

***Kaiser Permanente***

**National Total Joint Replacement  
Registry**

**Liz Paxton**

**Director of Surgical Outcomes & Analysis**

# Overview

- ❖ Background Total Joint Replacement (TJR)
- ❖ Importance of establishing a TJR post-market surveillance system
- ❖ Kaiser Permanente National Total Joint Registry
  - Development/Implementation
  - Clinical quality improvement
    - Clinical effectiveness
    - Patient safety
    - Risk management
    - Resource stewardship
    - Service quality
- ❖ Expansion within & beyond orthopedics

# Background

## Total Joint Replacement in the United States

### Current Volume

- 600,000 TJRs each year (Hip & Knees)
  - 14,000 program-wide in KP

### Projected Volume 2030 (Kurtz et al., 2006)

- TKA 3.48 million per year
- THA 572,000 per year

### Projected Costs

#### Annual Hospital Charges by 2015 (Ong et al., 2007)

- Primary THA \$17.4 billion, TKA \$40.8 billion
- Revision THA \$3.8 billion, TKA \$4.1 billion

# *Importance of a TJR System*

- ❖ Identify TJR revision/failure rates
- ❖ Identify patients at risk for failures/revisions
- ❖ Assess post-market implant performance
- ❖ Immediately identify/notify patients w/recalled implants
  - ❖ **Hip Stem Failure (late 90's)**
    - Silent failures until reach catastrophic level
    - Still presenting
  - ❖ **Hip Cup Recall (2000)**
    - 17,500 patients with recalled implant
    - Traces of machine oil on the cup

# KP National Total Joint Registry

Initiated 2001 by  
Orthopedic Surgeons

- 95% voluntary participation
- 300 surgeons
- 38 KP centers
- 5 Regions

Funded via  
savings w/ Nat  
purchasing  
contracts

Outcomes data  
helps guide  
purchasing  
decisions

Standardized  
TJA  
documentation

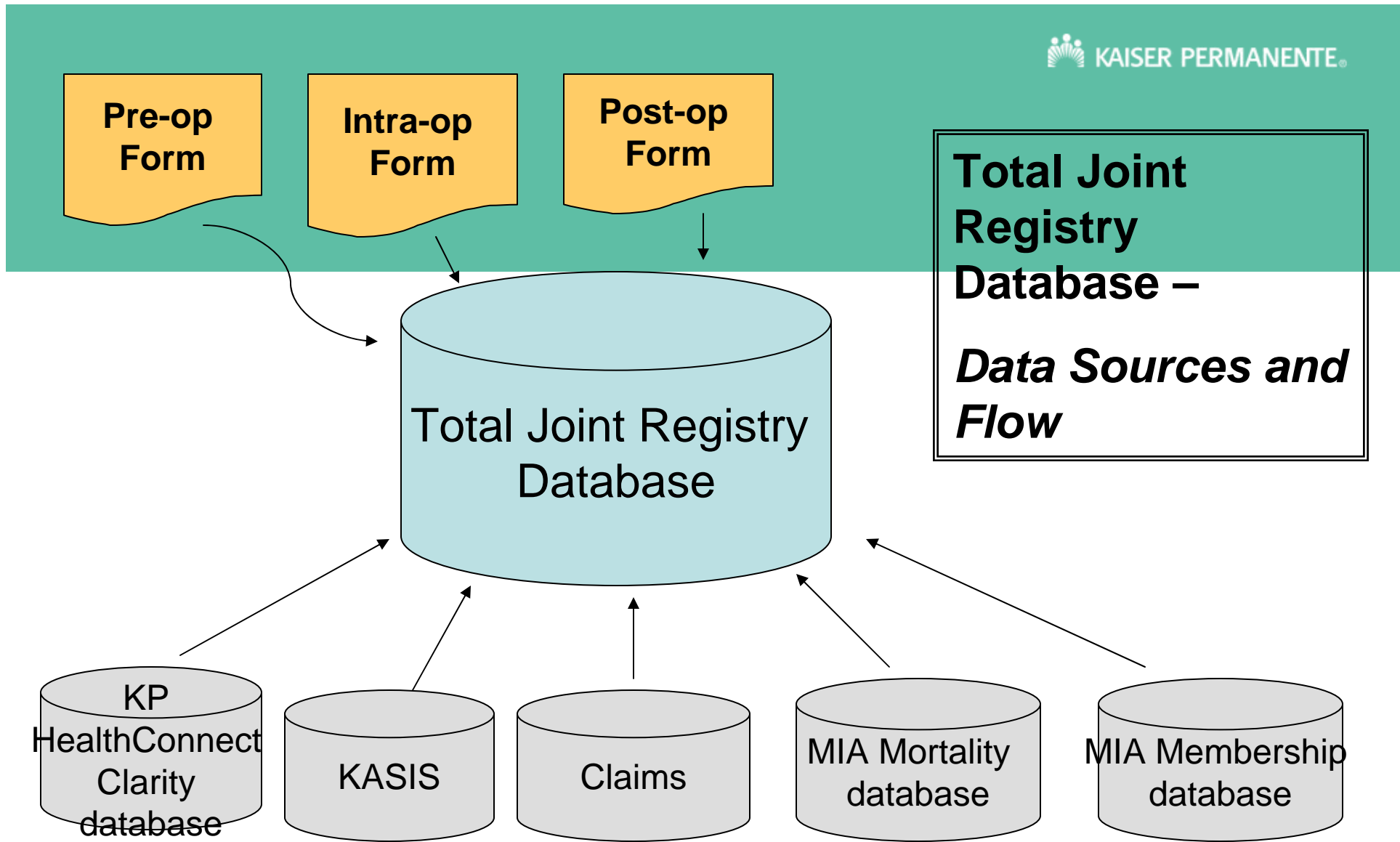
- Pre-operative
- Operative
- Follow-up

Database of all  
Total Joint  
procedures

- 65,000 total joints registered
- Demographics
- Surgical Techniques
- Implant Characteristics

## Value

Clinical effectiveness  
Cost efficiency  
Patient safety/quality  
Risk management



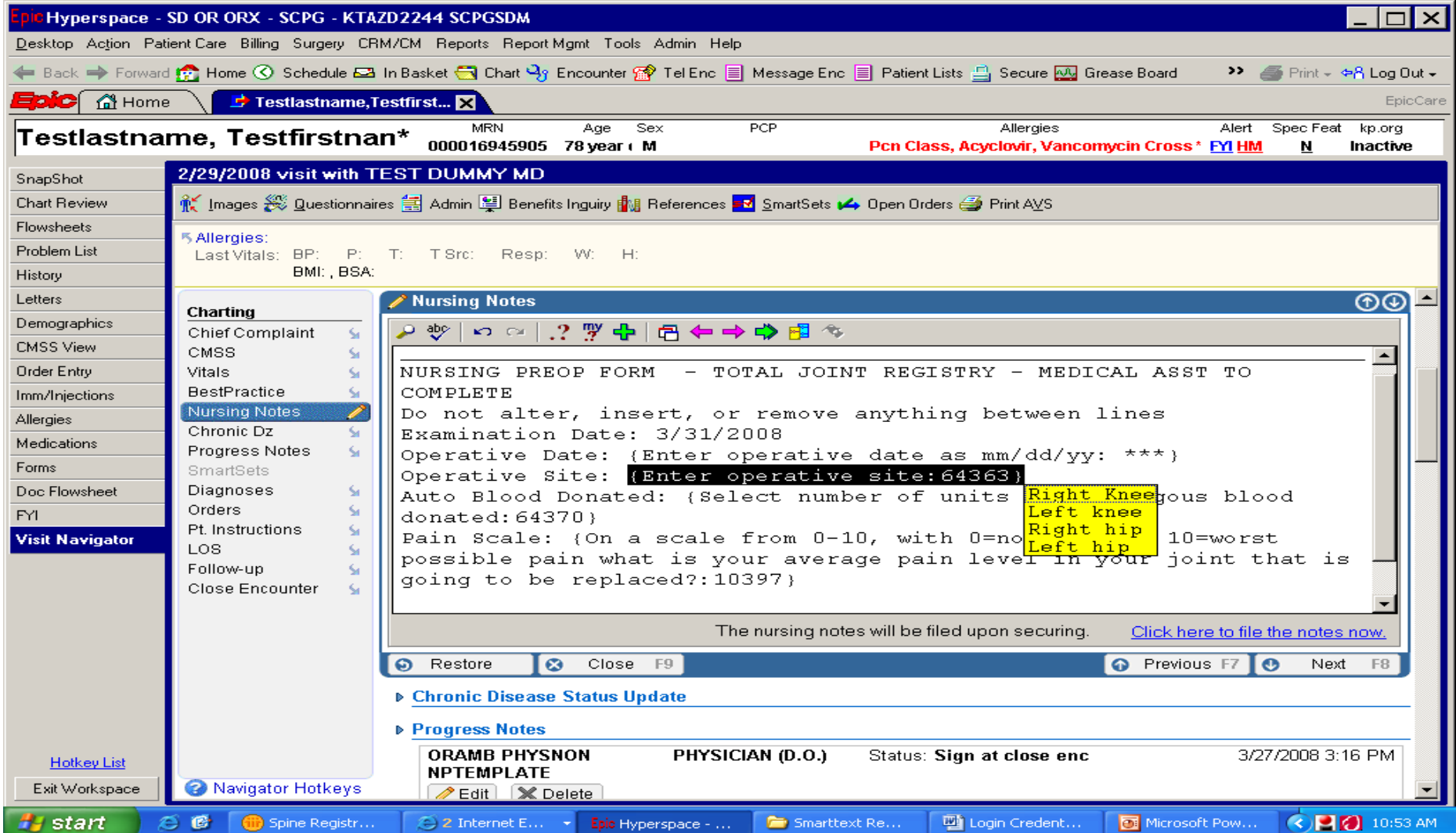
Participating Regions: Colorado, Southern CA, Northern CA, Hawaii, Northwest

MIA: Management and Information Analysis Dept

KASIS: Kaiser Anesthesia and Surgery Information System

# KPHC Smart Phrases

## Pre-op – Physician/PA Section



**Epic Hyperspace - SD OR ORX - SCPG - KTAZD2244 SCPGSDM**

Desktop Action Patient Care Billing Surgery CRM/CM Reports Report Mgmt Tools Admin Help

← Back → Forward Home Schedule In Basket Chart Encounter Tel Enc Message Enc Patient Lists Secure Grease Board Print Log Out

**Testlastname, Testfirstnan\*** MRN: 000016945905 Age: 78 year Sex: M PCP: Allergies: Pcn Class, Acyclovir, Vancomycin Cross \* Alert: FYI HM Spec Feat: N kp.org: Inactive

**2/29/2008 visit with TEST DUMMY MD**

Images Questionnaires Admin Benefits Inquiry References SmartSets Open Orders Print AVS

**Allergies:**  
Last Vitals: BP: P: T: T Src: Resp: Wt: H:  
BMI: , BSA:

**Charting**

- Chief Complaint
- CMSS
- Vitals
- BestPractice
- Nursing Notes**
- Chronic Dz
- Progress Notes
- SmartSets
- Diagnoses
- Orders
- Pt Instructions
- LOS
- Follow-up
- Close Encounter

**Nursing Notes**

NURSING PREOP FORM - TOTAL JOINT REGISTRY - MEDICAL ASST TO COMPLETE  
Do not alter, insert, or remove anything between lines  
Examination Date: 3/31/2008  
Operative Date: {Enter operative date as mm/dd/yy: \*\*\*}  
Operative Site: {Enter operative site: 64363}  
Auto Blood Donated: {Select number of units  
Right Knee  
Left knee  
Right hip  
Left hip  
10=worst  
10397}

The nursing notes will be filed upon securing. [Click here to file the notes now.](#)

Restore Close F9 Previous F7 Next F8

▶ **Chronic Disease Status Update**

▶ **Progress Notes**

ORAMB PHYSNON PHYSICIAN (D.O.) Status: Sign at close enc 3/27/2008 3:16 PM  
NPTEMPLATE  
Edit Delete

Hotkey List  
Exit Workspace  
Navigator Hotkeys

start Spine Registr... Internet E... Epic Hyperspace - ... Smarttext Re... Login Credent... Microsoft Pow... 10:53 AM

# KPHC Smart Phrases

Epic Hyperspace - SD OR ORX - SCPG - KTAZD2244 SCPGSDM

Desktop Action Patient Care Billing Surgery CRM/CM Reports Report Mgmt Tools Admin Help

← Back → Forward Home Schedule In Basket Chart Encounter Tel Enc Message Enc Patient Lists Secure Grease Board Print Log Out

Epic Home Testlastname, Testfirst... EpicCare

**Testlastname, Testfirstnan\*** MRN: 000016945905 Age: 78 year Sex: M PCP: Allergies: Pcn Class, Acyclovir, Vancomycin Cross\* Alert: FYI HM Spec Feat: N kp.org: Inactive

2/29/2008 visit with TEST DUMMY MD

Images Questionnaires Admin Benefits Inquiry References SmartSets Open Orders Print AYS

Allergies: Last Vitals: BP: P: T: T Src: Resp: W: H: BMI: , BSA:

Charting

- Chief Complaint
- CMSS
- Vitals
- BestPractice
- Nursing Notes
- Chronic Dz
- Progress Notes
- SmartSets
- Diagnoses
- Orders
- Pt. Instructions
- LOS
- Follow-up
- Close Encounter

SmartSets

Diagnoses (View Only)

None

HIP STATUS FORM - TOTAL JOINT REGISTRY  
 Do not alter, insert, or remove anything between lines  
 Examination Date: 3/27/2008  
 Operative Site: {Enter hip operative site:37960}  
 Charnley Classification: {Charnley Classification now?:64366}  
 Ambulatory Support: {Ambulatory support used now?:64365}  
 Component loosening: {Radiographic component loosening?:64702}  
 Osteolysis: {Radiographic osteolysis?:64702}  
 Complications: {Select all complications that occurred:64705}  
 Revision planned: {Is a revision planned?:39231::No}

not assessed  
 none  
 possibly of femur  
 possibly of acetabulum  
 definitely of femur  
 definitely of acetabulum

Note status:  Sign at closing of section  Sign at closing of encounter

Restore Close F9 Previous F7 Next F8

Hotkey List Exit Workspace Navigator Hotkeys

ORAMB PHYSNON NPT... Open Charts, OPEN ORDERS 10:57 AM

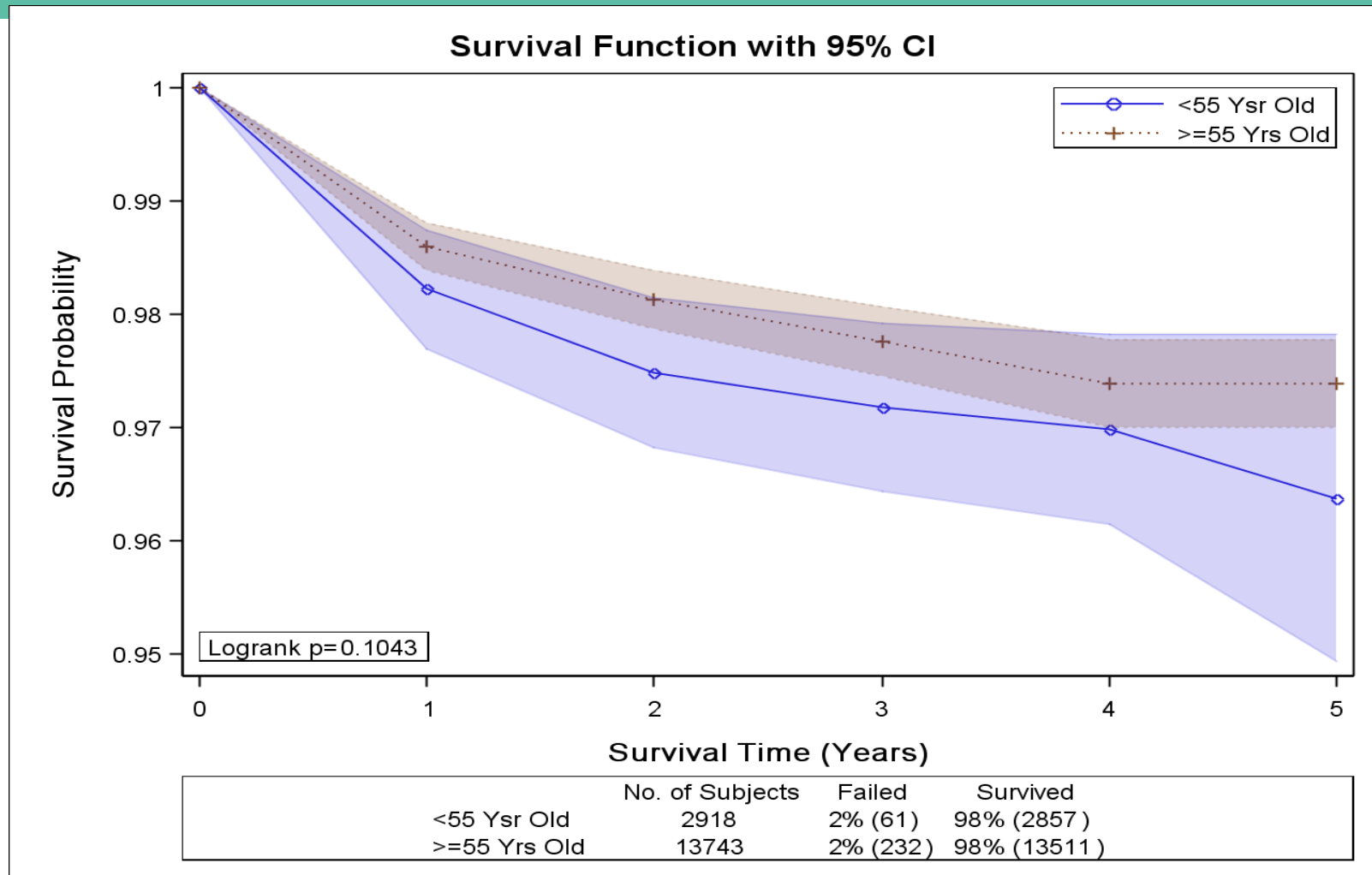
# *Patient Safety/Risk Management Implant Recalls & Advisories*



Timely, efficient patient identification

- S&N calaxo screws
- MTF allografts
- S&N TC plus knee implants
- Stryker Trident hip cups

# Clinical Effectiveness: THA Survival



# TJR Registry - THA Reasons for Revision

| Top Reasons for Revision | Registry THAs |
|--------------------------|---------------|
| Instability              | 161 (54%)     |
| Infection                | 59 (20%)      |
| Aseptic Loosening        | 32 (11%)      |
| Other                    | 29 (10%)      |
| Periprosthetic Fracture  | 18 (6%)       |
| Femoral Fracture         | 15 (5%)       |
| Pain                     | 13 (4%)       |
| LLI                      | 12 (4%)       |
| Polyliner Wear           | 8 (3%)        |
| Osteolysis               | 4 (1.3%)      |

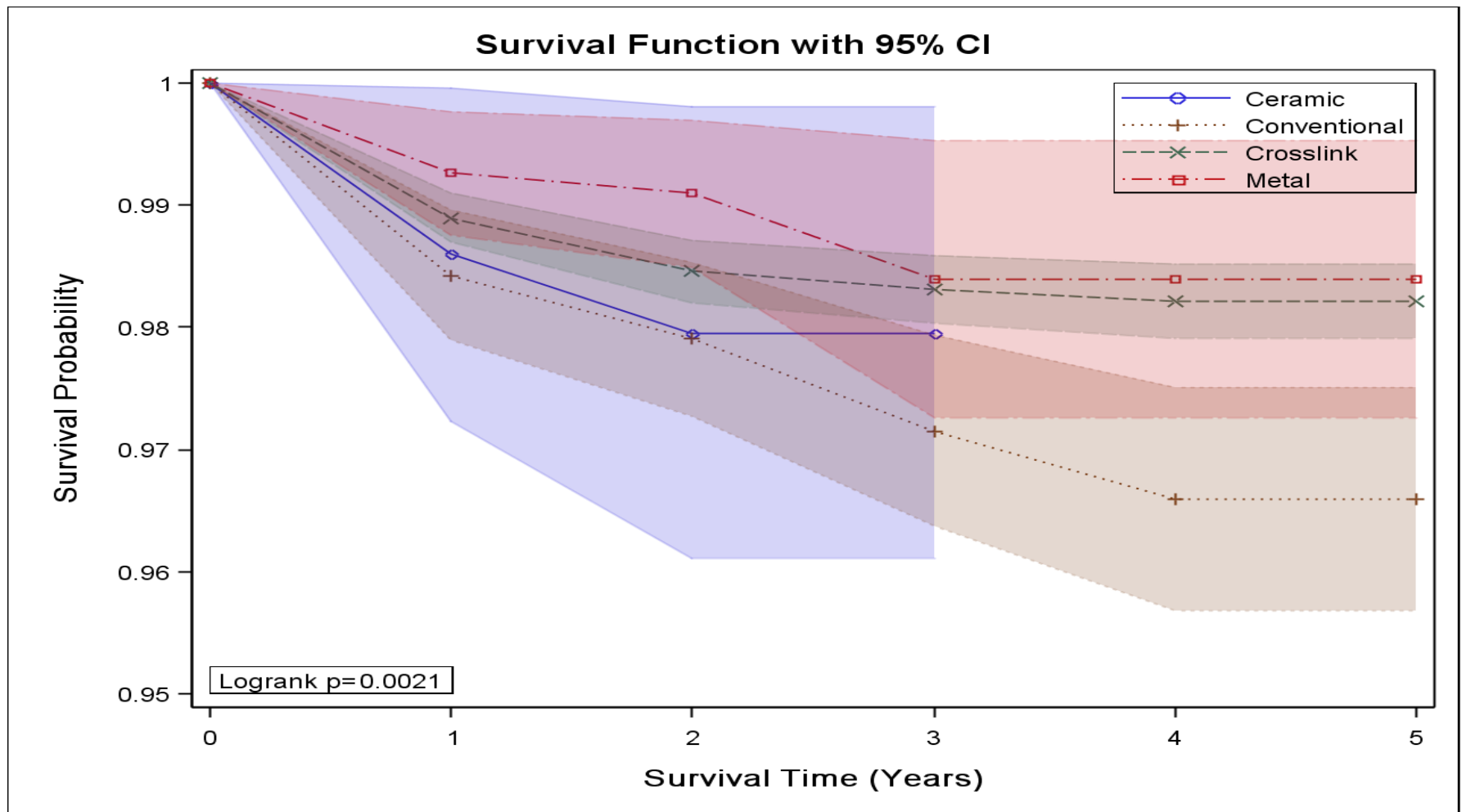


# *THA Revision Risk Factors*

- ❖ **Higher ASA score**
- ❖ **Younger Age**
- ❖ **Region**
- ❖ **Cemented technique**
- ❖ **Conventional insert**

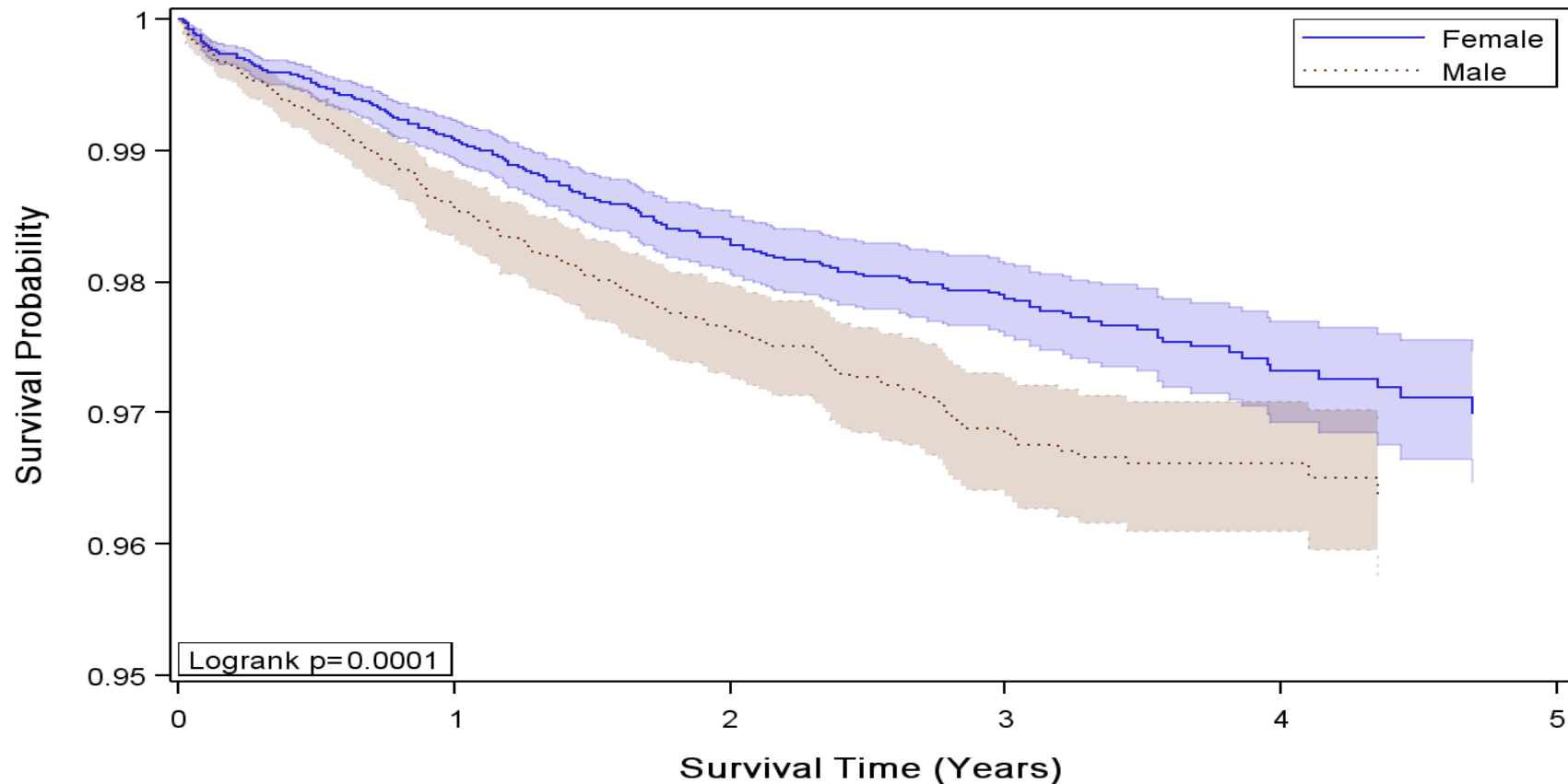


# Clinical & Cost Effectiveness: THA Implants



# Clinical Effectiveness: TKA Survival

Survival Curve with 95% CI



|        | No. of Subjects | Event    | Censored    |
|--------|-----------------|----------|-------------|
| Female | 18525           | 2% (278) | 98% (18247) |
| Male   | 10529           | 2% (220) | 98% (10309) |

# TJR Registry – TKA Reasons for Revision



| Top Reasons for Revision | Registry TKAs |
|--------------------------|---------------|
| Infection                | 202 (49%)     |
| Instability              | 78 (16%)      |
| Other                    | 69 (14%)      |
| Aseptic Loosening        | 64 (13%)      |
| Pain                     | 64 (13%)      |
| Arthrofibrosis           | 47 (10%)      |
| Femoral Fracture         | 13 (3%)       |
| Wound Dehiscence         | 9 (2%)        |
| Osteolysis               | 9 (2%)        |

# *TKA Revision Risk Factors*

- ❖ **Higher ASA score**
- ❖ **Younger Age**
- ❖ **Region**
- ❖ **Uncemented technique**
- ❖ **Femoral Component**



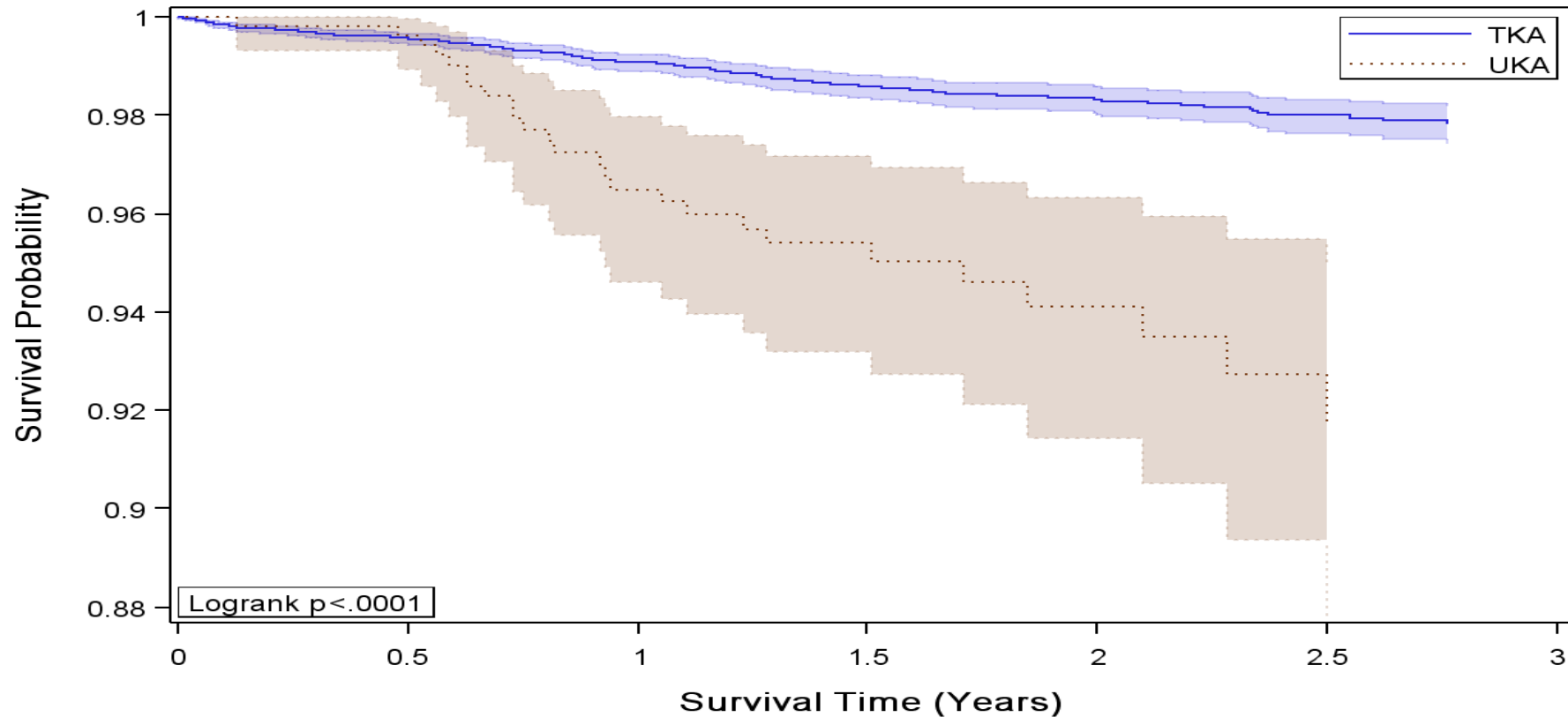
# *Clinical & Cost Effectiveness: Testing Industry claims*

- ❖ **Gender Specific Knee**
- ❖ **\$1,000 extra**
- ❖ **Registry data indicated men and women similar ROM, satisfaction, pain, and revision rates**
- ❖ **Why needed?**



# Clinical Effectiveness: Changes in Practice

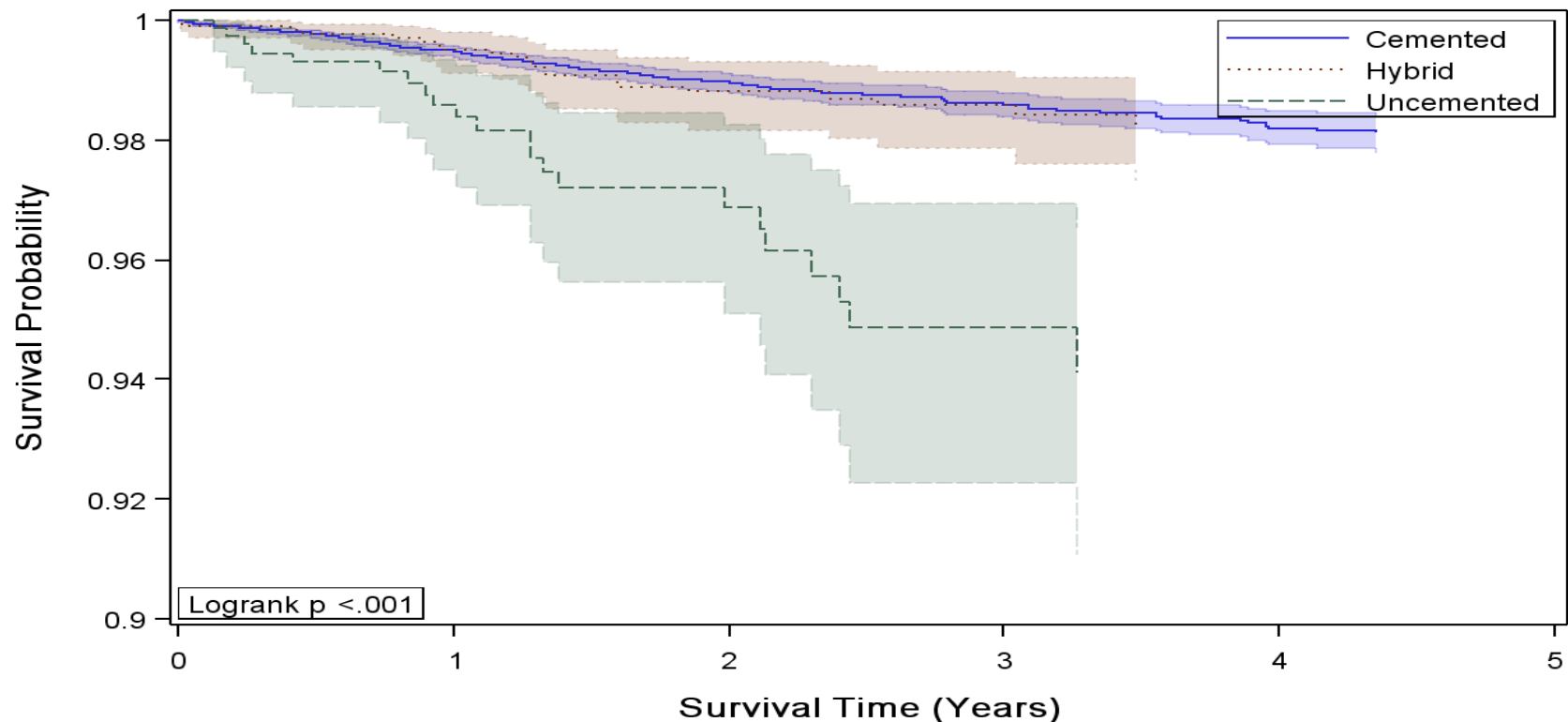
Survival Curve with 95% CL



|     | No. of Subjects | Event    | Censored    |
|-----|-----------------|----------|-------------|
| TKA | 14547           | 1% (173) | 99% (14374) |
| UKA | 601             | 4% (26)  | 96% (575)   |

# Clinical Effectiveness: Changes in Practice

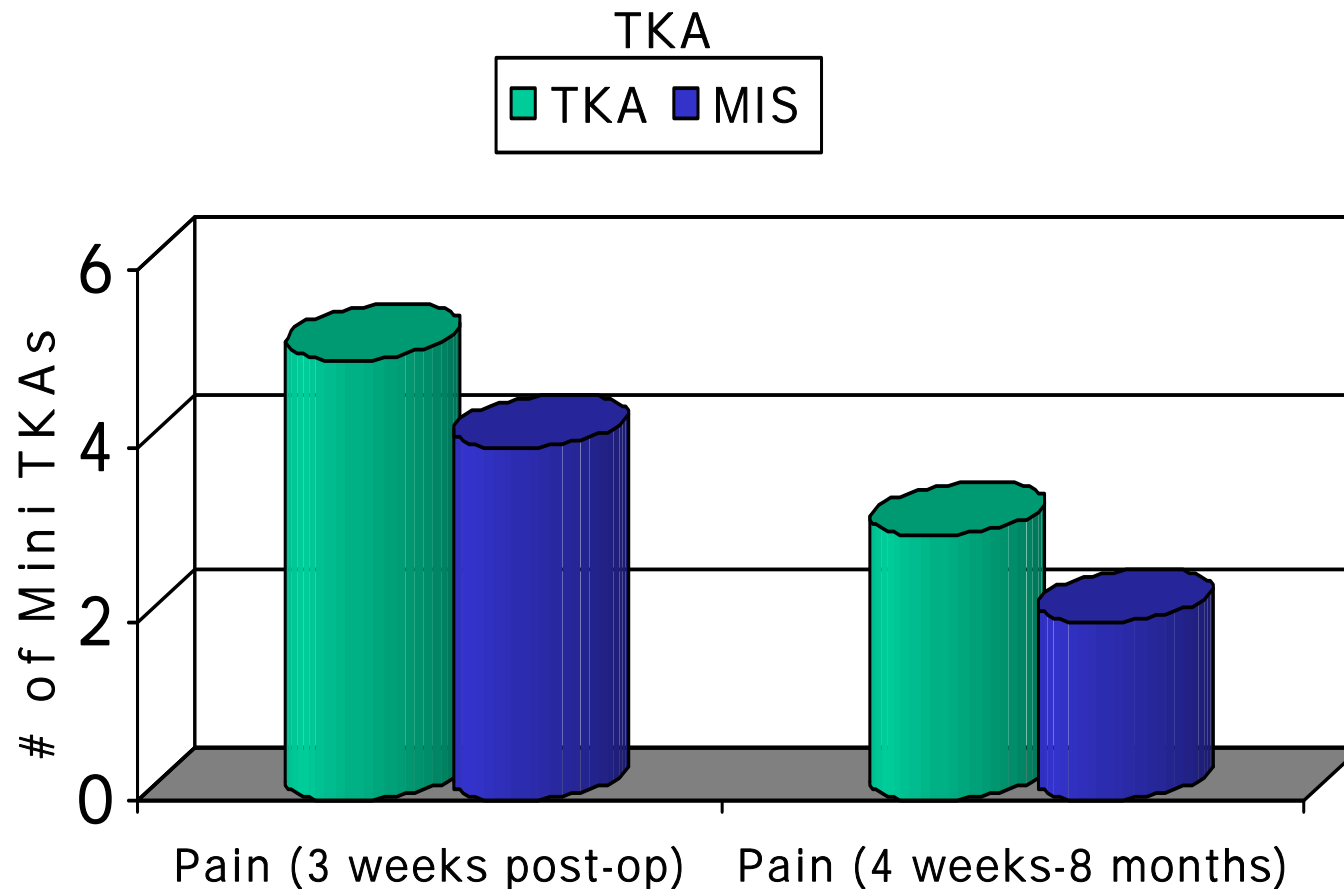
Survival Curve with 95% CI



|            | No. of Subjects | Event    | Censored    |
|------------|-----------------|----------|-------------|
| Cemented   | 24594           | 1% (234) | 99% (24360) |
| Hybrid     | 1960            | 1% (21)  | 99% (1939)  |
| Uncemented | 773             | 3% (22)  | 97% (751)   |

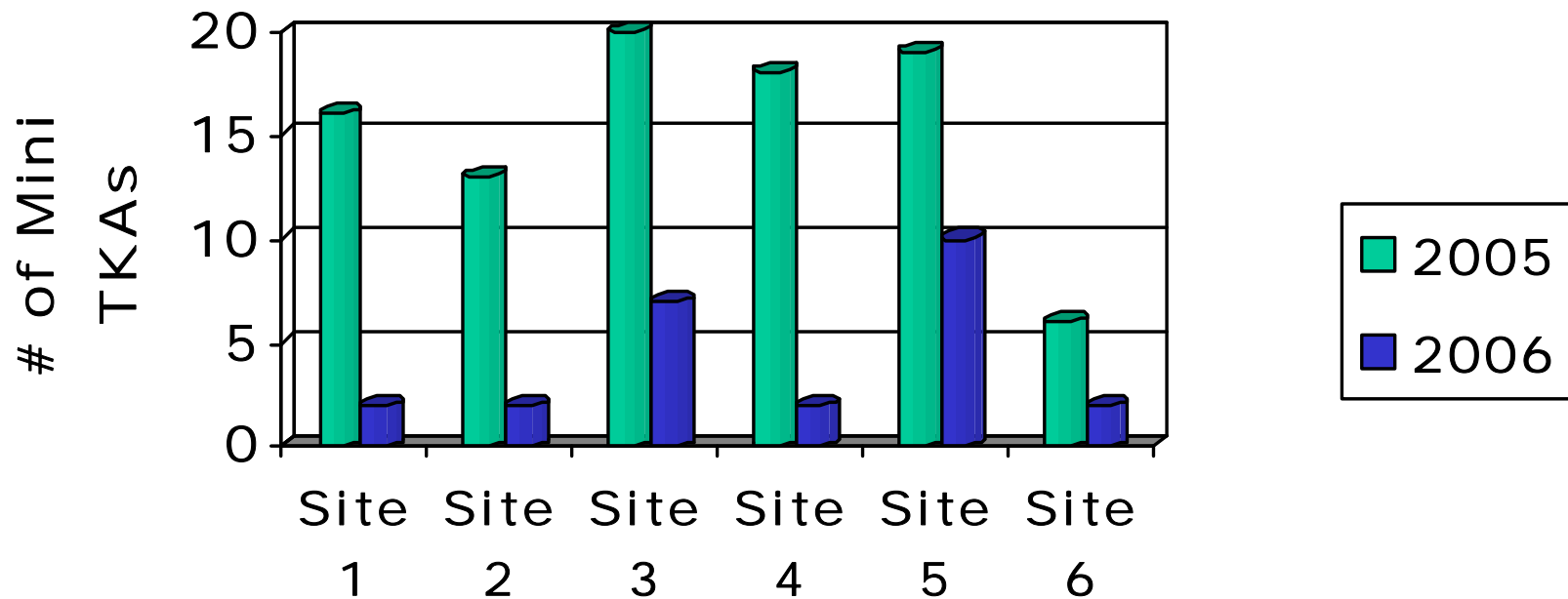
# Clinical Effectiveness: Changes in Practice

Significantly higher pain in Minimally Invasive (MIS)



# Clinical Effectiveness: Changes in Practice

Significant decrease in  
MIS TKAs after providing feedback



# *Future of National Implant Registries*

