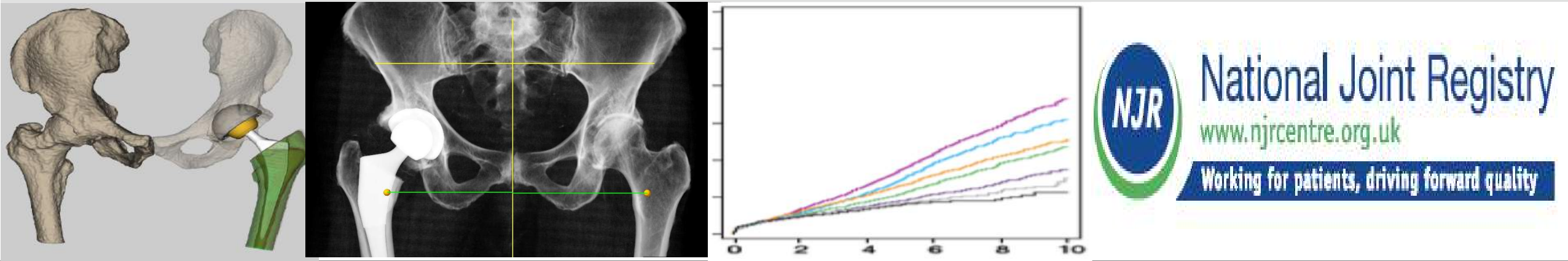


What do Registries tell us about older patients and what is confounding ?



John A Skinner FRCS (Orth)

Royal National Orthopaedic Hospital, Stanmore, UK

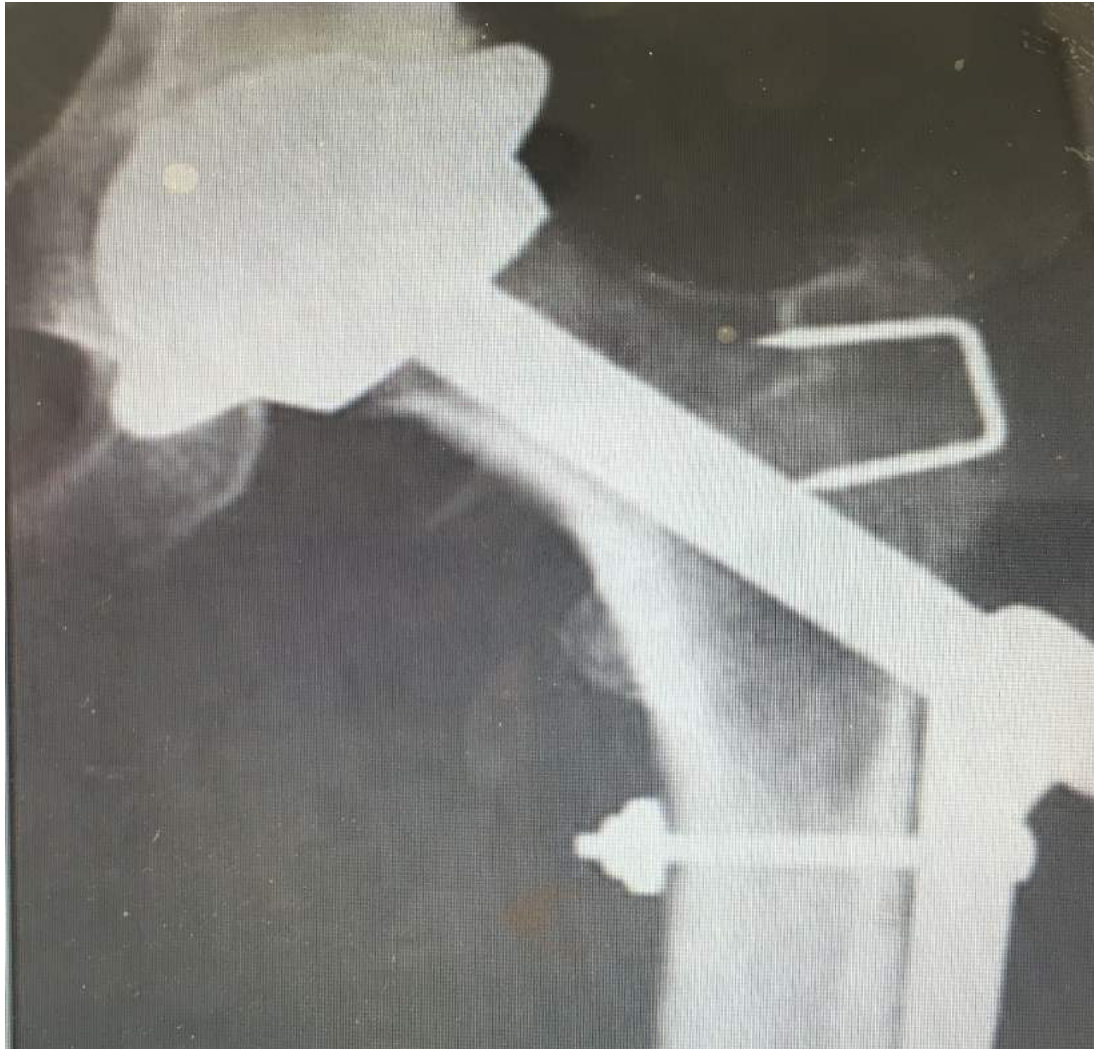


Philip Wiles



- 1938
- Middlesex Hospital
- Metal on Metal
- Screw fixation

The Wiles Total Hip Arthroplasty



1938

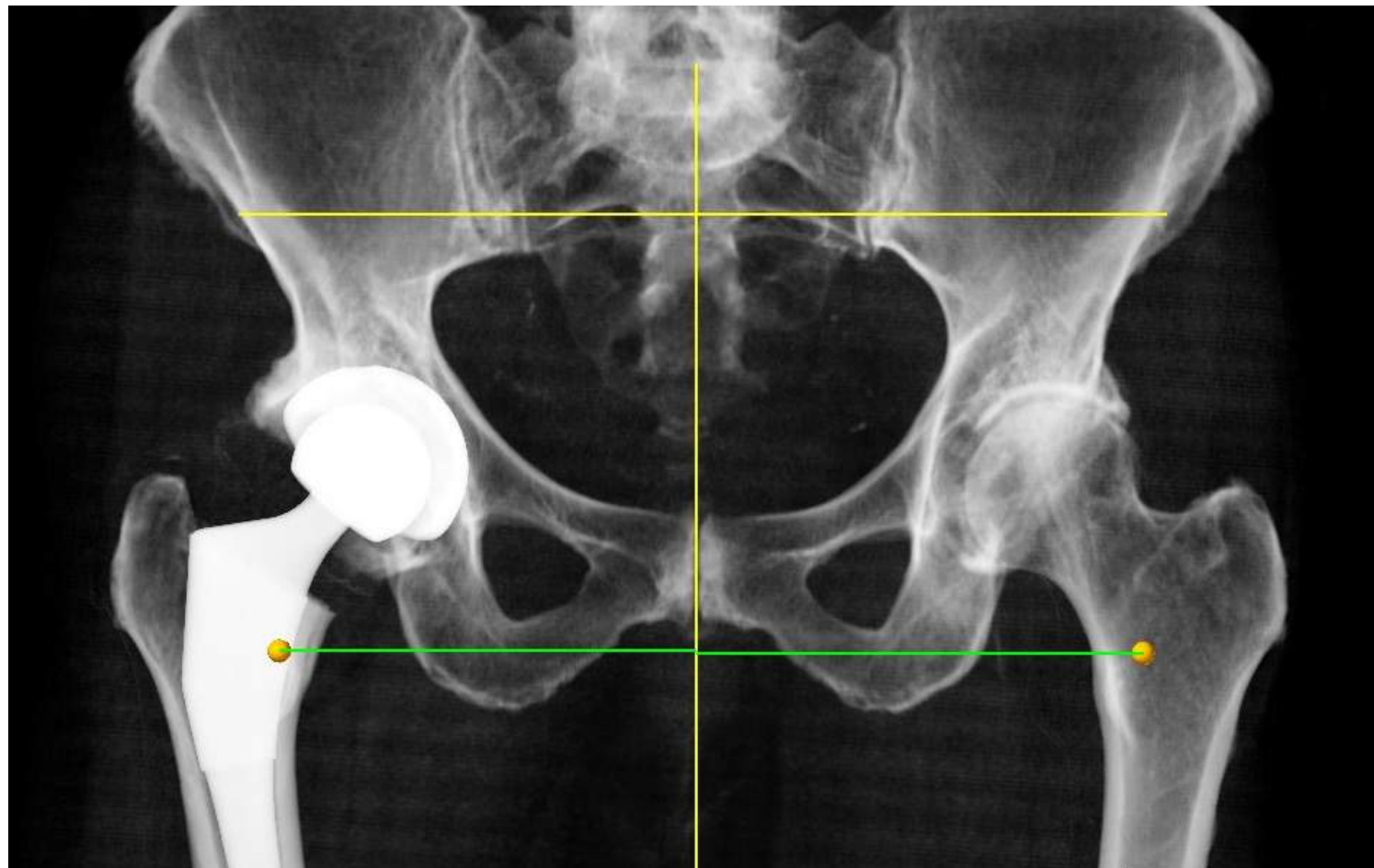
Middlesex Hospital
Metal on Metal
Screw fixation



Wiles BJS 1958

performed six times on patients severely crippled by Still's disease. There was a measure of success in that those who were previously bed-ridden were thereby enabled just to walk. All these patients are now believed to be dead of other causes ; the radiographs of their hips were destroyed during the war, not by enemy action but deliberately by those responsible for the care of hospital records. One patient who had both hips operated upon in 1938 was alive in 1951, thirteen years later, but she can no longer be traced. She then had some 20° of active flexion at each hip and, although many other joints were stiff, she could walk a little and operate a mechanically propelled chair. The acetabular

The Operation of the Century



THA - We already know

- Happy patients
- Few complications
- Improved scores
- Cost effective for trust
- 'Operation of the century'

THE LANCET

Volume 363 Number 10173 Pages 212-546 February 23-March 1, 2019

www.thelancet.com

Review

The operation of the century: total hip replacement

Ian D Learmonth, Claire Young, Cecil Rorabeck

Lancet 2017; 370: 1508-19
Published Online
March 29, 2017
DOI:10.1016/S0140-6736(17)30452-7

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Department of Orthopaedics,
University of Western Ontario,
London Health Services
Centre, London, Ontario,
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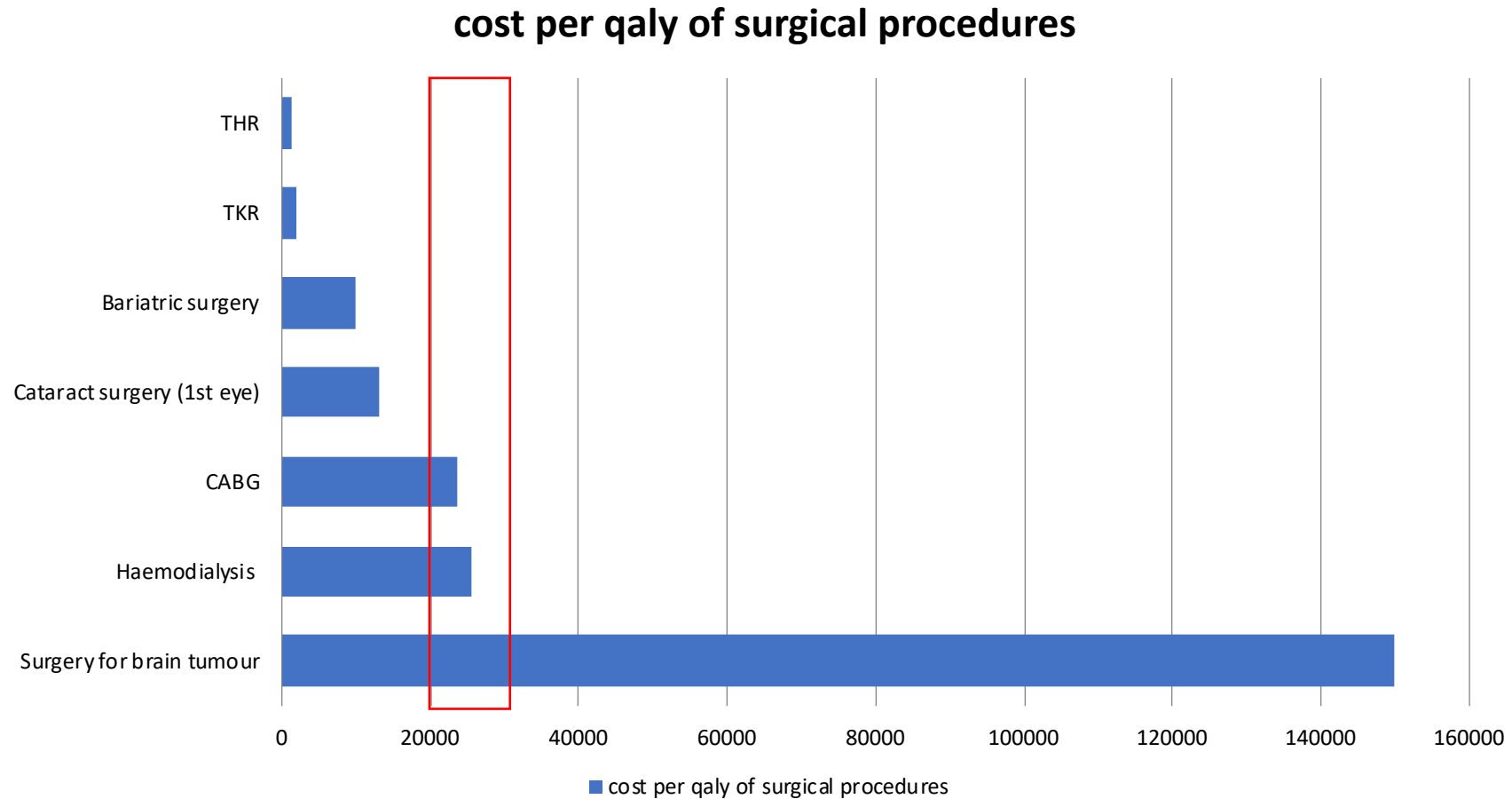
In the 1960s, total hip replacement revolutionised management of elderly patients crippled with arthritis, with very good long-term results. Today, young patients present for hip-replacement surgery hoping to restore their quality of life, which typically includes physically demanding activities. Advances in bioengineering technology have driven development of hip prostheses. Both cemented and uncemented hips can provide durable fixation. Better materials and design have allowed use of large-bore bearings, which provide an increased range of motion with enhanced stability and very low wear. Minimally invasive surgery limits soft-tissue damage and facilitates accelerated discharge and rehabilitation. Short-term objectives must not compromise long-term performance. Computer-assisted surgery will contribute to reproducible and accurate placement of implants. Universal economic constraints in healthcare services dictate that further developments in total hip replacement will be governed by their cost-effectiveness.

Palaeopathologists have diagnosed osteoarthritis of the hip in ancient skeletons,¹ and prevalence and distribution of the disease then seems no different from today.² However, little more than 100 years ago, the first attempt was made to treat hip arthritis surgically. Interpositional arthroplasty, offered in the late 19th and early 20th centuries, entailed replacing various tissues—including fascia lata, skin, and even the submucosa of pig's bladder—between the articulating surfaces of the hip. Interposition of a vitallium cup, which covered the reshaped femoral head, by Smith-Petersen in 1938 heralded a new era of

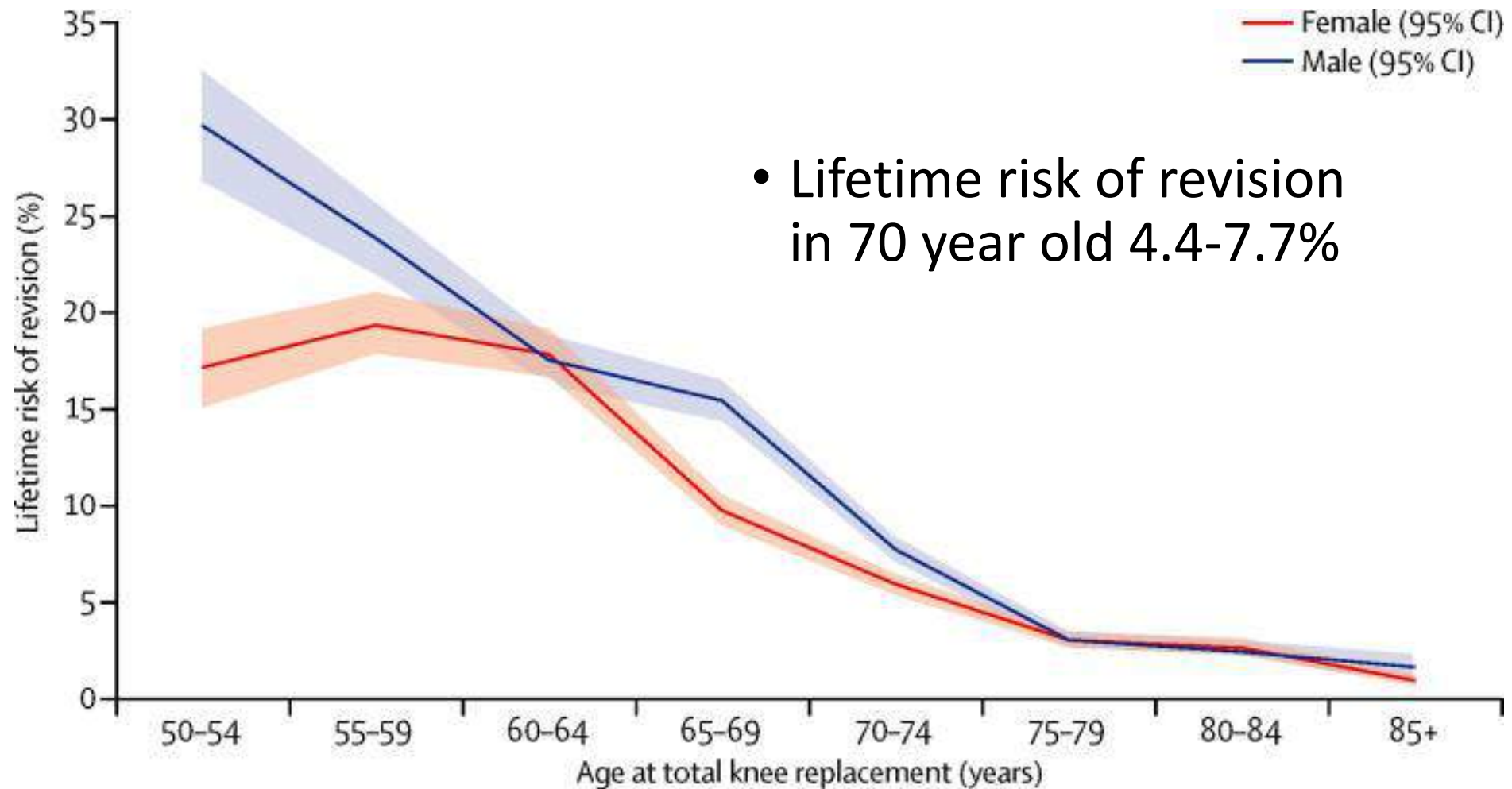
fracture of the implant,³ aseptic loosening as a result of mechanical failure of the fixation interface,⁴ infection,⁵ polyethylene wear,⁶ and dislocation.⁷ Furthermore, high failure rates were reported in young patients.⁸⁻²⁰

Indications for total hip replacement were initially largely restricted to either elderly and infirm people or individuals with locomotor limitations associated with other comorbidities. However, today, an unacceptable compromise in quality of life constitutes a valid indication for total hip replacement, and patients seek so-called high-performance hips to deliver their expectations and

THR is highly cost-effective



Revision is highly unlikely



Low rate of complications

- 514,555 primary THRs
- 3.2% surgical 30 day readmission rate
 - Mostly wound problems
- 0.8% return to theatre
 - Mostly dislocations

Research

JAMA Surgery | Original Investigation

Factors Associated With 30-Day Readmission After Primary Total Hip Arthroplasty

Analysis of 514 455 Procedures in the UK National Health Service

Adam M. Ali, BMBS, MA(Cantab), MRCS(Eng); Mark D. Loeffler, MBBS, FRCS(Tr&Orth); Paul Aylin, MBChB, FFPH; Alex Bottle, PhD, MSc, HonMFPH

 Supplemental content

IMPORTANCE Thirty-day readmission to hospital after total hip arthroplasty (THA) has significant direct costs and is used as a marker of hospital performance. All-cause readmission is the only metric in current use, and risk factors for surgical readmission and those resulting in return to theater (RTT) are poorly understood.

OBJECTIVE To determine whether patient-related predictors of all-cause, surgical, and RTT readmission after THA differ and which predictors are most significant.

DESIGN, SETTING, AND PARTICIPANTS Analysis of all primary THAs recorded in the National Health Service (NHS) Hospital Episode Statistics database from 2006 to 2015. The effect of patient-related factors on 30-day readmission risk was evaluated by multilevel logistic regression analysis. The analysis comprised all acute NHS hospitals in England and all patients receiving primary THA.

MAIN OUTCOMES AND MEASURES Thirty-day readmission rate for all-cause, surgical (defined using *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision* primary admission diagnoses), and readmissions resulting in RTT.

RESULTS Across all hospitals, 514 455 procedures were recorded. Seventy-nine percent of patients were older than 60 years, 40.3% were men, and 59.7% were women. There were 30 489 all-cause readmissions (5.9%), 16 499 surgical readmissions (3.2%), and 4286 RTT readmissions (0.8%). Fifty-four percent of readmissions were for surgical causes. Comorbidities with the highest odds ratios (ORs) of RTT included those likely to affect patient behavior: drug abuse (OR, 2.22; 95% CI, 1.34-3.67; $P = .002$), psychoses (OR, 1.83; 95% CI, 1.16-2.87; $P = .009$), dementia (OR, 1.57; 95% CI, 1.11-2.22; $P = .01$), and depression (OR, 1.52; 95% CI, 1.31-1.76; $P < .001$). Obesity had a strong independent association with RTT (OR, 1.46; 95% CI, 1.45-6.43; $P < .001$), with one of the highest population attributable fractions of the comorbidities (3.4%). Return to theater in the index episode was associated with a significantly increased risk of RTT readmission (OR, 5.35; 95% CI, 4.45-6.43; $P < .001$). Emergency readmission to the hospital in the preceding 12 months increased the risk of readmission significantly, with the association being most pronounced for all-cause readmission (for >2 emergency readmissions, OR, 2.33; 95% CI, 2.11-2.57; $P < .001$). Hip resurfacing was associated with a lower risk of RTT when compared with cemented implants (OR, 0.69; 95% CI, 0.54-0.88; $P = .002$) but for other types of readmission, implant type had no significant association with readmission risk. Increasing age and length of stay were strongly associated with all-cause readmission.

CONCLUSIONS AND RELEVANCE Many patient-related risk factors for surgical and RTT readmission differ from those for all-cause readmission despite the latter being the only measure in widespread use. Clinicians and policy makers should consider these alternative readmission metrics in strategies for risk reduction and cost savings.

JAMA Surg. doi:10.1001/jamasurg.2017.3949
Published online October 4, 2017.

Author Affiliations: St Mary's Hospital, London, England (Ali); Imperial College, London, England (Ali); Colchester General Hospital, England (Loeffler); Dr Foster Unit at Imperial College, London, England (Aylin, Bottle).

Corresponding Author: Adam M. Ali, BMBS, MA(Cantab), MRCS(Eng); St Mary's Hospital, Praed St, London W2 1NY, United Kingdom (adam.ali@psst.harvard.edu).

THR is a fantastic operation

- Less than 1% have reoperation
- 3% of patients are readmitted

Risks:

- Increased age
- Low or High BMI
- Low socioeconomic group
- Mental health issues
- Poorer general health
- Smoking and drug consumption

NICE: Osteoarthritis Care and Management CG177 (Feb 2014 updated 2017)

- Refer for consideration of joint surgery before there is prolonged and established functional limitation and severe pain
- Patient – specific factors (including age, sex, smoking, obesity & comorbidities) should not be barriers to referral for joint surgery

Population

Age	2005	2011	2021	2031
>65	9.6M	10.5M	12.7M	15.3M
>85	1.1M	1.4M	1.8M	2.5M
>100	9 400	14 000	26 000	48 000
population	59.8M	61.4M	63.8M	65.7M

2005 to 2011

32% increase in over 65's

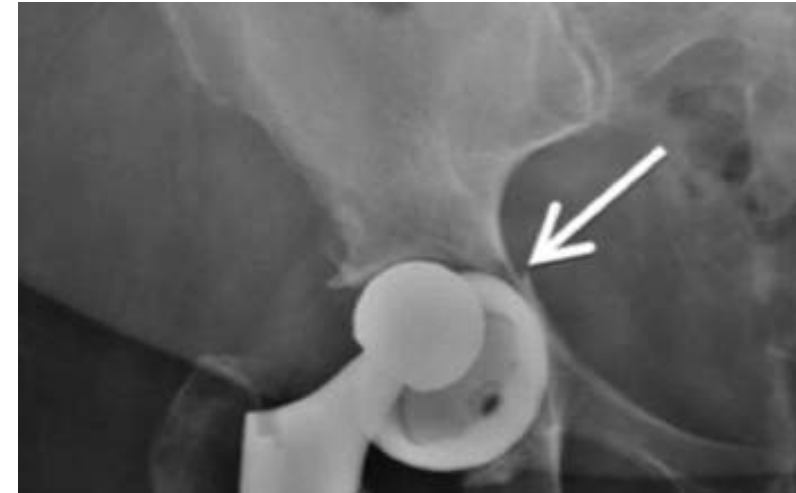
64% increase in over 85's

2001 census

Ageing problems – fracture risk



Schwarzkopf *et al.*, Bulletin of the Hospital for Joint Diseases 2013



■ HIP

Epidemiology of periprosthetic fracture of the femur in 32 644 primary total hip arthroplasties

A 40-YEAR EXPERIENCE

M. P. Abdel,
C. D. Watts,
M. T. Houdek,
D. G. Lewallen,
D. J. Berry

*From Mayo Clinic,
Minnesota, United
States*

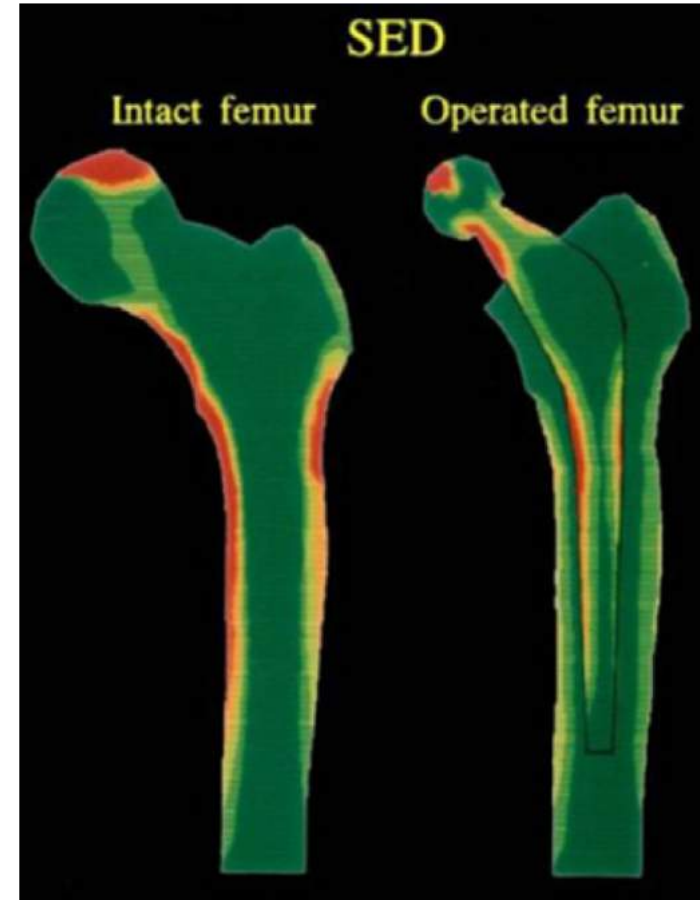
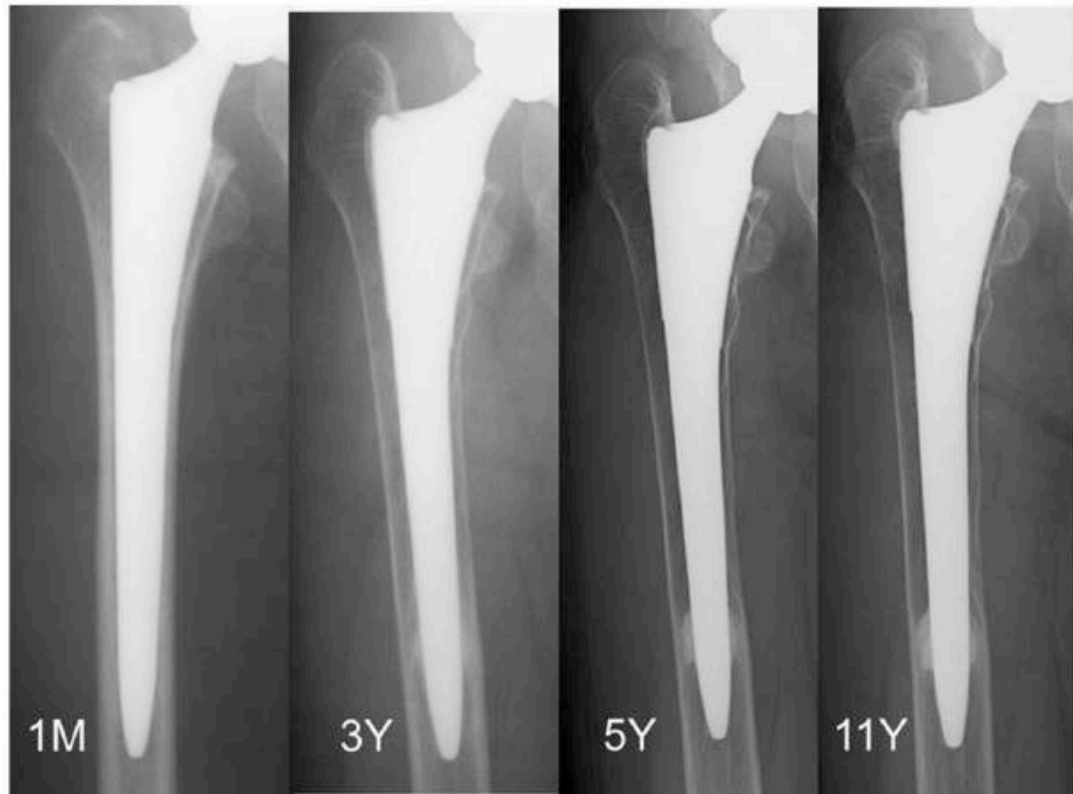
Aim and Methods

The goals of this study were to define the risk factors, nature, chronology, and treatment strategies adopted for periprosthetic femoral fractures in 32 644 primary total hip arthroplasties (THAs).

Results

There were 564 intra-operative fractures (1.7%); 529 during uncemented stem placement (3.0%) and 35 during cemented stem placement (0.23%). Intra-operative fractures were more common in females and patients over 65 years ($p < 0.001$). The majority occurred during placement of the femoral component (60%), and involved the calcar (69%). There were 557 post-operative fractures (20-year probability: 3.5%; 95% confidence interval (CI) 3.2 to 3.9); 335 fractures after placement of an uncemented stem (20-year probability: 2.7%; 95% CI 6.2 to 9.1) and 222 after placement of a cemented stem (20-year probability: 2.1%; 95% CI 1.8 to 2.5). The probability of a post-operative fracture within 30 days after an uncemented stem was ten times higher than a cemented stem. The most common post-operative fracture type was a Vancouver A₁ (32%; $n = 135$), with 67% occurring after a fall. In all, 36% ($n = 152$) were treated with revision arthroplasty.

Metal and the Ageing Skeleton

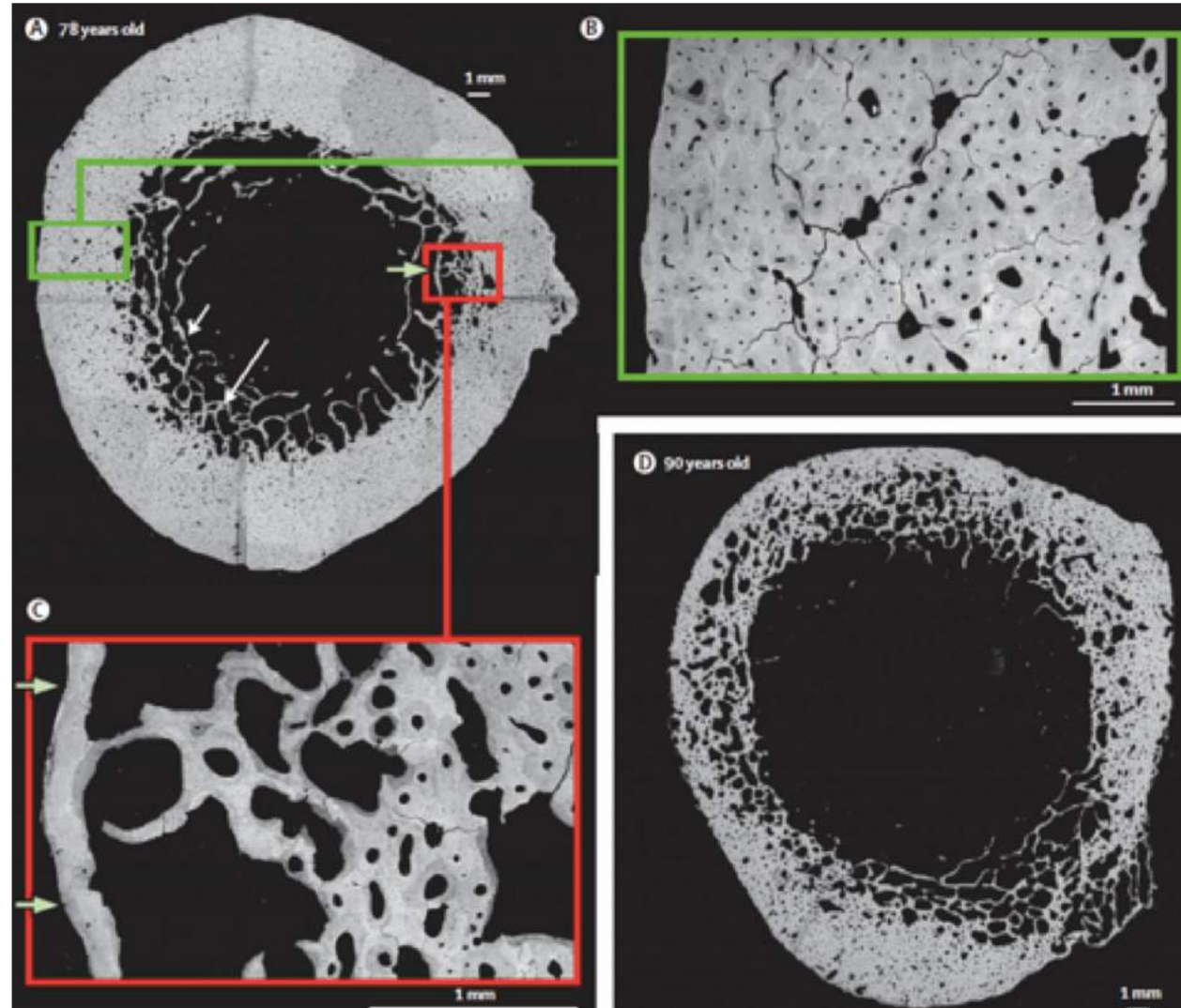




Nishimo *et al.*, 2013. J Arthroplasty

Sumner. 2015. Journal of Biomechanics

The Ageing Skeleton and Cortical Porosity



Zebaze, 2010, The Lancet

Who is receiving joint replacement? Hips

Hips



recorded on the NJR
since April 2003

105,306
replacement
procedures

↑ 3.6%
(101,651 in 2016)

60% 

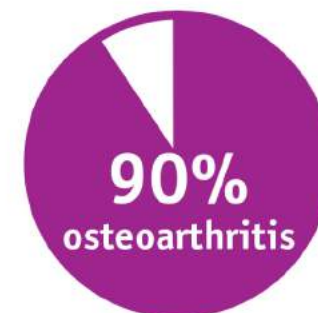
average ages:



67.5



69.9



Diagnosis

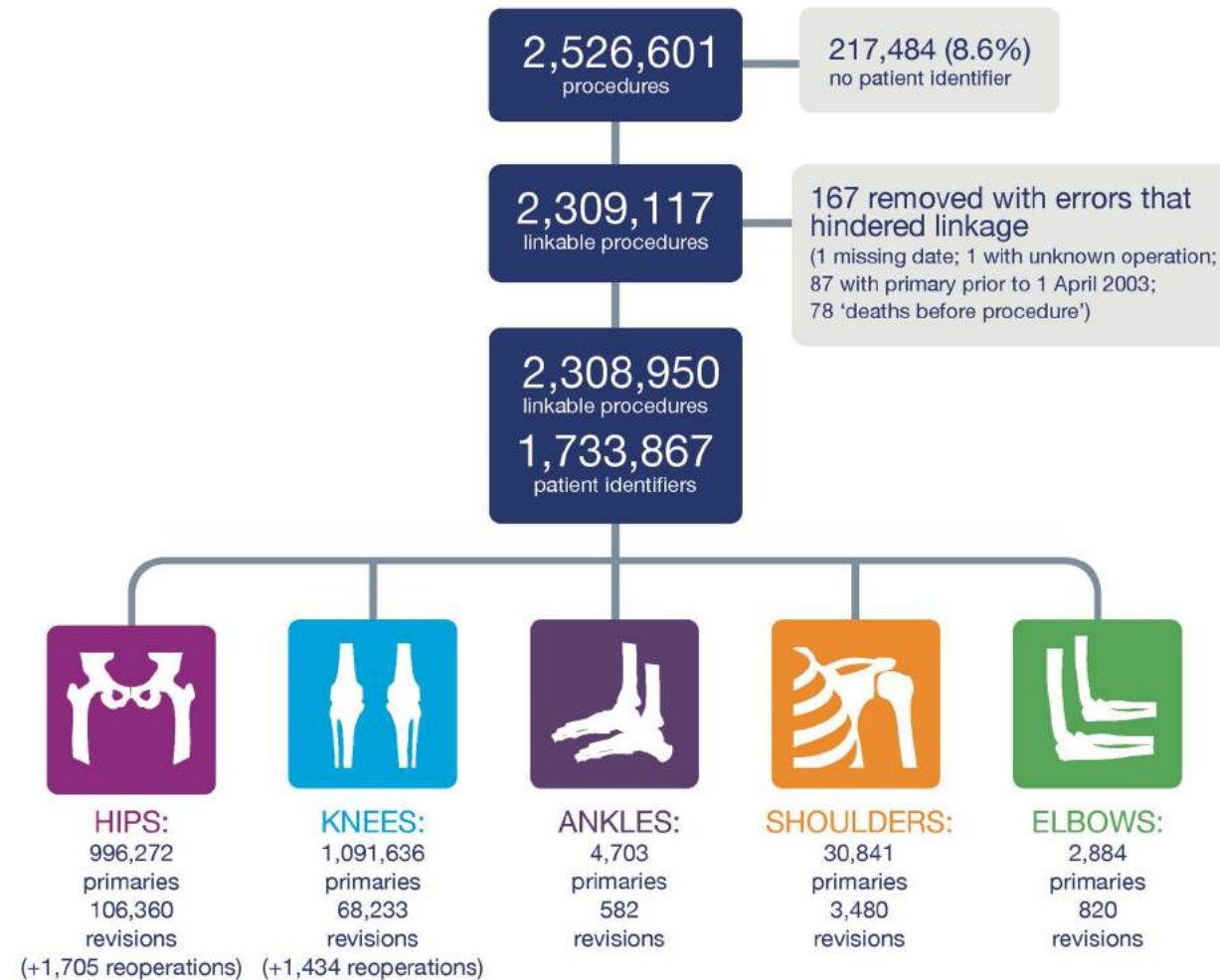
average BMI

28.8

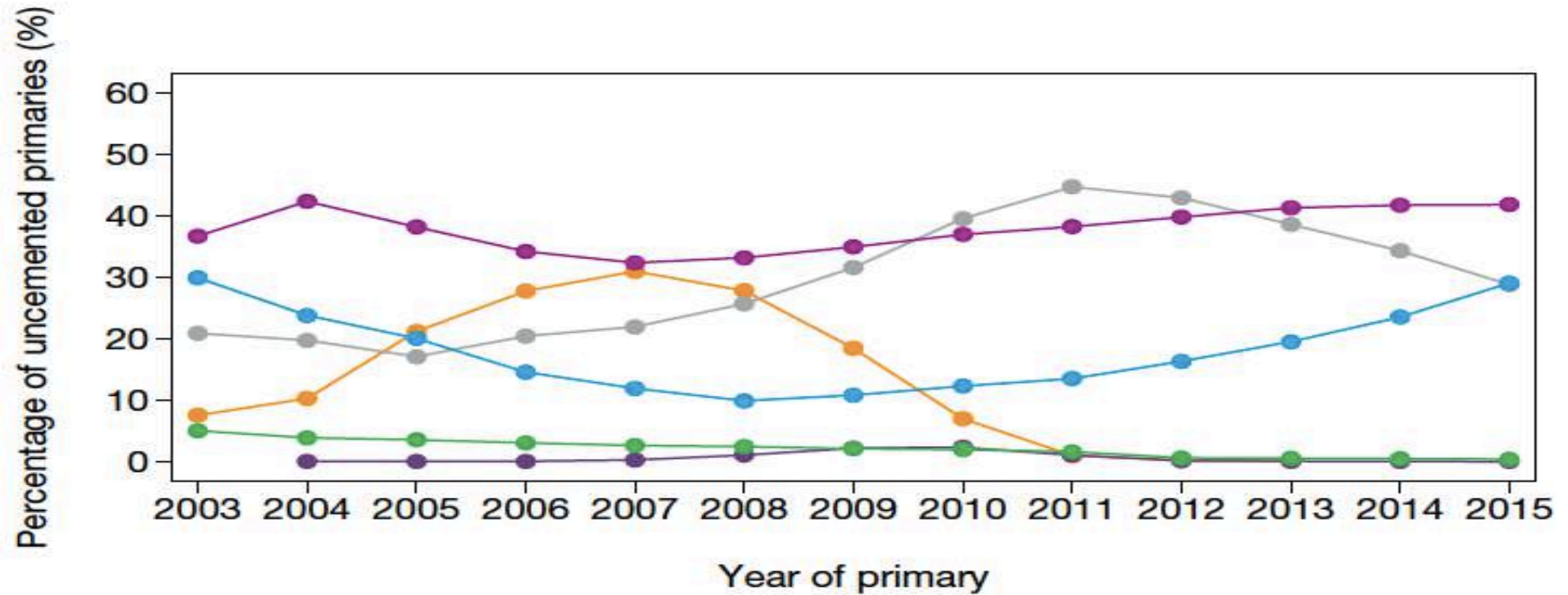
=

'overweight'

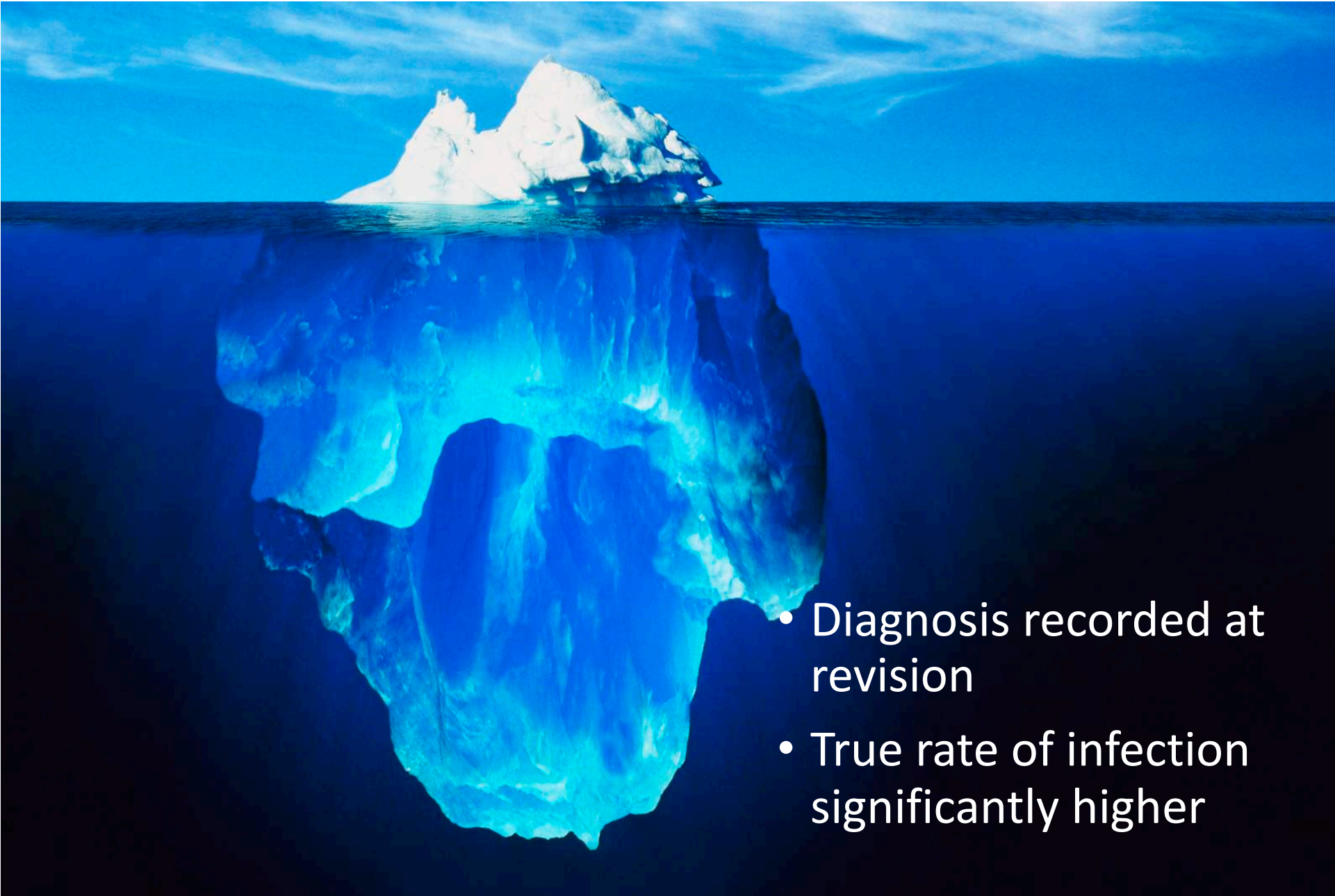
Data Analysis



Which Bearings?



- Uncemented MoP
- Uncemented CoP
- Uncemented CoC
- Uncemented Other/Unsure
- Uncemented CoM
- Uncemented MoM



- Diagnosis recorded at revision
- True rate of infection significantly higher

True rate of infection

346

Acta Orthopaedica 2016; 87 (4): 346–350

New Zealand Joint Registry data underestimates the rate of prosthetic joint infection

Mark ZHU¹, Saiprasad RAVI², Chris FRAMPTON³, Chris LUEY⁴, and Simon YOUNG^{1,2}

Audit of 4,009 cases

NZJR underestimates by 1/3

326

Acta Orthopaedica 2015; 86 (3): 326–334

The “true” incidence of surgically treated deep prosthetic joint infection after 32,896 primary total hip arthroplasties

A prospective cohort study

Per Hviid GUNDTOLT^{1,2,3}, Søren OVERGAARD^{2,3}, Henrik Carl SCHØNHEYDER^{4,5}, Jens Kjølseth MØLLER^{6,7}, Per KJÆRSGAARD-ANDERSEN⁸, and Alma Becic PEDERSEN⁹

Audit of 32,896 cases

Danish registry underestimates by 40%

Lindgren et al. *BMC Musculoskeletal Disorders* 2014, **15**:384
<http://www.biomedcentral.com/1471-2474/15/384>



RESEARCH ARTICLE

Open Access

Validation of reoperations due to infection in the Swedish Hip Arthroplasty Register

J Viktor Lindgren^{1,2,5*}, Max Gordon^{2,4}, Per Wretenberg¹, Johan Kärrholm^{2,3} and Göran Garellick^{2,3}

Only 67% of cases of revision/reoperation for infection recorded in SHAR

True rate of infection

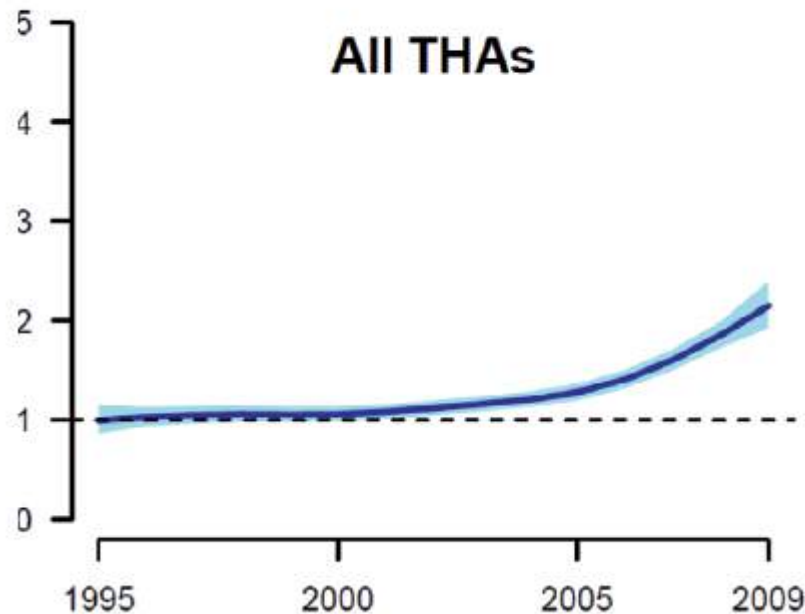
Acta Orthopaedica 2012; 83 (5): 449–458

449

Increasing risk of prosthetic joint infection after total hip arthroplasty

2,778 revisions due to infection after 432,168 primary THAs in the Nordic Arthroplasty Register Association (NARA)

Håvard Dale¹, Anne M Fenstad¹, Geir Hallan¹, Leif I Havelin^{1,2}, Ove Furnes^{1,2}, Søren Overgaard^{3,4}, Alma B Pedersen⁵, Johan Kärrholm⁶, Göran Garellick⁶, Pekka Pulkkinen⁷, Antti Eskelinen⁸, Keijo Mäkelä⁹, and Lars B Engesæter^{1,2}



- Absolute rate of infection increasing?
- Dale 2012
- Improved diagnosis?
- Risk relative to other causes likely to increase

Patient-associated risk factors for PJI

Obesity, Diabetes, and Preoperative Hyperglycemia as Predictors of Periprosthetic Joint Infection

A Single-Center Analysis of 7181 Primary Hip and Knee Replacements for Osteoarthritis

Esa Jämsen, MD, PhD, Pasi Nevalainen, MD, PhD, Antti Eskelinen, MD, PhD, Kaisa Huotari, MD, PhD,
Jarkko Kalliovalkama, MD, PhD, and Teemu Moilanen, MD, PhD

J Bone Joint Surg Am. 2012;94:e101(1-9)

7,181 TKRs and THRs

Morbidly obese OR 6.4

Diabetic OR 2.3

10% infection rate in
patients with both

■ HIP

R. S. Namba,
M. C. S. Inacio,
E. W. Paxton

J Bone Joint Surg Br
2012;94-B:1330-8.

**Risk factors associated with surgical site
infection in 30 491 primary total hip
replacements**

Gender

Obesity

ASA≥3

Others – smoking (OR 1.4), alcohol, renal/liver disease, DMARDS...

Modification of risk factors

T. O. Smith,
T. Aboelmagd,
C. B. Hing,
A. MacGregor

■ SPECIALTY UPDATE

Does bariatric surgery prior to total hip or knee arthroplasty reduce post-operative complications and improve clinical outcomes for obese patients?

No change in rate of PJI after bariatric surgery

Arthritis Care & Research
Vol. 63, No. 10, October 2011, pp 1365–1374
DOI 10.1002/acr.20555
© 2011, American College of Rheumatology

ORIGINAL ARTICLE

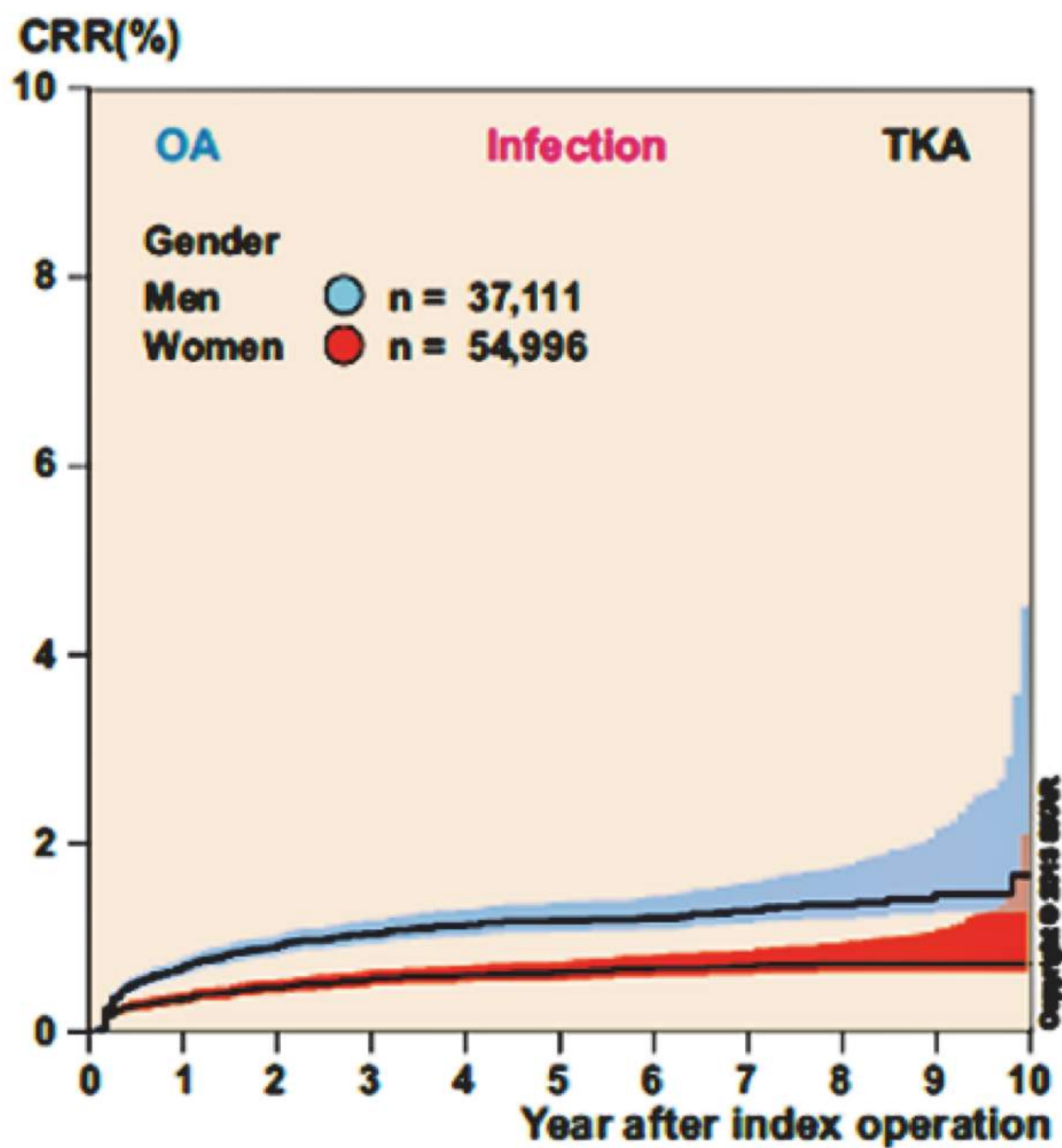
Smoking As a Risk Factor for Short-Term Outcomes Following Primary Total Hip and Total Knee Replacement in Veterans

JASVINDER A. SINGH,¹ THOMAS K. HOUSTON,² BRENT A. PONCE,³ GRADY MADDOX,³
MICHAEL J. BISHOP,⁴ JOSHUA RICHMAN,³ ELIZABETH J. CAMPAGNA,⁵ WILLIAM G. HENDERSON,⁶
AND MARY T. HAWN³

Ex-smokers have same rate of PJI as non-smokers

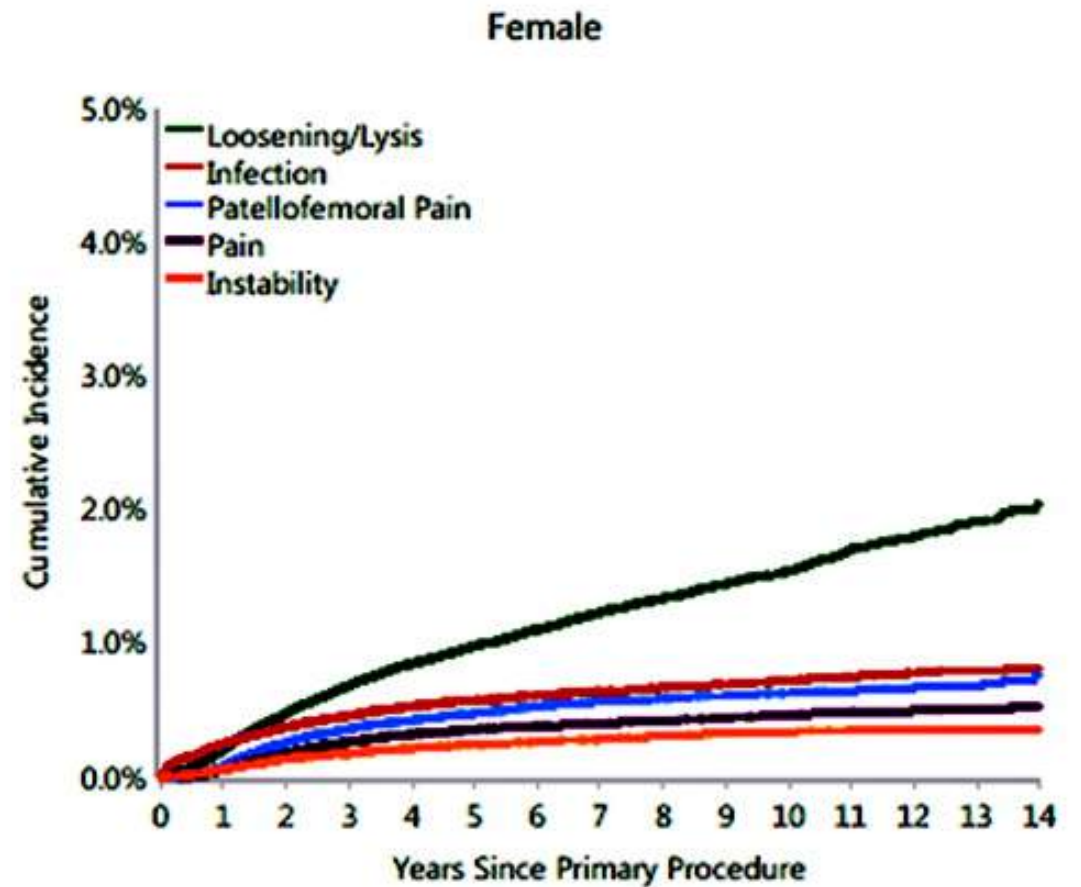
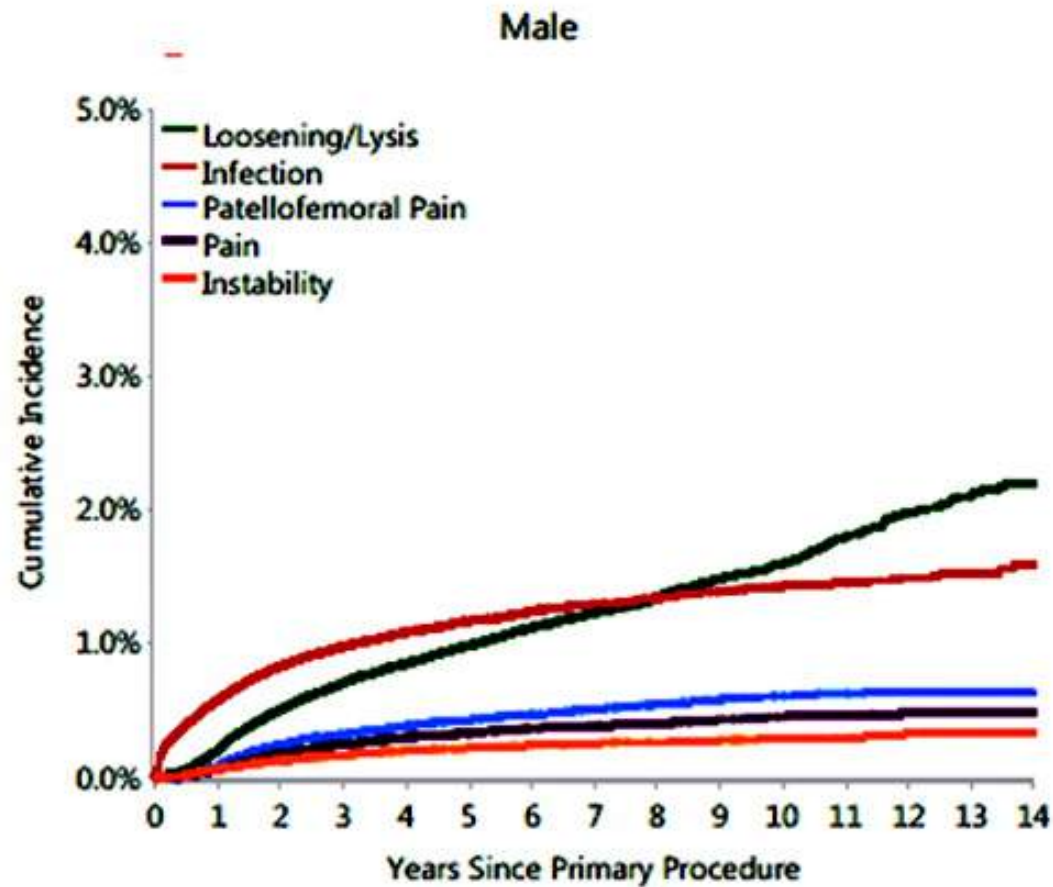
Diagnosis





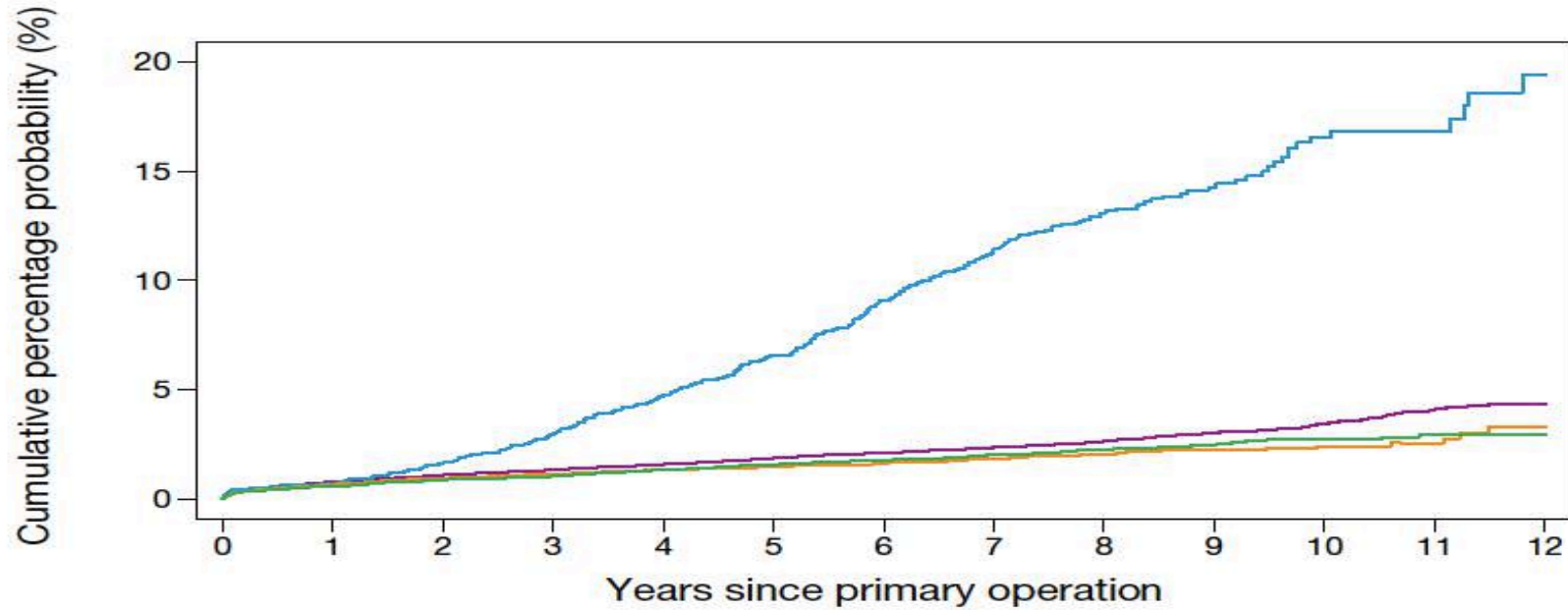
Cumulative rate of revision after TKA

Infection > in Men v Women



How long do Primary Hips last?

© National Joint Registry 2016



Numbers at risk

Hybrid MoP	91,077	76,724	63,866	53,042	43,235	34,407	26,773	20,085	14,105	9,029	5,330	2,573	789
Hybrid MoM	2,147	2,114	2,059	1,995	1,911	1,826	1,623	1,361	913	535	296	169	66
Hybrid CoP	27,533	19,733	13,563	9,456	7,024	5,378	4,050	2,865	2,017	1,435	917	504	162
Hybrid CoC	21,485	19,533	17,319	15,055	12,739	10,390	8,326	6,387	4,644	2,994	1,635	649	151



Health warning over hip implants

INVESTIGATION

AURA
DONNELLY

Health Correspondent



TENS OF thousands of patients who received hip replacements are at the centre of a major health alert over concerns they are poisoning their bodies.

Medical regulators are drawing up new advice for more than 30,000 Britons who have received "metal-on-metal" devices because of fears that they are even more dangerous than previously thought, a *Sunday Telegraph* investigation has found.

Problems occur with such devices when friction between the metal ball and cup causes minuscule metal filings to

break off, which can seep into the blood and cause inflammation, destroying muscle and bone.

There are also concerns that the fragments could put the nervous system, heart and lungs at risk of being slowly poisoned.

The problems have been found to affect people of all ages but studies have found young and petite women are particularly at risk.

Patients with this type of hip replacement are already supposed to undergo annual checks, with scans and blood tests if doctors find symptoms that suggest metal leakage.

Advisers to the Medicines and Healthcare products Regulatory Agency (MHRA) have decided the advice should go

further due to concerns that the devices could cause "systemic toxicity" in the body.

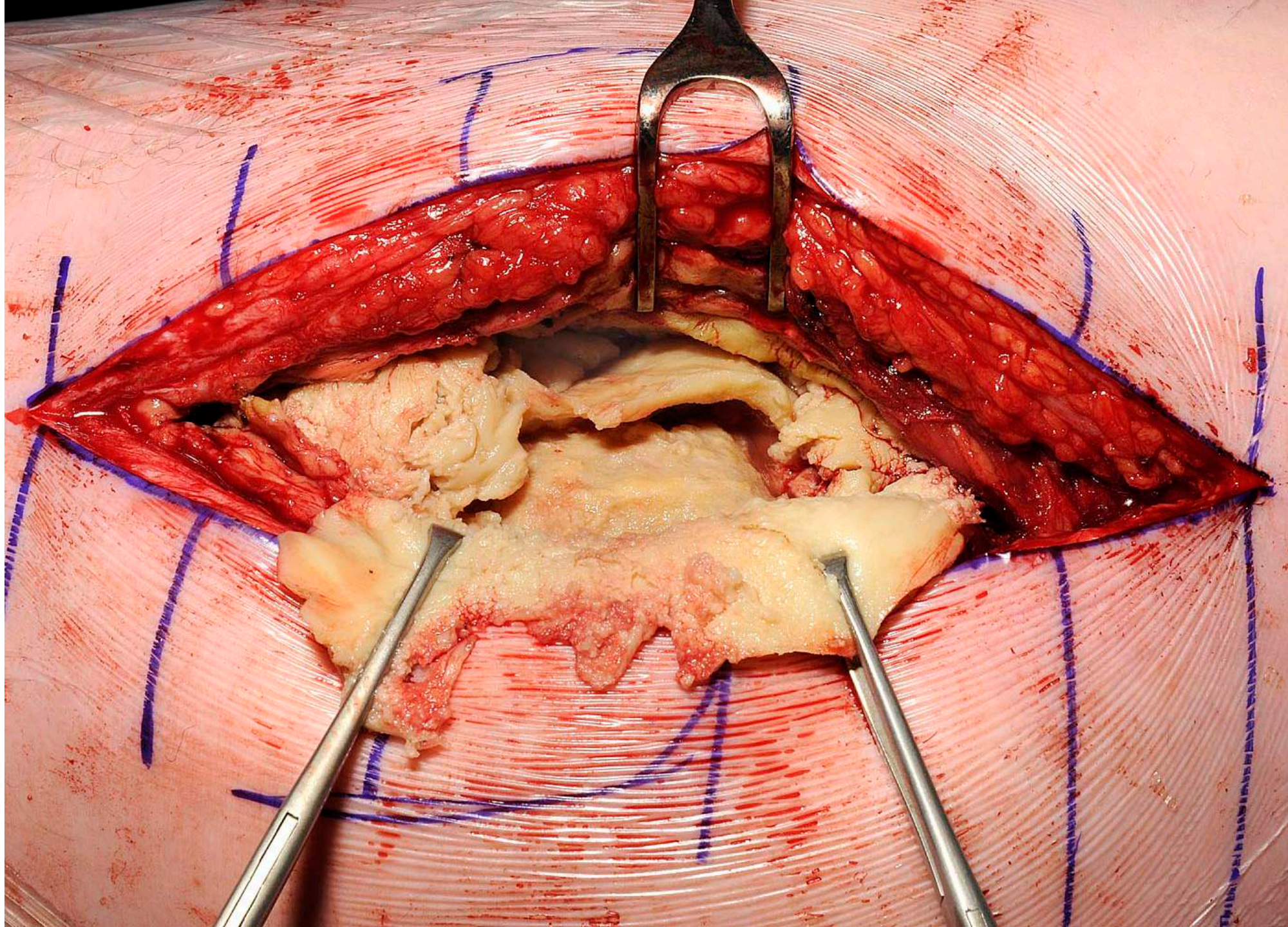
The move comes as an investigation found:

- Newly obtained research shows some hip replacements, which were withdrawn from the UK market in 2010, have far higher failure rates than had been known – of up to 50 per cent within six years.

- Warnings from senior surgeons that although all patients given two specific implants should have been checked for metal leaks, not all have been contacted.

- Nine legal firms are preparing compensation claims for 1,136 patients who suffered as a result of the two substandard devices.

A report from a conference





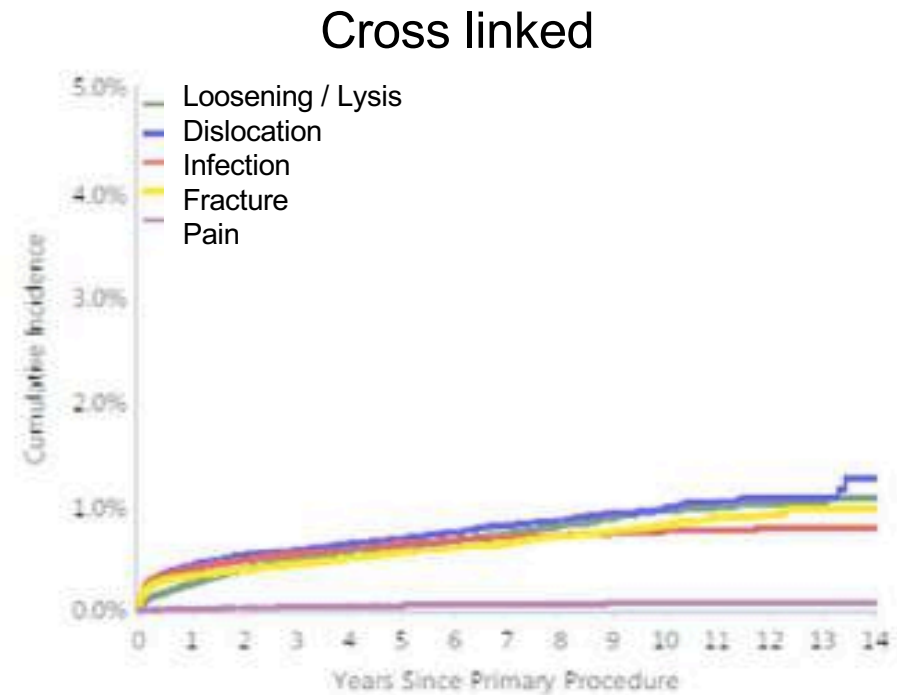
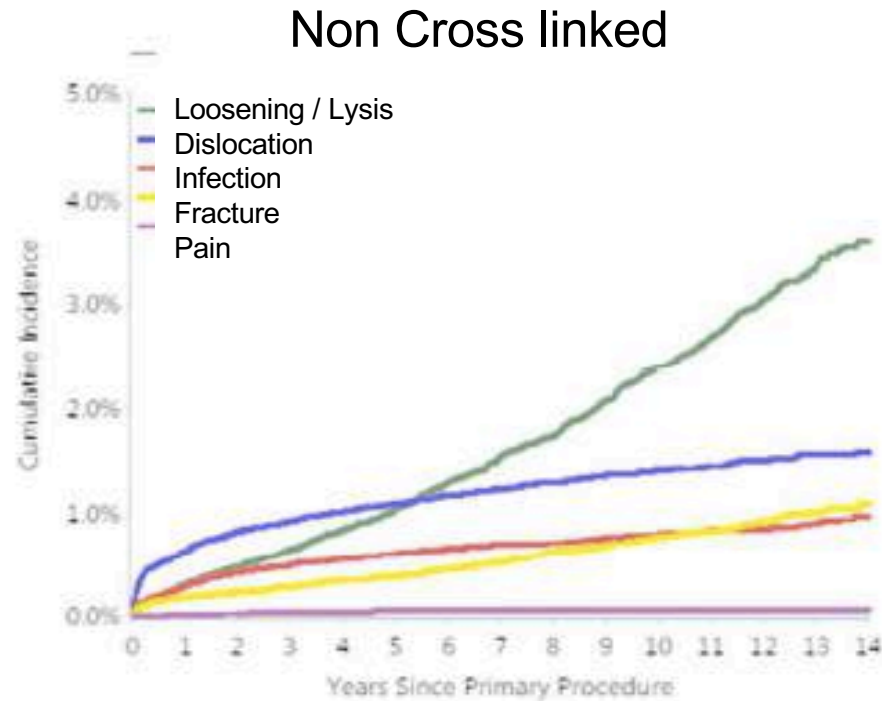
G. Grammatopoulos,
H. Pandit,
Y.-M. Kwon,
R. Gundle,
P. McLardy-Smith,
D. J. Beard,
D. W. Murray,
H. S. Gill

*From the Nuffield
Orthopaedic Centre,*

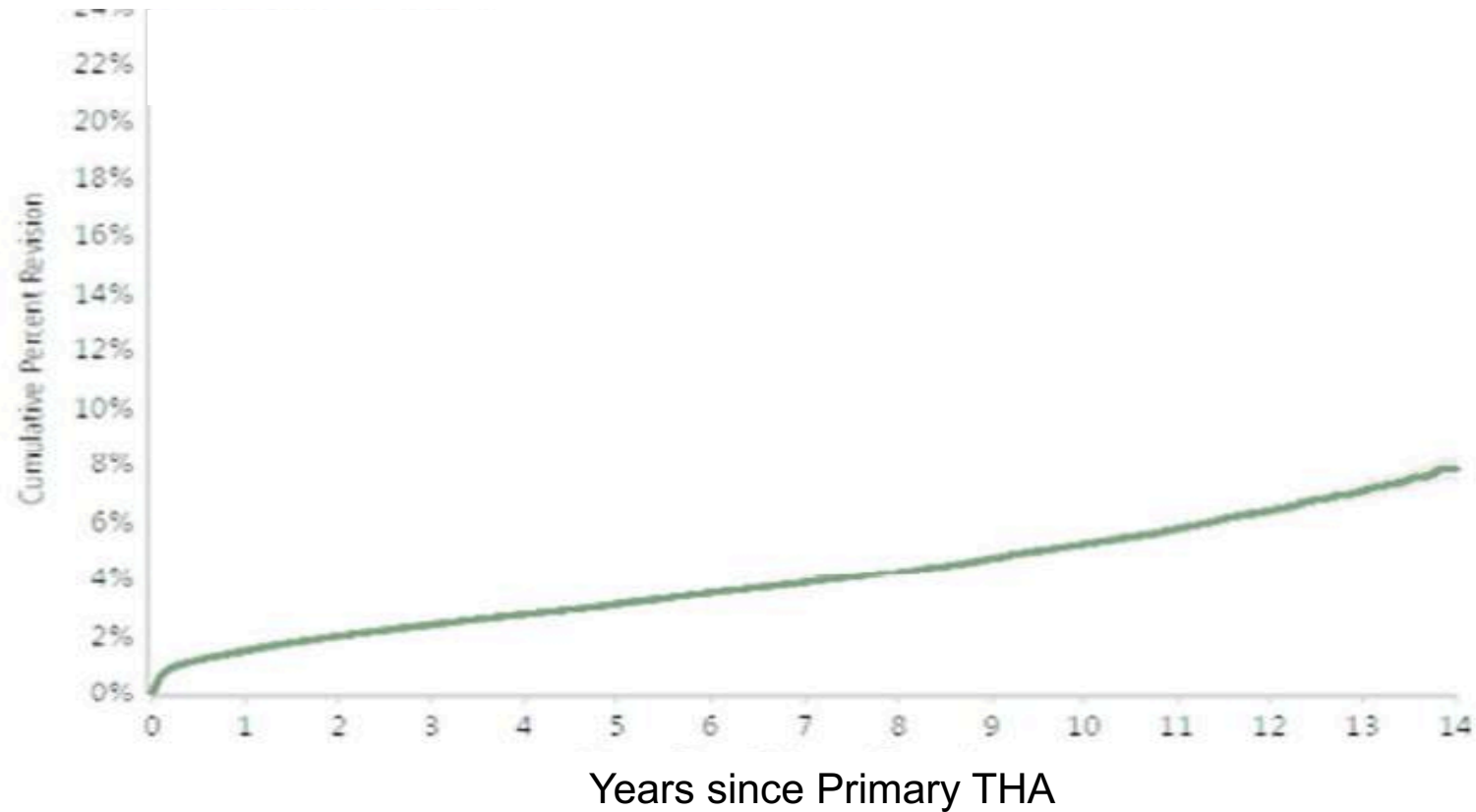
Hip resurfacings revised for inflammatory pseudotumour have a poor outcome

	Oxford experience
Incidence	1%
Major Complications (Recurrent Dislocations Nerve palsies Femoral artery stenosis)	8 out 16 (50%)
Re-revisions	5 out of 16 (31%)
Hip function following revision	Worse than before the primary procedure. Significantly inferior to primary THA

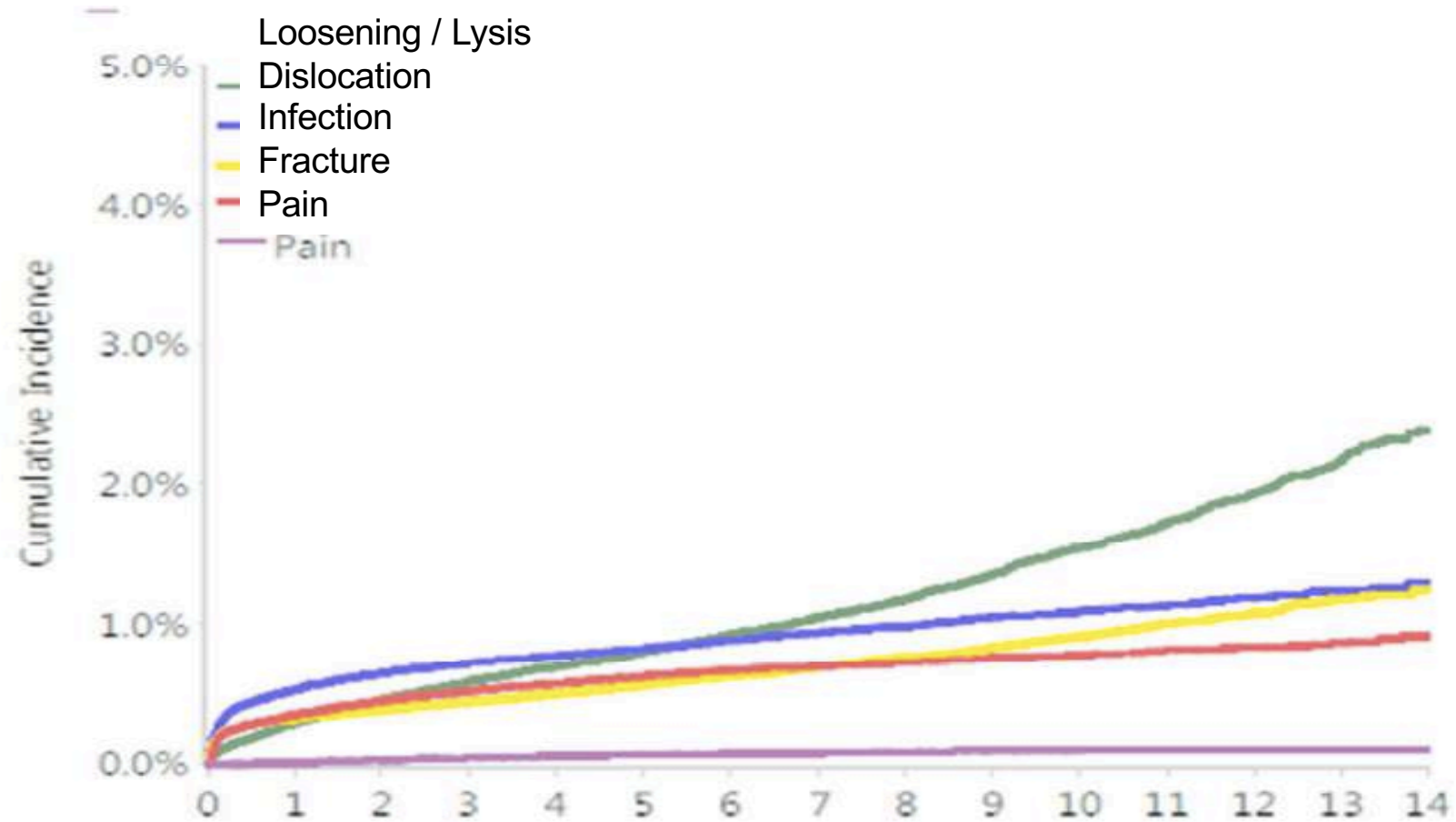
New Advances for the good Cross linked Polyethylene



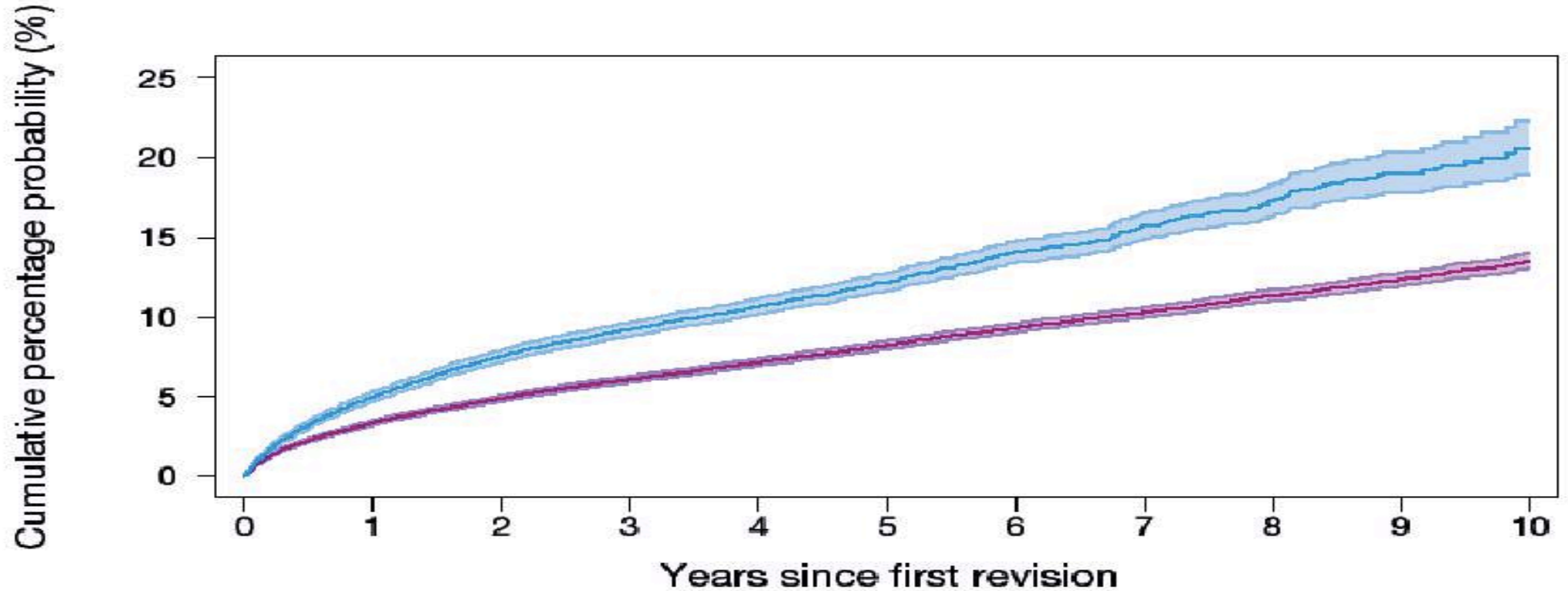
Cumulative Revisions of hip Arthroplasty



Cumulative Revision Rates for THR by Failure Mode



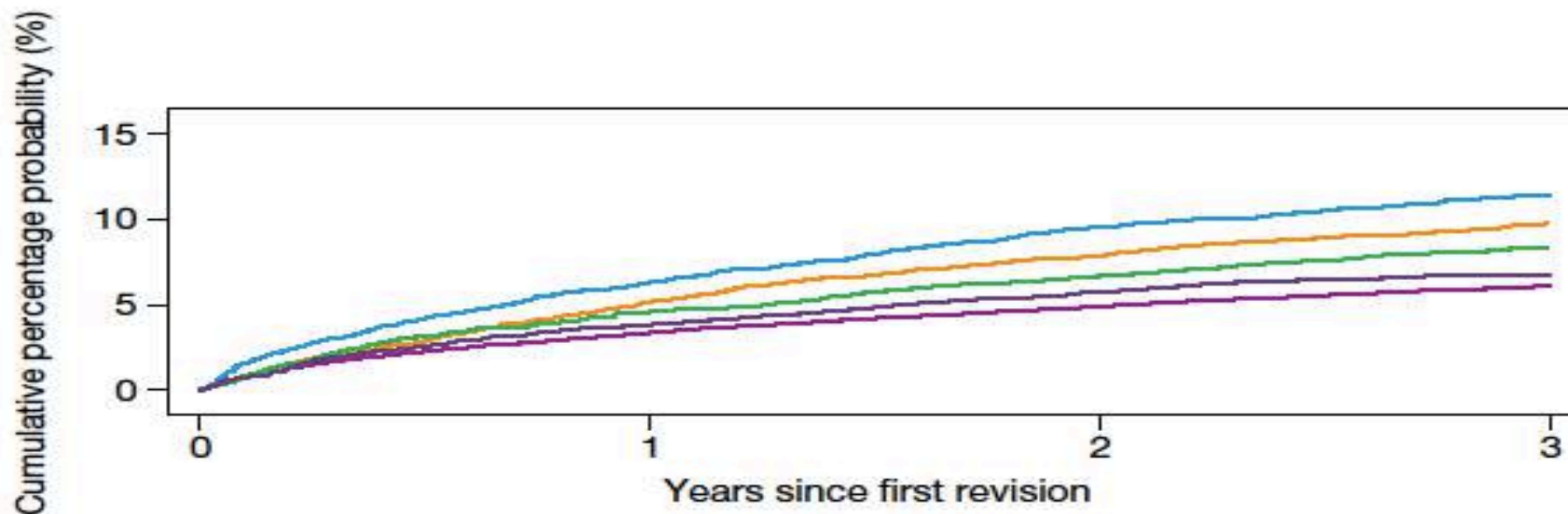
Risk of Re-revision if Primary on NJR



Numbers at risk

Primary not in the NJR	57,204	49,325	42,742	36,281	29,808	24,062	19,009	14,488	10,363	6,673	3,988
Primary in the NJR	20,926	16,813	13,451	10,358	7,206	4,801	3,142	1,944	1,119	546	256

Early Failure Matters: Re-revision Risk

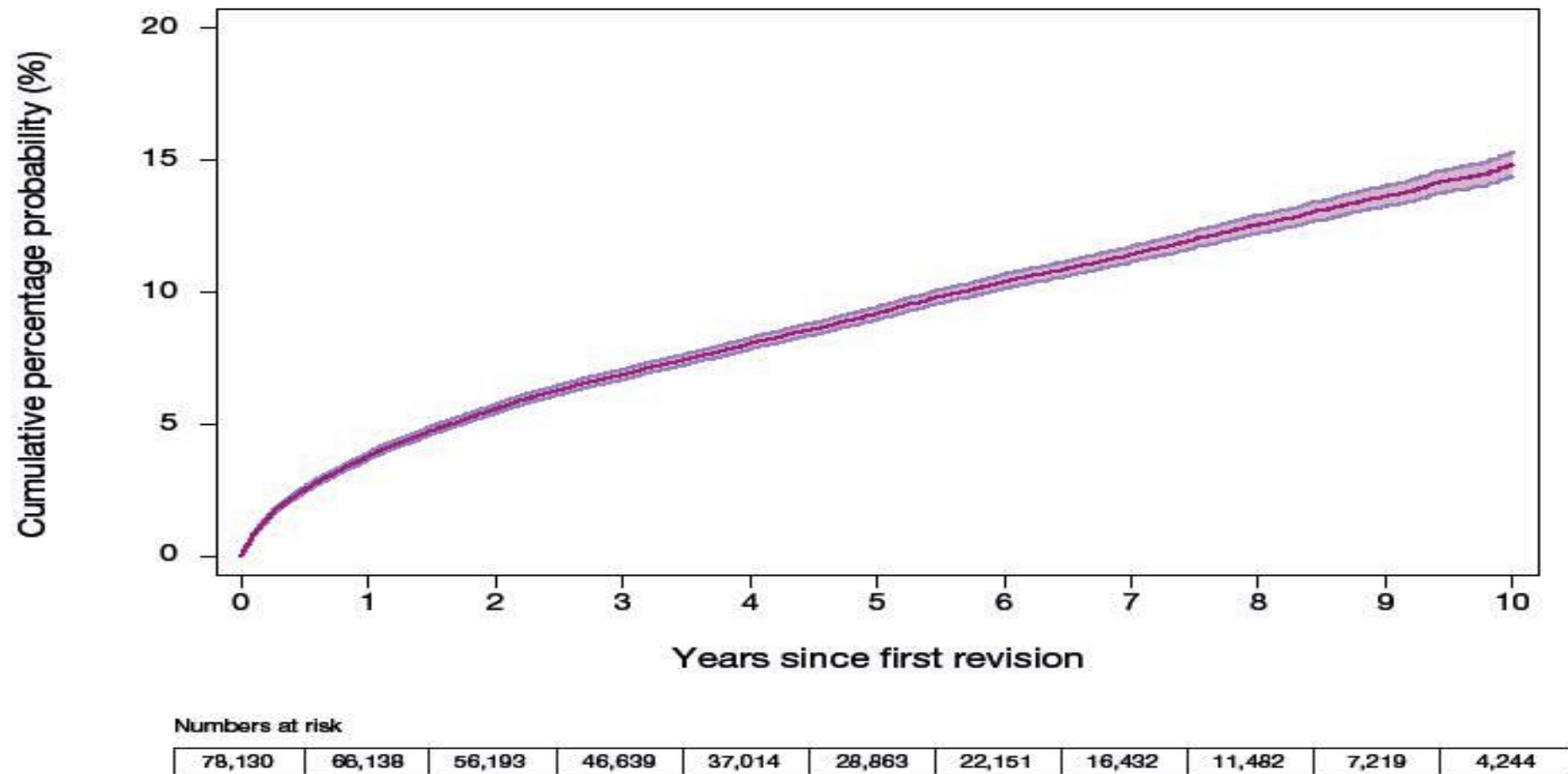


Numbers at risk

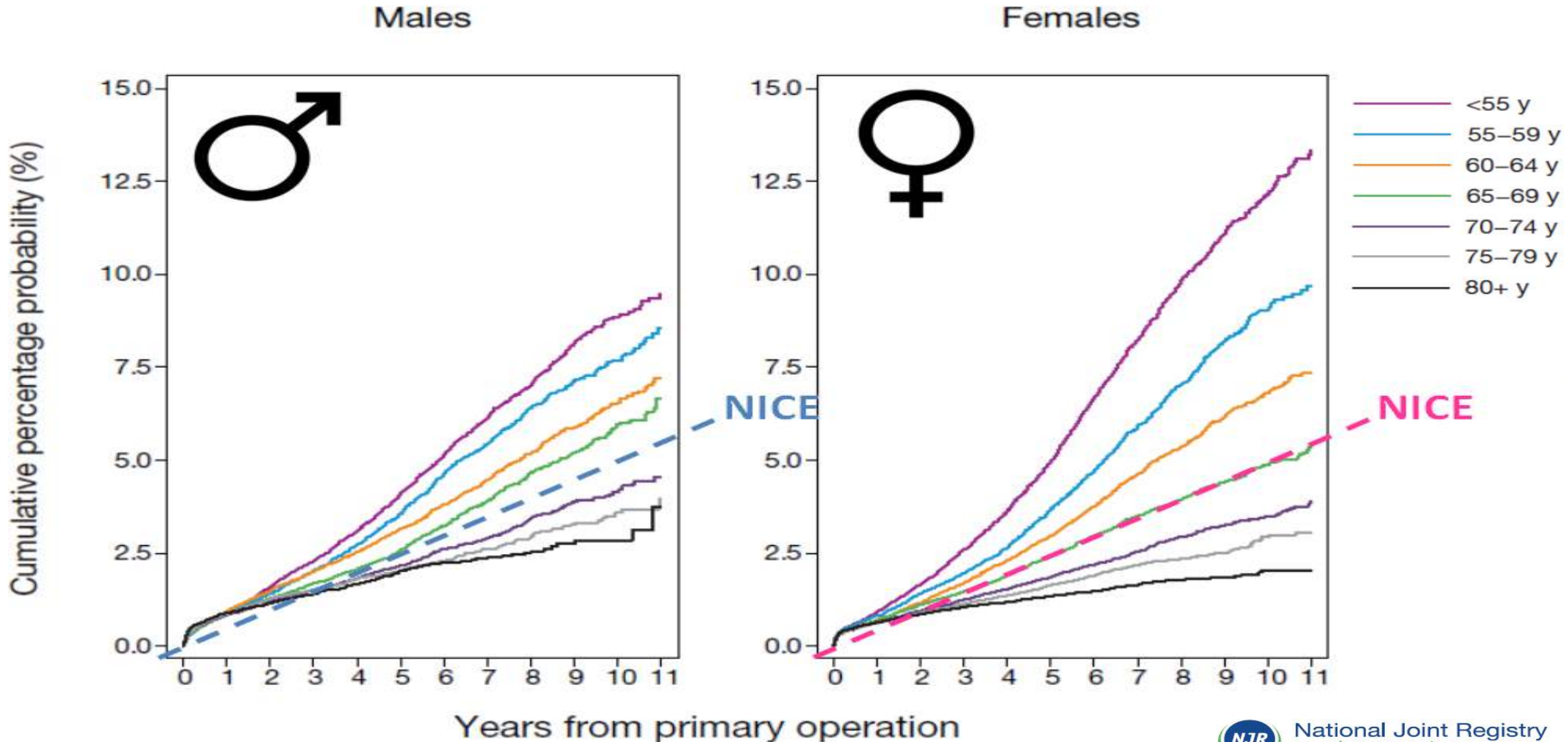
Primary not in the NJR	57,204	49,325	42,742	36,281
First rev. <1y	5,924	4,779	3,918	3,245
First rev. 1-3y	4,990	4,204	3,625	3,062
First rev. 3-5y	3,997	3,452	2,965	2,312
First rev. 5+y	6,015	4,378	2,943	1,739

How long do Revisions Last

© National Joint Registry 2016



Effect of age on THR NJR 2015



Linking Databases

RESEARCH

Risk of cancer in first seven years after metal-on-metal hip replacement compared with other bearings and general population: linkage study between the National Joint Registry of England and Wales and hospital episode statistics

OPEN ACCESS

Alison J Smith *statistician*¹, Paul Dieppe *chair of clinical education research*², Martyn Porter *consultant orthopaedic surgeon*³, Ashley W Blom *professor and head of orthopaedic surgery*¹, on behalf of the National Joint Registry of England and Wales

Expected versus observed incidences of cancer after hip replacement (95% CI)

	Expected incidence rate*		Observed incidence rate	
	Men	Women	Men	Women
All hip replacement	1.91 (1.82 to 2.00)	1.48 (1.42 to 1.54)	1.46 (1.39 to 1.54)	1.11 (1.06 to 1.16)
Stemmed metal-on-metal	1.45 (1.23 to 1.69)	1.22 (1.02 to 1.46)	1.15 (0.96 to 1.38)	0.84 (0.68 to 1.05)
Resurfacing	0.77 (0.63 to 0.94)	0.73 (0.54 to 0.98)	0.48 (0.37 to 0.62)	0.56 (0.40 to 0.78)
Other bearing surfaces	2.13 (2.05 to 2.22)	1.53 (1.47 to 1.59)	1.66 (1.57 to 1.76)	1.15 (1.10 to 1.21)

*Based on national incidence rates.

Mortality?

BMJ



BMJ 2013;347:f6549 doi: 10.1136/bmj.f6549 (Published 27 November 2013)

Page 1 of 12

RESEARCH

Mortality rates at 10 years after metal-on-metal hip resurfacing compared with total hip replacement in England: retrospective cohort analysis of hospital episode statistics

 OPEN ACCESS

Adrian R Kendal *research fellow*¹, Daniel Prieto-Alhambra *senior clinical research fellow*^{1 2 3 4}, Nigel K Arden *professor of rheumatic diseases and consultant rheumatologist*^{1 2}, Andrew Carr *Nuffield professor of orthopaedic surgery*¹, Andrew Judge *senior statistician and departmental lecturer in musculoskeletal epidemiology*^{1 2}

- Reduced mortality with MOM hip resurfacing

Cancer?

BMJ

BMJ 2012;344:e2383 doi: 10.1136/bmj.e2383 (Published 3 April 2012)

Page 1 of 11

RESEARCH

Risk of cancer in first seven years after metal-on-metal hip replacement compared with other bearings and general population: linkage study between the National Joint Registry of England and Wales and hospital episode statistics

OPEN ACCESS

Alison J Smith *statistician*¹, Paul Dieppe *chair of clinical education research*², Martyn Porter *consultant orthopaedic surgeon*³, Ashley W Blom *professor and head of orthopaedic surgery*¹, on behalf of the National Joint Registry of England and Wales

No increased cancer risk compared to other bearing types during first 7 years

BMJ

BMJ 2012;345:e4646 doi: 10.1136/bmj.e4646 (Published 25 July 2012)

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RESEARCH

Risk of cancer with metal-on-metal hip replacements: population based study

OPEN ACCESS

Keijo T Mäkelä *orthopaedic surgeon*¹, Tuomo Visuri *associate professor*², Pekka Pulkkinen *statistician*², Antti Eskelinen *head of research unit*³, Ville Remes *associate professor*⁴, Petri Virolainen *associate professor*¹, Mika Junnila *orthopaedic surgeon*¹, Eero Pukkala *professor*^{5,6}

No increased cancer risk compared to other hip types at 4 years in Finnish population

OPEN ACCESS Freely available online

PLOS ONE

Patterns of Risk of Cancer in Patients with Metal-on-Metal Hip Replacements versus Other Bearing Surface Types: A Record Linkage Study between a Prospective Joint Registry and General Practice Electronic Health Records in England

Arief Lalmohamed^{1,2}, Alexander J. MacGregor³, Frank de Vries^{1,4,5,6}, Hubertus G. M. Leufkens¹, Tjeerd P. van Staa^{1,4,7*}

¹ Division of Pharmacoepidemiology and Clinical Pharmacology, Utrecht Institute of Pharmaceutical Sciences, Utrecht University, Utrecht, The Netherlands, ² Department of Clinical Pharmacy, University Medical Center Utrecht, Utrecht, The Netherlands, ³ Norwich Medical School, University of East Anglia, Norwich United Kingdom, ⁴ Medical Research Council (MRC) Lifecourse Epidemiology Unit, Southampton General Hospital, Southampton, United Kingdom, ⁵ Department of Clinical Pharmacy and Toxicology, Maastricht University Medical Centre+, Maastricht, The Netherlands, ⁶ Care and Public Health Research Institute (CAPHRI), Maastricht, The Netherlands, ⁷ Clinical Practice Research Datalink (CPRD), Medicines and Healthcare products Regulatory Agency, London, United Kingdom

No increased cancer risk for hip resurfacing vs stemmed MOM v other bearings

Heart failure?

QUEBEC BEER-DRINKERS' CARDIOMYOPATHY

Canad. Med. Ass. J.
Oct. 7, 1967, vol. 97

Quebec Beer-Drinkers' Cardiomyopathy: Etiological Considerations

YVES MORIN, M.D.* and PHILIPPE DANIEL, M.D.,† *Quebec, Que.*

- -Quebec Aug 1965-April 1966
- -48 patients with distinct clinical, haemodynamic and pathological features
- -Nutritionally deficient alcoholics
- -All drank one brand of beer
- -10x normal levels of cobalt sulfate added as foam stabilising agent

Heart failure?



Cobalt intoxication diagnosed with the help of Dr House

Kirsten Dahms, Yulia Sharkova, Peter Heitland, Sabine Pankuweit, Juergen R Schaefer

Lancet 2014; 383: 574

Philipps-University Marburg,
University Clinic Marburg,
Internal Medicine

In May, 2012, a 55-year-old man was referred to our clinic for severe heart failure (New York Heart Association class IV). He had raised brain natriuretic peptide of 1053 ng/L (normal <55 ng/L) and his estimated ejection

concentration in 24 h urine was 6140 nmol/L (normal <17 nmol/L) and chromium urine concentration was 52300 nmol/L (normal <11.5 nmol/L). We initiated 2,3-dimercaptopropane-1-sulfonate treatment and referred

METAL ON METAL HIP IMPLANTS

Arthroprosthetic cobaltism associated with metal on metal hip implants

Stephen S Tower *orthopaedic surgeon*

Anchorage Fracture and Orthopedic Clinic, 3831 Piper Street, Suite 220, Anchorage, AK 99508, USA

OPEN ACCESS Freely available online

PLOS ONE

Metal-on-Metal Hip Prostheses and Systemic Health: A Cross-Sectional Association Study 8 Years after Implantation

Jennifer R. Prentice¹, Matthew J. Clark¹, Nigel Hoggard¹, Allison C. Morton², Claire Tooth³, Martyn N. Paley¹, Ian Stockley⁴, Marios Hadjivassiliou³, J. Mark Wilkinson^{1,4*}

¹ Department of Human Metabolism, University of Sheffield, Sheffield, United Kingdom, ² Department of Cardiology, Sheffield Teaching Hospitals NHS Foundation Trust, Sheffield, United Kingdom, ³ Department of Neurology, Sheffield Teaching Hospitals NHS Foundation Trust, Sheffield, United Kingdom, ⁴ Department of Orthopaedics, Sheffield Teaching Hospitals NHS Foundation Trust, Sheffield, United Kingdom

Advances in Heart Failure

Cobalt Cardiomyopathy A Critical Reappraisal in Light of a Recent Resurgence

Milton Packer, MD

Heart failure after conventional metal-on-metal hip replacements

A retrospective cohort study

Marianne H GILLAM¹, Nicole L PRATT¹, Maria C S INACIO¹, Elizabeth E ROUGHEAD¹, Sepehr SHAKIB², Stephen J NICHOLLS³, and Stephen E GRAVES⁴

No statistically significant difference for most MOM subgroups

Men with ASR XL THA had three times higher rate of hospitalization for heart failure

- 63 patients
- Mean age 82 years
- HR 3.2, 95% CI 1.6-6.5
- 18 hospital admissions with HF as either primary or secondary diagnosis

The screenshot shows the Australian Government Department of Health Therapeutic Goods Administration (TGA) website. The main navigation bar includes links for Home, Safety information, Consumers, Health professionals, Industry, About the TGA, and News room. A search bar is located on the right. The left sidebar under 'Safety information' lists 'Reporting problems', 'Alerts', 'Current year alerts', 'All alerts', 'Recalls', 'Early warning system', and 'Safety information & education'. The main content area is titled 'ASR XL total hip replacements' and features an alert dated 29 November 2016. The alert text states: 'Consumers and health professionals are advised that a recently published Australian study^{1,2} suggests a higher incidence of first hospitalisation due to heart failure among a group of male patients with ASR XL metal-on-metal (MoM) hip implants when compared with a similar group who had received a metal-on-polyethylene (MoP) implant.' It further explains that the ASR XL is a type of MoM hip implant where both moving surfaces are metal, unlike MoP implants which have one metal and one plastic polymer surface. The alert concludes that there is growing evidence that the two metal surfaces wear against each other, releasing trace amounts of cobalt and chromium (Co/Cr), especially in the first 18 months or so after surgery. A 'Related information' section on the right lists links for 'Metal-on-metal hip implants: Information for patients', 'Metal-on-metal hip replacement implants', and 'Recall of DePuy Orthopaedics ASR hip replacement device'.

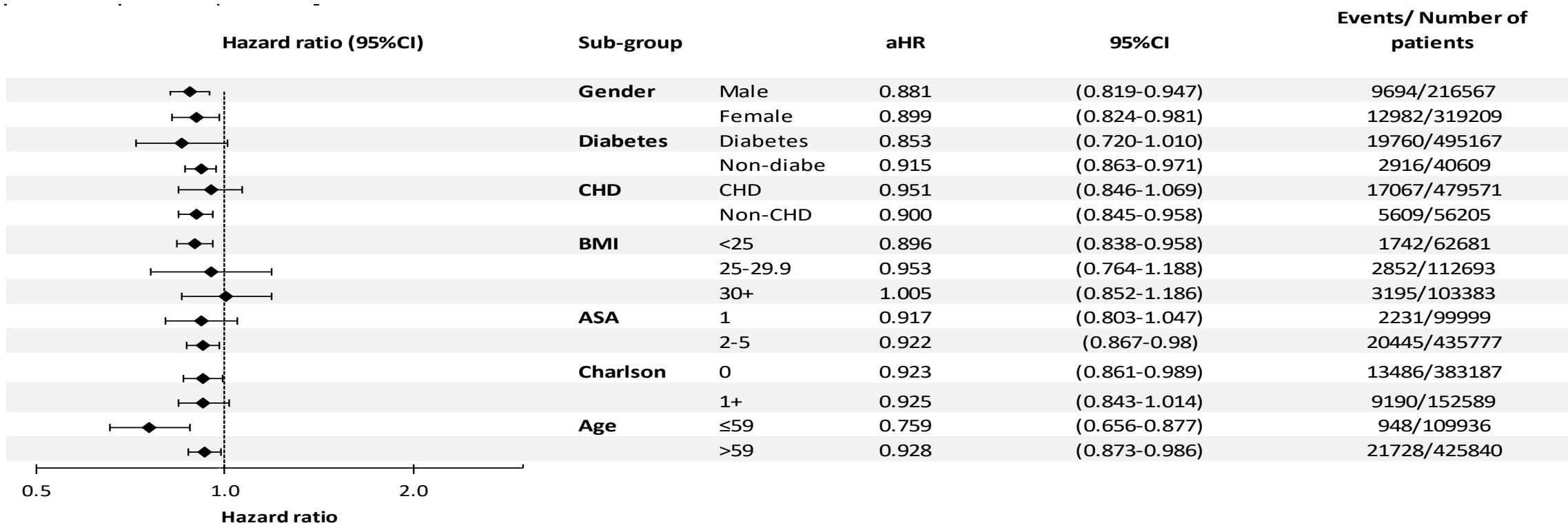
Events and crude rates

Outcome		MOM	Control	Crude RR
HF	N	53,529	482,247	
	Events	1,431	21,245	
	Rate (per kpy)	3.8	9.7	0.389 (0.368 - 0.410)
Cancer	N	51,273	436,167	
	Events	4,260	37,623	
	Rate (per kpy)	11.8	18.9	0.624 (0.605 – 0.644)
Death	N	53,529	482,247	
	Events	3,728	55,875	
	Rate (per kpy)	9.7	24.9	0.389 (0.376 – 0.402)

Adjusted hazard ratios

	HR	95% CI Control		p
HF	0.901	0.853	0.953	<0.001
Cancer	0.881	0.852	0.911	<0.001
Death	0.892	0.862	0.924	<0.001

Forest plot of sub-groups





■ HIP

The risk of cardiac failure following metal-on-metal hip arthroplasty

S. A. Sabah,
J. C. Moon,
S. Jenkins-Jones,
C. L. Morgan,
C. J. Currie,
J. M. Wilkinson,
M. Porter,
G. Captur,
J. Henckel,
N. Chaturvedi,
P. Kay,
J. A. Skinner,
A. H. Hart,
C. Manisty

Aims

The aim of this study was to determine whether patients with metal-on-metal (MoM) arthroplasties of the hip have an increased risk of cardiac failure compared with those with alternative types of arthroplasties (non-MoM).

Patients and Methods

A linkage study between the National Joint Registry, Hospital Episodes Statistics and records of the Office for National Statistics on deaths was undertaken. Patients who underwent elective total hip arthroplasty between January 2003 and December 2014 with no past history of cardiac failure were included and stratified as having either a MoM (n = 53 529) or a non-MoM (n = 482 247) arthroplasty. The primary outcome measure was the time to an admission to hospital for cardiac failure or death. Analysis was carried out using data from all patients and from those matched by propensity score.



**M. R. Whitehouse,
J. R. Berstock,
M. B. Kelly,
C. L. Gregson,
A. Judge,
A. Sayers,
T. J. Chesser**

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Senior Research Fellow
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University of Bristol, Bristol

■ TRAUMA

Higher 30-day mortality associated with the use of intramedullary nails compared with sliding hip screws for the treatment of trochanteric hip fractures

A PROSPECTIVE NATIONAL REGISTRY STUDY

Aims

The aim of this study was to investigate the association between the type of operation used to treat a trochanteric fracture of the hip and 30-day mortality.

Patients and Methods

Data on 82 990 patients from the National Hip Fracture Database were analyzed using generalized linear models with incremental case-mix adjustment for patient, non-surgical and surgical characteristics, and socioeconomic factors.

Results

The use of short and long intramedullary nails was associated with an increase in 30-day mortality (adjusted odds ratio (OR) 1.125, 95% confidence interval (CI) 1.040 to 1.218; $p = 0.004$) compared with the use of sliding hip screws (12.5% increase). If this were causative, it would represent 98 excess deaths over the four-year period of the study and one excess death would be caused by treating 112 patients with an intramedullary nail rather than a sliding hip screw.

Conclusion

There is a 12.5% increase in the risk of 30-day mortality associated with the use of an intramedullary nail compared with a sliding hip screw in the treatment of a trochanteric fractures of the hip.

Cite this article: *Bone Joint J* 2019;101-B:83–91.

Comparing two treatments



■ TRAUMA

Higher 30-day mortality associated with the use of intramedullary nails compared with sliding hip screws for the treatment of trochanteric hip fractures

A PROSPECTIVE NATIONAL REGISTRY STUDY

M. R. Whitehouse,
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University of Bristol, Bristol

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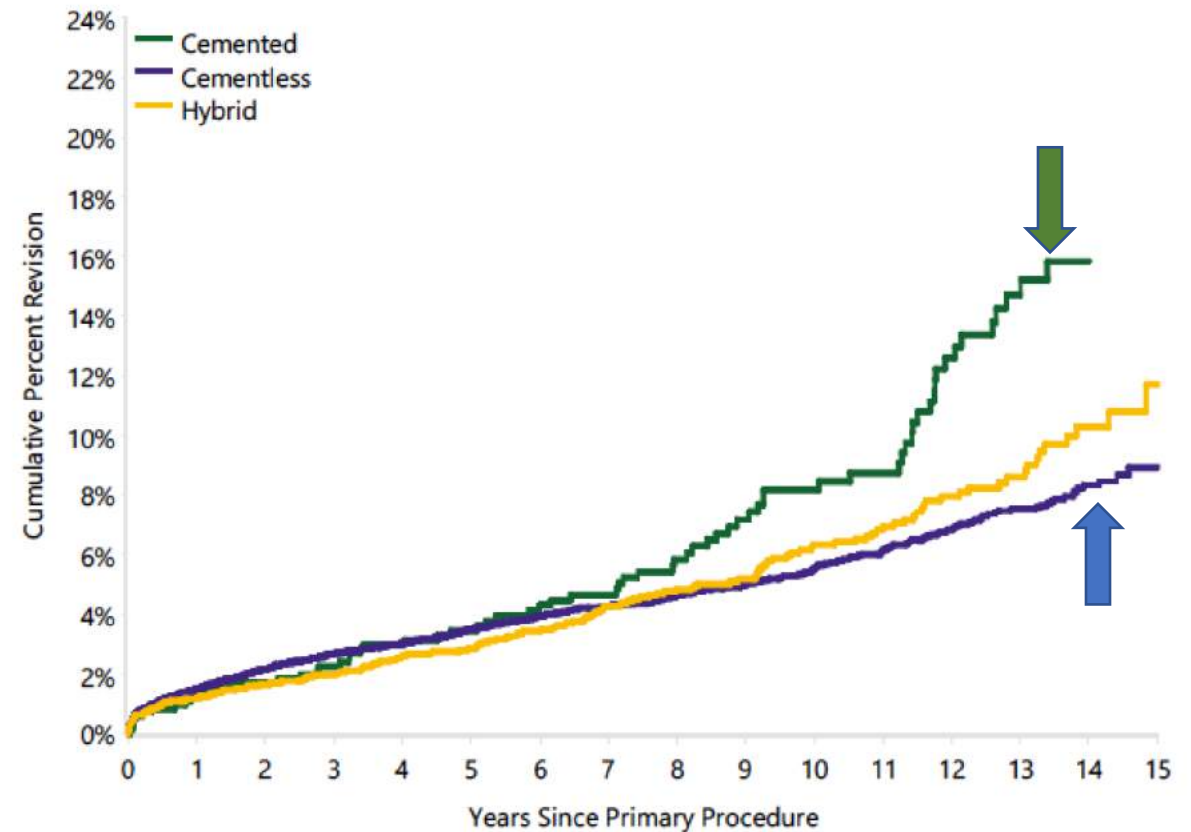
Cite this article: *Bone Joint J* 2019;101-B:83–91.

- Are the groups the same?
- IMN in pathological #
- No data on comorbidities
- No cause of death data
- Ascertainment rate 104%
- Maybe those that die are less well

Patients with primary diagnosis of OA and less than 55 yo

- Both components cemented is the most revised at 15 years
- Both components with Cementless fixation is the least revised

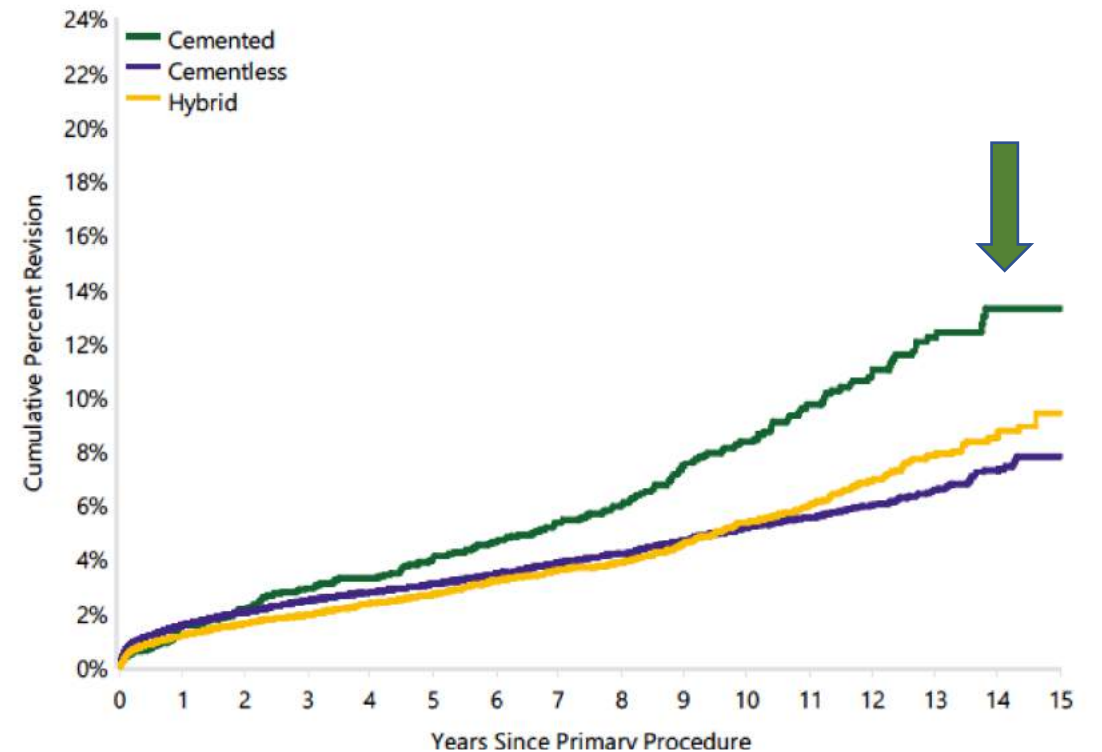
Figure HT12 Cumulative Percent Revision of Primary Total Conventional Hip Replacement Fixation (Primary Diagnosis OA)



Patients with primary diagnosis of OA and between 55-64 yo

- Both components cemented is the most revised at 15 years
- Both components with Cementless fixation is the least revised

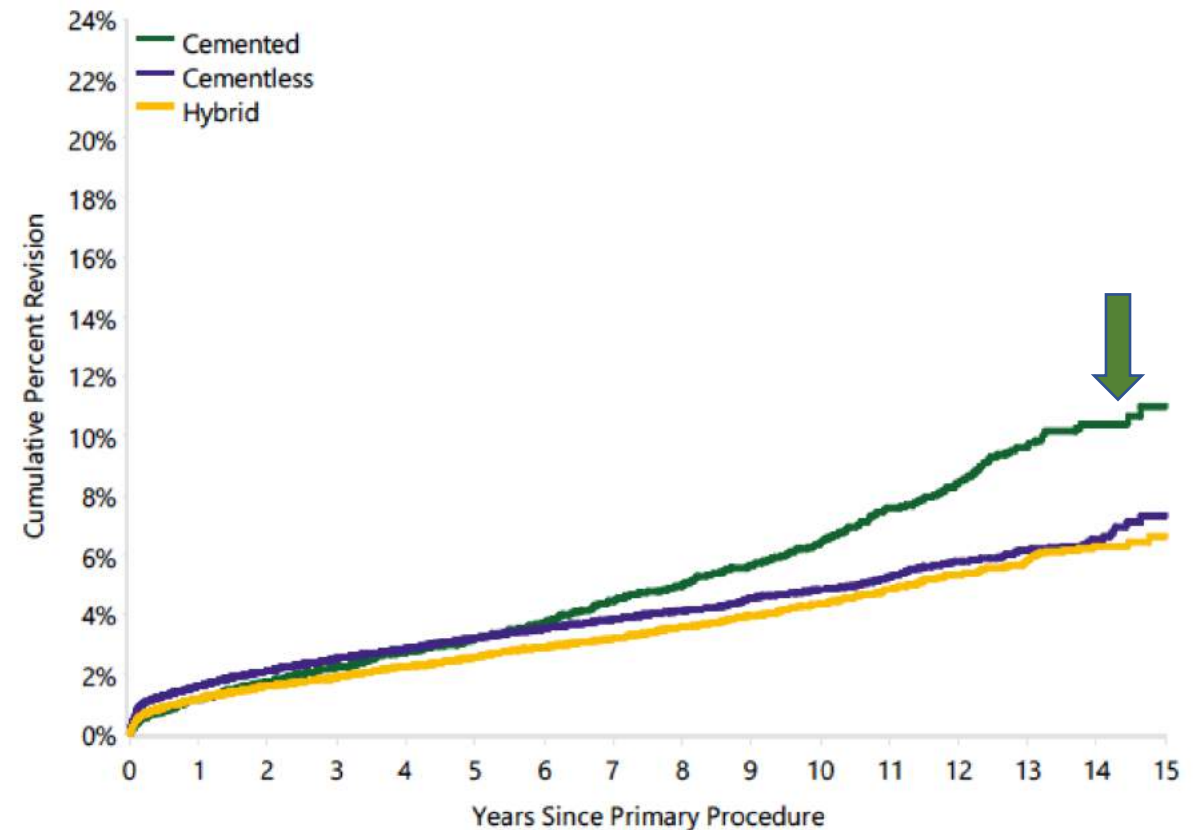
Figure HT13 Cumulative Percent Revision of Primary Total Conventional Hip Replace Fixation (Primary Diagnosis OA)



Patients with primary diagnosis of OA and between 65-74 yo

- Both components cemented is the most revised at 15 years
- Cementless or hybrid fixation is the least revised

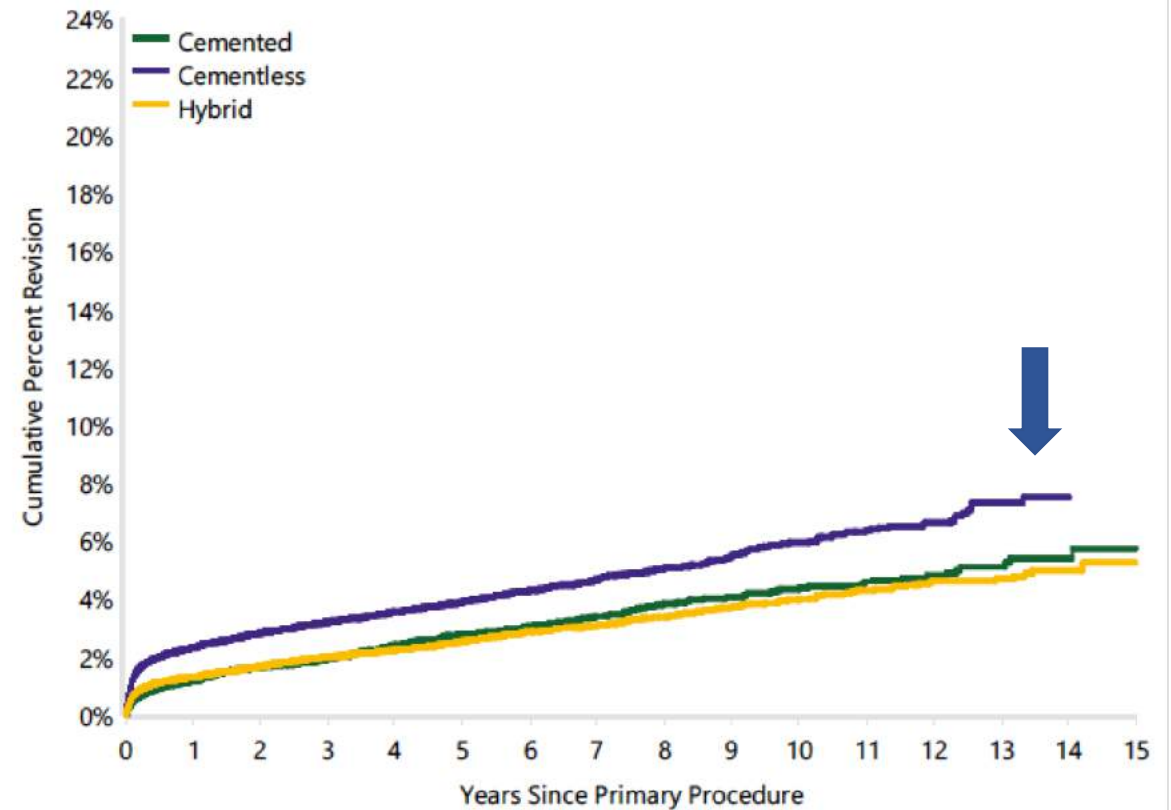
Figure HT14 Cumulative Percent Revision of Primary Total Conventional Hip Replacement Fixation (Primary Diagnosis OA)



>75 cemented and hybrid least revised

- Both components cementless are the most revised after 15 years
- Both components cemented and hybrid fixation are the least revised

Figure HT15 Cumulative Percent Revision of Primary Total Conventional Hip Replacement Fixation (Primary Diagnosis OA)



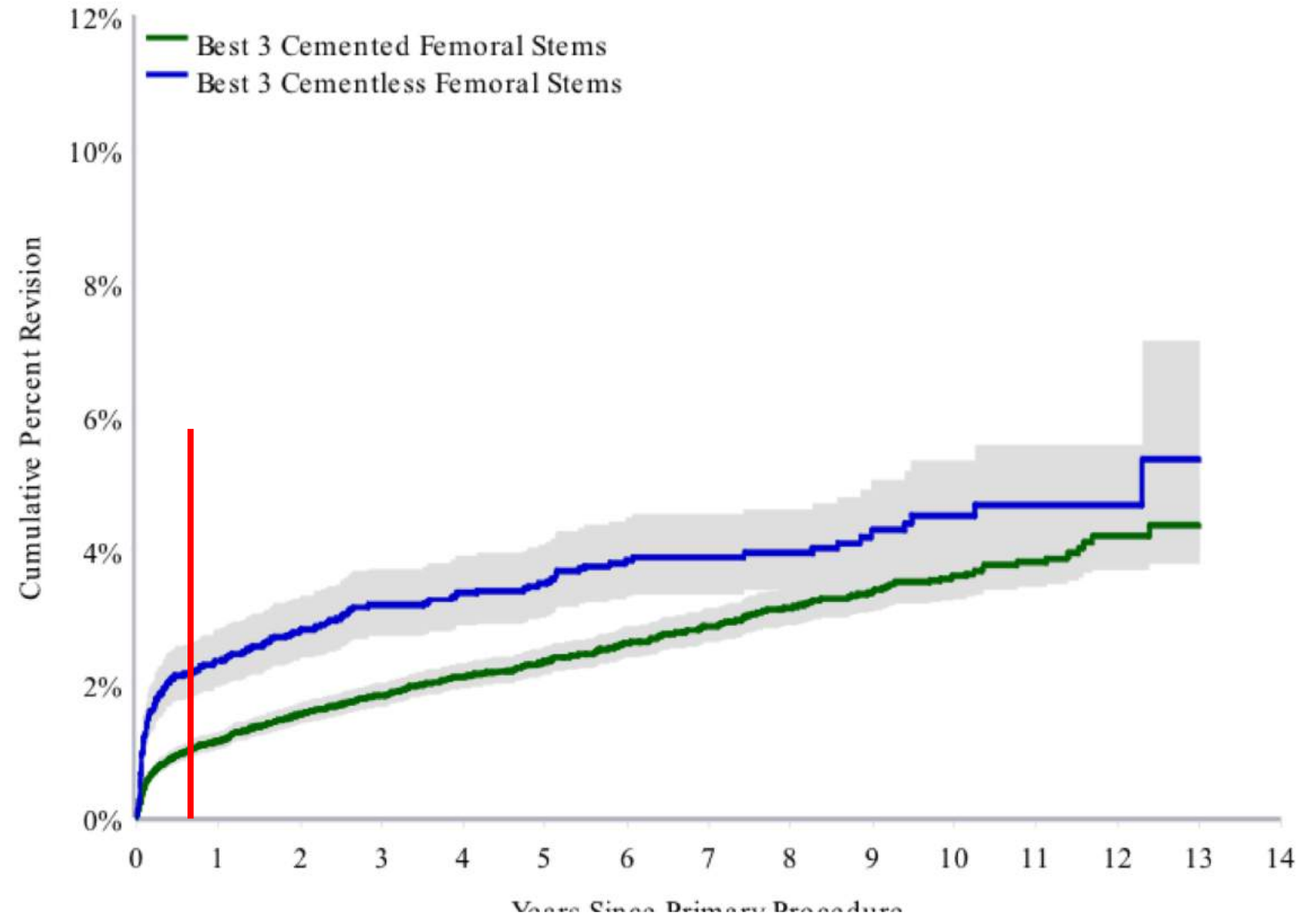
Cemented and Cementless Femoral stem fixation in THR for patients older than 75 years

A comparison of the best
performing stems in this age Group

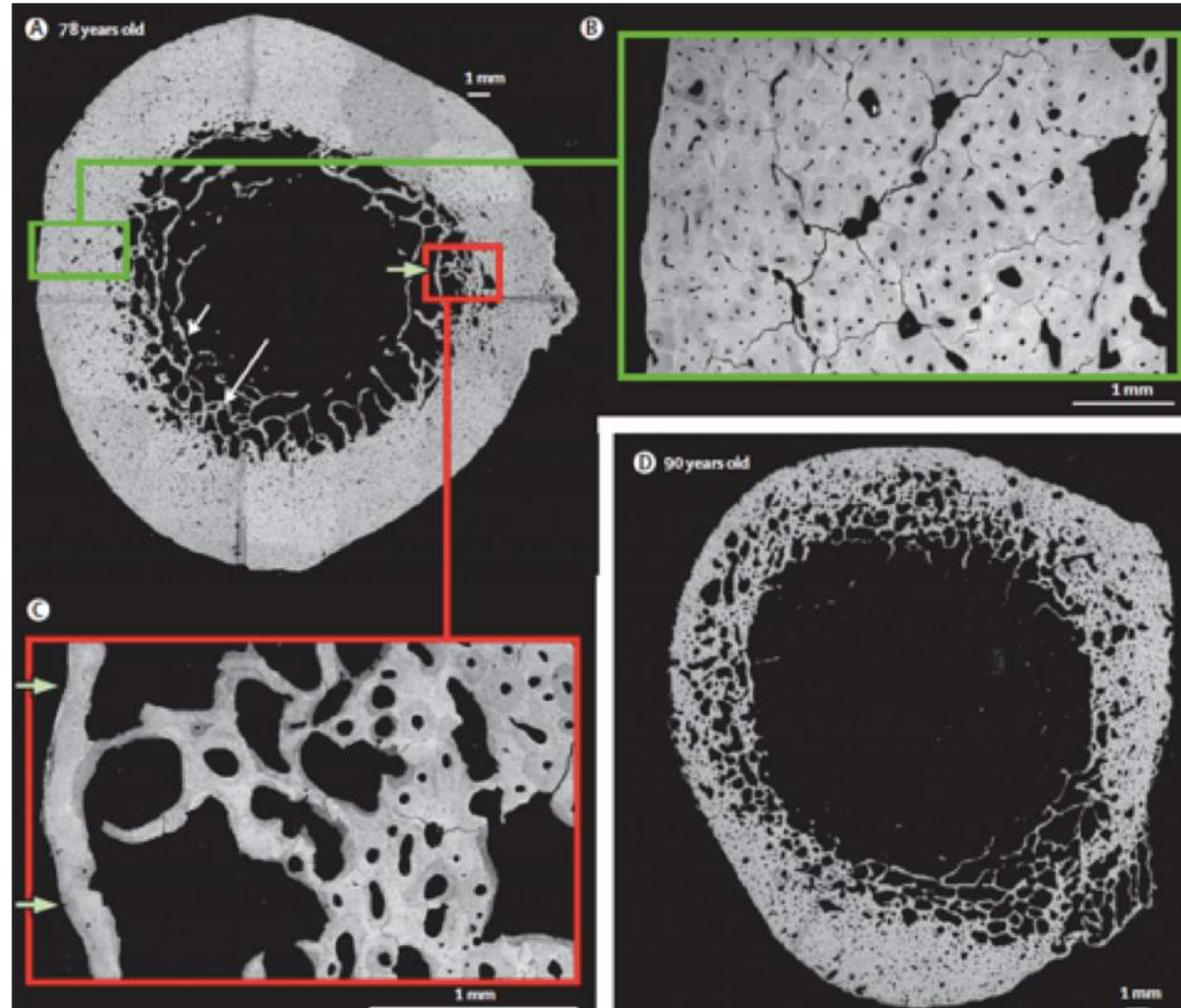
OA diagnosis age >75 yo

- Cementless higher revision rate than cemented
 - Hazard ratios only significant in the 1st 6 month after implantation
- No difference after 6 months
- Reason for initial difference
 - fracture
 - loosening (never fixed)

Figure 3: Cumulative Percent Revision of Primary Total Conventional Hip Replacement (Primary Diagnosis OA)



The Ageing Skeleton and Cortical Porosity



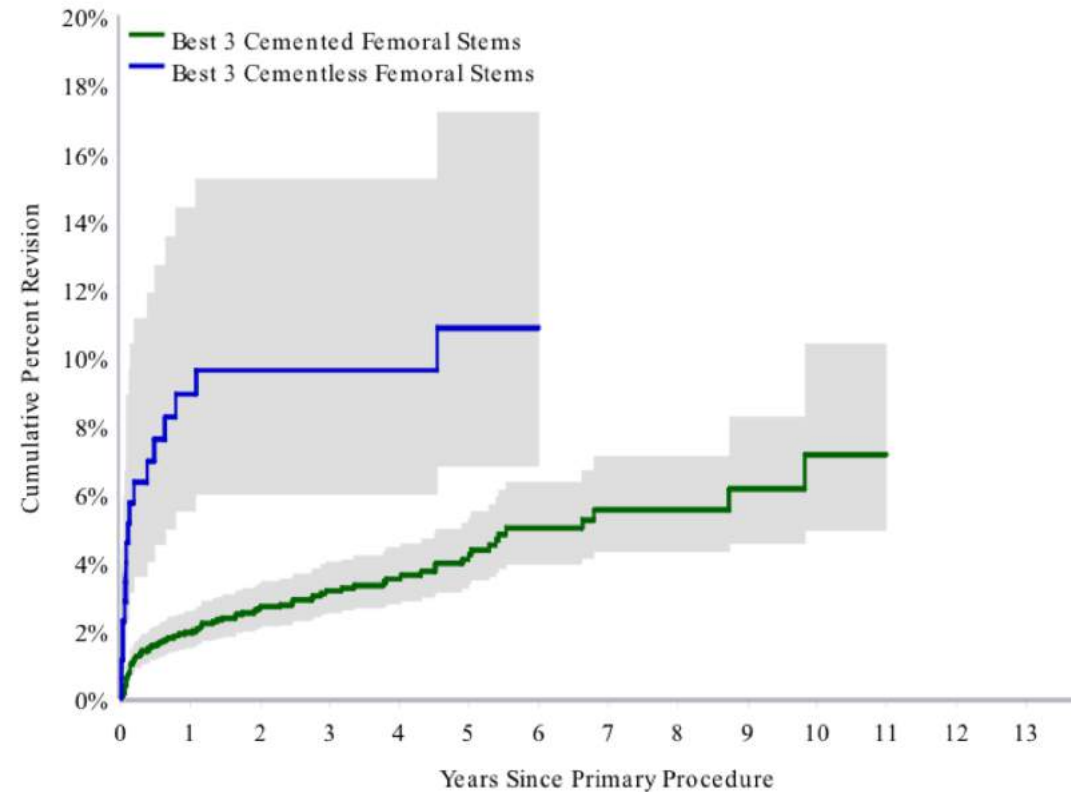
Zebaze, 2010, The Lancet

Fractured NOF as primary diagnosis

- a more definitive surrogate for bone quality

- **When used in #NOF setting the differences are much greater and the gender difference is lost**

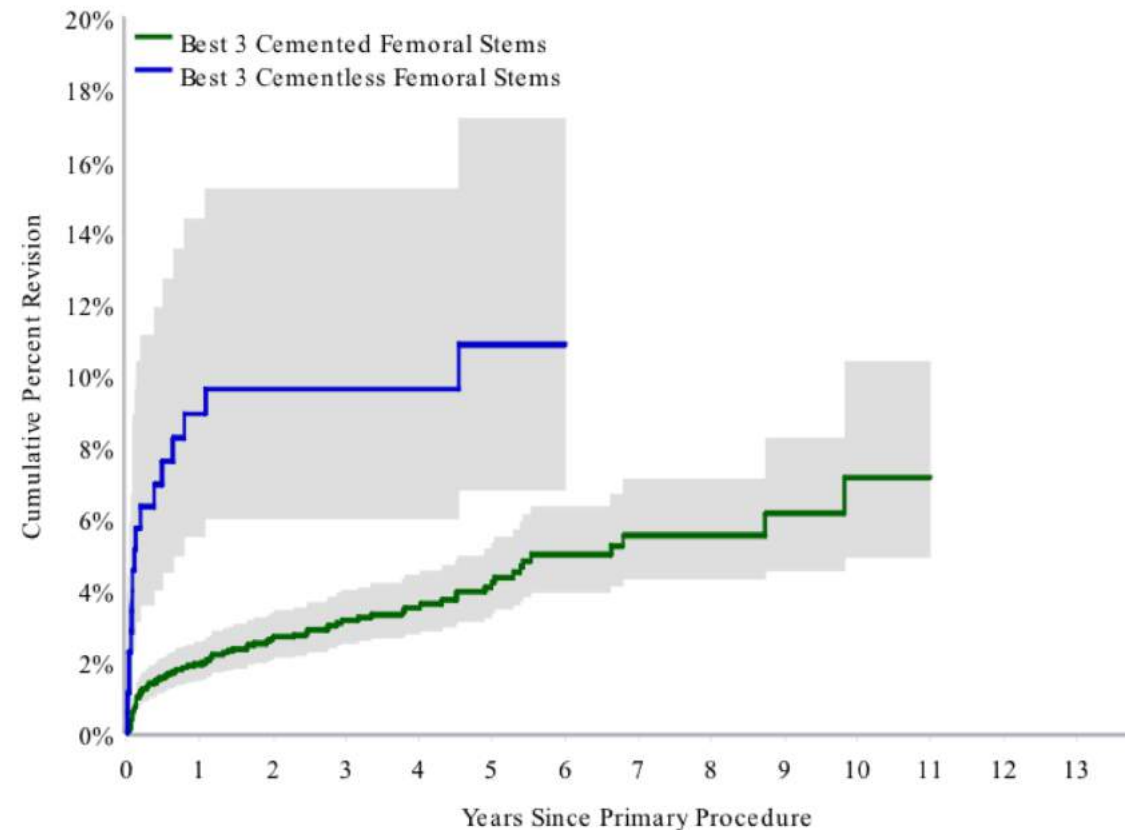
Figure 5: Cumulative Percent Revision of Primary Total Conventional Hip Re Stem (Primary Diagnosis Fractured NOF)



Fractured NOF as primary diagnosis

- In the 1st 2 weeks cementless stems were revised 32 times more often than cemented stems
- Main reasons for this increase was
 - fracture
 - Loosening
- The gender differences are not seen in this diagnosis category

Figure 5: Cumulative Percent Revision of Primary Total Conventional Hip Replacement Stem (Primary Diagnosis Fractured NOF)



Summary of fixation in older age bracket

- In male patients with OA in this older age group, cementless and cemented stem philosophy is equally successful over a 15 year period
 - Recover from a high early failure rate and the graphs cross after 6 years
- For female patients aged greater than 75yo with primary diagnosis of OA cemented stem philosophy is better than cementless
 - Never recovers from the high early failure rate

Summary of fixation in the older age bracket

- **For all patients (both male and female) aged greater than 75 years old with a primary diagnosis of #NOF the cemented femoral fixation philosophy is better than cementless**

Conclusion

- Registry Data is useful but has limitations
- Data quality need audit and confirmation
- Beware small datasets and over interpretation
- Beware Confounding in Registers and Data Mining Studies
- Understanding population characteristics, complexity and Risk factors for outcomes is important
- Linking Databases is the future for answering complex questions

Thank You



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