

*North Carolina Orthopaedic Association*

*2015 Annual Meeting*

*Opening Session - Saturday, October 10*



**October 9-11, 2015 • Kiawah Island Golf Resort**

Kiawah Island, South Carolina

This continuing medical education activity is jointly provided by the NCOA  
and the Southern Regional Area Health Education Center

# How will the Financial Incentive to Provide THA and TKA for High-risk Patients Change with Flat-rate Bundled Payments?

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R. Carter Clement, MD, MBA; Michael M. Kheir, MD; Adrienne E. Soo, BS; Peter B. Derman, MD, MBA; David N. Flynn, MD, MBA; L. Scott Levin, MD, FACS; Lee A. Fleisher, MD



THE UNIVERSITY  
*of* NORTH CAROLINA  
*at* CHAPEL HILL



# Background

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- CMS experimenting with “Bundling”
- Recently proposed mandatory bundled payments in TJA beginning Jan 2016
- Meant to change incentives created by “Fee for service” payments
- Risk of “Cherry picking”

# Background

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- Need for well-designed risk stratification
- Still, “flat rate” bundling programs predominate
- Currently, CMS bases payments on MS-DRG Weights
- Extra compensation for “MCC” modifiers

# Study Questions

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What is the financial impact of major medical complications among Medicare patients undergoing total hip arthroplasty (THA), both currently and with “flat-rate” bundled payments?

Are certain patient characteristics predictive of major complications?

# Methods

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- THA & TKA examined, THA data only here
- Retrospective, 553 primary elective THAs in Medicare-eligible patients (age 65+) at an urban academic center, 2 year period
- Contribution Margin: reimbursement less variable cost  
(represents hospital's short-term incentives)
- Profit: reimbursement less total cost  
(represents long-term incentives)

# Methods

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- Patients with an MCC were compared to those without on basis of profit & CM
  - For current reimbursement levels
  - With flat-rate bundled payments
- Also compared on basis of clinical & demographic factors

# Results: Contribution Margin

	No MCC (n=507)	+ MCC (n=46)	P-value
Variable cost	\$9,496	\$14,590	<0.01
Reimbursement	\$16,051	\$26,183	<0.01
Contribution margin	\$6,997	\$10,317	0.02
Current margin relative to patients without major complications	-	\$3,319	0.02
Margin with flat-rate bundled payments relative to patients without major complications	-	-\$5,094	<0.01
Change in Margin with flat-rate bundled payments	-	-\$8,413	<0.01

# Results: Profit

	No MCC (n=507)	+ MCC (n=46)	P-value
Total cost	\$17,629	\$28,890	<0.01
Reimbursement	\$16,051	\$26,183	<0.01
Profit	-\$1,212	-\$4,423	<0.01
Current profit relative to patients without major complications	-	-\$3,211	<0.01
Profit with flat-rate bundled payments relative to patients without major complications	-	-\$11,261	<0.01
Change in Profit with flat-rate bundled payments	-	-\$8,050	<0.01

# Results: Patient Characteristics

	+ MCC	No MCC	P-Value
Age (years)	76.2	73.8	<b>0.02</b>
Gender (Male)	36.3%	43.5%	0.39
ASA ( $\geq 3$ )	69.6%	38.5%	<b>&lt; 0.01</b>
BMI	30.3	28.8	0.12
LOS (days)	7.7	4.1	<b>&lt; 0.01</b>
Race			
White	63.0%	76.5%	<b>0.02</b>
Black	28.3%	19.1%	0.16
Asian	2.2%	0.4%	0.12
Native			
American	0.0%	0.4%	0.67
Other	6.5%	1.6%	-
Unknown	0.0%	2.0%	-

## Results: TKA

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A very similar pattern of results was found among TKA patients, but the procedure was profitable for hospitals with and without complications  
(\$1,344 & \$1,562, respectively)

Again, ASA grade was an important predictor of major complications

# Conclusions

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- TJA complications increase hospital costs
- Current Medicare reimbursement is higher for patients with major complications
  - Covers variable, not fixed costs for THA
  - Covers TKA costs well
- Flat-rate bundled payments would create a much larger incentive against these patients
- Risk factors for major complications can be identified, so “cherry picking” is a real threat

# Conclusions

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CMS and other payers should design rigorous risk adjustment methodologies before rolling out bundled payments to prevent barriers to care for high-risk patients

# References

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1. Belmont PJ, Goodman GP, Waterman BR, Bader JO, Schoenfeld AJ. Thirty-day postoperative complications and mortality following total knee arthroplasty: incidence and risk factors among a national sample of 15,321 patients. *J. Bone Joint Surg. Am.* 2014;96:20–26.
2. Bosco JA, Karkenny AJ, Hutzler LH, Slover JD, Iorio R. Cost burden of 30-day readmissions following Medicare total hip and knee arthroplasty. *J. Arthroplasty.* 2014;29:903–905.
3. Bozic KJ, Chiu VW, Takemoto SK, Greenbaum JN, Smith TM, Jerabek SA, Berry DJ. The validity of using administrative claims data in total joint arthroplasty outcomes research. *J. Arthroplasty.* 2010;25:58–61.
4. Bozic KJ, Ward L, Vail TP, Maze M. Bundled payments in total joint arthroplasty: targeting opportunities for quality improvement and cost reduction. *Clin. Orthop.* 2014;472:188–193.
5. Center for Medicare & Medicaid Innovation. Bundled Payments for Care Improvement (BPCI) Initiative: General Information. Available at: <http://innovation.cms.gov/initiatives/bundled-payments/> [Accessed November 28, 2014].
6. Center for Medicare & Medicaid Innovation. Medicare Acute Care Episode (ACE) Demonstration. Available at: <http://innovation.cms.gov/initiatives/ACE/> [Accessed November 28, 2014].

# References

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7. Center for Medicare & Medicaid Innovation. Bundled Payments for Care Improvement Request for Applications. Available at: <http://innovation.cms.gov/Files/x/Bundled-Payments-for-Care-Improvement-Request-for-Applications.pdf> [Accessed November 28, 2014].
8. Cutler DM, Ghosh K. The potential for cost savings through bundled episode payments. *N. Engl. J. Med.* 2012;366:1075–1077.
9. Froimson MI, Rana A, White RE, Marshall A, Schutzer SF, Healy WL, Naas P, Daubert G, Iorio R, Parsley B. Bundled payments for care improvement initiative: the next evolution of payment formulations: AAHKS Bundled Payment Task Force. *J. Arthroplasty.* 2013;28:157–165.
10. Garland A, Rolfson O, Garellick G, Kärrholm J, Hailer NP. Early postoperative mortality after simultaneous or staged bilateral primary total hip arthroplasty: an observational register study from the Swedish Hip Arthroplasty Register. *BMC Musculoskelet. Disord.* 2015;16:77.
11. Hansen E, Bozic KJ. Hospital profitability on the decline for joint replacement service lines. *Orthop. Today.*
12. Healy WL, Rana AJ, Iorio R. Hospital Economics of Primary Total Knee Arthroplasty at a Teaching Hospital. *Clin. Orthop.* 2011;469:87–94.

**Thank You**

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University of California  
San Francisco



How will we treat knee arthritis in the future?  
*payers, platelets, partials, and PRO's*

Thomas Parker Vail, MD  
James L. Young Professor and Chairman  
Department of Orthopaedic Surgery  
University of California, San Francisco

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Disclosure

The Department of Orthopaedic Surgery and faculty at UCSF receive research and educational support from private, public, and non-profit entities that includes patients, payers, and technology providers.

Dr. Vail is a consultant for DePuy (consulting fees and royalties). He is a Director on the ABOs, and the Boards of AAHKS, the Hip Society, and the Knee Society.

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# Change.

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We are in a time of tremendous change and evolution with unparalleled opportunities to reshape how we **deliver** care for patients, **define** our field, and incorporate **discovery** into practice.

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# Threats.

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## Focus on cost

Total direct **expenditures** for musculoskeletal conditions have been estimated to be over **one trillion** dollars annually, or around **7% of the GDP**.

The average hospital **cost** for knee replacement surgery is \$35-45,000. 500-600,000 TJA are performed annually.

**Cost: \$17.5 Billion!**

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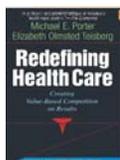
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Evidence-based decisions: "Pay for quality, not quantity. Value. Transparency."



Value = quality/cost

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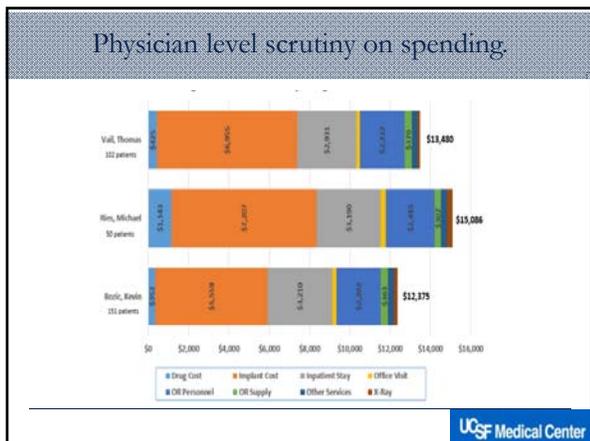
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### Hospital/physician level scrutiny of performance

Expert • Independent • Nonprofit  
**ConsumerReports.org**

**Consumer Reports rates hospitals on infections: 9 highest, 12 lowest performing hospitals**

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### Payer strategies to shift risk to provider

- Payers (GAO report) recognize that financial incentives could induce some physicians to oversupply overvalued services and undersupply undervalued services
- Population management through accountable care (ACO)
- Episode of care management through bundles (bundled care)

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H.R. 2, the “Medicare Access and CHIP Reauthorization Act of 2015” (MACRA)

Performance assessment of eligible professionals:

- Quality (measures developed through notice, registries, global and population based measures)
- Resource use
- Clinical practice improvement (access, population management, safety, alternate payment participation)
- Meaningful use (EHR)

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H.R. 2, the “Medicare Access and CHIP Reauthorization Act of 2015” (MACRA)

Performance scoring and payment adjustments:

- Negative Adjustments: The maximum negative adjustment will be as follows: 4% in 2019, 5% in 2020, 7% in 2021, and 9% in 2022 and subsequent years.
- Zero adjustments
- Positive adjustments: balanced with negative.
- Additional incentives: linear increase

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H.R. 2, the “Medicare Access and CHIP Reauthorization Act of 2015” (MACRA)

5% bonus on Medicare disbursements through alternative payment models (APM) such as ACO and bundled care

- 2019 and 2020, at least 25% of the Part B payments
- 2021 and 2022, at least 50% of Part B payments
- 2023 and each subsequent year at least 75% of Part B

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**PROPOSED RULE: MEDICARE PROGRAM; COMPREHENSIVE CARE FOR JOINT REPLACEMENT PAYMENT MODEL FOR ACUTE CARE HOSPITALS FURNISHING LOWER EXTREMITY JOINT REPLACEMENT SERVICES [CMS-5516-P]**

**SUMMARY**

On July 9, 2015, the Centers for Medicare & Medicaid Services (CMS) posted a proposed rule to implement a new Medicare Part A and B payment model, called the Comprehensive Care for Joint Replacement (CCJR) model, as a demonstration project under section 1115A of the Social Security Act. Under the model, acute care hospitals in certain selected geographic areas would receive retrospective bundled payments for episodes of care for lower extremity joint replacement or reattachment of a lower extremity. All related care within 90 days of hospital discharge from the joint replacement procedures would be included in the episode of care. Participation would be mandatory for hospitals selected to be in the demonstration.

The rule was published in the July 14<sup>th</sup> issue of the *Federal Register*. The 60-day public comment period ends at close of business on September 8, 2015. If finalized as proposed, the policies in the proposed rule would take effect on January 1, 2016.

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**Current *tension* in orthopaedic practice**

Common	Controversial
Indications for surgery “straight-forward”	Huge regional variation
Under 50: fastest growing segment	Under 50: least favorable outcomes
Personalized	Standardized
High cost	High value
Highly developed marketing	Poorly developed outcome reporting
More people insured	More people underinsured

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**Take action?**

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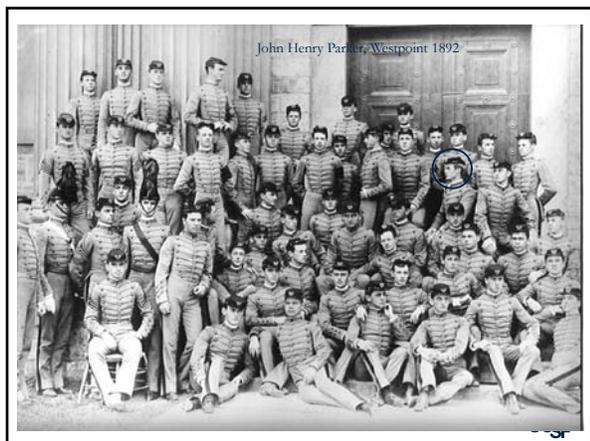
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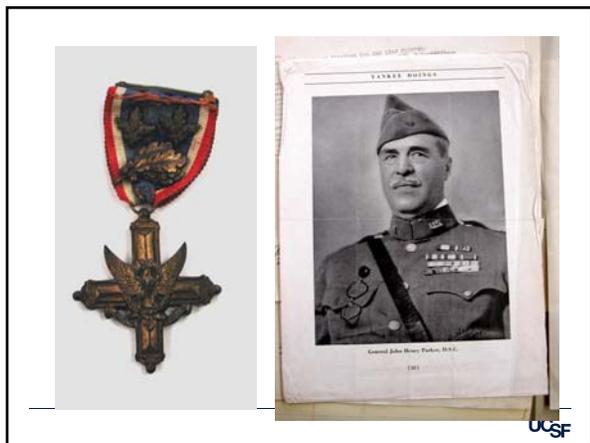
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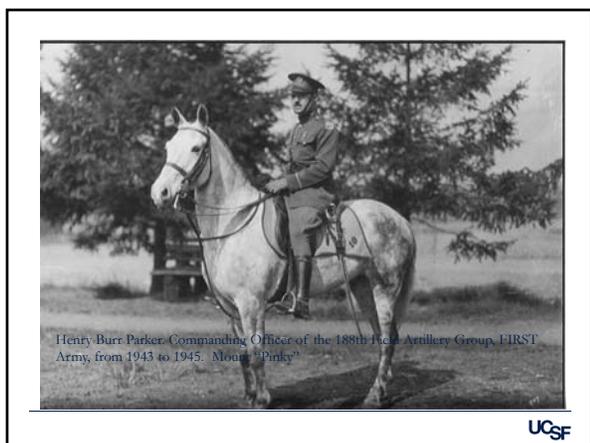
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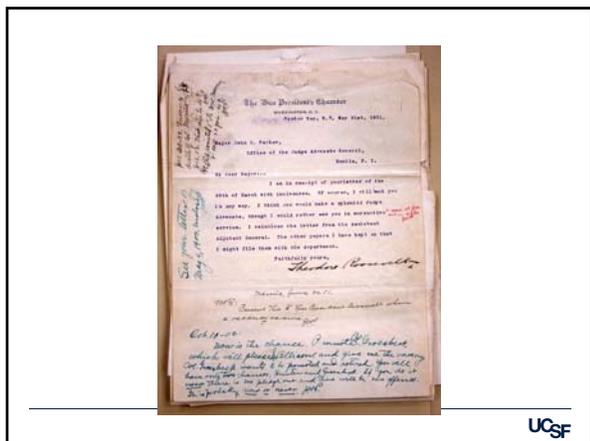
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There is an ethical imperative to pursue the highest quality

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There is a financial imperative for reform

Musculoskeletal disorders and diseases are **the most common “health condition” in the United States**, the **leading cause of disability**, affecting **all age groups** including children and adults, and accounting for more than **half of all chronic conditions in people over 50 years**.

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We must be aware of what is going on around us in order to succeed in our mission



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*What made us successful yesterday will not necessarily be the right formula for tomorrow.*



*Beyond Basketball, Mike Krzyzewski, Warner Business Books, 2006*

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**Advocate.**

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## The Direct and Indirect Costs to Society of Treatment for End-Stage Knee Osteoarthritis

David Ruiz Jr, MA, Lane Koenig, PhD, Timothy M. Dell, MS, Paul Gallo, BS, Alexa Naraiak, BA, Javad Parsvizi, MD, and John Toogoo, MD  
*Investigation performed at KNG Health Consulting, LLC, Rockville, Maryland*

**Conclusions:** The estimated lifetime societal savings from the more than 600,000 total knee arthroplasties performed in the U.S. in 2009 were estimated to be approximately \$12 billion. These societal savings primarily accrued to patients and employers. The study demonstrates the importance of a societal perspective when considering the costs and benefits of total knee arthroplasty and policies that will affect access to this procedure.

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### Outcome assessment without risk adjustment pushes aside the most vulnerable patients.







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**DOCUMENTATION OF CLINICAL RISK FACTORS FOR LOWER EXTREMITY AMPUTABILITY**

Patient's Name \_\_\_\_\_ Date of Birth \_\_\_\_\_

I hereby document that I am planning to perform a lower extremity total replacement on the above patient and that this patient has the following clinical risk factors:

Clinical Risk Factor	Code
<input type="checkbox"/> Morbid obesity BMI >=40	278.01
<input type="checkbox"/> Smoking	302.1
<input type="checkbox"/> Chronic anticoagulation	V78.01
<input type="checkbox"/> Chronic alcohol use	303.51
<input type="checkbox"/> Workless compensation claim	V79.3
<input type="checkbox"/> Previous osteomyelitis infection	711.09
<input type="checkbox"/> Compromised leg dexterity	713.83
<input type="checkbox"/> Ankle knee deformity <17 degrees	734.6
<input type="checkbox"/> Previous ORIF leg	71.131
<input type="checkbox"/> Previous ORIF knee	71.124
<input type="checkbox"/> Depression/psychiatric disease	300.9

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**Define practice.**

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**AAOS**  
AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS

**SURGICAL MANAGEMENT OF  
OSTEOARTHRITIS OF THE KNEE**

**EVIDENCE-BASED CLINICAL PRACTICE  
GUIDELINE**

*Public Comment Draft*

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**AAOS Performance Measures Committee  
(Council on Research and Quality)**

Evidence\*  
↓  
Clinical practice guideline (CPG)  
↓  
Appropriate use criteria (AUC)  
↓  
Clinical performance measures (outcome based)  
↓  
Performance assessment

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AAOS Performance Measures Committee  
(Council on Research and Quality)

- Assessing function and pain in patients with osteoarthritis
- The management of hip fractures in the elderly

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The evidence basis for defining quality is  
disappointingly sparse

- Evidence is poor (DVT, dental prophylaxis, HA injections)
- Recommendations are controversial (HA injections)
- Unintended consequences may be dangerous (efficiency measures?).

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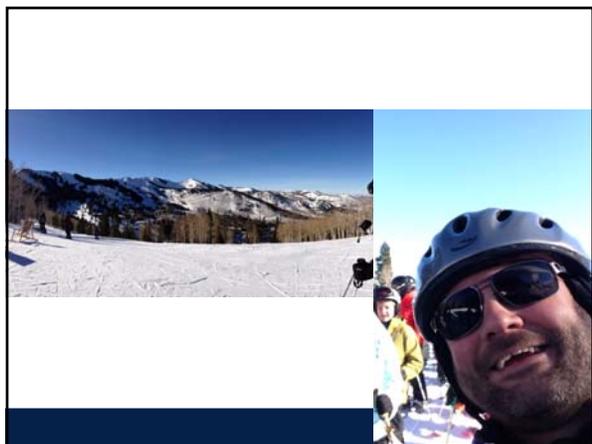
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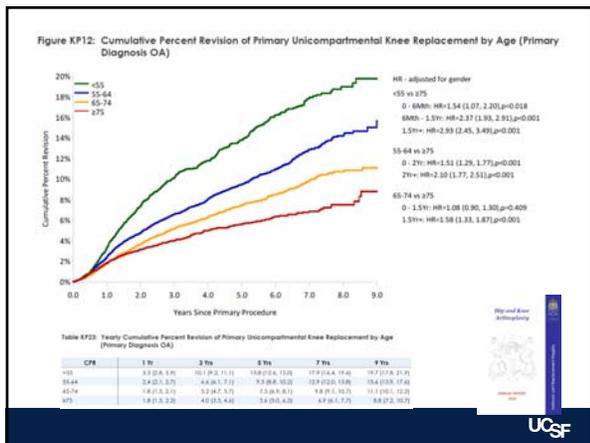
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**Does the evidence support change?**

*“Be careful about reading health books. You may die of a misprint.”*

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**Measure results.**

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*What is the best measure of performance in orthopaedic surgery?*



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The value-based use of “quality”

“The value-based use of the term quality refers **strictly to patient-centered health outcomes and does not include measures of processes** or patients’ satisfaction with services that do not directly impact their health.”

Improving Value in Musculoskeletal Care Delivery  
AOA Critical Issues  
David H. Wei, MD, MS, Gillian A. Hawker, MD, MSc, David S. Jeyasevar, MD, MBA, and Kevin J. Boicic, MD, MBA

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*"When you get a hip replacement, it's not how quick did you get out of bed, but how soon did you get back to playing golf. And unless we know you're a golfer, we don't really know how to then measure the outcome..."*

— Dr. David Feinberg, CEO, UCLA Health System

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### What is a quality measure?

National Quality Measure Clearinghouse [www.qualitymeasures.ahrq.gov](http://www.qualitymeasures.ahrq.gov)

Access – timely and appropriate care

Outcome – health state of a patient resulting from health care

Patient experience – aggregate reports of patients

Process – health care service provided to or on behalf of a patient

Structure – capacity to provide care (nurse/patient ratio)

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### What is a quality measure?

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Structure – capacity to provide care (nurse/patient ratio)

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*Patient reported outcome (PRO)*

e117(1)

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**Comparison of Patient-Reported and Clinician-Assessed Outcomes Following Total Knee Arthroplasty**

Gaurav Khanna, MD, Jasvinder A. Singh, MD, MPH, Donald L. Pomeroy, MD, and Terence J. Gioe, MD  
Investigation performed at the Minneapolis Veterans Affairs Medical Center, Minneapolis, Minnesota, and the University of Louisville Medical College, Louisville, Kentucky




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**ORIGINAL INVESTIGATION**

ONLINE FIRST

**The Cost of Satisfaction**

*A National Study of Patient Satisfaction, Health Care Utilization, Expenditures, and Mortality*

Joshua J. Fenton, MD, MPH; Anthony F. Jerant, MD; Klea D. Bertakis, MD, MPH; Peter Franks, MD



**Conclusion:** In a nationally representative sample, higher patient satisfaction was associated with less emergency department use but with greater inpatient use, higher overall health care and prescription drug expenditures, and increased mortality.

ARCH INTERN MED/VOL 172 (NO. 5), MAR 12, 2012 WWW.ARCHINTERNMED.COM  
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**Innovate.**




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**Surgical Warranties to Improve Quality and Efficiency in Elective Colon Surgery**

Donald E. Fry, MD; Michael Pine, MD, MBA; Barbara L. Jones, MA; Roger J. Meimban, PhD

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**Personalize and standardize.**

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TKA: innovation that has improved recovery and ROM in my patients

1. PAIN CONTROL (hemostasis and pre-emptive pain management) - early
2. Early mobilization without weight bearing restrictions - early
3. Balancing the knee – long term




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### Strategies to balance the knee

Measured resection	Gap balancing
<ul style="list-style-type: none"> <li>• Common in primary TKA</li> </ul>	<ul style="list-style-type: none"> <li>• Common in primary TKA</li> </ul>
<ul style="list-style-type: none"> <li>• Ligaments balanced after bone cuts</li> </ul>	<ul style="list-style-type: none"> <li>• Ligaments balanced before bone cuts</li> </ul>
<ul style="list-style-type: none"> <li>• Requires intact skeletal references</li> </ul>	<ul style="list-style-type: none"> <li>• Requires awareness of joint line</li> </ul>
<ul style="list-style-type: none"> <li>• Not ideal for cases of bone loss</li> </ul>	<ul style="list-style-type: none"> <li>• Can be used in cases of bone loss</li> </ul>




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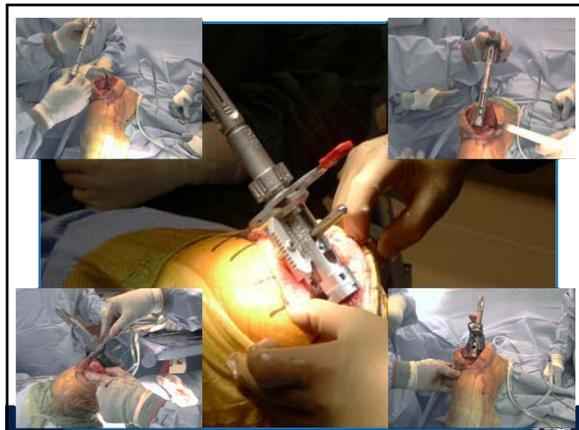
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 **NIH Public Access**  
**Author Manuscript**  
*Cancer Epidemiol Biomarkers Prev*: Author manuscript; available in PMC 2014 May 15.  
 Published in final edited form as:  
*Cancer Epidemiol Biomarkers Prev*. 2013 May; 22(5): 972-983. doi:10.1158/1055-9965.E

**Identification of PTHrP(12-48) as a plasma biomarker associated with breast cancer bone metastasis**

Charity L. Washam<sup>1,2,8</sup>, Stephanie D. Byrum<sup>1,3,8</sup>, Kim Leitzel<sup>4</sup>, Suhail M. Ali<sup>5</sup>, A. Tackett<sup>2</sup>, Dana Gaddy<sup>1,6</sup>, Suzanne E. Sundermann<sup>1</sup>, Allan Lipton<sup>4</sup>, and Larry J. Gostout<sup>7</sup>

<sup>1</sup>Department of Orthopaedic Surgery, Center for Orthopaedic Research, University of Arkansas for Medical Sciences, Little Rock, AR  
<sup>2</sup>Department of Bioinformatics, University of Arkansas at Little Rock, Little Rock, AR  
<sup>3</sup>Department of Biochemistry and Molecular Biology, University of Arkansas for Medical Sciences, Little Rock, AR  
<sup>4</sup>Penn State/Hershey Medical Center, Hershey, PA; Penn State/Hershey Med. Center, Hershey, PA  
<sup>5</sup>VAMC, Lebanon, PA, Hershey, PA; Penn State/Hershey Medical Center, Hershey, PA  
<sup>6</sup>Department of Physiology and Biophysics, University of Arkansas for Medical Sciences, Little Rock, AR

NIH-PA Author Manuscript

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**Research  
priorities.**



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 **Orthopaedic Research Society**

Board of Specialty Societies Workshop  
 ORS 2016 Annual Meeting  
 March 5-8, 2016 (Saturday - Tuesday) - Disney's Coronado Springs Resort

Total knee arthroplasty is a both a very common and fast growing part of orthopaedic practice. Due to the associated costs and frequency of total knee procedures in the United States, there is a high priority placed upon optimization of outcome, minimizing complications, and assessing performance. **Three areas of focus have been identified as having both a clinical priority and high degree of relevance to orthopaedic research: performance measures and outcome, peri-prosthetic infection, and optimization of surgical technique.**

60 Presentation Title and/or Sub Brand Name Here 9/20/2015 

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# Education priorities.



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## Alignment in education: residency training, certification, and practice

- Incorporate assessment of outcomes/skills
- Avoid "add on" incremental work
- Should be objective, reflective and non-punitive
- Actively encourage surgeon involvement
- Include hospital system care improvement



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## Knee Arthritis – a case study in future practice

- Accept/understand change
- Acknowledge threats
- Take action
- Define practice
- Measure results
- Innovate (measure results again!)
- Prioritize research
- Align education



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UCSF

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San Francisco

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