Periprosthetic Joint Infection

Coming of a Tsunami

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I (and/or my co-authors) have something to disclose.

Detailed disclosure information is available via:

"My Academy" app;

Printed Final Program; or

AAOS Orthopaedic Disclosure Program on the AAOS website at
http://www.aaos.org/disclosure

PJI

Fact 1

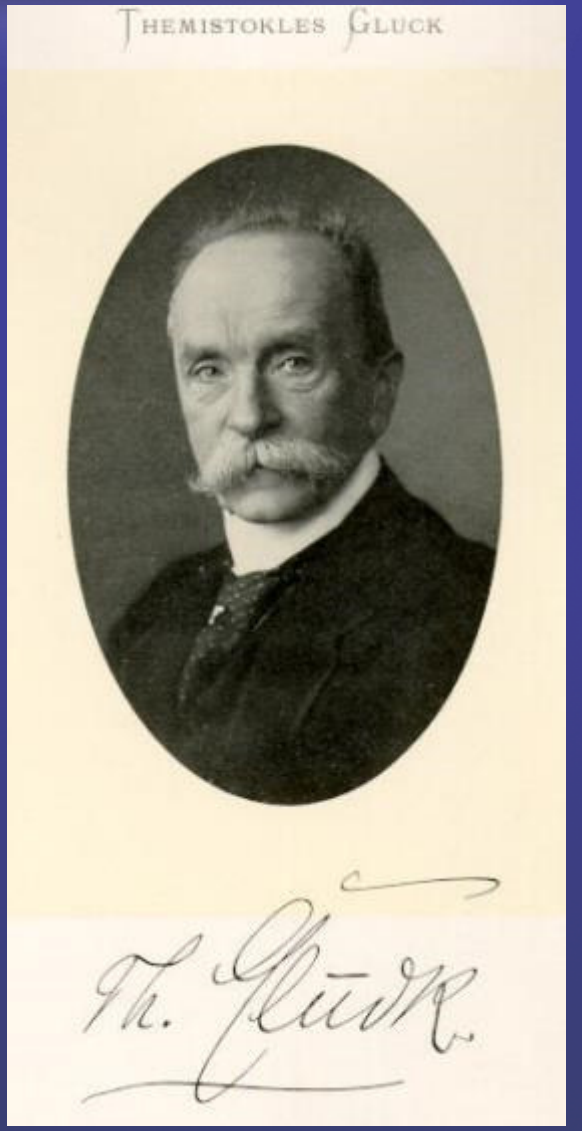
- Infection is a terrible problem

Unrecognized Genuis

- 1880- First wrist arthroplasty
- 1890- first Ivory Knee replacement

Into knee of a 17 year old girl

- 14 joints that year including a hip
- Reported on five cases



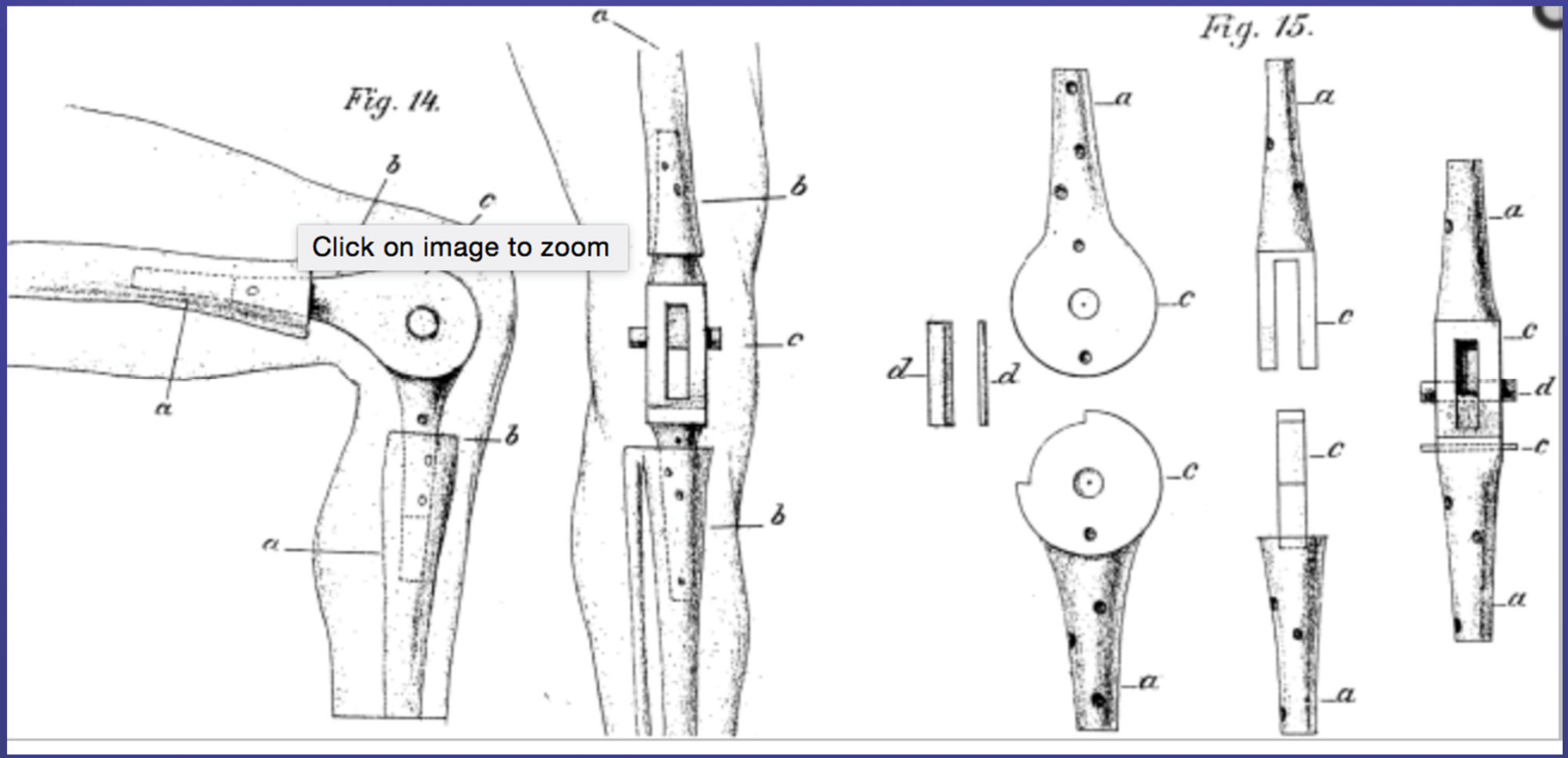
INFECTION

.... ailments of human will be treated by artificial materials…….

Unrecognized Genuis

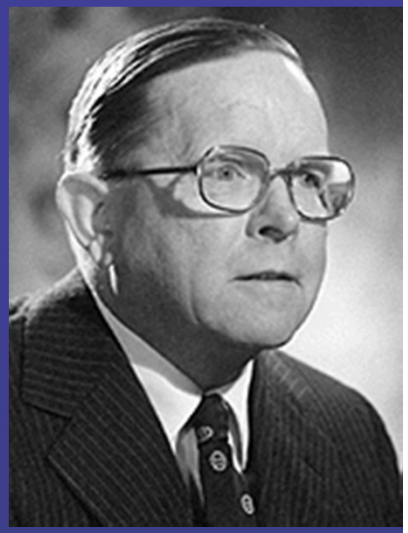
- **Themistokles Gluck (1853-1942)**
- Balkan War surgeon– bone defect
- Intramedullary fixation
- Biocompatability
- Plate fixation (mandible)
- Bone cement (So much earlier than Haboush (1953),Wiltse (1957), Charnley(1964)
- 1880- vascular graft (Alexis Carrel who was given the Noble Prize in 1912

Unrecognized Genuis



Periprosthetic Joint Infection

- 1979s Sir John Charnley



…joint sepsis will be the major hurdle in our way in the future..

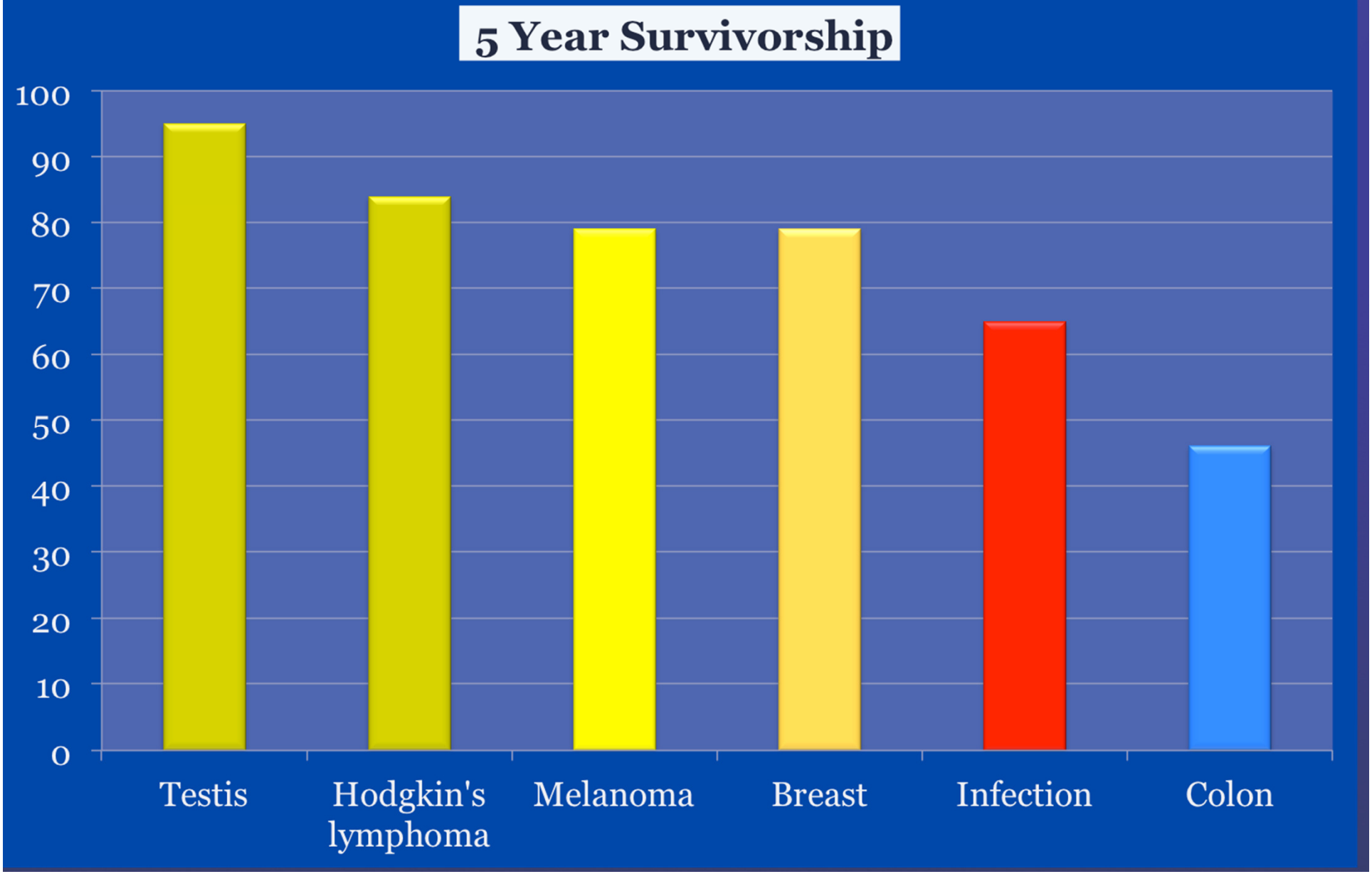
High morbidity






Infection kills

PJI worse than Some Cancers



Mortality after TJA
Medicare Study

Are We Winning or Losing the War with PJI: Trends in PJI and Mortality Risk for the Medicare Population

- Steven M. Kurtz PhD
- Edmund Lau MS
- Min-Sun Son PhD
- Ellen T. Chang ScD
- Werner Zimmerli MD
- Javad Parvizi MD

Summary of Findings

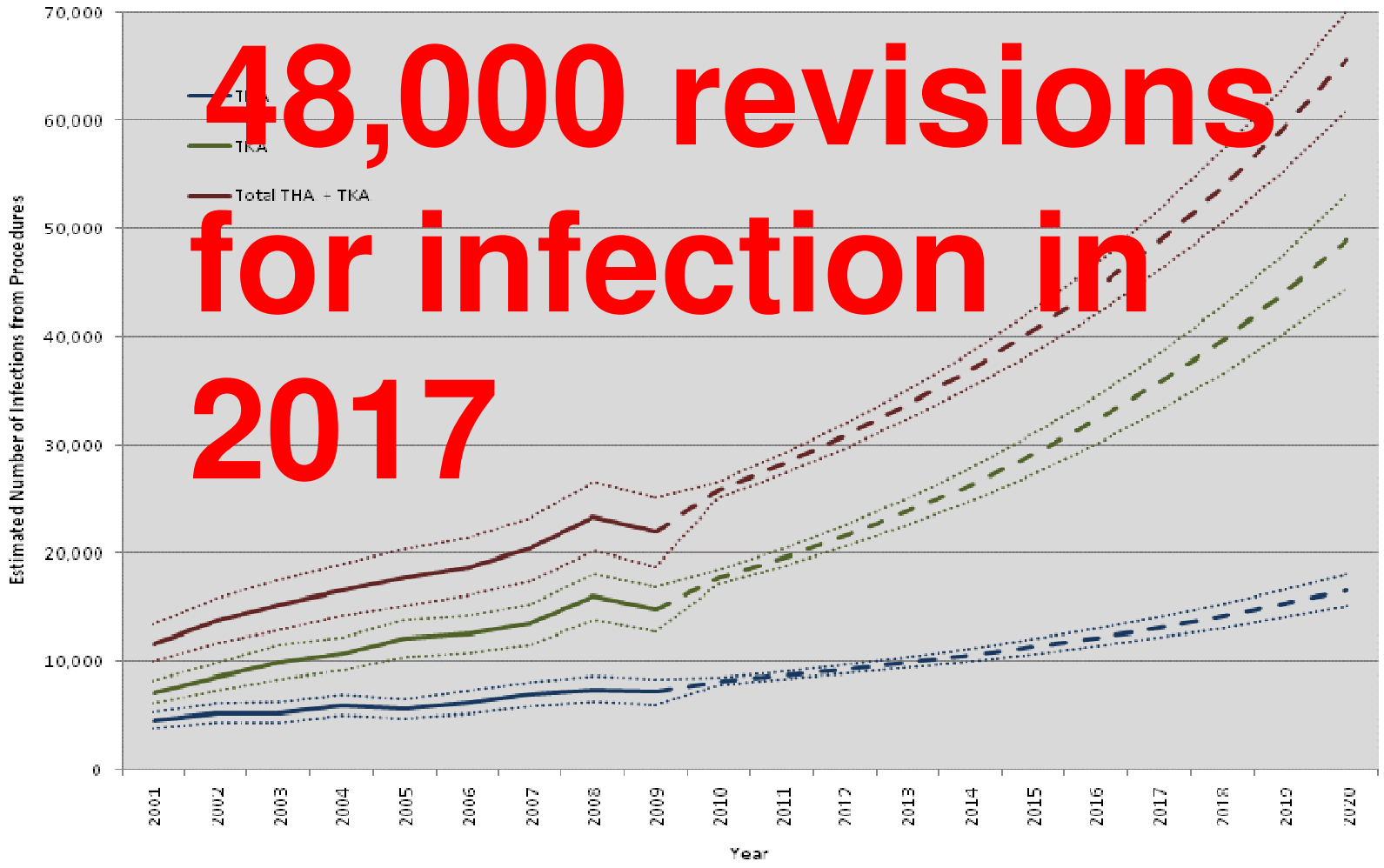
- PJI incidence has not improved over time
- Mortality risk after PJI has decreased over time
- The 5-year overall survival of PJI patients is comparable to two of the most common cancers
  - **TKA: 72%**
  - Breast cancer: 73%
  - Prostate cancer: 79%

PJI
Fact 2

- Infection is on the rise

Infected Revisions 2001-2010

Burden

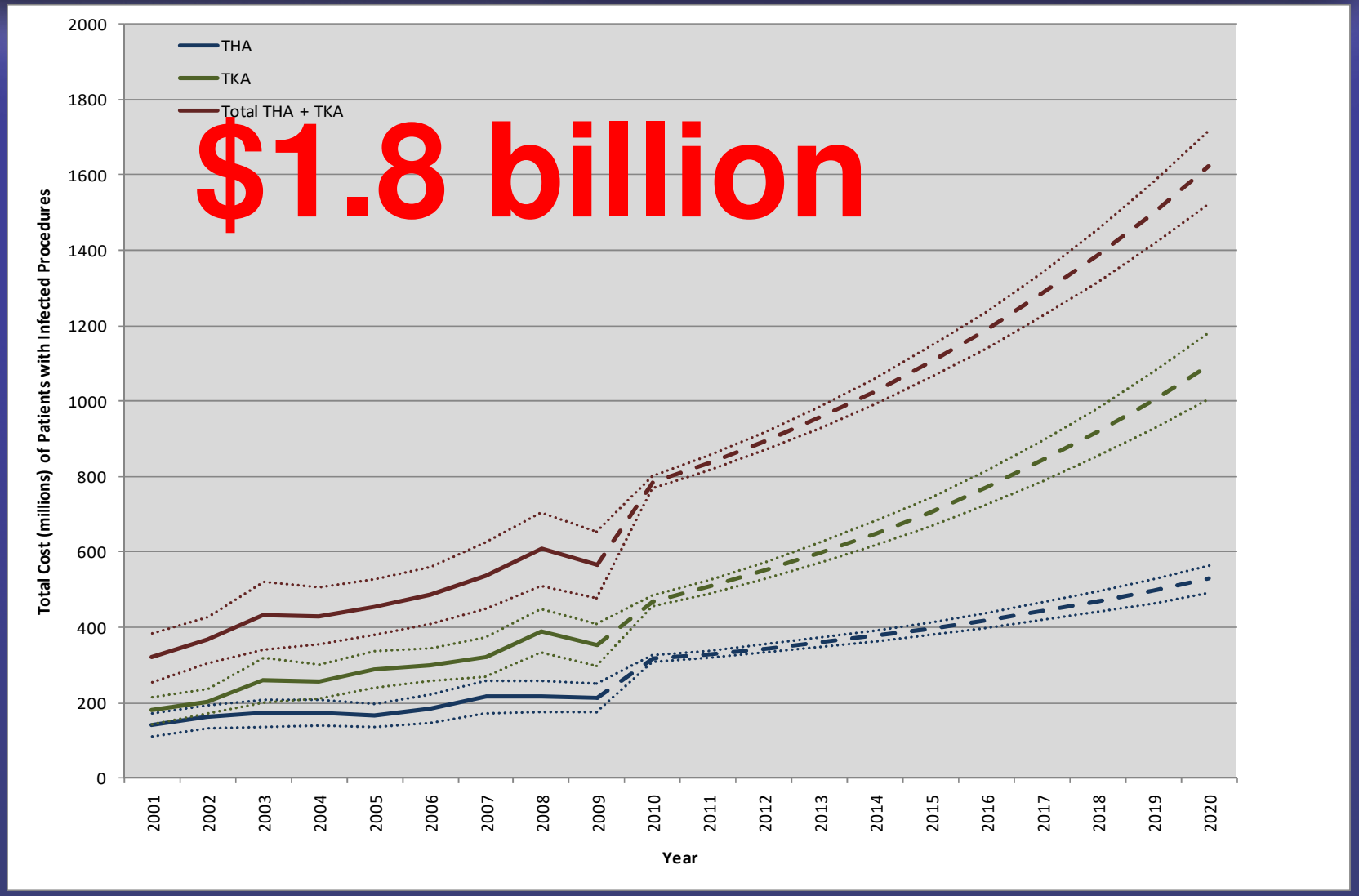


48,000 revisions for infection in 2017

Kurtz, S, Parvizi J JOA 2012

Infected Revisions 2001-2010

Cost

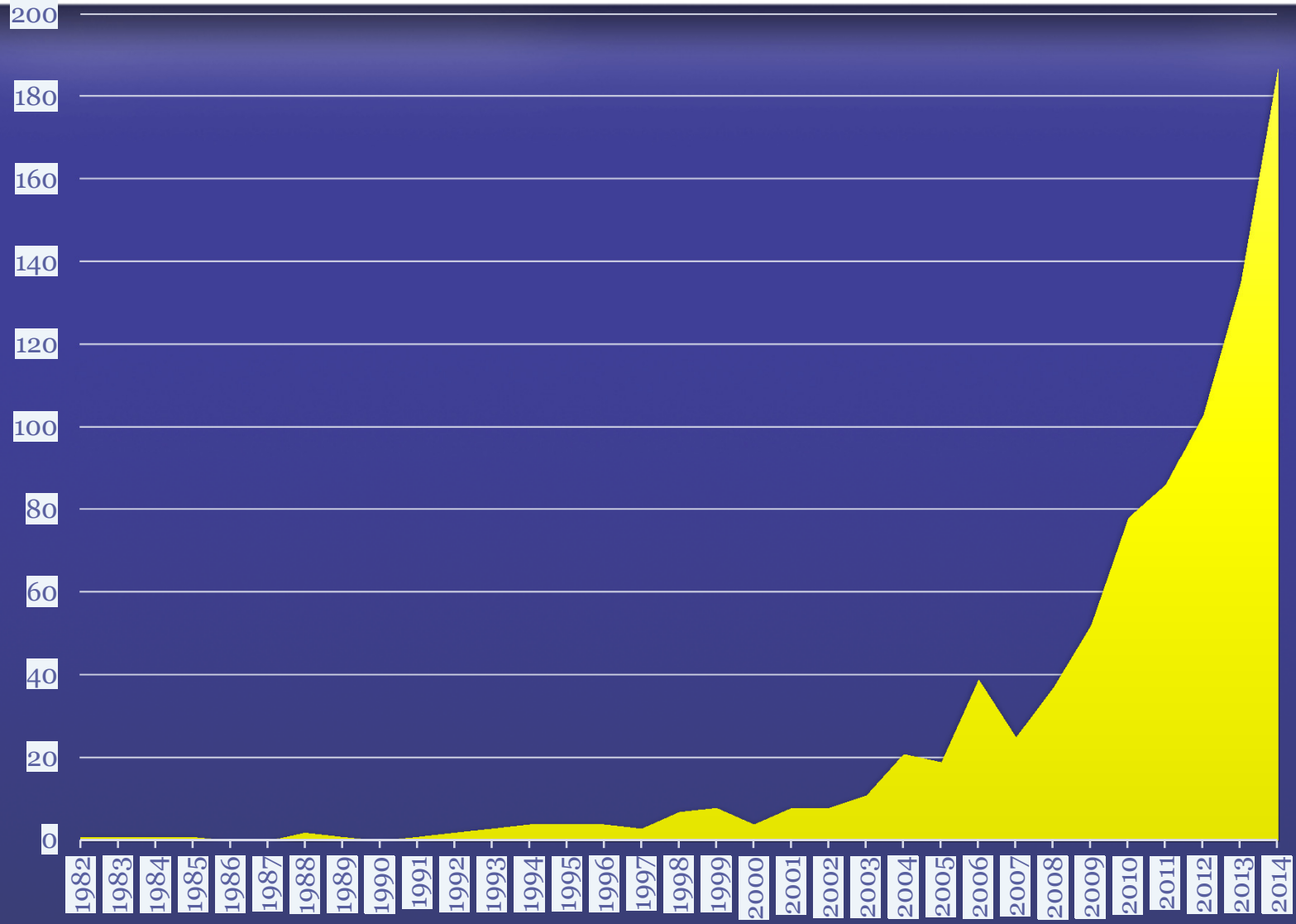


Kurtz, S, Parvizi J JOA 2012

PJI
Fact 3

- Prevention is best

Pubmed Publications for PJI by Year



Obtained using the keyword "periprosthetic joint infection"

Prevention of Surgical Site Infection

World Health Organization

Periprosthetic Joint Infection

- Prevention of SSI Guidelines are in development

CDC Guidelines for SSI Prevention

- Core Section
  - Antimicrobial prophylaxis
  - Glycemic control
  - Normothermia
  - Tissue oxygenation
  - Skin Preparation
  - S.aureus colonization
  - Surgical check list

CDC Guidelines for SSI Prevention

- Arthroplasty
  - Transfusion
  - Immunosuppression
  - Anticoagulation
  - Surgical attire
  - Surgical technique
  - Anesthesia
  - Environment
  - Biofilm

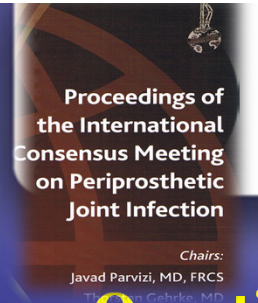
Evidence Based Pyramid

CDC Guidelines for SSI Prevention

Much of what we have is based on thin science, if any at all

International Consensus Meeting

Philadelphia, August 2013



International Consensus

- **Question: What are significant risk factors for development of surgical site infection (SSI) or periprosthetic joint infection (PJI) after elective total joint arthroplasty (TJA)?**

- **Consensus:** The risk factors for SSI or PJI include history of previous surgery, uncontrolled diabetes mellitus, malnutrition, morbid obesity, active liver disease, active renal disease, excessive smoking (>one pack per day), excessive alcohol consumption (>40 units per week), intravenous drug abuse, recent hospitalization, extended stay in a rehabilitation facility, male gender, diagnosis of post-traumatic arthritis, inflammatory arthropathy, prior surgical procedure in the affected joint, and severe immunodeficiency.

- **Delegate Vote:** Agree: 94%, Disagree: 4%, Abstain: 2%.

Prevention of PJI

- Optimize Host

Patient Optimization

- Systemic or local infection
- Immunosuppressive state
- Uncontrolled Diabetes/hyperglycemia
- Chronic disease (anemia, liver, renal, etc.)
- Malnutrition
- Obesity
- Affective disorders
- Smoking
- Excessive Alcohol consumption
- IV drugs/HIV

Patient Optimization

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Control Nidus

- GI/GU (urine)
- Skin
- Nails
- Oral cavity

PJI Consensus

- **No role for routine dental clearance**
  - **Ask about oral disease**

Is routine dental clearance necessary?

- 358 elective TJA
  - With dental clearance
- 218 hip fracture (THA or hemiarthroplasty)
  - No dental clearance
- No statistical difference was found between the two groups in terms of early postoperative infection

Lampley A et al. JOA, 2014

Dental disease

- Risk factors
  - Tobacco use,
  - Poor flossing habits,
  - Hx of tooth extraction,
  - Narcotic use,
  - Lack of a dentist visit within 12 months.

Tokarski AT et al. The Journal of Arthroplasty 2014

PJI Consensus

- **No role for routine urine screening**
- **Ask about urinary symptoms**

PJI Consensus

- Routine urine screening
- 4.58 wound infections in non-prosthetic knee operations
- Cost = $1,500,000 per wound infection prevented

Lawrence VA et al . J Clin Epidemiol. 1989

Patient Optimization

- Systemic or local infection
- **Immunosuppressive state**
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- IV drugs/HIV

Inflammatory Arthritis

- Increases risk of infection/ other complications
- Inherent disease state
- DMARDS/steroids
- Hazard ratio = 1.96

Berbari EF, et al; Clin Infect Dis, 27:1247, 1998

Pulido L et al CORR 2009

Moucha et al JBJS 2011

PJI in Patients with RA

Ann Rheum Dis 2011;70:1810–1814.

Table 3 Baseline patient characteristics

Number of patients with prosthetic joints	nbDMARD (n=659)	Anti-TNF (n=2689)
Exposure time (years)*	1954	12 959
Events	6	41
Incidence prosthetic joint SA/1000 pyrs (95% CI)	3.1 (1.1 to 6.7)	3.2 (2.3 to 4.3)
Adjusted HR (95% CI)	Ref	1.2 (0.4 to 3.4)

*Patients were included in this analysis only if they had a prosthetic joint in situ.
Anti-TNF, anti-tumour necrosis factor; nbDMARD, non-biological disease-modifying antirheumatic drug; pyrs, patient years.

DMARDS and PJI

- Patients on DMARDs have serious infections

Giles JT et al Arthritis Care Res 2006

DMARDS and PJI

2005 BSR

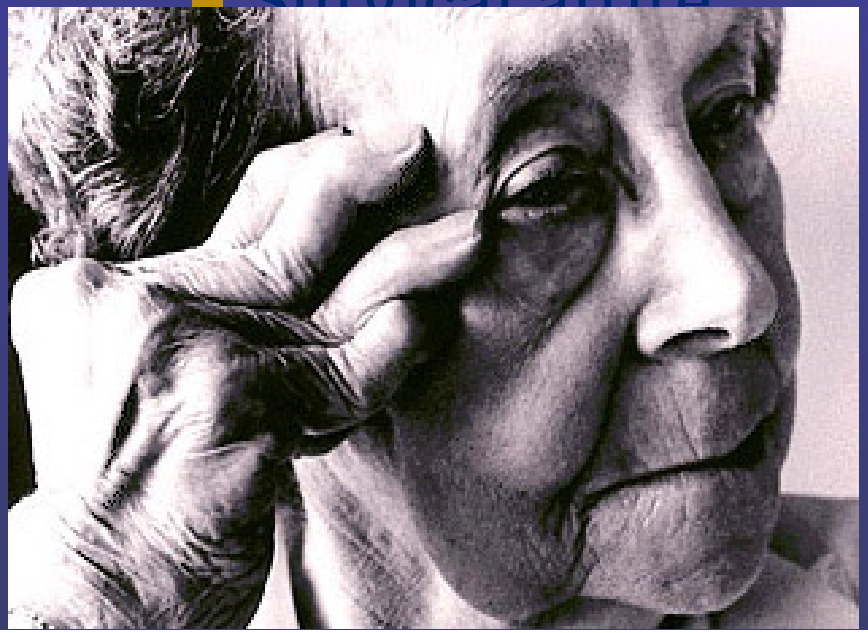
- Biologics stopped 2-4 weeks prior to procedure
- and restarted after wound healing

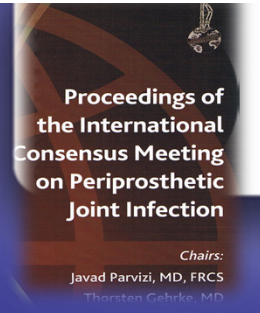
2012 ACR

- Topic not addressed

CDC Guidelines for SSI Prevention

- Arthroplasty
  - Transfusion
  - Immunosuppression → No recommendation
  - Anticoagulation
  - Surgical attire





International Consensus

- **Question: Should disease-modifying agents be stopped prior to elective TJA?**

- **Consensus:** Yes. Disease-modifying agents should be stopped prior to elective TJA; however, the timing of drug discontinuation should be based on specific medication and the individual patient.

- **Delegate Vote:** Agree: 92%, Disagree: 5%, Abstain: 3%.

Medication	Half life	Recommendation
lonsteroidal Anti-inflammatory Drugs (NSAIDs)	2-17 hours	Discontinue therapy within 1 week prior to surgery
Methotrexate	0.7 to 5.8 hours	Discontinue therapy within 1 week prior to surgery Continue therapy 2 weeks after surgery Patients with renal dysfunction, hold 2 weeks prior to surgery
ulfasalazine zathioprine	5 hours 7.6 hours	Discontinue therapy prior to 1 week before surgery
eflunomide	2 weeks	Hold for 6 weeks prior to surgery
lydroxychloroqine	1-2 months	Continue therapy up to and including the day of surgery
iological Response Modifiers		
tanercept nfliximab olimumab ocilizumab batacept dalimumab ertolizumab ituximab	4.3 days 8-10 days 12-14 days 21 days	Hold for at least 1.5 weeks prior to surgery Hold for 3 weeks prior to surgery Hold for 1 month prior to surgery Hold for 2 months prior to surgery
oat agents		
llopurinol olchicine robenecid	1-2 hours 26-32 hours 26-32 hours	Discontinue therapy within 1 week prior to surgery

Patient Optimization

- Systemic or local infection
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- **Uncontrolled Diabetes/hyperglycemia**
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- Obesity
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- Smoking
- Excessive Alcohol consumption
- IV drugs/HIV

Diabetes

- Increases risk of infection
- Other complications

Marchant MH et al JBJS 2009

Jamsen E et al Eur J Interrn Med 2010

Mravoic J Diabets Sci Technol 2011

American Diabets Association 2013

CDC Guidelines for SSI Prevention

- Core Section
  - Antimicrobial prophylaxis
  - Glycemic control → Maintain under 200 mg/dL 10 mmol/L
  - Normothermia
  - Tissue
  - Skin Pr
  - S.aureu on
  - Surgica

International Consensus
- 200 mg/dL
- Contraindication in presence of ulcer

Patient Optimization

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Chronic State

- Renal
- Liver
- Chronic anemia

Olsen M et al JBJS 2008

Greenky M, et al Clin Orthop 2012

HICPAC and CDC Guideline 2013

Viola J et al J Arthroplasty 2015

Anemia

- Increases all time complications
  - Mortality
  - SSI/PJI

Greenky M, et al Clin Orthop 2012

Viola J et al J Arthroplasty 2015

Anemia

Rothman Study

- 13,593 TJA
- 2,580 anemic patients
- Multivariate analysis (OR = 2.11)
- Cardiovascular complication 26.5% vs 11.8%
- Infection 4.5% vs 1.12%
- Mortality 0.2% vs 0.08%

Viola J et al J Arthroplasty 2015

Anemia

- Chronic conditions

  (renal failure, liver disease, etc.)

- Malnurished
- Blood transfusion "immunomodulation"
- Oxygenation/wound healing

Patient Optimization

- Systemic or local infection
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- **Malnutrition**
- Obesity
- Affective disorders
- Smoking
- Excessive Alcohol consumption
- IV drugs/HIV

Malnutrition

- Direct correlation with adverse outcome

Gherini S et al Clin Orthop 1993

Lavernia C et al J Am Coll Nutr 1999

Jaberi F et al Clin Orthop 1999

Malnutrition
Definition

- WHO definition
- Four components of metabolic syndrome:
  - Albumin (normal 3.5-5.0 g/dL)
  - Pre-albumin (normal 15-35 mg/dL)
  - Transferrin (normal 204-360 mg/dL),
  - Lymphocyte count (normal 800-2000/mm^3) [10]

Malnutrition

Rothman Study

- Prospective study
- 2,161 TJA
- Overall incidence 8.5%
- Complication 12 vs 2.9% ($p<0.0001$)
- Hematoma formation, infection, renal, cardiovascular

Huang R et al J Arthroplasty 2013

- Paradoxical malnutrition

Patient Optimization

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Obesity
Issues

- More complications



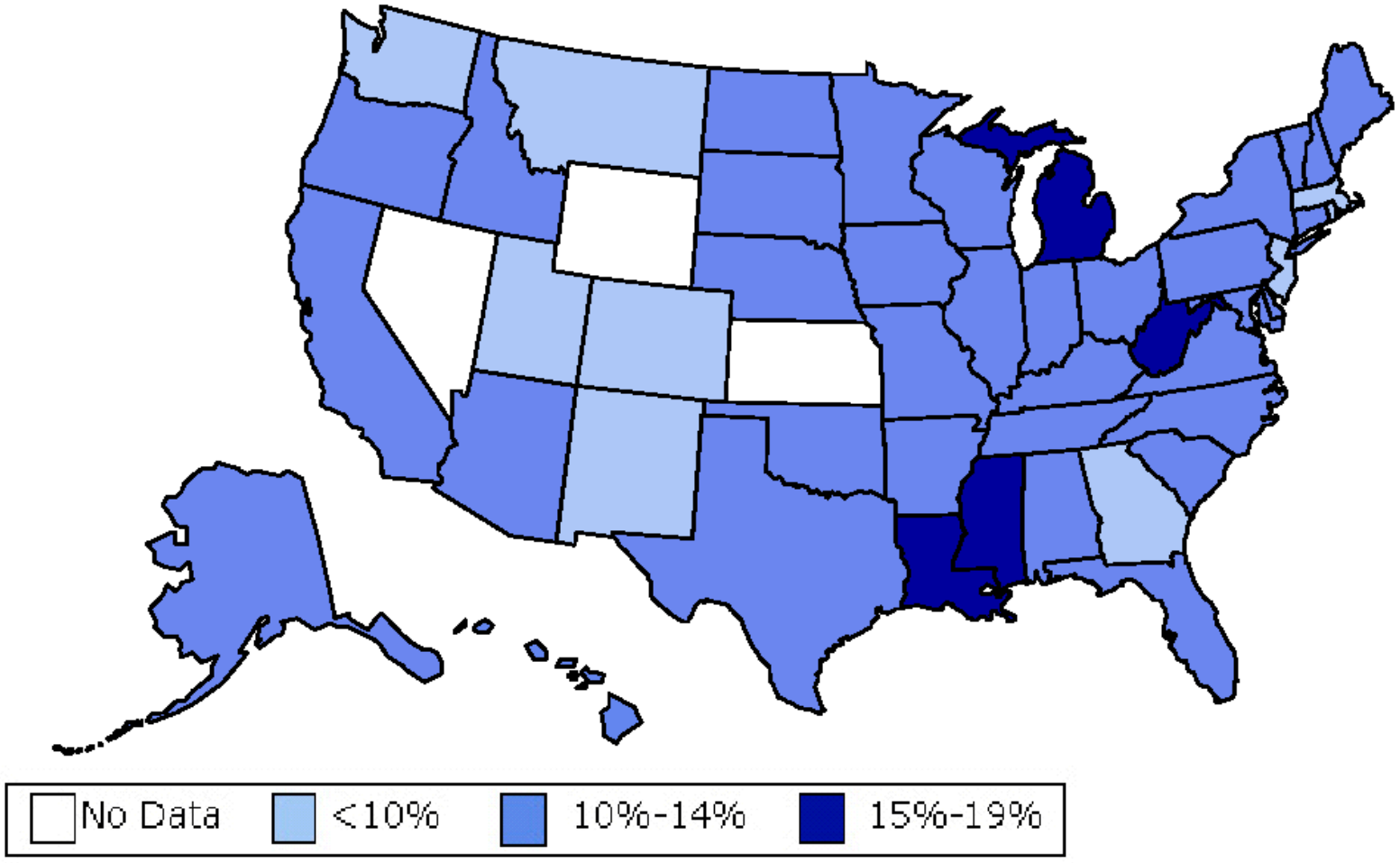



Obesity

Obesity Trends* Among U.S. Adults

BRFSS, 1991

(*BMI ≥30, or ~ 30 lbs overweight for 5'4" woman)



Mokdad et al *JAMA* 2003

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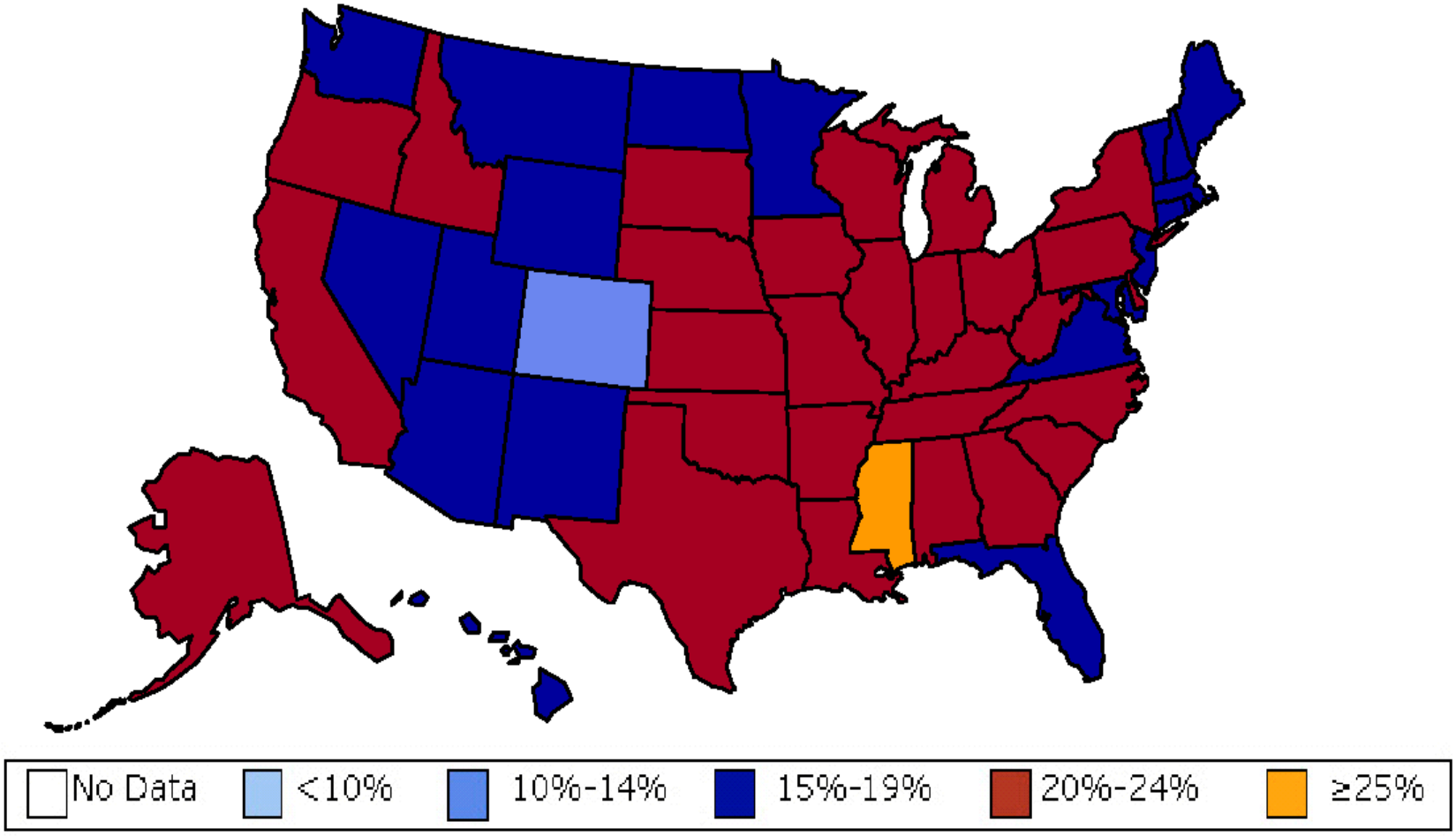


Mokdad et al *JAMA* 2003

Metabolic Syndrome
Definition

- WHO definition
- Four components of metabolic syndrome:
  - Obesity (BMI > 30 kg/m^2)
  - Diabetes
  - Hypertension
  - Dyslipidemia

Metabolic Syndrome

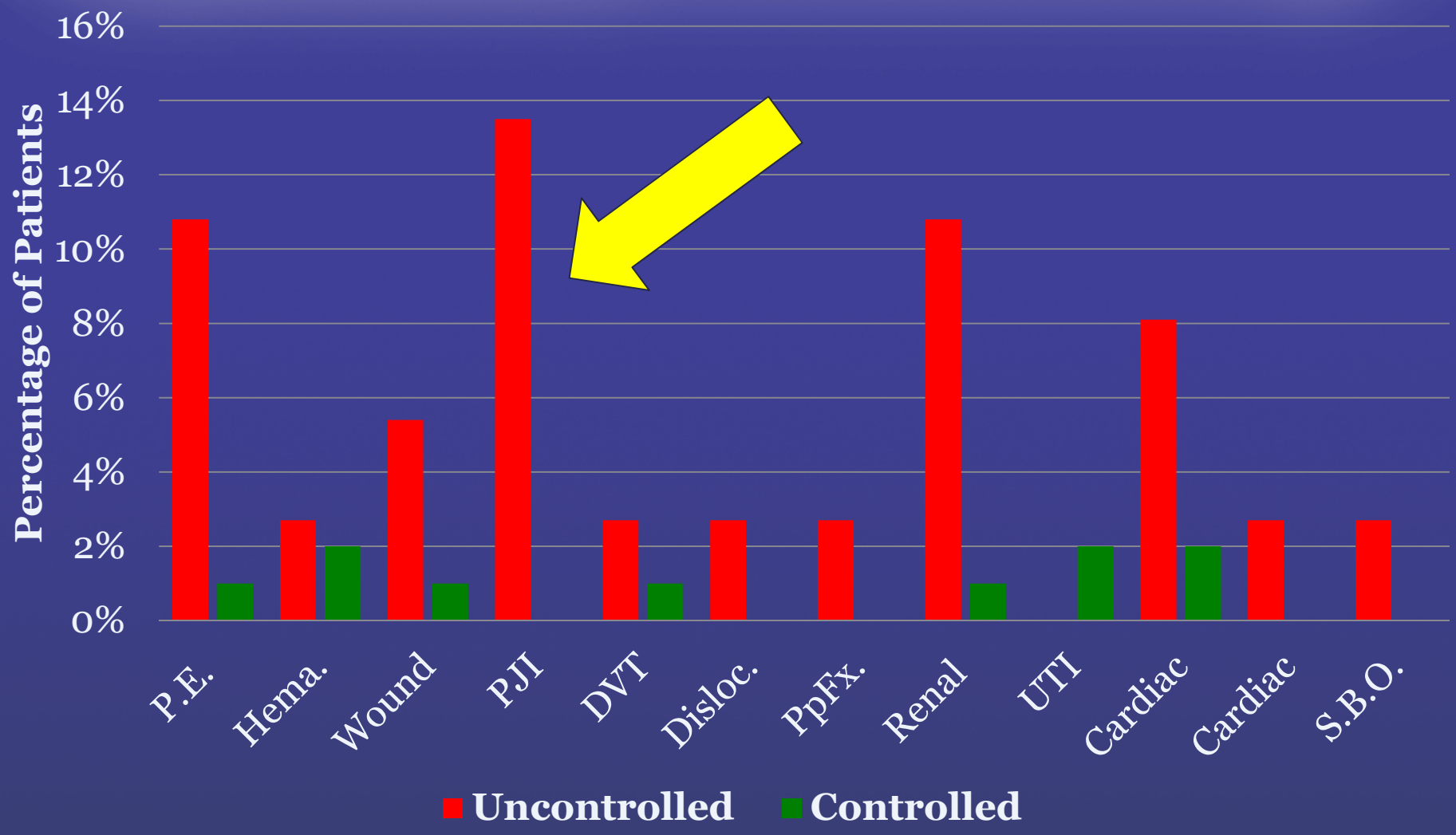
- Metabolic syndrome has been indicated as a risk factor of morbidity following TJA.

  Parvizi J et al. *The Journal of Arthroplasty*. 2008
  Gandhi R et al. *J. Rheumatol*. 2009

- Patients with uncontrolled vs. controlled diabetes are at an increased risk of morbidity and mortality following TJA.

  Marchant MH et al. *J Bone Joint Surg Am*. 2009

Complications
Parvizi et al JOA 2008

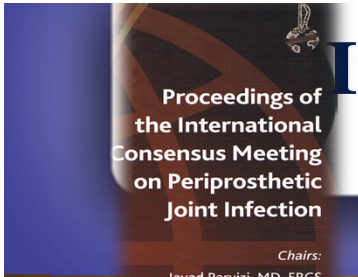


Obesity and TKA
Issues

- Is there a limit?

International Consensus Meeting

Philadelphia, August 2013



No limit determined

Obesity and TJA
AAHKS Workgroup

- Literature Review
- Obesity increases risk for complication
- BMI> 40 Kg/m²

Workgroup of AAHKS *J Arthroplasty* 2013

Philadelphia

- Fattest Population in the Nation

Patient Optimization

- Systemic or local infection
- Immunosuppressive state
- Uncontrolled Diabetes/hyperglycemia
- Chronic disease (anemia, liver, renal, etc.)
- Malnutrition
- **Obesity**
- **Affective disorders**
- Smoking
- Excessive Alcohol consumption
- IV drugs/HIV

Beware of these Patients

- Pain everywhere
- Affective disorder

Parvizi's Case

- 380 lb
- 5' 1"

Affective Disorder

- Increases incidence of infection

Kiecolt-Glaser J Psychosom Res 2002

Leonard BE. Prog Neuro-Psychopharmacology 2001

Bozic K Clin Orthop 2012

Depression and Infection

- Depression affects immune system
- ↑ Inflammatory cytokines (IL-6)
- ↑ ACTH and cortisol

Kiecolt-Glaser J Psychosom Res 2002

Leonard BE. Prog Neuro-Psychopharmacology 2001

Depression and Infection

- Self neglect (hygiene)
- Malnutrition
- Chronic disease

Parvizi J et al JBJS 2003

Rezapoor M J Arthroplasty 2015

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Smoking and Infection

- Smoking increases the risk of infection
- Heavy smoking (>20 per day)
- Cessation reduces the risk
- 6-8 weeks prior to surgery

Singh J Arth Care Res 2011

Khan LA et al Hip Int J Clin Exp Res 2008

Argintar E et al J AAOS 2012

Matar W et al JBJS 2010

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Khan LA et al Hip Int J Clin Exp Res 2008

Argintar E et al J AAOS 2012

Matar W et al JBJS 2010

Smoking increase the risk of PJI

- Metabolic effects are concerning

- **Most studies find smoking to confer an increased risk of infection or wound complications**

Metabolic Effects

- ↓ Reduced cutaneous blood flow
- ↓ Soft-tissue oxygenation and aerobic metabolism

- ↑ Carbon monoxide
- ↑ Platelet aggregation causing micro-thrombi and decreased perfusion
- Nicotine negatively modulates T-cell function

Literature

- Peersman, et al, CORR 2001
  - Retrospective review of 6489 TKA patients, 113 infections (16 superficial, 97 deep)
  - Smoking was a significant risk factor for **infection** (p=0.01)

Literature

- Duchman, et al, JBJS 2015
  - NSQIP database study, 78,191 primary TKA and THA patients
  - 30-day complications
  - Current smokers had a higher rate of **wound complications** (1.8%) compared with former smokers and nonsmokers (1.3% and 1.1%, respectively; $p < 0.001$).

Literature

- Singh, et al, Arthritis Care and Research 2011
  - VASQIP database study, primary THA/TKA patients
  - Current smokers were significantly more likely than never-smokers to have **surgical site infections** (odds ratio [OR] 1.41, 95% CI 1.16-1.72)

Literature

- Moller et al, JBJS(Br) 2003
  - Retrospective review of 825 primary THA/TKA patients
  - Smoking was a significant risk factor for **wound complications** (23% vs 8%, P < 0.001) and an independent predictor of wound complication (OR 3.2, 95% CI 1.8-6, P = 0.001)
  - Wound complications = hematoma, culture + infection, subfascial collection

Our Data (Unpublished)

- Retrospective
- 15,275 patients (17,394 primary TJA)
- Current smokers were significantly more likely than non-smokers to undergo reoperation for infection (1.2% vs. 0.69%, OR 1.8, 95% CI: 1.1-2.9, p=0.02)
- No significant differences were noted between current smokers and former smokers with regards to reoperation for infection (1.24% vs. 0.87%, p=0.33)

Patient Optimization

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- IV drugs/HIV

Alcohol Consumption and Infection

- Excessive alcohol consumption (>40 units/week)
- ↑ Risk of infection/other complications
- Cessation reduces the risk *(Tonnesen H et al BMJ 1999)*
- 4 weeks prior to surgery

Aggarwal VK J Arthroplasty 2014

Azodi OS JBJS-B 2006

Harris AHJ JBJS 2011

Patient Optimization

- Systemic or local infection
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- Malnutrition
- **Obesity**
- **Affective disorders**
- **Smoking**
- **Excessive Alcohol consumption**
- **IV drugs/HIV**

Drug Abuse and HIV

- ↑ Risk of infection

(Parvizi J et al J Arthroplasty 2003)

- HIV-positive (14%)
- Drug abuse (25%)
- Both (40%)

Lehman CR J Arthroplasty 2001

HIV and Infection

- CD4 count > 300
- Low viral count

Aggarwal VK et al J Arthroplasty 2014

- Retroviral therapy positive effect

Enayatollahi et al –Pending publication

Human Immunodeficiency Virus and Total Joint Arthroplasty: The Risk for Infection is Reduced

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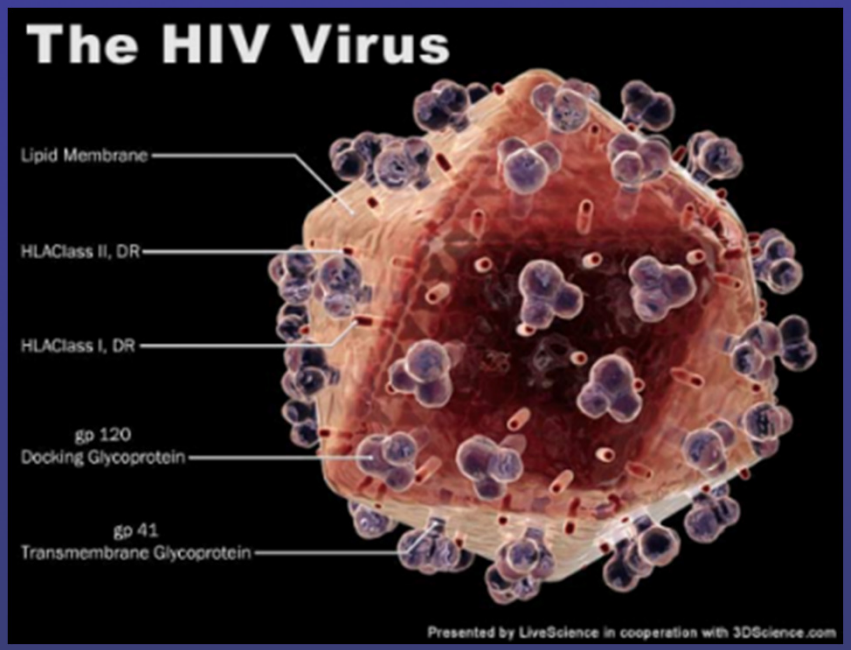
Dermot Murphy[2], Mitchell G. Maltenfort[1]PhD
Javad Parvizi[1] MD FRCS

[1]Rothman Institute at Thomas Jefferson University, Philadelphia, PA
[2] Department of Orthopaedics, University of Limerick, Midlands Regional Hospital, Tullamore, Ireland

HIV and TJA

Epidemiology

- HIV was identified in 1983.
- Its socioeconomic and psychological burden continues to be a great challenge to global health

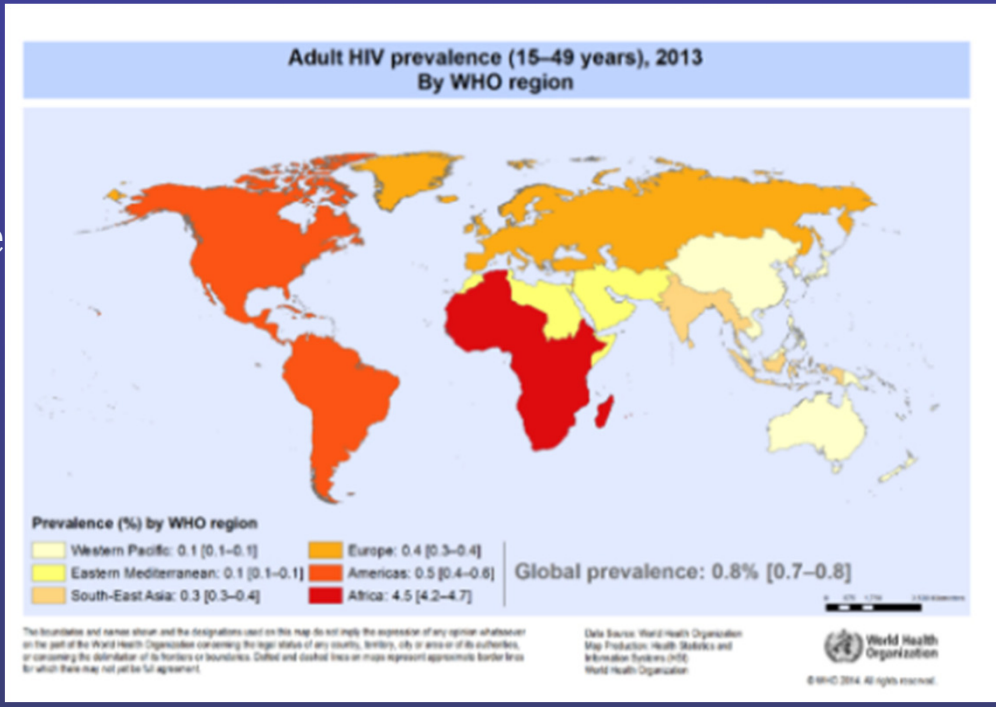


HIV and TJA

Epidemiology

- 39 million people had died of HIV since the beginning of the epidemic
- As of 2013,
  - > 35 million people worldwide
  - >one million in the US

www.who.int/gho/hiv/en/



HIV and TJA

HIV in IRAN

- **As of 2013, Estimated number of people (all ages) living with HIV** 70 000 [47 000-110 000]

http://www.who.int/gho/hiv/en/

- HIV rates have increased by 80% per year for the past decade.

- 75% of those infected are unaware of their status.

Lancet, vol382,2013

HIV and TJA

Why this study?

- The advent of HAART in 1997

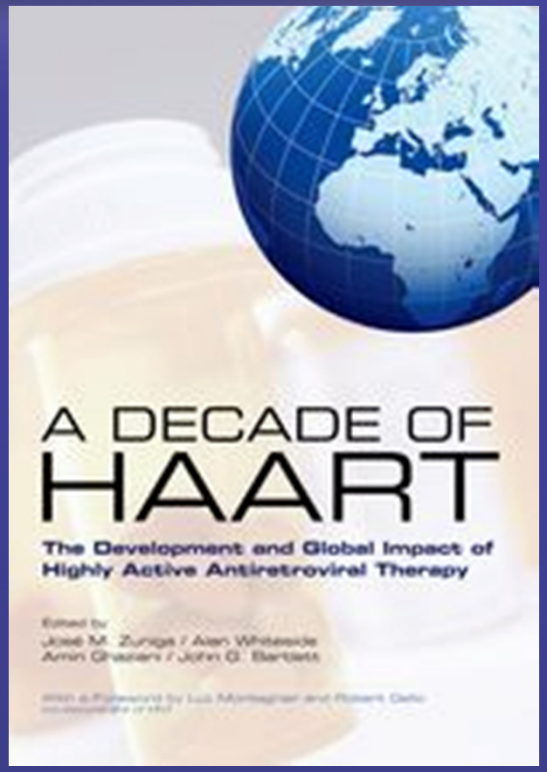
changed the nature of HIV infection

- In US, by 2015 >50% of all

HIV infections will be >50 Y/O Cumminis et al 2014

- Musculoskeletal complications
  - Osteonecrosis of bone 45-fold
  - Osteopenia and osteoporosis → insufficiency fractures

    including femoral neck fractures. Triant et al 2008



HIV and TJA

Why this study?

- The demand for TJA in HIV patients is on the rise
- Treatment strategies and outcomes of TJA in HIV patients is controversial
- PJI rate in earlier studies : 50% Swensen et al 2012
  - Prior to HAART era
  - Comorbidities like hemophilia, IVDU
- PJI rate in recent studies is comparable to HIV-negative population
  Graham et al 2014, Capogna et al 2013
- Hemophilic patients were exposed to HIV through unscreened factor replacements between the years 1979 and 1985 .

HIV and TJA

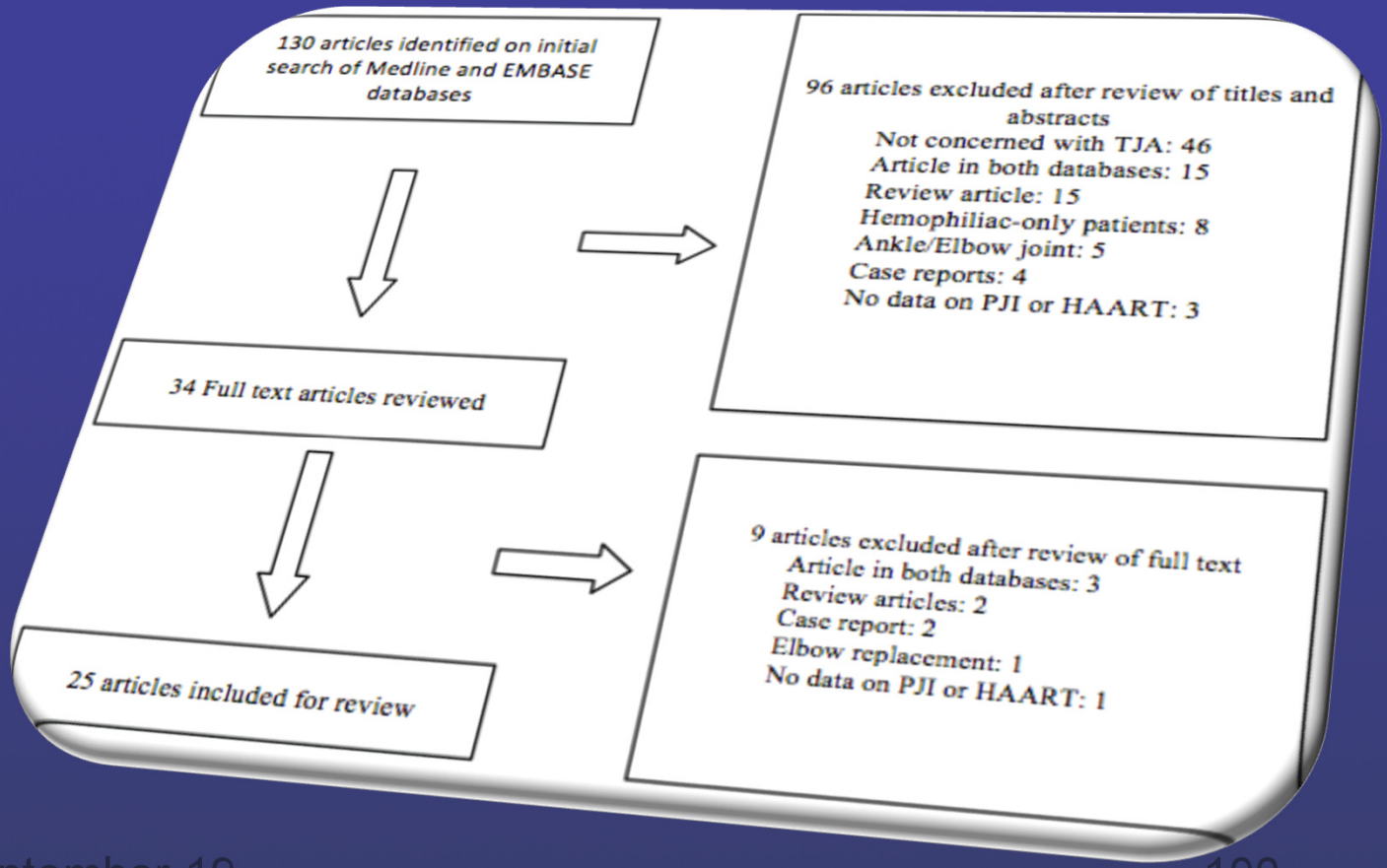
Present study

- Systematic review
- Study hypotheses:
  1. HIV patients without hemophilia have a lower rate of PJI than HIV patients with hemophilia after primary TJA.

  1. The use of HAART may reduce the rate of PJI

HIV and TJA

Our search strategy



Demographics of HIV patients with hemophilia

Study	TJA number	PJI number	patients number	male number	follow up	Mean age (years)
Goddard et al[40] 2010	17	1	16	Unclear	9.2 years (2-23)	43 (25-70)
Habermann et al[22] 2008	33	2	41 in study overall	37	81 months (2-14 years)	46 (34-68)
Hicks et al[16] 2001	91	17	Unclear	Unclear	5.7 years (0.1 – 20.8)	39 (22-60)
Lehman et al[17] 2001	18	3	14	Unclear	62 months (24-152)	33 (25-48)
Norian et al[41] 2002	40	4	29	Unclear	110 months (24-246)	33.7 (+/- 8.2)
Thomason et al[42] 1999	12	4	12 (not useable)	Unclear	7.5 years	Unclear
Powell et al[43] 2005	30	3	19	19	80 months (2-323)	33 (20-61)
Ragni et al[44] 1995	34	8	34 (not useable)	Unclear	Unclear	36 (+/- 3.1)
Rodriguez et al[45] 2011	21	2	21	Unclear	8.5 years (1-13)	36.5 (24-52)
Rodriguez et al[46] 2007	19	1	19	Unclear	7.5 years (1-10)	31 (24-42)
Unger et al[47] 1995	26	0	15	Unclear	6.4 years (1-9)	33 (25-42)
TOTAL	341	45				

Demographics of HIV-infected patients without hemophilia

Study	TJA number	PJI number	patients number	male nubmer	Follow up	Mean age (years)
Capogna et al[21] 2013	69	3	57	33	609 days	44.8
Chokotho et al[31] 2013	15	0	12	Unclear – HIV patients not separated	Unclear	47.1 (not useable)
Cummins et al[4] 2014	8	0	7	3 (Not useable as operations not clear)	25 months (1-68 months)	35 (not useable)
Graham et al[32] 2014	43	0	29	19	3 years, 6 months (5 months – 8 years and 2 months)	47 years, 7 months (21 – 59 + 5 months)
Yoo et al[33] 2010	5	0	3	3	16.6 months (4-37 months)	38.6 (not separated by operation)
Lin et al[25] 2014	22	2	20	20	4.6 years (2-8.6 years)	49 (+/- 17.8)
Lubega et al[18] 2009	18	0	18	Unclear	Unclear	52 (not useable)
Mahoney et al[34] 2005	54	1	40	31	2.3 years (1-7 years)	44.4 (+/- 9.3)
Snir et al[35] 2014	41	1	31	22	33 months (4-116)	49.6 (32-75)
Tornero et al[36] 2012	18	0	13	11	3.3 years (+/- 2.5)	44.3 (+/- 9.1)
Wang et al[37] 2012	8	0	5	Unclear	38.6 months (4-84)	44.5 (36-54)
Falakassa et al[38] 2014	32	0	24	17	14 months (1.5 – 60)	50 (31-74)
Issa et al[39] 2013	44	2	34	23	7 years (4-11 years)	48 (Range 34-80)
Lehman et al[17] 2001	4	0	na	na	Unclear	Unclear
TOTAL	381	9	293	71.3%		

HIV and TJA

Incidence of PJI in HIV patients with and without HAART

Author	Number of PJI/number of TJA on HAART (%)	Number of PJI/number of TJA not on HAART (%)	Total number of PJI/total number of TJAs (%)
Capogna et al.[9]	2/54 (3.7)	1/15 (6.7)	3/69 (4.3)
Chokotho et al.[23]	0/15 (0)	0/0 (0)	0/15 (0)
Cummins et al.[8]	0/8 (0)	0/0 (0)	0/8 (0)
Graham et al.[7]	0/43 (0)	0/0 (0)	0/43 (0)
Issa et al.[46]	2/44 (4.5)	0/0 (0)	2/44 (4.5)
Yoo et al.[40]	0/5 (0)	0/0 (0)	0/5 (0)
Lin et al.[34]	2/21 (9.5)	0/1 (0)	2/22 (9)
Snir et al.[42]	1/41(2.4)	0/0 (0)	1/41 (2.4)
Tornero et al.[43]	0/18 (0)	0/0 (0)	0/18 (0)

HIV and TJA

Statistics

- conventional meta-analysis with an offset of 0.5
- “lme4” package in the R statistical analysis platform (R Foundation for Statistical Computing, Vienna, Austria)

HIV and TJA

Results

	TJA NUMBER	PJI NUMBER	MEAN AGE YEAR	F/U	MALE %
HIV WITHOUT HEMOPHILIA	381	9	46.9	1.5mo-11y	71.3
HIV + HEMOPHILIA	341	45	38.1	1-26 y	>90
	722	P<0.0001			

HIV and TJA

Results

- The rate of PJI in HIV-only group was 2.14% (95% CI 1.02%-4.53%).
- The rate of PJI in the HIV and hemophilia group was 11.88% (95% CI: 7.82%-17.63%).
- This difference was statistically significant ($p<0.0001$) with an odds ratio for hemophilia of 6.17 (95% CI: 2.68-14.23).

HIV and TJA

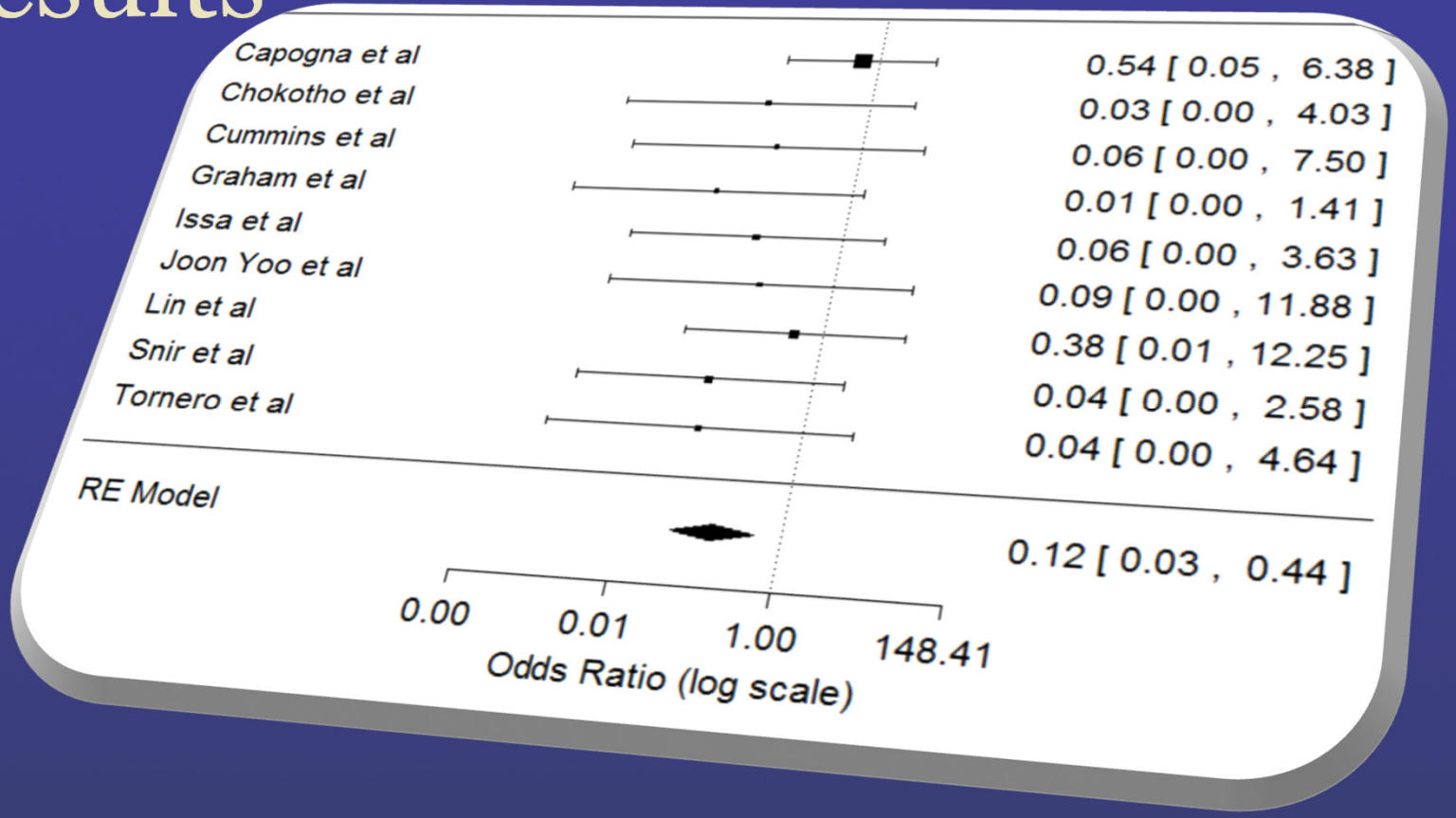
Results

- HAART was associated with fewer infections overall, with an odds ratio of 0.12 (95% CI: 0.03-0.44)

HIV and TJA

Results

Effect of HAART on the rate of PJI



HIV and TJA

Concerns

Post op. morbidity and mortality in HIV patients is significantly related to:

- Malnourishment
- Wight loss
- Renal diseases
- Fluid imbalance

Lin et al 2013

HIV and TJA

Concerns

- Safe thresholds for CD4 and Viral load need to be determined.

- CD4 < 200 in trauma patients is associated with increased complications

Guild et al 2012

HIV and TJA

Limitations

- All studies were retrospective
- Demographics were insufficient
- Inconsistent patient-level data on CD4, viral load, and other comorbidities

HIV and TJA

Conclusion

- Rates of PJI after primary TJA in patients with HIV-only are not as high as those in patients with both HIV and hemophilia
- HAART and optimization of underlying comorbidities has appeared to lower the rate of PJI

HIV and TJA

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Poster ID #p052

HIV and TJA

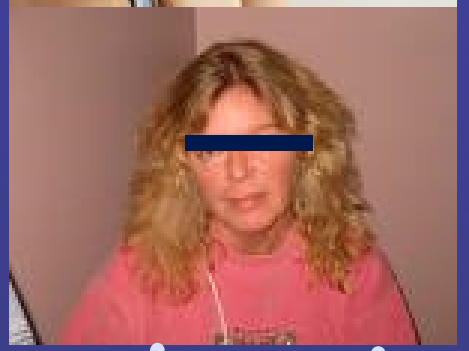
THANK YOU

Human Immunodeficiency Virus and Total Joint Arthroplasty: The Risk for Infection is Reduced

Enayatollahi MA, Murphy D, Maltenfort MG, Parvizi J. J Arthroplasty 2016

Beware of these Patients

- Pain everywhere
- Affective disorders!!
- Numerous previous operations!!



Do Not Operate on

- 40 year old comes with parents
- More than 5 allergies including allergy to water
- Sun glasses in the office
- Bow-tie

Jefferson