SIRIS
schweizerisches implantatregister
registre suisse des implants
registro svizzero delle protesi
swiss implant registry

SIRIS Implant Report (Extended)
CCB cups & CCE reinforcement rings (THA & revision)

Mathys AG

Report generated 29 April 2025
Data period 1 January 2012 – 31 March 2025 (follow-up 31 March 2025)

This report has been prepared by **SwissRDL**, Medical Registries and Data Linkage, Institute of Social and Preventive Medicine, University of Bern, on order of the SIRIS Foundation. The report provides information on the use and outcomes of the stated product compared to all other relevant procedures involving registered implants of the same product category, based on data collected by the SIRIS Registry.

Disclaimer
SwissRDL has taken every care to ensure that the data supplied are accurate but does not warrant that the data are error free and does not accept any liability for errors or omissions in the data.

Institut für Sozial- und Präventivmedizin ISPM
SwissRDL Medical Registries and Data Linkage

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SIRIS Implant Report (Extended) 2025
3-5-7-10-years ODEP-rating compatible*

* Please let us know if you wish to submit your product for ODEP-rating. We will provide you with any data you may need to facilitate the process.

Supplier	Mathys AG
Produced by	Dr Christian Brand **SwissRDL**, Medical Registries and Data Linkage Institute of Social and Preventive Medicine University of Bern Mittelstrasse 43 3012 Bern
Version	1.0
Date	29.04.2025
Database	Swiss National Joint Registry (SIRIS)
Date of implant library	31.03.2025
Observation period	01.01.2012 - 31.03.2025
Date of data export	26.04.2025
Date of official statistics follow-up	30.04.2023 (projected censoring events after that date)
Implant	CCB cemented cups & CCE reinforcement rings (PART A: primary/THA uses; PART B: revision uses)
Exclusions	None
Comparison group	All other cemented cups used in primary procedures (Part A) or revision procedures (Part B) – selected eclass categories 34-32-10-08

Contents

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PART A: PRIMARY USES

Please note that this report is organised as follows:

Main group:	CCB cups (THA)*
Main comparison (C):	All comparable THAs using cemented cups (THA)
Comparison subgroups:	None
Implant subgroups:	1. CCB full profile 2. CCB low profile 3. CCE reinforcement ring

* Registrations are not always complete; individual components of multi-component procedures may be missing and therefore the total number of main product uses may not be the same as the sum of all derived mutually exclusive subgroups.

1. OVERVIEW

Table 1: Number of documented primary implantations per year

Year	CCB cup (THA)	(C) other cem AC THA	CCB full profile	CCB low profile	CCE
2012	14	148	0	14	0
2013	6	435	1	5	1
2014	18	442	0	18	3
2015	8	522	0	8	2
2016	13	518	1	12	3
2017	18	499	0	18	3
2018	14	512	0	14	7
2019	19	474	0	19	6
2020	8	420	1	7	0
2021	14	482	0	14	5
2022	14	400	0	14	4
2023	12	399	0	12	3
2024	5	354	0	5	6
2025	1	62	0	1	0
TOTAL	**164**	**5667**	**3**	**161**	**43**

Number of implants used in revision procedures (Part B of this report): 125 (including CCE uses without CCB)
Number of implants used in hemi-arthroplasties: n/a

Table 2: Number of documented revisions per year of primary implantation

Year	CCB cup (THA)	(C) other cem AC THA	CCB full profile	CCB low profile	CCE
2012	2	18	0	2	0
2013	3	42	0	3	0
2014	2	36	0	2	1
2015	1	36	0	1	1
2016	0	36	0	0	0
2017	1	35	0	1	1
2018	0	40	0	0	1
2019	1	24	0	1	0
2020	1	25	0	1	0
2021	0	25	0	0	0
2022	0	18	0	0	0
2023	1	27	0	1	0
2024	0	21	0	0	1
2025	0	1	0	0	0
TOTAL	**12**	**384**	**0**	**12**	**5**

Number of recorded “first reoperations” that do not fall within the registry's definition of component revision (= any procedure during which a component is removed from or added to a joint): 0

Table 3: Months from Primary to Revision operation

Group	Number of revisions	Min	Median	Max	Mean	StDev
CCB cup (THA)	12	0.2	1	66.3	11.6	20.6
(C) other cem AC THA	384	0.0	4	145.2	19.7	29.9
CCB full profile	0					
CCB low profile	12	0.2	1	66.3	11.6	20.6
CCE	5	0.2	7	33.9	14.0	15.7

Table 4: Follow-up of implants in full cohort in months

Group	Number of implants	Min	Median	Max	Mean	StDev
CCB cup (THA)	164	0.1	39	148.9	47.0	36.6
(C) other cem AC THA	5667	0.0	45	158.3	52.1	39.9
CCB full profile	3	11.5	26	54.1	30.4	21.7
CCB low profile	161	0.1	39	148.9	47.3	36.8
CCE	43	0.2	34	135.3	47.3	38.0

Table 5: Some numbers

Group	Number of patients	Male	Female	Implants lost due to death of patient	Implants lost to follow-up for other reasons	Implants still at risk	Surgical units	Surgeons	N surgeons with 50+ implants	N surgeons with 100+ implants
CCB cup (THA)	160	46	114	68	3	81	24	51	0	0
(C) other cem AC THA	5447	1754	3693	1832	231	3220	150	651	23	6
CCB full profile	3	1	2	3	0	0	1	2	0	0
CCB low profile	157	45	112	65	3	81	23	49	0	0
CCE	42	18	24	10	1	27	8	19	0	0

Official statistics follow-up until 30.04.2023. Censoring events are reliably projected beyond this point with a simulation model based on patient typologies and observed patterns. Units are the individual orthopaedic or surgical/traumatology departments. Surgical volume refers to main product only.

2. PRIMARY OPERATION

2.1. Patient characteristics

Table 6: Sex, age and BMI

		CCB cup (THA)	(C) other cem AC THA	CCB full profile	CCB low profile	CCE
Sex	**n**	**%**	**%**	**%**	**%**	**%**
Female	116	70.7	67.9	66.7	70.8	58.1
Male	48	29.3	32.1	33.3	29.2	41.9
Total (n; 100%)	**164**	**100%**	**5667**	**3**	**161**	**43**
Age at primary operation						
Mean		79.5	75.4	84.7	79.4	76.2
StDev		10.7	12.8	10.7	10.7	10.5
Median		81	78	87	81	79
Min		44	15	73	44	49
Max		96	103	94	96	91
Total		**164**	**5666**	**3**	**161**	**43**
BMI* at primary operation						
Mean		24.4	25.7	24.1	24.4	25.3
StDev		5.1	5.4	4.6	5.2	6.5
Median		24	25	24	24	25
Min		16	14	21	16	17
Max		48	67	27	48	48
Total		**105**	**3794**	**2**	**103**	**35**

* Only available since 2015 and still optional. In 2015, roughly a third of entries was missing. However, by 2024 the share of missing values has declined to under 5%.

2.2. Clinical characteristics

Table 7: Diagnosis, restriction and morbidity

	CCB cup (THA)		(C) other cem AC THA	CCB full profile	CCB low profile	CCE
Diagnosis	**n**	**%**	**%**	**%**	**%**	**%**
Osteoarthritis	58	35.4	47.8	66.7	34.8	34.9
Inflammatory arthritis	0	0.0	0.5	0.0	0.0	0.0
Developmental dysplasia	0	0.0	2.7	0.0	0.0	2.3
Fracture	58	35.4	27.3	0.0	36.0	11.6
Osteonecrosis	33	20.1	11.0	33.3	19.9	34.9
Post Perthes	0	0.0	0.5	0.0	0.0	2.3
Other	15	9.1	10.2	0.0	9.3	14.0
Total (n; 100%)	**164**	**100%**	**5667**	**3**	**161**	**43**
Restriction (Charnley)*	**n**	**%**	**%**	**%**	**%**	**%**
A unilaterally diseased	57	55.3	55.0	0.0	56.4	54.3
B bilaterally diseased	23	22.3	22.5	100.0	20.8	25.7
BB + prosthesis[(a)]	22	21.4	18.9	0.0	21.8	17.1
C other condition[(b)]	1	1.0	3.7	0.0	1.0	2.9
Total (n; 100%)	**103**	**100%**	**3568**	**2**	**101**	**35**
Morbidity (ASA)*	**n**	**%**	**%**	**%**	**%**	**%**
ASA 1, no disturbance	6	5.0	2.7	0.0	5.1	2.6
ASA 2, mild/moderate	43	35.8	37.5	0.0	36.4	33.3
ASA 3, severe	69	57.5	54.4	100.0	56.8	56.4
ASA 4/5, life-threatening	2	1.7	5.4	0.0	1.7	7.7
Total (n; 100%)	**120**	**100%**	**4230**	**2**	**118**	**39**

* Only available since 2015 and still optional. Missing ASA values have fallen from 12% in 2015 to approx. 2% in 2022. The corresponding values for Charnley are 33% and 11%.
[(a)] bilaterally diseased and prosthesis present
[(b)] any other condition that affects walking

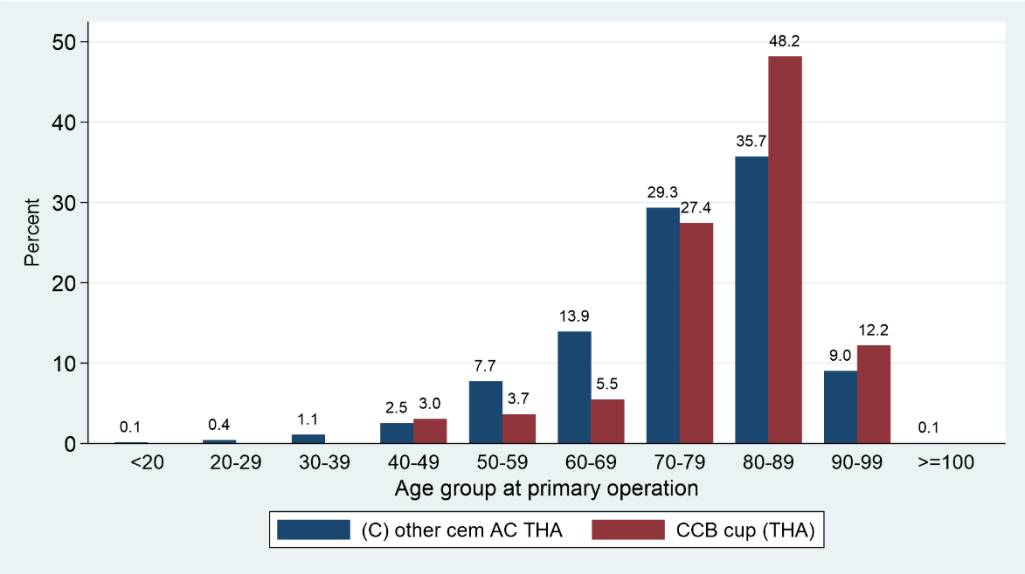
Table 8: Previous surgery (multiple choice)

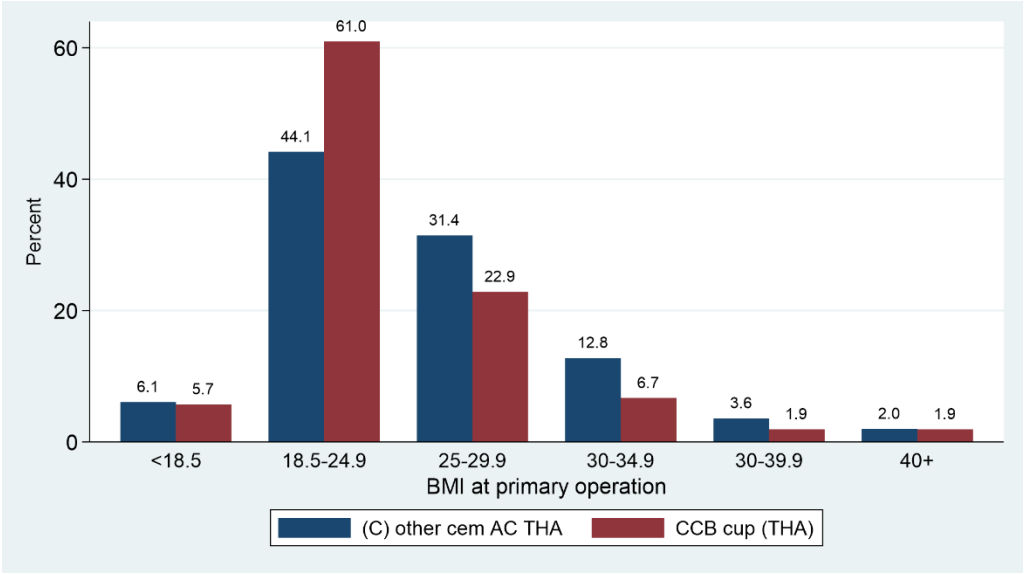
	CCB cup (THA)		(C) other cem AC THA	CCB full profile	CCB low profile	CCE
	n	%	%	%	%	%
None	**143**	**87.2**	**84.2**	**66.7**	**87.6**	**76.7**
Osteotomy femur	0	0.0	1.7	0.0	0.0	2.3
Osteotomy pelvis	0	0.0	1.0	0.0	0.0	0.0
Internal fixation acetabulum	3	1.8	2.6	0.0	1.9	2.3
Internal fixation femur	8	4.9	7.9	33.3	4.3	9.3
Open impingement surgery**	0	0.0	0.1		0.0	0.0
Arthroscopic impingement surgery**	0	0.0	0.1		0.0	0.0
Arthrodesis*	0	0.0	0.1	0.0	0.0	0.0
Other*	11	6.7	3.8	0.0	6.8	9.3
Total primary cases (n)	**164**		**5667**	**3**	**161**	**43**

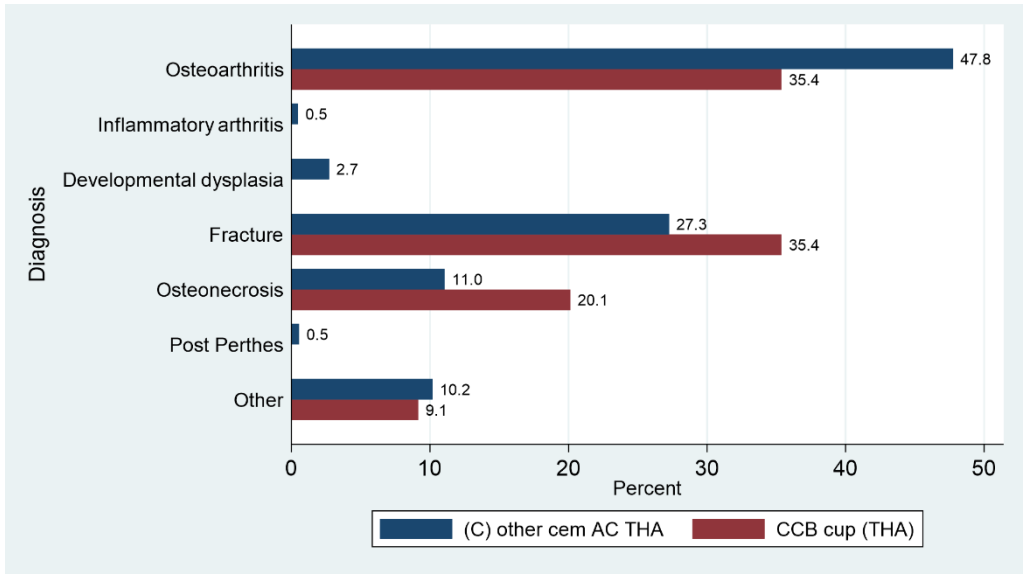
* Only available since 2015
** Only available since 2021

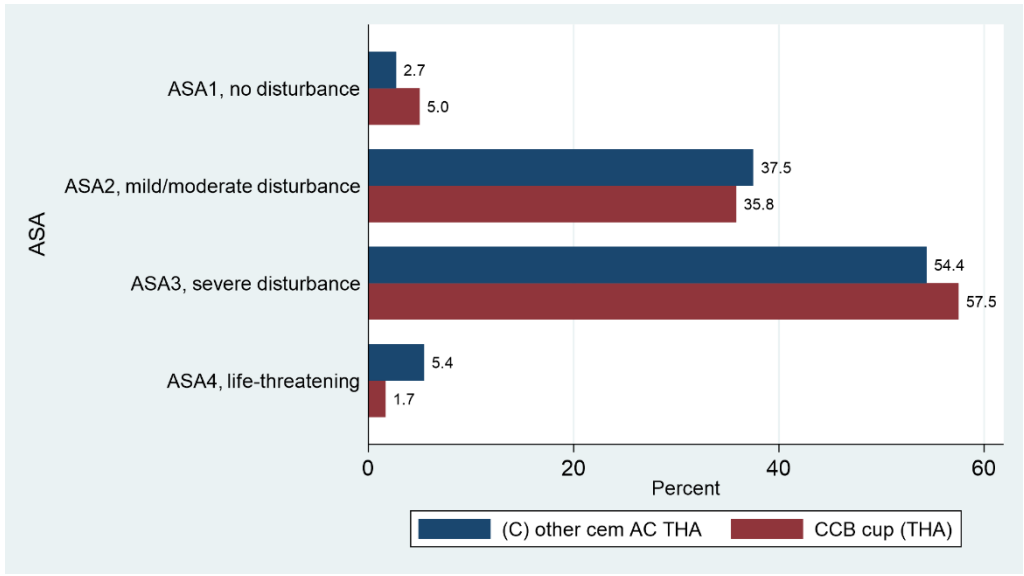
Distributions (CCB)

Figure 1: age groups, BMI groups, diagnosis and ASA groups (CCB)



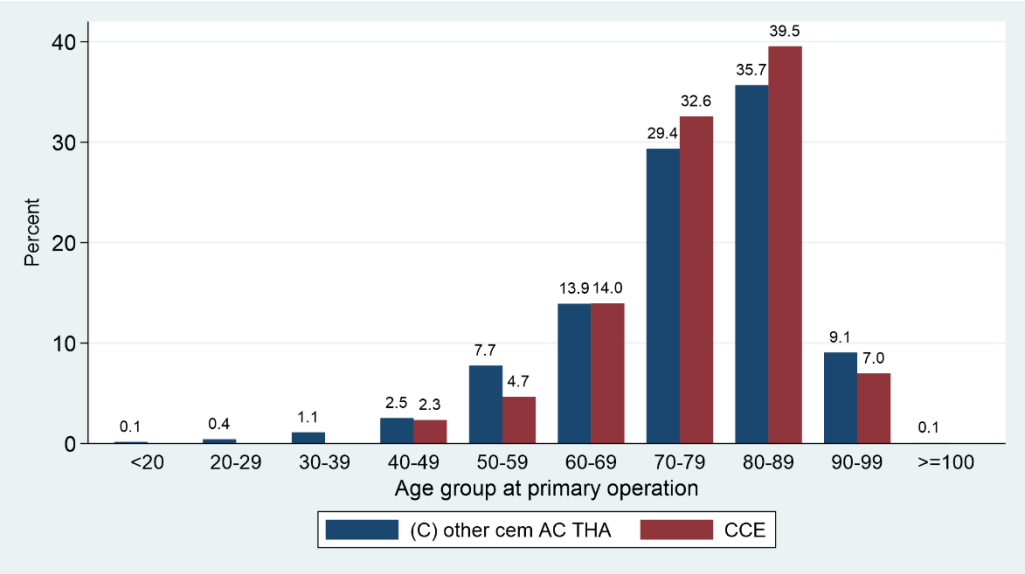


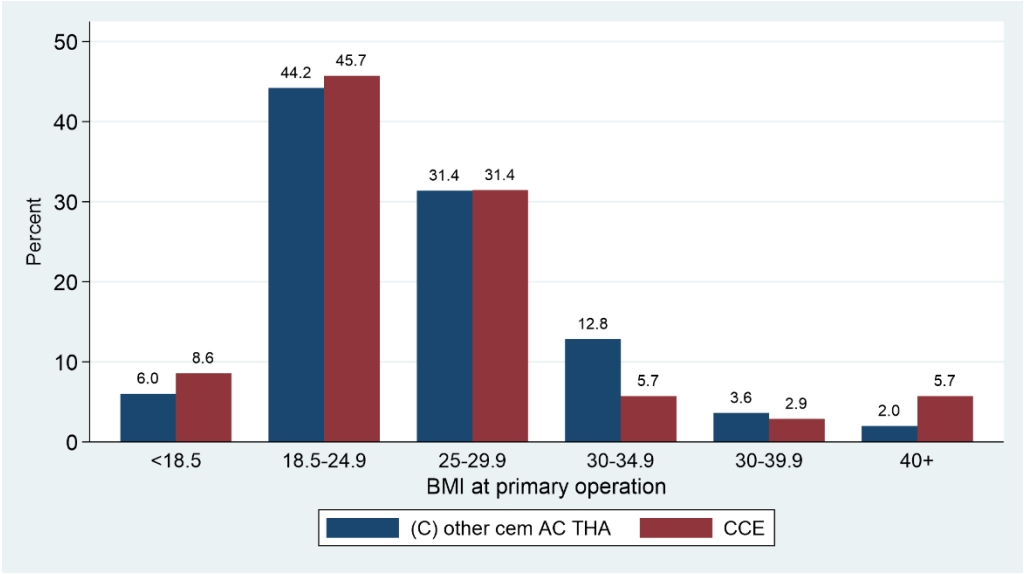


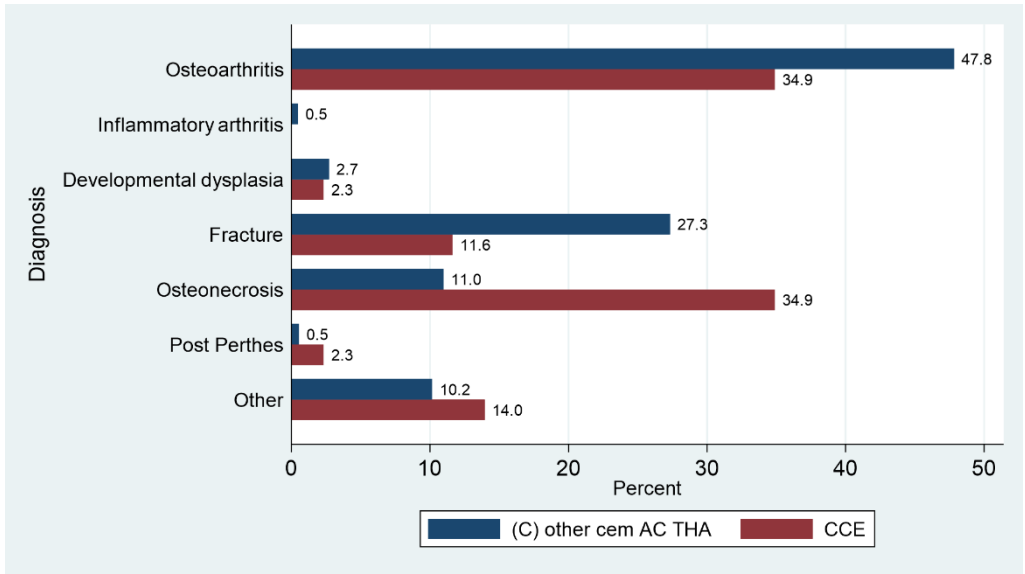


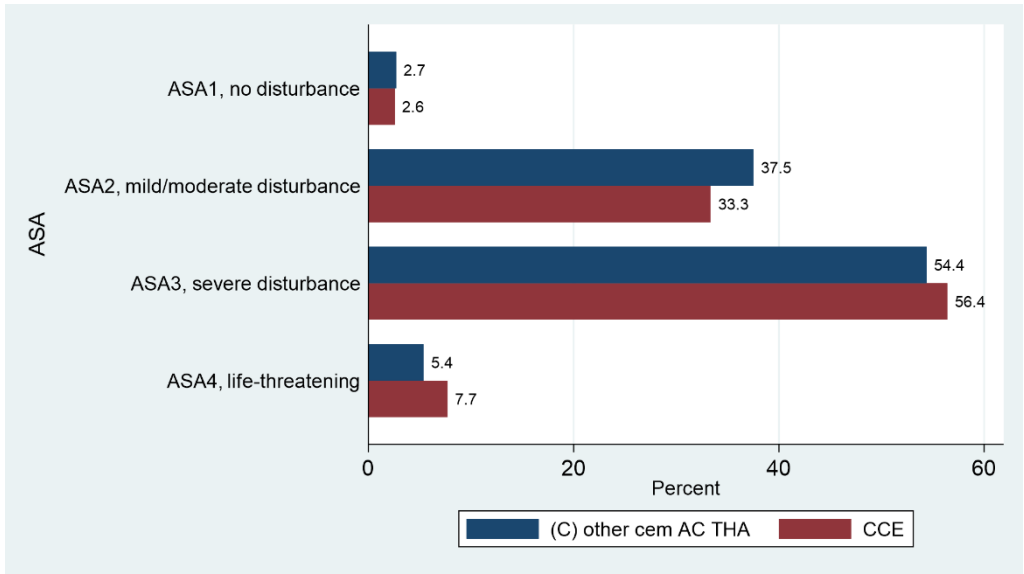
Distributions (CCE)

Figure 2: age groups, BMI groups, diagnosis and ASA groups (CCE)









2.3. Operation details

Table 9: Procedure, design and type of bearing

	CCB cup (THA)		(C) other cem AC THA	CCB full profile	CCB low profile	CCE
Procedure	**n**	**%**	**%**	**%**	**%**	**%**
Total hip prosthesis	164	100.0	100.0	100.0	100.0	100.0
Hemi hip prosthesis	0	0.0	0.0	0.0	0.0	0.0
Total (n; 100%)	**164**	**100%**	**5667**	**3**	**161**	**43**
Approach*	**n**	**%**	**%**	**%**	**%**	**%**
Anterior	43	34.1	33.3	50.0	33.9	43.6
Anterolateral	61	48.4	24.0	0.0	49.2	17.9
Lateral	19	15.1	10.6	0.0	15.3	28.2
Posterior	2	1.6	25.5	0.0	1.6	7.7
Transfemoral	0	0.0	0.8	0.0	0.0	0.0
Trochanter osteotomy**	0	0.0	1.3	0.0	0.0	0.0
Other	1	0.8	4.4	50.0	0.0	2.6
Total (n; 100%)	**126**	**100%**	**4632**	**2**	**124**	**39**
Patient positioning*	**n**	**%**	**%**	**%**	**%**	**%**
Supine, normal table	21	16.7	14.9	0.0	16.9	10.3
Supine, extension table	41	32.5	29.0	100.0	31.5	46.2
Lateral	63	50.0	55.7	0.0	50.8	43.6
Other	1	0.8	0.4	0.0	0.8	0.0
Total (n; 100%)	**126**	**100%**	**4631**	**2**	**124**	**39**
Component fixation	**n**	**%**	**%**	**%**	**%**	**%**
All cemented	102	62.2	56.4	33.3	62.7	34.9
All uncemented	4	2.4	1.8	33.3	1.9	0.0
Hybrid[(a)]	6	3.7	2.2	0.0	3.7	2.3
Reverse hybrid[(b)]	21	12.8	23.3	0.0	13.0	11.6
Reinforcem. ring, FE cem	18	11.0	10.1	0.0	11.2	32.6
Reinforcem. ring, FE uncem	13	7.9	6.2	33.3	7.5	18.6
Total (n; 100%)	**164**	**100%**	**5667**	**3**	**161**	**43**

* Only available since 2015
** Only from 2021
[(a)] acetabulum uncemented; femur cemented
[(b)] acetabulum cemented; femur uncemented

Please alert the SIRIS registry if you notice any inconsistencies in the ways in which surgeons and hospitals claim to have used your products. Any inconsistencies will be noted by the SIRIS data quality and monitoring team and, in case of systematic data entry errors, reported to the hospitals where the errors originated.

Please note that there is considerable confusion at the data entry stage regarding certain features of implants including component fixation. The implants included in this analysis are all intended for either cemented or uncemented use. We cannot determine whether the reported other uses are data entry errors – in this case occurring probably at random – or whether they represent genuine off-label uses of the products.

Table 10: Technology and additional interventions (multiple choice)

	CCB cup (THA)		(C) other cem AC THA	CCB full profile	CCB low profile	CCE
Technology**	**n**	**%**	**%**	**%**	**%**	**%**
None	**29**	**63.0**	**51.3**		**63.0**	**0.0**
Computer navigation cup	0	0.0	0.4		0.0	0.0
Computer navigation stem	0	0.0	0.2		0.0	0.0
Robotic-assisted[(a)]	0	0.0	0.1		0.0	0.0
Patient specific cutting blocks	0	0.0	0.1		0.0	0.0
Intraop. fluoroscopy / radiogr.	17	37.0	48.3		37.0	100.0
Total primary cases (n)	**46**		**1680**	**0**	**46**	**18**
Additional interventions*	**n**	**%**	**%**	**%**	**%**	**%**
None	**92**	**73.0**	**71.1**	**100.0**	**72.6**	**46.2**
Acetabular roof plasty	9	7.1	6.6	0.0	7.3	20.5
Central osseous reconstr.	10	7.9	7.8	0.0	8.1	17.9
Proximal femur osteotomy	1	0.8	0.6	0.0	0.8	2.6
ORIF / CRIF acetabulum**	2	4.3	8.3		4.3	5.6
Cerclage femur**	2	4.3	7.1		4.3	11.1
ORIF / CRIF femur**	0	0.0	2.0		0.0	5.6
Augments**	0	0.0	0.8		0.0	0.0
Other	16	12.7	13.2	0.0	12.9	17.9
Total primary cases (n)	**126**		**4612**	**2**	**124**	**39**

* Only available since 2015
** Only available since 2021
[(a)] image guided / CT based

3. HIP REVISION

3.1. Patient characteristics at first revision

Table 11: Sex, age and BMI at first revision

		CCB cup (THA)	(C) other cem AC THA	CCB full profile	CCB low profile	CCE
Sex	**n**	**%**	**%**	**%**	**%**	**%**
Female	7	58.3	63.5		58.3	60.0
Male	5	41.7	36.5		41.7	40.0
Total (n; 100%)	**12**	**100%**	**384**	**0**	**12**	**5**
Age at first revision						
Mean		77.3	73.1		77.3	68.0
StDev		8.4	13.6		8.4	14.8
Median		80	76		80	75
Min		56	21		56	52
Max		90	99		90	81
Total		**12**	**384**	**0**	**12**	**5**
BMI* at first revision						
Mean		28.0	26.8		28.0	24.2
StDev		7.8	6.2		7.8	4.3
Median		28	26		28	25
Min		20	14		20	20
Max		39	49		39	28
Total		**5**	**288**	**0**	**5**	**3**

* Only available since 2015 and still optional. In 2015, roughly a third of entries was missing. However, by 2022 the share of missing values has declined to under 10%.

3.2. Intervention details at first revision

Table 12: Intervention at first revision

	CCB cup (THA)		(C) other cem AC THA	CCB low profile	CCE
Intervention at first revision (any component)	**n**	**%**	**%**	**%**	**%**
Revision AC + FE[(f)(a)]	3	25.0	15.4	25.0	0.0
Revision AC[(a)]	0	0.0	9.4	0.0	0.0
Revision AC + head[(a)(h)]	2	16.7	25.5	16.7	60.0
Revision FE[(f)]	1	8.3	9.4	8.3	20.0
Revision FE + inlay[(f)(a)]	0	0.0	3.6	0.0	0.0
Revision head[(h)]	5	41.7	12.5	41.7	20.0
Revision inlay[(a)]	0	0.0	1.3	0.0	0.0
Revision head and inlay[(a)(h)]	0	0.0	12.5	0.0	0.0
Totalisation of hemi prosthesis	0	0.0	0.0	0.0	0.0
Totalisation of hemi (+stem)	0	0.0	0.5	0.0	0.0
Component removal (spacer)	0	0.0	3.6	0.0	0.0
Reimplantation*	0	0.0	1.6	0.0	0.0
Girdlestone	0	0.0	1.6	0.0	0.0
Revision FE, inlay & osteosynth.[(f)(a)]	0	0.0	1.0	0.0	0.0
Other intervention**	1	8.3	2.1	8.3	0.0
Total (n; 100%)	**12**	**100%**	**384**	**12**	**5**

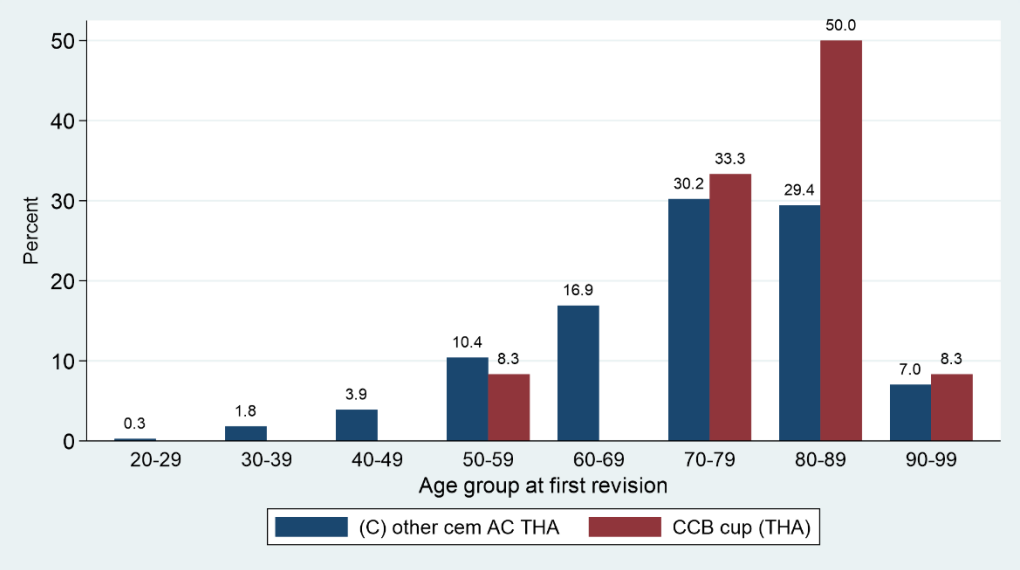
[(f)] We recognise these revision procedures as FEMORAL revisions (FEMORAL component unambiguously linked to reason for revision) and show them as a separate revision outcome category below.
[(a)] We recognise these revision procedures as ACETABULAR revisions (ACETABULAR component unambiguously linked to reason for revision) and show them as a separate revision outcome category below.
[(h)] We recognise these revision procedures as HEAD revisions (HEAD component unambiguously linked to reason for revision; the femoral stem remains in situ).
* after spacer or Girdlestone
** assigned as applicable

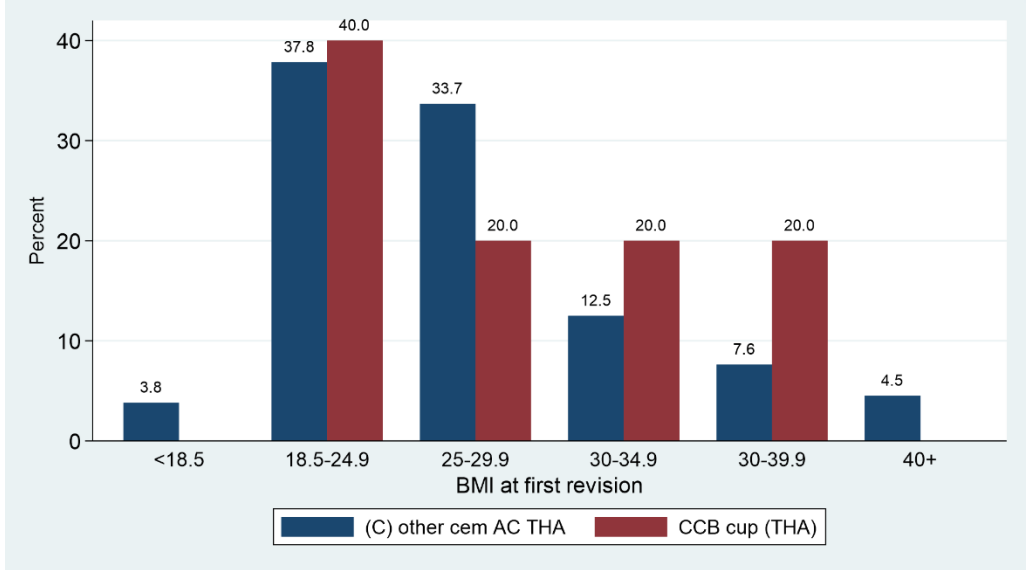
Others: `"Revision FE+Kopf"'

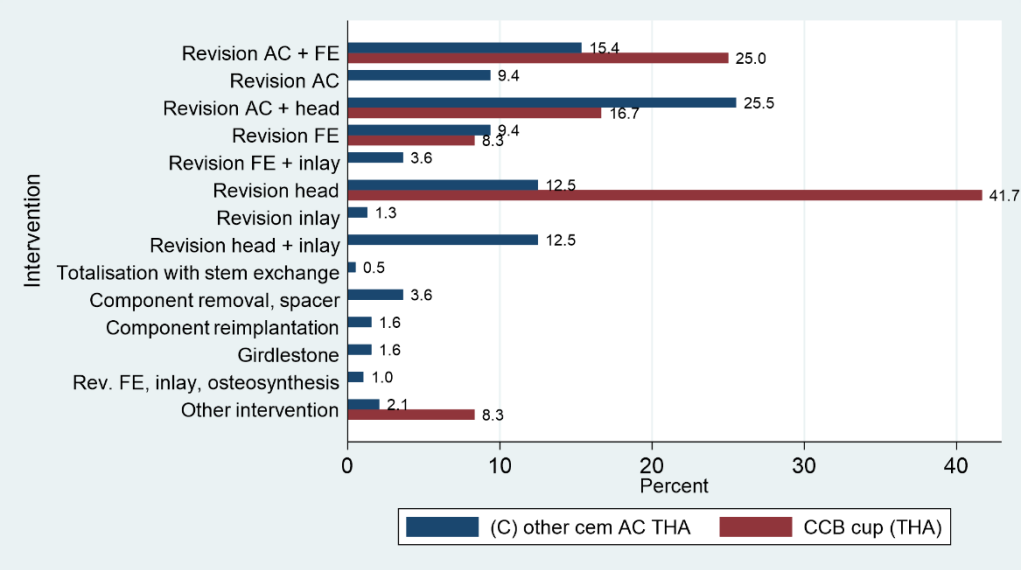
Please note that there is considerable confusion at the data entry stage regarding certain features of implants. For example, totalisations as revision procedures for THAs are obvious data entry errors, as are AC-related revisions for hemi-arthroplasties (the latter being probably totalisations). The previous versions of the SIRIS proforma led to obvious confusion regarding the meaning of revision categories. SIRIS version 2021 features a number of changes that eliminate the ability to enter such inconsistent responses.

Distributions (CCB)

Figure 3: age groups, BMI groups and interventions at first revision (CCB)

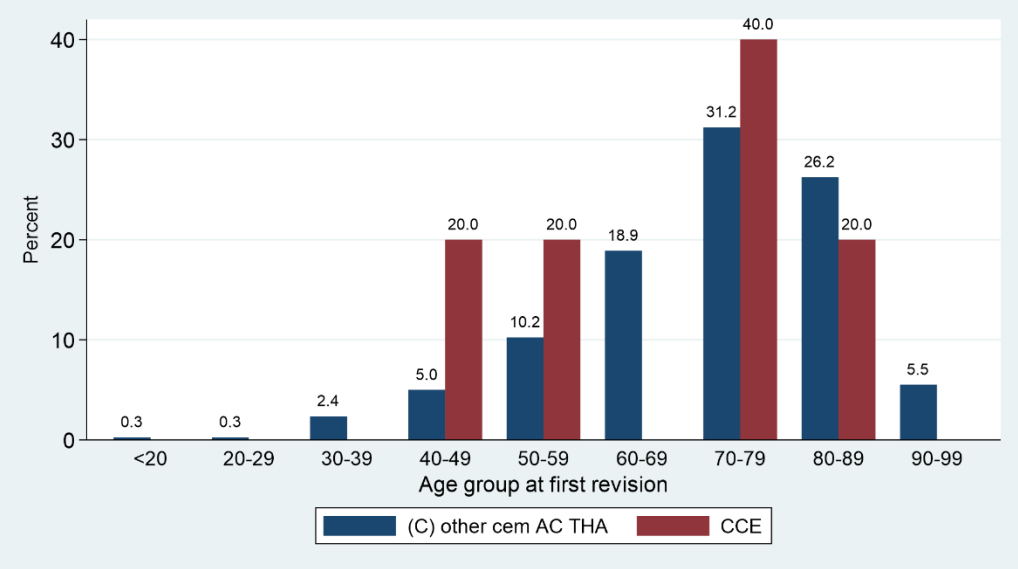


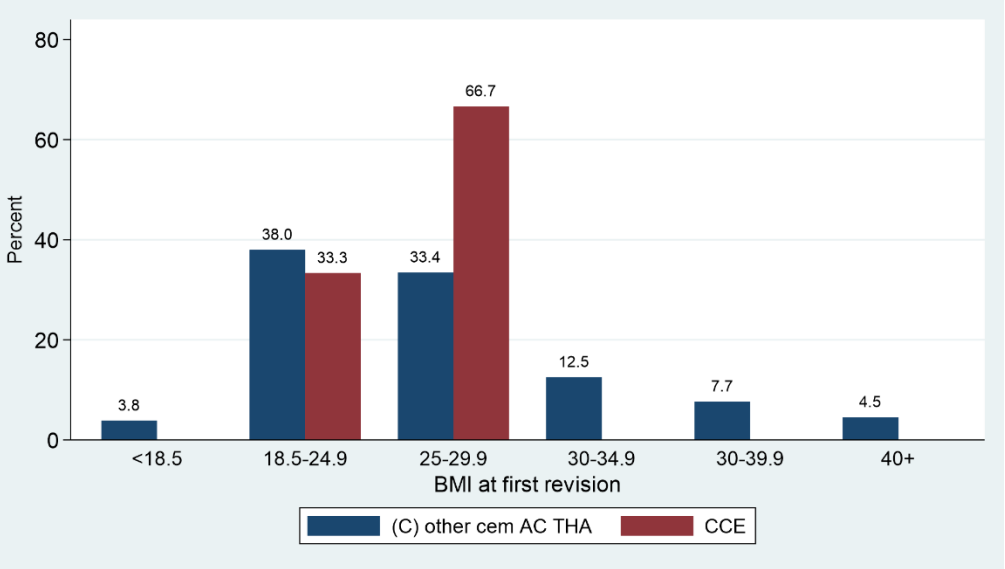


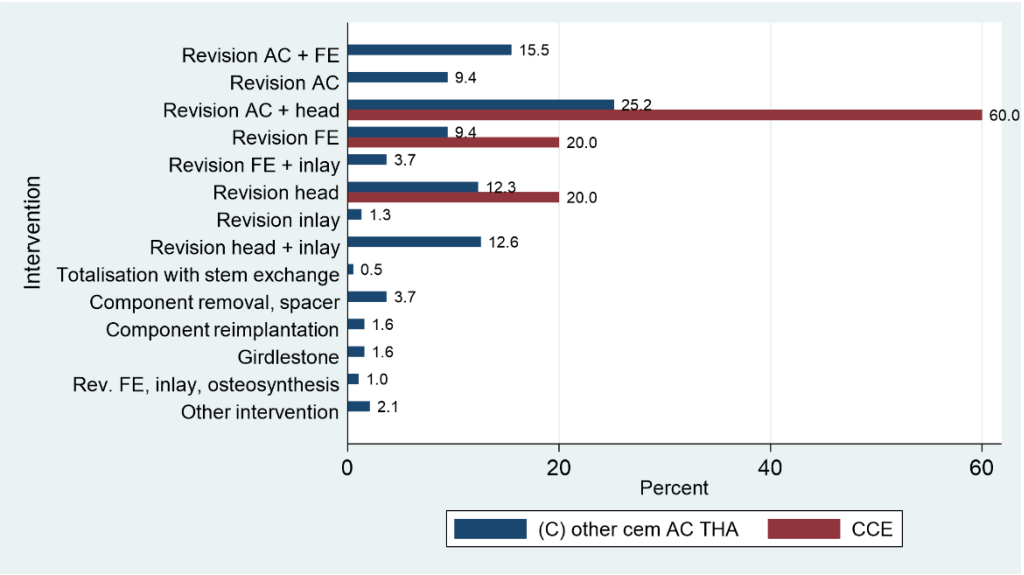


Distributions (CCE)

Figure 4: age groups, BMI groups and interventions at first revision (CCE)







3.3. Overview subsequent revisions (re-revisions)

Table 13: Overview re-revisions

Number of subsequent revisions on record (i.e. after first revision)	CCB cup (THA)		(C) other cem AC THA	
	n	% of first revisions	n	% of first revisions
1 subsequent revision	0	0.0	58	15.1
2	2	16.7	11	2.9
3	0	0.0	9	2.3
4	0	0.0	5	1.3
5 or more subsequent revisions	0	0.0	3	0.8
Total (n joints re-revised)	**2**	**16.7**	**86**	**22.4**

Interventions at subsequent revisions	CCB cup (THA)		(C) other cem AC THA	
	n	%	n	%
Revision AC + FE	1	25.0	16	11.2
Revision AC	0	0.0	13	9.1
Revision AC + head	2	50.0	26	18.2
Revision FE	0	0.0	4	2.8
Revision FE + inlay	0	0.0	5	3.5
Revision head	1	25.0	5	3.5
Revision inlay	0	0.0	2	1.4
Revision head and inlay	0	0.0	24	16.8
Totalisation of hemi prosthesis	0	0.0	0	0.0
Totalisation of hemi (+stem)	0	0.0	0	0.0
Component removal (spacer)	0	0.0	16	11.2
Reimplantation*	0	0.0	24	16.8
Girdlestone	0	0.0	5	3.5
Revision FE, inlay & osteosynth.	0	0.0	0	0.0
Other intervention	0	0.0	3	2.1
Total (n revisions)	**4**	**100%**	**143**	**100%**

* after spacer or Girdlestone

Others: …

3.4. First revision of any component

3.4.1. Clinical characteristics at first revision (any component)

Table 14: Diagnosis at first revision

Diagnosis at first revision	CCB cup (THA)		(C) other cem AC THA		CCB low profile	CCE
	n	% of revs	n	% of revs	% of revs	% of revs
Loosening acetabular	2	16.7	109	28.4	16.7	0.0
Loosening femoral	2	16.7	51	13.3	16.7	0.0
Infection	4	33.3	114	29.7	33.3	20.0
Periprosthetic fracture AC	0	0.0	26	6.8	0.0	0.0
Periprosthetic fracture FE	1	8.3	34	8.9	8.3	20.0
Dislocation	0	0.0	82	21.4	0.0	0.0
Implant failure	0	0.0	10	2.6	0.0	0.0
Wear	0	0.0	5	1.3	0.0	0.0
Osteolysis AC	0	0.0	11	2.9	0.0	0.0
Osteolysis FE	0	0.0	0	0.0	0.0	0.0
Acetabular protrusion	0	0.0	7	1.8	0.0	20.0
Trochanter pathology	0	0.0	3	0.8	0.0	0.0
Pain of unclear origin	1	8.3	23	6.0	8.3	0.0
Girdlestone	0	0.0	5	1.3	0.0	0.0
Spacer	0	0.0	5	1.3	0.0	0.0
Ion blood level	0	0.0	0	0.0	0.0	0.0
Squeaking	0	0.0	0	0.0	0.0	0.0
Metalosis	0	0.0	3	0.8	0.0	0.0
Impingement	0	0.0	1	0.3	0.0	0.0
Position / orientation of cup	0	0.0	20	5.2	0.0	0.0
Position / orientation of stem	1	8.3	7	1.8	8.3	0.0
Other	4	33.3	29	7.6	33.3	60.0
Total Diagnoses (n)	**15**		**545**		**15**	**6**
Total Revisions (n)	**12**		**384**		**12**	**5**

NB: We report results for these multiple response categories as supplied by hospitals even if some categories may have been entered erroneously or based on a different understanding of a category's purpose. Significant discrepancies, however, will always be discussed with the registry's data quality and monitoring team.

Other: `"Fannen (lever out)"' `"Frühinfekt"' `"Hämatom"' `"Hämatom nach INR Entgleisung"'

Table 15: Cumulative incidence of different indications at first revision (any component)

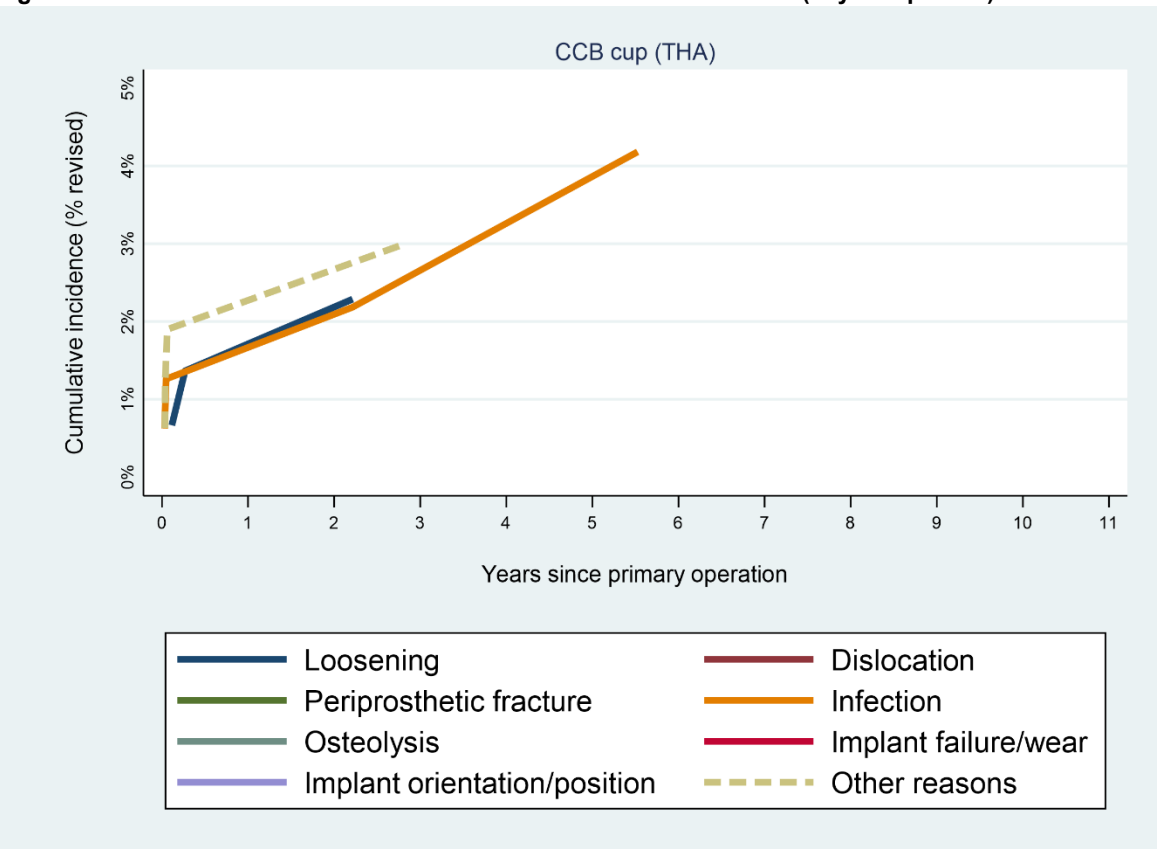
CCB cup (THA)	1-year	2-year	3-year	5-year	7-year	9-year	10-year	11-year
Loosening	1.4 (0.3-5.4)	1.4 (0.3-5.4)	2.3 (0.7-7.0)	2.3 (0.7-7.0)	2.3 (0.7-7.0)	2.3 (0.7-7.0)		
Dislocation	0.0 (.-.)	0.0 (.-.)	0.0 (.-.)	0.0 (.-.)	0.0 (.-.)	0.0 (.-.)		
Periprosthetic fracture	0.6 (0.1-4.3)	0.6 (0.1-4.3)	0.6 (0.1-4.3)	0.6 (0.1-4.3)	0.6 (0.1-4.3)	0.6 (0.1-4.3)		
Infection	1.3 (0.3-5.0)	1.3 (0.3-5.0)	2.2 (0.7-6.8)	2.2 (0.7-6.8)	4.2 (1.4-12.3)	4.2 (1.4-12.3)		
Osteolysis	0.0 (.-.)	0.0 (.-.)	0.0 (.-.)	0.0 (.-.)	0.0 (.-.)	0.0 (.-.)		
Implant failure / wear	0.0 (.-.)	0.0 (.-.)	0.0 (.-.)	0.0 (.-.)	0.0 (.-.)	0.0 (.-.)		
Implant orientation / position	0.7 (0.1-5.0)	0.7 (0.1-5.0)	0.7 (0.1-5.0)	0.7 (0.1-5.0)	0.7 (0.1-5.0)	0.7 (0.1-5.0)		
Other reasons	1.9 (0.6-5.8)	1.9 (0.6-5.8)	3.0 (1.1-8.1)	3.0 (1.1-8.1)	3.0 (1.1-8.1)	3.0 (1.1-8.1)		
(C) other cem AC THA	**1-year**	**2-year**	**3-year**	**5-year**	**7-year**	**9-year**	**10-year**	**11-year**
Loosening	1.0 (0.7-1.3)	1.5 (1.2-1.9)	1.9 (1.5-2.3)	2.7 (2.2-3.3)	3.4 (2.8-4.1)	4.8 (3.9-5.9)	5.6 (4.5-7.0)	5.8 (4.7-7.3)
Dislocation	1.3 (1.0-1.6)	1.3 (1.0-1.6)	1.3 (1.1-1.7)	1.5 (1.2-1.9)	1.5 (1.2-1.9)	2.0 (1.5-2.6)	2.0 (1.5-2.6)	2.0 (1.5-2.6)
Periprosthetic fracture	0.6 (0.4-0.8)	0.7 (0.5-1.0)	0.7 (0.5-1.0)	1.0 (0.7-1.3)	1.2 (0.9-1.6)	1.5 (1.1-2.1)	1.9 (1.3-2.8)	1.9 (1.3-2.8)
Infection	1.7 (1.4-2.1)	2.0 (1.6-2.4)	2.0 (1.7-2.5)	2.2 (1.8-2.7)	2.3 (1.9-2.8)	2.3 (1.9-2.8)	2.3 (1.9-2.8)	2.6 (2.0-3.3)
Osteolysis	0.1 (0.0-0.2)	0.1 (0.1-0.3)	0.2 (0.1-0.3)	0.2 (0.1-0.3)	0.2 (0.1-0.5)	0.3 (0.1-0.7)	0.5 (0.2-1.3)	0.5 (0.2-1.3)
Implant failure / wear	0.1 (0.1-0.3)	0.1 (0.1-0.3)	0.2 (0.1-0.4)	0.3 (0.1-0.5)	0.4 (0.2-0.7)	0.6 (0.3-1.2)	0.6 (0.3-1.2)	0.6 (0.3-1.2)
Implant orientation / position	0.3 (0.2-0.4)	0.3 (0.2-0.5)	0.4 (0.3-0.7)	0.5 (0.3-0.7)	0.6 (0.4-0.9)	0.7 (0.4-1.1)	0.7 (0.4-1.1)	0.7 (0.4-1.1)
Other reasons	0.3 (0.2-0.5)	0.5 (0.3-0.7)	0.5 (0.4-0.8)	0.6 (0.4-0.9)	0.6 (0.4-0.9)	0.6 (0.4-0.9)	0.6 (0.4-0.9)	0.6 (0.4-0.9)

Figures are omitted where n at risk <10
Reasons may refer to femoral or acetabular component
(95% confidence intervals)

Please note that these are Kaplan-Meier estimates of selected generic reasons for first revisions that SIRIS has recorded since its inception. The individual revision rates cannot be added up to the total all components revision rate because revisions can have multiple reasons.

Interpretation: A line starts when an indication was recorded for the first time and it ends when it was recorded for the last time as an underlying reason for first revision (please note that single revisions of a type are not shown).

Figure 5: Cumulative incidence of different indications at first revision (any component)



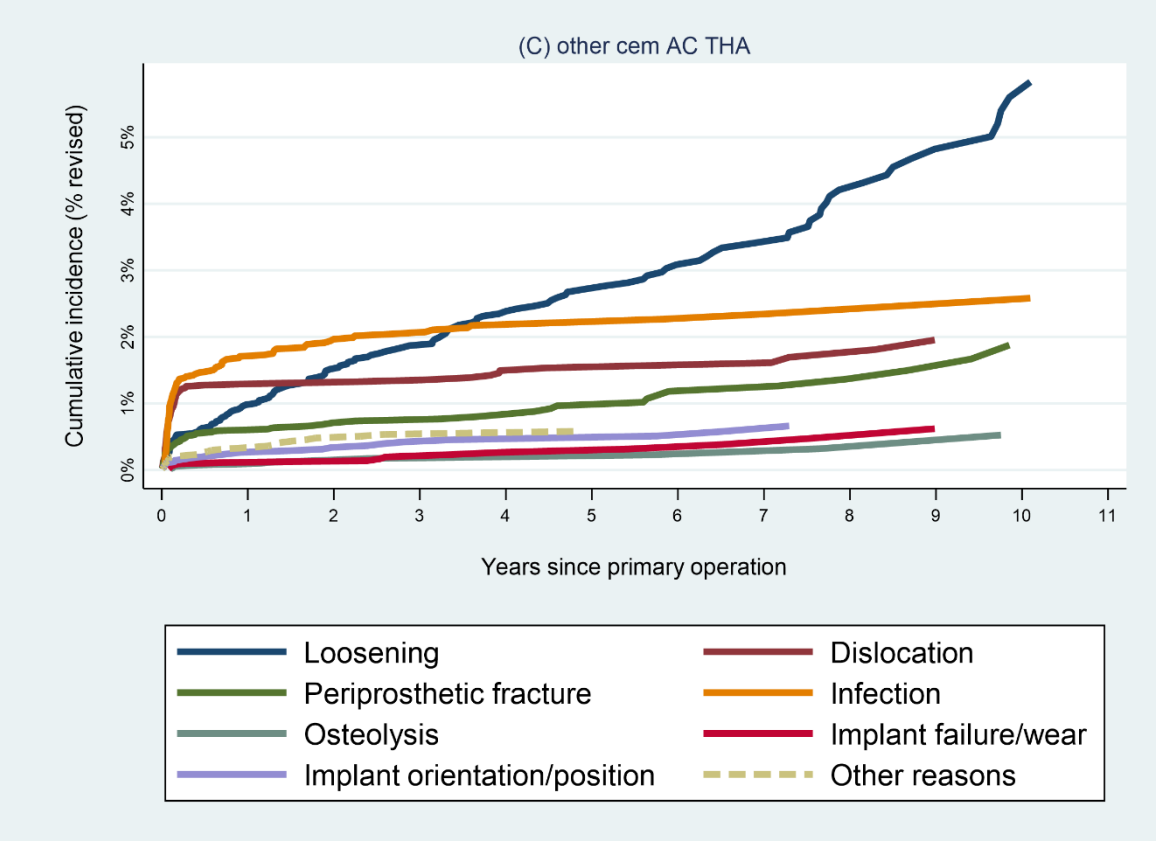
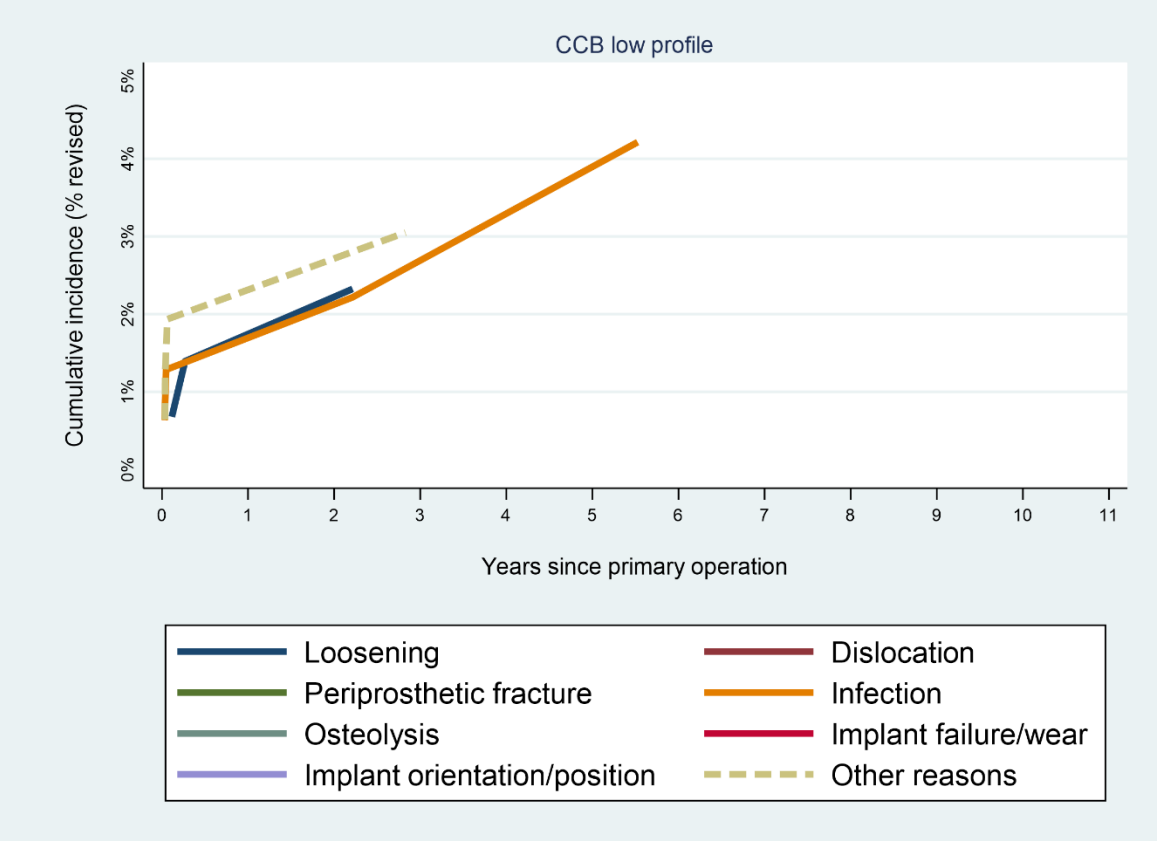
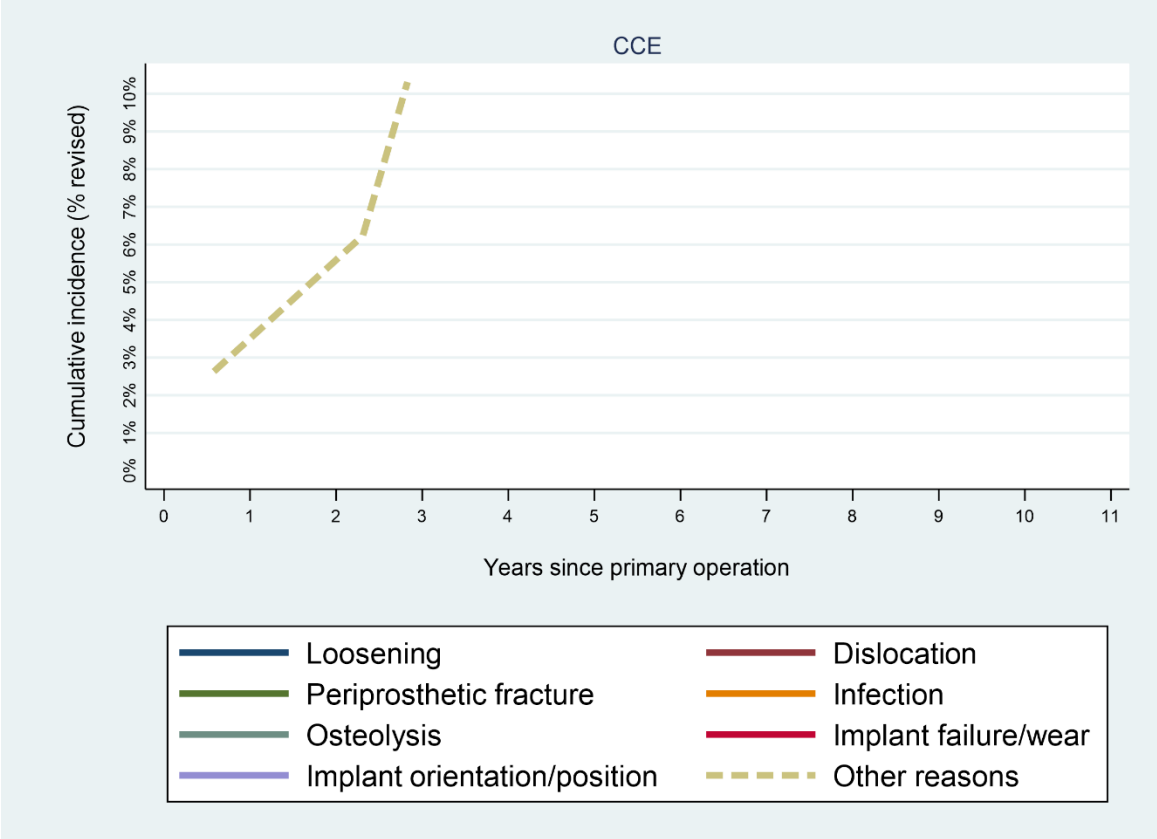


Figure 6: Cumulative incidence of different indications: relevant subgroups I





3.4.2. Revision rate per 100 component years at first revision (any component)

Table 16: Overview revisions

Group	Number Primaries	Number Revised	Adjusted component years (time at risk)	*For comparison: Unadjusted component years*	Revisions per 100 component years	95% CI lower bound	95% CI upper bound
CCB cup (THA)	**164**	**12**	**643**	**1026**	**1.87**	**1.07**	**3.23**
(C) other cem AC THA	**5667**	**384**	**24602**	**35114**	**1.56**	**1.41**	**1.72**
CCB full profile	3	0	8	26	0.00	0.00	33.57
CCB low profile	161	12	635	1001	1.89	1.08	3.27
CCE	43	5	169	206	2.95	1.27	6.72

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

Adjusted for mortality and migration. A patient is deemed at risk from day of operation until the day of first revision, until confirmed or projected dead/emigrated from Switzerland, or until end of follow-up. A small fraction of patients was deemed lost to follow-up after assumed time intervals, as they could not be traced by the national statistical office (status unknown in Switzerland) or because of missing or inconsistent information at data entry (subject to ongoing data quality monitoring activities).

3.4.3. 3-5-7-10-year survival overview (any component)

Table 17: Survival of implants at X years (main group)

Years (X)	Cohort	Total	Revised <= X years	Number lost due to death	Number lost to follow-up for other reasons	Number not yet reached X years	Still at risk at X years	Revised > X years
3	1. All implants	164	11	40	1	26	86	1
	2. Implants with 3+ years follow-up	134	10	37	1		86	1
5	1. All implants	164	11	51	3	40	59	1
	2. Implants with 5+ years follow-up	112	10	42	1		59	1
7	1. All implants	164	12	62	3	57	30	0
	2. Implants with 7+ years follow-up	81	9	41	1		30	0
10	1. All implants	164	12	68	3	75	6	0
	2. Implants with 10+ years follow-up	41	8	27			6	0

Table 18: Survival of implants at X years (subgroups)

Years (X)	Group	Total	Revised <= X years	Number lost due to death	Number lost to follow-up for other reasons	Number not yet reached X years	Still at risk at X years	Revised > X years
3	CCB full profile	3	0	2			1	0
	CCB low profile	161	11	38	1	26	85	1
	CCE	43	5	8		11	19	0
5	CCB full profile	3	0	3				0
	CCB low profile	161	11	48	3	40	59	1
	CCE	43	5	9	1	14	14	0
7	CCB full profile	3	0	3				0
	CCB low profile	161	12	59	3	57	30	0
	CCE	43	5	10	1	18	9	0
10	CCB full profile	3	0	3				0
	CCB low profile	161	12	65	3	75	6	0
	CCE	43	5	10	1	24	3	0

Table 19: Revision rate of implants with at least X years follow up (any component)

Years (X)	Group	Number Primaries with X years follow-up	Number Revised at year X	Adjusted component years (time at risk)	*For comparison: Unadjusted component years*	Revisions per 100 component years	95% CI lower bound	95% CI upper bound
3	**CCB cup (THA)**	**134**	**10**	**312**	**378**	**3.20**	**1.75**	**5.80**
	(C) other cem AC THA	**4554**	**245**	**11286**	**13074**	**2.17**	**1.92**	**2.46**
	CCB full profile	3	0	6	9	0.00	0.00	38.68
	CCB low profile	131	10	306	369	3.27	1.78	5.91
	CCE	31	4	78	87	5.10	2.00	12.40
5	**CCB cup (THA)**	**112**	**10**	**385**	**516**	**2.60**	**1.42**	**4.72**
	(C) other cem AC THA	**3663**	**229**	**13842**	**17417**	**1.65**	**1.45**	**1.88**
	CCB full profile	2	0	5	10	0.00	0.00	41.26
	CCB low profile	110	10	379	506	2.64	1.44	4.78
	CCE	25	4	95	111	4.20	1.64	10.30
7	**CCB cup (THA)**	**81**	**9**	**345**	**515**	**2.61**	**1.38**	**4.89**
	(C) other cem AC THA	**2702**	**189**	**13067**	**17876**	**1.45**	**1.26**	**1.67**
	CCB full profile	2	0	5	14	0.00	0.00	41.26
	CCB low profile	79	9	339	501	2.65	1.40	4.97
	CCE	15	3	76	87	3.93	1.35	10.93
10	**CCB cup (THA)**	**41**	**8**	**188**	**341**	**4.24**	**2.17**	**8.15**
	(C) other cem AC THA	**1142**	**98**	**7072**	**10716**	**1.39**	**1.14**	**1.69**
	CCB full profile	1	0	5	10	0.00	0.00	46.00
	CCB low profile	40	8	184	331	4.35	2.22	8.35
	CCE	5	2	33	33	5.99	1.66	19.39

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

Adjusted for mortality and migration. A patient is deemed at risk from day of operation until the day of first revision, until confirmed or projected dead/emigrated from Switzerland, or until end of follow-up. A small fraction of patients was deemed lost to follow-up after assumed time intervals, as they could not be traced by the national statistical office (status unknown in Switzerland) or because of missing or inconsistent information at data entry (subject to ongoing data quality monitoring activities).

Please note that the above table only refers to implants with sufficient observation time at the specified time interval (3-5-7-10 years). The number of revisions and the number of component years also refer to the same time interval (i.e. number of revisions within X years / component years accumulated by year X).

3.4.4. Kaplan-Meier estimates of first revision rates (any component)

Table 20: Kaplan-Meier estimates of first revision rates (any component)

Estimated cumulative revision rates	1-year	2-year	3-year	5-year	7-year	9-year	10-year	12-year
CCB cup (THA)	**5.7 (3.0-10.7)**	**5.7 (3.0-10.7)**	**7.7 (4.3-13.6)**	**7.7 (4.3-13.6)**	**9.5 (5.2-17.1)**	**9.5 (5.2-17.1)**		
(C) other cem AC THA	**4.4 (3.9-5.0)**	**5.4 (4.8-6.0)**	**5.9 (5.3-6.6)**	**7.2 (6.4-7.9)**	**8.0 (7.2-8.9)**	**9.8 (8.7-11.1)**	**10.7 (9.4-12.2)**	**11.8 (9.8-14.2)**
CCB full profile								
CCB low profile	5.8 (3.1-10.9)	5.8 (3.1-10.9)	7.8 (4.3-13.8)	7.8 (4.3-13.8)	9.7 (5.3-17.3)	9.7 (5.3-17.3)		
CCE	7.2 (2.4-20.8)	7.2 (2.4-20.8)	14.5 (6.1-32.2)	14.5 (6.1-32.2)				

Figures are omitted where n at risk <10
(95% confidence intervals)

Figure 7: Kaplan-Meier (any component) I

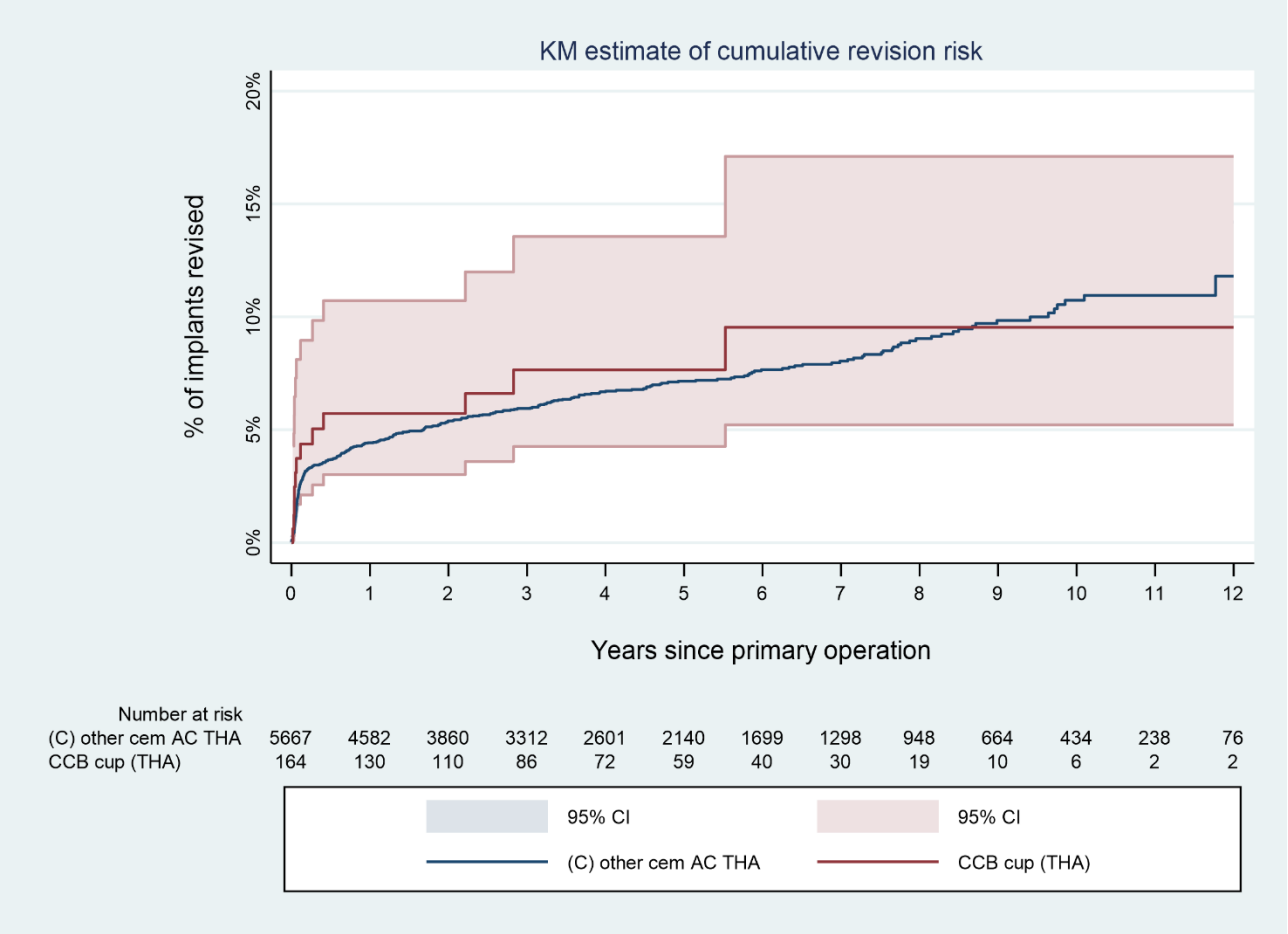
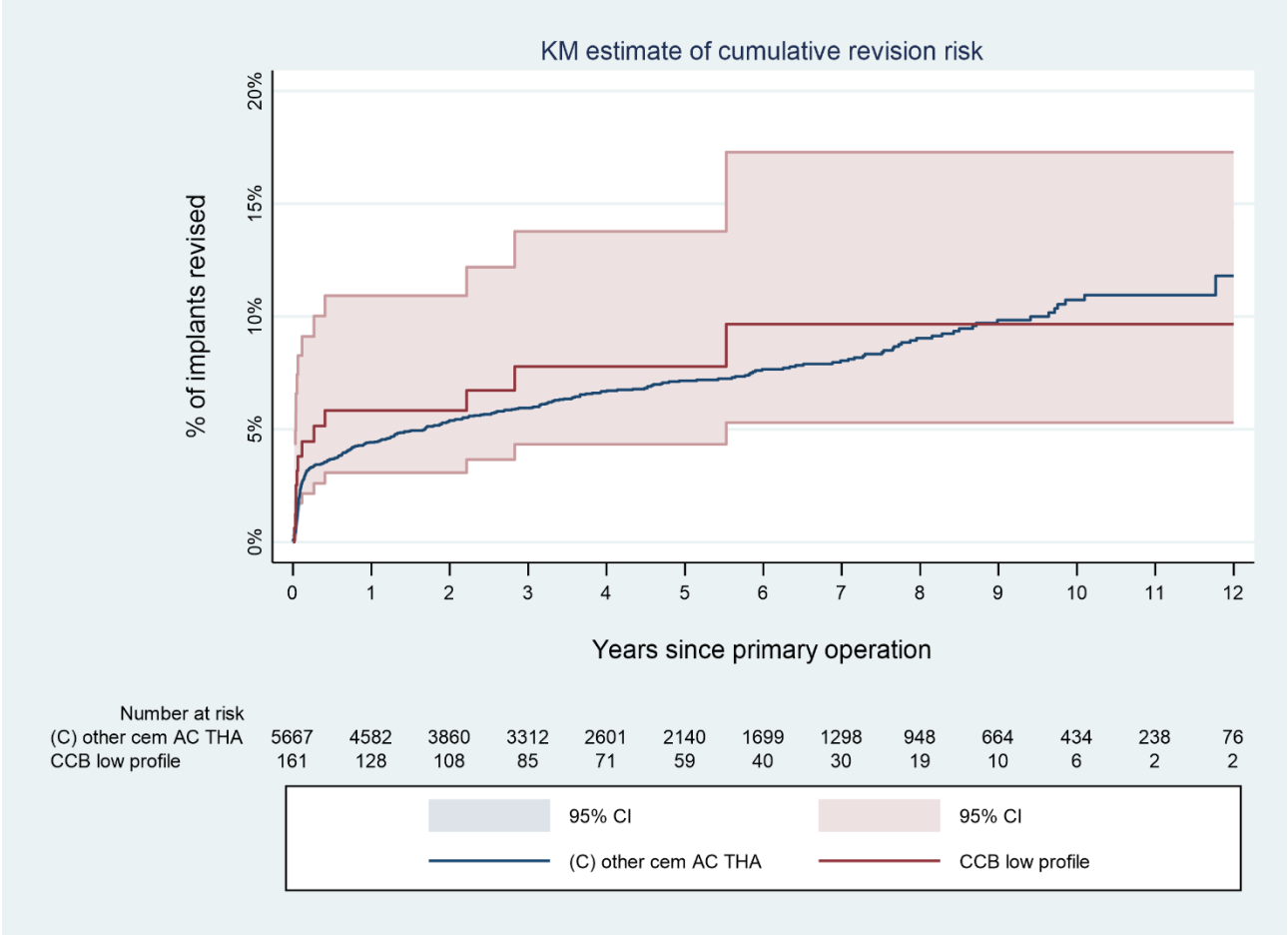


Figure 8: Kaplan-Meier (any component) II



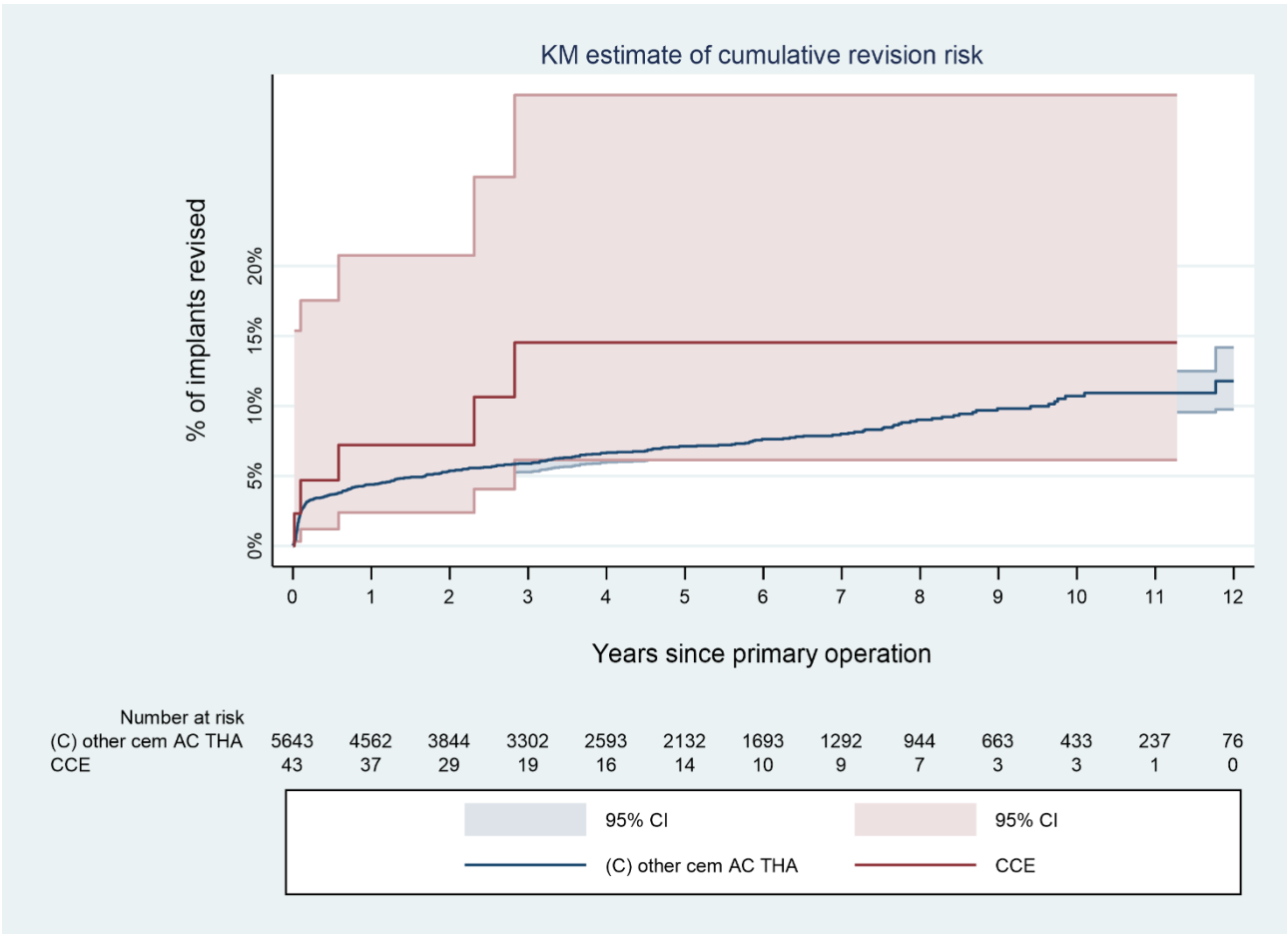


Figure 9: Kaplan-Meier estimates of first revision rates (any component); Comparing more recent main product implants (<3 years) with older main product implants

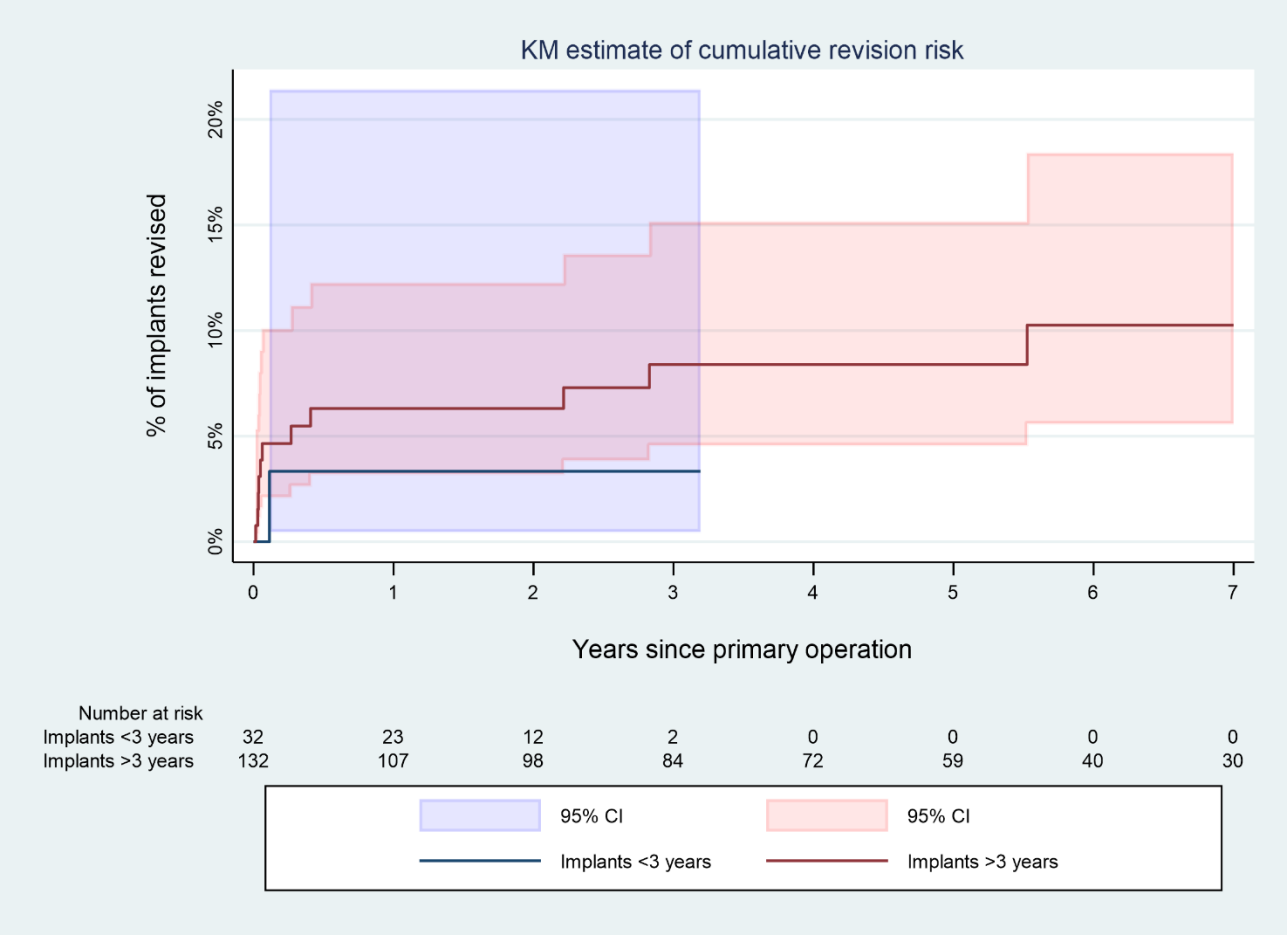


Table 21: Kaplan-Meier estimates of first revision rates (any component); Comparing more recent main product implants (<3 years) with older main product implants

Implants from the past 3 years	1-year	2-year	3-year	5-year	7-year
CCB cup (THA)	**3.3 (0.5-21.4)**	**3.3 (0.5-21.4)**			
(C) other cem AC THA	**5.2 (4.1-6.7)**	**6.6 (5.2-8.4)**	**6.6 (5.2-8.4)**		
CCB full profile					
CCB low profile	3.3 (0.5-21.4)	3.3 (0.5-21.4)			
CCE	7.7 (1.1-43.4)				
Implants that are older than 3 years	**1-year**	**2-year**	**3-year**	**5-year**	**7-year**
CCB cup (THA)	**6.3 (3.2-12.2)**	**6.3 (3.2-12.2)**	**8.4 (4.6-15.1)**	**8.4 (4.6-15.1)**	**10.3 (5.6-18.4)**
(C) other cem AC THA	**4.2 (3.6-4.9)**	**5.1 (4.5-5.8)**	**5.7 (5.0-6.5)**	**6.9 (6.2-7.8)**	**7.8 (7.0-8.8)**
CCB full profile					
CCB low profile	6.5 (3.3-12.5)	6.5 (3.3-12.5)	8.6 (4.7-15.4)	8.6 (4.7-15.4)	10.4 (5.7-18.6)
CCE	6.8 (1.7-24.5)	6.8 (1.7-24.5)	15.3 (6.0-36.1)	15.3 (6.0-36.1)	

Figures are omitted where n at risk <10
(95% confidence intervals)

3.4.5. Cox proportional hazard ratios (any component)

Table 22: Cox proportional hazard ratios (any component)

Group of interest	Comparison group	HR	p (sig)	95% CI lb	95% CI ub	n in model
CCB cup (THA)	**(C) other cem AC THA**	**0.99**	**0.981**	**0.366**	**2.668**	**3172**
CCB low profile	(C) other cem AC THA	1.01	0.983	0.374	2.730	3170
CCE	(C) other cem AC THA	1.69	0.366	0.540	5.314	3099

HR=Hazard ratio; lb=lower bound; ub=upper bound

Cox survival model adjusted for age (continuous), BMI (continuous), sex, Charnley restriction, ASA morbidity.

Most covariates have been available since 2015 and are still optional. Please note the number of observations (complete cases).

Please note that coefficients are provided for indicative purposes and the underlying statistical models do not necessarily meet all formal assumptions.

Statistician's comment: The revision risk of CCB cups and CCE reinforcement rings is compatible to that of other cemented cups used in total hip arthroplasty. The risk-adjusted hazard ratio is almost exactly one, indicating perfect equivalence. THAs with CCE reinforcement rings tended to have slightly higher overall revision risk, but the risk-adjusted hazard ratio of 1.69 is statistically not significant.

3.5. First revision of ACETABULAR component

3.5.1. Clinical characteristics at first ACETABULAR revision

Table 23: Diagnosis at first acetabular revision

Diagnosis at first ACETABULAR revision	CCB cup (THA)		(C) other cem AC THA		CCB low profile	CCE
	n	% of revs	n	% of revs	% of revs	% of revs
Loosening acetabular	2	40.0	107	37.2	40.0	0.0
Loosening femoral	2	40.0	32	11.1	40.0	0.0
Infection	1	20.0	65	22.6	20.0	0.0
Periprosthetic fracture AC	0	0.0	20	6.9	0.0	0.0
Periprosthetic fracture FE	0	0.0	17	5.9	0.0	0.0
Dislocation	0	0.0	68	23.6	0.0	0.0
Implant failure	0	0.0	8	2.8	0.0	0.0
Wear	0	0.0	5	1.7	0.0	0.0
Osteolysis AC	0	0.0	10	3.5	0.0	0.0
Osteolysis FE	0	0.0	0	0.0	0.0	0.0
Acetabular protrusion	0	0.0	7	2.4	0.0	33.3
Trochanter pathology	0	0.0	0	0.0	0.0	0.0
Pain of unclear origin	1	20.0	21	7.3	20.0	0.0
Girdlestone	0	0.0	2	0.7	0.0	0.0
Spacer	0	0.0	2	0.7	0.0	0.0
Ion blood level	0	0.0	0	0.0	0.0	0.0
Squeaking	0	0.0	0	0.0	0.0	0.0
Metalosis	0	0.0	3	1.0	0.0	0.0
Impingement	0	0.0	1	0.3	0.0	0.0
Position / orientation of cup	0	0.0	20	6.9	0.0	0.0
Position / orientation of stem	1	20.0	5	1.7	20.0	0.0
Other	1	20.0	24	8.3	20.0	100.0
Total Diagnoses (n)	**8**		**417**		**8**	**4**
Total Revisions (n)	**5**		**288**		**5**	**3**

NB: We report results for these multiple response categories as supplied by hospitals even if some categories may have been entered erroneously or based on a different understanding of a category's purpose. Significant discrepancies, however, will always be discussed with the registry's data quality and monitoring team.

Others: `"Fannen (lever out)"'

3.5.2. Revision rate per 100 component years at first ACETABULAR revision

Table 24: Overview acetabular revisions

Group	Number Primaries	Number Revised	Adjusted component years (time at risk)	*For comparison: Unadjusted component years*	Revisions per 100 component years	95% CI lower bound	95% CI upper bound
CCB cup (THA)	**164**	**5**	**673**	**1098**	**0.74**	**0.32**	**1.73**
(C) other cem AC THA	**5667**	**288**	**24981**	**35636**	**1.15**	**1.03**	**1.29**
CCB full profile	3	0	8	26	0.00	0.00	33.57
CCB low profile	161	5	665	1072	0.75	0.32	1.75
CCE	43	3	177	214	1.69	0.58	4.86

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

Adjusted for mortality and migration. A patient is deemed at risk from day of operation until the day of first revision, until confirmed or projected dead/emigrated from Switzerland, or until end of follow-up. A small fraction of patients was deemed lost to follow-up after assumed time intervals, as they could not be traced by the national statistical office (status unknown in Switzerland) or because of missing or inconsistent information at data entry (subject to ongoing data quality monitoring activities).

3.5.3. Kaplan-Meier estimates of first revision rates (ACETABULAR component)

Table 25: Kaplan-Meier estimates of first acetabular revision rates

Estimated cumulative revision rates	1-year	2-year	3-year	5-year	7-year	9-year	10-year	12-year
CCB cup (THA)	**2.0 (0.6-6.0)**	**2.0 (0.6-6.0)**	**3.9 (1.6-9.3)**	**3.9 (1.6-9.3)**	**3.9 (1.6-9.3)**	**3.9 (1.6-9.3)**		
(C) other cem AC THA	**3.1 (2.7-3.6)**	**3.8 (3.3-4.4)**	**4.3 (3.8-4.9)**	**5.4 (4.7-6.1)**	**6.1 (5.4-7.0)**	**7.8 (6.8-9.0)**	**8.4 (7.2-9.7)**	**9.4 (7.5-11.8)**
CCB full profile								
CCB low profile	2.0 (0.7-6.2)	2.0 (0.7-6.2)	4.0 (1.6-9.4)	4.0 (1.6-9.4)	4.0 (1.6-9.4)	4.0 (1.6-9.4)		
CCE	2.6 (0.4-16.8)	2.6 (0.4-16.8)	10.0 (3.3-28.3)	10.0 (3.3-28.3)	10.0 (3.3-28.3)			

Figures are omitted where n at risk <10
(95% confidence intervals)

3.6. First revision of FEMORAL component

3.6.1. Clinical characteristics at first FEMORAL revision

Table 26: Diagnosis at first femoral revision

Diagnosis at first FEMORAL revision	CCB cup (THA)		(C) other cem AC THA		CCB low profile	CCE
	n	% of revs	n	% of revs	% of revs	% of revs
Loosening acetabular	1	16.7	24	18.3	16.7	0.0
Loosening femoral	2	33.3	44	33.6	33.3	0.0
Infection	2	33.3	26	19.8	33.3	0.0
Periprosthetic fracture AC	0	0.0	8	6.1	0.0	0.0
Periprosthetic fracture FE	1	16.7	30	22.9	16.7	100.0
Dislocation	1	16.7	21	16.0	16.7	0.0
Implant failure	0	0.0	3	2.3	0.0	0.0
Wear	0	0.0	3	2.3	0.0	0.0
Osteolysis AC	0	0.0	2	1.5	0.0	0.0
Osteolysis FE	0	0.0	1	0.8	0.0	0.0
Acetabular protrusion	0	0.0	2	1.5	0.0	0.0
Trochanter pathology	0	0.0	2	1.5	0.0	0.0
Pain of unclear origin	1	16.7	9	6.9	16.7	0.0
Girdlestone	0	0.0	4	3.1	0.0	0.0
Spacer	0	0.0	2	1.5	0.0	0.0
Ion blood level	0	0.0	0	0.0	0.0	0.0
Squeaking	0	0.0	0	0.0	0.0	0.0
Metalosis	0	0.0	2	1.5	0.0	0.0
Impingement	0	0.0	0	0.0	0.0	0.0
Position / orientation of cup	1	16.7	8	6.1	16.7	0.0
Position / orientation of stem	2	33.3	6	4.6	33.3	0.0
Other	0	0.0	7	5.3	0.0	0.0
Total Diagnoses (n)	**11**		**204**		**11**	**1**
Total Revisions (n)	**6**		**131**		**6**	**1**

NB: We report results for these multiple response categories as supplied by hospitals even if some categories may have been entered erroneously or based on a different understanding of a category's purpose. Significant discrepancies, however, will always be discussed with the registry's data quality and monitoring team.

Others: …

3.6.2. Revision rate per 100 component years at first FEMORAL revision

Table 27: Overview femoral revisions

Group	Number Primaries	Number Revised	Adjusted component years (time at risk)	*For comparison: Unadjusted component years*	Revisions per 100 component years	95% CI lower bound	95% CI upper bound
CCB cup (THA)	**164**	**6**	**668**	**1091**	**0.90**	**0.41**	**1.94**
(C) other cem AC THA	**5667**	**131**	**25627**	**36505**	**0.51**	**0.43**	**0.61**
CCB full profile	3	0	8	26	0.00	0.00	33.57
CCB low profile	161	6	661	1065	0.91	0.42	1.97
CCE	43	1	185	229	0.54	0.10	3.00

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

Adjusted for mortality and migration. A patient is deemed at risk from day of operation until the day of first revision, until confirmed or projected dead/emigrated from Switzerland, or until end of follow-up. A small fraction of patients was deemed lost to follow-up after assumed time intervals, as they could not be traced by the national statistical office (status unknown in Switzerland) or because of missing or inconsistent information at data entry (subject to ongoing data quality monitoring activities).

3.6.3. Kaplan-Meier estimates of first revision rates (FEMORAL component)

Table 28: Kaplan-Meier estimates of first femoral revision rates

Estimated cumulative revision rates	1-year	2-year	3-year	5-year	7-year	9-year	10-year	12-year
CCB cup (THA)	**2.6 (1.0-6.8)**	**2.6 (1.0-6.8)**	**3.5 (1.5-8.3)**	**3.5 (1.5-8.3)**	**5.4 (2.2-12.8)**	**5.4 (2.2-12.8)**		
(C) other cem AC THA	**1.2 (0.9-1.5)**	**1.7 (1.4-2.1)**	**1.9 (1.5-2.3)**	**2.6 (2.1-3.1)**	**3.0 (2.5-3.7)**	**3.3 (2.7-4.1)**	**4.0 (3.2-5.1)**	**4.2 (3.3-5.4)**
CCB full profile								
CCB low profile	2.7 (1.0-7.0)	2.7 (1.0-7.0)	3.6 (1.5-8.4)	3.6 (1.5-8.4)	5.5 (2.3-12.9)	5.5 (2.3-12.9)		
CCE	2.3 (0.3-15.4)	2.3 (0.3-15.4)	2.3 (0.3-15.4)	2.3 (0.3-15.4)	2.3 (0.3-15.4)			

Figures are omitted where n at risk <10
(95% confidence intervals)

PART B: REVISION USES

Please note that this report is organised as follows:

Main group:	CCB cups used in revision procedures * **We call this the "base revision" and all analyses are undertaken as "base revision to first re-revision"**
Main comparison (C):	All comparable revisions using cemented cups
Comparison subgroups:	None
Implant subgroups:	1. CCB low profile (rev) 2. CCE reinforcement ring (rev)

* Registrations are not always complete; individual components of multi-component procedures may be missing and therefore the total number of main product uses may not be the same as the sum of all derived mutually exclusive subgroups.

4. OVERVIEW BASE REVISIONS

Table 29: Number of documented base revisions per year

Year	CCB cup (rev)	(C) other cem AC rev	CCB low profile (rev)	CCE (rev)
2012	9	229	9	0
2013	10	479	10	1
2014	14	554	14	7
2015	10	479	10	1
2016	7	499	7	2
2017	11	497	11	1
2018	7	448	7	8
2019	8	475	8	6
2020	5	402	5	2
2021	1	445	1	0
2022	4	396	4	2
2023	4	412	4	0
2024	4	345	4	1
2025	0	59	0	0
TOTAL	**94**	**5719**	**94**	**31**

Number of implants used in primary procedures (not part of this report): 188 (including CCE uses without CCB)
Number of implants used in hemi-arthroplasties: n/a
Total number of implants used in revisions (note that any discrepancy between this number and the number of base “first” revisions is due to multiple re-revisions in some patients): 125 (including CCE uses without CCB)

Table 30: Number of documented re-revisions per year of base revision

Year	CCB cup (rev)	(C) other cem AC rev	CCB low profile (rev)	CCE (rev)
2012	3	39	3	0
2013	4	92	4	0
2014	3	102	3	2
2015	2	96	2	0
2016	1	86	1	0
2017	1	95	1	0
2018	1	76	1	0
2019	2	86	2	2
2020	0	61	0	0
2021	0	69	0	0
2022	0	57	0	0
2023	2	49	2	0
2024	1	44	1	0
2025	0	0	0	0
TOTAL	**20**	**952**	**20**	**4**

Table 31: Months from base revision to re-revision operation

Group	Number of re-revisions	Min	Median	Max	Mean	StDev
CCB cup (rev)	20	0.0	7	77.3	18.6	25.4
(C) other cem AC rev	952	0.0	7	145.4	18.4	25.2
CCB low profile (rev)	20	0.0	7	77.3	18.6	25.4
CCE (rev)	4	0.6	9	74.4	23.1	34.6

Table 32: Follow-up of implants (base revision) in full cohort in months

Group	Number of implants	Min	Median	Max	Mean	StDev
CCB cup (rev)	94	0.0	45	158.0	51.0	43.3
(C) other cem AC rev	5719	0.0	46	158.2	53.4	42.5
CCB low profile (rev)	94	0.0	45	158.0	51.0	43.3
CCE (rev)	31	0.6	49	129.0	57.7	41.1

Table 33: Some numbers

Group	Number of patients	Male	Female	Implants lost due to death of patient	Implants lost to follow-up for other reasons	Implants still at risk	Surgical units	Surgeons	N surgeons with 50+ implants	N surgeons with 100+ implants
CCB cup (rev)	93	41	52	38	2	34	19	32	0	0
(C) other cem AC rev	5620	2314	3306	1374	238	3155	146	579	21	7
CCB low profile (rev)	93	41	52	38	2	34	19	32	0	0
CCE (rev)	31	12	19	9	6	12	10	17	0	0

Official statistics follow-up until 30.04.2023. Censoring events are reliably projected beyond this point with a simulation model based on patient typologies and observed patterns. Units are the individual orthopaedic or surgical/traumatology departments. Surgical volume refers to main product only.

5. BASE REVISION OPERATION

5.1. Patient characteristics at base revision

Table 34: Sex, age and BMI at base revision

		CCB cup (rev)	(C) other cem AC rev	CCB low profile (rev)	CCE (rev)
Sex	**n**	**%**	**%**	**%**	**%**
Female	52	55.3	58.8	55.3	61.3
Male	42	44.7	41.2	44.7	38.7
Total (n; 100%)	**94**	**100%**	**5719**	**94**	**31**
Age at base revision					
Mean		80.6	74.5	80.6	75.1
StDev		9.3	11.4	9.3	12.9
Median		81	76	81	80
Min		43	18	43	43
Max		98	104	98	95
Total		**94**	**5716**	**94**	**31**
BMI* at base revision					
Mean		25.9	26.3	25.9	26.3
StDev		4.9	5.3	4.9	5.4
Median		26	26	26	26
Min		15	13	15	15
Max		39	66	39	37
Total		**48**	**3689**	**48**	**22**

* Only available since 2015 and still optional. In 2015, roughly a third of entries was missing. However, by 2024 the share of missing values has declined to under 5%.

5.2. Clinical characteristics at base revision

Table 35: Clinical characteristics at base revision

Diagnosis at base revision	CCB cup (rev)		(C) other cem AC rev		CCB low profile (rev)	CCE (rev)
	n	% of revs	n	% of revs	% of revs	% of revs
Loosening acetabular	42	44.7	2097	36.7	44.7	41.9
Loosening femoral	20	21.3	885	15.5	21.3	9.7
Infection	12	12.8	637	11.1	12.8	12.9
Periprosthetic fracture AC	7	7.4	476	8.3	7.4	3.2
Periprosthetic fracture FE	10	10.6	384	6.7	10.6	9.7
Dislocation	4	4.3	1030	18.0	4.3	25.8
Implant failure	2	2.1	172	3.0	2.1	0.0
Wear	9	9.6	635	11.1	9.6	0.0
Osteolysis AC	6	6.4	599	10.5	6.4	0.0
Osteolysis FE	2	2.1	343	6.0	2.1	0.0
Acetabular protrusion	3	3.2	185	3.2	3.2	6.5
Trochanter pathology	1	1.1	69	1.2	1.1	0.0
Pain of unclear origin	8	8.5	460	8.0	8.5	9.7
Girdlestone	2	2.1	201	3.5	2.1	6.5
Spacer	1	1.1	207	3.6	1.1	3.2
Ion blood level	0	0.0	58	1.0	0.0	0.0
Squeaking	0	0.0	22	0.4	0.0	0.0
Metalosis	2	2.1	251	4.4	2.1	0.0
Impingement	1	1.1	39	0.7	1.1	3.2
Position / orientation of cup	1	1.1	322	5.6	1.1	3.2
Position / orientation of stem	0	0.0	83	1.5	0.0	0.0
Other	5	5.3	574	10.0	5.3	0.0
Total Diagnoses (n)	**138**		**9729**		**138**	**42**
Total Base Revisions (n)	**94**		**5719**		**94**	**31**

Others: `"Serom/Hämatom"' `"Verdacht auf Low-Grade Iinfekt"' `"hämatogener Spätinfekt"' `"v2012: ectopic ossification"'

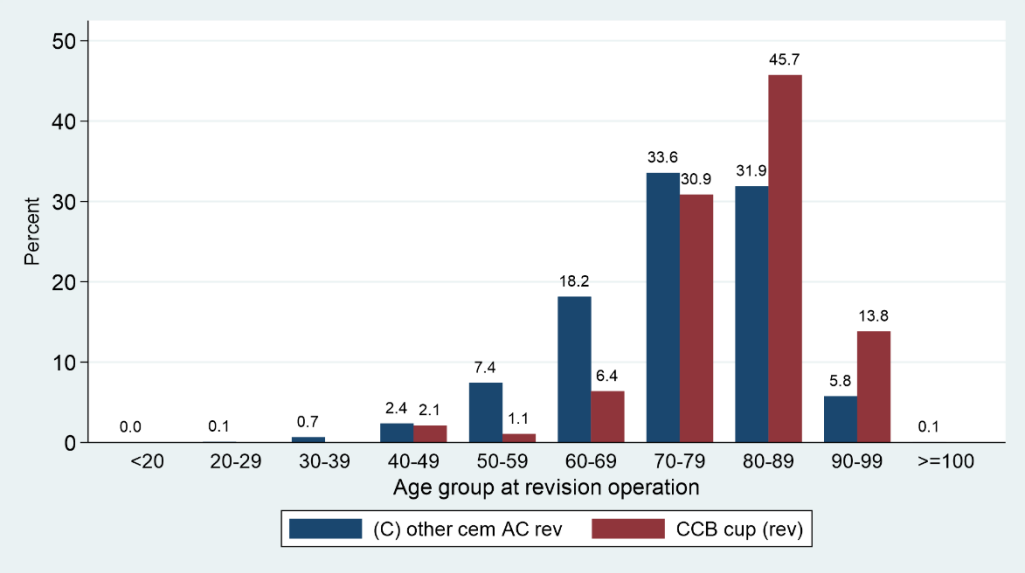
Table 36: Restriction and morbidity at base revision

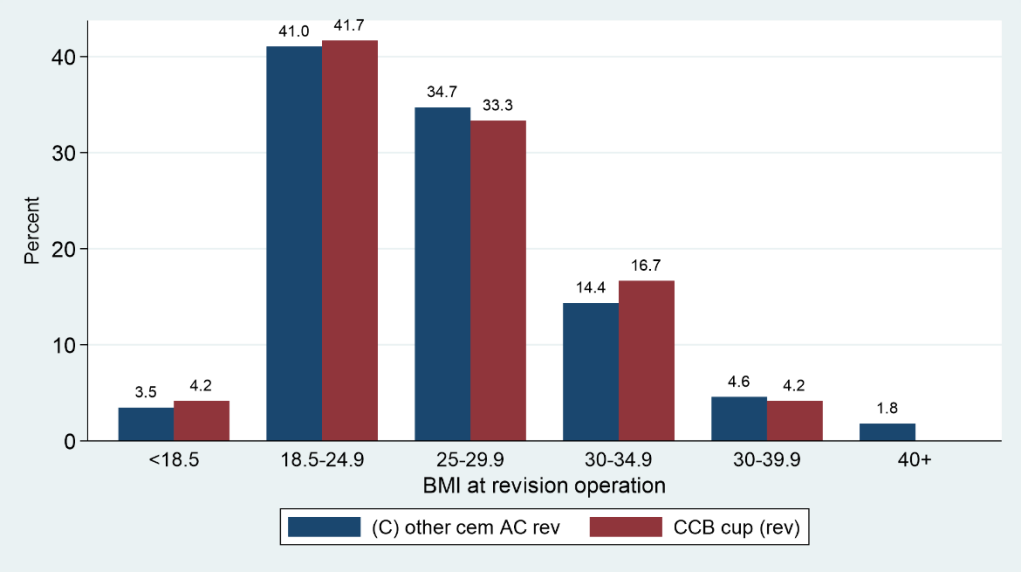
Characteristics at base revision	CCB cup (rev)		(C) other cem AC rev	CCB low profile (rev)	CCE (rev)
Restriction (Charnley)*	**n**	**%**	**%**	**%**	**%**
A unilaterally diseased	19	40.4	42.3	40.4	60.0
B bilaterally diseased	3	6.4	12.7	6.4	10.0
BB + prosthesis[(a)]	24	51.1	39.3	51.1	20.0
C other condition[(b)]	1	2.1	5.7	2.1	10.0
Total (n; 100%)	**47**	**100%**	**3164**	**47**	**20**
Morbidity (ASA)*	**n**	**%**	**%**	**%**	**%**
ASA 1, no disturbance	0	0.0	3.3	0.0	0.0
ASA 2, mild/moderate	16	30.2	37.1	30.2	13.0
ASA 3, severe	35	66.0	54.7	66.0	82.6
ASA 4/5, life-threatening	2	3.8	4.9	3.8	4.3
Total (n; 100%)	**53**	**100%**	**4028**	**53**	**23**

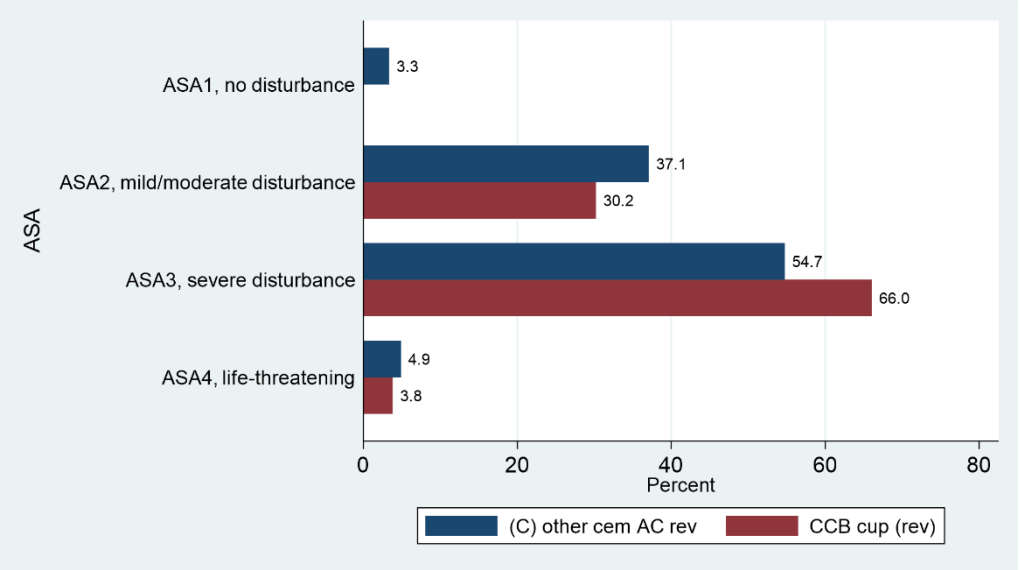
* Only available since 2015 and still optional. Missing ASA values have fallen from 12% in 2015 to approx. 2% in 2022. The corresponding values for Charnley are 33% and 11%.
[(a)] bilaterally diseased and prosthesis present
[(b)] any other condition that affects walking

Distributions (CCB)

Figure 10: age groups, BMI groups and ASA groups at base revision (CCB)

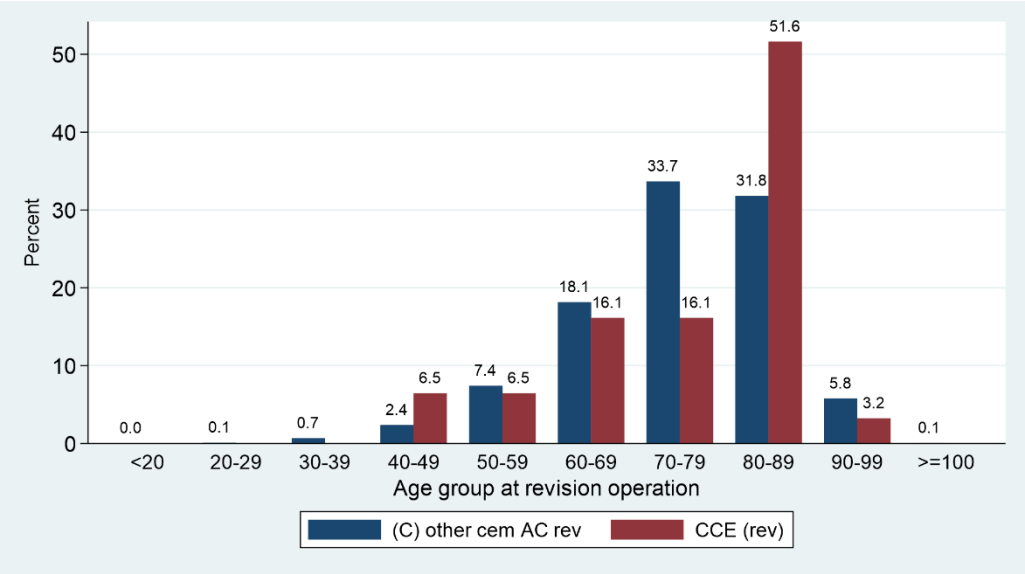


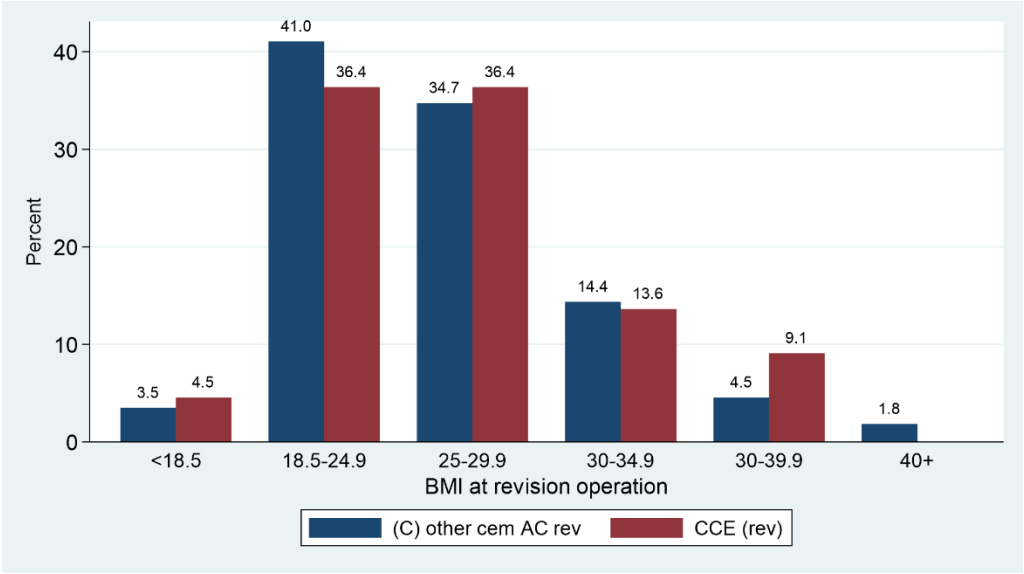


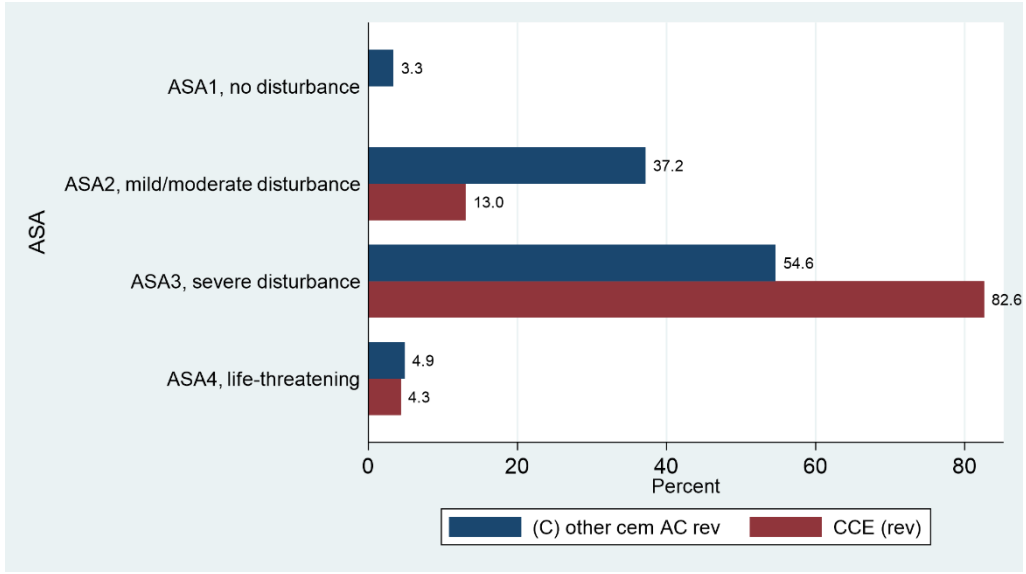


Distributions (CCE)

Figure 11: age groups, BMI groups and ASA groups at base revision (CCE)







5.3. Operation details at base revision

Table 37: Intervention at base revision

	CCB cup (rev)		(C) other cem AC rev	CCB low profile (rev)	CCE (rev)
Intervention at base revision	**n**	**%**	**%**	**%**	**%**
Revision AC + FE	33	35.1	31.4	35.1	19.4
Revision AC	15	16.0	13.7	16.0	9.7
Revision AC + head	23	24.5	34.1	24.5	35.5
Revision FE	1	1.1	0.6	1.1	3.2
Revision FE + inlay	6	6.4	1.8	6.4	0.0
Revision head	0	0.0	0.1	0.0	0.0
Revision inlay	3	3.2	0.9	3.2	3.2
Revision head and inlay	4	4.3	3.9	4.3	6.5
Totalisation of hemi prosthesis	1	1.1	1.5	1.1	6.5
Totalisation of hemi (+stem)	2	2.1	0.9	2.1	0.0
Component removal (spacer)	0	0.0	0.0	0.0	0.0
Reimplantation	4	4.3	8.9	4.3	16.1
Girdlestone	0	0.0	0.0	0.0	0.0
Revision FE, inlay & osteosynth.	0	0.0	0.7	0.0	0.0
Other intervention	2	2.1	1.6	2.1	0.0
Total (n; 100%)	**94**	**100%**	**5719**	**94**	**31**

Table 38: Approach, positioning and component fixation at base revision

	CCB cup (rev)		(C) other cem AC rev	CCB low profile (rev)	CCE (rev)
Approach*	**n**	**%**	**%**	**%**	**%**
Anterior	14	23.0	12.7	23.0	4.3
Anterolateral	10	16.4	10.9	16.4	13.0
Lateral	24	39.3	19.6	39.3	47.8
Posterior	6	9.8	41.6	9.8	26.1
Transfemoral	4	6.6	7.8	6.6	8.7
Trochanter osteotomy**	1	1.6	2.0	1.6	0.0
Other	2	3.3	5.4	3.3	0.0
Total (n; 100%)	**61**	**100%**	**4443**	**61**	**23**
Patient positioning*	**n**	**%**	**%**	**%**	**%**
Supine, normal table	8	13.1	10.1	13.1	26.1
Supine, extension table	13	21.3	11.3	21.3	4.3
Lateral	40	65.6	77.9	65.6	65.2
Other	0	0.0	0.8	0.0	4.3
Total (n; 100%)	**61**	**100%**	**4443**	**61**	**23**
Component fixation	**n**	**%**	**%**	**%**	**%**
All cemented	38	43.7	42.1	43.7	25.0
All uncemented	3	3.4	6.8	3.4	3.6
Hybrid[(a)]	4	4.6	2.5	4.6	0.0
Reverse hybrid[(b)]	13	14.9	22.0	14.9	21.4
Reinforcem. ring, FE cem	14	16.1	8.4	16.1	21.4
Reinforcem. ring, FE uncem	13	14.9	13.9	14.9	25.0
Reinforcem. ring, FE unch.	2	2.3	4.3	2.3	3.6
Total (n; 100%)	**87**	**100%**	**5404**	**87**	**28**

* Only available since 2015
** Only from 2021
[(a)] acetabulum uncemented; femur cemented
[(b)] acetabulum cemented; femur uncemented

Please alert the SIRIS registry if you notice any inconsistencies in the ways in which surgeons and hospitals claim to have used your products. Any inconsistencies will be noted by the SIRIS data quality and monitoring team and, in case of systematic data entry errors, reported to the hospitals where the errors originated.

Please note that there is considerable confusion at the data entry stage regarding certain features of implants including component fixation. The implants included in this analysis are all intended for either cemented or uncemented use. We cannot determine whether the reported other uses are data entry errors – in this case occurring probably at random – or whether they represent genuine off-label uses of the products.

Table 39: Technology and additional interventions at base revision (multiple choice)

	CCB cup (rev)		(C) other cem AC rev	CCB low profile (rev)	CCE (rev)
Technology**	**n**	**%**	**%**	**%**	**%**
None	**4**	**36.4**	**54.0**	**36.4**	**25.0**
Computer navigation cup	0	0.0	0.2	0.0	0.0
Computer navigation stem	0	0.0	0.1	0.0	0.0
Robotic-assisted[(a)]	0	0.0	0.1	0.0	0.0
Patient specific cutting blocks	0	0.0	0.2	0.0	0.0
Intraop. fluoroscopy / radiogr.	7	63.6	45.8	63.6	75.0
Total primary cases (n)	**11**		**1536**	**11**	**4**
Additional interventions*	**n**	**%**	**%**	**%**	**%**
None	**35**	**57.4**	**51.2**	**57.4**	**56.5**
Acetabular roof plasty	7	11.5	11.7	11.5	17.4
Central osseous reconstr.	9	14.8	18.1	14.8	13.0
Proximal femur osteotomy	3	4.9	3.7	4.9	4.3
ORIF / CRIF acetabulum**	0	0.0	9.2	0.0	0.0
Cerclage femur**	1	7.7	19.7	7.7	0.0
ORIF / CRIF femur**	1	7.7	7.6	7.7	0.0
Augments**	0	0.0	3.4	0.0	0.0
Other	10	16.4	16.3	16.4	17.4
Total primary cases (n)	**60**		**4383**	**60**	**23**

* Only available since 2015
** Only available since 2021
[(a)] image guided / CT based

6. HIP RE-REVISION

6.1. Patient characteristics at first re-revision

Table 40: Sex, age and BMI at first re-revision

		CCB cup (rev)	(C) other cem AC rev	CCB low profile (rev)	CCE (rev)
Sex	**n**	**%**	**%**	**%**	**%**
Female	8	40.0	61.1	40.0	75.0
Male	12	60.0	38.9	60.0	25.0
Total (n; 100%)	**20**	**100%**	**952**	**20**	**4**
Age at first re-revision					
Mean		75.7	72.8	75.7	56.8
StDev		12.7	11.8	12.7	13.9
Median		76.5	75	76.5	52
Min		45	33	45	46
Max		100	100	100	77
Total		**20**	**952**	**20**	**4**
BMI* at first re-revision					
Mean		26.2	27.0	26.2	23.0
StDev		6.7	6.2	6.7	5.3
Median		24	26	24	25
Min		17	16	17	17
Max		39	89	39	27
Total		**12**	**717**	**12**	**3**

* Only available since 2015 and still optional. In 2015, roughly a third of entries was missing. However, by 2022 the share of missing values has declined to under 10%.

6.2. Intervention details at first re-revision

Table 41: Intervention at first re-revision

	CCB cup (rev)		(C) other cem AC rev	CCB low profile (rev)	CCE (rev)
Intervention at first re-revision (any component)	**n**	**%**	**%**	**%**	**%**
Revision AC + FE[(f)(a)]	2	10.0	14.1	10.0	25.0
Revision AC[(a)]	0	0.0	9.2	0.0	0.0
Revision AC + head[(a)(h)]	3	15.0	25.4	15.0	0.0
Revision FE[(f)]	2	10.0	7.5	10.0	0.0
Revision FE + inlay[(f)(a)]	0	0.0	4.1	0.0	0.0
Revision head[(h)]	7	35.0	8.7	35.0	25.0
Revision inlay[(a)]	0	0.0	1.3	0.0	0.0
Revision head and inlay[(a)(h)]	3	15.0	15.8	15.0	50.0
Totalisation of hemi prosthesis	0	0.0	0.1	0.0	0.0
Totalisation of hemi (+stem)	0	0.0	0.2	0.0	0.0
Component removal (spacer)	0	0.0	5.0	0.0	0.0
Reimplantation*	2	10.0	2.6	10.0	0.0
Girdlestone	0	0.0	2.7	0.0	0.0
Revision FE, inlay & osteosynth.[(f)(a)]	0	0.0	1.3	0.0	0.0
Other intervention**	1	5.0	2.0	5.0	0.0
Total (n; 100%)	**20**	**100%**	**952**	**20**	**4**

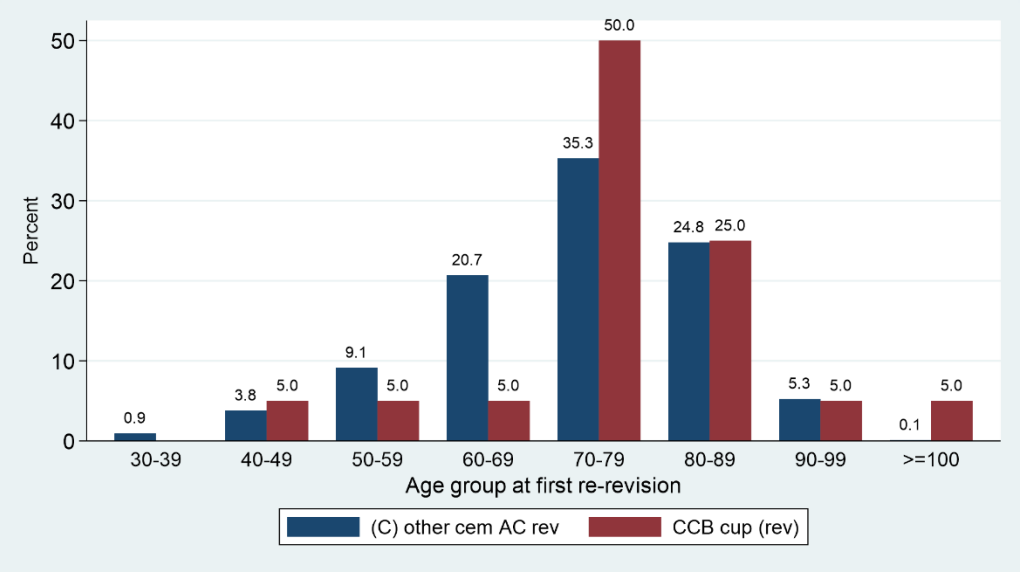
[(f)] We recognise these revision procedures as FEMORAL revisions (FEMORAL component unambiguously linked to reason for revision) and show them separately below.
[(a)] We recognise these revision procedures as ACETABULAR revisions (ACETABULAR component unambiguously linked to reason for revision)
[(h)] We recognise these revision procedures as HEAD revisions (HEAD component unambiguously linked to reason for revision; the femoral stem remains in situ).
* after spacer or Girdlestone
** assigned as applicable
NB: separate revision categories for multiple components (FE + AC) are not shown routinely for re-revisions but can be added to the report on request.

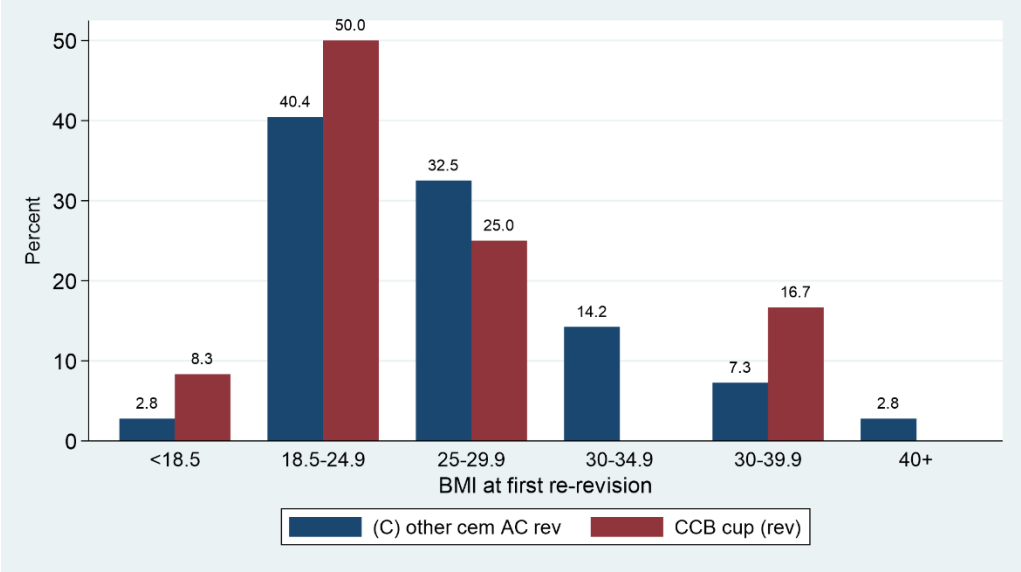
Others: `"'Tausch proximaler Teil"'

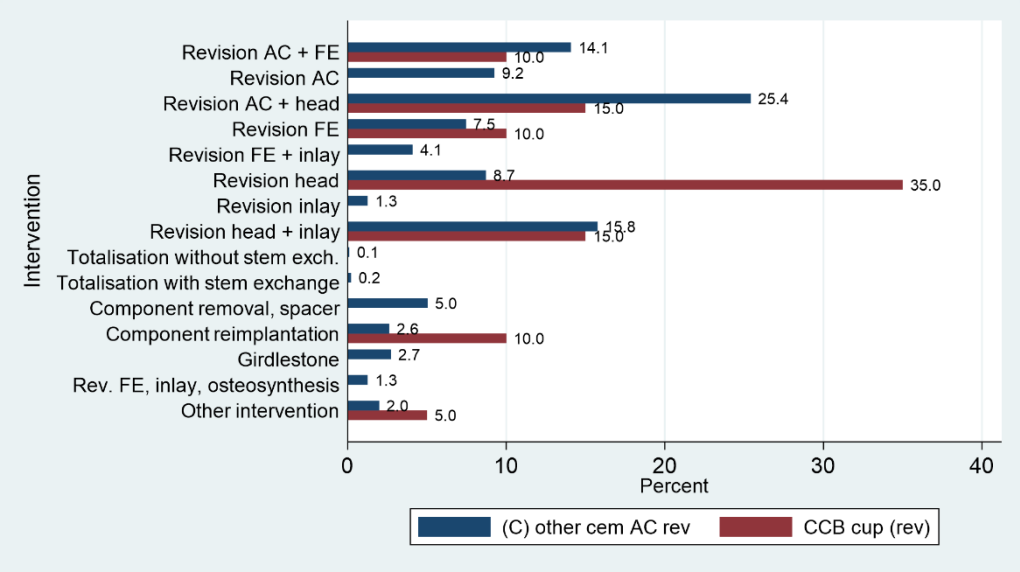
Please note that there is considerable confusion at the data entry stage regarding certain features of implants. For example, totalisations as revision procedures for THAs are obvious data entry errors, as are AC-related revisions for hemi-arthroplasties (the latter being probably totalisations). The previous versions of the SIRIS proforma led to obvious confusion regarding the meaning of revision categories. SIRIS version 2021 features a number of changes that eliminate the ability to enter such inconsistent responses.

Distributions (CCB)

Figure 12: age groups, BMI groups and interventions at first re-revision (CCB)

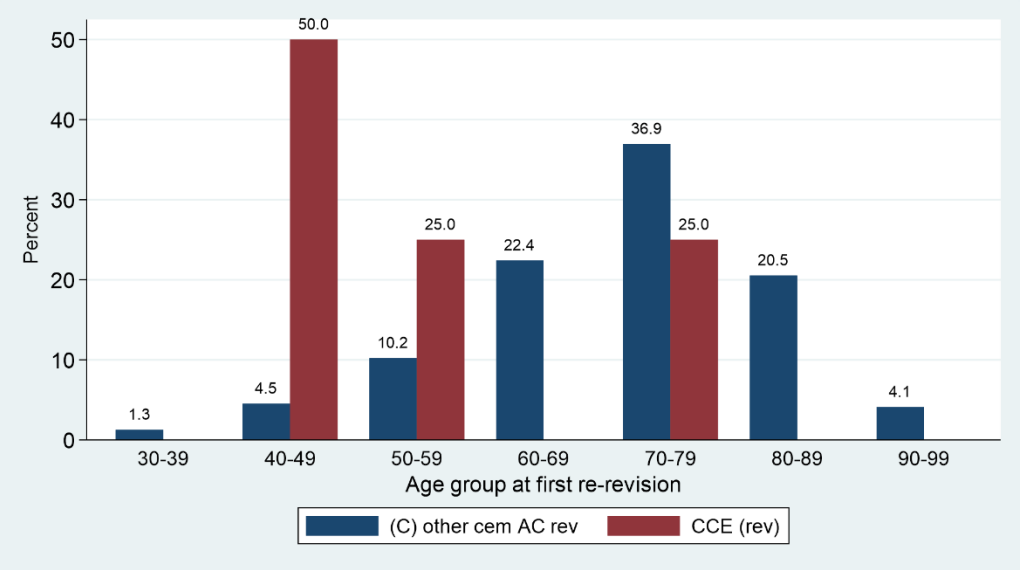


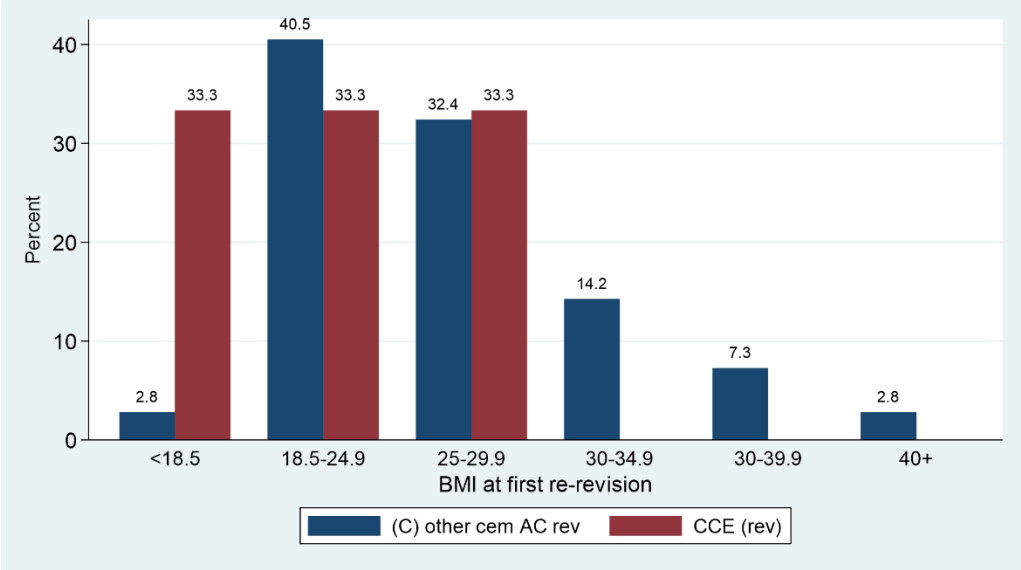


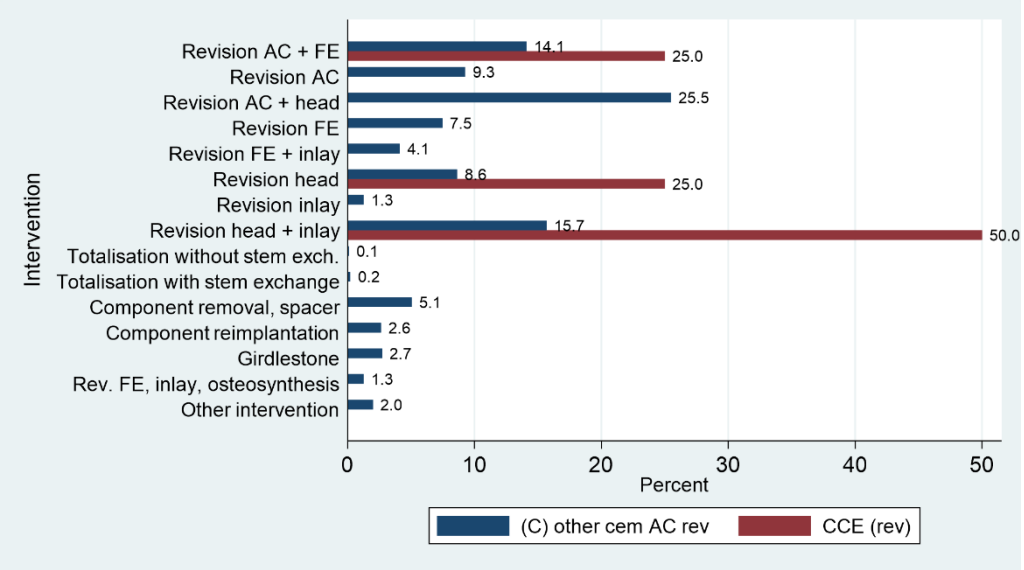


Distributions (CCE)

Figure 13: age groups, BMI groups and interventions at first re-revision (CCE)







6.3. Overview subsequent revisions (re-revisions)

Table 42: Overview re-revisions

Number of subsequent revisions on record (i.e. after first re-revision)	CCB cup (rev)		(C) other cem AC rev	
	n	% of first re-revisions	n	% of first re-revisions
1 subsequent revision	5	25.0	222	23.3
2	2	10.0	96	10.1
3	0	0.0	41	4.3
4	0	0.0	21	2.2
5 or more subsequent revisions	0	0.0	26	2.7
Total (n joints re-revised)	**7**	**35.0**	**406**	**42.6**

Interventions at subsequent revisions (i.e. after first re-revision)	CCB cup (rev)		(C) other cem AC rev	
	n	%	n	%
Revision AC + FE	1	11.1	94	12.1
Revision AC	0	0.0	49	6.3
Revision AC + head	3	33.3	128	16.4
Revision FE	1	11.1	33	4.2
Revision FE + inlay	0	0.0	20	2.6
Revision head	3	33.3	49	6.3
Revision inlay	0	0.0	11	1.4
Revision head and inlay	1	11.1	126	16.2
Totalisation of hemi prosthesis	0	0.0	0	0.0
Totalisation of hemi (+stem)	0	0.0	0	0.0
Component removal (spacer)	0	0.0	95	12.2
Reimplantation*	0	0.0	104	13.4
Girdlestone	0	0.0	42	5.4
Revision FE, inlay & osteosynth.	0	0.0	3	0.4
Other intervention	0	0.0	25	3.2
Total (n revisions)	**9**	**100%**	**779**	**100%**

* after spacer or Girdlestone

Others: …

6.4. First re-revision of any component

6.4.1. Clinical characteristics at first re-revision (any component)

Table 43: Diagnosis at first re-revision

Diagnosis at first re-revision	CCB cup (rev)		(C) other cem AC rev		CCB low profile (rev)	CCE (rev)
	n	% of revs	n	% of revs	% of revs	% of revs
Loosening acetabular	5	25.0	274	28.8	25.0	25.0
Loosening femoral	4	20.0	120	12.6	20.0	25.0
Infection	8	40.0	243	25.5	40.0	50.0
Periprosthetic fracture AC	0	0.0	31	3.3	0.0	0.0
Periprosthetic fracture FE	1	5.0	57	6.0	5.0	0.0
Dislocation	5	25.0	215	22.6	25.0	0.0
Implant failure	0	0.0	27	2.8	0.0	0.0
Wear	1	5.0	26	2.7	5.0	25.0
Osteolysis AC	1	5.0	29	3.0	5.0	25.0
Osteolysis FE	2	10.0	21	2.2	10.0	25.0
Acetabular protrusion	0	0.0	12	1.3	0.0	0.0
Trochanter pathology	0	0.0	13	1.4	0.0	0.0
Pain of unclear origin	1	5.0	69	7.2	5.0	0.0
Girdlestone	0	0.0	18	1.9	0.0	0.0
Spacer	0	0.0	6	0.6	0.0	0.0
Ion blood level	0	0.0	2	0.2	0.0	0.0
Squeaking	0	0.0	3	0.3	0.0	0.0
Metalosis	1	5.0	24	2.5	5.0	0.0
Impingement	0	0.0	5	0.5	0.0	0.0
Position / orientation of cup	0	0.0	37	3.9	0.0	0.0
Position / orientation of stem	0	0.0	21	2.2	0.0	0.0
Other	3	15.0	102	10.7	15.0	0.0
Total Diagnoses (n)	**32**		**1355**		**32**	**7**
Total Re-Revisions (n)	**20**		**952**		**20**	**4**

NB: We report results for these multiple response categories as supplied by hospitals even if some categories may have been entered erroneously or based on a different understanding of a category's purpose. Significant discrepancies, however, will always be discussed with the registry's data quality and monitoring team.

Other: `"Inégalité de longueur"' `"Nachsinken Revitanschaft"' `"schmerzen"'

Table 44: Cumulative incidence of different indications at first re-revision (any component)

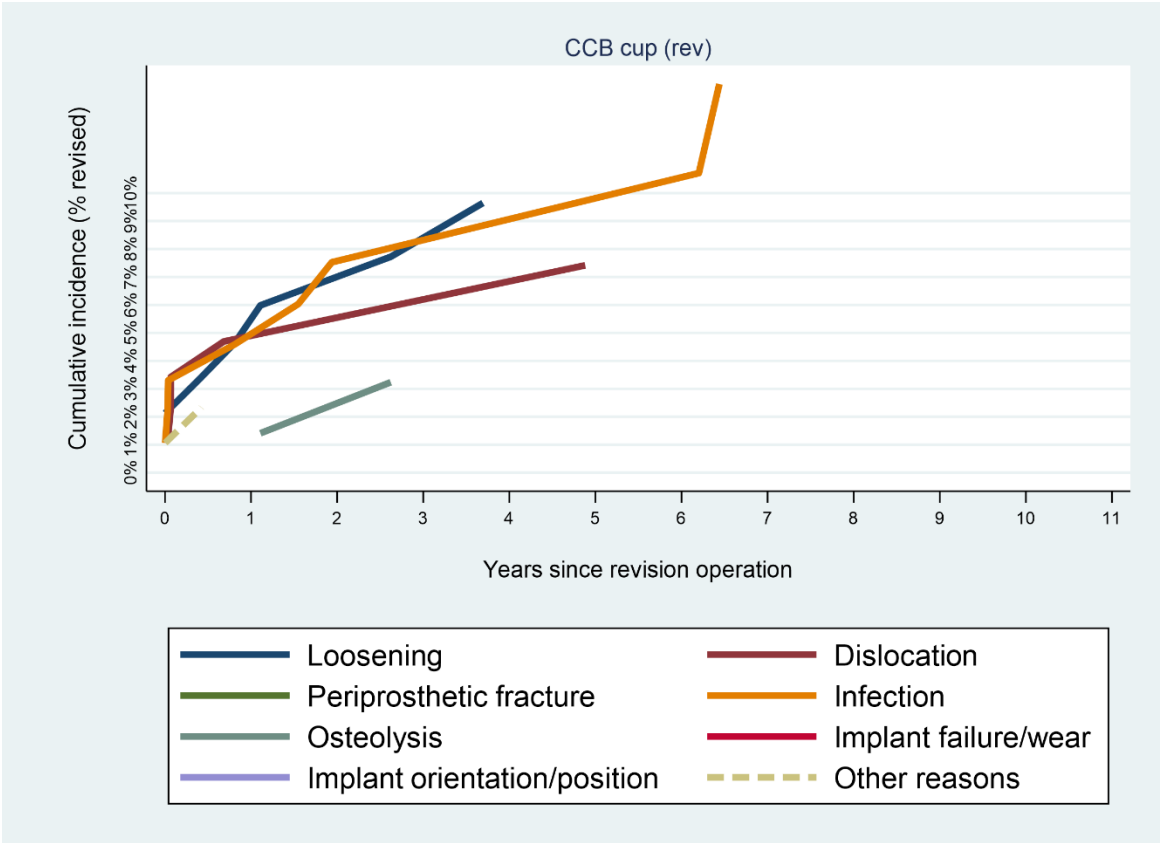
CCB cup (rev)	1-year	2-year	3-year	5-year	7-year	9-year	10-year	11-year
Loosening	4.6 (1.8-11.9)	6.0 (2.5-13.8)	7.7 (3.5-16.6)	9.6 (4.6-19.6)	9.6 (4.6-19.6)	9.6 (4.6-19.6)		
Dislocation	4.7 (1.8-12.0)	4.7 (1.8-12.0)	4.7 (1.8-12.0)	7.4 (2.9-18.2)	7.4 (2.9-18.2)	7.4 (2.9-18.2)		
Periprosthetic fracture	0.0 (.-.)	0.0 (.-.)	1.9 (0.3-12.4)	1.9 (0.3-12.4)	1.9 (0.3-12.4)	1.9 (0.3-12.4)		
Infection	4.6 (1.7-11.8)	7.5 (3.4-16.1)	7.5 (3.4-16.1)	7.5 (3.4-16.1)	13.9 (6.6-28.0)	13.9 (6.6-28.0)		
Osteolysis	0.0 (.-.)	1.4 (0.2-9.6)	3.2 (0.8-12.5)	3.2 (0.8-12.5)	3.2 (0.8-12.5)	3.2 (0.8-12.5)		
Implant failure / wear	1.1 (0.2-7.3)	1.1 (0.2-7.3)	1.1 (0.2-7.3)	1.1 (0.2-7.3)	1.1 (0.2-7.3)	1.1 (0.2-7.3)		
Implant orientation / position	0.0 (.-.)	0.0 (.-.)	0.0 (.-.)	0.0 (.-.)	0.0 (.-.)	0.0 (.-.)		
Other reasons	2.3 (0.6-9.1)	2.3 (0.6-9.1)	2.3 (0.6-9.1)	2.3 (0.6-9.1)	2.3 (0.6-9.1)	2.3 (0.6-9.1)		
(C) other cem AC rev	**1-year**	**2-year**	**3-year**	**5-year**	**7-year**	**9-year**	**10-year**	**11-year**
Loosening	2.5 (2.1-2.9)	4.1 (3.5-4.7)	5.5 (4.9-6.2)	7.4 (6.6-8.3)	8.9 (8.0-9.9)	10.4 (9.3-11.7)	10.7 (9.5-12.0)	11.0 (9.8-12.4)
Dislocation	3.4 (2.9-3.9)	3.8 (3.3-4.3)	3.9 (3.4-4.5)	4.2 (3.7-4.8)	4.2 (3.7-4.9)	4.5 (3.9-5.1)	4.5 (3.9-5.1)	4.5 (3.9-5.1)
Periprosthetic fracture	0.9 (0.7-1.2)	1.2 (0.9-1.5)	1.4 (1.1-1.7)	1.7 (1.4-2.2)	2.0 (1.6-2.5)	2.3 (1.8-3.0)	2.5 (1.9-3.2)	2.5 (1.9-3.2)
Infection	3.1 (2.6-3.6)	3.7 (3.3-4.3)	4.3 (3.7-4.9)	4.7 (4.2-5.4)	5.1 (4.5-5.9)	5.7 (5.0-6.6)	5.7 (5.0-6.6)	5.7 (5.0-6.6)
Osteolysis	0.2 (0.1-0.4)	0.4 (0.3-0.7)	0.7 (0.5-1.0)	1.0 (0.7-1.3)	1.2 (0.9-1.7)	1.6 (1.2-2.3)	1.8 (1.3-2.5)	1.8 (1.3-2.5)
Implant failure / wear	0.4 (0.3-0.6)	0.7 (0.5-1.0)	0.9 (0.6-1.2)	1.1 (0.8-1.5)	1.2 (0.9-1.6)	1.6 (1.2-2.2)	1.6 (1.2-2.2)	1.6 (1.2-2.2)
Implant orientation / position	0.5 (0.3-0.7)	0.7 (0.5-1.0)	0.9 (0.6-1.2)	1.1 (0.9-1.5)	1.1 (0.9-1.5)	1.4 (1.0-1.9)	1.4 (1.0-1.9)	1.4 (1.0-1.9)
Other reasons	1.3 (1.0-1.6)	1.6 (1.3-2.0)	1.8 (1.5-2.2)	1.9 (1.5-2.3)	2.0 (1.6-2.5)	2.0 (1.6-2.5)	2.1 (1.7-2.7)	2.1 (1.7-2.7)

Figures are omitted where n at risk <10
Reasons may refer to femoral or acetabular component
(95% confidence intervals)

Please note that these are Kaplan-Meier estimates of selected generic reasons for first revisions that SIRIS has recorded since its inception. The individual revision rates cannot be added up to the total all components revision rate because revisions can have multiple reasons.

Interpretation: A line starts when an indication was recorded for the first time and it ends when it was recorded for the last time as an underlying reason for first re-revision (please note that single re-revisions of a type are not shown).

Figure 14: Cumulative incidence of different indications at first re-revision (any component)



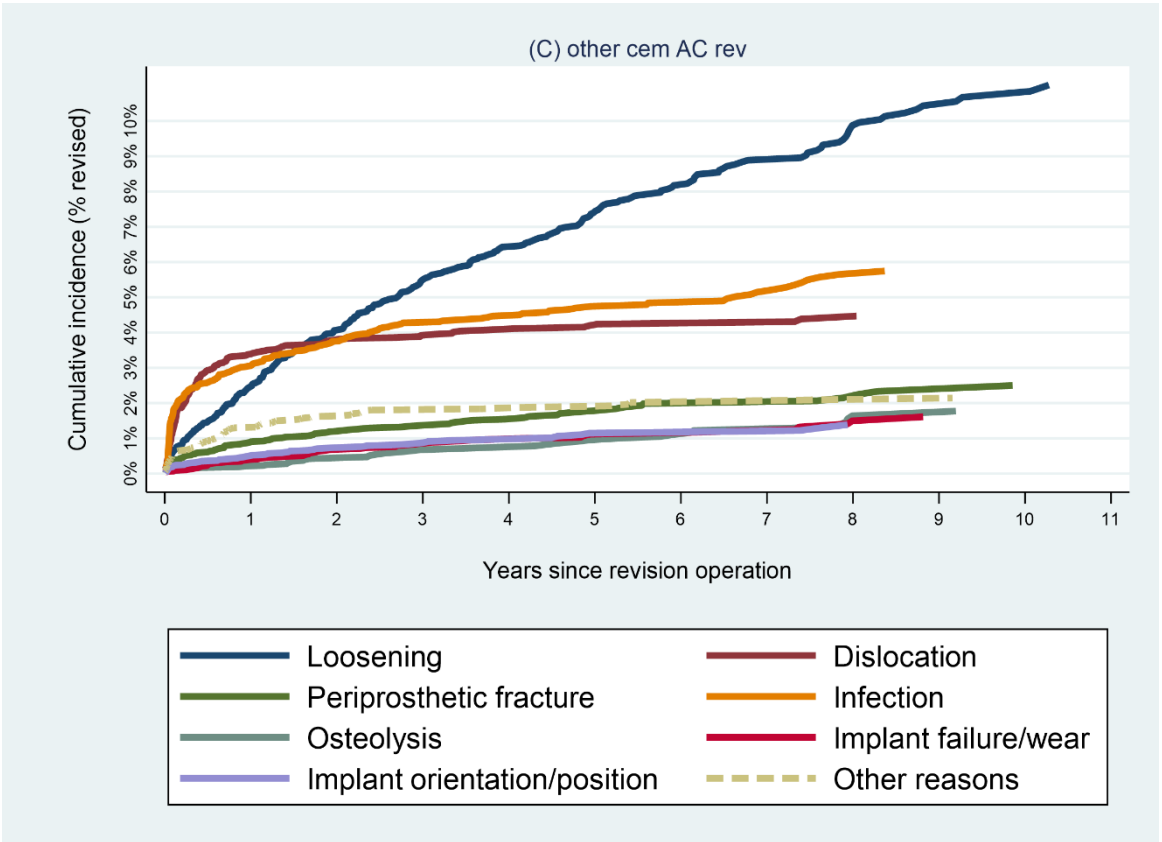
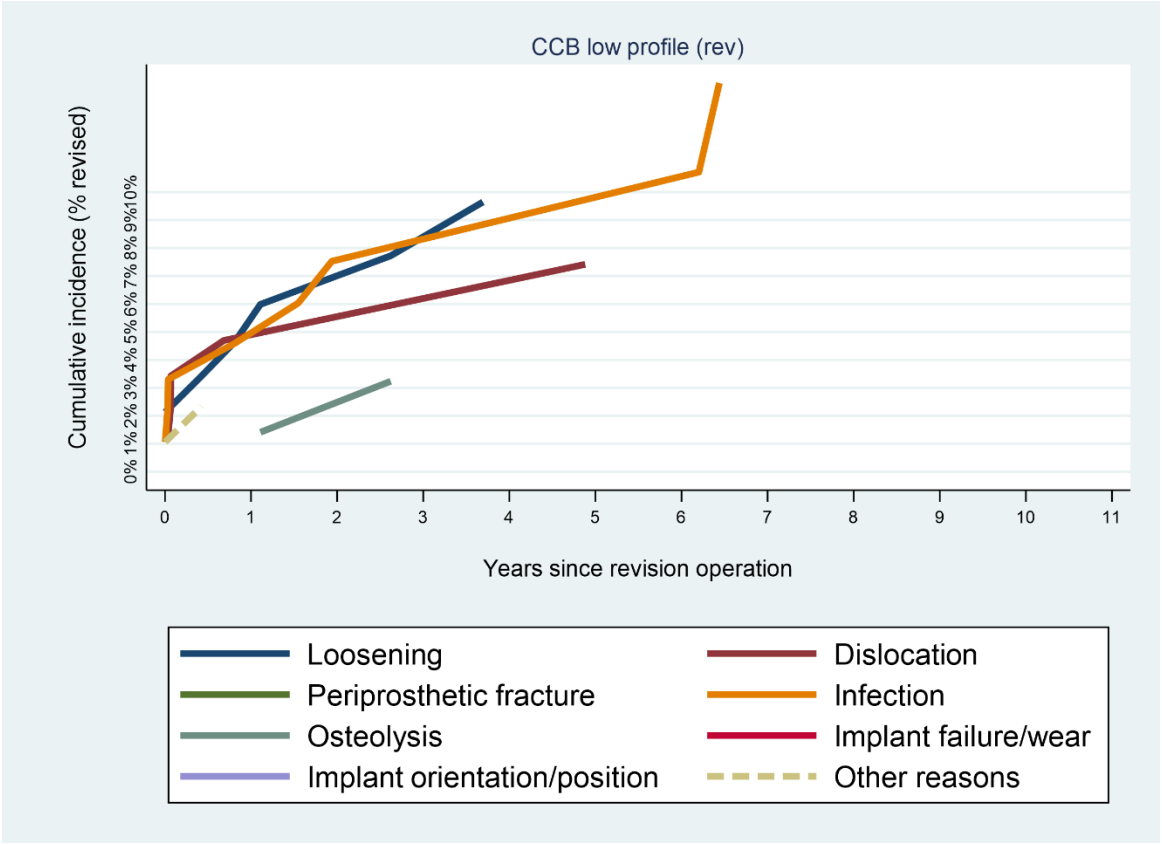
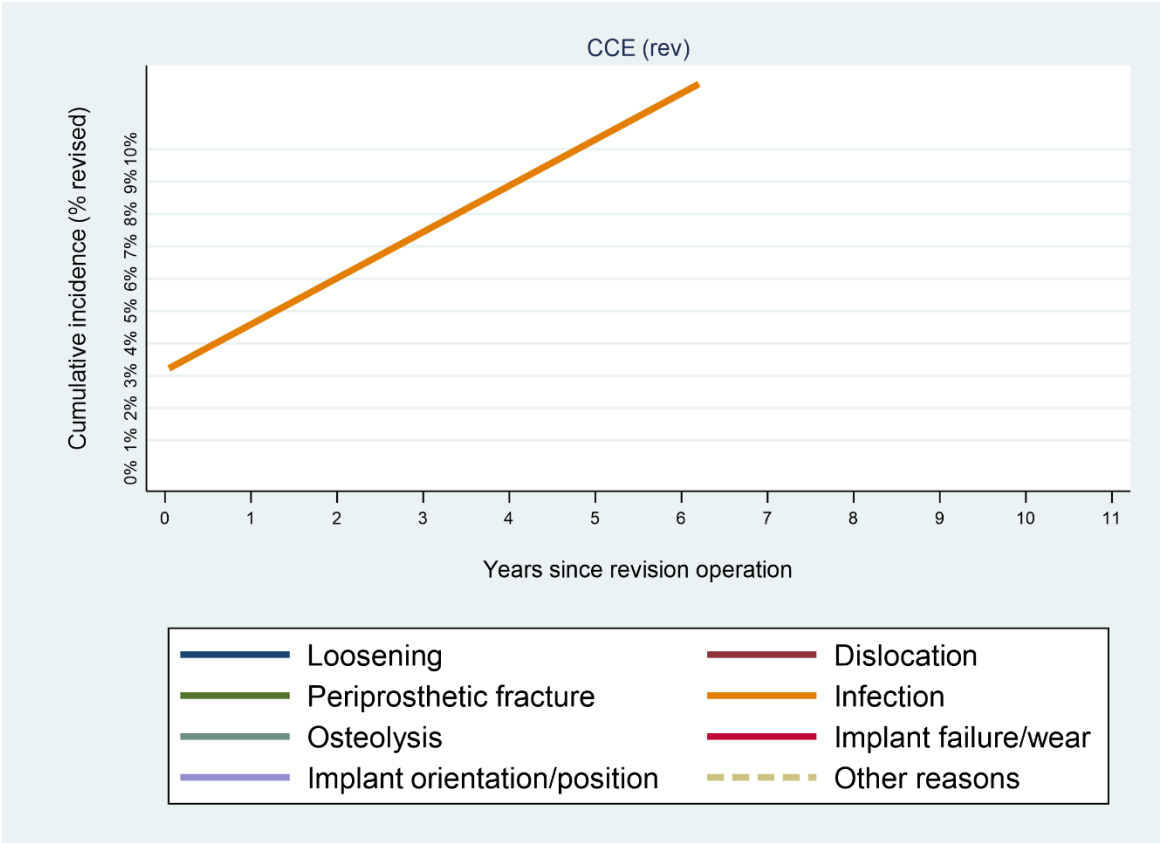


Figure 15: Cumulative incidence of different indications: relevant subgroups I





6.4.2. Re-Revision rate per 100 component years at first re-revision (any component)

Table 45: Overview re-revisions

Group	Number base revisions	Number re-revised	Adjusted component years (time at risk)	*For comparison: Unadjusted component years*	Re-Revisions per 100 component years	95% CI lower bound	95% CI upper bound
CCB cup (rev)	**94**	**20**	**400**	**620**	**5.01**	**3.26**	**7.60**
(C) other cem AC rev	**5719**	**952**	**25429**	**33311**	**3.74**	**3.52**	**3.98**
CCB low profile (rev)	94	20	400	620	5.01	3.26	7.60
CCE (rev)	31	4	149	199	2.68	1.05	6.69

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

Adjusted for mortality and migration. A patient is deemed at risk from day of operation until the day of first revision, until confirmed or projected dead/emigrated from Switzerland, or until end of follow-up. A small fraction of patients was deemed lost to follow-up after assumed time intervals, as they could not be traced by the national statistical office (status unknown in Switzerland) or because of missing or inconsistent information at data entry (subject to ongoing data quality monitoring activities).

6.4.3. Kaplan-Meier estimates of first re-revision rates (any component)

Table 46: Kaplan-Meier estimates of first revision rates (any component)

Estimated cumulative re-revision rates	1-year	2-year	3-year	5-year	7-year	9-year	10-year	12-year
CCB cup (rev)	**13.2 (7.7-22.2)**	**17.1 (10.6-26.8)**	**18.6 (11.8-28.7)**	**22.6 (14.6-34.0)**	**27.9 (18.3-41.3)**	**27.9 (18.3-41.3)**		
(C) other cem AC rev	**10.3 (9.5-11.2)**	**13.2 (12.3-14.1)**	**15.2 (14.2-16.2)**	**17.8 (16.7-18.9)**	**19.6 (18.4-20.9)**	**21.6 (20.3-23.0)**	**22.1 (20.7-23.5)**	**22.7 (21.1-24.3)**
CCB low profile (rev)	13.2 (7.7-22.2)	17.1 (10.6-26.8)	18.6 (11.8-28.7)	22.6 (14.6-34.0)	27.9 (18.3-41.3)	27.9 (18.3-41.3)		
CCE (rev)	6.9 (1.8-25.1)	10.7 (3.6-29.6)	10.7 (3.6-29.6)	10.7 (3.6-29.6)				

Figures are omitted where n at risk <10
(95% confidence intervals)

Figure 16: Kaplan-Meier (any component) I

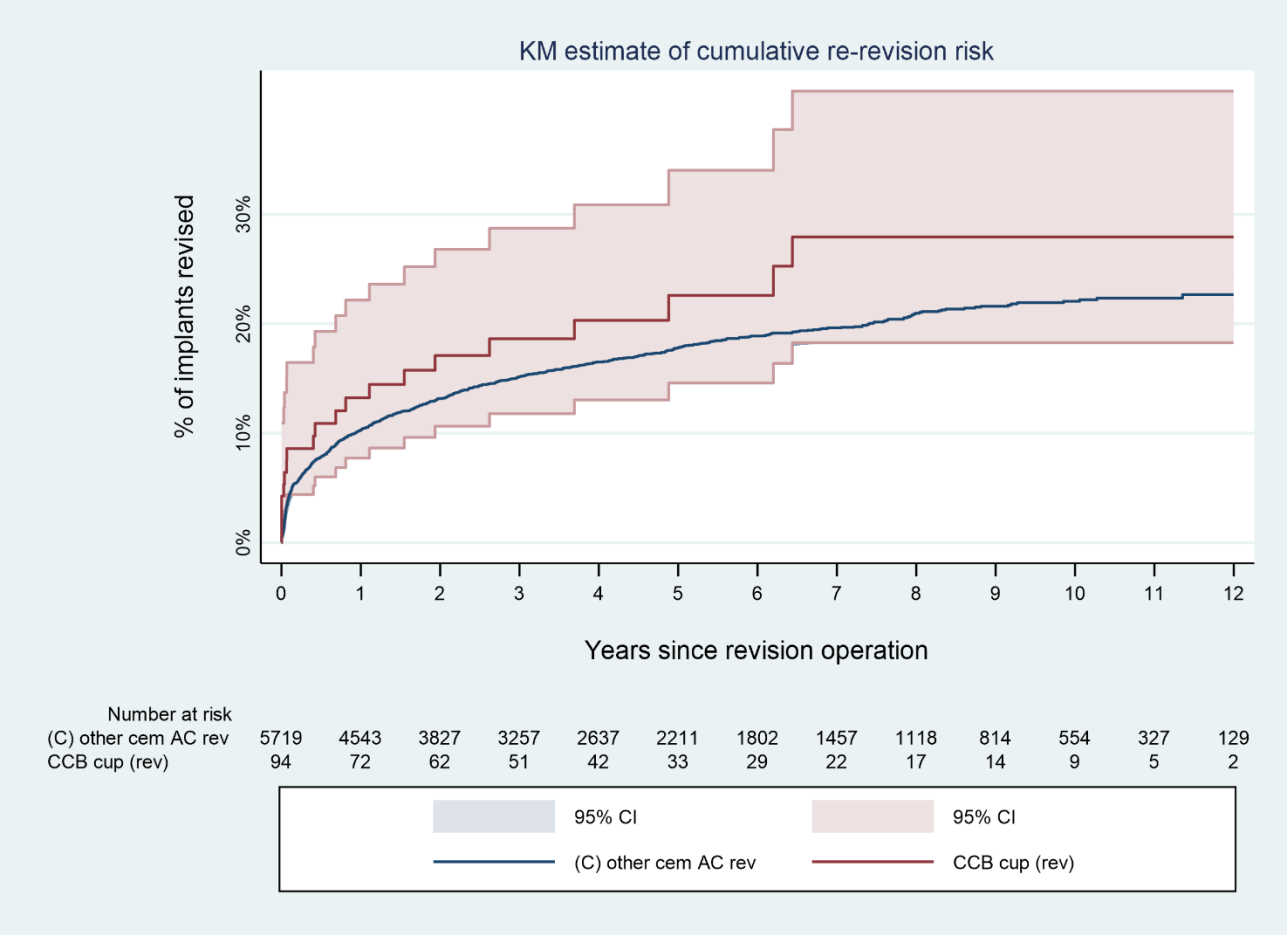
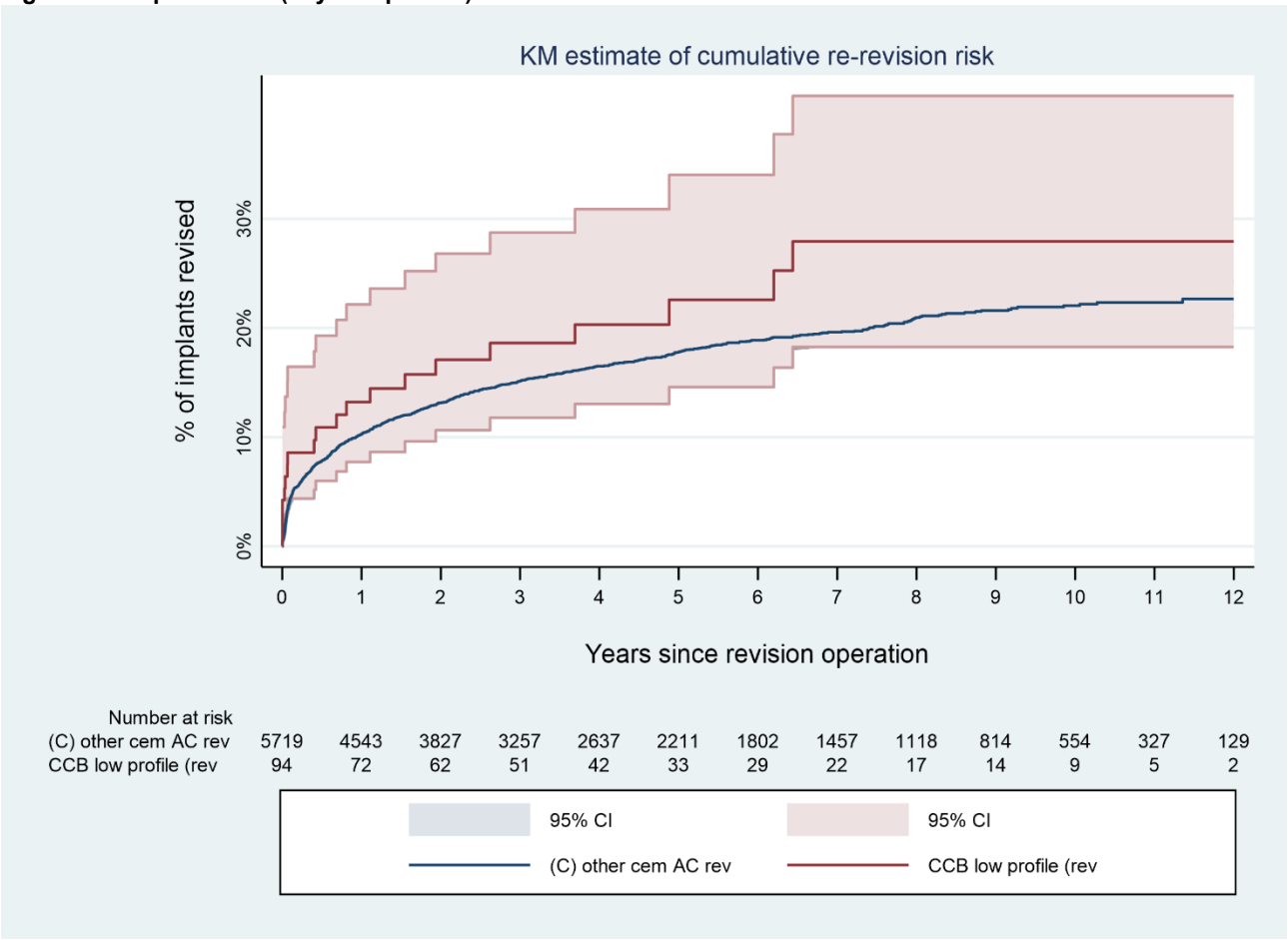


Figure 17: Kaplan-Meier (any component) II



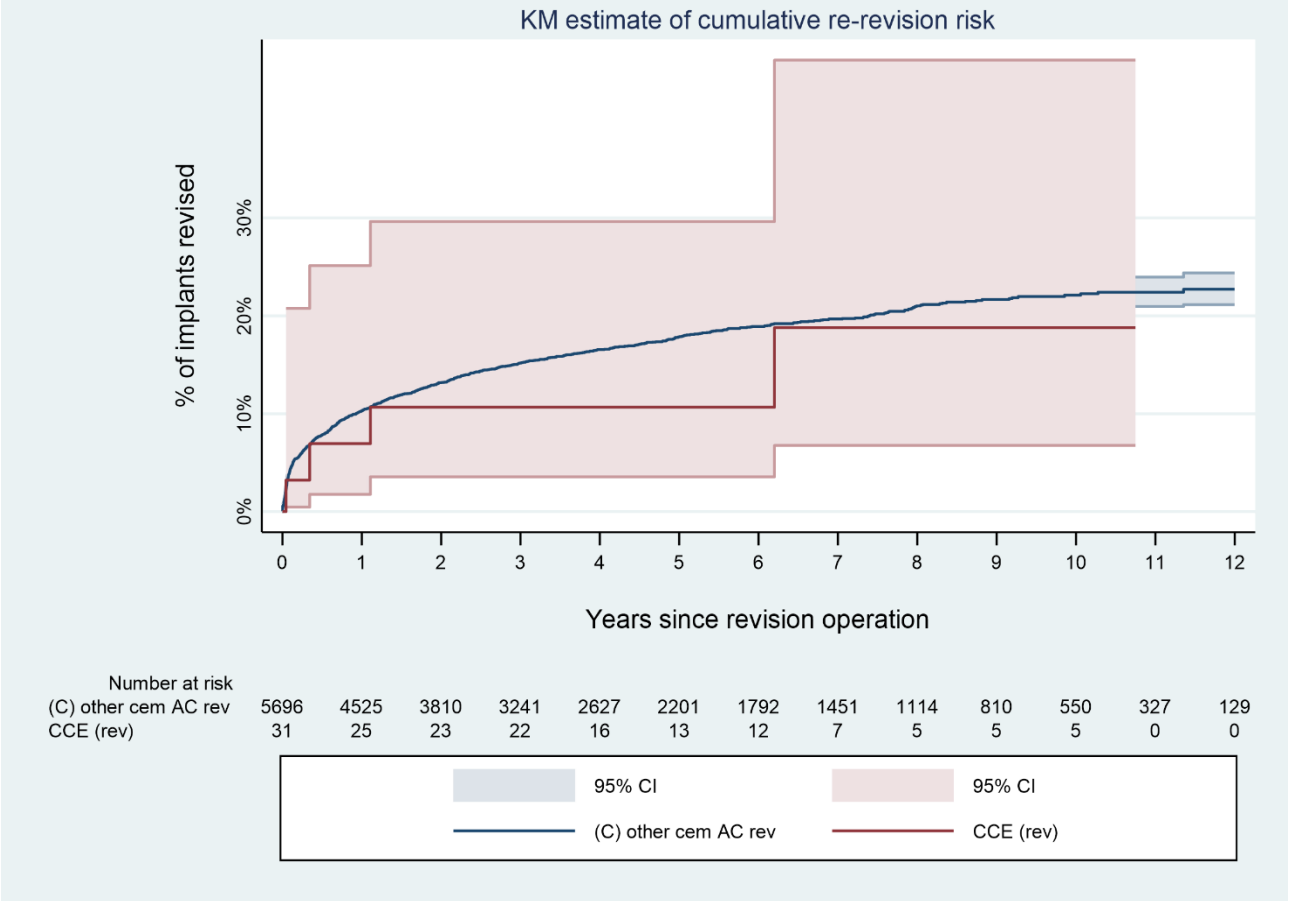


Figure 18: Kaplan-Meier estimates of first re-revision rates (any component); Comparing more recent main product implants (<3 years) with older main product implants

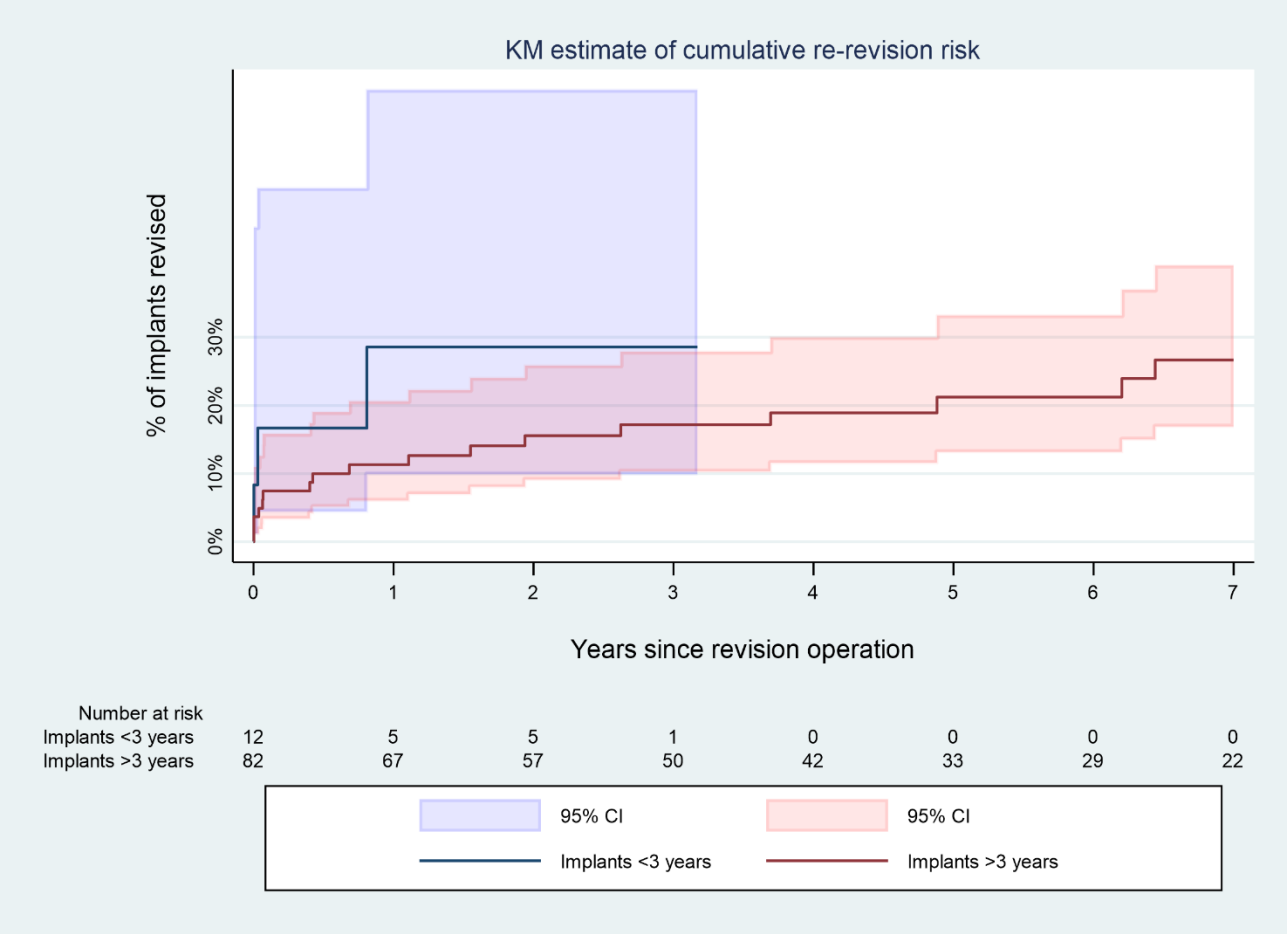


Table 47: Kaplan-Meier estimates of first re-revision rates (any component); Comparing more recent main product implants (<3 years) with older main product implants

Implants from the past 3 years	1-year	2-year	3-year	5-year	7-year
CCB cup (rev)					
(C) other cem AC rev	**11.4 (9.7-13.4)**	**13.8 (11.8-16.2)**	**15.6 (13.1-18.6)**		
CCB low profile (rev)					
CCE (rev)					
Implants that are older than 3 years	**1-year**	**2-year**	**3-year**	**5-year**	**7-year**
CCB cup (rev)	**11.3 (6.0-20.6)**	**15.5 (9.1-25.8)**	**17.2 (10.3-27.8)**	**21.2 (13.2-33.2)**	**26.6 (16.9-40.5)**
(C) other cem AC rev	**10.0 (9.2-10.9)**	**12.9 (12.0-14.0)**	**14.9 (13.9-16.1)**	**17.6 (16.4-18.8)**	**19.4 (18.2-20.7)**
CCB low profile (rev)	11.3 (6.0-20.6)	15.5 (9.1-25.8)	17.2 (10.3-27.8)	21.2 (13.2-33.2)	26.6 (16.9-40.5)
CCE (rev)	7.3 (1.9-26.1)	11.0 (3.7-30.3)	11.0 (3.7-30.3)	11.0 (3.7-30.3)	

Figures are omitted where n at risk <10
(95% confidence intervals)

6.4.4. Cox proportional hazard ratios of re-revisions (any component)

Table 48: Cox proportional hazard ratios (any component)

Group of interest	Comparison group	HR	p (sig)	95% CI lb	95% CI ub	n in model
CCB cup (rev)	**(C) other cem AC rev**	**1.16**	**0.703**	**0.547**	**2.451**	**2844**
CCB low profile (rev)	(C) other cem AC rev	1.16	0.703	0.547	2.451	2844
CCE (rev)	(C) other cem AC rev	0.64	0.524	0.158	2.556	2808

HR=Hazard ratio; lb=lower bound; ub=upper bound

Cox survival model adjusted for age (continuous), BMI (continuous), sex, Charnley restriction, ASA morbidity.

Most covariates have been available since 2015 and are still optional. Please note the number of observations (complete cases).

Please note that coefficients are provided for indicative purposes and the underlying statistical models do not necessarily meet all formal assumptions.

Statistician's comment: The re-revision risk of CCB cups and CCE reinforcement rings is compatible to that of other cemented cups used in revision arthroplasty. The risk-adjusted hazard ratio is 1.16, indicating equivalence when considering that it is statistically entirely insignificant. However, revisions involving CCB cups were affected by an unusually high infection risk, as shown in Table 44 and Figure 14 above. Revisions with CCE reinforcement rings tended to have slightly lower overall re-revision risk, but the risk-adjusted hazard ratio of 0.64 is statistically not significant.

7. APPENDIX (Implant and revision overview)

This report is accompanied by an Excel file containing the following implant and revision information. Further content or customisations may be available on request.

Primary uses: All registered components as defined within the scope of this report. Numbers shown in the appendix may differ from the actual count of implants in the report due to multiple registrations of the same component or due to registration of 'orphaned' minor components without a necessary main component.

Revision uses: All registered uses in revision procedures.

Variables:

SIRIS standardised article number	Implant description	Number registered	E-class category

Implant Groups:

Number registered	Main component 1: SIRIS standardised article number	Main component 1: Implant description	Main component 2 …	Main component 3 …

Revisions: Individual revisions of main product including details on risk factors, implant components and revision implants. Please note that if an implant field is empty, this may, depending on the context, indicate that the information is not applicable, missing or that the implant used is not yet recognised in the SIRIS implant library.

Variables:

Year	Age	ASA	BMI	Charnley	Sex	Procedure	Fixation	Time to revision	Reasons	Rev Procedure	AC brand	AC description	FE brand	FE description	Head brand	Head description	Rev AC description	Rev FE description	Rev insert description	Rev head description

Format example: hip arthroplasty

Cross-tabulation of types of revisions and underlying reasons (multiple reasons possible)

Format:

Type of revision caused by….	Reason 1	Reason 2	Reason 3	Reason …
Type 1				
Type 2				
Type 3				
…				