

American Joint Replacement Registry: Introduction and Highlights

www.aaos.org/registries/ajrr

Our Speakers Today

- **Bryan D. Springer, MD, FAAOS** - AJRR Steering Committee Chair
- **James A. Browne, MD, FAAOS** - AJRR Steering Committee Member

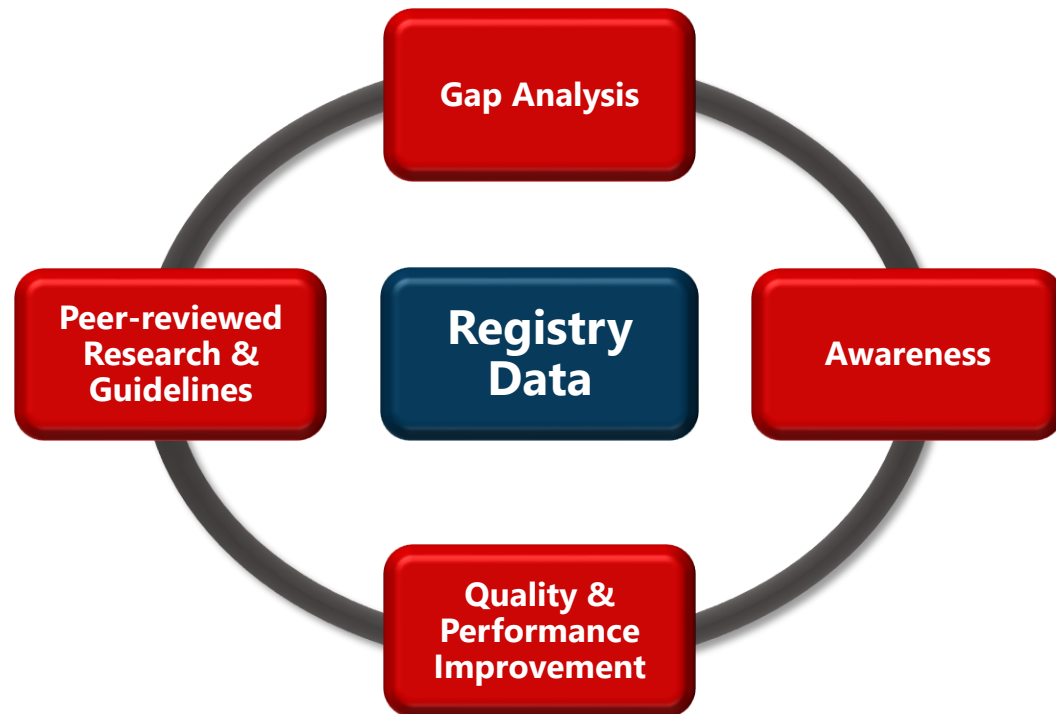
Disclosures: Bryan D. Springer, MD, FAAOS

- AAOS: Chair of AJRR Steering Committee
- AJRR: Board or committee member
- American Association of Hip and Knee Surgeons: Board or committee member
- Arthroplasty Today: Editorial or governing board
- ICJR: Board or committee member
- Journal of Arthroplasty: Editorial or governing board
- No financial conflicts of interest relevant to this presentation

Disclosures: James A. Browne, MD, FAAOS

- AAOS: Member of AJRR Steering Committee
- American Association of Hip and Knee Surgeons: Board or committee member
- American Joint Replacement Registry (AAOS): Board or committee member
- Journal of Arthroplasty: Editorial or governing board; Publishing royalties, financial or material support
- Journal of Bone and Joint Surgery - American: Publishing royalties, financial or material support
- Southern Orthopaedic Association: Board or committee member
- No financial conflicts of interest relevant to this presentation

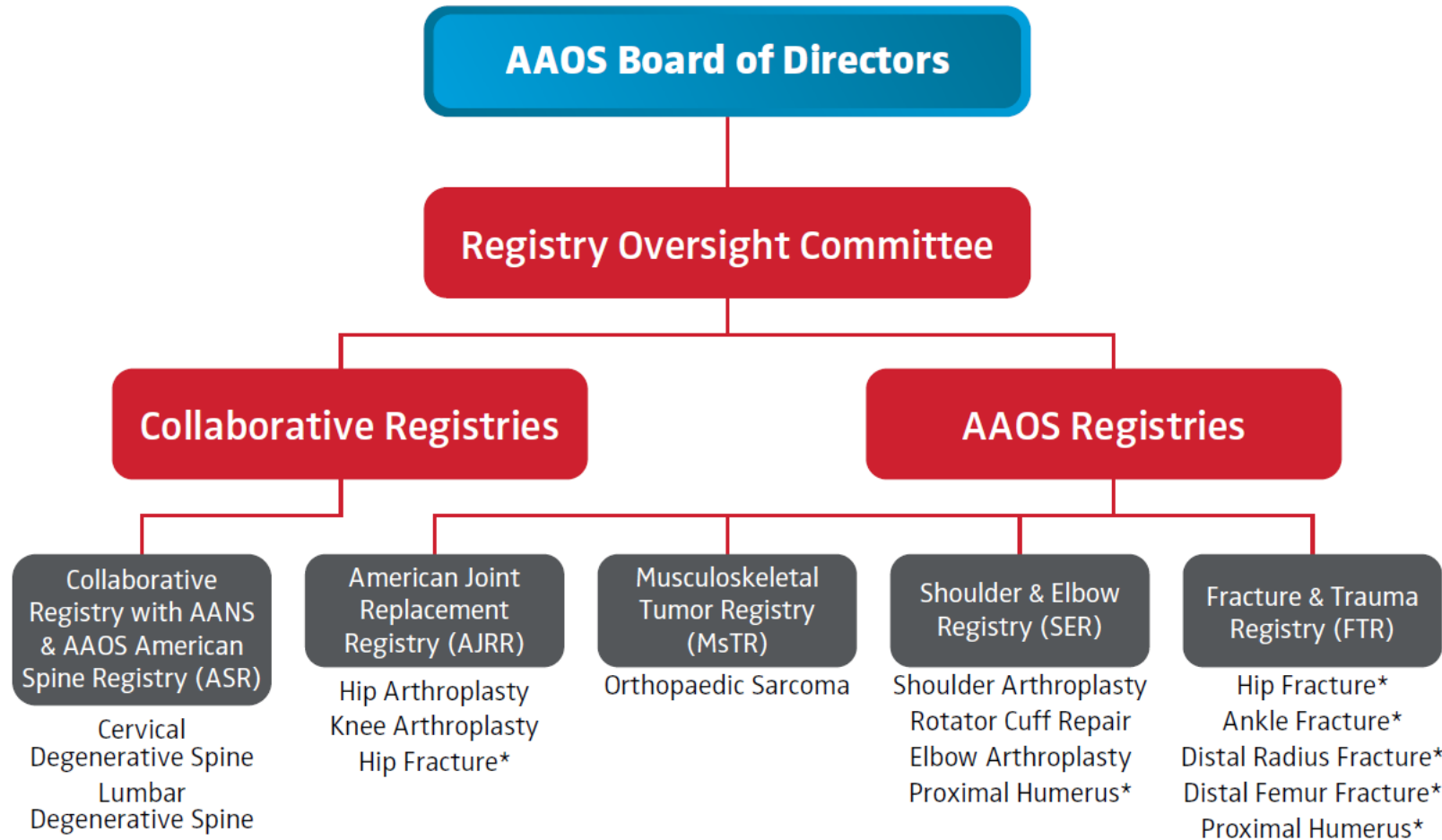
At the Core of Academy Strategy



Registry Effort Goals

- ✓ Collect unique clinical information demonstrating ***real-world practice***
- ✓ Enable ***performance measurement*** by physicians for physicians
- ✓ Facilitate national registry-driven ***quality improvement*** programs
- ✓ Support novel scientific ***research***

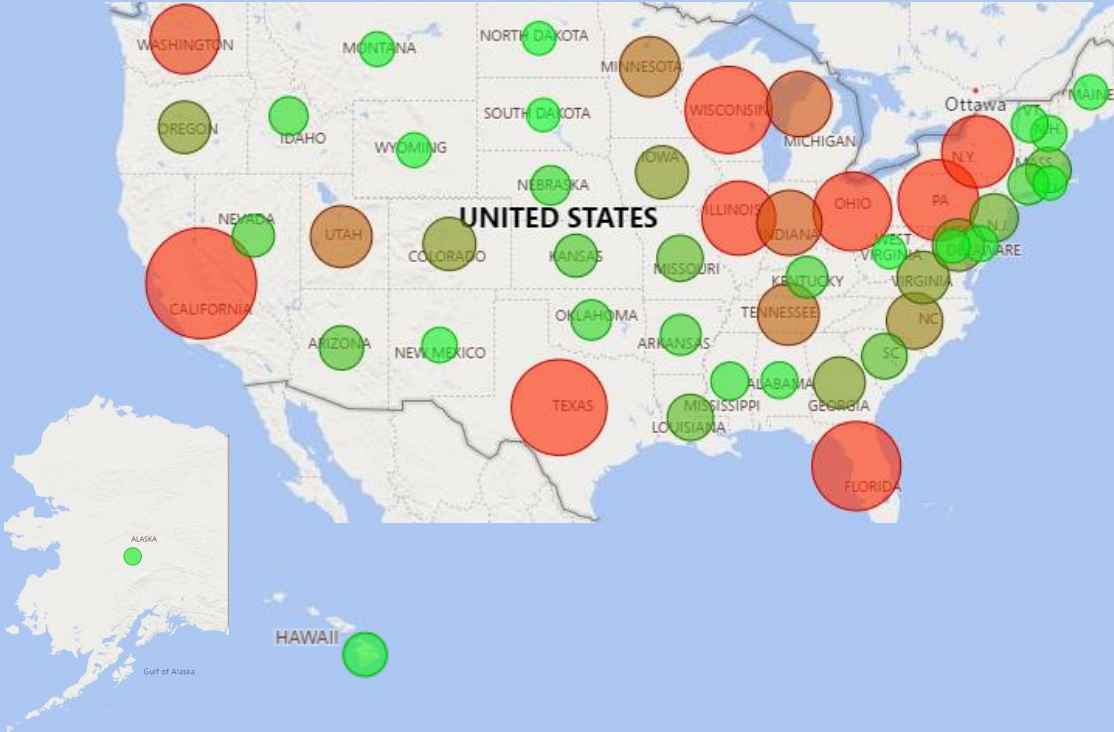
AAOS Family of Registries



**Modules in development*

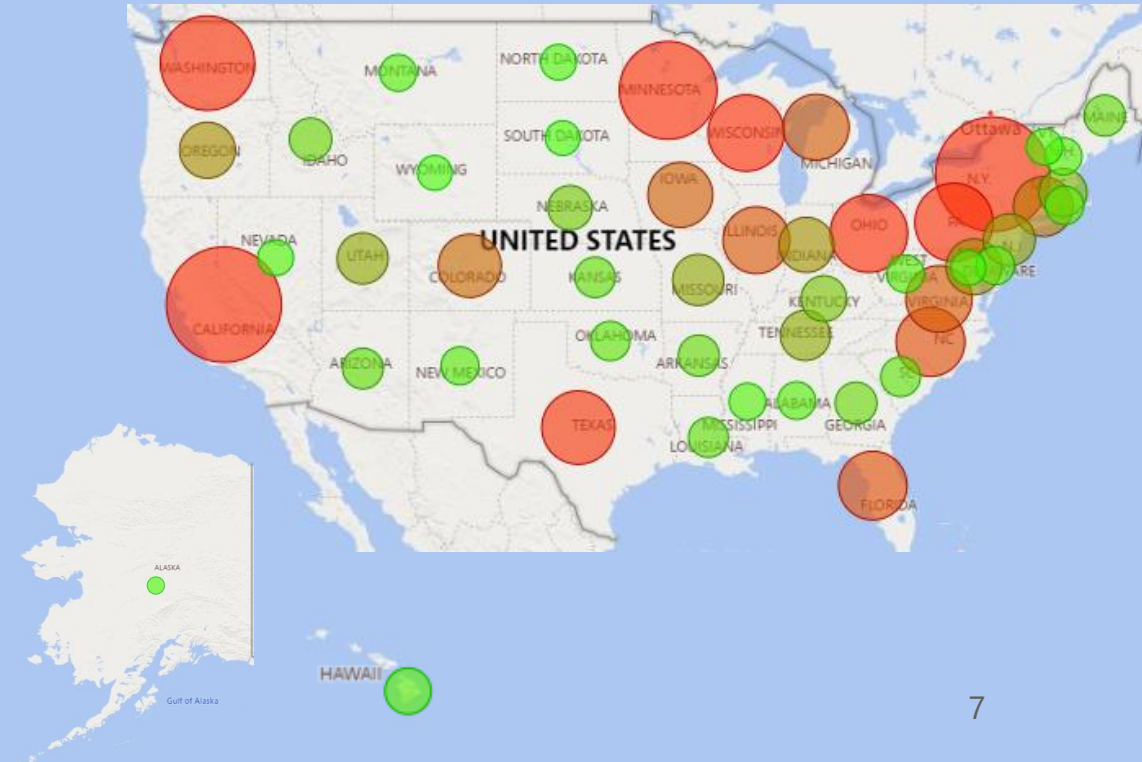
Participation Across the Registries

Sites by State



Over 1,600 participating sites contracted and 12,500 registered surgeons across all 50 states.

Procedures by State

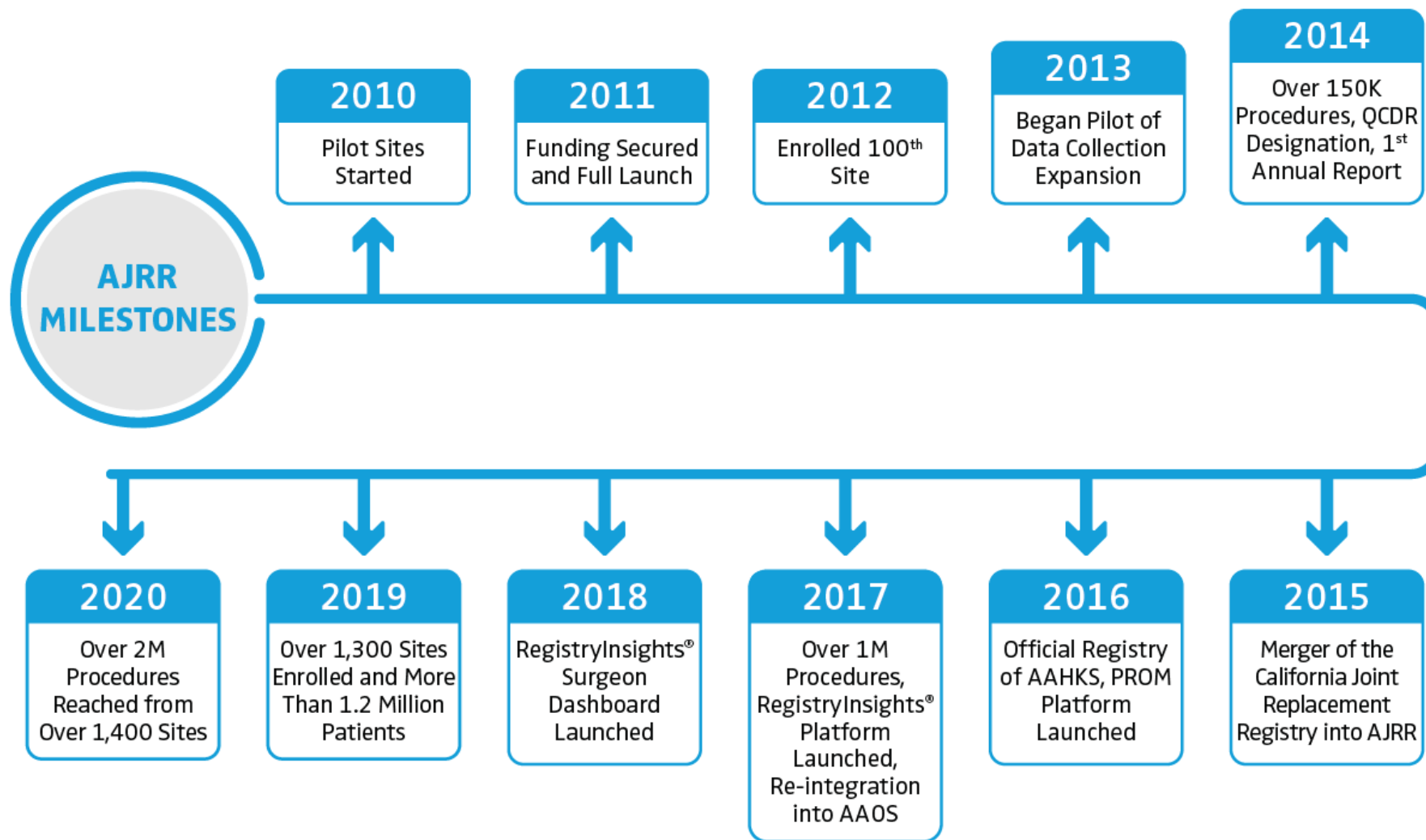


Data representing over 2,300,000 procedures capturing approximately 40% of all US TJA volume annually.

American Joint Replacement Registry



About AJRR



AJRR Steering Committee

- **Bryan D. Springer, MD, FAAOS – Chair**
OrthoCarolina
- **James I. Huddleston, III, MD, FAAOS – Vice Chair**
Stanford University
- **Scott M. Sporer, MD, FAAOS – Secretary**
Rush
- **James A. Browne, MD, FAAOS**
University of Virginia
- **Antonia Chen, MD, MBA, FAAOS**
Brigham and Women’s Hospital
- **Paul J. Duwelius, MD, FAAOS**
Orthopedic and Fracture Specialists
- **Richard L. Illgen, II, MD, FAAOS**
University of Wisconsin
- **William A. Jiranek, MD, FAAOS, FACS**
Duke University
- **Robert L. Krebbs**
Health Plan Representative, Optima Health
- **Jonathan H. Lee, MD, FAAOS**
Health Plan Representative, Cigna Healthcare
- **Richard F. Seiden, Esq.**
Public Advisory Board (PAB) Representative
- **James D. Slover, MD, FAAOS, MS**
NYU Langone Health
- **Jeffrey B. Stambough, MD, FAAOS**
University of Arkansas

AJRR Data Element Overview

Two Modules: Hip Arthroplasty & Knee Arthroplasty

Procedure

Patient

- Name, Date of Birth, SSN
- Diagnosis (ICD-9/10, CPT)
- Gender
- Race/Ethnicity
- Height + Weight/BMI
- Payer Status

Site of Service

- Name and Address (TIN, NPI)

Surgeon

- Name (NPI)
- Trainee

Procedure

- Type (ICD-9/10, CPT)
- Date of Surgery, Length of Stay
- Surgical Approach
- Surgical Technique
- Laterality
- Implants (Manufacturer, Lot #)
- Anesthesia

Comorbidities and Complications

- Comorbidities (ICD-9/10, CPT)
- CJR Risk Variables
- Height + Weight/Body Mass Index
- Length of Stay
- American Society of Anesthesiologists Score
- Charlson Index
- Operative and Post-operative Complications

Patient-reported Outcomes

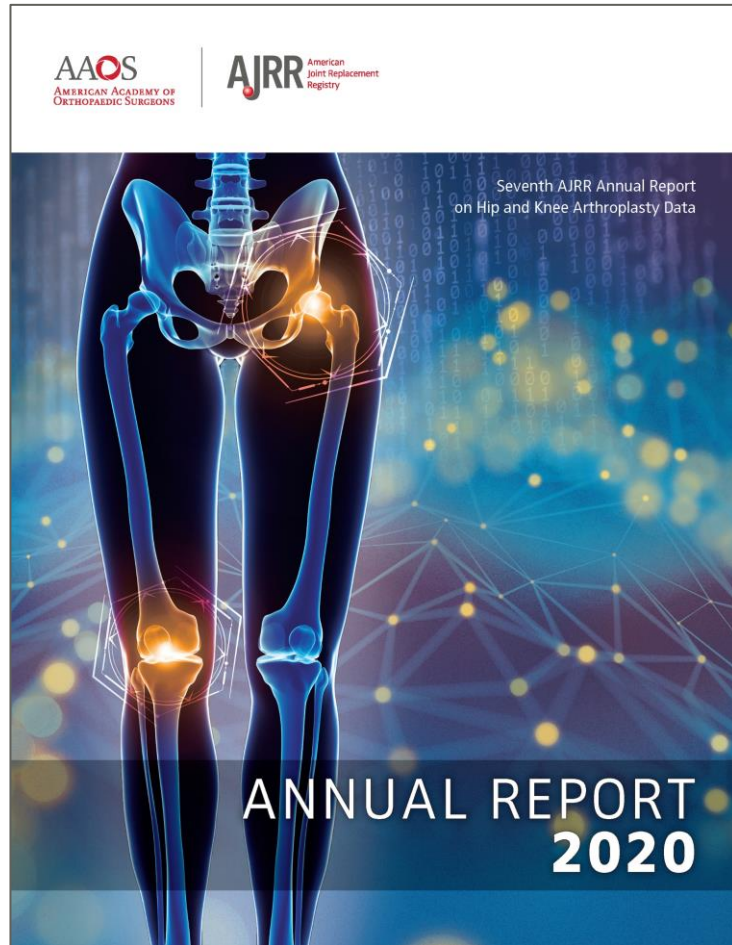
Recommended:

- PROMIS-10 Global
- VR-12
- HOOS Jr. /KOOS, Jr.

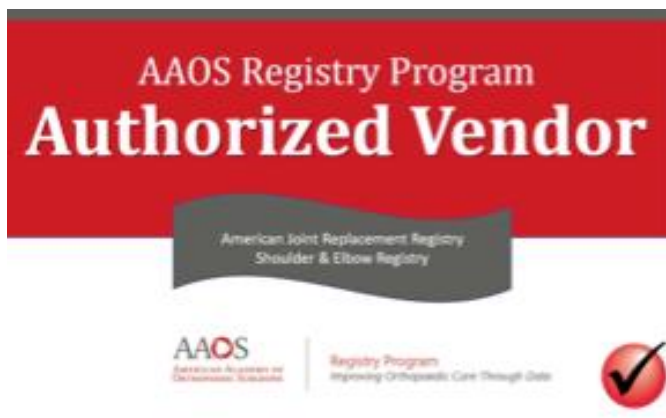
Also Accepted:

- SF-36 v1
- HOOS/KOOS
- Oxford Hip and Knee Scores
- Knee Society Knee Scoring System
- Harris Hip Score
- WOMAC (Modified via HOOS and KOOS)
- SF-12, EQ-5D, WOMAC (only accepting final scores)

Integration of Medicare Data



- Access to **Medicare claims** inclusive of inpatient (148 data elements), outpatient (122 data elements) & National Death Index
- Linked by full identifiers for longitudinal tracking
- 2012-2019 Medicare data for all patients represented in Registry
 - Medicare files
 - National Death Index
 - National Inpatient Sample (NIS) integrated as reference data for representative analyses
 - NPPES dataset incorporated for NPI validation
- Access to custom reports that compare their site to the national Annual Report analyses, show migration trends, etc.



Decrease Data Collection Burden

- 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

Qualified Clinical Data Registry

- AAOS maintains a QCDR designation
- Specialty society driven participation in the Merit-incentive Based Payment System (MIPS)
- QCDR provides participants access to Promoting Interoperability (PI) and Quality Payment Program (QPP) credit
- Additional opportunities for alternative reporting for the bundled payment through BPCI-A episodes

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.

- AAOS RegistryInsights® Platform Standard Reports and personalized dashboards
- AAOS RegistryInsights National Benchmarks
- Accreditation Association for Ambulatory Health Care (AAAHC) Advanced Orthopaedic Certification
- Aetna Institutes of Quality (IOQ) Orthopaedic Surgery
- American Board of Neurological Surgery (ABNS) Continuous Certification (CC)
- American Board of Orthopaedic Surgeons (ABOS) Maintenance of Certification (MOC) Program
- BlueCross BlueShield Blue Distinction Specialty Care
- Blue Shield of California waiver of prior authorization
- Bree Collaborative
- CMS Merit-based Incentive Payment System (MIPS) Promoting Interoperability (PI) and Quality Payment Program (QPP)
- Centers for Medicare & Medicaid Services (CMS) Bundled Payments for Care Improvement Advanced (BPCI-A)
- CMS Comprehensive Care for Joint Replacement (CJR) Model
- Cigna Surgical Treatment Support Program
- DNV GL Orthopaedic Center of Excellence
- The Alliance QualityPath
- The Joint Commission Advanced for Total Hip & Knee Replacement Certification
- The Joint Commission Advanced Certification in Spine Surgery (ACSS)

Three Ways to Access Data



Custom
Reports



RegistryInsights®
Dashboards



Registry Analytics
Institute®

Custom Reports

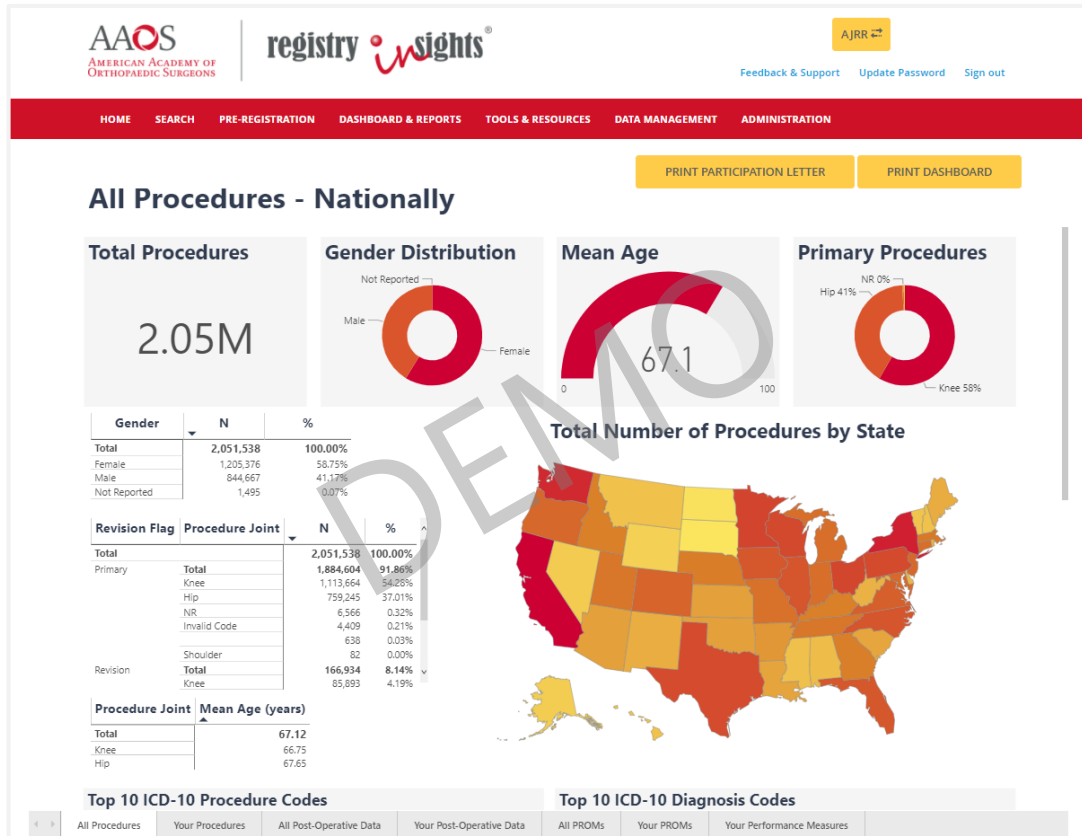


Custom reports created by our analytics team to help understand and package your site data in an actionable format

Custom reports can include site specific metrics and shape continuous improvements to the canned dashboards provided

Aggregated reports for every metric across all data submitted including procedural, post-operative and PROMs data can be provided at your site level

RegistryInsights® Dashboards



On-demand practice specific dashboards



Compare your practice to national performance benchmarks



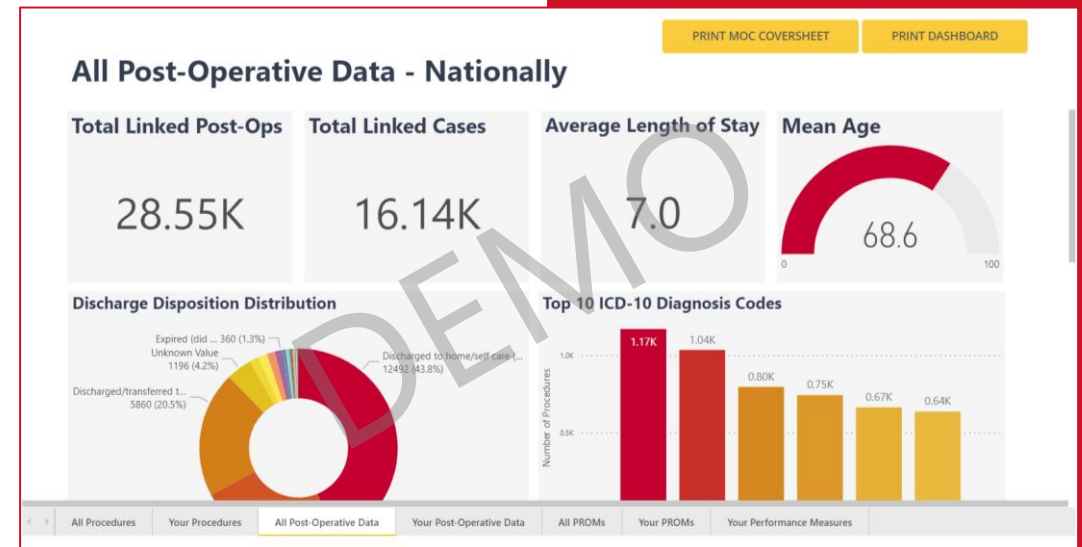
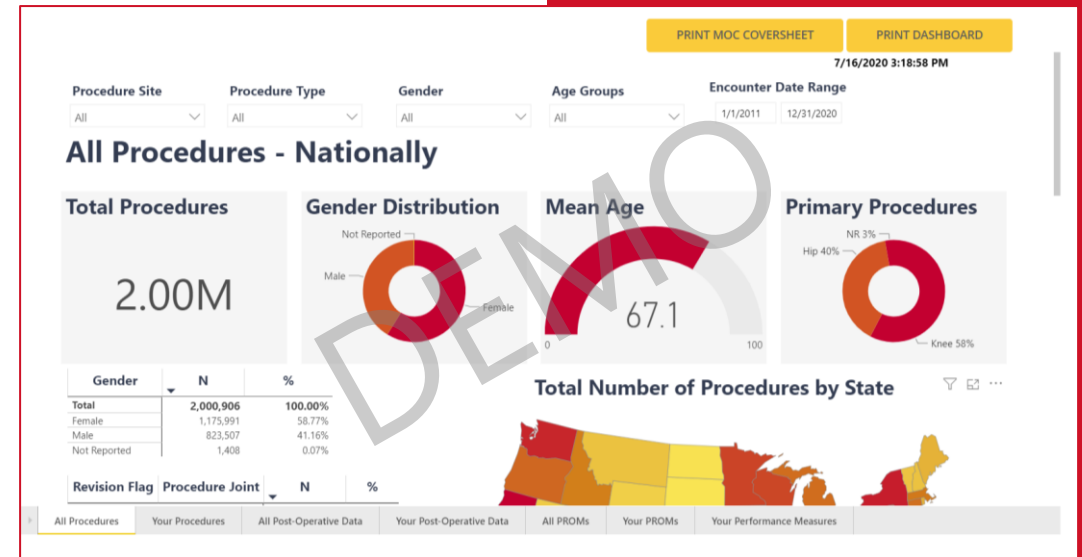
Unlimited surgeon accounts with access to system, site, and surgeon level dashboards



Surgeon Dashboards

Authorized Surgeon Users

- View their procedural, post-operative and PROM data
- National benchmarks for comparison measures
- Request custom reports
- Submit data for quality initiatives (e.g., ABOS MOC, QPP, BPCI-A)



PROM Management

AAOS AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS registry insights

UNET Community Feedback & Support Sign out

HOME SEARCH PRE-REGISTRATION DASHBOARD & REPORTS TOOLS & RESOURCES DATA MANAGEMENT ADMINISTRATION

HOME / REPORTS

Procedure Reports Patient Reported Outcomes Reports

Count of Components by Type

Count of Procedures by ICD-10 Procedure Codes

Count of Procedures by CPT Procedure Codes

Procedures With Component Information (ICD-10)

Shoulder Procedures Submitted to SER (ICD-10)

Count of Procedures By Surgeon

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AAOS AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS registry insights

UNET Community Feedback & Support Sign out

HOME SEARCH PRE-REGISTRATION DASHBOARD & REPORTS TOOLS & RESOURCES DATA MANAGEMENT ADMINISTRATION

HOME / REPORTS / PROM PATIENT STATUS REPORT

Entries 10 Results 1-10 of 120

| ACCOUNT ID | HOSPITAL/ASC NAME | PATIENT ID | PATIENT LAST NAME | PATIENT FIRST NAME | PATIENT DATE OF BIRTH | PATIENT EMAIL ADDRESS | PATIENT PHONE TYPE | PATIENT PHONE NUMBER | PROCEDURE | LATERALITY | PLANNED SURGERY DATE | SURGEON NPI |
|------------|---------------------|------------|-------------------|--------------------|-----------------------|-----------------------|--------------------|----------------------|-----------------------|------------|----------------------|-------------|
| 1041062 | SER Test Hospital 1 | PRP30258 | ataAOS | johnny | 1/1/1980 | | | | Shoulder Arthroplasty | Left | 1/24/2019 | |
| 1041062 | SER Test Hospital 1 | PRP30258 | ataAOS | johnny | 1/1/1980 | | | | Shoulder Arthroplasty | Left | 1/24/2019 | |
| 1041061 | SER Test Hospital 5 | PRP30261 | Bobby | Ricky | 7/16/2019 | | | | Rotator Cuff Repair | Left | 2/28/2019 | 1619012200 |
| 1041061 | SER Test Hospital 5 | PRP30261 | Bobby | Ricky | 7/16/2019 | | | | Rotator Cuff Repair | Right | 2/28/2019 | 1619012200 |
| 1041062 | SER Test Hospital 1 | PRP30246 | Brown | Charlie | 1/1/1980 | | | | Shoulder Arthroplasty | Left | 1/20/2019 | |
| 1041062 | SER Test Hospital 1 | PRP30246 | Brown | Charlie | 1/1/1980 | | | | Shoulder Arthroplasty | Left | 1/20/2019 | |
| 1041062 | SER Test Hospital 1 | PRP30235 | butkus | dick | 1/1/1980 | | | | Shoulder Arthroplasty | Left | 1/20/2019 | |

PRE-REGISTRATION FORM PRE-REGISTRATION UPLOAD

This form allows AJRR Users to pre-register patients prior to surgery for pre-operative, patient-reported outcome measures (PROMs) data collection. Once the form has been submitted, a patient pre-operative case will be added to the Registry. The pre-registration process permits users to collect PROMs from patients via the AJRR platform through the patient kiosk or through manual entry of a patients' PROMs responses into the platform if collected by paper or clinician/surrogate administration.

PART 1: Patient demographic details

Please complete all applicable required and optional fields of the patient demographic section. Note: Email is conditionally required, however if you are administering assessments via email you must provide a patient email or the system will not be able to send the email to the patient.

If the Patient Social Security Number (SSN) is not available, please select the 'Not Available' option next to the Social Security field. Please note that the Registry also accepts the last 4 digits of the SSN. Patient SSN assists the Registry with achieving its mission through the ability to track longitudinal device information.

Social Security*

Not Available

Email

PART 2: Pre-Operative Case Information

Please complete all applicable required and optional fields of the pre-operative case section. Case information is required for all cases to be added to the Registry. Please note that all case data requested pertains to future procedures.

Planned Proc Date

Procedure Site

Select One

Shoulder

Elbow

Institution

Select One

Surgeon

Select One

Payer Info

Select One

SUBMIT

Registry Analytics Institute®

- The goal of the AAOS Registry Analytics Institute is to provide a resource to the scientific community to further understand and improve orthopaedic and musculoskeletal care by making data available to examine outcomes related to orthopaedics.
 - The Institute provides clinicians and clinician-scientists the opportunity to submit proposals for analytic insight that are contained within its various registries.
 - Selected awardees receive statistical support, data analyses, and potential monetary support

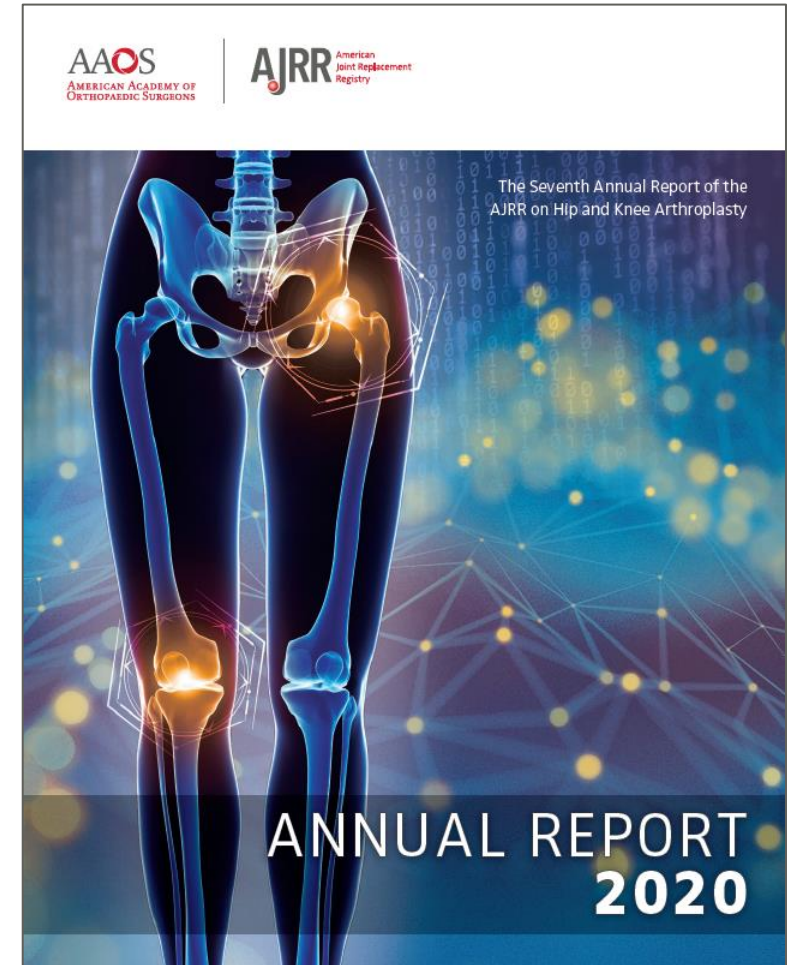
To learn more: www.aaos.org/registryanalyticsinstitute

2020 AJRR Annual Report

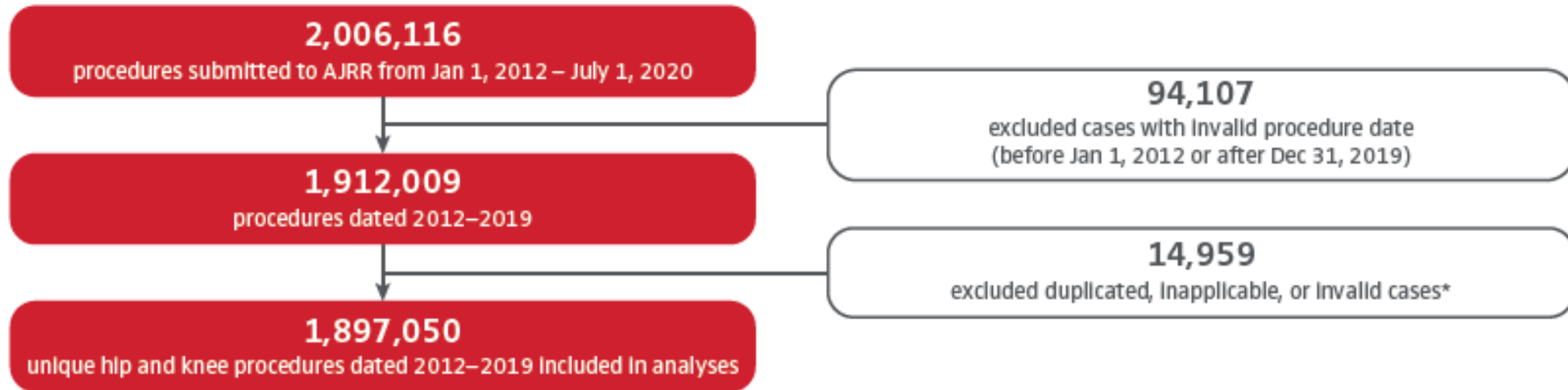
- Summary Statistics
 - Procedure, institution, and patient distributions
- Data Completeness
- Hip Arthroplasty
- Knee Arthroplasty
- Revision Procedures
- Implant Utilization and Survivorship
- Patient Reported Outcome Measures (PROMs)

Download the 2020 Annual Report and

2019 Annual Report Supplement: www.aaos.org/registries/publications



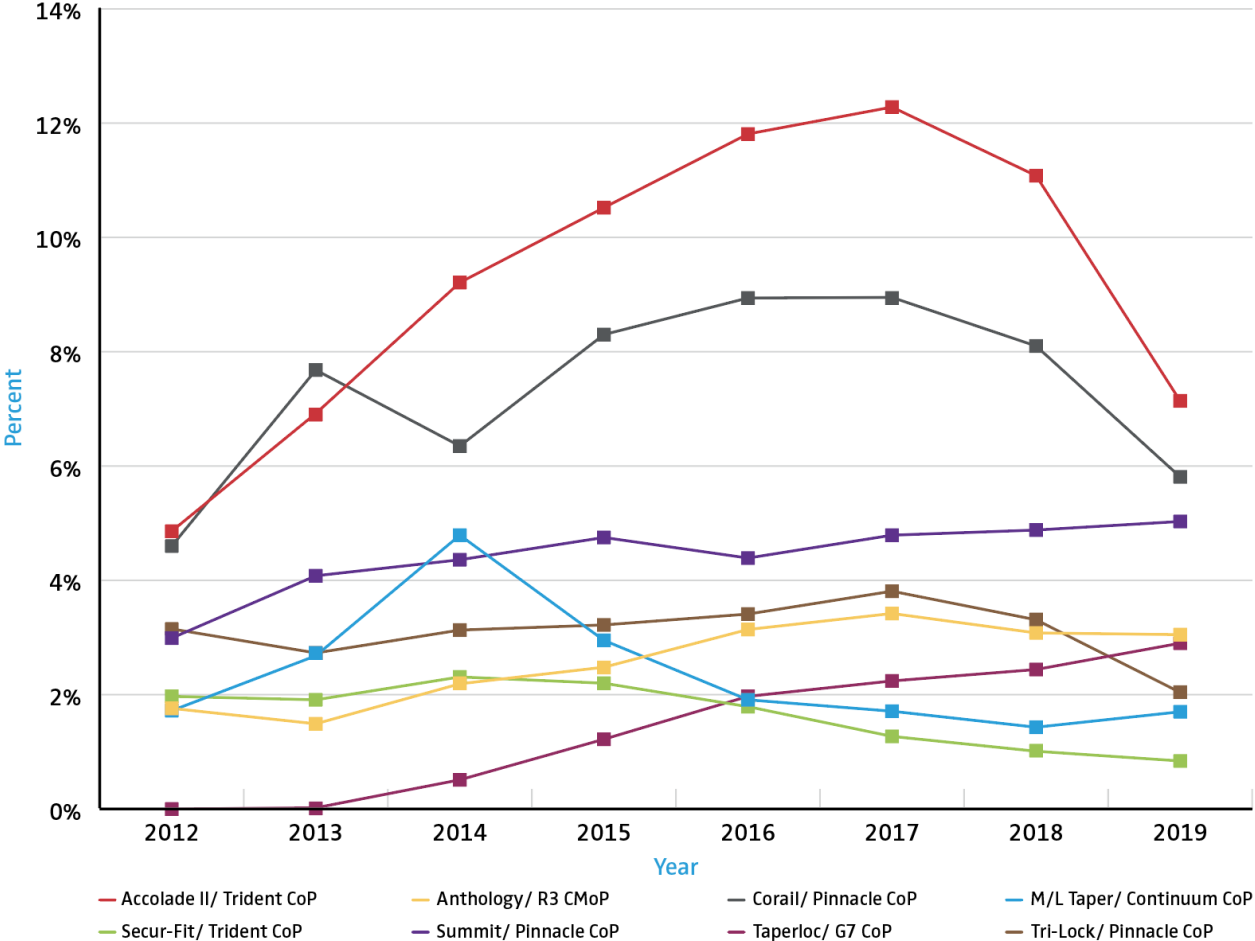
AJRR Annual Report Overview



- Data submitted to AJRR across all 50 states and the District of Columbia
- Supplementary datasets utilized where appropriate for descriptive and longitudinal analysis
 - Medicare inpatient and outpatient claims data
 - American Hospital Association (AHA) survey data

Implant Utilization

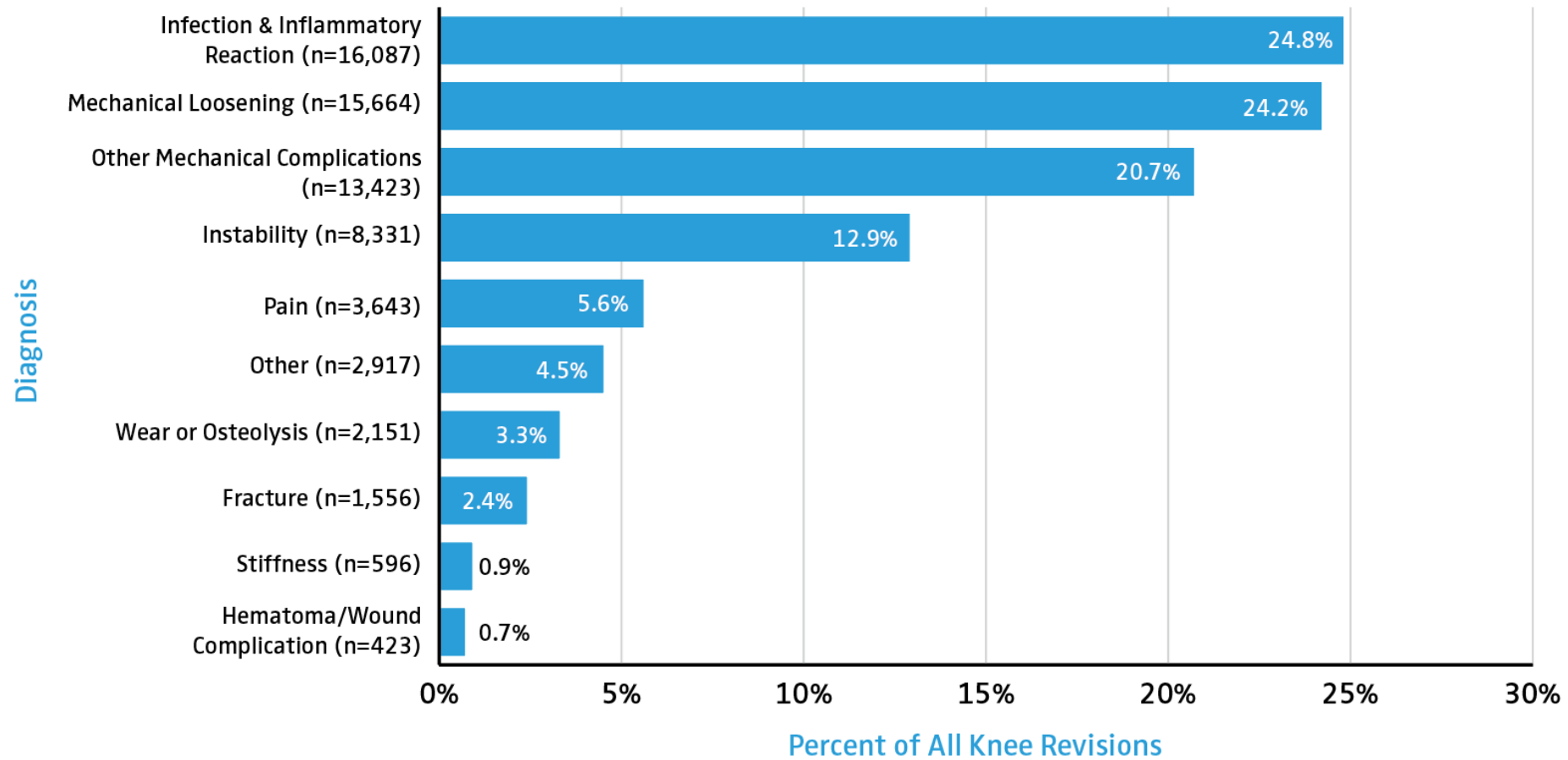
Figure 2.25: Elective Primary Total Hip Arthroplasty Stem/Shell Component Combinations by Year, 2012-2019 (N=482,808)



| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---------|--------|--------|--------|--------|--------|--------|--------|--------|
| Total N | 12,750 | 26,646 | 47,476 | 65,113 | 84,446 | 90,604 | 84,094 | 71,679 |

Revision Procedures

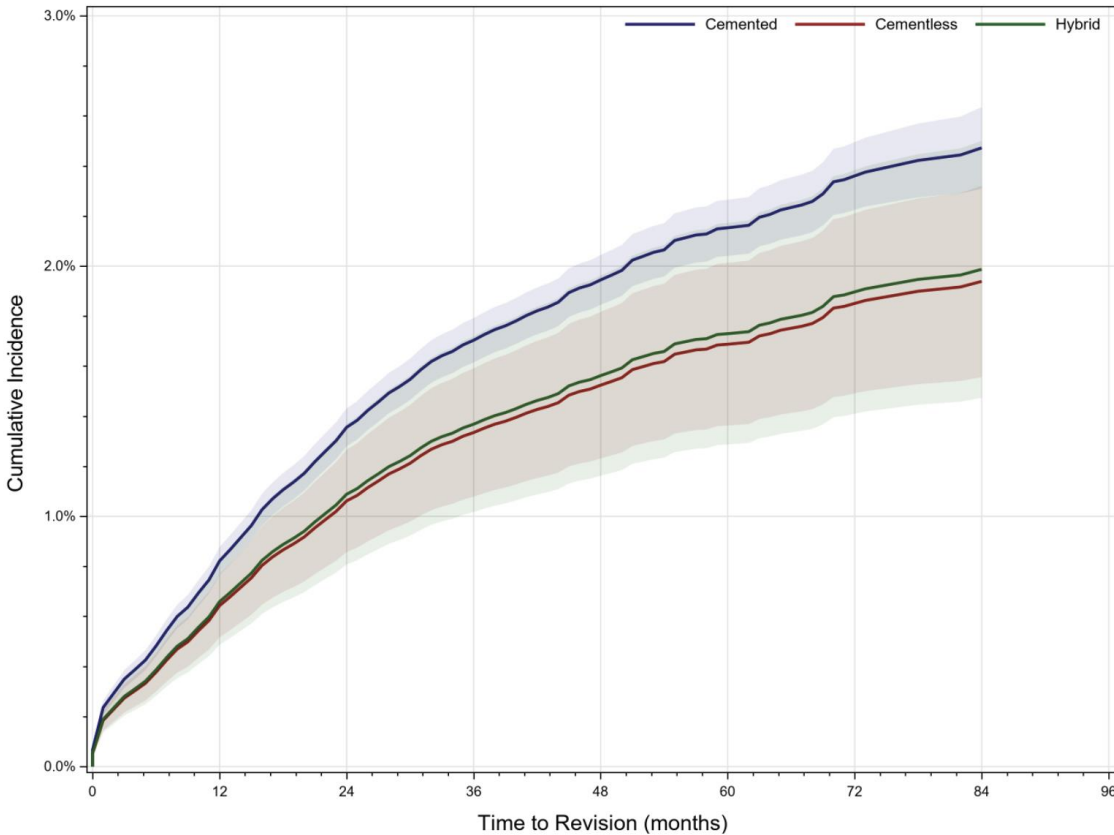
Figure 3.24: Distribution of Diagnosis Associated with All Knee Revisions, 2012-2019 (N=64,791)



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Cumulative Percent Revision Figures

Figure 3.12: Cumulative Percent Revision for Cemented Versus Cementless Fixation for a Primary Total Knee Arthroplasty for Males <65 Years of Age Diagnosed with Primary Osteoarthritis as Submitted Only to AJRR, 2012-2019



| Number at Risk (months) | 0-12 | 13-24 | 25-36 | 37-48 | 49-60 | 61-72 | 73-84 | 85-96 | Total |
|-------------------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|--------------|----------------|
| Cementless | 2,287 | 2,070 | 1,884 | 1,468 | 781 | 513 | 283 | 116 | 9,402 |
| Cemented | 12,386 | 15,043 | 18,628 | 17,685 | 14,801 | 10,633 | 6,132 | 2,751 | 98,059 |
| Hybrid | 406 | 610 | 726 | 731 | 549 | 593 | 354 | 137 | 4,106 |
| Total | 15,079 | 17,723 | 21,238 | 19,884 | 16,131 | 11,739 | 6,769 | 3,004 | 111,567 |

Age Adjusted Hazard Ratio (95% CI)
 Cementless vs. Cemented: 0.782 (0.641, 0.954) $p=0.0152$
 Hybrid vs. Cemented: 0.802 (0.617, 1.041) $p=0.0978$

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Patient Reported Outcome Measures

Table 2.5/2.6: Change Between Preoperative and 1-Year Postoperative PROM Scores After Elective Primary Hip Arthroplasty and Knee Arthroplasty, 2012-2019

| 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* |
|---|---------------------------|----------------------------------|--|---|---------------------------------------|
| HOOS, JR. (Hip disability and Osteoarthritis Outcome Score) | Score | 24,749 | 5,769 | 23.3% | 92.5% |
| PROMIS-10 (Patient-Reported Outcomes Measurement Information System 10) | Mental T | 16,525 | 3,978 | 24.1% | 38.6% |
| | Physical T | 16,525 | 3,978 | 24.1% | 67.5% |
| VR-12 (The Veterans RAND 12 Item Health Survey) | Mental Health Component | 11,898 | 3,265 | 27.4% | 40.0% |
| | Physical Health Component | 11,754 | 3,271 | 27.8% | 80.5% |

*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.

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| 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* |
|---|---------------------------|----------------------------------|--|---|---------------------------------------|
| KOOS, JR. (Knee injury and Osteoarthritis Outcome Score, Junior) | Score | 41,976 | 10,290 | 24.5% | 88.0% |
| PROMIS-10 (Patient-Reported Outcomes Measurement Information System 10) | Mental T | 29,164 | 7,421 | 25.5% | 32.7% |
| | Physical T | 29,164 | 7,421 | 25.5% | 67.5% |
| VR-12 (The Veterans RAND 12 Item Health Survey) | Mental Health Component | 18,219 | 5,058 | 27.8% | 33.9% |
| | Physical Health Component | 18,016 | 5,065 | 28.1% | 75.0% |

*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.

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2019 AJRR Annual Report Supplement

- AJRR Representativeness Analysis compared to NIS Data for THA and TKA
 - Procedure volume
 - Patient Demographics
 - Geographic representation
- Device Specific Cumulative Percent Revision Curves
 - Most commonly used Hip and Knee constructs

Download the 2020 Annual Report and 2019 Annual Report Supplement: www.aaos.org/registries/publications

ANNUAL REPORT 2019

Sixth AJRR Annual Report
on Hip and Knee Arthroplasty Data

AJRR Representativeness (NIS Comparison)

Figure 1.2 Proportion of TJA Patients by Age Groups, Comparison Between NIS and AAOS-AJRR, 2012-2018

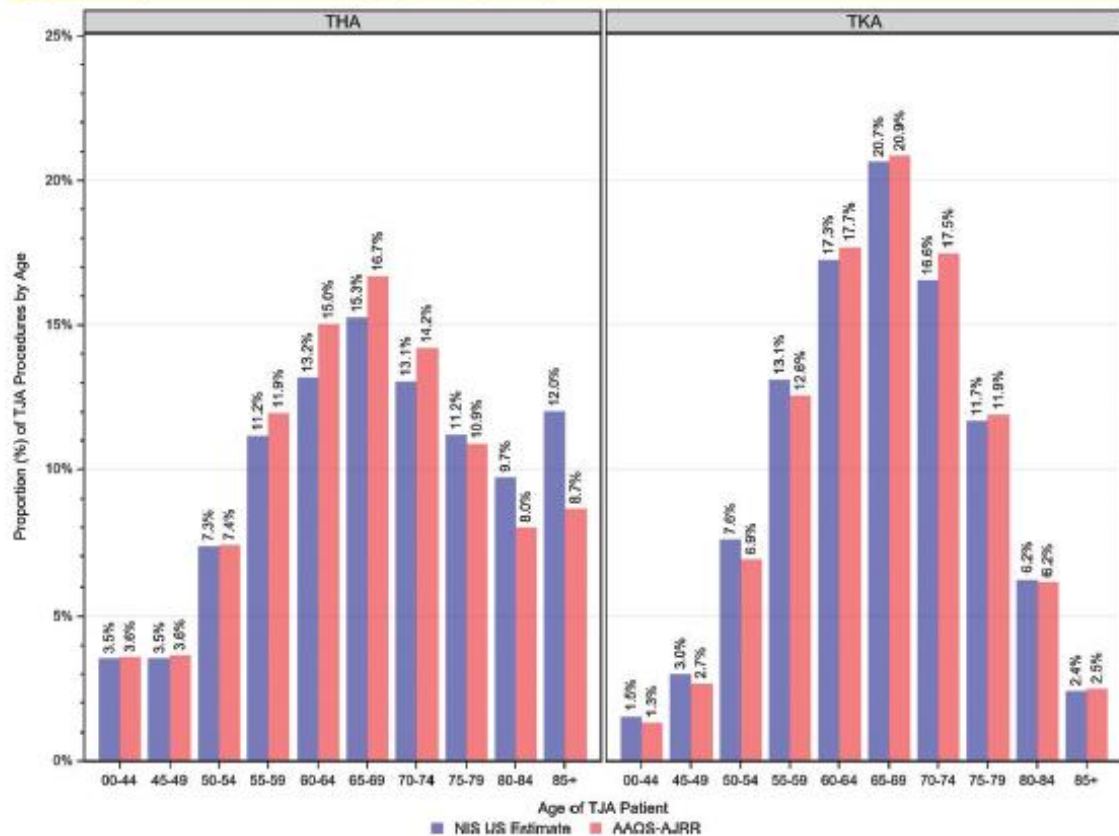
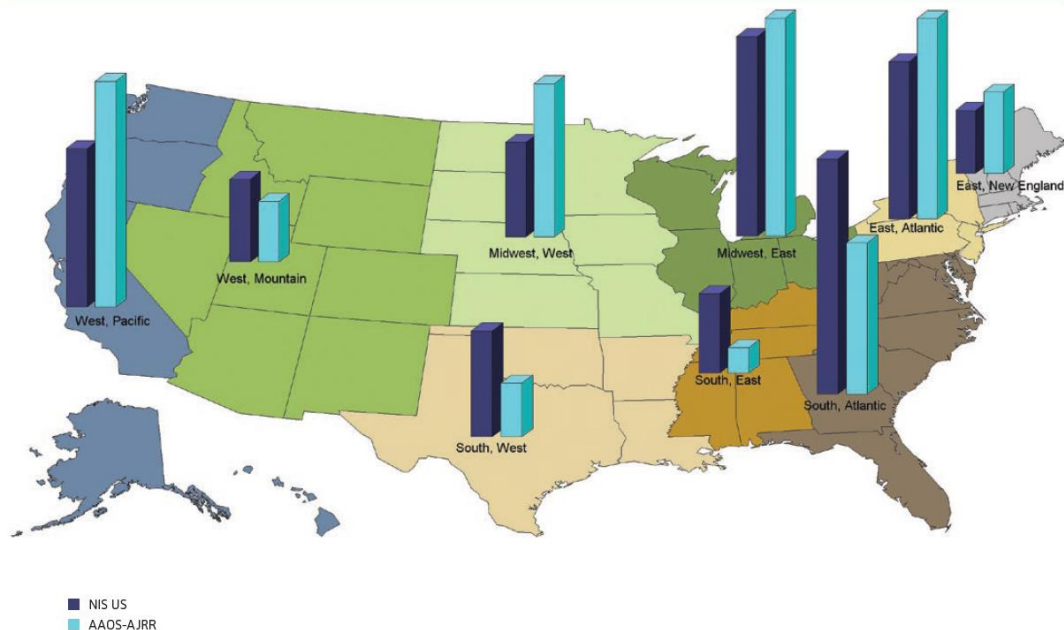
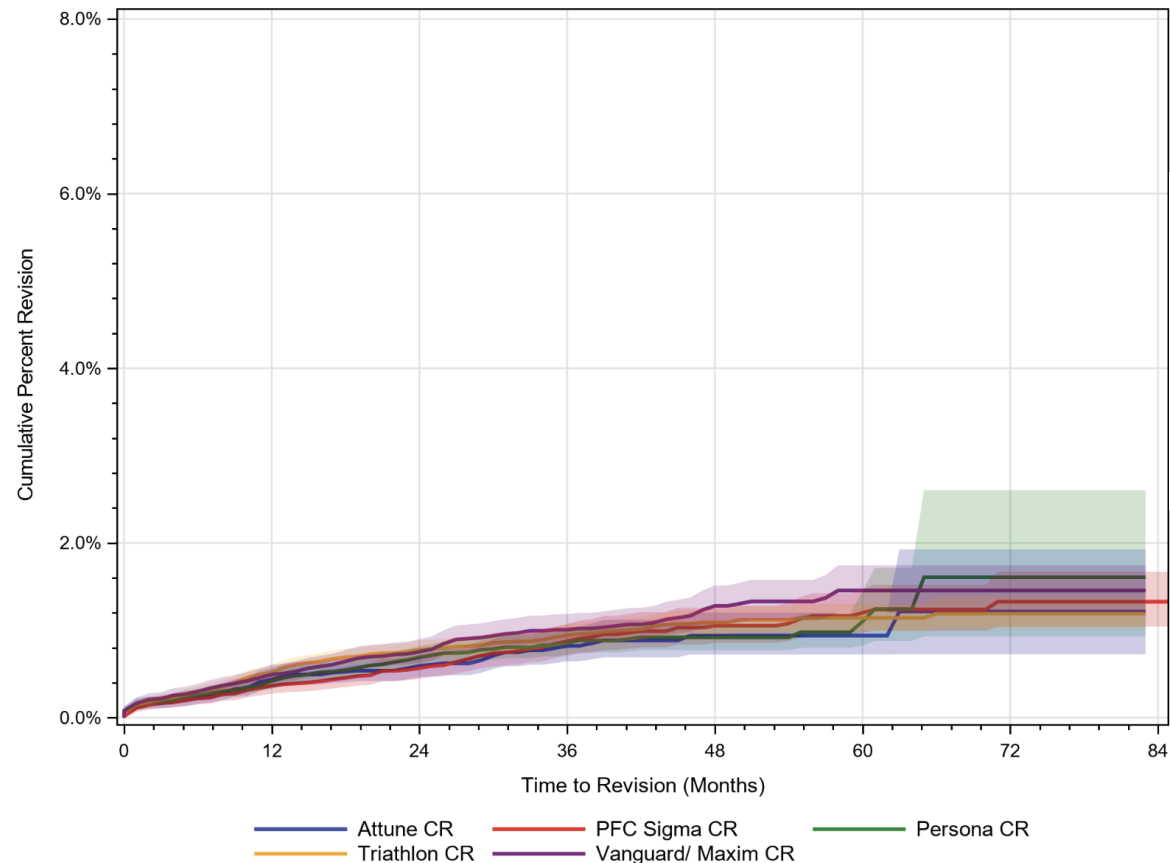


Figure 1.3 Proportion of THA Procedures by U.S. Census Division, Comparison Between NIS and AAOS-AJRR, 2012-2018



Device-Specific Cumulative Percent Revision Curves

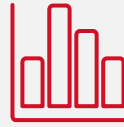
Figure 3.16: Five Most Commonly Used Constructs: Cruciate Retaining Fixed Bearing Tibial Baseplate Designs for Primary Total Knee Arthroplasty in Patients ≥65 Years of Age for All Causes for Revision, 2012-2018



| Group Name | Total | Failure Events | Not Failed | Competing Events (Death) | Percent Without Event |
|--------------------|----------------|----------------|----------------|--------------------------|-----------------------|
| Vanguard/ Maxim CR | 19,106 | 169 | 18,690 | 247 | 99.1% |
| Triathlon CR | 37,356 | 287 | 36,657 | 412 | 99.2% |
| PFC Sigma CR | 13,845 | 110 | 13,492 | 243 | 99.2% |
| Persona CR | 23,788 | 160 | 23,440 | 188 | 99.3% |
| Attune CR | 12,826 | 82 | 12,661 | 83 | 99.4% |
| Total | 106,921 | 808 | 104,940 | 1,173 | 99.2% |

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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**



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



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

Contact the AAOS Registry Program

General: RegistryInfo@aaos.org

Technical Support: RegistrySupport@aaos.org

Contracts, Invoicing, & Onboarding: RegistryEngagement@aaos.org

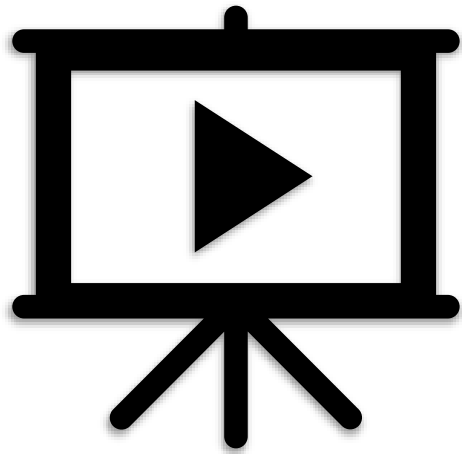
Custom Analytics: RegistryAnalytics@aaos.org

Registry Analytics Institute: RegistryAnalyticsInstitute@aaos.org

Phone: (847) 292-0530

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

Webinar Recordings



- Recordings and slide decks from past webinars can be found on [this page](#) of the AAOS website.
- If you would like to view a recording of a webinar held before October 2020, please visit [learn.aaos.org](https://www.aaos.org/learn).

Improving orthopaedic
care through **data.**

Questions?

RegistryInfo@aaos.org

www.aaos.org/registries

Improving orthopaedic
care through **data.**

Thank You

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Reference Slides

Participation Fee

- Single institution, 1-year licensing fee **\$3,750**
- **\$750** 1x configuration fee
- Includes Access to:
 - ✓ AAOS RegistryInsights® Platform standard reports and personalized dashboards
 - ✓ AAOS RegistryInsights national benchmarks
 - ✓ PRO Platform for survey collection
 - ✓ Ongoing support
 - ✓ Inclusion in User Group Network (Unet)