



ANNUAL REPORT 2018

**Survivorship Curve
Digital Supplement**

As noted in the Annual Report, the graphs represented here from data analysis of both the AJRR and CMS databases cannot infer causation, only an association between the variables shown. Additional factors would need to be considered in any examination of cause and effect in the areas studied, which include stem fixation methods, head size and composition, knee design and tibial insert composition stratified by age and sex. Details of the methodology employed in the construction of these figures can be found in the Annual Report pp 40.

Contents

Fixation of Femoral Stem

- Figure 1: Fixation of the femoral stem: cemented vs cementless designs in patients diagnosed with primary OA (2012-2017)2
- Figure 2: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented for Males Diagnosed with Primary OA (2012-2017)2
- Figure 3: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented for Females Diagnosed with Primary OA (2012-2017)3
- Figure 4: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented For Ages 65-69 Diagnosed with Primary OA (2012-2017)3
- Figure 5: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented For ages 70-79 Diagnosed with Primary OA (2012-2017).4
- Figure 6: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented For ages 80+ Diagnosed with Primary OA (2012-2017)4
- Figure 7: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented for Males ages 65-69 Diagnosed with Primary OA (2012-2017) . . .5
- Figure 8: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented for Males ages 70-79 Diagnosed with Primary OA (2012-2017) . . .5
- Figure 9: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented for Males ages 80+ Diagnosed with Primary OA (2012-2017) . . .6
- Figure 10: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented for Females ages 65-69 Diagnosed with Primary OA (2012-2017) 6
- Figure 11: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented for Females ages 70-79 Diagnosed with Primary OA (2012-2017) 7
- Figure 12: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented for Females Ages 80+ Diagnosed with Primary OA (2012-2017) . .7
- Figure 13: Composition of Femoral Heads for patients Diagnosed with Primary OA (2012-2017) (Metal on Metal Removed).8
- Figure 14: Femoral Head Composition for Males (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)8
- Figure 15: Femoral Head Composition for Females (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)9
- Figure 16: Composition of Femoral Heads for Patients 65-69 Years of Age Diagnosed with Primary OA (2012-2017) (Metal on Metal Removed)9
- Figure 17: Femoral Head Composition for Ages 70-79 (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017).10
- Figure 18: Femoral Head Composition for Ages 80+ (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)10

Femoral Head Diameter

Figure 19: Diameter of Femoral Heads Diagnosed with Primary OA (2012-2017)	11
Figure 20: Femoral Head Diameter for Males (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)	11
Figure 21: Femoral Head Diameter for Females (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)	12
Figure 22: Femoral Head Diameter for Ages 65-69 (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)	12
Figure 23: Femoral Head Diameter for Ages 70-79 (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)	13
Figure 24: Femoral Head Diameter for Ages 80+ (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)	13
Figure 25: Femoral Head Diameter For Males Ages 65-69 (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)	14
Figure 26: Femoral Head Diameter for Males Ages 70-79 (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)	14
Figure 27: Femoral Head Diameter for Males Ages 80+ (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)	15
Figure 28: Femoral Head Diameter for Females Ages 65-69 (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)	15
Figure 29: Femoral Head Diameter for Females Ages 70-79 (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)	16
Figure 30: Femoral Head Diameter for Females Ages 80+ (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)	16
Figure 31: Ceramic Heads by Diameter of Femoral Heads (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)	17
Figure 32: Cobalt Chrome Heads by Diameter of Femoral Heads (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)	17
Figure 33: ≤ 28mm Head by Composition of Femoral Heads Diagnosed with Primary OA (2012-2017)	18
Figure 34: 32mm Head by Composition of Femoral Heads Diagnosed with Primary OA (2012-2017)	18
Figure 35: 36mm Head by Composition of Femoral Heads Diagnosed with Primary OA (2012-2017)	19
Figure 36: 40 mm Head by Composition of Femoral Heads Diagnosed with Primary OA (2012-2017)	19

Primary Knee Design

Figure 37: Primary Knee Implant Designs Diagnosed with Primary OA (2012-2017)	20
Figure 38: Primary Knee Implant Designs in Males Diagnosed with Primary OA (2012-2017)	20
Figure 39: Primary Knee Implant Designs in Females Diagnosed with Primary OA (2012-2017)	21
Figure 40: Primary Knee Implant Designs in Ages 65-69 Diagnosed with Primary OA (2012-2017)	21
Figure 41: Primary Knee Implant Designs in Ages 70-79 Diagnosed with Primary OA (2012-2017)	22
Figure 42: Primary Knee Implant Designs in Ages 80+ Diagnosed with Primary OA (2012-2017)	22

Tibial Insert Composition

Figure 43: Composition of Tibial Inserts Diagnosed with Primary OA (2012-2017)	23
Figure 44: Composition of Tibial Inserts for Males Diagnosed with Primary OA (2012-2017)	23
Figure 45: Composition of Tibial Inserts for Females Diagnosed with Primary OA (2012-2017)	24
Figure 46: Composition of Tibial Inserts for Patients Aged 65-69 Diagnosed with Primary OA (2012-2017)	24
Figure 47: Composition of Tibial Inserts for Patients Aged 70-79 Diagnosed with Primary OA (2012-2017)	25
Figure 48: Composition of Tibial Inserts for Patients Aged 80+ Diagnosed with Primary OA (2012-2017)	25

Knee Femoral Component

Figure 49: Knee Constructs Femoral Component (Total Knee and Uni-condylar) Diagnosed with Primary OA (2012-2017)	26
Figure 50: Knee Constructs Femoral Component (Total Knee and Uni-condylar) For Males Diagnosed with Primary OA (2012-2017)	26
Figure 51: Knee Constructs Femoral Component (Total Knee and Uni-condylar) For Females Diagnosed with Primary OA (2012-2017)	27
Figure 52: Knee Constructs Femoral Component (Total Knee and Uni-condylar) For Patients 65-69 Years of Age Diagnosed with Primary OA (2012-2017)	27
Figure 53: Knee Constructs Femoral Component (Total Knee and Uni-condylar) For Patients 70-79 Years of Age Diagnosed with Primary OA (2012-2017)	28
Figure 54: Knee Constructs Femoral Component (Total Knee and Uni-condylar) For Patients 80+ Years of Age Diagnosed with Primary OA (2012-2017)	28

Fixation of Femoral Stem

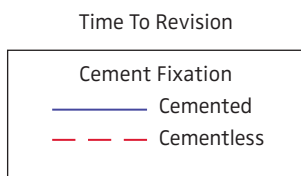
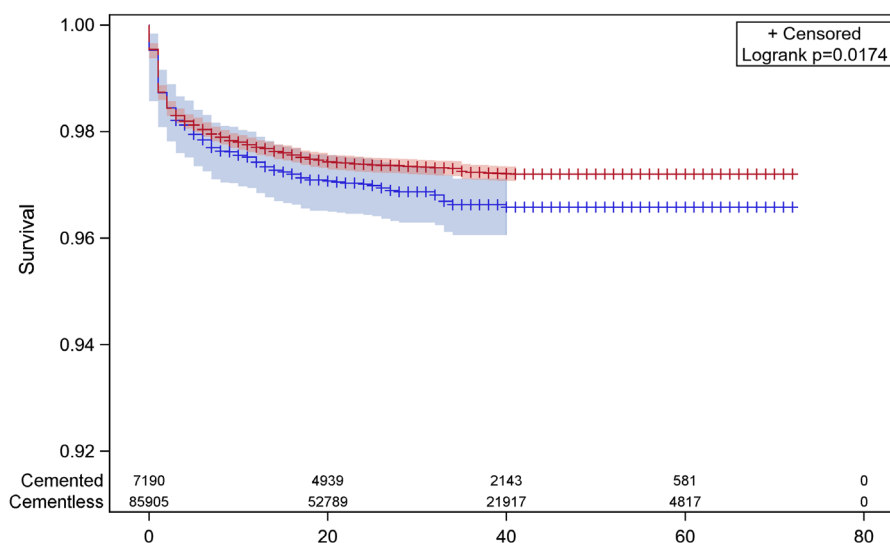


Figure 1: Fixation of the femoral stem: cemented vs cementless designs in patients diagnosed with primary OA (2012-2017)

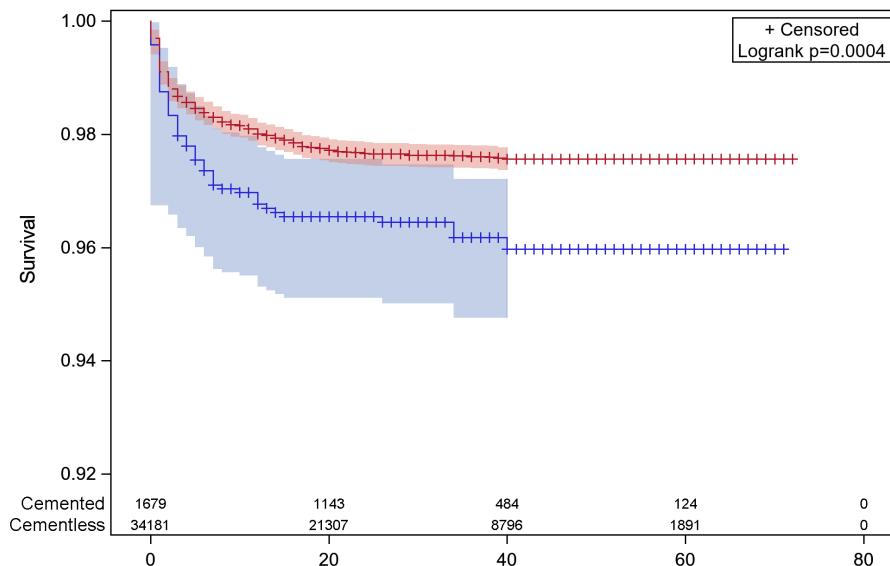
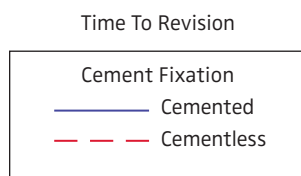


* Total possible patient population: 108,002; After accounting for missing data and exclusions as noted, the number analyzed = 93,095 (85% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Cement Fixation	Total	Failed	Censored	Percent Censored
1	Cemented	7,190	219	6,971	97.0%
2	Cementless	85,905	2,175	83,730	97.5%
Total		93,095	2,394	90,701	97.4%

Figure 2: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented for Males Diagnosed with Primary OA (2012-2017)

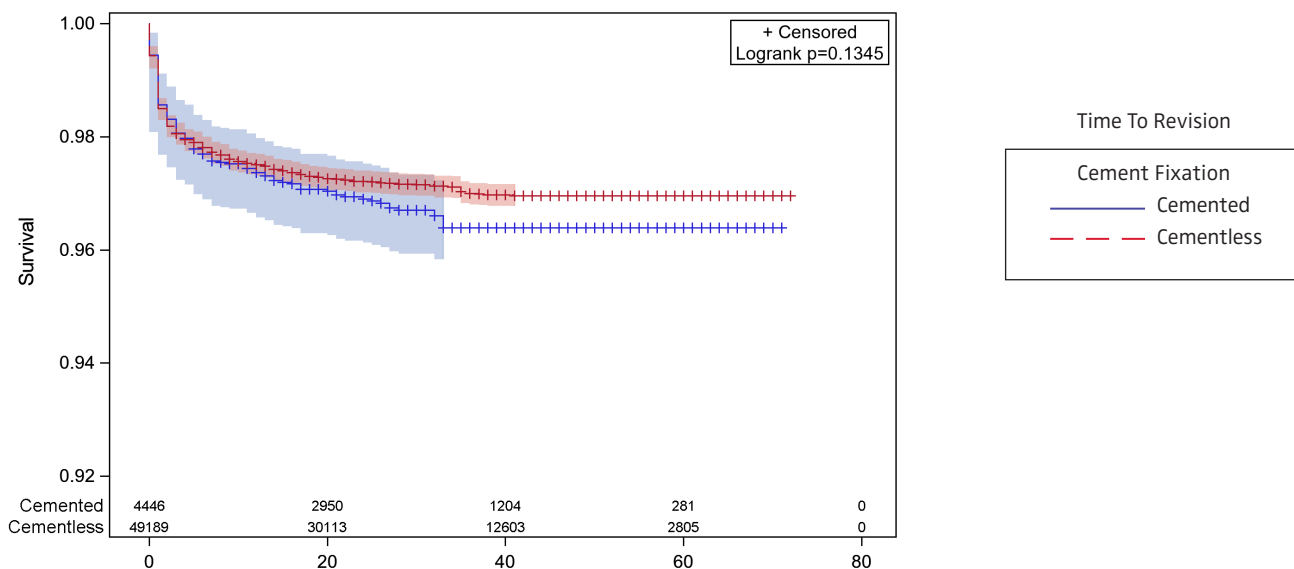


* Total possible patient population: 37,836; after accounting for missing data and exclusions as noted, the number analyzed=35860 (94.8% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Cement Fixation	Total	Failed	Censored	Percent Censored
1	Cemented	1,679	60	1,619	96.4%
2	Cementless	34,181	755	33,426	97.8%
Total		35,860	815	35,045	97.7%

Figure 3: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented for Females Diagnosed with Primary OA (2012-2017)

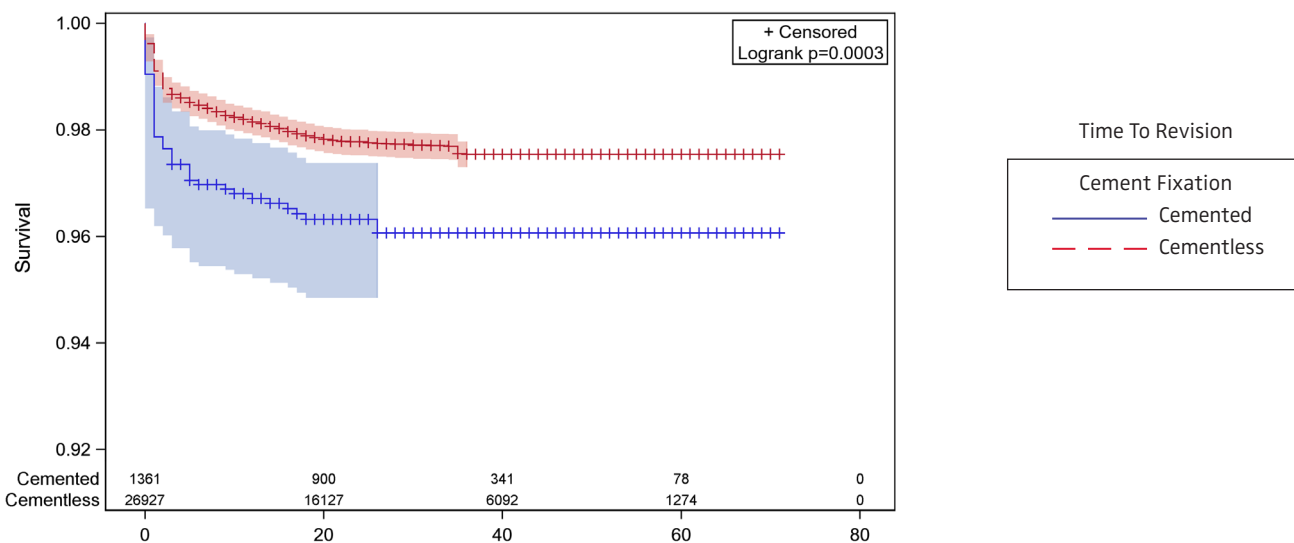


* Total possible patient population: 57,037; after accounting for missing data and exclusions as noted, the number analyzed=53,635 (94 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Cement Fixation	Total	Failed	Censored	Percent Censored
1	Cemented	4,446	141	4,305	96.8%
2	Cementless	49,189	1,351	47,838	97.3%
Total		53,635	1,492	52,143	97.2%

Figure 4: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented For Ages 65-69 Diagnosed with Primary OA (2012-2017)

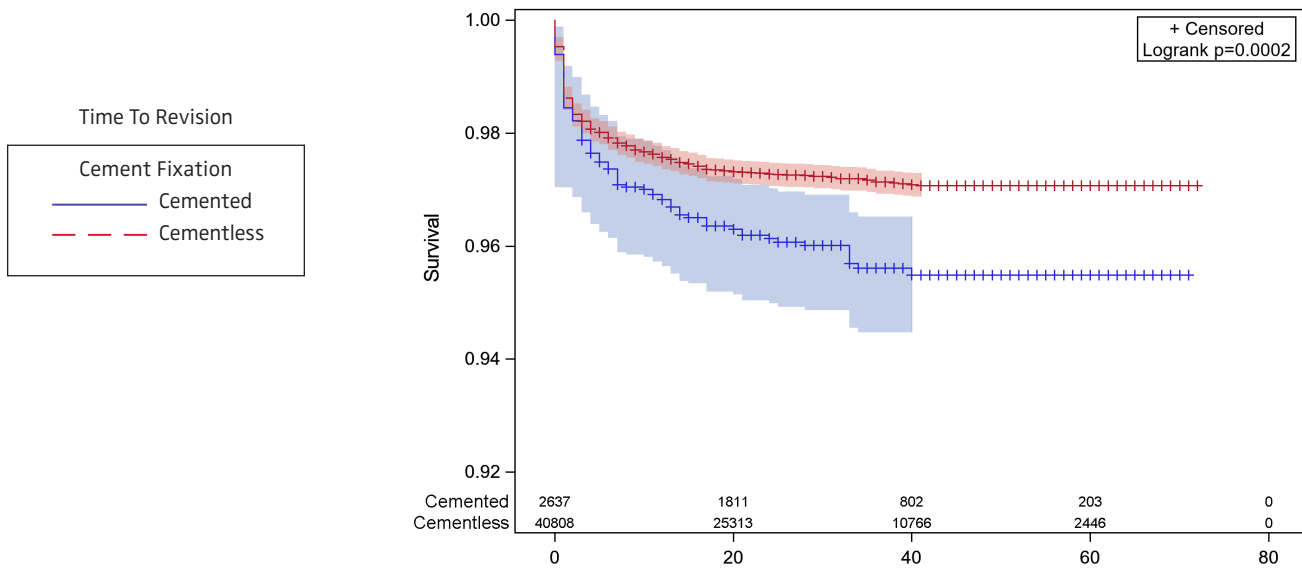


* Total possible patient population: 32,282; After accounting for missing data and exclusions as noted, the number analyzed = 28,288 (88% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Cement Fixation	Total	Failed	Censored	Percent Censored
1	Cemented	1,361	50	1,311	96.3%
2	Cementless	26,927	576	26,351	97.9%
Total		28,288	626	27,662	97.8%

Figure 5: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented For ages 70-79 Diagnosed with Primary OA (2012-2017)

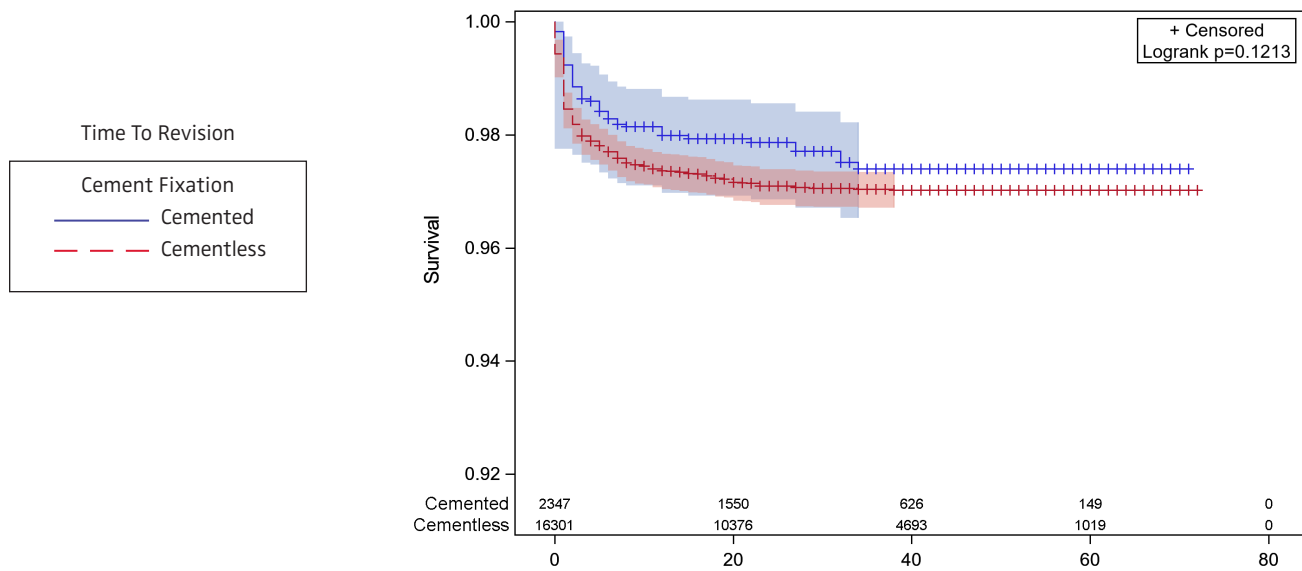


* Total possible patient population: 57,037; after accounting for missing data and exclusions as noted, the number analyzed= 43,445 (76% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Cement Fixation	Total	Failed	Censored	Percent Censored
1	Cemented	2,637	104	2,533	96.1
2	Cementless	40,808	1,085	39,723	97.3
Total		43,445	1,189	42,256	97.3

Figure 6: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented For ages 80+ Diagnosed with Primary OA (2012-2017)

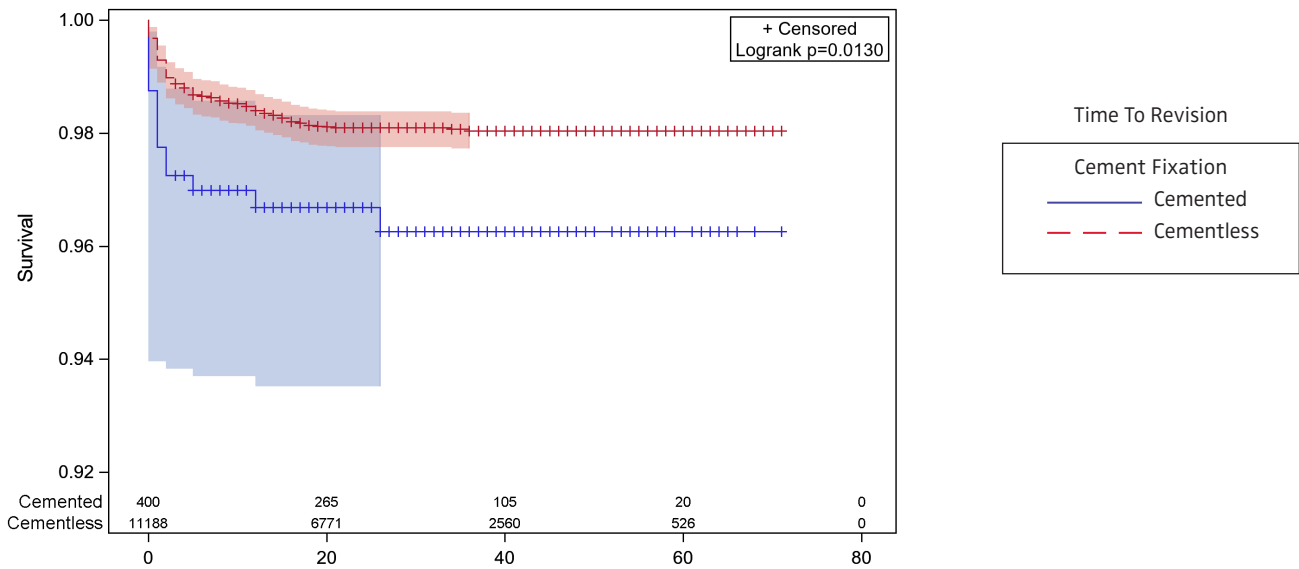


* Total possible patient population: 19,767; after accounting for missing data and exclusions as noted, the number analyzed=18,648 (94.3 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Cement Fixation	Total	Failed	Censored	Percent Censored
1	Cemented	2,347	53	2,294	97.7
2	Cementless	16,301	457	15,844	97.2
Total		18,648	510	18,138	97.3

Figure 7: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented for Males ages 65-69 Diagnosed with Primary OA (2012-2017)

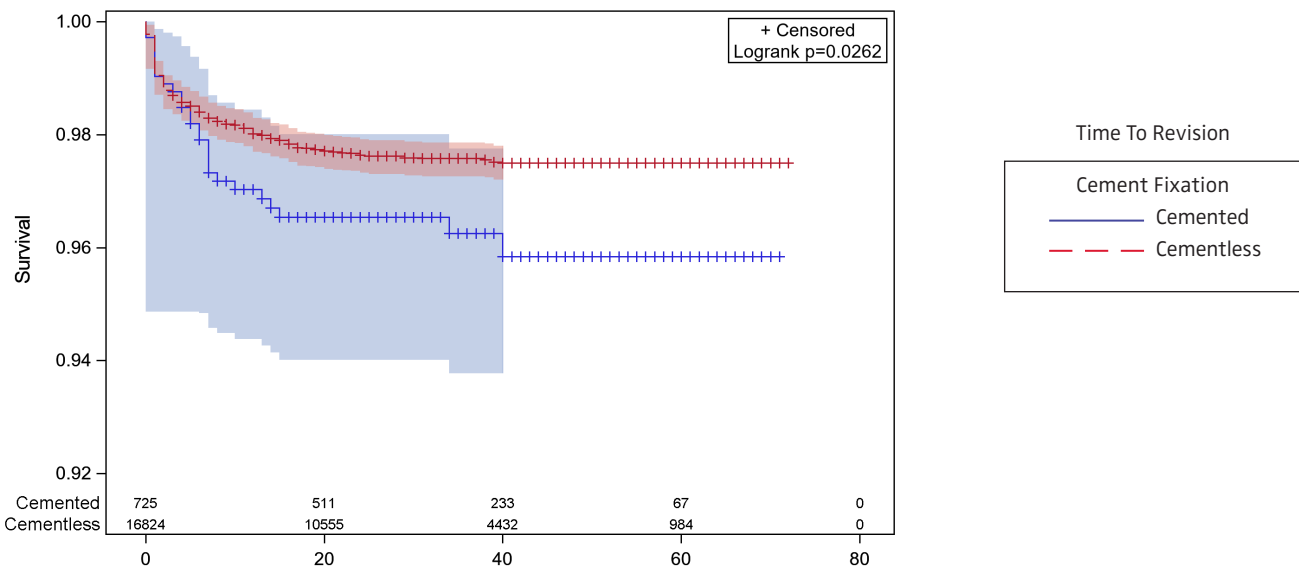


* Total possible patient population: 12,840; after accounting for missing data and exclusions as noted, the number analyzed=11,588 (90.2 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Cement Fixation	Total	Failed	Censored	Percent Censored
1	Cemented	400	14	386.0	96.5
2	Cementless	11,188	200	10,988.0	98.2
Total		11,588	214	11,374.0	98.2

Figure 8: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented for Males ages 70-79 Diagnosed with Primary OA (2012-2017)

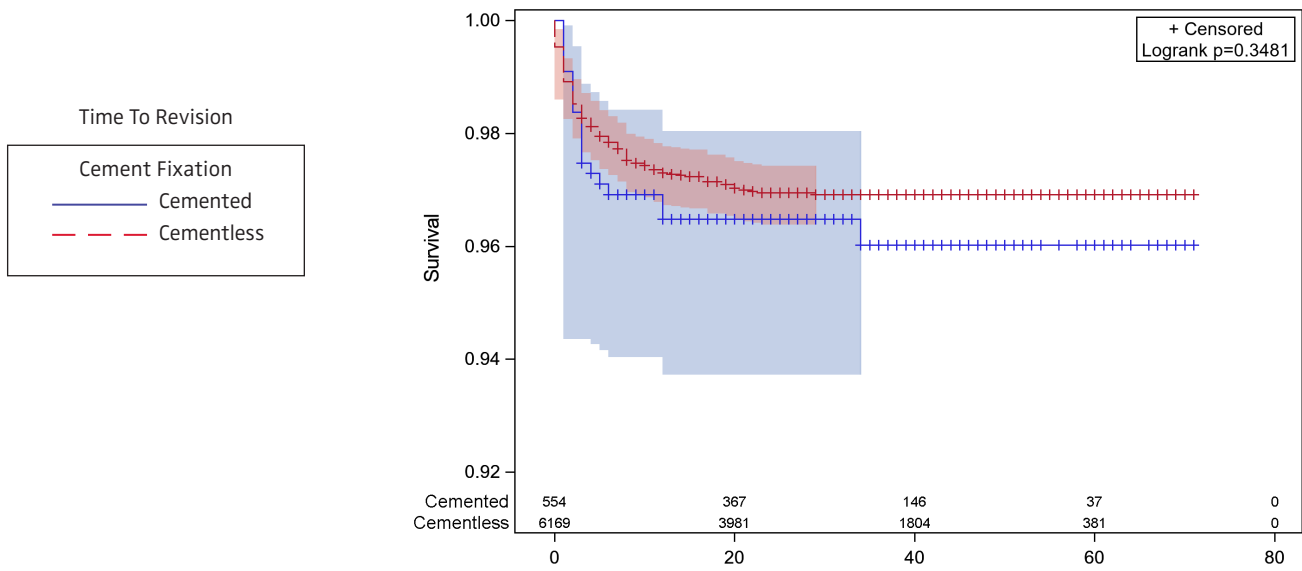


* Total possible patient population: 18,523; after accounting for missing data and exclusions as noted, the number analyzed=17,549 (95 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Cement Fixation	Total	Failed	Censored	Percent Censored
1	Cemented	725	26	699	96.4
2	Cementless	16,824	377	16,447	97.8
Total		17,549	403	17,146	97.7

Figure 9: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented for Males ages 80+ Diagnosed with Primary OA (2012-2017)

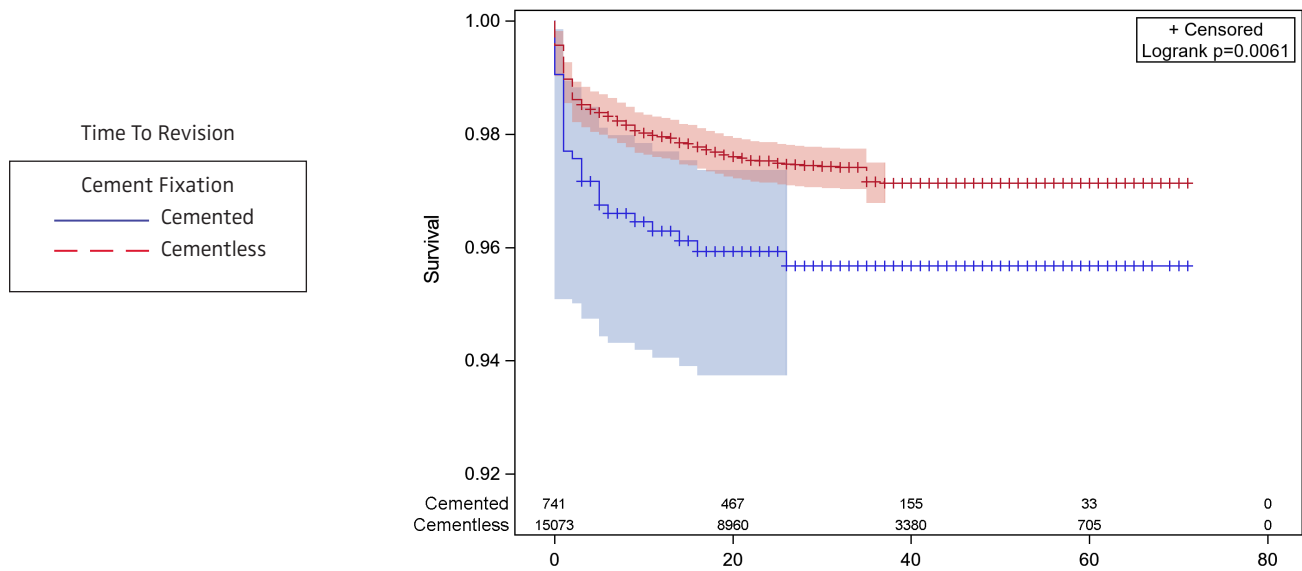


* Total possible patient population 7,073; after accounting for missing data and exclusions as noted, the number analyzed=6,723 (95 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Cement Fixation	Total	Failed	Censored	Percent Censored
1	Cemented	554	20	534	96.4
2	Cementless	6,169	178	5,991	97.1
Total		6,723	198	6,525	97.1

Figure 10: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented for Females ages 65-69 Diagnosed with Primary OA (2012-2017)

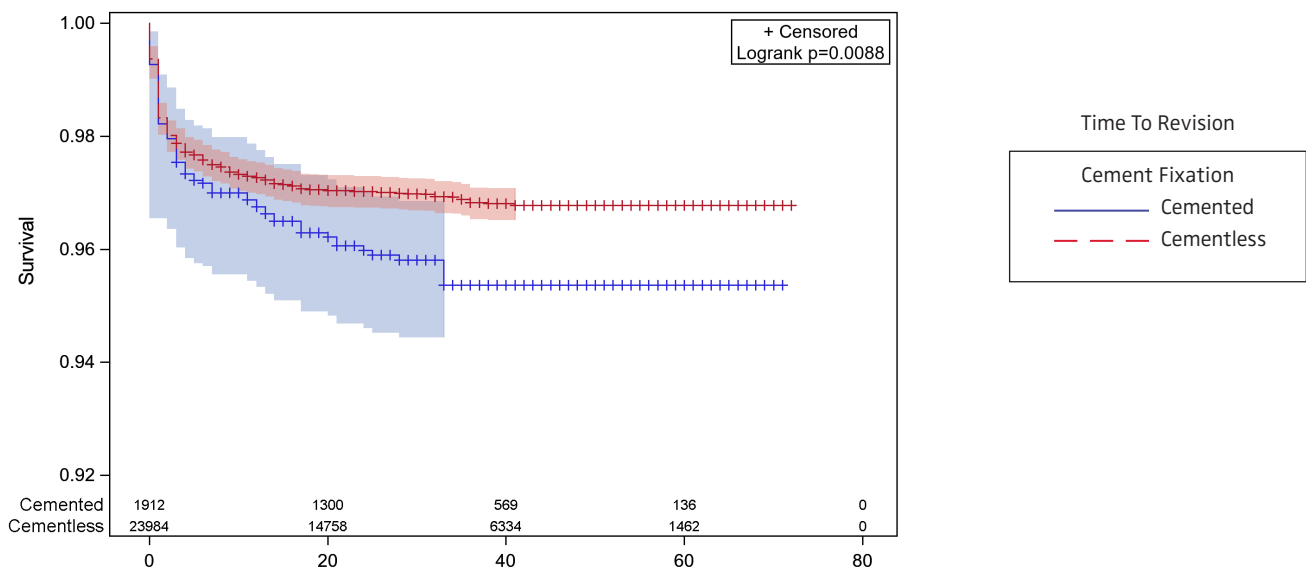


* Total possible patient population 16,773; after accounting for missing data and exclusions as noted, the number analyzed=15,814 (94.3 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Cement Fixation	Total	Failed	Censored	Percent Censored
1	Cemented	741	30	711	96.0
2	Cementless	15,073	364	14,709	97.6
Total		15,814	394	15,420	97.5

Figure 11: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented for Females ages 70-79 Diagnosed with Primary OA (2012-2017)

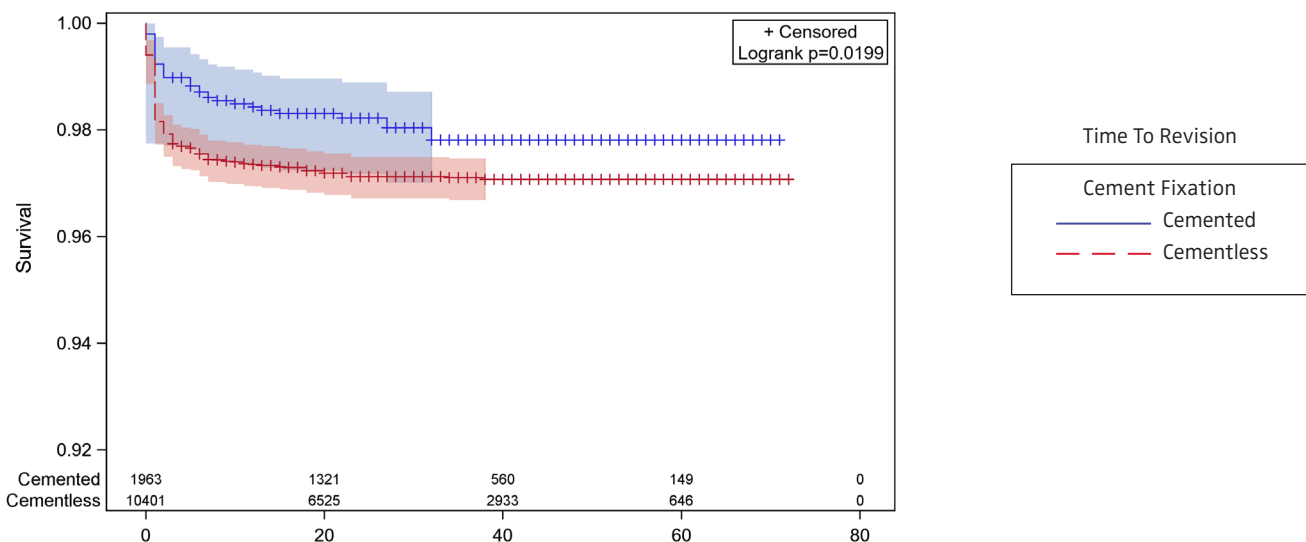


* Total possible patient population 27,570; after accounting for missing data and exclusions as noted, the number analyzed=25,896 (93.9 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Cement Fixation	Total	Failed	Censored	Percent Censored
1	Cemented	1,912	78	1,834.0	95.9
2	Cementless	23,984	708	23,276.0	97.1
Total		25,896	786	25,110.0	97.0

Figure 12: Fixation of Hip Construct Femoral Component: Cemented vs Non-Cemented for Females Ages 80+ Diagnosed with Primary OA (2012-2017)

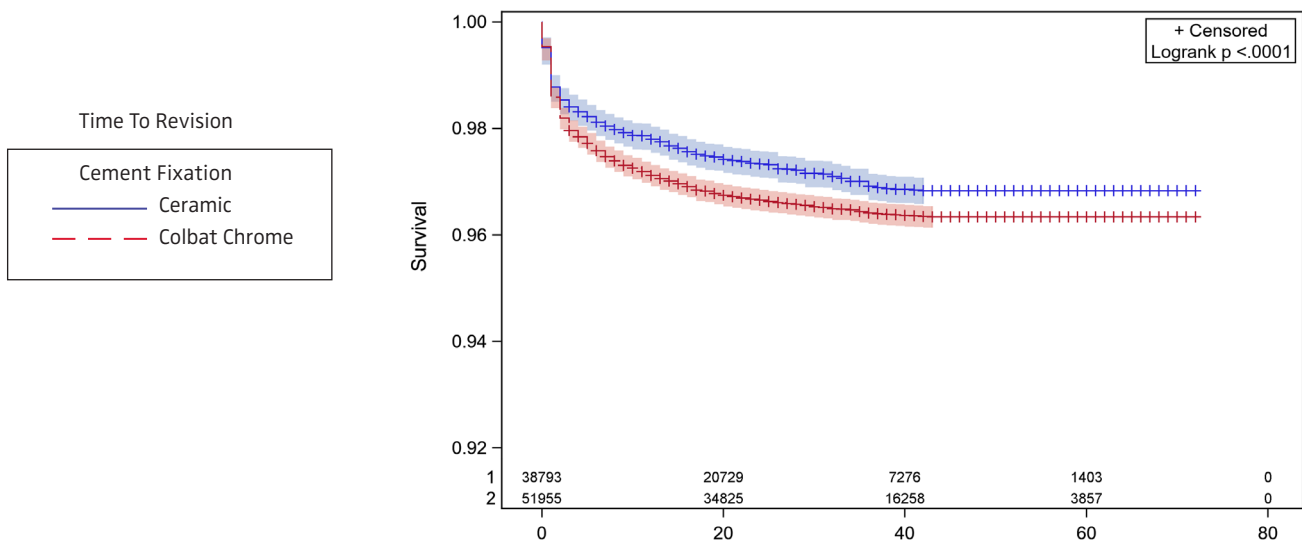


* Total possible patient population: 22,669; After accounting for missing data and exclusions as noted, the number analyzed = 12,364 (54% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Cement Fixation	Total	Failed	Censored	Percent Censored
1	Cemented	1,963	37	1,926	98.1%
2	Cementless	10,401	290	10,111	97.2%
Total		12,364	327	12,037	97.4%

Figure 13: Composition of Femoral Heads for patients Diagnosed with Primary OA (2012-2017) (Metal on Metal Removed)

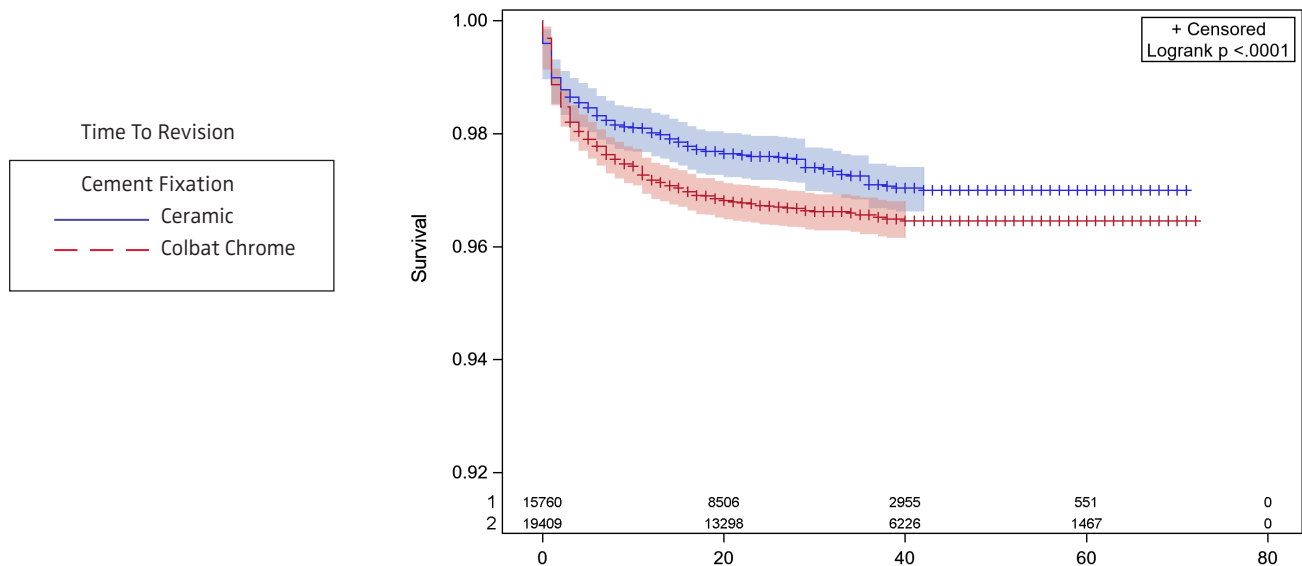


* Total possible patient population: 101,192; After accounting for missing data and exclusions as noted, the number analyzed = 90,748 (90% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Head Composition	Total	Failed	Censored	Percent Censored
1	Ceramic	38,793	1,000	37,793	97.4%
2	Cobalt Chrome	51,955	1,721	50,234	96.7%
Total		90,748	2,721	88,027	97.0%

Figure 14: Femoral Head Composition for Males (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)

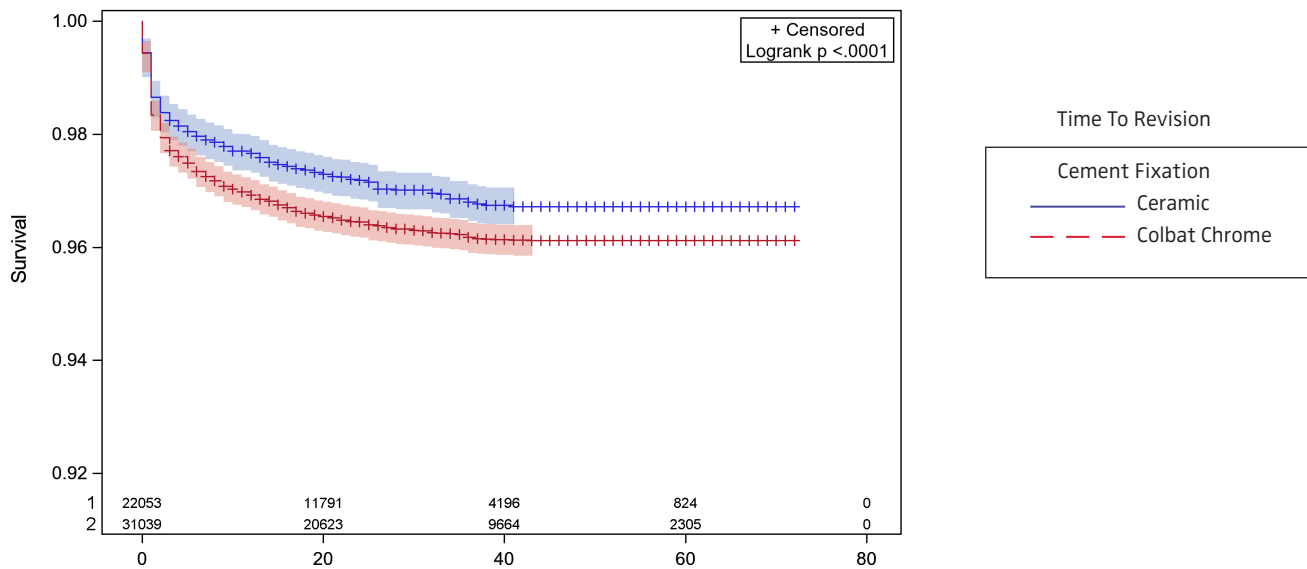


* Total possible patient population 37,836; after accounting for missing data and exclusions as noted, the number analyzed=35,169 (92.9 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Head Composition	Total	Failed	Censored	Percent Censored
1	Ceramic	15,760	372	15,388	97.64
2	Cobalt Chrome	19,409	624	18,785	96.78
Total		35,169	996	34,173	97.17

Figure 15: Femoral Head Composition for Females (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)

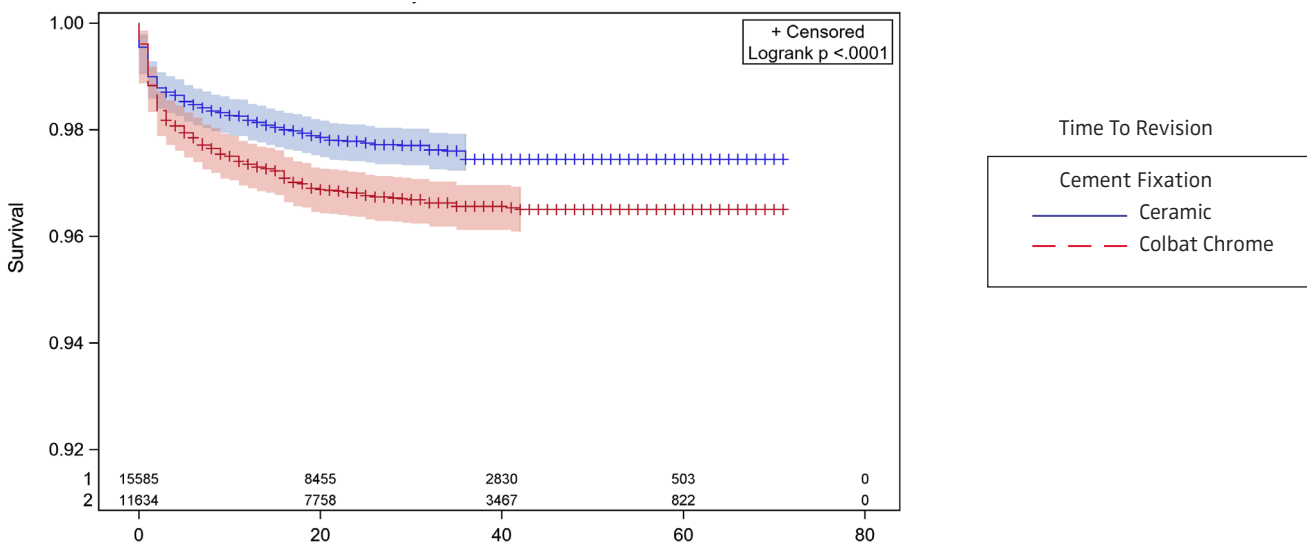


* Total possible patient population 57,037; after accounting for missing data and exclusions as noted, the number analyzed=53,092 (93.1 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Head Composition	Total	Failed	Censored	Percent Censored
1	Ceramic	22,053	600	21,453	97.3
2	Cobalt Chrome	31,039	1,096	29,943	96.5
Total		53,092	1,696	51,396	96.8

Figure 16: Composition of Femoral Heads for Patients 65-69 Years of Age Diagnosed with Primary OA (2012-2017) (Metal on Metal Removed)

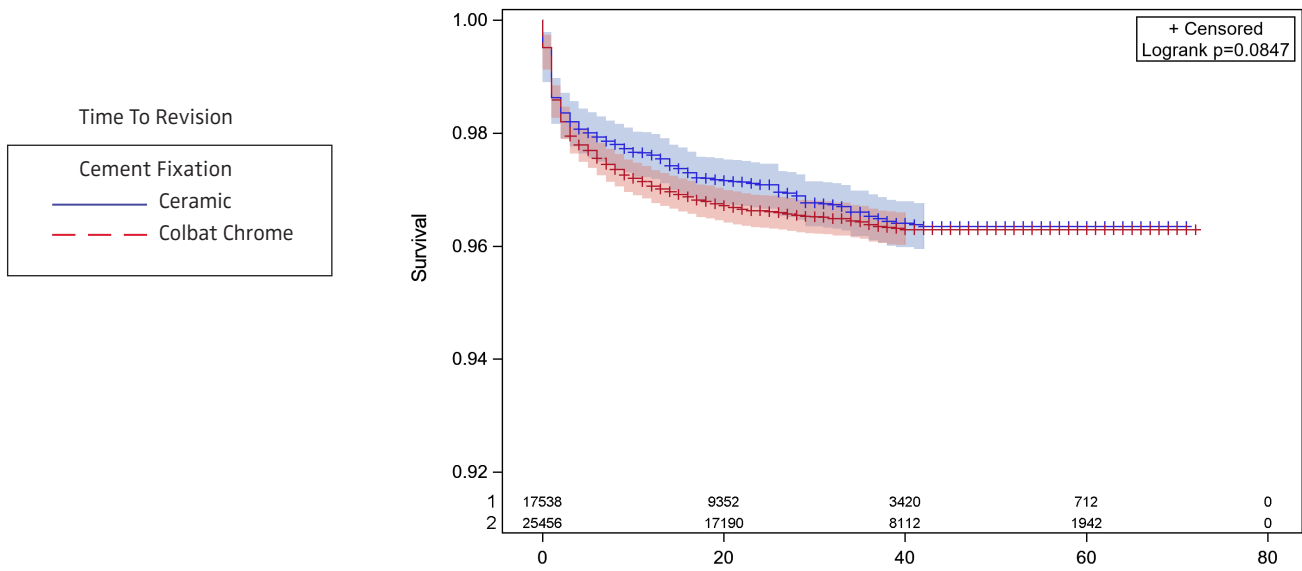


* Total possible patient population: 30,534; After accounting for missing data and exclusions as noted, the number analyzed = 27,219 (89% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Head Composition	(% of the Total)	Total	Failed	Censored	Percent Censored
1	Ceramic	0.572577979	15,585	329	15,256	97.9%
2	Cobalt Chrome	0.427422021	11,634	364	11,270	96.9%
Total			27,219	693	26,526	97.5%

Figure 17: Femoral Head Composition for Ages 70-79 (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)

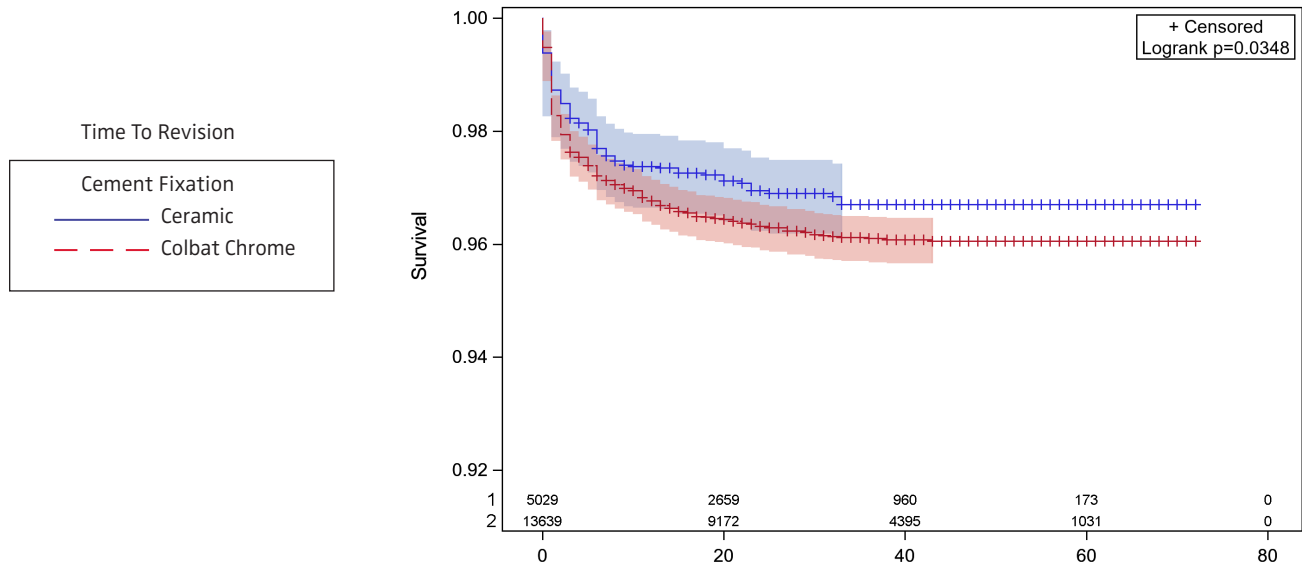


* Total possible patient population 46,093; after accounting for missing data and exclusions as noted, the number analyzed=42,994 (93.3 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Head Composition	Total	Failed	Censored	Percent Censored
1	Ceramic	17,538	507	17,031	97.1
2	Cobalt Chrome	25,456	854	24,602	96.7
Total		42,994	1,361	41,633	96.8

Figure 18: Femoral Head Composition for Ages 80+ (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)

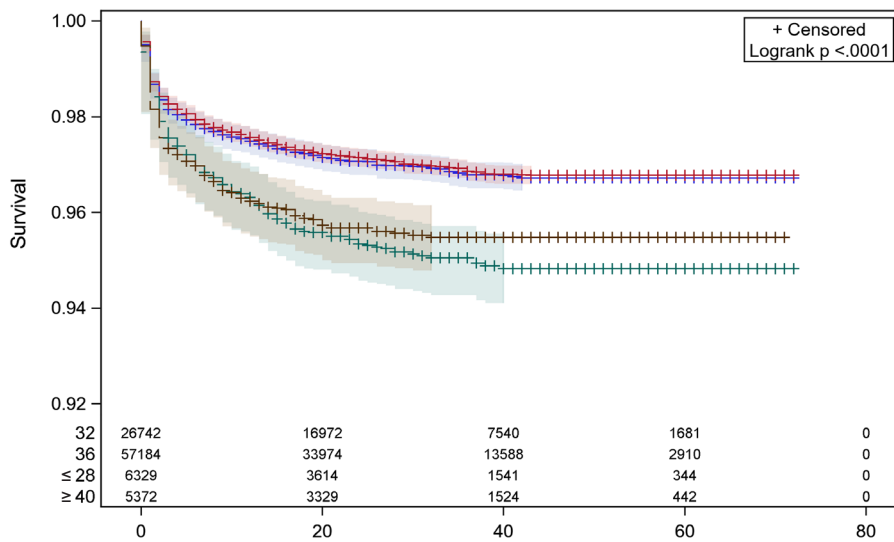


* Total possible patient population 19,767; after accounting for missing data and exclusions as noted, the number analyzed=18,668 (94.4 % of total population)

Summary of the Number of Censored and Uncensored Values

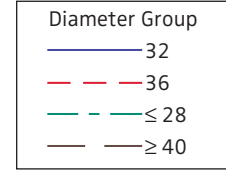
Stratum	Head Composition	Total	Failed	Censored	Percent Censored
1	Ceramic	5,029	144	4,885	97.1
2	Cobalt Chrome	13,639	496	13,143	96.4
Total		18,668	640	18,028	96.6

Figure 19: Diameter of Femoral Heads Diagnosed with Primary OA (2012-2017)



Femoral Head Diameter

Time To Revision

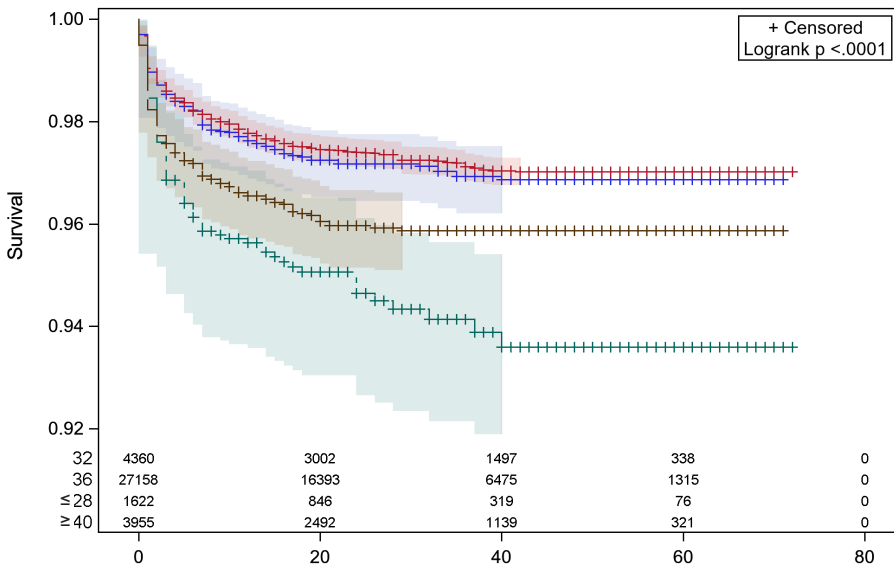


* Total possible patient population: 101,192; After accounting for missing data and exclusions as noted, the number analyzed 95,627 (95% of total population)

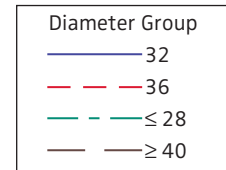
Summary of the Number of Censored and Uncensored Values

Stratum	Diameter Group	Total	Failed	Censored	Percent Censored
1	32	26,742	776	25,966	97.1%
2	36	57,184	1,594	55,590	97.2%
3	≤28	6,329	279	6,050	95.6%
4	≥40	5,372	223	5,149	96.9%
Total		95,627	2,872	92,755	97.0%

Figure 20: Femoral Head Diameter for Males (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)



Time To Revision

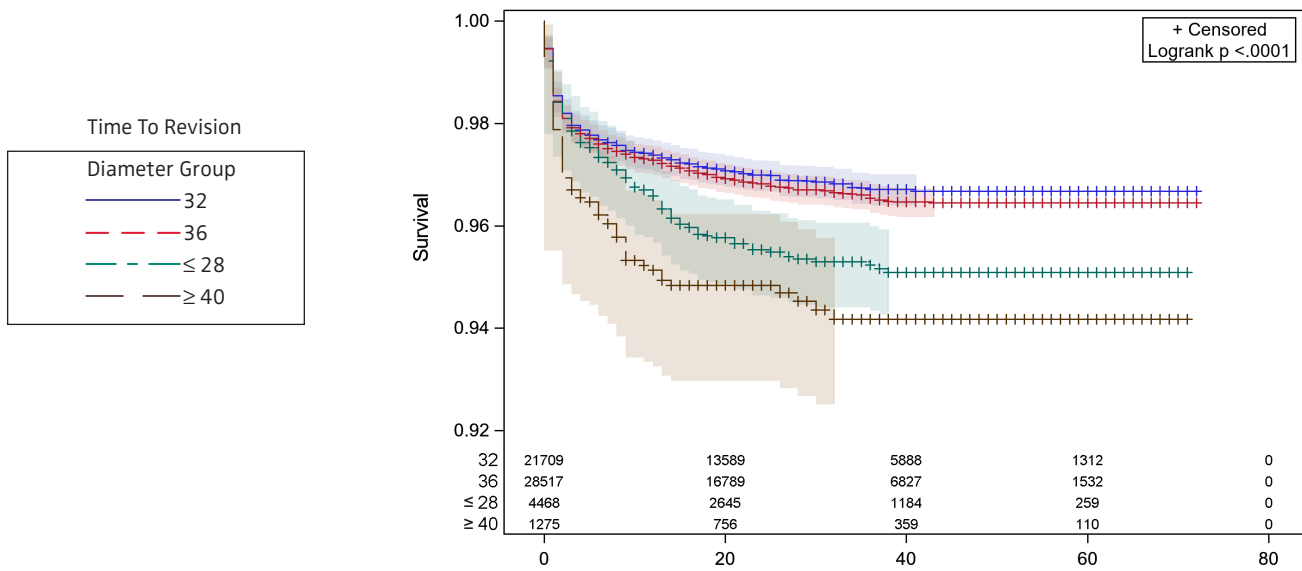


* Total possible patient population 37,836; after accounting for missing data and exclusions as noted, the number analyzed=37,095 (98% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Diameter Group	Total	Failed	Censored	Percent Censored
1	32	4,360	122	4,238	97.2%
2	36	27,158	691	26,467	97.5%
3	≤28	1,622	83	1,539	94.9%
4	≥40	3,955	151	3,804	96.2%
Total		37,095	1,047	36,048	97.2%

Figure 21: Femoral Head Diameter for Females (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)

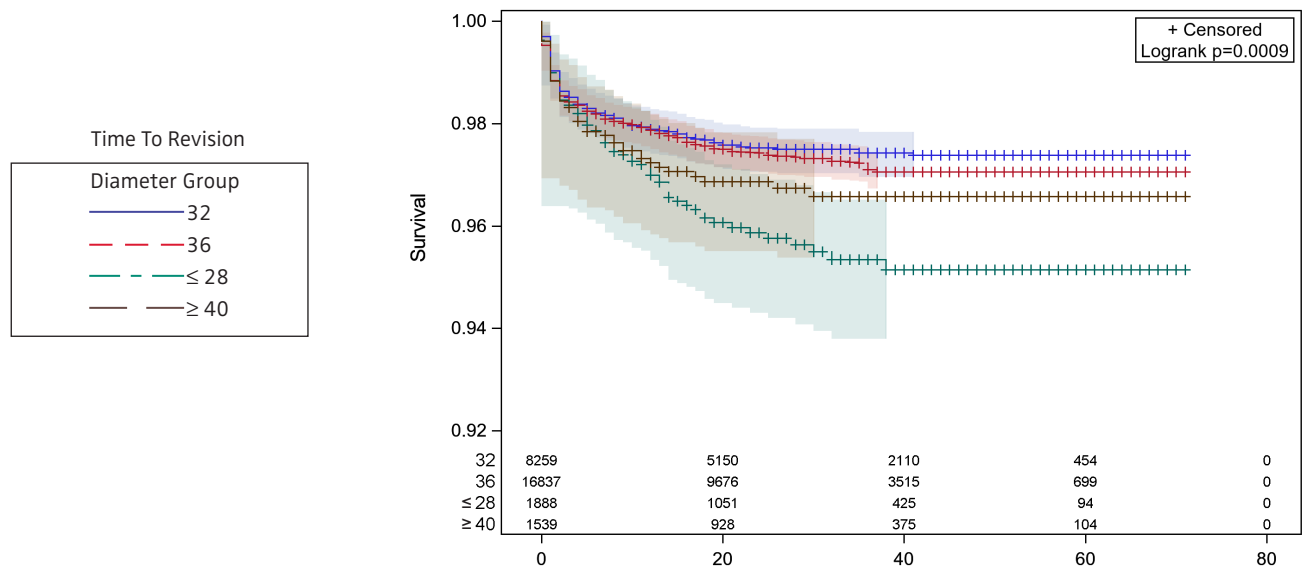


* Total possible patient population 57,037; after accounting for missing data and exclusions as noted, the number analyzed=55,969 (98.1 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Diameter Group	Total	Failed	Censored	Percent Censored
1	32	21,709	647	21,062	97.0%
2	36	28,517	886	27,631	96.9%
3	≤28	4,468	188	4,280	95.8%
4	≥40	1,275	67	1,208	94.8%
Total		55,969	1,788	54,181	96.8%

Figure 22: Femoral Head Diameter for Ages 65-69 (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)

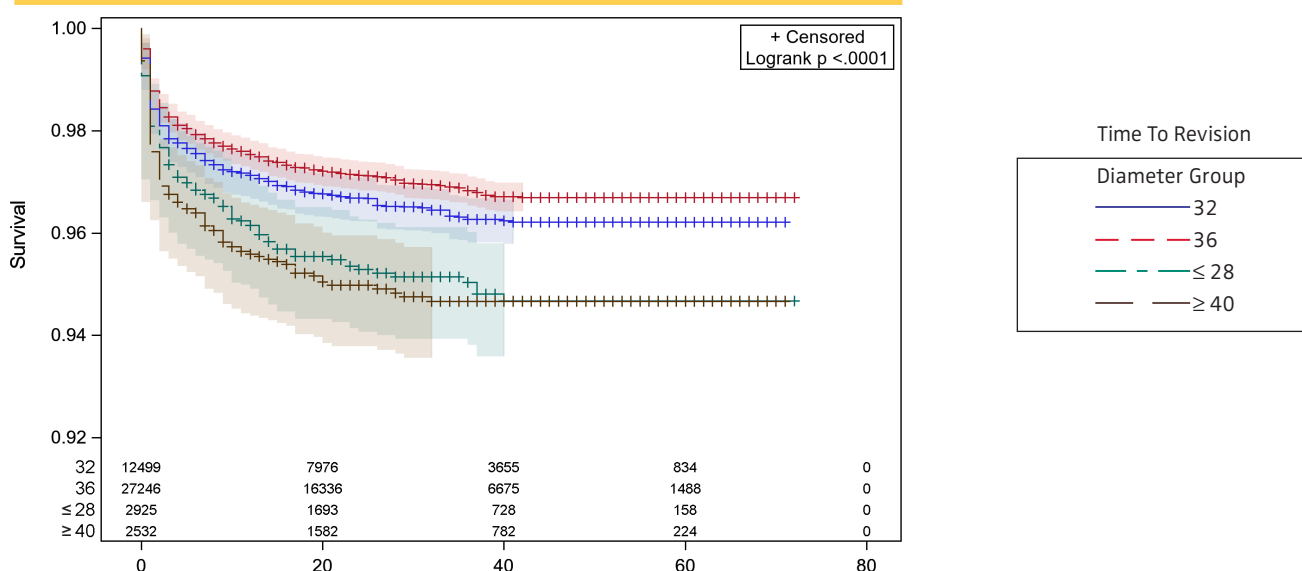


* Total possible patient population 28,829; after accounting for missing data and exclusions as noted, the number analyzed=28,523 (98.9 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Diameter Group	Total	Failed	Censored	Percent Censored
1	32	8,259	195	8,064	97.6%
2	36	16,837	420	16,417	97.5%
3	≤28	1,888	73	1,815	96.1%
4	≥40	1,539	47	1,492	97.0%
Total		28,523	735	27,788	97.4%

Figure 23: Femoral Head Diameter for Ages 70-79 (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)

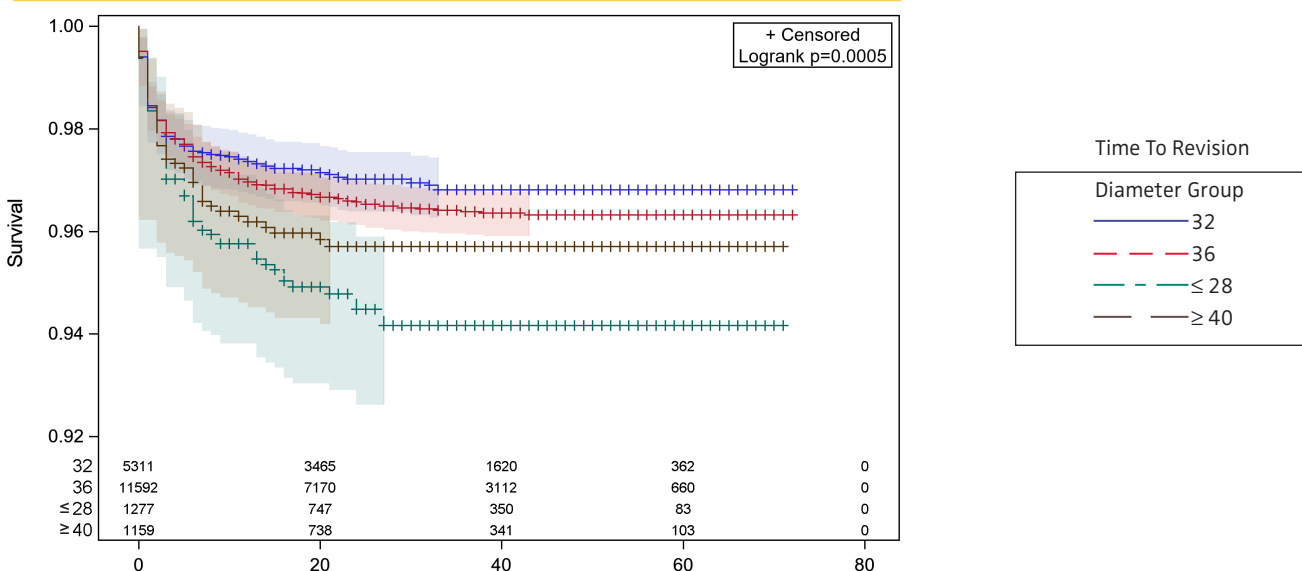


* Total possible patient population 46,093; after accounting for missing data and exclusions as noted, the number analyzed=45,202 (98 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Diameter Group	Total	Failed	Censored	Percent Censored
1	32	12,499	418	12,081	96.7%
2	36	27,246	772	26,474	97.2%
3	≤28	2,925	132	2,793	95.5%
4	≥40	2,532	124	2,408	95.1%
Total		45,202	1,446	43,756	96.8%

Figure 24: Femoral Head Diameter for Ages 80+ (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)

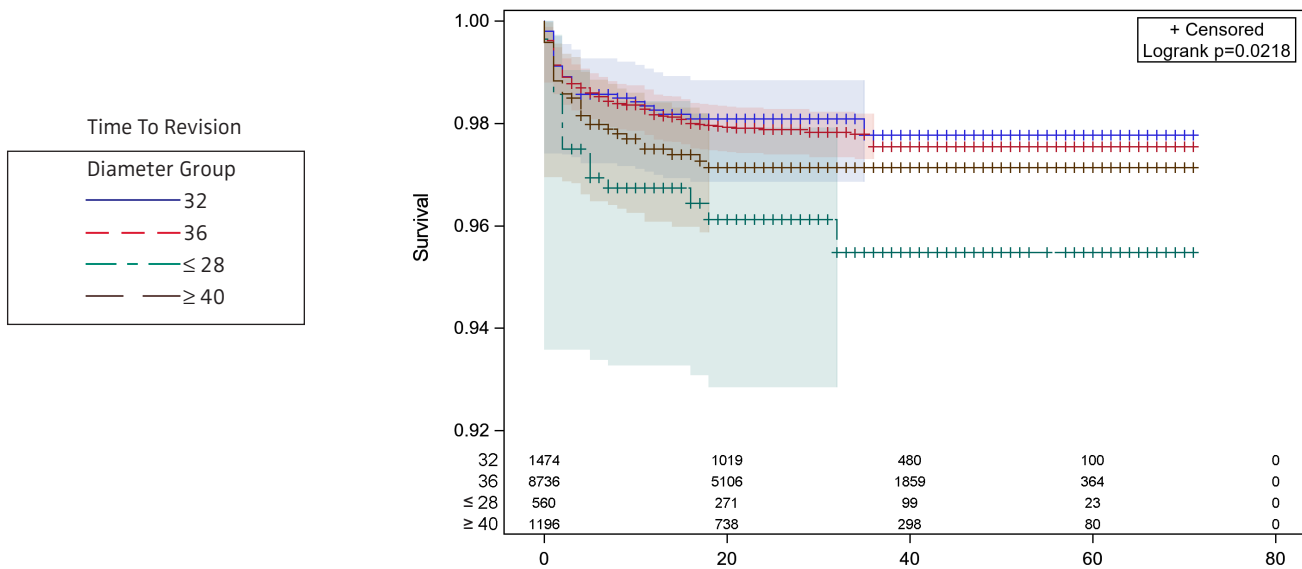


* Total possible patient population 19,767; after accounting for missing data and exclusions as noted, the number analyzed=19,339 (97.8 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Diameter Group	Total	Failed	Censored	Percent Censored
1	32	5,311	156	5,155	97.1%
2	36	11,592	385	11,207	96.7%
3	≤28	1,277	66	1,211	94.8%
4	≥40	1,159	47	1,112	95.9%
Total		19,339	654	18,685	96.6%

Figure 25: Femoral Head Diameter For Males Ages 65-69 (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)

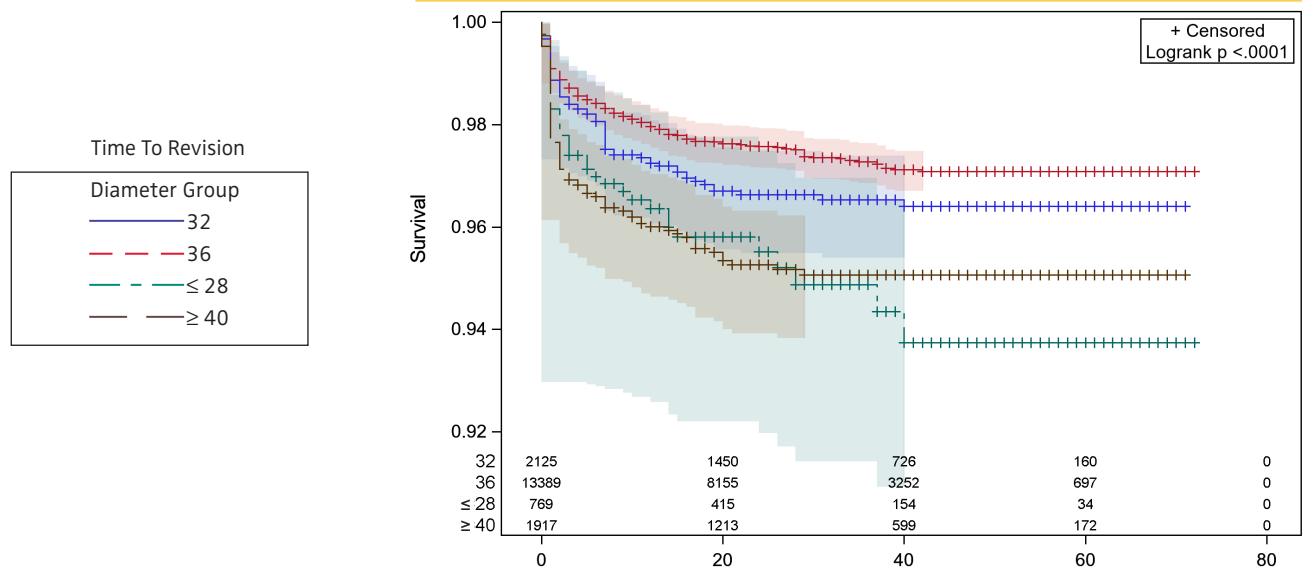


* Total possible patient population 12,240; after accounting for missing data and exclusions as noted, the number analyzed=11,966 (97.8 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Diameter Group	Total	Failed	Censored	Percent Censored
1	32	1,474	29	1,445	98.0%
2	36	8,736	180	8,556	97.9%
3	≤28	560	21	539	96.3%
4	≥40	1,196	32	1,164	97.3%
Total		11,966	262	11,704	97.8%

Figure 26: Femoral Head Diameter for Males Ages 70-79 (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)

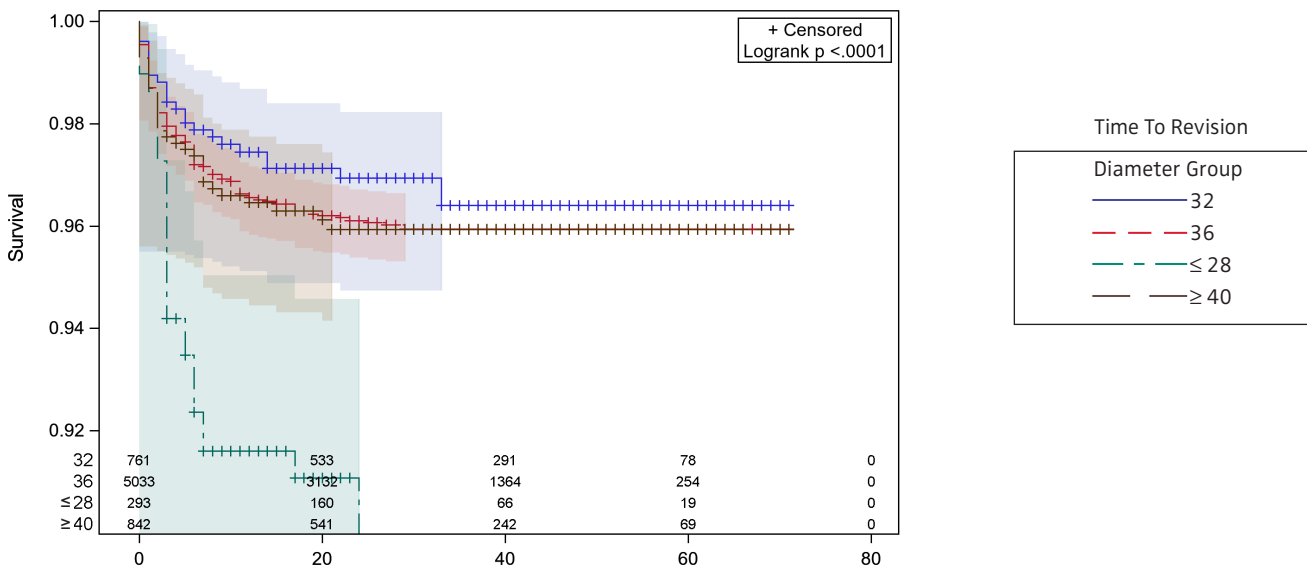


* Total possible patient population 18,523; after accounting for missing data and exclusions as noted, the number analyzed=18,200 (98.3% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Diameter Group	Total	Failed	Censored	Percent Censored
1	32	2,125	69	2,056	96.8%
2	36	13,389	324	13,065	97.6%
3	≤28	769	35	734	95.5%
4	≥40	1,917	87	1,830	95.5%
Total		18,200	515	17,685	97.2%

Figure 27: Femoral Head Diameter for Males Ages 80+ (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)

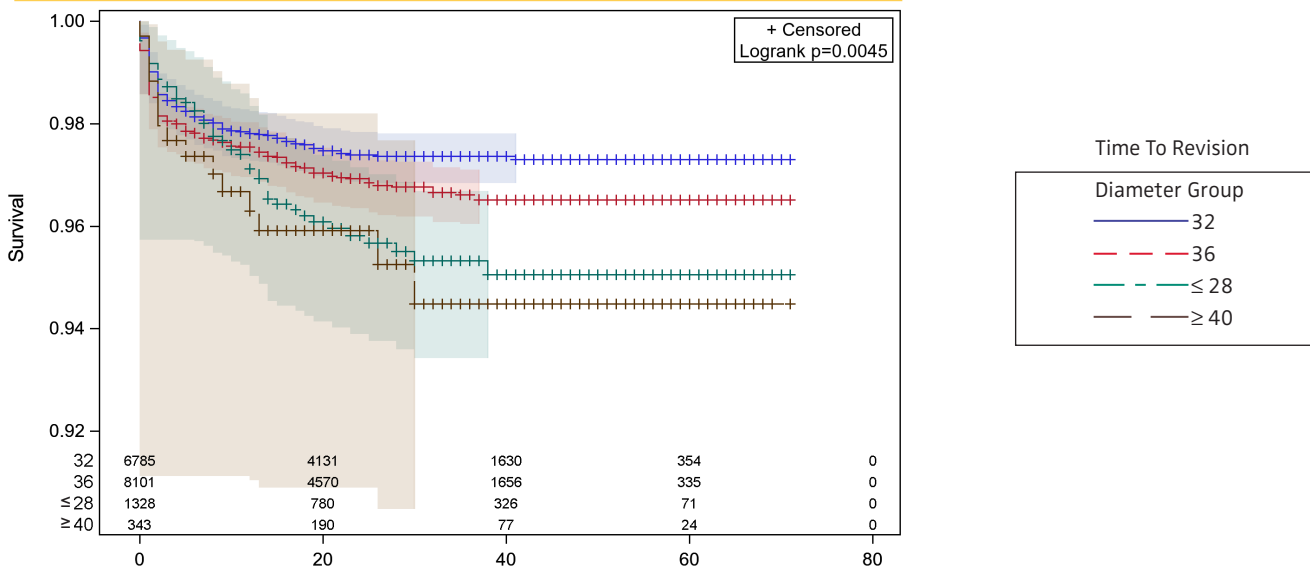


* Total possible patient population 7,073; after accounting for missing data and exclusions as noted, the number analyzed=6,929 (98 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Diameter Group	Total	Failed	Censored	Percent Censored
1	32	761	24	737	96.9%
2	36	5,033	187	4,846	96.3%
3	≤28	293	27	266	90.8%
4	≥40	842	32	810	96.2%
Total		6,929	270	6,659	96.1%

Figure 28: Femoral Head Diameter for Females Ages 65-69 (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)

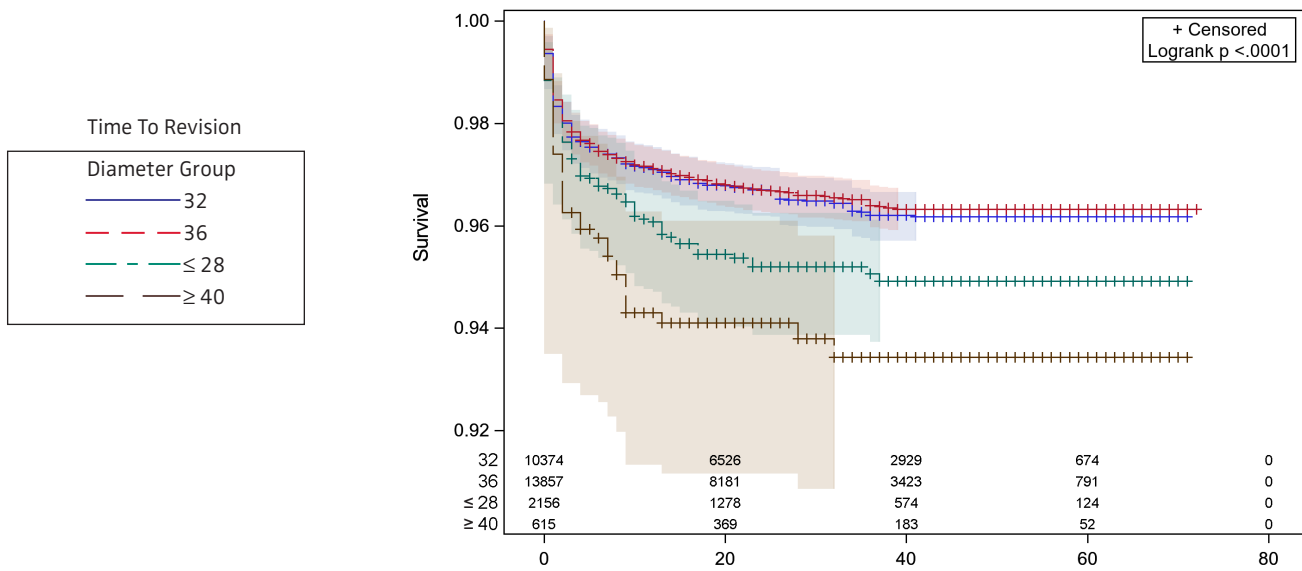


* Total possible patient population 16,773; after accounting for missing data and exclusions as noted, the number analyzed=16,557 (98.7 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Diameter Group	Total	Failed	Censored	Percent Censored
1	32	6,785	166	6,619	97.6%
2	36	8,101	240	7,861	97.0%
3	≤28	1,328	52	1,276	96.1%
4	≥40	343	15	328	95.6%
Total		16,557	473	16,084	97.1%

Figure 29: Femoral Head Diameter for Females Ages 70-79 (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)

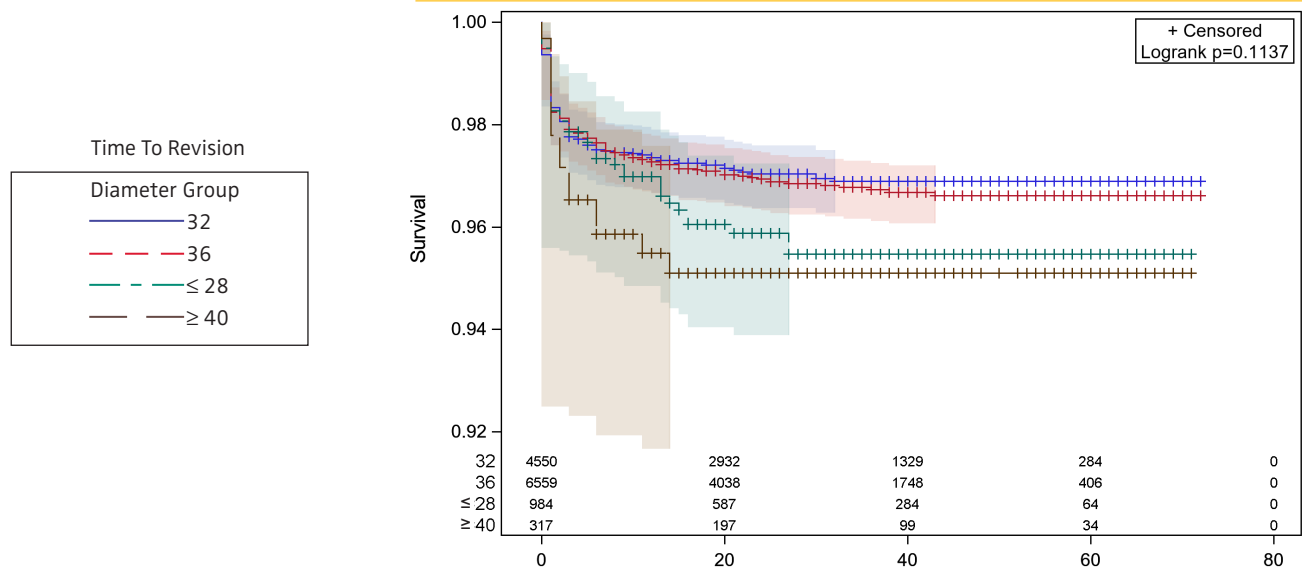


* Total possible patient population 27,570; after accounting for missing data and exclusions as noted, the number analyzed=27,002 (97.9% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Diameter Group	Total	Failed	Censored	Percent Censored
1	32	10,374	349	10,025	96.6%
2	36	13,857	448	13,409	96.8%
3	≤28	2,156	97	2,059	95.5%
4	≥40	615	37	578	94.0%
Total		27,002	931	26,071	96.6%

Figure 30: Femoral Head Diameter for Females Ages 80+ (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)

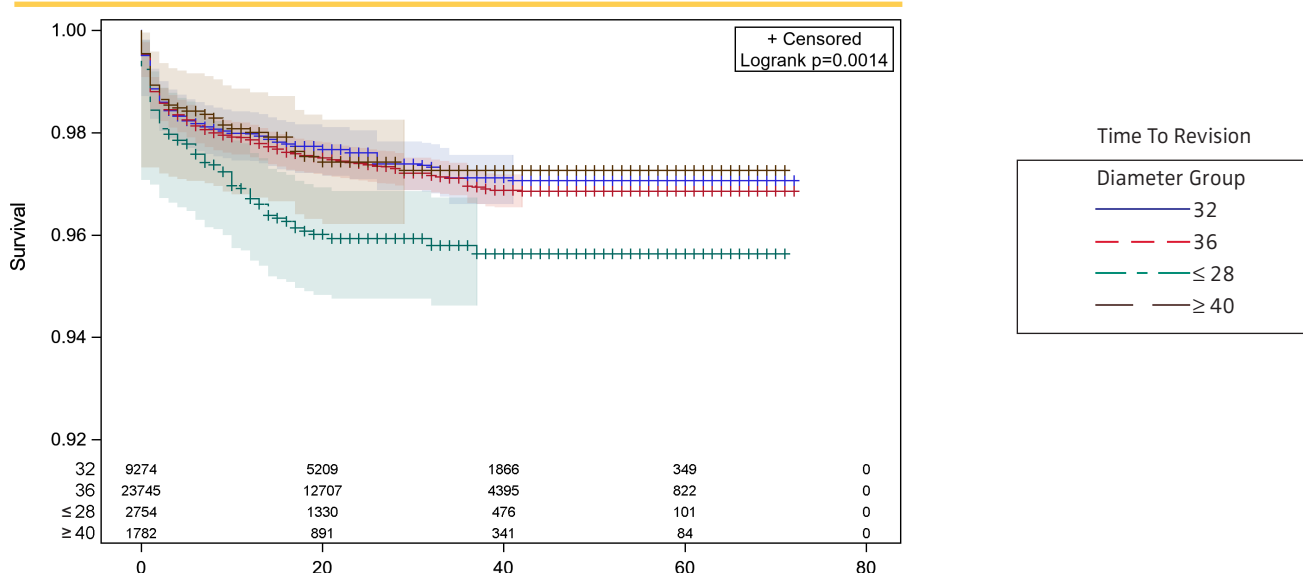


* Total possible patient population 12,652; after accounting for missing data and exclusions as noted, the number analyzed=12,410 (98.1% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Diameter Group	Total	Failed	Censored	Percent Censored
1	32	4,550	132	4,418	97.1%
2	36	6,559	198	6,361	97.0%
3	≤28	984	39	945	96.0%
4	≥40	317	15	302	95.3%
Total		12,410	384	12,026	96.9%

Figure 31: Ceramic Heads by Diameter of Femoral Heads (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)

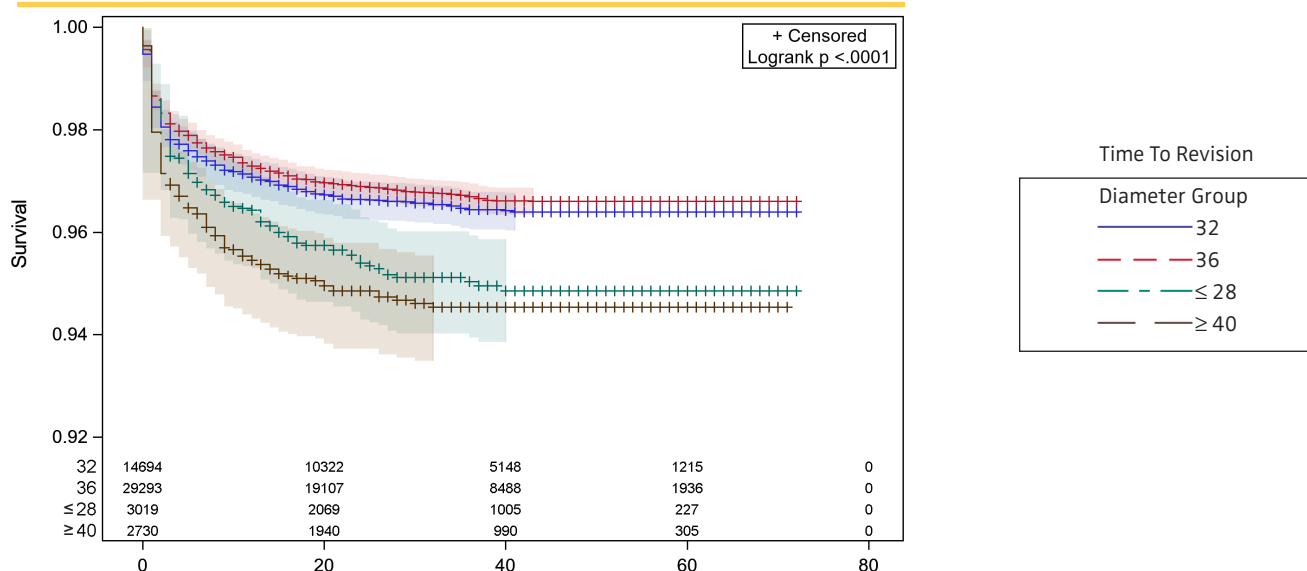


* Total possible patient population 37,813; after accounting for missing data and exclusions as noted, the number analyzed=37,555 (99.3 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Diameter Group	Total	Failed	Censored	Percent Censored
1	32	9,274	224	9,050	97.6%
2	36	23,745	600	23,145	97.5%
3	≤28	2,754	100	2,654	96.4%
4	≥40	1,782	41	1,741	97.7%
Total		37,555	965	36,590	97.4%

Figure 32: Cobalt Chrome Heads by Diameter of Femoral Heads (Metal on Metal Constructs Removed) Diagnosed with Primary OA (2012-2017)

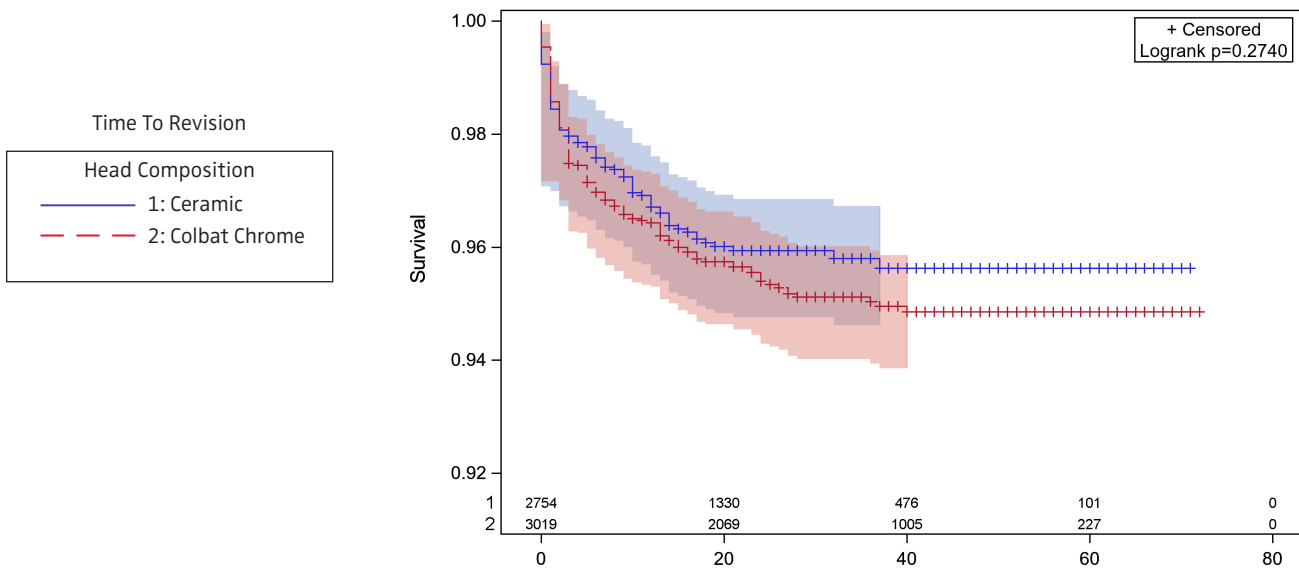


* Total possible patient population 50,448; after accounting for missing data and exclusions as noted, the number analyzed=49,736 (98.6 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Diameter Group	Total	Failed	Censored	Percent Censored
1	32	14,694	490	14,204	96.7%
2	36	29,293	897	28,396	96.9%
3	≤28	3,019	138	2,881	95.4%
4	≥40	2,730	140	2,590	94.9%
Total		49,736	1,665	48,071	96.7%

Figure 33: ≤ 28mm Head by Composition of Femoral Heads Diagnosed with Primary OA (2012-2017)

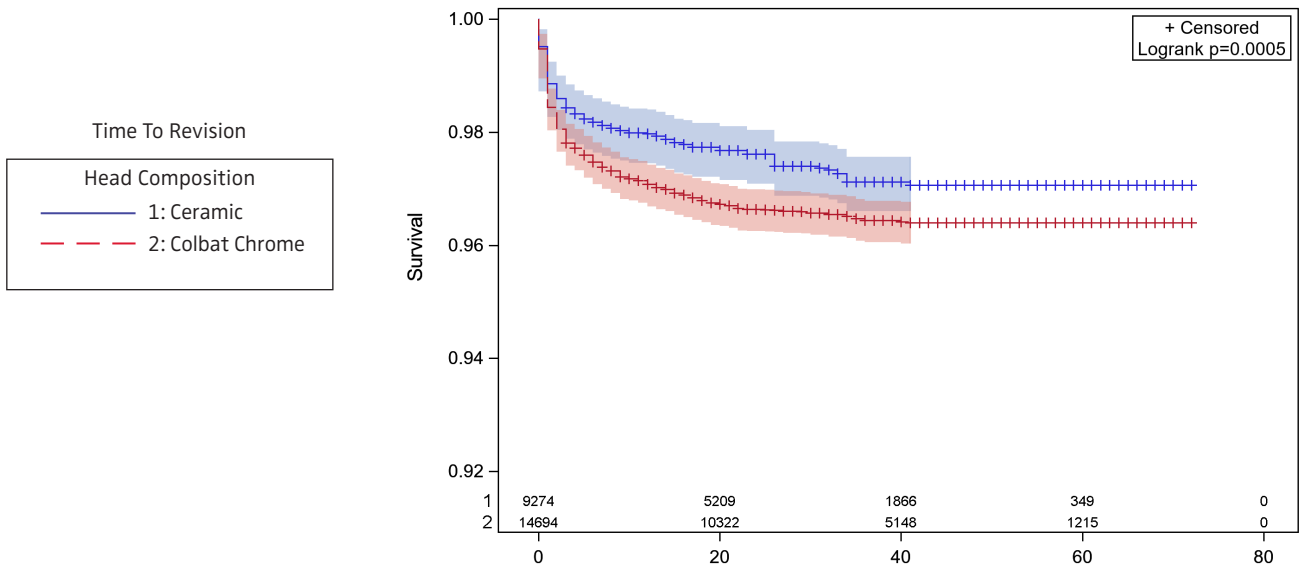


* Total possible patient population 6,090; after accounting for missing data and exclusions as noted, the number analyzed=5,773 (94.8 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Head Composition	Total	Failed	Censored	Percent Censored
1	Ceramic	2,754	100	2,654	96.4%
2	Cobalt Chrome	3,019	138	2,881	95.4%
Total		5,773	238	5,535	95.9%

Figure 34: 32mm Head by Composition of Femoral Heads Diagnosed with Primary OA (2012-2017)

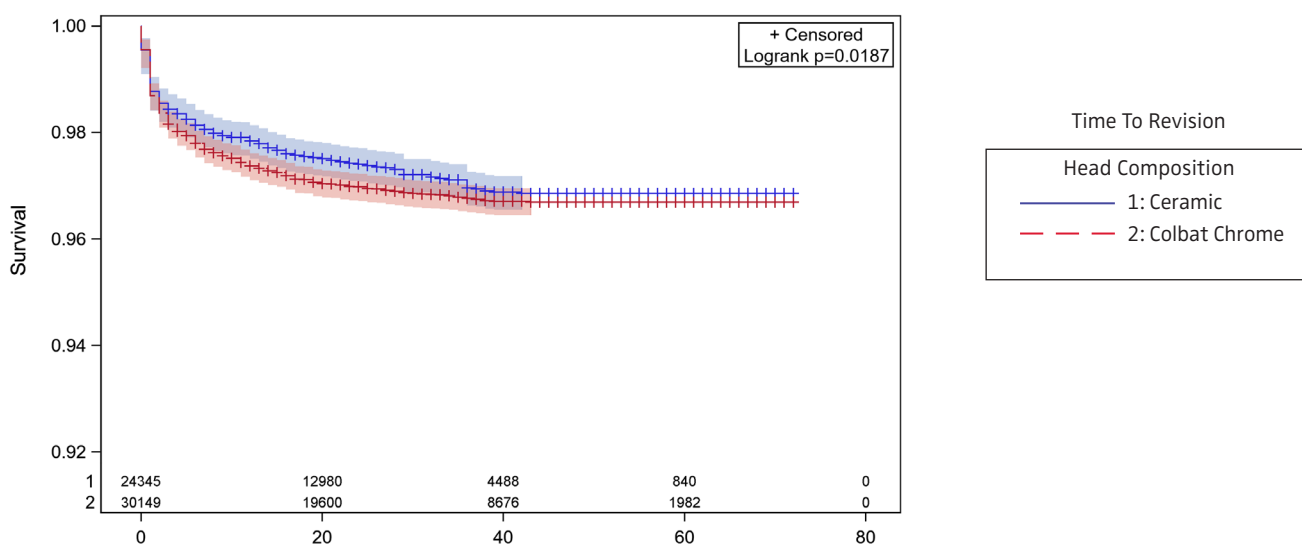


* Total possible patient population 26,069 after accounting for missing data and exclusions as noted, the number analyzed=23,968 (91.9 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Head Composition	Total	Failed	Censored	Percent Censored
1	Ceramic	9,274	224	9,050	97.6%
2	Cobalt Chrome	14,694	490	14,204	96.7%
Total		23,968	714	23,254	97.0%

Figure 35: 36mm Head by Composition of Femoral Heads Diagnosed with Primary OA (2012-2017)

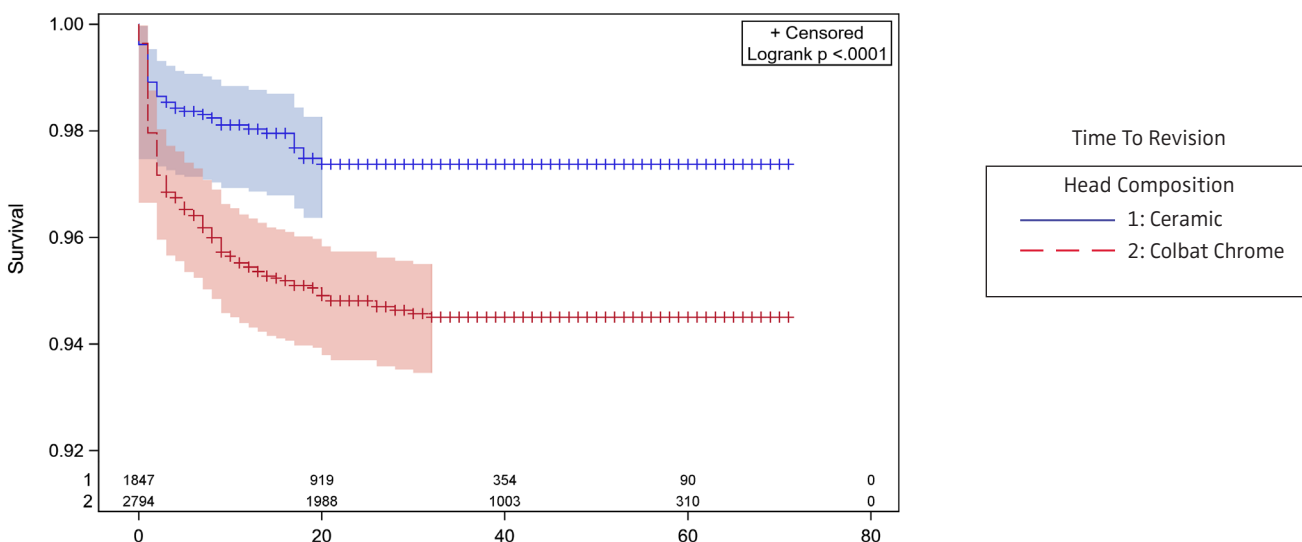


* Total possible patient population: 59,864; After accounting for missing data and exclusions as noted, the number analyzed 54,494 (91% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Head Composition	Total	Failed	Censored	Percent Censored
1	Ceramic	24,345	615	23,730	97.5%
2	Cobalt Chrome	30,149	898	29,251	97.0%
Total		54,494	1,513	52,981	97.2%

Figure 36: 40 mm Head by Composition of Femoral Heads Diagnosed with Primary OA (2012-2017)



* Total possible patient population: 5,528; After accounting for missing data and exclusions as noted, the number analyzed 4,461 (84% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Head Composition	Total	Failed	Censored	Percent Censored
1	Ceramic	1,847	42	1,805	97.7%
2	Cobalt Chrome	2,794	144	2,650	94.9%
Total		4,641	186	4,455	96.0%

Primary Knee Design

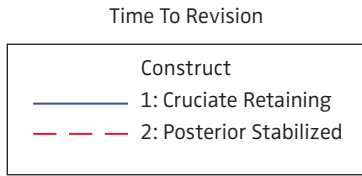
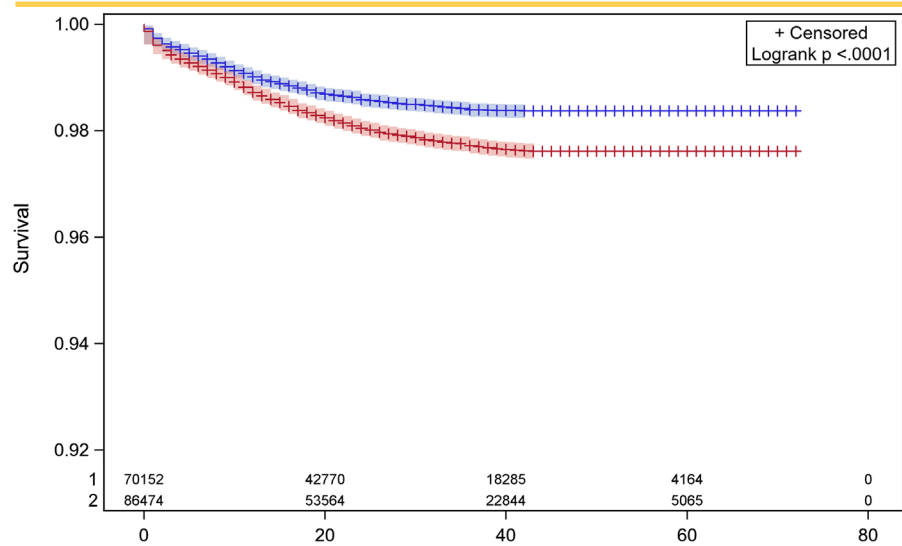


Figure 37: Primary Knee Implant Designs Diagnosed with Primary OA (2012-2017)

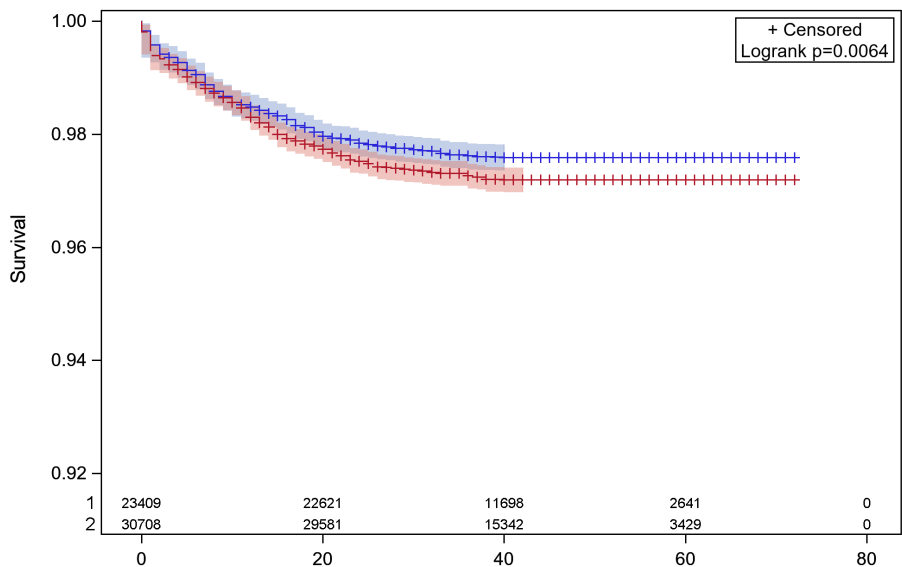
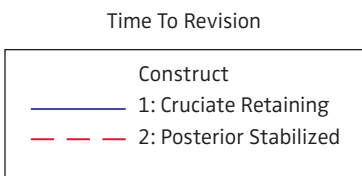


* Total possible patient population: 162,942; After accounting for missing data and exclusions as noted, the number analyzed 156,626 (96% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Construct	Total	Failed	Censored	Percent Censored
1	Cruciate Retaining	70,152	908	69,244	98.7%
2	Posterior Stabilized	86,474	1,581	84,893	98.2%
Total		156,626	2,489	154,137	98.4%

Figure 38: Primary Knee Implant Designs in Males Diagnosed with Primary OA (2012-2017)

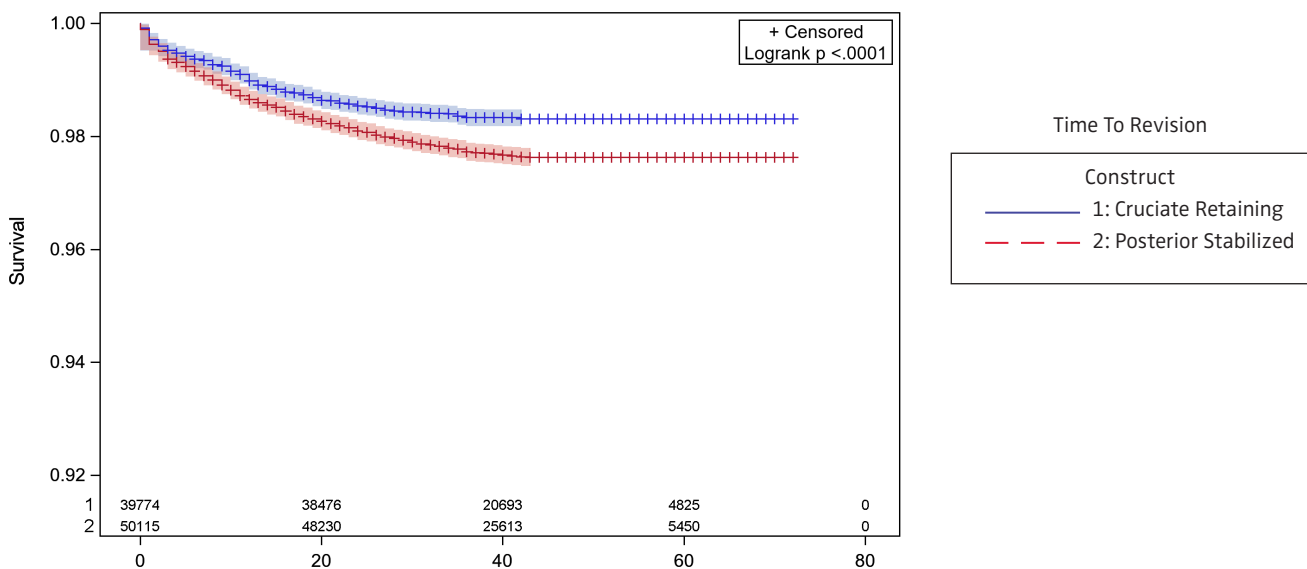


* Total possible patient population 54,117 after accounting for missing data and exclusions as noted, the number analyzed=54,117 (100 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Construct	Total	Failed	Censored	Percent Censored
1	Cruciate Retaining	23,409	551	22,858	97.7%
2	Posterior Stabilized	30,708	838	29,870	97.3%
Total		54,117	1,389	52,728	97.4%

Figure 39: Primary Knee Implant Designs in Females Diagnosed with Primary OA (2012-2017)

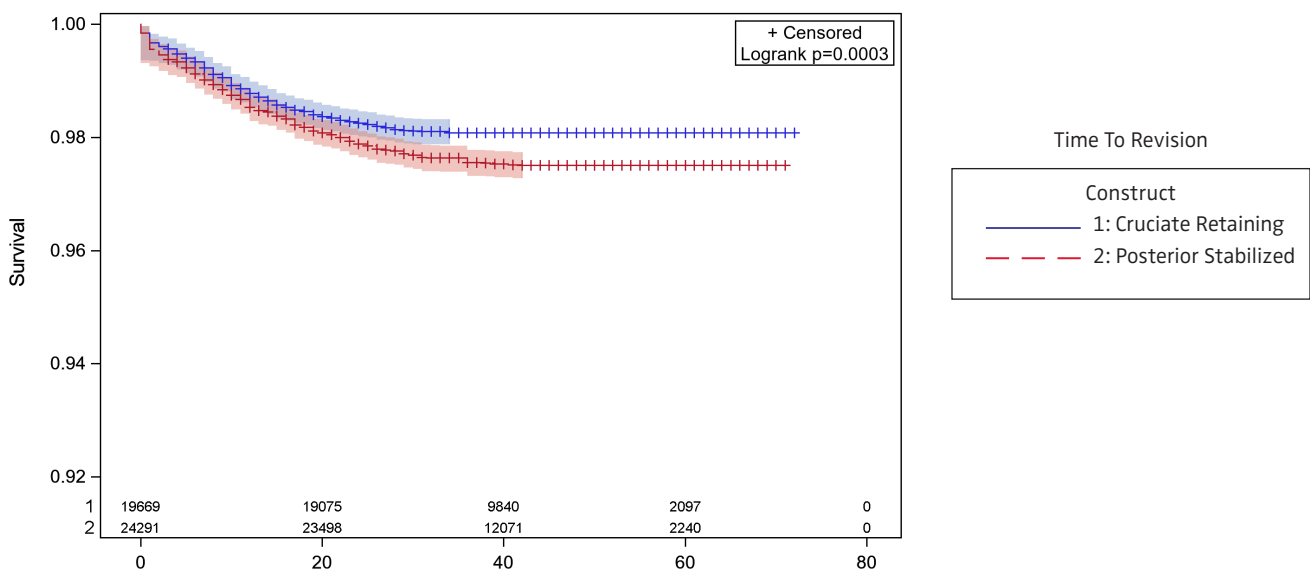


* Total possible patient population 89,889 after accounting for missing data and exclusions as noted, the number analyzed=89,889 (100 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Construct	Total	Failed	Censored	Percent Censored
1	Cruciate Retaining	39,774	649	39,125	98.4%
2	Posterior Stabilized	50,115	1,126	48,989	97.8%
Total		89,889	1,775	88,114	98.0%

Figure 40: Primary Knee Implant Designs in Ages 65-69 Diagnosed with Primary OA (2012-2017)

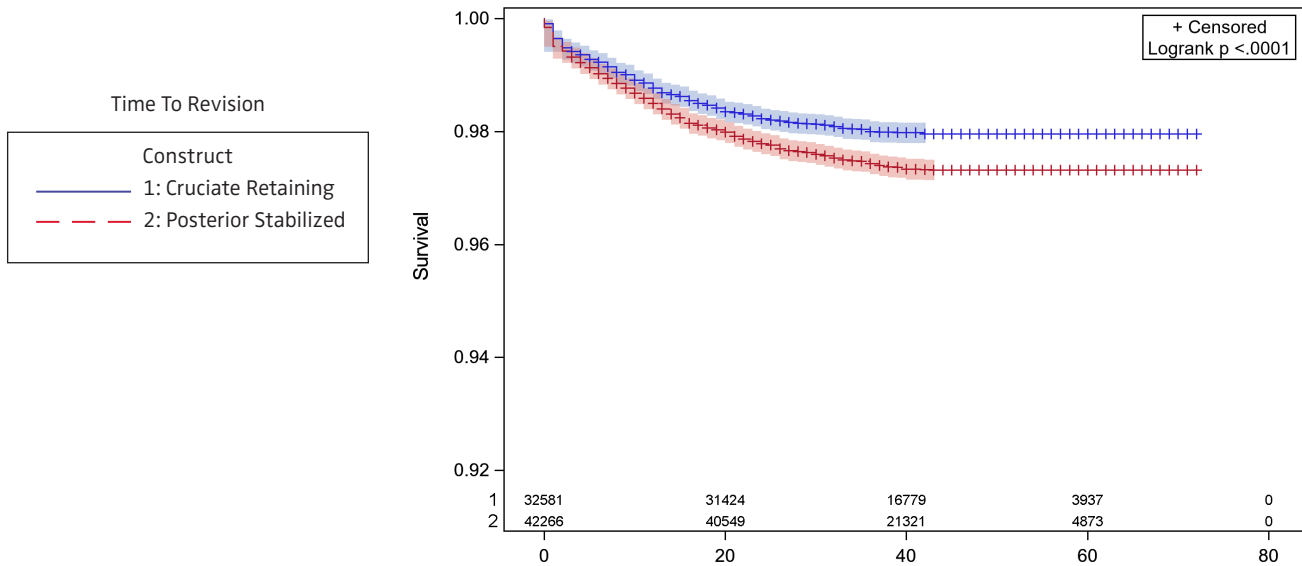


* Total possible patient population 43,960 after accounting for missing data and exclusions as noted, the number analyzed=43,960 (100 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Construct	Total	Failed	Censored	Percent Censored
1	Cruciate Retaining	19,669	373	19,296	98.1%
2	Posterior Stabilized	24,291	585	23,706	97.6%
Total		43,960	958	43,002	97.8%

Figure 41: Primary Knee Implant Designs in Ages 70-79 Diagnosed with Primary OA (2012-2017)

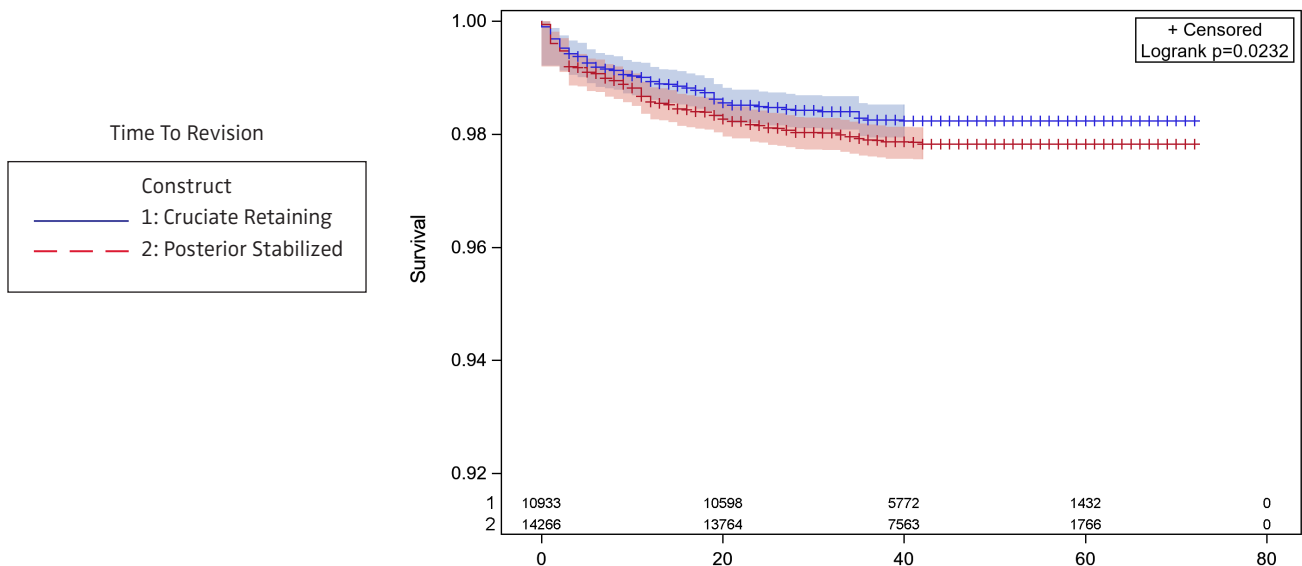


* Total possible patient population 74,847 after accounting for missing data and exclusions as noted, the number analyzed=74,847 (100 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Construct	Total	Failed	Censored	Percent Censored
1	Cruciate Retaining	32,581	642	31,939	98.0%
2	Posterior Stabilized	42,266	1,081	41,185	97.4%
Total		74,847	1,723	73,124	97.7%

Figure 42: Primary Knee Implant Designs in Ages 80+ Diagnosed with Primary OA (2012-2017)



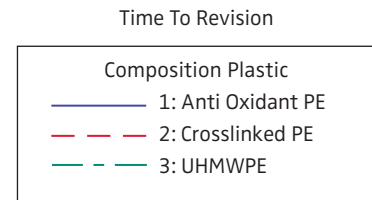
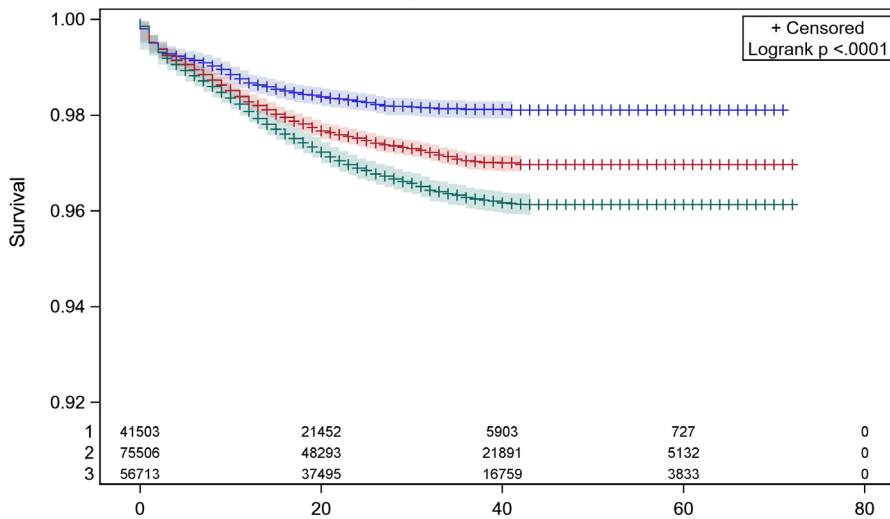
* Total possible patient population 25,199 after accounting for missing data and exclusions as noted, the number analyzed=25,199 (100 % of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Construct	Total	Failed	Censored	Percent Censored
1	Cruciate Retaining	10,933	185	10,748	98.3%
2	Posterior Stabilized	14,266	298	13,968	97.9%
Total		25,199	483	24,716	98.1%

Tibial Insert Composition

Figure 43: Composition of Tibial Inserts Diagnosed with Primary OA (2012-2017)

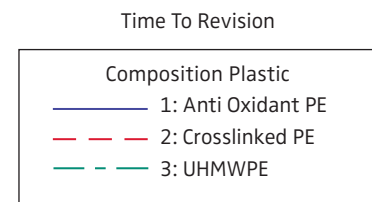
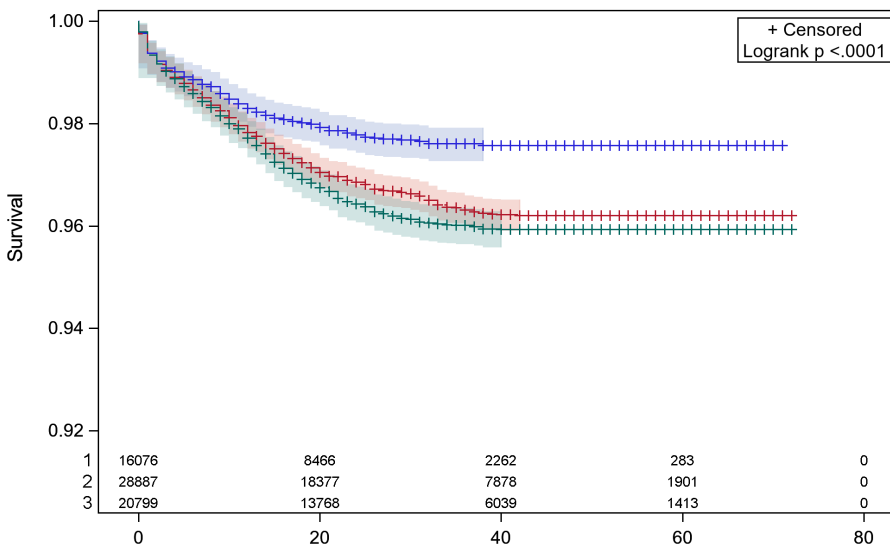


* Total possible patient population: 199,834; After accounting for missing data and exclusions as noted, the number analyzed 173,222 (87% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Composition Plastic	Total	Failed	Censored	Percent Censored
1	Anti-Oxidant PE	41,503	631	40,872	98.5%
2	Crosslinked PE	75,506	1,810	73,696	97.6%
3	UHMWPE	56,713	1,712	55,001	97.0%
Total		173,722	4,153	169,569	97.6%

Figure 44: Composition of Tibial Inserts for Males Diagnosed with Primary OA (2012-2017)

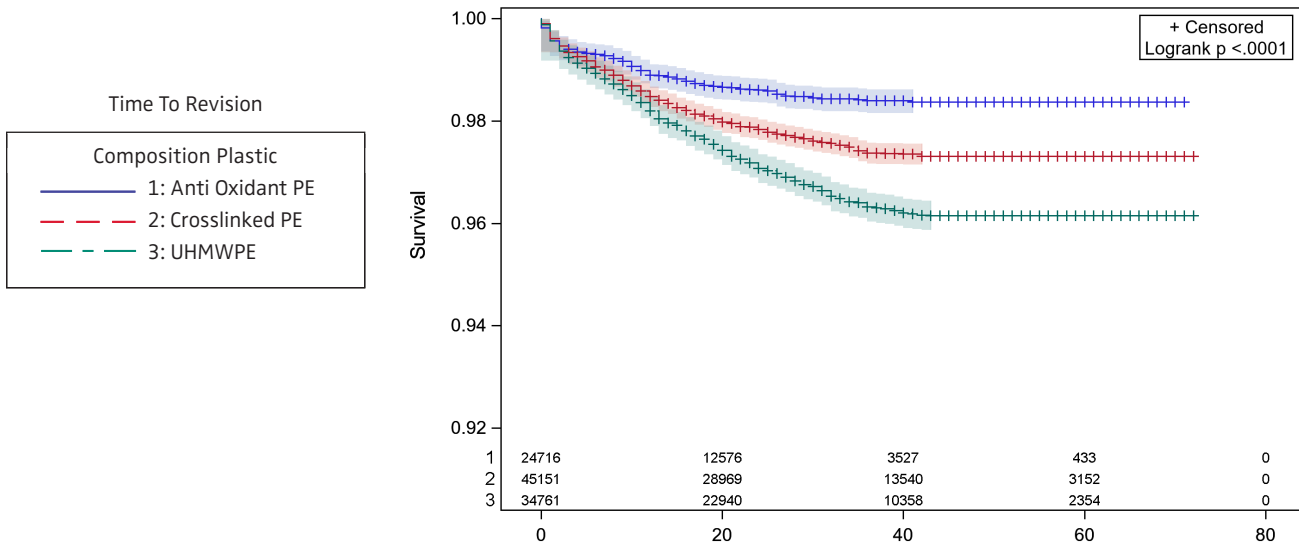


* Total possible patient population: 73,853; After accounting for missing data and exclusions as noted, the number analyzed 65,762; (89.0% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Composition Plastic	Total	Failed	Censored	Percent Censored
1	Anti Oxidant PE	16,076	317	15,759	98.0%
2	Crosslinked PE	28,887	869	28,018	97.0%
3	UHMWPE	20,799	697	20,102	96.7%
Total		65,762	1,883	63,879	97.1%

Figure 45: Composition of Tibial Inserts for Females Diagnosed with Primary OA (2012-2017)

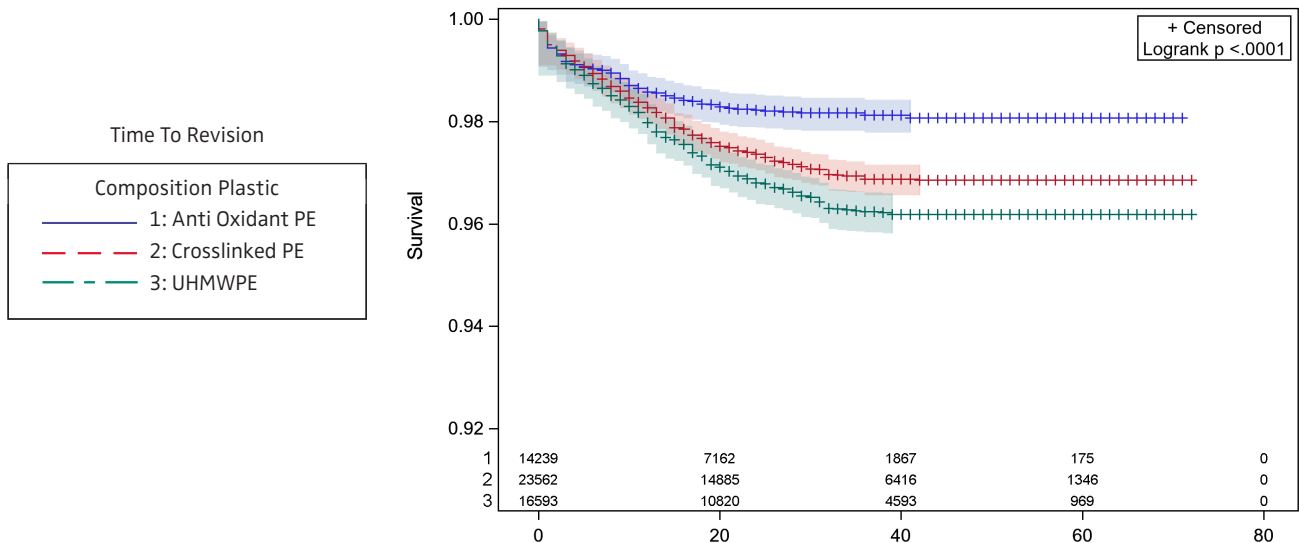


* Total possible patient population: 120,251; After accounting for missing data and exclusions as noted, the number analyzed 104,628 (87% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Composition Plastic	Total	Failed	Censored	Percent Censored
1	Anti Oxidant PE	24,716	312	24,404	98.7%
2	Crosslinked PE	45,151	954	44,197	97.9%
3	UHMWPE	34,761	1,012	33,749	97.1%
Total		104,628	2,278	102,350	97.8%

Figure 46: Composition of Tibial Inserts for Patients Aged 65-69 Diagnosed with Primary OA (2012-2017)

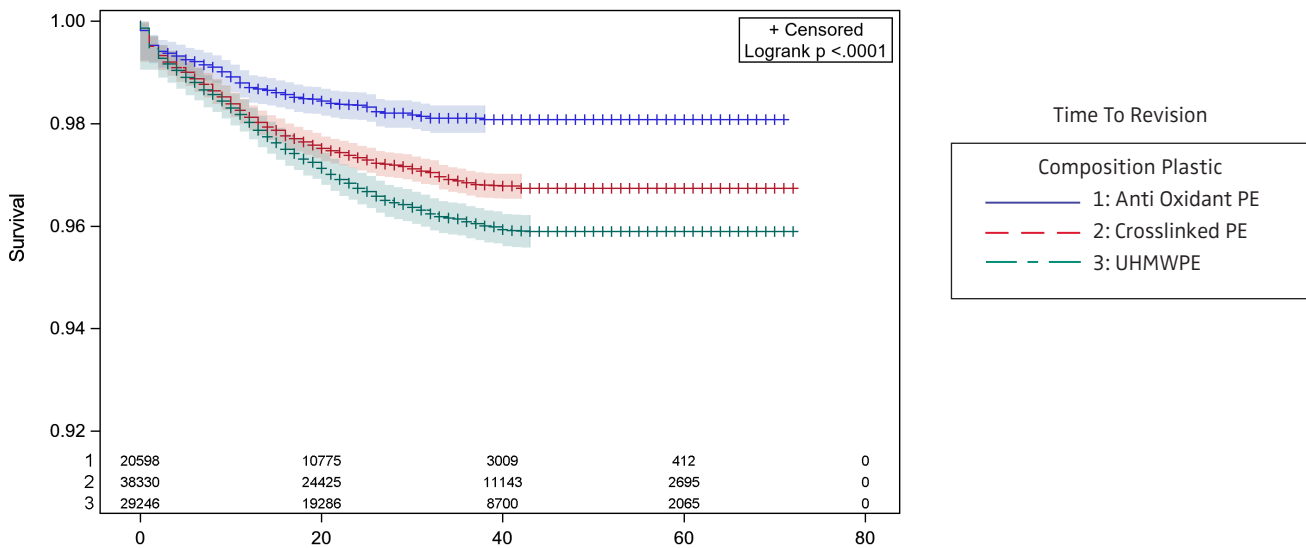


* Total possible patient population: 61,965; After accounting for missing data and exclusions as noted, the number analyzed 54,394 (87.7% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Composition Plastic	Total	Failed	Censored	Percent Censored
1	Anti Oxidant PE	14,239	224	14,015	98.4%
2	Crosslinked PE	23,562	588	22,974	97.5%
3	UHMWPE	16,593	503	16,090	97.0%
Total		54,394	1,315	53,079	97.6%

Figure 47: Composition of Tibial Inserts for Patients Aged 70-79 Diagnosed with Primary OA (2012-2017)

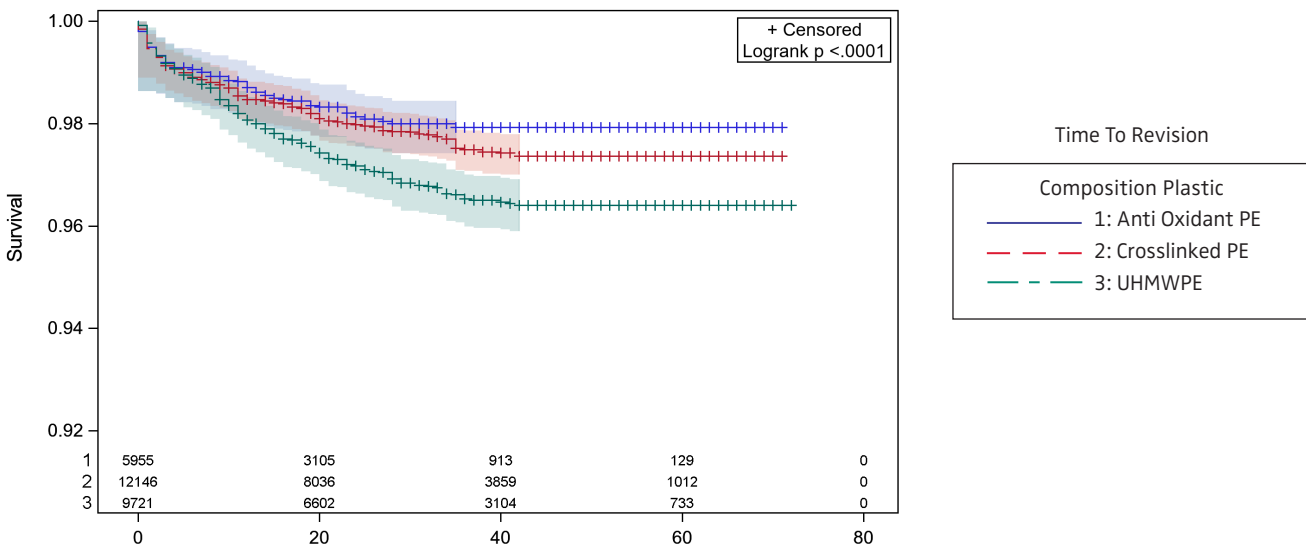


* Total possible patient population: 100,455; After accounting for missing data and exclusions as noted, the number analyzed 88,174 (87.7% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Composition Plastic	Total	Failed	Censored	Percent Censored
1	Anti Oxidant PE	20,598	308	20,290	98.5%
2	Crosslinked PE	38,330	984	37,346	97.4%
3	UHMWPE	29,246	929	28,317	96.8%
Total		88,174	2,221	85,953	97.5%

Figure 48: Composition of Tibial Inserts for Patients Aged 80+ Diagnosed with Primary OA (2012-2017)



* Total possible patient population: 31,414; After accounting for missing data and exclusions as noted, the number analyzed 27,822 (88.5% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Composition Plastic	Total	Failed	Censored	Percent Censored
1	Anti Oxidant PE	5,955	97	5,858	98.4%
2	Crosslinked PE	12,146	251	11,895	97.9%
3	UHMWPE	9,721	277	9,444	97.2%
Total		27,822	625	27,197	97.8%

Knee Femoral Component

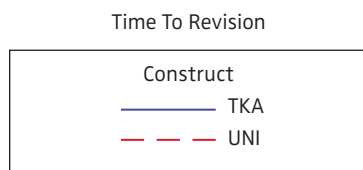
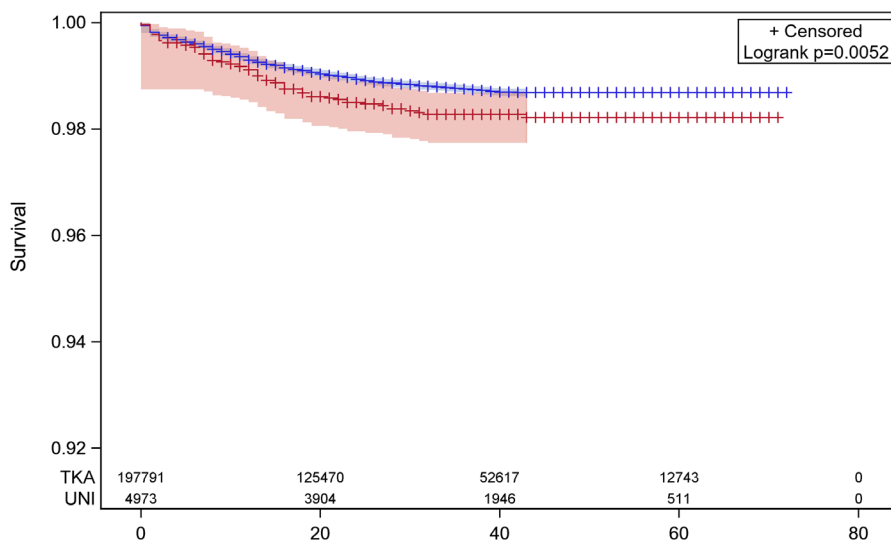


Figure 49: Knee Constructs Femoral Component (Total Knee and Uni-condylar) Diagnosed with Primary OA (2012-2017)

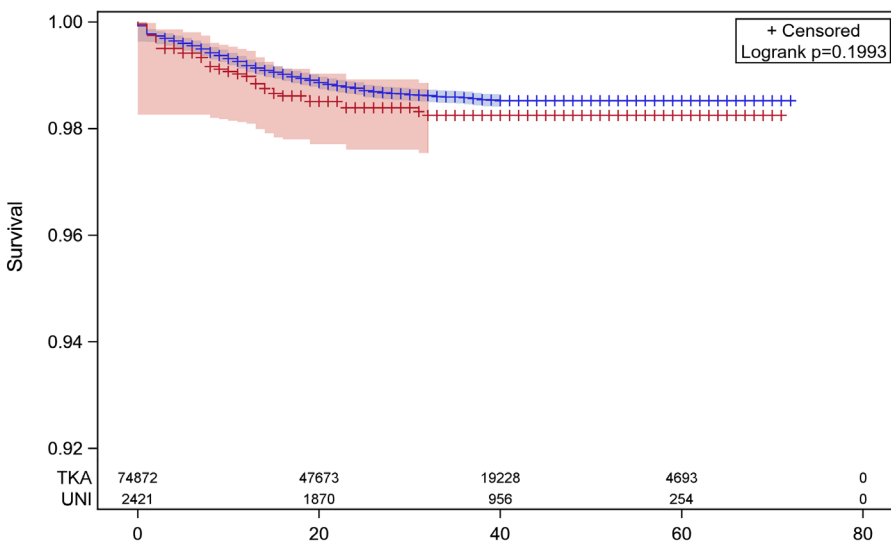
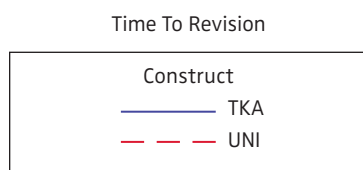


* Total possible patient population: 231,792; After accounting for missing data and exclusions as noted, the number analyzed 202,764 (87% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Construct	Total	Failed	Censored	Percent Censored
1	TKA	19,7791	1,990	195,801	99.0%
2	UNI	4,973	77	4,896	98.5%
Total		202,764	2,067	200,697	99.0%

Figure 50: Knee Constructs Femoral Component (Total Knee and Uni-condylar) For Males Diagnosed with Primary OA (2012-2017)

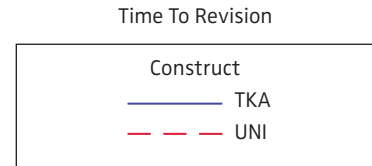
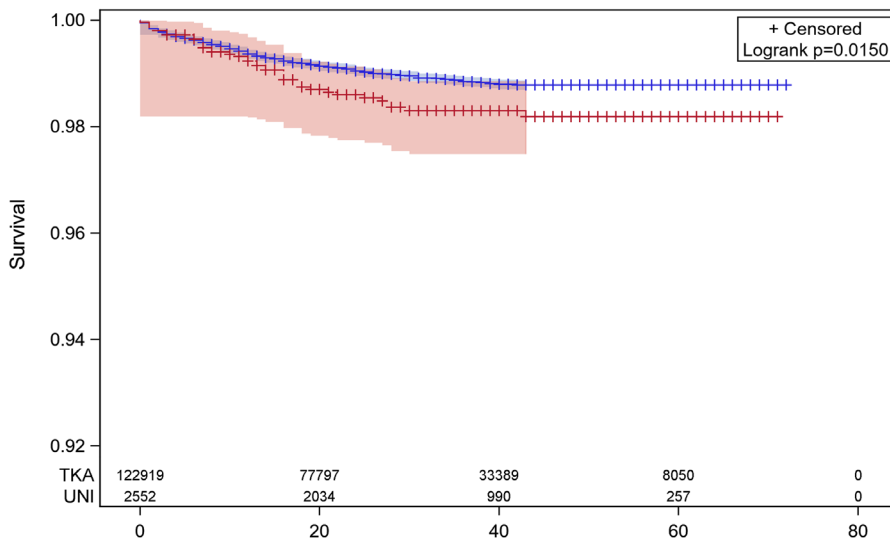


* Total possible patient population: 87,964; After accounting for missing data and exclusions as noted, the number analyzed 77,293 (88% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Construct	Total	Failed	Censored	Percent Censored
1	TKA	74,872	863	74,009	98.9%
2	UNI	2,421	38	2,383	98.4%
Total		77,293	901	76,392	98.8%

Figure 51: Knee Constructs Femoral Component (Total Knee and Uni-condylar) For Females Diagnosed with Primary OA (2012-2017)

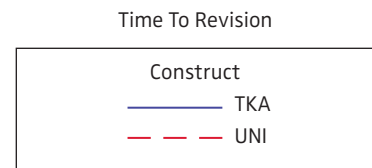
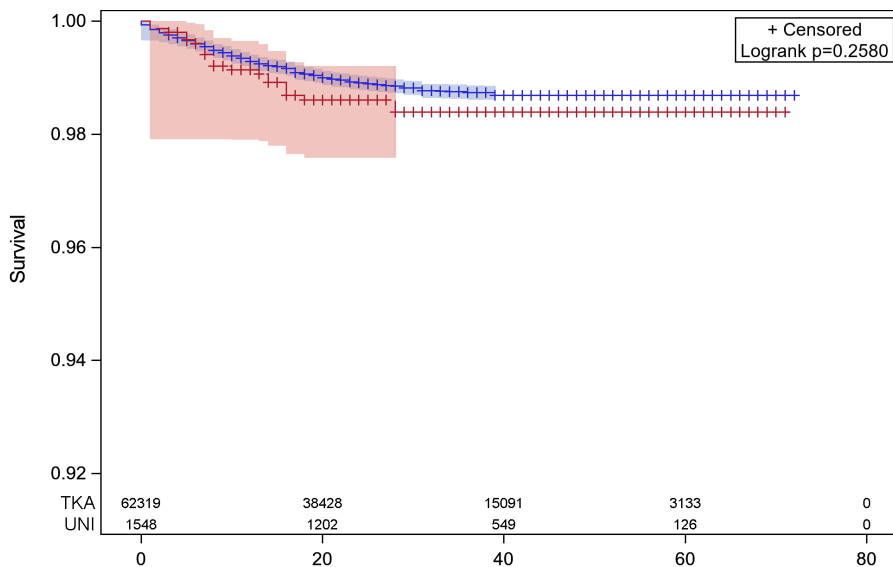


* Total possible patient population: 143,828; After accounting for missing data and exclusions as noted, the number analyzed 125,471 (87% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Construct	Total	Failed	Censored	Percent Censored
1	TKA	122,919	1,127	121,792	99.1%
2	UNI	2,552	39	2,513	98.5%
Total		125,471	1,166	124,305	99.1%

Figure 52: Knee Constructs Femoral Component (Total Knee and Uni-condylar) For Patients 65-69 Years of Age Diagnosed with Primary OA (2012-2017)

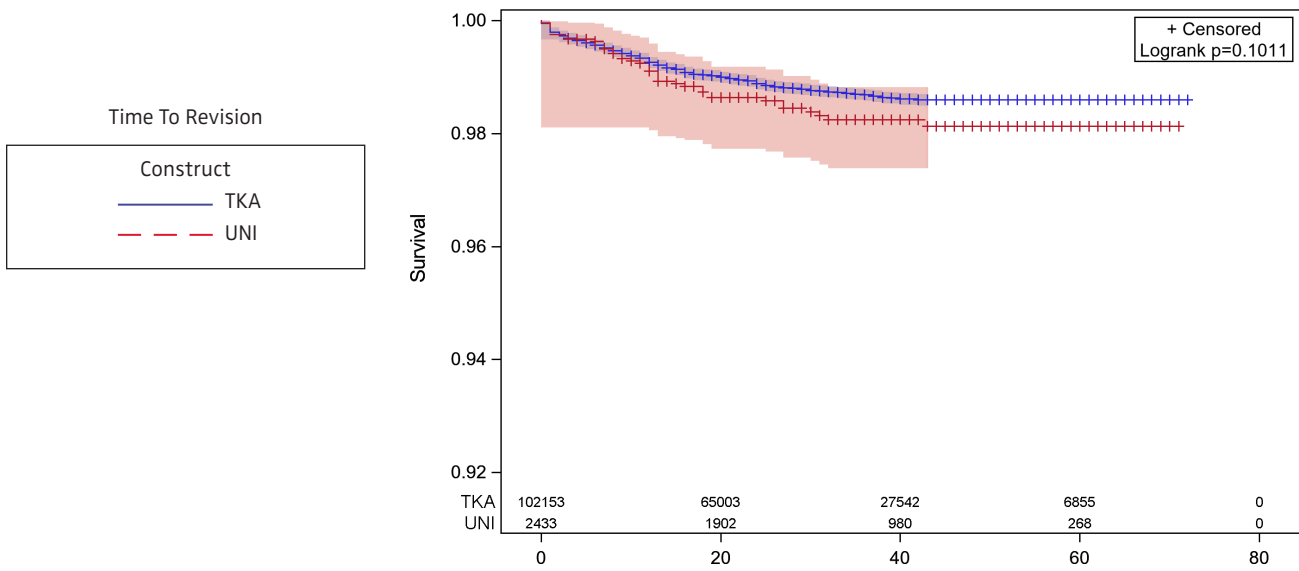


* Total possible patient population: 65,794; After accounting for missing data and exclusions as noted, the number analyzed 63,867 (97% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Construct	Total	Failed	Censored	Percent Censored
1	TKA	62,319	624	61,695	99.0%
2	UNI	1,548	22	1,526	98.6%
Total		63,867	646	63,221	99.0%

Figure 53: Knee Constructs Femoral Component (Total Knee and Uni-condylar) For Patients 70-79 Years of Age Diagnosed with Primary OA (2012-2017)

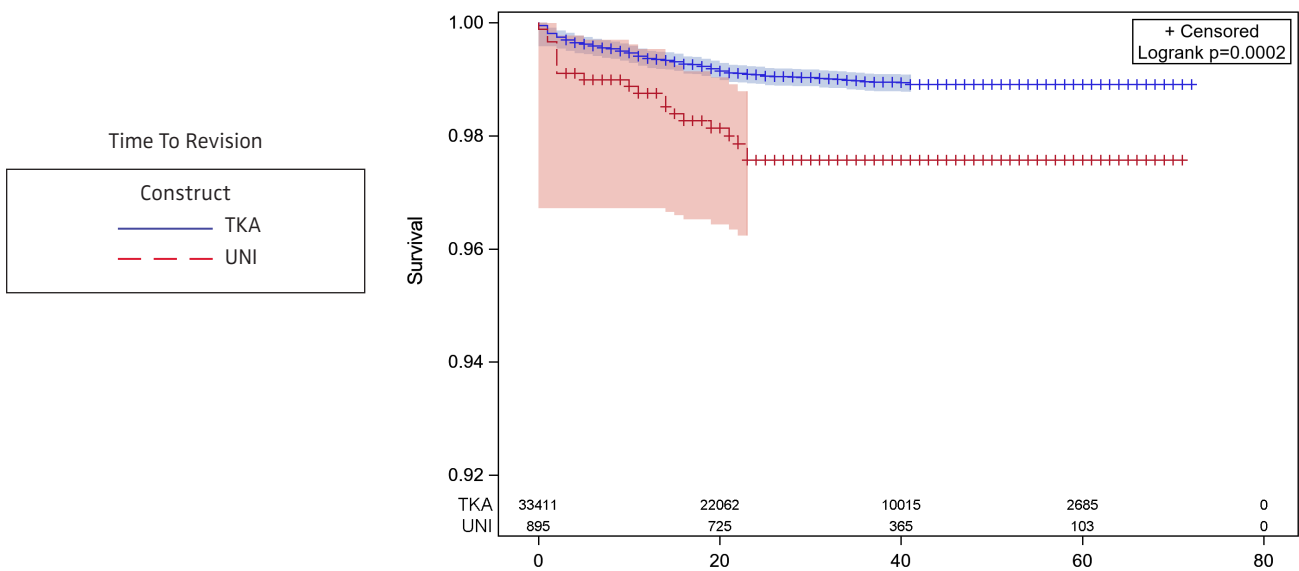


* Total possible patient population: 106,148; After accounting for missing data and exclusions as noted, the number analyzed 104,586 (98.5% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Construct	Total	Failed	Censored	Percent Censored
1	TKA	102,153	1,091	101,062	98.9%
2	UNI	2,433	38	2,395	98.4%
Total		104,586	1,129	103,457	98.9%

Figure 54: Knee Constructs Femoral Component (Total Knee and Uni-condylar) For Patients 80+ Years of Age Diagnosed with Primary OA (2012-2017)



* Total possible patient population: 34,718; After accounting for missing data and exclusions as noted, the number analyzed 34,306 (98.8% of total population)

Summary of the Number of Censored and Uncensored Values

Stratum	Construct	Total	Failed	Censored	Percent Censored
1	TKA	33,411	292	33,119	99.1%
2	UNI	895	20	875	97.8%
Total		34,306	312	33,994	99.1%

Published by:

American Joint Replacement Registry

9400 West Higgins Road

Rosemont, IL 60018

Phone: 1-847-292-0530

Email: AJRRinfo@aaos.org

www.aaos.org/ajrr

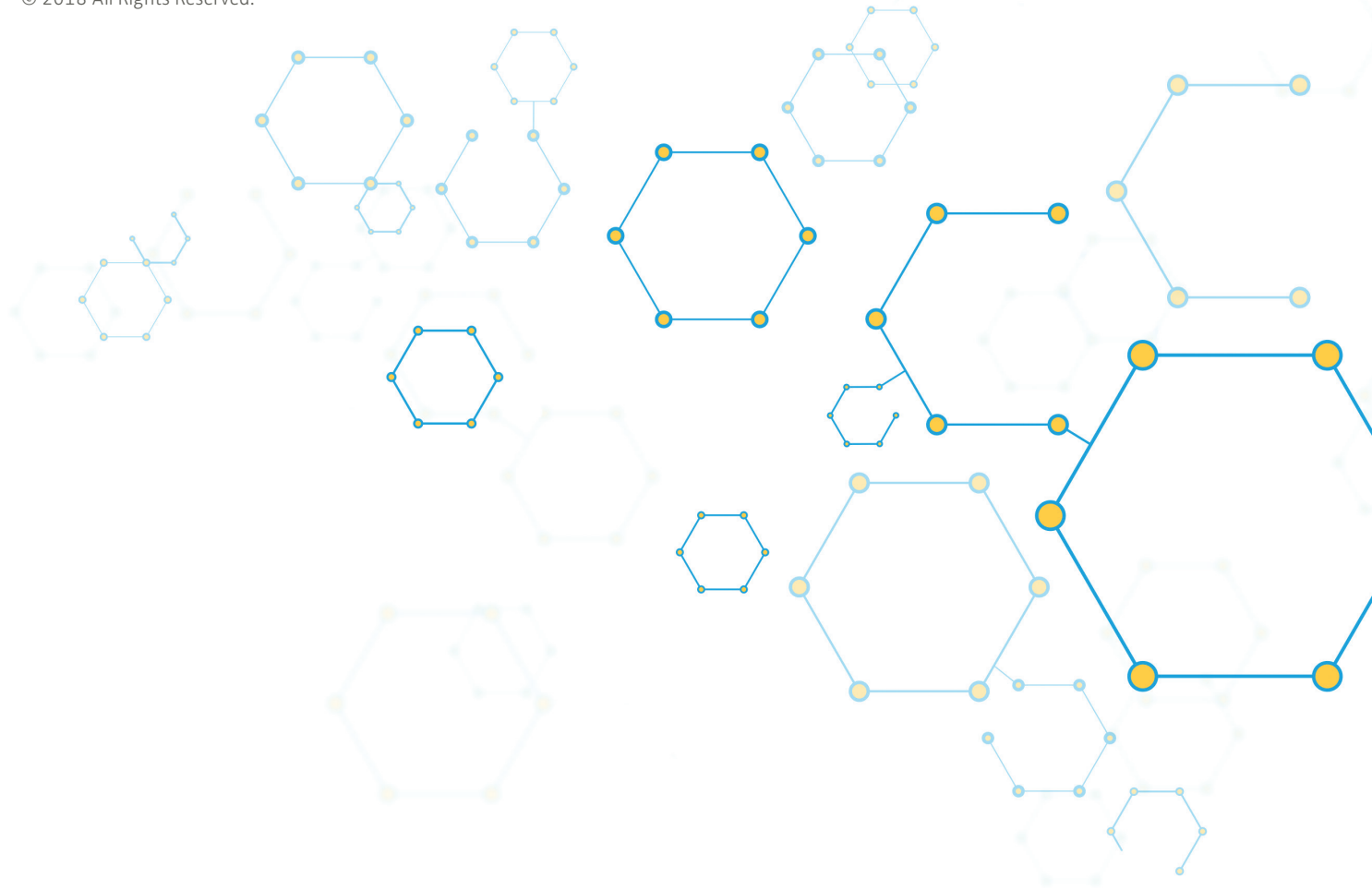
The material presented in AJRR's 2018 Annual Report has been made available by the American Joint Replacement Registry for educational purposes only. This material is not intended to present the only, or necessarily best, methods or procedures for the medical situations discussed, but rather is intended to represent an approach, view, statement, or opinion of the author(s) or producer(s), which may be helpful to others who face similar situations.

Any statements about commercial products and devices do not represent an AJRR endorsement or evaluation of these products. These statements may not be used in advertising or for any commercial purpose.

© 2018 All Rights Reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form, or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission from the publisher.

At the time of publication, every effort was made to ensure the information contained in this report was accurate. The document is available for download on the AJRR website.

© 2018 All Rights Reserved.



American Joint Replacement Registry

9400 West Higgins Road

Rosemont, IL 60018

Phone: 1-847-292-0530

Email: AJRRinfo@aaos.org

www.aaos.org/ajrr