Nasjonalt Register for Leddproteser

REPORT

June 2017

Norwegian National Advisory Unit on Arthroplasty and Hip Fractures

Norwegian Arthroplasty Register
Norwegian Cruciate Ligament Register
Norwegian Hip Fracture Register
Norwegian Paediatric Hip Register

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NORWEGIAN NATIONAL ADVISORY UNIT ON ARTHROPLASTY AND HIP FRACTURES
2017 ANNUAL REPORT

This annual report presents results and descriptive statistics from our five registers.

Results aimed at the general public are published in November of each year on the website of the National Service Centre for Medical Quality Registers (http://www.kvalitetsregistre.no/resultater/). Some of the results are included in this annual report.

The Cruciate Ligament Register has tried out an electronic medical registration system (MRS) at Haukeland University Hospital, and is now ready to test it at other hospitals. A corresponding system of electronic registration of patient-reported outcome measures (PROM) for total hip arthroplasty has been created in the MRS and is currently being tested at Haukeland University Hospital. There are plans to start at other hospitals in 2017.

This annual report is sent electronically to all Norwegian orthopaedic surgeons. Paper copies can be obtained by contacting us. The National Advisory Unit website http://nrlweb.ihelse.net/ contains all our annual reports and references to all our scientific papers and presentations. Most of the papers are also available electronically from our website. Since we mainly publish findings from implants and surgical methods in scientific journals where we can account for materials and methods and discuss strengths and weaknesses and the significance of the findings, these are to be found in the reference lists at the end of this annual report. This year for the first time we present percentages of three- and ten-year durability of the most commonly used hip and knee prostheses in Norway. This is also available on the website of the National Service Centre.

A completeness analysis is published for each of the registers. These analyses were conducted in cooperation with the National Service Centre and the Norwegian Patient Register. Hospitals with low reporting need to review their reporting routines. Please contact us and we will be happy to offer our assistance.

The Norwegian Arthroplasty Register now has its own Facebook page https://www.facebook.com/leddregisteret/ , which we hope you will visit. You will find a QR code on the back of this year's report.

Hospital-based annual reports, with data from each hospital, will as before be sent to our contact persons at the hospitals and to the general manager. We encourage our contacts to pass on the reports to the hospital administration and to their colleagues, and to check that the figures recorded from the hospital are correct. The reports should be used for local improvement work.

Please remember that the Norwegian Data Protection Authority requires statements of consent to be signed by patients before operations are reported to the registers, and the statements to be stored in locked archive cabinets or on a secure server at each hospital.

We would like to thank Leif Ivar Havelin for thirty years' work for the registers. He retired in 2016. Geir Hallan has taken over as head of the Hip Arthroplasty Register.

May we remind you of the Hip Arthroplasty Register's 30-year anniversary celebration on 28-29 September 2017. Please remember to sign up.

We would like to thank all orthopaedic surgeons in Norway for good reporting. We are also grateful for good cooperation with the Reference Group, Helse Bergen, Helse Vest, the Centre for Clinical Documentation and Evaluation (SKDE) via the National Service Centre for Medical Quality Registers, the equipment suppliers, the University of Bergen, the Norwegian Patient Register (NPR), the Norwegian Knowledge Centre for the Health Services, the Norwegian Institute of Public Health, the Office of the Auditor General, the Norwegian Board of Health Supervision, the Directorate of Health and the Ministry of Health and Care Services.

Bergen, 17.06.2017

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Norwegian Arthroplasty Register

Total Hip Replacement

THE HIP ARTHROPLASTY REGISTER
2017 ANNUAL REPORT

This year's annual report contains data on *211 234 hip replacement operations*. The milestone of 10 000 operations per year was reached in 2016! 8881 primary operations and 1452 revisions were recorded; this is an increase of about 500 compared to 2015. Thirty-two patients received two primary prostheses in the same session.
Forty-one revisions were reported where the prosthetic parts were not changed. These were soft tissue debridement due to infection, osteosynthesis of periprosthetic fractures, muscle transposition and muscle reconstruction. These re-operations without replacement of prosthetic parts were added to the form in 2015.

Surgical approach has changed over the last five years. Anterior approaches now account for about 20% of primary operations and are used in fewer than 5% of revisions. The direct lateral approach is used less and less, having decreased from more than 70% 10 years ago to 16% in 2016. In revision operations, this approach is also used less than previously, but still accounts for close to 40%. The posterior approach is becoming increasingly popular and was recorded for 58% of primary operations in 2016. These changes are thought to be beneficial, since patient experience of direct lateral approach is inferior to that of other approaches (Amlie et al., 2014). The posterior approach is also used more frequently in revisions (48%). In patients operated since 2008, we find no difference in prosthetic survival between the approaches (Figure r). Mjaaland et al. showed that overall prosthetic survival is similar in the different approaches, but that a lateral approach increased the chance of revision due to infection, while a posterior approach was associated with more dislocation (Mjaaland KE et al., 2017).

Fixation: Our register and all other registers have repeatedly shown poorer results with uncemented stems than with cemented stems in the oldest patients, especially in women. There are signs of increased use of cemented femoral stems over the last couple of years, especially in the form of classical hybrid fixation. About 60% of patients above 75 years now receive cemented stems, and we believe that this proportion should be further increased. In revisions, there has been a gradual increase in the use of uncemented fixation since 2003. Both in the acetabulum and in the femur, three out of four revisions are currently uncemented. Bone impaction grafting with cement in the femur has been decreasing for the past ten years, and in 2016, no cases with the use of this technique were recorded. Also in the acetabulum, there is less bone impaction grafting with cement than previously.

The use of *32mm heads is increasing* steadily (2016: about 73%) and there has been a slight increase in the use of 36mm heads over the last 10 years (2016: about 10%). Heads >36mm are no longer used, which we view as beneficial because it appears from some other registers that the larger heads lead to poorer prosthetic survival. Cross-linked polyethylene used with metal or ceramic heads predominates in the articulations (>90%) and we find good support for this in the literature.

Metal-on-metal prostheses with heads larger than 32mm are no longer used in Norway. Survival rates for the 485 patients operated with these prostheses in Norway are somewhat worse than with conventional prostheses, see figure s. However, the main problem with these prostheses is

the risk of developing a pseudotumour, which can be a very serious complication. Please remember that hospitals have a duty to monitor all patients with such prostheses for the rest of their lives. Recommendations for monitoring are available here: http://nrlweb.ihelse.net.

This year's report contains two figures (t and u) which illustrate *to what degree each point on the registration form is completed*. The Norwegian Arthroplasty Register (NRL) records a very high proportion of the arthroplasties performed in Norway. In order for an operation to be registered with us, we need the patient's date of birth, ID number, date of surgery, side (right or left), type of surgery and implant (using stickers) on the form. If any of this information is missing, the form is returned or a secretary from the Register will call the hospital to have it completed.
If there is missing information on points other than these key points, the form is registered with missing data on those points. Some points often have missing data, as seen in the figure. Examples of points where information is commonly lacking are the registration of bone grafting (about 30%) and the degree of bone loss (more than 50%) in revisions. We hope that surgeons will take even greater care in completing the forms.
One of the great advantages of the NRL over some other registries is the amount of detail, and it is therefore important that we have good reporting of details. The report from the Register on the website of the National Service Centre for Medical Quality Registers (https://kvalitetsregistre.no/registers/522/resultater) includes publication of prosthetic results as well as results at hospital level. These results must be seen in conjunction with the completeness of reporting of revisions. Results from hospitals with less than 80% completeness of reporting for revisions are excluded from these analyses.

PUBLICATIONS SINCE 1 JANUARY 2016

Johanson PE et al. (a NARA study) compared the risk of cup or liner revision in cup designs used with conventional and cross-linked plastic. For some cups (Reflection, ZCA), there were better results with cross-linked plastic, while for others there was no difference after ten years.

Wangen H studied reverse hybrid hip replacements and compared these to cemented ones (NARA). There was a 40% greater risk of revision with a reverse hybrid hip replacement, and the risk was particularly high for periprosthetic fractures.

Johnsen MB et al., in a gene study, showed that in smokers there is an inverse correlation between the level of smoking and the risk of hip or knee arthroplasty, and they argue that this is a causal relationship.

Magnusson K et al. linked the Arthroplasty Register with the Twin Register, and found that the risk of hip arthroplasty was greatly influenced by genetic factors, while the risk of knee arthroplasty was more strongly associated with BMI.

Junnila M et al. studied the most common cemented hip prostheses in NARA data and found differences in the results. Spectron EF/Reflection and Elite THA had the poorest results.

Tsukanaka M et al. studied results of hip arthroplasty in the youngest patients (<20 years) and found that 30% were revised within ten years and that the bone quality around the prosthesis was poor in many patients.

Mjaaland KE et al. compared implant survival after mally invasive surgery or anterolateral surgical approach with posterior or direct lateral approach. Results from the Register show that overall prosthetic survival is similar in the different approaches, but there were more dislocations with the posterior approach and more infections with the lateral approach.

Hellevik AI et al. studied the incidence of total hip and knee arthroplasty due to osteoarthritis and the association with thyroid function in a prospective cohort study with data from the NRL and the Health Survey in Nord-Trøndelag (HUNT). The study showed no association between thyroid function and the risk of hip or knee arthroplasty due to osteoarthritis.

Johnsen MB et al., in a study using data from the NRL and HUNT, showed that increased recreational activity was associated with a greater risk of hip arthroplasty in women and men aged 45-59. The risk of knee arthroplasty increased for young women with high leisure-time activity, but not for men.

Please also consult the list of publications in this report and on our website
http://nrlweb.ihelse.net/

Thank you for good reporting, and we welcome suggestions for research projects.

Bergen, 16.06.2017

Geir Hallan
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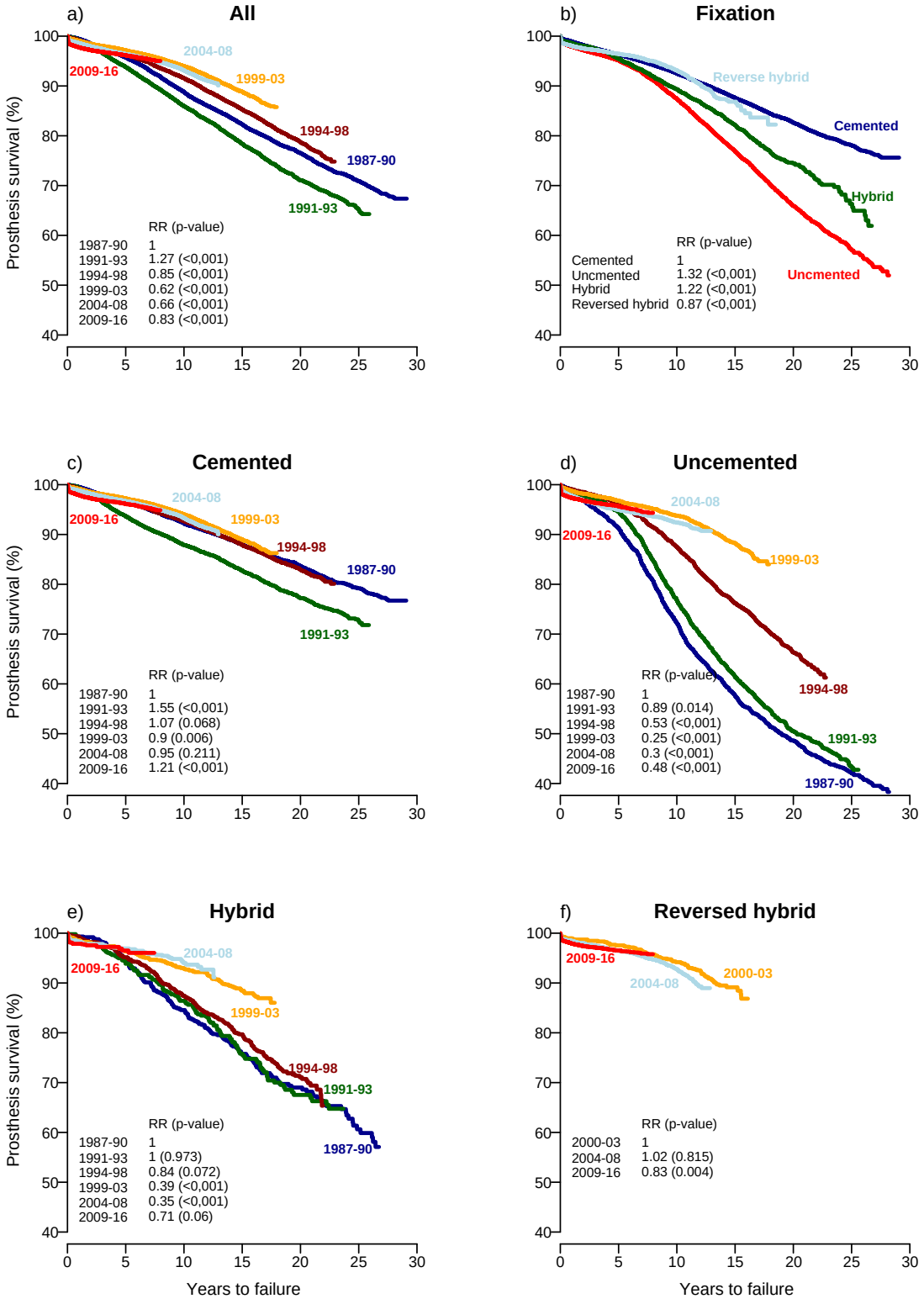
Anne Marie Fenstad
Biostatistician

Irina Kvinnesland
IT Consultant

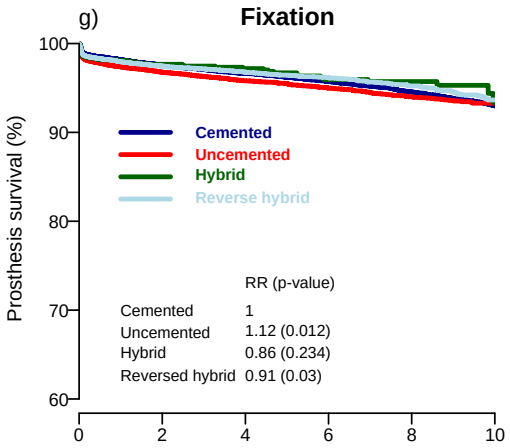
Christoffer Bartz-Johannessen
Biostatistician

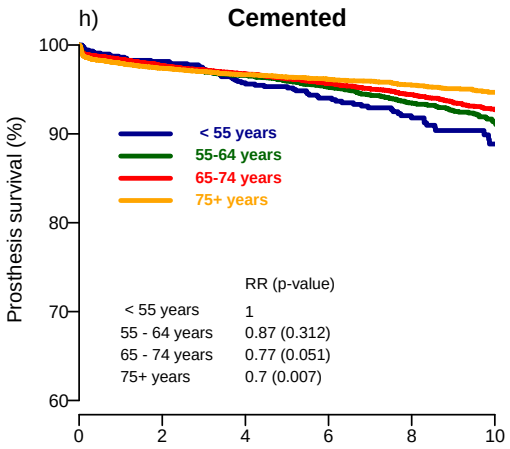
Survival of total hip prostheses
1987-2016

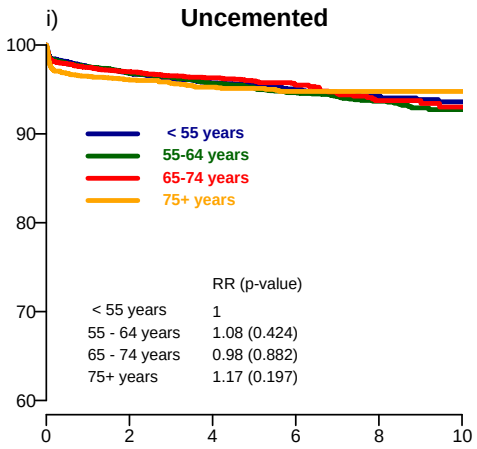


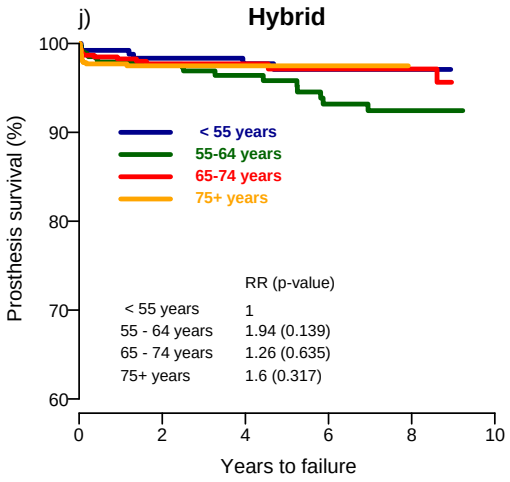
Kaplan-Meier survival curves. Rate ratio (RR) is adjusted for age, gender and diagnosis.
Survival estimate is given as long as more than 50 prostheses are at risk.

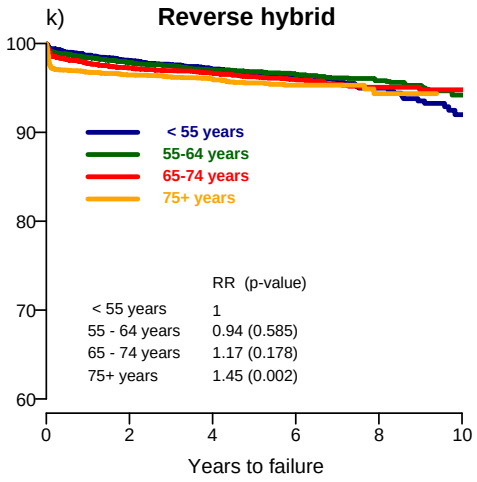
Survival of total hip prostheses
2006-2016







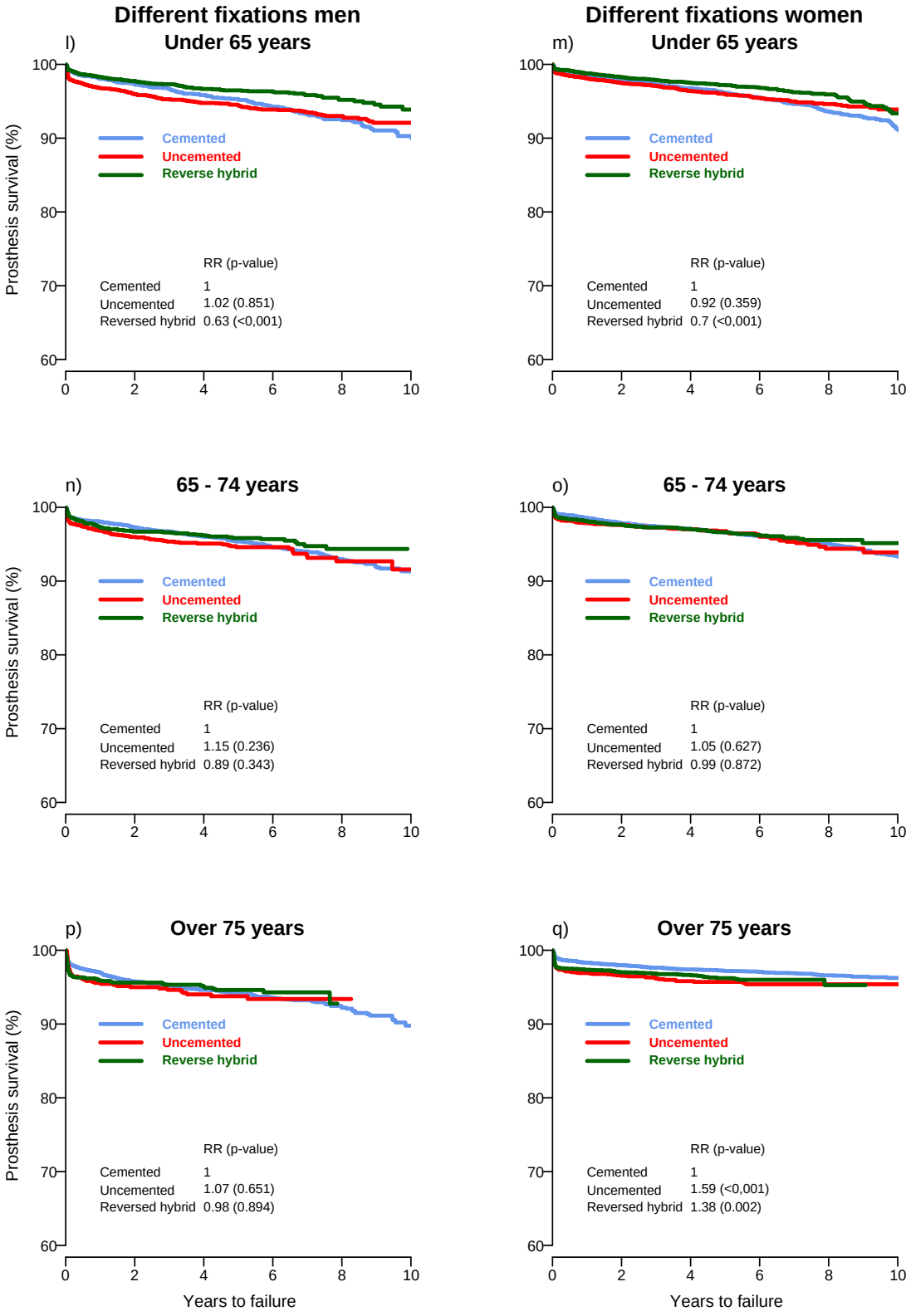




Kaplan-Meier survival curves. Rate ratio (RR) is adjusted for age, gender and diagnosis.
Survival estimate is given as long as more than 50 prostheses are at risk.

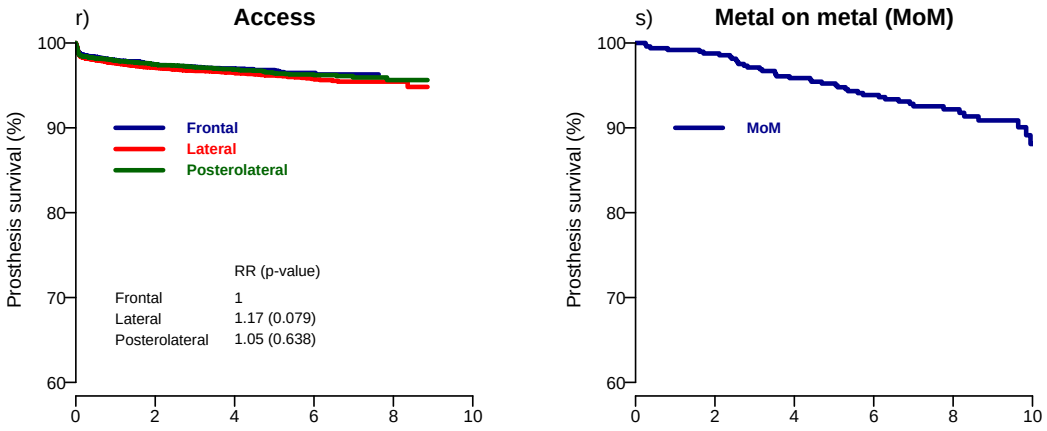
Survival of total hip prostheses

2006-2016

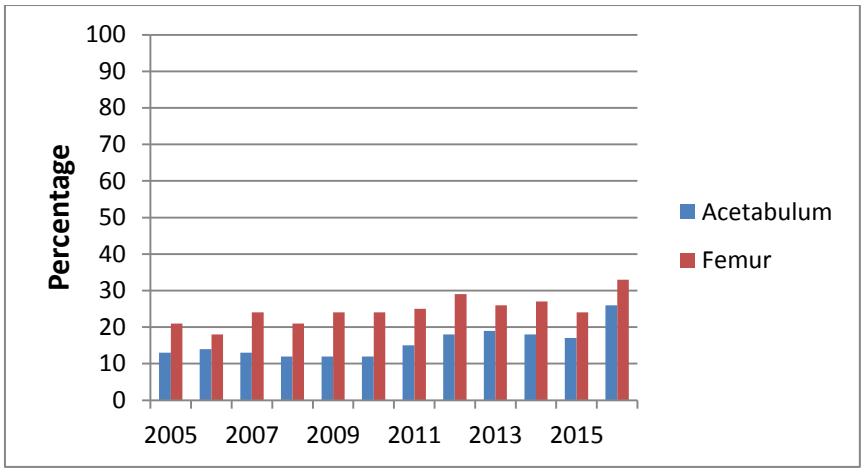


Kaplan-Meier survival curves. Rate ratio (RR) is adjusted for age, gender and diagnosis.
Survival estimate is given as long as more than 50 prostheses are at risk.

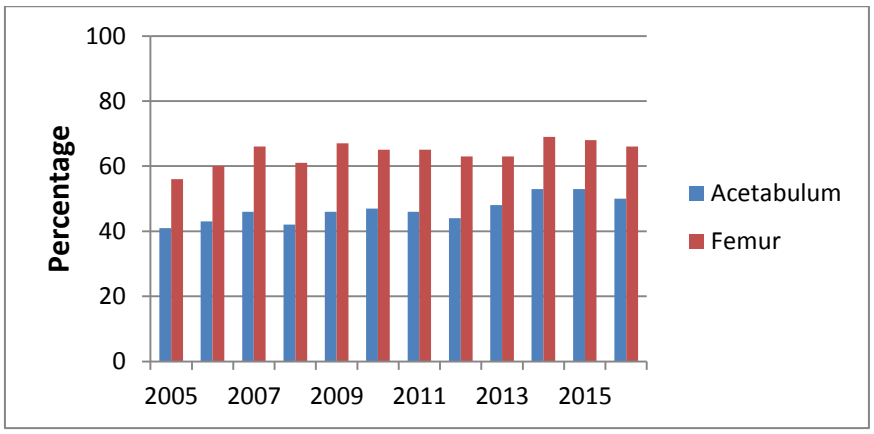
Survival hip prostheses



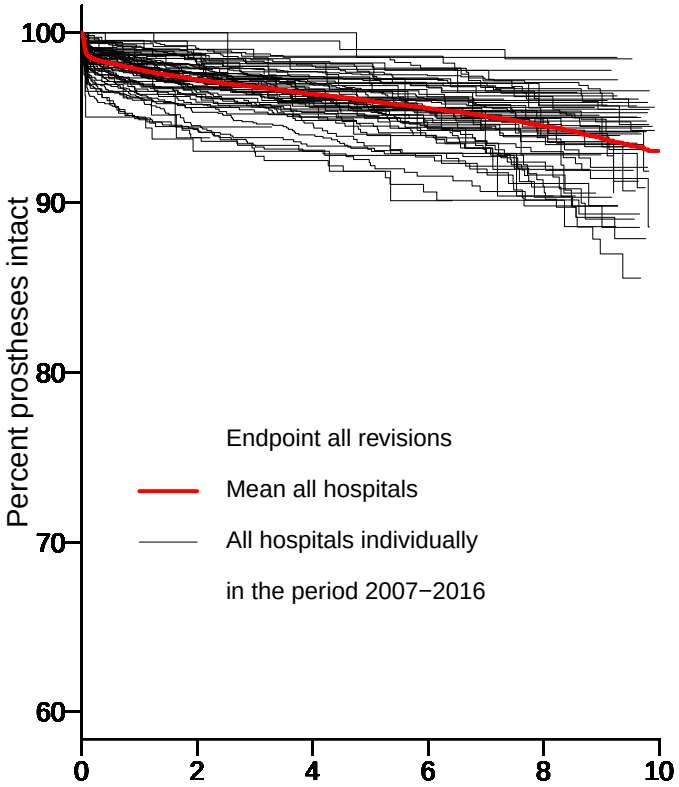
t) Bone transplant, revisions - percent of cases with missing data

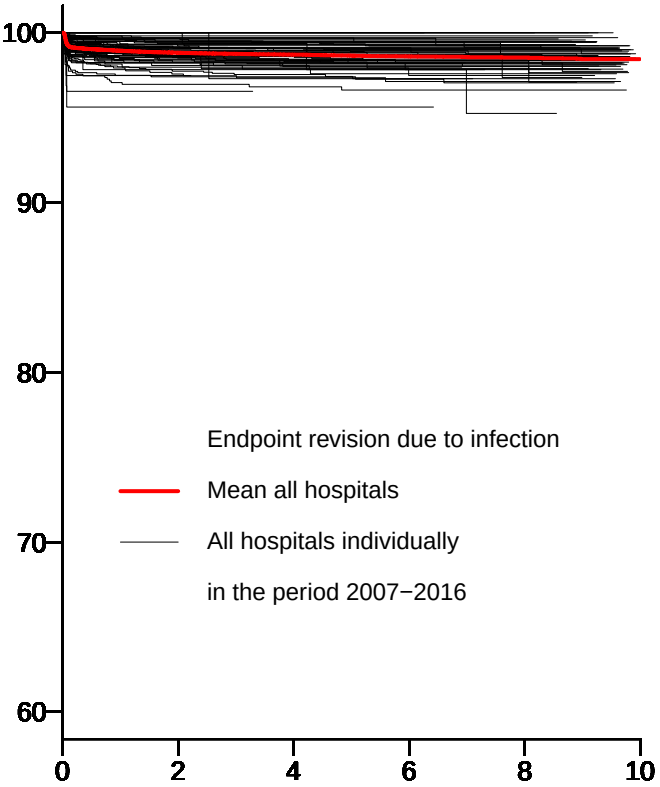


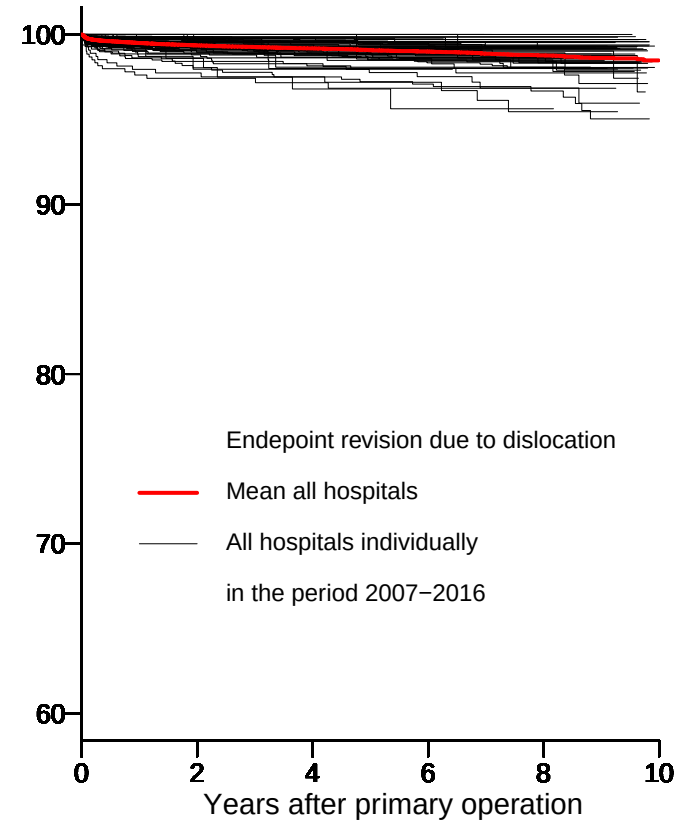
u) Bone loss, revisions - percent of cases with missing data



Total hip arthroplasty -
Last 10 years survival curves for all hospitals







One stage bilateral hip prosthesis operations

Year	1987-2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Sum:
Number of patients	148	12	15	13	19	15	15	18	26	23	22	28	32	386

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 Y: Number of primary THA operations, 2016

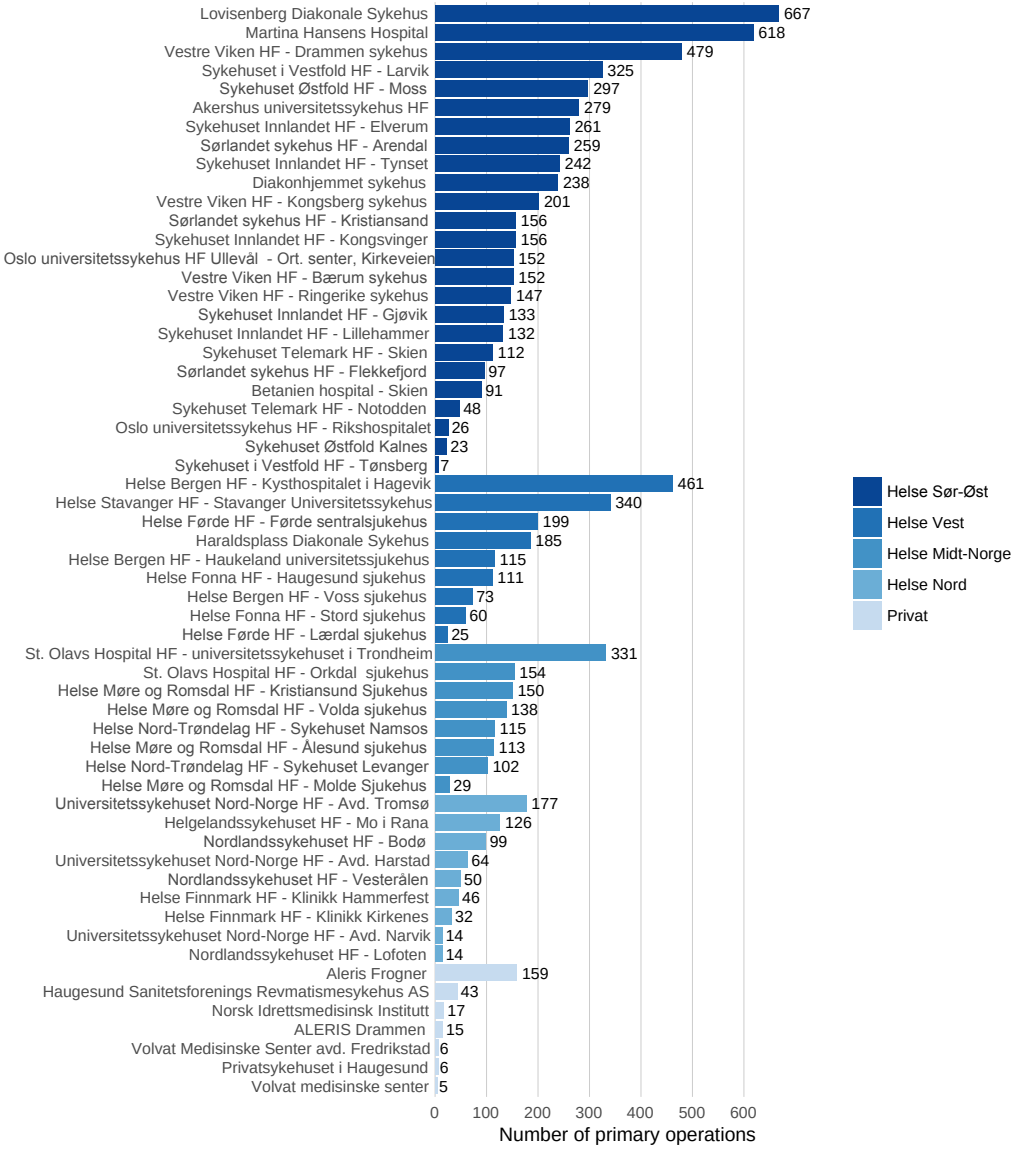
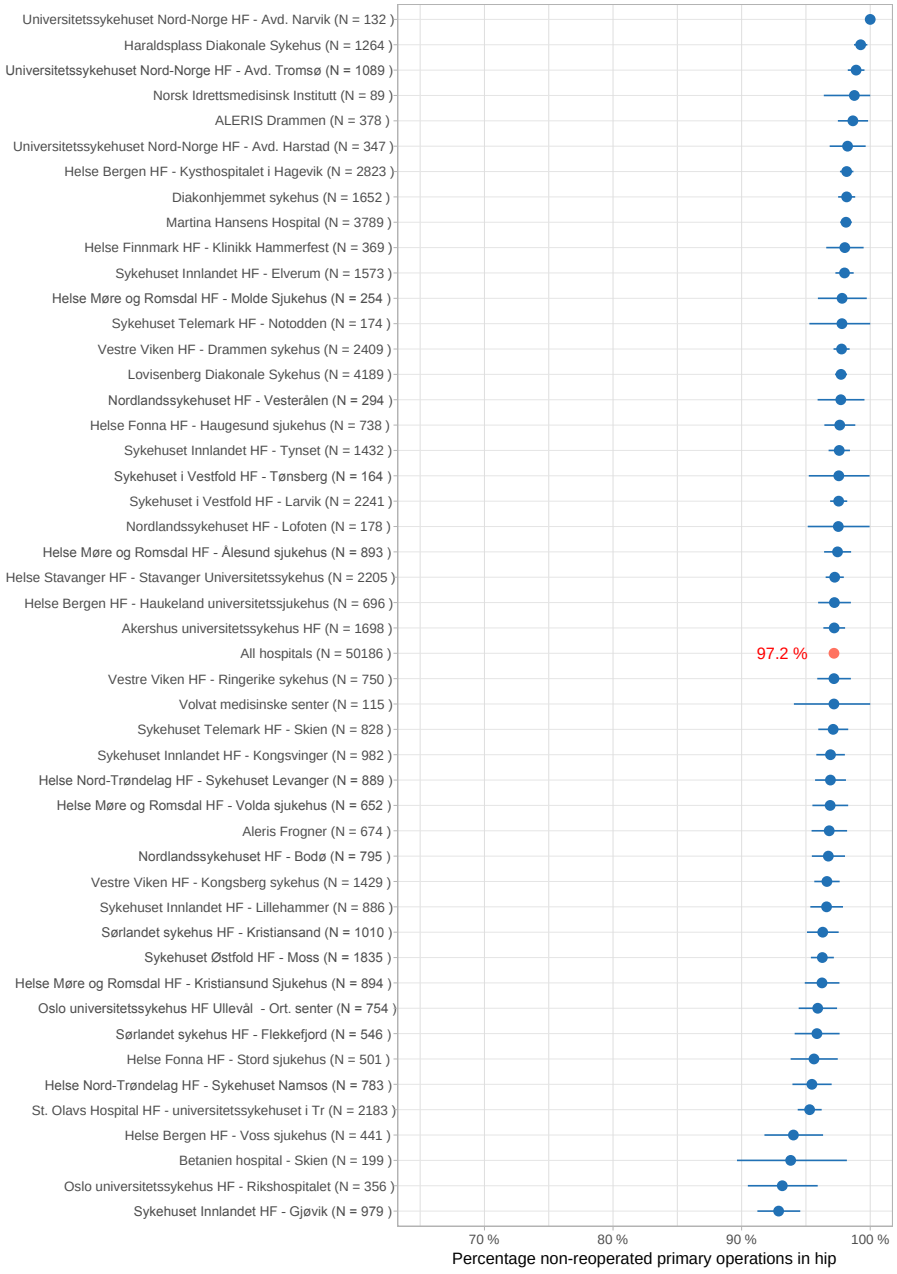
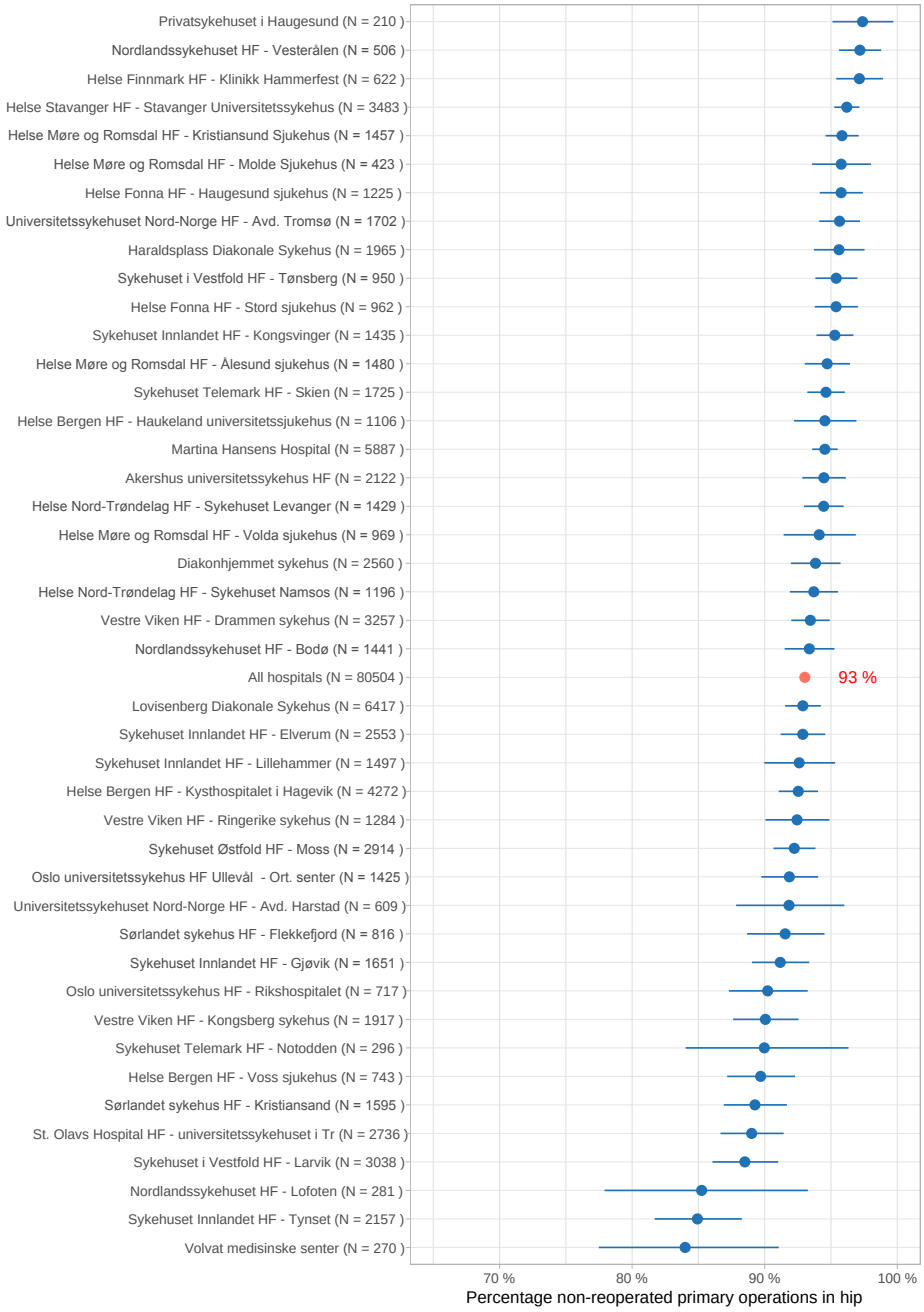


Figure Z: Percentage non-revised patients two years after operations in 2010-2016



Kaplan-Meier estimates of percentage non-revised patients after two years with 95% confidence interval. 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 2010 to 2016. Only hospitals with operations in 2016 and with more than 50 operations from 2010 to 2016 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 coverage of at least 80% for revisions from 2008 to 2012 are included.

Figure Æ: Percentage non-revised patients ten years after operations in 2005-2016



Kaplan-Meier estimates of percentage non-revised patients after ten years with 95% confidence interval. 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 2005 to 2016. Only hospitals with operations in 2016 and with more than 50 operations from 2005 to 2016 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 coverage of at least 80% for revisions from 2008 to 2012 are included.

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 despite the fact that this hospital in reality 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, this will also give skewed results in the statistics.
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.

There is also a statistical uncertainty in the ranking lists because the data from the NRL are poorly suited for such calculations. The NRL was designed to compare the results of implants and surgical procedures nationwide. To compare quality in hospitals is a complex matter, 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 too weak, and are further weakened by the fact that the hospitals' coverage (reporting rate) of reoperations varies from 16.7% to 100%. This issue is explained in detail in the following articles: 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.

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

If league tables of hospitals are publicised, there is thus a danger that hospitals' reporting of revisions may become poorer, leading to inferior quality of the registers. In order to achieve complete reporting of reoperations (revisions), reporting to the Register should be linked to performance-based financing, reporting should be made mandatory, and the requirement for the patient's written consent to reporting of the operation to the Register should be waived and replaced by presumed consent.

Figure Ø: Durability of hip replacements 2005-2016

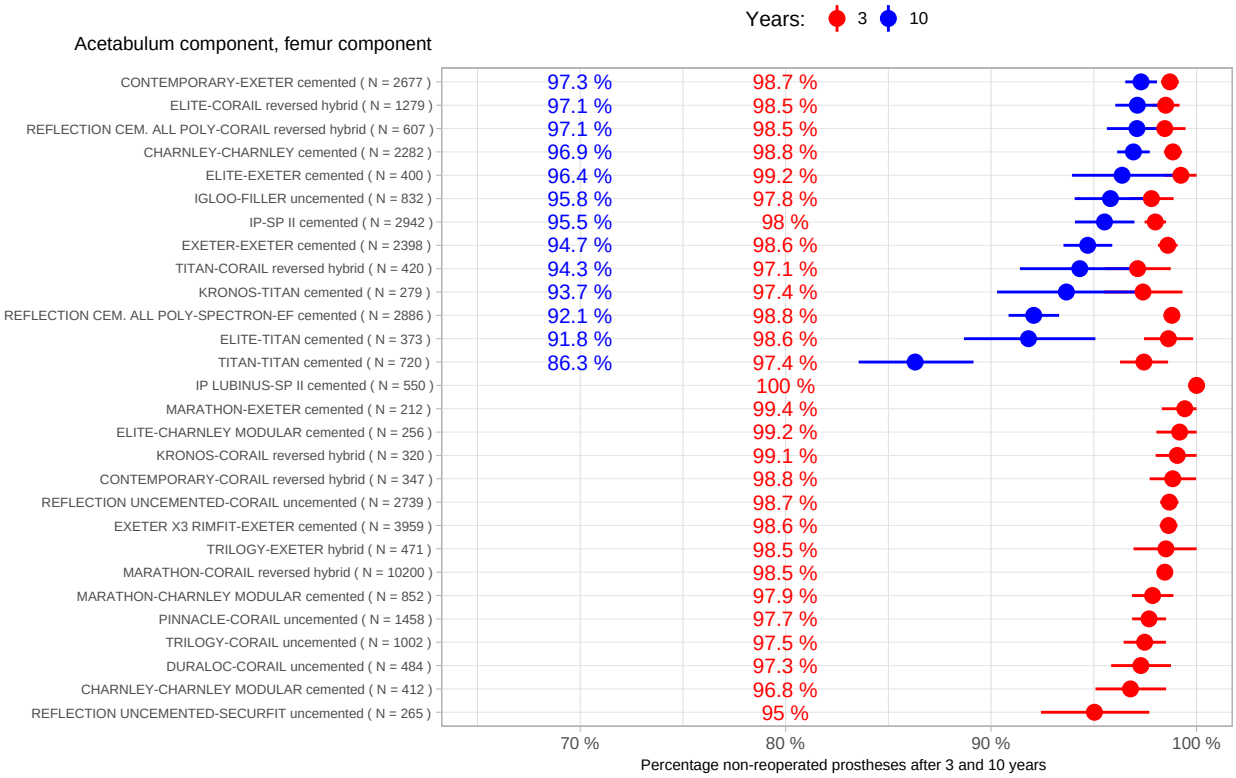


Figure Ø shows the estimated Kaplan-Meier percentage at three and ten years for different combinations of hip prostheses. We have only included combinations used in 500 or more operations in 2005-2016. A further requirement for inclusion in the figure is that there must still be at least 50 examples of the combination at three and ten years respectively. Only **standard patients** from 2005 to 2016 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. 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 combinations Reflection All Poly/Spectron EF (cemented) and Titan/Titan (cemented) are no longer in use. This is based on results in studies published by the Register (Espehaug B 2009, Hallan G 2007, Hallan G 2010, Hallan G 2012 and Kadar T 2011), see our list of publications in the annual report http://nrlweb.ihelse.net/ 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 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 (see the reference list in http://nrlweb.ihelse.net/Rapporter/Rapport2017.pdf).

In general, we can state the following:

1. A poor result for a particular prosthesis may be caused by a learning curve for its use, which means that some patients will be revised due to the lack of experience with the particular implant.
2. In our papers, we adjust for differences in patient groups such as age, gender, diagnosis, joint surface material and fixation. Some prostheses and materials tend to be used in younger and more active patients. Such patients may wear out the prosthesis faster. A prosthesis used in many such patients may have poorer results than a prosthesis used in older and less active patients. The degree of activity is not recorded in the registers.
3. A prosthesis may be used at few hospitals and in small numbers, which may mean that the revision percentage reflects the skill of the surgeon or the threshold for revision rather than the qualities of the prosthesis.
4. If a prosthesis is used in a large number of patients (>3000) and in several hospitals (>5), we consider the results more reliable.
5. Scientific papers discuss the reason for revision of the prosthesis. If there is a natural biological or mechanical reason, we have more faith in the results, i.e. we consider a high revision rate to be due to qualities of the prosthesis rather than the surgeon.
6. 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 randomised controlled trials. Furthermore, the results must be reproduced in other studies and registers before being considered valid.

Results of hip and knee arthroplasty in Norway are generally good and comparable to results in the other Nordic countries (Mäkelä K 2014, Junnila M 2016 and Robertsson O 2010), see the reference list in our annual report. The two hip prostheses with poorest ten-year results (Titan/Titan and Reflection cemented/Spectron EF) have been discontinued in Norway on the basis of results in our earlier publications (Espehaug B 2010, Hallan 2012 and Kadar T 2011). This also applies to the Duracon knee prosthesis (Gøthesen 2013).

TOTAL HIP ARTHROPLASTY

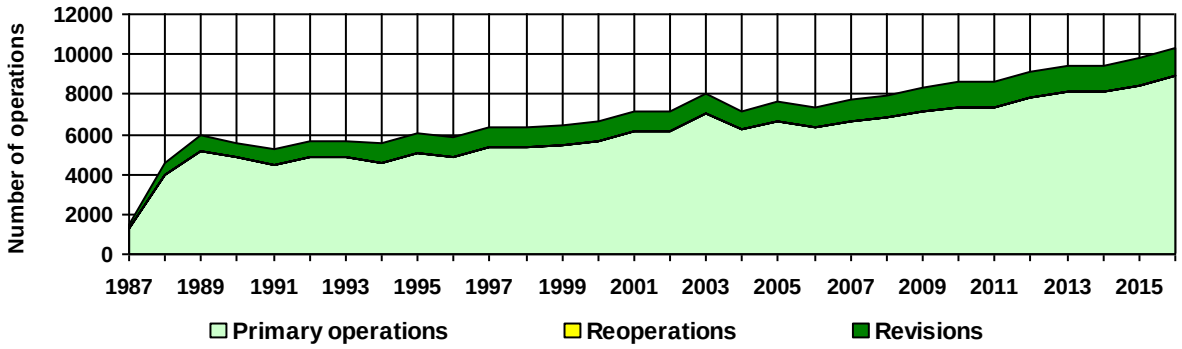
Table 1: Annual numbers of operations (Hemi prosthesis operations for hip fracture are not included here. These are found in tables of The Norwegian Hip Fracture Register)

Year	Primary operations *		Reoperations **		Revisions		Total
2016	8 881	(85,8%)	41	(0,4%)	1 433	(13,8%)	10 355
2015	8 438	(85,7%)	16	(0,2%)	1 392	(14,1%)	9 846
2014	8 127	(86,3%)	23	(0,2%)	1 269	(13,5%)	9 419
2013	8 096	(86,0%)	15	(0,2%)	1 305	(13,9%)	9 416
2012	7 846	(85,6%)	24	(0,3%)	1 291	(14,1%)	9 161
2011	7 360	(85,1%)	13	(0,2%)	1 274	(14,7%)	8 647
2010	7 330	(85,4%)	1	(0,0%)	1 257	(14,6%)	8 588
2009	7 114	(85,5%)			1 209	(14,5%)	8 323
2008	6 848	(85,9%)			1 122	(14,1%)	7 970
2007	6 660	(86,4%)			1 052	(13,6%)	7 712
2006	6 319	(86,3%)			1 007	(13,7%)	7 326
2005	6 597	(86,2%)	1	(0,0%)	1 056	(13,8%)	7 654
2004	6 218	(86,9%)			940	(13,1%)	7 158
2003	7 040	(87,7%)			990	(12,3%)	8 030
1998-02	28 841	(85,6%)	1	(0,0%)	4 844	(14,4%)	33 686
1993-97	24 670	(83,8%)	1	(0,0%)	4 754	(16,2%)	29 425
1987-92	24 663	(86,5%)			3 855	(13,5%)	28 518
Total	**181 048**	**(85,7%)**	**136**	**(0,1%)**	**30 050**	**(14,2%)**	**211 234**

* In addition, there were reports on 136 primary hemi prostheses done for other reasons than hip fractures.

** Reoperations where prosthetic parts are not changed or removed (soft tissue debridements for infected prosthesis, soft tissue procedures for gluteal insufficiency etc.).

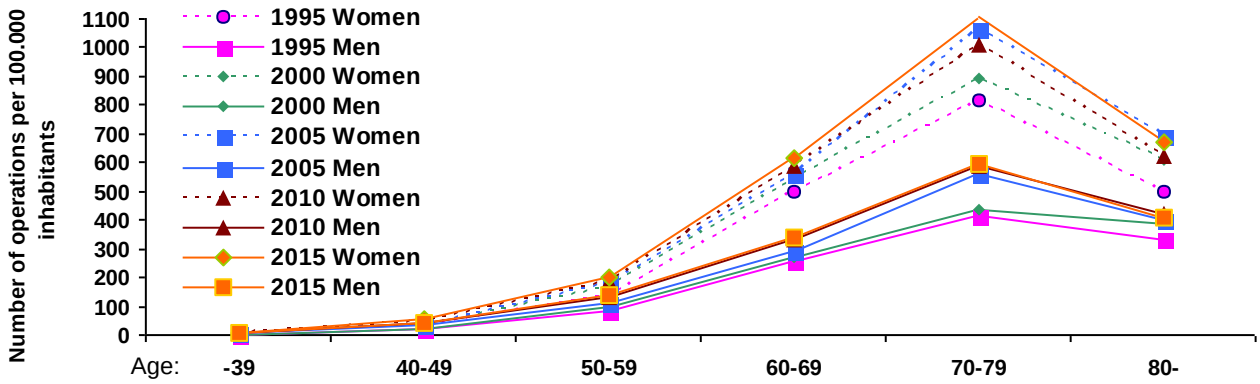
Figure 1: Annual numbers of operations



54,9 % of all operations were performed on the right side. 67,1 % performed in women.

Mean age at primary surgery was 69,0 years, 69,9 years for women and 67,1 years for men

Figure 2: Incidence of primary hip prostheses



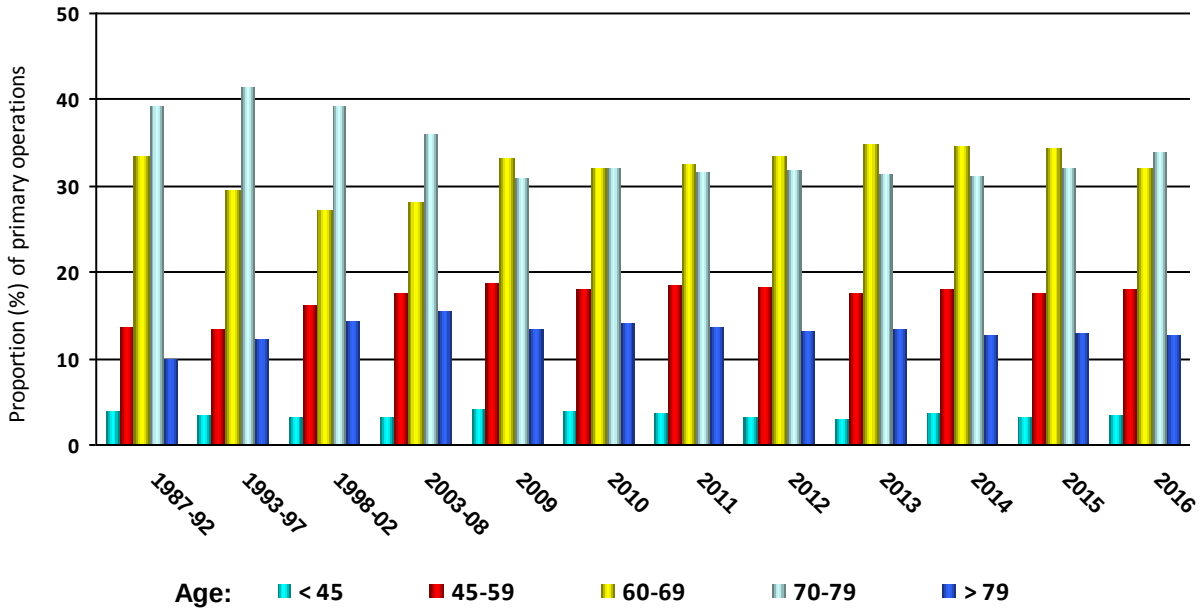
Reasons for primary operations

Table 2:

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
2016	7050	136	351	680	11	105	19	340	226	33	245	15
2015	6777	108	331	587	10	106	21	321	182	26	199	27
2014	6393	115	356	647	18	86	28	287	250	22	174	29
2013	6402	125	351	610	10	115	31	288	172	29	192	36
2012	6218	157	366	615	12	92	45	206	186	16	202	14
2011	5787	132	373	573	24	96	26	189	138	21	187	30
2010	5734	130	355	594	36	88	20	161	151	16	191	50
2009	5515	131	390	560	26	127	24	151	174	11	164	32
2008	5359	144	443	498	25	99	21	149	145	19	144	6
2007	5166	146	475	457	21	80	22	159	174	22	110	15
2006	4819	147	486	445	17	83	24	131	172	19	126	13
2005	5097	166	550	437	29	87	22	102	143	14	107	14
2004	4680	141	534	414	17	85	20	97	118	18	102	3
2003	5304	171	584	511	26	69	25	89	35	9	58	11
1998	20994	851	2891	2037	141	390	145	238	349	60	514	237
1993	17140	902	3133	1796	214	329	116	116	174	80	499	158
1987	16605	942	3303	2037	414	319	105	55	70	81	452	281
Total	**135040**	**4644**	**15272**	**13498**	**1051**	**2356**	**714**	**3079**	**2859**	**496**	**3666**	**971**

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

Figure 3: Age by year of operation



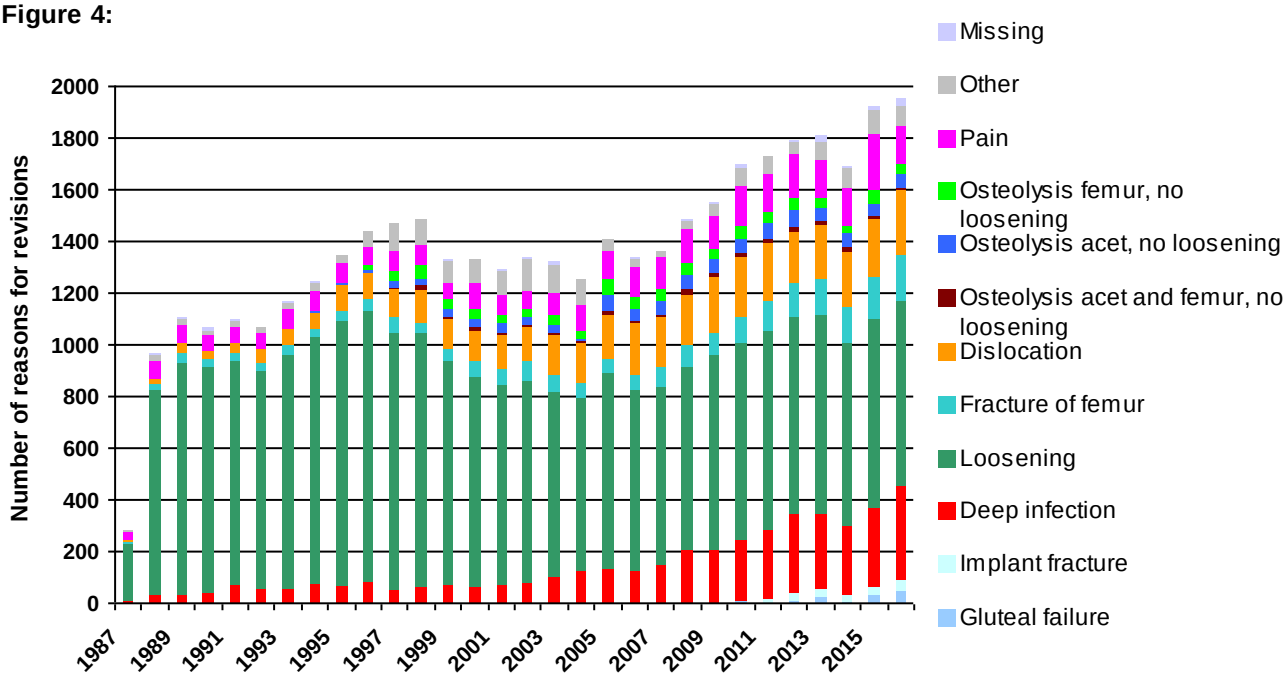
Reasons for revisions

Table 3:

Year of revision	Loosening of acetabular component	Loosening of femoral component	Dislocation	Deep infection	Periprosthetic fracture	Pain	Osteolysis acet.,no loosening	Osteolysis femur, no loosening	Polyethylene wear	Previous Girdlestone	Implant fracture	Gluteal failure	Other	Missing information
2016	445	265	254	365	175	144	50	40	29	12	47	45	128	34
2015	433	292	228	313	153	211	46	56	49	9	32	28	133	18
2014	424	281	216	266	140	147	50	36	48	18	23	10	99	12
2013	449	322	213	291	133	145	53	43	55	12	29	24	102	18
2012	445	318	203	310	123	168	70	42	49	18	30	5	83	8
2011	443	323	220	274	114	146	63	52	66	22	10	3	75	5
2010	444	319	229	239	96	154	55	50	55	45	0	7	78	12
2009	443	316	215	203	82	131	52	41	80	29	0	3	47	10
2008	399	305	192	211	79	131	54	53	63	47	0	0	31	5
2007	409	282	187	149	72	120	53	48	66	28	0	1	26	3
2006	399	295	198	126	61	119	45	46	48	22	0	0	32	2
2005	423	337	164	129	59	113	63	57	65	29	0	0	44	3
2004	371	297	152	124	60	101	11	32	78	44	0	0	104	1
2003	395	326	154	97	60	82	33	39	71	36	0	0	112	12
1998-02	2076	2157	633	338	269	370	146	203	367	167	0	0	497	27
1993-97	2270	2649	434	344	206	382	34	66	70	176	0	0	247	11
1987-92	2100	2407	179	232	154	368	0	0	25	43	0	0	118	38
Total	**12368**	**11491**	**4071**	**4011**	**2036**	**3032**	**878**	**904**	**1284**	**757**	**171**	**126**	**1956**	**219**

Revision causes are not mutually exclusive. More than one reason of revision is possible

Figure 4:



The graph is hierarchical, i.e. if a revision is marked both "Deep infection" and "Loosening", only "Deep infection" is counted.

Type of revision

Table 4a: Age 75 years old or younger

Year	Exchange of femoral stem and head	Exchange of stem, PE liner, head	Exchange of acetabular cup	Exchange of femoral head	Exchange of femoral head and acetabular cup	Exchange of all components	Exchange of PE liner only	Exchange of PE liner and femoral head	Exchange of PE liner and femoral stem	Removal of prosthesis or cement spacer	Removal of prosthesis and insertion of cement spacer	Insertion of new prosthesis (after Girdlestone)	Soft tissue debridement of infected prosthesis	Muscle resonance and transposition	Osteosynthesis for fracture	Other operation	Missing information	Total
2016	71	12	91	39	195	148	1	46	3	7	87		75	16	9	56	7	**863**
2015	92	13	113	33	162	138	3	59	5	20	68	4	56			41	3	**810**
2014	68	20	115	33	140	122	3	49	6	13	74	1	42			21	1	**708**
2013	77	8	93	43	166	138	2	43	5	15	73	2	46			15	4	**730**
2012	88	8	89	29	156	162	6	38	5	17	70	1	43			19	5	**736**
2011	83	6	102	47	157	162	3	48	9	29	25	1	36			25	2	**735**
2010	89	8	114	60	173	178	1	37	4	32	15	8	5			7	11	**742**
2009	85	6	46	57	239	176	6	54	5	30	10	7				2	2	**725**
2003-08	432	49	524	152	897	903	35	249	31	202	35	48	1			21	27	**3606**
1998-02	492	63	327	61	623	905	24	239	6	125	0	103	1			11	8	**2988**
1993-97	737	11	451	21	253	1314	15	56	8	135	0	101	1			10	4	**3117**
1987-92	647		353	8	19	1484	2	2	3	101	0	15				10	29	**2673**
Total	**2961**	**204**	**2418**	**583**	**3180**	**5830**	**101**	**920**	**90**	**726**	**457**	**291**	**306**	**16**	**9**	**238**	**103**	**18433**

Figure 5a: Age 75 years old or younger

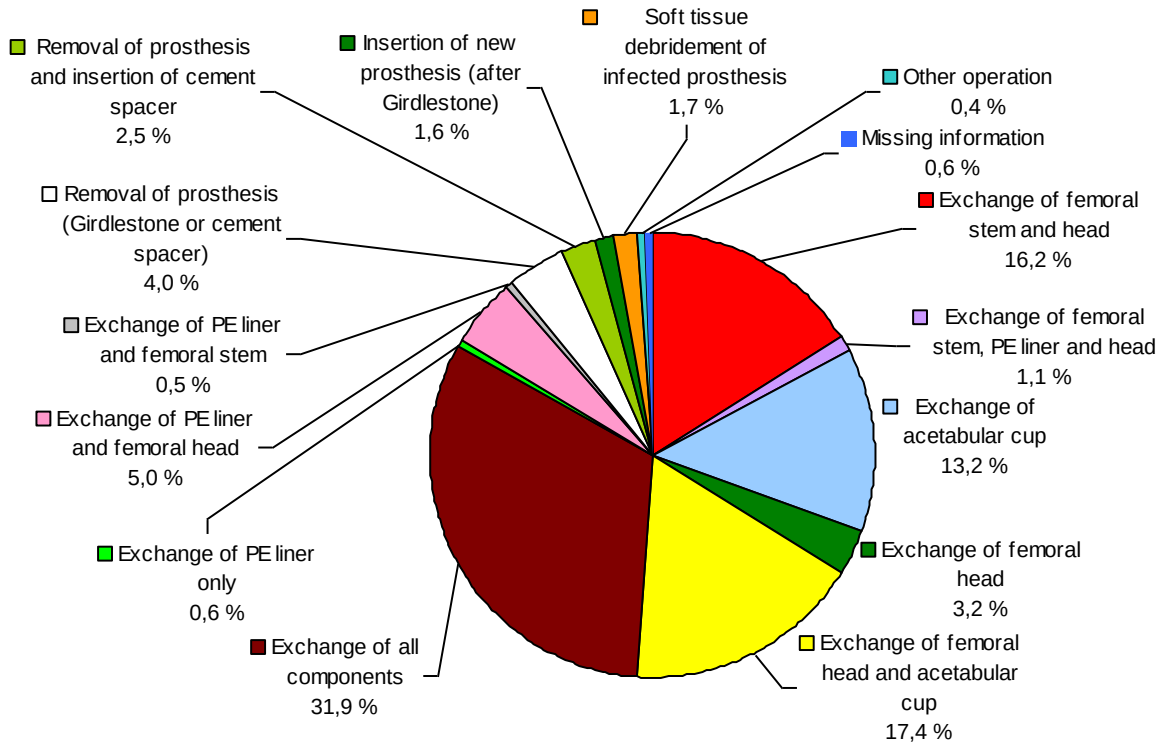
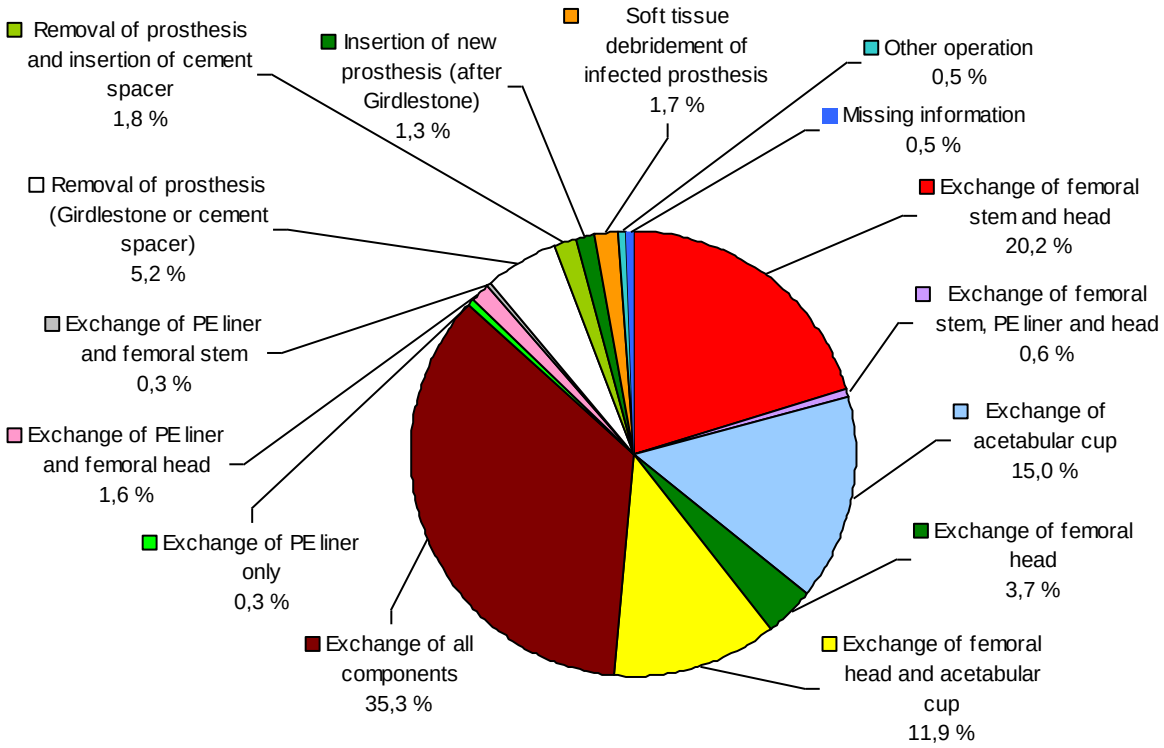


Table 4b: Age over 75 years old

Year	Exchange of femoral stem and head	Exchange of stem, PE liner, head	Exchange of acetabular cup	Exchange of femoral head	Exchange of femoral head and acetabular cup	Exchange of all components	Exchange of PE liner only	Exchange of PE liner and femoral head	Exchange of PE liner and femoral stem	Removal of prosthesis or cement spacer	Removal of prosthesis and insertion of cement spacer	Insertion of new prosthesis (after Girdlestone)	Soft tissue debridement of infected prosthesis	Muscle resonance and transposition	Osteosynthesis for fracture	Other operation	Missing information	Total
2016	69	9	76	28	96	145	1	13	3	8	48	4	44	6	26	27	1	**611**
2015	82	10	97	29	92	151	6	17	4	24	28	1	29		1	25	2	**598**
2014	87	4	90	28	100	150	5	14	2	25	18		31		1	24	5	**584**
2013	96	3	81	16	88	170	2	14	4	13	29	3	35			33	3	**590**
2012	81	3	99	32	72	158		19	2	20	37	1	32			18	5	**579**
2011	94	1	97	32	89	144	3	12	5	23	14	2	22			10	4	**552**
2010	94		87	44	77	143	1	12	1	27	6	5	4			9	6	**516**
2009	69	3	59	50	99	140	3	12	2	35	6	3				4		**485**
2003-08	437	17	418	129	384	837	10	44	7	180	25	33	1			27	14	**2563**
1998-02	499	12	207	34	189	723	5	22	4	102	0	46				6	8	**1857**
1993-97	451	2	223	11	88	705	2	4		96	0	46				8	2	**1638**
1987-92	276		203	1	9	627				46	0	4				3	13	**1182**
Total	**2335**	**64**	**1737**	**434**	**1383**	**4093**	**38**	**183**	**34**	**599**	**211**	**148**	**198**	**6**	**28**	**194**	**63**	**11755**

Figure 5b: Age over 75 years old



Bone transplantation in revisions

Table 5: Acetabular cup

Year	Yes	No	Bone impaction[1]	Missing	Total
2016	68 (4,6 %)	929 (63 %)	95 (6,4 %)	382 (25,9 %)	**1 474**
2015	102 (7,2 %)	969 (68,8 %)	92 (6,5 %)	245 (17,4 %)	**1 408**
2014	112 (8,7 %)	855 (66,2 %)	94 (7,3 %)	231 (17,9 %)	**1 292**
2013	89 (6,7 %)	849 (64,3 %)	131 (9,9 %)	251 (19 %)	**1 320**
2012	105 (8 %)	832 (63,3 %)	143 (10,9 %)	235 (17,9 %)	**1 315**
2011	112 (8,7 %)	807 (62,7 %)	181 (14,1 %)	187 (14,5 %)	**1 287**
2010	131 (10,4 %)	787 (62,6 %)	189 (15 %)	151 (12 %)	**1 258**
2009	111 (9,2 %)	715 (59,1 %)	245 (20,3 %)	138 (11,4 %)	**1 209**
2008	110 (9,8 %)	668 (59,5 %)	211 (18,8 %)	133 (11,9 %)	**1 122**
2007	132 (12,5 %)	594 (56,5 %)	193 (18,3 %)	133 (12,6 %)	**1 052**
2006	115 (11,4 %)	554 (55 %)	201 (20 %)	137 (13,6 %)	**1 007**
2005	161 (15,2 %)	526 (49,8 %)	230 (21,8 %)	140 (13,2 %)	**1 057**
2004	161 (17,1 %)	570 (60,6 %)	162 (17,2 %)	47 (5 %)	**940**
2003	162 (16,4 %)	651 (65,8 %)	147 (14,8 %)	30 (3 %)	**990**
1998-02	1 026 (21,2 %)	3 034 (62,6 %)	655 (13,5 %)	130 (2,7 %)	**4 845**
1993-97	1 337 (28,1 %)	3 081 (64,8 %)	220 (4,6 %)	117 (2,5 %)	**4 755**
1987-92	1 027 (26,6 %)	2 758 (71,5 %)	0 (0 %)	70 (1,8 %)	**3 855**
Total	**5 061 (16,8 %)**	**19 179 (63,5 %)**	**3 189 (10,6 %)**	**2 757 (9,1 %)**	**30 186**

Table 6: Femoral stem

Year	Yes	No	Bone impaction[1]	Missing	Total
2016	43 (2,9 %)	947 (64,2 %)	3 (0,2 %)	481 (32,6 %)	**1 474**
2015	70 (5 %)	980 (69,6 %)	11 (0,8 %)	347 (24,6 %)	**1 408**
2014	63 (4,9 %)	879 (68 %)	3 (0,2 %)	347 (26,9 %)	**1 292**
2013	84 (6,4 %)	881 (66,7 %)	8 (0,6 %)	347 (26,3 %)	**1 320**
2012	81 (6,2 %)	838 (63,7 %)	21 (1,6 %)	375 (28,5 %)	**1 315**
2011	116 (9 %)	818 (63,6 %)	29 (2,3 %)	324 (25,2 %)	**1 287**
2010	119 (9,5 %)	798 (63,4 %)	44 (3,5 %)	297 (23,6 %)	**1 258**
2009	129 (10,7 %)	752 (62,2 %)	45 (3,7 %)	283 (23,4 %)	**1 209**
2008	144 (12,8 %)	677 (60,3 %)	69 (6,1 %)	232 (20,7 %)	**1 122**
2007	125 (11,9 %)	601 (57,1 %)	70 (6,7 %)	256 (24,3 %)	**1 052**
2006	145 (14,4 %)	598 (59,4 %)	81 (8 %)	183 (18,2 %)	**1 007**
2005	181 (17,1 %)	570 (53,9 %)	86 (8,1 %)	220 (20,8 %)	**1 057**
2004	125 (13,3 %)	647 (68,8 %)	119 (12,7 %)	49 (5,2 %)	**940**
2003	137 (13,8 %)	726 (73,3 %)	97 (9,8 %)	30 (3 %)	**990**
1998-02	971 (20 %)	2 937 (60,6 %)	807 (16,7 %)	130 (2,7 %)	**4 845**
1993-97	1 328 (27,9 %)	2 991 (62,9 %)	319 (6,7 %)	117 (2,5 %)	**4 755**
1987-92	593 (15,4 %)	3 192 (82,8 %)	0 (0 %)	70 (1,8 %)	**3 855**
Total	**4 454 (14,8 %)**	**19 832 (65,7 %)**	**1 812 (6 %)**	**4 088 (13,5 %)**	**30 186**

1 Registration of "Bone impaction" started in 1996.

Bone loss in revisions

Table 7: Acetabular cup

Year	Type I	Type IIA	Type IIB	Type IIC	Type IIIA	Type IIIB	Missing	Total
2016	265	214	100	82	54	26	733	**1 474**
2015	241	180	108	51	59	20	749	**1 408**
2014	197	171	93	70	41	31	689	**1 292**
2013	253	186	85	78	60	25	633	**1 320**
2012	209	238	111	88	73	18	578	**1 315**
2011	227	183	116	87	66	20	588	**1 287**
2010	236	176	103	77	62	19	585	**1 258**
2009	210	165	92	78	76	27	561	**1 209**
2008	196	181	83	96	67	27	472	**1 122**
2007	185	142	88	73	55	30	479	**1 052**
2006	210	136	78	65	59	24	435	**1 007**
2005	240	137	87	74	59	23	437	**1 057**

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 superiort.
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 8: Femoral stem

Year	Type I	Type II	Type IIIA	Type IIIB	Type IV	Missisng	Total
2016	252	151	68	22	4	977	**1 474**
2015	200	134	87	17	10	960	**1 408**
2014	162	149	67	13	3	898	**1 292**
2013	234	153	67	24	4	838	**1 320**
2012	205	190	70	18	6	826	**1 315**
2011	177	165	77	21	7	840	**1 287**
2010	195	150	70	18	8	817	**1 258**
2009	155	141	68	20	9	816	**1 209**
2008	156	177	81	11	10	687	**1 122**
2007	144	129	60	18	10	691	**1 052**
2006	167	151	58	22	5	604	**1 007**
2005	210	152	72	23	10	590	**1 057**

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 superiort.
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.

Registration of bone loss started in 2005

Surgical approach

Table 9: In primary operations *

Year	Anterior		Anterolateral		Direct lateral		Posterior		Other		Missing information		Total
2016	713	(8 %)	1 143	(12,9 %)	1 425	(16 %)	5 136	(57,8 %)	5	(0,1 %)	459	(5,2 %)	**8 881**
2015	520	(6,2 %)	1 147	(13,6 %)	2 232	(26,5 %)	4 078	(48,3 %)	3	(0 %)	458	(5,4 %)	**8 438**
2014	337	(4,1 %)	1 057	(13 %)	3 173	(39 %)	3 014	(37,1 %)	17	(0,2 %)	529	(6,5 %)	**8 127**
2013	342	(4,2 %)	1 081	(13,4 %)	3 625	(44,8 %)	2 472	(30,5 %)	24	(0,3 %)	552	(6,8 %)	**8 096**
2012	438	(5,6 %)	1 023	(13 %)	3 918	(49,9 %)	2 192	(27,9 %)	12	(0,2 %)	263	(3,4 %)	**7 846**
2011	429	(5,8 %)	748	(10,2 %)	3 897	(52,9 %)	2 081	(28,3 %)	30	(0,4 %)	175	(2,4 %)	**7 360**
2010	625	(8,5 %)	470	(6,4 %)	3 918	(53,5 %)	2 154	(29,4 %)	48	(0,7 %)	115	(1,6 %)	**7 330**
2009	326	(4,6 %)	340	(4,8 %)	4 357	(61,2 %)	1 963	(27,6 %)	11	(0,2 %)	117	(1,6 %)	**7 114**
2008	68	(1 %)	387	(5,7 %)	4 360	(63,7 %)	1 927	(28,1 %)	8	(0,1 %)	98	(1,4 %)	**6 848**
2007	14	(0,2 %)	404	(6,1 %)	4 417	(66,3 %)	1 711	(25,7 %)	10	(0,2 %)	104	(1,6 %)	**6 660**
2006	2	(0 %)	452	(7,2 %)	4 270	(67,6 %)	1 482	(23,5 %)	3	(0 %)	110	(1,7 %)	**6 319**
2005	7	(0,1 %)	521	(7,9 %)	4 419	(67 %)	1 534	(23,3 %)	4	(0,1 %)	112	(1,7 %)	**6 597**
2004	8	(0,1 %)	462	(7,4 %)	4 285	(68,9 %)	1 437	(23,1 %)	6	(0,1 %)	20	(0,3 %)	**6 218**
2003	12	(0,2 %)	591	(8,4 %)	4 846	(68,8 %)	1 559	(22,1 %)	3	(0 %)	29	(0,4 %)	**7 040**
1998-02	49	(0,2 %)	2 116	(7,3 %)	9 756	(68,5 %)	6 790	(23,5 %)	34	(0,1 %)	96	(0,3 %)	**28 841**
1993-97	67	(0,3 %)	1 464	(5,9 %)	6 871	(68,4 %)	6 153	(24,9 %)	26	(0,1 %)	89	(0,4 %)	**24 670**
1987-92	61	(0,2 %)	1 627	(6,6 %)	6 201	(65,7 %)	6 544	(26,5 %)	13	(0,1 %)	217	(0,9 %)	**24 663**
Total	**4 018**	**(2,2 %)**	**15 033**	**(8,3 %)**	**05 970**	**(58,5 %)**	**52 227**	**(28,8 %)**	**257**	**(0,1 %)**	**3 543**	**(2 %)**	**181 048**

Figure 6: In primary operations *

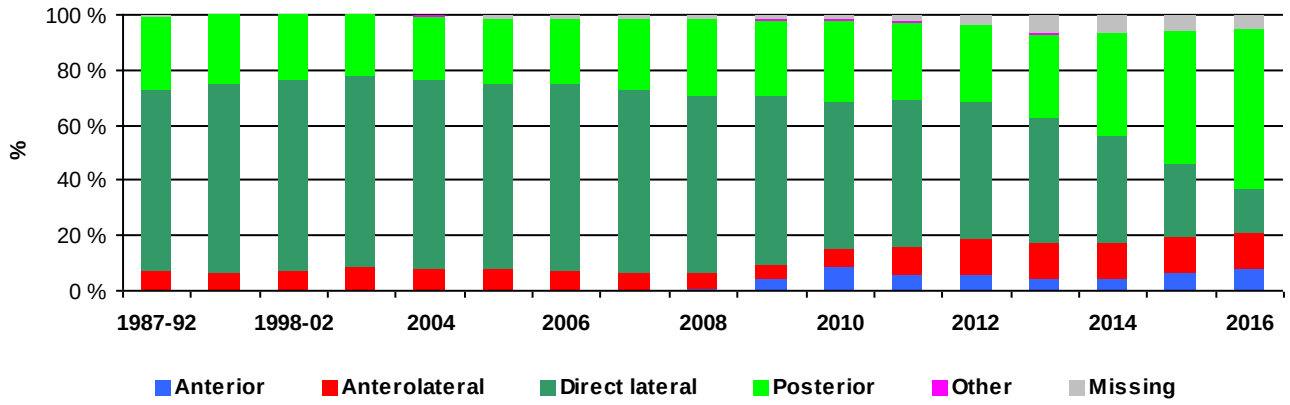


Table 10: Mini invasive surgery in primary surgery

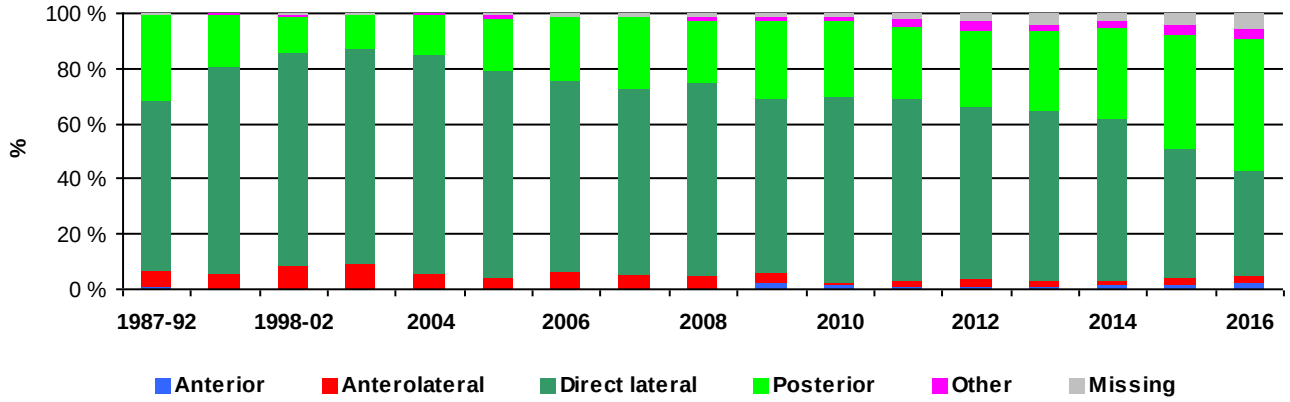
Year	Yes		No		Missing		Total
2016	1 793	(20,2%)	6 853	(77,2%)	235	(2,6%)	**8 881**
2015	1 593	(18,9%)	6 533	(77,4%)	312	(3,7%)	**8 438**
2014	1 336	(16,4%)	6 520	(80,2%)	271	(3,3%)	**8 127**
2013	1 407	(17,4%)	6 317	(78,0%)	372	(4,6%)	**8 096**
2012	1 327	(16,9%)	5 860	(74,7%)	659	(8,4%)	**7 846**
2011	1 000	(13,6%)	6 005	(81,6%)	355	(4,8%)	**7 360**
2010	934	(12,7%)	6 171	(84,2%)	225	(3,1%)	**7 330**
2009	398	(5,6%)	6 670	(93,8%)	46	(0,6%)	**7 114**
2008	65	(0,9%)	6 755	(98,6%)	28	(0,4%)	**6 848**
2007	4	(0,1%)	6 567	(98,6%)	89	(1,3%)	**6 660**
2006	58	(0,9%)	6 006	(95,0%)	255	(4,0%)	**6 319**
2005	144	(2,2%)	5 814	(88,1%)	639	(9,7%)	**6 597**

* 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
2016	27	(1,8 %)	44	(3 %)	563	(38,2 %)	700	(47,5 %)	54	(3,7 %)	86	(5,8 %)	**1 474**
2015	24	(1,7 %)	35	(2,5 %)	661	(46,9 %)	572	(40,6 %)	50	(3,6 %)	66	(4,7 %)	**1 408**
2014	16	(1,2 %)	25	(1,9 %)	762	(59 %)	426	(33 %)	23	(1,8 %)	40	(3,1 %)	**1 292**
2013	7	(0,5 %)	31	(2,3 %)	817	(61,9 %)	379	(28,7 %)	33	(2,5 %)	53	(4 %)	**1 320**
2012	11	(0,8 %)	35	(2,7 %)	828	(63 %)	353	(26,8 %)	46	(3,5 %)	42	(3,2 %)	**1 315**
2011	9	(0,7 %)	26	(2 %)	851	(66,1 %)	335	(26 %)	30	(2,3 %)	36	(2,8 %)	**1 287**
2010	14	(1,1 %)	17	(1,4 %)	843	(67 %)	347	(27,6 %)	19	(1,5 %)	18	(1,4 %)	**1 258**
2009	24	(2 %)	42	(3,5 %)	770	(63,7 %)	341	(28,2 %)	12	(1 %)	20	(1,7 %)	**1 209**
2008	3	(0,3 %)	52	(4,6 %)	787	(70,1 %)	251	(22,4 %)	10	(0,9 %)	19	(1,7 %)	**1 122**
2007	1	(0,1 %)	55	(5,2 %)	706	(67,1 %)	273	(26 %)	2	(0,2 %)	15	(1,4 %)	**1 052**
2006	1	(0,1 %)	61	(6,1 %)	699	(69,4 %)	231	(22,9 %)	2	(0,2 %)	13	(1,3 %)	**1 007**
2005	3	(0,3 %)	44	(4,2 %)	789	(74,6 %)	198	(18,7 %)	14	(1,3 %)	9	(0,9 %)	**1 057**
2004	2	(0,2 %)	52	(5,5 %)	731	(77,8 %)	134	(14,3 %)	2	(0,2 %)	19	(2 %)	**940**
2003	1	(0,1 %)	85	(8,6 %)	738	(74,5 %)	114	(11,5 %)	6	(0,6 %)	46	(4,6 %)	**990**
1998-02	15	(0,3 %)	396	(8,2 %)	3 691	(76,2 %)	647	(13,4 %)	40	(0,8 %)	56	(1,2 %)	**4 845**
1993-97	5	(0,1 %)	274	(5,8 %)	3 537	(74,4 %)	895	(18,8 %)	19	(0,4 %)	25	(0,5 %)	**4 755**
1987-92	15	(0,4 %)	244	(6,3 %)	2 386	(61,9 %)	1 179	(30,6 %)	7	(0,2 %)	24	(0,6 %)	**3 855**
Total	**178**	**(0,6 %)**	**1 518**	**(5 %)**	**20 159**	**(66,8 %)**	**7 375**	**(24,4 %)**	**369**	**(1,2 %)**	**587**	**(1,9 %)**	**30 186**

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

Trochanteric osteotomy

Table 12:

	Primary operations						Revisions						
Year	**No**		**Yes**		**Missing**		**No**		**Yes**		**Missing**		**Total**
2016	8 391	(94,5 %)	24	(0,3 %)	466	(5,2 %)	1 288	(87,4 %)	91	(6,2 %)	95	(6,4 %)	**10 355**
2015	7 597	(90 %)	29	(0,3 %)	812	(9,6 %)	1 201	(85,3 %)	96	(6,8 %)	111	(7,9 %)	**9 846**
2014	7 389	(90,9 %)	20	(0,2 %)	718	(8,8 %)	1 111	(86 %)	66	(5,1 %)	115	(8,9 %)	**9 419**
2013	7 226	(89,3 %)	58	(0,7 %)	812	(10 %)	1 158	(87,7 %)	65	(4,9 %)	97	(7,3 %)	**9 416**
2012	7 042	(89,8 %)	37	(0,5 %)	767	(9,8 %)	1 078	(82 %)	111	(8,4 %)	126	(9,6 %)	**9 161**
2011	6 624	(90 %)	29	(0,4 %)	707	(9,6 %)	1 064	(82,7 %)	123	(9,6 %)	100	(7,8 %)	**8 647**
2010	6 690	(91,3 %)	38	(0,5 %)	602	(8,2 %)	1 061	(84,3 %)	106	(8,4 %)	91	(7,2 %)	**8 588**
2009	6 584	(92,5 %)	59	(0,8 %)	471	(6,6 %)	1 013	(83,8 %)	121	(10 %)	75	(6,2 %)	**8 323**
2008	6 248	(91,2 %)	59	(0,9 %)	541	(7,9 %)	954	(85 %)	106	(9,4 %)	62	(5,5 %)	**7 970**
2007	6 105	(91,7 %)	75	(1,1 %)	480	(7,2 %)	867	(82,4 %)	112	(10,6 %)	73	(6,9 %)	**7 712**
2006	5 718	(90,5 %)	87	(1,4 %)	514	(8,1 %)	836	(83 %)	104	(10,3 %)	67	(6,7 %)	**7 326**
2005	5 985	(90,7 %)	112	(1,7 %)	500	(7,6 %)	864	(81,7 %)	102	(9,6 %)	91	(8,6 %)	**7 654**
2004	5 998	(96,5 %)	130	(2,1 %)	90	(1,4 %)	808	(86 %)	99	(10,5 %)	33	(3,5 %)	**7 158**
2003	6 706	(95,3 %)	213	(3 %)	121	(1,7 %)	862	(87,1 %)	97	(9,8 %)	31	(3,1 %)	**8 030**
1998-02	27 628	(95,8 %)	930	(3,2 %)	283	(1 %)	4 157	(85,8 %)	593	(12,2 %)	95	(2 %)	**33 686**
1993-97	22 306	(90,4 %)	2 192	(8,9 %)	172	(0,7 %)	4 094	(86,1 %)	600	(12,6 %)	61	(1,3 %)	**29 425**
1987-92	19 347	(78,4 %)	4 986	(20,2 %)	330	(1,3 %)	2 934	(76,1 %)	873	(22,6 %)	48	(1,2 %)	**28 518**
Total	**163 584**	**(90,4 %)**	**9 078**	**(5 %)**	**8 386**	**(4,6 %)**	**25 350**	**(84 %)**	**3 465**	**(11,5 %)**	**1 371**	**(4,5 %)**	**211 234**

Antibiotic prophylaxis

Table 13:

	Primary operations						Revisions						
Year	**No**		**Yes**		**Missing**		**No**		**Yes**		**Missing**		**Total**
2016	3	(0 %)	8 826	(99,4 %)	52	(0,6 %)	82	(5,6 %)	1 363	(92,5 %)	29	(2 %)	**10 355**
2015	0	(0 %)	8 399	(99,5 %)	39	(0,5 %)	9	(0,6 %)	1 378	(97,9 %)	21	(1,5 %)	**9 846**
2014	1	(0 %)	8 088	(99,5 %)	38	(0,5 %)	8	(0,6 %)	1 276	(98,8 %)	8	(0,6 %)	**9 419**
2013	2	(0 %)	8 057	(99,5 %)	37	(0,5 %)	8	(0,6 %)	1 294	(98 %)	18	(1,4 %)	**9 416**
2012	2	(0 %)	7 810	(99,5 %)	34	(0,4 %)	11	(0,8 %)	1 291	(98,2 %)	13	(1 %)	**9 161**
2011	6	(0,1 %)	7 332	(99,6 %)	22	(0,3 %)	43	(3,3 %)	1 236	(96 %)	8	(0,6 %)	**8 647**
2010	6	(0,1 %)	7 297	(99,5 %)	27	(0,4 %)	45	(3,6 %)	1 203	(95,6 %)	10	(0,8 %)	**8 588**
2009	32	(0,4 %)	7 081	(99,5 %)	1	(0 %)	37	(3,1 %)	1 170	(96,8 %)	2	(0,2 %)	**8 323**
2008	39	(0,6 %)	6 804	(99,4 %)	5	(0,1 %)	38	(3,4 %)	1 077	(96 %)	7	(0,6 %)	**7 970**
2007	27	(0,4 %)	6 626	(99,5 %)	7	(0,1 %)	30	(2,9 %)	1 015	(96,5 %)	7	(0,7 %)	**7 712**
2006	37	(0,6 %)	6 282	(99,4 %)	0	(0 %)	28	(2,8 %)	979	(97,2 %)	0	(0 %)	**7 326**
2005	25	(0,4 %)	6 572	(99,6 %)	0	(0 %)	18	(1,7 %)	1 039	(98,3 %)	0	(0 %)	**7 654**
2004	1	(0 %)	6 217	(100 %)	0	(0 %)	6	(0,6 %)	929	(98,8 %)	5	(0,5 %)	**7 158**
2003	1	(0 %)	7 038	(100 %)	1	(0 %)	8	(0,8 %)	975	(98,5 %)	7	(0,7 %)	**8 030**
1998-02	41	(0,1 %)	28 793	(99,8 %)	7	(0 %)	29	(0,6 %)	4 809	(99,3 %)	7	(0,1 %)	**33 686**
1993-97	109	(0,4 %)	24 556	(99,5 %)	5	(0 %)	42	(0,9 %)	4 709	(99 %)	4	(0,1 %)	**29 425**
1987-92	1 706	(6,9 %)	22 915	(92,9 %)	42	(0,2 %)	152	(3,9 %)	3 681	(95,5 %)	22	(0,6 %)	**28 518**
Total	**2 038**	**(1,1 %)**	**178 693**	**(98,7 %)**	**317**	**(0,2 %)**	**594**	**(2 %)**	**29 424**	**(97,5 %)**	**168**	**(0,6 %)**	**211 234**

Fixation in primary operations

Figure 8a: All patients

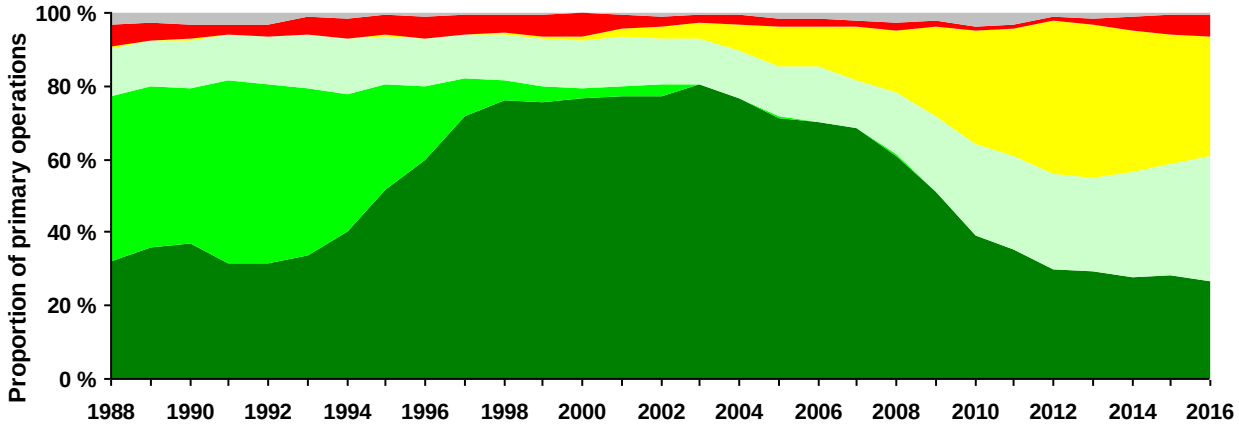
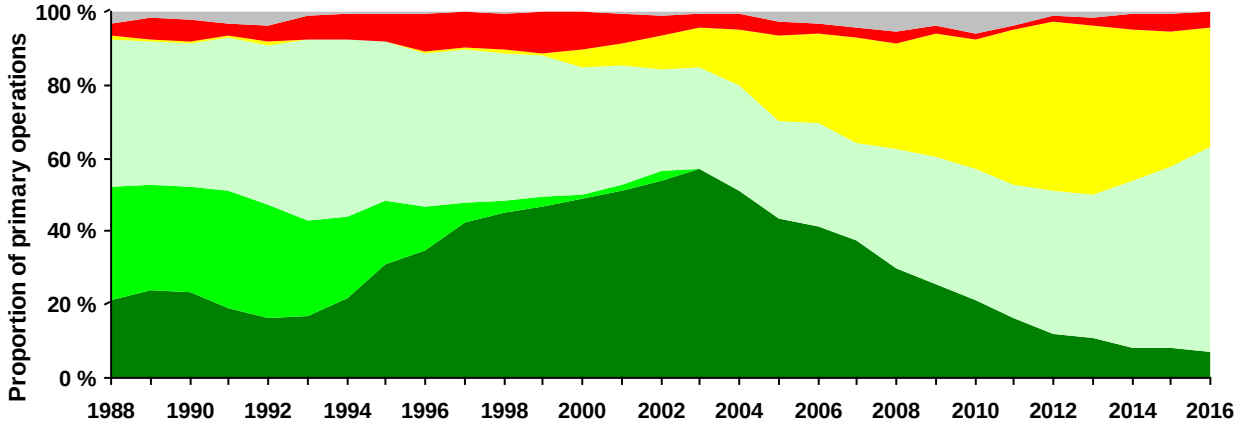
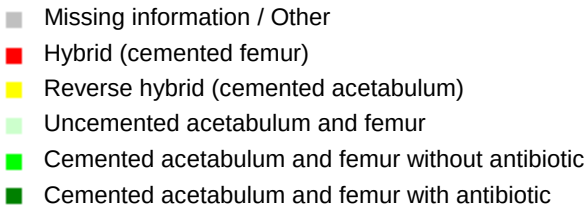


Figure 8b: Patients under 65 years old





Fixation in primary operations (cont.)

Figure 8c: Patients 65 years or older and under 75 years old

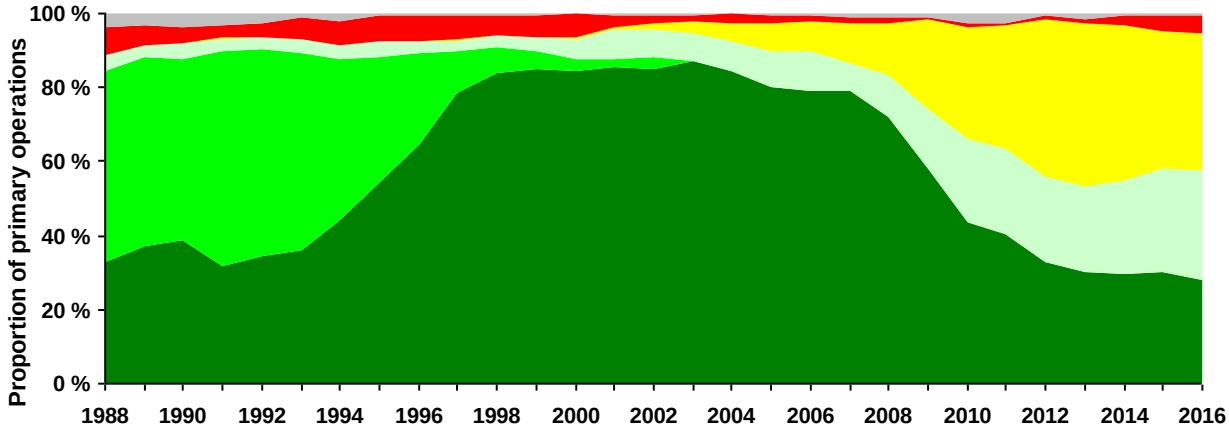
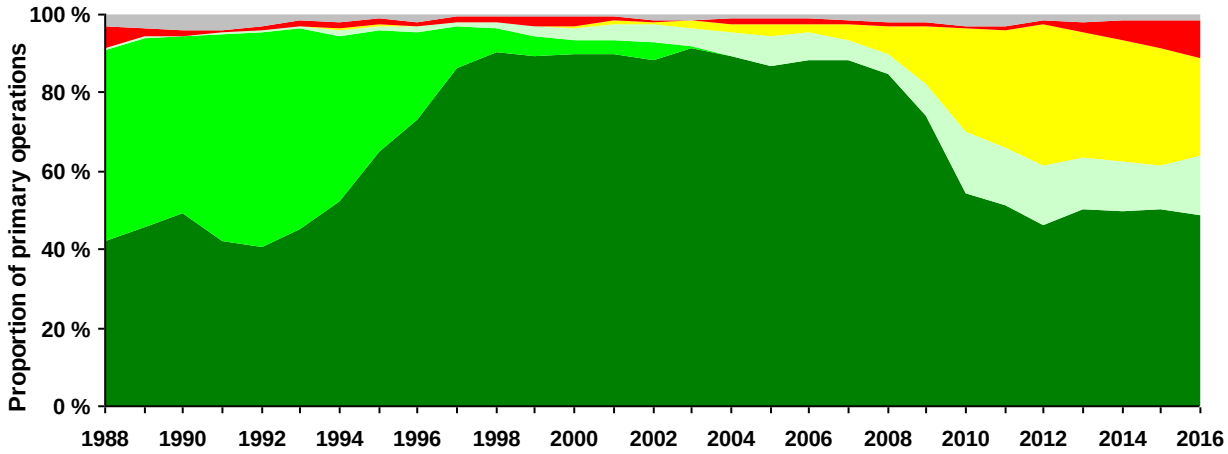
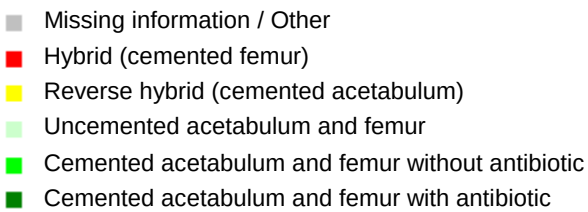


Figure 8d: Patients over 75 years old





Fixation in revisions

Figure 9: Acetabular cup - All patients

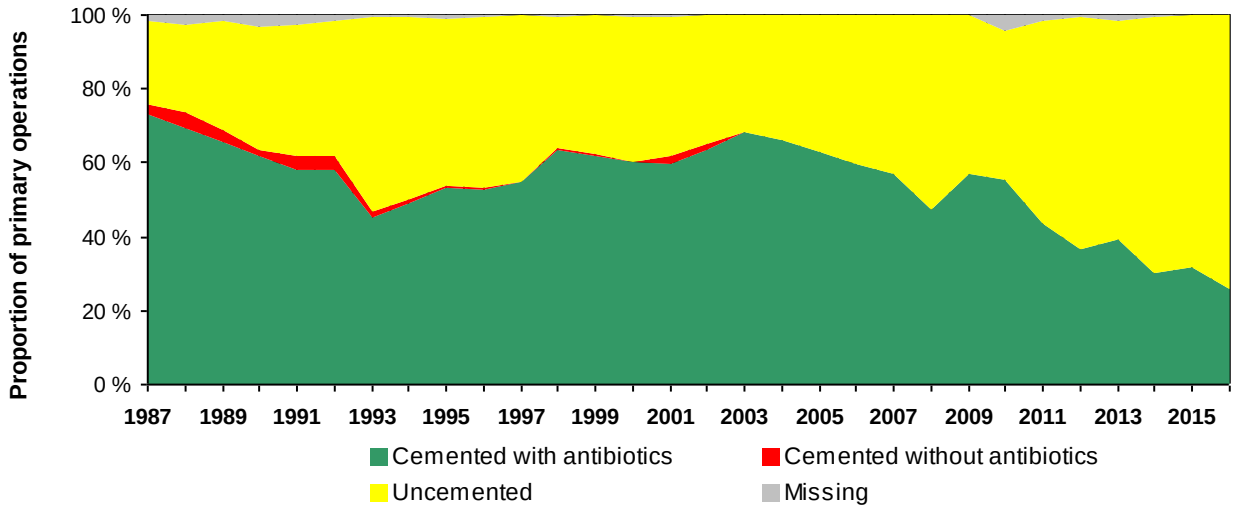
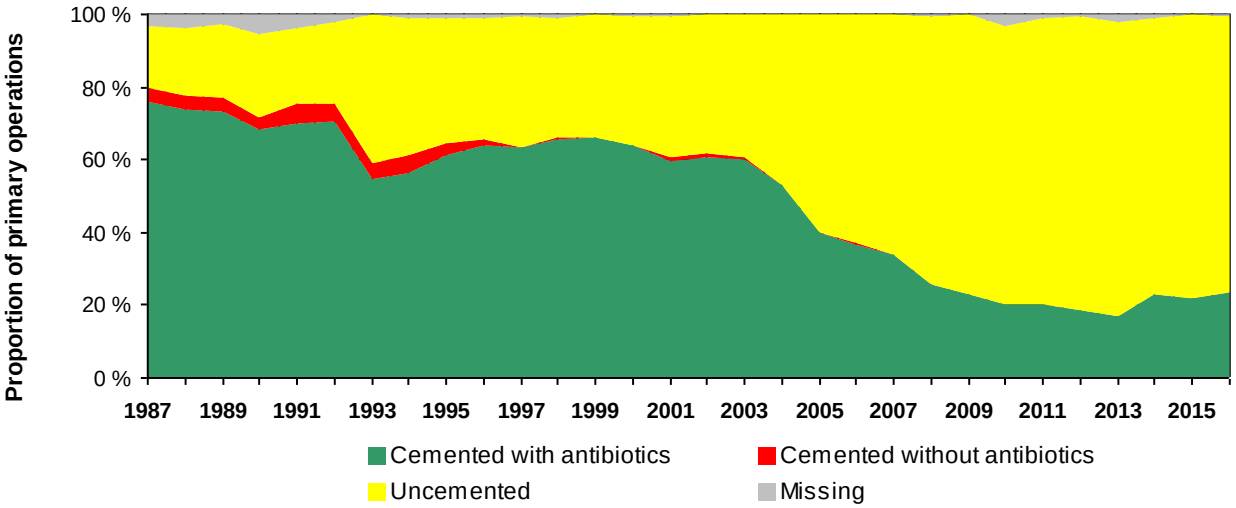


Figure 10: Femoral stem - All patients



Type of fixation and bone transplantation in revisions

Table 14: Acetabular cup

	Cemented					Uncemented				
	Bone impaction	Bone transpl.	No	Missing	Total	Bone impaction	Bone transpl.	No	Missing	Total
2016	16%	7%	58%	19%	231	6%	7%	70%	17%	686
2015	21%	9%	63%	7%	300	5%	12%	69%	15%	638
2014	26%	10%	56%	8%	259	4%	14%	67%	14%	593
2013	31%	7%	50%	12%	347	4%	11%	71%	13%	521
2012	36%	8%	46%	10%	316	5%	14%	71%	11%	555
2011	42%	7%	44%	6%	377	4%	16%	67%	13%	471
2010	37%	10%	49%	5%	477	3%	23%	66%	8%	347
2009	45%	8%	43%	4%	469	9%	20%	64%	6%	353
2003-08	40%	12%	43%	4%	2 508	7%	29%	59%	5%	1 658
1998-02	28%	22%	49%	0%	1 989	8%	45%	46%	1%	1 163
1993-97	10%	27%	61%	2%	1 659	3%	57%	38%	2%	1 512
1987-92	0%	23%	76%	1%	1 848	0%	65%	33%	2%	874
Total	**25%**	**17%**	**54%**	**4%**	**10 780**	**5%**	**32%**	**56%**	**7%**	**9 371**

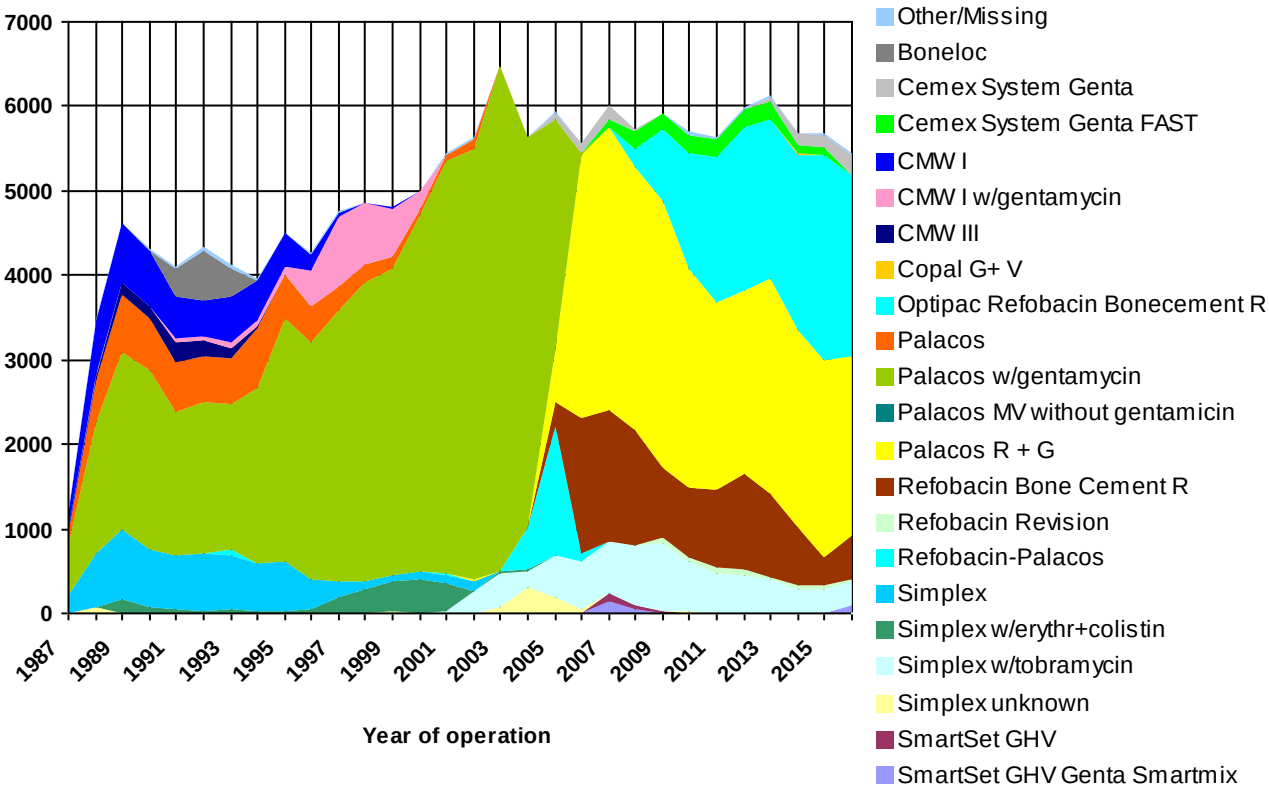
Table 15: Femoral stem

	Cemented					Uncemented				
	Bone impaction	Bone transpl.	No	Missing	Total	Bone impaction	Bone transpl.	No	Missing	Total
2016	0%	1%	77%	23%	124	1%	7%	75%	17%	406
2015	2%	4%	82%	12%	117	2%	9%	76%	14%	427
2014	3%	3%	63%	32%	114	0%	13%	74%	14%	375
2013	6%	4%	62%	27%	95	0%	14%	72%	14%	457
2012	13%	4%	60%	23%	100	1%	15%	71%	13%	430
2011	20%	4%	56%	20%	100	2%	22%	65%	11%	389
2010	29%	5%	58%	8%	106	2%	24%	66%	8%	398
2009	28%	5%	50%	17%	113	1%	25%	64%	10%	375
2003-08	35%	8%	53%	4%	1 176	4%	35%	55%	6%	1 631
1998-02	36%	15%	48%	1%	1 812	14%	52%	33%	1%	1 013
1993-97	11%	24%	64%	2%	2 120	7%	63%	29%	1%	1 231
1987-92	0%	6%	92%	2%	2 369	0%	65%	34%	1%	651
Total	**17%**	**13%**	**67%**	**4%**	**8 346**	**4%**	**36%**	**53%**	**7%**	**7 783**

Registration of "Bone impaction" started in 1996

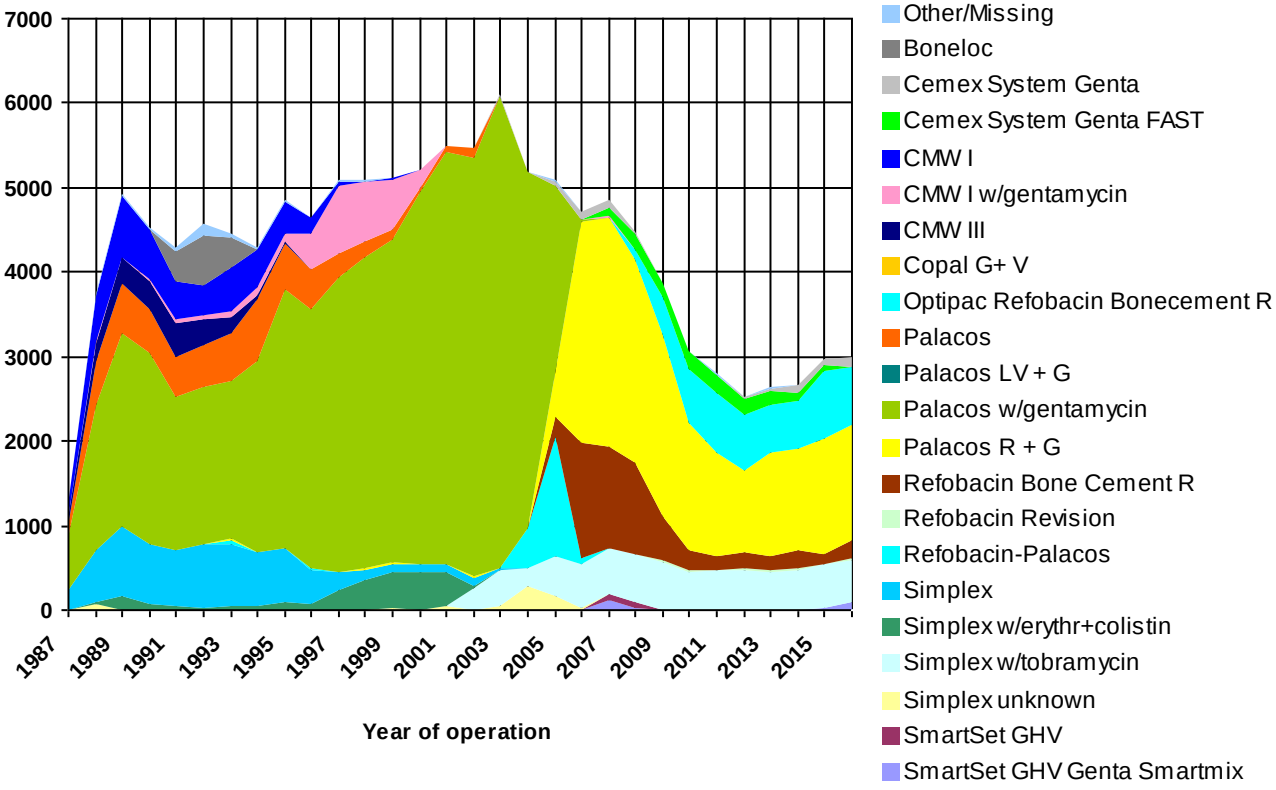
Cements used in the acetabulum

Figure 11: In primary- and revision surgeries



Cements used in the femur

Figure 12: In primary- and revision surgeries



Cemented primary prostheses

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

Cup	Stem	1987-08	2009	2010	2011	2012	2013	2014	2015	2016	Total
CHARNLEY	CHARNLEY	39479	345	223	115	112	65	39			**40378**
EXETER	EXETER	11607	577	496	155	80	25				**12940**
REFLECTION CEM. ALL POLY	SPECTRON-EF	8823	546	134	112	85	33	1			**9734**
TITAN	TITAN	6796	152	7							**6955**
EXETER X3 RIMFIT	EXETER			54	604	982	1173	1156	1352	1303	**6624**
IP	LUBINUS SP II	2380	569	627	525	471	415	279	304	261	**5831**
CONTEMPORARY	EXETER	2312	701	734	627	188	104	54	14	3	**4737**
SPECTRON	ITH	2405									**2405**
MARATHON	CHARNLEY MODULAR	8	182	323	282	203	196	225	134	45	**1598**
KRONOS	TITAN	1413	54	16							**1483**
ELITE	TITAN	1185	39								**1224**
ELITE	CHARNLEY	934		2	1						**937**
REFLECTION CEM. ALL POLY	ITH	926									**926**
REFLECTION CEM. ALL POLY	BIO-FIT	898									**898**
WEBER ALLO PRO	MS-30	813									**813**
ELITE	EXETER	677	69	31		1					**778**
LUBINUS	LUBINUS SP II	13					125	167	250	212	**767**
ZCA	CPT	756									**756**
CHARNLEY	CHARNLEY MODULAR	528	129		1	1		1			**660**
MARATHON	EXETER	4	18	17	18	70	82	90	120	184	**603**
IP	LUBINUS	587									**587**
ELITE	ELITE	577	1	1							**579**
CHARNLEY	EXETER	571									**571**
TITAN	FJORD	523									**523**
ELITE	CHARNLEY MODULAR	194	111	53	57	48	30	21			**514**
SPECTRON	SP I	432									**432**
MODULAR HIP SYSTEM	BIO-FIT	430									**430**
SPECTRON	TITAN	411									**411**
CHARNLEY	C-STEM	378									**378**
CHARNLEY	ELITE	375									**375**
OPERA	SPECTRON-EF	355	1								**356**
ELITE	MS-30	331									**331**
AVANTAGE	EXETER	3	18	29	37	41	47	61	37	36	**309**
PEARL	TITAN	285									**285**
MODULAR HIP SYSTEM	ITH	277									**277**
MARATHON	LUBINUS SP II		1	11	8	11	20	43	64	110	**268**
SPECTRON	BIO-FIT	226									**226**
IP	SP I	214									**214**
MARATHON	C-STEM	7	18	9					41	127	**202**
LMT	LMT	191									**191**
ELITE	CPT	141	24	16	1						**182**
ZCA	CPS-PLUS	168									**168**
MÜLLER TYPE	MÜLLER TYPE	166									**166**
PE-PLUS	CPS-PLUS	159	5								**164**
ELITE	C-STEM	121									**121**

Uncemented primary prostheses

Table 17: (The 45 most common combinations of cup and stem)

Cup	Stem	1987-08	2009	2010	2011	2012	2013	2014	2015	2016	Total
REFLECTION UNCEMENTED	CORAIL	494	209	520	529	674	745	822	540	169	**4702**
IGLOO	FILLER	1857	144	208	228	249	210	171	123	165	**3355**
PINNACLE	CORAIL	237	91	116	296	455	357	318	383	488	**2741**
TRILOGY	CORAIL	866	306	182	128	182	216	272	248	325	**2725**
TROPIC	CORAIL	2659									**2659**
ATOLL	CORAIL	1280									**1280**
DURALOC	CORAIL	419	84	188	238	72	62				**1063**
Continuum Acetabular System	CORAIL							187	302	330	**819**
R3	CORAIL				1	1			121	491	**614**
BICON-PLUS	ZWEYMÜLLER	570	16								**586**
TRIDENT	CORAIL	13	8	24	3	17	26	72	112	265	**540**
REFLECTION UNCEMENTED	SECURFIT	33	83	128	146	91	32				**513**
TRILOGY	SCP/UNIQUE	502	3	3			1				**509**
TRILOGY	HACTIV	330	57	38	4	12	7				**448**
TRIDENT	ACCOLADE II						42	75	173	126	**416**
GEMINI	PROFILE	407									**407**
R3	POLARSTEM			21	68	56	80	49	48	69	**391**
BICON-PLUS	HACTIV	386									**386**
DURALOC	PROFILE	332									**332**
REFLECTION UNCEMENTED	HACTIV	1					9	3	117	183	**313**
REFLECTION UNCEMENTED	OMNIFIT	153	72	47	22	6					**300**
DURALOC	SCP/UNIQUE	267									**267**
TRILOGY	FILLER	85	33	45	40	38	18		2		**261**
ENDLER	ZWEYMÜLLER	247									**247**
EUROPEAN CUP SYSTEM	TAPERLOC	240									**240**
REFLECTION UNCEMENTED	SCP/UNIQUE	122	36	13	6	1	14	25	13	10	**240**
PLASMACUP	BICONTACT	232									**232**
LMT	TAPERLOC	224									**224**
TRIDENT	ABG II			6	22	29	52	81	22		**212**
R3	FILLER							30	88	90	**208**
TI-FIT	BIO-FIT	175									**175**
REFLECTION UNCEMENTED	SL-PLUS MIA		12	157							**169**
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	137	9		2			1	1		**150**
REFLECTION UNCEMENTED	PROFEMUR GLADIATOR			3	37	60	37	1			**138**
AVANTAGE	CORAIL	28	25	19	12	16	4	2	2	30	**138**
TRILOGY	OMNIFIT	102	23	9							**134**
TRIDENT	POLARSTEM							43	58	21	**122**
TITAN	CORAIL	116									**116**
REFLECTION UNCEMENTED	BICONTACT	101									**101**

Hybrid primary prostheses

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

Cup (uncemented)	Stem (cemented)	1987-08	2009	2010	2011	2012	2013	2014	2015	2016	Total
TRILOGY	EXETER	307	20	29	53	44	88	201	232	236	**1210**
TROPIC	TITAN	869									**869**
MORSCHER	MS-30	612	30	25							**667**
TRILOGY	CHARNLEY	382									**382**
ENDLER	TITAN	336									**336**
R3	LUBINUS SP II								41	140	**181**
REFLECTION UNCEMENTED	LUBINUS SP II	4			1	2	32	62	78	1	**180**
DURALOC	CHARNLEY	153									**153**
TRIDENT	EXETER	69	17	1	1		1	10	22	30	**151**
REFLECTION UNCEMENTED	BIO-FIT	142									**142**
REFLECTION UNCEMENTED	SPECTRON-EF	109	11			1	1				**122**
AVANTAGE	EXETER	17	2	2	8	20	7	10	15	32	**113**
ATOLL	TITAN	105									**105**
IP	SP I	101									**101**
TRILOGY	CPT	89									**89**
REFLECTION UNCEMENTED	C-STEM							1	24	61	**86**
HG II	ANATOMIC CC	80									**80**
GEMINI	CHARNLEY	77									**77**
TI-FIT	BIO-FIT	53									**53**
TROPIC	EXETER	47									**47**

Table 19: Reverse hybrid primary prostheses. (The 20 most common)

Cup (cemented)	Stem (uncemened)	1987-08	2009	2010	2011	2012	2013	2014	2015	2016	Total
MARATHON	CORAIL	7	390	1127	1757	2735	2935	2760	2602	2377	**16690**
ELITE	CORAIL	1451	334	249	227	205	86	70	3	2	**2627**
REFLECTION CEM. ALL POLY	CORAIL	674	268	193	15	25	21	22	30	29	**1277**
TITAN	CORAIL	568	181	132	48	1					**930**
CONTEMPORARY	CORAIL	51	183	202	236	6	2	1			**681**
KRONOS	CORAIL	407	121	98	7						**633**
REFLECTION CEM. ALL POLY	HACTIV	225	63	26	49	91	20	1			**475**
EXETER X3 RIMFIT	CORAIL	1		2	58	42	70	88	46	129	**436**
EXETER X3 RIMFIT	ACCOLADE II						59	49	119	141	**368**
REFLECTION CEM. ALL POLY	FILLER	118	24	10	12	23	26	19	1		**233**
IP	CORAIL	75	47	43	16	4	11	3	2	5	**206**
EXETER	CORAIL	100	45	26		2					**173**
EXETER	ABG II	172									**172**
REFLECTION CEM. ALL POLY	TAPERLOC	155									**155**
EXETER X3 RIMFIT	ABG II			10	69	60	8				**147**
AVANTAGE	CORAIL	6	5	15	23	11	15	19	13	14	**121**
EXETER X3 RIMFIT	FILLER				1		22	36	34	25	**118**
CHARNLEY	CORAIL	102	12	2			1				**117**
ELITE	SCP/UNIQUE	80	8	2	3	2	2	1			**98**
OPERA	CORAIL	84	5								**89**

Acetabular cups in primary operations

Table 20: (The 45 most common)

Cup	1987-08	2009	2010	2011	2012	2013	2014	2015	2016	Total
CHARNLEY	42153	489	230	117	114	66	40			**43209**
MARATHON	32	659	1556	2139	3087	3317	3188	3042	2982	**20002**
REFLECTION CEM. ALL POLY	12173	926	387	193	234	108	53	36	33	**14143**
EXETER	12105	625	522	156	84	26	1			**13519**
TITAN	8266	340	161	48	1					**8816**
ELITE	6065	615	391	304	261	118	94	4	2	**7854**
EXETER X3 RIMFIT	1		71	745	1103	1369	1360	1569	1613	**7831**
REFLECTION UNCEMENTED	1537	511	907	767	848	933	970	798	433	**7704**
IP	3412	634	715	559	488	441	286	313	266	**7114**
TRILOGY	3260	455	340	243	292	349	509	517	576	**6541**
CONTEMPORARY	2398	891	957	889	195	110	56	14	3	**5513**
TROPIC	3823									**3823**
SPECTRON	3652									**3652**
IGLOO	2078	145	211	230	249	211	174	123	169	**3590**
PINNACLE	277	110	158	326	468	385	330	397	517	**2968**
KRONOS	1883	184	119	7						**2193**
DURALOC	1312	85	207	245	72	62				**1983**
TRIDENT	122	40	36	33	53	161	346	441	540	**1772**
ATOLL	1491									**1491**
R3			22	75	57	80	81	306	821	**1442**
BICON-PLUS	1184	25		2			1	1		**1213**
AVANTAGE	240	97	104	109	119	103	118	98	156	**1144**
ZCA	1047	9	6							**1062**
MODULAR HIP SYSTEM	878									**878**
Continuum Acetabular System							191	319	345	**855**
MORSCHER	752	48	37	6						**843**
WEBER ALLO PRO	830									**830**
LUBINUS	31				1	125	168	251	213	**789**
ENDLER	662									**662**
BIRMINGHAM HIP RESURFACING	274	103	78	42	21	2				**520**
GEMINI	510									**510**
OPERA	451	6								**457**
POLARCUP		3	5	46	58	79	66	64	49	**370**
EUROPEAN CUP SYSTEM	332									**332**
TI-FIT	312									**312**
PEARL	287									**287**
PLASMACUP	283									**283**
LMT (Uncemented)	275									**275**
HARRIS/GALANTE	252									**252**
PE-PLUS	241	6								**247**
MÜLLER TYPE	242									**242**
ABG II	236									**236**
EXCEED ABT RINGLOC-X		43	7	7	8	20	39	66	37	**227**
COXA	220									**220**
LMT (Cemented)	208									**208**

Acetabular cups in revisions

Table 21: (The 45 most common)

Cup	1987-08	2009	2010	2011	2012	2013	2014	2015	2016	Total
CHARNLEY	2805	25	17	9	5	3				**2864**
TROPIC	1884	1								**1885**
ELITE	1409	66	55	33	19	12	6			**1600**
AVANTAGE	559	151	169	149	126	105	86	86	77	**1508**
TRILOGY	980	94	83	70	50	51	56	65	58	**1507**
TRABECULAR METAL	22	36	50	97	118	161	214	160	194	**1052**
PINNACLE	222	83	93	86	97	82	117	97	110	**987**
EXETER	910	18	12	1	3					**944**
REFLECTION CEM. ALL POLY	798	54	32	11	7	4	3	4	2	**915**
MARATHON	6	63	135	130	164	138	65	94	66	**861**
POLARCUP		12	41	50	84	121	116	133	116	**673**
REFLECTION UNCEMENTED	73	44	48	62	78	94	83	74	34	**590**
IGLOO	360	22	22	28	24	17	15	15	25	**528**
TITAN	490	26	11							**527**
ATOLL	396									**396**
TRIDENT	32	11	9	22	38	40	44	94	86	**376**
IP	208	16	10	7	10	4	3	4	3	**265**
CONTEMPORARY	82	57	42	45	9	3				**238**
KRONOS	206	13	6							**225**
CHRISTIANSEN	196									**196**
SPECTRON	189									**189**
EXETER X3 RIMFIT			2	23	24	30	25	29	29	**162**
DURALOC	75	11	8	16	10	5	11	9	2	**147**
Continuum Acetabular System							13	51	66	**130**
OPERA	94	7								**101**
R3					7	6	6	20	61	**100**
HARRIS/GALANTE	99									**99**
ZCA	95	1								**96**
MODULAR HIP SYSTEM	95									**95**
CAPTIV	71								7	**78**
EUROPEAN CUP SYSTEM	73									**73**
LMT (Uncemented)	67									**67**
ENDLER	66									**66**
BICON-PLUS	46	2		1	2	3		2	1	**57**
HG II	53									**53**
MORSCHER	40	4	4	3						**51**
GEMINI	47									**47**
SECURFIT	45									**45**
OCTOPUS	37	3								**40**
REGENEREX RINGLOC	2	6	9	13	7	2				**39**
TI-FIT	36									**36**
PARHOFER	35									**35**
PCA	33				1					**34**
S-ROM	27									**27**
ORIGINAL M.E. MÜLLER	25									**25**
COXA	25									**25**

Femoral stems in primary operations

Table 22: (The 45 most common)

Stem	1987-08	2009	2010	2011	2012	2013	2014	2015	2016	Total
CORAIL	10349	2429	3257	3681	4492	4631	4702	4454	4725	**42720**
CHARNLEY	41614	359	233	117	116	67	43			**42549**
EXETER	15841	1441	1455	1558	1461	1569	1648	1849	1885	**28707**
TITAN	11893	256	36	3						**12188**
SPECTRON-EF	9674	574	145	119	92	37	10	3	1	**10655**
LUBINUS SP II	2644	590	658	558	519	621	583	774	783	**7730**
FILLER	2161	212	295	295	321	373	327	259	287	**4530**
ITH	3723									**3723**
CHARNLEY MODULAR	747	435	394	352	258	237	261	153	46	**2883**
BIO-FIT	1993									**1993**
MS-30	1814	35	27	1				17	21	**1915**
HACTIV	1014	126	79	58	108	38	9	150	278	**1860**
SCP/UNIQUE	1130	85	48	23	15	33	36	27	34	**1431**
CPT	1059	30	21	2		1	2	1	2	**1118**
ZWEYMÜLLER	1003	94	5							**1102**
ELITE	1019	4	1	2	3	1				**1030**
OMNIFIT	673	113	70	28	6					**890**
PROFILE	890									**890**
ACCOLADE II						110	137	313	324	**884**
ABG II	399	6	62	105	94	78	81	23		**848**
C-STEM	512	19	9			1	2	75	203	**821**
SP I	779	1								**780**
TAPERLOC (Uncemented)	768	3								**771**
FJORD	651	1								**652**
LUBINUS	624									**624**
POLARSTEM			23	101	83	106	102	108	92	**615**
SECURFIT	35	91	136	167	94	32				**555**
CPS-PLUS	482	7	7							**496**
TAPERLOC (Cemented)	456									**456**
BICONTACT	443									**443**
ABG I	304									**304**
KAR/Corail Revision	112	11	15	12	20	32	22	29	42	**295**
TI-FIT	221									**221**
MÜLLER TYPE	213									**213**
FEMORA	182									**182**
SL-PLUS MIA		12	165							**177**
BI-METRIC	60	35	33	15	5	2	3	7	16	**176**
HARRIS/GALANTE	169									**169**
PROFEMUR GLADIATOR			4	48	71	38	4			**165**
PARHOFER	159									**159**
KAREY	136									**136**
MÜLLER TYPE V	132									**132**
ECHELON	115	4	2							**121**
ECHO- Bi-Metric						7	32	59	22	**120**
ANATOMIC CC	113									**113**

Femoral stems in revisions

Table 23: (The 45 most common)

Stem	1987-08	2009	2010	2011	2012	2013	2014	2015	2016	Total
CHARNLEY	2949	11	12	6	1	1	2	1		**2983**
KAR/Corail Revision	1791	175	130	157	138	147	120	138	102	**2898**
EXETER	1506	61	64	70	72	62	63	77	77	**2052**
CORAIL	1202	43	52	43	62	65	40	51	65	**1623**
TITAN	531	5	1	1						**538**
RESTORATION	95	42	42	39	57	67	63	70	55	**530**
CPT	454	7	7	6	7	2	5	7	6	**501**
FJORD	475	1								**476**
FILLER	263	17	19	19	15	16	16	10	19	**394**
SPECTRON-EF	312	16	13	14	4	8	3	3	2	**375**
TTHR	39	28	40	61	71	52	36	20	23	**370**
ELITE	346	3	2			1	1			**353**
REEF	265	30	21	3	5	2				**326**
LUBINUS SP II	158	3	3	2	9	8	30	15	9	**237**
ANATOMIC BR	192									**192**
ITH	192									**192**
BIO-FIT	167									**167**
MP RECONSTRUCTION	34	2	12	21	24	26	18	17	12	**166**
BI-METRIC	55	10	21	15	16	16	1		2	**136**
HACTIV	81	7	14		4	4		13	9	**132**
REVITAN			1		7	27	20	36	31	**122**
REACTIV	27	9	9	6	3	6	19	13	26	**118**
TAPERLOC (Uncemented)	115									**115**
ARCOS				1	3	11	17	27	33	**92**
ZWEYMÜLLER	82		1							**83**
Profemur	1	4	26	16	11	14	5			**77**
ECHELON	57	5	5	1						**68**
SP I	66									**66**
SCAN HIP	59									**59**
LUBINUS	51									**51**
Securus						6	15	11	19	**51**
RECLAIM					1	13	9	12	12	**47**
HARRIS/GALANTE	44									**44**
FEMORA	43									**43**
PARHOFER	43									**43**
CHARNLEY MODULAR	15	3	4	3	3	3	3	3	5	**42**
AURA	20	7	11							**38**
PROFEMUR GLADIATOR			1	6	19	9	3			**38**
MS-30	30	3	1						2	**36**
LANDOS (Reconstruction)	33									**33**
MÜLLER TYPE	32									**32**
OMNIFIT	31			1						**32**
C-STEM	13						1	3	12	**29**
PRIUS							2	11	16	**29**
CPS-PLUS	26									**26**

Monoblock and modular femoral head

Table 24: Primary operations and revisions - Cemented stem

Caput	1987-08	2009	2010	2011	2012	2013	2014	2015	2016	Total
Monoblock	46830	368	236	113	116	67	41	1		**47772**
Modular	56468	3493	2823	2675	2410	2567	2629	2973	3061	**79099**
Missing	142	1	6	13	1	3	3	3	1	**173**
Total	**103440**	**3862**	**3065**	**2801**	**2527**	**2637**	**2673**	**2977**	**3062**	**127044**

Table 25: Primary operations and revisions - Uncemented stem

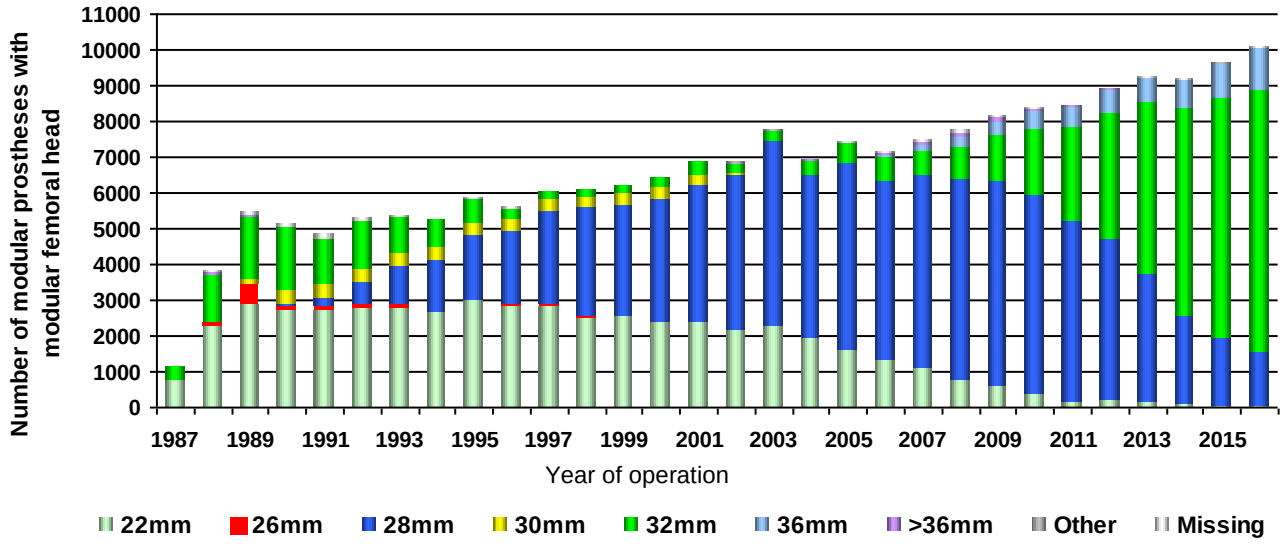
Caput	1987-08	2009	2010	2011	2012	2013	2014	2015	2016	Total
Monoblock	66	2	3			2		1		**74**
Modular	25144	3607	4587	4913	5789	5950	5907	5970	6326	**68193**
Missing	94	1	10	3	4	3	6	3	3	**127**
Total	**25304**	**3610**	**4600**	**4916**	**5793**	**5955**	**5913**	**5974**	**6329**	**68394**

Femoral head diameter

Table 26: In primary operations and revisions

Year	22 mm	26 mm	28 mm	30 mm	32 mm	36 mm	>36 mm	Other	Missing	Total
2016	81		1 490	1	7 300	1 171	1	5	37	**10 086**
2015	70		1 888		6 728	945	5	3	25	**9 664**
2014	97		2 432	1	5 845	802	4	4	36	**9 221**
2013	154	2	3 568	1	4 838	674	3	6	36	**9 282**
2012	212		4 518	3	3 503	671	25	5	27	**8 964**
2011	186		5 057		2 607	522	52	1	28	**8 453**
2010	384		5 570	3	1 826	481	82	1	52	**8 399**
2009	629	2	5 719	4	1 241	385	115	2	53	**8 150**
2008	761	2	5 628	2	880	279	136	3	66	**7 757**
2007	1 092		5 430	2	666	148	111	2	63	**7 514**
2006	1 318	6	5 015	3	638	58	60	5	36	**7 139**
2005	1 584	9	5 254		522	4	41	2	29	**7 445**
2004	1 942	26	4 548	7	393		4	3	27	**6 950**
2003	2 262	24	5 136	13	309		3	14	16	**7 777**
2002	2 169	16	4 320	62	274		2	24	14	**6 881**
2001	2 383	18	3 809	317	342		1	3	15	**6 888**
2000	2 389	6	3 425	347	269			3	8	**6 447**
1999	2 546	26	3 104	337	198			2	7	**6 220**
1998	2 500	66	3 036	305	224			2	5	**6 138**
1997	2 860	24	2 627	297	226		6	1	7	**6 048**
1996	2 861	7	2 102	287	306	1	15		5	**5 584**
1995	3 011	4	1 821	342	673		7		5	**5 863**
1994	2 639	13	1 474	359	806		5		7	**5 303**
1993	2 805	70	1 043	390	1 045		2		11	**5 366**
1992	2 771	124	605	404	1 332		8		70	**5 314**
1991	2 707	102	274	380	1 264		12		133	**4 872**
1990	2 731	117	27	398	1 778	1	20		106	**5 178**
1989	2 875	566	5	151	1 757		23		100	**5 477**
1988	2 281	133	1	1	1 334		15		71	**3 836**
1987	778	1	1		359		6		13	**1 158**
Total	**51 078**	**1 364**	**88 927**	**4 417**	**49 483**	**6 142**	**764**	**91**	**1 108**	**203 374**

Figure 13: In primary operations and revisions



Femoral head prostheses

Table 27: In primary operations and revisions (The 50 most common)

Prosthesis	1987-08	2009	2010	2011	2012	2013	2014	2015	2016	Total
EXETER	17704	1588	1471	1140	867	744	652	792	742	**25700**
LANDOS	18620	1199	1157	671	72	7	15	0	0	**21741**
CERAMTEC	1735	688	1013	1797	2688	2578	2440	2210	2180	**17329**
UNIVERSAL	15741	658	198	175	149	108	50	38	35	**17152**
CORAIL	7	151	650	1253	2023	2400	2707	2890	3108	**15189**
FJORD	9394	1028	768	510	62	6	2	3	0	**11773**
SP II	2859	617	695	605	566	680	645	819	830	**8316**
LFIT ANATOMIC	33	56	225	677	878	1243	1428	1644	1691	**7875**
ELITE	2619	355	296	191	158	195	184	136	62	**4196**
IGLOO	1705	173	228	252	254	207	208	170	229	**3426**
SCANOS	1190	185	124	63	102	28	30	211	341	**2274**
PROTEK	1904	44	32	4	1	0	0	0	0	**1985**
PINNACLE	14	83	187	150	306	340	248	160	285	**1773**
PLUS ENDO	1239	142	103	38	29	34	30	14	16	**1645**
CPT	1534	41	32	11	7	9	2	1	4	**1641**
PROFILE	1404	1	9	14	1	0	0	0	0	**1429**
HIPBALL PREMIUM	35	23	75	143	188	235	166	136	116	**1117**
TAPERLOC	1088	0	0	0	0	0	0	0	0	**1088**
MALLORY-HEAD	564	55	60	43	34	42	64	107	94	**1063**
BIOTECHNI	824	40	57	56	44	29	4	2	1	**1057**
OXINIUM	363	207	172	73	68	68	47	5	10	**1013**
HARRIS/GALANTE	844	4	6	9	7	6	0	6	4	**886**
OMNIFIT	631	73	65	36	19	20	1	2	2	**849**
" OSTEONICS Heads" , C-taper head	197	154	168	182	94	20	0	0	0	**815**
ZIRCONIA	763	0	0	0	0	0	0	0	0	**763**
BICONTACT	482	1	0	3	1	3	6	2	2	**500**
BIRMINGHAM HIP RESURFACING	254	77	73	39	20	2	0	0	0	**465**
ABG I	361	8	11	9	7	3	7	6	2	**414**
BIOBALL	9	19	25	49	66	42	62	61	58	**391**
VERSYS	30	12	21	45	41	38	29	80	81	**377**
SURGIVAL	372	0	0	0	0	0	0	0	0	**372**
ZWEYMÜLLER	342	0	0	0	0	0	0	0	0	**342**
FURLONG	0	0	0	0	0	7	71	80	90	**248**
CERAMIC OSTEO	220	0	0	0	0	0	0	0	0	**220**
STRYKER Heads	3	2	18	44	22	15	23	41	48	**216**
FEMORA	213	0	0	0	0	0	0	0	0	**213**
PARHOFER	181	1	1	0	0	1	0	0	0	**184**
TI-FIT	131	7	3	0	0	0	0	0	0	**141**
SMITH & NEPHEW CERAMIC HEADS	0	2	126	0	0	0	0	0	0	**128**
CHRISTIANSEN	126	0	0	0	0	0	0	0	0	**126**
PCA	100	1	3	2	1	1	0	2	0	**110**
BIOLOX DELTA	0	0	0	0	16	42	5	3	1	**67**
BIRMINGHAM HIP MODULAR	20	25	9	3	1	0	0	0	0	**58**
ABG II	48	0	0	0	0	0	0	0	0	**48**
ASR MODULAR	42	3	0	0	0	0	0	0	0	**45**
LINK Rippensystem	38	0	0	0	0	0	0	0	0	**38**
MUTARS	12	2	0	0	1	1	2	10	6	**34**
AURA II	21	2	4	0	2	0	0	0	0	**29**
HASTINGS HIP	29	0	0	0	0	0	0	0	0	**29**
WEBER	28	0	0	0	0	0	0	0	0	**28**

Dual Mobility articulation

Table 28 In primary operation

Prosthesis	1987-08	2009	2010	2011	2012	2013	2014	2015	2016	Total
AVANTAGE	233	95	100	109	118	100	109	89	148	**1101**
POLARCUP		3	5	46	58	76	59	56	45	**348**
TRIDENT					2	6	1	4	13	**26**
CAPTIV									18	**18**
Restoration ADM				1	1	2	1		5	**10**
GYROS	2									**2**

Table 29 In revisions

Prosthesis	1987-08	2009	2010	2011	2012	2013	2014	2015	2016	Total
AVANTAGE	542	149	169	149	127	105	89	88	91	**1509**
POLARCUP		12	41	50	82	122	119	140	123	**689**
Restoration ADM				1	10	8	6	12	17	**54**
TRIDENT					4	3	7	9	11	**34**
GYROS	10									**10**
CAPTIV									9	**9**

ASA classification

Figure 14: Primary operations

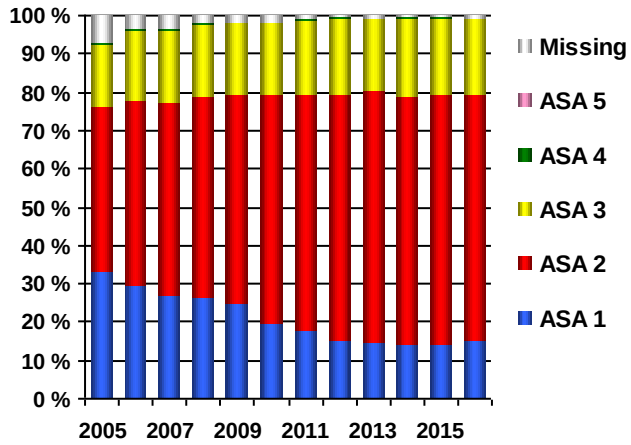
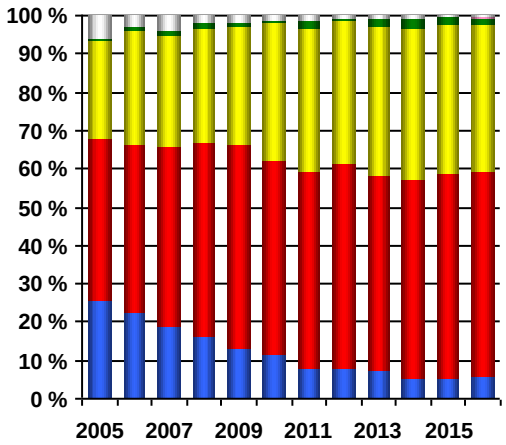


Figure 15: Revisions



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 30: Primary operations *

Year	1	2	3	4	Missing	Total
2016	794 (9%)	6999 (79%)	965 (11%)	71 (1%)	52 (1%)	**8881**
2015	1062 (13%)	6272 (74%)	958 (11%)	57 (1%)	89 (1%)	**8438**
2014	1113 (14%)	5946 (73%)	962 (12%)	31 (0%)	75 (1%)	**8127**
2013	1341 (17%)	5633 (70%)	1049 (13%)	10 (0%)	63 (1%)	**8096**
2012	1580 (20%)	4853 (62%)	1322 (17%)	9 (0%)	82 (1%)	**7846**
2011	2220 (30%)	4304 (58%)	795 (11%)	3 (0%)	38 (1%)	**7360**
2010	2365 (32%)	4308 (59%)	610 (8%)	4 (0%)	43 (1%)	**7330**
2009	2606 (37%)	3861 (54%)	578 (8%)	3 (0%)	66 (1%)	**7114**
2008	3132 (46%)	3059 (45%)	574 (8%)	8 (0%)	75 (1%)	**6848**
2007	3546 (53%)	2432 (37%)	530 (8%)	10 (0%)	142 (2%)	**6660**
2006	3927 (62%)	1544 (24%)	678 (11%)	15 (0%)	155 (2%)	**6319**
2005	4393 (67%)	679 (10%)	1093 (17%)	6 (0%)	426 (6%)	**6597**

Table 31: Revisions *

Year	1	2	3	4	Missing	Total
2016	203 (14%)	1054 (72%)	163 (11%)	27 (2%)	27 (2%)	**1474**
2015	220 (16%)	1019 (72%)	133 (9%)	12 (1%)	24 (2%)	**1408**
2014	224 (17%)	921 (71%)	118 (9%)	9 (1%)	20 (2%)	**1292**
2013	223 (17%)	914 (69%)	151 (11%)	6 (0%)	26 (2%)	**1320**
2012	240 (18%)	823 (63%)	216 (16%)	10 (1%)	26 (2%)	**1315**
2011	318 (25%)	758 (59%)	184 (14%)	8 (1%)	19 (1%)	**1287**
2010	438 (35%)	683 (54%)	125 (10%)	2 (0%)	10 (1%)	**1258**
2009	421 (35%)	649 (54%)	126 (10%)	5 (0%)	8 (1%)	**1209**
2008	477 (43%)	531 (47%)	94 (8%)	5 (0%)	15 (1%)	**1122**
2007	501 (48%)	409 (39%)	106 (10%)	1 (0%)	35 (3%)	**1052**
2006	587 (58%)	273 (27%)	122 (12%)	4 (0%)	21 (2%)	**1007**
2005	706 (67%)	121 (11%)	162 (15%)	4 (0%)	64 (6%)	**1057**

Figure 16: Primary operations

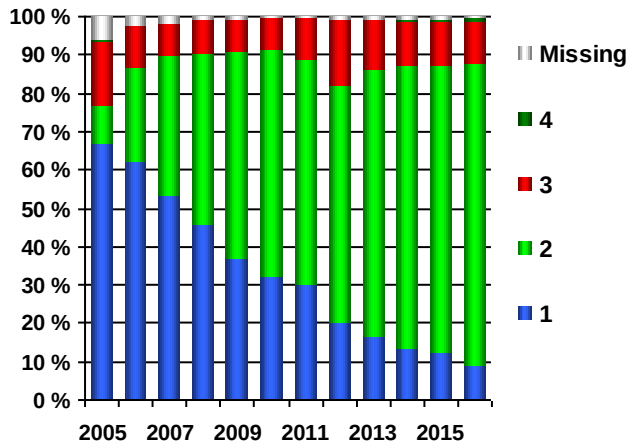
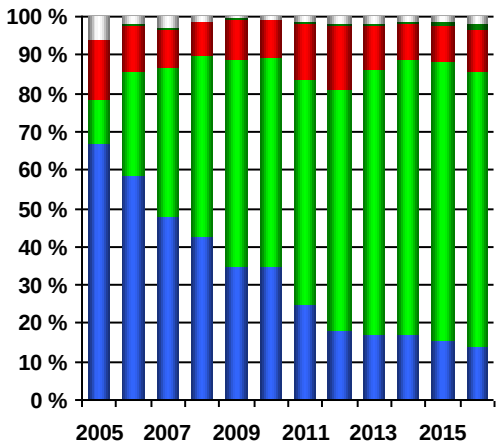


Figure 17: Revisions



*

1 = Yes - Medication started preoperatively
2 = Yes - Medication started postoperatively
3 = Yes - Missing information on medication start
4 = No

Registration of thrombosis prophylaxis started in 2005

Thrombosis prophylaxis

Table 32: All operations

Drugs	2005-07	2008	2009	2010	2011	2012	2013	2014	2015	2016
Acetylsalicylsyre (Albyl-E, Globoid, Acetyratio, Magnyl E)		0,1 %	0,1 %				0,1 %	0,4 %	0,6 %	0,8 %
Apixiban (Eliquis)						0,1 %	1,2 %	1,5 %	1,5 %	1,5 %
Dabigatranetixalat (Re-Novate, Pradaxa)	0,9 %	0,2 %	0,2 %					0,1 %	0,1 %	
Dalteparin (Fragmin)	49,7 %	61,0 %	50,7 %	63,2 %	65,1 %	63,1 %	56,1 %	51,6 %	58,5 %	61,6 %
Dekstran (Macrodex, Dextran)		0,1 %		0,1 %	0,3 %	0,1 %	0,1 %	0,1 %		
Enoksaparin (Klexane)	42,5 %	35,1 %	44,0 %	31,5 %	25,5 %	24,6 %	27,9 %	31,4 %	24,0 %	22,0 %
Rivaroksaban (Xarelto)				0,3 %	2,9 %	2,0 %	2,3 %	2,2 %	1,5 %	1,5 %
Warfarin (Marevan)	0,1 %	0,1 %	0,1 %	0,1 %		0,1 %			0,1 %	
Ximelagatran (Exanta, Malagatran)	0,8 %	0,1 %	0,1 %	0,1 %						
Other		0,1 %	0,1 %					0,1 %		
Combination of 2 drugs	1,1 %	1,2 %	3,3 %	3,9 %	5,2 %	8,4 %	10,7 %	10,6 %	11,5 %	10,0 %
Clinical study	0,8 %	1,1 %	0,7 %	0,1 %						
Unknown						0,1 %		0,1 %		
No drugs		0,1 %	0,1 %							
Missing	4,0 %	0,9 %	0,7 %	0,7 %	0,9 %	1,5 %	1,4 %	2,0 %	2,2 %	2,6 %
Total	**22692**	**7970**	**8323**	**8591**	**8658**	**9177**	**9452**	**9446**	**9867**	**10378**

Figure 18: Drugs - All operations

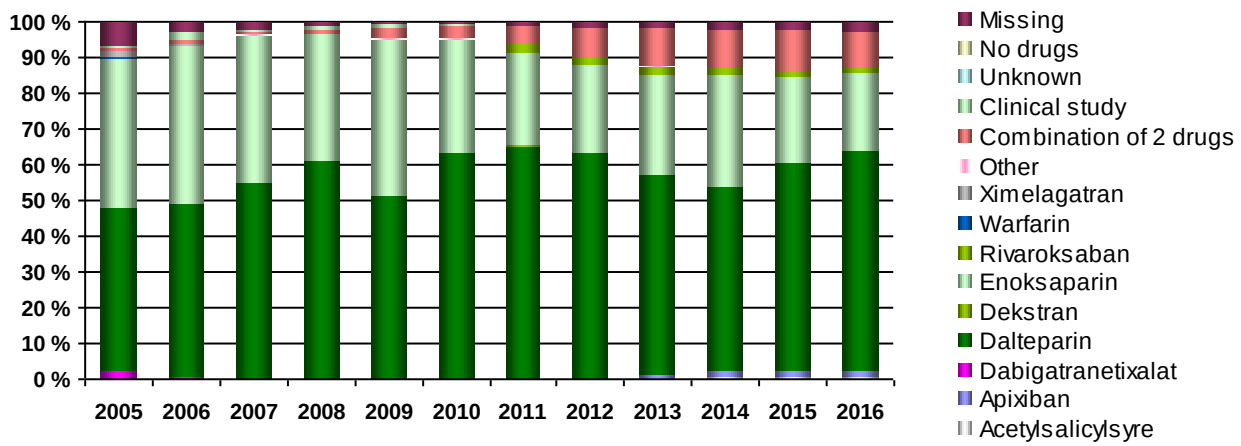


Table 33: Duration - All operations

Year	Days: 1-7	8-14	15-21	22-28	29-35	>35	No drugs	Missing	Total
2016	1415	3454	1101	728	2034	22	0	1624	10378
2015	1435	2882	725	941	2337	26	0	1521	9867
2014	1397	2278	577	903	2943	45	0	1303	9446
2013	1428	1402	597	1480	3230	63	0	1252	9452
2012	1163	1595	703	1495	3091	34	0	1096	9177
2011	700	1744	695	1397	3196	40	1	885	8658
2010	758	2172	636	1078	3154	44	2	747	8591
2009	880	2404	668	785	2637	37	6	906	8323
2008	837	2479	787	701	2166	124	5	871	7970
2007	847	2222	1230	388	2044	44	6	931	7712
2006	978	2096	1093	276	1738	111	0	1034	7326
2005	1036	2073	1203	363	1416	231	0	1332	7654

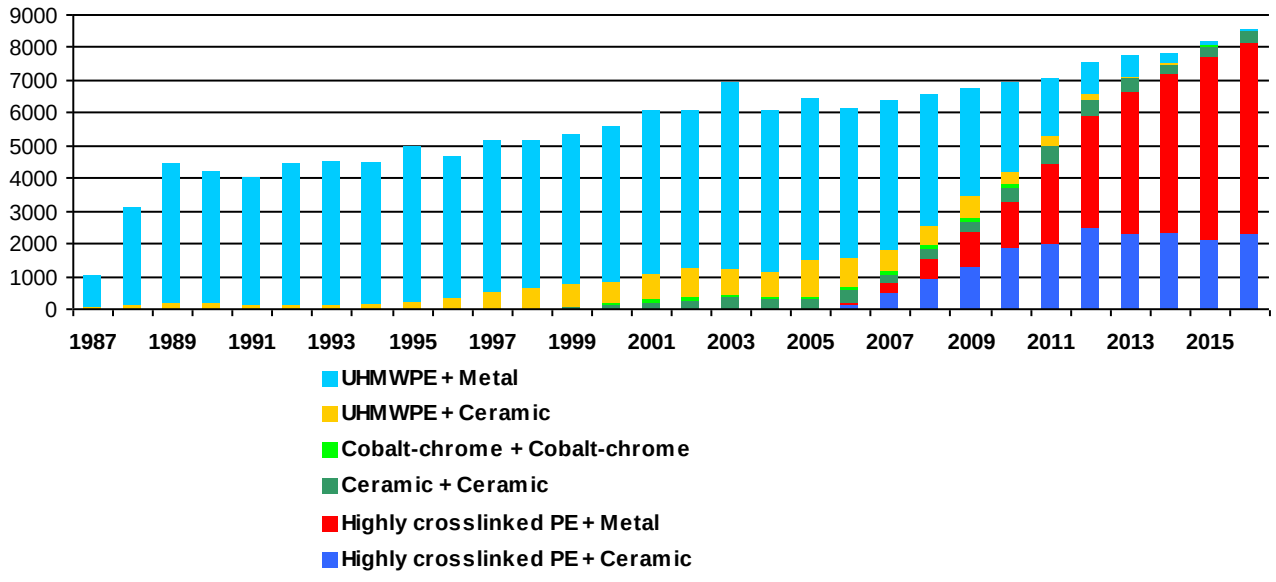
Registration of thrombosis prophylaxis started in 2005

Articulations

Table 34: In primary operations - All patients

Cup + Femoral head	1987-08	2009	2010	2011	2012	2013	2014	2015	2016	Total
UHMWPE + Steel	66616	1912	1451	748	342	153	69	5	0	71296
UHMWPE + Cobalt-chrome	28379	1356	1267	1014	638	526	236	108	12	33536
Highly crosslinked PE + Cobalt-chrome	978	905	1157	1886	2744	3560	4155	4767	5171	25323
Highly crosslinked PE + Alumina	1426	1000	1508	1511	2011	1916	1772	1522	1413	14079
UHMWPE + Alumina	9465	602	354	293	146	44	8	4	2	10918
Highly crosslinked PE + Steel	29	158	280	533	654	725	712	803	691	4585
Highly crosslinked PE + Alumina/Zirconium[1]	82	292	368	512	481	425	550	631	888	4229
Alumina + Alumina	2309	227	322	368	246	201	108	7	0	3788
UHMWPE + Titanium	1967	19	4	1	2	4	1	0	0	1998
Alumina/Zirconium + Alumina/Zirconium[1]	207	70	92	145	226	197	190	319	343	1789
UHMWPE + Missing	1717	5	0	1	0	0	1	0	0	1724
UHMWPE + Zirconium	1402	0	0	0	0	0	0	0	0	1402
Cobalt-chrome + Cobalt-chrome	755	127	98	46	37	17	15	16	24	1135
Steel + Cobalt-Chrome	161	44	58	90	95	106	130	105	157	946
Highly crosslinked PE + Oxinium	225	185	149	56	61	51	39	3	2	771
Missing + Cobalt-chrome	506	9	21	28	9	10	13	16	11	623
Missing + Missing	514	8	8	8	9	13	12	8	6	586
Steel + Steel	53	38	39	30	37	24	20	36	47	324
Missing + Steel	276	11	11	6	5	4	3	5	2	323
UHMWPE + Alumina/Zirconium[1]	137	81	40	18	0	3	1	0	0	280
Missing + Alumina	175	8	14	7	9	10	3	2	6	234
Missing + Titanium	154	0	3	1	2	0	5	0	0	165
Titanium + Cobalt-chrome	2	1	3	22	31	34	16	18	33	160
Titanium + Alumina/Zirconium[1]	3	2	11	4	18	27	17	40	32	154
Highly crosslinked PE + Titanium	12	13	18	2	15	14	16	9	18	117
UHMWPE + Oxinium	75	1	0	0	0	0	0	0	0	76
Highly crosslinked PE + Missing	21	9	17	7	2	3	2	4	3	68
Titanium + Alumina	30	1	6	1	4	2	4	2	1	51
Other (n<50)	180	30	31	22	22	27	29	8	19	368
Total	**117856**	**7114**	**7330**	**7360**	**7846**	**8096**	**8127**	**8438**	**8881**	**181048**

Figure 19: In primary operations



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

Completeness of reporting analysis for the Hip Arthroplasty Register, 2013-2014

A completeness of reporting analysis for the Hip 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 Hip Arthroplasty Register (NAR). A report on the implementation and results will be published on www.helsedirektoratet.no. 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	**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 99	Other primary prosthetic replacement of hip joint
Reoperation	**NFC 2***	Secondary implantation of total prosthesis in hip joint not using cement
	NFC 3*	Secondary implantation of total prosthesis in hip joint using hybrid technique
	NFC 4*	Secondary implantation of total prosthesis in hip joint using cement
	NFC 99	Other secondary prosthetic replacement in hip joint
	NFU 1*	Removal of total prosthesis from hip joint

The completeness of reporting rate for the Hip Arthroplasty Register was calculated as follows:

$$\frac{(Only\ NAR + Inclusion\ in\ both\ registers)}{(Only\ NPR + Only\ NAR + Inclusion\ in\ both\ registers)}$$

Completeness of reporting for the NPR was calculated in a similar way:

$$\frac{(Only\ NPR + Inclusion\ in\ both\ registers)}{(Only\ NAR + Only\ NPR + Inclusion\ in\ both\ registers)}$$

Primary operations. In 2013 and 2014, 16 681 primary hip replacements were reported to one or both of the registers. 96.7% of these were reported to the NAR while 97.2% were reported to the NPR. Completeness of reporting by hospital is divided into health regions and shows a completeness of reporting rate for the NAR ranging from 79.1% to 100% between the different hospitals. For hospitals with a low completeness of reporting rate for the Hip Arthroplasty Register, either the form was not sent to the NAR or other interventions than hip arthroplasties were incorrectly coded with NFB 20/30/40/99 (There were only 7 operations in the category NFB 99 during the period).

Procedure codes to be used for primary operations: NFB 20 - NFB 30 - NFB 40 - NFB 99

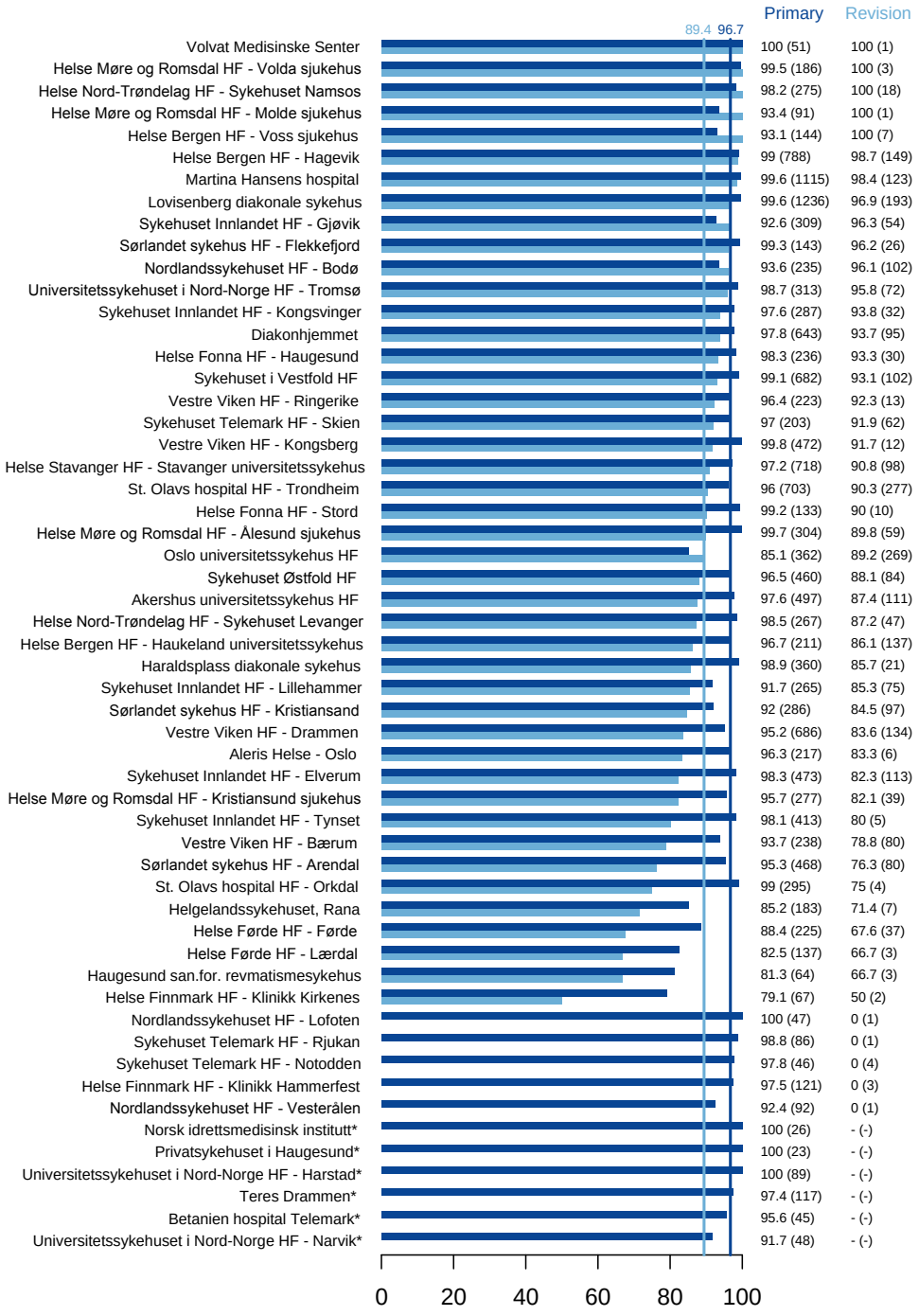
Revision operations. In 2013 and 2014, 2903 revisions were reported to one or both of the registers. 89.4% of these were reported to the NAR while 84.4% were reported to the NPR (revision level 1). Completeness of reporting by hospital shows that the completeness of reporting rate for the NAR varied between 55.0% and 100% in the various 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 primary and revision operations, hip prosthesis 2013-2014



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.

* Have no registered revisions in NAR or NPR.

CONTENTS

Knee prostheses

ARTHROPLASTY OF THE KNEE AND OTHER JOINTS
2017 ANNUAL REPORT

In the period 1994-2016, 82 104 knee replacements, 7638 shoulder replacements and 9727 replacements of other joints than the hip, knee and shoulder were recorded. There has been an increase of 5% in primary knee replacements since 2015. The number of unicondylar knee replacements has also risen in the past year. Osteoarthritis is the dominant cause of knee arthroplasties. The number of primary shoulder prostheses has increased by 3% since 2015.

A comparative study of the lifetime risk of knee arthroplasty in the Nordic countries and Australia showed that Norway had the lowest risk in 2013 (Ackerman IN 2017). A report from the Centre for Clinical Documentation and Evaluation (SKDE) "Indicators for the Measurement of Unwarranted Variation", using figures from our registers, reveals differences between health trusts in the number of knee arthroplasties, but the differences are small. The Nordland and Finnmark health trusts have the lowest numbers of knee replacements.

NEW FIGURES FOR KNEE PROSTHESES

We have created some new figures showing prosthesis survival rates for selected groups of knee prostheses and/or patients. These are described in the text under each figure.

QUALITY OF ARTHROPLASTY IN NORWAY

Survival curves show a gradual improvement since 1994 in results of total knee prostheses, when the endpoint is revision surgery. In a study based on our register data, hospitals that performed more than 100 knee arthroplasties per year had fewer reoperations than hospitals with a lower number of such operations (Badawy M 2013). Unicondylar knee replacements
should be concentrated at a smaller number of hospitals (Badawy 2014) to decrease the number of reoperations.

In a study published in 2017 (Dyrhovden G 2017), the periods 1994-2004 and 2005-2015 were compared. Here, we showed an improvement in results in the later period for total knee replacements, but not for unicondylar knee replacements. There is still considerable room for improvement in both prosthesis design and surgery, and there are a particularly large number of revisions for infection, loosening, displaced components, instability and pain.

For ankle prostheses, recent results are poorer. More ankle arthroplasties are being performed on patients with osteoarthritis and after injuries. These patients are younger and more often male than previously, when rheumatic patients dominated. There is a need for RCTs to clarify which patients should have ankle prostheses and which patients should have spinal fusion surgery.

SHOULDER FRACTURES

Several RCTs have shown that the outcomes of conservative treatment and hemiarthroplasties are equally good for dislocated three or four fragment fractures. We see a decrease in the use of hemiprostheses in acute fractures. There is an increase in the use of reverse shoulder prostheses in acute fractures, which may partly be due to an ongoing RCT. There is a need for more RCTs to study the efficacy of this type of prosthesis in comparison with non-operative treatment.

KNEE ARTHROPLASTY REVISIONS

There were 581 knee arthroplasty revisions reported to the Register in 2016. PhD candidate Tesfaye Leta defended her thesis on knee arthroplasty revisions on 07.03.2017. In the first published article (Leta T 2015), we found no statistically significant improvement in knee arthroplasty revisions in

recent years, but a tendency towards better results with longer follow-up. Revision of the whole prosthesis gave better results than revision of individual components. 22% of the revisions were operated again after 10 years, and half of the revisions took place within two years. Most early revisions are due to infection and instability. Results for reoperations are significantly worse than for primary operations.
We find that the use of a stem is often not checked on the form. When a stem is used, it must be indicated whether it was a tibial or femoral stem, and a sticker must be attached to the back of the form. Some prostheses use both a femoral and tibial stem, and if this is not checked, we have no way of knowing where the stem was used.
In knee arthroplasty revisions involving only insertion of the patellar component due to pain, patients' quality of life improved slightly. The effect was most pronounced in the patients with the most pain before the revision. In one-third of patients, the surgery had no effect (Leta T 2015).
Total arthroplasty revision was technically more challenging than revision of unicondylar knee prostheses to total knee arthroplasty, using more bone packing and stems, and with a higher infection rate. However, no difference was found in pain, quality of life, functioning or survival between total revision and unicondylar revision arthroplasty (Leta T 2016).

COMPLETENESS ANALYSIS

In this report, we show completeness for primary operations and revisions for 2008-2014. The national average is good for primary knee arthroplasties (95.3%) and for revisions (89%). Some hospitals have low reporting of revisions in particular. This may result in too low revision rates at these hospitals. In some hospital results, we remove hospitals with lower than 80% completeness of revisions. We encourage hospitals to review their reporting routines if their completeness is low. Reporting is worse for finger, wrist and back prostheses.

HOSPITAL RESULTS

We present some hospital results. Durability of prostheses inserted at individual hospitals after two and ten years. Unadjusted figures. A complete report is available on the website of the National Service Centre for Medical Quality Registers (http://www.kvalitetsregistre.no/resultater/).

PROSTHESES RESULTS

We present three- and ten-year durability for the most commonly used knee prostheses in Norway (more than 500 prostheses in use). None of those used today have poor results, but few prostheses have ten-year results from Norway. However, there are ten-year results for most prostheses from other countries.

SUMMARY OF THE MOST IMPORTANT SCIENTIFIC FINDINGS LAST YEAR

New bone cements used since 2005 have yielded the same results as Palacos cement used before 2005. There is no difference in the risk of knee arthroplasty revision between the original Palacos cement with gentamicin (Heraeus) and the copy Refobacin Bone Cement (Biomet) (Birkeland Ø 2017).
The incidence of knee arthroplasty was lowest in Norway of all the Nordic countries in 1997-2012, but has increased in all the countries (Niemelainen MJ 2017). A comparison of the lifetime risk of knee arthroplasty in the Nordic countries and Australia for 2003 and 2013 showed an increase in all the countries. Lifetime risk was highest for women in Australia (21.1%) and Finland (22.8%) and lowest in Norway (9.7%) (Ackerman IN 2017).
We have contributed to an international consensus report on post-operative knee fibrosis (Kalson NS 2016).

We have published two studies on computer-navigated knee arthroplasty. One is a register-based study from Norway with 8 years of follow-up. Here, no difference was found between computer-navigated and conventional knee arthroplasty, but there were more revisions due to displaced components in conventional arthroplasty (Dyrhovden G 2016). In a randomised RSA study (radiostereometric analysis), no difference in migration was found after two years between computer-navigated and conventional knee arthroplasty (Petursson 2017).

The four Nordic countries (Nordic Arthroplasty Register Association) have begun to collaborate on shoulder prosthesis studies, and the first study has now been published (Rasmussen J 2016). Shoulder arthroplasty has increased in all the countries, mostly due to osteoarthritis (34%) and fractures (34%). Especially arthroplasty for osteoarthritis has increased. The incidence of shoulder arthroplasty was lower in Norway than in Denmark and Sweden. Results for the Delta Xtend reverse prosthesis were significantly better than for the Delta III, but the surgery took place in different periods.

Hemiarthroplasty using a stem and reverse total arthroplasty for acute proximal humerus fractures were compared in a Nordic study. There was no difference with all revisions as endpoint, but reverse total arthroplasty had a higher risk of revision due to infection (Brorson 2017).

We now have an interesting partnership with Oslo University Hospital and the Norwegian University of Science and Technology (NTNU), with a link between HUNT (the Nord-Trøndelag Health Study) and the Hip and Knee Arthroplasty Registers. Marianne Bakke Johnsen and Alf Inge Hellevik are the PhD candidates involved. Johnson (2016) showed that high levels of physical activity in leisure time increased the risk of total hip arthroplasty in both men and women, but for knee arthroplasty, this effect was only seen in women. In an interesting study using Mendelian randomisation and DNA analysis, we found (Johnsen 2017) that smoking may have a causal relationship with reduced risk of knee arthroplasty. Does nicotine have a protective effect on the cartilage?

Karin Magnussen has published a study linking the Hip and Knee Arthroplasty Registers with the Twin Register. In a study published in 2017, she finds that genetic factors contribute more to the risk of total hip arthroplasty due to osteoarthritis than to the risk of knee replacement.

Congratulations to Mona Badawy and Tesfaye Leta for successful defence of their PhD theses. The theses are available on our website.

Thank you for good reporting and we welcome suggestions for research projects.

Bergen, 05.06.2017

Ove Furnes
Chief Physician/Professor
Knee Surgery

Anne Marie Fenstad
Biostatistician

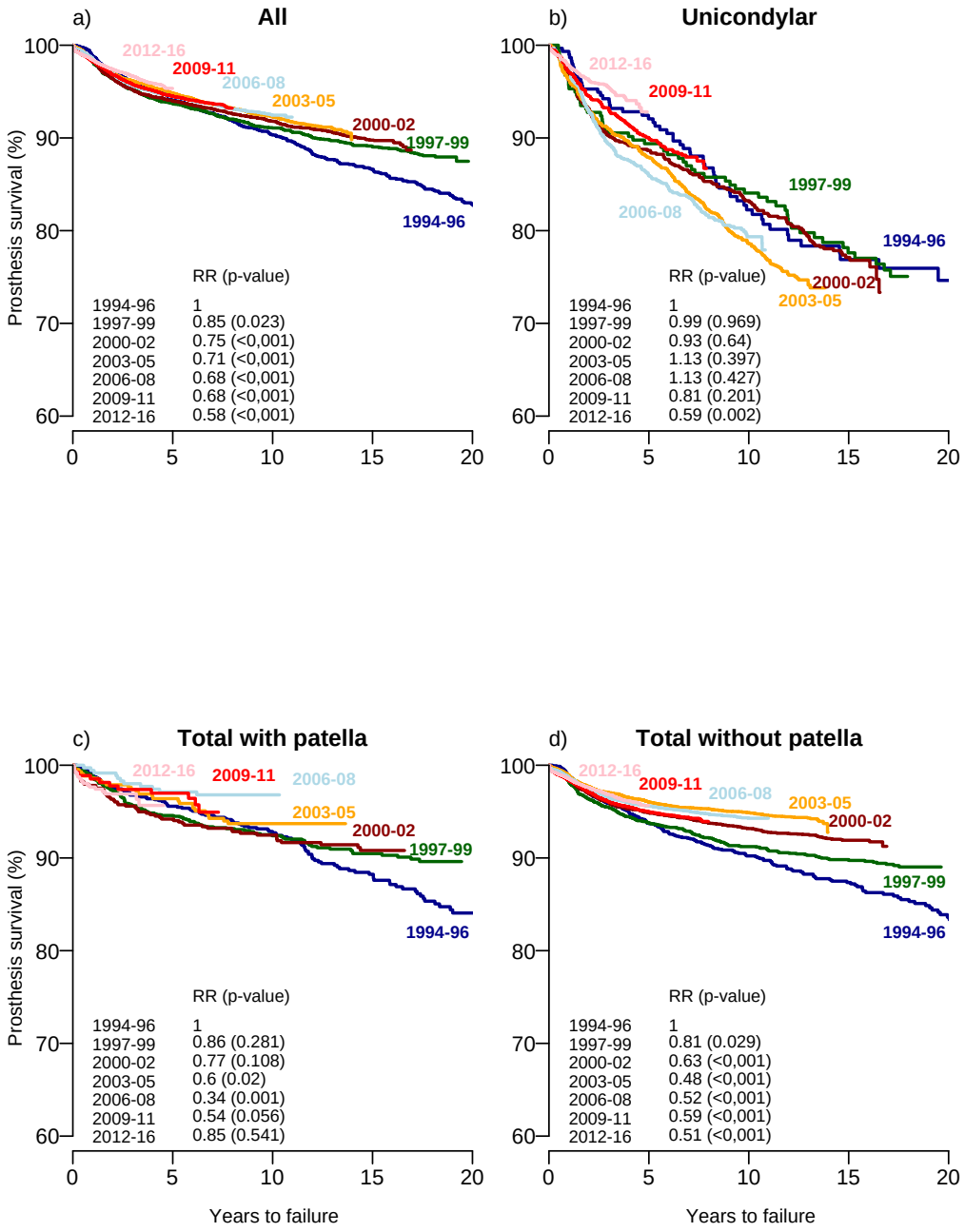
Yngvar Krukhaug
Chief Physician
Hand and Finger Surgery

Irina A Kvinnesland
IT Consultant

Christoffer Bartz-Johannessen
Biostatistician

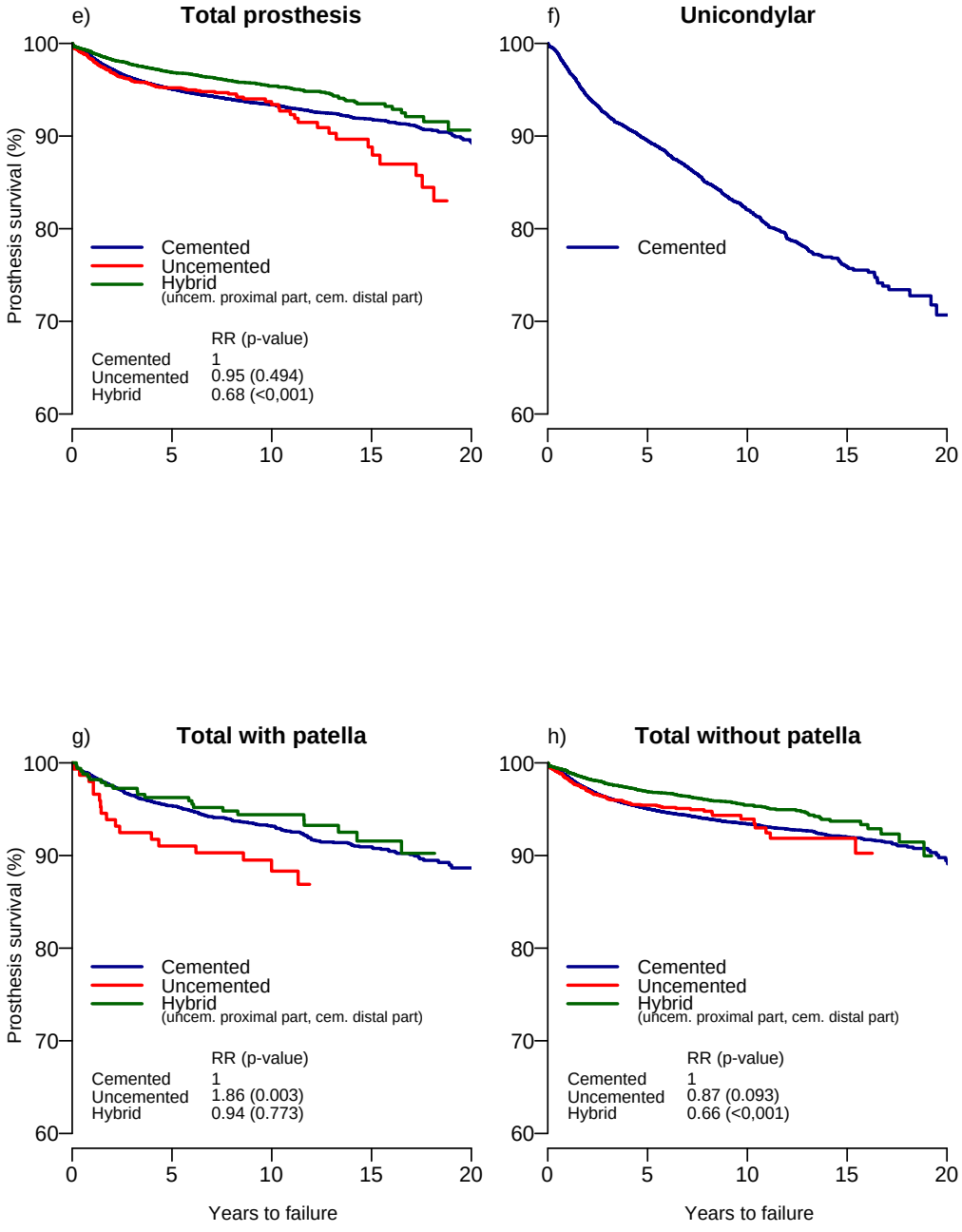
Randi Hole
Chief Physician
Shoulder Surgery

Survival curves for knee prosthesis



Survival curves estimated by the Kaplan-Meier method. Survival estimate is given as long as > 50 prostheses are at risk.
Risk ratio (RR) estimates adjusted for age, sex and diagnosis.

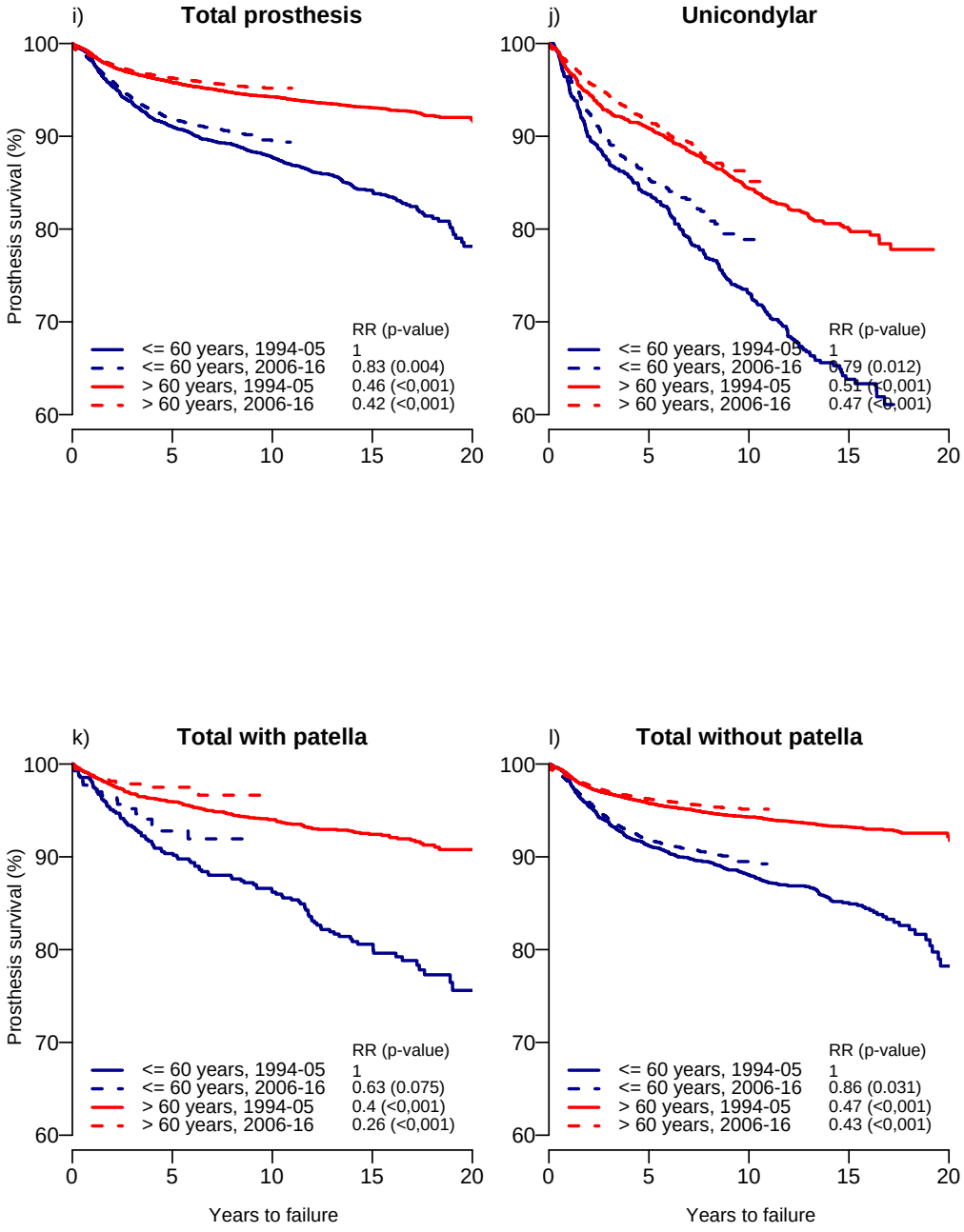
Survival curves for knee prosthesis - Fixation
1994 - 2016



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.

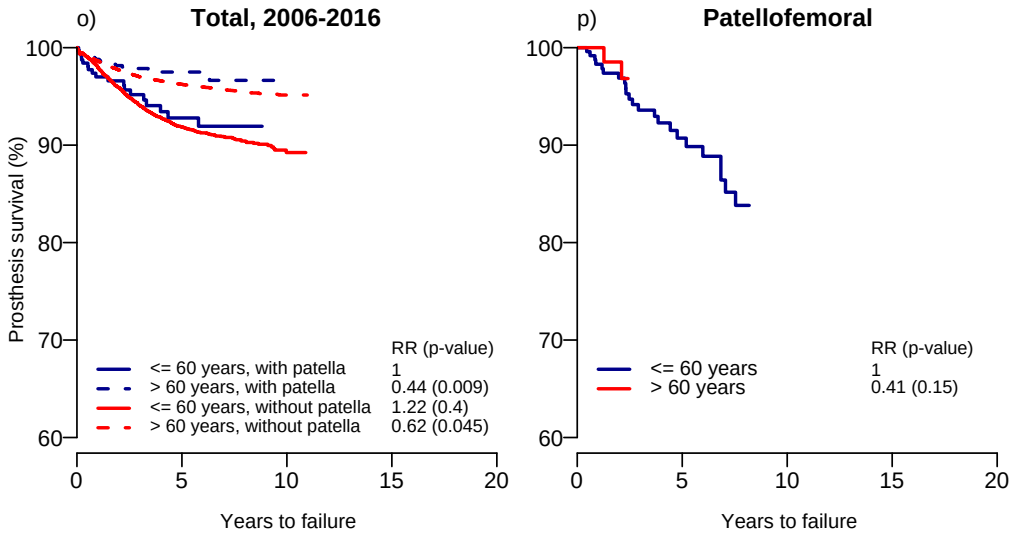
Survival curves for knee prosthesis - Age
1994 - 2016

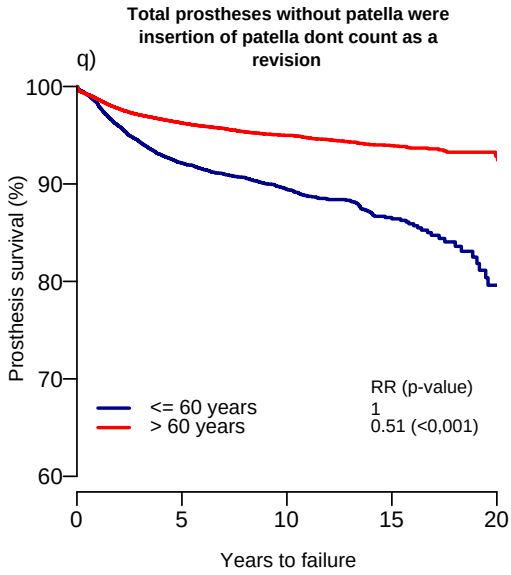


Survival curves estimated by the Kaplan-Meier method. Survival estimate is given as long as > 50 prostheses are at risk.

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

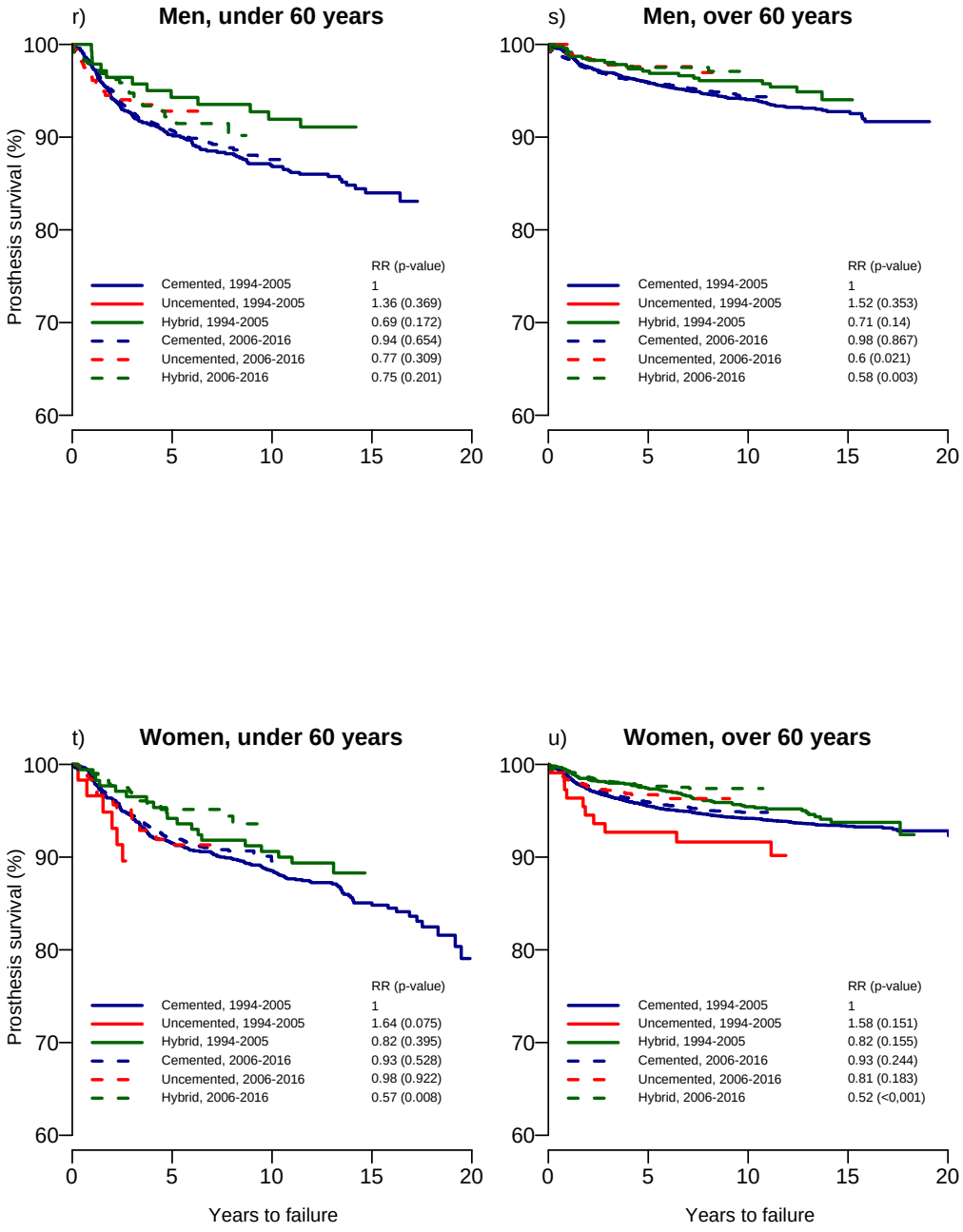
Survival curves for knee prostheses
1994 - 2016





Survival curves estimated by the Kaplan-Meier method. Survival estimate is given as long as > 50 prostheses are at risk.
Risk ratio (RR) estimates adjusted for age, sex and diagnosis.

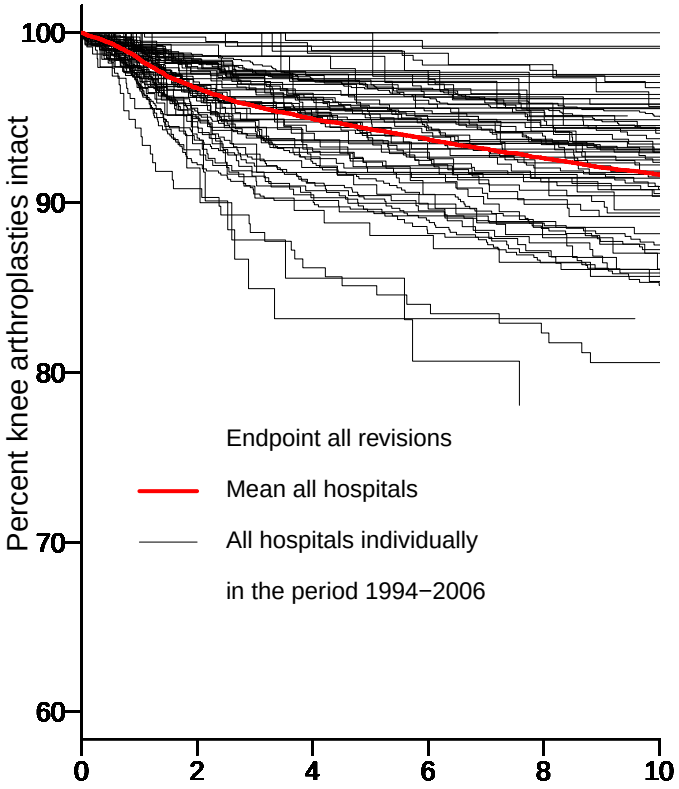
Survival curves for total prostheses in knee without patella 1994 - 2016

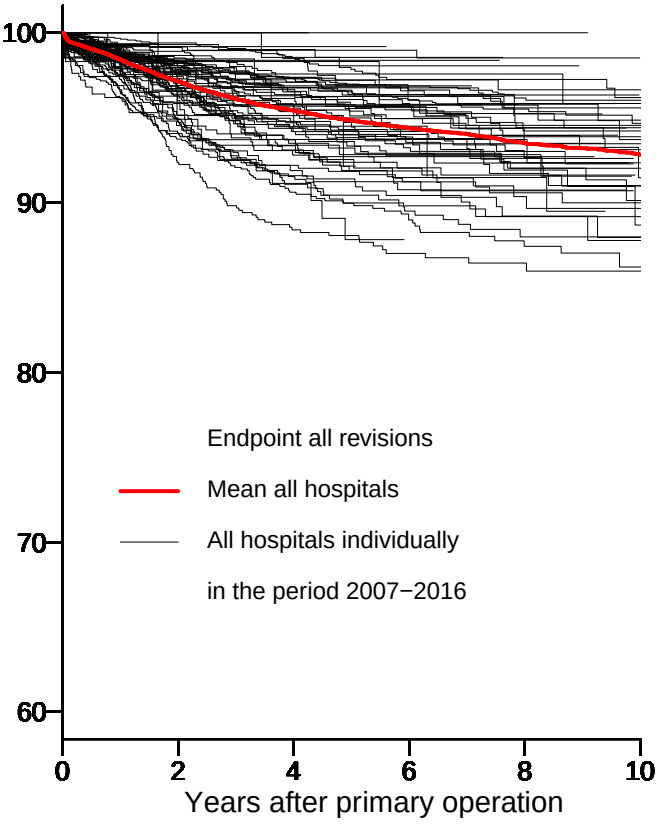


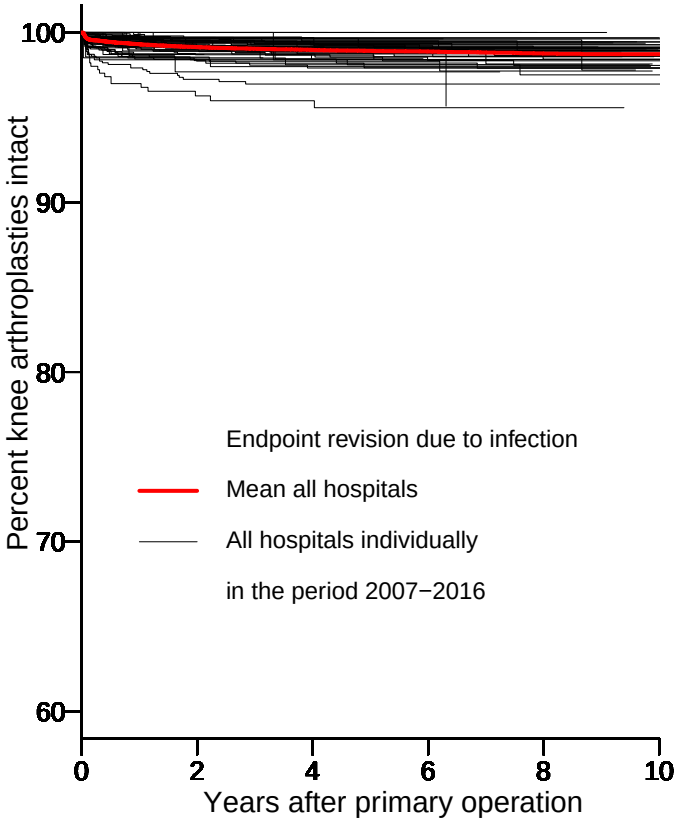
Kaplan-Meier survival curves. Survival estimate is given as long as > 50 prostheses are at risk.

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

Survival curves for all hospitals individually - total and unicondylar knee arthroplasties







One stage bilateral knee prosthesis operations

Year	1994-2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Sum:
Number of patients	38	4	6	3	8	8	8	6	21	21	40	49	72	284

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 Y: Number of primary operations in knee, 2016

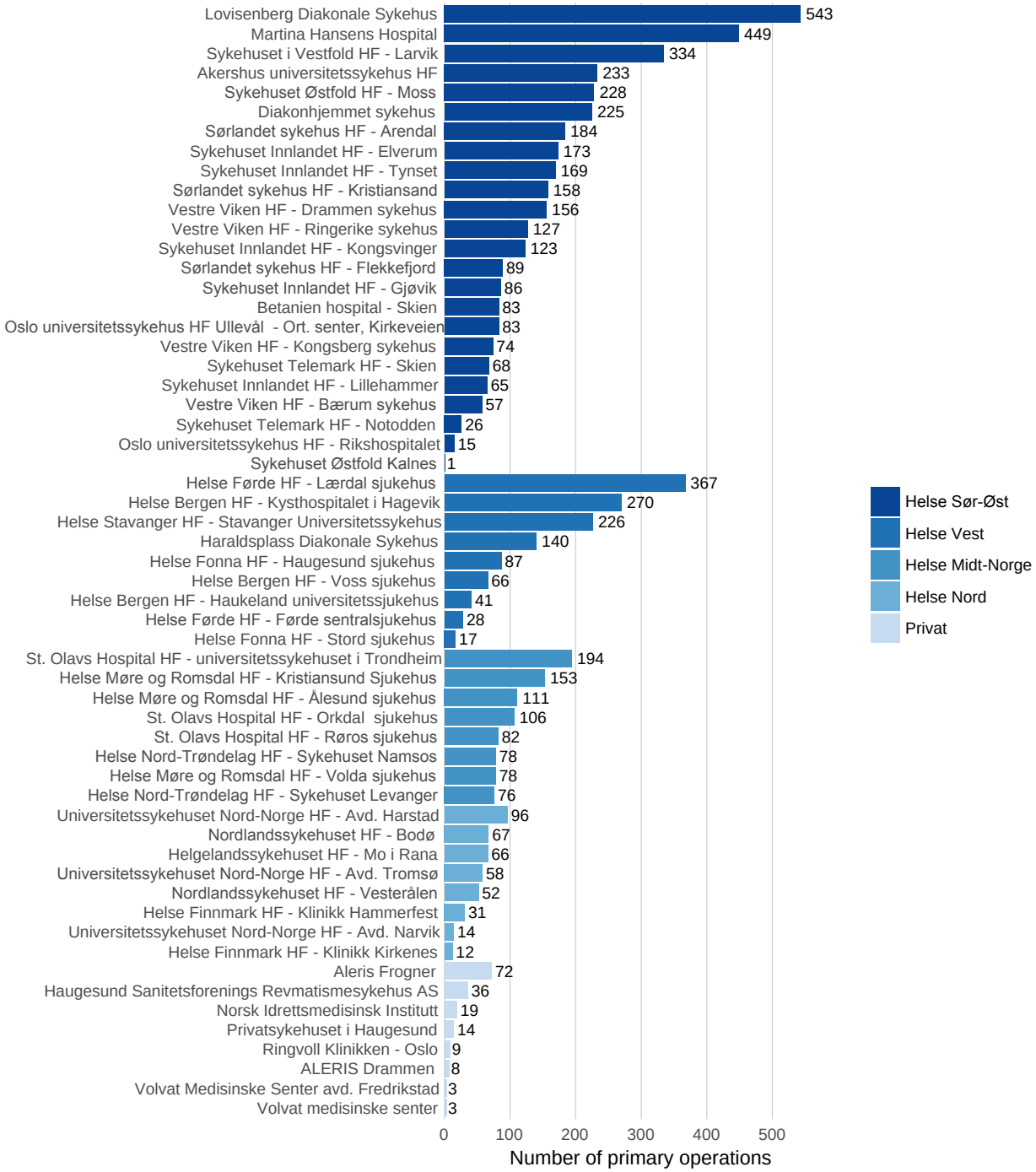
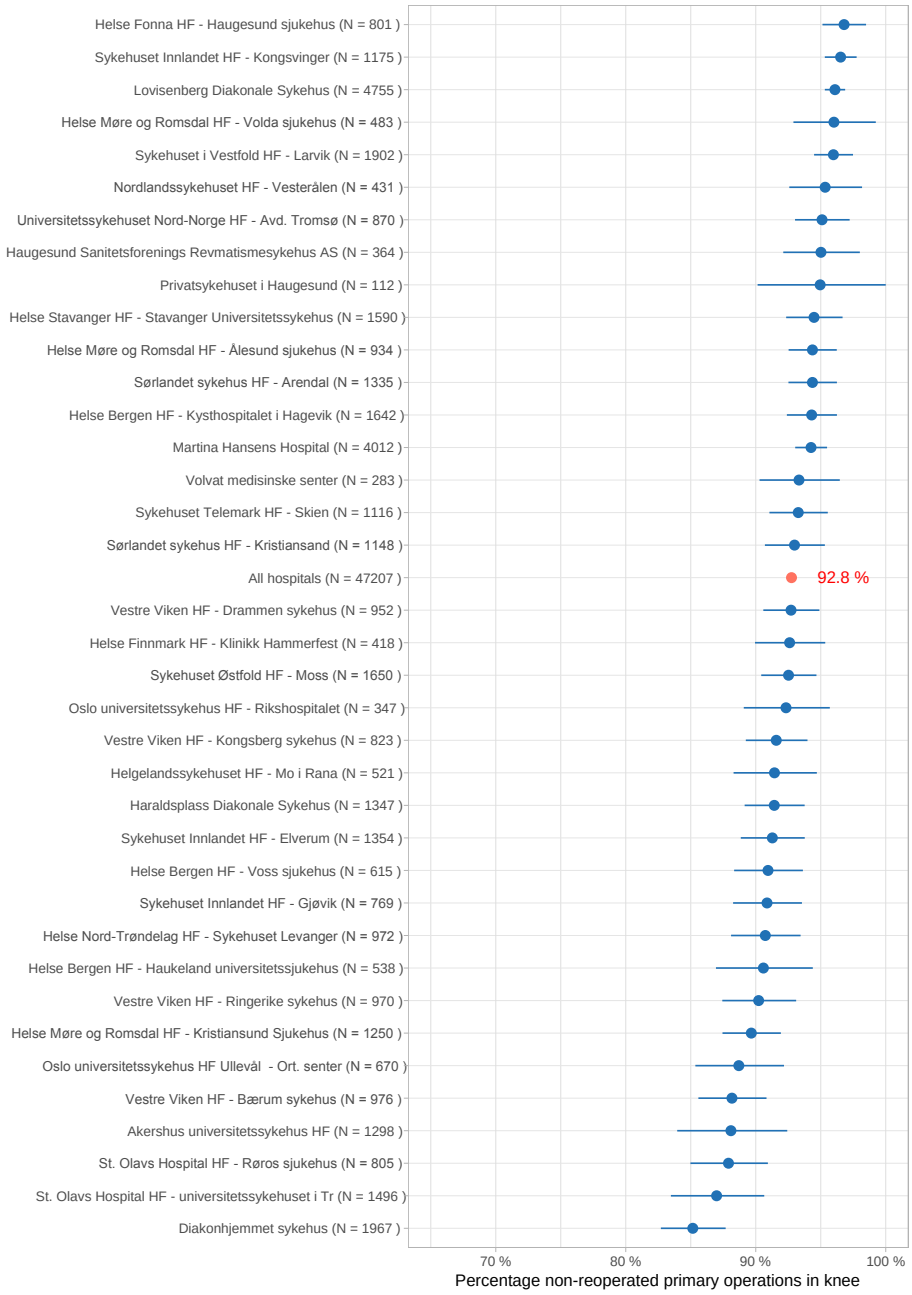


Figure Z: Percentage non-revised patients two years after operations in 2010-2016

Kaplan-Meier estimates of percentage non-revised patients after two years with 95% confidence interval. 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 2010 to 2016. Only hospitals with operations in 2016 and with more than 50 operations from 2010 to 2016 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 coverage of at least 80% for revisions from 2008 to 2012 are included.

Figure Æ: Percentage non-revised patients ten years after operations in 2005-2016



Kaplan-Meier estimates of percentage non-revised patients after ten years with 95% confidence interval. 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 2005 to 2016. Only hospitals with operations in 2016 and with more than 50 operations from 2005 to 2016 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 coverage of at least 80% for revisions from 2008 to 2012 are included.

Figure Ø: Percentage non-reoperated prostheses after 3 and 10 years, 2005-2016

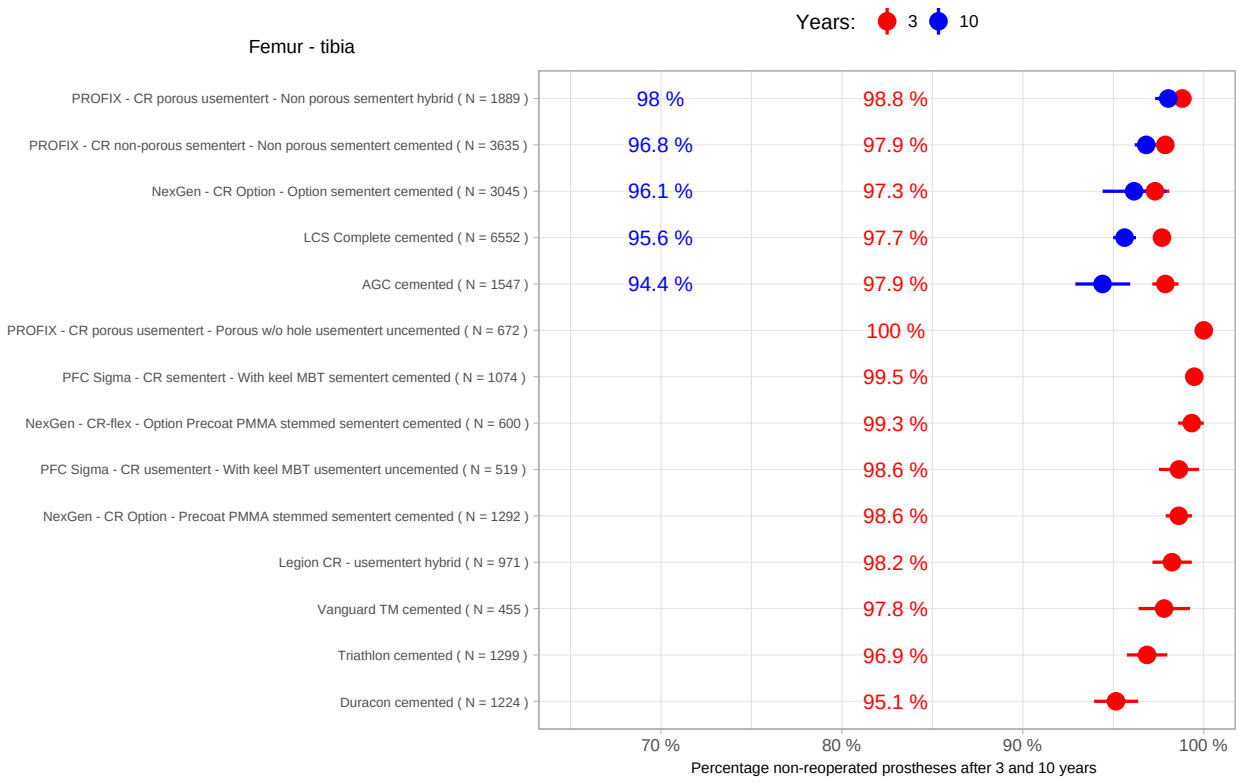


Figure Ø shows the estimated Kaplan-Meier percentage at three and ten years for different combinations of knee prostheses. We have only included combinations used in 500 or more operations in 2005-2016. A further requirement for inclusion in the figure is that there must still be at least 50 examples of the combination at three and ten years respectively. Only **standard patients** from 2005 to 2016 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.

Duracon knee prosthesis is no longer in use (Gøthesen Ø 2013)

See section “How to interpret the prosthesis results” page 22.

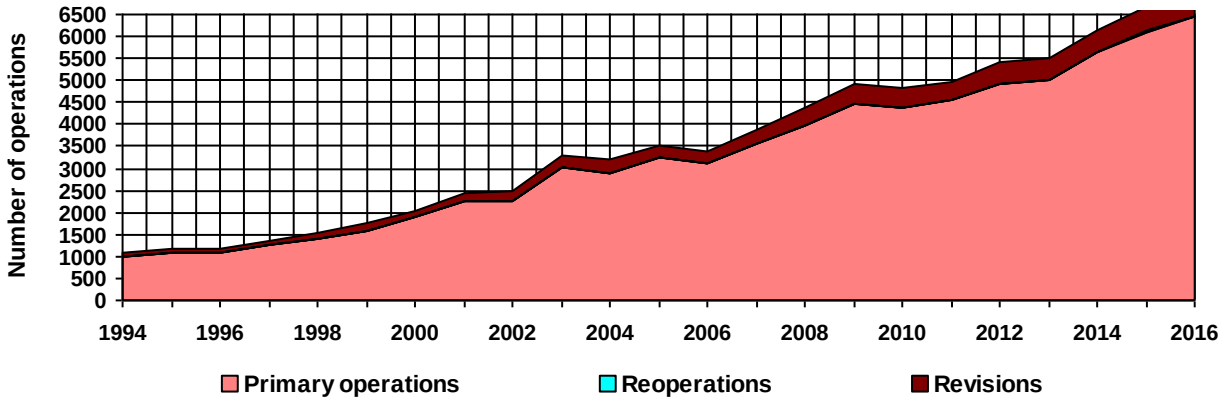
KNEE PROSTHESES

Table 1: Annual numbers of operations

Year	Primary operations		Reoperations *		Revisions		Total
2016	6 466	(91,6%)	10	(0,1%)	583	(8,3%)	**7 059**
2015	6 108	(91,7%)	9	(0,1%)	545	(8,2%)	**6 662**
2014	5 620	(91,9%)	7	(0,1%)	491	(8,0%)	**6 118**
2013	5 025	(91,3%)	6	(0,1%)	474	(8,6%)	**5 505**
2012	4 916	(90,9%)	7	(0,1%)	486	(9,0%)	**5 409**
2011	4 545	(91,3%)	2	(0,0%)	429	(8,6%)	**4 976**
2010	4 400	(91,5%)		(0,0%)	411	(8,5%)	**4 811**
2009	4 468	(91,1%)		(0,0%)	438	(8,9%)	**4 906**
2008	3 990	(91,6%)		(0,0%)	367	(8,4%)	**4 357**
2007	3 588	(92,3%)		(0,0%)	301	(7,7%)	**3 889**
2006	3 109	(92,1%)		(0,0%)	267	(7,9%)	**3 376**
2005	3 254	(92,8%)		(0,0%)	251	(7,2%)	**3 505**
2004	2 906	(90,2%)		(0,0%)	317	(9,8%)	**3 223**
2003	3 037	(92,4%)		(0,0%)	250	(7,6%)	**3 287**
2002	2 274	(91,3%)		(0,0%)	218	(8,7%)	**2 492**
2001	2 237	(91,8%)		(0,0%)	200	(8,2%)	**2 437**
1994-00	9 286	(91,7%)		(0,0%)	844	(8,3%)	**10 130**
Total	**75 229**	**(91,6%)**	**41**	**(0,0%)**	**6 872**	**(8,4%)**	**82 142**

* 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



53,4 % of all operations were performed on the right side. 63,5 % performed in women.

Mean age at primary surgery was 68,6 years, 69,2 years for women and 67,4 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 68,1 years in 2016, 68,5 years for women and 67,5 years for men.

Figure 2: Incidence of primary knee prostheses

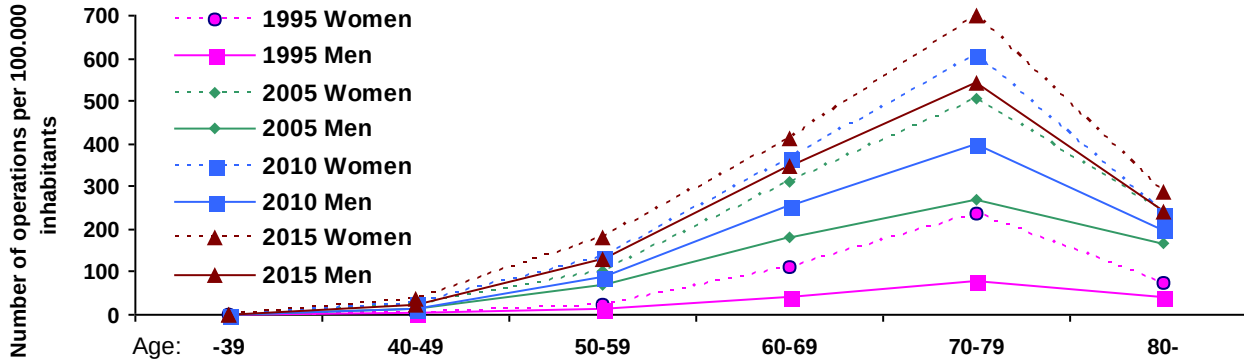


Figure 3: Age at the insertion of primary total knee prostheses

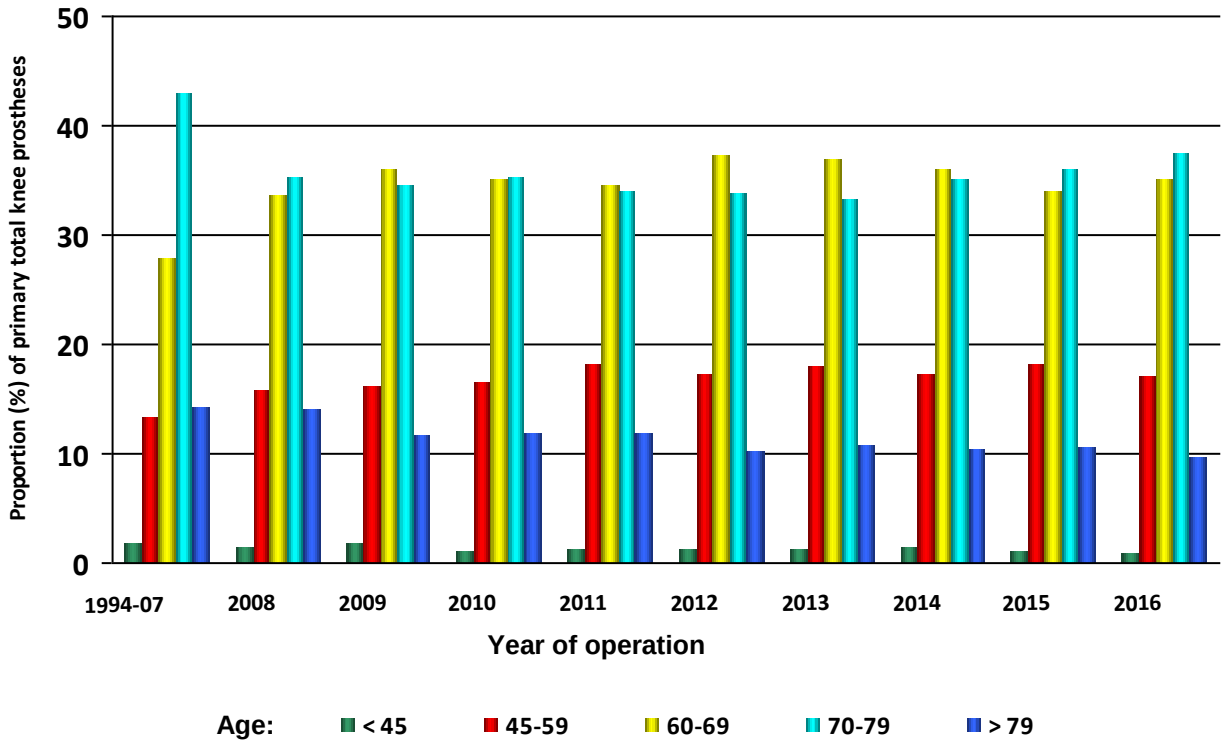


Figure 4: Age at the insertion of primary unicondylar knee prostheses

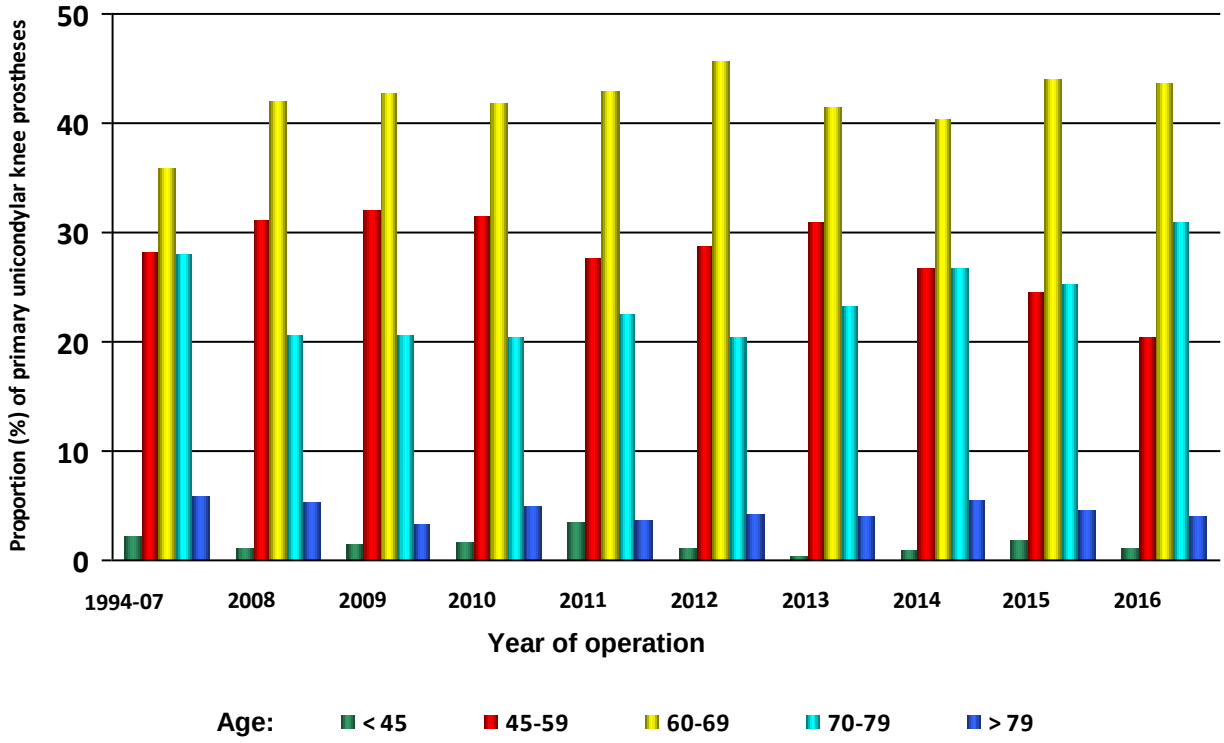


Figure 5: Age and sex at the insertion of primary total knee prostheses

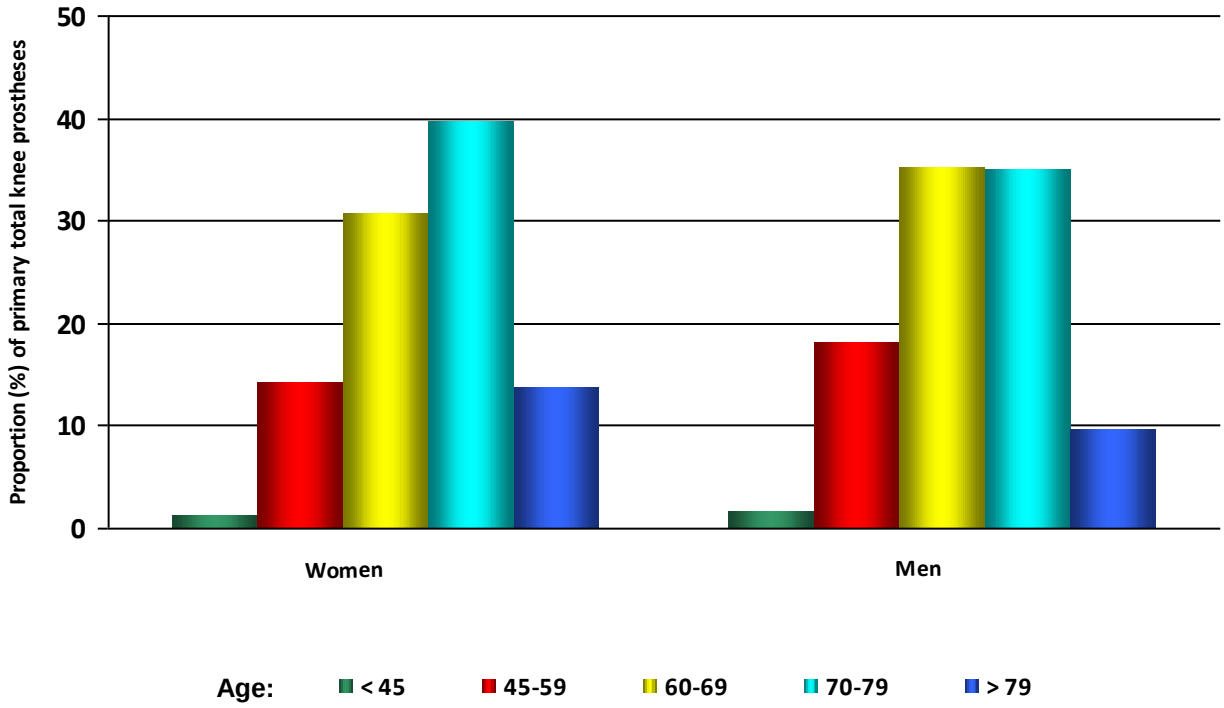
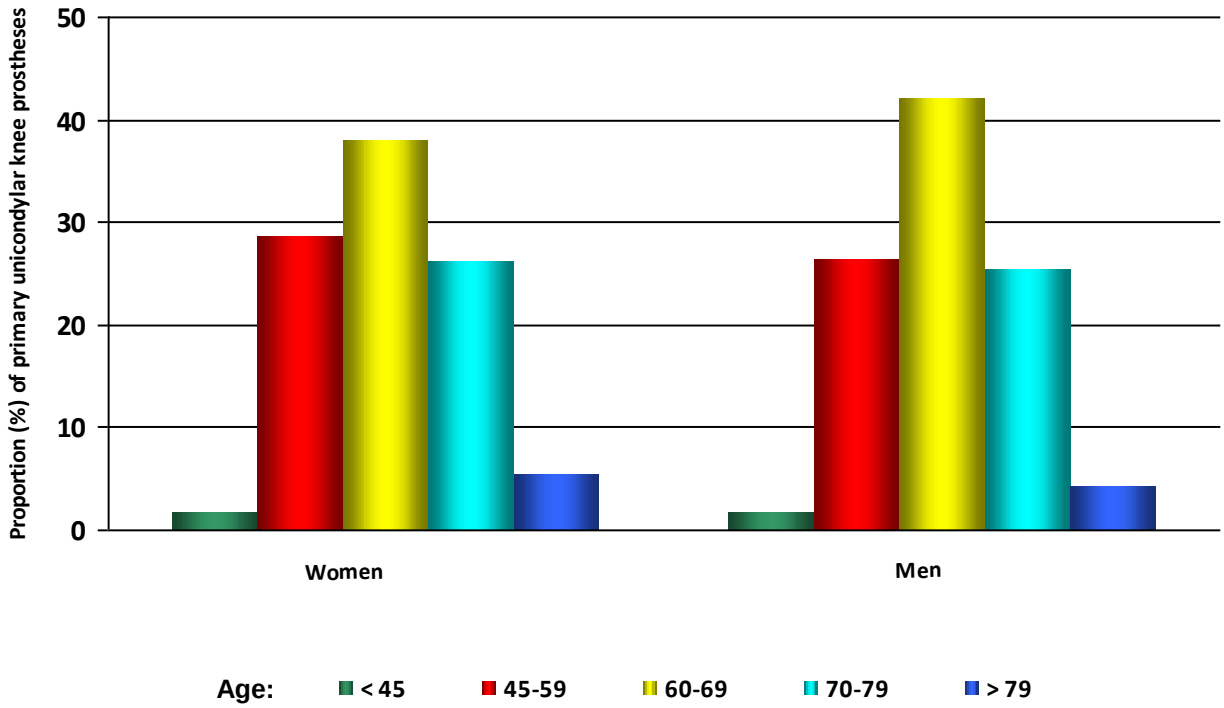


Figure 6: Age and sex at the insertion of primary unicondylar knee prostheses



Types of knee prostheses

Table 2: Primary operations

Year	Total with patella		Total without patella		Unicondylar		Patello-femoral		Bicompart-mental		Hinged * prostheses		Missing		Total
2016	204	(3,2%)	5 296	(81,9%)	858	(13,3%)	78	(1,2%)			28	(0,4%)			**6 466**
2015	160	(2,6%)	5 130	(84,0%)	748	(12,2%)	39	(0,6%)			31	(0,5%)			**6 108**
2014	113	(2,0%)	4 865	(86,6%)	596	(10,6%)	38	(0,7%)			8	(0,1%)			**5 620**
2013	93	(1,9%)	4 410	(87,8%)	476	(9,5%)	38	(0,8%)			6	(0,1%)	2	(0,0%)	**5 025**
2012	99	(2,0%)	4 297	(87,4%)	473	(9,6%)	33	(0,7%)			12	(0,2%)	2	(0,0%)	**4 916**
2011	88	(1,9%)	3 977	(87,5%)	439	(9,7%)	29	(0,6%)			12	(0,3%)			**4 545**
2010	88	(2,0%)	3 867	(87,9%)	414	(9,4%)	23	(0,5%)			8	(0,2%)			**4 400**
2009	96	(2,1%)	3 887	(87,0%)	463	(10,4%)	19	(0,4%)	1	(0,0%)	2	(0,0%)			**4 468**
2008	115	(2,9%)	3 413	(85,5%)	440	(11,0%)	21	(0,5%)	1	(0,0%)					**3 990**
1994-07	3 760	(12,7%)	22 253	(74,9%)	3 618	(12,2%)	56	(0,2%)	1	(0,0%)	2	(0,0%)	1	(0,0%)	**29 691**
Total	**4 816**	**(6,4%)**	**61 395**	**(81,6%)**	**8 525**	**(11,3%)**	**374**	**(0,5%)**	**3**	**(0,0%)**	**109**	**(0,1%)**	**5**	**(0,0%)**	**75 229**

* Indicated by the surgeon on the report form

Figure 7: Primary operations

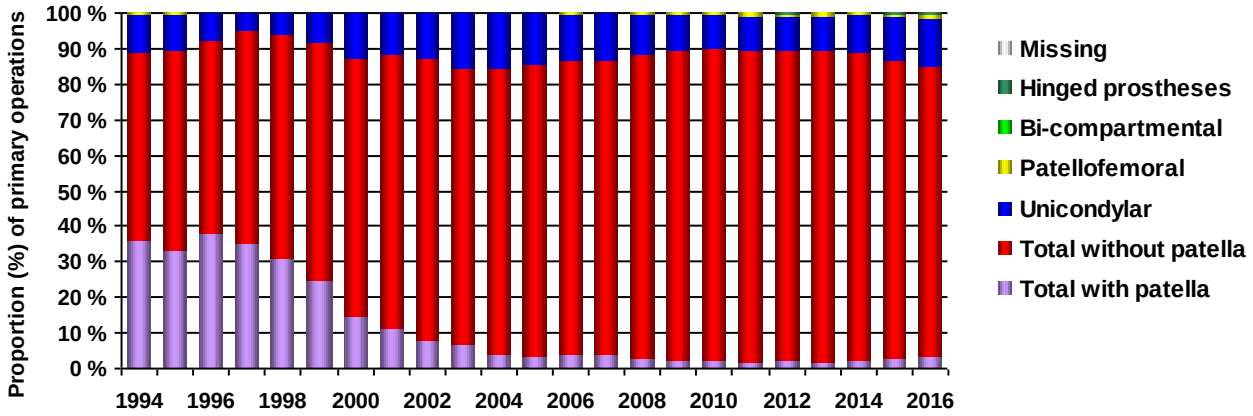


Table 3: Classification of stability and modularity in primary total prostheses

Year	---------- MS ----------		---------- PS ----------			Rotating platform	Hinged * prostheses	Total
	All poly	MT	All poly	MT	CCK			
2016	4	3653	0	455	18	1 365	29	**5 524**
2015	2	3529	0	332	22	1 399	33	**5 317**
2014	2	3383	0	130	22	1 416	20	**4 973**
2013	2	3162	0	53	25	1 254	9	**4 505**
2012	5	2852	0	23	16	1 488	17	**4 401**
2011	5	2537	0	14	9	1 485	19	**4 069**
2010	3	2486	0	20	5	1 425	18	**3 957**
2009	3	2536	0	9	8	1 412	5	**3 973**
2008	1	2162	0	25	3	1 324	8	**3 523**
2007	0	1925	0	16	2	1 162	6	**3 111**
2006	0	1636	0	10	2	1 045	2	**2 695**
2005	0	1617	0	11	0	1 156	3	**2 787**
2004	0	1507	0	8	3	921	1	**2 440**
2003	3	1762	0	7	0	778	1	**2 551**
2002	2	1253	0	14	0	702	3	**1 974**
2001	0	1233	0	12	1	704	3	**1 953**
1994-00	3	6942	0	33	11	1 377	18	**8 384**

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

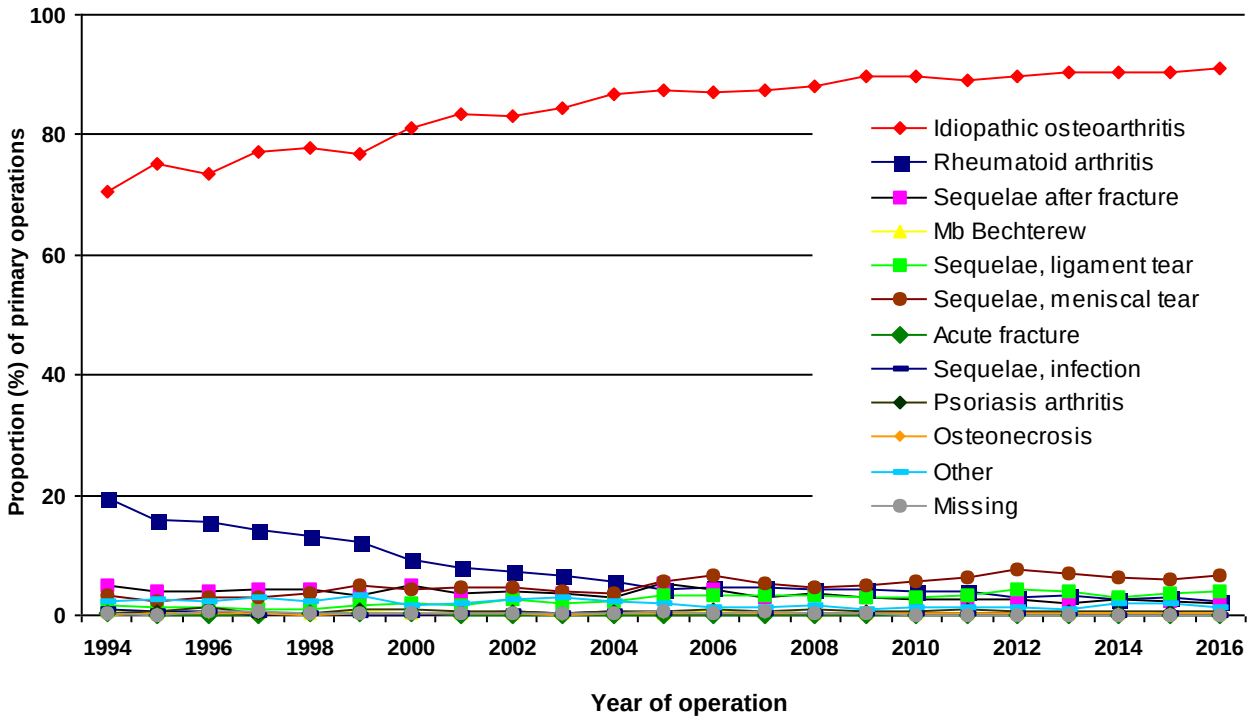
Reasons for primary operations - Total knee prostheses

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
2016	5 014	134	117	18	223	365	2	9	38	13	77	0
2015	4 788	165	114	16	199	321	1	18	36	10	103	2
2014	4 496	140	124	22	142	307	3	7	30	16	94	2
2013	4 073	144	95	11	173	308	1	16	29	9	41	4
2012	3 946	126	110	15	182	332	2	13	33	11	61	4
2011	3 617	161	114	12	134	260	1	18	35	10	54	2
2010	3 552	156	101	13	117	217	2	10	25	7	58	3
2009	3 574	167	118	11	116	200	2	13	25	7	46	10
2008	3 105	149	125	14	116	169	3	9	30	10	54	8
2007	2 719	146	95	17	98	162	4	11	17	11	44	16
2006	2 354	123	114	14	92	178	0	12	23	11	40	5
2005	2 434	120	145	13	94	155	2	11	19	7	53	14
2004	2 129	138	76	6	59	89	0	15	14	6	54	10
2003	2 167	174	94	9	49	98	2	11	8	1	79	5
2002	1 648	144	79	7	54	90	3	10	12	6	50	5
2001	1 645	157	75	5	35	90	1	6	11	7	38	8
2000	1 324	151	79	6	35	69	3	2	14	4	29	3
1999	1 124	180	50	9	24	73	3	2	13	5	50	3
1998	1 033	177	55	3	15	47	5	5	3	2	32	4
1997	907	167	49	3	10	34	1	1	5	2	37	9
1996	725	154	40	8	14	29	1	8	12	3	24	6
1995	735	154	39	4	13	22	0	6	6	4	26	1
1994	624	173	44	5	15	29	2	10	4	0	20	2
Total	**57 733**	**3 500**	**2 052**	**241**	**2 009**	**3 644**	**44**	**223**	**442**	**162**	**1 164**	**126**

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

Figure 8:



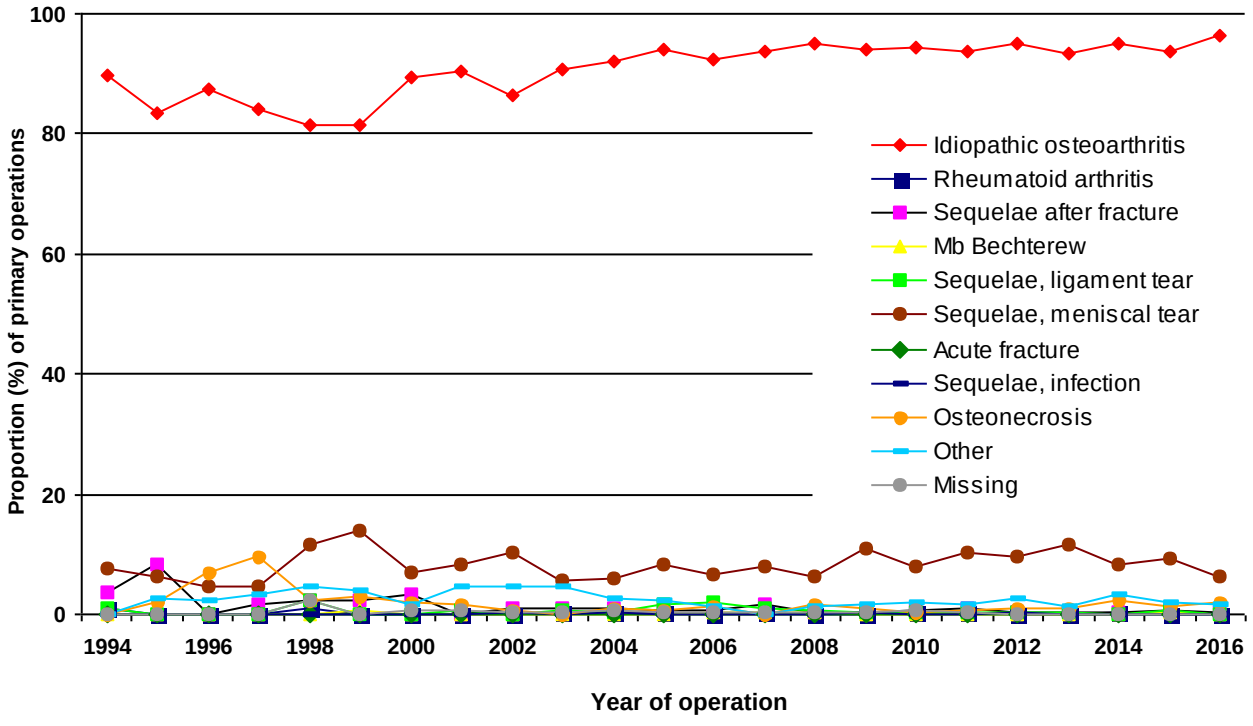
Reasons for primary operations - Unicondylar knee prostheses

Table 5:

Year	Idiopathic osteoarthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechterew	Sequelae, ligament tear	Sequelae, meniscal tear	Sequelae, infection	Osteonecrosis	Other	Missing
2016	826	1	2	1	1	54	1	16	13	0
2015	700	0	4	2	5	70	0	11	14	0
2014	566	2	2	0	0	49	0	13	20	0
2013	445	0	1	0	1	55	0	4	6	0
2012	450	0	1	0	1	46	1	4	13	0
2011	412	1	4	0	1	45	0	3	7	1
2010	391	2	3	0	1	33	0	2	8	3
2009	435	0	1	0	2	50	1	5	8	2
2008	418	0	2	1	3	27	0	7	6	2
2007	436	2	7	1	4	37	0	0	0	2
2006	369	0	2	1	8	26	0	5	5	1
2005	429	2	3	0	7	38	0	3	10	1
2004	411	1	4	0	1	27	2	5	12	3
2003	426	2	5	0	3	27	0	0	21	1
2002	251	0	3	0	0	30	1	2	13	1
2001	241	0	0	0	2	22	0	4	12	2
2000	216	0	8	0	0	17	0	5	4	2
1999	105	0	3	1	0	18	0	4	5	0
1998	71	1	2	0	2	10	0	2	4	2
1997	53	0	1	0	0	3	0	6	2	0
1996	76	0	0	0	0	4	0	6	2	0
1995	91	0	9	0	0	7	0	2	3	0
1994	96	1	4	0	1	8	0	0	0	0
Total	**7 914**	**15**	**71**	**7**	**43**	**703**	**6**	**109**	**188**	**23**

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

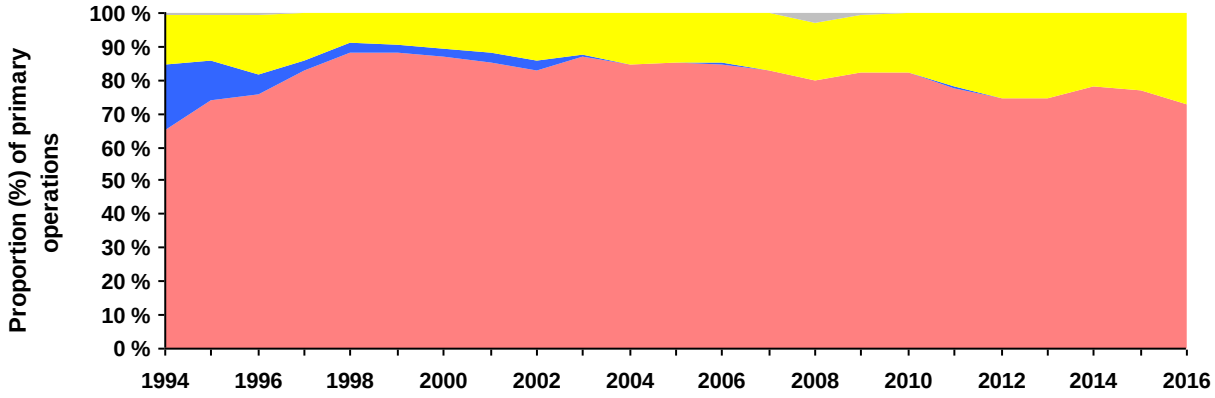


Figure 11: Tibia

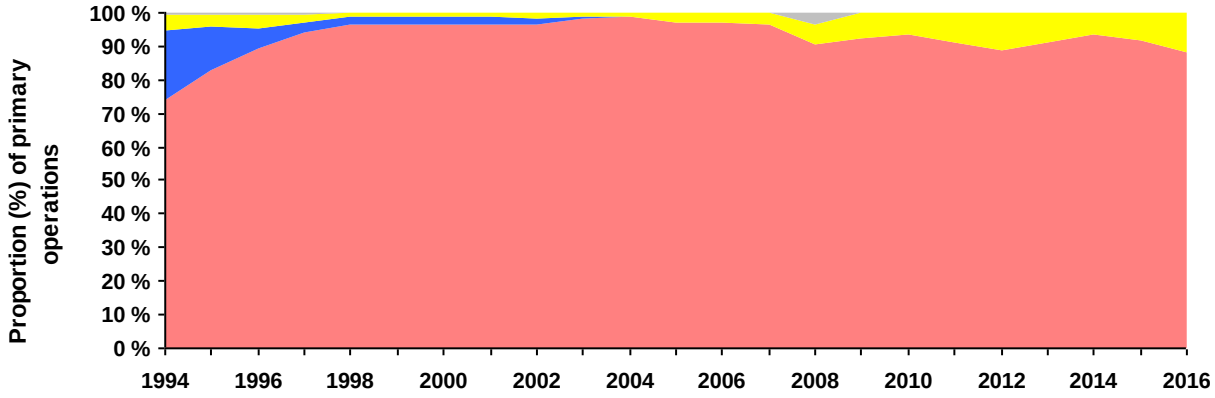
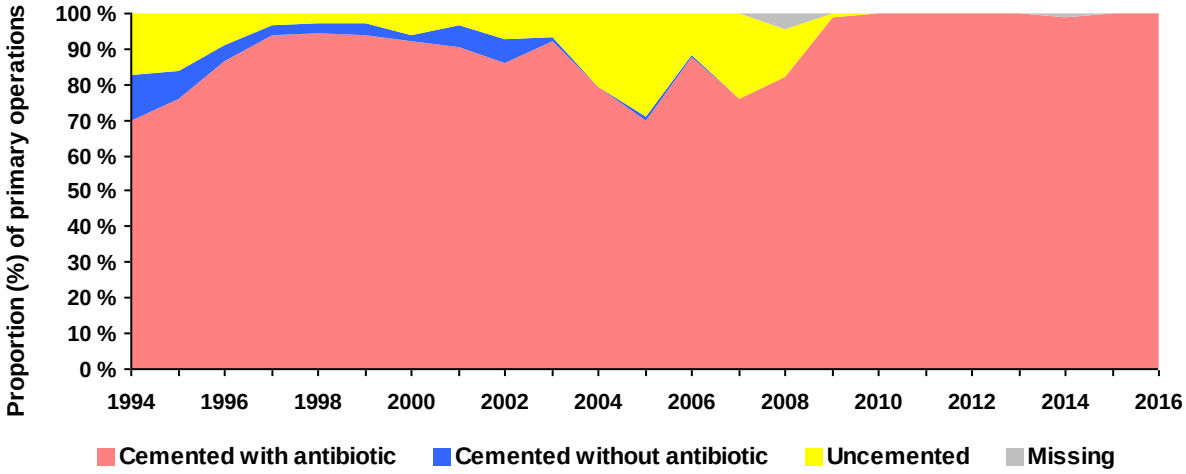


Figure 12: Patella



Use of cement in total knee prostheses

Figure 13: Primary operations

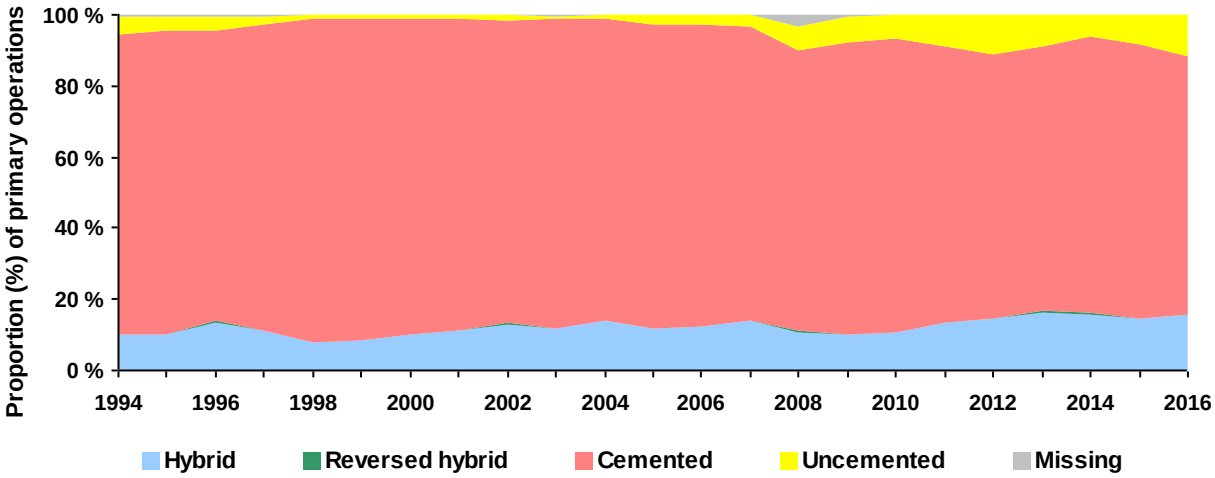
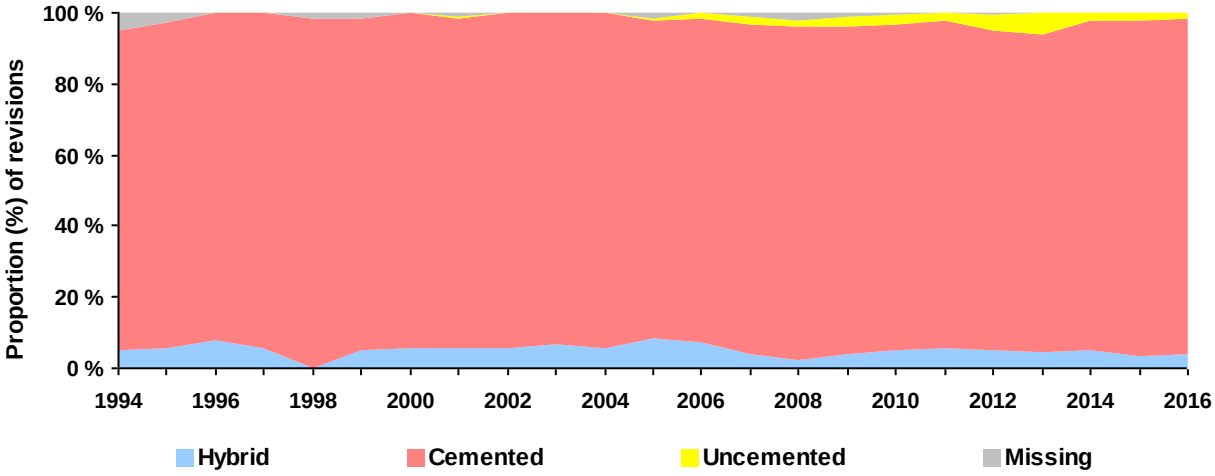
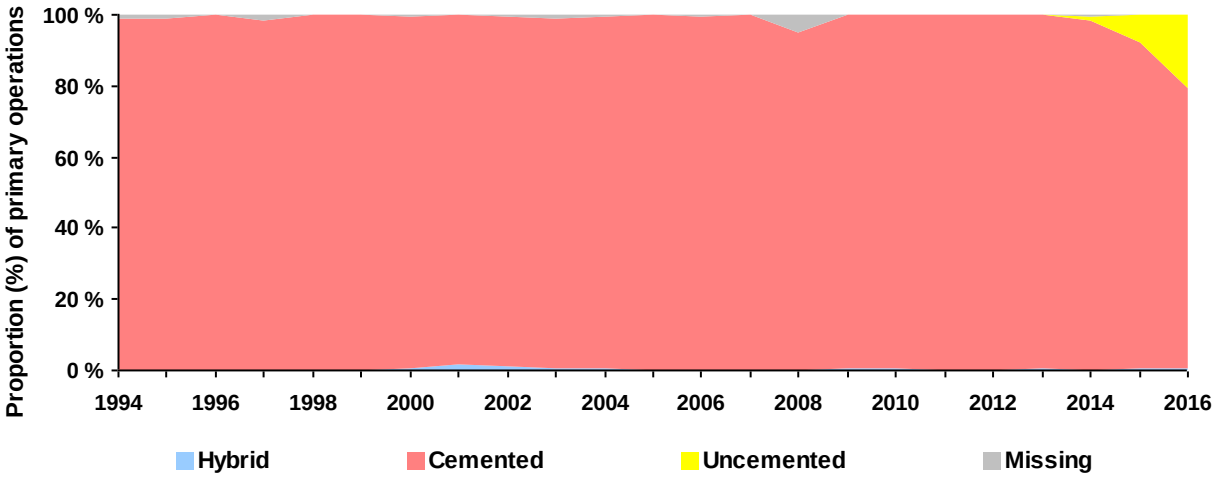


Figure 14: Revisions



Use of cement in unicondylar knee prostheses

Figure 15: Primary operations



The 7 most common primary total prostheses without patella component in 2013-2016

Table 6:

Product	Cemented *	Uncemented *	Hybrid	All poly	Rotating platform	Stabilization HXLPE	Stabilization MS	Stabilization PS	Stabilization CCK	Total
NexGen	7 958	635	789	0	0	613	8623	728	115	**9 391**
LCS Complete	2 367	58	378	0	2 802	0	2802	3	0	**2 807**
PFC-Sigma	1 606	860	167	0	2 632	0	2630	5	3	**2 638**
Legion	915	4	1 387	0	0	65	2231	85	5	**2 310**
Triathlon	1 072	70	124	0	0	1 240	1232	27	14	**1 269**
PROFIX	706	147	317	2	0	0	1171	0	0	**1 171**
Vanguard TM	303	0	0	0	0	0	302	18	0	**303**

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 MS	Stabilization PS	Stabilization CCK	Total
CR Option	5 973	2	5978	0	0	**5 978**
CR-flex porous uncemented	39	821	862	0	0	**862**
CR-flex Option	791	0	791	0	0	**791**
CR-flex gender	472	0	472	0	0	**472**
CR Porous uncemented	34	275	309	0	0	**309**
LPS-flex porous standard	2	280	0	283	0	**283**
LPS Option	249	0	0	249	0	**249**
CR Precoat	170	1	171	0	0	**171**
LCCK Option	114	0	0	0	114	**114**
LPS-flex Option	103	5	0	108	0	**108**
CR-flex porous	3	23	26	0	0	**26**
LPS-flex	6	0	0	6	0	**6**
Other	6	5	1	10	0	**11**
Unknown	9	2	0	0	0	**11**

Product: PROFIX (35)

Product Category	Cemented *	Uncemented *	Stabilization MS	Stabilization PS	Stabilization CCK	Total
CR non-porous cemented	600	2	602	0	0	**602**
CR porous uncemented	98	457	555	0	0	**555**
CR Oxinium	5	0	5	0	0	**5**
Other	2	0	2	0	0	**2**
Unknown	5	1	0	0	0	**7**

Product: LCS Complete (48)

Product Category	Cemented *	Uncemented *	Stabilization MS	Stabilization PS	Stabilization CCK	Total
Cemented	2 318	0	0	0	0	**2 320**
Uncemented	43	437	0	0	0	**480**
Other	4	0	0	0	0	**4**
Unknown	3	0	0	3	0	**3**

Product: PFC-Sigma (49)

Product Category	Cemented*	Uncemented *	Stabilization MS	PS	CCK	Total
CR cemented	1 597	0	1600	0	0	**1 600**
CR uncemented	6	1 023	1029	0	0	**1 029**
PS	5	0	0	5	0	**5**
Other	2	0	0	0	0	**2**
Unknown	3	0	0	0	0	**3**

Product: Triathlon (58)

Product Category	Cemented*	Uncemented *	Stabilization MS	PS	CCK	Total
CR cemented	1 027	3	1033	0	0	**1 033**
Beaded CR uncemented	5	190	195	0	0	**195**
PS cemented	20	0	0	20	0	**20**
TS cemented	13	0	0	0	13	**13**
Unknown	8	0	0	0	0	**8**

Product: Legion (62)

Product Category	Cemented*	Uncemented *	Stabilization MS	PS	CCK	Total
CR uncemented	10	1 385	1396	0	0	**1 396**
CR cemented	821	0	822	0	0	**822**
PS cemented	66	5	0	71	0	**71**
CR Oxinium cemented	14	0	14	0	0	**14**
PS Oxinium cemented	9	0	0	10	0	**10**
Other	4	1	0	2	3	**5**
Unknown	1	0	0	0	0	**1**

Product: Vanguard TM (67)

Product Category	Cemented*	Uncemented *	Stabilization MS	PS	CCK	Total
CR Anatomic interlok cemented	300	0	300	0	0	**300**
PS Anatomic interlok cemented	15	0	0	15	0	**15**
Other	3	0	2	1	0	**3**
Unknown	1	0	0	0	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
Option cemented	5 766	9	0	**5 775**
Precoat PMMA stemmed cemented	2 826	1	0	**2 828**
Trabecular metal uncemented	6	638	0	**644**
Precoat AP wedge stemmed	125	1	0	**126**
Unknown	16	0	0	**16**

Product: PROFIX (35)

Product Category	Cemented *	Uncemented *	All poly	Total
Non porous cemented	983	3	0	**986**
Porous w/o hole uncemented	1	148	0	**149**
Porous uncemented	31	0	0	**31**
Other	2	0	2	**2**
Unknown	3	0	0	**3**

Table 6 B: Tibia

Product: LCS Complete (48)

Product Category	Cemented *	Uncemented *	All poly	Total
No keel MBT* cemented	2 725	1	0	**2 727**
No keel MBT* uncemented	1	56	0	**57**
MBT* revision	16	0	0	**16**
Other	2	2	0	**4**
Unknown	3	0	0	**3**

* MBT = Mobile bearing tray

Product: PFC-Sigma (49)

Product Category	Cemented *	Uncemented *	All poly	Total
With keel MBT* cemented	1 732	4	0	**1 737**
With keel MBT* uncemented	11	851	0	**862**
No keel MBT* cemented	14	2	0	**16**
MBT* revision	7	8	0	**15**
Unknown	6	1	0	**7**

* MBT = Mobile bearing tray

Product: Triathlon (58)

Product Category	Cemented *	Uncemented *	All poly	Total
Cemented	1 161	1	0	**1 162**
PA uncemented	4	70	0	**74**
Universal cemented	27	0	0	**27**
Unknown	6	0	0	**6**

Product: Legion (62)

Product Category	Cemented *	Uncemented *	All poly	Total
Male tapered cemented	2 300	5	0	**2 305**
All poly CR	8	0	8	**8**
Unknown	5	0	0	**5**

Product: Vanguard TM (67)

Product Category	Cemented *	Uncemented *	All poly	Total
Highly polished modular PCR	299	0	0	**299**
Interlok Monobloc PCR cemented	15	0	0	**15**
Other	4	0	0	**4**

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: Foring Tibia Insert

Product: NexGen (31)

Product Category	Rotating platform	Stabilization HXLPE	MS	PS	CCK	Total
CR-Flex	0	0	7947	0	0	**7 947**
LPS-FlexFixed	0	0	0	714	0	**714**
CR-Prolong	0	609	609	0	0	**609**
LCCK	0	0	0	0	79	**79**
CR	0	0	10	0	0	**10**
Other	0	4	0	4	0	**4**
Unknown	0	0	0	0	0	**28**

Product: PROFIX (35)

Product Category	Rotating platform	Stabilization HXLPE	MS	PS	CCK	Total
Conforming PCR	0	0	1022	0	0	**1 022**
Conforming+	0	0	141	0	0	**141**
Unknown	0	0	8	0	0	**8**

Product: LCS Complete (48)

Product Category	Rotating platform	Stabilization HXLPE	MS	PS	CCK	Total
Rotating platform RP	2 802	0	2802	0	0	**2 802**
Unknown	0	0	0	0	0	**5**

Product: PFC-Sigma (49)

Product Category	Rotating platform	Stabilization HXLPE	MS	PS	CCK	Total
Rotating platform RP-CV	2 624	0	2624	0	0	**2 624**
Revision STB	5	0	0	0	0	**5**
Other	3	0	1	0	3	**4**
Unknown	0	0	0	0	0	**5**

Product: Triathlon (58)

Product Category	Rotating platform	Stabilization HXLPE	MS	PS	CCK	Total
CR-X3 HXLPE	0	1 026	1026	0	0	**1 026**
CS-X3 HXLPE	0	192	192	0	0	**192**
PS-X3 HXLPE	0	14	0	14	0	**14**
PS	0	0	0	13	0	**13**
CR	0	0	10	0	0	**10**
TS-X3 HXLPE	0	8	0	0	8	**8**
Unknown	0	0	0	0	0	**6**

Product: Legion (62)

Product Category	Rotating platform	Stabilization HXLPE	MS	PS	CCK	Total
CR standard	0	0	1242	0	0	**1 242**
Dished	0	0	979	0	0	**979**
PS high flex	0	59	0	59	0	**59**
PS	0	0	0	20	0	**20**
CR-highflex HXLPE	0	5	5	0	0	**5**
Other	0	1	1	0	2	**3**
Unknown	0	0	0	0	0	**2**

Product: Vanguard TM (67)

Product Category	Rotating platform	Stabilization HXLPE	MS	PS	CCK	Total
Arcom CR	0	0	288	0	0	**288**
Arcom PS	0	0	0	14	0	**14**
Other	0	0	0	1	0	**1**
Unknown	0	0	0	0	0	**1**

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

Table 7: Femoral prostheses in primary operations

Prosthesis	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Profix	7510	1097	1216	1155	1169	1388	1039	131		1	**14706**
LCS Complete	2532	1315	1374	1420	1491	1488	802	712	675	618	**12427**
NexGen	970	172	205	251	221	656	1598	2421	2688	2684	**11866**
AGC	3385	352	341	290	247	224	27				**4866**
LCS	4818										**4818**
Genesis I	3293										**3293**
Duracon	815	463	508	470	396	101					**2753**
PFC-Sigma	1				3	1	453	707	729	750	**2644**
Triathlon	51	48	178	164	287	329	245	229	297	498	**2326**
Legion						3	136	673	753	757	**2322**
Tricon -C with Pro-Fit	1085										**1085**
Vanguard TM	1	3	66	144	198	149	147	65	65	42	**880**
E-motion	403	9	46	10							**468**
Kinemax	411										**411**
Tricon M	337										**337**
Advance	79	15	38	29	44	43	51	12			**311**
Journey II BCS								7	70	56	**133**
Scorpio	60	44	7	12	2	2					**127**
NexGen Rotating Hinge	5	6	3	10	16	10	4	19	29	22	**124**
Interax I.S.A.	106										**106**
Attune										44	**44**
AGC Dual	43										**43**
Search	40										**40**
Kotz	33										**33**
Evolution Medial-Pivot									10	19	**29**
GMK Sphere										18	**18**
RT-Plus Modular	1			4	1	6	4				**16**
Andre (n<15)	31	3	2	4	2	5	2	8	5	19	**81**
Total	**26010**	**3527**	**3984**	**3963**	**4077**	**4405**	**4508**	**4984**	**5321**	**5528**	**66307**

Table 8: Femoral prostheses in revisions

Prosthesis	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
NexGen	89	26	34	29	42	60	107	102	122	106	**717**
Profix	393	53	48	54	47	40	43	6			**684**
LCS Complete	106	60	71	61	60	57	42	31	16	23	**527**
NexGen Rotating Hinge	19	9	12	9	12	17	18	47	53	47	**243**
Genesis I	211										**211**
LCS	181										**181**
Triathlon			1	10	17	29	34	24	23	18	**156**
Legion		1	8	7		1	6	26	40	30	**119**
Scorpio	11	16	19	25	16	7					**94**
PFC-Sigma							12	21	24	30	**87**
AGC	65	7	1	3	2	4	1				**83**
Duracon	36	9	17	5	5	4					**76**
Vanguard TM		1	17	23	21	3	2				**67**
AGC Dual	62										**62**
Dual Articular 2000	27	3									**30**
RT-Plus Modular			3	1	1	9	9	1			**24**
S-ROM Rotat. Hinge	3		2		7	2	1	4	1	4	**24**
Tricon -C with Pro-Fit	20										**20**
Kinemax	16										**16**
E-motion	6	4	5	1							**16**
Legion Hinge Knee								1	7	8	**16**
Andre (n<15)	59	4	7	3	7	5	3	2		6	**96**
Total	**1304**	**193**	**245**	**231**	**237**	**238**	**278**	**265**	**286**	**272**	**3549**

Table 9: Tibial prostheses in primary operations

Prosthesis	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Profix	7504	1097	1216	1155	1169	1388	1039	131		1	**14700**
LCS Complete	2492	1307	1374	1419	1491	1488	802	712	675	619	**12379**
NexGen	970	172	205	251	221	656	1598	2421	2688	2684	**11866**
AGC	3395	351	341	290	247	224	27				**4875**
LCS	4488	8									**4496**
Genesis I	3293										**3293**
Duracon	815	463	508	470	396	101					**2753**
PFC-Sigma	1				3	1	453	707	730	749	**2644**
Triathlon	51	48	178	164	287	329	245	229	297	498	**2326**
Legion						3	136	673	753	757	**2322**
Tricon II	1417										**1417**
Vanguard TM	1	3	66	144	198	148	146	65	65	42	**878**
E-motion	403	9	46	10							**468**
Kinemax	411										**411**
LCS Universal	373										**373**
Advance	79	15	38	29	44	43	51	12			**311**
Journey II BCS								7	70	56	**133**
Scorpio	60	44	7	12	2	2					**127**
NexGen Rotating Hinge	5	6	3	10	16	10	4	19	29	22	**124**
Interax I.S.A.	106										**106**
Attune										44	**44**
Search	40										**40**
Kotz	33										**33**
Evolution Medial-Pivot									10	19	**29**
AGC Dual	27										**27**
GMK Sphere										18	**18**
RT-Plus Modular	1			4	1	6	4				**16**
Andre (n<15)	37	4	2	4	1	5	3	8	4	19	**87**
Total	**26002**	**3527**	**3984**	**3962**	**4076**	**4404**	**4508**	**4984**	**5321**	**5528**	**66296**

Table 10: Tibial prostheses in revisions

Prosthesis	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
NexGen	88	27	33	30	42	61	111	109	124	114	**739**
Profix	402	49	47	53	45	45	44	7	1	1	**694**
LCS Complete	135	81	94	73	81	68	55	46	25	25	**683**
Genesis I	256	2			1						**259**
NexGen Rotating Hinge	19	9	12	8	12	16	18	47	51	45	**237**
LCS	236										**236**
Triathlon			1	10	18	31	35	24	24	21	**164**
Duracon	41	12	21	12	14	11	7				**118**
Legion		1	8	7		1	6	26	39	30	**118**
Scorpio	11	16	19	26	17	8			1		**98**
PFC-Sigma							12	20	24	33	**89**
AGC	67	7	1	4	2	4					**85**
Tricon II	71										**71**
Vanguard TM			17	22	21	4	3				**67**
AGC Dual	59										**59**
Dual Articular 2000	26	3									**29**
RT-Plus Modular			3	1	1	9	9	1			**24**
Maxim	21			1							**22**
E-motion	6	4	6	1		1					**18**
Kinemax	17										**17**
Legion Hinge Knee								1	7	8	**16**
Andre (n<15)	32	4	5	3	6	9	3	4		8	**74**
Total	**1487**	**215**	**267**	**251**	**260**	**268**	**303**	**285**	**296**	**285**	**3917**

Unicondylar knee prostheses

Table 11: Femoral prostheses in primary operations

Prosthesis	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Oxford UNI (III)	2559	400	444	400	412	334	233	202	196	198	**5378**
Oxford Partial Knee					1	104	205	371	514	631	**1826**
Genesis UNI	344	1	1								**346**
Miller/Galante UNI	282	10	4								**296**
MOD III	200										**200**
Preservation	127	20	7	11							**165**
LINK Schlitten UNI	9				3	14	20	13	17	17	**93**
Duracon	50										**50**
Journey Uni					7	14	3	3	12	7	**46**
Oxford UNI (II)	45										**45**
Sigma High Performance Uni					8	6	11	6	9	3	**43**
ZUK (Unicondylar)		9	7	3	8	1					**28**
Other (n<15)	2						3	1		2	**8**
Total	**3618**	**440**	**463**	**414**	**439**	**473**	**475**	**596**	**748**	**858**	**8524**

Table 12: Tibial prostheses in primary operations

Prosthesis	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Oxford UNI (III)	2558	399	444	400	412	334	232	203	192	201	**5375**
Oxford Partial Knee					1	104	206	370	518	628	**1827**
Genesis UNI	344	1	1								**346**
Miller/Galante UNI	279	10	4								**293**
MOD III	201										**201**
Preservation	127	20	7	11							**165**
LINK Schlitten UNI	9				3	14	20	13	17	17	**93**
Duracon	50										**50**
Journey Uni					7	14	3	3	12	7	**46**
Oxford UNI (II)	45	1									**46**
Sigma High Performance Uni					8	6	11	6	9	3	**43**
ZUK (Unicondylar)		9	7	3	8	1					**28**
Other (n<15)	1						3			2	**6**
Total	**3614**	**440**	**463**	**414**	**439**	**473**	**475**	**595**	**748**	**858**	**8519**

Patellofemoral prostheses

Table 13: Femoral prostheses in primary operations

Prosthesis	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Journey PFJ	3	16	18	21	25	14	18	22	7	17	**161**
NexGen PFJ Gender	0	0	0	2	4	19	16	16	32	47	**136**
Patella Mod III / II	33	0	0	0	0	0	0	0	0	0	**33**
LCS PFJ	17	0	1	0	0	0	0	0	0	0	**18**
Legion	0	0	0	0	0	0	0	0	0	14	**14**
Other (n<5)	3	5	0	0	0	0	4	0	0	0	**12**
Total	**56**	**21**	**19**	**23**	**29**	**33**	**38**	**38**	**39**	**78**	**374**

Table 14: Patella prostheses in primary operations

Prosthesis	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Journey PFJ	3	14	18	21	25	14	18	22	7	31	**173**
NexGen PFJ Gender				2	4	19	16	16	31	46	**134**
Patella Mod III / II	33										**33**
LCS PFJ	17										**17**
Other (n<5)	3	5	1				4		1	1	**15**
Total	**56**	**19**	**19**	**23**	**29**	**33**	**38**	**38**	**39**	**78**	**372**

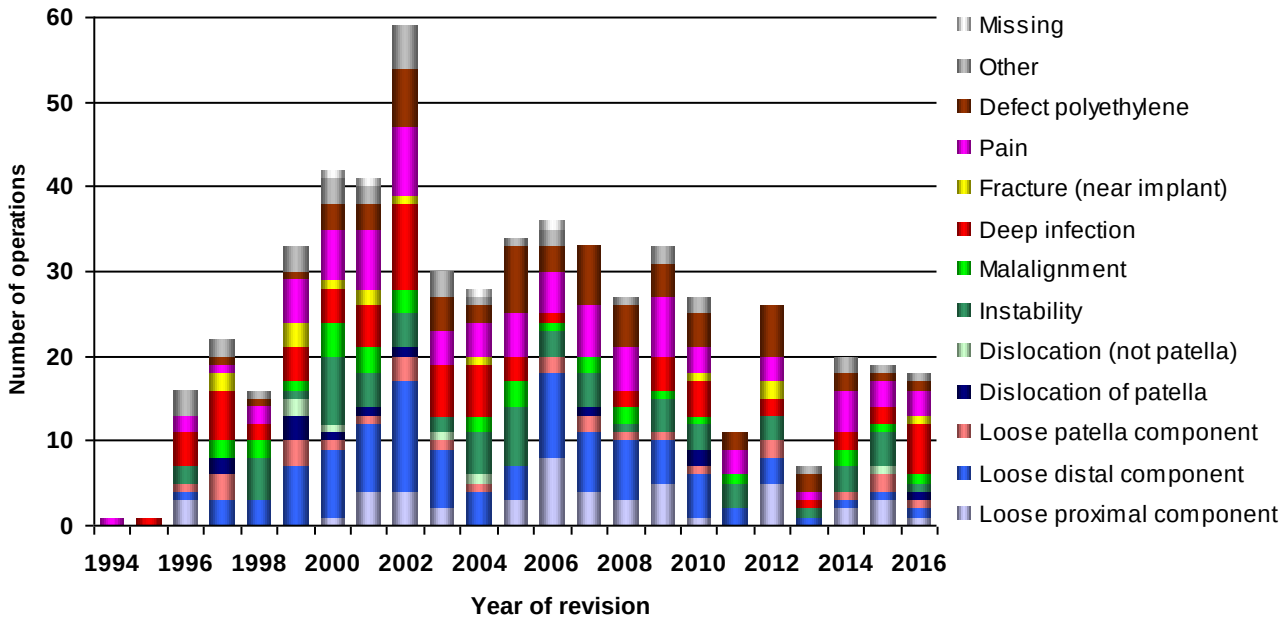
Reasons for revisions

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

Year of revision	Loose proximal comp.	Loose distal comp.	Loose patella comp.	Dislocation of patella	Dislocation (not patella)	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Other	Missing
2016	1	1	1	1	0	1	1	6	1	3	1	1	0
2015	3	1	2	0	1	4	1	2	0	3	1	1	0
2014	2	1	1	0	0	3	2	2	0	5	2	2	0
2013	0	1	0	0	0	1	0	1	0	1	2	1	0
2012	5	3	2	0	0	3	0	2	2	3	6	0	0
2011	0	2	0	0	0	3	1	0	0	3	2	0	0
2010	1	5	1	2	0	3	1	4	1	3	4	2	0
2009	5	5	1	0	0	4	1	4	0	7	4	2	0
2008	3	7	1	0	0	1	2	2	0	5	5	1	0
2007	4	7	2	1	0	4	2	0	0	6	7	0	0
2006	8	10	2	0	0	3	1	1	0	5	3	2	1
2005	3	4	0	0	0	7	3	3	0	5	8	1	0
2004	0	4	1	0	1	5	2	6	1	4	2	1	1
2003	2	7	1	0	1	2	0	6	0	4	4	3	0
2002	4	13	3	1	0	4	3	10	1	8	7	5	0
2001	4	8	1	1	0	4	3	5	2	7	3	2	1
2000	1	8	1	1	1	8	4	4	1	6	3	3	1
1999	0	7	3	3	2	1	1	4	3	5	1	3	0
1998	0	3	0	0	0	5	2	2	0	2	1	1	0
1997	0	3	3	2	0	0	2	6	2	1	1	2	0
1996	3	1	1	0	0	2	0	4	0	2	0	3	0
1995	0	0	0	0	0	0	0	1	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	1	0	0	0
Total	**49**	**101**	**27**	**12**	**6**	**68**	**32**	**75**	**14**	**89**	**67**	**36**	**4**

Revision causes are not mutually exclusive. More than one reason for revision is possible

Figure 16: Reasons for revisions of total knee prostheses with patella



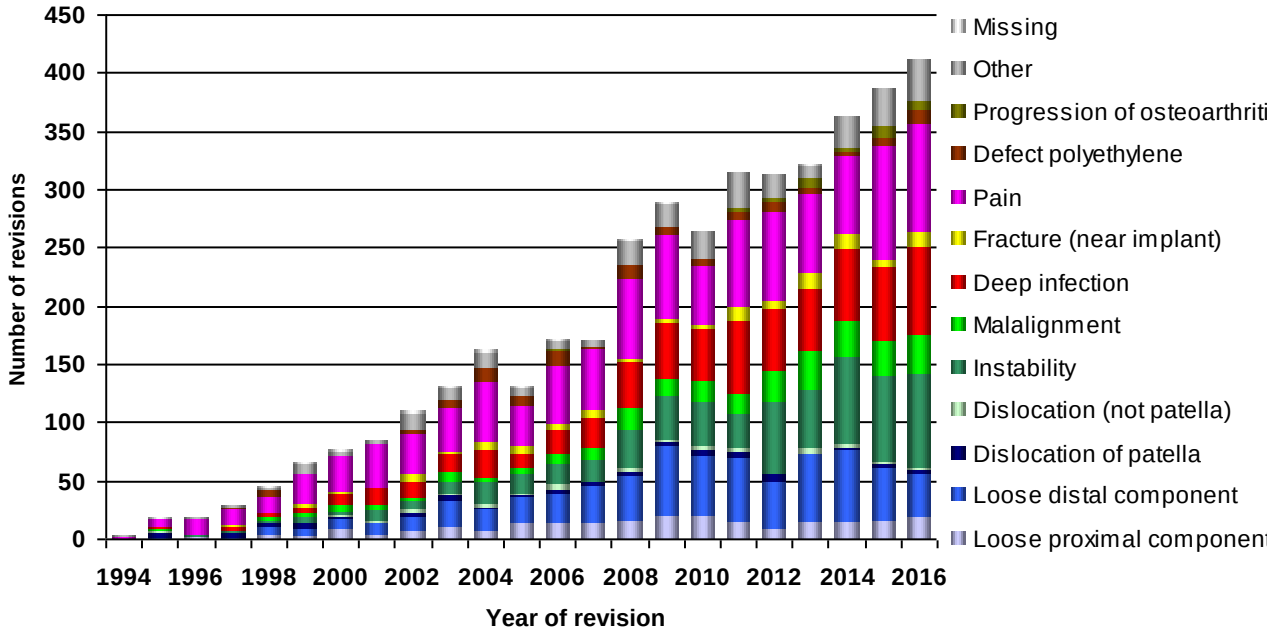
Reasons for revisions

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

Year of revision	Loose proximal comp.	Loose distal comp.	Dislocation of patella	Dislocation (not patella)	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Progression of osteoarthritis	Other	Missing
2016	18	38	3	3	80	33	76	14	91	12	8	36	0
2015	15	46	3	3	73	30	64	7	96	8	10	32	0
2014	16	60	2	4	74	31	62	14	66	4	2	28	0
2013	15	58	1	5	49	34	52	14	68	6	8	11	1
2012	8	42	7	0	60	28	52	7	77	9	3	21	0
2011	16	54	5	3	29	17	63	12	76	6	3	31	1
2010	21	51	4	4	38	19	44	3	52	4		25	0
2009	20	60	4	2	36	16	47	5	71	6	1	20	1
2008	15	39	4	3	32	19	40	3	69	11		20	2
2007	13	33	3	1	19	10	25	7	53	2		5	0
2006	14	26	3	5	16	9	20	6	50	13	1	8	2
2005	13	23	2	2	17	4	13	6	34	9		6	2
2004	7	19	2	3	18	4	24	7	51	11		14	3
2003	10	23	4	2	10	9	15	2	38	6		10	3
2002	6	12	4	3	7	4	14	6	35	3		14	3
2001	3	10	0	2	11	3	16	0	36	1		4	0
2000	8	9	1	2	4	5	11	1	30	1		3	1
1999	4	5	4	0	5	4	6	2	26	1		8	2
1998	3	7	3	0	2	4	3	0	13	8		2	1
1997	0	1	4	0	1	0	4	2	13	2	1	1	0
1996	1	0	1	0	1	0	0	1	13	0		2	0
1995	0	2	3	1	1	1	2	0	7	0		0	2
1994	0	0	0	0	0	0	0	0	2	0		1	0
Total	**226**	**618**	**67**	**48**	**583**	**284**	**653**	**119**	**1 067**	**123**	**37**	**302**	**24**

Revision causes are not mutually exclusive. More than one reason for revision is possible

Figure 17: Reasons for revisions of total knee prostheses without patella



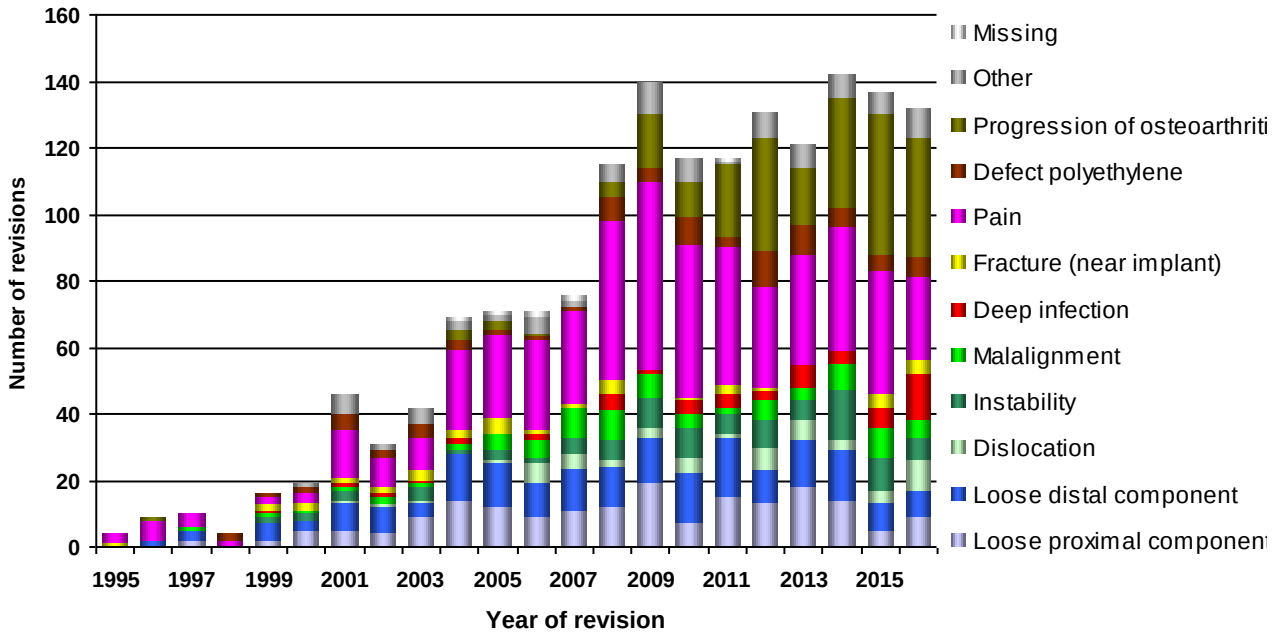
Reasons for revisions

Table 17: Reasons for revisions of unicondylar knee 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
2016	9	8	9	7	5	14	4	25	6	36	9	0
2015	5	8	4	10	9	6	4	37	5	42	7	0
2014	14	15	3	15	8	4	0	37	6	33	7	0
2013	18	14	6	6	4	7	0	33	9	17	7	0
2012	13	10	7	8	6	3	1	30	11	34	8	0
2011	15	18	1	6	2	4	3	41	3	22	1	1
2010	7	15	5	9	4	4	1	46	8	11	7	0
2009	19	14	3	9	7	1	0	57	4	16	10	0
2008	12	12	2	6	9	5	4	48	7	5	5	0
2007	11	12	5	5	9	0	1	28	1		2	2
2006	9	10	6	2	5	2	1	27	1	1	5	2
2005	12	13	1	3	5	0	5	25	1	3	2	1
2004	14	14	0	1	2	2	2	24	3	3	3	1
2003	9	4	1	4	1	1	3	10	4		5	0
2002	4	8	1	0	2	1	2	9	2		2	0
2001	5	8	1	3	1	1	2	14	5		6	0
2000	5	3	0	2	1	0	2	3	2		1	0
1999	2	5	0	2	1	1	2	2	1		0	0
1998	0	0	0	0	0	0	0	2	2		0	0
1997	2	3	0	0	1	0	0	4	0		0	0
1996	0	2	0	0	0	0	0	6	0	1	0	0
1995	0	0	0	0	0	0	1	3	0		0	0
Total	**185**	**196**	**55**	**98**	**82**	**56**	**38**	**511**	**81**	**224**	**87**	**7**

Revision causes are not mutually exclusive. More than one reason for revision is possible

Figure 18: Reasons for revisions of unicondylar knee prostheses

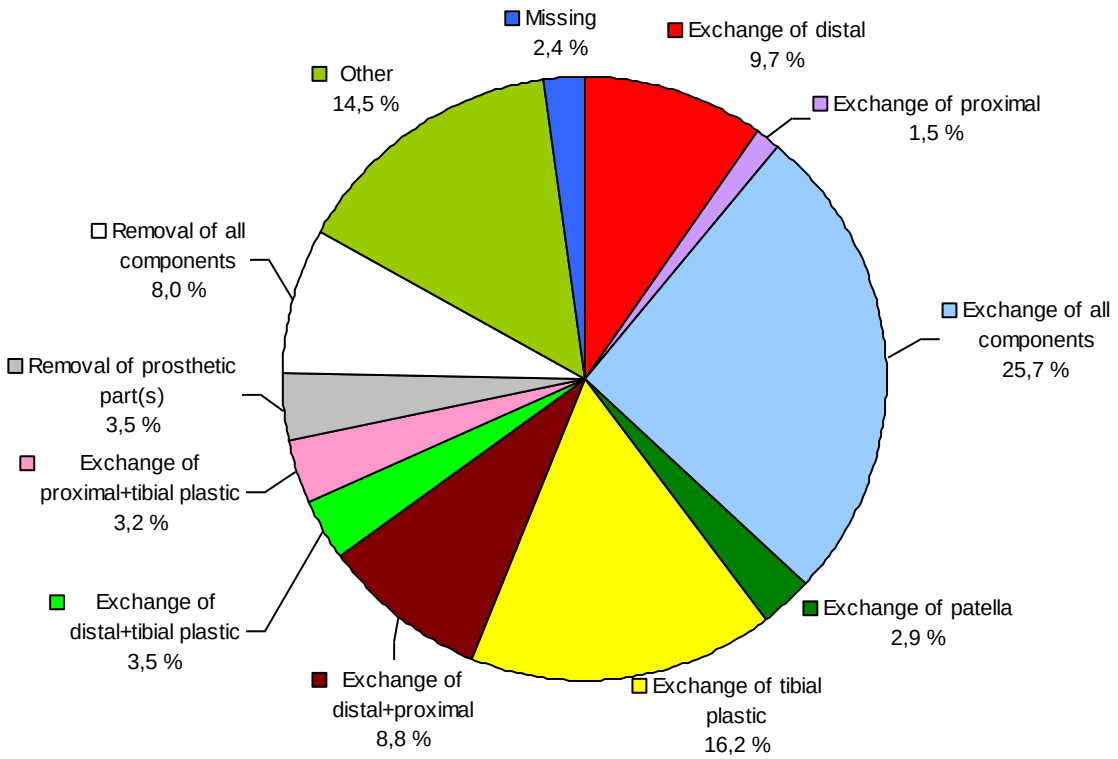


Type of revision

Table 18: Total knee prostheses with patella

Year of primary operation	Exchange of distal	Exchange of distal+tibial plastic	Exchange of distal+proximal	Exchange of whole prosthesis	Exchange of patella	Exchange of tibial plastic	Exchange of proximal	Exchange of proximal+tibial	Removal of whole prosthesis	Removal of prosthetic part(s)	Other	Missing	Total
2016						5							**5**
2015					2	1					1		**4**
2014		1				2						1	**4**
2012		1	1	1		1							**4**
2011						2							**2**
2010				1		1					1		**3**
2009						2		1			2		**6**
2008				1		1		1	1				**4**
2007				1		2				1			**4**
2006		1			1			1					**3**
2005		1		1					1		1	1	**5**
2004		1		2		3		1		1			**8**
2003	1	1		6		2			1		2		**13**
2002	4		1	3	1	2			1		1		**13**
2001	6			2	1	2	2		3	1	1		**18**
2000	3		5	6		4		1	3	1	1		**24**
1999	5	3	6	6	2	4		1	6		2		**35**
1998	3		2	8	1	7		1	1	4	6	2	**35**
1997	5	1	4	8		2		1	3	1	9	1	**35**
1996	4	1	2	12		4		2	3	2	7	2	**39**
1995	1		7	14		6	2	1	4		9		**44**
1994	1	1	2	15	2	2	1			1	6	1	**32**
Total	**33**	**12**	**30**	**87**	**10**	**55**	**5**	**11**	**27**	**12**	**49**	**8**	**340**

Figure 19: Total knee prostheses with patella

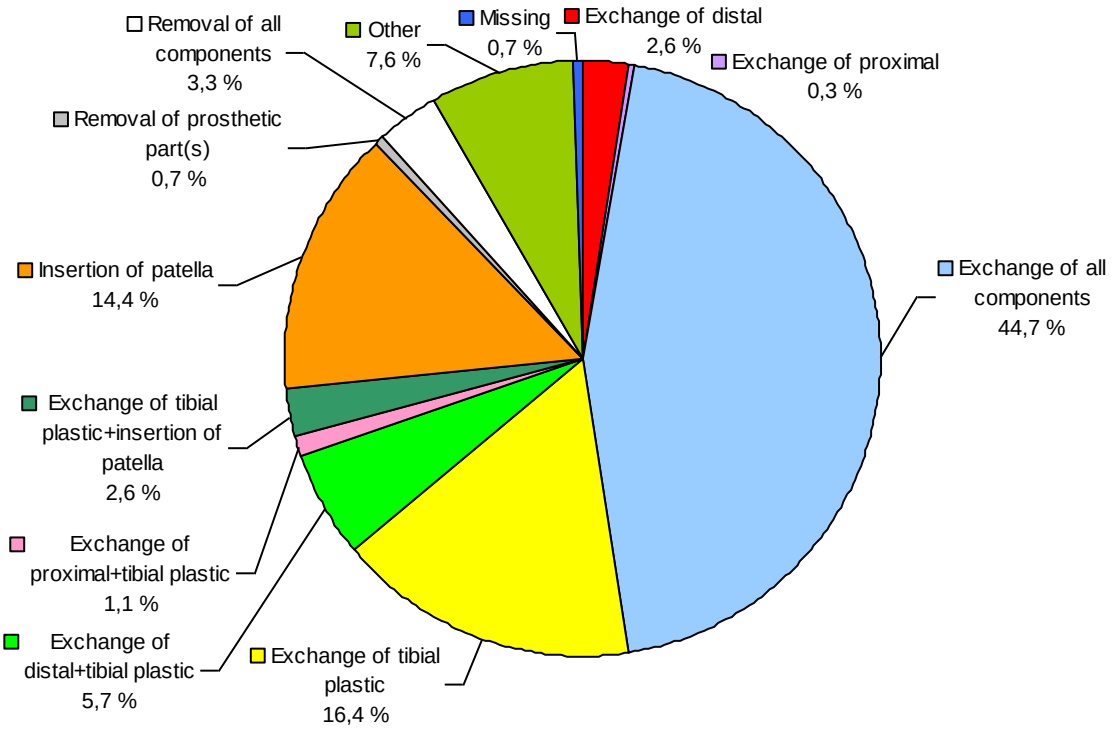


Type of revision

Table 19: Total knee prostheses without patella

Year of primary operation	Exchange of distal	Exchange of distal+tibial plastic	Exchange of whole prosthesis	Exchange of tibial plastic+inns. patella	Exchange of tibial plastic	Exchange of proximal	Exchange of proximal+tibial	Removal of whole prosthesis	Removal of prosthetic part(s)	Insertion of patella	Other	Missing	Total
2016		2	12		36		1	1			12		**64**
2015		5	29	5	39					8	16		**102**
2014		11	55	14	41		1	6		15	14		**157**
2013	1	9	82	4	39		4	1		18	17		**175**
2012	1	19	123	8	47			5	2	15	13	1	**234**
2011	1	23	147	8	54		2	8		25	20	1	**290**
2010	1	20	135	4	45	1	2	6	2	33	14		**263**
2009	4	20	134	1	49		6	9	1	26	19		**269**
2008	1	19	109	8	45	1	2	9	2	22	14	1	**233**
2007	1	13	123	6	29	1	2	6	1	19	14		**215**
2006	5	11	83	3	15	1	2	9	1	23	15	1	**169**
2005	6	11	63	2	13		2	6		24	19		**146**
2004	9	11	63	3	26		5	9		23	10	2	**161**
2003	5	7	76	1	28		2	12		29	13	1	**174**
2002	9	11	59	7	22		2	5	1	26	7	1	**150**
2001	14	4	48	8	12	1	4	6	1	41	7	2	**148**
2000	5	3	70	2	14	1	1	1	4	24	11		**136**
1999	10	4	41	4	14	2	1	5	1	32	7	3	**124**
1998	8	1	20	2	9			5	1	24	5	4	**79**
1997	4	1	40	1	5	2		1	2	27	7	1	**91**
1996	5	2	30	3	6	1		5	3	20	9	2	**86**
1995			38		5	1		1	1	24	4	1	**75**
1994	3		42		3		1	3	1	25	10	3	**91**
Total	**93**	**207**	**1622**	**94**	**596**	**12**	**40**	**119**	**24**	**523**	**277**	**24**	**3632**

Figure 20: Total knee prostheses without patella

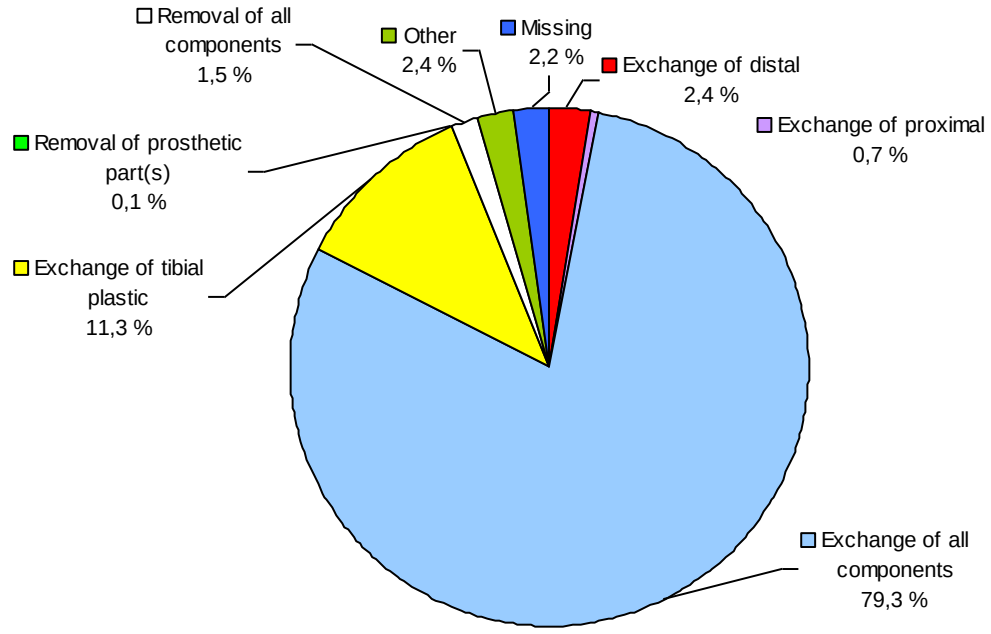


Type of revision

Table 20: Unicondylar prostheses

Year of primary operation	Exchange of distal	Exchange of whole prosthesis	Exchange of tibial plastic	Exchange of proximal	Removal of whole prosthesis	Removal of prosthetic part(s)	Other	Missing	Total
2016		1	10						**11**
2015	1	11	5						**17**
2014	2	13	4		1		2		**22**
2013		12	9		1				**22**
2012	2	22	9		1				**34**
2011	1	26	6				2	1	**36**
2010		39	10				1		**50**
2009		46	11		1		1		**59**
2008	1	59	8		2				**70**
2007		78	7	1	2		4	2	**94**
2006	1	70	7	1	1		3	2	**85**
2005	2	78	10				1	4	**95**
2004		89	5		2			2	**98**
2003	4	101	7	1			7	6	**126**
2002		36	6	2	2	1			**47**
2001	7	38	6		2		2	1	**56**
2000	1	54	5		1		1	1	**63**
1999	2	20		1				3	**26**
1998	2	16		1			1		**20**
1997		14		1					**15**
1996		9			1			1	**11**
1995	1	22							**23**
1994		21					1	1	**23**
Total	**27**	**875**	**125**	**8**	**17**	**1**	**26**	**24**	**1103**

Figure 21: Unicondylar prostheses



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
2016	703	4 355	1 230	12		166	**6 466**
2015	680	4 146	1 188	7		87	**6 108**
2014	580	3 900	1 058	8		74	**5 620**
2013	549	3 509	892	5	1	69	**5 025**
2012	667	3 276	901	8		64	**4 916**
2011	582	3 019	873	6		65	**4 545**
2010	661	2 845	797	7		90	**4 400**
2009	832	2 740	793	8		95	**4 468**
2008	785	2 352	765	8	1	79	**3 990**
2007	747	2 060	709			72	**3 588**
2006	769	1 718	541	10	1	70	**3 109**
2005	913	1 565	559	2		214	**3 253**

Table 22: Revisions

Year	ASA 1	ASA 2	ASA 3	ASA 4	ASA 5	Missing	Total
2016	27	351	180	2		33	**593**
2015	35	313	180	7		19	**554**
2014	50	296	137	2		13	**498**
2013	45	290	133			12	**480**
2012	52	287	135	3		16	**493**
2011	54	249	119			9	**431**
2010	77	199	121	1		13	**411**
2009	93	212	117	1		15	**438**
2008	102	164	88			13	**367**
2007	73	141	69	2		16	**301**
2006	57	134	57	4		15	**267**
2005	61	94	70			26	**251**

Figure 22: Primary operations

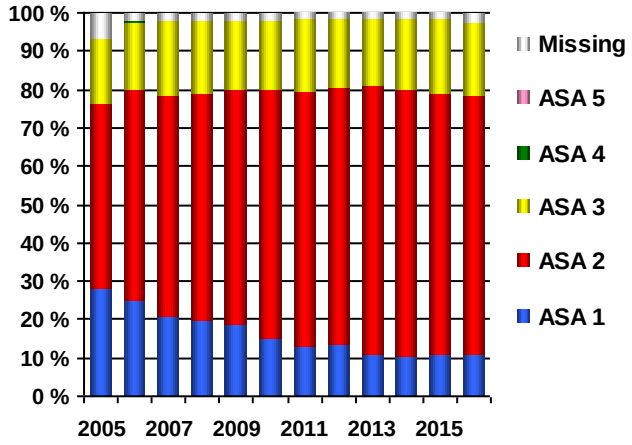
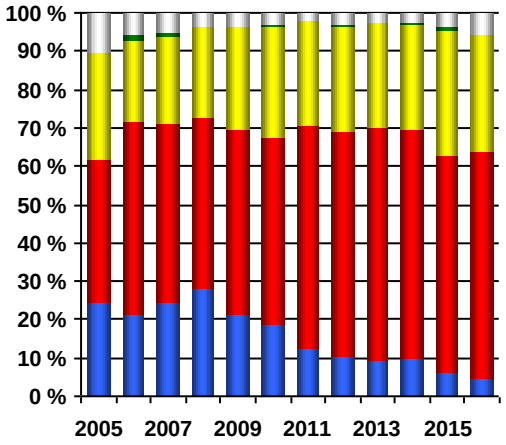


Figure 23: Revisions



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
2016	833	4 766	780	58	29	**6 466**
2015	923	4 295	816	29	45	**6 108**
2014	798	4 006	763	25	28	**5 620**
2013	898	3 346	716	10	55	**5 025**
2012	1 131	2 879	871	7	28	**4 916**
2011	1 268	2 287	953	8	29	**4 545**
2010	1 412	2 408	533	8	39	**4 400**
2009	1 607	2 386	424	10	41	**4 468**
2008	1 648	1 828	463	13	38	**3 990**
2007	1 876	1 259	416	5	32	**3 588**
2006	1 802	675	578	14	40	**3 109**
2005	2 021	388	702	8	135	**3 254**

Table 24: Revisions

Year	Preoperatively	Postoperatively	Unknown* pre / post	No	Missing	Total
2016	94	418	72	7	2	**593**
2015	64	406	68	11	5	**554**
2014	69	350	67	7	5	**498**
2013	75	317	77	6	5	**480**
2012	105	268	111	6	3	**493**
2011	97	229	100	2	3	**431**
2010	107	227	70	6	1	**411**
2009	93	262	74	4	5	**438**
2008	106	184	62	7	8	**367**
2007	146	96	46	4	9	**301**
2006	139	62	54	3	9	**267**
2005	138	38	56	4	15	**251**

* Missing information on medication start

Figure 24: Primary operations

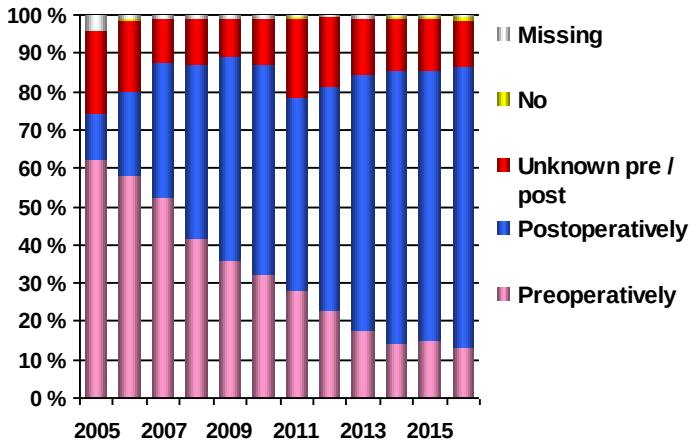
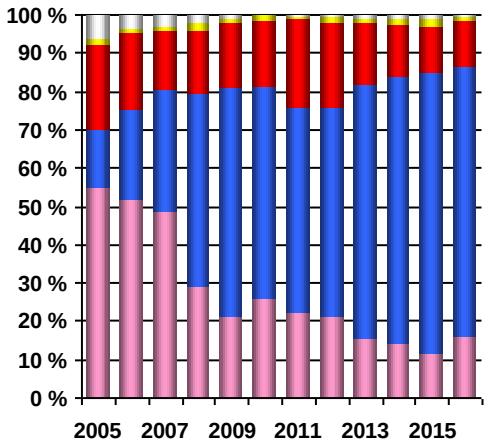


Figure 25: Revisions



Registration of thrombosis prophylaxis started in 2005

Thrombosis prophylaxis

Table 25: Drugs - All operations

Drugs	2005-06	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Apixiban (Eliquis)								1,2%	1,1%	0,9%	1,0%
Dalteparin (Fragmin)	49,6%	56,1%	57,2%	52,6%	62,4%	64,4%	59,2%	54,1%	50,4%	56,3%	56,5%
Enoksaparin (Klexane)	42,5%	39,6%	38,0%	43,4%	32,8%	28,2%	29,2%	30,0%	32,2%	26,7%	24,5%
Rivaroksaban (Xarelto)					0,1%	2,2%	2,6%	2,5%	1,8%	1,4%	1,1%
Ximelagatran (Exanta, Malagatran)	1,8%										
No drugs	0,4%	0,2%	0,5%	0,3%	0,3%	0,2%	0,2%	0,3%	0,5%	0,6%	0,9%
Clinical study	0,1%	0,7%	1,1%								
Combination of 2 drugs	1,6%	1,3%	1,2%	2,1%	3,1%	3,5%	7,3%	10,1%	12,2%	12,2%	14,1%
Other	0,5%	0,2%	0,3%	0,1%	0,1%	0,1%	0,2%	0,2%	0,6%	0,5%	0,7%
Missing	3,4%	1,9%	1,7%	1,5%	1,1%	1,4%	1,3%	1,6%	1,2%	1,5%	1,2%

Figure 26: Drugs

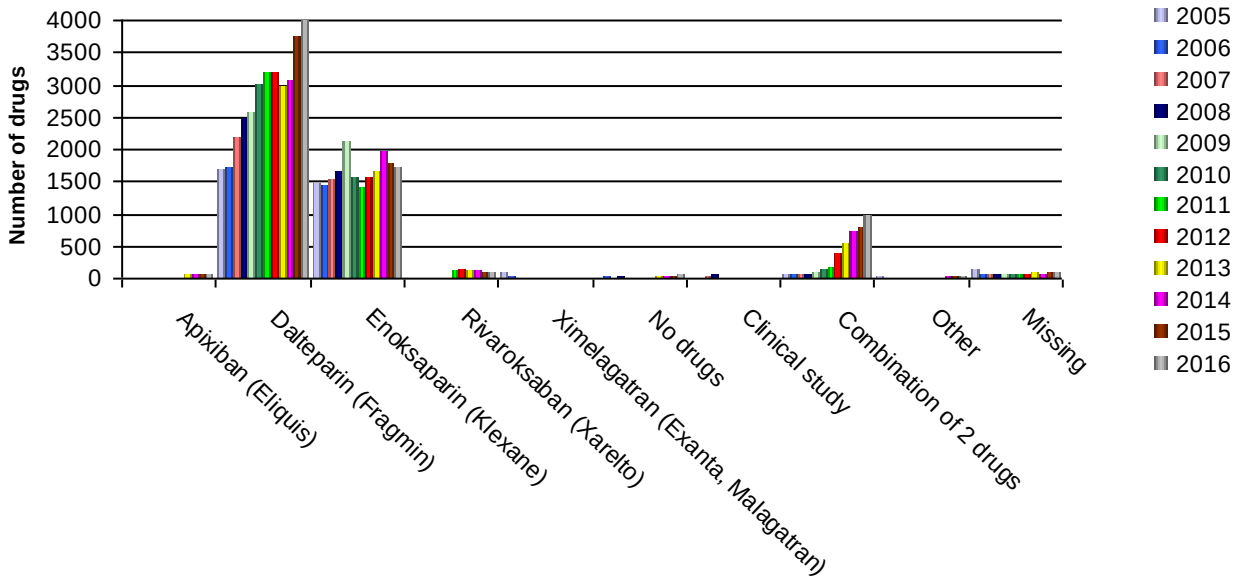


Table 26: Duration - All operations

Year	Days: 1-7	8-14	15-21	22-28	29-35	>35	No drugs	Missing	Total
2016	1 167	3 142	545	313	713	38	65	1 076	**7 059**
2015	1 011	2 387	977	326	865	143	40	913	**6 662**
2014	956	1 795	1 024	370	1 065	153	32	723	**6 118**
2013	722	1 594	1 005	398	996	120	16	654	**5 505**
2012	582	1 633	1 206	335	890	95	13	655	**5 409**
2011	289	1 345	1 377	403	798	101	10	653	**4 976**
2010	348	1 348	1 321	239	779	52	14	710	**4 811**
2009	398	1 586	1 166	228	761	8	14	745	**4 906**
2008	424	1 455	828	172	751	31	20	676	**4 357**
2007	489	1 177	797	119	742	8	9	548	**3 889**
2006	441	1 038	576	112	543	9	17	640	**3 376**
2005	547	1 060	621	111	530	69	12	555	**3 505**

Registration of thrombosis prophylaxis started in 2005

Fibrinolysis Inhibitor

Table 27: Drugs - Primary operations

Drugs	2010	2011	2012	2013	2014	2015	2016
Cyclokapron (Tranexamic acid)	2	1372	3482	3925	4708	5312	5711
Missing		74	153	116	114	72	63
Total	**2**	**1446**	**3635**	**4041**	**4822**	**5384**	**5774**

Registration of fibrinolysis inhibitor started in 2011

Perioperative complications

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

Type	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Patella tendon rupture / Avulsion fractures / ligament rupture / tendon injury	41	12	14	1	13	12	10	21	17	15	156
Fracture	43	8	9	7	16	7	5	5	6	9	115
Rupture / damage MCL (medial colateral ligament)		1	7	14	5	12	12	5	5	10	71
Technical problem with cement	18	1	6	6	10	6	6	5	4		62
Failure of instruments	16	7	3	4	3	5	3	7	1	1	50
Blood torniquet failing	21	8	1	4	5	4	3		1		47
Fracture of proximal bone	13	3	3	3	1	4	5	3	6	3	44
Adm. failure (missing comp. etc.)	17		4	1	2	7	7	2		4	44
Problem due to difficult anatomy	3	7	2	5	3	6	3	5	5	3	42
Anestesiproblemer	6	2		5	7	2	4	7	4	1	38
Other periop. compl.	92	19	25	24	25	27	33	34	40	27	346

Previous operation in relevant joint

Table 29: For primary total prostheses

Type	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Meniscus	2384	321	411	511	582	706	700	770	757	878	8020
Osteotomy	1480	114	122	121	110	116	110	135	119	136	2563
Synovectomy	770	72	100	58	68	65	64	66	66	39	1368
Osteosynthesis of intraarticular joint fracture	577	76	89	77	84	74	62	97	94	97	1327
Ligament	119	18	13	16	18	23	24	65	86	147	529
Artrodesis	20	2		1	1	2	2			2	30
Other previous op.	1203	123	163	217	227	283	267	308	323	314	3428

Mini-invasive surgery

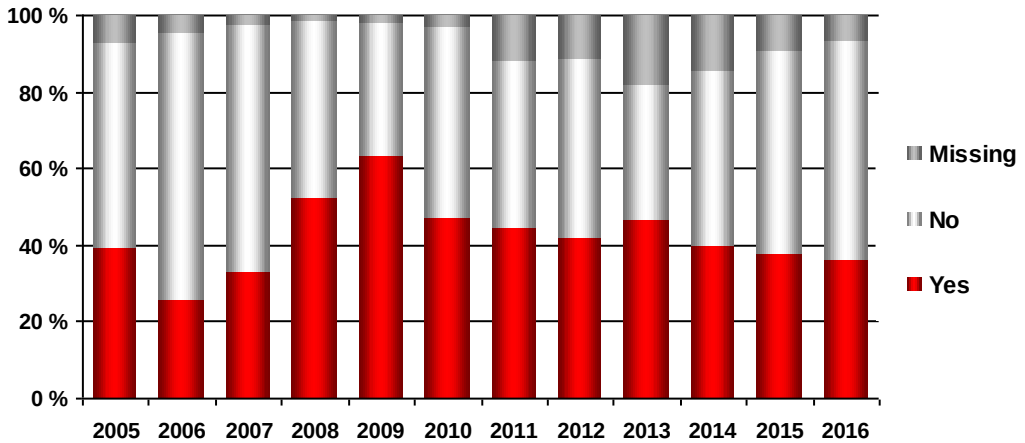
Table 30: Primary operations - Total knee prostheses

Year	Yes	No	Missing	Total
2016	9 (0%)	4 925 (90%)	566 (10%)	**5 500**
2015	5 (0%)	4 629 (88%)	656 (12%)	**5 290**
2014	4 (0%)	4 328 (87%)	646 (13%)	**4 978**
2013	11 (0%)	3 777 (84%)	715 (16%)	**4 503**
2012	16 (0%)	3 695 (84%)	685 (16%)	**4 396**
2011	15 (0%)	3 586 (88%)	464 (11%)	**4 065**
2010	21 (1%)	3 749 (95%)	185 (5%)	**3 955**
2009	25 (1%)	3 793 (95%)	165 (4%)	**3 983**
2008	14 (0%)	3 357 (95%)	157 (4%)	**3 528**
2007	22 (1%)	2 961 (95%)	129 (4%)	**3 112**
2006	3 (0%)	2 580 (96%)	115 (4%)	**2 698**
2005	5 (0%)	2 484 (89%)	300 (11%)	**2 789**

Table 31: Primary operations - Unicondylar knee prostheses

År	Yes	No	Missing	Total
2016	313 (36%)	486 (57%)	59 (7%)	**858**
2015	283 (38%)	396 (53%)	69 (9%)	**748**
2014	238 (40%)	273 (46%)	85 (14%)	**596**
2013	223 (47%)	167 (35%)	86 (18%)	**476**
2012	199 (42%)	220 (47%)	54 (11%)	**473**
2011	196 (45%)	191 (44%)	52 (12%)	**439**
2010	196 (47%)	205 (50%)	13 (3%)	**414**
2009	293 (63%)	161 (35%)	9 (2%)	**463**
2008	230 (52%)	204 (46%)	6 (1%)	**440**
2007	155 (33%)	299 (64%)	12 (3%)	**466**
2006	104 (26%)	276 (69%)	19 (5%)	**399**
2005	179 (39%)	244 (54%)	33 (7%)	**456**

Figure 27: Primary operations - Unicondylar knee prostheses



Registration of MIS started in 2005

Computernavigation

Table 32: Primary operations - Total knee prostheses

Year	Yes	No	Missing	Total
2016	575 (10%)	4 380 (80%)	545 (10%)	**5 500**
2015	471 (9%)	4 169 (79%)	650 (12%)	**5 290**
2014	433 (9%)	3 898 (78%)	647 (13%)	**4 978**
2013	381 (8%)	3 400 (76%)	722 (16%)	**4 503**
2012	416 (9%)	3 298 (75%)	682 (16%)	**4 396**
2011	443 (11%)	3 176 (78%)	446 (11%)	**4 065**
2010	659 (17%)	3 111 (79%)	185 (5%)	**3 955**
2009	761 (19%)	3 062 (77%)	160 (4%)	**3 983**
2008	742 (21%)	2 640 (75%)	146 (4%)	**3 528**
2007	374 (12%)	2 619 (84%)	119 (4%)	**3 112**
2006	254 (9%)	2 335 (87%)	109 (4%)	**2 698**
2005	185 (7%)	2 332 (84%)	272 (10%)	**2 789**

Figure 28: Primary operations - Total knee prostheses

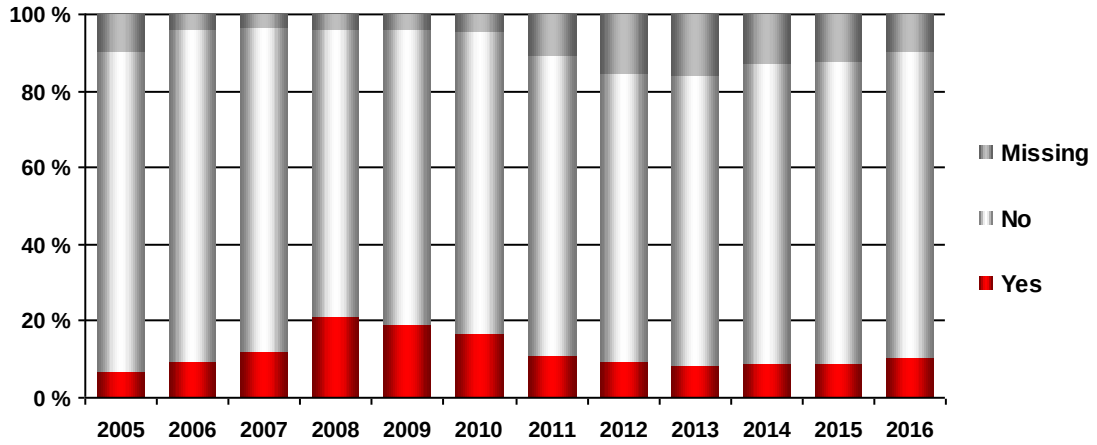


Table 33: Primary operations - Unicondylar knee prostheses

Year	Yes	No	Missing	Total
2016	0	795 (93%)	63 (7%)	**858**
2015	3 (0%)	677 (91%)	68 (9%)	**748**
2014	0	510 (86%)	86 (14%)	**596**
2013	0	388 (82%)	88 (18%)	**476**
2012	0	417 (88%)	56 (12%)	**473**
2011	1 (0%)	387 (88%)	51 (12%)	**439**
2010	7 (2%)	394 (95%)	13 (3%)	**414**
2009	3 (1%)	452 (98%)	8 (2%)	**463**
2008	15 (3%)	416 (95%)	9 (2%)	**440**
2007	4 (1%)	448 (96%)	14 (3%)	**466**
2006	15 (4%)	364 (91%)	20 (5%)	**399**
2005	2 (0%)	419 (92%)	35 (8%)	**456**

Registration of CAOS started in 2005

Cements used in total knee prostheses

Table 34: Primary operations - Femur

Cement	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Palacos R + G	2646	1450	1779	1666	1314	1274	1405	1449	1479	1404	**15866**
Palacos w/gentamicin	14677										**14677**
Optipac Refobacin Bonecement R	2	159	679	1100	1326	1314	1322	1736	2150	1825	**11613**
Refobacin Bone Cement R	2202	911	531	366	410	397	349	356	158	541	**6221**
Cemex w/gentamycin	488	88	118	110	173	189	216	209	160	149	**1900**
Refobacin-Palacos	1577										**1577**
SmartMix Cemvac + SmartSet GHV Genta	30	37	7		22	189	183	268	292	274	**1302**
Simplex w/Tobramycin	337	89	170	78							**674**
Palacos	424										**424**
Cemex System Genta FAST	24	88	44	34	13						**203**
Simplex	184										**184**
CMW I w/gentamicin	169										**169**
CMW I	53										**53**
Other (n<50)	121	10	9		2	3	7	7	12	19	**190**
Missing information	5	41	8	9	15	4	2				**84**
Total	**22939**	**2873**	**3345**	**3363**	**3275**	**3370**	**3484**	**4025**	**4251**	**4212**	**55137**

Table 35: Primary operations - Tibia

Cement	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Palacos R + G	3488	1847	2266	2190	1952	1953	2131	2190	2224	2220	**22461**
Palacos w/gentamicin	17798										**17798**
Optipac Refobacin Bonecement R	2	180	727	1178	1416	1447	1471	1907	2318	1955	**12601**
Refobacin Bone Cement R	2343	953	564	393	447	472	394	377	171	556	**6670**
Cemex w/gentamycin	589	110	118	112	181	190	214	222	165	150	**2051**
Refobacin-Palacos	1626										**1626**
SmartMix Cemvac + SmartSet GHV Genta	40	37	7		22	189	182	269	294	276	**1316**
Simplex w/Tobramycin	345	88	169	77							**679**
Palacos	452										**452**
Cemex System Genta FAST	55	116	61	38	13						**283**
CMW I w/gentamicin	192	1		1							**194**
Simplex	186										**186**
CMW I	54										**54**
Other (n<50)	133	13	12	1	3	5	9	7	17	44	**244**
Missing information	5	46	8	10	9	3	3	1	1		**86**
Total	**27308**	**3391**	**3932**	**4000**	**4043**	**4259**	**4404**	**4973**	**5190**	**5201**	**66701**

Cements used in unicondylar knee prostheses

Table 36: Primary operations - Femur

Cement	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Palacos R + G	390	210	244	232	220	254	287	381	426	365	**3009**
Palacos w/gentamicin	2201										**2201**
Optipac Refobacin Bonecement R		27	100	110	159	164	156	167	226	223	**1332**
Refobacin Bone Cement R	440	141	56	46	40	49	18	26	25	81	**922**
Refobacin-Palacos	269										**269**
Simplex w/Tobramycin	154	11	36	14	4		2	2			**223**
Cemex w/gentamycin	54	6	3								**63**
Cemex System Genta FAST	7	26	22	7							**62**
SmartSet GHV	2				8	6	11	6	9	2	**44**
Simplex	40										**40**
Other (n<20)	61	4		3	7		2	3	2	7	**89**
Total	**3618**	**425**	**461**	**412**	**438**	**473**	**476**	**585**	**688**	**678**	**8254**

Table 37: Primary operations - Tibia

Cement	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Palacos R + G	400	205	247	236	221	254	286	385	425	367	**3026**
Palacos w/gentamicin	2199										**2199**
Optipac Refobacin Bonecement R		27	100	107	159	164	154	166	226	224	**1327**
Refobacin Bone Cement R	431	144	55	46	40	49	18	26	25	81	**915**
Refobacin-Palacos	266										**266**
Simplex w/Tobramycin	148	9	36	14	4		2	2			**215**
Cemex w/gentamycin	52	8	3								**63**
Cemex System Genta FAST	7	25	22	7							**61**
SmartSet GHV	2				8	6	11	6	9	2	**44**
Simplex	39										**39**
Other (n<20)	56	4		3	7		2	3	2	7	**84**
Total	**3600**	**422**	**463**	**413**	**439**	**473**	**473**	**588**	**687**	**681**	**8239**

Antibiotic prophylaxis

Table 38: Primary operations

Drugs	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Cefalotin (Keflin)	23072	3274	3696	3628	3731	3940	4182	4891	5225	5605	**61244**
Cefuroksim (Zinacef, Cefuroxim, Lifurox)	2989	168	141	172	205	162	96	14		1	**3948**
Kloksacillin (Ekvacillin)	771	130	206	249	234	265	185	134	207	23	**2404**
Klindamycin (Dalacin, Clindamycin)	431	99	125	112	146	215	227	281	316	339	**2291**
Dikloksacillin (Diclocil, Dicillin)	1427	101	67	13	27	17	22	8	1	3	**1686**
Imipenem (Tienam)	51										**51**
Cefazolin (Cephazolin)	34		5			1		1			**41**
Cefaleksin (Keflex, Cefalexin)	19					1		1			**21**
Benzylpenicillin (Penicillin G)	17	1					1	1			**20**
Erytromycin (Ery-max, Abboticin)	16						1				**17**
Ciprofloksasin (Ciproxin)	5	1	1			1				2	**10**
Combination of 2 drugs	706	187	182	175	156	271	273	230	305	451	**2936**
Other (n<10)	18	5	1		3	1	2	2	4	6	**42**
Missing	135	24	44	51	43	42	36	57	50	36	**518**
Total	**29691**	**3990**	**4468**	**4400**	**4545**	**4916**	**5025**	**5620**	**6108**	**6466**	**75229**

Table 39: Revisions

Drugs	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Cefalotin (Keflin)	1660	256	281	275	271	291	300	290	321	349	**4294**
Cefuroksim (Zinacef, Cefuroxim, Lifurox)	282	5	10	8	6	12	2	1	1	1	**328**
Klindamycin (Dalacin, Clindamycin)	93	18	26	12	17	27	23	27	25	26	**294**
Dikloksacillin (Diclocil, Dicillin)	165	15	4	3	8	12	8	3	6	5	**229**
Kloksacillin (Ekvacillin)	77	5	3	6	19	9	18	21	19	15	**192**
Vankomycin (Vancomycin, Vancocin)	35	10	14	16	11	13	21	19	8	14	**161**
Benzylpenicillin (Penicillin G)	15	2	6	5	2		3	2	4	4	**43**
Ampicillin (Pentrexyl, Pondocillin, Doktacilin)	10				2		1				**13**
Ciprofloksasin (Ciproxin)	7	1						1		1	**10**
Combination of 2 drugs	211	31	64	63	71	123	97	122	157	137	**1076**
Other (n<10)	15	1	1	4	1	1	1	4	6	1	**35**
Missing	78	23	29	19	23	5	6	8	7	40	**238**
Total	**2648**	**367**	**438**	**411**	**431**	**493**	**480**	**498**	**554**	**593**	**6913**

Patient specific instruments

Table 40:

Year	Yes	No	Missing	Total
2016	5	6973	1 135	**8 113**
2015	14	6214	1 516	**7 744**
2014	22	5485	1 570	**7 077**
2013	25	4668	1 780	**6 473**
2012	88	4241	1 959	**6 288**
2011	65	1693	4 141	**5 899**

Registration started in 2011

Drain

Table 41:

Year	Yes	No	Missing	Total
2016	2 035	5088	990	**8 113**
2015	2 277	4683	784	**7 744**
2014	2 244	3909	924	**7 077**
2013	2 076	3343	1 054	**6 473**
2012	2 207	2841	1 240	**6 288**
2011	1 095	1127	3 677	**5 899**

Registration started in 2011

Completeness of reporting analysis for the Knee Arthroplasty Register, 2013-2014

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). A report on the implementation and further results will be published on www.helsedirektoratet.no. There are separate statistics on primary operations and revisions. Some hospitals have few knee arthroplasty operations and the completeness of reporting rate must be seen in this light.

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

Type	Code	Description
Primary operation	**NGB 0***	Primary partial prosthetic replacement of knee joint not using cement
	NGB 1*	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 99	Other primary prosthetic replacement of knee joint
Reoperation	**NGC 0***	Secondary implantation of partial prosthesis in knee joint not using cement
	NGC 1*	Secondary implantation of partial prosthesis in knee joint using cement
	NGC 2*	Secondary implantation of total prosthesis in knee joint not using cement
	NGC 3*	Secondary implantation of total prosthesis in knee joint using hybrid technique
	NGC 4*	Secondary implantation of total prosthesis in knee joint using cement
	NGC 99	Other secondary prosthetic replacement in knee joint
	NGU 0*	Removal of partial prosthesis from knee joint
	NGU 1*	Removal of total prosthesis from knee joint

The completeness of reporting rate for the Knee Arthroplasty Register was calculated as follows:

$$\frac{(Only\ NAR + Inclusion\ in\ both\ registers)}{(Only\ NPR + Only\ NAR + Inclusion\ in\ both\ registers)}$$

Completeness of reporting for the NPR was calculated in a similar way:

$$\frac{(Only\ NPR + Inclusion\ in\ both\ registers)}{(Only\ NAR + Only\ NPR + Inclusion\ in\ both\ registers)}$$

Primary operations. In 2013 and 2014, 11 011 primary knee replacements were reported to one or both of the registers. 95.3% of these were reported to the NAR, while 97.9% were reported to the NPR. The analysis by hospital shows a completeness of reporting rate for the NAR ranging from 77.1% to 100% between the different hospitals. For hospitals with a low completeness of reporting rate for the Knee Arthroplasty Register, either the form was not sent in or other interventions than knee arthroplasties were incorrectly coded with NGB 0*/NGB 1*/NGB 20/NGB 30/NGB 40 (There were only 9 operations in the category NGB 99 during the period).

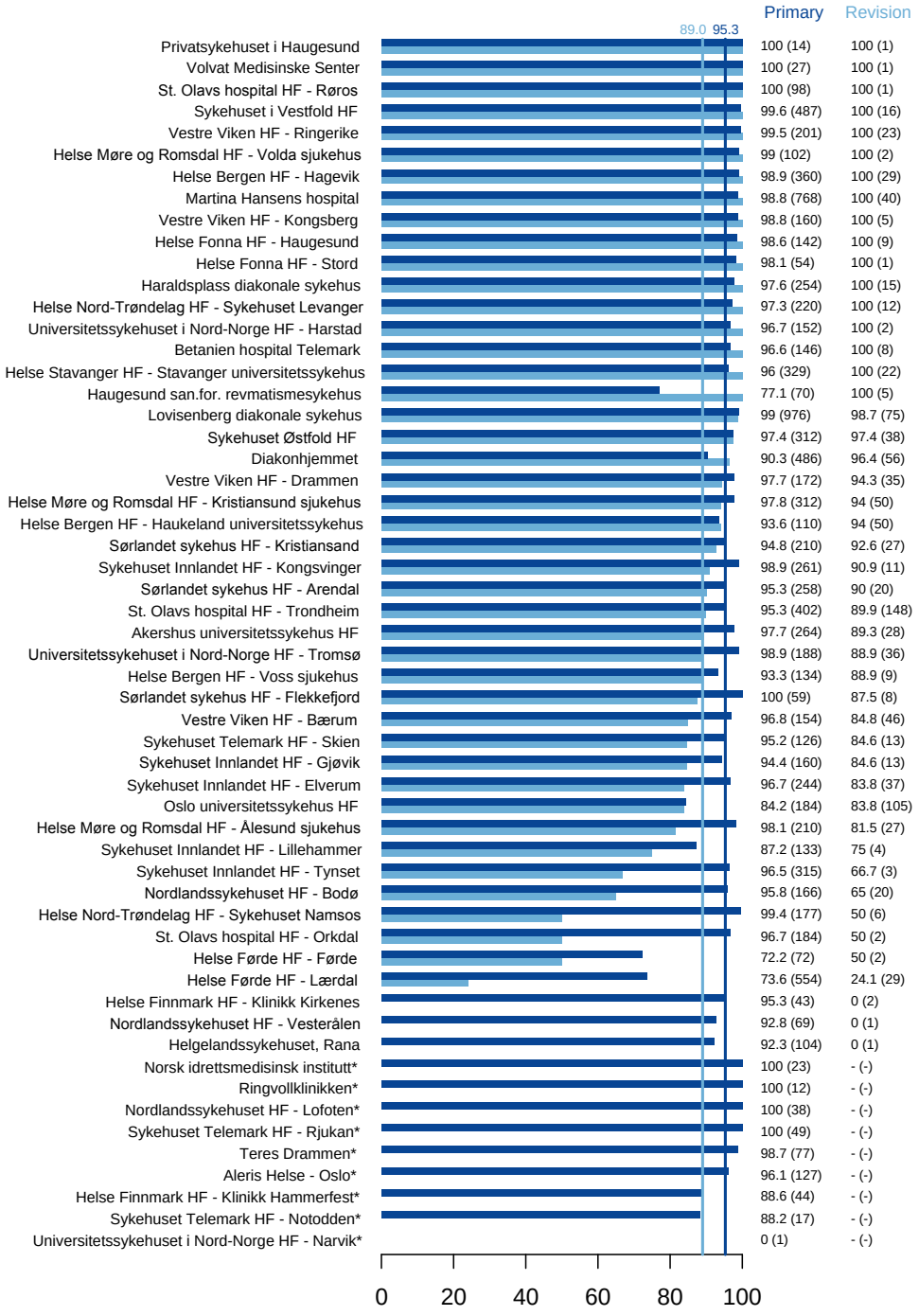
Procedure codes to be used for primary operations: NGB 0* - NGB 1* - NGB 20 - NGB 30 - NGB 40

Revision operations. In 2013 and 2014, 1097 revisions were reported to one or both of the registers. 89.0% of these were reported to the NAR, while 88.4% were reported to the NPR (revision level 1). The completeness of reporting by hospital shows that the completeness of reporting rate for the NAR varied between 24.1% and 100%. 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: NGC 0* - NGC 1* - NGC 2* - NGC 3* - NGC 4* - 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 primary and revision operations, knee prosthesis 2013-2014



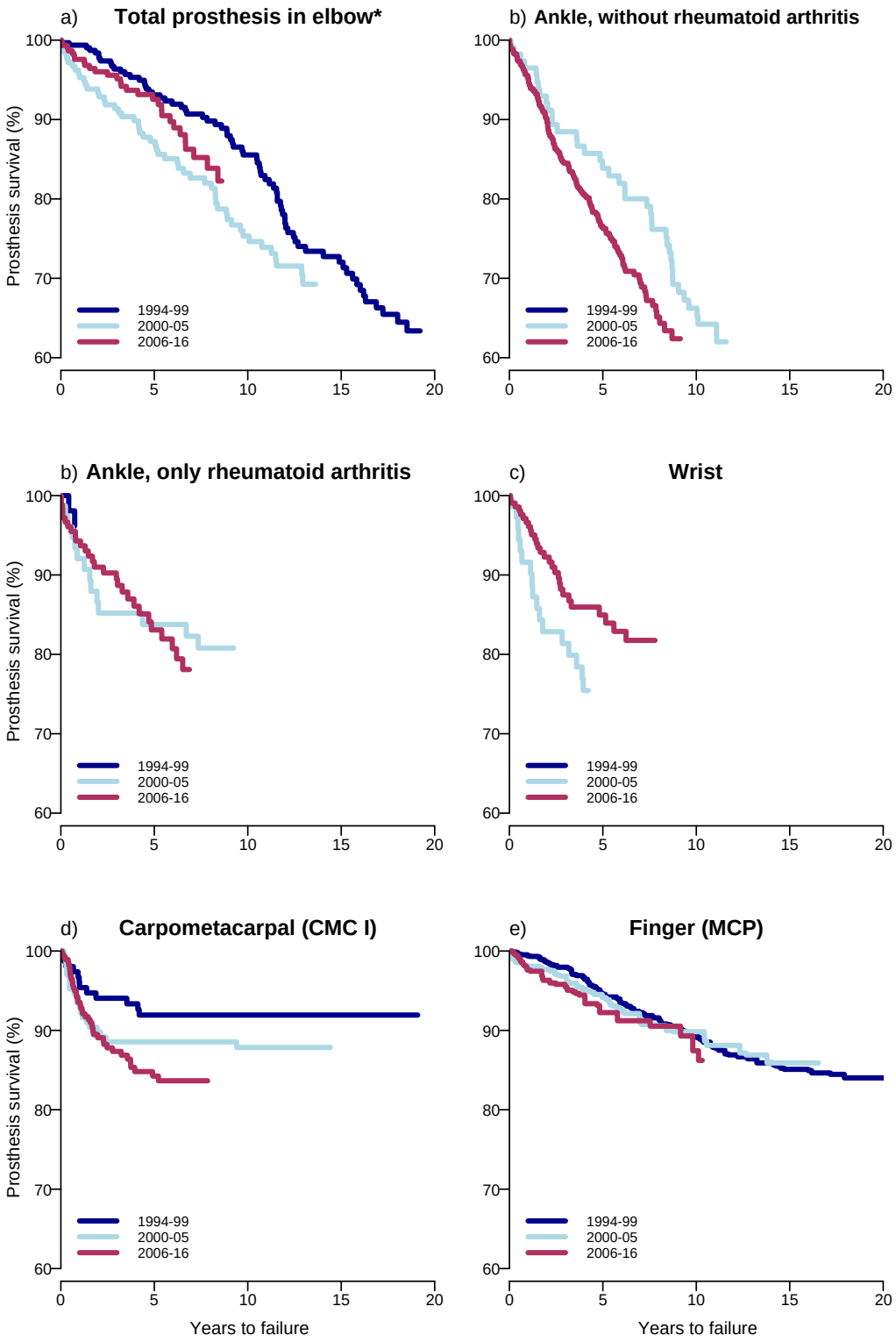
Dark blue bars and first number to the right of the bars gives completeness of reporting for primary operations. Light blue bars and second number to the right of the bars gives completeness of reporting for revision operations (level 1). The numbers in brackets gives the number of operations registered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

* Have no registered revisions in NAR or NPR.

CONTENTS

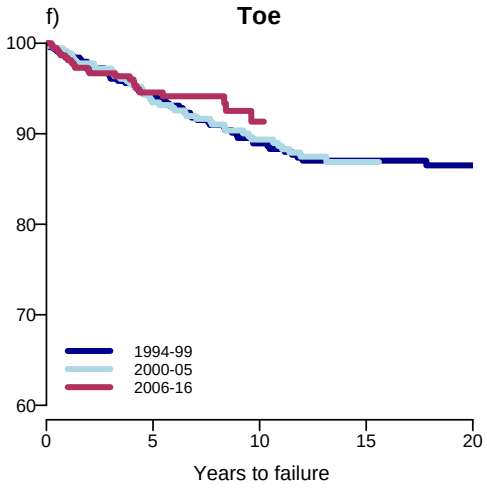
Completeness analysis

Survival curves for joint prosthesis



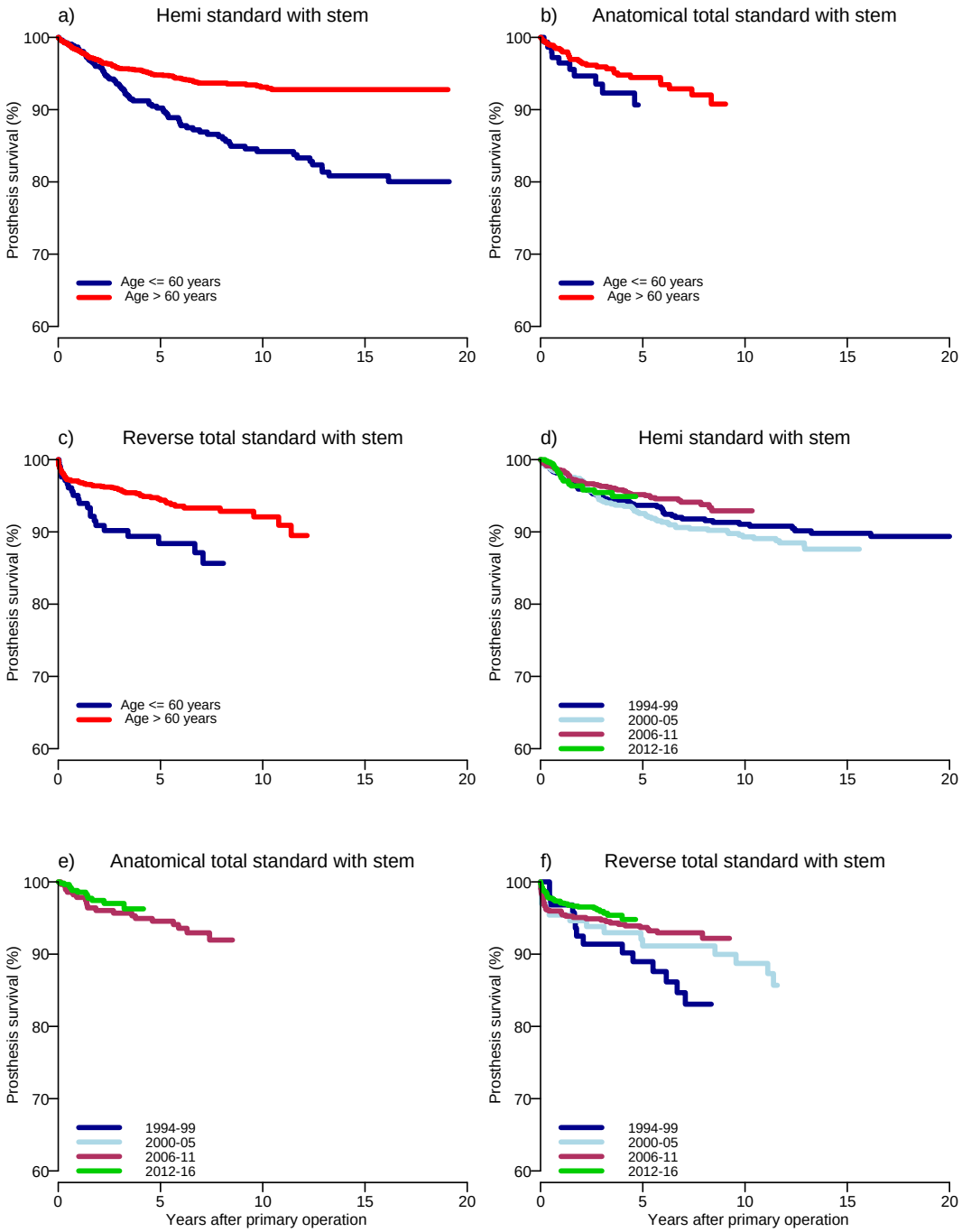
*Caput radii prosthesis for acute fracture is not included.
Kaplan-Meier survival curves. Survival estimate is given as long as > 50 prostheses are at risk.

Survival curves for joint prosthesis



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

Survival curves - Shoulder arthroplasty



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

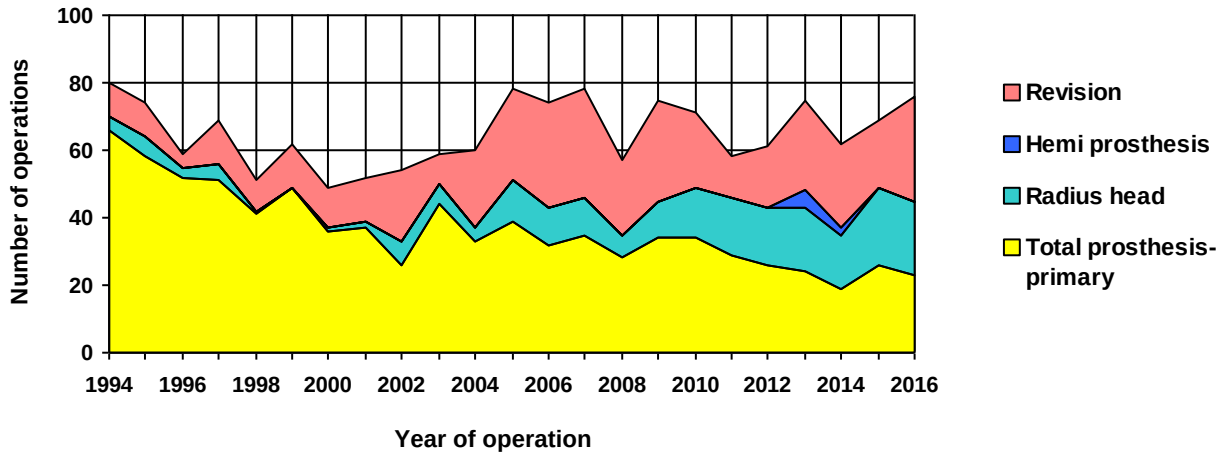
ELBOW PROSTHESES

Table 1: Annual number of prostheses

Year	Primary operations						Reoperations *		Revisions		Total
	Hemi prosthesis		Total prosthesis		Radius head						
2016			23	(30,3%)	22	(28,9%)	1	(1,3%)	30	(39,5%)	**76**
2015			26	(37,7%)	23	(33,3%)			20	(29,0%)	**69**
2014	2	(3,2%)	19	(30,6%)	16	(25,8%)			25	(40,3%)	**62**
2013	5	(6,7%)	24	(32,0%)	19	(25,3%)	1	(1,3%)	26	(34,7%)	**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**
2008			28	(49,1%)	7	(12,3%)			22	(38,6%)	**57**
2007			35	(44,9%)	11	(14,1%)			32	(41,0%)	**78**
2006			32	(43,2%)	11	(14,9%)			31	(41,9%)	**74**
2005			39	(50,0%)	12	(15,4%)			27	(34,6%)	**78**
2004			33	(55,0%)	4	(6,7%)			23	(38,3%)	**60**
2003			44	(74,6%)	6	(10,2%)			9	(15,3%)	**59**
2002			26	(48,1%)	7	(13,0%)			21	(38,9%)	**54**
2001			37	(71,2%)	2	(3,8%)			13	(25,0%)	**52**
1994-00			353	(79,5%)	20	(4,5%)			71	(16,0%)	**444**
Total	**7**	**(0,5%)**	**842**	**(56,0%)**	**220**	**(14,6%)**	**3**	**(0,2%)**	431	(28,7%)	**1503**

* 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



53,1 % of all operations were performed on the right side. 74,8 % performed in women. Mean age: 62 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
2016	3	14	3			5			
2015	1	13	4			8		2	
2014		13	5			3			
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	
2008	1	19	1			6	1	1	
2007	3	22	4			2		6	
2006	3	19	9					1	
2005	6	26	9	3	1	2		1	
2004	2	23	2	2		4		2	2
2003	5	32	6					3	
2002	1	24				1		1	
2001	2	33	1	1			1		
1994-00	10	327	12			4		12	5
Total	**51**	**645**	**84**	**6**	**3**	**58**	**3**	**44**	**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
2014		1				2			
2013			1			4			
Total	**0**	**1**	**1**	**0**	**0**	**6**	**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
2016			2			19		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			
2008			2			5			
2007						11			
2006			5			5		1	
2005	2		2		1	6		1	1
2004	1		1			2			
2003			1			5			
2002	1		2			4		2	
2001			1			1			
1994-00		13	5			2		2	
Total	**9**	**13**	**36**	**0**	**1**	**161**	**0**	**8**	**1**

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

Use of cement in elbow prostheses

Table 5: Primary operations - Humerus

Year	Cement with antibiotics		Cement without antibiotics		Uncemented		Missing		Total
2016	23	(100,0							**23**
2015	25	(96,2%)			1	(3,8%)			**26**
2014	18	(85,7%)					3	(14,3%)	**21**
2013	27	(93,1%)			2	(6,9%)			**29**
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**
2008	24	(85,7%)			2	(7,1%)	2	(7,1%)	**28**
2007	31	(88,6%)			4	(11,4%)			**35**
2006	24	(75,0%)			8	(25,0%)			**32**
2005	23	(59,0%)			16	(41,0%)			**39**
2004	16	(48,5%)			17	(51,5%)			**33**
2003	25	(56,8%)	3	(6,8%)	16	(36,4%)			**44**
2002	12	(46,2%)	3	(11,5%)	10	(38,5%)	1	(3,8%)	**26**
2001	12	(32,4%)	3	(8,1%)	22	(59,5%)			**37**
1994-00	194	(55,0%)	86	(24,4%)	70	(19,8%)	3	(0,8%)	**353**
Total	**562**	**(66,2%)**	**95**	**(11,2%)**	**180**	**(21,2%)**	**12**	**(1,4%)**	**849**

Table 6: Primary operations - Ulna/radius

Year	Cement with antibiotics		Cement without antibiotics		Uncemented		Missing		Total
2016	30	(62,5%)			18	(37,5%)			**48**
2015	31	(63,3%)			18	(36,7%)			**49**
2014	21	(63,6%)	1	(3,0%)	9	(27,3%)	2	(6,1%)	**33**
2013	23	(53,5%)			20	(46,5%)			**43**
2012	24	(55,8%)			19	(44,2%)			**43**
2011	40	(87,0%)			4	(8,7%)	2	(4,3%)	**46**
2010	44	(89,8%)			1	(2,0%)	4	(8,2%)	**49**
2009	37	(82,2%)			6	(13,3%)	2	(4,4%)	**45**
2008	29	(82,9%)			4	(11,4%)	2	(5,7%)	**35**
2007	42	(91,3%)			3	(6,5%)	1	(2,2%)	**46**
2006	35	(81,4%)			8	(18,6%)			**43**
2005	42	(82,4%)			9	(17,6%)			**51**
2004	28	(75,7%)			9	(24,3%)			**37**
2003	41	(82,0%)	4	(8,0%)	4	(8,0%)	1	(2,0%)	**50**
2002	21	(63,6%)	3	(9,1%)	9	(27,3%)			**33**
2001	30	(76,9%)	3	(7,7%)	6	(15,4%)			**39**
1994-00	256	(68,6%)	86	(23,1%)	29	(7,8%)	2	(0,5%)	**373**
Total	**774**	**(72,8%)**	**97**	**(9,1%)**	**176**	**(16,6%)**	**16**	**(1,5%)**	**1 063**

Prostheses used in elbow prostheses - Total prostheses

Table 7: Primary operations - Humerus

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Discovery	40	9	21	24	21	18	19	9	18	11	**190**
Norway	180										**180**
Kudo	162										**162**
IBP	118	3	4	5	2	3	1				**136**
GSB III	43	9	7	5	2	4	3	3	1		**77**
NES	46	7	1								**54**
Nexel									4	12	**16**
Mark II	2		1		1	1		1	2		**8**
IBP Reconstruction	5										**5**
Coonrad/Morrey	1				2			1	1		**5**
Other (n < 5)	2				1		1	5			**9**
Total	**599**	**28**	**34**	**34**	**29**	**26**	**24**	**19**	**26**	**23**	**842**

Table 8: Primary operations - Ulna/radius

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Discovery	40	9	21	24	21	18	19	9	18	11	**190**
Norway	179										**179**
Kudo	162										**162**
IBP	118	3	4	5	2	3	1				**136**
GSB III	43	9	7	5	2	4	3	3	1		**77**
NES	47	7	1								**55**
Nexel									4	12	**16**
Mark II	2		1		1	1		1	2		**8**
IBP Reconstruction	5										**5**
Coonrad/Morrey	1				2			1	1		**5**
Other (n < 5)	2				1		1	3			**7**
Total	**599**	**28**	**34**	**34**	**29**	**26**	**24**	**17**	**26**	**23**	**840**

Prostheses used in elbow prostheses - Hemiprostheses

Table 9: Primary operations - Humerus

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Latitude Anatomic hemi							5	2			**7**
Total							**5**	**2**			**7**

Prostheses used in elbow prostheses - Radius head prostheses

Table 10: Primary operations - Radius

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
rHead	29	4	9	9	8	1		2			**62**
Acumed anatomic radial head		1			4	11	16	5	13	12	**62**
Radial Head	21	1	2	5							**29**
Explor					2	2	3	5	7	10	**29**
Silastic H.P. 100	20										**20**
Link radius					2	1		4	3		**10**
Evolve	2	1				2					**5**
Other (n < 5)	1			1	1						**3**
Total	**73**	**7**	**11**	**15**	**17**	**17**	**19**	**16**	**23**	**22**	**220**

Reasons for revisions in elbow prostheses

Table 11:

Year	Loose proximal comp.	Loose distal comp.	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Other	Missing
2016	9	8	1		1	12	2	2	5	5	
2015	4	5	1	1		6		1	7	2	1
2014	5	5		1	1	6	3	4	6	4	1
2013	4	3	1	2		8	2	1	10	8	
2012	1	3	2	1		7		1	5	8	
2011	3	5	2	1		1	2	2	3	3	1
2010	3	8	2	2	2	3	7	2	2	6	
2009	6	11		3	2	2	5	4	5	11	
2008	6	5		1	4	5	4	3	2	6	
2007	5	12	1	2	1	4	1	5	4	10	
2006	11	13	2	3	1	3	4	1	2	7	1
2005	11	9	4	1	1	2	5	3	3		
2004	8	11	2	3		3	5	2	2	3	
2003	4	4	1			3	2	1		1	
2002	4	7	1	4	3	2	5	6	1	3	1
2001	7	8	1		1		1	4	1	1	1
1994-00	35	30	5	4	2	4	13	12	2	11	1
Total	**126**	**147**	**26**	**29**	**19**	**71**	**61**	**54**	**60**	**89**	**7**

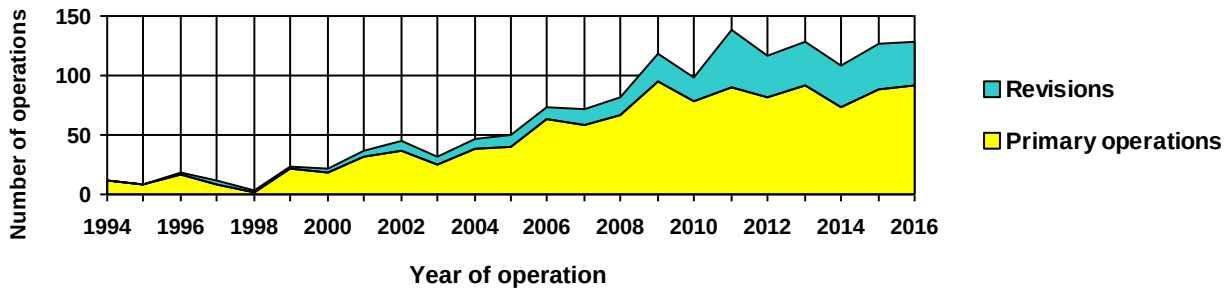
More than one reason for revision is possible

ANKLE PROSTHESES

Table 1: Annual number of operations

Year	Primary operations		Revisions		Total
2016	92	(71,9%)	36	(28,1%)	**128**
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	95	(79,8%)	24	(20,2%)	**119**
2008	66	(80,5%)	16	(19,5%)	**82**
2007	58	(80,6%)	14	(19,4%)	**72**
2006	63	(86,3%)	10	(13,7%)	**73**
2005	40	(80,0%)	10	(20,0%)	**50**
2004	39	(83,0%)	8	(17,0%)	**47**
2003	25	(78,1%)	7	(21,9%)	**32**
2002	36	(80,0%)	9	(20,0%)	**45**
2001	32	(88,9%)	4	(11,1%)	**36**
1994-00	87	(87,9%)	12	(12,1%)	**99**
Total	**1139**	**(76,0%)**	**360**	**(24,0%)**	**1499**

Figure 1: Annual numbers of operations



57,6 % of all operations were performed on the right side. 54,5 % performed in women. Mean age: 59,8 years.

Table 2: Ankle disease in primary operations

Year	Idiopathic osteoarthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechterew	Sequelae ligament tear	Acute fracture	Sequelae of infection	Other	Missing
2016	22	13	27	1	30			5	
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	27		13		1	1	
2008	20	15	24		7		2	2	
2007	13	16	20	2	6			2	
2006	19	14	24		5			5	
2005	15	9	18		3			1	
2004	8	10	17		1			3	1
2003	7	11	2	1				4	
2002	7	21	4	1				5	
2001	7	14	9	1				4	
1994-00	11	64	7	1	1			8	
Total	**314**	**308**	**364**	**11**	**133**	**0**	**4**	**68**	**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
2016					92	(100,0%)			**92**
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	(5,3%)			88	(92,6%)	2	(2,1%)	**95**
2008	1	(1,5%)			61	(92,4%)	4	(6,1%)	**66**
2007					58	(100,0%)			**58**
2006					63	(100,0%)			**63**
2005	1	(2,5%)			39	(97,5%)			**40**
2004					39	(100,0%)			**39**
2003	1	(4,0%)			24	(96,0%)			**25**
2002					36	(100,0%)			**36**
2001					32	(100,0%)			**32**
2000					19	(100,0%)			**19**
1999					22	(100,0%)			**22**
1998					2	(100,0%)			**2**
1997	3	(37,5%)			5	(62,5%)			**8**
1996	7	(41,2%)	3	(17,6%)	7	(41,2%)			**17**
1995	5	(62,5%)	3	(37,5%)					**8**
1994	6	(54,5%)	4	(36,4%)			1	(9,1%)	**11**
Total	**29**	**(2,5%)**	**10**	**(0,9%)**	**1 092**	**(96,0%)**	**7**	**(0,6%)**	**1 138**

Table 4: Primary operations - Talus

Year	Cement with antibiotics		Cement without antibiotics		Uncemented		Missing		Total
2016					92	(100,0%)			**92**
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	(5,3%)			88	(92,6%)	2	(2,1%)	**95**
2008	1	(1,5%)			61	(92,4%)	4	(6,1%)	**66**
2007					58	(100,0%)			**58**
2006	1	(1,6%)			62	(98,4%)			**63**
2005	1	(2,5%)			39	(97,5%)			**40**
2004					39	(100,0%)			**39**
2003	1	(4,0%)	1	(4,0%)	23	(92,0%)			**25**
2002					36	(100,0%)			**36**
2001					32	(100,0%)			**32**
2000					19	(100,0%)			**19**
1999					22	(100,0%)			**22**
1998					2	(100,0%)			**2**
1997	3	(37,5%)			5	(62,5%)			**8**
1996	7	(41,2%)	3	(17,6%)	7	(41,2%)			**17**
1995	5	(62,5%)	3	(37,5%)					**8**
1994	7	(63,6%)	4	(36,4%)					**11**
Total	**31**	**(2,7%)**	**11**	**(1,0%)**	**1 090**	**(95,8%)**	**6**	**(0,5%)**	**1 138**

Prostheses used in ankle prostheses

Table 5: Primary operations - Tibia

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Link S.T.A.R.	332	59	57	40	50	39	38		1		**616**
Salto Talaris							26	62	85	76	**249**
Mobility	4	2	25	26	16	12	15				**100**
CCI		4	12	13	17	12	11	9			**78**
Norwegian TPR	32										**32**
TM Total Ankle								3	3	16	**22**
Rebalance					7	8					**15**
Salto Mobile						11	1				**12**
Hintegra	9	1	1								**11**
AES	3										**3**
Total	**380**	**66**	**95**	**79**	**9(**	**82**	**91**	**74**	**89**	**92**	**1138**

Table 6: Primary operations - Talus

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Link S.T.A.R.	332	59	57	40	50	39	38		1		**616**
Salto Talaris							22	61	84	75	**242**
Mobility	4	2	25	26	16	12	15				**100**
CCI		4	12	13	17	12	11	9			**78**
Norwegian TPR	32										**32**
TM Total Ankle								3	3	16	**22**
Rebalance					7	8					**15**
Salto Mobile						11	1				**12**
Hintegra	9	1	1								**11**
Salto XT							4	1	1	1	**7**
AES	3										**3**
Total	**380**	**66**	**95**	**79**	**9(**	**82**	**91**	**74**	**89**	**92**	**1138**

Reasons for revisions in ankle prostheses

Table 7:

Year	Loose proximal comp.	Loose distal comp.	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Other	Missing
2016	12	10		1	2	2	2	13	4	2	
2015	6	6		1	7	4		16	10	6	
2014	14	11		1	4	1		14	9	2	
2013	6	3	1	5	9	3	1	14	17	3	
2012	7	4		2	1	3	1	14	9	3	
2011	9	6	1	8	7	5	1	17	10	2	
2010	2	1		3	3	1	2	12	3	3	
2009	7	3	1	5	7	3	1	9	4		
2008	3	4	1	2	5		1	4	2	3	
2007	2	2		2	1	1		7	3	1	
2006	3	2		2	2	1	1	4	1		
2005	1	3		1	2	1		4	1	1	
2004	5	4		1	1	2		1	1	1	
2003	3	3			2	1		2	1		
2002	4	1		1	1			4	1		
2001	2	2						2		1	
1994-00	9	7		2	4		1	4		1	
Total	**95**	**72**	**4**	**37**	**58**	**28**	**11**	**141**	**76**	**29**	**0**

More than one reason for revision is possible

FINGER JOINT PROSTHESES

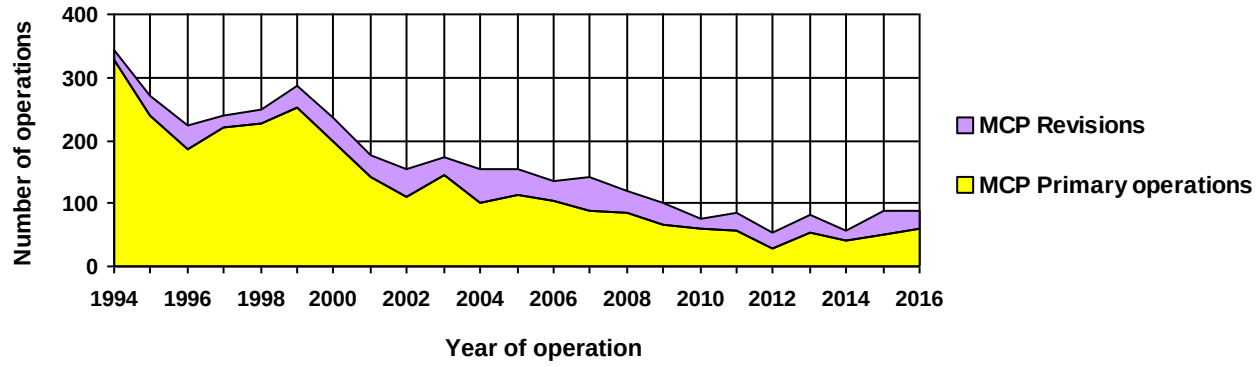
Table 1: Annual number of operations - MCP

Year	Primary operations		Revisions		Total
2016	59	(67,8%)	28	(32,2%)	**87**
2015	51	(57,3%)	38	(42,7%)	**89**
2014	42	(75,0%)	14	(25,0%)	**56**
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	59	(76,6%)	18	(23,4%)	**77**
2009	66	(66,0%)	34	(34,0%)	**100**
2008	84	(70,0%)	36	(30,0%)	**120**
2007	88	(61,5%)	55	(38,5%)	**143**
2006	104	(77,6%)	30	(22,4%)	**134**
2005	112	(72,7%)	42	(27,3%)	**154**
2004	101	(66,0%)	52	(34,0%)	**153**
2003	145	(83,8%)	28	(16,2%)	**173**
2002	110	(71,4%)	44	(28,6%)	**154**
2001	141	(79,7%)	36	(20,3%)	**177**
1994-00	1651	(89,5%)	194	(10,5%)	**1845**
Total	**2952**	**(80,2%)**	**730**	**(19,8%)**	**3682**

Table 2: Annual number of operations - PIP

Year	Primary operations		Revisions		Total
2016	1	(100,0%)			**1**
2015	5	(100,0%)			**5**
2014	4	(100,0%)			**4**
2013	6	(100,0%)			**6**
2011	3	(100,0%)			**3**
2010	6	(100,0%)			**6**
2009	3	(100,0%)			**3**
2008	4	(57,1%)	3	(42,9%)	**7**
2007	6	(85,7%)	1	(14,3%)	**7**
2006	7	(87,5%)	1	(12,5%)	**8**
2005	6	(85,7%)	1	(14,3%)	**7**
2004	7	(87,5%)	1	(12,5%)	**8**
2003			1	(100,0%)	**1**
2002	6	(100,0%)			**6**
2001	2	(100,0%)			**2**
1994-00	23	(79,3%)	6	(20,7%)	**29**
Total	**89**	**(86,4%)**	**14**	**(13,6%)**	**103**

Figure 1: Annual number of operations



61,4 % of all operations were performed on the right side. 87,6 % performed in women. Mean age: 61,3 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
2016	4	55						2	
2015	5	43		1				2	
2014		33					1	8	
2013		53	1					3	
2012		25	1					1	
2011	1	50						6	
2010	3	53	1					2	
2009	2	62						2	
2008	2	81						1	
2007	2	85		1				4	
2006	10	91	1		1			3	
2005	9	91	9				1	3	1
2004	5	95						1	1
2003	1	132		3				9	
2002	2	103						6	
2001	5	132						5	
2000	9	186					1	3	
1999	2	249		3				2	
1998	12	213		1		1		5	1
1997	3	215						5	
1996		181		1				5	
1995	1	228	3					9	
1994		323						5	
Total	**78**	**2779**	**16**	**10**	**1**	**1**	**3**	**92**	**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
2016	1								
2015	3		2						
2014	3		1						
2013	1	5							
2011		2	1						
2010		2	2		1			1	
2009	2						1		
2008	2		1					1	
2007	3		1		1				1
2006	4	3							
2005	4	2	1						
2004	6	1						1	
2002	3	2	1					2	
2001		2							
2000	1	3							
1999	1	6						1	
1998		4							
1996	1	2	1			1			
1995		1				1			
1994		1							
Total	**35**	**36**	**11**	**0**	**2**	**2**	**1**	**6**	**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
2016	2 (3,4%)		57 (96,6%)		**59**
2015	1 (2,0%)		48 (94,1%)	2 (3,9%)	**51**
2014			41 (97,6%)	1 (2,4%)	**42**
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**
2008	1 (1,2%)		83 (98,8%)		**84**
2007			88 (100,0%)		**88**
2006			103 (99,0%)	1 (1,0%)	**104**
2005		2 (1,8%)	109 (97,3%)	1 (0,9%)	**112**
2004	1 (1,0%)		100 (99,0%)		**101**
2003			145 (100,0%)		**145**
2002			108 (99,1%)	1 (0,9%)	**109**
2001	1 (0,7%)		140 (99,3%)		**141**
2000			198 (100,0%)		**198**
1999			253 (100,0%)		**253**
1998			228 (100,0%)		**228**
1997			216 (98,6%)	3 (1,4%)	**219**
1996			187 (100,0%)		**187**
1995			238 (100,0%)		**238**
1994			326 (99,4%)	2 (0,6%)	**328**
Total	**6 (0,2%)**	**2 (0,1%)**	**2 929 (99,3%)**	**12 (0,4%)**	**2 949**

Table 6: Primary operations - Distal

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
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**
2008			2 (100,0%)		**2**
2007			2 (100,0%)		**2**
2006			7 (100,0%)		**7**
2005			4 (100,0%)		**4**
2004			1 (100,0%)		**1**
2003			1 (100,0%)		**1**
2002			5 (100,0%)		**5**
2001			1 (100,0%)		**1**
2000			1 (100,0%)		**1**
1996			2 (100,0%)		**2**
1995			4 (100,0%)		**4**
Total			**37 (100,0%)**		**37**

Use of cement in PIP prostheses

Table 7: Primary operations - Proximal

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
2016			1 (100,0%)		**1**
2015			5 (100,0%)		**5**
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**
2008			4 (100,0%)		**4**
2007			5 (83,3%)	1 (16,7%)	**6**
2006			7 (100,0%)		**7**
2005			6 (100,0%)		**6**
2004			7 (100,0%)		**7**
2002			6 (100,0%)		**6**
2001			2 (100,0%)		**2**
2000			4 (100,0%)		**4**
1999			7 (100,0%)		**7**
1998			4 (100,0%)		**4**
1996			5 (100,0%)		**5**
1995			2 (100,0%)		**2**
1994			1 (100,0%)		**1**
Total			**86 (96,6%)**	**3 (3,4%)**	**89**

Table 8: Primary operations - Distal

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
2014			1 (100,0		**1**
2011			2 (100,0		**2**
2010			2 (100,0		**2**
2008			1 (100,0		**1**
2007			2 (100,0		**2**
2006			4 (80,0%)	1 (20,0%)	**5**
2005			5 (100,0		**5**
2004			5 (100,0		**5**
2002			1 (100,0		**1**
1996			3 (100,0		**3**
1995			1 (100,0		**1**
Total			**27 (96,4%)**	**1 (3,6%)**	**28**

Finger prostheses

Table 9: MCP prostheses in primary operations - Proximal

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Silastic HP 100	1674	81	61	53	49	27	25		5	1	**1976**
Avanta	554			1					1		**556**
NeuFlex	193	1	4								**198**
Silastic HP 100 II				4	6		28	41	45	54	**178**
Ascension MCP	23	2	1	1	2			1		2	**32**
MCS	6										**6**
SR Avanta										2	**2**
Moje	1										**1**
Total	**2451**	**84**	**66**	**59**	**57**	**27**	**53**	**42**	**51**	**59**	**2949**

Table 10: MCP prostheses in primary operations - Distal

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Ascension MCP	21	2	1	1	2			1		2	**30**
MCS	6										**6**
Moje	1										**1**
Total	**28**	**2**	**1**	**1**	**2**			**1**		**2**	**37**

Table 11: PIP prostheses in primary operations - Proximal

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Silastic HP 100	21						4	2			**27**
SR Avanta	4	3	3	4	1		1	1	5	1	**23**
Ascension MCP	17	1									**18**
NeuFlex	7										**7**
Ascension PIP PyroCarbon				2	2			1			**5**
MCS	4										**4**
Avanta	3						1				**4**
Moje	1										**1**
Total	**57**	**4**	**3**	**6**	**3**		**6**	**4**	**5**	**1**	**89**

Table 12: PIP prostheses in primary operations - Distal

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Ascension MCP	17	1									**18**
Ascension PIP PyroCarbon				2	2			1			**5**
MCS	4										**4**
Moje	2										**2**
Total	**23**	**1**		**2**	**2**			**1**			**29**

Finger prostheses - Reasons for revisions

Table 13: MCP prostheses - Reasons for revisions

Year	Loose proximal comp.	Loose distal comp.	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Fractured/defect component	Other	Missing
2016			5	5	8	1	2	10	9	5	7	
2015	6	2		6		1		15	9	8	10	
2014		1		4				2	4		5	
2013				4	13			13		10	1	
2012			1	2	4			10	4	13	1	
2011					6	2		13		12	8	
2010	1	1	2				2	3		10	3	
2009	1	2	3	2	2	4		6	3	22	5	
2008		1	2	4	15	4		13	5	10	5	
2007		3	11	8	2	1		16		39		4
2006			4	10	4	1		7	4	11		1
2005			5	6	6			12	5	24	4	2
2004	2	5		8	8			12		30	5	4
2003		1	1		9			8	1	17	2	
2002		3		12	7			15		27	4	
2001		3	3	4	7			11	3	9	10	
2000		2	1	2	1	4	8	4		20	5	1
1999		1	4	3	6		4	7		14	8	
1998		1	1	3	5		1	2		11	1	
1997		1	3	4	4	1		8		11	1	
1996				8				13		22	7	2
1995	4				4		7	12		13	5	
1994					1		1	1		2	4	6
Total	**14**	**27**	**46**	**95**	**112**	**19**	**25**	**213**	**47**	**340**	**101**	**20**

Revision reasons are not mutually exclusive. More than one reason for revision is possible

Table 14: PIP prostheses - Reasons for revisions

Year	Loose proximal comp.	Loose distal comp.	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Fractured/defect component	Other	Missing
2008	1	1	1	1	1			2				
2007								1			1	
2006					1							
2005										1		
2004	1	1										
2003	1	1										
1998				1						1		
1997										4		
1996	1											
Total	**4**	**3**	**1**	**2**	**2**	**0**	**0**	**3**	**0**	**6**	**1**	**0**

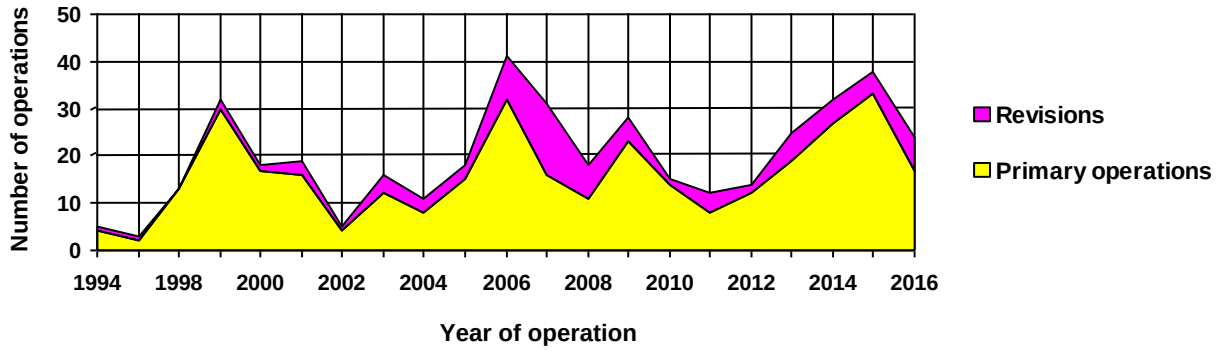
Revision reasons are not mutually exclusive. More than one reason for revision is possible

WRIST PROSTHESES

Table 1: Annual number of operations

Year	Primary operations		Revisions		Total
2016	17	(70,8%)	7	(29,2%)	**24**
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**
2008	11	(61,1%)	7	(38,9%)	**18**
2007	16	(51,6%)	15	(48,4%)	**31**
2006	32	(78,0%)	9	(22,0%)	**41**
2005	15	(83,3%)	3	(16,7%)	**18**
2004	8	(72,7%)	3	(27,3%)	**11**
2003	12	(75,0%)	4	(25,0%)	**16**
2002	4	(80,0%)	1	(20,0%)	**5**
2001	16	(84,2%)	3	(15,8%)	**19**
1994-00	66	(93,0%)	5	(7,0%)	**71**
Total	**333**	**(79,7%)**	**85**	**(20,3%)**	**418**

Figure 1: Annual number of operations



57,2 % of all operations were performed on the right side.63,2 % performed in women Mean age: 56,1 years.

Table 2: Wrist disease in primary operations

Year	Idiopathic osteo-arthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechte-rew	Sequelae ligament tear	Acute fracture	Sequelae after infection	Other	Missing
2016	4		6		6	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	
2008	4	2	2		2				1
2007	1	6	6		1			2	
2006	5	19	6		1			3	
2005	5		4					6	
2004		8							
2003	1	5	3					3	
2002		4							
2001		14	2						
1994-00	2	59		1				4	
Total	**45**	**140**	**77**	**1**	**42**	**1**	**2**	**38**	**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
2016			17 (100,0%)		**17**
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**
2008			10 (100,0%)		**10**
2007			16 (100,0%)		**16**
2006			32 (100,0%)		**32**
2005			15 (100,0%)		**15**
2004	2 (25,0%)		6 (75,0%)		**8**
2003	1 (8,3%)		11 (91,7%)		**12**
2002			4 (100,0%)		**4**
2001	1 (6,3%)	1 (6,3%)	14 (87,5%)		**16**
2000	3 (17,6%)		14 (82,4%)		**17**
1999			29 (96,7%)	1 (3,3%)	**30**
1998			13 (100,0%)		**13**
1995			2 (100,0%)		**2**
1994			4 (100,0%)		**4**
Total	**7 (2,1%)**	**1 (0,3%)**	**318 (96,1%)**	**5 (1,5%)**	**331**

Table 4: Primary operations - Distal

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
2016			17 (100,0%)		**17**
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**
2008			9 (100,0%)		**9**
2007			15 (100,0%)		**15**
2006			32 (100,0%)		**32**
2005			15 (100,0%)		**15**
2004	4 (50,0%)		4 (50,0%)		**8**
2003	3 (25,0%)		9 (75,0%)		**12**
2002			3 (100,0%)		**3**
2001	1 (6,7%)		14 (93,3%)		**15**
2000	1 (5,9%)		16 (94,1%)		**17**
1999			30 (100,0%)		**30**
1998			13 (100,0%)		**13**
Total	**9 (2,8%)**		**310 (96,9%)**	**1 (0,3%)**	**320**

Wrist prostheses

Table 5: Primary operations - Proximal

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Motec Wrist	47	9	21	14	5	5	4	9	17	7	**138**
Biax	90										**90**
Remotion Wrist					3	3	10	13	13	5	**47**
Elos[1]	23										**23**
Scheker Radio-ulnar	1	1				1	3	3	1	3	**13**
Uhead (Druj)						3	2	2	1	2	**10**
Silastic ulnar head	7										**7**
Eclypse radio-ulnar			2								**2**
TMW	1										**1**
Total	**169**	**10**	**23**	**14**	**8**	**12**	**19**	**27**	**32**	**17**	**331**

Table 6: Primary operations - Distal

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Motec Wrist	47	9	21	14	5	5	4	9	17	7	**138**
Biax	89										**89**
Remotion Wrist					3	3	10	13	14	5	**48**
Elos[1]	23										**23**
Scheker Radio-ulnar						1	3	3	1	3	**11**
Uhead (Druj)						3	2	2	1	2	**10**
TMW	1										**1**
Total	**160**	**9**	**21**	**14**	**8**	**12**	**19**	**27**	**33**	**17**	**320**

Table 7: Reasons for revisions

Year	Loose proximal comp.	Loose distal comp.	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Other	Missing	Total
2016		2	1		1	2		1				7
2015		2		1		1		1	1	1		7
2014		1				1		1		3		6
2013		1			1	1		3	1	1		8
2012					2			1				3
2011		2			1	1		2				6
2010										1		1
2009		2		1	1	1		3				8
2008		4	1			2		2		1		10
2007		6		1	1	5		3	1	2		19
2006	3	5				2				1		11
2005		2		1								3
2004	1	1			2	1		2				7
2003		1			1			2				4
2002			1									1
2001		2		1	2			1				6
2000		1										1
1999	1				1	1		1				4
1995								1				1
1994								1				1
Total	**5**	**32**	**3**	**5**	**13**	**18**	**0**	**25**	**3**	**10**	**0**	**114**

Revision reasons are not mutually exclusive. More than one reason for revision is possible

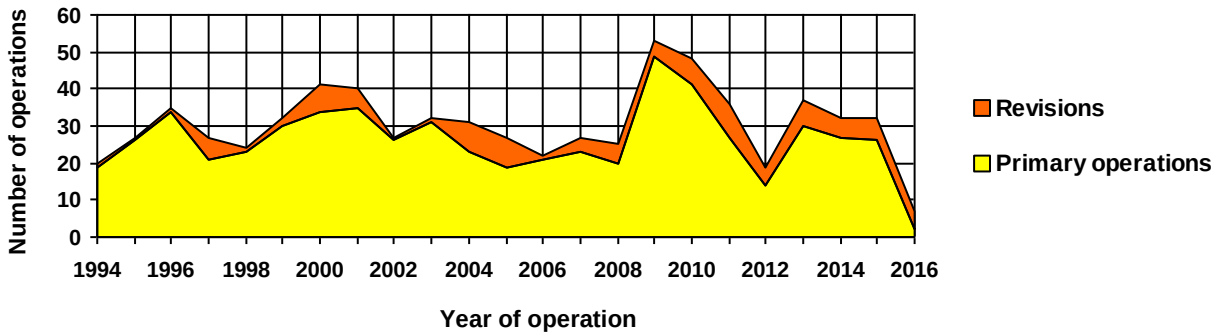
[1]Elos are 3 different development models of Motec Wrist. Motec Wrist was previously sold under the name Gibbon.

CARPOMETACARPAL PROSTHESES (CMC I)

Table 1: Annual number of operations

Year	Primary operations		Revisions		Total
2016	2	(28,6%)	5	(71,4%)	**7**
2015	26	(81,3%)	6	(18,8%)	**32**
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**
2008	20	(80,0%)	5	(20,0%)	**25**
2007	23	(85,2%)	4	(14,8%)	**27**
2006	21	(95,5%)	1	(4,5%)	**22**
2005	19	(70,4%)	8	(29,6%)	**27**
2004	23	(74,2%)	8	(25,8%)	**31**
2003	31	(96,9%)	1	(3,1%)	**32**
2002	26	(96,3%)	1	(3,7%)	**27**
2001	35	(87,5%)	5	(12,5%)	**40**
1994-00	187	(90,8%)	19	(9,2%)	**206**
Total	**601**	**(85,7%)**	**100**	**(14,3%)**	**701**

Figure 1: Annual number of operations



47,8 % of all operations were performed on the right side. 83 % performed in women. Mean age: 62,8 years.

Table 2: Carpometacarpal disease in primary operations

Year	Idiopathic osteoarthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechterew	Sequelae ligament tear	Acute fracture	Sequelae of infection	Other	Missing
2016		2							
2015	24	1				1			
2014	24	2						1	
2013	23	5		1				1	
2012	13	1							
2011	26		1						
2010	37	4							
2009	47	2						1	
2008	17	3							
2007	17	6						1	
2006	15	4						2	
2005	16	2						1	
2004	21							2	
2003	23	5						3	
2002	20	5						1	
2001	25	8		1				1	
1994-00	122	59	2	3				7	
Total	**470**	**109**	**3**	**5**	**0**	**1**	**0**	**21**	**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
2016			2 (100,0%)		**2**
2015			26 (100,0%)		**26**
2014			26 (96,3%)	1 (3,7%)	**27**
2013			30 (100,0%)		**30**
2012			14 (100,0%)		**14**
2011			27 (100,0%)		**27**
2010			40 (97,6%)	1 (2,4%)	**41**
2009			44 (91,7%)	4 (8,3%)	**48**
2008			20 (100,0%)		**20**
2007			23 (100,0%)		**23**
2006			21 (100,0%)		**21**
2005			19 (100,0%)		**19**
2004			23 (100,0%)		**23**
2003	1 (3,2%)		30 (96,8%)		**31**
2002	1 (3,8%)		25 (96,2%)		**26**
2001			35 (100,0%)		**35**
1994-00	1 (0,5%)		185 (98,9%)	1 (0,5%)	**187**
Total	**3 (0,5%)**		**590 (98,3%)**	**7 (1,2%)**	**600**

Carpometacarpal prostheses - Prosthesis brand

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

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Silastic Trapezium	281	17	16	11	9	6	8	8	4	2	**362**
Swanson Titanium Basal	71			1							**72**
Motec			21	17	15	2					**55**
Elektra	2	3	10	12	3	5	4	5	8		**52**
Motec II						1	18	14	14		**47**
Avanta Trapezium	6		1								**7**
Custom made	5										**5**
Total	**365**	**20**	**48**	**41**	**27**	**14**	**30**	**27**	**26**	**2**	**600**

Reasons for revisions

Table 5:

Year	Loose proximal	Loose distal comp.	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Other	Missing
2016	2		1	1				2			
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		3	2		1		3			
2009	1		2					1		1	
2008			2					4			
2007			1	3				1			
2006			1								
2005			4	1				7	1	2	
2004	1		3					6		1	
2003			1								
2002											1
2001			4	1				4	1	1	
1994-00	1		6	2				10		5	
Total	**29**	**0**	**38**	**11**	**0**	**2**	**1**	**48**	**2**	**11**	**1**

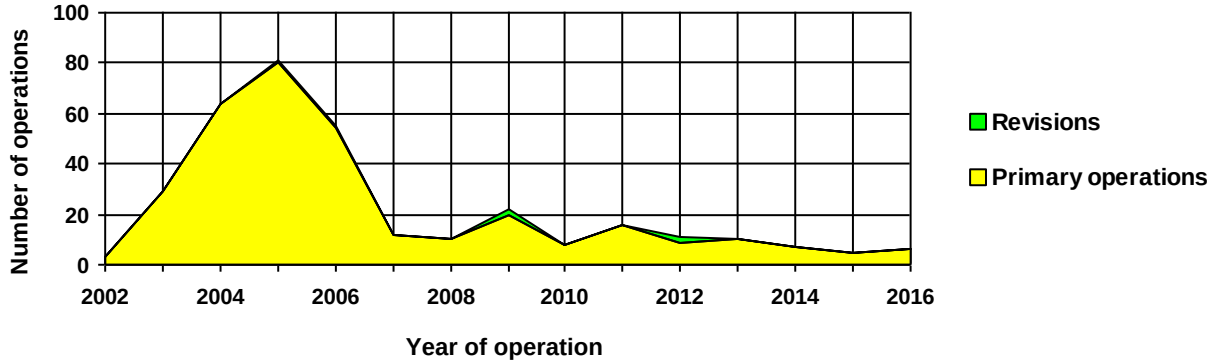
Revision reasons are not mutually exclusive. More than one reason for revision is possible

LUMBAR DISC PROSTHESES

Table 1: Annual number of operations

Year	Primary operations		Revisions		Total
2016	6	(100,0%)			**6**
2015	5	(100,0%)			**5**
2014	7	(100,0%)			**7**
2013	10	(100,0%)			**10**
2012	9	(81,8%)	2	(18,2%)	**11**
2011	16	(100,0%)			**16**
2010	8	(100,0%)			**8**
2009	20	(90,9%)	2	(9,1%)	**22**
2008	10	(100,0%)			**10**
2007	12	(100,0%)			**12**
2006	54	(98,2%)	1	(1,8%)	**55**
2005	80	(98,8%)	1	(1,2%)	**81**
2004	64	(100,0%)			**64**
2003	29	(100,0%)			**29**
2002	3	(100,0%)			**3**
Total	**333**	**(98,2%)**	**6**	**(1,8%)**	**339**

Figure 1: Annual number of operations



59,6 % performed in women. Mean age: 43,5 years.

Table 2: Back disease - Primary operations

Year	Idiopathic osteoarthritis	Sequelae after fracture	Spondylitis	Sequelae after prolapse surgery	Disc degeneration	Sequelae of infection	Other	Missing
2016	1				6			
2015					5			
2014			5		2			
2013				1	9			
2012					9			
2011			6		10			
2010				1	6		2	
2009				2	18		1	
2008				4	8		1	
2007				2	12			
2006	2		26	11	22		1	
2005	6	1	52	19	17		2	
2004	1		49			1	15	
2003			22	3			4	
2002	1		1				2	
Totalt	**11**	**1**	**161**	**43**	**124**	**1**	**28**	**0**

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

Use of cement in lumbar disc prostheses

Table 3: Primary operations - Proximal

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
2016			6 (100,0%)		**6**
2015			5 (100,0%)		**5**
2014			7 (100,0%)		**7**
2013			10 (100,0%)		**10**
2012			9 (100,0%)		**9**
2011			16 (100,0%)		**16**
2010			8 (100,0%)		**8**
2009			20 (100,0%)		**20**
2008			10 (100,0%)		**10**
2007			12 (100,0%)		**12**
2006			54 (100,0%)		**54**
2005			80 (100,0%)		**80**
2004			64 (100,0%)		**64**
2003			29 (100,0%)		**29**
2002			3 (100,0%)		**3**
Total			**333 (100,0%)**		**333**

Table 4: Primary operations - Distal

Year	Cement with antibiotics	Cement without antibiotics	Uncemented	Missing	Total
2016			6 (100,0%)		**6**
2015			5 (100,0%)		**5**
2014			7 (100,0%)		**7**
2013			10 (100,0%)		**10**
2012			9 (100,0%)		**9**
2011			16 (100,0%)		**16**
2010			8 (100,0%)		**8**
2009			20 (100,0%)		**20**
2008	2 (20,0%)		8 (80,0%)		**10**
2007			11 (91,7%)	1 (8,3%)	**12**
2006	1 (1,9%)		52 (96,3%)	1 (1,9%)	**54**
2005			80 (100,0%)		**80**
2004			64 (100,0%)		**64**
2003			29 (100,0%)		**29**
2002			3 (100,0%)		**3**
Total	**3 (0,9%)**		**328 (98,5%)**	**2 (0,6%)**	**333**

Lumbar disc prostheses - Prosthesis brand

Table 5: Primary operations - Proximal

Prostheses	2002-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Prodisc	214	2		4	16	9	10	7	5	6	**273**
Charité	30	8	20	4							**62**
TotaIt	**244**	**10**	**20**	**8**	**16**	**9**	**10**	**7**	**5**	**6**	**335**

Table 6: Primary operations - Distal

Prostheses	2002-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Prodisc	214	2		4	16	9	10	7	5	6	**273**
Charité	30	8	20	4							**62**
Total	**244**	**10**	**20**	**8**	**16**	**9**	**10**	**7**	**5**	**6**	**335**

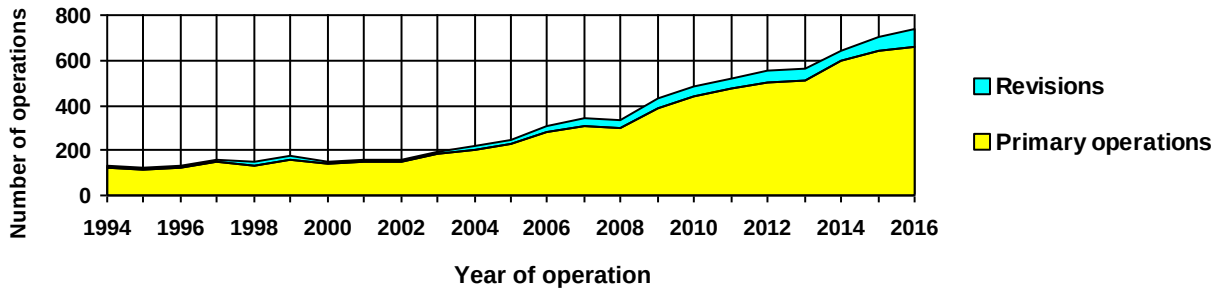
SHOULDER PROSTHESES

Table 1: Annual number of operations in shoulder prostheses

Year	Primary operations		Reoperations *		Revisions		Total
2016	663	(90,2%)			72	(9,8%)	**735**
2015	644	(91,7%)			58	(8,3%)	**702**
2014	594	(92,4%)	1	(0,2%)	48	(7,5%)	**643**
2013	517	(90,9%)	2	(0,4%)	50	(8,8%)	**569**
2012	500	(89,1%)	1	(0,2%)	60	(10,7%)	**561**
2011	481	(92,5%)			39	(7,5%)	**520**
2010	447	(91,2%)			43	(8,8%)	**490**
2009	392	(90,7%)			40	(9,3%)	**432**
2008	302	(89,9%)			34	(10,1%)	**336**
1994-07	2426	(91,5%)			224	(8,5%)	**2650**
Total	**6966**	**(91,2%)**	**4**	**(0,1%)**	**668**	**(8,7%)**	**7638**

* 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



53,2 % of all operations were performed on the right side. 71,6 % performed in women. Mean age: 69,8 years.

Table 2: Annual number of operations - Stemmed shoulder hemiprostheses

Year	Primary operations		Revisions		Total
2016	88	(82,2%)	19	(17,8%)	**107**
2015	111	(85,4%)	19	(14,6%)	**130**
2014	123	(93,2%)	9	(6,8%)	**132**
2013	108	(85,7%)	18	(14,3%)	**126**
2012	166	(91,7%)	15	(8,3%)	**181**
2011	177	(92,7%)	14	(7,3%)	**191**
2010	176	(92,6%)	14	(7,4%)	**190**
2009	161	(91,5%)	15	(8,5%)	**176**
2008	137	(94,5%)	8	(5,5%)	**145**
1994-07	1698	(92,9%)	130	(7,1%)	**1828**
Total	**2945**	**(91,9%)**	**261**	**(8,1%)**	**3206**

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

Year	Primary operations		Revisions		Total
2016	167	(91,8%)	15	(8,2%)	**182**
2015	139	(96,5%)	5	(3,5%)	**144**
2014	120	(93,8%)	8	(6,3%)	**128**
2013	99	(96,1%)	4	(3,9%)	**103**
2012	61	(95,3%)	3	(4,7%)	**64**
2011	79	(94,0%)	5	(6,0%)	**84**
2010	69	(90,8%)	7	(9,2%)	**76**
2009	56	(98,2%)	1	(1,8%)	**57**
2008	37	(97,4%)	1	(2,6%)	**38**
1994-07	99	(82,5%)	21	(17,5%)	**120**
Total	**926**	**(93,0%)**	**70**	**(7,0%)**	**996**

Table 4: Annual number of operations - Resurfacing shoulder hemiprostheses

Year	Primary operations		Revisions		Total
2016			11	(100,0%)	**11**
2015	2	(28,6%)	5	(71,4%)	**7**
2014			11	(100,0%)	**11**
2013	9	(52,9%)	8	(47,1%)	**17**
2012	10	(43,5%)	13	(56,5%)	**23**
2011	20	(71,4%)	8	(28,6%)	**28**
2010	25	(71,4%)	10	(28,6%)	**35**
2009	53	(84,1%)	10	(15,9%)	**63**
2008	43	(81,1%)	10	(18,9%)	**53**
1994-07	266	(97,1%)	8	(2,9%)	**274**
Total	**428**	**(82,0%)**	**94**	**(18,0%)**	**522**

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

Year	Primary operations		Revisions		Total
2012	1	(100,0%)			**1**
2011	1	(100,0%)			**1**
2009	2	(100,0%)			**2**
2008	1	(50,0%)	1	(50,0%)	**2**
1994-07	5	(83,3%)	1	(16,7%)	**6**
Total	**10**	**(83,3%)**	**2**	**(16,7%)**	**12**

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

Year	Primary operations		Reoperations *		Revisions		Total
2016	371	(94,9%)			20	(5,1%)	**391**
2015	350	(92,3%)			29	(7,7%)	**379**
2014	304	(94,1%)			19	(5,9%)	**323**
2013	252	(95,1%)			13	(4,9%)	**265**
2012	216	(90,4%)	1	(0,4%)	22	(9,2%)	**239**
2011	161	(95,8%)			7	(4,2%)	**168**
2010	131	(93,6%)			9	(6,4%)	**140**
2009	100	(92,6%)			8	(7,4%)	**108**
2008	75	(92,6%)			6	(7,4%)	**81**
1994-07	329	(88,4%)			43	(11,6%)	**372**
Total	**2289**	**(92,8%)**	**1**	**(0,0%)**	**176**	**(7,1%)**	**2466**

Table 7: Annual number of operations - Non stemmed hemiprostheses

Year	Primary operations		Reoperations *		Revisions		Total
2016	12	(75,0%)			4	(25,0%)	**16**
2015	16	(72,7%)			6	(27,3%)	**22**
2014	23	(82,1%)	1	(3,6%)	4	(14,3%)	**28**
2013	26	(100,0%)					**26**
2012	23	(82,1%)			5	(17,9%)	**28**
2011	21	(95,5%)			1	(4,5%)	**22**
2010	33	(100,0%)					**33**
2009	5	(100,0%)					**5**
Total	**159**	**(88,3%)**	**1**	**(0,6%)**	**20**	**(11,1%)**	**180**

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

Table 8: Annual number of operations - Non stemmed total shoulder prostheses

Year	Primary operations		Revisions		Total
2016	18	(85,7%)	3	(14,3%)	**21**
2015	15	(75,0%)	5	(25,0%)	**20**
2014	21	(95,5%)	1	(4,5%)	**22**
2013	18	(100,0%)			**18**
2012	20	(80,0%)	5	(20,0%)	**25**
2011	15	(100,0%)			**15**
2010	8	(100,0%)			**8**
2009	8	(100,0%)			**8**
2008	3	(100,0%)			**3**
Total	**126**	**(90,0%)**	**14**	**(10,0%)**	**140**

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

Year	Primary operations		Revisions	Total
2015	3	(100,0%)		**3**
2014	1	(100,0%)		**1**
Total	**4**	**(100,0%)**		**4**

Reasons for primary operations

Table 10: Shoulder disease in primary operations - Stemmed shoulder hemiprostheses

Year	Idiopathic osteo-arthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechte-rew	Sequelae ligament tear	Acute fracture	Sequelae after infection	Rotarcuff arthropathy	Other	Missing
2016	16	1	9	1		58			3	
2015	14	1	15			81	1		5	
2014	21		15			88			4	
2013	21	1	7		1	77		2	3	
2012	22	3	13			126			4	
2011	34	4	26			115			3	
2010	35	8	22	1		109			2	
2009	28	9	27			101		1	3	
2008	21	13	29	1		69		2	4	2
1994-07	324	422	363	13	8	554	7	3	79	8
Total	**536**	**462**	**526**	**16**	**9**	**1378**	**8**	**8**	**110**	**10**

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

Table 11: Shoulder disease in primary operations - Anatomic stemmed total shoulder prostheses

Year	Idiopathic osteo-arthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechte-rew	Sequelae ligament tear	Acute fracture	Sequelae after infection	Rotarcuff arthropathy	Other	Missing
2016	138	7	20		1	2	1		2	
2015	124	3	7		1		1		6	
2014	96	5	14		3				3	
2013	84	3	10		1	1	1			
2012	54	1	4		1				2	
2011	68	3	10				1			
2010	58	2	3		2				3	1
2009	38	5	11		1		1		2	
2008	28	2	3			1			3	
1994-07	61	14	14	1	1	1	1		6	1
Total	**749**	**45**	**96**	**1**	**11**	**5**	**6**	**0**	**27**	**2**

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

Table 12: Shoulder disease in primary operations - Resurfacing shoulder hemiprostheses

Year	Idiopathic osteo-arthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechte-rew	Sequelae ligament tear	Acute fracture	Sequelae after infection	Rotarcuff arthropathy	Other	Missing
2015	2									
2013	8		1	1						
2012	8								2	
2011	18	1						1	1	
2010	17	3	3						2	
2009	33	13	5		2			1		1
2008	32	10	1						2	
1994-07	167	67	24	3	3	1	3	3	11	2
Total	**285**	**94**	**34**	**4**	**5**	**1**	**3**	**5**	**18**	**3**

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

Table 13: Shoulder disease in primary operations - Resurfacing total shoulder prostheses

Year	Idiopathic osteo-arthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechte-rew	Sequelae ligament tear	Acute fracture	Sequelae after infection	Rotarcuff arthropathy	Other	Missing
2012	1									
2011	1									
2009	2									
2008	1									
1994-07	4								2	
Total	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**

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

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

Year	Idiopathic osteo-arthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechte-rew	Sequelae ligament tear	Acute fracture	Sequelae after infection	Rotarcuff arthropathy	Other	Missing
2016	117	27	61	2	13	100	1	82	16	
2015	123	30	63	1	17	77	4	56	23	
2014	116	22	45	2	18	86	2	38	13	
2013	87	26	37		14	76	1	24	5	
2012	61	19	50		24	43	4	33	10	
2011	46	21	30	1	9	30	1	35	9	1
2010	41	27	26		5	12	4	21	8	1
2009	42	19	15	1	1	9	2	13	4	
2008	22	19	19	1	1	5	1	7	4	
1994-07	69	147	68	1	2	7	2	31	23	1
Total	**724**	**357**	**414**	**9**	**104**	**445**	**22**	**340**	**115**	**3**

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

Table 15: Shoulder disease in primary operations - Non stemmed shoulder hemiprostheses

Year	Idiopathic osteo-arthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechte-rew	Sequelae ligament tear	Acute fracture	Sequelae after infection	Rotarcuff arthropathy	Other	Missing
2016	7		4		1				1	
2015	13		3			1		1		
2014	16		2		1				4	
2013	23	1	2						2	
2012	15	3	3	2				1		
2011	13	6	2						1	
2010	23	3	7			1			2	
2009	2		1		1				2	
Total	**112**	**13**	**24**	**2**	**3**	**2**	**0**	**2**	**12**	**0**

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

Table 16: Shoulder disease in primary operations - Non stemmed total shoulder prostheses

Year	Idiopathic osteo-arthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechte-rew	Sequelae ligament tear	Acute fracture	Sequelae after infection	Rotarcuff arthropathy	Other	Missing
2016	12	2	1		2			1		
2015	13		1		1					
2014	18		3							
2013	15		1		1				2	
2012	17			1	1				1	
2011	13	2								
2010	6	1							1	
2009	5	2	1							
2008	2	1								
Total	**101**	**8**	**7**	**1**	**5**	**0**	**0**	**1**	**4**	**0**

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

Table 17: Shoulder disease in primary operations - Reversed non stemmed total shoulder prostheses

Year	Idiopathic osteo-arthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechte-rew	Sequelae ligament tear	Acute fracture	Sequelae after infection	Rotarcuff arthropathy	Other	Missing
2015	2					1				
2014						1				
Total	**2**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**

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

Use of cement in shoulder prostheses

Table 18: Stemmed shoulder hemiprostheses - Primary operations - Humerus

Year	Cem. with antib.		Cem. without antib.		Uncemented		Missing		Total
2016	49	(55,7%)			39	(44,3%)			**88**
2015	68	(61,3%)			41	(36,9%)	2	(1,8%)	**111**
2014	84	(68,3%)			36	(29,3%)	3	(2,4%)	**123**
2013	80	(74,1%)			28	(25,9%)			**108**
2012	140	(84,3%)			26	(15,7%)			**166**
2011	130	(73,4%)	1	(0,6%)	37	(20,9%)	9	(5,1%)	**177**
2010	135	(76,7%)			36	(20,5%)	5	(2,8%)	**176**
2009	117	(72,7%)			33	(20,5%)	11	(6,8%)	**161**
2008	87	(63,5%)	2	(1,5%)	36	(26,3%)	12	(8,8%)	**137**
1994-07	1 040	(61,2%)	39	(2,3%)	617	(36,3%)	2	(0,1%)	**1 698**
Total	**1 930**	**(65,5%)**	**42**	**(1,4%)**	**929**	**(31,5%)**	**44**	**(1,5%)**	**2 945**

Table 19: Anatomic stemmed total shoulder prostheses - Primary operations - Glenoid

Year	Cem. with antib.		Cem. without antib.		Uncemented		Missing		Total
2016	153	(91,6%)			14	(8,4%)			**167**
2015	125	(89,9%)			14	(10,1%)			**139**
2014	99	(82,5%)			18	(15,0%)	3	(2,5%)	**120**
2013	77	(79,4%)			20	(20,6%)			**97**
2012	50	(83,3%)			10	(16,7%)			**60**
2011	65	(82,3%)			14	(17,7%)			**79**
2010	57	(82,6%)			11	(15,9%)	1	(1,4%)	**69**
2009	40	(71,4%)			15	(26,8%)	1	(1,8%)	**56**
2008	30	(81,1%)			2	(5,4%)	5	(13,5%)	**37**
1994-07	43	(44,3%)	3	(3,1%)	51	(52,6%)			**97**
Total	**739**	**(80,2%)**	**3**	**(0,3%)**	**169**	**(18,3%)**	**10**	**(1,1%)**	**921**

Table 20: Anatomic stemmed total shoulder prostheses - Primary operations - Humerus

Year	Cem. with antib.		Cem. without antib.		Uncemented		Missing		Total
2016	17	(10,2%)			150	(89,8%)			**167**
2015	24	(17,3%)			115	(82,7%)			**139**
2014	24	(20,2%)			93	(78,2%)	2	(1,7%)	**119**
2013	58	(58,6%)			41	(41,4%)			**99**
2012	45	(73,8%)			15	(24,6%)	1	(1,6%)	**61**
2011	58	(74,4%)			20	(25,6%)			**78**
2010	54	(81,8%)			11	(16,7%)	1	(1,5%)	**66**
2009	38	(69,1%)			16	(29,1%)	1	(1,8%)	**55**
2008	28	(75,7%)			3	(8,1%)	6	(16,2%)	**37**
1994-07	43	(50,0%)	1	(1,2%)	42	(48,8%)			**86**
Total	**389**	**(42,9%)**	**1**	**(0,1%)**	**506**	**(55,8%)**	**11**	**(1,2%)**	**907**

Table 21: Resurfacing shoulder hemiprostheses - Primary operations - Humerus

Year	Cem. with antib.		Cem. without antib.		Uncemented		Missing		Total
2015					2	(100,0			**2**
2013					9	(100,0			**9**
2012					10	(100,0			**10**
2011			2	(10,0%)	17	(85,0%)	1	(5,0%)	**20**
2010	1	(4,0%)	2	(8,0%)	22	(88,0%)			**25**
2009					44	(83,0%)	9	(17,0%)	**53**
2008					15	(34,9%)	28	(65,1%)	**43**
1994-07					50	(18,8%)	216	(81,2%)	**266**
Total	**1**	**(0,2%)**	**4**	**(0,9%)**	**169**	**(39,5%)**	**254**	**(59,3%)**	**428**

Table 22: Resurfacing total shoulder prostheses - Primary operations - Glenoid

Year	Cem. with antib.		Cem. without antib.		Uncemented		Missing		Total
2011	1	(100,0							**1**
1994-07					2	(100,0			**2**
Total	**1**	**(33,3%)**			**2**	**(66,7%)**			**3**

Table 23: Resurfacing total shoulder prostheses - Primary operations - Humerus

Year	Cem. with antib.		Cem. without antib.		Uncemented		Missing		Total
2012					1	(100,0			**1**
2011							1	(100,0	**1**
2009							2	(100,0	**2**
2008					1	(100,0			**1**
1994-07							5	(100,0	**5**
Total					**2**	**(20,0%)**	**8**	**(80,0%)**	**10**

Table 24: Reversed stemmed total shoulder prostheses - Primary operations - Glenoid

Year	Cem. with antib.		Cem. without antib.		Uncemented		Missing		Total
2016	1	(0,3%)			370	(99,7%)			**371**
2015	3	(0,9%)			346	(98,9%)	1	(0,3%)	**350**
2014	9	(3,0%)			295	(97,0%)			**304**
2013	2	(0,8%)			250	(99,2%)			**252**
2012	1	(0,5%)	1	(0,5%)	213	(98,6%)	1	(0,5%)	**216**
2011	1	(0,6%)	1	(0,6%)	158	(98,1%)	1	(0,6%)	**161**
2010	6	(4,6%)	1	(0,8%)	122	(93,1%)	2	(1,5%)	**131**
2009	2	(2,0%)			97	(97,0%)	1	(1,0%)	**100**
2008	1	(1,3%)			65	(86,7%)	9	(12,0%)	**75**
1994-07	26	(7,9%)	1	(0,3%)	301	(91,8%)			**328**
Total	**52**	**(2,3%)**	**4**	**(0,2%)**	**2 217**	**(96,9%)**	**15**	**(0,7%)**	**2 288**

Table 25: Reversed stemmed total shoulder prostheses - Primary operations - Humerus

Year	Cem. with antib.		Cem. without antib.		Uncemented		Missing		Total
2016	239	(64,4%)			132	(35,6%)			**371**
2015	215	(61,4%)			135	(38,6%)			**350**
2014	180	(59,2%)			119	(39,1%)	5	(1,6%)	**304**
2013	143	(56,7%)			107	(42,5%)	2	(0,8%)	**252**
2012	140	(64,8%)			76	(35,2%)			**216**
2011	99	(61,5%)			60	(37,3%)	2	(1,2%)	**161**
2010	72	(55,0%)			57	(43,5%)	2	(1,5%)	**131**
2009	50	(50,0%)			49	(49,0%)	1	(1,0%)	**100**
2008	51	(68,0%)			16	(21,3%)	8	(10,7%)	**75**
1994-07	126	(38,3%)	1	(0,3%)	201	(61,1%)	1	(0,3%)	**329**
Total	**1 315**	**(57,4%)**	**1**	**(0,0%)**	**952**	**(41,6%)**	**21**	**(0,9%)**	**2 289**

Table 26: Non stemmed shoulder hemiprostheses - Primary operations - Humerus

Year	Cem. with antib.		Cem. without antib.		Uncemented		Missing		Total
2016					9	(100,0			**9**
2015					5	(100,0			**5**
2014					12	(92,3%)	1	(7,7%)	**13**
2013					11	(100,0			**11**
2012			1	(7,1%)	13	(92,9%)			**14**
2011					16	(100,0			**16**
2010	1	(3,3%)			29	(96,7%)			**30**
2009					5	(100,0			**5**
Total	**1**	**(1,0%)**	**1**	**(1,0%)**	**100**	**(97,1%)**	**1**	**(1,0%)**	**103**

Table 27: Non stemmed total shoulder prostheses - Primary operations - Glenoid

Year	Cem. with antib.		Cem. without antib.	Uncemented		Missing		Total
2016	18	(100,0						**18**
2015	15	(100,0						**15**
2014	21	(100,0						**21**
2013	14	(77,8%)		4	(22,2%)			**18**
2012	18	(90,0%)		1	(5,0%)	1	(5,0%)	**20**
2011	14	(93,3%)				1	(6,7%)	**15**
2010	6	(75,0%)		2	(25,0%)			**8**
2009	3	(42,9%)		4	(57,1%)			**7**
2008				3	(100,0			**3**
Total	**109**	**(87,2%)**		**14**	**(11,2%)**	**2**	**(1,6%)**	**125**

Table 28: Non stemmed total shoulder prostheses - Primary operations - Humerus

Year	Cem. with antib.		Cem. without antib.	Uncemented		Missing		Total
2016	2	(11,1%)		16	(88,9%)			**18**
2015	1	(10,0%)		9	(90,0%)			**10**
2014	1	(5,9%)		16	(94,1%)			**17**
2013	2	(12,5%)		13	(81,3%)	1	(6,3%)	**16**
2012	2	(11,8%)		15	(88,2%)			**17**
2011	1	(7,1%)		13	(92,9%)			**14**
2010	1	(12,5%)		7	(87,5%)			**8**
2009				8	(100,0			**8**
2008				3	(100,0			**3**
Total	**10**	**(9,0%)**		**100**	**(90,1%)**	**1**	**(0,9%)**	**111**

Table 29: Reversed non stemmed total shoulder prostheses - Primary operations - Glenoid

Year	Cem. with antib.	Cem. without antib.	Uncemented		Missing	Total
2015			3	(100,0		**3**
2014			1	(100,0		**1**
Total			**4**	**(100,0%**		**4**

Table 30: Reversed non stemmed total shoulder prostheses - Primary operations - Humerus

Year	Cem. with antib.		Cem. without antib.	Uncemented		Missing	Total
2015	3	(100,0					**3**
2014				1	(100,0		**1**
Total	**3**	**(75,0%)**		**1**	**(25,0%)**		**4**

Prosthesis brand

Stemmed hemiprostheses shoulder

Table 31: Primary operations- Caput humeri

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Bio - Modular	640	18	21	36	13	20	2	1	2		**753**
Global Advantage	332	55	53	54	66	44	36	40	34	16	**730**
Global Fx	58	10	26	29	47	50	17	16	13	11	**277**
Global	248										**248**
Nottingham	155	28	7	7	3	3					**203**
EPOCA			27	20	28	24	20	21	5		**145**
Delta I	62										**62**
Global Unite						1		11	21	24	**57**
Promos standard						8	13	12	11	6	**50**
Aequalis	5	9	6	5	8	7	6				**46**
Nottingham 1	1	1	12	15	2	4	2				**37**
Aequalis-Fracture	3	6	3	7	7	2	3	3	1	1	**36**
Modular	33										**33**
Bigliani/Flatow	14	4	4	1	3		2		1		**29**
Comprehensive						2	4	6	2	13	**27**
JR-Vaios Anatomic							1	7	9	2	**19**
Global unite anatomic								3	3	9	**15**
Aequalis Ascend Flex Anatomic							2	2	8	3	**15**
Other (n < 10)	4	2	1					1	1	3	**12**
Total	**1555**	**133**	**160**	**174**	**177**	**165**	**108**	**123**	**111**	**88**	**2794**

Table 32: Primary operations - Humerus

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Bio - Modular	654	21	21	34	13	20	2	1	2		**768**
Global Advantage	187	37	45	42	60	41	35	38	33	16	**534**
Global Fx	204	28	34	41	53	54	18	18	14	11	**475**
Global	261										**261**
Nottingham	153	26	10	10	4	7					**210**
EPOCA			27	21	28	24	20	21	5		**146**
Delta I	63										**63**
Global Unite						1		11	21	24	**57**
Scan Shoulder	56										**56**
Promos standard						8	13	12	11	6	**50**
Neer II	45	2									**47**
Aequalis	5	8	4	5	8	7	5				**42**
Aequalis-Fracture	3	7	5	7	7	2	4	3	1	1	**40**
Modular	33										**33**
Nottingham 1	2	2	10	15	1		2				**32**
Bigliani/Flatow	15	4	4	1	3		2		1		**30**
JR-Vaios Anatomic							1	7	9	2	**19**
Comprehensive Fracture			1			2	4	6	2	3	**18**
Global unite anatomic								3	3	9	**15**
Aequalis Ascend Flex Anatomic							2	2	8	3	**15**
Monosperical	13	1									**14**
Comprehensive										10	**10**
Other (n < 10)	4	1						1	1	3	**10**
Total	**1698**	**137**	**161**	**176**	**177**	**166**	**108**	**123**	**111**	**88**	**2945**

Anatomic stemmed total shoulder prostheses

Table 33: Primary operations - Glenoid

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Aequalis	18	22	31	51	51	32	36	3			**244**
Global unite anatomic								3	81	100	**184**
Aequalis Ascend Flex Anatomic							11	68	15	29	**123**
Global	8	8	20	14	18	14	30	9	1		**122**
Global Advantage	4						2	18	27	18	**69**
Bio - Modular	49		1								**50**
JR-Vaios Anatomic							4	8	8	11	**31**
Bigliani/Flatow	4	6	1		2	4	1	2		1	**21**
Promos standard						1	3	6	6	4	**20**
Anatomical shoulder						5	8	2	1		**16**
Nottingham	13										**13**
Other (n < 10)	1	1	3	4	8	4	2	1		4	**28**
Total	**97**	**37**	**56**	**69**	**79**	**60**	**97**	**120**	**139**	**167**	**921**

Table 34: Primary operations - Caput humeri

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Aequalis	18	22	31	51	51	33	36	6			**248**
Global Advantage	13	8	19	14	18	14	31	27	28	17	**189**
Global unite anatomic								3	81	100	**184**
Aequalis Ascend Flex Anatomic							12	65	14	29	**120**
Bio - Modular	35		1								**36**
JR-Vaios Anatomic							4	8	8	11	**31**
Promos standard						1	4	6	6	4	**21**
Bigliani/Flatow	4	6	1		2	4	1	2		1	**21**
Anatomical shoulder						5	8	2	2		**17**
Nottingham	15										**15**
Other (n < 10)	1	1	4	4	8	4	3	1		5	**31**
Total	**86**	**37**	**56**	**69**	**79**	**61**	**99**	**120**	**139**	**167**	**913**

Table 35: Primary operations - Humerus

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Aequalis	18	22	31	51	51	33	36	6			**248**
Global unite anatomic								3	81	100	**184**
Global Advantage	12	8	18	14	18	14	31	26	27	16	**184**
Aequalis Ascend Flex Anatomic							12	63	14	29	**118**
Bio - Modular	34		1								**35**
JR-Vaios Anatomic							3	8	8	11	**30**
Promos standard						1	4	6	6	4	**21**
Bigliani/Flatow	4	6	1		2	4	1	2		1	**21**
Anatomical shoulder						5	8	1	2		**16**
Nottingham	15										**15**
Other (n < 10)	3	1	4	1	7	4	4	4	1	6	**35**
Total	**86**	**37**	**55**	**66**	**78**	**61**	**99**	**119**	**139**	**167**	**907**

Resurfacing shoulder hemiprostheses

Table 36: Primary operations - Humerus

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Copeland	215	28	35	12	4	4					**298**
Global C.A.P.	44	11	12	8	11	4	2		2		**94**
EPOCA Resurfacing			2	3	4	2	7				**18**
Aequalis Resurfacing	6	4	2		1						**13**
Other (n < 10)	1		2	2							**5**
Total	**266**	**43**	**53**	**25**	**20**	**10**	**9**		**2**		**428**

Resurfacing total shoulder prostheses

Table 37: Primary operations - Glenoid

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Copeland	2										**2**
Aequalis Resurfacing					1						**1**
Total	**2**				**1**						**3**

Table 38: Primary operations - Humerus

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Copeland	5		1								**6**
Aequalis Resurfacing		1	1		1	1					**4**
Total	**5**	**1**	**2**		**1**	**1**					**10**

Reversed stemmed total shoulder prostheses

Table 39: Primary operations - Glenoid

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Delta Xtend	15	49	64	91	114	147	142	178	222	242	**1264**
Delta III	307	5	1	1							**314**
Tess Reversed		15	30	31	28	32	30	38	39	24	**267**
Aequalis Ascend Flex Reverse							17	38	47	40	**142**
Promos Reverse					9	10	16	21	14	17	**87**
Aequalis Reversed II					1	18	36	11	13	5	**84**
Comprehensive Reverse					1	1	1	3	5	29	**40**
Aequalis-Reversed	6	5	3	8	7	2					**31**
JRI-Vaios Inverse							9	5	4	3	**21**
SMR Axioma reversed								2	4	11	**17**
Trebecular Metal Reverse Shou		1	2		1	1	1	3	2		**11**
Anatomical shoulder Reversed						5		5			**10**
Total	**328**	**75**	**100**	**131**	**161**	**216**	**252**	**304**	**350**	**371**	**2288**

Table 40: Primary operations - Caput humeri

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Delta Xtend	15	49	64	91	115	147	142	178	222	242	**1265**
Delta III	300	5	1	1							**307**
Tess Reversed		15	29	31	27	32	30	38	39	24	**265**
Aequalis Ascend Flex Reversed							17	41	44	34	**136**
Promos Reverse					9	10	16	21	14	17	**87**
Aequalis Reversed Fracture						3	15	8	16	11	**53**
Aequalis-Reversed	3	5	3	8	8	10	13				**50**
Comprehensive Reverse					1	1	1	3	5	29	**40**
JRI-Vaios Inverse							9	5	4	3	**21**
SMR Axioma reversed								2	4	11	**17**
Aequalis Reversed II						6	8				**14**
Trebecular Metal Reverse Shoulder		1	2		1	1		3	2		**10**
Anatomical shoulder Reversed						5		5			**10**
Total	**318**	**75**	**99**	**131**	**161**	**215**	**251**	**304**	**350**	**371**	**2275**

Table 41: Primary operations - Humerus

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Delta Xtend	15	49	64	91	115	147	142	178	222	242	**1265**
Delta III	308	5	1	1							**315**
Tess Reversed		15	30	31	27	32	30	38	39	24	**266**
Aequalis Ascend Flex Reversed							17	41	44	34	**136**
Promos Reverse					9	10	16	21	14	17	**87**
Aequalis-Reversed	6	5	3	8	8	12	19				**61**
Aequalis Reversed Fracture						3	15	8	16	11	**53**
Comprehensive Reverse					1	1	1	3	5	27	**38**
JRI-Vaios Inverse							9	5	4	3	**21**
SMR Axioma reversed								2	4	11	**17**
Trebecular Metal Reverse Shoulder		1	2		1	1	1	3	2		**11**
Anatomical shoulder Reversed						5		5			**10**
Other (n < 10)						5	2			2	**9**
Total	**329**	**75**	**100**	**131**	**161**	**216**	**252**	**304**	**350**	**371**	**2289**

Non stemmed shoulder hemiprostheses

Table 42: Primary operations - Caput humeri

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Tess-Anatomic			5	30	16	13	7	7	3	5	**86**
ECLIPSE TM				3	5	9	15	10	11	3	**56**
Andre (n < 10)						1	4	6	2	4	**17**
Total			**5**	**33**	**21**	**23**	**26**	**23**	**16**	**12**	**159**

Table 43: Primary operations - Humerus

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Tess-Anatomic			5	30	16	13	7	7	3	5	**86**
Other (n < 10)						1	4	6	2	4	**17**
Total			**5**	**30**	**16**	**14**	**11**	**13**	**5**	**9**	**103**

Non stemmed total shoulder prostheses

Table 44: Primary operations - Glenoid

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Tess-Anatomic		3	7	8	14	7	3	3	3	4	**52**
Aequalis Ascend Flex Anatomic								13	7	12	**32**
Simpliciti						10	10				**20**
ECLIPSE TM					1	3	2	4	5		**15**
Other (n < 10)							3	1		2	**6**
Total		**3**	**7**	**8**	**15**	**20**	**18**	**21**	**15**	**18**	**125**

Table 45: Primary operations - Caput humeri

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Tess-Anatomic		3	8	8	14	7	4	3	3	4	**54**
Simpliciti						10	12	13	7	12	**54**
ECLIPSE TM					1	3	2	4	5		**15**
Andre (n < 10)								1		2	**3**
Total		**3**	**8**	**8**	**15**	**20**	**18**	**21**	**15**	**18**	**126**

Table 46: Primary operations - Humerus

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Simpliciti						10	12	14	7	12	**55**
Tess-Anatomic		3	8	8	14	7	4	3	3	4	**54**
Other (n < 10)										2	**2**
Total		**3**	**8**	**8**	**14**	**17**	**16**	**17**	**10**	**18**	**111**

Reversed stemmed total shoulder prostheses

Table 47: Primary operations - Glenoid

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Comprehensive Nano Stemless									3		**3**
Comprehensive Reverse								1			**1**
Total								**1**	**3**		**4**

Table 48: Primary operations - Caput humeri

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Comprehensive Nano Stemless Reverse									3		**3**
Comprehensive Reverse								1			**1**
Total								**1**	**3**		**4**

Table 49: Primary operations - Humerus

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Comprehensive Nano Stemless Reverse								1	3		**4**
Total								**1**	**3**		**4**

Reasons for revisions

Table 50: Stemmed shoulder hemiprostheses

Year	Loose proximal	Loose distal comp	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Other	Missing
2016	1	1	3	1		1	1	7		7	
2015	1	2	1	3	1	2		10		6	
2014			2	1		1		6		2	
2013		2	2	5		3	2	12	2	4	
2012	1	2	4	1			1	5		5	1
2011			3	2		3		6		4	
2010		3	3	1		2	1	9		5	
2009			1	3		3	1	10		4	
2008			1	2		1		5		2	1
2007	1	1	1	3		2		12		2	2
2006	1	3		4		2	2	10	1	4	
2005	1	2		1	1	3		5		3	
2004		1	5	3				5		5	
2003		1		1		2		6		3	
2002		1						5			
2001	1		1	1				4		2	1
2000	1	1	1	2		2		4		2	
1999			2			1		5		1	
1998			1			1	2	6		3	1
1997				1				1			
1996		1	1					2		2	
1995								1		1	
Total	**8**	**21**	**32**	**35**	**2**	**29**	**10**	**136**	**3**	**67**	**6**

Revision reasons are not mutually exclusive. More than one reason for revision is possible. All revisions were included.

Table 51: Anatomic stemmed total shoulder prostheses

Year	Loose proximal	Loose distal comp	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Other	Missing
2016	4	1		2		7		3		1	
2015						1		4		1	
2014	2			4	1		1	3		3	
2013						3		2			
2012			1	2				1	2		
2011	1	1	3					1			
2010			1	2		4		1		1	
2009			1								
2008								1			
2006		1	1							1	
2004	1										
2003								1			
2002	1	1	1					1			
2001	1							1			
1999	1							2		1	
1998			1					1		1	
1997				1				1			
1996	2		1			1					
1995			1			1					
1994			1							1	
Total	**13**	**4**	**12**	**11**	**1**	**17**	**1**	**23**	**2**	**10**	**0**

Revision reasons are not mutually exclusive. More than one reason for revision is possible. All revisions were included.

Table 52: Resurfacing shoulder hemiprostheses

Year	Loose proximal	Loose distal comp	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Other	Missing
2016		3		1				7		3	
2015	1	2						1		1	
2014		1		1				10		3	
2013		1						7		1	
2012		1	1	2		2		6		3	
2011					1			6		5	
2010								9		1	
2009								9		2	
2008		2		1				10		2	
2007	1		1			1		2	1		
2006		1		1		1		2			
2005		1						1			
Total	**2**	**12**	**2**	**6**	**1**	**4**	**0**	**70**	**1**	**21**	**0**

Revision reasons are not mutually exclusive. More than one reason for revision is possible. All revisions were included.

Table 53: Resurfacing total shoulder prostheses

Year	Loose proximal	Loose distal comp	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Other	Missing
2008								1			
2005			1	1							
Total	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**

Revision reasons are not mutually exclusive. More than one reason for revision is possible. All revisions were included.

Table 54: Reversed stemmed total shoulder prostheses

Year	Loose proximal	Loose distal comp	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Other	Missing
2016	4	3	4	1		9	4	2	1		
2015	6	2	4	1	1	12	2	2	3	2	
2014	1	2	3	2		8	1	2		2	
2013	3	3	4	1		6		1		2	
2012	6	5	6	1		7		1	2	2	
2011	1		1	1			3			1	
2010	3	1	2	1		1				3	
2009	2	1				4				2	
2008	1		3		1					1	
2007	2	2	3	2		7		1			
2006	1	1	1	1		1			1	1	
2005	1	1						1			
2004	4	3	3	1						3	
2003	2		1					1			1
2002	1					1					
2001	3					2					
2000	1			1		2	1				
1999		1									
1998						1				1	
1996								1			
1995						2				1	
Total	**42**	**25**	**35**	**13**	**2**	**63**	**11**	**12**	**7**	**21**	**1**

Revision reasons are not mutually exclusive. More than one reason for revision is possible. All revisions were included.

Table 55: Non stemmed shoulder hemiprostheses

Year	Loose proximal	Loose distal comp	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Other	Missing
2016							1	3		2	
2015								3		3	
2014		1						4		1	
2012			1			2		1		2	
2011										1	
Total	**0**	**1**	**1**	**0**	**0**	**2**	**1**	**11**	**0**	**9**	**0**

Revision reasons are not mutually exclusive. More than one reason for revision is possible. All revisions were included.

Table 56: Non stemmed total shoulder prostheses

Year	Loose proximal	Loose distal comp	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Other	Missing
2016		1				1		1		1	
2015	2			1		3		1			
2014	1							1			
2012	4					3		1			
Total	**7**	**1**	**0**	**1**	**0**	**7**	**0**	**4**	**0**	**1**	**0**

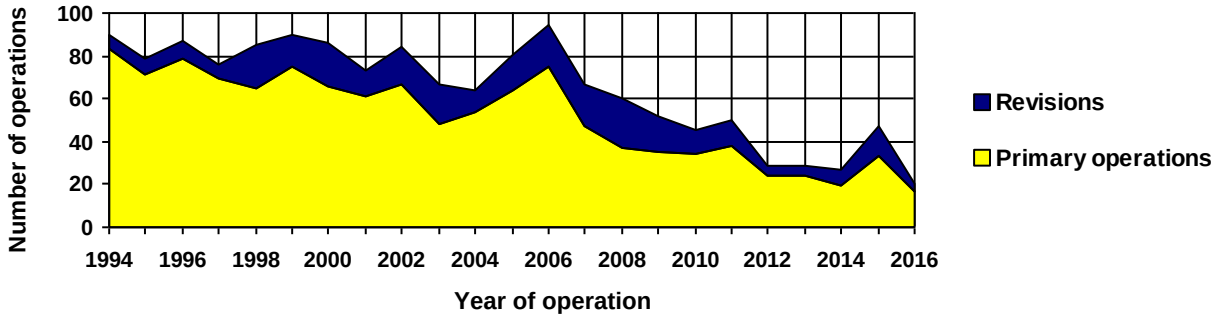
Revision reasons are not mutually exclusive. More than one reason for revision is possible. All revisions were included.

TOE JOINT PROSTHESES

Table 1: Annual number of operations

Year	Primary operations		Revisions		Total
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**
2008	37	(61,7%)	23	(38,3%)	**60**
2007	47	(70,1%)	20	(29,9%)	**67**
2006	75	(79,8%)	19	(20,2%)	**94**
2005	64	(79,0%)	17	(21,0%)	**81**
2004	54	(84,4%)	10	(15,6%)	**64**
2003	48	(71,6%)	19	(28,4%)	**67**
2002	67	(79,8%)	17	(20,2%)	**84**
2001	61	(83,6%)	12	(16,4%)	**73**
1994-00	508	(85,7%)	85	(14,3%)	**593**
Total	**1185**	**(80,0%)**	**297**	**(20,0%)**	**1 482**

Figure 1: Annual number of operations



52,4 % of all operations were performed on the right side. 83,7 % performed in women. Mean age: 60,4 years.

Table 2: Toe disease in primary operations

Year	Idiopathic osteoarthritis	Rheumatoid arthritis	Sequelae after fracture	Mb. Bechterew	Sequelae ligament tear	Acute fracture	Sequelae of infection	Other	Missing
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	
2008	6	29						2	
2007	13	28		1				4	1
2006	21	46	2					8	
2005	31	22	9				1	10	
2004	13	37						5	
2003	2	41	1	2				3	
2002	8	53		1				6	
2001	4	51		2				3	1
1994-00	45	435	3	2	1			23	2
Total	**258**	**835**	**19**	**10**	**2**	**1**	**2**	**84**	**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
2016			17 (100,0%)		**17**
2015			32 (97,0%)	1 (3,0%)	**33**
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%)		64 (97,0%)		**66**
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			81 (97,6%)	2 (2,4%)	**83**
Total	**6 (0,5%)**		**1 170 (98,8%)**	**8 (0,7%)**	**1 184**

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	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Silastic HP 100	776	30	25	22	22	14	13	11	11	5	**929**
LPT	29	3	3	6	14	9	10	8	20	12	**114**
Toefit-plus	31	4	7	5	2	1	1		1		**52**
Sutter	26										**26**
Biomet Total Toe	25										**25**
Moje	18										**18**
LaPorta	14										**14**
Swanson Titanium	4			1							**5**
Epyc									1		**1**
Total	**923**	**37**	**35**	**34**	**38**	**24**	**24**	**19**	**33**	**17**	**1184**

Table 6: Primary operations - Distal

Prostheses	1994-07	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Toefit-plus	31	4	7	5	2	1	1		1		**52**
Biomet Total Toe	25										**25**
Moje	18										**18**
Total	**74**	**4**	**7**	**5**	**2**	**1**	**1**		**1**		**95**

Reasons for revisions

Table 7:

Year	Loose proximal	Loose distal comp.	Dislocation	Instability	Malalignment	Deep infection	Fracture (near implant)	Pain	Defect polyethylene	Other	Missing
2016								1	1		
2015				1	5			4	5	3	
2014		1		1	2			2	4		
2013					2			3	2		
2012					1			2		3	
2011					3	1		7	1	5	
2010		3			2	2		3	2	3	
2009			1		3	2		7	3	5	
2008				2	10	1		13	1	6	
2007	2	3	2	1	3	2	1	10		6	
2006		1		1	4	2		10	1	6	1
2005	1	1	1		7	2		6	1	5	2
2004					3			7		6	
2003	1	2	1	2	6	2		9		8	
2002	1	1		1	4	4		5		7	3
2001		3		2	5			8	1	4	
2000		2		1	6	2		6	1	6	1
1999		2			3	1		6		6	
1998		2	1	1	4	3		5		6	1
1997		1			3	1		6		1	
1996				1	4		1	4		3	
1995			1	2	2	2		5		1	
1994		1					1	3		2	1
Total	**5**	**23**	**7**	**16**	**82**	**27**	**3**	**132**	**23**	**92**	**9**

Revision reasons are not mutually exclusive. More than one reason for revision is possible

Completeness of reporting analysis for total elbow arthroplasty, 2008-2014

A completeness of reporting analysis 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. Some hospitals have few total elbow arthroplasties and the completeness of reporting rate must be seen in this light.

NCSP codes for combining data from NPR hospital stays and total elbow arthroplasties

Type	Code	Description
Primary operation	**NCB 20**	Primary total prosthetic replacement of elbow joint not using cement
	NCB 30	Primary total prosthetic replacement of elbow joint using hybrid technique
	NCB 40	Primary total prosthetic replacement of elbow joint using cement
With and without	**NCB 99**	Other primary prosthetic replacement of elbow joint
Revision level 1	**NCC 2y**	Secondary implantation of total prosthesis in elbow joint not using cement Includes: Of component of total prosthesis
	NCC 3y	Secondary implantation of total prosthesis in elbow joint using hybrid technique Includes: Of component of total prosthesis
	NCC 4y	Secondary implantation of total prosthesis in elbow joint using cement Includes: Of component of total prosthesis
	NCC 99	Other secondary prosthetic replacement in elbow joint
	NCU 1y	Removal of total prosthesis from elbow joint
Revision level 2	**NCC 59**	Secondary implantation of interposition prosthesis in elbow joint
	NCS 19	Incision and debridement of infection of elbow joint
	NCS 49	Incision and debridement of infection of elbow joint with introduction of therapeutic agent
	NCW 69	Reoperation for deep infection in surgery of elbow or forearm For infection at the site of target structures
	NCH 2y	Reduction of dislocation of prosthesis of elbow joint
	T 81.*	Complications of procedures, not elsewhere classified
	T 84.*	Complications of internal orthopaedic prosthetic devices, implants and grafts

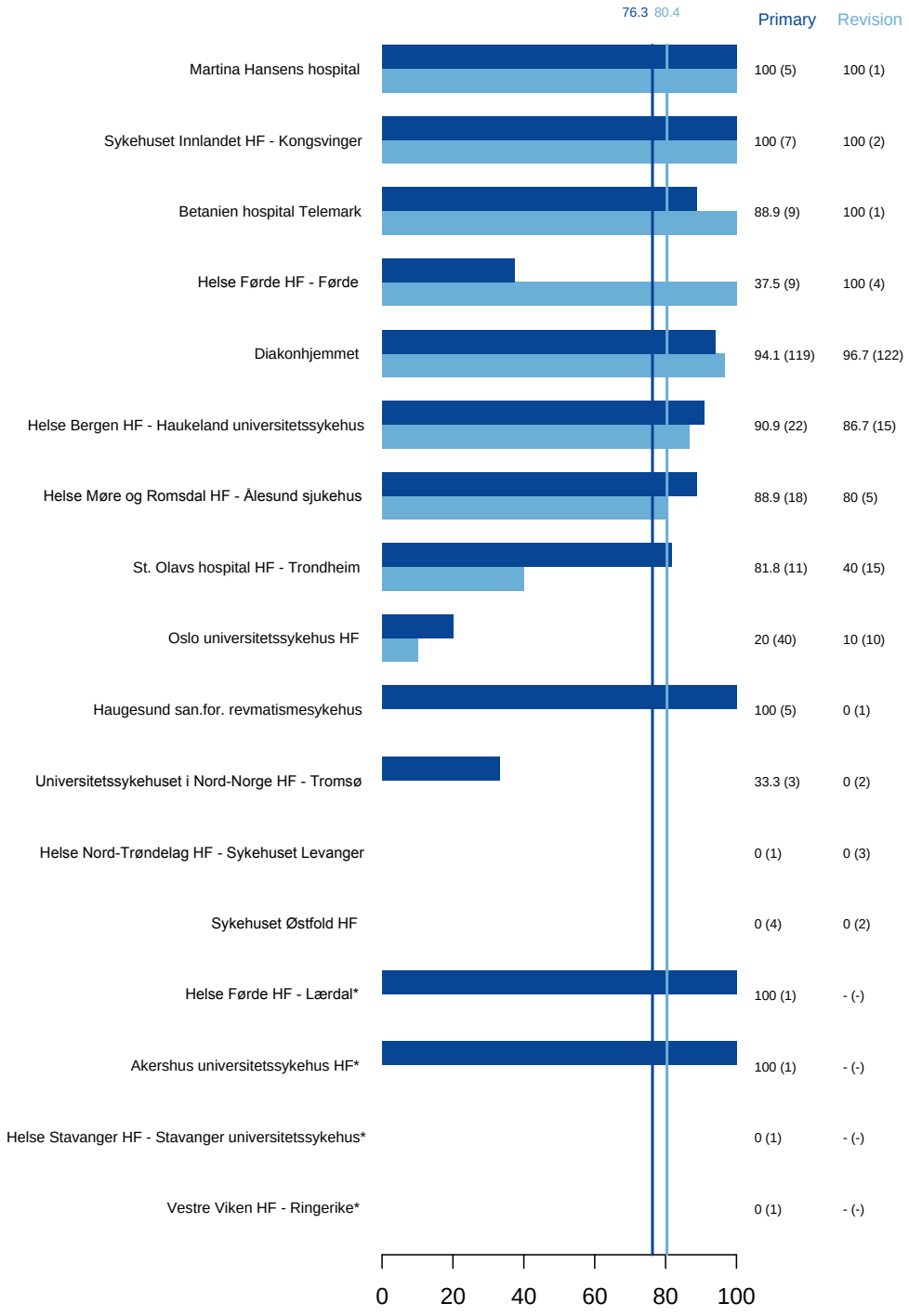
Primary operations. From 2008 to 2014, 240 primary total elbow arthroplasties were reported to one or both of the registers. 76.3% were reported to the NAR while 95.3% were reported to the NPR. Completeness of reporting by hospital shows a rate for the NAR ranging from 0% to 100% between the different hospitals. For hospitals with a low completeness of reporting rate for the NAR, either the form was not sent, or other interventions than elbow arthroplasties were incorrectly coded with NCB 20*/NCB 30*/NCB 40*. (There were only 18 operations in the category NCB 99 during the period).

Procedure codes to be used for primary operations: NCB 20*/NCB 30*/NCB 40*

Revision operations. From 2008 to 2014, 189 revisions were reported to one or both of the registers. 80.4% of these were reported to the NAR, while 90.5% were reported to the NPR (revision level 1). The completeness of reporting by hospital shows that the completeness of reporting rate for the NAR varied between 0% and 100%. 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:
NCC 2* - NCC 3* - NCC 4* and possibly NCU 1* and NCC 99.

Completeness of reporting for primary and revision operations, elbow total prosthesis 2008-2014



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.

* Have no registered revisions in NAR or NPR.

Completeness of reporting analysis for ankle arthroplasty, 2008-2014

A completeness of reporting analysis 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. Some hospitals have few ankle arthroplasties and the completeness of reporting rate must be seen in this light.

NCSP codes for combining data from NPR hospital stays and ankle arthroplasties

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
With and without	**NHB 99**	Other primary prosthetic replacement of joint of ankle 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
Revision level 2	**NHC 59**	Secondary implantation of interposition prosthesis in ankle joint
	NHS 19	Incision and debridement of infection of joint of ankle or foot
	NHS 49	Incision and debridement of infection of joint of ankle or foot with introduction of therapeutic agent
	NHW 69	Reoperation for deep infection in surgery of ankle or foot For infection at the site of target structures
	NHC 99	Other secondary prosthetic replacement in joint of ankle or foot
	NHH 2y	Reduction of dislocation of joint prosthesis of ankle or foot
	T 81.*	Complications of procedures, not elsewhere classified
	T 84.*	Complications of internal orthopaedic prosthetic devices, implants and grafts

Primary operations. From 2008 to 2014, 638 primary ankle arthroplasties were reported to one or both of the registers. 90.6% were reported to the NAR, while 97.2% were reported to the NPR. Completeness of reporting by hospital shows a rate for the NAR ranging from 0% to 100% 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. (There were only 13 operations in the category NHB 99 during the period).

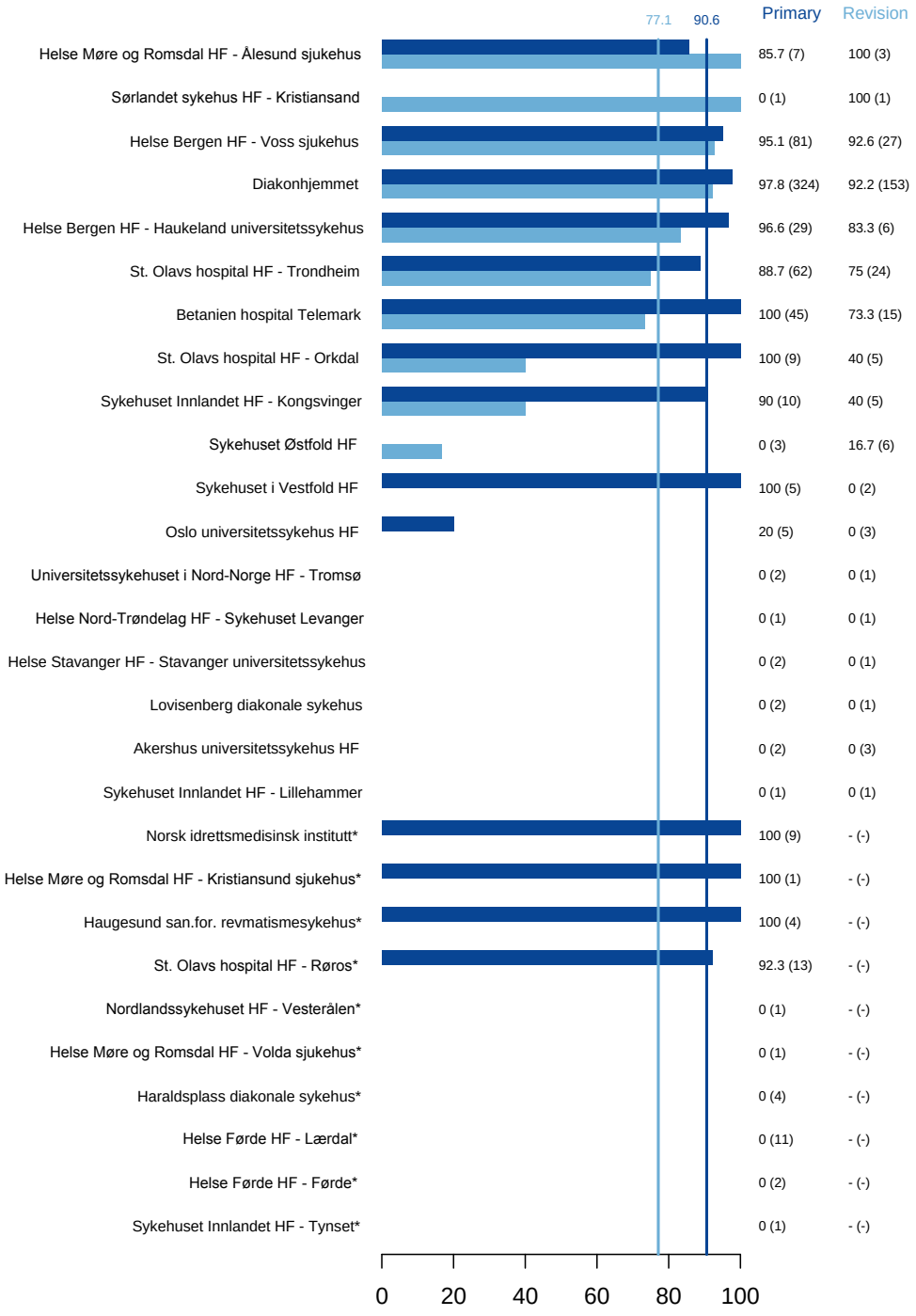
Procedure codes to be used for primary operations:
NHB 0* - NHB 1* - NHB 20 - NHB 30 - NHB 40

Revision operations. From 2008 to 2014, 275 revisions were reported to one or both of the registers. 77.1% of these were reported to the NAR, while 94.5% were reported to the NPR (revision level 1). The completeness of reporting by hospital shows that the completeness of reporting rate for the NAR varied between 16.7% and 100%. 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:
NHC 0* - NHC 1* - NHC 2* - NHC 3* - NHC 4* - NHC 99 - NHU 0* - NHU 1*

Completeness of reporting for primary and revision operations, ankle prosthesis 2008-2014



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.

* Have no registered revisions in NAR or NPR.

Completeness of reporting analysis for finger arthroplasty, 2008-2014

A completeness of reporting analysis 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. Some hospitals have few finger arthroplasties and the completeness of reporting rate must be seen in this light.

NCSP codes for combining data from NPR hospital stays and finger arthroplasties

Type	Code	Description
Primary operation	**NDB 8y**	Primary prosthetic replacement of joint of finger or metacarpal
With and without	**NDB 99**	Other primary prosthetic replacement of joint of wrist or 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
Revision level 2	**NDS 19**	Incision and debridement of infection of joint of wrist or hand
	NDS 49	Incision and debridement of infection of joint of wrist or hand with introduction of therapeutic agent
	NDW 69	Reoperation for deep infection in surgery of wrist or hand For infection at the site of target structures
	NDC 99	Other secondary prosthetic replacement in joint of wrist or hand
	NDH 2y	Reduction of dislocation of joint prosthesis of wrist or hand
	T 81.*	Complications of procedures, not elsewhere classified
	T 84.*	Complications of internal orthopaedic prosthetic devices, implants and grafts

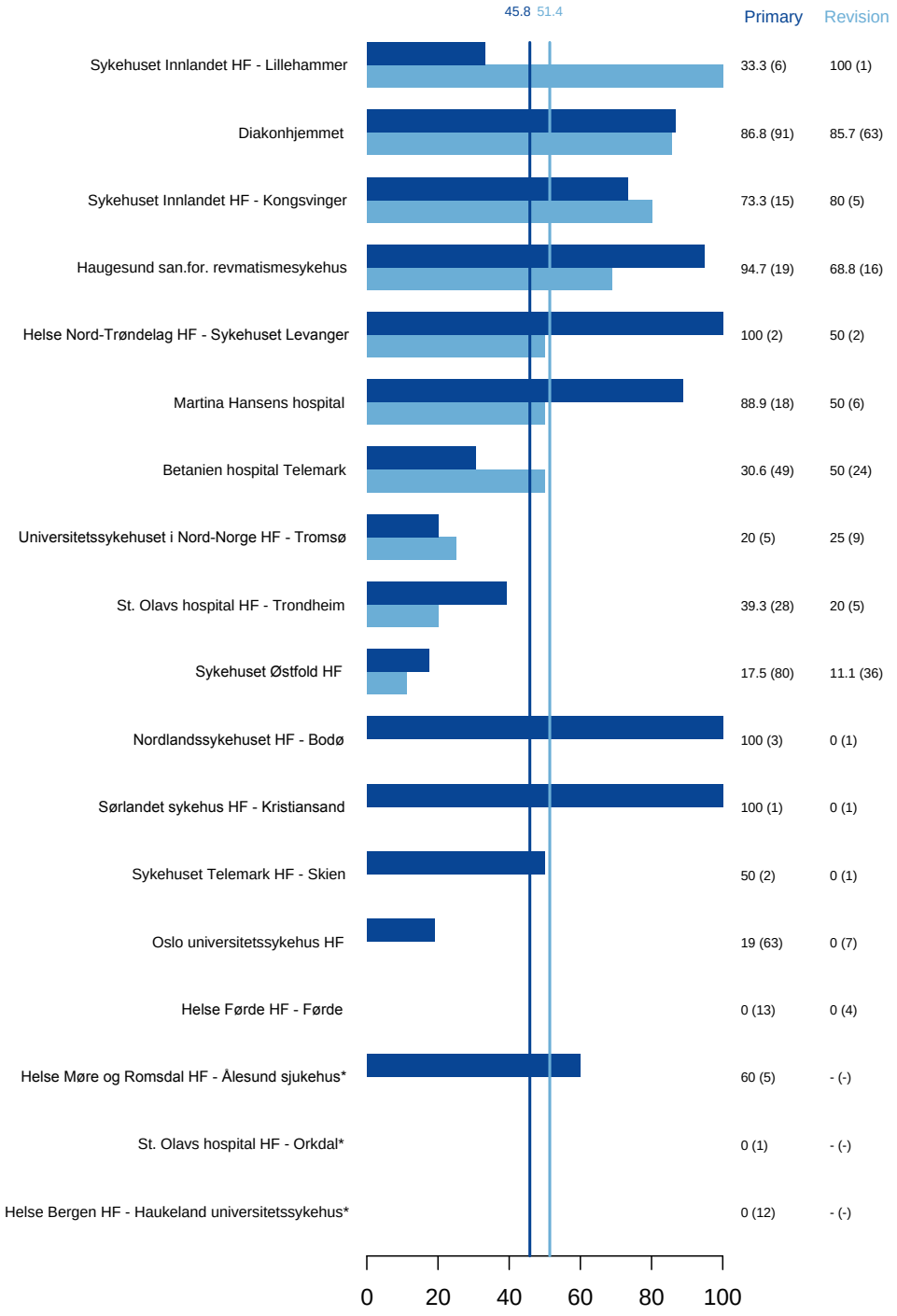
Primary operations. From 2008 to 2014, 413 primary finger arthroplasties were reported to one or both of the registers. 45.8% were reported to the NAR, while 96.1% were reported to the NPR. Completeness of reporting by hospital shows a rate for the NAR ranging from 0% to 100% between the different hospitals. 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 (There were 84 operations in the category NDB 99 during the period).

Procedure code to be used for primary operations: NDB 8y

Revision operations. From 2008 to 2014, 181 revisions were reported to one or both of the registers. 51.4% of these were reported to the NAR, while 96.1% were reported to the NPR (revision level 1). The completeness of reporting by hospital shows that the completeness of reporting rate for the NAR varied between 0% and 100%. A low completeness of reporting rate may mean that the revision 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:
NDC 8y - NDU 2y

Completeness of reporting for primary and revision operations, finger prosthesis 2008-2014



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.

* Have no registered revisions in NAR or NPR.

Completeness of reporting analysis for wrist/carpus/distal radioulnar joint (DRUJ), 2008-2014

A completeness of reporting analysis 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. Some hospitals perform few of these arthroplasties and the completeness of reporting rate must be seen in this light.

NCSP codes for combining data from NPR hospital stays and wrist/carpus/DRUJ

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
With and without	**NDB 5y**	Primary prosthetic interposition arthroplasty of joint of wrist
	NDB 99	Other primary prosthetic replacement of joint of wrist or 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
With and without	**NDU 2y**	Removal of prosthesis from other joint of hand
	NDC 99	Other secondary prosthetic replacement in joint of wrist or hand
Revision level 2	**NDS 19**	Incision and debridement of infection of joint of wrist or hand
	NDS 49	Incision and debridement of infection of joint of wrist or hand with introduction of therapeutic agent
	NDW 69	Reoperation for deep infection in surgery of wrist or hand For infection at the site of target structures
	NDH 2y	Reduction of dislocation of joint prosthesis of wrist or hand
	T 81.*	Complications of procedures, not elsewhere classified
	T 84.*	Complications of internal orthopaedic prosthetic devices, implants and grafts

Primary operations. From 2008 to 2014, 454 primary wrist/carpus/DRUJ arthroplasties were reported to one or both of the registers. 70.3% were reported to the NAR while 80.6% were reported to the NPR. Completeness of reporting by hospital shows a rate for the NAR ranging from 0% to 100% between the different hospitals. (There were 29 operations in the category NDB 99 during the period).

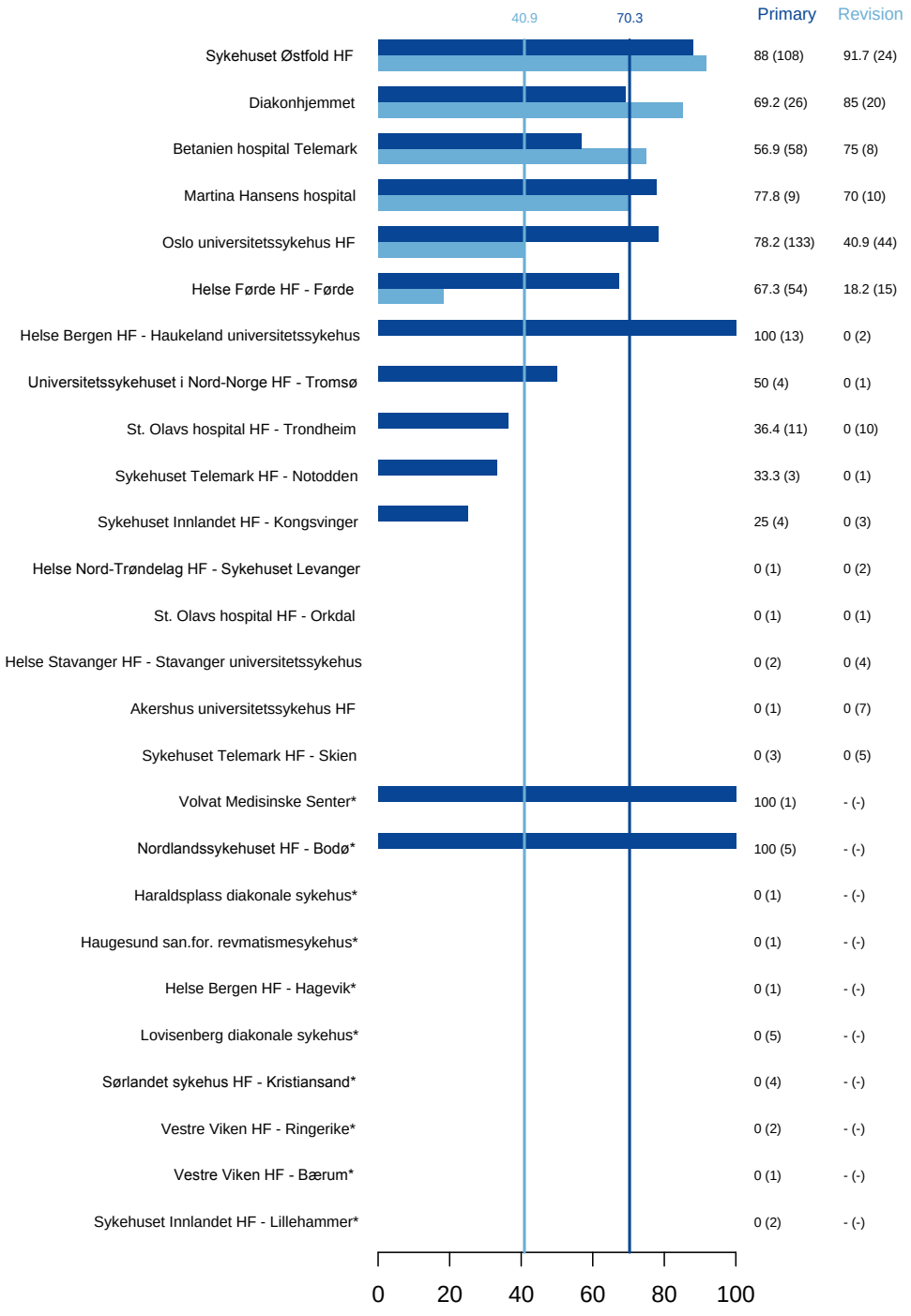
Procedure codes to be used for primary operations: NDB 0* - NDB 1* - NDB 2* - NDB 3* - NDB 4* - NDB 5*

Revision operations. From 2008 to 2014, 176 revisions were reported to one or both of the registers. 40.9% of these were reported to the NAR, while 80.1% were reported to the NPR (revision level 1). The completeness of reporting by hospital shows that the completeness of reporting rate for the NAR varied between 0% and 91.7%. 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: NDC 0* - NDC 1* - NDC 2* - NDC 3* - NDC 4* - NDB 5*

Completeness of reporting for primary and revision operations, hand prosthesis 2008-2014



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.

* Have no registered revisions in NAR or NPR.

Completeness of reporting analysis for shoulder arthroplasty, 2008-2014

A completeness of reporting analysis 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. Some hospitals perform few shoulder arthroplasties and the completeness of reporting rate must be seen in this light.

NCSP codes for combining data from NPR hospital stays and shoulder arthroplasties

Type	Code	Description
Primary operation	**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
With and without	**NBB 99**	Other primary prosthetic replacement of 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 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
Revision level 2	**NBC 59**	Secondary implantation of interposition prosthesis in humero-scapular joint
	NBS 19	Incision and debridement of infection of joint of shoulder
	NBS 49	Incision and debridement of infection of joint of shoulder with introduction of therapeutic agent
	NBW 69	Reoperation for deep infection in surgery of shoulder or upper arm For infection at the site of target structures
	NBH 2y	Reduction of dislocation of prosthesis of humero-scapular joint
	T 81.*	Complications of procedures, not elsewhere classified
	T 84.*	Complications of internal orthopaedic prosthetic devices, implants and grafts

Primary operations. From 2008 to 2014, 3562 primary shoulder arthroplasties were reported to one or both of the registers. 90.4% were reported to the NAR, while 96.9% were reported to the NPR. Completeness of reporting by hospital shows a rate for the NAR ranging from 0% to 100% 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 NBB 0*/NBB 1*/NBB 20/NBB 30/NBB 40. (There were only 10 operations in the category NBB 99 during the period).

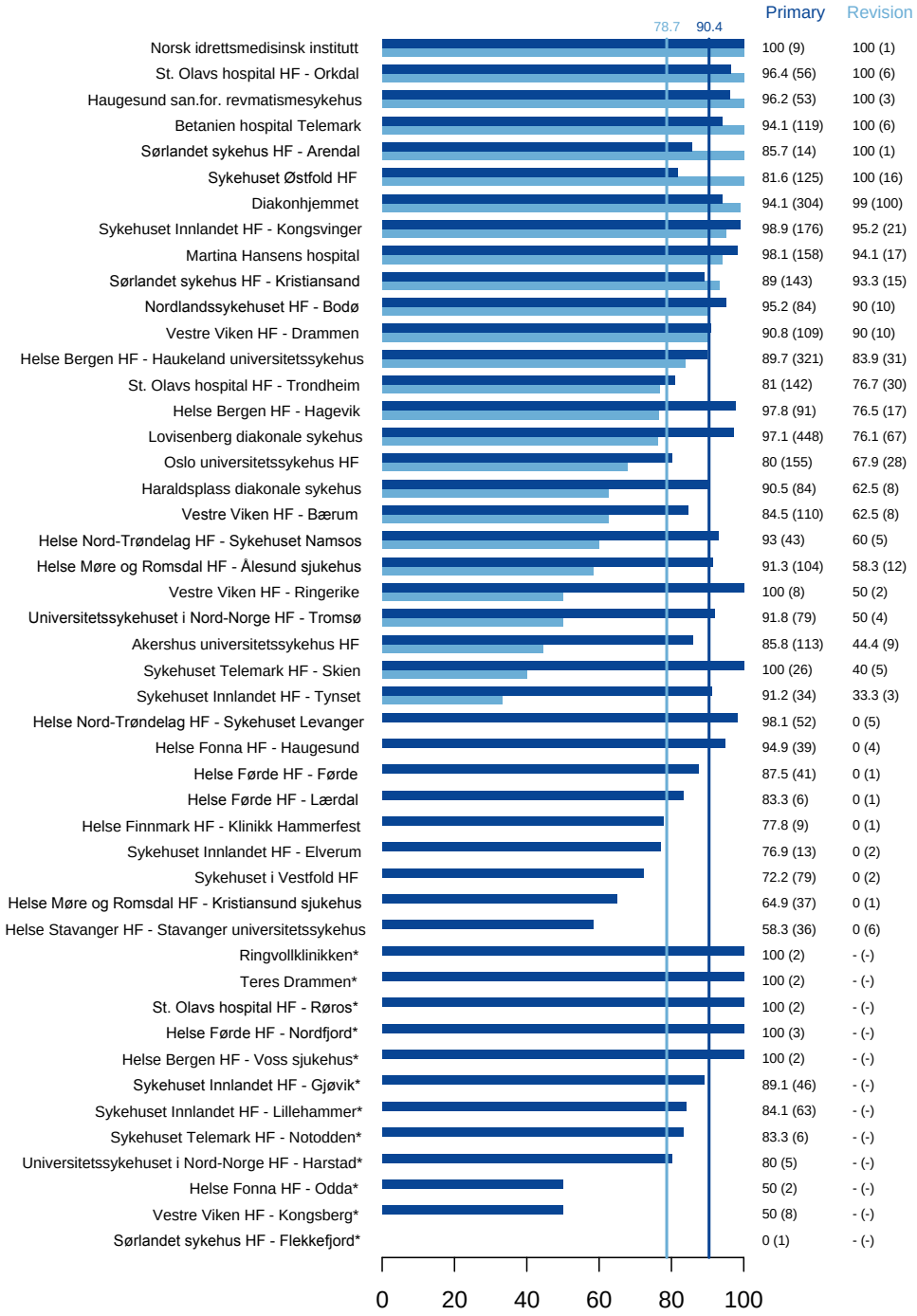
Procedure codes to be used for primary operations: NBB 0* - NBB 1* - NBB 20 - NBB 30 - NBB 40

Revision operations. From 2008 to 2014, 460 revisions were reported to one or both of the registers. 78.7% of these were reported to the NAR, while 90.0% were reported to the NPR (revision level 1). The completeness of reporting by hospital shows that the completeness of reporting rate for the NAR varied between 16.7% and 100%. 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: NBC 0* - NBC 1* - NBC 2* - NBC 3* - NBC 4* - NBC 99 - NBU 0* - NBU 1*

Completeness of reporting for primary and revision operations, shoulder prosthesis 2008-2014



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.

* Have no registered revisions in NAR or NPR.

Completeness of reporting analysis for toe joint replacements, 2008-2014

A completeness of reporting analysis 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. Some hospitals perform few toe joint replacements and the completeness of reporting rate must be seen in this light.

NCSP codes for combining data from NPR hospital stays and toe joint replacements

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 of 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
Revision level 2	**NHS 19**	Incision and debridement of infection of joint of ankle or foot
	NHS 49	Incision and debridement of infection of joint of ankle or foot with introduction of therapeutic agent
	NHW 69	Reoperation for deep infection in surgery of ankle or foot For infection at the site of target structures
	NHH 2y	Reduction of dislocation of joint prosthesis of ankle or foot
	T 81.*	Complications of procedures, not elsewhere classified
	T 84.*	Complications of internal orthopaedic prosthetic devices, implants and grafts

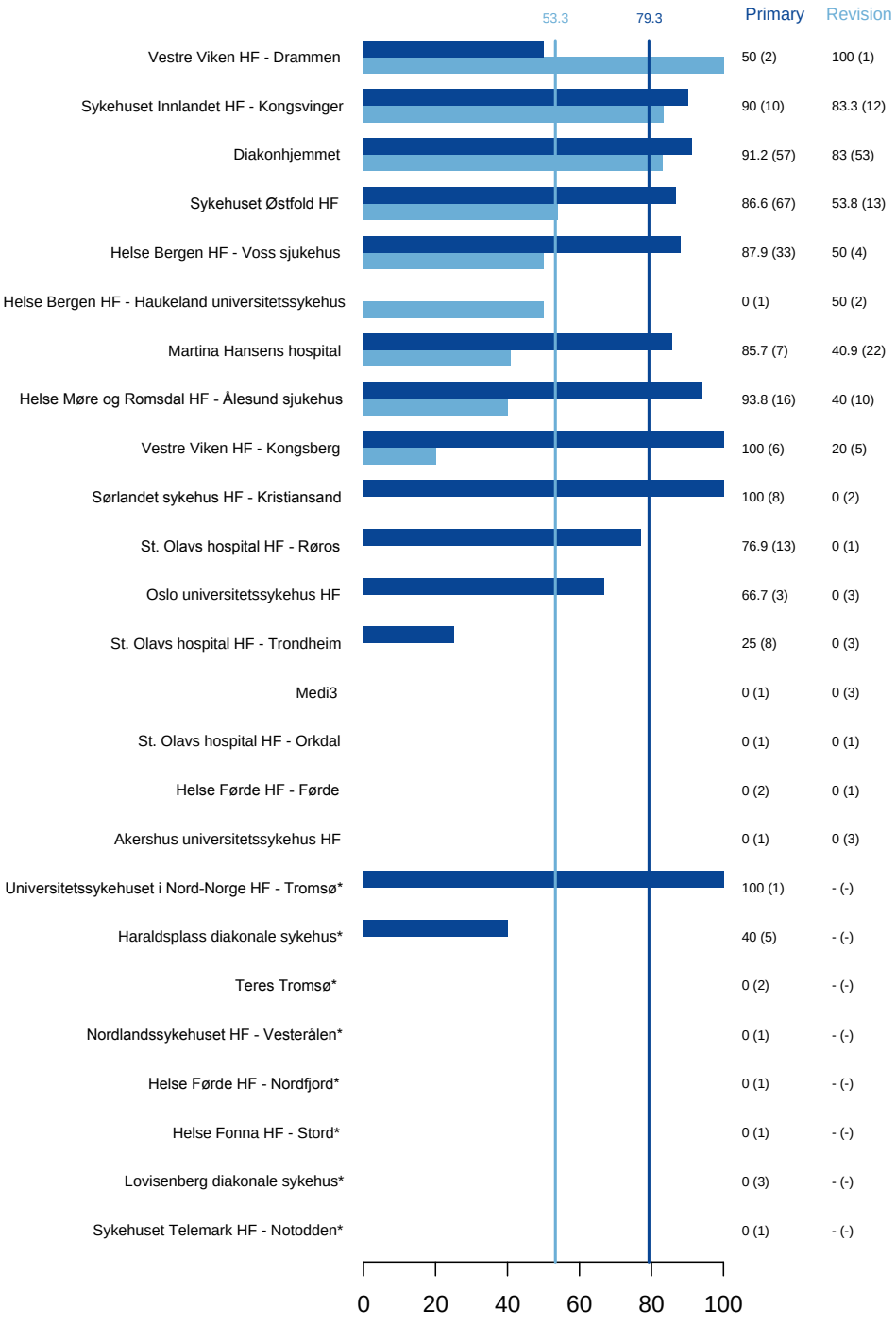
Primary operations. From 2008 to 2014, 251 primary toe joint replacements were reported to one or both of the registers. 79.3% were reported to the NAR, while 94.8% were reported to the NPR. Completeness of reporting by hospital shows a rate for the NAR ranging from 0% to 100% between the different hospitals. For hospitals with a low completeness of reporting rate for the NAR, either the form was not sent, or other interventions than toe joint replacements 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 2008 to 2014, 152 revisions were reported to one or both of the registers. 53.3% of these were reported to the NAR, while 92.1% were reported to the NPR (revision level 1). The completeness of reporting by hospital shows that the completeness of reporting rate for the NAR varied between 0% and 100%. 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:
NHC 6y - NHC 7y - NHC 8y - NHU 2y

Completeness of reporting for primary and revision operations, toe prosthesis 2008-2014



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.

* Have no registered revisions in NAR or NPR.

CONTENTS

Norwegian Hip Fracture Register

NORWEGIAN HIP FRACTURE REGISTER
ANNUAL REPORT 2017

The Norwegian Hip Fracture Register (NHFR) now contains data from almost 100 000 primary operations and over 10 000 revisions. Last year, 8422 primary operations and 944 reoperations were reported to the Register. The number of reoperations has increased in the last two years; today, about 10% of operations in the NHFR are now reoperations. An increase in the number of revisions is worrying and needs to be investigated further. One explanation may be better reporting of revisions to the Register, meaning that the actual number of annual revisions has not necessarily changed.

Quality of hip fracture surgery in Norway

Survival curves for hip fractures show a gradual improvement in treatment of displaced femoral neck fractures in that the risk of revision has decreased. The reason is probably that treatment for these fractures has changed from screw fixation to arthroplasty surgery. In most studies, arthroplasty surgery has shown a significantly lower revision risk than screw fixation. As shown later in this annual report, an increasing proportion of intertrochanteric and subtrochanteric fractures have been treated with intramedullary nails in recent years. This is in line with the results of a previous study from the Register (Matre, 2013), which found a lower risk of revision when an intramedullary nail was used compared with a sliding hip screw for these fractures. It is therefore surprising to find no improvement in results, nor any reduced revision risk for such fractures.

Completeness

Completeness analyses of reporting to the NHFR compared to the Norwegian Patient Register (NPR) for 2013-2014 indicate good completeness for both osteosyntheses (86.0%) and hemiarthroplasty (93.4%), but, surprisingly, somewhat lower completeness for total hip arthroplasty (83.9%). The completeness rate for all types of revisions is lower (69.5%). Calculation of completeness for reoperations has been a challenging process, since coding of reoperations reported to the NPR is in many cases unclear or incorrect. The NPR also lacks specification of right or left side, which leads to uncertainty in the analysis. It is important to report reoperations and we urge everyone to ensure that these are also reported to the Register. Completeness analyses are presented at the end of this year's report from the NHFR.

Results by hospital

The Centre for Clinical Documentation and Evaluation (SKDE) at the National Service Centre for Medical Quality Registers requires annual reporting from the NHFR. We are required by SKDE to publish data for each hospital. This year's report includes an extract from the

hospital results. The complete annual reports from the Hip Fracture Register to SKDE with all hospital results can be read at https://www.kvalitetsregistre.no/registers/nasjonalt-hoftebruddregister. In 2016, SKDE evaluated the NHFR as being at Stage 3 of 4. This is excellent. In order to achieve the highest level, Stage 4, which only the Norwegian Stroke Register has achieved, the NHFR must publish online updated data for all participating units. We are therefore planning an online presentation of hospital results. This will reveal whether individual hospitals follow current professional knowledge in the treatment of hip fractures (using so-called "process indicators"). Some performance indicators will also be published. The process indicators and performance indicators will together enable an assessment of the treatment of hip fractures at each hospital; here, the process indicators will show the potential for improvement where the results are poor. We plan to publish interactive results at www.kvalitetsregistre.no during autumn 2017.

We are now in the process of selecting indicators that may be useful in assessing treatment at the various hospitals. Process indicators must reflect treatment that is widely accepted as best practice. It is therefore very important that the indicators have a broad scientific basis in orthopaedics.

Patient-reported outcomes

Patient-reported outcomes (PROMs) have been recorded in the NHFR since 2005. But in this year's report, these data is presented in more detail. The fact that we have patient-reported data makes the NHFR unique. The Norwegian Cruciate Ligament Register also records PROMs and the Norwegian Arthroplasty Register is in the process of establishing electronic PROM registration. PROM registration is useful in providing important additional information on treatment. In the Hip Fracture Register, we have so far used EQ-5D-3L (three possible responses to each question). We are considering changing to EQ-5D-5L (five options for each question), which can better differentiate between small differences in the functional level of patients.

Summary of scientific activity in 2016

The year 2016 was a successful scientific year. Four articles were published:

Marit Bakken et al. published an article in collaboration with the Norwegian Prescription Database and the Norwegian Hip Fracture Register, showing an association between the use of antipsychotics and a doubled risk of a hip fracture.

Jan-Erik Gjertsen et al., in a study of PROM data, showed that hip fractures have a dramatic impact on patients' functioning and that reduced functioning is also present one year post-operatively and in patients with no loss of functioning pre-operatively.

Sunniva Leer-Salvesen et al. studied the use of thrombosis prophylaxis in hemiarthroplasty for hip fractures. The results showed increased mortality if thrombosis prophylaxis was started after surgery, compared to starting it before surgery.

Torbjørn Kristensen et al. compared surgical approaches in hemiarthroplasty. The posterior approach was associated with less pain, better patient satisfaction and better quality of life than the lateral approach. Revision operations were similar for the two approaches.

The Norwegian Hip Fracture Register cooperates with a number of hospitals on studies of national and local results. We are very pleased that the huge amount of data in the Register is being used in research and we encourage all researchers who wish to use data from the Register to contact us.

Thank you all for good reporting and we look forward to continued fruitful cooperation!

Bergen 14.06.17

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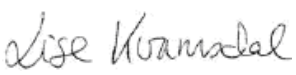

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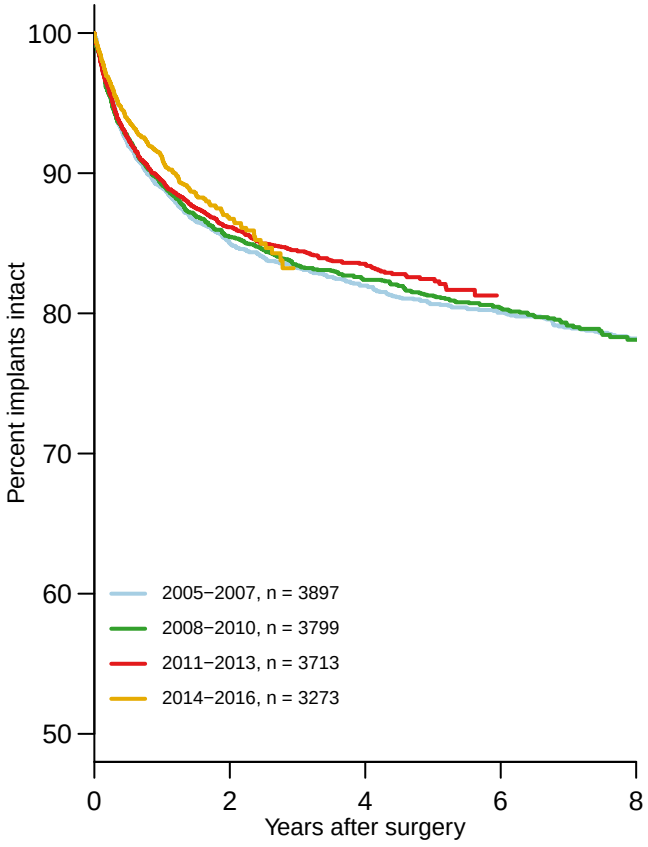
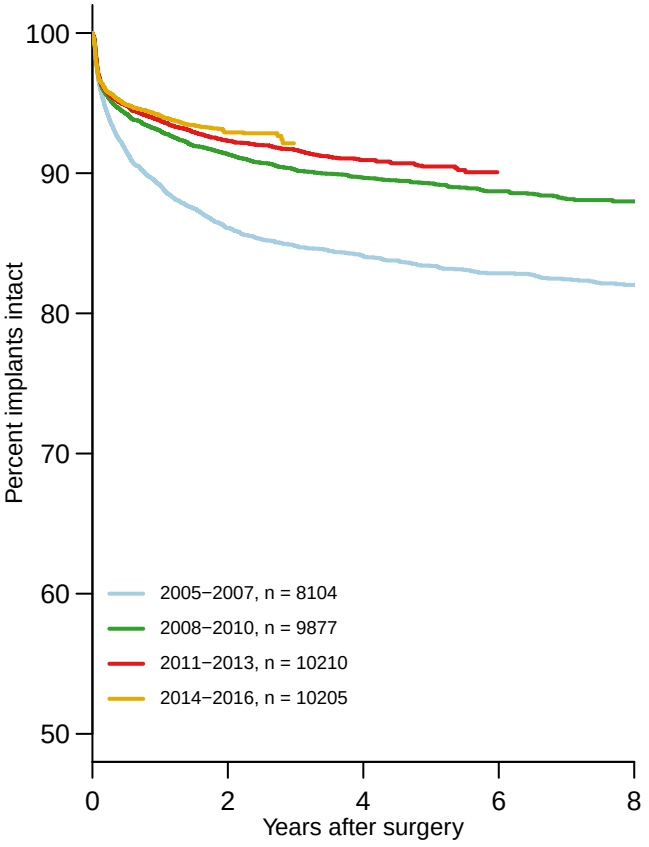
Survival of hip fracture implants

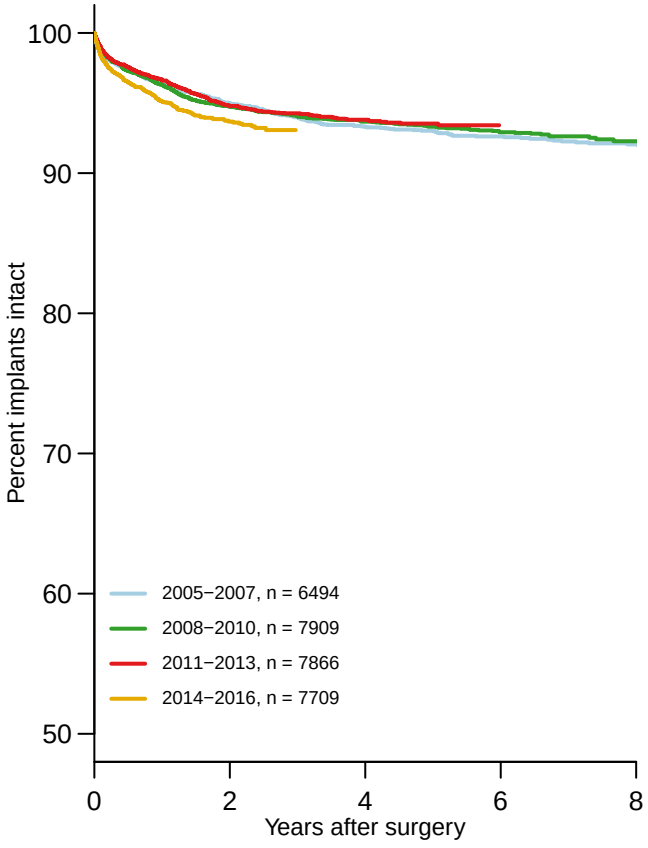
2005−2016



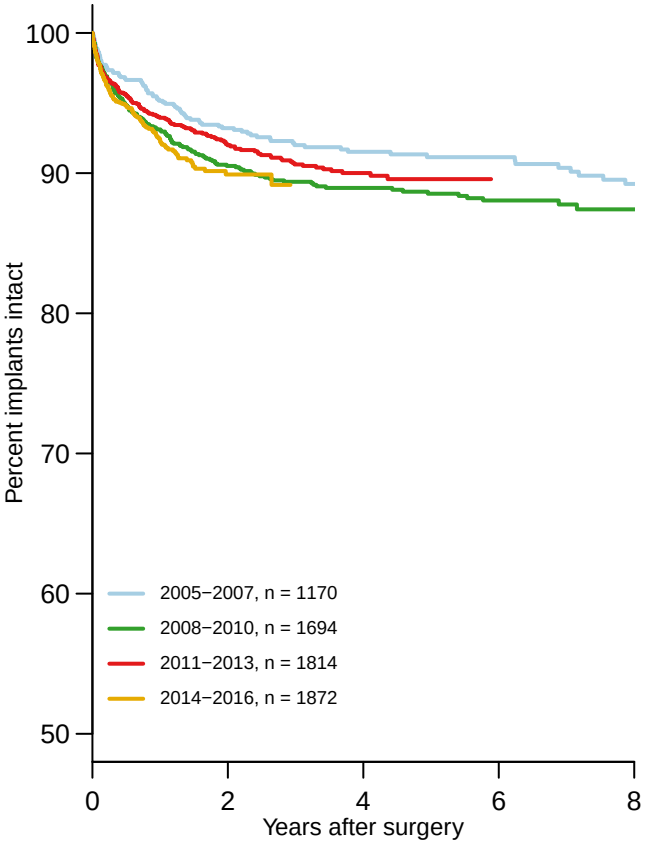
a) Intracapsular fracture, undisplaced



b) Intracapsular fracture, displaced



c) Trochanteric fractures



d) Sub−/intertrochanteric fractures

HIP FRACTURES

Numbers of operations

Table 1: Annual numbers of operations

Year	Primary operation		Reoperation		Total
2016	8422	(89,9%)	944	(10,1%)	**9366**
2015	8406	(90,3%)	905	(9,7%)	**9311**
2014	8177	(91,4%)	770	(8,6%)	**8947**
2013	8309	(90,4%)	885	(9,6%)	**9194**
2012	8435	(90,5%)	885	(9,5%)	**9320**
2011	8599	(90,4%)	910	(9,6%)	**9509**
2010	8363	(90,8%)	852	(9,3%)	**9215**
2009	8258	(89,6%)	962	(10,4%)	**9220**
2008	8362	(90,0%)	930	(10,0%)	**9292**
2007	7870	(89,4%)	930	(10,6%)	**8800**
2006	7517	(89,4%)	890	(10,6%)	**8407**
2005	5879	(89,9%)	661	(10,1%)	**6540**
Total	**96597**	**(90,2%) ***	**10524**	**(9,8%) ****	**107121**

49% of primary operations were on the right side. 70% of primary operations were performed on women.
Mean age at primary surgery was 80 years: 82 years for women and 77 years for men.
* 2529 (3%) were primary operations with total hip prostheses from the Norwegian Arthroplasty Register.
** 3460 (33%) were reoperations with total hip prostheses from the Norwegian Arthroplasty Register.

Figure 1: Annual numbers of operations

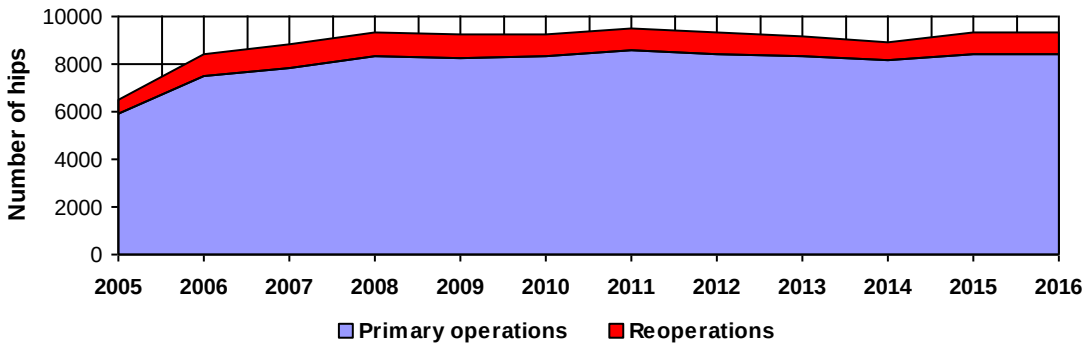
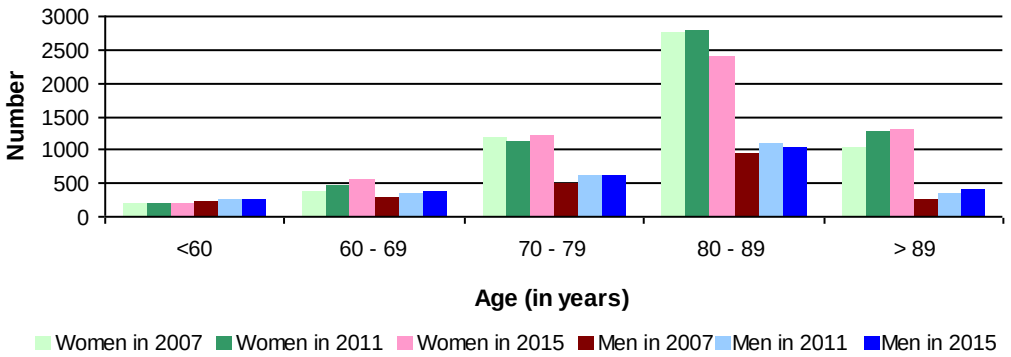


Figure 2: Age by primary operation (in 2007, 2011 and 2015)



Time from fracture to operation in hours - primary operations

Table 2: Time from fracture to operation in hours*

	0 - 6	>6 - 12	>12 - 24	>24 - 48	>48	Missing	Total
2016	299 (3,7%)	1098 (13,6%)	2854 (35,3%)	2415 (29,9%)	1223 (15,1%)	188 (2,3%)	**8077**
2015	309 (3,8%)	1082 (13,4%)	3054 (37,8%)	2330 (28,8%)	1104 (13,7%)	203 (2,5%)	**8082**
2014	326 (4,1%)	1156 (14,7%)	2995 (38,0%)	2188 (27,7%)	1045 (13,2%)	178 (2,3%)	**7888**
2013	314 (3,9%)	1129 (14,1%)	2932 (36,6%)	2261 (28,2%)	1198 (15,0%)	177 (2,2%)	**8012**
2012	316 (3,8%)	1167 (14,2%)	2936 (35,7%)	2309 (28,1%)	1326 (16,1%)	171 (2,1%)	**8225**
2011	313 (3,7%)	1206 (14,3%)	2843 (33,8%)	2419 (28,8%)	1421 (16,9%)	205 (2,4%)	**8407**
2010	355 (4,3%)	1218 (14,9%)	2882 (35,1%)	2216 (27,0%)	1340 (16,3%)	189 (2,3%)	**8200**
2009	354 (4,4%)	1290 (15,9%)	2857 (35,3%)	2128 (26,3%)	1306 (16,1%)	165 (2,0%)	**8100**
2008	385 (4,7%)	1320 (16,1%)	2835 (34,5%)	2201 (26,8%)	1292 (15,7%)	178 (2,2%)	**8211**
2007	452 (5,9%)	1434 (18,6%)	2610 (33,8%)	1872 (24,3%)	1188 (15,4%)	155 (2,0%)	**7711**
2006	465 (6,3%)	1488 (20,2%)	2647 (35,9%)	1683 (22,8%)	983 (13,3%)	115 (1,6%)	**7381**
2005	445 (7,7%)	1294 (22,4%)	1974 (34,2%)	1147 (19,9%)	809 (14,0%)	105 (1,8%)	**5774**
Total	**4333 (4,6%)**	**14882 (15,8%)**	**33419 (35,5%)**	**25169 (26,8%)**	**14235 (15,1%)**	**2029 (2,2%)**	**94068**

* Total hip prostheses are not counted

Figure 3: Time from fracture to operation - grouped in hours (n=94068)

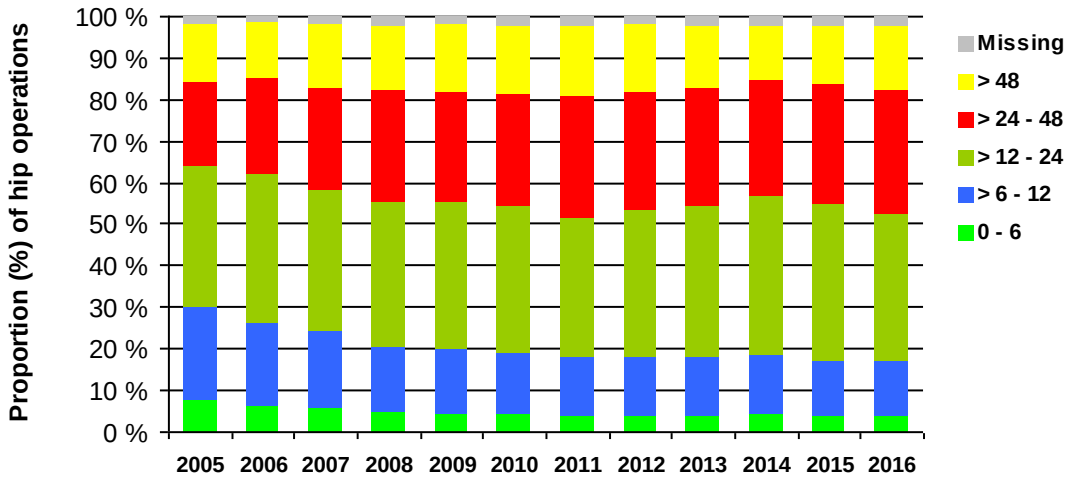
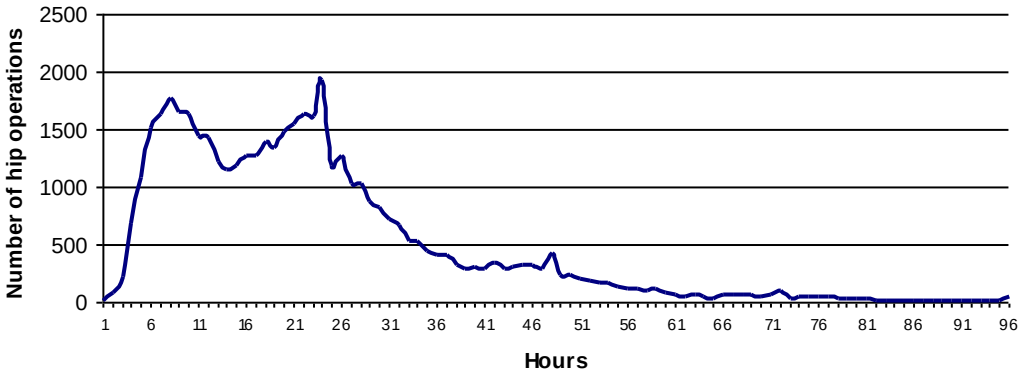


Figure 4: Time from fracture to operation - continuous (n=47151)



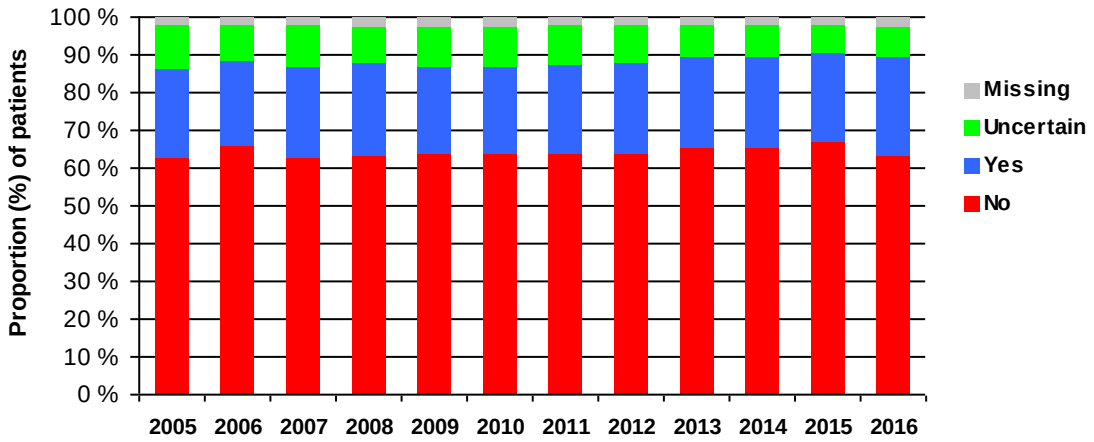
Mean time from fracture to operation was 23 hours (median 21 hours).

Cognitive impairment

Table 3: Cognitive impairment - primary operations*

	No		Yes		Uncertain		Missing		Total
2016	5109	(63,3%)	2118	(26,2%)	631	(7,8%)	219	(2,7%)	**8077**
2015	5382	(66,6%)	1919	(23,7%)	601	(7,4%)	180	(2,2%)	**8082**
2014	5133	(65,1%)	1933	(24,5%)	642	(8,1%)	180	(2,3%)	**7888**
2013	5236	(65,4%)	1938	(24,2%)	675	(8,4%)	163	(2,0%)	**8012**
2012	5221	(63,5%)	2007	(24,4%)	821	(10,0%)	176	(2,1%)	**8225**
2011	5347	(63,6%)	1990	(23,7%)	901	(10,7%)	169	(2,0%)	**8407**
2010	5220	(63,7%)	1917	(23,4%)	834	(10,2%)	229	(2,8%)	**8200**
2009	5157	(63,7%)	1890	(23,3%)	832	(10,3%)	221	(2,7%)	**8100**
2008	5186	(63,2%)	2026	(24,7%)	794	(9,7%)	205	(2,5%)	**8211**
2007	4834	(62,7%)	1873	(24,3%)	836	(10,8%)	168	(2,2%)	**7711**
2006	4845	(65,6%)	1675	(22,7%)	720	(9,8%)	141	(1,9%)	**7381**
2005	3610	(62,5%)	1384	(24,0%)	649	(11,2%)	131	(2,3%)	**5774**
Total	**60280**	**(64,1%)**	**22670**	**(24,1%)**	**8936**	**(9,5%)**	**2182**	**(2,3%)**	**94068**

Figure 5: Cognitive impairment - primary operations*



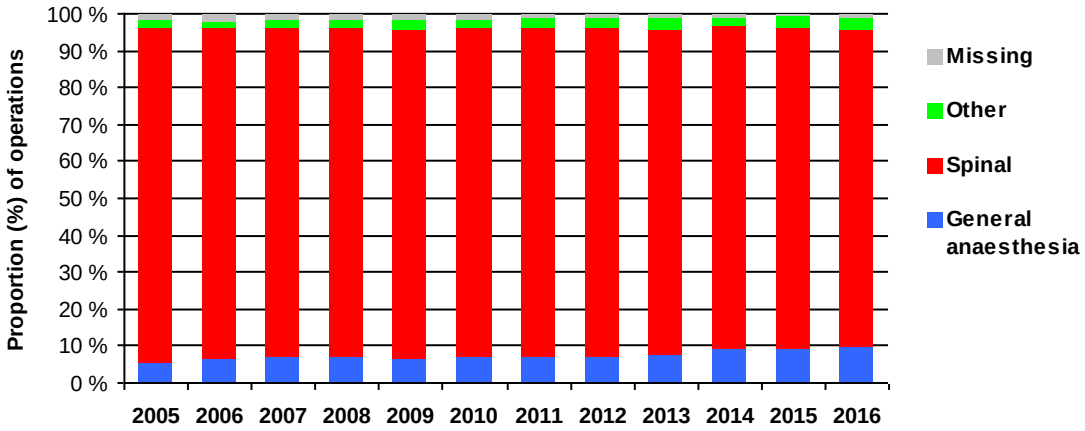
* Total hip prostheses are not counted

Type of anaesthesia

Table 4: Type of anaesthesia - primary operations*

	General anaesthesia		Spinal		Other		Missing		Total
2016	800	(9,9%)	6910	(85,6%)	282	(3,5%)	84	(1,0%)	**8076**
2015	758	(9,4%)	7037	(87,1%)	225	(2,8%)	62	(0,8%)	**8082**
2014	732	(9,3%)	6887	(87,3%)	203	(2,6%)	66	(0,8%)	**7888**
2013	588	(7,3%)	7095	(88,6%)	256	(3,2%)	73	(0,9%)	**8012**
2012	560	(6,8%)	7364	(89,5%)	219	(2,7%)	82	(1,0%)	**8225**
2011	586	(7,0%)	7506	(89,3%)	219	(2,6%)	96	(1,1%)	**8407**
2010	565	(6,9%)	7321	(89,3%)	194	(2,4%)	120	(1,5%)	**8200**
2009	520	(6,4%)	7246	(89,5%)	188	(2,3%)	146	(1,8%)	**8100**
2008	591	(7,2%)	7297	(88,9%)	182	(2,2%)	141	(1,7%)	**8211**
2007	550	(7,1%)	6852	(88,9%)	187	(2,4%)	122	(1,6%)	**7711**
2006	472	(6,4%)	6632	(89,9%)	137	(1,9%)	140	(1,9%)	**7381**
2005	323	(5,6%)	5222	(90,4%)	123	(2,1%)	106	(1,8%)	**5774**
Total	**7045**	**(7,5%)**	**83369**	**(88,6%)**	**2415**	**(2,6%)**	**1238**	**(1,3%)**	**94067**

Figure 6: Type of anaesthesia in primary operations*



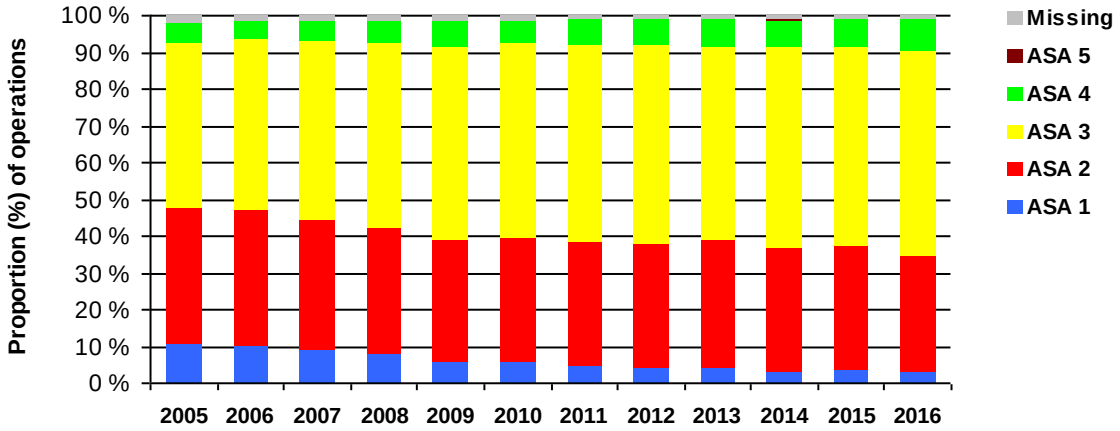
* Total hip prostheses are not counted

ASA classification (ASA = American Society of Anesthesiologists)

Table 5: ASA classification - primary operations

	ASA 1	ASA 2	ASA 3	ASA 4	ASA 5	Missing	Total
2016	264 (3,1%)	2670 (31,7%)	4679 (55,6%)	704 (8,4%)	10 (0,1%)	94 (1,1%)	**8421**
2015	302 (3,6%)	2847 (33,9%)	4525 (53,8%)	624 (7,4%)	12 (0,1%)	96 (1,1%)	**8406**
2014	255 (3,1%)	2730 (33,4%)	4470 (54,7%)	608 (7,4%)	14 (0,2%)	100 (1,2%)	**8177**
2013	378 (4,5%)	2839 (34,2%)	4383 (52,8%)	609 (7,3%)	17 (0,2%)	83 (1,0%)	**8309**
2012	356 (4,2%)	2833 (33,6%)	4547 (53,9%)	594 (7,0%)	8 (0,1%)	97 (1,1%)	**8435**
2011	436 (5,1%)	2877 (33,5%)	4612 (53,6%)	558 (6,5%)	6 (0,1%)	110 (1,3%)	**8599**
2010	493 (5,9%)	2806 (33,6%)	4410 (52,7%)	498 (6,0%)	16 (0,2%)	140 (1,7%)	**8363**
2009	509 (6,2%)	2720 (32,9%)	4309 (52,2%)	564 (6,8%)	10 (0,1%)	146 (1,8%)	**8258**
2008	677 (8,1%)	2858 (34,2%)	4172 (49,9%)	527 (6,3%)	9 (0,1%)	119 (1,4%)	**8362**
2007	716 (9,1%)	2767 (35,2%)	3820 (48,5%)	451 (5,7%)	7 (0,1%)	109 (1,4%)	**7870**
2006	772 (10,3%)	2746 (36,5%)	3496 (46,5%)	372 (4,9%)	13 (0,2%)	118 (1,6%)	**7517**
2005	639 (10,9%)	2166 (36,8%)	2620 (44,6%)	316 (5,4%)	13 (0,2%)	125 (2,1%)	**5879**
Total	**5797** (6,0%)	**32859** (34,0%)	**50043** (51,8%)	**6425** (6,7%)	**135** (0,1%)	**1337** (1,4%)	**96597**

Figure 7: ASA classification - 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.

Primary operations

Table 6: Type of fracture (reason for primary operation)

	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7	Type 8	Type 9	Annet	Missing	Total
2016	1069	3516	230	1233	1309	460	341	4	160	92	8	**8422**
	12,7%	41,7%	2,7%	14,6%	15,5%	5,5%	4,0%	0,0%	1,9%	1,1%	0,1%	
2015	1153	3349	243	1335	1254	442	322	2	228	77	1	**8406**
	13,7%	39,8%	2,9%	15,9%	14,9%	5,3%	3,8%	0,0%	2,7%	0,9%	0,0%	
2014	1050	3331	287	1332	1243	420	287	2	161	63	1	**8177**
	12,8%	40,7%	3,5%	16,3%	15,2%	5,1%	3,5%	0,0%	2,0%	0,8%	0,0%	
2013	1171	3296	260	1302	1277	447	293	4	167	91	1	**8309**
	14,1%	39,7%	3,1%	15,7%	15,4%	5,4%	3,5%	0,0%	2,0%	1,1%	0,0%	
2012	1226	3471	262	1277	1271	467	207	3	173	75	3	**8435**
	14,5%	41,1%	3,1%	15,1%	15,1%	5,5%	2,5%	0,0%	2,1%	0,9%	0,0%	
2011	1316	3443	276	1346	1393	398	188	4	162	73	0	**8599**
	15,3%	40,0%	3,2%	15,7%	16,2%	4,6%	2,2%	0,0%	1,9%	0,8%	0,0%	
2010	1249	3287	321	1313	1364	431	161	2	167	66	2	**8363**
	14,9%	39,3%	3,8%	15,7%	16,3%	5,2%	1,9%	0,0%	2,0%	0,8%	0,0%	
2009	1234	3368	329	1306	1211	425	151	7	149	70	8	**8258**
	14,9%	40,8%	4,0%	15,8%	14,7%	5,1%	1,8%	0,1%	1,8%	0,8%	0,1%	
2008	1316	3222	351	1475	1240	439	149	2	83	82	3	**8362**
	15,7%	38,5%	4,2%	17,6%	14,8%	5,2%	1,8%	0,0%	1,0%	1,0%	0,0%	
2007	1416	2993	391	1353	1052	438	158	1	0	66	2	**7870**
	18,0%	38,0%	5,0%	17,2%	13,4%	5,6%	2,0%	0,0%	0,0%	0,8%	0,0%	
2006	1408	2820	343	1311	1010	414	131	5	0	71	4	**7517**
	18,7%	37,5%	4,6%	17,4%	13,4%	5,5%	1,7%	0,1%	0,0%	0,9%	0,1%	
2005	1073	2291	276	1011	757	318	102	3	0	35	13	**5879**
	18,3%	39,0%	4,7%	17,2%	12,9%	5,4%	1,7%	0,1%	0,0%	0,6%	0,2%	
Total	**14681**	**38387**	**3569**	**15594**	**14381**	**5099**	**2490**	**39**	**1450**	**861**	**46**	**96597**
	15,2%	**39,7%**	**3,7%**	**16,1%**	**14,9%**	**5,3%**	**2,6%**	**0,0%**	**1,5%**	**0,9%**	**0,0%**	

Type 1: Intracapsular fracture, undisplaced
Type 2: Intracapsular fracture, displaced
Type 3: Basocervical fracture
Type 4: Trochanteric fracture (2 fragments)
Type 5: Trochanteric fracture (multifragment)
Type 6: Subtrochanteric fracture
Type 7: Intracapsular fracture unspecified (from the Norwegian Arthroplasty Register)
Type 8: Trochanteric fracture unspecified (from the Norwegian Arthroplasty Register)
Type 9: Intertrochanteric fracture (The registration started in 2008)

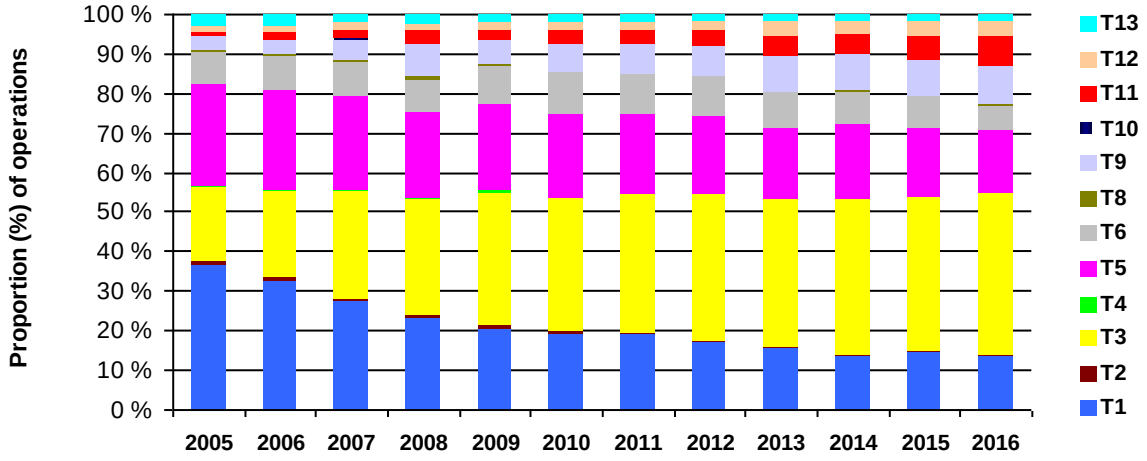
Table 7: Type of primary operations - all fractures

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	Total
2016	1144	39	3424	2	1366	514	0	19	815	11	608	345	135	0	**8422**
	13,6%	0,5%	40,7%	0,0%	16,2%	6,1%	0,0%	0,2%	9,7%	0,1%	7,2%	4,1%	1,6%	0,0%	
2015	1240	36	3232	2	1498	664	0	14	757	8	509	324	121	1	**8406**
	14,8%	0,4%	38,4%	0,0%	17,8%	7,9%	0,0%	0,2%	9,0%	0,1%	6,1%	3,9%	1,4%	0,0%	
2014	1127	31	3188	1	1551	689	0	17	732	7	417	289	128	0	**8177**
	13,8%	0,4%	39,0%	0,0%	19,0%	8,4%	0,0%	0,2%	9,0%	0,1%	5,1%	3,5%	1,6%	0,0%	
2013	1289	32	3100	3	1496	749	0	20	747	4	430	297	142	0	**8309**
	15,5%	0,4%	37,3%	0,0%	18,0%	9,0%	0,0%	0,2%	9,0%	0,0%	5,2%	3,6%	1,7%	0,0%	
2012	1455	27	3137	5	1632	848	1	19	635	8	332	210	126	0	**8435**
	17,2%	0,3%	37,2%	0,1%	19,3%	10,1%	0,0%	0,2%	7,5%	0,1%	3,9%	2,5%	1,5%	0,0%	
2011	1649	50	3003	19	1697	870	0	12	658	14	281	192	154	0	**8599**
	19,2%	0,6%	34,9%	0,2%	19,7%	10,1%	0,0%	0,1%	7,7%	0,2%	3,3%	2,2%	1,8%	0,0%	
2010	1616	83	2781	29	1733	899	0	17	571	4	280	163	187	0	**8363**
	19,3%	1,0%	33,3%	0,3%	20,7%	10,7%	0,0%	0,2%	6,8%	0,0%	3,3%	1,9%	2,2%	0,0%	
2009	1688	81	2755	82	1765	788	0	50	489	8	228	158	166	0	**8258**
	20,4%	1,0%	33,4%	1,0%	21,4%	9,5%	0,0%	0,6%	5,9%	0,1%	2,8%	1,9%	2,0%	0,0%	
2008	1943	64	2439	70	1784	690	2	64	686	10	266	151	193	0	**8362**
	23,2%	0,8%	29,2%	0,8%	21,3%	8,3%	0,0%	0,8%	8,2%	0,1%	3,2%	1,8%	2,3%	0,0%	
2007	2181	50	2115	48	1868	644	0	36	430	6	157	159	175	1	**7870**
	27,7%	0,6%	26,9%	0,6%	23,7%	8,2%	0,0%	0,5%	5,5%	0,1%	2,0%	2,0%	2,2%	0,0%	
2006	2466	60	1643	34	1891	628	1	43	272	4	127	136	211	1	**7517**
	32,8%	0,8%	21,9%	0,5%	25,2%	8,4%	0,0%	0,6%	3,6%	0,1%	1,7%	1,8%	2,8%	0,0%	
2005	2154	52	1112	24	1492	469	1	28	211	3	55	105	171	2	**5879**
	36,6%	0,9%	18,9%	0,4%	25,4%	8,0%	0,0%	0,5%	3,6%	0,1%	0,9%	1,8%	2,9%	0,0%	
Total	**19952**	**605**	**31929**	**319**	**19773**	**8452**	**5**	**339**	**7003**	**87**	**3690**	**2529**	**1909**	**5**	**96597**
	20,7%	**0,6%**	**33,1%**	**0,3%**	**20,5%**	**8,7%**	**0,0%**	**0,4%**	**7,2%**	**0,1%**	**3,8%**	**2,6%**	**2,0%**	**0,0%**	

T1: Two screws or pins
T2: Three screws or pins
T3: Bipolar hemiprosthesis
T4: Unipolar hemiprosthesis
T5: Hip compression screw and plate
T6: Hip compression screw with lateral support plate
T7: Angle plate
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: Other *
T14: Missing

* Proportion (%) of operations with combination: Hip compression screw and additional anti-rotational screw is 1,4%

Figure 8: Type of primary operations - all fractures



T1: Two screws or pins
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T3: Bipolar hemiprosthesis
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T11: Long intramedullary nail with distal locking
T12: Total hip prosthesis
T13: Other *
T14: Missing

* Proportion (%) of operations with combination: Hip compression screw and additional anti-rotational screw is 1,4 %

Table 8: Type of primary operation per type of primary fracture

Type of primary fracture	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	Total
Intracapsular fracture, undisplaced	13212 89,5%	201 1,4%	822 5,6%	4 0,0%	321 2,2%	0 0,0%	1 0,0%	7 0,0%	22 0,1%	0 0,0%	4 0,0%	0 0,0%	87 0,6%	0 0,0%	**14760**
Intracapsular fracture, displaced	6579 17,1%	400 1,0%	30429 79,0%	300 0,8%	333 0,9%	2 0,0%	0 0,0%	4 0,0%	36 0,1%	0 0,0%	10 0,0%	0 0,0%	293 0,8%	1 0,0%	**38535**
Basocervical fracture	129 3,1%	2 0,0%	307 7,3%	12 0,3%	2002 47,6%	77 1,8%	1 0,0%	29 0,7%	324 7,7%	1 0,0%	19 0,5%	0 0,0%	666 15,8%	0 0,0%	**4207**
Trochanteric fracture (2 fragments)	10 0,1%	0 0,0%	38 0,2%	0 0,0%	11043 69,5%	907 5,7%	2 0,0%	235 1,5%	2807 17,7%	6 0,0%	219 1,4%	0 0,0%	325 2,0%	2 0,0%	**15879**
Trochanteric fracture (multifragment)	3 0,0%	1 0,0%	94 0,6%	0 0,0%	4900 33,8%	5132 35,4%	1 0,0%	56 0,4%	3085 21,3%	25 0,2%	762 5,3%	0 0,0%	322 2,2%	0 0,0%	**14512**
Subtrochanteric fracture	3 0,1%	1 0,0%	35 0,7%	0 0,0%	892 17,4%	1441 28,2%	0 0,0%	4 0,1%	435 8,5%	45 0,9%	2158 42,2%	0 0,0%	84 1,6%	1 0,0%	**5117**
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%	2490 100,0%	0 0,0%	0 0,0%	**2490**
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%	39 100,0%	0 0,0%	0 0,0%	**39**
Intertrochanteric fracture **	0 0,0%	0 0,0%	10 0,7%	0 0,0%	146 10,0%	704 48,4%	0 0,0%	3 0,2%	230 15,8%	5 0,3%	321 22,1%	0 0,0%	31 2,1%	0 0,0%	**1455**
Other	11 1,2%	0 0,0%	169 18,8%	2 0,2%	129 14,3%	187 20,8%	0 0,0%	1 0,1%	62 6,9%	5 0,6%	197 21,9%	0 0,0%	98 10,9%	0 0,0%	**901**
Missing	5 10,2%	0 0,0%	25 51,0%	1 2,0%	7 14,3%	2 4,1%	0 0,0%	0 0,0%	2 4,1%	0 0,0%	0 0,0%	0 0,0%	3 6,1%	1 2,0%	**49**
Total	**19952** **20,4%**	**605** **0,6%**	**31929** **32,6%**	**319** **0,3%**	**19773** **20,2%**	**8452** **8,6%**	**5** **0,0%**	**339** **0,3%**	**7003** **7,2%**	**87** **0,1%**	**3690** **3,8%**	**2529** **2,6%**	**1909** **1,9%**	**5** **0,0%**	**97944**

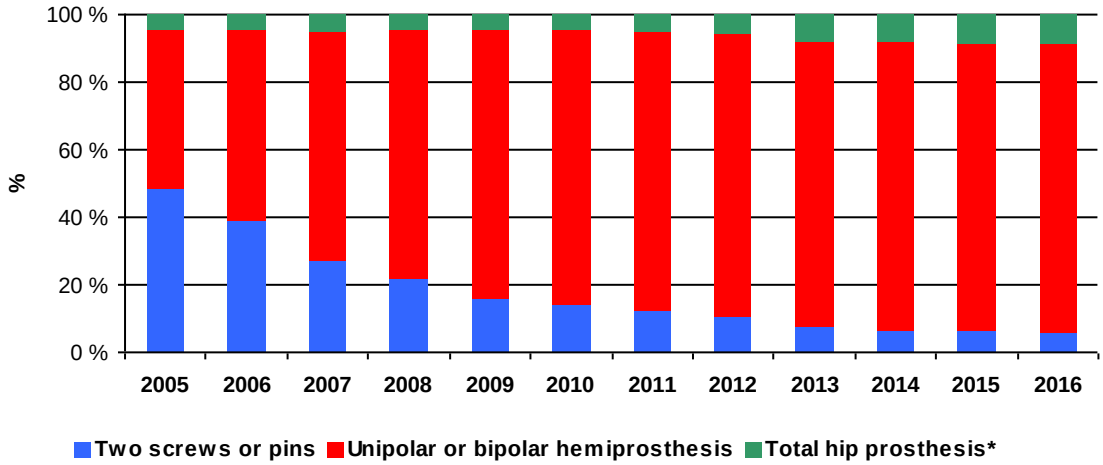
T1: Two screws or pins
T2: Three screws or pins
T3: Bipolar hemiprosthesis
T4: Unipolar hemiprosthesis
T5: Hip compression screw and plate
T6: Hip compression screw with lateral support plate
T7: Angle plate
T8: Short intramedullary nail without distal locking
T9: Short intramedullary nail with distal locking
T10: Long intramedullary nail without distal locking
T11: Long intramedullary nail with distal locking
T12: Total hip prosthesis
T13: Other ***
T14: Missing

* Total hip prostheses reported to the Norwegian Arthroplasty Register

** The registration started in 2008

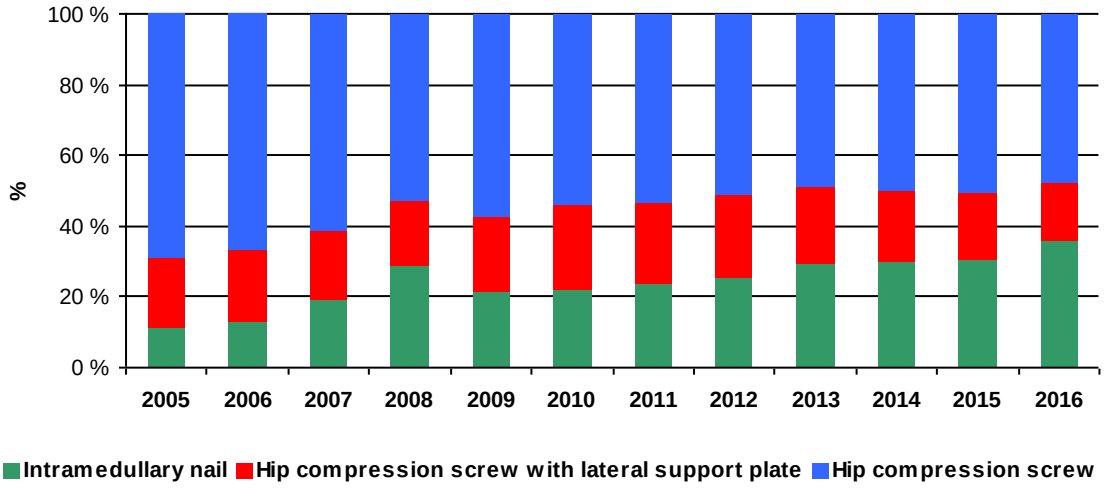
*** Proportion (%) of operations with combination: Hip compression screw and additional anti-rotational screw is 1,4%

Figure 9a: Time trend for treatment of displaced femoral neck fractures



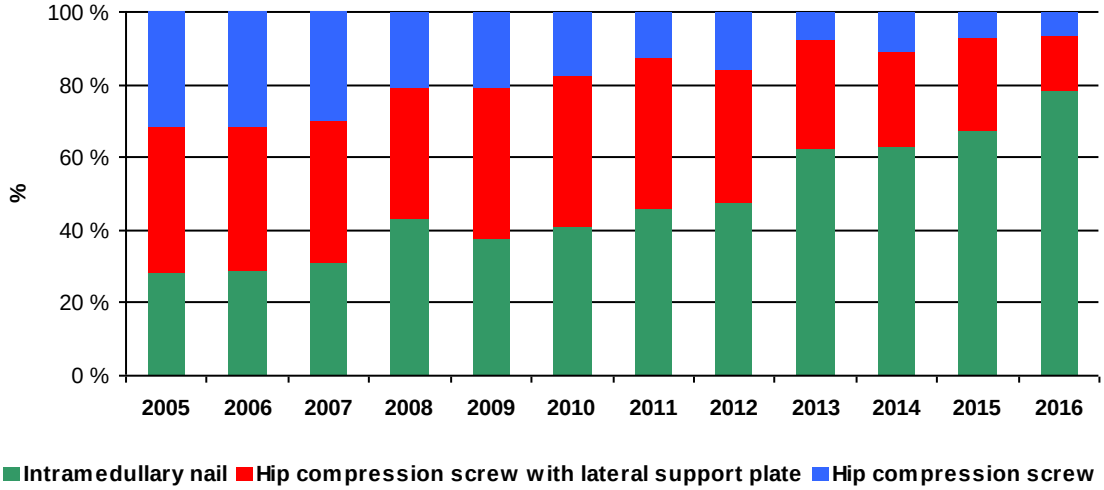
* Total hip prostheses for femoral neck fracture were reported to the Norwegian Arthroplasty Register without information about displacement of fracture

Figure 9b: Time trend for treatment of trochanteric* fractures



* Trochanteric fracture '(AO OTA type A1 and A2)

Figure 9c: Time trend for treatment of inter-* and subtrochanteric fractures



* Intertrochanteric fracture '(AO OTA type A3)

Reoperations

Table 9: Reasons for reoperation - all fractures (more than one reason is possible)

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	Total
2016	141	48	16	76	8	9	192	17	32	34	73	13	42	412	**1113**
	12,7%	4,3%	1,4%	6,8%	0,7%	0,8%	17,3%	1,5%	2,9%	3,1%	6,6%	1,2%	3,8%	37,0%	
2015	160	71	34	65	8	10	175	18	35	33	83	11	47	359	**1109**
	14,4%	6,4%	3,1%	5,9%	0,7%	0,9%	15,8%	1,6%	3,2%	3,0%	7,5%	1,0%	4,2%	32,4%	
2014	111	58	31	50	7	4	148	14	20	20	66	17	23	353	**922**
	12,0%	6,3%	3,4%	5,4%	0,8%	0,4%	16,1%	1,5%	2,2%	2,2%	7,2%	1,8%	2,5%	38,3%	
2013	141	57	33	74	5	10	158	15	28	22	76	7	47	376	**1049**
	13,4%	5,4%	3,1%	7,1%	0,5%	1,0%	15,1%	1,4%	2,7%	2,1%	7,2%	0,7%	4,5%	35,8%	
2012	153	65	37	75	18	9	183	15	34	22	63	4	43	342	**1063**
	14,4%	6,1%	3,5%	7,1%	1,7%	0,8%	17,2%	1,4%	3,2%	2,1%	5,9%	0,4%	4,0%	32,2%	
2011	157	75	59	82	12	5	147	12	41	23	67	8	33	341	**1062**
	14,8%	7,1%	5,6%	7,7%	1,1%	0,5%	13,8%	1,1%	3,9%	2,2%	6,3%	0,8%	3,1%	32,1%	
2010	176	79	48	79	11	11	129	14	44	26	58	10	37	288	**1010**
	17,4%	7,8%	4,8%	7,8%	1,1%	1,1%	12,8%	1,4%	4,4%	2,6%	5,7%	1,0%	3,7%	28,5%	
2009	216	96	59	95	8	18	150	7	38	36	49	9	57	296	**1134**
	19,0%	8,5%	5,2%	8,4%	0,7%	1,6%	13,2%	0,6%	3,4%	3,2%	4,3%	0,8%	5,0%	26,1%	
2008	245	104	63	101	10	10	104	20	39	42	57	10	33	259	**1097**
	22,3%	9,5%	5,7%	9,2%	0,9%	0,9%	9,5%	1,8%	3,6%	3,8%	5,2%	0,9%	3,0%	23,6%	
2007	287	132	85	111	10	10	84	13	32	39	48	9	31	251	**1142**
	25,1%	11,6%	7,4%	9,7%	0,9%	0,9%	7,4%	1,1%	2,8%	3,4%	4,2%	0,8%	2,7%	22,0%	
2006	318	125	64	101	7	8	77	20	21	30	33	7	21	204	**1036**
	30,7%	12,1%	6,2%	9,7%	0,7%	0,8%	7,4%	1,9%	2,0%	2,9%	3,2%	0,7%	2,0%	19,7%	
2005	281	107	71	85	9	12	50	16	25	27	33	2	23	76	**817**
	34,4%	13,1%	8,7%	10,4%	1,1%	1,5%	6,1%	2,0%	3,1%	3,3%	4,0%	0,2%	2,8%	9,3%	
Total	**2386**	**1017**	**600**	**994**	**113**	**116**	**1597**	**181**	**389**	**354**	**706**	**107**	**437**	**3557**	**12554**
	19,0%	**8,1%**	**4,8%**	**7,9%**	**0,9%**	**0,9%**	**12,7%**	**1,4%**	**3,1%**	**2,8%**	**5,6%**	**0,9%**	**3,5%**	**28,3%**	

R1: Osteosynthesis failure
R2: Nonunion
R3: Avascular necrosis (segmental collaps)
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 material through caput
R11: New fracture around implant
R12: Loosening of hemiprosthesis
R13: Other
R14: Reported reoperations to the Norwegian Arthroplasty Register except ”Deep infection” which is included in R7: Infection – deep.

Table 10: Reasons for reoperation per type of primary fracture (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	569	232	184	242	24	6	106	13	20	51	157	5	91	**1700**
	33,5%	13,6%	10,8%	14,2%	1,4%	0,4%	6,2%	0,8%	1,2%	3,0%	9,2%	0,3%	5,4%	
Intracapsular fracture, displaced	634	249	155	260	22	65	906	102	312	51	197	66	89	**3108**
	20,4%	8,0%	5,0%	8,4%	0,7%	2,1%	29,2%	3,3%	10,0%	1,6%	6,3%	2,1%	2,9%	
Basocervical fracture	115	55	28	55	8	1	38	4	10	30	11	2	20	**377**
	30,5%	14,6%	7,4%	14,6%	2,1%	0,3%	10,1%	1,1%	2,7%	8,0%	2,9%	0,5%	5,3%	
Trochanteric fracture (2 fragments)	135	45	18	58	13	8	76	16	4	48	44	0	45	**510**
	26,5%	8,8%	3,5%	11,4%	2,5%	1,6%	14,9%	3,1%	0,8%	9,4%	8,6%	0,0%	8,8%	
Trochanteric fracture (multifragment)	274	116	27	90	16	12	222	25	9	81	64	3	63	**1002**
	27,3%	11,6%	2,7%	9,0%	1,6%	1,2%	22,2%	2,5%	0,9%	8,1%	6,4%	0,3%	6,3%	
Subtrochanteric fracture	135	70	3	46	3	6	95	8	4	16	30	3	43	**462**
	29,2%	15,2%	0,6%	10,0%	0,6%	1,3%	20,6%	1,7%	0,9%	3,5%	6,5%	0,6%	9,3%	
Intertrochanteric fracture*	47	12	3	16	1	0	23	5	2	9	8	0	7	**133**
	35,3%	9,0%	2,3%	12,0%	0,8%	0,0%	17,3%	3,8%	1,5%	6,8%	6,0%	0,0%	5,3%	
Other	18	9	2	3	2	3	18	2	3	7	8	2	12	**89**
	20,2%	10,1%	2,2%	3,4%	2,2%	3,4%	20,2%	2,2%	3,4%	7,9%	9,0%	2,2%	13,5%	
Missing	1	0	0	0	0	0	1	0	0	0	0	0	0	**2**
	50,0%	0,0%	0,0%	0,0%	0,0%	0,0%	50,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	
Total	**1928**	**788**	**420**	**770**	**89**	**101**	**1485**	**175**	**364**	**293**	**519**	**81**	**370**	**7383**
	26,1%	**10,7%**	**5,7%**	**10,4%**	**1,2%**	**1,4%**	**20,1%**	**2,4%**	**4,9%**	**4,0%**	**7,0%**	**1,1%**	**5,0%**	

R1: Osteosynthesis failure
R2: Nonunion
R3: Avascular necrosis (segmental collaps)
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 material through caput
R11: New fracture around implant
R12: Loosening of hemiprosthesis
R13: Other

* The registration started in 2008

** Total hip prostheses are not counted

Table 11: Type of reoperation (more than one reason is possible)

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	Total
2016	81	36	147	0	106	149	14	7	158	395	**1093**
	7,4%	3,3%	13,4%	0,0%	9,7%	13,6%	1,3%	0,6%	14,5%	36,1%	
2015	68	36	181	0	115	130	19	4	148	346	**1047**
	6,5%	3,4%	17,3%	0,0%	11,0%	12,4%	1,8%	0,4%	14,1%	33,0%	
2014	46	26	157	0	84	112	7	4	99	333	**868**
	5,3%	3,0%	18,1%	0,0%	9,7%	12,9%	0,8%	0,5%	11,4%	38,4%	
2013	70	32	159	0	119	116	14	7	117	363	**997**
	7,0%	3,2%	15,9%	0,0%	11,9%	11,6%	1,4%	0,7%	11,7%	36,4%	
2012	73	42	188	0	91	137	14	9	109	331	**994**
	7,3%	4,2%	18,9%	0,0%	9,2%	13,8%	1,4%	0,9%	11,0%	33,3%	
2011	71	34	214	0	98	105	19	13	113	345	**1012**
	7,0%	3,4%	21,1%	0,0%	9,7%	10,4%	1,9%	1,3%	11,2%	34,1%	
2010	86	40	220	2	91	105	15	11	103	281	**954**
	9,0%	4,2%	23,1%	0,2%	9,5%	11,0%	1,6%	1,2%	10,8%	29,5%	
2009	120	40	254	0	97	129	10	11	94	294	**1049**
	11,4%	3,8%	24,2%	0,0%	9,2%	12,3%	1,0%	1,0%	9,0%	28,0%	
2008	111	40	317	1	86	83	10	15	91	255	**1009**
	11,0%	4,0%	31,4%	0,1%	8,5%	8,2%	1,0%	1,5%	9,0%	25,3%	
2007	118	31	371	1	78	67	5	11	64	236	**982**
	12,0%	3,2%	37,8%	0,1%	7,9%	6,8%	0,5%	1,1%	6,5%	24,0%	
2006	97	37	371	6	82	63	8	5	56	203	**928**
	10,5%	4,0%	40,0%	0,6%	8,8%	6,8%	0,9%	0,5%	6,0%	21,9%	
2005	82	25	322	35	46	39	9	7	42	78	**685**
	12,0%	3,6%	47,0%	5,1%	6,7%	5,7%	1,3%	1,0%	6,1%	11,4%	
Total	**1023**	**419**	**2901**	**45**	**1093**	**1235**	**144**	**104**	**1194**	**3460**	**11618**
	8,8%	**3,6%**	**25,0%**	**0,4%**	**9,4%**	**10,6%**	**1,2%**	**0,9%**	**10,3%**	**29,8%**	

R1: Removal of implant (when only procedure)
R2: Girdlestone (= Removal of implant/hemiprosthesis and caput)
R3: Bipolar hemiprosthesis
R4: Unipolar haemiprosthesis
R5: Re-osteosynthesis
R6: Drainage of haematoma or infection
R7: Closed reduction of dislocated hemiprosthesis
R8: Open reduction of dislocated hemiprosthesis
R9: Other
R10: Total hip prosthesis

Table 12: Reoperation with primary screw osteosynthesis (reasons are not mutually exclusive)

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	Total
2016	33	2	49	0	27	3	0	0	4	155	**273**
	12,1%	0,7%	17,9%	0,0%	9,9%	1,1%	0,0%	0,0%	1,5%	56,8%	
2015	25	3	65	0	22	3	0	1	7	128	**254**
	9,8%	1,2%	25,6%	0,0%	8,7%	1,2%	0,0%	0,4%	2,8%	50,4%	
2014	16	0	70	0	25	3	0	0	3	134	**251**
	6,4%	0,0%	27,9%	0,0%	10,0%	1,2%	0,0%	0,0%	1,2%	53,4%	
2013	34	2	72	0	35	1	0	1	2	139	**286**
	11,9%	0,7%	25,2%	0,0%	12,2%	0,3%	0,0%	0,3%	0,7%	48,6%	
2012	31	10	98	0	27	4	0	0	3	131	**304**
	10,2%	3,3%	32,2%	0,0%	8,9%	1,3%	0,0%	0,0%	1,0%	43,1%	
2011	37	9	113	0	23	2	0	0	7	139	**330**
	11,2%	2,7%	34,2%	0,0%	7,0%	0,6%	0,0%	0,0%	2,1%	42,1%	
2010	43	11	113	1	26	2	0	0	4	125	**325**
	13,2%	3,4%	34,8%	0,3%	8,0%	0,6%	0,0%	0,0%	1,2%	38,5%	
2009	65	8	125	0	15	7	0	0	5	137	**362**
	18,0%	2,2%	34,5%	0,0%	4,1%	1,9%	0,0%	0,0%	1,4%	37,8%	
2008	53	12	161	0	21	3	0	0	3	135	**388**
	13,7%	3,1%	41,5%	0,0%	5,4%	0,8%	0,0%	0,0%	0,8%	34,8%	
2007	64	8	198	1	15	1	0	0	5	141	**433**
	14,8%	1,8%	45,7%	0,2%	3,5%	0,2%	0,0%	0,0%	1,2%	32,6%	
2006	34	5	193	5	21	2	0	0	2	125	**387**
	8,8%	1,3%	49,9%	1,3%	5,4%	0,5%	0,0%	0,0%	0,5%	32,3%	
2005	4	6	124	12	6	4	0	0	4	48	**208**
	1,9%	2,9%	59,6%	5,8%	2,9%	1,9%	0,0%	0,0%	1,9%	23,1%	
Total	**439**	**76**	**1381**	**19**	**263**	**35**	**0**	**2**	**49**	**1537**	**3801**
	11,5%	**2,0%**	**36,3%**	**0,5%**	**6,9%**	**0,9%**	**0,0%**	**0,1%**	**1,3%**	**40,4%**	

R1: Removal of implant (when only procedure)
R2: Girdlestone (= Removal of implant/hemiprosthesis and caput)
R3: Bipolar hemiprosthesis
R4: Unipolar hemiprosthesis
R5: Re-osteosynthesis
R6: Drainage of haematoma or infection
R7: Closed reduction of dislocated hemiprosthesis
R8: Open reduction of dislocated hemiprosthesis
R9: Other
R10: Total hip prosthesis

Table 13: Reoperation with primary uni/bipolar hemiprosthesis (reasons are not mutually exclusive)

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	Total
2016	0	12	20	0	6	80	9	6	96	42	**271**
	0,0%	4,4%	7,4%	0,0%	2,2%	29,5%	3,3%	2,2%	35,4%	15,5%	
2015	0	5	18	0	1	65	16	1	74	46	**226**
	0,0%	2,2%	8,0%	0,0%	0,4%	28,8%	7,1%	0,4%	32,7%	20,4%	
2014	0	9	19	0	3	48	5	4	61	37	**186**
	0,0%	4,8%	10,2%	0,0%	1,6%	25,8%	2,7%	2,2%	32,8%	19,9%	
2013	0	11	15	0	2	68	9	4	77	37	**223**
	0,0%	4,9%	6,7%	0,0%	0,9%	30,5%	4,0%	1,8%	34,5%	16,6%	
2012	0	11	23	0	0	55	10	8	56	31	**194**
	0,0%	5,7%	11,9%	0,0%	0,0%	28,4%	5,2%	4,1%	28,9%	16,0%	
2011	0	10	14	0	1	60	16	8	70	32	**211**
	0,0%	4,7%	6,6%	0,0%	0,5%	28,4%	7,6%	3,8%	33,2%	15,2%	
2010	0	8	17	0	3	58	10	9	68	17	**190**
	0,0%	4,2%	8,9%	0,0%	1,6%	30,5%	5,3%	4,7%	35,8%	8,9%	
2009	0	9	10	0	0	44	7	9	49	20	**148**
	0,0%	6,1%	6,8%	0,0%	0,0%	29,7%	4,7%	6,1%	33,1%	13,5%	
2008	0	10	7	0	2	46	5	12	45	20	**147**
	0,0%	6,8%	4,8%	0,0%	1,4%	31,3%	3,4%	8,2%	30,6%	13,6%	
2007	0	5	9	0	0	27	3	10	35	11	**100**
	0,0%	5,0%	9,0%	0,0%	0,0%	27,0%	3,0%	10,0%	35,0%	11,0%	
2006	0	6	2	0	0	28	4	3	29	10	**82**
	0,0%	7,3%	2,4%	0,0%	0,0%	34,1%	4,9%	3,7%	35,4%	12,2%	
2005	0	1	1	0	0	12	3	3	13	2	**35**
	0,0%	2,9%	2,9%	0,0%	0,0%	34,3%	8,6%	8,6%	37,1%	5,7%	
Total	**0**	**97**	**155**	**0**	**18**	**591**	**97**	**77**	**673**	**305**	**2013**
	0,0%	**4,8%**	**7,7%**	**0,0%**	**0,9%**	**29,4%**	**4,8%**	**3,8%**	**33,4%**	**15,2%**	

R1: Removal of implant (when only procedure)
R2: Girdlestone (= Removal of implant/hemiprosthesis and caput)
R3: Bipolar hemiprosthesis
R4: Unipolar hemiprosthesis
R5: Re-osteosynthesis
R6: Drainage of haematoma or infection
R7: Closed reduction of dislocated hemiprosthesis
R8: Open reduction of dislocated hemiprosthesis
R9: Other
R10: Total hip prosthesis

Table 14: Specification of R9 - Others

	Total	-06 2005	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Cable Ready plate + cerclage	**5**	1	1					1		2		
Cement spacer	**19**			1		1	2	1	3	3	4	4
Cerclage	**17**	1		2	1		2	1	3	2	3	2
Dall Miles plate + cerclage	**19**				1	3	3	1		4	4	3
Drainage of haematoma	**26**	10	3	5	1	3	2	1				1
Exchange of caput/bipolar head	**528**	27	27	35	42	56	58	42	67	43	55	76
Exchange of caput/bipolar head + osteosynthesis with plate/cerclage	**5**					2			1	1	1	
Suture of muscle/fascie	**9**			1	1	3		1			1	2
Unspecified plate + cerclage	**16**	2		1			1	3	2	2	5	
Other (n<5)	**29**	1	4		3		2	5	1	4	1	8
Total	**673**	**42**	**35**	**45**	**49**	**68**	**70**	**56**	**77**	**61**	**74**	**96**

Implants

Table 15: Cemented hemiprostheses - primary operations

Femur	Caput	Bipolar head	Total	-2005-07	2008	2009	2010	2011	2012	2013	2014	2015	2016
Charnley		Hastings bipolar head	**2768**	1319	369	368	290	143	120	98	61		
Charnley Modular	Elite	Hastings bipolar head	**1278**	167	221	227	208	142	160	152	1		
Charnley Modular	Elite	Landos bipolar cup (DePuy)	**24**	15	5	4							
Charnley Modular	Elite	Self-centering bipolar (DePuy)	**746**		3	28	31	23	36	55	241	258	71
Charnley Modular	Unknown caput	Hastings bipolar head	**12**	5	2	1		2	1	1			
Corail	Articul/Eze CoCr	Self-centering bipolar (DePuy)	**388**			1	1	9	40	51	75	118	93
Corail	Articul/Eze CoCr	Vario-Cup (Link)	**168**				1	6	8	8	35	47	63
Corail	Articul/Eze Ultamet (M-Spec)	Self-centering bipolar (DePuy)	**12**						5	2	2	1	2
Corail	Cobalt chrome (DePuy)	Landos bipolar cup (DePuy)	**10**	6	1	2	1						
Corail	Cobalt chrome (DePuy)	Self-centering bipolar (DePuy)	**77**		1	14	31	22	9				
CPS-PLUS	Metal Ball Head	Bipolar Ball Head	**23**	1		1	19	2					
C-Stem	Articul/Eze CoCr	Self-centering bipolar (DePuy)	**93**									5	88
C-Stem	Articul/Eze Ultamet (M-Spec)	Self-centering bipolar (DePuy)	**110**									12	98
Elite	Elite	Hastings bipolar head	**23**	6	6	5	1	4		1			
ETS			**301**	102	71	79	23	16	3	2	2	2	1
Exeter/V40	Exeter/V40	Self-centering bipolar (DePuy)	**870**			1	7	42	31	94	250	228	217
Exeter/V40	Exeter/V40	UHR	**11344**	1069	700	752	852	1139	1241	1262	1318	1454	1557
Exeter/V40	Exeter/V40	Unknown bipolar head	**33**	5		2	4	8	3	2	2	1	6
MS-30	Femoral head (VerSys co.cr)	Self-centering bipolar (DePuy)	**57**									11	46
MS-30	Protasul/Metasul	UHR	**22**	21				1					
SP II (Link)	Articul/Eze CoCr	Self-centering bipolar (DePuy)	**31**						1		18	9	3
SP II (Link)	CoCrMo (Link)	Self-centering bipolar (DePuy)	**224**							7	49	70	98
SP II (Link)	CoCrMo (Link)	UHR	**741**							62	204	218	257
SP II (Link)	CoCrMo (Link)	Vario-Cup (Link)	**1937**	165	182	292	279	251	233	263	71	90	111
Spectron	Cobalt Chrom (S&N)	Biarticular cup (Permedica)	**33**	5	17	7	2	2					
Spectron	Cobalt Chrom (S&N)	HIP Bipolar Cup	**119**			8	12	19	9	16	21	19	15
Spectron	Cobalt Chrom (S&N)	Landos bipolar cup (DePuy)	**112**	99	12	1							
Spectron	Cobalt Chrom (S&N)	Self-centering bipolar (DePuy)	**30**		7	14	9						
Spectron	Cobalt Chrom (S&N)	Tandem	**1090**	370	204	182	70	104	95	65			
Spectron	Cobalt Chrom (S&N)	Universal bipolar	**17**	17									
Spectron	Cobalt Chrom (S&N)	Unknown bipolar head	**11**	4	3	1	3						
Spectron	Cobalt Chrom (S&N)	Vario-Cup (Link)	**81**	4	16	48	13						
Spectron	Cobalt chrome (DePuy)	Landos bipolar cup (DePuy)	**16**	16									
Titan	Alumina Biolox (DePuy)	Landos bipolar cup (DePuy)	**11**	11									
Titan	Articul/Eze CoCr	Landos bipolar cup (DePuy)	**15**	15									
Titan	Articul/Eze CoCr	Self-centering bipolar (DePuy)	**15**				12	2	1				
Titan	Cobalt chrome (DePuy)	Landos bipolar cup (DePuy)	**672**	484	168	19	1						
Titan	Cobalt chrome (DePuy)	Self-centering bipolar (DePuy)	**227**		55	135	36	1					
Titan	Unknown caput	Landos bipolar cup (DePuy)	**15**	13	2								
Other	(n < 10)		**275**	84	26	25	24	24	10	23	19	16	24
Unknown			**36**	13	6	8	2	1			1	3	2
Total			**24067**	**4016**	**2077**	**2225**	**1932**	**1932**	**2006**	**2164**	**2370**	**2562**	**2752**

Table 16: Uncemented hemiprostheses - primary operations

Femur	Caput	Bipolar head	Total	2005 -07	2008	2009	2010	2011	2012	2013	2014	2015
Accolade II	Exeter/V40	Vario-Cup (Link)	**25**							2	8	11
Corail	Alumina Biolox (DePuy)	Self-centering bipolar (DePuy)	**11**		1	1	6	3				
Corail	Alumina Biolox (DePuy)	Vario-Cup (Link)	**10**			1	9					
Corail	Articul/Eze Biolox Forte (DePuy)	Self-centering bipolar (DePuy)	**14**			3	1	3	7			
Corail	Articul/Eze CoCr	Bipolar Ball Head	**64**					17	39	8		
Corail	Articul/Eze CoCr	Landos bipolar cup (DePuy)	**118**	78	34		5	1				
Corail	Articul/Eze CoCr	Self-centering bipolar (DePuy)	**3195**		23	87	202	348	620	532	471	429
Corail	Articul/Eze CoCr	UHR	**375**				17	49	44	40	82	75
Corail	Articul/Eze CoCr	Vario-Cup (Link)	**159**				21	37	32	47	17	4
Corail	Articul/Eze Ultamet (M-Spec)	Self-centering bipolar (DePuy)	**405**					21	143	146	80	9
Corail	Cobalt Chrom (S&N)	Self-centering bipolar (DePuy)	**37**			14	23					
Corail	Cobalt Chrom (S&N)	Vario-Cup (Link)	**13**				13					
Corail	Cobalt chrome (DePuy)	Landos bipolar cup (DePuy)	**779**	587	164	21	7					
Corail	Cobalt chrome (DePuy)	Self-centering bipolar (DePuy)	**1144**	1	61	323	383	344	31	1		
Corail	Cobalt chrome (DePuy)	Tandem	**11**	4	1		4	2				
Corail	Cobalt chrome (DePuy)	UHR	**20**	8	1	3	3	5				
Corail	Metal Ball Head	Bipolar Ball Head	**25**			1	5	19				
Corail	Modular Cathcart (Fracture head hip ball)		**14**			3	8	3				
Corail	Unknown caput	Landos bipolar cup (DePuy)	**10**	8	2							
Corail	Unknown caput	Unknown bipolar head	**15**	3		5	4	1	1	1		
Filler	Biotechni fem. head	Biarticular cup (Permedica)	**24**	22	1	1						
Filler	Cobalt Chrom (S&N)	Biarticular cup (Permedica)	**19**	8	6	4			1			
Filler	Hipball Premium	Biarticular cup (Permedica)	**197**	69	71	50	7					
Filler	Hipball Premium	HIP Bipolar Cup	**599**			33	95	129	126	99	37	44
Filler	Hipball Premium	UHR	**41**							10	22	6
Furlong	Furlong	UHR	**78**									21
HACTIV	HACTIV head	Moonstone	**22**	22								
HACTIV	HACTIV head	Tandem	**19**	9	4	2		1	2	1		
HACTIV	HACTIV head	UHR	**63**								41	22
Polarstem	Cobalt Chrom (S&N)	Tandem	**213**				18	64	74	39	16	2
Polarstem	Cobalt Chrom (S&N)	UHR	**68**								25	34
SL-PLUS	HACTIV head	Bipolar Ball Head	**16**	16								
SL-PLUS	Metal Ball Head	Bipolar Ball Head	**155**	80	36	32	7					
Other	(n < 10)		**230**	43	26	26	41	13	18	13	20	16
Unknown			**6**	2	1	2					1	
Total			**8194**	**960**	**432**	**612**	**879**	**879**	**1138**	**939**	**820**	**673**

Table 17: Cemented hemiprostheses - reoperations

Femur	Caput	Bipolar head	Total	2005 -07	2008	2009	2010	2011	2012	2013	2014	2015
Charnley		Hastings bipolar head	**490**	299	65	50	40	22	8	3	3	
Charnley Modular	Elite	Hastings bipolar head	**82**	19	13	17	12	11	2	8		
Charnley Modular	Elite	Landos bipolar cup (DePuy)	**7**	2	5							
Charnley Modular	Elite	Self-centering bipolar (DePuy)	**35**		2		1	3	7	1	12	8
Corail	Articul/Eze CoCr	Self-centering bipolar (DePuy)	**34**					4	8	1	5	7
Corail	Articul/Eze CoCr	Vario-Cup (Link)	**6**					1			3	1
Corail	Cobalt chrome (DePuy)	Self-centering bipolar (DePuy)	**11**			2	5	4				
CPS-PLUS	Metal Ball Head	Bipolar Ball Head	**8**	1	3		4					
CPS-PLUS Rev. stem	Metal Ball Head	Bipolar Ball Head	**7**	5	1	1						
C-Stem	Articul/Eze CoCr	Self-centering bipolar (DePuy)	**5**									
C-Stem	Articul/Eze Ultamet (M-Spec)	Self-centering bipolar (DePuy)	**5**									
Elite	Elite	Hastings bipolar head	**5**	2			1		2			
ETS			**23**	15	4	3				1		
Exeter/V40	Exeter/V40	Self-centering bipolar (DePuy)	**50**				1	3	8	7	14	11
Exeter/V40	Exeter/V40	UHR	**777**	268	74	57	42	55	64	52	47	73
Exeter/V40	Exeter/V40	Unknown bipolar head	**6**	1	1		1			1	2	
Fjord	Cobalt chrome (DePuy)	Landos bipolar cup (DePuy)	**7**	6	1							
MS-30	Protasul/Metasul	UHR	**5**	5								
Restoration Modular (femur)	Exeter/V40	Self-centering bipolar (DePuy)	**11**			2	3	3	1	1		1
Restoration Modular (femur)	Exeter/V40	UHR	**11**							4	2	2
SP II (Link)	CoCrMo (Link)	Self-centering bipolar (DePuy)	**10**									3
SP II (Link)	CoCrMo (Link)	UHR	**40**							2	12	15
SP II (Link)	CoCrMo (Link)	Vario-Cup (Link)	**150**	35	14	11	18	24	19	12	7	4
Spectron	Cobalt Chrom (S&N)	HIP Bipolar Cup	**5**				1	3				1
Spectron	Cobalt Chrom (S&N)	Landos bipolar cup (DePuy)	**11**	6	5							
Spectron	Cobalt Chrom (S&N)	Tandem	**128**	62	22	18	3	5	11	6	1	
Spectron	Cobalt Chrom (S&N)	Universal bipolar	**9**	9								
Titan	Cobalt chrome (DePuy)	Landos bipolar cup (DePuy)	**135**	114	17	4						
Titan	Cobalt chrome (DePuy)	Self-centering bipolar (DePuy)	**19**	1	5	9	3	1				
Other	(n < 5)		**98**	37	14	9	7	2	3	3	6	6
Unknown			**5**	3	1			1				
Total			**2195**	**890**	**247**	**183**	**142**	**142**	**133**	**102**	**114**	**132**

Table 18: Uncemented hemiprostheses - reoperations

Femur	Caput	Bipolar head	Total	2005 -07	2008	2009	2010	2011	2012	2013	2014	2015
Arcos	Modular Head (Biomet)	Self-centering bipolar (DePuy)	**11**								2	5
Corail	Articul/Eze CoCr	Landos bipolar cup (DePuy)	**23**	12	11							
Corail	Articul/Eze CoCr	Self-centering bipolar (DePuy)	**108**		2	4	19	10	15	19	12	14
Corail	Articul/Eze CoCr	UHR	**14**				3	4			2	2
Corail	Articul/Eze Ultamet (M-Spec)	Self-centering bipolar (DePuy)	**31**					4	13	10	2	2
Corail	Cobalt chrome (DePuy)	Landos bipolar cup (DePuy)	**92**	75	13	2	2					
Corail	Cobalt chrome (DePuy)	Self-centering bipolar (DePuy)	**75**		4	28	25	17	1			
Corail	Cobalt chrome (DePuy)	UHR	**6**		1	2	1	1	1			
Filler	Biotechni fem. head	Biarticular cup (Permedica)	**21**	20	1							
Filler	Cobalt chrome (DePuy)	Biarticular cup (Permedica)	**6**	4	2							
Filler	Cobalt chrome (DePuy)	Landos bipolar cup (DePuy)	**5**	5								
Filler	Hipball Premium	Biarticular cup (Permedica)	**57**	32	18	7						
Filler	Hipball Premium	HIP Bipolar Cup	**80**			4	8	21	7	13	12	8
HACTIV	HACTIV head	Moonstone	**7**	7								
KAR	Articul/Eze CoCr	Self-centering bipolar (DePuy)	**7**						3	3	1	
KAR	Articul/Eze Ultamet (M-Spec)	Self-centering bipolar (DePuy)	**7**						4	3		
KAR	Cobalt chrome (DePuy)	Landos bipolar cup (DePuy)	**20**	12	6	1		1				
KAR	Cobalt chrome (DePuy)	Self-centering bipolar (DePuy)	**14**			6	5	2	1			
REEF	Cobalt chrome (DePuy)	Self-centering bipolar (DePuy)	**6**		1	3	2					
Restoration-HA	C-Taper Head	Landos bipolar cup (DePuy)	**7**	6	1							
SL-PLUS	Metal Ball Head	Bipolar Ball Head	**12**	8	1	2	1					
TTHR	Articul/Eze CoCr	UHR	**6**								4	1
TTHR	CoCrMo (Link)	UHR	**7**								1	4
TTHR	TETE Inox	Self-centering bipolar (DePuy)	**5**				4	1				
Other	(n < 5)		**122**	32	10	13	9	12	10	9	7	14
Unknown			**3**	3								
Total			**752**	**216**	**71**	**72**	**79**	**79**	**55**	**57**	**43**	**50**

Table 19: Screws - primary operations

Product	Total	2005-07	2008	2009	2010	2011	2012	2013	2014	2015	2016
Asnis III	**1362**	315	75	49	126	177	156	105	121	120	118
Hansson pin system (LIH)	**2062**	971	253	235	212	112	69	60	41	60	49
Olmed	**10428**	4038	1230	1123	790	675	660	563	448	482	419
Richards CHP	**6715**	1647	454	365	572	733	597	593	547	614	593
Other (n<10)	**3**					2			1		
Total	**20570**	**6971**	**2012**	**1772**	**1700**	**1699**	**1482**	**1321**	**1158**	**1276**	**1179**

Table 20: Hip compression screws - primary operations

Product	Total	2005-07	2008	2009	2010	2011	2012	2013	2014	2015	2016
DHS	**4260**	2649	1009	337	108	58	28	8	13	25	25
LCP DHS	**5800**		34	705	476	485	458	468	662	1356	1156
Omega	**111**	98	3	1	2	3	2	2			
Richards CHS	**18033**	4244	1426	1510	2046	2021	1992	1765	1564	773	692
Swemac CHS System	**13**									8	5
Other (n<10)	**7**	1	2					1	1		2
Total	**28224**	**6992**	**2474**	**2553**	**2632**	**2567**	**2480**	**2244**	**2240**	**2162**	**1880**

Table 21: Intramedullary nails - primary operations

Product	Total	2005-07	2008	2009	2010	2011	2012	2013	2014	2015	2016
ACE	**49**	30	12	7							
Gamma 3	**5880**	523	502	505	656	672	657	765	709	467	424
IMHS	**27**	22	3	1	1						
IMHS CP	**10**	10									
LFN	**69**	6	3	10	12	8	8	8	7	4	3
PFN	**26**	24	2								
PFNA	**941**	72	39	41	30	40	91	136	117	174	201
T2	**13**	4		2	1	3	1		2		
T2 recon	**234**	1		1	19	38	29	61	33	24	28
T-Gamma	**508**	448	34	22	3						1
Trigen Intertan	**2989**	149	406	150	133	190	186	198	282	560	735
Trigen TAN/FAN	**374**	79	25	35	17	14	22	34	22	62	64
Other (n<10)	**11**	5		2			1		2	1	
Total	**11131**	**1373**	**1026**	**776**	**872**	**965**	**995**	**1202**	**1174**	**1292**	**1456**

Fixation of hemiprostheses

Table 22: Primary operations

	Uncemented		Cement with antibiotics		Cement without antibiotics		Missing		Total
2016	682	(19,9%)	2750	(80,1%)	0	(0,0%)	2	(0,1%)	**3434**
2015	667	(20,6%)	2561	(79,2%)	1	(0,0%)	6	(0,2%)	**3235**
2014	811	(25,4%)	2360	(74,0%)	3	(0,1%)	16	(0,5%)	**3190**
2013	921	(29,7%)	2154	(69,4%)	0	(0,0%)	28	(0,9%)	**3103**
2012	1064	(33,8%)	1959	(62,3%)	11	(0,3%)	110	(3,5%)	**3144**
2011	987	(32,6%)	1925	(63,7%)	6	(0,2%)	105	(3,5%)	**3023**
2010	837	(29,8%)	1896	(67,4%)	7	(0,2%)	71	(2,5%)	**2811**
2009	568	(20,0%)	2174	(76,6%)	8	(0,3%)	87	(3,1%)	**2837**
2008	399	(15,9%)	2010	(80,1%)	8	(0,3%)	92	(3,7%)	**2509**
2007	387	(17,9%)	1726	(79,8%)	1	(0,0%)	49	(2,3%)	**2163**
2006	323	(19,3%)	1331	(79,4%)	3	(0,2%)	20	(1,2%)	**1677**
2005	233	(20,5%)	882	(77,6%)	4	(0,4%)	17	(1,5%)	**1136**
Total	**7879**	**(24,4%)**	**23728**	**(73,5%)**	**52**	**(0,2%)**	**603**	**(1,9%)**	**32262**

Figure 10: Time trend for fixation of primary hemiprostheses

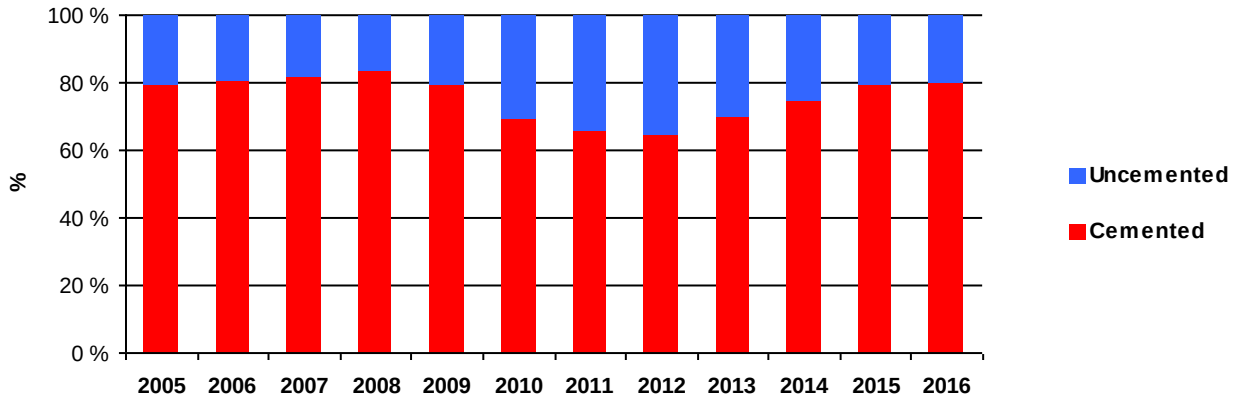


Table 23: Type of cement - primary operations

Product	Manufacturer	Total	2005-07	2008	2009	2010	2011	2012	2013	2014	2015	2016
Cemex w/gentamycin	Alere	**252**	45	4		1			11	10	71	110
Cemex System Genta FAST	Alere	**639**	22	58	101	102	83	74	84	86	29	
	Alere	**16**										16
Copal G+ V	Heraeus	**4**								1	1	2
Optipac Refobacin Bonecement R	Biomet	**6214**		42	223	518	718	790	725	911	1248	1039
Optipac Refobacin Revision	Biomet	**128**					2	1	58	67		
Palacos w/gentamicin	Heraeus/Sc	**353**	353									
Palacos R + G	Heraeus	**10867**	2107	1285	1375	993	714	690	869	880	957	997
	Heraeus	**90**									1	89
Refobacin Bone Cement R	Biomet	**4304**	1028	550	396	246	357	368	394	380	219	366
Refobacin Revision	Biomet	**2**									1	1
Refobacin-Palacos	Biomet	**314**	314									
Simplex w/Tobramycin	Stryker	**2**		1	1							
Simplex unknown	Stryker	**75**	5	15	42	13						
SmartMix Cemvac + SmartSet GHV Genta	Ortomedic	**107**	33	29	4						3	38
Missing information		**361**	32	26	32	23	51	36	13	25	31	92
Total		**23728**	**3939**	**2010**	**2174**	**1896**	**1925**	**1959**	**2154**	**2360**	**2561**	**2750**

Table 24: Hydroxyapatite (HA) - uncemented prostheses

	With HA		Without HA		Missing		Total
2016	675	(99,0%)	5	(0,7%)	2	(0,3%)	**682**
2015	664	(99,6%)	3	(0,4%)	0	(0,0%)	**667**
2014	805	(99,3%)	5	(0,6%)	1	(0,1%)	**811**
2013	920	(99,9%)	1	(0,1%)	0	(0,0%)	**921**
2012	1062	(99,8%)	2	(0,2%)	0	(0,0%)	**1064**
2011	986	(99,9%)	1	(0,1%)	0	(0,0%)	**987**
2010	824	(98,4%)	13	(1,6%)	0	(0,0%)	**837**
2009	524	(92,3%)	44	(7,7%)	0	(0,0%)	**568**
2008	362	(90,7%)	37	(9,3%)	0	(0,0%)	**399**
2007	351	(90,7%)	36	(9,3%)	0	(0,0%)	**387**
2006	284	(87,9%)	39	(12,1%)	0	(0,0%)	**323**
2005	192	(82,4%)	41	(17,6%)	0	(0,0%)	**233**
Total	**7649**	**(97,1%)**	**227**	**(2,9%)**	**3**	**(0,0%)**	**7879**

Pathological fractures

Table 25: Pathological fracture (osteoporotic fracture not included) - primary operations *

	No		Yes		Missing		Total
2016	6987	(86,5%)	117	(1,4%)	973	(12,0%)	**8077**
2015	7076	(87,6%)	117	(1,4%)	889	(11,0%)	**8082**
2014	6917	(87,7%)	80	(1,0%)	891	(11,3%)	**7888**
2013	6987	(87,2%)	133	(1,7%)	892	(11,1%)	**8012**
2012	7191	(87,4%)	106	(1,3%)	928	(11,3%)	**8225**
2011	7485	(89,0%)	135	(1,6%)	787	(9,4%)	**8407**
2010	7611	(92,8%)	93	(1,1%)	496	(6,0%)	**8200**
2009	7307	(90,2%)	107	(1,3%)	686	(8,5%)	**8100**
2008	7388	(90,0%)	102	(1,2%)	721	(8,8%)	**8211**
2007	6958	(90,2%)	93	(1,2%)	660	(8,6%)	**7711**
2006	6653	(90,1%)	91	(1,2%)	637	(8,6%)	**7381**
2005	5135	(88,9%)	65	(1,1%)	574	(9,9%)	**5774**
Total	**83695**	**(89,0%)**	**1239**	**(1,3%)**	**9134**	**(9,7%)**	**94068**

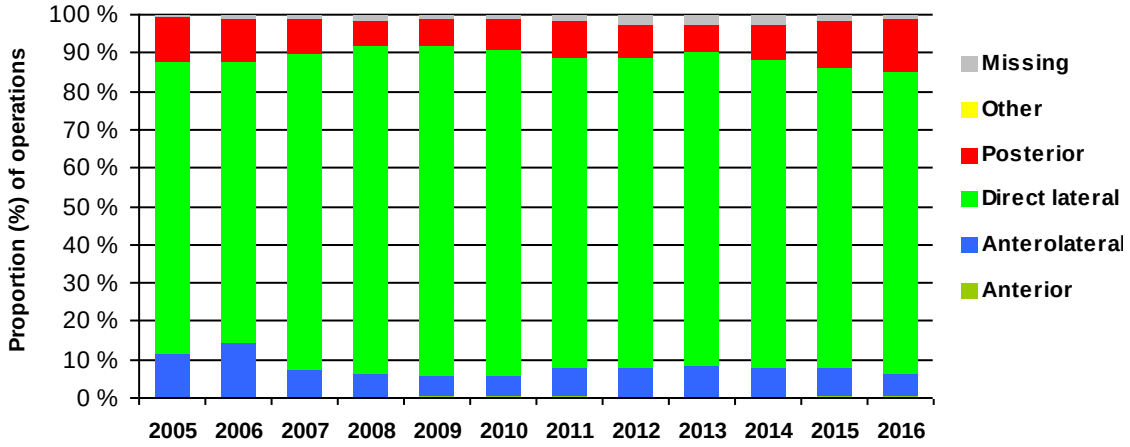
* Patients operated with total hip prostheses were excluded

Surgical approach used in hemiarthroplasty

Table 26: Surgical approach used in hemiarthroplasty

	Anterior		Anterolateral		Direct lateral		Posterior		Other		Missing		Total
2016	11	(0,3%)	209	(6,1%)	2692	(78,4%)	485	(14,1%)	0	(0,0%)	36	(1,0%)	**3433**
2015	14	(0,4%)	232	(7,2%)	2544	(78,6%)	387	(12,0%)	1	(0,0%)	57	(1,8%)	**3235**
2014	3	(0,1%)	252	(7,9%)	2560	(80,3%)	291	(9,1%)	1	(0,0%)	83	(2,6%)	**3190**
2013	8	(0,3%)	255	(8,2%)	2538	(81,8%)	224	(7,2%)	0	(0,0%)	78	(2,5%)	**3103**
2012	6	(0,2%)	238	(7,6%)	2535	(80,6%)	278	(8,8%)	1	(0,0%)	86	(2,7%)	**3144**
2011	11	(0,4%)	228	(7,5%)	2443	(80,8%)	290	(9,6%)	0	(0,0%)	51	(1,7%)	**3023**
2010	14	(0,5%)	142	(5,1%)	2391	(85,1%)	230	(8,2%)	0	(0,0%)	34	(1,2%)	**2811**
2009	14	(0,5%)	147	(5,2%)	2441	(86,0%)	200	(7,0%)	0	(0,0%)	35	(1,2%)	**2837**
2008	1	(0,0%)	155	(6,2%)	2143	(85,4%)	176	(7,0%)	0	(0,0%)	34	(1,4%)	**2509**
2007	0	(0,0%)	162	(7,5%)	1777	(82,2%)	201	(9,3%)	0	(0,0%)	23	(1,1%)	**2163**
2006	1	(0,1%)	244	(14,5%)	1224	(73,0%)	189	(11,3%)	0	(0,0%)	19	(1,1%)	**1677**
2005	0	(0,0%)	131	(11,5%)	864	(76,1%)	136	(12,0%)	0	(0,0%)	5	(0,4%)	**1136**
Total	**83**	**(0,3%)**	**2395**	**(7,4%)**	**26152**	**(81,1%)**	**3087**	**(9,6%)**	**3**	**(0,0%)**	**541**	**(1,7%)**	**32261**

Figure 11: Surgical approach used in hemiarthroplasty



Definition of operative approach:

- **Anterior** (between sartorius and tensor)
- **Anterolateral** (between gluteus medius and tensor)
- **Direct lateral** (transgluteal)
- **Posterior** (behind the gluteus medius)

Intraoperative complications

Table 27: Intraoperative complications - primary operations

	Yes		No		Missing		Total
2016	332	(3,9%)	7831	(93,0%)	259	(3,1%)	**8422**
2015	305	(3,6%)	7807	(92,9%)	294	(3,5%)	**8406**
2014	308	(3,8%)	7582	(92,7%)	287	(3,5%)	**8177**
2013	306	(3,7%)	7746	(93,2%)	257	(3,1%)	**8309**
2012	340	(4,0%)	7770	(92,1%)	325	(3,9%)	**8435**
2011	353	(4,1%)	7959	(92,6%)	287	(3,3%)	**8599**
2010	322	(3,9%)	7762	(92,8%)	279	(3,3%)	**8363**
2009	302	(3,7%)	7684	(93,1%)	272	(3,3%)	**8258**
2008	365	(4,4%)	7726	(92,4%)	271	(3,2%)	**8362**
2007	273	(3,5%)	7359	(93,5%)	238	(3,0%)	**7870**
2006	244	(3,3%)	7020	(93,4%)	253	(3,4%)	**7517**
2005	188	(3,2%)	5557	(94,5%)	134	(2,3%)	**5879**
Total	**3638**	**(3,8%)**	**89803**	**(93,0%)**	**3156**	**(3,3%)**	**96597**

Antibiotic prophylaxis

Table 28: Screw - primary fixation

	Yes		No		Missing		Total
2016	1113	(94,1%)	63	(5,3%)	7	(0,6%)	**1183**
2015	1165	(91,3%)	102	(8,0%)	9	(0,7%)	**1276**
2014	988	(85,3%)	162	(14,0%)	8	(0,7%)	**1158**
2013	1008	(76,3%)	307	(23,2%)	6	(0,5%)	**1321**
2012	1016	(68,6%)	455	(30,7%)	11	(0,7%)	**1482**
2011	1000	(58,9%)	682	(40,1%)	17	(1,0%)	**1699**
2010	952	(56,0%)	721	(42,4%)	26	(1,5%)	**1699**
2009	885	(50,0%)	859	(48,6%)	25	(1,4%)	**1769**
2008	930	(46,3%)	1050	(52,3%)	27	(1,3%)	**2007**
2007	905	(40,6%)	1300	(58,3%)	26	(1,2%)	**2231**
2006	812	(32,1%)	1663	(65,8%)	51	(2,0%)	**2526**
2005	533	(24,2%)	1626	(73,7%)	47	(2,1%)	**2206**
Total	**11307**	**(55,0%)**	**8990**	**(43,7%)**	**260**	**(1,3%)**	**20557**

Table 29: Hemiprosthesis - primary operations

	Yes		No		Missing		Total
2016	3408	(99,5%)	3	(0,1%)	15	(0,4%)	**3426**
2015	3227	(99,8%)	2	(0,1%)	5	(0,2%)	**3234**
2014	3183	(99,8%)	0	(0,0%)	6	(0,2%)	**3189**
2013	3090	(99,6%)	4	(0,1%)	9	(0,3%)	**3103**
2012	3134	(99,7%)	6	(0,2%)	2	(0,1%)	**3142**
2011	3009	(99,6%)	4	(0,1%)	9	(0,3%)	**3022**
2010	2803	(99,8%)	4	(0,1%)	3	(0,1%)	**2810**
2009	2826	(99,6%)	8	(0,3%)	3	(0,1%)	**2837**
2008	2487	(99,1%)	13	(0,5%)	9	(0,4%)	**2509**
2007	2150	(99,4%)	7	(0,3%)	6	(0,3%)	**2163**
2006	1665	(99,3%)	9	(0,5%)	3	(0,2%)	**1677**
2005	1129	(99,4%)	2	(0,2%)	5	(0,4%)	**1136**
Total	**32111**	**(99,6%)**	**62**	**(0,2%)**	**75**	**(0,2%)**	**32248**

Table 30: Hip compression screw and plate (including angle plate) - primary operations

	Yes		No		Missing		Total
2016	1871	(99,5%)	1	(0,1%)	8	(0,4%)	**1880**
2015	2154	(99,6%)	3	(0,1%)	5	(0,2%)	**2162**
2014	2227	(99,4%)	7	(0,3%)	6	(0,3%)	**2240**
2013	2239	(99,7%)	4	(0,2%)	2	(0,1%)	**2245**
2012	2462	(99,2%)	14	(0,6%)	5	(0,2%)	**2481**
2011	2527	(98,4%)	28	(1,1%)	12	(0,5%)	**2567**
2010	2583	(98,1%)	37	(1,4%)	12	(0,5%)	**2632**
2009	2490	(97,5%)	53	(2,1%)	10	(0,4%)	**2553**
2008	2377	(96,0%)	83	(3,4%)	16	(0,6%)	**2476**
2007	2361	(94,0%)	138	(5,5%)	13	(0,5%)	**2512**
2006	2343	(93,0%)	161	(6,4%)	16	(0,6%)	**2520**
2005	1823	(92,9%)	121	(6,2%)	18	(0,9%)	**1962**
Total	**27457**	**(97,3%)**	**650**	**(2,3%)**	**123**	**(0,4%)**	**28230**

Table 31: Intramedullary nail - primary operations

	Yes		No		Missing		Total
2016	1446	(99,5%)	1	(0,1%)	6	(0,4%)	**1453**
2015	1278	(99,2%)	6	(0,5%)	4	(0,3%)	**1288**
2014	1157	(98,6%)	5	(0,4%)	11	(0,9%)	**1173**
2013	1181	(98,3%)	15	(1,2%)	5	(0,4%)	**1201**
2012	935	(94,1%)	53	(5,3%)	6	(0,6%)	**994**
2011	864	(89,5%)	96	(9,9%)	5	(0,5%)	**965**
2010	796	(91,3%)	68	(7,8%)	8	(0,9%)	**872**
2009	712	(91,9%)	58	(7,5%)	5	(0,6%)	**775**
2008	914	(89,1%)	105	(10,2%)	7	(0,7%)	**1026**
2007	573	(91,1%)	54	(8,6%)	2	(0,3%)	**629**
2006	397	(89,0%)	48	(10,8%)	1	(0,2%)	**446**
2005	236	(79,5%)	56	(18,9%)	5	(1,7%)	**297**
Total	**10489**	**(94,3%)**	**565**	**(5,1%)**	**65**	**(0,6%)**	**11119**

Table 32: Reoperations

	Yes		No		Missing		Total
2016	827	(87,6%)	106	(11,2%)	11	(1,2%)	**944**
2015	831	(91,8%)	63	(7,0%)	11	(1,2%)	**905**
2014	726	(94,3%)	42	(5,5%)	2	(0,3%)	**770**
2013	809	(91,4%)	66	(7,5%)	10	(1,1%)	**885**
2012	803	(90,7%)	76	(8,6%)	6	(0,7%)	**885**
2011	804	(88,4%)	92	(10,1%)	14	(1,5%)	**910**
2010	730	(85,7%)	111	(13,0%)	11	(1,3%)	**852**
2009	793	(82,4%)	151	(15,7%)	18	(1,9%)	**962**
2008	783	(84,2%)	131	(14,1%)	16	(1,7%)	**930**
2007	797	(85,7%)	125	(13,4%)	8	(0,9%)	**930**
2006	753	(84,6%)	120	(13,5%)	17	(1,9%)	**890**
2005	545	(82,5%)	108	(16,3%)	8	(1,2%)	**661**
Total	**9201**	**(87,4%)**	**1191**	**(11,3%)**	**132**	**(1,3%)**	**10524**

Table 33: Type of antibiotics - primary operations (n=86720)

Antibiotics (generic name)	2005-07	2008	2009	2010	2011	2012	2013	2014	2015	2016
Ampicillin (Pentrexyl, Pondocillin, Doktacilin)	0,38%	0,28%	0,16%	0,25%	0,21%	0,16%	0,19%	0,22%	0,10%	0,09%
Benzylpenicillin (Penicillin G)	0,15%	0,13%	0,17%	0,05%	0,23%	0,28%	0,30%	0,28%	0,35%	0,33%
Cefalotin (Keflin)	73,40%	75,37%	76,46%	77,41%	73,46%	73,27%	74,73%	77,76%	78,01%	82,84%
Cefotaksim (Claforan)	0,23%	0,14%	0,22%	0,20%	0,33%	0,31%	0,30%	0,26%	0,19%	0,28%
Cefuroksim (Zinacef, Cefuroxim, Lifurox)	5,02%	4,55%	3,80%	3,61%	3,67%	4,31%	2,14%	0,97%	0,33%	0,28%
Ciprofloksasin (Ciproxin)	0,09%	0,05%	0,15%	0,14%	0,19%	0,19%	0,18%	0,07%	0,10%	0,03%
Dikloksacillin (Diclocil, Dicillin)	4,92%	4,92%	3,66%	1,59%	2,01%	2,25%	1,56%	0,20%	0,19%	0,15%
Gentamicin (Garamycin, Gensumycin)	0,20%	0,15%	0,06%	0,08%	0,13%	0,12%	0,04%	0,12%	0,13%	0,10%
Klindamycin (Dalacin, Clindamycin)	1,71%	2,23%	2,28%	2,49%	3,08%	3,23%	3,60%	3,78%	3,91%	4,23%
Kloksacillin (Ekvacillin)	0,61%	1,14%	2,13%	4,31%	5,69%	4,73%	5,67%	5,96%	5,45%	0,85%
Mecillinam (Selexid)	0,04%	0,03%	0,04%	0,02%	0,14%	0,09%	0,12%	0,12%	0,12%	0,07%
Metronidasol (Flagyl, Metronidazol, Elyzol)	0,04%	0,06%	0,06%	0,07%	0,10%	0,13%	0,09%	0,03%	0,06%	0,05%
Piperacillin\Tazobactam (Tazocin)	0,01%	0,03%	0,01%	0,04%	0,06%	0,06%	0,09%	0,08%	0,06%	0,18%
Other	0,43%	0,14%	0,17%	0,18%	0,27%	0,32%	0,23%	0,31%	0,18%	0,27%
Missing information	0,43%	0,34%	0,28%	0,31%	0,25%	0,21%	0,45%	0,43%	0,36%	0,29%

Pharmacological antithrombotic prophylaxis

Table 34: Primary operation

	Yes		No		Missing		Total
2016	8207	(97,5%)	182	(1,9%)	32	(0,6%)	**8422**
2015	8204	(97,6%)	168	(1,8%)	34	(0,6%)	**8406**
2014	7962	(97,4%)	191	(1,9%)	24	(0,7%)	**8177**
2013	8162	(98,2%)	139	(1,3%)	8	(0,4%)	**8309**
2012	8308	(98,5%)	125	(1,1%)	2	(0,4%)	**8435**
2011	8488	(98,7%)	92	(1,0%)	19	(0,3%)	**8599**
2010	8238	(98,5%)	94	(1,1%)	31	(0,4%)	**8363**
2009	8150	(98,7%)	78	(0,9%)	30	(0,4%)	**8258**
2008	8218	(98,3%)	112	(1,3%)	32	(0,4%)	**8362**
2007	7707	(97,9%)	135	(1,7%)	28	(0,4%)	**7870**
2006	7274	(96,8%)	197	(2,6%)	46	(0,6%)	**7517**
2005	5736	(97,6%)	117	(2,0%)	26	(0,4%)	**5879**
Total	**94654**	**(98,0%)**	**1630**	**(1,7%)**	**312**	**(0,3%)**	**96597**

Table 35: Number of drugs in antithrombotic prophylaxis

	One drug		Two drugs		Total
2016	8031	(97,9%)	176	(2,1%)	**8207**
2015	7957	(97,0%)	247	(3,0%)	**8204**
2014	7745	(97,3%)	217	(2,7%)	**7962**
2013	7902	(96,8%)	260	(3,2%)	**8162**
2012	8134	(97,9%)	174	(2,1%)	**8308**
2011	8402	(99,0%)	86	(1,0%)	**8488**
2010	8204	(99,6%)	34	(0,4%)	**8238**
2009	8132	(99,8%)	18	(0,2%)	**8150**
2008	8202	(99,8%)	16	(0,2%)	**8218**
2007	7692	(99,8%)	15	(0,2%)	**7707**
2006	7259	(99,8%)	15	(0,2%)	**7274**
2005	5715	(99,6%)	21	(0,4%)	**5736**
Total	**93375**	**(98,6%)**	**1279**	**(1,4%)**	**94654**

Table 36: Antithrombotic prophylaxis if one drug - primary operation (n=93378)

	2005-07	2008	2009	2010	2011	2012	2013	2014	2015	2016
Dalteparin (Fragmin)	51,80%	63,72%	51,94%	61,32%	62,97%	62,93%	53,35%	51,03%	59,82%	64,90%
Enoksaparin (Klexane)	47,92%	35,98%	47,70%	38,37%	36,62%	36,33%	45,68%	48,04%	39,11%	34,13%
Other	0,06%	0,13%	0,18%	0,18%	0,09%	0,05%	0,26%	0,37%	0,46%	0,40%
Missing information	0,19%	0,18%	0,17%	0,12%	0,31%	0,70%	0,68%	0,56%	0,62%	0,60%

Table 37: Time of first dose in antithrombotic prophylaxis - primary operation

	Preoperatively		Postoperatively		Missing		Total
2016	2581	(31,5%)	4707	(57,4%)	920	(11,2%)	**8208**
2015	2633	(32,1%)	4693	(57,2%)	878	(10,7%)	**8204**
2014	2618	(32,9%)	4475	(56,2%)	869	(10,9%)	**7962**
2013	2819	(34,6%)	4351	(53,3%)	992	(12,1%)	**8162**
2012	3108	(37,4%)	4132	(49,8%)	1068	(12,9%)	**8308**
2011	3322	(39,2%)	4060	(47,8%)	1106	(9,8%)	**8488**
2010	3309	(40,2%)	3585	(43,5%)	1344	(10,5%)	**8238**
2009	3760	(46,2%)	3046	(37,4%)	1344	(12,1%)	**8150**
2008	3509	(42,7%)	2973	(36,2%)	1736	(16,3%)	**8218**
2007	2925	(38,0%)	2968	(38,5%)	1814	(17,6%)	**7707**
2006	2931	(40,4%)	2058	(28,3%)	2285	(19,6%)	**7274**
2005	2188	(38,7%)	44	(0,8%)	3504	(26,7%)	**5736**
Total	**35703**	**(37,7%)**	**41092**	**(43,4%)**	**17860**	**(18,9%)**	**94655**

DURATION OF SURGERY

Figure 13: Duration of surgery for the different types of operations

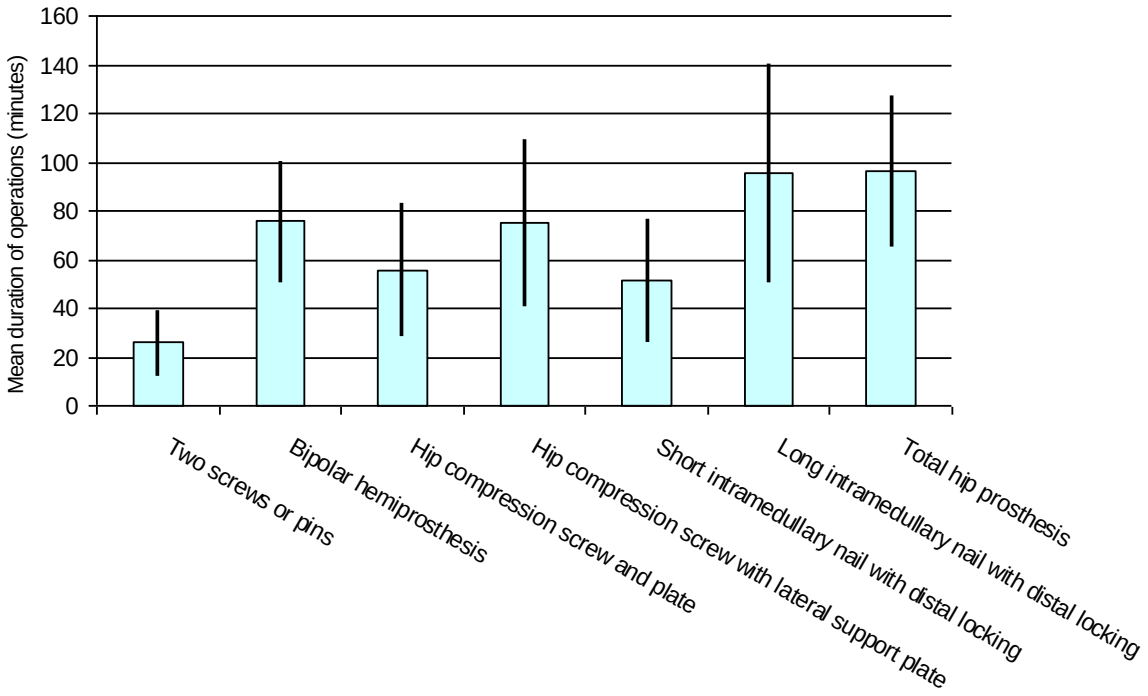


Table 38: Duration of surgery for the different types of operations

Type of operations	Total	Mean duration of operations (minutes)	Standard deviation
Two screws or pins	19015	26	13
Bipolar hemiprosthesis	30735	76	25
Hip compression screw and plate	18880	56	27
Hip compression screw with lateral support plate	8107	75	34
Short intramedullary nail with distal locking	6665	52	25
Long intramedullary nail with distal locking	3512	96	45
Total hip prosthesis	2460	97	31

PROM (Patient Reported Outcome Measures)

Table 39: Number of issued and answered patient questionnaires

	4 months *		12 months *		36 months *		Total	
	Issued	Answered (%)	Issued	Answered (%)	Issued	Answered (%)	Issued	Answered (%)
2016	7016	3958 (56,4%)	6077	3251 (53,5%)	4206	2321 (55,2%)	**17299**	**9530** (55,1%)
2015	6919	3980 (57,5%)	5844	3257 (55,7%)	4385	2392 (54,5%)	**17148**	**9629** (56,2%)
2014	6818	3825 (56,1%)	6003	3272 (54,5%)	4332	2350 (54,2%)	**17153**	**9447** (55,1%)
2013	6904	3955 (57,3%)	6096	3515 (57,7%)	4443	2439 (54,9%)	**17443**	**9909** (56,8%)
2012	7575	4202 (55,5%)	6784	3816 (56,3%)	1789	1050 (58,7%)	**16148**	**9068** (56,2%)
2011	6459	3555 (55,0%)	5553	3118 (56,1%)	1411	816 (57,8%)	**13423**	**7489** (55,8%)
2010	4985	2826 (56,7%)	2264	1308 (57,8%)	3752	2134 (56,9%)	**11001**	**6268** (57,0%)
2009	2554	1484 (58,1%)	2360	1363 (57,8%)	4095	2207 (53,9%)	**9009**	**5054** (56,1%)
2008	2273	1305 (57,4%)	1904	1086 (57,0%)	3180	1817 (57,1%)	**7357**	**4208** (57,2%)
2007	3503	1967 (56,2%)	5069	2837 (56,0%)			**8572**	**4804** (56,0%)
2006	6160	3607 (58,6%)	4848	2787 (57,5%)			**11008**	**6394** (58,1%)
2005	2817	1641 (58,3%)					**2817**	**1641** (58,3%)
Total	63983	36305 (56,7%)	52802	29610 (56,1%)	31593	17526 (55,5%)	**148378**	**83441** (56,2%)

* The register sends questionnaires to patients 4, 12 and 36 months post-operatively

Figures 13-20 present patient-reported data collected on questionnaires 4, 12, and 36 months postoperative.

Figure 13: Mean EQ-5D-3L index score for different fracture types. An index score of 1 represents the best possible health state and 0 represents a health state similar to death.

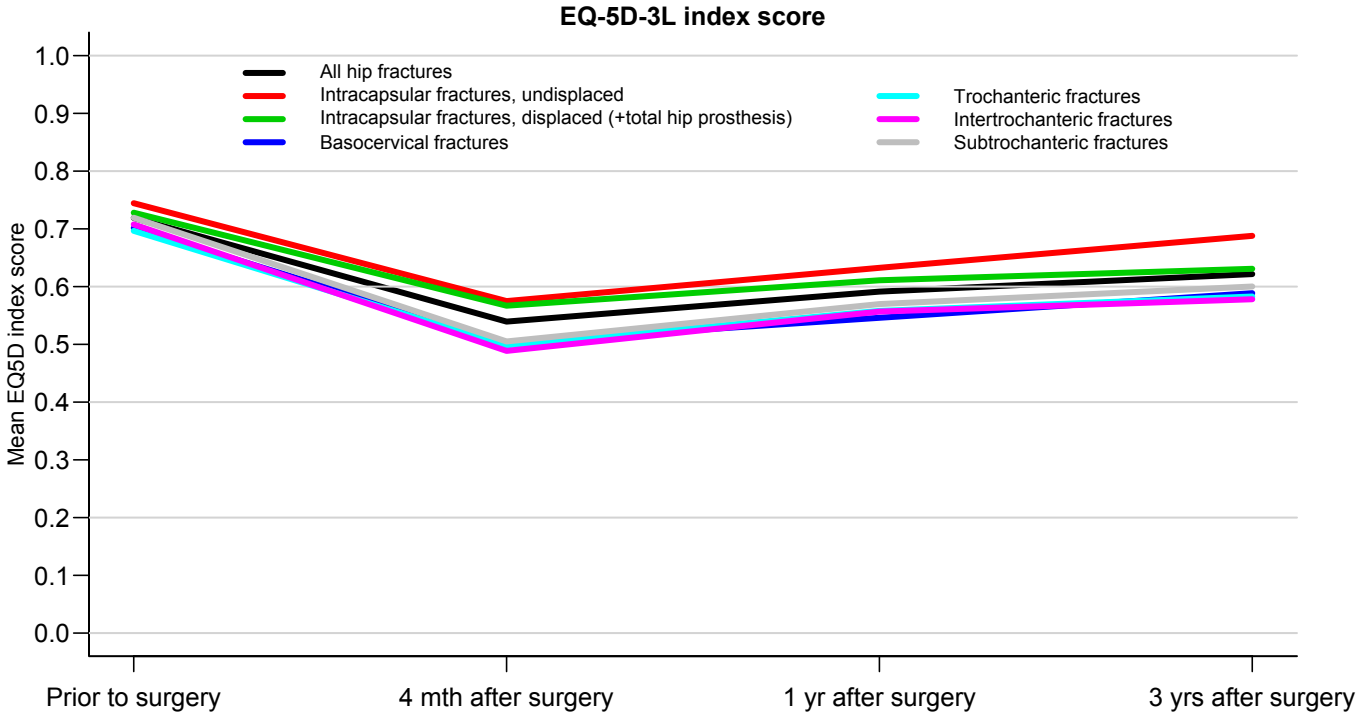


Figure 14: Mean EQ-5D-3L index score for different operation methods. An index score of 1 represents the best possible health state and 0 represents a health state similar to death.

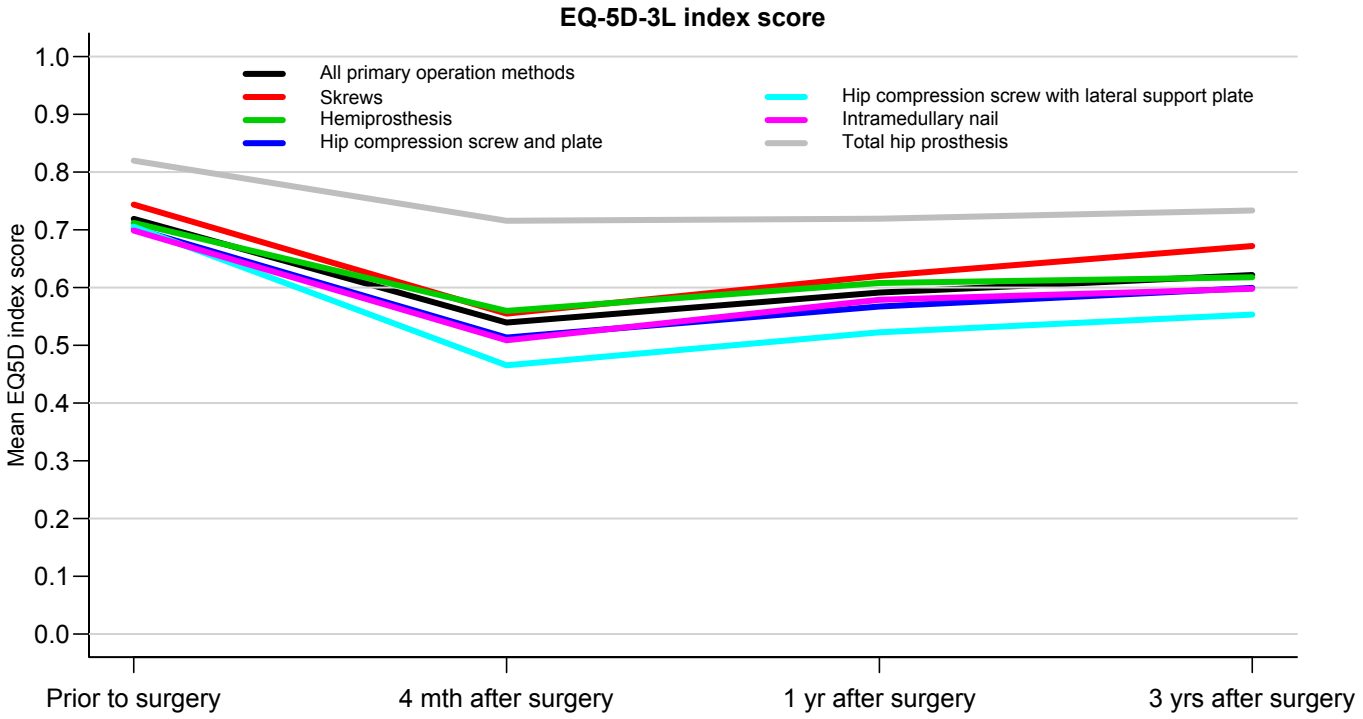


Figure 15: Walking ability derived from the first dimension of EQ-5D-3L for different fracture types. The figure shows the proportion of patients reporting «I have some problems in walking about» or «I am confined to bed» at different follow-ups.

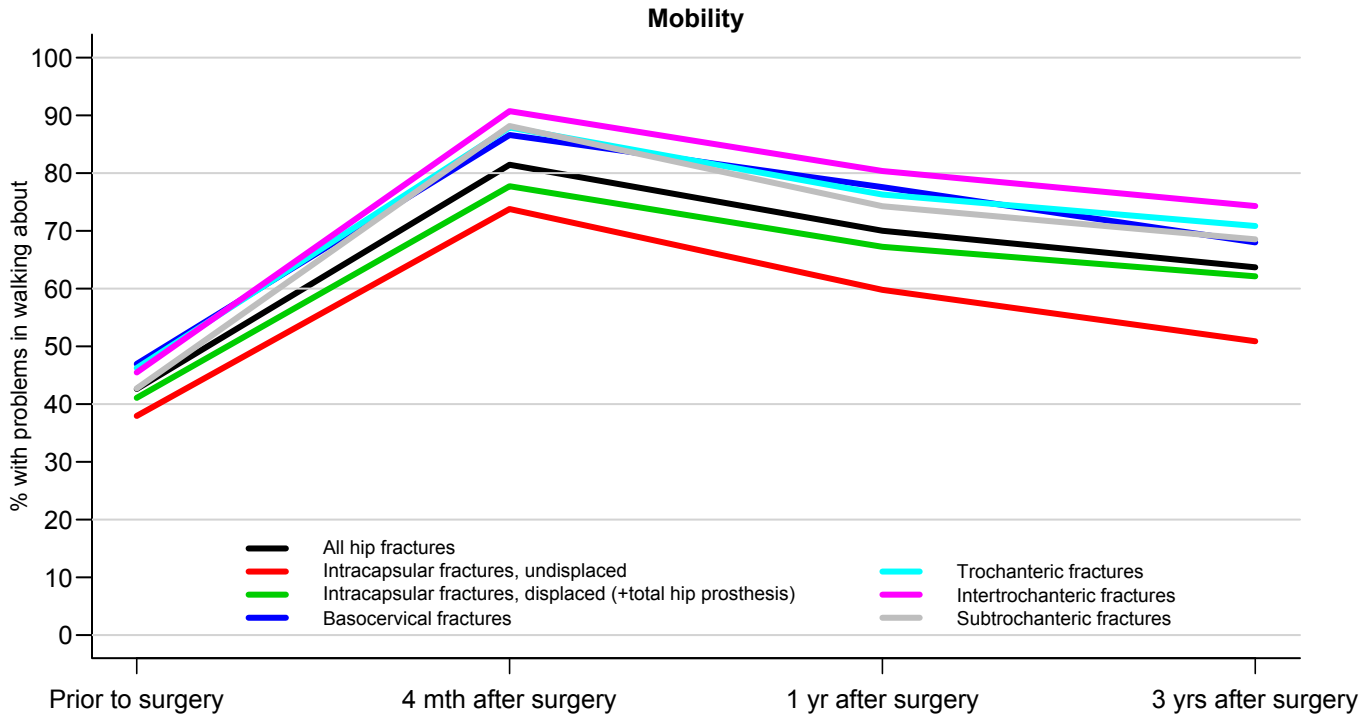


Figure 16: Walking ability derived from the first dimension of EQ-5D-3L for different operation methods. The figure shows the proportion of patients reporting «I have some problems in walking about» or «I am confined to bed» at different follow-ups.

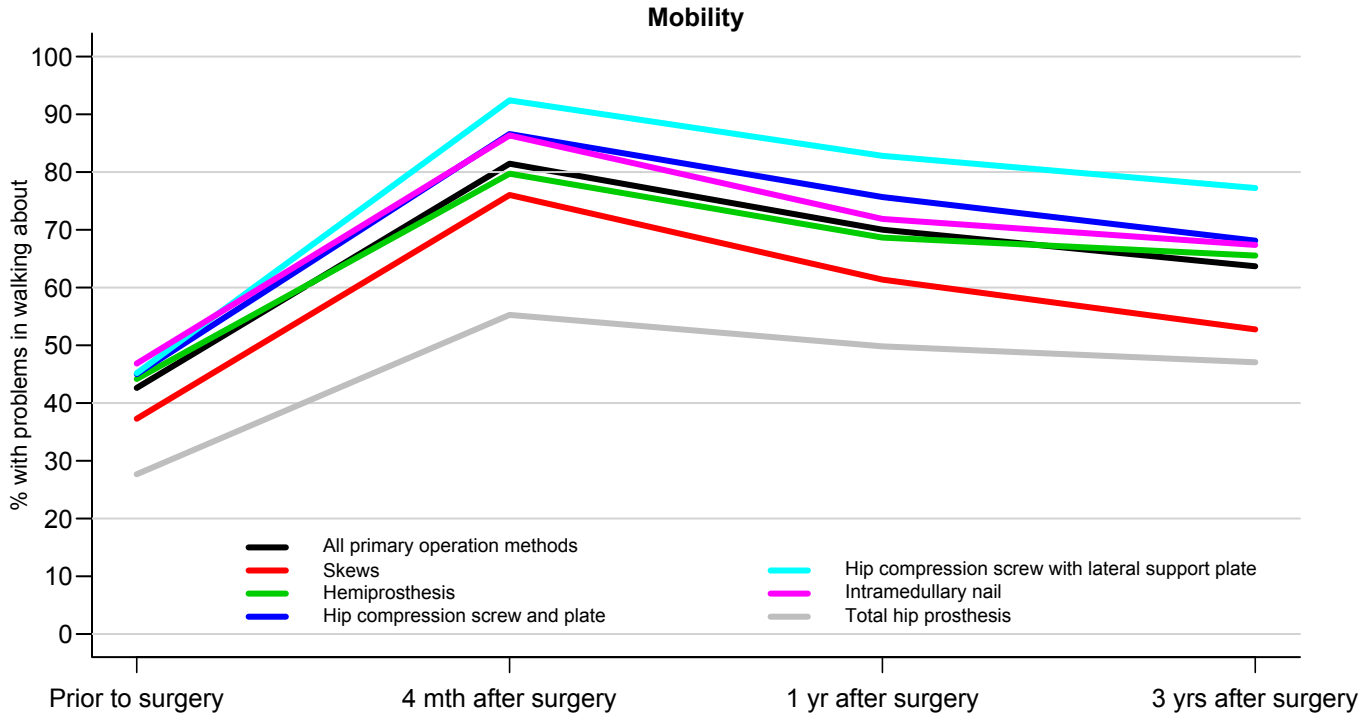


Figure 17: Pain derived from the fourth dimension of EQ-5D-3L for different fracture types. The figure shows the proportion of patients reporting «I have moderate pain or discomfort» or «I have extreme pain or discomfort» at different follow-ups.

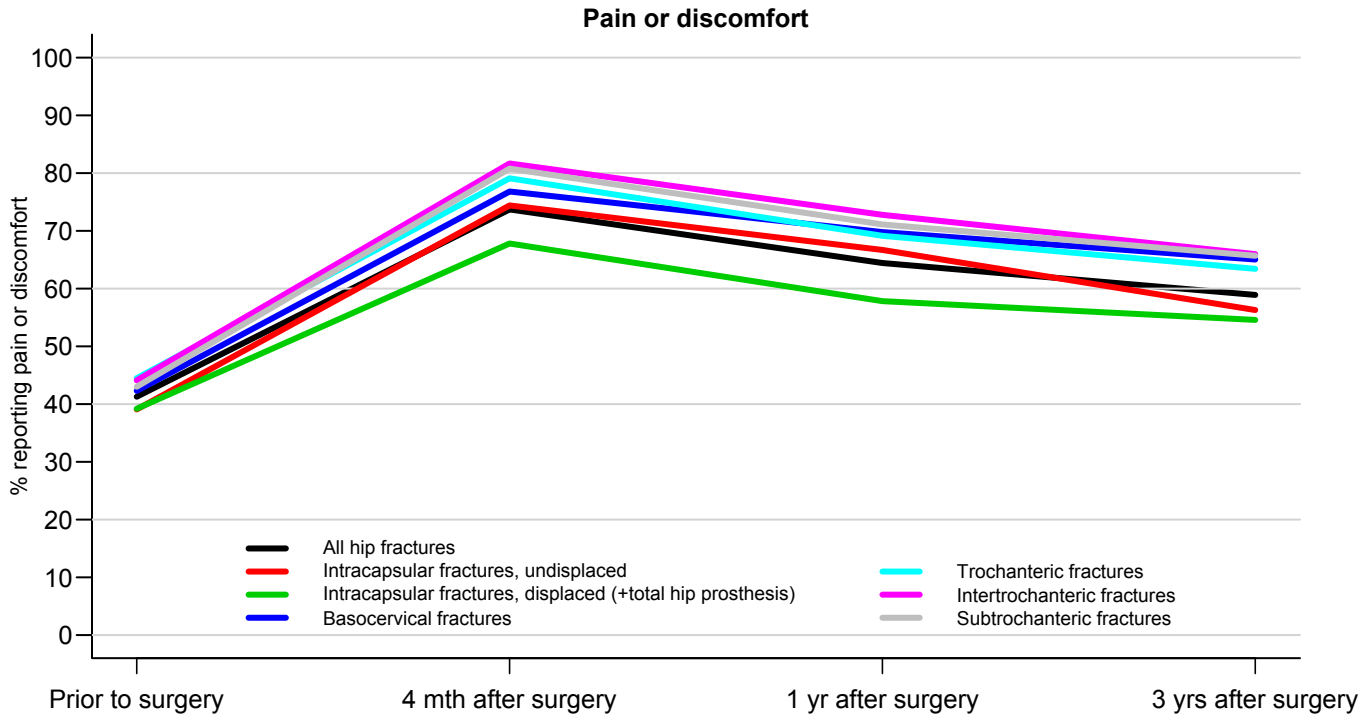


Figure 18: Pain derived from the fourth dimension of EQ-5D-3L for different operation methods. The figure shows the proportion of patients reporting «I have moderate pain or discomfort» or «I have extreme pain or discomfort» at different follow-ups.

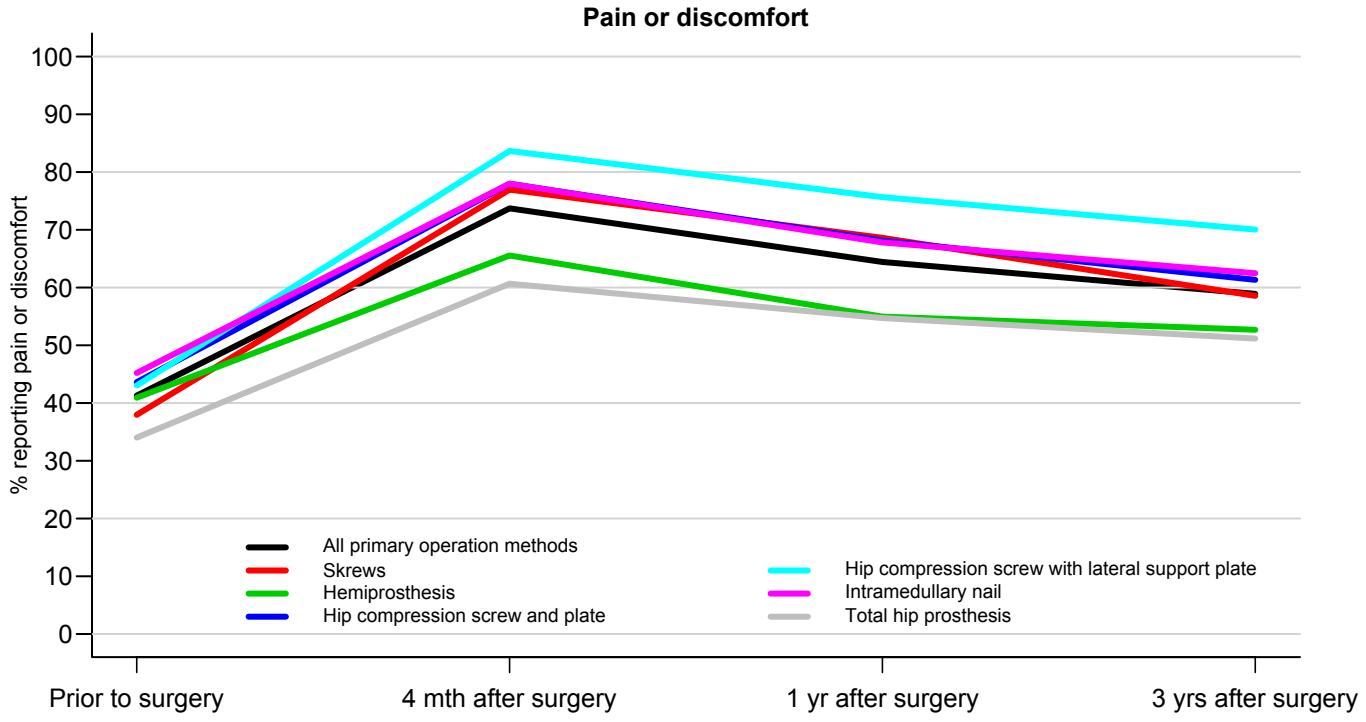


Figure 19: Satisfaction with the result of the operation for different fracture types at different follow-ups. The figure shows the proportion of patients reporting to be satisfied or very satisfied (0-40 points on a visual analogue scale where the value 0 indication very satisfied and 100 indicating very dissatisfied).

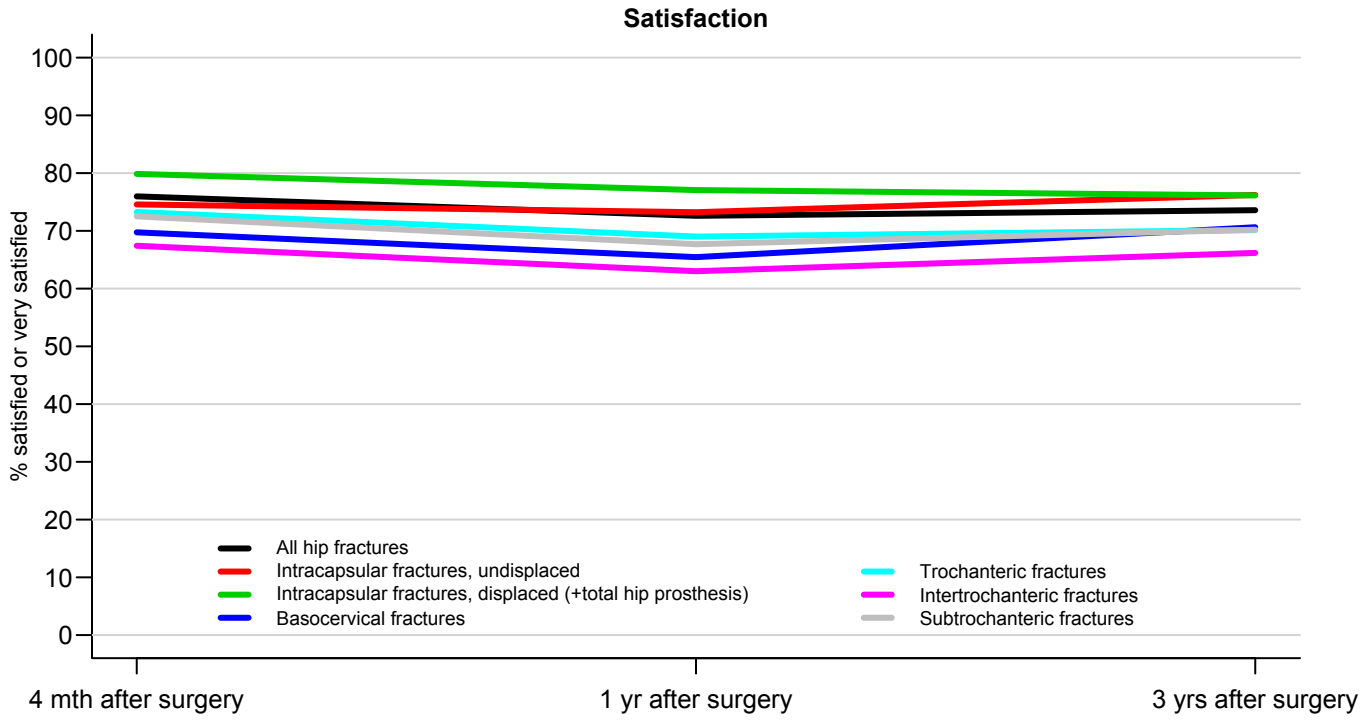
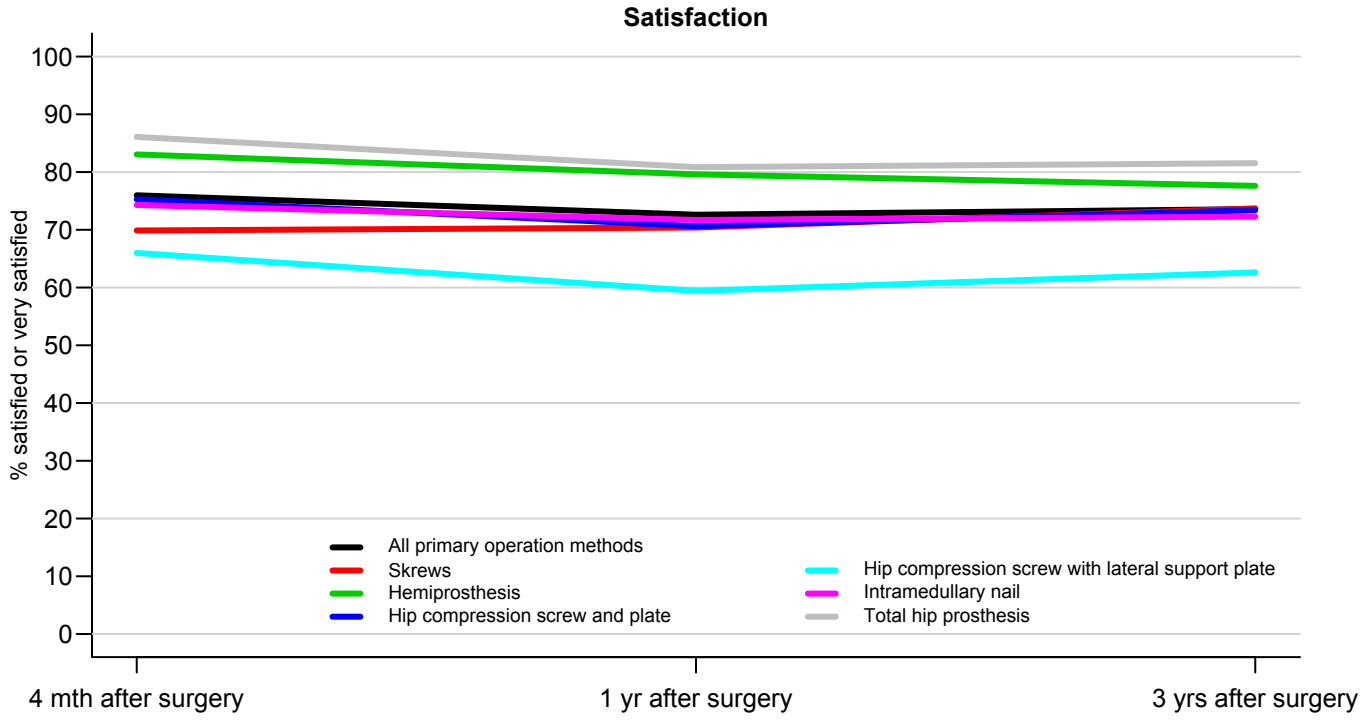


Figure 20: Satisfaction with the result of the operation for different operation methods at different follow-ups. The figure shows the proportion of patients reporting to be satisfied or very satisfied (0-40 points on a visual analogue scale where the value 0 indication very satisfied and 100 indicating very dissatisfied).



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 on www.kvalitetsregistre.no. Figures 21 to 25 present updated results for the different hospitals for operations performed in the period 2014-2016.

Figure 21: Number of primary operations in 2016

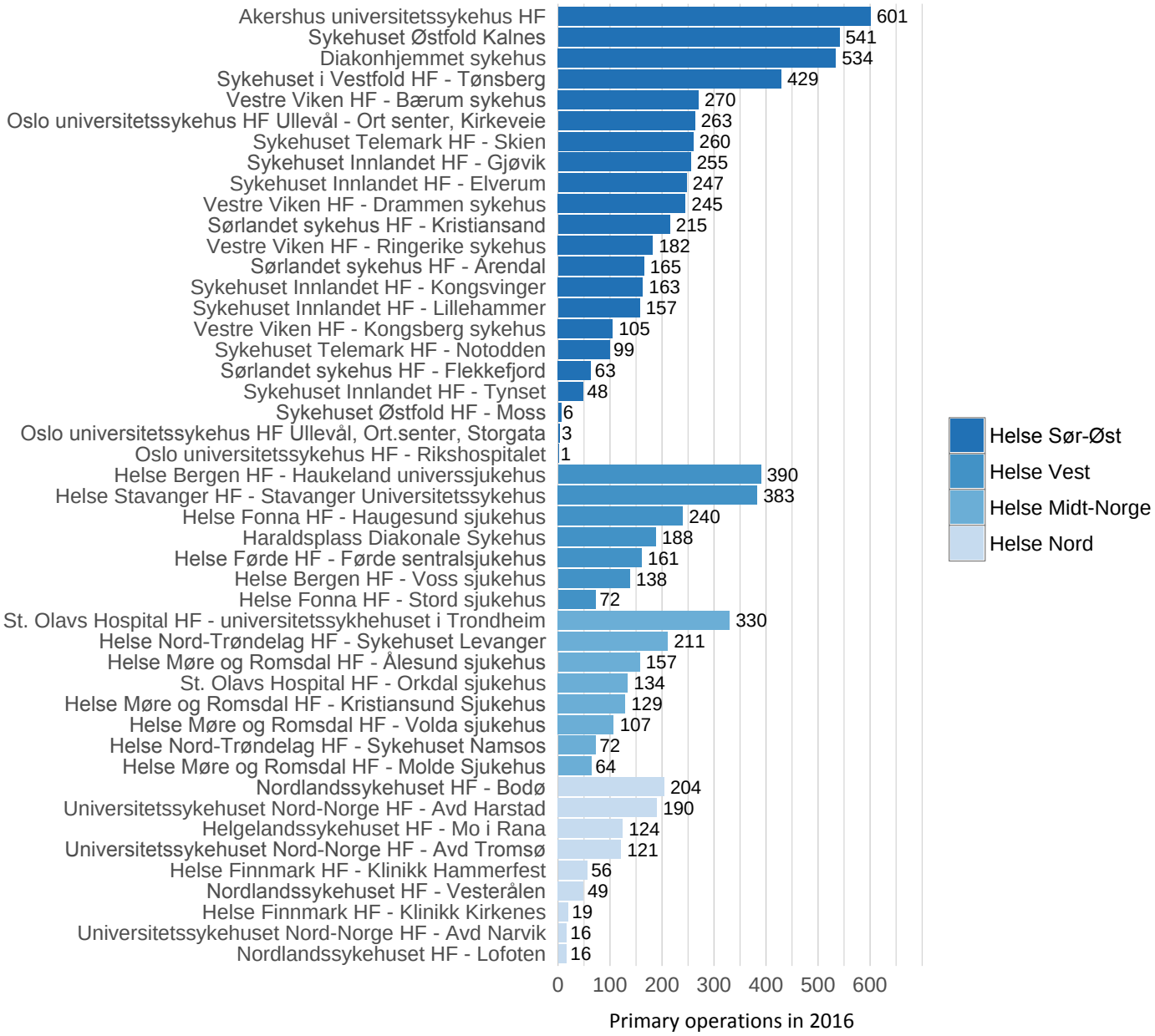


Figure 22: Treatment of displaced femoral neck fracture in patients over 70 years of age. The figure shows the proportion of patients treated with screw osteosynthesis/hemiprosthesis/total hip prosthesis at each hospital in the period 2014-2016. Hospitals with n<10 have been excluded.

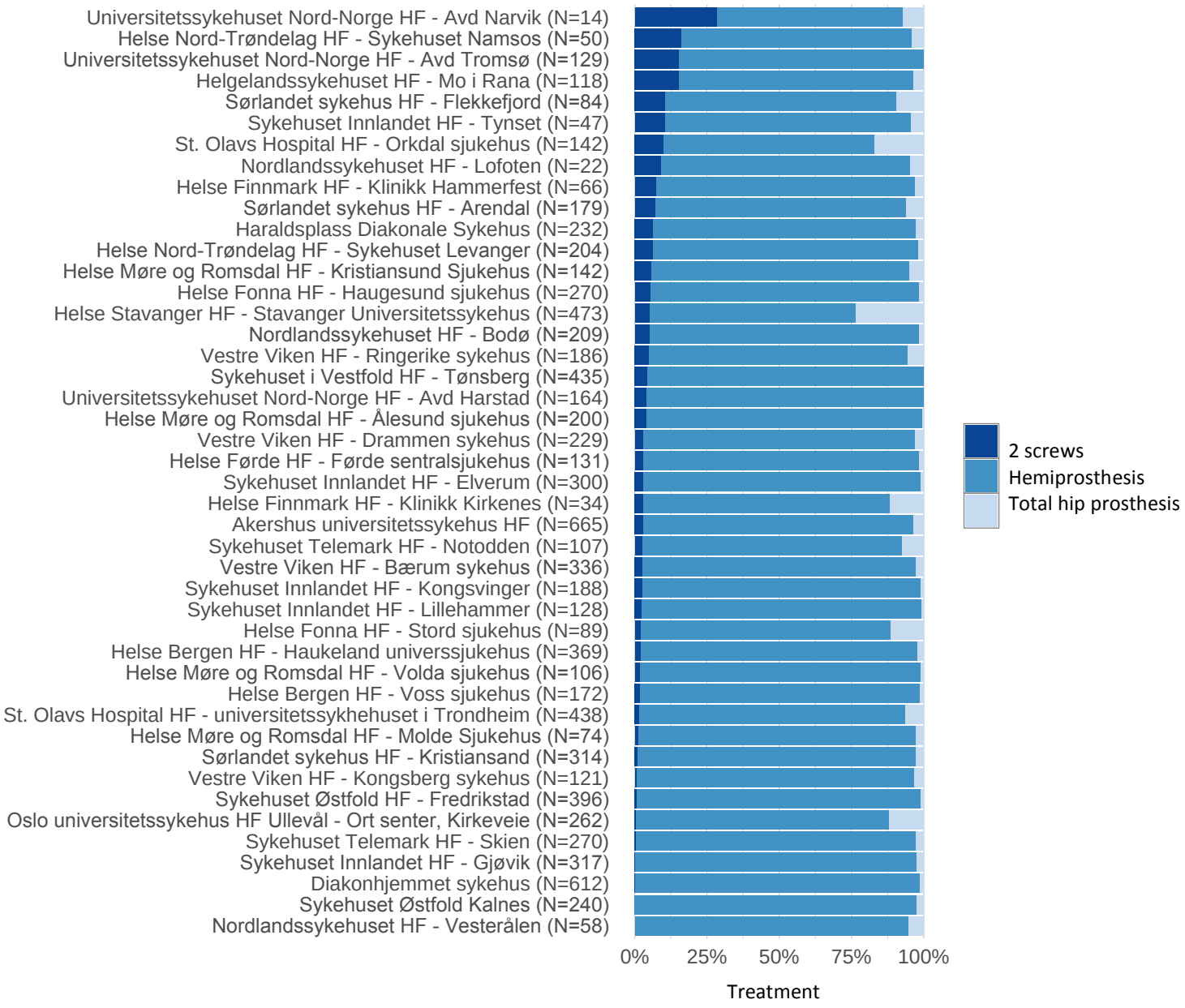


Figure 23: Reoperations after all types of hip fractures 2014-2016. The figure shows the proportion of patients not reoperated at each hospital. Hospitals with n<10 have been excluded.

Figure 24: Reoperations after displaced femoral neck fractures in patients over 70 years of age, regardless of type of primary operation. The figure shows the proportion of patients not reoperated at each hospital. Hospitals with n<10 have been excluded.

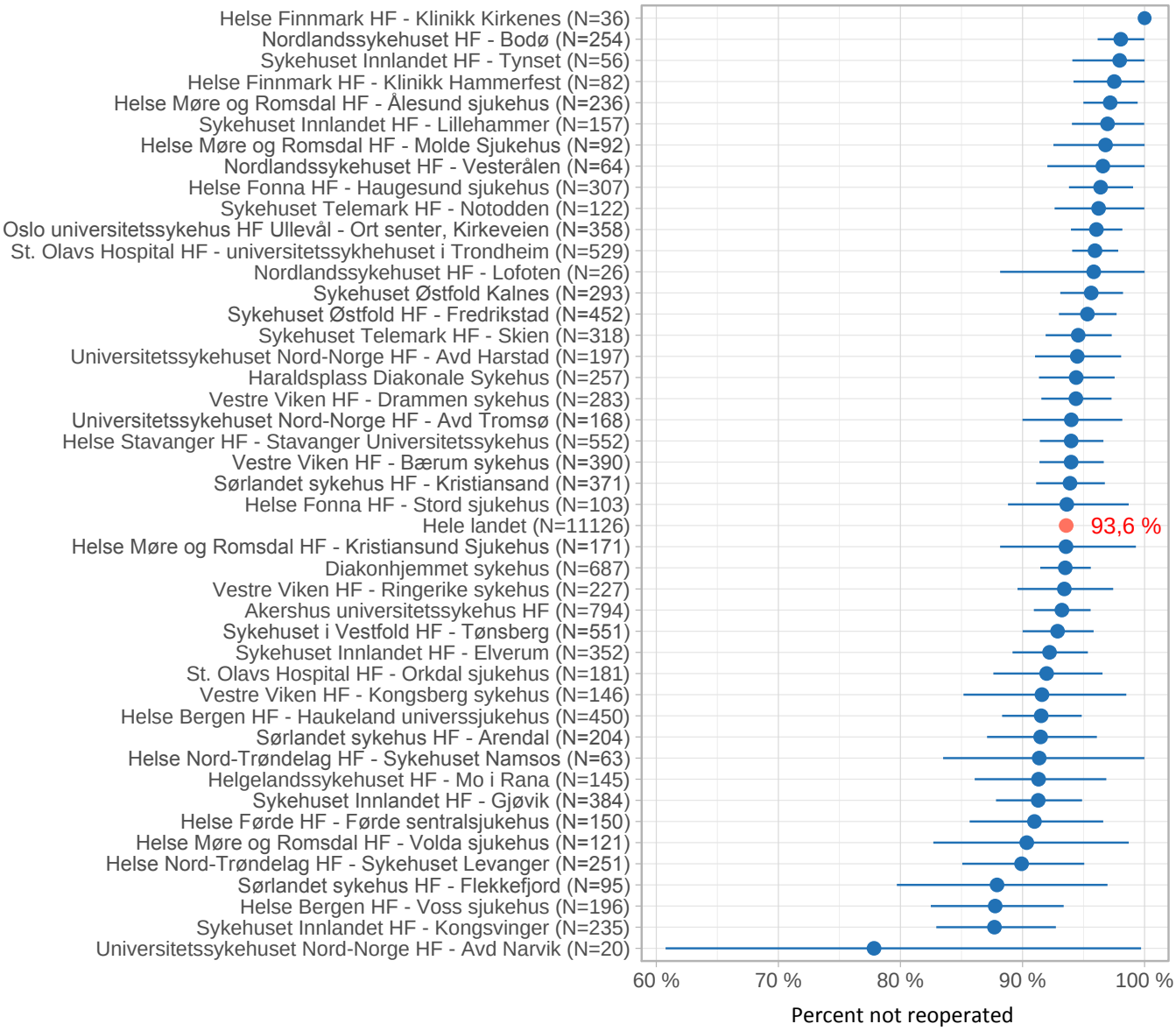
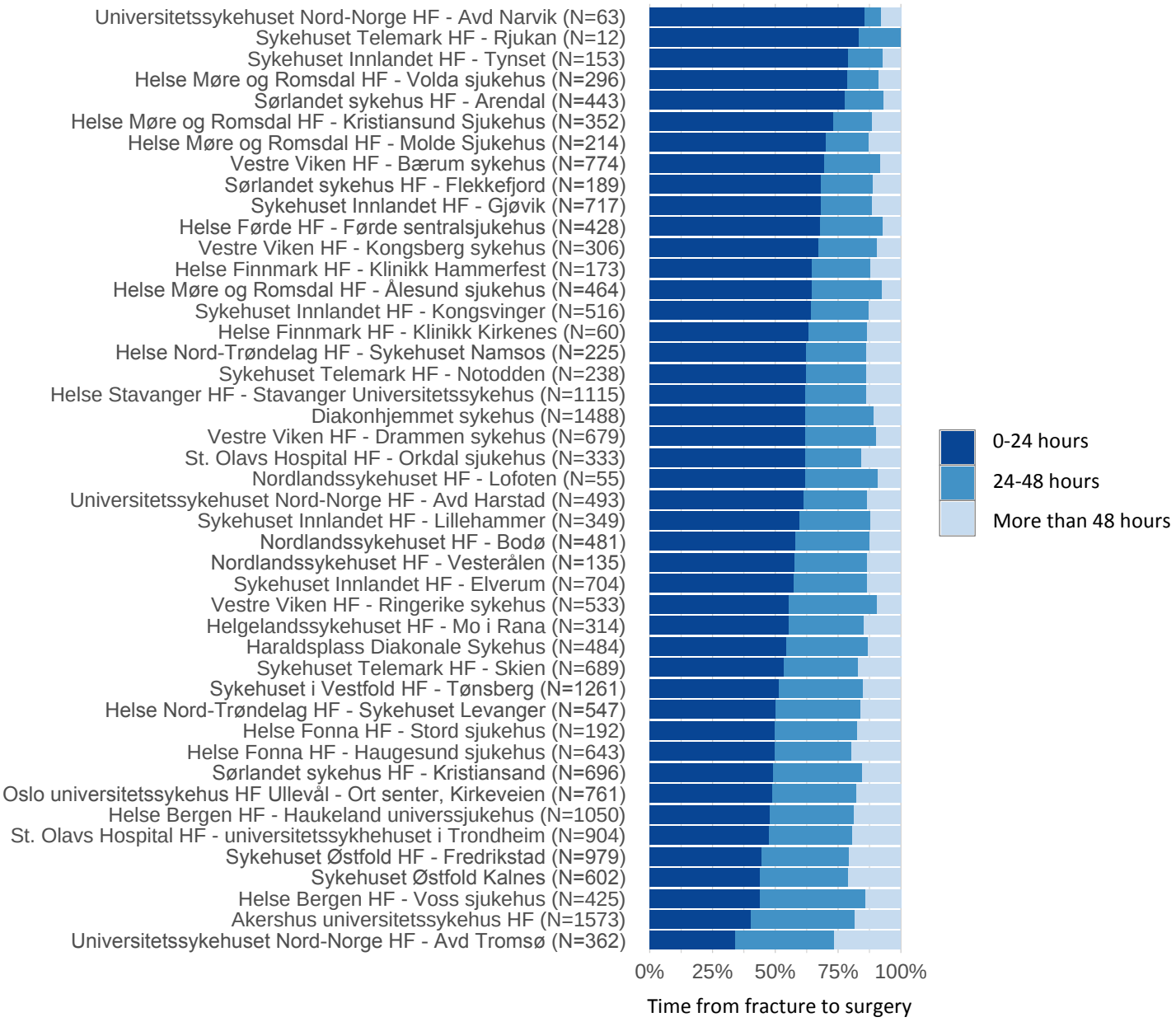


Figure 25: Waiting time from fracture to surgery. The figure shows waiting time, sorted by proportion of fractures treated within 24 hours after the fracture at the different hospitals in the period 2014-2016. Hospitals with n<10 have been excluded.



Completeness analysis for the Norwegian Hip Fracture Register, 2013-2014

A completeness analysis has been conducted for the Norwegian Hip Fracture Register (NHFR) for primary operations (osteosynthesis, partial and total arthroplasty) and revisions (following primary osteosynthesis, partial and total arthroplasty for hip fractures) performed in the period 2013-14. 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 www.helsedirektoratet.no.

Formulae for completeness rates:

$$\textbf{Completeness rate NHFR} = \frac{\textbf{Only NHFR} + \textbf{Inclusion in both registers}}{\textbf{Only NPR} + \textbf{Only NHFR} + \textbf{Inclusion in both registers}}$$

$$\textbf{Completeness rate NPR} = \frac{\textbf{Only NPR} + \textbf{Inclusion in both registers}}{\textbf{Only NHFR} + \textbf{Only NPR} + \textbf{Inclusion in both registers}}$$

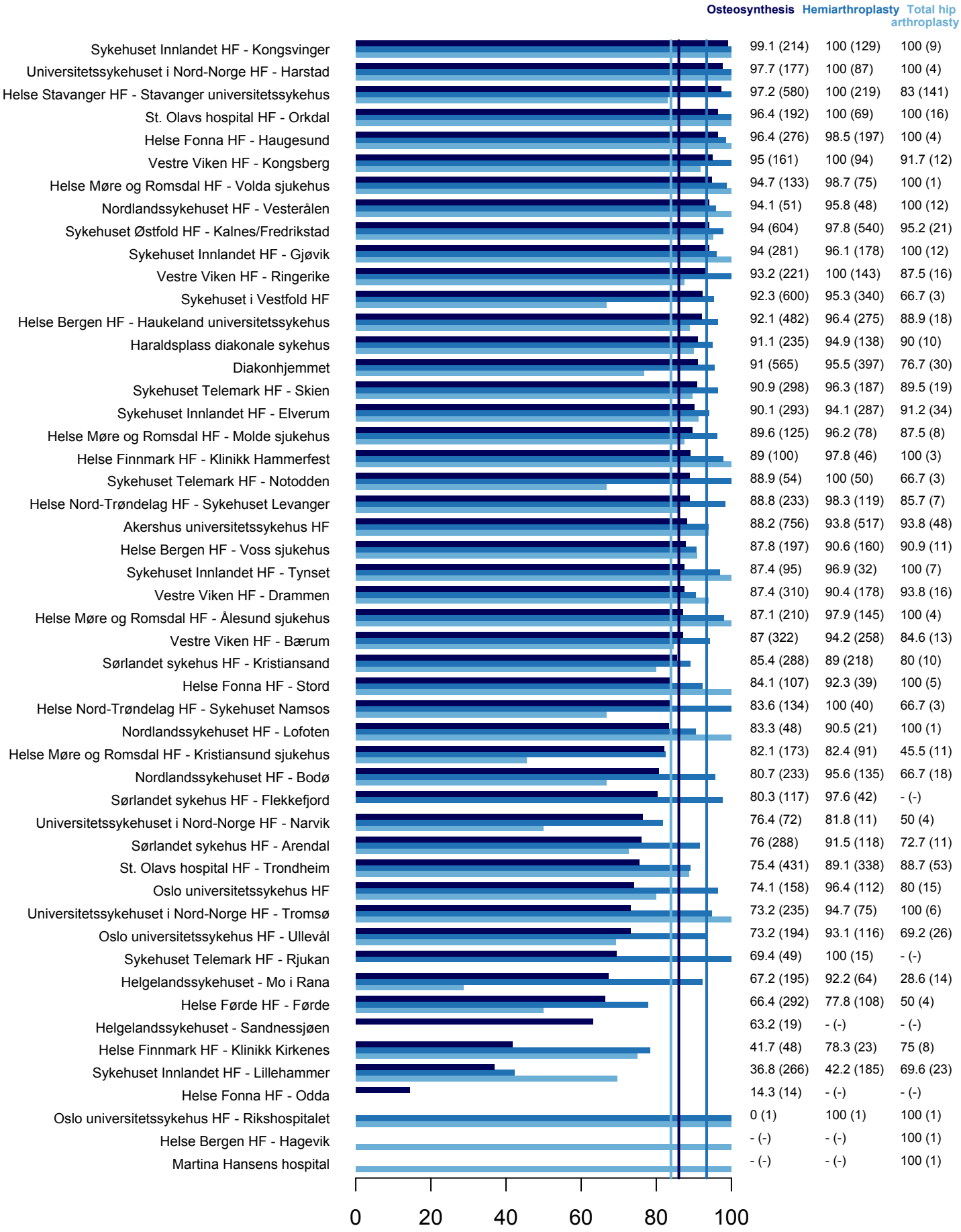
For details of the NSCP and ICD-10 codes used when extracting data from the NPR for comparison of primary and revision surgery in the NHFR and for the complete results, please consult the Completeness Analysis Report, which will be published at www.helsedirektoratet.no.

Primary hip fracture surgery. Information in the NHFR showed a high degree of agreement with the information in the NPR. Completeness for osteosynthesis was 86.0%, for hemiarthroplasty 93.4% and for total arthroplasty 83.9%. However, there are considerable variations in completeness between hospitals. Over 1/3 of hospitals have 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.

Revisions. The information in the NHFR did not agree with NPR data as well as for primary surgery. Completeness for reoperations after osteosynthesis was 65.4%, after hemiarthroplasty 67.9%, and after total arthroplasty 94.1%. The overall rate for reoperations was 69.5%. 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 revisions reported to the NPR is often imprecise or incorrect. Low completeness may mean that the revision 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 revisions 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.

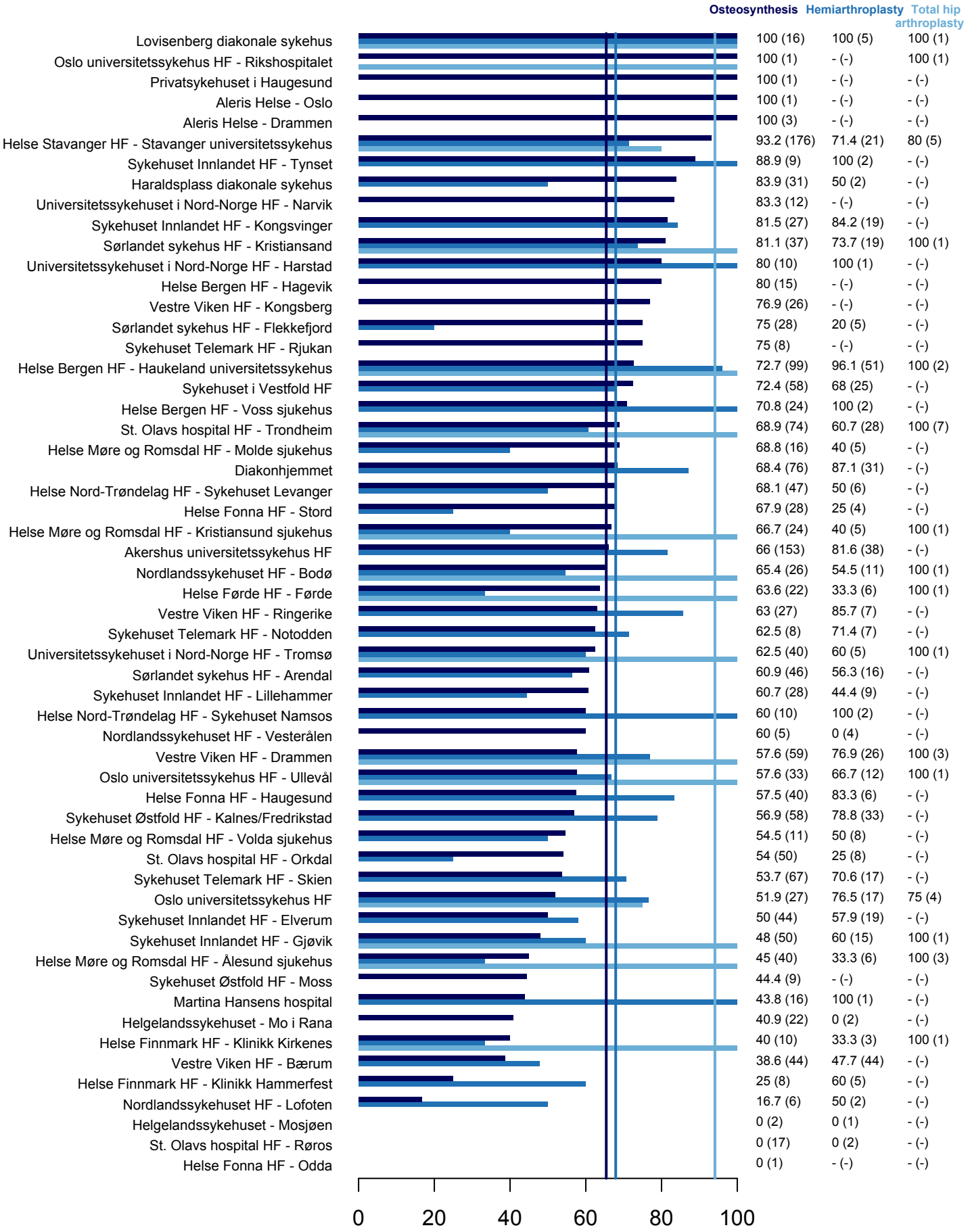
The following pages show the hospital-based completeness analysis for primary operations and reoperations. We urge hospitals with low completeness to review their coding practices and routines in reporting to the registers.

Completeness analysis for primary operations for Hip Fractures 2013-2014



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 hemiarthroplasty. Light blue bars and third number to the right of the bars gives completeness of reporting for total hip arthroplasty. The numbers in parenthesis gives the number of operations registered at both NHFR and NPR. Vertical lines shows the national averages.

Completeness analysis for reoperations after Hip Fractures 2013-2014



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 hemiarthroplasty. Light blue bars and third number to the right of the bars gives completeness of reporting for total hip arthroplasty. The numbers in parenthesis gives the number of operations registered at both NHFR and NPR. Vertical lines shows the national averages.

CONTENTS

Norwegian Cruciate Ligament Register

NORWEGIAN CRUCIATE LIGAMENT REGISTER
2017 ANNUAL REPORT

SKDE (The Centre for Clinical Documentation and Evaluation) has a strong influence on our everyday work. SKDE requires an annual report with results from the various hospitals to be published on the website of the Service Centre and easily available to anyone who wishes to consult it (https://www.kvalitetsregistre.no/registers/nasjonalt-korsbandregister). The challenge here may be to explain certain results that seem somehow unrelated. In the information on the number of ACL reconstructions, quite a few hospitals report between two and nine ACL reconstructions per year. This figure is so low that it is probably not advisable to operate on so few patients, and referring these patients to a higher volume hospital should be considered.

There has been a great deal of discussion about the publication of results. This should be now be laid to rest; it has been decided that results are to be published and in the future we should concentrate on providing the public with good information and helpful responses to queries, and pursuing any questions that may arise. We live in an age of openness and should definitely view this in a positive light.

SKDE will probably also require revision rates, infection rates and KOOS scores to be published from the various hospitals. Only our register has good information on revision rates. The same procedure code is used for reconstruction of ACL and revision of ACL. For this reason, NPR will not receive details of the revisions. We therefore do not know compliance for revisions. We have received an inquiry about this and I have stated that it is desirable to have a separate procedure code for revisions of ACL.

At Haukeland University Hospital, we have begun electronic registration of the ACL form filled out by doctors. In order to enter the correct fixation devices, we use a barcode scanning system that works very well. For authentication, we use either an SMS code or identification with a chip in the ID card, which is also used for e-prescriptions. Authentication via SMS is only possible if the person has his or her own mobile phone. When logging in, the person receives a four-digit code to be used for access and to enter the data. This also works well. When the data have been entered, they are collated, and the forms can be submitted to the database.

Work on the electronic form has taken somewhat longer than expected, partly to correct mistakes discovered, but also to wait for the website to be produced in new versions. The scanning system has not yet been fully clarified with the supplier.

The biggest change in the Cruciate Ligament Register is that efforts are now being made to include non-operated patients. This is the so-called “non-op study” by Guri Ekås. This is a multi-centre study that follows patients with ACL ruptures to see how they manage in the future. When the electronic form for non-operated patients has been produced, the electronic registration pilot will be expanded to centres that have considerable primary contact with ACL injuries. Injuries within the past six months will be recorded and the patients followed in the same way as primary operated patients, using KOOS.

With regard to the KOOS forms, it has been unclear how these have been sent out in relation to revisions. If a revision of an ACL reconstruction is reviewed, the KOOS forms should be

sent out again after the revision at 2, 5 and 10 year intervals. It is emphasised that this takes place from the date of the revision. Then the forms will not be sent out after the original ACL reconstruction. Here routines must be changed and improved.

In the presentation of the results, we have changed the diagrams to bar charts, which are easier to view and relate to.

In 2016, a total of 1825 primary ACL reconstructions and 195 revisions were performed. So-called "other procedures" are treatments after a primary reconstruction; there were 210 of these. There has obviously been underreporting here. The explanation is probably that these operations are performed in places and under circumstances where those involved are not so concerned that the patient has had a previous ACL reconstruction. This is a general problem in corresponding registers. It also means that important information is lacking.

We have regularly had information in "Norsk ortopedpost" in the form of "News from the Cruciate Ligament Register". This is general information about what is happening in the Register, and we find it a useful place to provide such information.

Our coverage rate has been just under 80%. That is not satisfactory, and we must attempt to raise this.

Patient consent is an absolute requirement. The patient must fill out the consent form and the form must be stored outside the hospital's patient record. We have been in contact with lawyers from the Data Protection Office, and the requirement is that the statement of consent must not be kept in the patient record. It must be stored separately, in a secure, lockable cabinet inside a locked door. The statement of consent must be available on request. This is until now an absolute requirement.

The operation forms are required to be submitted to the Register. Please refer to "bestillingsdokumentet" (ordering document) from the Ministry of Health and Care Services, and if this has not been done, the hospital director must be contacted. It is optional for the patient to give consent for a form to be filled out.

There are currently many national and international projects based on the Cruciate Ligament Register. A follow-up study from previous two-year results in a Scandinavian cohort is now including results after five and ten years for ACL reconstructed patients with knees with simultaneous meniscus and cartilage damage.

There will be a study of risk of revision in relation to activity at the time of injury, while another project is looking into the significance of BMI and graft thickness for revision risk in hamstring ACLR.

Another study is exploring re-revisions and the effect of possible predictors of this.

In an REK-approved student thesis at the University of Bergen, data is being collected for the validation of data in the Cruciate Ligament Register and KOOS results.

In addition, the Register is collaborating with the Swedish register on a study of revision factors and predictors of patient-related outcomes, and also on a comparison of baseline data between a number of ACL registers, led by Kaiser Permanente (USA).

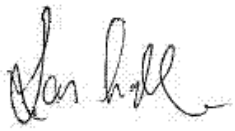
Endre Søreide et al. have published an article in AJSM concerning revision risk in relation to reported use of NSAIDs.

Jon H Røtterud et al. have published an article in AJSM, where they examine two-year follow-up of a cohort of ACL patients from Norway and Sweden.

Svend Ulstein et al. have published an article showing no negative effect on PROMs for simultaneous cartilage injuries 5-9 years after ACLR.

Many thanks to all of you who send in the form regularly.

Bergen, 16.06.2017



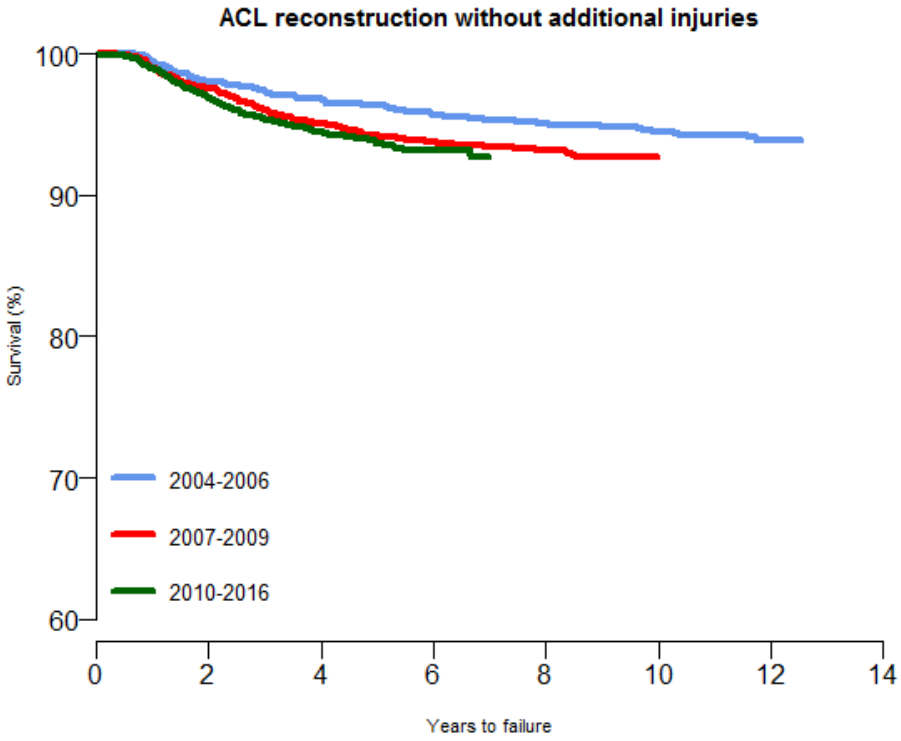
Lars Engebretsen
Chairman of the Steering Committee

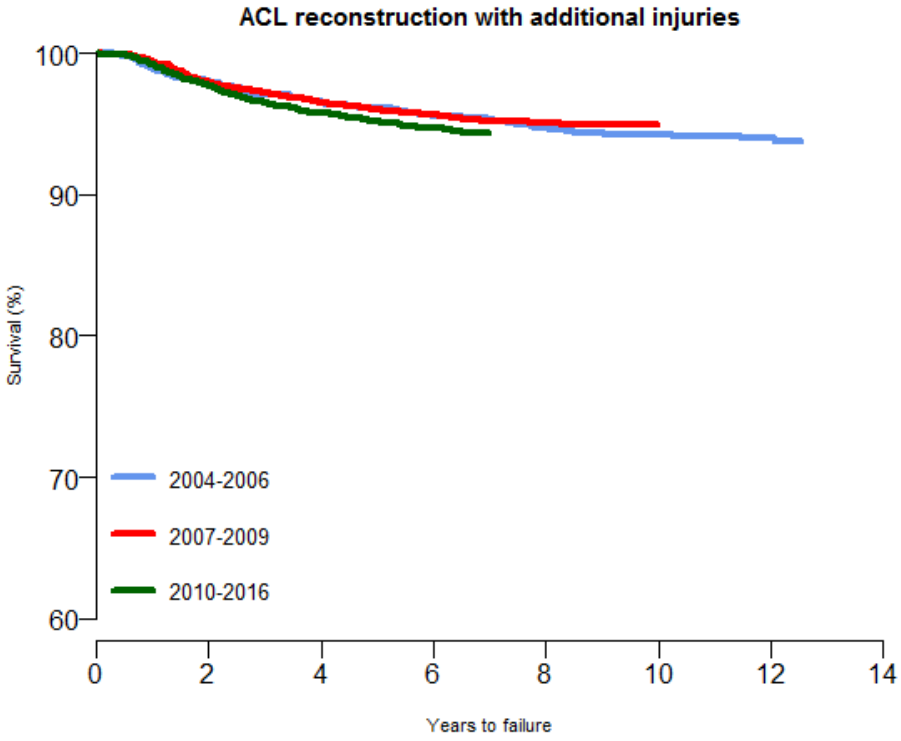
Knut Fjeldsgaard
Chief Physician

Irina Kvinnesland
IT Consultant

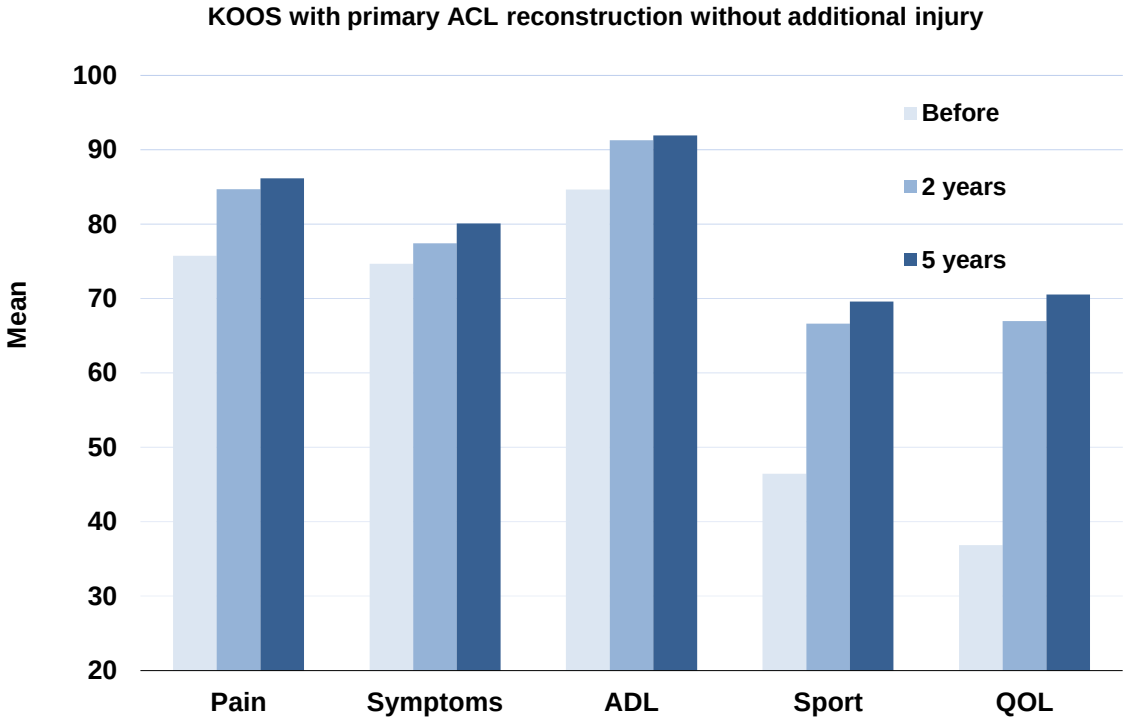
Stein Håkon Låstad Lygre
Biostatistician

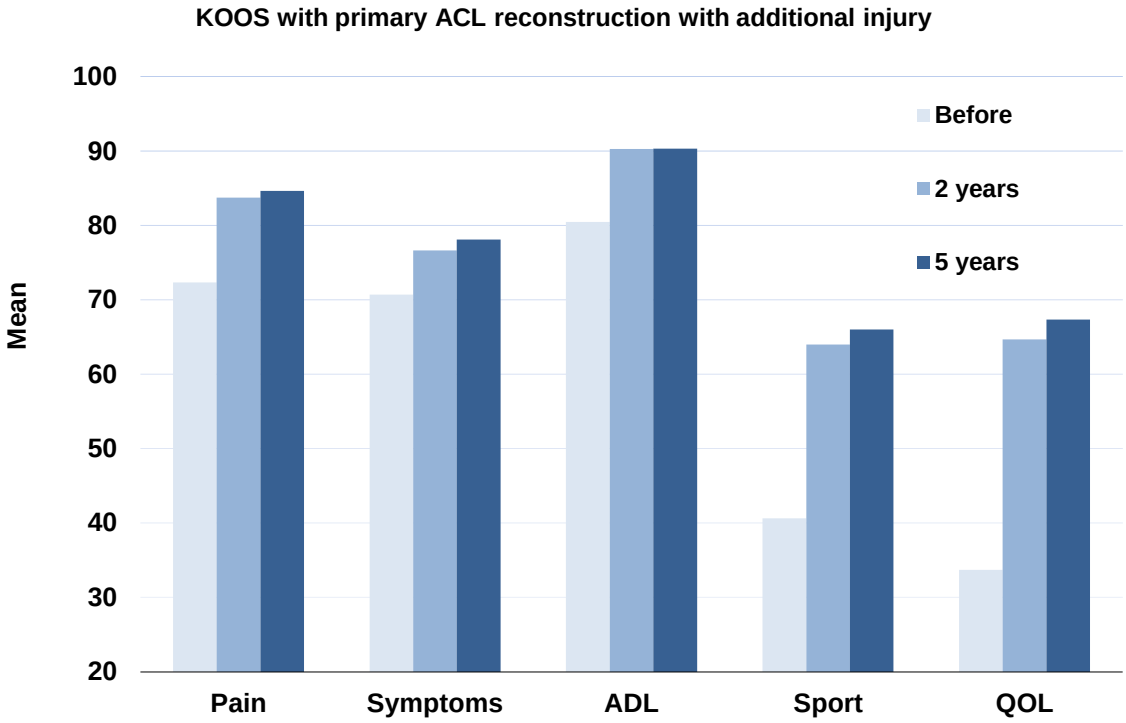
Survival of cruciate ligament operations

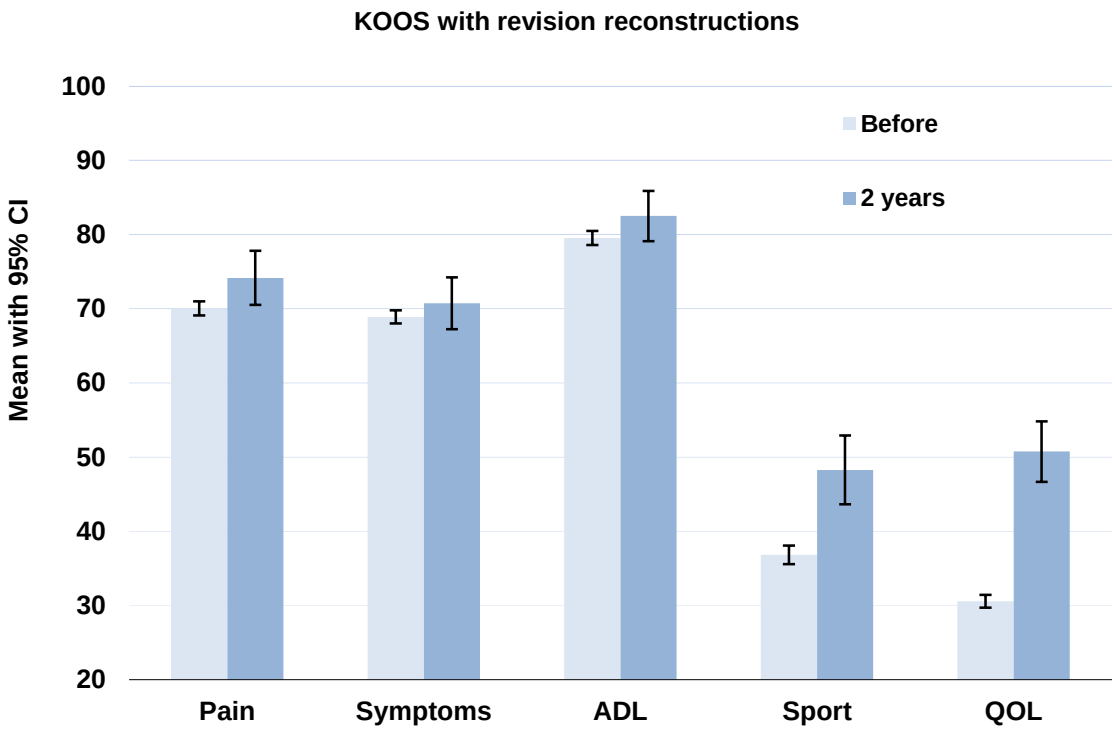




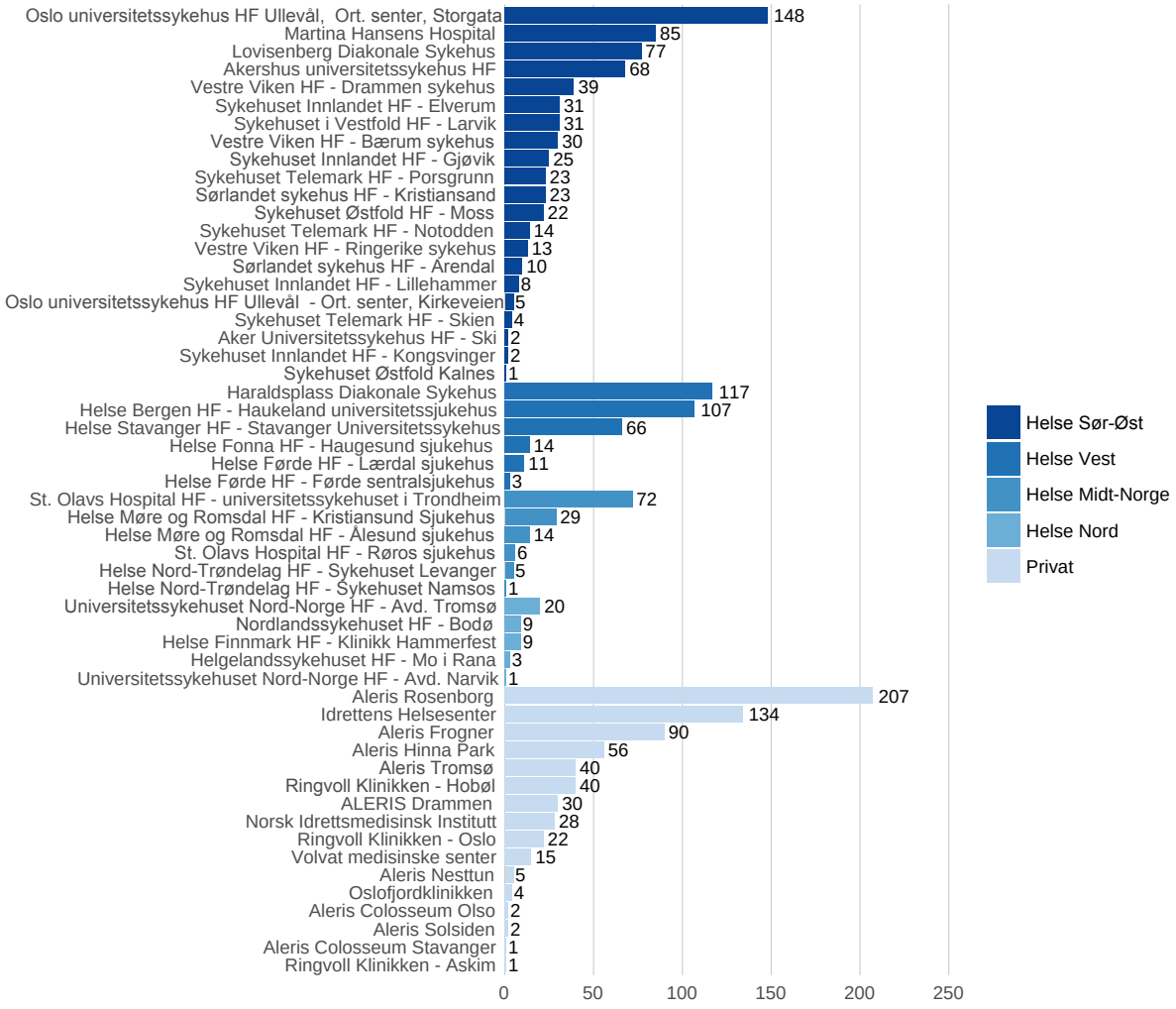
Survivalestimate is given as long as >20 reconstrucions remaines at risk


KOOS with primary ACL reconstruction without additional injury
Mean
100
90
80
70
60
50
40
30
20
Before
2 years
5 years
Pain
Symptoms
ADL
Sport
QOL


KOOS with primary ACL reconstruction with additional injury
Mean
100
90
80
70
60
50
40
30
20
Before
2 years
5 years
Pain
Symptoms
ADL
Sport
QOL


KOOS with revision reconstructions
Mean with 95% CI
100
90
80
70
60
50
40
30
20
Before
2 years
Pain
Symptoms
ADL
Sport
QOL

Annual numbers of cruciate ligament primary operations in 2016



Cruciate Ligament

All categories of operations

Table 1: Annual numbers of operations

	Primary reconstruction		Revision reconstruction		Only other procedures		Total
2016	1825	(81,8%)	195	(8,8%)	210	(9,4%)	**2230**
2015	1772	(82,2%)	224	(10,4%)	161	(7,5%)	**2157**
2014	1738	(81,4%)	251	(11,8%)	147	(6,9%)	**2136**
2013	1773	(84,1%)	207	(9,8%)	129	(6,1%)	**2109**
2012	1783	(83,6%)	220	(10,3%)	130	(6,1%)	**2133**
2004-11	12555	(87,7%)	972	(6,8%)	784	(5,5%)	**14311**
Total	**21446**	**(85,5%)**	**2069**	**(8,3%)**	**1561**	**(6,2%)**	**25076**

Registration complete from 2005. 49,2% of the operations were performed on the right side. 43,8% of the operations were performed on females. 7,3% of the patients had a previous ACL/PCL-injury in the opposite knee. (11,8% was missing). Mean age was 28,7 years, 27,2 years for women and 29,8 years for men. Standard deviation of age was 10,6 years, 11,1 years for women and 9,9 years for men.
Median value for duration of primary ACL reconstruction was 71 minutes.

Figure 1: Distribution of hospitals by surgery volume, primary ACL reconstructions

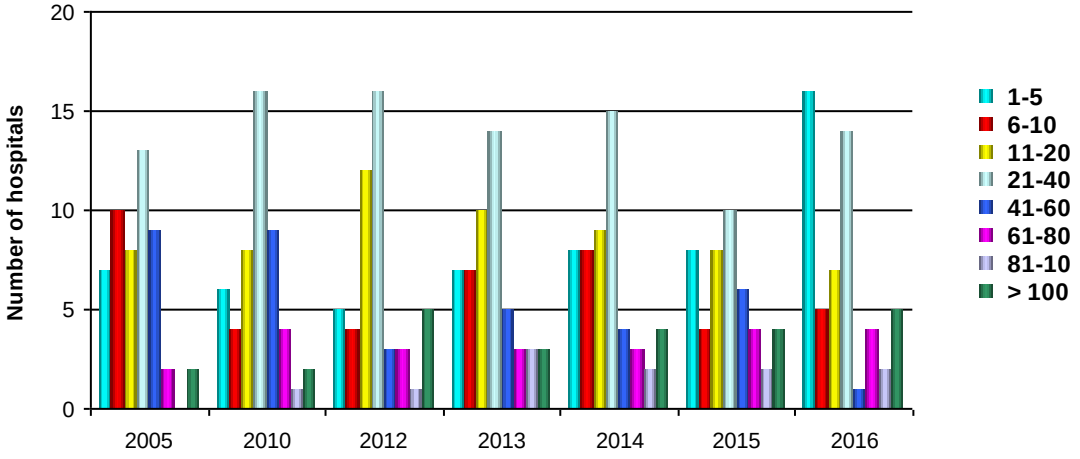


Figure 2: Distribution of hospitals by surgery volumes, revision reconstructions ACL

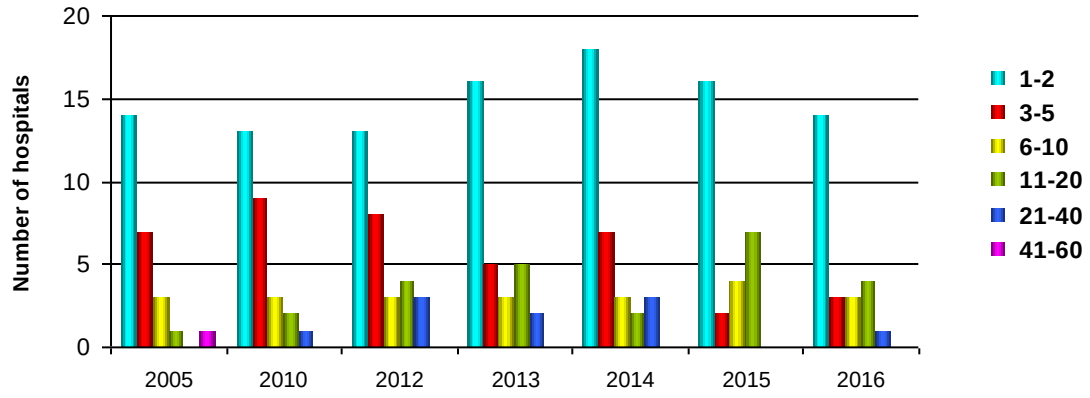
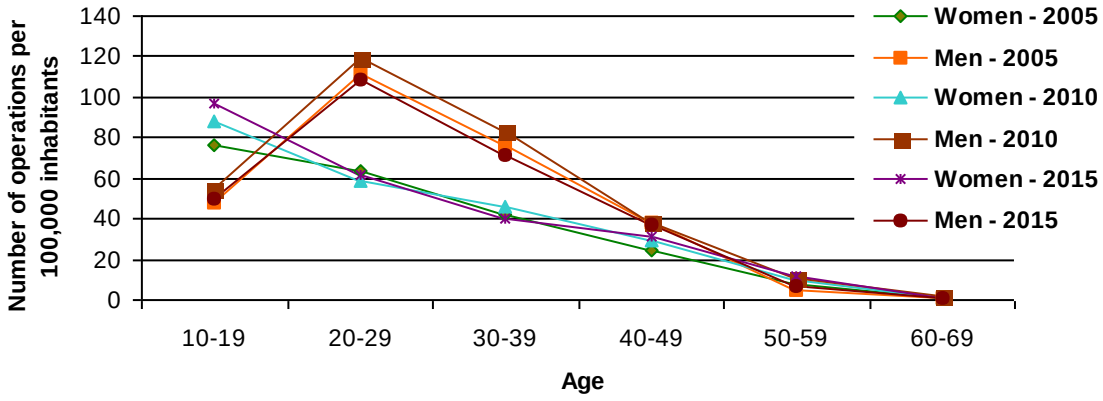


Figure 3: Incidence of primary reconstruction of cruciate ligament for 2005, 2010 and 2015



Distribution of other procedures

Table 2: 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	Artrodesis
2016	1024	51	47	66	11	9	56	19	2	27	2	0
2015	1016	65	43	63	7	4	51	31	5	31	5	0
2014	944	80	86	60	8	12	46	43	1	29	1	0
2013	879	103	45	66	6	10	40	31	2	16	4	0
2012	913	77	49	75	12	9	55	25	1	36	1	0
2004-11	5969	604	190	444	49	33	293	152	13	427	17	0
Total	**10745**	**980**	**460**	**774**	**93**	**77**	**541**	**301**	**24**	**566**	**30**	**0**

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)
8610	x					
413	x	x				
241		x				
167						x
145	x					x
84				x		
82	x		x			
78			x			
59	x			x		
29	x	x		x		
21				x		x
20	x			x		x
20					x	
16		x		x		
13		x				x
11	x	x				x
10	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 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)
471	x				
116			x		
68			x	x	
64				x	
48	x		x		
43		x			
27	x			x	
26	x	x			
24					x
22	x		x	x	
15	x				x
12	x		x		x
11			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
514	x							
170				x				
92							x	
58		x						
58			x					
55	x			x				
41						x		
35				x	x			
29	x		x					
24							x	x
22			x	x				
22	x	x						
17				x			x	x
15	x		x	x				
14		x		x				
14				x			x	
13			x		x			
12			x	x	x			
12					x			
11				x		x		
11								x
11	x						x	x
10	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.

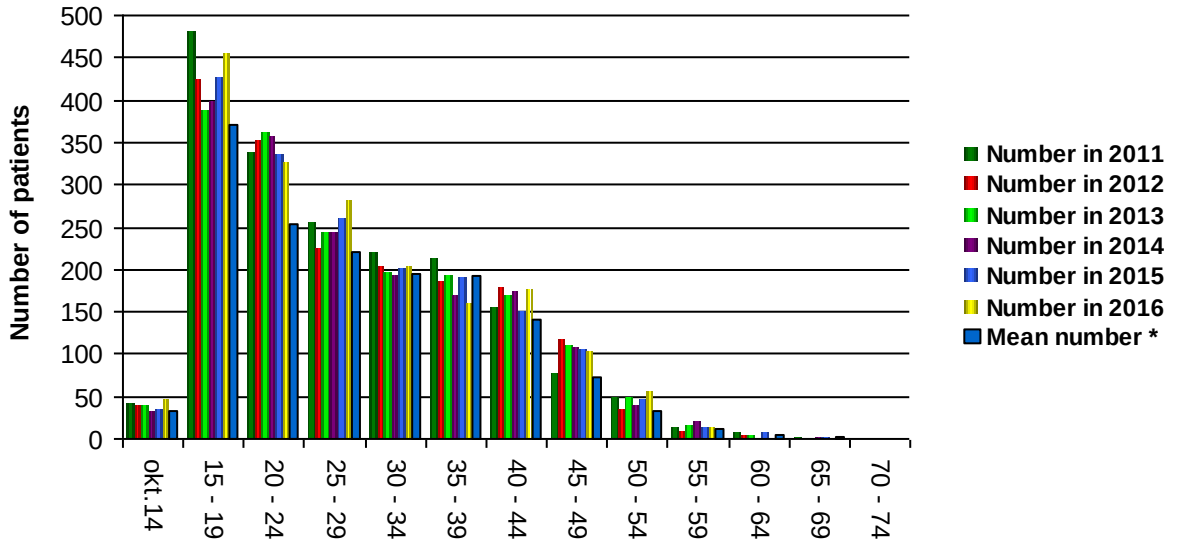
Intraoperative complications

Table 6: Intraoperative complications for all categories of surgeries

	Yes		No		Missing		Total
2016	49	(2,2%)	2120	(95,1%)	60	(2,7%)	**2230**
2015	62	(2,9%)	2035	(94,3%)	60	(2,8%)	**2157**
2014	59	(2,8%)	1995	(93,4%)	82	(3,8%)	**2136**
2013	60	(2,8%)	1965	(93,2%)	84	(4,0%)	**2109**
2012	44	(2,1%)	2046	(95,9%)	43	(2,0%)	**2133**
2004-11	467	(3,3%)	13576	(94,9%)	268	(1,9%)	**14311**
Total	**741**	**(3,0%)**	**23737**	**(94,7%)**	**597**	**(2,4%)**	**25076**

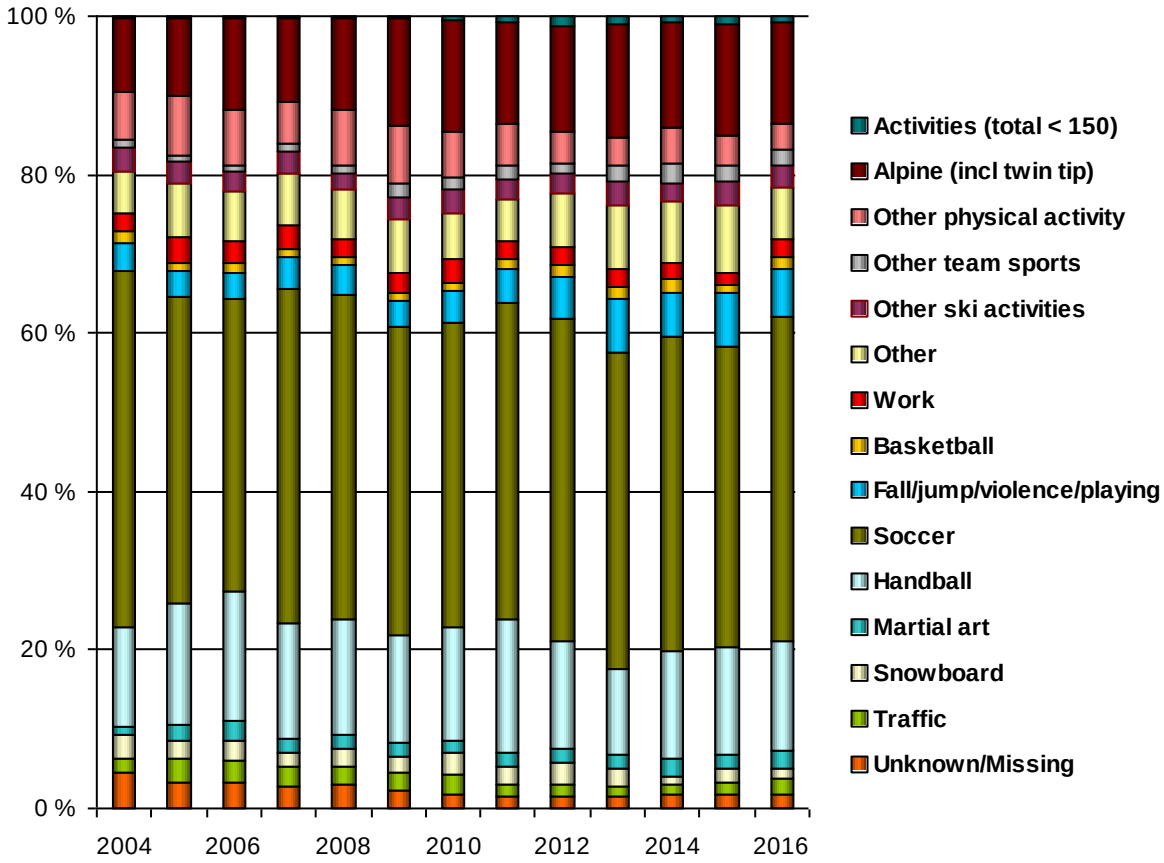
Primary reconstruction of cruciate ligament

Figure 4: Age by primary operation



* Mean number of primary operations for 2004 - 2010

Figure 5: Activity that lead to injury



Actual injury

Table 7: Actual injury*

	ACL	PCL	MCL	LCL	PLC	Cartilage	Meniscus
2016	1800	46	188	51	19	409	1045
2015	1745	56	167	40	24	354	995
2014	1713	58	171	35	20	368	931
2013	1755	38	169	54	23	379	868
2012	1762	36	152	32	14	379	938
2004-11	12436	336	798	179	144	3134	6124
Total	**21211**	**570**	**1645**	**391**	**244**	**5023**	**10901**

* 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
7797	x						
7063	x					x	
2876	x					x	x
1437	x						x
540	x		x				
415	x		x			x	
250	x		x			x	x
158	x		x				x
81	x			x			
70	x	x	x				
48	x			x	x		
41	x	x	x				x
27	x	x					
21	x			x			x
20	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
99		x					
70	x	x	x				
41	x	x	x				x
35		x					x
28	x	x	x			x	
27	x	x					
23	x	x	x			x	x
21		x	x				
18	x	x				x	
16	x	x		x	x		
15	x	x				x	x
13	x	x			x		
10	x	x		x	x	x	x
10		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 10 or more.

Choice of graft for injuries registered in primary reconstructions

Table 10: BPTB

	ACL	PCL	MCL	LCL	PLC
2016	1120	0	0	0	0
2015	974	1	0	0	0
2014	736	1	0	0	0
2013	572	2	0	0	0
2012	465	1	0	0	0
2004-11	3598	22	1	0	0
Total	**7465**	**27**	**1**	**0**	**0**

Table 11: HAMSTRING

	ACL	PCL	MCL	LCL	PLC
2016	585	22	23	15	5
2015	726	29	17	6	3
2014	952	20	19	7	4
2013	1166	21	14	8	7
2012	1278	24	14	3	3
2004-11	8761	210	104	11	9
Total	**13468**	**326**	**191**	**50**	**31**

Table 12: ALLOGRAFT

	ACL	PCL	MCL	LCL	PLC
2016	4	20	7	4	6
2015	5	21	6	6	12
2014	4	20	3	8	10
2013	7	8	1	8	5
2012	4	10	2	4	4
2004-11	24	24	6	37	46
Total	**48**	**103**	**25**	**67**	**83**

Table 13: Suture

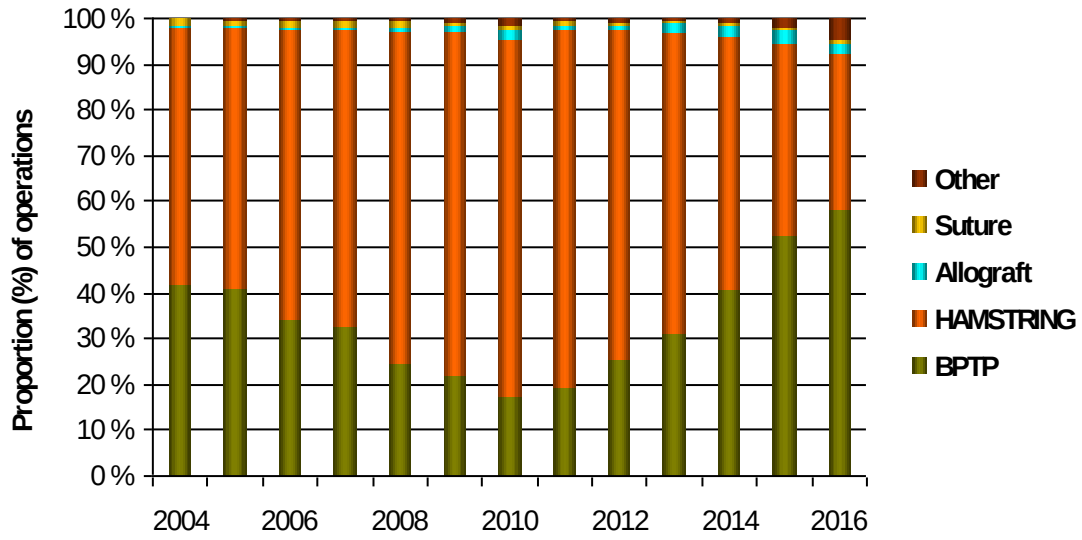
	ACL	PCL	MCL	LCL	PLC
2016	10	1	6	4	4
2015	0	1	7	3	2
2014	1	1	4	2	1
2013	0	0	8	7	3
2012	0	0	6	3	2
2004-11	3	7	68	47	41
Total	**14**	**10**	**99**	**66**	**53**

Table 14: Other

	ACL	PCL	MCL	LCL	PLC
2016	80	0	4	0	1
2015	37	1	1	0	0
2014	17	5	0	0	0
2013	3	2	0	0	0
2012	14	1	1	0	0
2004-11	41	27	6	8	5
Total	**192**	**36**	**12**	**8**	**6**

There are 21 forms where there are registered product for ACL and 23 forms 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)

Product	Total	2004-11	2012	2013	2014	2015	2016
Profile Interference Scr	**368**	85	58	55	53	49	68
ToggleLoc	**696**	221	115	157	71	72	60
Endobutton CL BTB	**834**	1	52	81	141	261	298
SoftSilk	**2597**	1219	135	168	280	369	426
Endobutton CL Ultra	**6489**	2933	994	884	725	520	433

Table 16: Tibia ACL (The 5 most common)

Product	Total	2004-11	2012	2013	2014	2015	2016
Biosure PK	**561**	117	76	133	103	54	78
Intrafix Screw	**1560**	1122	153	97	80	69	39
Biosure HA Interferenc	**1965**	718	341	288	234	206	178
SoftSilk	**3005**	1182	168	235	343	503	574
RCI Screw	**4093**	2799	281	284	277	224	228

Table 17: Femur PCL (The 5 most common)

Product	Total	2004-11	2012	2013	2014	2015	2016
Sheated Cannulated Int	**5**				1	2	2
Guardsman Femoral	**8**	3		2	1		2
Peek Interference Scre	**16**		3	5	3	4	1
RCI Screw	**30**	19				5	6
SoftSilk	**64**	23	4	2	7	14	14
Endobutton CL Ultra	**199**	95	18	19	28	24	15

Table 18: Tibia PCL (The 5 most common)

Product	Total	2004-11	2012	2013	2014	2015	2016
Biosure HA Interferenc	**23**	3	2	4	5	7	2
BioRCI-HA	**25**	5	3	4	6	4	3
SoftSilk	**28**	16	2	2	3	1	4
AO Skrue	**72**	50	7	1	5	2	7
RCI Screw	**239**	176	11	9	9	19	15

Table 19: Femur and tibia ACL (The 5 most common)

Femur	Tibia	Total	2004-11	2012	2013	2014	2015	2016
Endobutton CL Ultra	Biosure PK	**464**	110	74	114	100	51	15
Endobutton CL BTB	SoftSilk	**572**	1	40	68	83	193	187
Endobutton CL Ultra	Biosure HA Interference screw	**1784**	659	316	273	214	160	162
Endobutton CL Ultra	RCI Screw	**2069**	999	245	241	239	175	170
SoftSilk	SoftSilk	**2280**	1112	116	148	248	297	359

Meniscal lesion

Table 20: Actual treatment of meniscal lesion

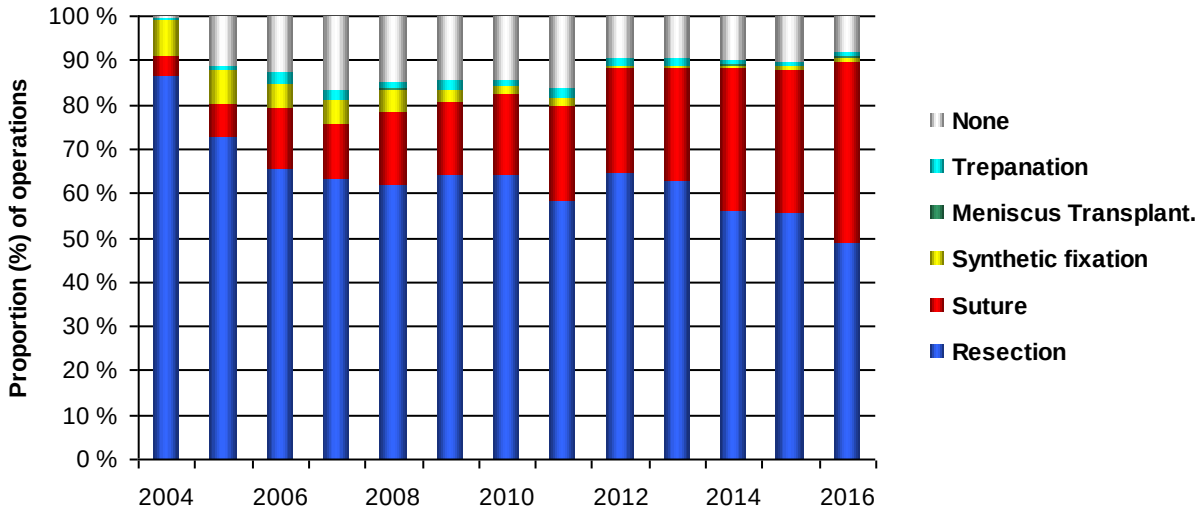
		Resection				Synthetic fixation	Meniscus Transplant.	Trepanation	None	Total
		OLD	Total	Partial	Suture					
2016	Lateral	0	2	313	203	9	2	8	59	**596**
2016	Medial	0	9	314	325	6		7	45	**706**
2015	Lateral	0	3	342	144	3		7	68	**567**
2015	Medial	0	3	349	262	9		3	60	**686**
2014	Lateral	0	2	292	130	4	1	7	68	**504**
2014	Medial	0	7	324	232	4	1	4	42	**614**
2013	Lateral	0	2	294	99	2		11	49	**457**
2013	Medial	0	7	348	166	3		8	50	**582**
2012	Lateral	21	2	326	89	3	1	10	57	**509**
2012	Medial	18	9	338	176	4		9	46	**600**
2004-11	Lateral	2019	1	146	356	63	1	68	508	**3162**
2004-11	Medial	2353	2	175	759	236	3	60	491	**4079**
Total		**4411**	**49**	**3561**	**2941**	**346**	**9**	**202**	**1543**	**13062**

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 registreded in both groups.

The value in OLD Resection are the forms that are registered before the new forms were introduced in autumn 2011. Total and Partial Resection values are the new forms were introduced in autumn 2011.

Figure 7: Treatment of meniscal lesions in primary reconstructions



Fixation

Table 21: Synthetic

Product	Total	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Contour Meniscus arrow	**143**	7	40	24	38	25	8	1						
FAST-FIX	**17**							1	7	3		1		5
Meniscal Dart	**19**		3	8	6	2								
Meniscal Dart Stick	**24**		7	4	1	6	5		1					
Meniscus arrow	**31**	18	6	1			2	1	2		1			
Unknown	**62**	2	4	2	3	3	2		11	4	4	8	10	9
Total	**296**	**27**	**60**	**39**	**48**	**36**	**17**	**3**	**21**	**7**	**5**	**9**	**10**	**14**

Table 22: Suture

Product	Total	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
ANNET	**6**													6
FAST-FIX	**2074**		28	45	61	99	118	127	192	208	203	280	319	394
Meniscal Dart Stick	**1**							1						
Meniscus arrow	**7**							3	4					
Rapidloc	**74**	9	10	19	24	8	2				2			
Unknown	**309**			2	1	1	3	3	48	40	43	49	54	65
Total	**2471**	**9**	**38**	**66**	**86**	**108**	**123**	**134**	**244**	**248**	**248**	**329**	**373**	**465**

Cartilage lesion all localizations

Table 23: 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
2016	37,9%	44,3%	14,1%	3,0%	0,8%
2015	31,4%	43,5%	19,1%	5,8%	0,3%
2014	30,0%	45,5%	17,8%	5,0%	1,7%
2013	25,1%	50,0%	20,2%	4,4%	0,3%
2012	26,2%	47,3%	20,7%	5,1%	0,6%
2004-11	38,1%	41,0%	15,1%	4,3%	1,5%

Table 24: Treatment codes for all localizations

	Debridement	Micro fracture	No treatment	Other	Missing
2016	9,1%	1,9%	77,3%		11,8%
2015	12,3%	3,6%	80,1%		3,9%
2014	13,3%	3,8%	77,8%	0,9%	4,2%
2013	19,7%	3,9%	73,1%	0,2%	3,2%
2012	18,5%	5,1%	72,8%	0,6%	2,9%
2004-11	10,3%	2,9%	58,4%	1,3%	27,1%

Cartilage injuries registered in primary reconstructions

Figure 8: All Cartilage injuries (total)

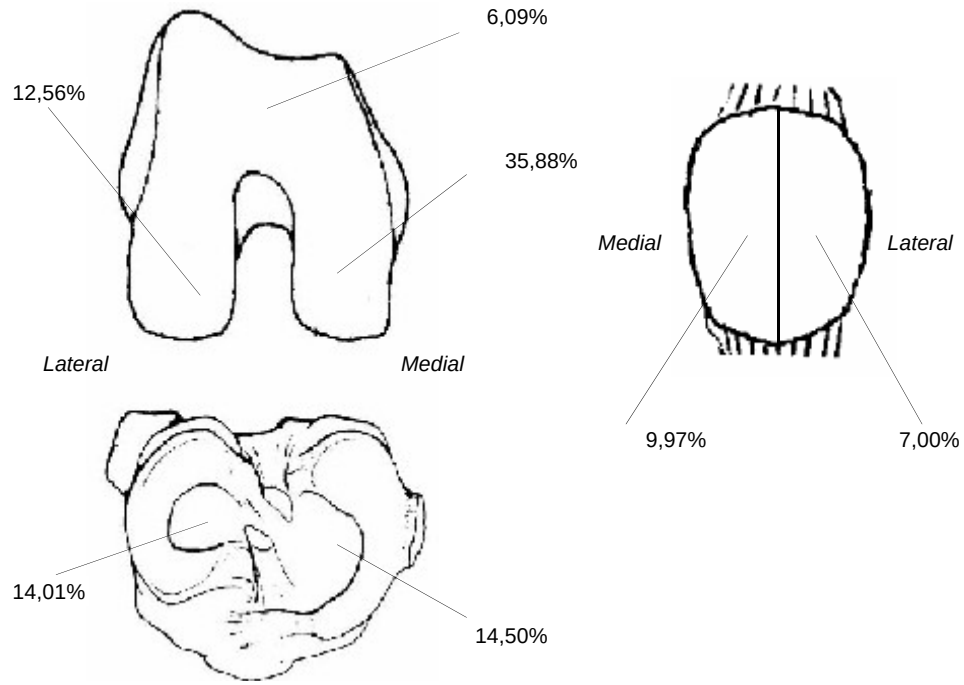
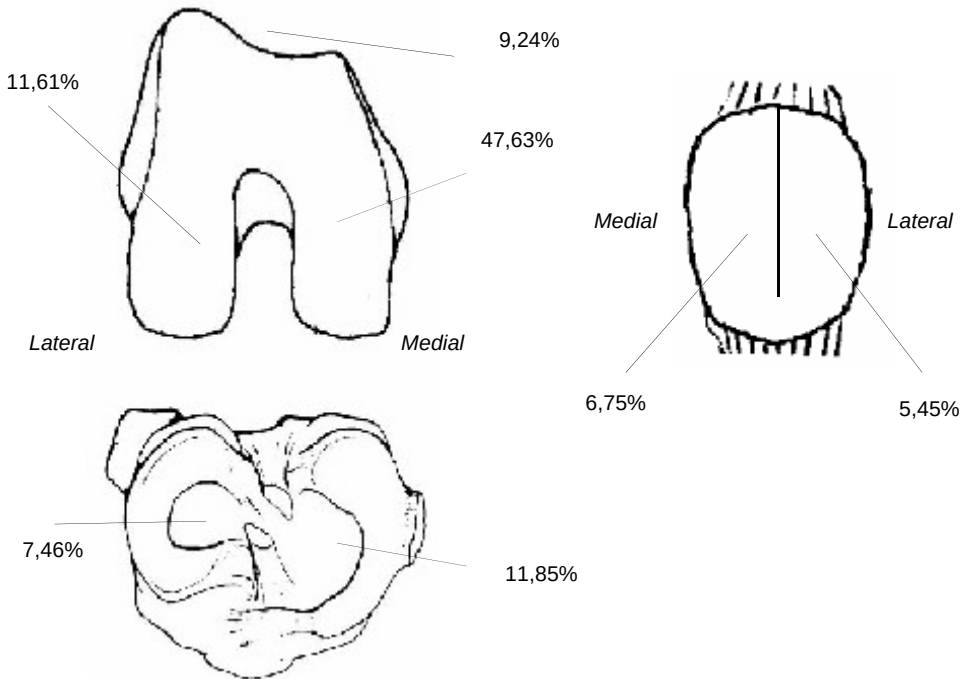


Figure 9: All Cartilage injuries with area greater than 2 cm² and ICRS equal 3 or 4 (total)



Outpatient surgery

Table 25: Outpatient surgery

	Yes		No		Missing		Total
2016	1298	(71,1%)	517	(28,3%)	10	(0,5%)	**1825**
2015	1244	(70,2%)	515	(29,1%)	13	(0,7%)	**1772**
2014	1166	(67,1%)	556	(32,0%)	16	(0,9%)	**1738**
2013	1144	(64,5%)	616	(34,7%)	13	(0,7%)	**1773**
2012	1228	(68,9%)	553	(31,0%)	2	(0,1%)	**1783**
2004-11	5777	(46,0%)	6718	(53,5%)	60	(0,5%)	**12555**
Total	**11857**	**(55,3%)**	**9475**	**(44,2%)**	**114**	**(0,5%)**	**21446**

Intraoperative complications

Table 26: Intraoperative complications

	Yes		No		Missing		Total
2016	42	(2,3%)	1735	(95,1%)	48	(2,6%)	**1825**
2015	54	(3,0%)	1673	(94,4%)	45	(2,5%)	**1772**
2014	55	(3,2%)	1622	(93,3%)	61	(3,5%)	**1738**
2013	53	(3,0%)	1657	(93,5%)	63	(3,6%)	**1773**
2012	39	(2,2%)	1711	(96,0%)	33	(1,9%)	**1783**
2004-11	423	(3,4%)	11910	(94,9%)	222	(1,8%)	**12555**
Total	**666**	**(3,1%)**	**20308**	**(94,7%)**	**472**	**(2,2%)**	**21446**

Systemic antibiotic prophylaxis

Table 27: Systemic antibiotic prophylaxis

	Yes		No		Missing		Total
2016	1823	(99,9%)	0	(0,0%)	2	(0,1%)	**1825**
2015	1767	(99,7%)	1	(0,1%)	4	(0,2%)	**1772**
2014	1735	(99,8%)	1	(0,1%)	2	(0,1%)	**1738**
2013	1762	(99,4%)	2	(0,1%)	9	(0,5%)	**1773**
2012	1777	(99,7%)	5	(0,3%)	1	(0,1%)	**1783**
2004-11	12428	(99,0%)	93	(0,7%)	34	(0,3%)	**12555**
Total	**21292**	**(99,3%)**	**102**	**(0,5%)**	**52**	**(0,2%)**	**21446**

Table 28: Drug

	2004-11	2012	2013	2014	2015	2016
Benzylpenicillin (Penicillin G)			0,11%	0,06%		
Cefaleksin (Keflex, Cefalexin)	0,02%					
Cefalotin (Keflin)	90,00%	92,52%	92,91%	92,45%	94,85%	96,98%
Cefotaksim (Claforan)				0,17%		
Cefuroksim (Zinacef, Cefuroxim, Lifurox)	2,05%	0,56%	0,45%	0,23%		0,05%
Ciprofloksasin (Ciproxin)	0,01%			0,06%		
Dikloksacillin (Diclocil, Dicillin)	4,10%	0,90%	0,91%	0,75%	0,06%	0,16%
Doksysyklin (Vibramycin, Dumoxin, Doxylin)	0,01%					
Erytromycin (Ery-max, Abboticin)	0,02%			0,06%		
Gentamicin (Garamycin, Gensumycin)	0,02%					0,16%
Klindamycin (Dalacin, Clindamycin)	2,66%	1,97%	2,16%	2,07%	1,30%	2,03%
Kloksacillin (Ekvacillin)	0,99%	4,05%	2,67%	3,23%	3,11%	0,33%
Linkomycin (Lincocin)	0,01%					
Oxacillin (Unspecified)			0,17%	0,17%		
Tobramycin (Nebcina, Nebcin, Tobi)			0,11%			
Missing	0,12%		0,51%	0,75%	0,62%	0,27%

Thrombosis prophylaxis

Table 29: Thrombosis prophylaxis

	Yes		No		Missing		Total
2016	1491	(81,7%)	326	(17,9%)	8	(0,4%)	**1825**
2015	1528	(86,2%)	240	(13,5%)	4	(0,2%)	**1772**
2014	1428	(82,2%)	301	(17,3%)	9	(0,5%)	**1738**
2013	1489	(84,0%)	270	(15,2%)	14	(0,8%)	**1773**
2012	1473	(82,6%)	308	(17,3%)	2	(0,1%)	**1783**
2005-11	9434	(80,3%)	2130	(18,1%)	222	(1,9%)	**11786**
Total	**16843**	**(81,5%)**	**3575**	**(17,3%)**	**259**	**(1,3%)**	**20677**

There are 33 old forms that are filled out so that thrombosis prophylaxis can not be registered. These are added to missing.

Table 30: Use of drugs

	One drug		Two drugs		Total
2016	1473	(98,8%)	18	(1,2%)	**1491**
2015	1519	(99,4%)	9	(0,6%)	**1528**
2014	1416	(99,2%)	12	(0,8%)	**1428**
2013	1468	(98,6%)	21	(1,4%)	**1489**
2012	1470	(99,8%)	3	(0,2%)	**1473**
2005-11	9379	(99,4%)	55	(0,6%)	**9434**
Total	**16725**	**(99,3%)**	**118**	**(0,7%)**	**16843**

Table 31: Drug

	2005-11	2012	2013	2014	2015	2016
Acetylsalicylsyre (Albyl-E, Globoid, Acetyratio, Magnyl E)				0,07%		0,07%
Dabigatranetixalat (Re-Novate, Pradaxa)	0,01%	0,07%				
Dalteparin (Fragmin)	60,05%	67,96%	64,88%	56,23%	58,64%	60,16%
Dekstran (Macrodex, Dextran)	0,03%	0,07%	0,27%	0,35%	0,20%	0,07%
Enoksaparin (Klexane)	35,05%	31,43%	32,03%	41,95%	39,92%	37,83%
Heparin (Heparin)	0,01%					
Rivaroksaban (Xarelto)	0,01%	0,14%	0,27%		0,07%	0,07%
Warfarin (Marevan)	0,01%			0,14%		0,20%
Ximelagatran (Exanta, Malagatran)	0,32%					
Missing			0,07%			
No drugs	3,75%		0,74%			
Missing	0,17%	0,14%	0,34%	0,42%	0,59%	0,40%
Two drugs	0,58%	0,20%	1,41%	0,84%	0,59%	1,21%

NSAID's

Table 32: NSAID's

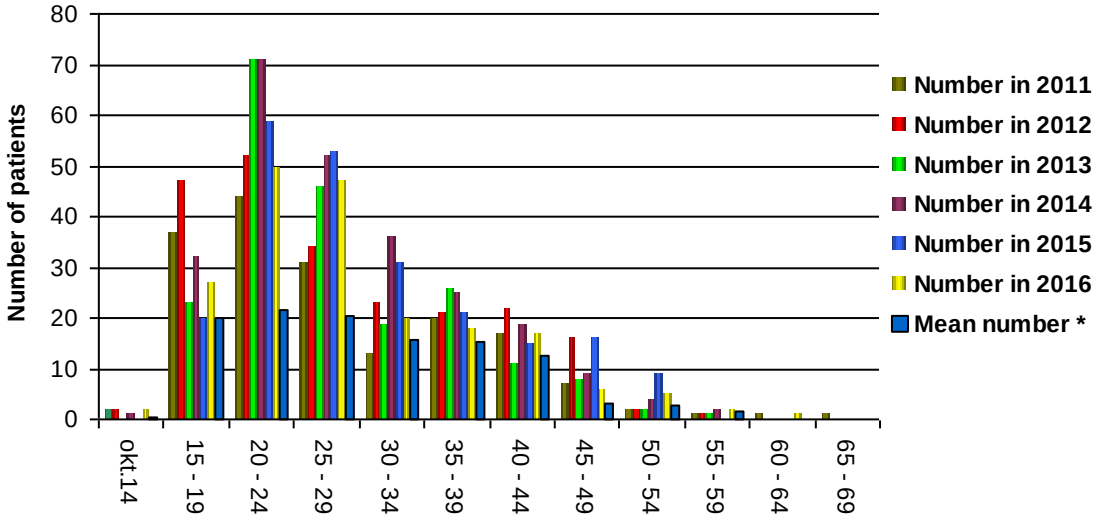
	Yes		No		Missing		Total
2016	904	(49,5%)	877	(48,1%)	44	(2,4%)	**1825**
2015	827	(46,7%)	908	(51,2%)	37	(2,1%)	**1772**
2014	715	(41,1%)	976	(56,2%)	47	(2,7%)	**1738**
2013	757	(42,7%)	955	(53,9%)	61	(3,4%)	**1773**
2012	805	(45,1%)	926	(51,9%)	52	(2,9%)	**1783**
2011	894	(48,1%)	882	(47,4%)	83	(4,5%)	**1859**
2010	763	(43,6%)	809	(46,3%)	176	(10,1%)	**1748**
2009	831	(44,7%)	639	(34,4%)	388	(20,9%)	**1858**
2008	572	(34,0%)	416	(24,7%)	696	(41,3%)	**1684**
2007	94	(5,8%)	76	(4,7%)	1463	(89,6%)	**1633**
Total	**7162**	**(40,5%)**	**7464**	**(42,2%)**	**3047**	**(17,2%)**	**17673**

Table 33: Drug

	2007-11	2012	2013	2014	2015	2016
Celecoksib (Celebra)	1,62%	1,86%	5,02%	2,94%	0,73%	0,33%
Diklofenak (Voltaren, Diclofenac, Cataflam)	92,52%	93,17%	86,79%	68,81%	54,66%	57,74%
Etoricoksib (Arcoxia)	0,22%	0,37%	2,11%	21,40%	37,97%	34,40%
Ibuprofen (Ibux, Ibumetin)	1,05%	0,37%	0,79%	0,98%	1,69%	3,54%
Ketorolak (Toradol)	2,76%	3,73%	3,96%	4,34%	3,02%	1,99%
Naproksen (Vimovo)				0,14%	0,60%	0,66%
Parecoksib (Dynastat)			0,26%	0,28%		0,11%
Piroxicam (Brexidol)	0,10%	0,12%				
Missing	1,74%	0,37%	1,06%	1,26%	1,21%	1,22%

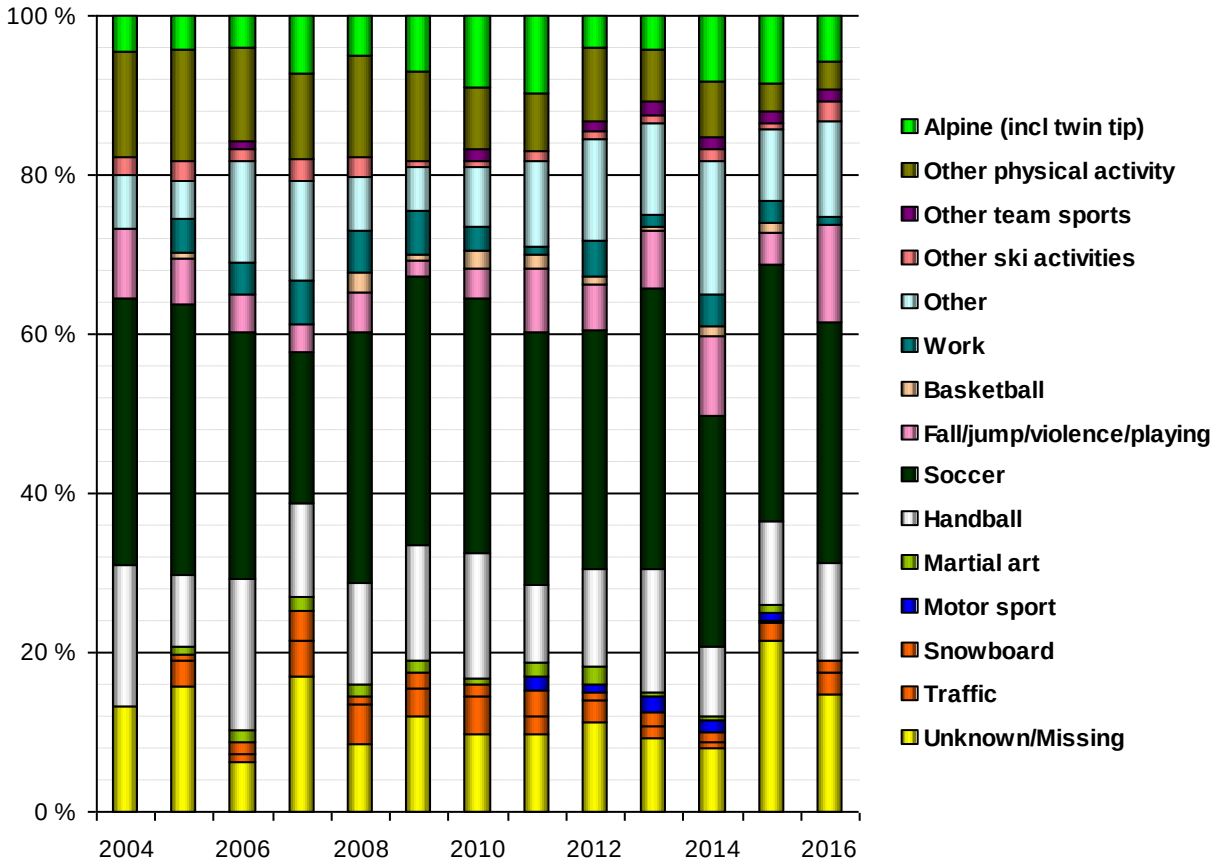
Revision reconstruction

Figure 10: Age by primary operation



* Mean number of primary operations for 2004 - 2010

Figure 11: Activity that lead to injury



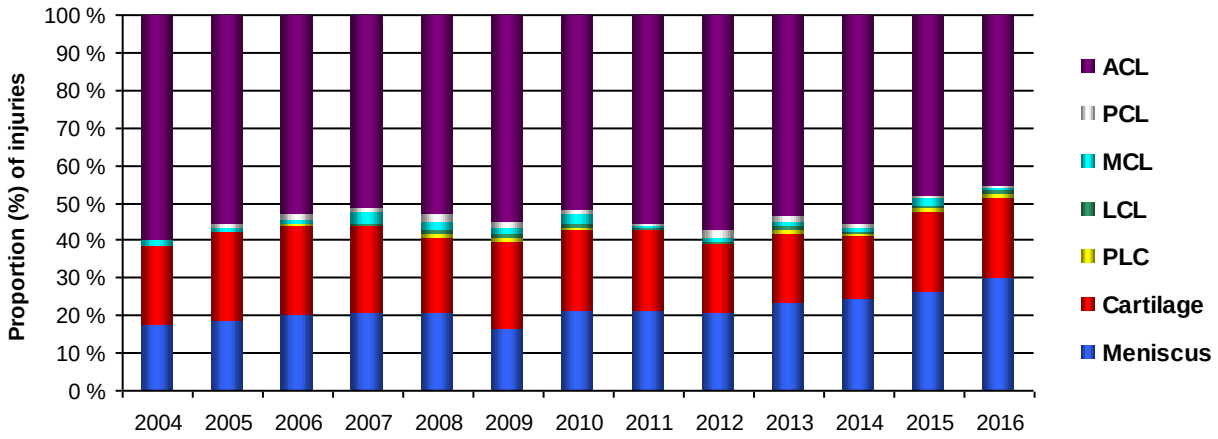
Actual injury

Table 34: Actual injury*

	ACL	PCL	MCL	LCL	PLC	Cartilage	Meniscus
2016	148	2	3	3	4	68	99
2015	165	2	7	2	3	73	91
2014	195	3	4	2	1	59	86
2013	184	6	4	3	5	63	81
2012	195	6	4	2		62	71
2004-11	925	20	29	9	9	387	338
Total	**1812**	**39**	**51**	**21**	**22**	**712**	**766**

* More than one type of injury can be given for each form

Figure 12: Actual injury



Additional injuries

Table 35: ACL with additional injuries

Number	ACL	PCL	MCL	LCL	PLC	Meniscus	Cartilage
781	x						
358	x					x	
312	x					x	x
288	x						x
16	x		x				
8	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 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 36: PCL with additional injuries

Number	ACL	PCL	MCL	LCL	PLC	Meniscus	Cartilage
11		x					
6		x					x
4	x	x	x				x
3	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 37: Reason for revision reconstruction

	Cause 1	Cause 2	Cause 3	Cause 4	Cause 5	Cause 6	Other	Total
2016	4	9	5	107	75	4	1	201
2015	6	12	3	116	81	1	1	219
2014	3	4	1	109	120	6		237
2013	1	11	1	123	74	5		210
2012	8	10	3	95	99	3	6	221
2004-11	9	32	7	238	247	6	27	560
Total	**31**	**78**	**20**	**788**	**696**	**25**	**35**	**1673**

Cause 1: Infection
Cause 2: Fixation failure
Cause 3: Untreated ligamentinjury
Cause:4: Graft failure
Cause 5: New trauma
Cause 6: Pain

Choice of graft for injuries registered in revision reconstructions

Table 38: BPTB

	ACL	PCL	MCL	LCL	PLC
2016	83	0	0	0	0
2015	92	0	0	0	0
2014	120	0	0	0	0
2013	91	0	0	0	0
2012	101	0	0	0	0
2004-11	352	2	0	0	0
Total	**839**	**2**	**0**	**0**	**0**

Table 39: HAMSTRING

	ACL	PCL	MCL	LCL	PLC
2016	38	1	0	1	1
2015	50	0	0	1	1
2014	50	1	1	0	0
2013	50	1	1	0	0
2012	53	0	2	1	0
2004-11	497	4	12	1	0
Total	**738**	**7**	**16**	**4**	**1**

Table 40: ALLOGRAFT

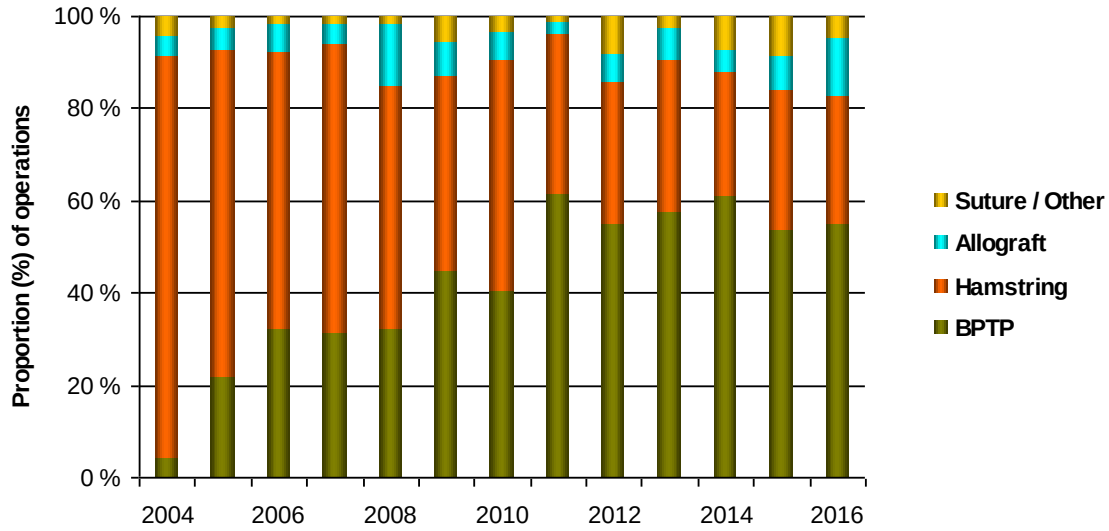
	ACL	PCL	MCL	LCL	PLC
2016	12	1	1	2	3
2015	7	2	3	0	0
2014	7	1	0	1	1
2013	4	3	1	1	2
2012	5	6	0	0	0
2004-11	30	10	5	6	8
Total	**65**	**23**	**10**	**10**	**14**

Table 41: Suture / Other

	ACL	PCL	MCL	LCL	PLC
2016	7	0	0	0	0
2015	15	0	0	0	0
2014	13	0	0	1	0
2013	3	0	0	0	1
2012	15	0	0	0	0
2004-11	19	4	3	0	0
Total	**72**	**4**	**3**	**1**	**1**

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)

Product	Total	2004-11	2012	2013	2014	2015	2016
Profile Interference Screw	**34**	10	4	5	8	4	3
Sheated Cannulated Interference Screw	**52**	1		13	10	13	15
Endobutton CL BTB	**80**		11	9	30	17	13
Endobutton CL Ultra	**369**	140	46	48	50	49	36
SoftSilk	**424**	176	53	44	61	44	46

Table 43: Femur PCL (The 5 most common)

Product	Total	2004-11	2012	2013	2014	2015	2016
EndoButton CL		2					
Guardsman Femoral		1					
Propel Cannulated		2					
ComposiTCP 30+60	**1**		1				
SoftSilk	**6**	2		1		1	2
RCI Screw	**11**	10	1				
Endobutton CL Ultra	**12**	3	4	3	2		

Table 44: Tibia ACL (The 5 most common)

Product	Total	2004-11	2012	2013	2014	2015	2016
Sheated Cannulated Interference Screw	**45**			12	11	11	11
Propel Cannulated	**90**	38	8	10	18	7	9
Biosure HA Interference screw	**191**	39	29	30	29	40	24
RCI Screw	**322**	236	21	18	21	11	15
SoftSilk	**386**	147	52	44	59	39	45

Table 45: Tibia PCL (The 5 most common)

Product	Total	2004-11	2012	2013	2014	2015	2016
BioRCI-HA	**1**		1				
Intrafix Screw	**1**				1		
Propel Cannulated	**3**	2	1				
AO Skrue	**4**	3	1				
RCI Screw	**24**	14	2	4	1	1	2

Table 46: Femur and tibia ACL (The 5 most common)

Femur	Tibia	Total	2004-11	2012	2013	2014	2015	2016
Endobutton CL BTB	Propel Cannulated	**31**			2	16	6	7
Sheated Cannulated Interference Screw	Sheated Cannulated Interference Screw	**44**			12	10	11	11
Endobutton CL Ultra	RCI Screw	**118**	71	10	10	12	8	7
Endobutton CL Ultra	Biosure HA Interference screw	**137**	20	15	27	23	31	21
SoftSilk	SoftSilk	**350**	141	47	36	52	33	41

Meniscal lesion

Table 47: Actual treatment of meniscal lesion

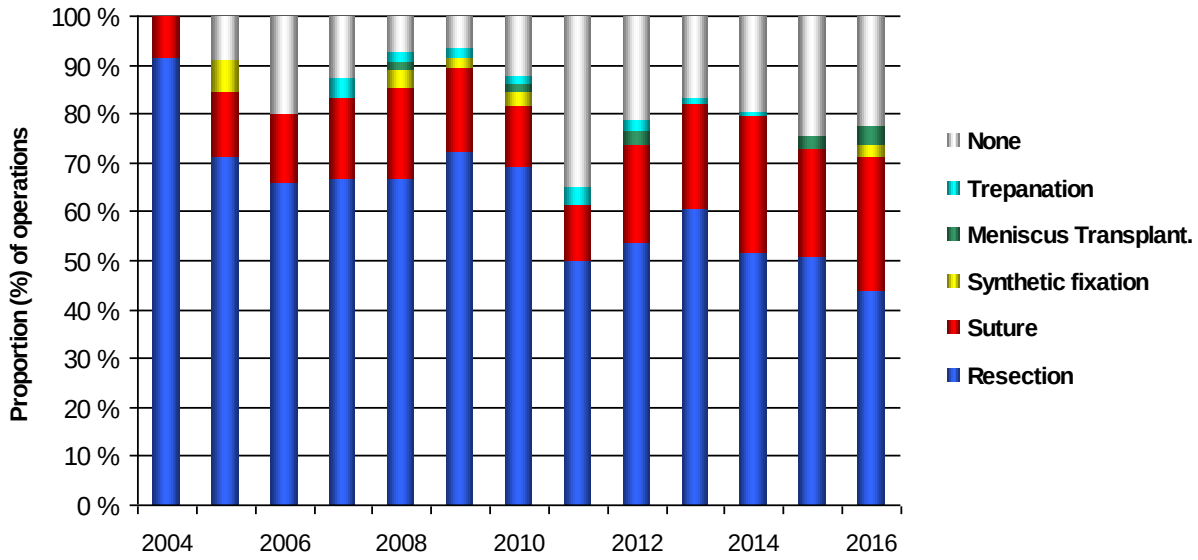
		Resection			Suture	Synthetic fixation	Meniscus Transplant.	Trepanation	None	Total
		OLD	Total	Partial						
2016	Lateral			18	21	1	1		11	**52**
2016	Medial		2	35	13	2	4		17	**73**
2015	Lateral			19	8				16	**43**
2015	Medial			39	17		3		12	**71**
2014	Lateral			24	12				4	**40**
2014	Medial			29	17			1	16	**63**
2013	Lateral			29	4			1	7	**41**
2013	Medial			32	18				10	**60**
2012	Lateral			14	6		2	2	4	**28**
2012	Medial		1	28	10				13	**52**
2004-11	Lateral	85	1	7	15	4		4	36	**152**
2004-11	Medial	149	3	18	42	4	2	4	27	**249**
Total		**234**	**7**	**292**	**183**	**11**	**12**	**12**	**173**	**924**

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 36: Actual injury has less. The reason for this is that we distinguish between the lateral and medial injury and some injuries are registreded in both groups.

The value in OLD Resection are the forms that are registered before the new forms were introduced in autumn 2011. Total and Partial Resection values are the new forms were introduced in autumn 2011.

Figure 14: Treatment of meniscal lesions in revision reconstructions



Fixation

Table 48: Synthetic

Product	Total	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Contour Meniscus arrow	**3**	2			1								
Meniscus arrow	**1**	1											
Unknown	**4**					1							3
Total	**8**	**3**			**1**	**1**							3

Table 49: Suture

Produktnavn	Total	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
ANNET	**1**												1
FAST-FIX	**112**	3	4	6	6	5	4	5	14	16	19	16	14
Meniscus arrow	**1**						1						
Rapidloc	**4**	1	2	1									
Unknown	**39**					1		4	1	5	6	9	13
Total	**157**	**4**	**6**	**7**	**6**	**6**	**5**	**9**	**15**	**21**	**25**	**25**	**28**

Cartilage lesion all localizations

Table 50: ICRS Grade

Definitjon 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
2016	34,0%	40,7%	18,0%	6,7%	0,5%
2015	29,7%	42,3%	22,9%	4,0%	1,1%
2014	10,6%	60,2%	23,9%	3,5%	1,8%
2013	24,6%	47,0%	23,1%	3,7%	1,5%
2012	14,3%	45,2%	31,7%	7,1%	1,6%
2004-11	21,1%	52,1%	21,0%	4,5%	1,2%

Table 51: Treatment codes for all localizations

	Debridement	Micro fracture	No treatment	Other	Missing
2016	8,8%	1,0%	86,6%		3,6%
2015	16,0%	0,6%	76,0%	1,7%	5,7%
2014	3,5%	4,4%	83,3%	1,8%	7,0%
2013	18,7%	2,2%	71,6%		7,5%
2012	18,3%	3,2%	74,6%		4,0%
2004-11	5,7%	2,2%	67,7%	1,5%	22,9%

Cartilage injuries registered in revision reconstructions

Figure 15: All Cartilage injuries (total)

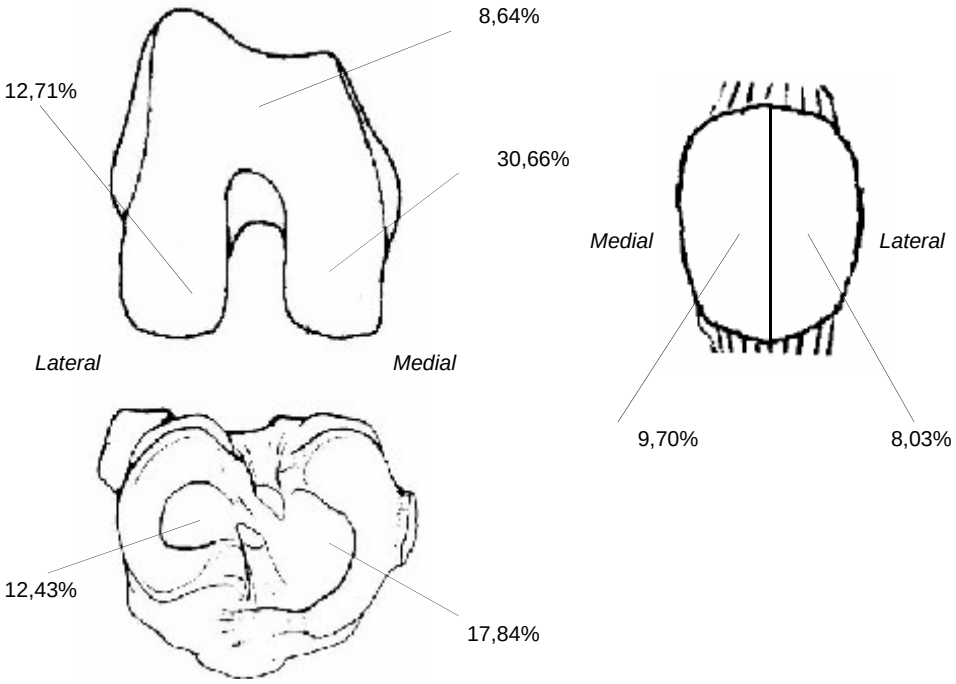


Figure 16: All Cartilage injuries with area greater than 2 cm² (total)

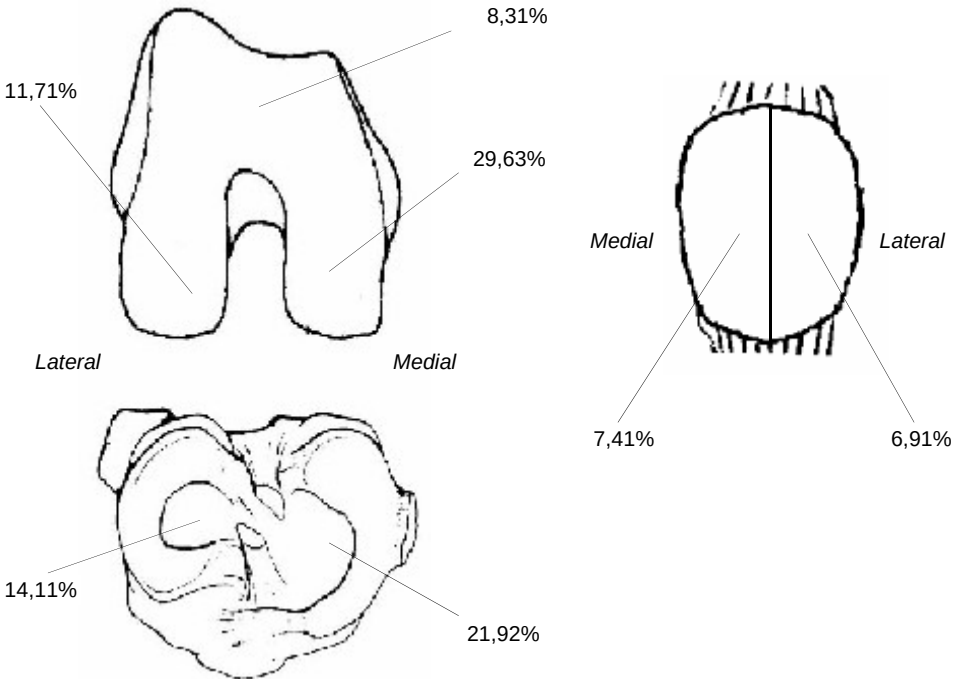
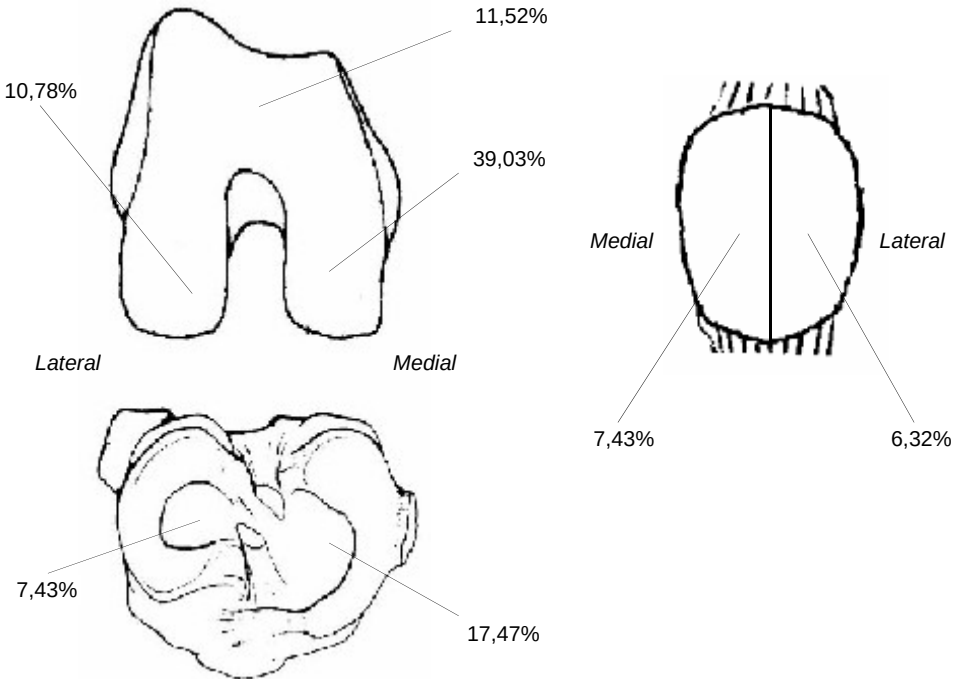


Figure 17: All Cartilage injuries with area greater than 2 cm² and ICRS equal 3 or 4 (total)



Outpatient surgery

Table 52: Outpatient surgery

	Yes		No		Missing		Total
2016	89	(45,6%)	105	(53,8%)	1	(0,5%)	**195**
2015	117	(52,2%)	101	(45,1%)	6	(2,7%)	**224**
2014	125	(49,8%)	124	(49,4%)	2	(0,8%)	**251**
2013	96	(46,4%)	106	(51,2%)	5	(2,4%)	**207**
2012	120	(54,5%)	99	(45,0%)	1	(0,5%)	**220**
2004-11	355	(36,5%)	613	(63,1%)	4	(0,4%)	**972**
Total	**902**	**(43,6%)**	**1148**	**(55,5%)**	**19**	**(0,9%)**	**2069**

Intraoperative complications

Table 53 : Intraoperative complications

	Yes		No		Missing		Total
2016	6	(3,1%)	186	(95,4%)	3	(1,5%)	**195**
2015	8	(3,6%)	206	(92,0%)	10	(4,5%)	**224**
2014	3	(1,2%)	235	(93,6%)	13	(5,2%)	**251**
2013	7	(3,4%)	189	(91,3%)	11	(5,3%)	**207**
2012	5	(2,3%)	208	(94,5%)	7	(3,2%)	**220**
2004-11	40	(4,1%)	910	(93,6%)	22	(2,3%)	**972**
Total	**69**	**(3,3%)**	**1934**	**(93,5%)**	**66**	**(3,2%)**	**2069**

Systemic antibiotic prophylaxis

Table 54: Systemic antibiotic prophylaxis

	Yes		No		Missing		Total
2016	186	(95,4%)	6	(3,1%)	3	(1,5%)	**195**
2015	220	(98,2%)	3	(1,3%)	1	(0,4%)	**224**
2014	249	(99,2%)	2	(0,8%)			**251**
2013	204	(98,6%)	2	(1,0%)	1	(0,5%)	**207**
2012	216	(98,2%)	3	(1,4%)	1	(0,5%)	**220**
2004-11	958	(98,6%)	11	(1,1%)	3	(0,3%)	**972**
Total	**2033**	**(98,3%)**	**27**	**(1,3%)**	**9**	**(0,4%)**	**2069**

Table 55: Drug

	2004-11	2012	2013	2014	2015	2016
Benzylpenicillin (Penicillin G)		0,46%				
Cefalotin (Keflin)	93,11%	88,43%	91,67%	90,76%	92,73%	98,39%
Ceftriakson (Rocefalin)				0,40%		
Cefuroksim (Zinacef, Cefuroxim, Lifurox)	0,84%	0,46%				
Ciprofloksasin (Ciproxin)				0,40%		
Dikloksacillin (Diclocil, Dicillin)	2,40%	0,93%	1,47%	0,40%		
Gentamicin (Garamycin, Gensumycin)		0,46%				
Klindamycin (Dalacin, Clindamycin)	2,19%	4,17%	3,43%	3,21%	3,18%	1,61%
Kloksacillin (Ekvacillin)	1,04%	4,63%	2,45%	4,02%	2,27%	
Oxacillin (Unspecified)				0,40%		
Vankomycin (Vancomycin, Vancocin)	0,10%					
Missing	0,31%	0,46%	0,98%	0,40%	1,82%	

Thrombosis prophylaxis

Table 56: Thrombosis prophylaxis

	Yes		No		Missing		Total
2016	134	(68,7%)	57	(29,2%)	4	(2,1%)	**195**
2015	176	(78,6%)	47	(21,0%)	1	(0,4%)	**224**
2014	201	(80,1%)	49	(19,5%)	1	(0,4%)	**251**
2013	173	(83,6%)	32	(15,5%)	2	(1,0%)	**207**
2012	183	(83,2%)	36	(16,4%)	1	(0,5%)	**220**
2005-11	741	(80,1%)	171	(18,5%)	15	(1,6%)	**927**
Total	**1608**	**(79,4%)**	**392**	**(19,4%)**	**24**	**(1,2%)**	**2024**

There are 2 old forms that are filled out so that thrombosis prophylaxis can not be registered. These are added to missing.
There are 7 forms with two drugs and 1601 forms with one drug.

Table 57: Drug

	2005-11	2012	2013	2014	2015	2016
Apixiban (Eliquis)				0,50%		
Dalteparin (Fragmin)	65,05%	67,21%	73,41%	58,21%	56,25%	58,21%
Dekstran (Macrodex, Dextran)	0,13%		0,58%			
Enoksaparin (Klexane)	31,98%	32,79%	25,43%	39,30%	42,61%	40,30%
Rivaroksaban (Xarelto)				0,50%		
Warfarin (Marevan)					0,57%	
Ximelagatran (Exanta, Malagatran)	0,40%					
No drugs	1,89%					
Missing	0,13%			1,00%		0,75%
Two drugs	0,27%		0,58%	0,50%	0,57%	0,75%

NSAID's

Table 58: NSAID's

	Yes		No		Missing		Total
2016	67	(34,4%)	118	(60,5%)	10	(5,1%)	**195**
2015	82	(36,6%)	135	(60,3%)	7	(3,1%)	**224**
2014	80	(31,9%)	167	(66,5%)	4	(1,6%)	**251**
2013	84	(40,6%)	119	(57,5%)	4	(1,9%)	**207**
2012	84	(38,2%)	130	(59,1%)	6	(2,7%)	**220**
2007-11	187	(27,5%)	330	(48,5%)	163	(24,0%)	**680**
Total	**584**	**(32,9%)**	**999**	**(56,2%)**	**194**	**(10,9%)**	**1777**

Table 59: Drug

	2007-11	2012	2013	2014	2015	2016
Celecoksib (Celebra)	0,53%		2,38%			
Diklofenak (Voltaren, Diclofenac, Cataflam)	92,51%	90,48%	73,81%	68,75%	56,10%	68,66%
Etoricoksib (Arcoxia)	1,60%		1,19%	17,50%	36,59%	26,87%
Ibuprofen (Ibux, Ibumetin)					1,22%	1,49%
Ketorolak (Toradol)	4,28%	9,52%	19,05%	10,00%	4,88%	1,49%
Parecoksib (Dynastat)			1,19%			
Piroxicam (Brexidol)	0,53%					
Missing	0,53%		2,38%	3,75%	1,22%	1,49%

CONTENTS

Norwegian Paediatric Hip Register

PAEDIATRIC HIP REGISTER
2016 ANNUAL REPORT

The Paediatric Hip Register is now in its sixth year of operation, and we are very pleased to have obtained the status of a national quality register. This means that all hospitals that treat children with the relevant hip disorders are now required to report to our register. In addition, we are now ensured more funding for future data collection, which also involves stricter requirements for good organisation and reporting in our register.

Anne Kristin Reve, PhD candidate and assistant doctor at the Orthopaedic Department of Stavanger University Hospital has completed a coverage analysis in cooperation with the Norwegian Patient Register (NPR) of data in the register. Much effort has gone into this analysis, and it has been especially difficult to obtain reliable figures on patients who were only outpatients. The analysis therefore focused most strongly on operated patients. The figures show that we still need to get more reports in and we will therefore conduct a new analysis in two years' time.

For the past two years, we have been cooperating with Swedish paediatric orthopaedists, who have now established their own paediatric orthopaedic register. We aim to use as similar parameters as possible in the two national registers to enable data to be compared and used in larger studies. In this regard, we will also cooperate on joint Patient-Recorded Outcome Measures (PROMs) to be used in both registers. We have started to translate PROMIS Ped into Norwegian; this is validated for children from 8-17 years, with a separate version for children as young as four.

With regard to open and arthroscopic hip surgery in young adults, a group has been formed to draft a new form for these operations, to ensure that the most useful parameters are recorded. For this part of the register, we plan to use IHOT 12, a questionnaire containing 12 questions which is a simplified version of IHOT 33. IHOT 12 has now been translated and is ready for use.

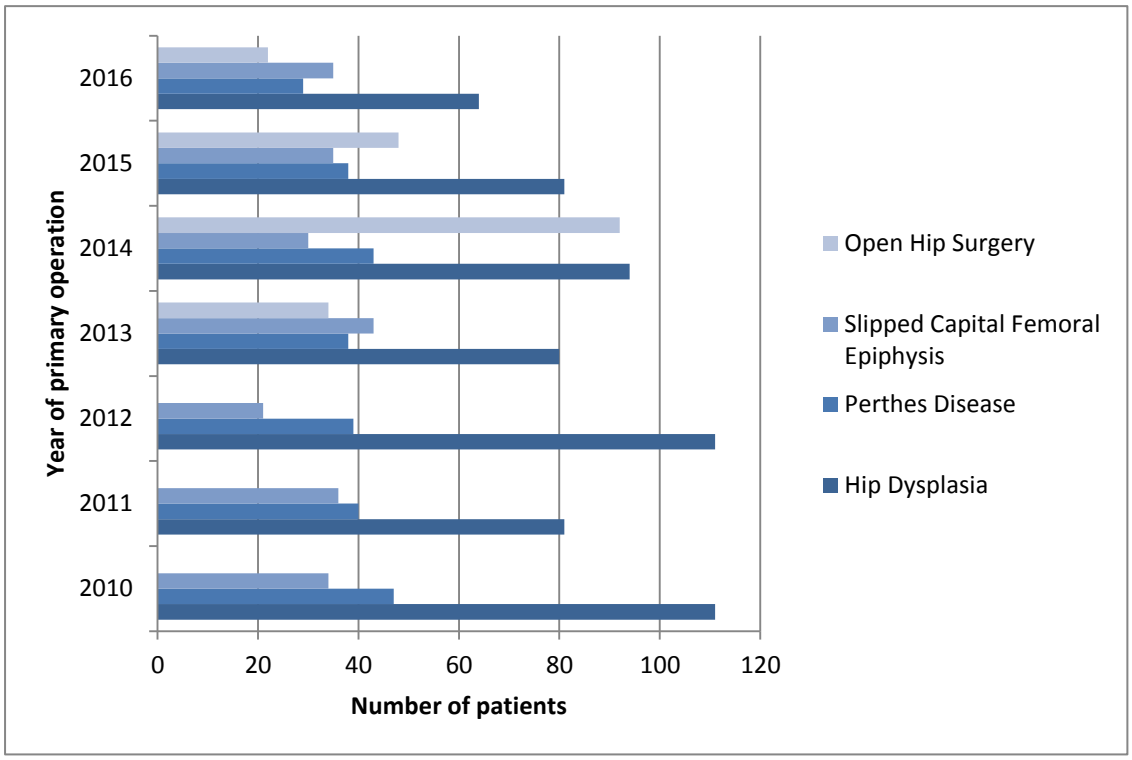
The collection of radiographs of children in the Register is functioning satisfactorily, and work is now well underway to clean the files and measure the radiographs. Ola Wiig has leave from his post as a chief physician this spring, specifically to undertake this work.

To improve reporting to the registry, we have started planning electronic registration forms. We have got the green light to begin this work, and hope to have completed it during 2017.

Trude Gundersen
Haukeland University Hospital
General Manager

Ola Wiig
Oslo University Hospital
Head of the Steering Committee

Number of treated patients registered in the Paediatric Hip Register



PAEDIATRIC HIP DISEASE

Hip Dysplasia

Table 1: HD - New cases per year

Year diagnosed	Unilateral	Bilateral	Missing	Total
2016	22	10	1	**33**
2015	37	14	0	**51**
2014	56	24	1	**81**
2013	51	19	0	**70**
2012	74	31	0	**105**
2011	66	19	0	**85**
2010	89	18	0	**107**
2009	21	6	0	**27**
2008	6	2	0	**8**
2007	4	2	0	**6**
2006	1	0	0	**1**
2005	0	1	0	**1**
2004	2	0	0	**2**
2001	2	0	0	**2**
2000	1	0	0	**1**
Unknown	23	3	8	**34**
Total	**455**	**149**	**10**	**614**

Table 2: HD - Earlier treatment

Treatment year	None	Pillow / abd. orthosis	Other	Missing	Total
2016	31	29	6	6	**72**
2015	38	24	15	28	**105**
2014	38	40	14	26	**118**
2013	29	16	9	39	**93**
2012	6	4	0	126	**136**
2011	0	1	0	96	**97**
2010	2	2	0	123	**127**
Unknown	0	0	0	2	**2**
Total	**144**	**116**	**44**	**446**	**750**

More than one form for patient per side is possible.

Table 3: HD - Hip status

Year treated	Located	Partially dislocated	Luksert	Missing	Total
2016	42	9	14	7	**72**
2015	53	26	17	9	**105**
2014	66	15	35	2	**118**
2013	50	18	17	8	**93**
2012	68	21	34	13	**136**
2011	54	13	23	7	**97**
2010	66	23	29	9	**127**
Unknown	1	1	0	0	**2**
Total	**400**	**126**	**169**	**55**	**750**

More than one form for patient per side is possible

Table 4: HD - Acetabular index

Year diagnosed	< 15°	< 20°	< 25°	< 30°	< 35°	< 40°	< 45°	>= 45°	Missing	Total
2016	0	0	0	5	4	5	2	11	6	**33**
2015	0	0	1	3	13	4	7	16	7	**51**
2014	0	1	3	8	20	10	5	22	12	**81**
2013	0	0	0	8	16	10	8	14	14	**70**
2012	0	0	5	11	26	10	12	28	13	**105**
2011	0	1	3	11	25	11	6	20	8	**85**
2010	0	3	5	23	25	12	12	14	13	**107**
2009	0	0	1	3	4	6	3	4	6	**27**
2008	0	0	0	1	4	0	0	1	2	**8**
2007	0	0	0	1	2	2	0	1	0	**6**
2006	0	0	0	0	1	0	0	0	0	**1**
2005	0	0	0	0	0	0	0	0	1	**1**
2004	0	0	0	1	0	1	0	0	0	**2**
2001	0	0	0	0	0	0	0	0	2	**2**
2000	0	0	0	0	0	0	1	0	0	**1**
Unknown	0	0	0	5	7	2	3	1	16	**34**
Total	**0**	**5**	**18**	**80**	**147**	**73**	**59**	**132**	**100**	**614**

Mean number used for both hips for bilateral HD,

Table 5: HD - Non-operative treatment

Treatment year	Pillow	Plaster	Abduction orthosis	Closed reduction	No treatment/ obs.	Missing	Total
2016	9	1	27	0	12	3	**52**
2015	5	6	43	2	9	3	**68**
2014	13	12	27	6	23	7	**88**
2013	20	7	40	2	9	3	**81**
2012	36	27	46	6	12	5	**132**
2011	24	14	43	5	6	2	**94**
2010	38	20	58	9	6	1	**132**
2009	1	1	3	1	2	0	**8**
2007	3	1	1	0	0	0	**5**
2005	1	0	1	0	0	0	**2**
Unknown	0	1	0	1	1	0	**3**
Total	**150**	**90**	**289**	**32**	**80**	**24**	**665**

Table 6: HD - Reduction - Surgical

Treatment year	Yes
2016	**8**
2015	**10**
2014	**12**
2013	**10**
2012	**6**
2011	**12**
2010	**14**
Total	**72**

Table 7: HD - Femoral osteotomy

Treatment year	Varising	Rotation	Shortening	Total
2016	6	5	0	**11**
2015	5	3	2	**10**
2014	1	0	0	**1**
2013	5	4	3	**12**
2012	2	2	0	**4**
2011	3	2	1	**6**
2010	1	3	1	**5**
Total	**23**	**19**	**7**	**49**

Table 8: HD - Pelvic osteotomy

Treatment year	Salter	Dega	Triple	Periacetab.	Periacetab. osteotomy	Other	Total
2016	1	7	0	1	0	0	**9**
2015	5	7	0	0	0	3	**15**
2014	8	2	0	0	0	0	**10**
2013	8	0	0	0	1	0	**8**
2012	3	0	0	0	0	0	**3**
2011	2	1	0	2	0	0	**5**
2010	1	1	0	0	0	0	**2**
Total	**28**	**18**	**0**	**3**	**1**	**3**	**52**

Table 9: HD - Tenotomi

Treatment year	Psoas tenotomy	Adductor tenotomy	Total
2016	2	0	**2**
2015	6	6	**12**
2014	8	14	**22**
2013	8	2	**10**
2012	5	5	**10**
2011	3	0	**3**
2010	8	5	**13**
Total	**40**	**32**	**72**

Slipped Capital Femoral Epiphysis (ECF)

Table 10: ECF - New cases per year

Year diagnosed	Unilateral	Bilateral	Total
2016	25	4	**29**
2015	16	7	**23**
2014	21	3	**24**
2013	17	11	**28**
2012	16	5	**21**
2011	26	9	**35**
2010	21	6	**27**
2009	4	0	**4**
2008	2	0	**2**
2007	1	2	**3**
2006	1	1	**2**
2005	1	0	**1**
2004	1	0	**1**
Unknown	15	10	**25**
Total	**167**	**58**	**225**

Table 11: ECF - Classification

Year diagnosed	Acute	Chronic	Acute on chronic	Stable (Able to bear weight)	Unstable (Unable to ambulate)
2016	5	16	6	18	10
2015	5	16	2	19	4
2014	1	16	6	13	9
2013	3	16	5	19	5
2012	2	9	5	10	5
2011	6	14	7	20	4
2010	4	14	3	17	7
2009	0	1	0	1	0
2008	0	0	0	1	0
2006	0	0	0	1	0
2005	1	0	0	0	1
Unknown	2	11	0	12	1
Total	**29**	**113**	**34**	**131**	**46**

Table 12: ECF - Symptoms duration

Year diagnosed	< 4 weeks	4 - 8 weeks	9 - 26 weeks	27-52 weeks	> 52 weeks	Total
2016	0	1	0	0	0	**1**
2015	0	1	1	0	0	**2**
2014	0	2	1	0	1	**4**
2013	1	2	3	3	0	**9**
2012	3	4	3	1	0	**11**
2011	5	3	6	4	3	**21**
2010	3	8	8	2	0	**21**
2007	0	0	0	0	1	**1**
Unknown	2	0	0	0	0	**2**
Total	**14**	**21**	**22**	**10**	**5**	**72**

Table 13: ECF - Degree of slippage

Year diagnosed	< 30°	30 - 50°	> 50°	Total
2016	11	10	7	**28**
2015	12	8	2	**22**
2014	9	6	7	**22**
2013	11	11	4	**26**
2012	7	3	5	**15**
2011	11	7	6	**24**
2010	15	4	7	**26**
2005	1	0	0	**1**
Unknown	6	3	5	**14**
Total	**83**	**52**	**43**	**178**

Table 14: ECF - Type of primary operation

Year treated	Screw osteosynthesis	Femoral osteotomy	Pin osteosynthesis	Total
2016	31	0	5	**36**
2015	23	1	10	**34**
2014	28	0	4	**32**
2013	32	0	11	**43**
2012	14	0	9	**23**
2011	24	1	15	**40**
2010	22	1	13	**36**
2009	1	0	0	**1**
Total	**175**	**3**	**67**	**245**

Table 15: ECF - Primary operation - Osteosynthesis with screws

Year treated	Number of screws			Brand		
	1 screw	2 screws	> 2 screws	Olmed	Richards	Smith+N.
2016	27	1	3	13	1	1
2015	21	1	0	11	4	3
2014	23	5	0	10	6	3
2013	28	1	1	12	7	1
2012	10	3	0	7	0	0
2011	20	4	0	15	3	1
2010	19	3	0	13	4	0
2009	1	0	0	1	0	0
Total	**149**	**18**	**4**	**82**	**25**	**9**

Smith+N. = Smith and Nephew

Table 16: ECF - Primay operation - Osteosynthesis with pins

Year treated	Number of pins				Diameter				
	1	2	3	> 3	2,3	2,5	2,8	3,0	3,2
2016	1	3	1	0	1	0	0	0	0
2015	0	8	2	0	5	3	0	0	0
2014	1	2	1	0	2	0	0	1	0
2013	0	10	0	0	8	0	0	0	1
2012	0	7	1	0	5	1	0	0	0
2011	0	12	3	0	5	1	1	0	1
2010	0	12	1	0	9	1	0	1	2
Total	**2**	**54**	**9**	**0**	**35**	**6**	**1**	**2**	**4**

Perthes Disease (CLP)

Table 17: CLP - Number of new cases per year

Year diagnosed	Unilateral	Bilateral	Total
2016	16	2	**18**
2015	24	3	**27**
2014	35	1	**36**
2013	39	1	**40**
2012	42	3	**45**
2011	24	4	**28**
2010	59	12	**71**
2009	4	0	**4**
2008	1	2	**3**
2007	3	0	**3**
2006	1	0	**1**
2005	2	0	**2**
2004	1	0	**1**
2003	5	0	**5**
2002	4	0	**4**
2001	1	0	**1**
2000	2	0	**2**
Unknown	35	6	**41**
Total	**298**	**34**	**332**

Table 18: CLP - Catterall

Year diagnosed	I/II	III/IV	Missing	Total
2016	5	10	3	**18**
2015	9	17	2	**28**
2014	7	24	5	**36**
2013	11	23	6	**40**
2012	14	25	6	**45**
2011	11	16	1	**28**
2010	22	42	7	**71**
2009	0	4	0	**4**
2008	0	2	1	**3**
2007	0	1	2	**3**
2006	0	0	1	**1**
2005	0	1	1	**2**
2004	0	1	0	**1**
2003	0	1	4	**5**
2002	0	1	3	**4**
2001	0	0	1	**1**
2000	1	1	0	**2**
Unknown	1	14	31	**46**
Total	**81**	**183**	**74**	**338**

I/II = < 50 % caput necrosis III/IV = < 50 % caput necrosis

Table 19: CLP - Treatment

Year treated	None/ physiotherapy	Abduction orthosis	Femoral osteotomy	Salter	Dega	Periacetabular	Other pelvic osteotomy	Total
2016	17	0	19	0	0	0	1	**37**
2015	29	0	12	0	0	0	2	**43**
2014	36	2	11	0	0	0	0	**49**
2013	32	0	13	0	0	0	0	**45**
2012	34	0	3	0	0	0	3	**40**
2011	31	0	15	0	0	0	0	**46**
2010	42	0	10	0	0	0	0	**52**
Total	**221**	**2**	**83**	**0**	**0**	**0**	**6**	**312**

Table 20: CLP - Plates and screws

Year treated	Prebent plate	Angel plate	Special plate	Normal screws	Angle-stable screws
2016	2	2	13	5	15
2015	1	2	8	2	8
2014	0	0	10	1	7
2013	2	1	9	3	12
2012	1	0	7	2	2
2011	0	0	19	5	9
2010	1	7	3	5	3
Total	**7**	**12**	**69**	**23**	**56**

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Oral presentations/Abstracts/Posters 2016-2017 (68 in total)

Norwegian Arthroplasty Register (50 in total)

Leta TH, Lygre SHL, Skredderstuen A, Hallan G, Gjertsen JE, Rokne B, Furnes O. The outcome of unicompartmental knee arthroplasties after aseptic revision into total knee arthroplasties. A comparative study of 768 total knees and 578 uni knees revised to total knees reported to the Norwegian arthroplasty register (1994-2011). 58th Nordic orthopaedic federation congress; 2016 27-29 April; Linköping, Sweden.

Furnes O, Dybvik E, Småbrekke A, Fenstad AM, Hallan G, Havelin L. Ceramic on ceramic articulation in 4926 uncemented total hip replacements with up to 15 years follow up reported to the Norwegian arthroplasty register. Poster presented at the 58th Nordic Orthopaedic Federation Congress; 2016 27-29 April; Linköping, Sweden.

Lie SA. Co-occurring competing risk illustrated using data from two different hip implants with two different bone cements. The 7TH International Conference Methodological Issues in Oral Health Research; 2016 11-13 May; Bergen, Norway

Furnes O. Report from Norwegian shoulder arthroplasty registry. The 7th Triennial Nordic shoulder and elbow conference; 2016 12-13. May; Odense, Denmark

Furnes O. The learning curve of surgical procedures – Influence on education. The 7th Triennial Nordic shoulder and elbow conference; 2016 12-13 may; Odense, Denmark

Dyrhovden G, Furnes O, Gøthesen Ø, Badawy M, Lygre SH. Time trends in causes of revision in unicompartmental and total knee replacement 1994-2014. Poster presented at the 5th International Congress of Arthroplasty Registries (ISAR); 2016 28-30 May; Manchester, UK.

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K, Kärrholm J. Mixed outcome in a design-specific comparison between highly cross-linked and conventional polyethylene in total hip arthroplasty, 163368 THR in the Nordic arthroplasty register association database with 5-11 years follow up (ISAR). 5th International Congress of Arthroplasty registries; 2016 28-30 May; Manchester, UK.

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Furnes O. Innføring av PROM I leddproteseregisteret. Presentert på symposium på høstmøtet i Norsk Ortopedisk Forening; 2016 26.-28. oktober; Oslo

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Furnes O. Experiences from the Norwegian Hip arthroplasty register 1987-2016. Invited speaker 43rd annual meeting of Japanese Hip Society, Kyoto 4th November 2016.

Furnes O. Hofteprotesens historie. LINKademy, kurs i sementert hofteprotese; 2016 1.-2. desember; Bergen

Furnes O. Spiller det noen rolle hvilken sement jeg bruker? LINKademy, kurs i sementert hofteprotese; 2016 1.-2. desember; Bergen

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Fenstad AM. Statistikk- et nyttig verktøy! ENT3R- elevkveld; 2017 April 4; Universitetet i Bergen

Fenstad AM. Multippel testing. Kurs i analyse av registerdata; 2017 April 24-26; Tromsø

Wilkinson M, Bartz-Johannessen C, Furnes O, Havelin L, Fenstad AM, Lie SA, Pedersen A, Overgaard S, Kärrholm J, Garellick G, Nemes S, Malchau H, Mäkelä KT, Eskelinen A, Wilkinson JM. Risk stratification algorithms for hip replacement outcomes: An evaluation of the heterogeneity in prosthesis survivorship between Scandinavian countries using the NARA database. 6th International Congress of Arthroplasty Registries; 2017 May 20 – 22; San Francisco, USA

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Furnes O, Gøthesen Ø, Lygre SH, Lorimer M, Graves S. Risk of aseptic loosening for 43525 rotating platform total knee replacements. A combined registry study from Norway and Australia, 2003-2014. 6th International Congress of Arthroplasty Registries; 2017 May 20 – 22; San Francisco, USA

Havelin LI. Translating registry findings into clinical practice. NAR, Norwegian. 6th International Congress of Arthroplasty Registries; 2017 May 20 – 22; San Francisco, USA

Furnes O, Leeuwe M. Data completeness and validity of outcome presentation of registry data. 6th International Congress of Arthroplasty Registries; 2017 May 20 – 22; San Francisco, USA

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Tsikandylakis G, Kärrholm J, Hailer NP, Eskelinen A, Mäkelä K, Hallan G, Furnes O, Pedersen AB, Overgaard S, Mohaddes M. Should 36 mm heads be used to reduce the risk of revision due to dislocation after total hip arthroplasty? An analysis of 300,715 procedures in the Nordic arthroplasty registry association. 6th International Congress of Arthroplasty Registries; 2017 May 20 – 22; San Francisco, USA

Lehtimäki K, Rasmussen J, Mokka J, Salomonsson B, Hole R, Jensen SL, Äärimaa V. Risk factors for revision after reverse shoulder arthroplasty – Nordic arthroplasty registry study. 6th International Congress of Arthroplasty Registries; 2017 May 20 – 22; San Francisco, USA

Norwegian Hip Fracture Register (11 in total)

Gjertsen JE, Dybvik E, Furnes O, Fevang JM, Havelin LI, Matre K, Engesæter LB. Improved outcome after hip fracture surgery in Norway. 10 years results from the Norwegian hip fracture register. 5TH FFN Global Congress; 2016 1-3 september; Rome, Italy

Gjertsen JE. Hip fracture care in Scandinavia. QIST conference; 2016 18 october; Newcastle, UK

Gjertsen JE. SSI in hip fracture. QIST conference; 2016 19 october; Newcastle, UK

Kristensen TB, Dybvik EH, Furnes O, Engesæter LB, Gjertsen JE. Overlevelse for sementerte hemiprotesestammer. Rapport fra Nasjonalt hoftebruddregister. Høstmøtet i Norsk Ortopedisk Forening; 2016 26.-28. oktober; Oslo

Gjertsen JE, Dybvik E, Furnes O, Fevang JM, Havelin LI, Matre K, Engesæter LB. Mindre reoperasjoner etter hoftebruddskirurgi i Norge. Resultater fra Nasjonalt hoftebruddregister 2005-2014. Høstmøtet i Norsk Ortopedisk Forening; 2016 26.-28. oktober; Oslo

Råen V, Arnason OT, Kjærner-Semb Ø, Jahnsen E, Leer-Salvesen S, Engesæter LB. Validering av rapportering av primæropererte hoftebrudd til Norsk Pasientregister. Høstmøtet i Norsk Ortopedisk Forening; 2016 26.-28. oktober; Oslo

Kjærner-Semb Ø, Arnason OT, Jahnsen E, Råen V, Leer-Salvesen S, Engesæter LB. Enkel metode for å finne antall primær operasjoner for hoftebrudd. Høstmøtet i Norsk Ortopedisk Forening; 2016 26.-28. oktober; Oslo

Jahnsen E, Arnason OT, Kjærner-Semb Ø, Leer-Salvesen S, Råen V, Engesæter LB. Validering av rapporteringen av primær operasjoner for hoftebrudd til Nasjonalt hoftebruddregister ved åtte sykehus i Norge. Høstmøtet i Norsk Ortopedisk Forening; 2016 26.-28. oktober; Oslo

Vinje T, Engesæter L, Gjertsen JE. Tid frå skade til operasjon og død for pasientar med hoftefraktur - ein nasjonal kohortstudie med propensity score matching. Høstmøtet i Norsk Ortopedisk Forening; 2016 26.-28. oktober; Oslo

Gjertsen JE, Dybvik E, Furnes O, Fevang JM, Havelin LI, Matre K, Engesæter LB. Improved outcome after hip fracture surgery in Norway. 10-years results from the Norwegian hip fracture register. 6th International Congress of Arthroplasty Registries; 2017 May 20 – 22; San Francisco, USA

Kristensen TB, Dybvik E, Furnes O, Engesæter LB, Gjertsen JE. Stem survival of cemented hemiarthroplasty for femoral neck fractures. A report from the Norwegian hip fracture register. 6th International Congress of Arthroplasty Registries; 2017 May 20 – 22; San Francisco, USA

Norwegian Cruciate Ligament Register (5 in total)

Fjeldsgaard K. Status for elektronisk rapportering. Presentert på symposium på høstmøtet i Norsk Ortopedisk Forening; 2016 26.-28. oktober; Oslo

Persson A, Fjeldsgaard K, Gjertsen JE, Engebretsen L, Kjellsen AB, Fevang JM. New trauma is the most common cause of revision after primary anterior cruciate ligament reconstruction - a study from the Norwegian knee ligament registry 2004-2015. Høstmøtet i Norsk Ortopedisk Forening; 2016 26.-28. oktober; Oslo

Aga C, Granan LP, Kartus J, Lind M, Maletis G, Engebretsen L. No difference in revision rates or treatment failures between single bundle and double bundle anterior cruciate ligament reconstruction, A register study. Høstmøtet i Norsk Ortopedisk Forening; 2016 26.-28. oktober; Oslo

Gifstad T, Inderhaug E, Drogset JO. Grafttykkelse og kroppsmasseindeks i det norske korsbåndregisteret. Høstmøtet i Norsk Ortopedisk Forening; 2016 26.-28. oktober; Oslo

Ekås GR, Engebretsen L. Korsbåndregisteret er i endring i form av registrering av ikke – opererete

korsbåndspasienter; Prosjektpresentasjon og demonstrasjon av elektronisk skjema. Høstmøtet i Norsk Ortopedisk Forening; 2016 26.-28. oktober; Oslo

Norwegian Paediatric Hip Register (2 in total)

Wiig O. Introduksjon og status for barnehofteregisteret. Presentert på symposium på høstmøtet i Norsk Ortopedisk Forening; 2016 26.-28. oktober; Oslo

Reve AK. Hva kan gjøres for å øke compliance? Presentert på symposium på høstmøtet i Norsk Ortopedisk Forening; 2016 26.-28. oktober; Oslo

Operation forms (in Norwegian only)
Data from these forms is the basis of this report.

Nasjonalt Register for Leddproteser
Ortopedisk klinikk, Helse Bergen HF
Haukeland universitetssjukehus, Postboks 1400
Møllendalsbakken 11, 5021 BERGEN
Tlf 55973742/55973743

F.nr. (11 sifre).....

Navn:.....

(Skriv tydelig ev. pasientklistrelapp – spesifiser sykehus.)

Sykehus:.....

HOFTEPROTESER

Alle totale hofteproteseoperasjoner og hemiproteser på annen indikasjon enn fraktur/fraktursekvele registreres her (hemiprotese for fraktur/fraktursekvele registreres på Hoftebruddskjema). Alle reoperasjoner skal registreres: skifte/fjerning av protesedeler, kantplastikk, bløtdelsdebridement, og operasjoner for protesenær fraktur eller gluteal svikt.

TIDLIGERE OPERASJON I AKTUELLE HOFTE (ev. flere kryss)
☐0 Nei
☐1 Osteosyntese for fraktur i prox. femurende
☐2 Hemiprotese pga. fraktur
☐3 Osteotomi
☐4 Artrodese
☐5 Totalprotese(r)
☐6 Annen operasjon ……

AKTUELLE OPERASJON (ett kryss)
☐1 Primæroperasjon (også hvis hemiprotese tidligere)
☐2 Reoperasjon (totalprotese tidligere)
☐3 Primær hemiprotese for annen indikasjon enn fraktur/fraktursekvele

OPERASJONSDATO (dd.mm.åå) |__|__| |__|__| |__|__|

AKTUELLE SIDE (ett kryss) (Bilateral opr.= 2 skjema)
☐1 Høyre ☐2 Venstre

ÅRSAK TIL AKTUELLE OPERASJON (KRYSS AV ENTEN I A ELLER B)

A. Primæroper. pga (ev. flere kryss)
☐1 Idiopatisk coxartrose
☐2 Rheumatoid artritt
☐3 Sekvele etter frakt. colli. fem.
☐4 Sekv. dysplasi
☐5 Sekv. dysplasi med total luksasjon
☐6 Sekv. Perthes
☐7 Sekv. epifysiolyse
☐8 Mb. Bechterew
☐9 Akutt fraktura colli femoris
☐10 Annet……..
(f.eks caputnekrose, tidl. artrodese o.l)

B. Reoper. pga (ev. flere kryss)
☐1 Løs acetabularkomponent
☐2 Løs femurkomponent
☐3 Luksasjon
☐4 Dyp infeksjon
☐5 Fraktur i acetabulum
☐6 Fraktur av femur
Vancouverklassifikasjon, se bakside.
☐A ☐B1 ☐B2 ☐ B3 ☐C
☐7 Smerter
☐8 Osteolyse i acetab. uten løsning
☐9 Osteolyse i femur uten løsning
☐10 Implantatfraktur femurdel
☐11 Implantatfraktur caput
☐12 Implantatfraktur kopp
☐13 Implantatfraktur liner
☐14 Implantatfraktur annet: .....
.....
☐15 Gluteal svikt
☐16 Annet……
(f.eks Girdlestone etter tidl. infisert protese)

REOPERASJONSTYPE (ev. flere kryss)
☐1 Bytte av femurkomponent
☐2 Bytte av acetabularkomponent
☐3 Bytte av hele protesen
☐4 Fjernet protese og satt inn sementspacer
☐5 Fjernet sementspacer og satt inn ny protese
☐6 Fjernet protese (Girdlestone eller fjerning av sementspacer)
Angi hvilke deler som ble fjernet……
☐7 Bytte av plastforing
☐8 Bytte av caput
☐9 Bløtdelsdebridement
☐10 Ny protese etter Girdlestone
☐11 Resutur av muskel
☐12 Transposisjon av muskel
☐13 Osteosyntese for fraktur
☐14 Konvertering til hemiprotese
☐15 Andre operasjoner ……

TILGANG (ett kryss)
☐1 Fremre (Mellom sartorius og tensor)
☐2 Anterolateral (Mellom glut. medius og tensor)
☐3 Direkte lateral (Transgluteal)
☐4 Bakre (Bak gluteus medius)
☐5 Annen ……

MINIINVASIV KIRURGI (MIS) ☐0 Nei ☐1 Ja
LEIE ☐0 Sideleie ☐1 Rygg
TROCHANTEROSTEOTOMI ☐0 Nei ☐1 Ja

BENTRANSPLANTASJON (ev. flere kryss)
Acetabulum ☐0 Nei ☐1 Ja ☐2 Benpakking
Femur ☐0 Nei ☐1 Ja ☐2 Benpakking a.m. Ling/Gie

BENTAP VED REVISJON (Paprosky's klassifikasjon se baksiden)
Acetabulum ☐1 I ☐2 IIA ☐3 IIB ☐4 IIC ☐5 IIIA ☐6 IIIB
Femur ☐1 I ☐2 II ☐3 IIIA ☐4 IIIB ☐5 IV

PROTESEKOMPONENTER (Bruk klistrelapp på baksiden, eller skriv REF.NR.)

Acetabulum
Navn/Type ……
ev. REF.NR. … ……
☐ Med hydroksylapatitt ☐ Uten hydroksylapatitt
☐1 Sement med antibiotika – Navn ……
☐2 Sement uten antibiotika – Navn ……
☐3 Usementert

Femur (+ ev. trokanterdel)
Navn/Type ……
ev. REF.NR. .. ……
☐ Med hydroksylapatitt ☐ Uten hydroksylapatitt
☐1 Sement med antibiotika – Navn ……
☐2 Sement uten antibiotika – Navn ……
☐3 Usementert

Caput (+ ev. halsdel)
☐1 Fastsittende caput
☐2 Separat caput - Navn/Type ……
ev. REF. NR. .. ……
Diameter ……

ANTIBIOTIKAPROFYLAKSE ☐0 Nei ☐1 Ja

	Navn	*Dosering*	*Varighet i timer*
Medikament 1	.....	……	……timer
Medikament 2	.....	……	……timer
Medikament 3	.....	……	……timer

TROMBOSEPROFYLAKSE
☐0 Nei ☐1 Ja: Første dose ☐1 Preoperativt ☐2 Postoperativt
Medikament 1……..Dosering opr.dag……
Dosering videre…….Varighet……..døgn
Medikament 2…….. Dosering……..Varighet……..døgn
FAST TROMBOSEPROFYLAKSE
☐0 Nei ☐1 Ja, type: ……

FIBRINOLYSEHEMMER
☐0 Nei ☐1 Ja, medikament: …….. Dosering……

OPERASJONSSTUE
☐1 "Green house"
☐2 Operasjonsstue med laminær luftstrøm
☐3 Vanlig operasjonsstue

OPERASJONSTID (hud til hud) ……min

PEROPERATIV KOMPLIKASJON
☐0 Nei
☐1 Ja,hvilke(n) .....

ASA KLASSE (se baksiden for definisjon)
☐1 Frisk
☐2 Asymptomatisk tilstand som gir økt risiko
☐3 Symptomatisk sykdom
☐4 Livstruende sykdom
☐5 Moribund

Lege .....
Legen som har fylt ut skjemaet (navnet registreres ikke i databasen).

RETTLEDNING TIL HOFTEPROTESER

Registreringen gjelder innsetting, skifting og fjerning av totalproteser i hofteledd, samt kantplastikk, bløtdelsrevisjon for infisert protese og hemiproteser på annen indikasjon enn fraktur/fraktursekvele. Hemiprotese for fraktur/ fraktursekvele registreres på Hoftebruddskjema. Ett skjema fylles ut for hver operasjon. Fødselsnummer (11sifre) og sykehusnavn må påføres. Aktuelle ruter markeres med kryss. På eget Samtykkeskjema skal pasienten gi samtykke til rapportering til Leddregisteret. Samtykkeskjema skal lagres i pasientjournal.

AKTUELLE OPERASJON

Primæroperasjoner: Første totalproteseoperasjon, og første hemiprotese hvis denne settes inn på annen indikasjon enn fraktur. Hemiprotese for fraktur/fraktursekvele registreres på Hoftebruddskjema.

Reoperasjon (totalprotese tidligere): Fjerning av protesedeler (f.eks. Girdlestone) må registreres. Kantplastikk (f. eks. PLAD), bløtdelsrevisjoner for infeksjon, osteosyntese, resutur av muskel og muskeltransposisjon registreres selv om protesedeler ikke skiftes.

ÅRSAK TIL AKTUELLE OPERASJON

Kryss av under A ved primæroperasjoner og under B ved reoperasjoner. I B må du krysse av for alle årsakene til reoperasjon, eller forklare med fritekst.

REOPERASJONSTYPE

Fjerning av protesedeler (f.eks. Girdlestone) må registreres. Kantplastikk (f. eks. PLAD), bløtdelsrevisjoner for infeksjon, osteosyntese, resutur av muskel og muskeltransposisjon registreres selv om protesedeler ikke skiftes.

BENTRANSPLANTASJON Benpropp som sementstopper regnes ikke som bentransplantat. Vi skiller mellom benpakking og transplantasjon.

PROTESEKOMPONENTER: Acetabulum - Femur - Caput - Trokanterdel og hals hvis disse er separate deler

Bruk klistrelappene som følger med protesen. Lim disse på baksiden av skjema. Alternativt, skriv inn protesenavn + REF.NR., materiale, overflatebelegg og design. Sementnavn må anføres (bruk klistrelapp).

KOMPLIKASJONER Også operasjoner hvor pasienter dør på operasjonsbordet eller rett etter operasjon skal meldes. Ved stor blødning, angi mengde.

ASA-KLASSE (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.

MINIINVASIV KIRURGI (MIS = Minimally Invasive Surgery) når det er brukt spesialinstrument laget for MIS.

ANTIBIOTIKAPROFYLAKSE Før på antibiotikum som er benyttet i forbindelse med operasjonen, f.eks.: Medikament 1: Keflin 2g x 4, med varighet 4,5 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 blødningsreduserende legemidler i forbindelse med operasjonen (f.eks. Cyklokapron).

BEINTAP VED REVISJON

Femur (Paprosky`s klassifikasjon)

Type I: Minimalt tap av metafysært ben og intakt diafyse.

Type II: Stort tap av metafysært ben, men intakt diafyse.

Type IIIA: Betydelig tap av metafysært ben uten mulighet for proximal mekanisk støtte. Over 4 cm intakt corticalis i isthmusområdet.

Type IIIB: Betydelig tap av metafysært ben uten mulighet for proximal mekanisk støtte. Under 4 cm intakt corticalis i isthmusområdet.

Type IV: Betydelig tap av metafysært ben uten mulighet for proximal mekanisk støtte. Bred isthmus med liten mulighet for cortical støtte.

Acetabulum (Paprosky`s klassifikasjon)

Type I: Hemisfærisk acetabulum uten kantdefekter. Intakt bakre og fremre kolonne. Defekter i forankringshull som ikke ødelegger subchondral benplate.

Type IIA: Hemisfærisk acetabulum uten store kantdefekter, intakt bakre og fremre kolonne, men med lite metafysært ben igjen.

Type IIB: Hemisfærisk acetabulum uten store kantdefekter, intakt bakre og fremre kolonne, men med lite metafysært ben igjen og noe manglende støtte superiort.

Type IIC: Hemisfærisk acetabulum uten store kantdefekter, intakt bakre og fremre kollonne, men med defekt i medial vegg.

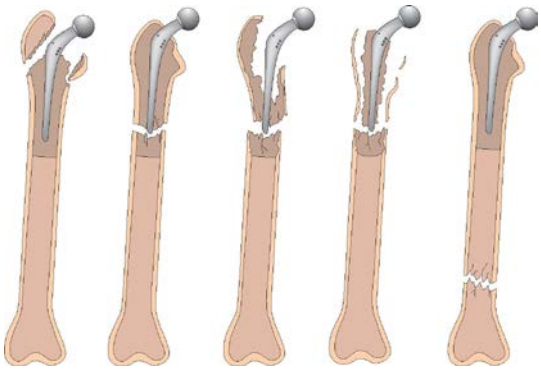
Type IIIA: Betydelig komponentvandring, osteolyse og bentap. Bentap fra kl.10 til 2.

Type IIIB: Betydelig komponentvandring, osteolyse og bentap. Bentap fra kl. 9 til 5.

Kopi beholdes til pasientjournalen, originalen sendes Haukeland universitetssjukehus.

PROTESENÆR FRAKTUR

Vancouverklassifikasjon



Type A Type B1 Type B2 Type B3 Type C

Kontaktpersoner vedrørende registreringsskjema er

Seksjonsoverlege Leif Ivar Havelin, tlf. 55 97 56 87 og overlege Ove Furnes, tlf. 55 97 56 90
Ortopedisk klinikk, Haukeland universitetssjukehus. Besøksadresse: Møllendalsbakken 11.
Sekretærer i Nasjonalt Register for Leddproteser, Ortopedisk klinikk, Helse Bergen:
Ingunn Vindenes, tlf. 55 97 37 43 og Merete Husøy, tlf. 55 97 82 53
Epost nrl@helse-bergen.no Internett: http://nrlweb.ihelse.net/
Skjema revidert i november 2015.

Nasjonalt Register for Leddproteser
Ortopedisk klinikk, Helse Bergen HF
Haukeland universitetssjukehus, Postboks 1400
Møllendalsbakken 11, 5021 BERGEN
Tlf 55973742/55973743

F.nr. (11 sifre).....

Navn:.....

(Skriv tydelig ev. pasientklistrelapp – spesifiser sykehus.)

Sykehus:.....

KNEPROTESER og andre leddproteser

Innsetting, skifting eller fjerning av protese eller protesedeler, samt bløtdelsrevisjoner for infisert protese.

LOKALISASJON, AKTUELL OPERASJON
☐1 Kne ☐6 Håndledd
☐2 Ankel ☐7 Fingre (angi ledd) ……
☐3 Tær (angi ledd) …….. ☐8 Annet ……..
☐4 Skulder ☐9 Rygg (angi nivå)……..
☐5 Albue

AKTUELLE SIDE (ett kryss) (Bilateral opr. = 2 skjema)
☐1 Høyre ☐2 Venstre

TIDLIGERE OPERASJON I AKTUELLE LEDD (ev. flere kryss)
☐0 Nei
☐1 Osteosyntese for intraartikulær/leddnær fraktur
☐2 Osteotomi
☐3 Artrodese
☐4 Protese
☐5 Synovectomi
☐6 Annet (f.eks menisk og leddbåndsop.)……

AKTUELLE OPERASJON (ett kryss)
☐1 Primæroperasjon ☐ 2 Reoperasjon (protese tidligere)

OPERASJONSDATO (dd.mm.åå) |__|__| |__|__| |__|__|

ÅRSAK TIL AKTUELLE OPERASJON (KRYSS AV ENTEN I A ELLER B)

A. Primæroper. pga (ev. flere kryss)
☐1 Idiopatisk artrose
☐2 Rheumatoid artritt
☐3 Fraktursequele……
☐4 Mb. Bechterew
☐5 Sequele ligamentskade
☐6 Sequele meniskskade
☐7 Akutt fraktur
☐8 Infeksjonssequele
☐9 Spondylose
☐10 Sequele prolaps kirurgi
☐11 Degenerativ skivesykdom
☐12 Rotarcuff artropati
☐13 Annet ……

B. Reoper. pga (ev. flere kryss)
☐1 Løs prox.protesedel
☐2 Løs distal protesedel
☐3 Løs patellaprotese
☐4 Luksasjon av patella
☐5 Luksasjon (ikke patella)
☐6 Instabilitet
☐7 Aksefeil
☐8 Dyp infeksjon
☐9 Fraktur av bein (nær protesen)
☐10 Smerter
☐11 Slitt eller defekt plastforing
Hvilken……
☐12 Progresjon av artrose
☐13 Annet (f.eks tidl fjernet protese)
……

REOPERASJONSTYPE (ev. flere kryss)
☐1 Bytte el. innsetting av distal komponent
☐2 Bytte el. innsetting av proximal protesedel
☐3 Bytte el. innsetting av hele protesen
☐4 Innsetting av patellakomp.
☐5 Bytte av patellaprotese
☐6 Bytte av plastforing
☐7 Artrodese
☐8 Amputasjon
☐9 Fjernet protesedeler (inkl. sementspacer)
Angi hvilke deler ……..
……
☐10 Bløtdelsdebridement for infisert protese
☐11 Annet……

BENTRANSPLANTASJON (ev. flere kryss)
Proximalt ☐0 Nei ☐1 Ja ☐2 Benpakking
Distalt ☐0 Nei ☐1 Ja ☐2 Benpakking

ANTIBIOTIKAPROFYLAKSE ☐0 Nei ☐1 Ja

	Navn	*Dosering*	*Varighet i timer*
Medikament 1	.....	.....	.....timer
Medikament 2	.....	.....	.....timer
Medikament 3	.....	.....	.....timer

TROMBOSEPROFYLAKSE
☐0 Nei ☐1 Ja: Første dose ☐1 Preoperativt ☐2 Postoperativt
Medikament 1……..Dosering opr.dag……
Dosering videre……..Varighet……døgn
Medikament 2…….. Dosering……Varighet……døgn

FAST TROMBOSEPROFYLAKSE
☐0 Nei ☐1 Ja, type: ……

FIBRINOLYSEHEMMER
☐0 Nei ☐1 Ja, medikament: …….. Dosering……
DREN ☐0 Nei ☐1 Ja. Antatt varighet ……døgn
OPERASJONSTID (hud til hud) ……minutter
PEROPERATIV KOMPLIKASJON
☐0 Nei ☐1 Ja,hvilke(n): .....

MINI INVASIV KIRURGI (MIS) ☐0 Nei ☐1 Ja
COMPUTERNAVIGERING (CAOS) ☐0 Nei ☐1 Ja Type:……..
PASIENTTILPASSEDE INSTRUMENTER ☐0 Nei ☐1 Ja Type:……..

ASA KLASSE (se baksiden for definisjon)
☐1 Frisk
☐2 Asymptomatisk tilstand som gir økt risiko
☐3 Symptomatisk sykdom
☐4 Livstruende sykdom
☐5 Moribund

PROTESE KNE (Bruk klistrelapper på baksiden, eller spesifiser nøyaktig)

PROTESETYPE
☐1 Totalprot. m/patella . ☐4 Patellofemoralledd prot.
☐2 Totalprot. u/patella ☐5 Bi-compartmental ☐6 Hengslet protese
☐3 Unicondylær prot ☐ Medial ☐ Lateral ☐7 Annet ……

FEMURKOMPONENT
Navn/Type/Str ……
ev. katalognummer ……
Sentral stamme ☐0 Nei ☐1 Ja, ev. lengde ……..mm
Metallforing ☐0 Nei ☐1 Ja
Stabilisering ☐0 Nei ☐1 Ja, bakre ☐2 Ja, annen
☐1 Sement med antibiotika – Navn ……
☐2 Sement uten antibiotika – Navn ……
☐3 Usementert

TIBIAKOMPONENT (metallplatå)
Navn/Type/Str ……
ev. katalognummer ……
Forlenget sentral stamme ☐0 Nei ☐1 Ja, ev. lengde ……mm
Metallforing ☐0 Nei ☐1 Ja
☐1 Sement med antibiotika – Navn ……
☐2 Sement uten antibiotika – Navn ……
☐3 Usementert

TIBIAKOMPONENT (plastkomponent)
Navn/Type/Str ……
ev. katalognummer. ……
Tykkelse …….. mm
Stabilisering ☐0 Nei ☐1 Ja, bakre ☐2 Ja, annen

PATELLAKOMPONENT
Navn/Type/Str ……
ev. katalognummer ……
Metallrygg ☐0 Nei ☐1 Ja
☐1 Sement med antibiotika – Navn ……
☐2 Sement uten antibiotika – Navn ……
☐3 Usementert

KORSBÅND

Intakt fremre korsbånd før operasjon	☐0 Nei	☐1 Ja
Intakt fremre korsbånd etter operasjon	☐0 Nei	☐1 Ja
Intakt bakre korsbånd før operasjon	☐0 Nei	☐1 Ja
Intakt bakre korsbånd etter operasjon	☐0 Nei	☐1 Ja

PROTESE ANDRE LEDD (Bruk klistrelapper på baksiden, eller spesifiser nøyaktig)

PROTESETYPE
☐1 Totalprotese ☐2 Hemiprotese ☐3 Enkomponentprotese ☐4 Annet …..

PROKSIMAL KOMPONENT
Navn/Type/Str ……
ev. katalognummer ……
☐1 Sement med antibiotika – Navn ……
☐2 Sement uten antibiotika – Navn ……
☐3 Usementert

DISTAL KOMPONENT
Navn/Type/Str ……
ev. katalognummer ……
☐1 Sement med antibiotika – Navn ……
☐2 Sement uten antibiotika – Navn ……
☐3 Usementert

INTERMEDIÆR KOMPONENT (f.eks. caput humeri)
Navn/Type/Str/Diameter……
ev. katalognummer ……

Lege .....
Legen som har fylt ut skjemaet (navnet registreres ikke i databasen).

Registreringen gjelder innsetting, skifting eller fjerning av protese i kne, skuldre og andre ledd med unntak av hofter som har eget skjema. Ett skjema fylles ut for hver operasjon. Pasientens fødselsnummer (11 sifre) og sykehus må være påført. Aktuelle ruter markeres med kryss.
På eget Samtykkeskjema skal pasienten gi samtykke til rapportering til Leddregisteret. Samtykkeskjemaet skal lagres i pasientjournal.

Kommentarer til de enkelte punktene

AKTUELLE OPERASJON
Primæroperasjon: Dette er første totalproteseoperasjon.
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.

BENTRANSPLANTASJON
Påsmøring av benvev rundt protesen regnes ikke som bentransplantat.

ANTIBIOTIKAPROFYLAKSE
Medikament, dose og varighet av profylaksen skal angis f.eks. slik: Medikament: Keflin, Dosering: 2g x 4, med varighet 4,5 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 blødningsreduserende 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-KLASSE (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

PROTESETYPE
Dersom det er gjort revisjon av totalprotese uten patellakomponent og REOPERASJONSTYPE er innsetting av patellakomponent, skal det krysses av for pkt. 1: Totalprotese med patellakomponent (dvs. protesen har nå blitt en totalprotese med patellakomponent). Ved revisjon av unicondylær protese til totalprotese brukes enten pkt. 1 eller 2.

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 på baksiden av skjemaet (vennligst ikke plasser klistrelapper på markeringskryss, som brukes ved scanning av skjema).
Navnet på sementen som evt. brukes må anføres, f.eks. Palacos R+G. (Bruk helst klistrelapp)
Under femurkomponent skal evt. påsatt femurstamme anføres med lengde.
Med metallforing under femur- og tibiakomponent menes bruk av en eller flere separate metallkiler (wedges) som erstatning for manglende benstøtte.
Stabilisering er bruk av proteser med stabilisering som kompensasjon for sviktende båndapparat.
Forlenget sentral stamme under tibiakomponent (metallplatå) skal bare anføres ved bruk av en lengre påsatt stamme enn standardkomponenten.

ANDRE LEDD. PROTESETYPE
Ved bruk av hemiprotese med bare en komponent, f.eks. resurfacing i skulder, skrives dette på DISTAL KOMPONENT. Enkomponent-protese i finger/tå, skrives på PROKSIMAL KOMPONENT.

COMPUTERNAVIGERING (CAOS = Computer Aided Orthopaedic Surgery)
Angi firmanavn på computersystem.

MINIINVASIV KIRURGI (MIS = Minimally Invasive Surgery)
Her menes at kirurgen har brukt kort snitt og at det er brukt spesialinstrument laget for MIS.

PASIENTTILPASSEDE INSTRUMENTER
Her menes kutteblokker eller instrumenter som lages etter MR eller CT bilder tatt av pasienten før operasjonen. Oppgi navn på systemet.

Kopi beholdes til pasientjournalen, originalen sendes Haukeland universitetssjukehus.

Kontaktpersoner vedrørende registreringsskjema er
Overlege Ove Furnes, tlf. 55 97 56 90 og seksjonsoverlege Leif Ivar Havelin, tlf. 55 97 56 87.
Ortopedisk klinikk, Haukeland universitetssjukehus. Besøksadresse: Møllendalsbakken 11.
Sekretærer i Nasjonalt Register for Leddproteser, Ortopedisk klinikk, Helse Bergen:
Randi Furnes, tlf. 55 97 37 42 og Ingunn Vindenes, tlf. 55 97 37 43.
Epost: nrl@helse-bergen.no Internett: http://nrlweb.ihelse.net/
Skjema revidert i november 2015.

NASJONALT HOFTEBRUDDREGISTER
Nasjonalt Register for Leddproteser
Helse Bergen HF, Ortopedisk klinikk
Haukeland universitetssjukehus
Møllendalsbakken 11
5021 BERGEN
Tlf: 55976452

F.nr. (11 sifre).....

Navn:.....

(Skriv tydelig ev. pasientklistrelapp – spesifiser sykehus.)

Sykehus:.....

HOFTEBRUDD

PRIMÆRE OPERASJONER PÅ BRUDD I PROKSIMALE FEMURENDE og ALLE REOPERASJONER, inkludert lukket reponering av hemiproteser. Ved primæroperasjon med totalprotese og ved reoperasjon til totalprotese brukes kun hofteproteseskjema. Alle produktklistrelapper settes i merket felt på baksiden av skjemaet.

AKTUELLE OPERASJON
☐1 Primæroperasjon ☐ 2 Reoperasjon

SIDE (ett kryss) (Bilateral opr.= 2 skjema)
☐1 Høyre ☐2 Venstre

OPR TIDSPUNKT (dd.mm.åå) |__|__| |__|__| |__|__| kl |__|__|

BRUDD TIDSPUNKT (dd.mm.åå) |__|__| |__|__| |__|__| kl |__|__|
Dersom det er usikkerhet om bruddtidspunkt, fyll ut neste punkt.

TID FRA BRUDD TIL OPERASJON I TIMER
☐1 0-6 ☐2 >6-12 ☐3 >12-24 ☐4 >24-48 ☐5 >48

KOGNITIV SVIKT
☐0 Nei ☐1 Ja (Se test på baksiden) ☐2 Usikker

ASA-KLASSE (se bakside av skjema for definisjon)
☐1 Frisk
☐2 Asymptomatisk tilstand som gir økt risiko
☐3 Symptomatisk sykdom
☐4 Livstruende sykdom
☐5 Moribund

TYPE PRIMÆRBRUDD (ÅRSAK TIL PRIMÆROPERASJON) (Kun ett kryss)
Se baksiden for klassifikasjon
☐1 Lårhalsbrudd udislokert (Garden 1 og 2)
☐2 Lårhalsbrudd dislokert (Garden 3 og 4)
☐3 Lateralt lårhalsbrudd
☐4 Pertrokantært tofragment (AO klassifikasjon A1)
☐5 Pertrokantært flerfragment (AO klassifikasjon A2)
☐9 Intertrokantært (AO klassifikasjon A3)
☐6 Subtrokantært
☐7 Annet, spesifiser.....

TYPE PRIMÆROPERASJON (Kun ett kryss)
(Fylles ut bare ved primæroperasjon - eget skjema for totalproteser)
(Fest produktklistrelapp på baksiden eller spesifiser nøyaktig produkt)
☐1 To skruer eller pinner
☐2 Tre skruer eller pinner
☐3 Bipolar hemiprotese
☐4 Unipolar hemiprotese
☐5 Glideskrue og plate
☐6 Glideskrue og plate med trokantær støtteplate
☐7 Vinkelplate
☐8 Kort margnagle uten distal sperre
☐9 Kort margnagle med distal sperre
☐10 Lang margnagle uten distal sperre
☐11 Lang margnagle med distal sperre
☐12 Annet, spesifiser.....

Navn / størrelse og katalognummer.....

ÅRSAK TIL REOPERASJON (Flere enn ett kryss kan brukes)
☐1 Osteosyntesesvikt/havari
☐2 Ikke tilhelet brudd (non-union/pseudartrose)
☐3 Caputnekrose (segmentalt kollaps)
☐4 Lokal smerte pga prominerende osteosyntesemateriale
☐5 Brudd tilhelet med feilstilling
☐6 Sårinfeksjon – overfladisk
☐7 Sårinfeksjon – dyp
☐8 Hematom
☐9 Luksasjon av hemiprotese
☐10 Osteosyntesematerialet skåret gjennom caput
☐11 Nytt brudd rundt implantat
☐12 Løsning av hemiprotese
☐13 Annet, spesifiser.....

TYPE REOPERASJON (Flere enn ett kryss kan brukes)
(Fest produktklistrelapp på baksiden eller spesifiser nøyaktig produkt)
☐1 Fjerning av implantat (Brukes når dette er eneste prosedyre)
☐2 Girdlestone (= fjerning av implantat og caput)
☐3 Bipolar hemiprotese
☐4 Unipolar hemiprotese
☐5 Re-osteosyntese
☐6 Debridement for infeksjon
☐7 Lukket reposisjon av luksert hemiprotese
☐8 Åpen reposisjon av luksert hemiprotese
☐9 Annet, spesifiser.....

Navn / størrelse og katalognummer.....

FIKSASJON AV HEMIPROTESE
(For totalprotese sendes eget skjema til hofteproteseregisteret)
☐1 Usementert ☐1 med HA ☐2 uten HA
☐2 Sement med antibiotika Navn.....
☐3 Sement uten antibiotika Navn.....

PATOLOGISK BRUDD (Annen patologi enn osteoporose)
☐0 Nei ☐1 Ja, type.....

TILGANG TIL HOFTELEDDET VED HEMIPROTESE (Kun ett kryss)
☐1 Fremre (mellom sartorius og tensor)
☐2 Anterolateral (mellom gluteus medius og tensor)
☐3 Direkte lateral (transgluteal)
☐4 Bakre (bak gluteus medius)
☐5 Annet, spesifiser.....

ANESTESITYPE
☐1 Narkose ☐2 Spinal ☐3 Annet, spesifiser.....

PEROPERATIVE KOMPLIKASJONER
☐0 Nei ☐1 Ja, hvilke(n).....

OPERASJONSTID (hud til hud).....minutter.

ANTIBIOTIKAPROFYLAKSE ☐0 Nei ☐1 Ja

	Navn	Dosering	Varighet i timer
Medikament 1.....			.....timer
Medikament 2.....			.....timer
Medikament 3.....			.....timer

TROMBOSEPROFYLAKSE
☐0 Nei ☐1 Ja: Første dose ☐1 Preoperativt ☐2 Postoperativt

Medikament 1 ..... Dosering opr.dag.....
Dosering videre ..... Varighet ..... døgn
Medikament 2 ..... Dosering ..... Varighet ..... døgn

FAST TROMBOSEPROFYLAKSE
☐0 Nei ☐1 Ja, type: .....

FIBRINOLYSEHEMMER
☐0 Nei ☐1 Ja, medikament : ..... Dosering .....

OPERATØRERFARING
Har en av operatørene mer enn 3 års erfaring i hoftebruddkirurgi? ☐0 Nei ☐1 Ja

Lege.....
Legen som har fylt ut skjemaet (navnet registreres ikke i databasen).

RETTLEDNING

Registreringen gjelder alle operasjoner for hoftebrudd (lårhals, pertrokantære og subtrokantære) og alle reoperasjoner, også reposisjoner, på pasienter som er primæroperert og reoperert for hoftebrudd. **Ved primæroperasjon med totalprotese og ved reoperasjon til totalprotese sendes bare skjema til hofteproteseregisteret.**
Ett skjema fylles ut for hver operasjon. Originalen sendes Haukeland universitetssjukehus og kopien lagres i pasientens journal. Pasientens fødselsnummer (11 sifre) og sykehuset må være påført. Aktuelle ruter markeres med kryss. Pasienten skal på eget skjema gi samtykke til registrering i Nasjonalt hoftebruddregister og samtykkeerklæringen lagres i pasientens journal på sykehuset.

Kommentarer til enkelte punkt:
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.

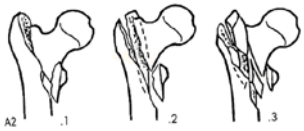
KOGNITIV SVIKT
Kognitiv svikt kan eventuelt testes ved å be pasienten tegne klokken når den er 10 over 11. En pasient med kognitiv svikt vil ha problemer med denne oppgaven.

ASA-KLASSE (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

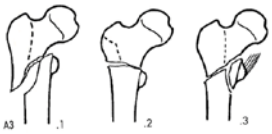
GARDENS KLASSIFISERING AV LÅRHALSBRUDD
Garden 1: Ikke komplett brudd av lårhalsen (såkalt innkilt)
Garden 2: Komplett lårhalsbrudd uten dislokasjon
Garden 3: Komplett lårhalsbrudd med delvis dislokasjon. Fragmentene er fortsatt i kontakt, men det er feilstilling av lårhalsens trabekler.
Caputfragmentet ligger uanatomisk i acetabulum.
Garden 4: Komplett lårhalsbrudd med full dislokasjon. Caputfragmentet er fritt og ligger korrekt i acetabulum slik at trabeklene er normalt orientert.

AO KLASSIFIKASJON AV TROKANTÆRE BRUDD

A1: Pertrokantært tofragment brudd



A2: Pertrokantært flerfragment brudd



A3: Intertrokantært brudd


Subtrokantært brudd*

*Subtrokantært brudd: Bruddsentrum er mellom nedre kant av trokanter minor og 5 cm distalt for denne.

REOPERASJONSÅRSAK
Dyp infeksjon defineres som infeksjon som involverer fascie, protese, ledd eller periprotetisk vev.

IMPLANTAT
Implantattype må angis entydig. Produktklistrelapp er ønskelig for å angi katalognummer for osteosyntesematerialet eller protesen som er brukt.

PEROPERATIVE KOMPLIKASJONER
Vi ønsker også å få meldt dødsfall på operasjonsbordet og peroperativ transfusjonstrengende blødning.

ANTIBIOTIKAPROFYLAKSE
Her føres det på hvilket antibiotikum som er blitt benyttet i forbindelse med operasjonen. Det anføres dose, antall doser og profylaksens varighet. F.eks. Medkament 1: Keflin 2g x 4, med varighet 4,5 timer.

TROMBOSEPROFYLAKSE
Medikament, dose og antatt varighet av profylaksen skal angis separat for oprerasjonsdagen og senere. Det skal også oppgis om pasienten står fast på tromboseprofylakse (AlbylE, Marevan, Plavix ol).

FIBRINOLYSEHEMMER
Her føres det på om en benytter blødningsreduserende legemidler i forbindelse med operasjonen (f.eks. Cyklokapron).

Kontaktpersoner vedrørende registreringsskjema er:
Overlege Jan-Erik Gjertsen, Ortopedisk klinikk, Haukeland universitetssjukehus. Tlf. 55 97 56 72 (email: jan-erik.gjertsen@helse-bergen.no)
Professor Lasse Engesæter, Ortopedisk klinikk, Haukeland universitetssjukehus. Tlf. 55 97 56 84
Prosjektkoordinator Nasjonalt Hoftebruddregister: Lise B. Kvamsdal. Tlf. 55 97 64 52 (email: nrl@helse-bergen.no)
Internett: http://nrlweb.ihelse.net/

PRODUKTKLISTRELAPPER:

NASJONALT HOFTEBRUDDREGISTER
Nasjonalt Register for Leddproteser
Helse Bergen HF, Ortopedisk klinikk
Haukeland Universitetssykehus
Møllendalsbakken 11
5021 BERGEN

PASIENTSPØRRESKJEMA NASJONALT HOFTEBRUDDREGISTER

1. Dato for utfylling av skjema: |__|__| |__|__| |__|__|

2. Spørreskjemaet er besvart av:

☐ [1] Meg selv

eller ved hjelp av….(kryss av i ruten som gjelder)

☐ [2] Slektning (ektefelle, barn)
☐ [3] God venn eller annen nærstående
☐ [4] Annen privat person
☐ [5] Hjemmesykepleier/hjemmehjelp
☐ [6] Annen person, angi hvem:_____

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I de neste 5 spørsmålene ønsker vi å vite hvordan livssituasjonen din var FØR du fikk hofte/lårhalsbruddet som du ble operert for.

3. Hvordan opplevde du gangevnen din?

- ☐ [1] Jeg hadde ingen problemer med å gå omkring
- ☐ [2] Jeg hadde litt problemer med å gå omkring
- ☐ [3] Jeg var sengeliggende

4. Hvordan klarte du personlig stell?

- ☐ [1] Jeg hadde ingen problemer med personlig stell
- ☐ [2] Jeg hadde litt problemer med å vaske meg eller kle meg
- ☐ [3] Jeg klarte ikke å vaske meg eller kle meg

5. Hvordan klarte du dine vanlige gjøremål (f.eks. arbeid, studier, husarbeid, familie- og fritidsaktiviteter)?

- ☐ [1] Jeg hadde ingen problemer med å utføre mine vanlige gjøremål
- ☐ [2] Jeg hadde litt problemer med å utføre mine vanlige gjøremål
- ☐ [3] Jeg var ute av stand til å utføre mine vanlige gjøremål

6. Smerter eller ubehag?

- ☐ [1] Jeg hadde verken smerte eller ubehag
- ☐ [2] Jeg hadde moderat smerte eller ubehag
- ☐ [3] Jeg hadde sterk smerte eller ubehag

7. Angst eller depresjon?

- ☐ [1] Jeg var verken engstelig eller deprimert
- ☐ [2] Jeg var noe engstelig eller deprimert
- ☐ [3] Jeg var svært engstelig eller deprimert

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5021 BERGEN

I de 5 neste spørsmålene ønsker vi å vite hvordan livssituasjonen din er NÅ:

8. Hvordan opplever du gangevnen din?

- ☐ [1] Jeg har ingen problemer med å gå omkring
- ☐ [2] Jeg har litt problemer med å gå omkring
- ☐ [3] Jeg er sengeliggende

9. Hvordan klarer du personlig stell?

- ☐ [1] Jeg har ingen problemer med personlig stell
- ☐ [2] Jeg har litt problemer med å vaske meg eller kle meg
- ☐ [3] Jeg klarer ikke å vaske meg eller kle meg

10. Hvordan klarer du dine vanlige gjøremål (f.eks. arbeid, studier, husarbeid, familie- og fritidsaktiviteter)?

- ☐ [1] Jeg har ingen problemer med å utføre mine vanlige gjøremål
- ☐ [2] Jeg har litt problemer med å utføre mine vanlige gjøremål
- ☐ [3] Jeg er ute av stand til å utføre mine vanlige gjøremål

11. Smerter eller ubehag?

- ☐ [1] Jeg har verken smerte eller ubehag
- ☐ [2] Jeg har moderat smerte eller ubehag
- ☐ [3] Jeg har sterk smerte eller ubehag

12. Angst eller depresjon?

- ☐ [1] Jeg er verken engstelig eller deprimert
- ☐ [2] Jeg er noe engstelig eller deprimert
- ☐ [3] Jeg er svært engstelig eller deprimert

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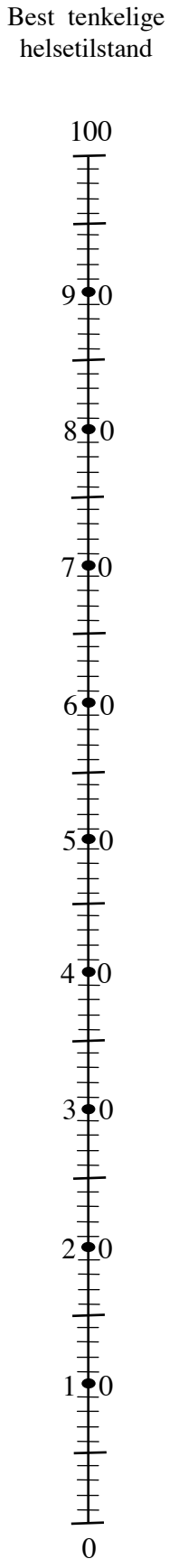
5021 BERGEN

13. Din helsetilstand i dag.

For å hjelpe folk til å si hvor god eller dårlig en helsetilstand er, har vi laget en skala (omtrent som et termometer) hvor den beste tilstanden du kan tenke deg er merket 100 og den verste tilstanden du kan tenke deg er merket 0.

Vi vil gjerne at du viser på denne skalaen hvor god eller dårlig helsetilstanden din er i dag, etter din oppfatning. Vær vennlig å gjøre dette ved å trekke en linje fra boksen nedenfor til det punktet på skalaen som viser hvor god eller dårlig din helsetilstand er i dag.

Din egen helsetilstand i dag



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Haukeland Universitetssykehus
Møllendalsbakken 11
5021 BERGEN

SMERTE

14. Sett ett kryss på den streken som du synes tilsvarer din gjennomsnittlige smerteopplevelse fra den opererte hoften den siste måneden:

Ingen smerte   Maksimal smerte

IııııııııIııııııııIııııııııIııııııııIııııııııIııııııııIııııııııIııııııııIııııııııIııııııııI

lett   moderat   middels   sterk   uutholdelig

TILFREDSHET

15. Sett ett kryss på den streken som du synes tilsvarer hvor fornøyd du er med operasjonsresultatet:

Fornøyd   Misfornøyd

IııııııııIııııııııIııııııııIııııııııIııııııııIııııııııIııııııııIııııııııIııııııııIııııııııI

svært fornøyd   fornøyd   middels fornøyd   misfornøyd   svært misfornøyd

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5021 BERGEN

16. Har du besvær fra den andre hoften?

☐ 1 Ja ☐ 2 Nei

17. Er det andre årsaker til at du har problemer med å gå?
(For eksempel smerter fra andre ledd, ryggsmerter, hjerte-karsykdom eller andre sykdommer som påvirker gangevnen din)

☐ 1 Ja ☐ 2 Nei

18. Har du hatt nye operasjoner i den samme hoften som ble operert for hoftebrudd?

☐ 1 Ja ☐ 2 Nei

Takk for at du tok deg tid til å svare på spørsmålene. Dine svar er svært nyttige for oss. Vennligst send spørreskjemaet i retur til oss i den ferdig frankerte svarkonvolutten.

NASJONALT KORSBÅNDSREGISTER
Nasjonalt Register for Leddproteser
Helse Bergen HF, Ortopedisk klinikk
Haukeland universitetssjukehus
Møllendalsbakken 11, 5021 BERGEN
Tlf: 55976450

F.nr. (11 sifre).....

Navn.....

Sykehus.....

(Skriv tydelig evt. pasientklistrelapp – spesifiser sykehus.)

KORSBÅND

KORSBÅNDSOPERASJONER OG ALLE REOPERASJONER på pasienter som tidligere er korsbåndsoperert.
Alle klistrelapper (med unntak av pasientklistrelapp) settes i merket felt på baksiden av skjemaet.

(Bilateral operasjon = 2 skjema)
AKTUELLE SIDE (ett kryss) ☐0 Høyre ☐1 Venstre

MOTSATT KNE ☐0 Normalt ☐1 Tidligere ACL/PCL-skade

TIDLIGERE OPERASJON I SAMME KNE
☐0 Nei ☐1 Ja

SKADEDATO FOR AKTUELL SKADE (mm.åå) |__|__| |__|__|

AKTIVITET SOM FØRTE TIL AKTUELLE SKADE
☐0 Fotball
☐1 Håndball
☐2 Snowboard
☐3 Alpint (inkl. twin tip)
☐4 Annen skiaktivitet
☐5 Kampsport
☐6 Basketball
☐7 Annen lagidrett
☐8 Motor- og bilsport
☐9 Annen fysisk aktivitet
☐10 Arbeid
☐11 Trafikk
☐12 Fall/hopp/vold/lek
☐98 Annet……

AKTUELLE SKADE (Registrer alle skader – også de som ikke opereres)
☐ ACL ☐ MCL ☐ PLC ☐ Med. menisk
☐ PCL ☐ LCL ☐ Brusk ☐ Lat. menisk
☐ Annet……

YTTERLIGERE SKADER (evt. flere kryss) ☐ Nei, hvis ja spesifiser under

☐ Karskade	Hvilken: ……
☐ Nerveskade	☐ 0 N. tibialis ☐ 1 N. peroneus
☐ Fraktur	☐ 0Femur ☐ 1Tibia ☐ 2Fibula ☐ 3Patella ☐ 4Usikker
☐ Ruptur i ekstensorapparatet	☐ 0Quadricepssenen ☐ 1Patellarsenen

OPERASJONSDATO (dd.mm.åå) |__|__| |__|__| |__|__|

AKTUELLE OPERASJON (ett kryss)
☐0 Primær rekonstruksjon av korsbånd
☐1 Revisjonskirurgi, 1. seanse
☐2 Revisjonskirurgi, 2. seanse
☐3 Annen knekirurgi (Ved kryss her skal andre prosedyrer fylles ut)

ÅRSAK TIL REVISJONSREKONSTRUKSJON (evt. flere kryss)
☐ Infeksjon
☐ Fiksasjonssvikt
☐ Ubehandlede andre ligamentskader
☐ Annet ……
☐ Graftsvikt
☐ Nytt traume
☐ Smerte

ANDRE PROSEDYRER (evt. flere kryss) ☐ Nei, hvis ja spesifiser under
☐ Meniskoperasjon
☐ Synovektomi
☐ Mobilisering i narkose
☐ Fjerning av implantat
☐ Benreseksjon (Notch plastikk)
☐ Osteotomi
☐ Annet ……
☐ Osteosyntese
☐ Bruskoperasjon
☐ Artroskopisk debridement
☐ Operasjon pga infeksjon
☐ Bentransplantasjon
☐ Artrodese

GRAFTVALG

	ACL	PCL	MCL	LCL	PLC
☐ BPTB					
☐ Hamstring					
☐ Allograft					
☐ Direkte sutur					
☐ Annet ……					

GRAFTDIAMETER (oppgi største diameter på graftet) .. ……mm

Ved bruk av double bundle-teknikk: AM:……mm PL:……mm

TILGANG FOR FEMURKANAL
☐1 Anteromedial ☐2Transtibial ☐3 Annet ……

FIKSASJON
Sett klistrelapp på merket felt på baksiden av skjemaet
Skill mellom femur og tibia

AKTUELL BEHANDLING AV MENISKLESJON

	Partiell reseksjon	Total reseksjon	Sutur	Syntetisk fiksasjon*	Menisk-transpl.	Trepanering	Ingen
Medial	☐	☐	☐	☐	☐	☐	☐
Lateral	☐	☐	☐	☐	☐	☐	☐

* Sett klistrelapp på merket felt på baksiden

BRUSKLESJON (evt. flere kryss)

	Areal (cm²) ≤2	Areal (cm²) >2	ICRS Grade* 1 2 3 4	Artrose Ja	Artrose Nei	Behandlings-kode** 1 2 3 4	Spesifiser annet
Patella MF	☐	☐	☐☐☐☐	☐	☐	☐☐☐☐	……
Patella LF	☐	☐	☐☐☐☐	☐	☐	☐☐☐☐	……
Trochlea fem.	☐	☐	☐☐☐☐	☐	☐	☐☐☐☐	……
Med.fem. cond.	☐	☐	☐☐☐☐	☐	☐	☐☐☐☐	……
Med. tib. plat.	☐	☐	☐☐☐☐	☐	☐	☐☐☐☐	……
Lat.fem. cond.	☐	☐	☐☐☐☐	☐	☐	☐☐☐☐	……
Lat. tib. plat.	☐	☐	☐☐☐☐	☐	☐	☐☐☐☐	……

*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.

DAGKIRURGISK OPERASJON ☐0 Nei ☐1 Ja

PEROPERATIVE KOMPLIKASJONER ☐0 Nei ☐1 Ja,
hvilke(n) .....

OPERASJONSTID (hud til hud).....min

SYSTEMISK ANTIBIOTIKA
☐ 0 Nei ☐1 Ja ☐1 Profylakse ☐2 Behandling

Medikament 1 ..... Dosering …….. Varighet ……timer

Eventuelt i kombinasjon med medikament 2 .....

TROMBOSEPROFYLAKSE
☐0 Nei ☐1 Ja: Første dose ☐1 Preoperativt ☐2 Postoperativt

Medikament 1 ..... Dosering opr.dag……..
Dosering videre …….. Varighet …… døgn

Medikament 2 .....

Anbefalt total varighet av tromboseprofylakse……

NSAIDs
☐0 Nei ☐1 Ja, hvilken type……
Anbefalt total varighet av NSAIDs-behandling……

HØYDE .....cm

VEKT .....kg

RØYK ☐0 Nei ☐1 Av og til ☐2 Daglig

SNUS ☐0 Nei ☐1 Av og til ☐2 Daglig

Lege:.....
Legen som har fylt ut skjemaet (navnet registreres ikke i databasen).

RETTLEDNING

- Registreringen gjelder ALLE fremre og bakre korsbåndsoperasjoner.
- Registreringen gjelder ALLE kneoperasjoner på pasienter som tidligere er korsbåndsoperert.
- Ett skjema fylles ut for hvert kne som blir operert.
- Aktuelle ruter markeres med kryss. Stiplet linje fylles ut der dette er aktuelt.
- Pasienten skal på eget skjema gi samtykke til registrering.

KOMMENTARER TIL DE ENKELTE PUNKTENE

FORKORTELSER SOM ER BRUKT PÅ SKJEMAET

- ACL: Fremre korsbånd
- PCL: Bakre korsbånd
- MCL: Mediale kollateralligament
- LCL: Laterale kollateralligament
- PLC: Popliteus kompleks/bicepssene kompleks
- BPTB; Patellarsene autograft
- AM: Anteromediale bunt av ACL
- PL: Posterolaterale bunt av ACL

SKADEDATO — Skriv inn skadedatoen så eksakt som mulig.
Ved ny skade av tidligere operert korsbånd, skriv inn den nye skadedatoen.

FIKSASJON — Angi hvilken fiksasjonstype som er brukt ved å feste klistrelapp på baksiden.
Husk å skille mellom femur og tibia for graftfiksasjon, og mellom medial og lateral side for meniskfiksasjon.

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.

SYSTEMISK ANTIBIOTIKA

Her føres det på hvilket antibiotikum som er blitt benyttet i forbindelse med operasjonen. Det anføres dose, antall doser og profylaksens varighet. F.eks. Medikament 1: Keflin 2g x 4, med varighet 12 timer.

TROMBOSEPROFYLAKSE

Type, dose og antatt varighet av profylaksen skal angis separat for operasjonsdagen og senere.

Kopi beholdes i pasientjournalen, originalen sendes til Nasjonalt Korsbåndsregister.

Kontaktpersoner vedrørende registreringsskjema er
Professor Lars Engebretsen, Ortopedisk avdeling, Oslo
Universitetssykehus e-post: lars.engebretsen@medisin.uio.no
Overlege Knut Andreas Fjeldsgaard, Haukeland universitetssjukehus
e-post: knut.andreas.fjeldsgaard@helse-bergen.no
Sekretær i Nasjonalt Korsbåndsregister, Ortopedisk avd., Helse Bergen
Merete Husøy, tlf.: 55 97 64 50, faks: 55 97 37 49
e-post: korsband@helse-bergen.no

GRAFTFIKSASJON		MENISKFIKSASJON	
FEMUR	TIBIA	MEDIAL	LATERAL

KOOS – Spørreskjema for knepasienter.

NASJONALT
KORSBÅNDSREGISTER
Nasjonalt Register for Leddproteser
Helse Bergen HF, Ortopedisk klinikk
Haukeland universitetssjukehus
Møllendalsbakken 11
5021 BERGEN Tlf: 55976450

DATO: _____ **OPERASJONSDATO**: _____

FØDSELSNR (11 siffer): _____

NAVN: _____

SYKEHUS:_____

Veiledning: Dette spørreskjemaet inneholder spørsmål om hvordan du opplever kneet ditt før operasjonen. Informasjonen vil hjelpe oss til å følge med i hvordan du har det og fungerer i ditt daglige liv. Besvar spørsmålene ved å krysse av for det alternativ du synes stemmer best for deg (kun ett kryss ved hvert spørsmål). Hvis du er usikker, kryss likevel av for det alternativet som føles mest riktig.

KRYSS AV FOR RIKTIG KNE (NB: Ett skjema for hvert kne)**:**☐[1] **VENSTRE** ☐[0] **HØYRE**

Røyker du? ☐[0] Nei ☐[1] Av og til ☐[2] Daglig Hvis du røyker daglig – hvor mange sigaretter per dag: _____	Vekt: _____ kg Høyde :_____ cm

Symptom

Tenk på **symptomene** du har hatt fra kneet ditt den **siste uken** når du besvarer disse spørsmålene.

S1. Har kneet vært hovent?

Aldri	Sjelden	I blant	Ofte	Alltid
☐[0]	☐[1]	☐[2]	☐[3]	☐[4]

S2. Har du følt knirking, hørt klikking eller andre lyder fra kneet?

Aldri	Sjelden	I blant	Ofte	Alltid
☐[0]	☐[1]	☐[2]	☐[3]	☐[4]

S3. Har kneet haket seg opp eller låst seg?

Aldri	Sjelden	I blant	Ofte	Alltid
☐[0]	☐[1]	☐[2]	☐[3]	☐[4]

S4. Har du kunnet rette kneet helt ut?

Alltid	Ofte	I blant	Sjelden	Aldri
☐[0]	☐[1]	☐[2]	☐[3]	☐[4]

S5. Har du kunnet bøye kneet helt?

Alltid	Ofte	I blant	Sjelden	Aldri
☐[0]	☐[1]	☐[2]	☐[3]	☐[4]

Stivhet

De neste spørsmålene handler om **leddstivhet.** Leddstivhet innebærer vanskeligheter med å komme i gang eller økt motstand når du bøyer eller strekker kneet. Marker graden av leddstivhet du har opplevd i kneet ditt den **siste uken.**

S6. Hvor stivt er kneet ditt når du nettopp har våknet om morgenen?

Ikke noe	Litt	Moderat	Betydelig	Ekstremt
☐[0]	☐[1]	☐[2]	☐[3]	☐[4]

S7. Hvor stivt er kneet ditt senere på dagen etter å ha sittet, ligget eller hvilt?

Ikke noe	Litt	Moderat	Betydelig	Ekstremt
☐[0]	☐[1]	☐[2]	☐[3]	☐[4]

Smerte

P1. Hvor ofte har du vondt i kneet?

Aldri	Månedlig	Ukentlig	Daglig	Hele tiden
☐0	☐1	☐2	☐3	☐4

Hvilken grad av smerte har du hatt i kneet ditt den **siste uken** ved følgende aktiviteter?

P2. Snu/vende på belastet kne

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

P3. Rette kneet helt ut

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

P4. Bøye kneet helt

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

P5.Gå på flatt underlag

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

P6. Gå opp eller ned trapper

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

P7. Om natten (smerter som forstyrrer søvnen)

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

P8. Sittende eller liggende

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

P9. Stående

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

Funksjon i hverdagen

De neste spørsmålene handler om din fysiske funksjon. **Angi graden av vanskeligheter du har opplevd den siste uken ved følgende aktiviteter på grunn av dine kneproblemer.**

A1. Gå ned trapper

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

A2. Gå opp trapper

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

A3. Reise deg fra sittende stilling

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

Angi graden av **vanskeligheter** du har opplevd ved hver aktivitet den **siste uken.**

A4. Stå stille

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

A5. Bøye deg, f.eks. for å plukke opp en gjenstand fra gulvet

Ingen	Lett	Moderat	Betydelig	Svært sto
☐0	☐1	☐2	☐3	☐4

A6. Gå på flatt underlag

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

A7. Gå inn/ut av bil

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

A8. Handle/gjøre innkjøp

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

A9. Ta på sokker/strømper

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

A10. Stå opp fra sengen

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

A11. Ta av sokker/strømper

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

A12. Ligge i sengen (snu deg, holde kneet i samme stilling i lengre tid)

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

A13. Gå inn/ut av badekar/dusj

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

A14. Sitte

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

A15. Sette deg og reise deg fra toalettet

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

A16. Gjøre tungt husarbeid (måke snø, vaske gulv, støvsuge osv.)

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

A17. Gjør lett husarbeid (lage mat, tørke støv osv.)

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

Funksjon, sport og fritid

De neste spørsmålene handler om din fysiske funksjon. **Angi graden av vanskeligheter du har opplevd den siste uken ved følgende aktiviteter på grunn av dine kneproblemer.**

SP1. Sitte på huk

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

SP2. Løpe

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

SP3. Hoppe

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

SP4. Snu/vende på belastet kne

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

SP5. Stå på kne

Ingen	Lett	Moderat	Betydelig	Svært stor
☐0	☐1	☐2	☐3	☐4

Livskvalitet

Q1. Hvor ofte gjør ditt kneproblem seg bemerket?

Aldri	Månedlig	Ukentlig	Daglig	Alltid
☐0	☐1	☐2	☐3	☐4

Q2. Har du forandret levesett for å unngå å overbelaste kneet?

Ingenting	Noe	Moderat	Betydelig	Fullstendig
☐0	☐1	☐2	☐3	☐4

Q3. I hvor stor grad kan du stole på kneet ditt?

Fullstendig	I stor grad	Moderat	Til en viss grad	Ikke i det hele tatt
☐0	☐1	☐2	☐3	☐4

Q4. Generelt sett, hvor store problemer har du med kneet ditt?

Ingen	Lette	Moderate	Betydelige	Svært store
☐0	☐1	☐2	☐3	☐4

Takk for at du tok deg tid og besvarte samtlige spørsmål!

BARNEHOFTEREGISTERET
Nasjonalt Register for Leddproteser
Helse Bergen HF, Ortopedisk klinikk
Haukeland universitetssjukehus
Møllendalsbakken 11, 5021 Bergen

F.nr. (11 sifre): .....

Navn: .....

Sykehus: .....

(Skriv tydelig eller bruk pasientklistrelapp. Husk sykehus!)

BARNEHOFTESYKDOM

HOFTEDYSPLASI (Dysplasi på rtg bekken hos barn eldre enn 3 mnd)

BEHANDLINGSDATO ...../..... 20..... **SIDE** Hø Ve *(Ett kryss. Bilateral = 2 skjema)*
FØRSTE GANG DIAGNOSTISERT ...../..... 20..... *(Fylles ut første gang det sendes inn skjema)*
TIDLIGERE BEHANDLING ☐ Ingen ☐ Pute/abduksjonsortose
☐ Annen, spesifiser: .....
BEHANDLINGSTRENGENDE DYSPLASI I FAMILIE N J
SYMPTOMVARIGHET (>12 år) ..... mnd
IMPINGEMENT TEST (>12 år) Høyre: Neg. Pos. Venstre: Neg. Pos.
RØNTGEN FØR BEHANDLING
Acetabular indeks (<=12 år) Hø ..... Ve ..... CE vinkel (>12 år) Hø ..... Ve .....
Cross-over tegn (>12 år) Hø: Neg. Pos. Ve: Neg. Pos.
Spina ischiadica projisert medialt for linea terminales? (>12 år) Hø: N J Ve: N J
Bruskhøyde (>12 år) *(mm i øvre vektbærende del av leddet i AP projeksjon)*: <2 2-3 >3
HOFTE ☐ I ledd ☐ Subluksert ☐ Luksert
LATERALE HJØRNE ☐ Normalt ☐ Avrundet/ defekt
CAPUTKJERNE ☐ Normal ☐ Forsinket ☐ Ikke tilstede ☐ Caputnekrose
BEHANDLING ☐ Ingen (obs.) ☐ Pute ☐ Abduksjonsortose ☐ Lukket repos. ☐ Hoftegips
ÅPEN REPOSISJON N J
TENOTOMI ☐ Psoastenotomi ☐ Adduktortenotomi
FEMUROSTEOTOMI ☐ Varisering ☐ Rotasjon ☐ Forkortning
PLATE ☐ Forbøyd plate ☐ Vinkelplate ☐ Spesialplate, fabrikat: .....
SKRUER ☐ Vanlige skruer ☐ Vinkelstabile skruer
BEKKENOSTEOTOMI ☐ Salter ☐ Dega ☐ Trippel ☐ Takplastikk
☐ Periacetabular osteotomi ☐ Annen: .....
TILGANG ☐ Fremre ☐ Lateral ☐ Annen: .....
POSTOPERATIV HOFTEGIPS N J Antall uker .....
POSTOPERATIV RØNTGEN (ETTER BEKKENOSTEOTOMI)
Acetabular indeks (<=12 år) Hø ..... Ve ..... CE vinkel (>12 år) Hø ..... Ve .....
REOPERASJONSTYPE ☐ Reosteosyntese ☐ Bløtdelsrevisjon ☐ Fjerne ostemat.
☐ Annen: .....
REOPERASJONSÅRSAK ☐ Osteosyntesesvikt ☐ Infeksjon ☐ Pseudartrose
☐ Blødning ☐ Annen: .....
ANNEN OPERASJON N J Spesifiser: .....
KNIVTID FOR OPERATIV BEHANDLING: ..... min.

EPIFYSIOLYSIS CAPITIS FEMORIS

OPERASJONSDATO ...../..... 20..... **SIDE** Hø Ve *(Ett kryss. Bilateral 2 skjema)*
FØRSTE GANG DIAGNOSTISERT ...../..... 20..... *(Fylles ut første gang det sendes inn skjema)*
HØYDE OG VEKT Høyde: ..... cm Vekt: ..... kg
SYMPTOMVARIGHET ☐ Kronisk (> 3 uker) ☐ Akutt (< 3 uker) ☐ Akutt på kronisk
STABILITET ☐ Stabil (klarer belaste) ☐ Ustabil (klarer ikke belaste)
RØNTGEN ☐ < 30° ☐ 30-50° ☐ > 50° *(Glidningsvinkel i sideplan)*
OPERASJON ☐ Primæroperasjon ☐ Reoperasjon ☐ Profylaktisk
PRIMÆROPERASJONSTYPE Fiksasjon in-situ: N J Peroperativ reposisjon: N J
Kirurgisk hofte-dislokasjon: N J Collumosteotomi: N J
Femurosteotomi: N J Spesifiser: .....
Skrueosteosyntese: N J Antall skruer: ..... Fabrikat: .....
Pinnefiskasjon: N J Antall pinner: ..... Diameter: ..... mm
Platefiksasjon: N J Spesifiser: .....
Annen operasjon: N J Spesifiser: .....
REOPERASJONSTYPE ☐ Reosteosyntese ☐ Bløtdelsrevisjon ☐ Fjerne ostemat.
☐ Annen, spesifiser: .....
REOPERASJONSÅRSAK ☐ Feilplass. av osteosynt. ☐ Osteosyntesesvikt ☐ Infeksjon
☐ Blødning ☐ Annen: .....
KNIVTID FOR OPERATIV BEHANDLING: ..... min.

Ved operativ behandling (artroskopisk eller åpen) for impingement etter SCFE:
fyll ut rubrikken ÅPNE OG ARTROSKOPISKE HOFTEOPERASJONER

Dato: ..... Lege: .....
Legen som har fylt ut skjemaet (Navnet registreres ikke i databasen)

CALVÉ-LEGG-PERTHES

BEHANDLINGSDATO ...../..... 20..... **SIDE** Hø Ve *(Ett kryss. Bilateral = 2 skjema)*
FØRSTE GANG DIAGNOSTISERT ...../..... 20..... *(Fylles ut første gang det sendes inn skjema)*
SYMPTOMVARIGHET ..... mnd **HALTING** N J
SMERTE ☐ Ingen ☐ Lett ☐ Betydelig **CATTERALL** ☐ I / II ☐ III / IV
BEHANDLING ☐ Ingen (fysioterapi) ☐ Abduksjonsortose
FEMUROSTEOTOMI ☐ Varisering ☐ Valgisering ☐ Rotasjon
PLATE ☐ Forbøyd plate ☐ Vinkelplate ☐ Spesialplate, fabrikat: .....
SKRUER ☐ Vanlige skruer ☐ Vinkelstabile skruer
BEKKENOSTEOTOMI ☐ Salter ☐ Dega ☐ Takplastikk
☐ Annen, spesifiser: .....
ANNEN OPERATIV BEHANDLING ☐ Trochanter transposisjon ☐ Trochanter apofysiodese
☐ Annen, spesifiser: .....
REOPERASJONSTYPE ☐ Reosteosyntese ☐ Bløtdelsrevisjon ☐ Fjerne ostemat.
☐ Annen: .....
REOPERASJONSÅRSAK ☐ Osteosyntesesvikt ☐ Blødning ☐ Infeksjon
☐ Pseudartrose ☐ Annen: .....
KNIVTID FOR OPERATIV BEHANDLING: ..... min.
Ved artroskopi eller hoftedislokasjon for sequele etter CLP:
fyll ut rubrikken ÅPNE OG ARTROSKOPISKE HOFTEOPERASJONER

ÅPNE OG ARTROSKOPISKE HOFTEOPERASJONER

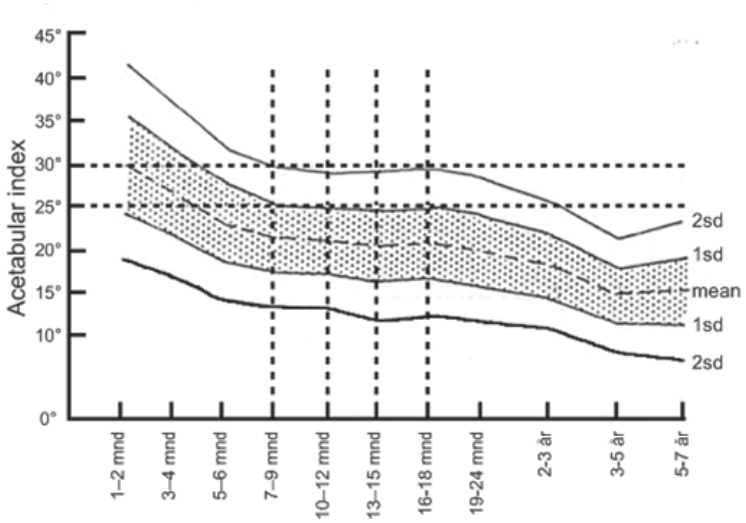
BEHANDLINGSDATO ...../..... 20..... **SIDE** Hø Ve *(Ett kryss. Bilateral = 2 skjema)*
OPERASJON ☐ Primæroperasjon ☐ Reoperasjon ☐ Kun diagnostisk uten intervensjon
SYMPTOMVARIGHET ..... mnd
TIDLIGERE HOFTELIDELSE N J ☐ SCFE ☐ CLP ☐ DDH
☐ Andre: .....
DIAGNOSE ☐ Cam impingement ☐ Pincer impingement ☐ Kombinert impingement
☐ Annen: .....
PREOPERATIVE FUNN Impingement test Høyre: Neg. Pos. Venstre: Neg. Pos.
Halting: N J Rtg Alfavinkel sideplan: Hø ..... Ve ..... frontplan: Hø ..... Ve .....
CE-vinkel Hø ..... Ve ..... Cross-over tegn Hø: Neg. Pos. Ve: Neg. Pos.
Spina ischiadica projisert medialt for linea terminales? Hø: N J Ve: N J
Bruskhøyde *(mm i øvre vektbærende del av leddet i AP projeksjon)*: <2 2-3 >3
MR funn: ☐ Labrumskade ☐ Paralabral cyste ☐ Subchondral cyste
Effekt av lokalbedøvelse i leddet: N J ☐ Ikke aktuelt
KIRURGISK TILGANG ☐ Artroskopisk ☐ Kirurgisk dislokasjon ☐ Konvertering til åpen tilgang
Tilgang ved åpen kirurgi: ☐ Lateral ☐ Annen: .....
Fiksasjonsmetode ved trochanter osteotomi: .....
Portaler: ☐ Anterior ☐ Anterolateral ☐ Posterolateral ☐ Distal anterior ☐ Proximal anterior
☐ Perifere kompartment først ☐ Sentrale kompartment først
PEROPERATIVE FUNN
Labrum: ☐ Normal ☐ Degen. forandret ☐ Forbenet ☐ Partiell ruptur ☐ Gjennomgående ruptur
Bruskskade acetabulum: N J Grad: 0 1 2 3 4 Lokalisasjon: 1 2 3 4 5 6
Bruskskade caput femoris: N J Areal: ..... mm² Dybde (ICRS): 1 2 3 4
Lokalisasjon: 1 2 3 4 5 6
Ligamentum teres skade: N J ☐ Partiell ruptur ☐ Total ruptur
Frie legemer: N J ☐ Perifert ☐ Sentralt
Os acetabuli: N J ☐ Som forbening av labrum ☐ Som del av leddflaten Synovitt: N J
KIRURGISK BEHANDLING Labrumruptur: ☐ Debridement ☐ Sutur. Antall ankre: .....
Type ankre: ..... ☐ Labrumrekonstruksjon, spesifiser: .....
(Klistrelapp på baksiden)
Bruskskade: ☐ Ingen beha. ☐ Debridement ☐ Mikrofraktur ☐ Annen: .....
Pincerlesjon: ☐ Ingen beha. ☐ Reseksjon. Dybde max ..... mm Lengde ..... mm
Camlesjon: ☐ Ingen beha. ☐ Reseksjon
Ligamentum teres: ☐ Ingen beha. ☐ Debridement ☐ Annen: .....
Os acetabuli: ☐ Ingen beha. ☐ Fjerning ☐ Fiksering ☐ Annen: .....
Frie legemer fjernet: N J Synovectomi: N J Knivtid ..... min.
Reoperasjonsårsak, spesifiser: .....

202 5023 Bergen Grafisk as - 03.2013

RETTLEDNING

1. 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 nevroortopediske 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.

CAPUTKJERNE: Ved unilateral – sammenlign med frisk side.

2. 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

3. EPIFYSIOLYSIS CAPITIS FEMORIS

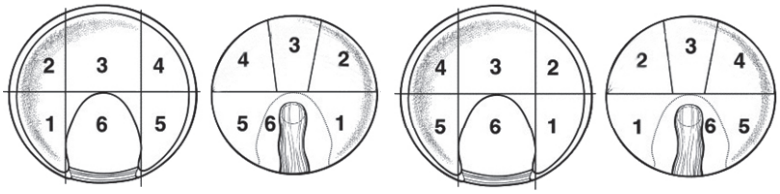
- **Registreres første gang ved diagnose/primærbehandling**
- **Registreres ved senere behandling som krever anestesi** Osteosyntese, femurosteotomier, reoperasjoner.

4. ÅPNE OG ARTROSKOPISKE HOFTEOPERASJONER

Alle pasienter (uavhengig av alder) som gjennomgår åpen eller artroskopisk hofteoperasjon, unntatt fraktur-, protese- og tumor-operasjoner, skal registreres.

Bruskskade i acetabulum – Grade:
0=Normal.
1=Loss of fixation to the subchondral bone resulting in a wave sign, defined as occuring when the capsular side of the labrum is pushed inwards with the probe resulting in bulging of the adjacent articular cartilage.
2=Presence of cleavage tear with obvious separation at the chondrolabral junction.
3=Delamination of the articular cartilage.
4=Presence of exposed bone in the acetabulum.

Bruskskade i acetabulum og på caput femoris – Lokalisasjon:
1-2: Fortil, 4-5: Baktil



Venstre hofte Høyre hofte

Bruskskade på caput femoris – Dybde (ICRS):
1=Nearly normal: Superficial lesions, soft identation and/or superficial fissures and cracks.
2=Abnormal: Lesions extending down to <50% of cartilage depth.
3=Severely abnormal: Cartilage defects extending down to >50% of cartilage depth as well as down to calcified layer.
4=Severely abnormal: Osteochondral injuries, lesions extending just through the sub chondral boneplate or deeper defects down into trabecular bone.

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