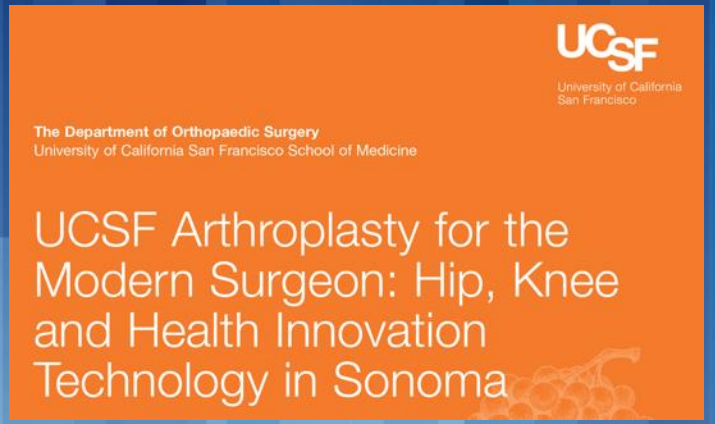
Outpatient Total Joint Arthroplasty: Perspectives from an Academic Institution

Michael P. Bolognesi, MD
Professor of Orthopaedic Surgery
Division Chief, Adult Reconstruction
Duke University Medical Center



Duke Orthopaedic Surgery

Division of Adult Reconstruction

Disclosures

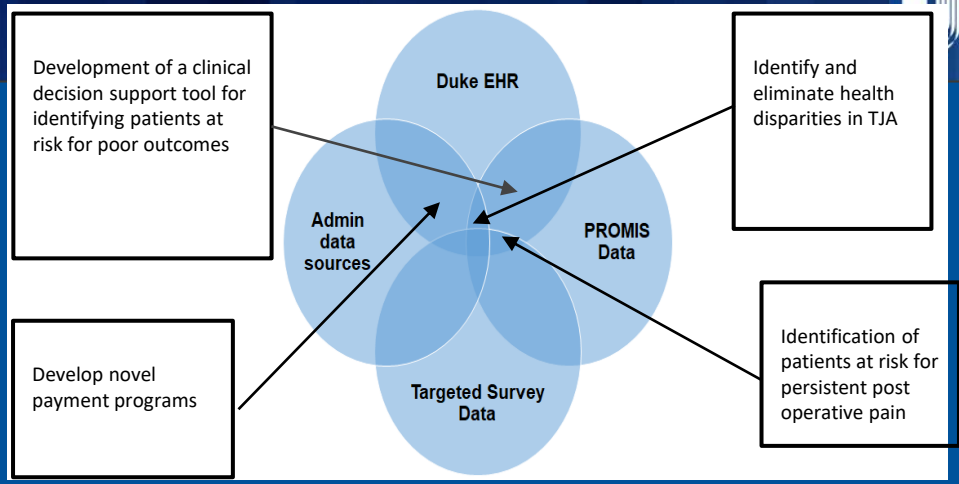
- *Amedica - Stock Options, Surgical Advisory Board*
- *Zimmer Biomet - Royalties, Consulting Payments, Resident Educational Support, Design Surgeon, Research Support*
- *Total Joint Orthopedics - Stock and Stock Options, Advisory Board Member, Resident Educational Support, Consultant Payments, Design Surgeon*
- *Depuy - Research Support, Resident Educational Support, Principal Investigator*
- *Exactech- Resident Educational Support*
- *Stryker - Resident Educational Support*
- *Smith and Nephew- Royalties, Resident Educational Support, Fellowship Support*
- *EOA- Board of Directors*
- *SOA Board of Directors*
- *Omega - Fellowship Support- Fellowship Director*
- *North American Specialty Hospital- Advisory Board*

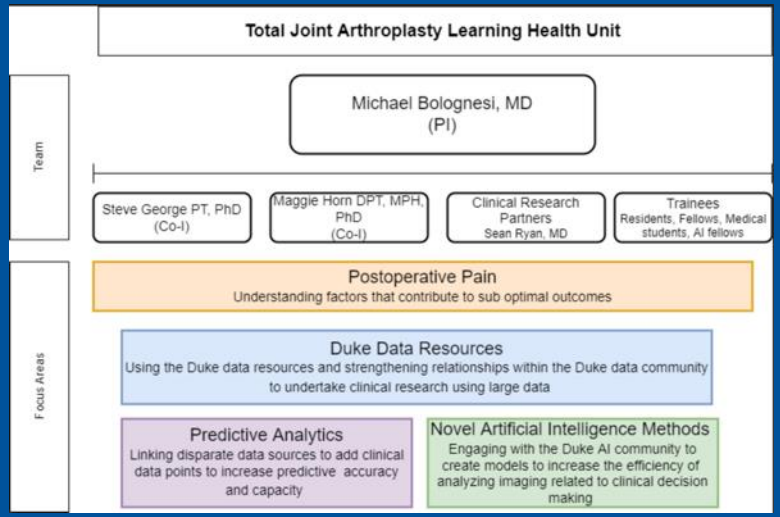
TOTAL JOINT ARTHROPLASTY

LEARNING HEALTH UNIT

DATA. DECISIONS. OUTCOMES.

Duke Clinical Research Institute | MUSCULOSKELETAL





Real Disclosures

This is a reality for hip and knee arthroplasty care…

Likely also a lot of other MSK codes…

A percentage of our patients can and probably should be outpatient

I work at an institution that was not exactly set up to do OP arthroplasty

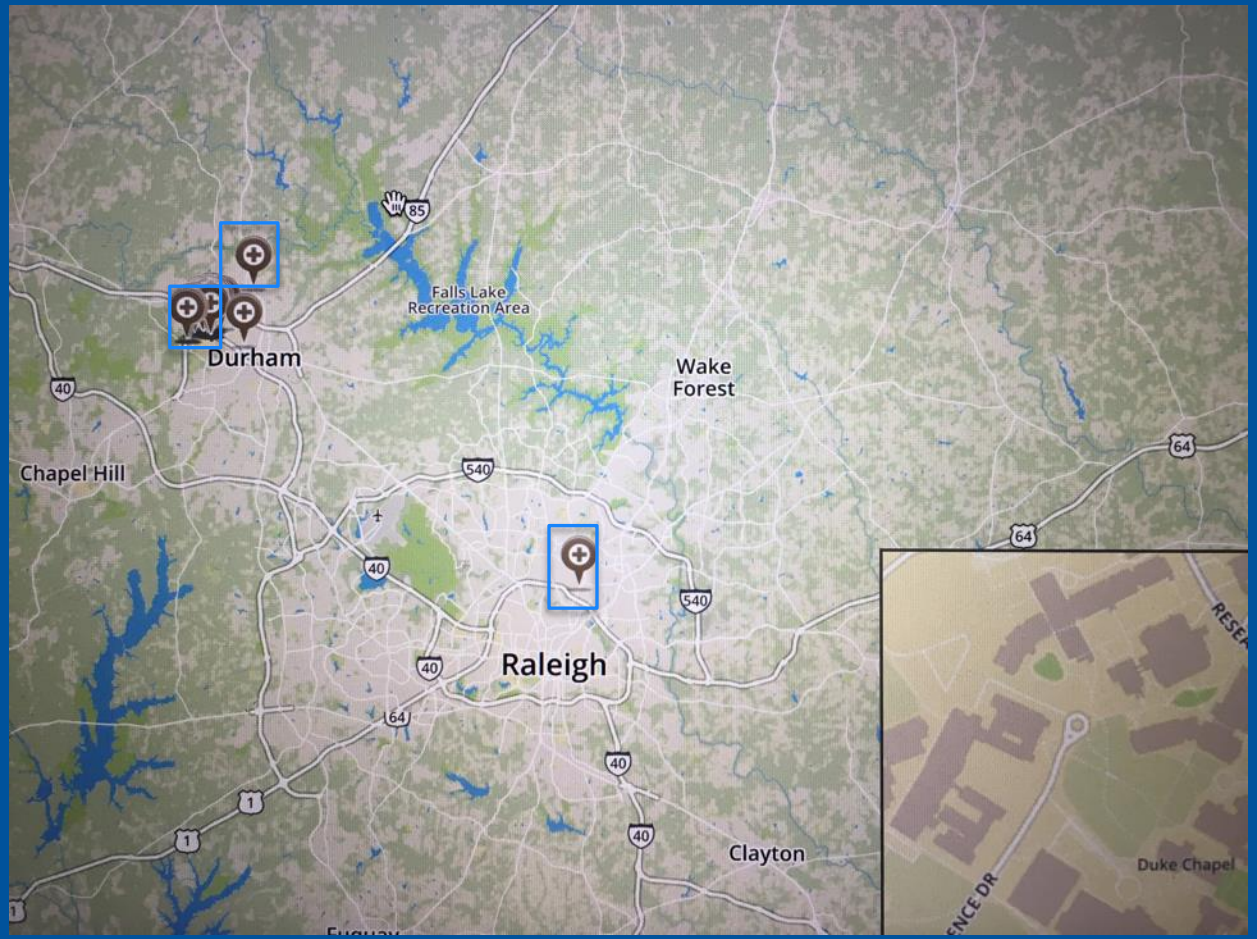
But we were interested from the beginning about the patient selection issue….

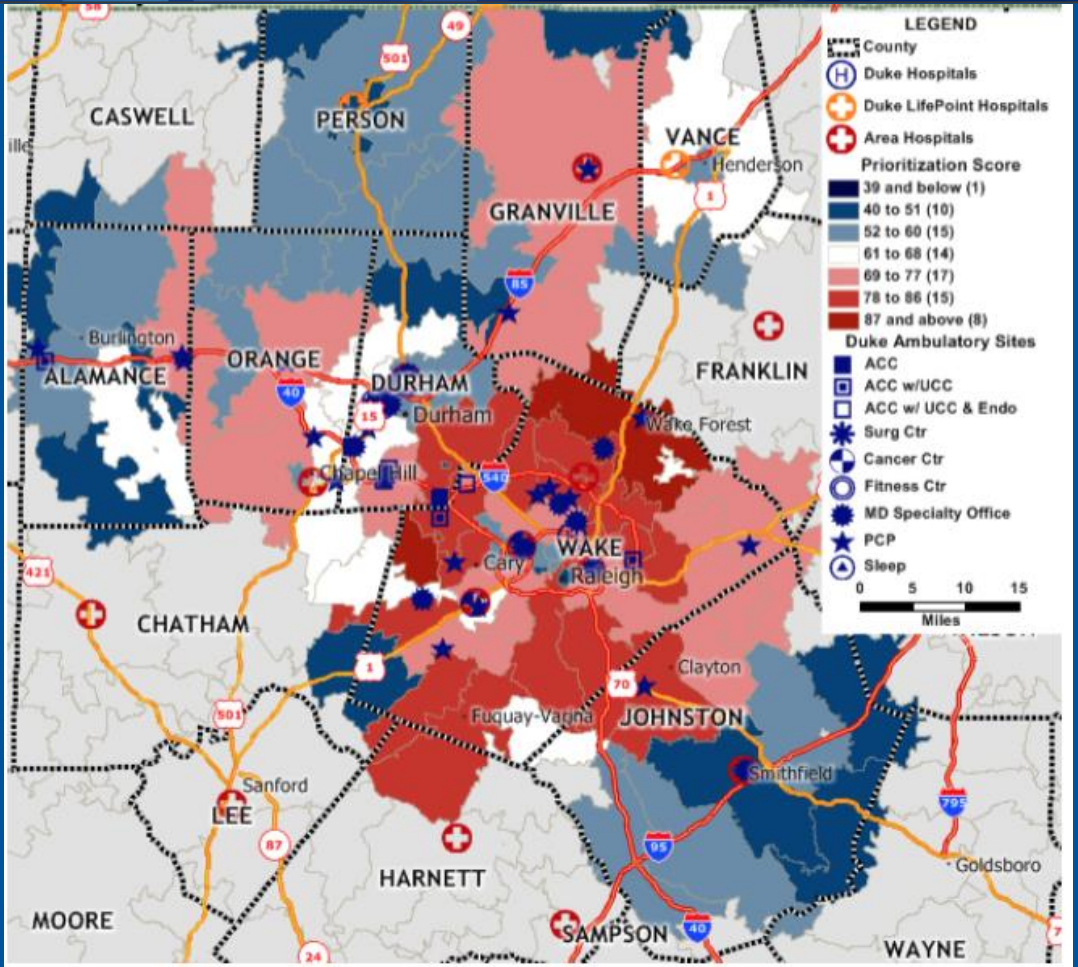
Introduction

- Outpatient arthroplasty has its place
- We felt like we needed to be able to offer this option to our patient population
- The financial concerns from the hospital side about this transition are real
- Our traditional set up was three hospitals and no free standing center.
- We are not always able to move swiftly while trying to develop programs like this

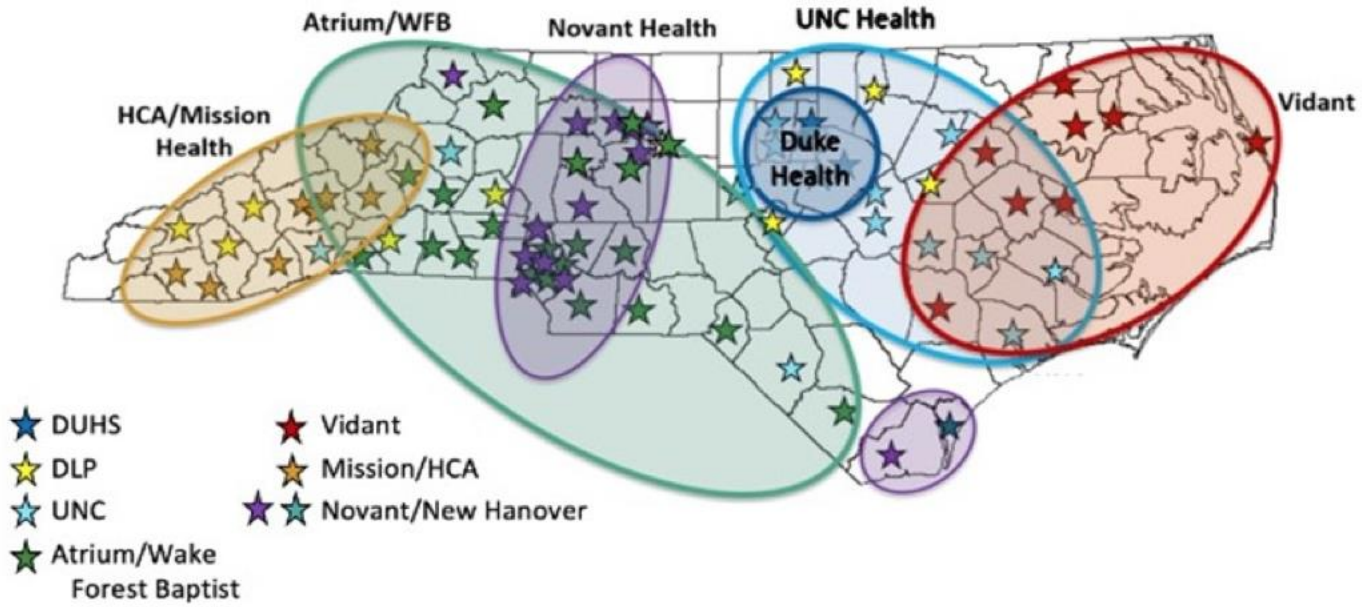
Three hospital program….

….Duke University Health System.


Falls Lake
Recreation Area
Durham
Wake
Forest
Chapel Hill
Raleigh
Clayton
Duke Chapel
85
40
540
64
1


LEGEND
County
Duke Hospitals
Duke LifePoint Hospitals
Area Hospitals
Prioritization Score
39 and below (1)
40 to 51 (10)
52 to 60 (15)
61 to 68 (14)
69 to 77 (17)
78 to 86 (15)
87 and above (8)
Duke Ambulatory Sites
ACC
ACC w/UCC
ACC w/ UCC & Endo
Surg Ctr
Cancer Ctr
Fitness Ctr
MD Specialty Office
PCP
Sleep
0 5 10 15
Miles
CASWELL
PERSON
VANCE
Henderson
GRANVILLE
Burlington
ORANGE
ALAMANCE
DURHAM
Durham
FRANKLIN
Wake Forest
Chapel Hill
WAKE
Cary
Raleigh
CHATHAM
Clayton
JOHNSTON
Fuquay-Varina
Smithfield
Sanford
LEE
HARNETT
Goldsboro
MOORE
SAMPSON
WAYNE

Healthcare Landscape: North Carolina Provider Consolidation



So we work in a "bigger" system…..

★★★ 5. There are 3 children and 1 wagon. Two children can play at a time. One child can ride and one child can pull. In the table, show all the ways the children can ride and pull.

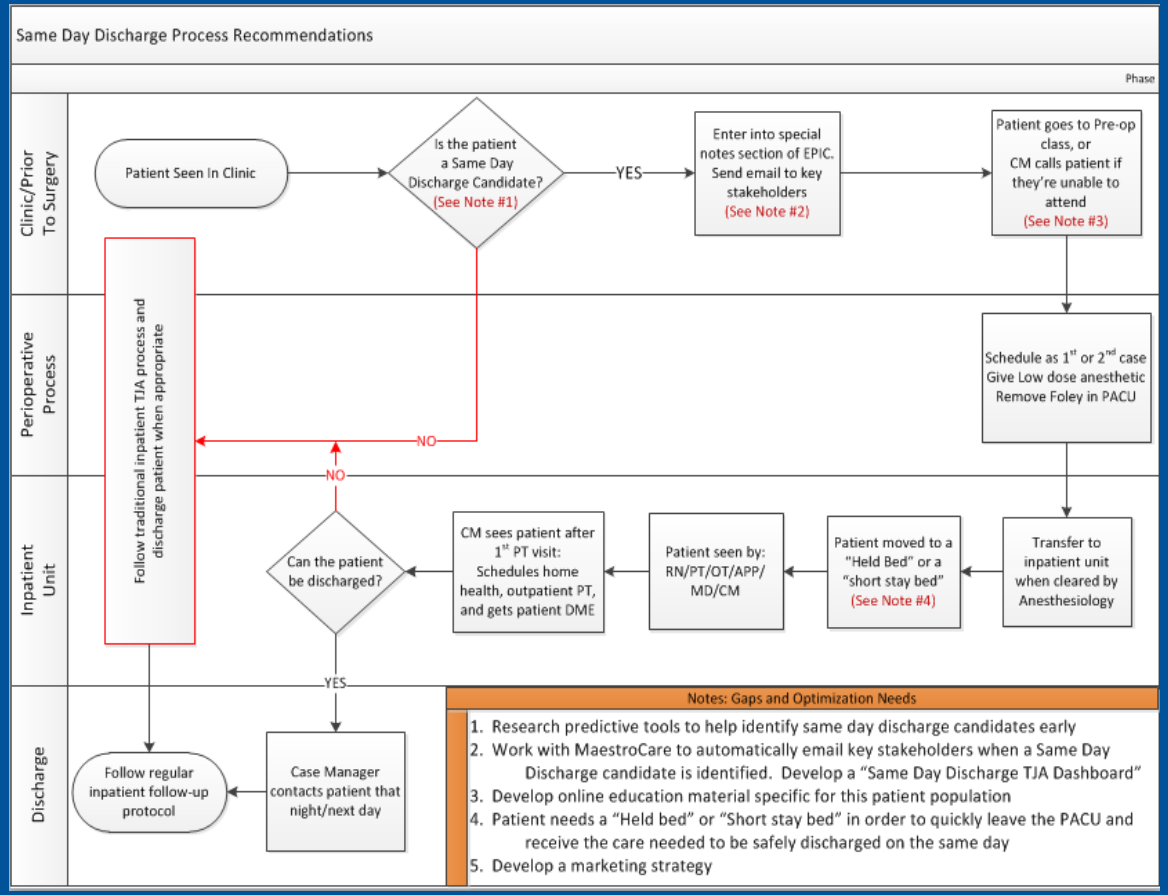
Sam Kevin Alice

Child Pulling	Child Riding

“Get a bigger wagon.....”

Julia Bolognesi
Age 6

Early pathway…



Education and Communication

- The conversation in clinic
- PT before procedure?
- DME before procedure?
- Written materials
- Electronically available materials
- Online video and interactive sites
- Web based apps
- Communication via EMR’s

Logisitical Considerations…

- IF something does go really bad
- Many ASCs Are Not On A Hospital Campus
- Is There An Intensivist On Site ?
- How Long Will It Take ??
  - Ambulance To Arrive
  - Patient Transport To An Acute Care Hospital

Patient Selection for Outpatient Arthroplasty

- Medical screening of some kind
- “Acceptable” medical history
- Function independently with walker or crutches?
- Pre-op physiotherapy evaluation
  - Preoperative education critical
  - Written materials, electronic materials, “hot” line, different means of communication?
  - Family support at home (contract?)
- Live within 1-2 hours of the center/facility
  - Or have 23 hour stay capabilities

Why Do Patients Stay in the Hospital?

- *Fear/Anxiety*
  - Unknown
  - Pain
- *Risk*
  - Co-morbidities
  - Medical complications
- *Side-effects of our treatment*
  - Narcotics/anesthesia
  - Blood loss
  - Surgical trauma

There is data…..

The Journal of Arthroplasty 32 (2017) 1103–1106

Contents lists available at ScienceDirect

The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org

Health Policy and Economics

Same Day Total Hip Arthroplasty Performed at an Ambulatory Surgical Center: 90-Day Complication Rate on 549 Patients

Gregg R. Klein, MD *, Jason M. Posner, BA, Harlan B. Levine, MD, Mark A. Hartzband, MD

Hartzband Center for Hip and Knee Replacement, Paramus, New Jersey

Clin Orthop Relat Res (2017) 475:364–372
DOI 10.1007/s11999-016-4915-z

Clinical Orthopaedics and Related Research®
A Publication of The Association of Bone and Joint Surgeons®

SYMPOSIUM: 2016 HIP SOCIETY PROCEEDINGS

Otto Aufranc Award

A Multicenter, Randomized Study of Outpatient versus Inpatient Total Hip Arthroplasty

Nitin Goyal MD, Antonia F. Chen MD, MBA, Sarah E. Padgett PA-C, Timothy L. Tan MD, Michael M. Kheir MD, Robert H. Hopper Jr PhD, William G. Hamilton MD, William J. Hozack MD

The Journal of Arthroplasty 31 (2016) S197–S201

Contents lists available at ScienceDirect

The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org

Complications - Other

Is Outpatient Arthroplasty as Safe as Fast-Track Inpatient Arthroplasty? A Propensity Score Matched Analysis

Francis Lovecchio, MD [a,*], Hasham Alvi, MD [b], Shawn Sahota, MD [b], Matthew Beal, MD [b], David Manning, MD [b]

[a] *Northwestern University Feinberg School of Medicine, Chicago, Illinois*
[b] *Department of Orthopaedic Surgery, Northwestern University Feinberg School of Medicine, Chicago, Illinois*

The Journal of Arthroplasty xxx (2017) 1–5

Contents lists available at ScienceDirect

The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org

Low Rates of Adverse Events Following Ambulatory Outpatient Total Hip Arthroplasty at a Free-Standing Surgery Center

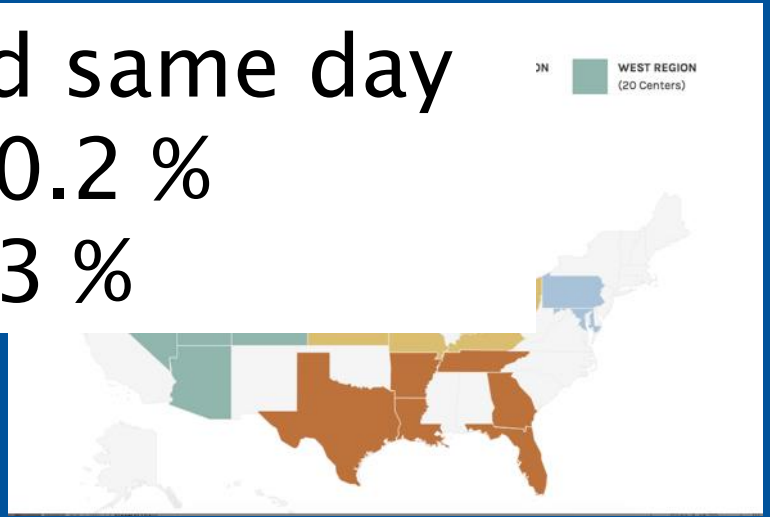
Patrick C. Toy, MD *, Matthew N. Fournier, MD, Thomas W. Throckmorton, MD, William M. Mihalko, MD, PhD

Department of Orthopaedic Surgery & Biomedical Engineering, University of Tennessee-Campbell Clinic, Memphis, Tennessee

The data is increasing…..

- 2011 – 2017: 76 centers in 19 states
- Patient Selection ~ Surgeon / Center specific
- 19,415 To
  - 7,227 U
  - 6,146 T
  - 5,102 T
  - 940 Revisions, TSA
- Mean age 58
- Surgeon reported outcomes
  - Discharge Disposition, Hospital Admissions, Complications, Infection

- 97 % discharged same day
- Deep infection 0.2 %
- Readmission 0.3 %



JIS Outpatient Arthroplasty Experience

White Fence Surgical Suites: June 2013 – June 8, 2021; 6 surgeons

- 11482 hip, knee & shoulder arthroplasties
  - 3097 partial knee arthroplasty
  - 4700 primary TKA
  - 253 revision TKA/THA
  - 3341 primary THA
  - 91 shoulder arthroplasty
- 11028 (96.0%) discharged same day
- 25 (0.22%) transferred to acute hospital
- 429 (3.7%) stayed overnight
  - 143 (1.25%) stayed for convenience
  - 295 (2.57%) stayed for a medical reason

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Modifiable Risk Factors…

- Anemia
- Diabetes
- Malnutrition
- Obesity
- Smoking
- Narcotics

We know these things matter…..

Impact of Perioperative Allogeneic and Autologous Blood Transfusion on Acute Wound Infection Following Total Knee and Total Hip Arthroplasty

Erik T. Newman, MD, Tyler Steven Watters, MD, John S. Lewis, MD, Jason M. Jennings, MD, DPT, Samuel S. Wellman, MD, David E. Attarian, MD, Stuart A. Grant, MB ChB, FRCA, Cynthia L. Green, PhD, Thomas P. Vail, MD, and Michael P. Bolognesi, MD

THE JOURNAL OF BONE & JOINT SURGERY
JB&JS

Anemia

Clin Orthop Relat Res (2015) 473:57–63
DOI 10.1007/s11999-014-3668-9

Clinical Orthopaedics and Related Research®
A Publication of The Association of Bone and Joint Surgeons®

SYMPOSIUM: 2014 KNEE SOCIETY PROCEEDINGS

The John Insall Award

Morbid Obesity Independently Impacts Complications, Mortality, and Resource Use After TKA

Michele R. D'Apuzzo MD, Wendy M. Novicoff PhD, James A. Browne MD

Obesity

The Impact of Glycemic Control and Diabetes Mellitus on Perioperative Outcomes After Total Joint Arthroplasty

By Milford H. Marchant Jr., MD, Nicholas A. Viens, MD, Chad Cook, PT, PhD, MBA, Thomas Parker Vail, MD, and Michael P. Bolognesi, MD

Investigation performed at Duke University Medical Center, Durham, North Carolina

THE JOURNAL OF BONE & JOINT SURGERY
JB&JS
J Bone Joint Surg Am. 2009;91:1621-9

Diabetes

ARTICLES

Effect of preoperative smoking intervention on postoperative complications: a randomised clinical trial

Ann M Møller, Nete Villebro, Tom Pedersen, Hanne Tønnesen

THE LANCET • Vol 359 • January 12, 2002 • www.thelancet.com

Smoking

The Journal of Arthroplasty xxx (2017) 1–7

Contents lists available at ScienceDirect

The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org

ELSEVIER

Trends in Opioid Utilization Before and After Total Knee Arthroplasty

Cary S. Politzer, BS [a,*], Beau J. Kildow, MD [b], Daniel E. Goltz, BS [a], Cynthia L. Green, PhD [c], Michael P. Bolognesi, MD [b], Thorsten M. Seyler, MD, PhD [b]

[a] Duke University School of Medicine, Mary Duke Biddle Trent Semans Center for Health Education, Duke University Medical Center Greenspace, Durham, North Carolina
[b] Department of Orthopaedic Surgery, Duke University Medical Center, Durham, North Carolina
[c] Department of Biostatistics and Bioinformatics, Duke Clinical Research Institute, Duke University Medical Center, Durham, North Carolina

Narcotics

The Effect of Malnutrition on Patients Undergoing Elective Joint Arthroplasty

Ronald Huang, MD, Max Greenky, BS, Glenn J. Kerr, MD, Matthew S. Austin, MD, Javad Parvizi, MD, FRCS

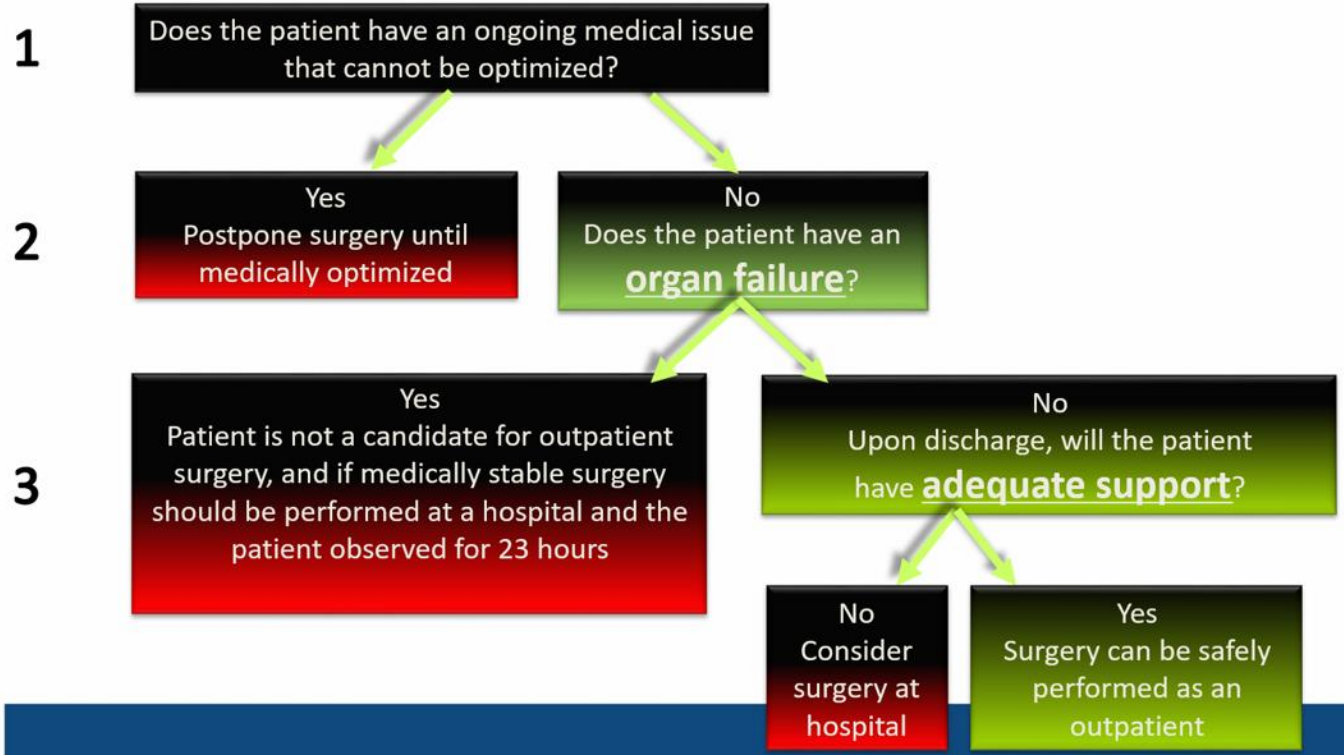
Rothman Institute at Thomas Jefferson University Hospital, Philadelphia, Pennsylvania

Malnutrition

Started Conservatively

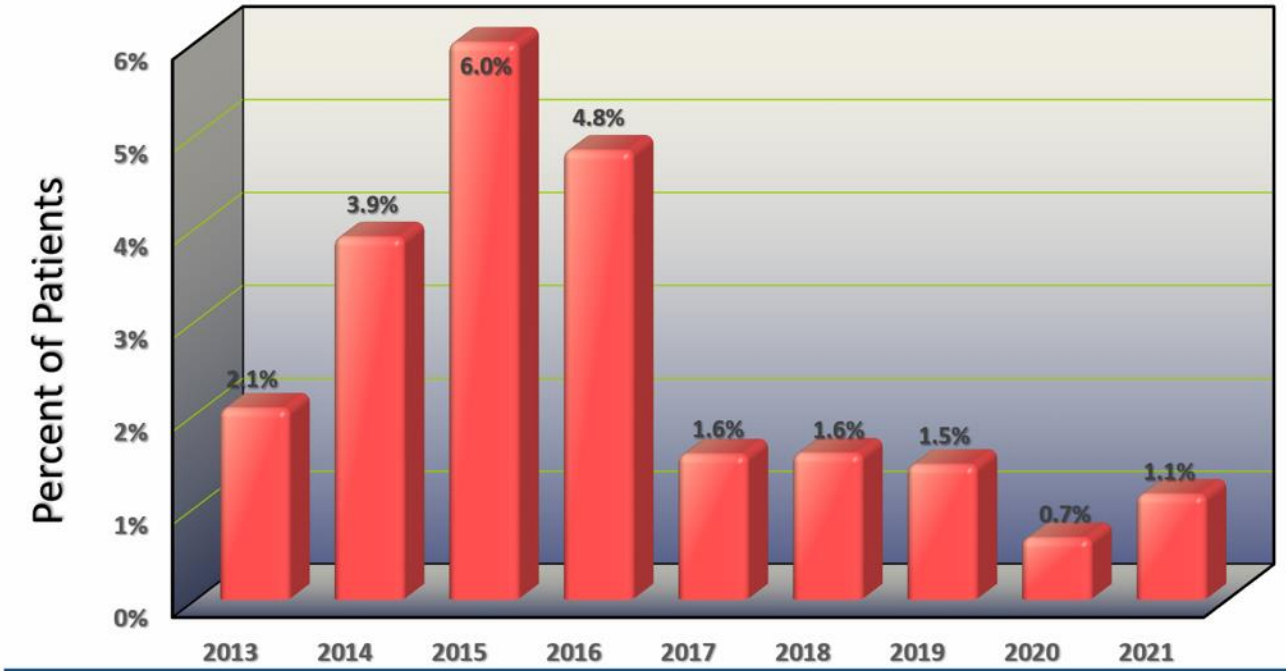
- Cardiac
  - Prior revascularization
  - CHF
  - Valve disease
  - Arrhythmia/Pacemaker
- Pulmonary
  - COPD
  - Home O2
- Untreated OSA
- BMI >40
- Hematologic
  - Chronic Coumadin
  - Coagulopathy
  - Anemia: Hbg <13.0
  - Thrombophilia
- Neurological
  - CVA
  - Delirium/dementia
- Solid organ transplant
- Renal Disease
  - Dialysis
  - Severely elevated serum Cr
- Gastrointestinal
  - History of ileus
  - Chronic hepatic disease
- Genitourinary
  - History of urinary retention
  - Severe BPH

Basic Patient Health Screening Algorithm



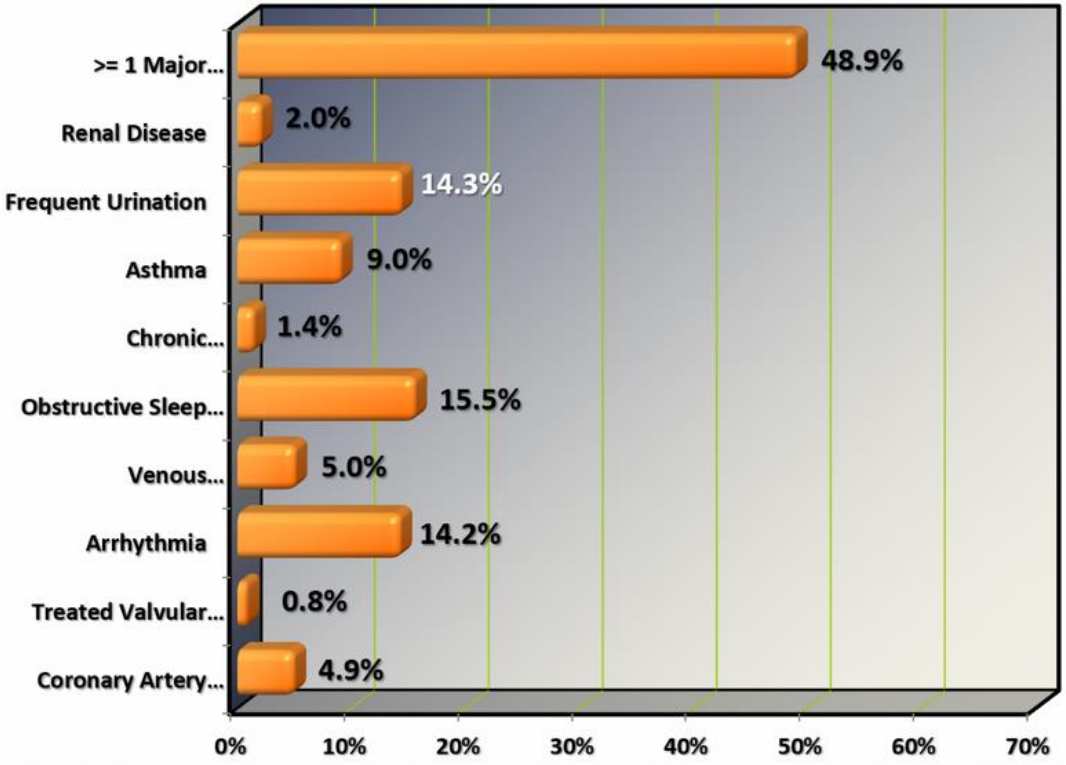
JIS ORTHOPEDICS

WFSS Overnight Medical Reason Stay or Transfer after Hip & Knee Arthroplasty by Year



JIS ORTHOPEDICS

Preoperative Major Co-Morbidities

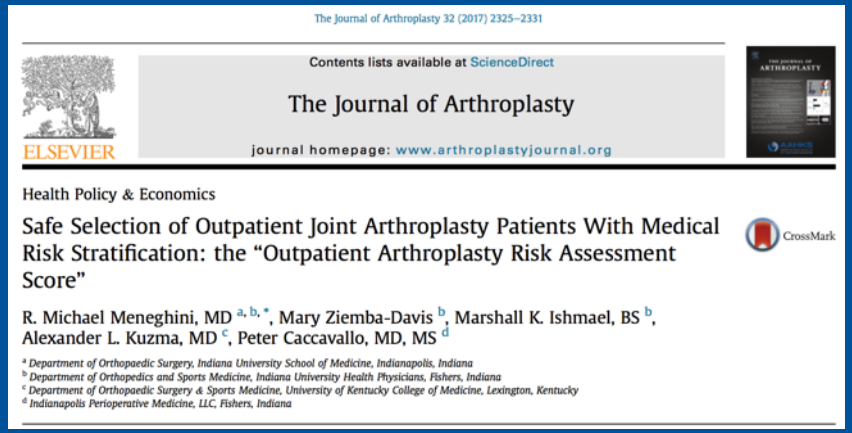


JIS ORTHOPEDICS

You have to at least try to figure out how to screen….

….there is a growing list of ”checklists“….

Predictive Score for OP?



The Journal of Arthroplasty 32 (2017) 2325–2331

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The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org

Health Policy & Economics

Safe Selection of Outpatient Joint Arthroplasty Patients With Medical Risk Stratification: the "Outpatient Arthroplasty Risk Assessment Score"

R. Michael Meneghini, MD [a, b, *], Mary Ziemba-Davis [b], Marshall K. Ishmael, BS [b], Alexander L. Kuzma, MD [c], Peter Caccavallo, MD, MS [d]

[a] Department of Orthopaedic Surgery, Indiana University School of Medicine, Indianapolis, Indiana
[b] Department of Orthopedics and Sports Medicine, Indiana University Health Physicians, Fishers, Indiana
[c] Department of Orthopaedic Surgery & Sports Medicine, University of Kentucky College of Medicine, Lexington, Kentucky
[d] Indianapolis Perioperative Medicine, LLC, Fishers, Indiana

- Retrospective review of 1120 consecutive primary TJAs
- OARA score developed to stratify patients as "low-moderate risk (<59) and "not appropriate" (>60) for early discharge.
- OARA score for primary TJA had more precise predictive ability than the ASA-PS and CCI .

Same Day Discharge Total Hip Arthroplasty: Failure to Launch and Why?

SDD Inclusion
Medical Criteria
❑ No CAD or Arrhythmias
❑ No chronic anticoagulation
❑ No moderate or severe sleep apnea
❑ Hgb > 12g/dl
❑ BMI < 40kg/m^2
Other Criteria
❑ Patient in full agreement ❑ Patient must have a coach ❑ Patient and coach must attend preoperative education session

Variable	Failure to Launch	Control	p-value
Duration of anesthesia (min)	147.9	132.7	**<0.001**
Surgery Time	85.5	71.1	**<0.001**
Screws n (%)			
Yes	16 (53.3%)	81 (25.7%)	**0.019**
No	14 (46.7%)	234 (74.3%)	-
Cemented Component n (%)			
Yes	2 (6.1%)	6 (2.0%)	0.18
No	31 (93.9%)	309 (98.0%)	-
Transfusion n (%)			
Yes	2 (6.3%)	2 (0.5%)	**0.015**
No	30 (93.8%)	313 (99.5 %)	-
Sedatives & Analgesics n (mg)			
Tramadol	5 (55.0)	5 (60.0)	0.67
Diphenhydramine	2 (17.5)	12 (41.0)	0.83
Propofol	32 (532.6)	191 (447.7)	0.11
Midazolam	32 (6.7)	188 (6.5)	0.44
Diazepam	3 (3.2)	17 (2.7)	0.66
Narcotics n (mg)			
Hydromorphone	9 (0.87)	55 (0.58)	0.66
Percocet	3 (5.0)	9 (5.1)	0.89
Oxycodone	26 (10.6)	128 (10.0)	**0.02**
Roxicodone	21 (15.6)	89 (12.8)	0.35
Morphine	21 (3.5)	137 (3.9)	0.51
Fentanyl	28 (126.8)	187 (131.7)	0.75

Our starting point for screening…….

CJR – Risk Stratification Guidelines for Elective Primary Total Knee, Hip, Ankle Replacements- Duke Health System Consensus/Evidence-based - 2016

1. BMI 40 or greater
2. Active smoker- must begin cessation program (urine and serum testing)
3. HgA1C > 7.5%
4. Albumin of 3 or less (?3.4 or less)
5. Anemia - Hgb less than 11 (procedure/weight/gender based)
6. Thrombocytopenia- platelets less than 50k
7. ESRD on dialysis
8. Coronary stenting with or without AMI within the past 6 months
9. Stroke or TIA within previous 6 months
10. Any active infections; any open wounds on the lower extremity posted for surgery
11. Other significant issues- e.g. uncontrolled hypo-hyperthyroidism/ hyperparathyroidism, ASA 4, COPD on oxygen, etc.
12. Chronic high dose narcotic use (morphine milligram equivalents)

Patients that do not meet these criteria may occasionally receive surgery if reviewed and approved by a faculty panel at Preoperative Conference.

SPECIAL ARTICLE

A Perioperative Medicine Model for Population Health: An Integrated Approach for an Evolving Clinical Science

Solomon Aronson, MD, MBA, FASA, FACC, FCCP, FAHA, FASE,* Julie Westover, BS,* Nicole Guinn, MD,* Tracy Setji, MD, MHS,† Paul Wischmeyer, MD,* Padma Gulur, MD,* Thomas Hopkins, MD,* Thorsten M. Seyler, MD, PhD,‡ Sandhya Lagoo-Deendayalan, MD, PhD,§ Mitchell T. Heflin, MD, MHS,† Annemarie Thompson, MD,* Madhav Swaminathan, MD,* and Ellen Flanagan, MD*

Table 1. Population Cohorts, Examples, and Potential for Value Creation

Healthy	Asymptomatic Early Chronic Disease	Complex Full Onset Chronic Disease	Special Complex Disease
Majority of population	DM, HTN, IHD, CHF, smoking	Late-stage CHF, COPD, chronic back pain, CV disease, DM	Cancer, stroke, transplant, congenital disease
Negligible value creation potential	Moderate value creation potential	Significant value creation potential	Significant value creation potential

Abbreviations: CHF, congestive heart failure; COPD, chronic obstructive pulmonary disease; CV, cardiovascular; DM, diabetes mellitus; HTN, hypertension; IHD, ischemic heart disease.

Table 2. Perioperative Risk Evaluation and Optimization Programs at Duke

Clinic Name	Modifiable Risk(s)	Timeline
Preoperative anemia clinic	Anemia	Operational
Preoperative diabetes clinic	Poor glycemic control	Operational
Preoperative nutrition optimization clinic	Malnourishment	Operational
Perioperative pain clinic	Complex pain syndromes	Operational
Perioperative optimization for senior health clinic	Elderly, medically complex, frail	Operational
Perioperative smoking cessation clinic	Smoking	Planned FY18
PAT clinic (current state) PASS clinic	Opioid risk assessment/medicine reconciliation by pharm tech	Operational planned FY18
Coagulation management clinic	Coagulation disorders	In development
Obstructive sleep apnea clinic	Sleep disorders	In development
Weight reduction regimen and counseling	Obesity	In development
Preop functional readiness and clinic	Poor exercise tolerance	In development
Perioperative mental health clinic	Mental health disorders	In development
Preoperative allergy clinic	PCN allergy testing	Operational
Preoperative cognitive assessment	Discharge planning	In development
Preop CHF/HTN/CAD/stents optimization	CV health assessment	In development

Abbreviations: CAD, coronary artery disease; CHF, congestive heart failure; CV, cardiovascular; FY, fiscal year; HTN, hypertension; PASS, preanesthesia surgical screening; PAT, preanesthesia testing; PCN, penicillin; prehab, prehabilitation; preop, preoperative.

The Journal of Arthroplasty xxx (2017) 1–7

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[a] Duke University School of Medicine, Mary Duke Biddle Trent Semans Center for Health Education, Duke University Medical Center Greenspace, Durham, North Carolina
[b] Department of Orthopaedic Surgery, Duke University Medical Center, Durham, North Carolina
[c] Department of Biostatistics and Bioinformatics, Duke Clinical Research Institute, Duke University Medical Center, Durham, North Carolina

- 66,950 patients, minimum 2 year follow up
- Risk factors for chronic use: pre-operative use, younger age, female gender, greater length of stay, and worse health status.

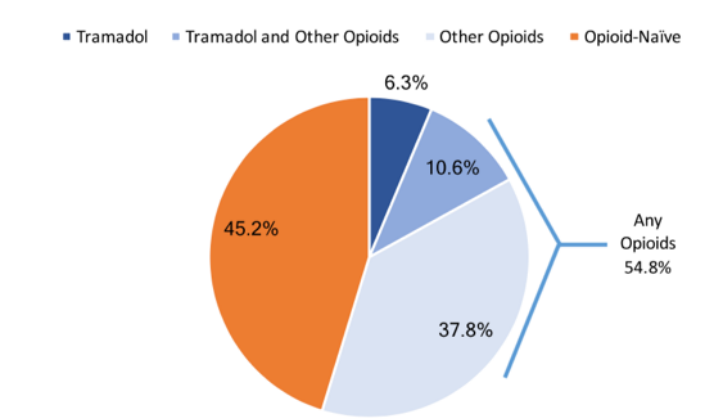


Fig. 1. Percentage of patients in each pre-TKA opioid use cohort

Alert…what about the patient that comes in on narcotics?

Join us for the grand opening of Duke Perioperative Pain Care!

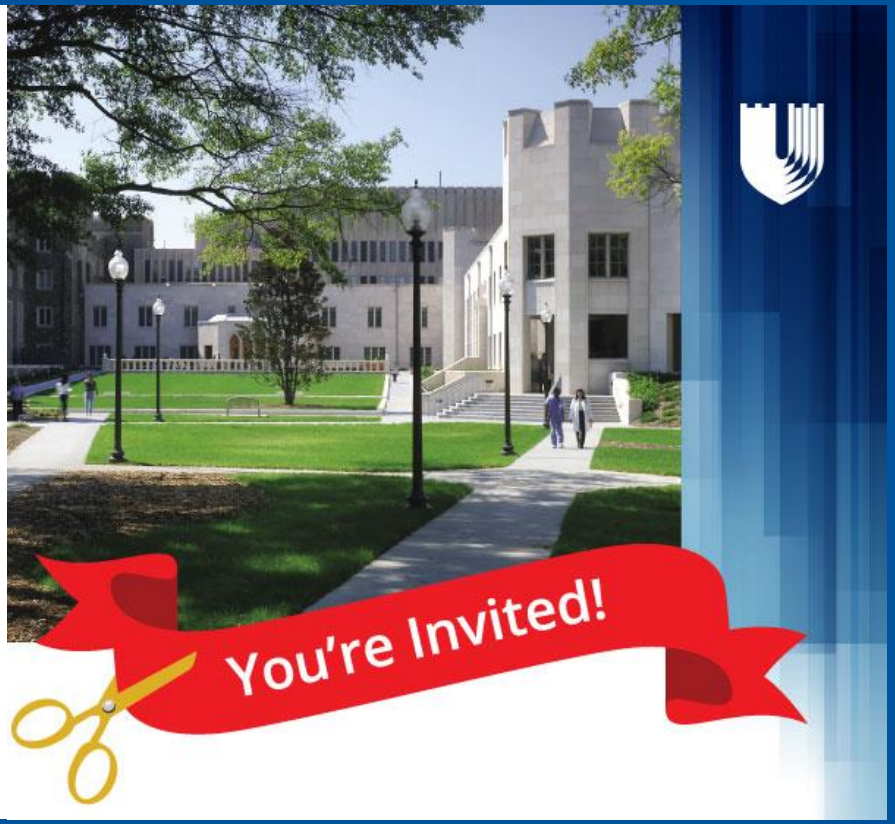
This clinic is the first-of-its-kind in the nation, established to optimize the functional recovery of surgical patients through personalized care plans for their pain management.

We cordially invite you to celebrate the opening of this new clinic with coffee and cupcakes!

Date: Monday, March 13th

Time: 12:30 p.m.

Location:
Duke Perioperative Pain Care
Duke Clinic 2F/2G
40 Duke Medicine Circle
Durham, NC 27710



Utilization of Data to Make Predictive Tool….

….Academic opportunity….

Duke Health Total Joint Database:
Candidates for Outpatient TKA

4,970
Primary Unilateral TKAs

March 2014 – December 2017

DUH, DRH, DRAH

Univariable Significance ($p < 0.05$)

Multivariable Model

Factor predictive of Length of Stay <30 hours

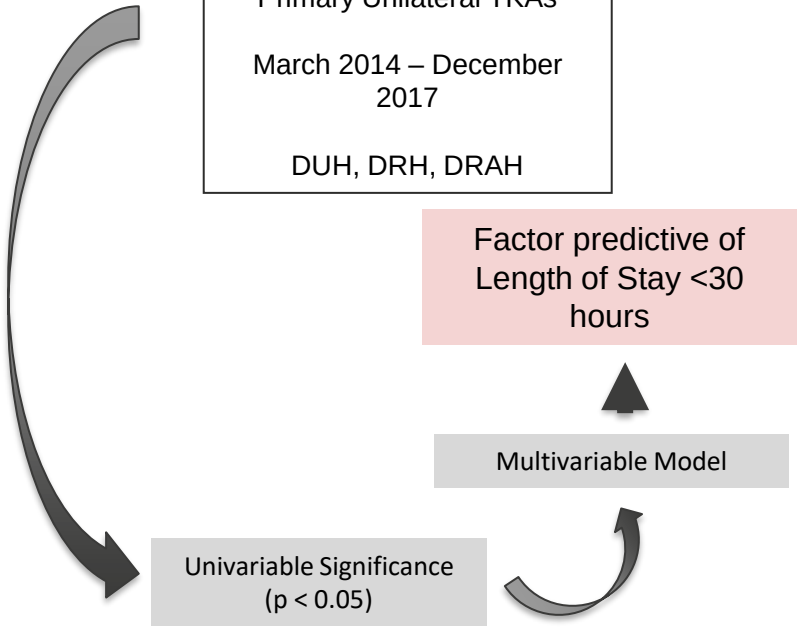
- ✓ 90-day Readmissions
- ✓ 90-day ED Visits
- ✓ Bundled payment targets/costs (if available)
- ✓ Readmission diagnosis/surgery
- ✓ Hospital
- ✓ Attending
- ✓ Gender
- ✓ Age
- ✓ BMI
- ✓ ASA
- ✓ Race
- ✓ Smoking Status
- ✓ Marital Status
- ✓ Chronic opioid use
- ✓ Insurance type
- ✓ Anesthesia type
- ✓ Procedure duration
- ✓ Surgical APGAR Scare
- ✓ Combined Surgical APGAR-ASA Score
- ✓ Hemoglobin (pre- and post-operative)
- ✓ BUN (pre- and post-operative)
- ✓ Creatinine (pre- and post-operative)
- ✓ Albumin (pre-operative)
- ✓ Anion gap (pre-operative)
- ✓ Length of stay
- ✓ Discharge location
- ✓ Indication for primary
- ✓ Primary: emergent vs elective
- ✓ **Elixhauser comorbidity index:**
  - ✓ AIDS HIV
  - ✓ Alcohol Dependence
  - ✓ Deficiency Anemia
  - ✓ Cardiac Arrhythmia
  - ✓ Rheumatoid Collagen Disease
  - ✓ Blood Loss Anemia
  - ✓ Congestive Heart Failure
  - ✓ Chronic Pulmonary Disease
  - ✓ Coagulation Deficiency
  - ✓ Depression
  - ✓ Diabetes
  - ✓ Diabetes Complicated
  - ✓ Drug Abuse
  - ✓ Hypertension
  - ✓ Hypertension Complicated
  - ✓ Hypothyroidism
  - ✓ Liver Disease
  - ✓ Lymphoma
  - ✓ Electrolyte Disorder
  - ✓ Metastatic Cancer
  - ✓ Neurologic Disease
  - ✓ Paralysis
  - ✓ Peripheral Vascular Disease
  - ✓ Psychoses
  - ✓ Pulmonary Circulation Disease
  - ✓ Renal Failure
  - ✓ Tumor Without Metastasis
  - ✓ Peptic Ulcer Disease
  - ✓ Valvular Disease
  - ✓ Weight Loss

Duke Health Total Joint Database:
Candidates for Outpatient TKA

4,970
Primary Unilateral TKAs

March 2014 – December 2017

DUH, DRH, DRAH



458 cases (9.2%) with inpatient LOS < 30 hours

- 90-day readmission rate:
  - < 30 hours: 4.6%
  - > 30 hours: 4.5% (p = 0.95)

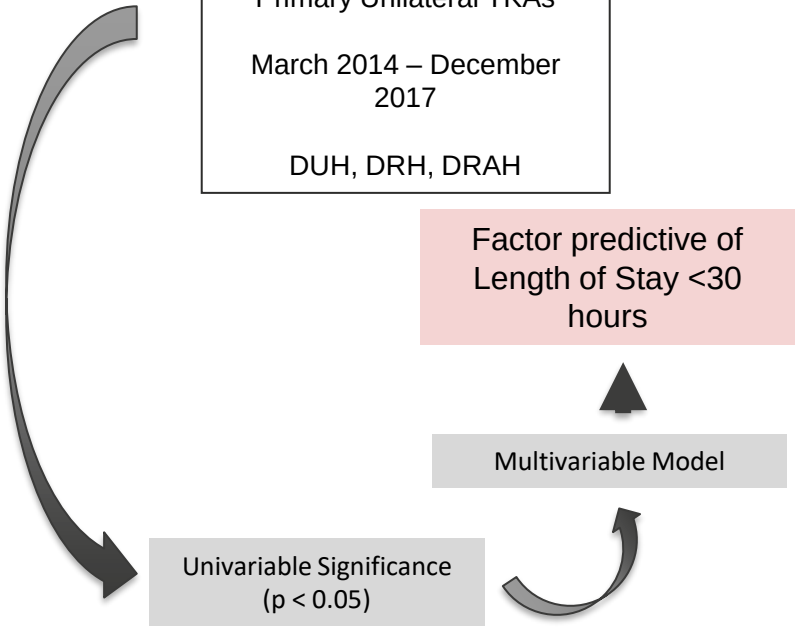
Variable	Odds Ratio	P-value
Positive Association		
Age < 75	1.76	0.0010
Pre-operative hemoglobin	1.11	0.0063
Gender (male)	1.37	0.0059
Negative Association		
BMI	0.89	0.0222
ASA Score	0.72	0.0009
Insurance Type (Medicare)	0.76	0.0087
Depression	0.69	0.0284
Electrolyte disorder	0.61	0.0353

Duke Health Total Joint Database:
Candidates for Outpatient TKA

4,970
Primary Unilateral TKAs

March 2014 – December 2017

DUH, DRH, DRAH



458 cases (9.2%) with inpatient LOS < 30 hours

- 90-day readmission rate:
  - < 30 hours: 4.6%
  - > 30 hours: 4.5% (p = 0.95)

Sub-analysis: Medicare Only

N = 2201 TKAs

7.5% LOS < 30 hours (p = 0.0004 vs non-Medicare)

Variables reaching significance in multivariable model:

- Hemoglobin
- Age
- ASA
- Depression

AUC: 0.69!

Predictive Models: Underlying Cohort/Variables

N > 50,000

Total Hip, Knee, and Shoulder Arthroplasty Cases

DukeHealth 2013 – 2020 (all)

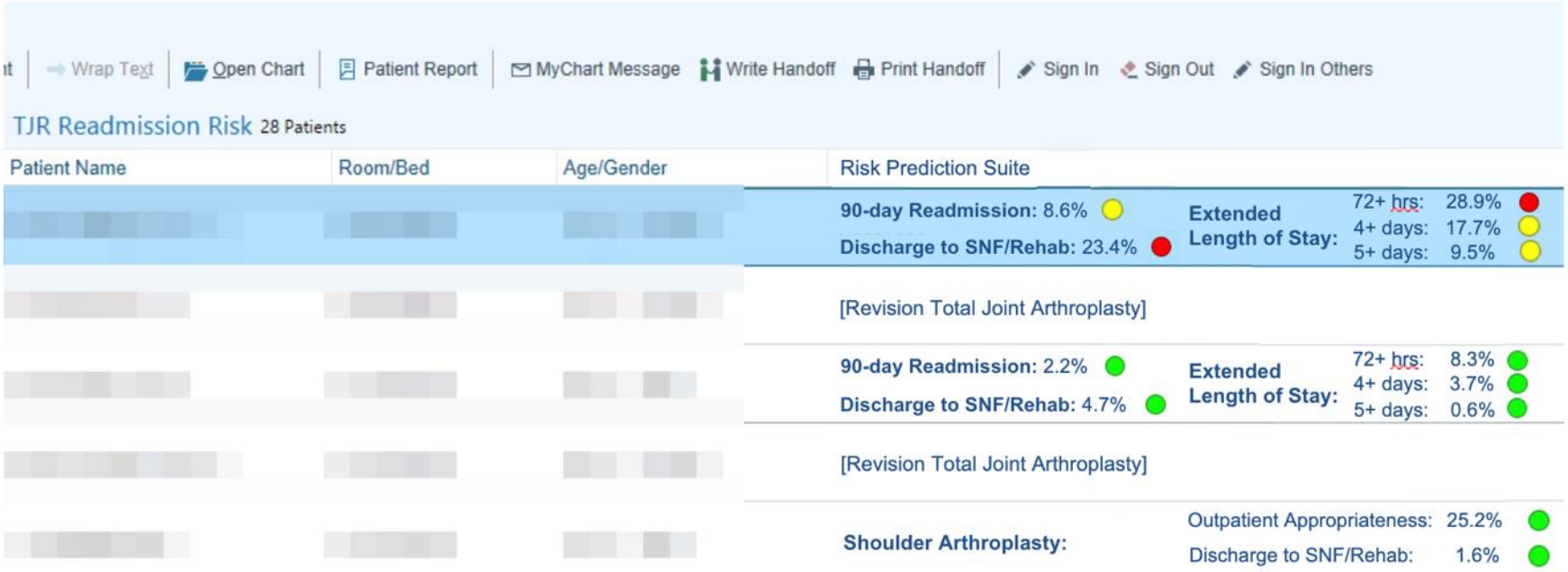
NYU Langone Health 2013 – 2020 (hip/knee)

RUSH 2008 – 2020 (shoulder)

- ✓ 90-day Readmissions
- ✓ 90-day ED Visits
- ✓ Bundled payment targets/costs (if available)
- ✓ Readmission diagnosis/surgery/days
- ✓ Hospital
- ✓ Attending
- ✓ Gender
- ✓ Age
- ✓ BMI
- ✓ ASA
- ✓ Race
- ✓ Smoking Status
- ✓ Marital Status
- ✓ Chronic opioid use
- ✓ Chronic anticoagulation
- ✓ Revision
- ✓ Fracture
- ✓ Laterality
- ✓ Insurance type
- ✓ Anesthesia type
- ✓ Procedure duration
- ✓ Surgical APGAR Scare
- ✓ Combined Surgical APGAR-ASA Score
- ✓ Hemoglobin (pre- and post-operative)
- ✓ BUN (pre- and postoperative)
- ✓ Creatinine (pre- and post-operative)
- ✓ Albumin (pre-operative)
- ✓ Anion gap (pre-operative)
- ✓ Length of stay
- ✓ Discharge location
- ✓ Indication for primary
- ✓ Primary: emergent vs elective
- ✓ **Elixhauser comorbidity index:**
  - ✓ AIDS HIV
  - ✓ Alcohol Dependence
  - ✓ Deficiency Anemia
  - ✓ Cardiac Arrhythmia
  - ✓ Rheumatoid Collagen Disease
  - ✓ Blood Loss Anemia
  - ✓ Cardiac Arrhythmia
  - ✓ Congestive Heart Failure
  - ✓ Chronic Pulmonary Disease
  - ✓ Coagulation Deficiency
  - ✓ Depression
  - ✓ Diabetes
  - ✓ Diabetes Complicated
  - ✓ Drug Abuse
  - ✓ Hypertension
  - ✓ Hypertension Complicated
  - ✓ Hypothyroidism
  - ✓ Liver Disease
  - ✓ Lymphoma
  - ✓ Electrolyte Disorder
  - ✓ Metastatic Cancer
  - ✓ Neurologic Disease
  - ✓ Paralysis
  - ✓ Peripheral Vascular Disease
  - ✓ Psychoses
  - ✓ Pulmonary Circulation Disease
  - ✓ Renal Failure
  - ✓ Tumor Without Metastasis
  - ✓ Peptic Ulcer Disease
  - ✓ Valvular Disease
  - ✓ Weight Loss

Requirement:
Every variable must be able to be pulled in an automated fashion

Surgical Risk Prediction Suite: Full Implementation In Progress



Duke Orthopaedic Surgery
Duke University School of Medicine

Surgical Risk Prediction Suite: Hip, Knee, and Shoulder Arthroplasty

Primary Total Hip and Knee Arthroplasty

Clinical Decision Tool	Category	Required Parameters	Accuracy (AUC)
Outpatient Appropriateness (THA)	Pre-operative	22 variables	0.75
Outpatient Appropriateness (TKA)	Pre-operative	22 variables	0.71
Discharge to SNF/Rehab	Pre-operative	9 variables	0.82
90-day Readmission	Pre-operative (previously required post-op variables)	17 variables	0.72
Extended Length of Stay	Pre-operative	18 variables	0.80

Anatomic and Reverse Total Shoulder Arthroplasty

Clinical Decision Tool	Category	Required Parameters	Accuracy (AUC)
Outpatient Appropriateness	Pre/Intra-operative	8 variables	0.76
Discharge to SNF/Rehab	Pre-operative	9 variables	0.87
90-day Readmission	Pre-operative	16 variables	0.72

Accuracy Thresholds (AUC)	
0.70	Good
0.80	Very Good
0.90	Excellent

Surgical Considerations

- Efficient rgery
- Standard d on every case
- Less tray
- Do what
- Agree on en anesthesia protocols
- Hip Appr r?

This is ”a” way……

“Standardized and Predictable”

- Celecoxib (Mobic), Lyrica (Neurontin), Tylenol, TXA, preop
- Short acting spinal (hips), Adductor canal block for knees (10 cc 0.25% Marcaine)
- General anesthesia with LMA
- Pericapsular injectable cocktail
- IV steroid: Dexamethasone x 2 doses
- Scopolomine patch, Zofran
- IV Toradol and Pepcid
- Appropriate fluid management
- No foley catheters
- No labs

White Fence Surgical Suites

Joint Implant Surgeons

PRO-MAPP

Midwest Training & Development Services

SurgCenter Development

Midwest Specialty Surgery Center, LLC

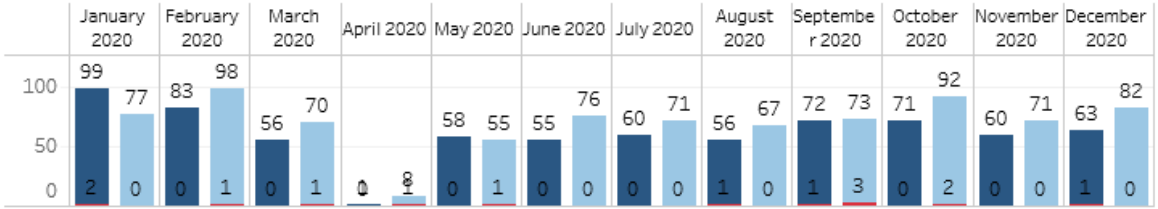
Midwest Center for Joint Replacement

DUHS Total Joint Dashboard (Inpatient Only)

Total Hip CPT Code: 27130
Total Knee CPT Code: 27447

Location: (All)
Rolling 12 Flag: Last 12 Mont...
Month-Year: (All)
Surgeon: (All)
Payer: (All)

THA | TKA | 30-Day Readmits — Total IP Cases and 30-Day Readmissions



Type	Primary Surgeon	Total IP Cases	Avg. Incision to Close (Hrs)	Average LOS	Avg. ASA Rating	ED 90-Day Return %	30-Day Readmit Rate	Avg. Total Direct Cost
Knee	Total	734	1.7	2.0	2.5	7.2%	0.7%	$10,827
	BOLOGNESI, MICHAEL PA..	225	1.4	1.8	2.4	6.2%	0.0%	$9,630
	WELLMAN, SAMUEL SEC..	124	1.7	2.0	2.5	3.2%	0.0%	$11,106
	KELLEY, SCOTT STREATER	82	1.7	1.4	2.6	1.2%	0.0%	$10,680
	SEYLER, THORSTEN MAR..	76	1.9	2.9	2.7	6.6%	1.3%	$12,334
	STANLEY, SAMUEL DAVID	51	2.7	2.6	2.4	9.8%	3.9%	$12,597
	HALLOWS, RHETT KENDA..	42	1.7	1.9	2.7	19.0%	0.0%	$11,365
	HOLST, DAVID CHRISTIAN	42	1.9	2.1	2.6	14.3%	0.0%	$10,495
	ATTARIAN, DAVID EDWA..	29	1.6	1.8	2.4	0.0%	0.0%	$8,887
	JIRANEK, WILLIAM ARTH..	23	2.6	2.3	2.6	17.4%	0.0%	$13,376
	Other MD's	16	1.8	2.1	2.8	18.8%	6.3%	$11,175
	BENEDICT, FREDERICK E..	7	1.4	3.0	2.9	0.0%	0.0%	$11,645
	COMSTOCK, MICHAEL CH..	6	1.4	2.4	2.5	33.3%	16.7%	$11,938
	JONES, DAVID TURNER	4	1.3	3.7	2.5	0.0%	0.0%	$12,373
	ALMEKINDERS, LOUIS CO..	3	1.9	2.4	2.7	33.3%	0.0%	$11,169
	BURROUGHS, PAUL L III	2	1.3	1.1	2.5	0.0%	0.0%	$8,966
	WHEELESS, CLIFFORD RO..	1	1.5	3.2	3.0	0.0%	0.0%	$18,883

DukeHealth

DUHS TKA Dashboard: IP vs. OP

Patient Status
- Inpatient
- Outpatient

Location: (All)

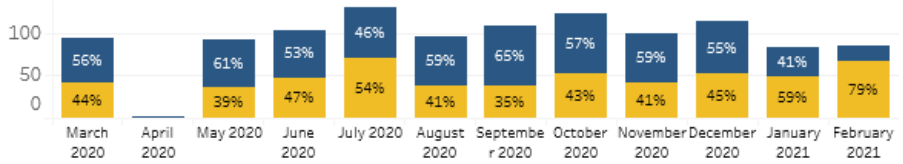
Last 12 Months Flag: Last 12 Months

Month - Year: (All)

Primary Surgeon: (All)

Payer: (All)

Total Cases by Month



YTD Outpatient % of Total

47.2%

Total Cases By Provider

Billing Class	Primary Surgeon	Total Cases	Avg. ASA Rating	Avg. Incision to Close (Hrs)	Avg. Age	Avg. LOS (Hrs)	ED 90-Day Return %	Avg. Total Direct Cost
Grand Total		1,135	2.5	1.7	67	53	5.1%	$8,580
Inpatient	Total	598	2.5	1.8	68	74	5.7%	$9,818
	BOLOGNESI, MICH..	190	2.4	1.4	69	76	4.2%	$8,756
	KELLEY, SCOTT STR..	69	2.6	1.7	71	32	0.0%	$8,888
	WELLMAN, SAMUE..	95	2.5	1.8	65	78	3.1%	$10,835
	HOLST, DAVID CHR..	35	2.6	1.9	68	81	5.6%	$8,992
	HALLOWS, RHETT ..	31	2.7	1.8	68	64	19.4%	$11,034
	SEYLER, THORSTE..	62	2.6	1.9	68	91	6.5%	$11,507
	COMSTOCK, MICHA..	4	2.5	1.2	80	110	0.0%	$9,374
	STANLEY, SAMUEL ..	47	2.4	2.7	70	74	10.6%	$11,639
	ALMEKINDERS, LO..	1	2.0	1.7	72	57	100.0%	$9,660
	ATTARIAN, DAVID ..	25	2.5	1.6	69	71	0.0%	$8,086
	Other MD's	15	2.8	1.8	67	92	26.7%	$8,915
	BENEDICT, FREDER..	4	2.8	1.4	77	97	0.0%	$10,545
	JIRANEK, WILLIAM ..	14	2.5	2.5	68	81	7.1%	$11,953
	BURROUGHS, PAU..	4	2.5	1.3	78	104	0.0%	$5,977

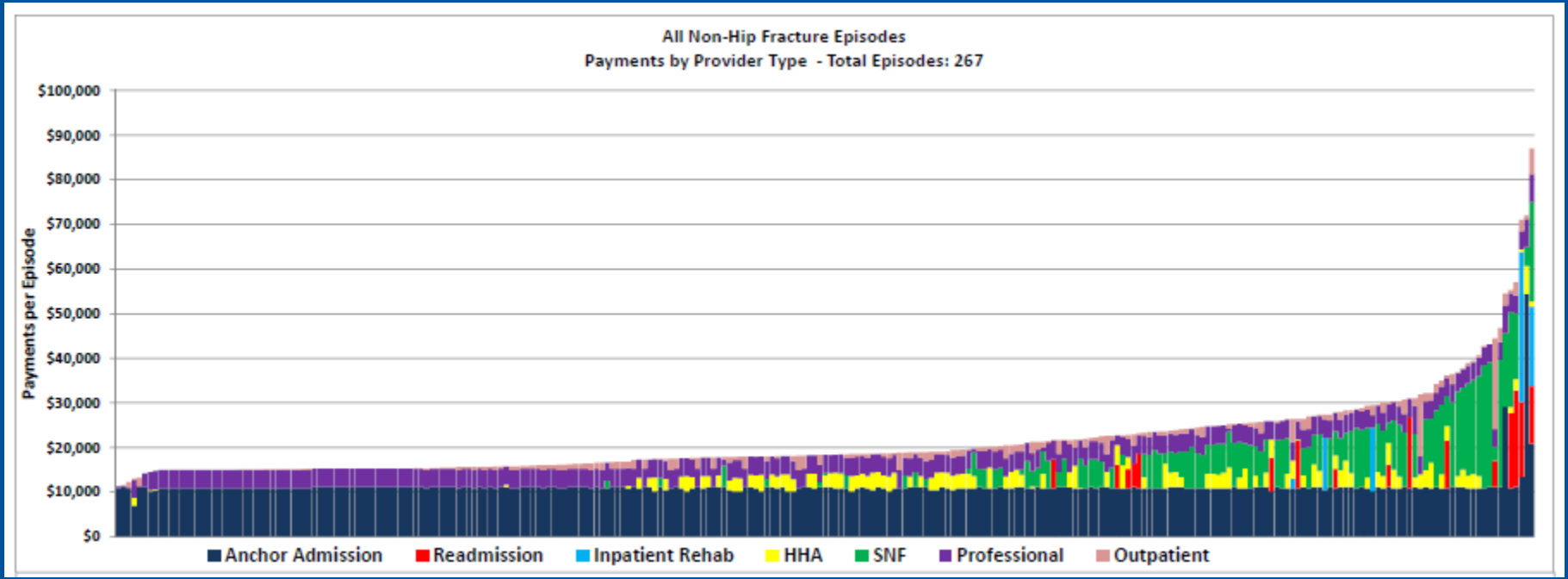
As you might expect….

….the financial considerations are real.

The real big challenge……

- IP vs OP status created a lot of confusion
- The interpretation of the rule has been variable
- Reimbursement to the hospital is at risk
- Has created significant unanticipated out of pocket costs to patients

Where do you spend the money today?…….



DRG 470 without hip fracture-
$20,622 *($819 < mean, $2154 > median) (Historical- Mean $21,441)*

Consider what happens cost wise to the TKA patients that are now coded as OP with the IPO list decision from CMS…..

Financial Considerations

- CMS Patients?
- Direct to Payor Bundles
- Cost containment
- Surgeon performance
- Joint venture opportunity?
- Surgeon ownership?

The COVID Acceleration….

- We did not operate outside of emergencies for 6 weeks
- We eventually got an opportunity to do cases based on a tiered system
- We started to make the argument that we could get people out same day or 23 hour
- We needed to ramp up our program

Usual approach needed change….

- Block in PACU (3rd floor near the OR)
- Go back to PACU to recover
- Move up to 6th floor to a room
- Then PT comes to see the patient
- PACU Hold, Transport delays, Room cleaning delays, discharge delays, etc.

Do we Have any Options?

VIP Case gave me an idea….

Carolina Football ... · Jun 4, 2019

#CarolinaFootball HC @CoachMackBrown underwent successful knee replacement surgery on Monday.

The procedure was done by one of Coach **Brown**'s former UNC players, Dr. Michael **Bolognesi** who said, "The surgery went really well with no issues."

bit.ly/2XpVmxH

12 55 445

Show this thread

Needed to think outside the box….

- Surgical Care Unit (SCU)
- Third floor in the Duke Medical Pavilion
- We had used this location for overflow, VIP cases, etc.
- Utilized by multiple surgical specialites
- Physician extenders on site
- Can we get PT, DME and pharmacy service to show up there?

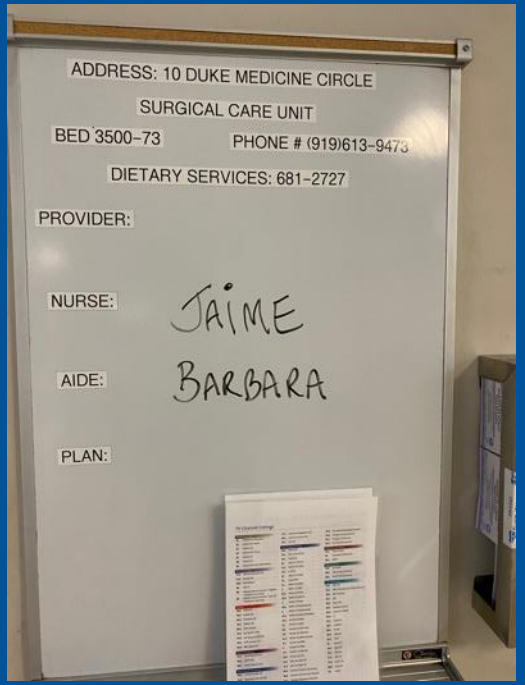
What is this Place?

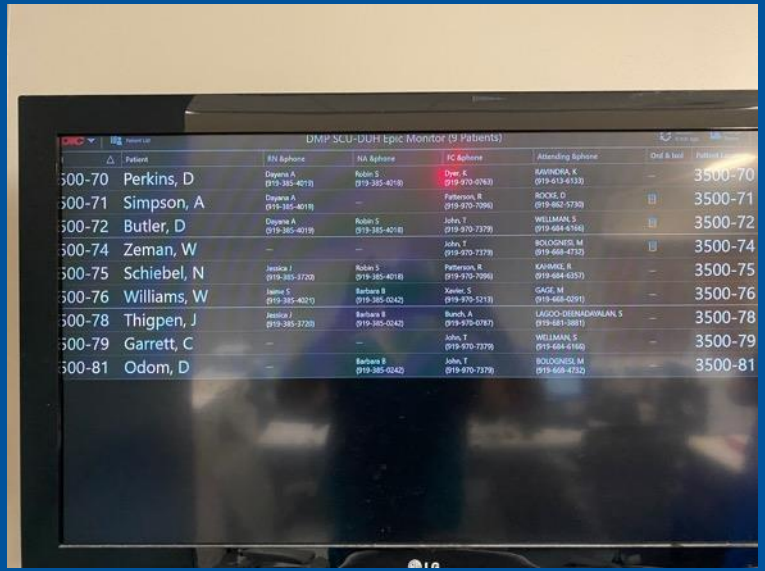
Pretty Nice Waiting Room

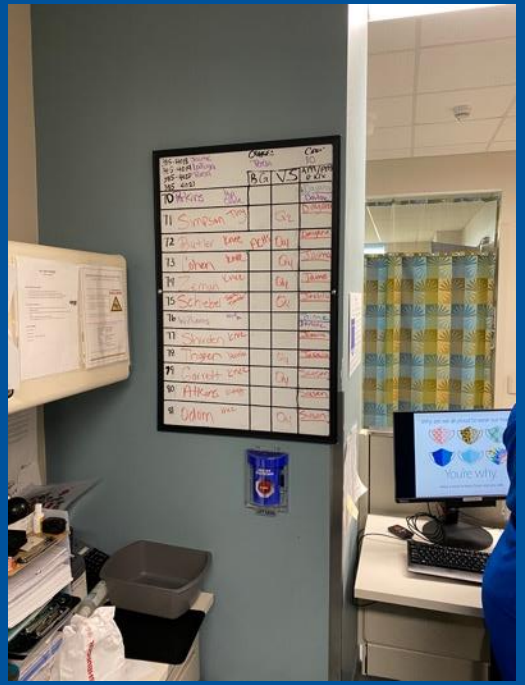
Just the Basics

Everything was There

Twelve “Beds”


ADDRESS: 10 DUKE MEDICINE CIRCLE
SURGICAL CARE UNIT
BED 3500-73
PHONE # (919)613-9473
DIETARY SERVICES: 681-2727
PROVIDER:
NURSE:
JAIME
AIDE:
BARBARA
PLAN:


DMP SCU-DUH Epic Monitor (9 Patients)
Patient
RN &phone
NA &phone
FC &phone
Attending &phone
500-70 Perkins, D
500-71 Simpson, A
500-72 Butler, D
500-74 Zeman, W
500-75 Schiebel, N
500-76 Williams, W
500-78 Thigpen, J
500-79 Garrett, C
500-81 Odom, D
3500-70
3500-71
3500-72
3500-74
3500-75
3500-76
3500-78
3500-79
3500-81



How Did We Do?

You Have to Review the Data..

DukeHealth

Orthopedics & Spine Value

Proc Group Search Mode
CPT Primary Procedure...

Procedure Group
(Multiple values)

Discharge Location
(All)

Discharge Month
(All)

Surgeon
(All)

Surgeon Clinical Dept
(All)

Surgeon Clinical Division
(All)

Patient Base Class
(All)

Discharge Department
(All)

Discharge Disposition
(All)

Age
4 106

Chart Series
Discharge Location

Short Stay Arthroplasty Is Not Associated with Increased 90-Day Complications

Christine J Wu, MD, Sean P Ryan, MD, Zoe W Hinton, MD, Lefko T Charalambous, BS, Samuel S Wellman, MD, Michael P Bolognesi, & Thorsten M Seyler, MD, PhD

Department of Orthopaedic Surgery, Duke University Medical Center, Durham, NC

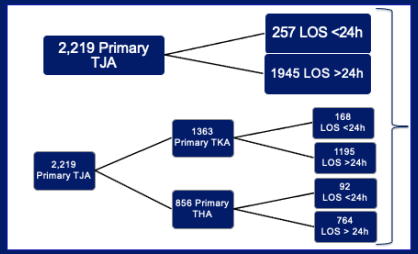
Introduction

- With modern advances in surgical technique and postoperative care, length of stay following total hip (THA) and total knee arthroplasty (TKA) has decreased over time
- With the removal of THA and TKA from the inpatient only list by the Center for Medicare and Medicaid Services (CMS), tertiary referral academic centers are faced with challenging transitions to outpatient surgery
- Outpatient THA and TKA in well-selected patients have proved successful in smaller hospitals and orthopaedic groups with free-standing ambulatory surgery centers (ASC)
- Primary study objective
  1) To investigate if short stay arthroplasty, defined as length of stay (LOS) less than 24 hours, would influence 90-day readmission and ED visit rates at a single tertiary referral center

Methods

- Retrospective review of single tertiary referral center database from July 2015 – January 2018 for patients undergoing primary TKA and primary THA
- Data Collection:
  - Demographics
  - Medical Comorbidities: BMI and ASA score
  - Postoperative Length of Stay (LOS)
  - Disposition
  - 90-day ED visits and 90-day readmissions
  - Total Hospital Cost of Care
- Univariable and multivariable models used to evaluate likelihood of 90-day readmissions and ED visits

Figure 1: Patient Stratification and Analysis



Results

Table 1: Total Joint Arthroplasty Hospital Outcome Variables Across Length of Stay Less Than 24 Hours

	<24hrs (257)	>24hrs (1945)	p-value
Age	64 (57, 70)	65 (58, 71)	0.051
Female Sex	90 (34.6)	1114 (56.9)	<0.001*
BMI (kg/m2)	29.1 (26.1, 32.3)	30.5 (26.6, 34.9)	<0.001*
ASA >2	135 (51.9)	1130 (57.7)	0.077
SNF/Rehab dispo	2 (0.77)	354 (18.1)	<0.001*
90-day ED	11 (4.23)	199 (10.16)	0.002*
90-day readmission	2 (0.78)	101 (5.19)	0.002*
Total hospital cost, normalized	0.95 (0.90, 1.02)	1.04 (0.96, 1.16)	<0.001*

- LOS <24h for all THA/TKA was associated with male sex, lower BMI, lower rates of discharge to SNF or Rehab, lower 90-day ED visits and readmissions, and lower total hospital costs
- Multivariable regression model for readmissions
  - controlling for age, gender, BMI, ASA score
  - LOS >24 hours was significantly more likely to have a readmission (OR 5.98, 95% CI 1.460-24.513; p=0.013)
- Multivariable regression model for ED visits
  - controlling for age, gender, BMI, ASA score
  - LOS >24 hours was significantly more likely to have ED visit (OR 2.408, 95% CI 1.251-4.635; p=0.009)

Table 2: Total Knee Arthroplasty Hospital Outcome Variables Across Length of Stay Less Than 24 Hours

	<24hrs (168)	>24hrs (1195)	p-value
Age	66 (60, 71)	67 (61, 72)	0.139
Female Sex	64 (38.1)	706 (59.1)	<0.001
BMI (kg/m2)	29.6 (26.8, 33.5)	31.3 (27.3, 35.6)	0.006*
ASA >2	77 (45.8)	496 (41.5)	0.287
SNF/Rehab dispo	1 (0.6)	228 (19.08)	<0.001*
90-day ED	9 (5.4)	115 (9.6)	0.072
90-day readmission	2 (1.2)	47 (4.0)	0.073
Total hospital cost, normalized	.94 (0.99, 1.02)	1.02 (0.95, 1.27)	<0.001*

- LOS <24h TKA was associated with lower BMI, lower rates of discharge to SNF or Rehab, and lower total hospital costs
- Multivariable regression model for readmissions
  - controlling for age, gender, BMI, ASA score
  - LOS >24 hours was was not significantly associated with readmission (OR 2.916, 95% CI 0.695-12.237; p=0.144
- Multivariable regression model for ED visits
  - controlling for age, gender, BMI, ASA score
  - LOS >24 hours was not significantly associated with ED return (OR 1.677, 95% CI 0.827-3.400; p=0.152)

Results (cont'd)

Table 3: Total Hip Arthroplasty Hospital Outcome Variables Across Length of Stay Less Than 24 Hours

	<24hrs (92)	>24hrs (764)	p-value
Age	61 (51, 68)	63 (54, 70)	0.092
Female Sex	66 (71.7)	356 (46.6)	<0.001*
BMI (kg/m2)	28.2 (24.6, 30.4)	29.2 (25.5, 33.5)	0.014*
ASA >2	44 (47.8)	431 (56.5)	0.114
OR time	91.8 (79.8, 103.2)	96.0 (82.2, 118.8)	0.009*
SNF/Rehab dispo	1 (1.1)	126 (16.5)	<0.001*
90-day ED	2 (2.2)	84 (11.0)	0.008*
90-day readmission	0 (0)	54 (7.11)	0.009*
Total hospital cost, normalized	0.99 (0.92, 1.04)	1.08 (0.99, 1.20)	<0.001*

- LOS <24h THA was associated with female sex, lower BMI, shorter OR time, lower rates of discharge to SNF or Rehab, decreased 90 day ED visits and readmissions, and lower total hospital costs
- Multivariable regression model for ED visits
  - controlling for age, gender, BMI, ASA score
  - LOS >24 hours was significantly more likely to have an ED visit (OR 8.676, 95% CI 1.184-63.548; p=0.034)

Conclusions

- Short Stay (LOS <24 hours) was associated with significantly decreased risk of 90-day readmissions and ED visits, lower rates of discharge to SNF/Rehab, and lower costs
- After controlling for potential confounding variables, a significant decrease in ED visits remained in the THA cohort alone
- With the goal of minimizing costs and maintaining patient safety, outpatient and short stay arthroplasty seem to be valuable and feasible options in tertiary academic centers

Financial Disclosures: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Best Poster Award….

- Complications Not Including Infection
- Short Stay (LOS <24 hours) was associated with significantly decreased risk of 90-day readmissions and ED visits, lower rates of discharge to SNF/Rehab, and lower costs
- With the goal of minimizing costs and maintaining patient safety, outpatient and short stay arthroplasty seem to be valuable and feasible options in tertiary academic centers

It can be done in the big hospital….

- By no means perfect
- Still struggle to get folks out of the PACU and over to the SCU
- Getting DME and Meds to Beds to happen after 5 pm can be a challenge
- Some cases with eventually ”have” to got to the true ASC setting
- This likely has improved care…..

What is our current state?

New free standing ASC..

Duke Arringdon

Waiting Room

OR's

Recovery Room/Overnight Bays

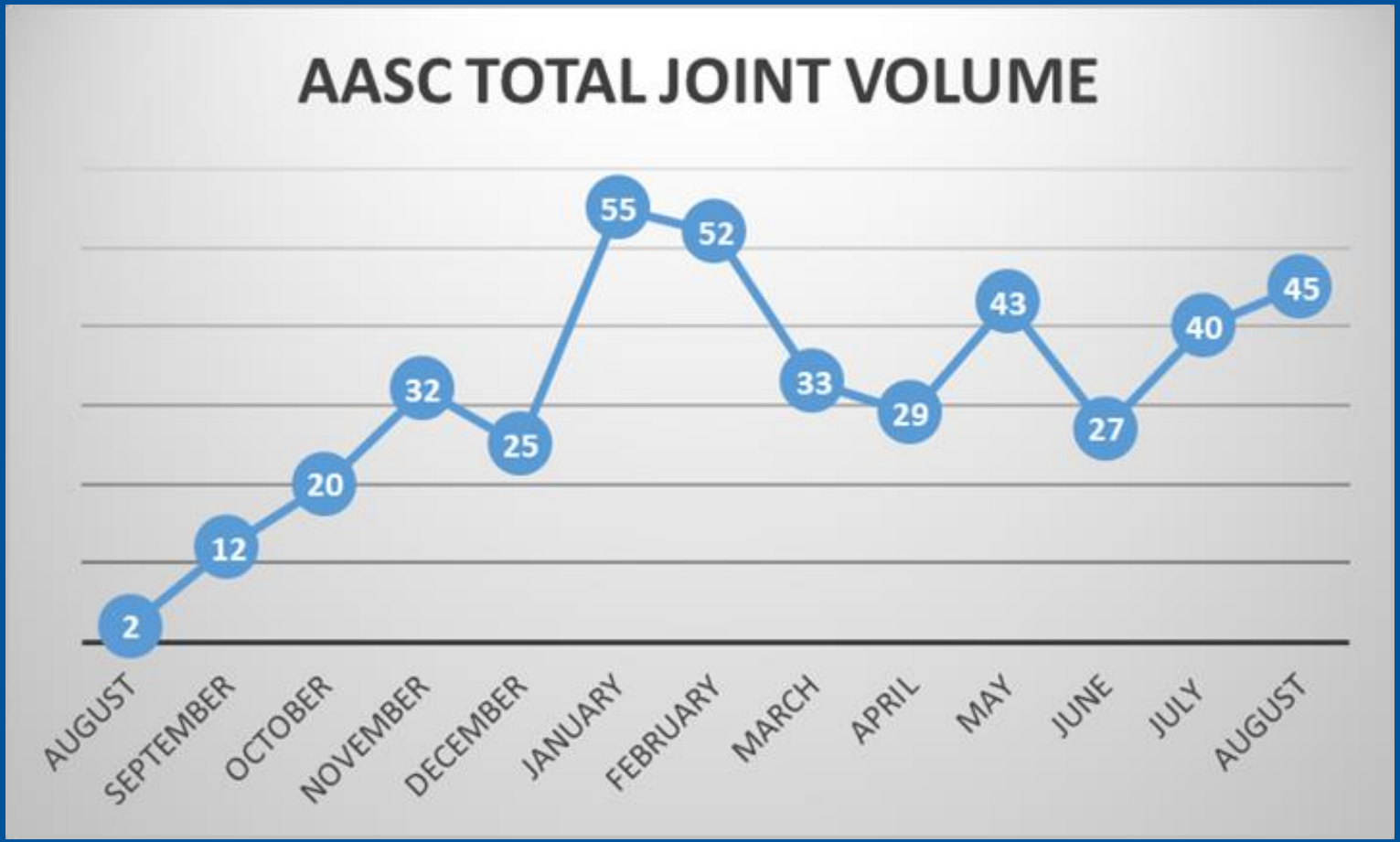
Patient Selection Guidelines for Outpatient Total Joint Replacement

Patient Medical Factors:

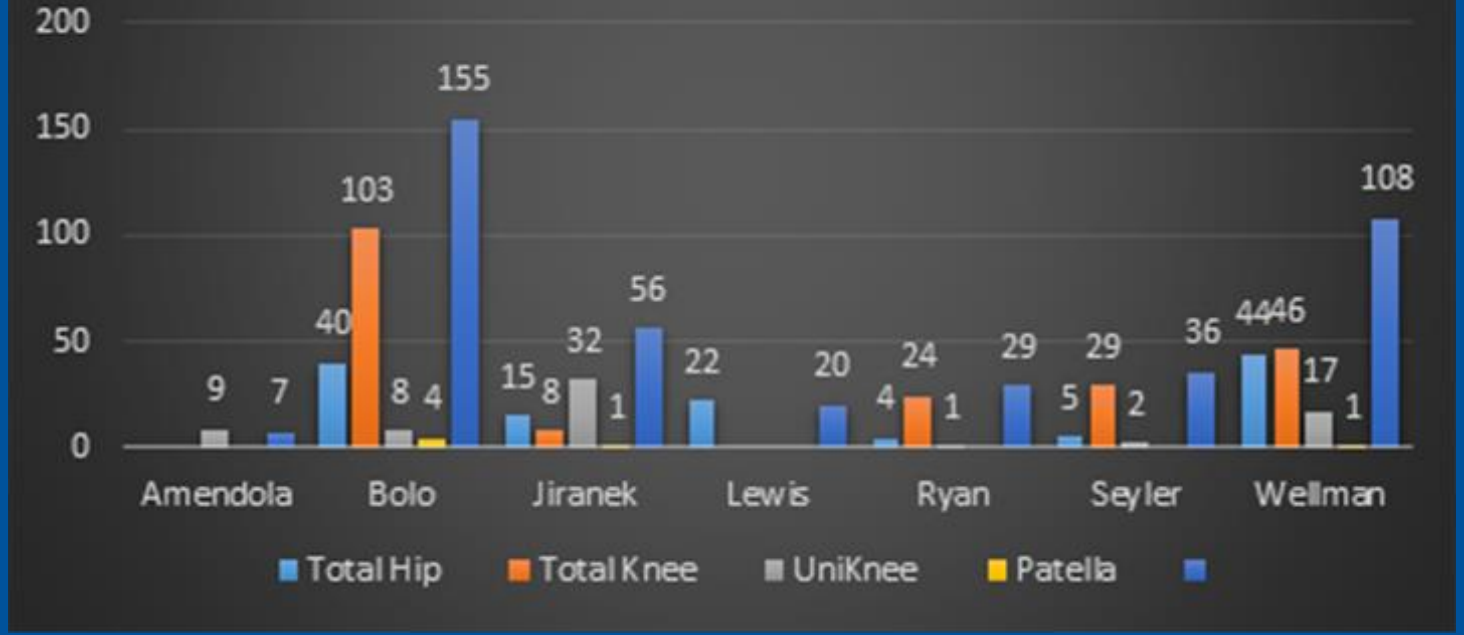
- Must not have any systemic infection or communicable disease
- Must have ASA Physical Classification Score of 3 or less, and determined appropriate for procedure through collaboration of anesthesia provider and physician
- Obstructive Sleep Apnea (OSA) requires evaluation by anesthesia
- BMI < 40
- No known significant cardiac condition (i.e., Coronary Artery Disease, CHF, Uncontrolled hypertension, Arrhythmia, Pacemakers, AICD)
- No significant evidence of pulmonary disease (i.e., COPD)
- No significant history of significant GI issues – such as post-op ileus
- No significant history of liver disease – (i.e., Cirrhosis)
- No significant renal failure
- No significant hematology issues (i.e., HGB > 13)
- No significant elevation in Hemoglobin a1c
- No significant gyne-uro issues (History of urinary retention)
- No major neurological issues (History of dementia or post-op delirium), Prior CVA
- No history of major organ transplant
- No documented history of MRSA
- No history of malignant hyperthermia
- No active substance abuse or unmanaged chronic pain
- No poorly controlled anxiety or depression

These guidelines can be modified at any time and are at the discretion of the operating surgeon and anesthesia provider.

AASC TOTAL JOINT VOLUME



AASC TOTAL JOINT VOLUME through August 2022: 415 cases; 29 CORI robot



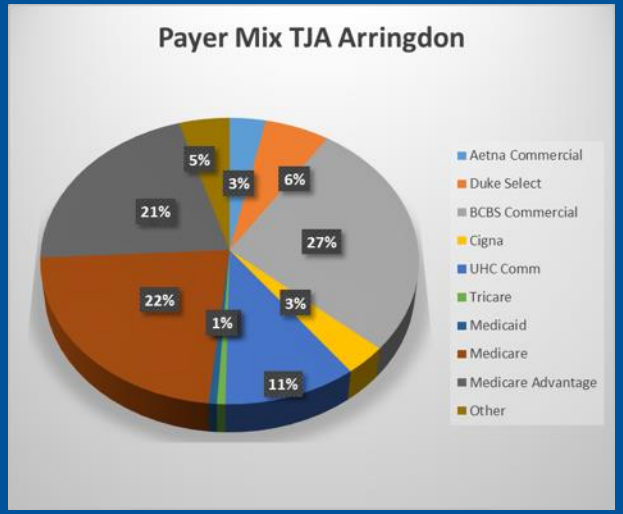
Total Joint Outcomes Dashboard

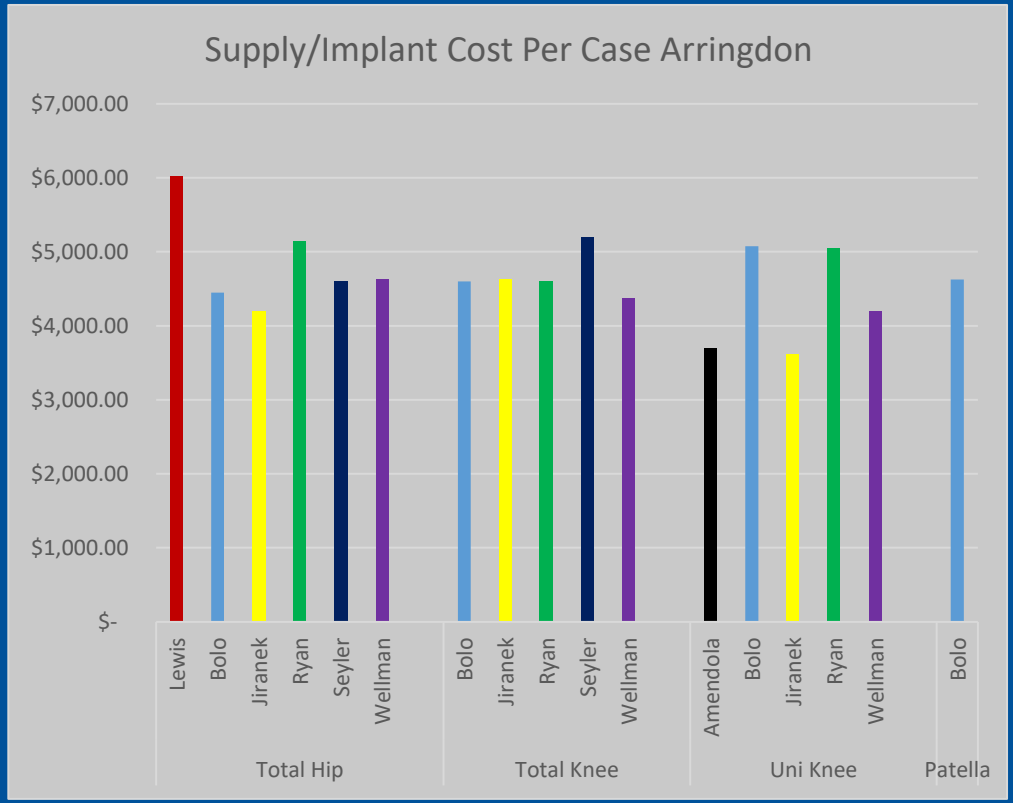
				Procedure					
Description:	Patella	Partial Knee 27446	Total Knee 27447	Total Hip 27130	Total Shoulder 23472	Hemi Shoulder 23470	Event Total	Events per 1000 patients	% of Total Case Volume
Admission within 30 days			1				1	5	0.27%
Admissions 30-90 days									
Return to OR < 30 days				1			1	5	0.27%
Return to OR 30-90 days									
Return to ED 1 Day			2				2	10	0.54%
Return to ED < 30 days			8	3			8	40	2.16%
DVT's									
Falls*			1				1	5	0.27%
Pain									
SSI's: Superficial			1	1			2	10	0.54%
Periprosthetic JI									
Hospital Transfers				2			2	10	0.54%
Event Total			11	6			17		4.59%
Patients Involved			11	5			16		4.32%
% of Procedure Case Volume	3.06%	31.82%	50.81%	30.54%					
Total Procedure Case Volume	6	63	188	113			370		

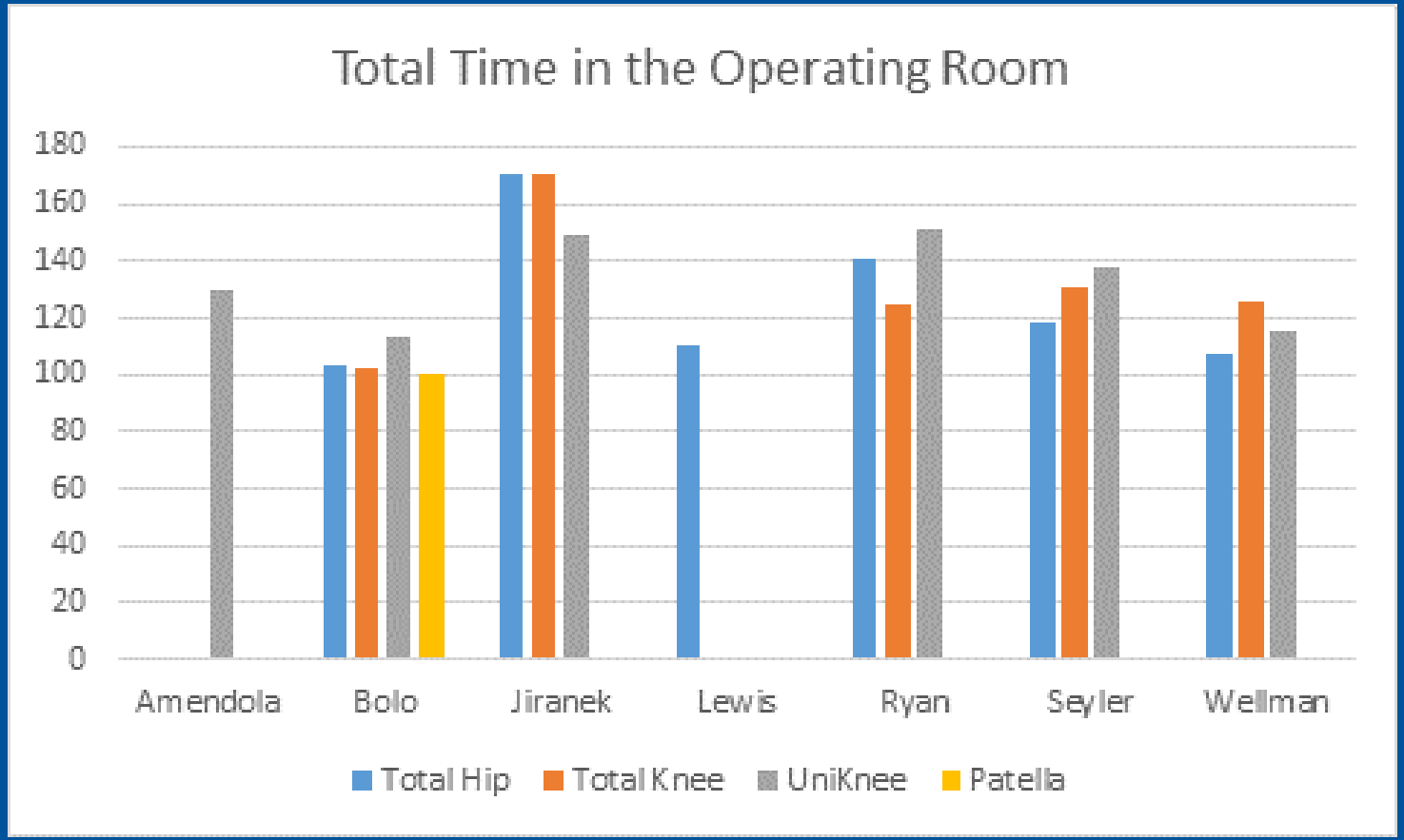
* Includes all falls and assisted to ground

** Per CDC definition - Infection that occurs after surgery in the part of the body where surgery took place. SSI can sometimes be superficial infection involving the skin only

Rate for Primary total Joint Procedures (DRG 470) 30-day Admission (all cause) is 3.91%. 90-day Admission (all casue) 5.23%. Source: Crimson Clinical Advantages Continuum of Care 2/17/19. The Complication of Care metric is based on the AHRQ (Agency for HealthCare Research and Quality) classication system for complication codes.

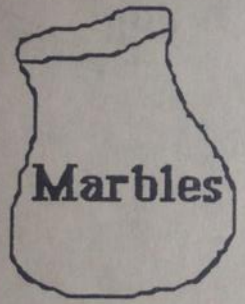

Payer Mix TJA Arringdon
5%
3%
6%
21%
27%
22%
3%
1%
11%
Aetna Commercial
Duke Select
BCBS Commercial
Cigna
UHC Comm
Tricare
Medicaid
Medicare
Medicare Advantage
Other


Supply/Implant Cost Per Case Arringdon
$7,000.00
$6,000.00
$5,000.00
$4,000.00
$3,000.00
$2,000.00
$1,000.00
$-
Lewis
Bolo
Jiranek
Ryan
Seyler
Wellman
Bolo
Jiranek
Ryan
Seyler
Wellman
Amendola
Bolo
Jiranek
Ryan
Wellman
Bolo
Total Hip
Total Knee
Uni Knee
Patella


Total Time in the Operating Room
180
160
140
120
100
80
60
40
20
0
Amendola
Bolo
Jiranek
Lewis
Ryan
Seyler
Wellman
Total Hip
Total Knee
UniKnee
Patella

We are doing a pretty good job…….

2. There are 5 red, 3 green, and 4 blue marbles in a bag. What would be the chance of getting a red marble if the marble was pulled out of the bag without looking?



Discussion

- Screening is critical to succeed in this space.
- Lots of things have to change with the transition to OP
- Education also becomes even more important
- Patient needs home support/advocate….
- Anesthesia's role is critical and needs to support OP effort
- Need buy in from everyone…
- The financial considerations are challenging
- Surgeon performance and behavior must be considered….
- Will always be a challenge in some patients and not every CMS total joint needs to become an OP!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Some patients….

….will always be a challenge in the OP setting….

What other things are alerts?……

- Wearing Disney sweatshirt (Grumpy is the worst)
- Wearing dark glasses inside
- Writes extensive extra history in margin of intake form, marks skin with pen to designate localization of pain
- 50 year old patient that arrives to clinic appointment with mother and father (not that there is anything wrong with being close to your family)

Also creates concern……

- Has a “protective” wristband under her watch secondary to “metal allergy”
- Anything multiple is bad….
- Has multiple cats
  Has multiple rings
- Multiple allergies- we will discuss this more later
- Same name for first and last name

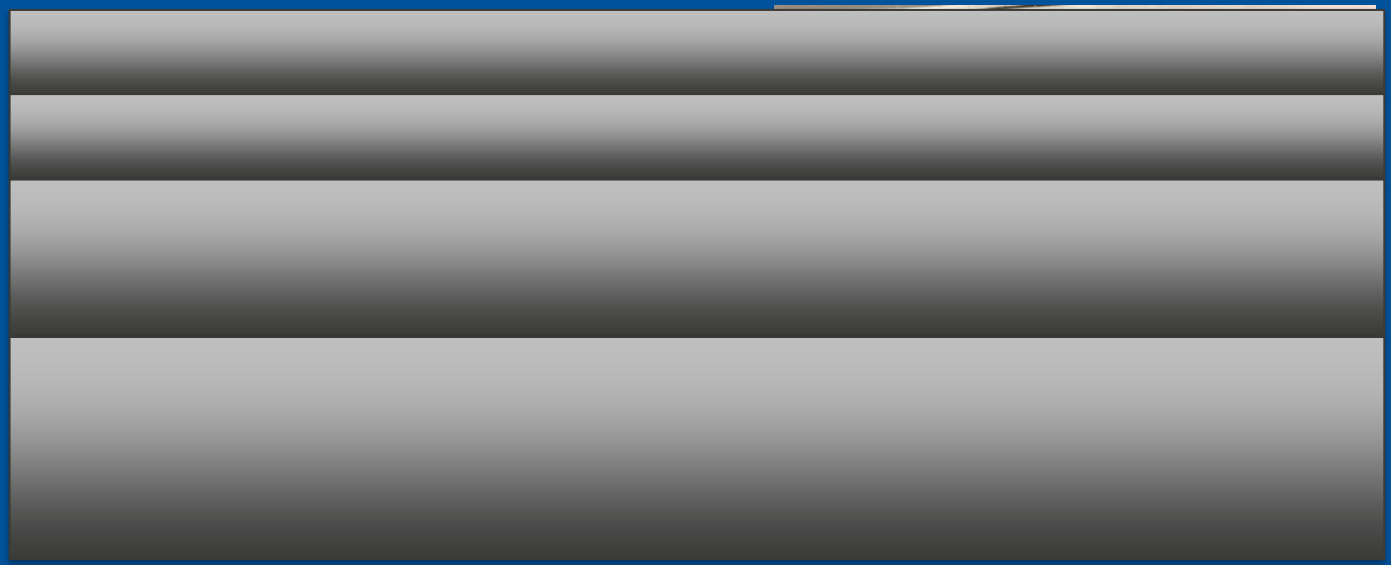
Worrisome quotes……

- I have a high pain tolerance..
- Vicodin does not work for me…
- It can not be any worse than this…
- I wish someone would just cut my legs off…
- I work on hard cement all day…
- My pain is 11/10….
- The only med that works for me is something like ox or oxy……

Word of caution about allergies……

- Tater Tots
- K Mart Kola
- Soap
- Tape
- Epinephrine
- All Metals
- Water?

Extreme allergy situation……



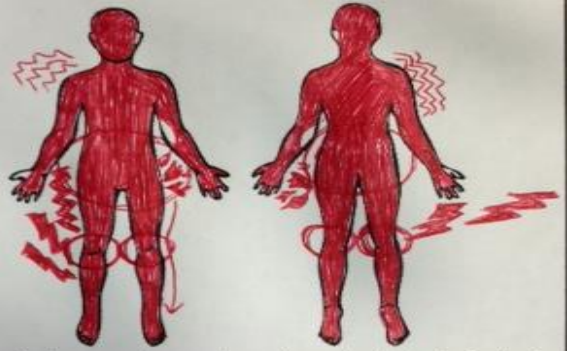

8
2-3

What is the quality of your pain?

- [x] Sharp
- [x] Dull
- [x] Stabbing
- [x] Throbbing
- [x] Aching
- [x] Burning
- [x] Other: Eyeballs

Mark areas below where you are having pain with an X.

FRONT BACK



Please circle a number on the pain scale below to indicate your current pain level.

No Pain 1 2 3 4 5 6 7 8 9 10 Severe Pain

What makes your pain better?

- [ ] Rest
- [ ] Heat
- [ ] Ice
- [ ] Elevation
- [x] Other: Amputation

What makes your pain worse?

- [x] Standing
- [x] Walking
- [x] Lifting
- [x] Exercise
- [x] Twisting
- [x] Lying in Bed
- [x] Bending
- [x] Squatting
- [x] Kneeling
- [x] Stairs
- [x] Sitting
- [x] Coughing
- [x] Sneezing
- [x] Other: breathing CSxing

How often do you
- [ ] Constantly

Does your pain wa

Since your sympt
- [ ] Better

Do you use any of
- [ ] Cane

How many blocks pain limits you? _

Have you had any symptoms? If so
- [ ] Medications
- [ ] Injections
- [ ] Therapy
- [ ] Surgery

What is your curr
- [ ] Out of Work

To be completed

Do your knee(s) s

Do you experienc your knee(s)?

Do you use a raili

Do you have prob

Do you have prob

To be completed

Do you limp whe

Do you have pain

Do you have diffi

Do you have prob

Do you have prob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