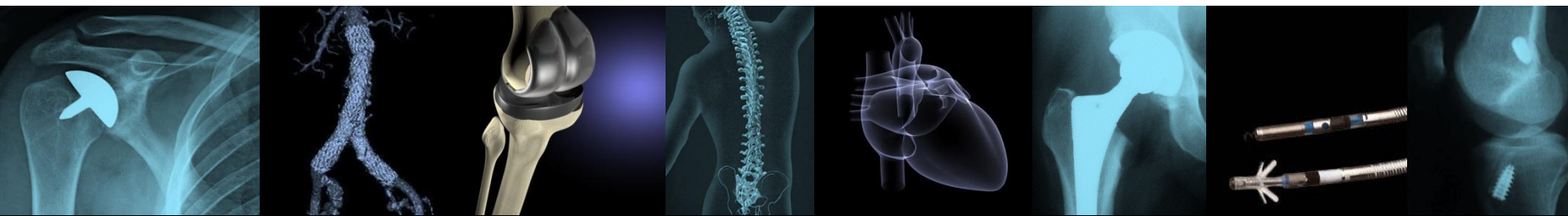


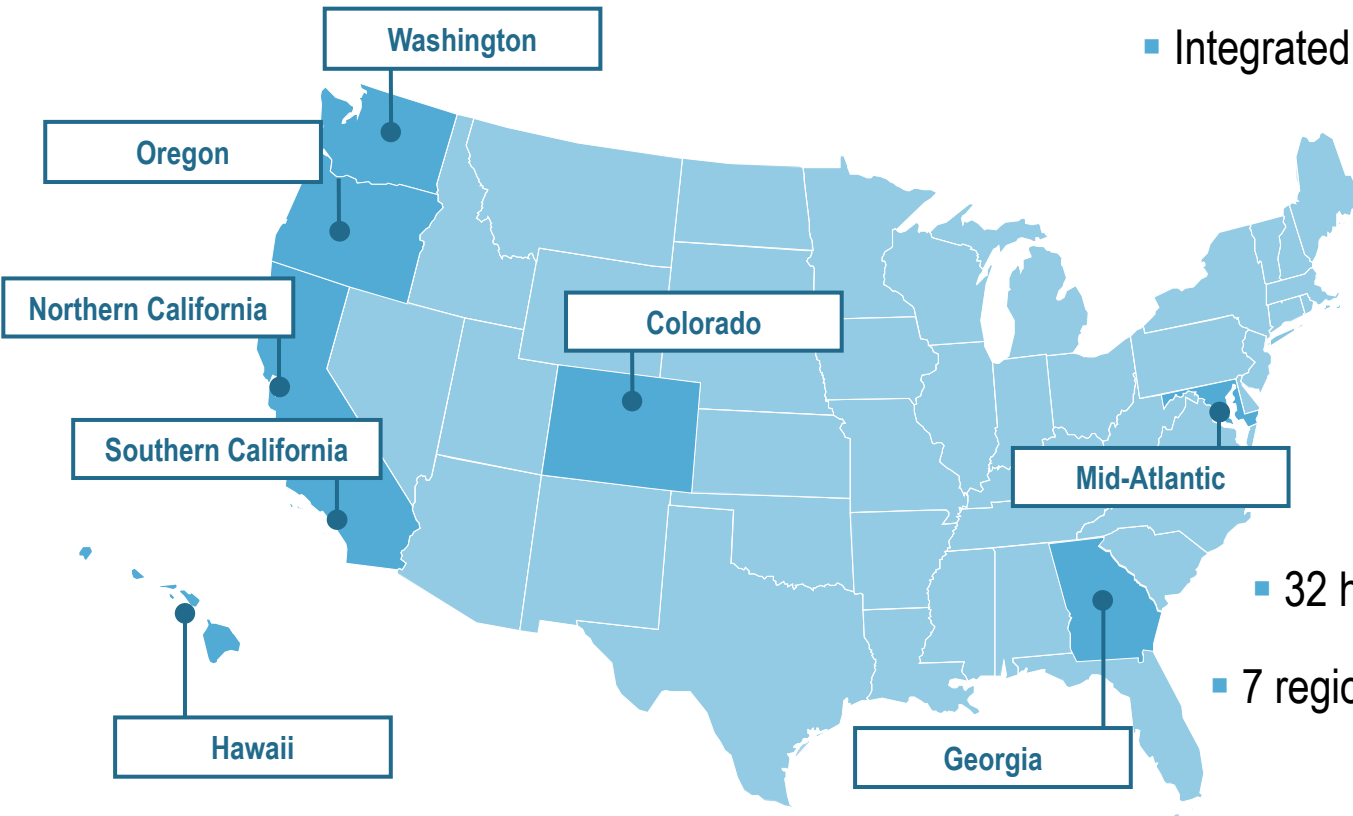
Kaiser Permanente Total Joint Registry: Enhancing Quality, Patient Safety & Cost Effectiveness



RIAP Conference
July 2016

Liz Paxton
Director Kaiser Permanente National Implant Registries

About Kaiser Permanente



- Nation's largest nonprofit health plan
- Integrated health care delivery system
 - 9 million members
 - 12,000+ physicians
 - 140,000+ employees
 - 430+ medical offices
- 32 hospitals and medical centers
- 7 regions serving 8 states and D.C.

A Learning Health Care System

Information-rich, patient
focused enterprises

Evidence is
continually refined
as a byproduct of
care delivery



Information and
evidence transform
interactions from
reactive to
proactive (benefits
and harms)

*From "A Learning Health Care System for
Cancer Care" by Carolyn Clancy, MD, Agency
for Healthcare Research and Quality*

Goals Kaiser Permanente Registries

- Identify patients at risk for poor outcomes
- Identify clinical best practices for quality improvement
- Identify best performing/outlier devices for our patients
- Device recalls/notifications
- Comparative effectiveness research

Orthopedic Registries

Total Joint	250,000
Hip Fracture	28,000
ACLR	30,300
Spine	19,500
Shoulder	9,400

Cardiac/Vascular

ICDS	30,900
Pacemakers	69,000
Leads	140,120
Heart Valve	24,500
EVAR	3,260

Kaiser Permanente Registries

- Developed in 2001
- Modeled after Swedish Hip Register
- Methods
 - Standardized documentation
 - Leveraging existing EHR data
 - Patient information
 - Procedures/diagnoses
 - Implant data and clinical attributes library
 - Labs
 - Medications
 - Adverse event electronic screening methods
 - Stringent quality control processes
 - Chart review validation of outcomes (Revision, Infection, DVT, PE)

The screenshot displays the 'Total Joint Registry' software interface. At the top, there are buttons for 'Select the procedure' (Bilateral Knee, Bilateral Hip, Left Knee, Right Knee, Left Hip, Right Hip) and 'Restore' (MK) and 'Close' (F9). Below this is the 'Left Knee Implant Registry' form, which is divided into several sections:

- Anesthesia:** General, Spinal, Epidural, ASA (I, II, III, IV, V).
- Drain:** Reinsertion, Non-Reinsertion, None.
- Reason for Surgery:** Osteoarthritis (OA), Rheumatoid arthritis (RA), Inflammatory arthritis (Non-RA), Post-traumatic arthritis, Osteonecrosis/vascular necrosis, Aseptic loosening, Pain, Instability, Osteolysis, Adrotibrosis, Synovial impingement, Ingrowth failure, Seroma, Hematoma, Infection, Wound drainage, Wound dehiscence, Poly liner wear, Femoral fracture, Tibial fracture, Component fracture, PF joint malunion, Failed extensor mechanism, Failed uni-spacer, Failed HTO, Failed ORP, Failed LKA, Failed TKA, Other (use comments).
- Revision:** Yes/No, Conversion Yes/No.
- Procedure(s):** TKA with patella, TKA without patella, TKA revision, LKA (medial or lateral), LKA converted to TKA, Patellofemoral unicompartment, ORP changed to TKA, Stage 1 - epiplantation, Stage 2 - replantation, Poly liner exchange, I & D, HWR (Hardware Removal), MUA, Revision femur, Revision tibia, Revision patella, Synovectomy, ORP of (use comments), Other (use comments).
- Cement:** None, Patella, Tibia, Femur; Meta Augmentation: None, Tibia, Femur.
- Bone graft:** None, Non-Structural, Structural; Specify Location: Tibia, Femur.
- Soft tissue releases:** lateral retropatella (patella tracking) Yes/No.
- Exposure:** Parapatellar, Mid-vestib, Sub-vestib, Tubercle osteotomy, Quads/scope release, Trivector, CAS (Computer Assisted Surgery), MIA, Other (use comments).
- DVT Prophylaxis:** Coumadin, SCD, Aspirin, TED hose, Anti-inflammatory, Low molecular weight heparin, Airdra, Foot pump, Other (use comments).
- Infection Prophylaxis:** IV antibiotics, Antibiotics in cement, Clean air, Laminar flow, Sasee suits, Antibiotic irrigation, Other (use comments).

Select the procedure

Bilateral Knee

Bilateral Hip

Left Knee

Right Knee

Left Hip

Right Hip

Restore

Close F9

Previous F7

Next F8

Select the procedure Bilateral Knee Bilateral Hip **Left Knee** Right Knee Left Hip Right Hip

Left Knee Implant Registry

Anesthesia		<input type="button" value="General"/> <input type="button" value="Spinal"/> <input type="button" value="Epidural"/>		ASA <input type="button" value="I"/> <input type="button" value="II"/> <input type="button" value="IV"/> <input type="button" value="V"/>	
<input type="button" value="Regional"/> <input type="button" value="Femoral nerve block"/> <input type="button" value="MAC"/>		<input type="button" value="Other (use comments)"/>			
Drain		<input type="button" value="Reinfusion"/> <input type="button" value="Non-Reinfusion"/> <input type="button" value="None"/>			
Reason for Surgery (Check all that apply)		<input type="button" value="Osteoarthritis (OA)"/> <input type="button" value="Rheumatoid arthritis (RA)"/> <input type="button" value="Inflammatory arthritis (Non-RA)"/> <input type="button" value="Post traumatic arthritis"/> <input type="button" value="Osteonecrosis/Avascular necrosis"/>			
<input type="button" value="Aseptic loosening"/> <input type="button" value="Pain"/> <input type="button" value="Instability"/> <input type="button" value="Osteolysis"/> <input type="button" value="Arthrofibrosis"/>		<input type="button" value="Synovial impingement"/> <input type="button" value="Ingrowth failure"/> <input type="button" value="Seroma"/> <input type="button" value="Hematoma"/> <input type="button" value="Infection"/>			
<input type="button" value="Wound drainage"/> <input type="button" value="Wound dehiscence"/> <input type="button" value="Poly liner wear"/> <input type="button" value="Femoral fracture"/> <input type="button" value="Tibial fracture"/>		<input type="button" value="Component fracture"/> <input type="button" value="PF joint malfunction"/> <input type="button" value="Failed extensor mechanism"/> <input type="button" value="Failed uni-spacer"/> <input type="button" value="Failed HTO"/>			
<input type="button" value="Failed ORIF"/> <input type="button" value="Failed UKA"/> <input type="button" value="Failed TKA"/> <input type="button" value="Other (use comments)"/>					
Revision <input type="button" value="Yes"/> <input type="button" value="No"/>		Conversion <input type="button" value="Yes"/> <input type="button" value="No"/>			
Procedure(s) (Check all that apply)		<input type="button" value="TKA with patella"/> <input type="button" value="TKA without patella"/> <input type="button" value="TKA revision"/> <input type="button" value="UKA (medial or lateral)"/> <input type="button" value="UKA converted to TKA"/> <input type="button" value="Patellofemoral uni/arthroplasty"/>			
<input type="button" value="ORIF changed to TKA"/> <input type="button" value="Stage 1 - explantation"/> <input type="button" value="Stage 2 - reimplantation"/> <input type="button" value="Poly liner exchange"/> <input type="button" value="I & D"/> <input type="button" value="HMR (Hardware Removal)"/>		<input type="button" value="MJU"/> <input type="button" value="Revision femur"/> <input type="button" value="Revision tibia"/> <input type="button" value="Revision patella"/> <input type="button" value="Synovectomy"/> <input type="button" value="ORIF of (use comments)"/>			
<input type="button" value="Other (use comments)"/>					
Cement <input type="button" value="None"/> <input type="button" value="Patella"/> <input type="button" value="Tibia"/> <input type="button" value="Femur"/>		Metal Augmentation <input type="button" value="None"/> <input type="button" value="Tibia"/> <input type="button" value="Femur"/>			
Bone graft <input type="button" value="None"/> <input type="button" value="Non-Structural"/> <input type="button" value="Structural"/>		Specify Location <input type="button" value="Tibia"/> <input type="button" value="Femur"/>			
Soft tissue releases lateral retinaculum (patellar tracking) <input type="button" value="Yes"/> <input type="button" value="No"/>					
Exposure		<input type="button" value="Parapatellar"/> <input type="button" value="Mid-vastus"/>		# of incisions <input type="button" value="1"/> <input type="button" value="2"/> <input type="button" value="3"/> <input type="button" value="4"/> <input type="button" value="5"/> <input type="button" value="6"/> <input type="button" value="7"/> <input type="button" value="8"/> <input type="button" value="9"/> <input type="button" value="10"/>	
<input type="button" value="Sub-vastus"/> <input type="button" value="Tubercle osteotomy"/>		<input type="button" value="Quadriceps release"/> <input type="button" value="Trivector"/>		Length of incisions <input type="text"/>	
<input type="button" value="CAS (Computer Assisted Surgery)"/> <input type="button" value="Mini"/>		<input type="button" value="Other (use comments)"/>			
DVT Prophylaxis		<input type="button" value="Coumadin"/> <input type="button" value="SCD"/>		Infection Prophylaxis	
<input type="button" value="Aspirin"/> <input type="button" value="TED hose"/>		<input type="button" value="Anti-inflammatory"/> <input type="button" value="Low molecular weight heparin"/>		<input type="button" value="IV antibiotics"/> <input type="button" value="Antibiotics in cement"/> <input type="button" value="Clean air"/>	
<input type="button" value="Aritra"/> <input type="button" value="Foot pump"/>		<input type="button" value="Other (use comments)"/>		<input type="button" value="Laminar flow"/> <input type="button" value="Space suits"/> <input type="button" value="Antibiotic irrigation"/>	
<input type="button" value="Other (use comments)"/>				<input type="button" value="Other (use comments)"/>	

Implant Data Elements Extracted from EHR

Optime Company	Optime Catalog #	Optime LotNo	Optime ImplantName	Optime Qty	Optime Laterality
ZIMMER	00595001506	59998478	COMPONENT FEMORAL E- L68 MM X W59.4 MM RIGHT KNEE CEMENTED CRUCIATE RETAINING NEXGEN CR-FLEX ZIMALOY PRECOAT STERILE - LOG319457	1	RIGHT
ZIMMER	00595203010	62283716	SURFACE ARTICULAR YELLOW L66 MM X W42 MM NEXGEN CR-FLEX 10 C-H 3-4 STANDARD TIBIAL KNEE PROLONG UHMW POLYETHYLENE CRUCIATE RETAINING STERILE - LOG319457	1	RIGHT

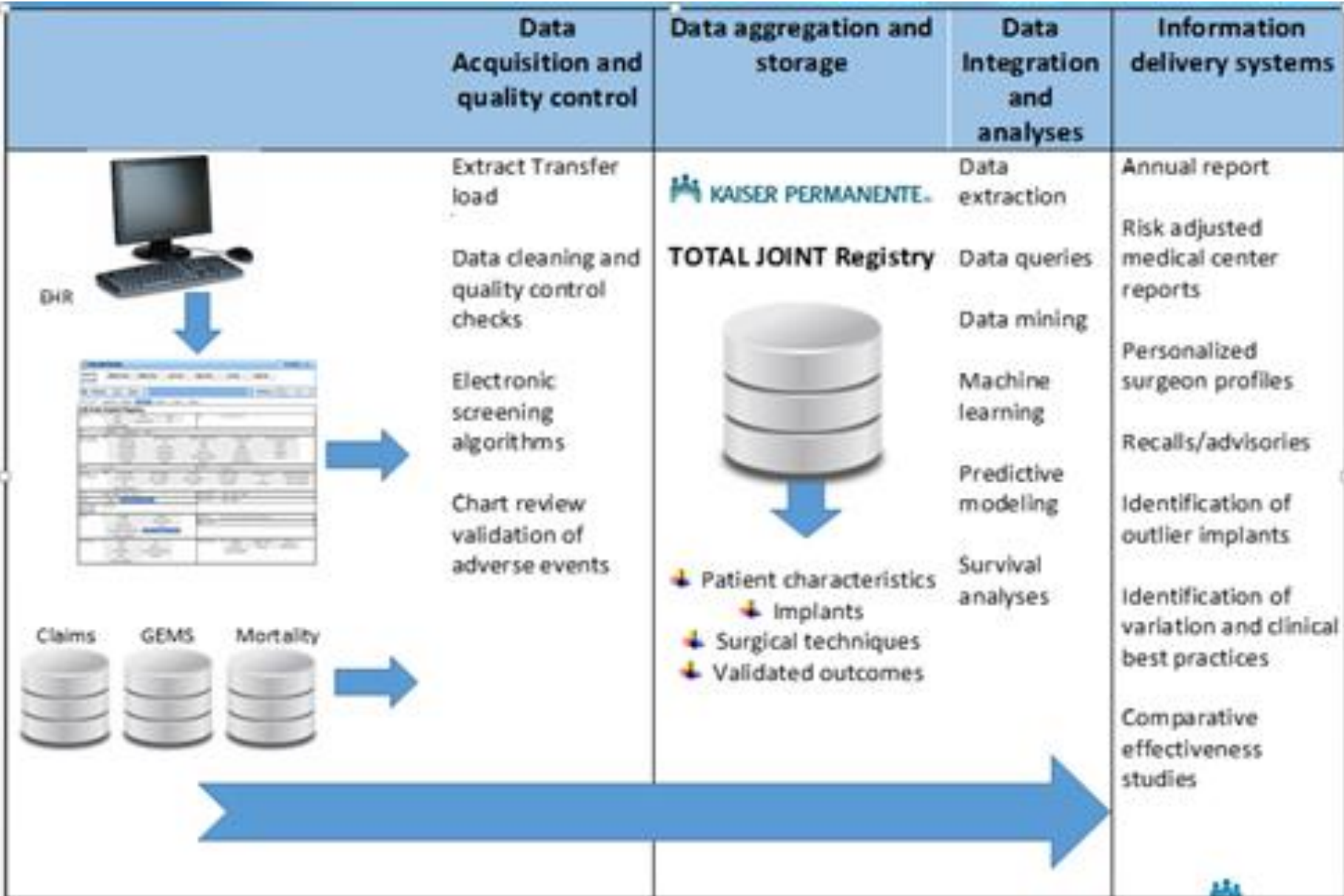
Implant Components
Company Name
Catalog #
Lot/Serial #
Quantity
Material
Fixation
Size
Mobility
Stability



Implant Reference Library



COMPANY NAME	CATALOG #	DESCRIP-TION	IMPLANT NAME	CATE-GORY	INSERT MATERIAL	FEMORAL MATERIAL	CEMENT FIXATION	SIZE	STABILITY	MOBIL-ITY
ZIMMER	00595001506	NEXGEN CR FLEX FEM COMP PRECOAT	NEXGEN	FEMORAL		COCR	CEMENTED	SIZE E	MINIMALLY STABILISED	
ZIMMER	00595203010	ZIMMER ARTICULAR SURFACE CR PROLONG	ZIMMER	INSERT	HIGHLY CROSS-LINKED			SIZE 2	MINIMALLY STABILISED	FIXED



Identification of Variation

Patient

- Individual risk
- Subgroups at risk

Implant

- Outliers (best/worst)

Surgeon

- Individual performance
- Clinical best practices

Medical Center

- Medical center performance

KP Tools for Enhancing Quality & Patient care

- Medical center reports
- Individualized surgeon profiles
- Quarterly quality reports
- Patient risk calculators
- Outlier implant reports
- Recall/advisory identification/tracking
- Newsletters/meetings/conferences
- Publications

SAR Annual Surgeon Report

2015 Registry Goals for Quality Improvement

- Increase participation for all regions > 80%. This

Current Status

- Your participation in Quarter 1 2015: 33%
- Your participation in Quarter 2 2015: 33%
- Reduce the number of Hemiarthroplasty procedures

Current Status

- Leads to contact individual surgeons who are reasons for individual surgeries.

Shoulder Arthroplasty Registry Key Findings

- Increased VTE rates were observed after trauma. Here is the link to the paper.
- Our study on age suggested patients <59 year Hemiarthroplasty(Hemi) and Reverse Total Shoulder Arthroplasty(TSA). Here is the link to the paper.
- Following TSA, risk factors for revision are high. are associated with increased risk of readmission.
- Following RTSA, patients >75 years and females have lower rates of revision while higher ASA scores and diabetes are associated with risk of readmission.

Surgeon Report Covers Data from 2005 through 2014				
Total Shoulder Arthroplasty	Surgeon	Facility FON	Region SCAL	National
# of Primary (Revised) Cases	12 (0)	141 (2)	1650 (41)	5219 (122)
Primary Patient Characteristics				
Age (year), Median (IQR)	67.5 (61.5-73.0)	69.0 (62.0-75.0)	69.0 (63.0-76.0)	69.0 (63.0-75.0)
Female	50.0%	52.5%	50.8%	49.9%
Diagnosis: Osteoarthritis	100.0%	92.2%	94.9%	94.3%
Diagnosis: Osteonecrosis / AVN	0.0%	2.1%	1.8%	2.0%
Diagnosis: Rheumatoid Arthritis	0.0%	3.5%	1.5%	1.6%
Reasons for Revision				
Infection	0 (0.0)	0 (0.0)	7 (17.1)	23 (18.9)
Glenoid Component Loosening	0 (0.0)	1 (50.0)	13 (31.7)	44 (36.1)
Rotator Cuff Tear	0 (0.0)	0 (0.0)	18 (43.9)	44 (36.1)
Other	0 (0.0)	1 (50.0)	9 (22.0)	28 (23.0)
Cumulative Revision Probability				
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
1 year	0 (0.0)	1.5 (0.4-5.7)	1.2 (0.8-1.9)	0.9 (0.7-1.3)
3 years	0 (0.0)	1.5 (0.4-5.7)	2.4 (1.7-3.4)	2.4 (1.9-2.9)
5 years				

Quarterly Quality Report - 2014Q4

Hip Fracture Implant Registry

90-Day Revision Rate



Year/Qt	Number of Primary Cases	Number of 90d Revision	Facility 90d Revision Rate	Region 90d Revision Rate
2013Q1	60	1	1.7%	1.6%
2013Q2	57	1	1.8%	1.8%
2013Q3	50	1	2.0%	1.8%
2013Q4	59	0	0.0%	1.0%
2014Q1	45	0	0.0%	1.8%
2014Q2	68	1	1.5%	2.5%
2014Q3	56	1	1.8%	2.2%
2014Q4	57	0	0.0%	1.6%

Identifying Patient Risk Factors

Implant Recalls/Advisories

- 14,000 patients with enhanced surveillance due to 17 recalls in 2014-2015 alone
- Allows immediate notification of patients and lists to surgeons
- Provides a mechanism to monitor patient follow-up related to recall

DePuy ASR August 2010 Recall Tracking Database

SEARCH FOR: MRN Last Name ASR Update: Go!

Instructions: Enter applicable information below in fields that are highlighted in white.

PATIENT INFORMATION

MRN: 1234567 Region: CO Last Name: SMITH First Name: JANE Phone: ASR Update: 06/05/07 RIGHT Inherited: Non-Member:

Sex: F Race: DOB: Follow-up Facility: Follow-up MD: Jeckyll Risk Mgr: Hyde

TJR HIP SURGERIES

Facility	Surgeon	Update	Opside	TJR Rev Date	Scheduled Rev Date	Implants	ASR Flag	BMI
DVR	Jeckyll	6/5/2007	RIGHT			<input type="checkbox"/>	<input checked="" type="checkbox"/>	0
*						<input type="checkbox"/>	<input type="checkbox"/>	

Patient Name: SMITH JANE MRN: 1234567 ASR Update: 06/05/07 RIGHT

PATIENT STATUS CASE MANAGER LOG BONE SCAN HISTOPATHOLOGY PAIN ION SCAN LAB MRI XRAY DEPUY CLAIM INFO

Contact Date: 11/9/2010 Staff: CO Case Manager Follow Up Date: Provider Appt Date: 12/8/2010

Are you having any pain around your hip area? Change in Pain Level? Pain Level: Appt Provider: Tuttle

Note: seen in clinic 9/2/10, will need appt with Dr. Tuttle

Risk Factors for Revisions and Complications

Revision Total Hip Arthroplasty: Factors Associated with Re-Revision Surgery

Monti Khatod, MD, Guy Cafri, PhD, Maria C.S. Inacio, PhD, Alan L. Schepps, MS, Elizabeth W. Paxton, MA, and Stefano A. Bini, MD

Risk Factors Associated with Deep Surgical Site Infections After Primary Total Knee Arthroplasty

An Analysis of 56,216 Knees

Robert S. Namba, MD, Maria C.S. Inacio, MS, and Elizabeth W. Paxton, MA



ELSEVIER

Contents lists available at ScienceDirect

The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org



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The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org

Risk factors for Total Hip Arthroplasty Aseptic Revision

Monti Khatod, MD^a, Guy Cafri, PhD^b, Robert S. Namba, MD^c, Maria C.S. Inacio, PhD^b, Elizabeth W. Paxton, MA^b

Risk Factors for Total Knee Arthroplasty Aseptic Revision

Robert S. Namba, MD^a, Guy Cafri, PhD^b, Monti Khatod, MD^c, Maria C.S. Inacio, PhD^b, Timothy W. Brox, MD^d, Elizabeth W. Paxton, MA^b

Clin Orthop Relat Res
DOI 10.1007/s11999-015-4278-x

Clinical Orthopaedic
and Related Research
A Publication of The Association of Bone and Joint Surgeons

Clin Orthop Relat Res
DOI 10.1007/s11999-015-4263-4

and Related Research[®]
A Publication of The Association of Bone and Joint Surgeons[®]



SYMPOSIUM: 2014 MEETING OF INTERNATIONAL SOCIETY OF ARTHROPLASTY REGISTERS

SYMPOSIUM: 2014 MEETING OF INTERNATIONAL SOCIETY OF ARTHROPLASTY REGISTERS

Are There Modifiable Risk Factors for Hospital Readmission After Total Hip Arthroplasty in a US Healthcare System?

Elizabeth W. Paxton MA, Maria C. S. Inacio PhD, Javinder A. Singh MD, MPH, Rebecca Love MPH, RN, Stefano A. Bini MD, Robert S. Namba MD

Association of Bisphosphonate Use and Risk of Revision After THA: Outcomes From a US Total Joint Replacement Registry

Monti Khatod MD, Maria C. S. Inacio PhD, Richard M. Dell MD, Stefano A. Bini MD, Elizabeth W. Paxton MA, Robert S. Namba MD

Patient Risk Calculators

Clin Orthop Relat Res
DOI 10.1007/s11999-015-4506-4

Clinical Orthopaedics
and Related Research®
A Publication of The Association of Bone and Joint Surgeons®



CLINICAL RESEARCH

Risk Calculators Predict Failures of Knee and Hip Arthroplasties: Findings from a Large Health Maintenance Organization

Elizabeth W. Paxton MA, Maria C. S. Inacio PhD, Monti Khatod MD,
Eric Yue MD, Tadashi Funahashi MD, Thomas Barber MD

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Print Mail Print Mail Word Excel

Address http://jcrnet.kp.org:81/nirw/Registries/risk_knee.htm Go Links

Orthopedics
Total Joint Replacement
Reports
Specifications
Annual Reports
Dynamic Registry Report
Infection Control
Participation Reports
Risk Calculators
TJR Total Hip
TJR Total Knee
Sample Forms
Champions
ACLR
Spine
Hip Fracture
Cardiology
Cardiac Surgery

TJR Total Knee

Age: years months

Gender: Male Female

Height: feet inches

Weight: pounds

Diabetes: No Yes

Osteoarthritis: No Yes

Inflammatory Arthritis: No Yes

Post Traumatic Arthritis: No Yes

Rheumatoid Arthritis: No Yes

Osteonecrosis: No Yes

Calculate Clear

Your risk of a revision is (within 5 years):

JavaScript and ActiveX controls are required to use calculators.

Home | Registries | Recalls | Research | Links | Contact Us

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start Risk Calculators: TJR ... 6:53 AM

Identifying Clinical Best Practices and Providing Surgeon Feedback

Identification of Clinical Best Practices

Clin Orthop Relat Res
DOI 10.1007/s11999-015-4230-0

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SYMPOSIUM: 2014 MEETING OF INTERNATIONAL SOCIETY OF ARTHROPLASTY REGISTERS

Anterior and Anterolateral Approaches for THA Are Associated With Lower Dislocation Risk Without Higher Revision Risk

Dhiren Sheth MD, Guy Cafri PhD, Maria C. S. Inacio PhD,
Elizabeth W. Paxton MA, Robert S. Namba MD

Pulmonary Embolism Prophylaxis in More Than 30, 000 Total Knee Arthroplasty Patients: Is There a Best Choice?

Monti Khatod, MD,* Maria C.S. Inacio, MS, Stefa and Elizabeth W. Paxton, MA

Antibiotic cement was associated with half the risk of re-revision in 1,154 aseptic revision total knee arthroplasties

Stefano A Bini, Priscilla H Chan, Maria C S Inacio, Elizabeth W Paxton & Monti Khatod

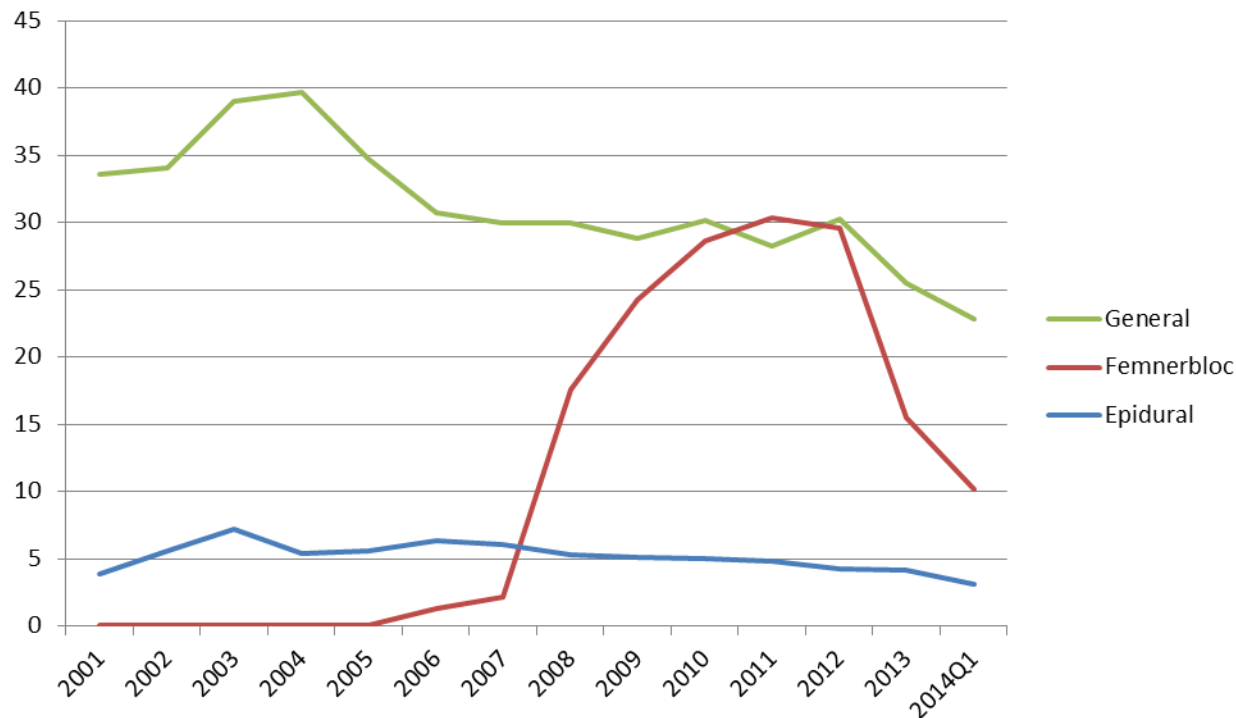
Acta Orthopaedica
2014; 85 (1): x-x

Can total knee arthroplasty be safely performed in patients with chronic renal disease? An evaluation of perioperative morbidity in 2,686 procedures from a Total Joint Replacement Registry

Alexander Miric, Maria CS Inacio, and Robert S Namba

TKA General Anesthesia

- General anesthesia found to be a significant risk factor for PE compared to non-general anesthesia, increasing the odds of an event by 67% (95% CI, 14%-144%; P =.009)



Confidential Surgeon Profiles

- Personal practice profiles to allow surgeons to compare their patient demographics, implants, techniques and outcomes to others in their medical center, region, and nationwide

KAISER PERMANENTE National Implant Registries

Total Joint Replacement Surgeon Profile Report

Criteria Selected: Procedure: HIP Op Date between May 2000 to March 2009 Op Type: PRIMARY Surgeon: SEUSS, CAT Facility: SITE 23 Region: SCAL

Demographics

Age Category	Surgeon		Facility		Region		National	
	#	%	#	%	#	%	#	%
<20	1	0.5%	1	0.1%	13	0.1%	25	0.1%
20-29	2	0.9%	15	1.7%	71	0.7%	137	0.5%
30-39	4	1.8%	21	2.3%	165	1.7%	407	1.5%
40-49	12	5.5%	86	9.5%	821	7.5%	1860	7.0%
50-59	25	11.4%	142	15.7%	2185	20.0%	5471	20.7%
60-69	60	27.3%	248	27.4%	3263	29.9%	7895	29.8%
70-79	87	39.5%	265	29.3%	3211	29.4%	7642	28.9%
80-89	29	13.2%	122	13.5%	1118	10.2%	2895	10.9%
90 and >	0	0.0%	5	0.6%	39	0.4%	113	0.4%
Missing	0	0.0%	0	0.0%	3	0.0%	4	0.0%
	220	100.0%	905	100.0%	10909	100.0%	26449	100.0%

Gender	Surgeon		Facility		Region		National	
	#	%	#	%	#	%	#	%
Male	74	33.6%	371	41.0%	4653	42.7%	11302	42.7%
Female	146	66.4%	534	59.0%	6252	57.3%	15143	57.3%
Missing	0	0.0%	0	0.0%	4	0.0%	4	0.0%
	220	100.0%	905	100.0%	10909	100.0%	26449	100.0%

ASA Score	Surgeon		Facility		Region		National	
	#	%	#	%	#	%	#	%
1	6	2.7%	45	5.0%	393	3.6%	1041	3.9%
2	172	78.2%	669	73.9%	6354	58.2%	15942	60.3%
3	40	18.2%	186	20.8%	3865	35.4%	8567	32.4%
4	2	0.9%	4	0.4%	103	0.9%	258	1.0%
5	0	0.0%	0	0.0%	5	0.0%	5	0.0%
Missing	0	0.0%	1	0.1%	189	1.7%	636	2.4%
	220	100.0%	905	100.0%	10909	100.0%	26449	100.0%

Print Date: 2/16/2010 2:43:38 PM
 Prepared By: Surgical Outcomes & Analysis
 Data Source: TJR Database

Page 1 of 7

Identifying the Best Implants For Our Patients

Outlier Implants

Screening for Outliers

- Flag implants with revision rate (per 100 component years) 2 times that of its group, e.g. THA, BHR, TKA, UKA

Risk-Adjustment

- Risk-adjusted by diagnosis, gender, and age
- Focus on implants with > 500 cases
- Survival analysis

Follow-up and Dissemination

- Monitor outliers with short-term follow-up and small Ns
- Confirmatory analyses with other national registries
- Share findings with surgeons

Device Comparative Effectiveness

Clin Orthop Relat Res
DOI 10.1007/s11999-014-4046-3

Clinical Orthopaedics
and Related Research
A Publication of The Association of Bone and Joint Surgeons®
Clin Orthop Relat Res
DOI 10.1007/s11999-014-4105-9

Clinical Orthopaedics
and Related Research®
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SYMPOSIUM: ADVANCES IN UHMWPE BIOMATERIALS

SYMPOSIUM: ADVANCES IN UHMWPE BIOMATERIALS

Is There a Difference in Total Knee Arthroplasty Risk of Revision in Highly Crosslinked versus Conventional Polyethylene?

Elizabeth W. Paxton MA, Maria C. S. Inacio PhD,
Steven Kurtz PhD, Rebecca Love MPH, RN,
Guy Cafri PhD, Robert S. Namba MD

Metal-on-conventional Polyethylene Total Hip Arthroplasty Bearing Surfaces Have a Higher Risk of Revision Than Metal-on-highly Crosslinked Polyethylene: Results From a US Registry

Elizabeth W. Paxton MA, Maria C. S. Inacio PhD,
Robert S. Namba MD, Rebecca Love MPH, RN,
Steven M. Kurtz PhD

Acta Orthopaedica 2013; 84 (5): x-x



■ KNEE

Increased risk of revision for high flexion total knee replacement with thicker tibial liners



■ KNEE

Does pre-coating total knee tibial implants affect the risk of aseptic revision?

ORIGINAL ARTICLE

Evaluation of total hip arthroplasty devices using a total joint replacement registry

Elizabeth W. Paxton*, Christopher F. Ake, Maria C.S. Inacio, Monti Khatod, Danica Marinac-Dabic and Art Sedrakyan.

22 July 8, 2016

Monoblock all-polyethylene tibial components have a lower risk of early revision than metal-backed modular components

A registry study of 27,657 primary total knee arthroplasties

ria C S Inacio², Robert S Namba¹, Dhiren Sheth¹, and Elizabeth W Paxton²

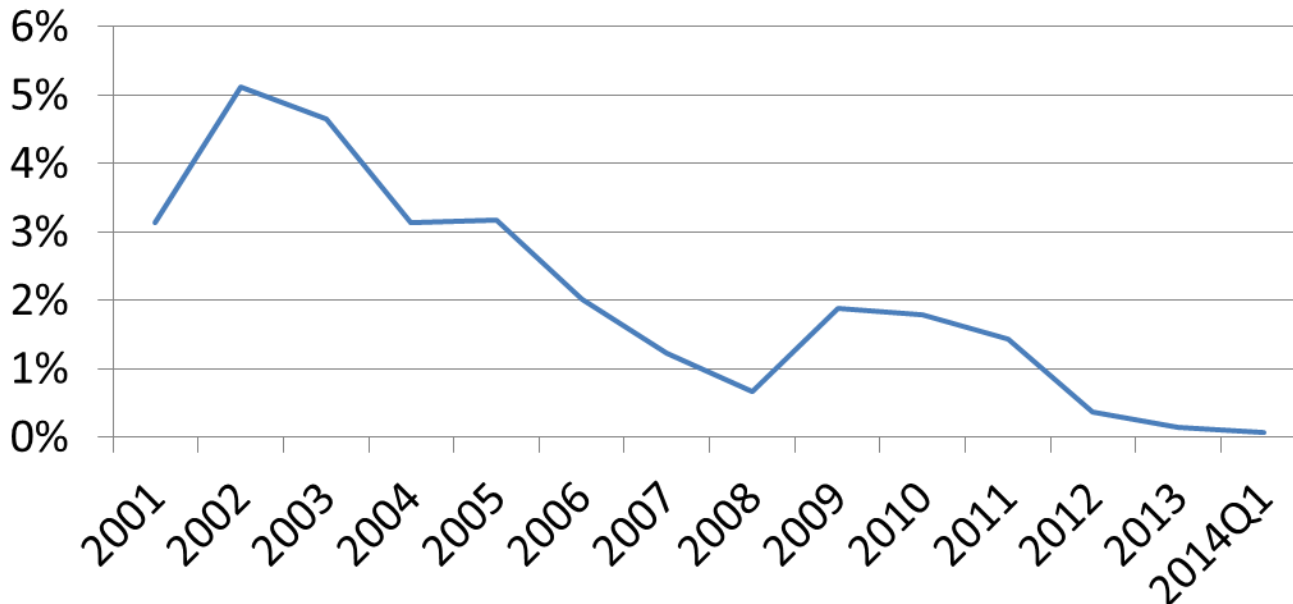
Acta Orthopaedica
2013; 84 (2): x-x

Alternative bearings in total knee arthroplasty: risk of early revision compared to traditional bearings An analysis of 62,177 primary cases

Maria C S Inacio, Guy Cafri, Elizabeth W Paxton, Steven M Kurts, and Robert S Namba

Total Knee Arthroplasty LCS Implant

Percent of Primary TKR Cases with LCS Implant

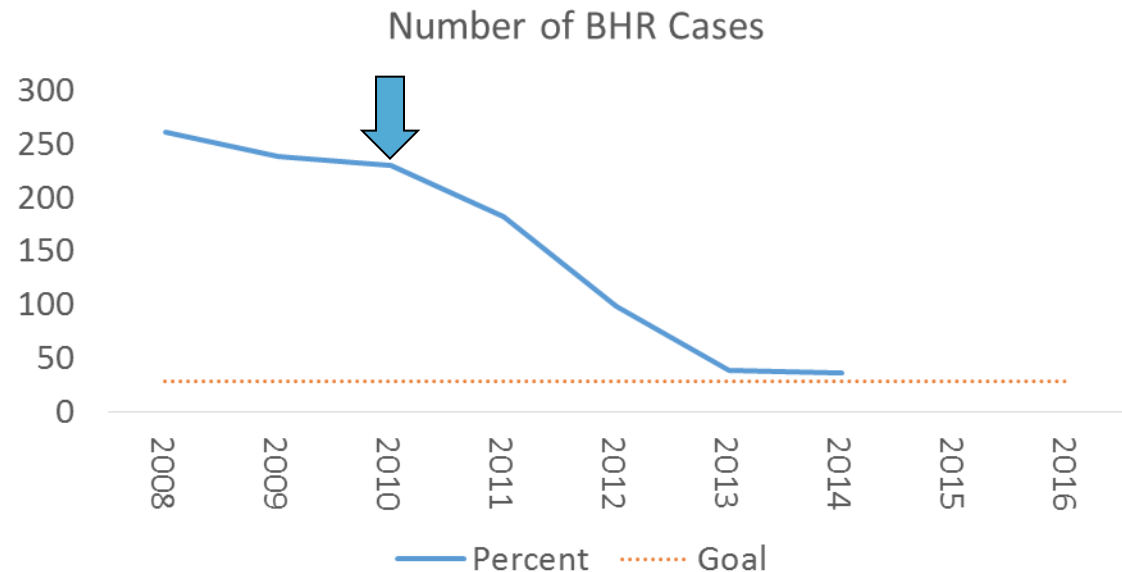


Early Identification of Outlier Devices and Changes in Clinical Practice

- Registry findings:

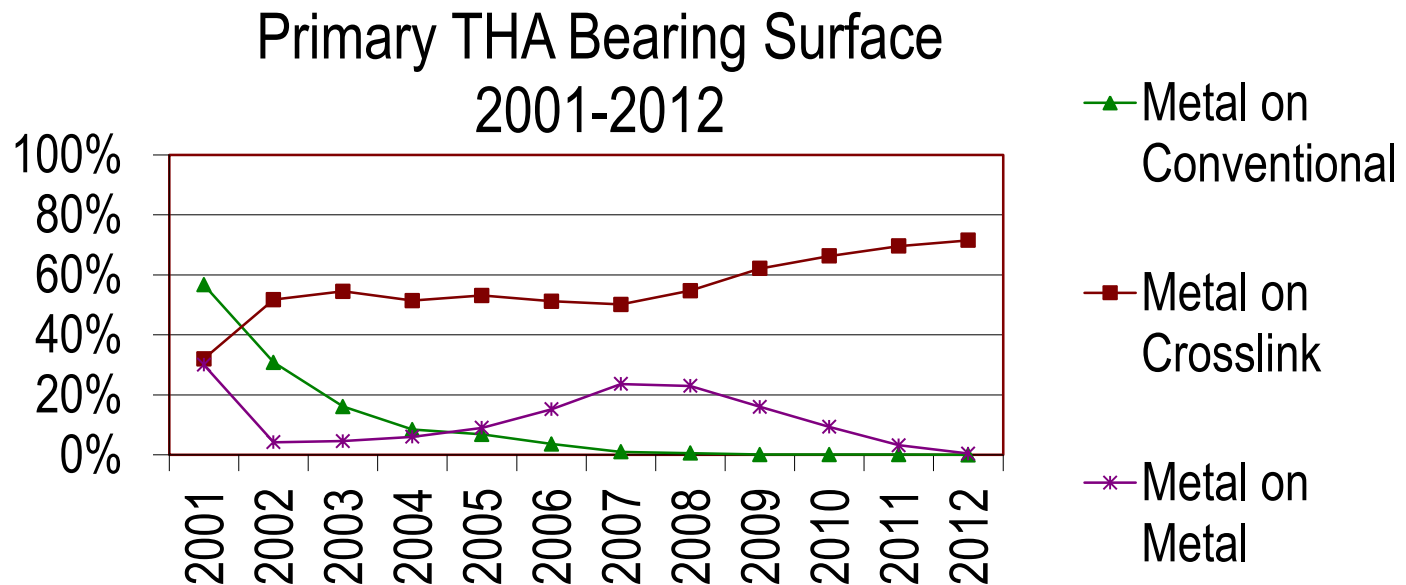
- HRs had a higher risk of revision than THA (HR=3.51, 2.02-6.10), $p < .001$

- Reduction in HR program-wide



Total Hip Arthroplasty Bearing Surface

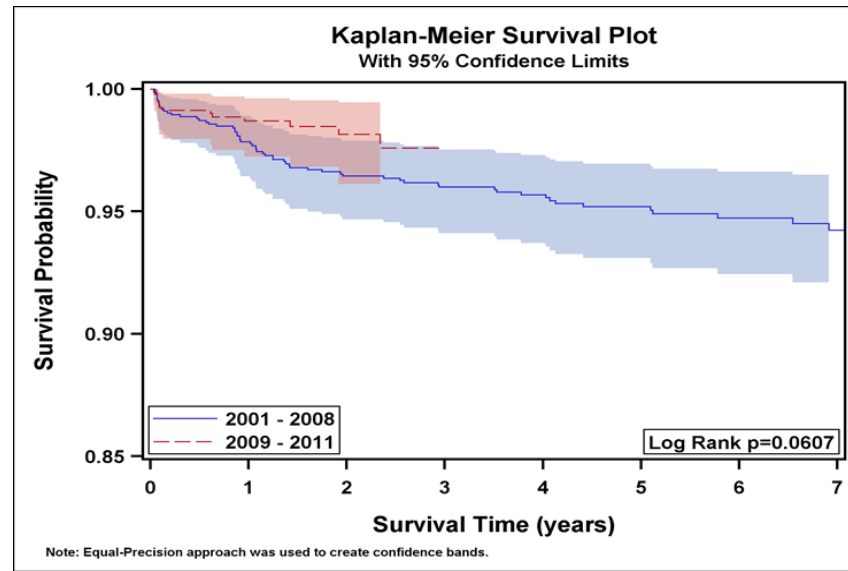
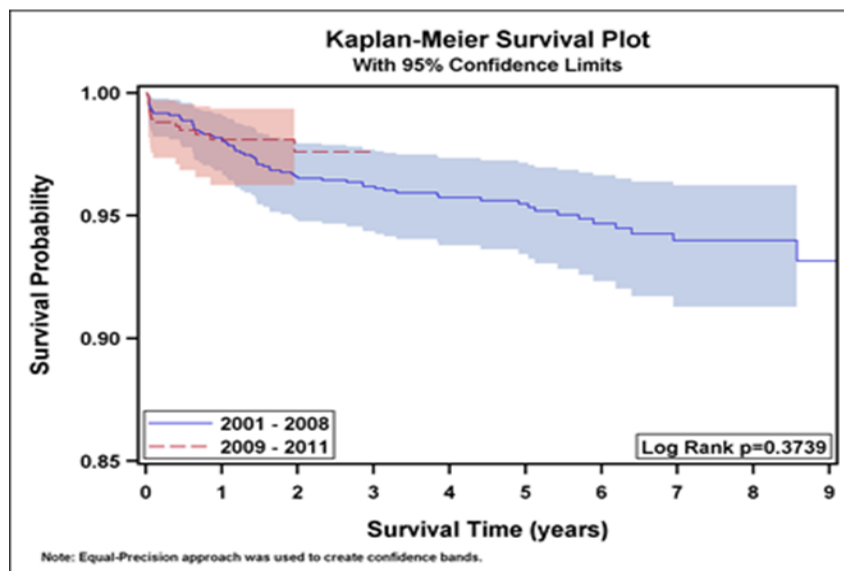
- Metal-on-conventional polyethylene and metal-on-metal shown to have higher risk of revision and are decreasing in use
- Metal-on-highly crosslinked polyethylene has a lower risk of revision and use is increasing



Identifying Hospital Variation and Best Practices

Hospital Variation and Improvement

- Methods
 - Observed vs expected risk adjusted revision rate for THR/TKR
 - Limited to facilities performing 500 total joints per year
 - 5 medical centers (out of 35) were identified as outliers
 - Independent, outside orthopedic surgeons reviewed two sites
 - Radiologic and chart review of ALL revisions was done
 - All total joint surgeons attended presentation of recommendations
- Results: Four of the medical centers improved their revision rates

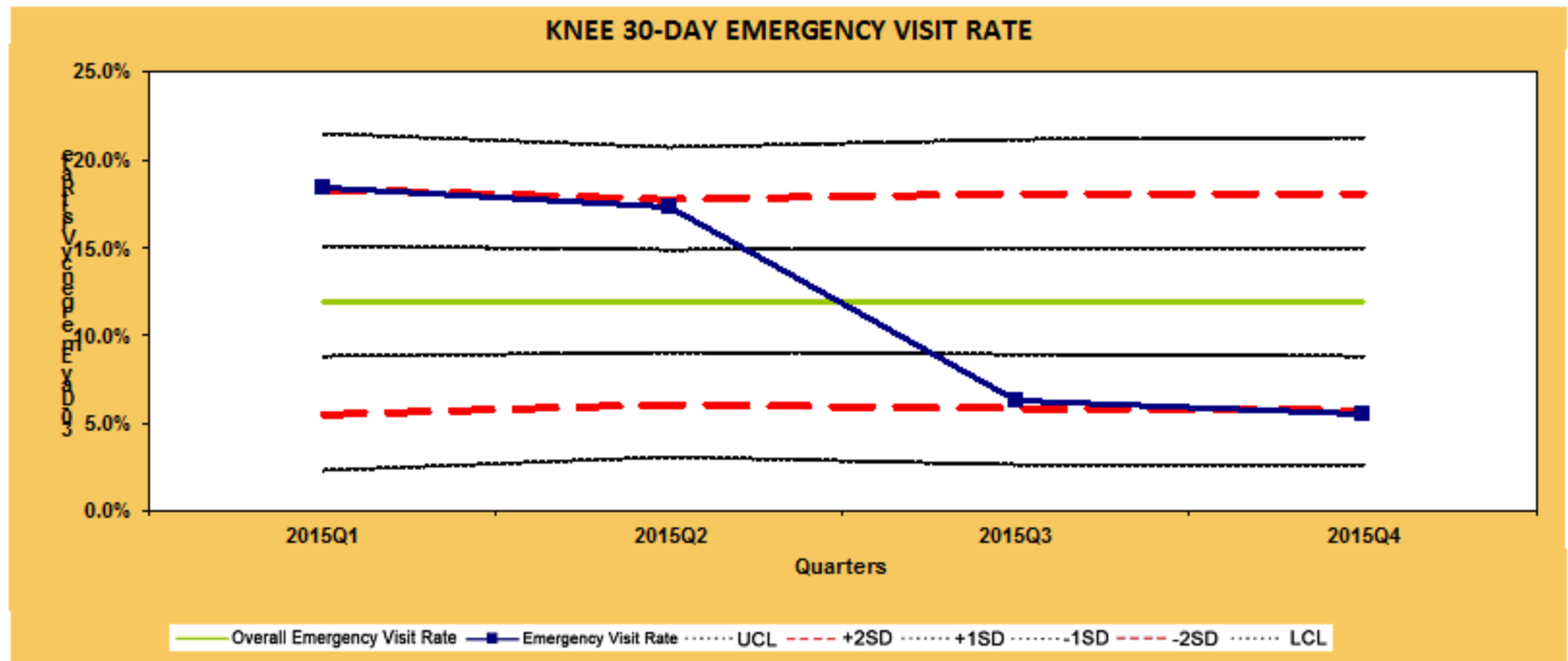


Quarterly Quality Reports

90-Day Deep Infection Rate	90-Day DVT Rate	90-Day PE Rate	90-Day Mortality Rate	30-Day UNPLANNED Inpatient Readmission Rate	30-Day Emergency Visit Rate	Length of Stay (Median)
<= 1.5%	<= 1.0%	<= 0.5%	<= 1.0%	<= 5.0%	<= 10.0%	<= 60
> 1.5%	> 1.0%	> 0.5%	> 1.0%	> 5.0%	> 10.0%	> 60
0.3%	0.6%	0.4%	0.3%	3.2%	7.8%	53.9
0.4%	0.9%	0.5%	0.2%	2.7%	7.8%	55.1
0.0%	0.0%	1.1%	0.0%	0.0%	0.0%	48.0
0.6%	1.2%	0.6%	0.5%	3.5%	9.2%	40.4
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	54.0
0.4%	0.4%	0.0%	0.0%	3.3%	7.7%	51.8
1.7%	0.7%	0.7%	0.0%	3.4%	9.4%	36.6
0.0%	0.0%	0.0%	2.0%	2.1%	0.0%	72.0
0.0%	1.2%	0.0%	0.0%	1.2%	6.7%	56.7
0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	55.0
0.0%	1.1%	0.3%	0.3%	2.5%	7.1%	56.4
0.0%	0.0%	0.0%	0.0%	0.7%	6.6%	55.5
0.0%	0.4%	0.8%	0.0%	1.9%	7.2%	55.8
0.0%	0.5%	0.0%	0.0%	4.9%	8.2%	56.3
0.0%	1.3%	0.8%	0.0%	2.7%	8.4%	60.1
0.4%	2.0%	0.4%	0.7%	2.8%	8.1%	55.0
1.6%	0.5%	0.5%	1.4%	3.7%	12.6%	48.5

Changes in Practice and Improved Patient Outcomes

Overall 30-Day Emergency Visit Rate: 11.94%



Cost effectiveness

- Identify best performing implants for national contracting decisions
- Evaluate expensive new technology claims
- Early identification and prevention of inferior implants
- Reduce revisions associated with less successful techniques/implants
 - Complicated revisions \$100,000 USD

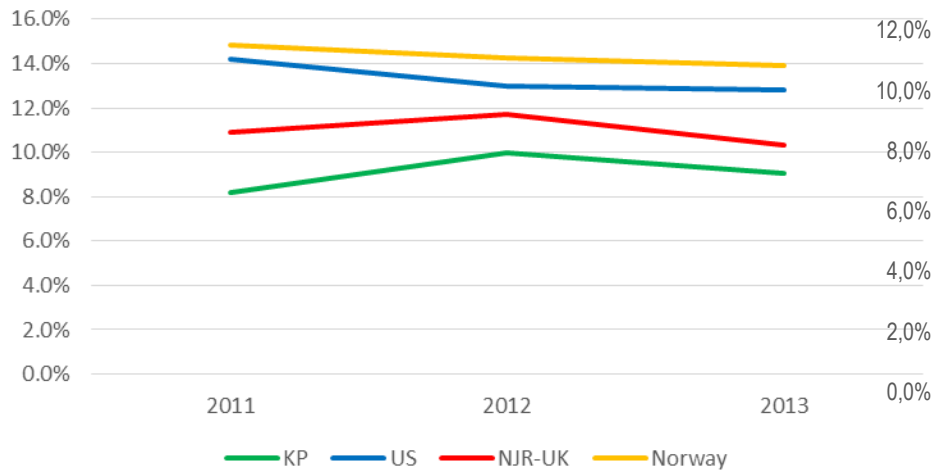
Total joint Replacement Outcomes

Total Joint Complications

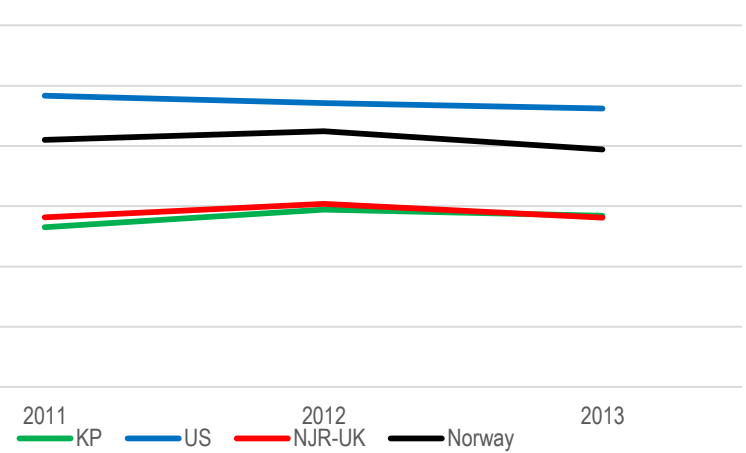
	Primary Total Hips	Revision Total Hips
Deep SSI	.5%	1.8%
DVT	.7%	.8%
PE	.5%	.4%
	Primary Total Knees	Revision Total Knees
Deep SSI	.7%	1.7%
DVT	.6%	.4%
PE	.6%	.4%

Revision Burden

THA Revision Burden



TKA Revision Burden



Longitudinal Tracking of Procedures/Devices

Registry	Total Joint Replacement 10-year Survival % (CI)	
	Hip	Knee
KP (2001-2013)	95.4 (95.1-95.7)	95.4 (95.2-95.6)
Australia (1999-2013)	93.2 (93.1-93.4)	94.4 (94.3-94.6)
Sweden (2003-2012)	94.6 (94.3-94.9)	94.6 (94.3-94.9)
New Zealand (1999-2013)	93.10%	95.7
NJR (2002-2013)	94.25 (94.09-94.45)	96.7 (96.6-96.8) uncemented

Value of Registries

- Provide quality, relevant clinical information to physicians, hospitals, patients, industry, regulators in real time based on real world experience
- Continuous Quality Improvement
 - Identification of variation in practices and outcomes
 - Identification and dissemination of clinical best practices
 - Clinician ownership is a critical factor in change
- Patient Safety
 - Identification of patient risk factors
 - Useful for recalls, advisories, and adverse event surveillance
- Comparative effectiveness

Conclusions

- Registries are vital for patient safety, quality improvement and cost-effectiveness
- A variety of quality improvement tools can be used to provide feedback to patients, surgeons, and hospitals
- Feedback on clinical best practices results in quality improvement and enhanced clinical outcomes for total joint replacement