

# Outpatient total knee arthroplasty is associated with higher risk of perioperative complications

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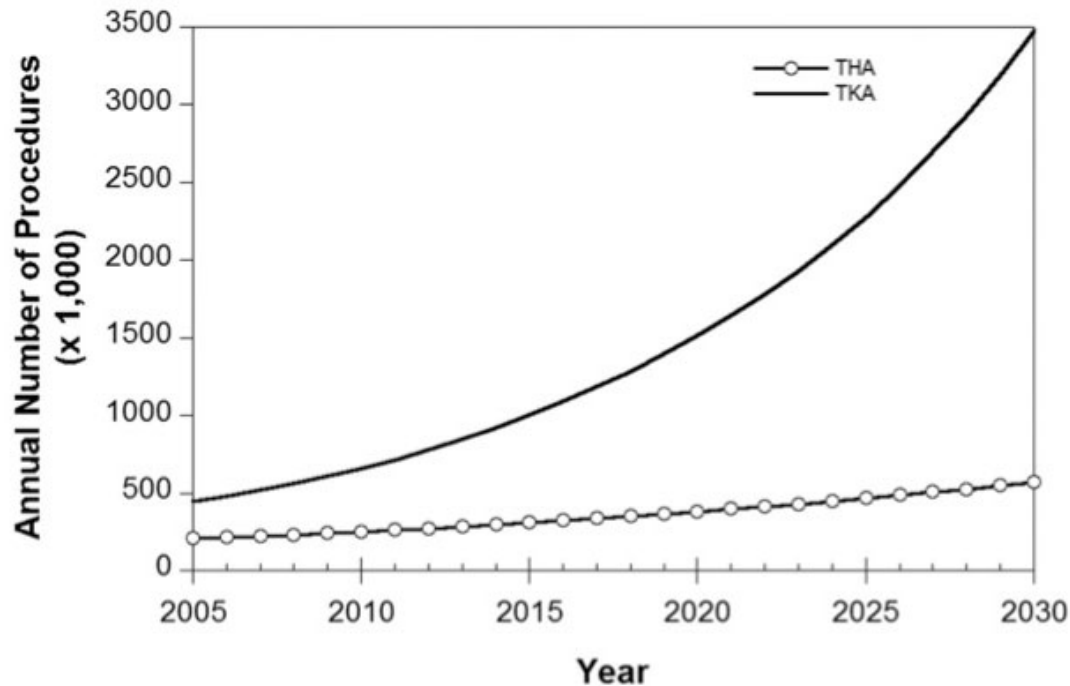
# Disclosures

I have no relevant disclosures relevant to the presentation



# Outpatient total knee arthroplasty

- Nationwide TKA volume is expected to increase 673% from 2010 to 2030<sup>1</sup>

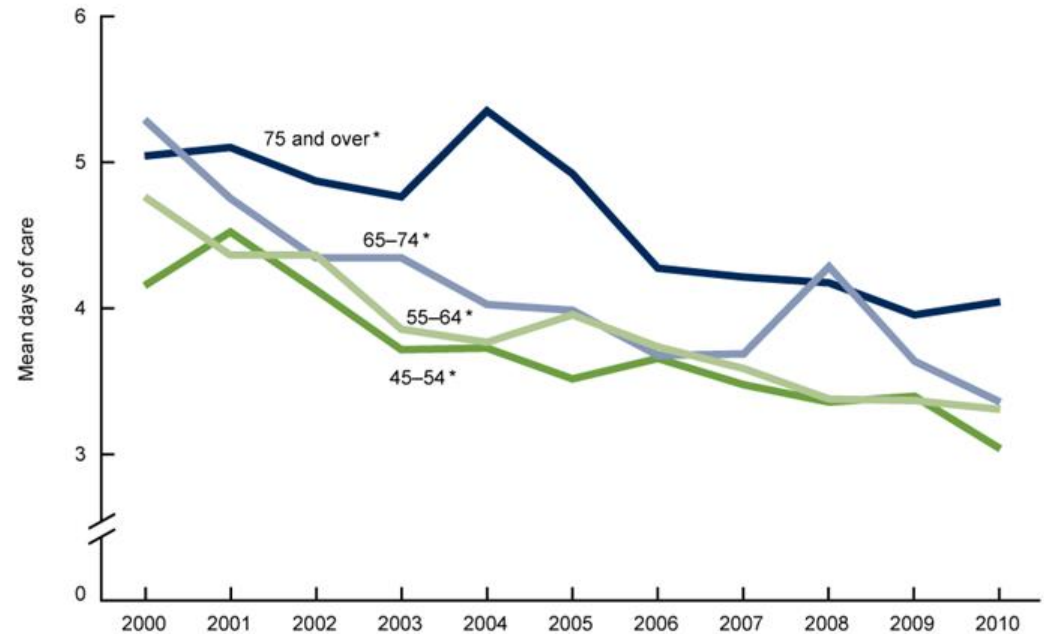


Kurtz S et al. *J Bone Joint Surg Am* 2007;89:780-785



# Outpatient total knee arthroplasty

- Enabled by decreasing hospital length of stay<sup>1</sup>
  - Careful patient selection
  - Structured perioperative management
  - Improved analgesia
- Cost savings<sup>2</sup>
  - \$4,000-\$8,000 per 90-day episode of care



# Outpatient total knee arthroplasty

- Body of literature on outpatient TKA is growing
  - Case series from single high-volume centers<sup>1,2</sup>
    - Uniformly excellent outcomes
    - No complications attributable to early discharge
  - Data from the Medicare and ACS NSQIP databases<sup>3,4,5</sup>
    - Equivalent 30-day reoperation and complication rates to inpatients
    - Some studies have shown higher post-discharge ED visit, readmission, and transfusion rates

**>> Purpose: To determine the trends and relative complication rates of outpatient TKA**



# Study Design

- Query of the PearlDiver Humana® administrative claims registry
  - Over 20 million de-identified patient records available
  - Private HMO/PPO insurance provider
  - Records available from 2007-2015
- Primary total knee arthroplasty (CPT-27447)
  - Outpatient defined by service location code “22”
  - Discharge within <24 hours of index procedure



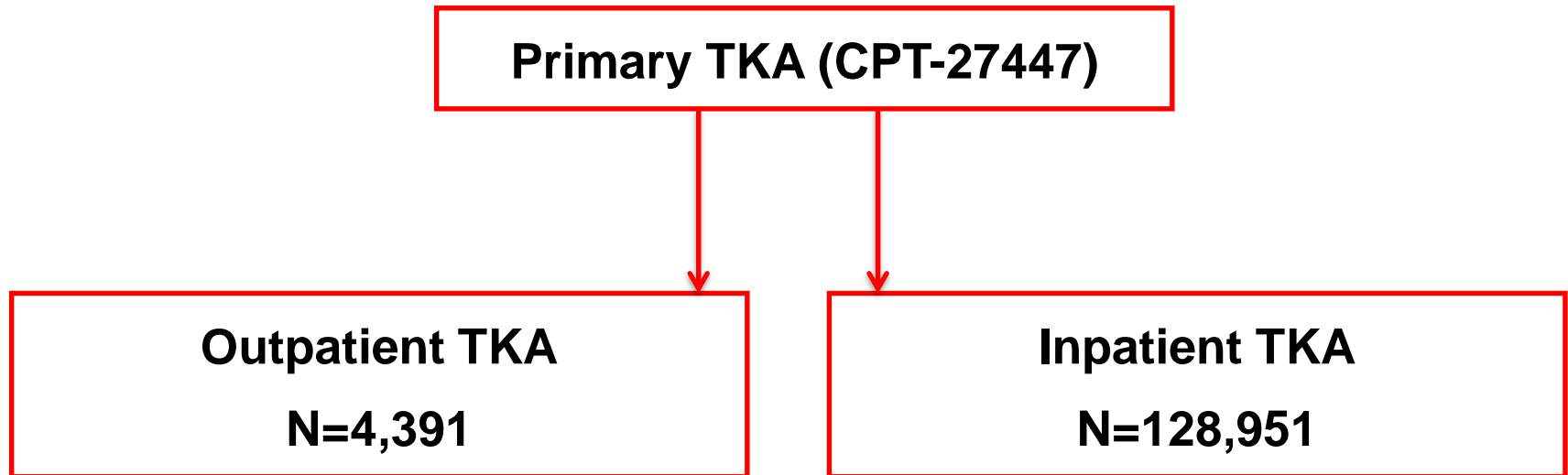
# Study Design

- Query for associated perioperative complications
  - Surgical complications (within one year) using CPT codes
  - Medical complications (within 14-90 days) using ICD codes
- **Adjusted odds ratios** using multivariate logistic regression adjusting for:
  - Age
  - Gender
  - Charlson Comorbidity Index

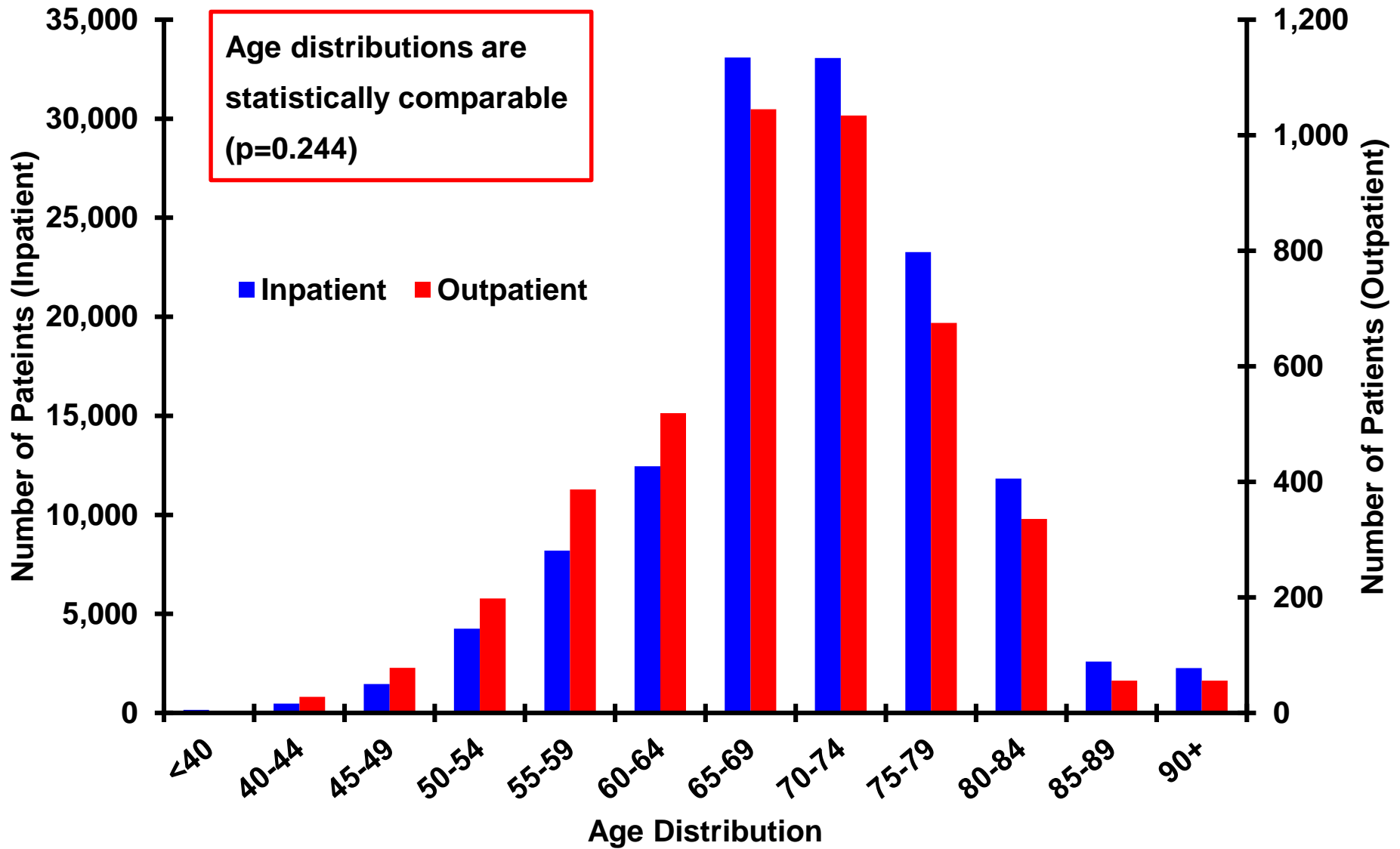
Humana®



# Study Design







	<u>Outpatient TKA (n=4,391)</u>		<u>Inpatient TKA (n=128,951)</u>		<u>Relative Ratio of Outpatient TKA</u>
	N	<sup>a</sup> Incidence (per 100,000)	N	<sup>a</sup> Incidence (per 100,000)	
<b>Gender</b>					
Male	1,560	17.1	46,805	512.8	0.03
Female	2,831	24.1	82,146	698.5	0.03
<b>Geographical region</b>					
Midwest	945	18.2	39,116	753.9	0.02
Northeast	32	2.0	3,152	192.3	0.01
South	2,940	26.5	73,706	664.8	0.04
West	474	16.0	12,977	436.7	0.04

**Females comprised 64.4% of outpatient TKA and 63.7% of inpatient TKA patients (p=0.460)**  
**The incidence of outpatient TKA was not equivalent between geographical regions (p<0.001)**

**Outpatient TKA (N=4,391)****Inpatient TKA (N=128,951)****Relative Ratio of  
Outpatient TKA**

<b>Case year</b>	<b>N</b>	<b><sup>a</sup>Incidence (per 100,000)</b>	<b>N</b>	<b><sup>a</sup>Incidence (per 100,000)</b>	
2007	299	4.7	7,041	111.7	0.04
2008	417	6.1	9,042	131.8	0.05
2009	400	6.4	10,585	168.3	0.04
2010	523	7.6	12,940	187.4	0.04
2011	513	7.8	14,243	217.9	0.04
2012	511	7.1	15,486	214.9	0.03
2013	555	7.0	18,843	238.8	0.03
2014	621	8.2	22,311	293.3	0.03
2015	552	7.4	18,460	248.3	0.03

- **The annual incidence of outpatient TKA ( $R^2=0.60$ ,  $p=0.015$ ) increased over the study period**
- **The mean CCI of outpatients and inpatients undergoing TKA were  $2.31 \pm 2.67$  and  $2.55 \pm 2.66$  ( $p=0.001$ )**

# Complication rates of outpatient TKA

Outpatient TKA (n=4,391) Inpatient TKA (n=128,951)

	N	Frequency (%)	N	Frequency (%)	‡Adjusted OR (for outpatient TKA)	p-value
<b><u>Surgical Complications</u></b>						
<b>Component revision</b>	<b>54</b>	<b>1.23%</b>	<b>1,124</b>	<b>0.87%</b>	<b>1.22 (1.01-1.47)</b>	<b>0.039</b>
<b>Surgical site infection</b>						
<b>Hardware explantation</b>	<b>22</b>	<b>0.50%</b>	<b>573</b>	<b>0.44%</b>	<b>1.35 (1.07-1.72)</b>	<b>0.013</b>
<b>I&amp;D and/or arthrotomy</b>	<b>53</b>	<b>1.21%</b>	<b>1,174</b>	<b>0.91%</b>	<b>1.50 (1.28-1.77)</b>	<b>&lt;0.001</b>
Knee fusion	<11	*	33	0.03%	*	
Amputation	<11	*	52	0.04%	*	
Knee dislocation	<11	*	73	0.06%	*	
<b>Stiffness requiring MUA</b>	<b>186</b>	<b>4.24%</b>	<b>4,599</b>	<b>3.57%</b>	<b>1.28 (1.17-1.40)</b>	<b>&lt;0.001</b>

# Complication rates of outpatient TKA

Outpatient TKA (n=4,391) Inpatient TKA (n=128,951)

<u>Medical Complications</u>	N	Frequency (%)	N	Frequency (%)	‡Adjusted OR (for outpatient TKA)	p-value
<b>DVT</b>	<b>85</b>	<b>1.94%</b>	<b>2,361</b>	<b>1.83%</b>	<b>1.42 (1.25-1.63)</b>	<b>&lt;0.001</b>
PE	74	1.69%	2,313	1.79%	0.97 (0.83-1.14)	0.729
Pneumonia	<11	*	65	0.05%	*	
<b>Acute renal failure</b>	<b>160</b>	<b>3.64%</b>	<b>4,902</b>	<b>3.80%</b>	<b>1.13 (1.01-1.25)</b>	<b>0.026</b>
Respiratory failure	58	1.32%	1,883	1.46%	1.02 (0.86-1.21)	0.819
MI	27	0.61%	1,007	0.78%	0.99 (0.77-1.28)	0.944
Cerebrovascular accident	59	1.34%	2,324	1.80%	0.77 (0.59-1.01)	0.061

# Limitations

- Limited data granularity of an administrative claims registry
  - Errors and limitations in CPT and ICD coding
  - No data on functional or patient-derived outcomes data
  - No data on ED presentations or readmissions
- Varying definition of outpatient arthroplasty
  - ASC versus hospital setting
  - Same-day versus overnight stay discharge
- Clinical significance of small differences in absolute risk

# Conclusions

- The annual incidence of outpatient TKA is increasing
- Using data from an administrative claims registry, outpatient TKA is associated with small but statistically significant increases in risk-adjusted incidence of:
  - Surgical site infections
  - Postoperative stiffness
  - Venous thromboembolism

# Conclusions

- The differences observed in this population-based study may reflect differences in outcomes between high-volume centers and others where outpatient TKA is less common
- Further research and carefully designed trials may help optimize outcomes in outpatient TKA as it becomes adopted more broadly

## **2018 OPPS final rule: CMS removes total knee arthroplasty from inpatient-only list**

November 6, 2017 | Medicare Web





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