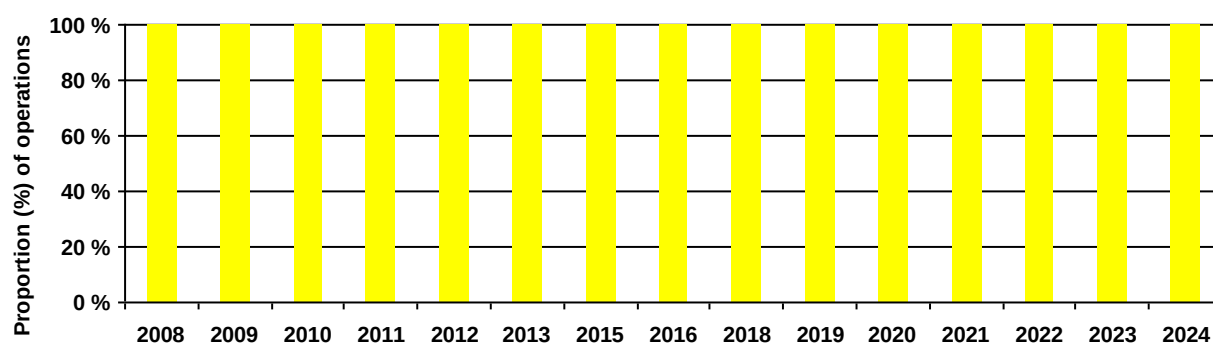
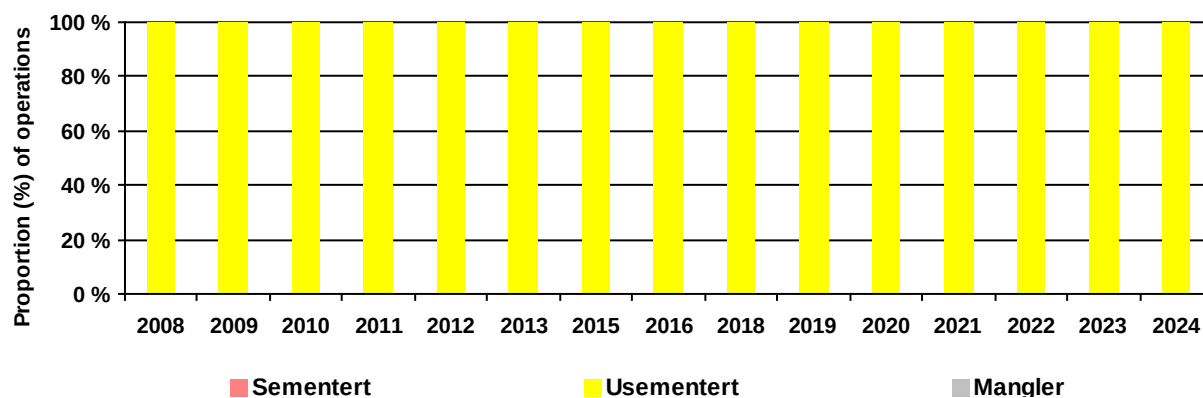
Figure 19: Reversed stemmed total shoulder prostheses - Primary operations - Glenoid**Figure 20: Reversed stemmed total shoulder prostheses - Primary operations - Humerus****Figure 21: Stemless shoulder hemiprosthesis - Primary operations - Humerus****Figure 22: Stemless total shoulder prostheses - Primary operations - Glenoid**

Figure 23: Stemless total shoulder prostheses - Primary operations - Humerus**Figure 24: Reversed stemless total shoulder prostheses - Primary operations - Glenoid****Figure 25: Reversed stemless total shoulder prostheses - Primary operations - Humerus**

Prosthesis brand

Stemmed hemiprotheses shoulder

Table 19: Primary operations- Caput humeri

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Bio - Modular	767			2							769
Global Advantage	715	15	1								731
Global Fx	267	11			1						279
Global	248										248
Nottingham	204										204
Global Unite	38	34	31	37	26	13	8	11	1		199
EPOCA	145										145
Tess-Anatomic	81	5									86
Comprehensive	17	13	16	4	5	7	7	2	3		74
Delta I	63										63
SMR- anatomic	3	7	13	10	8	4	4	4	1	1	55
Promos standard	45	6	2								53
Aequalis Ascend Flex Anatomic	11	2	11	6	4	5	5	3			47
Aequalis	44										44
Aequalis-Fracture	35	1	3	2							41
Nottingham 1	38										38
Modular	33										33
Bigliani/Flatow	30			1	1						32
JR-Vaios Anatomic	17	3	6	2	1						29
Delta Xtend	3		3	2	2	1	1	1	2	3	18
Other (n < 15)	26	3	1	1					3		34
Total	2 830	100	87	67	48	30	25	21	10	4	3 222

Table 20: Primary operations - Humerus

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Bio - Modular	776			2							778
Global Advantage	517	15	1								533
Global Fx	465	11			1						477
Global	261										261
Nottingham	210										210
Global Unite	38	34	31	37	26	13	8	11			198
EPOCA	146										146
Tess-Anatomic	80	5									85
Delta I	64										64
SMR- anatomic	3	7	13	10	8	4	4	4	1	1	55
Promos standard	44	6	2								52
Aequalis Ascend Flex Anatomic	11	2	11	6	4	5	5	3			47
Neer II	47										47
Aequalis-Fracture	39	1	3	2							45
Comprehensive Fracture	18	3	3	2	3	3	4	2	2		40
Aequalis	39										39
Comprehensive		10	13	2	2	4	3		1		35
Modular	33										33
Bigliani/Flatow	30			1	1						32
Nottingham 1	32										32
JR-Vaios Anatomic	17	3	6	2	1						29
Delta Xtend	3		3	2	2	1	1	1	2	3	18
Other (n < 15)	64	3	1	1					4		73
Total	2 937	100	87	67	48	30	25	21	10	4	3 329

Anatomic stemmed total shoulder prostheses

Table 21: Primary operations - Glenoid

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Global unite anatomic	85	100	130	137	142	153	135	140	179	159	1 360
Aequalis	248										248
Aequalis Ascend Flex Anatomic	95	30	25	25	10	8	13	14	5	2	227
Comprehensive	8		10	24	41	16	31	20	24	16	190
Global	124										124
Global Advantage	51	19	1								71
SMR- anatomic	1	4	11	9	7	2	2	8	9	3	56
JR-Vaios Anatomic	20	11	8	8	1						48
Tess-Anatomic	34	3		2							39
Bio - Modular	37										37
Promos standard	17	4	3	3							27
Bigliani/Flatow	20	1	2	1							24
Anatomical shoulder	15										15
Other (n < 15)	37				1	4		1	5	11	59
Total	792	172	190	209	202	183	181	183	222	191	2 525

Table 22: Primary operations - Caput humeri

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Global unite anatomic	85	100	130	136	141	151	133	141	179	160	1 356
Aequalis	250										250
Aequalis Ascend Flex Anatomic	92	30	25	25	10	11	13	14	9	2	231
Comprehensive	8		10	24	41	16	31	20	24	23	197
Global Advantage	172	18	1								191
SMR- anatomic	1	4	11	9	7	2	2	8	9	3	56
JR-Vaios Anatomic	20	11	8	8	1						48
Bio - Modular	47										47
Tess-Anatomic	34	3		2							39
Promos standard	17	4	3	3							27
Bigliani/Flatow	20	1	2	1							24
Anatomical shoulder	16										16
Nottingham	15										15
Other (n < 15)	13	1		1	2	3	2		1	3	26
Total	790	172	190	209	202	183	181	183	222	191	2 523

Table 23: Primary operations - Humerus

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Global unite anatomic	85	100	130	136	141	151	133	140	179	160	1 355
Aequalis	250										250
Aequalis Ascend Flex Anatomic	90	30	25	25	10	11	13	14	4		222
Comprehensive	8		10	24	41	16	31	20	24	23	197
Global Advantage	169	17	1								187
SMR- anatomic	1	4	11	9	7	2	2	8	9	3	56
Bio - Modular	48										48
JR-Vaios Anatomic	19	11	8	8	1						47
Tess-Anatomic	34	3		2							39
Promos standard	17	4	3	3							27
Bigliani/Flatow	20	1	2	1							24
Anatomical shoulder	16										16
Nottingham	15										15
Other (n < 15)	20	2		1	2	3	2	1	6	5	42
Total	792	172	190	209	202	183	181	183	222	191	2 525

Resurfacing shoulder hemiprostheses

Table 24: Primary operations - Humerus

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Copeland	304										304
Global C.A.P.	99										99
Scan Shoulder	42										42
EPOCA Resurfacing	19										19
Aequalis Resurfacing	16										16
Total	480	0	0	0	0	0	0	0	0	0	480

Resurfacing total shoulder prostheses

Table 25: Primary operations - Glenoid

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Copeland	2										2
Aequalis Resurfacing	2										2
Total	4	0	0	0	0	0	0	0	0	0	4

Table 26: Primary operations - Humerus

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Copeland	2										2
Aequalis Resurfacing	2										2
Total	4	0	0	0	0	0	0	0	0	0	4

Reversed stemmed total shoulder prostheses

Table 27: Primary operations - Glenoid

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Delta Xtend	1 025	245	305	394	420	427	529	564	722	780	5 411
Aequalis Reversed II	182	45	40	52	38	58	71	77	42	21	626
Comprehensive Reverse	15	29	22	20	43	64	103	97	110	85	588
SMR-reverse	5	11	31	41	36	35	38	45	43	48	333
Delta III	315										315
Tess Reversed	230	27	22	3							282
Promos Reverse	72	17	11	9							109
JRI-Vaios Inverse	18	3	5	5	6						37
Aequalis-Reversed	32								3	2	37
Tornier Aequalis Perform Rever					1	2		1	7	6	17
Trebecular Metal Reverse Shou	11		2								13
Anatomical shoulder Reversed	10										10
Other (n < 10)	7	1	1	1	1			1	2		14
Total	1 922	378	439	525	545	586	741	785	929	942	7 792

Table 28: Primary operations - Caput humeri

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Delta Xtend	1 026	245	305	394	420	427	529	565	723	780	5 414
Comprehensive Reverse	15	29	22	20	43	64	103	97	110	85	588
Aequalis Ascend Flex Reversed	102	34	32	31	27	47	51	51	35	14	424
SMR-reverse	6	11	31	41	37	35	38	45	43	48	335
Delta III	309										309
Tess Reversed	228	27	22	3							280
Aequalis Reversed Fracture	43	11	8	21	12	13	20	27	16	7	178
Promos Reverse	72	17	11	9							109
Aequalis-Reversed	51										51
JRI-Vaios Inverse	18	3	5	5	6						37
Aequalis Reversed II	14										14
Trebecular Metal Reverse Shou	10		2								12
Anatomical shoulder Reversed	10										10
Other (n < 10)	6	1	1	1					2	8	19
Total	1 910	378	439	525	545	586	741	785	929	942	7 780

Table 29: Primary operations - Humerus

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Delta Xtend	1 026	245	305	394	420	427	528	556	687	718	5 306
Aequalis Ascend Flex Reversed	102	34	32	31	27	47	51	50	35	14	423
Comprehensive Reverse	15	27	21	19	33	44	74	64	61	29	387
SMR-reverse	6	11	31	41	37	35	38	45	43	48	335
Delta III	315										315
Tess Reversed	229	27	22	3							281
Aequalis Reversed Fracture	43	11	8	21	12	13	20	27	15	7	177
Comprehensive Fracture		2	1	1	9	20	28	23	19	19	122
Promos Reverse	72	17	11	9							109
Global unite anatomic								5	33	60	98
Comprehensive								10	30	37	77
Aequalis-Reversed	62										62
JRI-Vaios Inverse	18	3	5	5	6						37
Trebecular Metal Reverse Shou	11		2								13
Anatomical shoulder Reversed	10										10
Other (n < 10)	13	1	1	1	1		2	5	6	10	40
Total	1 922	378	439	525	545	586	741	785	929	942	7 792

Stemless shoulder hemiprostheses

Table 30: Primary operations - Caput humeri

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
ECLIPSE TM	56	3									59
Global Icon			1	5	2		1	2			11
Simpliciti	8	1		1							10
Other (n < 10)	6	4		1							11
Total	70	8	1	7	2	0	1	2	0	0	91

Table 31: Primary operations - Humerus

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
ECLIPSE TM	56	3									59
Global Icon			1	5	2		1	2			11
Simpliciti	8	1		1							10
Other (n < 10)	6	4		1							11
Total	70	8	1	7	2	0	1	2	0	0	91

Stemless total shoulder prostheses

Table 32: Primary operations - Glenoid

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Global unite anatomic			9	16	24	34	20	35	37	21	196
Aequalis Ascend Flex Anatomic	20	12	13	24	12	8	15	4	5		113
SMR- anatomic				18	8	7	8	3	1	3	48
Tornier Perform anatomic								1	7	22	30
ECLIPSE TM	19		2	1	2	4	1				29
Simpliciti	20										20
Tess-Anatomic	10		1								11
Other (n < 10)	3	2	1	1				3			10
Total	72	14	26	60	46	53	44	46	50	46	457

Table 33: Primary operations - Caput humeri

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Global Icon			9	16	24	34	20	37	37	21	198
Simpliciti	42	12	13	24	12	8	15	5	12	22	165
SMR- anatomic				18	8	7	8	4	1	3	49
ECLIPSE TM	19		2	1	2	4	1				29
Tess-Anatomic	10		1								11
Other (n < 10)	1	2	1	1							5
Total	72	14	26	60	46	53	44	46	50	46	457

Table 34: Primary operations - Humerus

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Global Icon			9	16	24	34	20	37	37	21	198
Simpliciti	43	12	13	24	11	8	15	5	12	22	165
SMR- anatomic				18	8	7	8	4	1	3	49
ECLIPSE TM	19		2	1	2	4	1				29
Tess-Anatomic	10		1								11
Other (n < 10)		2	1	1	1						5
Total	72	14	26	60	46	53	44	46	50	46	457

Reversed stemless total shoulder prostheses

Table 35: Primary operations - Glenoid

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
SMR-reverse				10	11	9	7	13	14	11	75
Tess Reversed	12	1									13
Total	12	1	0	10	11	9	7	13	14	11	88

Table 36: Primary operations - Caput humeri

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
SMR-reverse	0	0	0	10	11	9	7	13	14	11	75
Tess Reversed	12	1	0	0	0	0	0	0	0	0	13
Total	12	1	0	10	11	9	7	13	14	11	88

Table 37: Primary operations - Humerus

Prostheses	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
SMR-reverse	0	0	0	10	11	9	7	13	14	11	75
Tess Reversed	12	1	0	0	0	0	0	0	0	0	13
Total	12	1	0	10	11	9	7	13	14	11	88

Reasons for revisions

Table 38: Stemmed shoulder hemiprostheses

Year of revision	Loose proximal	Loose distal comp	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Progression of osteoarthritis	Rotator cuff rupture	Other	Missing	Total
2024				1						1	1			2
2023								1		1	2	2		5
2022							1		1	1	1	2		4
2021				4			1	3		1	3	5		11
2020				2		2	1	6	1	3	1	9		16
2019		2	1	1		1	2	10		4		9		20
2018		1		2		2		8		2		6		14
2017			2	2		2	2	12		3		10		22
2016		2	1	1			1	10		6		8		18
2015			1	3		1		8		1		7		16
2014			2	1				8				2		10
2013		1	2	5		1	1	10				2		11
2012		2	4	1		1	2	5				4	1	16
2011			2	2		1		5		2		3		11
2010		3	2	1		1	1	8				5		11
2009				1		2	1	6				1		9
1994-08		9	12	14	1	8	3	66				28	4	112
Total	0	20	29	41	1	22	16	166	2	25	8	103	5	308

Revision reasons are not mutually exclusive. More than one reason for revision is possible. Only the first revision is counted.

The numbers include a total 7 reoperations where component parts are not removed, replaced or inserted.

Table 39: Anatomic stemmed total shoulder prostheses

Year of revision	Loose proximal	Loose distal comp	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Progression of osteoarthritis	Other	Missing	Total
2024	1		1	2			3			1	6		14
2023	1		3			2	2			1	9		17
2022		3					2	1	3	1	6		15
2021	4		1	1				2	3		3		11
2020	2					1		4	2		5		9
2019	3	1	1	5		1	1	3	2		7		15
2018	1		2	2	1			2	1		5		10
2017	5		2	4			1	2			5		14
2016	3	1		1		2		2			1		8
2015	2					2		3			1		6
2014	3			4	1		1	4			3		9
2013	1					1		1	1				3
2012	1			1		1		2	1				3
2011	1	1	2					1					4
2010			1	2							1		3
2009			1										1
1994-08	4		7					5	5		2		19
Total	32	6	21	22	2	10	10	32	18	3	54	0	161

Revision reasons are not mutually exclusive. More than one reason for revision is possible. Only the first revision is counted.

The numbers include a total 1 reoperation where component parts are not removed, replaced or inserted.

Table 40: Resurfacing shoulder hemiprostheses

Year of revision	Loose proximal	Loose distal comp	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Progression of osteoarthritis	Other	Missing	Total
2024							1						1
2023		1				1				1			2
2022										1			1
2021		1		1			1	1		2	1		6
2020								1					1
2019		1					1	2		2			3
2018							1	5		2	3		7
2017				1				6		4			8
2016		3		1				7		3	2		10
2015		2						1			1		4
2014		1		1			1	9		1	2		10
2013		1						7		1	1		8
2012		1	1	2		1		5		2	3		11
2011					1			5			5		7
2010								8		1	1		9
2009								9			2		10
1994-08		6	1	2		2	1	20	1		4		25
Total	0	17	2	8	1	4	6	86	1	20	25	0	123

Revision reasons are not mutually exclusive. More than one reason for revision is possible. Only the first revision is counted.

Total none reoperation where component parts are not removed, replaced or inserted.

Table 41: Resurfacing total shoulder prostheses

Year of revision	Loose proximal	Loose distal comp	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Progression of osteoarthritis	Other	Missing	Total
1994-08			1	1									1
Total	0	0	1	1	0	0	0	0	0	0	0	0	1

Revision reasons are not mutually exclusive. More than one reason for revision is possible. Only the first revision is counted.

Total none reoperation where component parts are not removed, replaced or inserted.

Table 42: Reversed stemmed total shoulder prostheses

Year of revision	Loose proximal	Loose distal comp	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Progression of osteoarthritis	Other	Missing	Total
2024	1	1	11	1		17	3	1		1	10		42
2023	2	1	7			7	6			1	4		26
2022	2	1	5	1		10	6	1			4		27
2021	4	5	5			14	4	2	2		4		28
2020	3		13	1		9	7		1		1		31
2019	1	1	7	1	1	5		1			2		17
2018	1	3	11	2		5	5	3	1		2		31
2017	2	2	6	2	1	7	2	6	2				22
2016	2	3	3	1		5	4	2	1				14
2015	4	1	4	1	1	5	2	2	3		1		20
2014	1	2	2	1		4	1	1			1		11
2013	3	2	3	1		3		1			1		9
2012	4	4	6	1		5			2		2		19
2011	1		2	1			2						6
2010	3	1	2	1		1	1				2		9
2009	1					2					1		4
1994-08	14	6	10	5	1	9	1	4	1		3		36
Total	49	33	97	20	4	108	44	24	13	2	38	0	352

Revision reasons are not mutually exclusive. More than one reason for revision is possible. Only the first revision is counted.

The numbers include a total 13 reoperations where component parts are not removed, replaced or inserted.

Table 43: Stemless shoulder hemiprostheses

Year of revision	Loose proximal	Loose distal comp	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Progression of osteoarthritis	Other	Missing	Total
2023				1							1		2
2021						1							1
2020										1			1
2019		1		1							1		2
2018		1									1		2
2017								1		1			1
2015								3		2			3
2014		1						2			1		3
2012						1							1
Total	0	3	0	2	0	2	0	6	0	4	4	0	16

Revision reasons are not mutually exclusive. More than one reason for revision is possible. Only the first revision is counted.

Total none reoperation where component parts are not removed, replaced or inserted.

Table 44: Stemless total shoulder prostheses

Year of revision	Loose proximal	Loose distal comp	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Progression of osteoarthritis	Other	Missing	Total
2024						1				1	1		3
2023	1			1		1					5		7
2022	1		1	1		2		2			4		6
2021	1	1		1		2		1			2		5
2020	1												1
2019	1	1				1		1	1				3
2018	2			2		1			1		3		7
2017			1								1		2
2016						1		1			1		2
2015				1									1
2012	1												1
Total	8	2	2	6	0	9	0	5	2	1	17	0	38

Revision reasons are not mutually exclusive. More than one reason for revision is possible. Only the first revision is counted.

Total none reoperation where component parts are not removed, replaced or inserted.

Table 45: Reversed stemless total shoulder prostheses

Year of revision	Loose proximal	Loose distal comp	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Progression of osteoarthritis	Other	Missing	Total
2022							1						1
2020		1				1		1					2
2011							1						1
2009	1	1											2
1994-08	1												1
Total	2	2	0	0	0	1	2	1	0	0	0	0	7

Revision reasons are not mutually exclusive. More than one reason for revision is possible. Only the first revision is counted.

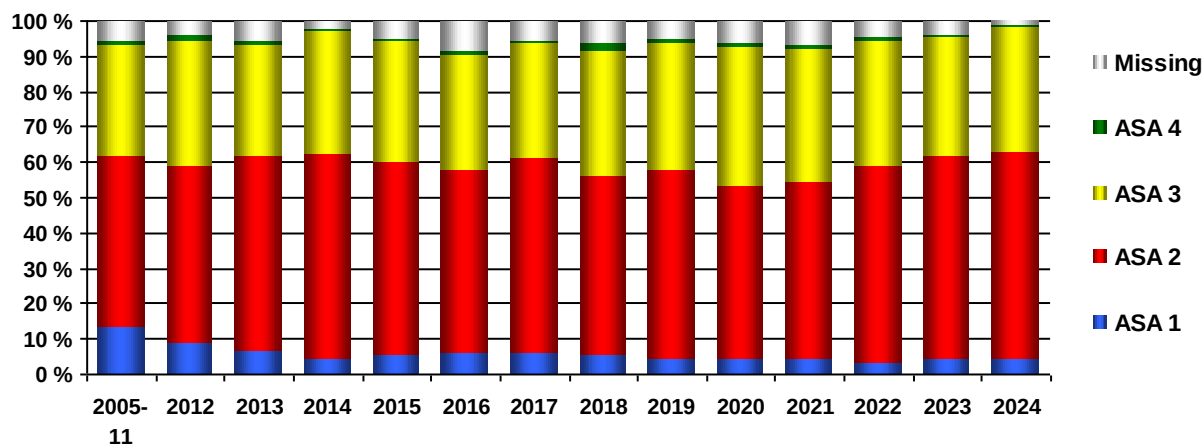
Total none reoperation where component parts are not removed, replaced or inserted.

ASA classification all shoulder prostheses

Table 46: Primary operations

Year	ASA 1	ASA 2	ASA 3	ASA 4	ASA 5	Missing	Total
2024	56	702	425	8		14	1 205
2023	58	699	415	7		48	1 227
2022	36	583	374	8		49	1 050
2021	45	499	377	11		67	999
2020	39	420	337	13		52	861
2019	37	459	307	6		45	854
2018	49	443	313	20		53	878
2017	45	410	243	4		41	743
2016	41	347	220	7		58	673
2015	37	349	223	3		32	644
2014	28	343	207	4		14	596
2013	36	283	163	5		30	517
2012	44	252	177	8		19	500
2005-11	328	1 180	768	28		133	2 437

Figure 26: Primary operations



ASA 1 = Healthy patients who smoke less than 5 cigarettes a day.

ASA 2 = Patients with an asymptomatic condition who are kept under medical control (f.ex. hypertension), or with diet (f. ex. diabetes mellitus type 2), and otherwise healthy patients who smoke five cigarettes or more daily.

ASA 3 = Patients having a condition that can cause symptoms. However, patients are kept under medical control (f. ex. moderate angina pectoris and mild asthma).

ASA 4 = Patients with a condition that is out of control (f. ex. heart failure and asthma).

ASA 5 = A moribund patient who is not expected to survive the operation.

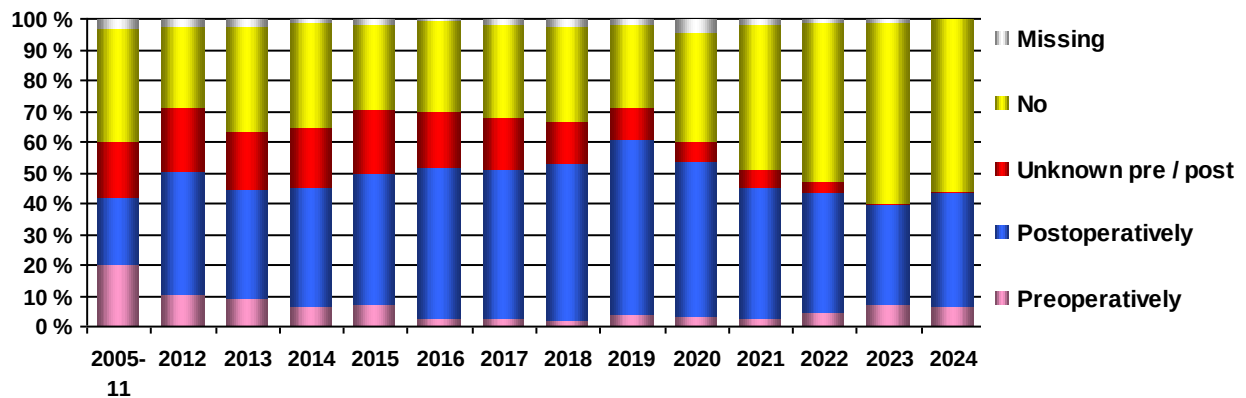
Registration of ASA classification started in 2005

Thromboprophylaxis

Table 47: Primary operations

Year	Preoperatively	Postoperatively	Unknown* pre / post	No	Missing	Total
2024	76	443	6	680	0	1 205
2023	85	395	12	723	12	1 227
2022	49	406	37	543	15	1 050
2021	26	426	59	466	22	999
2020	27	434	58	304	38	861
2019	35	484	88	233	14	854
2018	18	445	122	273	20	878
2017	18	360	123	229	13	743
2016	18	329	123	198	5	673
2015	46	276	129	180	13	644
2014	40	230	113	205	8	596
2013	46	183	99	176	13	517
2012	52	201	101	134	12	500
2005-11	488	530	449	887	83	2 437

Figure 27: Primary operations



Registration of thrombosis prophylaxis started in 2005

Previous operation in relevant joint

Table 48: For primary total prostheses

Type	1994-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Osteosynthesis of intraarticular fracture	410	48	54	49	51	50	47	48	50	37	844
Rotator cuff reconstruction	100	24	29	29	30	24	44	66	55	82	483
Biceps tenotomy / tenodesis	25	8	11	29	14	2	20	27	35	39	210
Diagnostic arthroscopy	78	11	9	28	10	7	11	19	19	11	203
Synovectomy	152	5	6	9	4	6	9	7	2	1	201
Subacromial decompression							14	19	37	37	107
Stabilizing interventions						1	2	17	25	36	81
Soft tissue procedure (eg Bankart)						1	2	14	23	24	64
Surgery for purulent arthritis	15	1		2		2	1	4	6	2	33
"Shaving"/Cleanup (Debridement)	14	1	5	3		2	1	1	1		28
Osteotomy	12	4	1	3	1	2	1		1	2	27
Ligament	3		6				1				10
Other bone block procedure								2	2	5	9
Arthrodesis	3	1	1		1		2				8
Latarjet								2	1	1	4
Other previous op.	201	24	36	58	40	40	25	29	31	30	514

Table 49: Surgical approach for all primary prostheses

Year	Delto- pectoral	Antero- superior / deltoid split	Lateral	Sabel	Saddle	Supero- lateral	Other	Missing	Total
2024	1 073	46	0	0	3	0	0	80	1 202
2023	928	62	0	0	0	0	0	35	1 025
2022	453	32	3	0	4	3	1	0	496
2021	149	16	0	1	0	0	0	0	166
2020	6	5	0	1	0	0	0	0	12
Total	2 609	161	3	2	7	3	1	115	2 901

Electronic registration started during 2020

Table 50: Glenoid type for all primary prostheses

Year	Normal	A1	A2	B1	B2	B3	C	D	Unknown/not classifiable	Missing	Total
2024	469	240	144	69	87	33	33	9	15	103	1 202
2023	411	218	111	53	58	30	35	14	43	52	1 025
2022	172	156	48	29	41	23	14	1	6	6	496
2021	89	22	17	11	14	10	1	2	0	0	166
2020	7	3	1	0	0	0	1	0	0	0	12
Total	1 148	639	321	162	200	96	84	26	64	161	2 901

Electronic registration started during 2020

PROM in the Shoulder Arthroplasty Register

The Shoulder Arthroplasty Register has been collecting electronic patient-reported data (Patient Reported Outcome Measures (PROM)) since 2020. The register aims to focus more on patients' perceived quality of life and joint function before and after operation. Patients complete an electronic questionnaire before operation and 1, 6, and 10 years after operation. The data we collect from patients will be compiled with the data reported by surgeons for the same patient group. This will allow us to focus on function and quality of life in addition to any potential revision of the prosthesis.

We have separated the figures into patients with acute fractures and those without fractures since the procedures for collecting preoperative PROM for fracture patients are not yet in place, and because we expect different results in these groups.

A total of 889 forms have been completed before primary shoulder prosthesis operation, and 1371 forms one year after operation (fracture patients are not included). For fracture patients, 377 PROM forms have been completed one year postoperatively. These numbers are for all primary operations from 2020 onwards. In 2024, 20 hospitals submitted preoperative PROM forms, but many hospitals have low reporting rates for preoperative PROM. The goal is to increase this proportion to >80%. All hospitals will receive their own results in the hospital report. Please feel free to contact our consultant, Mikal Solberg, at mikal.solberg@helse-bergen.no if you have any questions regarding the electronic registration of PROM.

Patient Demographics Before/After All Primary Operations **Without Acute Fracture**

Patient demographics	Before operation	1 year after
Number of forms (n)	889	1371
Men (%)	46.9	42.9
Median Age (min-max)	69.3 (28.1-95.2)	69.7 (22.4-89.5)
Body Mass Index mean (SD)	28.6 (5.6)	28 (7.2)
Drinking alcohol n (%)	699 (78.6)	1115 (81.3)
Smoking n (%)	56 (6.3)	109 (8)
Diabetes n (%)	23 (8.5)	140 (10.2)
Education upper secondary school or higher n (%)	346 (38.9)	684 (49.9)
Working n (%)	190 (21.4)	326 (23.8)
Living alone n (%)	226 (25.4)	410 (29.9)
Activity score UCLA activity* mean (SD)	4.7 (2)	5.4 (2)
State of health** (VAS) mean (SD)	57.4 (20.7)	69.8 (18.7)
Charnley (Category) Class A	161 (14.8)	732 (46.6)

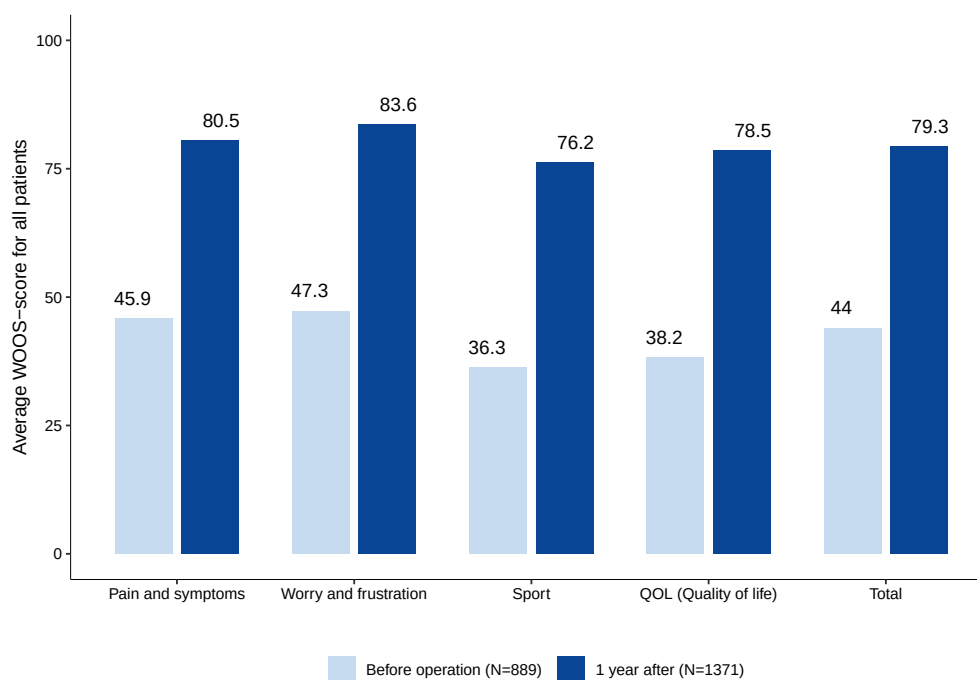
*Best possible score is 10, **100 is the best possible health

Patient Demographics After All Primary Operations **With Acute Fracture**

Patient demographics	1 year after
Number of forms (n)	377
Men (%)	21.2
Median Age (min-max)	71.6 (38.5-92.3)
Body Mass Index mean (SD)	27.2 (5)
Drinking alcohol n (%)	304 (80.6)
Smoking n (%)	60 (15.9)
Diabetes n (%)	60 (15.9)
Education upper secondary school or higher n (%)	182 (48.3)
Working n (%)	62 (16.4)
Living alone n (%)	146 (38.7)
Activity score UCLA activity* mean (SD)	4.8 (1.8)
State of health** (VAS) mean (SD)	68.3 (20.9)
Charnley (Category) Class A	318 (15.6)

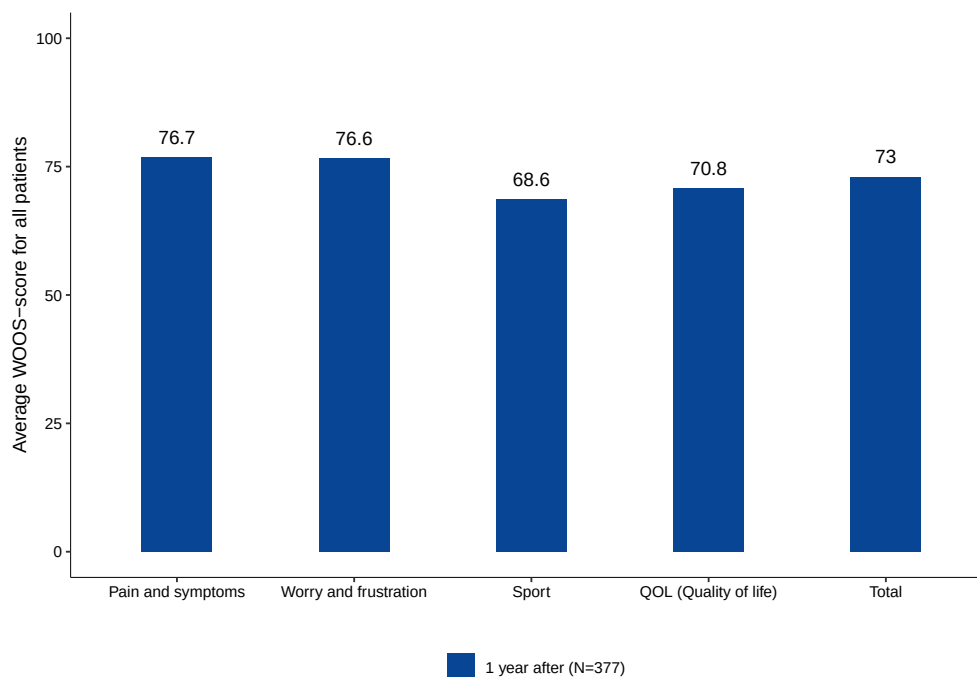
*Best possible score is 10, **100 is the best possible health

Figure C.16 (a): Average WOOS Score Before/After Primary Operation Without Acute Fracture*



*100 is the best possible score

Figure C.16 (b): Average WOOS Score After Primary Operation With Acute Fracture*



*100 is the best possible score

Figure C.17 (a): Proportion reporting moderate, severe, or very severe problems with mobility, self-care, usual activities, or reporting pain or anxiety before/after the primary operation **without Acute Fracture (EQ-5D-5L)**

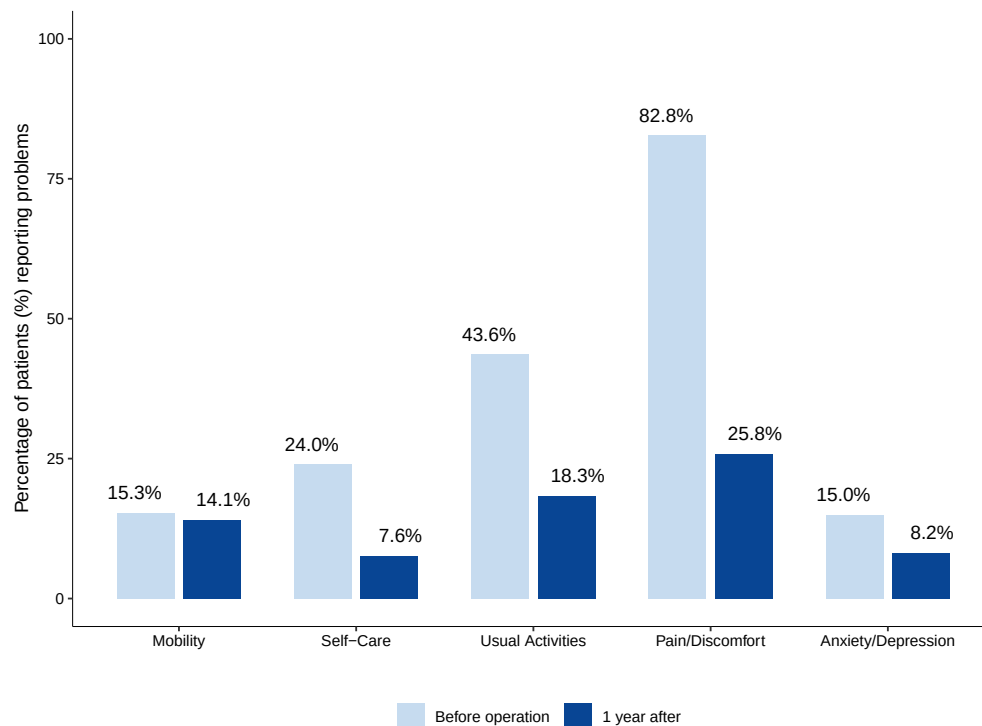
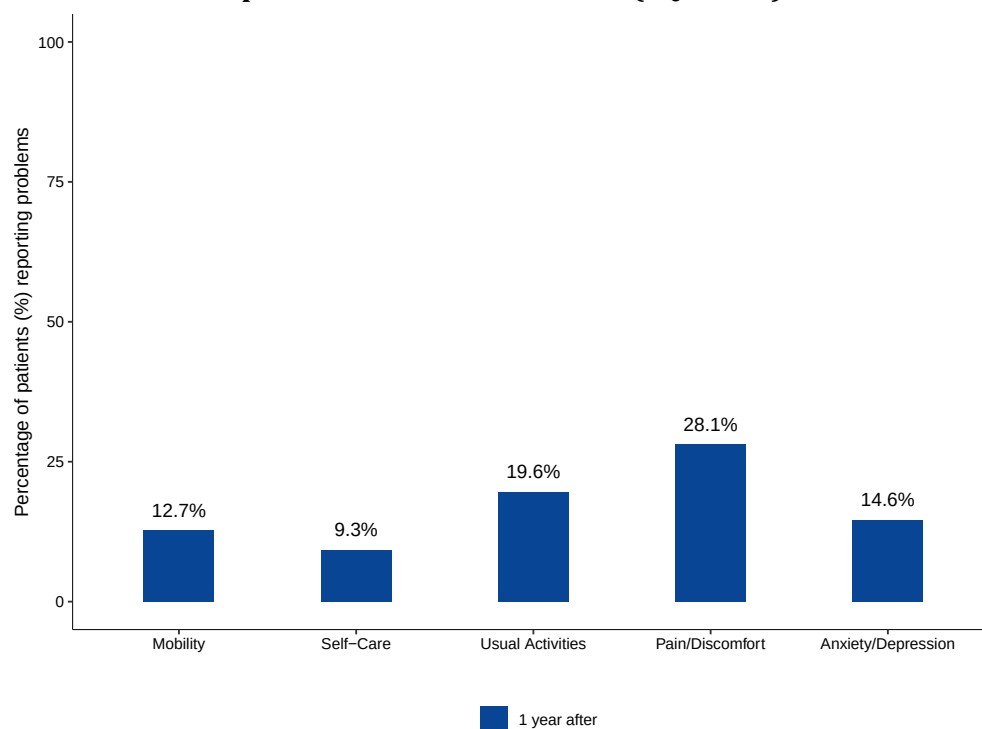


Figure C.17 (b): Proportion reporting moderate, severe, or very severe problems with mobility, self-care, usual activities, or reporting pain or anxiety before/after the primary operation **with Acute Fracture (EQ-5D-5L)**



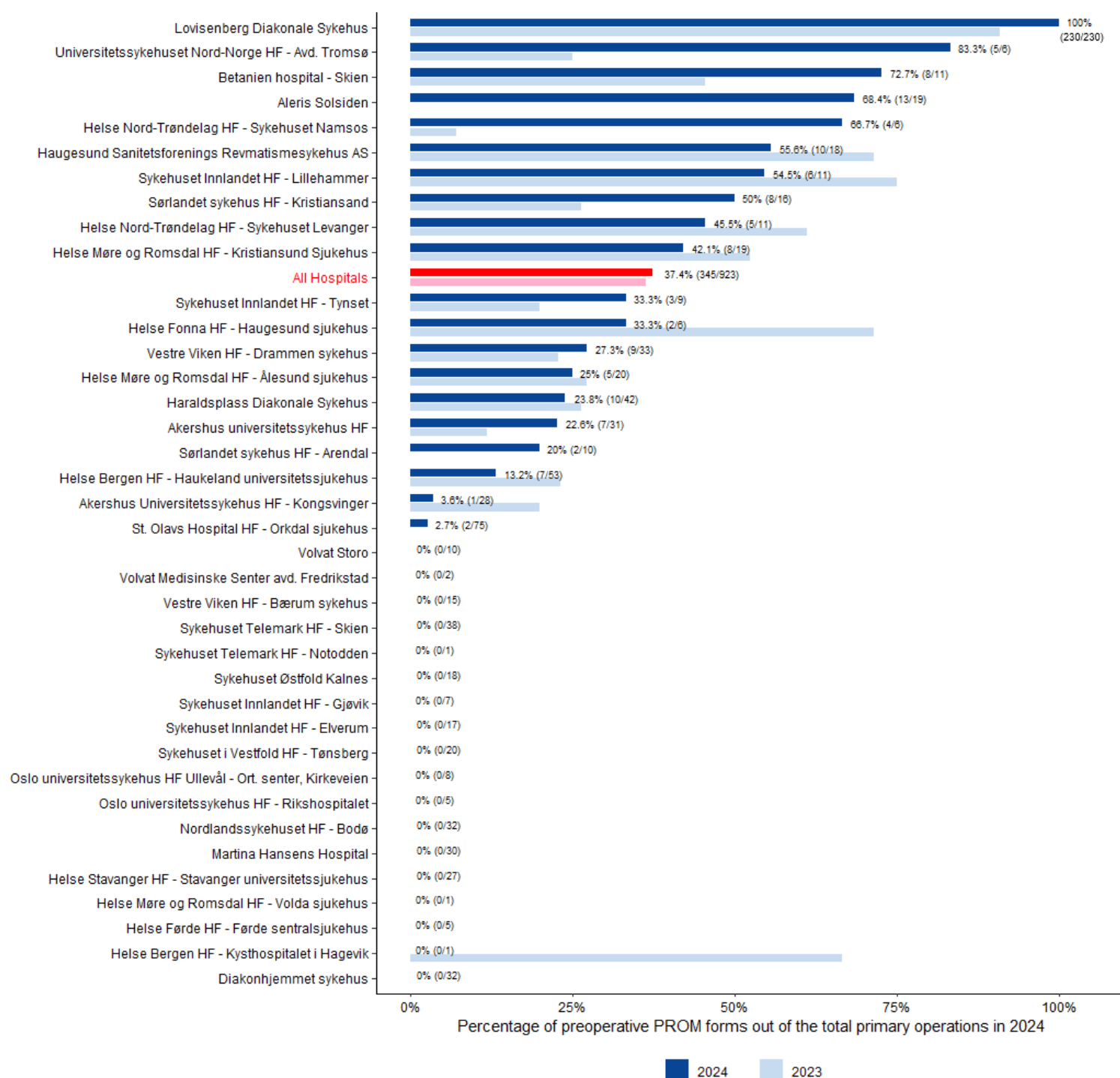
Health Authority	Reporting Hospitals (2024)	Number of Preoperative Forms (2024)
Central Norway	5/6	24
Northern Norway	1/2	5
South-Eastern Norway	9/21	274
Western Norway	4/7	29
Private	1/3	13

** 345 preoperative forms were completed out of the 923 primary operations (without acute fracture) in 2024*

Health Authority	Reporting Hospitals (2023)	Number of Preoperative Forms (2023)
Central Norway	4/6	29
Northern Norway	1/2	2
South-Eastern Norway	8/18	263
Western Norway	6/8	38
Private	0/2	0

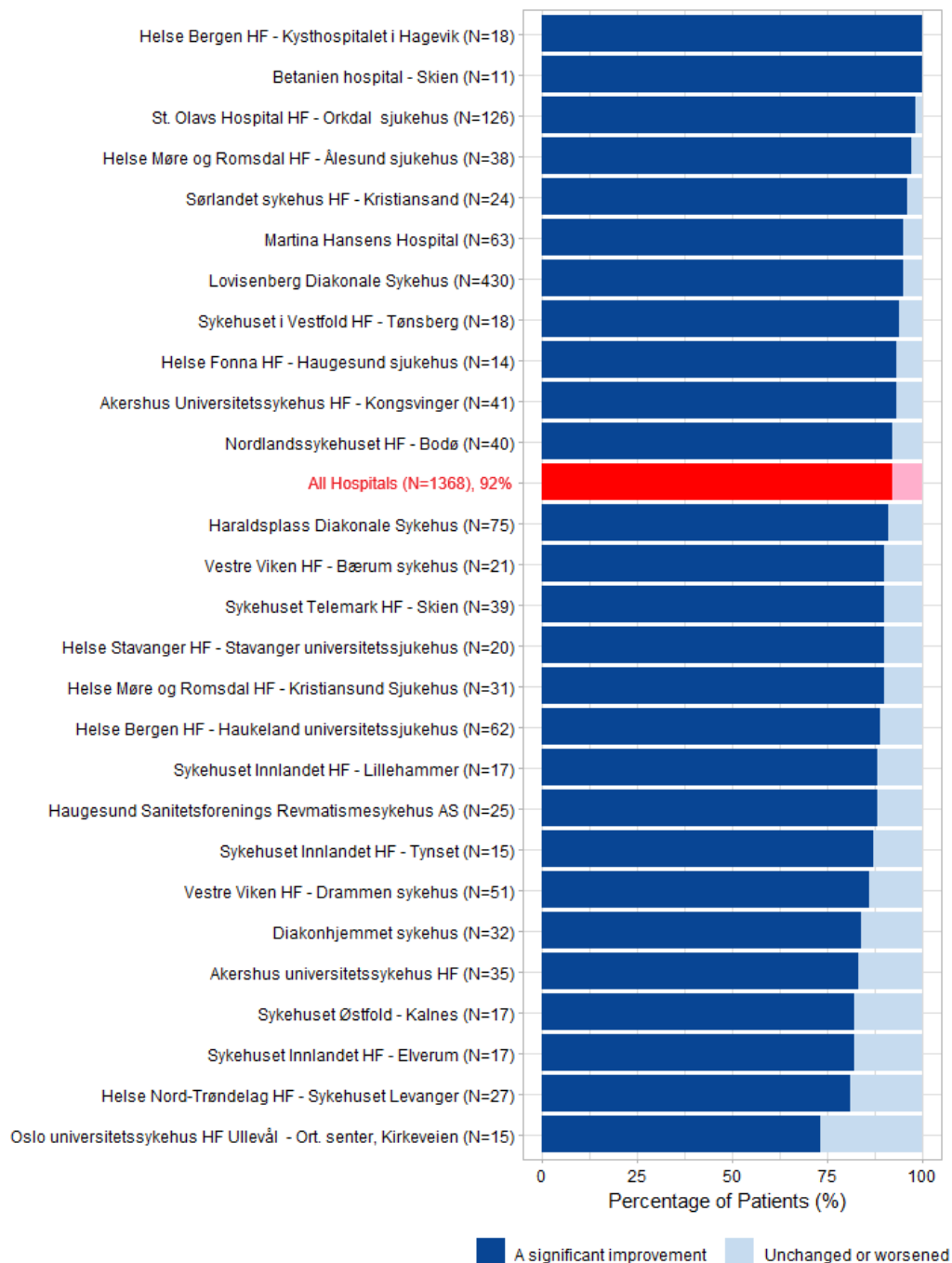
** 332 preoperative forms were completed out of the 914 primary operations (without acute fracture) in 2023*

Figure C.18: Proportion of primary shoulder prosthesis operations **without acute fracture where preoperative PROM form is completed**



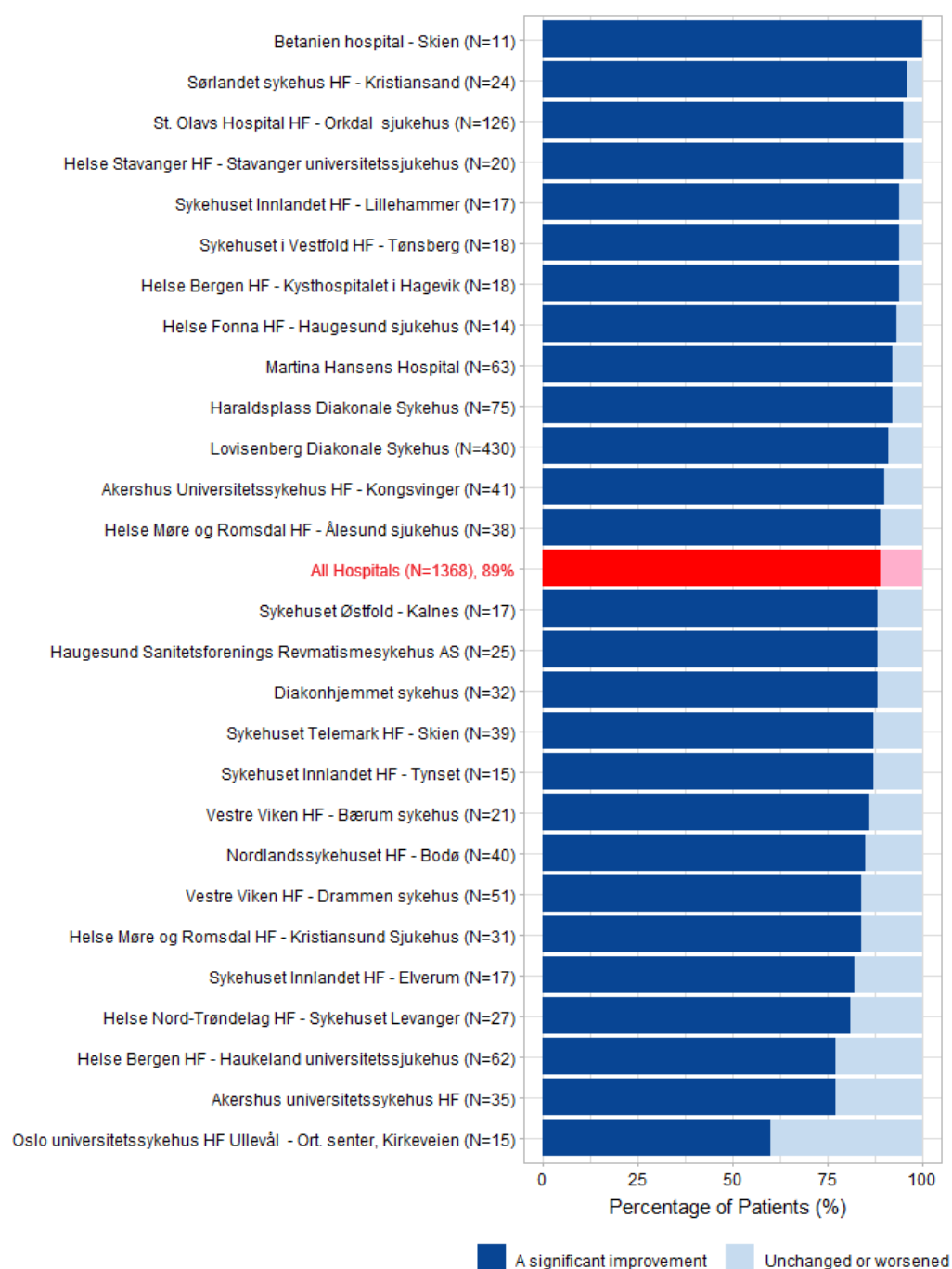
The diagram above shows the hospitals that have submitted preoperative PROM forms digitally through the MRS web solution. Reporting remains low, but some hospitals appear to have taken steps to improve their reporting. The proportion of preoperative PROM was 36.3% in 2023 and 37.4% in 2024. We remind you that any questions regarding reporting in MRS can be sent to the registry.

Figure C.19: Anchor questions for WOOS-PAIN AND SYMPTOMS 1 year after primary operation without acute fracture, 2020-2024



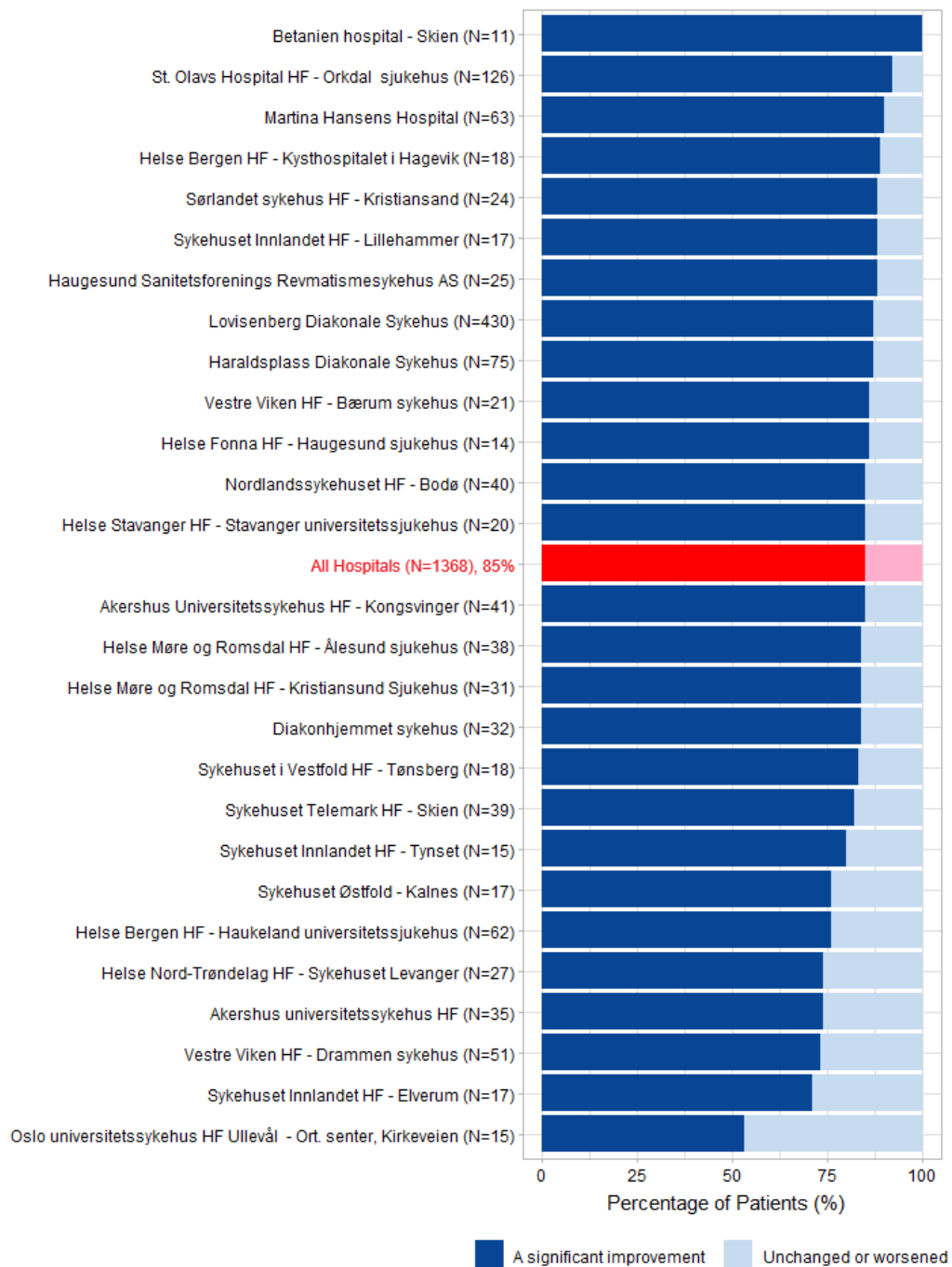
The patients have responded to the question "How do you experience shoulder pain and symptoms now compared to before the operation (pain, weakness, stiffness, cracking)?" The options "Less, a significant improvement" and "Slightly less, enough to be a significant improvement" are categorized in dark blue as "a significant improvement" in the figure. The other options "Very little change, not enough to be a significant improvement", "Unchanged", "Very little change, not enough to be a significant worsening", "Slightly more, enough to be a significant worsening", and "More, a significant worsening" are categorized in light blue as "Unchanged or worsening". Hospitals with fewer than 10 responses are excluded from the figure.

Figure C.20: Anchor questions for WOOS-ACTIVITIES IN DAILY LIFE 1 year after primary operation without acute fracture, 2020-2024



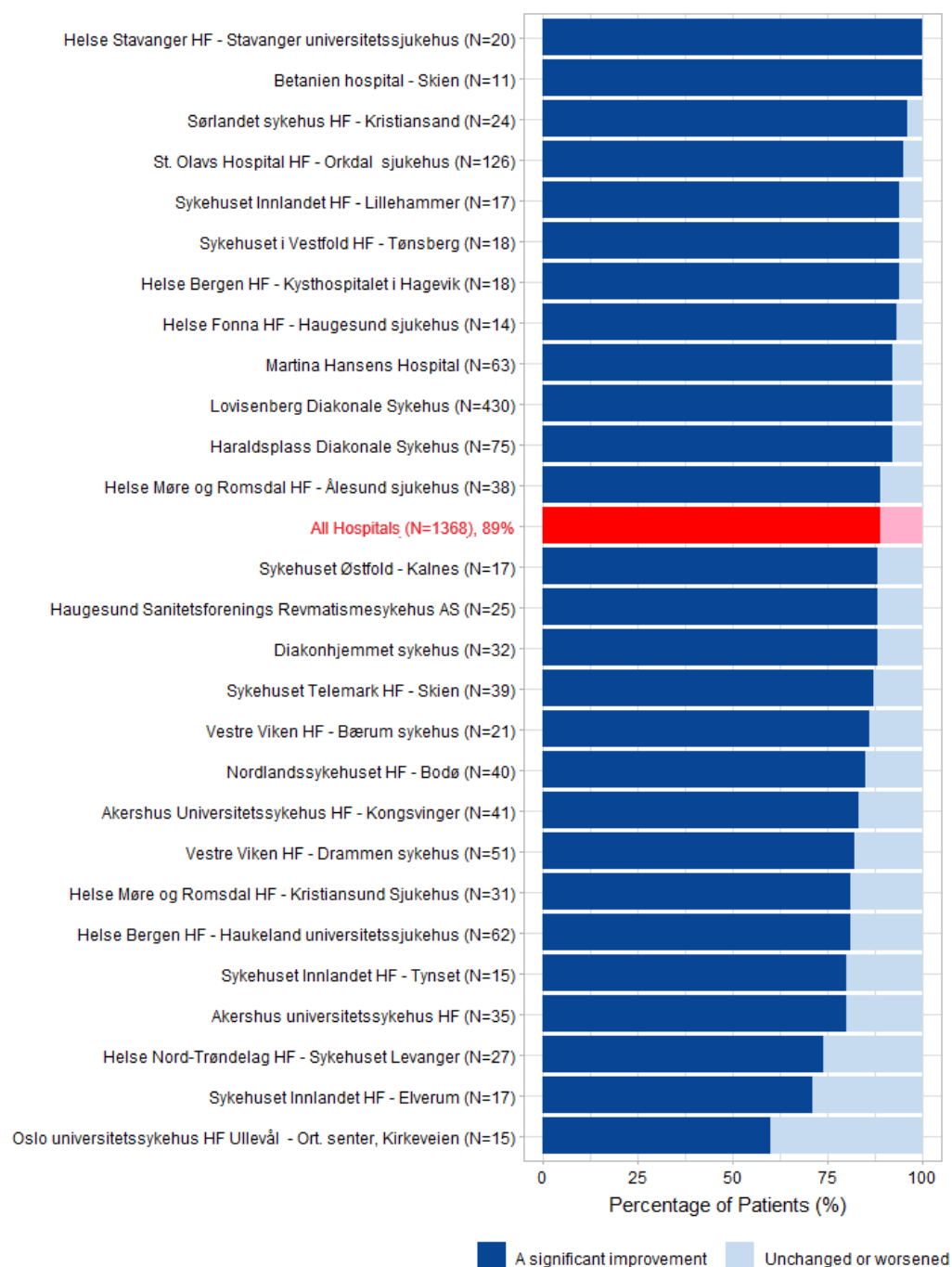
Patients have responded to the question "How is your ability to perform daily activities now compared to before the operation (sleep, comb hair, exercise, dress yourself, how often are you reminded of shoulder problems)?" The options "Less, a significant improvement" and "Slightly less, enough to be a significant improvement" are categorized in dark blue in the figure as "a significant improvement." The other options "Very little change, not enough to be a significant improvement", "Unchanged", "Very little change, not enough to be a significant worsening", "Slightly more, enough to be a significant worsening", and "More, a significant worsening" are categorized in light blue as "Unchanged or worsening." Hospitals with fewer than 10 responses are excluded from the figure.

Figure C.21: Anchor questions for WOOS-SPORT 1 year after primary operation without acute fracture, 2020-2024



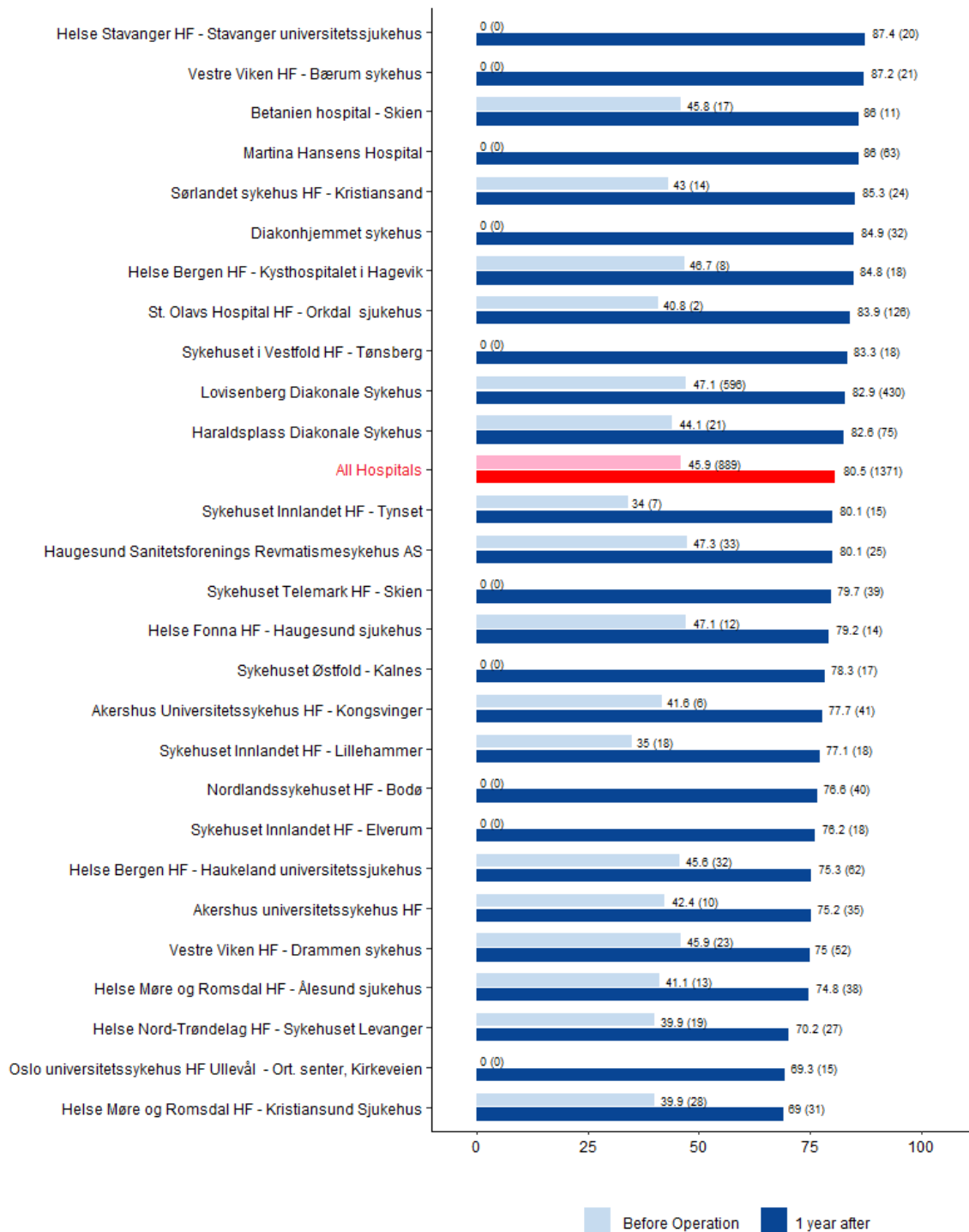
Patients have responded to the question "How is your ability to perform sports and leisure activities now compared to before the operation (lifting/carrying/pushing/throwing)?" The options "Better, a significant improvement" and "Slightly better, enough to be a significant improvement" are categorized in dark blue in the figure as "a significant improvement." The other options "Very little change, not enough to be a significant improvement", "Unchanged", "Very little change, not enough to be a significant worsening", "Slightly more, enough to be a significant worsening", and "More, a significant worsening" are categorized in light blue as "Unchanged or worsening." Hospitals with fewer than 10 responses are excluded from the figure.

Figure C.22: Anchor questions for WOOS-WORRY AND FRUSTRATION 1 year after primary operation without acute fracture, 2020-2024



Patients have responded to the question "How much do you worry and feel frustrated about your shoulder function now compared to before the operation?" The options "Less, a significant improvement" and "Slightly less, enough to be a significant improvement" are categorized in dark blue in the figure as "a significant improvement." The other options "Very little change, not enough to be a significant improvement", "Unchanged", "Very little change, not enough to be a significant worsening", "Slightly more, enough to be a significant worsening", and "More, a significant worsening" are categorized in light blue as "Unchanged or worsening." Hospitals with fewer than 10 responses are excluded from the figure.

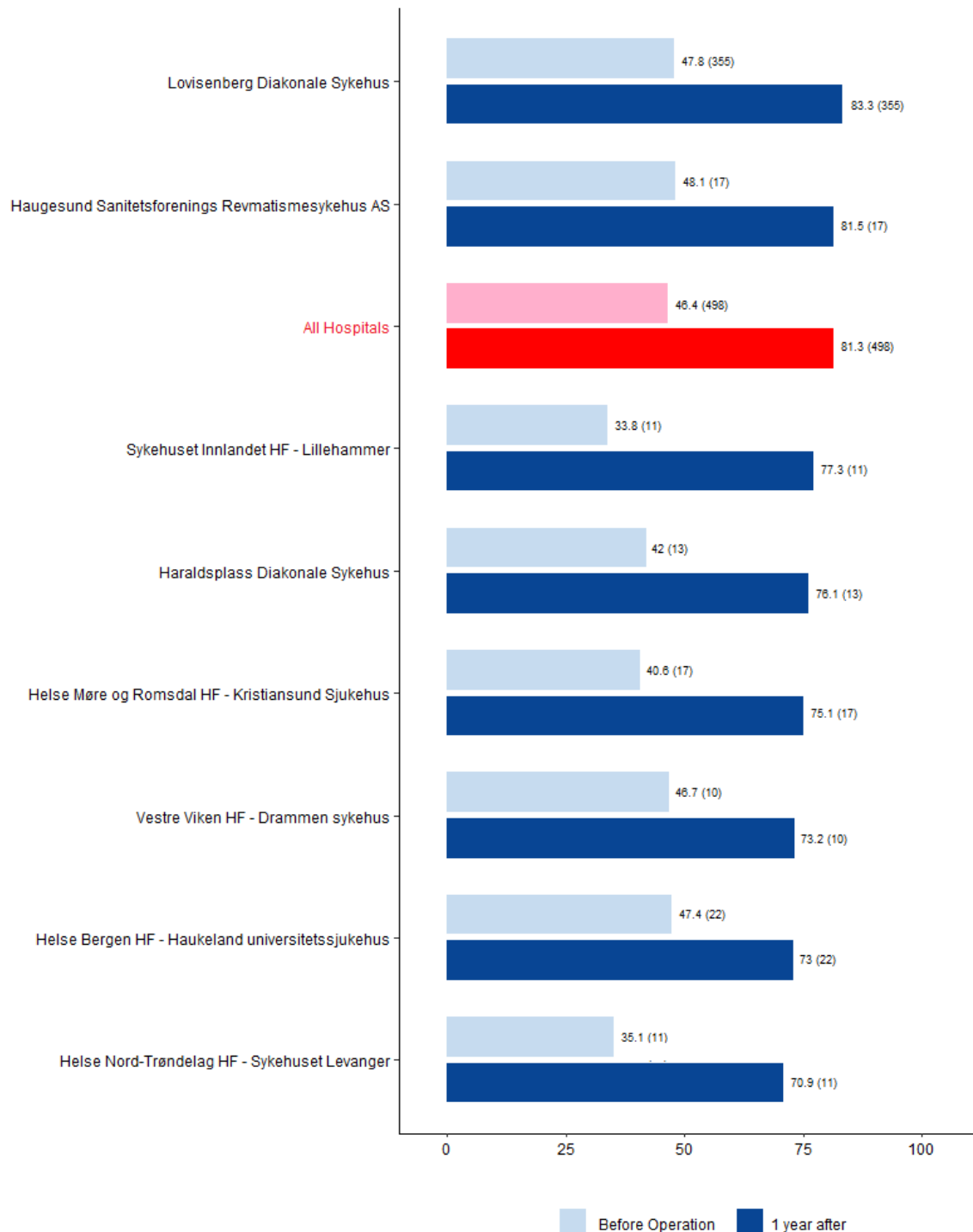
Figure C.23 (a): Average WOOS-PAIN AND SYMPTOMS score for all primary operations before and 1 year after operation without acute fracture * (Number of completed forms)



* 100 is the best possible score

Hospitals with fewer than 10 responses are excluded from the figure.

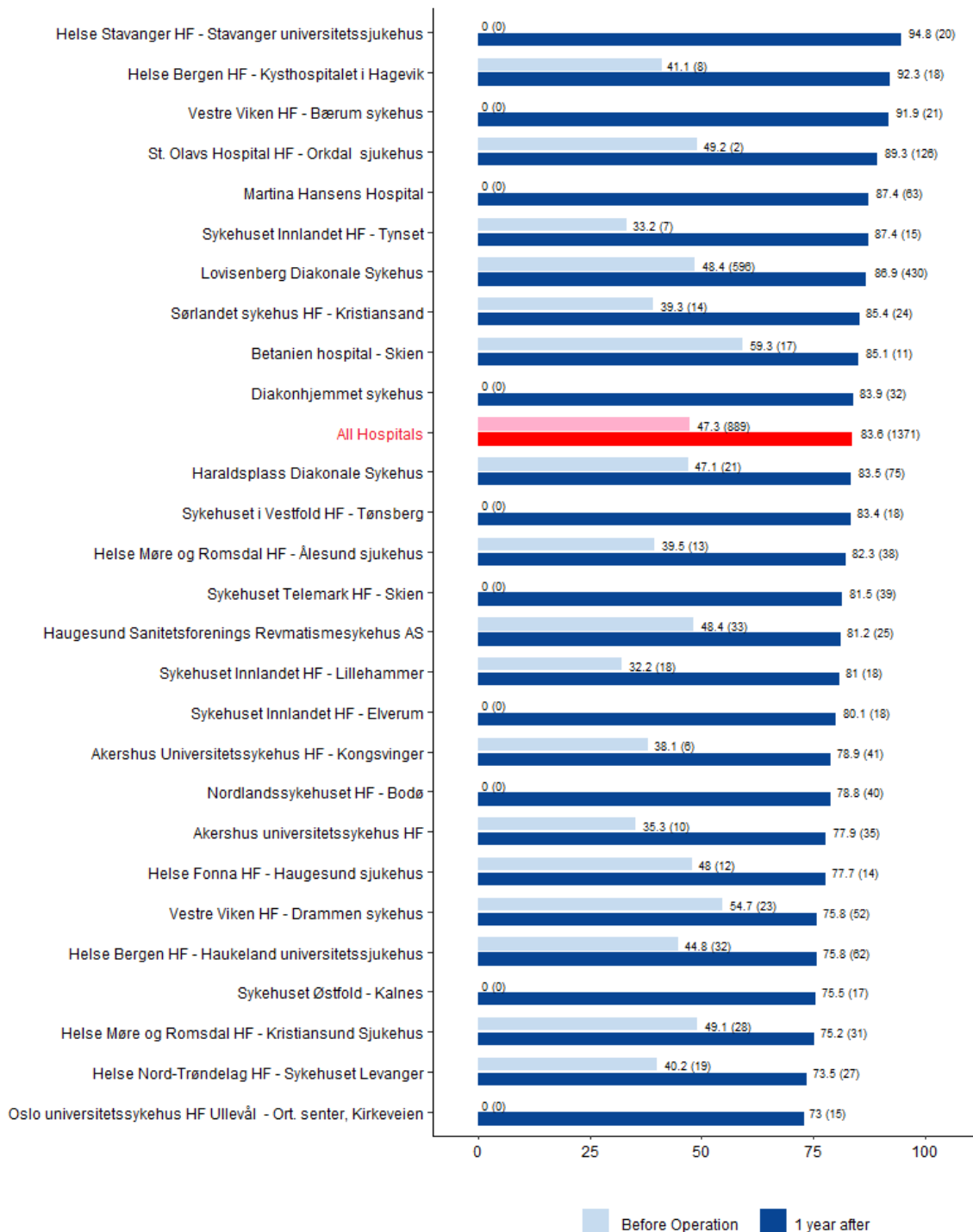
Figure C.23 (b): Average **WOOS-PAIN AND SYMPTOMS score for all primary operations before and 1 year after operation **without acute fracture (PROM forms mapped for the same operation)** * (Number of completed forms)**



* 100 is the best possible score

Hospitals with fewer than 10 responses are excluded from the figure.

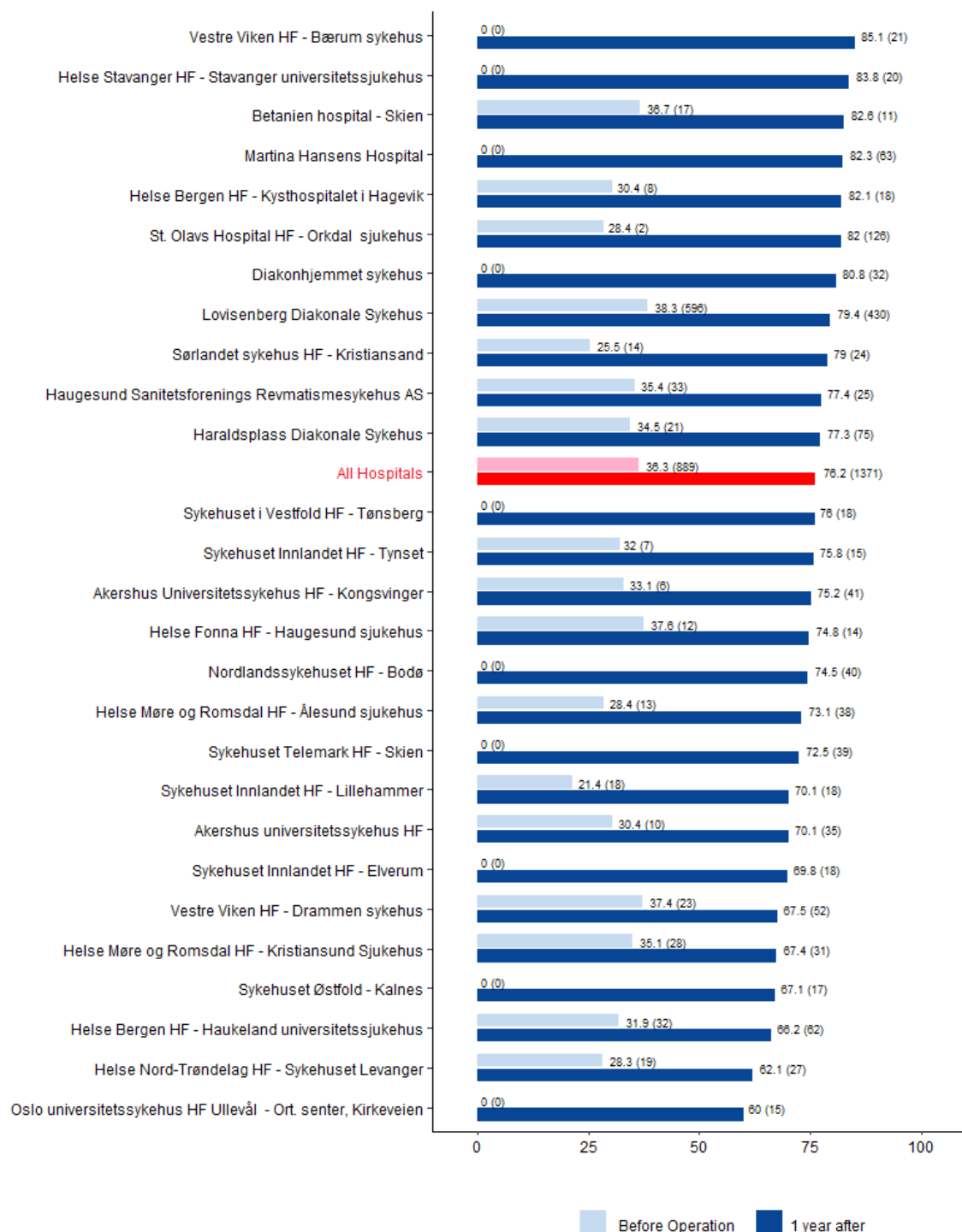
Figure C.24: Average WOOS-WORRY AND FRUSTRATION score for all primary operations before and 1 year after operation without acute fracture * (Number of completed forms)



* 100 is the best possible score

Hospitals with fewer than 10 responses are excluded from the figure.

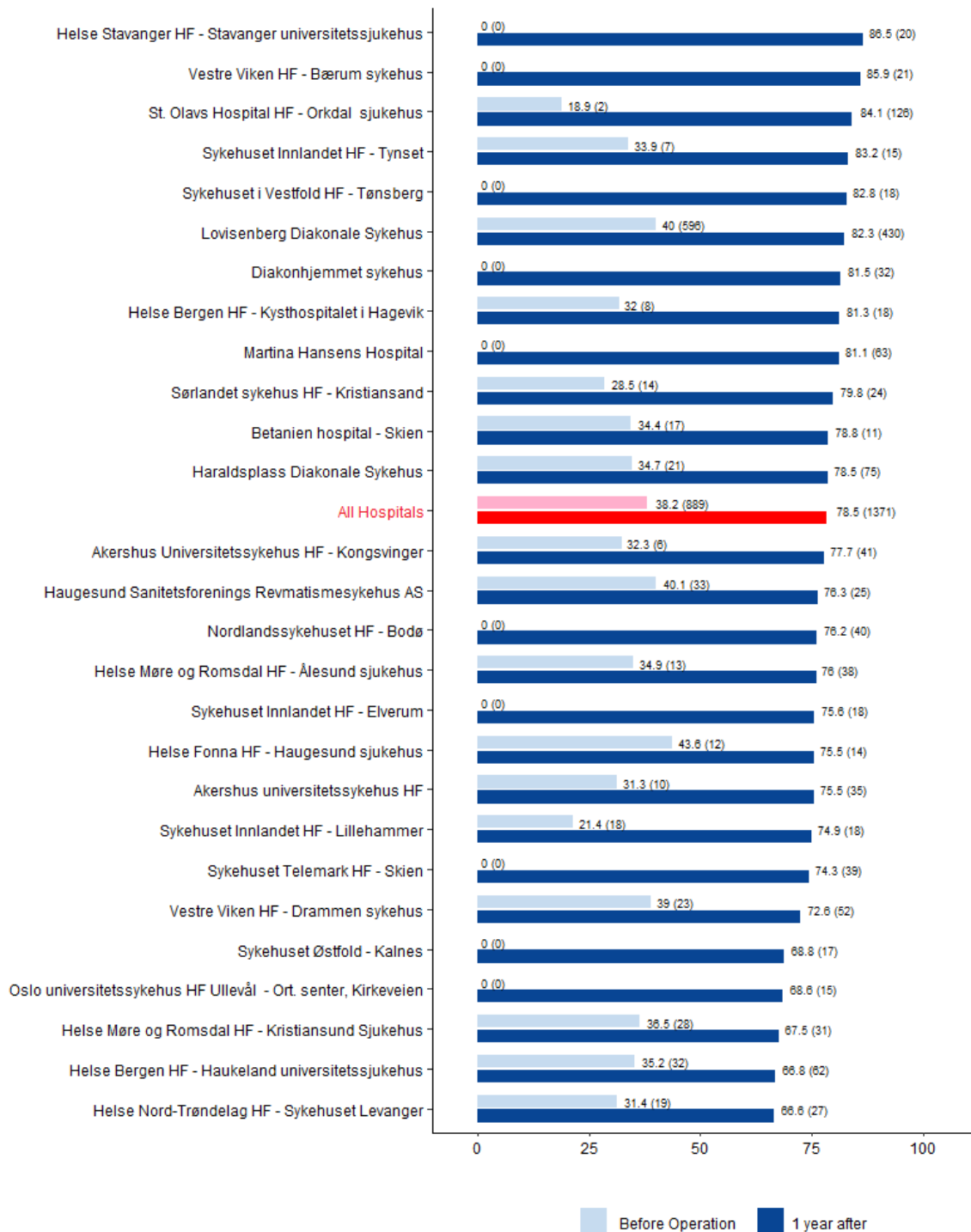
Figure C.25: Average WOOS-SPORT score for all primary operations before and 1 year after operation without acute fracture * (Number of completed forms)



* 100 is the best possible score

Hospitals with fewer than 10 responses are excluded from the figure.

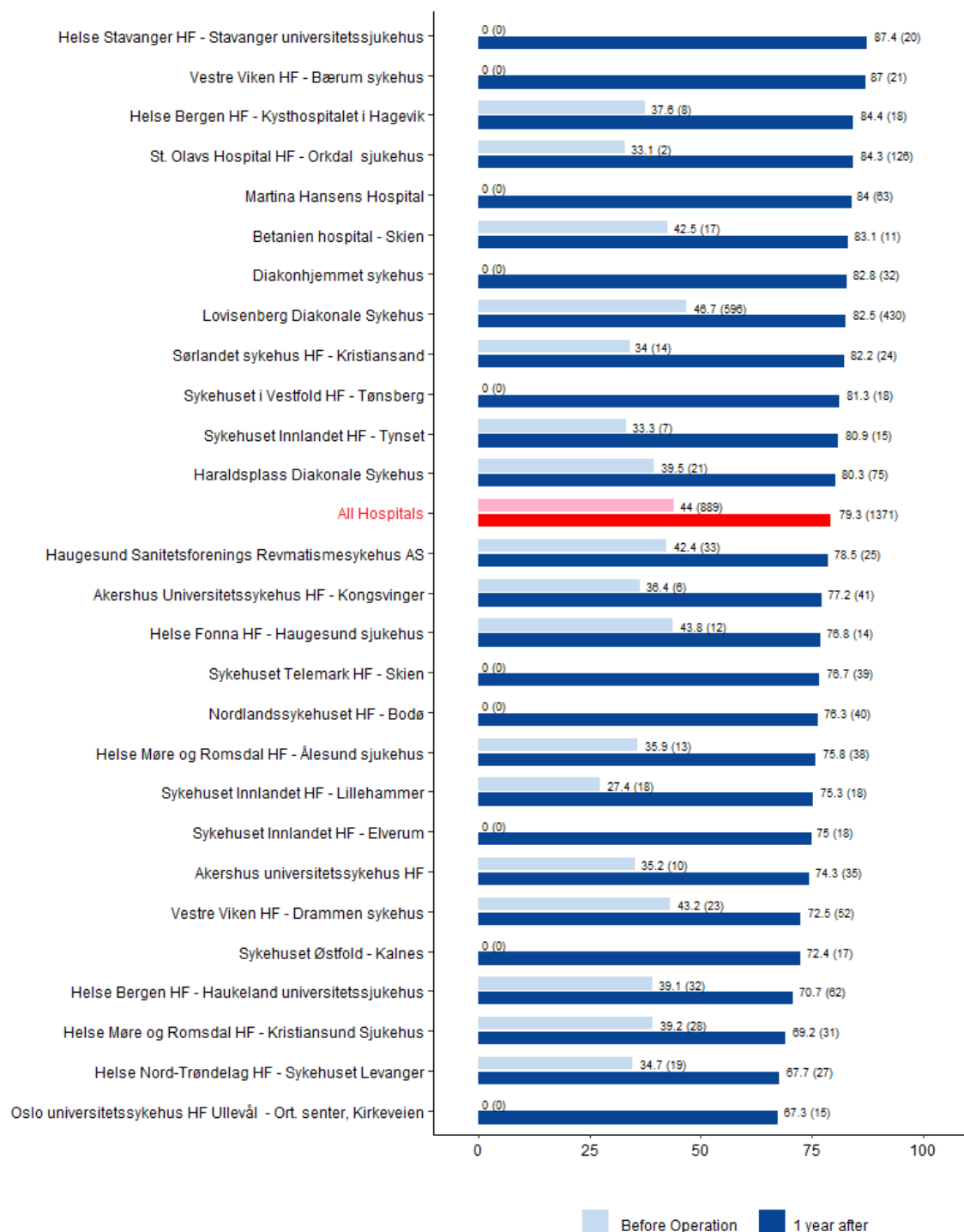
Figure C.26: Average WOOS-QUALITY OF LIFE score for all primary operations before and 1 year after operation without acute fracture * (Number of completed forms)



* 100 is the best possible score

Hospitals with fewer than 10 responses are excluded from the figure.

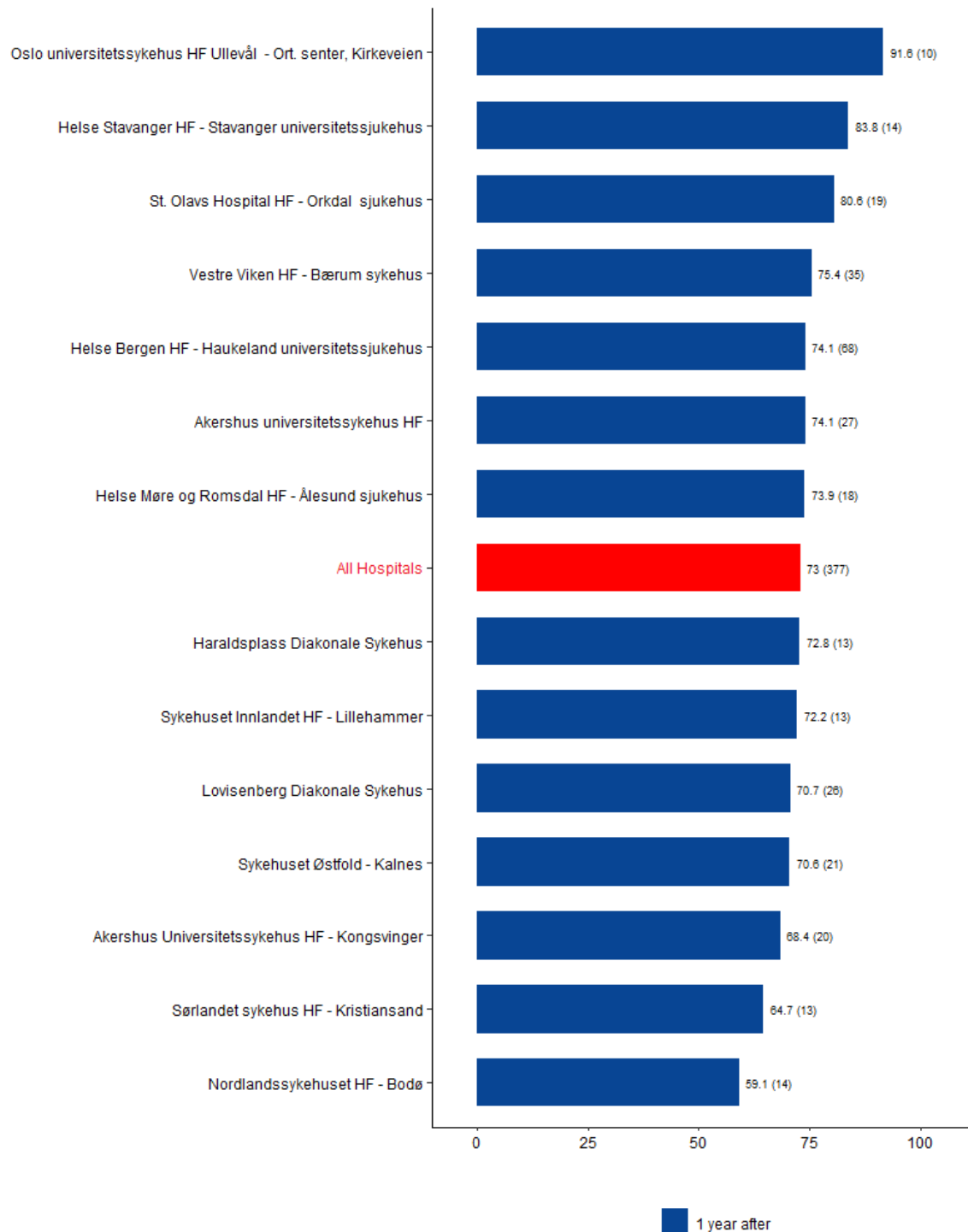
Figure C.27 (a): Average WOOS-TOTAL score for all primary operations before and 1 year after operation without acute fracture * (Number of completed forms)



* 100 is the best possible score

Hospitals with fewer than 10 responses are excluded from the figure.

Figure C.27 (b): Average WOOS-TOTAL score for all primary operations 1 year after operation with acute fracture * (Number of completed forms)



* 100 is the best possible score

Hospitals with fewer than 10 responses are excluded from the figure.

Completeness of reporting analysis for the Shoulder Arthroplasty Register 2021-2023

A completeness of reporting analysis for the Shoulder Arthroplasty Register has been conducted by combining the data in the Register with data from the Norwegian Patient Register (NPR). The report and analysis were prepared by the NPR in collaboration with the Shoulder Arthroplasty Register (NAR). There are separate statistics on primary operations and revisions.

NCSP codes for combining data from NPR hospital stays and the Shoulder Arthroplasty Register

Type		Code	Description
Primary operations		NBB 0y	Primary partial prosthetic replacement of humero-scapular joint not using cement
		NBB 1y	Primary partial prosthetic replacement of humero-scapular joint using cement
		NBB 20	Primary total prosthetic replacement of humero-scapular joint not using cement
		NBB 30	Primary total prosthetic replacement of humero-scapular joint using hybrid technique
		NBB 40	Primary total prosthetic replacement of humero-scapular joint using cement
		NBB 70	Primary total reconstruction prosthesis replacement of humero-scapular joint
		NBB 72	Primary total reconstruction prosthesis replacement of proximal humero-scapular joint, includes partial prosthesis
		NBB 76	Primary distal humero-scapular reconstruction prosthesis, combined with elbow-joint
		NBB 99	Other primary prosthetic replacement in joint of shoulder
Revision (level 1)		NBC 0y	Secondary implantation of partial prosthesis in humero-scapular joint not using cement Excludes: Of component of total prosthesis
		NBC 1y	Secondary implantation of partial prosthesis in humero-scapular joint using cement Excludes: Of component of total prosthesis
		NBC 2y	Secondary implantation of total prosthesis in humero-scapular joint not using cement Includes: Of component of total prosthesis
		NBC 3y	Secondary implantation of total prosthesis in humero-scapular joint using hybrid technique Includes: Of component of total prosthesis
		NBC 4y	Secondary implantation of total prosthesis in humero-scapular joint using cement
		NBC 70	Secondary total reconstruction prosthesis replacement of humero-scapular joint
		NBC 72	Secondary total reconstruction prosthesis replacement of proximal humero-scapular joint, includes partial prosthesis
		NBC 76	Secondary distal humero-scapular reconstruction prosthesis, combined with elbow-joint
		NBC 99	Other secondary prosthetic replacement in joint of shoulder
		NBU 0y	Removal of partial prosthesis from humero-scapular joint
		NBU 1y	Removal of total prosthesis from humero-scapular joint

Primary operations. From 2021-2023, 3639 primary total shoulder arthroplasties were reported to one or both of the registers. 89.9% were reported to the NAR while 97.2% were reported to the NPR. Completeness of reporting varies much between the different hospitals. For hospitals with a low completeness of reporting rate for the NAR, either the form was not sent, or other interventions than shoulder arthroplasties were incorrectly coded with NBB0* /NBB 1*/NBB 20/NBB 30/NBB 40.

Procedure codes to be used for primary operations:

NBB 0* - NBB 1* - NBB 20 - NBB 30 - NBB 40

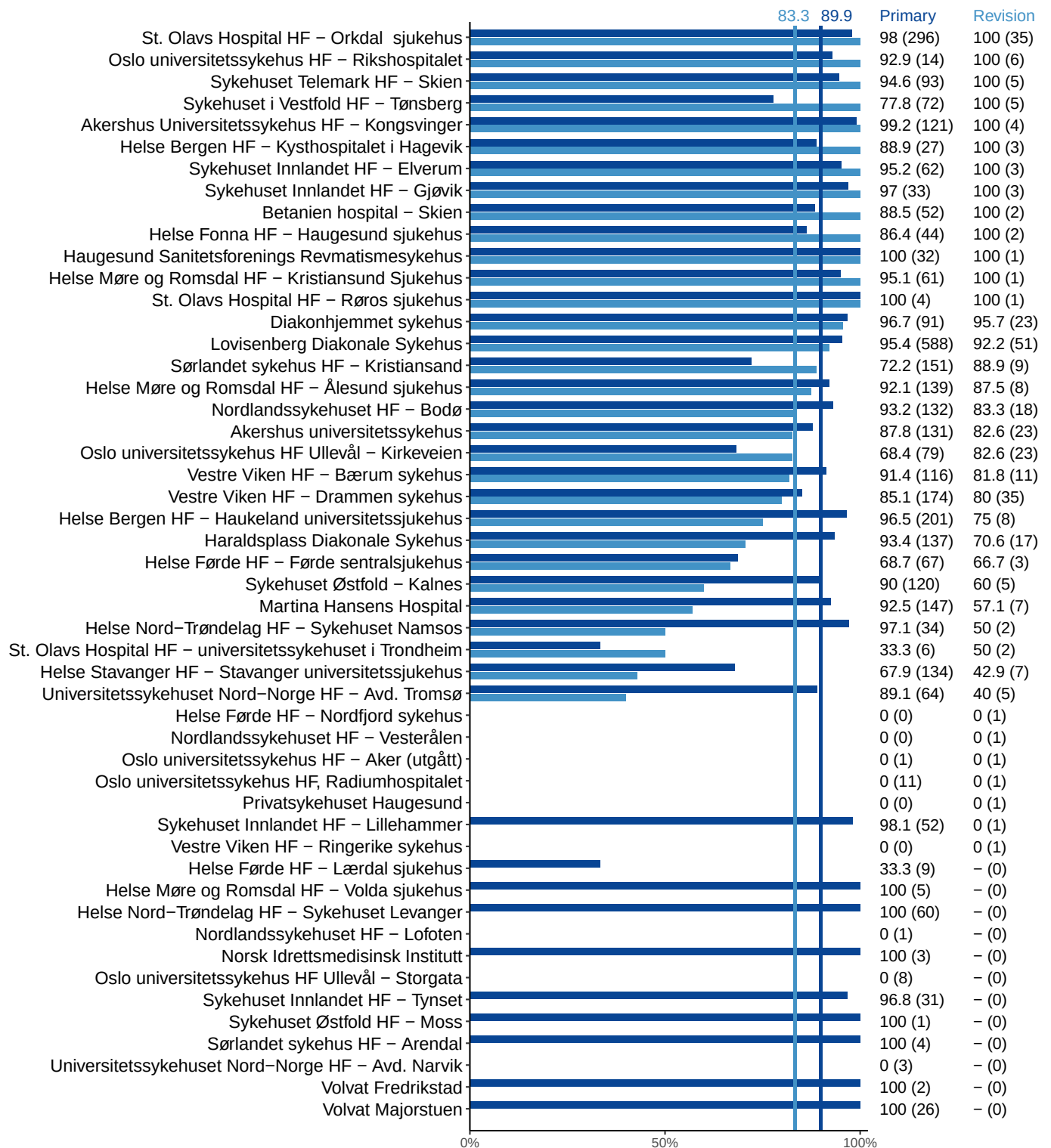
Revision operations. From 2021-2023, 335 revisions were reported to one or both of the registers. 83.3% of these were reported to the NAR, while 81.2% were reported to the NPR (revision level 1). Completeness of reporting varies much between the different hospitals. A low completeness of reporting rate may mean that the form was not sent in. It appears that a number of revision forms are missing in cases where the prosthesis was removed without a new one being inserted in the same operation; in such cases, a form should be submitted both when the prosthesis is removed and when any new insertion is performed.

Procedure codes to be used for revision operations, level 1:

NBC 0*2- NBC 1* - NBC 2* - NBC 3* - NBC 4* - NBC 99 - NBU 0* - NBU 1*

Shoulder

Figur C.28: Completeness of reporting for primary operations and revisions, Shoulder prosthesis, 2021-2023



Dark blue bars and first number to the right of the bars gives completeness of reporting for primary operations. Light blue bars and second number to the right of the bars gives completeness of reporting for revision operations (level 1). The numbers in brackets gives the number of operations registered at both NAR and NPR. Vertical lines shows the national averages.

CONTENTS

Norwegian Hip Fracture Register

Highlights from 2024	286
Introduction.....	287
Survival curves, hip fractures 2005-2024.....	290
Results for all hospitals individually - reoperations	291
Results for all hospitals individually – 1 year mortality.....	293
Numbers of primary operations in 2024.....	295
Treatment of displaced femoral neck fracture patients over 70 years of age	296
Fixation of hemiprosthesis in patients over 70 years of age	297
Non-reoperated hip fractures within 1 year	298
Waiting time from fracture to surgery	305
Reporting format in 2024.....	308
Annual number of hip fractures	309
Age by primary operation (in 2010, 2015 and 2024)	310
Time from fracture to operation in hours - primary operations.....	311
Reasons for delayed surgery	311
Cognitive impairment	312
Type of anaesthesia	313
ASA classification.....	314
Type of primary fracture	315
Type of primary operations – all fractures.....	316
Type of primary operation per fracture type.....	318
Time trend for treatment.....	319
Reasons for reoperation.....	322
Numbers of reoperation for each fracture type	323
Numbers of reoperation for each treatment type	324
Type of reoperation	325
Reoperation after primary screw osteosynthesis	326
Reoperation after primary uni/bipolar hemiprosthesis	327
Reoperation after primary hip compression screw.....	329
Reoperation after primary intermedullary nail	330
Hemiprostheses	331
Screws, hip compression screws, intramedullary nails.....	335
Fixation hemiprosthesis and time trend	336
Cement.....	337
Hydroxyapatite	337
Stem-design and time trend	338
Surgical approach used in hemiarthroplasty	339
Pathological fractures.....	340
Intraoperative complications	340
Systemic antibiotic prophylaxis	341
Pharmacological antitrombotic prophylaxis.....	344
Fixed Anticoagulation.....	346
Fibrinolysis inhibitor.....	346
Duration of surgery	347
Reporting method.....	348
Discharge forms reported in 2024.....	349
PROM – number of issued and answered questionnaires	360
PROM – results from all hospitals individually	361
Completeness analysis 2021-2023.....	372



Reporting



Primary operations
Reoperations

Reported
2005-2024

163,280
17,397

Reported
In 2024

8,375
780

44

Reporting
hospitals

100%

Coverage of
hospitals

90%

Electronic reporting
of operations

Completeness

85.6%

of primary osteosyntheses

91.6%

of primary hemiarthroplasties

93.8%

of primary total
arthroplasties



PROM

Patient reported data

Time after
operation

Reported
2005-2024

Reported
In 2024

4 months

64,491

2,652

12 months

54,420

2,295

36 months

34,484

1,666

Results and activities



Quality indicators

99 %

Prosthesis used in patients
> 70 years with displaced
femoral neck fracture

97 %

Cemented
hemiarthroplasties for
patients > 70 years

95 %

Non-reoperated hip
fractures within 1 year

92 %

30-days survival

49 %

Operated within 24 hours

84 %

Operated within 48 hours



Quality projects

- Reduce risk of infection after hemiarthroplasty
- Increase the proportion of preop nerve block
- Reduce surgical delay

4

Published
papers



2

Finished
PhD



8

Podium
presentations



Find us:

<https://www.helse-bergen.no/nrl>

<https://www.facebook.com/leddregisteret>

[Nasjonalt servicemiljø for medisinske kvalitetsregistre](#)

ANNUAL REPORT NORWEGIAN HIP FRACTURE REGISTER

The Norwegian Hip Fracture Register (NHFR) contains data from 163,185 primary operations and 17,395 reoperations. In 2024, 8,280 primary operations and 778 reoperations were reported to the registry. This represents a decrease in the number of reported primary operations compared to the previous two years. We are currently uncertain whether this reflects a true decline in the number of hip fractures being treated at Norwegian hospitals, or whether it is due to reduced completeness of reporting. Some hospitals have reported fewer operations than in previous years, and we will contact these hospitals to investigate the reasons behind this. We also ask all hospitals to verify that the number of operations reported to the NHFR in 2024 matches their own records when the hospital-specific annual reports are distributed later this year.

The electronic registration solution available in the Medical Registry System (MRS) within the Norwegian Health Network is now in use at most hospitals and appears to be functioning well. The proportion of electronically submitted forms continues to increase month by month. The advantages of electronic registration include more accurate reporting and immediate access to data for hospitals. This enables more effective use of NHFR data for local quality improvement initiatives.

The Norwegian Advisory Unit for Medical Quality Registries evaluates all medical quality registries in Norway annually. In 2024, the NHFR was classified as a 4A registry—the highest possible rating. This upgrade was based on the registry's ability to present results from local quality improvement projects. We are pleased that data from the NHFR are being used locally and remind hospitals using registry data for quality improvement to submit a brief report to the registry outlining the project and its outcomes. Since 2017, the NHFR has presented online interactive results. Hospital-specific results are available at www.kvalitetsregistre.no, and we hope these interactive results are actively used in local quality improvement efforts.

The new discharge questionnaire with peri-operative data has been adopted by several hospitals. These hospitals now have immediate access to their own data, and the results can serve as a valuable tool for monitoring whether patients with hip fractures are being treated in accordance with the Norwegian interdisciplinary guidelines. The discharge questionnaire should be completed for all patients over the age of 50 and includes variables such as preoperative walking ability, preoperative nerve block, orthogeriatric care, timing of first postoperative mobilization, fall prevention, nutritional interventions, osteoporosis treatment, medical complications during hospitalization, and level of care after discharge.

Unfortunately, many hospitals have not yet started reporting peri-operative data, and we hope these hospitals will begin reporting as soon as possible. At the registry's advisory board meeting in April 2025, it was agreed to launch a new national quality improvement project aimed at increasing the reporting rate of peri-operative data. Hospitals that have not yet started reporting or currently have low coverage for these data will be contacted by the NHFR and invited to participate in this quality improvement initiative.

To simplify the reporting process, we would like to highlight the following:

- A paper version of the discharge questionnaire has been developed, which can be completed by nurses or physicians at the time of discharge and later entered into MRS.

- The discharge questionnaire does not need to be entered into MRS by a physician. Some hospitals have delegated this task to clinical development and research nurses or administrative staff, and this approach appears to work very well.

The new discharge questionnaire forms the basis for three important quality indicators, presented below. As only a limited number of hospitals currently report discharge data on an ongoing basis, hospital-specific results for these indicators will not be included in this year's annual report. However, data for these indicators will be available at www.kvalitetsregistret.no for hospitals with more than 50% coverage for these variables. The new quality indicators based on data from the discharge form are:

- Proportion of hip fracture patients over 65 years assessed by a geriatrician during the hospital stay
- Proportion of hip fracture patients mobilized no later than the first postoperative day
- Proportion of hip fracture patients over 50 years receiving adequate osteoporosis treatment at discharge

This year's report presents peri-operative data for the first time. In addition, new data from the PROM questionnaire is included, which now features the HOOS-12 functional score alongside EQ-5D-5L.

In 2024, a PhD project using data from the NHFR was completed.

Stefan Bartels defended his PhD thesis on February 8, 2024, at the University of Oslo, with the dissertation titled *"Functional outcome and complications after surgical treatment of displaced low-energy femoral neck fractures in patients between 55 and 70 years."*

The NHFR congratulates Stefan on his important publications and, not least, on a successful and well-conducted defense!

Publications since January 1, 2024

Jan-Erik Gjertsen published an article presenting the results of a quality improvement project aimed at increasing the proportion of cemented stems. The proportion of cemented hemiarthroplasties increased from 27% to 91% at participating hospitals. The reoperation rate decreased from 5.9% in 2015–2017 to 3.3% in 2019–2021.

Cato Kjærvik investigated quality of life after hip fracture in a study linking data from the NHFR with the Norwegian Patient Registry and Statistics Norway. The study showed that quality of life is significantly reduced following a hip fracture. It also revealed that the group of patients responding to PROM questionnaires is highly selected. Patients' health status and socioeconomic background influence both the likelihood of responding and their reported quality of life. This selection bias is important to consider when interpreting PROM data.

In another study by Cato Kjærvik, physiotherapy during the first year after a hip fracture was found to be associated with higher quality of life. However, only 35% of patients received physiotherapy after discharge. Low socioeconomic status, male gender, increasing age, comorbidities, and dementia were factors associated with a lower likelihood of receiving physiotherapy.

Amara Ahmad and Emma H. Egeland examined mortality following trochanteric fractures treated with sliding hip screw versus intramedullary nail. The study found that intramedullary nailing was associated with slightly higher mortality on the day of surgery and the first postoperative day, but marginally lower mortality between days 8 and 30. The clinical significance of these findings remains uncertain and should not guide treatment decisions.

Olav Lutro studied the effect of antibiotic prophylaxis after hip and knee arthroplasty. The study included patients treated with both total and hemiarthroplasty for hip fractures. The results showed that four doses of antibiotic prophylaxis did not reduce the risk of prosthetic joint infection compared to 1–3 doses.

A full list of publications is available at the end of this year's report and on the registry's website: www.helse-bergen.no/nrl.

The NHFR is currently collaborating with several hospitals on studies using both national and local data. We are pleased that the NHFR's extensive dataset is being actively used in research, and we encourage all researchers interested in using data from the NHFR to get in touch.

Thank you to everyone for your excellent reporting and continued collaboration!

Bergen, June 2025



Jan-Erik Gjertsen
Senior consultant orthopaedic surgeon
Professor
Head of Hip Fracture Register



Eva Dybvik
Biostatistician/researcher



Sigurd Stenvik
Biostatistician/researcher



Ruth Gunvor Wasmuth
Consultant

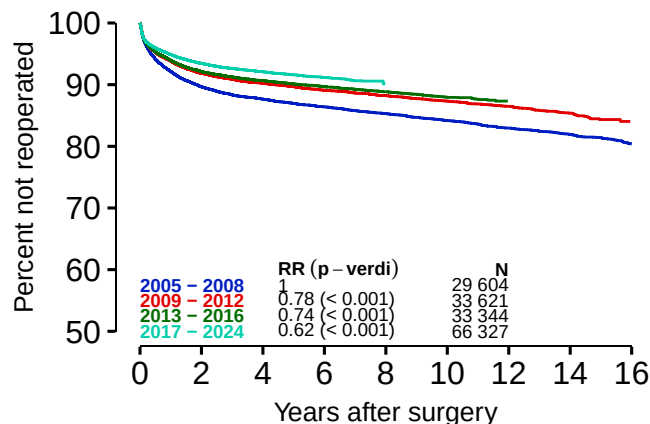


Irina Kvinnesland
IT consultant

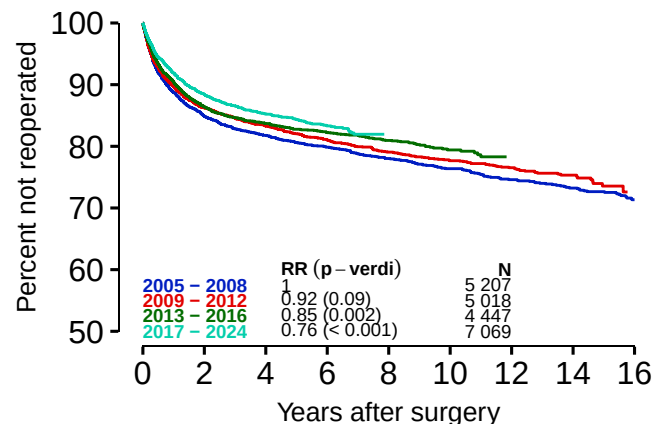
Survival of hip fracture implants 2005–2024

Endpoint: All reoperations

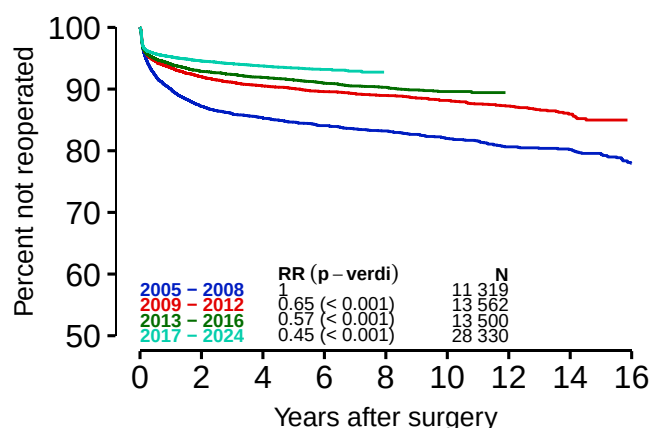
D.1) All hip fractures



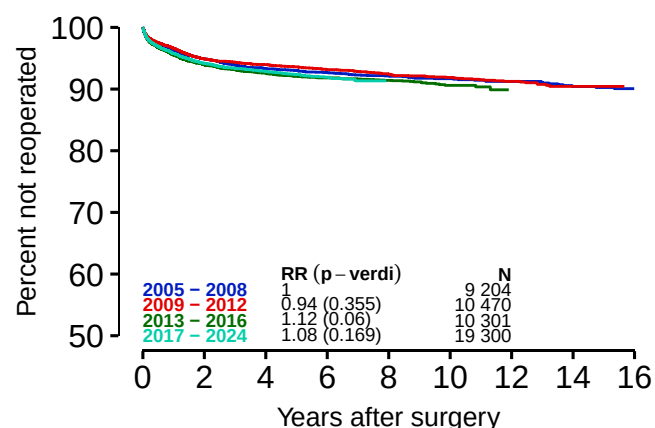
D.2) Undisplaced femoral neck fractures



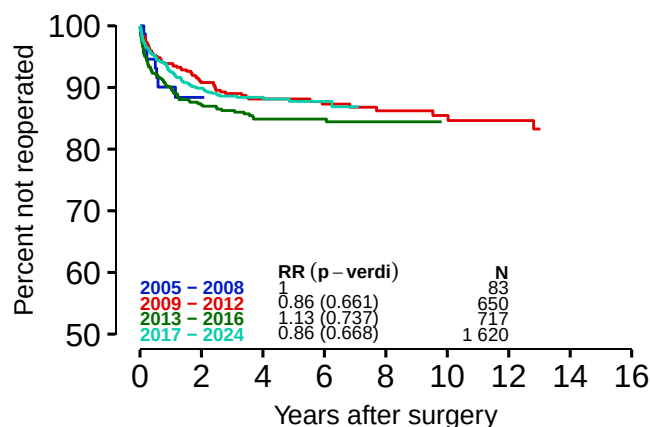
D.3) Displaced femoral neck fractures



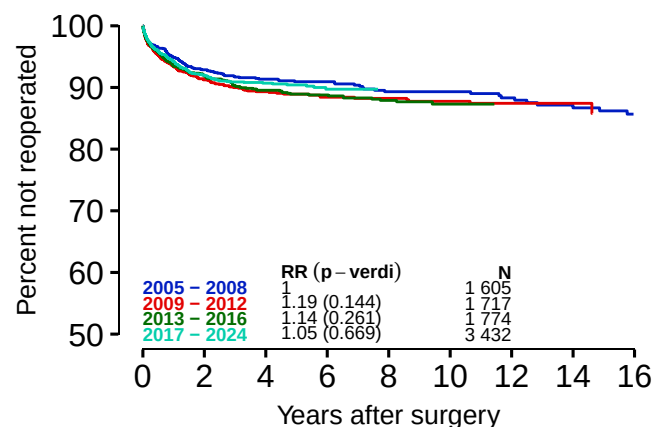
D.4) Trochanteric fractures (AO/OTA A1+A2)



D.5) Intertrochanteric fractures (AO/OTA A3)



D.6) Subtrochanteric fractures



Kaplan-Meier estimated survival curves (unadjusted). Survival is calculated as long as the number of implants at risk of reoperation is greater than 50.

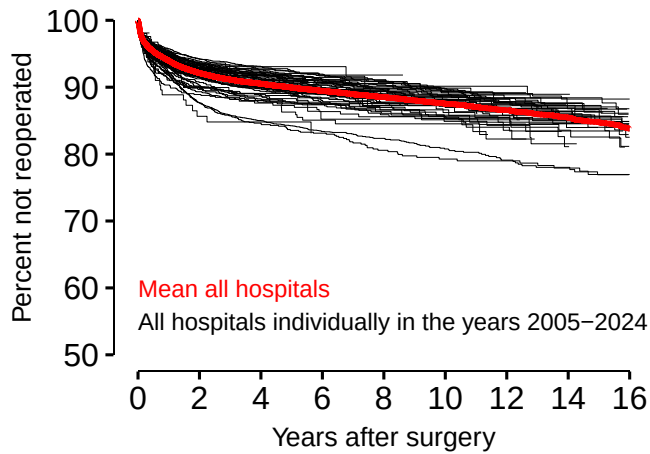
Rate Ratio (RR) is adjusted for age and gender.

Hospital results after hip fractures

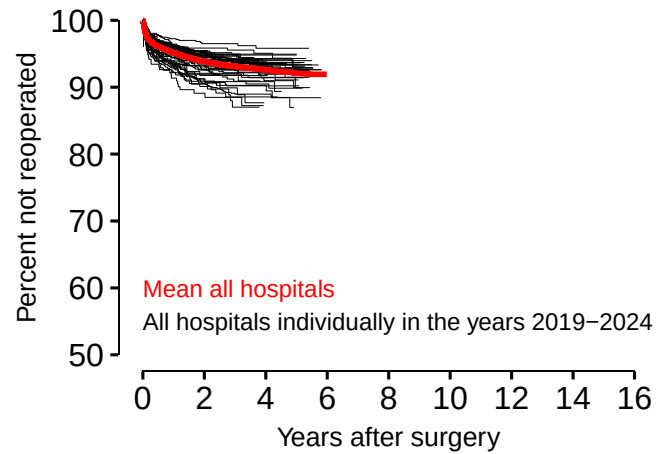
Norwegian Hip Fracture Register

Endpoint: All reoperations

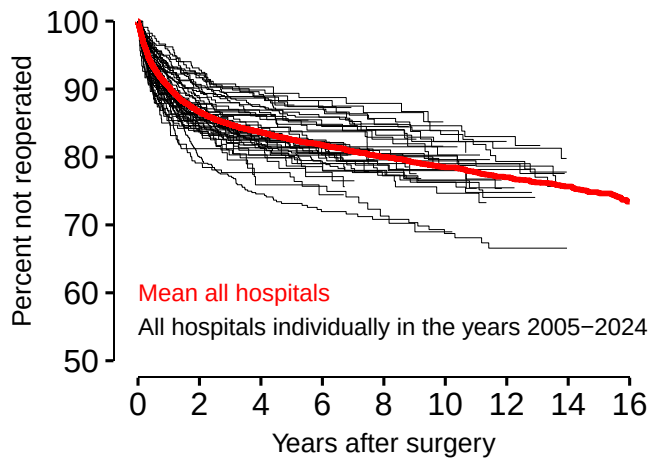
D.7) All hip fractures – 2005–2024



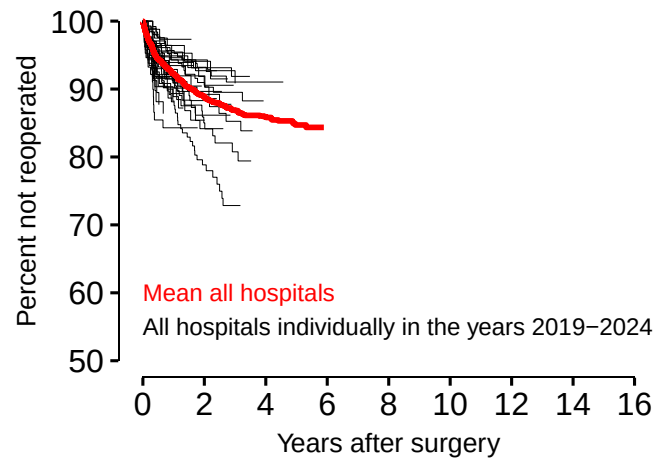
D.8) All hip fractures – 2019–2024



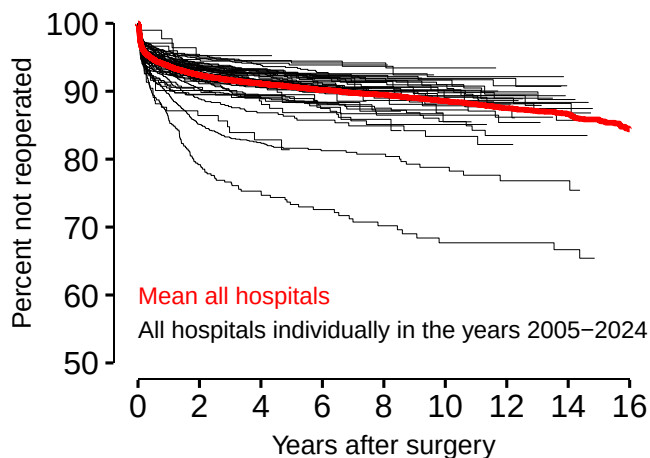
D.9) Undisplaced femoral neck fractures – 2005–2024



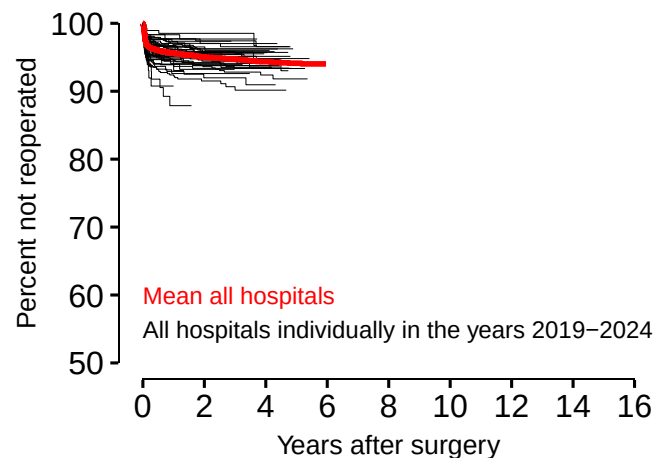
D.10) Undisplaced femoral neck fractures – 2019–2024



D.11) Displaced femoral neck fractures – 2005–2024



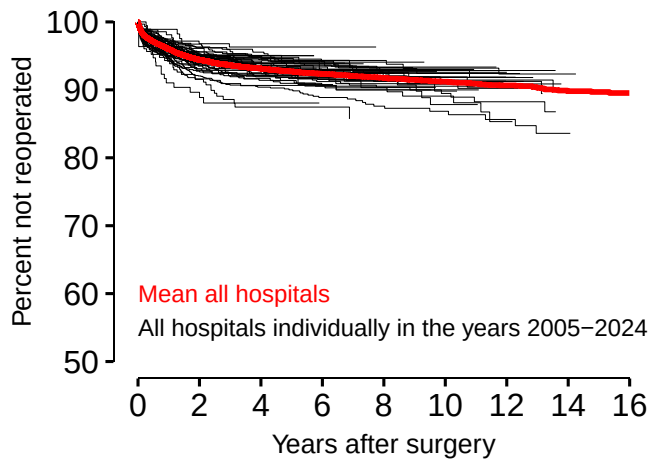
D.12) Displaced femoral neck fractures – 2019–2024



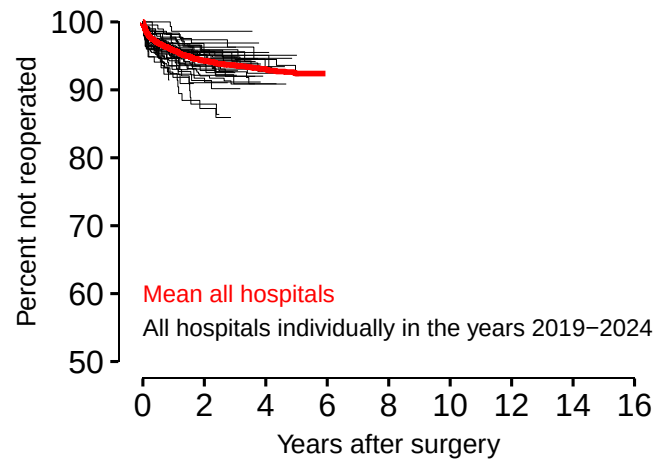
Hospital results after hip fractures

Endpoint: All reoperations

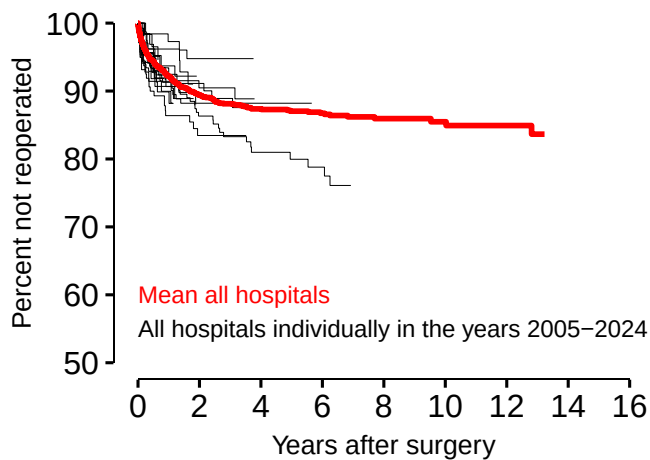
D.13) Trochanteric fractures (AO/OTA A1+A2) 2005–2024



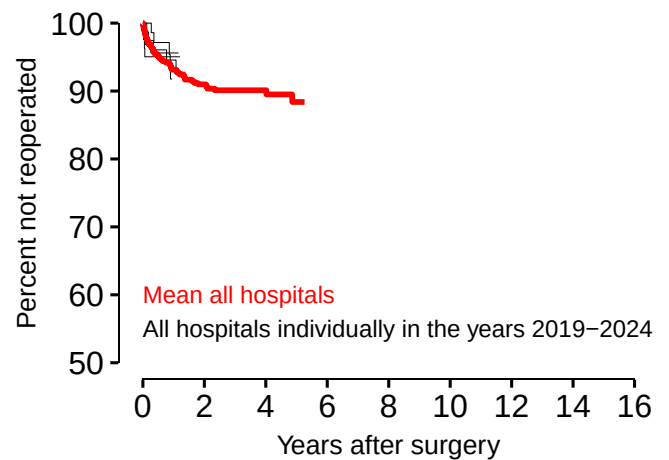
D.14) Trochanteric fractures (AO/OTA A1+A2) 2019–2024



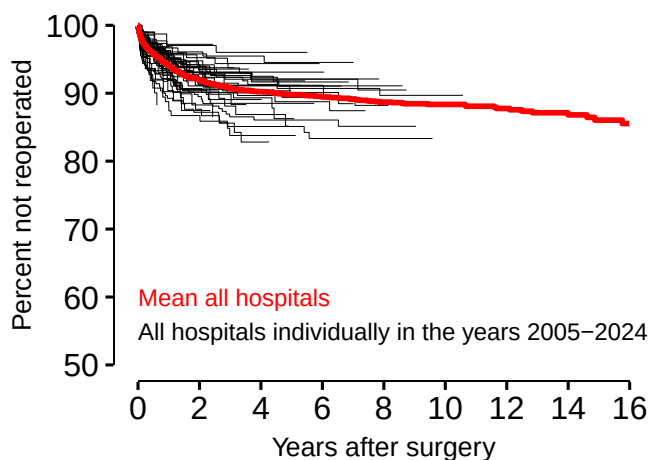
D.15) Intertrochanteric fractures (AO/OTA A3) 2005–2024



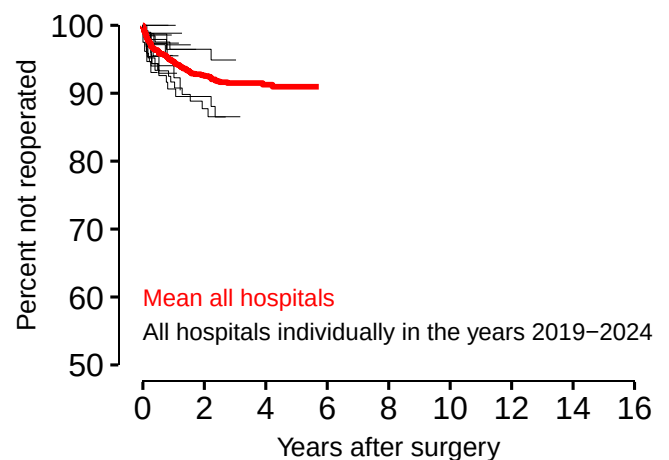
D.16) Intertrochanteric fractures (AO/OTA A3) 2019–2024



D.17) Subtrochanteric fractures – 2005–2024



D.18) Subtrochanteric fractures – 2019–2024

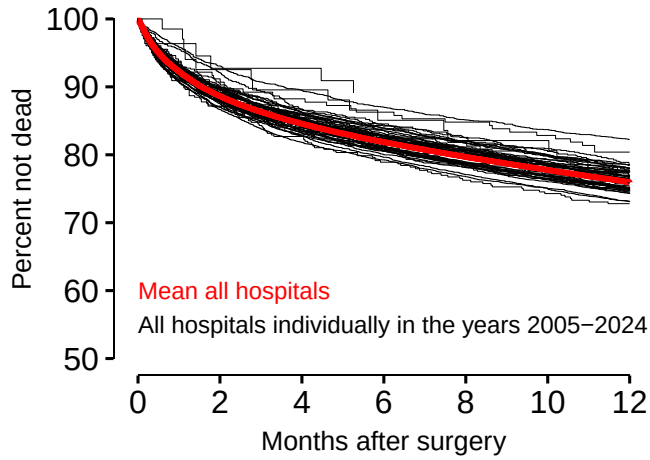


Hospital results after hip fractures

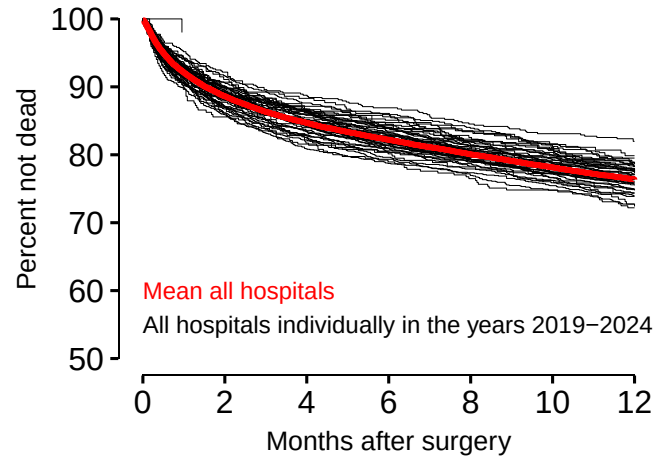
Norwegian Hip Fracture Register

Endpoint: 1-year mortality

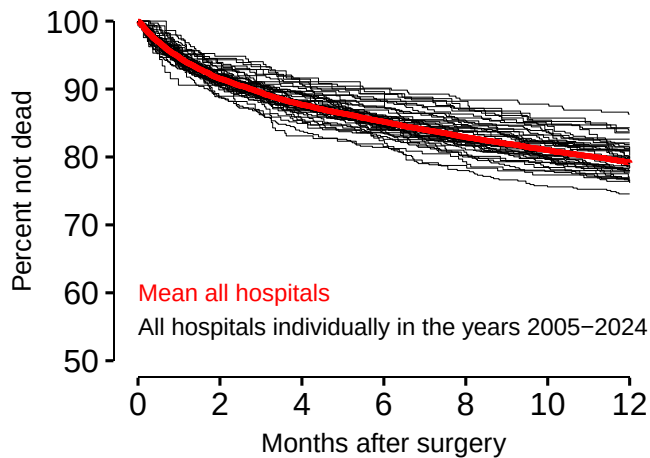
D.19) All hip fractures – 2005–2024



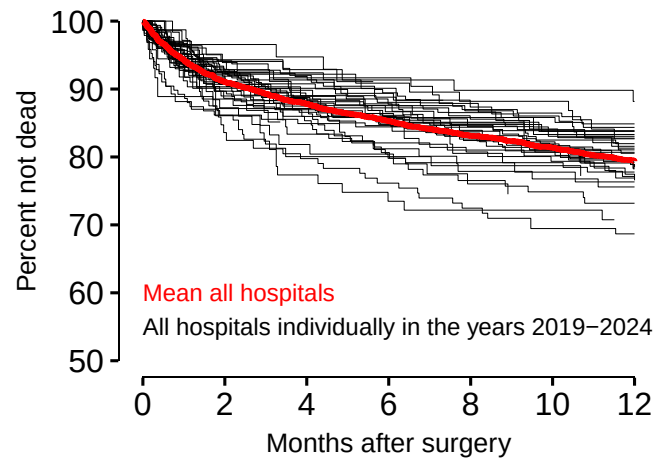
D.20) All hip fractures – 2019–2024



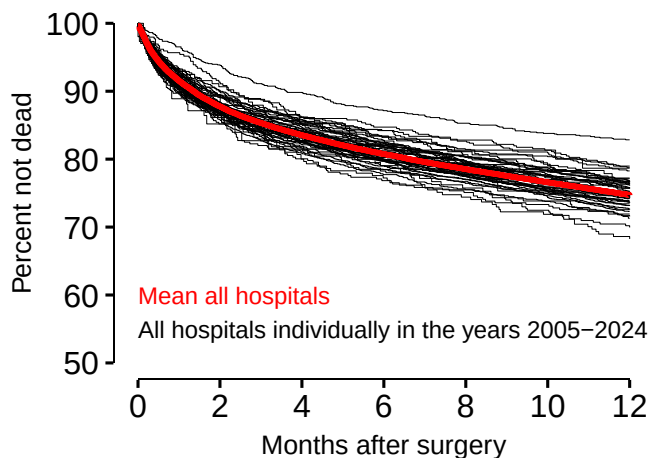
D.21) Undisplaced femoral neck fractures – 2005–2024



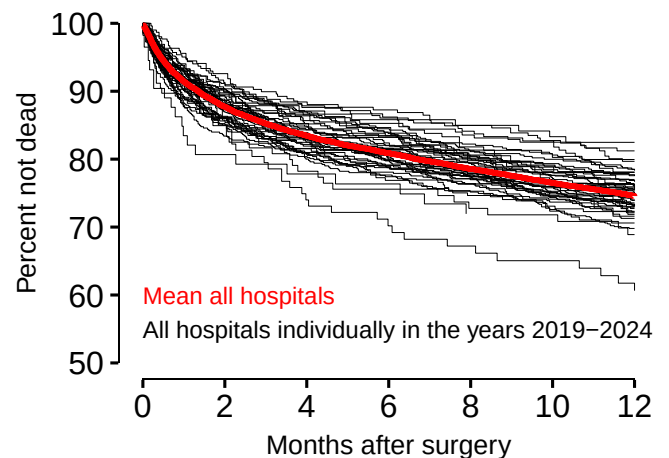
D.22) Undisplaced femoral neck fractures – 2019–2024



D.23) Displaced femoral neck fractures – 2005–2024



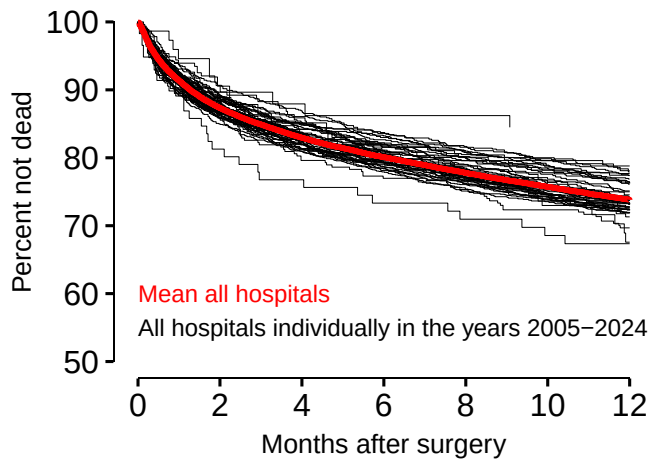
D.24) Displaced femoral neck fractures – 2019–2024



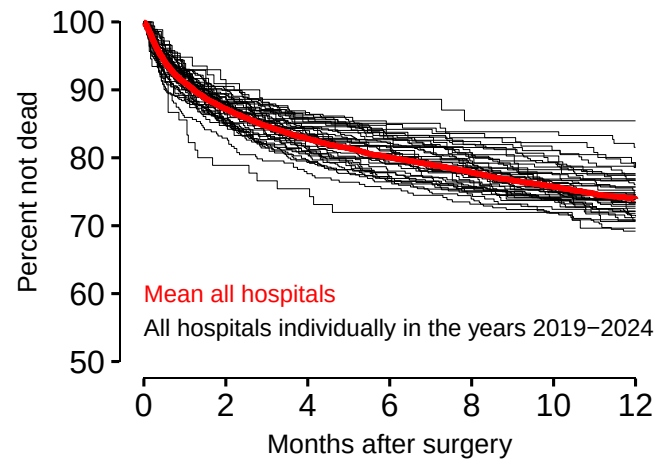
Hospital results after hip fractures

Endpoint: 1-year mortality

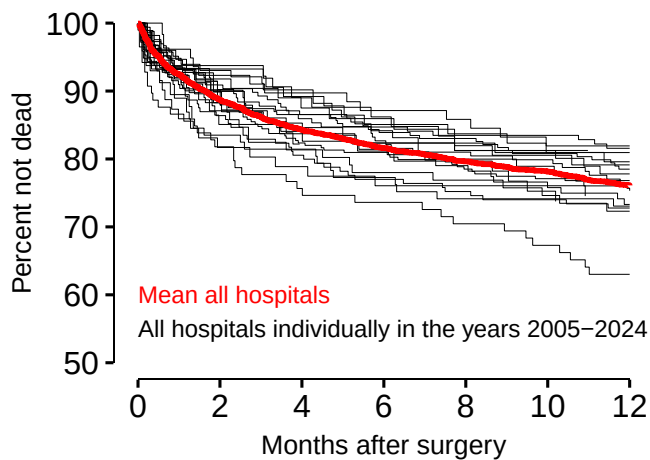
D.25) Trochanteric fractures (AO/OTA A1+A2) 2005–2024



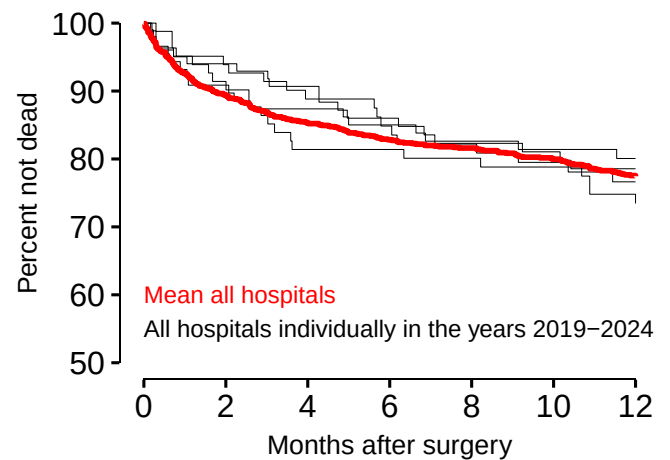
D.26) Trochanteric fractures (AO/OTA A1+A2) 2019–2024



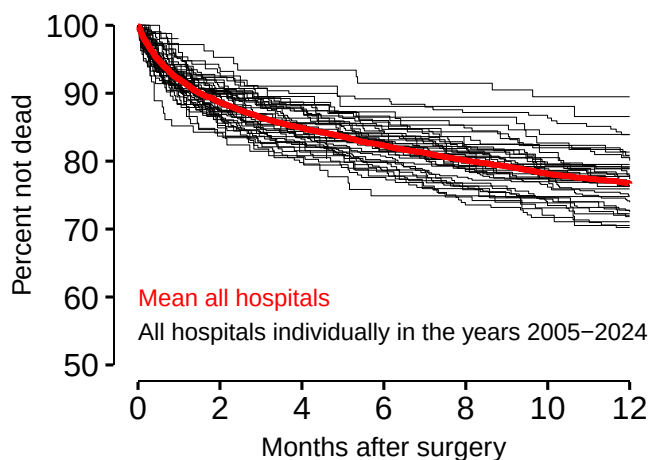
D.27) Intertrochanteric fractures (AO/OTA A3) 2005–2024



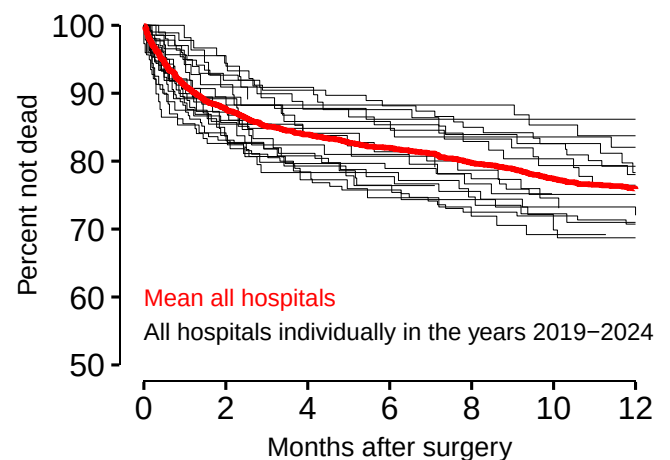
D.28) Intertrochanteric fractures (AO/OTA A3) 2019–2024



D.29) Subtrochanteric fractures 2005–2024



D.30) Subtrochanteric fractures 2019–2024



Hospital data

The Norwegian Hip Fracture Register is required to publish hospital data. These data are presented in the annual report to SKDE which is available at www.kvalitetsregistre.no. Figures D.32 to D.43 present updated results for the different hospitals for operations performed in the period 2022-2024.

Figure D.31: Number of primary operations in 2024 at each hospital

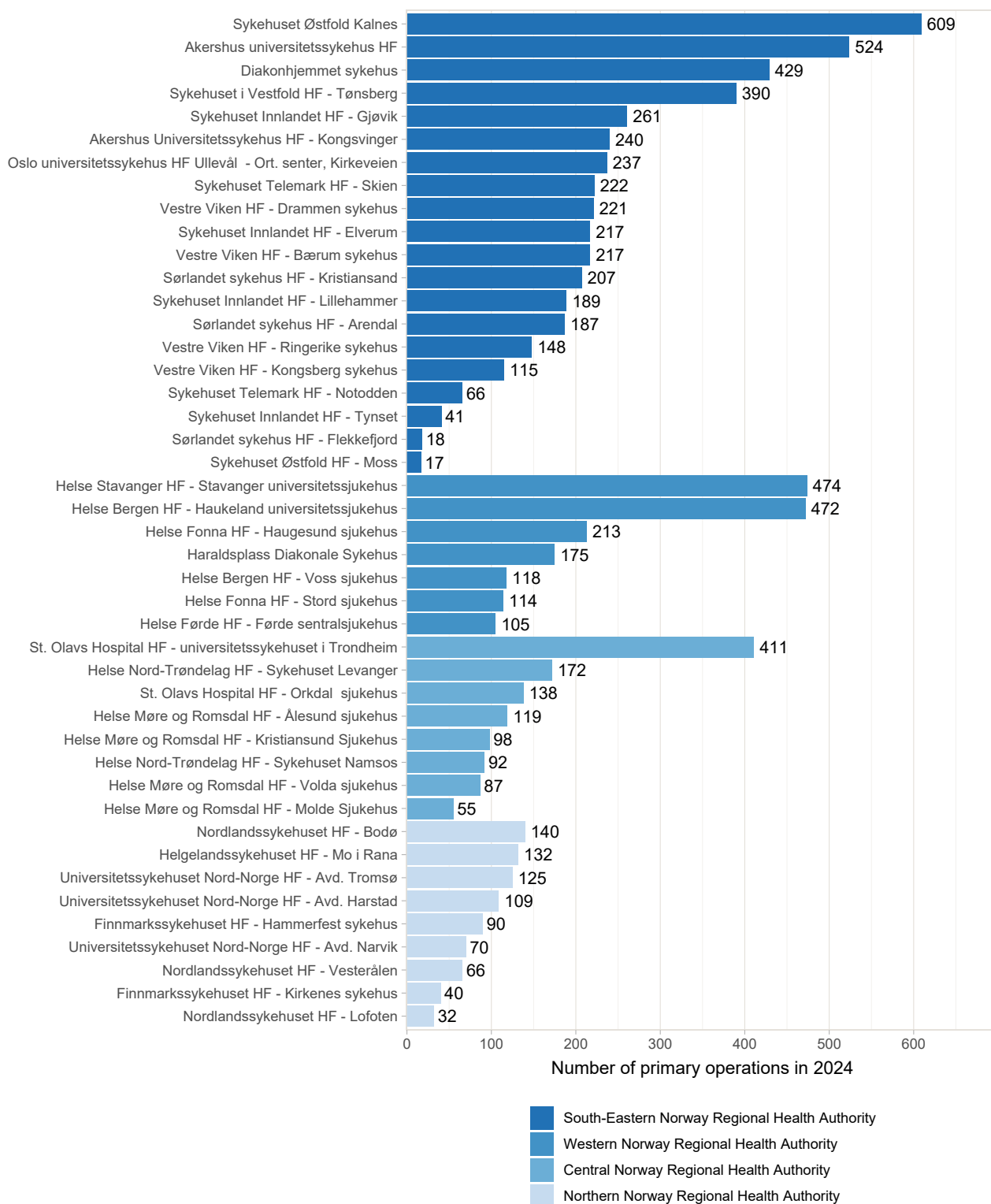


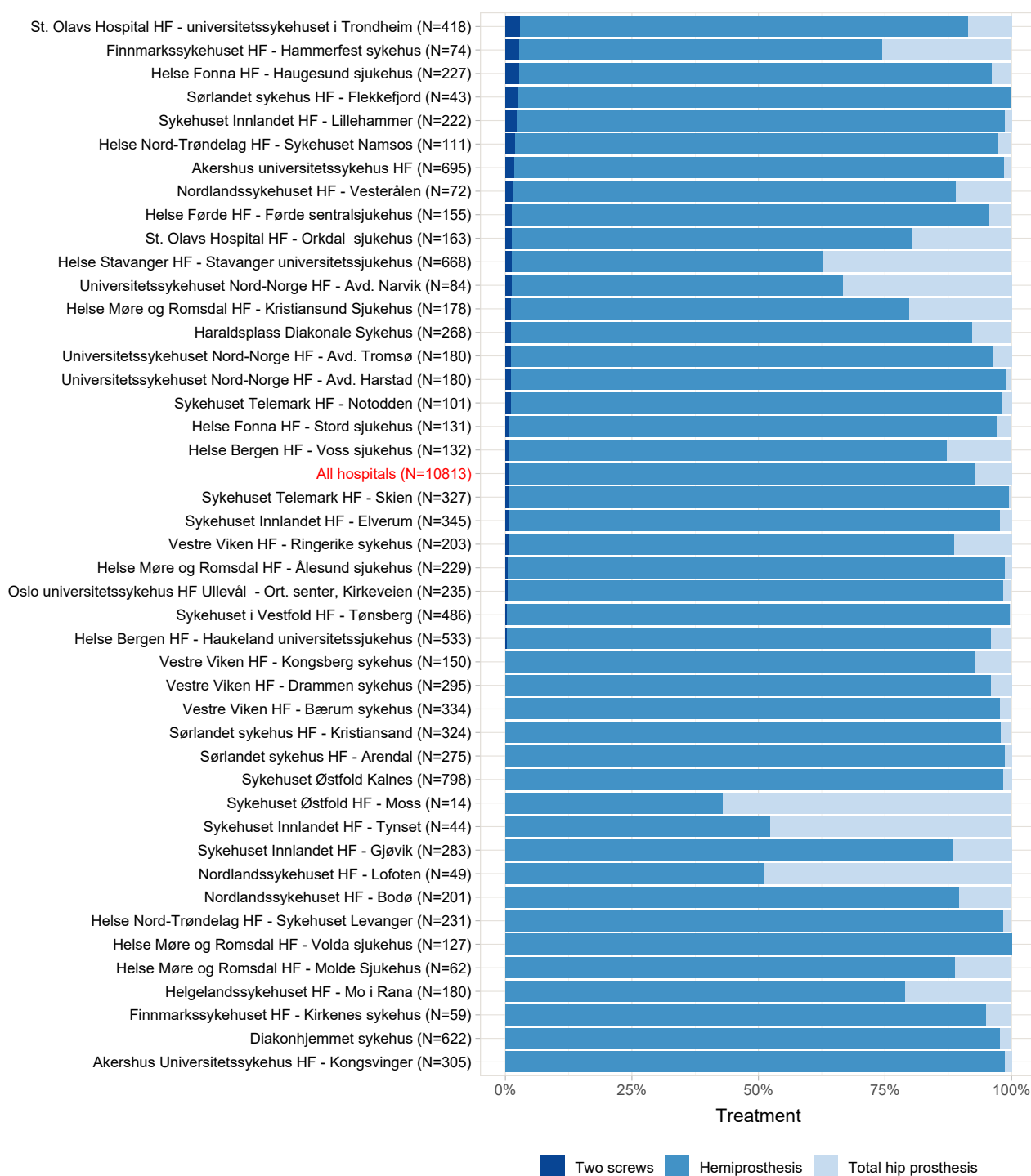
Figure D.32: Displaced femoral neck fractures in patients over 70 years of age in 2022-2024

Figure D.32 shows the proportion of patients treated with screw osteosynthesis/hemiprosthesis/total hip prosthesis at each hospital in the period 2022-2024. Hospitals with $n < 10$ have been excluded.

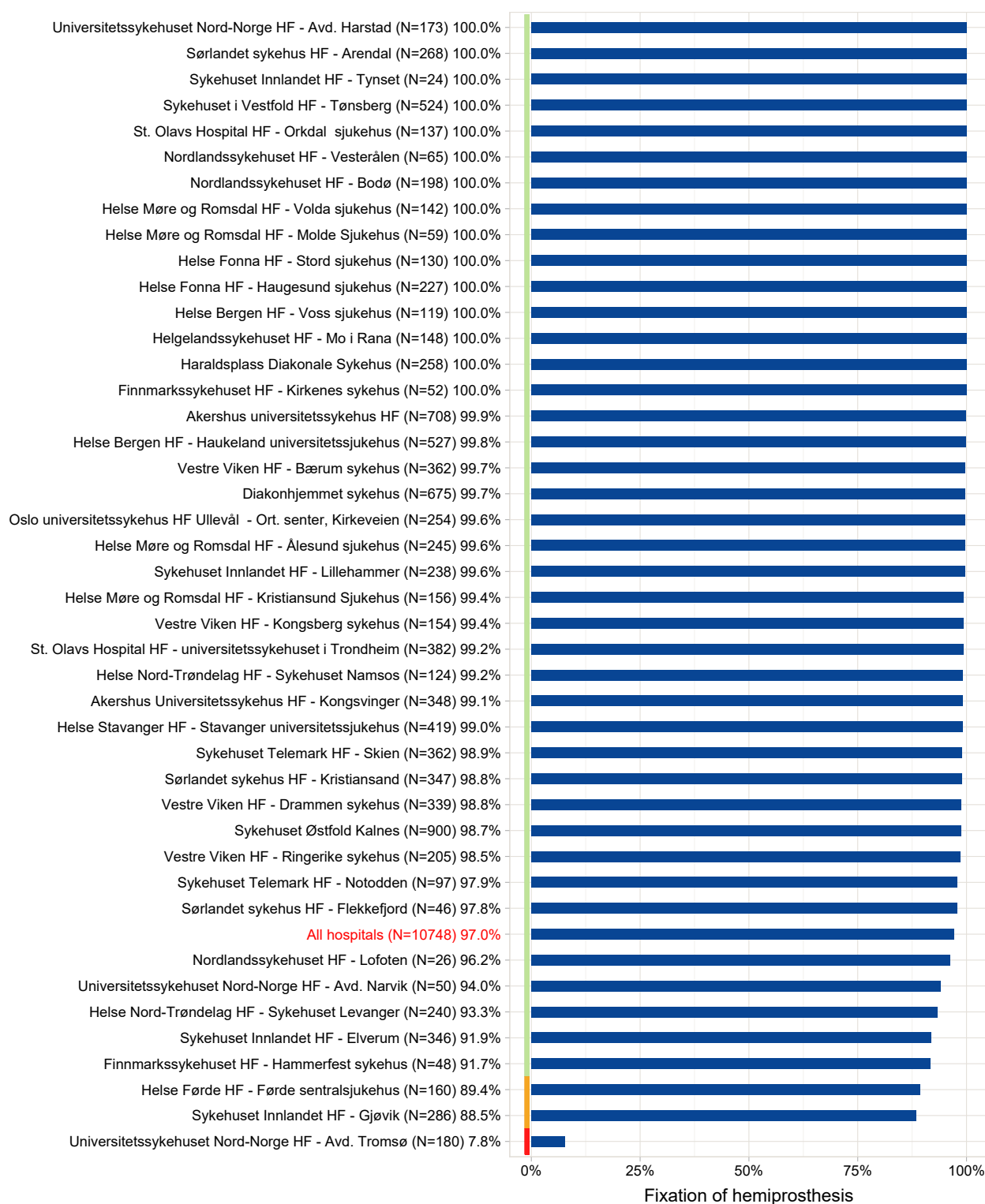
Figure D.33: Fixation of hemiprosthesis in patients over 70 years of age in 2022-2024

Figure D.33 shows the proportion of patients treated with cemented/uncemented hemiprosthesis, sorted by proportion of cemented hemiarthroplasties at each hospital in the period 2022-2024. This is a Key Performance Indicator (KPI) in the Norwegian Hip Fracture Register. The number of operations and the percentage of cemented hemiarthroplasties are reported for each hospital. Hospitals with $n < 10$ have been excluded.

Figure D.34: Proportion of non-reoperated hip fractures within 1 year - All hip fractures in 2022-2024

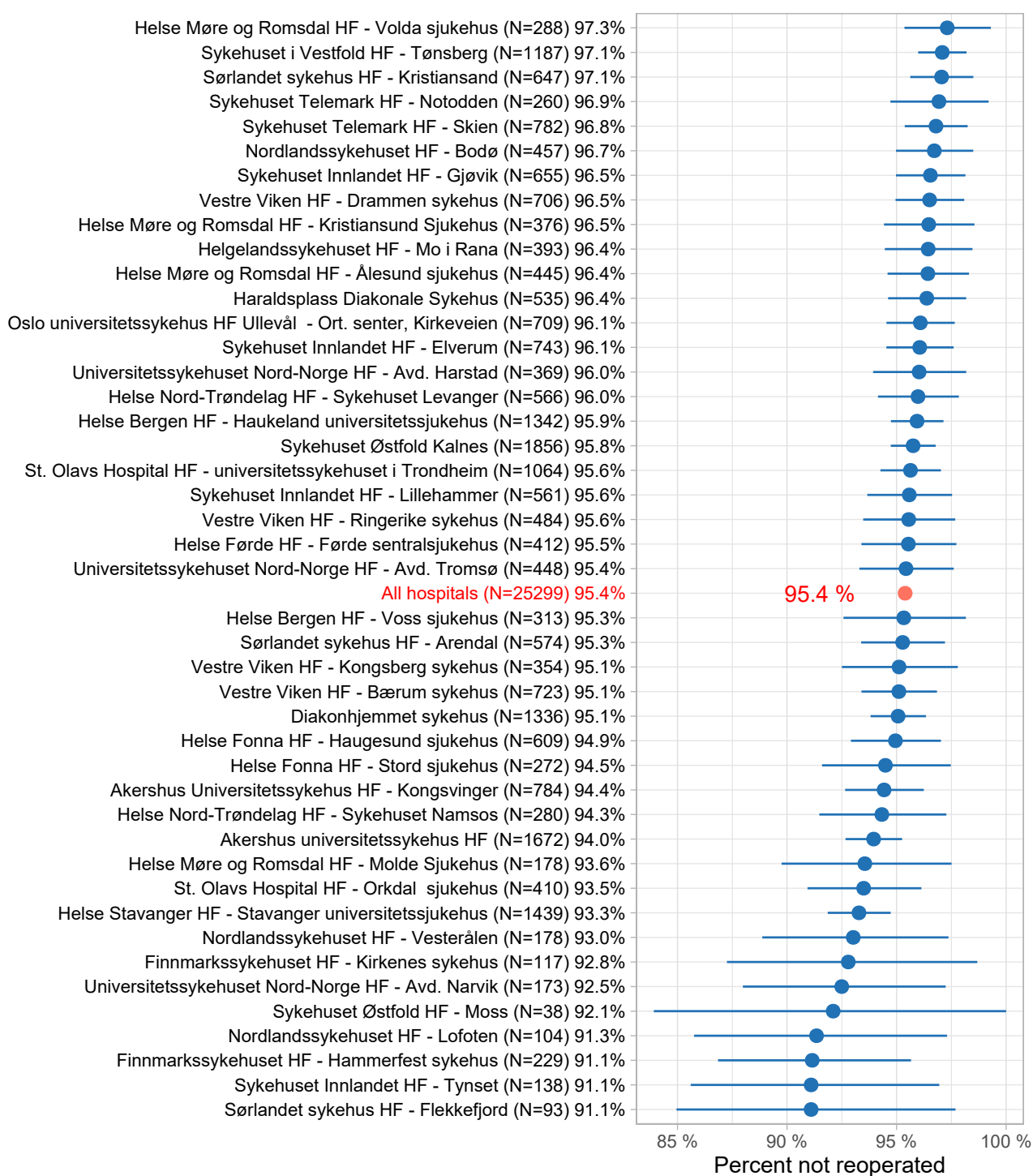


Figure D.34 shows Kaplan–Meier estimated proportions of patients not reoperated within 1 year for hip fractures operated during the period 2022 - 2024 (i.e., ‘implant survival’). The result is presented as a percentage (dot) with a 95 % confidence interval (horizontal lines). Results are reported at the hospital level. Hospitals with $n < 10$ have been excluded.

Figure D.35: Proportion of non-reoperated hip fractures within 1 year - Undisplaced femoral neck fractures in 2022-2024

Figure D.35 shows Kaplan–Meier estimated proportions of patients not reoperated within 1 year for undisplaced femoral neck fractures during the period 2022 - 2024 (i.e., ‘implant survival’). The result is presented as a percentage (dot) with a 95 % confidence interval (horizontal lines). Results are reported at the hospital level. The number of primary fractures at each hospital during this period is given in parentheses. Hospitals with $n < 10$ have been excluded.

Figure D.36: Proportion of non-reoperated hip fractures within 1 year - Displaced femoral neck fractures in 2022-2024

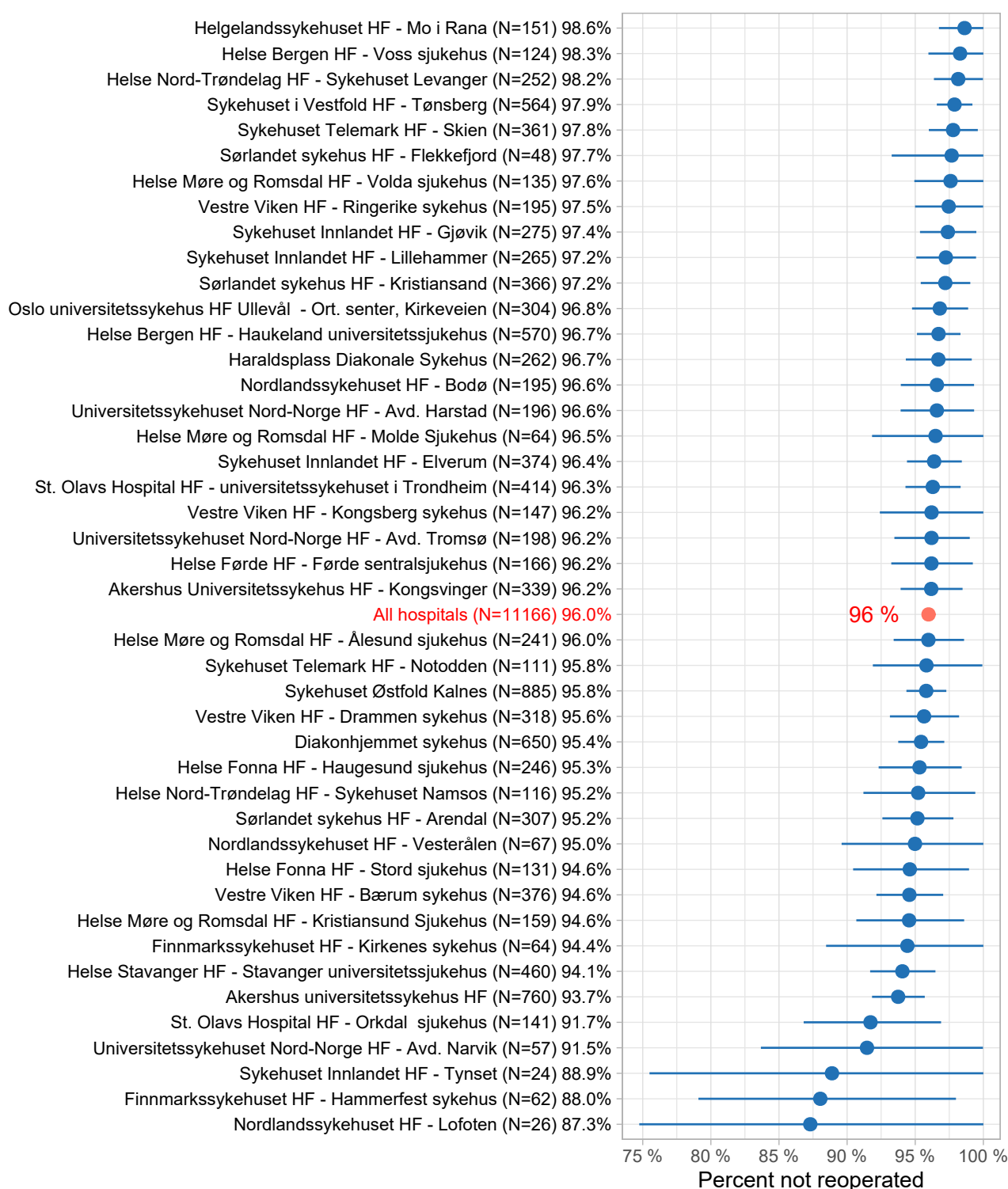


Figure D.36 shows Kaplan–Meier estimated proportions of patients not reoperated within 1 year for displaced femoral neck fractures during the period 2022 - 2024 (i.e., ‘implant survival’). The result is presented as a percentage (dot) with a 95 % confidence interval (horizontal lines). Results are reported at the hospital level. The number of primary fractures at each hospital during this period is given in parentheses. Hospitals with $n < 10$ have been excluded.

Figure D.37: Proportion of non-reoperated hip fractures within 1 year - AO/OTA A1 trochanteric fractures in 2022-2024

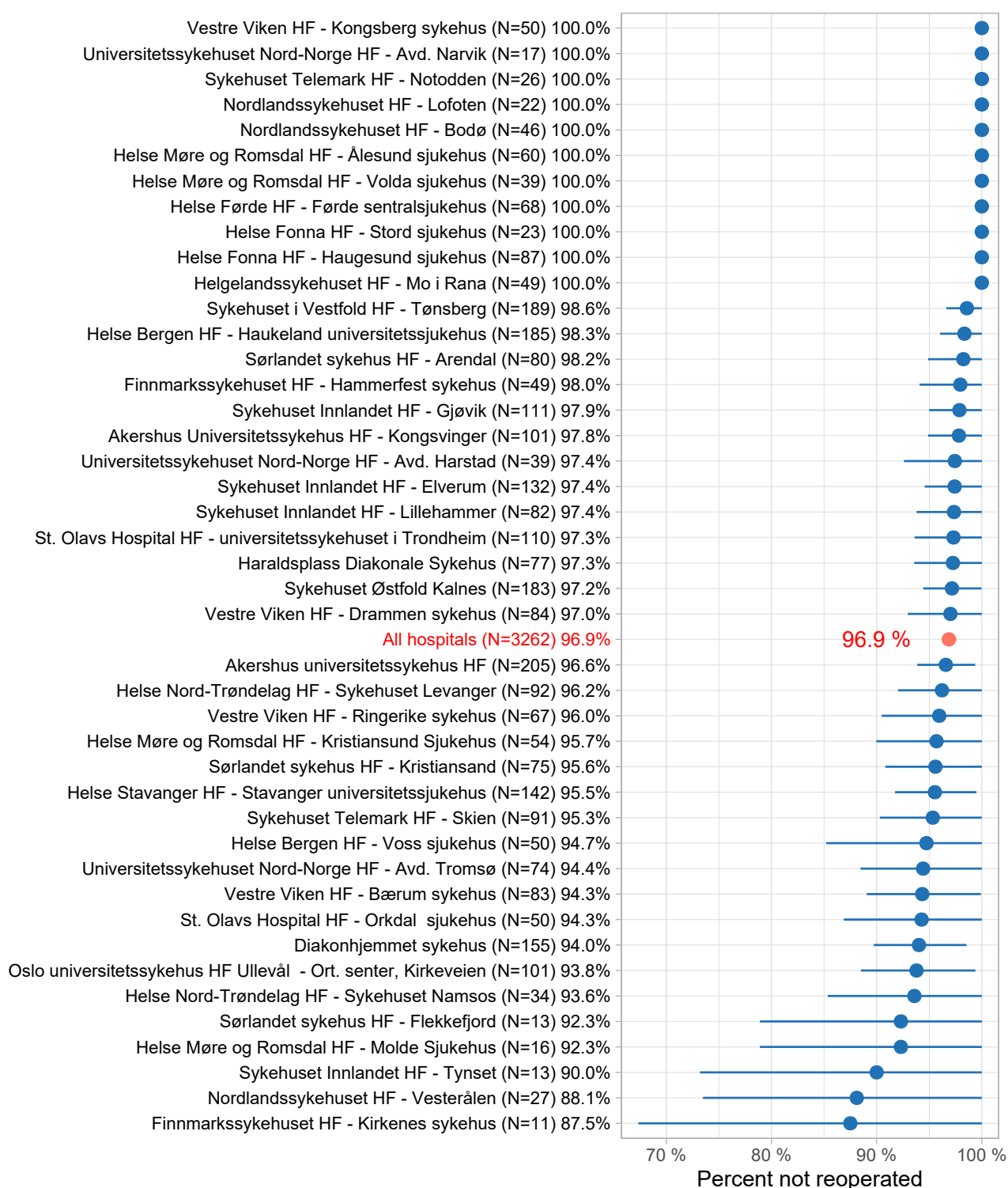


Figure D.37 shows Kaplan–Meier estimated proportions of patients not reoperated within 1 year for AO/OTA A1 trochanteric fractures during the period 2022 - 2024 (i.e., ‘implant survival’). The result is presented as a percentage (dot) with a 95 % confidence interval (horizontal lines). Results are reported at the hospital level. The number of primary fractures at each hospital during this period is given in parentheses. Hospitals with $n < 10$ have been excluded.

Figure D.38: Proportion of non-reoperated hip fractures within 1 year - AO/OTA A2 trochanteric fractures in 2022-2024

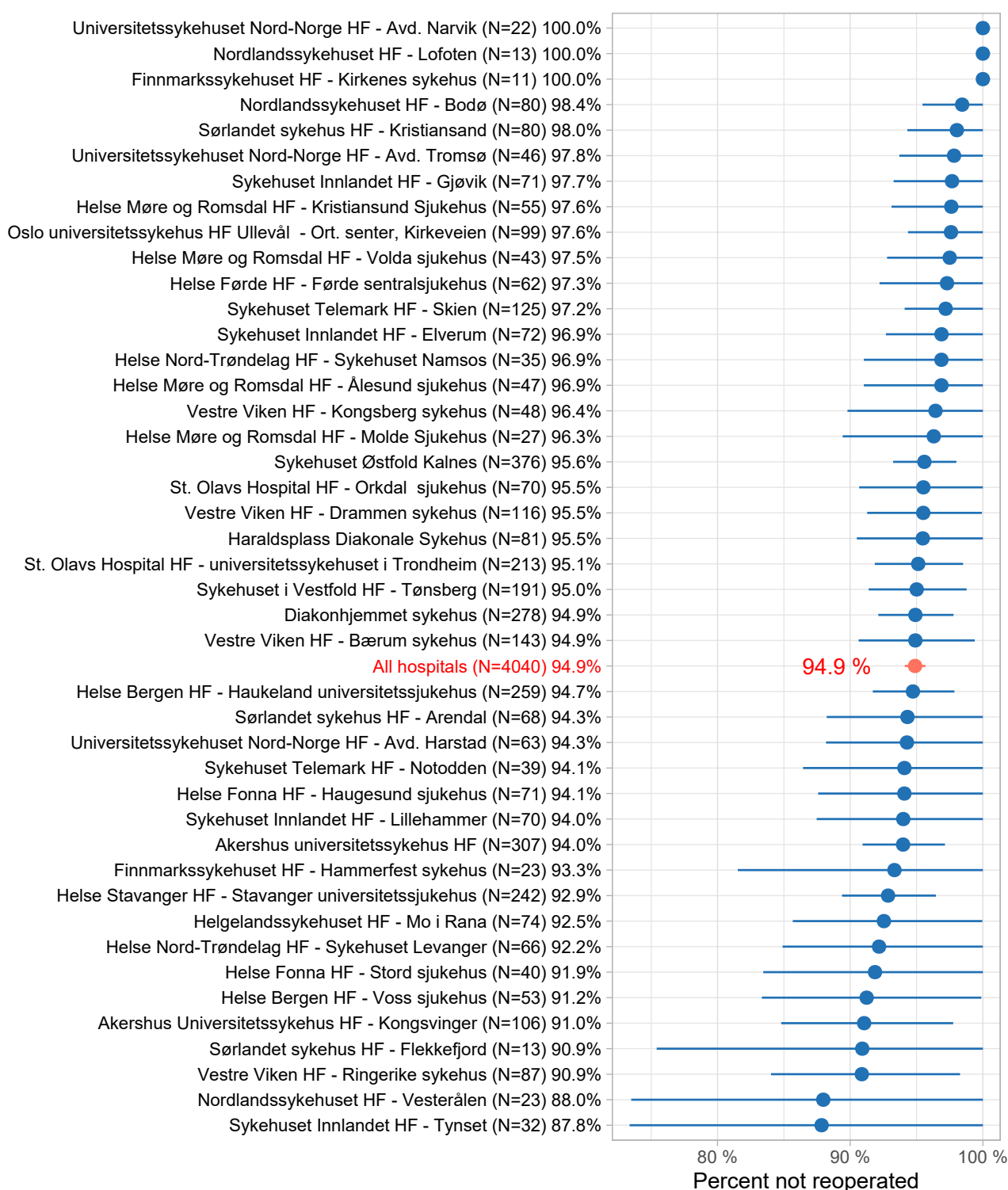


Figure D.38 shows Kaplan–Meier estimated proportions of patients not reoperated within 1 year for AO/OTA A2 trochanteric fractures during the period 2022 - 2024 (i.e., ‘implant survival’). The result is presented as a percentage (dot) with a 95 % confidence interval (horizontal lines). Results are reported at the hospital level. The number of primary fractures at each hospital during this period is given in parentheses. Hospitals with $n < 10$ have been excluded.

Figure D.39: Proportion of non-reoperated hip fractures within 1 year - AO/OTA A3 intertrochanteric fractures in 2022-2024

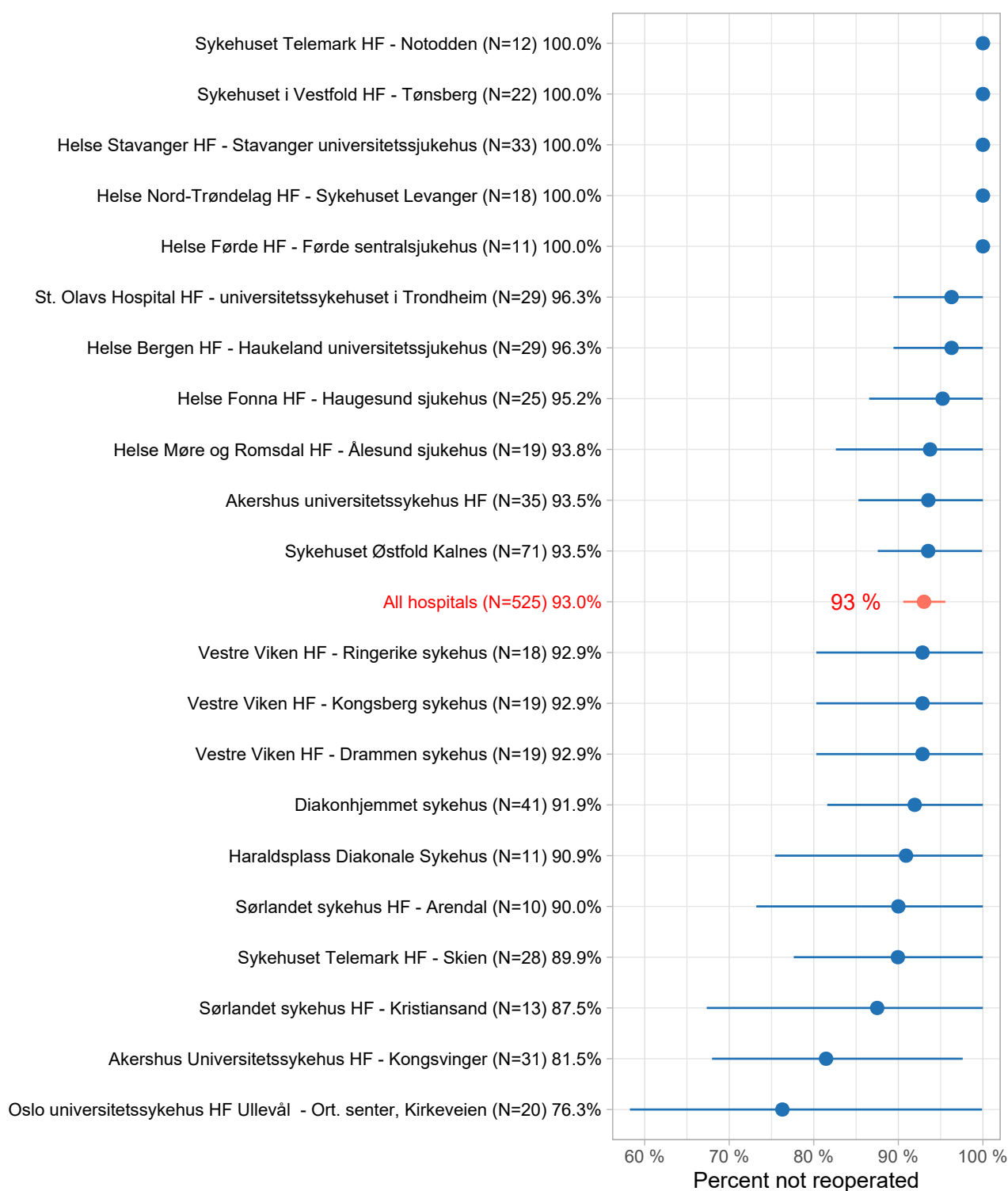


Figure D.39 shows Kaplan–Meier estimated proportions of patients not reoperated within 1 year for AO/OTA A3 intertrochanteric fractures during the period 2022 - 2024 (i.e., ‘implant survival’). The result is presented as a percentage (dot) with a 95 % confidence interval (horizontal lines). Results are reported at the hospital level. The number of primary fractures at each hospital during this period is given in parentheses. Hospitals with $n < 10$ have been excluded.

Figure D.40: Proportion of non-reoperated hip fractures within 1 year - Subtrochanteric fractures in 2022-2024

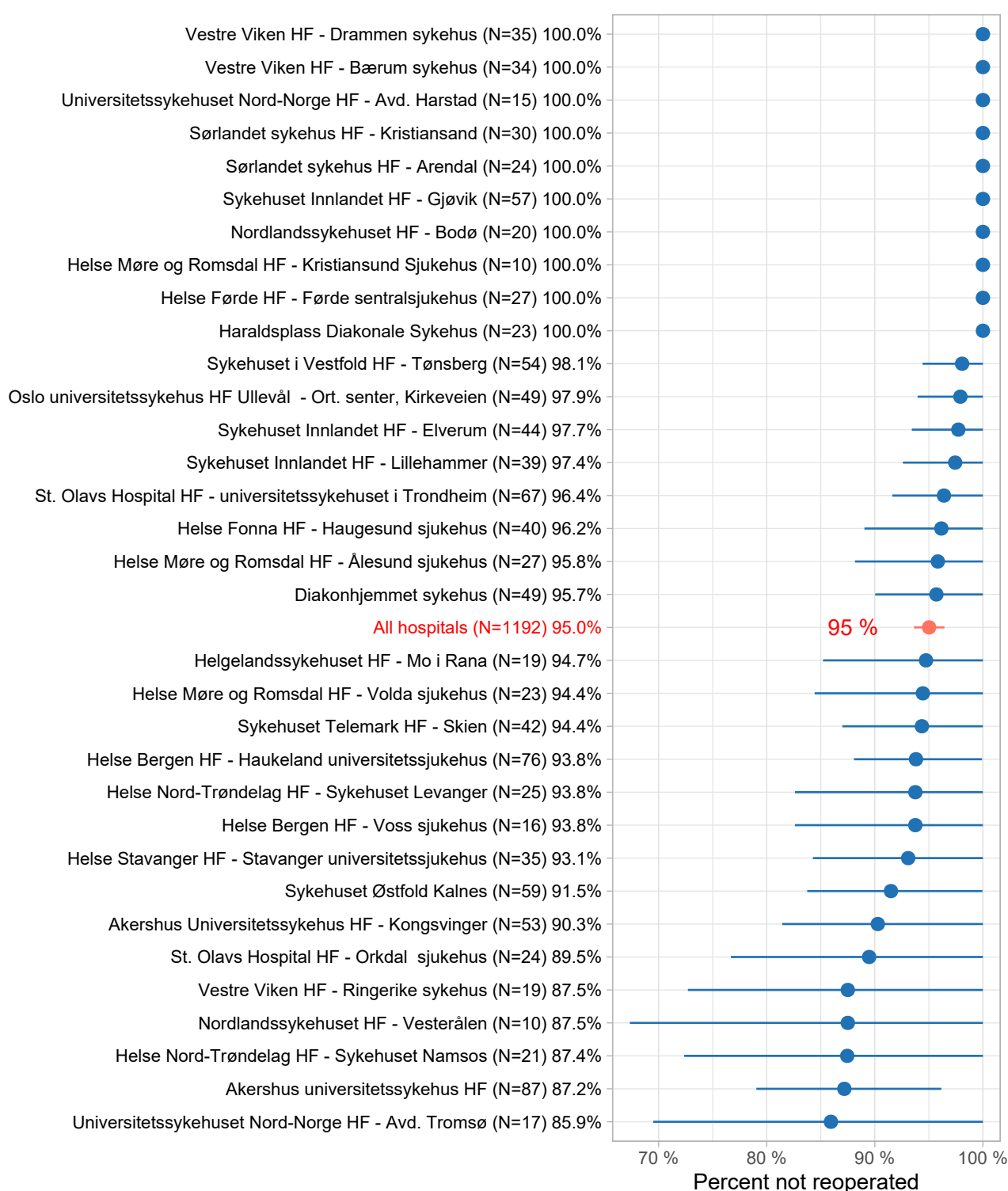


Figure D.40 shows Kaplan–Meier estimated proportions of patients not reoperated within 1 year for subtrochanteric fractures during the period 2022 - 2024 (i.e., ‘implant survival’). The result is presented as a percentage (dot) with a 95 % confidence interval (horizontal lines). Results are reported at the hospital level. The number of primary fractures at each hospital during this period is given in parentheses. Hospitals with $n < 10$ have been excluded.

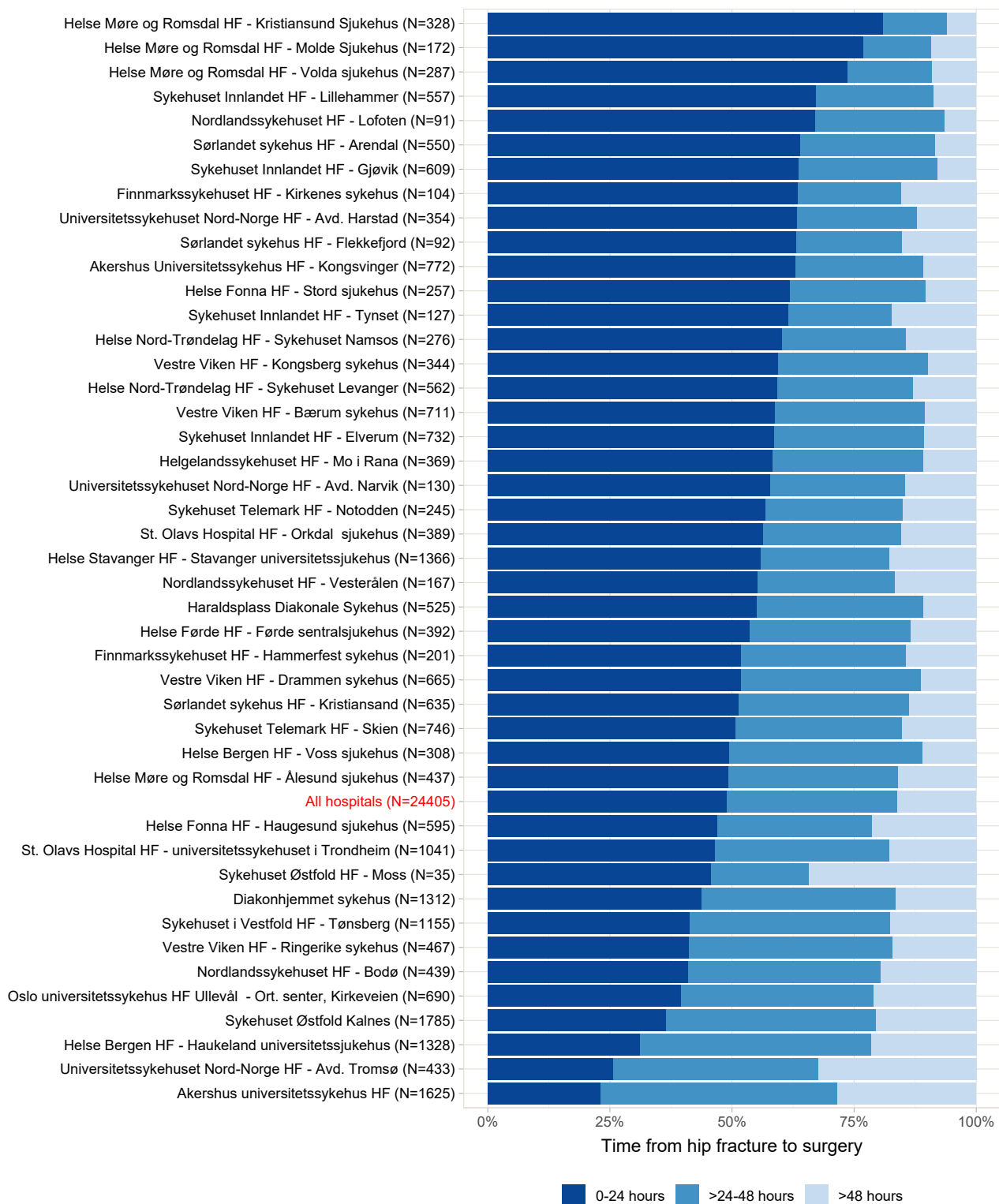
Figure D.41: Time from hip fracture to surgery

Figure D.41 shows time from hip fracture until surgery sorted by proportion of fractures operated within 24 hours, in the period 2022-2024. Hospitals with $n < 10$ have been excluded.

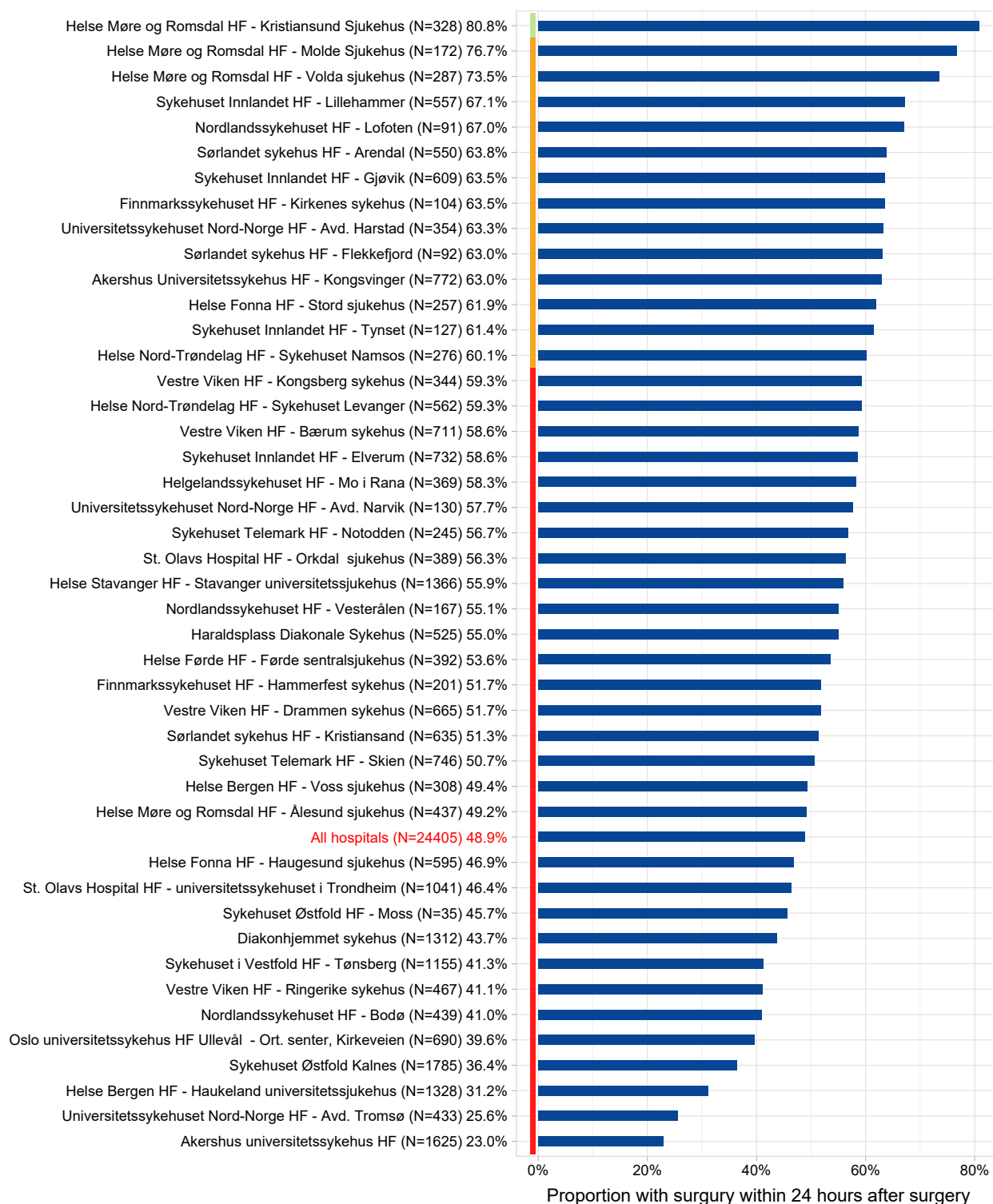
Figure D.42: Proportion operated within 24 hours after hip fracture

Figure D.42 shows the proportion of patients operated within 24 hours after fracture in 2022 - 2024. This is a key performance indicator in the Norwegian Hip Fracture Register. The number of operations and the proportion operated within 24 hours are reported for each hospital. Hospitals with fewer than 10 operations are excluded. The figure is sorted by the proportion of patients operated within 24 hours after fracture. There are considerable differences in waiting time for surgery between hospitals. Operations involving total hip arthroplasty have no information on time of fracture and are therefore not included.

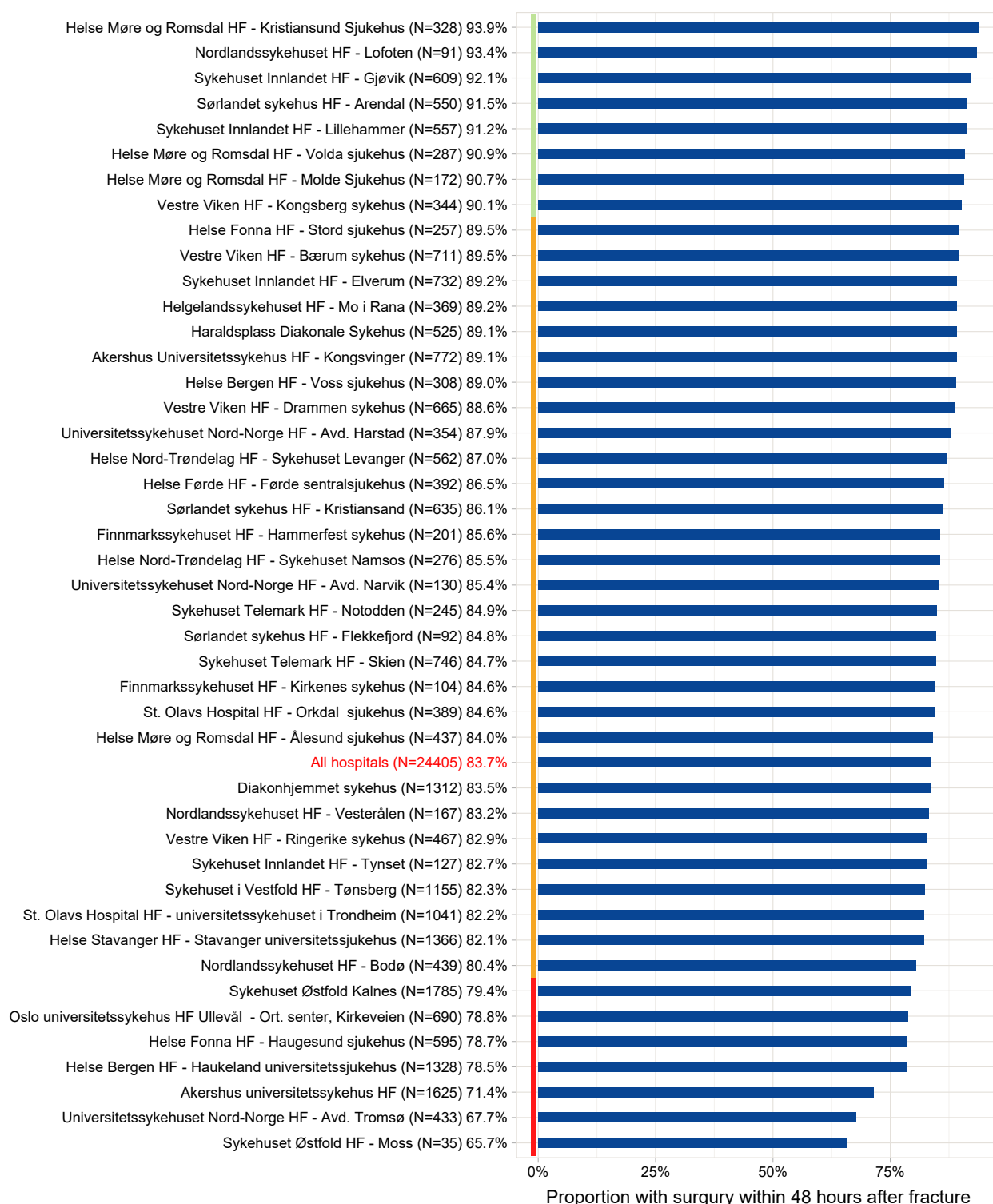
Figure D.43: Proportion operated within 48 hours after hip fracture

Figure D.43 shows the proportion of patients operated within 48 hours after fracture in 2022 - 2024. This is a key performance indicator in the Norwegian Hip Fracture Register. The number of operations and the proportion operated within 24 hours are reported for each hospital. Hospitals with fewer than 10 operations are excluded. The figure is sorted by the proportion of patients operated within 24 hours after fracture. There are considerable differences in waiting time for surgery between hospitals. Operations involving total hip arthroplasty have no information on time of fracture and are therefore not included.

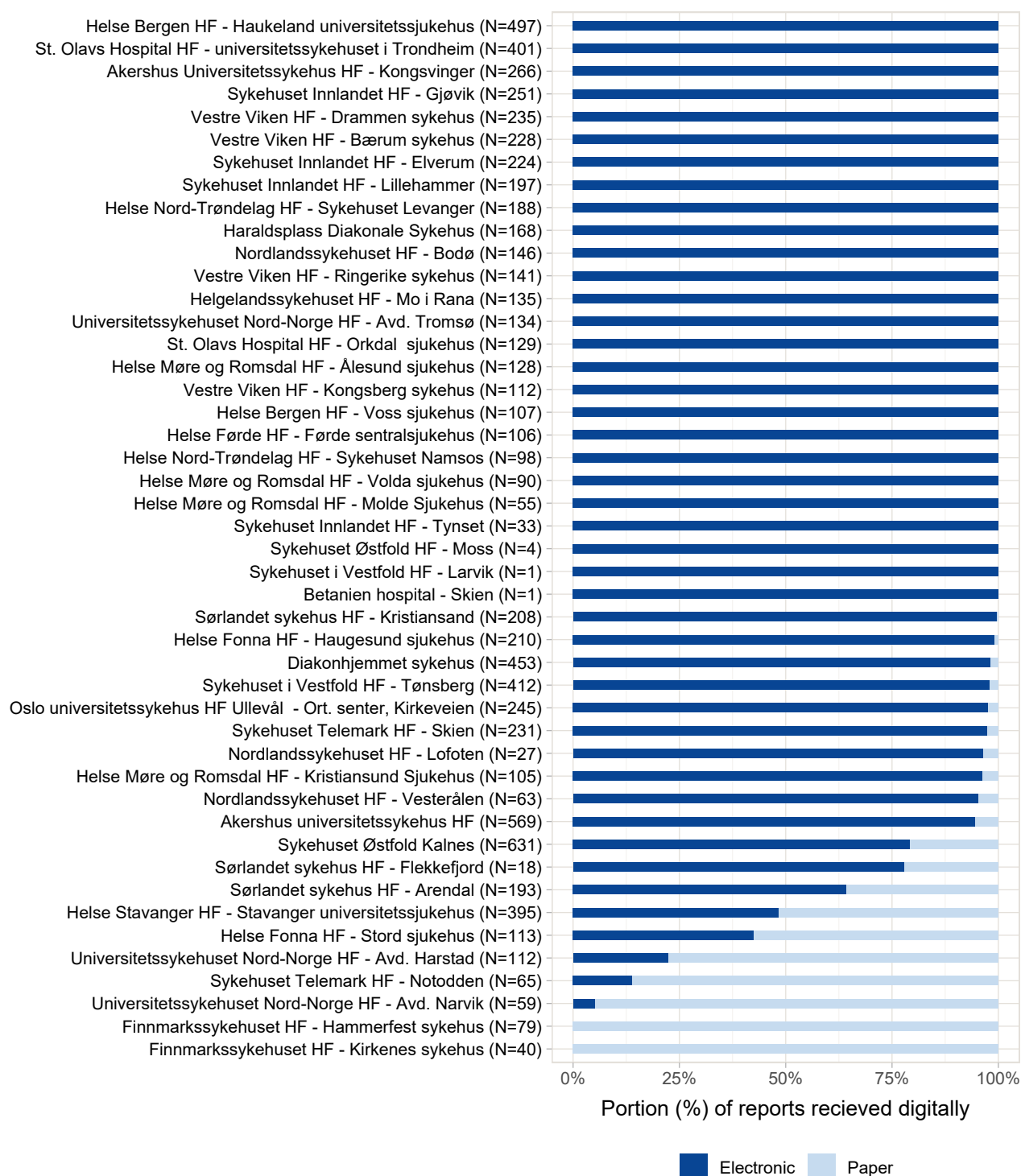
Figure D.44: Reporting format in 2024, all operations

Figure D.44 shows the proportion of operations that were electronically reported at the different hospitals in 2024. The national average for electronic reporting in 2024 is 90%.

HIP FRACTURES

Numbers of operations

Table 1: Annual numbers of operations

Year	Primary operation	Reoperation	Total
2024	8 375 (91,5%)	780 (8,5%)	9 155
2023	8 484 (91,0%)	835 (9,0%)	9 319
2022	8 656 (91,5%)	804 (8,5%)	9 460
2021	8 340 (91,4%)	785 (8,6%)	9 125
2020	7 783 (91,4%)	730 (8,6%)	8 513
2019	8 168 (89,9%)	920 (10,1%)	9 088
2018	8 426 (90,0%)	939 (10,0%)	9 365
2017	8 352 (90,3%)	901 (9,7%)	9 253
2016	8 503 (89,6%)	987 (10,4%)	9 490
2015	8 409 (90,0%)	939 (10,0%)	9 348
2014	8 183 (91,2%)	793 (8,8%)	8 976
2013	8 308 (90,2%)	899 (9,8%)	9 207
2012	8 437 (90,4%)	896 (9,6%)	9 333
2011	8 604 (90,3%)	925 (9,7%)	9 529
2005-10	46 252 (89,8%)	5 264 (10,2%)	51 516
Total	163 280 (90,4%) *	17 397 (9,6%) **	180 677

49% of primary operations were on the right side. 68% of primary operations were performed on women.

Mean age at primary surgery was 80 years: 81 years for women and 77 years for men.

* 6 883 (4%) were primary operations with total hip prostheses from the Norwegian Arthroplasty Register.

** 6 708 (39%) were reoperations with total hip prostheses from the Norwegian Arthroplasty Register.

Figure 1: Annual numbers of operations

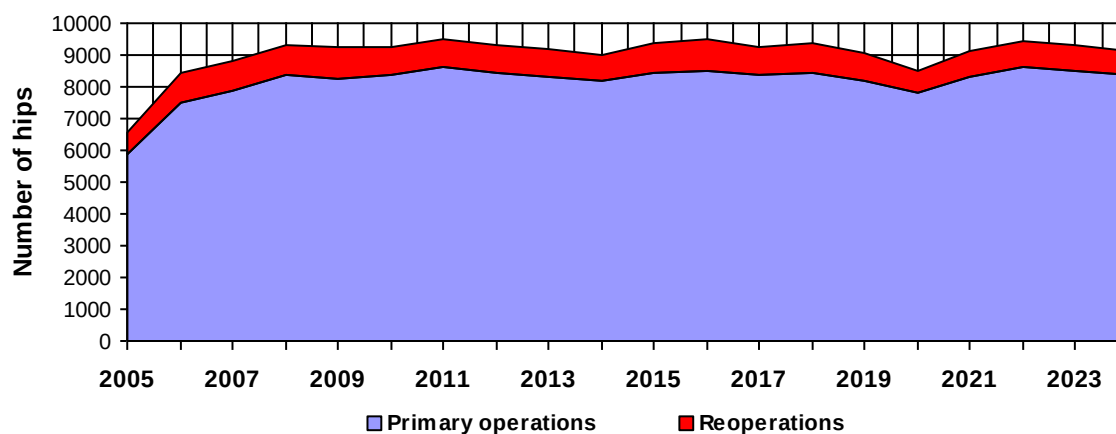
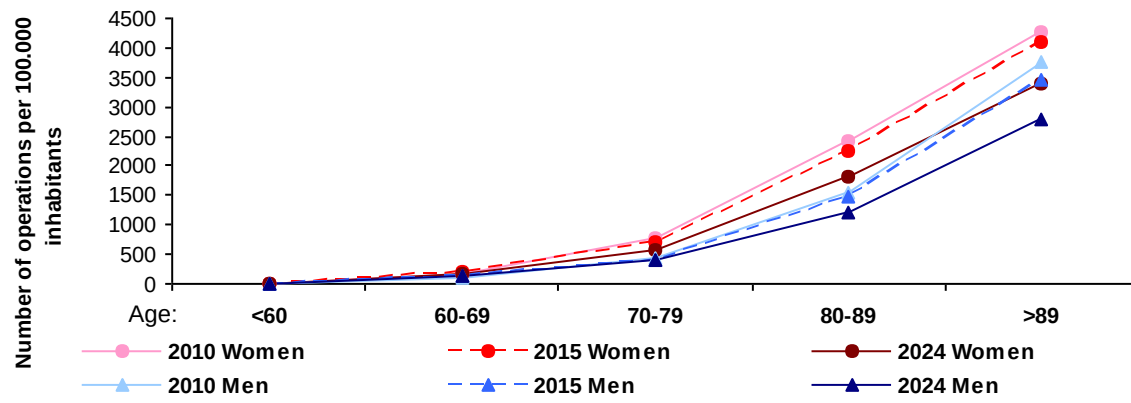


Figure 2a: Incidence of primary operation (in 2010, 2015 and 2024)

Time from fracture to operation in hours - primary operations

Table 2a: Time from fracture to operation in hours*

	0 - 6	>6 - 12	>12 - 24	>24 - 48	>48	Missing	Total
2024	183 (2,3%)	841 (10,7%)	2 953 (37,5%)	2 995 (38,1%)	1 330 (16,9%)	73 (,9%)	7 866
2023	195 (2,5%)	855 (10,8%)	2 971 (37,6%)	2 851 (36,0%)	1 408 (17,8%)	204 (2,6%)	7 912
2022	228 (2,8%)	927 (11,5%)	2 876 (35,6%)	2 719 (33,7%)	1 281 (15,9%)	625 (7,7%)	8 079
2021	265 (3,4%)	983 (12,6%)	2 913 (37,3%)	2 437 (31,2%)	1 058 (13,6%)	684 (8,8%)	7 802
2020	242 (3,3%)	979 (13,5%)	2 781 (38,4%)	2 141 (29,6%)	957 (13,2%)	683 (9,4%)	7 242
2019	225 (3,0%)	892 (11,8%)	2 698 (35,8%)	2 513 (33,3%)	1 071 (14,2%)	769 (10,2%)	7 538
2018	279 (3,6%)	957 (12,2%)	2 719 (34,7%)	2 418 (30,8%)	1 288 (16,4%)	765 (9,8%)	7 845
2017	298 (3,8%)	1 113 (14,0%)	2 776 (35,0%)	2 378 (29,9%)	1 206 (15,2%)	581 (7,3%)	7 940
2016	299 (3,7%)	1 106 (13,6%)	2 897 (35,5%)	2 426 (29,7%)	1 235 (15,1%)	540 (6,6%)	8 155
2015	309 (3,8%)	1 086 (13,4%)	3 053 (37,8%)	2 330 (28,8%)	1 105 (13,7%)	526 (6,5%)	8 086
2014	326 (4,1%)	1 157 (14,7%)	2 996 (38,0%)	2 189 (27,7%)	1 045 (13,2%)	470 (6,0%)	7 894
2013	314 (3,9%)	1 129 (14,1%)	2 932 (36,6%)	2 260 (28,2%)	1 198 (15,0%)	475 (5,9%)	8 012
2012	316 (3,8%)	1 167 (14,2%)	2 936 (35,7%)	2 309 (28,1%)	1 326 (16,1%)	383 (4,7%)	8 229
2011	313 (3,7%)	1 207 (14,3%)	2 845 (33,8%)	2 420 (28,8%)	1 421 (16,9%)	398 (4,7%)	8 414
2005-1	2 456 (5,4%)	8 045 (17,7%)	15 805 (34,8%)	11 247 (24,8%)	6 918 (15,2%)	1 781 (3,9%)	45 383
Total	6 248 (4,0%)	22 444 (14,4%)	56 151 (35,9%)	45 633 (29,2%)	23 847 (15,2%)	8 957 (5,7%)	156 397

* Total hip prostheses are not counted

Figure 3: Time from fracture to operation - grouped in hours (n=156 397)

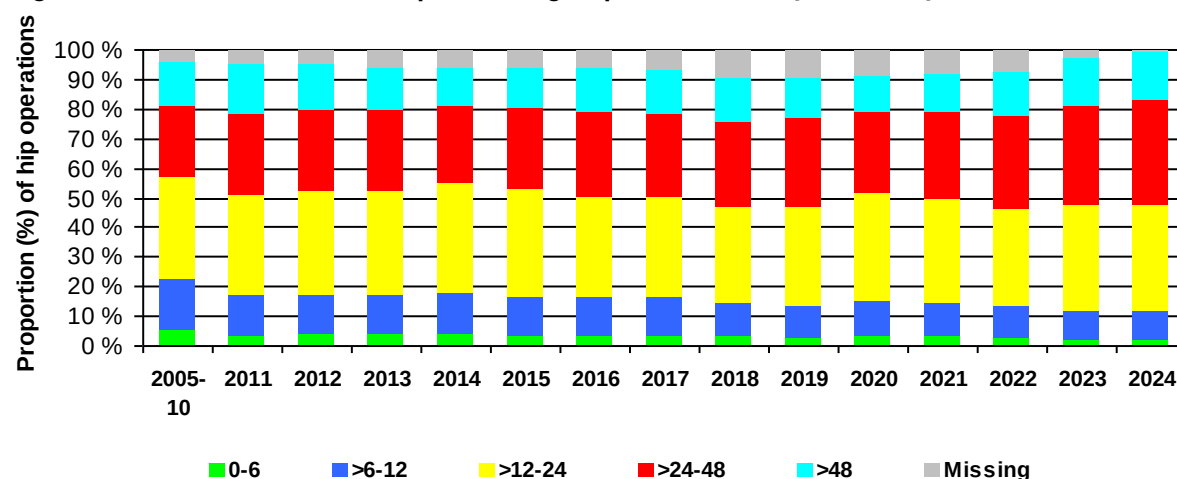


Table 2b: Reasons for delayed surgery *

Reason	2022	2023	2024	Total
Use of anticoagulants	4	46	51	101
Medical reasons	15	65	77	162
Lack of surgical capacity	43	219	360	625
Delayed medical examination	6	45	80	133
Patient delay	57	307	407	779
Other	7	49	114	172
Total	132	731	1 089	1 972

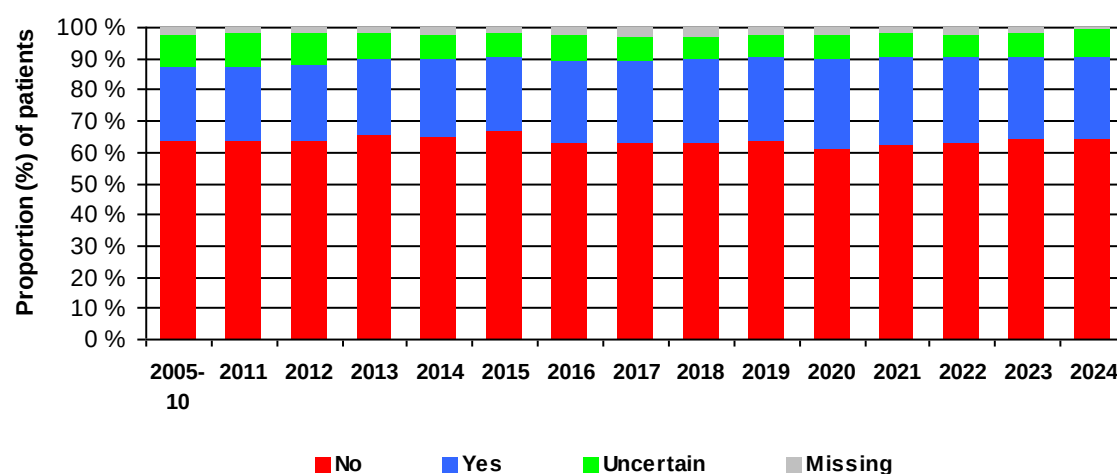
*Electronic registration started during 2021

Cognitive impairment

Table 3: Cognitive impairment - primary operations*

	No		Yes		Uncertain		Missing		Total
2024	5 299	(67,4%)	2 140	(27,2%)	732	(9,3%)	35	(0,4%)	7 866
2023	5 369	(67,9%)	2 167	(27,4%)	664	(8,4%)	156	(2,0%)	7 912
2022	5 130	(63,5%)	2 225	(27,5%)	608	(7,5%)	197	(2,4%)	8 079
2021	4 871	(62,4%)	2 178	(27,9%)	580	(7,4%)	172	(2,2%)	7 802
2020	4 423	(61,1%)	2 067	(28,5%)	567	(7,8%)	185	(2,6%)	7 242
2019	4 810	(63,8%)	2 020	(26,8%)	528	(7,0%)	180	(2,4%)	7 538
2018	4 970	(63,4%)	2 072	(26,4%)	560	(7,1%)	243	(3,1%)	7 845
2017	4 982	(62,7%)	2 084	(26,2%)	638	(8,0%)	236	(3,0%)	7 940
2016	5 159	(63,3%)	2 138	(26,2%)	636	(7,8%)	222	(2,7%)	8 155
2015	5 387	(66,6%)	1 918	(23,7%)	601	(7,4%)	180	(2,2%)	8 086
2014	5 136	(65,1%)	1 933	(24,5%)	642	(8,1%)	183	(2,3%)	7 894
2013	5 235	(65,3%)	1 938	(24,2%)	675	(8,4%)	164	(2,0%)	8 012
2012	5 222	(63,5%)	2 007	(24,4%)	821	(10,0%)	179	(2,2%)	8 229
2011	5 350	(63,6%)	1 991	(23,7%)	901	(10,7%)	172	(2,0%)	8 414
2005-10	28 853	(63,6%)	10 766	(23,7%)	4 665	(10,3%)	1 099	(2,4%)	45 383
Total	100 196	(64,1%)	39 644	(25,3%)	13 818	(8,8%)	3 603	(2,3%)	156 397

Figure 4: Cognitive impairment - primary operations*



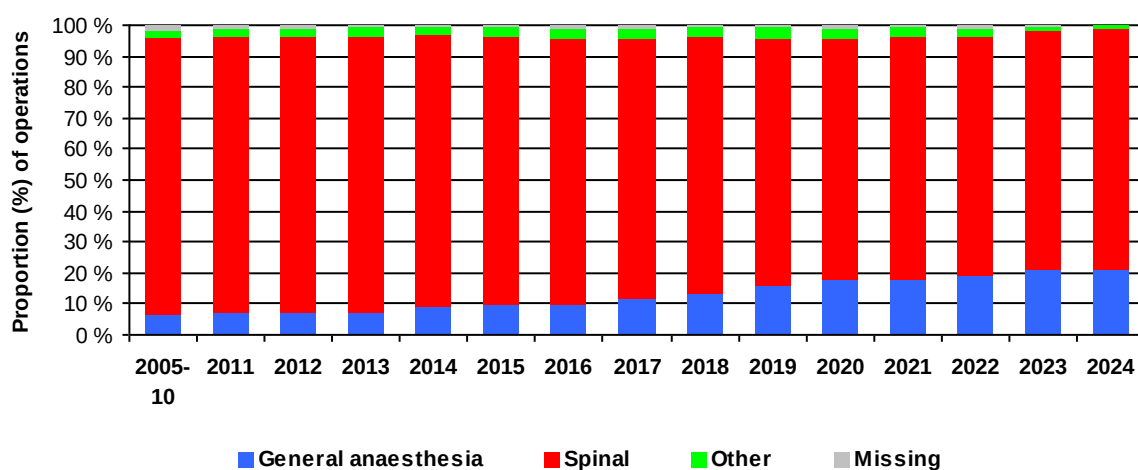
* Total hip prostheses are not counted

Type of anaesthesia

Table 4: Type of anaesthesia - primary operations*

	General anaesthesia		Spinal		Other		Missing		Total
2024	1 646	(20,9%)	6 097	(77,5%)	101	(1,3%)	22	(0,3%)	7 866
2023	1 653	(20,9%)	6 084	(76,9%)	137	(1,7%)	38	(0,5%)	7 912
2022	1 561	(19,3%)	6 219	(77,0%)	216	(2,7%)	83	(1,0%)	8 079
2021	1 412	(18,1%)	6 105	(78,2%)	229	(2,9%)	56	(0,7%)	7 802
2020	1 301	(18,0%)	5 629	(77,7%)	239	(3,3%)	73	(1,0%)	7 242
2019	1 185	(15,7%)	6 024	(79,9%)	263	(3,5%)	66	(0,9%)	7 538
2018	1 062	(13,5%)	6 482	(82,6%)	230	(2,9%)	71	(0,9%)	7 845
2017	929	(11,7%)	6 672	(84,0%)	258	(3,2%)	81	(1,0%)	7 940
2016	810	(9,9%)	6 976	(85,5%)	282	(3,5%)	87	(1,1%)	8 155
2015	758	(9,4%)	7 039	(87,1%)	226	(2,8%)	63	(0,8%)	8 086
2014	732	(9,3%)	6 890	(87,3%)	203	(2,6%)	69	(0,9%)	7 894
2013	588	(7,3%)	7 094	(88,5%)	256	(3,2%)	74	(0,9%)	8 012
2012	560	(6,8%)	7 364	(89,5%)	219	(2,7%)	86	(1,0%)	8 229
2011	586	(7,0%)	7 509	(89,2%)	219	(2,6%)	100	(1,2%)	8 414
2005-10	3 021	(6,7%)	40 572	(89,4%)	1 011	(2,2%)	779	(1,7%)	45 383
Total	17 804	(11,4%)	132 756	(84,9%)	4 089	(2,6%)	1 748	(1,1%)	156 397

Figure 5: Type of anaesthesia in primary operations*



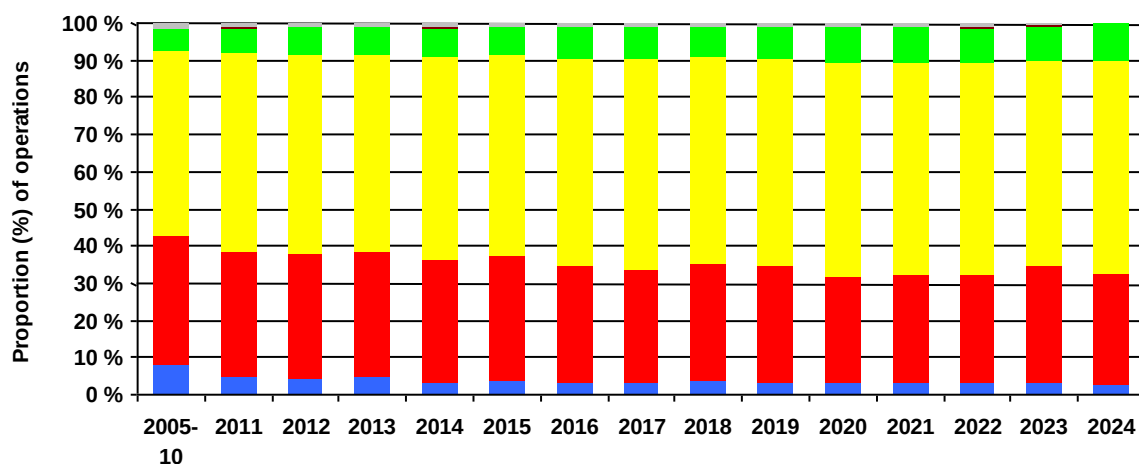
* Total hip prostheses are not counted

ASA classification

Table 5: ASA classification - primary operations

	ASA 1		ASA 2		ASA 3		ASA 4		ASA 5		Missing	Total
2024	213	(2,5%)	2 518	(30,1%)	4 804	(57,4%)	819	(9,8%)	10	(0,1%)	11 (0,1%)	8 375
2023	277	(3,3%)	2 673	(31,5%)	4 681	(55,2%)	775	(9,1%)	12	(0,1%)	66 (0,8%)	8 484
2022	266	(3,1%)	2 529	(29,2%)	4 945	(57,1%)	792	(9,1%)	21	(0,2%)	103 (1,2%)	8 656
2021	273	(3,3%)	2 419	(29,0%)	4 748	(56,9%)	802	(9,6%)	7	(0,1%)	91 (1,1%)	8 340
2020	239	(3,1%)	2 220	(28,5%)	4 490	(57,7%)	745	(9,6%)	11	(0,1%)	78 (1,0%)	7 783
2019	283	(3,5%)	2 566	(31,4%)	4 539	(55,6%)	689	(8,4%)	6	(0,1%)	85 (1,0%)	8 168
2018	319	(3,8%)	2 654	(31,5%)	4 697	(55,7%)	646	(7,7%)	13	(0,2%)	97 (1,2%)	8 426
2017	282	(3,4%)	2 553	(30,6%)	4 732	(56,7%)	678	(8,1%)	15	(0,2%)	92 (1,1%)	8 352
2016	264	(3,1%)	2 694	(31,7%)	4 732	(55,7%)	708	(8,3%)	10	(0,1%)	94 (1,1%)	8 502
2015	303	(3,6%)	2 850	(33,9%)	4 524	(53,8%)	624	(7,4%)	12	(0,1%)	96 (1,1%)	8 409
2014	256	(3,1%)	2 732	(33,4%)	4 471	(54,6%)	608	(7,4%)	14	(0,2%)	102 (1,2%)	8 183
2013	378	(4,5%)	2 838	(34,2%)	4 382	(52,7%)	609	(7,3%)	17	(0,2%)	84 (1,0%)	8 308
2012	356	(4,2%)	2 833	(33,6%)	4 548	(53,9%)	595	(7,1%)	8	(0,1%)	97 (1,1%)	8 437
2011	437	(5,1%)	2 879	(33,5%)	4 613	(53,6%)	558	(6,5%)	6	(0,1%)	111 (1,3%)	8 604
2005-10	3 806	(8,2%)	16 065	(34,7%)	22 828	(49,4%)	2 728	(5,9%)	68	(0,1%)	757 (1,6%)	46 252
Total	7 952	(4,9%)	53 023	(32,5%)	87 734	(53,7%)	12 376	(7,6%)	230	(0,1%)	1 964 (1,2%)	163 280

Figure 6: ASA classification - primary operations



ASA = American Society of Anesthesiologists

- **ASA 1:** Healthy patients who smoke less than 5 cigarettes a day..
- **ASA 2:** Patients with an asymptomatic condition who are kept under medical control (f.ex. hypertension), or with diet (f. ex. diabetes mellitus type 2), and otherwise healthy patients who smoke five cigarettes or more daily.
- **ASA 3:** Patients having a condition that can cause symptoms. However, patients are kept under medical control (f. ex. moderate angina pectoris and mild asthma).
- **ASA 4:** Patients with a condition that is out of control (f. ex. heart failure and asthma).
- **ASA 5:** A moribund patient who is not expected to survive the operation.
- **Missing**

Primary operations

Table 6: Fracture type (reason for primary operation)

	Type 1	Type 2	Type 3	Type 4	Type 5	Type 9	Type 6	Type 7	Type 8	Other	Missing	Total
2024	837	3 796	147	1 058	1 330	232	400	505	4	68	0	8 375
	10,0%	45,3%	1,8%	12,6%	15,9%	2,8%	4,8%	6,0%	0,0%	0,8%	0,0%	
2023	836	3 758	184	1 124	1 349	206	398	564	8	58	1	8 484
	9,9%	44,3%	2,2%	13,2%	15,9%	2,4%	4,7%	6,6%	0,1%	0,7%	0,0%	
2022	878	3 718	223	1 109	1 399	195	439	550	27	101	17	8 656
	10,1%	43,0%	2,6%	12,8%	16,2%	2,3%	5,1%	6,4%	0,3%	1,2%	0,2%	
2021	836	3 561	196	1 100	1 405	193	405	526	12	87	19	8 340
	10,0%	42,7%	2,4%	13,2%	16,8%	2,3%	4,9%	6,3%	0,1%	1,0%	0,2%	
2020	814	3 290	154	1 014	1 288	183	407	529	12	86	6	7 783
	10,5%	42,3%	2,0%	13,0%	16,5%	2,4%	5,2%	6,8%	0,2%	1,1%	0,1%	
2019	888	3 437	196	1 062	1 268	181	414	621	9	82	10	8 168
	10,9%	42,1%	2,4%	13,0%	15,5%	2,2%	5,1%	7,6%	0,1%	1,0%	0,1%	
2018	972	3 443	199	1 111	1 295	227	502	576	5	93	3	8 426
	11,5%	40,9%	2,4%	13,2%	15,4%	2,7%	6,0%	6,8%	0,1%	1,1%	0,0%	
2017	1 037	3 436	217	1 153	1 317	206	476	405	7	98	0	8 352
	12,4%	41,1%	2,6%	13,8%	15,8%	2,5%	5,7%	4,8%	0,1%	1,2%	0,0%	
2016	1 086	3 544	234	1 245	1 321	162	467	344	4	94	2	8 503
	12,8%	41,7%	2,8%	14,6%	15,5%	1,9%	5,5%	4,0%	0,0%	1,1%	0,0%	
2015	1 152	3 350	243	1 336	1 255	228	442	321	2	79	1	8 409
	13,7%	39,8%	2,9%	15,9%	14,9%	2,7%	5,3%	3,8%	0,0%	0,9%	0,0%	
2014	1 050	3 331	287	1 333	1 244	161	422	287	2	64	2	8 183
	12,8%	40,7%	3,5%	16,3%	15,2%	2,0%	5,2%	3,5%	0,0%	0,8%	0,0%	
2013	1 171	3 296	259	1 302	1 277	167	448	292	4	91	1	8 308
	14,1%	39,7%	3,1%	15,7%	15,4%	2,0%	5,4%	3,5%	0,0%	1,1%	0,0%	
2012	1 226	3 471	262	1 277	1 271	173	467	205	3	79	3	8 437
	14,5%	41,1%	3,1%	15,1%	15,1%	2,1%	5,5%	2,4%	0,0%	0,9%	0,0%	
2011	1 317	3 445	276	1 347	1 395	162	398	186	4	74	0	8 604
	15,3%	40,0%	3,2%	15,7%	16,2%	1,9%	4,6%	2,2%	0,0%	0,9%	0,0%	
2005-10	7 697	17 982	2 010	7 770	6 634	399	2 464	849	20	394	33	46 252
	16,6%	38,9%	4,3%	16,8%	14,3%	0,9%	5,3%	1,8%	0,0%	0,9%	0,1%	
Total	21 797	66 858	5 087	24 341	25 048	3 075	8 549	6 760	123	1 548	98	163 280
	13,3%	40,9%	3,1%	14,9%	15,3%	1,9%	5,2%	4,1%	0,1%	0,9%	0,1%	

Type 1: Intracapsular fracture, undisplaced

Type 2: Intracapsular fracture, displaced

Type 3: Basocervical fracture

Type 4: Trochanteric fracture (2 fragments) (AO / OTA A1)

Type 5: Trochanteric fracture (multifragment) (AO / OTA A2)

Type 9: Intertrochanteric fracture (AO / OTA A3) (The registration started in 2008)

Type 6: Subtrochanteric fracture

Type 7: Intracapsular fracture unspecified (from the Norwegian Arthroplasty Register)

Type 8: Trochanteric fracture unspecified (from the Norwegian Arthroplasty Register)

Table 7: Type of primary operation - all fractures

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	Total
2024	494	75	4 073	33	487	48	47	13	1 365	16	1 174	509	5	36	0	8 375
	5,9%	0,9%	48,6%	0,4%	5,8%	0,6%	0,6%	0,2%	16,3%	0,2%	14,0%	6,1%	0,1%	0,4%	0,0%	
2023	544	72	3 995	12	615	69	55	6	1 273	14	1 179	572	24	54	0	8 484
	6,4%	0,8%	47,1%	0,1%	7,2%	0,8%	0,6%	0,1%	15,0%	0,2%	13,9%	6,7%	0,3%	0,6%	0,0%	
2022	660	76	3 866	1	687	117	60	12	1 270	14	1 181	577	22	112	0	8 656
	7,6%	0,9%	44,7%	0,0%	7,9%	1,4%	0,7%	0,1%	14,7%	0,2%	13,6%	6,7%	0,3%	1,3%	0,0%	
2021	695	54	3 705	0	869	125	58	11	1 169	6	1 052	538	2	54	0	8 340
	8,3%	0,6%	44,4%	0,0%	10,4%	1,5%	0,7%	0,1%	14,0%	0,1%	12,6%	6,5%	0,0%	0,6%	0,0%	
2020	655	58	3 432	0	854	173	62	4	1 065	11	896	541	0	30	0	7 783
	8,4%	0,7%	44,1%	0,0%	11,0%	2,2%	0,8%	0,1%	13,7%	0,1%	11,5%	7,0%	0,0%	0,4%	0,0%	
2019	853	75	3 430	0	940	252	77	21	1 029	4	834	630	2	20	0	8 168
	10,4%	0,9%	42,0%	0,0%	11,5%	3,1%	0,9%	0,3%	12,6%	0,0%	10,2%	7,7%	0,0%	0,2%	0,0%	
2018	970	63	3 418	1	1 120	316	79	13	966	18	862	581	0	19	0	8 426
	11,5%	0,7%	40,6%	0,0%	13,3%	3,8%	0,9%	0,2%	11,5%	0,2%	10,2%	6,9%	0,0%	0,2%	0,0%	
2017	1 080	46	3 336	1	1 262	403	104	19	828	24	802	412	0	35	0	8 352
	12,9%	0,6%	39,9%	0,0%	15,1%	4,8%	1,2%	0,2%	9,9%	0,3%	9,6%	4,9%	0,0%	0,4%	0,0%	
2016	1 160	39	3 446	2	1 386	520	97	21	818	11	616	348	0	39	0	8 503
	13,6%	0,5%	40,5%	0,0%	16,3%	6,1%	1,1%	0,2%	9,6%	0,1%	7,2%	4,1%	0,0%	0,5%	0,0%	
2015	1 240	36	3 234	2	1 499	664	96	14	764	8	504	323	0	25	0	8 409
	14,7%	0,4%	38,5%	0,0%	17,8%	7,9%	1,1%	0,2%	9,1%	0,1%	6,0%	3,8%	0,0%	0,3%	0,0%	
2014	1 127	31	3 190	1	1 551	689	102	18	744	7	408	289	0	26	0	8 183
	13,8%	0,4%	39,0%	0,0%	19,0%	8,4%	1,2%	0,2%	9,1%	0,1%	5,0%	3,5%	0,0%	0,3%	0,0%	
2013	1 289	32	3 100	3	1 495	749	109	20	756	4	422	296	0	33	0	8 308
	15,5%	0,4%	37,3%	0,0%	18,0%	9,0%	1,3%	0,2%	9,1%	0,0%	5,1%	3,6%	0,0%	0,4%	0,0%	
2012	1 455	27	3 142	5	1 632	848	97	19	635	8	332	208	0	28	0	8 437
	17,2%	0,3%	37,2%	0,1%	19,3%	10,1%	1,1%	0,2%	7,5%	0,1%	3,9%	2,5%	0,0%	0,3%	0,0%	
2011	1 650	50	3 006	19	1 699	871	112	13	659	13	280	190	0	42	0	8 604
	19,2%	0,6%	34,9%	0,2%	19,7%	10,1%	1,3%	0,2%	7,7%	0,2%	3,3%	2,2%	0,0%	0,5%	0,0%	
2005-10	12 049	390	12 849	287	10 534	4 118	734	239	2 665	34	1 108	869	0	368	4	46 252
	26,1%	0,8%	27,8%	0,6%	22,8%	8,9%	1,6%	0,5%	5,8%	0,1%	2,4%	1,9%	0,0%	0,8%	0,0%	
Total	25 921	1 124	61 222	367	26 630	9 962	1 889	443	16 006	192	11 650	6 883	55	921	4	163 280
	15,9%	0,7%	37,5%	0,2%	16,3%	6,1%	1,2%	0,3%	9,8%	0,1%	7,1%	4,2%	0,0%	0,6%	0,0%	

T1: Two screws or pins

T2: Three screws or pins

T3: Bipolar hemiprosthesis

T4: Unipolar hemiprosthesis

T5: Hip compression screw

T6: Hip compression screw with lateral support plate

T7: Hip compression screw system and additional anti-rotational screw

T8: Short intramedullary nail without distal locking

T9: Short intramedullary nail with distal locking

T10: Long intramedullary nail without distal locking

T11: Long intramedullary nail with distal locking

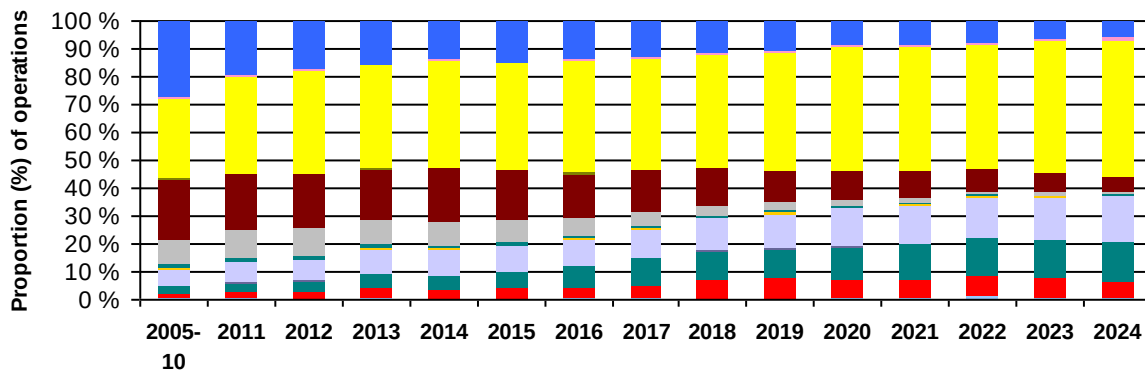
T12: Total hip prosthesis

T13: FNS (Femoral Neck System)

T14: Other

T15: Missing

Figure 7: Type of primary operation - all fractures



- T1: Two screws or pins
- T2: Three screws or pins
- T3: Bipolar hemiprosthesis
- T4: Unipolar hemiprosthesis
- T5: Hip compression screw
- T6: Hip compression screw with lateral support plate
- T7: Hip compression screw system and additional anti-rotational screw
- T8: Short intramedullary nail without distal locking
- T9: Short intramedullary nail with distal locking
- T10: Long intramedullary nail without distal locking
- T11: Long intramedullary nail with distal locking
- T12: Total hip prosthesis
- T13: FNS (Femoral Neck System)
- T14: Other
- T15: Missing

Table 8: Type of primary operation per fracture type

Fracture type	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	Total
Intracapsular fracture, undisplaced	18 274 83,3%	520 2,4%	2 246 10,2%	7 0,0%	453 2,1%	7 0,0%	138 0,6%	8 0,0%	53 0,2%	0 0,0%	7 0,0%	0 0,0%	50 0,2%	30 0,1%	0 0,0%	21 932
Intracapsular fracture, displaced	7 437 11,1%	593 0,9%	57 462 85,7%	345 0,5%	428 0,6%	14 0,0%	221 0,3%	5 0,0%	79 0,1%	0 0,0%	28 0,0%	0 0,0%	3 0,0%	243 0,4%	1 0,0%	67 080
Basocervical fracture	156 2,6%	4 0,1%	706 11,9%	12 0,2%	2 573 43,4%	91 1,5%	840 14,2%	30 0,5%	581 9,8%	1 0,0%	38 0,6%	0 0,0%	2 0,0%	52 0,9%	0 0,0%	5 927
Trochanteric fracture (2 fragments)	14 0,1%	2 0,0%	97 0,4%	0 0,0%	15 123 61,1%	1 069 4,3%	403 1,6%	294 1,2%	6 437 26,0%	16 0,1%	821 3,3%	0 0,0%	0 0,0%	59 0,2%	2 0,0%	24 744
Trochanteric fracture (multifragment)	4 0,0%	1 0,0%	212 0,8%	0 0,0%	6 684 26,5%	6 164 24,4%	193 0,8%	92 0,4%	7 506 29,7%	65 0,3%	3 853 15,3%	0 0,0%	0 0,0%	271 1,1%	0 0,0%	25 240
Intertrochanteric fracture *	0 0,0%	0 0,0%	35 1,1%	0 0,0%	202 6,5%	823 26,7%	13 0,4%	5 0,2%	570 18,5%	18 0,6%	1 362 44,1%	0 0,0%	0 0,0%	47 1,5%	0 0,0%	3 088
Subtrochanteric fracture	5 0,1%	1 0,0%	61 0,7%	0 0,0%	969 11,3%	1 559 18,2%	18 0,2%	6 0,1%	643 7,5%	85 1,0%	5 108 59,6%	0 0,0%	0 0,0%	93 1,1%	0 0,0%	8 566
Intracapsular fracture, unspecified **	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	6 760 100,0%	0 0,0%	0 0,0%	0 0,0%	6 760
Trochanteric fracture unspecified **	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	123 100,0%	0 0,0%	0 0,0%	0 0,0%	123
Other	25 1,6%	2 0,1%	351 21,8%	2 0,1%	185 11,5%	230 14,3%	60 3,7%	3 0,2%	129 8,0%	7 0,4%	427 26,6%	0 0,0%	0 0,0%	126 7,8%	0 0,0%	1 607
Missing	6 5,9%	1 1,0%	53 52,5%	1 1,0%	14 13,9%	5 5,0%	3 3,0%	0 0,0%	8 7,9%	0 0,0%	6 5,9%	0 0,0%	0 0,0%	0 0,0%	1 1,0%	101
Total	25 921 15,7%	1 124 0,7%	61 223 37,1%	367 0,2%	26 631 16,1%	9 962 6,0%	1 889 1,1%	443 0,3%	16 006 9,7%	192 0,1%	11 650 7,1%	6 883 4,2%	55 0,0%	921 0,6%	4 0,0%	165 168

T1: Two screws or pins

T2: Three screws or pins

T3: Bipolar hemiprosthesis

T4: Unipolar hemiprosthesis

T5: Hip compression screw

T6: Hip compression screw with lateral support plate

T7: Hip compression screw system and additional anti-rotational screw

T8: Short intramedullary nail without distal locking

T9: Short intramedullary nail with distal locking

T10: Long intramedullary nail without distal locking

T11: Long intramedullary nail with distal locking

T12: Total hip prosthesis

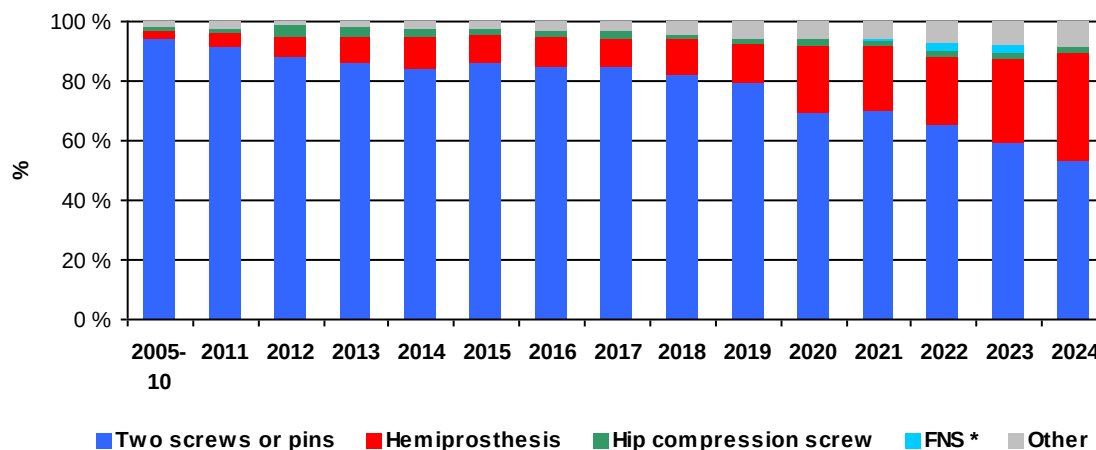
T13: FNS (Femoral Neck System)

T14: Other

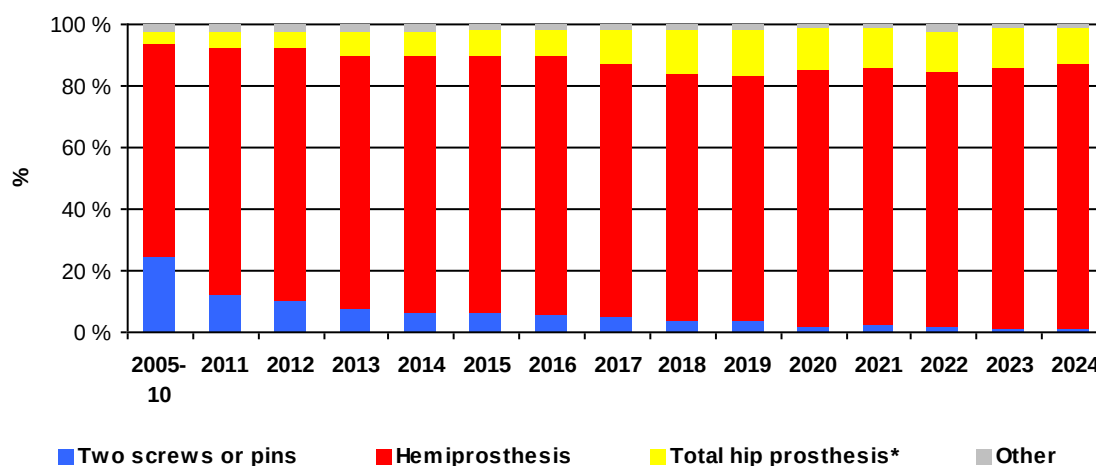
T15: Missing

* The registration started in 2008

** Total hip prostheses reported to the Norwegian Arthroplasty Register

Figure 8a: Time trend for treatment of undisplaced femoral neck fractures

* Femoral Neck System

Figure 8b: Time trend for treatment of displaced femoral neck fractures

* Total hip prostheses for femoral neck fracture were reported to the Norwegian Arthroplasty Register without information about dislocation fracture

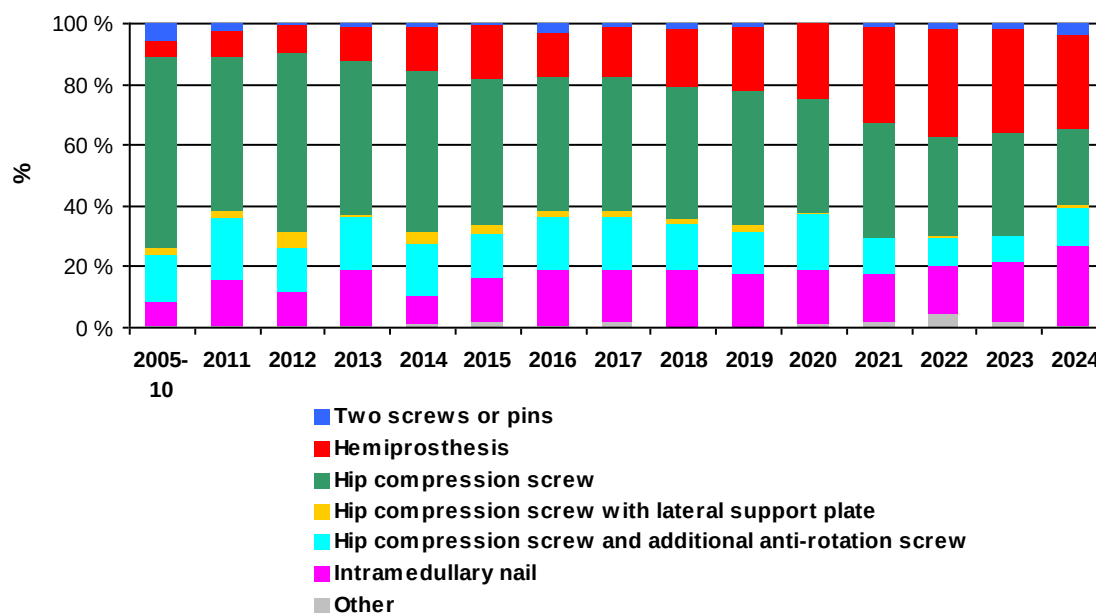
Figure 8c: Time trend for treatment of basocervical fractures

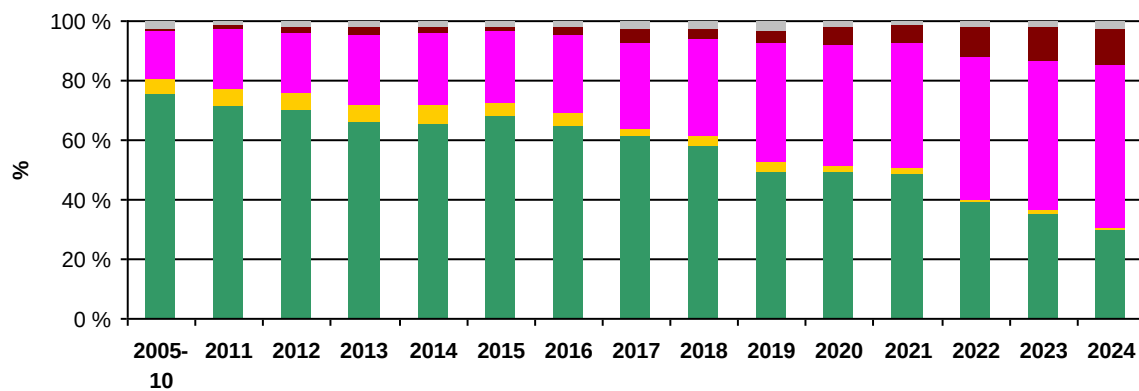
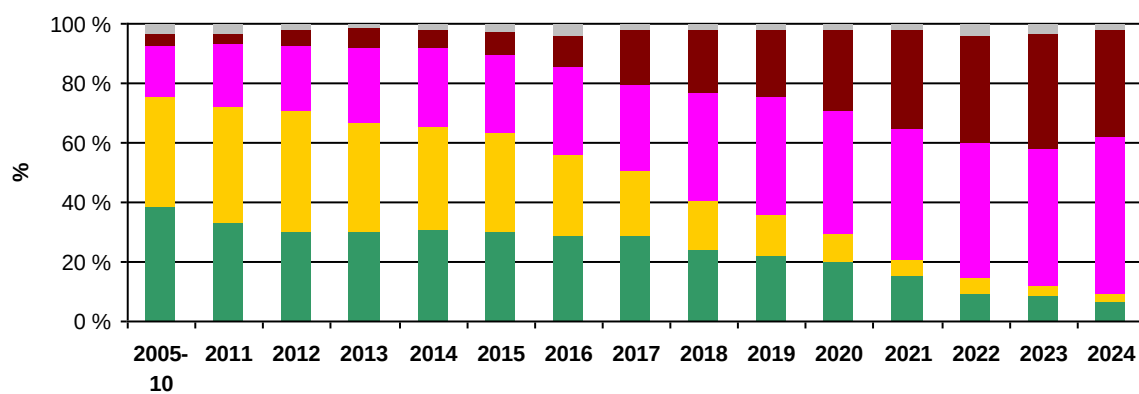
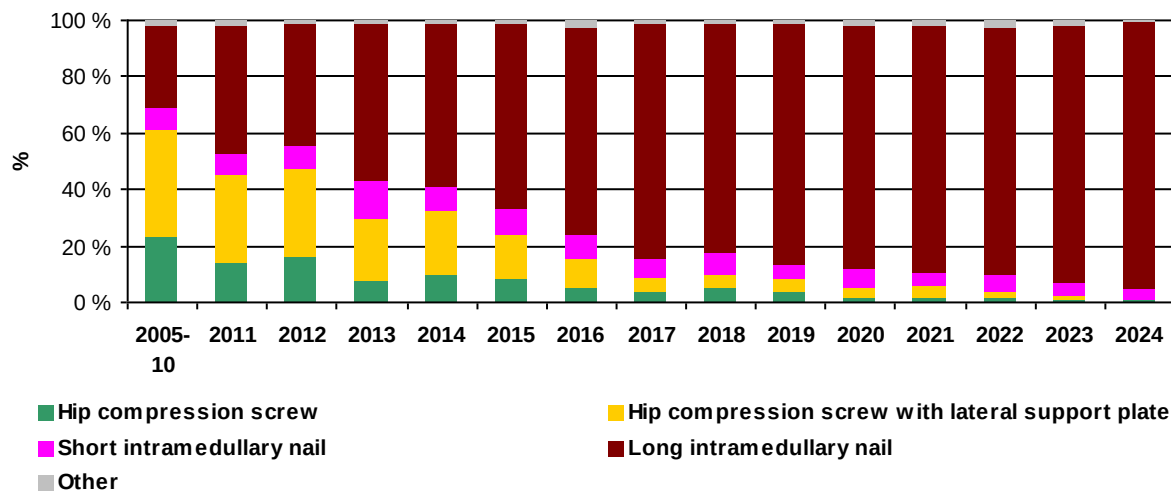
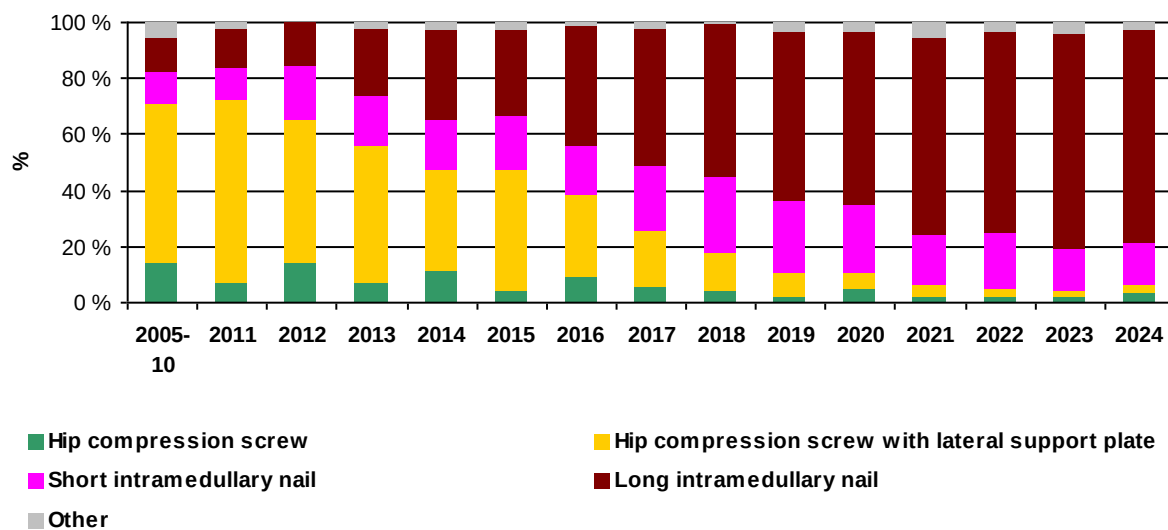
Figure 8d: Time trend for treatment of trochanteric fractures (AO / OTA type A1)**Figure 8e: Time trend for treatment of trochanteric fractures (AO / OTA type A2)****Figure 8f: Time trend for treatment of intertrochanteric fractures (AO / OTA type A3)**

Figure 8g: Time trend for treatment of subtrochanteric fractures

Reoperations

Table 9: Cause of reoperation - all fractures (more than one reason is possible)

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	Total
2024	73 8,4%	32 3,7%	7 0,8%	38 4,4%	0 0,0%	6 0,7%	158 18,1%	4 0,5%	36 4,1%	19 2,2%	85 9,8%	6 0,7%	40 4,6%	367 42,1%	871
2023	67 7,2%	33 3,5%	8 0,9%	49 5,3%	4 0,4%	8 0,9%	178 19,1%	10 1,1%	35 3,8%	3 0,3%	95 10,2%	5 0,5%	40 4,3%	396 42,5%	931
2022	96 10,5%	39 4,3%	15 1,6%	41 4,5%	3 0,3%	8 0,9%	142 15,5%	3 0,3%	34 3,7%	17 1,9%	80 8,8%	5 0,5%	36 3,9%	395 43,2%	914
2021	74 8,0%	36 3,9%	17 1,8%	44 4,7%	1 0,1%	5 0,5%	157 16,9%	11 1,2%	52 5,6%	17 1,8%	62 6,7%	7 0,8%	51 5,5%	393 42,4%	927
2020	62 7,5%	31 3,8%	16 1,9%	38 4,6%	4 0,5%	9 1,1%	154 18,7%	9 1,1%	26 3,2%	13 1,6%	85 10,3%	2 0,2%	24 2,9%	352 42,7%	825
2019	91 8,4%	48 4,4%	19 1,7%	74 6,8%	10 0,9%	9 0,8%	183 16,9%	12 1,1%	28 2,6%	19 1,7%	95 8,7%	7 0,6%	42 3,9%	449 41,3%	1 086
2018	98 9,1%	46 4,3%	17 1,6%	70 6,5%	3 0,3%	8 0,7%	219 20,4%	10 0,9%	35 3,3%	24 2,2%	75 7,0%	9 0,8%	44 4,1%	418 38,8%	1 076
2017	107 10,4%	47 4,6%	17 1,6%	60 5,8%	10 1,0%	8 0,8%	199 19,3%	14 1,4%	37 3,6%	16 1,6%	82 7,9%	5 0,5%	52 5,0%	378 36,6%	1 032
2016	141 12,1%	49 4,2%	17 1,5%	86 7,4%	11 0,9%	9 0,8%	200 17,2%	17 1,5%	32 2,7%	36 3,1%	74 6,4%	13 1,1%	43 3,7%	437 37,5%	1 165
2015	161 14,0%	71 6,2%	35 3,0%	72 6,3%	9 0,8%	10 0,9%	180 15,7%	18 1,6%	35 3,0%	33 2,9%	83 7,2%	11 1,0%	47 4,1%	384 33,4%	1 149
2014	111 11,7%	58 6,1%	31 3,3%	52 5,5%	7 0,7%	4 0,4%	156 16,4%	14 1,5%	20 2,1%	21 2,2%	67 7,1%	18 1,9%	23 2,4%	367 38,7%	949
2013	141 13,2%	57 5,3%	33 3,1%	75 7,0%	5 0,5%	10 0,9%	166 15,5%	15 1,4%	28 2,6%	22 2,1%	76 7,1%	7 0,7%	47 4,4%	389 36,3%	1 071
2012	153 14,2%	65 6,0%	38 3,5%	75 7,0%	19 1,8%	9 0,8%	187 17,4%	15 1,4%	34 3,2%	22 2,0%	63 5,8%	4 0,4%	43 4,0%	350 32,5%	1 077
2011	158 14,6%	75 6,9%	59 5,5%	83 7,7%	12 1,1%	5 0,5%	152 14,1%	12 1,1%	41 3,8%	23 2,1%	67 6,2%	8 0,7%	33 3,1%	352 32,6%	1 080
2005-10	1 524 24,3%	643 10,2%	390 6,2%	573 9,1%	55 0,9%	69 1,1%	612 9,7%	90 1,4%	199 3,2%	200 3,2%	278 4,4%	47 0,7%	202 3,2%	1 400 22,3%	6 282
Total	3 057 15,0%	1 330 6,5%	719 3,5%	1 430 7,0%	153 0,7%	177 0,9%	3 043 14,9%	254 1,2%	672 3,3%	485 2,4%	1 367 6,7%	154 0,8%	767 3,8%	6 827 33,4%	20 435

R1: Osteosynthesis failure

R2: Nonunion

R3: Avascular necrosis (segmental collapse)

R4: Local pain due to osteosynthesis material

R5: Malunion

R6: Infection - superficial

R7: Infection - deep

R8: Haematoma

R9: Dislocation of hemiprostheses

R10: Cutout of osteosynthesis

R11: Peri-implant fracture

R12: Loosening of hemiprostheses

R13: Other

R14: Reoperation reported to the Norwegian Arthroplasty Register except "Deep infection" which is included in R7: Infection – deep.

Table 10a: Causes of reoperation per fracture type (more than one reason is possible) *

Type of primary fracture	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	Total
Intracapsular fracture, undisplaced	708 29,7%	274 11,5%	239 10,0%	381 16,0%	36 1,5%	7 0,3%	178 7,5%	19 0,8%	34 1,4%	73 3,1%	278 11,7%	7 0,3%	151 6,3%	2 385
Intracapsular fracture, displaced	681 14,2%	271 5,7%	175 3,7%	314 6,6%	27 0,6%	96 2,0%	1 751 36,6%	144 3,0%	544 11,4%	56 1,2%	449 9,4%	103 2,2%	169 3,5%	4 780
Basocervical fracture	146 28,7%	66 13,0%	31 6,1%	77 15,1%	8 1,6%	2 0,4%	61 12,0%	6 1,2%	18 3,5%	32 6,3%	27 5,3%	3 0,6%	32 6,3%	509
Trochanteric fracture (2 fragments)	206 24,1%	71 8,3%	28 3,3%	98 11,5%	16 1,9%	17 2,0%	132 15,4%	16 1,9%	7 0,8%	74 8,7%	114 13,3%	0 0,0%	76 8,9%	855
Trochanteric fracture (multifragment)	458 27,0%	204 12,0%	41 2,4%	177 10,4%	26 1,5%	23 1,4%	328 19,4%	37 2,2%	11 0,6%	127 7,5%	138 8,1%	5 0,3%	119 7,0%	1 694
Intertrochanteric fracture**	86 28,2%	41 13,4%	7 2,3%	35 11,5%	5 1,6%	2 0,7%	59 19,3%	8 2,6%	5 1,6%	18 5,9%	14 4,6%	0 0,0%	25 8,2%	305
Subtrochanteric fracture	217 28,0%	132 17,0%	10 1,3%	78 10,1%	7 0,9%	7 0,9%	147 18,9%	12 1,5%	5 0,6%	27 3,5%	54 7,0%	3 0,4%	77 9,9%	776
Other	40 25,5%	15 9,6%	2 1,3%	10 6,4%	2 1,3%	3 1,9%	36 22,9%	2 1,3%	5 3,2%	10 6,4%	15 9,6%	2 1,3%	15 9,6%	157
Missing	3 30,0%	1 10,0%	0 0,0%	1 10,0%	0 0,0%	0 0,0%	4 40,0%	0 0,0%	0 0,0%	1 10,0%	0 0,0%	0 0,0%	0 0,0%	10
Total	2 545 22,2%	1 075 9,4%	533 4,6%	1 171 10,2%	127 1,1%	157 1,4%	2 696 23,5%	244 2,1%	629 5,5%	418 3,6%	1 089 9,5%	123 1,1%	664 5,8%	11 471

R1: Osteosynthesis failure
R2: Nonunion
R3: Avascular necrosis (segmental collapse)
R4: Local pain due to osteosynthesis material
R5: Malunion
R6: Infection - superficial
R7: Infection - deep
R8: Haematoma
R9: Dislocation of hemiprosthesis
R10: Cutout of osteosynthesis
R11: Peri-implant fracture
R12: Loosening of hemiprosthesis
R13: Other

* Total hip prostheses are not counted

** The registration started in 2008

Table 10b: Causes of reoperation per type of primary operation (more than one reason is possible) *

Type of primary operation	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	Total
T1	1 298 34,0%	492 12,9%	391 10,3%	671 17,6%	54 1,4%	19 0,5%	182 4,8%	23 0,6%	33 0,9%	118 3,1%	334 8,8%	9 0,2%	190 5,0%	3 814
T2	50 36,0%	22 15,8%	11 7,9%	18 12,9%	2 1,4%	1 0,7%	10 7,2%	1 0,7%	2 1,4%	4 2,9%	14 10,1%	1 0,7%	3 2,2%	139
T3	14 0,4%	7 0,2%	4 0,1%	8 0,2%	4 0,1%	82 2,6%	1 768 55,1%	140 4,4%	561 17,5%	1 0,0%	392 12,2%	103 3,2%	123 3,8%	3 207
T4	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	5 16,7%	13 43,3%	1 3,3%	9 30,0%	0 0,0%	1 3,3%	1 3,3%	0 0,0%	30
T5	461 31,7%	181 12,4%	54 3,7%	153 10,5%	25 1,7%	23 1,6%	222 15,3%	24 1,7%	12 0,8%	104 7,2%	96 6,6%	3 0,2%	96 6,6%	1 454
T6	246 26,3%	97 10,4%	16 1,7%	110 11,8%	10 1,1%	8 0,9%	261 27,9%	20 2,1%	4 0,4%	61 6,5%	41 4,4%	3 0,3%	59 6,3%	936
T7	59 31,4%	28 14,9%	17 9,0%	24 12,8%	6 3,2%	0 0,0%	25 13,3%	1 0,5%	1 0,5%	7 3,7%	7 3,7%	0 0,0%	13 6,9%	188
T8	4 13,3%	3 10,0%	3 10,0%	1 3,3%	3 10,0%	0 0,0%	2 6,7%	0 0,0%	0 0,0%	2 6,7%	8 26,7%	0 0,0%	4 13,3%	30
T9	191 24,7%	95 12,3%	24 3,1%	93 12,0%	14 1,8%	7 0,9%	65 8,4%	13 1,7%	4 0,5%	67 8,7%	132 17,1%	2 0,3%	67 8,7%	774
T10	4 23,5%	1 5,9%	1 5,9%	4 23,5%	0 0,0%	1 5,9%	2 11,8%	0 0,0%	0 0,0%	0 0,0%	1 5,9%	0 0,0%	3 17,6%	17
T11	200 25,0%	139 17,4%	10 1,3%	83 10,4%	9 1,1%	10 1,3%	138 17,3%	21 2,6%	3 0,4%	51 6,4%	60 7,5%	1 0,1%	74 9,3%	799
T13	17 20,7%	10 12,2%	2 2,4%	6 7,3%	0 0,0%	1 1,2%	8 9,8%	0 0,0%	0 0,0%	3 3,7%	3 3,7%	0 0,0%	32 39,0%	82
T14	1 100,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	0 0,0%	1
Total	2 545 22,2%	1 075 9,4%	533 4,6%	1 171 10,2%	127 1,1%	157 1,4%	2 696 23,5%	244 2,1%	629 5,5%	418 3,6%	1 089 9,5%	123 1,1%	664 5,8%	11 471

R1: Osteosynthesis failure
R2: Nonunion
R3: Avascular necrosis (segmental collapse)
R4: Local pain due to osteosynthesis material
R5: Malunion
R6: Infection - superficial
R7: Infection - deep
R8: Haematoma
R9: Dislocation of hemiprosthesis
R10: Cutout of osteosynthesis
R11: Peri-implant fracture
R12: Loosening of hemiprosthesis
R13: Other

T1: Two screws or pins
T2: Three screws or pins
T3: Bipolar hemiprosthesis
T4: Unipolar hemiprosthesis
T5: Hip compression screw
T6: Hip compression screw with lateral support plate
T7: Hip compression screw system and additional anti-rotational screw
T8: Short intramedullary nail without distal locking
T9: Short intramedullary nail with distal locking
T10: Long intramedullary nail without distal locking
T11: Long intramedullary nail with distal locking
T13: Other
T14: Missing

* Total hip prostheses are not counted

** The registration started in 2008

Table 11: Type of reoperation (more than one reason is possible)

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	Total
2024	42 4,4%	30 3,1%	96 10,0%	1 0,1%	96 10,0%	135 14,1%	22 2,3%	6 0,6%	159 16,6%	373 38,9%	960
2023	42 4,1%	16 1,6%	127 12,5%	1 0,1%	88 8,7%	150 14,7%	21 2,1%	5 0,5%	169 16,6%	398 39,1%	1 017
2022	37 3,8%	21 2,2%	107 11,1%	0 0,0%	100 10,4%	123 12,8%	22 2,3%	5 0,5%	157 16,3%	391 40,6%	963
2021	38 4,0%	15 1,6%	124 12,9%	0 0,0%	78 8,1%	137 14,3%	43 4,5%	5 0,5%	158 16,4%	363 37,8%	961
2020	34 3,9%	17 2,0%	87 10,0%	0 0,0%	77 8,9%	122 14,1%	12 1,4%	3 0,3%	155 17,9%	359 41,5%	866
2019	70 6,5%	22 2,0%	131 12,1%	0 0,0%	86 7,9%	147 13,6%	16 1,5%	4 0,4%	176 16,3%	430 39,7%	1 082
2018	71 6,3%	27 2,4%	114 10,2%	0 0,0%	108 9,6%	167 14,9%	16 1,4%	7 0,6%	189 16,9%	422 37,6%	1 121
2017	70 6,7%	33 3,2%	138 13,2%	0 0,0%	115 11,0%	153 14,6%	18 1,7%	6 0,6%	145 13,8%	369 35,2%	1 047
2016	90 8,0%	36 3,2%	151 13,3%	0 0,0%	100 8,8%	151 13,3%	14 1,2%	7 0,6%	161 14,2%	422 37,3%	1 132
2015	75 6,9%	36 3,3%	182 16,8%	0 0,0%	114 10,5%	131 12,1%	19 1,8%	4 0,4%	148 13,7%	372 34,4%	1 081
2014	48 5,4%	26 2,9%	159 17,9%	0 0,0%	81 9,1%	112 12,6%	7 0,8%	4 0,5%	99 11,1%	352 39,6%	888
2013	71 7,0%	32 3,2%	159 15,8%	0 0,0%	117 11,6%	116 11,5%	14 1,4%	6 0,6%	118 11,7%	376 37,3%	1 009
2012	73 7,3%	42 4,2%	189 18,8%	0 0,0%	91 9,1%	137 13,6%	14 1,4%	9 0,9%	109 10,8%	341 33,9%	1 005
2011	72 7,0%	34 3,3%	215 21,0%	0 0,0%	97 9,5%	105 10,2%	19 1,9%	13 1,3%	113 11,0%	358 34,9%	1 026
2005-10	615 10,9%	213 3,8%	1 856 32,9%	45 0,8%	476 8,4%	488 8,6%	57 1,0%	60 1,1%	452 8,0%	1 382 24,5%	5 644
Total	1 448 7,3%	600 3,0%	3 835 19,4%	47 0,2%	1 824 9,2%	2 374 12,0%	314 1,6%	144 0,7%	2 508 12,7%	6 708 33,9%	19 802

R1: Removal of implant (when only procedure)**R2:** Girdlestone (= Removal of hemiprosthesis or osteosynthesis material / femoral head)**R3:** Bipolar hemiprosthesis**R4:** Unipolar hemiprosthesis**R5:** Re-osteosynthesis**R6:** Debridement for haematoma or infection**R7:** Closed reduction of dislocated hemiprosthesis**R8:** Open reduction of dislocated hemiprosthesis**R9:** Other**R10:** Total hip prosthesis

Table 12: Reoperation after primary screw osteosynthesis (reasons are not mutually exclusive)

	R1	R2	R3	R4	R5	R6	R9	R10	Total
2024	13 9,8%	0 0,0%	12 9,0%	0 0,0%	19 14,3%	2 1,5%	2 1,5%	85 63,9%	133
2023	16 11,6%	1 0,7%	20 14,5%	0 0,0%	20 14,5%	1 0,7%	2 1,4%	78 56,5%	138
2022	13 8,0%	1 0,6%	28 17,2%	0 0,0%	17 10,4%	3 1,8%	2 1,2%	99 60,7%	163
2021	15 9,6%	0 0,0%	32 20,4%	0 0,0%	19 12,1%	3 1,9%	4 2,5%	84 53,5%	157
2020	12 8,0%	0 0,0%	20 13,3%	0 0,0%	16 10,7%	1 0,7%	3 2,0%	98 65,3%	150
2019	32 16,2%	0 0,0%	42 21,3%	0 0,0%	10 5,1%	3 1,5%	6 3,0%	104 52,8%	197
2018	27 12,1%	1 0,4%	30 13,5%	0 0,0%	25 11,2%	3 1,3%	7 3,1%	130 58,3%	223
2017	24 11,2%	4 1,9%	37 17,3%	0 0,0%	21 9,8%	2 0,9%	2 0,9%	124 57,9%	214
2016	36 12,7%	3 1,1%	53 18,7%	0 0,0%	27 9,5%	3 1,1%	4 1,4%	157 55,5%	283
2015	29 11,3%	3 1,2%	66 25,7%	0 0,0%	22 8,6%	3 1,2%	6 2,3%	128 49,8%	257
2014	17 6,7%	0 0,0%	70 27,7%	0 0,0%	25 9,9%	3 1,2%	3 1,2%	135 53,4%	253
2013	35 12,2%	2 0,7%	72 25,2%	0 0,0%	35 12,2%	1 0,3%	2 0,7%	139 48,6%	286
2012	31 10,2%	10 3,3%	99 32,5%	0 0,0%	27 8,9%	4 1,3%	3 1,0%	131 43,0%	305
2011	38 11,5%	9 2,7%	113 34,1%	0 0,0%	23 6,9%	2 0,6%	7 2,1%	139 42,0%	331
2005-10	264 12,5%	50 2,4%	916 43,5%	19 0,9%	104 4,9%	19 0,9%	23 1,1%	711 33,8%	2 106
Total	602 11,6%	84 1,6%	1 610 31,0%	19 0,4%	410 7,9%	53 1,0%	76 1,5%	2 342 45,1%	5 196

R1: Removal of implant (when only procedure)**R2:** Girdlestone (= Removal of hemiprosthesis or osteosynthesis material / femoral head)**R3:** Bipolar hemiprosthesis**R4:** Unipolar hemiprosthesis**R5:** Re-osteosynthesis**R6:** Debridement for haematoma or infection**R9:** Other**R10:** Total hip prosthesis

Table 13a: Reoperation after primary uni/bipolar hemiprosthesis (reasons are not mutually exclusive)

	R2	R3	R6	R7	R8	R9	R10	Total
2024	20 7,5%	33 12,3%	79 29,5%	8 3,0%	5 1,9%	85 31,7%	38 14,2%	268
2023	6 2,1%	40 14,2%	90 31,9%	12 4,3%	4 1,4%	93 33,0%	37 13,1%	282
2022	14 5,7%	22 9,0%	67 27,5%	12 4,9%	3 1,2%	89 36,5%	37 15,2%	244
2021	4 1,5%	28 10,7%	77 29,5%	25 9,6%	3 1,1%	90 34,5%	34 13,0%	261
2020	3 1,3%	21 9,1%	80 34,5%	5 2,2%	3 1,3%	93 40,1%	27 11,6%	232
2019	7 2,5%	33 11,8%	83 29,6%	10 3,6%	3 1,1%	97 34,6%	47 16,8%	280
2018	9 2,9%	28 8,9%	105 33,4%	10 3,2%	4 1,3%	113 36,0%	45 14,3%	314
2017	9 3,5%	28 10,8%	78 30,1%	8 3,1%	4 1,5%	84 32,4%	48 18,5%	259
2016	12 4,5%	20 7,5%	81 30,2%	9 3,4%	6 2,2%	98 36,6%	42 15,7%	268
2015	5 2,2%	18 7,9%	66 28,9%	16 7,0%	1 0,4%	74 32,5%	48 21,1%	228
2014	9 4,9%	20 10,9%	48 26,1%	5 2,7%	4 2,2%	61 33,2%	37 20,1%	184
2013	11 5,0%	15 6,8%	68 30,6%	9 4,1%	4 1,8%	78 35,1%	37 16,7%	222
2012	11 5,7%	23 11,9%	55 28,4%	10 5,2%	8 4,1%	56 28,9%	31 16,0%	194
2011	10 4,8%	14 6,7%	60 28,6%	16 7,6%	8 3,8%	70 33,3%	32 15,2%	210
2005-10	39 5,6%	46 6,6%	217 31,0%	32 4,6%	46 6,6%	241 34,5%	78 11,2%	699
Total	169 4,1%	389 9,4%	1 254 30,3%	187 4,5%	106 2,6%	1 422 34,3%	618 14,9%	4 145

R2: Girdlestone (=Removal of hemiprosthesis)
R3: Bipolar hemiprosthesis
R6: Debridement for haematoma or infection
R7: Closed reduction of dislocated hemiprosthesis
R8: Open reduction of dislocated hemiprosthesis
R9: Other
R10: Total hip prosthesis

Table 13b: Specification of «R9 – Others» i Table 13a

	2005 -15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Cable Ready plate + cerclage	5		1	1		2		1			10
Cerclage	15	2	2		4	5		7	7	5	47
Dall Miles plate + cerclage	16	3	2	2	1	2	1		1		28
DCP plate +/- cerclage		3	4	4	2		2	1	4	2	22
Drainage of haematoma	25	1	1				1			1	29
Fixation of trochanter (GTR)		1			1		1	1	1	1	6
Fixation of trochanter (Dall Miles)	3	1			1						5
NCB plate +/- cerclage				4	10	8	9	16	10	11	68
Revision of prosthesis + osteosynthesis	3				1					2	6
Cement spacer	15	4	3	1	2	1	3	2	3	3	37
Exchange of caput/bipolar head	453	76	67	94	71	74	69	57	62	51	1 074
Exchange of caput/bipolar head + osteosynthesis with plate/cerclage	6	1		2							9
Suture of muscle/fascie	7	2	1	1	2			1	1		15
Unspecified plate + cerclage	16	1	2	2	2				1	3	27
Other (n<5)	16	3	1	2		1	4	3	3	6	39
Total	580	98	84	113	97	93	90	89	93	85	1 422

Table 14a: Reoperation after primary hip compression screw (reasons are not mutually exclusive)

	R2	R3	R6	R7	R8	R9	R10	Total
2024	1 1,8%	9 16,4%	5 9,1%	0 0,0%	0 0,0%	2 3,6%	38 69,1%	55
2023	0 0,0%	13 20,3%	4 6,3%	0 0,0%	0 0,0%	2 3,1%	45 70,3%	64
2022	0 0,0%	8 11,4%	5 7,1%	0 0,0%	0 0,0%	7 10,0%	50 71,4%	70
2021	0 0,0%	17 21,8%	7 9,0%	0 0,0%	0 0,0%	9 11,5%	45 57,7%	78
2020	0 0,0%	17 21,5%	6 7,6%	0 0,0%	0 0,0%	6 7,6%	50 63,3%	79
2019	3 2,6%	20 17,1%	13 11,1%	0 0,0%	0 0,0%	10 8,5%	71 60,7%	117
2018	3 3,1%	19 19,8%	7 7,3%	0 0,0%	0 0,0%	8 8,3%	59 61,5%	96
2017	2 1,9%	33 31,4%	15 14,3%	0 0,0%	0 0,0%	11 10,5%	44 41,9%	105
2016	4 2,4%	37 22,4%	18 10,9%	0 0,0%	0 0,0%	16 9,7%	90 54,5%	165
2015	5 3,3%	50 32,7%	17 11,1%	0 0,0%	0 0,0%	19 12,4%	62 40,5%	153
2014	3 2,3%	30 22,6%	16 12,0%	0 0,0%	0 0,0%	5 3,8%	79 59,4%	133
2013	2 1,4%	38 26,8%	14 9,9%	0 0,0%	0 0,0%	6 4,2%	82 57,7%	142
2012	3 2,4%	34 27,4%	11 8,9%	0 0,0%	0 0,0%	13 10,5%	63 50,8%	124
2011	5 4,0%	35 27,8%	7 5,6%	0 0,0%	1 0,8%	9 7,1%	69 54,8%	126
2005-10	22 3,8%	204 35,4%	51 8,9%	0 0,0%	1 0,2%	51 8,9%	247 42,9%	576
Total	53 2,5%	564 27,1%	196 9,4%	0 0,0%	2 0,1%	174 8,4%	1 094 52,5%	2 083

R2: Girdlestone (=Removal of osteosynthesis material / femoral head)**R3:** Bipolar hemiprosthesis**R6:** Debridement for haematoma or infection**R7:** Closed reduction of dislocated hemiprosthesis**R8:** Open reduction of dislocated hemiprosthesis**R9:** Other**R10:** Total hip prosthesis

Table 14b: Reoperation after primary intramedullary nail (reasons are not mutually exclusive)

	R2	R3	R6	R7	R8	R9	R10	Total
2024	0 0,0%	26 21,3%	9 7,4%	0 0,0%	0 0,0%	24 19,7%	63 51,6%	122
2023	1 0,8%	17 13,6%	14 11,2%	0 0,0%	0 0,0%	23 18,4%	70 56,0%	125
2022	1 0,8%	24 20,3%	16 13,6%	0 0,0%	0 0,0%	18 15,3%	59 50,0%	118
2021	0 0,0%	27 25,2%	5 4,7%	0 0,0%	0 0,0%	19 17,8%	56 52,3%	107
2020	0 0,0%	21 20,6%	7 6,9%	0 0,0%	0 0,0%	23 22,5%	51 50,0%	102
2019	2 2,1%	20 21,1%	8 8,4%	0 0,0%	0 0,0%	15 15,8%	50 52,6%	95
2018	2 2,1%	20 21,1%	9 9,5%	0 0,0%	0 0,0%	20 21,1%	44 46,3%	95
2017	1 1,7%	12 20,3%	8 13,6%	0 0,0%	0 0,0%	10 16,9%	28 47,5%	59
2016	3 4,7%	20 31,3%	9 14,1%	0 0,0%	0 0,0%	9 14,1%	23 35,9%	64
2015	4 5,9%	15 22,1%	8 11,8%	0 0,0%	0 0,0%	8 11,8%	33 48,5%	68
2014	1 2,2%	14 31,1%	2 4,4%	0 0,0%	0 0,0%	3 6,7%	25 55,6%	45
2013	1 2,9%	4 11,8%	2 5,9%	0 0,0%	0 0,0%	5 14,7%	22 64,7%	34
2012	1 2,5%	7 17,5%	2 5,0%	0 0,0%	0 0,0%	8 20,0%	22 55,0%	40
2011	0 0,0%	11 31,4%	1 2,9%	0 0,0%	0 0,0%	3 8,6%	20 57,1%	35
2005-10	3 2,1%	55 38,2%	8 5,6%	0 0,0%	0 0,0%	16 11,1%	62 43,1%	144
Total	20 1,6%	293 23,4%	108 8,6%	0 0,0%	0 0,0%	204 16,3%	628 50,1%	1 253

R2: Girdlestone (= Removal of hemiprosthesis or osteosynthesis material / femoral head)**R3:** Bipolar hemiprosthesis**R6:** Debridement for haematoma or infection**R7:** Closed reduction of dislocated hemiprosthesis**R8:** Open reduction of dislocated hemiprosthesis**R9:** Other**R10:** Total hip prosthesis

Implants

Table 15: Cemented hemiprotheses - primary operations

Femur	Caput	Bipolar head	2005 -16	2017	2018	2019	2020	2021	2022	2023	2024	Total
Charnley		Hastings bipolar head	2 695									2 695
Charnley Modular	Elite	Hastings bipolar head	1 269									1 269
Charnley Modular	Elite	Landos bipolar cup	24									24
Charnley Modular	Elite	Self-centering bipolar	746	45								791
Corail	Articul/Eze CoCr	Self-centering bipolar	373	80	86	62				1	2	604
Corail	Articul/Eze CoCr	Vario-Cup	170	7								177
Corail	Cobalt chrome (DePuy)	Self-centering bipolar	49									49
CPS-PLUS	Metal Ball Head	Bipolar Ball Head	23									23
CPT	Protasul/Metasul	Multipolar		764	350	98						1 212
CPT	Protasul/Metasul	Self-centering bipolar		67	92	88						247
CPT	Protasul/Metasul	UHR		22	3							25
C-Stem	Articul/Eze CoCr	Self-centering bipolar	91	69	165	389	691	786	658	746	772	4 367
C-Stem	Articul/Eze CoCr	UHR							66	9	247	322
C-Stem	Articul/Eze Ultamet (M-Spec)	Self-centering bipolar	111	97			2			4	1	215
ETS			299									299
Exeter/V40	Exeter/V40	HIP Bipolar Cup	9	1	1	1	1	5	4			22
Exeter/V40	Exeter/V40	Multipolar		28	113	80	24					245
Exeter/V40	Exeter/V40	Self-centering bipolar	861	46						1	1	909
Exeter/V40	Exeter/V40	UHR	1 355	884	1 347	1 542	1 399	1 278	1 319	1 282	917	21 323
Lubinus SPII	Articul/Eze CoCr	Self-centering bipolar	26	1								27
Lubinus SPII	CoCrMo (Link)	Multipolar					61	71	80	83	32	327
Lubinus SPII	CoCrMo (Link)	Self-centering bipolar	224	17								241
Lubinus SPII	CoCrMo (Link)	UHR	741	258	261	234	241	455	546	493	549	3 778
Lubinus SPII	CoCrMo (Link)	Vario-Cup	1 948	178	270	324	541	628	710	815	998	6 412
MS-30	CoCr (ZimmerBiomet)	Multipolar							16	168	265	449
MS-30	CoCr (ZimmerBiomet)	Self-centering bipolar								18	54	72
MS-30	Protasul/Metasul	Multipolar		106	265	227	101	92	88	60		939
MS-30	Protasul/Metasul	Self-centering bipolar					33	55	50	30		168
MS-30	Protasul/Metasul	UHR	21									21
MS-30	Versys	Multipolar		2	1	63	95	147	111	24	3	446
MS-30	Versys	Self-centering bipolar	56	38	11							105
MS-30	Versys	UHR			21	35	41	48	40	69	4	258
MS-30	Zimmer heads	Multipolar		6	4		7	6	6	1		30
Spectron EF Primary	Articul/Eze CoCr	HIP Bipolar Cup						13	14	17	3	47
Spectron EF Primary	Cobalt Chrom (S&N)	Biarticular cup	33									33
Spectron EF Primary	Cobalt Chrom (S&N)	HIP Bipolar Cup	119	15	13	10	8	3				168
Spectron EF Primary	Cobalt Chrom (S&N)	Landos bipolar cup	112									112
Spectron EF Primary	Cobalt Chrom (S&N)	Self-centering bipolar	20									20
Spectron EF Primary	Cobalt Chrom (S&N)	Tandem	1 067									1 067
Spectron EF Primary	Cobalt Chrom (S&N)	Vario-Cup	82									82
Titan	Cobalt chrome (DePuy)	Landos bipolar cup	648									648
Titan	Cobalt chrome (DePuy)	Self-centering bipolar	227									227
Other	(n < 20)		666	154	91	49	57	30	80	69	150	1 346
Unknown			34	1	2	1	2		4	1	1	46
Total			24 099	2 886	3 096	3 203	3 304	3 617	3 792	3 891	3 999	51 887

Table 16: Uncemented hemiprostheses - primary operations

Femur	Caput	Bipolar head	2005 -15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Accolade II	Exeter/V40	Vario-Cup	21	4	2		2	2		3	9	5	48
Arcos	Modular Head (Biomet)	UHR				2	1		1	4	4	10	22
Corail	Articul/Eze CoCr	ic-head							1	9	8		18
Corail	Articul/Eze CoCr	Bipolar Ball Head	64										64
Corail	Articul/Eze CoCr	HIP Bipolar Cup							6	52	10	1	69
Corail	Articul/Eze CoCr	Landos bipolar cup	102										102
Corail	Articul/Eze CoCr	Multipolar					3	9	10	9	12	3	46
Corail	Articul/Eze CoCr	Self-centering bipolar	2 704	486	295	165	106	39	23	20	11	7	3 856
Corail	Articul/Eze CoCr	UHR	302	67	33	39	27	10	3	4	24	45	554
Corail	Articul/Eze CoCr	Vario-Cup	159	1									160
Corail	Articul/Eze Ultamet (M-Spec)	Self-centering bipolar	399	6	1								406
Corail	Cobalt Chrom (S&N)	Self-centering bipolar	37										37
Corail	Cobalt chrome (DePuy)	Landos bipolar cup	744										744
Corail	Cobalt chrome (DePuy)	Self-centering bipolar	1 127										1 127
Corail	Hipball Premium	UHR									19	14	33
Corail	Metal Ball Head	Bipolar Ball Head	25										25
Filler	Cobalt Chrom (S&N)	Biarticular cup	19										19
Filler	Hipball Premium	Biarticular cup	176										176
Filler	Hipball Premium	HIP Bipolar Cup	542	36	35	63	50	55	46	1			828
Filler	Hipball Premium	UHR	33										33
Furlong	Furlong	UHR	21	57	31								109
HACTIV	HACTIV head	Tandem	19										19
HACTIV	HACTIV head	UHR	63		1								64
Polarstem	Cobalt Chrom (S&N)	Tandem	213										213
Polarstem	Cobalt Chrom (S&N)	UHR	58	9	12	16	13	9	10	9	6	6	148
SL- PLUS/SLR PLUS	HACTIV head	Bipolar Ball Head	16										16
SL- PLUS/SLR PLUS	Metal Ball Head	Bipolar Ball Head	155										155
Other	(n < 15)		510	20	45	40	28	17	16	16	22	30	744
Unknown			5				1						6
Total			7 514	686	455	325	231	141	116	127	125	121	9 841

1 form is missing in Table 15 and 16 due to unknown brand name and unknown type of fixation

Table 17: Cemented hemiprotheses - reoperations

Femur	Caput	Bipolar head	2005 -15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Charnley		Hastings bipolar head	452										452
Charnley Modular	Elite	Hastings bipolar head	77										77
Charnley Modular	Elite	Self-centering bipolar	29										29
Corail	Articul/Eze CoCr	Self-centering bipolar	10	5	1	2	2						20
CPS-PLUS	Metal Ball Head	Bipolar Ball Head	15										15
CPT	Protasul/Metasul	Self-centering bipolar			2	4	4						10
C-Stem	Articul/Eze CoCr	Self-centering bipolar		4	2	2	7	3	9	10	8	13	58
ETS			22										22
Exeter/V40	Exeter/V40	Multipolar				6	1	2			1		10
Exeter/V40	Exeter/V40	Self-centering bipolar	34	6	1								41
Exeter/V40	Exeter/V40	UHR	720	42	31	37	49	26	32	41	41	20	1 039
Lubinus SPII	CoCrMo (Link)	UHR	29	12	11	7	3	6	12	11	8	8	107
Lubinus SPII	CoCrMo (Link)	Vario-Cup	145	6	11	2	10	7	10	8	15	11	225
MS-30	Protasul/Metasul	Multipolar			4	1	4	1	3	2	2		17
Restoration Modular	Exeter/V40	Self-centering bipolar	13			3	3	2		1		1	23
Restoration Modular	Exeter/V40	UHR	1	2	4	2		2				1	12
Spectron EF Primary	Cobalt Chrom (S&N)	Landos bipolar cup	11										11
Spectron EF Primary	Cobalt Chrom (S&N)	Tandem	120										120
Titan	Cobalt chrome (DePuy)	Landos bipolar cup	125										125
Other	(n <10)		281	35	35	22	19	13	24	16	26	28	499
Unknown			6		2								8
Total			2 090	112	104	88	102	62	90	89	101	82	2 920

Table 18: Uncemented hemiprostheses - reoperations

Femur	Caput	Bipolar head	2005 -15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Arcos	Modular Head (Biomet)	Multipolar			4	2	1	2	6	4	4	2	25
Arcos	Modular Head (Biomet)	Self-centering bipolar	5	5									10
Arcos	Modular Head (Biomet)	UHR			1	2	6	4	7	3	5	4	32
Corail	Articul/Eze CoCr	HIP Bipolar Cup								4	1		5
Corail	Articul/Eze CoCr	Landos bipolar cup	19										19
Corail	Articul/Eze CoCr	Self-centering bipolar	85	13	6	6	1	4	4	1	2		122
Corail	Articul/Eze CoCr	UHR		4	1								5
Corail	Articul/Eze Ultamet (M-Spec)	Self-centering bipolar	29										29
Corail	Cobalt chrome (DePuy)	Landos bipolar cup	81										81
Corail	Cobalt chrome (DePuy)	Self-centering bipolar	66										66
Corail Revisjon/KAR	Articul/Eze Ultamet (M-Spec)	Self-centering bipolar	7										7
Corail Revisjon/KAR	Cobalt chrome (DePuy)	Landos bipolar cup	9										9
Corail Revisjon/KAR	Cobalt chrome (DePuy)	Self-centering bipolar	6										6
Filler	Biotechni fem. head	Biarticular cup	18										18
Filler	Cobalt chrome (DePuy)	Biarticular cup	5										5
Filler	Hipball Premium	Biarticular cup	56										56
Filler	Hipball Premium	HIP Bipolar Cup	68	7	9	6	1	7	4				102
HACTIV	HACTIV head	Moonstone	5										5
Link MP Reconstruction	CoCrMo (Link)	UHR	1	1		1	2		2		2		9
Polarstem	Cobalt Chrom (S&N)	UHR	3	1	2	1	2		2	2			13
Reclaim	Articul/Eze CoCr	Self-centering bipolar	1				1	1		2		1	6
REEF	Cobalt chrome (DePuy)	Self-centering bipolar	5										5
Restoration-HA	C-Taper Head	Landos bipolar cup	7										7
Revitan	Versys	Multipolar			1	1	2	2					6
SL-PLUS/SLR PLUS	Metal Ball Head	Bipolar Ball Head	12										12
TTHR	Articul/Eze CoCr	UHR	5	1									6
TTHR	CoCrMo (Link)	UHR	5	2			1						8
TTHR	TETE Inox	Self-centering bipolar	5										5
Other	(n < 5)		212	5	9	8	12	5	3	3	8	4	269
Unknown			3		1								4
Total			718	39	34	27	29	25	28	19	22	11	952

2 forms are missing in Table 17 and 18 due to unknown brand name and unknown type of fixation

Table 19: Screws - primary operations

Product	2005-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Asnis III	1 244	118	114	119	212	179	221	399	388	405	3 399
Cannulated screw (DePuySynthes)					4	6	4	4	1	2	21
Cannulated screw (S&N)	2			18	82	59	88	60	66	30	405
Cannulated Screw (Zimmer Biomet)				1			27	108	70	33	239
Hansson pin system (LIH)	2 013	49	79	62	55	37	12	10	7	12	2 336
LE-screw							19	24	23	19	85
Olmed screw	10 010	433	272	196	86	71	72	35	11	3	11 189
Richards CHP	6 123	596	658	635	486	359	303	86	49	53	9 348
Other (n<10)		3	1	2	1						7
Unknown	1		1	2	3	2	4	12	2	12	39
Total	19 393	1 199	1 125	1 035	929	713	750	738	617	569	27 068

Table 20: Hip compression screws - primary operations

Product	2005-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
DHS	4 570	29	32	11	7						4 649
LCP DHS	4 850	1 212	1 162	983	812	693	679	667	655	513	12 226
Omega	122							1	1		124
Omega3	5	2	2			3	1	1			14
Richards CHS	18 042	755	566	512	437	391	372	195	83	68	21 421
Swemac CHS System	8	5	7	9	13	2					44
Other (n<10)	2									1	3
Total	27 599	2 003	1 769	1 515	1 269	1 089	1 052	864	739	582	38 481

Table 21: Intramedullary nails - primary operations

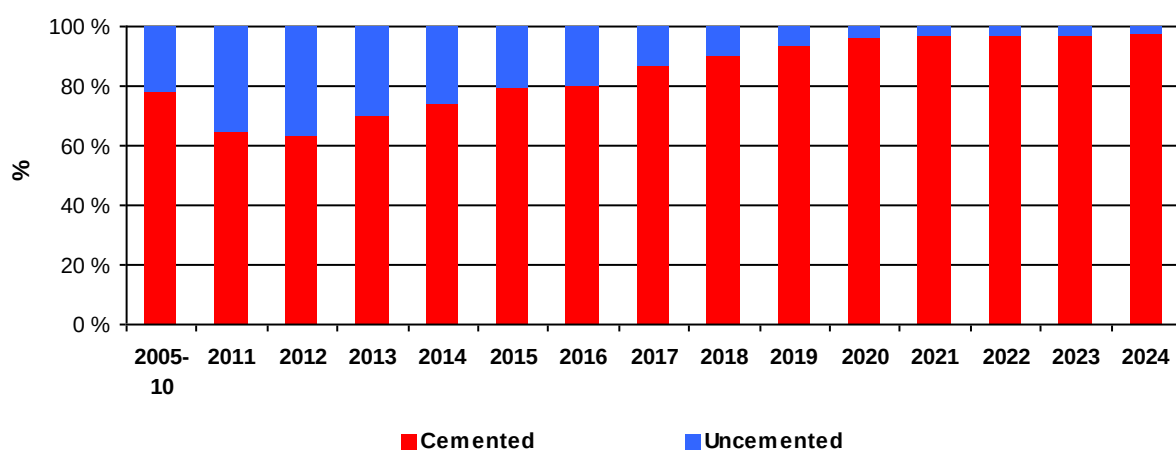
Product	2005-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
ACE	49										49
AFFIXUS			5	14	23	29	43	26	32	2	174
EXPERT LFN	66	3	5	2	7	1	2	1		1	88
Gamma3	5 459	429	369	511	1 052	1 220	1 476	1 691	1 697	1 667	15 571
Gamma4										37	37
IMHS	27										27
IMHS CP	10										10
PFN	26										26
PFNA	740	200	186	231	129	142	120	143	150	44	2 085
T2	14				1	1	1	1			18
T2 Alpha							3	5	13	15	36
T2 Recon	206	28	34	31	39	72	75	21	14	20	540
TFNA femoral nail				1	171	138	148	195	212	357	1 222
T-Gamma	507										507
TRIGEN INTERTAN	2 258	744	990	994	415	356	374	407	374	422	7 334
TRIGEN META-TAN				2	1		2	3	5	2	15
TRIGEN TAN/FAN	310	65	88	76	49	20	8	14	4	2	636
Other (n<10)	5								1	4	10
Unknown	6				1	1	3	4	3		18
Total	9 683	1 469	1 677	1 862	1 888	1 980	2 255	2 511	2 505	2 573	28 403

Hemiprotheses

Table 22: Fixation of primary hemiprotheses

	Uncemented		Cement with antibiotics		Cement without antibiotics		Missing		Total
2024	123	(3,0%)	3 999	(97,0%)	0	(0,0%)	0	(0,0%)	4 122
2023	127	(3,2%)	3 885	(96,7%)	5	(0,1%)	1	(0,0%)	4 018
2022	128	(3,3%)	3 791	(96,7%)	0	(0,0%)	1	(0,0%)	3 920
2021	117	(3,1%)	3 615	(96,8%)	1	(0,0%)	1	(0,0%)	3 734
2020	142	(4,1%)	3 303	(95,9%)	0	(0,0%)	0	(0,0%)	3 445
2019	231	(6,7%)	3 203	(93,3%)	0	(0,0%)	0	(0,0%)	3 434
2018	331	(9,7%)	3 087	(90,2%)	1	(0,0%)	2	(0,1%)	3 421
2017	455	(13,6%)	2 886	(86,4%)	0	(0,0%)	0	(0,0%)	3 341
2016	686	(19,8%)	2 769	(80,1%)	0	(0,0%)	1	(0,0%)	3 456
2015	673	(20,8%)	2 563	(79,2%)	1	(0,0%)	0	(0,0%)	3 237
2014	820	(25,7%)	2 365	(74,1%)	3	(0,1%)	4	(0,1%)	3 192
2013	939	(30,3%)	2 158	(69,5%)	0	(0,0%)	6	(0,2%)	3 103
2012	1 139	(36,2%)	1 966	(62,5%)	10	(0,3%)	33	(1,0%)	3 148
2011	1 060	(35,0%)	1 931	(63,8%)	6	(0,2%)	29	(1,0%)	3 026
2005-10	2 881	(21,9%)	10 035	(76,4%)	31	(0,2%)	190	(1,4%)	13 137
Total	9 852	(16,0%)	51 556	(83,5%)	58	(0,1%)	268	(0,4%)	61 734

Figure 9: Time trend for fixation of primary hemiprotheses *



* 268 operations with missing information on type of fixation

Table 23: Type of cement - primary operations

Product	Manufacturer	2005-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Cemex System Genta FAST	Alere	639										639
Cemex system genta ID green	Alere	1	16	126	106	76	6	1				332
Cemex w/gentamicin	Alere	142	111			1						254
Copal G + C	Heraeus					1			102	91	23	217
Copal G + V	Heraeus	2	2	8	4	6	2	9	88	2		123
Optipac Refobacin Bonecement R	Biomet	5 182	1 040	949	770	44		1				7 986
Optipac Refobacin Bonecement R-3	Zimmer Bio					16						16
Optipac Refobacin Revision	Biomet	128										128
Palacos R + G	Heraeus	9 884	1 007	763	883	563	273	332	281	336	465	14 787
Palacos R+G pro	Heraeus	3	93	374	1 078	2 362	2 934	3 262	3 291	3 447	3 507	20 351
Palacos w/gentamicin	Heraeus/Sc	353										353
Refobacin Bone Cement R	Biomet	3 946	367	524	77							4 914
Refobacin-Palacos	Biomet	315										315
Simplex unknown	Stryker	75										75
Simplex w/Tobramycin	Stryker	2					10	1				13
SmartSet GHV Genta. Smartmix	Ortomedic	69	39	31	21	11	30	5				206
Other (n<10)		1	1	3				2		2	1	10
Missing information		276	93	108	148	123	48	2	29	7	3	837
Total		21 018	2 769	2 886	3 087	3 203	3 303	3 615	3 791	3 885	3 999	51 556

Table 24: Hydroxyapatite (HA) - uncemented prostheses

	With HA		Without HA		Missing		Total
2024	108	(87,8%)	12	(9,8%)	3	(2,4%)	123
2023	121	(95,3%)	4	(3,1%)	2	(1,6%)	127
2022	126	(98,4%)	2	(1,6%)	0	(0,0%)	128
2021	115	(98,3%)	2	(1,7%)	0	(0,0%)	117
2020	142	(100,0%)	0	(0,0%)	0	(0,0%)	142
2019	228	(98,7%)	3	(1,3%)	0	(0,0%)	231
2018	327	(98,8%)	4	(1,2%)	0	(0,0%)	331
2017	452	(99,3%)	3	(0,7%)	0	(0,0%)	455
2016	681	(99,3%)	5	(0,7%)	0	(0,0%)	686
2015	673	(100,0%)	0	(0,0%)	0	(0,0%)	673
2014	820	(100,0%)	0	(0,0%)	0	(0,0%)	820
2013	939	(100,0%)	0	(0,0%)	0	(0,0%)	939
2012	1 139	(100,0%)	0	(0,0%)	0	(0,0%)	1 139
2011	1 059	(99,9%)	1	(0,1%)	0	(0,0%)	1 060
2005-10	2 698	(93,6%)	183	(6,4%)	0	(0,0%)	2 881
Total	9 628	(97,7%)	219	(2,2%)	5	(0,1%)	9 852

Table 25: Stem design- primary operations

Stem design	2005-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Straight	6 254	95	70	17	10	19	19	17	17	3	6 521
Anatomic	2 483	479	476	537	575	861	1 161	1 356	1 396	1 610	10 934
Double-tapered	10 722	1 797	1 921	1 953	1 823	1 438	1 288	1 333	1 290	945	24 510
Triple-tapered	74	237	328	490	729	981	1 146	1 078	1 180	1 435	7 678
Uncemented	7 514	686	455	325	231	141	116	127	125	121	9 841
Total	27 047	3 294	3 250	3 322	3 368	3 440	3 730	3 911	4 008	4 114	59 484

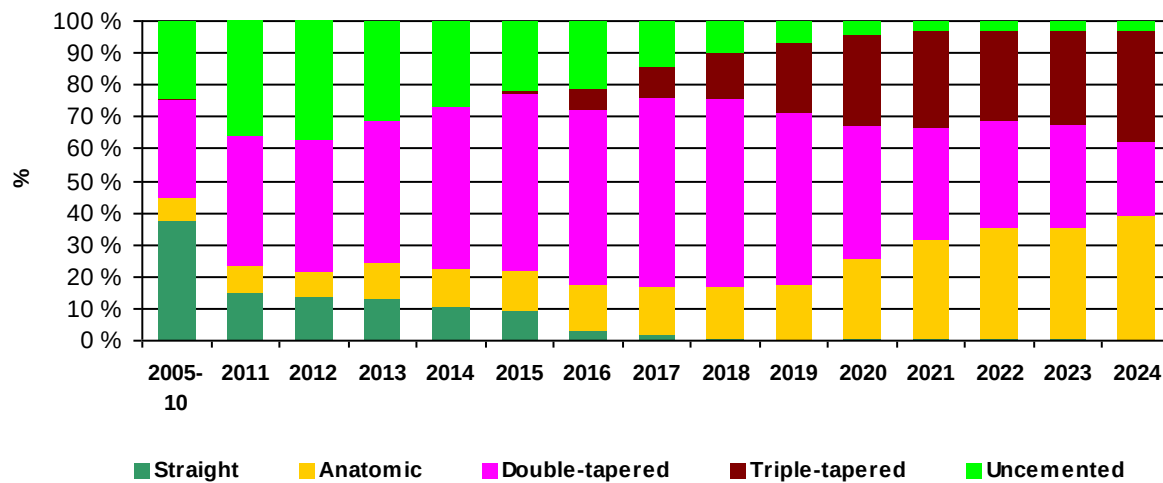
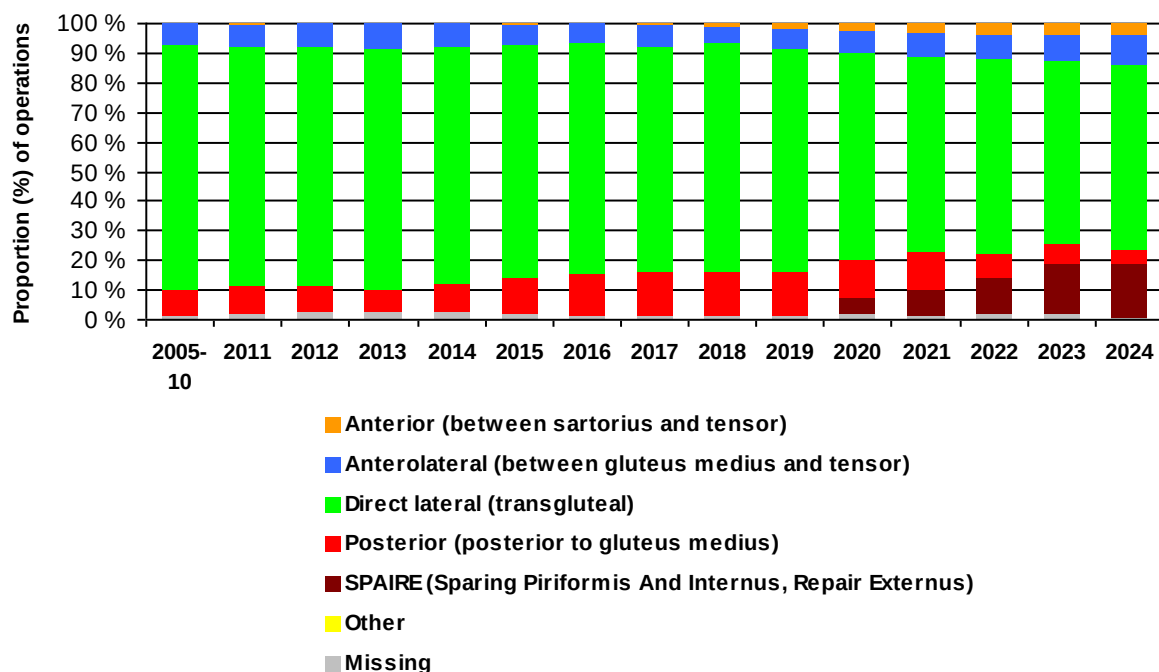
Figure 10: Stem design

Table 26: Surgical approach used in hemiarthroplasty

	Anterior		Anterolateral		Direct lateral		Posterior		SPAIRE *		Other	Missing	Total
2024	172	(4,2%)	396	(9,6%)	2 572	(62,4%)	208	(5,0%)	747	(18,1%)	8	(0,2%)	4 122
2023	161	(4,0%)	361	(9,0%)	2 480	(61,7%)	251	(6,2%)	682	(17,0%)	6	(0,1%)	4 018
2022	160	(4,1%)	314	(8,0%)	2 571	(65,6%)	315	(8,0%)	486	(12,4%)	3	(0,1%)	3 920
2021	136	(3,6%)	301	(8,1%)	2 439	(65,3%)	489	(13,1%)	307	(8,2%)	4	(0,1%)	3 734
2020	102	(3,0%)	252	(7,3%)	2 399	(69,6%)	442	(12,8%)	185	(5,4%)	0	(0,0%)	3 445
2019	67	(2,0%)	230	(6,7%)	2 577	(75,0%)	514	(15,0%)	4	(0,1%)	1	(0,0%)	3 434
2018	45	(1,3%)	196	(5,7%)	2 632	(76,9%)	501	(14,6%)	0	(0,0%)	0	(0,0%)	3 421
2017	24	(0,7%)	247	(7,4%)	2 541	(76,1%)	493	(14,8%)	0	(0,0%)	0	(0,0%)	3 341
2016	11	(0,3%)	210	(6,1%)	2 713	(78,5%)	487	(14,1%)	0	(0,0%)	0	(0,0%)	3 456
2015	14	(0,4%)	232	(7,2%)	2 544	(78,6%)	388	(12,0%)	0	(0,0%)	1	(0,0%)	3 237
2014	3	(0,1%)	252	(7,9%)	2 562	(80,3%)	291	(9,1%)	0	(0,0%)	1	(0,0%)	3 192
2013	8	(0,3%)	255	(8,2%)	2 538	(81,8%)	224	(7,2%)	0	(0,0%)	0	(0,0%)	3 103
2012	6	(0,2%)	239	(7,6%)	2 538	(80,6%)	278	(8,8%)	0	(0,0%)	1	(0,0%)	3 148
2011	11	(0,4%)	228	(7,5%)	2 446	(80,8%)	290	(9,6%)	0	(0,0%)	0	(0,0%)	3 026
2005-10	30	(0,2%)	981	(7,5%)	10 843	(82,5%)	1 132	(8,6%)	0	(0,0%)	0	(0,0%)	13 137
Total	950	(1,5%)	4 694	(7,6%)	46 395	(75,2%)	6 303	(10,2%)	2 411	(3,9%)	25	(0,0%)	61 734

* SPAIRE (Sparing Piriformis And Internus, Repair Externus)

Figure 11: Surgical approach used in hemiarthroplasty

Pathological fractures

Table 27: Pathological fractures (osteoporotic fractures not included) - primary operations *

	No		Yes		Missing		Total
2024	8 033	(97,5%)	92	(1,1%)	114	(1,4%)	8 239
2023	7 745	(93,5%)	89	(1,1%)	452	(5,5%)	8 286
2022	6 973	(85,8%)	122	(1,5%)	1 032	(12,7%)	8 127
2021	6 778	(87,0%)	110	(1,4%)	905	(11,6%)	7 793
2020	6 266	(86,5%)	86	(1,2%)	890	(12,3%)	7 242
2019	6 509	(86,4%)	82	(1,1%)	945	(12,5%)	7 536
2018	6 811	(86,8%)	86	(1,1%)	948	(12,1%)	7 845
2017	6 875	(86,6%)	96	(1,2%)	969	(12,2%)	7 940
2016	7 097	(87,0%)	85	(1,0%)	973	(11,9%)	8 155
2015	7 105	(87,9%)	88	(1,1%)	893	(11,0%)	8 086
2014	6 944	(88,0%)	57	(0,7%)	893	(11,3%)	7 894
2013	7 031	(87,8%)	89	(1,1%)	892	(11,1%)	8 012
2012	7 233	(87,9%)	64	(0,8%)	932	(11,3%)	8 229
2011	7 548	(89,7%)	76	(0,9%)	790	(9,4%)	8 414
2005-10	41 238	(90,9%)	369	(0,8%)	3 776	(8,3%)	45 383
Total	140 186	(89,2%)	1 591	(1,0%)	15 404	(9,8%)	157 181

* Patients operated with total hip prostheses were excluded

Intraoperative complications

Table 28: Intraoperative complications - primary operations

	Yes		No		Missing		Total
2024	289	(3,5%)	8 069	(96,4%)	17	(0,2%)	8 375
2023	231	(2,7%)	8 133	(95,9%)	120	(1,4%)	8 484
2022	209	(2,4%)	8 216	(94,9%)	231	(2,7%)	8 656
2021	219	(2,6%)	7 889	(94,6%)	232	(2,8%)	8 340
2020	212	(2,7%)	7 333	(94,2%)	238	(3,1%)	7 783
2019	226	(2,8%)	7 709	(94,4%)	233	(2,9%)	8 168
2018	268	(3,2%)	7 909	(93,9%)	249	(3,0%)	8 426
2017	268	(3,2%)	7 863	(94,2%)	221	(2,7%)	8 352
2016	335	(3,9%)	7 908	(93,0%)	260	(3,1%)	8 503
2015	305	(3,6%)	7 810	(92,9%)	294	(3,5%)	8 409
2014	308	(3,8%)	7 586	(92,7%)	289	(3,5%)	8 183
2013	306	(3,7%)	7 744	(93,2%)	258	(3,1%)	8 308
2012	340	(4,0%)	7 772	(92,1%)	325	(3,9%)	8 437
2011	354	(4,1%)	7 961	(92,5%)	289	(3,4%)	8 604
2005-10	1 694	(3,7%)	43 110	(93,2%)	1 448	(3,1%)	46 252
Total	5 564	(3,4%)	153 012	(93,7%)	4 704	(2,9%)	163 280

Antibiotic prophylaxis

Table 29: Antibiotic prophylaxis in primary screw fixation

	Yes		No		Missing		Total
2024	554	(97,4%)	15	(2,6%)	0	(0,0%)	569
2023	609	(98,9%)	6	(1,0%)	1	(0,2%)	616
2022	716	(97,3%)	17	(2,3%)	3	(0,4%)	736
2021	736	(98,3%)	8	(1,1%)	5	(0,7%)	749
2020	698	(97,9%)	12	(1,7%)	3	(0,4%)	713
2019	904	(97,4%)	16	(1,7%)	8	(0,9%)	928
2018	995	(96,3%)	30	(2,9%)	8	(0,8%)	1 033
2017	1 063	(94,4%)	54	(4,8%)	9	(0,8%)	1 126
2016	1 129	(94,2%)	63	(5,3%)	7	(0,6%)	1 199
2015	1 165	(91,3%)	102	(8,0%)	9	(0,7%)	1 276
2014	988	(85,3%)	162	(14,0%)	8	(0,7%)	1 158
2013	1 008	(76,3%)	307	(23,2%)	6	(0,5%)	1 321
2012	1 016	(68,6%)	455	(30,7%)	11	(0,7%)	1 482
2011	1 000	(58,8%)	682	(40,1%)	18	(1,1%)	1 700
2005-10	5 017	(40,3%)	7 220	(58,0%)	202	(1,6%)	12 439
Total	17 598	(65,1%)	9 149	(33,8%)	298	(1,1%)	27 045

Table 30: Antibiotic prophylaxis in primary hemiprosthesis operations

	Yes		No		Missing		Total
2024	4 099	(99,8%)	5	(0,1%)	2	(0,0%)	4 106
2023	4 005	(100,0%)	2	(0,0%)	0	(0,0%)	4 007
2022	3 855	(99,7%)	2	(0,1%)	10	(0,3%)	3 867
2021	3 697	(99,8%)	2	(0,1%)	6	(0,2%)	3 705
2020	3 411	(99,4%)	1	(0,0%)	20	(0,6%)	3 432
2019	3 415	(99,6%)	1	(0,0%)	14	(0,4%)	3 430
2018	3 400	(99,4%)	4	(0,1%)	15	(0,4%)	3 419
2017	3 321	(99,5%)	2	(0,1%)	14	(0,4%)	3 337
2016	3 430	(99,5%)	3	(0,1%)	15	(0,4%)	3 448
2015	3 229	(99,8%)	2	(0,1%)	5	(0,2%)	3 236
2014	3 184	(99,8%)	0	(0,0%)	7	(0,2%)	3 191
2013	3 090	(99,6%)	4	(0,1%)	9	(0,3%)	3 103
2012	3 138	(99,7%)	7	(0,2%)	2	(0,1%)	3 147
2011	3 012	(99,6%)	4	(0,1%)	9	(0,3%)	3 025
2005-10	13 063	(99,4%)	43	(0,3%)	30	(0,2%)	13 136
Total	61 349	(99,6%)	82	(0,1%)	158	(0,3%)	61 589

Table 31: Antibiotic prophylaxis in primary hip compression screw operations

	Yes	No	Missing	Total
2024	582 (100,0%)	0 (0,0%)	0 (0,0%)	582
2023	736 (99,6%)	0 (0,0%)	3 (0,4%)	739
2022	856 (99,1%)	0 (0,0%)	8 (0,9%)	864
2021	1 045 (99,3%)	0 (0,0%)	7 (0,7%)	1 052
2020	1 082 (99,4%)	0 (0,0%)	7 (0,6%)	1 089
2019	1 263 (99,5%)	0 (0,0%)	6 (0,5%)	1 269
2018	1 501 (99,1%)	2 (0,1%)	12 (0,8%)	1 515
2017	1 763 (99,7%)	2 (0,1%)	4 (0,2%)	1 769
2016	1 993 (99,5%)	1 (0,0%)	9 (0,4%)	2 003
2015	2 250 (99,6%)	3 (0,1%)	6 (0,3%)	2 259
2014	2 329 (99,4%)	7 (0,3%)	6 (0,3%)	2 342
2013	2 346 (99,7%)	5 (0,2%)	2 (0,1%)	2 353
2012	2 557 (99,2%)	14 (0,5%)	6 (0,2%)	2 577
2011	2 641 (98,5%)	28 (1,0%)	13 (0,5%)	2 682
2005-10	14 675 (95,4%)	625 (4,1%)	86 (0,6%)	15 386
Total	37 619 (97,8%)	687 (1,8%)	175 (0,5%)	38 481

Table 32: Antibiotic prophylaxis in primary Intramedullary nail operations

	Yes	No	Missing	Total
2024	2 562 (99,8%)	6 (0,2%)	0 (0,0%)	2 568
2023	2 463 (99,6%)	1 (0,0%)	8 (0,3%)	2 472
2022	2 468 (99,6%)	1 (0,0%)	8 (0,3%)	2 477
2021	2 231 (99,7%)	0 (0,0%)	7 (0,3%)	2 238
2020	1 964 (99,4%)	1 (0,1%)	11 (0,6%)	1 976
2019	1 872 (99,2%)	3 (0,2%)	13 (0,7%)	1 888
2018	1 845 (99,2%)	1 (0,1%)	13 (0,7%)	1 859
2017	1 667 (99,6%)	2 (0,1%)	4 (0,2%)	1 673
2016	1 458 (99,5%)	1 (0,1%)	7 (0,5%)	1 466
2015	1 280 (99,2%)	6 (0,5%)	4 (0,3%)	1 290
2014	1 160 (98,6%)	5 (0,4%)	12 (1,0%)	1 177
2013	1 182 (98,3%)	15 (1,2%)	5 (0,4%)	1 202
2012	935 (94,1%)	53 (5,3%)	6 (0,6%)	994
2011	864 (89,5%)	96 (9,9%)	5 (0,5%)	965
2005-10	3 628 (89,7%)	389 (9,6%)	29 (0,7%)	4 046
Total	27 579 (97,5%)	580 (2,1%)	132 (0,5%)	28 291

Table 33: Antibiotic prophylaxis in reoperations

	Yes		No		Missing		Total
2024	673	(86,3%)	87	(11,2%)	0	(0,0%)	780
2023	720	(86,2%)	102	(12,2%)	6	(0,7%)	835
2022	711	(88,4%)	85	(10,6%)	6	(0,7%)	804
2021	663	(84,5%)	110	(14,0%)	12	(1,5%)	785
2020	636	(87,1%)	85	(11,6%)	9	(1,2%)	730
2019	799	(86,8%)	111	(12,1%)	10	(1,1%)	920
2018	797	(84,9%)	126	(13,4%)	16	(1,7%)	939
2017	771	(85,6%)	121	(13,4%)	9	(1,0%)	901
2016	859	(87,0%)	115	(11,7%)	13	(1,3%)	987
2015	857	(91,3%)	65	(6,9%)	17	(1,8%)	939
2014	746	(94,1%)	45	(5,7%)	2	(0,3%)	793
2013	822	(91,4%)	67	(7,5%)	10	(1,1%)	899
2012	814	(90,8%)	76	(8,5%)	6	(0,7%)	896
2011	816	(88,2%)	95	(10,3%)	14	(1,5%)	925
2005	4 437	(84,3%)	747	(14,2%)	80	(1,5%)	5 264
Total	15 121	(86,9%)	2 037	(11,7%)	210	(1,2%)	17 397

Table 34: Type of antibiotics - primary operations

Antibiotics (Trade name)	2005-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Cefalotin (Keflin)	65 925	7 837	7 032	5 830	828	851	1 270	1 670	1 818	1 807	94 868
	84,2%	92,0%	84,5%	69,5%	10,1%	10,9%	15,2%	19,3%	21,4%	21,5%	61,9%
Cefazolin (Cephazolin)	4	2	748	2 073	6 387	6 288	6 598	6 536	6 284	6 219	41 139
	0,0%	0,0%	9,0%	24,7%	78,2%	80,9%	79,1%	75,5%	73,9%	74,2%	26,8%
Klindamycin (Dalacin, Clindamycin)	2 466	397	394	376	391	364	384	339	332	314	5 757
	3,1%	4,7%	4,7%	4,5%	4,8%	4,7%	4,6%	3,9%	3,9%	3,7%	3,8%
Kloksacillin (Ekvacillin)	3 204	80	15	9	445	181	13	11	17	7	3 982
	4,1%	0,9%	0,2%	0,1%	5,4%	2,3%	0,2%	0,1%	0,2%	0,1%	2,6%
Cefuroksim (Zinacef, Cefuroxim, Lifurox)	2 899	27	21	6	30	9	10	2	2	3	3 009
	3,7%	0,3%	0,3%	0,1%	0,4%	0,1%	0,1%	0,0%	0,0%	0,0%	2,0%
Dikloksacillin (Diclocil, Dicillin)	2 268	14	3	12	13	8	7	6	2	1	2 334
	2,9%	0,2%	0,0%	0,1%	0,2%	0,1%	0,1%	0,1%	0,0%	0,0%	1,5%
Other *	1 220	130	75	68	70	61	51	74	42	31	1 822
	1,6%	1,5%	0,9%	0,8%	0,9%	0,8%	0,6%	0,9%	0,5%	0,4%	1,2%
Missing information	308	28	30	12	3	10	13	14	9	4	431
	0,4%	0,3%	0,4%	0,1%	0,0%	0,1%	0,2%	0,2%	0,1%	0,0%	0,3%
Total	78 294	8 515	8 318	8 386	8 167	7 772	8 346	8 652	8 506	8 386	153 342

* Drugs used less than 1% of operations last year or less than 1% of total surgery

Pharmacological antithrombotic prophylaxis

Table 35: Primary operation

	Yes		No		Missing		Total
2024	8 029	(95,9%)	343	(4,1%)	3	(0,0%)	8 375
2023	8 188	(96,5%)	281	(3,2%)	15	(0,3%)	8 484
2022	8 338	(96,3%)	291	(3,0%)	27	(0,7%)	8 656
2021	8 032	(96,3%)	279	(2,9%)	29	(0,8%)	8 340
2020	7 518	(96,6%)	239	(2,7%)	26	(0,7%)	7 783
2019	7 939	(97,2%)	193	(2,0%)	36	(0,8%)	8 168
2018	8 208	(97,4%)	190	(2,0%)	28	(0,6%)	8 426
2017	8 149	(97,6%)	182	(1,9%)	21	(0,5%)	8 352
2016	8 281	(97,4%)	186	(1,9%)	36	(0,7%)	8 503
2015	8 208	(97,6%)	168	(1,8%)	33	(0,6%)	8 409
2014	7 966	(97,3%)	191	(1,9%)	26	(0,7%)	8 183
2013	8 161	(98,2%)	139	(1,3%)	8	(0,4%)	8 308
2012	8 310	(98,5%)	125	(1,1%)	2	(0,4%)	8 437
2011	8 491	(98,7%)	92	(1,0%)	21	(0,3%)	8 604
2005-10	45 325	(98,0%)	733	(1,6%)	194	(0,4%)	46 252
Total	159 143	(97,5%)	3 632	(2,2%)	505	(0,3%)	163 280

Table 36: Number of drugs in antithrombotic prophylaxis

	One drug		Two drugs		Total
2024	7 703	(95,9%)	326	(4,1%)	8 029
2023	7 846	(95,8%)	342	(4,2%)	8 188
2022	8 026	(96,3%)	312	(3,7%)	8 338
2021	7 730	(96,2%)	302	(3,8%)	8 032
2020	7 309	(97,2%)	209	(2,8%)	7 518
2019	7 716	(97,2%)	223	(2,8%)	7 939
2018	8 024	(97,8%)	184	(2,2%)	8 208
2017	7 965	(97,7%)	184	(2,3%)	8 149
2016	8 101	(97,8%)	180	(2,2%)	8 281
2015	7 961	(97,0%)	247	(3,0%)	8 208
2014	7 750	(97,3%)	216	(2,7%)	7 966
2013	7 903	(96,8%)	258	(3,2%)	8 161
2012	8 138	(97,9%)	172	(2,1%)	8 310
2011	8 405	(99,0%)	86	(1,0%)	8 491
2005-10	45 211	(99,7%)	114	(0,3%)	45 325
Total	155 788	(97,9%)	3 355	(2,1%)	159 143

Table 37: Antithrombotic prophylaxis if one drug - primary operation (n=155 748)

	2005-15	2016	2017	2018	2019	2020	2021	2022	2023	2024
Dalteparin (Fragmin)	56,9%	64,8%	70,5%	71,6%	59,3%	56,6%	57,9%	59,5%	59,6%	60,8%
Enoksaparin (Klexane)	42,6%	34,3%	28,2%	27,5%	39,7%	42,0%	40,6%	38,5%	38,2%	37,2%
Other	0,2%	0,4%	0,5%	0,5%	0,7%	1,1%	1,1%	1,5%	1,8%	1,8%
Missing information	0,4%	0,6%	0,7%	0,4%	0,3%	0,3%	0,4%	0,7%	0,5%	0,2%
Totalt	85 350	8 098	7 964	8 023	7 704	7 305	7 723	8 020	7 843	7 698

Table 38: Time of first dose in antithrombotic prophylaxis - primary operation

	Preoperatively		Postoperatively		Missing		Total
2024	2 610	(32,5%)	5 347	(66,6%)	72	(0,8%)	8 029
2023	2 352	(28,7%)	5 405	(66,0%)	431	(5,3%)	8 188
2022	2 230	(26,8%)	5 150	(61,8%)	958	(11,5%)	8 338
2021	1 907	(23,8%)	5 150	(64,1%)	975	(12,1%)	8 032
2020	1 898	(25,2%)	4 746	(63,2%)	874	(11,6%)	7 518
2019	2 153	(27,1%)	4 954	(62,4%)	832	(10,4%)	7 939
2018	2 407	(29,3%)	4 937	(60,2%)	864	(10,5%)	8 208
2017	2 346	(28,9%)	4 847	(59,5%)	956	(11,7%)	8 149
2016	2 593	(31,4%)	4 762	(57,5%)	926	(11,2%)	8 281
2015	2 633	(32,1%)	4 696	(57,2%)	879	(10,7%)	8 208
2014	2 618	(32,9%)	4 477	(56,2%)	871	(11,0%)	7 966
2013	2 818	(34,6%)	4 351	(53,3%)	992	(12,1%)	8 161
2012	3 109	(37,4%)	4 133	(49,8%)	1 068	(12,9%)	8 310
2011	3 324	(39,2%)	4 060	(47,8%)	1 107	(9,8%)	8 491
2005-10	18 622	(41,2%)	14 674	(32,4%)	12 029	(16,6%)	45 325
Total	53 620	(33,7%)	81 689	(51,3%)	23 834	(15,0%)	159 143

Table 39: Regular anticoagulation if one drug - primary operations (n=42 333)

	2005-15	2016	2017	2018	2019	2020	2021	2022	2023	2024
Acetylsalicylic acid (Albyl-E, Globoid, Acetyratio, Magnyl E)	21,0%	60,2%	51,7%	45,8%	42,2%	38,2%	35,4%	35,3%	35,6%	33,7%
Apixaban (Eliquis)	0,9%	14,3%	20,7%	27,1%	29,3%	36,3%	38,4%	38,7%	39,8%	40,7%
Rivaroxaban (Xarelto)	1,6%	8,5%	8,5%	9,8%	9,5%	8,7%	7,8%	7,0%	6,9%	6,7%
Clopidogrel (Plavix, Klopido g rel)	1,1%	4,4%	4,3%	5,2%	6,5%	6,8%	8,7%	8,7%	9,0%	10,6%
Dabigatranetixalat (Re ‐ Novate, Pradaxa)	1,3%	3,9%	4,7%	4,4%	3,9%	3,2%	2,8%	3,1%	2,4%	2,2%
Acetylsalicylic acid and dipyridamol (Asasantin retard, Diprasorin)	1,1%	3,8%	3,3%	3,3%	3,3%	1,6%	1,6%	2,0%	1,7%	1,6%
Dalteparin (Fragmin)	0,5%	2,0%	2,5%	2,1%	2,1%	1,7%	1,0%	1,3%	1,1%	1,1%
Edoxaban (Lixiana)			0,0%	0,2%	0,7%	0,9%	1,1%	1,1%	1,3%	1,5%
Other	0,9%	2,4%	2,8%	1,9%	2,2%	2,4%	2,2%	1,4%	1,2%	1,4%
Missing	71,7%	1,4%	1,8%	0,6%	0,5%	0,5%	1,1%	1,5%	1,0%	0,5%
Total	19 244	2 128	2 166	2 265	2 294	2 424	2 701	2 923	2 982	3 109

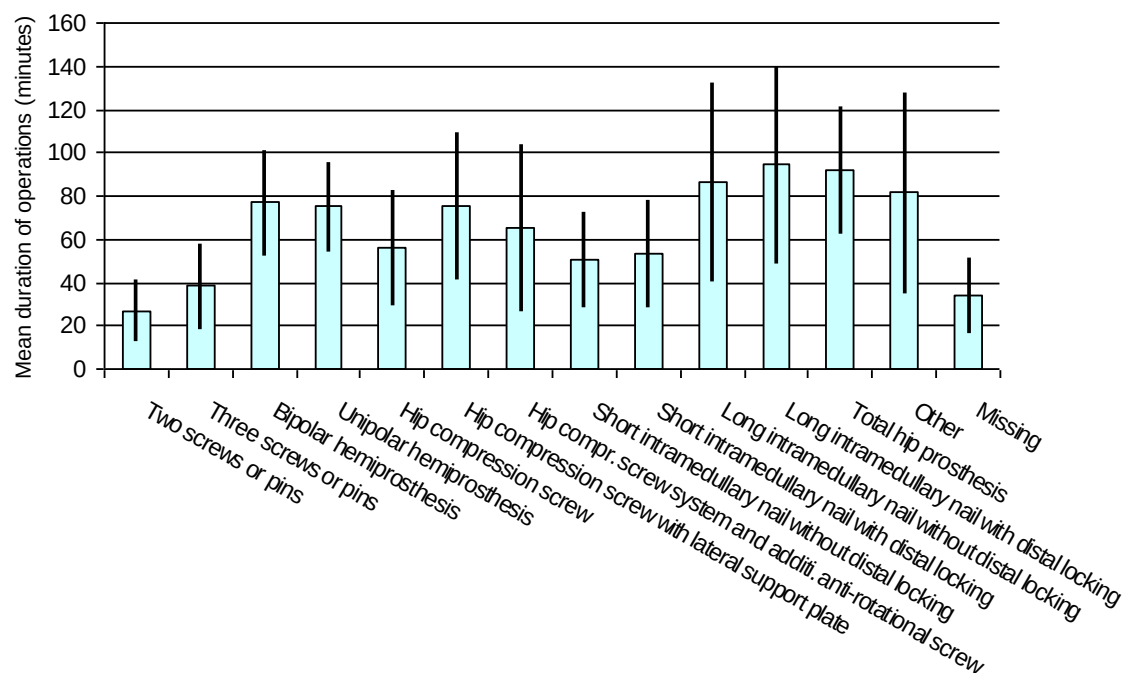
Table 40: Fibrinolysis inhibitor - primary operations* (n=107 625)

	2005-15	2016	2017	2018	2019	2020	2021	2022	2023	2024
No	76,8%	74,3%	70,2%	66,8%	60,6%	54,3%	48,1%	42,4%	36,2%	32,3%
No administration						0,0%	17,1%	34,2%	19,9%	7,0%
Systemic							0,0%	2,8%	30,8%	50,3%
Local								0,1%	0,6%	1,1%
Both systemic and local								0,2%	4,6%	7,3%
Yes - paper form	12,8%	20,8%	26,0%	29,1%	35,6%	41,1%	30,6%	16,5%	5,6%	0,9%
Missing	10,5%	4,9%	3,8%	4,1%	3,7%	4,6%	4,2%	4,0%	2,3%	1,1%
Total	37 257	8 154	7 940	7 842	7 538	14 482	23 397	24 234	23 736	23 592

*Electronic registration started during 2020

DURATION OF SURGERY

Figure 12: Duration of surgery for the different types of operations



The vertical bars indicate the mean duration $\pm$ standard deviation.

Table 41: Duration of surgery for the different types of operations

Type of operations	Total	Mean duration of operation (minutes)	Standard deviation
Two screws or pins	24 753	27	15
Three screws or pins	1 058	38	19
Bipolar hemiprosthesis	59 317	77	25
Unipolar hemiprosthesis	347	75	21
Hip compression screw	25 502	56	27
Hip compression screw with lateral support plate	9 566	75	34
Hip compression screw system and additional anti-rotational screw	1 808	65	39
Short intramedullary nail without distal locking	412	51	22
Short intramedullary nail with distal locking	15 378	53	25
Long intramedullary nail without distal locking	183	86	46
Long intramedullary nail with distal locking	11 266	94	46
Total hip prosthesis	6 746	92	29
Other	939	82	46
Missing	4	34	18

REPORTING METHOD

Table 42: Reporting method - primary operations

Method	2005-15	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Paper form	88 193	8 503	8 352	8 367	8 114	7 337	5 313	2 804	819	129	137 931
Electronic registration						1	25	1 089	4 962	7 510	13 587
Paper form registered electronically							2	2	22	52	78
Paper form upgraded to electronic reporting				59	54	445	3 000	4 761	2 681	684	11 684
Total	88 193	8 503	8 352	8 426	8 168	7 783	8 340	8 656	8 484	8 375	163 280

Figure 13:

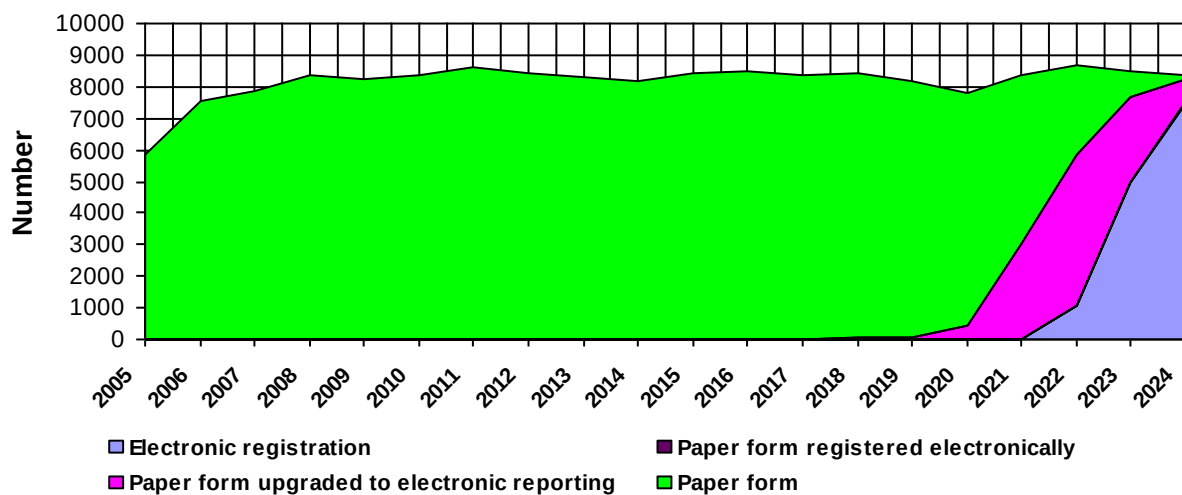


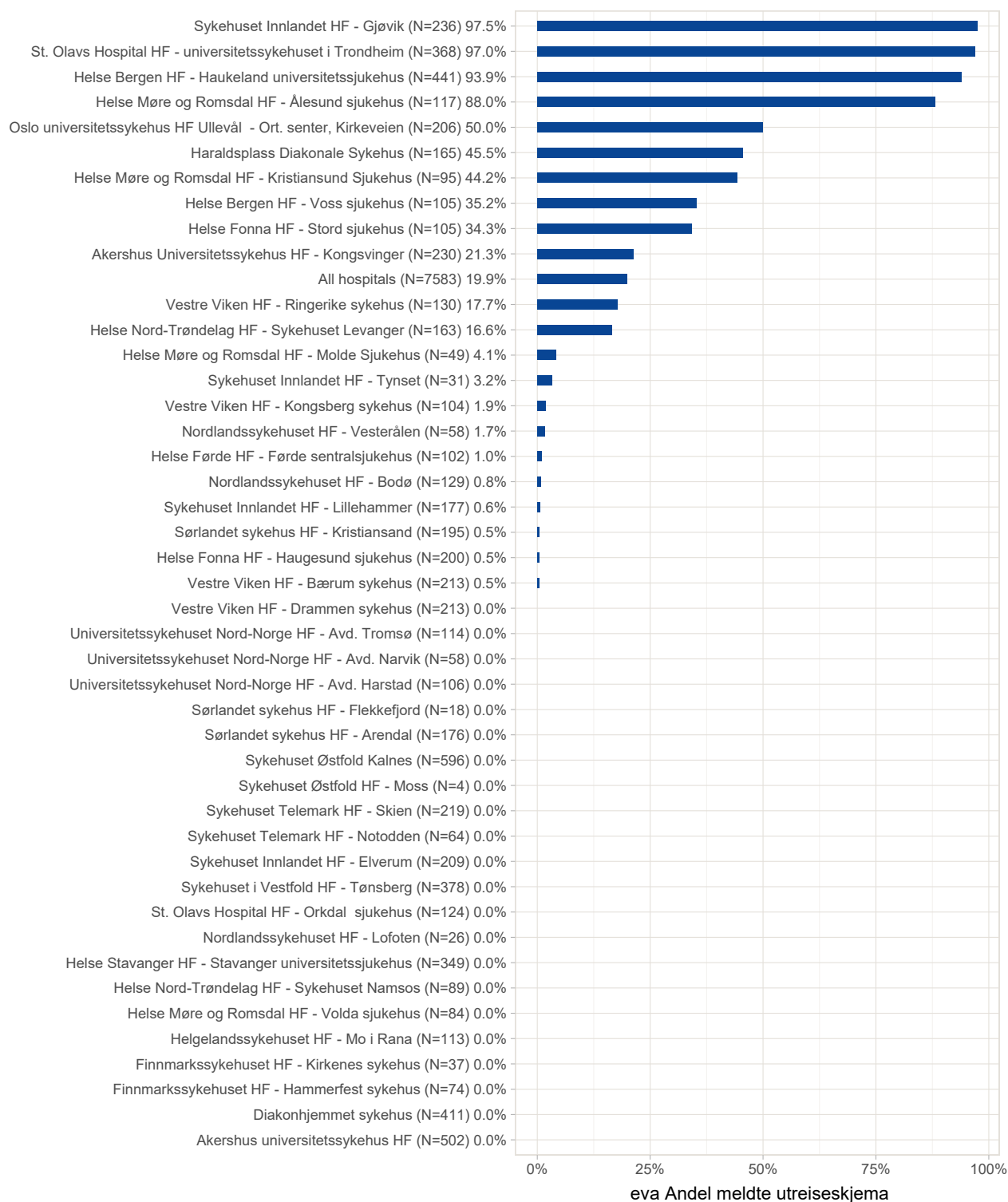
Figure D.45: Proportion of discharge forms reported for patients over 50 years with primary hip fracture in 2024

Figure D.45 shows the number of reported primary operations in 2024 for patients over 50 years, and the proportion of reported discharge forms for these is provided for each hospital. It is currently not possible to report discharge forms for total hip arthroplasties, so these are excluded.

Admission information

Table 43: Pre-fracture residence

Year	Home	Institution	Acute care (Other hospital/ ward)	Rehabilitation	Other	Total
2024	1 019 66.0%	329 21.3%	42 2.7%	8 0.5%	145 9.4%	1 543 100%
2023	107 68.2%	29 18.5%	9 5.7%	0 0.0%	12 7.6%	157 100%
2022*	32 82.1%	5 12.8%	1 2.6%	0 0.0%	1 2.6%	39 100%
2021*	14 63.6%	3 13.6%	2 9.1%	1 4.5%	2 9.1%	22 100%
Total	1 172 66.6%	366 20.8%	54 3.1%	9 0.5%	160 9.1%	1 761 100%

Table 44: Pre-fracture mobility

Year	G1	G2	G3	G4	G5	G6	Total
2024	825 53.5%	48 3.1%	376 24.4%	137 8.9%	23 1.5%	134 8.7%	1 543 100%
2023	87 55.4%	6 3.8%	28 17.8%	13 8.3%	0 0.0%	23 14.6%	157 100%
2022*	26 66.7%	0 0.0%	5 12.8%	0 0.0%	0 0.0%	8 20.5%	39 100%
2021*	13 59.1%	0 0.0%	2 9.1%	1 4.5%	0 0.0%	6 27.3%	22 100%
Total	951 54.0%	54 3.1%	411 23.3%	151 8.6%	23 1.3%	171 9.7%	1 761 100%

- G1:** Freely mobile without aids
G2: Mobile outdoors with one aid
G3: Mobile outdoors with two aids or frame
G4: Some indoor mobility, but never goes outside without help
G5: No functional mobility
G6: Unknown

* Only data from a single hospital

Discharge information

Table 45: Acute discharge destination

Year	Home	Institution	Acute care (Other hospital/ ward)	Rehabilitation	Other	Total
2024	290 18.8%	850 55.1%	87 5.6%	218 14.1%	98 6.4%	1 543 100%
2023	32 20.4%	66 42.0%	13 8.3%	32 20.4%	14 8.9%	157 100%
2022*	9 23.1%	10 25.6%	1 2.6%	15 38.5%	4 10.3%	39 100%
2021*	6 27.3%	7 31.8%	1 4.5%	4 18.2%	4 18.2%	22 100%
Total	337 19.1%	933 53.0%	102 5.8%	269 15.3%	120 6.8%	1 761 100%

* Only data from a single hospital

Organization of Treatment

Table 46: Preoperative Nerve Block

Year	No	Yes	Unknown	Total
2024	260 16.9%	1 251 81.1%	32 2.1%	1 543 100%
2023	19 12.1%	134 85.4%	4 2.5%	157 100%
2022*	2 5.1%	29 74.4%	8 20.5%	39 100%
2021*	5 22.7%	11 50.0%	6 27.3%	22 100%
Total	286 16.2%	1 425 80.9%	50 2.8%	1 761 100%

Table 47: Got Out of Bed by Day 1 Postoperatively

Year	No	Yes	Unknown	Total
2024	205 13.3%	1 305 84.6%	33 2.1%	1 543 100%
2023	16 10.2%	129 82.2%	12 7.6%	157 100%
2022*	4 10.3%	28 71.8%	7 17.9%	39 100%
2021*	1 4.5%	17 77.3%	4 18.2%	22 100%
Total	226 12.8%	1 479 84.0%	56 3.2%	1 761 100%

* Only data from a single hospital

Table 48: Type of Treatment Pathway

Year	O1	O2	O3	Total
2024	1 038 67.3%	484 31.4%	21 1.4%	1 543 100%
2023	118 75.2%	34 21.7%	5 3.2%	157 100%
2022*	39 100%	0 0.0%	0 0.0%	39 100%
2021*	22 100%	0 0.0%	0 0.0%	22 100%
Total	1 217 69.1%	518 29.4%	26 1.5%	1 761 100%

O1: Conventional Orthopedic Treatment

O2: Orthogeriatric Treatment

O3: Treatment Pathway in Collaboration with Other Internal Medicine Specialty (Other than Geriatrics)

Table 49: Geriatrician Involvement During Hospital Stay

Year	No	Yes	Unknown	Total
2024	1 038 67.3%	472 30.6%	33 2.1%	1 543 100%
2023	101 64.3%	24 15.3%	32 20.4%	157 100%
2022*	4 10.3%	0 0.0%	35 89.7%	39 100%
2021*	1 4.5%	0 0.0%	21 95.5%	22 100%
Total	1 144 65.0%	496 28.2%	121 6.9%	1 761 100%

* Only data from a single hospital

Table 50: Fall Risk Assessment (STRATIFY or Equivalent)

Year	No	Yes	Unknown	Total
2024	317 20.5%	1 121 72.7%	105 6.8%	1 543 100%
2023	34 21.7%	90 57.3%	33 21.0%	157 100%
2022*	2 5.1%	9 23.1%	28 71.8%	39 100%
2021*	2 9.1%	1 4.5%	19 86.4%	22 100%
Total	355 20.2%	1 221 69.3%	185 10.5%	1 761 100%

Nutrition

Table 51: Nutrition Screening

Year	No Risk of Malnutrition	Risk of Malnutrition	Screening not Performed	Unknown	Total
2024	599 38.8%	435 28.2%	155 10.0%	354 22.9%	1 543 100%
2023	71 45.2%	32 20.4%	17 10.8%	37 23.6%	157 100%
2022*	7 17.9%	2 5.1%	3 7.7%	27 69.2%	39 100%
2021*	2 9.1%	0 0.0%	0 0.0%	20 90.9%	22 100%
Total	679 38.6%	469 26.6%	175 9.9%	438 24.9%	1 761 100%

Table 52: Nutritional Interventions

Year	No	Yes	Unknown	Total
2024	777 50.4%	405 26.2%	361 23.4%	1 543 100%
2023	99 63.1%	24 15.3%	34 21.7%	157 100%
2022*	6 15.4%	1 2.6%	32 82.1%	39 100%
2021*	3 13.6%	0 0.0%	19 86.4%	22 100%
Totalt	885 50.3%	430 24.4%	446 25.3%	1 761 100%

* Only data from a single hospital

Osteoporosis Treatment

Table 53: Bone Protection Medication at Discharge

Year	No	Yes	Unknown	Total
2024	377 24.4%	1 074 69.6%	92 6.0%	1 543 100%
2023	32 20.4%	109 69.4%	16 10.2%	157 100%
2022*	3 7.7%	25 64.1%	11 28.2%	39 100%
2021*	2 9.1%	14 63.6%	6 27.3%	22 100%
Total	414 23.5%	1 222 69.4%	125 7.1%	1 761 100%

Table 54: Calcium / Vitamin D

Year	No Action taken	Commenced	Continued	Unknown	Total
2024	446 28.9%	758 49.1%	241 15.6%	98 6.4%	1 543 100%
2023	38 24.2%	76 48.4%	23 14.6%	20 12.7%	157 100%
2022*	4 10.3%	16 41.0%	3 7.7%	16 41.0%	39 100%
2021*	3 13.6%	12 54.5%	0 0.0%	7 31.8%	22 100%
Total	491 27.9%	862 48.9%	267 15.2%	141 8.0%	1 761 100%

Table 55: Oral Bisphosphonate (Alendronic Acid)

Year	No Action Taken	Commenced	Continued	Unknown	Total
2024	1 197 77.6%	34 2.2%	49 3.2%	263 17.0%	1 543 100%
2023	108 68.8%	9 5.7%	7 4.5%	33 21.0%	157 100%
2022*	16 41.0%	0 0.0%	0 0.0%	23 59.0%	39 100%
2021*	14 63.6%	0 0.0%	0 0.0%	8 36.4%	22 100%
Total	1 335 75.8%	43 2.4%	56 3.2%	327 18.6%	1 761 100%

* Only data from a single hospital

Table 56: Intravenous Bisphosphonate (Zoledronic Acid)

Year	No Action Taken	Commenced	Continued	Unknown	Total
2024	656 42.5%	579 37.5%	107 6.9%	201 13.0%	1 543 100%
2023	71 45.2%	56 35.7%	6 3.8%	24 15.3%	157 100%
2022*	5 12.8%	21 53.8%	0 0.0%	13 33.3%	39 100%
2021*	2 9.1%	12 54.5%	0 0.0%	8 36.4%	22 100%
Total	734 41.7%	668 37.9%	113 6.4%	246 14.0%	1 761 100%

Table 57: Denosumab (Prolia)

Year	No Action Taken	Commenced	Continued	Unknown	Total
2024	1 210 78.4%	45 2.9%	63 4.1%	225 14.6%	1 543 100%
2023	127 80.9%	3 1.9%	3 2.9%	24 15.3%	157 100%
2022*	17 43.6%	1 2.6%	0 0.0%	21 53.8%	39 100%
2021*	15 68.2%	0 0.0%	0 0.0%	7 31.8%	22 100%
Total	1 369 77.7%	49 2.8%	66 3.7%	277 15.7%	1 761 100%

Table 58: Other Medication

Year	No Action Taken	Commenced	Continued	Unknown	Total
2024	0	0	2	0	2
2023	0	0	1	0	1
2022*	0	0	0	0	0
2021*	0	0	0	0	0
Total	0	0	3	0	3

* Only data from a single hospital

Table 59: Specification of Other Medication

Name of Medication	2021*	2022*	2023	2024	Total
Teriparatide (Forsteo, Terrosa, Movymia)	0	0	0	1	1
Romosozumab (Evenity)	0	0	0	1	1
Alendronate	0	0	1	0	1
Total	0	0	1	2	3

Table 60: Referred for Bone Densitometry (DXA)

Year	No	Yes	Unknown	Total
2024	1 244 80.6%	159 10.3%	140 9.1%	1 543 100%
2023	100 63.7%	16 10.2%	41 26.1%	157 100%
2022*	0 0.0%	1 2.6%	38 97.4%	39 100%
2021*	2 9.1%	1 4.5%	19 86.4%	22 100%
Total	1 346 76.4%	177 10.1%	238 13.5%	1 761 100%

* Only data from a single hospital

Complications

Table 61: Complications during hospitalization (multiple selections allowed)

Year	K1	K2	K3	K4	K5	K6	K7	K8	K9	K10	Total
2024	241	16	84	67	24	8	2	42	13	113	1 543
	15,6%	1,0%	5,4%	4,3%	1,6%	0,5%	0,1%	2,7%	0,8%	7,3%	100%
2023	18	2	12	5	2	0	0	1	4	9	157
	11,5%	1,3%	7,6%	3,2%	1,3%	0,0%	0,0%	0,6%	2,5%	5,7%	100%
2022*	5	0	0	0	0	0	0	1	0	1	39
	12,8%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	2,6%	0,0%	2,6%	100%
2021*	2	0	0	0	0	0	0	0	0	1	22
	9,1%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	4,5%	100%
Total	266	18	96	72	26	8	2	44	17	124	1 761
	15,1%	1,0%	5,5%	4,1%	1,5%	0,5%	0,1%	2,5%	1,0%	7,0%	100%

K1: Delirium (confirmed using 4AT or CAM)

K2: Pressure sore

K3: Urinary tract infection (UTI)

K4: Pneumonia

K5: Acute kidney injury (serum creatinine increase > 50% or increase > 50 µmol/L)

K6: Deep vein thrombosis / pulmonary embolism (DVT / PE)

K7: Wound infection

K8: Cardiovascular event (myocardial infarction, stroke)

K9: In-hospital fall

K10: Other

* Only data from a single hospital

Table 62: Specification of Other complication during hospitalization**

Complication	2021*	2022*	2023	2024	Total
Posthemorrhagic anemia	1	1	2	53	57
Heart failure	0	0	0	7	7
Constipation / ileus	0	0	1	11	12
Electrolyte disturbance	0	0	0	11	11
Infection	0	0	0	5	5
Gastrointestinal bleeding	0	0	0	3	3
Respiratory failure	0	0	0	24	24
Atrial fibrillation (AF)	0	0	0	4	4
Residual urine / bladder tamponade	0	0	1	5	6
Gastrointestinal infection	0	0	0	1	1
Covid 19	0	0	2	0	2
Epilepsy / seizure	0	0	0	3	3
Hematuria	0	0	0	1	1
Diabetes-related complication	0	0	0	3	3
Dizziness	0	0	0	2	2
Syncope	0	0	1	0	1
Other	0	0	0	1	1
Total	1	1	7	124	143

* Only data from a single hospital

** It is possible to report multiple complications

PROM (Patient Reported Outcome Measures)

Table 63a: Number of issued and answered patient questionnaires - The Norwegian Hip Fracture Register

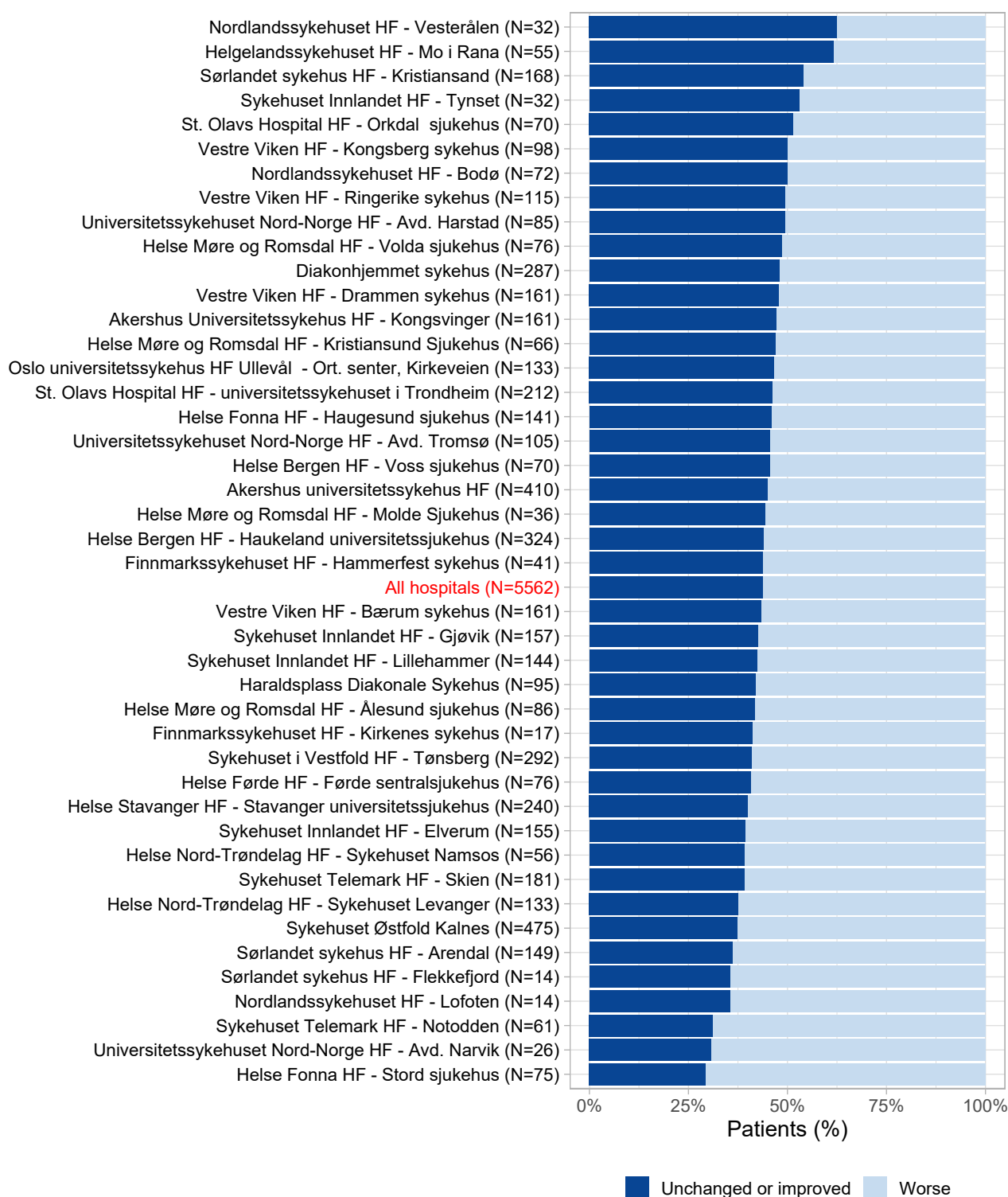
	4 months *		12 months *		36 months *		Total	
	Issued	Answered (%)	Issued	Answered (%)	Issued	Answered (%)	Issued	Answered (%)
2024	6 199	2 559 (41,3%)	5 315	2 186 (41,1%)	3 349	1 379 (41,2%)	14 863	6 124 (41,2%)
2023	6 264	2 647 (42,3%)	5 773	2 724 (47,2%)	3 738	1 720 (46,0%)	15 775	7 091 (45,0%)
2022	6 579	3 231 (49,1%)	5 497	2 946 (53,6%)	3 836	1 980 (51,6%)	15 912	8 157 (51,3%)
2021	6 053	3 221 (53,2%)	5 440	2 945 (54,1%)	4 249	2 144 (50,5%)	15 742	8 310 (52,8%)
2020	5 848	3 288 (56,2%)	5 418	3 078 (56,8%)	4 260	2 250 (52,8%)	15 526	8 616 (55,5%)
2019	6 224	3 333 (53,6%)	5 820	3 349 (57,5%)	4 233	2 221 (52,5%)	16 277	8 903 (54,7%)
2018	6 787	3 778 (55,7%)	5 972	3 434 (57,5%)	4 338	2 377 (54,8%)	17 097	9 589 (56,1%)
2017	6 661	3 799 (57,0%)	5 928	3 416 (57,6%)	4 082	2 251 (55,1%)	16 671	9 466 (56,8%)
2016	6 694	3 736 (55,8%)	6 067	3 518 (58,0%)	4 202	2 324 (55,3%)	16 963	9 578 (56,5%)
2015	6 614	3 752 (56,7%)	5 837	3 345 (57,3%)	4 380	2 391 (54,6%)	16 831	9 488 (56,4%)
2014	6 580	3 650 (55,5%)	5 990	3 264 (54,5%)	4 330	2 349 (54,2%)	16 900	9 263 (54,8%)
2013	6 679	3 777 (56,6%)	6 084	3 510 (57,7%)	4 383	2 395 (54,6%)	17 146	9 682 (56,5%)
2012	7 486	4 130 (55,2%)	6 774	3 807 (56,2%)	1 664	964 (57,9%)	15 924	8 901 (55,9%)
2011	6 323	3 462 (54,8%)	5 491	3 070 (55,9%)	1 303	728 (55,9%)	13 117	7 260 (55,3%)
2010	4 908	2 761 (56,3%)	2 139	1 213 (56,7%)	3 601	2 024 (56,2%)	10 648	5 998 (56,3%)
2009	2 420	1 389 (57,4%)	2 234	1 265 (56,6%)	4 023	2 156 (53,6%)	8 677	4 810 (55,4%)
2008	2 124	1 195 (56,3%)	1 789	1 000 (55,9%)	3 109	1 777 (57,2%)	7 022	3 972 (56,6%)
2007	3 405	1 895 (55,7%)	4 971	2 771 (55,7%)			8 376	4 666 (55,7%)
2006	6 036	3 515 (58,2%)	4 754	2 721 (57,2%)			10 790	6 236 (57,8%)
2005	2 770	1 612 (58,2%)					2 770	1 612 (58,2%)
Total	112 654	60 730 (53,9%)	97 293	53 562 (55,1%)	63 080	33 430 (53,0%)	273 027	147 722 (54,1%)

* The register sends questionnaires to patients 4, 12 and 36 months post-operatively

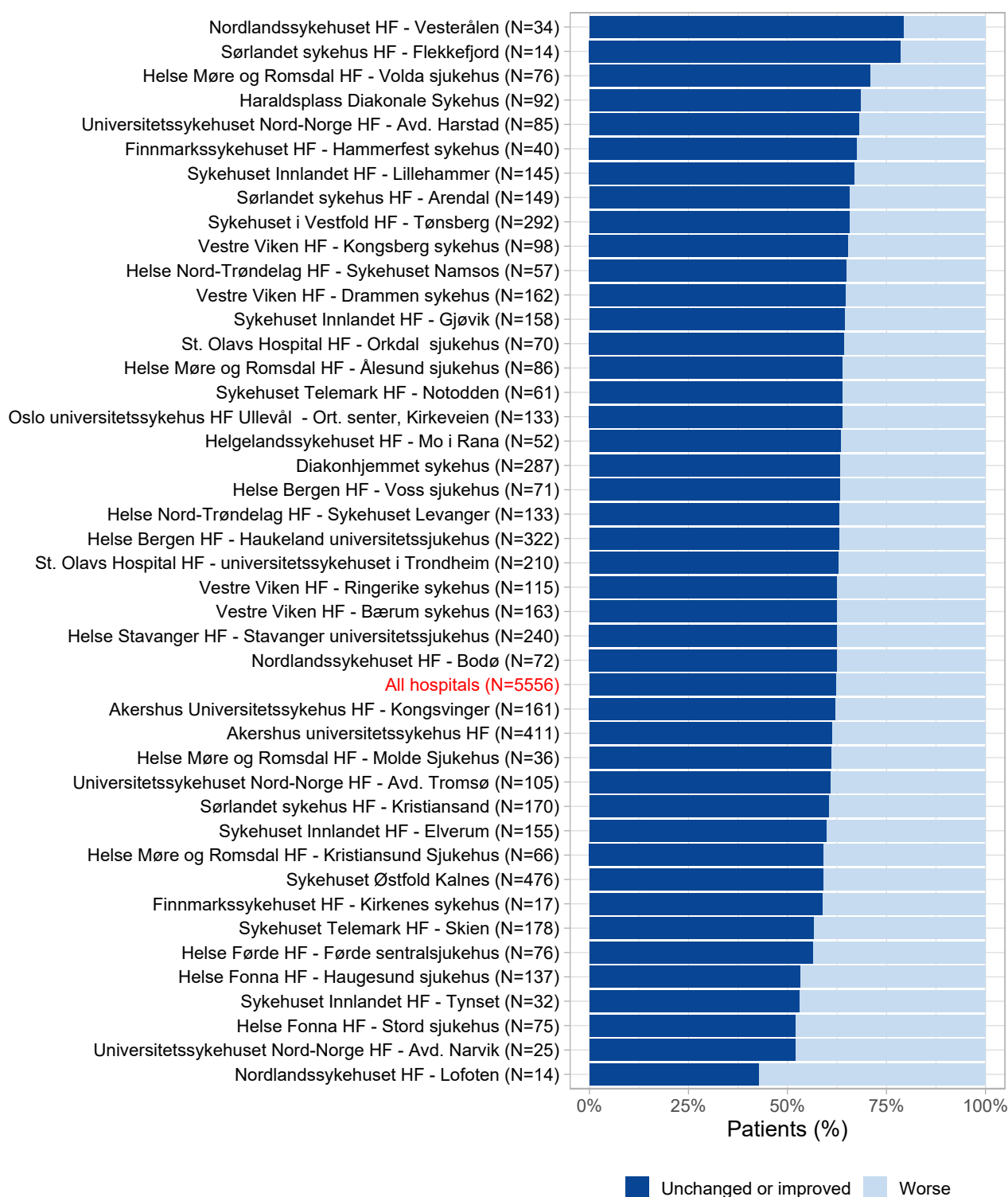
Table 63b: Number of issued and answered patient questionnaires - The Norwegian Arthroplasty Register

	4 months *		12 months *		36 months *		Total	
	Issued	Answered (%)	Issued	Answered (%)	Issued	Answered (%)	Issued	Answered (%)
2024	144	94 (65,3%)	200	111 (55,5%)	426	289 (67,8%)	770	494 (64,2%)
2023	121	81 (66,9%)	357	198 (55,5%)	458	287 (62,7%)	936	566 (60,5%)
2022	500	346 (69,2%)	26	2 (7,7%)	7	4 (57,1%)	533	352 (66,0%)
2021	495	375 (75,8%)	24	2 (8,3%)	10	7 (70,0%)	529	384 (72,6%)
2020	524	365 (69,7%)	17	1 (5,9%)	46	28 (60,9%)	587	394 (67,1%)
2019	524	397 (75,8%)	19	4 (21,1%)	8	3 (37,5%)	551	404 (73,3%)
2018	542	393 (72,5%)	23	3 (13,0%)	8	3 (37,5%)	573	399 (69,6%)
2017	348	261 (75,0%)	25	3 (12,0%)	9	4 (44,4%)	382	268 (70,2%)
2016	319	228 (71,5%)	10	2 (20,0%)	3	1 (33,3%)	332	231 (69,6%)
2015	305	228 (74,8%)	7	1 (14,3%)	5	3 (60,0%)	317	232 (73,2%)
2014	238	175 (73,5%)	13	7 (53,8%)	2	1 (50,0%)	253	183 (72,3%)
2013	223	178 (79,8%)	14	7 (50,0%)	63	46 (73,0%)	300	231 (77,0%)
2012	90	73 (81,1%)	11	9 (81,8%)	132	88 (66,7%)	233	170 (73,0%)
2011	141	94 (66,7%)	127	97 (76,4%)	109	88 (80,7%)	377	279 (74,0%)
2010	80	67 (83,8%)	132	98 (74,2%)	153	111 (72,5%)	365	276 (75,6%)
2009	144	100 (69,4%)	135	102 (75,6%)	74	52 (70,3%)	353	254 (72,0%)
2008	151	111 (73,5%)	113	83 (73,5%)	76	43 (56,6%)	340	237 (69,7%)
2007	98	72 (73,5%)	97	63 (64,9%)			195	135 (69,2%)
2006	129	94 (72,9%)	98	65 (66,3%)			227	159 (70,0%)
2005	50	29 (58,0%)					50	29 (58,0%)
Total	5 166	3 761 (72,8%)	1 448	858 (59,3%)	1 589	1 058 (66,6%)	8 203	5 677 (69,2%)

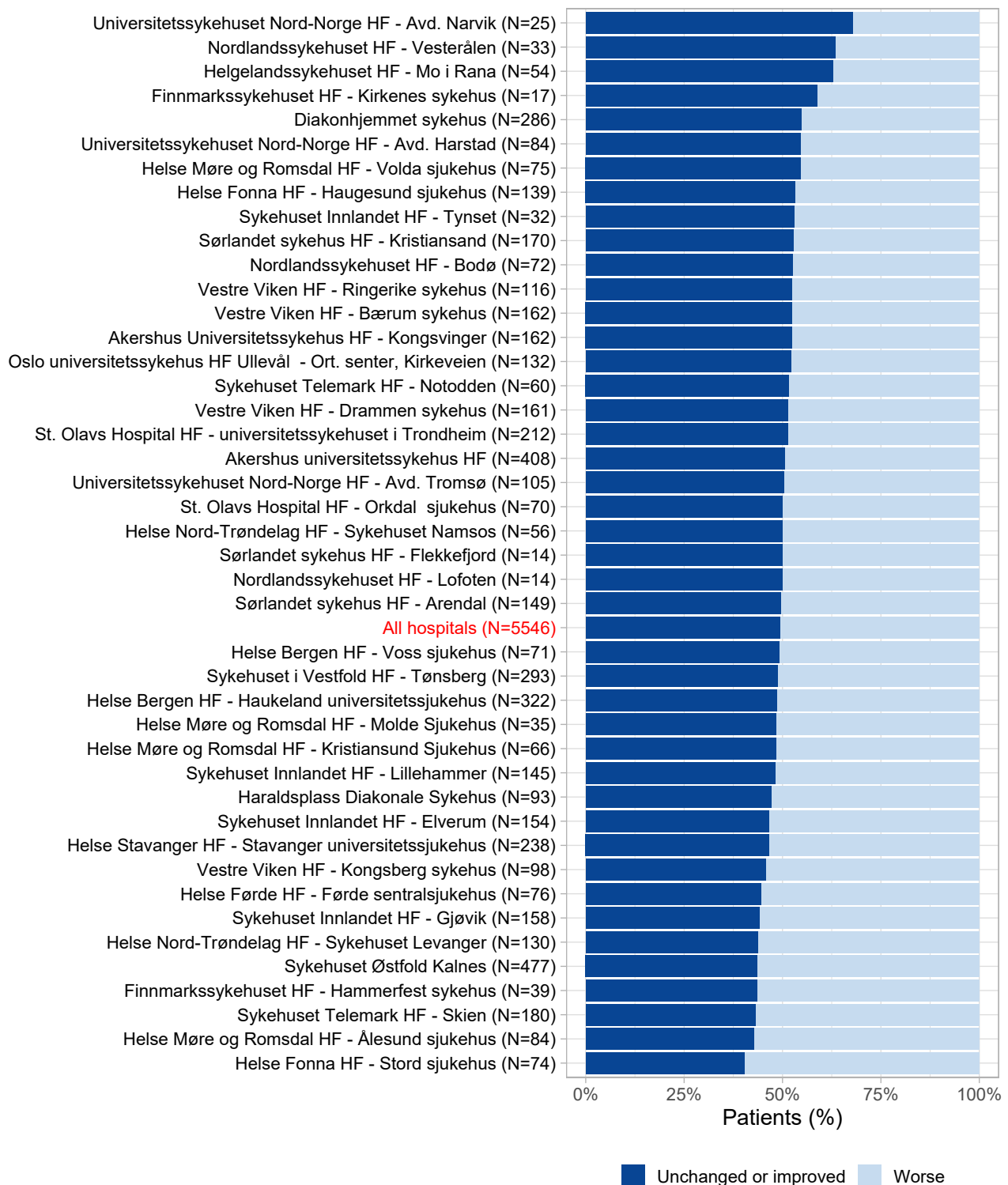
* The register sends questionnaires to patients 4, 12 and 36 months after operation with total hip prosthesis reported to the Norwegian Arthroplasty Register

Figure D.46: Walking ability after hip fracture, 2022-2024 - all hip fractures

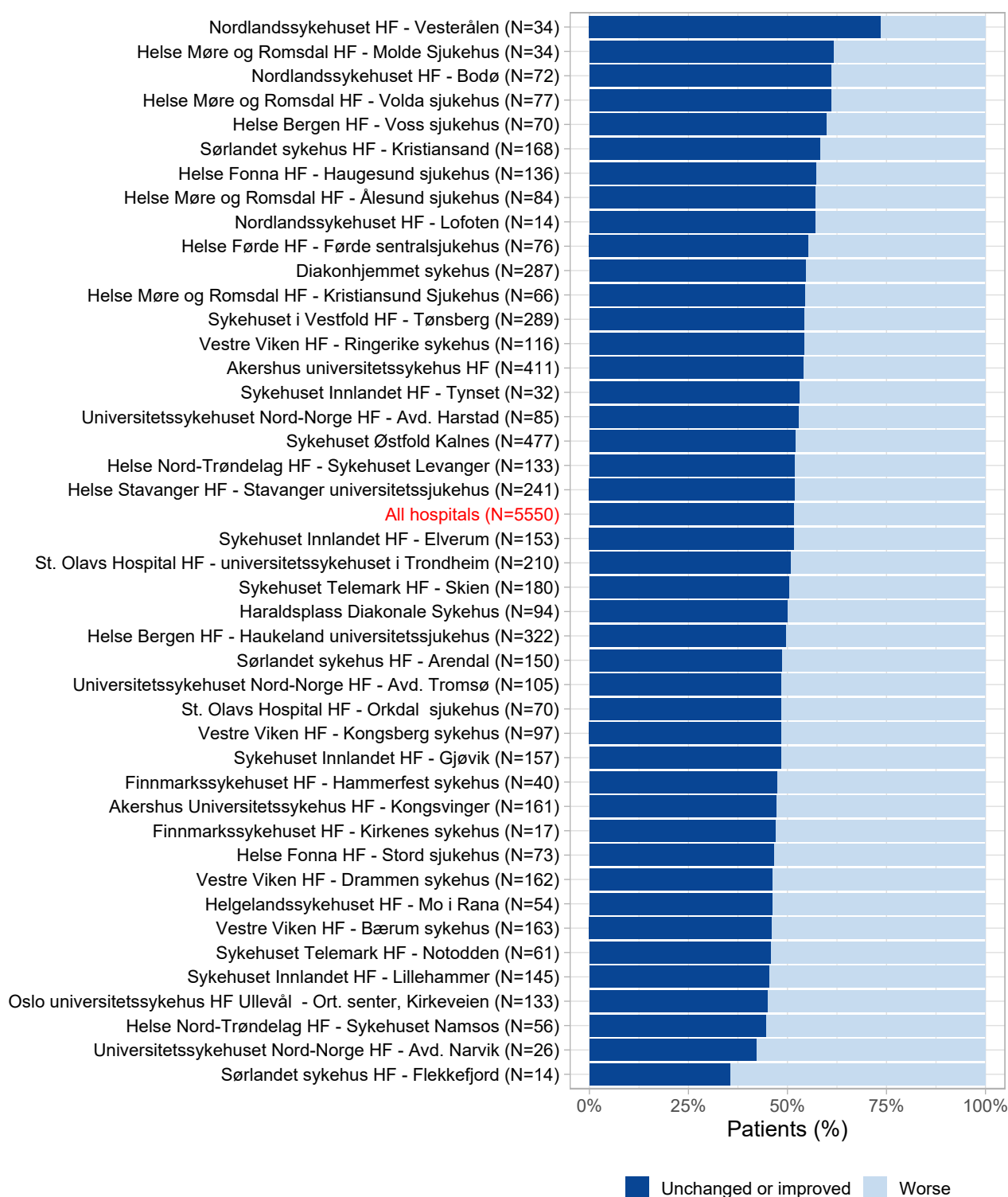
The figure D.46 shows the proportion of patients who report unchanged or improved walking ability from preoperatively to 4 months postoperatively assessed on the basis of the 1st dimension of EQ-5D-5L. Only hospitals with 10 or more response are displayed.

Figure D.47: Self-care after hip fracture, 2022-2024 - all hip fractures

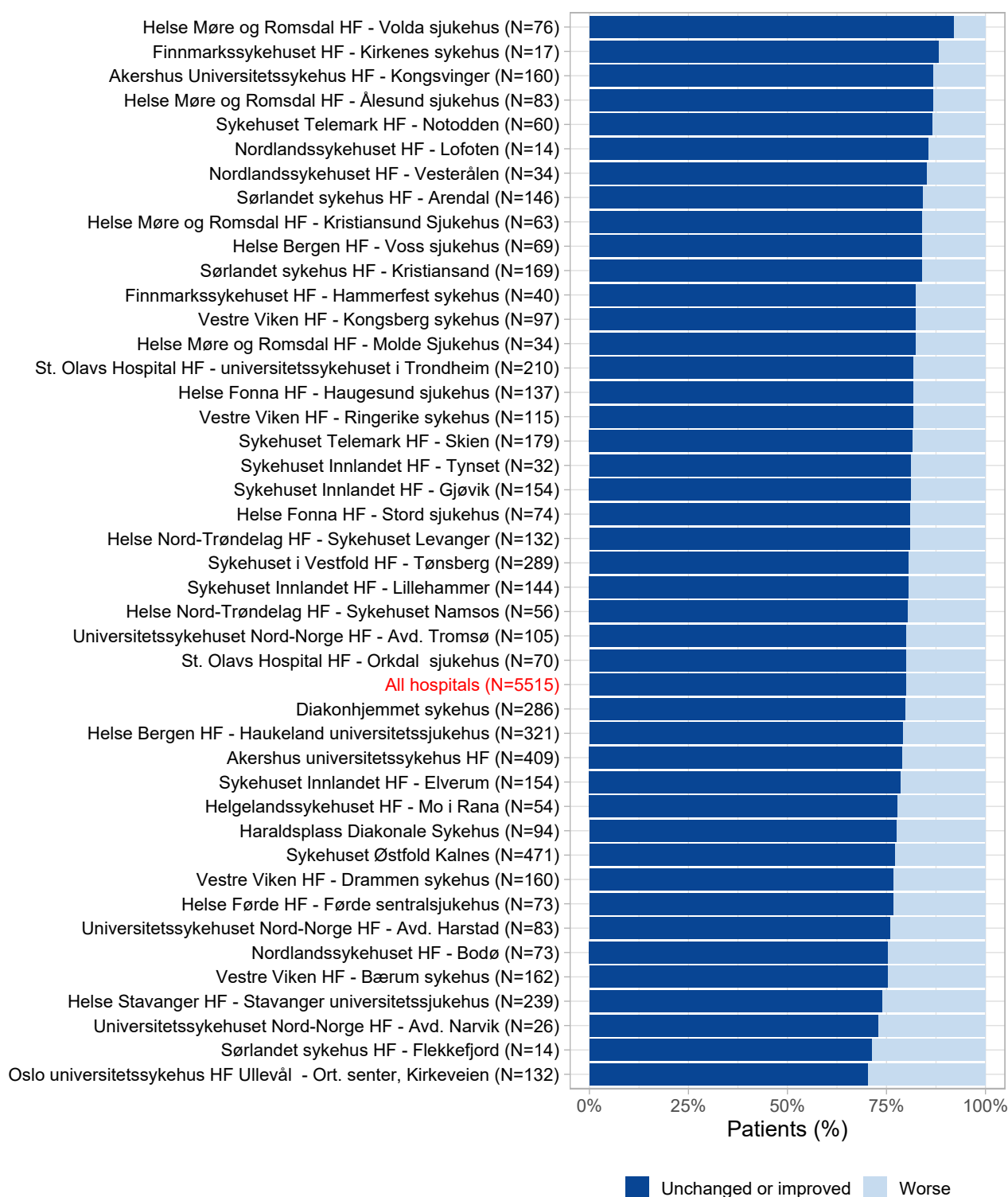
The figure D.47 shows the proportion of patients who report unchanged or improved ability to perform self-care from preoperatively to 4 months postoperatively assessed on the basis of the 2nd dimension of EQ-5D-5L. Only hospitals with 10 or more response are displayed.

Figure D.48: Usual activities after hip fracture, 2022-2024 - all hip fractures

The figure D.48 shows the proportion of patients who report unchanged or improved ability to perform usual activities from preoperatively to 4 months postoperatively assessed on the basis of the 3rd dimension of EQ-5D-5L. Only hospitals with 10 or more response are displayed.

Figure D.49: Pain/discomfort after hip fracture, 2022-2024 - all hip fractures

The figure D.49 shows the proportion of patients who report unchanged or improved pain/discomfort from preoperatively to 4 months postoperatively assessed on the basis of the 3rd dimension of EQ-5D-5L. Only hospitals with 10 or more response are displayed.

Figure D.50: Anxiety/depression after hip fracture, 2022-2024 - all hip fractures

The figure D.50 shows the proportion of patients who report unchanged or less anxiety/depression from preoperatively to 4 months postoperatively assessed on the basis of the 3rd dimension of EQ-5D-5L. Only hospitals with 10 or more response are displayed.

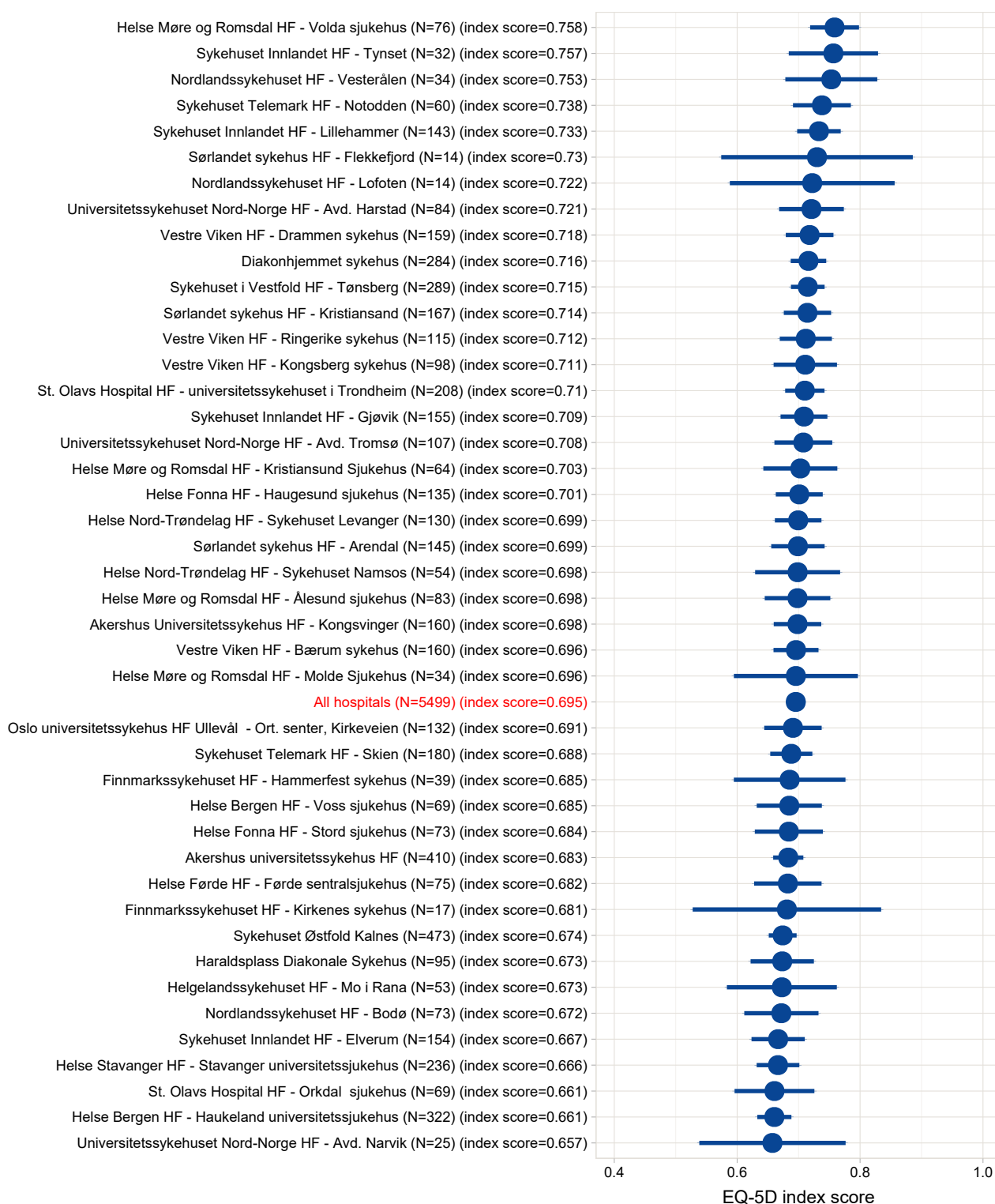
Figure D.51: EQ-5D-5L index score after hip fracture, 2022-2024 - all hip fractures

Figure D.51 shows the EQ-5D-5L index score for all hip fractures operated on during the period 2022-2024 at various hospitals. The index score is calculated based on responses in the five different dimensions. An index score of 1 corresponds to the best possible quality of life, while an index score of 0 corresponds to death. The number of patients who have completed the PROM questionnaires after surgery at each hospital is indicated in parentheses. Hospitals with fewer than 10 responses are excluded.

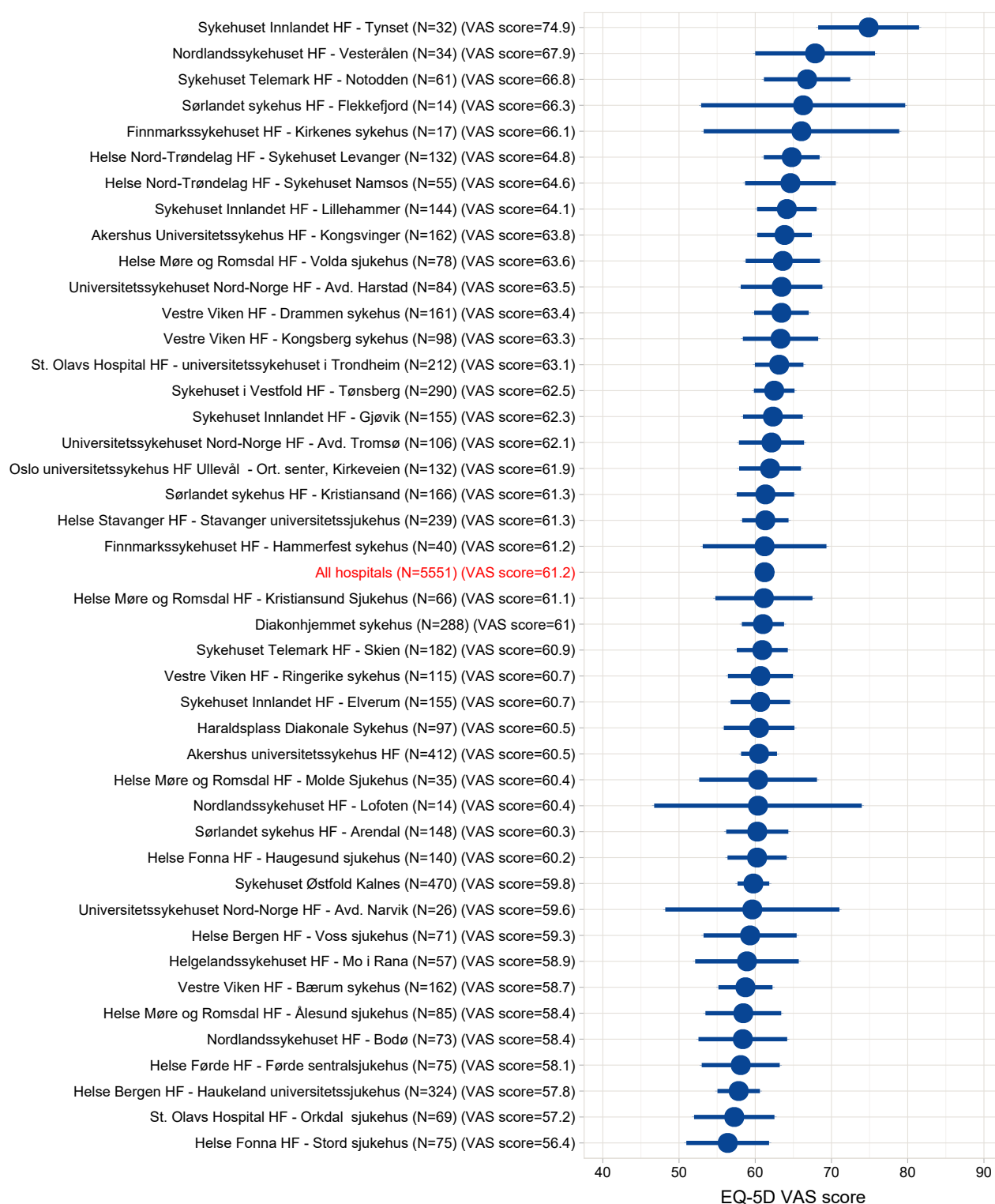
Figure D.52: EQ-5D-VAS after hip fracture, 2022-2024 - all hip fractures

Figure D.52 shows the EQ-5D visual analogue scale (VAS) for all hip fractures operated on during the period 2022-2024 at various hospitals. Patients report their quality of life by marking a point on a scale from 0 (worst imaginable quality of life) to 100 (best imaginable quality of life). The number of patients who have completed the PROM questionnaires after surgery at each hospital is indicated in parentheses. Hospitals with fewer than 10 responses are excluded.

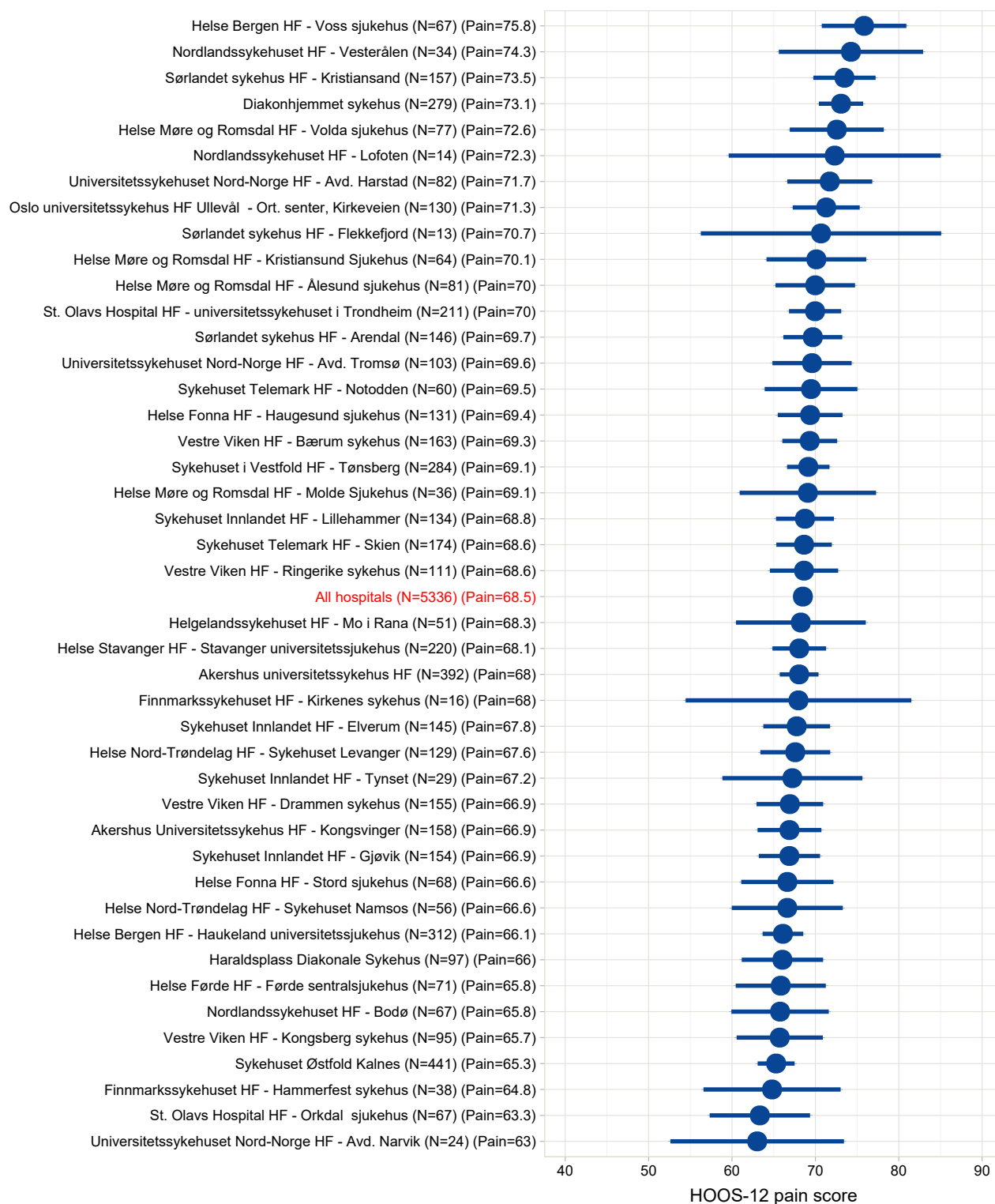
Figure D.53: HOOS-12 pain after hip fracture 2022-2024 - all hip fractures

Figure D.53 shows the HOOS-12 pain score 4 months after hip fracture surgery in 2022-2024 at different hospitals. Patients answer 4 questions about pain, and the responses are converted into a score where 100 represents the best outcome (least pain) and 0 the worst outcome (most pain). The figure shows the mean pain score and the 95 % confidence interval for each hospital. The number of patients who have completed the PROM questionnaires after surgery at each hospital is shown in parentheses. Hospitals with fewer than 10 responses are excluded.

Figure D.54: HOOS-12 function after hip fracture, 2022-2024 - all hip fractures

Figure D.54 shows the HOOS-12 function score 4 months after hip fracture surgery in 2022-2024 at different hospitals. Patients answer 4 questions about function, and the responses are converted into a score where 100 represents the best outcome (best function) and 0 the worst outcome (less function). The figure shows the mean function score and the 95 % confidence interval for each hospital. The number of patients who have completed the PROM questionnaires after surgery at each hospital is shown in parentheses. Hospitals with fewer than 10 responses are excluded.

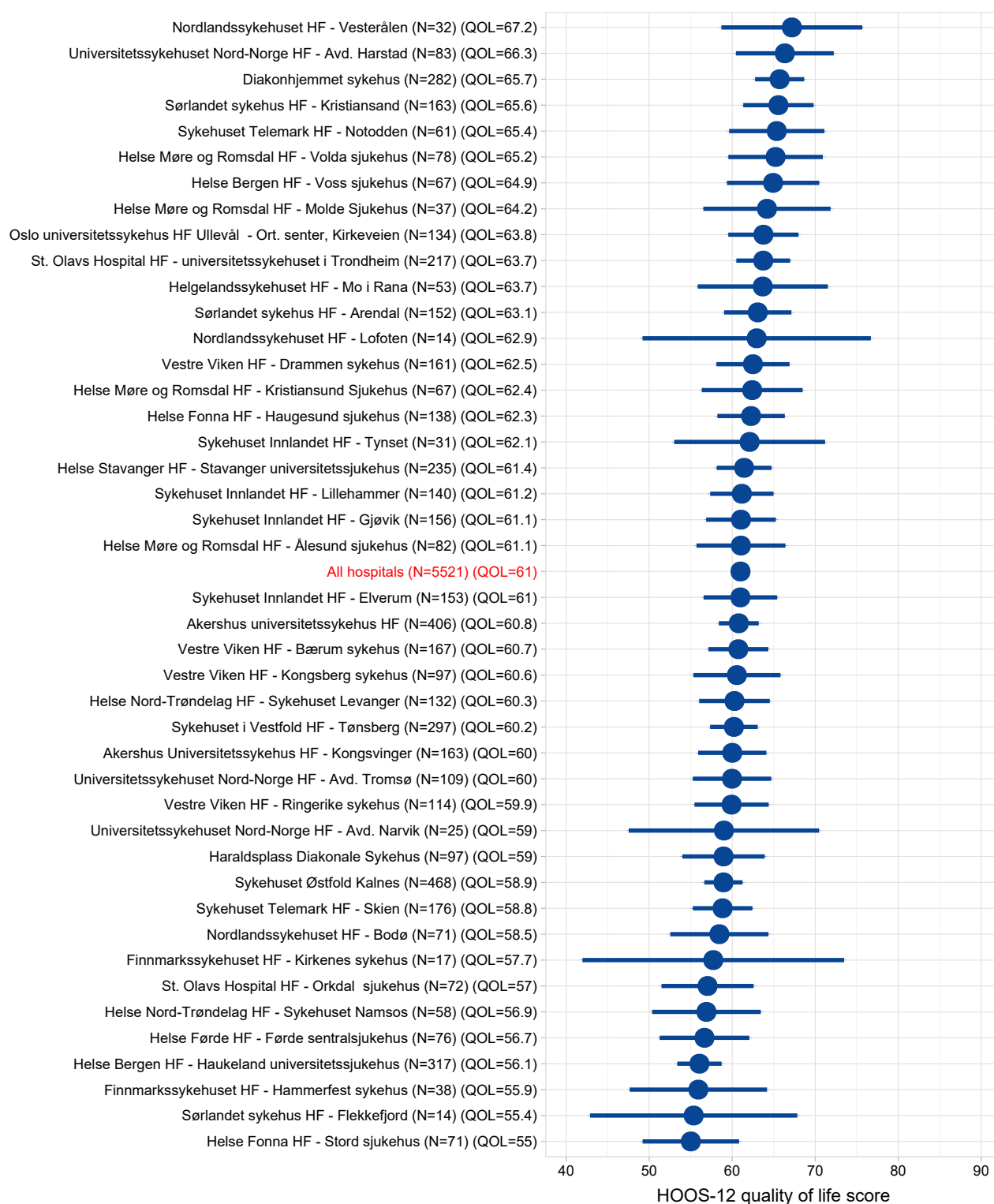
Figure D.55: HOOS-12 quality of life after hip fracture, 2022-2024 - all hip fractures

Figure D.55 shows the HOOS-12 quality of life score 4 months after hip fracture surgery in 2022-2024 at different hospitals. Patients answer 4 questions about quality of life, and the responses are converted into a score where 100 represents the best outcome (best quality of life) and 0 the worst outcome (low quality of life). The figure shows the mean quality of life score and the 95 % confidence interval for each hospital. The number of patients who have completed the PROM questionnaires after surgery at each hospital is shown in parentheses. Hospitals with fewer than 10 responses are excluded.

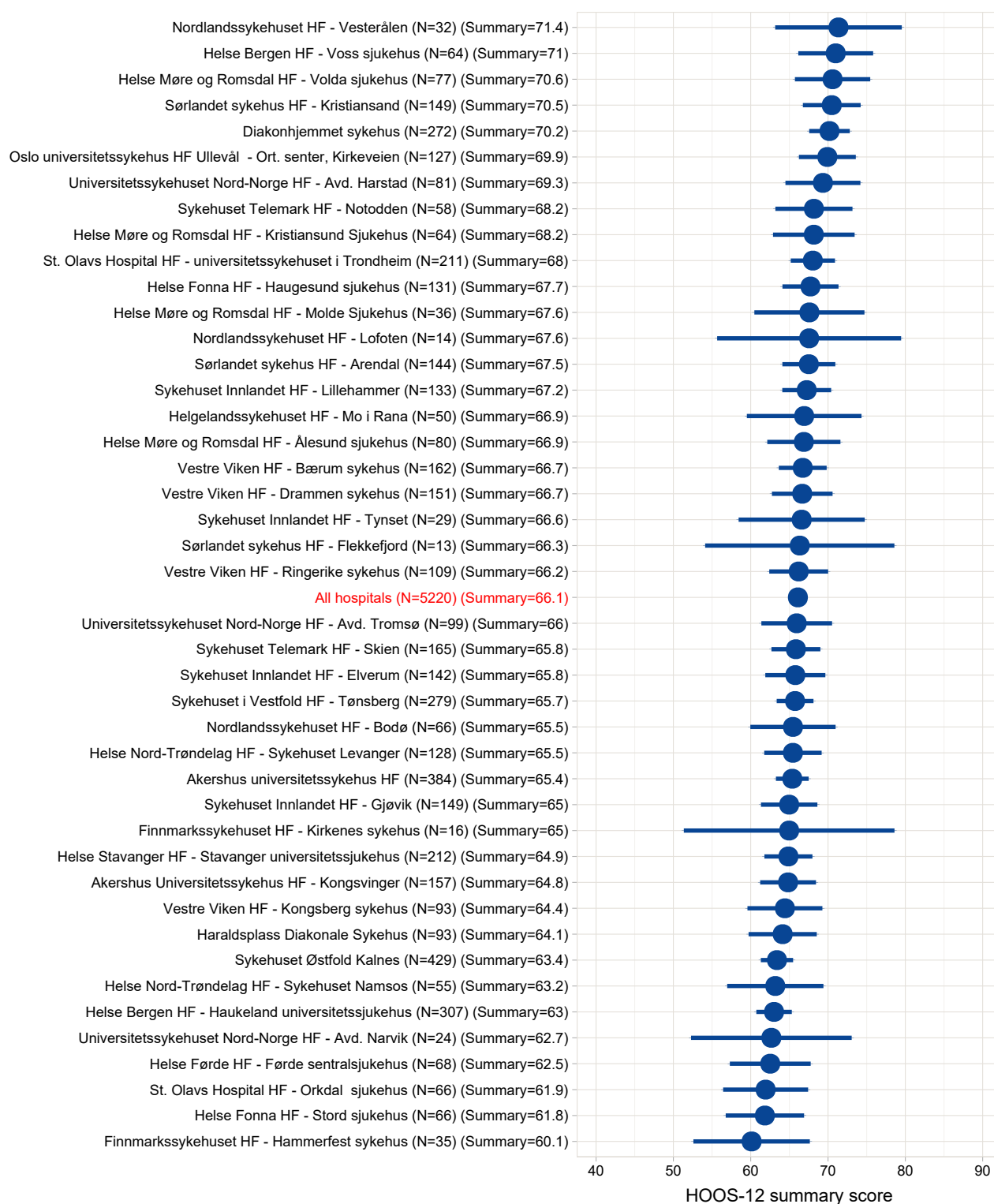
Figure D.56: HOOS-12 summary score after hip fracture, 2022-2024 - all hip fractures

Figure D.56 shows the HOOS-12 summary score 4 months after hip fracture surgery in 2022-2024 at different hospitals. The HOOS-12 Summary Score is calculated based on all 12 questions across the 3 dimensions of HOOS-12, and the score 100 represents the best outcome and 0 the worst outcome. The figure shows the mean summary score and the 95 % confidence interval for each hospital. The number of patients who have completed the PROM questionnaires after surgery at each hospital is shown in parentheses. Hospitals with fewer than 10 responses are excluded.

Completeness analysis for the Norwegian Hip Fracture Register, 2021-2023

A completeness analysis has been conducted for the Norwegian Hip Fracture Register (NHFR) for primary operations (osteosynthesis, partial and total arthroplasty) and reoperations (following primary osteosynthesis, partial and total arthroplasty for hip fractures) performed in the period 2021-2023. A report and analysis have been prepared by the Norwegian Patient Register (NPR) in cooperation with the NHFR. A report on the implementation and results will be published at [Helsedirektoratet](#).

Formulae for completeness rates:

$$\text{Completeness rate NHFR} = \frac{\text{only NHFR} + \text{inclusion both registers}}{\text{only NPR} + \text{only NHFR} + \text{inclusion both registers}}$$

$$\text{Dekningsgrad NPR} = \frac{\text{only NPR} + \text{inclusion both registers}}{\text{only NPR} + \text{only NHFR} + \text{inclusion both registers}}$$

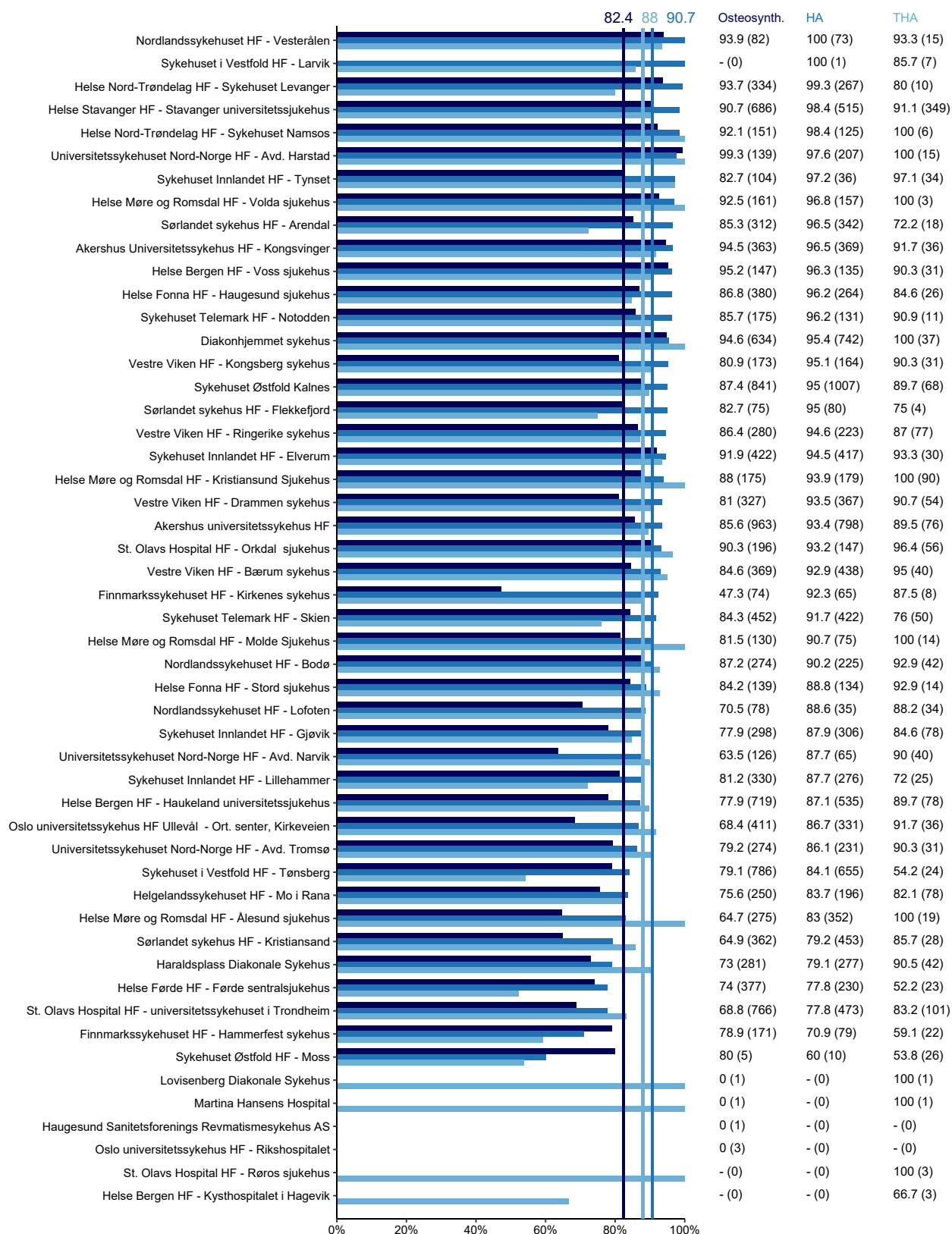
For details of the NSCP and ICD-10 codes used when extracting data from the NPR for comparison of primary operations and reoperations in the NHFR and for the complete results, please consult the Completeness Analysis Report, which will be published at [Helsedirektoratet](#).

Primary hip fracture surgery. Information in the NHFR showed a high degree of agreement with the information in the NPR. Completeness for osteosynthesis was 82.4% , for hemiarthroplasty 90.7% and for total arthroplasty 88%. However, there are considerable variations in completeness between hospitals. Many of the hospitals have completeness under 80 %, which we consider very low. One explanation for low completeness rates in NHFR may be patients not giving consent to registration of the data. The differences between rates for primary osteosynthesis, hemiarthroplasty and total arthroplasty show that this cannot be the only cause and that hospitals must improve their reporting of primary hip fracture surgery with the correct diagnostic and procedure codes. Completeness for primary total hip arthroplasty for fractures is lower than completeness for all total arthroplasties reported to the Norwegian Arthroplasty Register (NAR). We believe that part of the reason is coding practices and we are currently investigating this further.

Reoperations. The information in the NHFR did not agree with NPR data as well as for primary surgery. Completeness for reoperations after osteosynthesis was 77.3%, after hemiarthroplasty 85.3%, and after total arthroplasty 91.6%. It has been particularly challenging to perform completeness analyses for reoperations. The fact that the NPR does not specify left or right side leads to some uncertainty in the analysis. Furthermore, coding of reoperations reported to the NPR is often imprecise or incorrect. Low completeness may mean that the reoperation form was not sent to the NHFR or that the surgery was incorrectly coded in the NPR. We would like to point out that all reoperations of partial and total arthroplasty due to infection (including those where prosthetic parts are not changed or removed) must be reported on a form to the NHFR or NRL. These must be given the codes **NFS 19, NFS 49 or NFW 69**.

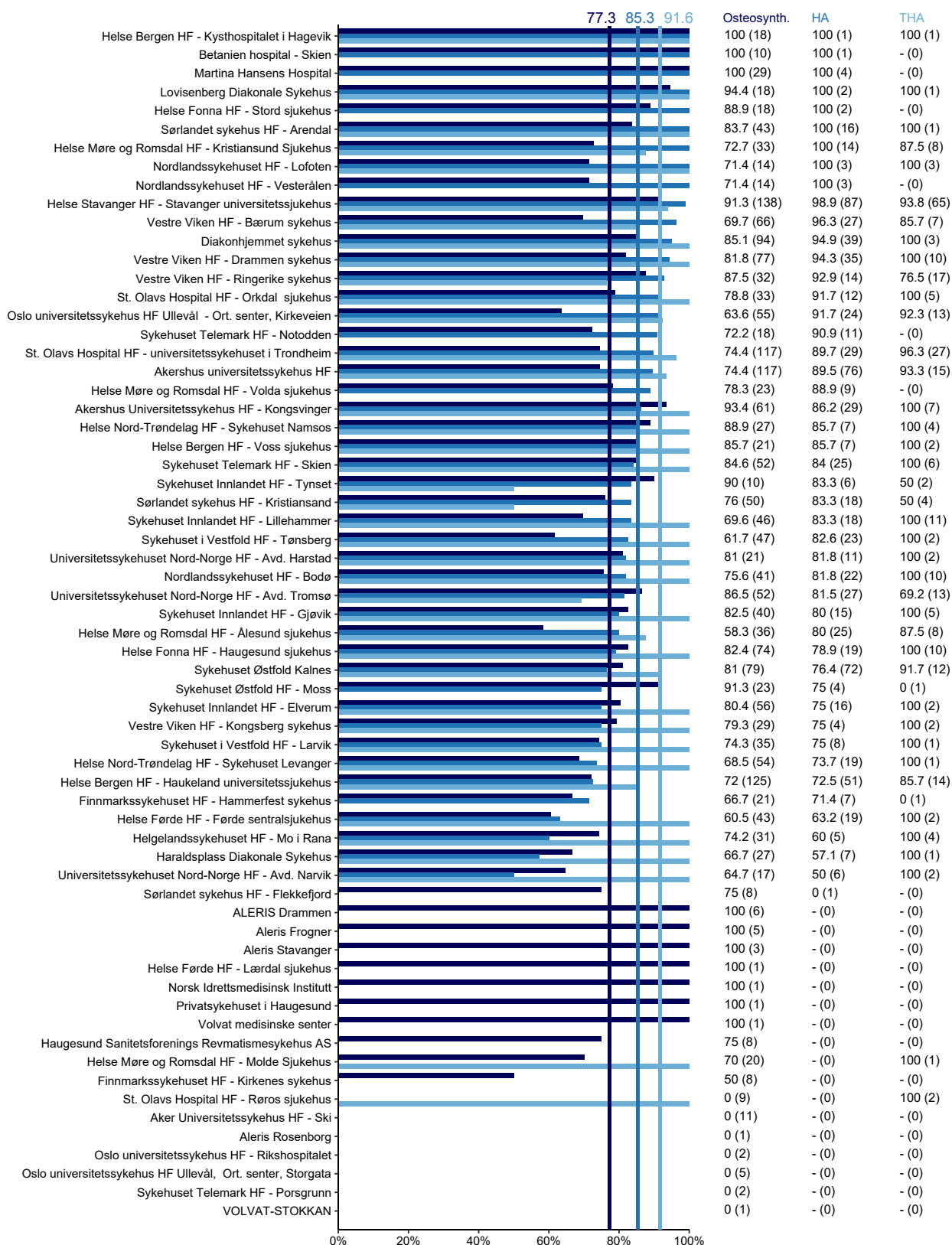
The following pages show the hospital-based completeness analysis for primary operations and reoperations. We urge hospitals with low completeness to review their coding practices and routines in reporting to the registers.

Completeness of reporting, primary operations of hip fractures 2021-2023



Dark blue bars and first number to the right of the bars gives completeness of reporting for osteosynthesis. Medium blue bars and second number to the right of the bars gives completeness of reporting for hemiprosthesis. Light blue bars and third number to the right of the bars gives completeness of reporting for total prosthesis. The numbers in paranthesis gives the number of operations registered at both NHFR and NPR. Vertical lines shows the national averages.

Completeness of reporting, reoperations of hip fractures 2021-2023



Dark blue bars and first number to the right of the bars gives completeness of reporting for osteosynthesis. Medium blue bars and second number to the right of the bars gives completeness of reporting for hemiprosthesis. Light blue bars and third number to the right of the bars gives completeness of reporting for total prosthesis. The numbers in paranthesis gives the number of operations registered at both NHFR and NPR. Vertical lines shows the national averages.

CONTENTS

Norwegian Knee Ligament Register

Highlights from 2024	367
Introduction.....	377
Survival for cruciate ligament operations	378
Annual numbers of primary reconstructions for each hospital in 2024	379
Annual numbers of primary and revision reconstructions for each hospital	380
Number of answers about physiotherapy in 2024 without acute patients.....	381
Number of patients with well documented grafts in 2024	382
Prophylactic antibiotic use according to guidelines in 2024	383
Proportion of unrevised ACL after 8 years in 2004-24	384
Proportion of unrevised ACL after 8 years in 2015-24	385
Number of operations reported via electronic forms in 2024	386
All categories of operations	
Annual number of operations	387
Distribution of hospitals by surgery volume.....	387
Incidence of primary reconstruction of cruciate ligament by sex and year	388
Distribution of other procedures	389
PROM – number of issued and answered patient questionnaires.....	389
PROM – sport/activity before injury.....	390
Distribution of other procedures	392
Intraoperative complications	393
Primary reconstruction of cruciate ligament	
Age and activity that lead to injury	394
Actual injury and additional injuries.....	396
Choice of graft	397
Fixation.....	399
Meniscal lesion.....	400
Meniscal fixation.....	402
Cartilage lesion.....	403
Cartilage injuries.....	404
Outpatient surgery.....	405
Intraoperative complications	405
Systemic antibiotic prophylaxis	406
Thrombosis prophylaxis	407
Physiotherapy.....	408
Revision reconstruction	
Age and activity that led to injury	409
Actual injury and additional injuries.....	410
Reason for revision reconstruction.....	411
Choice of graft	411
Fixation.....	413
Meniscal lesion.....	414
Meniscal fixation.....	415
Cartilage lesion.....	415
Cartilage injuries.....	416
Outpatient surgery.....	417
Intraoperative complications	417
Systemic antibiotic prophylaxis	417
Thrombosis prophylaxis	418
KOOS in primary ACL reconstructions.....	419
Proportion two years KOOS QOL score over 44 for all hospitals	420
KOOS subscores for each hospital in 2024	421
Completeness analysis 2021-2023.....	426



Reporting



Primary reconstruction
Revision reconstructions

Reported
2004-2024

36,886
3,714

Reported
In 2024

2,152
249

Completeness

88.5%

primary reconstructions

91.6%

revisions

4

Published
Papers



1

PhD



3

Podium
Presentations



47

Hospitals reporting

100%

electronic

Find us:

<https://www.helse-bergen.no/nrl#nasjonalt-korsbandregister>

<https://www.kvalitetsregistre.no/register/muskel-og-skjelett/nasjonalt-korsbandregister>



Meniscus Research project

Incidence and
treatment strategy of
lateral meniscus
posterior root tears
and ramp lesions.

Initiated activities

Machine learning

Predicting anterior cruciate
ligament reconstruction outcome
(revisions and PROM) using
machine learning analysis of
National Knee Ligament
Registers.

PROM

Time after
operation

2 years

5 years

10 years

Reported
2005-2024

Reported
in 2024

19,650 **1,356 (66%)**

14,877 **1,041 (57%)**

9,620 **974 (45%)**



ANNUAL REPORT NORWEGIAN KNEE LIGAMENT REGISTER

The leadership and secretariat of the Norwegian Knee Ligament Register are responsible for this annual report, which presents and comments on selected data from 2024. A more comprehensive report, coordinated by the Norwegian National Network for Arthroplasty and Hip Fractures, will present complete data. This report will be distributed to all hospitals and registry contact persons within the registry's scope. We are grateful for the support and engagement surrounding the registry. There is a high level of participation from the national professional community through reporting (high completeness of reporting), and many exciting research projects are currently underway. Ongoing projects within the cruciate ligament registry provide insight into the high quality and accuracy of the data. Ensuring that all aspects of data quality are maintained means we can trust the results we present.

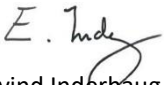
The number of reported primary anterior cruciate ligament (ACL) reconstructions and revisions in the past year was 2,152 and 249, respectively. This highlights that the increase in procedures in recent years is not solely due to a post-pandemic backlog but likely reflects a genuine rise in the number of patients undergoing surgery for ACL injuries. A key trend in our register is the increasing number of young women sustaining ACL injuries requiring surgery. This trend is particularly evident in football and team handball, likely due to increased participation in these sports. The register has been featured in national media regarding this development, with a focus on how such injuries affect knee function in young, active women. Injury prevention efforts targeting young athletes remain critically important.

2024 also marks a turning point in the use of lateral tenodesis as an adjunct procedure in ACL reconstruction. From being rarely performed in 2020, it is now used in over 20% of cases. This trend is supported by growing evidence, including the multinational STABILITY study, which shows a reduced risk of revision with combined surgery. These new data provide a foundation for further analyses on revision risk and return to sport following surgery.

The response rate to patient-reported outcome measures remains high—at two, five, and ten years postoperatively. This provides robust data on how knee function evolves over time in this patient group. Nevertheless, we continue to work actively to improve reporting and gain insight into which patients choose not to respond to the questionnaires. New in the 2024 report is the registration of activity level at baseline and at all follow-up time points. These data show that most patients participate at a recreational or lower level, with only 7% competing at an elite level prior to injury. Most patients spend 4–9 hours per week on sports activities, and 62% aim to return to the same level as before the injury. Thirty-six percent hope to return to sport at a higher level.

The Steering Committee of the Norwegian Knee Ligament Register consists of Chair Jon Olav Drogset, Lars Engebretsen, Stig Heir, Ann Kristin Hansen, Ove Furnes, Jonas Meling Fevang, and patient representative Birgitt Løkhaug Gjerde. Through annual meetings and ongoing communication, the committee plays an important role in supporting daily operations and stimulating future development of our national register.

Bergen, June 2025


Eivind Inderhaug
Ortho surgeon/professor
Head of NKLR


Irina A. Kvinnesland
It-consultant

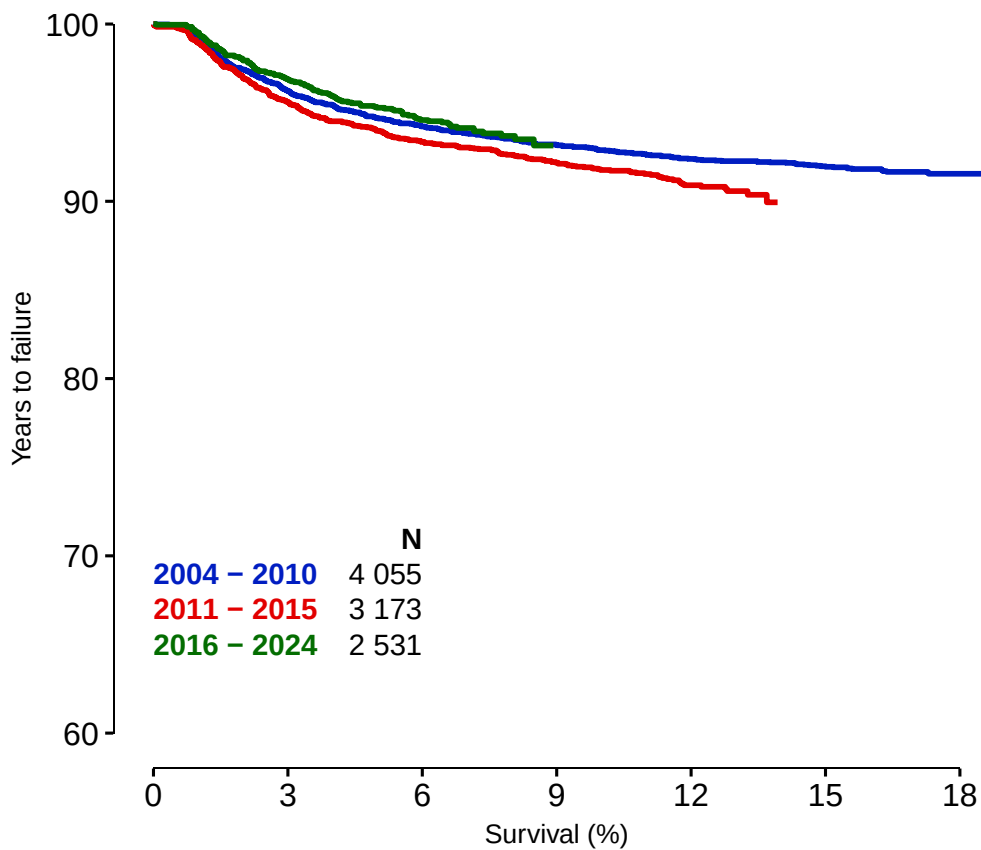

Sigurd Stenvik
Biostatistician


Anne Marie Fenstad
Biostatistician

Survival of cruciate ligament operations 2004–2024

Report 2025

E.1) ACL reconstruction without additional injuries



E.2) ACL reconstruction with additional injuries

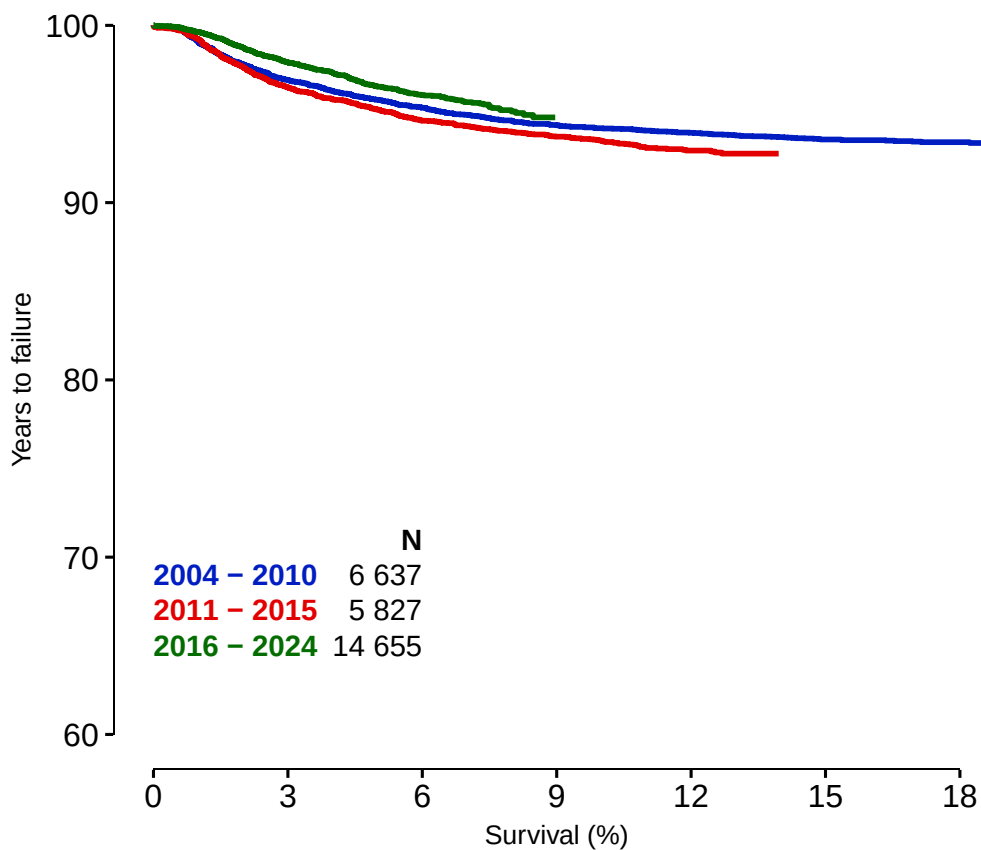


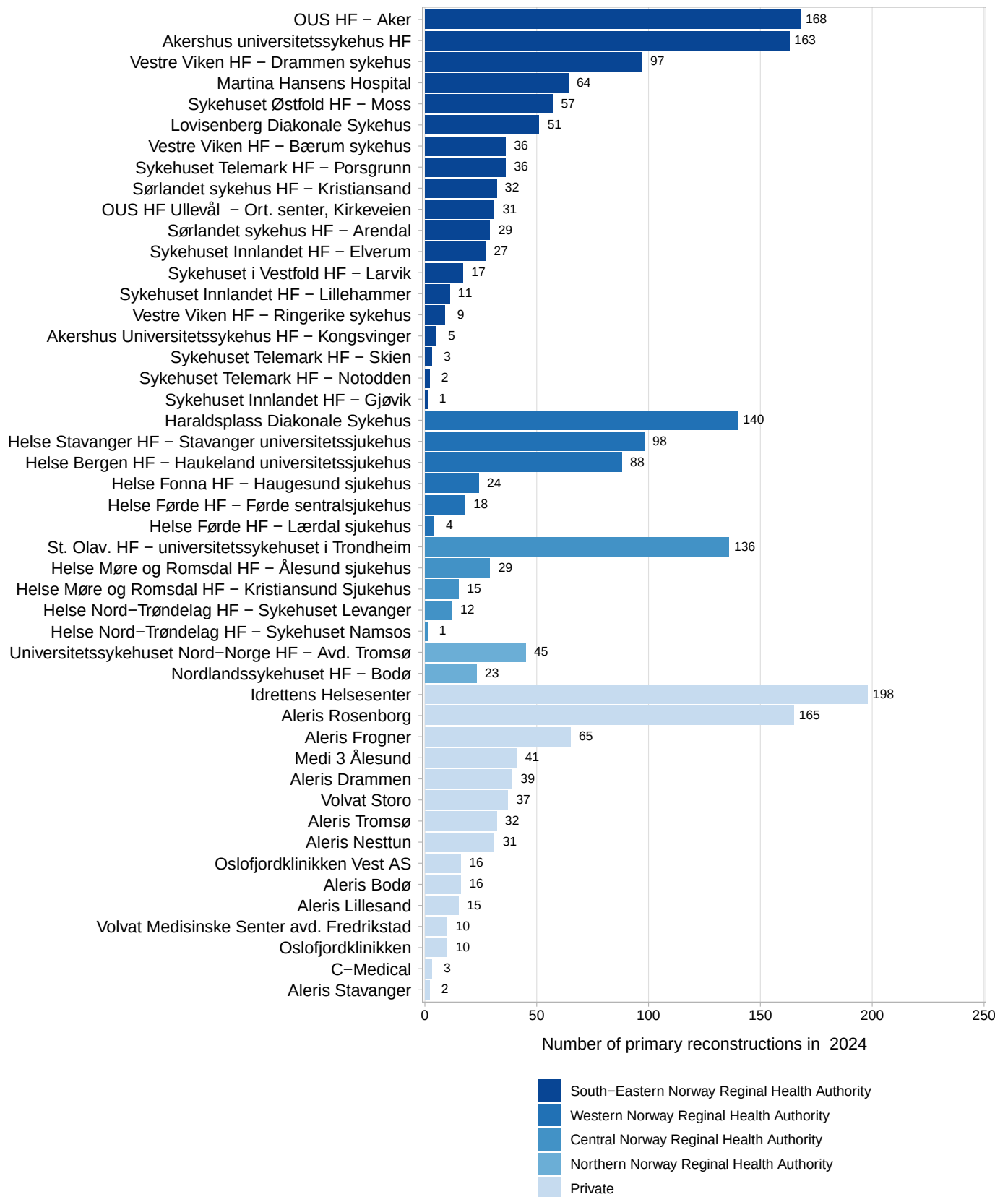
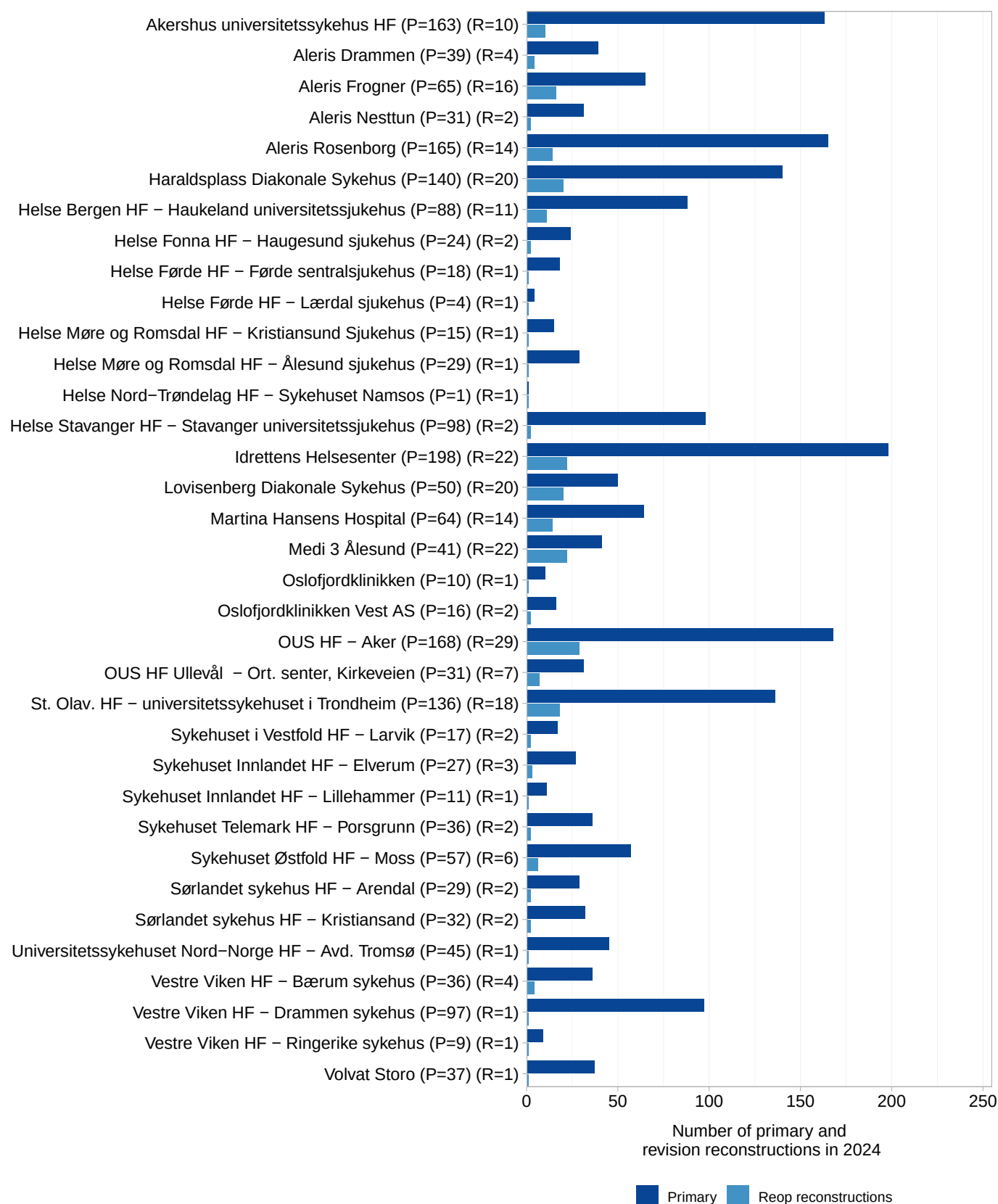
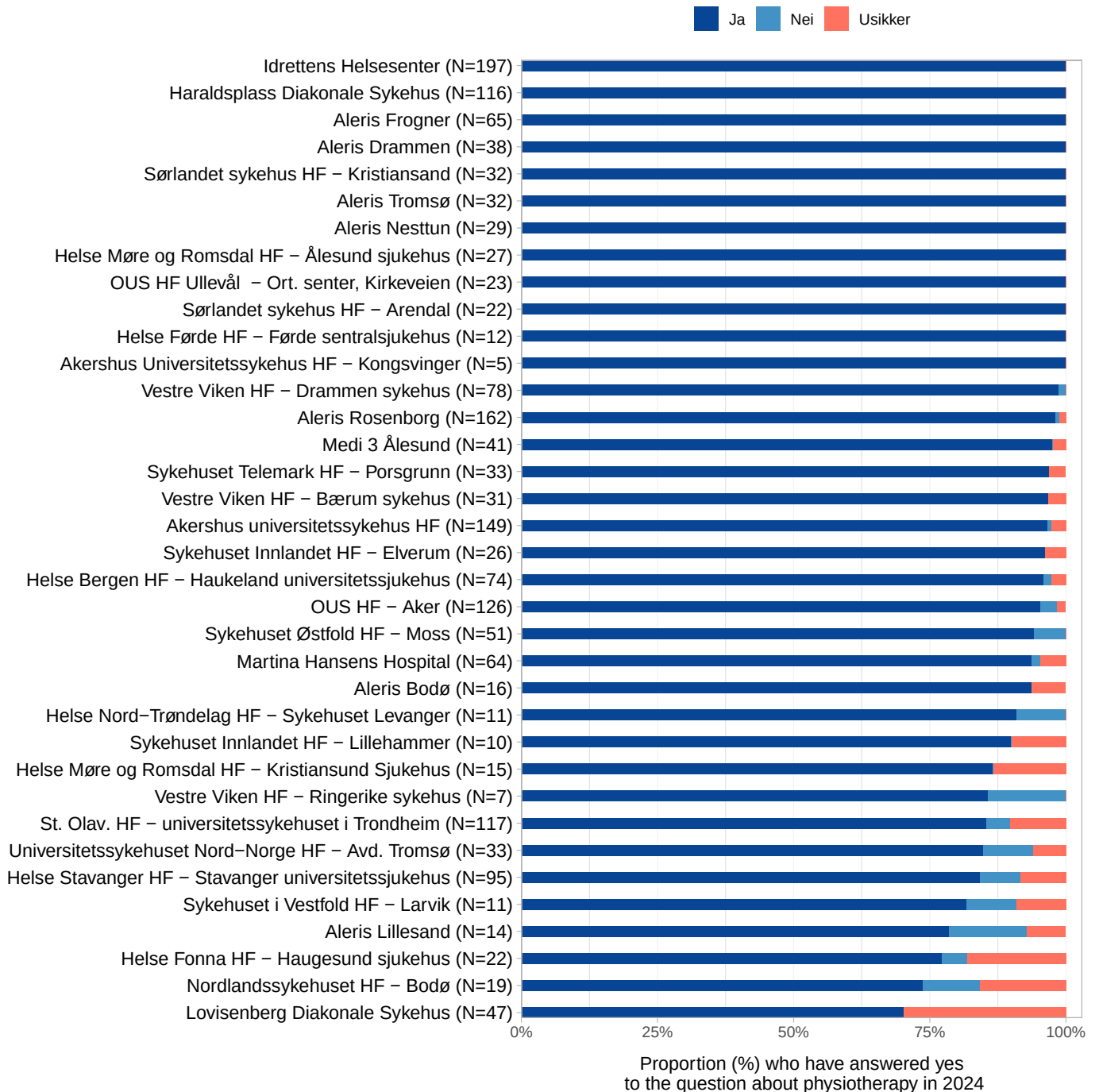
Figure E.3: Annual number of primary cruciate ligament reconstructions in 2024

Figure E.4: Annual number of primary and revision cruciate ligament reconstructions for each hospital in 2024



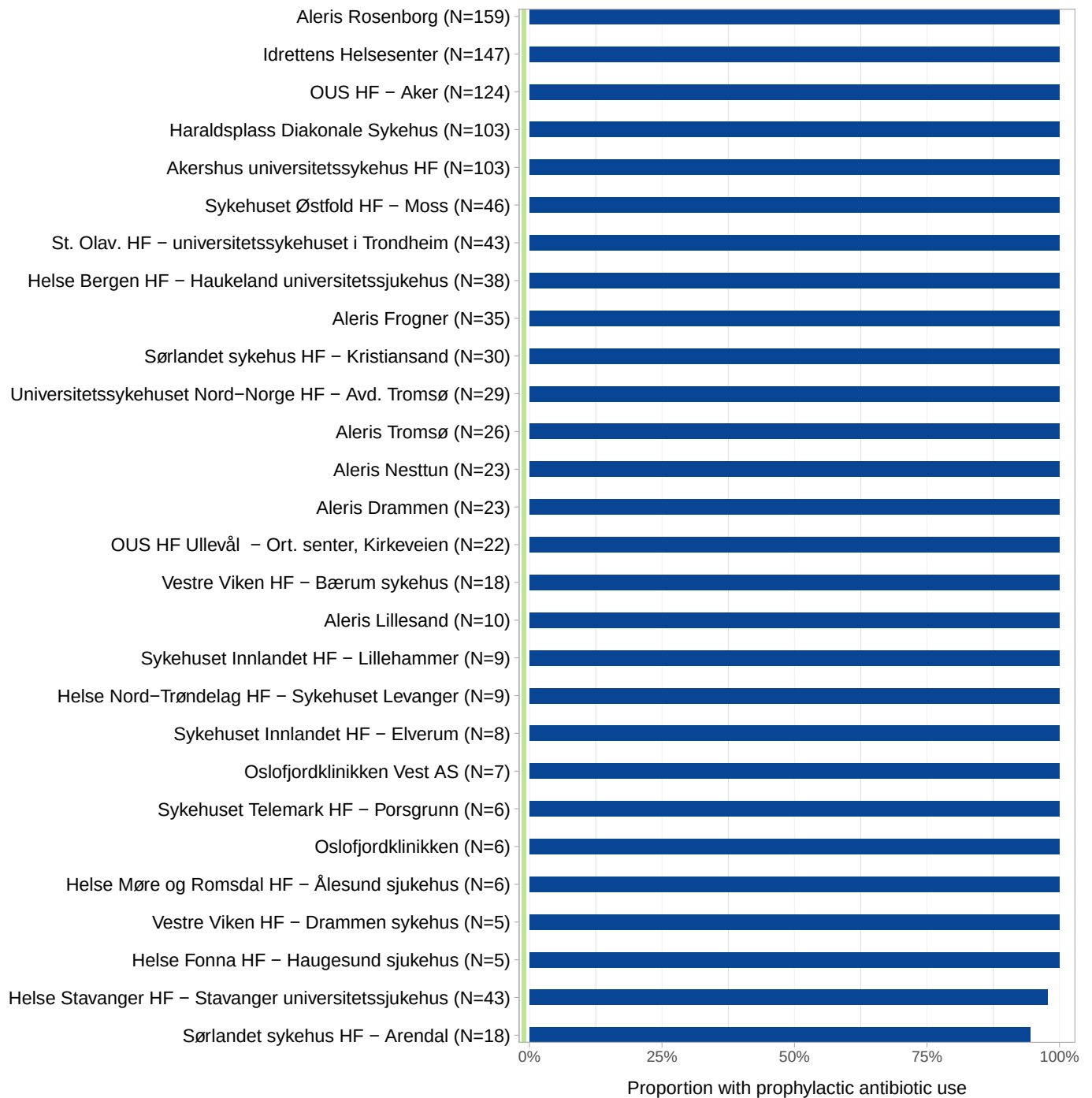
Hospitals without reop reconstructions in 2024 are removed from the figure.

Figure E.5: Number of answers about physiotherapy in 2024 excluding acute patients

Since 2020, it has been reported whether patients have undergone physiotherapy before surgery. If the patient has not undergone physiotherapy, the reason is inquired. In cases of acute injury, physiotherapy is less relevant. Patients who did not undergo physiotherapy due to acute injury have been excluded from the figure. Hospitals with less than 5 responses about physiotherapy in 2024 are also removed from the figure.

Figure E.6: Number of patients with well-documented grafts in 2024

Figure E.7: Proportion with prophylactic antibiotic use according to the guidelines in 2024



Hospitals with less than 5 primary reconstructions in 2024 are removed from the figure.

Figure E.8: The proportion of unrevised anterior cruciate ligament (ACL) reconstructions after 8 years in the period from 2004-2024

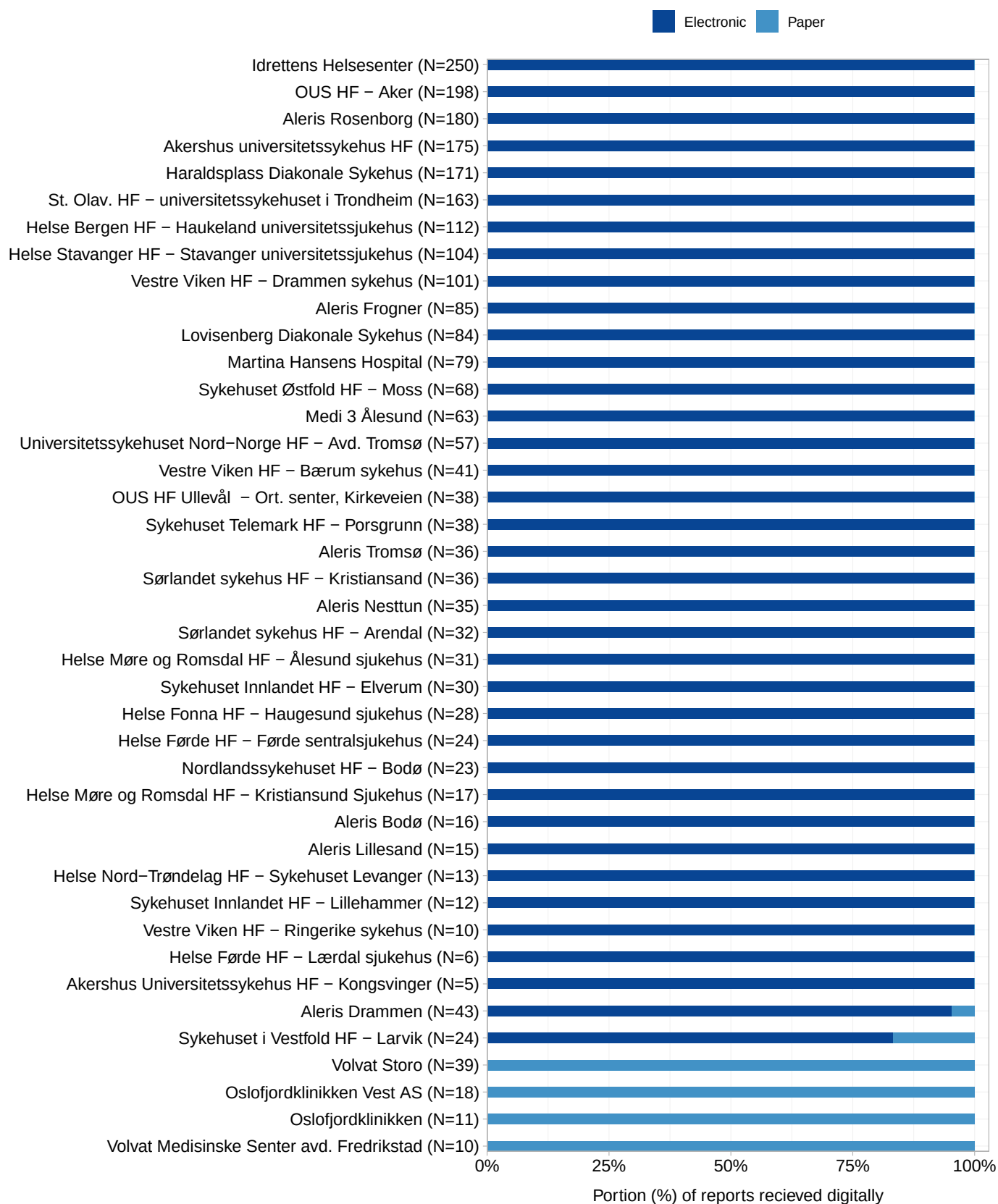


The figure depicts the proportion of patients who have not undergone reoperation in the first 8 year after the primary surgery. In the national average, 94.4% of patients have avoided reoperations. In clinical practise, some hospitals may operate on patients with the lowest risk of complications and reoperations, while other, with better expertise in handling problems, may operate on patients with a higher risk of complications. In such cases, there is a chance that the latter hospitals may achieve less favorable results when attempting to compare hospital outcomes.

Figure E.9: The proportion of unrevised anterior cruciate ligament (ACL) reconstructions after 8 years in the period from 2015-2024



The figure depicts the proportion of patients who have not undergone reoperations in the first 8 years after primary surgeries during the period from 2015. We have done this to provide more current data and to see if the revision rate has changed in the latest period. 94.8% of the patients have avoided reoperations.

Figure E.10: Electronic or paper reporting per hospital in 2024

National average for electronic form registration in 2024 is 96.6%.

Cruciate Ligament

All categories of operations

Table 1: Annual numbers of operations

	Primary reconstruction		Revision reconstruction		Only other procedures *		Total
2024	2 152	(84,8%)	249	(9,8%)	137	(5,4%)	2 538
2023	2 202	(86,5%)	196	(7,7%)	147	(5,8%)	2 545
2022	1 904	(84,4%)	214	(9,5%)	138	(6,1%)	2 256
2021	1 548	(81,7%)	181	(9,6%)	165	(8,7%)	1 894
2020	1 693	(82,1%)	162	(7,9%)	206	(10,0%)	2 061
2004-19	27 387	(84,9%)	2 712	(8,4%)	2 176	(6,7%)	32 275
Total	36 886	(84,7%)	3 714	(8,5%)	2 969	(6,8%)	43 569

* Distribution of other procedures can be found in Table 2a.

Registration complete from 2005. 49,3% of the operations were performed on the right side. 45,8% of the operations were performed on females. 7,7% of the patients had a previous ACL/PCL-injury in the opposite knee. (7,9% was missing). Mean age was 27,9 years, 26,7 years for women and 29,0 years for men. Standard deviation of age was 10,7 years, 11,3 years for women and 10,0 years for men. Median value for duration of primary ACL reconstruction was 75 minutes.

Figure 1: Distribution of hospitals by surgery volume, primary ACL reconstructions

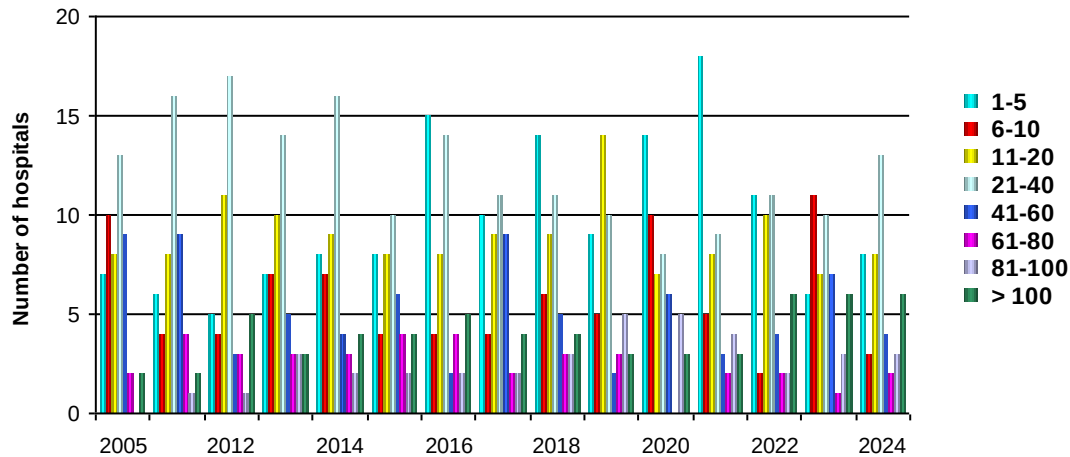
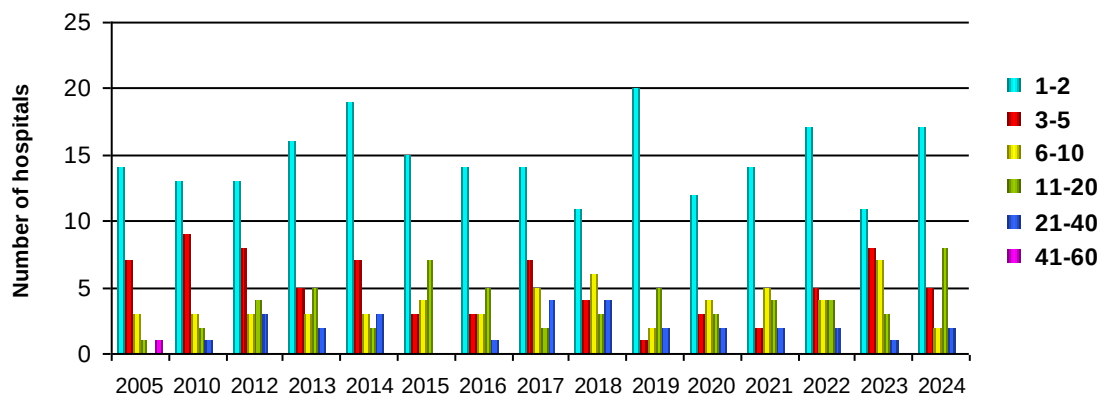


Figure 2: Distribution of hospitals by surgery volumes, revision reconstructions ACL



Incidence of primary reconstruction of cruciate ligament for 2005, 2010, 2015, 2024

Figure 3a: For women

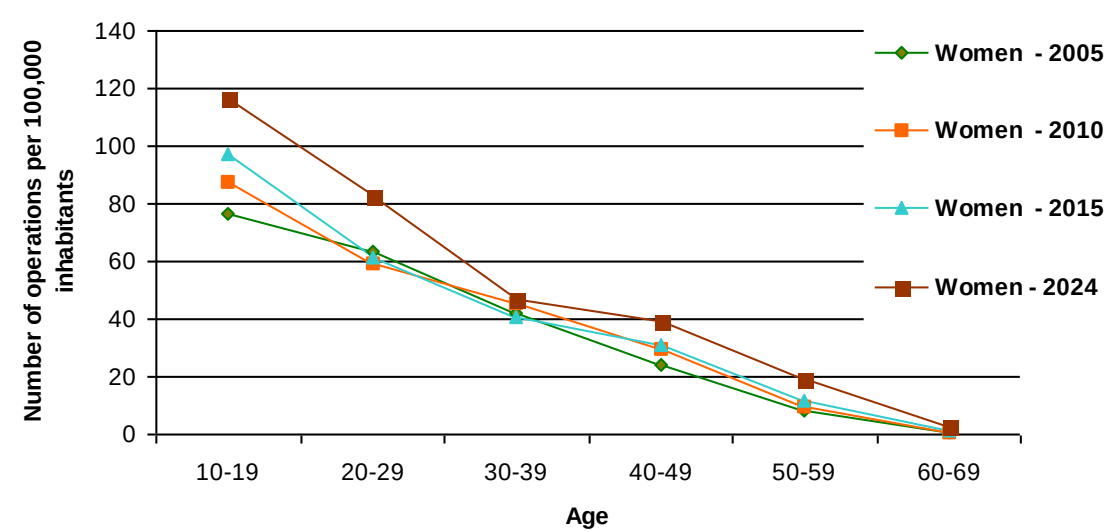
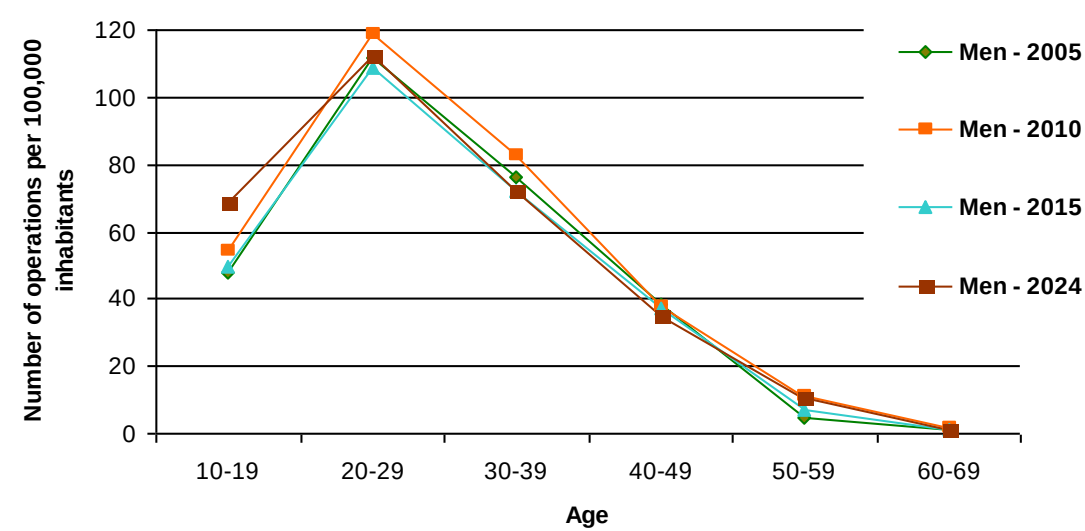


Figure 3b: For men



Distribution of other procedures

Table 2a: The number of other procedures for all categories of surgeries

	Meniscus surgery	Cartilage surgery	Synovectomy	Arthroscopic debridement	Mobilizing in narcosis	Surgery due to infection	Removal of implants	Bone transplantation	Osteotomy	Bone resection (Notch plasty)	Osteosynthesis	Arthrodesis	Osteosynthesis patella fracture	Suture of the patellar or quadriceps tendons	Lateral extraarticular tenodesis
2024	123	9	26	52	15	6	60	42	6	30	1	0	0	5	508
2023	448	26	17	41	13	3	46	20	6	50	0	0	1	1	185
2022	473	30	22	32	14	1	49	40	8	15	3	0	2	0	100
2021	435	22	26	37	6	11	43	26	17	21	3	0	1	4	60
2020	493	23	21	44	5	6	49	21	8	36	2	1	1	5	34
2004-19	13 880	1 080	574	955	118	92	698	375	40	865	38	0	2	1	15
Total	15 852	1 190	686	1 161	171	119	945	524	85	1 017	47	1	7	16	902

PROM (Patient Reported Outcome Measures)

Table 2b: Number of issued and answered patient questionnaires

	2 years *			5 years *			10 years *			Total		
	Issued	Answered (%)		Issued	Answered (%)		Issued	Answered (%)		Issued	Answered (%)	
2024	2 065	1 356 (65,7%)		1 828	1 041 (56,9%)		2 181	974 (44,7%)		6 074	3 371 (55,5%)	
2023	1 452	859 (59,2%)		1 847	1 038 (56,2%)		1 843	871 (47,3%)		5 142	2 768 (53,8%)	
2022	2 269	1 509 (66,5%)		1 928	947 (49,1%)		2 029	872 (43,0%)		6 226	3 328 (53,5%)	
2021	1 366	703 (51,5%)		1 753	858 (48,9%)		1 800	927 (51,5%)		4 919	2 488 (50,6%)	
2020	1 736	1 031 (59,4%)		1 843	989 (53,7%)		1 716	937 (54,6%)		5 295	2 957 (55,8%)	
2019	1 834	987 (53,8%)		1 652	846 (51,2%)		1 801	1 022 (56,7%)		5 287	2 855 (54,0%)	
2018	1 862	1 024 (55,0%)		1 688	865 (51,2%)		1 647	830 (50,4%)		5 197	2 719 (52,3%)	
2017	1 783	1 002 (56,2%)		1 743	944 (54,2%)		1 602	888 (55,4%)		5 128	2 834 (55,3%)	
2016	1 754	1 033 (58,9%)		1 818	1 013 (55,7%)		1 426	811 (56,9%)		4 998	2 857 (57,2%)	
2015	1 758	1 058 (60,2%)		1 716	966 (56,3%)		1 515	934 (61,7%)		4 989	2 958 (59,3%)	
2014	1 769	1 036 (58,6%)		1 823	1 054 (57,8%)		899	554 (61,6%)		4 491	2 644 (58,9%)	
2013	1 852	1 164 (62,9%)		1 688	989 (58,6%)					3 540	2 153 (60,8%)	
2012	1 920	1 219 (63,5%)		1 801	959 (53,2%)					3 721	2 178 (58,5%)	
2011	1 676	1 095 (65,3%)		1 303	716 (55,0%)					2 979	1 811 (60,8%)	
2010	1 867	1 232 (66,0%)		1 694	1 126 (66,5%)					3 561	2 358 (66,2%)	
2009	1 637	1 131 (69,1%)		762	526 (69,0%)					2 399	1 657 (69,1%)	
2008	1 574	926 (58,8%)								1 574	926 (58,8%)	
2007	1 467	733 (50,0%)								1 467	733 (50,0%)	
2006	957	552 (57,7%)								957	552 (57,7%)	
Total	32 598	19 650 (60,3%)		26 887	14 877 (55,3%)		18 459	9 620 (52,1%)		77 944	44 147 (56,6%)	

* The register sends questionnaires to patients 2, 5 and 10 years post-operatively

PROM (Patient Reported Outcome Measures)

Table 2c: Distribution of primary sport/activity performed before the injury *

	Exercise level		Lower level competition		Medium to high level competition		Elite level		Total number
2024	409	(35,0%)	398	(34,1%)	285	(24,4%)	77	(6,6%)	1 169
2023	217	(31,7%)	231	(33,8%)	191	(27,9%)	45	(6,6%)	684
Total	626	(33,8%)	629	(33,9%)	476	(25,7%)	122	(25,7%)	1 853

*Electronic registration started in 2023. The registry sends questionnaires to patients preoperatively

Figure 3c: Distribution of primary sport/activity performed before the injury

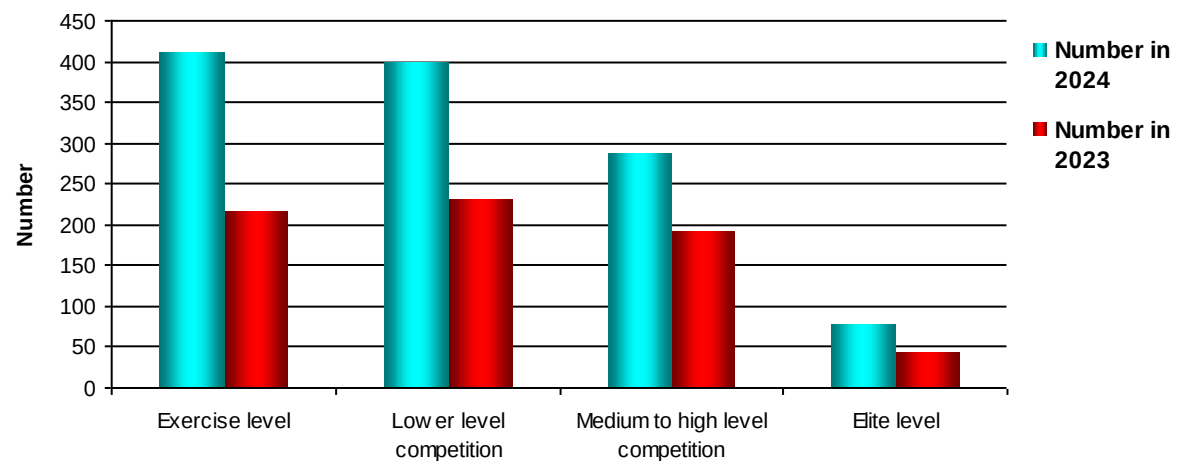


Table 2d: How often was the primary sport/activity performed before the injury? *

	≥10 hours/week		4-9 hours/week		1-3 hours/week		<4 hours/month		Total number
2024	201	(17,4%)	678	(57,8%)	268	(23,0%)	22	(1,9%)	1 169
2023	112	(16,4%)	422	(61,7%)	140	(20,5%)	10	(1,5%)	684
Total	313	(16,9%)	1 100	(59,4%)	408	(22,0%)	32	(22,0%)	1 863

*Electronic registration started in 2023. The registry sends questionnaires to patients preoperatively

Figure 3d: How often was the primary sport/activity performed before the injury?

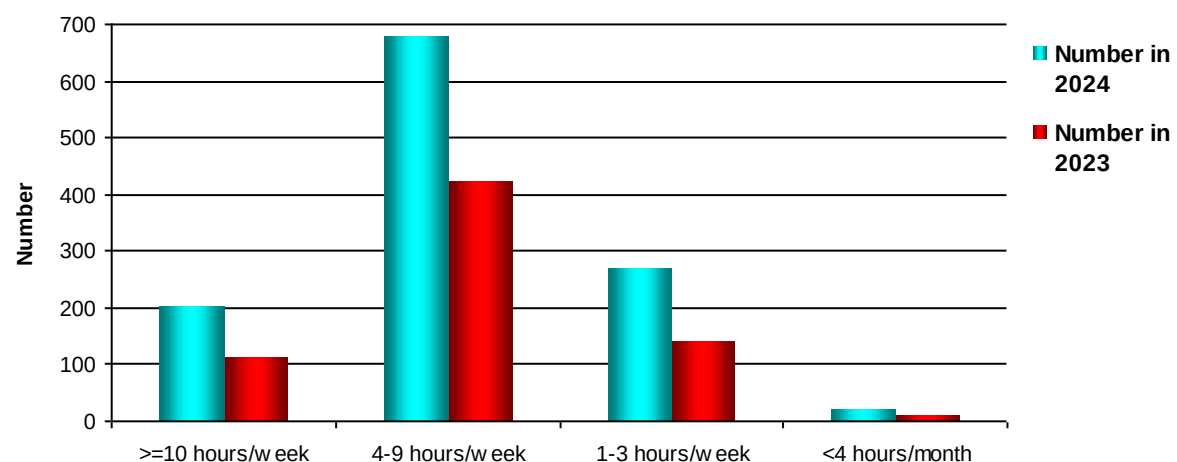
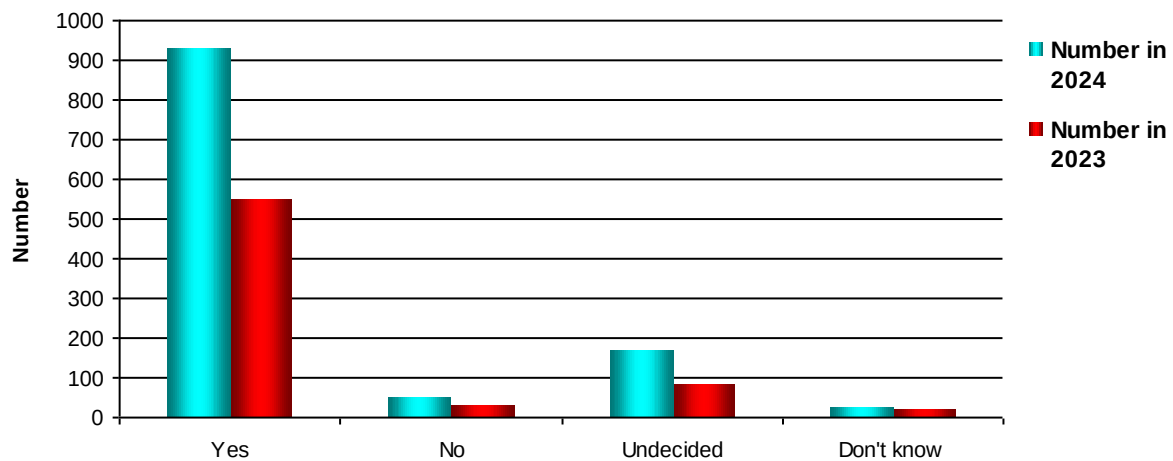


Table 2e: Wanted to return to the same sport/activity as before the injury?*

	Yes		No		Undecided		Don't know		Total number
2024	923	(79,0%)	51	(4,3%)	169	(14,5%)	26	(2,2%)	1 169
2023	548	(80,2%)	30	(4,4%)	86	(12,6%)	19	(2,8%)	683
Total	1 471	(79,5%)	81	(4,4%)	256	(13,8%)	45	(13,8%)	1 852

*Electronic registration started in 2023. The registry sends questionnaires to patients preoperatively

Figure 3e: Wanted to return to the same sport/activity as before the injury?**Table 2f: What level did you want to return to after surgery/rehabilitation? ***

	Same level		Lower level		Higher level		Total number
2024	570	(61,5%)	23	(2,5%)	330	(36,1%)	923
2023	347	(63,3%)	6	(1,1%)	195	(35,6%)	548
Total	917	(62,2%)	29	(2,0%)	525	(35,9%)	1 471

*Electronic registration started in 2023. The registry sends questionnaires to patients preoperatively

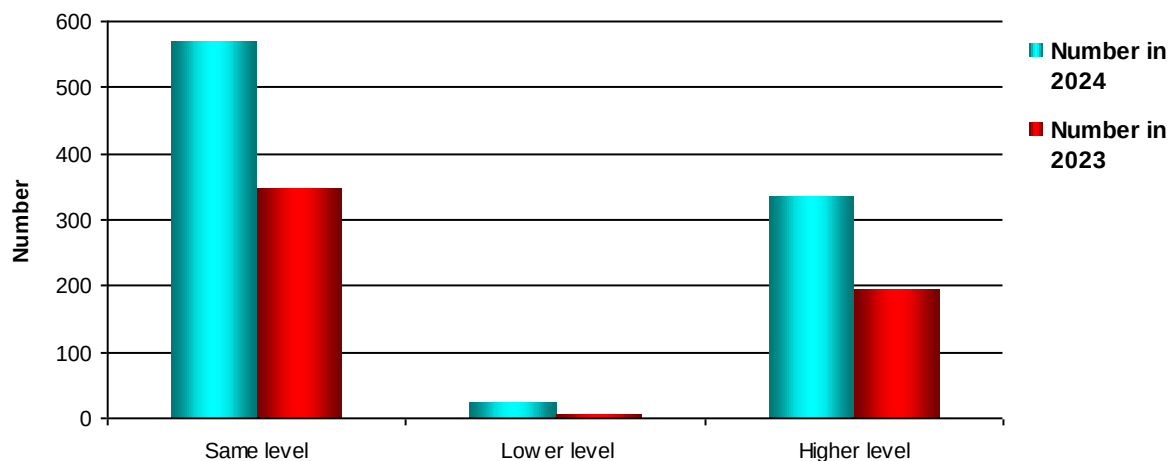
Figure 3f: What level did you want to return to after surgery/rehabilitation?

Table 3: Distribution of other procedures in combination with primary reconstruction of cruciate ligament

	Meniscus surgery	Cartilage surgery	Synovectomy	Arthroscopic debridement	Removal of implants	Bone resection (Notch plasty)	Lateral extraarticular tenodesis
13 340							
10 312	x						
8 431							
1 604	x						
655							x
425	x	x					
363	x						
253		x					
204						x	
197	x					x	
92				x			
87	x		x				
83			x				
73	x			x			
60	x					x	
49						x	
38						x	
35	x					x	
30	x	x					
29	x	x		x			
22				x		x	
22					x		
22	x			x		x	
18	x	x					
16		x		x			

X indicates applied procedure and each row gives the number of operations that is carried out with this combination of procedures. The table shows only combinations that have a number of ten or more.

Table 4: Distribution of other procedures in combination with primary reconstruction of cruciate ligament

	Meniscus surgery	Cartilage surgery	Removal of implants	Bone transplantation	Bone resection (Notch plasty)	Lateral extraarticular tenodesis
1 289						
629	x					
499						
183						x
146	x					
125			x			
86			x	x		
82			x	x		
79				x		
67				x		
53	x		x			
49		x				
44			x			
34	x			x		
33	x					
31	x		x	x		
28	x	x				
27					x	
23			x			x
19					x	x
19	x				x	
18					x	
15			x		x	

X indicates applied procedure and each row gives the number of operations that is carried out with this combination of procedures. The table shows only combinations that have a number of ten or more.

Table 5: Distribution of other procedures when this is the only procedure

	Meniscus surgery	Cartilage surgery	Synovectomy	Arthroscopic debridement	Mobilizing in narcosis	Surgery due to infection	Removal of implants	Bone transplantation
1 100	x							
396								
283				x				
177							x	
115	x			x				
114			x					
73		x						
66						x		
64	x		x					
55				x	x			
46	x	x						
41			x	x				
35				x			x	
33			x		x			
28	x						x	
27	x		x	x				
26							x	x
24		x		x				
23					x			
20			x	x	x			
18				x			x	x

X indicates applied procedure and each row gives the number of operations that is carried out with this combination of procedures. The table shows only combinations that have a number of 11 or more.

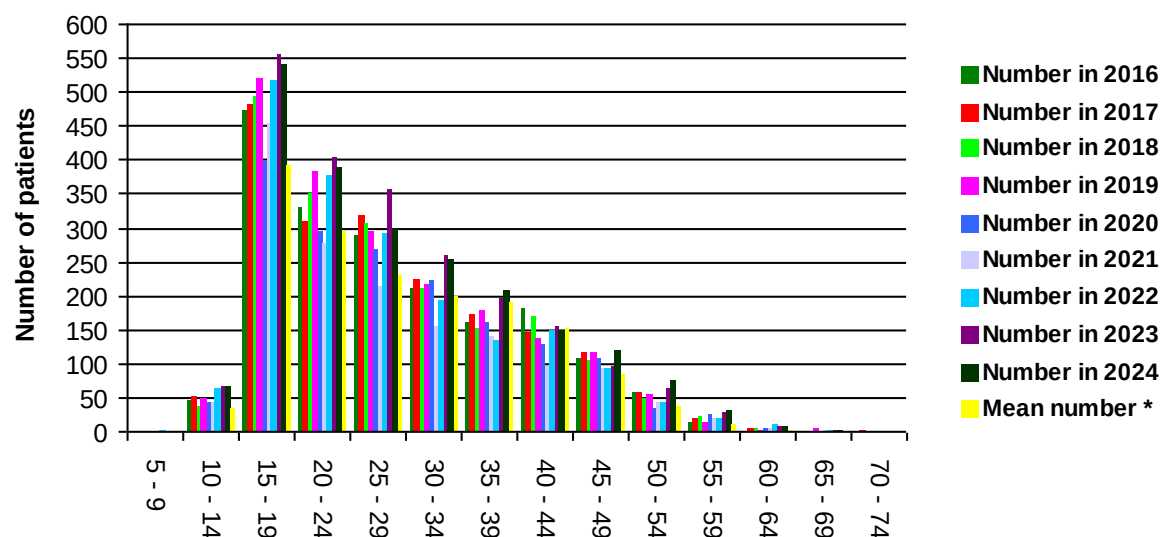
Intraoperative complications

Table 6: Intraoperative complications for all categories of surgeries

	Yes	No	Missing	Total
2024	59 (2,3%)	2 476 (97,6%)	2 (,1%)	2 538
2023	63 (2,5%)	2 469 (97,0%)	13 (,5%)	2 545
2022	54 (2,4%)	2 174 (96,4%)	27 (1,2%)	2 256
2021	41 (2,2%)	1 823 (96,3%)	30 (1,6%)	1 894
2020	39 (1,9%)	1 998 (96,9%)	23 (1,1%)	2 061
2004-19	902 (2,8%)	30 619 (94,9%)	749 (2,3%)	32 275
Total	1 158 (2,7%)	41 559 (95,4%)	844 (1,9%)	43 569

Primary reconstruction of cruciate ligament

Figure 4: Age by primary operation



* Mean number of primary operations for 2004 - 2015

Figure 5a: Activity that lead to injury

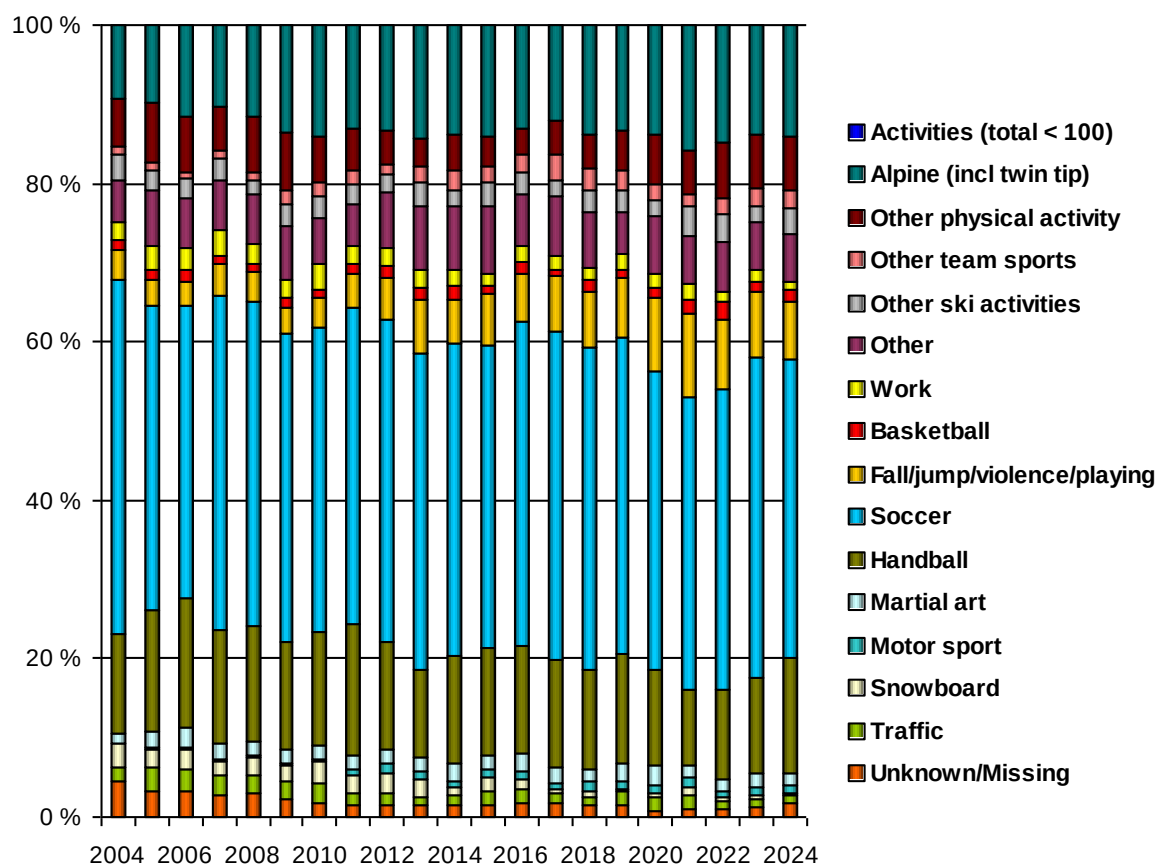
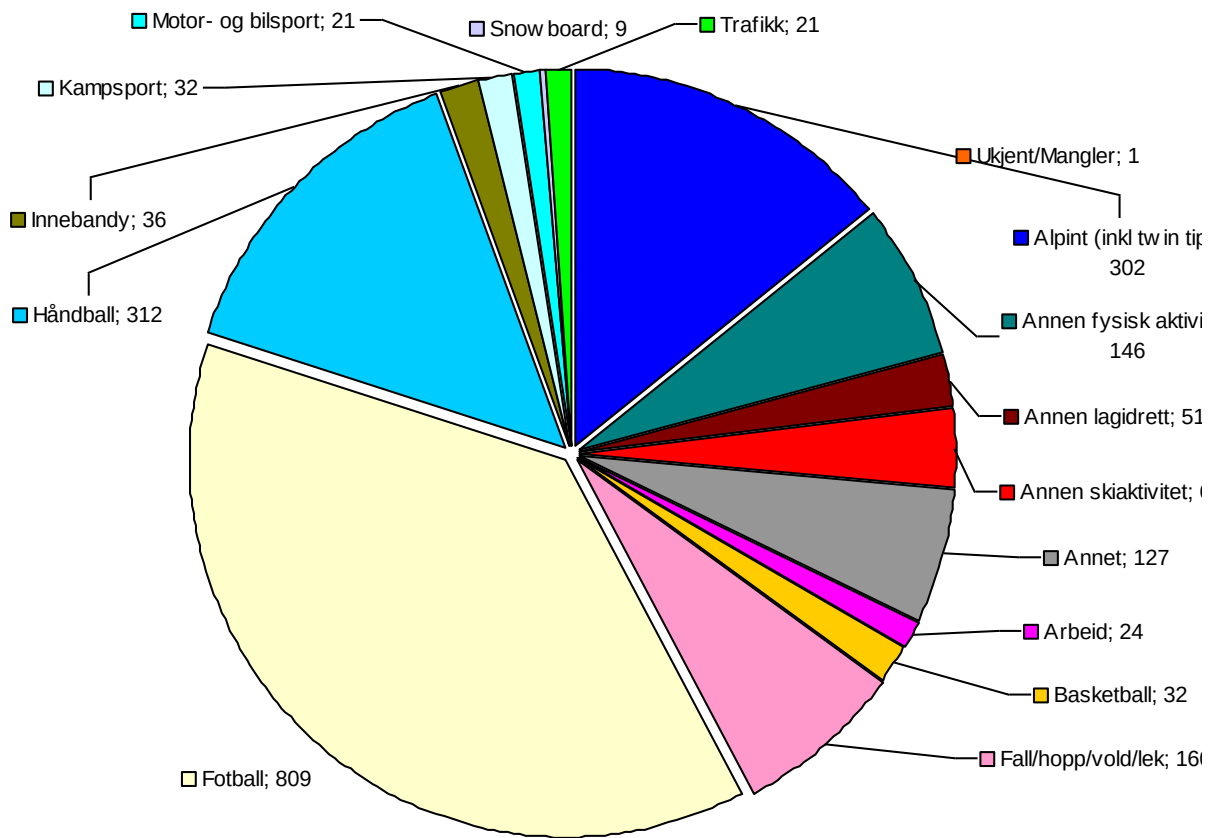


Figure 5b: Activity that lead to injury in 2024

Actual injury that was operated on

Table 7: Actual injury that was operated on*

	ACL	PCL	MCL	LCL	PLC	Cartilage	Meniscus
2024	2 129	58	158	52	16	440	1 480
2023	2 184	57	180	54	19	528	1 483
2022	1 878	53	125	48	19	448	1 241
2021	1 529	48	113	40	17	424	1 006
2020	1 670	43	103	25	11	447	1 104
2004-19	27 082	719	2 296	541	306	6 507	14 601
Total	36 472	978	2 975	760	388	8 794	20 915

* More than one type of injury can be given for each form

Additional injuries

Table 8: ACL with additional injuries

Number	ACL	PCL	MCL	LCL	PLC	Meniscus	Cartilage
13 536	x					x	
11 700	x						
5 405	x					x	x
2 156	x						x
868	x		x			x	
827	x		x				
499	x		x			x	x
242	x		x				x
171	x			x			
126	x	x	x				
88	x			x		x	
66	x			x	x		
61	x	x	x				x
45	x	x					
38	x			x			x
32	x	x		x	x		
31	x				x		
28	x		x	x			
23	x	x	x			x	
21	x		x	x		x	

x indicates registered injury and each row tell the number of incidences of different combination of injuries. The first row gives the number of records where ACL where the only injury. The table shows only combinations that have a number of 20 or more.

Table 9: PCL with additional injuries

Number	ACL	PCL	MCL	LCL	PLC	Meniscus	Cartilage
166		x					
126	x	x	x				
61	x	x	x				x
55	x	x	x			x	
49		x					x
46	x	x	x			x	x
45	x	x					
36		x	x				
35	x	x				x	
32	x	x		x	x		
24		x				x	
23	x	x				x	x
23	x	x		x	x	x	
22		x				x	x
17		x	x				x
16	x	x			x		
15		x		x	x		
15	x	x		x	x	x	x
14	x	x		x	x		x
12	x	x		x			
12		x			x		
12	x	x					x

x indicates registered injury and each row tell the number of incidences of different combination of injuries. The first row gives the number of records where PCL where the only injury. The table shows only combinations that have a number of 11 or more.

Choice of graft for injuries registered in primary reconstructions

Table 10: BPTB

	ACL	PCL	MCL	LCL	PLC	Total
2024	1 531	0	0	0	0	1 531
2023	1 595	0	1	0	0	1 596
2022	1 408	0	0	0	0	1 408
2021	1 118	0	1	0	0	1 119
2020	1 233	0	0	1	0	1 234
2004-19	11 387	31	3	1	0	11 422
Total	18 272	31	5	2	0	18 310

Table 11: HAMSTRING

	ACL	PCL	MCL	LCL	PLC	Total
2024	300	10	52	8	2	372
2023	357	5	45	12	2	421
2022	293	10	48	18	3	372
2021	277	4	38	10	2	331
2020	331	10	31	3	0	375
2004-19	14 972	350	285	73	40	15 720
Total	16 530	389	499	124	49	17 591

Table 12: ALLOGRAFT

	ACL	PCL	MCL	LCL	PLC	Total
2024	29	41	16	13	9	108
2023	19	41	5	14	8	87
2022	15	36	5	12	6	74
2021	22	36	6	13	11	88
2020	10	25	5	6	8	54
2004-19	63	176	32	84	107	462
Total	158	355	69	142	149	873

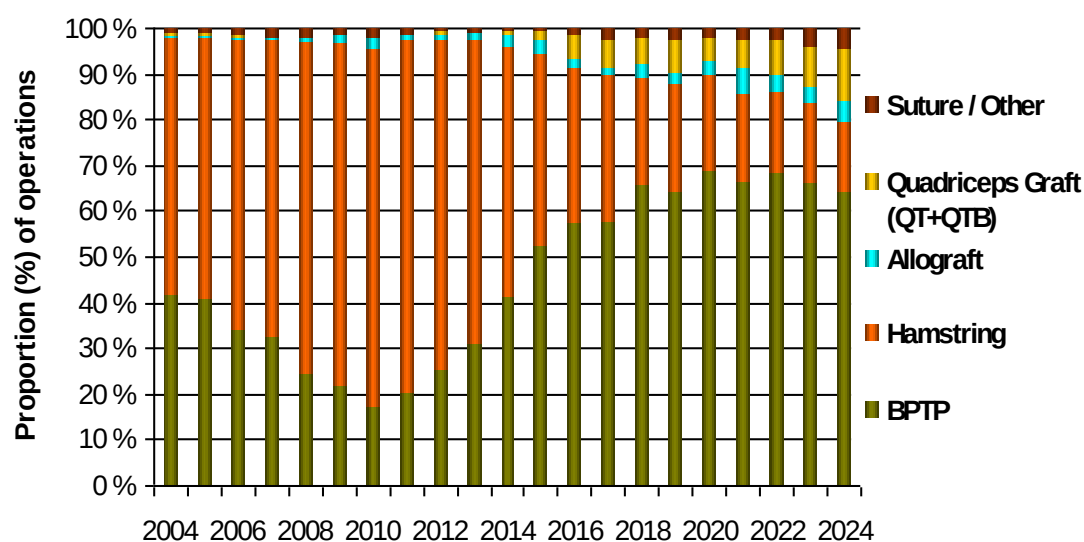
Table 13: Quadriceps Graft (QTC + QTB)

	ACL	PCL	MCL	LCL	PLC	Total
2024	263	0	0	0	0	263
2023	208	0	1	0	0	209
2022	152	0	0	0	0	152
2021	107	0	1	0	0	108
2020	93	1	0	0	0	94
2004-19	560	13	0	0	1	574
Totalt	1 383	14	2	0	1	1 400

Table 14: Suture / Other

	ACL	PCL	MCL	LCL	PLC	Total
2024	4	6	76	20	5	111
2023	5	8	63	17	7	100
2022	8	4	26	10	5	53
2021	5	4	24	6	2	41
2020	3	4	20	9	0	36
2004-19	73	63	170	92	72	470
Total	98	89	379	154	91	811

There were 22 forms where it was registered product for ACL og 23 forms where it was registered product for PCL but not checked for choice of graft.

Figure 6: Choice of graft for all injuries in primary reconstructions

Fixation

Table 15: Femur ACL (The 5 most common for the last 5 years)

Product	2004-19	2020	2021	2022	2023	2024	Total
Endobutton CL Ultra	7 514	197	124	137	168	106	8 246
SoftSilk	3 956	355	390	409	367	536	6 013
Endobutton CL BTB	1 637	272	164	172	139	30	2 414
Sheated Cannulated Int	826	127	112	158	140	191	1 554
ACL TightRope	502	67	125	157	235	246	1 332

Table 16: Tibia ACL (The 5 most common for the last 5 years)

Product	2004-19	2020	2021	2022	2023	2024	Total
SoftSilk	4 846	673	614	702	795	780	8 410
RCI Screw	4 693	155	79	88	146	119	5 280
Full Thread Interference	424	182	150	311	353	287	1 707
Tightrope ABS	224	42	170	188	282	243	1 149
PEEK Interference Scre	628	109	98	98	94	105	1 132

Table 17: Femur PCL (The 5 most common for the last 5 years)

Product	2004-19	2020	2021	2022	2023	2024	Total
Endobutton CL Ultra	223	4	3	6	11	8	255
SoftSilk	120	17	17	11	16	27	208
Ultrabutton		10	10	8	12	12	52
ACL TightRope	15	5	5	6	5	3	39
Softsilk 1.5 screw (7mm)	5	4	6	2	4	2	23

Table 18: Tibia PCL (The 5 most common for the last 5 years)

Product	2004-19	2020	2021	2022	2023	2024	Total
RCI Screw	284	14	18	18	31	29	394
PEEK Interference Scre	11	4	9	8	4	5	41
Biosure Regenesorb Int	2	3	7	2	4	12	30
BioComposite SwiveLo	12	2	2	5	3	2	26
Biosure PK	7	4	3	2	1	1	18

Table 19: Femur and tibia ACL (The 5 most common for the last 5 years)

Femur	Tibia	2004-19	2020	2021	2022	2023	2024	Total
SoftSilk	SoftSilk	3 411	292	330	346	297	467	5 143
Endobutton CL BTB	SoftSilk	1 102	253	145	145	115	24	1 784
ACL TightRope	Tightrope ABS	163	41	156	171	262	225	1 018
PEEK Interference Screw	PEEK Interference Screw	410	83	86	82	85	82	828
Cannulated Interference Screw	Full Thread Interference screw	134	72	40	102	147	168	663

Meniscal lesion

Table 20: Actual treatment of meniscal lesion

		Resection			Suture	Synthetic fixation	Meniscus Transplant.	Trepanation	None	Total
		OLD *	Total	Partial						
2024	Lateral			223	429			1	32	685
2024	Medial		10	191	695		1		44	941
2023	Lateral		1	227	474	1		2	59	764
2023	Medial		7	244	678			1	59	989
2022	Lateral			200	398			7	50	655
2022	Medial		6	208	528	2		1	40	785
2021	Lateral		2	160	324			5	46	537
2021	Medial		7	191	398	2			37	635
2020	Lateral			217	284			8	54	563
2020	Medial		5	245	440	1		1	48	740
2004-19	Lateral	2 040	15	2 569	1 963	77	6	130	1 056	7 856
2004-19	Medial	2 371	61	2 692	3 266	256	7	109	977	9 739
Total		4 411	114	7 367	9 877	339	14	265	2 502	24 889

It became possible to register "Trepanation" and "None" from 01.01.2005. There have been forms where this has been an additional information. This information have been registered, but the registration is not complete before 2005.

In table 7: Actual injury has less. The reason for this is that we distinguish between the lateral and medial injury and some injuries are registred in both groups.

*The value in OLD Resection are the forms that are registered before an updated form was introduced in autumn 2011. The Total and Partial Resection values are the updated form was introduced in autumn 2011.

Figure 7a: Treatment of meniscal lesions in primary reconstructions

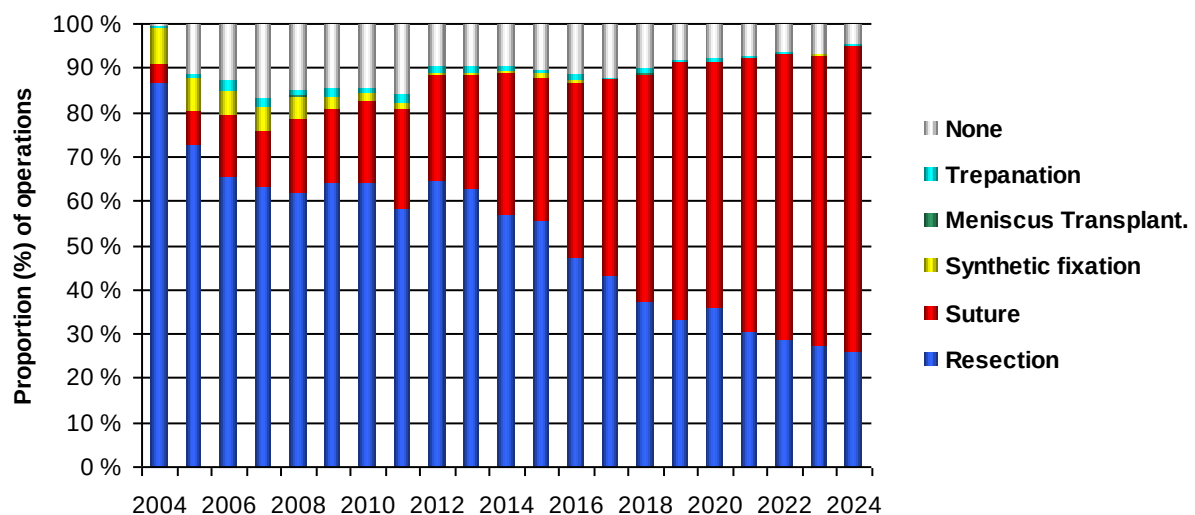


Figure 7b: Distribution of medial meniscal rupture types

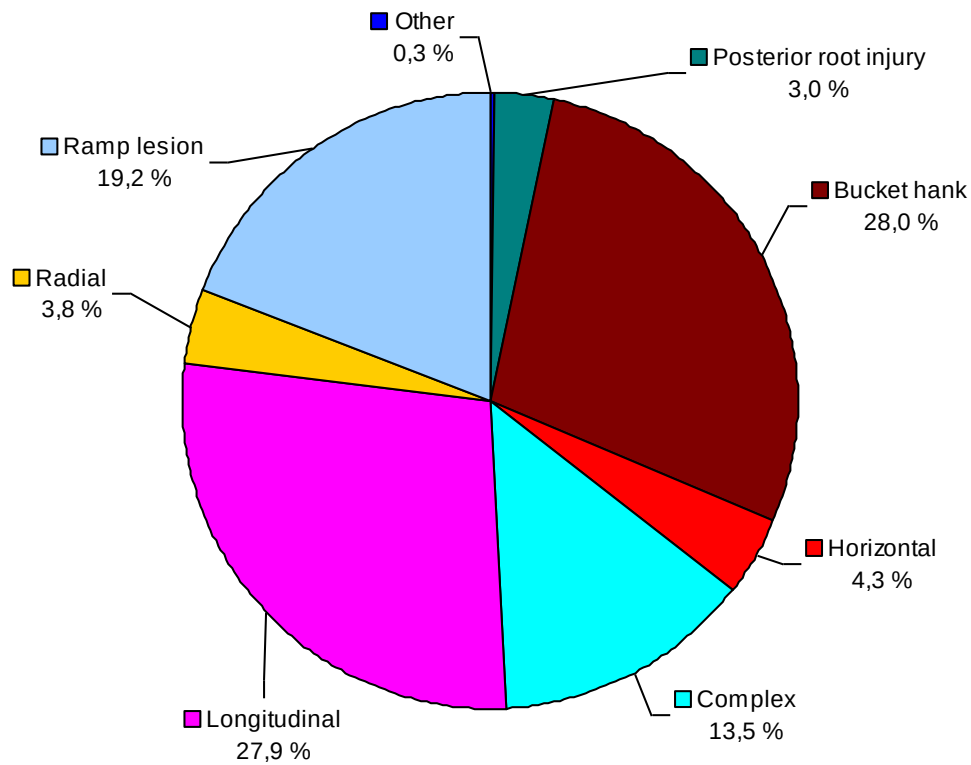
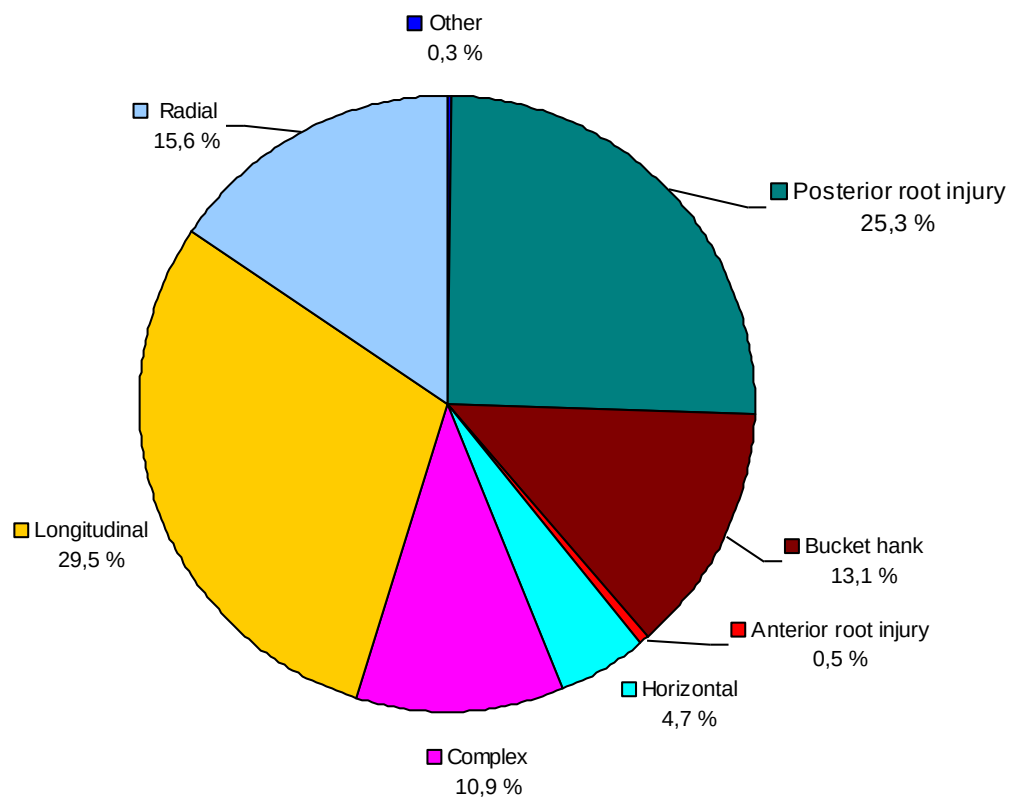


Figure 7c: Distribution of lateral meniscal rupture types



Meniscal fixation

Table 21: Suture

Product	2004-12	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
BioComposite SwiveLock C w/Fiber Tape						9	7	11	7	12	8	9	6	69
Coated Braided Polyester Ssuture	7									3	2	1	1	14
Endobutton (BOX OF 1) Str							1	14	5	14	12	30	14	90
Endobutton CL BTB											2	4	9	15
Endobutton CL Ultra								4	2	3	3	1	2	15
FAST-FIX	889	203	284	320	411	460	537	628	532	520	615	651	758	6 808
FiberStitch Implant Suture									12	9	34	56	15	126
FiberWire Suture													21	21
Meniscal Cinch								7	5	1				13
Meniscal Root Repair System										2	1	3		6
Orthocord w/Double-Armed Meniscal Needles					1		1	29	11	24	44	26	4	140
PDS II (polydioxanone) suture						8			1		1	4	16	30
Rapidloc	72	2												74
Suture Buttons								12	6	1	6	7	16	48
Suture Washer Ster.							4	11	7	6	6	1	1	36
SutureTape								1	1	2	14	28	28	74
Tightrope ABS Button								2	2	5	7	14	14	44
Truespan Meniscal Repair System								21	28	17	72	164	155	457
Ultratape Suture Blue												1	8	9
Unknown	98	43	49	54	65	23	12	1	2	4	2	1	1	355
Other (n<5)	1						2		3	2	5	13	6	32
Total	1 067	248	333	374	477	500	564	741	624	625	834	1 014	1 075	8 476

Cartilage lesion all localizations

Table 22: ICRS Grade

Definition of ICRS Grade:

1. Nearly normal: Superficial lesions, soft indentation and/or superficial fissures and cracks.
2. Abnormal: Lesions extending down to <50% of cartilage depth.
3. Severely abnormal: Cartilage defects extending down >50% of cartilage depth as well as down to calcified layer.
4. Severely abnormal: Osteochondral injuries, lesions extending just through the subchondral boneplate or deeper defects down into trabecular bone.

	Code 1	Code 2	Code 3	Code 4	Missing
2024	28,4%	48,7%	19,7%	3,2%	
2023	31,6%	47,2%	18,3%	2,6%	0,3%
2022	29,0%	51,5%	16,2%	2,8%	0,5%
2021	30,6%	48,6%	16,8%	3,6%	0,5%
2020	40,3%	41,6%	15,0%	2,4%	0,7%
2004-19	37,4%	41,6%	15,9%	3,9%	1,3%

Table 23: Treatment codes for all localizations

	Debridement	Micro fracture	No treatment	Other	Missing
2024	16,1%	0,7%	81,7%	0,4%	1,1%
2023	11,6%	1,0%	85,2%	0,7%	1,6%
2022	13,7%	0,8%	83,6%	0,4%	1,5%
2021	7,8%	0,8%	86,6%	0,9%	3,9%
2020	6,3%	1,0%	86,8%	1,0%	5,0%
2004-19	10,6%	2,6%	70,5%	0,8%	15,5%

Cartilage injuries registered in primary reconstructions

Figure 8: Localization of lesions for all cartilage lesions

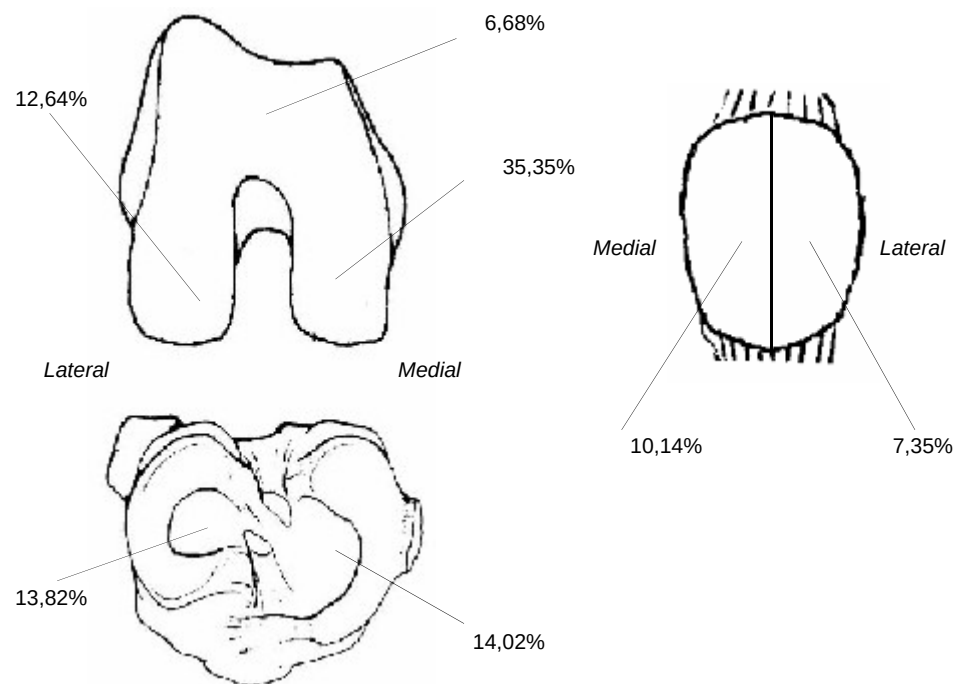
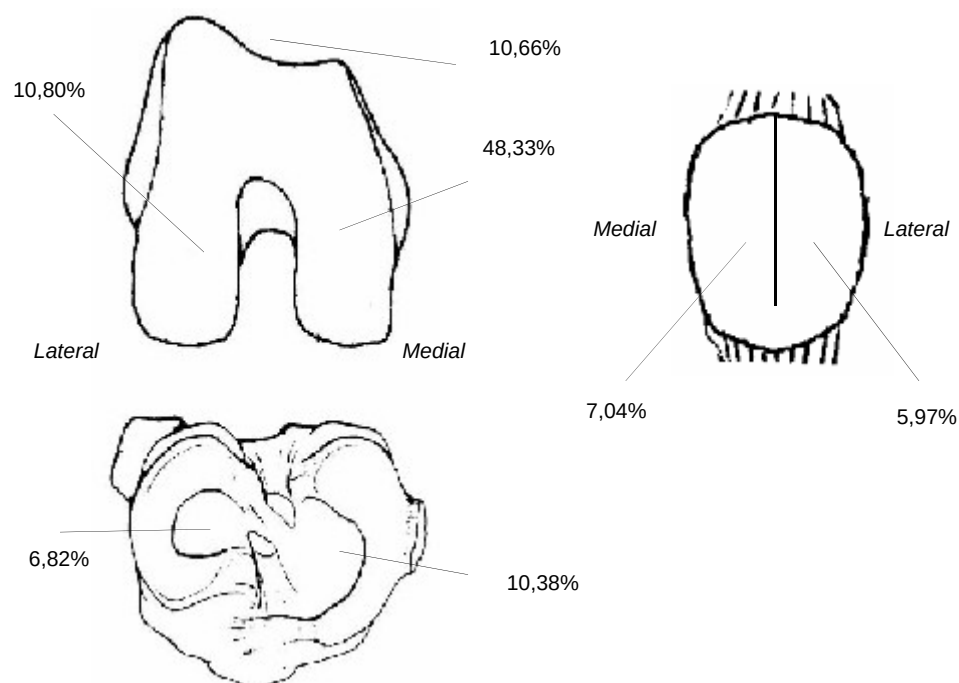


Figure 9: Localization of lesions for cartilage lesions with size >2 cm² and ICRS equal to 3 or 4



Outpatient surgery

Table 24: Outpatient surgery

	Yes		No		Missing		Total
2024	1 886	(87,6%)	265	(12,3%)	1		2 152
2023	1 857	(84,3%)	345	(15,7%)			2 202
2022	1 564	(82,1%)	339	(17,8%)	1	(0,1%)	1 904
2021	1 279	(82,6%)	267	(17,2%)	1	(0,1%)	1 548
2020	1 399	(82,6%)	283	(16,7%)	10	(0,6%)	1 693
2004-19	16 311	(59,6%)	10 943	(40,0%)	131	(0,5%)	27 387
Total	24 296	(65,9%)	12 442	(33,7%)	144	(0,4%)	36 886

Intraoperative complications

Table 25: Intraoperative complications

	Yes		No		Missing		Total
2024	53	(2,5%)	2 098	(97,5%)	1		2 152
2023	57	(2,6%)	2 136	(97,0%)	9	(0,4%)	2 202
2022	50	(2,6%)	1 831	(96,2%)	22	(1,2%)	1 904
2021	32	(2,1%)	1 492	(96,4%)	24	(1,6%)	1 548
2020	34	(2,0%)	1 636	(96,6%)	22	(1,3%)	1 693
2004-19	800	(2,9%)	25 997	(94,9%)	586	(2,1%)	27 387
Total	1 026	(2,8%)	35 190	(95,4%)	664	(1,8%)	36 886

Systemic antibiotic prophylaxis

Table 26: Systemic antibiotic prophylaxis

	Yes		No		Missing		Total
2024	2 148	(99,8%)	4	(0,2%)			2 152
2023	2 188	(99,4%)	13	(0,6%)	1		2 202
2022	1 889	(99,2%)	15	(0,8%)			1 904
2021	1 538	(99,4%)	7	(0,5%)	3	(0,2%)	1 548
2020	1 683	(99,4%)	8	(0,5%)	1	(0,1%)	1 693
2004-19	27 210	(99,4%)	115	(0,4%)	60	(0,2%)	27 387
Total	36 656	(99,4%)	162	(0,4%)	65	(0,2%)	36 886

Table 27: Drug

	2004-19	2020	2021	2022	2023	2024
Benzylpenicillin (Penicillin G)	0,01%					
Cefaleksin (Keflex, Cefalexin)	0,01%			0,05%		
Cefalotin (Keflin)	84,87%	12,42%	11,96%	13,45%	11,61%	13,69%
Cefazolin (Cephazolin)	7,40%	82,47%	85,96%	83,91%	86,38%	84,92%
Cefotaksim (Claforan)	0,01%					
Cefuroksim (Zinacef, Cefuroxim, Lifurox)	1,05%				0,18%	
Ciprofloksasin (Ciproxin)	0,01%					
Dikloksacillin (Diclocil, Dicillin)	2,07%	0,12%		0,26%		
Doksysisylin (Vibramycin, Dumoxin, Doxylin)	0,00%					
Erytromycin (Ery-max, Abboticin)	0,01%					
Gentamicin (Garamycin, Gensumycin)	0,03%					
Klindamycin (Dalacin, Clindamycin)	2,31%	2,61%	1,43%	1,69%	1,37%	1,35%
Kloksacillin (Ekvacillin)	1,88%	2,26%	0,46%	0,26%	0,27%	
Linkomycin (Lincocin)	0,01%				0,05%	
Oxacillin (Unspecified)	0,02%					
Piperacillin\Tazobactam (Tazocin)	0,00%					
Tobramycin (Nebcina, Nebcin, Tobi)	0,01%					
Missing	0,29%	0,12%	0,20%	0,37%	0,14%	0,05%

Thrombosis prophylaxis

Table 28: Thrombosis prophylaxis

	Yes		No		Missing		Total
2024	806	(37,5%)	1 346	(62,5%)	0	(0,0%)	2 152
2023	933	(42,4%)	1 263	(57,4%)	6	(0,3%)	2 202
2022	947	(49,7%)	952	(50,0%)	5	(0,3%)	1 904
2021	762	(49,2%)	781	(50,5%)	5	(0,3%)	1 548
2020	943	(55,8%)	745	(44,1%)	5	(0,3%)	1 693
2005-19	21 238	(79,9%)	5 109	(19,2%)	271	(1,0%)	26 618
Total	25 629	(71,0%)	10 196	(28,2%)	292	(0,8%)	36 117

There are 33 old forms that are filled out so that thrombosis prophylaxis can not be registered. These are added to missing.

Table 29: Use of medication for thrombosis prophylaxis

	One drug		Two drugs		Total
2024	729	(90,4%)	77	(9,6%)	806
2023	708	(75,9%)	225	(24,1%)	933
2022	766	(80,9%)	181	(19,1%)	947
2021	643	(84,4%)	119	(15,6%)	762
2020	744	(78,9%)	199	(21,1%)	943
2005-19	21 003	(98,9%)	235	(1,1%)	21 238
Total	24 593	(96,0%)	1 036	(4,0%)	25 629

Table 30: Drug

	2004-19	2020	2021	2022	2023	2024
Acetylsalicylic acid (Albyl-E, Globoid, Acetyratio, Magnyl E)	0,03%	0,42%	0,92%	0,53%	0,54%	0,74%
Apixaban (Eliquis)	0,02%	0,21%	0,52%	0,74%	0,86%	14,27%
Dabigatranetixalat (Re-Novate, Pradaxa)	0,01%			0,11%		
Dalteparin (Fragmin)	59,76%	49,42%	50,52%	49,00%	45,23%	36,85%
Dextran (Macrodex, Dextran)	0,08%			0,11%	0,21%	
Enoxaparin (Klexane)	36,70%	28,42%	31,50%	28,51%	26,69%	36,35%
Fondaparinux (Arixtra)					0,11%	
Heparin (Heparin)	0,00%					
Rivaroxaban (Xarelto)	0,06%	0,11%		1,27%	1,82%	2,23%
Ticagrelor (Brilique)	0,00%			0,21%		
Warfarin (Marevan)	0,04%	0,11%	0,13%			
Ximelagatran (Exanta, Malagatran)	0,14%					
Unknown	0,00%					
No drugs	1,72%					
Missing	0,32%	0,21%	0,79%	0,42%	0,43%	
Two drugs	1,11%	21,10%	15,62%	19,11%	24,12%	9,55%

Physiotherapy *

Table 31: Has preoperative physiotherapy been performed?

	Yes		No		Uncertain		Total
2024	1 758	(85,0%)	244	(11,8%)	67	(3,2%)	2 069
2023	1 357	(81,3%)	258	(15,5%)	54	(3,2%)	1 669
2022	1 037	(81,8%)	200	(15,8%)	31	(2,4%)	1 268
2021	832	(83,5%)	133	(13,3%)	32	(3,2%)	997
2020	73	(83,0%)	11	(12,5%)	4	(4,5%)	88
Total	5 057	(83,0%)	846	(13,9%)	188	(3,1%)	6 091

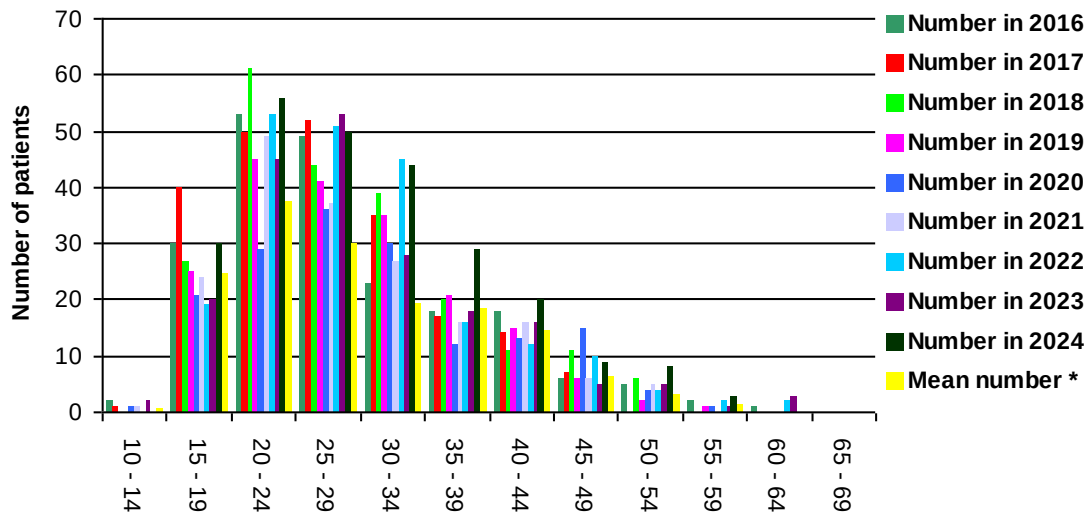
Table 32: Reason for not performing physiotherapy

	Acute injury		Undesirable		Economy		Other		Missing		Total
2024	208	(85,2%)	3	(1,2%)	0	(0,0%)	30	(12,3%)	3	(1,2%)	244
2023	224	(86,8%)	6	(2,3%)	0	(0,0%)	26	(10,1%)	2	(0,8%)	258
2022	176	(88,0%)	3	(1,5%)	0	(0,0%)	16	(8,0%)	5	(2,5%)	200
2021	115	(86,5%)	4	(3,0%)	0	(0,0%)	13	(9,8%)	1	(0,8%)	133
2020	7	(63,6%)	2	(18,2%)	0	(0,0%)	1	(9,1%)	1	(9,1%)	11
Total	730	(86,3%)	18	(2,1%)	0	(0,0%)	86	(10,2%)	12	(1,4%)	846

* Electronic registration started in 2019

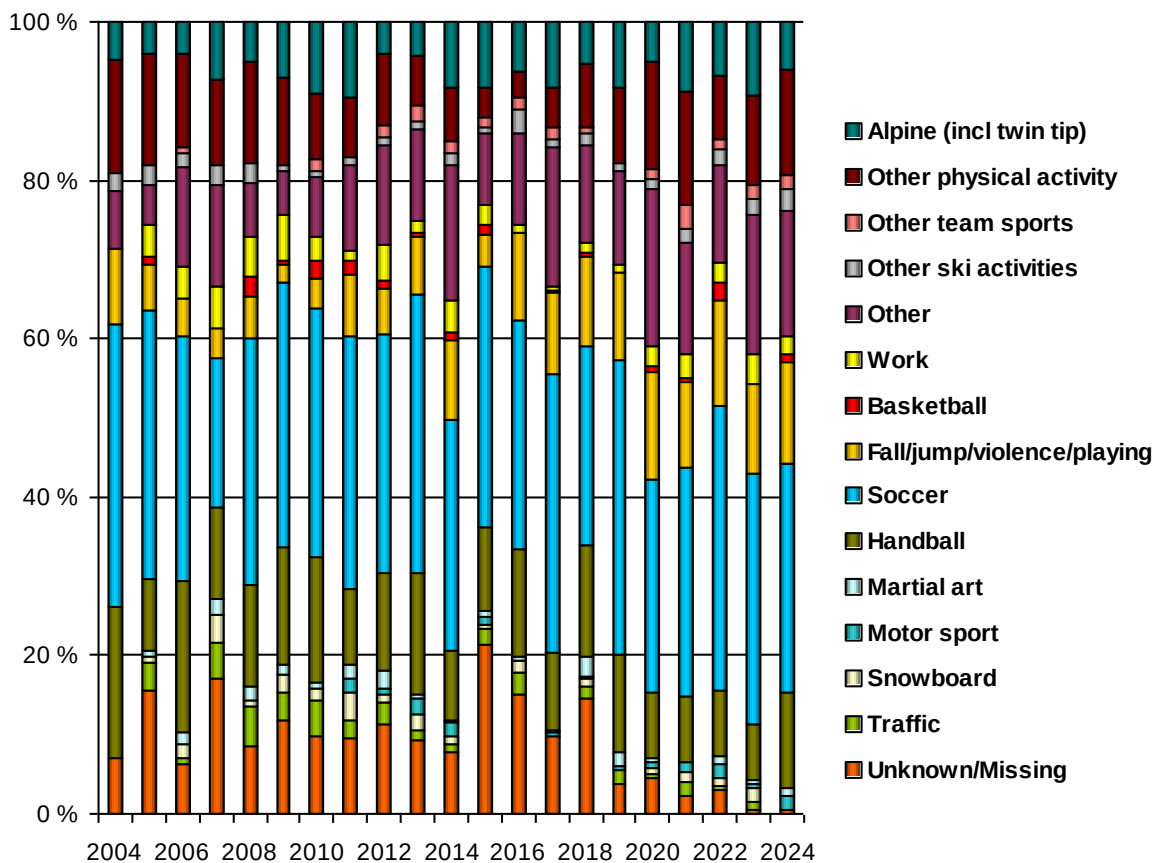
Revision reconstruction

Figure 10: Age by revision reconstruction



* Mean number of revision reconstructions for 2004 - 2015

Figure 11: Activity that lead to injury



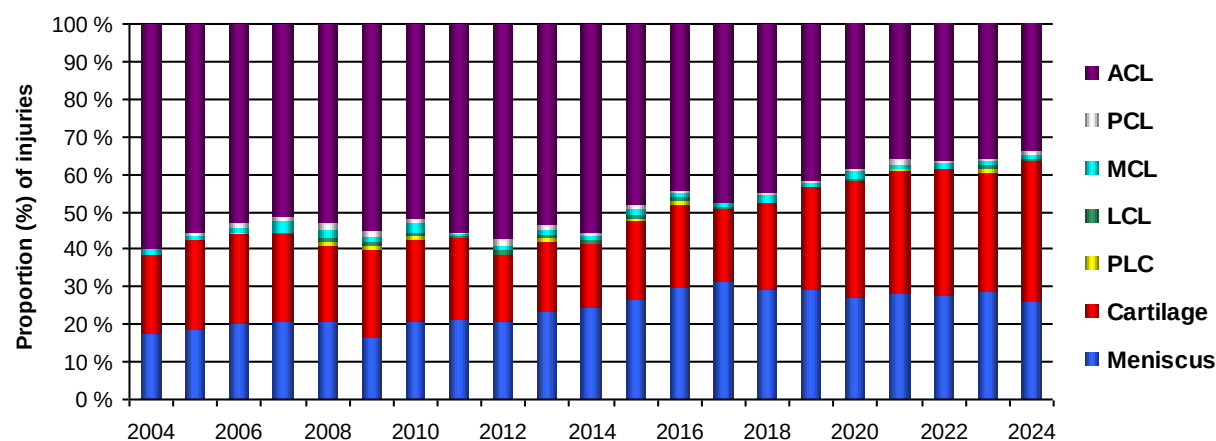
Actual injury that was operated on

Table 33: Actual injury that was operated on*

	ACL	PCL	MCL	LCL	PLC	Cartilage	Meniscus
2024	223	7	5	3	3	108	170
2023	176	2	6	5	3	86	139
2022	194	4	7	2		104	146
2021	164	7	3	1	3	93	126
2020	155	3	8	1	1	67	108
2004-19	2 423	50	69	23	27	980	1 172
Total	3 335	73	98	35	37	1 438	1 861

* More than one type of injury can be given for each form

Figure 12: Actual injury that was operated on



Additional injuries

Table 34: ACL with additional injuries

Number	ACL	PCL	MCL	LCL	PLC	Meniscus	Cartilage
1 091	x						
858	x					x	
794	x					x	x
443	x						x
24	x		x				
22	x		x			x	x
9	x		x			x	
9	x		x				x
7	x	x					
6	x			x			

x indicates registered injury and each row tell the number of incidences of different combination of injuries. The first row gives the number of records where ACL where the only injury. The total number will be identical to the total number of registered ACL injuries. The table shows only combinations that have a number of more than 5.

Table 35: PCL with additional injuries

Number	ACL	PCL	MCL	LCL	PLC	Meniscus	Cartilage
20		x					
10		x					x
7	x	x					
5	x	x	x				x
5	x	x					x
4	x	x				x	x

x indicates registered injury and each row tell the number of incidences of different combination of injuries. The first row gives the number of records where PCL where the only injury. The total number will be identical to the total number of registered PCL injuries. The table shows only combinations that have a number of more than 2.

Reason for revision reconstruction

Table 36: Reason for revision reconstruction

	Cause 1	Cause 2	Cause 3	Cause 4	Cause 5	Cause 6	Cause 7	Cause 8	Other	Total
2024	2	8		98	158	4	29	45		344
2023	2	7	2	68	114	7	9	26		235
2022		18	1	84	115	2	17	37		274
2021		8	2	76	88	6	11	21		212
2020	1	6	1	56	85	2	7	13		171
2004-19	38	99	28	1 070	988	48	13	9	35	2 328
Total	43	146	34	1 452	1 548	69	86	151	35	3 564

Cause 1: Infection

Cause 2: Fixation failure

Cause 3: Untreated ligament injury

Cause 4: Graft failure

Cause 5: New trauma

Cause 6: Pain

Cause 7: Tibial duct misplacement Cause 8: Femoral duct misalignment

Choice of graft for injuries registered in revision reconstructions

Table 37: BPTB

	ACL	PCL	MCL	LCL	PLC	Total
2024	97	0	0	0	0	97
2023	59	0	0	0	0	59
2022	81	0	0	0	0	81
2021	78	0	0	0	0	78
2020	73	0	0	0	0	73
2004-19	1 133	3	0	0	0	1 136
Total	1 521	3	0	0	0	1 524

Table 38: HAMSTRING

	ACL	PCL	MCL	LCL	PLC	Total
2024	57	2	2	0	0	59
2023	54	0	2	1	1	56
2022	51	0	2	0	0	51
2021	37	1	1	0	0	38
2020	42	1	4	0	0	43
2004-19	869	10	20	4	4	887
Total	1 110	14	31	5	0	1 160

Table 39: ALLOGRAFT

	ACL	PCL	MCL	LCL	PLC	Total
2024	15	4	2	1	2	22
2023	23	2	1	3	2	30
2022	16	4	4	0	0	20
2021	15	5	2	1	3	24
2020	7	2	0	0	0	9
2004-19	81	28	13	10	15	134
Total	157	45	22	15	22	261

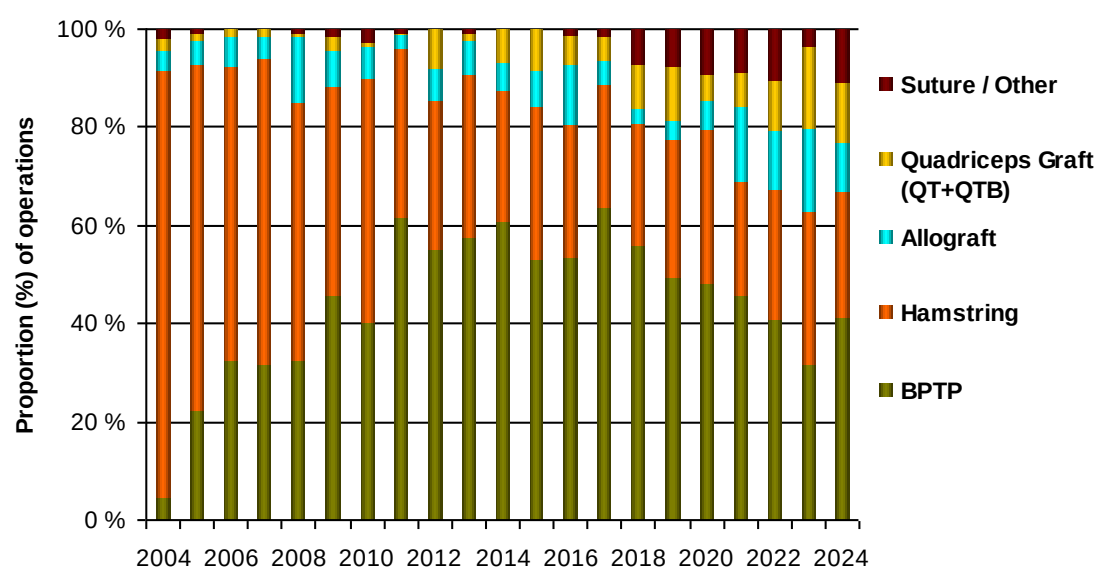
Tabell 40: Quadriceps Graft (QTC + QTB)

	ACL	PCL	MCL	LCL	PLC	Total
2024	263	0	0	0	0	263
2023	208	0	1	0	0	209
2022	152	0	0	0	0	152
2021	107	0	1	0	0	108
2020	93	1	0	0	0	94
2004-19	560	13	0	0	1	574
Total	1 383	14	2	0	1	1 400

Table 41: Suture / Other

	ACL	PCL	MCL	LCL	PLC	Total
2024	24	1	1	0	0	26
2023	6	0	1	0	0	7
2022	19	0	1	1	0	21
2021	14	1	0	0	0	15
2020	12	0	1	1	0	14
2004-19	33	5	5	1	2	46
Total	108	7	9	3	2	129

There were 1 forms where it was registered product for ACL but not checked for choice of graft. It was registered direct suture for two cases (PLC, MCL).

Figure 13: Choice of graft for all injuries in revision reconstruction

Fixation

Table 42: Femur ACL (The 5 most common for the last 5 years)

Product	2004-19	2020	2021	2022	2023	2024	Total
SoftSilk	567	41	43	44	27	51	773
Endobutton CL Ultra	484	33	22	26	26	18	609
ACL TightRope	14	7	14	26	37	30	128
PEEK Interference Scre	53	7	17	16	4	14	111
Softsilk 1.5 screw (7mm	7	6	7	12	16	2	50

Table 43: Femur PCL (The 5 most common for the last 5 years)

Product	2004-19	2020	2021	2022	2023	2024	Total
Endobutton CL Ultra	15	1	3			2	21
SoftSilk	11		4	3		2	20
RCI Screw	12			1			13
Ultrabutton			1	1	1	3	6
PEEK Interference Scre	2			1			3

Table 44: Tibia ACL (The 5 most common for the last 5 years)

Product	2004-19	2020	2021	2022	2023	2024	Total
SoftSilk	545	55	50	44	44	55	793
RCI Screw	378	23	22	22	20	25	490
Biosure PK	57	10	15	18	23	13	136
PEEK Interference Scre	59	10	13	19	7	21	129
Tightrope ABS	6	1	7	19	37	23	93

Table 45: Tibia PCL (The 5 most common for the last 5 years)

Product	2004-19	2020	2021	2022	2023	2024	Total
RCI Screw	27	1	2	1		2	33
AO Skrue	8				1	2	11
Biosure PK			2		1	2	5
Biosure Regenesorb Int					1	1	2
PEEK Interference Scre				1		1	2

Table 46: Femur and tibia ACL (The 5 most common for the last 5 years)

Femur	Tibia	2004-19	2020	2021	2022	2023	2024	Total
SoftSilk	SoftSilk	469	31	31	25	14	38	608
Endobutton CL Ultra	RCI Screw	156	17	10	9	6	4	202
PEEK Interference Screw	PEEK Interference Screw	48	7	17	15	4	14	105
ACL TightRope	Tightrope ABS	2		7	17	35	19	80
ACL TightRope	PEEK Interference Screw	8	5	5	8	6	12	44
Softsilk 1.5 screw (7mm x 25 mm)	SoftSilk	7	6	7	11	11	1	43

Meniscal lesion

Table 47: Actual treatment of meniscal lesion

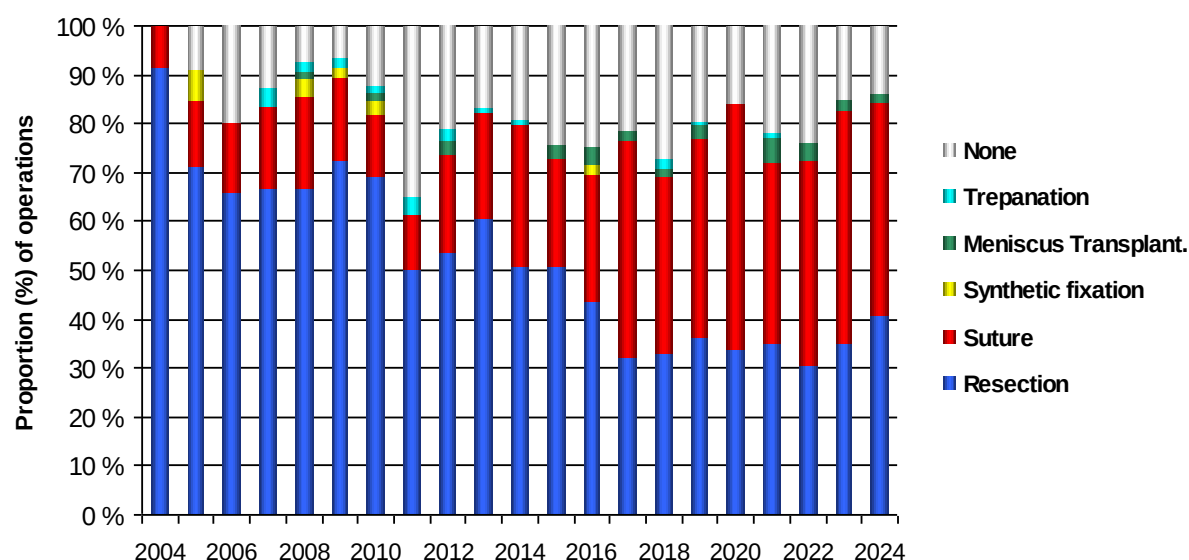
		Resection			Synthetic fixation	Meniscus Transplant.	Trepanation	None	Total
	OLD *	Total	Partial	Suture					
2024	Lateral		27	21				8	56
2024	Medial	1	49	61		4		18	133
2023	Lateral		21	34				10	65
2023	Medial		35	43		4		14	96
2022	Lateral		19	27				18	64
2022	Medial	1	31	43		6		22	103
2021	Lateral		17	25			1	9	52
2021	Medial		32	27		7		22	88
2020	Lateral		14	25				8	47
2020	Medial	1	25	35				11	72
2004-19	Lateral	85	2	177	156	5	4	10	558
2004-19	Medial	149	8	276	221	6	18	6	853
Total		234	13	723	718	11	43	17	2 187

It became possible to register "Trepanation" and "None" from 01.01.2005. There have been forms where this has been an additional information. This information have been registered, but the registration is not complete before 2005.

In table 34: Actual injury has less. The reason for this is that we distinguish between the lateral and medial injury and some injuries are registered in both groups.

*The value in OLD Resection are the forms that are registered before an updated form was introduced in autumn 2011. The Total and Partial Resection values are the updated form was introduced in autumn 2011.

Figure 14: Treatment of meniscal lesions in revision reconstructions



Meniscal fixation

Table 48: Suture

Product	2004-12	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
BioComposite SwiveLock C w/Fiber Tape						3	1	5	1				1	11
Endobutton (BOX OF 1) Str								4	2	4	5	6		21
FAST-FIX	47	16	20	16	15	42	34	38	39	32	52	44	60	455
Orthocord w/Double-Armed Meniscal Needles								1		6	4		1	12
PDS II (polydioxanone) suture						1	1						4	6
Suture Buttons								2			1	2	4	9
Suture Washer Ster.							1	1	1	1	2	1		7
Tightrope ABS Button											3	3	3	9
Truespan Meniscal Repair System								1		2	3	12	9	27
Unknown	6	5	6	9	13	1	2	2						44
Other (n<5)	5									1	1	5	5	17
Total	58	21	26	25	28	47	39	54	43	46	71	73	87	618

Cartilage lesion all localizations

Table 49: ICRS Grade

Definition av ICRS Grade:

1. Nearly normal: Superficial lesions, soft indentation and/or superficial fissures and cracks.
2. Abnormal: Lesions extending down to <50% of cartilage depth.
3. Severely abnormal: Cartilage defects extending down >50% of cartilage depth as well as down to calcified layer.
4. Severely abnormal: Osteochondral injuries, lesions extending just through the subchondral boneplate or deeper defects down into trabecular bone.

	Code 1	Code 2	Code 3	Code 4	Missing
2024	32,0%	45,8%	20,0%	2,2%	
2023	34,8%	45,6%	18,4%	1,2%	
2022	27,7%	53,5%	17,7%	1,2%	
2021	34,7%	48,2%	14,3%	2,9%	
2020	40,4%	42,9%	13,8%	3,0%	
2004-19	27,1%	46,7%	19,7%	4,7%	1,8%

Table 50: Treatment codes for all localizations

	Debridement	Micro fracture	No treatment	Other	Missing
2024	7,5%		90,8%	0,6%	1,1%
2023	3,1%		92,6%		4,4%
2022	5,1%		92,2%		2,7%
2021	6,1%	0,8%	91,4%		1,6%
2020	2,9%	0,5%	96,2%		0,5%
2004-19	8,1%	1,8%	75,6%	1,1%	13,4%

Cartilage injuries registered in revision reconstructions

Figure 15: Localization of lesions for all cartilage lesions

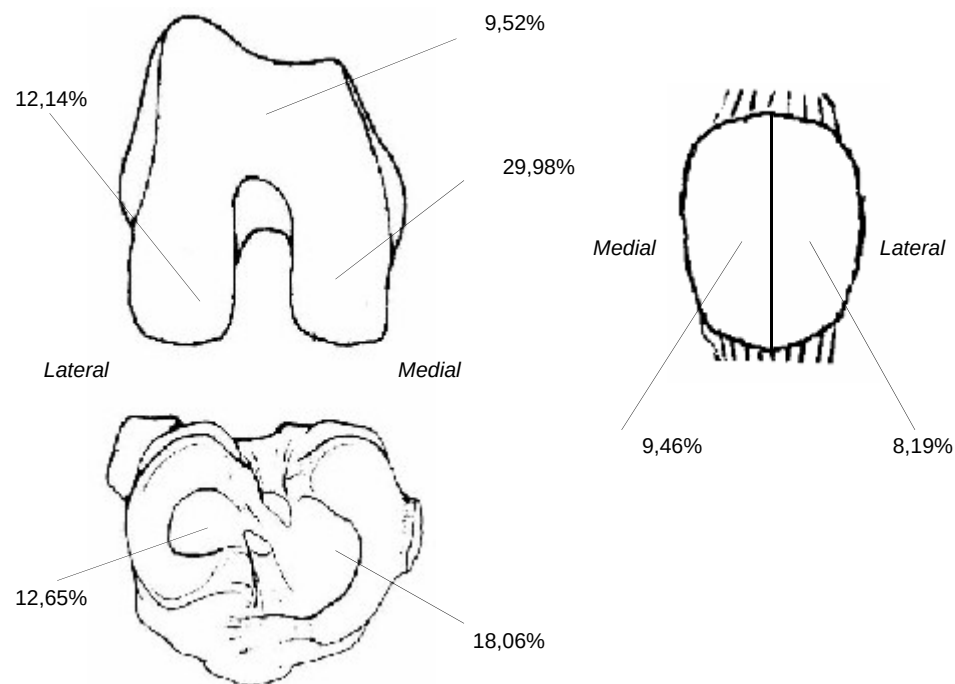
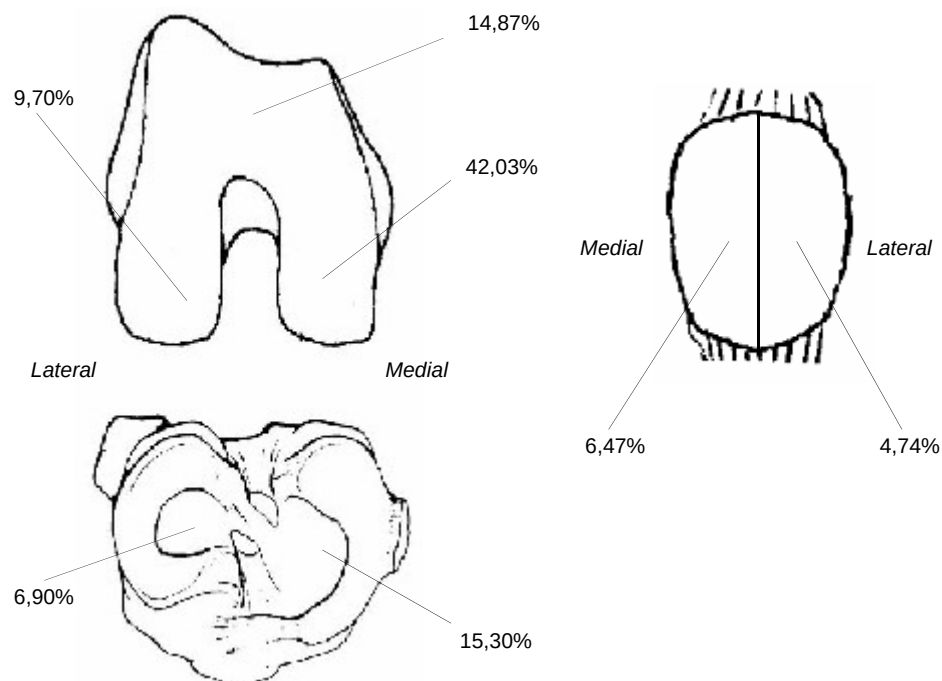


Figure 16: Localization of lesions for cartilage lesions with size $>2 \text{ cm}^2$ and ICRS equal to 3 or 4



Outpatient surgery

Table 51: Outpatient surgery

	Yes		No		Missing		Total
2024	178	(71,5%)	70	(28,1%)			249
2023	132	(67,3%)	64	(32,7%)			196
2022	120	(56,1%)	93	(43,5%)	1	(0,5%)	214
2021	105	(58,0%)	76	(42,0%)			181
2020	102	(63,0%)	60	(37,0%)			162
2004-19	1 221	(45,0%)	1 465	(54,0%)	26	(1,0%)	2 712
Total	1 858	(50,0%)	1 828	(49,2%)	27	(0,7%)	3 714

Intraoperative complications

Table 52 : Intraoperative complications

	Yes		No		Missing		Total
2024	6	(2,4%)	241	(96,8%)	1	(0,4%)	249
2023	6	(3,1%)	189	(96,4%)	1	(0,5%)	196
2022	3	(1,4%)	210	(98,1%)	1	(0,5%)	214
2021	8	(4,4%)	170	(93,9%)	3	(1,7%)	181
2020	4	(2,5%)	158	(97,5%)			162
2004-19	93	(3,4%)	2 534	(93,4%)	85	(3,1%)	2 712
Total	120	(3,2%)	3 502	(94,3%)	91	(2,5%)	3 714

Systemic antibiotic prophylaxis

Table 53: Systemic antibiotic prophylaxis

	Yes		No		Missing		Total
2024	244	(98,0%)	4	(1,6%)			249
2023	194	(99,0%)	1	(0,5%)	1	(0,5%)	196
2022	211	(98,6%)	3	(1,4%)			214
2021	177	(97,8%)	3	(1,7%)	1	(0,6%)	181
2020	162	(100,0%)					162
2004-19	2 666	(98,3%)	35	(1,3%)	11	(0,4%)	2 712
Total	3 654	(98,4%)	46	(1,2%)	13	(0,4%)	3 714

Table 54: Drug

	2004-19	2020	2021	2022	2023	2024
Benzylpenicillin (Penicillin G)	0,04%					
Cefalotin (Keflin)	85,26%	7,41%	7,91%	6,64%	5,15%	9,84%
Cefazolin (Cephazolin)	8,06%	88,27%	88,14%	92,42%	92,78%	89,34%
Ceftriakson (Rocefin)	0,04%					
Cefuroksim (Zinacef, Cefuroxim, Lifurox)	0,34%					
Ciprofloksasin (Ciproxin)	0,04%					
Dikloksacillin (Diclocil, Dicillin)	1,09%					
Gentamicin (Garamycin, Gensumycin)	0,04%					
Imipenem (Tienam)	0,04%					
Klindamycin (Dalacin, Clindamycin)	2,63%	3,09%	3,39%	0,47%	1,55%	0,41%
Kloksacillin (Ekevacin)	1,91%	0,62%			0,52%	0,41%
Oxacillin (Unspecified)	0,04%					
Vankomycin (Vancomycin, Vancocin)	0,04%					
Missing	0,45%	0,62%	0,56%	0,47%		

Thrombosis prophylaxis

Table 55: Thrombosis prophylaxis

	Yes		No		Missing		Total
2024	76	(30,6%)	172	(69,4%)	1	(0,4%)	249
2023	76	(38,8%)	120	(61,2%)			196
2022	85	(39,7%)	127	(59,3%)	2	(0,9%)	214
2021	83	(45,9%)	98	(54,1%)			181
2020	94	(58,0%)	68	(42,0%)			162
2005-19	2 058	(77,2%)	580	(21,8%)	29	(1,1%)	2 667
Total	2 472	(67,4%)	1 165	(31,8%)	32	(0,9%)	3 669

There are 2 old forms that are filled out so that thrombosis prophylaxis can not be registered. These are added to missing.

There are 70 forms with two drugs and 2402 forms with one drug.

Table 56: Drug

	2004-19	2020	2021	2022	2023	2024
Apixaban (Eliquis)	0,05%	1,06%				14,47%
Dalteparin (Fragmin)	64,09%	42,55%	55,42%	43,53%	55,26%	34,21%
Dextran (Macrodex, Dextran)	0,10%					
Enoxaparin (Klexane)	33,92%	34,04%	33,73%	41,18%	21,05%	44,74%
Rivaroxaban (Xarelto)	0,05%				5,26%	1,32%
Ticagrelor (Brilique)		1,06%				
Warfarin (Marevan)	0,05%					
Ximelagatran (Exanta, Malagatran)	0,15%					
No drugs	0,68%					
Missing	0,39%				1,32%	
Two drugs	0,10%	21,28%	10,84%	15,29%	17,11%	5,26%

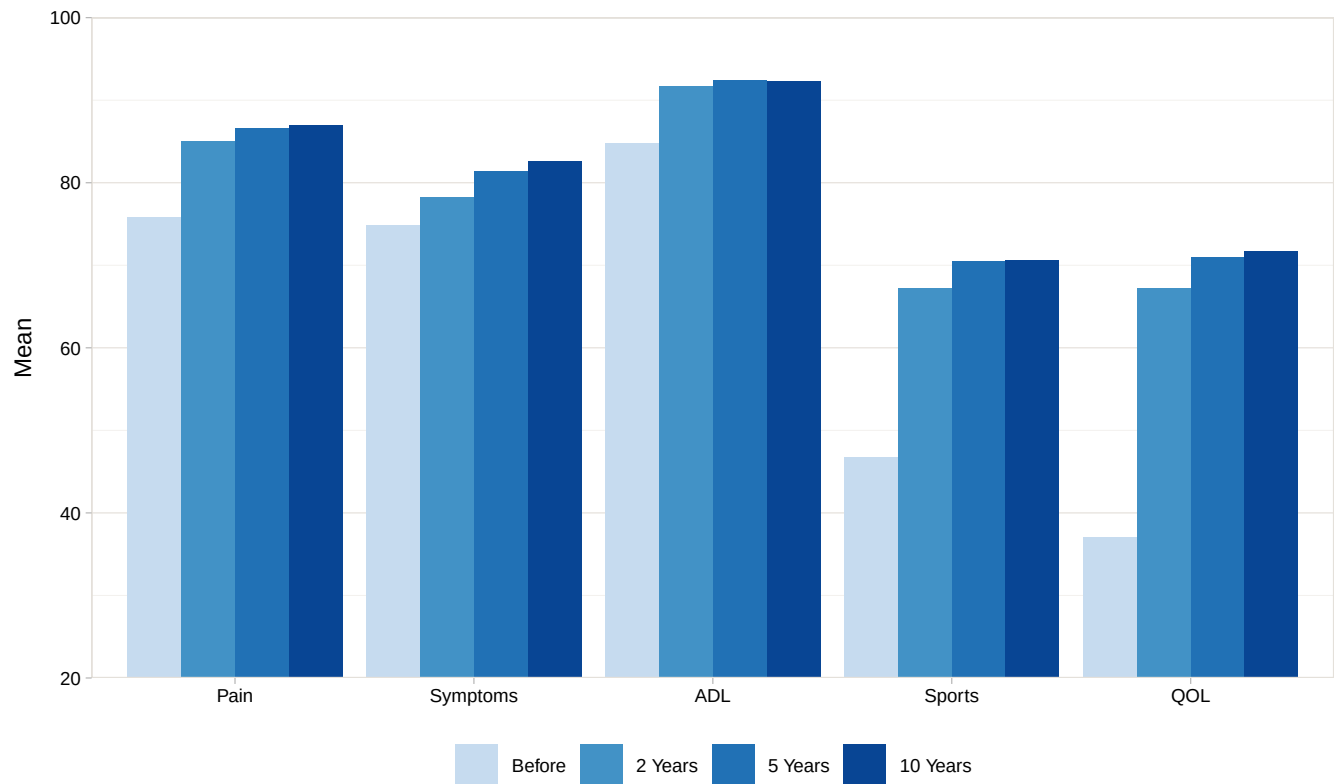
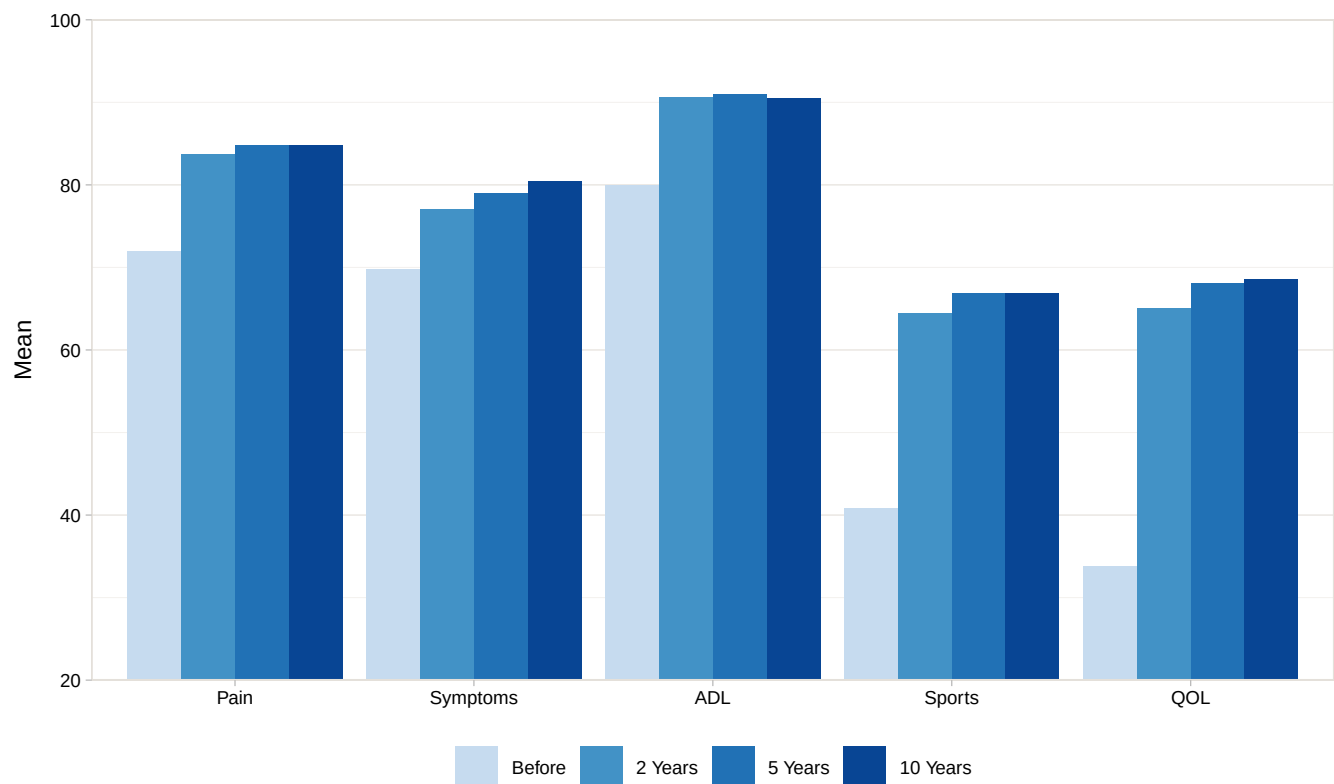
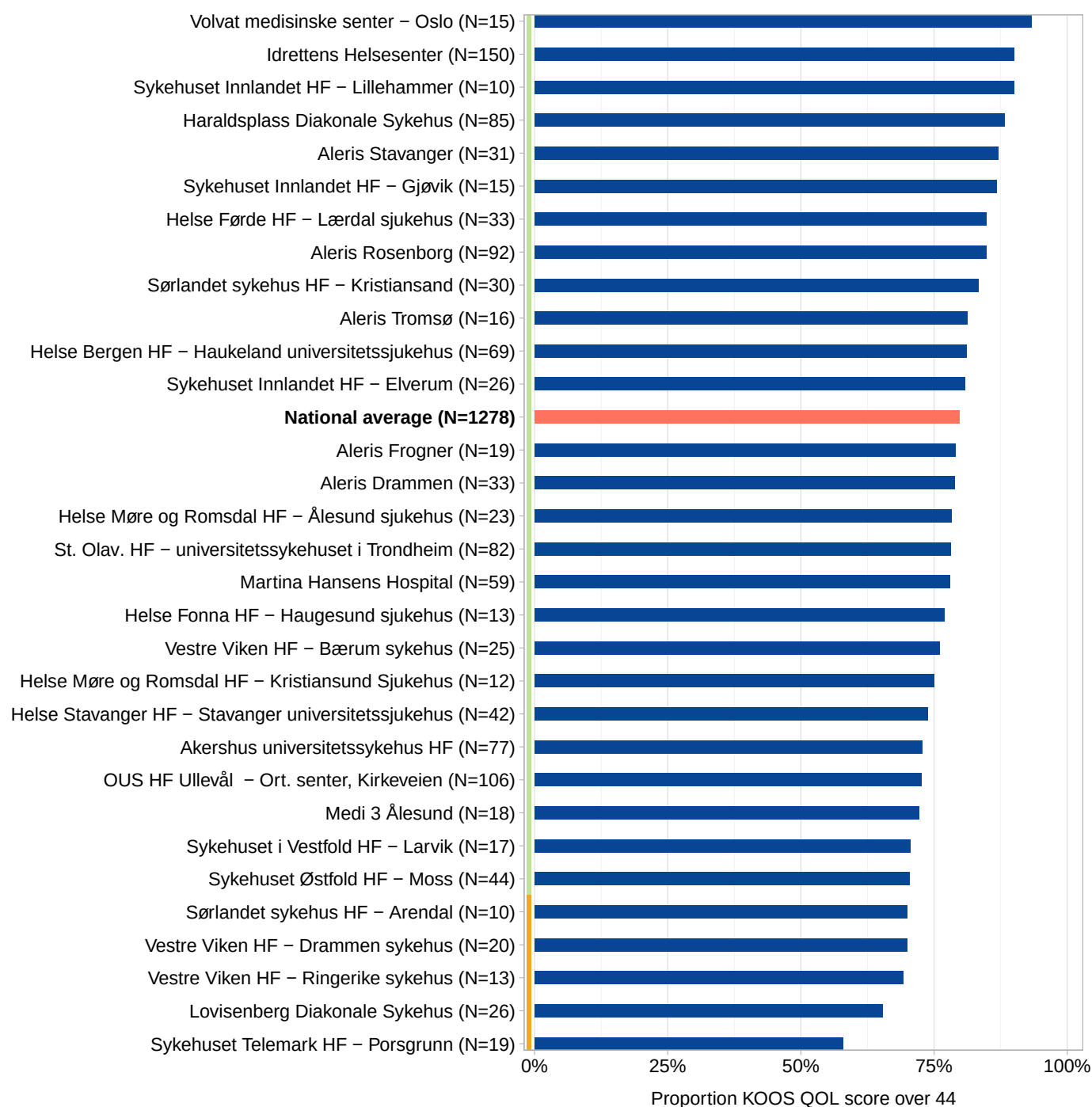
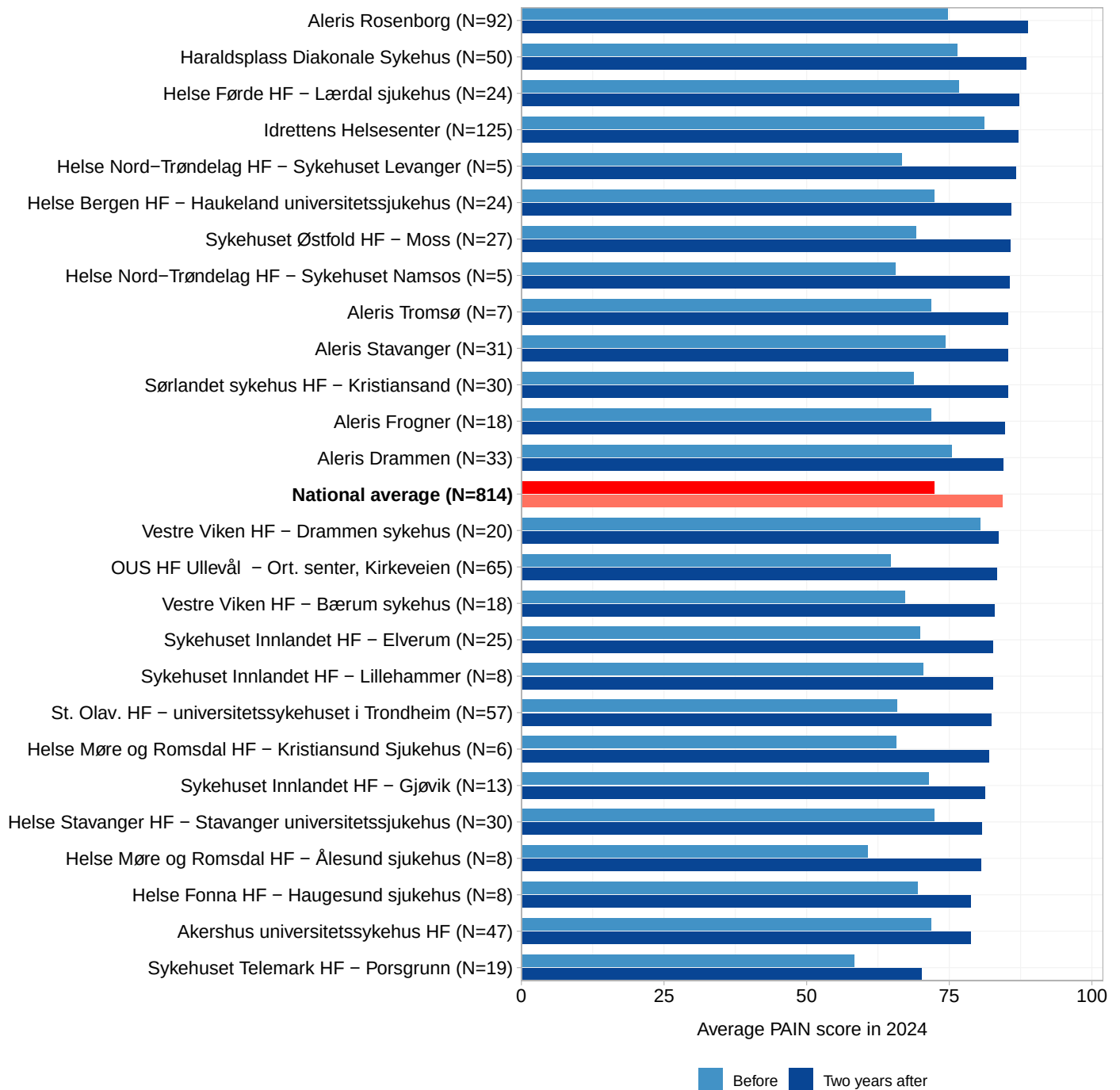
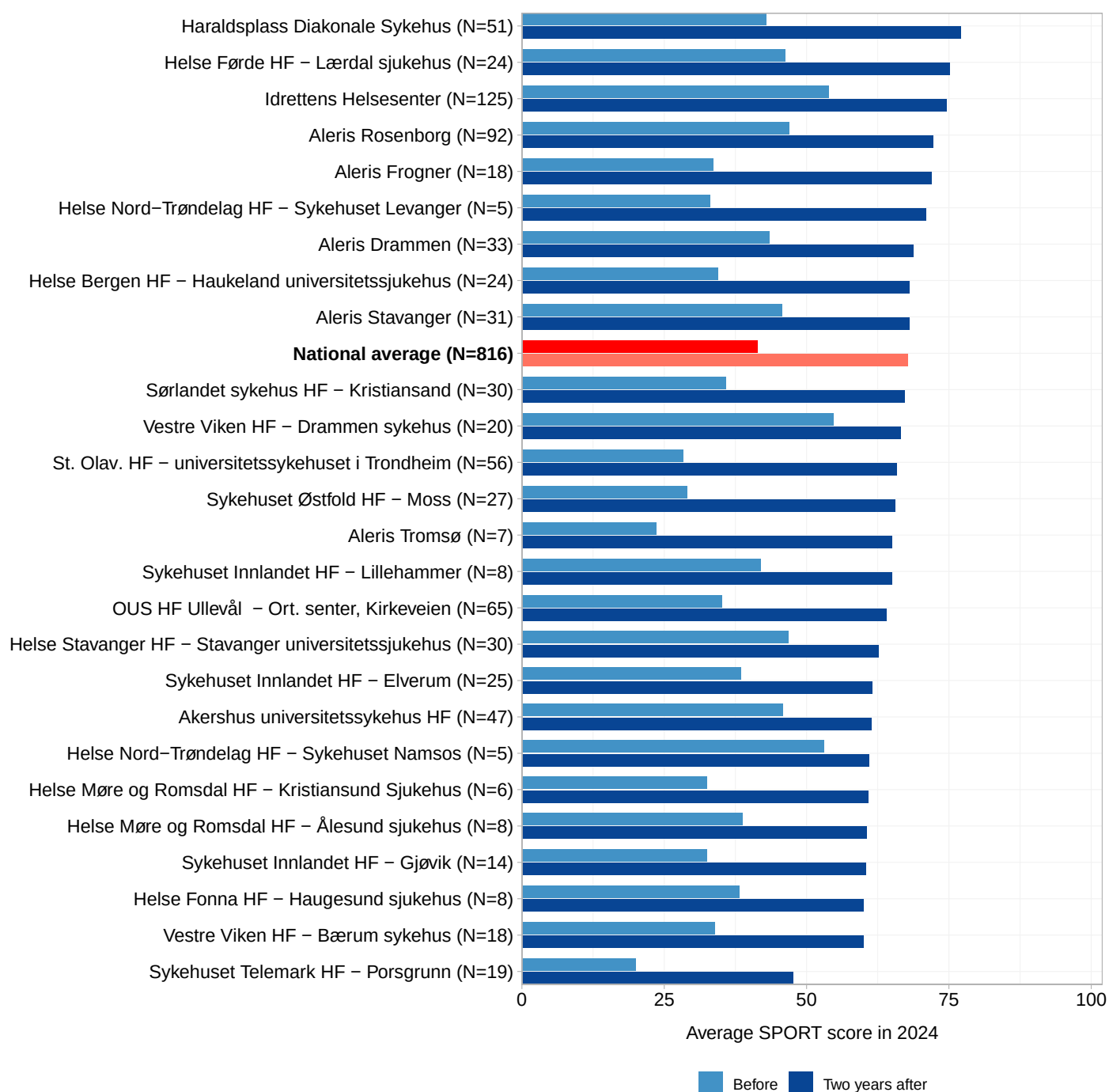
Figure E.11: KOOS in primary ACL reconstruction without additional injury**Figure E.12: KOOS in primary ACL reconstruction with additional injury**

Figure E.13: Proportion two years KOOS QOL score over 44 for each hospital in 2024

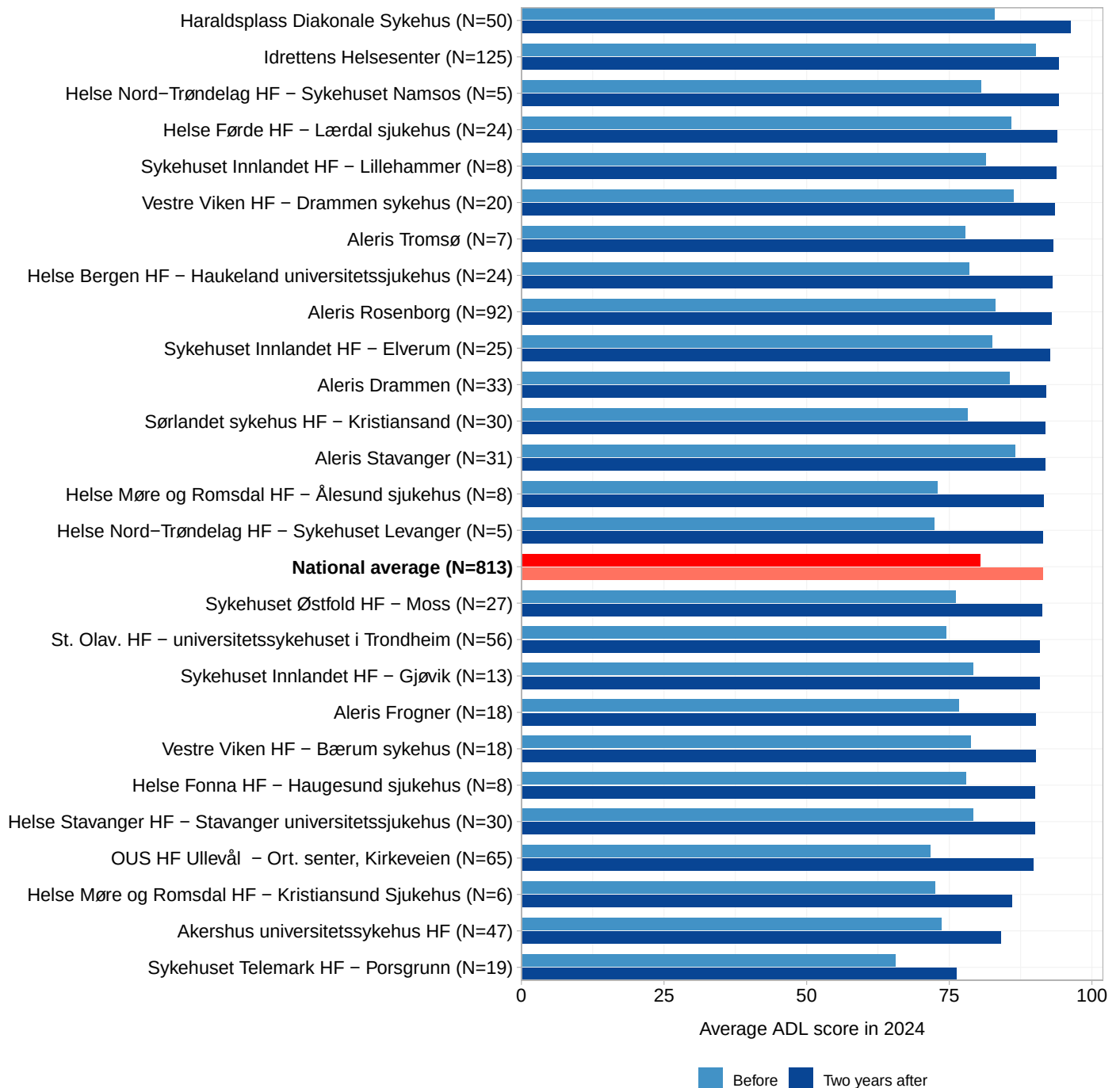
Patient completed two years postop PROM which was completed in 2024. National average in 2024 is 79.7%.

Figure E.14: KOOS score for PAIN for each hospital in 2024

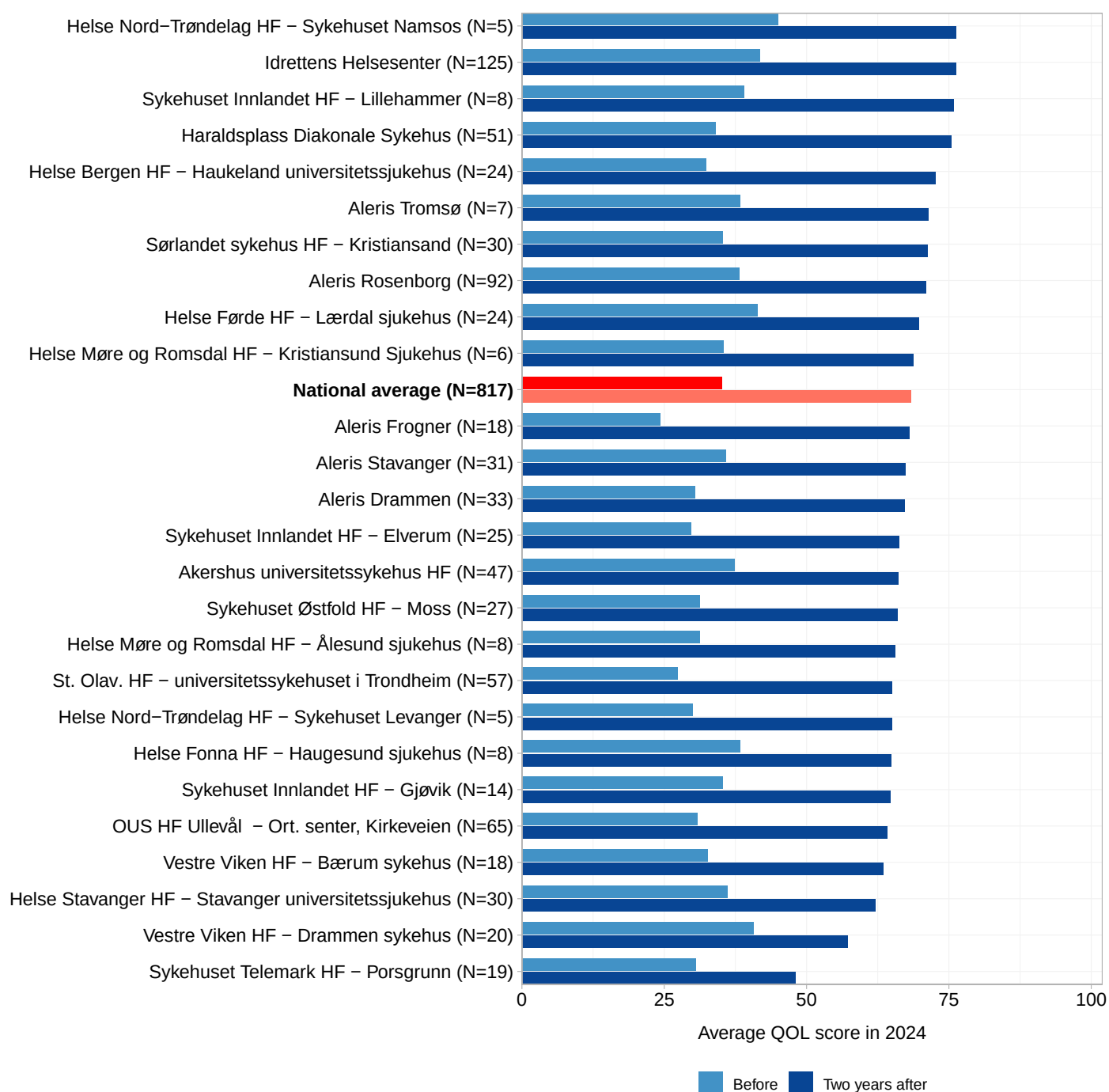
The data which is included in the figure is patients which has completed two years postop PROM in 2024 and preop PROM earlier. Hospitals with less than 5 is removed from the figure. National average for KOOS PAIN is 72.4 for preop PROM and 84.4 for two years postop PROM.

Figure E.15: KOOS score for SPORT for each hospital in 2024

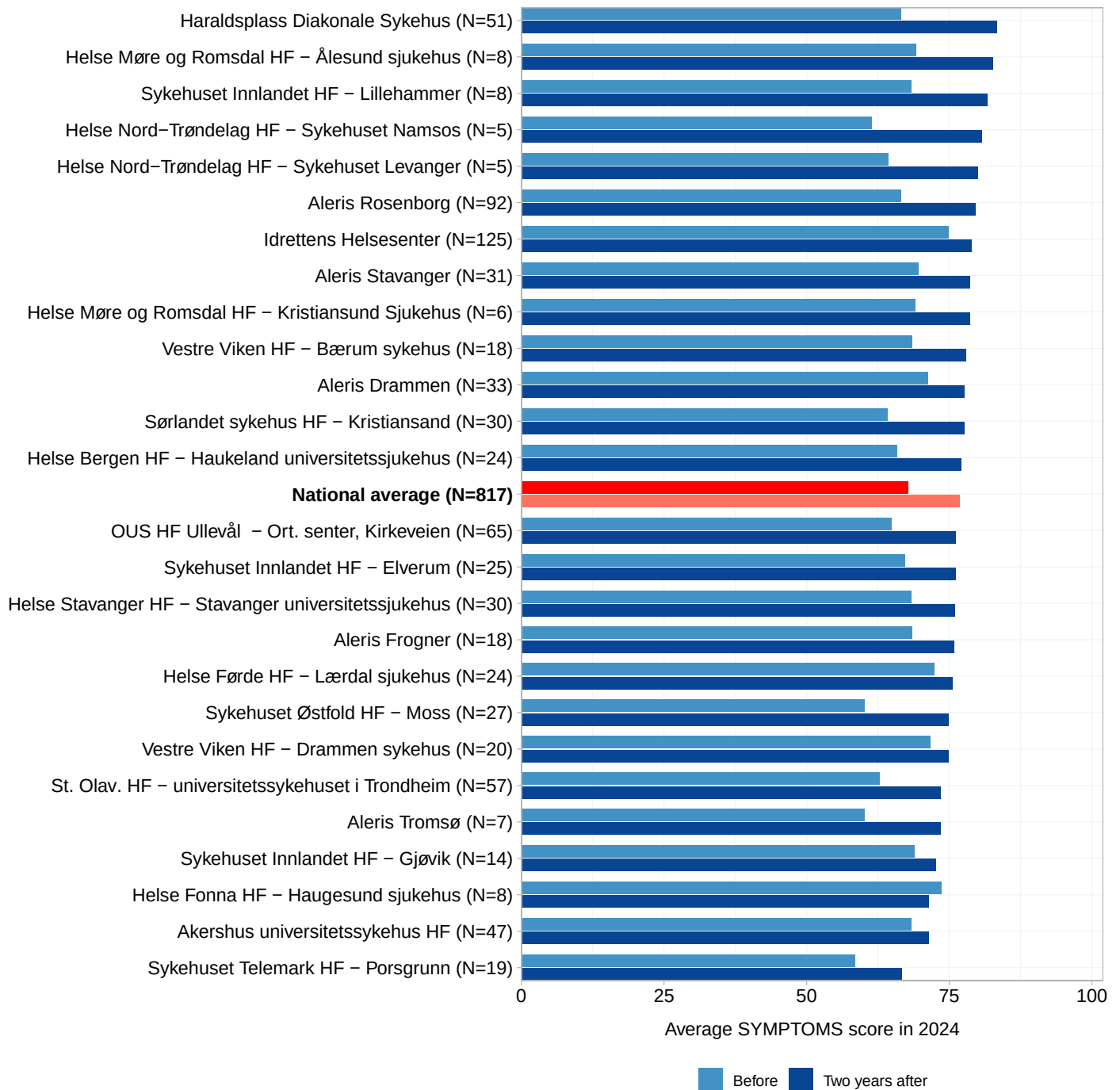
The data which is included in the figure is patients which has completed two years postop PROM in 2024 and preop PROM earlier. Hospitals with less than 5 is removed from the figure. National average for KOOS SPORT is 41.4 for preop PROM and 67.7 for two years postop PROM.

Figure E.16: KOOS score for ADL for each hospital in 2024

The data which is included in the figure is patients which has completed two years postop PROM in 2024 and preop PROM earlier. Hospitals with less than 5 is removed from the figure. National average for KOOS ADL is 80.5 for preop PROM and 91.4 for two years postop PROM.

Figure E.17: KOOS score for QOL for each hospital in 2024

The data which is included in the figure is patients which has completed two years postop PROM in 2024 and preop PROM earlier. Hospitals with less than 5 is removed from the figure. National average for KOOS QOL is 35.1 for preop PROM and 68.4 for two years postop PROM.

Figure E.18: KOOS score for SYMPTOMS for each hospital in 2024

The data which is included in the figure is patients which has completed two years postop PROM in 2024 and preop PROM earlier. Hospitals with less than 5 is removed from the figure. National average for KOOS SYMPTOMS is 67.8 for preop PROM and 76.8 for two years postop PROM.

Completeness analysis for the Cruciate Ligament Register 2021-2023

A completeness analysis for the Cruciate Ligament Register has been conducted by combining the data in the Register with data from the Norwegian Patient Register (NPR). The report and analysis were prepared by the NPR in collaboration with the Cruciate Ligament Register.

NCSP codes for combining data from NPR hospital stays and the Cruciate Ligament Register

Code	Description
NGE60	Primary anterior cruciate ligament reconstruction
NGE61	Primary posterior cruciate ligament reconstruction
NGE62	Primary medial collateral ligament reconstruction in the knee
NGE63	Primary lateral collateral ligament reconstruction in the knee
NGE 11 and S83.5/M23.5	Transcision or excision of ligament of knee; anterior cruciate, open, in connection with sprain of cruciate ligament/chronic instability of knee
NGE 12 and S83.5/M23.5	Transcision or excision of ligament of knee; posterior cruciate, open, in connection with sprain of cruciate ligament/chronic instability of knee
NGE 15	Transcision or excision of ligament of knee; anterior cruciate, arthroscopic
NGE 16	Transcision or excision of ligament of knee; posterior cruciate, arthroscopic
NGE 21	Fixation of fragment of surface of knee; anterior cruciate, open
NGE 22	Fixation of fragment of surface of knee; posterior cruciate, open
NGE 25	Fixation of fragment of surface of knee; anterior cruciate, arthroscopic
NGE 26	Fixation of fragment of surface of knee; posterior cruciate, arthroscopic
NGE 31	Transposition of ligament of knee; anterior cruciate, open
NGE 32	Transposition of ligament of knee; posterior cruciate, open
NGE 35	Transposition of ligament of knee; anterior cruciate, arthroscopic
NGE 36	Transposition of ligament of knee; posterior cruciate, arthroscopic
NGE 41	Plastic repair of ligament of knee not using prosthetic material; anterior cruciate, open
NGE 42	Plastic repair of ligament of knee not using prosthetic material; posterior cruciate, open
NGE 45	Plastic repair of ligament of knee not using prosthetic material; anterior cruciate, arthroscopic
NGE 46	Plastic repair of ligament of knee not using prosthetic material; posterior cruciate, arthroscopic
NGE 51	Plastic repair of ligament of knee using prosthetic material; anterior cruciate, open
NGE 52	Plastic repair of ligament of knee using prosthetic material; posterior cruciate, open
NGE 55	Plastic repair of ligament of knee using prosthetic material; anterior cruciate, arthroscopic
NGE 56	Plastic repair of ligament of knee using prosthetic material; posterior cruciate, arthroscopic
NGT 19 and S83.5/M23.5	Forcible manipulation of knee joint, in connection with sprain of cruciate ligament/chronic instability of knee

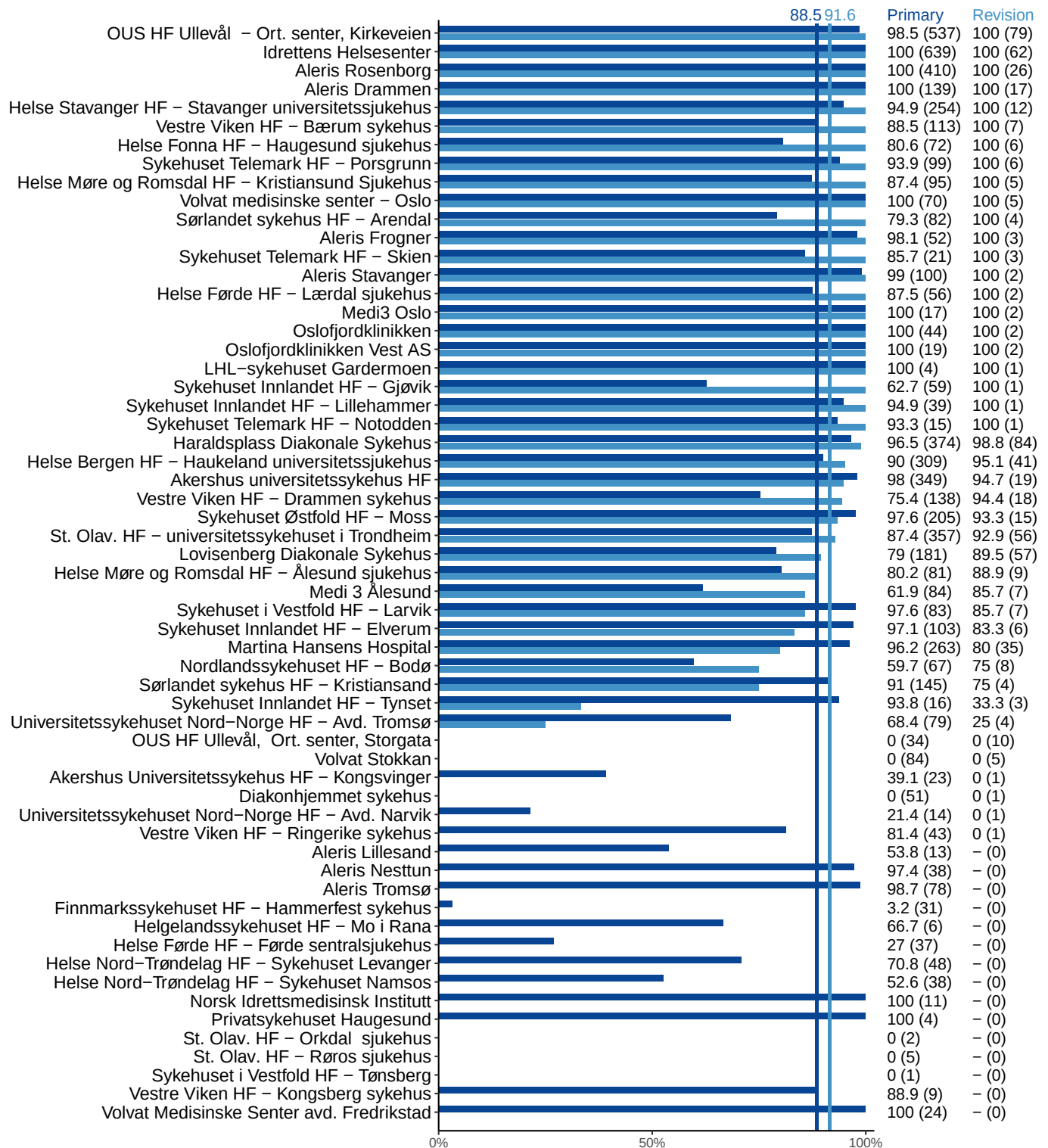
Formula for completeness rates:

$$\text{Completeness rate NCLR} = \frac{\text{only NCLR} + \text{both registers}}{\text{only NPR} + \text{only NCLR} + \text{both registers}}$$

$$\text{Completeness rate NPR} = \frac{\text{only NPR} + \text{both registers}}{\text{only NPR} + \text{only NCLR} + \text{both registers}}$$

Primary reconstructions: In 2021-2023, 6364 primary cruciate ligament operations were reported to one or both of the registers. 88.5% of these were reported to the Cruciate Ligament Register, while 70.6% were reported to the NPR. The coverage for the Cruciate Ligament Register shows considerable variation between hospitals. In the case of hospitals with a low coverage rate for the Cruciate Ligament Register, either the forms were not submitted or other interventions than cruciate ligament surgery were incorrectly coded.

Reop reconstructions: In 2021-2023, 641 reop reconstructions cruciate ligament operations were reported to one or both of the registers. 91.6% of these were reported to the Cruciate Ligament Register, while 60.7% were reported to the NPR.

Figure E.19: Completeness of reporting for cruciate ligament operations 2021-2023

Dark blue bars and first number to the right of the bars gives completeness of reporting for primary operations. Light blue bars and second number to the right of the bars gives completeness of reporting for revision operations. The numbers in brackets gives the number of operations registered at both NAR and NPR. Vertical lines shows the national averages. Private clinics will often score better in primary and reconstructions. One reason for this is that private clinics are not obligated to report it's operations to NPR.

CONTENTS

Norwegian Pediatric Hip Register

Highlights from 2024	430
Introduction	431
Number of pediatric hips at each hospital in 2024	432
Number of open and arthroscopic procedures at each hospital in 2024	432
Time trend for symptom duration before Perthes' disease	433
Time trend for symptom duration before SCFE diagnosis.....	433
 Pediatric hips.....	 435
Developmental dysplasia of the hip (DDH)	435
Perthes' disease.....	440
Slipped Capital Femoral Epiphysis (SCFE)	446
PROM for pediatric hip.....	452
 Open and arthroscopic hip preserving surgery in young adults.....	 471
Periacetabular osteotomy (PAO)	472
Other open procedures	477
Hip arthroscopies	478
PROM for young adults.....	489
 Completeness analysis 2021-22.....	 491
Completeness analysis outpatients	492

Norwegian Paediatric Hip Register



Hip dysplasia (DDH)

Perthes disease

Slipped capital femoral epiphysis (SCFE)

Open procedure/arthroscopy

Reported in
2010-2024

1301

557

486

713

Reported in
2024

52

20

46

184

11/13

Hospitals reported to
the register

85%

compliance

100%

Electronic

DDH
85.7%

Completeness 2022

Perthes
92.9%

SCFE
77.4%

Arthroscopy
78.5%

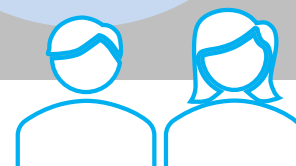
ePROM 2010-2024

DDH
106

Perthes
76

SCFE
102

Arthroscopy
219



Find us:

<https://www.helse-bergen.no/nrl>

<https://www.facebook.com/leddregisteret>

Nasjonalt servicemiljø for medisinske kvalitetsregistre

Results and activities



Quality indicator

0.08% DDH Proportion late-diagnosed hip dysplasia

38.5% DDH Proportion newborn ultrasound screened

35% Perthes Duration of symptoms $\leq$ 2 months

76.9% Perthes Operation children > 6 years Caterall III/IV

52.2% SCFE Duration of symptoms $\leq$ 2 months

90% SCFE Implantat allowing further growth

Research



Arthroscopic surgery in
adolescent athletes with
Femoroacetabular
impingement syndrome
(FAIS) – do they return to
sport?

A collaboration with the
Norwegian school of sport
science.

ANNUAL REPORT NORWEGIAN PAEDIATRIC HIP REGISTER

The Paediatric Hip Register has a fully digital reporting system for both registration forms and postoperative PROM collection. During the year, we also implemented an electronic solution for preoperative PROM reporting in the adult hip section. Additional questions have been included in the PROM questionnaires to capture sports activity, both pre- and postoperatively, allowing assessment of return to activity and whether patients resume their previous level of participation.

We are the first among the orthopedic registries to have imported all data from previous paper forms into the Medical Registry System (MRS), meaning all data are now consolidated in one place. This is of great value to all reporting hospitals, as they now also have access to PROM data for patients reported prior to 2019.

In 2024, 18 hospitals reported to the registry—14 to the pediatric hip section and 6 to the adult hip section, with some reporting to both. Paediatric hip conditions are primarily treated at the major university hospitals, although diagnosis and follow-up of conservatively managed hip dysplasia and Perthes disease often occur at local hospitals. We are pleased that we this year have included hospitals in the Northern Health Region that treat pediatric hip conditions.

For the adult hip section, open procedures are mainly performed at Oslo University Hospital (OUH) and Haukeland University Hospital (HUH-KIH), while arthroscopic procedures are carried out at several institutions, including private clinics. We have worked with MRS to enable private providers to report to the system, and we have an increasing number of hip arthroscopies being reported. Throughout the reporting year, we conducted dropout analyses for pediatric hip conditions including hip dysplasia, Perthes disease, and slipped capital femoral epiphysis. These analyses were performed at three university hospitals and revealed that the coverage rates from the Norwegian Patient Registry (NPR) underestimate the actual reporting. The register's reporting rate is higher than indicated, and we have presented corrected coverage rates based on the findings. Based on these results, we have created a new algorithm for future coverage analyses to exclude patients who should not be reported to the register.

In 2024, most children reported with hip dysplasia were diagnosed after three months of age. Children diagnosed at birth typically begin treatment immediately, and most normalize before the first X-ray is taken. Nationally, the goal is to minimize the proportion of late-diagnosed hip dysplasia. A new national guideline for screening, treatment, and follow-up of children with hip dysplasia has been developed and published, with broad professional consensus among involved specialties. Based on this, we are planning to include all children with hip dysplasia in the registry, including those receiving only brace treatment. This will allow the registry to provide insights into the outcomes of screening and treatment, and whether hospitals are adhering to the evidence-based guideline.

As in 2023, the number of patients reported with slipped capital femoral epiphysis continues to rise. A significant proportion of these patients undergo prophylactic surgery on the contralateral hip either during the primary procedure or as planned surgery 6–12 weeks later.

For the adult hip section, this year's report includes four new quality indicators, focusing on the use of thromboprophylaxis and antibiotic prophylaxis in connection with surgical procedures.



Trude Gundersen
Senior Consultant Ortho Surgeon
Head of Paediatric Hip Register



Eva Dybvik
Biostatistician/researcher

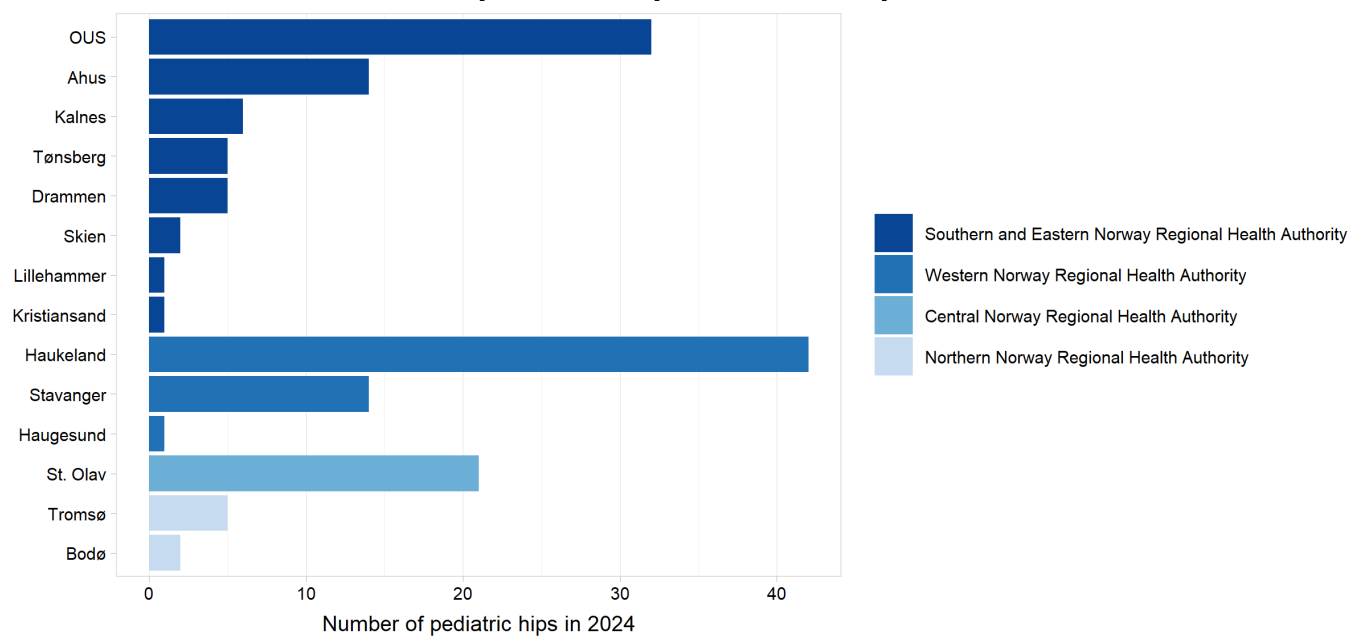
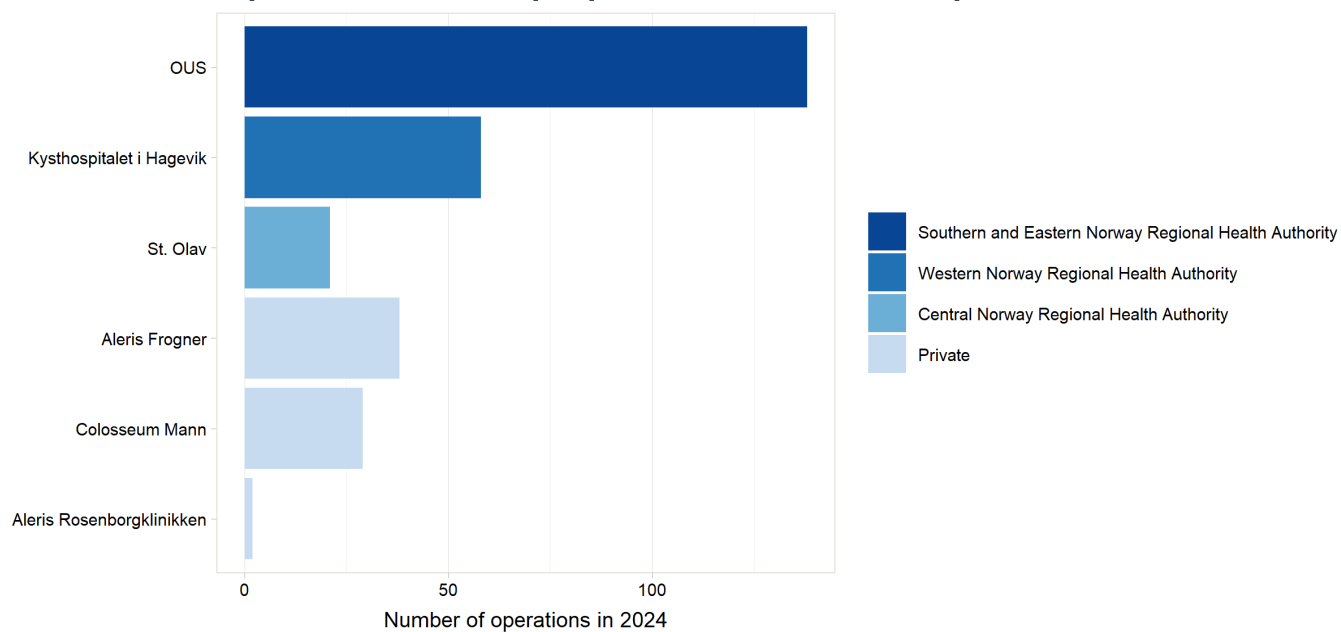
Figure F.1:**Number of pediatric hips at each hospital in 2024****Figure F.2:****Open and arthroscopic procedures at each hospital in 2024**

Figure F.3: Time trend for symptom duration before Perthes’ disease

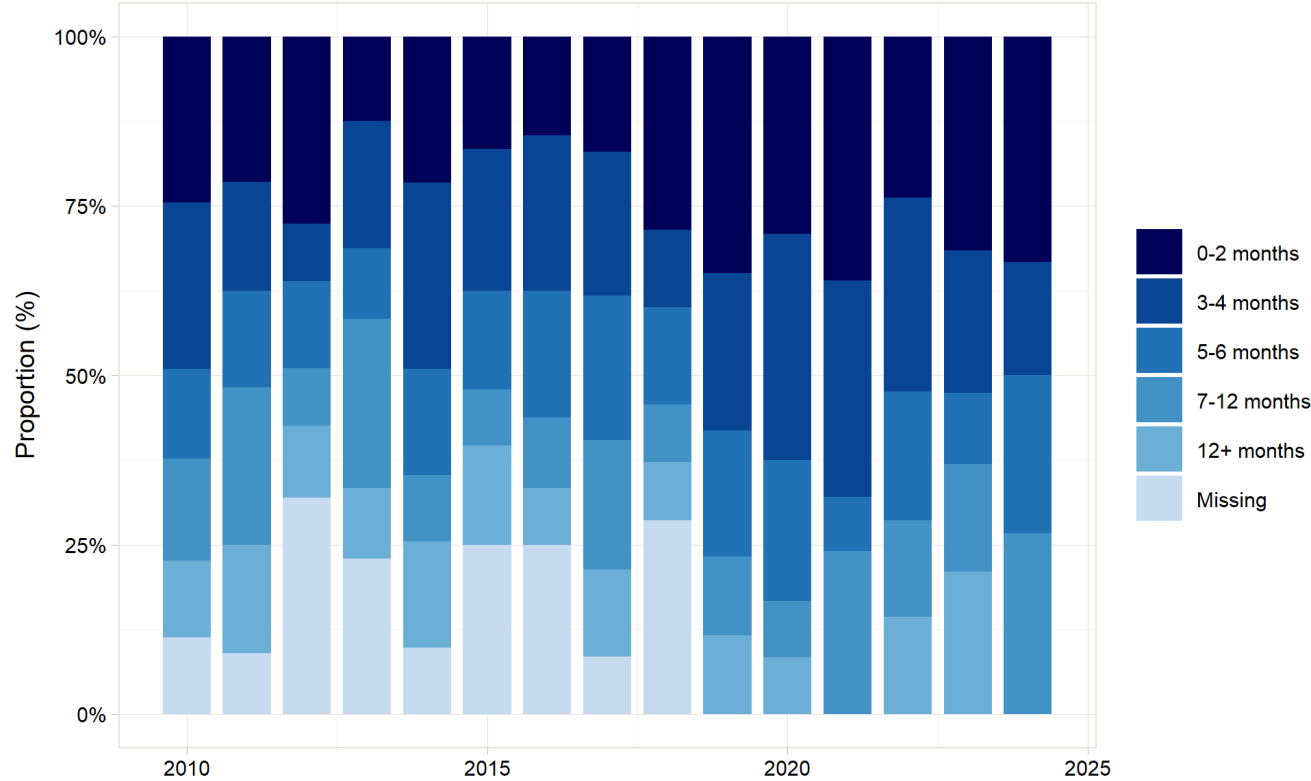
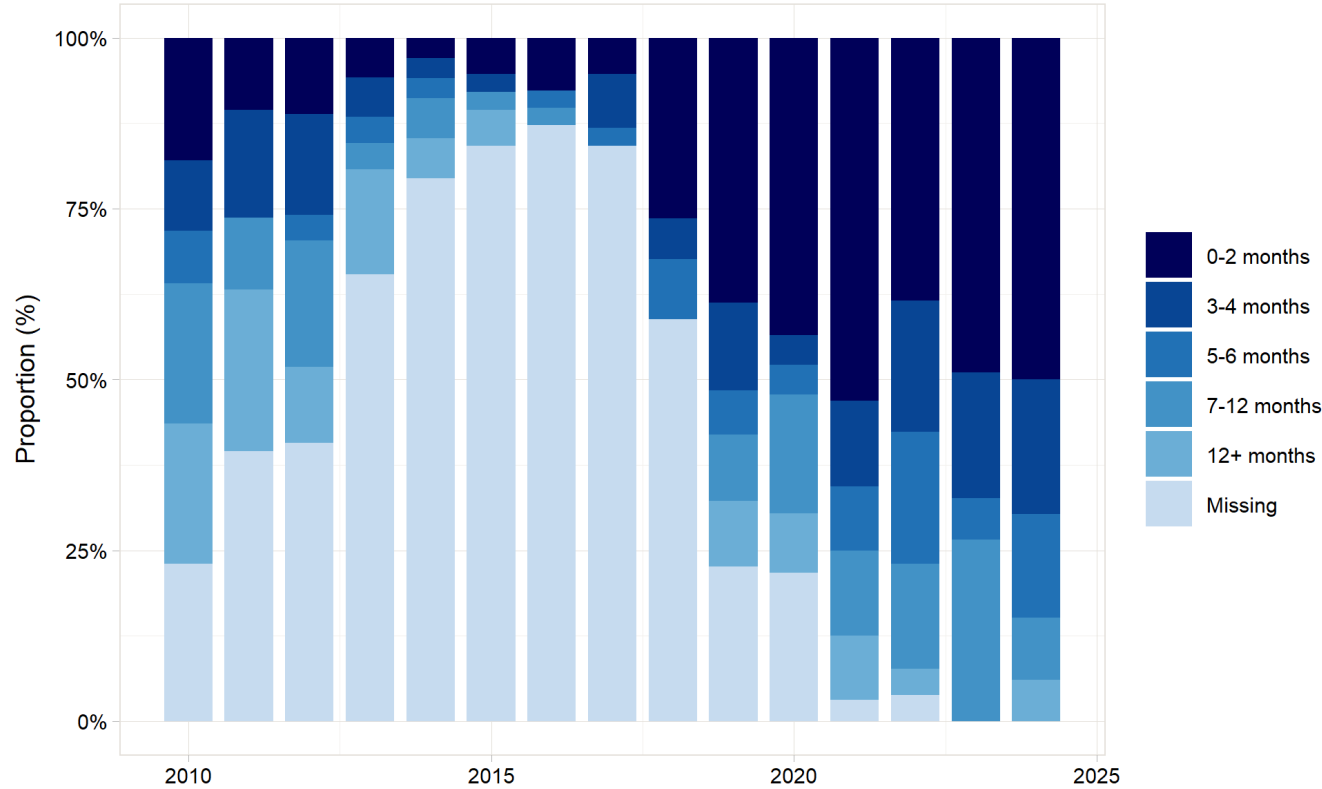


Figure F.4: Time trend for symptom duration before SCFE diagnosis



Annual report 2025

The National Pediatric Hip Registry collects data from all hospitals treating children with hip diseases such as Developmental dysplasia of the hip (DDH), Perthes disease, and slipped capital femoral epiphysis (SCFE). In addition, open and arthroscopic hip perserving in young adults are also registered. We will present the key findings from the data collected from all hospitals in the registry.

PEDIATRIC HIPS

Developmental dysplasia of the hip (DDH)

Nationally, we observe that the number of DDH reported to the registry in 2024 is somewhat reduced compared to previous years. There have been no changes in the inclusion criteria, and we have no reason to believe that fewer children with DDH are being born. Hospitals must have been attentive to registering all children with DDH, including those who do not undergo surgery.

Table 1: Number of reported children with DDH

Year	Number of children	Total number DDH
2024	41	55
2023	48	61
2022	55	73
2021	41	61
2020	66	100
2019	62	88
2018	62	93
2017	67	101
2016	50	78
2015	64	100
2014	74	114
2013	62	91
2012	91	132
2011	74	94
2010	99	125

Table 2: The number of hips diagnosed with DDH before and after 3 months of age

Year	<3 months	>3 months	Missing	Total
2024	26	29	0	55
2023	15	46	0	61
2022	32	38	3	73
2021	30	28	3	61
2020	35	55	10	100
2019	33	52	3	88
2018	38	51	4	93
2017	43	55	3	101
2016	24	49	5	78
2015	37	56	7	100
2014	53	60	1	114
2013	31	59	1	91
2012	58	73	1	132
2011	36	58	0	94
2010	42	81	2	125

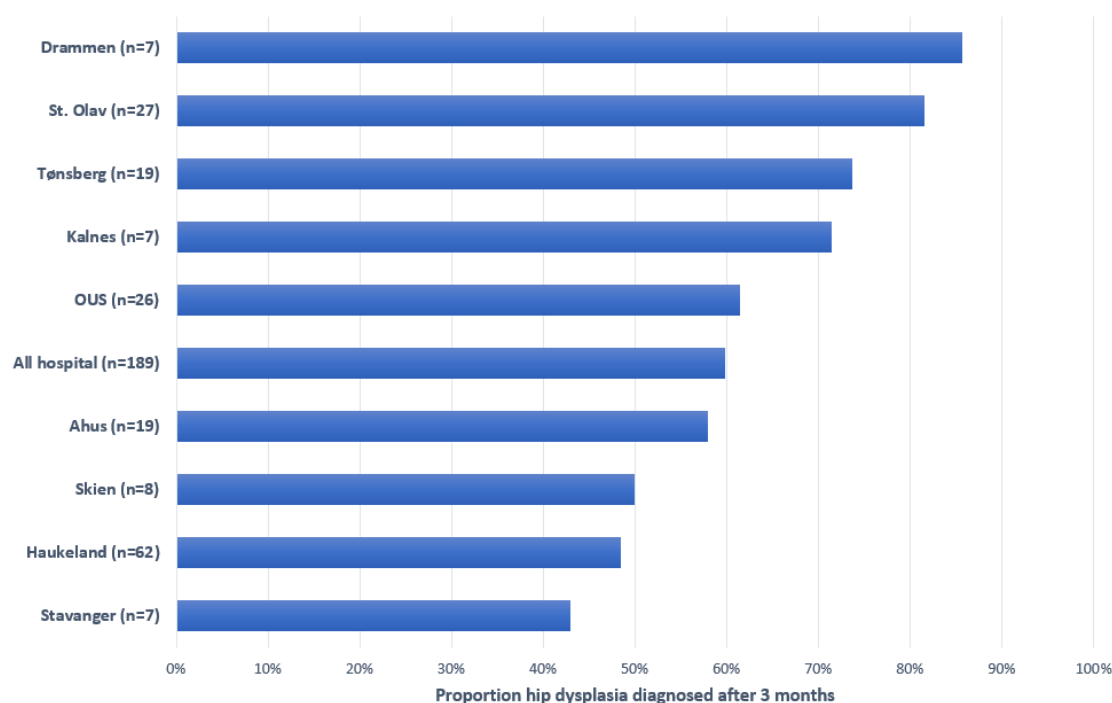
The proportion of late-detected hip dysplasias (after 3 months) diagnosed annually should be below 1/1000 (0.1%) of all newborns.

According to data from Statistics Norway (SSB), 54,0,13 children were born in Norway in 2024. The data from the registry shows that 29 children were diagnosed with hip dysplasia after the age of 3 months. **This results in an incidence of late-detected dysplasia of 0.05%.** Thus, we are below the target of less than 0.1%, but there are still 29 children who are diagnosed late, and who often have to undergo more prolonged and demanding treatment to achieve good hip function.

We do not have birth statistics per hospital per year, so we are unable to calculate the proportion of late-detected hip dysplasias relative to the total number of births per hospital. We also do not know if all hospitals where children are born have screening, treatment, and follow-up for children with hip dysplasia. Therefore, this indicator will always be presented at the national level only.

Table 2 and Figure F.5 show the number of late-detected hip dysplasias among all reported cases of hip dysplasia per hospital, but we have shown that the proportion of late-detected dysplasias is generally high in the registry. This likely reflects that all children who are diagnosed at birth and receive early treatment are largely normalized before the first X-ray is taken. They should therefore not be included in the registry. Among those reported in the registry (with findings of dysplasia on the first X-ray after 4 months of age), there is a large proportion of children who have been diagnosed later than 3 months.

Figure F.5: Hospital-specific proportion of hip dysplasia diagnosed after 3 months among those reported with hip dysplasia to the registry in 2022-2024



Only hospitals with more than 5 reported cases in 2022-2024 are included in the figure.

For DDH, late-detected dysplasia is nationally defined as a diagnosis made after 3 months of age. All children are screened at the newborn examination, either clinically or additionally with ultrasound if they have risk factors for hip disease. The national goal is to keep the proportion of late-detected DDH as low as possible, aiming to be below 0.1 % of all newborns. Of course, the aim is for as many as possible to receive the diagnosis as early as possible, highlighting the importance of thorough newborn screening.

Table 3: Number of hips screened for DDH with ultrasound

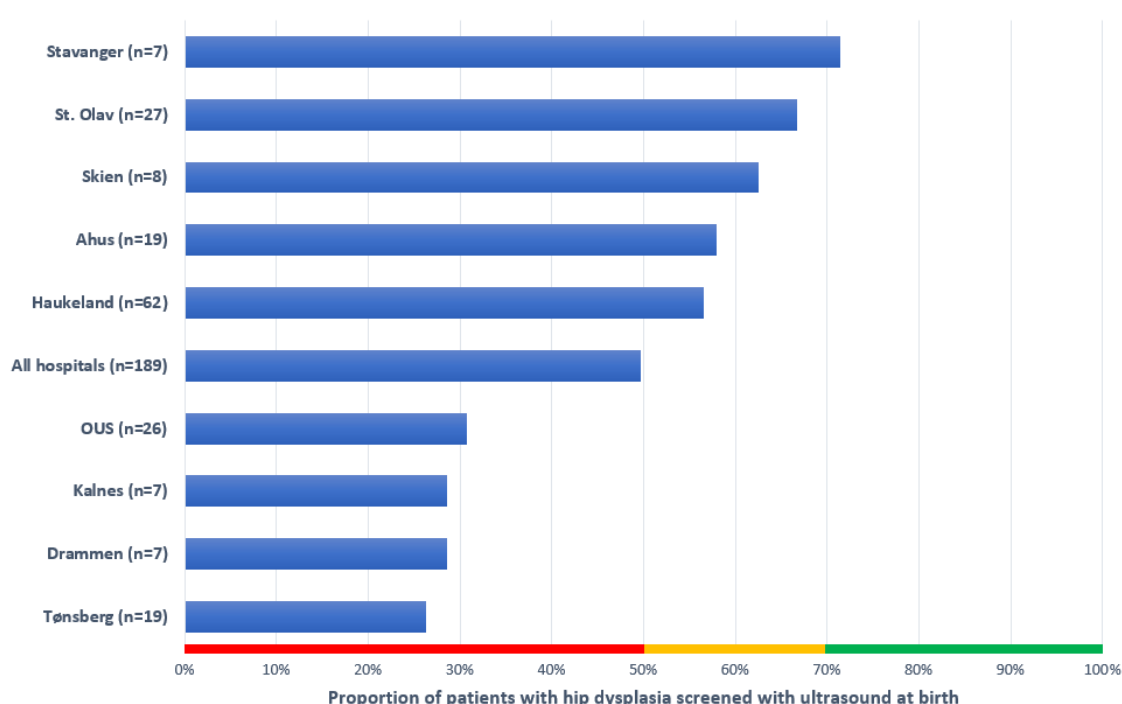
Year	No screening	Ultrasound screening	Missing	Total
2024	24	31	0	55
2023	35	26	0	61
2022	33	37	3	73
2021	29	29	3	61
2020	41	49	10	100
2019	30	28	30	88
2018	10	6	77	93
2017	12	11	78	101

Table 4: Previous treatment of DDH

Year	None	Pillow / Abd. ort.	Other	Missing	Total
2024	28	25	1	1	55
2023	32	26	3	0	61
2022	38	28	5	2	73
2021	27	26	4	4	61
2020	49	41	3	7	100
2019	50	33	3	2	88
2018	44	40	7	2	93
2017	41	42	14	4	101
2016	32	35	6	5	78
2015	38	25	13	24	100
2014	37	38	13	26	114
2013	30	16	5	40	91
2012	7	8	0	117	132
2011	2	1	0	91	94
2010	3	7	0	115	125
Total	458	391	77	440	1366

We can see from the data in Table 3 that only 31/55 reported cases of hip dysplasia were screened with ultrasound at birth. We know that those who are screened at birth and diagnosed with hip dysplasia start early treatment. The inclusions in the registry, which only include children with findings of dysplasia on the first X-ray examination at 4-6 months of age, mean that those who have received treatment and normalized before this X-ray are not included in the registry. Those who are not screened with ultrasound as newborns are those without clear clinical findings and without risk factors for hip dysplasia. These children are often diagnosed later, which is likely related to the fact that approximately 43% of the children reported to the registry are diagnosed after 3 months. These figures will be used in the work on new national, interdisciplinary recommendations for screening, treatment, and follow-up of hip dysplasia.

Figure F.6: Hospital-specific proportion of patients reported with hip dysplasia who were ultrasound-screened at birth in 2022-2024



Only hospitals with more than 5 reported cases in 2022-2024 are included in the figure.

The screening program for hip dysplasia identifies most newborns with dysplasia. This is done through clinical examination and ultrasound for risk groups (breech position, family history, foot deformities, and clinical findings), selectively. Treatment is started early, and for most, this will result in the normalization of the hip joint before the first X-ray is taken at 4-6 months of age. These cases are not included in our registry.

We can see that the proportion of those not screened with ultrasound at birth correlates well with the figures we have for late-detected dysplasias. This highlights the importance of carrying out the screening program properly, especially regarding the clinical examination, so that all those with risk factors undergo early ultrasound.

Even in countries where ultrasound screening is universal, late-detected hip dysplasia is still observed.

Table 5: Hip status at the time of diagnosis for DDH

Year	Grade I	Grade II	Grade III	Grade IV	Missing	Total
2024	19	20	10	6	0	55
2023	36	13	5	4	3	61
2022	42	13	8	9	1	73
2021	30	15	8	8	0	61
2020	70	17	6	6	1	100
2019	57	11	5	13	2	88
2018	73	2	9	5	4	93
2017	67	6	10	16	2	101
2016	43	0	13	15	7	78
2015	51	0	24	17	8	100
2014	65	0	15	32	2	114
2013	49	0	16	17	9	91
2012	64	0	20	34	14	132
2011	55	0	14	21	4	94
2010	65	0	24	29	7	125
Total	786	97	187	232	64	1366

Table 6: Pelvic osteotomy performed for dysplasia

Year	Salter	Dega	Other	Total
2024	1	0	0	1
2023	3	2	0	5
2022	4	2	0	6
2021	1	1	0	2
2020	2	3	0	5
2019	4	4	0	8
2018	1	9	0	10
2017	3	12	0	15
2016	2	8	1	11
2015	5	7	1	13
2014	7	2	0	9
2013	7	0	0	7
2012	3	0	0	3
2011	2	1	2	5
2010	1	1	0	2
Total	46	52	4	102

Table 7: Age and sex at the time of dysplasia

Sex	N	Mean age	Median age	Standard deviation
Boy	174	0.8 year	0.3 year	1.7 year
Girl	1149	0.6 year	0.4 year	1.4 year

Perthes' disease

Perthes' disease affects children aged 3-9 years. Without a known cause, they experience degeneration of the hip joint, leading to pain and limping. There is no effective treatment to halt or reverse a noninfectious necrosis of the femoral head, but it is considered crucial to reduce load through activity restrictions. Activities that impact femoral head necrosis, such as running and jumping, are especially limited to reduce stress on the hip joint. Most children become stiffer in the hip joint, especially during the degenerative phase, and it's essential for them to start targeted physiotherapy with an emphasis on stretching exercises. The stretching primarily aims to maintain mobility. Caterall's classification is used to assess the extent of degeneration. It indicates the percentage of the femoral head affected, with Grade 1 being less than 25 %, Grade 2 less than 50 %, Grade 3 less than 75 %, and Grade 4 affecting the entire femoral head. The degree of degeneration is crucial to classify, as treatment choices depend on it.

Table 8: Number reported per year with Perthes' disease

Year	Total
2024	30
2023	19
2022	21
2021	25
2020	24
2019	43
2018	35
2017	47
2016	48
2015	48
2014	51
2013	48
2012	47
2011	56
2010	53
Total	595

Table 9: Duration of symptoms before diagnosis for Perthes'

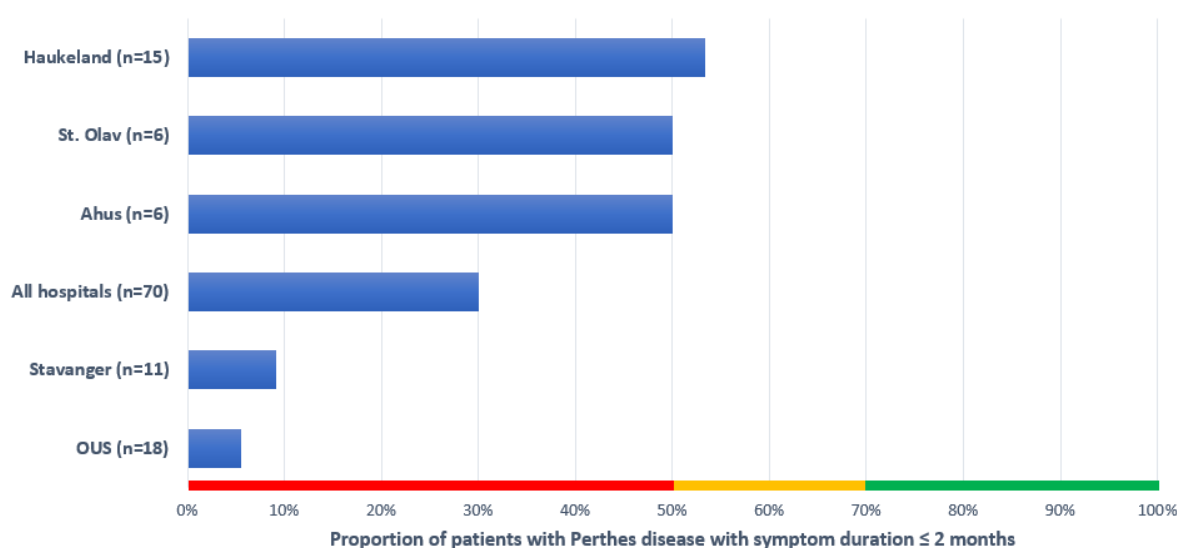
Year	<= 2 months	>2 months	Missing	Total
2024	10	20	0	30
2023	6	13	0	19
2022	5	16	0	21
2021	9	16	0	25
2020	7	17	0	24
2019	15	28	0	43
2018	10	15	10	35
2017	8	35	4	47
2016	7	29	12	48
2015	8	28	12	48
2014	11	35	5	51
2013	6	31	11	48
2012	13	19	15	47
2011	12	39	5	56
2010	13	34	6	53

Table 10: Caterall classification at diagnosis for Perthes'

Year	Caterall I/II	Caterall III/IV	Missing	Total
2024	9	21	0	30
2023	3	16	0	19
2022	1	20	0	21
2021	11	14	0	25
2020	5	19	0	24
2019	13	29	1	43
2018	9	24	2	35
2017	13	28	6	47
2016	8	25	15	48
2015	11	26	11	48
2014	10	33	8	51
2013	11	32	5	48
2012	15	27	5	47
2011	16	36	4	56
2010	20	32	1	53

In recent years, an important goal of the registry has been to provide information to reduce the time from when patients first experience symptoms of hip disease to when they receive a diagnosis. The aim has been for as many as possible to be diagnosed and begin treatment within 2 months. The data shows that over half of the patients still experience symptoms for longer than this, and the registry therefore has an important role in reaching out to the population with information, so that patients seek healthcare when they experience symptoms that could be indicative of Perthes disease.

Figure F.7: The hospital-specific proportion of patients with a symptom duration of ≤ 2 months before diagnosis for Perthes disease in 2022-2024



Only hospitals with more than 5 reported cases in 2022-2024 are included in the figure.

From Figure F.3, which shows trends in symptom duration over time, we observe that there is still some way to go before most patients are diagnosed within 2 months. However, it appears that there has been an increasing proportion over the last 3-4 years achieving this, and we hope to see this proportion continue to rise in the coming years. We also note that since the variable was made mandatory in 2018, there have been no missing data for this quality indicator from 2019 onwards.

Table 11: Number of children under and over 6 years of age who undergo surgery, divided by Caterall classification

Year	<6yr Cat I/II	<6yr Cat III/IV	<6yr Cat Missing	>6yr Cat I/II	>6yr Cat III/IV	>6yr Cat Missing
2024	0/5	0/6		0/4	9/15	
2023	0/2	0/5		0/1	8/11	
2022	0/1	1/8			9/12	
2021	0/7	0/8		0/4	4/6	
2020	0/3	0/9		0/2	9/10	
2019	0/6	0/10	0/1	1/7	16/19	
2018	0/4	1/10		0/5	8/14	2/2
2017	0/2	0/14	0/2	0/11	7/14	4/4
2016	0/2	2/8	1/2	0/6	9/17	12/13
2015	0/5	1/14		0/6	6/12	9/11
2014	0/2	1/17	1/2	0/8	10/16	4/6
2013	0/5	2/16	0/2	1/6	10/16	2/3
2012	0/8	0/13	0/1	0/7	6/14	3/4
2011	0/8	1/16		0/8	13/20	4/4
2010	0/13	3/16	0/1	0/7	5/16	

Table 12: Age and sex at the time of Perthes' disease

Sex	N	Mean age	Median age	Standard deviation
Boy	446	6.1 year	5.9 year	2.4 year
Girl	120	6.2 year	5.8 year	2.3 year

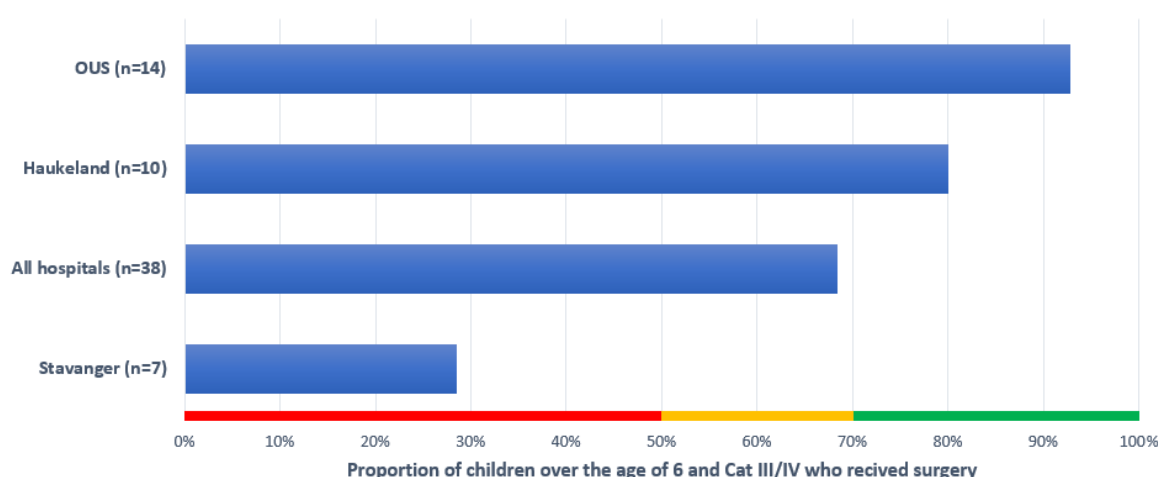
Based on a large Norwegian study conducted between 1996-2000 on children with Perthes' disease, it has been concluded that children under 6 years of age, regardless of the degree of degeneration, achieve the best results with conservative treatment. For children over 6 years of age, those with over 50 % degeneration will have a better outcome if they undergo proximal varus femoral osteotomy. This is done to improve coverage of the affected femoral head. These principles also form the basis of the national treatment guidelines adopted by the Norwegian Pediatric Orthopedic Society.

Children diagnosed with Perthes disease over the age of 6 and with more than 50% of the femoral head affected are recommended surgery with varus femoral osteotomy. The proportion of operated cases should be 90%.

National treatment recommendations for Perthes disease state that children under the age of 6, regardless of the degree of femoral head involvement, should be treated conservatively. For children over the age of 6 with more than 50% involvement of the femoral head, surgery is recommended to improve containment of the femoral head.

The data show that patients reported in 2023 follow these recommendations and that surgeries are performed at a limited number of hospitals with specialized expertise in pediatric orthopedics. From the data in the registry, we see that some of the children reported in 2024 with the Perthes disease and who were older than 6 years were first operated on in 2025, and they will therefore only be included in the figures for next year's report. If the Perthes disease is made early in the course, the children may have less than 50% involvement of the femoral head. However, in some cases, progression of the collapse will occur, and they are then operated on if more than 50% of the femoral head has collapsed.

Figure F.8: The proportion of children over the age of 6 and classified as Cat III/IV who received surgery in 2022-2024

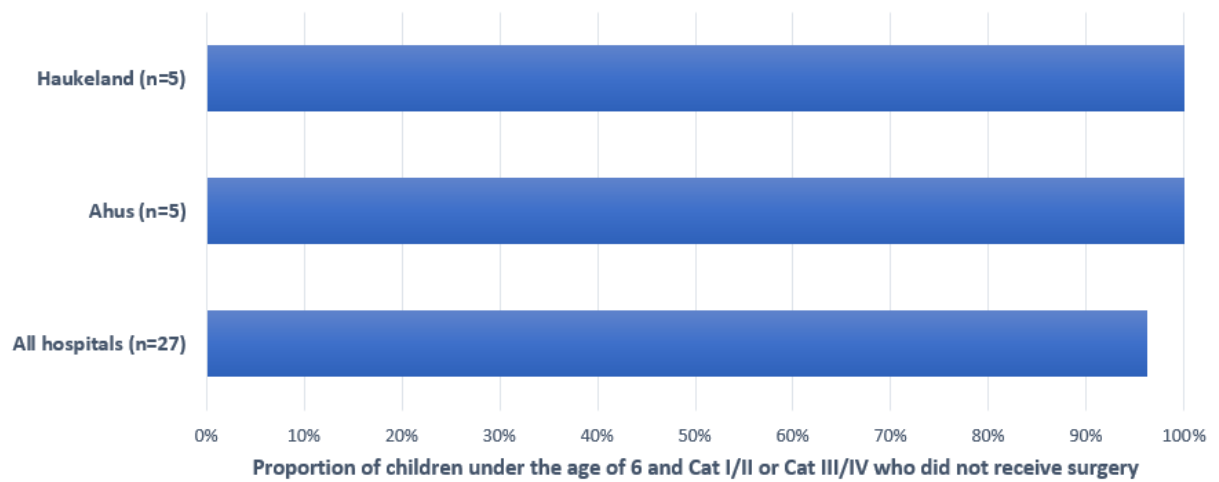


Only hospitals with more than 5 reported cases in 2022-2024 are included in the figure.

Hospitals with $n < 5$ even when aggregating data over three years:
Drammen, Kristiansand, Lillehammer, Skien and St. Olavs

We observe that the hospitals in Norway (Figure F.8 and Table 11) treating children with Perthes disease follow national and international treatment recommendations regarding surgery. Children under the age of 6 are treated conservatively regardless of the degree of femoral head deterioration, while children over the age of 6 with more than 50% deterioration undergo varus osteotomy.

Figure 9: The proportion of children under the age of 6 and classified as Cat I/II or Cat III/IV who did not received surgery in 2022-2024



Hospitals with $n < 5$ even when aggregating data over three years:
Drammen, Kalnes, OUS, Skien, St.Olav, Stavanger and Tønsberg

Slipped Capital Femoral Epiphysis (SCFE)

Slipped capital femoral epiphysis, a slippage of the femoral head on the femoral neck, is a condition that always requires surgery. Using data from the Norwegian Patient Registry (NPR), the incidence has previously been estimated at 25–40 cases per year in Norway. The low number of new cases per year means that smaller hospitals may not have any patients to report to the registry every year.

Table 13: Number of reported SCFE per year

Year	Prophylactic treatment	Total
2024	9	66
2023	4	49
2022	3	26
2021	4	32
2020	1	23
2019	4	31
2018	5	34
2017	0	38
2016	3	39
2015	2	38
2014	0	34
2013	5	52
2012	3	27
2011	4	38
2010	1	39

Table 14: Duration of symptoms before SCFE diagnosis

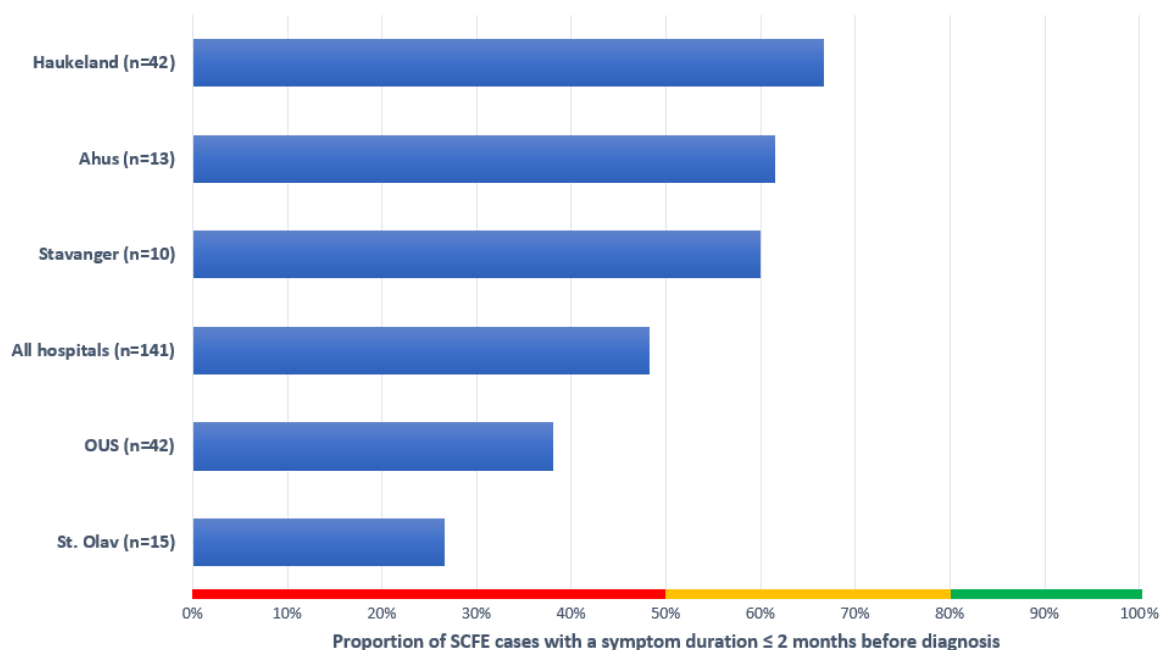
Year	<=2 months	>2 months	Missing	Total
2024	33	33	0	66
2023	25	24	0	49
2022	10	16	0	26
2021	17	15	0	32
2020	10	13	0	23
2019	14	16	1	31
2018	12	18	4	34
2017	7	30	1	38
2016	8	29	2	39
2015	11	27	0	38
2014	3	31	0	34
2013	7	38	7	52
2012	5	18	4	27
2011	9	25	4	38
2010	10	24	5	39

For SCFE it is essential to diagnose the condition as early as possible. However, many individuals have often experienced symptoms for a while before undergoing X-rays and receiving a diagnosis. Previous research indicates that the duration of symptoms is often linked to the severity of the slippage, with those experiencing longer durations typically having more severe forms of slippage, which in turn leads to a poorer long-term prognosis. Therefore, a national goal is for as many individuals as possible to receive a diagnosis within 2 months.

Through the quality improvement study conducted in the registry over the past years, we have identified that delays in diagnosis primarily occur at the patient level and due to the time taken from seeking care in primary healthcare to being referred to specialist care. Therefore, the registry has prioritized raising awareness of the diagnosis through various lectures, and we still see that too many cases are diagnosed late.

However, there is a positive trend showing an increasing proportion of diagnoses being made within 2 months of symptom onset. While this is encouraging, the registry sees it as its responsibility to continue these information efforts to further reduce delays.

Figure F.10: Proportion of SCFE cases with a symptom duration of less than 2 months before diagnosis in 2022-2024



Only hospitals with more than 5 reported cases in 2022-2024 are included in the figure.

Hospitals with $n < 5$ even when aggregating data over three years:

Bodø, Drammen, Elverum, Hagesund, Kalnes, Tromsø and Tønsberg

Table 15: Degree of slippage at the time of SCFE diagnosis

Year	< 30 degrees	30-50 degrees	> 50 degrees	Missing	Total
2024	24	20	21	1	66
2023	18	17	12	2	49
2022	18	5	3	0	26
2021	10	8	14	0	32
2020	8	8	5	2	23
2019	15	11	4	1	31
2018	16	6	3	9	34
2017	16	8	9	5	38
2016	16	10	8	5	39
2015	17	11	6	4	38
2014	14	7	9	4	34
2013	30	12	5	5	52
2012	9	6	5	7	27
2011	14	10	8	6	38
2010	23	7	8	1	39
Total	248	146	120	52	566

Table 16: Choice of implants for SCFE

Year	Screw osteosynthesis	Pin osteosynthesis	Other	Missing	Total
2024	65	1	0	0	66
2023	49	0	0	0	49
2022	26	0	0	0	26
2021	31	0	1	0	32
2020	21	0	2	0	23
2019	27	4	0	0	31
2018	31	2	0	1	34
2017	34	3	1	0	38
2016	33	5	1	0	39
2015	26	10	2	0	38
2014	29	3	2	0	34
2013	38	10	2	2	52
2012	19	8	0	0	27
2011	26	11	0	1	38
2010	27	12	0	0	39
Total	482	69	11	4	566

Table 17: Primary operation with implants that allow for continued growth in SCFE

Year	Allow for continued growth	No	Missing	Total
2024	57	2	0	59
2023	38	4	0	42
2022	19	3	1	23
2021	21	1	0	22
2020	13	4	5	22
2019	12	8	7	27
Total	160	22	13	195

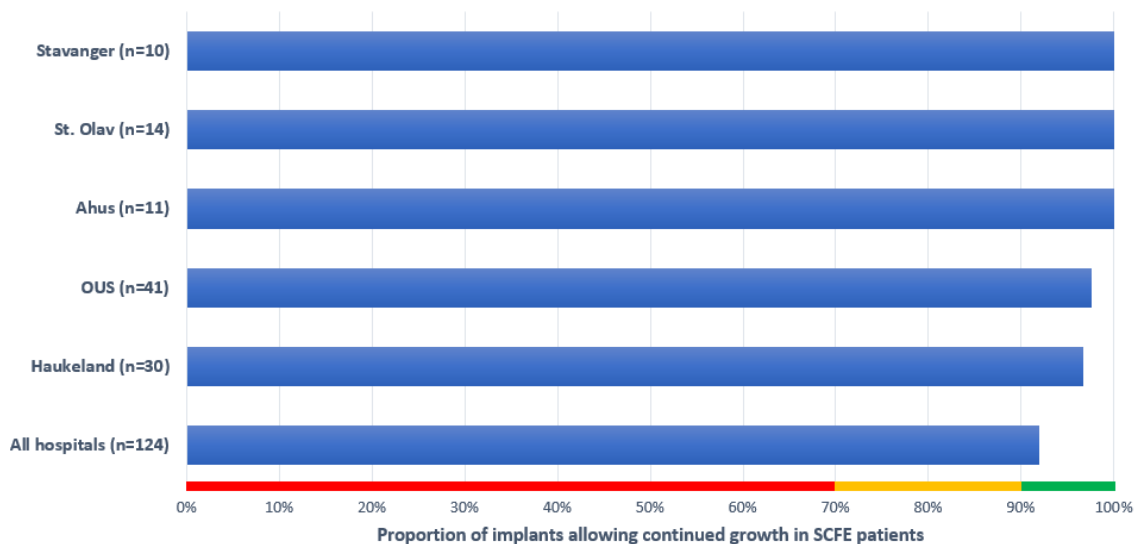
National recommendations for the treatment of slipped capital femoral epiphysis emphasize the use of implants that allow continued growth of the femoral neck. This approach is known to reduce the risk of leg length discrepancy and increase the potential for remodeling of the deformity caused by the slip.

The registry has previously contacted hospitals that did not use such implants. This applies only to patients with mild and moderate slips who undergo in situ fixation, as severe slips often require open surgery with reduction of the femoral head to an anatomical or near-anatomical position.

We now observe that most hospitals reporting patients in 2024 are using such implants. However, in some cases, alternative implants are chosen, with the reasons specified in the forms. These cases typically involve patients with little or no remaining growth potential.

There has been a trend for hospitals with a low volume of SCFE surgeries per year to transfer these patients to larger hospitals with access to such implants.

Figure F.11: Proportion of implants allowing continued growth used in SCFE patients treated with in situ fixation in 2022-2024



Only hospitals with more than 5 reported cases in 2022-2024 are included in the figure.

The Norwegian Pediatric Orthopedic Association has national recommendations stating that implants allowing continued growth should be used for in situ fixation of SCFE.

Data show that the larger hospitals, which perform the majority of these surgeries, consistently use such implants. However, some hospitals with lower surgical volumes still do not use them. Nevertheless, an increasing number of cases are now being referred to hospitals equipped with these implants.

We are likely to see a significant centralization of this type of surgery in the future.

In Table 17, which displays the number of patients operated on with implants allowing for continued growth, only patients who underwent in situ fixation are included.

Table 18: Reoperations after SCFE

Year	Number of reoperations
2024	1
2023	2
2022	2
2020	10
2019	4
2018	8
2017	6
2016	9
2015	8
2014	9
2013	3
2012	7
2011	8
2010	12
Total	89

Table 19: Reasons for reoperation following the primary procedure for SCFE

Year	Re-osteosynthesis	Soft tissue revision	Removal of screw	Other	Missing	Total
2024	0	0	1	0	0	1
2023	1	0	1	0	0	2
2022	1	0	1	0	0	2
2020	1	0	7	0	2	10
2019	0	0	3	0	1	4
2018	1	0	5	0	2	8
2017	1	0	2	0	3	6
2016	0	0	8	0	1	9
2015	0	0	5	0	3	8
2014	2	0	4	0	3	9
2013	0	0	2	0	1	3
2012	1	0	6	0	0	7
2011	0	0	5	0	3	8
2010	1	0	8	0	3	12
Total	9	0	58	0	22	89

All reoperations should be reported to the registry. The most common reoperations have their own checkbox, but the more unusual ones are classified as 'other.' If you want information about reoperations reported on your own patients, you can contact the registry directly to obtain this information.

Table 20: Age and sex at the time of SCFE

Sex	N	Mean age	Median age	Standard deviation
Boy	277	13.1 year	13.1 year	1.7 year
Girl	267	11.7 year	11.8 year	1.3 year

Patient-Reported Outcome Measures (PROM/PREM)

«**Pediatric Hip**» is a disease-specific questionnaire that has been developed and validated for children with hip disorders. The maximum score is 72, and the lowest score is 0.

We observe that all three diagnoses generally score well, but that Perthes disease has somewhat lower scores compared to the other two diagnoses. This is expected, as these patients experience a collapse of the femoral head, which partially or completely remodels over time. Depending on age, the acetabulum may adapt, but many patients develop a stiffer hip joint after the disease has run its course. There is little difference in the Pediatric Hip score between hospitals.

PROM scores are reported separately for the three pediatric hip disorders. Both the national average score and the hospital-level scores are provided. This year, we have divided PROM results by age: at 10 years and 18 years for hip dysplasia and Perthes disease, and at 1 year postoperatively and at 18 years for SCFE.

The lines represent the range from the lowest to the highest value within hospitals, and the circle indicates the average score. The number of cases and the average score are shown alongside the hospital names on the left side of the bars.

Only hospitals with $n > 5$ are included. Hospitals with fewer than 5 cases can access their own PROM scores through MRS.

Figure F.12a: Hip dysplasia 10 years – Pediatric hip score

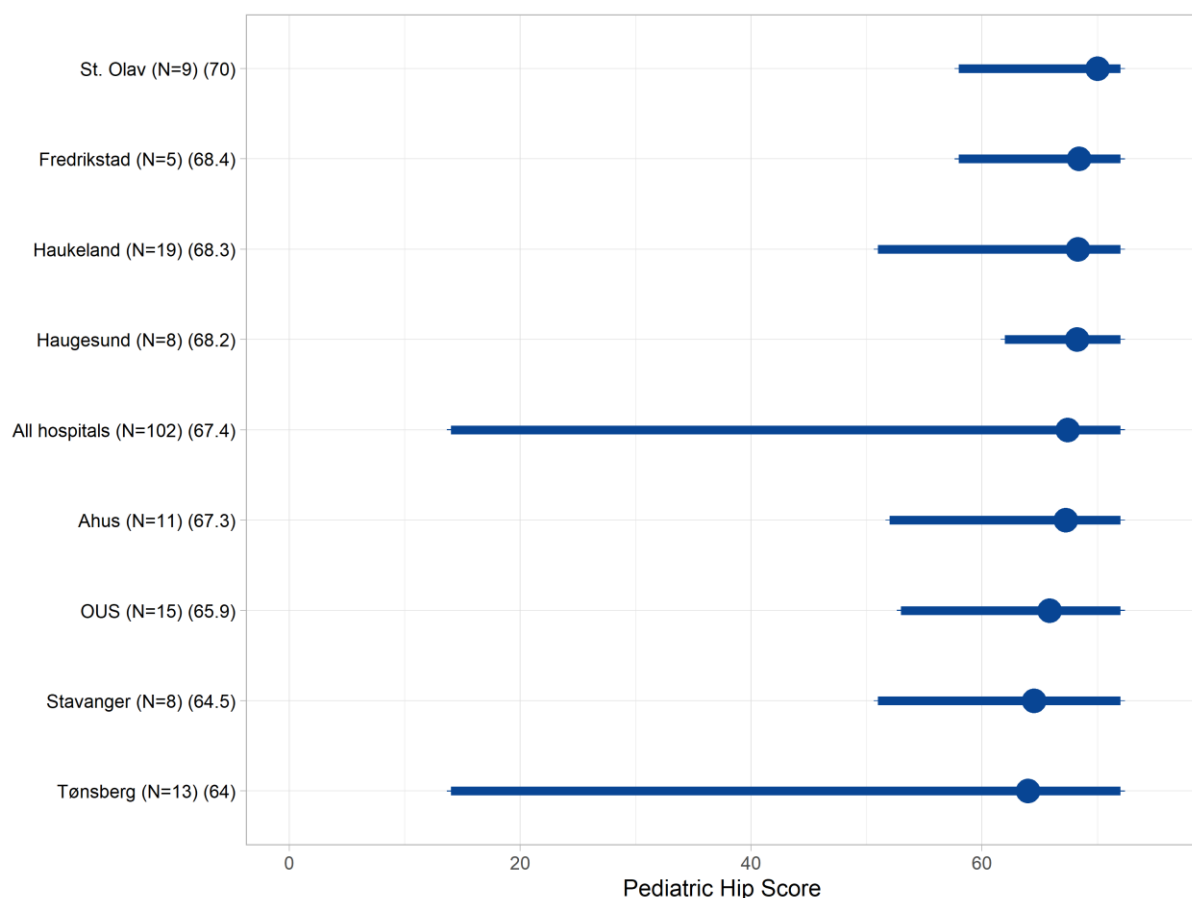


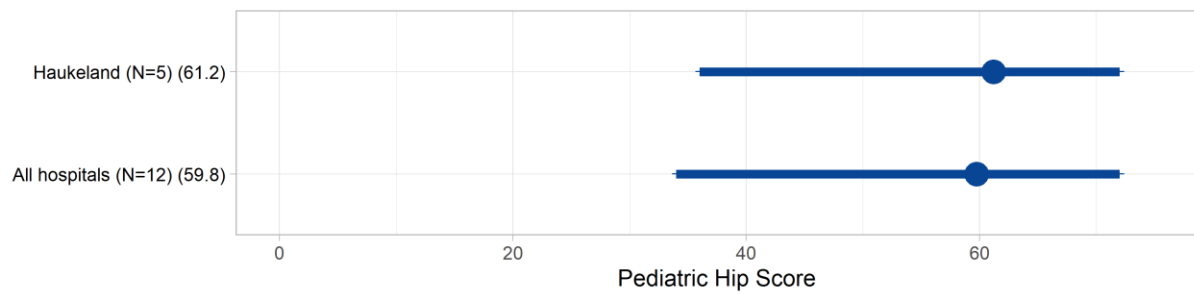
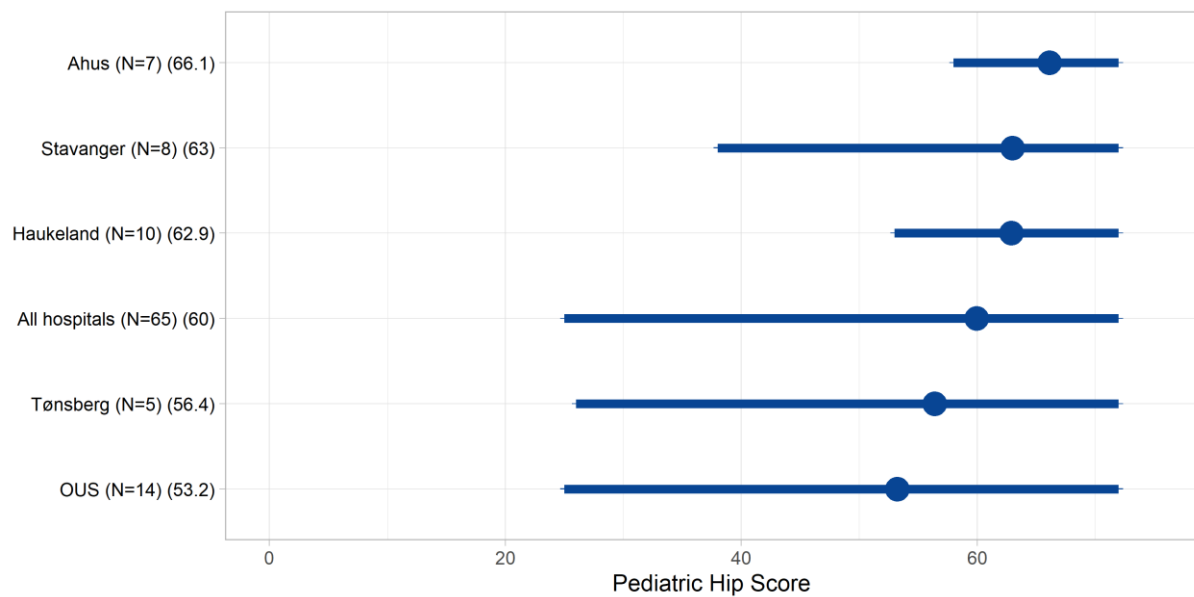
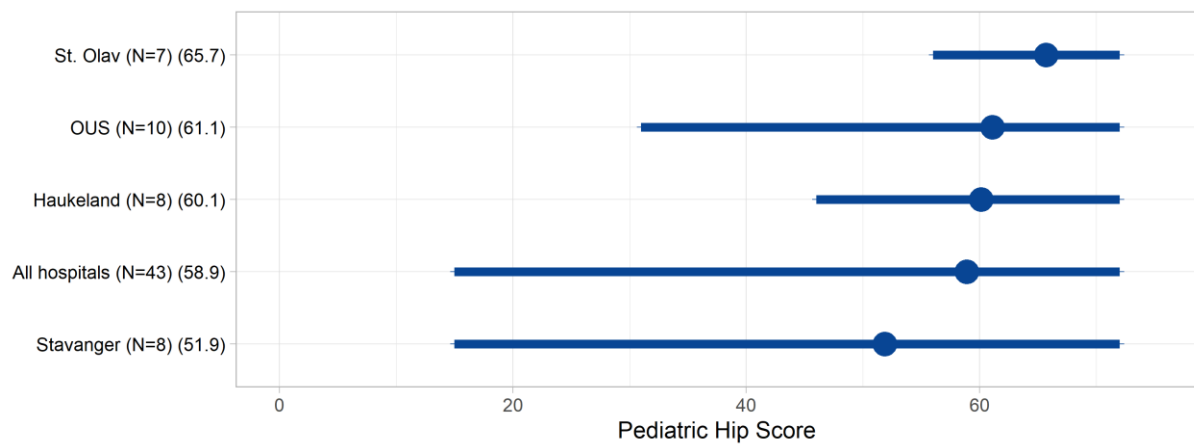
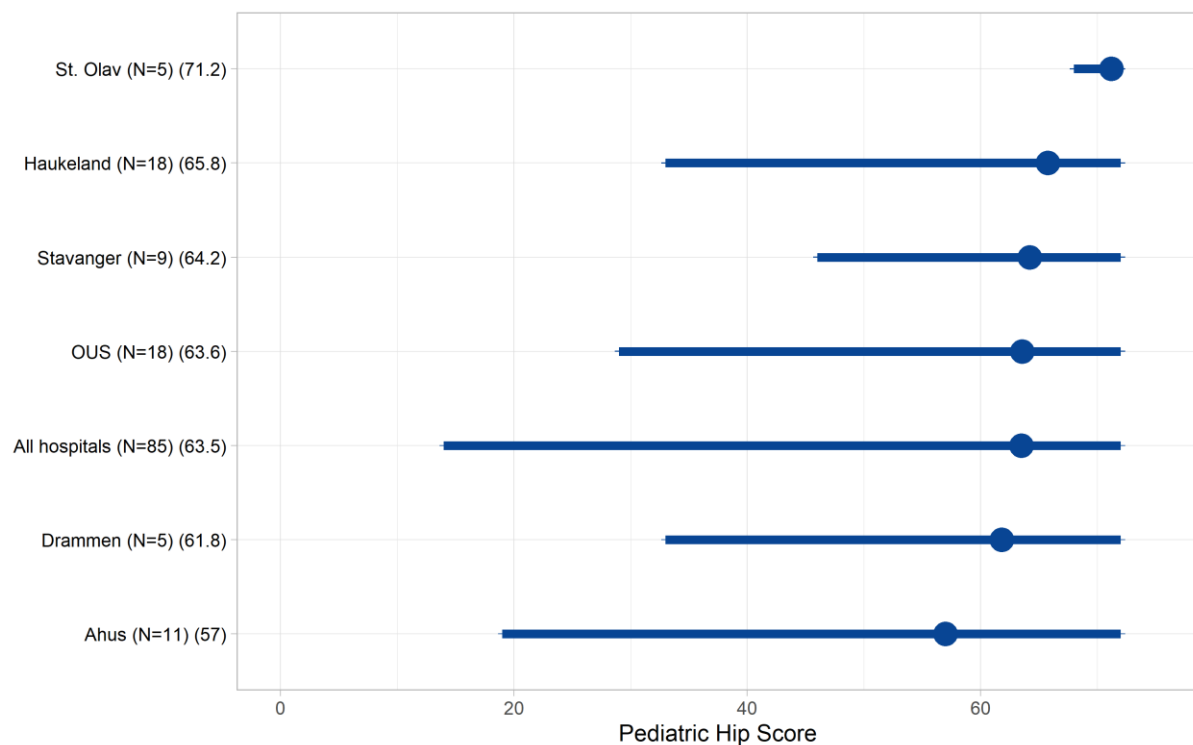
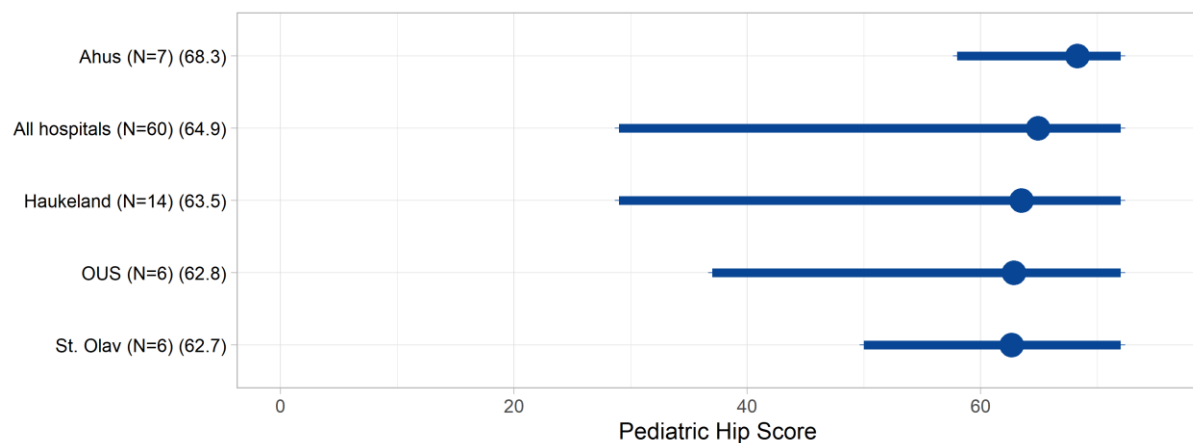
Figure F.12b: Hip dysplasia 18 years – Pediatric hip score**Figure F.13a:** Perthes disease 10 years – Pediatric hip score**Figure F.13b:** Perthes disease 18 years – Pediatric hip score

Figure F.14a: SCFE 1 year postoperative – Pediatric hip score**Figure F.14b:** SCFE 18 years – Pediatric hip score

PROMIS-25-PED is a disease-unspecific questionnaire that evaluates various dimensions of daily functioning. It measures the dimensions of anxiety, depression, peer relationships, physical function, fatigue, and pain interference. A conversion model is used to calculate T-scores, where the average age-matched population has a score of 50.

For **peer relationships and physical function**, a score above 50 indicates better outcomes than the average. For **anxiety, depression, fatigue, and pain interference**, a score below 50 reflects lower levels of these dimensions compared to the average population.

We observe that despite having experienced a pediatric hip disease, patients generally score well on this disease-unspecific questionnaire. Their daily lives are minimally affected by their condition.

There is also little variation in PROMIS-25-PED scores between hospitals, with none standing out as having significantly poorer scores.

PROMIS-25-PED scores are presented separately for each of the three pediatric hip diseases. National average scores and hospital-level averages are provided.

In the reports, each dimension is displayed individually for the three hip diseases. There is no composite score for PROMIS-25-PED. **The age-matched population average of 50 is indicated by a red line. For physical function and peer relationships, scores above 50 are considered good results, while for the other dimensions, scores below 50 are desirable outcomes.**

Figure F.15a: Hip dysplasia 10 years – PROMIS 25-PED Mobility

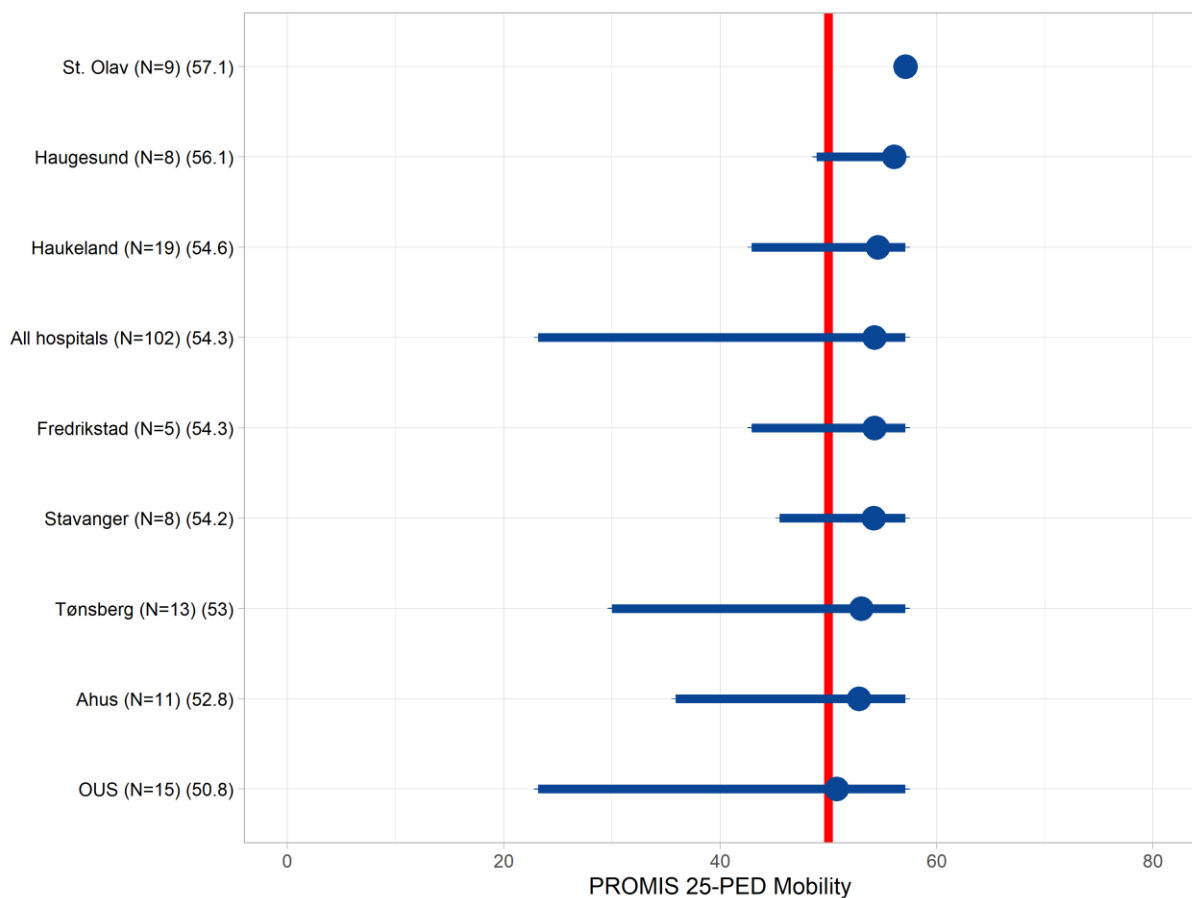


Figure F.15b: Hip dysplasia 10 years – PROMIS 25-PED Mobility

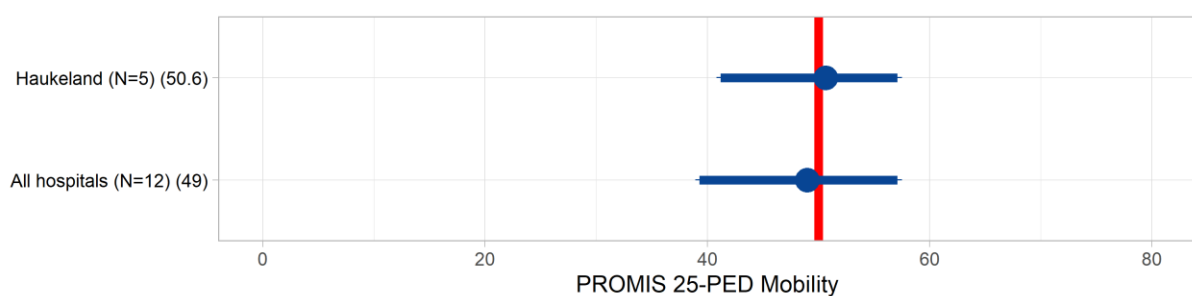


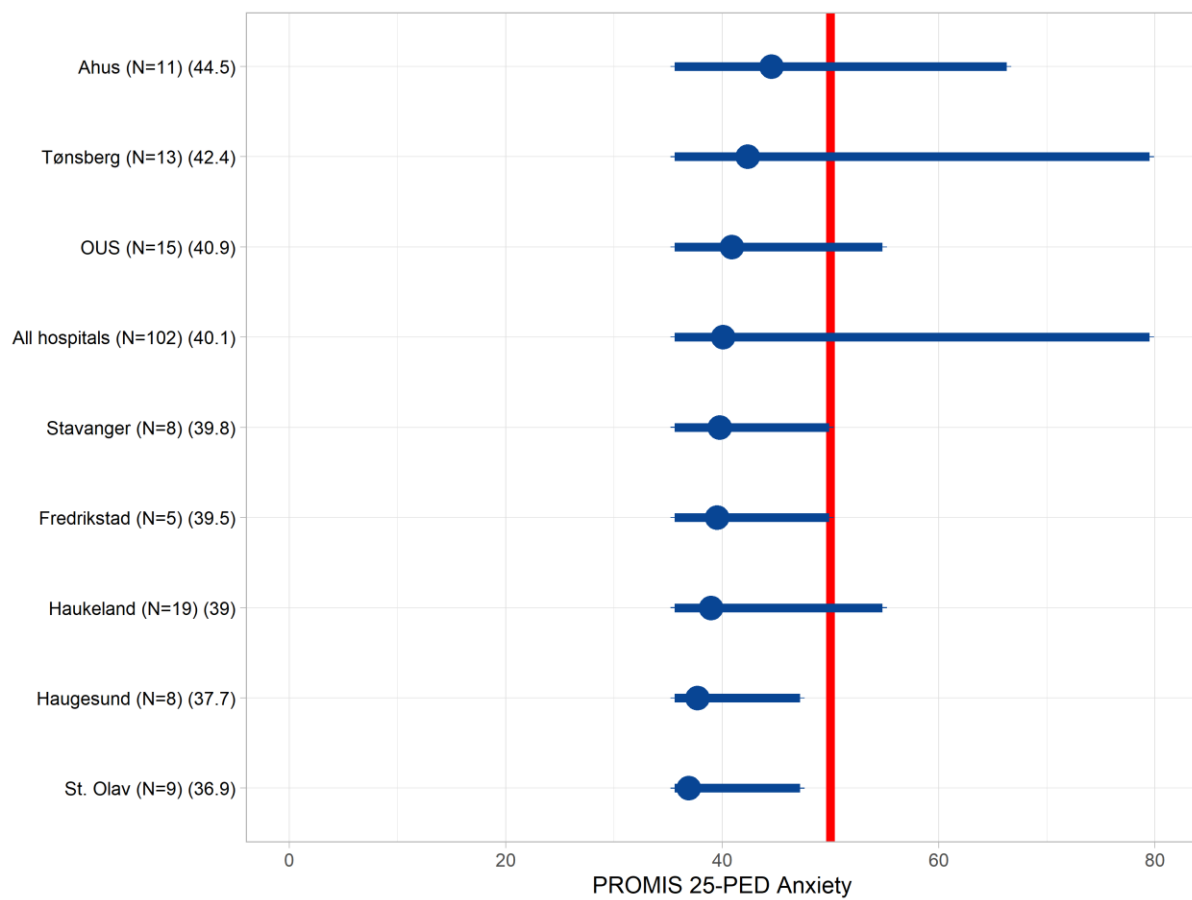
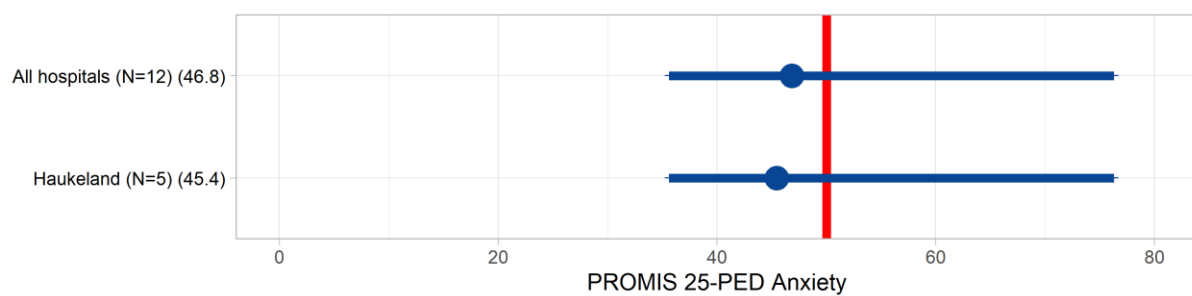
Figure F.16a: Hip dysplasia 10 years – PROMIS 25-PED Anxiety**Figure F.16b:** Hip dysplasia 18 years – PROMIS 25-PED Anxiety

Figure F.17a: Hip dysplasia 10 years – PROMIS 25-PED Depression

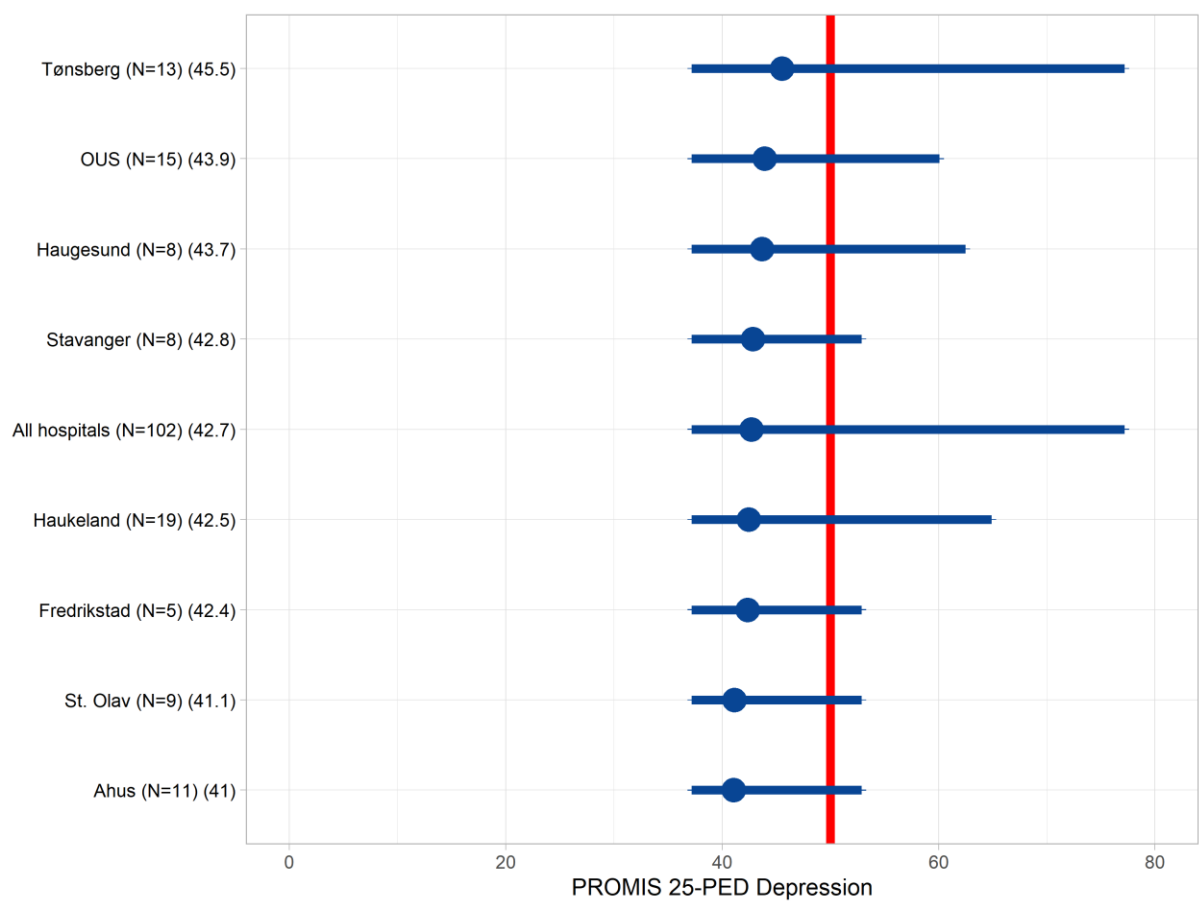


Figure F.17b: Hip dysplasia 18 years – PROMIS 25-PED Depression

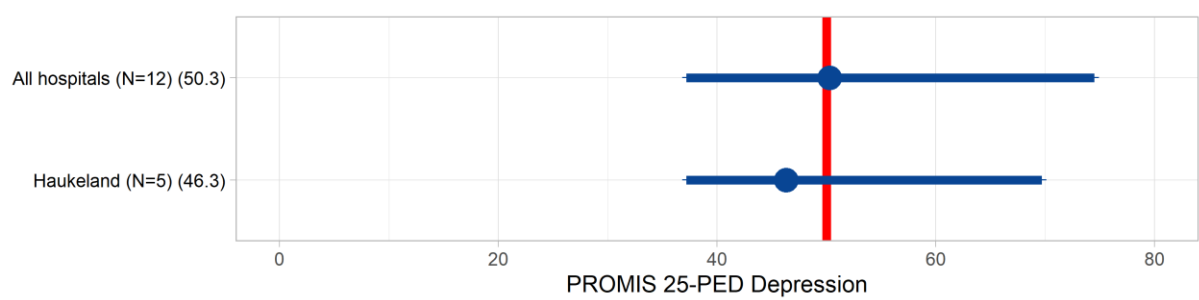


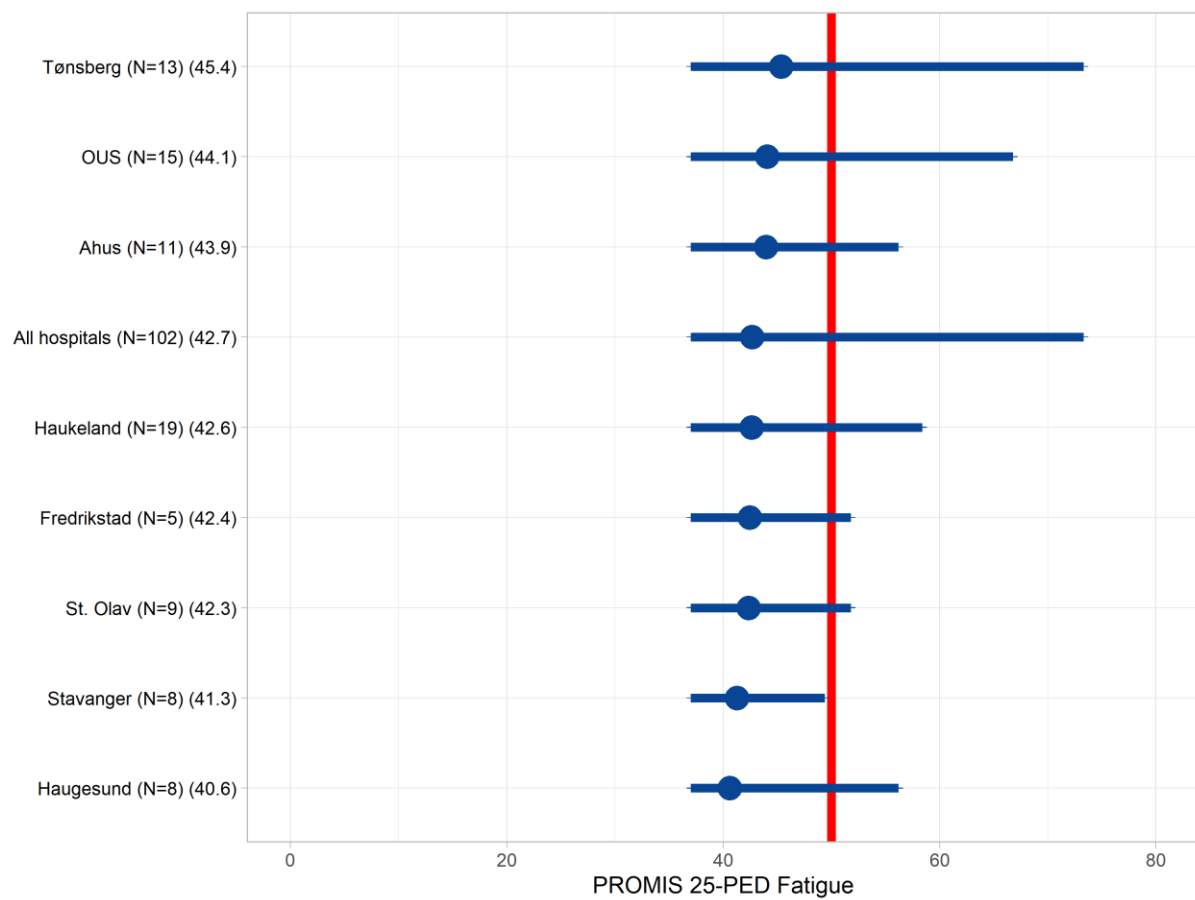
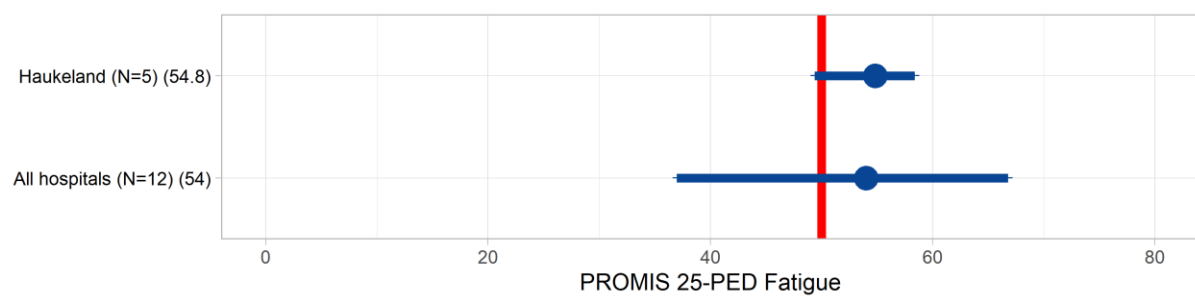
Figure F.18a: Hip dysplasia 10 years – PROMIS 25-PED Fatigue**Figure F.18b:** Hip dysplasia 18 years – PROMIS 25-PED Fatigue

Figure F.19a: Hip dysplasia 10 years – PROMIS 25-PED Peer relationship

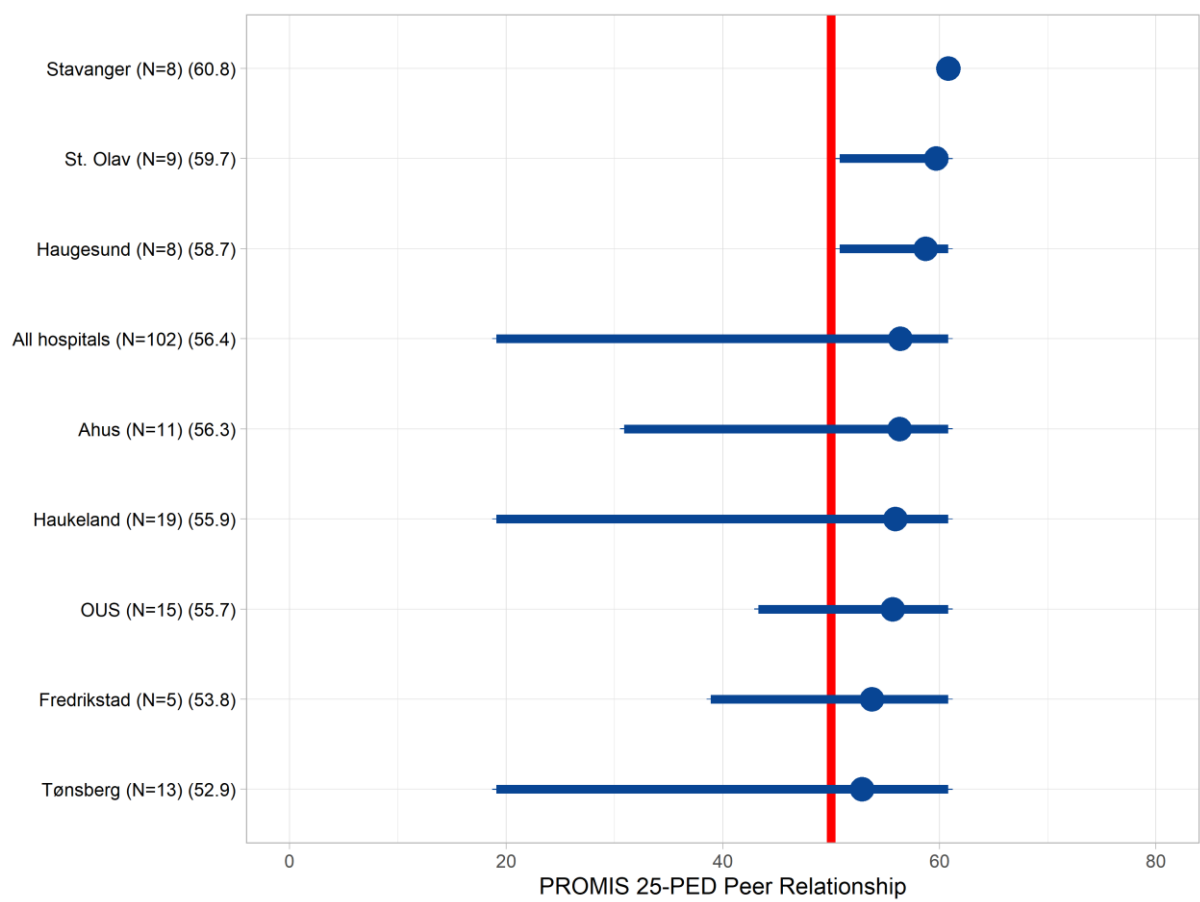


Figure F.19b: Hip dysplasia 18 years – PROMIS 25-PED Peer relationship

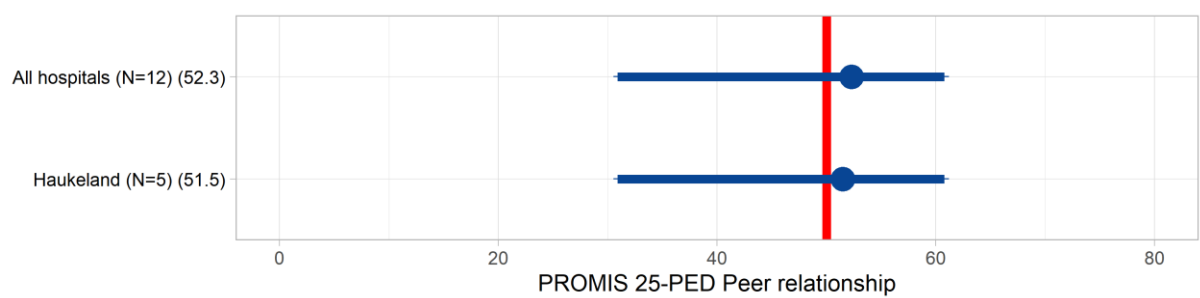
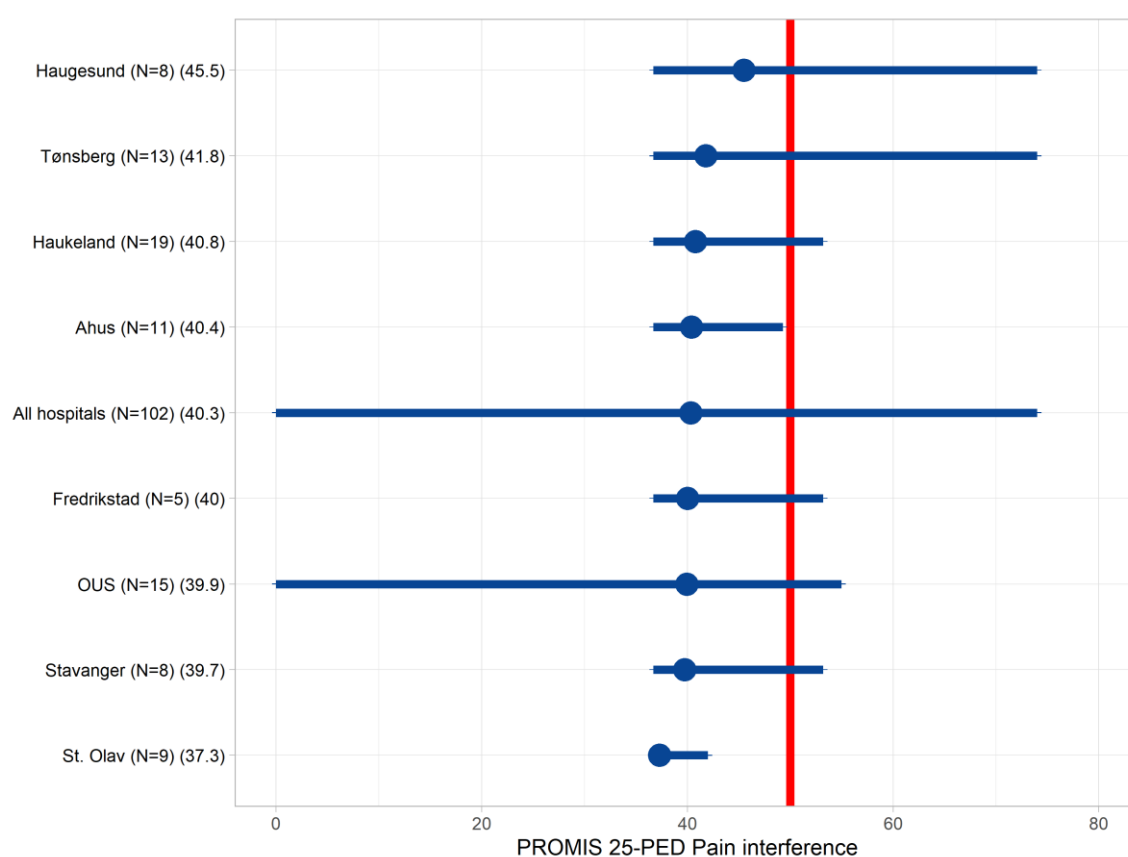
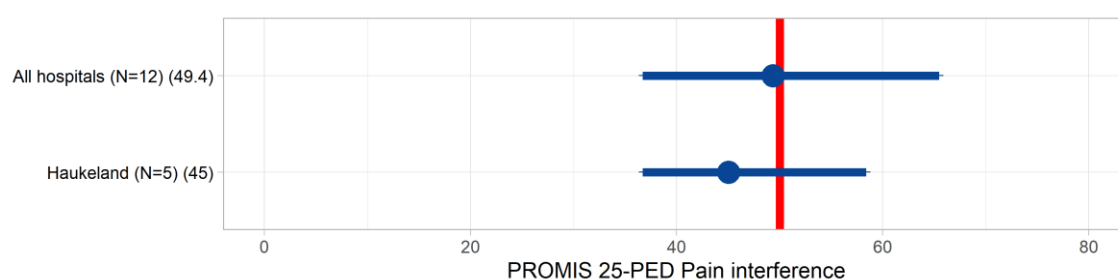


Figure F.20a: Hip dysplasia 10 years – PROMIS 25-PED Pain interference**Figure F.20b:** Hip dysplasia 18 years – PROMIS 25-PED Pain interference**Table 21:** Hip dysplasia 10 years – PROMIS 25-PED T-Score

Hospital	N	Mobility	Anxiety	Depression	Fatigue	Peer relationship	Pain interference
All hospitals	102	54.3	40.1	42.7	42.7	56.4	40.3
Ahus	11	52.8	44.5	41.0	43.9	56.3	40.4
Fredrikstad	5	54.3	39.5	42.4	42.4	53.8	40.0
Haugesund	8	56.1	37.7	43.7	40.6	58.7	45.5
Haukeland	19	54.6	39.0	42.5	42.6	55.9	40.8
OUS	15	50.8	40.9	43.9	44.1	55.7	39.9
St. Olav	9	57.1	36.9	41.1	42.3	59.7	37.3
Stavanger	8	54.2	39.8	42.8	41.3	60.8	39.7
Tønsberg	13	53.0	42.4	45.5	45.4	52.9	41.8

Table 22: Hip dysplasia 18 years – PROMIS 25-PED T-Score

Hospital	N	Mobility	Anxiety	Depression	Fatigue	Peer relationship	Pain interference
All hospitals	12	49.0	46.8	50.3	54.0	52.3	49.4
Haukeland	5	50.6	45.4	46.3	54.8	51.5	45.0

Only hospitals with n > 5 are shown in the tables

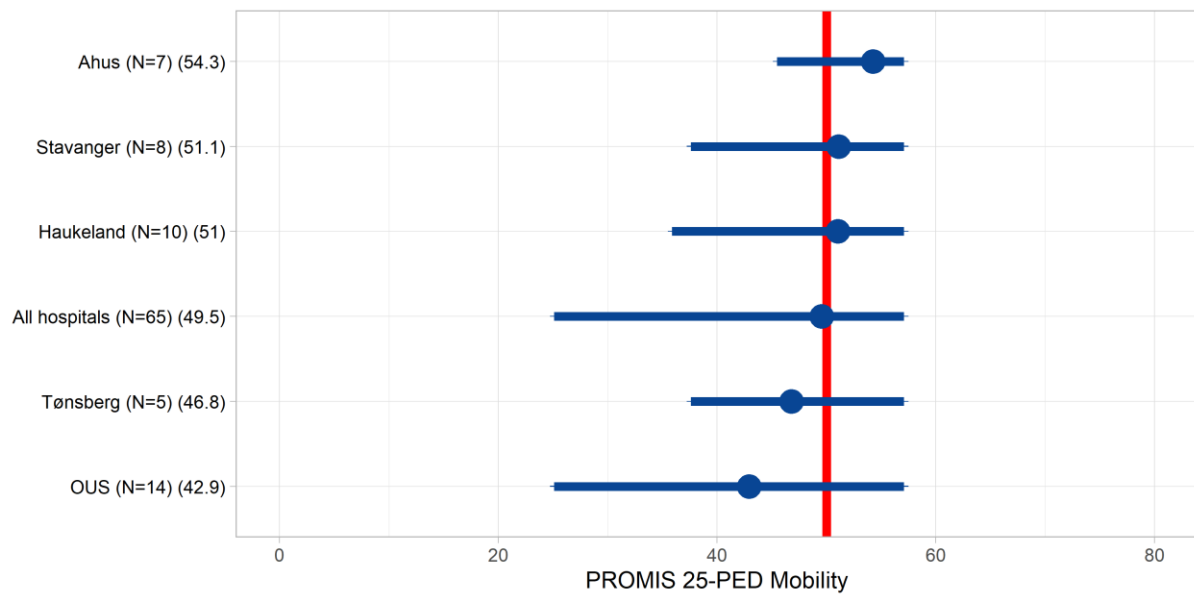
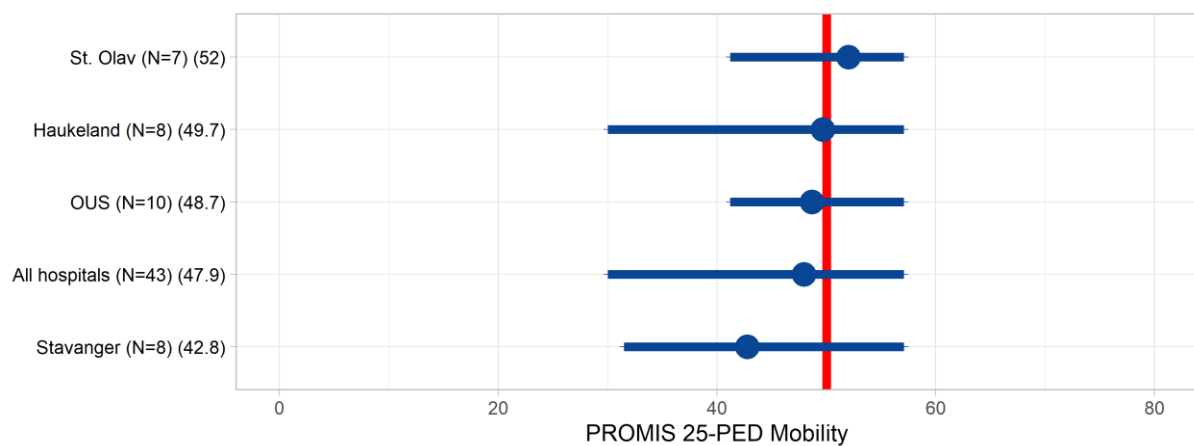
Figure F.21a: Perthes disease 10 years – PROMIS 25-PED Mobility**Figure F.21b:** Perthes disease 18 years – PROMIS 25-PED Mobility

Figure F.22a: Perthes disease 10 years – PROMIS 25-PED Anxiety

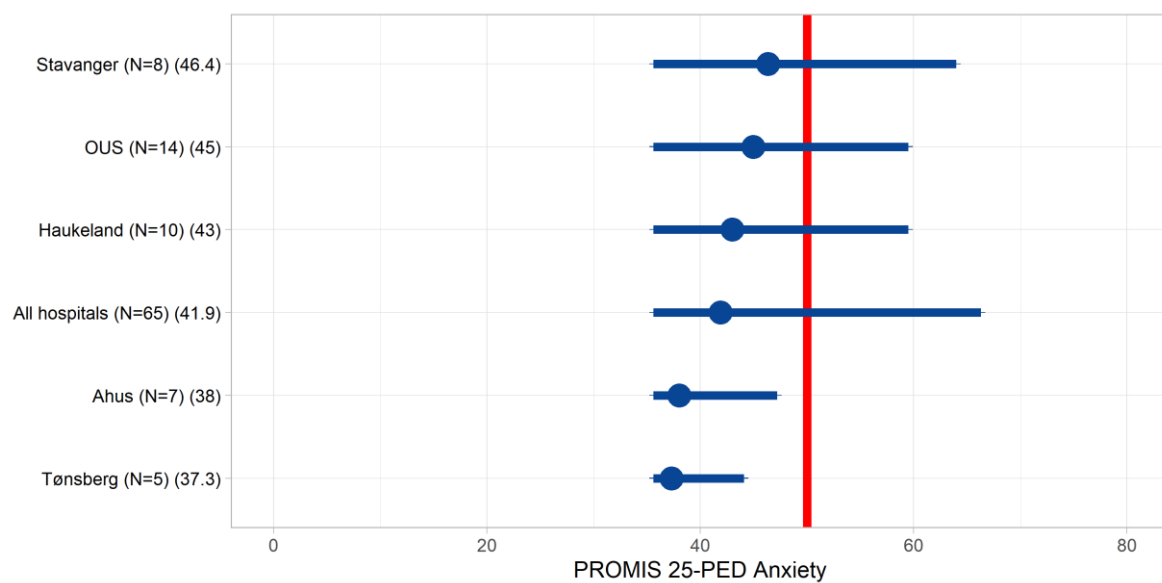


Figure F.22b: Perthes disease 18 years – PROMIS 25-PED Anxiety

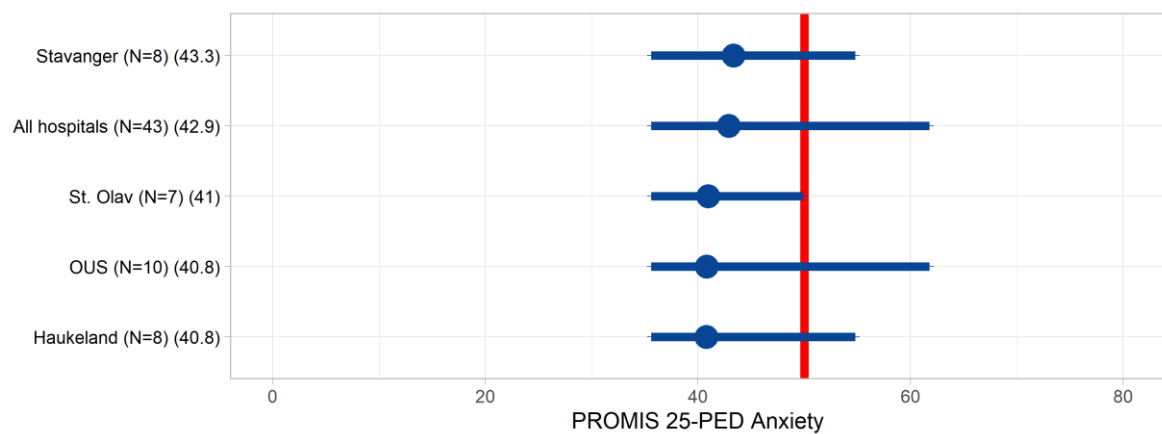


Figure F.23a: Perthes disease 10 years – PROMIS 25-PED Depression

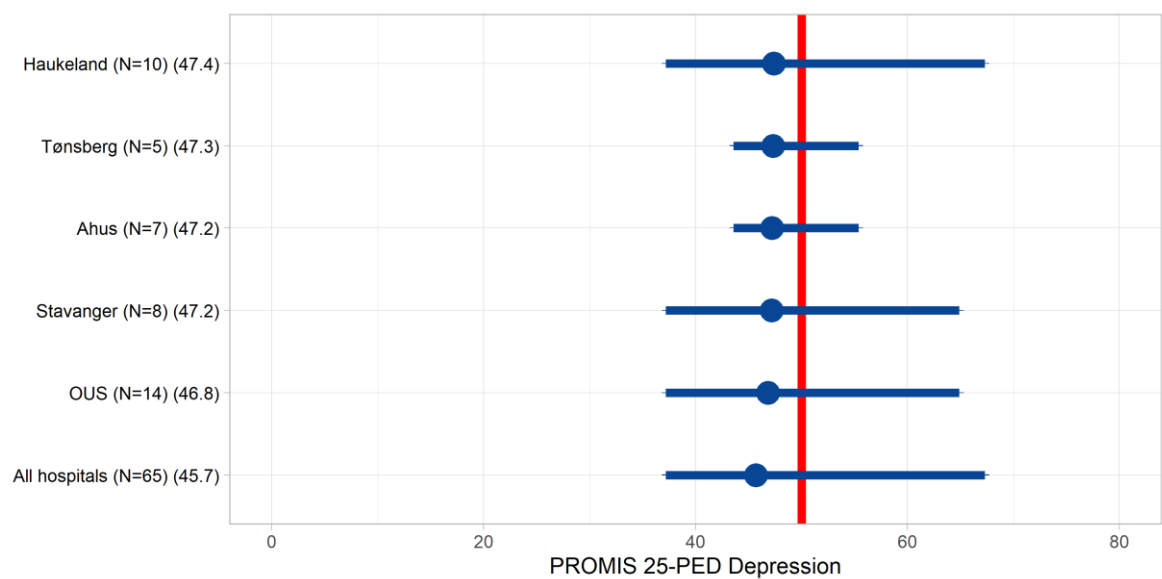


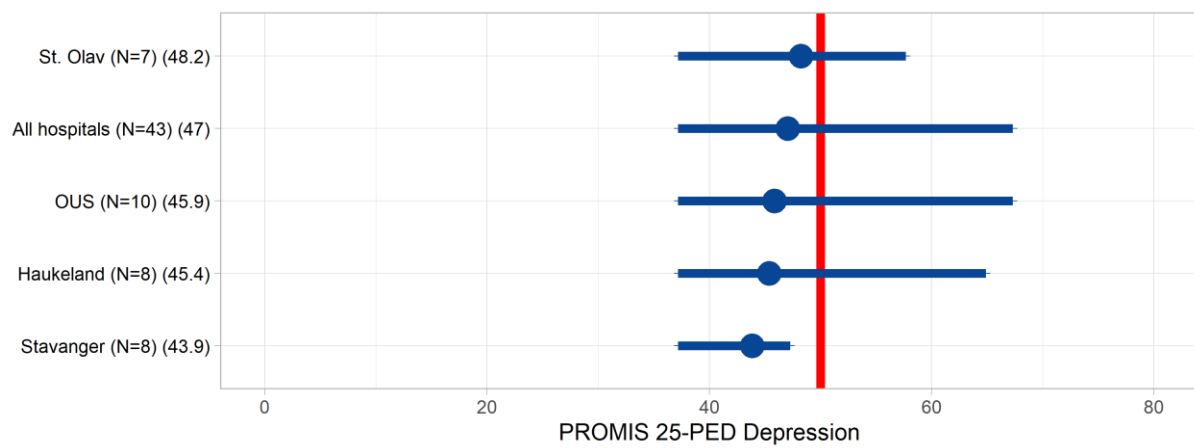
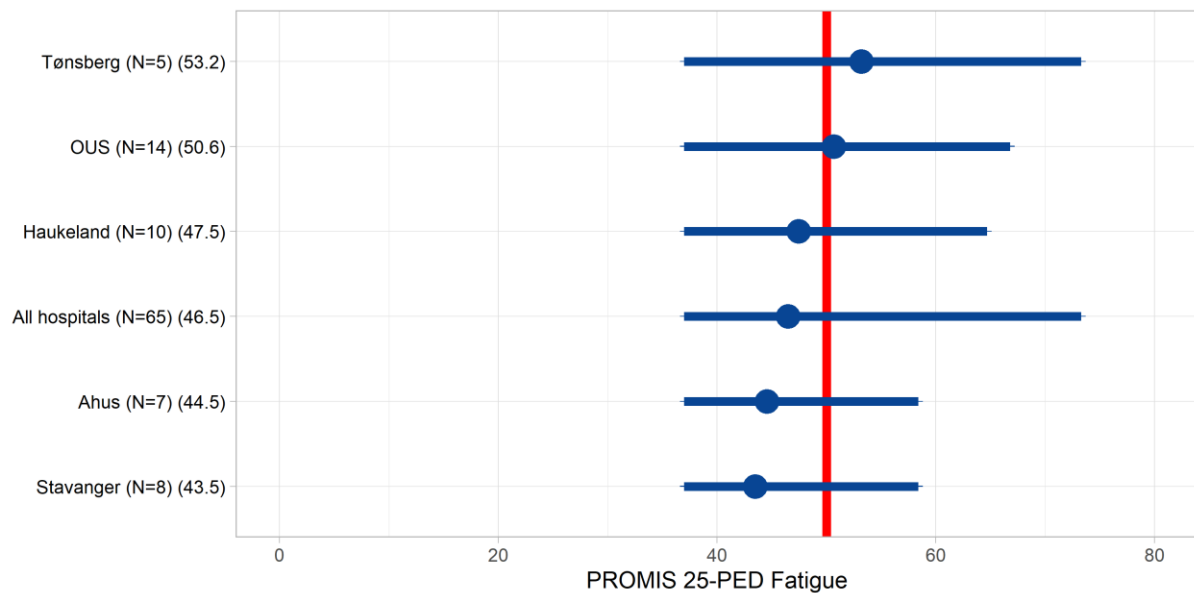
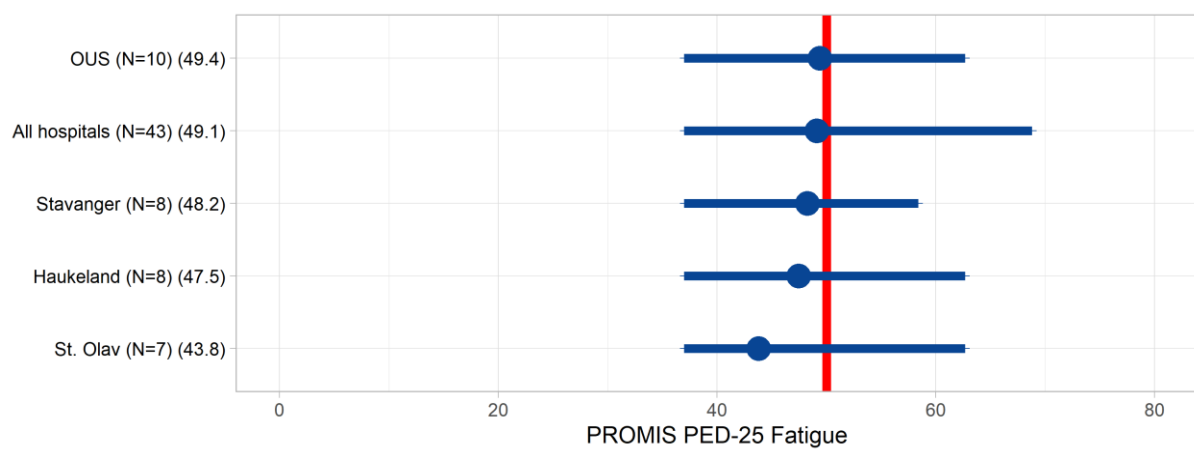
Figure F.23b: Perthes disease 18 years – PROMIS 25-PED Depression**Figure F.24a:** Perthes disease 10 years – PROMIS 25-PED Fatigue**Figure F.24b:** Perthes disease 18 years – PROMIS 25-PED Fatigue

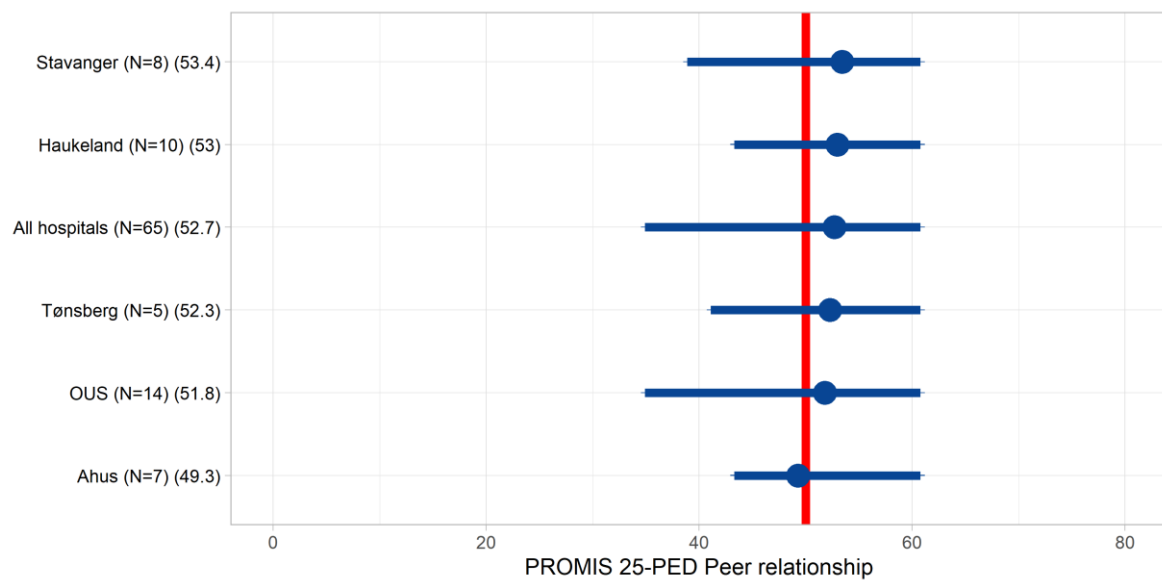
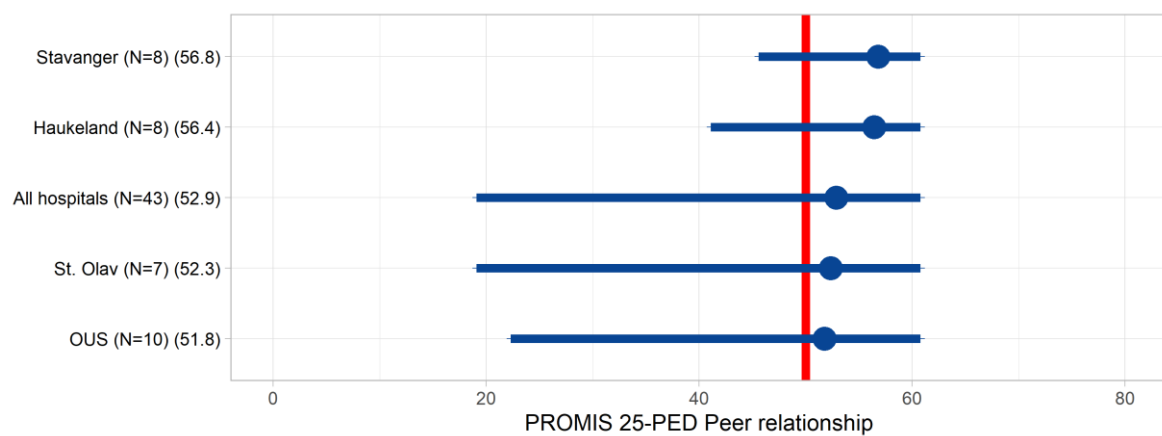
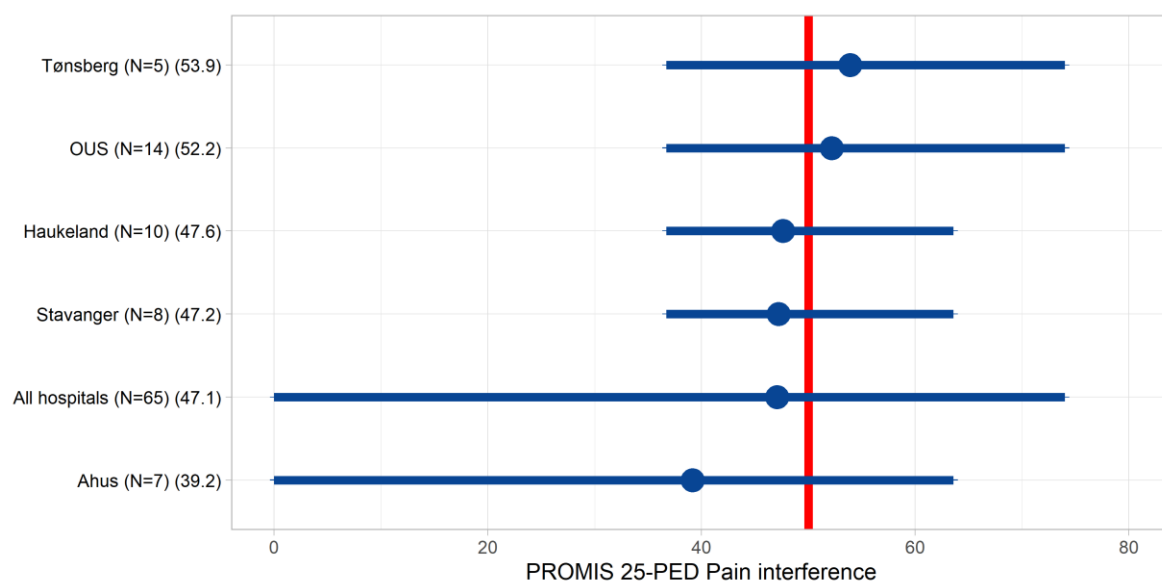
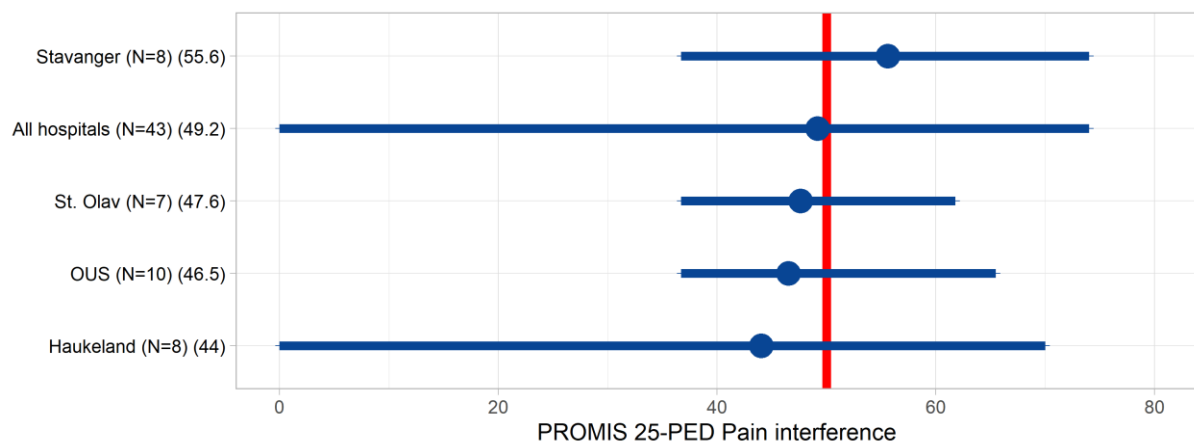
Figure F.25a: Perthes disease 10 years – PROMIS 25-PED Peer relationship**Figure F.25b:** Perthes disease 18 years – PROMIS 25-PED Peer relationship**Figure F.26a:** Perthes disease 10 years – PROMIS 25-PED Pain interference

Figure F.26b: Perthes disease 18 years – PROMIS 25-PED Pain interference**Table 23:** Perthes disease 10 years – PROMIS 25-PED T-Score

Hospital	N	Mobility	Anxiety	Depression	Fatigue	Peer relationship	Pain interference
All hospitals	65	49.5	41.9	45.7	46.5	52.7	47.1
Ahus	7	54.3	38.0	47.2	44.5	49.3	39.2
Haukeland	10	51.0	43.0	47.4	47.5	53.0	47.6
OUS	14	42.9	45.0	46.8	50.6	51.8	52.2
Stavanger	8	51.1	46.4	47.2	43.5	53.4	47.2
Tønsberg	5	46.8	37.3	47.3	53.2	52.3	53.9

Table 24: Perthes disease 10 years – PROMIS 25-PED T-Score

Hospital	N	Mobility	Anxiety	Depression	Fatigue	Peer relationship	Pain interference
All hospitals	43	47.9	42.9	47.0	49.1	52.9	49.2
Haukeland	8	49.7	40.8	45.4	47.5	56.4	44.0
OUS	10	48.7	40.8	45.9	49.4	51.8	46.5
St. Olav	7	52.0	41.0	48.2	43.8	52.3	47.6
Stavanger	8	42.8	43.3	43.9	48.2	56.8	55.6

Only hospitals with n > 5 are shown in the tables.

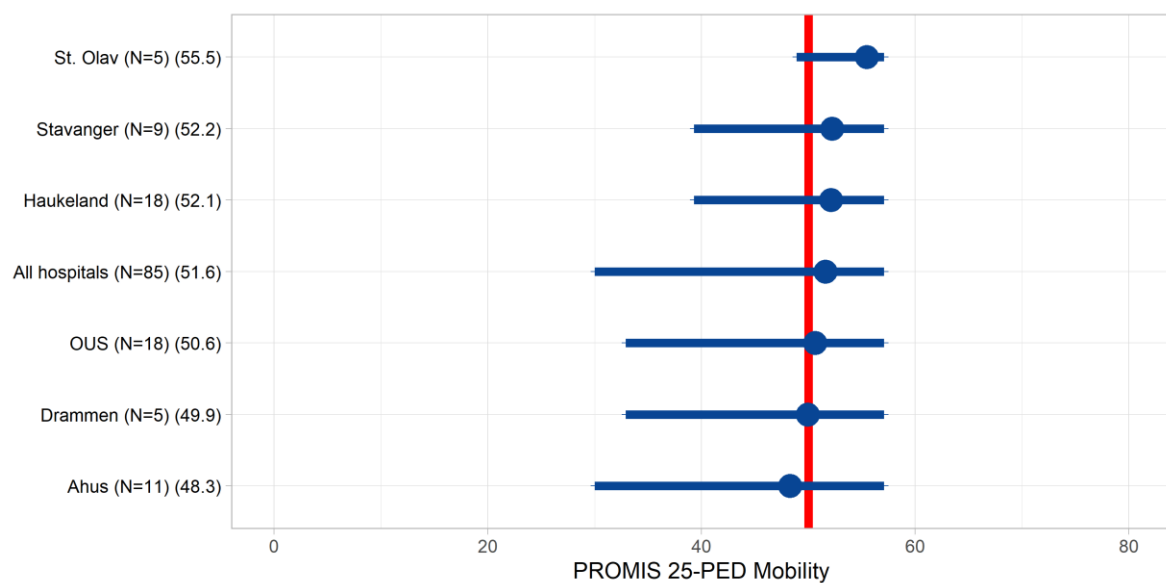
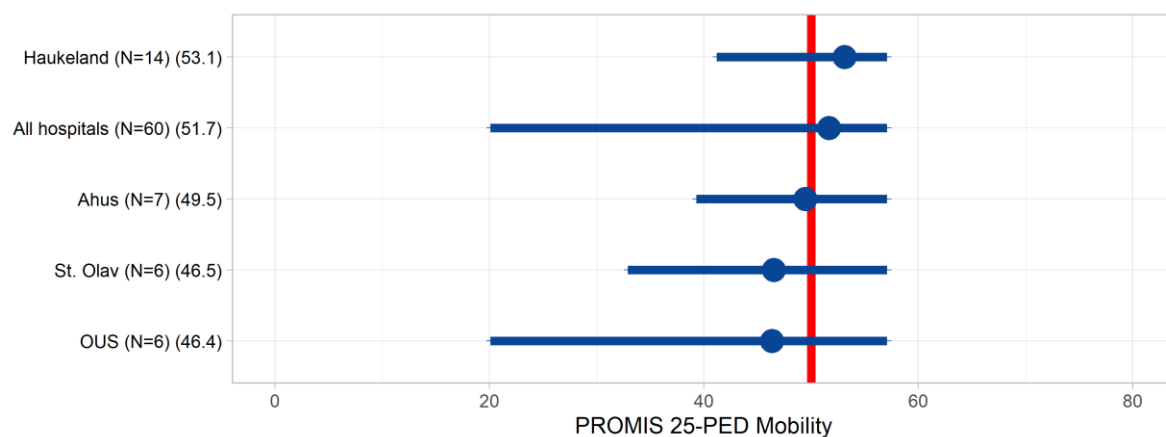
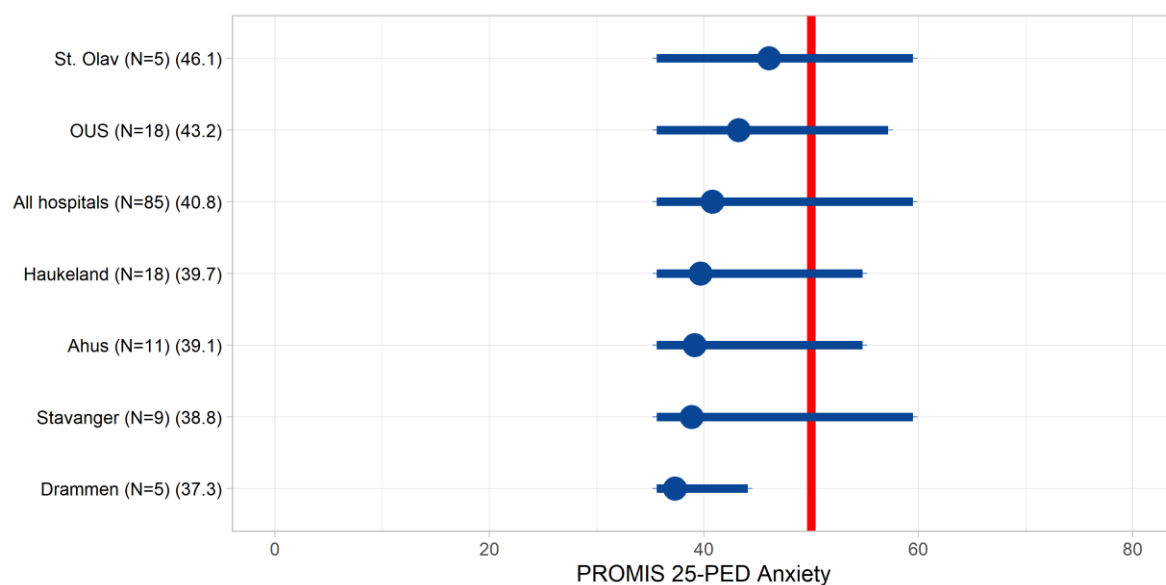
Figure F.27a: SCFE 1 year postoperative – PROMIS 25-PED Mobility**Figure F.27b:** SCFE 18 years – PROMIS 25-PED Mobility**Figure F.28a:** SCFE 1 year postoperative – PROMIS 25-PED Anxiety

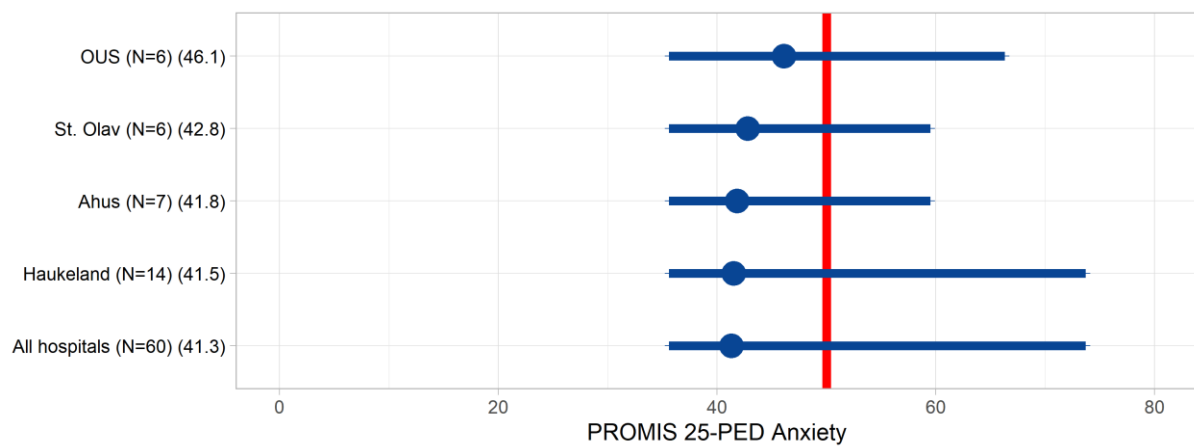
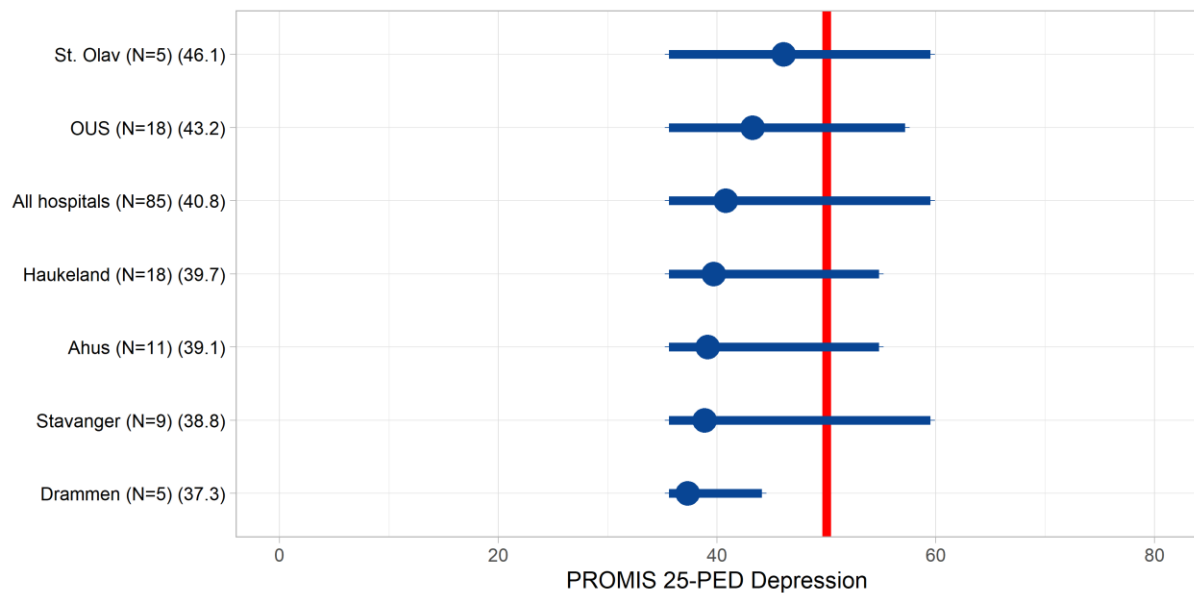
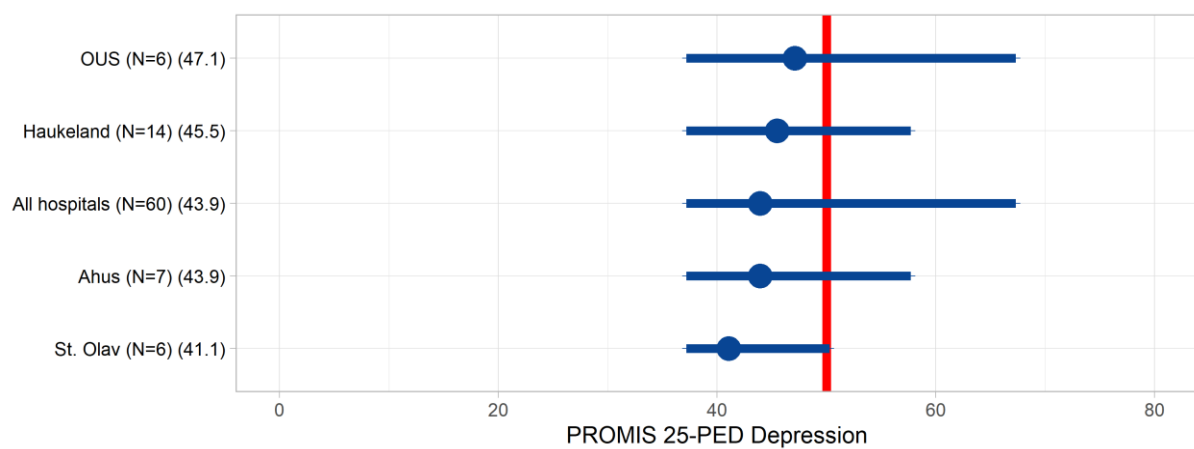
Figure F.28b: SCFE 18 years – PROMIS 25-PED Anxiety**Figure F.29a:** SCFE 1 year postoperative – PROMIS 25-PED Depression**Figure F.29b:** SCFE 18 years – PROMIS 25-PED Depression

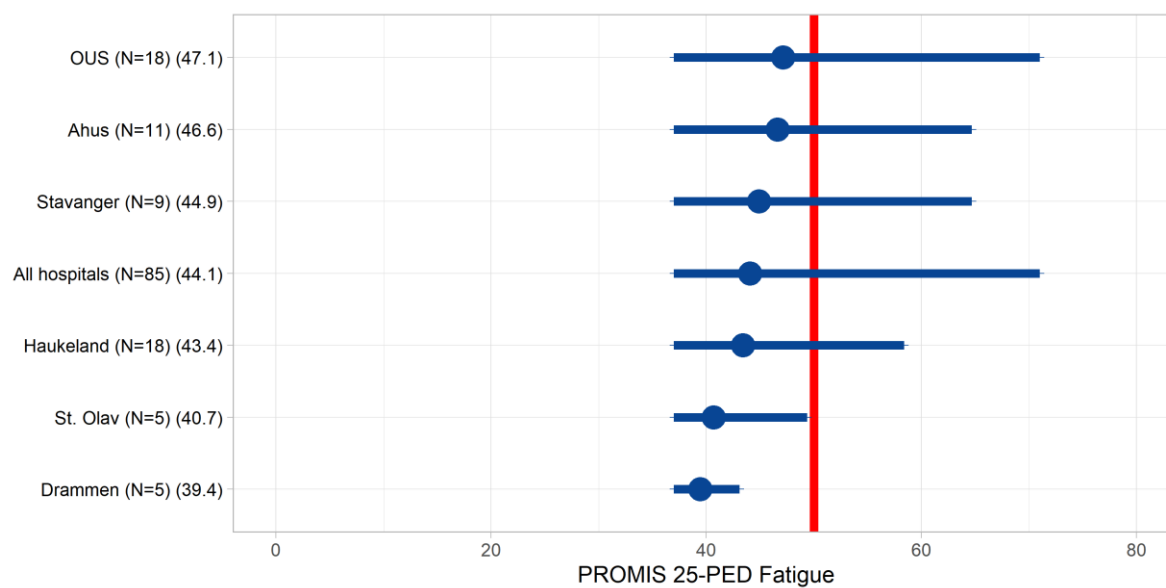
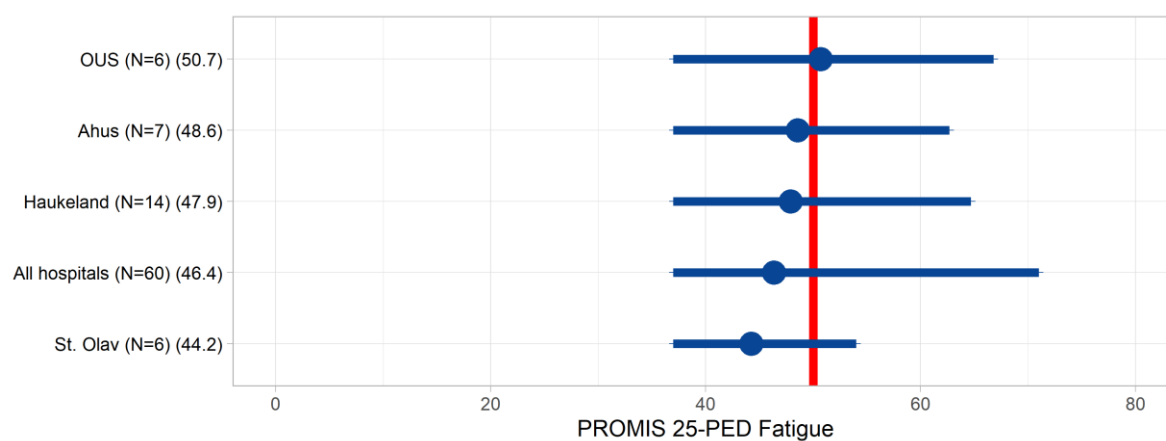
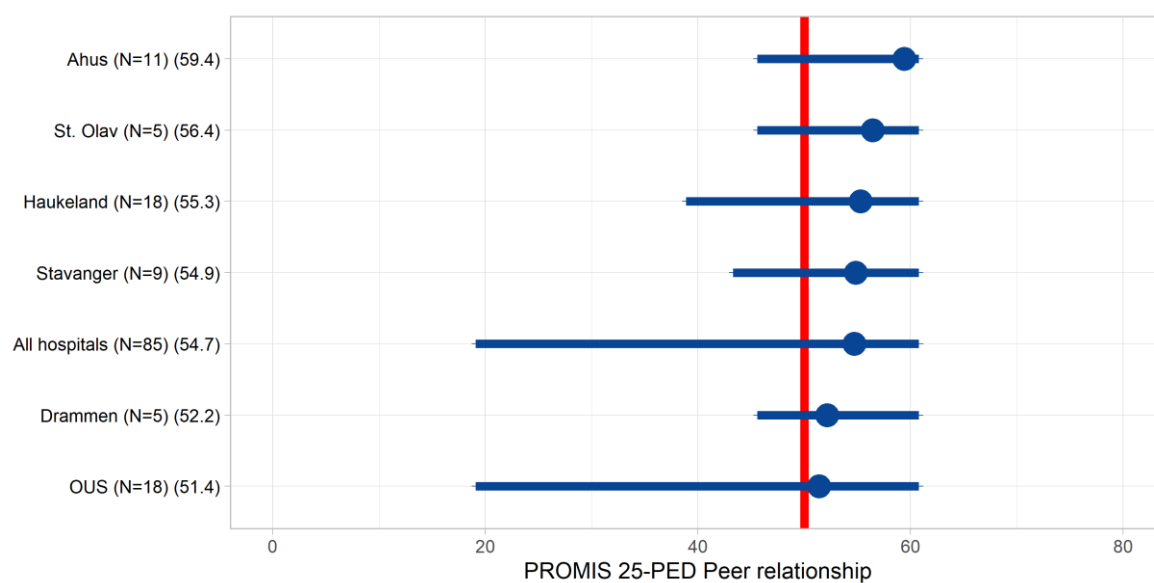
Figure F.30a: SCFE 1 year postoperative – PROMIS 25-PED Fatigue**Figure F.30b:** SCFE 18 years – PROMIS 25-PED Fatigue**Figure F.31a:** SCFE 1 year postoperative – PROMIS 25-PED Peer Relationship

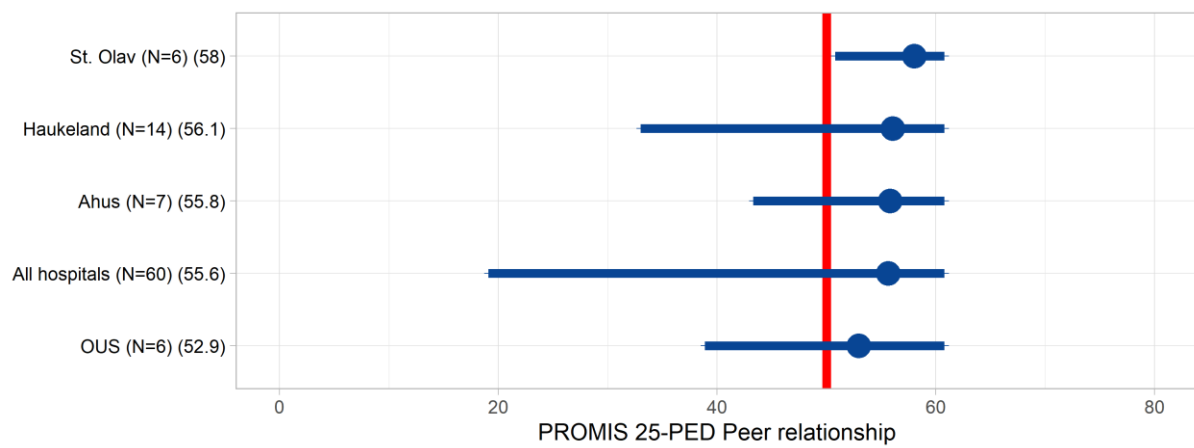
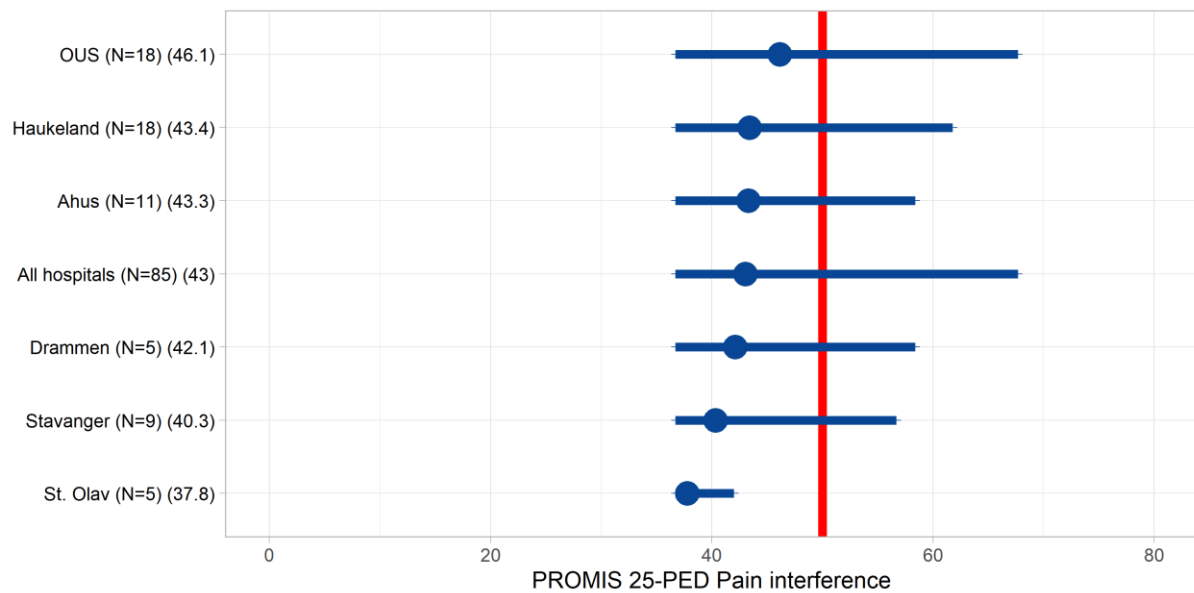
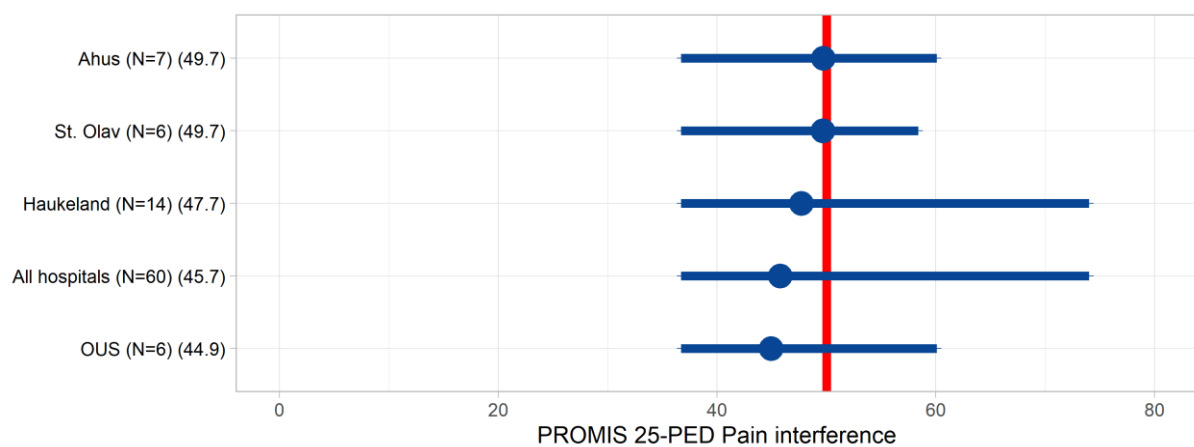
Figure F.31b: SCFE 18 years – PROMIS 25-PED Peer Relationship**Figure F.32a:** SCFE 1 year postoperative – PROMIS 25-PED Pain interference**Figure F.32b:** SCFE 18 years – PROMIS 25-PED Pain interference

Table 25: SCFE 1 year postoperative – PROMIS 25-PED T-Score

Hospital	N	Mobility	Anxiety	Depression	Fatigue	Peer relationship	Pain interference
All hospitals	85	51.6	40.8	41.7	44.1	54.7	43.0
Ahus	11	48.3	39.1	39.2	46.6	59.4	43.3
Drammen	5	49.9	37.3	39.2	39.4	52.2	42.1
Haukeland	18	52.1	39.7	43.6	43.4	55.3	43.4
OUS	18	50.6	43.2	42.1	47.1	51.4	46.1
St. Olav	5	55.5	46.1	43.6	40.7	56.4	37.8
Stavanger	9	52.2	38.8	40.6	44.9	54.9	40.3

Table 26: SCFE 18 years – PROMIS 25-PED T-Score

Hospital	N	Mobility	Anxiety	Depression	Fatigue	Peer relationship	Pain interference
All hospitals	60	51.7	41.3	43.9	46.4	55.6	45.7
Ahus	7	49.5	41.8	43.9	48.6	55.8	49.7
Haukeland	14	53.1	41.5	45.5	47.9	56.1	47.7
OUS	6	46.4	46.1	47.1	50.7	52.9	44.9
St. Olav	6	46.5	42.8	41.1	44.2	58.0	49.7

Only hospitals with n > 5 are shown in the tables.

OPEN AND ARTHROSCOPIC HIP PRESERVING SURGERY IN YOUNG ADULTS

Electronic registration of these procedures was initiated on February 1st, 2019, and since then, a total of 1,026 surgeries have been reported to the national registry. Among these, 753 patients have undergone hip arthroscopy, 235 periacetabular osteotomy (PAO) and 38 other open procedures.

This type of surgery has been performed at only a few hospitals, and especially for periacetabular osteotomies, it requires specialized expertise.

Periacetabular osteotomies are procedures where coverage of the femoral head can be optimized, such as in cases of dysplastic undercoverage or malrotation (version anomalies). They are performed for symptomatic acetabular dysplasia that does not respond to non-operative measures.

Other open procedures include femoral osteotomies for torsion and/or axis deviations, and complex impingement surgery through surgical hip dislocation. These open procedures are mainly performed at two centers: Kysthospitalet in Hagevik and Oslo University Hospital. In total, 46 periacetabular osteotomies were reported in 2024, which is the highest number since we began registration. There is no reason to believe that there is any significant increase in this type of surgery, so we interpret the increase in 2024 as a sign that we have good reporting routines to the registry from both hospitals that perform this type of surgery.

Hip arthroscopies are performed for various indications, the most common being femoroacetabular impingement syndrome (FAI), loose bodies, synovial disorders, or as a result of sequelae from pediatric hip disease not involving impingement. Both public hospitals and private providers report to the registry; in 2024, a total of 237 hip arthroscopies were reported. The largest increase in the number of arthroscopies is likely due to our efforts to include all private providers, as well as the fact that all hospitals performing hip arthroscopies now report to the registry.

Table 27: Number of hip arthroscopies, periacetabular osteotomies (PAO), and other open hip procedures per year

Year	Hip arthroscopy	PAO	Other open procedures	Total
2024	237	46	3	286
2023	166	28	6	200
2022	94	42	4	140
2021	116	34	9	159
2020	60	40	1	101
2019	80	45	14	139
2017	0	0	1	1

Table 28: Hospital distribution of hip arthroscopies, PAO, and other open hip procedures in 2024

Hospital	Hip arthroscopy	PAO	Other open procedures	Total
Aleris Frogner	38	0	0	38
Aleris Rosenborgklinikken	2	0	0	2
CMedical	29	0	0	29
Kysthospitalet i hagevik	34	21	3	58
Oslo universitetssykehus	113	25	0	138
St. Olavs	21	0	0	21

Periacetabular osteotomy (PAO)

Table 29: Demographic data for patients with PAO

PAO n=235		
	Mean (sd)	Min-Max
Age	26.5 (8.3)	12-45
Agegroups	n	%
10-20 years	71	30,2
21-30 years	75	31,9
31-40 years	76	32,3
41-50 years	13	5,5
> 50 years	0	0
Gender	n	%
Male	49	20.9
Female	186	79.1
	Mean (sd)	Min-Max
BMI	23.6 (3.3)	15.5-30.9
BMI groups	n	%
< 18.5	11	4.7
18.5-24.9	144	61.3
25-29.9	75	31.9
30-39.9	5	2.1
>= 40	0	0
ASA	n	%
ASA 1	164	69.8
ASA 2	68	28.9
ASA 3	3	1.3
Side	n	%
Right	130	55.3
Left	105	44.7

Table 30: Age groups of PAO patients by hospital

	10-20 years		21-30 years		31-40 years		41-50 years	
	N	%	N	%	N	%	N	%
All hospitals	71	30,2 %	75	31,9 %	76	32,3 %	13	5,5 %
Kysthospitalet	17	19,3 %	31	35,2 %	34	38,6 %	6	6,8 %
OUS	54	36,7 %	44	29,9 %	42	28,6 %	7	4,8 %

Table 31: PAO Radiographic parameters before surgery

Lateral Central Edge angle	n	%
< 0	21	8.9
0-10	43	18.3
11-15	62	26.4
16-20	82	34.9
21-25	15	6.4
< 25	11	4.7
Missing	1	0.4
Lateral Central Edge choice	n	%
Pelvic radiograph	229	97.4
Not based on pelvic radiograph	0	0
Missing	6	2.6
Cartilage thickness in the hip joint (mm)	n	%
< 2	0	0
2-3	0	0
> 3	232	98.7
Missing	3	1.3

Periacetabular osteotomies are performed in patients with symptomatic acetabular dysplasia, but to be effective, the procedure must be done before the patient shows signs of osteoarthritis. In most cases, the development of osteoarthritis is age-related. The average age of operated patients is 26.5 years, meaning they are young. There are far more women than men undergoing periacetabular osteotomy, which corresponds well with the gender distribution seen in hip dysplasia among children.

The center-edge (CE) angle is the most commonly used measurement to describe acetabular dysplasia in the adult population. It reflects the degree of acetabular coverage over the femoral head. A CE angle below 20° is considered definite dysplasia, while a value between 20° and 25° is described as borderline. In some cases, factors other than femoral head coverage influence the decision to perform reorientation of the acetabulum, such as acetabular and/or femoral rotation.

We observe that 95% of patients undergoing PAO have a CE angle below 25°, indicating a strong rationale for the surgery performed.

Cartilage height in the hip joint is a measure of osteoarthritis progression. Normal cartilage height is >3 mm, while a height <2 mm is considered osteoarthritis. We observe that all patients operated with PAO have a cartilage height >3 mm, and none with early or definite osteoarthritis have undergone PAO.

Table 32: PAO – Operation and indication

Previous procedures on the affected hip	n	%
No	202	86
Yes	33	14
Arthroscopic procedure	19	57.6
Open hip surgery	14	42.4
Indication for the current procedure	n	%
Femoroacetabular impingement (FAI)	14	6
Labral injury of unknown etiology	0	0
Acetabular dysplasia (including version anomalies)	227	96.6
Femoral dysplasia/malrotation	27	11.5
Sequelae of pediatric hip joint disease	0	0
Extra-articular cause	0	0
Other	1	0.4
Surgical time (incision to closure)- minutes	Mean (sd) 136.3 (64.2)	Min-Max 47-319
Intraoperative complication	n	%
No	226	96,7
Yes	9*	3,8

* We note that 9 intraoperative complications have been reported. Five of these are fractures of the posterior column, one is a fracture of the inferior ramus, and one is a fracture of the anterior inferior iliac spine.

Table 33: PAO – Medications

Systemic antibiotics		
<u>Prophylaxis</u>	n	%
No	0	0
Yes	235	100
Preoperative	233	99.1
Periaoperative	0	0
Postoperative	2	0.9
Cox inhibitor		
<u>Heterotopic ossification prophylaxis</u>	n	%
No	235	100
Yes	0	0
<u>Prophylactic antitrombotic treatment</u>	n	%
No	1	0.4
Yes	234	99.6
Preoperative	11	4.7
Perioperative	2	0.9
Postoperative	221	94.4

Figure 33: Proportion of PAO patients receiving postoperative antitrombotic prophylactic treatment in 2024

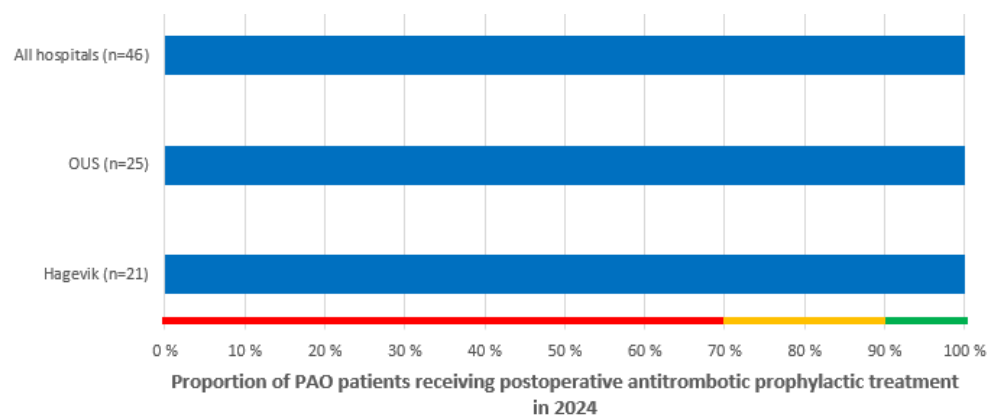


Table 34: Proportion of PAO patients receiving postoperative antitrombotic prophylactic treatment in 2024

Hospitals	2024	
	N	Proportion antitrombotic prophylactic treatment
All hospitals	46	100 %
Hagevik	21	100 %
OUS	25	100 %

Figure 34: Proportion of PAO patients receiving postoperative antitrombotic prophylactic treatment in 2022-2024

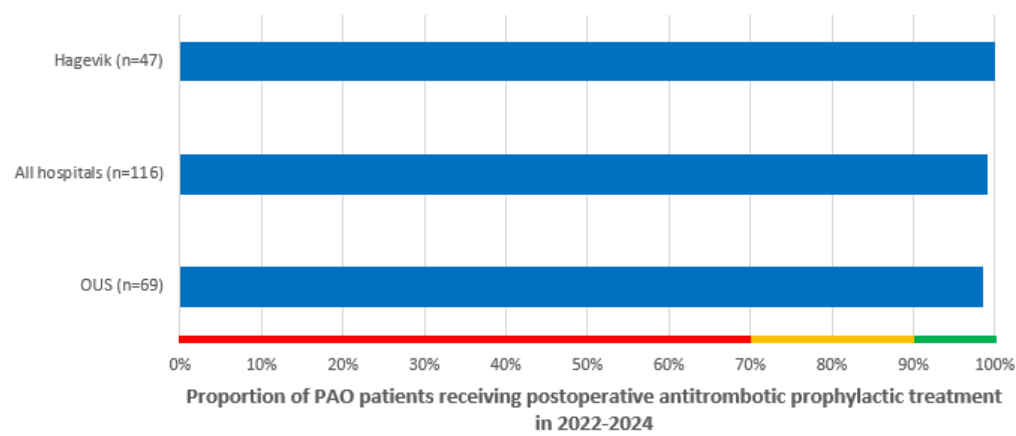
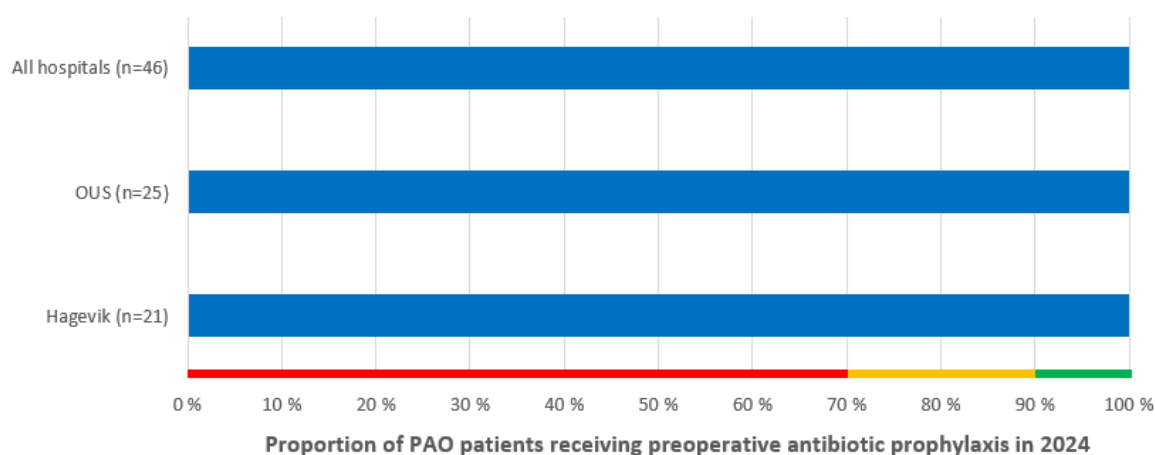


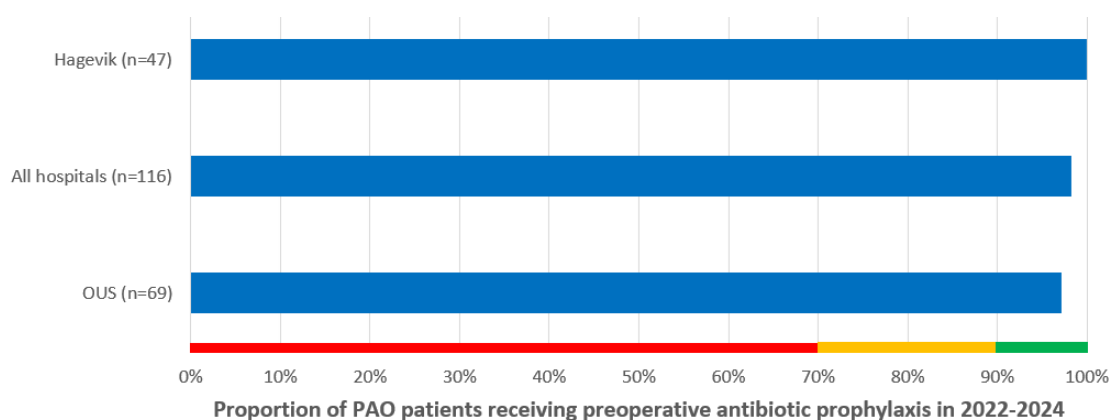
Table 35: Proportion of PAO patients receiving postoperative thromboprophylaxis in 2022-2024

Hospitals	2022-2024	
	N	Proportion antitrombotic prophylactic treatment
All hospitals	116	99.1 %
Hagevik	47	100 %
OUS	69	98.6 %

It appears that all patients undergoing periacetabular osteotomy initiate antitrombotic prophylactic treatment. This is in accordance with national guidelines for the use of anticoagulants to prevent blood clots in major hip surgery.

Figure 35: Proportion of PAO patients receiving preoperative antibiotic prophylaxis in 2024**Table 36:** Proportion of PAO patients receiving preoperative antibiotic prophylaxis in 2024

Hospitals	2024	
	N	Proportion antibiotic prophylaxis
All hospitals	46	100 %
Hagevik	21	100 %
OUS	25	100 %

Figure 36: Proportion of PAO patients receiving preoperative antibiotic prophylaxis in 2022-2024**Table 37:** Proportion of PAO patients receiving preoperative antibiotics prophylaxis in 2022-2024

Hospitals	2022-2024	
	N	Proportion antibiotic prophylaxis
All hospitals	116	97.1 %
Hagevik	47	100 %
OUS	69	98.3 %

This type of surgery, where both pelvic osteotomies are performed and metal screws are inserted to secure the osteotomies, should, according to national guidelines, include preoperative antibiotic prophylaxis to prevent infection. If the surgery is prolonged, antibiotics should also be administered perioperatively. It appears that hospitals performing these procedures largely follow national recommendations for antibiotic use in connection with surgery.

Other open procedures

Table 38: Other open procedures – Demographic data

Other open procedures n=38		
	Mean (sd)	Min-Max
Age	23.2 (6.4)	14-37
Age groups	n	%
10-20 year	13	34.2
21-30 year	19	50
31-40 year	6	15.8
41-50 year	0	0
> 50 year	0	0
Gender	n	%
Male	14	36.8
Female	24	63.2
	Mean (sd)	Min-Max
BMI	26.7 (4.7)	18.5-35.9
BMI groups	n	%
< 18,5	0	0
18.5-24.9	16	42.1
25-29.9	13	34.2
30-39.9	9	23.7
>= 40	0	0
ASA	n	%
ASA 1	24	63.2
ASA 2	14	36.8
ASA 3	0	0
Side	n	%
Right	26	68.4
Left	12	31.6

Table 39: Other open procedures – Operation and indication

Previous procedures on the affected hip	n	%
No	24	63.2
Yes	14	36.8
Arthroscopic procedure	2	14.3
Open hip surgery	12	85.7
Indication for the current procedure	n	%
Femoroacetabular impingement (FAI)	20	52.6
Labral injury of unknown etiology	0	0
Acetabular dysplasia (including version anomalies)	1	2.6
Femoral dysplasia/malrotation	12	31.6
Sequelae of pediatric hip joint disease	13	34.2
Extra-articular cause	3	7.9
Other	2	5.3

Hip arthroscopies

Hip arthroscopies are performed for several different diagnoses, the most common being femoroacetabular impingement. This condition is more prevalent in men and does not necessarily correlate with previous hip disease in childhood. In addition, some patients undergo arthroscopic procedures either before or after PAO. These cases typically involve prevention of secondary impingement (cam resection) or repair of a persistently symptomatic labral tear following PAO.

Overall, the patient group undergoing hip arthroscopy tends to be somewhat older than those undergoing open procedures.

There is little variation between hospitals in the patient populations being operated on. This suggests a consensus within the field regarding which patients should be offered surgery and which diagnoses should be treated.

Table 40: Demographic data for patients undergoing hip arthroscopy

	Mean (sd)	Min-Max
Age	32.7 (10.5)	13-78
Age groups	n	%
10-20 year	77	10.2
21-30 year	258	34.3
31-40 year	239	31.7
41-50 year	139	18.5
> 50 year	40	5.3
Gender	n	%
Male	432	57.4
Female	321	42.6
	Mean (sd)	Min-Max
BMI	24.9 (3.6)	15.0-39.9
BMI groups	n	%
< 18.5	11	1.5
18.5-24.9	425	56.4
25-29.9	236	31.3
30-39.9	81	10.8
>= 40	0	0
ASA	n	%
ASA 1	580	77
ASA 2	166	22
ASA 3	7	0.9
Side	n	%
Right	413	54.8
Left	340	45.2

Table 41: Hospital-specific age groups for hip arthroscopy

	10-20 year		21-30 year		31-40 year		41-50 year		>50 year	
	N	%	N	%	N	%	N	%	N	%
All hospitals	77	10.2 %	258	34.3 %	239	31.7 %	139	18.5 %	40	5.3 %
Aleris Frogner	2	3.0 %	14	20.9 %	23	34.3 %	21	31.3 %	7	10.4 %
Aleris Rosenborg	2	9.1 %	5	22.7 %	7	31.8 %	6	27.3 %	2	9.1 %
Ålesund	1	7.7 %	0	0.0 %	4	30.8 %	4	30.8 %	4	30.8 %
Colosseum Mann	5	17.2 %	17	58.6 %	4	13.8 %	3	10.3 %	0	0.0 %
Kysthospitalet	22	11.2 %	81	41.1 %	74	37.6 %	19	9.6 %	1	0.5 %
OUS	33	10.7 %	90	29.3 %	93	30.3 %	72	23.5 %	19	6.2 %
St. Olav	12	10.2 %	51	43.2 %	34	28.8 %	14	11.9 %	7	5.9 %

Table 42: Hip arthroscopy – preoperative information and radiology

Alpha-angel	n	%
< 55	190	25.2
55-64	104	13.8
65-74	99	13.1
75-84	117	15.5
85-94	148	19.7
>=95	70	9.3
Missing	25	3.3
Alpha-angel options	n	%
X-ray	478	63.5
MRI/CT	22	2.9
Nötzli	196	26
Missing	57	7.6
Cartilage thickness (mm)	n	%
< 2	4	0.5
2-3	28	3.7
> 3	682	90.6
Missing	39	5.2
Subchondral cysts	n	%
No	650	86.3
Yes	65	8.6
Missing	38	5.0
Previous procedures on the affected hip	n	%
No	651	86.5
Yes	102	13.5
Arthroscopic procedure	82	10.9
Open hip surgery	70	9.3
Indication for the current procedure*	n	%
Femoroacetabular impingement (FAI)	594	78.9
Labral injury of unknown etiology	109	14.5
Acetabular dysplasia (including version anomalies)	54	7.2
Femoral dysplasia/malrotation	9	1.2
Sequelae of pediatric hip joint disease	20	2.7
Extra-articular cause	11	1.5
Other	78	10.4

* It is possible to select multiple reasons for surgery.

Table 43: Hospital-specific indications for hip arthroscopy*

	All hospitals		Aleris Frogner		Aleris Rosenborg		CMedical	
	N	%	N	%	N	%	N	%
Femoroacetabular impingement (FAI)	594	78.9 %	63	94.0 %	19	86.4 %	2	6.9 %
Labral injury of unknown etiology	109	14.5 %	28	41.8 %	4	18.2 %	1	3.4 %
Acetabular dysplasia (including version anomalies)	54	7.2 %	2	3.0 %	2	9.1 %	0	0.0 %
Femoral dysplasia/malrotation	9	1.2 %	0	0.0 %	0	0.0 %	0	0.0 %
Sequelae of pediatric hip joint disease	20	2.7 %	0	0.0 %	0	0.0 %	0	0.0 %
Extra-articular cause	11	1.5 %	1	1.5 %	0	0.0 %	1	3.4 %
Other	78	10.4 %	1	1.5 %	0	0.0 %	3	10.3 %

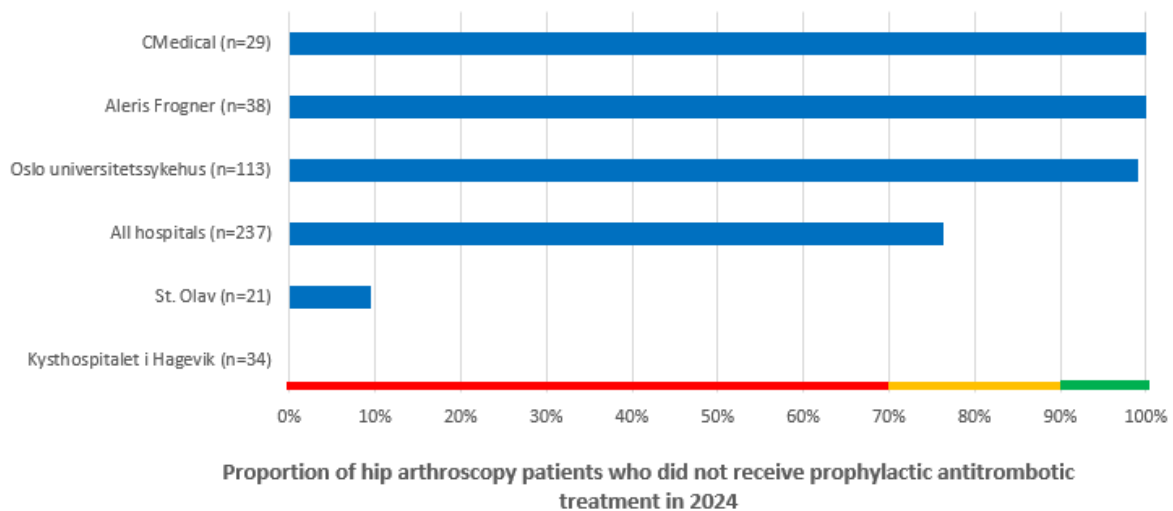
	Kysthospitalet		OUS		St. Olavs		Ålesund	
	N	%	N	%	N	%	N	%
Femoroacetabular impingement (FAI)	174	88.3 %	211	68.7 %	98	83.1 %	2	15.4 %
Labral injury of unknown etiology	8	4.1 %	54	17.6 %	2	1.7 %	12	92.3 %
Acetabular dysplasia (including version anomalies)	32	16.2 %	16	5.2 %	2	1.7 %	0	0.0 %
Femoral dysplasia/malrotation	8	4.1 %	1	0.3 %	0	0.0 %	0	0.0 %
Sequelae of pediatric hip joint disease	17	8.6 %	3	1.0 %	0	0.0 %	0	0.0 %
Extra-articular cause	0	0.0 %	2	0.7 %	7	5.9 %	0	0.0 %
Other	11	5.6 %	48	15.6 %	15	12.7 %	0	0.0 %

* It is possible to select multiple reasons for surgery.

Table 44: Hip arthroscopy medications

Systemic antibiotics		
<u>Prophylaxis</u>	n	%
No	59	7.8
Yes	694	92.2
Preoperative	654	94.2
Perioperative	39	5.6
Postoperative	2	0.3
Cox inhibitor		
<u>Heterotopic ossification prophylaxis</u>	n	%
No	86	11.4
Yes	667	88.6
Prophylactic antitrombotic treatment		
No	428	56.8
Yes	325	43.2
Preoperative	4	1.2
Perioperative	2	0.6
Postoperative	319	98.2

Figure 37: Proportion of hip arthroscopy patients who **did not** receive prophylactic antitrombotic treatment in 2024

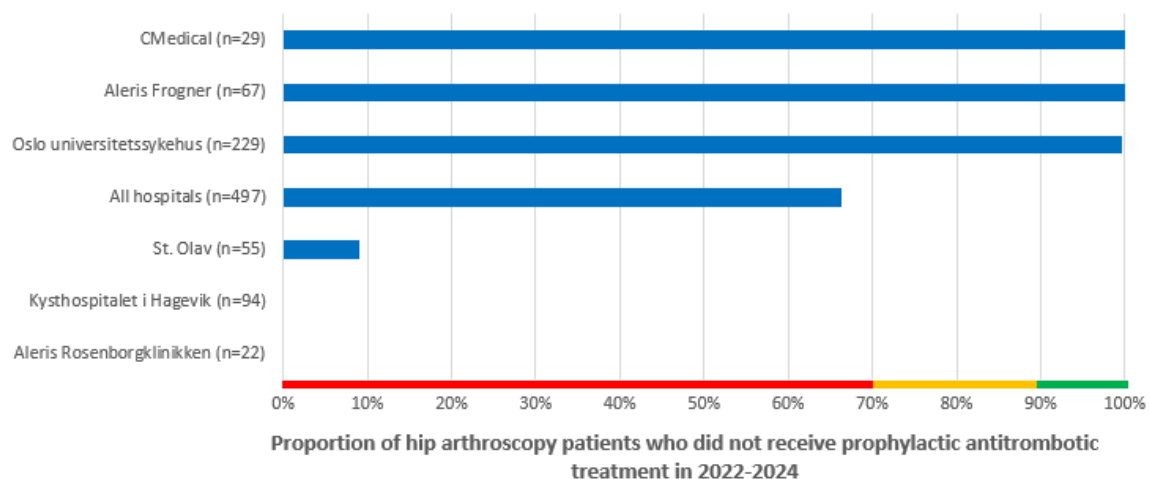


Only hospitals with more than 5 reported cases in 2024 are included in the figure.

Table 45: Proportion of hip arthroscopy patients who **did not** receive prophylactic antitrombotic treatment in 2024

Hospital	2024	
	N	Proportion not receiving prophylactic antitrombotic treatment
All hospitals	237	76.4 %
Aleris Frogner	38	100 %
CMedical	29	100 %
Hagevik	34	0 %
OUS	113	99.1 %
St. Olav	25	9.5 %

Figure 38: Proportion of hip arthroscopy patients who **did not** receive prophylactic antitrombotic treatment in 2022-2024



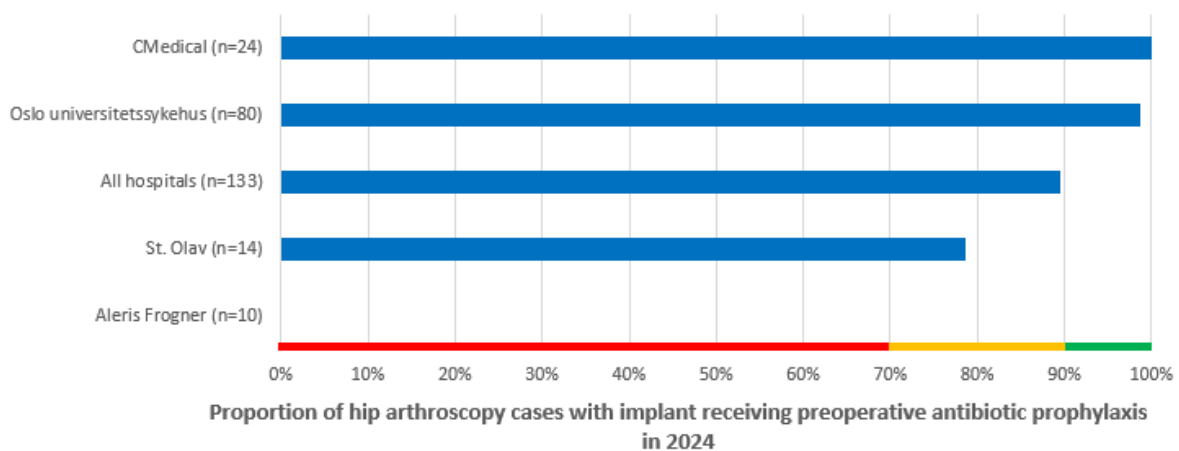
Only hospitals with more than 5 reported cases in 2022-2024 are included in the figure.

Table 46: Proportion of hip arthroscopy patients who **did not** receive prophylactic antitrombotic treatment in 2022-2024

Hospital	2022-2024	
	N	Proportion not receiving prophylactic antitrombotic treatment
All hospitals	497	66.4 %
Aleris Frogner	67	100 %
Aleris Rosenborgklinikken	22	0 %
CMedical	29	100 %
Hagevik	94	0 %
OUS	229	99.6 %
St. Olav	55	9.1 %

Hospitals with n < 5 even when combining 3 years: Ålesund

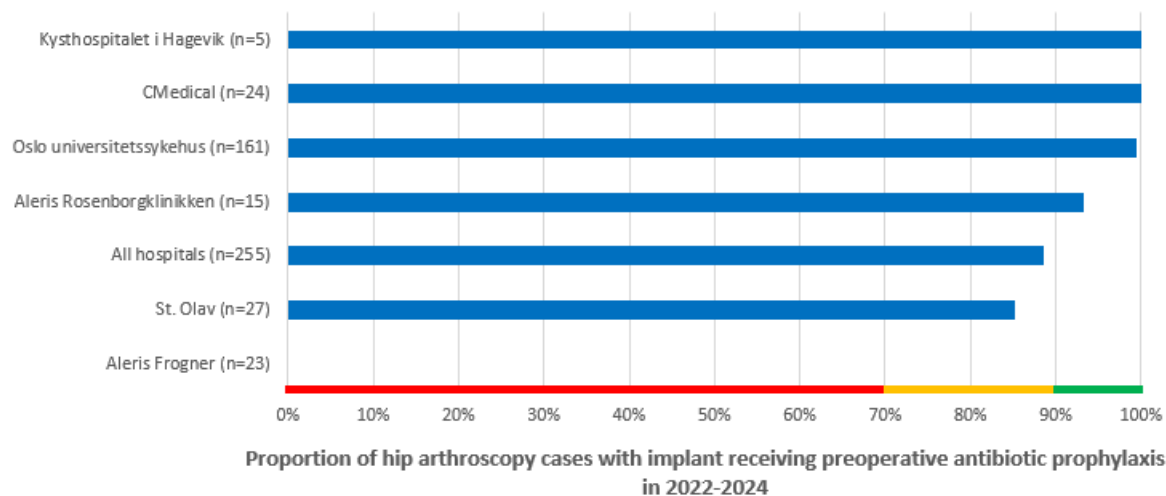
The data are presented to show the proportion of patients who have undergone hip arthroscopy and did NOT receive thromboprophylaxis. We observe that at some hospitals, thromboprophylaxis is systematically administered to all patients undergoing hip arthroscopy. According to national guidelines, only patients with risk factors for thromboembolic disease should receive such treatment. Therefore, we will examine the use of thromboprophylaxis in patients undergoing hip arthroscopy in a separate quality improvement project.

Figure 39: Proportion of hip arthroscopy cases with implant receiving preoperative antibiotic prophylaxis in 2024

Only hospitals with more than 5 reported cases in 2024 are included in the figure.

Table 47: Proportion of hip arthroscopy cases with implant receiving preoperative antibiotic prophylaxis in 2024

Hospital	2024	
	N	Proportion preoperative antibiotic prophylaxis
All hospitals	133	89.5 %
Aleris Frogner	10	0 %
CMedical	24	100 %
OUS	80	98.8 %
St. Olavs	14	78.6 %

Figure 40: Proportion of hip arthroscopy cases with implant receiving preoperative antibiotic prophylaxis in 2022-2024**Table 48:** Proportion of hip arthroscopy cases with implant receiving preoperative antibiotic prophylaxis in 2022-2024

Hospital	2022-2024	
	N	Proportion preoperative antibiotic prophylaxis
All hospitals	255	88.6 %
Aleris Frogner	10	0 %
Aleris Rosenborgklinikken	15	93.3 %
CMedical	24	100 %
Hagevik	5	100 %
OUS	161	93.4 %
St. Olavs	27	88.6 %

When implants are inserted during orthopedic surgery, national guidelines recommend administering preoperative antibiotic prophylaxis to prevent infection. In hip arthroscopy procedures, suture anchors may sometimes be used, and these represent foreign bodies that can increase the risk of infection, even though the risk is small. According to national guidelines, antibiotic prophylaxis is recommended when permanent foreign bodies are implanted.

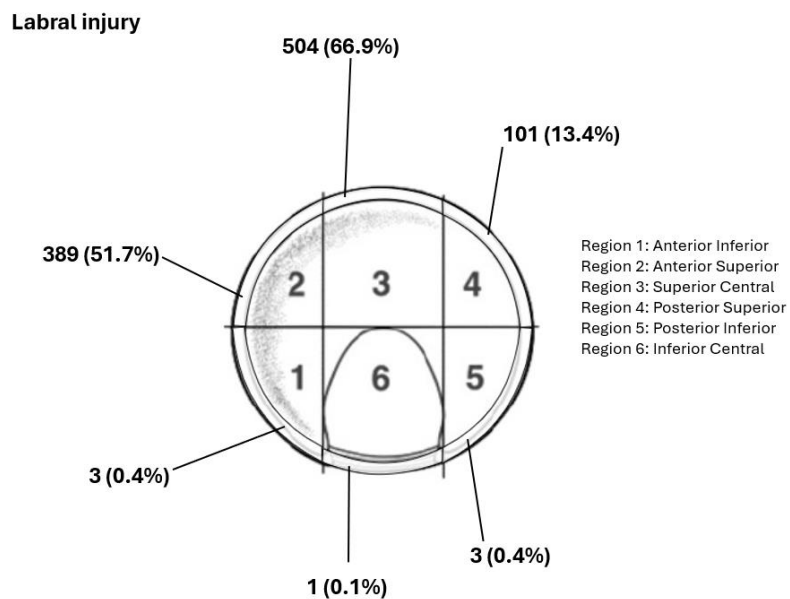
In some cases, it is not known in advance whether anchors will be placed, and antibiotics are then administered during the procedure if the decision is made to insert them. These cases will not be included when assessing the proportion of patients who received preoperative antibiotics.

It appears that most hospitals administer antibiotics preoperatively when implants are used, but this is not universal. We therefore plan to initiate a discussion within the professional community to ensure that everyone is updated on national guidelines.

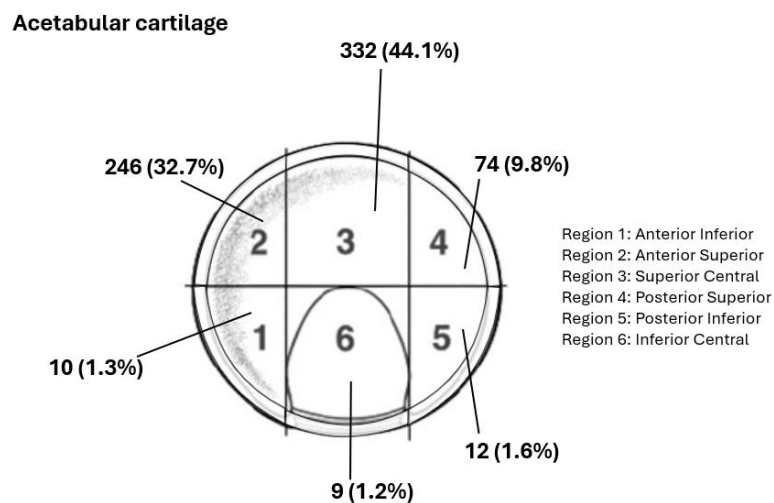
Table 49: Hip arthroscopy – portals, positioning, and intraoperative findings

Arthroscopic Portals	n	%
Laterale/distal variants	749	99.5
Anterior	442	58.7
Posterolateral	8	1.1
Positioning	n	%
Supine	556	73.8
Lateral	197	26.5
Intraoperativ findings		
Cartilage/labral injury*	n	%
No	87	11.6
Yes	666	88.4
Synovitis	n	%
No	303	40.2
Yes	450	59.8
Specify		
Focal	412	91.6
Generalized	38	8.4
Ligamentum capitis femoris injured?		
No	724	96.1
Yes	29	3.9

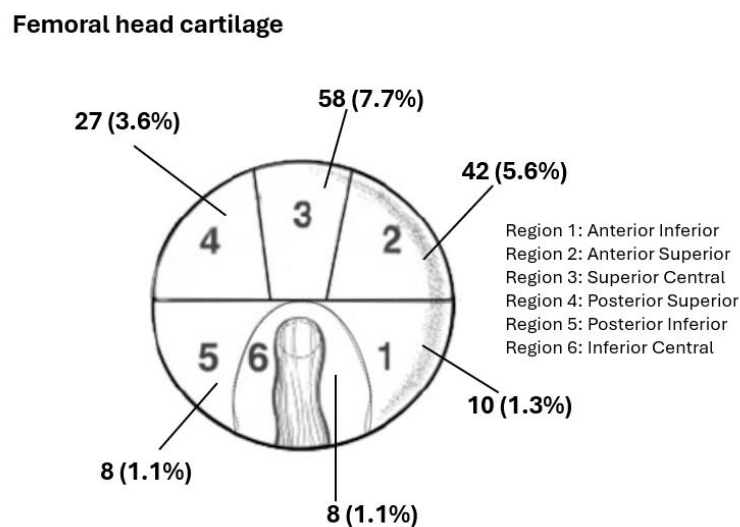
* The figures below show details of cartilage and labral injuries.

Figure 41: Hip arthroscopy – labral injury

The percentage in parentheses indicates the proportion of injuries in the specified region out of all performed arthroscopies; multiple regions may be affected per hip arthroscopy.

Figure 42: Acetabular cartilage

The percentage in parentheses indicates the proportion of injuries in the specified region out of all performed arthroscopies; multiple regions may be affected per hip arthroscopy.

Figure 43: Femoral head cartilage

The percentage in parentheses indicates the proportion of injuries in the specified region out of all performed arthroscopies; multiple regions may be affected per hip arthroscopy.

Figures 41–43 show intraoperative findings during arthroscopy. We observe that almost 90% of patients have cartilage and/or labral damage. For labral injuries, these are most often located in the superior central and superior anterior parts of the acetabulum. For acetabular cartilage injuries, the same pattern is seen—they occur in the superior regions, mainly in the anterior and central superior areas. For cartilage injuries on the femoral head, the same pattern is observed, although far fewer patients have these lesions.

There is little that can be done for cartilage injuries, whereas for labral injuries, one can either perform a labral suture or a debridement to prevent further symptoms and progression of the damage.

Table 50: Hip arthroscopy – performed procedures

Procedures	n	%
Isolated CAM-resection	344	45.7
Cam + Pincer	174	23.1
Isolated Pincer	109	14.5
Other/missing	126	16.7
Labral	n	%
No treatment	217	28.8
Debridement	145	19.3
Suture	349	46.3
Reconstruction	1	0.1
Resection	17	2.3
Cartilage	n	%
No treatment	368	48.9
Debridement	4	0.4
Microfracture	1	0.1
Other procedures	8	1.1
Removed loose bodies	n	%
No	712	94.6
Yes	40	5.3
Missing	1	0.1
Implants	n	%
Suture anchors/sutures	348	46.2
Allograft	0	0
Autograft	0	0
Screws	0	0
Other	0	0
Capsular management in hip arthroscopy	n	%
Capsulectomy	0	0
Portal-limited capsulotomy	347	46.1
Interportal capsulotomy	218	29
Femoral neck axis capsulotomy (Kelly)	188	25
Dome capsulotomy (Dienst technique)	11	1.5
Capsular closure following capsulotomy	n	%
None	326	43.3
Partial	36	4.8
Complete	391	51.9

Table 51: Hip arthroscopy – operative data

	Mean (sd)	Min-Max
Surgical time (skin-to-skin) – minutes	100 (39)	18-256
	Mean (sd)	Min-Max
Traction time in hip arthroscopy – minutes	53 (24)	0-140
Intraoperative complications	n	%
No	747	99.2
Yes	6	0.8

Open and arthroscopic procedures in young adults PROM

For young adult hips, PROMs are sent to patients at 1, 2, 5, and 10 years postoperatively for both open and arthroscopic procedures. The PROMs used are EQ-5D-5L, a generic tool, and IHOT-12, a condition-specific tool developed for young, active patients with hip problems.

The EQ-5D-5L includes five questions with five response options for each question. It assesses mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Additionally, it features a VAS scale from 0 to 100, where patients rate their current health state, with 0 being the worst imaginable health and 100 the best imaginable health.

The IHOT-12 consists of 12 questions about hip-related symptoms and issues in various activities. Responses are given on a continuous scale ranging from extreme/severe symptoms (0 points) to no symptoms/problems (100 points). Scores for each question are averaged to produce an overall score between 0 and 100.

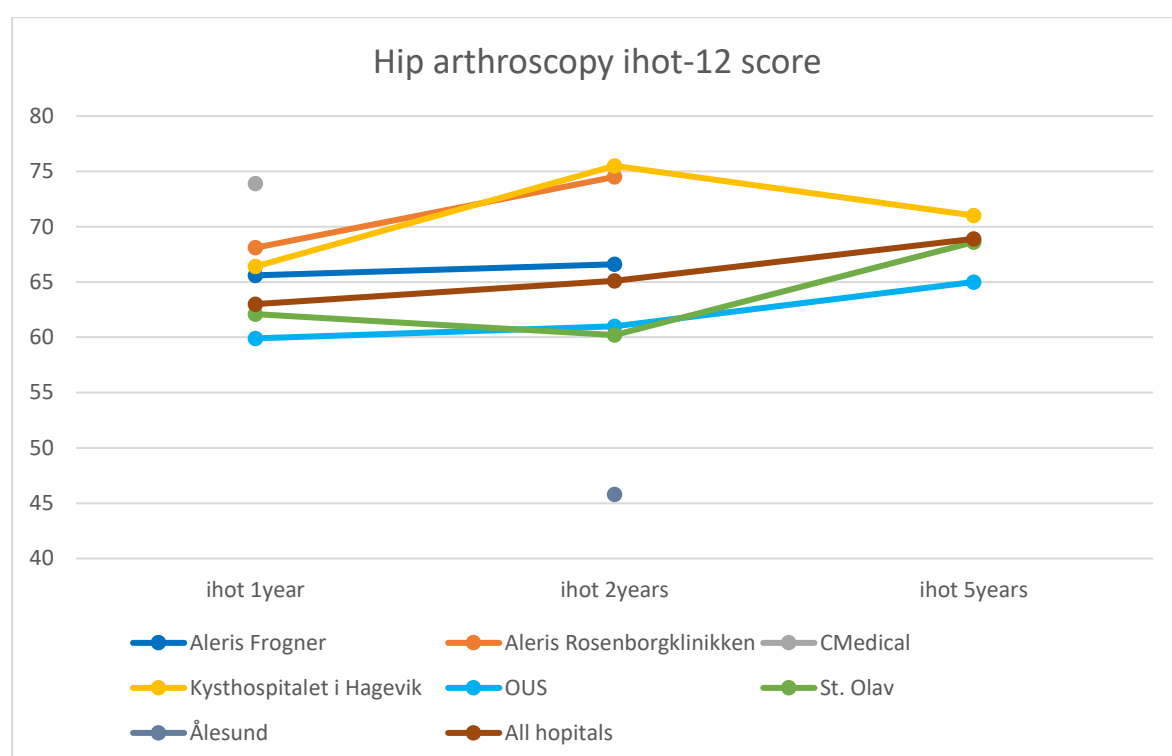
Data for PROMs at 1, 2, and 5 years postoperatively are presented at the hospital level.

Figure 44: PROM iHOT-12 for PAO 1, 2 and 5 years after surgery



Table 52: PROM IHOT-12 for PAO 1, 2 and 5 years after surgery

	1year	2years	5years
All hospitals	66.1	62.3	66.1
Kysthospitalet	77.5	61.6	77.5
OUS	62.2	62.8	62.2

Figure 45: PROM iHOT-12 for Hip Arthroscopy 1, 2 and 5 years after surgery**Table 53:** PROM IHOT-12 for Hip Arthroscopy 1, 2 and 5 years after surgery

	1year	2years	5years
All hospitals	63.0	65.1	68.9
Aleris Frogner	65.6	66.6	
Aleris Rosenborgklinikken	68.1	74.5	
CMedical	73.9		
Kysthospitalet i Hagevik	66.4	75.5	71.0
OUS	59.9	61.0	65.0
St. Olav	62.1	60.2	68.6
Ålesund		45.8	

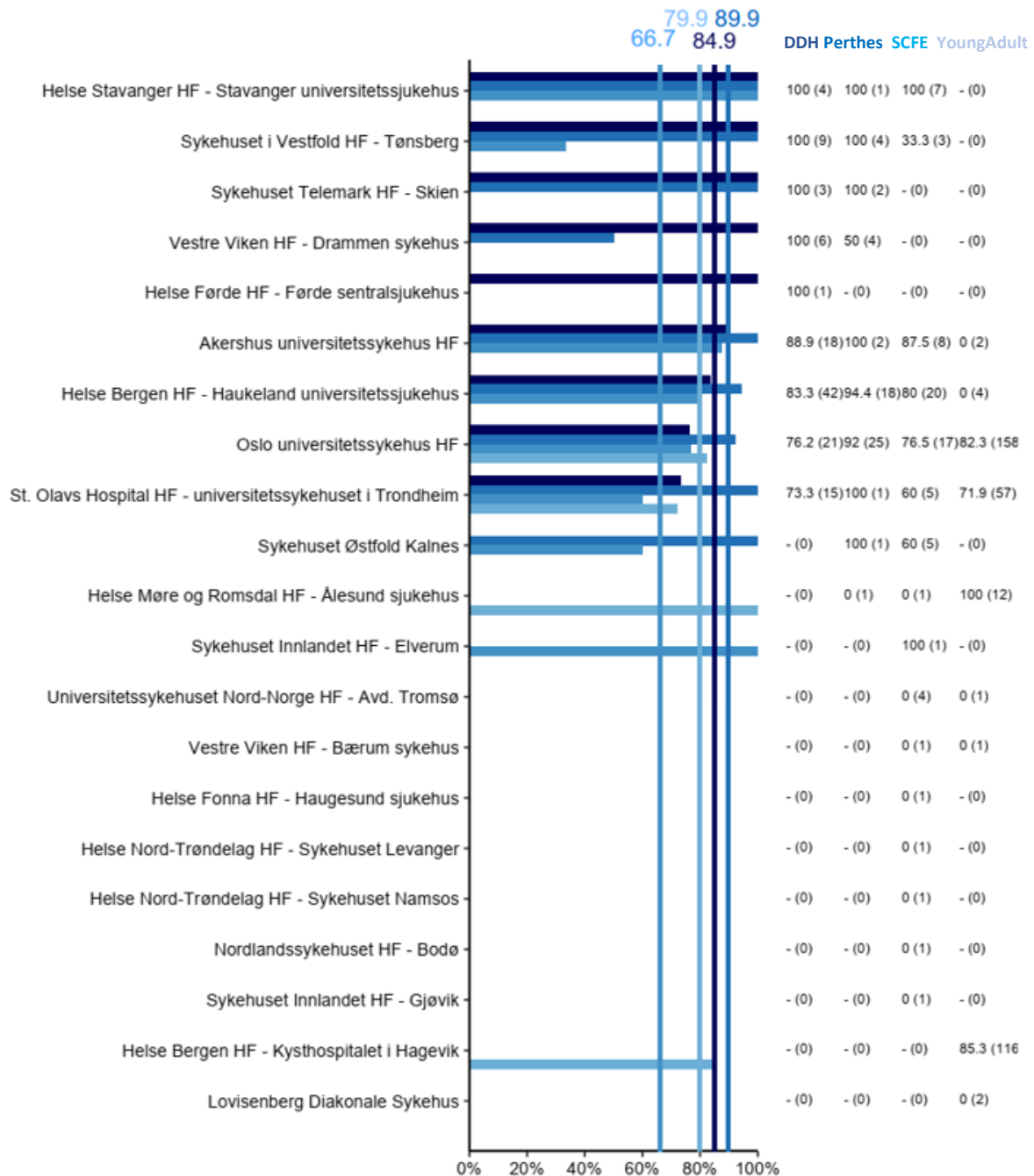
Average iHOT-12 scores are only presented for time points where there are more than 5 PROM responses from patients

Table 54: Number of PROMs sent and completed from MRS

		Sent	Expired	Initiated	Completed	Response rate
Pediatric hips						
	2024	74*	37	22	37	50 %
	2023	290	79	15	210	72 %
Young adults						
	2024	311*	75	37	235	76 %
	2023	242	55	8	186	77 %

For all PROM questionnaires sent out, a reminder is issued 25 days after dispatch to increase the response rate.

Completeness of reporting, Norwegian Pediatric Hip Register and Open and Arthroscopic procedures in Young adults 2021-2022



The completeness is reported for the years 2021–2022. This analysis is conducted every other year and involves linking the registry's data with data reported by your hospital to the Norwegian Patient Register (NPR).

The completeness is calculated only for inpatients and does not reflect the completeness of Perthes disease and Hip dysplasia, which are followed up exclusively in outpatient clinics.

To ensure high data quality, a minimum completeness rate of 80% is required for all groups. Most hospitals have a small number of patients in each group, so the goal is to achieve a completeness of

over 90% at all hospitals to include as many patients as possible in the registry. If your hospital's completeness rate is lower than desired, we ask that measures be taken to ensure the registration of these patients.

Previously, completeness calculations were only performed for admitted/operated patients. For the 2021/2022 completeness analyses, this has been extended to include outpatient patients for the first time, with a protocol developed for this purpose.

In 2023, completeness analyses for outpatient patients were also conducted in collaboration with the Norwegian Patient Register (NPR). This is particularly challenging for patients diagnosed with hip dysplasia. In the ICD-10 coding system, the code Q65.8 is used for patients with pure acetabular dysplasia with the hip in place. This diagnosis indicates "other congenital deformities of the hip" and is also used for several other conditions unrelated to hip dysplasia.

Additionally, children coded at birth with unstable, subluxable, or dislocated hips may normalize by 4–6 months of age when the first X-ray is taken. These children will also have this diagnosis code but should not be included in our registry.

Therefore, completeness analyses against the NPR were performed with the criterion that the child must be over 6 months old and have at least three consultations with the same specified diagnosis within 18 months. This approach helps filter out patients reported to NPR but likely have other hip deformities or congenital instability that normalizes before 6 months of age.

For 2021/2022, completeness analyses were conducted for patients registered in the adult hip section of the registry. This had not been done previously.

Dropout analyses are also planned at four hospitals: Haukeland University Hospital, Stavanger University Hospital, Oslo University Hospital, and St. Olav's Hospital. These analyses will examine patients reported to NPR with the three relevant diagnoses in the pediatric hip registry. By reviewing medical records and X-rays, it will be assessed whether these patients should have been reported to the registry or if they fall outside the inclusion criteria.

Table 55: Developmental dysplasia of the hip, outpatients

Place of treatment	Both	Only NBHR	Only NPR	Totalt	NBHR (%)	NPR (%)
Oslo universitetssykehus HF	2	14	4	20	80.0	30.0
Ahus, Nordbyhagen	14	2	1	17	94.1	88.2
Sykehuset i Vestfold, Tønsberg	9	0	0	9	100.0	100.0
Sykehuset Østfold, Kalnes	0	0	3	3	0.0	100.0
Vestre Viken, Drammen	3	3	2	8	75.0	62.5
Sykehuset Telemark, Skien	3	0	0	3	100.0	100.0
Helse Bergen, Haukeland	25	10	36	71	49.3	85.9
Helse Førde, Førde	0	1	1	2	50.0	50.0
Helse Stavanger, Stavanger	3	1	1	5	80.0	80.0
St. Olavs hospital, Trondheim	6	5	1	12	91.7	58.3
UNN, Tromsø	0	0	4	4	0.0	100.0
Totalt	65	36	53	154	65.6	76.6

Table 56: Perthes disease, outpatients

Place of treatment	Both	Only NBHR	Only NPR	Totalt	NBHR (%)	NPR (%)
Oslo universitetssykehus HF	7	16	20	43	53.5	62.8
Ahus, Nordbyhagen	2	0	6	8	25.0	100.0
Sykehuset i Vestfold, Tønsberg	2	2	7	11	36.4	81.8
Sykehuset Innlandet, Lillehammer	0	0	2	2	0.0	100.0
Sykehuset Innlandet, Elverum	0	0	1	1	0.0	100.0
Sykehuset Innlandet, Gjøvik	0	0	1	1	0.0	100.0
Sykehuset Østfold, Kalnes	1	0	0	1	100.0	100.0
Sykehuset Østfold, Moss	0	0	1	1	0.0	100.0
Sørlandet sykehus, Arendal	0	0	2	2	0.0	100.0
Sørlandet sykehus, Kristiansand	0	0	1	1	0.0	100.0
Vestre Viken, Drammen	2	0	10	12	16.7	100.0
Vestre Viken, Kongsberg	0	0	1	1	0.0	100.0
Vestre Viken, Ringerike	0	0	1	1	0.0	100.0
Sykehuset Telemark, Porsgrunn	2	0	2	4	50.0	100.0
Helse Bergen, Haukeland	13	4	6	23	73.9	82.6
Helse Bergen, Skadepoliklinikken	0	0	1	1	0.0	100.0
Helse Fonna, Haugesund	0	0	1	1	0.0	100.0
Helse Stavanger, Stavanger	1	0	6	7	14.3	100.0
Helse Møre og Romsdal, Ålesund	0	0	3	3	0.0	100.0
St. Olavs hospital, Trondheim	1	0	2	3	33.3	100.0
Helgelandssykehus, Sandnessjøen	0	0	1	1	0.0	100.0
UNN, Tromsø	0	0	3	3	0.0	100.0
Finnmarkssykehuset, Kirkenes	0	0	1	1	0.0	100.0
Totalt	31	22	79	132	40.2	83.3

PUBLICATIONS

Full list of publications on our website <https://www.helse-bergen.no/nrl>

PhD thesis (68 from 1995 to June 2025)

Norwegian Arthroplasty Register (36 from 1995 to June 2025)

PhD thesis from 2022 to June 2025 (5)

Rognsvåg T. A multidisciplinary intervention tailored to knee osteoarthritis patients at risk of chronic pain after total knee arthroplasty [dissertation]. 2025 University of Bergen; Bergen, Norway

Birkenes T. Long-term risk of arthroplasty and patient-reported outcomes following focal cartilage lesions in the knee [dissertation]. 2024 University of Bergen; Bergen, Norway

Hole RM. Shoulder arthroplasty in Norway: Risk of revision and death [dissertation]. 2024 University of Bergen; Bergen, Norway

Thoen PS. Advancements in total hip arthroplasty- polyethylene, articulation and factors associated with dislocation [dissertation]. 2022 University of Oslo; Oslo, Norway

Øhrn FD. Contemporary total knee arthroplasty: Designs and surgical methods [dissertation]. 2022 NTNU; Norway

Norwegian Hip Fracture Register (12 from 1995 to June 2025)

PhD thesis from 2022 to June 2025 (5)

Lian T. Quality improvement in the treatment of hip fractures [dissertation]. 2024 University of Oslo; Oslo, Norway

Bartels S. Functional outcome and complications after surgical treatment of displaced low-energy femoral neck fractures in patients between 55 and 70 years [dissertation]. 2024 University of Oslo; Oslo, Norway

Grønhaug KM. Intramedullary nailing in the treatment of trochanteric and subtrochanteric fractures [dissertation]. 2023 University of Bergen; Bergen, Norway

Kjærvik C. Hip fractures in Norway- Inequity in treatment and outcomes [dissertation]. 2022 University of Tromsø; Vesterålen, Norway

Pollmann C. Improving outcomes in hip fracture patients [dissertation]. 2022 University of Oslo; Oslo, Norway

Norwegian Knee Ligament Register (12 from 1995 to June 2025)

PhD thesis from 2022 to June 2025 (1)

Martin K. Predicting anterior cruciate ligament reconstruction outcome- Machine learning analysis of National Knee Ligament Registries[dissertation].2025 Oslo Sports Trauma Research Senter; Oslo, Norway;

Norwegian National Network for Arthroplasty and Hip Fractures (9 from 1995 to June 2025)

PhD thesis from 2022 to June 2025 (2)

Olsen U. Advancing the understanding of preoperative factors and patient experience related to pain and physical function after total knee arthroplasty [dissertation]. 2024 University of Oslo; Oslo, Norway

Ngoie LB. Musculoskeletal impairment and road traffic injuries in Malawi [dissertation]. 2023 University of Bergen; Malawi

Papers (503 from 1995 to June 2025)

Papers from 2022 to June 2025 (100)

Norwegian Arthroplasty Register (260 from 1995 to June 2025)

Papers from 2022 to June 2025 (47)

Wensaas A, Blatti C, Terjesen T, Huhnstock S. Long-term outcome of nonoperative treatment of Perthes` disease: only 19% total hip arthroplasty at a mean follow-up of 48 years. *Bone Joint J.* 2025 Jun 1;107-B(6): 657-662

Terjesen T, Wensaas A. Good long-term clinical outcome in 50% of hips with mild and moderate chronic slipped capital femoral epiphysis treated with in situ fixation: 93 hips with a follow-up of 50 years. *JB JS Open Access.* 2025 Apr 18;10(2):e24.0012

Hatzikotoulas K, Southam L, Stefansdottir L, Boer CG, McDonald ML, Pett JP, Park YC, Tuerlings M, Mulders R, Barysenka A, Arruda AL, Tragante V, Rocco A, Bittner N, Chen S, Horn S, Srinivasasainagendra V, To K, Katsoula G, Kreitmaier P, Tenghe AMM, Gilly A, Arbeevea L, Chen LG, Pins AMD, Dochtermann D, Henkel C, Höijer J, Ito S, Lind PA, Lukusa-Sawalena B, Minn AKK, Mola-Caminal M, Narita A, Nguyen C, Reimann E, Silberstein MD, Skogholt AH, Tiwari H, Yau MS, Yue M, Zhao W, Zhou JJ, Alexiadis G, Banasik K, Brunak S, Campbell A, Cheung JTS, Dowsett J, Faquih T, Faul JD, Fei L, Fenstad AM, Funayama T, Gabrielsen ME, Gocho C, Gromov K, Hansen T, Hudjashov G, Ingvarsson T, Johnsen JS, Jonsson H, Kakehi S, Karjalainen J, Kasbohm E, Lemmelä S, Lin K, Liu X, Loef M, Mangino M, McCartney D, Millwood IY, Richman J, Roberts MB, Ryan KA, Samartzis D, Shivakumar M, Skou ST, Sugimoto S, Suzuki K, Tukuwa H, Teder-Laving M, Thomas L, Tomizuka K, Turman C, Weiss S, Wu TT, Zengini E, Zhang Y, Ferreira MAR, Babis G, Baras A, Barker T, Carey DJ, Cheah KSE, Chen Z, Cheung JPY, Daly M, Mutsert RD, Eaton CB, Erikstrup C, Furnes O, Golightly YM, Gudbjartsson DF, Hailer NP, Hayward C, Hochberg MC, Homuth G, Huckins LM, Hveem K, Ikegawa S, Ishijima M, Isomura M, Jones M, Kang JH, Kardias SLR, Kloppenburg M, Kraft P, Kumahashi N, Kuwata S, Lee MTM, Lee PH, Lerner R, Li L, Lietman SA, Lotta L, Lupton MK, Mägi R, Martin NG, McAlindon TE, Medland SE, Michaëlsson K, Mitchell BD, Mook-Kanamori DO, Morris AP, Nabika T, Nagami F, Nelson AE, Ostrowski SR, Palotie A, Pedersen OB, Rosendaal FR, Sakurai-Yageta M, Schmidt CO, Sham PC, Singh JA, Smelser DT, Smith JA, Song YQ, Sørensen E, Tamiya G, Tamura Y, Terao C, Thorleifsson G, Troelsen A, Tsezou A, Uchio Y, Uitterlinden AG, Ullum H, Valdes AM, Heel DAV, Waleter RG, Weir DR, Wilkinson JM, Winsvold BS, Yamamoto M, Zwart JA, Stefansson K, Meulenbelt I, Teichmann SA, Meurs JBJV, Stykarsdottir U, Zeggini E. Translational genomics of osteoarthritis in 1,962,069 individuals. *Nature* 2025 Apr 9;[Epub ahead of print]

Lutro O, Tjørhom MB, Leta TH, Gjertsen JE, Hallan G, Bruun T, Westberg M, Wik TS, Pollmann CT, Lygre SHL, Furnes O, Engesæter L, Dale H. How many doses and what type of antibiotic should be used as systemic antibiotic prophylaxis in primary hip and knee arthroplasty? A register-based study on 301,204 primary total and hemi- hip and total knee arthroplasties in Norway 2005-2023. *Acta Orthop.* 2025 Mar 4;96:217-225

Karlsen ØE, Dale H, Furnes O, Eriksen-Volle HM, Westberg M. Trends of surgical site infection and periprosthetic joint infection after primary total hip arthroplasty in two national health registers 2013-2022. *J Hosp Infec.* 2025 Feb 7;[Epub ahead of print]

Von Hintze J, Ponkilainen V, W-Dahl A, Hailer NP, Furnes O, Fenstad AM, Badawy M, Pedersen AB, Lindberg-Larsen M, Niemeläinen MJ, Mäkelä K, Eskelinen A. Incidence of constrained condylar and hinged knee implants and mid- to long-term survivorship: a register- based study from the Nordic Arthroplasty Association (NARA). *Acta Orthop.* 2025 Feb 6;96:142-150

Pakarinen O, Ponkilainen V, Varnum C, Pedersen AB, Overgaard S, Kärrholm J, Rolfson O, Fenstad AM, Furnes O, Hallan G, Mäkelä K, Eskelinen A. Choice of bearings influences the implant survival of total hip arthroplasty in patients who have osteoarthritis aged 55 years or more: Results of 158,044 patients from the Nordic arthroplasty register association from 2005-2017. *J Arthroplasty.* 2025 Feb;40(2):437-442

Lübbeke A, Hoogervorst LA, Mheen PJM, Prentice HA, Rolfson O, Nelissen RGHH, Steinbrück A, McGauran G, Barea C, Erikson K, Pedersen AB, Porter M, ISAR group. Arthroplasty registries at a glance: an initiative of the International Society of Arthroplasty Registries (ISAR) to facilitate access, understanding, and reporting of registry data from an international perspective. *Acta Orthop.* 2025 Jan 24;96:116-126

Bergvad IB, Kottorp A, Aamodt A, Lerdal A, Skou ST, Lindberg MF. Cross-cultural adaptation and validation of a Norwegian version of the Goodman Satisfaction Score (GSS-NO) for patients with hip and knee arthroplasty. *Acta Orthop.* 2025 Jan 10;96:52-58

Leta TH, Chang RN, Fenstad AM, Lie SA, Lygre SHL, Lindberg-Larsen M, Pedersen AB, Lutro O, Willis J, Frampton C, Wyatt M, Dragosloveanu S, Vorovenci AE, Dragomirescu D, Dale H, Hallan G, Gjertsen JE, Prentice HA, Furnes O, Sedrakvan A, Paxton EW. Number of doses of systemic antibiotic prophylaxis may be reduced in cemented primary knee arthroplasty irrespective of use of antibiotic in the cement: A multiregistry-based meta-analysis. *JB JS Open Access*. 2024 Dec 11;9(4):e24.00140

Roerink AMC, Nelissen RGHH, Holder C, Graves SE, Dunbar M, Bohm E, Grimberg AW, Steinbrück A, Dale H, Fenstad AM, Blom AW, Lenguerrand E, Frampton C, Willems T, Victor J, Espallargues M, Arias-de la Torre J, Ciminello E, Torre M, Pijls BG. Sex-based differences in risk of revision for infection after hip, knee, shoulder, and ankle arthroplasty in osteoarthritis patients: a multinational registry study of 4,800,000 implants. *Acta Orthop*. 2024 Dec 10;95:730-736

Rognsvåg T, Nordmo IK, Bergvad IB, Fenstad AM, Furnes O, Lerdal A, Lindberg MF, Skou ST, Badawy M. Digital health literacy in Norwegian patients with hip and knee arthroplasty: normative data from a cross-sectional study. *Acta Orthop*. 2024 Nov 25;95:677-684

French JMR, Deere K, Whitehouse MR, Pegg DJ, Ciminello E, Valentini R, Torre M, Mäkelä K, Lübbecke A, Bohm ER, Fenstad AM, Furnes O, Hallan G, Willis J, Overgaard S, Rolfson O, Sayers A. The completeness of national hip and knee replacement registers. *Acta Orthop*. 2024 Nov 18;95:654-660

Birkenes T, Furnes O, Lygre SHL, Solheim E, Aaroen A, Knutsen G, Drogset JO, Heir S, Engebretsen L, Loken S, Visnes H. Long-term outcomes of arthroscopically verified focal cartilage lesions in the knee: A 19-year multicenter follow-up with patient-reported outcomes. *J Bone Joint Surg AM*. 2024 Nov 6;106(21):1991-2000

Venäläinen MS, Panula VJ, Eskelinen AP, Fenstad AM, Furnes O, Hallan G, Rolfson O, Kärrholm J, Hailer NP, Pedersen AB, Overgaard S, Mäkelä KT, Elo LL. Prediction of early adverse events after THA: A comparison of different machine-learning strategies based on 262,356 observations from the Nordic arthroplasty register association (NARA) dataset. *ACR Open Rheumatol*. 2024 Oct;6(10):669-677

Hals OM, Fenstad AM, Furnes O, Østerås H, Unsgaard-Tøndel M, Stensdotter AK. Holdninger til fysisk aktivitet hos personer i Norge med primær totalprotese i kne eller hofte: En nasjonal spørreundersøkelse. *Fysioterapeuten*. 2024 Aug 20

Hole RM, Fenstad AM, Gjertsen JE, Hallan G, Furnes O. Influence of design features and brand of reverse shoulder arthroplasties on survivorship and reasons for revision surgery: results of 5,494 arthroplasties with up to 15 years' follow-up reported to the Norwegian arthroplasty register 2007-2022. *Acta Orthop*. 2024 Aug 27;95:463-471

Nordbø JV, Straume-Næsheim TM, Hallan G, Fenstad AM, Sivertsen EA, Årøen A. Patients with total hip arthroplasty were more physically active 9.6 years after surgery: a case-control study of 429 hip arthroplasty cases and 29,272 participants from a population-based health study. *Acta Orthop*. 2024 May 30;95:268-274

Leta TH, Lie SA, Fenstad AM, Lygre SHL, Lindberg-Larsen M, Pedersen AB, W-Dahl A, Rolfson O, Bülow E, van Steenbergen LN, Nelissen RGHH, Harries D, de Steiger R, Lutro O, Mäkelä K, Venäläinen MS, Willis J, Wyatt M, Frampton C, Grimberg A, Steinbrück A, Wu Y, Armaroli C, Gentilini MA, Picus R, Bonetti M, Dragosloveanu S, Vorovenci AE, Dragomirescu D, Dale H, Brand C, Christen B, Shapiro J, Wilkinson JM, Armstrong R, Wooster K, Hallan G, Gjertsen JE, Chang RN, Prentice HA, Sedrakyan A, Paxton EW, Furnes O. Periprosthetic joint infection after total knee arthroplasty with or without antibiotic bone cement. *JAMA Netw Open*. 2024 May 1;7(5):e2412898

Kirkeboe RL, Nordsletten L, Madsen JE, Dybvik E, Lie SA, Hallan G, Clarke-Jenssen J. Long-term follow-up and survival of delayed total hip arthroplasty following acetabular fracture: a matched cohort study of 552 cases from the Norwegian arthroplasty register. *Hip Int*. 2024 May;34(3):396-401

Mikaelsen JR, Jakobsen RB, Røtterud JH, Randsborg PH. Body mass index did not affect the risk of revision 3-9 years after total knee replacement surgery. *Arthroplasty today*. 2024 Apr 16;27:101376

Gjertsen JE, Nilsen D, Furnes O, Hallan G, Kroken G, Dybvik E, Fenstad AM. Promoting cemented fixation of the femoral stem in elderly female hip arthroplasty patients and elderly hip fracture patients: a retrospective cohort study from the Norwegian arthroplasty register and the Norwegian hip fracture register. *Acta Orthop*. 2024 feb 23;95:130-137

Birkenes T, Furnes O, Lygre SHL, Solheim E, Årøen A, Knutsen G, Drogset JO, Heir S, Engebretsen L, Løken S, Visnes H. Previous cartilage surgery is associated with inferior patient-reported outcomes after knee arthroplasty. *Knee Surg Sports Traumatol Arthrosc*. 2024 Feb;32(2):361-370

Lutro O, Mo S, Tjørhom MB, Fenstad AM, Leta TH, Bruun T, Hallan G, Furnes O, Dale H. How good are surgeons at disclosing periprosthetic joint infection at the time of revision, based on pre-and intra-operative assessment? A study

on 16,922 primary total hip arthroplasties reported to the Norwegian arthroplasty register. *Acta Orthop.* 2024 Jan 30;95:67-72

Østerås N, Aas E, Moseng T, Bodegom-Vos LV, Dziedzic K, Natvig B, Røtterud JH, Vlieland TV, Furnes O, Fenstad AM, Hagen KB. Longer-term quality of care, effectiveness, and cost-effectiveness of implementing a model of care for osteoarthritis: A cluster-randomized controlled trial. *Osteoarthritis Cartilage.* 2024 Jan;32(1):108-119

Hole RM, Fenstad AM, Gjertsen JE, Hallan G, Furnes O. The Delta III and Delta Xtend reverse shoulder arthroplasty. Risk of revision and failure mechanisms: a report on 3,650 cases from the Norwegian arthroplasty register 1994-2021. *J Shoulder Elbow Surg.* 2023 Dec 15;S1058-2746(23)

Sundet M, Dybvik E, Furnes O, Eriksen ML, Hallan G. Poor survivorship of total ankle replacements. 1368 cases from the period 1994-2021 in the Norwegian arthroplasty register. *Foot Ankle Surg.* 2023 Dec;29(8):603-610

Furnes O, Gjertsen JE, Inderhaug E, Gundersen T, Fenstad AM, Lie SA, Hallan G. I starten var det hofteregisteret- så ble vi flere Nasjonalt Register for Leddproteser, Nasjonalt Hoftebruddregister, Nasjonalt Korsbåndregister og Nasjonalt Barnehofteregister. *Norsk Epidemiologi* 2023;31(1-2):55-64

Hailer NP, Furnes O, Mäkelä K, Overgaard S. Register-based randomized trials: the new power-tool in orthopedic research? *Acta Orthop.* 2023 Sep 29;94:490-492

Rojewski S, Westberg M, Nordsletten L, Meyer HE, Holvik K, Furnes O, Fenstad AM, Dahl J. Postvaccination immune responses and risk of primary total hip arthroplasty- A population-based cohort study. *Osteoarthritis Cartilage.* 2023 Sep;31(9):1249-1256

Skåden Ø, Furnes O, Lygre SHL, Badawy M, Gøthesen Ø. Did a new design of the Oxford unicompartmental knee prosthesis result in improved survival? A study from the Norwegian arthroplasty register 2012-2021. *Clin Orthop Relat Res.* 2023 Sep 1;481(9):1703-1712

Leta TH, Fenstad AM, Lygre SHL, Lie SA, Lindberg-Larsen M, Pedersen AB, W-Dahl A, Rolfson O, Bülow E, Ashforth JA, Van Steenberg L, Nelissen RGHH, Harries D, De Steiger R, Lutro O, Hakulinen E, Mäkelä K, Willis J, Wyatt M, Frampton C, Grimberg A, Steinbrück A, Wu Y, Armaroli C, Molinari M, Picus R, Mullen K, Illgen R, Stoica IC, Vorovenci AE, Dragomirescu D, Dale H, Brand C, Christen B, Shapiro J, Wilkinson JM, Armstrong R, Wooster K, Hallan G, Gjertsen JE, Chang RN, Prentice HA, Paxton EW, Furnes O. The use of antibiotic-loaded bone cement and systemic antibiotic prophylactic use in 2,971,357 primary total knee arthroplasties from 2010 to 2020: an international register-based observational study among countries in Africa, Europe, North America, and Oceania. *Acta Orthop.* 2023 Aug 9;94:416-425

Pawloy K, Fenstad AM, Leta T, Hallan G, Gjertsen JE, Dale H, Lie SA, Furnes O. No difference in risk of revision due to infection between clindamycin and cephalosporins as antibiotic prophylaxis in cemented primary total knee replacements: a report from the Norwegian arthroplasty register 2005-2020. *Acta Orthop.* 2023 Jul 31;94:404-409

Dale H, Fenstad AM, Hallan G, Overgaard S, Pedersen AB, Hailer NP, Kärrholm J, Rolfson O, Eskelinen A, Mäkelä KT, Furnes O. Increasing risk of revision due to infection after primary total hip arthroplasty: results from the Nordic arthroplasty register association. *Acta Orthop.* 2023 Jun 27;94:307-315

Mikkelsen RT, Overgaard S, Pedersen AB, Kärrholm J, Rolfson O, Fenstad AM, Furnes O, Hallan G, Mäkelä K, Eskelinen A, Varum C. Does choice of bearings influence the survival of cementless total hip arthroplasty in patients aged 20-55 years? Comparison of 21,594 patients reported to the Nordic Arthroplasty Register Association dataset 2005-2017. *Acta Orthop.* 2023 Jun 5;94:266-273

Birkenes T, Furnes O, Lygre SHL, Solheim E, Aaroen A, Knutsen G, Drogset JO, Heir S, Engebretsen L, Loken S, Visnes H. The long-term risk of knee arthroplasty in patients with arthroscopically verified focal cartilage lesions: A Linkage study with the Norwegian arthroplasty register, 1999 to 2020. *J Bone Joint Surg Am.* 2023 Jun 21;105(12):951-961

Brendsdal ES, Lie SA, Furnes O, Hove LM, Krukhaug Y. Long-term survival of 2997 finger metacarpophalangeal joint arthroplasties from the Norwegian arthroplasty register. *J Hand Surg Eur Vol.* 2023 Jan;48(1):3-9

Vinther D, Mailhac A, Andersen IT, Overgaard S, Lie SA, Fenstad AM, Gjertsen JE, Furnes O, Pedersen AB. Association between duration of anticoagulant thromboprophylaxis and revision rate in primary total hip arthroplasty: a Danish and Norwegian nationwide cohort study. *Acta Orthop.* 2022 Dec 27;93:930-937

Nilsen DH, Furnes O, Kroken G, Robsahm TE, Johnsen MB, Engebretsen L, Nordsletten L, Bahr R, Lie SA. Risk of total hip arthroplasty after elite sport: linking 3304 former world- class athletes with the Norwegian arthroplasty register. *Br J Sports Med.* 2022 Dec 7;57(1):33-39

Irmola T, Ponkilainen V, Mäkelä KT, Robertsson O, W-Dahl A, Furnes O, Fenstad AM, Pedersen AB, Schrøder HM, Niemeläinen MJ, Eskelinen A. Impact of Nordic arthroplasty register association (NARA) collaboration on demographics, methods and revision rates in knee arthroplasty: a register-based study from NARA 2000-2017. *Acta Orthop*. 2022 Nov 28;93:866-873

Tiulpin A, Saarakkala S, Mathiessen A, Hammer HB, Furnes O, Nordsletten L, Englund M, Magnusson K. Predicting total knee arthroplasty from ultrasonography using machine learning. *Osteoarthritis and Cartilage Open*. 2022 Nov 6;4(4):100319

Kjeldgaard HK, Meyer HE, O'Flaherty M, Apalset EM, Dahl C, Emaus N, Fenstad AM, Furnes O, Gjertsen JE, Hoff M, Schei B, Sjøgaard AJ, Tell GS, Holvik K. Impact of total hip replacements on the incidence of hip fractures in Norway during 1999-2019. A NOREPOS study. *J Bone Miner Res*. 2022 Oct;37(10):1936-1943

Thoen PS, Lygre SHL, Nordsletten L, Furnes O, Stigum H, Hallan G, Röhrli SM. Risk factors for revision surgery due to dislocation within 1 year after 111,711 primary total hip arthroplasties from 2005 to 2019: a study from the Norwegian Arthroplasty Register. *Acta Orthop*. 2022 Jun 24;93:593-601

Perry TA, Silman A, Culliford D, Gates L, Arden N, Bowen C, International Ankle Arthroplasty Registry Consortium. Survival of primary ankle replacements: data from global joint registries. *J Foot Ankle Res*. 2022 May 7;15(1):33

Benson TE, Andersen IT, Overgaard S, Fenstad AM, Lie SA, Gjertsen JE, Furnes O, Pedersen AB. Association of perioperative thromboprophylaxis on revision rate due to infection and aseptic loosening in primary total hip arthroplasty - new evidence from the Nordic arthroplasty registry association (NARA). *Acta Orthop*. 2022 Apr 8;93:417-423

Brüggemann H, Dalen I, Bache-Mathiesen LK, Fenstad AM, Hallan G, Fosse L. Incidence and risk factors of intraoperative periprosthetic femoral fractures during primary total hip arthroplasty: 218,423 cases reported to the Norwegian arthroplasty register between 1987 and 2020. *Acta Orthop*. 2022 Apr;93:405-412

Lie SA, Fenstad AM, Lygre SHL, Kroken G, Dybvik E, Gjertsen JE, Hallan G, Dale H, Furnes O. Kaplan-Meier and Cox Regression are preferable for the analysis of time to revision of joint arthroplasty. Thirty-one years of follow-up for cemented and uncemented THAs inserted from 1987 to 2000 in the Norwegian arthroplasty register. *JBJS Open Access*. 2022 Feb 23;7(1):e21.00108

Norwegian Hip Fracture Register (62 from 1995 to June 2025)

Papers from 2022 to June 2025 (14)

Kjærvik C, Gjertsen JE, Stensland E, Olsen JA, Kjærvik C, Søreide O. The influence of socioeconomic position on patient-reported outcome measures following hip fractures- a register based observational study on 35,206 patients from the Norwegian hip fracture register 2014-2018. *Health Qual Life Outcomes*. 2025 May 4;23(1):47

Lutro O, Tjørhom MB, Leta TH, Gjertsen JE, Hallan G, Bruun T, Westberg M, Wik TS, Pollmann CT, Lygre SHL, Furnes O, Engesæter L, Dale H. How many doses and what type of antibiotic should be used as systemic antibiotic prophylaxis in primary hip and knee arthroplasty? A register-based study on 301,204 primary total and hemi- hip and total knee arthroplasties in Norway 2005-2023. *Acta Orthop*. 2025 Mar 4;96:217-225

Kjærvik C, Gjertsen JE, Stensland E, Uleberg B, Taraldsen K, Søreide O. Impact of physiotherapy access on health-related quality of life following hip fracture: an observational study on 30 752 hip fractures from the Norwegian hip fracture register 2014-2018. *BMJ Open*. 2024 Jun 6;14(6):e086428

Ahmad A, Egeland EH, Dybvik E, Gjertsen JE, Lie SA, Fenstad AM, Matre K, Furnes O. Equivalent mortality after operation with sliding hip screw or intramedullary nail for trochanteric AO/OTA A1 and A2 fractures reported in the Norwegian hip fracture register 2008 to 2020. *Bone Joint J*. 2024 Jun 1;106-B(6):603-612

Kjærvik C, Gjertsen JE, Stensland E, Dybvik EH, Søreide O. Patient-reported outcome measures in hip fracture patients. *Bone Joint J*. 2024 Apr 1;106-B(4):394-400

Gjertsen JE, Nilsen D, Furnes O, Hallan G, Kroken G, Dybvik E, Fenstad AM. Promoting cemented fixation of the femoral stem in elderly female hip arthroplasty patients and elderly hip fracture patients: a retrospective cohort study from the Norwegian arthroplasty register and the Norwegian hip fracture register. *Acta Orthop*. 2024 Feb 23;95:130-137

Furnes O, Gjertsen JE, Inderhaug E, Gundersen T, Fenstad AM, Lie SA, Hallan G. I starten var det hofteregisteret- så ble vi flere Nasjonalt Register for Leddproteser, Nasjonalt Hoftebruddregister, Nasjonalt Korsbåndregister og Nasjonalt Barnehofteregister. *Norsk Epidemiologi* 2023;31(1-2):55-64

Sund A, Dybvik E, Gjertsen JE. Orthopaedic surgeons' ability to detect pathologic hip fractures: review of 1484 fractures reported to the Norwegian hip fracture register. *J Orthop Surg Res*. 2023 Nov 4;18(1):832

Johansen A, Hall AJ, Ojeda-Thies C, Poacher AT, Costa ML, Global Fragility Fracture Network Hip Fracture Audit Special Interest Group. Standardization of global hip fracture audit could facilitate learning, improve quality, and guide evidence-based practice. *Bone Joint J*. 2023 Sep 1;105-B(9):1013-1019

Grønhaug KML, Dybvik E, Matre K, Östman B, Gjertsen JE. Comparison of intramedullary nails in the treatment of trochanteric and subtrochanteric fractures: An observational study of 13,232 fractures in the Norwegian hip fracture register. *J Bone Joint Surg Am*. 2023 Aug 16;105(16):1227-1236

Hoseth JM, Aae TF, Jakobsen RB, Fenstad AM, Bukholm IRK, Gjertsen JE, Randsborg PH. Compensation claims after hip fracture surgery in Norway 2008-2018. *Geriatric Orthopaedic Surgery & Rehabilitation*. 2023 Jul 8;14:21514593231188623

Garre-Fivelsdal TE, Gjertsen JE, Dybvik E, Bakken MS. A standardized clinical pathway for hip fracture patients is associated with reduced mortality: data from the Norwegian hip fracture register. *Eur Geriatr Med*. 2023 Jun;14(3):557-564

Kjærvik C, Gjertsen JE, Stensland E, Saltyte-Benth J, Soereide O. Modifiable and non-modifiable risk factors in hip fracture mortality in Norway, 2014 to 2018: a linked multiregistry study. *Bone Joint J*. 2022 Jul;104-B(7):884-893

Grønhaug KML, Dybvik E, Matre K, Östman B, Gjertsen JE. Intramedullary nail versus sliding hip screw for stable and unstable trochanteric and subtrochanteric fractures: 17,341 patients from the Norwegian hip fracture register. *Bone Joint J*. 2022 Feb;104-B(2):274-282

Norwegian Knee Ligament Register (85 from 1995 to June 2025)

Papers from 2022 to June 2025 (12)

Zsidai B, Winkler PW, Naarup E, Olsson E, Horvath A, Moatshe G, Lind M, Musahl V, Senorski EH, Samuelsson K. Evaluation of factors associated with short-term failure after primary isolated PCL reconstruction. A study of patients from the Swedish and Norwegian knee ligament registries. *Orthopaedic Journal of Sports Medicine*. 2025 Jan 3;13(1):23259671241305191

Moatshe G, LaPrade CM, Fenstad AM, Persson A, LaPrade M, Martin RK, Engebretsen L, LaPrade RF. Rates of subjective failure after both isolated and combined posterior cruciate ligament reconstruction: A study from the Norwegian knee ligament registry 2004-2021. *Am J Sports Med*. 2024 May;52(6):1491-1497

Zegzdryn M, Moatshe G, Engebretsen L, Drogset JO, Lygre SHL, Visnes H, Persson A. Increased risk for early revision with quadriceps graft compared with patellar tendon graft in primary ACL reconstructions. *Knee Surg Sports Traumatol Arthrosc*. 2024 Mar;32(3):656-665

Martin RK, Wastvedt S, Pareek A, Persson A, Visnes H, Fenstad AM, Moatshe G, Wolfson J, Lind M, Engebretsen L. Unsupervised machine learning of the combined Danish and Norwegian knee ligament registers: Identification of 5 distinct patient groups with differing ACL revision rates. *Am J Sports Med*. 2024 Mar;52(4):881-891

Furnes O, Gjertsen JE, Inderhaug E, Gundersen T, Fenstad AM, Lie SA, Hallan G. I starten var det hofteregisteret- så ble vi flere Nasjonalt Register for Leddproteser, Nasjonalt Hoftebruddregister, Nasjonalt Korsbåndregister og Nasjonalt Barnehofteregister. *Norsk Epidemiologi* 2023;31(1-2):55-64

Kooy CEVW, Jakobsen RB, Fenstad AM, Persson A, Visnes H, Engebretsen L, Ekås GR. Major increase in incidence of pediatric ACL reconstructions from 2005 to 2021: A study from the Norwegian knee ligament register. *Am J Sports Med*. 2023 Sep;51(11):2891-2899

Martin RK, Wastvedt S, Pareek A, Persson A, Visnes H, Fenstad AM, Moatshe G, Wolfson J, Lind M, Engebretsen L. Ceiling effect of the combined Norwegian and Danish knee ligament registers limits anterior cruciate ligament reconstruction outcome prediction. *Am J Sports Med*. 2023 Jul;51(9):2324-2332

Visnes H, Gifstad T, Persson A, Lygre SHL, Engebretsen L, Drogset JO, Furnes O. ACL reconstruction patients have increased risk of knee arthroplasty at 15 years of follow-up: Data from the Norwegian knee ligament register and the Norwegian arthroplasty registerform 2004 to 2020. *JB JS Open Access*. 2022 Jun 21;7(2):e22.00023

Martin RK, Persson A, Moatshe G, Fenstad AM, Engebretsen L, Drogset JO, Visnes H. Low annual hospital volume of anterior cruciate ligament reconstruction is not associated with higher revision rates. *Knee Surg Sports Traumatol Arthrosc.* 2022 May;30(5):1575-1583

Midttun E, Andersen MT, Engebretsen L, Visnes H, Fenstad AM, Gjertsen JE, Persson A. Good validity in the Norwegian knee ligament register: assessment of data quality for key variables in primary and revision cruciate ligament reconstructions from 2004 to 2013. *BMC Musculoskelet Disord.* 2022 Mar 9;23(1):231

Martin RK, Wastvedt S, Pareek A, Persson A, Visnes H, Fenstad AM, Moatshe G, Wolfson J, Lind M, Engebretsen L. Machine learning algorithm to predict anterior cruciate ligament revision demonstrates external validity. *Knee Surg Sports Traumatol Arthrosc.* 2022 Feb;30(2):368-375

Martin RK, Wastvedt S, Pareek A, Persson A, Visnes H, Fenstad AM, Moatshe G, Wolfson J, Engebretsen L. Predicting anterior cruciate ligament reconstruction revision: A machine learning analysis utilizing the Norwegian knee ligament register. *J Bone Joint Surg Am.* 2022 Jan 19;104(2):145-153

Norwegian Paediatric Hip Register (2)

Rosendal K, Gundersen T, Klingenberg C. Hoftelddysplasi hos nyfødte. *Tidsskr Nor legeforen* 2025 Mar 13;Vol.145

Furnes O, Gjertsen JE, Inderhaug E, Gundersen T, Fenstad AM, Lie SA, Hallan G. I starten var det hofteregisteret- så ble vi flere Nasjonalt Register for Leddproteser, Nasjonalt Hoftebruddregister, Nasjonalt Korsbåndregister og Nasjonalt Barnehofteregister. *Norsk Epidemiologi* 2023;31(1-2):55-64

Papers from clinical studies related to Norwegian National Network for Arthroplasty and Hip Fractures (92 from 1995 to June 2025)

Papers from 2022 to June 2025 (25)

Skåden Ø, Furnes O, Lygre SHL, Moldestad IO, Hallan G, Fenstad AM, Høl PJ, Gøthesen ØJ. Radiostereometric measurement of implant migration in robotically assisted vs conventional bi-cruciate stabilized cemented total knee arthroplasty: secondary analysis of a randomized controlled trial. *Acta Orthop.* 2025 Mar 24;96:283-289

Berge TLL, Lygre GB, Kubon B, Lie SA. Key factors for a National dental implant registry. *J Dent.* 2025 Mar;154:105603

Andreasen C, Dahl C, Frihagen F, Borgen TT, Basso T, Gjertsen JE, Figved W, Wisløff T, Hagen G, Apalset EM, Stutzer JM, Lund I, Hansen AK, Nissen FI, Joakimsen RM, Syversen U, Eriksen EF, Nordsletten L, Omsland TK, Bjørnerem Å, Solberg LB. Fracture liaison service (FLS) is associated with lower subsequent fragility fracture risk and mortality: NoFRACT (the Norwegian capture the fracture initiative) *Osteoporos Int.* 2025 Mar;36(3):501-512

Ludvigsen T, Hammer OL, Fevang JM, Matre K, Dybvig EH, Randsborg PH. Complex regional pain syndrome following distal radius fracture: Does surgical method matter? *J Wrist Surg.* 2024 Sep 4;[Epub ahead of print]

Jacobsen KK, Laborie LB, Kristiansen H, Schäfer A, Gundersen T, Zayats T, Rosendahl K. Genetics of hip dysplasia – a systematic literature review. *BMC Musculoskelet Disord.* 2024 Oct 1;25(1):762

Johannessen HG, Hallan G, Kadar T, Fenstad AM, Lygre SHL, Haugan K, Høl PJ, Badawy M, Jonsson B, Indrekvam K, Aamodt A, Furnes O. Polyethylene wear and cup migration of cemented total hip arthroplasty with femoral heads made of oxidized zirconium, steel, or cobalt chromium: a 10- year secondary analysis from a randomized trial using radiostereometry. *Acta Orthop.* 2024 Sep 30;95:578-585

Semsarian S, Omsland TK, Heen E, Madar AA, Frihagen F, Gjertsen JE, Solberg LB, Figved W, Stutzer JM, Borgen TT, Andreasen C, Hansen AK, Bjørnerem Å, Dahl C. Subsequent fracture risk in Norwegians and immigrants with an index forearm fracture: a cohort study. *Arch Osteoporos.* 2024 Aug 6;19(1):72

Silva MMB, Gjertsen JE, Moldestad IO, Furnes O, Khan M, Høl PJ. Effects of implant precoating and fat contamination on the stability of the tibial baseplate. *Knee.* 2024 Jul 25;49:266-278

Woldeyesus TA, Gjertsen JE, Dalen I, Meling T, Behzadi M, Harboe K, Djuv A. Preoperative CT improves the assessment of stability in trochanteric hip fractures. *Bone Jt Open.* 2024 Jun;5(6):524-531

Vinther D, Thomsen RW, Furnes O, Gjertsen JE, Pedersen AB. Impact of diabetes on the risk of subsequent fractures in 92,600 patients with an incident hip fracture: A Danish nationwide cohort study 2004-2018. *Bone.* 2024 Jul;184-117104

Laborie LB, Rasmussen H, Jacobsen KK, Gundersen T, Rosendahl K. Neonatal ultrasound and radiographic markers of hip dysplasia in young adults. *Pediatrics*. 2024 Apr 1;153(4):e2023064564

Andreasen C, Dahl C, Solberg LB, Borgen TT, Wisløff T, Gjertsen JE, Figved W, Stutzer JM, Nissen FI, Nordsletten L, Frihagen F, Bjørnerem Å, Omsland TK. Epidemiology of forearm fractures in women and men in Norway 2008-2019. *Osteoporos Int*. 2024 Apr;35(4):625-633

Rognsvåg T, Bergvad IB, Furnes O, Indrekvam K, Lerdal A, Lindberg MF, Skou ST, Stubberud J, Badawy M. Exercise therapy, education, and cognitive behavioral therapy alone, or in combination with total knee arthroplasty, in patients with knee osteoarthritis: a randomized feasibility study. *Pilot Feasibility Stud*. 2024 Feb 28;10(1):43

Håberg Ø, Foss OA, Gundersen T, Lian ØB, Hoel MS, Holen KJ. The incidence of late-detected developmental dysplasia of the hip and its functional outcomes: a 17-year cohort study using selective ultrasound screening. *Acta Orthop*. 2023 Dec 11;94:588-593

Khan M, Gjertsen JE, Fenstad AM, Refsum A, Nguyen U, Hallan G, Høl PJ, Furnes O. Cementing techniques for total knee arthroplasty in Norwegian hospitals; a questionnaire-based study. *BMC Musculoskelet Disord*. 2023 Nov 18;24(1):900

Omsland TK, Solberg LB, Bjørnerem Å, Borgen TT, Andreasen C, Wisløff T, Hagen G, Basso T, Gjertsen JE, Apalset EM, Figved W, Stutzer JM, Nissen FI, Hansen AK, Joakimsen RM, Figari E, Peel G, Rashid AA, Khoshkhabari J, Eriksen EF, Nordsletten L, Frihagen F, Dahl C. Validation of forearm fracture diagnosis in administrative patient registers. *Arch Osteoporos*. 2023 Aug 24;18(1):111

Olsen U, Lindberg MF, Rose C, Denison E, Gay C, Aamodt A, Brox JJ, Skare Ø, Furnes O, Lee KA, Lerdal A. Factors correlated with pain after total knee arthroplasty: A systematic review and meta-analysis. *PLoS One*. 2023 mar 24;18(3):e0283446

Høl PJ, Hallan G, Furnes O, Fenstad AM, Indrekvam K, Kadar T. Similarly low-blood metal ion levels at 10-years follow-up of total hip arthroplasties with Oxinium, CoCrMo, and stainless steel femoral heads. Data from a randomized clinical trial. *J Biomed Mater Res B Appl Biomater*. 2023 Apr;111(4):821-828

Holsen M, Hovind V, Bedane HK, Osvoll KI, Gjertsen JE, Furnes O, Walsh ME, Ingebrigtsen T. Geographical variation in orthopedic procedures in Norway: Cross-sectional population-based study. *Scand J. Surg*. 2022 Dec;111(4):92-98

Zaliecckas J, Mondragon IR, Pobedinskas P, Kristoffersen AS, Mohamed-Ahmed S, Gjerde C, Høl PJ, Hallan G, Furnes O, Cimpan MR, Haenen K, Holst B, Greve MM. Polycrystalline Diamond coating on orthopedic implants: Realization and role of surface topology and chemistry in adsorption of proteins and cell proliferation. *ACS Appl Mater Interfaces*. 2022 Oct 5;14(39):44933-44946

Bartels S, Kristensen TB, Gjertsen JE, Frihagen F, Rogmark C, Dolatowski FC, Figved W, Benth JS, Utvåg SE. Total hip arthroplasty leads to better results after low-energy displaced femoral neck fracture in patients aged 55 to 70 years. A randomized controlled multicenter trial comparing internal fixation and total hip arthroplasty. *J Bone Joint Surg AM*. 2022 Aug 3;104(15):1341-1351

Wolf S, Johannessen AC, Ellison P, Furnes O, Hallan G, Rogg K, Skarstein K, Høl PJ. Inflammatory tissue reactions around aseptically loose cemented hip prostheses: A retrieval study of the Spectron EF stem with Reflection All-Poly acetabular cup. *J Biomed Mater Res B Appl Biomater*. 2022 Jul;110(7):1624-1636

Grønhaug KML, Dybvik E, Gjertsen JE, Samuelsson K, Östman B. Subsequent ipsi- and contralateral femoral fractures after intramedullary nailing of a trochanteric or subtrochanteric fracture: a cohort study on 1012 patients. *BMC Musculoskelet Disord*. 2022 Apr 28;23(1):399

Ngoie LB, Dybvik E, Hallan G, Gjertsen JE, Mkandawire N, Varela C, Young S. The unmet need for treatment of children with musculoskeletal impairment in Malawi. *BMC Pediatr*. 2022 Jan 28;22(1):67

Olsen AL, Magnussen LH, Skjaerven LH, Assmus J, Sundal MA, Furnes O, Hallan G, Strand LI. Basic body awareness therapy versus standard care in hip osteoarthritis. A randomized controlled trial. *Physiother Res Int*. 2022 Jan;27(1):e1930

Oral presentations/Abstracts/Posters between 2024 and June 2025 (56)

Norwegian Arthroplasty Register (31)

Furnes O. Status på revisjoner fra leddregisteret. Årsaker til revisjon, PROMS og prognoser for fremtiden. NFHKK-Vårdagene;2025 21.-23. Mai; Svolvær

Harvinder PS, Kang N, Scott R, Tucker K, on behalf of ODEP for shoulders and international registries. 15-year outcomes after shoulder replacements: International joint registry reports. 14th Annual ISAR congress;2025 19.-21. February; Christchurch, New Zealand

Furnes O, Leta TH, Chang RN, Lie SA, Fenstad AM, Lygre SHL, Lindberg-Larsen M, Pedersen AB, W-Dahl A, Rolfson O, Johansson O, Steenbergen LN, Nelissen RGHH, Holder C, Steiger RD, Lewis P, Lutro O, Mäkelä K, Venäläinen MS, Willis J, Frampton C, Wyatt M, Grimberg A, Steinbrück A, Wu Y, Dale H, Brand C, Christen B, Shapiro J, Wilkinson JM, Edwards M, Hallan G, Gjertsen JE, Sedrakyan A, Prentice HA, Paxton EW. Does antibiotic-loaded bone cement reduce risk of revision for infection after total knee arthroplasty in high-risk patients? A register data based meta-analysis 2010-2020. 14th Annual ISAR congress;2025 19.-21. February; Christchurch, New Zealand

Furnes O, Leta TH, Chang RN, Fenstad AM, Lie SA, Lygre SHL, Lindberg-Larsen M, Pedersen AB, Lutro O, Willis J, Frampton C, Wyatt M, Dragosloveanu S, Vorovenci AE, Dragomirescu D, Dale H, Hallan G, Gjertsen JE, Prentice HA, Sedrakyan A, Paxton EW. Number of doses of systemic antibiotic prophylaxis may be reduced when used in combination with antibiotic-loaded bone cement- Register-based meta-analyses on 289,926 primary knee arthroplasties. 14th Annual ISAR congress;2025 19.-21. February; Christchurch, New Zealand

Dale H, Lutro O, Mo S, Tjørhom MB, Fenstad AM, Leta TH, Bruun T, Hallan G, Furnes O. How good are surgeons at disclosing periprosthetic joint infection at the time of revision, based on pre- and intra-operative assessment? A study on 16,922 primary total hip arthroplasties reported to the Norwegian arthroplasty register. 14th Annual ISAR congress;2025 19.-21. February; Christchurch, New Zealand

Dale H, Lutro O, Tjørhom MB, Leta TH, Gjertsen JE, Hallan G, Bruun T, Westberg M, Wik TS, Pollmann CT, Lygre SHL, Furnes O, Engesæter L. How many doses of systemic antibiotic prophylaxis should be used in primary hip and knee arthroplasty? A register-based study on 301,204 primary total- and hemi-hip and total arthroplasties in Norway 2005-2023. 14th Annual ISAR congress;2025 19.-21. February; Christchurch, New Zealand

Dale H, Karlsen ØE, Furnes O, Eriksen-Volle HM, Westberg M. Trends of surgical site infection and periprosthetic joint infection after primary total hip arthroplasty in two national health register 2013-2022. 14th Annual ISAR congress;2025 19.-21. February; Christchurch, New Zealand

Furnes O, Lygre SHL, Fenstad AM, Sundal E, Grønning M. Diving exposure and need for joint arthroplasty in Norway. A register-based study. 14th Annual ISAR congress;2025 19.-21. February; Christchurch, New Zealand

Dale H, Børsheim S, Kristensen TB, Hallan G, Gjertsen JE, Furnes O, Dybvik E. Periprosthetic femoral fracture in hip arthroplasty: Should stem designs and fixation method vary based on sex and age groups? Data on 187,576 cases from the Norwegian Arthroplasty Register and Norwegian Hip Fracture Register 2005-2023. 14th Annual ISAR congress;2025 19.-21. February; Christchurch, New Zealand

Furnes O, Fenstad AM, Dale H, Gjertsen JE, Kristensen TB, Stenvik S, Dybvik E, Mulpuri KS, Hallan G. Quality indicators for total hip replacement (THR) in the Norwegian Arthroplasty Register. 14th Annual ISAR congress;2025 19.-21. February; Christchurch, New Zealand

Dale H, Børsheim S, Kristensen TB, Hallan G, Gjertsen JE, Furnes O, Dybvik E. Periprosthetic femoral fracture in hip arthroplasty: Does different stem designs have distinct fracture patterns (Vancouver) and surgical treatments? Data on 137,806 cases from the Norwegian Arthroplasty Register 2005-2023. 14th Annual ISAR congress;2025 19.-21. February; Christchurch, New Zealand

Dale H, Kristensen TB, Hallan G, Gjertsen JE, Furnes O, Dybvik E. Periprosthetic femoral fracture in hip arthroplasty: Can choice of stem design and fixation method reduce the risk? Data on 187,576 cases from the Norwegian Arthroplasty Register and the Norwegian Hip Fracture Register 2005-2023. 14th Annual ISAR congress;2025 19.-21. February; Christchurch, New Zealand

Bakke Ø, Stenvik S, Furnes O, Kristensen T, Dale H, Hallan G. Langtidsoverleving av 1.MTP-leddsproteser registrert ved Nasjonalt Register for Leddproteser 1994-2022. Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Gifstad T, Klaksvik J, Fenstad AM, Wik TS. PROMs i Nasjonalt Register for Leddproteser og lokalt kvalitetsregister. Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Paulsen A, Djuv A, Ludvigsen J, Furnes O. Digital pasientstyrt klinisk proteseoppfølging med automatisert dataoverføring til Nasjonalt Register for Leddproteser. Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Nordbø JV, Fenstad AM, Straume-Næsheim TM, Sivertsen EA, Årøen A. Fysisk aktivitet 6,7 år etter hofteprotese-revisjonskirurgi. Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Børsheim S, Kristensen TB, Hallan G, Gjertsen JE, Furnes O, Dale H. Periprostetisk femurfraktur ved hofteproteser: Kan valg av stammedesign og fiksasjonsmetode redusere risikoen? Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Børsheim S, Kristensen TB, Hallan G, Gjertsen JE, Furnes O, Dybvik E, Dale H. Periprostetisk femurfraktur: Bør stammedesign og fiksasjonsmetode variere basert på kjønn og aldersgrupper? Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Børsheim S, Kristensen TB, Hallan G, Gjertsen JE, Furnes O, Dybvik E, Dale H. Periprostetisk femurfraktur: Stammedesign, bruddmønstre og kirurgiske behandlinger? Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Dale H, Børsheim S, Kristensen TB, Hallan G, Gjertsen JE, Furnes O, Dybvik E. Periprostetisk femurfraktur: Har ulike stammedesign forskjellige bruddmønstre (Vancouver) og kirurgiske behandlinger? Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Karlsen ØE, Dale H, Furnes O, Volle HME, Westberg M. Sammenligning av infeksjoner etter hofteproteseoperasjoner i NOIS og Nasjonalt Register for Leddproteser 2013 – 2022. Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Fenstad AM, Lygre SHL, Furnes O, Sundal E, Grønning M. Dykkeeksponering og behov for leddproteser i Norge. En registerbasert studie. Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Furnes O. Evolution of registry-based studies for hip and knee replacement. Inaugural symposium for professor Claus Varnum; 2024 27 Sep; Vejle; Denmark

Furnes O. Dokumentasjon av hofteproteser i Nasjonalt Register for Leddproteser. Avslutningssymposium for professor emeritus Arild Aamodt; 2024 16 Aug; Lovisenberg Diakonale sykehus; Oslo

Osteras N, Moseng T, Bodegom-Vos LV, Dziedzic K, Natvig B, Røtterud JH, Vlieland T.P.M V, Fenstad AM, Furnes O, Hagen KB. Implementing OA treatment recommendations in primary care postponed joint replacement in hip and knee joints - 8-year follow-up of a cluster randomized controlled trial. EULAR congress; 2024 12.-15. June; Vienna

Leta TH, Lie SA, Fenstad AM, Lygre SHL, Lindberg-Larsen M, Pedersen AB, W-Dahl A, Rolfson O, Bülow E, van Steenbergen LN, Nelissen RGHH, Harries D, de Steiger R, Lutro O, Mäkelä K, Venäläinen MS, Willis J, Wyatt M, Frampton C, Grimberg A, Steinbrück A, Wu Y, Armaroli C, Gentilini MA, Picus R, Bonetti M, Dragosloveanu S, Vorovenci AE, Dragomirescu D, Dale H, Brand C, Christen B, Shapiro J, Wilkinson JM, Armstrong R, Wooster K, Hallan G, Gjertsen JE, Chang RN, Prentice HA, Sedrakyan A, Paxton EW, Furnes O. Periprosthetic joint infection after primary total knee arthroplasty with or without antibiotic bone cement: A meta-analysis based on international joint registry data. ISAR congress; 2024 1.-2. juni; Hamburg, Tyskland

Rognsvag T, Nordmo IK, Bergvad IB, Fenstad AM, Furnes O, Lerdal A, Lindberg MF, Skou ST, Badawy M. Digital health literacy in patients undergoing hip and knee arthroplasty surgery- normative data from 383 patients. OARSI World congress; 2024 18.-21. April; Vienna

Lindberg MF, Aamodt A, Badawy M, Bergvad IB, Furnes O, Gay C, Holm I, Kise NJ, Lüthi A, Rognsvag T, Skou ST, Stubberud J, Lerdal A. Exercise therapy and internet-delivered cognitive behavioral therapy with and without total knee arthroplasty for patients with knee osteoarthritis- the multiknee trial. OARSI World congress; 2024 18.-21. April; Vienna

Osteras N, Moseng T, Bodegom-Vos LV, Dziedzic K, Natvig B, Røtterud JH, Vlieland T.P.M V, Fenstad AM, Furnes O, Hagen KB. Implementing OA treatment recommendations in primary care postponed joint replacement in hip and knee joints - 8-year follow-up of a cluster randomized controlled trial. OARSI World congress; 2024 18.-21. April; Vienna

Fenstad AM. Erfaringer fra kobling av registre. Halvårssamling for medisinske kvalitetsregistre i Helse Vest; 2024 21 Mars; Bergen

Fenstad AM. Fra kvalitetsforbedringsprosjekt til publisert artikkel. Halvårssamling for medisinske kvalitetsregistre i Helse Vest; 2024 21 Mars; Bergen

Norwegian Hip Fracture Register (8stk)

Tellefsen RA, Kristensen TB, Dybvik E, Gjertsen JE, Nordsletten L, Ugland T, Visnes H, Solberg LB. Høyere revisjonsrisiko med bakre tilgang ved hemiprotese for hoftebrudd sammenlignet med lateral og anterolateral. Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Børsheim S, Kristensen TB, Hallan G, Gjertsen JE, Furnes O, Dale H. Periprostetisk femurfraktur ved hofteproteser: Kan valg av stammedesign og fiksasjonsmetode redusere risikoen? Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Børsheim S, Kristensen TB, Hallan G, Gjertsen JE, Furnes O, Dybvik E, Dale H. Periprostetisk femurfraktur: Bør stammedesign og fiksasjonsmetode variere basert på kjønn og aldersgrupper? Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Frønsdal PS, Dybvik E, Kristensen TB, Gjertsen JE. Sammenligning av korte- og lange margnagler som behandling av trokantære og subtrokantære brudd. Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Meling T, Djuv A, Gjertsen JE. Er SUS sin hoftebruddhåndtering så dårlig som det kan se ut til i Nasjonalt hoftebruddregister? Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Gjertsen JE, Dybvik E, Solberg LB, Djuv A, Johnsen LG, Kjærvik C, Kristensen TB. Resultater fra utreiseskjemaet i Nasjonalt Hoftebruddregister? Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Kjærvik C, Gjertsen JE, Stensland E, Uleberg B, Taraldsen K, Søreide O. Tilgang til fysioterapi etter hoftebrudd påvirker helse relatert livskvalitet. Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Tellefsen RA, Solberg LB, Nordsletten L, Ugland T, Gjertsen JE, Dybvik E, Kristensen TB. Posterior or the anterolateral Watson Jones approach for hemiarthroplasty? - Results from the Norwegian Hip Fracture Register. ISAR congress; 2024 1.-2. juni; Hamburg, Tyskland

Norwegian Knee Ligament Register (3)

Visnes H, Persson A, Fenstad AM, Inderhaug E. Insidens og behandling av bakre laterale meniskrotskader og rampelesjoner ved korsbåndskonstruksjoner i Norge. Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Kjennvold S, Ulstein S, Årøen A, Forssblad M, Engebretsen L, Røtterud JH. Effekt av fokale brusklesjoner på pasientrapporterte resultater ved ACL-rekonstruksjon: En 10-årig kohortstudie. Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Kjennvold S, Røtterud JH, Årøen A, Forssblad M, Engebretsen L, Ulstein S. Effekten av debridement eller mikrofraktur for fulltykkelse bruskskader ved ACL-rekonstruksjon: En 10-årig kohortstudie. Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Norwegian Paediatric Hip Register (1)

Gramstad N, Blomquist J, Segadal J, Gundersen T, Sansone M, Dybvik E. Det nasjonale leddbevarende hofteregisteret; demografiske og perioperative data fra 530 pasienter. Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Clinical studies related to Norwegian National Network for Arthroplasty and Hip Fractures (13)

Vinther D, Thomsen RW, Furnes O, Gjertsen JE, Pedersen AB. Impact of diabetes on the risk of subsequent fractures in 92,600 patients with an incident hip fracture: A Danish nationwide cohort study 2004-2018. DOS congress; 2024 13.-15. November; Comwell Kolding, Denmark

Hatzikotoulas K. Large-scale genome-wide association study meta-analysis across 1,962,069 individuals reveals insights into the genetic mechanisms of osteoarthritis. ASHG 2024 Annual Meeting; 2024 5.-9. November; Denver, Colorado

Mo IF, Harlem T, Faleide AGH, Strand T, Vindfeldt S, Solheim E, Randsborg PH, Inderhaug E. ACLR med firedobla semitendinosusgraft vs. dubla semitendinosus og gracilisgraft: preliminaire 5-10 årsresultat (RCT). Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Persson A, Ryu B, Nam JW, Ro DH, Martin KR, Inderhaug E, Haland S, Kim SE. Automatisk måling av posterior tibial slope ved bruk av laterale røntgenbilder: En landemerke-basert metode. Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Hysing-Dahl T, Visnes H, Kjellsen A, Waaler PA, Persson A, Straume-Næsheim TM, Warø HA, Øye C, Inderhaug E. Patellastabiliserende kirurgi i Norge – en nasjonal spørreundersøkelse. Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Jacobsen KK, Gundersen T, Lie SA, Rosendahl K, Laborie LB. Seteleie som risikofaktor for hoftelddysplasi i den norske Mor-Far-Barn-studien (MoBa). Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Skåden Ø, Furnes O, Lygre SHL, Fenstad AM, Moksheim L, Gøthesen ØJ. 1 års resultater for Journey II BCS kneprotese operert med robotisert computer navigasjon og konvensjonell teknikk. Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Johannessen HG, Lie SA, Hallan G, Kadar T, Fenstad AM, Lygre SHL, Haugan K, Høl PJ, Badawy M, Jonsson B, Indrekvam K, Aamodt A, Furnes O. Koppplitasje og migrasjon ved 2 år som prediktor for seinere løsning: 18 års oppfølging av en randomisert RSA-studie. Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Rasmussen H, Gundersen T, Jacobsen KK, Lie SA, Rosendahl K, Laborie LB. Har putebehandling ved hoftelddysplasi i spedbarnsperioden betydning for hoftelddets morfologi ved 18-årsalder? Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Sjo MS, Harlem T, Strand T, Inderhaug E. Betydning av kanalplassering målt på 3D CT for klinisk resultat etter fremre korsbåndskonstruksjon. Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Martin RK, Håland S, Kim SE, Ro DH, Ryu B, Nam JW, Persson A, Inderhaug E. External validation of an AI tibial slope measurement algorithm applied on short radiographs from ACL injured patient. Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Moldestad IO, Kristensen TB, Fenstad AM, Høl PJ, Gjertsen JE, Furnes O, Hallan G. Polarstem versus Corail; en sammenligning av mikrobevegelse av to usementerte hoftestammer. Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Borojevic R, Gjertsen JE, Furnes O, Kristensen T. Mekaniske komplikasjoner etter osteosyntese av periprostetiske femurfrakturer ved Haukeland universitetssjukehus. Høstmøtet i Norsk Ortopedisk Forening; 2024 23.-25. Oktober; Oslo

Surgery Forms

All hospitals have fully or partially transitioned to electronic registration (MRS). This year, we therefore include a “paper version” of the electronic form for all registries. This provides an overview of which variables are included in all four of our registries.

The variable lists have not yet been translated and are currently available exclusively in Norwegian.

All registries have defined metadata. All variables with explanations and definitions can be found at: www.helsedata.no.

In addition, you can view the discharge form for the Hip Fracture Registry. We hope more hospitals will start using this and report to the registry.

For further information, please visit our website at <https://www.helse-bergen.no/nrl> or contact the registry office at nrl@helse-bergen.no.



Nasjonalt Register for Leddproteser

Ortopedisk klinikk, Helse Bergen HF

Haukeland universitetssjukehus

Postboks 1400

5021 Bergen

F.nr. (11 sifre).....

Navn:.....

Sykehus:.....

Hofteproteser

Registreringen gjelder innsetting, skifting eller fjerning av protesedeler, samt alle andre reoperasjoner relatert til proteseleddet.

Aktuell operasjon

- ☐ Primæroperasjon (også hvis hemiprotese tidligere)
☐ Reoperasjon (protese tidligere)
☐ Hemiprotese for annet enn hoftebrudd
☐ Lukket reposisjon av proteseluksasjon (reg. kun side og dato)

Operasjonsdato

Aktuelle side ☐ Venstre ☐ Høyre

ASA ☐ ASA1 ☐ ASA2 ☐ ASA3 ☐ ASA4 ☐ ASA5

Tidligere operasjon i aktuelle ledd (ev. flere kryss)

- ☐ Nei ☐ Ukjent ☐ Ja:
☐ Osteosyntese for fraktur i proximale femur
☐ Hemiprotese pga fraktur
☐ Osteotomi
☐ Artrodese
☐ Artroskopi
☐ Operasjon for brudd i acetabulum
☐ Takplastikk
☐ Operasjon for infeksjon
☐ Sementspacer pga infeksjon
☐ Osteosyntese for epifysiolyse
☐ Annet

Årsak til aktuell primæroperasjon (ev. flere kryss)

- ☐ Idiopatisk artrose
☐ Rheumatoid artritt
☐ Sekvele etter lårhalsbrudd
☐ Sekvele Calvè Legg Perthes
☐ Sekvele epifysiolyse
☐ Spondylartropati (Bechterew)
☐ Avaskulær caputnekrose, idiopatisk
☐ Sekvele etter dysplasi. Angi klassifisering:
☐ Grad1 ☐ Grad2 ☐ Grad3 ☐ Grad4 (Se bakside for klassifisering)

Akutt hoftebrudd. Spesifiser i feltene under:

Tid fra brudd til operasjon (timer):

☐ 0-6 ☐ 6-12 ☐ 12-24 ☐ 24-48 ☐ >48

Spesifiser årsak dersom over >48.....

Kognitiv svikt: ☐ Ja ☐ Nei ☐ Ukjent

Bruddtype: ☐ Lårhalsbrudd udislokert (Garden 1 og 2)

☐ Lårhalsbrudd dislokert (Garden 3 og 4)

☐ Lateralt lårhalsbrudd

☐ Pertrokantært tofragment (AO/OTA A1)

☐ Pertrokantært flerfragment (AO/OTA A2)

☐ Intertrokantært (AO/OTA A3)

☐ Subtrokantært

☐ Annen bruddtype

Patologisk brudd: ☐ Ukjent

☐ Nei

☐ Ja. Angi patologi

Operatørerfaring: ☐ Mer enn 3 års erfaring i hoftebruddkirurgi

☐ Mindre enn 3 års erfaring i hoftebruddkirurgi

☐ Annen operasjonsårsak

Årsak til aktuell reoperasjon (ev. flere kryss)

- ☐ Smerter alene
☐ Løs kopp
☐ Løs stamme
☐ Luksasjon
☐ Dyp infeksjon
☐ Langvarig sårsiving eller sårruptur
☐ Periprostetisk fraktur i acetabulum
☐ Fraktur av protesestammen
☐ Fraktur av protesehodet
☐ Fraktur av koppen
☐ Fraktur av implantat; annet
☐ Glutealsvikt
☐ Stor slitasje av kopp
☐ Fraktur av lineren. Spesifiser:
☐ Frakturert ☐ Gjennomslitt ☐ Luksert
☐ Periprostetisk fraktur av femur. Angi klassifisering:
(Se bakside for klassifisering)
☐ Type A (trokanterfraktur)
☐ Type B1 (ved protesespissen, fast protese)
☐ Type B2 (ved protesespissen, løs protese)
☐ Type B3 (rundt protesen, mye beintap)
☐ Type C (distalt for protesen, affiserer ikke denne)

☐ Annen reoperasjonsårsak.....

Reoperasjonstype (ev. flere kryss)

- ☐ Byttet stamme
☐ Byttet kopp
☐ Byttet hele protesen
☐ Fjernet protese og satt inn spacer
☐ Fjernet spacer og satt inn protese
☐ Fjernet protese eller spacer (Girdlestone)
☐ Byttet liner
☐ Byttet caput
☐ Bløtdelsdebridement
☐ Ny protese etter Girdlestone
☐ Resutur av muskel
☐ Transposisjon av muskel
☐ Osteosyntese av periprostetisk femurfraktur

☐ Annet.....

Leddspalte (minste i mm)

Operasjonstid – hud til hud (min):

Peroperative komplikasjoner ☐ Nei ☐ Ja, hvilken

Miniinvasiv Kirurgi (MIS) ☐ Nei ☐ Ja

Operasjonstilgang

- ☐ Fremre (mellom sartorius og tensor)
☐ Anterolateral (mellom glueus medius og tensor)
☐ Direkte lateral
☐ Bakre

Suturteknikk (hud)

- ☐ Fortløpende hudsutur ☐ Enkeltstående hudsutur
☐ Intracutan hudsutur ☐ Klips ☐ Lim

☐ Annet. Spesifiser

Dren ☐ Ja ☐ Nei

Beintap

Er det beintap i acetabulum ☐ Ja ☐ Nei

Er det beintap i femur ☐ Ja ☐ Nei

Beintap klassifikasjon (Paprosky`s klassifikasjon se baksiden)

Acetabulum ☐ I ☐ IIA ☐ IIB ☐ IIC ☐ IIIA ☐ IIIB

Femur ☐ I ☐ II ☐ IIIA ☐ IIIB ☐ IV

Er det gjort beintransplantasjon eller augmentering i acetabulum?

- ☐ Beinpakking a.m. Sloof
☐ Fokal transplantasjon (F.eks. cyster eller osteolyser)
☐ Strukturelt beingraft fiksert med skruer
☐ Augment av metall
☐ Metallring/bur
☐ Annet. Spesifiser.....

Er det gjort beintransplantasjon eller augmentering i femur?

- ☐ Beinpakking a.m. Ling/Gle
☐ Fokal beintransplantasjon (f.eks. i osteolyse)
☐ Strukturelt beingraft (f.eks.strutgraft)
☐ Annet. Spesifiser.....

Tromboseprofylakse

- ☐ Nei ☐ Ja, 1 medikament ☐ Ja, 2 medikament
Første dose ☐ Preoperativt ☐ Postoperativt
Medikament 1
Fast medikasjon ☐ Ja ☐ Nei: Antall dgr planlagt
Medikament 2
Fast medikasjon ☐ Ja ☐ Nei: Antall dgr planlagt

Fast antikoagulasjon ☐ Nei ☐ Ja ☐ Ukjent

Medikament

Fibrinolysehemmer ☐ Nei ☐ Ja ☐ Ukjent

Medikament

Administrering ☐ Systemisk ☐ Lokalt ☐ Systemisk og lokalt

Dosering ved systemisk adm.

Antibiotikaprofylakse

- ☐ Nei ☐ Ja, 1 medikament ☐ Ja, 2 medikament
Pågående antibiotikabehandling ☐ Nei ☐ Ja
Antibiotikaprofylakse preoperativt ☐ Nei ☐ Ja
Medikament 1.....
Dosering ☐ Milligram ☐ Gram
Antall doser (pr døgn) Varighet (timer)
Medikament 2
Dosering ☐ Milligram ☐ Gram
Antall doser (pr døgn) Varighet (timer)

Type ventilasjon

- ☐ Vanlig ventilasjon
☐ Vertikal unidireksjonal ventilasjon
☐ Horisontal unidireksjonal ventilasjon

Protesetype

- ☐ Usementert totalprotese med modulær kopp
☐ Protese med monoblokk usementert kopp
☐ Sementert totalprotese
☐ Hybrid totalprotese (sementert stamme)
☐ Omvendt hybrid totalprotese (usementert stamme)
☐ Hemiprotese (for annet enn hoftebrudd)
☐ Spesialprotese. Spesifiser:
☐ Persontilpasset stamme
☐ Persontilpasset kopp
☐ Constrained kopp (ikke dual-mobility = ikke spesialprotese)
☐ Primærprotese med revisjonsstamme
☐ Primærprotese med revisjonskopp
☐ Flere kopper utenpå hverandre
☐ Annet. Spesifiser

☐ Annen protesetype

Fest produktklislrelapper i eget felt, eller spesifiser nøyaktig:

Acetabulum

Navn/Type/Ref.nr.:

☐ Sement med antibiotika. Navn:.....

☐ Sement uten antibiotika. Navn:.....

☐ Usementert

Femur (+ ev. trokanterdel)

Navn/Type/Ref.nr.:

☐ Sement med antibiotika. Navn:.....

☐ Sement uten antibiotika. Navn:.....

☐ Usementert

Caput (+ ev. halsdel)

Navn/Type/Ref.nr.:

Lege.....

Legen som har fylt ut skjemaet.



RETTLEDNING HOFTEPROTESER

Registreringen gjelder innsetting, skifting eller fjerning av protesedeler, samt alle andre reoperasjoner relatert til proteseleddet.

Reoperasjoner kan for eksempel være:

- Bløtdelsdebridement pga infeksjon
- Lukket eller åpen reposisjon av luksert protese
- Osteosyntese av periprotetisk fraktur
- Bløtdelsplastikk, re-sutur av muskel eller muskeltransposisjon
- Fjerning av ektopisk bein

Aktuell operasjon

Primæroperasjon. Dette er første operasjon med totalprotese, eller med hemiprotese for annet enn hoftebrudd

ASA klassifisering (ASA=American Society of Anesthesiologists)

ASA-klasse 1: Friske pasienter som røyker mindre enn 5 sigaretter daglig.

ASA-klasse 2: Pasienter med en asymptomatisk tilstand som behandles medikamentelt (f.eks. hypertensjon) eller med kost (f.eks. diabetes mellitus type 2) og ellers friske pasienter som røyker 5 sigaretter eller mer daglig.

ASA-klasse 3: Pasienter med en tilstand som kan gi symptomer, men som holdes under kontroll medikamentelt (f.eks. moderat angina pectoris og mild astma).

ASA-klasse 4: Pasienter med en tilstand som ikke er under kontroll (f.eks. hjertesvikt og astma).

ASA-klasse 5: Moribund/døende pasient

Akutt hoftebrudd

Kognitiv svikt

Kognitiv svikt kan eventuelt testes ved å be pasienten tegne klokken når den er 10 over 11. En pasient med kognitiv svikt vil ha problemer med denne

Leddspalte

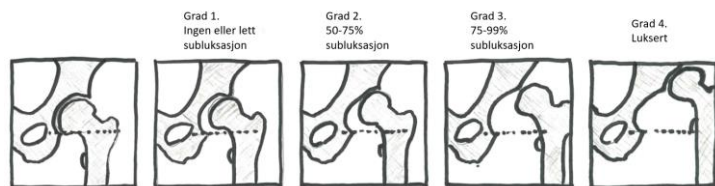
Minste leddspalte (mm) målt på de seneste røntgenbildene av hofte/bekkenet.

Peroperative komplikasjoner

Dersom pasienten dør under eller like etter operasjonen, ønsker vi likevel melding om operasjonen.

Årsak til aktuell operasjon: Sekvele etter dysplasi

Crowe – klassifikasjon:



Illustrasjon Geir Hallan

Miniinvasiv Kirurgi (MIS)

(MIS = Minimally Invasive Surgery) Her menes at kirurgen har brukt kort snitt og at det er brukt spesialinstrument laget for MIS.

Tromboseprofylakse

Medikament, dose og antatt varighet av profylaksen skal angis separat for operasjonsdagen og senere. Det skal også oppgis om pasienten står fast på tromboseprofylakse (AlbylE, Marevan, Plavix ol).

Fibrinolysehemmer

Medikament, dose og antatt varighet av profylaksen skal angis separat for operasjonsdagen og senere. Det skal også oppgis om pasienten står fast på tromboseprofylakse (AlbylE, Marevan, Plavix ol).

Type ventilasjon

Vanlig ventilasjon: operasjonsstue uten laminær luftstrøm

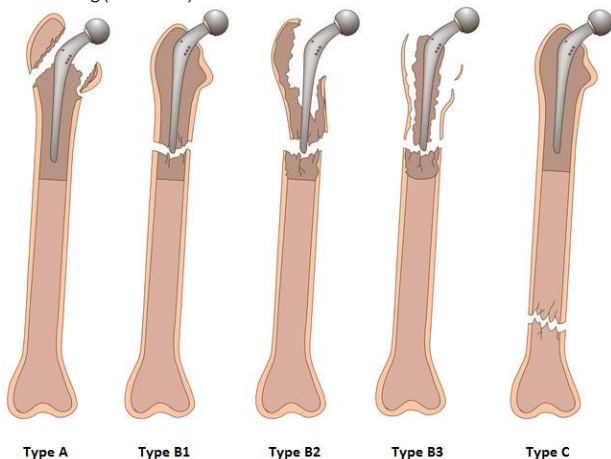
Vertikal unidireksjonal ventilasjon: laminær luftstrøm fra tak mot gulv

Horisontal unidireksjonal ventilasjon: laminær luftstrøm fra vegg mot vegg

Periprotetisk fraktur av femur

Alle frakturer i gjeldende knokkel skal registreres selv om protesen ikke er affisert. Eksempelvis skal en distal femurfraktur meldes som Vancouver C dersom der er en ipsilateral hofteprotese.

Klassifisering (Vancouver):



Paprosky-klassifikasjon av beintap i acetabulum

Type 1: Hemisfærisk acetabulum uten kantdefekter. Intakt bakre og fremre kolonne.

Defekter i forankringshull som ikke ødelegger subchondral beinplate

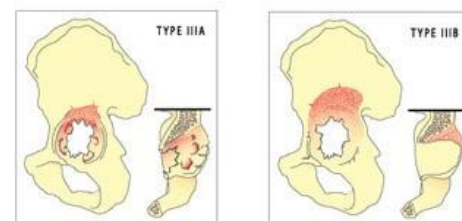
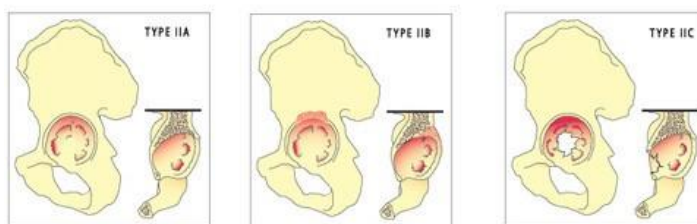
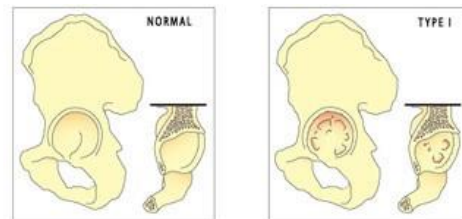
Type 2A: Hemisfærisk acetabulum uten store kantdefekter. Intakt bakre og fremre kolonne, men med lite metafysært bein igjen

Type 2B: Hemisfærisk acetabulum uten store kantdefekter, intakt fremre og bakre kolonne, men med lite metafysært bein igjen og manglende støtte kranielt

Type 2C: Hemisfærisk acetabulum uten store kantdefekter, intakt fremre og bakre kolonne, men med defekt i mediale vegg

Type 3A: Betydelig komponentvandring, osteolyse og beintap fra kl 10 til 2

Type 3B: Betydelig komponentvandring, osteolyse og beintap fra kl 9 til 5.



Paprosky-klassifikasjon av beintap i femur

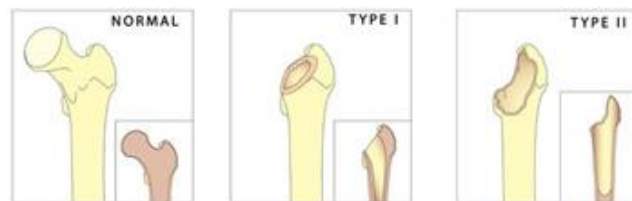
Type 1: Minimalt tap av metafysært ben og intakt diafyse

Type 2: Stort tap av metafysært ben, men intakt metafyse

Type 3A: Betydelig tap av metafysært ben uten mulighet for proksimal mekanisk støtte. Mer enn 4cm intakt corticalis i isthmus

Type 3B: Betydelig tap av metafysært ben uten mulighet for proksimal mekanisk støtte. Mindre enn 4cm intakt corticalis i isthmus

Type 4: Betydelig tap av metafysært ben uten mulighet for proksimal mekanisk støtte. Bred isthmus med liten mulighet for cortical støtte



Copyright Legeforlaget

Kontaktpersoner vedrørende registreringsskjema er

Overlege Geir Hallan, tlf. 55 97 56 87 og overlege Ove Furnes, tlf. 55 97 56 90

Ortopedisk klinikk, Haukeland universitetssjukehus. Besøksadresse: Møllendalsbakken 7.

Sekretær i Nasjonalt Register for Leddproteser, Ortopedisk klinikk, Helse Bergen:

Merete Husøy, tlf. 55 97 37 43, og sekretær Randi Furnes, tlf. 55 97 37 42

Epost nrl@helse-bergen.no

Internett: <https://www.helse-bergen.no/nrl>



Nasjonalt Register for Leddproteser

Helse Bergen HF, Ortopedisk klinikk
Haukeland universitetssjukehus
Møllendalsbakken 7
5021 BERGEN
Tlf: 55973742

F.nr. (11 sifre).....

Navn:.....

Sykehus:.....

Kneproteser

Innsetting, skifting eller fjerning av protese eller protesedeler, samt alle reoperasjoner relatert til proteseleddet.

Aktuell operasjon

☐ Primæroperasjon ☐ Reoperasjon (protese tidligere)

Aktuell side ☐ Venstre ☐ Høyre

Operasjonsdato (dd.mm. åå) |__| |__| |__|

ASA ☐ ASA1 ☐ ASA2 ☐ ASA3 ☐ ASA4 ☐ ASA5

Vekt (kg) |__| |__| **Høyde (cm)** |__| |__|

Ahlbäcks gradering av artrose (angis ved primæroperasjon)

☐ Grad1 ☐ Grad2 ☐ Grad3 ☐ Grad4 ☐ Grad5

Leddspalte (minste i mm) mm. (angis ved primæroperasjon)

Tidligere operasjon i aktuelle ledd (angis ved primærop. Evt. flere kryss)

☐ Nei ☐ Ukjent ☐ Ja. Spesifiser:

☐ Osteotomi	☐ Artrodese
☐ Protese	☐ Synovektomi
☐ Menisk	☐ Artroskopi (diagnostisk)
☐ Leddbånd	☐ Korsbånd
☐ Menisk og leddbånd	☐ Bein-og/eller bruskttransplantasjon
☐ Shaving/Opprensning (Debridement)	
☐ Osteosyntese for intraartikulær/leddnær fraktur	
☐ Annet.....	

Årsak til aktuell primæroperasjon (evt. flere kryss)

☐ Idiopatisk artrose	☐ Rheumatoid artritt
☐ Fraktursekvele	☐ Mb. Bechterew
☐ Sekvele ligamentskade	☐ Sekvele meniskskade
☐ Infeksjonssekvele	☐ Osteochondritt sekvele
☐ Akutt fraktur	☐ Psoriasis artritt
☐ Osteonekrose sekvele/avaskulær nekrose	
☐ Annen årsak	

Årsak til aktuell reoperasjon (evt. flere kryss)

☐ Løs proksimal protesedel	☐ Løs distal protesedel
☐ Løs patellaprotese	☐ Luksasjon av patella
☐ Instabilitet	☐ Dyp infeksjon
☐ Smerter	☐ Progresjon av artrose
☐ Forlenget sårsvining	☐ Fibrose
☐ Tidligere fjernet protese pga infeksjon	☐ Aksefeil

☐ Protesenær fraktur i femur. Angi klassifisering:

(se rettledning)

☐ Femur I ☐ Femur II ☐ Femur III

☐ Protesenær fraktur i tibia. Angi klassifisering:

(se rettledning)

☐ Tibia I A	☐ Tibia I B	☐ Tibia I C
☐ Tibia II A	☐ Tibia II B	☐ Tibia II C
☐ Tibia III A	☐ Tibia III B	☐ Tibia III C
☐ Tibia IV A	☐ Tibia IV B	☐ Tibia IV C

☐ Protesenær fraktur i patella. Angi klassifisering:

(se rettledning)

☐ Patella I ☐ Patella II ☐ Patella III A ☐ Patella III B

☐ Slitt eller defekt plastforing. Spesifiser:

☐ Slitt ☐ Knekt ☐ Annet:	☐ Tibia (Hele)
	☐ Tibia Medialt
	☐ Tibia Lateralt
	☐ Patella
	☐ Tibia & Patella

☐ Annen reoperasjonsårsak

Reoperasjonstype (evt. flere kryss)

- ☐ Bytte eller innsetting av distal komponent
☐ Bytte eller innsetting av proksimal komponent
☐ Bytte eller innsetting av hele protesen
☐ Innsetting av patellakomponent
☐ Bytte av patellaprotese
☐ Bytte av plastforing
☐ Artrodese
☐ Amputasjon
☐ Bløtdelsdebridement for infisert protese
☐ Innsetting av sementspacer

☐ Osteosyntese av protesenær fraktur. Spesifiser hvilket bein:

☐ Proksimal ☐ Distal ☐ Patella

☐ Fjernet protesedeler. Spesifiser:

☐ Alle	☐ Sementspacer	☐ Proksimal
☐ Distal	☐ Patella	☐ Intermediær (polyetylen)
☐ Annen protese komponent		

☐ Annen reoperasjonstype

Peroperative komplikasjoner (evt. flere kryss)

☐ Blodtomhet sviktende	☐ Adm.svikt (manglende komp. mm)
☐ Fraktur av proksimalt bein	☐ Fraktur av distalt bein
☐ Ruptur skade MCL	☐ Ligamentruptur/seneskade
☐ Svikt av instrumenter	☐ Svikt pga. anatomiske forhold
☐ Sprekk i distalt bein	☐ Teknisk problem med sement

☐ Annet

Operasjonstid (min) |__| |__|

Blodtomhet ☐ Nei ☐ Ja: **Blodtomhetstid (min)** |__| |__|

Miniinvasiv Kirurgi (MIS) ☐ Ja ☐ Nei

Computernavigering (CAOS) ☐ Nei ☐ Ja: Type

Robotassistert ☐ Nei ☐ Ja: Type

Pasientilpassede instrumenter ☐ Nei ☐ Ja: Type:

Operasjonstilgang

☐ Parapatellar medialt ☐ Parapatellar lateralt ☐ Subvastus

☐ Annet

Lokal infiltrasjons analgesi ☐ Ja ☐ Nei

Perifer nerveblokkade ☐ Ja ☐ Nei

Anestesi

☐ Generell ☐ Epidural ☐ Spinal ☐ Annet

Lukking Huden lukket på:

☐ Ekstensjon ☐ Fleksjon ☐ Både ekstendert og flektet

☐ Annet

Suturteknikk (hud)

☐ Fortløpende hudsutur ☐ Enkeltstående hudsutur

☐ Intracutan hudsutur ☐ Klips ☐ Lim

☐ Annet

Dren ☐ Ja ☐ Nei

Korsbånd

Intakt fremre korsbånd før operasjon	☐ Ja ☐ Nei
Intakt fremre korsbånd etter operasjon	☐ Ja ☐ Nei
Intakt bakre korsbånd før operasjon	☐ Ja ☐ Nei
Intakt bakre korsbånd etter operasjon	☐ Ja ☐ Nei

Beintap

☐ Proksimalt (femur) ☐ Distalt (tibia)

Beintap klassifikasjon:

(se rettledning)

☐ Type 1 ☐ Proksimalt ☐ Distalt
☐ Type 2A ☐ Proksimalt ☐ Distalt
☐ Type 2B ☐ Proksimalt ☐ Distalt
☐ Type 3 ☐ Proksimalt ☐ Distalt

Er det utført beintransplantasjon eller augmentering ?

☐ Beinpakking ☐ Proksimalt ☐ Distalt
☐ Augment av metall ☐ Proksimalt ☐ Distalt
☐ Fokal transplantasjon ☐ Proksimalt ☐ Distalt
☐ Strukturert beingraft fiksert med skruer ☐ Proksimalt ☐ Distalt
☐ Kon av metall ☐ Proksimalt ☐ Distalt
☐ Annet

Tromboseprofylakse

☐ Nei ☐ Ja, 1 medikament ☐ Ja, 2 medikament
Første dose ☐ Preoperativt ☐ Postoperativt

Medikament 1

Fast medikasjon ☐ Ja ☐ Nei: Antall dgr planlagt

Medikament 2

Fast medikasjon ☐ Ja ☐ Nei: Antall dgr planlagt

Fast antikoagulasjon ☐ Nei ☐ Ja ☐ Ukjent

Angi medikament

Fibrinolysehemmer ☐ Nei ☐ Ja ☐ Ukjent

Angi medikament

Administrering:

☐ Systemisk ☐ Lokalt ☐ Systemisk og lokalt

Dosering ved systemisk adm.

Antibiotikaprofylakse

☐ Nei ☐ Ja, 1 medikament ☐ Ja, 2 medikament

Pågående antibiotikabehandling ☐ Nei ☐ Ja

Antibiotikaprofylakse preoperativt ☐ Nei ☐ Ja

Medikament 1

Dosering ☐ Milligram ☐ Gram

Antall doser (pr døgn) Varighet (timer)

Medikament 2

Dosering ☐ Milligram ☐ Gram

Antall doser (pr døgn) Varighet (timer)

Protesetype

☐ Totalprot. m/patella
☐ Totalprot. u/patella
☐ Unicondylær protese. Spesifiser: ☐ Medial ☐ Lateral
☐ Patellefemoral
☐ Bi-compartmental
☐ Hengslet protese
☐ Total stabilisering (CCK)
☐ Annen protesetype

Fest produktklisterlapper nederst, eller spesifiser nøyaktig:

Femurkomponent Navn/Type/Str / evt. katalognr.

.....
Sentral stamme ☐ Nei ☐ Ja, evt. lengde mm
Sementert stamme ☐ Nei ☐ Ja
Metallforing ☐ Nei ☐ Ja
Stabilisering ☐ Nei ☐ Ja, bakre ☐ Ja, annen

☐ Sement m/antibiotika Navn:

☐ Sement u/antibiotika Navn:

☐ Usegmentert

Tibiakomponent (metallplatå) Navn/Type/Str / evt. katalognr.:

.....
Forlenget sentral stamme ☐ Nei ☐ Ja, evt. lengde mm
Sementert stamme ☐ Nei ☐ Ja
Metallforing ☐ Nei ☐ Ja
Stabilisering ☐ Nei ☐ Ja, bakre ☐ Ja, annen

☐ Sement m/antibiotika Navn:

☐ Sement u/antibiotika Navn:

☐ Usegmentert

Tibiakomponent (plastkomp.) Navn/Type/Str / evt. katalognr.

.....
Tykkelse mm
Stabilisering ☐ Nei ☐ Ja, bakre ☐ Ja, annen

Patellakomponent Navn/Type/Str / evt. katalognr.

.....
Metallforing ☐ Nei ☐ Ja

☐ Sement m/antibiotika Navn:

☐ Sement u/antibiotika Navn:

☐ Usegmentert

Lege

Legen som har fylt ut skjemaet.



Rettledning kneproteser

Registreringen gjelder innsetting, skifting eller fjerning av protesedeler, samt alle andre reoperasjoner relatert til proteseleddet.

Reoperasjoner kan for eksempel være:

- Bløtdelsdebridement pga infeksjon
- Osteosyntese av protesenær fraktur
- Lukket eller åpen reposisjon av luksert tibiaplast
- Mobilisering under anestesi (MUA)
- Artroskopisk adhesjonsløsning
- Rekonstruksjon av strekkeapparatet

ASA klassifisering (ASA=American Society of Anesthesiologists)

ASA-klasse 1: Friske pasienter som røyker mindre enn 5 sigaretter daglig.

ASA-klasse 2: Pasienter med en asymptomatisk tilstand som behandles medikamentelt (f.eks. hypertensjon) eller med kost (f.eks. diabetes mellitus type 2) og ellers friske pasienter som røyker 5 sigaretter eller mer daglig.

ASA-klasse 3: Pasienter med en tilstand som kan gi symptomer, men som holdes under kontroll medikamentelt (f.eks. moderat angina pectoris og mild astma).

ASA-klasse 4: Pasienter med en tilstand som ikke er under kontroll (f.eks. hjertesvikt og astma).

ASA-klasse 5: Moribund/døende pasient

Ahlbäck's radiografiske gradering av artrose, med tillegg av gradering av artrosen i lateral projeksjon

Anteroposterior (AP) projeksjon (frontbilde)

Grad 1: Reduksjon av leddsplate

Grad 2: Manglende leddsplate

Grad 3: Slitasje av tibialeddflate < 5 mm

Grad 4: Slitasje 5-10 mm

Grad 5: Stor sublaksjon av tibia

Lateral projeksjon (sidebilde)

Grad 3: Intakt bakre posterior tibialeddflate

Grad 4: Slitasje av bakre tibialeddflate

Grad 5: Fremre sublaksjon av tibia < 10 mm

Graderingen er laget for primær artrose, men fint om dere forsøker å angi graden også ved andre typer leddskade.

Leddspalte

Røntgen bilde anbefales tatt stående front med vektbelastning (antero-posterior- AP view). Begge knær i full ekstensjon. Strålegang horisontalt med leddlinjen. Medial og lateral leddspalte høyde (joint space width) måles i midten av de respektive kompartiment i mm. Oppgi hele tall.

Peroperative komplikasjoner

Dersom pasienten dør under eller like etter operasjonen, ønsker vi likevel melding om operasjonen.

Miniinvasiv Kirurgi (MIS)

(MIS = Minimally Invasive Surgery) Her menes at kirurgen har brukt kort snitt og at det er brukt spesialinstrument laget for MIS.

Computernavigering (CAOS)

(CAOS = Computer Aided Orthopaedic Surgery) Angi firmanavn på computersystem

Pasienttilpassede instrumenter

Her menes kutteblokker eller instrumenter som lages etter MR eller CT bilder tatt av pasienten før operasjonen. Oppgi navn på systemet.

Beintap og beintransplantasjon/beinerstatning

Påsmøring av benvev rundt protesen regnes ikke som beintransplantat.

Tromboseprofylakse

Medikament, dose og antatt varighet av profylaksen skal angis separat for operasjonsdagen og senere. Det skal også oppgis om pasienten står fast på tromboseprofylakse (AlbylE, Marevan, Plavix ol).

Fibrinolysehemmer

Her føres det på om en benytter blødningsreducerende legemidler i forbindelse med operasjonen (f.eks. Cyklokapron).

Protesetype

Gjelder ved revisjon

Dersom det er gjort revisjon av totalprotese uten patellakomponent og REOPERASJONSTYPE er innsetting av patellakomponent, skal 'Totalprotese m/patella' velges. Totalprotese med patellakomponent (dvs. protesen har nå blitt en totalprotese med patellakomponent).

Ved revisjon av unicondylær protese til totalprotese brukes enten 'Totalprotese m/patella', 'Totalprotese u/patella' eller hengset/stabilisert.

Periprostetiske frakturer – klassifikasjon

Tibiafrakturer klassifikasjon Felix, Stuart og Hanssen (1997) Clin Orthop Relat Res.

4 typer (I-IV) etter lokalisasjon

(Felix, Stuart og Hanssen (1997) Clin Orthop Relat Res.)

- A) Fast protese
- B) Løs protese
- C) Intraoperativ fraktur



Illustrasjon fra Rorabeck og Taylor (1999), Orthopedic Clinics of North America.

Patellafraktur klassifikasjon Ortiguera og Berry (2002), JBJS.

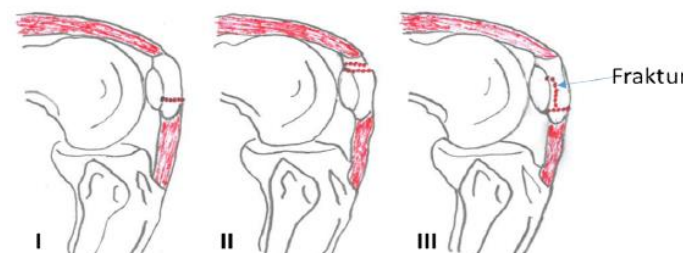
Type I: Intakt strekkeapparat, fast protese

Type II: Avbrutt strekkeapparat, fast protese

Type III: Løs protese

A) OK bein

B) Kominutt fraktur eller <10mm patella

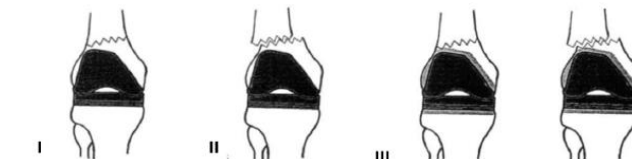


Femurfraktur klassifikasjon Rorabeck og Lewis (1997).

Type I: Udislokert fraktur, fastsittende protese

Type II: Dislokert fraktur, fastsittende protese

Type III: Udislokert eller dislokert fraktur, løs protese



Illustrasjon fra Rorabeck og Taylor (1999), Orthopedic Clinics of North America.

Anderson beintap klassifikasjon

Type 1: Intakt metafysebein, mindre beindefekt, revisjonskomponent forventes å være stabil

Femur (F1): Normal leddlinje, kondyler intakt

Tibia (T1): Protesekomponent over fibulahode og metafyse intakt

Type 2 (2A-en kondyl 2B- begge kondyler): Skadet metafysebein, metafysert beintap

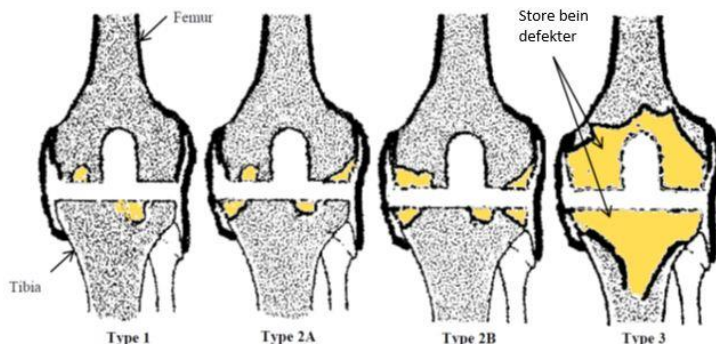
Femur (F2): Hevet leddlinje og kondyler skadet

Tibia (T2): Protesekomponent ved eller under toppen av fibula hodet og tibia bredden redusert

Type 3: Manglende metafyse, større beindefekter, kollateral eller patellar ligament muligens løsrevet

Femur (F3): Vandring av protesekomponent eller osteolyse til nivå med epikondylene

Tibia (T3): Komponent vandring eller osteolyse som har ført til tap av tibiakondyler.



Kontaktpersoner vedrørende registreringsskjema er

Seksjonsoverlege Ove Furnes, tlf. 55 97 56 90.

Ortopedisk klinikk, Haukeland universitetssjukehus. Besøksadresse: Møllendalsbakken 7.

Sekretærer i Nasjonalt Register for Leddproteser, Ortopedisk klinikk, Helse Bergen:

Randi Furnes, tlf. 55 97 37 42. Epost: nrl@helse-bergen.no Internett: <https://www.helse-bergen.no/nrl>



Nasjonalt Register for Leddproteser

Ortopedisk klinikk, Helse Bergen HF
Haukeland universitetssjukehus
Postboks 1400
5021 Bergen

F.nr. (11 sifre).....

Navn:.....

Sykehus:.....

Albueprotese

Registreringen gjelder innsetting, fjerning eller skifte av protesedeler, samt ALLE ANDRE reoperasjoner relatert til proteseleddet.

Aktuell operasjon

☐ Primæroperasjon ☐ Reoperasjon (protese tidligere)

Aktuell side ☐ Venstre ☐ Høyre

Operasjonsdato (dd.mm. åå) | | | | | | | |

ASA ☐ ASA1 ☐ ASA2 ☐ ASA3 ☐ ASA4 ☐ ASA5

Tidligere operasjon i aktuelle ledd (angis ved primæroperasjon. Evt. flere kryss)

☐ Nei ☐ Ukjent ☐ Ja. Spesifiser:

☐ Osteotomi ☐ Protese ☐ Artrodese

☐ Leddbånd ☐ Synovektomi

☐ Osteosyntese for intraartikulær/leddnær fraktur

☐ Annet.....

Årsak til aktuell primæroperasjon (evt. flere kryss)

☐ Idiopatisk artrose

☐ Rheumatoid artritt

☐ Fraktursekvele

☐ Mb. Bechterew

☐ Sekvele ligamentskade

☐ Akutt fraktur

☐ Infeksjonssekvele

☐ Psoriasis artritt

☐ Osteochondritt sekvele

☐ Osteonekrose sekvele/avaskulær nekrose

☐ Annen årsak

Årsak til aktuell reoperasjon (evt. flere kryss)

☐ Løs humeruskomponent

☐ Luksasjon

☐ Løs ulnakomponent

☐ Dyp infeksjon

☐ Instabilitet

☐ Progresjon av artrose

☐ Fibrose

☐ Aksefeil: ☐ Varus ☐ Valgus

☐ Protesenær fraktur. Spesifiser:

☐ Humerus ☐ Ulna ☐ Humerus og ulna

☐ Fortenget sårsivning

☐ Smerter alene (uten annen revisjonsårsak)

☐ Slitt eller defekt plastforing. Spesifiser:

☐ Slitt ☐ Knekt ☐ Annet

☐ Annet

Reoperasjonstype (evt. flere kryss)

☐ Bytte eller innsetting av distal komponent

☐ Bytte eller innsetting av proksimal komponent

☐ Bytte eller innsetting av hele protesen

☐ Bytte av plastforing

☐ Artrodese

☐ Amputasjon

☐ Bløtdelsdebridement for infisert protese

☐ Innsetting av sementspacer

☐ Osteosyntese av protesenær fraktur. Spesifiser:

☐ Humerus ☐ Ulna ☐ Radius

☐ Annet

☐ Fjernet protesedeler (inkl. spacer) Spesifiser:

☐ Alle ☐ Sementspacer ☐ Proksimal

☐ Distal ☐ Intermediær ☐ Annen protesekomp.

☐ Annen reoperasjonstype

Operasjonstid (min) | | | |

Blodtomhet ☐ Nei ☐ Ja: Blodtomhetstid (min) | | | |

Operasjonstilgang

☐ Paratricepial (triceps preserving)

☐ Triceps splitt

☐ Triceps flap

☐ Partiell utløsning av triceps fra olecranon (Morrey detachment)

☐ Annen tilgang

N. ulnaris transposisjon

☐ Nei ☐ Ja:

Type ulnaris operasjon: ☐ Eksplorasjon ☐ Transposisjon ☐ Annet

Reseksjon av caput radii ☐ Nei ☐ Ja

Lokal infiltrasjons analgesi ☐ Nei ☐ Ja

Suturteknikk (hud)

☐ Fortløpende hudsutur

☐ Enkeltstående hudsutur

☐ Intracutan hudsutur

☐ Klips ☐ Lim

☐ Annet

Dren ☐ Ja ☐ Nei

Peroperative komplikasjoner

☐ Fraktur av ulna

☐ Fraktur av humerus

☐ Sprekk i humerus

☐ Tricepseneruptur/avulsjonfr.

☐ Perforasjon av ulna

☐ Teknisk problem med sement

☐ Perforasjon av humerus

☐ Nerveskade f. eks. N. ulnaris

☐ Sprekk i ulna

☐ Adm.svikt (manglende komp. mm.)

☐ Annet

Beintap:

☐ Proksimalt ☐ Distalt

Beintransplantasjon eller augmentering:

☐ Eget bein

☐ Proksimalt ☐ Distalt

☐ Bankbein

☐ Proksimalt ☐ Distalt

☐ Syntetisk bein

☐ Proksimalt ☐ Distalt

☐ Augment av metall

☐ Proksimalt ☐ Distalt

☐ Kon av metall

☐ Proksimalt ☐ Distalt

☐ Annet

Antibiotikaprofylakse

☐ Nei ☐ Ja

Pågående antibiotikabehandling

☐ Nei ☐ Ja

Antibiotikaprofylakse preoperativt

☐ Nei ☐ Ja

Medikament 1

Dosering ☐ Milligram ☐ Gram

Antall doser (pr døgn) Varighet (timer)

Medikament 2

Dosering ☐ Milligram ☐ Gram

Antall doser (pr døgn) Varighet (timer)

Tromboseprofylakse

☐ Ja ☐ Nei

Første dose

☐ Preoperativt ☐ Postoperativt

Medikament 1

Fast medikasjon: ☐ Ja ☐ Nei: Antall dgr planlagt

Medikament 2

Fast medikasjon: ☐ Ja ☐ Nei: Antall dgr planlagt

Fast antikoagulasjon ☐ Ja ☐ Nei ☐ Ukjent

Angi medikament

Fibrinolysehemmer ☐ Nei ☐ Ja ☐ Ukjent

Angi medikament

Administrering ☐ Ingen ☐ Systemisk
 ☐ Lokalt ☐ Systemisk og lokalt

Protesetype

- ☐ Totaltprotese med caput radii komponent
☐ Totaltprotese uten caput radii komponent
☐ Hemiprotese (humerus)
☐ Caput radii
☐ Annet. Spesifiser

Fest produktklislapp under eller spesifiser nøyaktig produkt som er satt inn ved primær- eller reoperasjon:

Humeruskomponent

Navn/Type/Str / ev. katalognr.

- ☐ Sement med antibiotika – Navn
☐ Sement uten antibiotika – Navn
☐ Usementert

Ulnakomponent

Navn/Type/Str / ev. katalognr.

- ☐ Sement med antibiotika – Navn
☐ Sement uten antibiotika – Navn
☐ Usementert

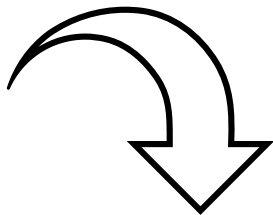
Caput radiikomponent

Navn/Type/Str / ev. katalognr.

- ☐ Sement med antibiotika – Navn
☐ Sement uten antibiotika – Navn
☐ Usementert

Lege

Legen som har fylt ut skjemaet.



RETTLEDNING ALBUEPROTESE

Registreringen gjelder innsetting, fjerning eller skifte av protesedeler, samt ALLE ANDRE reoperasjoner relatert til proteseleddet.

Reoperasjoner kan for eksempel være:

- Bløtdelsdebridement pga infeksjon
- Osteosyntese av protesenær fraktur
- Lukket eller åpen reposisjon av luksasjon
- Mobilisering under anestesi
- Artroskopisk adhesjonsløsning

ASA klassifisering

(ASA=American Society of Anesthesiologists)

ASA-klasse 1: Friske pasienter som røyker mindre enn 5 sigaretter daglig.

ASA-klasse 2: Pasienter med en asymptomatisk tilstand som behandles medikamentelt (f.eks. hypertensjon) eller med kost (f.eks. diabetes mellitus type 2) og ellers friske pasienter som røyker 5 sigaretter eller mer daglig.

ASA-klasse 3: Pasienter med en tilstand som kan gi symptomer, men som holdes under kontroll medikamentelt (f.eks. moderat angina pectoris og mild astma).

ASA-klasse 4: Pasienter med en tilstand som ikke er under kontroll (f.eks. hjertesvikt og astma).

ASA-klasse 5: Moribund/døende pasient

Beintap og beintransplantasjon/beinerstatning

Påsmøring av benvev rundt protesen regnes ikke som beintransplantat.

Peroperative komplikasjoner

Dersom pasienten dør under eller like etter operasjonen, ønsker vi likevel melding om operasjonen.

Tromboseprofylakse

Medikament, dose og antatt varighet av profylaksen skal angis separat for operasjonsdagen og senere. Det skal også oppgis om pasienten står fast på tromboseprofylakse (AlbylE, Marevan, Plavix ol).

Fibrinolysehemmer

Her føres det på om en benytter blødningsreducerende legemidler i forbindelse med operasjonen (f.eks. Cyklokapron).

Kontaktpersoner vedrørende registreringsskjema er

Overlege Yngvar Krukhaug

Seksjonsoverlege Ove Furnes, tlf. 55 97 56 90

Ortopedisk klinikk, Haukeland universitetssjukehus.

Besøksadresse: Møllendalsbakken 7.

Sekretær i Nasjonalt Register for Leddproteser, Ortopedisk klinikk,

Helse Bergen: Randi Furnes, tlf. 55 97 37 42

Epost nrl@helse-bergen.no

Internett: <https://www.helse-bergen.no/nrl>



Nasjonalt Register for Leddproteser

Ortopedisk klinikk, Helse Bergen HF
Haukeland universitetssjukehus
Postboks 1400
5021 Bergen

F.nr. (11 sifre).....

Navn:.....

Sykehus:.....

Ankelproteser

Registreringen gjelder innsetting, fjerning eller skifte av protesedeler, samt ALLE ANDRE reoperasjoner relatert til proteseleddet.

Aktuell operasjon

☐ Primæroperasjon ☐ Reoperasjon (protese tidligere)

Aktuell side ☐ Venstre ☐ Høyre

Operasjonsdato (dd.mm. åå) |__| |__| |__|

ASA ☐ ASA1 ☐ ASA2 ☐ ASA3 ☐ ASA4 ☐ ASA5

Preoperativ feilstilling (Angis kun ved primæroperasjon)

☐ Nei ☐ Ja. Hvilken: ☐ Varus ☐ Valgus ☐ Equinus

Antall grader °

Tidligere operasjon i aktuelle ledd (angis ved primæroperasjon. Evt. flere kryss)

☐ Ja ☐ Nei ☐ Ukjent

☐ Osteosyntese for intraartikulær/leddnær fraktur

☐ Osteotomi calcaneus

☐ Synovektomi

☐ Artrode. Spesifiser:

☐ Talo-navikulær artrode

☐ Talo-calcaneal artrode

☐ Mellomfots-artrode

☐ Trippelartrode

☐ Calcaneo-cuboidal artrode

☐ Subtalar artrode

☐ Annet

Årsak til aktuell primæroperasjon (evt. flere kryss)

☐ Idiopatisk artrose

☐ Rheumatoid artritt

☐ Fraktursekvele

☐ Spondylatropati (Mb. Bechterew)

☐ Sekvele ligamentskade

Annen årsak

Tilleggsprosedyrer (angis ved primæroperasjon. Evt. flere kryss)

☐ Talonavikulær artrode

☐ Subtalar artrode

☐ Achillesene-forlengelse

☐ Løsning av lig. Deltoideus

☐ Stabilisering lateralt

☐ Calcaneus-osteotomi

☐ Gastroc slide

☐ Osteotomi MT1

☐ Cotton-osteotomi

☐ Plastikkirurgisk prosedyre

☐ Annet

Årsak til aktuell reoperasjon (evt. flere kryss)

☐ Løs tibiakomponent

☐ Løs taluskomponent

☐ Løs tibia- og taluskomp.

☐ Luksasjon

☐ Instabilitet

☐ Dyp infeksjon

☐ Fibrose

☐ Progresjon av artrose

☐ Aksefeil: ☐ Varus ☐ Valgus

☐ Protesenær fraktur: ☐ Tibia ☐ Talus ☐ Tibia og Talus

☐ Forlenget sårsvning eller sårruptur

☐ Smerter alene (uten annen revisjonsårsak)

☐ Annen årsak

Reoperasjonstype (evt. flere kryss)

☐ Bytte av talus-komponent

☐ Byttet hele protesen

☐ Bytte av tibiakomponent

☐ Bytte plastforing

☐ Fjernet protese og gjort artrode

☐ Innsatt spacer

☐ Amputasjon

☐ Fjernet protese/spacer

☐ Debridement for infisert protese

☐ Osteosyntese for protesenær fraktur

☐ Debridement (bløddeler, bein) for annet enn infeksjon

☐ Annen reoperasjonstype

Leddspalte (minste i mm) mm. (Angis kun ved primæroperasjon)

Operasjonstid (min) |__| |__|

Type ventilasjon

☐ Vanlig ventilasjon

☐ Vertikal unidireksjonal ventilasjon

☐ Horisontal unidireksjonal ventilasjon

Blodtomhet ☐ Nei ☐ Ja: Blodtomhetstid (min) |__| |__|

Dren ☐ Ja ☐ Nei

Operasjonstilgang

☐ Fremre ☐ Lateral (Med fibulaosteotomi)

☐ Annen tilgang

Suturteknikk (hud)

☐ Fortløpende hudsutur

☐ Enkeltstående hudsutur

☐ Intracutan hudsutur

☐ Klips ☐ Lim

☐ Annet

Peroperative komplikasjoner (evt. flere kryss)

☐ Fraktur distalt i tibia / medial malleol

☐ Fraktur i laterale malleol

☐ Fraktur i talus

☐ Annen årsak

Antibiotikaprofylakse

☐ Nei ☐ Ja

Pågående antibiotikabehandling

☐ Nei ☐ Ja

Antibiotikaprofylakse preoperativt

☐ Nei ☐ Ja

Medikament 1

Dosering ☐ Milligram ☐ Gram

Antall doser (pr døgn) Varighet (timer)

Medikament 2

Dosering ☐ Milligram ☐ Gram

Antall doser (pr døgn) Varighet (timer)

Tromboseprofylakse

☐ Ja ☐ Nei

Første dose

☐ Preoperativt ☐ Postoperativt

Medikament 1

Fast medikasjon: ☐ Ja ☐ Nei: Antall dgr planlagt

Medikament 2

Fast medikasjon: ☐ Ja ☐ Nei: Antall dgr planlagt

Fast antikoagulasjon

☐ Ja ☐ Nei ☐ Ukjent

Angi medikament

Fibrinolysehemmer ☐ Ja ☐ Nei ☐ Ukjent

Angi medikament

Administrering: ☐ Ingen ☐ Systemisk

☐ Lokalt ☐ Systemisk og lokalt

Protesetype

- ☐ Usementert totalprotese med fast menisk
☐ Usementert totalprotese med bevegelig menisk
☐ Totalprotese med minst en sementert komponent
☐ Protese med revisjonskomponent(er)
☐ Annet

Fest produktklisterlapper nederst, eller spesifiser nøyaktig:

Proksimal komponent

Navn/Type/Str / ev. katalognr.

- ☐ Sement med antibiotika – Navn
☐ Sement uten antibiotika – Navn
☐ Usementert

Distal komponent

Navn/Type/Str / ev. katalognr.

- ☐ Sement med antibiotika – Navn
☐ Sement uten antibiotika – Navn
☐ Usementert

Intermediær komponent

Navn/Type/Str / ev. katalognr.:

Lege

Legen som har fylt ut skjemaet



Rettledning ankelprotese

Aktuell operasjon

Primæroperasjon er første operasjon med leddprotese. Reoperasjon er ALLE andre operasjoner relatert til proteseleddet.

En reoperasjon kan for eksempel være:

- Bløtdelsdebridement pga infeksjon
- Osteosyntese av protesenær fraktur
- Bløtdelsplastikk
- Fjerning av ektopisk bein / benet debridement

ASA klassifisering (ASA=American Society of Anesthesiologists)

ASA-klasse 1: Friske pasienter som røyker mindre enn 5 sigaretter daglig.

ASA-klasse 2: Pasienter med en asymptomatisk tilstand som behandles medikamentelt (f.eks. hypertensjon) eller med kost (f.eks. diabetes mellitus type 2) og ellers friske pasienter som røyker 5 sigaretter eller mer daglig.

ASA-klasse 3: Pasienter med en tilstand som kan gi symptomer, men som holdes under kontroll medikamentelt (f.eks. moderat angina pectoris og mild astma).

ASA-klasse 4: Pasienter med en tilstand som ikke er under kontroll (f.eks. hjertesvikt og astma).

ASA-klasse 5: Moribund/døende pasient

Leddspalte

Minste leddspalte (mm) målt på de seneste røntgenbildene.

Peroperative komplikasjoner

Dersom pasienten dør under eller like etter operasjonen, ønsker vi likevel melding om operasjonen.

Type ventilasjon

Vanlig ventilasjon: operasjonsstue uten laminær luftstrøm

Vertikal unidireksjonal ventilasjon: laminær luftstrøm fra tak mot gulv

Horisontal unidireksjonal ventilasjon: laminær luftstrøm fra vegg mot vegg

Protesetype

Sementert totalprotese/Omvendt hybrid totalprotese:

Det skal også scannes og registreres sementrestriktor.

Protese med monoblokk usementert kopp:

Det skal også scannes og registreres sementrestriktor dersom det er brukt en sementert stamme.

Spesialprotese:

Bruk av persontilpasset implantat, bruk av revisjonsimplantater ved primærkirurgi, bruk av flere lag med komponenter.

Tromboseprofylakse

Medikament, dose og antatt varighet av profylaksen skal angis separat for operasjonsdagen og senere. Det skal også oppgis om pasienten står fast på tromboseprofylakse (AlbylE, Marevan, Plavix ol.).

Fibrinolysehemmer

Her føres det på om en benytter blødningsreducerende legemidler i forbindelse med operasjonen (f.eks. Cyklokapron).

Kontaktpersoner vedrørende registreringsskjema er

Overlege Geir Hallan, 55 97 56 87

Seksjonsoverlege Ove Furnes, tlf. 55 97 56 90.

Ortopedisk klinikk, Haukeland universitetssjukehus.

Besøksadresse: Møllendalsbakken 7.

Sekretærer i Nasjonalt Register for Leddproteser, Ortopedisk klinikk, Helse Bergen: Randi Furnes, tlf. 55 97 37 42.

Epost: nrl@helse-bergen.no

Internett: <https://www.helse-bergen.no/nrl>



Nasjonalt Register for Leddproteser

Ortopedisk klinikk, Helse Bergen HF
Haukeland universitetssjukehus
Postboks 1400
5021 Bergen

F.nr. (11 sifre).....

Navn:.....

Sykehus:.....

Hånd, fingre og tær

Registreringen gjelder innsetting, skifting eller fjerning av protesedeler, samt alle andre reoperasjoner relatert til proteseleddet.

Bløtdelsrevisjon skal registreres selv om protesedeler ikke skiftes. Ett skjema fylles ut for hver operasjon.

Aktuelle ledd

- ☐ Radiocarpalledd (Håndledd)
☐ DRUJ (Distale radioulnarledd)
☐ CMC I (Carpometacarpal I)
☐ MCP. Angi finger nr 1 til 5: ☐ PIP. Angi finger nr 1 til 5:
☐ 1.finger ☐ 1.finger
☐ 2.finger ☐ 2.finger
☐ 3.finger ☐ 3.finger
☐ 4.finger ☐ 4.finger
☐ 5.finger ☐ 5.finger
☐ Annet ledd

Aktuell side ☐ Venstre ☐ Høyre (Bilateral opr. = 2 skjema)

Aktuell operasjon ☐ Primæroperasjon ☐ Reoperasjon

Operasjonsdato (dd.mm.åå) | | | | | | | |

Tidligere operasjon i aktuelle ledd ☐ Nei ☐ Ukjent ☐ Ja:

- ☐ Osteosyntese for intraartikulær/leddnær fraktur
☐ Osteotomi ☐ Artrodese
☐ Protese ☐ Synovectomi
☐ Leddreseksjon/Benekstirpasjon ☐ TFCC operasjon
☐ Carpal tunnel syndrom ☐ Purulent artritt
☐ Fjernet osteofytter ☐ Interposisjonsplastikk
☐ Artroskopi
☐ Annet

Årsak primæroperasjon (evt. flere kryss)

- ☐ Idiopatisk artrose ☐ Rheumatoid artritt
☐ Fraktursequele ☐ Psoriasis artritt
☐ Sekvele ligamentskade ☐ Sekvele TFCC
☐ Akutt fraktur ☐ Infeksjonssekvele
☐ Bindevevssykdom/LED
☐ Annet

Årsak reoperasjon (evt. flere kryss)

- ☐ Løs prox.protesedel ☐ Luksasjon
☐ Løs distal protesedel ☐ Instabilitet
☐ Protesenær fraktur ☐ Aksefeil
☐ Smerter alene ☐ Dyp infeksjon
☐ Frakturert protese ☐ Slitt plastforing
☐ Progresjon av artrose ☐ Stivt ledd
☐ Annet

Reoperasjonstype (evt. flere kryss)

- ☐ Bytte el. innsetting av distal komponent
☐ Bytte el. innsetting av proximal komponent
☐ Bytte el. innsetting av hele protesen
☐ Bytte av plastforing
☐ Artrodese
☐ Amputasjon
☐ Bløtdelsdebridement for infisert protese
☐ Reartikulasjon med innsetting av protese
☐ Bløtdelsdebridement for infisert protese
☐ Fjernet protesedeler (inkl. sementspacer)

☐ Spesifiser

☐ Osteosyntese av protesenær fraktur

☐ Proximal ☐ Distal ☐ Annet

☐ Annen reoperasjonstype

Beintransplantasjon

Proksimalt ☐ Ja ☐ Nei

Distalt ☐ Ja ☐ Nei

Antibiotikaprofylakse ☐ Nei ☐ Ja, 1 medikament ☐ Ja, 2 medikament

Pågående antibiotikabehandling ☐ Nei ☐ Ja

Antibiotikaprofylakse preoperativt ☐ Nei ☐ Ja

Medikament 1

Dosering ☐ Milligram ☐ Gram

Antall doser (pr døgn) Varighet (timer)

Medikament 2

Dosering ☐ Milligram ☐ Gram

Antall doser (pr døgn) Varighet (timer)

Tromboseprofylakse ☐ Ja ☐ Nei

Første dose ☐ Preoperativt ☐ Postoperativt

Medikament 1

Fast medikasjon: ☐ Ja ☐ Nei: Antall dgr planlagt

Medikament 2

Fast medikasjon: ☐ Ja ☐ Nei: Antall dgr planlagt

Fibrinolysehemmer ☐ Ja ☐ Nei ☐ Ukjent

Angi medikament

Administrering: ☐ Ingen ☐ Systemisk

☐ Lokalt ☐ Systemisk og lokalt

Peroperative komplikasjoner ☐ Nei ☐ Ja:

Spesifiser

ASA ☐ ASA1 ☐ ASA2 ☐ ASA3 ☐ ASA4 ☐ ASA5

Protesetype

- ☐ Totalprotese
☐ Hemiprotese
☐ Enkomponentprotese
☐ Annet

Fest produktklistrelapperi eget felt, eller spesifiser nøyaktig:

Proksimal komponent

Navn/Type/Str. evt. katalognummer:

.....

☐ Sement med antibiotika – Navn:

☐ Sement uten antibiotika – Navn:

☐ Usementert

Distal komponent

Navn/Type/Str. evt. katalognummer:

.....

☐ Sement med antibiotika – Navn:

☐ Sement uten antibiotika – Navn:

☐ Usementert

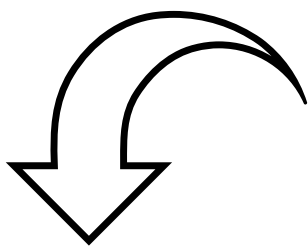
Intermediær komponent

Navn/Type/Str. evt. katalognummer:

.....

Lege.....

Legen som har fylt ut skjemaet.



Rettledning hånd, fingre og tær

Aktuell operasjon

Primæroperasjon: Dette er første proteseoperasjon.
Kryss av enten i A eller i B. Kryss av for alle årsakene til operasjonen.
Bløtdelsrevisjon for infeksjon skal registreres selv om protesedeler ikke skiftes.

Reoperasjonstype

Fjerning av protesedeler må spesifiseres og føres opp, også fjerning ved infeksjon.

Beintransplantasjon/beinerstatning

Påsmøring av benvev rundt protesen regnes ikke som bentransplantat.

Antibiotikaprofylakse

Medikament, dose og varighet av profylaksen skal angis f.eks. slik:
Medikament: Cefazolin, Dosering: 2g x 4, med varighet 9-12 timer.

Tromboseprofylakse

Medikament, dose og antatt varighet av profylaksen skal angis separat for operasjonsdagen og senere. Det skal også oppgis om pasienten står fast på tromboseprofylakse (AlbylE, Marevan, Plavix ol).

Fibrinolysehemmer

Her føres det på om en benytter blødningsreducerende legemidler i forbindelse med operasjonen (f.eks. Cyklokapron).

Peroperativ komplikasjon

Dersom det foreligger komplikasjon i form av stor blødning, må mengden angis.

Dersom pasienten dør under eller like etter operasjonen, ønsker vi likevel melding om operasjonen.

ASA klassifisering

(ASA=American Society of Anesthesiologists)

ASA-klasse 1: Friske pasienter som røyker mindre enn 5 sigaretter daglig.

ASA-klasse 2: Pasienter med en asymptomatisk tilstand som behandles medikamentelt (f.eks. hypertensjon) eller med kost (f.eks. diabetes mellitus type 2) og ellers friske pasienter som røyker 5 sigaretter eller mer daglig.

ASA-klasse 3: Pasienter med en tilstand som kan gi symptomer, men som holdes under kontroll medikamentelt (f.eks. moderat angina pectoris og mild astma).

ASA-klasse 4: Pasienter med en tilstand som ikke er under kontroll (f.eks. hjertesvikt og astma).

ASA-klasse 5: Moribund/døende pasient

Protesekomponenter

Her anføres kommersielle navn, materiale, størrelse og design.

Alternativt kan en føre opp protesenavn og katalognummer eller benytte klistrelapp som følger med de fleste protesene. Denne kan limes i eget felt, eller på baksiden.

Navnet på sementen som evt. brukes må anføres, f.eks. Palacos R+G. (Bruk helst klistrelapp)

Kontaktpersoner vedrørende registreringsskjema er

Overlege Yngvar Krukhaug

Seksjonsoverlege Ove Furnes, tlf. 55 97 56 90

Ortopedisk klinikk, Haukeland universitetssjukehus.

Besøksadresse: Møllendalsbakken 7.

Sekretær i Nasjonalt Register for Leddproteser, Ortopedisk klinikk,

Helse Bergen: Randi Furnes, tlf. 55 97 37 42

Epost nrl@helse-bergen.no

Internett: <https://www.helse-bergen.no/nrl>



Nasjonalt Register for Leddproteser

Ortopedisk klinikk, Helse Bergen HF
Haukeland universitetssjukehus
Postboks 1400
5021 Bergen

F.nr. (11 sifre).....

Navn:.....

Sykehus:.....

Skulderprotese

Registreringen gjelder innsetting, skifting eller fjerning av protesedeler, samt alle andre reoperasjoner relatert til proteseleddet. Bløtdelsrevisjon skal registreres selv om protesedeler ikke skiftes. Ett skjema fylles ut for hver operasjon.

Aktuell operasjon ☐ Primæroperasjon ☐ Reoperasjon (protese tidligere)

Aktuell side ☐ Venstre ☐ Høyre

Operasjonsdato (dd.mm.åå) | | | | | | | |

ASA ☐ ASA1 ☐ ASA2 ☐ ASA3 ☐ ASA4 ☐ ASA5

Tidligere operasjon i aktuelle ledd (Evt. flere kryss)

- ☐ Rotator cuff rekonstruksjon ☐ Osteosyntese
☐ Subacromial dekompresjon ☐ Bicepstenotomi/tenodese
☐ Diagnostisk artroskopi ☐ Operasjon for purulent artritt
☐ Stabiliserende inngrep spesifiser:
☐ Annen beinblokkprosedyre ☐ Latarjet
☐ Bløtvevprosedyre (for eks. Bankart)

☐ Annet

Årsak til aktuell primæroperasjon (Evt. flere kryss)

- ☐ Artrose spesifiser: ☐ Primær ☐ Sekundær
☐ Artritt spesifiser:
☐ Reumatoid artritt ☐ Psoriasisartritt
☐ Annet
- ☐ Fraktur spesifiser:
☐ 2-parts fraktur ☐ 3-parts fraktur ☐ 4-parts fraktur
Bruddtidspunkt (dd.mm.åå) | | | | | | | |
- ☐ Caputnekrose spesifiser:
☐ Ukjent ☐ Legemiddelindusert
☐ Caputnekrose pga. fraktursekvele
☐ Annet
- ☐ Fraktursekvele ☐ Rotarcuff artropati
☐ Patologisk fraktur ☐ Rotatorcuff ruptur
☐ Infeksjonssekvele ☐ Kronisk luksasjon
☐ Annen operasjonsårsak

Årsak til aktuell reoperasjon (Evt. flere kryss)

- ☐ Luksasjon ☐ Instabilitet
☐ Rotatorcuff ruptur/svikt ☐ Mistenkt eller manifest infeksjon
☐ Feilplassert komponent ☐ Dårlig bevegelighet/stivt ledd
☐ Progresjon av artrose/ glenoid erosjon
☐ Protesenær fraktur. spesifiser:
☐ Glenoid ☐ Humerus ☐ Både glenoid og humerus
☐ Aseptisk løsning. spesifiser:
☐ Glenoid ☐ Humerus ☐ Både glenoid og humerus
☐ Annen operasjonsårsak

Reoperasjonstype (Evt. flere kryss)

- ☐ Bytte eller innsetting av protesedeler spesifiser:
☐ Hele protesen
☐ Humerus spesifiser: ☐ Hele komponenten ☐ Hals
☐ Glenoid spesifiser: ☐ Baseplate ☐ Glenosfær ☐ Begge
☐ Intermediær spesifiser: ☐ Caput ☐ Liner ☐ Begge
☐ Fjernet spacer og satt inn protese
☐ Fjernet protese og satt inn spacer
☐ Annet
- ☐ Fjernet protesedeler spesifiser:
☐ Humerus spesifiser: ☐ Hele komponenten ☐ Hals
☐ Glenoid spesifiser: ☐ Baseplate ☐ Glenosfær ☐ Begge
☐ Intermediær spesifiser: ☐ Caput ☐ Liner ☐ Begge
☐ Annet
- ☐ Artrodese
☐ Bløtdelsdebridement for infisert protese
☐ Reponering av luksert protesedel
☐ Annen reoperasjonstype

Glenoidtype (se rettledning)

- ☐ Normal ☐ A1 ☐ A2
☐ B1 ☐ B2 ☐ B3
☐ C ☐ D ☐ Ukjent/ ikke klassifiserbar

Operasjonstilgang

- ☐ Delto-pectoral ☐ Antero-superior/deltoid splitt
☐ Annen tilgang

Subscapularis

- ☐ Bevart intakt ☐ Tenotomi ☐ Ikke rekonstruert/ruptur
☐ Peel off ☐ Osteotomi
☐ Annet spesifiser:

Cuff status ☐ Intakt/normal ☐ Ruptur

Operasjonstid (min) | | | |

Peroperative komplikasjoner

- ☐ Blødning (Uvanlig stor) ☐ Brudd på steriliseringsrutiner
☐ Fraktur ☐ Forsøkt osteosyntese primært
☐ Svikt av instrumenter ☐ Problem pga. anatomiske forhold
☐ Adm. Svikt (manglende komp. mm. svikt av utstyr/artroskopi rac.)
☐ Teknisk problem spesifiser: ☐ Protesekomp. ☐ Sement
☐ Fraktur spesifiser: ☐ Glenoid ☐ Humerus
☐ Annen komplikasjon

Pasienttilpassede instrumenter ☐ Nei ☐ Ja, type:

☐ Materialise ☐ Blueprint ☐ Annet

Dren ☐ Nei ☐ Ja. Antatt varighet i døgn

Tilleggsprosedyrer

- ☐ Ingen ☐ Sutur supra/infraspinatus
☐ Bicepstenotomi ☐ Bicepstenodese
☐ Fiksasjon av tuberkler ☐ Glenoidreaming v/hemiprotese
☐ Senetransfer spesifiser
- ☐ Annet

Beintap

☐ Proksimalt ☐ Distalt

Beintransplantasjon eller augmentering:

- ☐ Beinpakking ☐ Proksimalt ☐ Distalt
☐ Strukturelt bengraft ☐ Proksimalt ☐ Distalt
☐ Augment av metall ☐ Proksimalt ☐ Distalt
☐ Kon av metall ☐ Proksimalt ☐ Distalt
☐ Fokal transplantasjon ☐ Proksimalt ☐ Distalt
(For eks. cyster eller osteolyser)

☐ Annet

Antibiotikaprofylakse ☐ Nei ☐ Ja, 1 medikament ☐ Ja, 2 medikament

Pågående antibiotikabehandling ☐ Nei ☐ Ja

Antibiotikaprofylakse preoperativt ☐ Nei ☐ Ja

Medikament 1

Dosering ☐ Milligram ☐ Gram

Antall doser (pr døgn) Varighet (timer)

Medikament 2

Dosering ☐ Milligram ☐ Gram

Antall doser (pr døgn) Varighet (timer)

Tromboseprofylakse

☐Ja ☐Nei

Første dose

☐Preoperativt ☐Postoperativt

Medikament 1

.....

Fast medikasjon:

☐Ja ☐Nei: Antall dgr planlagt

Medikament 2

.....

Fast medikasjon:

☐Ja ☐Nei: Antall dgr planlagt

Fast antikoagulasjon

☐Ja ☐Nei ☐Ukjent

Angi medikament

.....

Fibrinolysehemmer

☐Ja ☐Nei ☐Ukjent

Angi medikament

.....

Administrering:

☐Ingen ☐Systemisk

☐Lokalt ☐Systemisk og lokalt

Protesetype

☐Totalprotese, anatomisk

☐Totalprotese, reversert

☐Hemiprotese

☐Annet, spesifiser

Fest produktklistrelapper nederst, eller spesifiser nøyaktig:

Glenoidkomponent

Navn/Type/Str / ev. katalognr.

☐Ingen prosedyre

☐Kun reaming

☐Sement med antibiotika

☐Sement uten antibiotika

☐Usementert:

Skruefiksering? ☐Nei ☐Ja: Antall skruer

Humeruskomponent

Navn/Type/Str / ev. katalognr.

☐Ingen prosedyre

☐Usementert

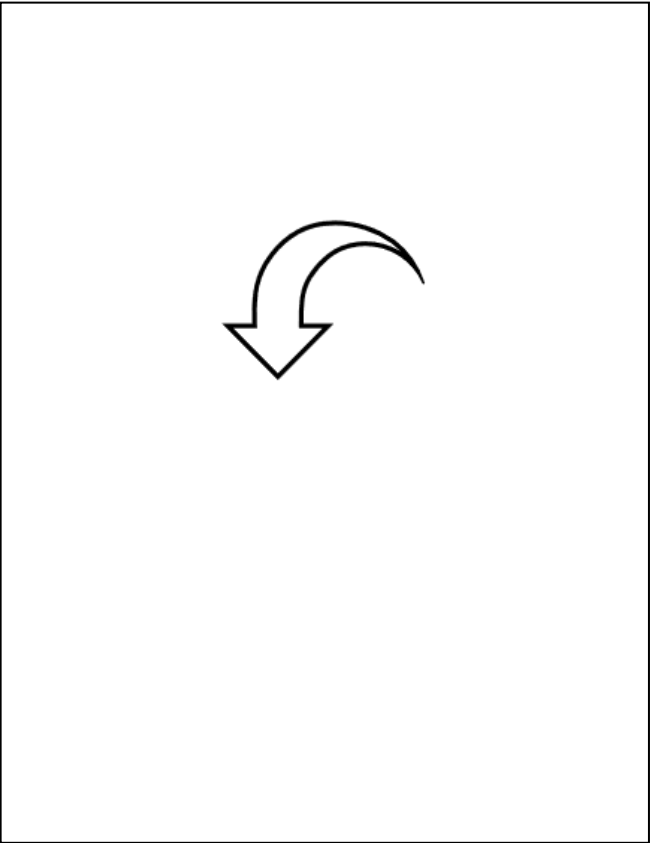
☐Sement med antibiotika

☐Sement uten antibiotika

Intermediær komponent (f.eks. caput humeri)

Navn/Type/Str / ev. katalognr.:

Lege.....
Legen som har fylt ut skjemaet.



Rettledning

Registreringen gjelder innsetting, skifting eller fjerning av protesedeler, samt alle andre reoperasjoner relatert til proteseleddet.
Bløtdelsrevisjon skal registreres selv om protesedeler ikke skiftes.
Ett skjema fylles ut for hver operasjon.
Reoperasjoner kan for eksempel være:

- Bløtdelsdebridement pga infeksjon
- Osteosyntese av protesenær fraktur
- Lukket eller åpen reposisjon av luksert protese
- Mobilisering under anestesi (MUA)
- Artroskopisk adheransløsning

Årsak til reoperasjon

Bløtdelsrevisjon for infeksjon skal registreres selv om protesedeler ikke skiftes.

Reoperasjonstype

Fjerning av protesedeler må spesifiseres og føres opp, også fjerning ved infeksjon.

Rotatorcuff artropati/ruptur

Rotatorcuff artropati er en kronisk tilstand karakterisert av rotatorcuff insuffisiens, glenohumoral leddforandringer og superior migrasjon av caput, mens det ved en rotatorcuff ruptur er en akutt eller kronisk ruptur i rotatorcuff-sener uten kroniske leddforandringer.

ASA klassifisering

(ASA=American Society of Anesthesiologists)
ASA-klasse 1: Friske pasienter som røyker mindre enn 5 sigaretter daglig.
ASA-klasse 2: Pasienter med en asymptomatisk tilstand som behandles medikamentelt (f.eks. hypertensjon) eller med kost (f.eks. diabetes mellitus type 2) og ellers friske pasienter som røyker 5 sigaretter eller mer daglig.
ASA-klasse 3: Pasienter med en tilstand som kan gi symptomer, men som holdes under kontroll medikamentelt (f.eks. moderat angina pectoris og mild astma).
ASA-klasse 4: Pasienter med en tilstand som ikke er under kontroll (f.eks. hjertesvikt og astma).
ASA-klasse 5: Moribund/døende pasient

Peroperative komplikasjoner

Dersom pasienten dør under eller like etter operasjonen, ønsker vi likevel melding om operasjonen.

Pasienttilpassede instrumenter

Her menes kutteblokker eller instrumenter som lages etter MR eller CT bilder tatt av pasienten før operasjonen. Oppgi navn på systemet.

Fibrinolysehemmer

Her føres det på om en benytter blødningsreducerende legemidler i forbindelse med operasjonen (f.eks. Cyklokapron).

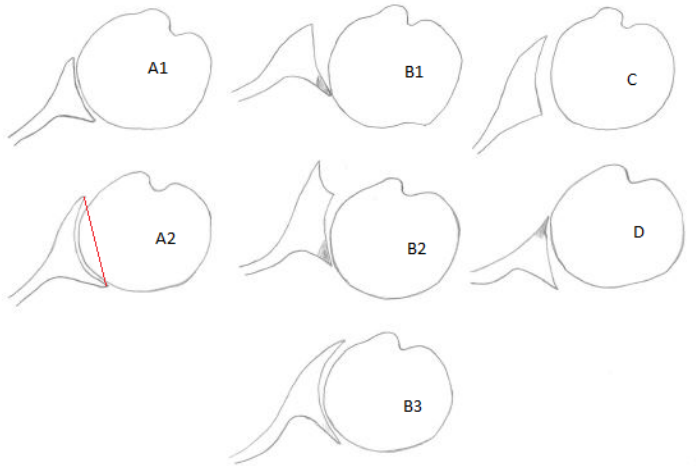
Tromboseprofylakse

Medikament, dose og antatt varighet av profylaksen skal angis separat for operasjonsdagen og senere. Det skal også oppgis om pasienten står fast på tromboseprofylakse (AlbylE, Marevan, Plavix ol).

Glenoidtype

A1: Ingen, eller minimal sentral erosjon
A2: betydelig sentral erosjon
B1: Posterior sublaksasjon av caput uten posteriort beintap
B2: Posterior sublaksasjon av caput med posteriort beintap som fører til bikonkav glenoid
B3: Monokonkavt beintap med 15grader retroversjon og/eller 70% posterior sublaksasjon
C: Glenoid retroversjon > 25 grader
D: Glenoid anteversjon eller anterior sublaksasjon < 40%

Referanse: J Shoulder Elbow Surg 2016 oct;25(10): 1601-6. A modification to the Walch classification of the glenoid in primary glenohumeral osteoarthritis using three-dimensional imaging. Bercik MJ et al.



Kontaktpersoner vedrørende registreringsskjema er

Seksjonsoverlege Randi Hole, tlf. 55 97 56 79.
Ortopedisk klinikk, Haukeland universitetssjukehus. Besøksadresse: Møllendalsbakken 7
Sekretær i Nasjonalt Register for Leddproteser, Ortopedisk klinikk, Helse Bergen:
Randi Furnes, tlf. 55 97 37 42.
Epost: nrl@helse-bergen.no
Internett: <https://www.helse-bergen.no/nrl>



Nasjonalt Hoftebruddregister

Helse Bergen HF, Ortopedisk klinikk
Haukeland universitetssjukehus
Møllendalsbakken 7
5021 BERGEN
Tlf: 55 97 64 50

F.nr. (11 sifre).....

Navn:.....

Sykehus:.....

Hoftebrudd

PRIMÆRE OPERASJONER for brudd i proksimale femurende og ALLE REOPERASJONER, inkludert lukket reponering av hemiprotetser.
Ved operasjon med totalprotese og ved reoperasjon til totalprotese skal det KUN fylles ut skjema til leddproteseregisteret.

Aktuell operasjon ☐ Primæroperasjon ☐ Reoperasjon

Aktuell side (Ett kryss. Bilateral opr. = 2 skjema) ☐ Høyre ☐ Venstre

Bruddtidspunkt (dd.mm.åå) |__| |__| |__| kl |__|

☐ Kryss av dersom nøyaktig bruddtidspunkt er usikkert

Operasjonsdato/tid (dd.mm.åå) |__| |__| |__| kl |__|

☐ Kryss av dersom nøyaktig klokkeslett for operasjon er usikkert

Tid fra brudd til operasjon (timer)

☐ 0-6 ☐ >6-12 ☐ >12-24 ☐ >24-48 ☐ >48:

Angi årsak dersom ventetid oversteg 48t:

☐ Bruk av antikoagulantia ☐ Medisinske årsaker

☐ Manglende operasjonskapasitet ☐ Utredning

☐ Forsinket kontakt med helsevesenet

☐ Annet

Kognitiv svikt ☐ Nei ☐ Ja ☐ Usikker

ASA ☐ ASA1 ☐ ASA2 ☐ ASA3 ☐ ASA4 ☐ ASA5

Bruddtype (kun ett kryss)

☐ Lårhalsbrudd udislokert (Garden 1 og 2)

Bakre tilt ☐ $1 < 20^\circ$ ☐ $2 > 20^\circ$

☐ Lårhalsbrudd dislokert (Garden 3 og 4)

☐ Lateralt lårhalsbrudd

☐ Pertrokantært tofragment (AO/OTA A1)

☐ Pertrokantært flerfragment (AO/OTA A2)

☐ Intertrokantært (AO/OTA A3)

☐ Subtrokantært

☐ Annet

Patologisk brudd (Annen patologi enn osteoporose)

☐ Nei ☐ Usikker ☐ Ja:

Type patologi

Type primæroperasjon (kun ett kryss)

☐ To skruer eller pinner

☐ Tre skruer eller pinner

☐ Bipolar hemiprotese

☐ Unipolar hemiprotese

☐ Glideskrue og plate

☐ Glideskrue og plate med trokantær støtteplate

☐ Kort margnagle uten distal sperre

☐ Kort margnagle med distal sperre

☐ Lang margnagle uten distal sperre

☐ Lang margnagle med distal sperre

☐ Annet

Fiksasjon ved hemiprotese

☐ Usementert

☐ Sement med antibiotika

☐ Sement uten antibiotika

Miniinvasiv kirurgi (MIS) ved hemiprotese ☐ Nei ☐ Ja

Tilgang til hofteledd ved hemiprotese (kun ett kryss)

☐ Fremre (mellom sartorius og tensor)

☐ Anterolateral (mellom gluteus medius og tensor)

☐ Direkte lateral

☐ Bakre (posterolateral)

☐ SPAIRE

☐ Annen

Anestesi

☐ Generell ☐ Epidural ☐ Spinal

☐ Annet

Årsak til reoperasjon (Flere enn ett kryss kan brukes)

☐ Osteosyntesesvikt/havari ☐ Caputnekrose (segmentalt kollaps)

☐ Forlenget sårsving ☐ Brudd tilhelet med feilstilling

☐ Sårinfeksjon – overfladisk ☐ Sårinfeksjon – dyp

☐ Hematom ☐ Luksasjon av hemiprotese

☐ Løsning av hemiprotese ☐ Nytt brudd rundt implantat

☐ Ikke tilhelet brudd (non-union/pseudartrose)

☐ Osteosyntesematerialet skåret gjennom caput

☐ Lokal smerte pga prominierende osteosyntesemateriale

☐ Annet

Type reoperasjon (Flere enn ett kryss kan brukes)

☐ Girdlestone ☐ Lukket reposisjon av luksert protese

☐ Bipolar hemiprotese ☐ Åpen reposisjon av luksert protese

☐ Unipolar hemiprotese ☐ Skifte av caput/bipolart hode

☐ Re-osteosyntese ☐ Debridement for infeksjon

☐ Fjerning av implantat (dersom eneste prosedyre)

☐ Annet

Peroperative komplikasjoner (Flere enn ett kryss kan brukes)

☐ Anestesiproblemer (dårlig effekt)

☐ Blødning ml

☐ Brukket skrue/ledpinne/bor

☐ Fraktur/fissur/løsning av trochanter

☐ Lavt blodtrykk (hypotensjon)

☐ Manglende implantat/utstyr/personell (forlenget opr.tid)

☐ Problem m/reponering av fraktur

☐ Sprekk/fissur / fraktur i femur (cerclage)

☐ Teknisk probl./svikt av instrumenter

☐ Teknisk problem m/ sement

☐ Annet

Operasjonstid (hud til hud i minutter) |__| |__|

Operatørerfaring (hovedoperatør eller assistent)

☐ Mindre enn 3 års erfaring i hoftebruddkirurgi

☐ Mer enn 3 års erfaring i hoftebruddkirurgi

Antibiotikaprofylakse

☐ Nei ☐ Ja, 1 medikament ☐ Ja, 2 medikament

Medikament 1

Dosering ☐ Milligram ☐ Gram

Antall doser (pr døgn) Varighet (timer)

Medikament 2

Dosering ☐ Milligram ☐ Gram

Antall doser (pr døgn) Varighet (timer)

Tromboseprofylakse

☐ Nei ☐ Ja, 1 medikament ☐ Ja, 2 medikament

Første dose ☐ ¹Preoperativt ☐ ²Postoperativt

Medikament 1

Fast medikasjon ☐ Ja ☐ Nei: Antall dgr planlagt

Medikament 2

Fast medikasjon ☐ Ja ☐ Nei: Antall dgr planlagt

Fast antikoagulasjon ☐Nei ☐Ja ☐Ukjent

Medikament

Fibrinolysehemmer ☐Nei ☐Ja ☐Ukjent

Medikament

Administrering:

☐Systemisk ☐Lokalt ☐Systemisk og lokalt

Dosering ved systemisk adm.

Lege.....

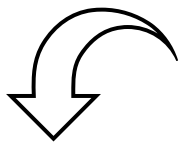
Legen som har fylt ut skjemaet.

Fest produktklislapp under eller spesifiser nøyaktig produkt som er satt inn ved primær- eller reoperasjon:

Navn / størrelse og katalognr.

Navn / størrelse og katalognr.

Navn / størrelse og katalognr.



Rettledning

Operasjons- og bruddtidspunkt

Operasjonstidspunkt (dato og klokkeslett) må føres opp på alle primæroperasjoner. Det er også sterkt ønskelig at dato og klokkeslett for *bruddtidspunkt* føres opp. Dette bl.a. for å se om tid til operasjon har effekt på prognose. (Hvis en ikke kjenner klokkeslettet for bruddtidspunkt lar en feltet stå åpent. En må da prøve å angi omtrentlig tidsrom fra brudd til operasjon på neste punkt).

Ved reoperasjon er ikke klokkeslett nødvendig.

ASA klassifisering (ASA=American Society of Anesthesiologists)

ASA-klasse 1: Friske pasienter som røyker mindre enn 5 sigaretter daglig.

ASA-klasse 2: Pasienter med en asymptomatisk tilstand som behandles medikamentelt (f.eks. hypertensjon) eller med kost (f.eks. diabetes mellitus type 2) og ellers friske pasienter som røyker 5 sigaretter eller mer daglig.

ASA-klasse 3: Pasienter med en tilstand som kan gi symptomer, men som holdes under kontroll medikamentelt (f.eks. moderat angina pectoris og mild astma).

ASA-klasse 4: Pasienter med en tilstand som ikke er under kontroll (f.eks. hjertesvikt og astma).

ASA-klasse 5: Moribund/døende pasient

Kognitiv svikt

Kognitiv svikt kan eventuelt testes ved å be pasienten tegne klokken når den er 10 over 11.

En pasient med kognitiv svikt vil ha problemer med denne oppgaven

Bruddtype

Garden klassifikasjon av trokantære brudd:

Garden 1: Ikke komplett brudd av lårhalsen (såkalt innkilt)

Garden 2: Komplet lårhalsbrudd uten dislokasjon

Garden 3: Komplet lårhalsbrudd med delvis dislokasjon. Fragmentene er fortsatt i kontakt, men det er feilstilling av lårhalsens trabekler. Caputfragmentet ligger uanatomisk i acetabulum

Garden 4: Komplet lårhalsbrudd med full dislokasjon. Caputfragmentet er fritt og ligger korrekt i acetabulum slik at trabeklene er normalt orientert.

AO klassifikasjon av trokantære brudd:



A1: Pertrokantert tofragment brudd



A2: Pertrokantert flerfragment brudd



A3: Intertrokantert brudd



Subtrokantert brudd*

*Subtrokantert brudd: Bruddsentrum er mellom nedre kant av trokanter minor og 5

Bakre tilt ved registrering av Lårhalsbrudd udislokert

(Garden 1 og 2)

Beregning av bakre tilt

MCL: Mid-collum line

RCL: Radius collum line

c: Center of caput

α : Posterior tilt

Årsak til reoperasjon

Dyp infeksjon defineres som infeksjon som involverer fascie, protese, ledd eller periprostetisk vev.

Peroperative komplikasjoner

Dersom flere komplikasjoner oppgis den mest alvorlige.

Dersom det foreligger komplikasjon i form av stor

blødning, må blødningsmengde angis.

Dersom pasienten dør under eller like etter operasjonen, ønsker vi likevel melding om operasjonen.

Operatørfaring (hovedoperatør eller assistent)

Angi erfaringsnivået til den mest erfarne operatøren.

Antibiotikaprofylakse

Dersom det gis ulike doser oppgis kun første dose og antall doser. Total varighet oppgis i timer.

Første dose: Dersom pasienten får Fragmin i påvente av operasjon, inkludert preoperativt på operasjonsdagen velger du 'Preoperativt'

Tromboseprofilakse

Medikament, dose og antatt varighet av profylaksen skal angis separat for operasjonsdagen og senere.

Dersom pasienten bruker fast antikoagulasjon og det ikke gis ytterligere

tromboseprofilakse, skal det krysses «nei» på dette punktet. Fast antikoagulasjon oppgis i punktet «Fast antikoagulasjon» nedenfor.

Fibrinolysehemmer

Her føres det på om en benytter blødningsreducerende legemidler i forbindelse med operasjonen (f.eks. Cyklokapron).

Implantat

Implantattype må angis entydig. Produktklislapp er ønskelig for å angi katalognummer for osteosyntesematerialet eller protesen som er brukt.

Kontaktpersoner vedrørende registreringsskjema er:

Registerleder Jan-Erik Gjertsen, Ortopedisk klinikk, Haukeland universitetssjukehus.

Tlf. 55 97 56 86 (email: jan-erik.gjertsen@helse-bergen.no)

Konsulent Nasjonalt Hoftebruddregister: Ruth Wasmuth. Tlf. 55 97 64 50

(email: nrl@helse-bergen.no)

Internett: <https://www.helse-bergen.no/nrl>





NASJONALT HOFTEBRUDDREGISTER

Nasjonalt Register for Leddproteser
Helse Bergen HF, Ortopedisk klinikk
Haukeland universitetssjukehus
Møllendalsbakken 7
5021 BERGEN
Tlf: 55973742

F.nr. (11 sifre).....

Navn:.....

(Skriv tydelig ev. pasientklislapp – spesifiser sykehus.)

Sykehus:.....

UTREISESKJEMA ETTER HOFTEBRUDD

TIDSPUNKT FOR INNLEGGELSE

(dd.mm.åå) | | | | | kl | | |

☐ NØYAKTIG KLOKKESLETT USIKKERT

INNLAGT FRA

- ☐ Egen bolig
☐ Sykehjem
☐ Annet sykehus / sykehusavdeling
☐ Rehabilitering
☐ Annet, spesifiser:

OPR DATO (dd.mm.åå) | | | | |

PREOPERATIV GANGFUNKSJON

- ☐ Går fritt uten krykker
☐ Går utendørs med en krykke
☐ Går utendørs med 2 krykker eller gåstativ
☐ Noe innendørs gange, ikke utendørs uten hjelp
☐ Ingen gangfunksjon
☐ Ukjent

PREOPERATIV SMERTEBLOKADE

☐ Nei ☐ Ja ☐ Ukjent

MOBILISERT FØRSTE POSTOPERATIVE DAG

☐ Nei ☐ Ja ☐ Ukjent

ORGANISERING AV BEHANDLING

- ☐ Konvensjonelt ortopedisk behandlingsforløp
☐ Ortogeriatrisk behandlingsforløp
☐ Behandlingsforløp i samarbeid med annen indremedisinsk spesialitet (enn geriatri)

VURDERT AV GERIATER UNDER SYKEHUSOPPHOLDET

☐ Nei ☐ Ja ☐ Ukjent

FALLUTREDNING (STRATIFY ELLER TILSVARENDE)

☐ Nei ☐ Ja ☐ Ukjent

ERNÆRINGSSCREENING

- ☐ Ingen risiko for underernæring
☐ Risiko for underernæring
☐ Ikke utført
☐ Ukjent

ERNÆRINGSTILTAK

☐ Nei ☐ Ja ☐ Ukjent

FORBYGGENDE MEDISIN MOT OSTEOPOROSE

☐ Nei ☐ Ja ☐ Ukjent

Vennligst kryss av for alle medikamentene under, dersom forebyggende medisin «Ja».

Oppstart: Pasienten har startet opp med medikamentet under sykehusinnleggelsen.
Ikke gitt: Pasienten bruker ikke medikamentet fra før og har heller ikke fått dette under innleggelsen.

Videreført: Pasienten bruker medikamentet fra før og skal fortsette med dette etter sykehusinnleggelsen.

Kalsium / D vitamin

☐ Ikke gitt ☐ Oppstart ☐ Videreført ☐ Ukjent

Peroral bisfosfonat

☐ Ikke gitt ☐ Oppstart ☐ Videreført ☐ Ukjent

Intravenøs bisfosfonat (Zoledronsyre)

☐ Ikke gitt ☐ Oppstart ☐ Videreført ☐ Ukjent

Denosumab

☐ Ikke gitt ☐ Oppstart ☐ Videreført ☐ Ukjent

Annen medisin, spesifiser:

.....
☐ Ikke gitt ☐ Oppstart ☐ Videreført ☐ Ukjent

HENVIST BEINTETTHETSMÅLING (DXA)

☐ Nei ☐ Ja ☐ Ukjent

KOMPLIKASJONER (Flere enn ett kryss kan brukes)

☐ Delirium

(Delirium skal være påvist vha. 4AT eller CAM.)

☐ Trykksår

☐ UVI

☐ Pneumoni

☐ Akutt nyreskade

(Akutt nyreskade hvis serumkreatininøkning > 50% eller en økning > 50 µmol/L.)

☐ DVT / LE

☐ Sårinfeksjon

☐ Hjerte-kar hendelse (Hjerte-kar hendelse kan være hjerteinfarkt, hjerneslag)

☐ Fall i avdelingen

☐ Annet, spesifiser:

TIDSPUNKT FOR UTSKRIVELSE

(dd.mm.åå) | | | | | kl | | |

☐ NØYAKTIG KLOKKESLETT USIKKERT

UTSKREVET TIL

- ☐ Egen bolig
☐ Sykehjem
☐ Annet sykehus / sykehusavdeling
☐ Rehabilitering
☐ Annet, spesifiser:



NASJONALT KORSBÅNDSREGISTER

Nasjonalt Register for Leddproteser
Ortopedisk klinikk, Helse Bergen HF
Haukeland universitetssjukehus
Postboks 1400
5021 Bergen

F.nr. (11 sifre).....

Navn:.....

Sykehus:.....

Skjemaet fylles ut av kirurgen elektronisk. Denne versjonen er tilpasset for visning i papirformat og er ikke ment for utfylling.

KORSBÅNDSOPERASJONER OG ALLE REOPERASJONER på pasienter som tidligere er korsbåndoperert

Aktuell behandling

- ☐ Primær korsbåndskade (ikke-operativ behandling)
☐ Primær rekonstruksjon av korsbånd
☐ Annen knekirurgi
☐ Revisjonsrekonstruksjon
☐ 1 seanse Revisjon
☐ 2 seanse Revisjonsrekonstruksjon

Aktuell side ☐ Venstre ☐ Høyre

Motsatt kne ☐ Normalt ☐ Tidligere ACL/PCL-skade

Tidligere operasjon i samme kne

- ☐ MCL ☐ LCL
☐ Menisksutur ☐ Meniskreseksjon
☐ Osteosyntese av fraktur ☐ Bruskkirurgi
☐ Patellastabiliserende kirurgi ☐ Osteotomi
☐ Ukjent/annet

Hyperekstensjon aktuelt kneledd

- ☐ < 5 grader ☐ 5 - 10 grader ☐ > 10 grader

Skadedato (dd.mm.åå) |__| |__| |__|

Operasjonsdato (dd.mm.åå) |__| |__| |__|

Aktivitet som førte til aktuell skade

Spesifiser:

Aktivitetsnivå før skade

- ☐ Level 1: Pivoterende sport
☐ Level 2: Mindre pivoterende sport
☐ Level 3: Ikke pivoterende aktivitet
☐ Level 4: Ingen/minimal aktivitet

Høyde (cm) |__| |__| |__| **Vekt (kg)** |__| |__| |__|

Røyk ☐ Ja ☐ Nei **Snus** ☐ Ja ☐ Nei

Har pasienten gjennomført fysioterapi?

- ☐ Ja
☐ Usikker
☐ Nei. Angi årsak: ☐ Akutt skade ☐ Ønsket ikke fysio
☐ Økonomi ☐ Annet

Årsak til rekonstruksjon av korsbånd (evt. flere kryss)

- ☐ Operasjonstrengende meniskskade
☐ Kombinert instabilitet
☐ Residiverende instabilitet i hverdagen
☐ Uakseptabel begrensning i sport/aktivitet
☐ Indikasjon grunnet aktivitetsnivå
☐ Annet (Spesifiser).....

Årsak til revisjon (evt. flere kryss)

- ☐ Nytt traume ☐ Graftsvikt
☐ Feilplassering av tibiakanal ☐ Smerte
☐ Feilplassering av femurkanal ☐ Infeksjon
☐ Ubehandlede andre ligamentskader ☐ Fiksasjonsvikt
☐ Annet

Dagkirurgisk operasjon ☐ Ja ☐ Nei

Operasjonstid (min) |__| |__| |__|

Andre prosedyrer

- ☐ Menisk operasjon ☐ Benreseksjon (Notch plastikk)
☐ Osteosyntese ☐ Osteosyntese patellafraktur
☐ Bentransplantasjon ☐ Operasjon pga infeksjon
☐ Osteotomi ☐ Mobilisering i narkose
☐ Synovektomi ☐ Artroskopisk debridement
☐ Bruskoperasjon ☐ Fjerning av fiksasjonsutstyr
☐ Lateral ekstraartikulær tenodesse
☐ Sutur av patellar- eller quadricepsse

☐ Annet (spesifiser)

Peroperative komplikasjoner ☐ Ja ☐ Nei

- ☐ Brudd på sterilitetsrutiner / forurenset graft
☐ Relevant intraoperativ nerve- eller karskade
☐ Problem med fiksasjon av graft i femur
☐ Problem med fiksasjon av graft i tibia
☐ Svikt av graft under høsting
☐ Ruptur av graft under fiksasjon eller prosedyre
☐ Patellafraktur eller seneruptur relatert til høsting
☐ Svikt/problemer med utstyr som leder til endret prosedyre

☐ Annet (spesifiser)

Førte komplikasjonen til endret graftvalg? ☐ Nei ☐ Ja

Dersom ja, oppgi opprinnelig graftvalg

Aktuell skade (Registrer alle skader – også de som ikke opereres)

☐ ACL ☐ PCL ☐ MCL ☐ PLC ☐ LCL

Gradering av skade ved primær korsbåndskade

Grad I ☐ Grad II ☐ Grad III

Konservativ behandling ved primær korsbåndskade

- ☐ Ortosebehandling
☐ Ortosebehandling ved risikoaktivitet

Graftvalg ved rekonstruksjon	ACL	PCL	MC	LCL	PLC
☐ Hamstring					
☐ BPTB					
☐ QT					
☐ Allograft					
☐ Autograft					
☐ Tractus illotibialis					
☐ Direkte sutur					
☐ Syntetisk graft					
☐ Ikke rekonstruert					

Graftdiameter mm.

Graftdiameter ved double bundle-teknikk:

AM mm. PL mm.

Tilgang for Femurkanal

Anteromedial ☐ Transtibial ☐ Anterolateral ☐

Meniskskade ☐Nei ☐Ja: ☐Lateralt ☐Medialt

Medial beskrivelse

- ☐Radiær
- ☐Horisontalt
- ☐Fremre rotskade
- ☐Komplekse rupturer
- ☐Longitudinell
- ☐Bøttehank
- ☐Bakre rotskade
- ☐Rampe lesjon

Degenerativ ☐Ja ☐Nei

Lateral beskrivelse

- ☐Radiær
- ☐Horisontalt
- ☐Fremre rotskade
- ☐Komplekse rupturer
- ☐Longitudinell
- ☐Bøttehank
- ☐Bakre rotskade
- ☐Rampe lesjon

Degenerativ ☐Ja ☐Nei

Aktuell behandling av menisklesjon

- ☐ Partiell reseksjon
- ☐ Total reseksjon
- ☐ Sutur - all inside
- ☐ Annen sutur
- ☐ Sutur med cortical fiksasjon
- ☐ Transplantasjon
- ☐ Medial
- ☐ Lateral
- ☐ Medial
- ☐ Lateral
- ☐ Medial
- ☐ Lateral
- ☐ Medial
- ☐ Lateral
- ☐ Medial
- ☐ Lateral

Brusklesjon (evt. flere kryss)	Areal (cm ²)		ICRS Grade*				Artrose		Behandlings-kode**				
	≤2	>2	1	2	3	4	Ja	Nei	1	2	3	4	Spesifiser annet
Patella MF	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Patella LF	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Trochlea fem.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Med.fem.cond.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Med.tib.plat.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Lat.fem.cond.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Lat. tib. plat.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

Ytterligere skader

☐ Karskade	☐ Arteria politea
☐ Nerveskade	☐ N. peroneus
	☐ N. peroneus
☐ Ruptur i eks.	☐ Quadricepssenen
	☐ Patellarsenen
☐ Fraktur	☐ Segondfraktur
	☐ Tibia
	☐ Femur
	☐ Fibula
	☐ Patella

Antibiotika profylakse Ja ☐ Nei ☐

Medikament 1

Medikament 2

Lokal antibiotikabehandling av graft

☐Nei ☐Ja

Tromboseprofylakse - over 7 dager

☐Nei ☐Ja

Medikament 1

Medikament 2

Lege.....

Legen som har fylt ut skjemaet

Fest produktklistrelapp i neste kolonne, eller produkt som er satt inn ved primær- eller reoperasjon:

Graftfiksasjon	
Femur	Tibia
Meniskfiksasjon	
Medial	Lateral

RETTLEDNING

Årsak til rekonstruksjon av korsbånd

1. Operasjonstrengende meniskskade som fordrer rekonstruksjon av korsbånd samtidig.
2. Inkluderer f.eks ACL+MCL gr 3 skader og multiligament/kneluksasjoner.
3. Instabilitet i dagligliv/hverdagsaktiviteter.
4. Stabil i daglige aktiviteter men uakseptabel begrensning i sport/aktivitet.
5. Operert uavhengig av tilleggsskader grunnet høyt aktivitetsnivå/eliteidrett.

Skadedato

Skriv inn skadedatoen så eksakt som mulig. Hvis dag er ukjent benytt '01' i aktuell måned, f eks 01.06.2018.
Ved revisjon: Skriv dato når du tror korsbåndsgraftet ble skadet etter primærrekonstruksjon. Dersom ingen ny kjent skade før revisjon, la skadedato stå tom.

Dagkirurgisk operasjon

Dagkirurgisk operasjon innebærer at pasienter møter frem, opereres og reiser hjem samme dag.

Peroperative komplikasjoner

Ved en ruptur/kontaminering av høstet graft e.l. skal det opprinnelige graftet anføres her. Andre peroperative komplikasjoner skal også fylles inn her

Hyperekstensjon aktuelt kneledd

Eventuell hyperekstensjon kan med fordel måles liggende på benk. Justere en pøll eller pute under foten i nøytral stilling slik at kneleddet henger fritt og avslappet noen cm over benken. Mål med goniometer (helst lang) akse mellom femur (fra sentral punkt i trochanter til sentral punkt laterale femurkondyl) og tibia (fra den mest laterale punktet i kneets leddlinje til laterale malleol). Du kan også bruke app til smarttelefon, f eks «Protractor™», til å regne ut vinkelen. Dersom bøttehankruptur eller annen skade/hevelse innskrenker bevegelse kan ispilateralt kne brukes.

Aktivitet som førte til aktuell skade

Velg aktivitet ved skadetidspunkt.

Dersom aktuell behandling er «Annen knekirurgi» eller revisjon og det ikke har vært en ny skade som fører til aktuell operasjon (f.eks. fjerning av cyclops – annen knekirurgi) la denne stå tom.

Aktivitetsnivå før skade

Beskriv hvilken aktivitetskategori pasienten regelmessig vil falle innenfor. Trenger ikke å være samme som skadeaktivitet.

Level 1: Pivoterende sport (fotball, håndball, innebandy, basketball).

Level 2: Mindre pivoterende sport (f.eks. racketsport, alpint, snowboarding, gymnastikk, aerobics).

Level 3: Ikke pivoterende aktivitet (f.eks. løping, langrenn, vektløfting).

Level 4: Lite fysisk aktivitet / vanlig ADL.

Aktuell skade og graftvalg

Skader ved inklusjonstidspunkt, påvist på MR OG ved klinisk undersøkelse. F.eks. hos en pasient med MR-svar «MCL skade grad 1», uten tegn til laksitet eller smerte ved klinisk undersøkelse, skal MCL-skade ikke registreres. Dersom ligament/leddbånd fra opprinnelig skade er tilhelt med normale kliniske funn ved inklusjonstidspunkt skal de heller ikke registreres. Ved revisjon 1 seanse – dersom ACL/PCL er skadet skal skade registreres, og graftvalg «ikke rekonstruert» velges.

Graftstørrelse

BPTB: minste bredde av senegraft

Hamstring: minste diamenten på senegraft

QTB/QT: minste bredde av senegraft

Allograft: samme måling som respektive autograft.

Akilles allograft: måles som hamstring

Tilgang for Femurkanal

Angi dersom femurkanalen ble boret ved hjelp av Transtibial (TT), anteriomedial (AM) eller anterolateral (AL) tilgang. Dersom både ACL og PCL rekonstrueres, angi tilgang for ACL.

Brusklesjon

Størrelse, ICRS-klassifisering, evt artrose og behandling av lesjon registreres. For primær korbåndskade registreres størrelse og evt artrose.

***ICRS Grade:** 1 Nearly normal: Superficial lesions, soft indentation and/or superficial fissures and cracks; 2 Abnormal: Lesions extending down to <50% of cartilage depth; 3 Severely abnormal: Cartilage defects extending down >50% of cartilage depth as well as down to calcified layer; 4 Severely abnormal: Osteochondral injuries, lesions extending just through the subchondral boneplate or deeper defects down into trabecular bone.

****Behandlingskoder:** 1 Debridement; 2 Mikrofraktur; 3 Ingen behandling; 4 Annet.

Antibiotikaprofylakse

Her føres det på hvilket antibiotikum som er blitt benyttet i forbindelse med operasjonen.

Tromboseprofylakse

Her føres tromboseprofylakse som er gitt med lengde over 7 dager.

Meniskskade

Klassifiser hovedrupturen. Med rotskade menes enten direkte løsnings av roten eller signifikant radiær rift inntil 10 mm fra roten som blir behandlet som en rotskade.

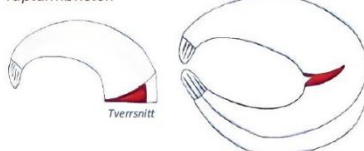
Aktuell behandling av menisklesjon

Ved registrering av all-inside suturer kan produkt registreres enten ved skanning eller ved å velge produkt i nedtrekksmeny. Dersom du f.eks. har brukt 3 all-inside suturer trenger du ikke registrere 3 implantat, men registrere én og fylle ut totalt antall i «Antall suturer». Inside-out/Outside-in registreres som «Annen sutur». Dersom du kombinerer «All-inside» med «Annen sutur», registreres totalt antall suturer i «Antall suturer». Rotsutur gjennom borekanal registreres som «Sutur med cortical fiksasjon». Du trenger ikke å registrere implantat/suturtråd ved «Annen sutur» eller «Sutur med cortical fiksasjon»

Beskrivelse meniskruptur

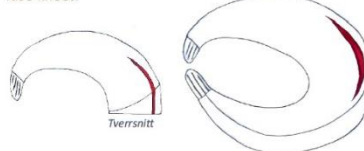
Radiær

Ruptur som starter fra sentrale del av menisken og strekker seg inn mot kapselen i et vertikalt rupturmønster.



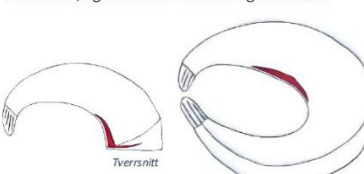
Longitudinell

En langsgående vertikal ruptur som følger meniskens kurve, men hvor fragmentet ikke kan dislokeres nok til å låse kneet.



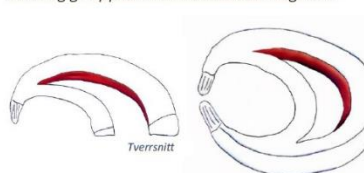
Horisontal

En langsgående ruptur som går horisontalt gjennom menisken, og deler den i en øvre og nedre del.



Bøttehank

En longitudinell vertikal ruptur som følger meniskens kurve og gir opphav til et dislokerbart fragment



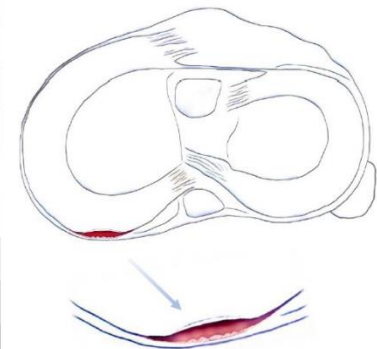
Komplekse rupturer

Ruptur som inkluderer flere mønstre av skader i samme menisk, for eksempel både langsgående og radial ruptur. Ofte degenerative, eller ved større skader.



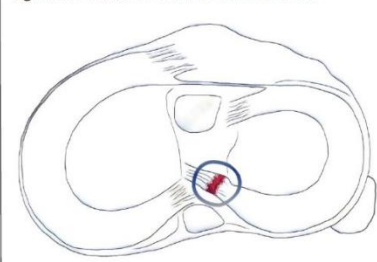
Ramp lesion

Ruptur av mediale menisks forbindelse med leddkapselen i bakhornet.



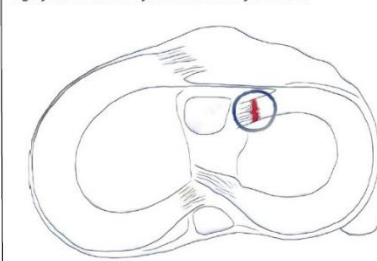
Bakre rotskade (posterior)

Med rotskade menes enten avulsjon av roten eller signifikant radiær rift inntil 10 mm fra roten.



Fremre rotskade (anterior)

Med rotskade menes enten avulsjon av roten eller signifikant radiær rift inntil 10 mm fra roten.



Kontaktpersoner vedrørende registreringsskjema

Registerleder: Eivind Inderhaug, Haukeland universitetssjukehus

Sekretær: Ruth Wasmuth

Telefon: 55 97 64 50 (08:00-14:00)

E-post: NRL@helse-bergen.no

Nettside: www.helse-bergen.no/nrl

Besøksadresse: Møllendalsbakken 7, Bergen

Postadresse:

Nasjonalt register for leddproteser
Ortopedisk klinikk, Helse Bergen HF
Haukeland universitetssjukehus
Postboks 1400
5021 Bergen



Nasjonalt barnehofteregister

Nasjonalt Register for Leddproteser
Ortopedisk klinikk, Helse Bergen HF
Haukeland universitetssjukehus
Postboks 1400
5021 Bergen

Registreringsskjema for barnehoftesykdom

Hoftedysplasi

Registrert dato (dd.mm.åå) |__| |__| |__|

Behandlingsdato (dd.mm.åå) |__| |__| |__|

Første gang diagnostisert (dd.mm.åå) |__| |__| |__|

Aktuell side Venstre ☐ Høyre ☐ (Bilateral = 2 skjema)

Behandlingstrengende dysplasia i familie? Ja ☐ Nei ☐

Er barnet ultralydscreenet ved fødselen? Ja ☐ Nei ☐

Symptomvarighet (> 12 år) mnd

Impingement test – høyre (> 12 år) Negativ ☐ Positiv ☐

Impingement test – venstre (> 12 år) Negativ ☐ Positiv ☐

Tidligere behandling

☐ Ingen ☐ Pute/abduksjonsortose

☐ Annet. Spesifiser

Røntgen før behandling

Hoftestatus ☐ Grad I ☐ Grad II ☐ Grad III ☐ Grad IV

Acetabular index (< 12 år) Høyre |__| Venstre |__|

Caputdekning |__| %

Caputkje (< 12 år)

☐ Normal ☐ Forsinket ☐ Ikke tilstede ☐ Caputnekrose

CE vinkel (> 12 år) Høyre |__| Venstre |__|

Bruskhøyde (> 12 år) ☐ <2mm ☐ 2-3mm ☐ >3mm

Ikke-operativ behandling

☐ Ingen (Observasjon) ☐ Pute

☐ Abduksjonsortose ☐ Lukket reposisjon

☐ Hoftegiips (< 12 år) Antall uker: |__|

Operasjon ☐ Primæroperasjon ☐ Reoperasjon

Primæroperasjon

☐ Åpen reposisjon

☐ Tenotomi, spesifiser:

☐ Psoastenotomi ☐ Adduktortenotomi

☐ Femurosteotomi, spesifiser:

☐ Varisering ☐ Valgisering ☐ Rotasjon ☐ Forkortning

☐ Annen

☐ Bekkenosteotomi, spesifiser:

☐ Salter ☐ Trippel ☐ Periacetabular osteotomi

☐ Dega ☐ Takplastikk ☐ Annen

☐ Skruer, antall ☐ Pinner, antall

Reoperasjonsårsak

☐ Rutinemessig fjerning

☐ Anisomeli

☐ Trochanterovervekst

☐ Sårruptur

☐ Postoperativ infeksjon

☐ Blødning

☐ Caputnekrose/Avaskulær nekrose

☐ Pseudartrose

☐ Osteosyntesvikt/Implantat svikt

☐ Feilplassering av implantat

☐ Annen årsak

Reoperasjonstype

☐ Fjerne osteosyntesemateriell

☐ Trochanterapofysiodese

☐ Perkutan fysiodese rundt kne

☐ Bløtdelsrevisjon

☐ Reosteosyntese

☐ Proximal femur osteotomi. Spesifiser

☐ Annen type. Spesifiser

Knivtid for operativ behandling |__| |__| min

Peroperative komplikasjoner

☐ Nei ☐ Ja. Spesifiser

Tilgang til hofteleddet

☐ Fremre ☐ Lateral ☐ Annen

F.nr. (11 sifre).....

Navn:.....

Sykehus:.....

Implantat

☐ Forbøyd plate

Fabrikat

☐ Vinkelplate

Fabrikat

☐ Spesialplate

Fabrikat

☐ Vanlige skruer

Antall

☐ Vinkelstabile skruer

Antall

☐ Steinmannpinner

Antall

☐ Annet

Postoperativ billediagnostikk

Diagnostikk gjort ved ☐ Røntgen ☐ CT ☐ MR

CE vinkel (>12 år) Høyre Venstre

Acetabular index (<12 år) Høyre Venstre

Hoftestatus ☐ Grad I ☐ Grad II ☐ Grad III ☐ Grad IV

Calvé-Legg-Perthes

Registrert dato (dd.mm.åå) |__| |__| |__|

Behandlingsdato (dd.mm.åå) |__| |__| |__|

Første gang diagnostisert (dd.mm.åå) |__| |__| |__|

Symptomvarighet (> 12 år) mnd

Aktuell side ☐ Venstre ☐ Høyre

Vekt (kg) |__| |__| **Høyde (cm)** |__| |__|

Halting ☐ Ja ☐ Nei

Smerte ☐ Ingen ☐ Lett ☐ Betydelig

Catteral ☐ I/II (<50% caputnekrose) ☐ III/IV (>50% caputnekrose)

Behandling ☐ Ingen (fysioterapi) ☐ Abduksjonsortose ☐ Operasjon

Operasjons ☐ Primæroperasjon ☐ Reoperasjon

Knivtid for operativ behandling |__| |__| min

Peroperative komplikasjoner

☐ Nei ☐ Ja. Spesifiser

Primæroperasjon

☐ Femurosteotomi. Spesifiser:

☐ Varisering ☐ Valgisering ☐ Rotasjon

☐ Annen (femurosteotomi).....

☐ Bekkenosteotomi. Spesifiser:

☐ Salter ☐ Trippel ☐ Dega

☐ Takplastikk ☐ Periacetabular osteotomi

☐ Annen (bekkenosteotomi)

☐ Skruer, antall ☐ Pinner, antall

Annen operativ behandling

☐ Ikke utført

☐ Trochanter transposisjon

☐ Trochanter apofysiodese

☐ Annen behandling

Implantat

☐ Ingen plate

☐ Forbøyd plate

☐ Spesialplate

☐ Vinkelplate

Fabrikat for plate

☐ Vanlige skruer

Antall

☐ Vinkelstabile skruer

Antall

Reoperasjonsårsak

☐ Rutinemessig fjerning	☐ Anisomeli
☐ Trochanterovervekst	☐ Sårruptur
☐ Postoperativ infeksjon	☐ Blødning
☐ Caputnekrose/Avaskulær nekrose	☐ Pseudartrose
☐ Osteosyntesesvikt/Implantat svikt	☐ Feilplassering av implantat
☐ Annen årsak	

Reoperasjonstype

- | |
|---|
| ☐ Fjerne osteosyntesemateriell |
| ☐ Trochanterapofysiodese |
| ☐ Perkutan fysiodese rundt kne |
| ☐ Bløtdelsrevisjon |
| ☐ Reosteosyntese |
| ☐ Proximal femur osteotomi. Spesifiser |
| ☐ Annen type. Spesifiser |

Epifysiolysis capitis femoris

Registrert dato (dd.mm.åå) | | | | | | | |

Operasjonsdato (dd.mm.åå) | | | | | | | |

Første gang diagnostisert (dd.mm.åå) | | | | | | | |

Aktuell side ☐ Venstre ☐ Høyre

Vekt (kg) | | | | Høyde (cm) | | | |

Klassifisering ☐ Akutt ☐ Kronisk ☐ Akutt på kronisk

Symptomvarighet (mnd)

Stabilitet ☐ Stabil (klarer å belaste) ☐ Ustabil (klarer ikke å belaste)

Røntgen (Glidningsvinkel i sideplan)

Operasjon ☐ Primæroperasjon ☐ Reoperasjon ☐ Profylaktisk

Knivtid for operativ behandling | | | | min

Peroperative komplikasjoner

Nei ☐ Ja ☐ spesifiser

Operasjonstype (Primæroperasjon / Profylaktisk)

☐ Fiksasjon in-situ	☐ Peroperativ reposisjon
☐ Femurosteotomi	☐ Collumosteotomi
☐ Kirurgisk hofte-dislokasjon	
☐ Annen operasjon.....	

Implantat

☐ Skru osteosyntese	Antall	Fabrikat
☐ Pinnefiksasjon	Antall	Diameter mm.
☐ Platefiksasjon	Fabrikat	
☐ Annet implantat	Spesifiser	
Implantat som tillater videre vekst i collum? ☐ Ja ☐ Nei		

Reoperasjonsårsak

☐ Rutinemessig fjerning	☐ Anisomeli
☐ Trochanterovervekst	☐ Sårruptur
☐ Postoperativ infeksjon	☐ Blødning
☐ Caputnekrose/Avaskulær nekrose	☐ Pseudartrose
☐ Osteosyntesesvikt/Implantat svikt	☐ Feilplassering av implantat
☐ Annen årsak	

Reoperasjonstype

- | |
|---|
| ☐ Fjerne osteosyntesemateriell |
| ☐ Trochanterapofysiodese |
| ☐ Perkutan fysiodese rundt kne |
| ☐ Bløtdelsrevisjon |
| ☐ Reosteosyntese |
| ☐ Proximal femur osteotomi. Spesifiser |
| ☐ Annen type. Spesifiser |

Lege.....

Legen som har fylt ut skjemaet.

Rettledning Hoftedysplasi

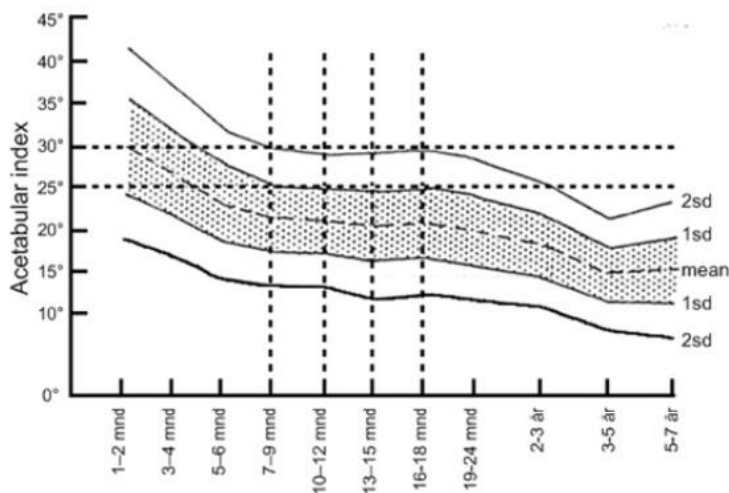
Kriterier: AI > mean + 2SD for aktuell alder (Se figur)

Alle barn som på røntgen bekken får påvist hoftedysplasi etter 3 måneders alder skal registreres. Barn som er diagnostisert før 3 måneders alder (putebehandlet) registreres hvis de fortsatt har dysplasi på røntgen bekken på kontroll etter 3 måneders alder. Barn med nevrootopediske lidelser skal ikke registreres

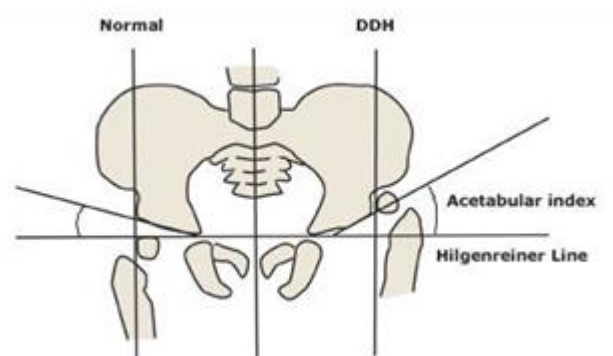
-Registreres første gang ved diagnose (røntgen bekken) /primærbehandling

- Registreres ved senere behandling som krever anestesi/ sedasjon

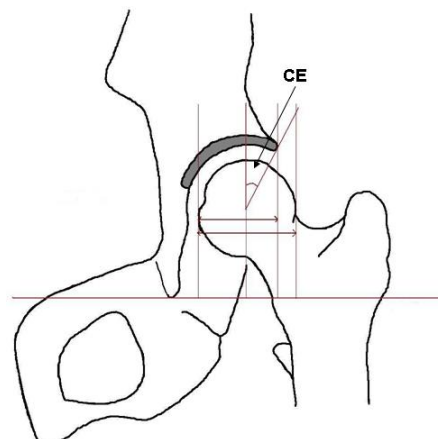
Lukket reposisjon/ hoftegips, åpen reposisjon, tenotomier, femur-/bekkenosteotomier, reoperasjoner. Operativ behandling (periacetabulære osteotomier, takplastikk og lignende) hos ungdommer og voksne skal også registreres.



Acetabulær index som vinkelen mellom Hilgenreiners linje og acetabulum:



Center-edge vinkelen måles som vinkelen formet av en vertical linje som går gjennom sentrum av caput femoris og en linje fra centrum av caput til laterale kant av acetabulum.



Hoftestatus

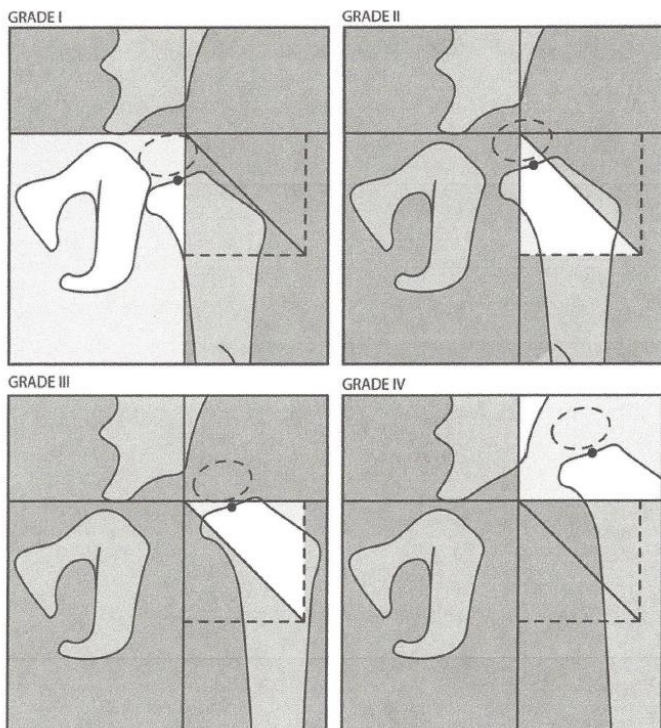
IHDI classification for DDH (not requiring the presence of an ossific nucleus)

Grade I: the H-point is at or medial to the P-line

Grade II: the H-point is lateral to the P-line and at or medial to the D-line

Grade III: the H-point is lateral to the P-line and at or inferior to the H-line

Grade IV: the H-point is superior to the H-line



Rettledning Calvé-Legg-Perthes

Registreres første gang ved diagnose/primærbehandling

Registreres ved senere behandling som krever anestesi (Femur-/bekkenosteotomier, reoperasjoner)

Catterall

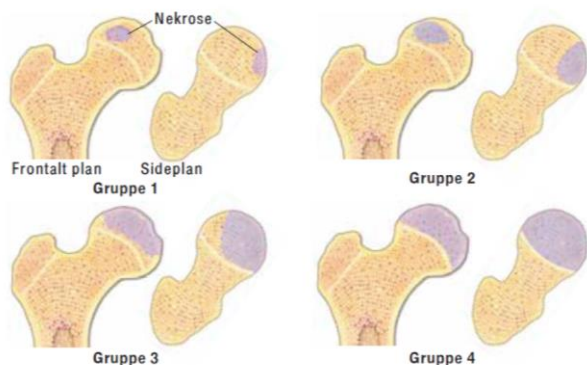
I/II (<50% caputnekrose) III/IV (>50% caputnekrose)

Catteralls klassifikasjon av caputnekrosens utbredelse ved Calvé-Legg-Perthes' sykdom:

Gruppe 1: < 25% caputaffeksjon

Gruppe 2: < 50% caputaffeksjon Gruppe 3: > 50% caputaffeksjon

Gruppe 4: Hele caput affisert



Rettledning Epifysiolsis capitis femoris

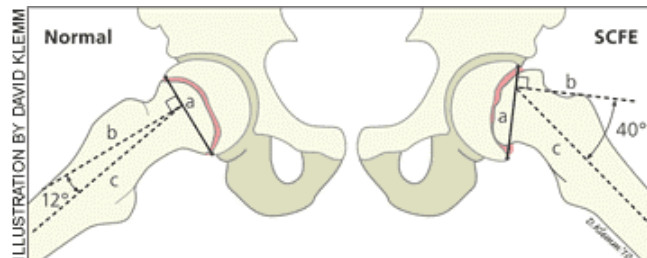
- Registreres første gang ved diagnose/primærbehandling

- Registreres ved senere behandling som krever anestesi

Osteosyntese, femurosteotomier, reoperasjoner

Røntgen (Glidningsvinkel i sideplan)

Hode-skaft vinkelen måler man mellom en linje som står vinkelrett på linjen gjennom fysisen og en linje som ligger parallelt med femur skaftet. Sal måles på innskutt eller Lauenstein projeksjon



Kontaktpersoner vedrørende registreringsskjema

Registerleder: Trude Gundersen, Haukeland universitetssjukehus

Sekretær: Randi Furnes

Telefon: 55 97 37 42 (08:00-14:00)

E-post: NRL@helse-bergen.no

Nettside: www.helse-bergen.no/nrl

Besøksadresse: Møllendalsbakken 7, Bergen

Postadresse:

Nasjonalt register for leddproteser

Ortopedisk klinikk, Helse Bergen HF

Haukeland universitetssjukehus

Postboks 1400

5021 Bergen



Nasjonalt Barnehofteregister

Nasjonalt register for leddproteser
Ortopedisk klinikk, Helse Bergen HF
Haukeland universitetssjukehus
Postboks 1400
5021 Bergen

F.nr. (11 sifre).....

Navn:.....

Sykehus:.....

Åpne og artroskopiske hofteoperasjoner

Alle pasienter (uavhengig av alder) som gjennomgår åpen eller artroskopisk hofteoperasjon, unntatt fraktur-, protese-, og tumor-operasjon, skal registreres.

Aktuell side ☐ Høyre ☐ Venstre

Vekt (kg) **Høyde (cm)**

ASA ☐ ASA1 ☐ ASA2 ☐ ASA3 ☐ ASA4

Operasjonsdato (dd.mm.åå)

Billedopptak

LCE- vinkel °

LCE- vinkel valg ☐ RTG bekken ☐ Måling ikke basert på rtg bekken

α-vinkel °

α-vinkel valg ☐ RTG ☐ MR/CT ☐ Nötzli

Tönnis (HTE) vinkel °

Bruskhøyde (mm) ☐ <2 ☐ 2-3 ☐ >3

Subchondrale cyster ☐ Nei ☐ Ja:

Subchondrale cyster – antall

Subchondrale cyster - størrelse (mm)

Tidligere operasjon i aktuelle hofte

☐ Nei ☐ Ja. Spesifiser:

☐ Artroskopisk inngrep

☐ Åpen hoftekirurgi. Spesifiser

Årsak til aktuelle operasjon

☐ Femoroacetabulær impingement

☐ Labrum skade uten kjent etiologi. Angi Beighton score

☐ Acetabulær dysplasi (alle former inklusive versjonsanomalier)

☐ Femoral dysplasi/malrotasjon

☐ Ekstraartikulær årsak.

Spesifiser

☐ Sekvele av barnehoftededdssykdom

Spesifiser hvilken dersom kjent

Annen årsak

Systemisk antibiotika

☐ Nei ☐ Ja, 1 medikament ☐ Ja, 2 medikament

Profylakse gitt ☐ Preoperativt ☐ Peroperativt ☐ Postoperativt

Medikament 1

Dosering ☐ Milligram ☐ Gram

Antall doser (pr døgn) Varighet (timer)

Medikament 2

Dosering ☐ Milligram ☐ Gram

Antall doser (pr døgn) Varighet (timer)

Cox hemmer

Heterotop ossifikasjonsprofylakse ☐ Nei ☐ Ja. Spesifiser:

Medikament

Dosering (mg/døgn)

Varighet (døgn)

Medikamentell tromboseprofylakse

☐ Nei ☐ Ja: Gitt: ☐ Preoperativt ☐ Peroperativt ☐ Postoperativt

Medikament

Fast medikasjon ☐ Ja ☐ Nei: Antall dgr planlagt

Operasjonstid (hud til hud-knivtid) min

Peroperativ komplikasjon ☐ Nei ☐ Ja. Spesifiser:

.....

Inngrepstype

☐ Artroskopi

☐ Åpen prosedyre. Spesifiser type:

☐ Intraartikulær

☐ Ekstraartikulær. Spesifiser:

☐ Periacetabular osteotomi

☐ Deroterende/aksekorrigerende femur osteotomi

☐ Annet. Spesifiser:

Artroskopi

Portaler ☐ Laterale/ distale varianter ☐ Anterior ☐ Posterolateral

Leie ☐ Rygg ☐ Side

Brusk/labrumskade

Labrumskade ☐ Nei ☐ Ja:

Lokalisasjon ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6

Beskrivelse ☐ Normal

☐ Degeneration

☐ Full thickness tear

☐ Detachment

☐ Ossification

Bruskskade i acetabulum ☐ Nei ☐ Ja:

Lokalisasjon ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6

Beskrivelse ☐ Normal

☐ Malacia

☐ Debonding

☐ Cleavage

☐ Defect

Bruskskade i på caput femoris ☐ Nei ☐ Ja:

Lokalisasjon ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6

Beskrivelse ☐ Nearly normal

☐ Abnormal

☐ Severly abnormal (3)

☐ Severly abnormal (4)

Synovitt? ☐ Nei ☐ Ja. Spesifiser: ☐ Fokal ☐ Generalisert

Reseksjon

☐ Cam reseksjon (osteochondroplastikk)

☐ Pincer (acetabular rand) reseksjon

Behandling bruskskade

☐ Ingen behandling: ☐ Psoastenotomi ☐ Fjernet corpus/corpora lib.

☐ Debridement

☐ Mikrofraktur

☐ Andre prosyrer. Spesifiser

☐ Annet. Spesifiser

Behandling labrumskade

☐ Ingen behandling ☐ Debridement ☐ Sutur

☐ Rekonstruksjon ☐ Reseksjon

Implantater

☐ Sutureankre/Suturer

Spesifiser

☐ Allograft

Spesifiser

☐ Autograft

Spesifiser

☐ Skruer

Spesifiser

☐ Annet

Spesifiser

Kapselhåndtering

- ☐ Kapsulectomi
- ☐ Kapsulotomi begrenset til portaler
- ☐ Kapsulotomi mellom portaler
- ☐ Kapsulotomi langs collum aksen (Kelly)
- ☐ Dome kapsulotomi (Dienst)

Lukking ved kapsulotomi

- ☐ Ingen ☐ Partiell ☐ Fullstendig

Strekktid |__|__|__| min

Intraartikulært inngrep (åpen kirurgi)

Tilgang

- ☐ Kocher-Langenbeck
- ☐ Gibson
- ☐ Kirurgisk hofteluksasjon
- ☐ Miniinvasiv. Spesifiser

Brusk/labrumskade

Labrumskade	☐ Nei ☐ Ja:
Lokalisasjon	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6
Beskrivelse	☐ Normal
	☐ Degeneration
	☐ Full thickness tear
	☐ Detachment
	☐ Ossification
Bruskskade i acetabuulum	☐ Nei ☐ Ja:
Lokalisasjon	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6
Beskrivelse	☐ Normal
	☐ Malacia
	☐ Debonding
	☐ Cleavage
	☐ Defect
Bruskskade i på caput femoris	☐ Nei ☐ Ja:
Lokalisasjon	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6
Beskrivelse	☐ Nearly normal
	☐ Abnormal
	☐ Severly abnormal (3)
	☐ Severly abnormal (4)

Synovitt? ☐ Nei ☐ Ja. Spesifiser: ☐ Fokal ☐ Generalisert

Ligamentum capitis femoris (L. teres femoris), skadet?

- ☐ Nei ☐ Ja

Reseksjon

- ☐ Cam reseksjon (osteochondroplastikk)
- ☐ Pincer (acetabular rand) reseksjon

Prosedyre

- ☐ Periacetabular osteotomi
- ☐ Deroterende/aksekorrigerende femur osteotomi
- ☐ Annet. Spesifiser

Behandling bruskskade

- ☐ Ingen behandling: ☐ Psoastenotomi ☐ Fjernet corpus/corpora lib.
- ☐ Debridement
- ☐ Mikrofraktur
- ☐ Andre prosyrer. Spesifiser
- ☐ Annet. Spesifiser

Behandling labrumskade

- ☐ Ingen behandling ☐ Debridement ☐ Sutur
- ☐ Rekonstruksjon ☐ Reseksjon

Fjernet corpus/corpora lib. ☐ Nei ☐ Ja:

Psoastenotomi ☐ Nei ☐ Ja:

Implantater (Intraartikulært)

- ☐ Suturankre/Suturer
- Spesifiser
- ☐ Allograft
- Spesifiser
- ☐ Autograft
- Spesifiser
- ☐ Skruer
- Spesifiser
- ☐ Annet
- Spesifiser

Lukking ved kapsulotomi

- ☐ Ingen ☐ Partiell ☐ Fullstendig

Luksasjonstid ved kirurgisk hofteluksasjon |__|__|__| min

Ekstraartikulært inngrep (åpen kirurgi)

Tilgang

- ☐ Stoppa
- ☐ Smith-Petersen
- ☐ Kocher-Langenbeck
- ☐ Gibson

Prosedyre

- ☐ Periacetabular osteotomi
- ☐ Deroterende/aksekorrigerende femur osteotomi
- ☐ Annet. Spesifiser:

Implantater

- ☐ Skruer
- Spesifiser
- ☐ Annet
- Spesifiser

Lege
Legen som har fylt ut skjemaet.

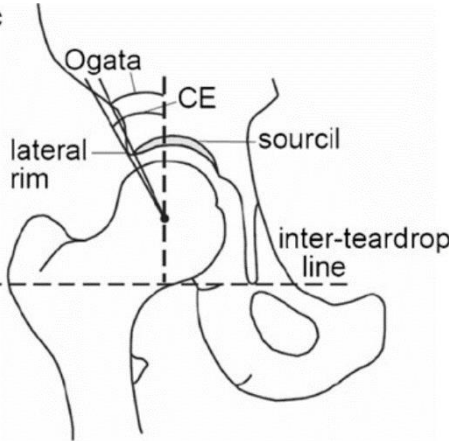
Rettledning

ASA

ASA 1 = Frisk
ASA 2 = Asymptomatisk tilstand som gir økt risiko
ASA 3 = Symptomatisk sykdom
ASA 4 = Livstruende sykdom

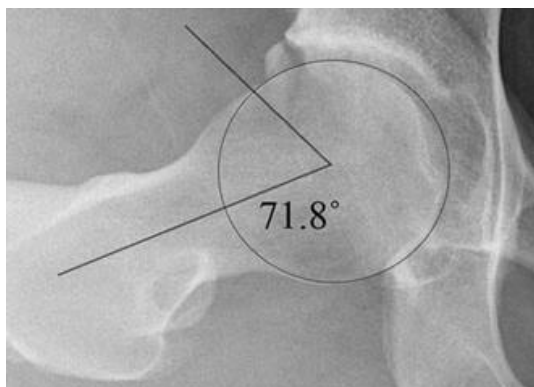
LCE vinkel (Wiberg 1939)

Det er laterale margin på et rettsilt rtg bekken (symfyse/spina sacri overlapp) som er det mest laterale referansepunkt (se skisse).
Ogata registreres ikke (lateral sourcil margin).
Rtg hofte vil på linje med skrått bekken - opptak gi feilkilde.



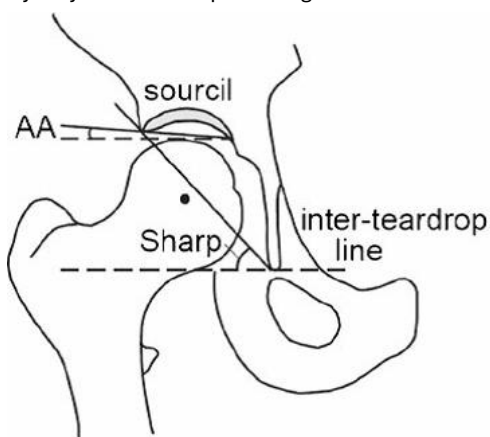
Alfa-vinkel

Alfa-vinkel kan estimeres fra røntgen projeksjoner (Dunn 45 anbefalt, se bilde), CT og MR med ordinære snittføringer og endelig MR (evt CT) med radiære rekonstruksjoner (Nötzli metodikk). Høyeste vinkel målt registreres. Ordinære CT og MR snittføringer anbefales ikke brukt.



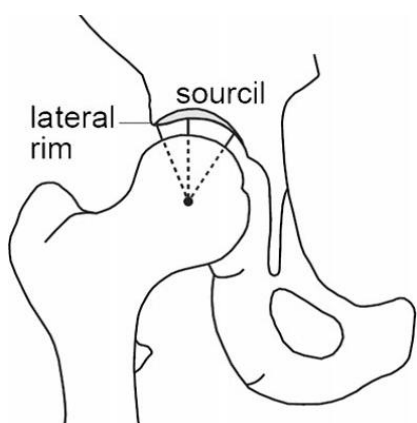
Tönnis vinkel

Tönnis vinkel er skissert som AA på figuren. Synonymt med «Lesquesne» og «HTE»



Bruskhøyde

Laveste bruskhøyde brukes til valg av gruppe, se skisse for målesteder:



Beighton score

0-2 point(s) possible for 1-4

- (1) Passive dorsiflexion of the little fingers beyond 90 degrees.
- (2) Passive apposition of the thumbs to the flexor aspects of the forearms.
- (3) Hyperextension of the elbows beyond 10 degrees.
- (4) Hyperextension of the knees beyond 10 degrees (none, one or both left and right)
- (5) Forward flexion of the trunk, with knees straight, so that the palms of the hands rested easily on the floor (0 or 1 only)

Heterotop ossifikasjonsprofylakse

«Cox-hemmer» er valgt som benevnelse, omfatter NSAIDs, Cox2-hemmere osv. Det registreres total døgndose og antall døgn.

Brusk- og labrumskade

Acetabulum

Normal: Macroscopically sound cartilage

Malacia: Roughening of surface, fibrillation

Debonding: Loss of fixation to the subchondral bone, macroscopically sound cartilage, carpet phenomenon

Cleavage: Loss of fixation to the subchondral bone: frayed edges, thinning of cartilage, flap

Defect: Full-thickness defect

Labrum

Normal: Macroscopically sound labrum

Degeneration: Thinning or localised hypertrophy, fraying, discoloration

Full-thickness tear: Complete avulsion from the acetabular rim

Detachment: Separation between acetabular and labral cartilage, preserved attachment to bone

Ossification: Osseous metaplasia, localized or circumferential

CaputFemoris

Nearly normal: Superficial lesions, soft indentation and/or superficial fissures and cracks.

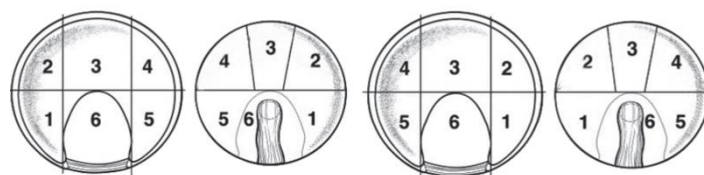
Abnormal: Lesions extending down to <50% of cartilage depth.

Severely abnormal (3): Cartilage defects extending down to >50% of cartilage depth as well as down to calcified layer.

Severely abnormal (4): Osteochondral injuries, lesions extending just through the sub chondral boneplate or deeper defects down into trabecular bone.

Lokalisasjon for brusk- og labrumskade

1-2: Fortil, 4-5: Baktill



Venstre hofte

Høyre hofte

Kontaktpersoner vedrørende registreringsskjema

Fagansvarlig for voksenhofte: Overlege Jone Segadal, Ortopedisk avdeling, Kysthospitalet i Hagevik

Registerleder: Trude Gundersen, Ortopedisk klinikk, Haukeland universitetssjukehus

Sekretær: Randi Furnes

Telefon: 55 97 37 42

E-post: NRL@helse-bergen.no

Nettside: www.helse-bergen.no/nrl

Besøksadresse: Møllendalsbakken 7, Bergen

Postadresse:

Nasjonalt register for leddproteser

Ortopedisk klinikk, Helse Bergen HF

Haukeland universitetssjukehus

Postboks 1400

5021 Bergen