
Orthopride
Belgian Hip and Knee Arthroplasty Registry
Annual Report
2018

October 2019



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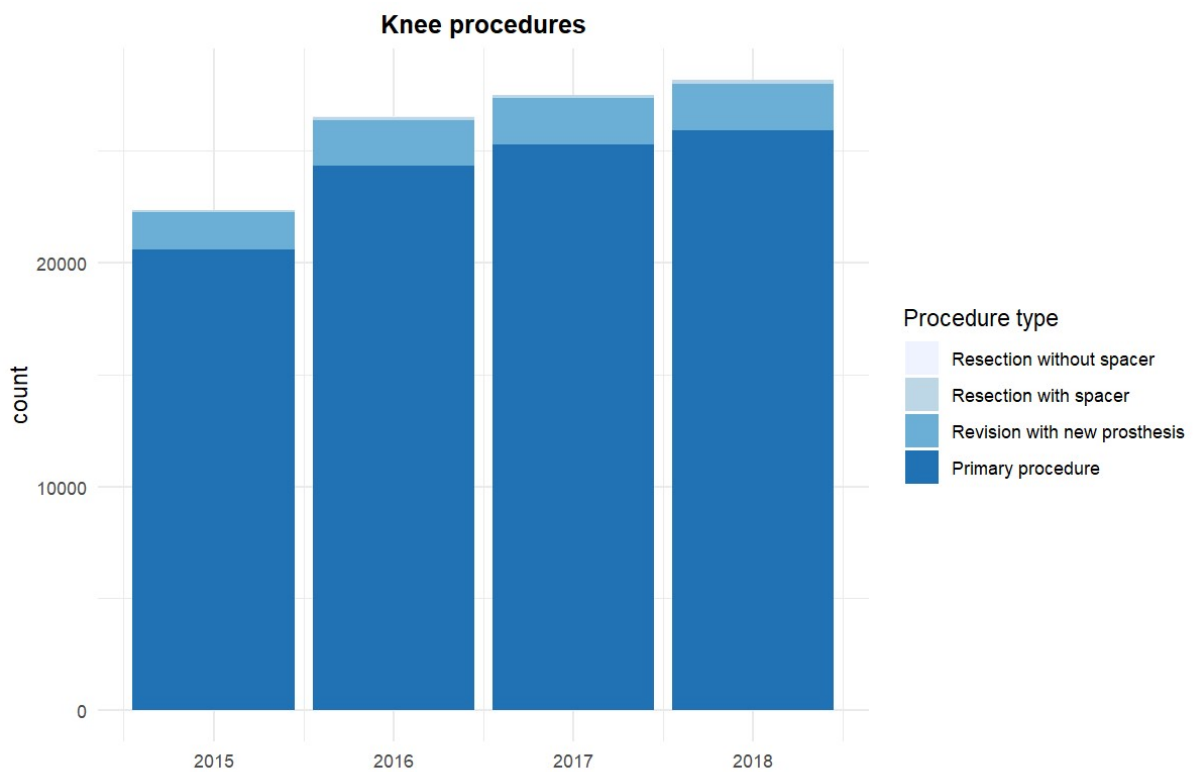
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1 GENERAL INTRODUCTION

Table 1.1 Total joint replacement procedures entered in Orthopride during 2018

	Knee procedures	Hip procedures
Primary procedure	25915	29464
Revision with new prosthesis	2079	2858
Resection with spacer	160	197
Resection without spacer	7	7
Total per joint	28161	32526

Figure 1.1 Total joint replacement procedures entered in Orthopride in 2015, 2016, 2017 and 2018



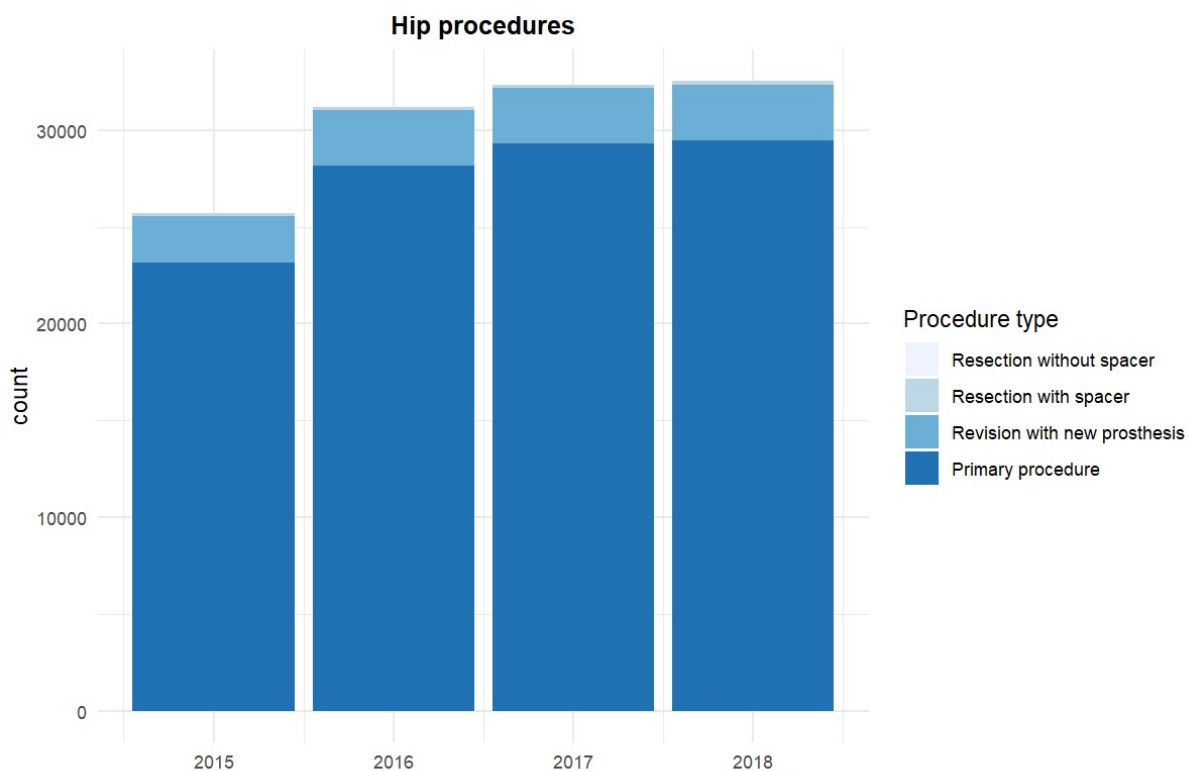


Table 1.2 Knee replacements according to patient's residence

	Frequency knee replacements	Percent on total amount	Procedures per 100.000 inhabitants	Percent of the inhabitants > 45 years*	Percent of the inhabitants >60 years*
Antwerp	4060	14,5%	220	46%	25%
Limburg	2542	9,1%	292	49%	26%
Liège	2409	8,6%	218	45%	24%
Namur	1121	4,0%	227	45%	24%
Luxembourg	650	2,3%	229	43%	22%
Hainaut	3193	11,4%	238	45%	24%
West-Flanders	4467	15,9%	375	51%	29%
East-Flanders	4313	15,4%	287	47%	25%
Flemish Brabant	2378	8,5%	209	47%	25%
Walloon Brabant	865	3,1%	216	46%	24%
Brussels	1579	5,6%	132	36%	18%
Other Country	500	1,8%	NA		
Total [Missing]	28077 [84]	100%	NA		

* Based on data provided on <https://bestat.economie.fgov.be>

Table 1.3 Knee revision burden and patient's age according to patient's residence

	Primary procedures			Revisions		
	Frequency	Row Percent	Age (mean \pm SD)	Frequency	Row Percent	Age (mean \pm SD)
Antwerp	3756	92,5	67,8 +/- 9,8	304	7,5	66,3 +/- 11,6
Limburg	2359	92,8	67,6 +/- 9,9	183	7,2	66,8 +/- 11,2
Liège	2213	91,9	67,4 +/- 9,9	196	8,1	65,6 +/- 11,9
Namur	1023	91,3	67,7 +/- 9,7	98	8,7	66,0 +/- 11,0
Luxembourg	594	91,4	67,2 +/- 10,0	56	8,6	66,2 +/- 11,5
Hainaut	2952	92,5	67,2 +/- 9,4	241	7,5	65,5 +/- 12,0
West-Flanders	4119	92,2	67,9 +/- 10,4	348	7,8	66,7 +/- 11,5
East-Flanders	3886	90,1	66,6 +/- 10,7	427	9,9	63,9 +/- 11,1
Flemish Brabant	2237	94,1	68,5 +/- 9,8	141	5,9	68,7 +/- 10, 1
Walloon Brabant	801	92,6	68,8 +/- 9,6	64	7,4	68,3 +/- 11,6
Brussels	1442	91,3	68,5 +/- 10,0	137	8,7	68,0 +/- 11,2
Other Country	460	92,0	63,6 +/- 14,6	40	8,0	66,5 +/- 8,1
Total	25842	92,0	67,6 +/- 10,0	2235	8,0	66,1 +/- 11,4

Table 1.4 Hip replacements according to patient's residence

	Frequency hip replacements	Percent on total amount	Procedures per 100.000 inhabitants	Percent of the inhabitants > 45 years*	Percent of the inhabitants >60 years*
Antwerp	5135	15,8%	278	46%	25%
Limburg	2630	8,1%	302	49%	26%
Liège	2942	9,1%	266	45%	24%
Namur	1315	4,1%	267	45%	24%
Luxembourg	819	2,5%	289	43%	22%
Hainaut	3660	11,3%	273	45%	24%
West-Flanders	4898	15,1%	411	51%	29%
East-Flanders	4461	13,8%	296	47%	25%
Flemish Brabant	2983	9,2%	262	47%	25%
Walloon Brabant	1061	3,3%	265	46%	24%
Brussels	1854	5,7%	155	36%	18%
Other Country	663	2,0%	NA		
Total [Missing]	32421 [105]	100%	NA		

* Based on data provided on <https://bestat.economie.fgov.be>

Table 1.5 Hip revision burden and patient's age according to patient's residence

	Primary procedures			Revisions		
	Frequency	Row Percent	Age (mean \pm SD)	Frequency	Row Percent	Age (mean \pm SD)
Antwerp	4700	91,5%	70,6 +/- 12,8	435	8,5%	72,2 +/- 11,8
Limburg	2443	92,9%	68,9 +/- 13,0	187	7,1%	71,4 +/- 15,1
Liège	2661	90,4%	70,1 +/- 13,1	281	9,6%	70,5 +/- 12,9
Namur	1159	88,1%	69,7 +/- 12,7	156	11,9%	70,8 +/- 12,2
Luxembourg	699	85,3%	68,4 +/- 13,6	120	14,7%	67,4 +/- 13,9
Hainaut	3298	90,1%	69,3 +/- 13,2	362	9,9%	70,3 +/- 12,7
West-Flanders	4417	90,2%	70,2 +/- 12,7	481	9,8%	70,4 +/- 13,0
East-Flanders	4047	90,7%	70,2 +/- 13,2	414	9,3%	71,6 +/- 12,5
Flemish Brabant	2724	91,3%	71,2 +/- 12,7	259	8,7%	73,7 +/- 12,1
Walloon Brabant	971	91,5%	70,3 +/- 12,5	90	8,5%	73,5 +/- 12,7
Brussels	1646	88,8%	72,0 +/- 13,9	208	11,2%	73,7 +/- 13,6
Other Country	601	90,6%	64,5 +/- 14,6	62	9,4%	68,3 +/- 10,3
Total	29464	90,6%	70,1 +/- 13,1	3062	9,4%	71,4 +/- 12,8

2 KNEE REPLACEMENT

2.1 PRIMARY KNEE REPLACEMENT

2.1.1 Demographics

Table 2.1 Age, gender and indications for primary knee replacement patients

N=25915		
	Mean	SD
Age (yrs)	67,6	10,2
	Count	N %
Age categories		
<45	357	1,4%
45-59	5354	20,7%
60-69	8464	32,7%
70-79	8648	33,4%
>=80	3092	11,9%
Gender		
Female	15874	61,3%
Male	10041	38,7%
Indication		
Osteoarthritis	24567	94,8%
Avascular necrosis	342	1,3%
Fracture	63	0,2%
Inflammatory arthropathy	169	0,7%
Post trauma	507	2,0%
Previous infection	21	0,1%
Indication other	246	0,9%

Figure 2.1 Age distribution by gender for primary knee replacement patients

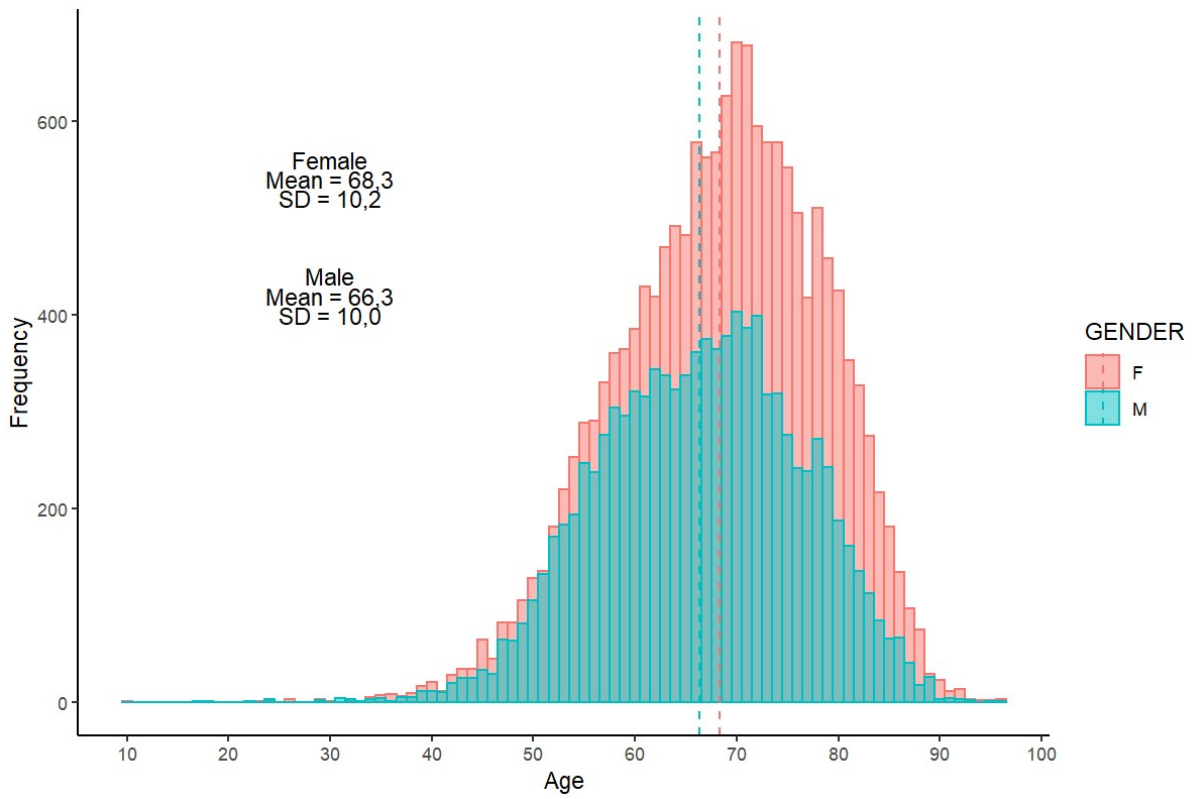


Figure 2.2 Age distribution by indication for primary knee replacement patients

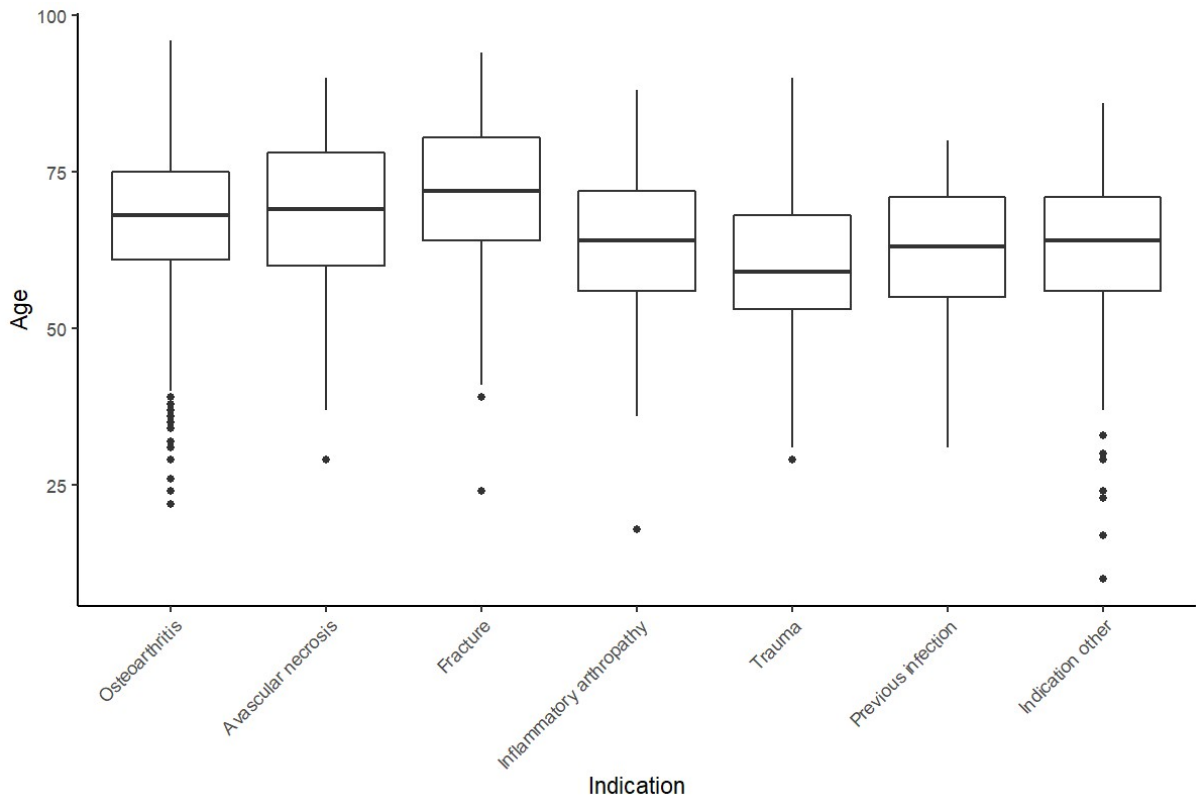


Table 2.2 Indications for primary knee replacements based on gender

	Male	Female
	N= 10041	N= 15874
	N (%)	N (%)
Osteoarthritis	9408 (93,7)	15159 (95,5)
Post trauma	297 (3,0)	210 (1,3)
Avascular necrosis	130 (1,3)	212 (1,3)
Fracture	18 (0,2)	45 (0,3)
Inflammatory arthropathy	51 (0,5)	118 (0,7)
Previous infection	13 (0,1)	8 (0,1)
Indication other	124 (1,2)	122 (0,8)

Table 2.3 Medical history of primary knee replacement patients

	Count	Percentage of total
No pre-operative surgeries	18388	71,0%
Pre-op Osteosynthesis of the tibia	260	1,0%
Pre-op Osteosynthesis of the femur	164	0,6%
Pre-op Osteotomy	351	1,4%
Pre-op Synovectomy	97	0,4%
Pre-op Meniscectomy	5666	21,9%
Pre-op ACL reconstruction	454	1,8%
Pre-op Other	1191	4,6%

Table 2.4 Pre-operative alignment of primary knee replacement patients

	Count	Percentage of total
Normal	7410	28,6%
Valgus	5186	20,0%
Varus	13319	51,4%

2.1.2 Surgical technique and implant characteristics

Table 2.5 Numbers and percentages of primary knee replacement types

	Number	Percentage of total
Total knee replacement	22027	85,0%
Unicompartmental replacement	3025	11,7%
Bicompartmental replacement	389	1,5%
Patellofemoral replacement	460	1,8%
Partial resurfacing femoral condyle	14	0,1%
Total	25915	100%

Figure 2.3 Distribution of primary total knee prosthesis types

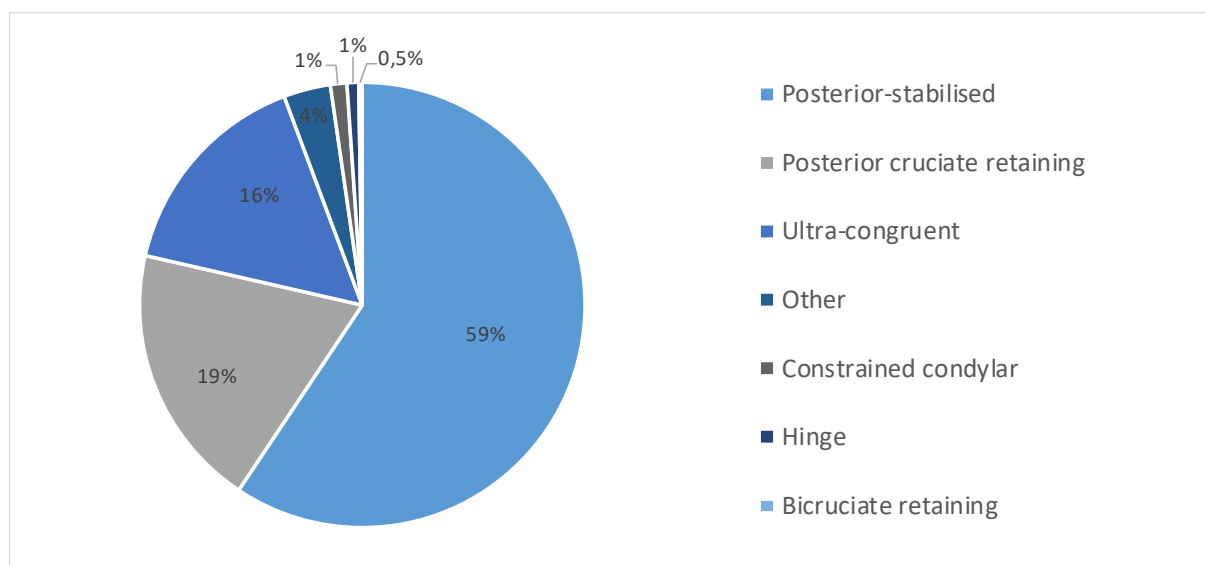


Table 2.6 Age and gender of primary knee replacement patients by type of replacement

	Total knee replacement	Unicompartmental replacement	Bicompartmental replacement	Patellofemoral replacement	Partial Resurfacing femoral condyle
	N=22027	N=3025	N=389	N=460	N=14
Mean age (years) (SD)	68,3 (9,8)	64,1 (10,3)	67,8 (9,6)	53,8 (11,1)	50,1 (7,6)
Age groups	% (N)	% (N)	% (N)	% (N)	% (N)
<45	0,9 (188)	2,2 (68)	1,3 (5)	19,8 (91)	35,7 (5)
45-59	18,4 (4051)	32,6 (987)	18,0 (70)	51,7 (238)	57,1 (8)
60-69	32,8 (7225)	33,5 (1014)	34,4 (134)	19,6 (90)	7,1 (1)
70-79	35,1 (7735)	24,7 (746)	35,2 (137)	6,5 (30)	0 (0)
>=80	12,8 (2828)	6,9 (210)	11,1 (43)	2,4 (11)	0 (0)
Gender	% (N)	% (N)	% (N)	% (N)	% (N)
Female	62,8 (13828)	47,7 (1444)	58,4 (227)	79,8 (367)	57,1 (8)
Male	37,2 (8199)	52,3 (1581)	41,6 (162)	20,2 (93)	42,9 (6)

Figure 2.4 Age distribution by implant type for primary knee replacement patients

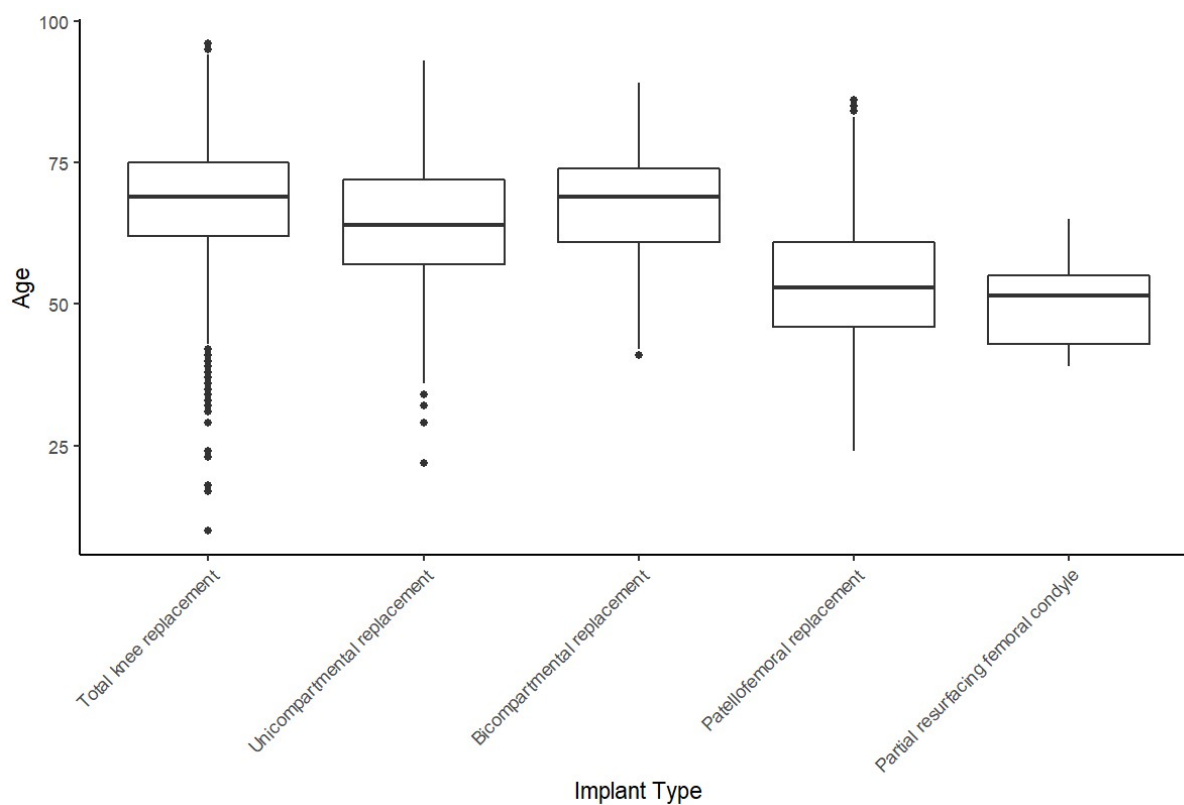


Table 2.7 Numbers and percentages of primary knee prosthesis fixation by type of prosthesis

	Total knee replacement	Unicompartmental replacement	Bicompartmental replacement	Patellofemoral replacement
	N=22027	N=3025	N=389	N=460
	% (N)	% (N)	% (N)	% (N)
Cemented	91,1 (20065)	66,6 (2014)	45,5 (177)	94,8 (436)
Revers hybrid	0,1 (25)	1,2 (35)	0,5 (2)	0 (0)
Hybrid	3,9 (870)	3,7 (111)	5,9 (23)	0 (0)
Uncemented	4,8 (1067)	28,6 (865)	48,1 (187)	5,2 (24)

Figure 2.5 Method of fixation by primary knee prosthesis type

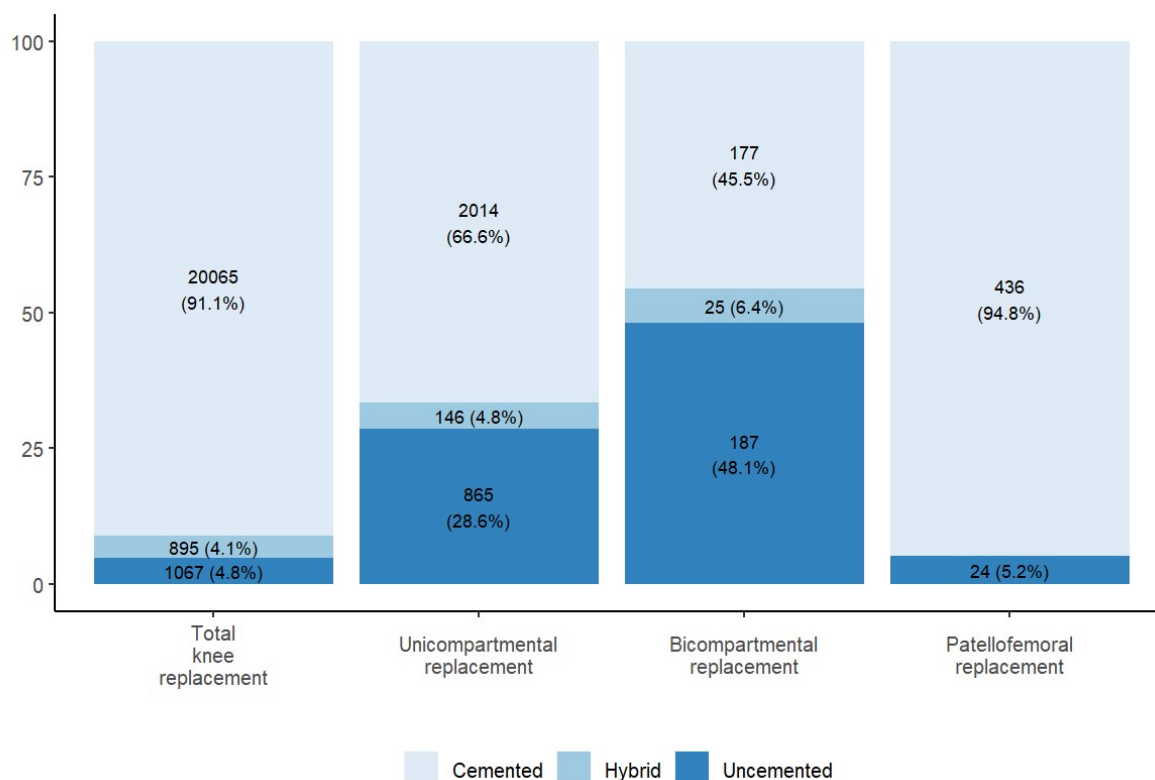
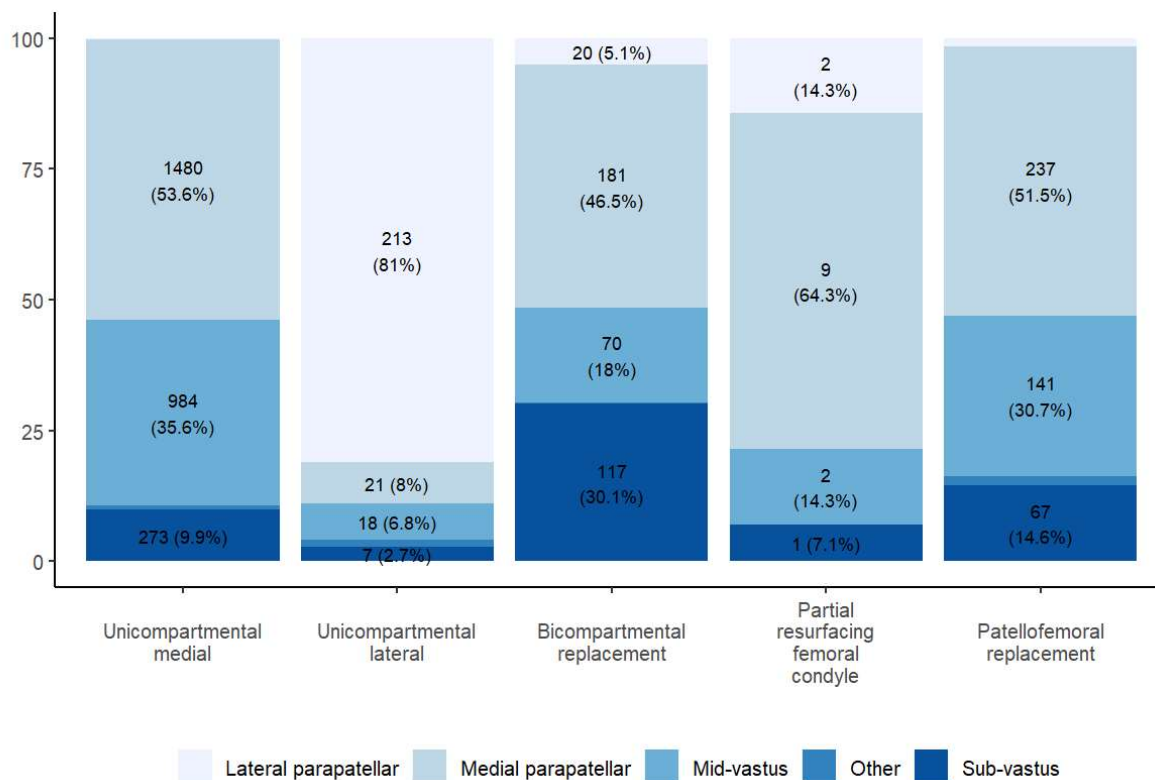
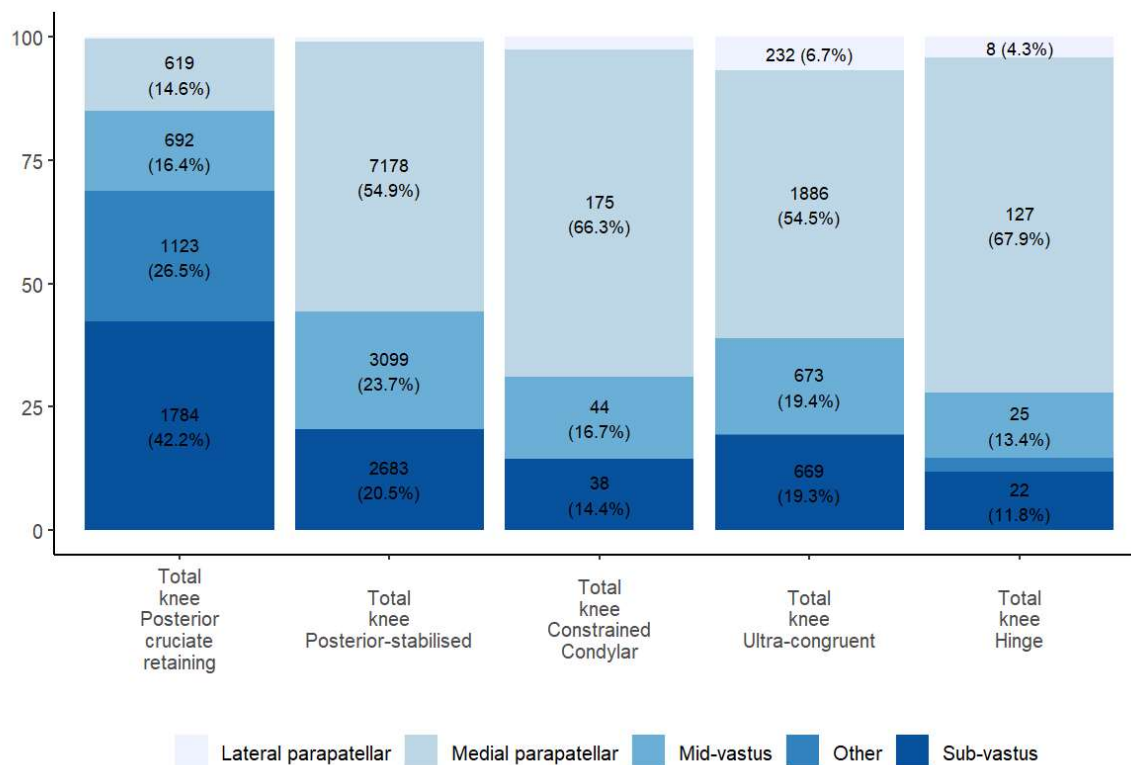


Figure 2.6 Approach used during primary partial knee replacements



Note: For readability of the figure, labels with percentages smaller than 2% are not displayed.

Figure 2.7 Approach used during primary total knee replacements



Note: For readability of the figure, labels with percentages smaller than 2% are not displayed.

Table 2.8 Usage of computer assisted navigation and custom made guides

	Computer assisted navigation	Custom made guides
Count (% of total procedures)	784 (3,0%)	1295 (5,0%)
Amount of hospitals (% of all hospitals)	41/102 (40,2%)	37/102 (36,3%)

Figure 2.8 Usage of computer assisted navigation and custom made guides according to implant type

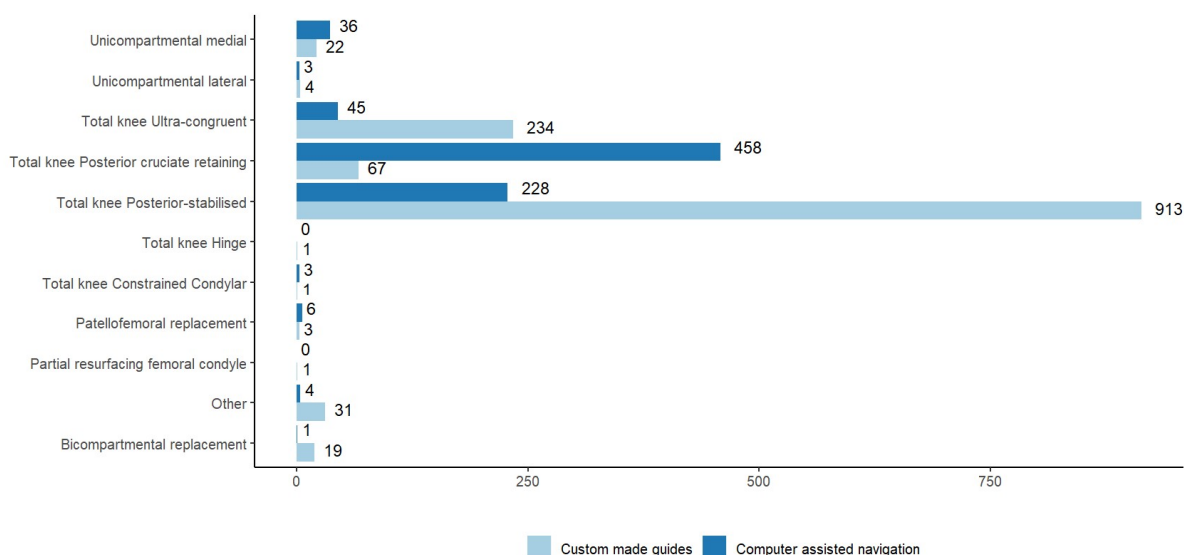
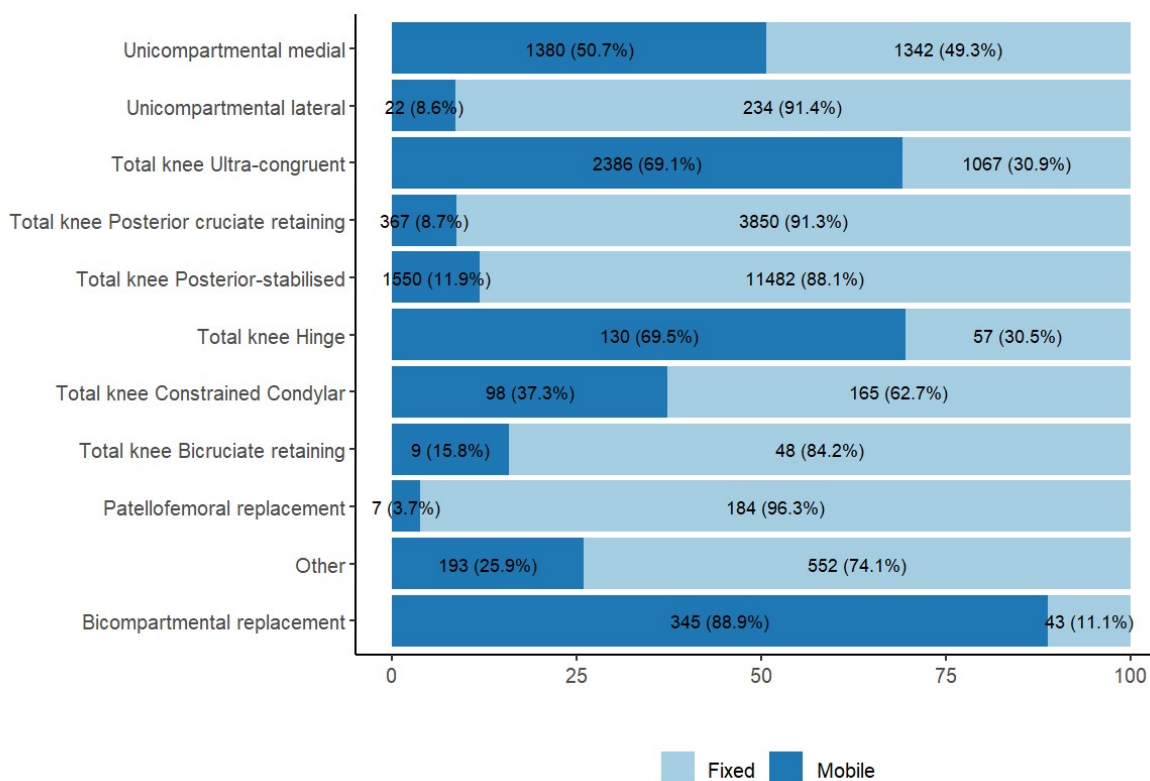


Figure 2.9 Insert type according to primary knee replacement type



2.2 REVISIONS AFTER PRIMARY KNEE REPLACEMENT

2.2.1 Demographics

Table 2.9 Age, gender and indications for knee revision procedures

N=2246		
	Mean	SD
Age (yrs)	66,1	11,4
	Count	N %
Age categories		
<45	67	3,0
45-59	592	26,4
60-69	664	29,6
70-79	644	28,7
>=80	279	12,4
Gender		
Female	1423	63,4
Male	823	36,6
Indication		
Aseptic loosening	622	27,7
Wear of polyethylene component	110	4,9
Instability	432	19,2
Infection	460	20,5
Periprosthetic fracture	129	5,7
Pain	453	20,2
Stiffness	105	4,7
Malalignment	132	5,9
Implant fracture	26	1,2
Progressive osteoarthritis in non-replaced component	265	11,8
Indication other	217	9,7

Figure 2.10 Knee revision burden according to age category

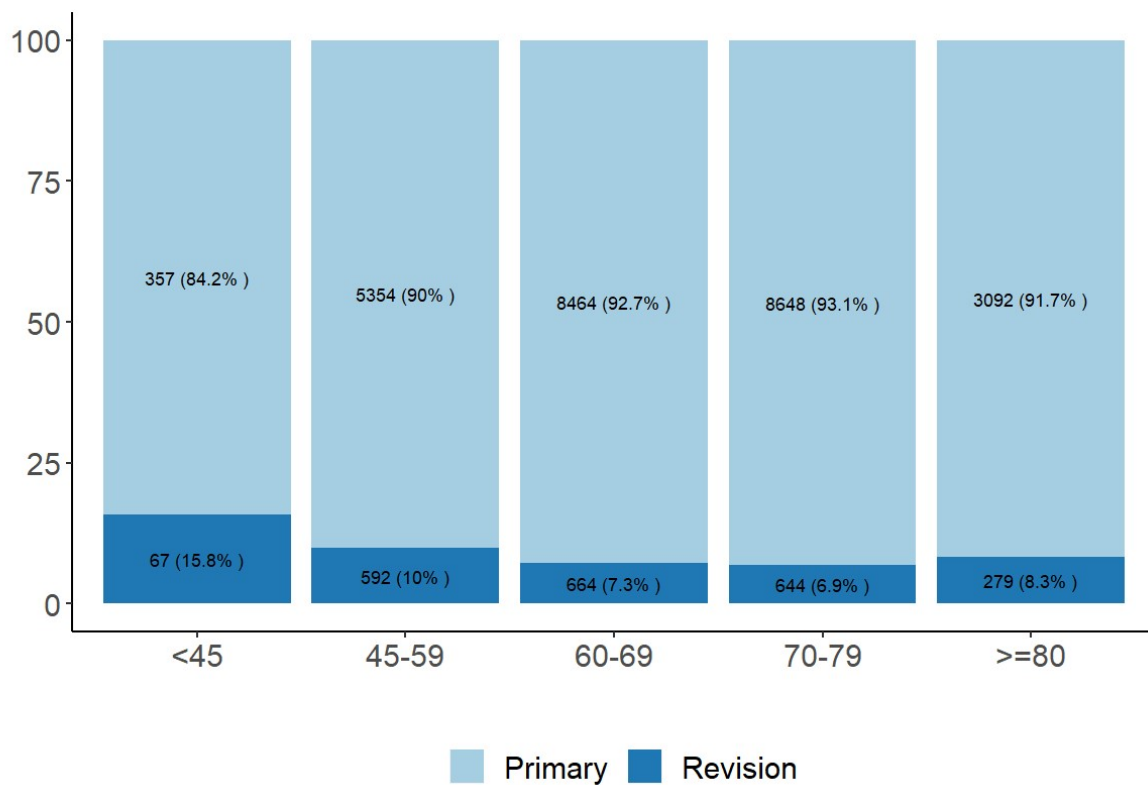


Figure 2.11 Age and gender by number of knee revision procedures

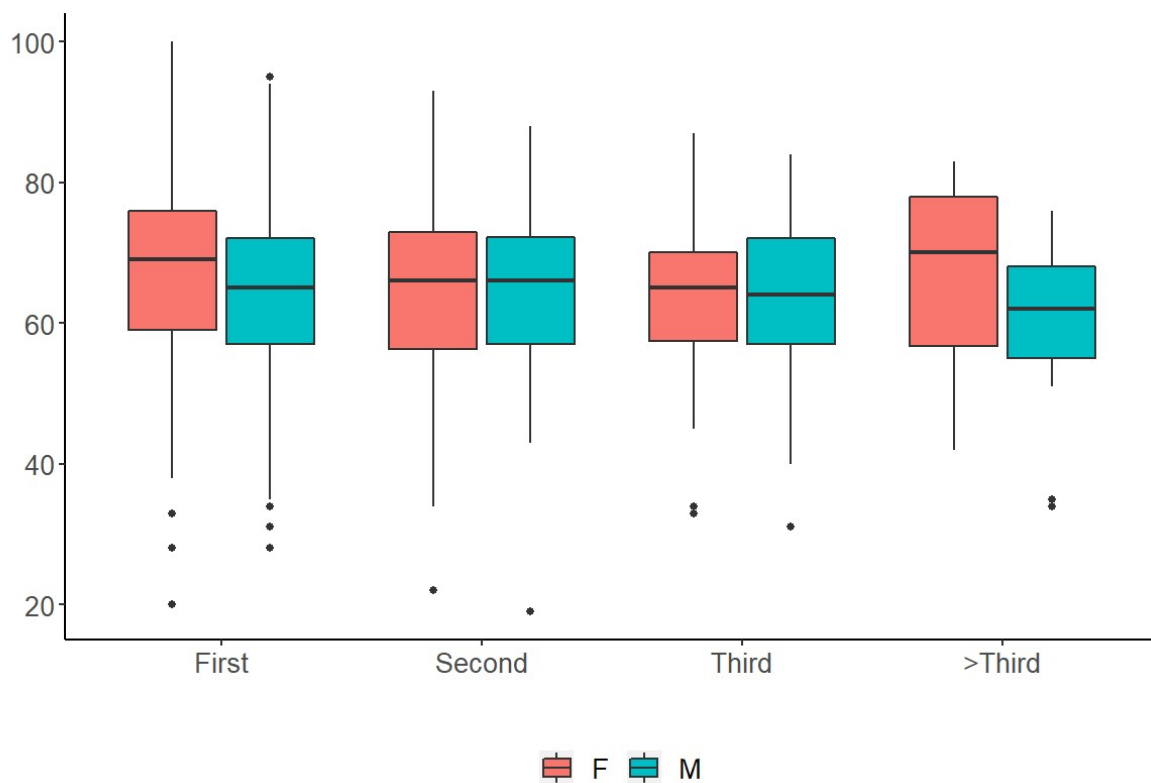
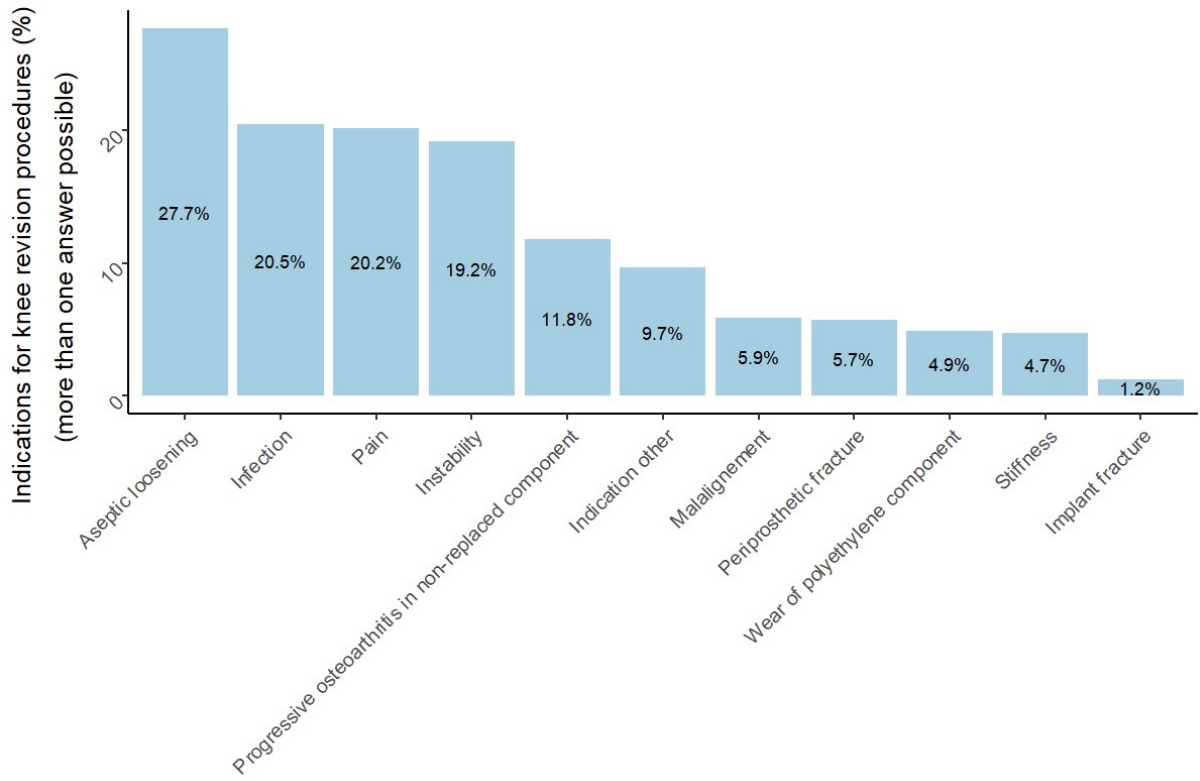


Figure 2.12 Indications for knee revision procedures



2.2.2 Surgical technique and implant characteristics

Table 2.10 Components removed during knee revision procedures

	Number	Proportion (%) ¹
Tibia	1358	65,3
Femur	1329	63,9
Patella	889	42,8
Insert	1805	86,8
Total number of procedures	2079	

¹More than one component can be exchanged during a revision procedure.

Table 2.11 Combinations of removed components during knee revision procedures

	Number	Percentage of total (%)
All components	1255	60,4
Tibia and Insert	90	4,3
Patella and insert	62	3,0
Femur and insert	41	2,0
Insert only	338	16,3
Patella only	247	11,9
Femur only	15	0,7
Other combination	31	1,5
Total number of procedures	2079	100,0

Table 2.12 Numbers and percentages of implanted knee types during knee revision procedures

	Number	Percentage of total (%)
Total knee replacement	1623	93,2
Unicompartmental	8	0,5
Bicompartmental replacement	45	2,6
Patellofemoral replacement	65	3,7
Total number of procedures	1741	100,0

Figure 2.13 Distribution of implanted total knee prosthesis types during revision procedures

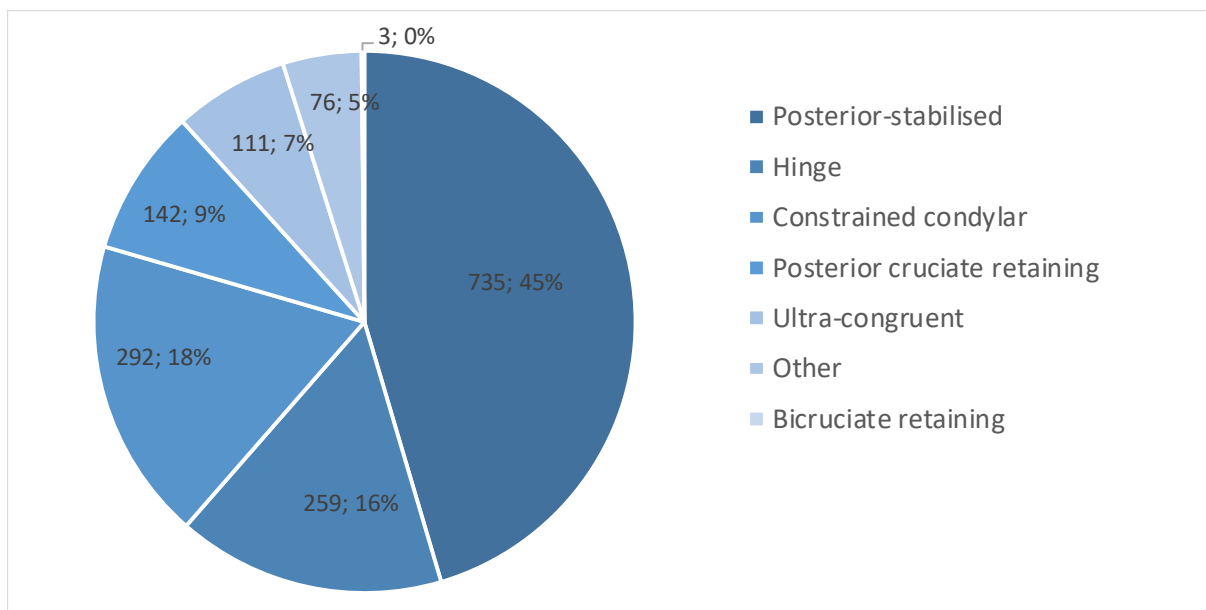
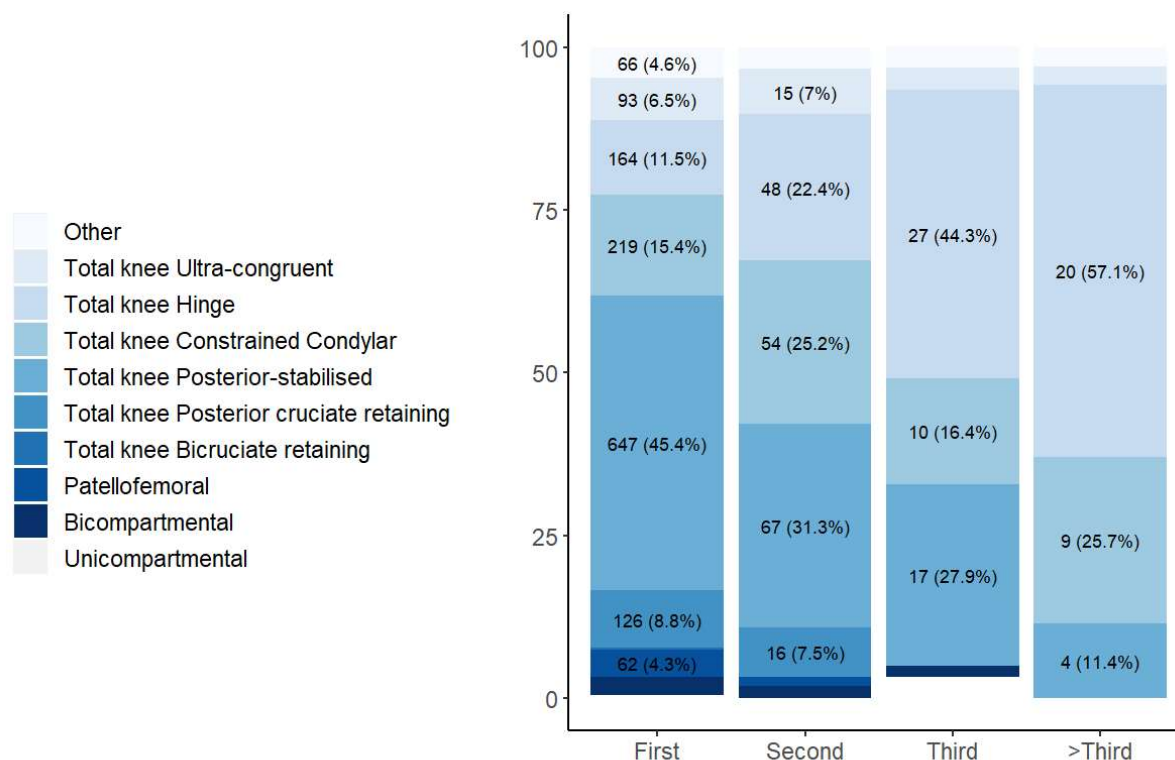


Figure 2.14 Type of implanted knee prosthesis during revision procedures according to the number of revisions



	1st revision	2nd revision	3rd revision	>3rd revision
	N (%)	N (%)	N (%)	N (%)
Total knee Other	66 (4,6)	7 (3,3)	2 (3,3)	1 (2,9)
Total knee Ultra-congruent	93 (6,5)	15 (6,5)	2 (3,3)	1 (2,9)
Total knee Hinge	164 (11,7)	48 (22,4)	27 (44,3)	20 (57,1)
Total knee Constrained condylar	219 (15,0)	54 (25,2)	10 (16,4)	9 (25,7)
Total knee Posterior-stabilised	647 (45,2)	67 (31,3)	17 (27,9)	4 (11,4)
Total knee Posterior cruciate retaining	126 (8,8)	16 (7,5)	0 (0)	0 (0)
Total knee bicruciate retaining	3 (0,2)	0 (0)	0 (0)	0 (0)
Patellofemoral replacement	62 (4,3)	3 (1,4)	0 (0)	0 (0)
Bicompartamental replacement	40 (2,8)	4 (1,9)	1 (1,6)	0 (0)
Unicompartamental	6 (0,4)	0 (0)	2 (3,3)	0 (0)
Total amount	1431 (100)	214 (100)	61 (100)	35 (100)

Figure 2.15 Approach during knee revision procedures

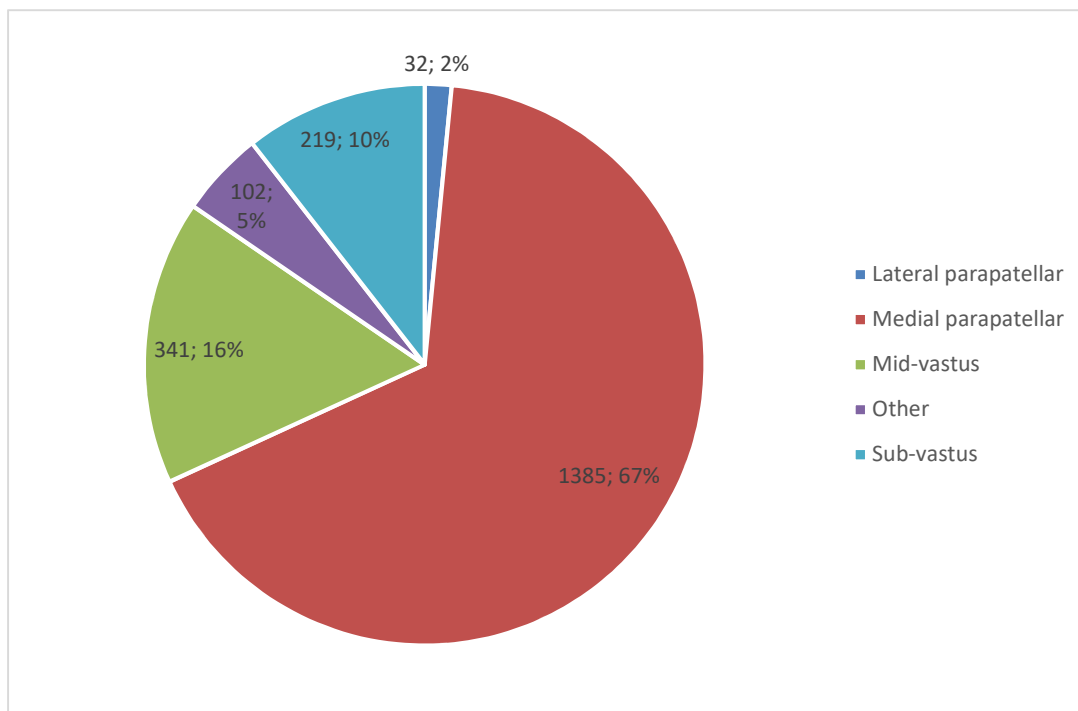


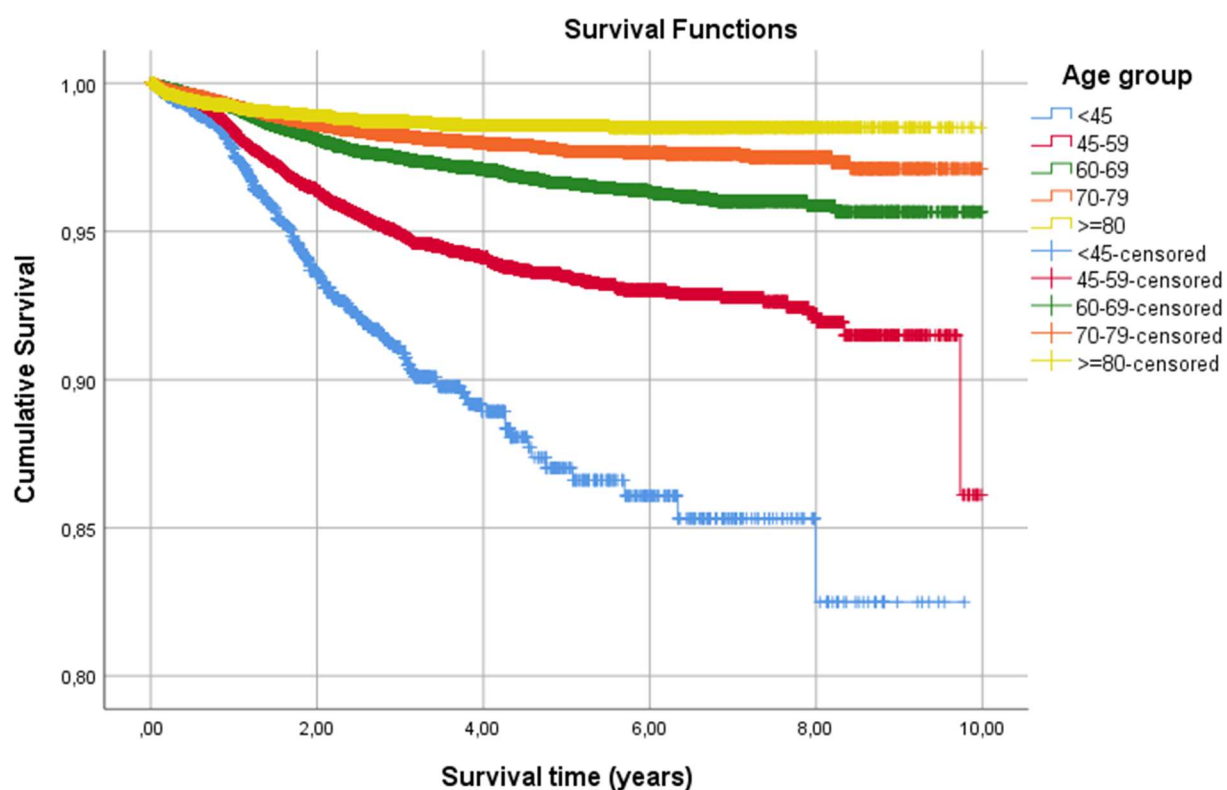
Table 2.13 Numbers and percentages of knee revisions by fixation

	Number	Percentage of total
Cemented	1349	96,1%
Reverse hybrid	5	0,4%
Hybrid	29	2,1%
Uncemented	21	1,5%
Total number of procedures	1404	100,0%

Note: Only replacements during which the femoral and/or tibial component were replaced were taken into account.

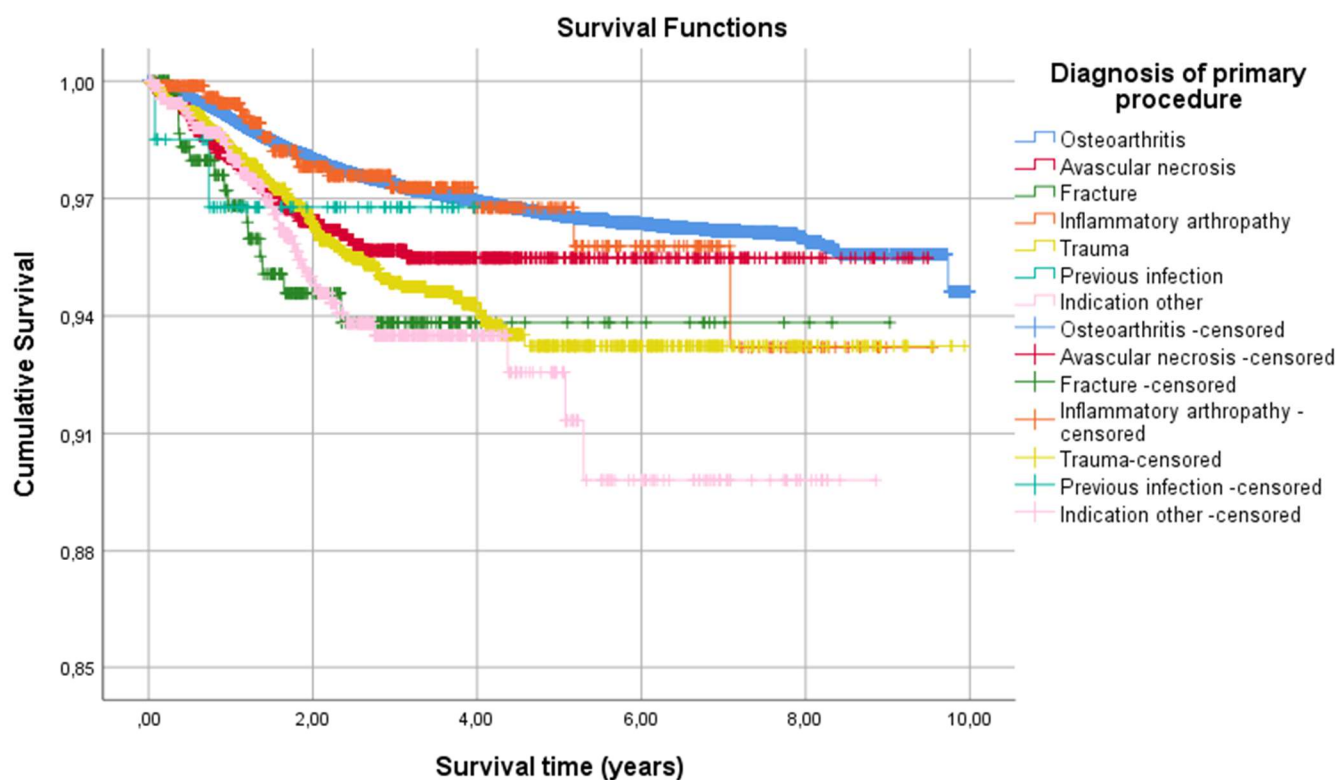
2.2.3 Implant survival after primary procedures

Figure 2.16 Kaplan-Meier curve for age at primary knee replacement



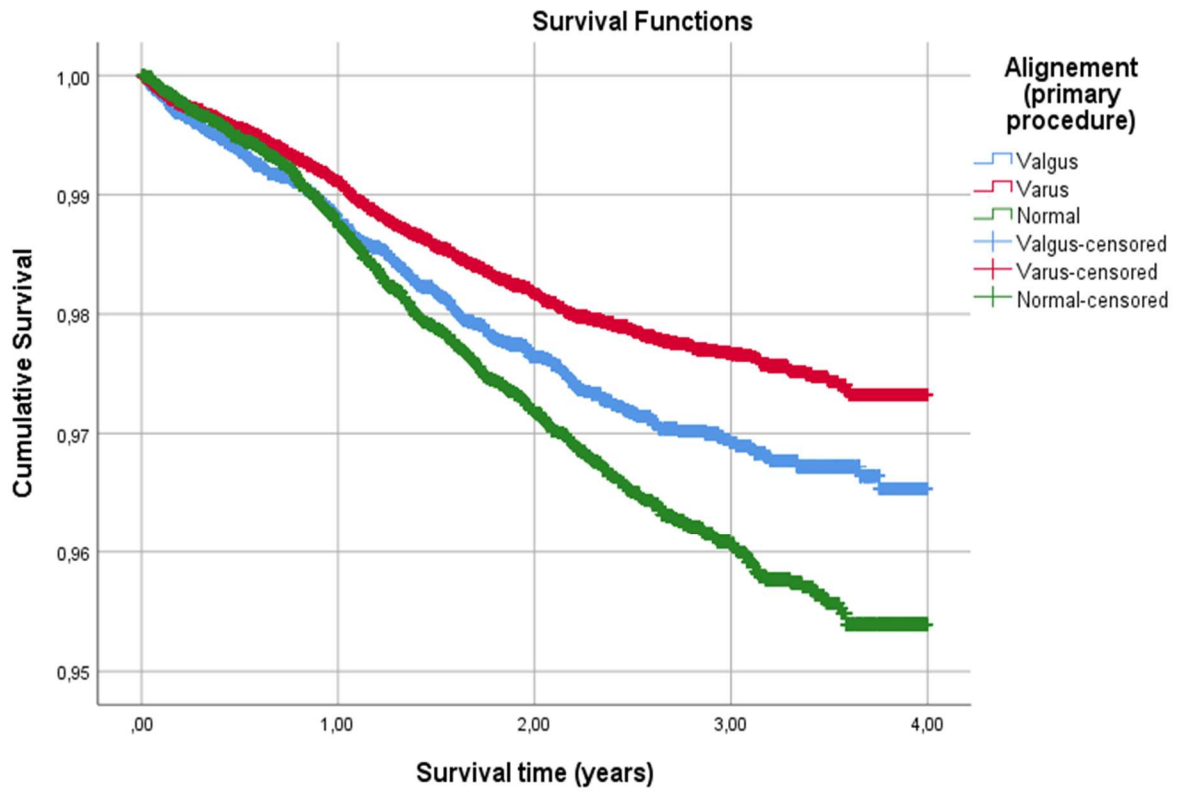
Number of events/Number at risk										
	0	1	2	3	4	5	6	7	8	9
<45	40/1945	58/1561	26/1129	14/733	6/374	2/217	1/140	1/69	0/29	0/6
45-59	345/24548	340/18854	171/13438	58/8541	24/4652	11/2445	3/1554	3/823	2/330	1/74
60-69	295/39918	295/31145	121/22665	48/14776	29/8207	11/4504	8/2870	1/1501	1/593	0/147
70-79	281/40845	178/31841	76/23160	29/15291	17/8761	3/5023	1/3293	2/1786	2/719	0/189
>=80	106/14485	30/11169	14/8203	7/5374	0/3126	1/1737	0/1091	0/549	0/195	0/47

Figure 2.17 Kaplan-Meier curve for indication at primary knee replacement



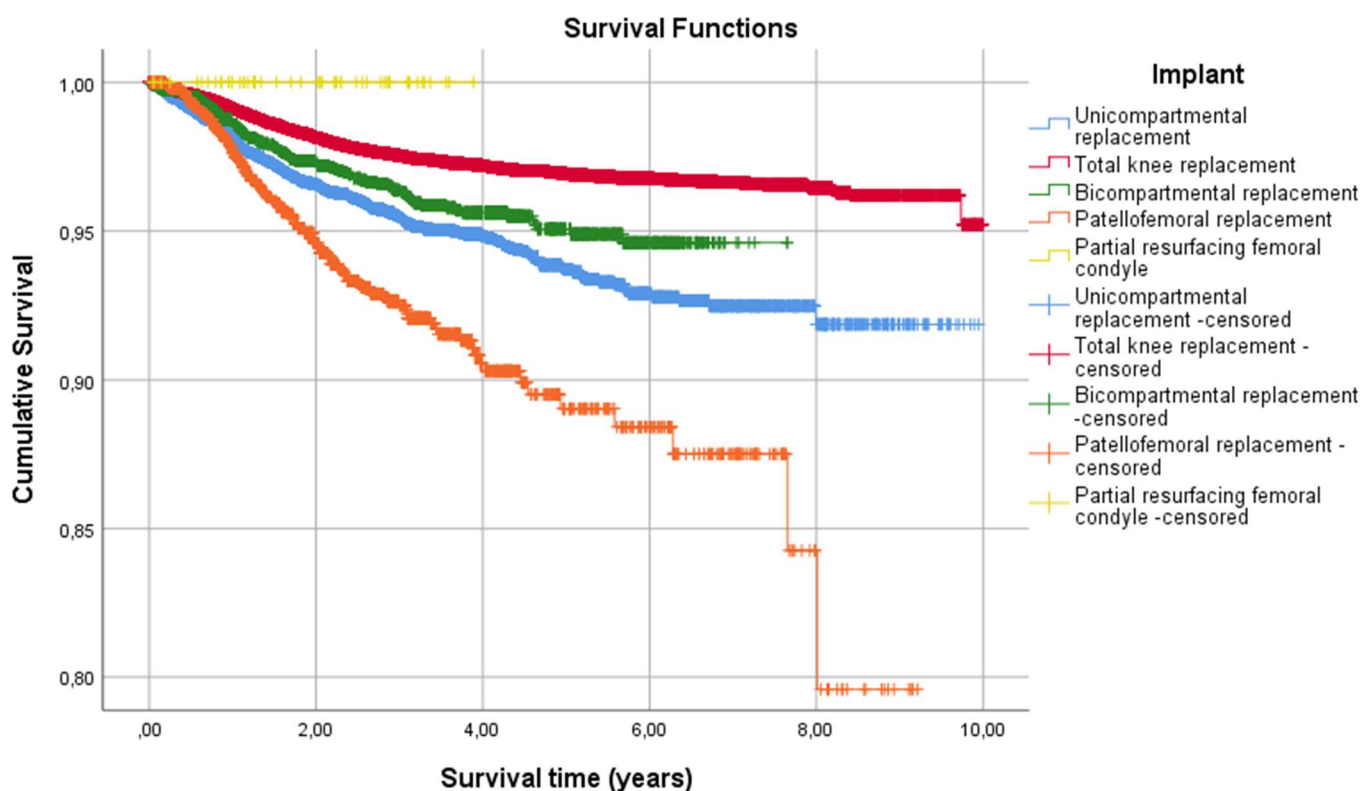
Number of events/Number at risk										
	0	1	2	3	4	5	6	7	8	9
Osteo-arthritits	970/1154 99	817/8978 6	375/6522 6	149/4261 1	71/24009	24/1332 1	13/85 66	6/454 3	5/178 1	1/440
Avascular necrosis	29/1627	18/1253	6/893	1/544	0/267	0/153	0/102	0/58	0/23	0/9
Fracture	9/325	5/244	1/155	0/73	0/21	0/17	0/11	0/5	0/3	0/1
Inflammatory arthropathy	4/796	9/623	2/459	1/313	0/182	1/108	0/71	1/38	0/16	0/1
Post trauma	38/2543	34/1991	19/1419	5/922	4/528	0/271	0/177	0/85	0/38	0/12
Previous infection	2/70	0/49	0/29	0/17	0/0	0/0	0/0	0/0	0/0	0/0
Other indication	15/919	17/650	6/434	0/250	1/125	2/78	0/47	0/22	0/9	0/0

Figure 2.18 Kaplan-Meier curve for alignment at primary knee replacement for patients with osteoarthritis as indication for knee replacement



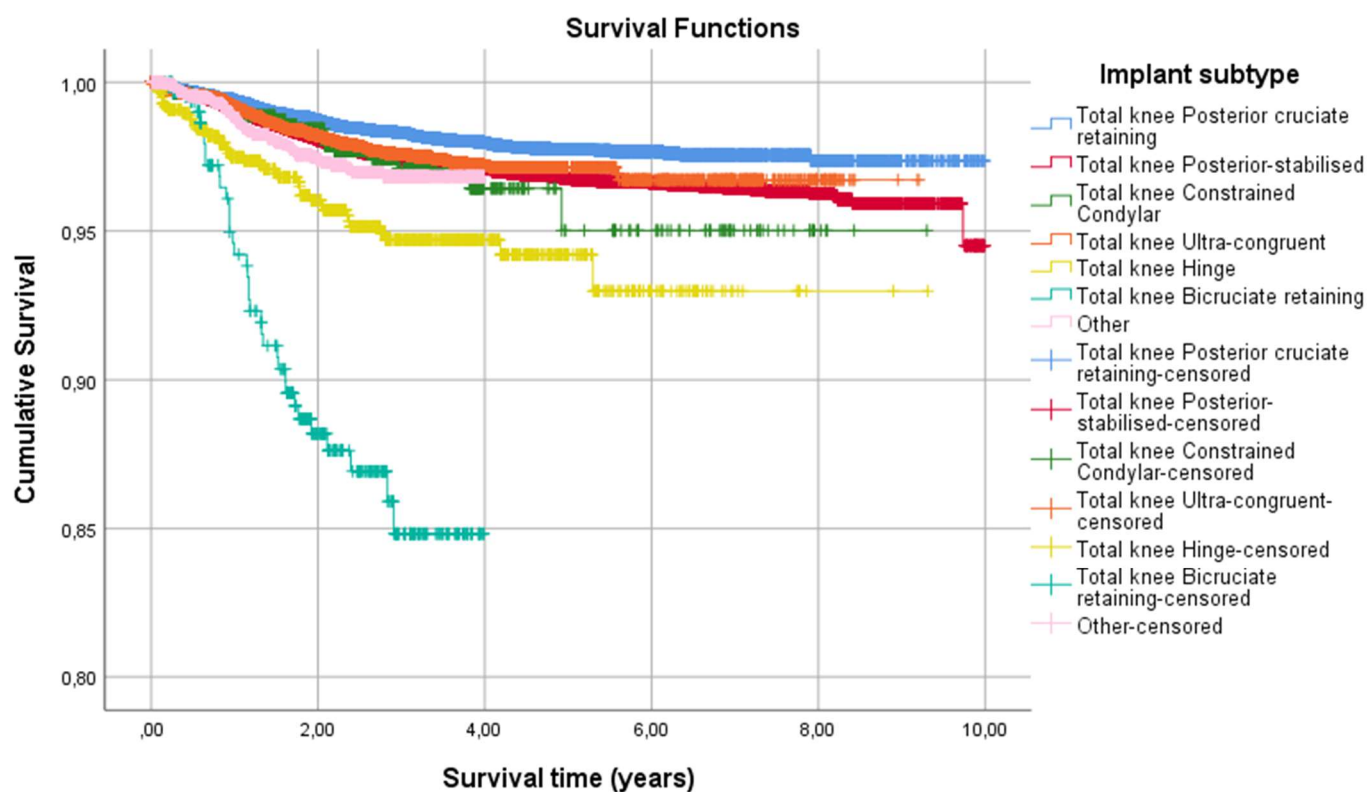
Number of events/Number at risk				
	0	1	2	3
Valgus	184/17827	127/12773	46/8059	8/3662
Varus	360/46863	267/33631	85/21127	20/9509
Normal	279/26243	250/18963	103/11794	25/5335

Figure 2.19 Kaplan-Meier curve for type of implant at primary knee replacement



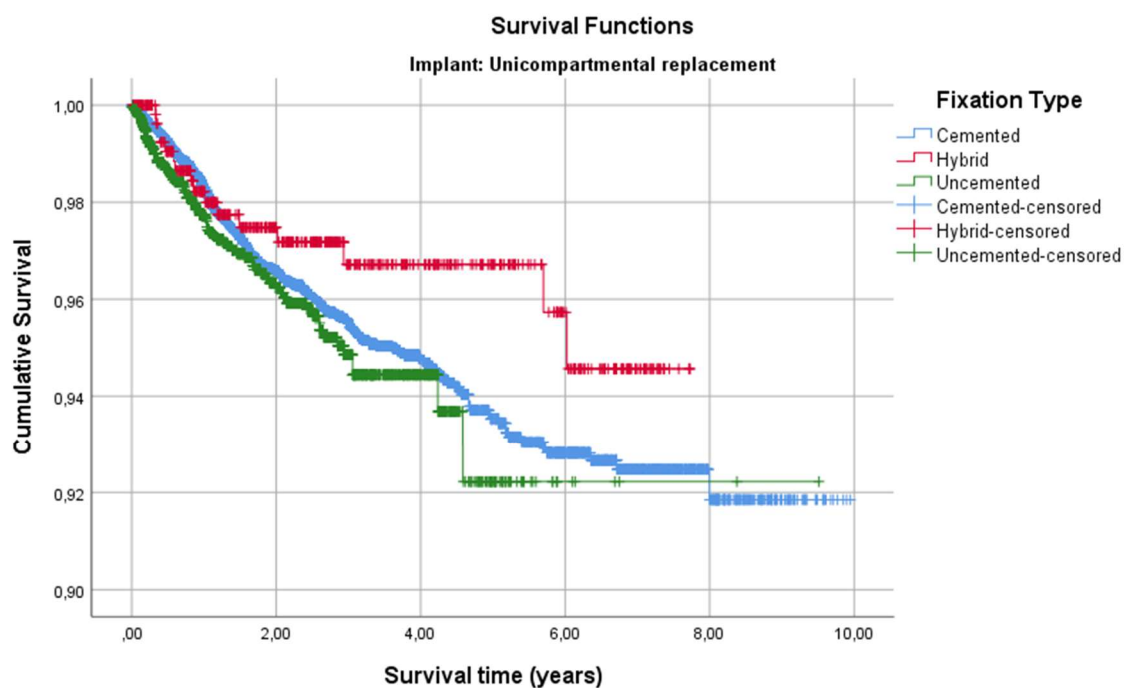
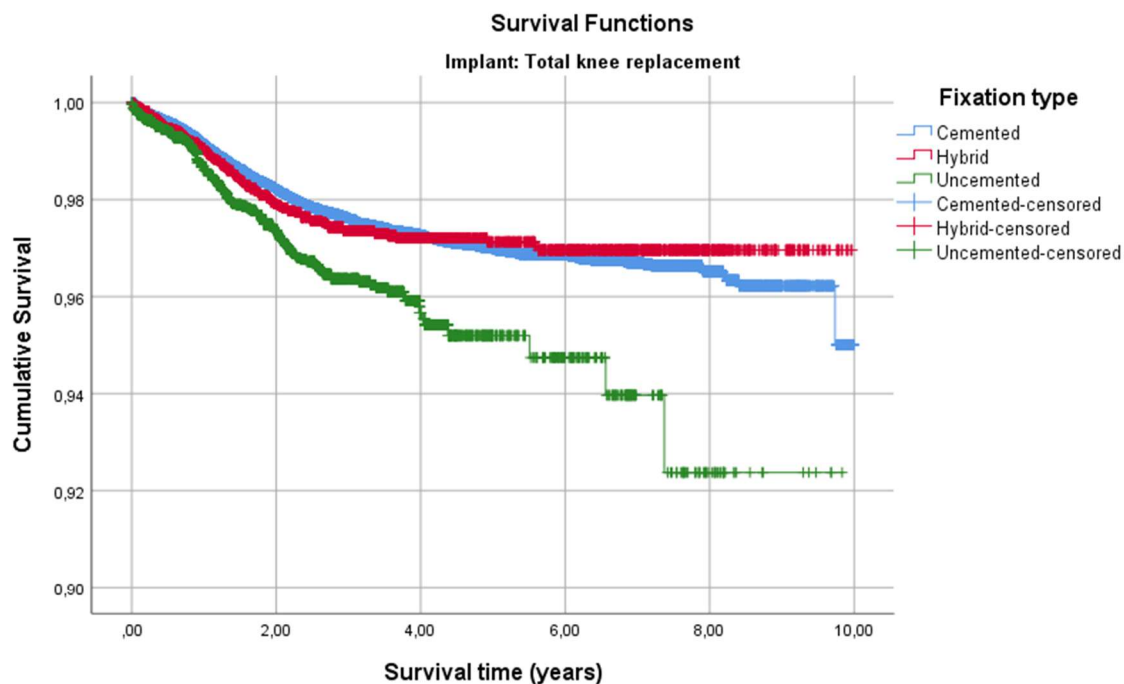
	Number of events/Number at risk									
	0	1	2	3	4	5	6	7	8	9
Unicompartamental replacement	170/10893	111/7724	49/5333	20/3444	19/2073	9/1238	3/817	1/421	0/148	0/34
Total knee replacement	819/105313	710/82240	316/59580	107/38405	44/20844	16/11442	9/7552	5/4094	3/1640	1/422
Bicompartmental replacement	31/2532	27/2112	15/1721	10/1359	4/1046	2/566	0/189	0/6	0/0	0/0
Patellofemoral replacement	41/2125	45/1624	21/1106	10/672	4/338	1/182	1/120	1/64	1/18	0/4
Partial resurfacing femoral condyle	0/55	0/41	0/27	0/10	0/0	0/0	0/0	0/0	0/0	0/0

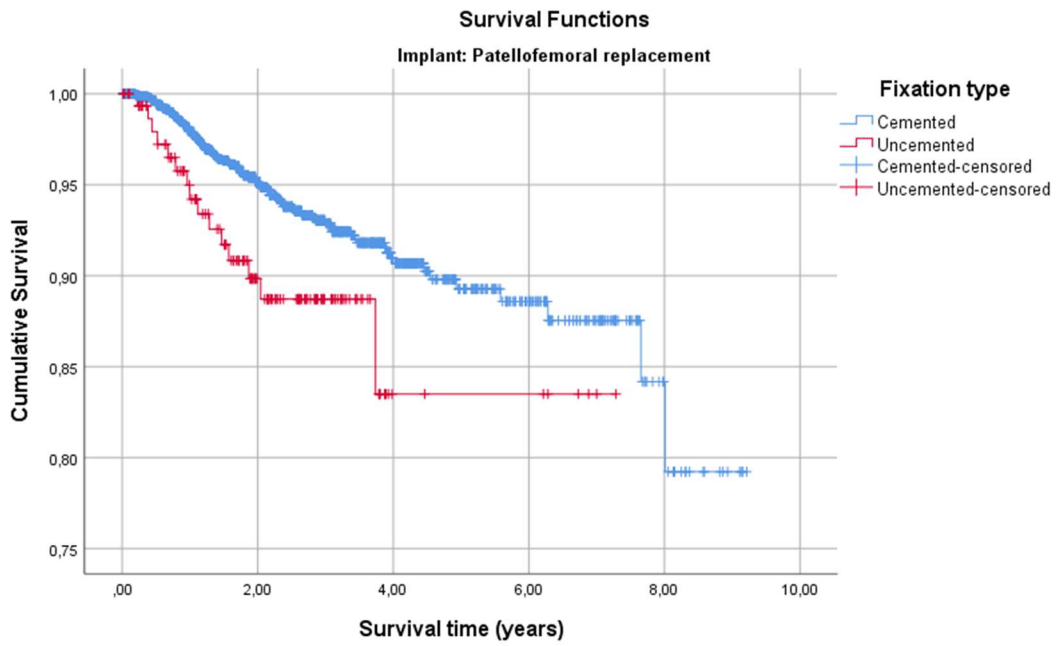
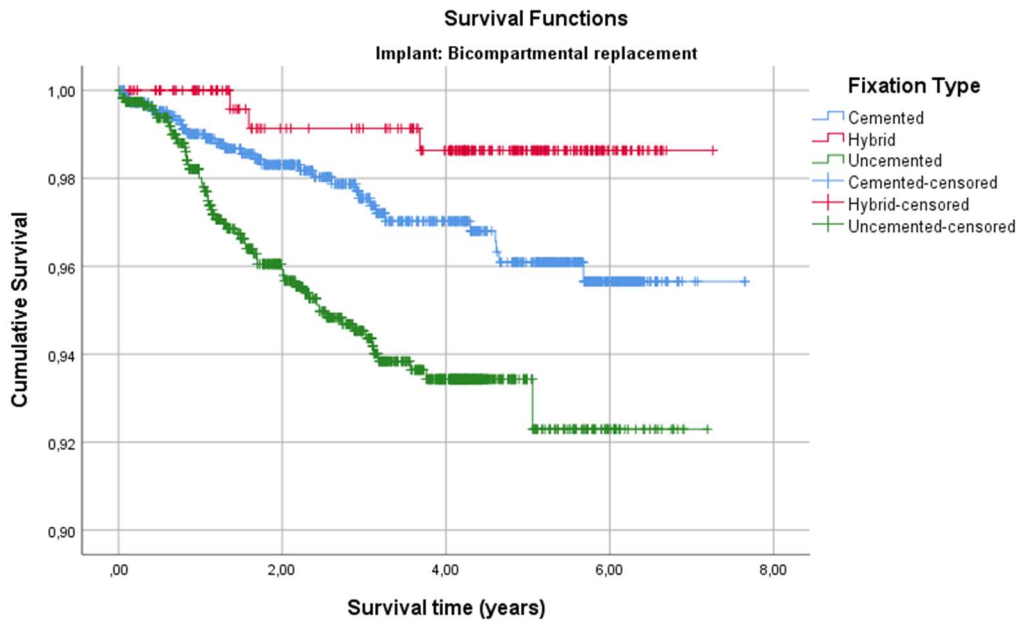
Figure 2.20 Kaplan-Meier curve for type of implant for total knee prostheses at primary knee replacement



	Number of events/Number at risk									
	0	1	2	3	4	5	6	7	8	9
Total knee Posterior cruciate retaining	114/21362	105/16983	49/12733	25/8878	10/5311	2/2950	2/1931	1/1022	0/442	0/98
Total knee Posterior-stabilised	528/64393	460/50681	206/37037	69/23939	31/13442	11/7735	7/5181	4/2868	3/1150	1/320
Total knee Constrained Condylar	10/1138	4/857	6/561	1/289	1/105	0/64	0/50	0/22	0/5	0/1
Total knee Ultra-congruent	103/14434	93/10823	39/7376	12/4385	1/1778	2/598	0/353	0/174	0/41	0/2
Total knee Hinge	23/1015	10/783	7/594	0/386	1/208	1/95	0/37	0/8	0/2	0/1
Total knee Bicruciate retaining	16/323	15/250	4/169	0/68	0/0	0/0	0/0	0/0	0/0	0/0
Other	25/2648	23/1863	5/1110	0/460	0/0	0/0	0/0	0/0	0/0	0/0

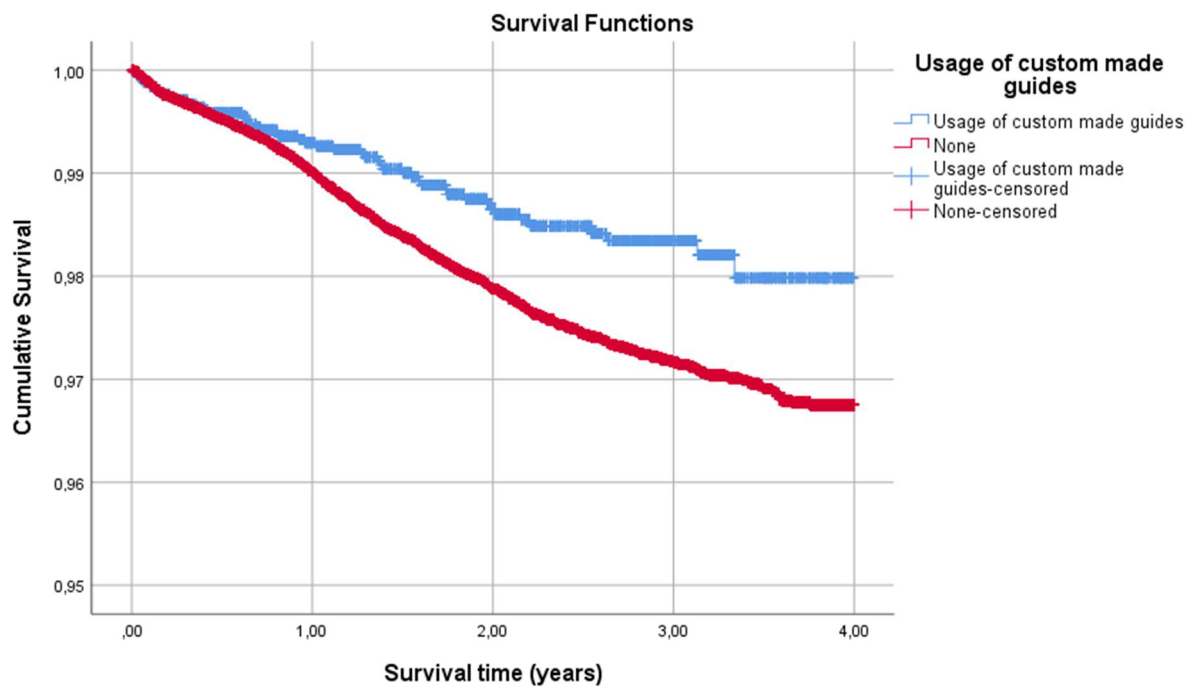
Figure 2.21 Kaplan-Meier curves for method of fixation according to primary knee replacement prosthesis type





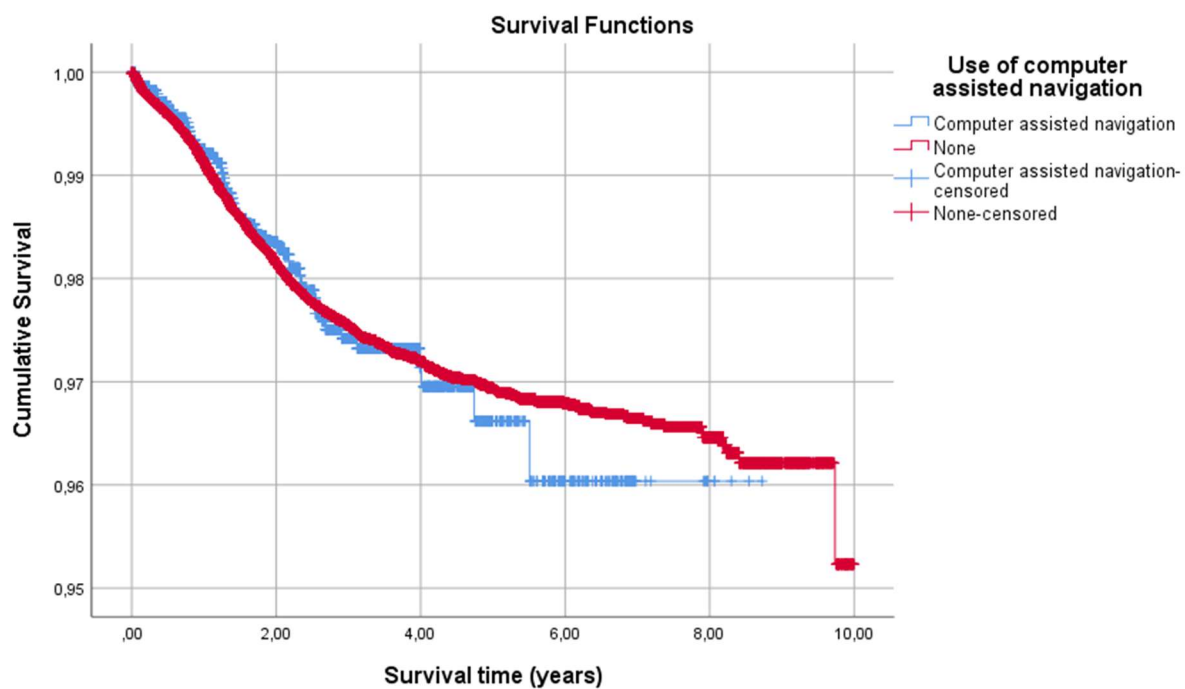
		Number of events/Number at risk									
		0	1	2	3	4	5	6	7	8	9
Unicompartmental replacement	Cemented	113/7759	87/5641	37/3985	18/2690	17/1641	7/1038	2/721	1/392	0/146	0/33
	Hybrid	9/585	3/431	2/320	0/208	0/163	1/119	1/83	0/27	0/0	0/0
	Un-cemented	47/2473	20/1577	10/954	2/472	2/195	0/38	0/6	0/2	0/2	0/1
Total knee replacement	Cemented	715/95098	618/74117	273/53387	96/34067	40/18299	13/9845	8/6345	4/3403	3/1366	1/337
	Hybrid	44/5140	44/4192	17/3304	3/2440	1/1701	2/1285	0/1001	0/610	0/243	0/77
	Un-cemented	59/4989	45/3846	25/2807	8/1817	3/763	1/255	1/167	1/68	0/28	0/6
Bicompartmental replacement	Cemented	10/1095	6/908	5/750	3/583	4/476	1/372	0/130	0/4	0/0	0/0
	Hybrid	0/273	2/248	0/217	1/210	0/191	0/109	0/32	0/1	0/0	0/0
	Un-cemented	21/1164	19/956	10/754	6/566	0/379	1/85	0/27	0/1	0/0	0/0
Patellofemoral replacement	Cemented	32/1943	38/1475	20/1000	9/609	4/305	1/164	1/107	1/57	1/17	0/4
	Un-cemented	8/153	5/121	1/80	1/37	0/7	0/6	0/6	0/2	0/0	0/0

Figure 2.22 Kaplan-Meier curve for usage of custom made guides during primary knee replacement for total knee replacement



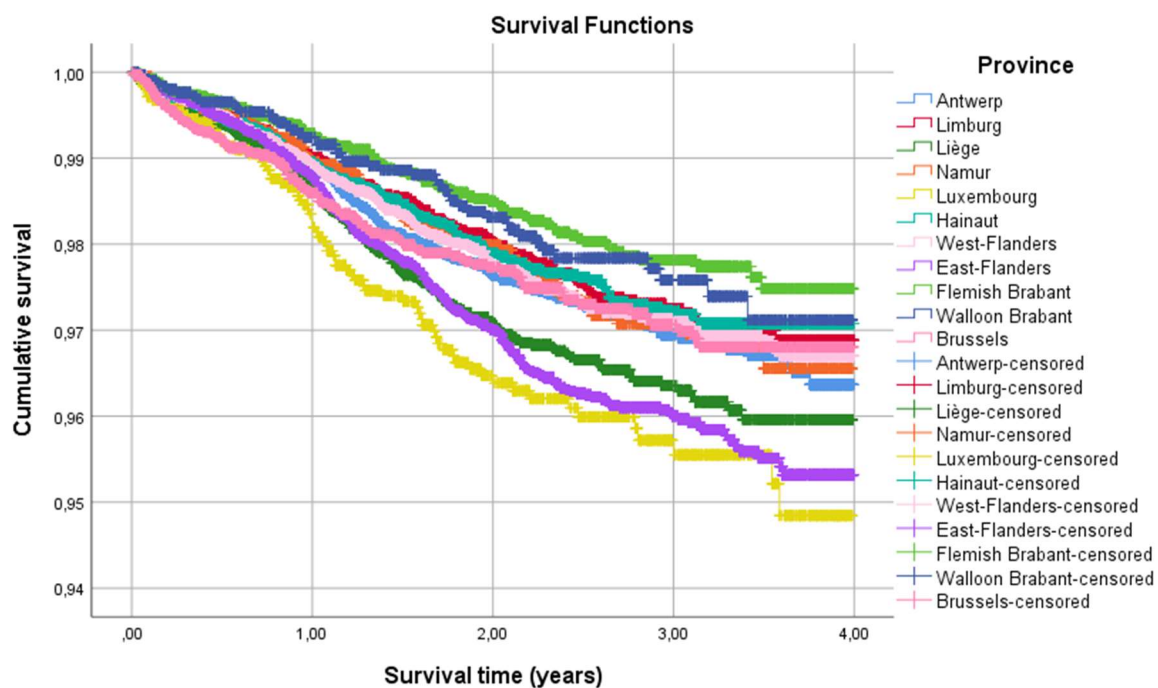
	Number of events/Number at risk			
	0	1	2	3
Usage of custom made guides	27/4339	16/3060	5/1969	2/887
None	684/79709	550/58023	206/36598	41/16610

Figure 2.23 Kaplan-Meier curve for usage of computer assisted navigation during primary knee replacement for total knee replacement



Number of events/Number at risk										
	0	1	2	3	4	5	6	7	8	9
Computer assisted navigation	19/2984	18/2217	13/1596	2/1057	2/525	1/221	0/115	0/13	0/5	0/0
None	800/102329	692/80023	303/57984	105/37348	42/20319	15/11221	9/7437	5/4081	3/1635	1/422

Figure 2.24 Kaplan-Meier curve for location where primary knee replacement was performed



Number of events/Number at risk				
	0	1	2	3
Antwerp	134/14121	110/10209	33/6427	8/2864
Limburg	70/8454	51/6018	24/3829	5/1835
Liège	95/8296	81/5949	21/3671	5/1637
Namur	35/3892	23/2809	13/1746	3/797
Luxembourg	37/2488	29/1852	7/1147	3/567
Hainaut	103/11317	71/8221	26/5096	3/2272
West-Flanders	133/14549	98/10269	34/6423	7/2844
East-Flanders	149/14317	153/10258	53/6309	11/2713
Flemish Brabant	50/8172	39/5865	20/3683	3/1645
Walloon Brabant	20/3047	17/2217	8/1424	2/656
Brussels	69/5596	31/4056	14/2615	3/1256

2.3 NINETY-DAYS MORTALITY AFTER KNEE REPLACEMENT PROCEDURES (SINCE 2015)

Table 2.14 90-days mortality after knee replacement by type of procedure

	Alive 90 days post-procedure		Died before 90 days post-procedure	
	Count	N %	Count	N %
Primary procedure	95.941	99,8%	159	0,2%
Revision with new prosthesis	7.779	99,4%	46	0,6%
Resection with spacer	566	97,9%	12	2,1%
Resection without spacer	26	100,0%	0	0,0%
Total	104.312	99,8%	217	0,2%

Table 2.15 90-days mortality after primary knee replacement by primary knee replacement types

	Alive 90 days post-procedure		Died before 90 days post-procedure	
	Count	N %	Count	N %
Total knee replacement	8.725	99,9%	5	0,06%
Unicompartmental replacement	83.949	99,8%	149	0,18%
Bicompartmental replacement	1.458	99,9%	2	0,14%
Patellofemoral replacement	1.754	99,8%	3	0,17%
Partial resurfacing femoral condyle	55	100,0%	0	0,00%
Total	95.941	99,8%	159	0,2%

Table 2.16 90-days mortality after knee revision procedures by combinations of removed components during knee revision procedures

	Alive 90 days post-procedure		Died before 90 days post-procedure	
	Count	N %	Count	N %
All components	4.675	99,2%	37	0,8%
Tibia and Insert	399	100,0%	0	0,0%
Patella and insert	186	100,0%	0	0,0%
Femur and insert	115	100,0%	0	0,0%
Insert only	1.189	99,2%	9	0,8%
Patella only	1.030	100,0%	0	0,0%
Femur only	63	100,0%	0	0,0%
Other combination	122	100,0%	0	0,0%
Total	7.779	99,4%	46	0,6%

Table 2.17 90-days mortality after knee replacement by age category

	Alive 90 days post-procedure		Died before 90 days post-procedure	
	Count	N %	Count	N %
<45	1.853	100,0%	0	0,0%
45-59	21.886	99,9%	11	0,1%
60-69	34.050	99,9%	29	0,1%
70-79	34.312	99,7%	90	0,3%
>=80	12.211	99,3%	87	0,7%
Total	104.312	99,8%	217	0,2%

3 HIP REPLACEMENT

3.1 PRIMARY HIP REPLACEMENT

3.1.1 Demographics

Table 3.1 Age, gender and indications for primary hip replacement patients

N=29464		
	Mean	SD
Age (yrs)	70,1	13,0
	Count	N %
Age categories		
<45	982	3,3%
45-59	5025	17,1%
60-69	7182	24,4%
70-79	8618	29,2%
>=80	7649	26,0%
Gender		
Female	17640	59,9%
Male	11821	40,1%
Indication		
Primary osteoarthritis	19721	66,9%
Secondary osteoarthritis	661	2,2%
Avascular necrosis	1377	4,7%
Rheumatoid arthritis	82	0,3%
Fracture	7029	23,9%
Tumor	70	0,2%
Hip dysplasia	340	1,2%
Indication other	184	0,6%

Figure 3.1 Age distribution by gender for primary hip replacement patients

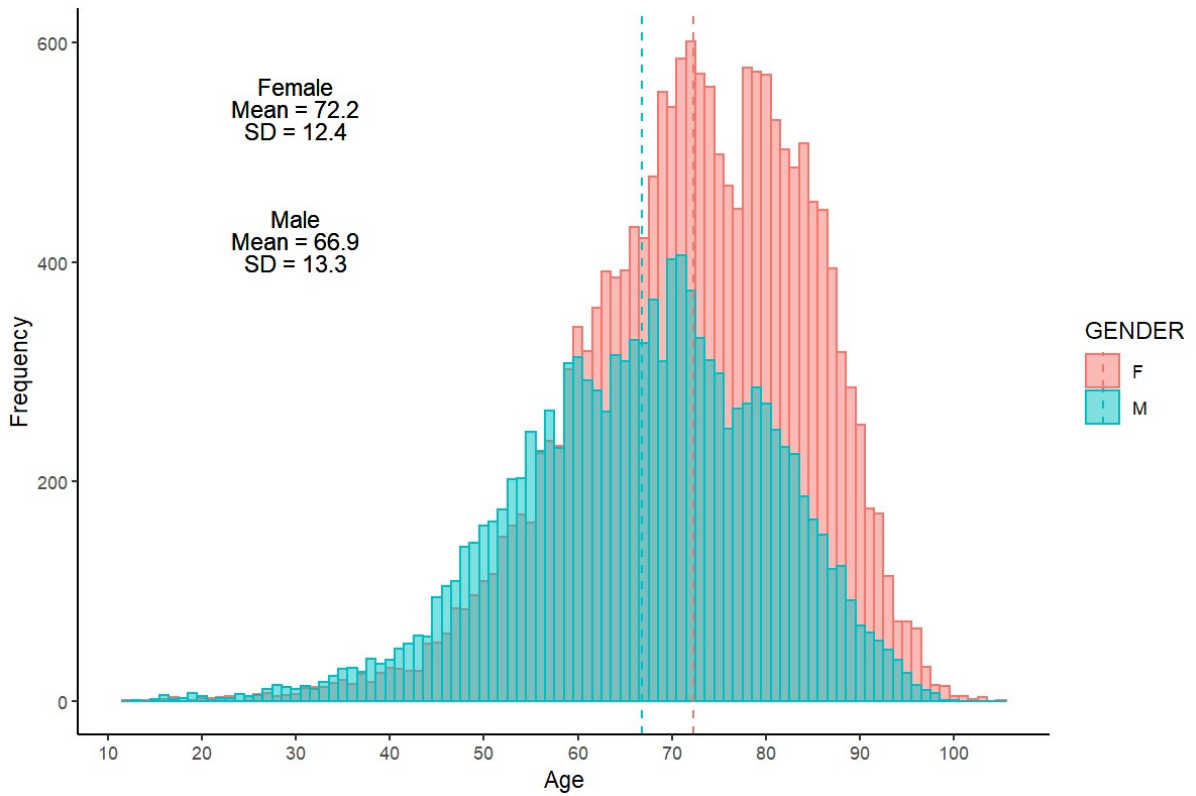


Figure 3.2 Age distribution by indication for primary hip replacement patients

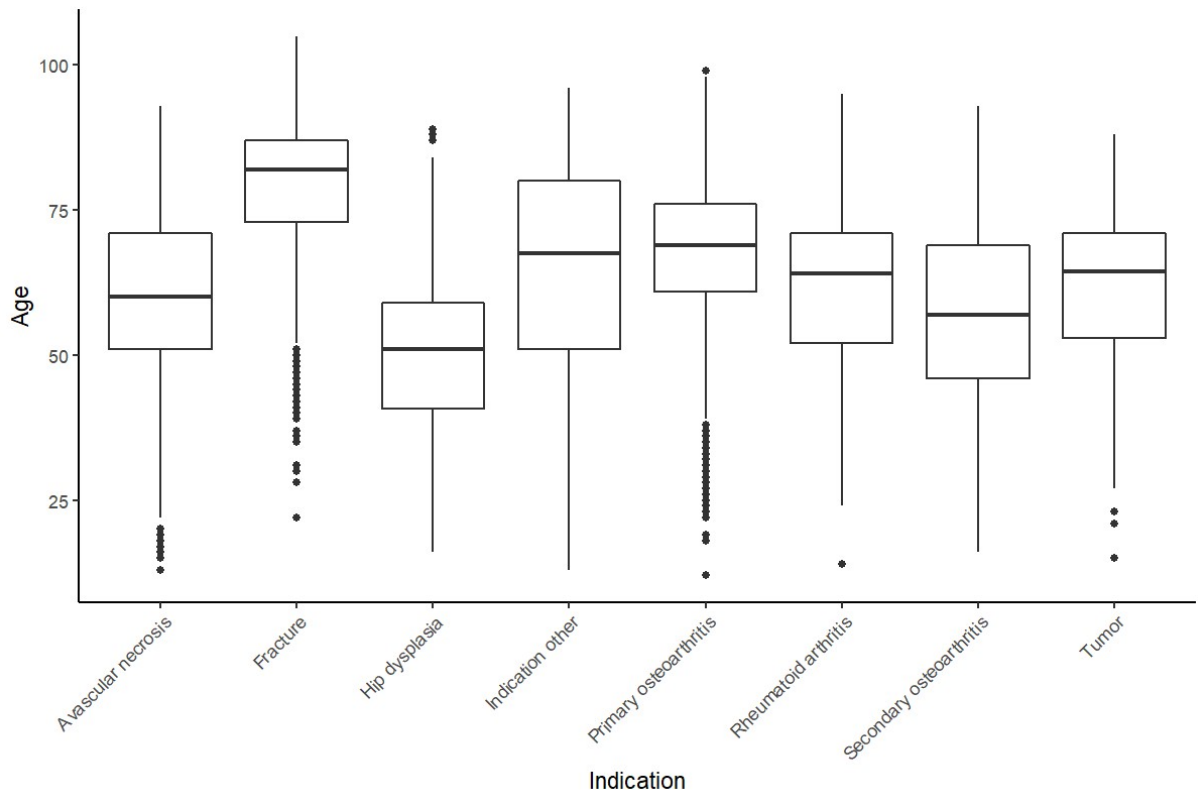
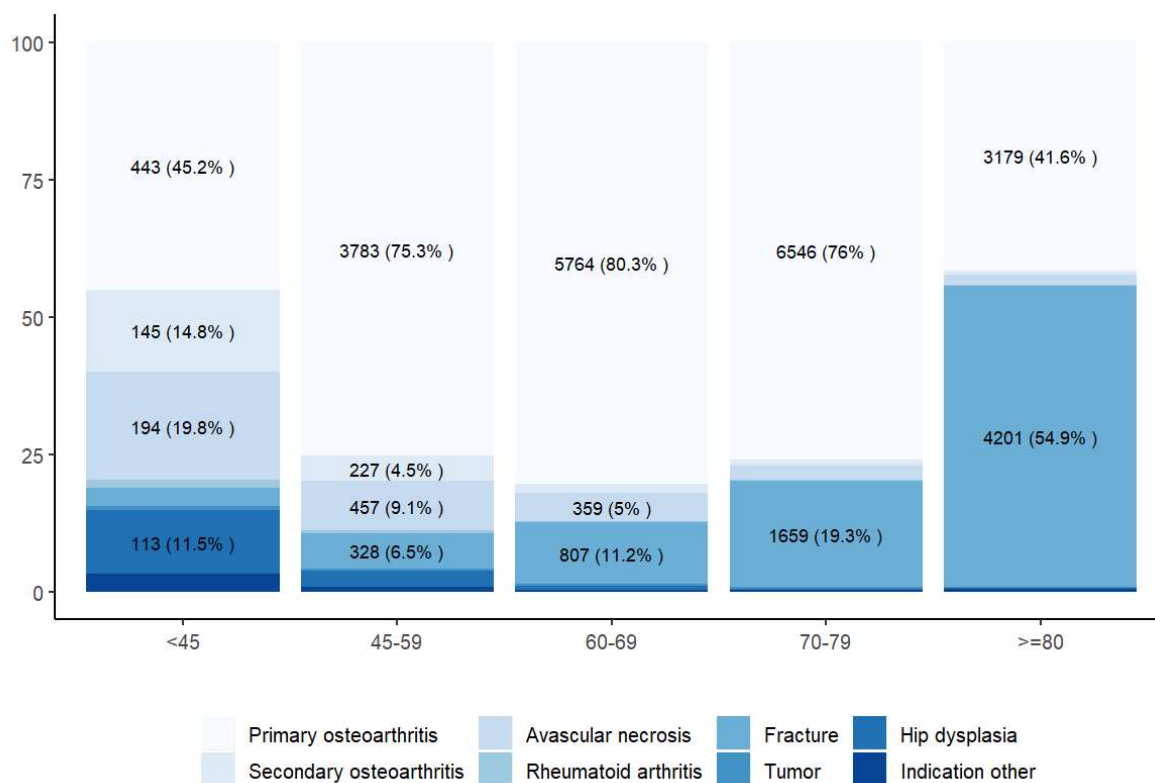


Table 3.2 Indications for primary hip replacements based on gender

	Male	Female
	N=11821	N=17640
	N (%)	N (%)
Primary osteoarthritis	8335 (70,5%)	11385 (64,5%)
Secondary osteoarthritis	351 (3,0%)	310 (1,8%)
Avascular necrosis	826 (7,0%)	551 (3,1%)
Rheumatoid arthritis	24 (0,2%)	58 (0,3%)
Fracture	2049 (17,3%)	4978 (28,2%)
Tumor	38 (0,3%)	32 (0,2%)
Hip dysplasia	114 (1,0%)	226 (1,3%)
Indication other	84 (0,7%)	100 (0,6%)

Figure 3.3 Indications for primary hip replacement according to age category



Note: For readability of the figure, labels with values and percentages smaller than 4% are not displayed.

3.1.2 Surgical technique and implant characteristics

Table 3.3 Numbers and percentages of primary hip replacement types

	Number	Percentage of total
Total prosthesis	22948	77,9
Total dual-mobility prosthesis	1756	6,0
Hemi - Bipolar	4389	14,9
Hemi Modular	55	0,2
Hemi Monoblock	9	0
Resurfacing Femoral (Hemi)	1	0
Resurfacing Femoral + Cup	306	1,0
Resurfacing Partial (Punaise)	1	0
Total	29465	100%

Table 3.4 Age and gender of primary hip replacement patients by type of replacement

	Total hip replacement	Total dual-mobility prosthesis	Hemi - Unipolar	Hemi - Bipolar	Resurfacing
	N=22948	N=1756	N=64	N=4389	N=307
Mean age (years) (SD)	67,4 (12,1)	73,9 (11,7)	83,2 (7,9)	83,4 (8,6)	50,4 (9,1)
Age groups	% (N)	% (N)	% (N)	% (N)	% (N)
<45	3,8 (871)	1,7 (30)	0 (0)	0,2 (7)	24,1 (74)
45-59	20,1 (4612)	9,5 (166)	1,6 (1)	1,3 (58)	61,2 (188)
60-69	28,6 (6574)	19,6 (344)	4,7 (3)	5,0 (220)	13,4 (41)
70-79	31,5 (7224)	31,9 (560)	18,8 (12)	18,6 (818)	1,3 (4)
>=80	15,9 (3660)	37,3 (655)	75,0 (48)	74,9 (3286)	0 (0)
Gender	% (N)	% (N)	% (N)	% (N)	% (N)
Male	42,2 (9684)	34,7 (609)	28,1 (18)	27,8 (1219)	94,8 (291)
Female	57,8 (13263)	65,3 (1147)	71,9 (46)	72,2 (3168)	5,2 (16)

Figure 3.4 Age distribution by implant type for primary hip replacement patients

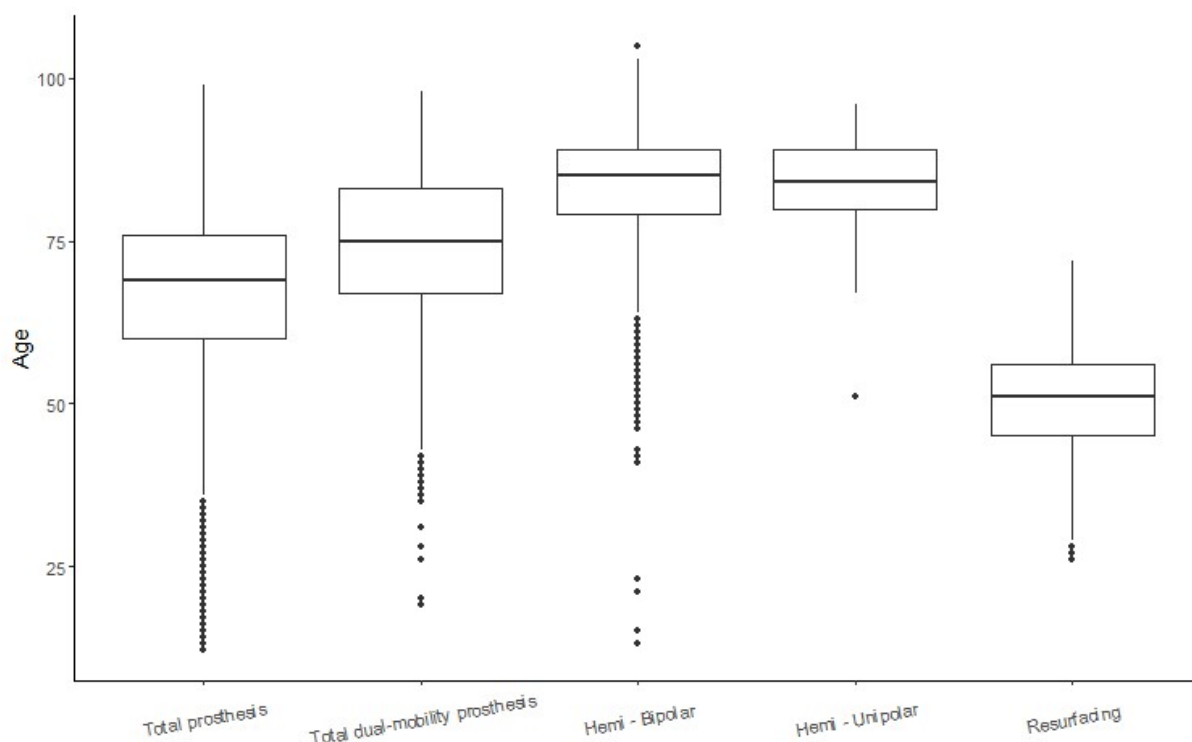
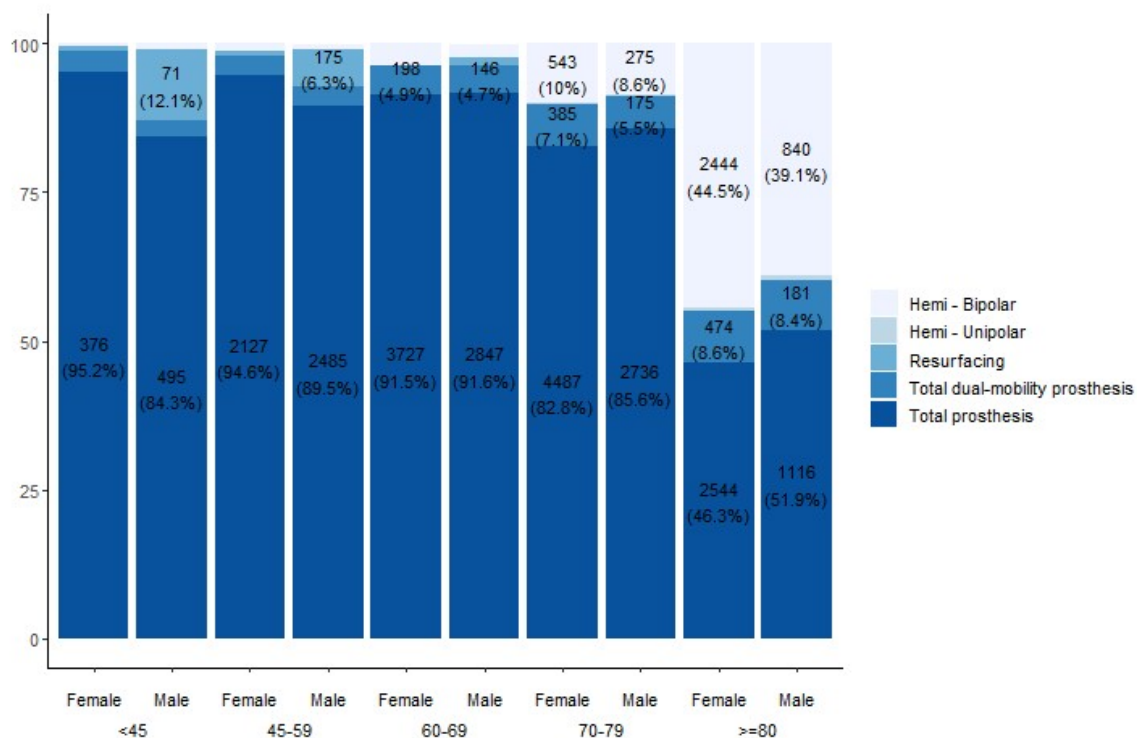
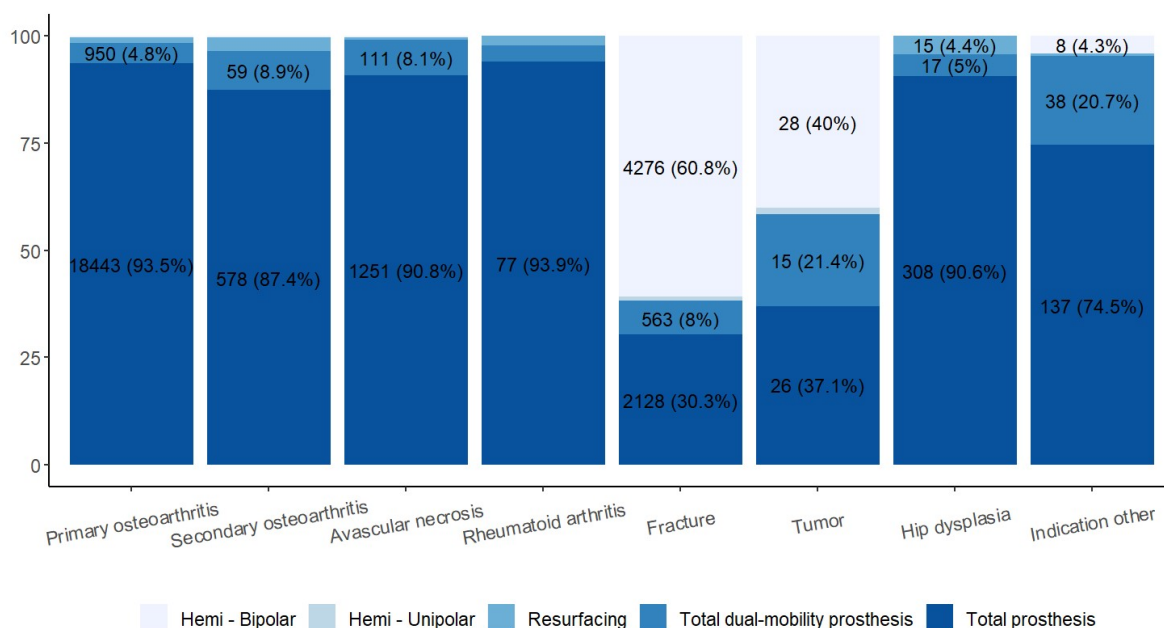


Figure 3.5 Type of primary hip replacement procedures by age groups and gender



Note: For readability of the figure, labels with values and percentages smaller than 4% are not displayed.

Figure 3.6 Type of primary hip replacement procedures by indication



Note: For readability of the figure, labels with values and percentages smaller than 4% are not displayed.

Table 3.5 Numbers and percentages of bearing surfaces in primary hip replacements according to type of replacement

	Total hip replacement	Total dual-mobility prosthesis (head)	Total dual-mobility prosthesis (cup)	Hemi - Bipolar	Resurfacing
	N=22948	N=1756	N=1756	N=4389	N=306
	% (N)	% (N)	% (N)	% (N)	% (N)
Metal - Polyethylene	5,1 (1180)	43,5 (764)	92,8 (1630)	64,7 (2840)	0 (0)
Ceramic - Polyethylene	36,2 (8302)	54,8 (962)	0 (0)	32,1 (1410)	0 (0)
Metal - Metal	0,2 (54)	0 (0)	0 (0)	0,7 (32)	99,3 (304)
Ceramic - Ceramic	56,8 (13028)	0 (0)	0 (0)	1,2 (52)	0,7 (2)
Other	1,7 (384)	1,7 (30)	7,2 (126)	1,3 (55)	0 (0)

Figure 3.7 Fixation of primay hip prosthesis according to type of replacement

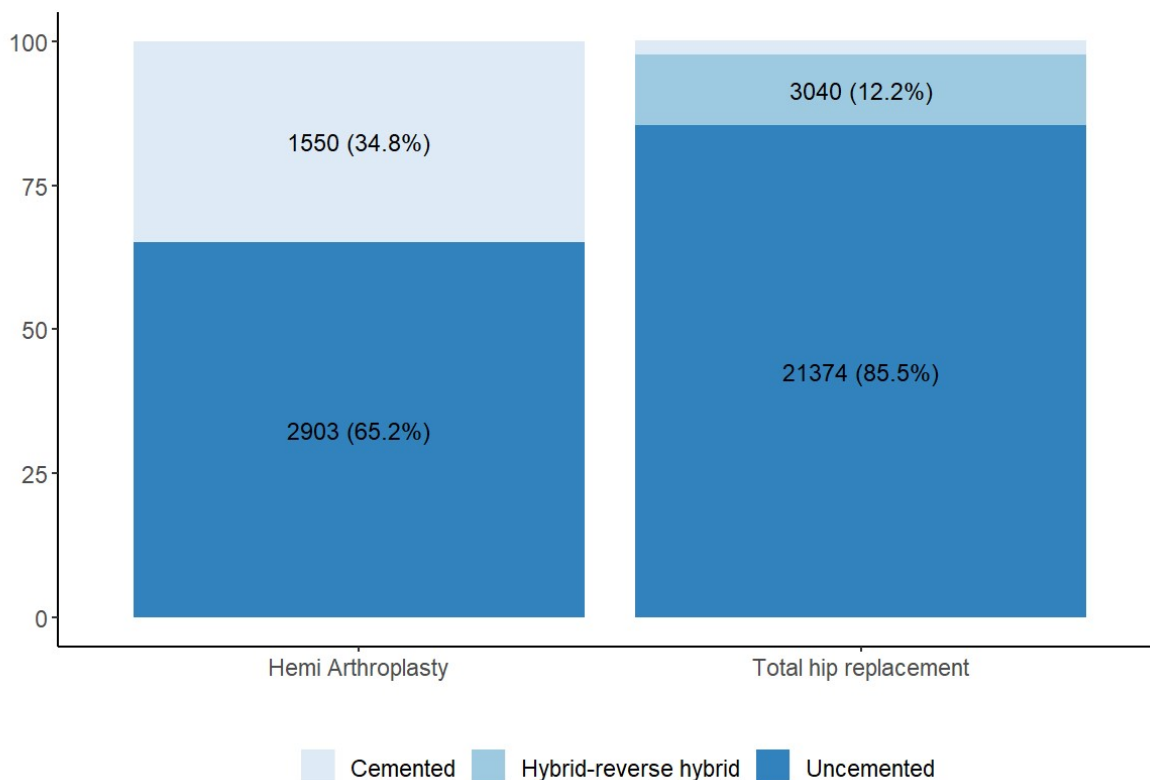


Figure 3.8 Fixation of total primay hip prosthesis according to age category

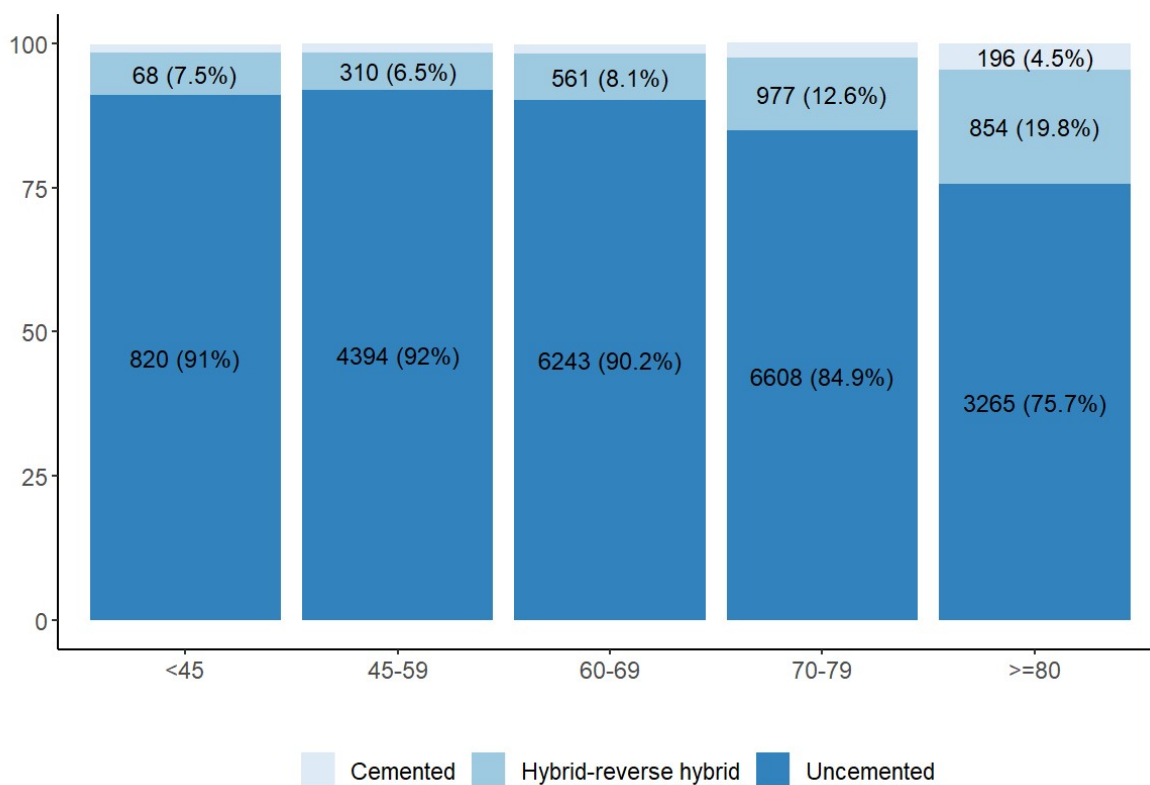


Figure 3.9 Approach used during primary hip replacement according to gender

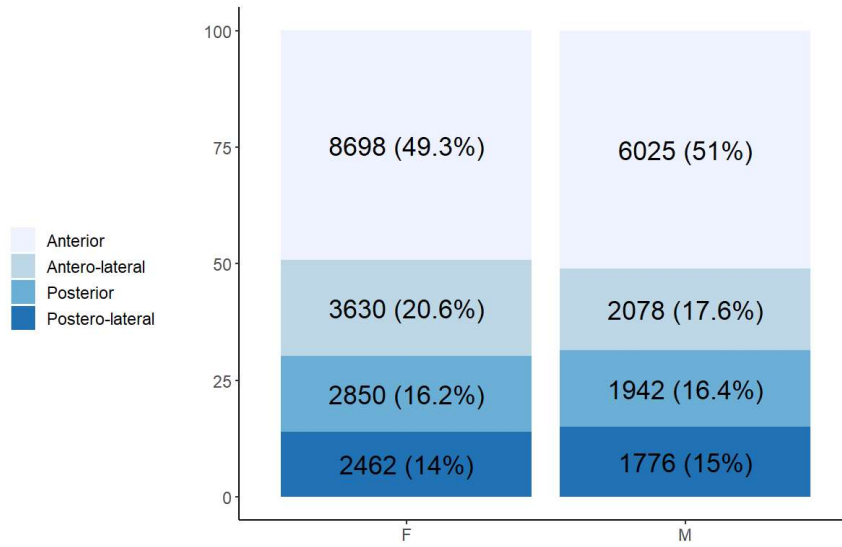


Figure 3.10 Approach used during primary hip replacement according to prosthesis type

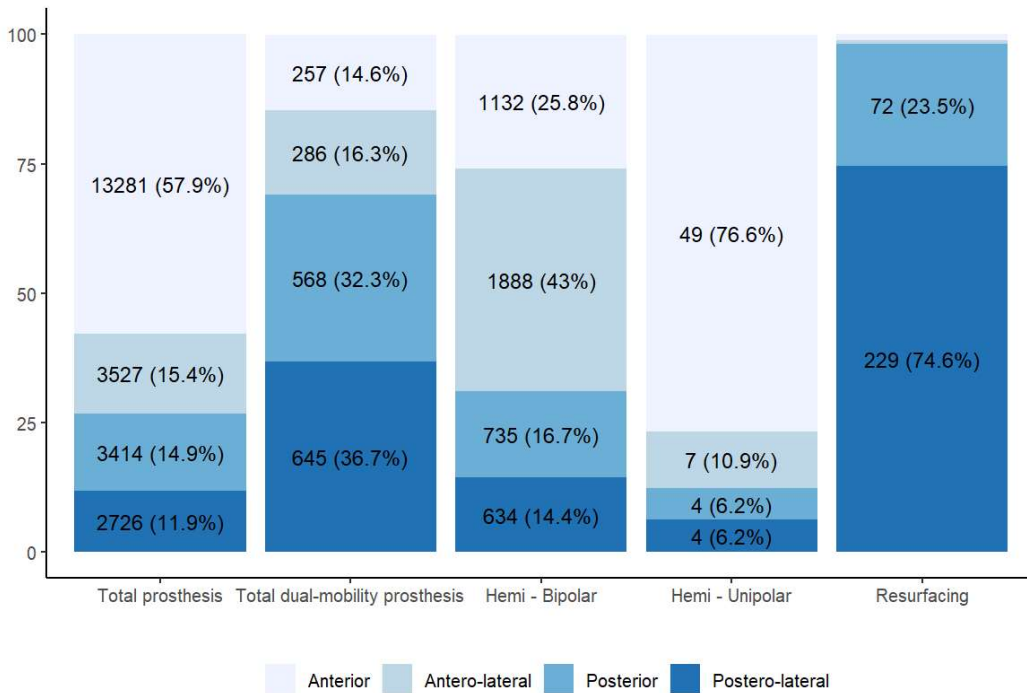


Table 3.6 Usage of custom made guides, computer assisted navigation and bone grafts during primary hip procedures

	Count	Percentage of total
Custom made guides	71	0,2%
Computer assisted navigation	13	< 0,1%
Bone grafts	445	1,5%
Autografts	387	1,3%
Allografts	42	0,1%
Auto and allografts	16	0,1%

Table 3.7 Usage of modular femoral neck according to type of prosthesis during primary hip procedures

	Count	Percentage of total
Total prosthesis	1864	8,1%
Total dual-mobility prosthesis	229	13,0%
Hemi - Bipolar	475	10,8%
Total	2568	8,8%

Table 3.8 Modular femoral neck types during primary hip procedures with modular necks

		Count	Percentage of total modular necks used
Frontal	Valgus	48	1,9%
	Varus	395	15,4%
	Neutral	2125	82,7%
Lateral	Anteversión	556	21,7%
	Retroversion	89	3,5%
	Neutral	1923	74,9%
Offset	Extended	633	24,6%
	Standard	1935	75,4%

3.2 REVISIONS AFTER PRIMARY HIP REPLACEMENT

3.2.1 Demographics

Table 3.9 Age, gender and indications for hip revision procedures

N=2673		
	Mean	SD
Age (yrs)	71,3	12,8
	Count	N %
Age categories		
<45	88	2,9
45-59	481	15,7
60-69	643	21,0
70-79	915	29,9
>=80	935	30,5
Gender		
Female	1731	56,5
Male	1331	43,5
Indication		
Aseptic loosening	998	32,6
Infection	512	16,7
Instability	496	16,2
Periprosthetic fracture	684	22,3
Pain	331	10,8
Wear	308	10,1
Other indication	346	11,3

Figure 3.11 Hip revision burden according to age category

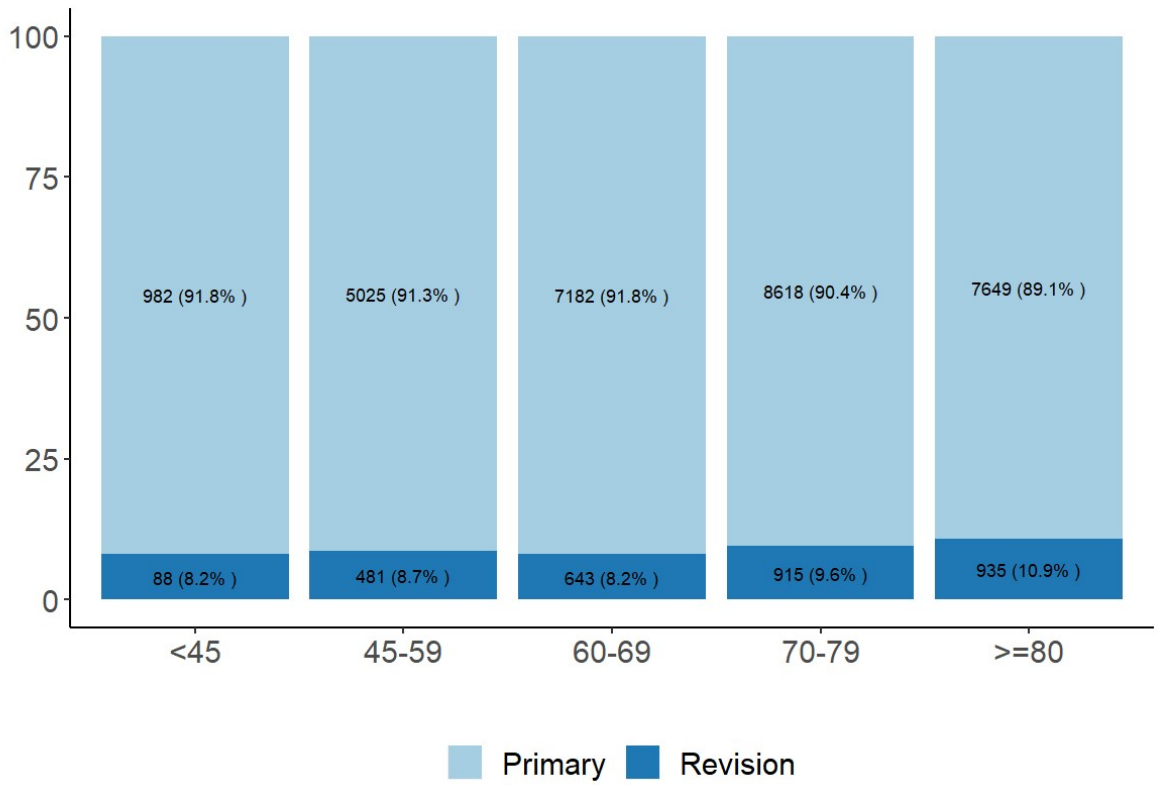


Figure 3.12 Age and gender by number of hip revision procedures

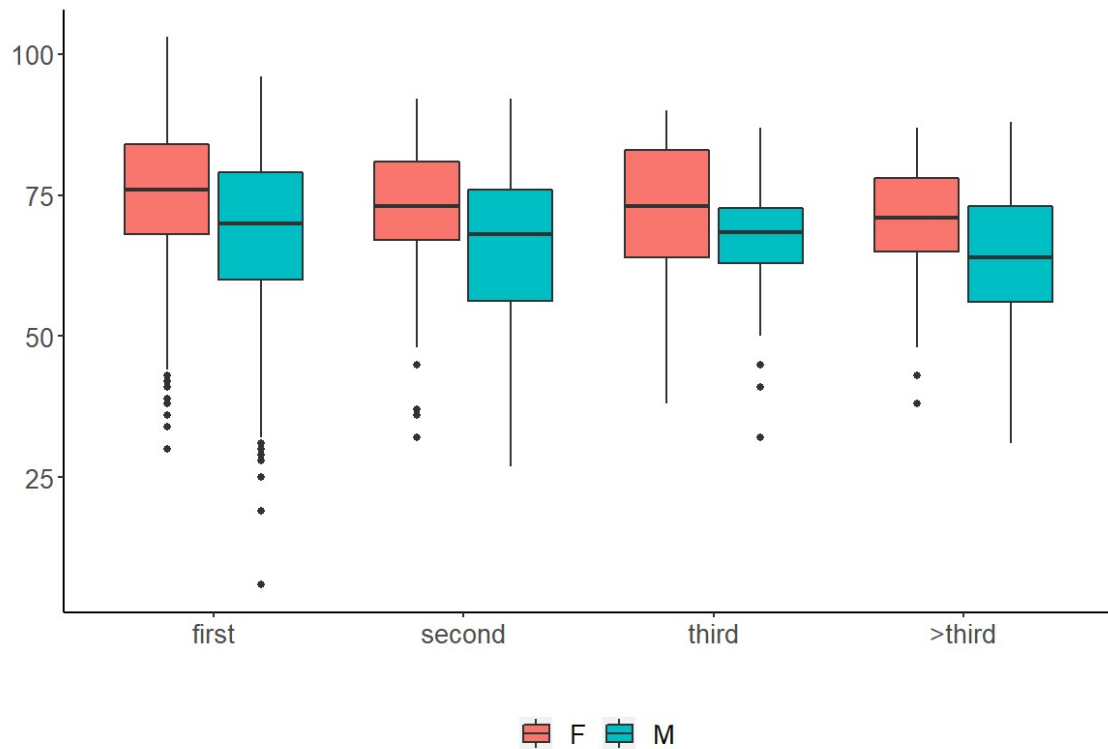
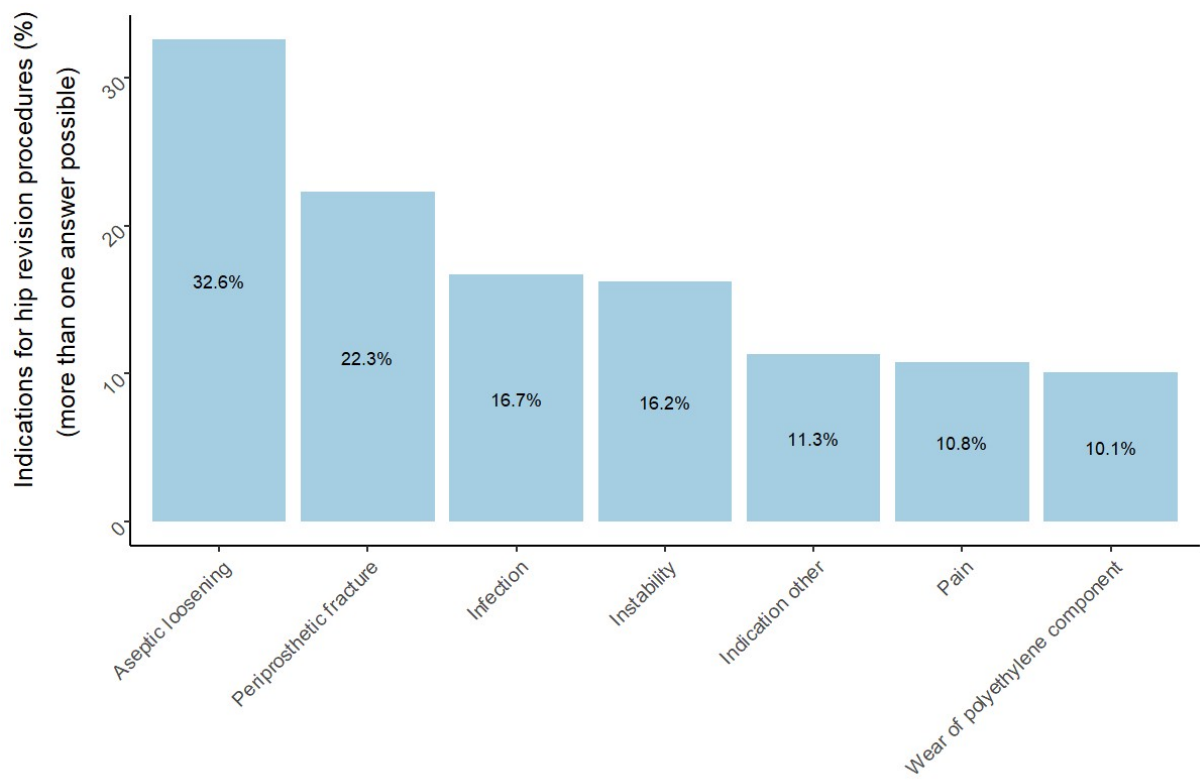


Figure 3.13 Indications for hip revision procedures



3.2.3 Surgical technique and implant characteristics

Figure 3.14 Combinations of revised components during hip revision procedures

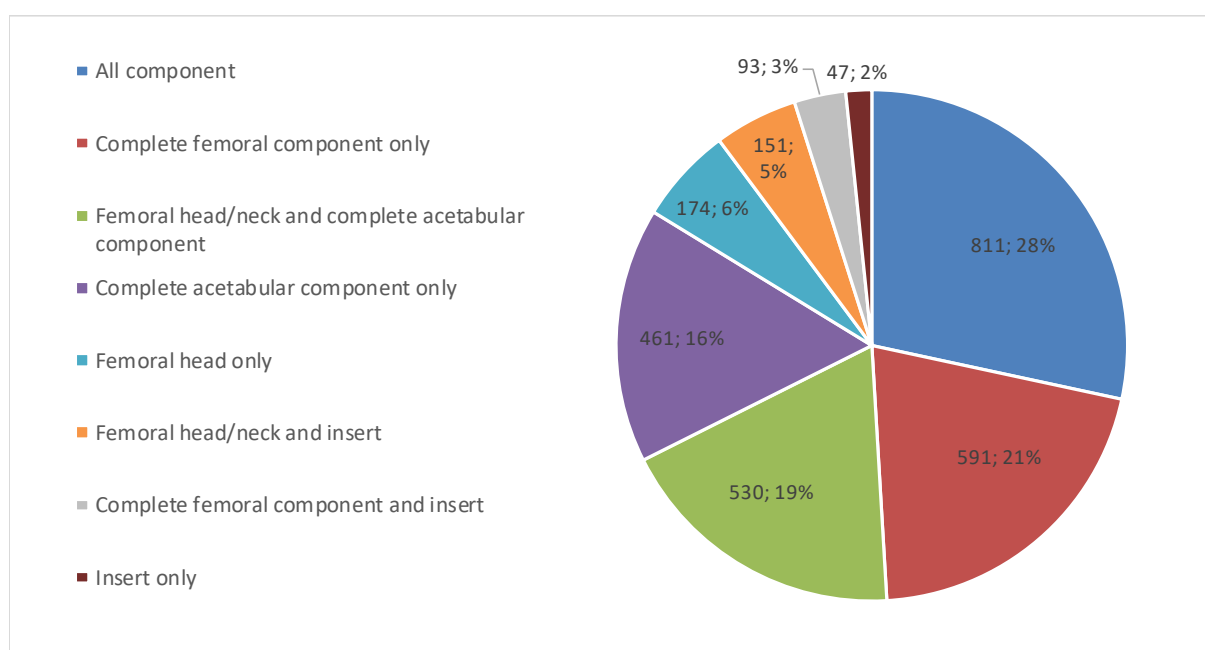


Table 3.10 Numbers and percentages of implanted hip types during hip revision procedures

	Number	Percentage of total
Total prosthesis	1850	65,8%
Total dual-mobility prosthesis	886	31,5%
Hemi - Unipolar	6	0,2%
Hemi - Bipolar	68	2,4%
Insert only	2	0,1%
Resurfacing	1	< 0,1%
Total number of procedures	2813	100%

Table 3.11 Numbers and percentages of bearing surfaces in hip revisions according to type of replacement

	Total hip replacement	Total dual-mobility prosthesis (head)	Total dual-mobility prosthesis (cup)	Hemi - Bipolar
	N=1849	N=885	N=885	N=67
	% (N)	% (N)	% (N)	% (N)
Metal - Polyethylene	14,7 (272)	53 (469)	93,6 (828)	77,6 (52)
Ceramic - Polyethylene	52,1 (964)	45 (398)	0 (0)	20,9 (14)
Metal - Metal	0,8 (15)	0 (0)	0 (0)	0 (0)
Ceramic - Ceramic	29,5 (546)	0 (0)	0 (0)	1,5 (1)
Other	2,8 (52)	2,0 (18)	6,4 (57)	0,0 (0)

Figure 3.15 Fixation of hip prosthesis according to type of replacement during hip revision procedures

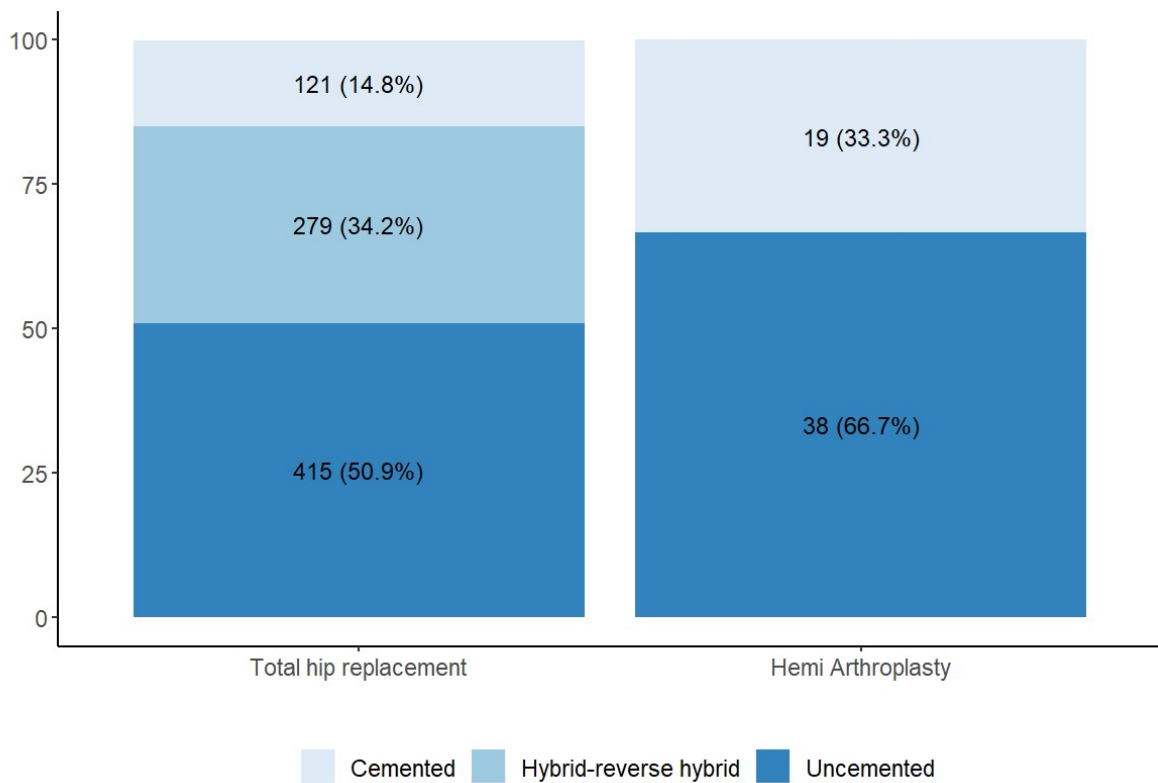


Figure 3.16 Approach used during revision hip replacement according to prosthesis type

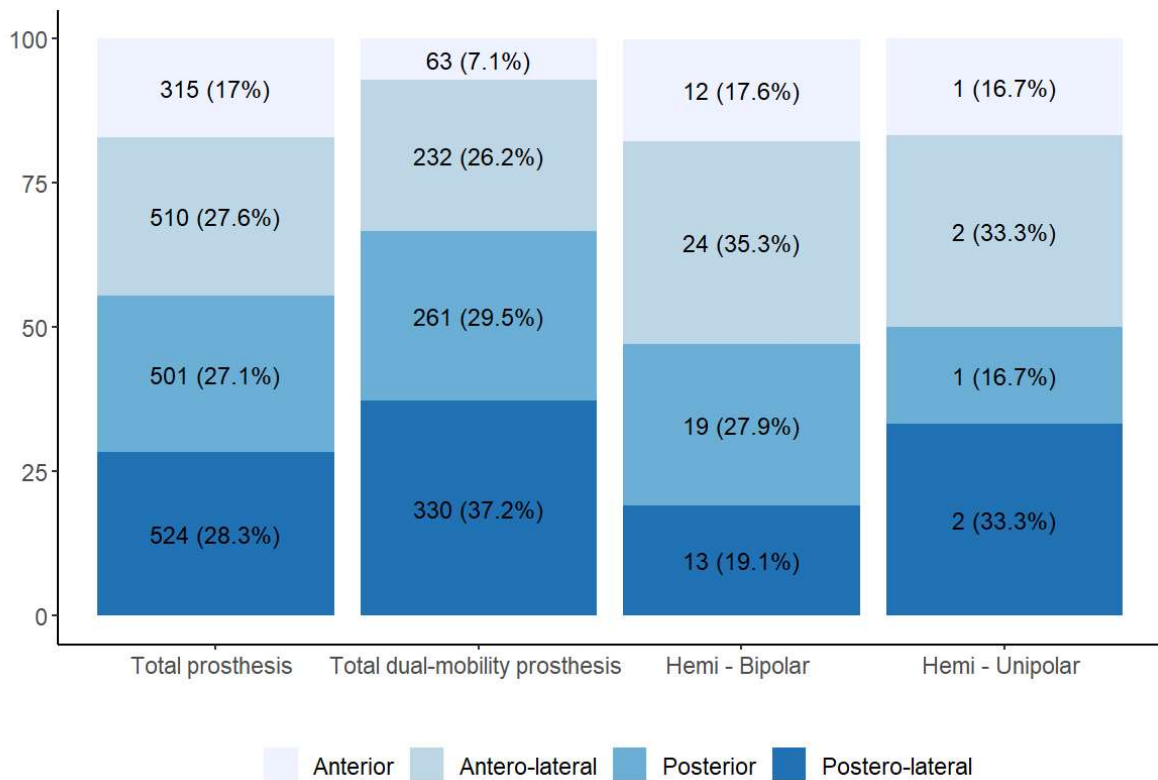


Table 3.12 Usage of custom made guides, computer assisted navigation and bone grafts during hip revision procedures

	Count	Percentage of total
Custom made guides	13	0,4%
Computer assisted navigation	4	0,1%
Bone grafts	576	20,5%
Autografts	85	3,0%
Allografts	452	16,1%
Auto and allografts	39	1,4%

Table 3.13 Usage of modular femoral neck according to type of prosthesis during hip revision procedures

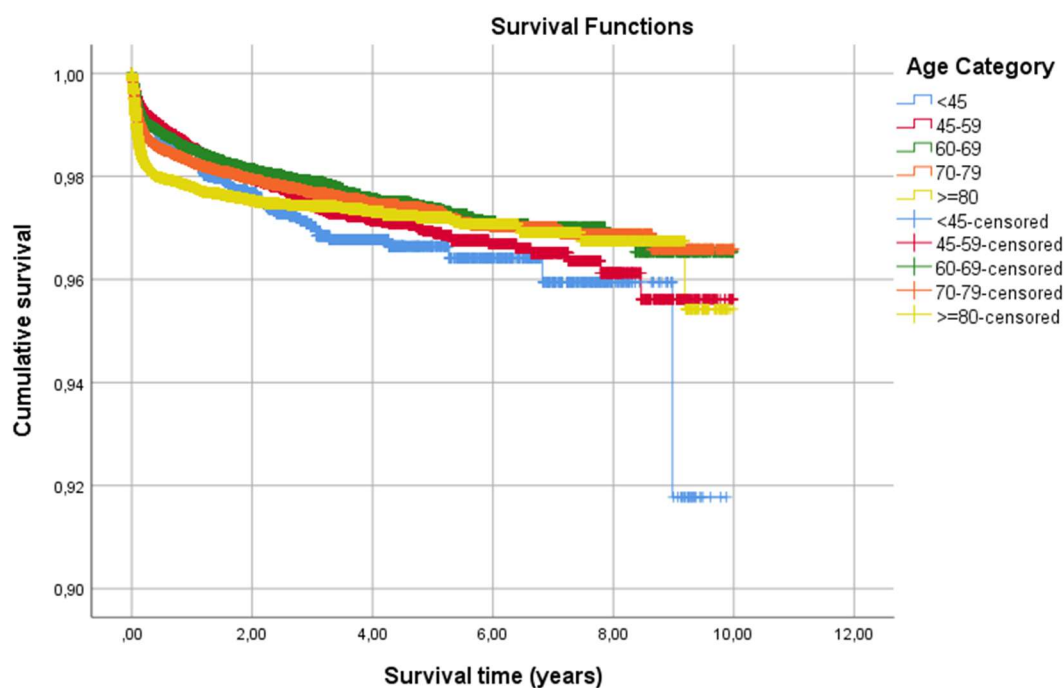
	Count	Percentage of total
Total prosthesis	271	16,3%
Total dual-mobility prosthesis	105	15,8%
Hemi - Bipolar	14	20,9%
Total	390	16,3%

Table 3.14 Usage of modular femoral neck types

		Count	Percentage of total modular necks used
Frontal	Valgus	6	1,5%
	Varus	70	17,9%
	Neutral	314	80,5%
Lateral	Anteversio	145	37,2%
	Retroversio	9	2,3%
	Neutral	236	60,5%
Offset	Extended	135	34,6%
	Standard	255	65,4%

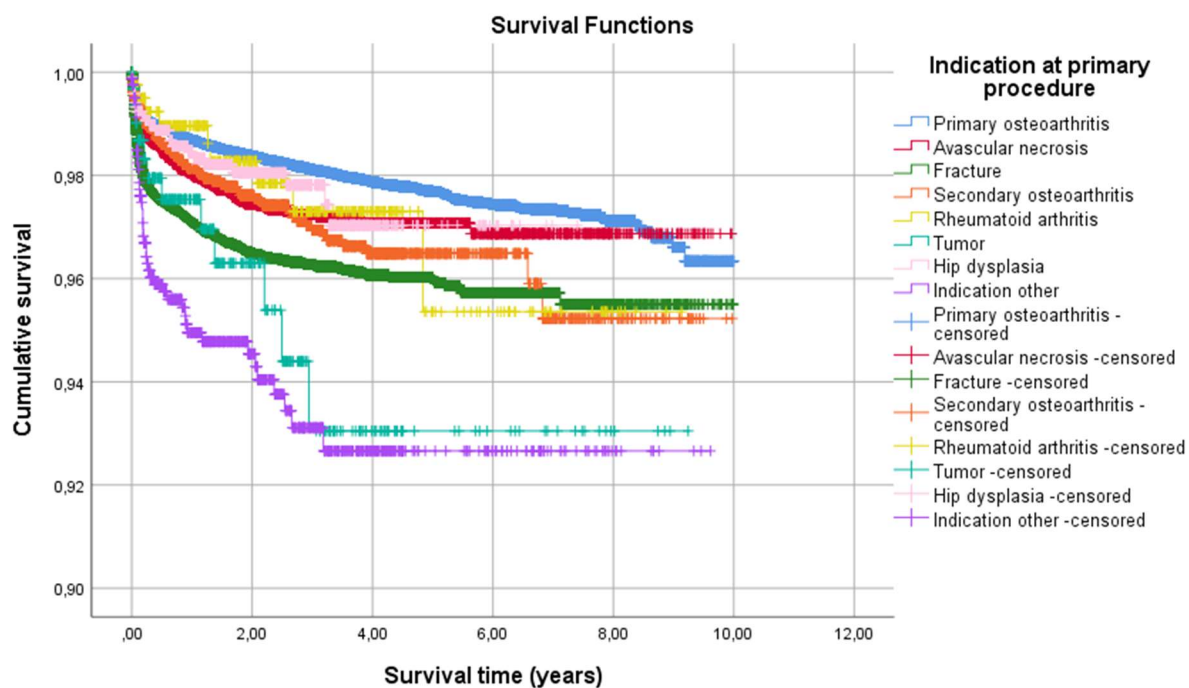
3.2.4 Implant survival after primary procedures

Figure 3.17 Kaplan-Meier curve for age at primary hip replacement



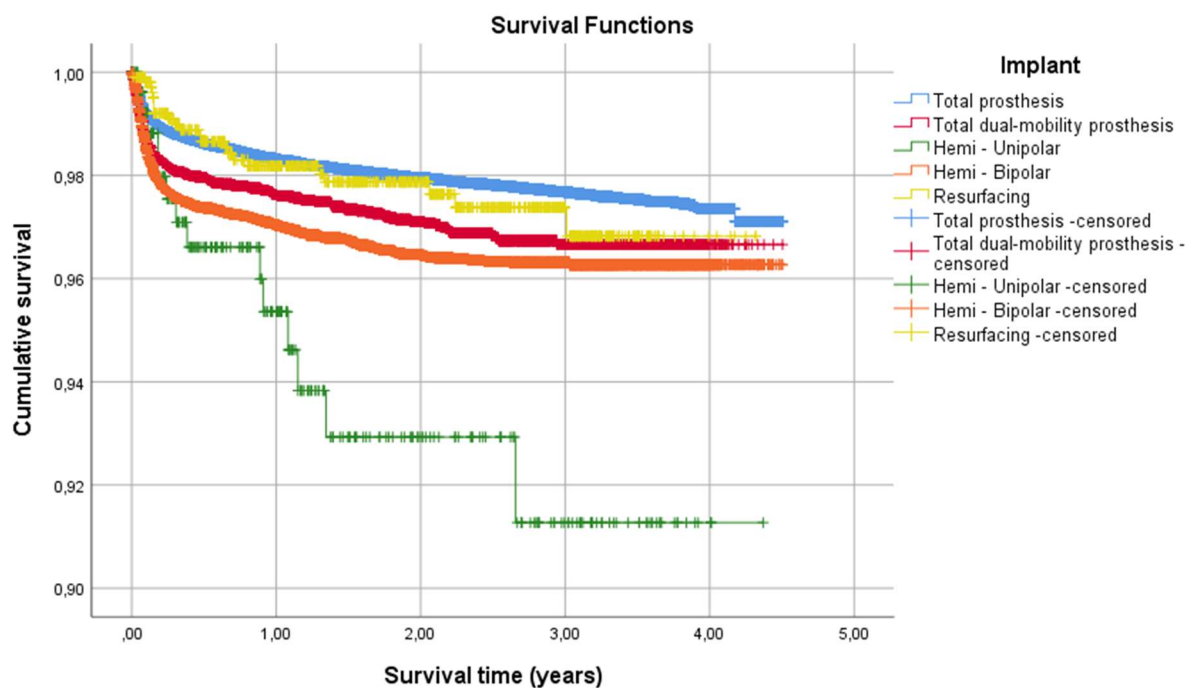
Number of events/Number at risk											
	0	1	2	3	4	5	6	7	8	9	10
<45	75/4639	19/3585	15/2601	4/1692	1/905	1/464	1/316	0/183	1/61	0/21	0/0
45-59	308/22949	91/17587	53/12507	21/8040	6/4322	5/2226	2/1428	2/751	1/307	0/94	0/0
60-69	473/34059	90/26224	39/18943	31/12160	9/6664	7/3354	2/2081	1/1097	1/468	0/173	0/0
70-79	644/39524	87/29676	47/21281	22/13709	7/7771	11/4041	0/2461	2/1386	1/591	0/202	0/1
>=80	707/34612	54/23398	16/15953	8/9814	4/5506	3/2616	2/1574	1/798	0/324	1/104	0/0

Figure 3.18 Kaplan-Meier curve for indication at primary hip replacement



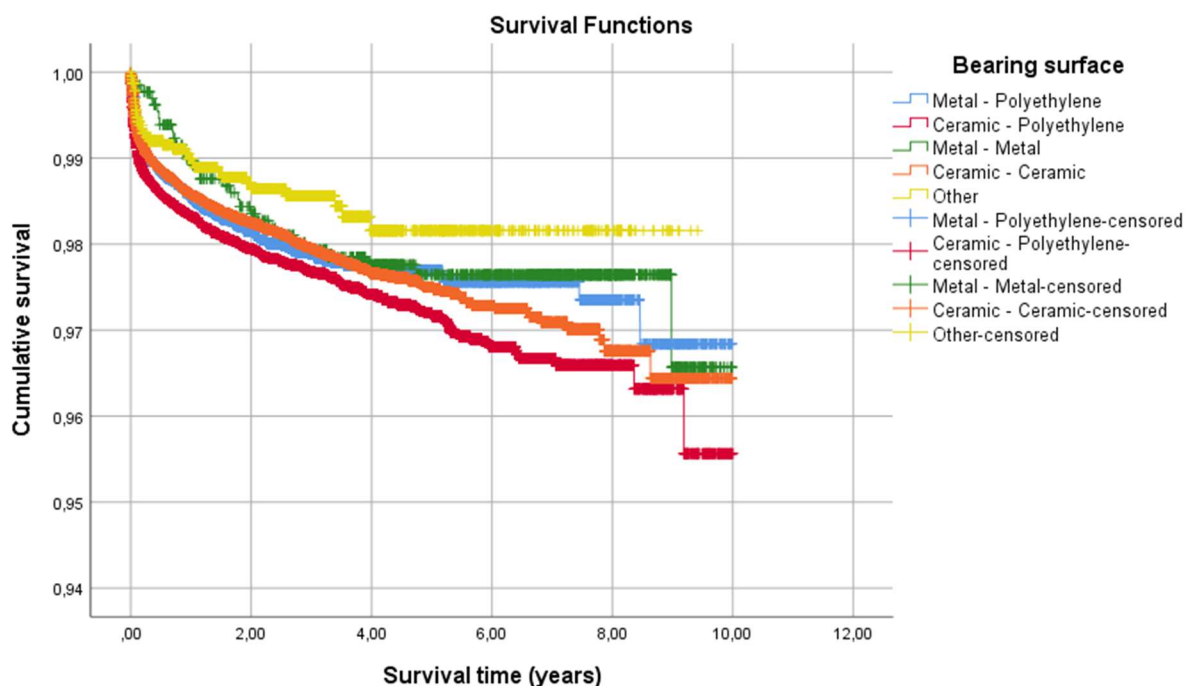
Number of events/Number at risk											
	0	1	2	3	4	5	6	7	8	9	10
Primary osteoarthritis	1152/92334	194/71242	117/51721	64/33580	25/18935	21/9912	5/6132	5/3399	4/1417	1/482	0/1
Avascular necrosis	128/6802	26/5250	7/3785	3/2399	0/1259	1/618	0/412	0/205	0/73	0/28	0/0
Fracture	812/31139	102/19981	26/12991	12/7658	1/4055	5/1742	0/1018	1/463	0/196	0/65	0/0
Secondary osteoarthritis	50/2881	10/2166	9/1574	4/1083	0/638	0/321	2/217	0/110	0/46	0/16	0/0
Rheumatoid arthritis	4/402	2/316	2/235	0/153	1/85	0/46	0/36	0/19	0/7	0/1	0/0
Tumor	7/317	2/185	3/115	0/69	0/42	0/23	0/18	0/13	0/6	0/1	0/0
Hip dysplasia	17/1194	3/840	1/543	2/299	0/85	0/23	0/10	0/1	0/0	0/0	0/0
Other indication	38/813	2/568	5/389	1/234	0/123	0/65	0/50	0/26	0/10	0/3	0/0

Figure 3.19 Kaplan-Meier curve for type of implant at primary hip replacement



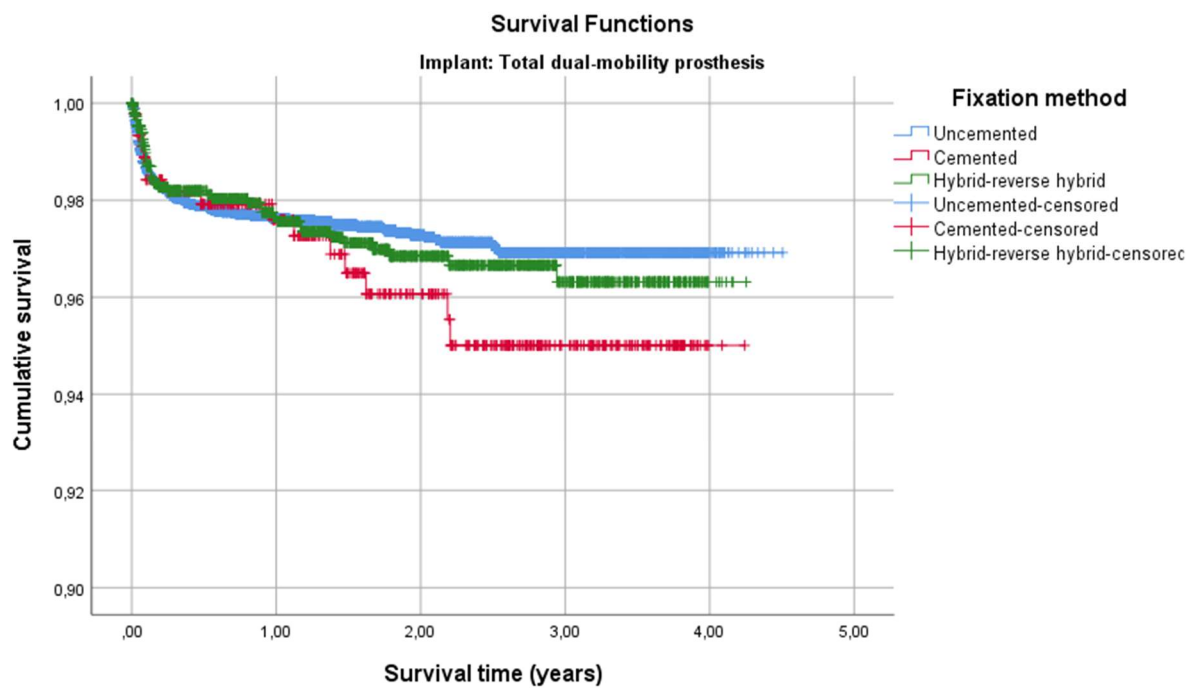
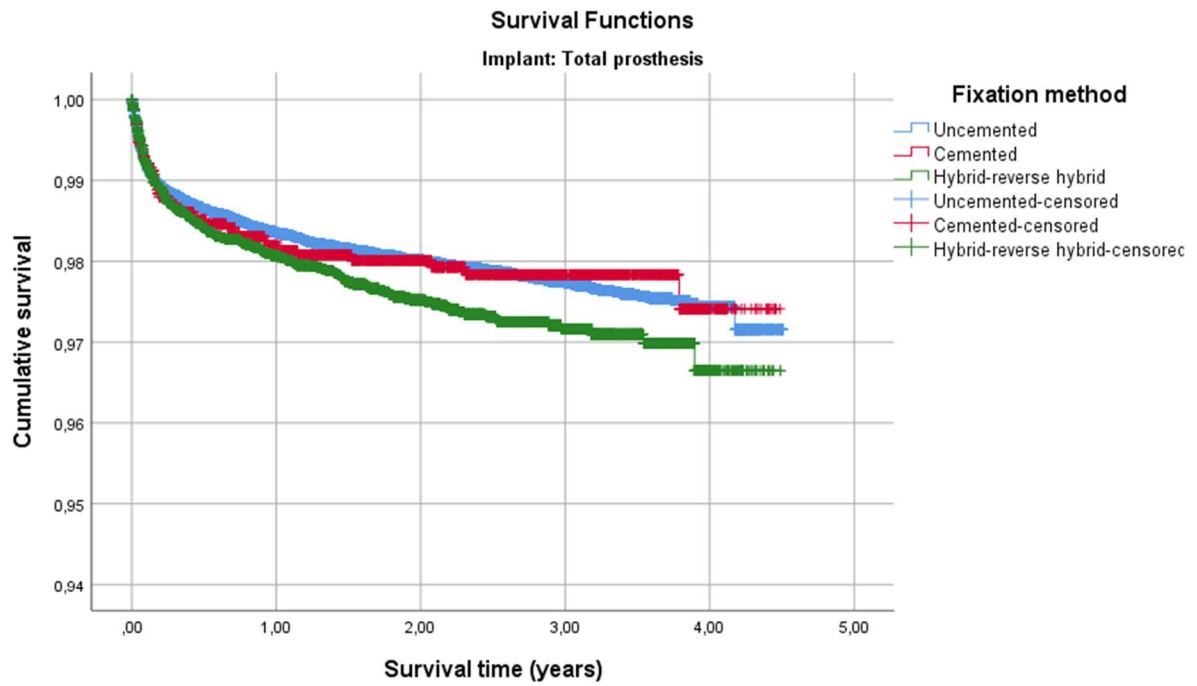
Number of events/Number at risk					
	0	1	2	3	4
Total prosthesis	1344/85564	185/60679	82/38186	28/17663	1/996
Total dual-mobility prosthesis	150/6797	20/4606	10/2817	0/1179	0/45
Hemi - Unipolar	10/272	3/142	1/77	0/39	0/4
Hemi - Bipolar	464/17813	47/10229	8/5744	1/2401	0/209
Resurfacing	17/1044	2/723	2/444	1/175	0/6

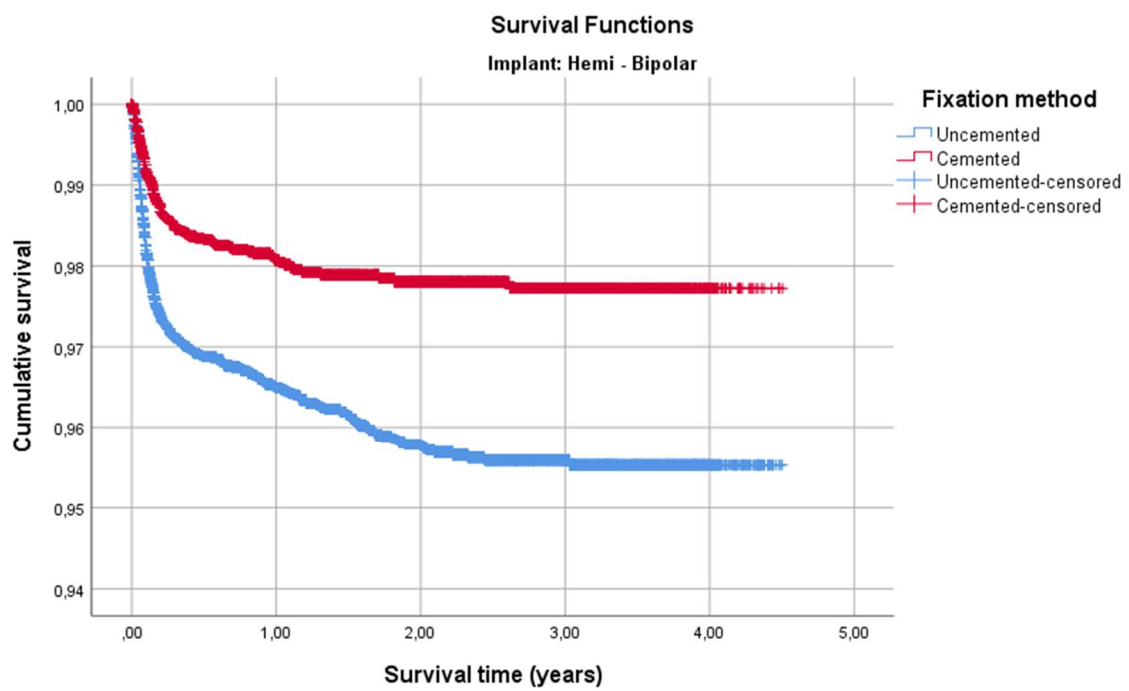
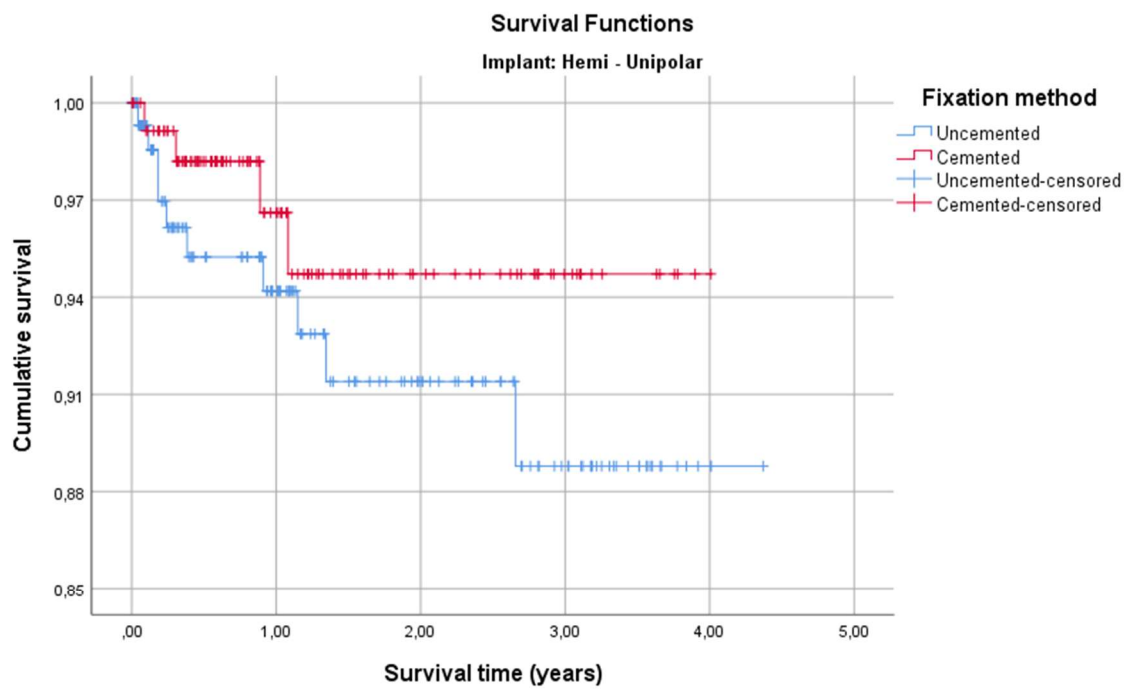
Figure 3.20 Kaplan-Meier curve for bearing surface for total hip prostheses at primary hip replacement

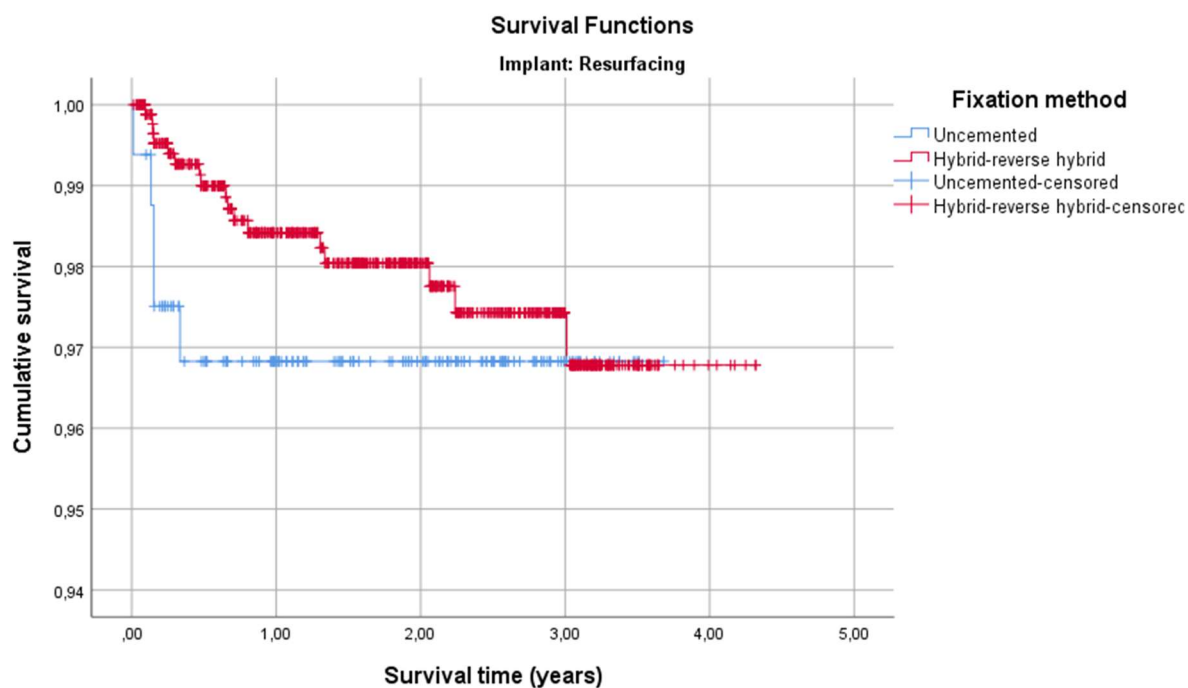


	Number of events/Number at risk										
	0	1	2	3	4	5	6	7	8	9	10
Metal – Poly-ethylene	116/8289	24/6839	14/5462	6/4205	1/2967	2/1586	0/1081	1/620	1/256	0/108	0/0
Ceramic – Poly-ethylene	575/36285	94/27196	46/19872	28/13423	15/8258	15/4727	3/2835	1/1359	1/491	1/163	0/1
Metal - Metal	13/1323	8/1255	5/1205	2/1153	1/1025	0/822	0/719	0/521	1/241	0/85	0/0
Ceramic - Ceramic	803/59716	131/45681	79/32285	43/19915	10/10115	8/4470	4/2659	3/1428	1/607	0/196	0/0
Other	22/2298	5/1870	2/1447	3/988	0/598	0/318	0/150	0/93	0/46	0/4	0/0

Figure 3.21 Kaplan-Meier curves for method of fixation according to primary hip replacement prosthesis type

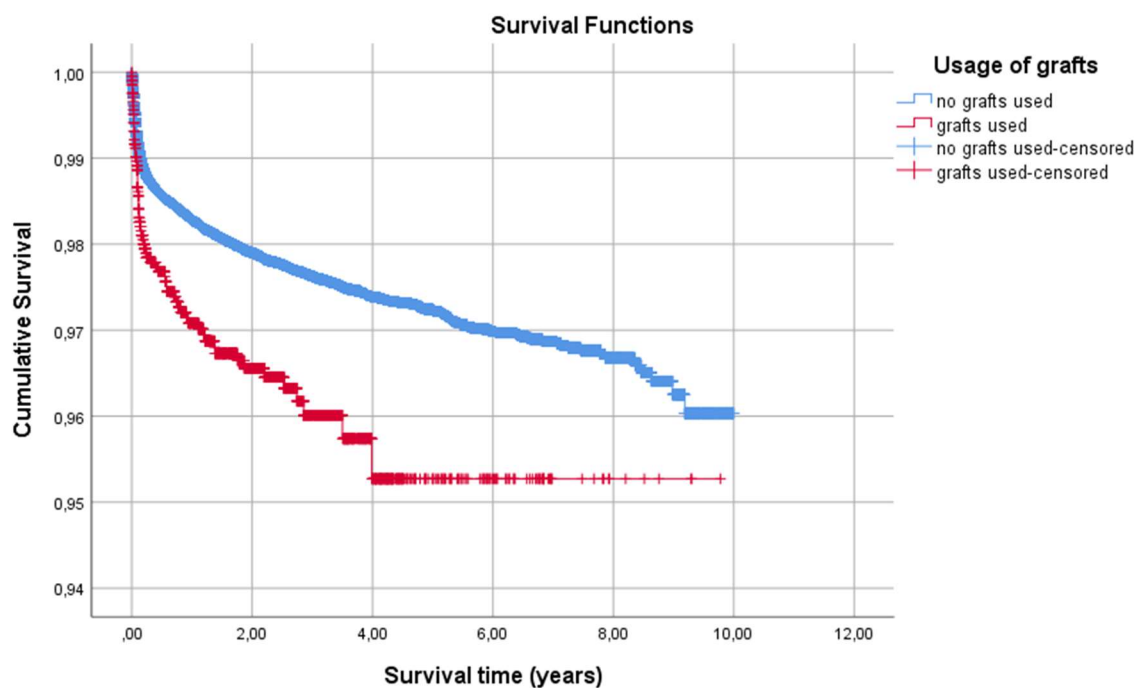






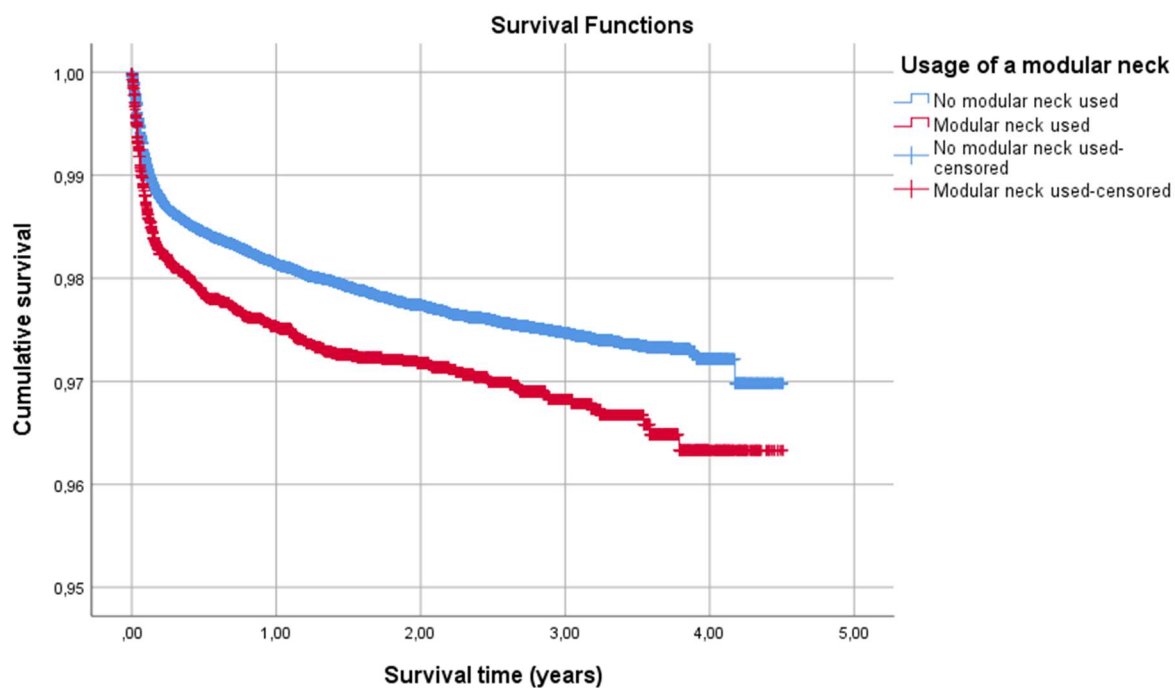
		Number of events/Number at risk				
		0	1	2	3	4
Total prosthesis	Uncemented	1135/73778	150/52130	68/32635	24/15031	1/844
	Cemented	39/2297	3/1733	2/1231	1/688	0/56
	Hybrid	170/9489	32/6816	12/4320	3/1944	0/96
Total dual-mobility prosthesis	Uncemented	108/4820	9/3309	6/2018	0/818	0/36
	Cemented	10/457	4/297	2/200	0/96	0/2
	Hybrid	32/1520	7/1000	2/599	0/265	0/7
Hemi - Unipolar	Uncemented	7/153	2/84	1/49	0/27	0/3
	Cemented	3/119	1/58	0/28	0/12	0/1
Hemi - Bipolar	Uncemented	363/11760	39/6732	7/3758	1/1628	0/161
	Cemented	101/6053	8/3497	1/1986	0/773	0/48
Resurfacing	Uncemented	5/162	0/121	0/83	0/22	0/0
	Hybrid	12/875	2/596	2/357	1/150	0/6

Figure 3.22 Kaplan-Meier curve for usage of grafts during primary hip replacement



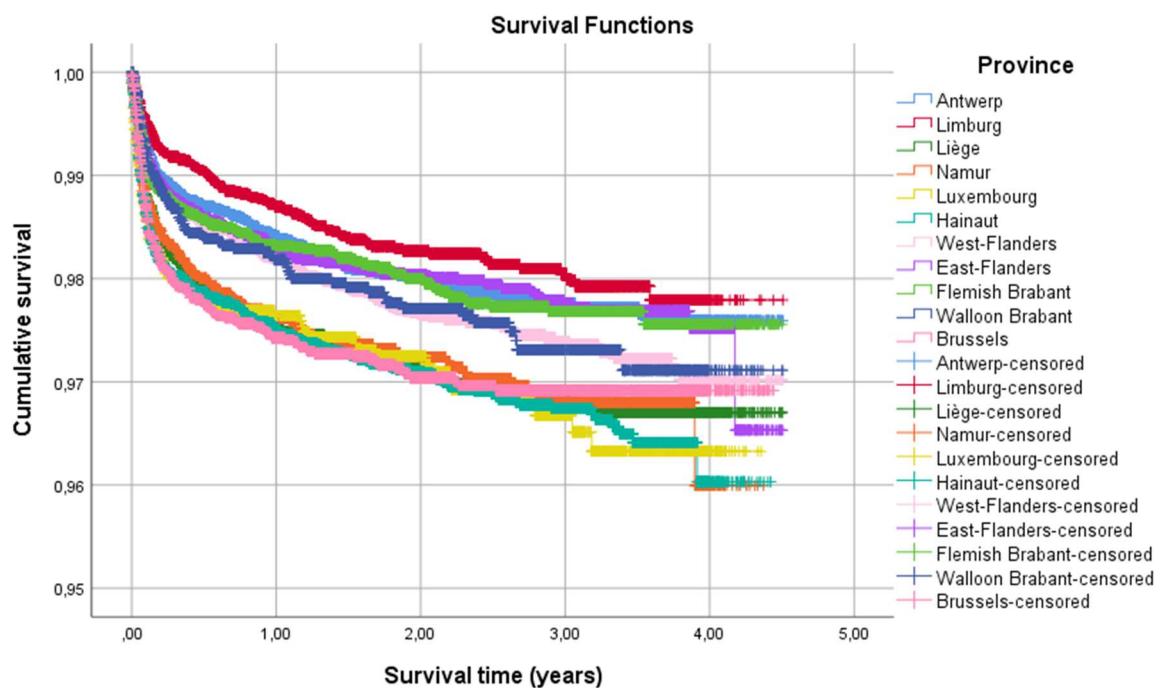
Number of events/Number at risk											
	0	1	2	3	4	5	6	7	8	9	10
No grafts used	2152/133828	334/99061	166/70319	84/44954	27/25020	27/12675	7/7851	6/4224	4/1749	1/593	0/1
Grafts used	56/2054	7/1487	4/1034	2/521	0/202	0/75	0/42	0/12	0/6	0/3	0/0

Figure 3.23 Kaplan-Meier curve for usage of a modular neck during primary hip replacement



Number of events/Number at risk					
	0	1	2	3	4
No modular neck used	1708/99323	227/67908	87/41787	23/18980	1/1026
Modular neck used	250/10853	25/7607	13/4961	6/2263	0/224

Figure 3.24 Kaplan-Meier curve for location where primary hip replacement was performed



	Number of events/Number at risk				
	0	1	2	3	4
Antwerp	254/17515	42/11944	14/7168	3/3224	0/256
Limburg	106/8961	23/6186	6/3826	3/1720	0/35
Liège	239/10545	25/7212	9/4591	4/2135	0/135
Namur	108/4861	11/3398	7/2151	1/985	0/42
Luxembourg	65/2893	7/2029	6/1289	2/617	0/37
Hainaut	302/12987	32/8964	16/5507	6/2381	0/77
West-Flanders	262/15725	47/10681	13/6683	6/3112	0/171
East-Flanders	234/15080	25/10270	12/6341	3/2903	1/235
Flemish Brabant	154/9905	17/6691	11/4099	1/1789	0/120
Walloon Brabant	66/3927	11/2745	5/1690	1/800	0/38
Brussels	164/6859	15/4700	3/2930	0/1341	0/92

3.3 NINETY-DAYS MORTALITY AFTER HIP REPLACEMENT PROCEDURES (SINCE 2015)

Table 3.15 90-days mortality after hip replacement by type of procedure

	Alive 90 days post-procedure		Died before 90 days post-procedure	
	Count	N %	Count	N %
Primary procedure	107.347	97,5%	2.724	2,5%
Revision with new prosthesis	10.697	97,2%	307	2,8%
Resection with spacer	626	94,6%	36	5,4%
Resection without spacer	33	84,6%	6	15,4%
Total	118.703	97,5%	3.073	2,5%

Table 3.16 90-days mortality after hip replacement by age category

	Alive 90 days post-procedure		Died before 90 days post-procedure	
	Count	N %	Count	N %
<45	4.107	99,9%	4	0,1%
45-59	20.254	99,7%	55	0,3%
60-69	29.677	99,5%	158	0,5%
70-79	34.606	98,6%	496	1,4%
>=80	30.024	92,7%	2.360	7,3%
Total [Missing]	118.668 [5]	97,5%	3.073	2,5%