

# Linking Device Data to Kaiser Permanente Electronic Health Record

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Liz Paxton, Director, National Implant Registries  
Rebecca Love, Senior Consultant

# About Kaiser Permanente

- Nation's largest nonprofit health plan

- Integrated health care delivery system

- 9 million members

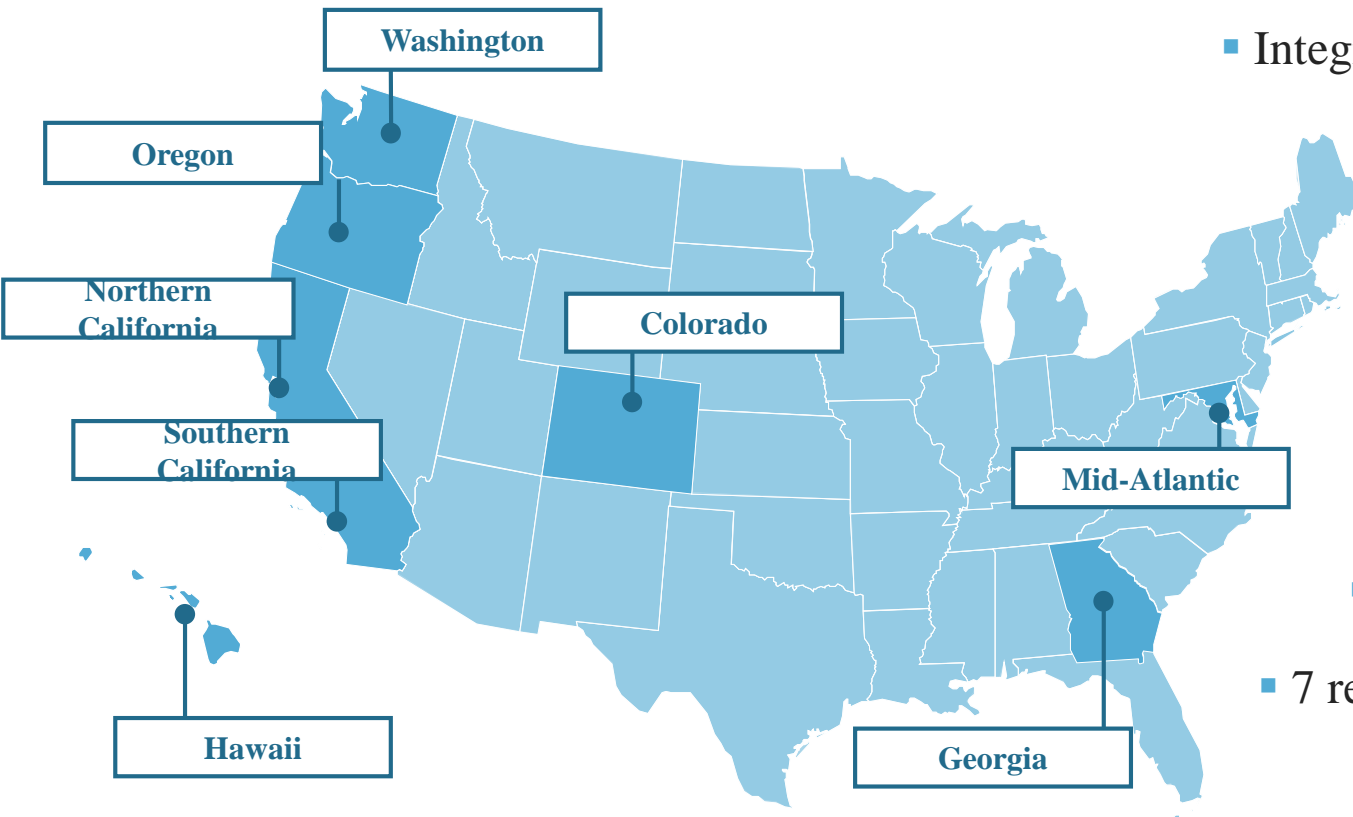
- 12,000+ physicians

- 140,000+ employees

- 430+ medical offices

- 32 hospitals and medical centers

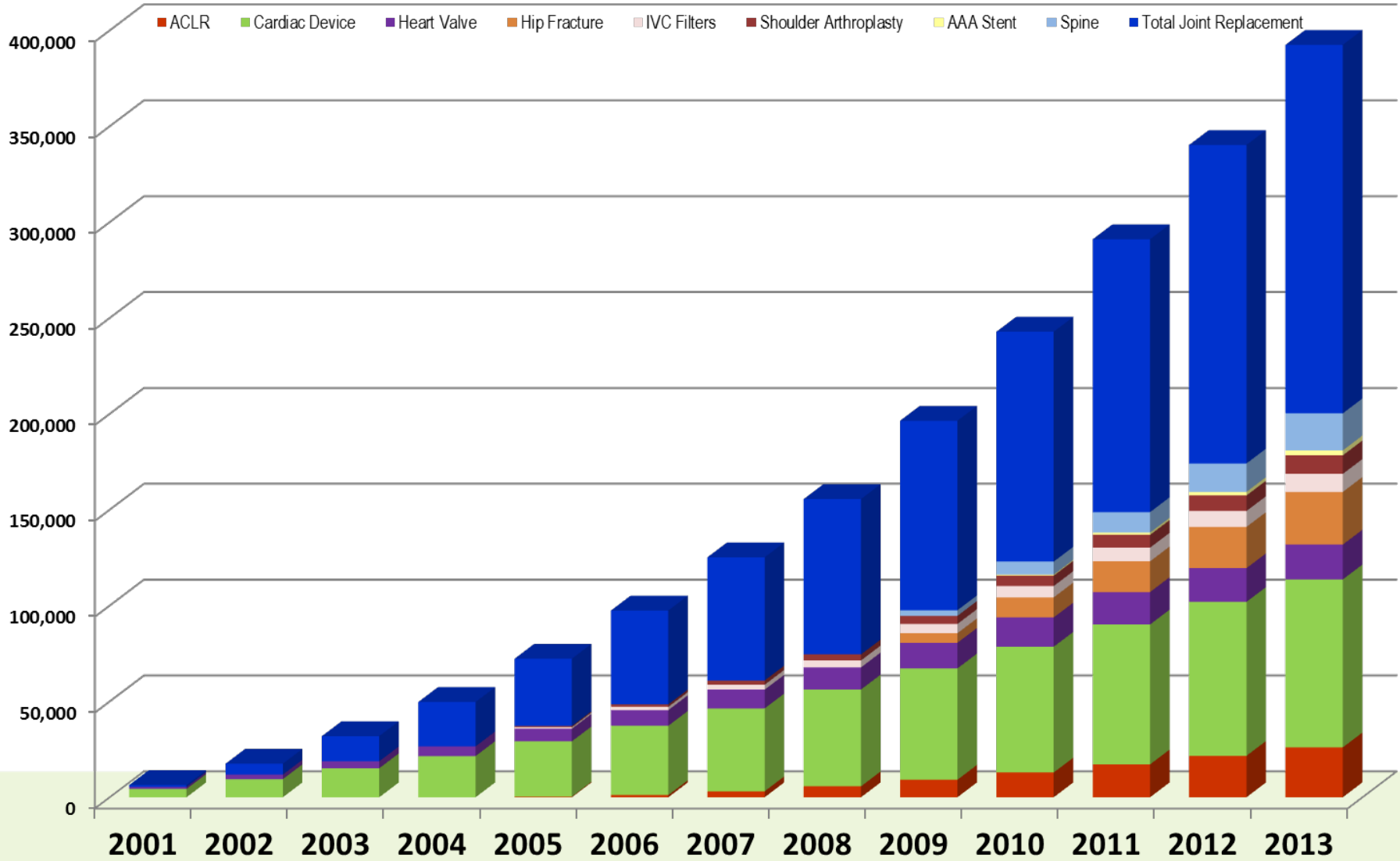
- 7 regions serving 8 states and D.C.



# Kaiser Permanente Registries

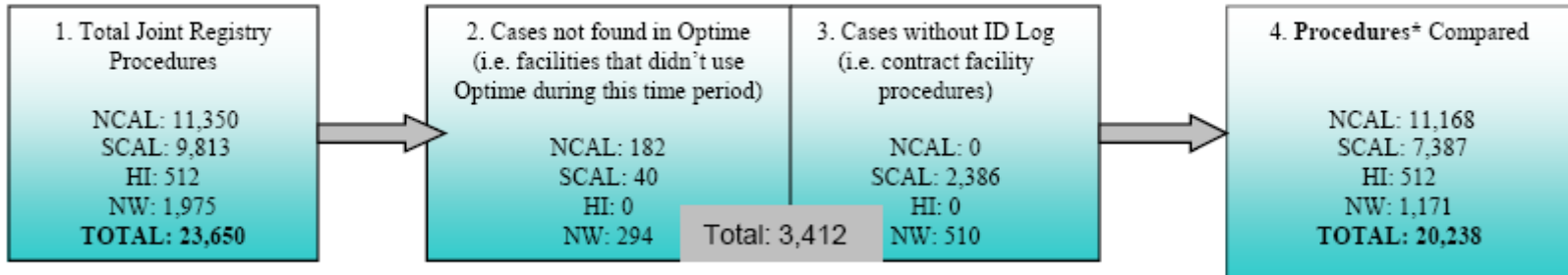
- Purpose:
  - Device recalls/notifications
  - Identify best performing/outlier devices for our patients
  - Identify patients at risk for poor outcomes
  - Identify clinical best practices for quality improvement
  - Comparative effectiveness research

# National Implant Registry Cumulative Volume

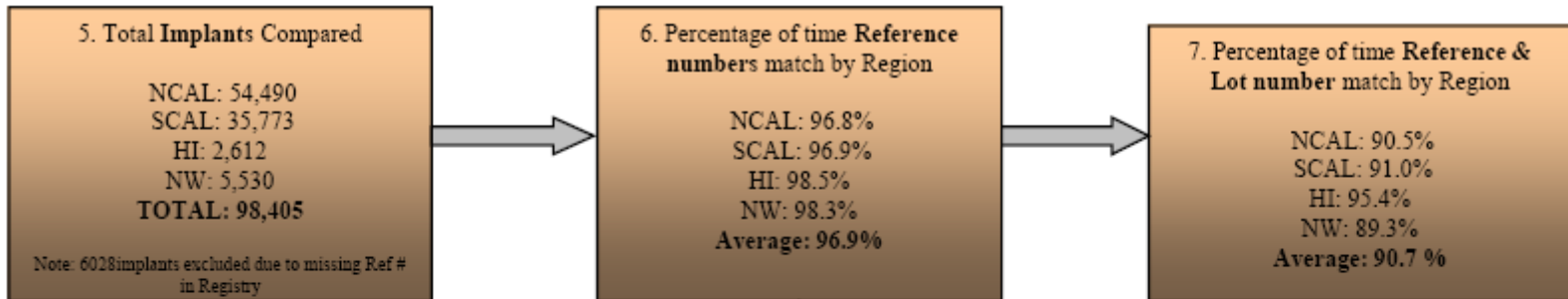


↑ Total Joint Replacements  
 ↑ ACLR  
 ↑ Cardiac Device Heart Valve  
 ↑ Shoulder Arthroplasty Hip Fracture Spine  
 ↑ AAA Stent IVC Filters

## Total Joint Registry Optime Data Comparison Time Period: 1/1/2010 thru 3/31/2011



\*A procedure is defined as a case matching in the Registry & Optime by: Procedural code, Region, MRN, Oupdate (w/ 5 days), Opsite and Opside.



Reference Number match but different Lot Number	Reference number match but Lot number missing in both Optime & Registry	Reference number match but Lot number missing in Registry	Reference number match but Lot number missing in Optime
Overall: 4.4%	Overall: 0.02%	Overall: 0.001%	Overall: 0.01%

# Electronic Collection: Inpatient

**Total Joint Registry** Complete

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	General	Spinal	Epidual	ASA	I	II	III	IV	V
	Regional	Femoral nerve block	MAC	Other (use comments)					

Drain	Retention	Non-Retention	None
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Reason for Surgery (Check all that apply)	Osteoarthritis (OA)	Rheumatoid arthritis (RA)	Inflammatory arthritis (Non-RA)	Post-traumatic arthritis	Osteonecrosis/avascular necrosis
	Asiatic loosening	Pain	Instability	Osteolysis	Arthralgia
	Synovial impingement	Ingrowth failure	Seroma	Hematomas	Infection
	Wound drainage	Wound dehiscence	Poly liner wear	Femoral fracture	Tibial fracture
	Component fracture	PF joint malfunction	Failed extensor mechanism	Failed uni-spacer	Failed HFO
	Failed ORP	Failed UKA	Failed TKA	Other (use comments)	

Revision	Yes	No	Conversion	Yes	No
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Procedure(s) (Check all that apply)	TKA with patella	TKA without patella	TKA revision	UKA (medial or lateral)	UKA converted to TKA	Patellofemoral unithroasty
	ORP changed to TKA	Stage 1 - explantation	Stage 2 - reimplantation	Poly liner exchange	I & D	HMR (Hardware Removal)
	MJA	Revision femur	Revision tibia	Revision patella	Synovectomy	ORP of (use comments)
	Other (use comments)					

Genet	Nurse	Patella	Tibia	Femur	Metal Augmentation	Nurse	Tibia	Femur
-------	-------	---------	-------	-------	--------------------	-------	-------	-------

bone graft	None	Non-Structural	Structural	Specify Location	Tibia	Femur
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Soft tissue releases lateral/anterolateral/patellar tracking	Yes	No
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Exposure	Paraspinal	Mid-rostus	Full incisions	1	2	3	4	5	6	7	8	9	10
	Sub-rostus	Tubercle osteotomy		Length of incisions									
	Quadriceps release	Trivector	Other (use comments)										
	CAS (Computer Assisted Surgery)	Mini	Other (use comments)										

IV/Intravenous	Counain	SCD	Infection Prophylaxis	IV antibiotics	Antibiotics in concert	Clean air
	Aspirin	TED hose		Laminar flow	Space suits	Antibiotic irrigation
	Anti-inflammatory	Low molecular weight heparin	Other (use comments)			
	Arils	Food pump	Other (use comments)			
	Other (use comments)					

**Implants** Complete

Search Implants/Trays Add Explant

Name	Status	Latex	Serial Number	Model/Cat Number	Explant patient's existing implants
PLATE BONE DCP 32MM 3 HOLE T STAINLESS STEEL FOOT 2.7MM SCREWS MINI FRAGMENT SET NONSTERILE - LOG3	Implanted			242.41	X
CARTRIDGE BONE STAPLE 15X16MM STAPLIZER ORTHOPEDIC - LOG3	Implanted			7615-03	X

Previous F7 Next F8

**Implant Record**

Inventory item: SYSTEM DELIVERY ELECTROD

Inventory location: SYSTEM DELIVERY ELECTROD Inventory Location selection window.

Serial no.:

Lot No.:

Implant name: SYSTEM DELIVERY ELECTRODE K

**Usage Details**

Action: Implanted Implant Actions selection window.

Site: Elbow Area field is now labeled Site.

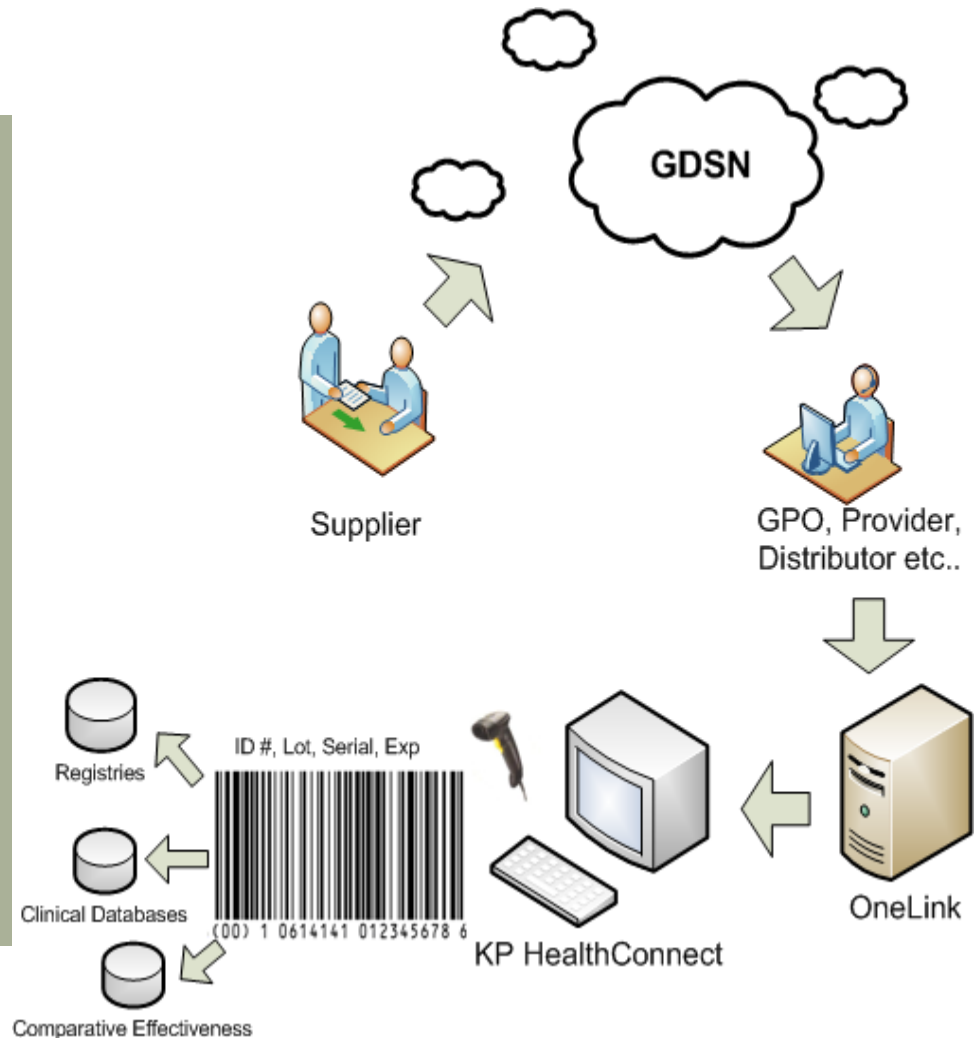
Laterality: Left Right Bilateral N/A Laterality of implantation quick buttons.

Implanted by: Chen, Vincent Wing-Shun (M.D.) Bautista, Rosa M Torculas, Hazel

Time of implant: 09:37 AM 3/5/2012 Now Time of Implant field automatically populates when you document action of Implanted.

# Kaiser Permanente UDI Implementation: GS1/UDI Bar-coding Standard

- GTIN's flowing between Item Master and Point of Care System
- Interfaces between Kaiser Permanente's (KP) PeopleSoft Item Master (OneLink) and Epic (KP HealthConnect) built
- Scanning GTIN's at Point of Care



# Example: Hip Implant

REF 1217-30-500 LOT D13120664

PINNACLE®  
 CANCELLOUS BONE SCREW  
 6.5mm x 30mm



(01)10803295010159



(17)240131(10)D13120664



2024-01

STERILE R  
 QTY 1

DePuy Orthopaedics, Inc.  
 100 Orthopaedic Drive  
 Warsaw IN 46582  
 1-800-388-8143

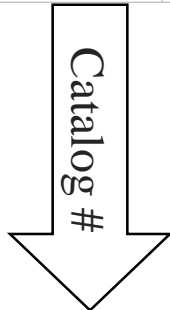
Optime_IMPLANTID	Optime_ImpManu	Optime_ImpModel	Optime_ImpLot	Optime_ImpName	Optime_ImpAction	Optime_ImpQty
312277923	DEPUY	121730500	D12050476	SCREW 6.5MMX30MM BONE PINNACLE CANCELLOUS - LOG312714	IMPLANTED	1



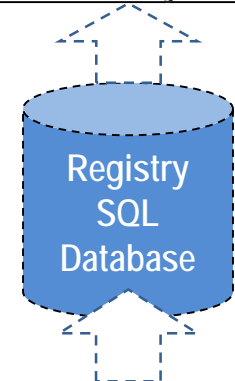
# Implant Data Elements Extracted from EHR

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

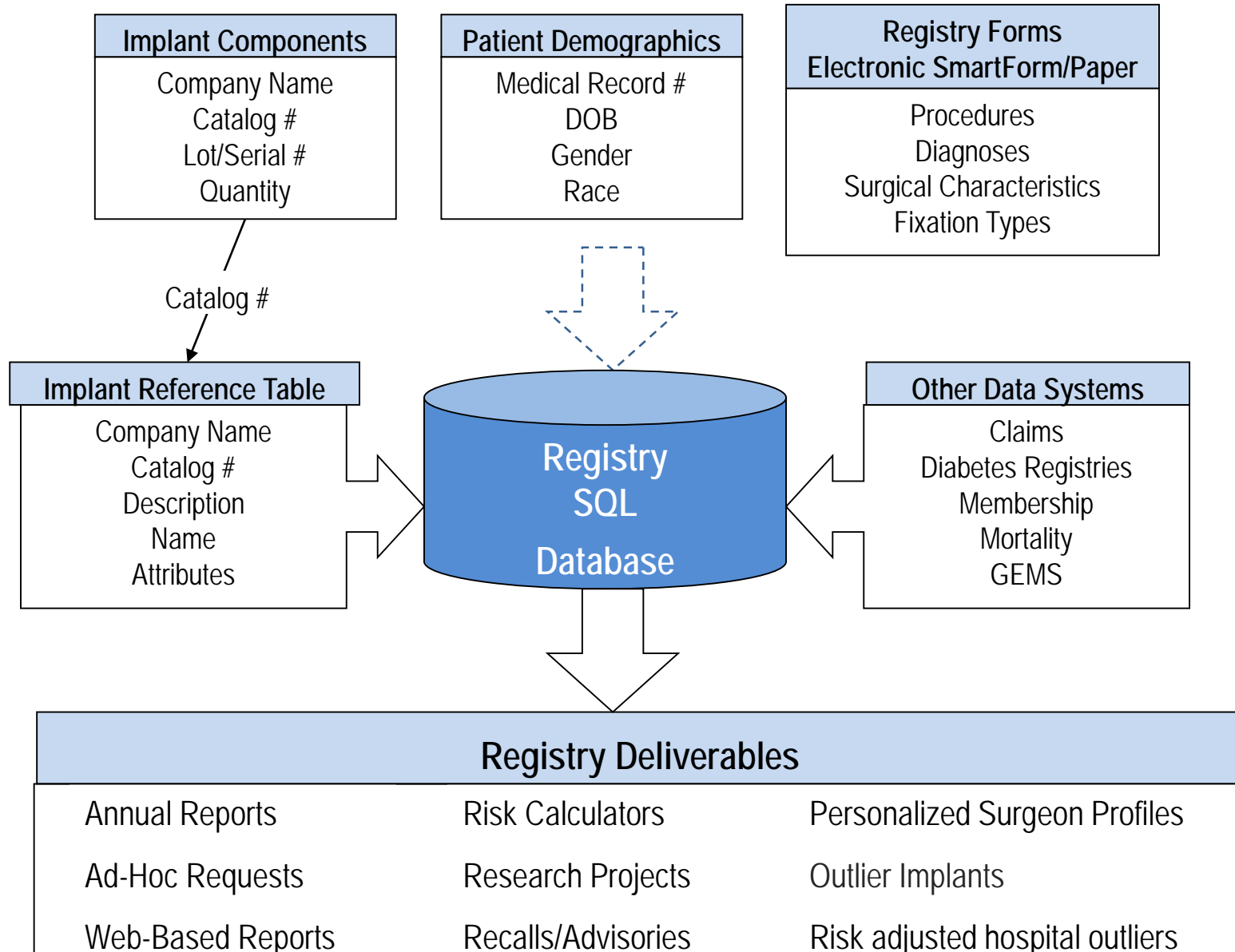


## Implant Reference Library

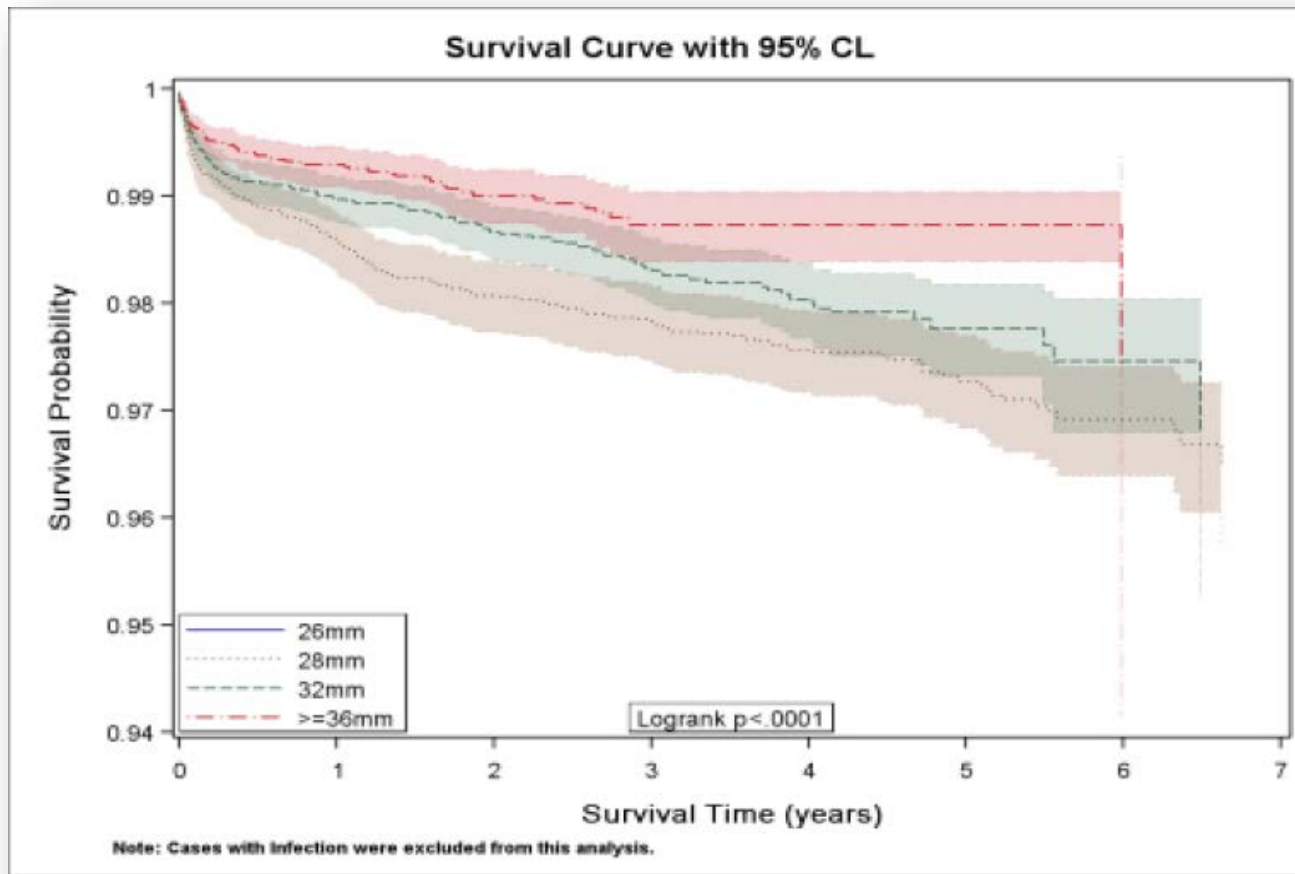


COMPANY NAME	CATALOG #	DESCRIP-TION	IMPLANT NAME	CATEGORY	INSERT MATERIAL	FEMORAL MATERIAL	CEMENT FIXATION	SIZE	STABILITY	MOBILITY
ZIMMER	00595001506	NEXGEN CR FLEX FEM COMP PRECOAT	NEXGEN	FEMORAL		COCR	CEMENTED	SIZE E	MINIMALLY STABILISED	
ZIMMER	00595203010	ZIMMER ARTICULAR SURFACE CR PROLONG	ZIMMER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

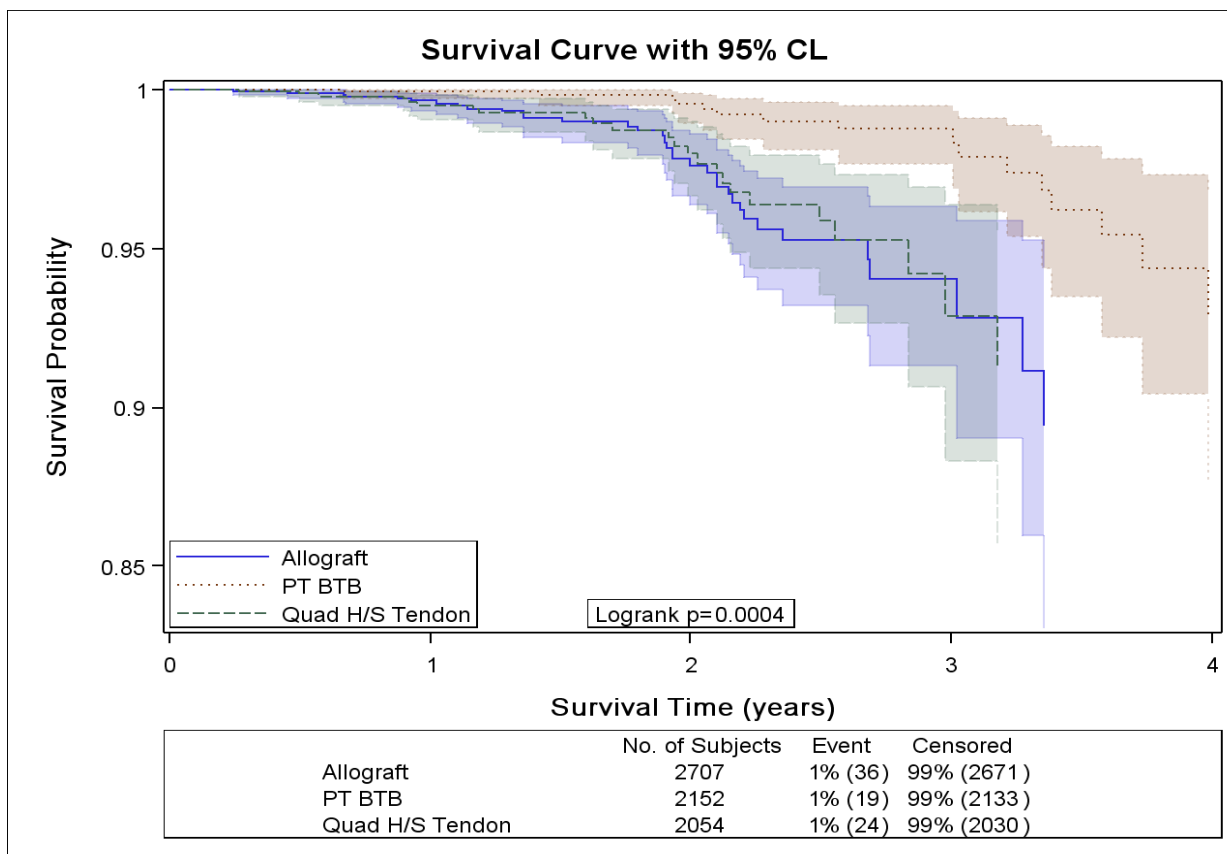
# Extracted from Electronic Health Record



# Implant Surveillance

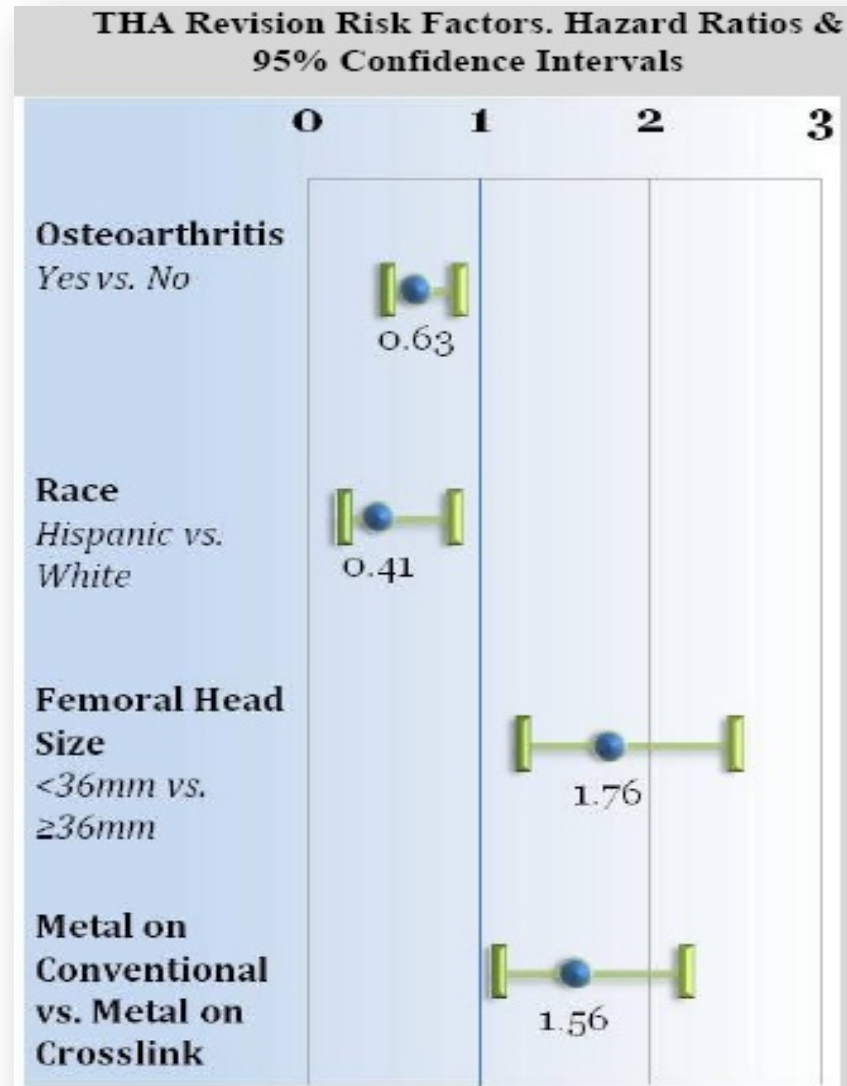


# Implant Comparative Effectiveness



Number at Risk (years)	0	1	2	3	4
Allograft	2707	1330	496	82	25
PT BTB	2152	1247	654	239	59
Quad H/S Tendon	2054	993	354	68	25

# Identification of Risk Factors



# Surgeon Profile and Medical Center Reports

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

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%	185	1.7%	407	1.5%
40-49	12	5.5%	88	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%	7995	29.8%
70-79	87	39.5%	285	29.3%	3211	29.4%	7842	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%
<b>Total</b>	<b>220</b>	<b>100.0%</b>	<b>905</b>	<b>100.0%</b>	<b>10909</b>	<b>100.0%</b>	<b>26449</b>	<b>100.0%</b>

Gender	Surgeon		Facility		Region		National	
	#	%	#	%	#	%	#	%
Male	74	33.6%	371	41.0%	4653	42.7%	11302	42.7%
Female	148	66.4%	534	59.0%	6252	57.3%	15143	57.3%
Missing	0	0.0%	0	0.0%	4	0.0%	4	0.0%
<b>Total</b>	<b>220</b>	<b>100.0%</b>	<b>905</b>	<b>100.0%</b>	<b>10909</b>	<b>100.0%</b>	<b>26449</b>	<b>100.0%</b>

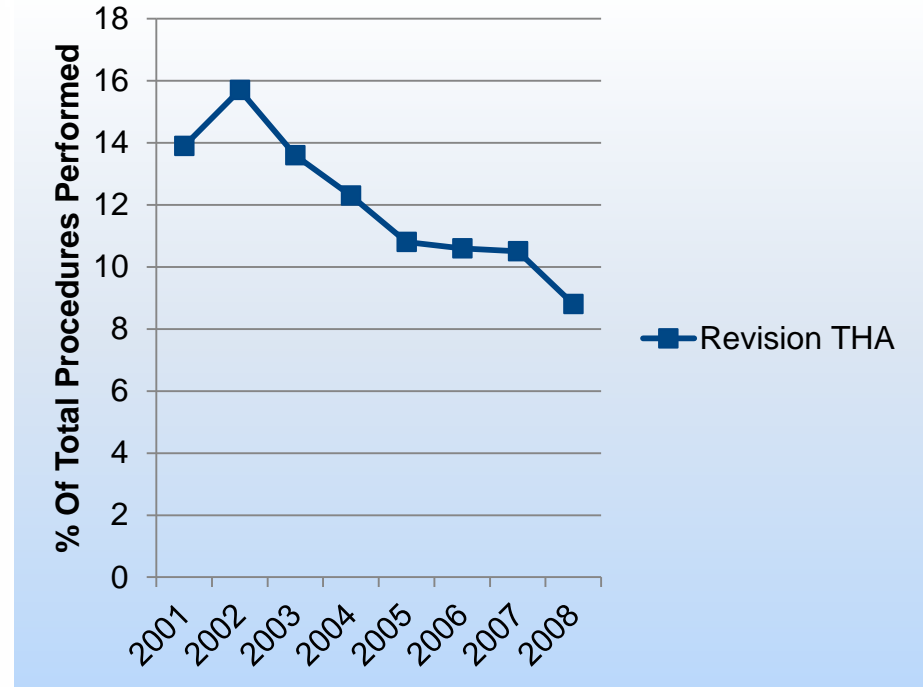
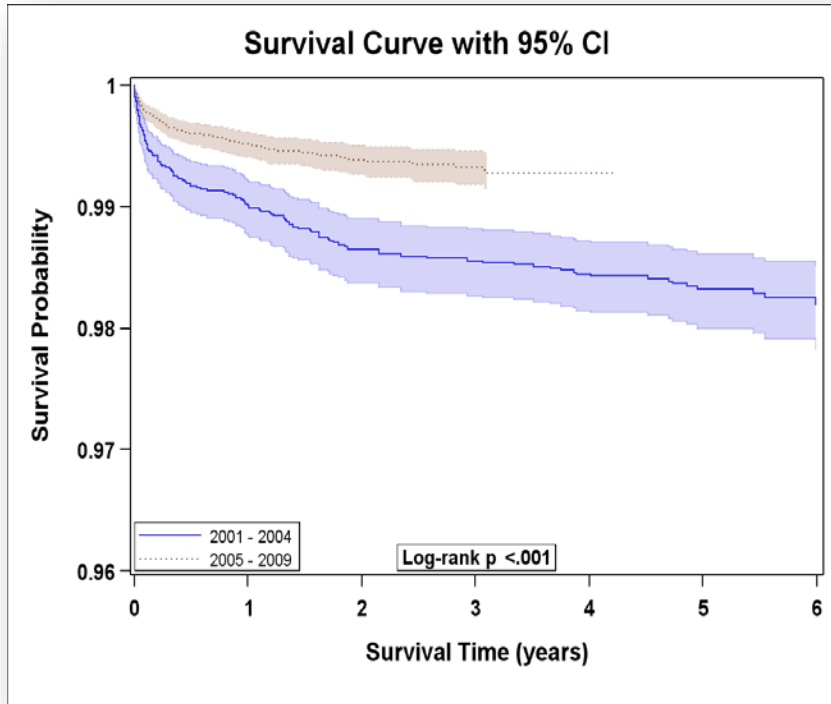
  

ASA Score	Surgeon		Facility		Region		National	
	#	%	#	%	#	%	#	%
1	6	2.7%	45	5.0%	393	3.6%	1041	3.9%
2	172	78.2%	669	73.9%	6354	58.2%	15942	60.3%
3	40	18.2%	188	20.8%	3865	35.4%	8567	32.4%
4	2	0.9%	4	0.4%	103	0.9%	258	1.0%
5	0	0.0%	0	0.0%	5	0.0%	5	0.0%
Missing	0	0.0%	1	0.1%	189	1.7%	638	2.4%
<b>Total</b>	<b>220</b>	<b>100.0%</b>	<b>905</b>	<b>100.0%</b>	<b>10909</b>	<b>100.0%</b>	<b>26449</b>	<b>100.0%</b>

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

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# THA Revision Rates/Burden



# Lessons Learned

- MD involvement at all stages
- Identify common core data elements with surgeon support
- Direct feedback to clinical staff and MDs
- Registry integration into workflow
- Leverage existing databases
- Discrete fields for data extraction
- Rigorous quality control mechanisms and validation of outcomes
- Implants need to be linked to clinical attributes to have meaningful clinical value



Thank You