SoFCOT Total Hip Arthroplasty Register Biannual report 2018

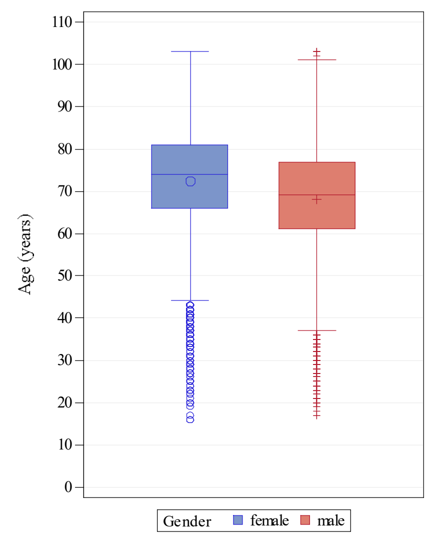
Part I: Primary Total Hip Arthroplasty

From January 1st 2006 to December 31th 2017, a total of 35'085 Total Hip Arthroplasties (THA) were registered in the SOFCOT hip register. The average age of the patients was 70.6 years (SD, 11.7 years). A total of 20'012 patients (57.0%) were female with an average age of 72.5 years, and 15'032 were male with an average age of 68.0 years (Table 1, Figure1).

Table 1. Patient age at operation

Gender	N	Min	Max	Average	Std Dev
Male	15032	17	103	68.0	11.9
Female	20008	16	103	72.5	11.1
Total	35040	16	103	70.6	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

Diagnostics	Frequency	Percentage
Primary osteoarthritis	26 382	75.2
Recent fracture	2 705	7.7
Hip dysplasia	1 621	4.6
Femoral head necrosis	1 578	4.5
Rapid destructive arthritis	1 262	3.6
Traumatic sequelae	807	2.3
Others	437	1.2
Rheumatoid arthritis	195	0.6
Post-Perthes Calve	98	0.3

The postero-lateral approach is used in more than half of the interventions (52.5%). Since about 2010, distribution of the individual approaches remains relatively stable (Figures 2a and 2b).

Figure 2a. Distribution of surgical approach

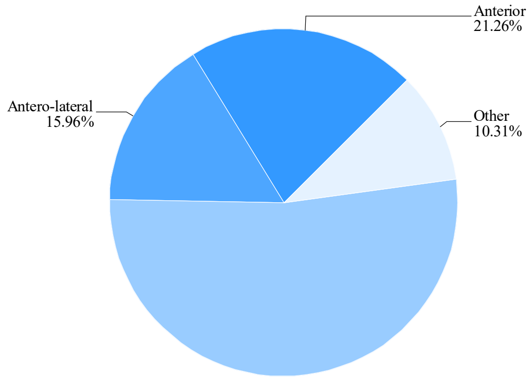


Figure 2b. Distribution of surgical approach: change over 12 years

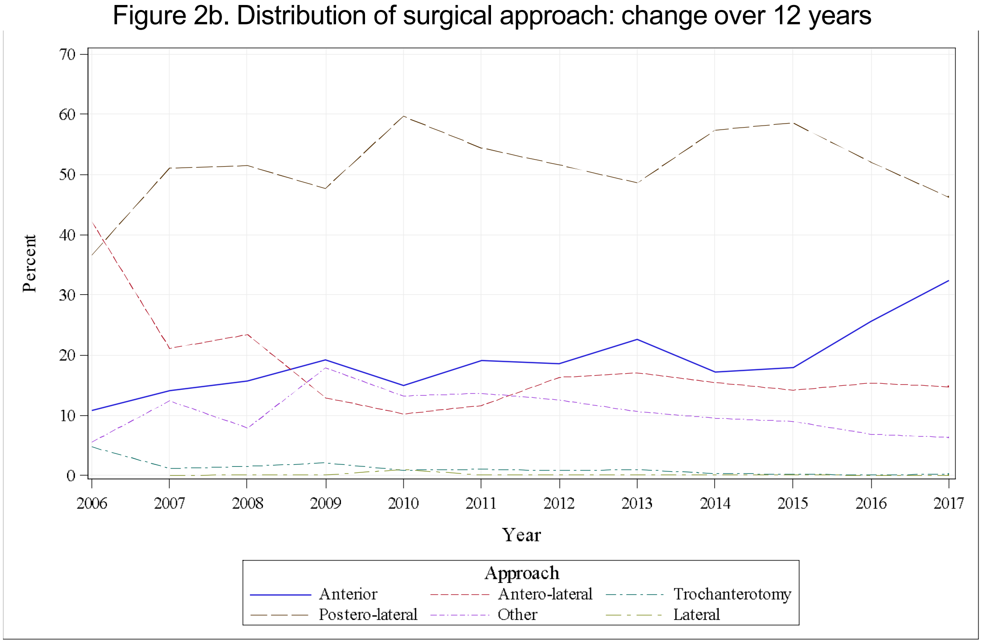


Table 3 shows that 90.3% of THAs are done conventionally, while a dual mobility cup was used in 33.2.1% of cases. All other types of THAs have a lower proportion (<4%). Almost two thirds of THAs were fixed without cement (Figure 3a). A steadily increase of the uncemented fixation type can be observed 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 3a. Types of THA for primary implantation

Type of Prosthesis	Frequency	Percent
Conventional THA	31 681	90.3
Femoral prosthesis with mobile cup	1 516	4.3
THA with short femoral stem	1 313	3.7
Total resurfacing	354	1.0
Other	212	0.6
Femoral resurfacing	5	0.0
THA with trans-cervical fixation	4	0.0
Total	35 085	100

Table 3b. Type of cups for primary implantation

Type of Cup	Frequency	Percent
Conventional	21 917	62.5
Dual mobility cup	11 633	33.2
Mobile head	1 516	4.3
Other	19	0.1

Figure 3a. Fixation of components

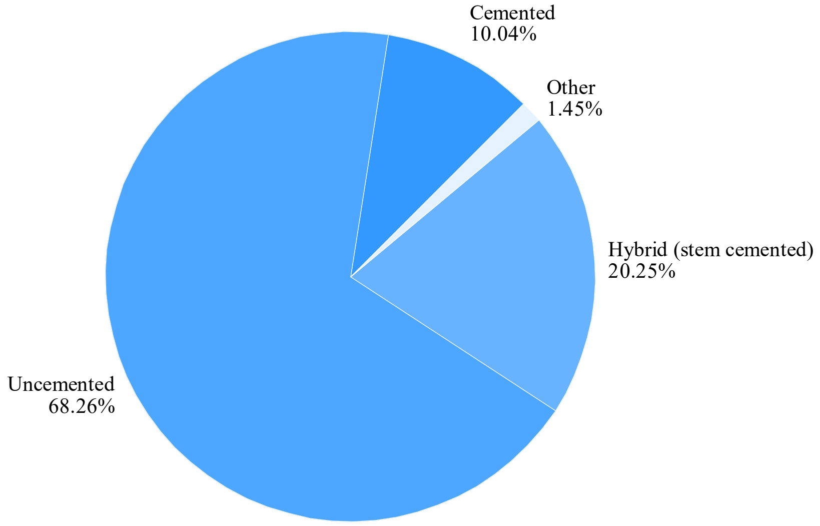


Figure 3b. Fixation of components: change over the 12 years

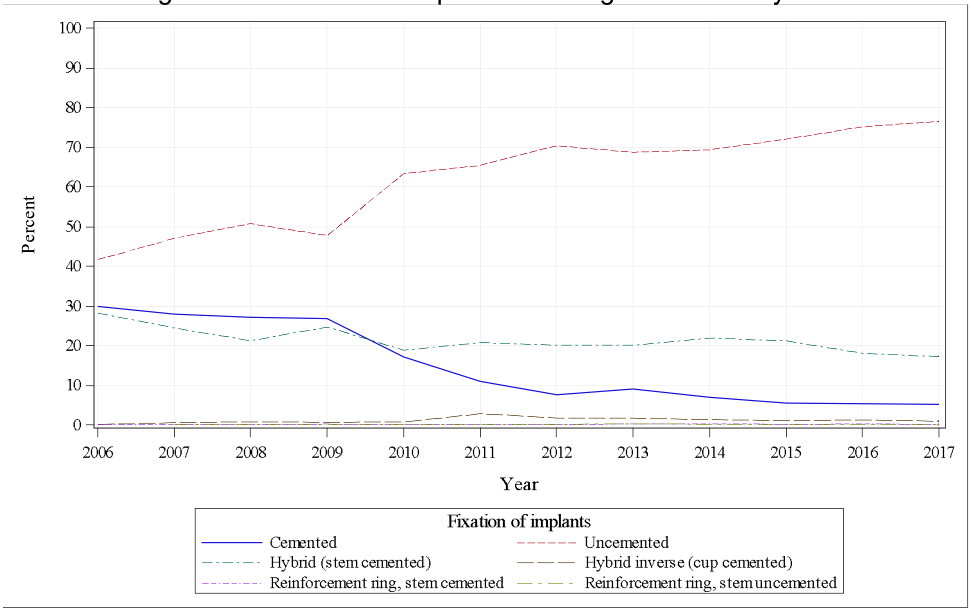
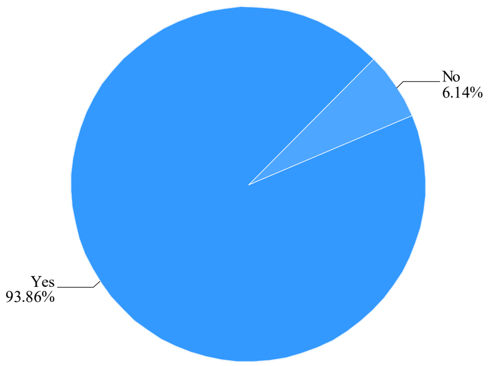


Figure 4. Use of antibiotic-impregnated cement

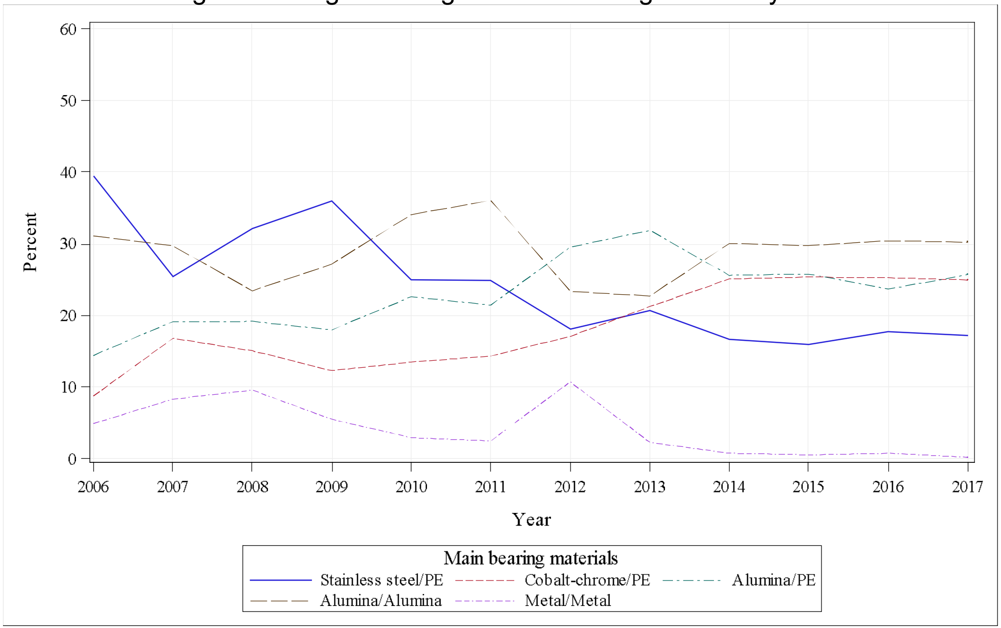


Five weight bearing materials represent 98.4% of THAs (Table 4). The order of frequency of the bearing materials did not change significantly since 2011, except that the proportion of Stainless steel/PE is steadily decreasing and Cobalt-chrome/PE is increasing.

Table 4. Weight bearing materials

Material	Frequency	Percent
Alumina/Alumina	10 193	29.1
Alumina/PE	8 706	24.8
Cobalt-chromium/PE	7 538	21.5
Stainless steel/PE	7 083	20.2
Metal/Metal	960	2.7
Other	367	1.0
Zirconia/PE	89	0.3
Titanium/PE	73	0.2
Zirconia/Alumina	72	0.2

Figure 5. Weight bearing materials: change over 12 years



The use of 28mm heads increased steadily (from 46.3% in 2011 to 50.0% in 2013 and further to 54.7 in 2017) 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 2017, and from 22.4% in 2011 to 18.7% in 2013 and further to 12.3% in 2017, respectively (Table 5).

Table 5. Size of femoral head

Size	Frequency	Percent
28 mm	19 182	54.7
32 mm	6 421	18.3
36 mm	4 465	12.7
22.2 mm	4 326	12.3
Other	638	1.8
26 mm	49	0.1

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
DURASUL	349
INITIALE	306
KERBOULL	160
EXAFIT	81
SATURNE	80
Total	1 423

Table 7. Most frequently used uncemented cups (>=50)

Implant name	N
PINNACLE	2 001
RM PRESSFIT	1 804
QUATTRO	1 657
CERAFIT	1 314
SATURNE	1 271
VERSAFITCUP	887
DUOFIX	865
AVANTAGE	830
TRIDENT	645
GYROS	631
DELTA	582
ALLOFIT	580
ABG 2	462
CEDIOR	427
ALPHA	412
STAFIT	315
ADES	305
HYPE	283
EVORA	260
CAPITOLE	246
HORIZON	237
SELENE	229
ETERNITY	228
ADM	210
ATLAS 4	198
MUST	197
ALLOCLASSIC	186
NOVAE/SUNFIT	145
SELF CENTERING	124
STANDARD cup Aston Medical	106
LAGOON	97
ATLAS 3	94
CARGOS	84
LIBERTY	80
HIP AND GO	69
MIXT	66
DELTAMOTION	61
TARGOS	61

Implant name	N
SELEXYS	59
EVOLUTION	57
Total	18 365

Table 8. Most frequently used cemented stems (>=50)

Implant name	N
INITIALE	929
EXAFIT	912
STANDARD stem PF Zimmer	670
STANDARD stem Avenir Zimmer	582
ABG 2	448
LEGEND	426
DEDICACE	275
CCA	255
OSTEAL	246
STANDARD stem INSTITUTION Groupe Lepine	203
STANDARD stem Tornier	181
OCEANE	168
HYPE	114
GENERIC	101
CENTRIS	74
Total	5 584

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

Implant name	N
STANDARD stem CORAIL 2 DePuy	3 015
STANDARD stem Avenir Zimmer	2 616
TARGOS	1 595
EXCEPTION	1 308
THELIOS	881
HYPE	622
STANDARD stem EXCEPTION Biomet	599
INTEGRALE	565
ALLOCLASSIC	478
RMIS	333
STANDARD stem HAP TARGOS Groupe Lepine	266
STANDARD stem OPTIMYS Mathys	232
LINEA	227
HELMED	222
ABG 2	194
CORAIL	179
AURA	167
STANDARD stem PAVI Groupe Lepine	144
STANDARD stem LIBRA Serf	135
STANDARD stem SL-Plus Plus Orthopedics	113
VALMER	107
ABG 2 MODULAR	101
LIBRA	101
STANDARD stem LOUXOR SEM	90
STANDARD stem CORAIL Arthrosurface	80
CERAFIT-MULTICONE	68
HARMONY	67
STANDARD stem Polar Smith & Nephew	65
BHS	57
Total	14 627

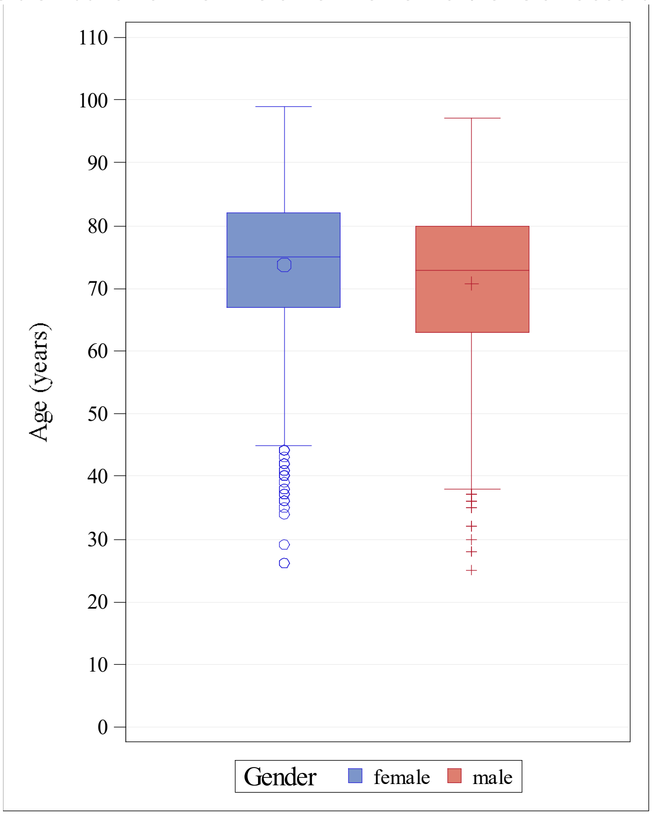
Part II: Re-intervention and THA Revision

From January 1st 2006 until December 31th 2017, 4’027 re-interventions of THAs were registered in SoFCOT. The average patient age was 72.4 years (SD, 11.5). A total of 2’290 patients (56.9%) were female with an average age of 73.7 years, and 1’735 patients were male with an average age of 70.7 years (Table 10, Figure 6)

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

Gender	N	Min	Max	Mean	SD
Male	1735	25	97	70.7	11.9
Female	2289	26	99	73.7	11.0
Total	4024	25	99	72.4	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 45.0% in 2017. Hip dislocation represents the second most common cause of re-interventions, same as in the previous years. Reinterventions 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 6.4% and 3.2% (Table 11).

Table 11. Causes of re-intervention and THA revisions

Diagnosis	Frequency	Percent
Aseptic loosening	1 813	45.0
Dislocation	499	12.4
Peri-prosthetic fracture	424	10.5
Wear and/or osteolysis	349	8.7
Septic Loosening - chronic infection	259	6.4
Deep acute infection	191	4.7
Pain	169	4.2
Others	156	3.9
Implant fracture	130	3.2
Head and neck resection	14	0.3
Per-operative fracture	13	0.3
Calcifications	7	0.2
Removal of material	3	0.1

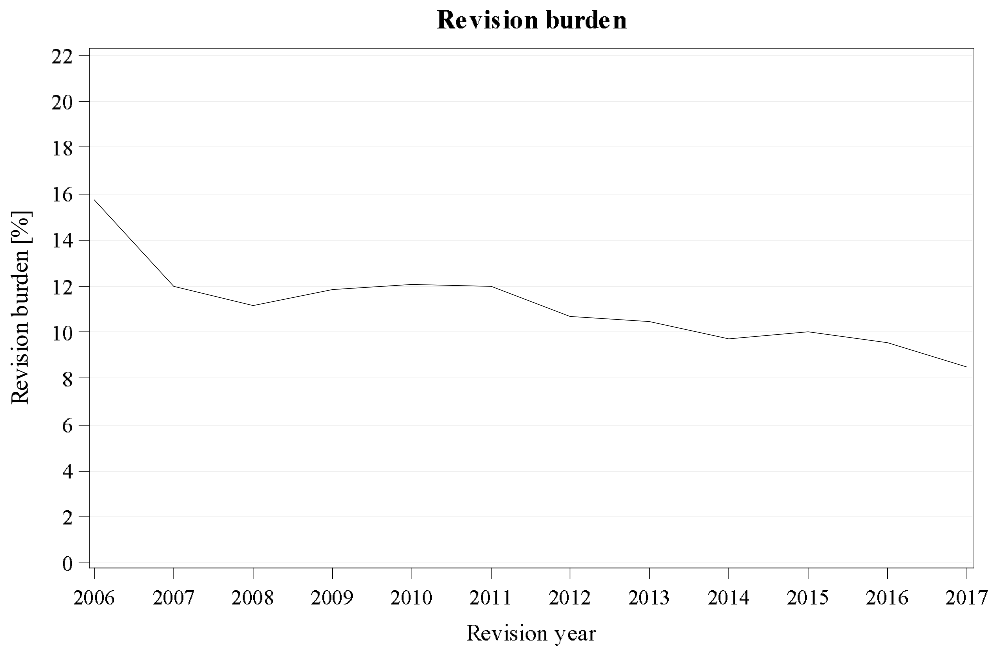
In concordance with the causes of revision, the most common reintervention remains the change of both the acetabular and femoral components, albeit with slightly decreasing frequency since 2009. The proportion of isolated replacement of acetabular components did not change since the last report (Table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

Table 12. Types of re-interventions / revisions

Intervention	Frequency	Percent
Complete exchange	1 820	45.2
Acetabular implant only	1 227	30.5
Femoral implant only	544	13.5
Head and liner	199	4.9
Reimplantation after resection	89	2.2
Others	46	1.1
Totalisation	28	0.7
Head only	22	0.5
Implant removal+spacer	20	0.5
Liner only	14	0.3
Head-neck resection	9	0.2
Osteosynthesis	6	0.1
Prosthetic lavage	3	0.1

For the calculation of the annual revision burden according to the formula "N annual revisions/ (N annual primaries + N annual revisions)", currently with 4'027 revisions recorded compared with 35'085 primary THAs registered since January 1st 2006, the overall 11 years revision burden is 11.5%. 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 11-year period 2006 and 2017 (%)



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 an acetabular component, either with conventional or dual mobility cups (DMC). The other arthroplasty types represent only 10.6% of the total THAs revised (Table 13).

Table 13a. Characteristics of the revised implants

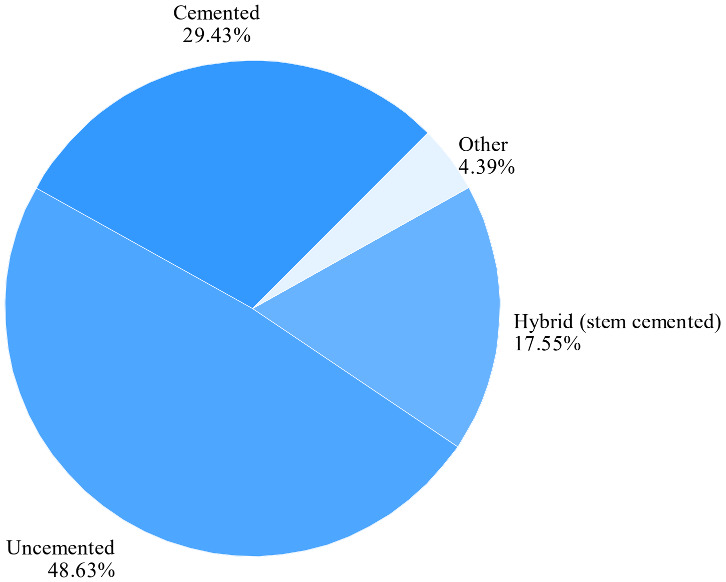
Revised	Frequency	Percent
THA with femoral stem	3 599	89.4
Femoral prosthesis with mobile cup	163	4.0
Others	149	3.7
Spacer	76	1.9
THA with short femoral stem	29	0.7
Femoral head resurfacing	7	0.2
Total resurfacing	4	0.1

Table 13b. Type of cups withdrawn

Cup type	Frequency	Percent
Conventional	3 221	80.0
Dual mobility cup	630	15.6
Mobile head	163	4.0
Other	13	0.3

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).

Table 14. Material of revised cups or inlays

Insert	Frequency	Percent
Conventional PE	2 692	71.7
Bulk alumina	425	11.3
Highly cross-link PE	285	7.6
None	111	3.0
CoCr-sandwich	109	2.9
Alumina-sandwich	70	1.9
Others	45	1.2
Non-modular CoCr	19	0.5

Missing information = 271

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 5%, down to a level of 27.9%. The alumina heads still represent 33.6% of the replaced heads, and the proportion of the revised Co-Cr heads increased by 3.9%, up to a level of 26.7%. The proportion of revised zirconia heads has also increased since 2009, to a current level of 9.2% (Table 15)

Table 15. Material of revised heads

Bille	Frequency	Percent
Alumina	1 263	33.6
Steel	1 046	27.9
CoCr	1 002	26.7
Zirconia	344	9.2
Other	73	1.9
Titanium	25	0.7
Oxynium	1	0.0

Missing information = 273

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 were 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 91.7% (Table 16).

Figure 9. Implant fixation of acetabular revisions

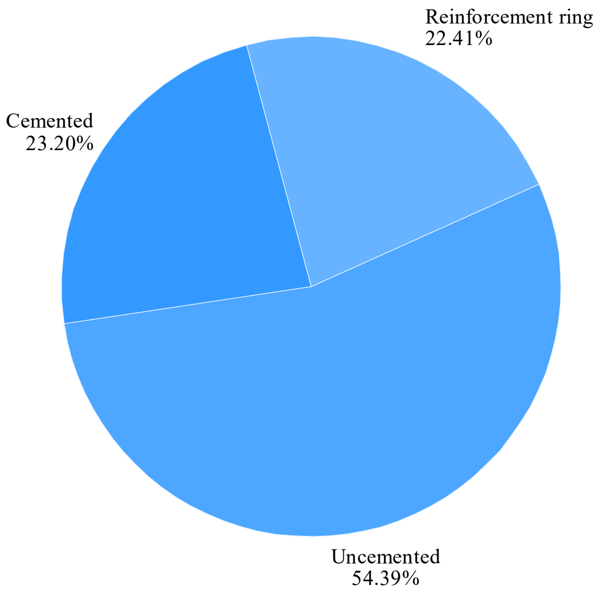


Figure 10. Use of cement in revisions

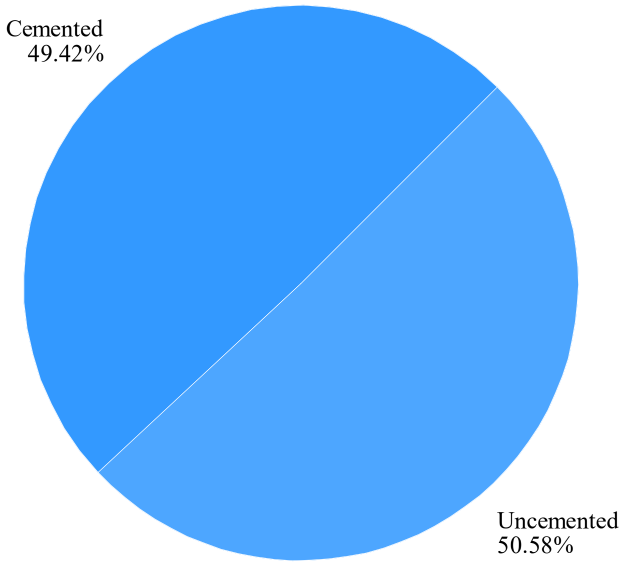


Table 16. Cemented revisions with and without antibiotics

Antibiotics	Frequency	Percent
Yes	1 562	91.7
No	141	8.3

Missing information = 2 324

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

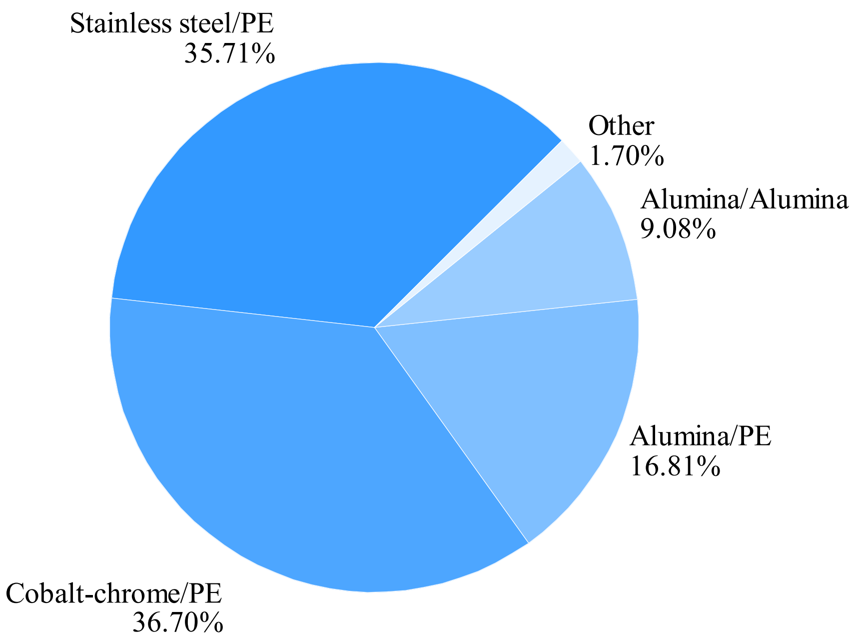
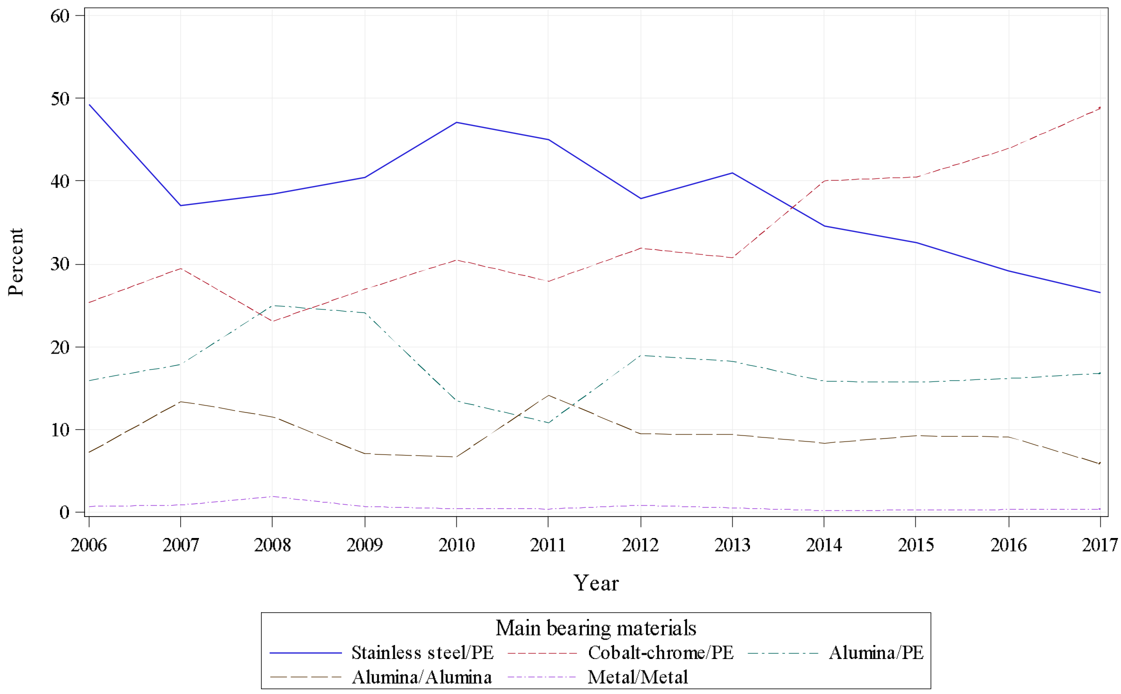


Figure 12. Main weight bearing materials used in revisions: change over 8 years



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. Patients characteristics and type of fixation in revised THAs

Revision diagnosis	N	Age	% female	% cemented	% uncemented	% hybrid
Aseptic loosening	1 813	72.5	59.1	43.1	34.6	18.0
Deep acute infection	191	72.0	46.6	23.0	44.0	13.6
Dislocation	499	73.2	61.5	28.1	56.7	12.8
Perioperative fracture	13	74.3	69.2	15.4	69.2	15.4
Implant fracture	130	69.5	37.7	20.0	65.4	11.5
Peri-prosthetic fracture	424	78.0	62.7	13.9	72.6	12.0
Septic Loosening - chronic infection	259	70.1	39.0	25.5	32.4	23.2
Wear and/or osteolysis	349	71.8	51.3	14.0	54.7	30.1
Pain	169	64.7	65.7	13.0	74.0	12.4
Calcifications	7	73.0	42.9	14.3	71.4	0.0
Removal of material	3	70.0	66.7	0.0	66.7	0.0
Head and neck resection	14	68.3	50.0	21.4	0.0	7.1
Other	156	68.7	61.5	9.6	71.8	12.8
Total	4 027	72.3	56.9	30.0	47.6	17.2

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

Table 18 (a,b,c,d,e). Co-variables influencing the 8 main causes for revision
(Odds ratio and 95% confidence intervals)

a / Influence of age and gender of the revised patients

Co-variables	Aseptic loosening	Dislocation	Wear and/or osteolysis	Periprosthetic fracture	Pain	Acute deep infection	Septic loosening/ chronic infection	Implant fracture
Age	n.s.	1.01 (1 - 1.02)	n.s.	1.07 (1.06 - 1.09)	0.95 (0.94 - 0.97)	n.s.	n.s.	n.s.
Female vs male	n.s.	**1.28 (1.04 - 1.57)**	n.s.	n.s.	**2.13 (1.48 - 3.07)**	0.58 (0.41 - 0.83)	0.52 (0.38 - 0.7)	0.47 (0.32 - 0.69)

- Age is a significant risk factor, influencing the revisions due to periprosthetic fractures and pain: for each additional year of age, the risk of a periprosthetic fracture increases by 7% while the risk of a revision due to pain decreases by 5%.

- Gender significantly influences the risk of revision due to dislocation, pain, acute infection, septic loosening and implant fracture. Females are 2.13-times more likely than males to require a revision due to pain, and 0.58-times and 0.47-times less likely than males to require revision due to an acute infection and implant fracture, respectively.

b / Fixation of removed THA implants

Co-variables	Aseptic loosening	Dislocation	Wear and/or osteolysis	Periprosthetic fracture	Pain	Acute deep infection	Septic loosening/ chronic infection	Implant fracture
Cemented vs uncemented	**3.17 (2.65 - 3.8)**	0.76 (0.58 - 0.98)	0.19 (0.13 - 0.27)	0.22 (0.15 - 0.32)	0.37 (0.2 - 0.69)	n.s.	**1.82 (1.19 - 2.78)**	n.s.
Hybrid vs uncemented	**1.46 (1.21 - 1.77)**	0.6 (0.45 - 0.82)	n.s.	0.44 (0.32 - 0.61)	n.s.	n.s.	**2.73 (1.89 - 3.96)**	n.s.
Reverse hybrid vs uncemented	**3.75 (2.38 - 5.89)**	n.s.	0.26 (0.09 - 0.72)	0.17 (0.05 - 0.54)	n.s.	n.s.	n.s.	n.s.
Support ring vs uncemented	**1.75 (1.07 - 2.86)**	0.5 (0.21 - 1.19)	0 (0 -57E11)	0.19 (0.06 - 0.63)	0.18 (0.02 - 1.53)	0.69 (0.21 - 2.31)	**9.13 (5.09 -16.38)**	**1.44 (0.33 - 6.28)**

- The risk of a revision due to aseptic loosening is 3.17-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 0.76, 0.19 and 0.22.

- Compared to uncemented fixation of both components, the standard hybrid fixation (cup uncemented, stem cemented) presents a 1.46-times higher risk of revision due to an aseptic loosening, while the risk due to periprosthetic fracture is 0.44-times lower.

- Compared to uncemented fixation of both components, the reverse hybrid fixation (cemented cup, uncemented stem) presents 3.75-times higher revision risk due to aseptic loosening, while the risk due to wear/osteolysis and periprosthetic fracture is 0.26 and 0.17-times lower.

c / Type of removed acetabular implant

Co-variables	Aseptic loosening	Dislocation	Wear and/or osteolysis	Periprosthetic fracture	Pain	Acute deep infection	Septic loosening/ chronic infection	Implant fracture
Conventional (std & DM) vs other	**2.68 (1.76 - 4.09)**	n.s.	**2.49 (1.04 - 6)**	n.s.	n.s.	n.s.	n.s.	0.48 (0.25 - 0.92)
Standard cup vs dual mobility cup	n.s.	**2.25 (1.63 - 3.12)**	**2.21 (1.53 - 3.2)**	0.56 (0.43 - 0.75)	0.37 (0.2 - 0.69)	n.s.	**1.82 (1.19 - 2.78)**	n.s.

- Compared to standard cups, dual-mobility cups reduce the risk of revision for dislocation by factor 2.25 and for wear and osteolysis by factor 2.21. Conversely, the risk of revision for periprosthetic fracture and pain is 0.56 and 0.37-times lower with standard cups.

.

d / Type of removed acetabular insert

Co-variables	Aseptic loosening	Dislocation	Wear and/or osteolysis	Periprosthetic fracture	Pain	Acute deep infection	Septic loosening/ chronic infection	Implant fracture
None vs conventional PE	n.s.	n.s.	n.s.	**2.09 (1.07 - 4.08)**	**2.79 (1.09 - 7.11)**	n.s.	n.s.	n.s.
Cross-linked PE vs conventional PE	0.31 (0.23 - 0.43)	**2.22 (1.6 - 3.08)**	0.15 (0.06 - 0.38)	**2.42 (1.71 - 3.43)**	n.s.	**2.1 (1.29 - 3.43)**	**2.13 (1.37 - 3.32)**	n.s.
Bulk alumina vs conventional PE	0.37 (0.28 - 0.49)	n.s.	0.03 (0.01 - 0.1)	**2.59 (1.72 - 3.91)**	**2.54 (1.5 - 4.31)**	n.s.	**3.09 (1.8 - 5.31)**	**3.74 (2.04 - 6.84)**
Sandwich alumina vs conventional PE	0.35 (0.2 - 0.63)	n.s.	0.08 (0.01 - 0.58)	**2.7 (1.32 - 5.54)**	**2.77 (1.12 - 6.81)**	n.s.	n.s.	**7.55 (3.49 - 16.35)**
Bulk CoCr vs conventional PE	n.s.	n.s.	n.s.	n.s.	**10.82 (3.32 -35.22)**	n.s.	n.s.	n.s.
Sandwich CoCr vs conventional PE	**1.63 (1.07 - 2.49)**	n.s.	n.s.	n.s.	n.s.	n.s.	0.12 (0.03 - 0.49)	n.s.
Other vs conventional PE	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	**6.83 (2.14 - 21.81)**

- Compared to conventional PE liner, cross-linked PE reduce the risk of revision for Aseptic loosening and wear and osteolysis by factor 0.31 and 0.15, respectively, but increase the risk of revision for infection and peri-prosthetic fracture by factor 2.1 and 2.42, respectively.
- Alumina liners show an increase risk of revision for implant fracture by a factor 3.74 for bulk alumina and 7.55 for sandwich-alumina liners.
- CoCr liners increase the risk of revision for pain by factor 10.8 when bulk.

e / Type of removed femoral head

Co-variables	Aseptic loosening	Dislocation	Wear and/or osteolysis	Periprosthetic fracture	Pain	Acute deep infection	Septic loosening/ chronic infection	Implant fracture
Metal vs alumina	n.s.	n.s.	**1.53 (1.09 - 2.15)**	n.s.	n.s.	n.s.	n.s.	n.s.
CoCr vs alumina	0.65 (0.53 - 0.8)	n.s.	n.s.	n.s.	n.s.	**1.7 (1.01 - 2.86)**	**3.36 (2.16 - 5.22)**	0.34 (0.15 - 0.77)
Titanium vs alumina	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Zirconium vs alumina	n.s.	0.31 (0.18 - 0.54)	**2.85 (1.97 - 4.13)**	0.43 (0.23 - 0.82)	0.95 (0.94 - 0.97)	n.s.	n.s.	n.s.
Other vs alumina	n.s.	n.s.	n.s.	n.s.	**2.13 (1.48 - 3.07)**	0.58 (0.41 - 0.83)	0.52 (0.38 - 0.7)	0.47 (0.32 - 0.69)

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

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, 434 first revisions (290 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)

	Demographics of re-operated patients					Fixation of the revised implants		
Revision cause	**N**	**%**	**Age**	**% female**	**Average interval (years)**	**Cemented**	**Uncemented**	**Hybrid and reverse hybrid**
Aseptic loosening	39	8.9	67.7	56.4	1.7	6	28	5
Deep acute infection	50	11.4	71.3	44.0	0.4	7	34	9
Dislocation	123	28.1	70.2	56.1	1.0	30	84	9
Per-operative fracture	6	1.4	74.5	83.3	0.3	0	5	1
Implant fracture	15	3.4	60.4	26.7	2.7	3	12	0
Peri-prosthetic fracture	101	23.1	74.4	67.3	0.8	7	77	17
Septic Loosening - chronic infection	15	3.4	63.2	53.3	2.1	0	6	9
Wear and/or osteolysis	4	0.9	61.0	25.0	5.6	0	3	1
Pain	28	6.4	61.8	57.1	1.7	2	25	1
Calcifications	2	0.5	67.5	50.0	1.2	0	2	0
Other	51	11.7	66.7	56.9	1.5	3	47	1
Total	**434**	**99.3**	**69.5**	**56.9**	**1.2**	**58**	**323**	**53**

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

Year	Total THAs	Observed component years	Number revised	Rp100ocy	Exact 95% Confidence interval	
2008	3780	5066	26	**0.51**	0.35	0.75
2009	4870	9372	35	**0.37**	0.27	0.52
2010	6549	15035	57	**0.38**	0.29	0.49
2011	8364	22430	84	**0.37**	0.30	0.46
2012	11320	32223	127	**0.39**	0.33	0.47
2013	14349	44978	185	**0.41**	0.36	0.47
2014	18534	61229	221	**0.36**	0.32	0.41
2015	24174	82294	291	**0.35**	0.32	0.40
2016	29680	109117	369	**0.34**	0.31	0.37
2017	35085	141210	434	**0.31**	0.28	0.34

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

At the end of 2017, after 12 years of survey, the average follow-up of the 35 085 primary THAs registered is 4 years.

Table 21 presents the various Rp100ocy that can be calculated by creating different implant strata by type of implant and type of implant fixation. Overall so far, standard cups show better Rp100ocy than Dual Mobility cups and all-cemented fixation THAS show better Pp100ocy than all cementless one.

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

By type of implant	Total THAs	Observed component years	Number revised	Average FU (years)	Rp100ocy	Exact 95% Confidence interval	
Conventional THA	31681	131153	393	4.1	**0.30**	0.27	0.33
Bipolar	1516	4480	25	3	**0.56**	0.38	0.82
Full resurfacing	354	1946	0	5.5	**0.00**	0.00	0.20
By type of cup							
Standard cup	21917	105341	287	4.8	**0.27**	0.24	0.31
Dual mobility cup	11633	31371	122	2.7	**0.39**	0.33	0.46
By type of implant fixation							
Cemented	3524	21531	55	6.1	**0.26**	0.20	0.33
Uncemented	23948	87096	322	3.6	**0.37**	0.33	0.41
Hybrid (uncemented cup, stem cemented)	7104	30619	50	4.3	**0.16**	0.12	0.22
Reverse hybrid (cemented cup, stem uncemented)	426	1670	4	3.9	**0.24**	0.09	0.61

**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 2017 by type of the 5 most common bearing combinations in primary THA. Note that Metal-Metal bearings (either conventional THA with 28 or 32mm head size and resurfacing) shows a lower Rp100ocy despite the longer observation time.

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

By bearing type	Total THAs	Observed component years	Number revised	Average FU (years)	Rp100ocy	Exact 95% Confidence interval	
Alumina / alumina	10193	40465	131	4	**0.32**	0.27	0.38
Alumina / PE	8706	33121	102	3.8	**0.31**	0.25	0.37
Stainless steel / PE	7083	33396	92	4.7	**0.28**	0.22	0.34
Cobal-chrome / PE	7538	25598	97	3.4	**0.38**	0.31	0.46
Metal / metal	960	6610	6	6.9	**0.09**	0.04	0.20

The steering group of the SoFCOT THA register would like to extend its sincere gratitude to all French orthopedic surgeons who are collaborating or have collaborated regularly to keep this register up dated

To join the register, please find more information on the SoFCOT web page

http://www.sofcot.fr/10-registre-national/registre-national.asp

Heading : PROSTHESIS REGISTER
How to get your password >>>

You will receive a user name and a password

Conseil National Professionnel de la Société Française de Chirurgie Orthopédique
56, rue Boissonade
75014, Paris
Tél : +33 (0)1 43 22 47 54 - Fax : +33 (0)1 43 22 46 70 – Mail : webmaster@sofcot.fr - Site web : www.sofcot.fr