

# 2025 AJRR ANNUAL REPORT WEBINAR

Presenters:

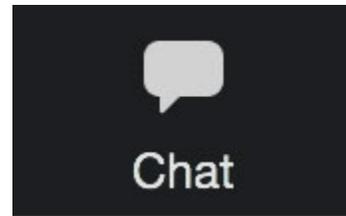
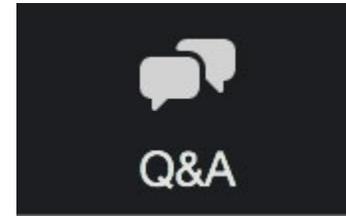
Dr. Richard Illgen, II- Editor of AJRR Annual Report

Dr. Jeffrey Stambough- Deputy Editor of the AJRR Annual Report

Emily Jimenez- Manager Registry's Combined Analytics Team

# MAIN CONTROLS

Use the Q&A button to submit questions to Faculty



Use the Chat button to request assistance from AAOS Staff

You can also contact staff via email at [webinars@aaos.org](mailto:webinars@aaos.org).

# DOWNLOAD THE HANDOUTS

Log in at [learn.aaos.org](http://learn.aaos.org)

**About This Webinar**

Live Stream

WEBINAR: COMPLEX CASES IN HIP PRESERVATION: NAVIGATING THE SPECTRUM

Click here to download the slide deck

**DESCRIPTION**    LEARNING OBJECTIVES    DISCLOSURES

Femoroacetabular impingement (FAI) syndrome and hip instability/dysplasia have er understanding of hip pathology has spurred a concomitant increase in surgical proce orthopedic surgery. This webinar will discuss multiple complex cases in hip preservat management of a variety of hip conditions, including FAI syndrome and hip instabilit

[Download presentation slides](#)

# PROGRAM EVALUATION

After the event, go back to learn.aaos.org



Don't forget to tell us how we did!

# AMERICAN JOINT REPLACEMENT REGISTRY: 2025 ANNUAL REPORT HIGHLIGHTS

[www.aaos.org/registries/ajrr](http://www.aaos.org/registries/ajrr)

# OUR SPEAKERS TODAY

- **Richard L. Illgen, II, MD, FAAOS**
  - University of Wisconsin
    - AJRR Research Subcommittee Chair; AJRR Annual Report Editor; Incoming AJRR Steering Committee Vice Chair
- **Jeffrey B. Stambough, MD, FAAOS**
  - University of Arkansas
    - AJRR Steering Committee member; AJRR Annual Report Deputy Editor

# DISCLOSURES: RICHARD L. ILLGEN, II, MD, FAAOS

## No financial conflicts of interest relevant to this presentation

- AAOS: Board or committee member
- Hereaus Medical: Paid consultant
- Stryker: IP royalties; Paid consultant

# DISCLOSURES: JEFFREY B. STAMBOUGH, MD, FAAOS

## No financial conflicts of interest relevant to this presentation

- AAOS: Board or committee member
- AAHKS: Board or committee member
- Journal of Arthroplasty: Editorial or board member

# AAOS FAMILY OF REGISTRIES



# Why Do Sites Participate?

Compare your practice to **national performance benchmarks**

Access to on-demand practice specific **quality reports and dashboards**

Facilitate tracking and monitoring of **longitudinal patient outcomes**

Improve the **value of care** delivered to Patients

Facilitate site, practice-specific, **payer-incentivized performance improvement** programs such as Blue Distinction & Centers of Excellence

Qualify for **national distinction programs** such as the Joint Commission Advanced Certification & AAAHC

Use for reporting to **quality improvement programs** such as MIPS, BPCI-A, ABOS MOC & ABNS CC

Early access to **surveillance alerts** for poorly performing implants

# DATA REUSE OPPORTUNITIES

Participation in the American Academy of Orthopaedic Surgeons (AAOS) Registry Program offers a wide variety of data reuse opportunities including requirements for quality initiatives and state collaboratives.

The ability to reuse registry data to enable performance measurement as well as facilitate national registry-driven quality improvement programs has been a focus of the Registry over the past few years. Now, AJRR data can be reused toward:

- Joint Commission Advanced THKR Certification
- ABOS MOC for Part II SAE credit
- CMS IQR THA/TKA PRO-PM
- CMS Comprehensive Care for Joint Replacement (CJR) Model
- CMS MIPS PI and QPP
- Accreditation Association for Ambulatory HealthCare (AAAHC) Advanced Orthopaedic Certification
- Aetna Institutes of Quality (IOQ) Orthopaedic Surgery
- BCBSA Blue Distinction® Centers for Knee and Hip Replacement
- Bree Collaborative
- Cigna Pathwell Bone & Joint™
- DNV Orthopaedic Center of Excellence
- The Alliance QualityPath

# Decrease Data Collection Burden



AAOS Registry Program  
**Authorized Vendor**

American Joint Replacement Registry  
Shoulder & Elbow Registry

AAOS  
AMERICAN ACADEMY OF  
ORTHOPAEDIC SURGEONS

Registry Program  
Improving Orthopaedic Care Through Data

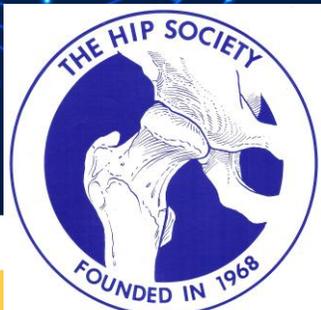


AAOS  
AMERICAN ACADEMY OF  
ORTHOPAEDIC SURGEONS

**AJRR** AMERICAN  
JOINT REPLACEMENT  
REGISTRY

- AAOS has partnered with technology vendors to facilitate the data submission process
- Re-use data that already exists in medical record, practice management and PRO systems
- Direct data submission and management can be handled by a technology provider with sites able to fix rejected files

# AMERICAN JOINT REPLACEMENT REGISTRY

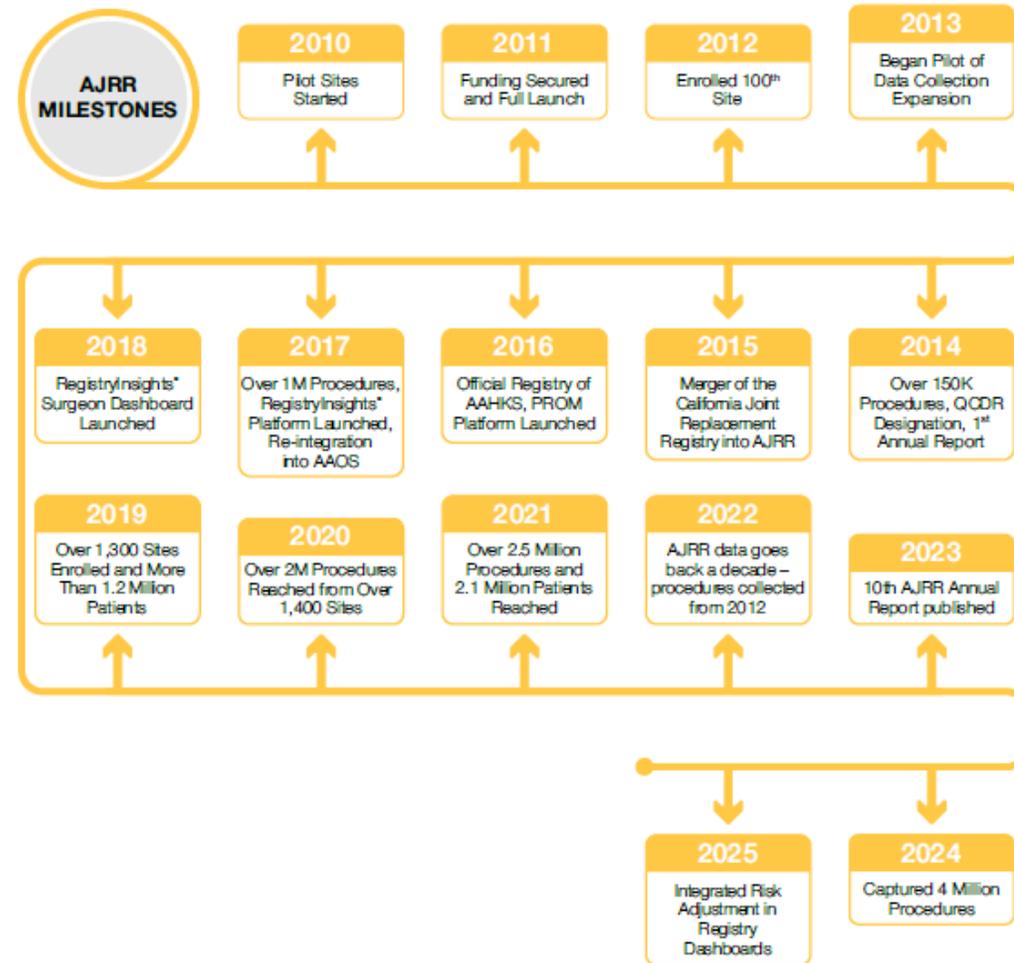




# AJRR Milestones

By end of 2024, there were 1,212 contracted institutions and 960 submitting data to the AJRR from across all 50 states and the District of Columbia; this represents an 8% increase in procedures from the previous report.

## AJRR'S HISTORY



# AJRR STEERING COMMITTEE

- **James I. Huddleston, III, MD, FAAOS – Chair**  
Stanford University
- **Scott M. Sporer, MD, FAAOS – Vice Chair**  
Rush
- **James A. Browne, MD, FAAOS**  
University of Virginia
- **Antonia F. Chen, MD, MBA, FAAOS**  
Brigham and Women’s Hospital
- **Paul J. Duwelius, MD, FAAOS**  
Orthopedic and Fracture Specialists
- **Brian Hallstrom, MD, FAOA, FAAOS**  
University of Michigan
- **Richard L. Ilgen, II, MD, FAAOS**  
University of Wisconsin
- **William A. Jiranek, MD, FACS, FAAOS**  
Duke University
- **Leslie Klemp, MS, RN, NE-BC, CPHQ**  
Rush University Medical Center
- **William Long, MD, FAAOS**  
Hospital for Special Surgery
- **Howard J Marans, MD**  
Aetna
- **James D. Slover, MD, MS, FAAOS**  
NYU Langone Health
- **Bryan D. Springer, MD, FAAOS**  
OrthoCarolina
- **Jeffrey B. Stambough, MD, FAAOS**  
University of Arkansas

# AJRR Data Element Overview

## DATA ELEMENTS FOR PARTICIPATION TO AJRR, IQR, AND JOINT COMMISSION

### Minimum Data Set (MDS):

Core data elements required as part of standard Registry participation. These represent the baseline information every site must provide.

- Patient Name (Last, First)
- Patient Date of Birth
- Diagnosis (ICD-9/10)
- Patient Sex
- Patient Zip Code
- Hospital or Surgery Center Name
- Hospital or Surgery NPI
- Surgeon National Provider Identifier (NPI)
- Procedure Codes (ICD-10 and CPT)
- Length of Stay
- Procedure Date
- Laterality
- Implants (Component Name, Manufacturer, Catalog Number, Lot Number)
- Discharge Disposition

### Hospital Inpatient Quality Reporting (IQR) Program (CMS):

Data elements required by CMS for the Hospital IQR Program.

- Chronic Narcotics Use
- Medicare Beneficiary ID
- Person Completing Survey
- Patient-Reported Outcome Measures (PROMs) Date of Collection
- PROMs Time Point
- Data Collection Mode
- Hip dysfunction and Osteoarthritis Outcome Score for Joint Replacement (HOOS, JR)
- Knee injury and Osteoarthritis Outcome Score for Joint Replacement (KOOS, JR)
- Patient-Reported Outcomes Measurement Information System (PROMIS) 10-Item Global Health
- Veterans RAND 12-Item Health Survey (VR-12)
- Comprehensive Joint Replacement (CJR) Risk Assessment (Low Back Pain, Health Literacy, Total Painful Joint Count)

### Joint Commission Elements:

Data elements required to meet Joint Commission Advanced Total Hip and Knee Replacement certification and accreditation reporting standards.

- Patient Residence
- Anesthesia Type
- Ambulation Day of Surgery
- Regional Anesthesia Exemption
- Discharge Disposition
- HOOS, JR
- KOOS, JR
- PROMIS
- VR-12

# INTEGRATION OF MEDICARE DATA

- Access to **Medicare claims** linked by full identifiers for longitudinal tracking
- Follow outcomes of AJRR patients occurring at non-AJRR participating institutions
- 2012-2024 Medicare data for all patients represented in Registry



# 2025 AJRR ANNUAL REPORT

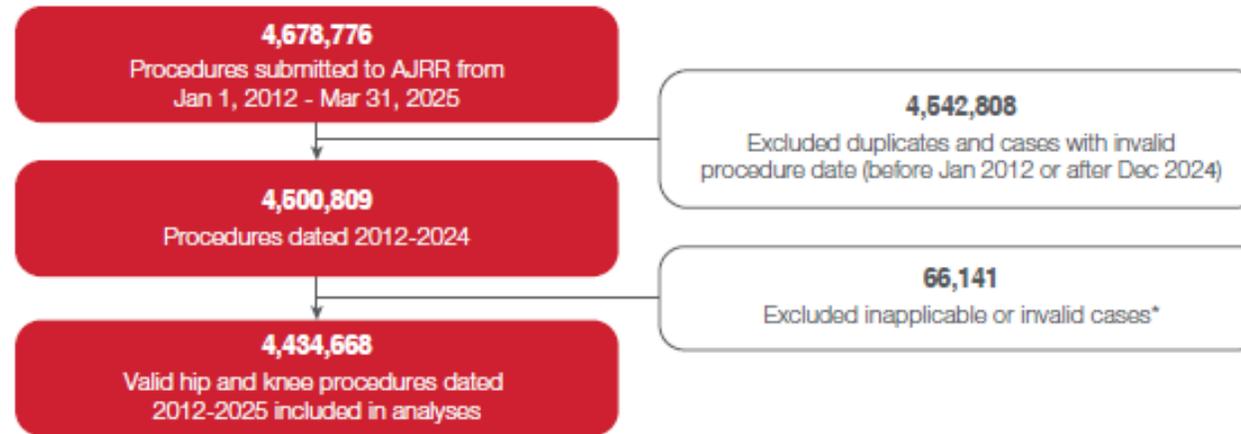
- Summary Statistics
  - Procedure, institution, and patient distributions
- Data Completeness
- Hip/Knee Arthroplasty
- Revision Procedures
- Implant Utilization and Survivorship
- Patient Reported Outcome Measures (PROMs)
- Recent publications and presentations

*Download the 2025 Annual Report and  
Annual Report Supplement: [www.aaos.org/registries/publications](http://www.aaos.org/registries/publications)*



# AJRR ANNUAL REPORT OVERVIEW

## Overall Results



\*Invalid data=joint procedures not in the hip or knee, procedure codes outside of approved AJRR data specifications, and hemiarthroplasty procedures without a diagnosis of femoral neck fracture.

- Data submitted to AJRR across all 50 states and the District of Columbia
- Supplementary Medicare and American Hospital Association datasets utilized where appropriate for descriptive and longitudinal analysis

# AJRR DATA COMPLETENESS

Key demographic and procedural information such as date of birth, gender, admission date, discharge date, procedure, and diagnosis information all exceed 95% completeness. Most of the elements described have remained stable compared to the previous Annual Reports.

**Table 1.1** Completeness For Minimum Dataset (Level 1 data)

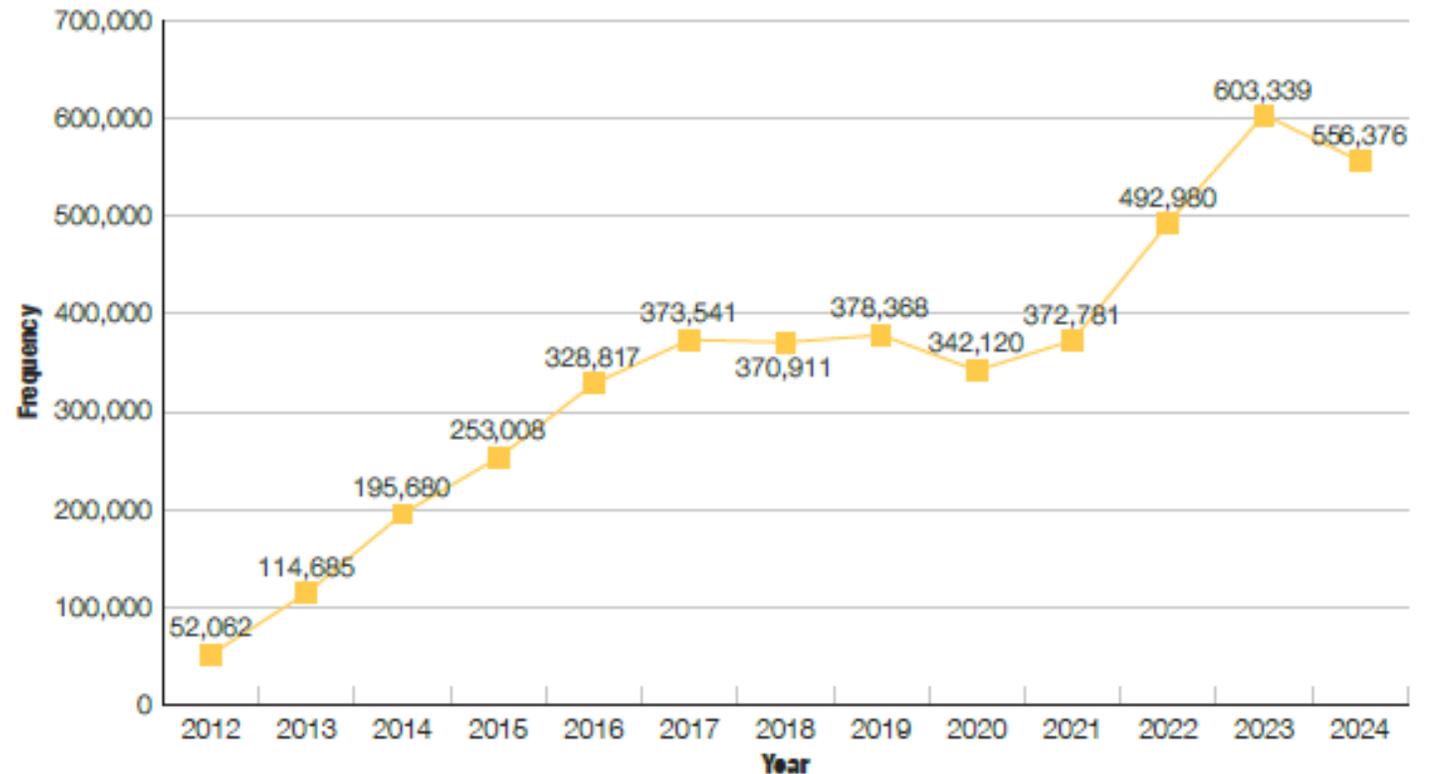
Element	N Total	Percent Reported	Percent NR	Percent Invalid
Principal Procedure Code	4,628,842	99.98	0	0.02
Principal Diagnosis Code	4,628,842	96.7	0	3.3
First Implant Catalog # Listed	4,628,842	89.86	0	10.14
First Implant Lot # Listed	4,628,842	86.21	0	13.79
Date of Birth	4,628,842	100	0	0
Gender	4,628,842	99.59	0.41	0
Zip Code	4,628,842	97.17	0	2.83
First Name	4,628,842	100	0	0
Last Name	4,628,842	99.97	0.03	0
Procedure Date	4,628,842	100	0	0
ADMSN/DSCHG LOS *	3,232,080	98.41	0	1.59
Discharge Disposition Code *	3,232,080	93.51	4.93	1.55

\*These variables were added in a later specification version and have a different denominator for completeness.

# ANNUAL PROCEDURAL VOLUME

In prior AJRR Annual Reports, cumulative procedure volume was presented as a running total of all procedures submitted to the Registry from all previous years. In this year's report, procedure volume is shown instead as the number of procedures submitted per year. Data for this report were captured through March 31, 2025.

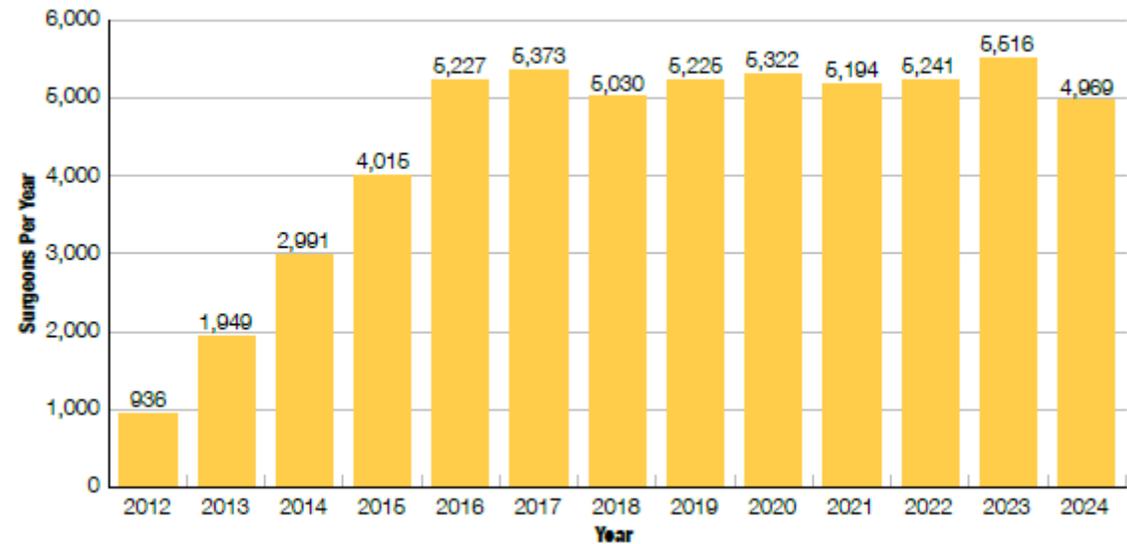
Figure 1.1 Annual Procedural Volume, By Year 2012-2024 (n=4,434,668)



# CUMULATIVE NUMBER OF SURGEONS REPRESENTED

In 2024 alone, there were 4,969 surgeons represented with at least one procedure in the AJRR. AJRR participating institutions are required to submit data from all surgeons performing hip or knee arthroplasty procedures at their facility.

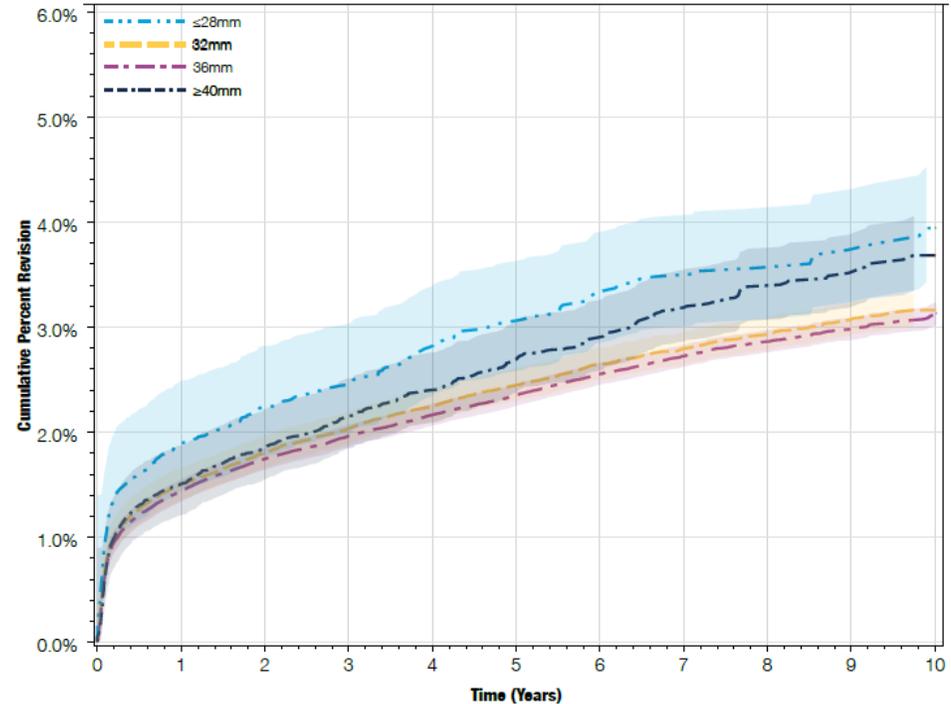
Figure 1.11 Cumulative Number of Surgeons Represented in Annual Procedure Submissions, 2012-2024 (N=12,049)



# IMPLANT TRENDS (HIP)

- Thirty-six-millimeter diameter femoral heads demonstrated lower CPR compared with 40mm heads at 0-2 years and 2-10 years postoperatively after adjusting for age, sex, and CCI
- Multiple confounding variables including the potential increased use of 40mm heads in more challenging patients at risk for dislocation were not accounted for in this analysis.
- There were no statistically significant differences comparing CPR for 28mm vs. 36mm or 32mm vs. 36mm heads at greater than 10 years follow-up interval

**Figure 2.12** Cumulative Percent Revision for Diameter of Femoral Heads for Elective Primary Total Hip Arthroplasty in Medicare Patients 65 Years of Age and Older with Primary Osteoarthritis, 2012-2024



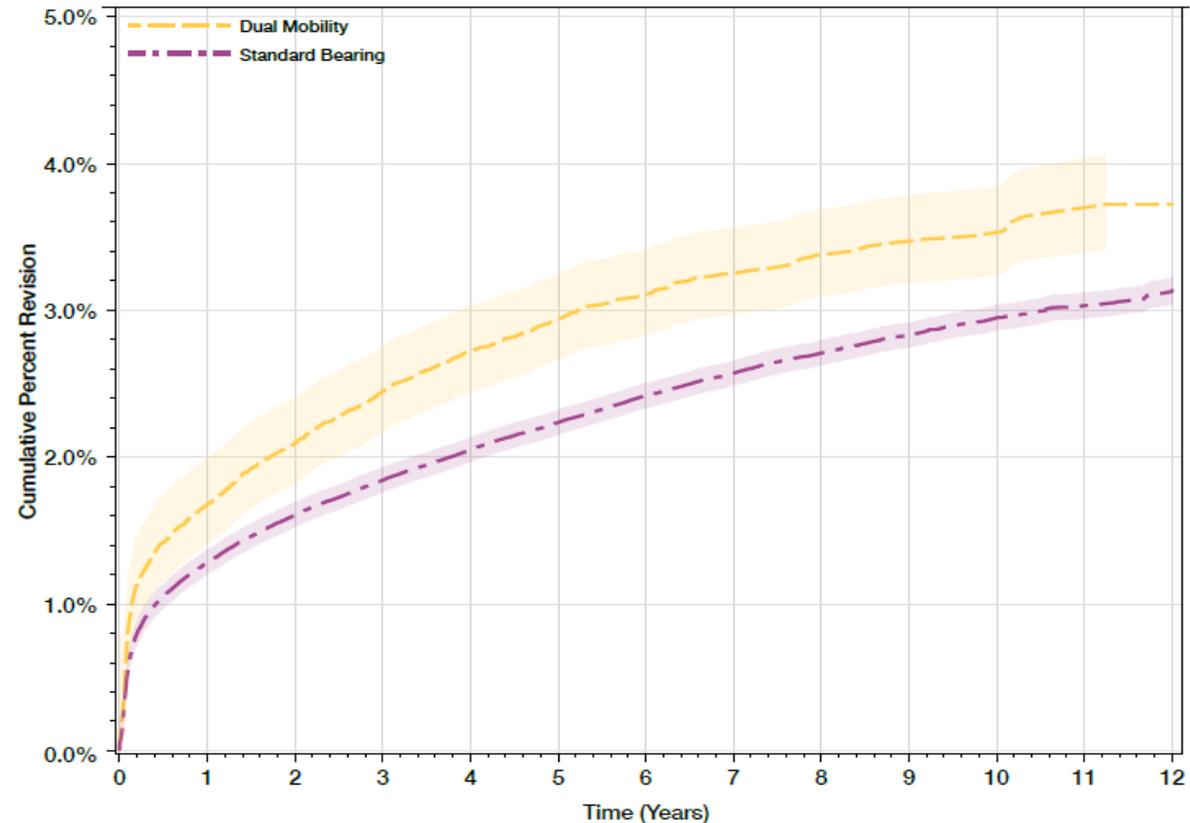
Group	stat	0	1	2	3	4	5	6	7	8	9	10
32mm	At Risk	115,416	104,308	91,672	80,291	70,695	61,519	50,165	38,713	27,273	17,036	9,708
	KM % revision	0.06 (0.05, 0.08)	1.50 (1.43, 1.57)	1.80 (1.72, 1.88)	2.03 (1.95, 2.12)	2.25 (2.16, 2.34)	2.45 (2.35, 2.55)	2.64 (2.54, 2.75)	2.79 (2.69, 2.9)	2.93 (2.82, 3.05)	3.08 (2.95, 3.2)	3.16 (3.03, 3.3)
36mm	At Risk	353,920	302,456	250,530	211,063	179,554	150,336	115,856	84,011	55,411	32,209	17,012
	KM % revision	0.06 (0.05, 0.07)	1.44 (1.4, 1.48)	1.74 (1.7, 1.79)	1.96 (1.91, 2.01)	2.16 (2.11, 2.21)	2.35 (2.3, 2.41)	2.55 (2.49, 2.61)	2.72 (2.66, 2.79)	2.86 (2.79, 2.93)	2.97 (2.9, 3.05)	3.12 (3.03, 3.22)
≤28mm	At Risk	16,019	13,401	10,583	8,307	6,614	5,527	4,762	3,873	2,874	1,906	1,170
	KM % revision	0.19 (0.14, 0.28)	1.89 (1.69, 2.12)	2.23 (2.01, 2.48)	2.45 (2.21, 2.72)	2.82 (2.55, 3.12)	3.06 (2.76, 3.39)	3.33 (3, 3.68)	3.48 (3.14, 3.85)	3.56 (3.21, 3.95)	3.73 (3.35, 4.16)	3.94 (3.5, 4.44)
≥40mm	At Risk	44,761	35,609	27,744	22,379	18,419	14,889	11,397	8,271	5,616	3,522	1,968
	KM % revision	0.04 (0.03, 0.07)	1.50 (1.39, 1.62)	1.85 (1.72, 1.99)	2.14 (2, 2.3)	2.40 (2.24, 2.56)	2.70 (2.52, 2.89)	2.90 (2.71, 3.1)	3.18 (2.97, 3.41)	3.38 (3.15, 3.63)	3.51 (3.26, 3.79)	3.68 (3.39, 4)

Age, Sex, CCI, CCI \* log(time) adjusted HR (95% CI), p-value  
 36mm vs 39mm over 10 Years: 1.056(0.931, 1.196) p=0.3960  
 32mm vs 36mm over 10 Years: 1.019(0.971, 1.070) p=0.4416  
 40mm vs 36mm at 0-2 Years: 1.083(1.001, 1.172), p=0.0470  
 40mm vs 36mm at 2-10 Years: 1.381(1.210, 1.577), p<.0001

# IMPLANT TRENDS (HIP)

- CPR was higher for DM compared with conventional bearings for THAs performed for primary osteoarthritis in patients of all ages (HR 1.2 (1.143,1.260), Figure 2.14)

**Figure 2.14** Cumulative Percent Revision for Dual Mobility Used for Elective Primary Total Hip Arthroplasty for Patients with Primary Osteoarthritis as Submitted Only to AJRR, 2012-2024



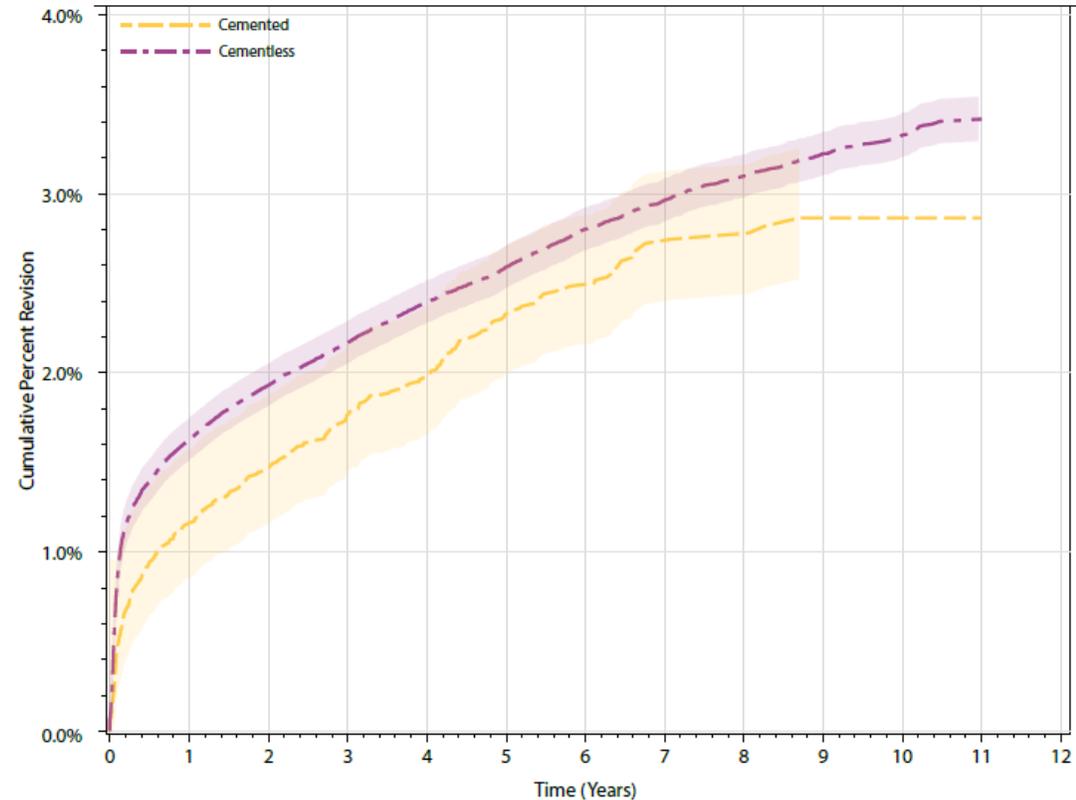
Group	stat	0	1	2	3	4	5	6	7	8	9	10	11	12
Dual Mobility	At Risk	75,157	64,566	53,742	45,556	37,881	30,484	22,679	16,118	10,574	6,132	3,317	1,453	515
	KM % revision	0.07 (0.05, 0.09)	1.68 (1.59, 1.77)	2.09 (1.99, 2.2)	2.44 (2.32, 2.56)	2.71 (2.59, 2.84)	2.94 (2.8, 3.08)	3.11 (2.96, 3.25)	3.25 (3.1, 3.4)	3.37 (3.21, 3.54)	3.46 (3.29, 3.64)	3.50 (3.32, 3.69)	3.63 (3.41, 3.87)	3.71 (3.45, 4)
Standard Bearing	At Risk	765,891	706,012	639,239	580,209	521,021	451,104	359,993	272,307	190,005	116,748	65,100	28,116	8,239
	KM % revision	0.05 (0.04, 0.05)	1.28 (1.25, 1.3)	1.60 (1.57, 1.63)	1.84 (1.81, 1.87)	2.05 (2.01, 2.08)	2.23 (2.2, 2.27)	2.41 (2.38, 2.45)	2.57 (2.53, 2.61)	2.70 (2.66, 2.75)	2.83 (2.78, 2.87)	2.94 (2.89, 3)	3.03 (2.97, 3.08)	3.13 (3.05, 3.21)

Age, Sex, CCI, CCI \* log(time) adjusted HR (95% CI), p-value  
 Dual Mobility vs Standard Bearing at 0-6 Years: 1.200(1.143, 1.260), p<.0001  
 Dual Mobility vs Standard Bearing at 6-12 Years: 0.866(0.668, 1.123), p=0.2760

# IMPLANT TRENDS (HIP)

- CPR was higher, but not statistically significant, for cementless compared with cemented femoral fixation in women  $\geq 65$  years old in primary THA (from 6 months to 5 years, HR 1.095 (0.948, 1.265),  $p=0.2187$ )

**Figure 2.24** Cumulative Percent Revision for Femoral Stem Fixation Used for Elective Primary Total Hip Arthroplasty for Female Medicare Patients 65 Years of Age and Older with Primary Osteoarthritis, 2012-2024



Group	stat	0	1	2	3	4	5	6	7	8	9	10	11
Cemented	At Risk	23,274	19,726	15,888	12,939	10,302	8,257	6,113	4,333	2,913	1,709	832	328
	KM % revision	0.04 (0.02, 0.08)	1.16 (1.03, 1.31)	1.47 (1.31, 1.64)	1.76 (1.59, 1.96)	1.98 (1.79, 2.19)	2.32 (2.1, 2.57)	2.48 (2.25, 2.75)	2.72 (2.46, 3.02)	2.75 (2.48, 3.05)	2.87 (2.57, 3.2)	2.87 (2.57, 3.2)	2.87 (2.57, 3.2)
Cementless	At Risk	291,394	253,726	215,747	185,121	159,629	136,126	107,582	79,936	54,101	32,313	17,776	7,666
	KM % revision	0.06 (0.05, 0.07)	1.63 (1.58, 1.67)	1.93 (1.88, 1.98)	2.17 (2.11, 2.22)	2.40 (2.34, 2.46)	2.59 (2.53, 2.66)	2.80 (2.74, 2.87)	2.96 (2.89, 3.04)	3.10 (3.02, 3.18)	3.22 (3.14, 3.31)	3.33 (3.24, 3.42)	3.33 (3.31, 3.53)

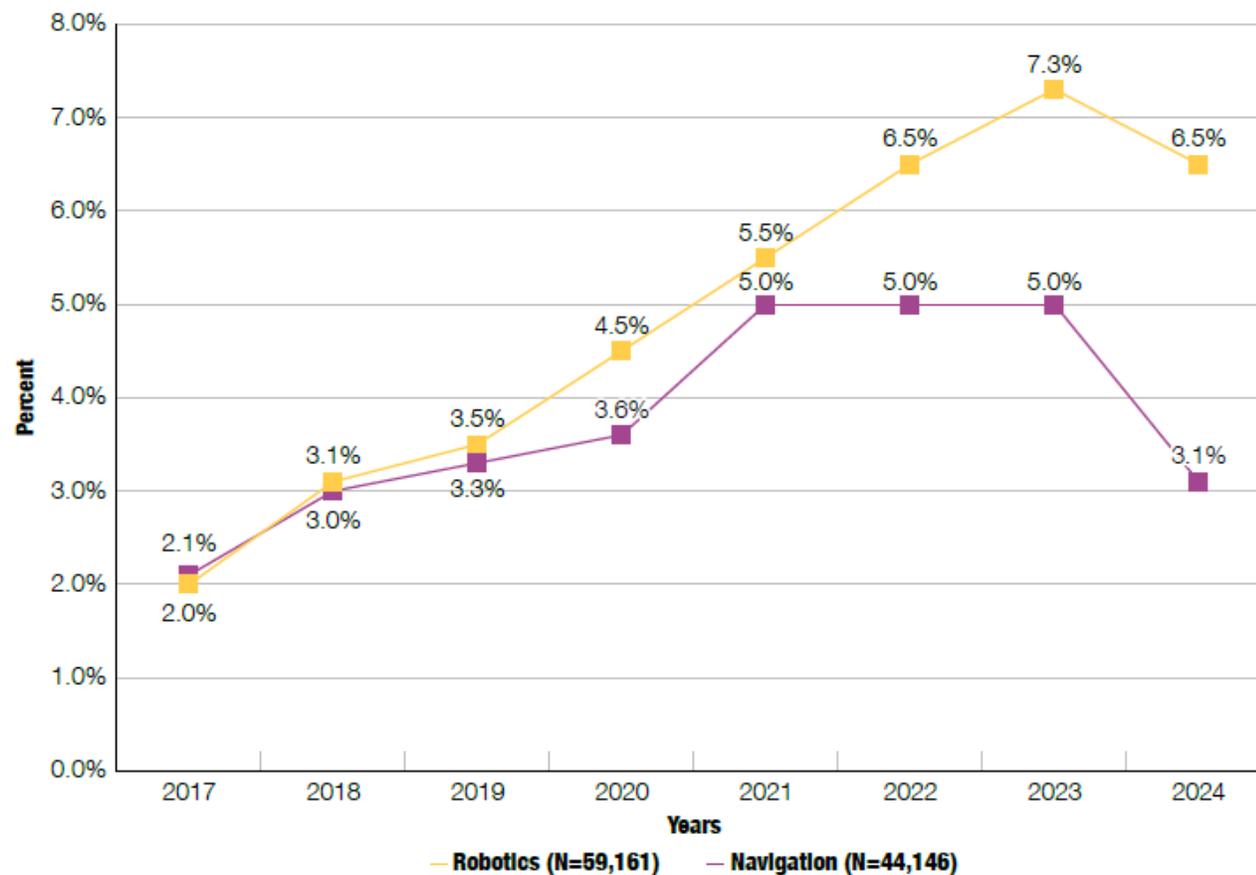
Age, Sex, CCI, CCI \* log(time) adjusted HR (95% CI), p-value  
 Cemented vs Cementless at 0-6 Months: 0.589(0.510, 0.679),  $p<.0001$   
 Cemented vs Cementless at 6 Months-5 Years: 1.095(0.948, 1.265),  $p=0.2187$   
 Cemented vs Cementless at 5-11 Years: 0.899(0.618, 1.304),  $p=0.5718$

# TECHNOLOGY USE (HIP)

Data completeness and reporting to AJRR on the use of robotics and navigation in primary THA has improved significantly over the last several years. However, data completeness for both computer navigation and robotics this year remains below 50% (approximately 44%) (Table 1.2).

The percentage of elective primary THA utilizing robotic assistance is over 6% in 2024 which are slightly lower than the rate reported in last year's report.

Figure 2.26 Rate of Technology Use for Assistance in Elective Primary Total Hip Arthroplasty, 2017-2024



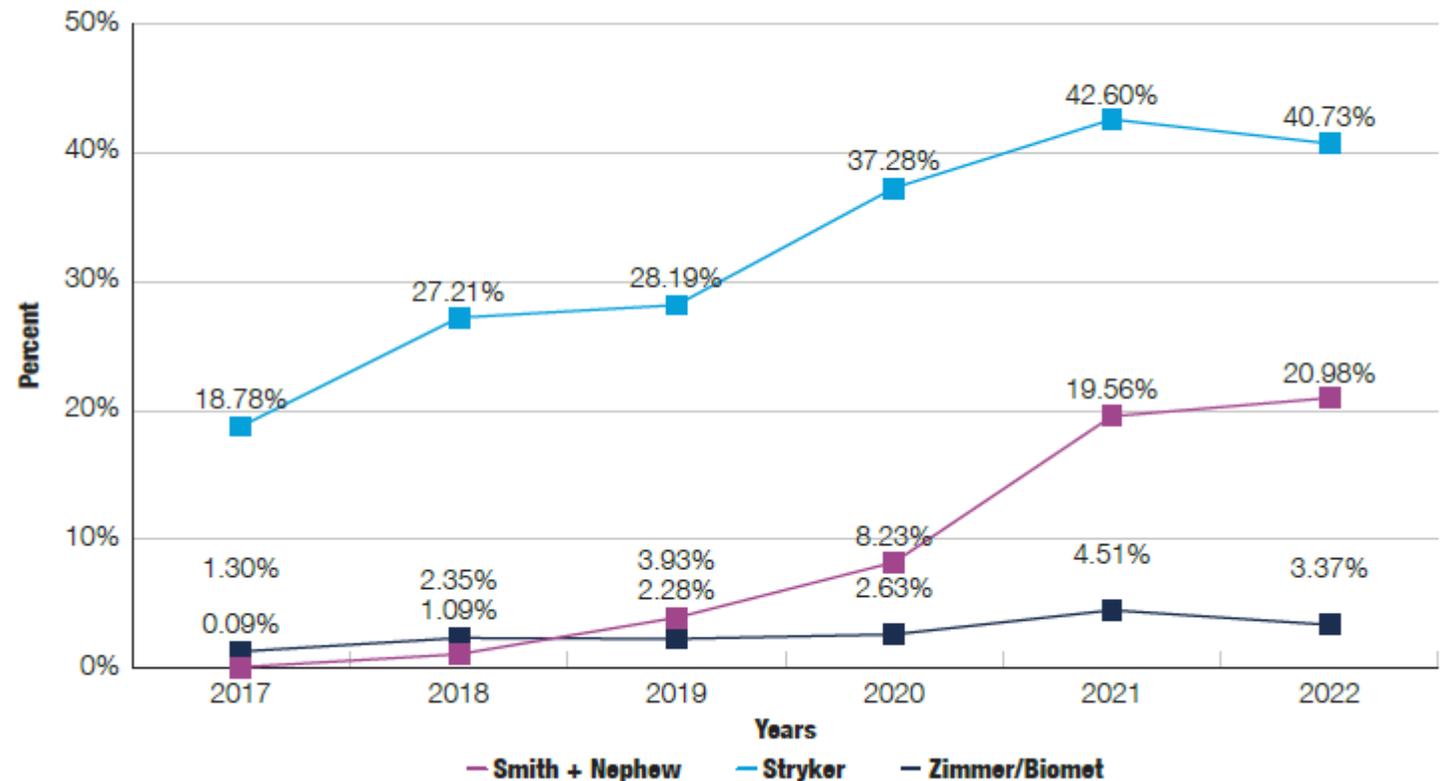
# TECHNOLOGY USE (HIP)

Rates of robotic use in primary THA varies significantly based on the specific robotic platforms used.

Figure 2.27 indicates the top three manufacturers reported that have a minimum number of 400 cases.

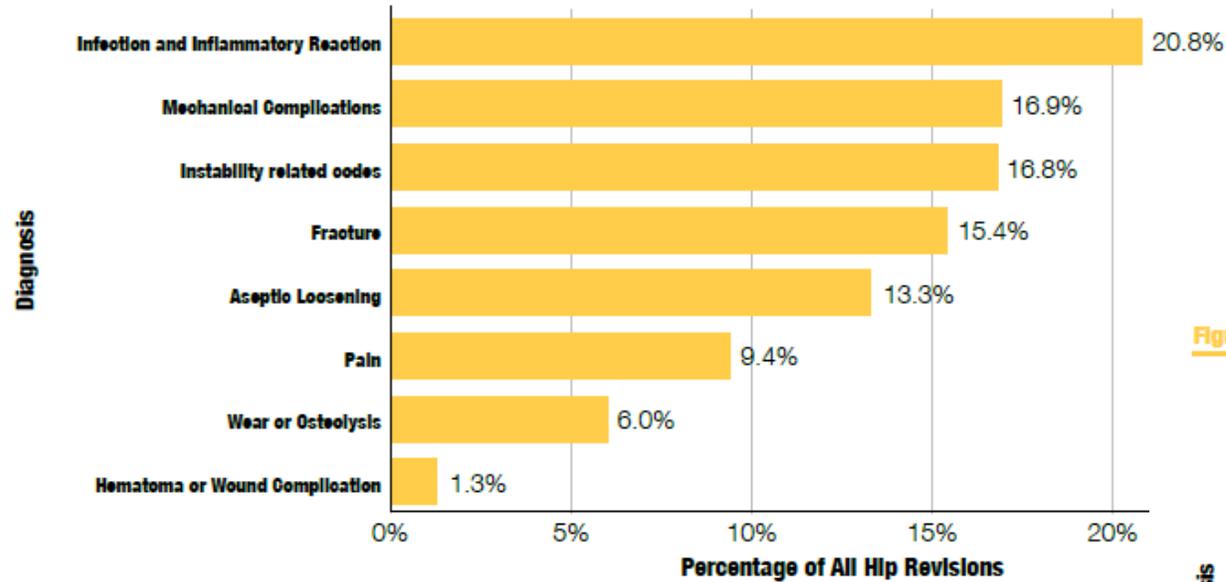
As data capture improves over time, additional manufacturers will be included for trend analysis. It is important to note that the robotics data submitted to the AJRR may be subject to selection bias, as it reflects robotic systems used by submitting institutions.

**Figure 2.27** Percentage of Manufacturer's Cases with Robotic Use in Primary THA, 2017-2022 (N=93,884)



# REVISION PROCEDURES (HIP)

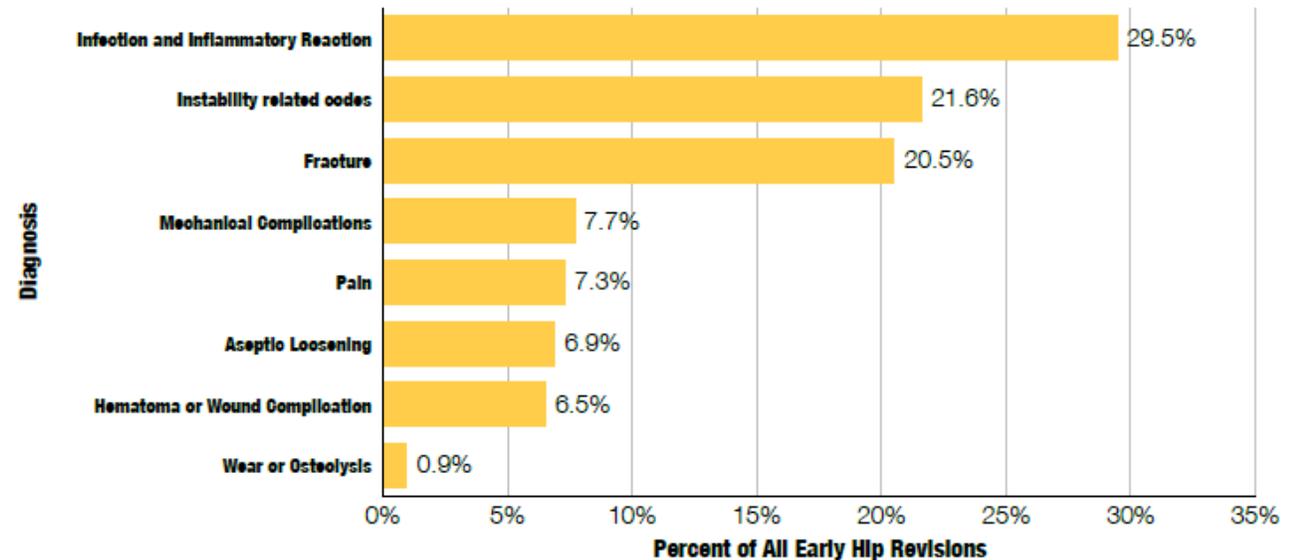
**Figure 2.33** Distribution of Diagnosis Associated with All Hip Revisions, 2012-2024 (N=167,439)



## INSIGHTS

Infection remains the most common reason for THA revision (20.8% of cases) and early THA revision (29.5%).

**Figure 2.34** Distribution of Diagnosis Associated With all Early "Linked" Hip Revisions, 2012-2024 (N=17,900)\*

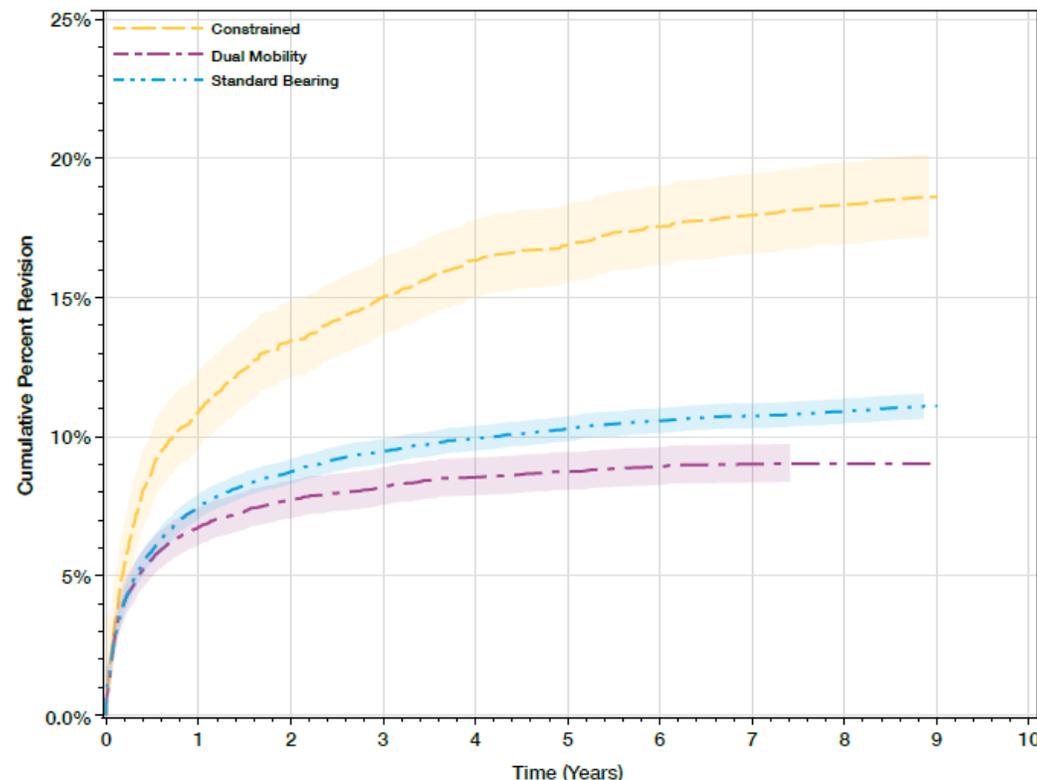


\*Linked revision requires matching patient ID, laterality, and procedure site

# CUMULATIVE PERCENT RE-REVISION

**Figure 2.45 Cumulative Percent Re-Revision after Revision Total Hip Arthroplasty by Liner Type in Medicare Patients 65 Years of Age and Older, 2012-2024**

After adjusting for age, sex, and CCI, DM demonstrated a significantly lower CPR in re-revision procedures compared to standard and constrained lined cases in Medicare patients aged 65 and older.



Group	stat	0	1	2	3	4	5	6	7	8	9
<b>Constrained</b>	At Risk	5,582	4,275	3,519	2,890	2,384	1,996	1,582	1,191	823	529
	KM % revision (0.06, 0.26)	0.13	11.38 (10.56, 12.27)	14.08 (13.15, 15.06)	15.71 (14.71, 16.76)	17.10 (16.04, 18.21)	17.70 (16.61, 18.84)	18.37 (17.25, 19.56)	18.77 (17.61, 19.99)	19.15 (17.96, 20.42)	19.52 (18.26, 20.85)
<b>Dual Mobility</b>	At Risk	11,121	8,898	7,350	6,120	4,999	3,947	2,824	1,909	1,253	774
	KM % revision (0.02, 0.12)	0.05	7.09 (6.61, 7.59)	8.09 (7.58, 8.63)	8.60 (8.07, 9.17)	8.96 (8.41, 9.54)	9.16 (8.6, 9.76)	9.35 (8.78, 9.96)	9.42 (8.84, 10.03)	9.47 (8.88, 10.1)	9.47 (8.88, 10.1)
<b>Standard Bearing</b>	At Risk	29,365	25,044	22,544	20,369	18,485	16,585	14,233	11,803	9,576	7,637
	KM % revision (0.1, 0.19)	0.14	7.85 (7.55, 8.17)	9.16 (8.83, 9.51)	9.93 (9.59, 10.29)	10.42 (10.06, 10.79)	10.78 (10.42, 11.16)	11.08 (10.71, 11.47)	11.26 (10.88, 11.65)	11.45 (11.07, 11.85)	11.64 (11.25, 12.04)

Age, Sex, CCI, CCI \* log(CCI) adjusted HR (95% CI), p-value  
 Constrained vs Dual Mobility at 0-6 Months: 1.543(1.368, 1.738), p<.0001  
 Constrained vs Dual Mobility at 6 Months-9 Years: 2.802(2.401, 3.270), p<.0001  
 Standard Bearing vs Dual Mobility over 9 Years: 1.213(1.125, 1.308)p<.0001

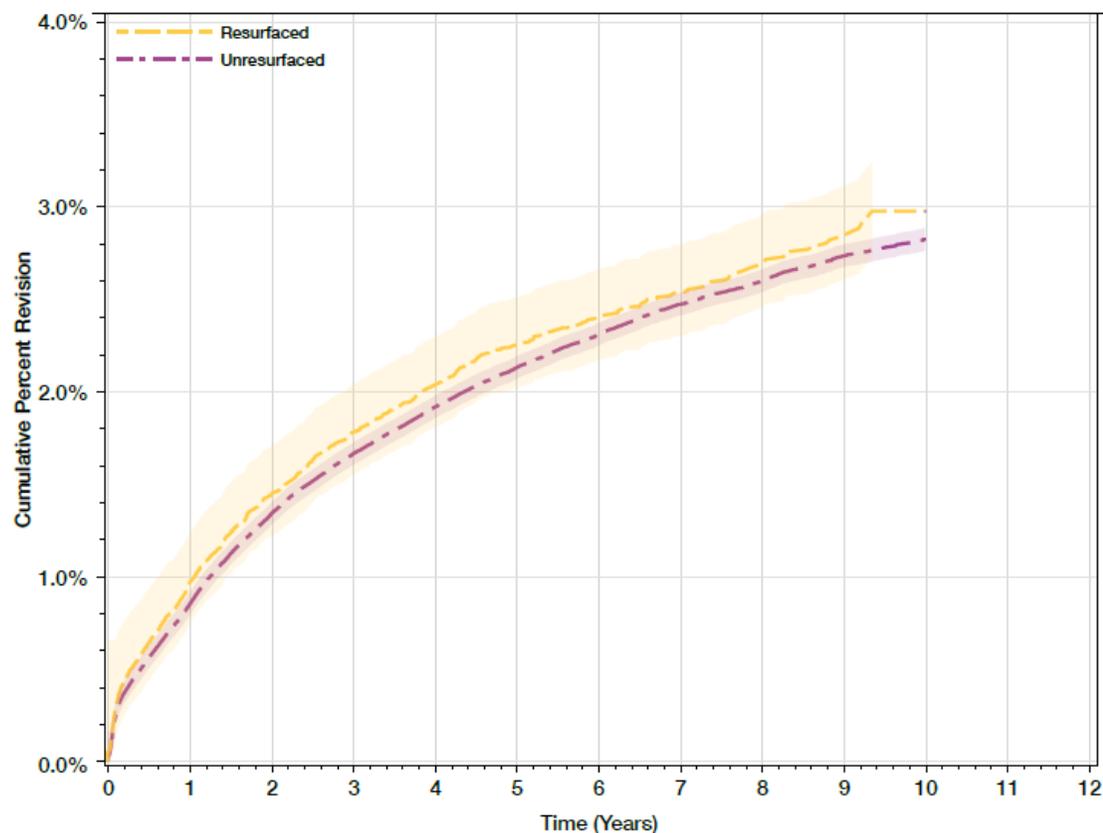
# CUMULATIVE PERCENT REVISION (KNEE)

CPR rates for primary TKA stratified by the presence or absence of patellar resurfacing in Medicare patients aged 65 years and older with primary osteoarthritis are reported from 2012 to 2024.

No statistically significant difference was noted comparing the CPR for primary TKA with or without patellar resurfacing at a 10 years follow-up interval (HR: 1.004(0.944,1.068) p=0.9045).

It should be noted that not all potential confounders have been considered in this analysis.

**Figure 3.9** Cumulative Percent Revision for Primary Total Knee Arthroplasty Patellar-Resurfacing in Medicare Patients 65 Years of Age and older with Primary Osteoarthritis, 2012-2024

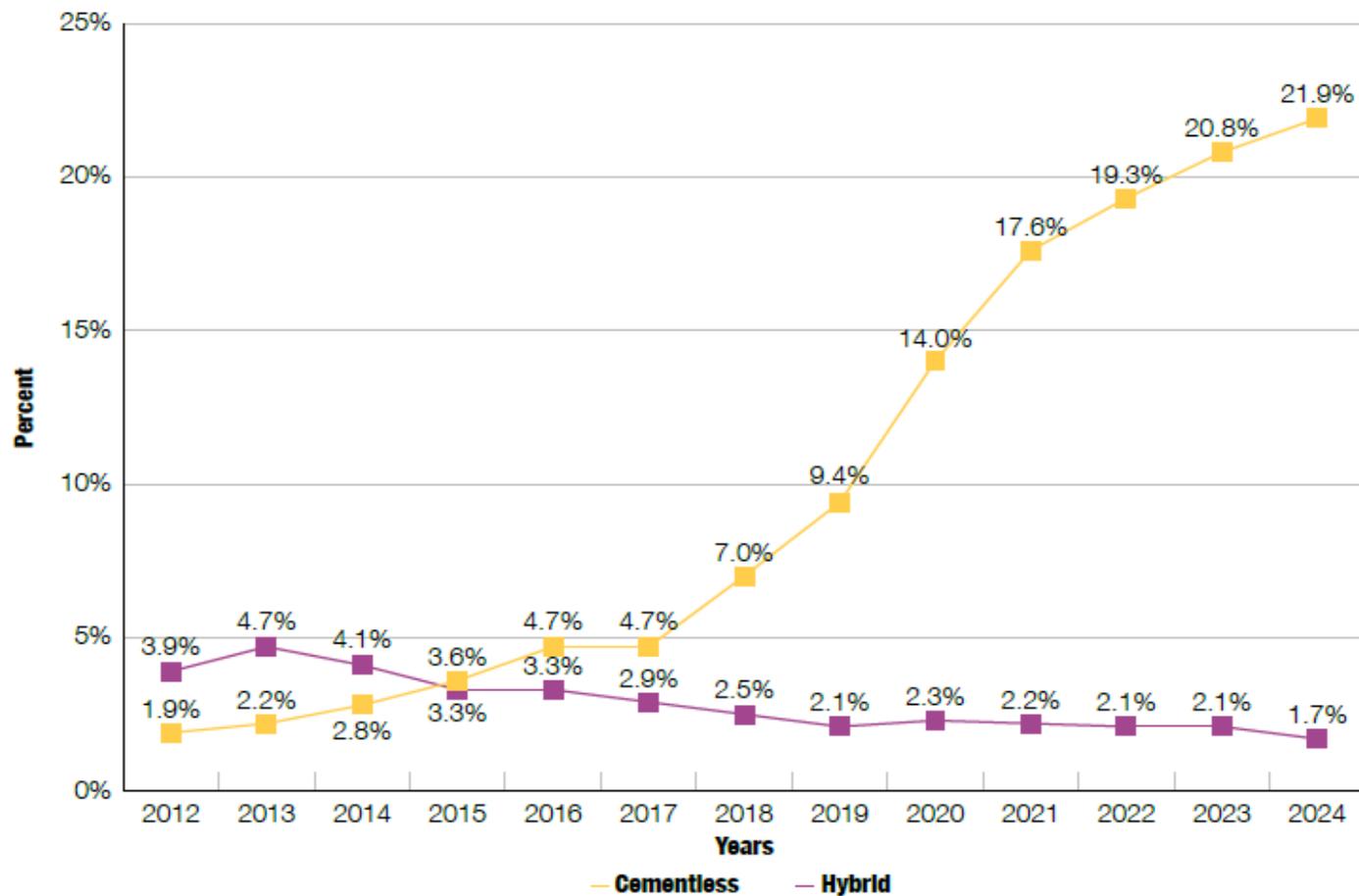


Group	stat	0	1	2	3	4	5	6	7	8	9	10
Resurfaced	At Risk	827,196	729,356	615,157	524,509	453,461	390,367	314,149	237,592	160,840	96,045	51,150
	KM % revision	0.02 (0.02, 0.02)	0.85 (0.83, 0.87)	1.34 (1.31, 1.37)	1.66 (1.63, 1.69)	1.92 (1.88, 1.95)	2.13 (2.09, 2.17)	2.31 (2.27, 2.35)	2.47 (2.43, 2.51)	2.60 (2.56, 2.64)	2.73 (2.69, 2.78)	2.82 (2.77, 2.88)
Unresurfaced	At Risk	75,404	60,765	45,466	35,433	28,985	23,918	18,408	13,616	8,666	4,930	2,641
	KM % revision	0.05 (0.04, 0.07)	0.96 (0.89, 1.04)	1.44 (1.35, 1.54)	1.78 (1.67, 1.89)	2.04 (1.92, 2.16)	2.25 (2.12, 2.39)	2.40 (2.27, 2.55)	2.53 (2.38, 2.69)	2.69 (2.53, 2.87)	2.84 (2.65, 3.04)	2.98 (2.76, 3.2)

Age, Sex, CCI, Age \* log(time), CCI \* log(time) adjusted HR (95% CI), p-value  
Unresurfaced vs Resurfaced over 120 Months: 1.004(0.944, 1.068)p=0.9045

# PROCEDURE TRENDS (KNEE)

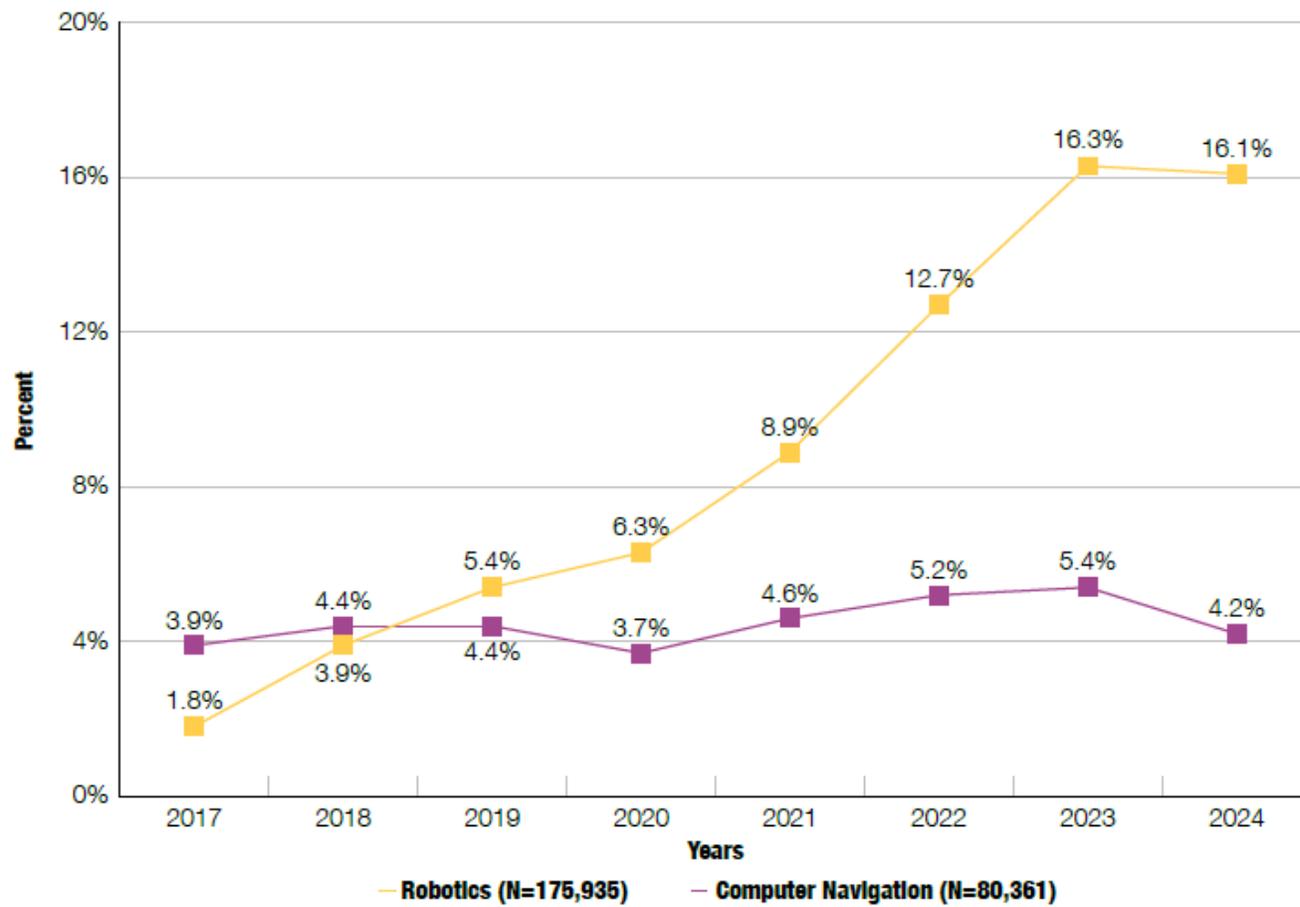
**Figure 3.10** Distribution of Hybrid and Cementless Fixation Utilization for Primary Total Knee Arthroplasty, 2012-2024  
(N=1,530,764)



# TECHNOLOGY USE (KNEE)

Trends in robotic usage for primary TKA in the U.S. over time are reported (Figures 3.16-3.17). The use of robotic assistance in primary TKA has significantly increased over the past five years approaching 16.1% in the aggregate analysis in 2024

Figure 3.16 Rate of Technology Use for Assistance in Total Knee Arthroplasty, 2017-2024 (N = 219,627)

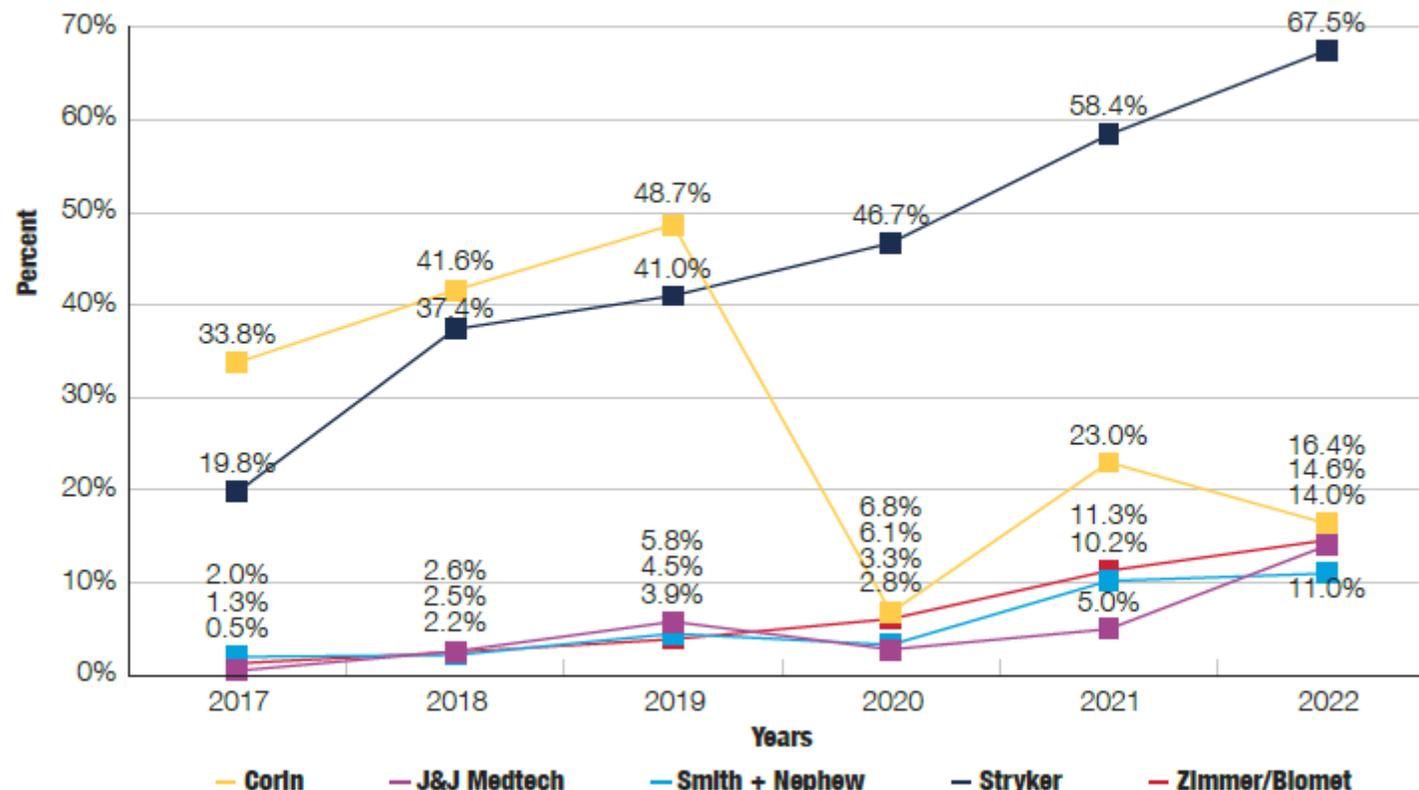


# TECHNOLOGY USE (KNEE)

Rates of robotic use in primary TKA varies significantly based on the specific robotic platforms used.

As data capture improves over time, additional manufacturers will be included for trend analysis. It is important to note that the robotics data submitted to the AJRR may be subject to selection bias, as it reflects robotic systems used by submitting institutions.

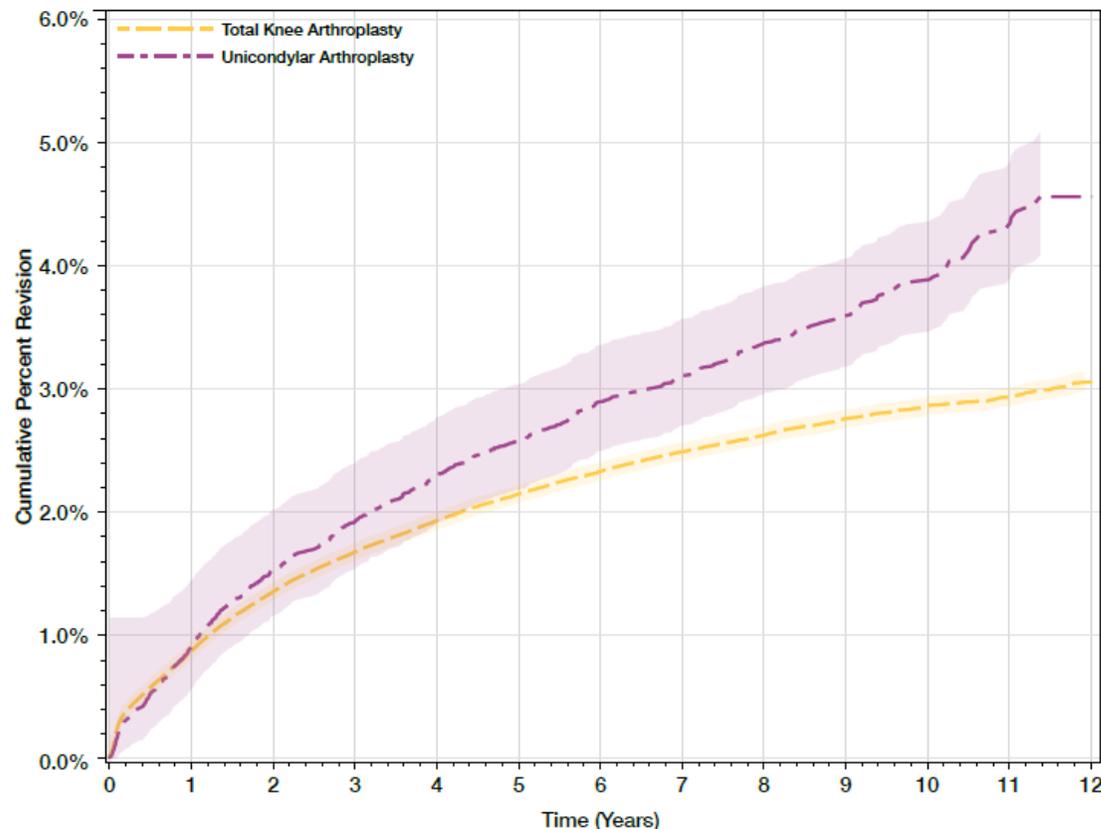
**Figure 3.17 Percentage of Primary TKA with Robotic Use Stratified by Manufacturer, 2017-2022 (N=176,416).**



# CUMULATIVE PERCENT REVISION (KNEE)

The CPR for primary TKA and UKA differ significantly for patients aged 65 and older. The rates of CPRs are higher in UKA compared to primary TKA after at longer term follow-up intervals.

**Figure 3.23** Cumulative Percent Revision of Total Knee Versus Unicondylar Knee Constructs for Femoral Components in Medicare Patients 65 Years of Age and older with Primary Osteoarthritis, 2012-2024

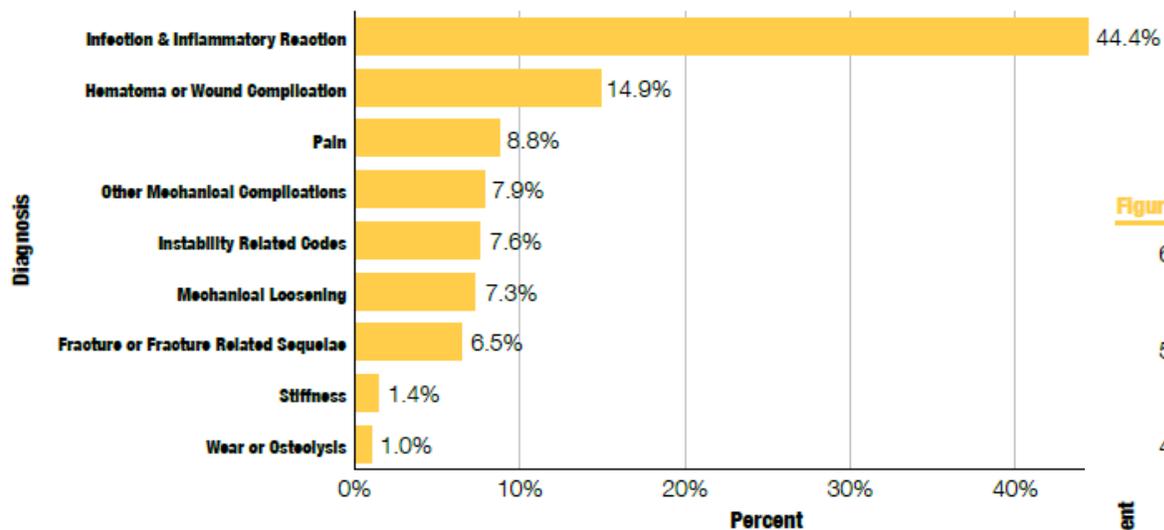


Group	stat	0	1	2	3	4	5	6	7	8	9	10	11	12
Total Knee Arthroplasty	At Risk	1,279,563	1,089,426	897,441	748,846	640,254	544,400	435,908	331,900	225,367	138,285	77,716	35,130	9,776
	KM % revision	0.03 (0.02, 0.03)	0.87 (0.86, 0.89)	1.35 (1.33, 1.38)	1.67 (1.65, 1.7)	1.93 (1.9, 1.96)	2.15 (2.12, 2.18)	2.33 (2.3, 2.36)	2.49 (2.45, 2.52)	2.62 (2.59, 2.66)	2.76 (2.72, 2.8)	2.86 (2.81, 2.9)	2.93 (2.88, 2.98)	3.05 (2.98, 3.12)
Unicondylar Arthroplasty	At Risk	45,543	39,889	33,613	28,565	24,493	20,872	16,521	12,562	9,958	7,171	4,421	2,089	811
	KM % revision	0.01 (0.01, 0.03)	0.91 (0.82, 1)	1.53 (1.41, 1.65)	1.92 (1.79, 2.06)	2.30 (2.15, 2.46)	2.57 (2.41, 2.74)	2.89 (2.71, 3.08)	3.10 (2.9, 3.3)	3.37 (3.15, 3.6)	3.58 (3.35, 3.83)	3.86 (3.6, 4.14)	4.34 (3.99, 4.71)	4.55 (4.15, 4.99)

Age, Sex, CCI adjusted HR (95% CI), p-value  
 Unicondylar Arthroplasty vs Total Knee Arthroplasty at 0-3 Months: 0.979(0.832,1.151), p=0.7944  
 Unicondylar Arthroplasty vs Total Knee Arthroplasty at 3 Months-6 Years: 1.346(1.254,1.444), p<.0001  
 Unicondylar Arthroplasty vs Total Knee Arthroplasty at 6-12 Years: 1.941(1.609,2.341), p<.0001

# REVISION (KNEE)

Figure 3.27 Distribution of Diagnosis Associated with Early “Linked” Knee Revisions, 2012-2023 (N=7,161)\*

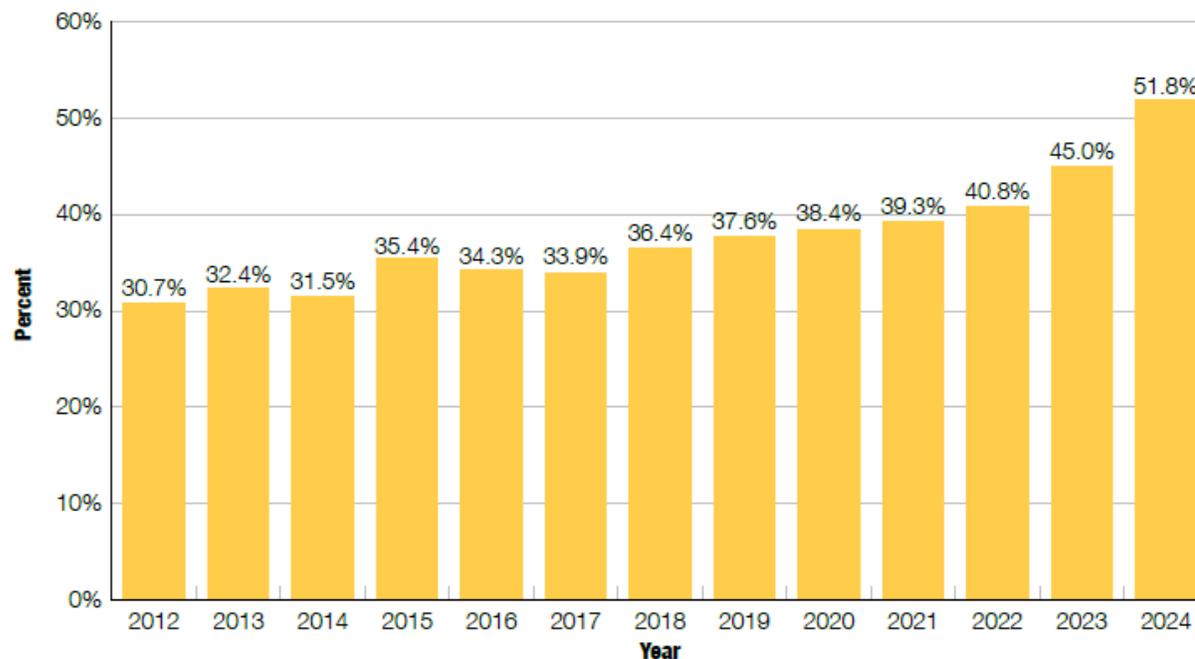


\*Linked revisions require matching patient ID, procedure site, and laterality

## INSIGHTS

Infection was the most frequent reason for re-revision TKA (40.2%)

Figure 3.29 Percent of Revision Knee Arthroplasty Procedures Due to Infection, 2012-2024 (N=51,816)



## INSIGHTS

The percentage of primary TKA revisions due to infection has consistently increased from 2015 and accounts for over half of all knee revisions in 2024 (Figure 3.29).

# PATIENT REPORTED OUTCOME MEASURES (HIP)

**Table 2.29 Overall Change Between Preoperative and 1-Year Postoperative PROM Scores after Primary Hip Arthroplasty using Distribution-Based MCID by PROM, 2012-2024**

Patient-Reported Outcome Measure (PROM)	PROM Component	Patients with Preoperative Score	Patients with Linked Postoperative Score	Response Rate, Percentage of Patients Who Completed a Preoperative and 1-Year Score	Patients with Meaningful Improvement*	Distribution-based MCID
<b>HOOS, JR. (Hip Disability and Osteoarthritis Outcome Score)</b>	Score	198,146	47,967	24.20%	93.30%	7.9
<b>PROMIS-10 (Patient-Reported Outcomes Measurement Information System 10)</b>	Mental T	128,629	29,395	22.90%	32.60%	5.1
	Physical T	128,633	29,397	22.90%	70.60%	4.7
<b>VR-12 (The Veterans RAND 12 Item Health Survey)</b>	Mental Health Component	28,790	8,506	29.50%	37.60%	5.8
	Physical Health Component	28,704	8,515	29.70%	81.10%	4.8

\*Meaningful improvement was calculated by minimal clinical important difference (MCID). MCID was determined to be a positive change score of half the pooled standard deviation.  
 \*Cases statistically incapable of achieving MCID due to a high preoperative score were excluded.

**Table 2.10 Overall Change Between Preoperative and 1-Year Postoperative PROM Scores after Primary Hip Arthroplasty using Anchor-Based MCID for KOOS JR., 2012-2024**

Patient-Reported Outcome Measure (PROM)	PROM Component	Patients with Preoperative Score	Patients with Linked Postoperative Score	Response Rate, Percentage of Patients Who Completed a Preoperative and 1-Year Score	Patients with Meaningful Improvement*	Anchor-based MCID Threshold
<b>HOOS, JR. (Hip Disability and Osteoarthritis Outcome Score)</b>	Score	197,096	47,687	24.20%	83.90%	18

\*Meaningful improvement was calculated by minimal clinical important difference (MCID). MCID was determined using an anchor-based approach, as described by Lyman SL et al, 2018.  
 \*Cases statistically incapable of achieving MCID due to a high preoperative score were excluded.

93% of reported cases met MCID for HOOS, JR.

# PATIENT REPORTED OUTCOME MEASURES (KNEE)

- AAOS has launched a PROMs in Practice initiative that aims to influence the active clinical use of PROMs at the point of musculoskeletal care. More information about this can be found on the AAOS website at [www.aaos.org/proms](http://www.aaos.org/proms)
- As of December 31, 2024, 751 sites submitted PROMs data which is a 19% increase from the 2023 report
- 87% of reported cases met MCID for KOOS, JR.

**Table 3.12 Overall Change Between Preoperative and 1-Year Postoperative PROM Scores after Primary Knee Arthroplasty using Distribution-Based MCID by PROM, 2012-2024**

Patient-Reported Outcome Measure (PROM)	PROM Component	Patients with Preoperative Score	Patients with Linked Postoperative Score	Response Rate, Percentage of Patients Who Completed a Preoperative and 1-Year Score	Patients with Meaningful Improvement*	Distribution-based MCID
KOOS, JR. (Knee Disability and Osteoarthritis Outcome Score)	Score	323,348	76,841	23.80%	86.90%	7.4
PROMIS-10 (Patient-Reported Outcomes Measurement Information System 10)	Mental T	212,059	47,950	22.60%	32.40%	4.7
	Physical T	212,059	47,942	22.60%	62.50%	4.3
VR-12 (The Veterans RAND 12 Item Health Survey)	Mental Health Component	47,727	14,119	29.60%	32.70%	5.9
	Physical Health Component	47,611	14,125	29.70%	72.90%	4.8

\*Meaningful improvement was calculated by minimal clinical important difference (MCID). MCID was determined to be a positive change score of half the pooled standard deviation.  
 \*\*Cases statistically incapable of achieving MCID due to a high preoperative score were excluded.

**Table 3.13 Overall Change Between Preoperative and 1-Year Postoperative PROM Scores after Primary Knee Arthroplasty using Anchor-Based MCID for KOOS JR., 2012-2024**

Patient-Reported Outcome Measure (PROM)	PROM Component	Patients with Preoperative Score	Patients with Linked Postoperative Score	Response Rate, Percentage of Patients Who Completed a Preoperative and 1-Year Score	Patients with Meaningful Improvement*	Anchor-based MCID Threshold
KOOS, JR. (Knee Disability and Osteoarthritis Outcome Score)	Score	322,536	76,648	23.80%	76.90%	14

\*Meaningful improvement was calculated by minimal clinical important difference (MCID). MCID was determined using an anchor-based approach, as described by Lyman SL et al, 2018.  
 \*\*Cases statistically incapable of achieving MCID due to a high preoperative score were excluded.

# RECENT PUBLICATIONS AND PRESENTATIONS

The goal of the AAOS Registry Analytics Institute® (RAI) is to provide a resource to the scientific community to further understand and improve orthopaedic and musculoskeletal care by making data analyses available. RAI also provides physicians and clinician-scientists access to information beyond what is already published in the AJRR Annual report.

- Over 20 publications utilizing AJRR data in 2025
- Review Appendix A for a list of relevant publications

## Appendix A

Recent AJRR Publications and Presentations

# CONTACT THE AAOS REGISTRY PROGRAM

**Annual Report:** [www.aaos.org/registries/publications](http://www.aaos.org/registries/publications)

**General:** [RegistryInfo@aaos.org](mailto:RegistryInfo@aaos.org)

**Contracts, Invoicing, & Onboarding:** [RegistryEngagement@aaos.org](mailto:RegistryEngagement@aaos.org)

**Phone:** (847) 292-0530

**Business Hours:** Monday through Friday, 8 a.m. to 4 p.m. Central Time