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**Orthopride**  
**Belgian Hip and Knee Arthroplasty Registry**  
**Annual Report**  
**2017**

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November 2018



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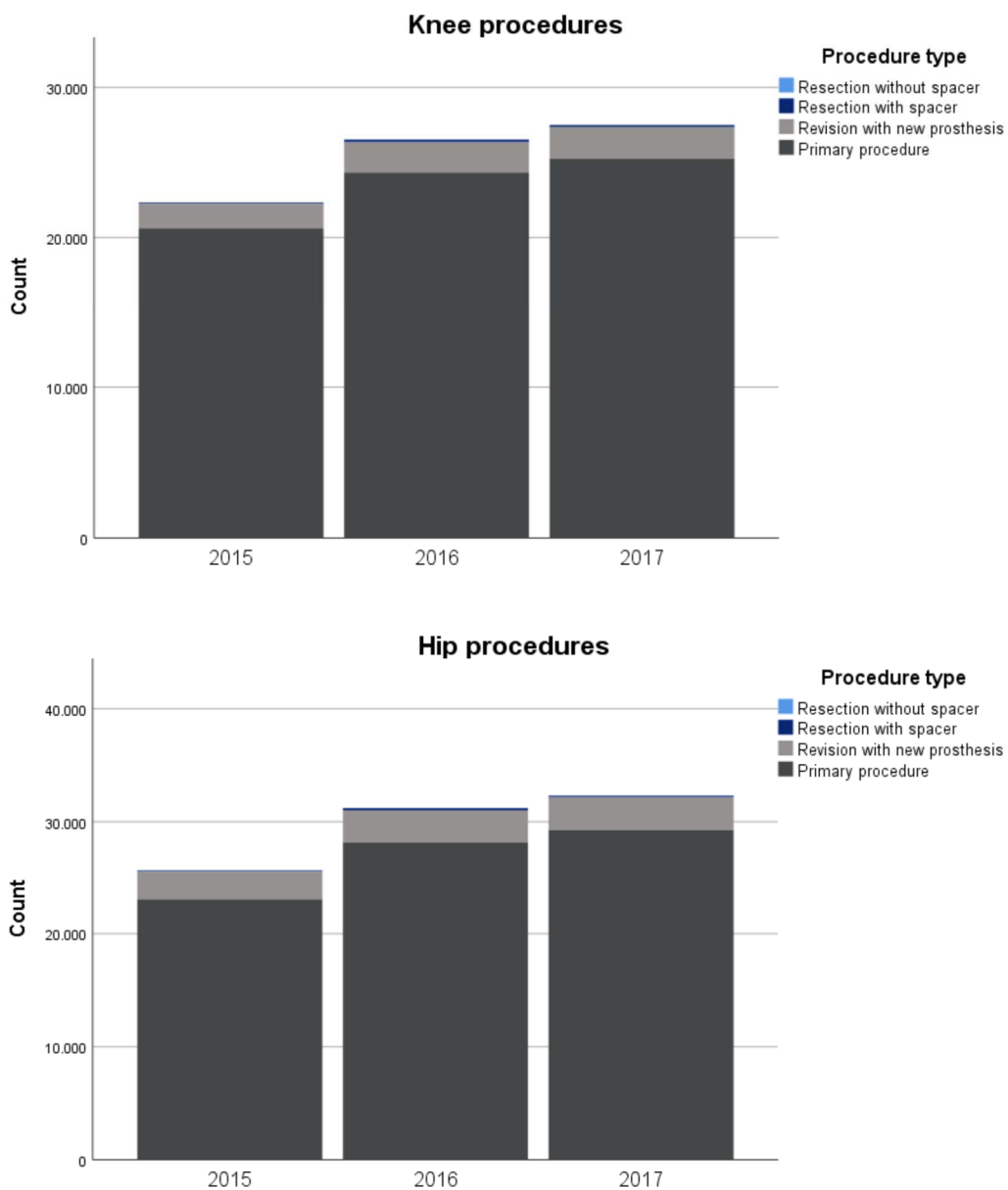
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# 1 GENERAL INTRODUCTION

Table 1.1 Total joint replacement procedures entered in Orthopride during 2017

	Knee procedures	Hip procedures
Primary procedure	22981	26505
Revision with new prosthesis	1838	2530
Resection with spacer	126	131
Resection without spacer	6	12
<b>Total per joint</b>	<b>24951</b>	<b>29178</b>

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



**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*
<b>Antwerp</b>	3568	14,3%	194	46%	25%
<b>Brussels</b>	1393	5,6%	117	36%	18%
<b>East-Flanders</b>	3929	15,8%	263	47%	25%
<b>Flemish Brabant</b>	2085	8,4%	185	47%	25%
<b>Hainaut</b>	3040	12,2%	227	45%	24%
<b>Liège</b>	2158	8,7%	196	45%	24%
<b>Limburg</b>	2075	8,3%	239	49%	26%
<b>Luxembourg</b>	677	2,7%	240	43%	22%
<b>Namur</b>	1012	4,1%	206	45%	24%
<b>Walloon Brabant</b>	786	3,2%	197	46%	24%
<b>West-Flanders</b>	3763	15,1%	317	51%	29%
<b>Other Country</b>	385	1,5%			
<b>Total [Missing]</b>	<b>24871 [80]</b>	<b>100%</b>			

\* 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 ± SD)	Frequency	Row Percent	Age (mean ± SD)
<b>Antwerp</b>	3292	92,3	68,1 +/- 10,1	276	7,7	66,6 +/- 11,0
<b>Limburg</b>	1936	93,3	66,9 +/- 10,4	139	6,7	65,6 +/- 12,2
<b>Liège</b>	1989	92,2	67,2 +/- 10	169	7,8	66,3 +/- 11,7
<b>Namur</b>	952	94,1	67,9 +/- 9,6	60	5,9	65,6 +/- 13,9
<b>Luxembourg</b>	618	91,3	67,1 +/- 10	59	8,7	66,3 +/- 9,9
<b>Hainaut</b>	2807	92,3	67,4 +/- 9,6	233	7,7	66,4 +/- 11,0
<b>West-Flanders</b>	3510	93,3	67,8 +/- 10,2	253	6,7	65,1 +/- 11,3
<b>East-Flanders</b>	3515	89,5	66,7 +/- 10,7	414	10,5	62,8 +/- 12,3
<b>Flemish Brabant</b>	1959	94	68,9 +/- 9,9	126	6	67,6 +/- 11,4
<b>Walloon Brabant</b>	734	93,4	68,6 +/- 9,5	52	6,6	74,2 +/- 10,7
<b>Brussels</b>	1254	90	68,3 +/- 10,2	139	10	68,8 +/- 10,9
<b>Other Country</b>	340	88,3	65 +/- 10,1	45	11,7	64,8 +/- 10,2
<b>Total</b>	<b>22906</b>	<b>92,1</b>	<b>67,6 +/- 10,1</b>	<b>1965</b>	<b>7,9</b>	<b>65,8 +/- 11,7</b>



**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*
<b>Antwerp</b>	4703	16,2%	256	46%	25%
<b>Brussels</b>	1780	6,1%	149	36%	18%
<b>East-Flanders</b>	3950	13,6%	264	47%	25%
<b>Flemish Brabant</b>	2543	8,7%	225	47%	25%
<b>Hainaut</b>	3505	12,1%	262	45%	24%
<b>Liège</b>	2571	8,8%	233	45%	24%
<b>Limburg</b>	2313	8%	267	49%	26%
<b>Luxembourg</b>	778	2,7%	276	43%	22%
<b>Namur</b>	1284	4,4%	261	45%	24%
<b>Walloon Brabant</b>	1056	3,6%	265	46%	24%
<b>West-Flanders</b>	4089	14,1%	345	51%	29%
<b>Other Country</b>	502	1,7%			
<b>Total</b>	<b>29074</b>	<b>100%</b>			
<b>[Missing]</b>	<b>[104]</b>				

\* 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 ± SD)	Frequency	Row Percent	Age (mean ± SD)
<b>Antwerp</b>	4319	91,9%	70,6 +/- 12,8	383	8,1%	71,2 +/- 13,4
<b>Brussels</b>	1600	89,9%	72,4 +/- 13,3	180	10,1%	72,7 +/- 12,9
<b>East-Flanders</b>	3596	91%	69,8 +/- 13,3	354	9%	71,6 +/- 12,3
<b>Flemish Brabant</b>	2360	92,8%	70,7 +/- 12,7	183	7,2%	71,6 +/- 13,3
<b>Hainaut</b>	3126	89,2%	69,2 +/- 12,9	379	10,8%	70,2 +/- 12,2
<b>Liège</b>	2340	91%	69,7 +/- 13	231	9%	70,3 +/- 14,6
<b>Limburg</b>	2145	92,7%	68,8 +/- 12,7	168	7,3%	71,2 +/- 12,5
<b>Luxembourg</b>	676	86,9%	69,7 +/- 13,5	102	13,1%	71,6 +/- 12,7
<b>Namur</b>	1146	89,3%	69,5 +/- 12,7	138	10,7%	71,6 +/- 12
<b>Walloon Brabant</b>	969	91,8%	69,8 +/- 12,5	87	8,2%	72,8 +/- 12,1
<b>West-Flanders</b>	3693	90,3%	70,1 +/- 12,7	396	9,7%	71,2 +/- 12
<b>Other Country</b>	445	88,6%	71,1 +/- 12,9	57	11,4%	66 +/- 19,1
<b>Total</b>	<b>26416</b>	<b>90,9%</b>	<b>69,9 +/- 13</b>	<b>2658</b>	<b>9,1%</b>	<b>71,1 +/- 12,9</b>

## 2 KNEE REPLACEMENT

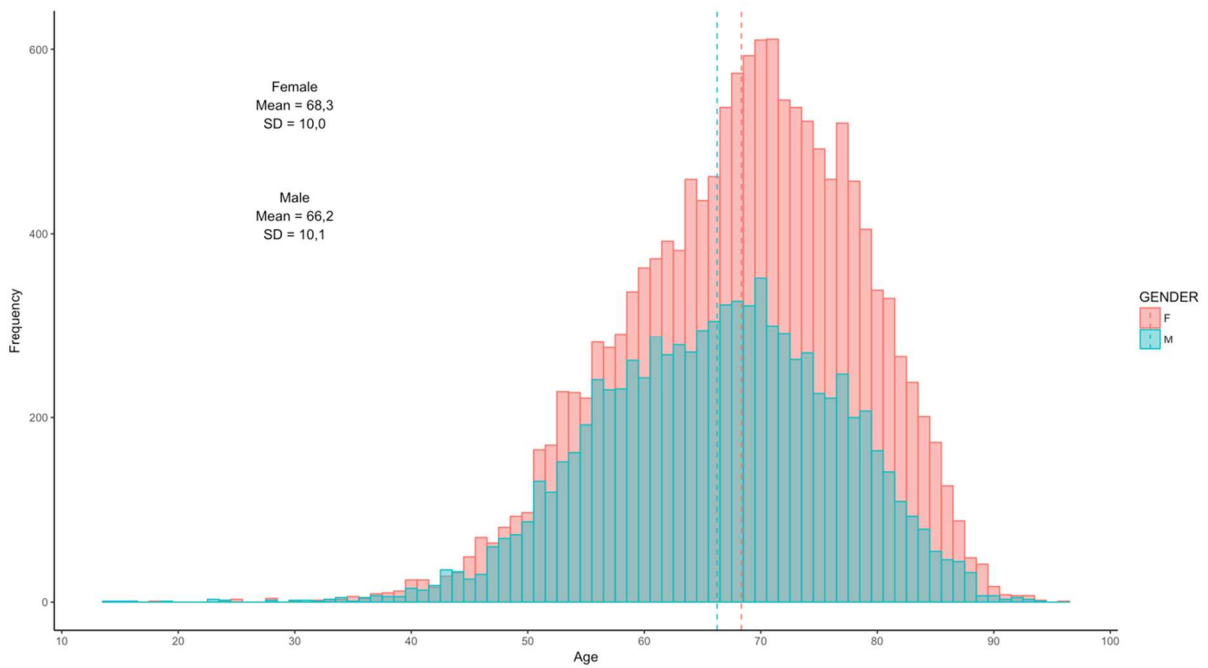
### 2.1 PRIMARY KNEE REPLACEMENT

#### 2.1.1 Demographics

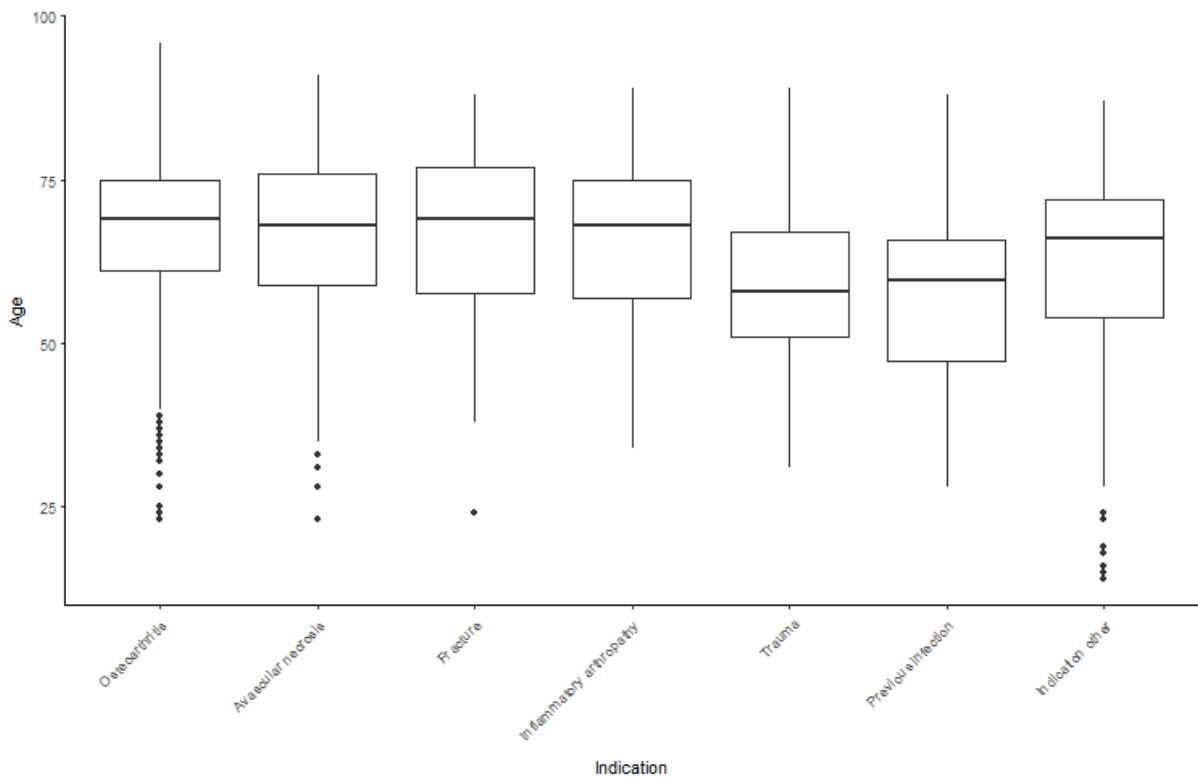
Table 2.1 Age, gender and indications for primary knee replacement patients

N=41774		
	Mean	SD
Age (yrs)	67,6	10,1
	Count	N %
Age categories		
<45	350	1,5%
45-59	4715	20,5%
60-69	7492	32,6%
70-79	7736	33,7%
>=80	2681	11,7%
Gender		
Female	14462	62,9%
Male	8518	37,1%
Indication		
Osteoarthritis	21768	94,7%
Avascular necrosis	322	1,4%
Fracture	80	0,3%
Inflammatory arthropathy	137	0,6%
Post trauma	479	2,1%
Previous infection	18	0,1%
Indication other	177	0,8%

**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= 8518	N= 14462
	N (%)	N (%)
<b>Osteoarthritis</b>	7940 (93,2)	13827 (95,6)
<b>Post trauma</b>	275 (3,2)	204 (1,4)
<b>Avascular necrosis</b>	120 (1,4)	202 (1,4)
<b>Fracture</b>	28 (0,3)	52 (0,4)
<b>Inflammatory arthropathy</b>	53 (0,6)	84 (0,6)
<b>Previous infection</b>	12 (0,1)	6 (0,0)
<b>Indication other</b>	90 (1,1)	87 (0,6)

**Table 2.3 Medical history of primary knee replacement patients**

	Count	Percentage of total
<b>No pre-operative surgeries</b>	16286	70,9%
<b>Pre-op Osteosynthesis of the tibia</b>	236	1,0%
<b>Pre-op Osteosynthesis of the femur</b>	221	1,0%
<b>Pre-op Osteotomy</b>	295	1,3%
<b>Pre-op Synovectomy</b>	98	0,4%
<b>Pre-op Meniscectomy</b>	5013	21,8%
<b>Pre-op ACL reconstruction</b>	343	1,5%
<b>Pre-op Other</b>	978	4,3%

**Table 2.4 Pre-operative alignment of primary knee replacement patients**

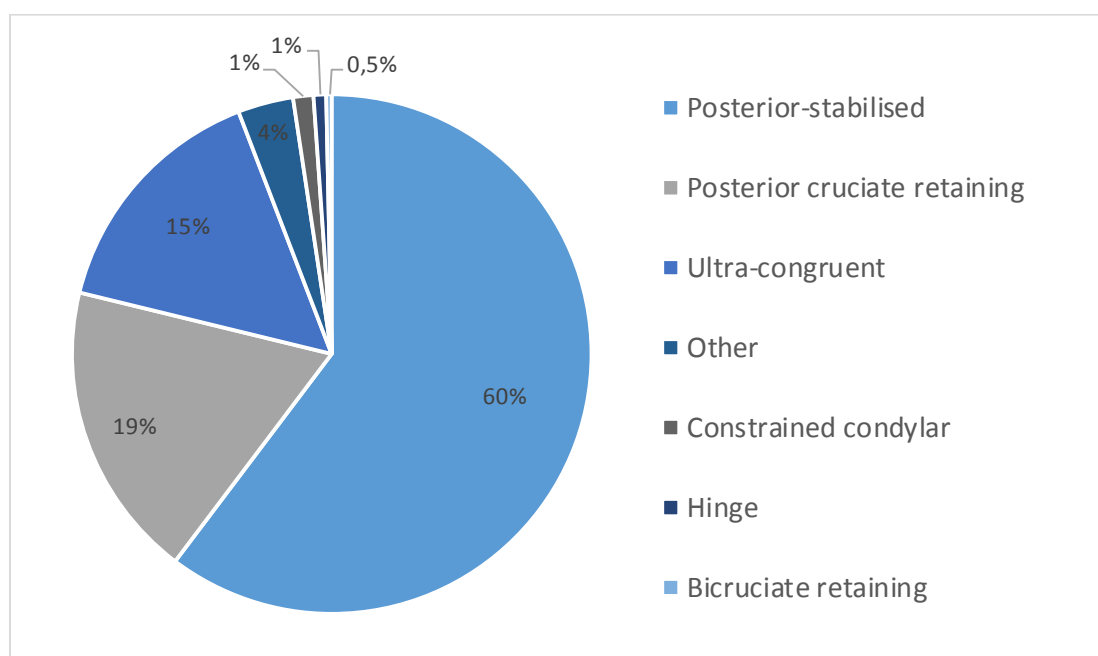
	Count	Percentage of total
<b>Normal</b>	6699	29,1%
<b>Valgus</b>	4539	19,8%
<b>Varus</b>	11743	51,1%

## 2.1.2 Surgical technique and implant characteristics

**Table 2.5 Numbers and percentages of primary knee replacement types**

	Number	Percentage of total
<b>Total knee replacement</b>	20060	87,3%
<b>Unicompartmental replacement</b>	2131	9,3%
<b>Bicompartmental replacement</b>	347	1,5%
<b>Patellofemoral replacement</b>	432	1,9%
<b>Partial resurfacing femoral condyle</b>	11	0,1%
<b>Total</b>	<b>22981</b>	<b>100%</b>

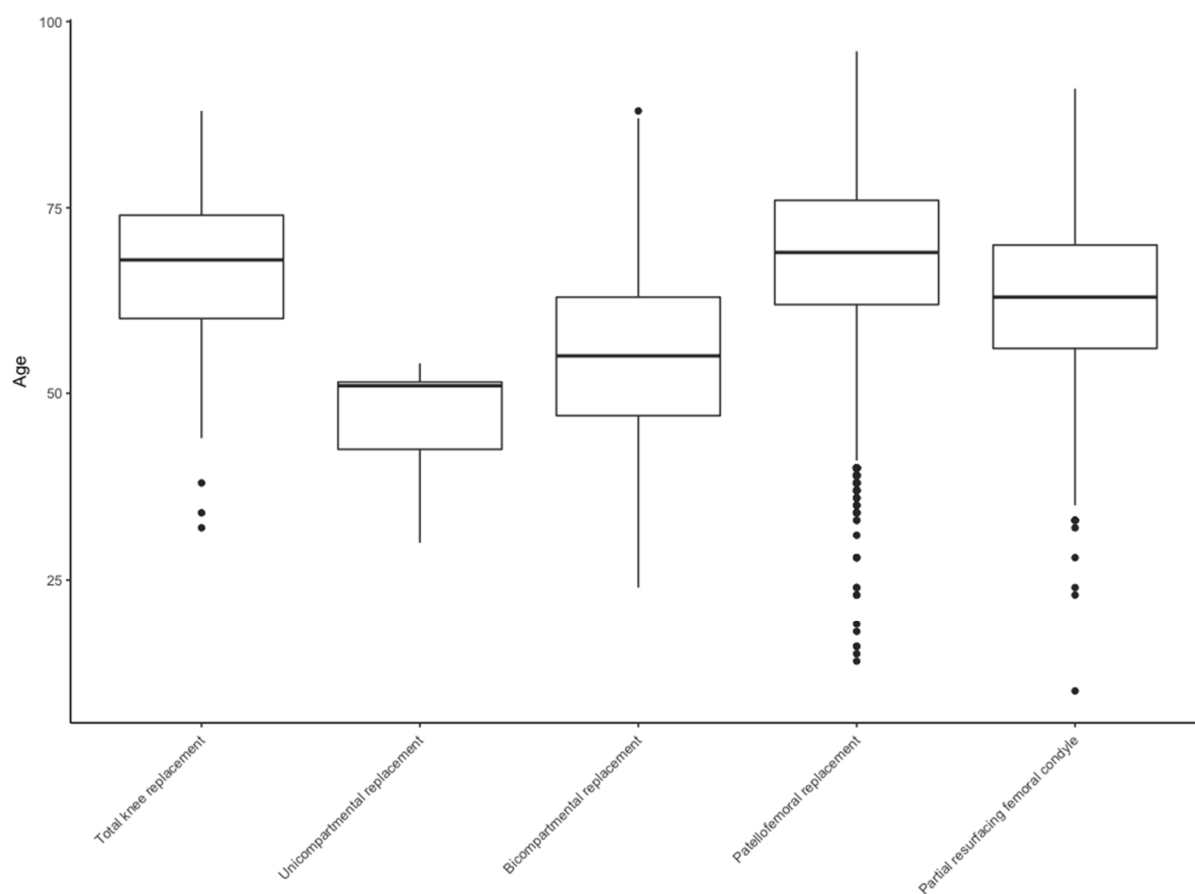
**Figure 2.3 Distribution of primary total knee prosthesis types**



**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
	<b>N=20060</b>	<b>N=2131</b>	<b>N=347</b>	<b>N=432</b>	<b>N=11</b>
<b>Mean age (years) (SD)</b>	68,3 ( 9,8)	63,0 (10,4)	67,2 ( 9,7)	55,4 (11,4)	46,0 ( 9,0)
<b>Age groups [Missing]</b>	<b>% (N)[7]</b>	<b>% (N)</b>	<b>% (N)</b>	<b>% (N)</b>	<b>% (N)</b>
<b>&lt;45</b>	1,1 (212)	2,6 (56)	1,4 (5)	17,1 (74)	27,3 (3)
<b>45-59</b>	18,2 (3649)	35,9 (766)	21,6 (75)	50,2 (217)	72,7 (8)
<b>60-69</b>	32,6 (6545)	34,7 (739)	33,1 (115)	21,5 (93)	0 (0)
<b>70-79</b>	35,6 (7143)	20,6 (439)	34,9 (121)	7,6 (33)	0 (0)
<b>&gt;=80</b>	12,5 (2504)	6,1 (131)	8,9 (31)	3,5 (15)	0 (0)
<b>Gender [Missing]</b>	<b>% (N)</b>	<b>% (N) [1]</b>	<b>% (N)</b>	<b>% (N)</b>	<b>% (N)</b>
<b>Female</b>	63,9 (12825)	50 (1065)	64,3 (223)	79,4 (343)	54,5 (6)
<b>Male</b>	36,1 (7235)	50 (1065)	35,7 (124)	20,6 (89)	45,5 (5)

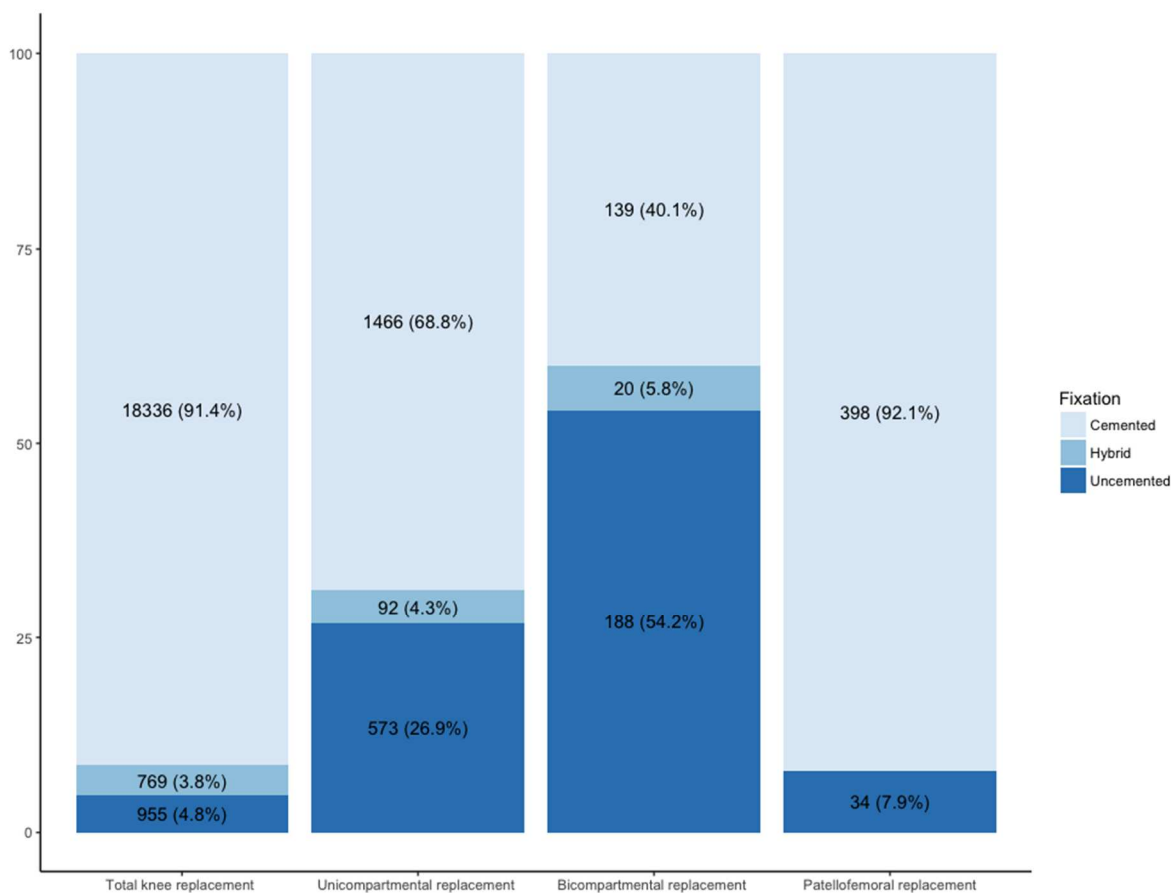
**Figure 2.4 Age distribution by implant type for primary knee replacement patients**



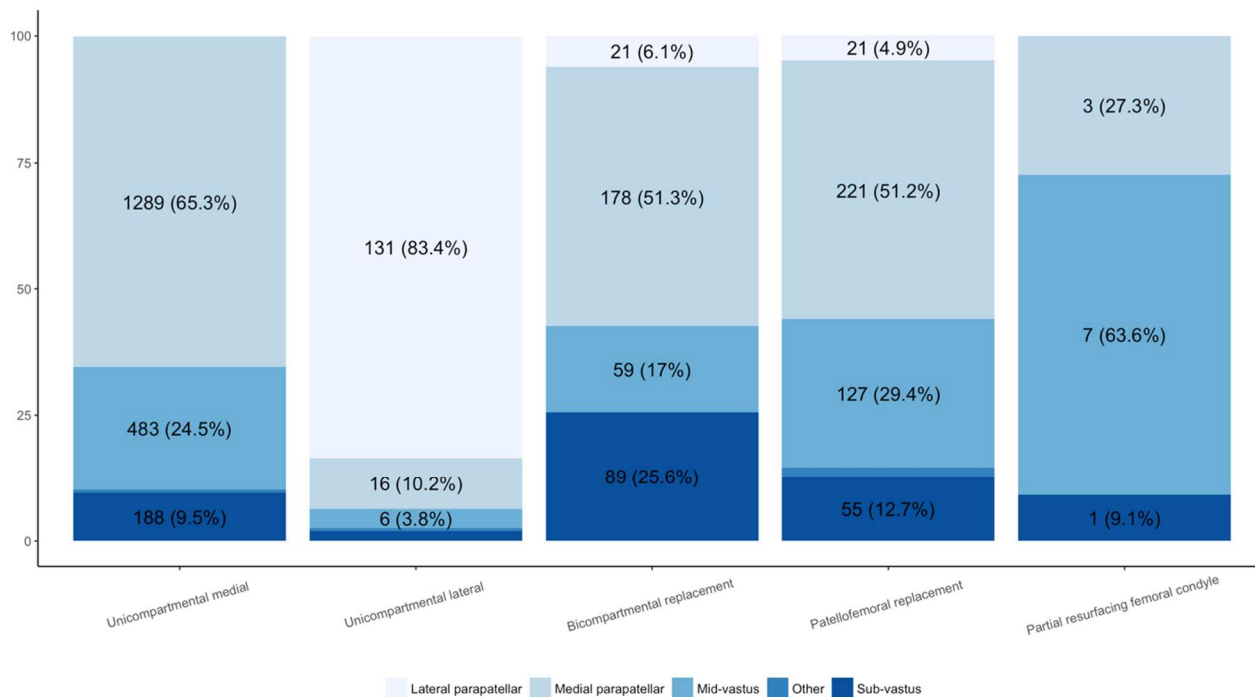
**Table 2.7 Numbers and percentages of primary knee prosthesis fixation by type of prosthesis**

	Total knee replacement	Unicompartmental replacement	Bicompartmental replacement	Patellofemoral replacement
	<b>N=20060</b>	<b>N=2131</b>	<b>N=347</b>	<b>N=432</b>
	<b>% (N)</b>	<b>% (N)</b>	<b>% (N)</b>	<b>% (N)</b>
<b>Cemented</b>	91,4 (18336)	68,8 (1466)	40,1 (139)	92,1 (398)
<b>Revers hybrid</b>	0,2 (36)	0,8 (17)	1,4 (5)	0 (0)
<b>Hybrid</b>	3,7 (733)	3,5 (75)	4,3 (15)	0 (0)
<b>Uncemented</b>	4,8 (955)	26,9 (573)	54,2 (188)	7,9 (34)

**Figure 2.5 Method of fixation by primary knee prosthesis type**

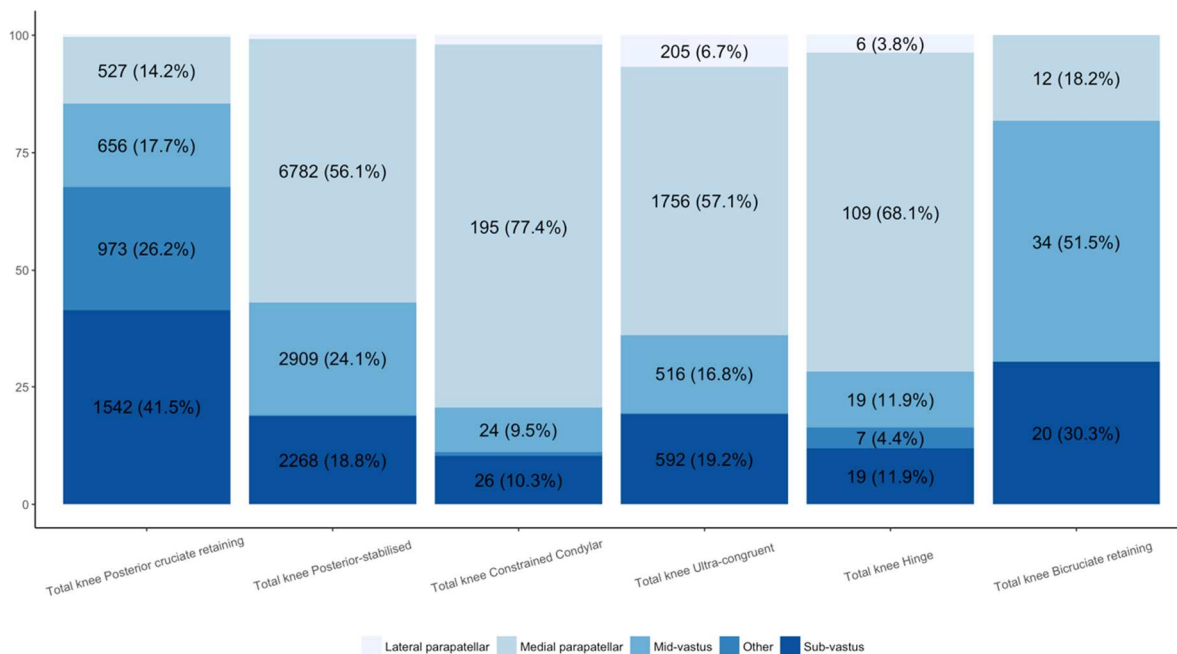


**Figure 2.6 Approach used during primary partial knee replacements**



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**



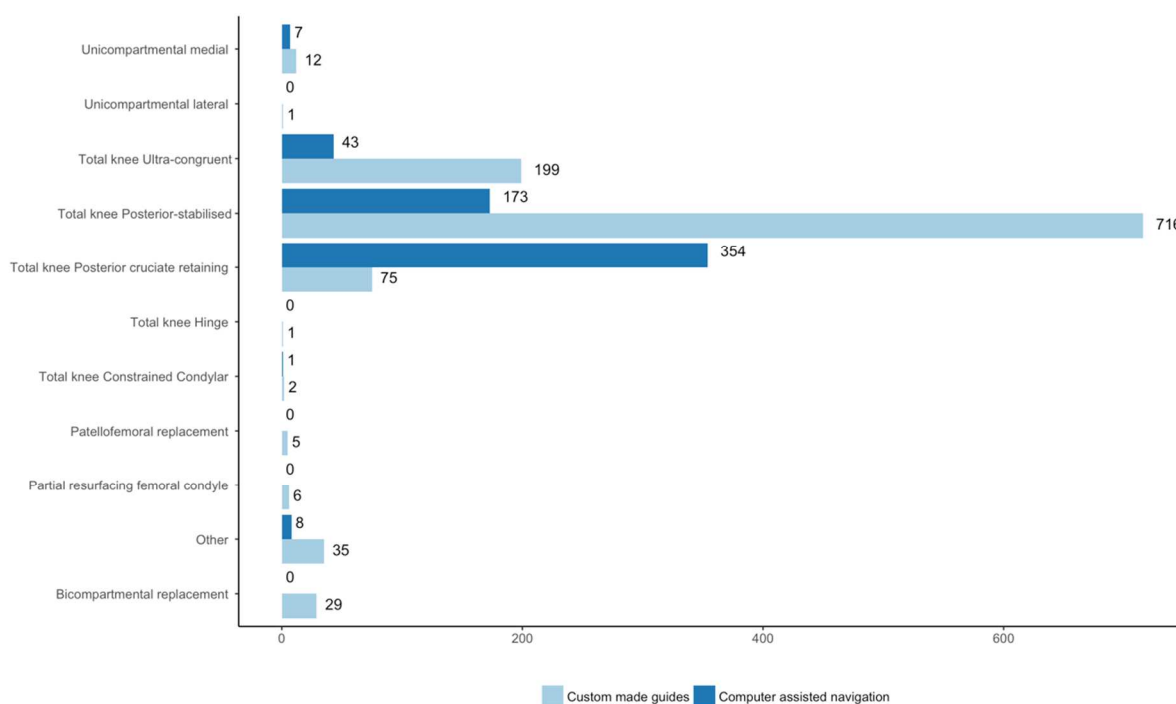
Note: For readability of the figure, labels with percentages smaller than 2% are not displayed.



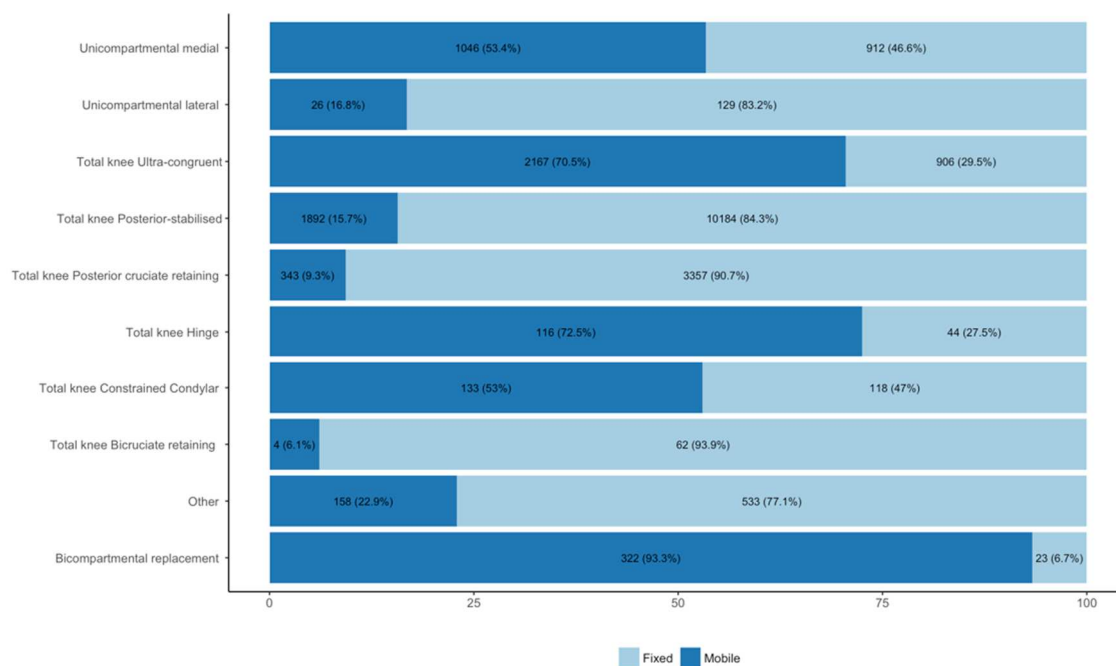
**Table 2.8 Usage of computer assisted navigation and custom made guides**

	Computer assisted navigation	Custom made guides
<b>Count (% of total procedures)</b>	586 (2,5%)	1081 (4,7%)
<b>Amount of hospitals (% of all hospitals)</b>	20/102 (19,6%)	32/102 (31,4%)

**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**



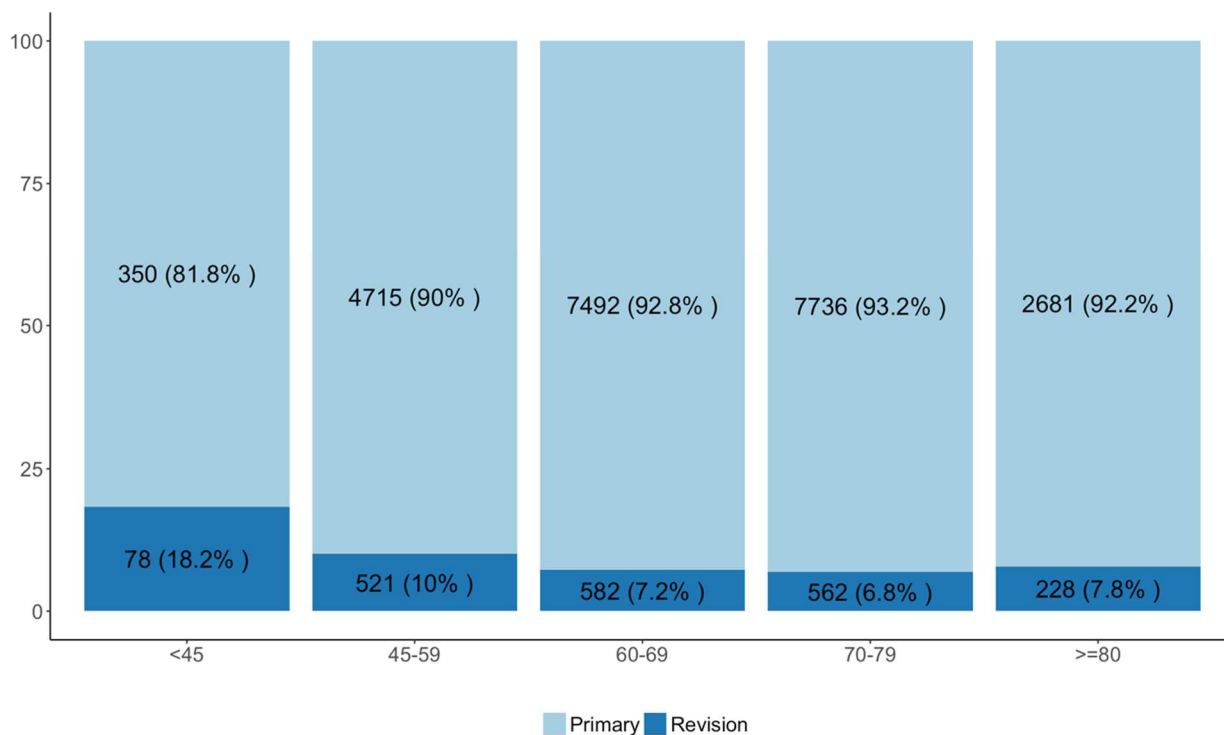
## 2.2 REVISIONS AFTER PRIMARY KNEE REPLACEMENT

### 2.2.1 Demographics

**Table 2.9 Age, gender and indications for knee revision procedures**

N=1970		
	Mean	SD
Age (yrs)	65,8	11,7
	Count	N %
<b>Age categories</b>		
<45	78	4,0
45-59	521	26,4
60-69	582	29,5
70-79	562	28,5
>=80	227	11,5
<b>Gender</b>		
Female	1128	62,3
Male	742	37,7
<b>Indication</b>		
Aseptic loosening	555	28,2
Wear of polyethylene component	110	5,6
Instability	352	17,9
Infection	387	19,6
Periprosthetic fracture	74	3,8
Pain	428	21,7
Stiffness	101	5,1
Malalignment	93	4,7
Implant fracture	20	1,0
Progressive osteoarthritis in non-replaced component	222	11,3
Indication other	192	9,7

**Figure 2.10 Knee revision burden according to age category**



**Figure 2.11 Age and gender by number of knee revision procedures**

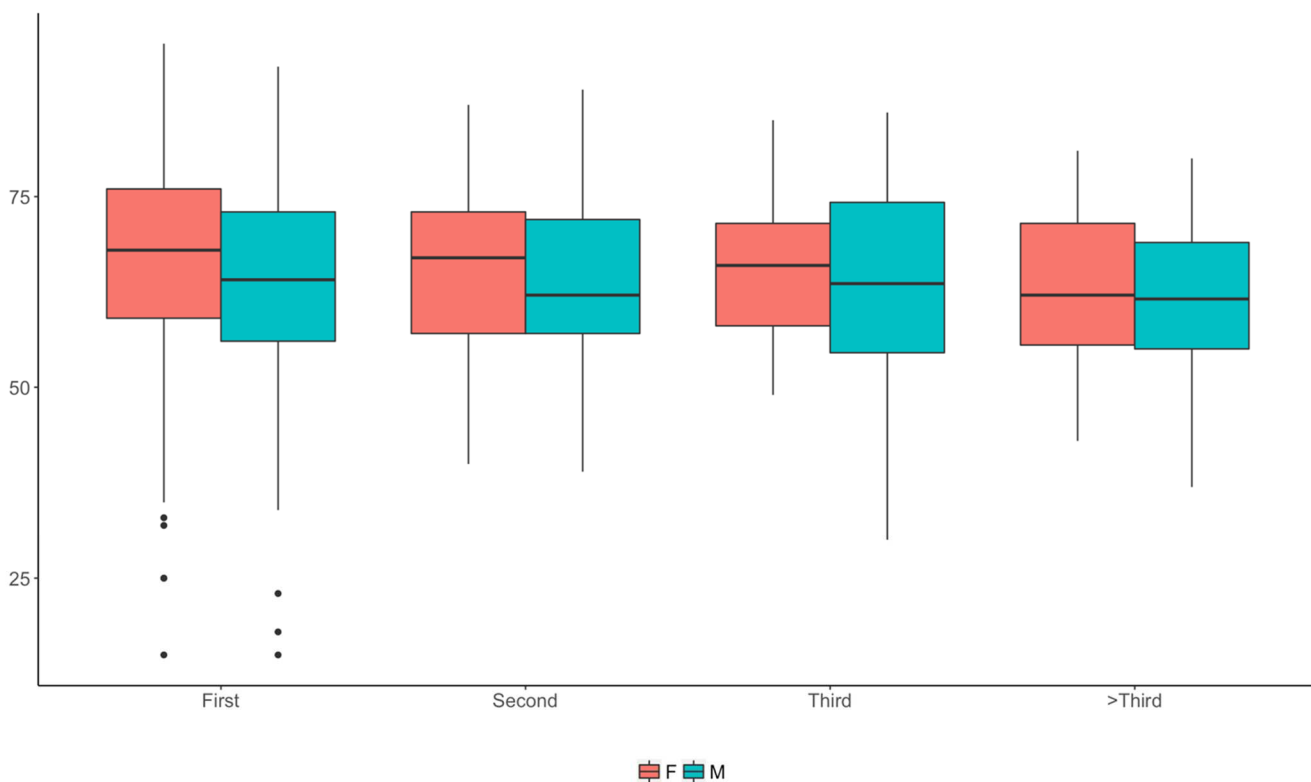
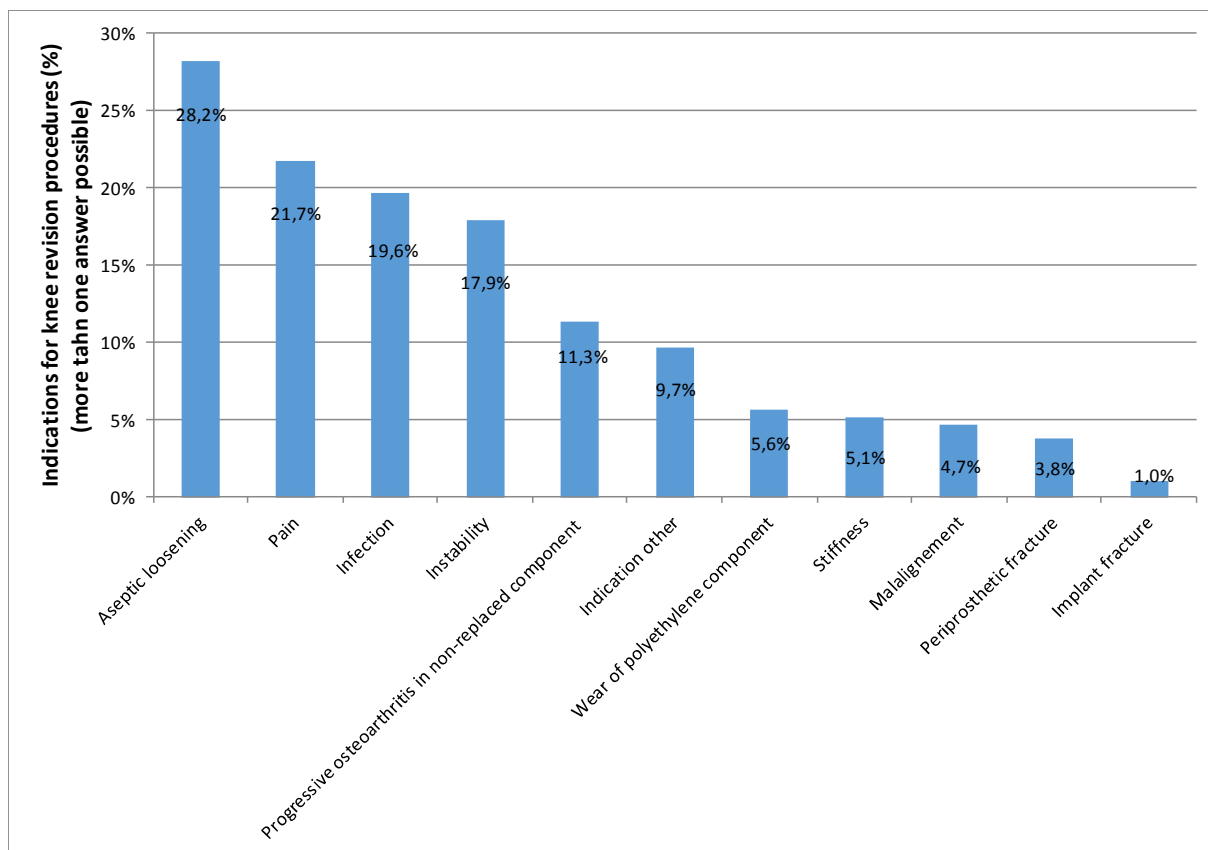


Figure 2.12 Indications for knee revision procedures



## 2.2.2 Surgical technique and implant characteristics

**Table 2.10 Components removed during knee revision procedures**

	Number	Proportion (%) <sup>1</sup>
<b>Tibia</b>	1223	66,5
<b>Femur</b>	1169	63,6
<b>Patella</b>	836	45,5
<b>Insert</b>	1581	86,0
<b>Total number of procedures</b>	<b>1838</b>	

<sup>1</sup>More than one component can be exchanged during a revision procedure.

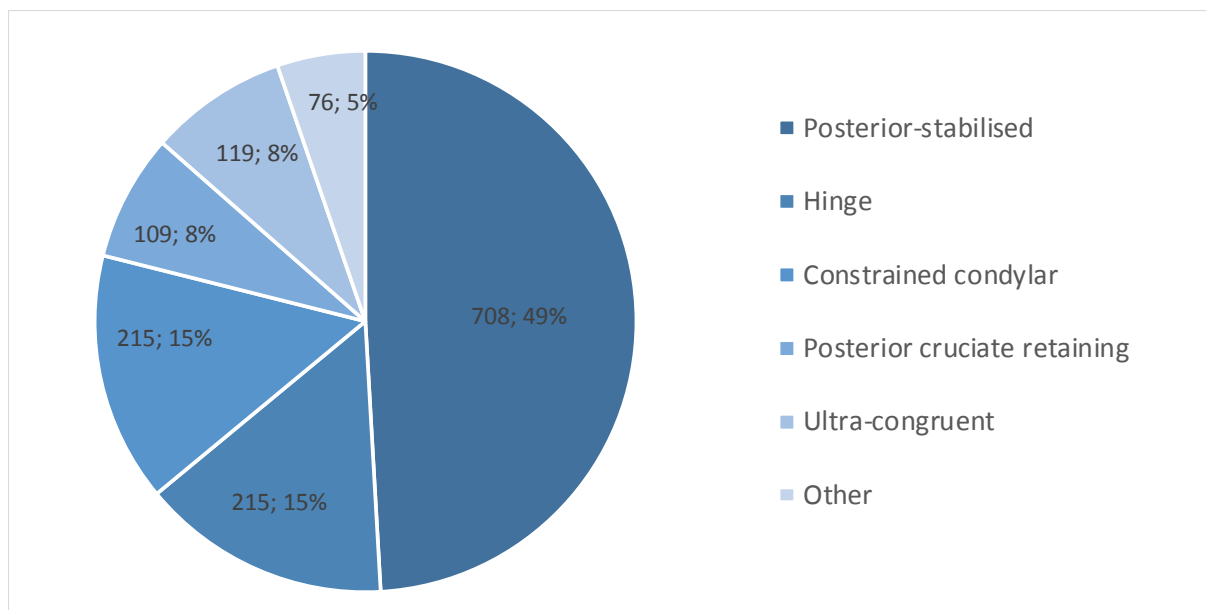
**Table 2.11 Combinations of removed components during knee revision procedures**

	Number	Percentage of total (%)
<b>All components</b>	1126	61,3
<b>Tibia and Insert</b>	90	4,9
<b>Patella and insert</b>	42	2,3
<b>Femur and insert</b>	22	1,2
<b>Insert only</b>	284	15,5
<b>Patella only</b>	246	13,4
<b>Femur only</b>	5	0,3
<b>Other combination</b>	23	1,3
<b>Total number of procedures</b>	<b>1838</b>	<b>100,0</b>

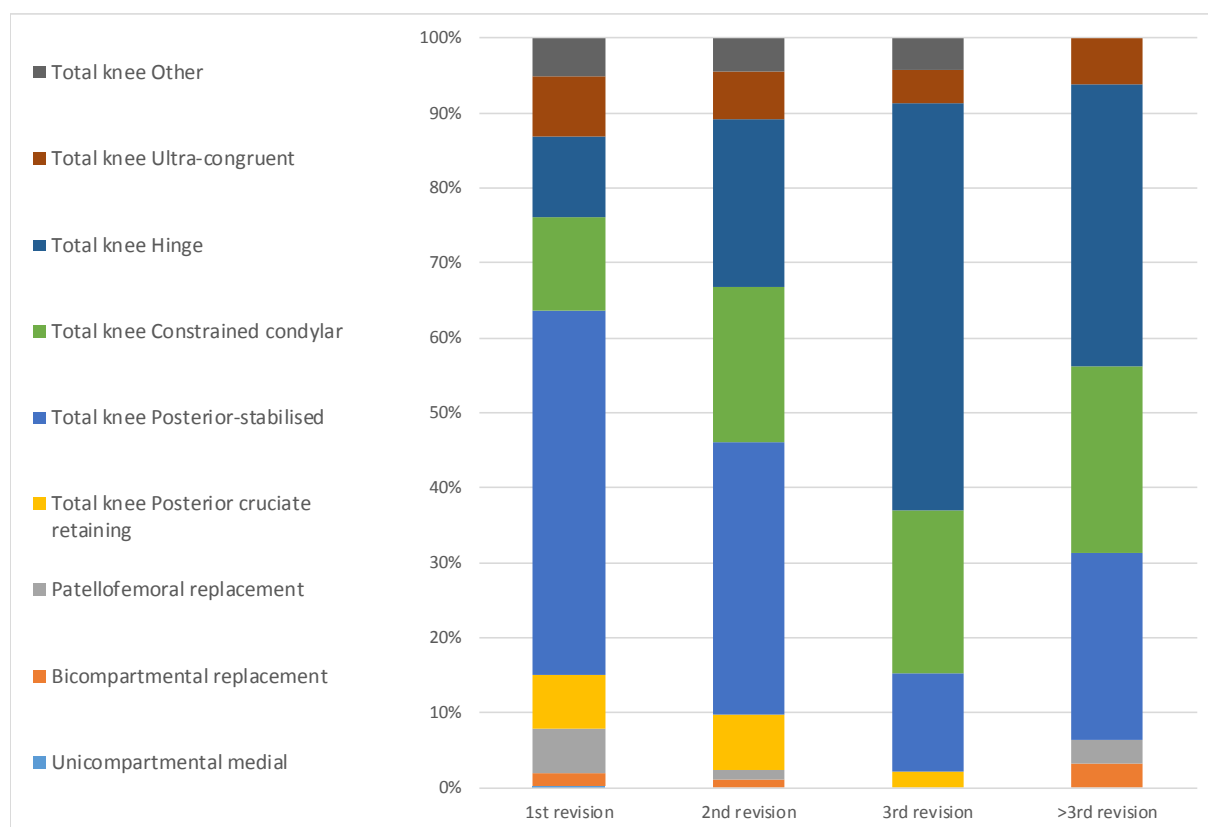
**Table 2.12 Numbers and percentages of implanted knee types during knee revision procedures**

	Number	Percentage of total (%)
<b>Total knee replacement</b>	1448	93,2
<b>Unicompartmental</b>	4	0,3
<b>Bicompartmental replacement</b>	25	1,6
<b>Patellofemoral replacement</b>	77	5,0
<b>Total number of procedures</b>	<b>1554</b>	<b>100,0</b>

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

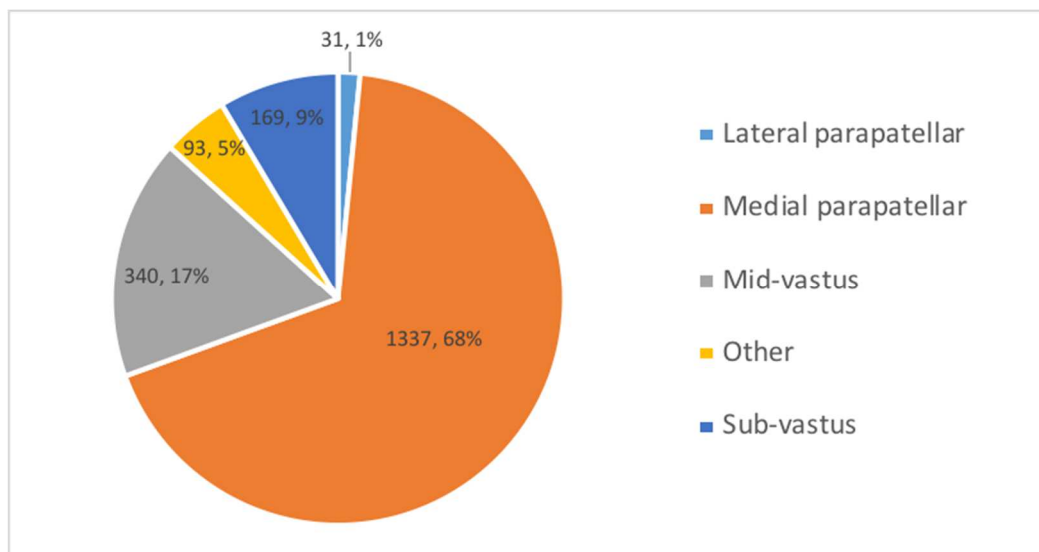


**Figure 2.14 Type of implanted knee prosthesis during revision procedures according to the number of revisions**



	1st revision	2nd revision	3rd revision	>3rd revision
	N (%)	N (%)	N (%)	N (%)
<b>Total knee Other</b>	66 (5,1)	8 (4,6)	2 (4,3)	0 (0)
<b>Total knee Ultra-congruent</b>	104 (8)	11 (6,3)	2 (4,3)	2 (6,3)
<b>Total knee Hinge</b>	139 (10,7)	39 (22,4)	25 (54,3)	12 (37,5)
<b>Total knee Constrained condylar</b>	161 (12,4)	36 (20,7)	10 (21,7)	8 (25)
<b>Total knee Posterior-stabilised</b>	631 (48,8)	63 (36,2)	6 (13)	8 (25)
<b>Total knee Posterior cruciate retaining</b>	93 (7,2)	13 (7,5)	1 (2,2)	0 (0)
<b>Patellofemoral replacement</b>	74 (5,7)	2 (1,1)	0 (0)	1 (3,1)
<b>Bicompartamental replacement</b>	22 (1,7)	2 (1,1)	0 (0)	1 (3,1)
<b>Unicompartmental medial</b>	4 (0,3)	0 (0)	0 (0)	0 (0)
<b>Total amount</b>	<b>1294 (100)</b>	<b>174 (100)</b>	<b>46 (100)</b>	<b>32 (100)</b>

**Figure 2.15 Approach during knee revision procedures**



**Table 2.13 Numbers and percentages of knee revisions by fixation**

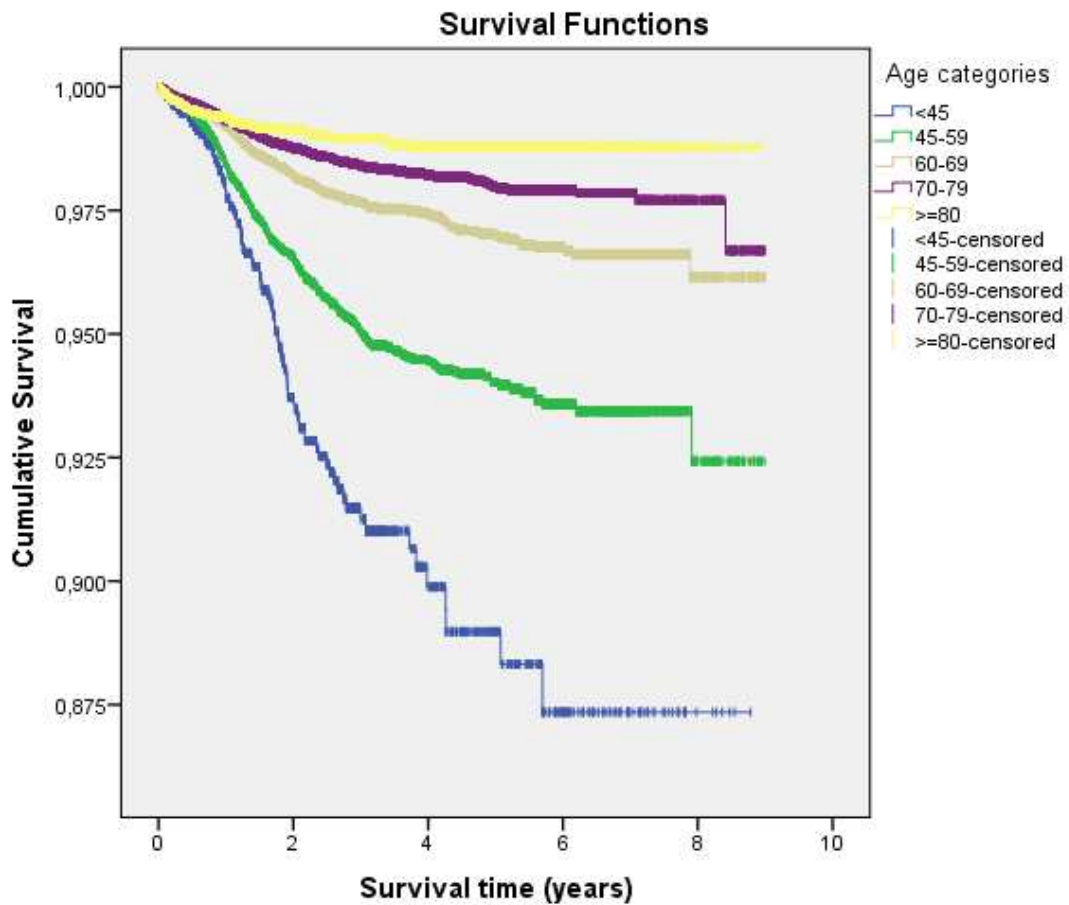
	Number	Percentage of total
<b>Cemented</b>	1205	96,9%
<b>Reverse hybrid</b>	3	0,2%
<b>Hybrid</b>	19	1,5%
<b>Uncemented</b>	17	1,4%
<b>Total number of procedures</b>	<b>1244</b>	<b>100,0%</b>

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



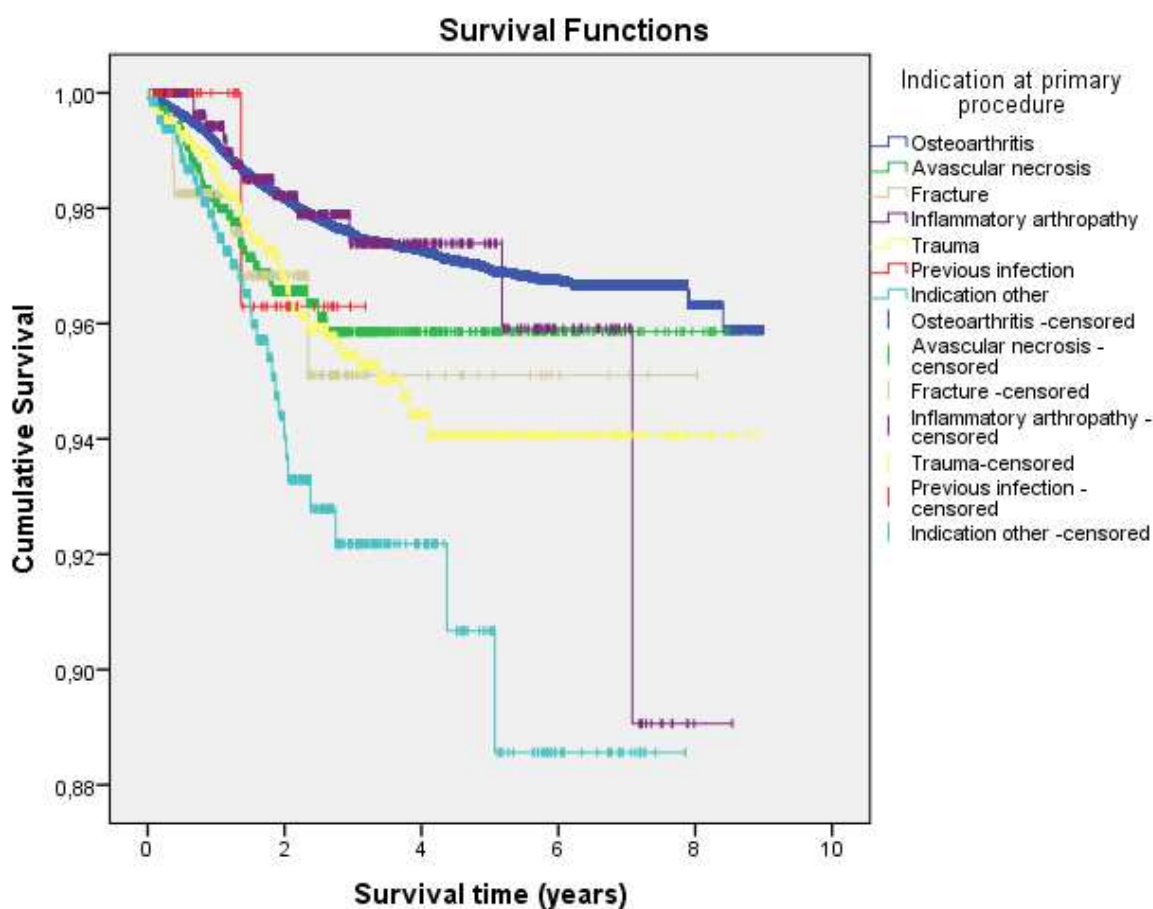
## 2.2.3 Implant survival after primary procedures

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



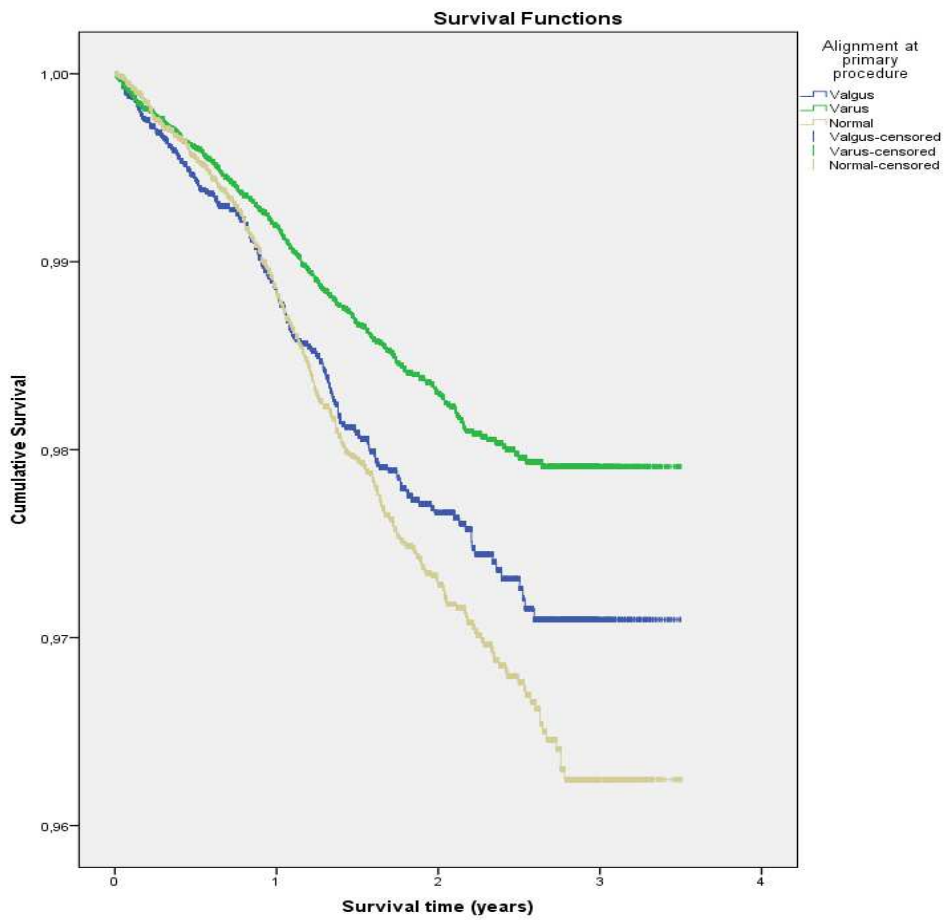
Number of events/Number at risk									
	0	1	2	3	4	5	6	7	8
<b>&lt;45</b>	29/1583	44/1206	14/774	5/403	2/221	2/142	0/69	0/30	0/6
<b>45-59</b>	253/18925	230/13957	108/8897	24/4908	9/2456	6/1561	1/824	1/332	0/74
<b>60-69</b>	214/31061	203/23336	65/15229	17/8584	17/4521	6/2876	2/1504	1/593	0/147
<b>70-79</b>	187/31814	116/23794	45/15722	12/9119	10/5034	2/3295	1/1786	1/720	1/191
<b>&gt;=80</b>	65/11332	19/8472	8/5544	4/3273	0/1737	0/1091	0/549	0/195	0/47

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



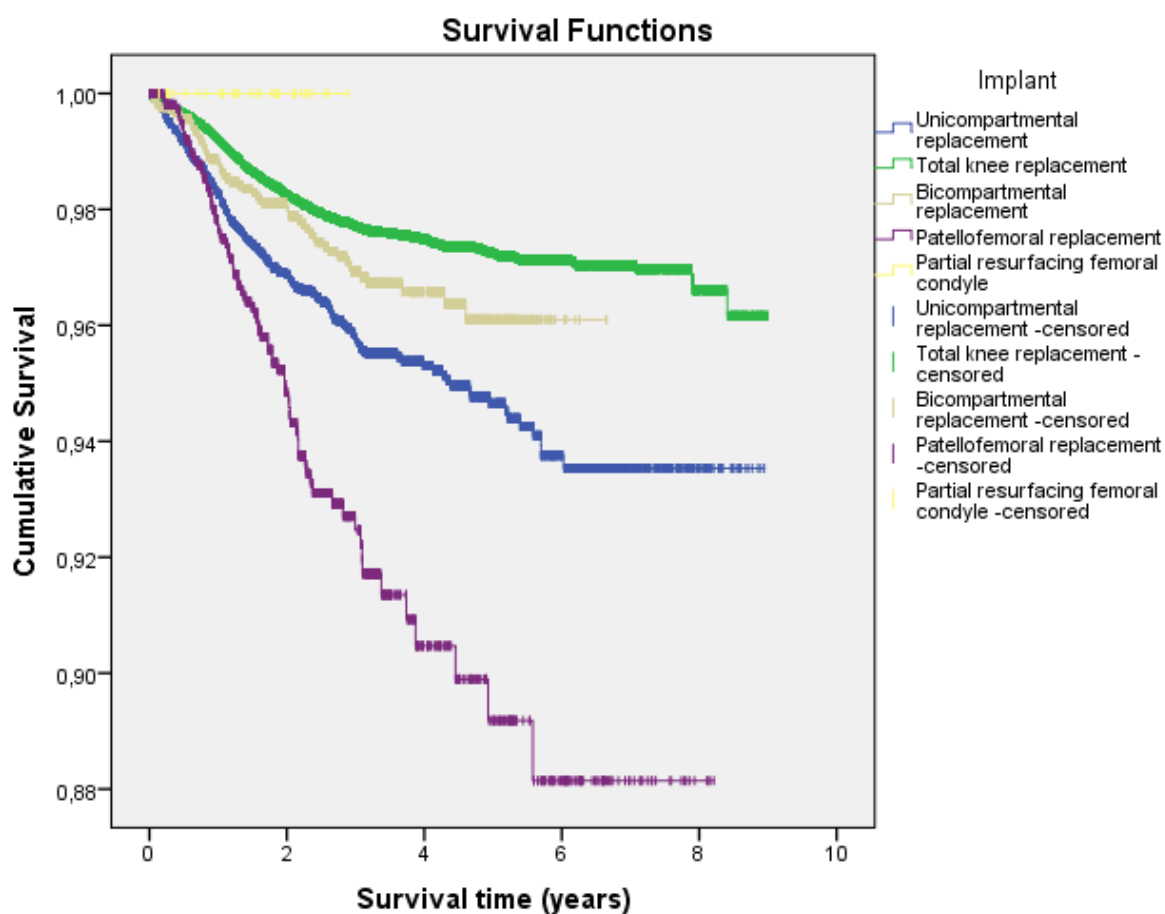
	Number of events/Number at risk									
	0	1	2	3	4	5	6	7	8	
<b>Osteo-arthritis</b>	683/8992 7	555/6726 7	220/4400 3	58/25139	36/13361	13/8580	4/454 7	2/178 4	1/442	
<b>Avascular necrosis</b>	21/1267	12/921	3/555	0/274	0/153	0/102	0/58	0/23	0/9	
<b>Fracture</b>	4/255	2/167	1/78	0/24	0/17	0/11	0/5	0/3	0/1	
<b>Inflammatory arthropathy</b>	3/614	5/472	2/319	0/187	0/108	1/72	0/38	1/17	0/1	
<b>Post trauma</b>	24/1974	23/1466	11/951	4/545	1/273	0/177	0/85	0/38	0/12	
<b>Previous infection</b>	0/50	1/32	0/18	0/1	0/0	0/0	0/0	0/0	0/0	
<b>Other indication</b>	13/654	13/459	4/258	0/129	1/79	1/48	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**



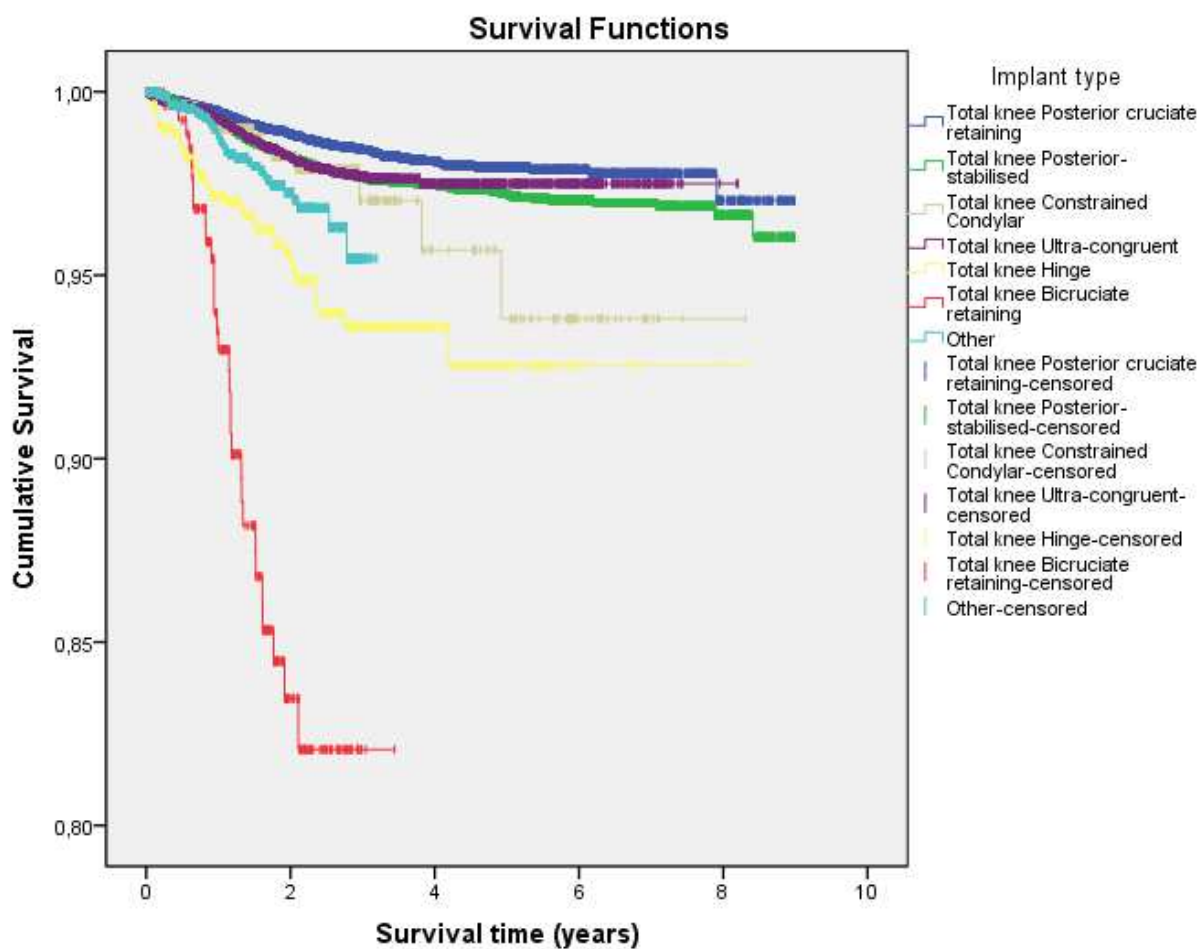
Number of events/Number at risk				
	0	1	2	3
<b>Valgus</b>	123/12834	80/8448	14/3911	0/204
<b>Varus</b>	227/33448	150/21857	28/9978	0/384
<b>Normal</b>	182/19079	150/12547	36/5874	0/453

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



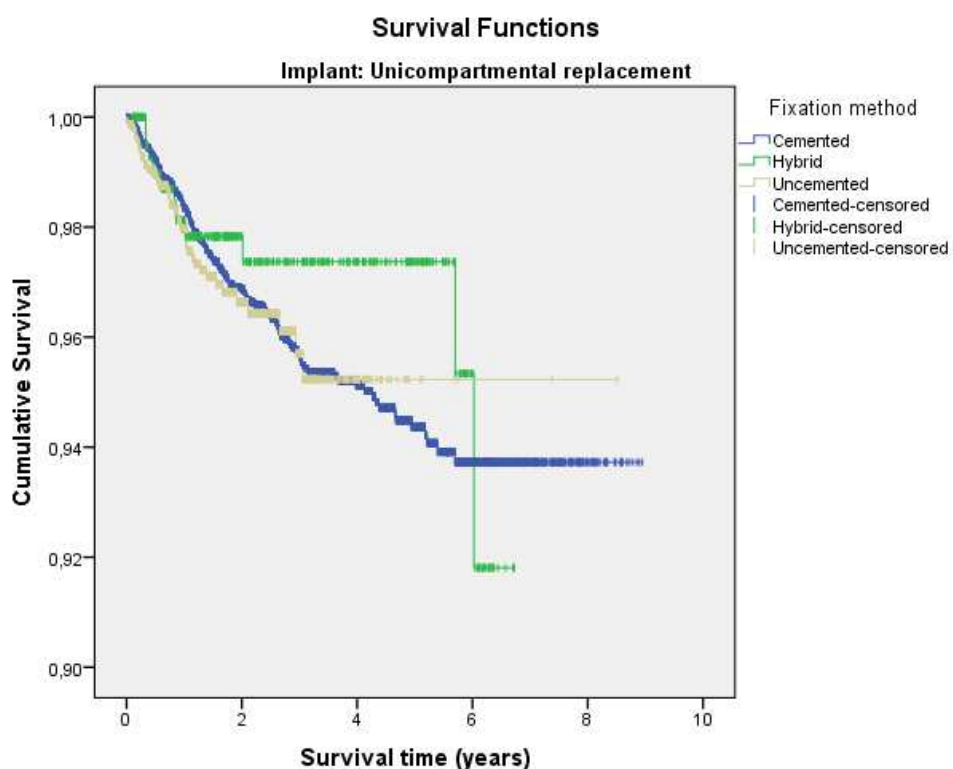
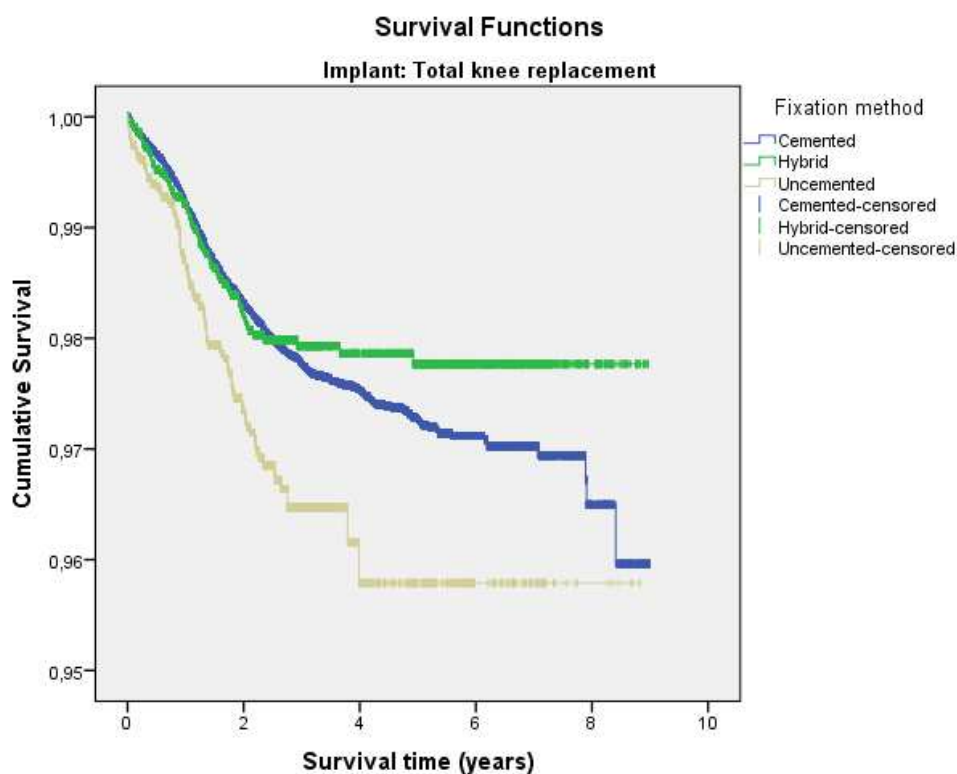
	Number of events/Number at risk									
	0	1	2	3	4	5	6	7	8	
<b>Unicompartamental replacement</b>	116/7768	67/5520	32/3571	9/2177	7/1250	6/824	1/422	0/149	0/34	
<b>Total knee replacement</b>	572/82310	495/61448	172/39639	40/21833	23/11463	9/7560	3/4097	3/1642	1/424	
<b>Bicompartmental replacement</b>	23/2125	13/1756	14/1389	3/1067	2/570	0/190	0/6	0/0	0/0	
<b>Patellofemoral replacement</b>	31/1640	29/1179	15/725	6/382	2/184	1/121	0/64	0/19	0/4	
<b>Partial resurfacing femoral condyle</b>	0/37	0/26	0/10	0/0	0/0	0/0	0/0	0/0	0/0	

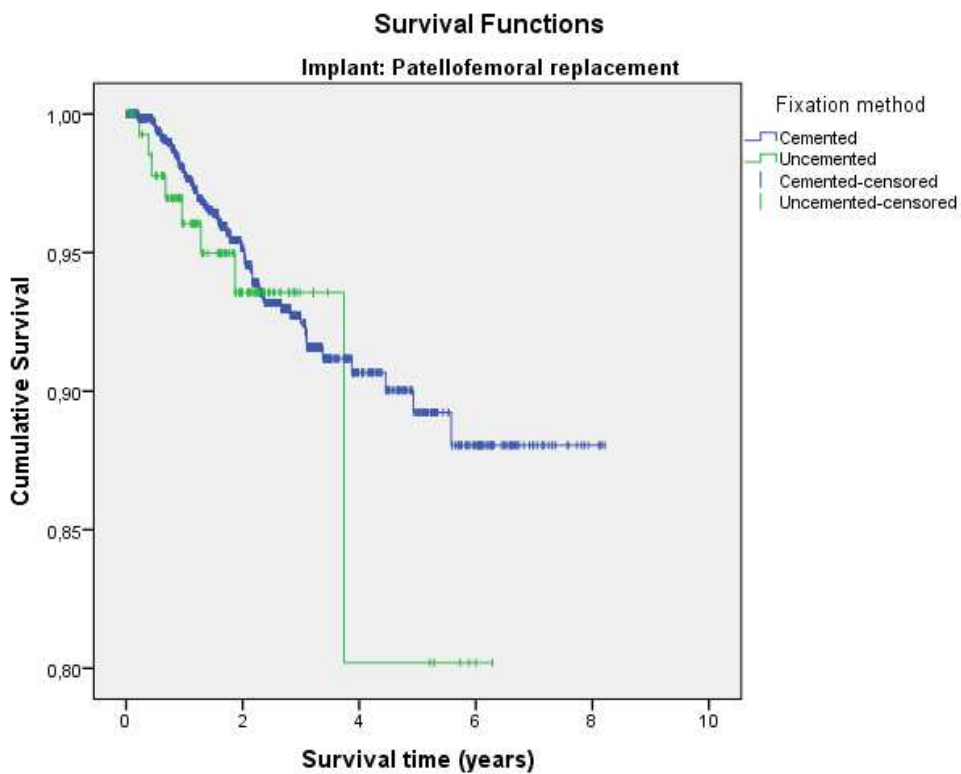
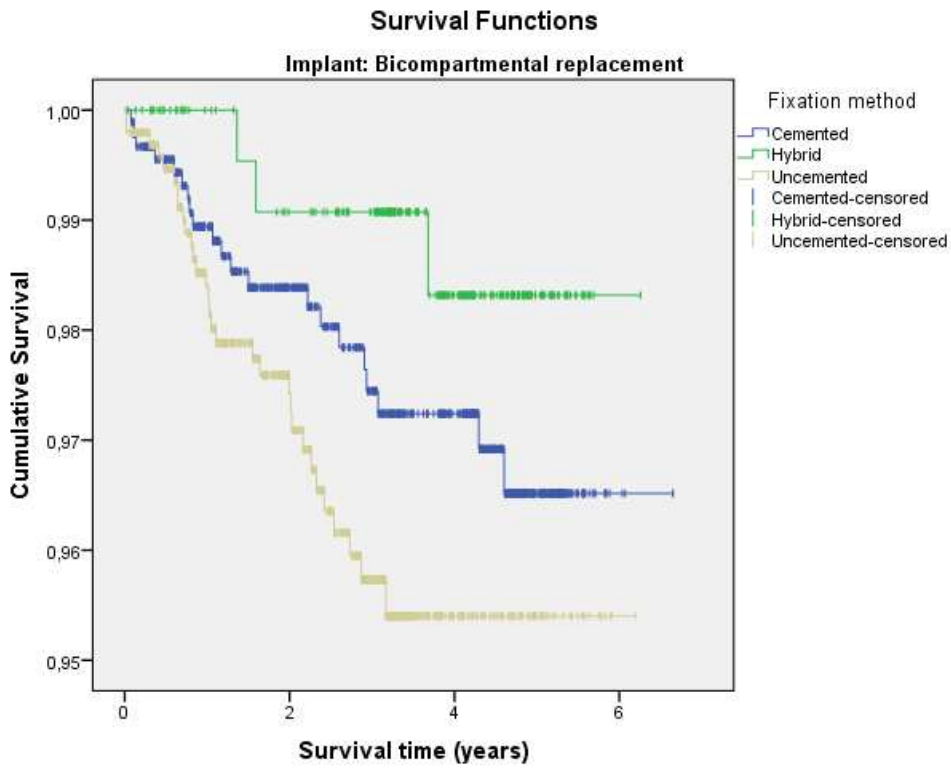
Figure 2.20 Kaplan-Meier curve for type of implant for total knee prostheses at primary knee replacement



	Number of events/Number at risk									
	0	1	2	3	4	5	6	7	8	
<b>Total knee Posterior cruciate retaining</b>	79/16889	72/13051	33/9098	14/5508	4/2955	1/1932	1/1023	1/443	0/98	
<b>Total knee Posterior-stabilised</b>	362/50833	319/38254	107/24760	23/14102	17/7749	8/5187	2/2870	2/1151	1/322	
<b>Total knee Constrained Condylar</b>	7/833	3/569	2/294	1/108	1/65	0/50	0/22	0/5	0/1	
<b>Total knee Ultra-congruent</b>	70/10796	64/7611	19/4534	2/1884	0/598	0/354	0/174	0/41	0/2	
<b>Total knee Hinge</b>	21/817	9/622	6/399	0/213	1/96	0/37	0/8	0/2	0/1	
<b>Total knee Bicruciate retaining</b>	16/264	14/184	1/71	0/2	0/0	0/0	0/0	0/0	0/0	
<b>Other</b>	17/1878	14/1157	4/483	0/16	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

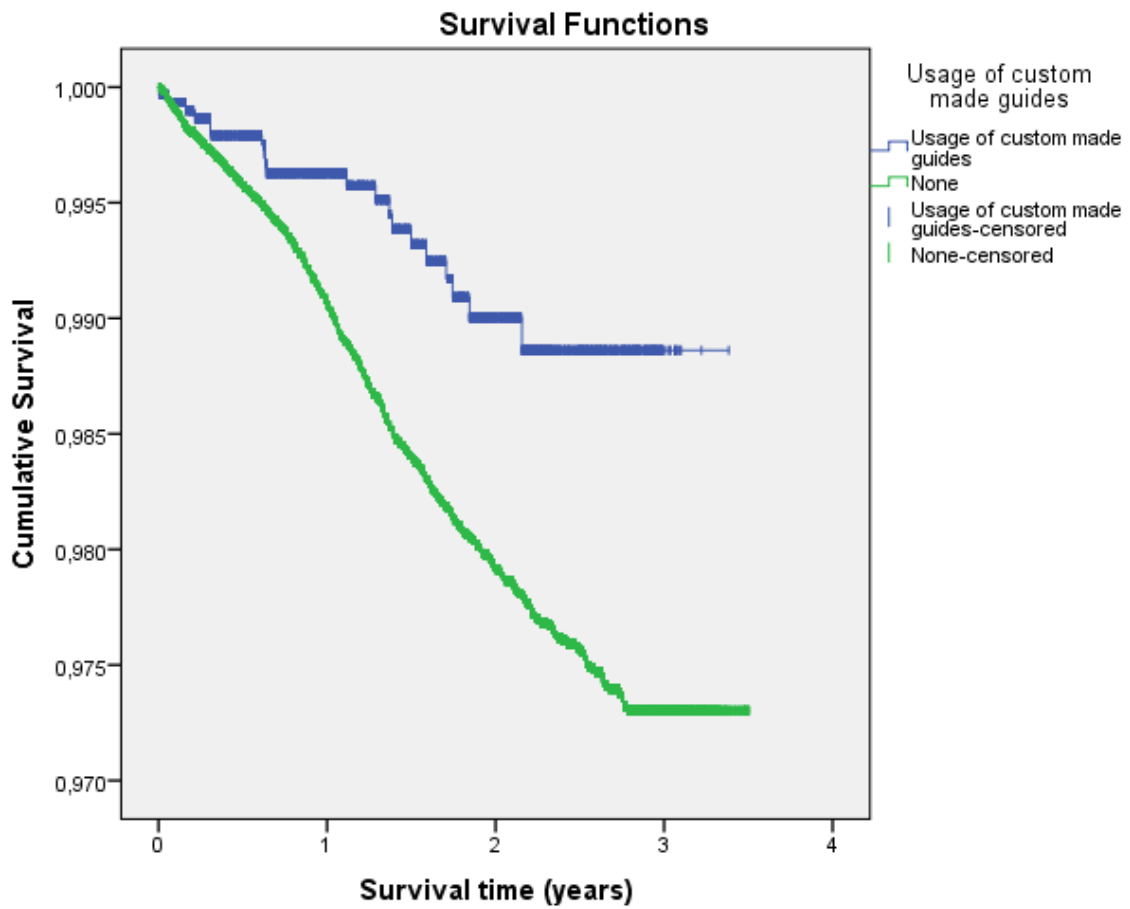




		Number of events/Number at risk								
		0	1	2	3	4	5	6	7	8
Unicompartamental replacement	Cemented	81/5677	54/4125	28/2790	8/1723	7/1049	4/726	0/392	0/147	0/33
	Hybrid	7/426	1/328	1/213	0/166	0/119	1/84	1/28	0/0	0/0
	Un-cemented	27/1589	11/992	3/494	1/214	0/39	0/6	0/2	0/2	0/1
Total knee replacement	Cemented	495/74067	428/55032	151/35157	37/19185	22/9865	9/6352	3/3405	3/1368	1/339
	Hybrid	30/4192	31/3382	6/2480	1/1723	1/1286	0/1002	0/610	0/243	0/77
	Un-cemented	46/3965	33/2949	14/1920	2/844	0/255	0/167	0/69	0/28	0/6
Bicompartamental replacement	Cemented	9/911	4/764	5/596	1/486	2/376	0/131	0/4	0/0	0/0
	Hybrid	0/239	2/219	0/210	1/192	0/109	0/32	0/1	0/0	0/0
	Un-cemented	14/975	7/773	9/583	1/389	0/85	0/27	0/1	0/0	0/0
Patellofemoral replacement	Cemented	25/1470	25/1050	15/644	5/331	2/166	1/108	0/57	0/18	0/4
	Un-cemented	5/141	2/101	0/55	1/25	0/6	0/6	0/2	0/0	0/0

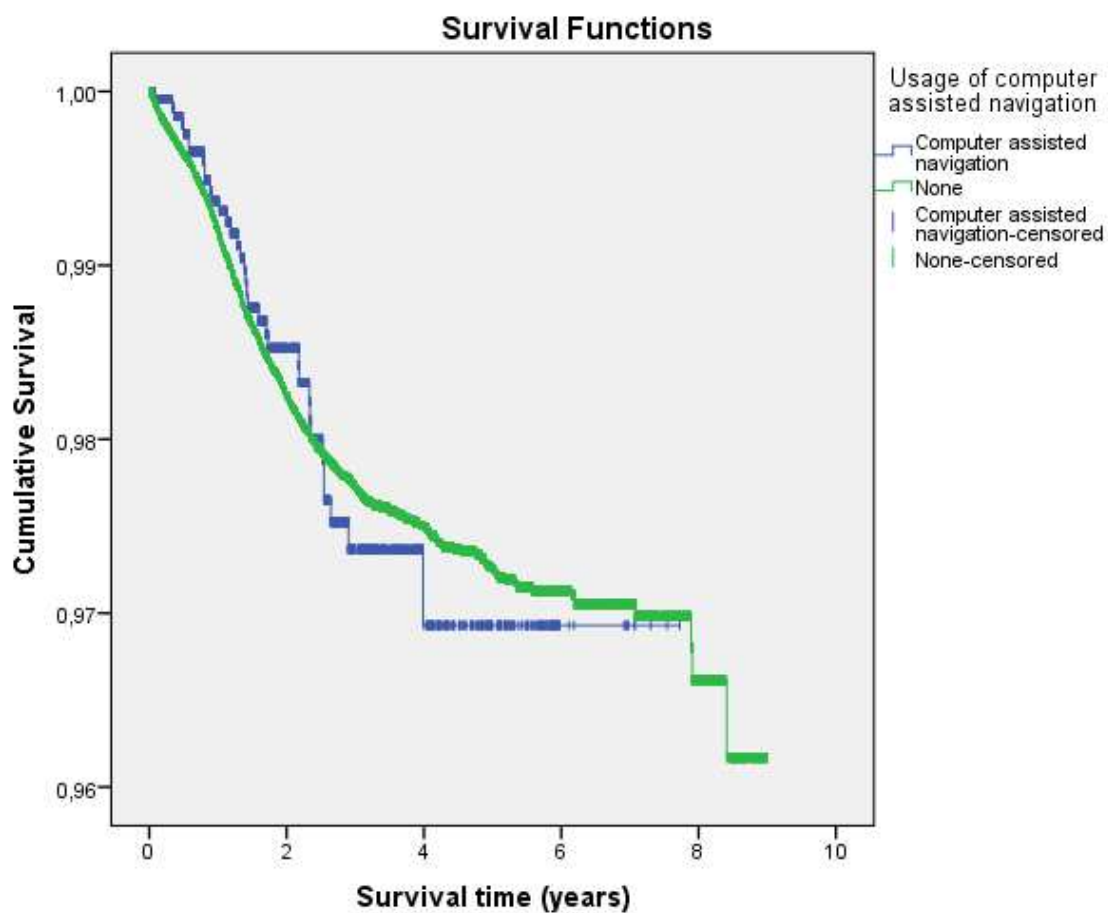


Figure 2.22 Kaplan-Meier curve for usage of custom made guides during primary knee replacement for total knee replacement



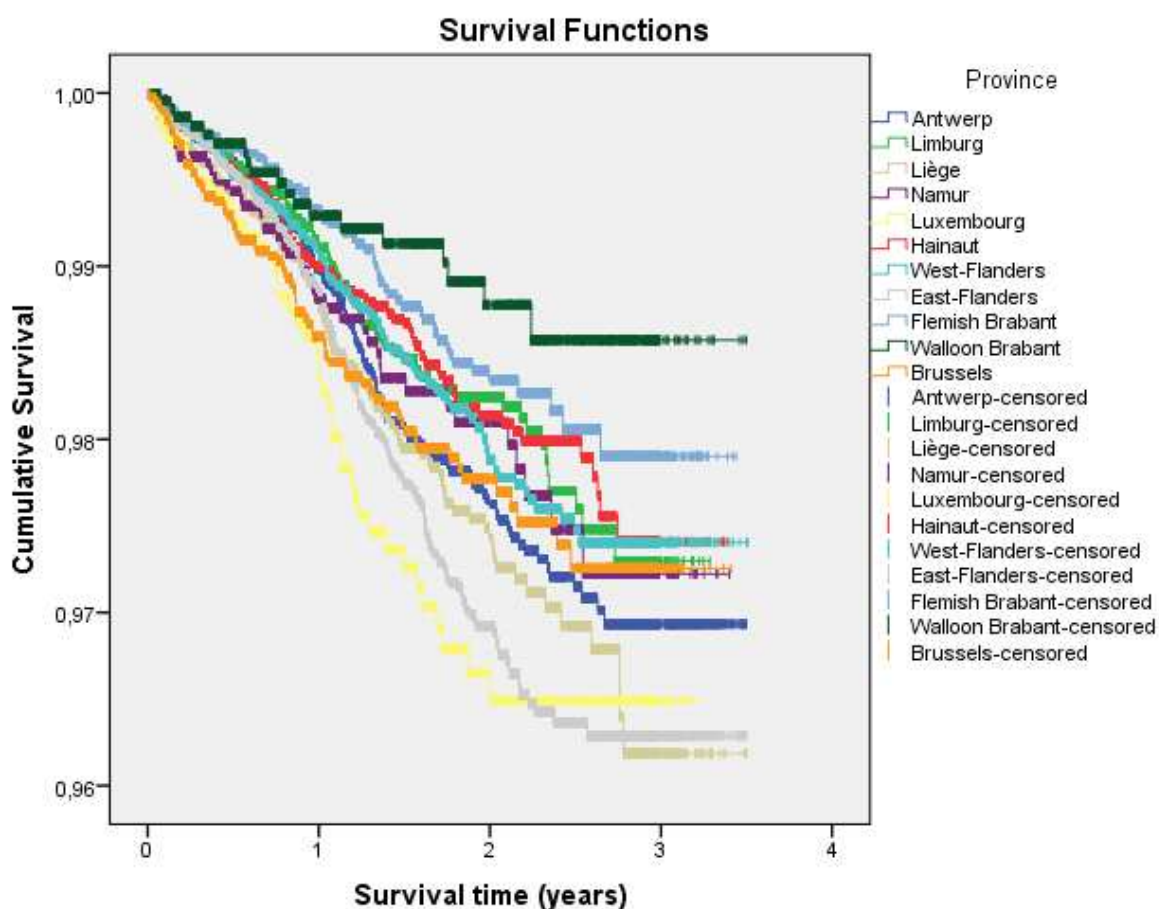
	Number of events/Number at risk			
	0	1	2	3
<b>Usage of custom made guides</b>	10/3054	9/2005	1/903	0/16
<b>None</b>	451/57991	340/38289	65/17728	0/915

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
<b>Computer assisted navigation</b>		12/2238	12/1633	10/1082	1/537	0/221	0/115	0/13	0/5	0/0
	<b>None</b>	560/8007 2	483/5981 5	162/3855 7	39/21296	23/11242	9/7445	3/408 4	3/163 7	1/424

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



	Number of events/Number at risk			
	0	1	2	3
<b>Antwerp</b>	88/10365	75/6948	15/3257	0/362
<b>Limburg</b>	42/5910	30/3917	10/1886	0/24
<b>Liège</b>	59/5927	41/3835	11/1735	0/74
<b>Namur</b>	28/2811	10/1812	5/834	0/26
<b>Luxembourg</b>	24/1848	18/1199	1/593	0/19
<b>Hainaut</b>	67/8167	33/5253	8/2360	0/49
<b>West-Flanders</b>	79/10309	58/6683	10/3002	0/127
<b>East-Flanders</b>	97/10322	99/6689	15/2949	0/204
<b>Flemish Brabant</b>	33/5852	28/3843	4/1765	0/109
<b>Walloon Brabant</b>	13/2218	5/1462	1/687	0/21
<b>Brussels</b>	49/4036	18/2709	5/1313	0/40

## 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	67745	99,8%	133	0,2%
Revision with new prosthesis	5453	99,3%	38	0,7%
Resection with spacer	381	98,7%	5	1,3%
Resection without spacer	17	100,0%	0	0,0%
<b>Total</b>	<b>73596</b>	<b>99,8%</b>	<b>176</b>	<b>0,2%</b>

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	59940	99,8%	123	0,21%
Unicompartmental replacement	5499	99,9%	5	0,09%
Bicompartmental replacement	1036	99,8%	2	0,19%
Patellofemoral replacement	1233	99,8%	3	0,24%
Partial resurfacing femoral condyle	37	100,0%	0	0,00%
<b>Total</b>	<b>67745</b>	<b>99,8%</b>	<b>133</b>	<b>0,2%</b>

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	3277	99,0%	33	1,0%
Tibia and Insert	300	100,0%	0	0,0%
Patella and insert	121	100,0%	0	0,0%
Femur and insert	71	100,0%	0	0,0%
Insert only	809	99,4%	5	0,6%
Patella only	742	100,0%	0	0,0%
Femur only	46	100,0%	0	0,0%
Other combination	87	100,0%	0	0,0%
<b>Total</b>	<b>5453</b>	<b>99,3%</b>	<b>38</b>	<b>0,7%</b>

**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	1362	100,0%	0	0,0%
45-59	15364	99,9%	11	0,1%
60-69	24071	99,9%	24	0,1%
70-79	24183	99,7%	69	0,3%
>=80	8600	99,2%	72	0,8%
<b>Total [Missing]</b>	<b>73580 [16]</b>	<b>99,8%</b>	<b>176</b>	<b>0,2%</b>

### 3 HIP REPLACEMENT

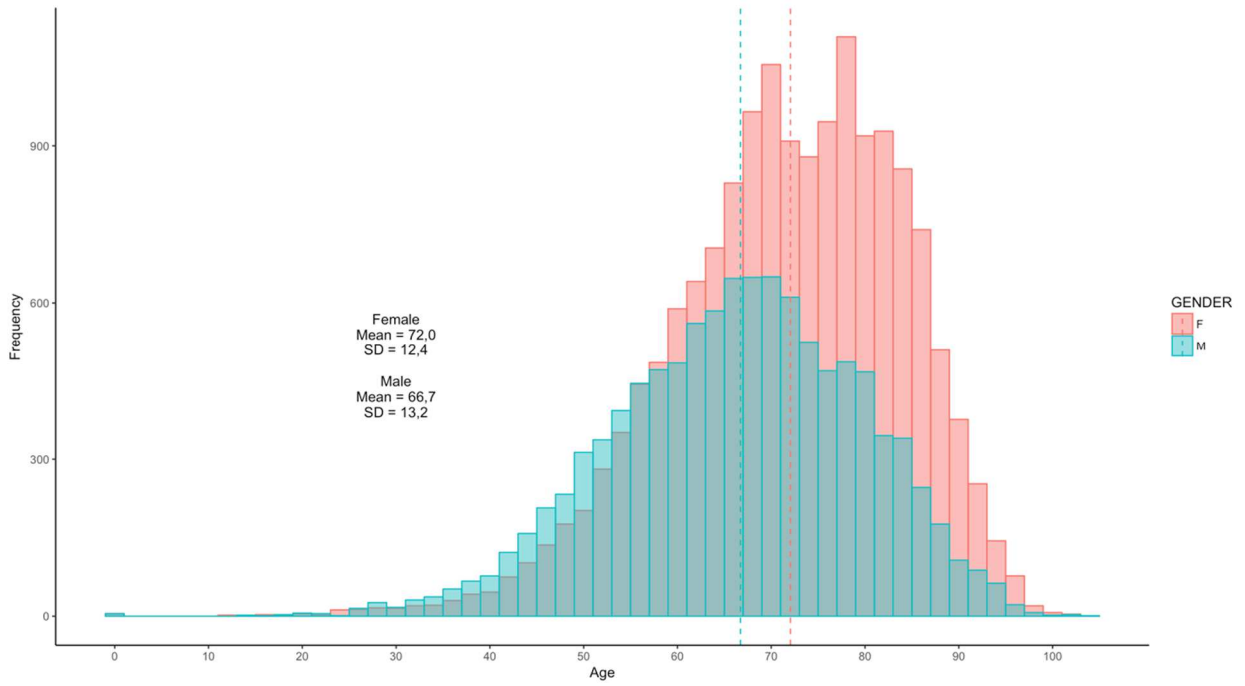
#### 3.1 PRIMARY HIP REPLACEMENT

##### 3.1.1 Demographics

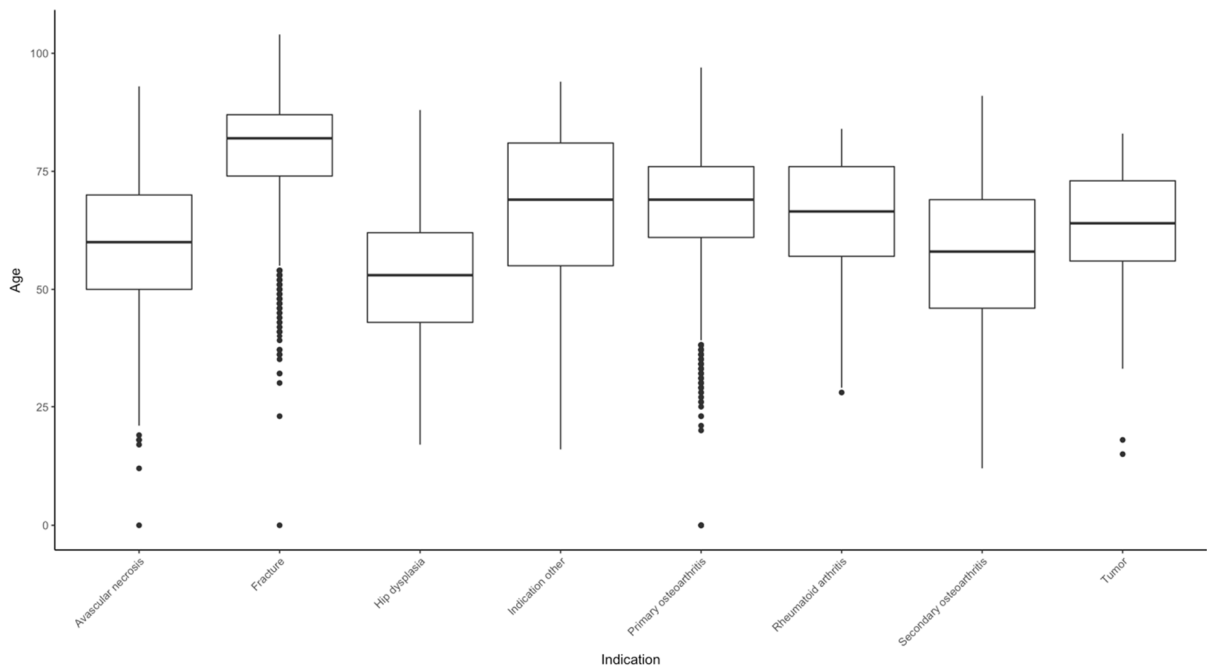
Table 3.1 Age, gender and indications for primary hip replacement patients

N=26505		
	Mean	SD
Age (yrs)	69,9	13,0
	Count	N %
<b>Age categories</b>		
<45	894	3,4%
45-59	4607	17,4%
60-69	6655	25,1%
70-79	7638	28,6%
>=80	6700	25,3%
<b>Gender</b>		
Female	15946	60,2%
Male	10559	39,8%
<b>Indication</b>		
Primary osteoarthritis	17902	67,5%
Secondary osteoarthritis	539	2,0%
Avascular necrosis	1308	4,9%
Rheumatoid arthritis	72	0,3%
Fracture	6179	23,3%
Tumor	56	0,2%
Hip dysplasia	280	1,1%
Indication other	169	0,6%

**Figure 3.1 Age distribution by gender for primary hip replacement patients**



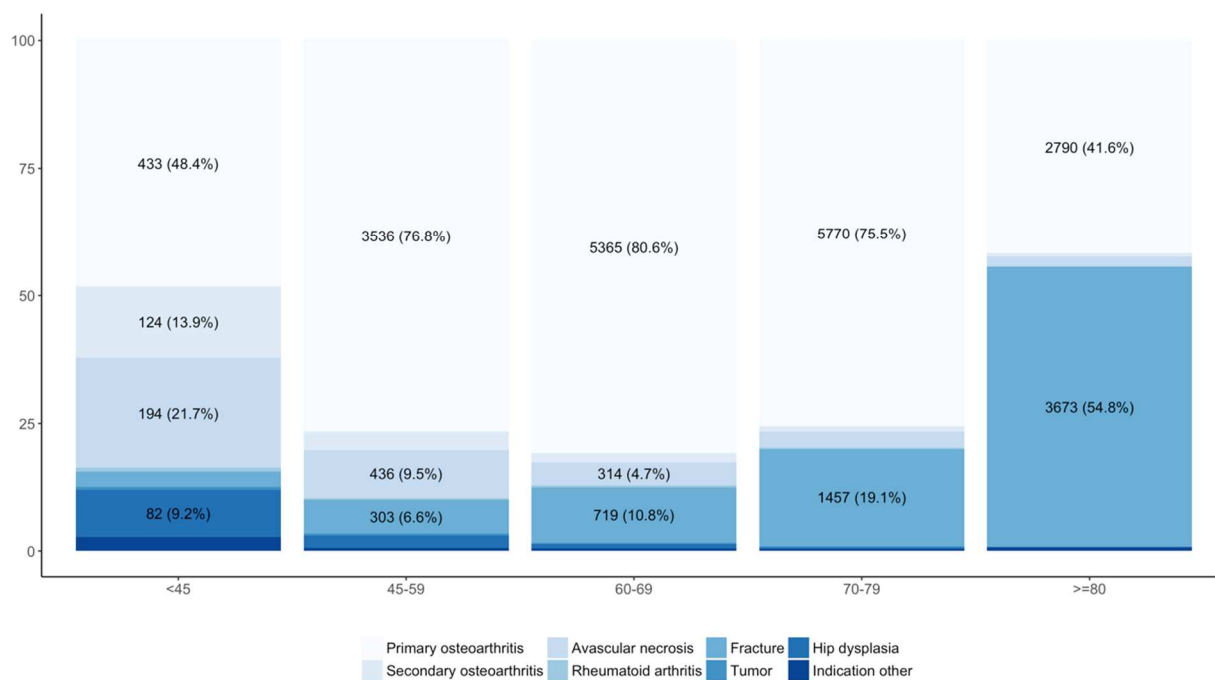
**Figure 3.2 Age distribution by indication for primary hip replacement patients**



**Table 3.2 Indications for primary hip replacements based on gender**

	Male	Female
	N=10559	N=15946
	N (%)	N (%)
Primary osteoarthritis	7470 (70,7%)	10432 (65,4%)
Secondary osteoarthritis	285 (2,7%)	254 (1,6%)
Avascular necrosis	776 (7,3%)	532 (3,3%)
Rheumatoid arthritis	13 (0,1%)	59 (0,4%)
Fracture	1851 (17,5%)	4328 (27,1%)
Tumor	21 (0,2%)	35 (0,2%)
Hip dysplasia	75 (0,7%)	205 (1,3%)
Indication other	68 (0,6%)	101 (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

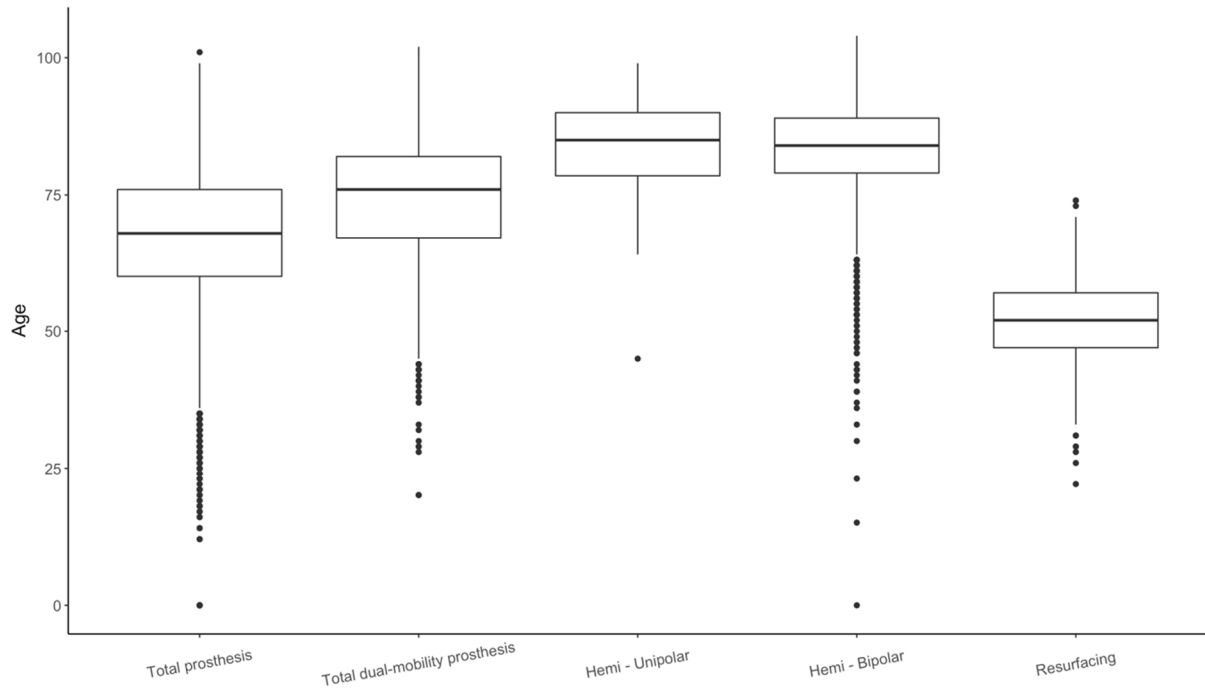
**Table 3.3 Numbers and percentages of primary hip replacement types**

	Number	Percentage of total
<b>Total prosthesis</b>	20592	77,7
<b>Total dual-mobility prosthesis</b>	1611	6,1
<b>Hemi - Bipolar</b>	4012	15,1
<b>Hemi Modular</b>	26	0,1
<b>Hemi Monoblock</b>	13	0
<b>Resurfacing Femoral (Hemi)</b>	1	0
<b>Resurfacing Femoral + Cup</b>	249	0,9
<b>Resurfacing Partial (Punaise)</b>	1	0
<b>Total</b>	<b>26505</b>	<b>100%</b>

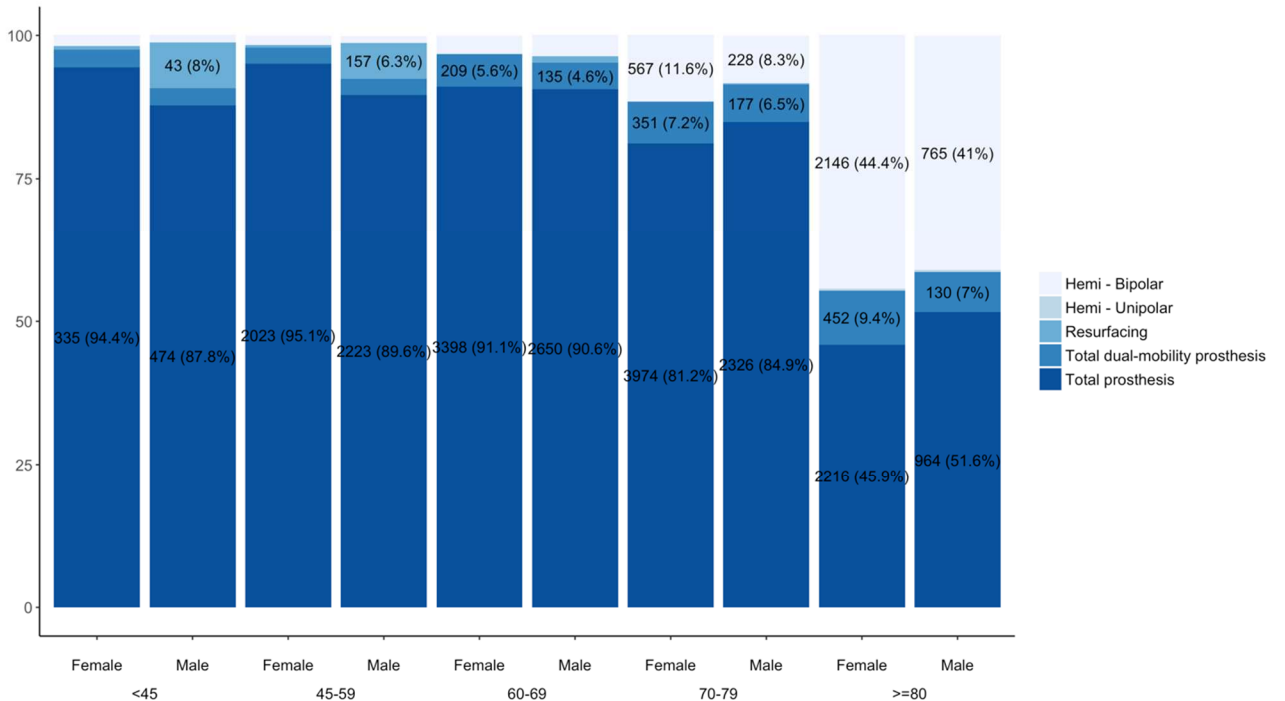
**Table 3.4 Age and gender of primary hip replacement patients by type of replacement**

	Total hip replacement	Total dual-mobility prosthesis	Hemi - Unipolar	Hemi - Bipolar	Resurfacing
	N=20592	N=1611	N=39	N=4011	N=251
<b>Mean age (years) (SD)</b>	67,3 (12,0)	74,1 (11,2)	82,6 (10,0)	83,0 (8,9)	51,6 ( 8,8)
<b>Age groups</b>	<b>% (N)</b>	<b>% (N)</b>	<b>% (N)</b>	<b>% (N)</b>	<b>% (N)</b>
<b>&lt;45</b>	3,9 (808)	1,7 (27)	0 (0)	0,3 (14)	17,9 (45)
<b>45-59</b>	20,6 (4246)	8,1 (130)	2,6 (1)	1,6 (65)	65,7 (165)
<b>60-69</b>	29,4 (6048)	21,4 (344)	5,1 (2)	5,6 (226)	13,9 (35)
<b>70-79</b>	30,6 (6300)	32,8 (528)	23,1 (9)	19,8 (795)	2,4 (6)
<b>&gt;=80</b>	15,4 (3180)	36,1 (582)	69,2 (27)	72,6 (2911)	0 (0)
<b>Gender</b>	<b>% (N)</b>	<b>% (N)</b>	<b>% (N)</b>	<b>% (N)</b>	<b>% (N)</b>
<b>Male</b>	42 (8641)	32,8 (528)	38,5 (15)	28,3 (1136)	94,8 (238)
<b>Female</b>	58 (11950)	67,2 (1083)	61,5 (24)	71,7 (2876)	5,2 (13)

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

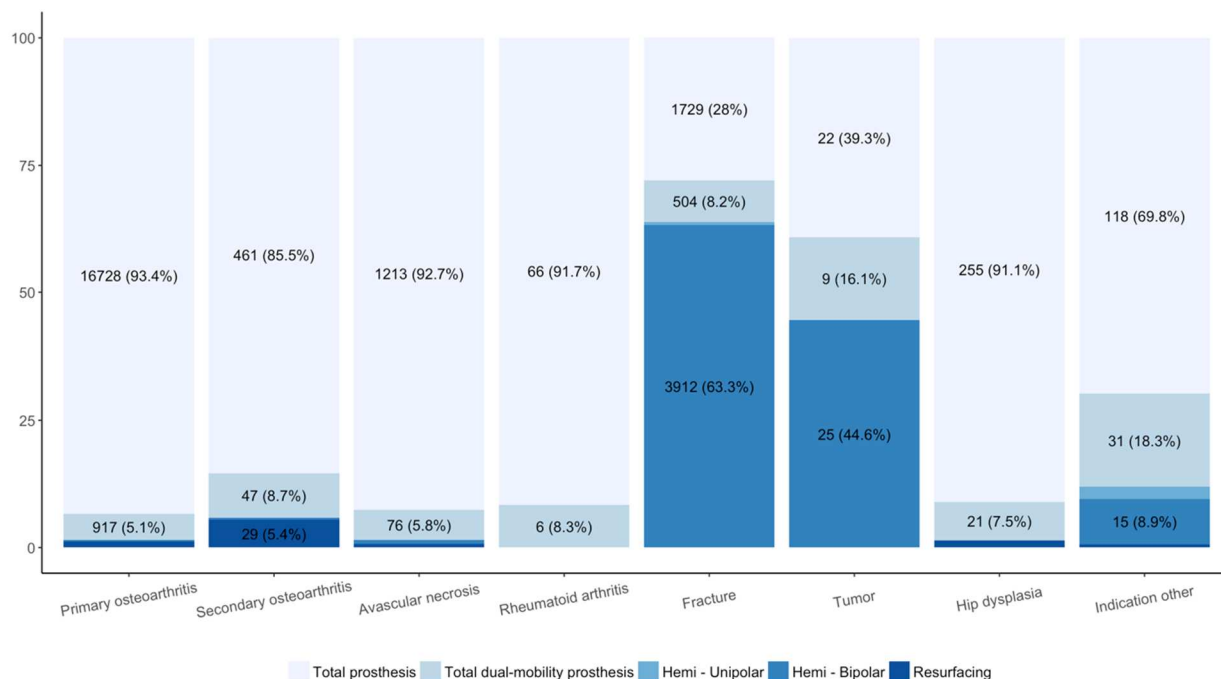


**Figure 3.5 Type of primary hip replacement procedures by age groups and gender**



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**

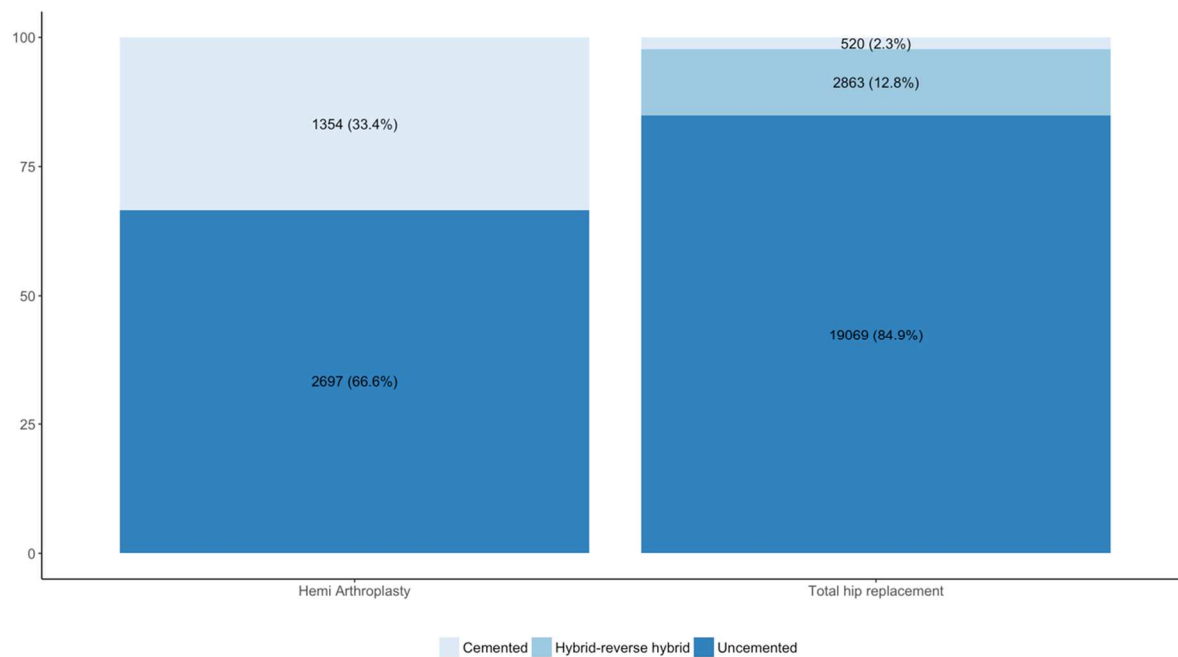


Note: For readability of the figure, labels with values and percentages smaller than 4% are not displayed.

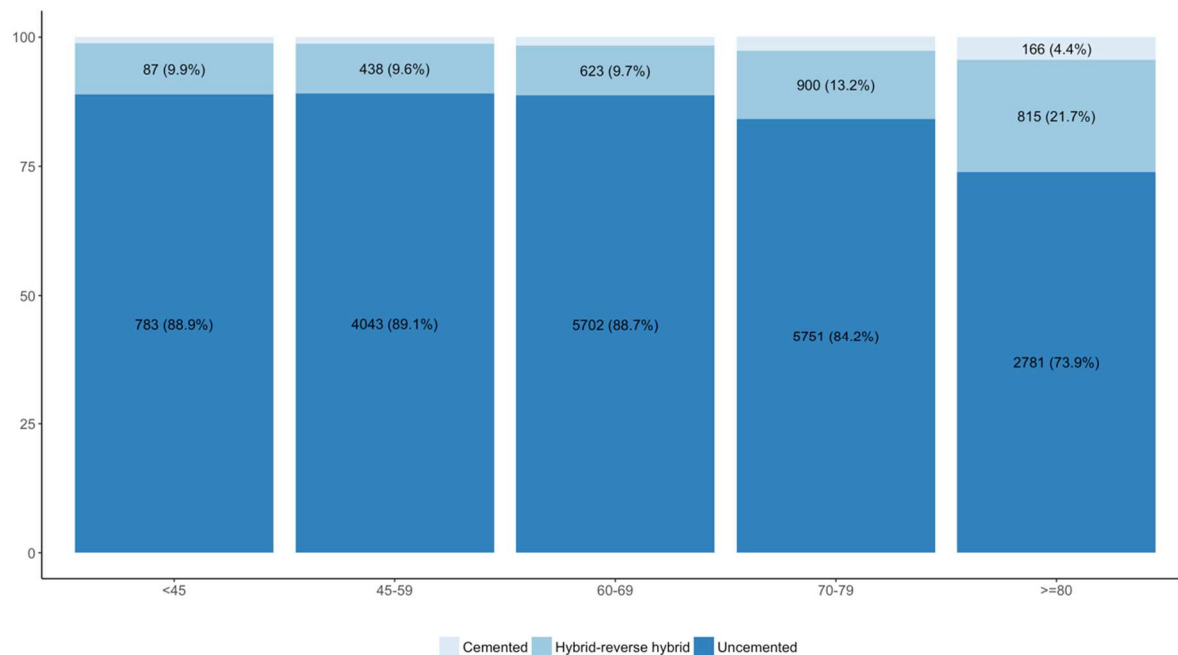
**Table 3.5 Numbers and percentages of bearing surfaces in primary hip replacements according to type of replacement**

	Total hip replacement	Total dual-mobility prosthesis (head)	Total dual-mobility prosthesis (cup)	Hemi - Bipolar	Resurfacing
	<b>N=20592</b>	<b>N=1611</b>	<b>N=1611</b>	<b>N=4012</b>	<b>N=250</b>
	<b>% (N)</b>	<b>% (N)</b>	<b>% (N)</b>	<b>% (N)</b>	<b>% (N)</b>
<b>Metal - Polyethylene</b>	5,9 (1224)	53 (854)	94 (1515)	68 (2730)	1,6 (4)
<b>Ceramic - Polyethylene</b>	32,5 (6700)	45,3 (730)	0 (0)	27,7 (1110)	0 (0)
<b>Metal - Metal</b>	0,2 (39)	0 (0)	0 (0)	1,2 (47)	98,4 (246)
<b>Ceramic - Ceramic</b>	59,5 (12248)	0 (0)	0 (0)	1,5 (59)	0 (0)
<b>Other</b>	1,9 (381)	1,7 (27)	6 (96)	1,6 (66)	0 (0)

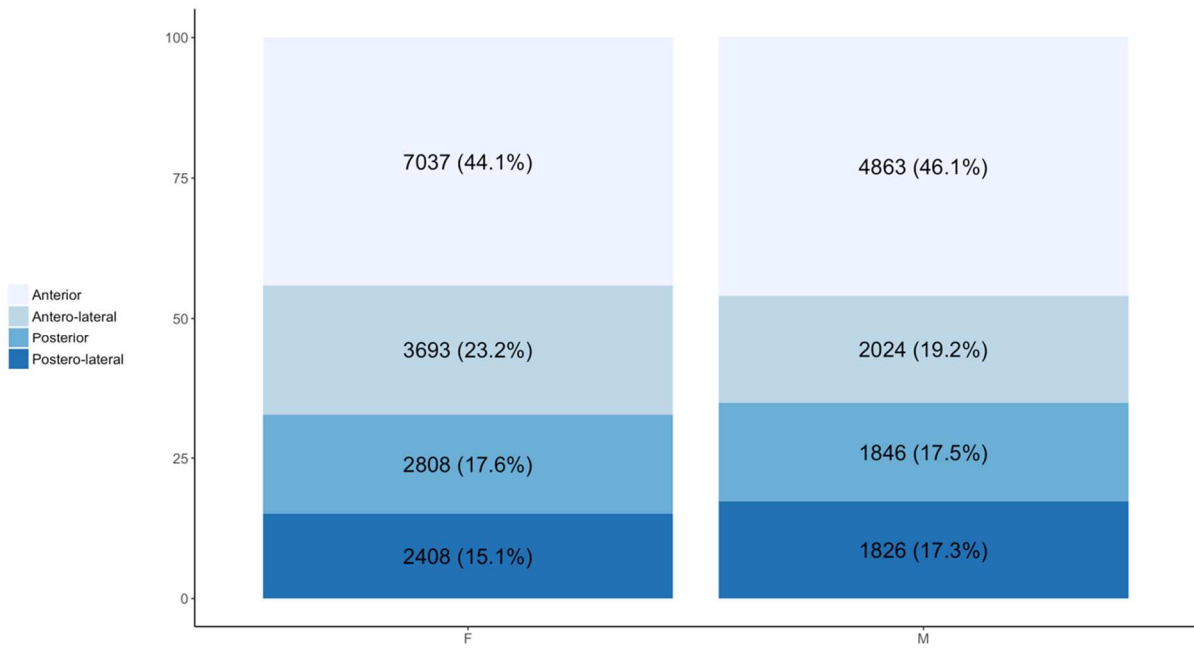
**Figure 3.7 Fixation of primay hip prosthesis according to type of replacement**



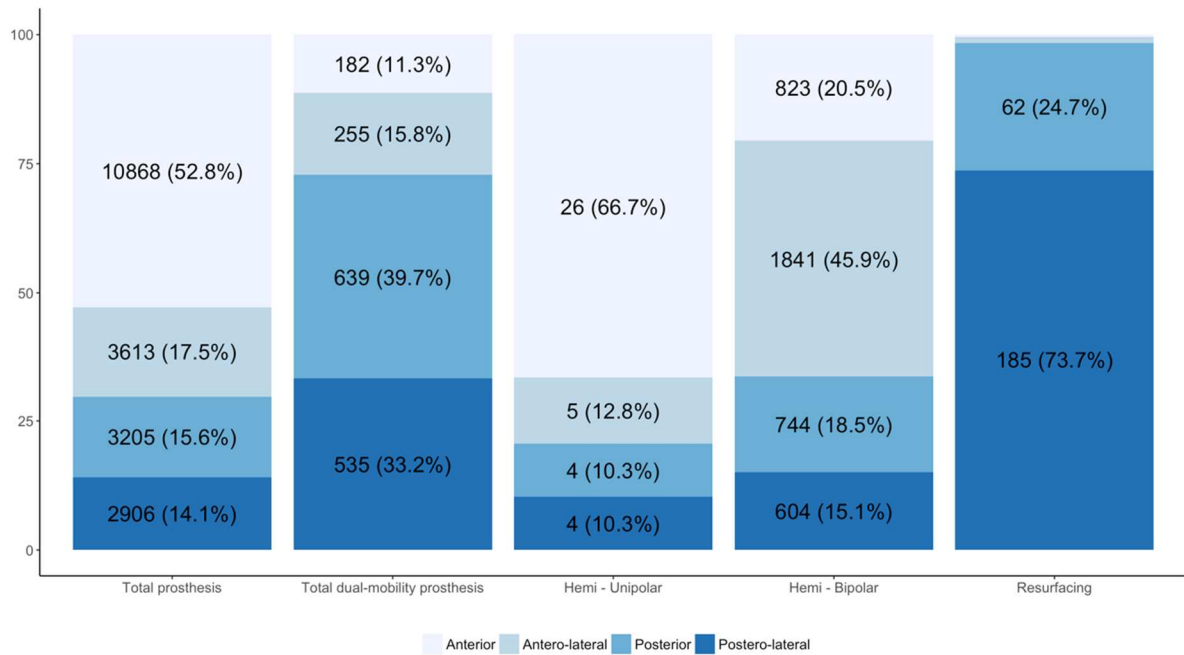
**Figure 3.8 Fixation of total primay hip prosthesis according to age category**



**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	68	0,3%
Computer assisted navigation	17	0,1%
Bone grafts	416	1,5%
Autografts	366	1,4%
Allografts	39	0,1%
Auto and allografts	11	< 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	1816	8,8%
Total dual-mobility prosthesis	157	9,7%
Hemi - Bipolar	451	11,2%
<b>Total</b>	<b>2424</b>	<b>9,2%</b>

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

		Count	Percentage of total modular necks used
Frontal	Valgus	31	1,3%
	Varus	468	19,3%
	Neutral	1925	79,4%
Lateral	Anteversión	524	21,6%
	Retroversion	124	5,1%
	Neutral	1776	73,3%
Offset	Extended	613	25,3%
	Standard	1811	74,7%

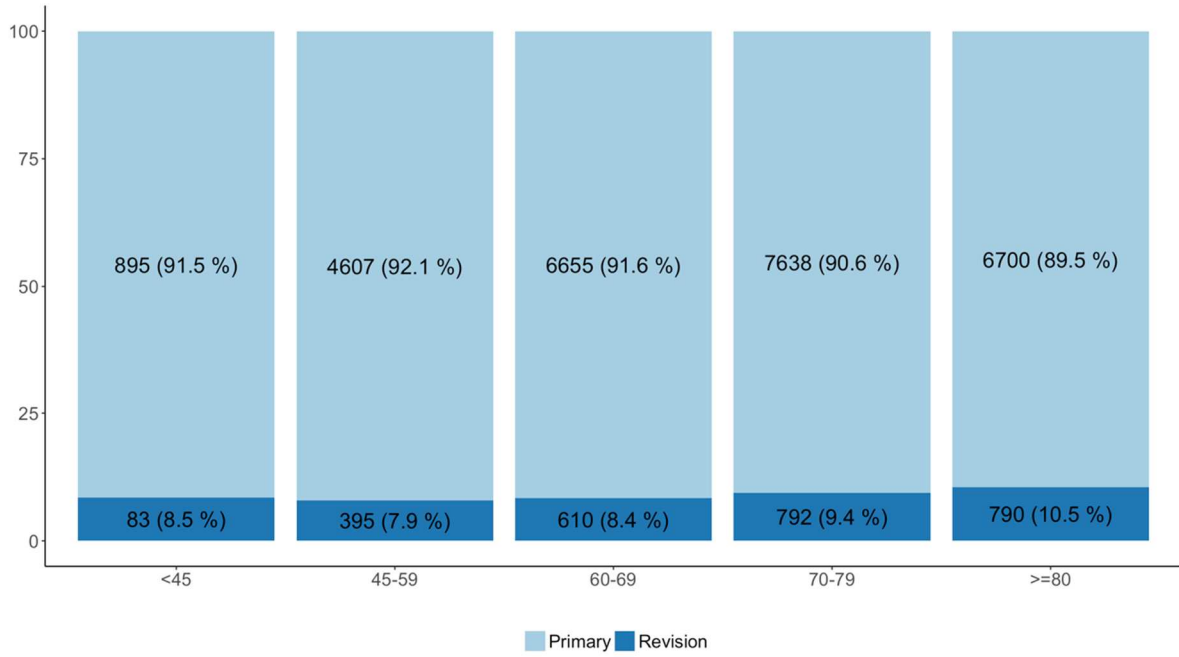
## 3.2 REVISIONS AFTER PRIMARY HIP REPLACEMENT

### 3.2.1 Demographics

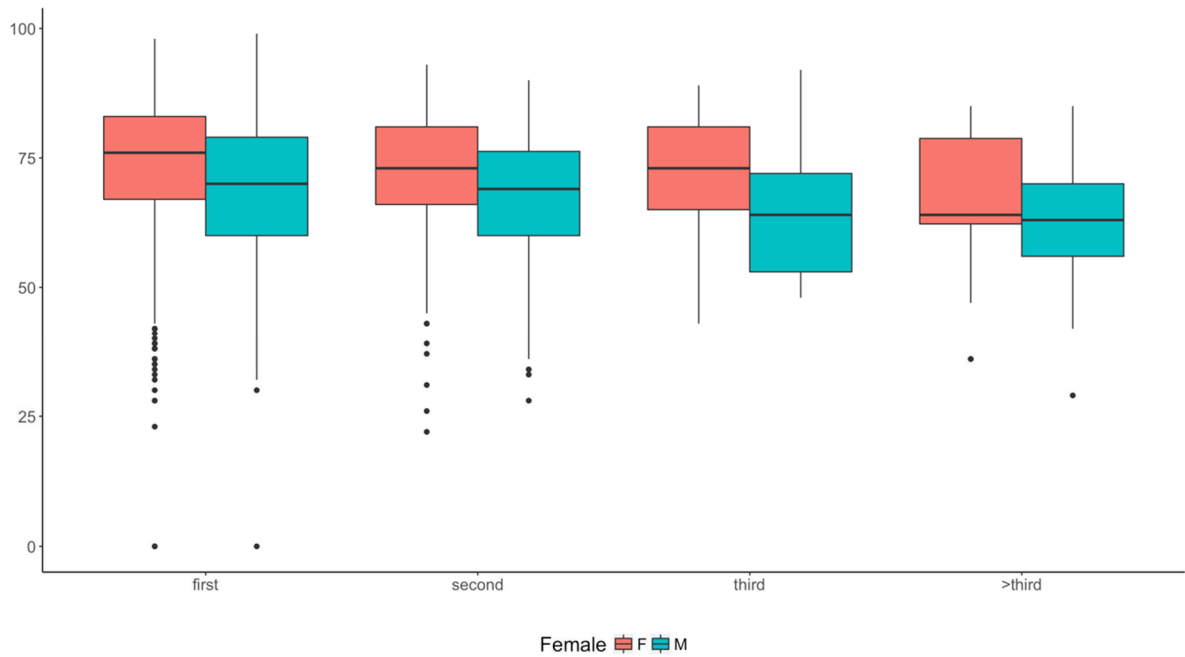
Table 3.9 Age, gender and indications for hip revision procedures

N=2673		
	Mean	SD
Age (yrs)	71,2	12,7
	Count	N %
<b>Age categories</b>		
<45	83	3,1
45-59	395	14,8
60-69	610	22,8
70-79	792	29,7
>=80	790	29,6
<b>Gender</b>		
Female	1559	58,3
Male	1114	41,7
<b>Indication</b>		
Aseptic loosening	908	34,0
Infection	360	13,5
Instability	426	15,9
Periprosthetic fracture	581	21,7
Pain	277	10,4
Wear	263	9,8
Other indication	327	12,2

**Figure 3.11 Hip revision burden according to age category**

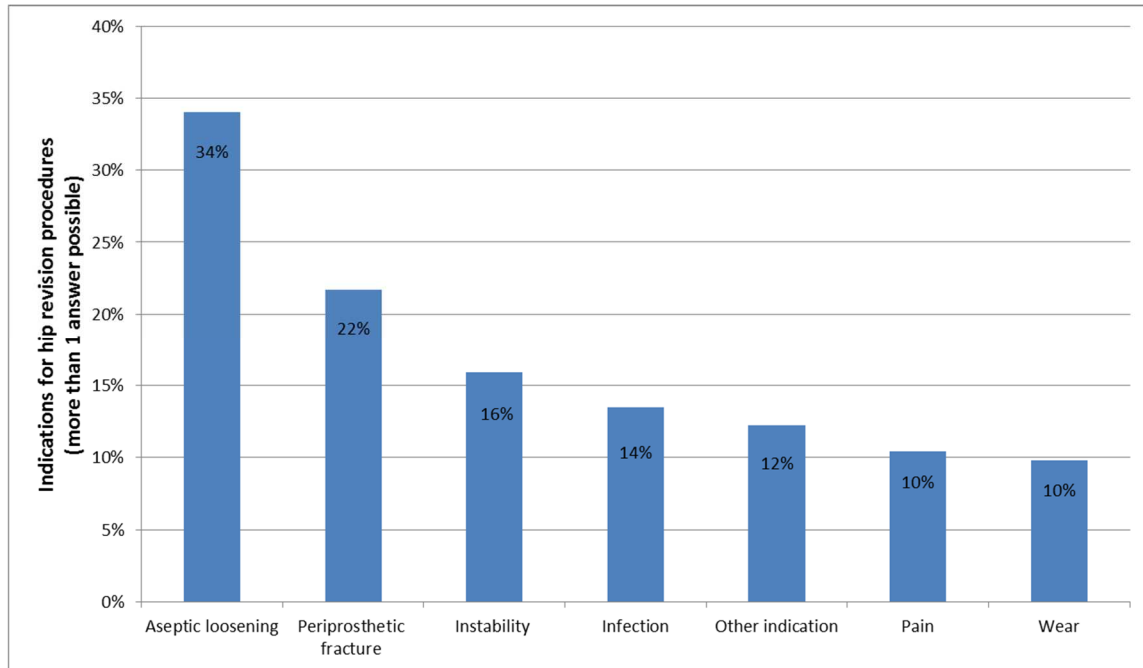


**Figure 3.12 Age and gender by number of hip revision procedures**



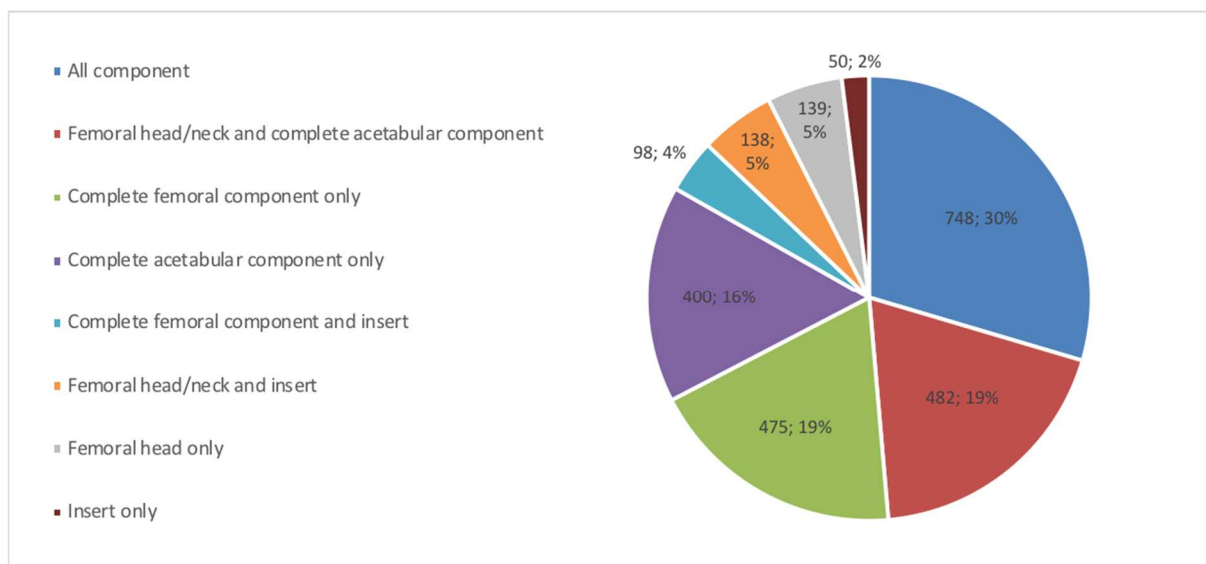


**Figure 3.13 Indications for hip revision procedures**



### 3.2.3 Surgical technique and implant characteristics

**Figure 3.14 Combinations of revised components during hip revision procedures**



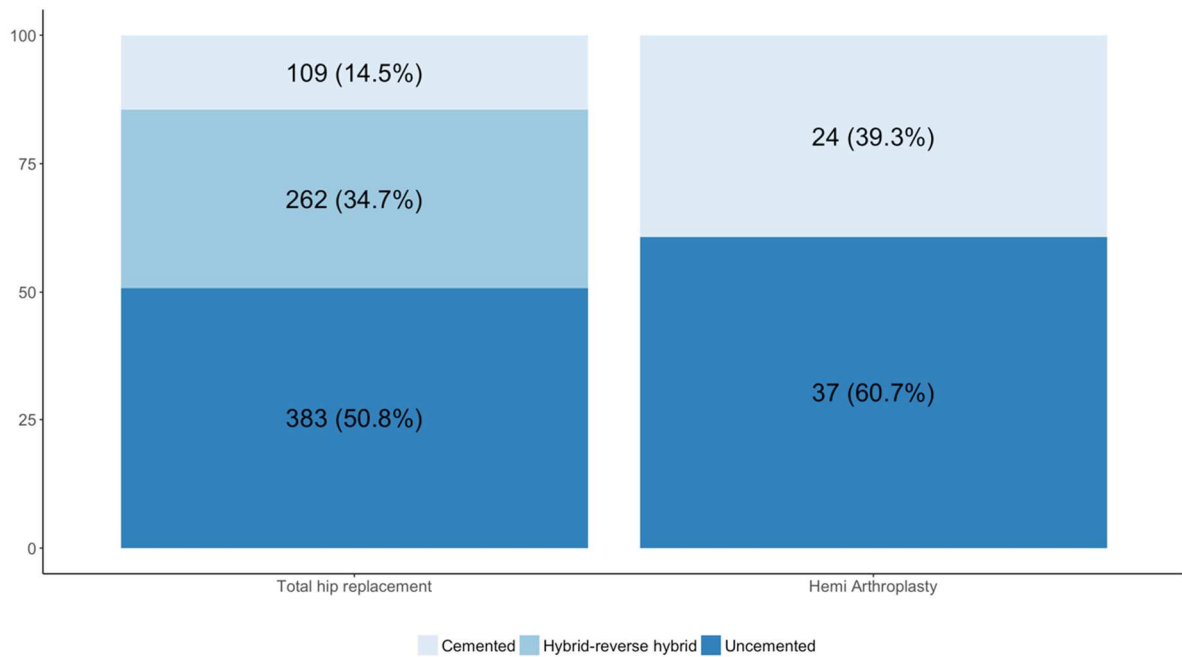
**Table 3.10 Numbers and percentages of implanted hip types during hip revision procedures**

	Number	Percentage of total
<b>Total prosthesis</b>	1658	66,7%
<b>Total dual-mobility prosthesis</b>	753	30,3%
<b>Hemi - Unipolar</b>	2	0,1%
<b>Hemi - Bipolar</b>	69	2,8%
<b>Insert only</b>	1	< 0,1%
<b>Total number of procedures</b>	<b>2484</b>	<b>100%</b>

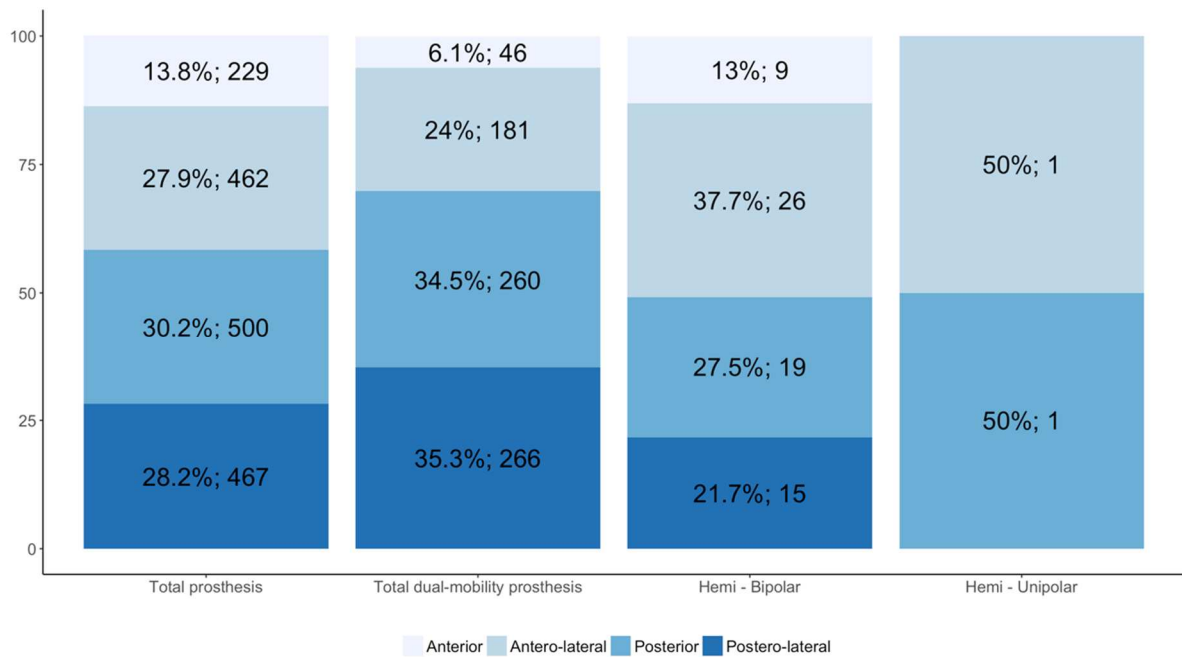
**Table 3.11 Numbers and percentages of bearing surfaces in hip revisions according to type of replacement**

	Total hip replacement	Total dual-mobility prosthesis (head)	Total dual-mobility prosthesis (cup)	Hemi - Bipolar
	<b>N=1654</b>	<b>N=753</b>	<b>N=753</b>	<b>N=69</b>
	<b>% (N)</b>	<b>% (N)</b>	<b>% (N)</b>	<b>% (N)</b>
<b>Metal - Polyethylene</b>	15,7 (260)	56,4 (425)	93,5 (704)	59,4 (41)
<b>Ceramic - Polyethylene</b>	52,2 (864)	41,4 (312)	0 (0)	37,7 (26)
<b>Metal - Metal</b>	0,8 (13)	0 (0)	0 (0)	1,4 (1)
<b>Ceramic - Ceramic</b>	28,2 (466)	0 (0)	0 (0)	1,4 (1)
<b>Other</b>	3,1 (51)	2,1 (16)	6,5 (49)	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	19	0,8%
Computer assisted navigation	7	0,3%
Bone grafts	591	23,8%
Autografts	92	3,7%
Allografts	469	18,9%
Auto and allografts	30	1,2%

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

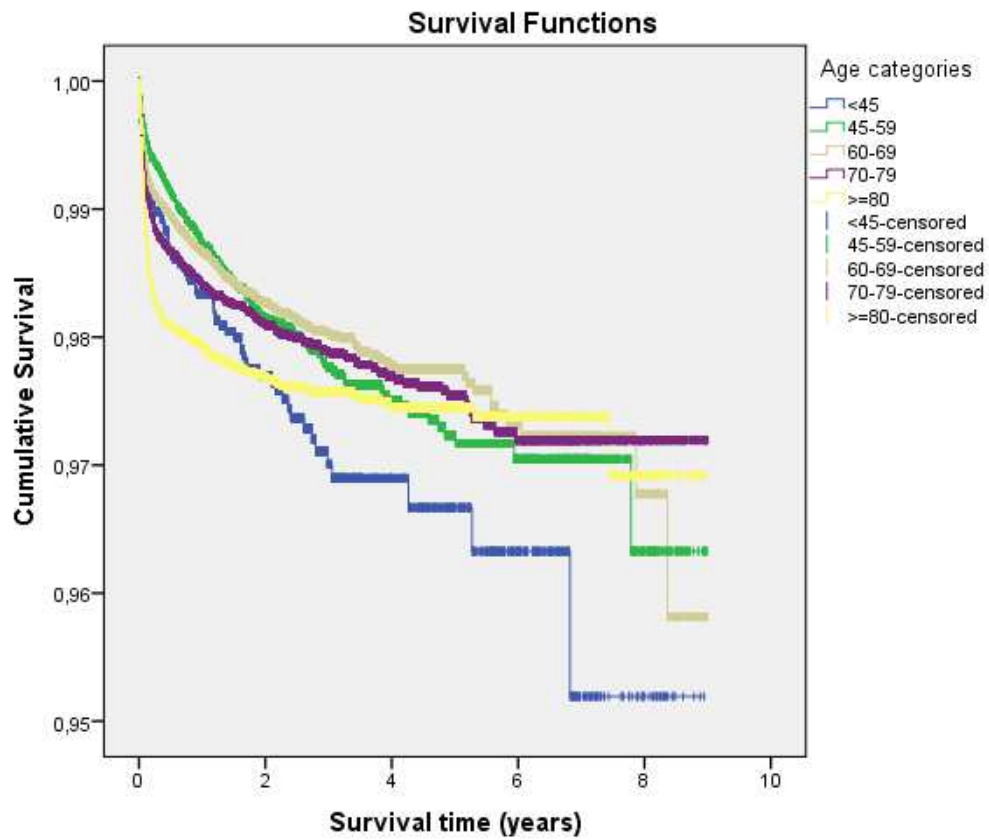
	Count	Percentage of total
Total prosthesis	231	15,6%
Total dual-mobility prosthesis	87	15,3%
Hemi - Bipolar	9	13,0%
<b>Total</b>	<b>327</b>	<b>15,4%</b>

**Table 3.14 Usage of modular femoral neck types**

		Count	Percentage of total modular necks used
Frontal	Valgus	4	1,2%
	Varus	57	17,4%
	Neutral	266	81,3%
Lateral	Anteversio	122	34,3%
	Retroversio	7	2,1%
	Neutral	208	63,6%
Offset	Extended	85	26%
	Standard	242	74%

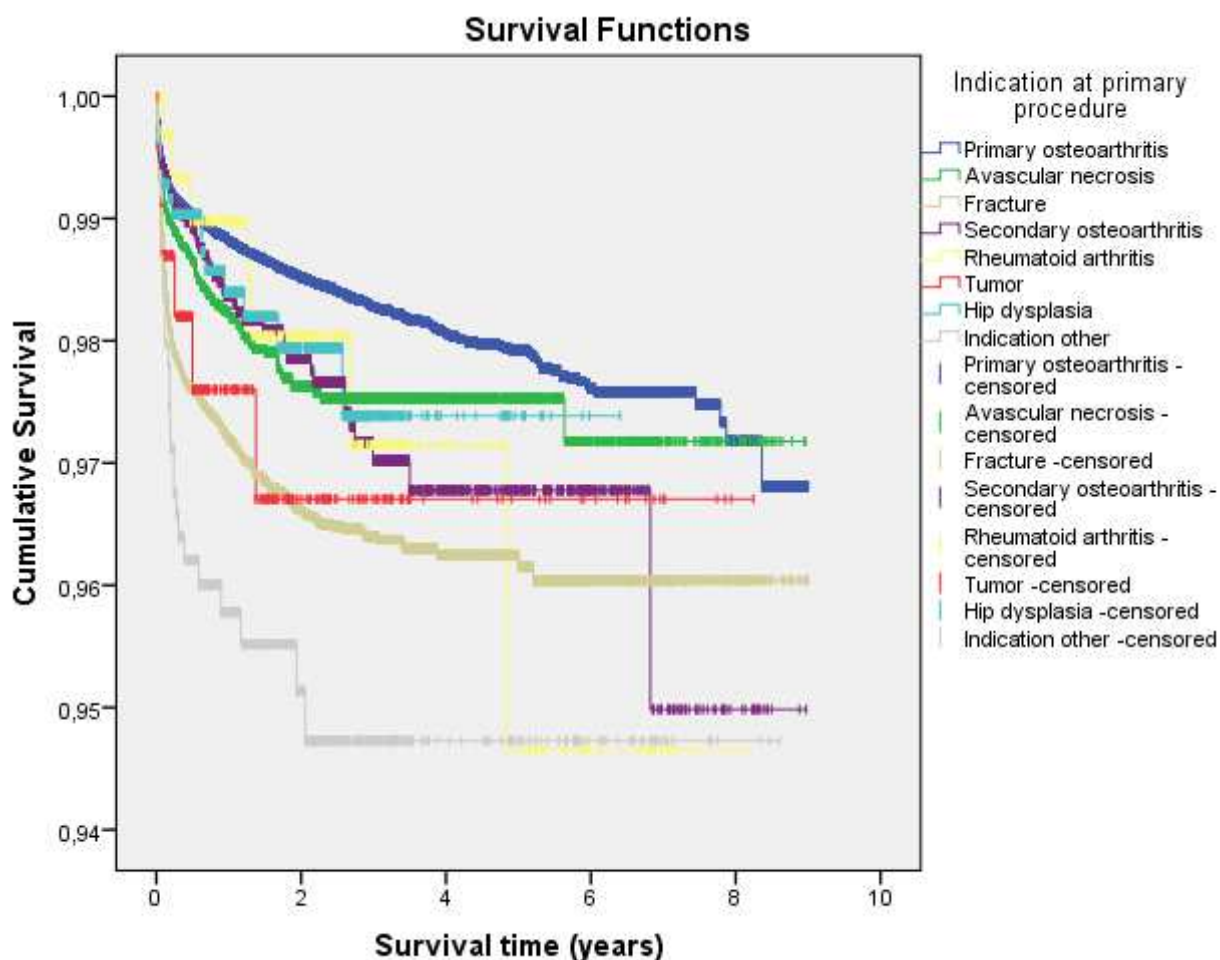
### 3.2.4 Implant survival after primary procedures

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



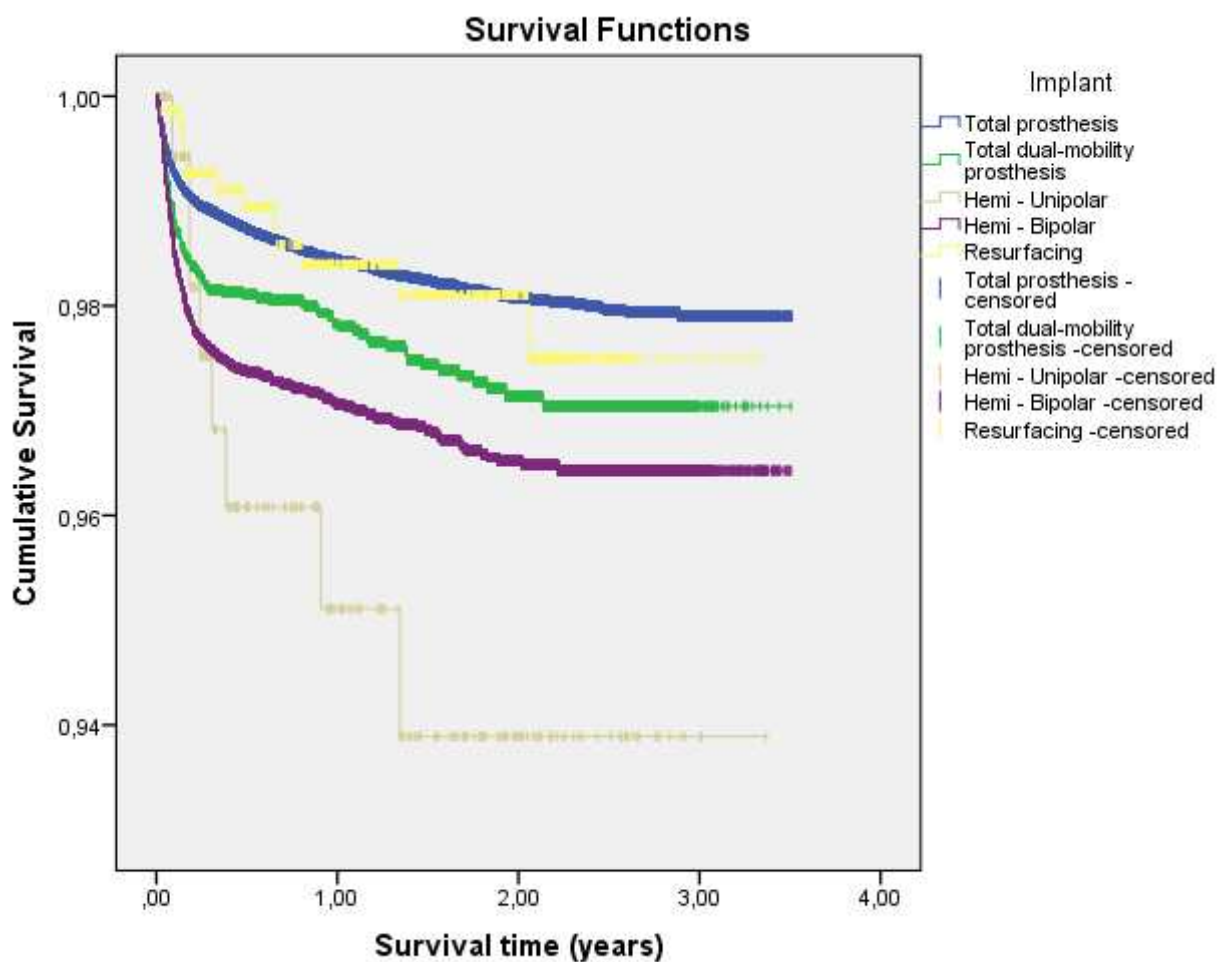
	Number of events/Number at risk									
	0	1	2	3	4	5	6	7	8	9
<45	56/3571	14/2624	9/1706	1/906	1/465	1/317	1/184	0/61	0/22	0/0
45-59	203/17473	62/12613	22/8081	8/4328	5/2232	2/1430	0/753	1/308	0/94	0/0
60-69	331/26237	63/19123	24/12212	11/6689	1/3359	7/2088	1/1098	1/469	1/174	0/0
70-79	451/30130	58/21603	23/13794	10/7782	5/4047	7/2470	0/1386	0/592	0/203	0/1
>=80	502/26093	35/16664	10/9972	4/5515	0/2617	1/1577	0/798	1/325	0/104	0/0

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



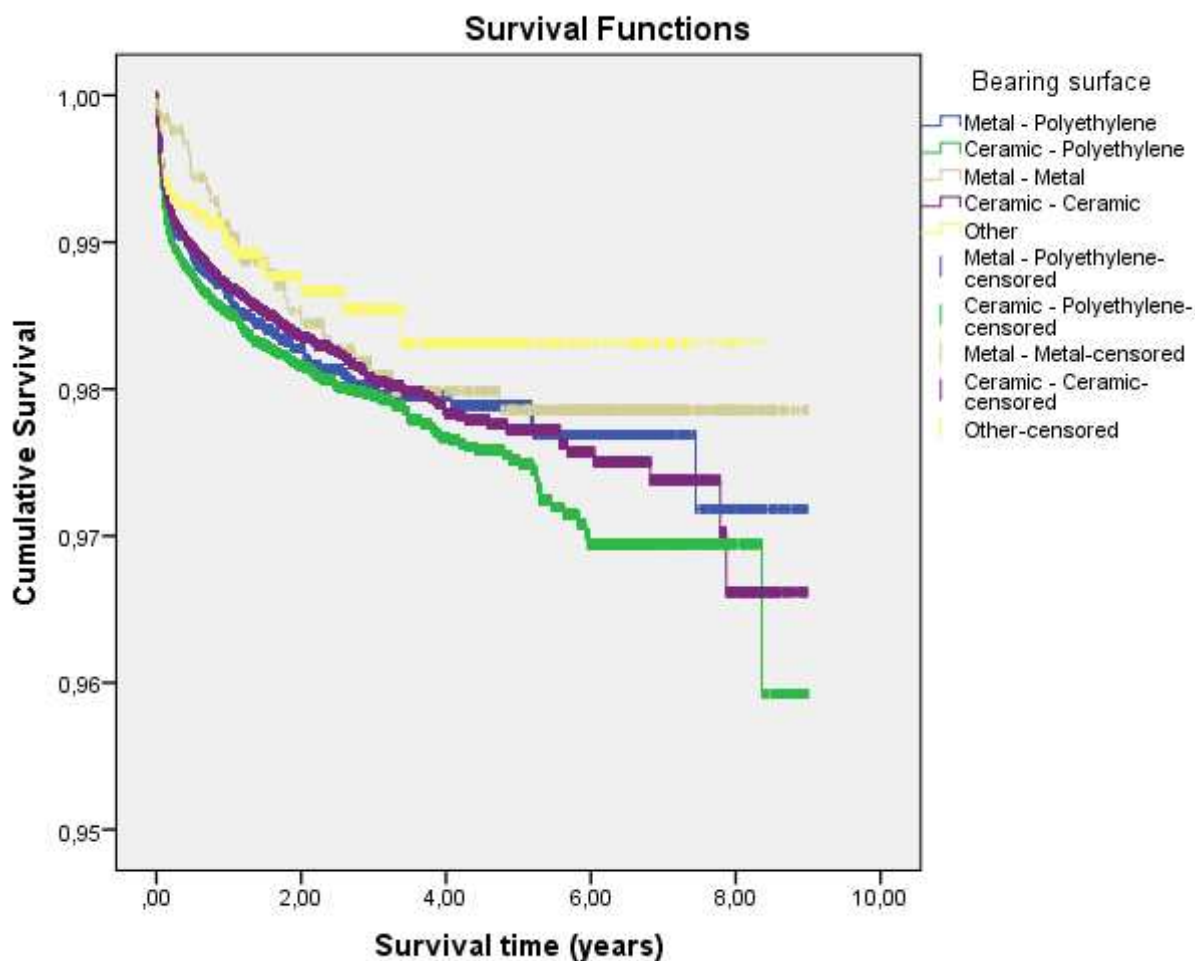
	Number of events/Number at risk									
	0	1	2	3	4	5	6	7	8	9
<b>Primary osteoarthritis</b>	798/71030	132/52129	62/33738	29/18972	11/9930	15/6149	1/3402	3/1420	1/485	0/1
<b>Avascular necrosis</b>	88/5293	20/3860	2/2414	0/1261	0/618	1/413	0/205	0/73	0/28	0/0
<b>Fracture</b>	581/23103	66/13803	14/7809	4/4067	0/1742	2/1022	0/463	0/197	0/65	0/0
<b>Secondary osteoarthritis</b>	33/2173	7/1593	7/1097	1/639	0/321	0/217	1/111	0/46	0/16	0/0
<b>Rheumatoid arthritis</b>	3/311	2/237	1/154	0/85	1/47	0/36	0/19	0/7	0/1	0/0
<b>Tumor</b>	5/234	1/128	0/73	0/42	0/23	0/18	0/13	0/6	0/1	0/0
<b>Hip dysplasia</b>	12/837	2/546	1/299	0/85	0/23	0/10	0/1	0/0	0/0	0/0
<b>Other indication</b>	24/608	2/399	1/241	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
<b>Total prosthesis</b>	878/60701	107/38724	17/17824	0/993
<b>Total dual-mobility prosthesis</b>	98/4877	15/2940	1/1209	0/44
<b>Hemi - Unipolar</b>	7/189	1/93	0/41	0/4
<b>Hemi - Bipolar</b>	328/12724	24/6324	2/2489	0/209
<b>Resurfacing</b>	10/706	1/445	1/177	0/6

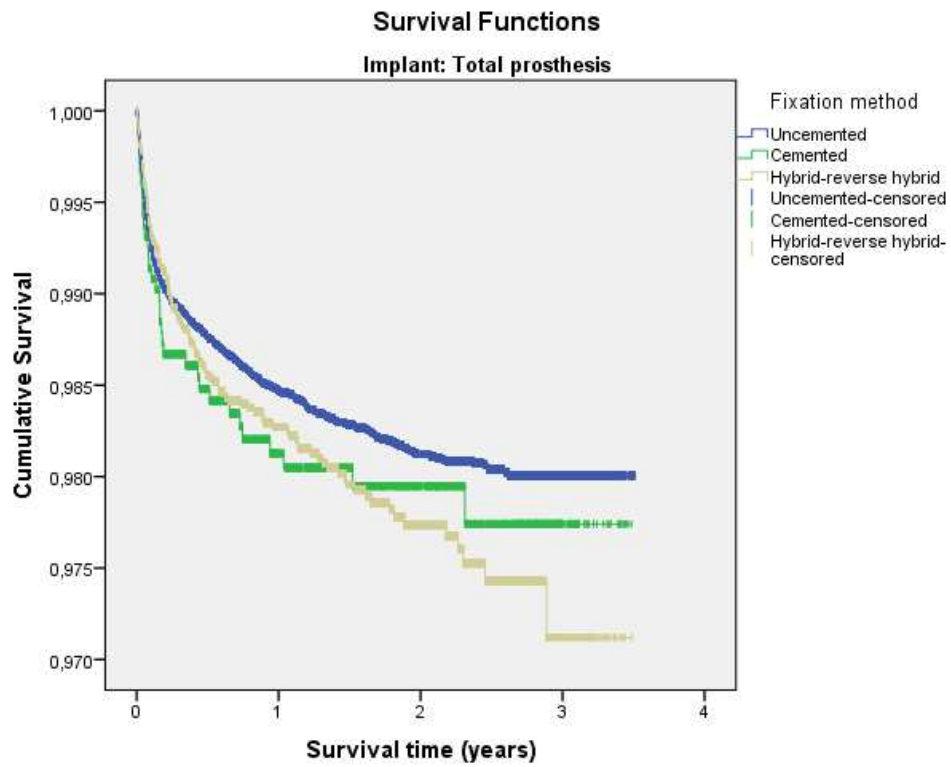
Figure 3.20 Kaplan-Meier curve for bearing surface for total hip prostheses at primary hip replacement

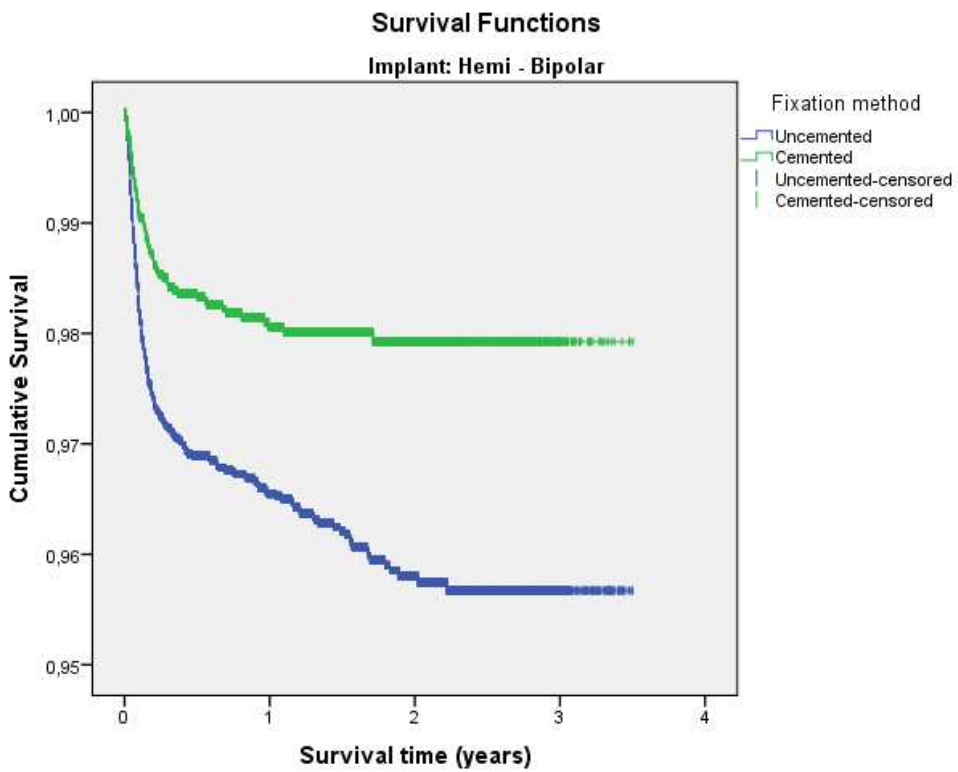
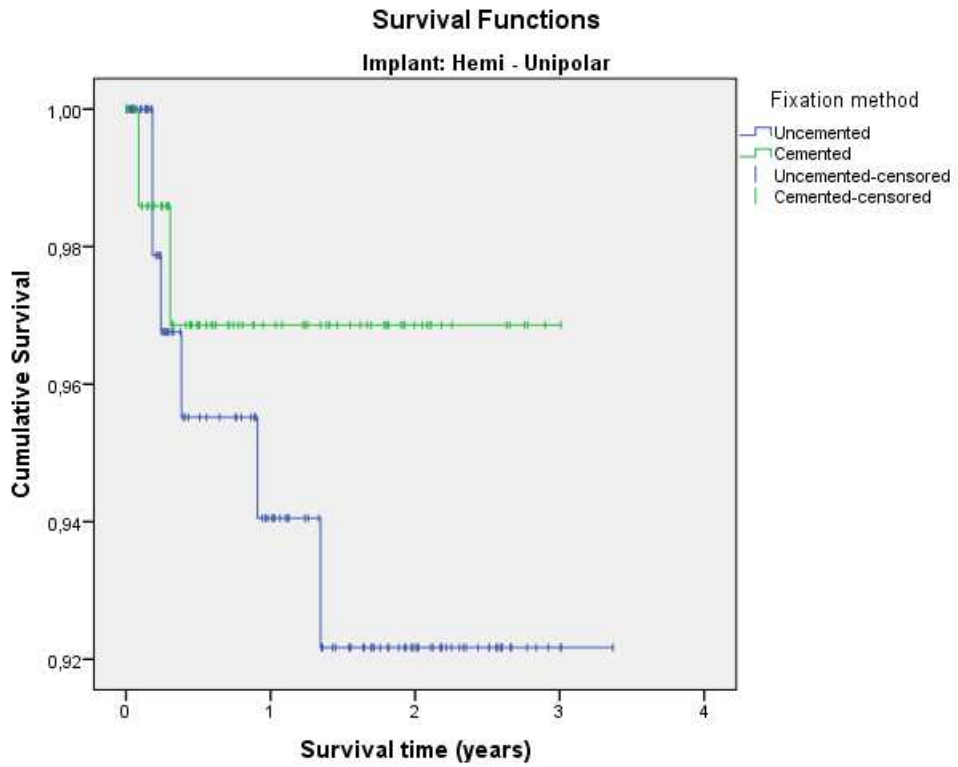


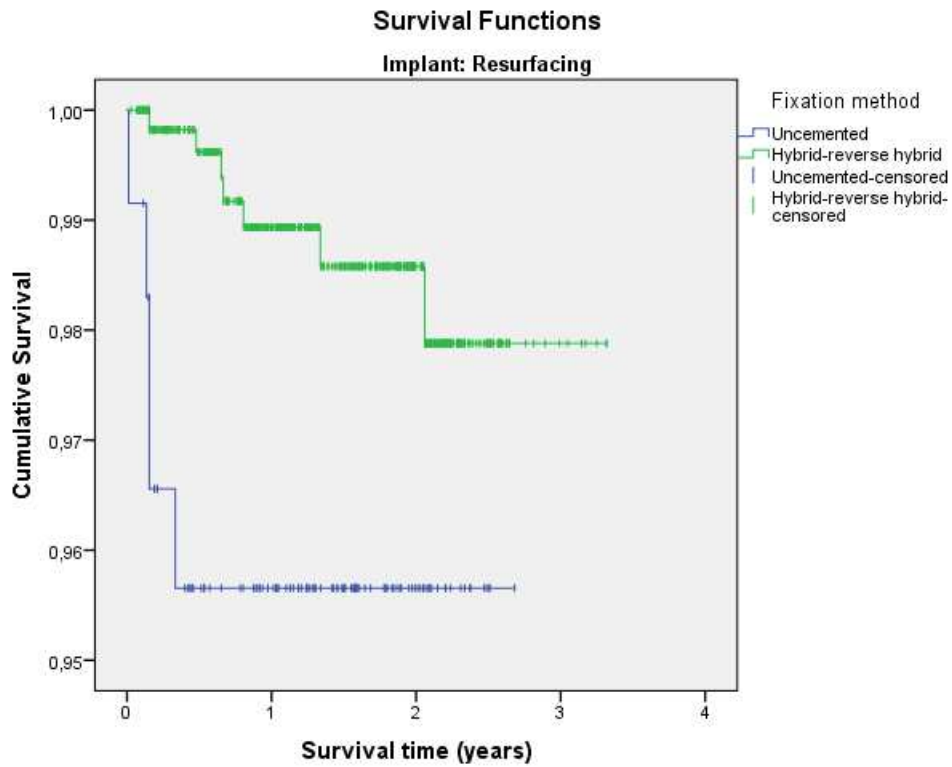
	Number of events/Number at risk									
	0	1	2	3	4	5	6	7	8	9
<b>Metal – Poly-ethylene</b>	91/6964	18/5534	11/4245	1/2970	1/1587	2/1083	0/620	1/257	0/108	0/0
<b>Ceramic – Poly-ethylene</b>	385/27369	64/20093	23/13495	17/8282	6/4738	12/2848	0/1360	0/491	1/164	0/1
<b>Metal - Metal</b>	11/1265	8/1213	4/1157	1/1026	1/823	0/719	0/521	0/241	0/86	0/0
<b>Ceramic - Ceramic</b>	558/45572	91/32588	41/20016	14/10135	4/4476	3/2664	2/1431	2/609	0/197	0/0
<b>Other</b>	18/1878	3/1458	2/996	1/601	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

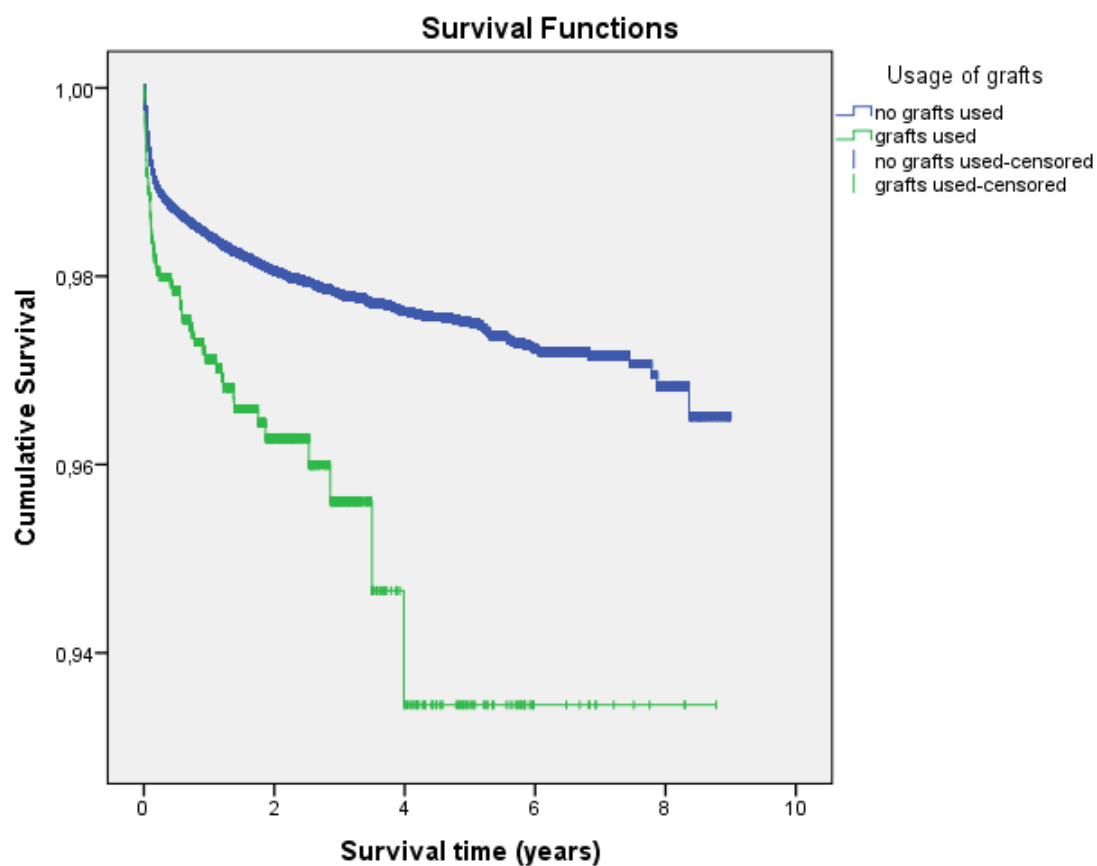






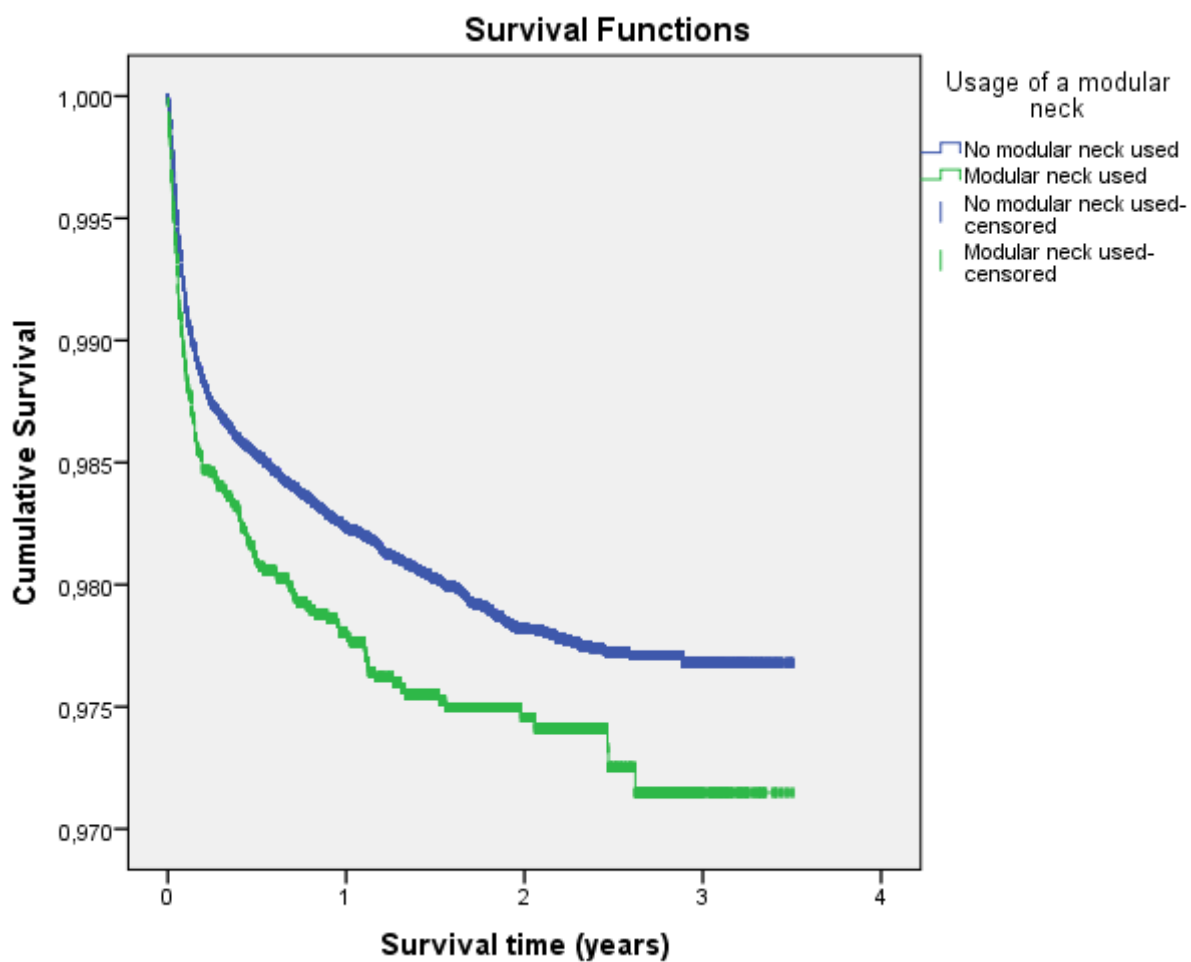
		Number of events/Number at risk			
		0	1	2	3
<b>Total prosthesis</b>	Uncemented	737/52040	87/33072	11/15160	0/842
	Cemented	31/1749	2/1246	1/693	0/56
	Hybrid	110/6912	18/4406	5/1971	0/95
<b>Total dual-mobility prosthesis</b>	Uncemented	66/3465	6/2106	1/835	0/36
	Cemented	7/334	3/211	0/100	0/2
	Hybrid	25/1078	6/623	0/274	0/6
<b>Hemi - Unipolar</b>	Uncemented	5/115	1/60	0/29	0/3
	Cemented	2/74	0/33	0/12	0/1
<b>Hemi - Bipolar</b>	Uncemented	256/8416	22/4128	2/1680	0/161
	Cemented	72/4308	2/2196	0/809	0/48
<b>Resurfacing</b>	Uncemented	5/118	0/83	0/22	0/0
	Hybrid	5/582	1/358	1/152	0/6

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



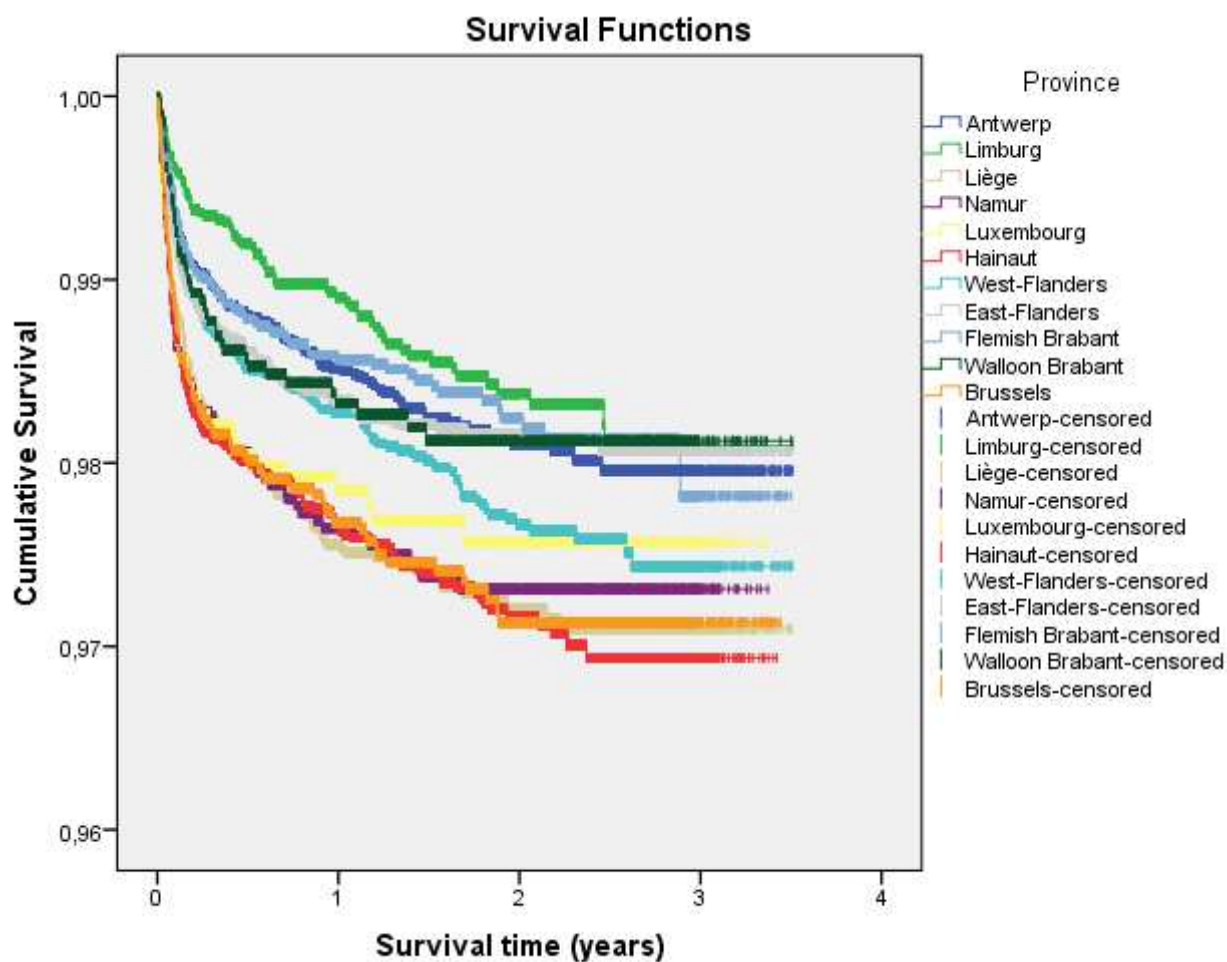
	Number of events/Number at risk									
	0	1	2	3	4	5	6	7	8	9
<b>No grafts used</b>	1502/102018	225/71635	86/45296	32/25071	12/12694	18/7873	2/4228	3/1753	1/596	0/1
<b>Grafts used</b>	42/1571	7/1060	2/529	2/203	0/75	0/42	0/12	0/6	0/3	0/0

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
<b>No modular neck used</b>	1140/70282	131/42889	16/19234	0/1026
<b>Modular neck used</b>	164/8021	15/5100	4/2288	0/220

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



	Number of events/Number at risk			
	0	1	2	3
<b>Antwerp</b>	166/12328	23/7369	3/3258	0/256
<b>Limburg</b>	62/6300	16/3911	3/1731	0/32
<b>Liège</b>	170/7587	12/4734	2/2167	0/135
<b>Namur</b>	78/3571	6/2209	0/1000	0/42
<b>Luxembourg</b>	43/2128	3/1327	0/626	0/37
<b>Hainaut</b>	201/9291	21/5643	4/2415	0/78
<b>West-Flanders</b>	175/11026	31/6857	4/3160	0/173
<b>East-Flanders</b>	163/10680	10/6508	2/2937	0/230
<b>Flemish Brabant</b>	91/6923	9/4211	3/1824	0/120
<b>Walloon Brabant</b>	44/2878	3/1746	0/814	0/38
<b>Brussels</b>	107/5019	12/3035	0/1363	0/93

### 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 %
<b>Primary procedure</b>	75574	97,2%	2185	2,8%
<b>Revision with new prosthesis</b>	7544	96,9%	244	3,1%
<b>Resection with spacer</b>	413	94,9%	22	5,1%
<b>Resection without spacer</b>	26	86,7%	4	13,3%
<b>Total</b>	<b>83557</b>	<b>97,1%</b>	<b>2455</b>	<b>2,9%</b>

**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 %
<b>&lt;45</b>	2940	99,9%	4	0,1%
<b>45-59</b>	14256	99,7%	47	0,3%
<b>60-69</b>	21157	99,4%	124	0,6%
<b>70-79</b>	24269	98,4%	398	1,6%
<b>&gt;=80</b>	20908	91,7%	1882	8,3%
<b>Total [Missing]</b>	<b>83530 [27]</b>	<b>97,1%</b>	<b>2455</b>	<b>2,9%</b>