SoFCOT Total Hip Arthroplasty Register
Annual report 2015

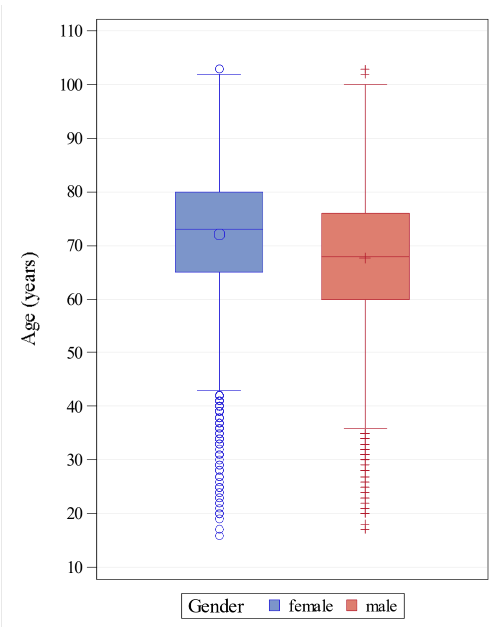
Part I: Primary Total Hip Arthroplasty

From January 1st 2006 until December 31th 2015, a total of 23'909 Total Hip Arthroplasties (THA) were registered in the SOFCOT hip register. The average age of the patients was 70.2 years (SD, 11.7 years). A total of 13'605 patients (56.9%) were female with an average age of 72.1 years, and 10'304 were male with an average age of 67.6 years (Table 1, Figure1).

Table 1. Patient age at operation

GENDER	Min	Max	Average	Std Dev
Male	17	103	67.6	11.9
Female	16	103	72.1	11.1
Total	16	103	70.2	11.7

Figure 1. Age distribution according to gender



Osteoarthritis is the main indication for THA (75.2%), followed by acute fracture, hip dysplasia and osteonecrosis of the femoral head (Table 2).

Table 2. Underlying diagnoses

DIAGNOSIS	Frequency	Percentage
Primary osteoarthritis	17981	75.2
Acute hip fracture	1622	6.8
Hip dysplasia	1208	5.1
Femoral head necrosis	1112	4.7
Rapid destructive arthritis	855	3.6
Post-trauma	570	2.4
Rheumatoid arthritis	157	0.7
Post Perthes-Calve	72	0.3
Others	332	1.4

The postero-lateral approach is used in more than half of the interventions (53.8%). Since about 2010 is the distribution of the individual approaches relatively stable (Figures 2a and 2b)

Figure 2a. Distribution of surgical approach

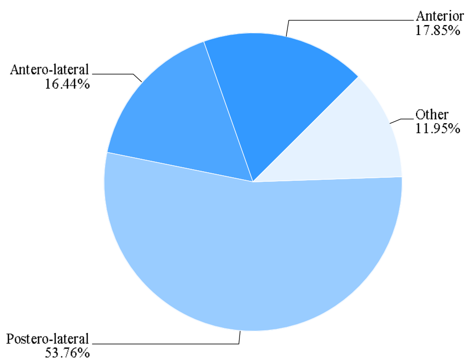


Figure 2b. Distribution of surgical approach: change over 8 years

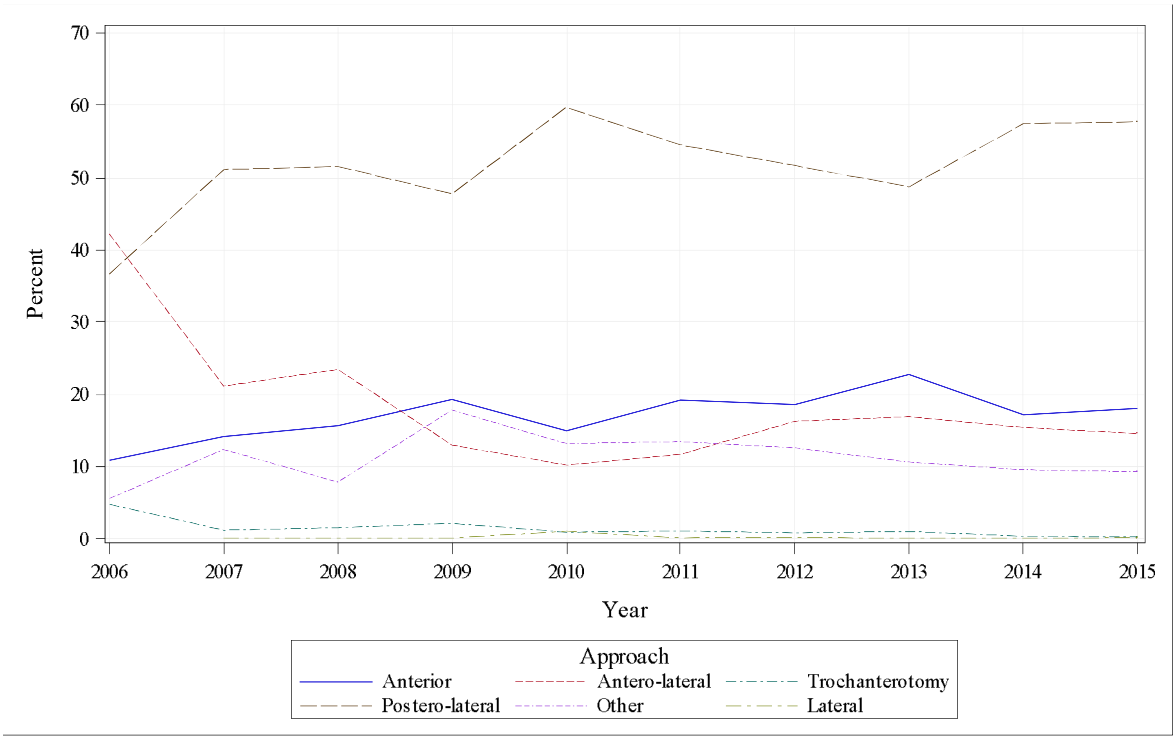


Table 3 shows that 63.5% of THAs are done conventionally, while a dual mobility cup was used in 28.1% of cases. All other types of THAs have a lower proportion (<4%). Almost two thirds of THAs were fixed without cement (Figure 3a). A steadily increase of the uncemented fixation type can be observed over the 10 years, which occurs in parallel to the decline of the cemented fixation in particular since 2009 (Figure 3b). When cement is used, it is in the majority of cases antibiotic-impregnated cement (from 87.3% in 2009 up to 93.5% in 2015) (Figure 4).

Table 3. Types of THA for primary implantation

TYPE of the PROSTHESIS	Frequency	Percent
Conventional THA	15189	63.5
THA with a dual mobility cup	6725	28.1
Femoral prosthesis with a mobile cup	880	3.7
THA with a short femoral stem	629	2.6
Full resurfacing	354	1.5
THA with a trans-cervical fixation	4	0.0
Femoral head resurfacing	3	0.0
Other	125	0.5

Figure 3a. Fixation of components

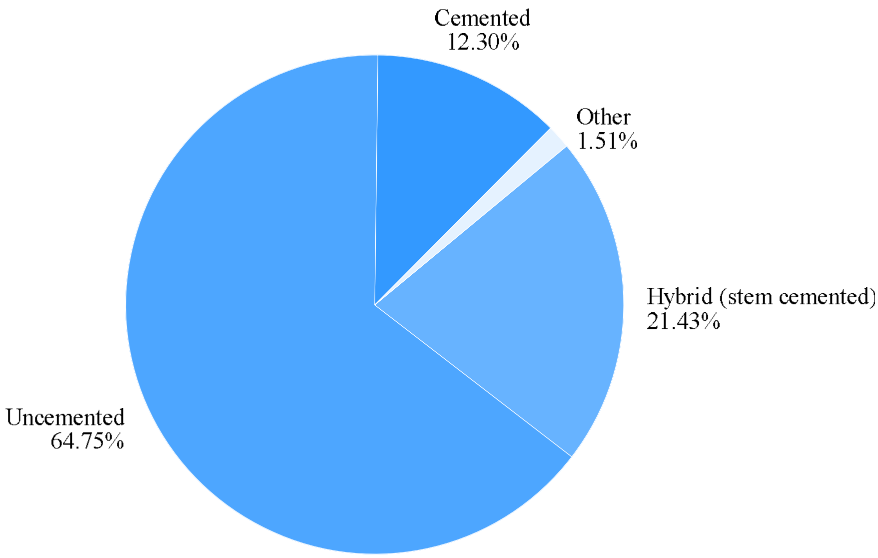


Figure 3b. Fixation of components: change over the 5 years

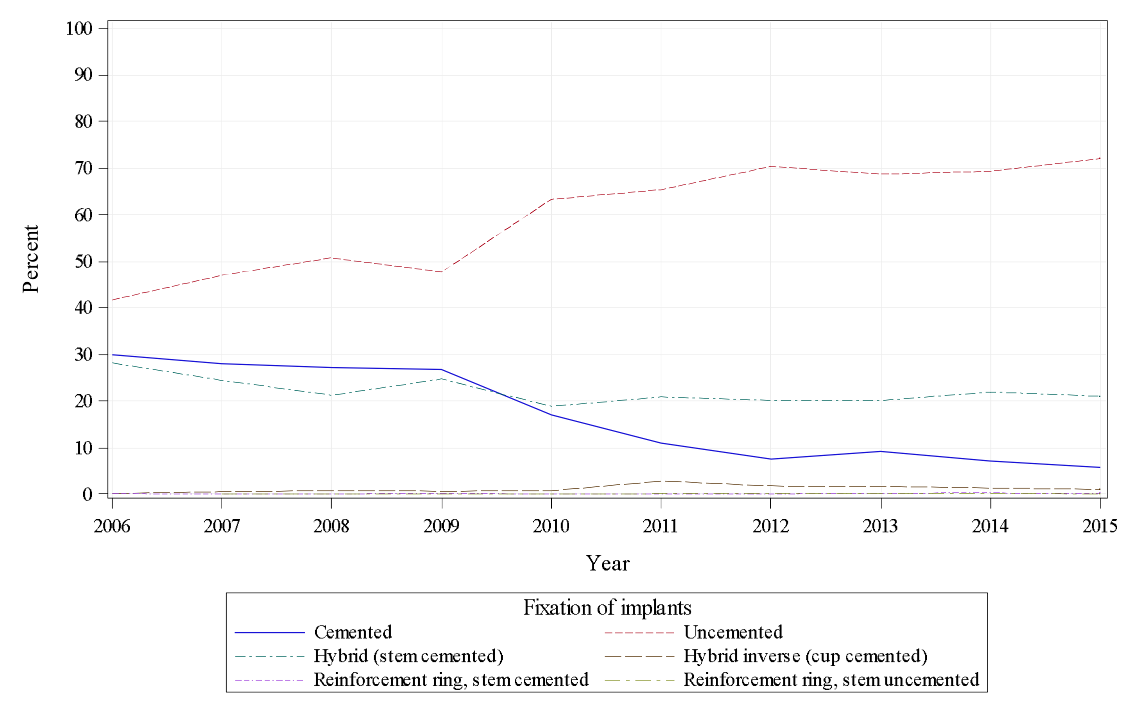
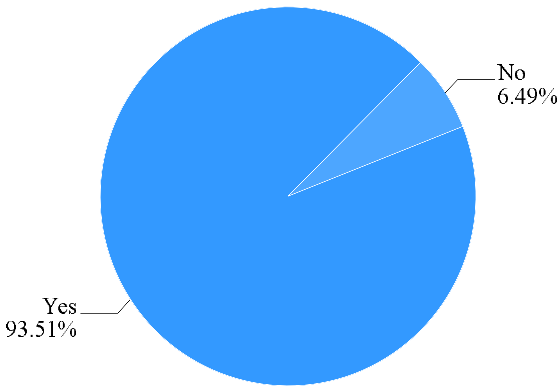


Figure 4. Use of antibiotic-impregnated cement

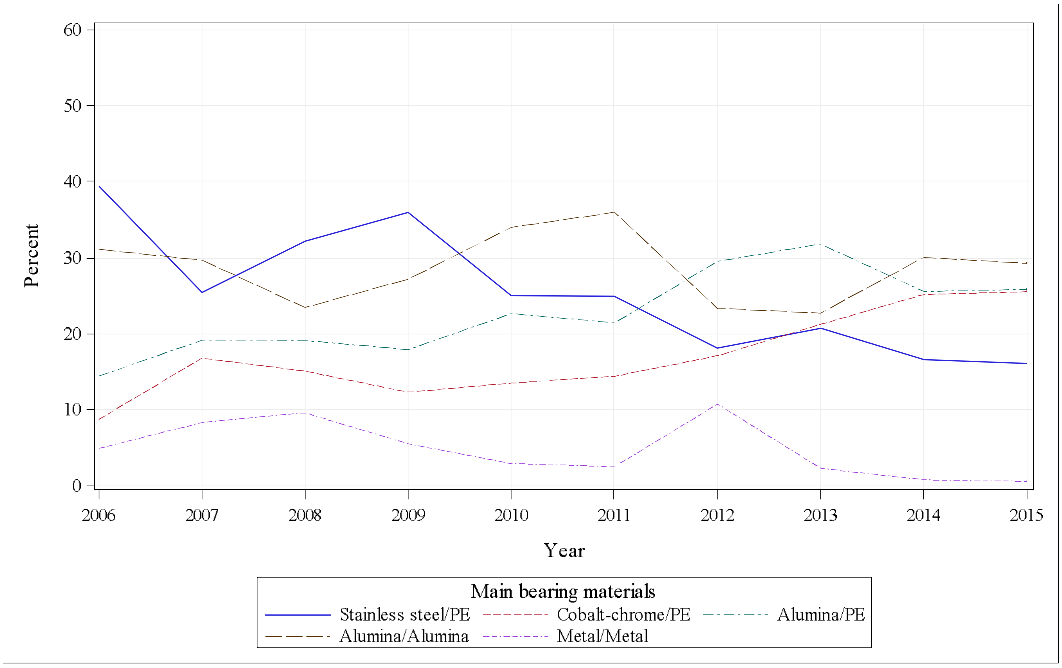


ive weight bearing materials represent 98.4% of THAs (Table 4). The order of frequency of the bearing materials did not change significantly since 2011, except that the proportion of Stainless steel/PE is steadily decreasing and Cobalt-chrome/PE is increasing.

Table 4. Weight bearing materials

MATERIAL	Frequency	Percent
Alumina/Alumina	6777	28.3
Alumina/PE	5943	24.9
Stainless steel/PE	5141	21.5
Cobalt-chrome/PE	4748	19.9
Metal/Metal	907	3.8
Zirconia/PE	39	0.2
Zirconia/Alumina	35	0.1
Titanium/PE	26	0.1
Other	289	1.2

Figure 5. Weight bearing materials: change over 5 years



The use of 28mm heads increased steadily (from 46.3% in 2011 to 50.0% in 2013 and further to 53.4 in 2015) thus still remains the predominant femoral head size. On the other hand, the use of 32mm and 22.2mm heads decreased, from 21.7% in 2011 to 19.4% in 2013 and further to 18.3% in 2015, and from 22.4% in 2011 to 18.7% in 2013 and further to 14.8% in 2015, respectively (Table 5).

Table 5. Size of femoral head

SIZE	Frequency	Percent
28 mm	12777	53.4
32 mm	4385	18.3
22.2 mm	3537	14.8
36 mm	2600	10.9
>40 mm	556	2.3
26 mm	40	0.2
Other	10	0.0

Most commonly used implants are listed below by type of fixation and restricted to at least 50 primary implantations that could accurately be identified (Tables 6, 7, 8 & 9).

Table 6. Most frequently used cemented cups (≥ 50)

Implant name	N
MKIII	447
INITIALE	287
DURASUL	279
KERBOULL	151
EXAFIT	80
total	1244

Table 7. Most frequently used uncemented cups (≥ 50)

Implant name	N
PINNACLE	1307
RM PRESSFIT	1269
QUATTRO	1120
CERAFIT	996
SATURNE	764
DUOFIX	670
TRIDENT	588
GYROS	565
ABG 2	459
ALLOFIT	434
CEDIOR	426
ALPHA	411
DELTA	405
VERSAFITCUP	378
STAFIT	314
SELENE	229
ETERNITY	219
ATLAS 4	176
ADM	163
ADES	149
EVORA	125
MUST	115
CAPITOLE	107
LAGOON	97
SELF CENTERING	95
HORIZON	88
CARGOS	77
STANDARD cup Astin Medical	71
HIP AND GO	69
ATLAS 3	68
SELEXYS	56
NOVAE	51
total	12061

Table 8. Most frequently used cemented stems (≥ 50)

Implant name	N
EXAFIT	795
INITIALE	640
LEGEND	427
PF	324
STANDARD stem PF Zimmer	274
ABG 2	237
DEDICACE	235
OSTEAL	185
CCA	184
STANDARD stem INSTITUTION Groupe Lepine	179
STANDARD stem Tornier	144
OCEANE	129
STANDARD stem Avenir Zimmer	108
AVENIR	96
CENTRIS	72
total	4029

Table 9. Most frequently used uncemented stems (> 50)

Implant name	N
CORAIL 2	1528
AVENIR	1201
TARGOS	1086
EXCEPTION	1020
THELIOS	722
STANDARD stem CORAIL 2 DePuy	721
STANDARD stem EXCEPTION Biomet	430
STANDARD stem Avenir Zimmer	386
ALLOCLASSIC	362
STANDARD stem HAP TARGOS Groupe Lepine	243
LINEA	225
RMIS	209
HELMED	200
ABG 2	184
AURA	156
INTEGRALE	151
ABG 2 MODULAR	101
CORAIL	100
LIBRA	89
STANDARD stem SL-Plus Plus Orthopedics	87
STANDARD stem PAVI Groupe Lepine	85
STANDARD stem LIBRA Serf	72
STANDARD stem OPTIMYS Mathys	66
VALMER	63
HARMONY	54
MULTICONE	53
STANDARD stem Polar Smith & Nephew	53
total	9647

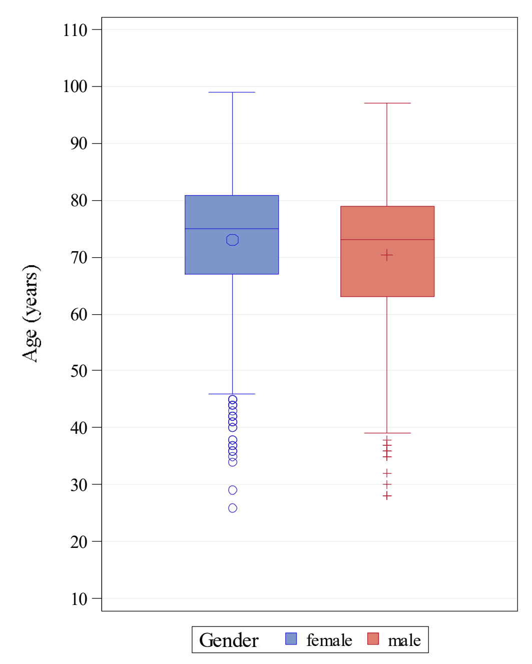
Part II : Re-intervention and THA Revision

From January 1st 2006 until December 31th 2015, 2'901 re-interventions of THAs were registered in SoFCOT. The average patient age was 72.1 years (SD, 11.5). A total of 1'720 patients (59.3%) were female with an average age of 73.2 years, and 1181 patients were male with an average age of 70.5 years (Table 10, Figure 6)

Table 10. Age of the patients at the re-intervention/THA Revision

Gender	Min	Max	Average	SD
Male	28	97	70.5	11.9
Female	26	99	73.2	11.0
Total	26	99	72.1	11.5

Figure 6. Age distribution at the time of re-intervention/revision according to gender



Aseptic loosening remains the principal cause of re-interventions, however, it decreased from 53.4% in 2011 to 47.1% in 2015. Hip dislocation represents the second most common cause of re-interventions, same as in the previous years. Re-interventions due to wear and osteolysis have only marginally increased over the last years, and the same is true for the periprosthetic fractures. Other causes of re-interventions worth mentioning are acute infection, pain, septic loosening and fracture of the implant, with frequencies between 4.8% and 3.0% (Table 11).

Table 11. Causes of re-interventions and THA revisions

DIAGNOSIS	Frequency	Percent
Aseptic loosening	1366	47.1
Dislocation	393	13.5
Wear and/or osteolysis	272	9.4
Periprosthetic fracture	253	8.7
Acute deep infection	139	4.8
Septic loosening – chronic infection	125	4.3
Pain	123	4.2
Implant fracture	88	3.0
Resection of the femoral neck	12	0.4
Calcifications	6	0.2
Intraoperative fracture	5	0.2
Explantation of material	2	0.1
Other	117	4.0

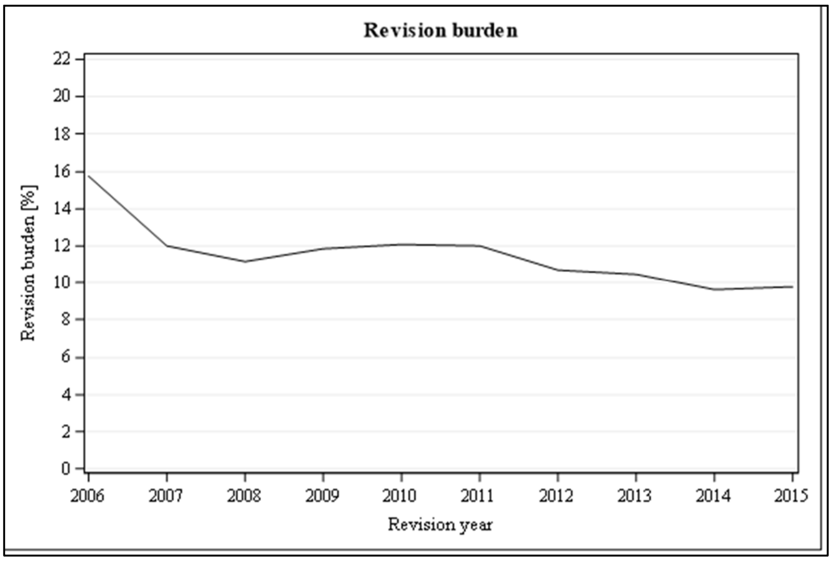
In concordance with the causes of revision, the most common intervention remains the change of both the acetabular and femoral components, albeit with slightly decreasing frequency since 2009. The proportion of isolated replacement of acetabular components did not change since the last report (Table 12).

Table 12. Types of re-interventions / revisions

INTERVENTION/REVISION	Frequency	Percent
Complete exchange	1315	45.3
Acetabular component only	911	31.4
Femoral component only	355	12.2
Head and Inlay	142	4.9
Re-implantation after previous resection	70	2.4
Totalisation of previous femoral prosthesis	20	0.7
Removal of implants and spacer	18	0.6
Head only	17	0.6
Head/neck resection	9	0.3
Inlay only	8	0.3
Prosthetic lavage	2	0.1
Osteosynthesis	2	0.1
Other	32	1.1

For the calculation of the **annual revision burden** according to the formula "N annual revisions/ (N annual primaries + N annual revisions)", currently with 2'901 revisions recorded compared with 23'909 primary THAs registered since January 1st 2006, the 10 years revision burden is 10.8%. The revision burden between 2008 and 2013 lied around 11% with a slight trend to decrease in the last years (Figure 7). It will be interesting to observe the future development of the revision burden. It will allow for comparisons of the performance of orthopaedic surgeons at the level of countries, institutions, and even between individual clinicians.

Figure 7. Annual revision burden during the 8-year period 2006 and 2014 (%).



Part II-A: Characteristics of the revised implants

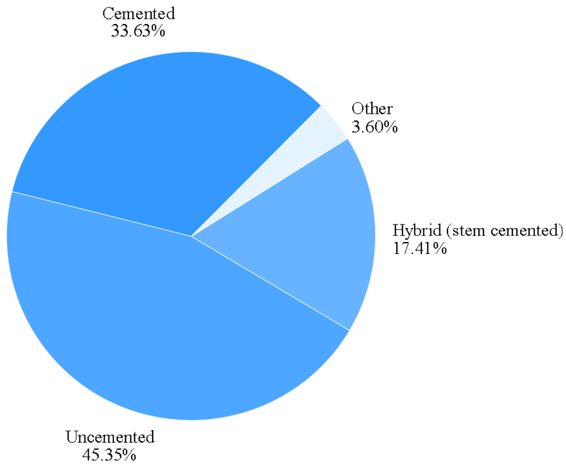
Unsurprisingly, the majority of the revised THAs are of the conventional type with a femoral stem and components with dual mobility. The other arthroplasty types represent only 10.1% of the total THAs revised (Table 13).

Table 13. Characteristics of the revised implants

PROSTHESES REVISED	Frequency	Percent
Conventional THA	2303	79.4
THA with a dual mobility cup	305	10.5
Femoral prosthesis with a mobile cup	111	3.8
Spacer	54	1.9
THA with a short femoral stem	17	0.6
Femoral head resurfacing	6	0.2
Full resurfacing	3	0.1
Other	102	3.5

The implants revised were mostly uncemented, whose proportion has steadily increased over the last years (Figure 8).

Figure 8. Fixation of the revised implants



Most of the revised acetabular cups or inlays are still made of conventional polyethylene (PE). Its proportion has marginally decreased over the last years, as have those of the bulk alumina or Co-Cr sandwich cups (Table 14). In contrast to the revised inlays, the distribution of the replaced heads has changed: compared to 2011, the proportion of the revised stainless steel heads decreased by 3%, down to a level of 29.8%. The alumina heads still represent 31.3% of the replaced heads, and the proportion of the revised Co-Cr heads increased by 2.5%, up to a level of 25.3%. The proportion of revised zirconia heads has also increased since 2009, to a current level of 10.5% (Table 15)

Table 14. Material of revised cups or inlays

MATERIAL	Frequency	Percent
Conventional PE	2024	74.9
Bulk alumina	279	10.3
Highly cross-linked PE	146	5.4
Co-Cr-sandwich	89	3.3
Alumina-sandwich	44	1.6
Co-Cr-massive	15	0.6
Others	35	1.3
No acetabular implant	71	2.6

Missing information =198

Table 15. Material of revised head

MATERIAL	Frequency	Percent
Alumina	846	31.3
Stainless steel	806	29.8
Co-Cr	684	25.3
Zirconia	284	10.5
Titanium	21	0.8
Other	60	2.2

Missing information = 200

Part II-B: Type of implant, fixation and cups used for revision

In about one fifth of all acetabular revisions the implant was supported by a reinforcement ring. Another quarter of acetabular revisions were cemented, and slightly more than the half was uncemented (Figure 9). This indicates a slight increase of the use of reinforcement rings in cemented acetabular revisions, and an even more accentuated increase in uncemented revisions (Figure 10). In cases with cementation, an antibiotic-impregnated cement was used in 89.8% (Table 16).

Figure 9. Implant fixation of acetabular revisions

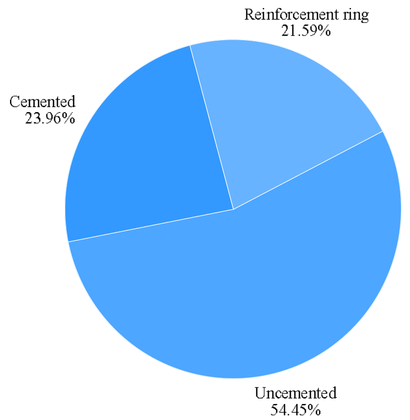


Figure 10. Use of cement in revisions

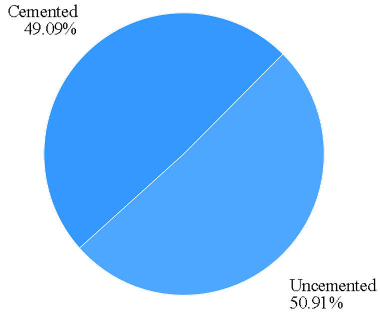


Table 16. Cemented revisions with and without antibiotics

ANTIBIOTICS	Frequency	Percent
Yes	1142	89.8
No	130	10.2

Missing information = 1258

Four weight bearing materials are mainly used in revisions, which are dominated by the classic combination of stainless steel/PE (Figure 11). Figure 12 shows a significant increase of the combination Co-Cr/PE at the cost of Alumina/PE since 2011.

Figure 11. Weight bearing materials used in revisions

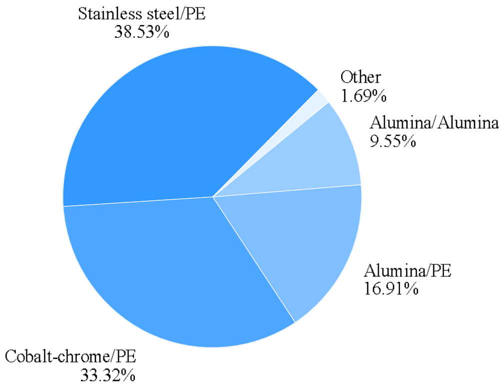
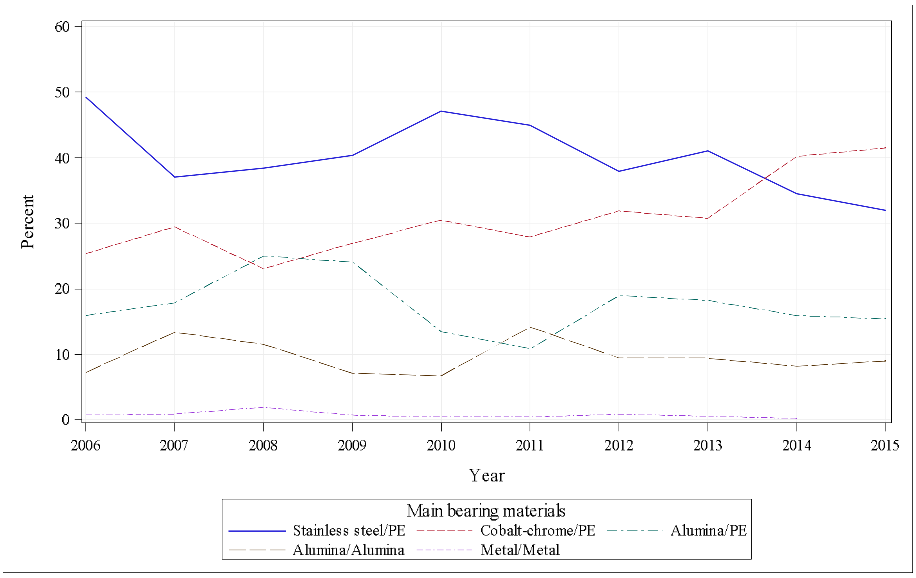


Figure 12. Main weight bearing materials used in revisions: change over 8 years



Part II-C: Analysis of the revision coefficients

The most important group of patients, those requiring a revision due to aseptic loosening, is composed of females in nearly 2/3 of the cases. In contrast, the revision group with deep infections or septic loosening consists mainly of male patients. Intra-operative or periprosthetic fractures usually occur in patients of high age.

One half of the revised implants due to aseptic loosening was cemented. The vast majority of other revised implants was uncemented (Table 17).

Table 17. Patient characteristics and type of fixation in revised THAs

REVISION DIAGNOSIS	N	Age	% females	% cemented	% uncemented	% hybrid
Aseptic loosening	1366	72.3	61.3	46.56	31.11	17.06
Acute deep infection	139	71.5	46.8	28.18	50.00	19.09
Dislocation	393	72.9	63.6	30.28	52.42	13.74
Perioperative fracture	5	74.0	60.0	40.00	40.00	20.00
Implant fracture	88	68.9	42.1	25.29	57.47	14.94
Peri-prosthetic fracture	253	78.5	64.4	14.23	74.70	9.88
Septic loosening- chronic infection	125	69.5	42.4	28.57	45.92	21.43
Wear and/or osteolysis	272	71.0	52.6	16.54	50.74	32.35
Pain	123	64.1	67.5	13.82	69.92	16.26
Calcifications	6	71.8	50.0	16.67	66.67	-
Implant removal	2	68.5	100.0	-	100.00	-
Head/neck resection	12	69.3	50	75.00	-	25.00
Other	117	68.4	63.3	10.71	73.21	14.29
TOTAL	2901	72.0	59.3	28.8	59.3	18.5

Another type of fixation at revision was used in less than 4% of the patients.

Table 18. Co-variables influencing the 8 main causes for revision (Odds ratios and 95% confident intervals)

Co-variables	Aseptic loosening	Dislocation	Wear and/or osteolysis	Peri-prosthetic fracture	Pain	Acute deep infection	Septic loosening-chronic infection	Implant fracture
Patient characteristics								
Age	n.s.	n.s.	0.99 (0.97-1.00)	1.09 (1.08-1.12)	0.95 (0.94-0.97)	n.s.	0.98 (0.97-1.00)	n.s.
Female vs male	n.s.	n.s.	n.s.	n.s.	2.03 (1.31-3.16)	0.51 (0.34-0.76)	0.59 (0.39-0.91)	0.53 (0.34-0.84)
Fixation of removed implant								
Cemented *vs* uncemented	3.42 (2.77-4.22)	n.s.	0.20 (0.13-0.29)	0.15 (0.09-0.25)	n.s.	n.s.	n.s.	n.s.
Hybrid *vs* uncemented	1.49 (1.19-1.86)	n.s.	n.s.	0.33 (0.21-0.53)	n.s.	n.s.	n.s.	n.s.
Reverse hybrid *vs* uncemented	6.08 (3.38-10.95)	n.s.	0.08 (0.01-0.58)	0.17 (0.04-0.74)	n.s.	n.s.	n.s.	n.s.
Support ring *vs* uncemented	3.48 (1.66-7.26)	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Type of removed implant								
Convent. *vs* dual mobility THA	n.s.	2.41 (1.55-3.75)	2.54 (1.50-4.29)	0.65 (0.43-0.97)	0.23 (0.13-0.39)	0.27 (0.17-0.43)	n.s.	n.s.
Other types *vs* dual mobility THA	0.44 (0.24-0.77)	3.75 (1.91-7.36)	n.s.	0.33 (0.13-0.85)	0.37 (0.14-0.98)	0.42 (0.14-1.21)	n.s.	n.s.
Type of insert								
None *vs* conventional PE	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Cross-linked PE *vs* conventional PE	0.32 (0.21-0.49)	n.s.	0.15 (0.05-0.48)	2.25 (1.39-3.65)	n.s.	n.s.	n.s.	n.s.
Bulk alumina *vs* conventional PE	0.45 (0.32-0.63)	n.s.	0.02 (0.00-0.13)	2.52 (1.48-4.30)	6.40 (3.83-10.68)	n.s.	n.s.	4.13 (2.08-8.20)
Sandwich alumina *vs* conventional PE	0.34 (0.16-0.74)	n.s.	0.13 (0.02-0.98)	n.s.	4.94 (1.62-15.10)	n.s.	n.s.	8.62 (3.34-22.20)
Bulk CoCr *vs* conventional PE	n.s.	n.s.	n.s.	n.s.	18.45 (5.65-60.26)	n.s.	n.s.	n.s.
Sandwich CoCr *vs* conventional PE	n.s.	n.s.	n.s.	n.s.	3.17 (1.28-7.88)	n.s.	n.s.	n.s.
Other *vs* conventional PE	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	8.05 (2.11-30.68)
Type of femoral head								
Metal *vs* alumina	n.s.	n.s.	1.58 (1.05-2.37)	n.s.	n.s.	n.s.	n.s.	n.s.
CoCr *vs* alumina	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	1.76 (1.10-2.80)	0.28 (0.09-0.86)
Titanium *vs* alumina	3.71 (1.32-10.41)	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Zirconium *vs* alumina	1.37 (1.00-1.87)	0.30 (0.16-0.55)	2.81 (1.83-4.32)	0.34 (0.15-0.75)	n.s.	n.s.	n.s.	n.s.
Other *vs* alumina	n.s.	0.27 (0.08-0.97)	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.

PE – polyethylene, n.s. – non significant, n.a. – not analysed because of small sample sizes

Age is a significant risk factor, **influencing the revisions due to wear/osteolysis, periprosthetic fractures, pain and septic loosening:** for each additional year of age, the risk of a periprosthetic fracture increases by 9%, while the risk of a revision due to pain decreases by 5%.

Gender significantly influences the risk of revision due to pain, acute infection, septic loosening and implant fracture. Females are 2.03-times more likely than males to require a revision due to pain, and 0.51-times and 0.53-times less likely than males to require revision due to an acute infection and implant fracture, respectively.

The risk of a revision due to aseptic loosening is 3.42-times higher in primary THAs with cemented fixation compared to uncemented fixation of the implants. However, cemented fixation compared to uncemented fixation reduces the risk for revision due to a dislocation, wear/osteolysis and periprosthetic fracture by factors 0.20 and 0.15.

Compared to uncemented fixation of both components, the standard hybrid fixation (cup uncemented, stem cemented) presents a 1.49-times higher risk of revision due to an aseptic loosening, while the risk due to periprosthetic fracture is 0.33-times lower.

Compared to uncemented fixation of both components, the reverse hybrid fixation (cemented cup, uncemented stem) presents 3.48-times higher revision risk due to aseptic loosening.

NB. The multivariable analyses could only adjust for co-variates that were recorded in the SoFCOT registry. Other important co-factors may exist. The precision of some risk estimates needs to be interpreted with care, as the partially wide confidence intervals demonstrate.

Part III : Preliminary analysis of revisions of patients with documented primary THA

This section is expected to develop bit by bit as the number of registered revisions for which information about the primary HTA is available in the SoFCOT registry grows. The social security number of the patient, gender and operated side allows establishing a link between the primary and revision interventions.

When this report went to press, 290 first revisions (222 in the previous report) could be linked to primary THAs. Not surprisingly, the first and most frequent causes of an early revision are hip dislocation, followed by periprosthetic fractures, acute deep infection, aseptic loosening, other causes, cobalt allergy, and implant fracture (Table 19).

Table 19. Characteristics of first revisions of patients with documented primary THA

Revision cause	Demographics of re-operated patients					Fixation of the revised implants		
	N	%	Age	% females	Average interval (years)	Cemented	Uncemented	Hybrid
Dislocation	102	35.17	70.1	57.84	1	26	67	9
Periprosthetic fracture	52	17.93	75.9	71.15	0.6	4	44	3
Acute deep infection	33	11.38	71.1	48.48	0.4	6	21	5
Others	25	8.62	65.7	64	0.9	2	22	1
Aseptic loosening	19	6.55	68.6	57.89	1.3	2	14	2
Pain	18	6.21	60.2	55.56	1.9	1	16	1
Cobalt allergy	15	5.17	68.9	40	2.6	0	15	0
Implant fracture	11	3.79	60.4	36.36	3.3	3	8	0
Septic loosening - chronic infection	8	2.76	59.1	50	2.4	0	2	4
Wear and/or osteolysis	4	1.38	61	25	5.7	0	3	1
Calcification	2	0.69	67.5	50	1.2	0	2	0
Intraoperative fracture	1	0.34	75	100	1.4	0	0	1
TOTAL	290	100.0	69.3	57.24	1.2	44	214	27

Survival analyses only make sense in registries with a very high documentation rate or full coverage, ideally linked to other databases like death registers. Since this is not possible in many countries, including France, the revision rate per 100 observed component years (Rp100ocy) was introduced by the Australian joint registry and has gained international acceptance as a measure for implant revision in registries with lower documentation rates.

The formula for the calculation of rp100ocy is:

$$\frac{\text{Number of cases of revision surgery for any reason x 100}}{\text{Number of observed components x observation time in years}}$$

The calculation of this Index allows for comparison of different implants even in the absence of survival curves.

Table 20. Revisions per 100 observed component years (Rp100ocy)

Year	Total THAs	Observed component years	Number revised	Rp100ocy	Exact 95% Confidence interval	
2008	3778	5094	30	0.59	0.41	0.84
2009	4867	9433	41	0.43	0.32	0.59
2010	6544	15146	63	0.42	0.33	0.53
2011	8352	22612	92	0.41	0.33	0.5
2012	11306	32502	142	0.44	0.37	0.51
2013	14325	45403	202	0.44	0.39	0.51
2014	18494	61836	240	0.39	0.34	0.44
2015	23909	83063	314	0.38	0.34	0.42

Note: Wilson score intervals were used to calculate the limits of 95% Confidence Intervals.

Studies from the *European Arthroplasty Register* has established in a systematic review of reports from national registers and clinical studies analysed with respect to revision rates that, after primary hip replacement, a mean of 1.29 revision per 100 observed component years was seen*.

Table 21 presents the various Rp100ocy that can be calculated by creating different implant strata by type of implant and type of implant fixation.

Table 21. Overall Rp100ocy by implant type and fixation used in primary THA

By type of implant	Total THAs	Observed component years	Number revised	Rp100ocy	Exact 95% Confidence interval	
- Conventional THA	15189	65214	230	0.35	0.31	0.4
- THA with a dual mobility cup	6725	13040	58	0.44	0.34	0.57
- THA with a mobile cup	880	2179	17	0.78	0.49	1.25
- Full resurfacing	354	1237	0	-	-	-
By type of implant fixation						
- cemented	2942	15329	50	0.33	0.25	0.43
- uncemented	15481	48243	231	0.48	0.42	0.54
- hybrid (with resurfacing)	5124	18406	32	0.17	0.12	0.25
- reverse hybrid (cemented cup)	303	929	0	-	-	-

**G. Labek,M. Thaler,W. Janda,M. Agreiter,B. Stöckl. Revision rates after total joint replacement.* CUMULATIVE RESULTS FROM WORLDWIDE JOINT REGISTER DATASETS. *J Bone Joint Surg [Br] 2011;93-B:293-7.*

Table 22 presents the various Rp100ocy that can be calculated by the end of 2015 by type of the 5 most common bearing combinations in primary THA. Note that Metal-Metal bearings (either in conventional THA with 28 or 32mm head size and resurfacing) shows a lower Rp100ocy despite the longer observation time (Figure 14)

Table 22. Overall Rp100ocy by bearings used in primary THA by number of inclusions

By bearing type	Total THAs	Observed component years	Number revised	Rp100ocy	Exact 95% Confidence interval	
- alumina / alumina	6777	23708	105	0.44	0.37	0.54
- alumina / PE	5943	18649	69	0.37	0.29	0.47
- stainless steel / PE	5141	21477	69	0.32	0.25	0.41
- cobalt-chrome / PE	4748	13447	57	0.42	0.33	0.55
- metal / metal	907	4775	9	0.19	0.1	0.36

We conducted the analysis for all implants used in primary THA. Total numbers of implants can be slightly inferior to those indicated in part I due to the use of a very precise and selective method using the article number that eliminates uncertain implant denominations when the implant was entered manually (not recommended).

Considering the threshold Rp100ocy index of 1.3, **all corresponding implants showing a Rp100ocy above this value might raise concern and suggest a specific survey (indicated in red boxes).**

Table 23. Rp100ocy of acetabular components non DM used in primary THA by decreasing order

Rank	non-DM CUP cemented	Total THAs	Observed component years	Number revised	Rp100ocy	Exact 95% Confidence interval	
1	PHARO	6	29	1	3.45	0.61	17.2
2	OCEANE	9	40	1	2.47	0.44	12.8
3	INITIALE	18	71	1	1.41	0.25	7.57
4	LOW PROFILE	29	75	1	1.33	0.24	7.17
5	MKIII	288	2131	5	0.23	0.1	0.55

Rank	non-DM CUP non-cemented	Total THAs	Observed component years	Number revised	Rp100ocy	Exact 95% Confidence interval	
1	LOGOS	3	25	2	7.91	2.2	24.7
2	DELTAMOTION	13	21	1	4.71	0.84	22.5
3	MUST	5	29	1	3.44	0.61	17.1
4	SELF CENTERING	100	228	7	3.08	1.5	6.21
5	TRIDENT	9	72	2	2.79	0.77	9.63
6	MIXT	9	52	1	1.92	0.34	10.1
7	CARGOS	28	74	1	1.35	0.24	7.24
8	APOGEE	12	87	1	1.15	0.2	6.21
9	ETERNITY	153	802	5	0.62	0.27	1.45
10	ABG 2	134	684	4	0.58	0.23	1.49
11	ATLAS 4	79	351	2	0.57	0.16	2.05

12	ALLOFIT	195	598	3	0.5	0.17	1.46
13	CEDIOR	244	1333	6	0.45	0.21	0.98
14	RM PRESSFIT	599	2986	10	0.33	0.18	0.62
15	ATLAS	55	363	1	0.28	0.05	1.54
16	HIP AND GO	215	1581	2	0.13	0.03	0.46
17	PINNACLE	878	3359	4	0.12	0.05	0.31
18	ALLOCLASSIC	231	1441	1	0.07	0.01	0.39
19	ABG	244	1994	1	0.05	0.01	0.28

Table 24. Rp100ocy of Dual Mobility acetabular components used in primary THA by decreasing order

Rank	DUAL MOB CUP cemented	Total THAs	Observed component years	Number revised	Rp100ocy	Exact 95% Confidence interval	
1	LIBERTY	71	282	1	0.35	0.06	1.98
Rank	**DUAL MOB CUP non-cemented**	**Total THAs**	**Observed component years**	**Number revised**	**Rp100ocy**	**Exact 95% Confidence interval**	
1	ADM	56	159	2	1.26	0.35	4.48
2	AVANTAGE 3P	67	561	1	0.18	0.03	1
3	QUATTRO	321	1034	1	0.1	0.02	0.55
4	GYROS	326	2337	2	0.09	0.02	0.31
5	AVANTAGE	638	2281	1	0.04	0.01	0.25

Table 25. Rp100ocy of Femoral components used in primary THA by decreasing order

Rank	STEM cemented	Total THAs	Observed component years	Number revised	Rp100ocy	Exact 95% Confidence interval	
1	GENERIC	2	7	1	13.4	2.41	49.3
2	OSTEAL	3	27	1	3.65	0.65	18.1
3	MODULYS 2	15	124	2	1.61	0.44	5.69
4	SAPIA	27	216	3	1.39	0.47	4.01
5	PF	35	169	1	0.59	0.1	3.27
6	FJORD	43	360	1	0.28	0.05	1.55
7	STERWEN	94	757	2	0.26	0.07	0.96
8	DEDICACE	50	385	1	0.26	0.05	1.46
9	EXAFIT	427	1473	2	0.14	0.04	0.49
10	LEGEND	679	3419	3	0.09	0.03	0.26

Rank	STEM non-cemented	Total THAs	Observed component years	Number revised	Rp100ocy	Exact 95% Confidence interval	
1	VALMER	17	32	4	12.3	4.90	27.7
2	THELIOS	4	21	2	9.57	2.66	29.0
3	SL+	3	22	1	4.59	0.81	22.0
4	ABG 2 MODULAR	89	496	18	3.63	2.31	5.66
5	STELLARIS	21	84	3	3.55	1.22	9.93
6	BHS	12	30	1	3.28	0.58	16.4
7	ABG 2	134	498	7	1.4	0.68	2.87
8	HELMED	20	83	1	1.2	0.21	6.51
9	AMI	60	180	2	1.11	0.3	3.95
10	AURA	79	202	2	0.99	0.27	3.54
11	RMIS	100	209	2	0.96	0.26	3.43
12	TWINSYS	35	140	1	0.72	0.13	3.94
13	LINEA	192	1056	5	0.47	0.2	1.1
14	CORAIL	196	929	4	0.43	0.17	1.1
15	CORAIL 2	1001	3091	11	0.36	0.2	0.64
16	AVENIR MULLER	135	310	1	0.32	0.06	1.8
17	EXCEPTION	858	3151	8	0.25	0.13	0.5
18	TARGOS MINI	236	626	1	0.16	0.03	0.9
19	ALLOCLASSIC	231	975	1	0.1	0.02	0.58
20	ESOP	174	1214	1	0.08	0.01	0.47
21	HIP AND GO	215	1249	1	0.08	0.01	0.45
22	AVENIR	969	6145	4	0.07	0.03	0.17
23	TARGOS	399	1936	1	0.05	0.01	0.29

Of course, only Rp100ocy of series with a minimum of 1ary implantations could be considered for these analyses.

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