

Patient Access to Care: What role does distance traveled to receive total joint arthroplasty play?

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

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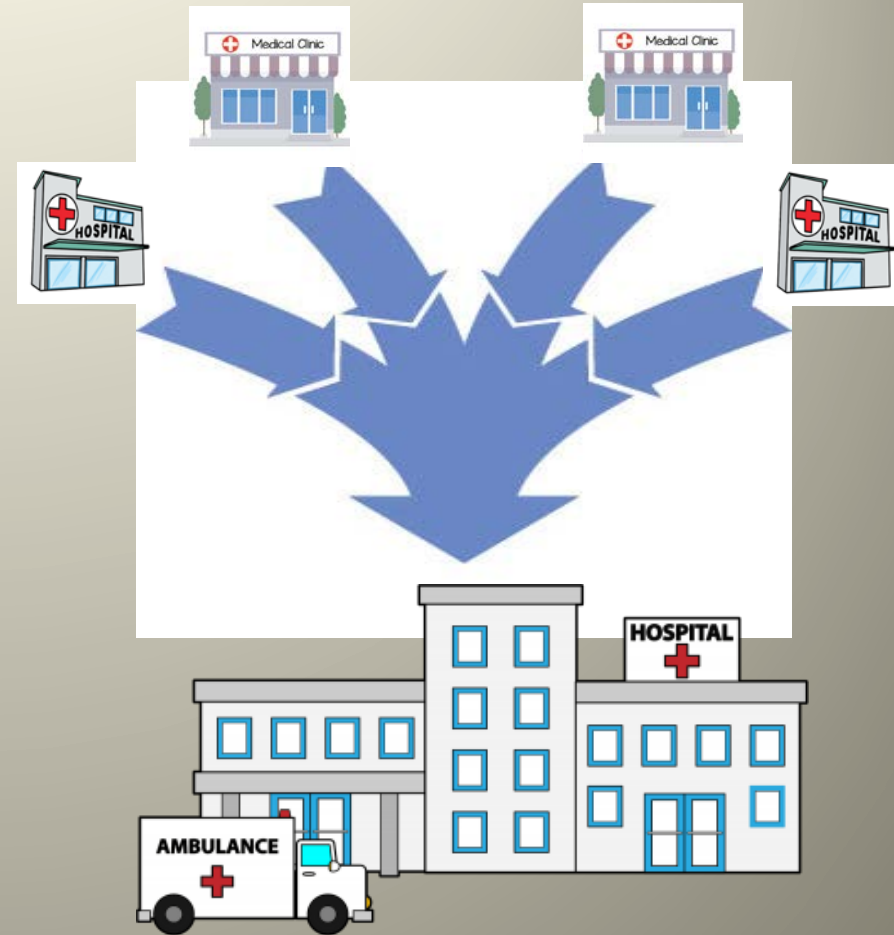
Introduction

- Over 1 million total hip (THA) and knee replacements (TKA) are performed in the US annually
- Volume is increasing significantly
- Large volume and continued increase in TJA utilization has made it a **cost concern** in American healthcare policy
- Recent strategies in health policy include:
 - Bundled payment models
 - Regionalization/Referral of care



Regionalization

- Regionalization of healthcare with referrals to High Volume Hospitals (HVHs) has been **shown to improve surgical outcomes**
- Referral to HVHs has been suggested in total joint arthroplasty (TJA)

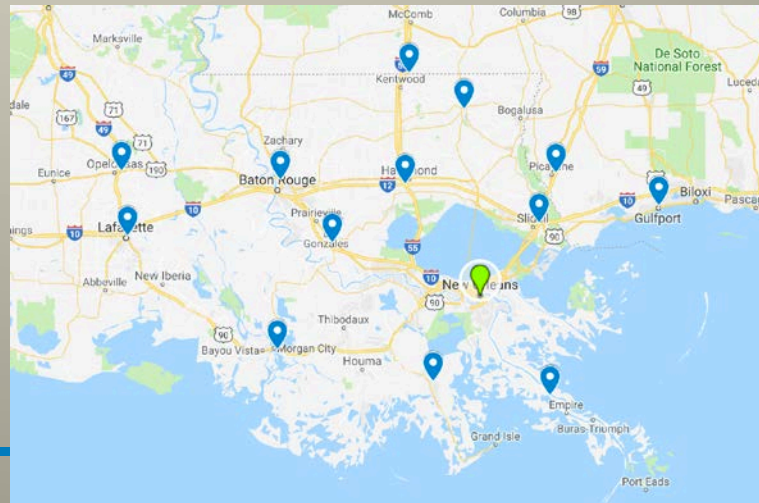


Objective

- Our objective was to examine how regionalization can impact access to care post-operatively in TJA patients
- Determine whether patients' traveling distances to undergo primary total hip and total knee arthroplasty impacted:
 - post-operative ED visits
 - clinic visits
 - readmissions
 - telephone, email, or other similar forms of communications

Methods

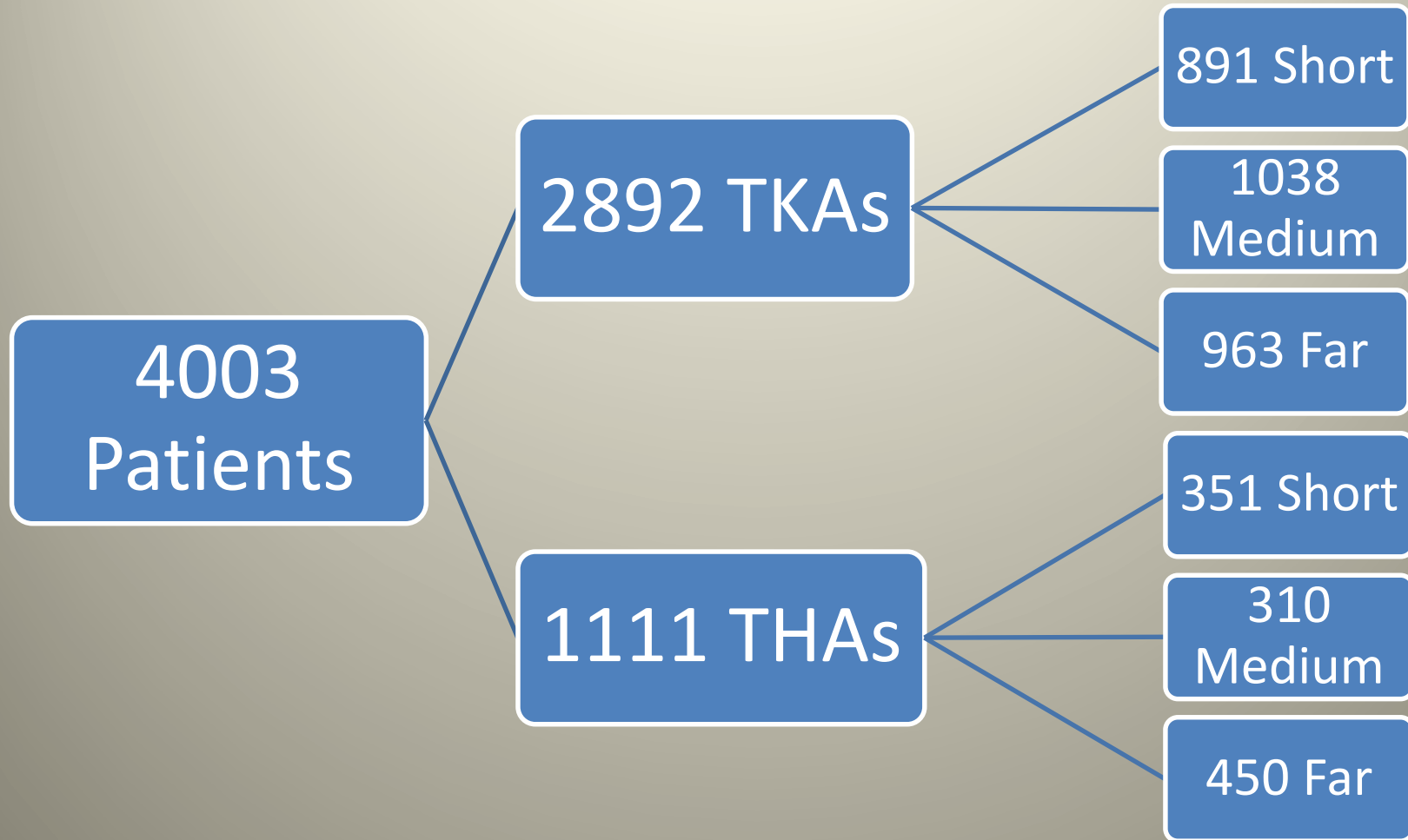
- Retrospective review of **all elective, primary TJA** from **2012-2017** in a single, multicenter, regional healthcare system (Ochsner Clinic, New Orleans, Louisiana)
- Analyzed patient travel distance to hospital based on centroid distance from the patient's home zip code to that of the hospital
- Patients were grouped into three distance categories:
 - **Short: <10km**
 - **Medium: 10-40km**
 - **Far: >40km**



Methods

- Patient demographics and comorbidities were collected
- Data was collected for the 90 days after TJA and included:
 - patient presentation to the ED
 - hospital readmissions
 - clinic visits
 - physician communications in the 90 days after TJA
- Descriptive statistics:
 - chi-square for categorical variables
 - ANOVA for continuous variables
- Multivariate linear model with a Poisson distribution examined effect of distance on outcome variables

Results



Results

		Total	Distance Group			P value
			<10 km	10-40km	>40km	
Age		64.7 (10.4)	66.5 (10.5)	64.7 (9.7)	63.3 (10.8)	<0.0001*
Gender	Male	2510 (62.7)	803 (64.7)	844 (62.6)	863 (61.1)	0.163
	Female	1493 (37.3)	439 (35.3)	504 (37.4)	550 (38.9)	
LOS		2.6 (1.6)	2.6 (1.6)	2.5 (1.6)	2.6 (1.6)	0.285
BMI		33.0 (7.2)	32.2 (7.2)	33.7 (7.3)	33.0 (7.2)	<0.0001*
Elixhauser Comorbidity Index		5 (3.6)	6 (3.8)	5 (3.5)	5 (3.6)	<0.0001*

-LOS=Length of Stay
 -Count (%) for categorical data
 -Mean (SD) for continuous data
 -* Statistically Significant

- Age was lower with further traveling patients
- Gender and length of stay was similar amongst all three groups
- BMI was higher in the medium and far distance groups, however comorbidity index lower in far travel patients
- Most people traveled greater than 10 km for their total joint replacement:
 - 40.5% of patients traveled >40 km to receive their total hip
 - 33% of patients traveled >40km to receive their total knee
- **129 patients >200km, 31 of those over >1000km**

Results

		Total	Distance Group			P value
			<10 km	10-40km	>40km	
Insurance Type	Private	1338 (33.4)	408 (32.9)	476 (35.3)	454 (32.1)	<0.0001*
	Medicare	2471 (61.7)	794 (63.9)	818 (60.7)	859 (60.8)	
	Medicaid	71 (1)	10 (0.7)	19 (1.3)	42 (1.0)	
	Other/No Ins	152 (3.8)	27 (2.2)	44 (3.3)	81 (5.7)	
Arthroplasty Type	Hip	1111 (27.8)	351 (28.3)	310 (23)	450 (31.8)	<0.0001*
	Knee	2892 (72.2)	891 (71.7)	1038 (77)	963 (68.2)	

-Ins=Insurance
 -Count (%) for categorical data
 -Mean (SD) for continuous data
 -* Statistically Significant

- Insurance type clinically similar except:
 - **Medicaid/other (no insurance/military) patients significantly higher in the far distance group**
- More Knees than Hips

	Total				P value
		<10 km	10-40km	>40km	
ED Visits 90 Days	0.22 (0.64)	0.26 (0.77)	0.23 (0.6)	0.18 (0.55)	0.04*
Readmission 90-days	0.33 (0.68)	0.44 (0.82)	0.33 (0.64)	0.24 (0.55)	<0.0001*
Clinic Visit 90-days	2.8 (1.1)	2.9 (1.1)	2.8 (1.1)	2.7 (1.1)	<0.0001*
Communication 90-days	3.4 (3.4)	3.3 (3.3)	3.1 (3.1)	3.9 (3.7)	<0.0001*

- **Significantly higher number of ED visits and Readmissions in the shorter distance groups**
- More clinic visits the closer the patient lived to the hospital
- Increased number communications in the Far distance group

-ED=Emergency Department
-Count (%) for categorical data
-Mean (SD) for continuous data
-* Statistically Significant

Multivariate Linear Regression Results

Variable	90 Day ED Presentation Rate [95% CI]	p value	90 Day Hospital Admission Rate [95% CI]	p value	90 Day Clinic Visit Rate [95% CI]	p value	90 Day Phone/Email Rate [95% CI]	p value
Gender	0.906 [0.788-1.042]	0.166	1.063 [0.946-1.195]	0.302	0.993 [0.954-1.033]	0.713	1.128 [1.047-1.216]	0.002
Ethnicity		0.071		0.066		0.109		0.197
Other vs Caucasian	0.691 [0.431-1.108]	0.125	1.346 [1.015-1.787]	0.039	0.949 [0.853-1.057]	0.343	1.095 [0.895-1.341]	0.377
African American vs Caucasian	1.118 [0.969-1.290]	0.126	1.088 [0.965-1.226]	0.167	0.959 [0.920-1.000]	0.047	1.069 [0.989-1.156]	0.094
Insurance Type		<0.0001		<0.0001		0.925		0.147
Private vs Medicare	0.634 [0.530-0.759]	<0.0001	0.798 [0.687-0.928]	0.003	0.987 [0.941-1.036]	0.608	1.025 [0.936-1.122]	0.594
other vs Medicare	0.642 [0.406-1.013]	0.057	0.457 [0.281-0.743]	0.002	0.999 [0.902-1.107]	0.991	0.829 [0.680-1.010]	0.063
Medicaid vs Medicare	1.722 [1.138-2.605]	0.001	0.448 [0.220-0.912]	0.004	0.951 [0.785-1.152]	0.607	0.846 [0.591-1.211]	0.361
Distance Group		0.001		<0.0001		0.01		<0.0001
short vs far	1.364 [1.152-1.614]	<0.0001	1.620 [1.410-1.862]	<0.0001	1.074 [1.025-1.125]	0.003	0.850 [0.778-0.929]	<0.0001
medium vs far	1.278 [1.078-1.514]	0.005	1.240 [1.072-1.434]	0.003	1.045 [0.998-1.094]	0.061	0.785 [0.720-0.856]	<0.0001
Age	0.973 [0.966-0.979]	<0.0001	0.999 [0.993-1.006]	0.803	0.998 [0.995-1.000]	0.04	0.986 [0.982-0.990]	<0.0001
BMI	0.987 [0.977-0.996]	0.005	1.002 [0.994-1.010]	0.594	1.001 [0.999-1.004]	0.375	0.991 [0.986-0.996]	<0.0001
Elixhauser Comorbidity	1.126 [1.109-1.145]	<0.0001	1.109 [1.094-1.124]	<0.0001	1.002 [0.996-1.007]	0.563	1.022 [1.011-1.033]	<0.0001
Length of Stay	1.036 [1.005-1.068]	0.02	1.108 [1.088-1.128]	<0.0001	0.972 [0.959-0.985]	<0.0001	0.973 [0.951-0.995]	0.015

Multivariate Linear Regression Results

- Insurance type affects rate of ED visits:
 - **Private < Medicare < Medicaid**
- **Distance Group (shorter) and LOS (longer stay) were significant risk factors for utilization of care**
- **Significantly higher number of ED visits and Readmissions in the shorter distance groups**
- **More clinic visits the closer you are (not significant between medium and far groups)**
- **Increased number communications in the Far distance group**

Results

- Compared to the far distance group, multivariate analysis showed that the short distance and medium distance groups had:
 - **40% and 27% more ED presentations at 90 days, respectively**
 - **64% and 24% more hospital readmissions at 90 days, respectively**
- Short distance group had 7% more clinic visits than the far distance group ($p=0.003$)
- The far distance group had 15% and 22% more physician communications than the short and medium distance groups, respectively ($p<0.0001$)

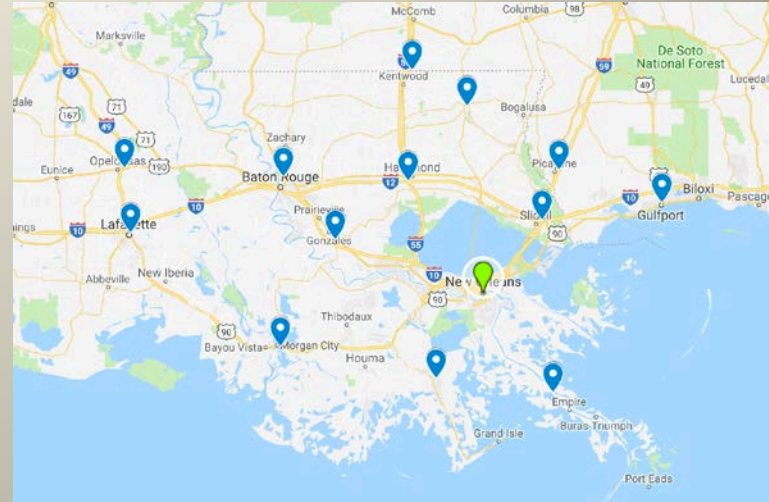
Results

- Analysis of ED presentation reason:
 - Short and medium distance group
 - **8.1 times and 2.9 times more likely than the far distance group to present for postoperative pain and/or swelling, respectively**
 - Similarly, frequency of ED visits not leading to readmission was inversely correlated with distance group:
 - **Short > Medium > Far**



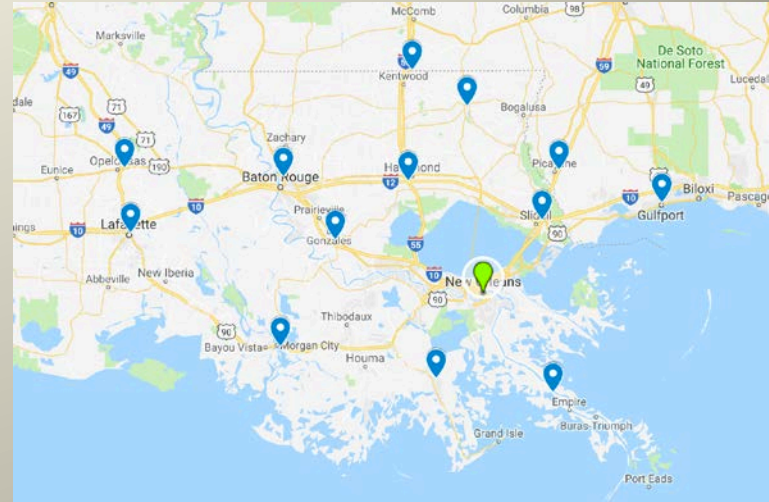
Discussion

- We found that distance traveled had a significant impact on patient utilization of care resources postoperatively
- In particular, patients with close geographic access to the ED were much more likely to present for surgical site pain and swelling
 - This may lead to increased cost burden on the healthcare system



Discussion

- Patients with decreased geographic access to their surgical center were more likely to communicate with their physician through phone, email, and patient portal use
- As predicted with bundling of care, increased percentage of Medicaid or no insurance in the far traveling distance group



Saleh et al. 2018

- **Pain and swelling is most common surgical reason (35%) to return to ED within 30 days**
- 80% of those not admitted to hospital
- Independent risk factors identified were African American race and being discharged home

Kelly et al. 2018

- 13.4% of THAs and 13.8% TKAs had ≥ 1 ED only (not-readmitted) visit in 90 days following procedure
- Rate of ≥ 1 readmission was 4.5% for THA and 5.5% for TKA
- **Most common cause of ED visit was postoperative swelling and pain**

Conclusion and Future Directions

- Patient travel distance for TJA significantly impacts their postoperative healthcare utilization
 - This must be considered as regionalization of healthcare continues and in development of future healthcare policy
- High utilization of the ED for non-emergent concerns occurred when geographic access was easier
 - **represents a target for cost-saving interventions**
- Trend in data for correlation between increased patient communications and decreased ED visits
- Higher percentage of Medicaid/No Insurance patients driving >40 km for their total joint

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