



Banner
University Medical Center
Phoenix

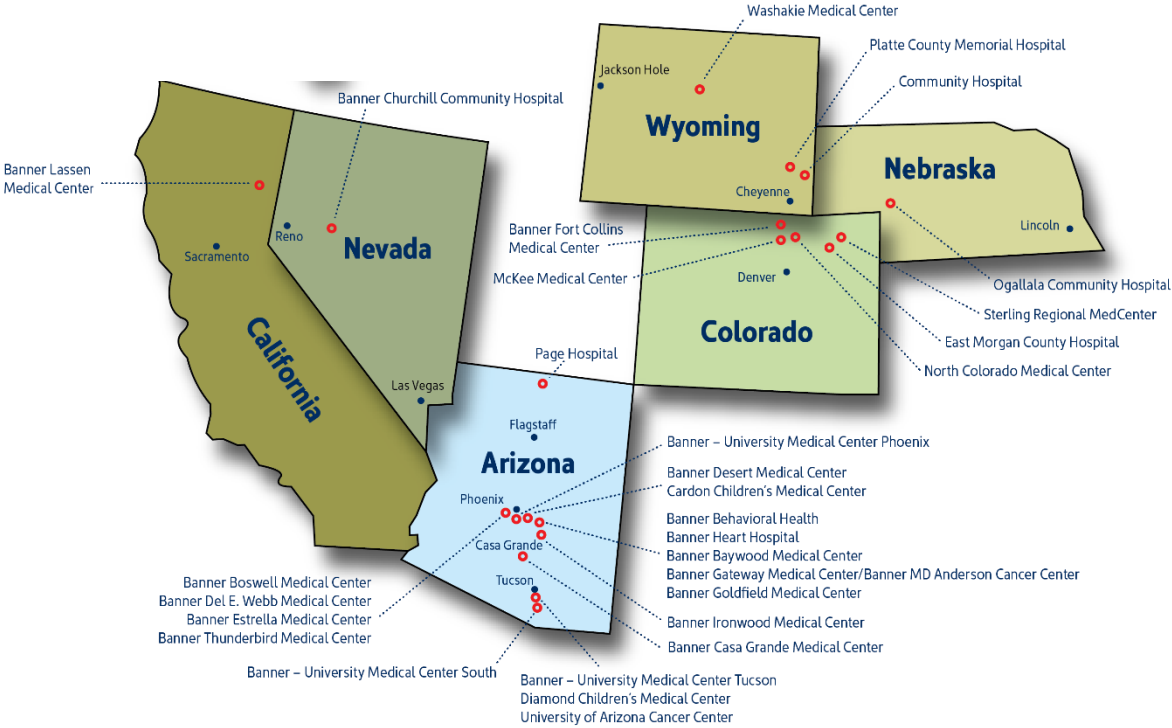
Using Clinical Process Redesign in a Culture of Quality Improvement to Improve Financial Performance of an Academic Medical Center

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Chief Executive Officer
Banner – University Medical Center, Phoenix
Banner Health, Phoenix, Az

Banner Health



- 28 Acute care hospitals and healthcare facilities
- 47,000 employees; largest private employer in Arizona
- Truven Analytics Top 5 large Health Systems (more than \$1.5 billion total operating expense)



Banner – University Medical Center Phoenix

- 733 bed Academic Medical Center
- Teaching Hospital for University of Arizona College of Medicine Phoenix
- ACS Level 1 Trauma Center
- Magnet™ Recognized
- 3,814 Employees
- 1,529 Medical Staff members
- 336 Allied Healthcare Providers



**American Heart Association
American Stroke Association
CERTIFICATION**
Meets standards for
Comprehensive Stroke Center

Vision & Strategy

Vision for Banner – University Medical Center Phoenix

- Highly coordinated destination for patients and families to experience value-based care, including the treatment of highly complex diagnoses
- Attract world-class physicians and members of multi-disciplinary teams to participate in an environment of teaching, scholarship, and clinical improvement
- Invite employed and independent faculty to work alongside to contribute and deliver excellent outcomes
- Improve value through reduction of clinical variation and cost
- Use the science of healthcare delivery to engage physicians, medical students, and staff in the improvement journey



Financial Performance

- 2013-2014
 - Despite double digit increases in Inpatient Admissions, OR cases, Endoscopies, Cath Lab Procedures— **Net Revenue had decreased YOY by over 10% leading to an operating margin of only 1-2 %**
- Senior Leadership Team decided to use this opportunity to launch a campus wide Engagement Effort to align **Physician Expertise** and Leadership **towards 'Clinical Process Redesign' (CPR)** with a focus on reducing waste in key clinical processes and misuse and overuse of supplies and pharmaceuticals.

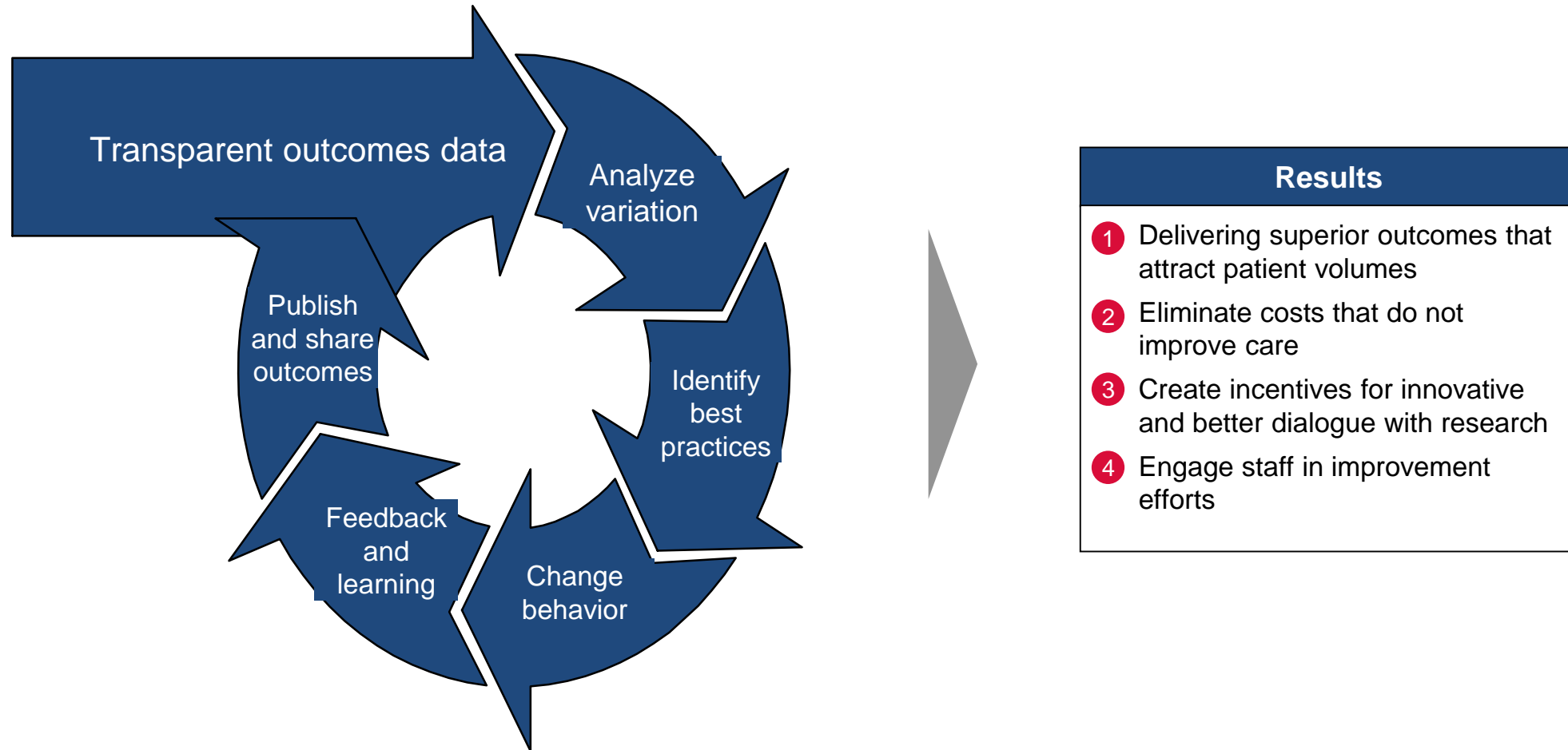


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An Organizational Culture focused on.. Performance Improvement

Strategy – High-value Performance Improvement Teams

Using high-value PI teams increase quality of care while reducing cost for a diagnosis



The Improvement Journey



Build the foundation

facility level infrastructure to support improvement projects

Identification of at least one PI project for each department that utilizes the tools of performance improvement

Education of at least 50% of BUMCP employees on performance improvement

Utilize the tools of PI

▪ *“Improve the way we improve” – focused effort on utilizing the tools of performance improvement related to three key themes:*

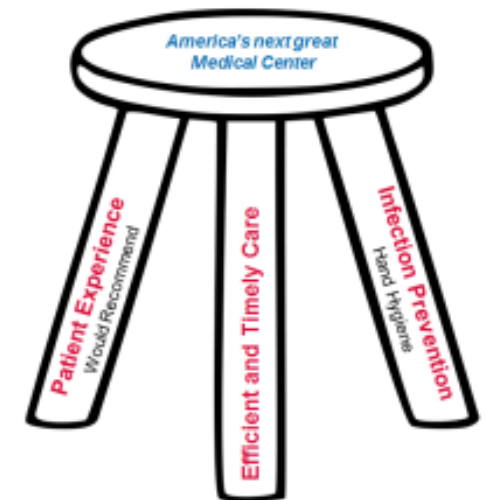
- 1. Efficient & Timely Care*
- 2. Patient Safety*
- 3. Patient Experience*

Disciplined Execution

- Continue improvement journey
- Each department to identify one PI project related to Efficient & Timely care and Patient Safety.
- Design interventions, implement, and remain ‘in control’

High Reliability

- Ensure improvements are sustained
- Increase number PI projects that reach control phase
- Application of high-reliability principals



Two major themes for 2017 improvement projects:

1. Efficient and Timely Care

- a) Reduce patient length of stay (Milliman's Index)
- b) Improve throughput and efficiency (e.g. discharge timeliness)

2. Deliver safe patient care

Each department selected ONE project from EACH of the two major themes

Efficient & Timely Care

1 Reduce LOS – Milliman's Index

- Target: < 1.000 Milliman's Index
- Stretch: < 0.970 Milliman's Index

2 Improve Discharge Timeliness – % discharge by 1pm

- Target: 30% of patients by 1pm
- Stretch: 35% of patients by 1pm

Patient Safety

3 Select a goal related to improving patient safety:

- a) CAUTI Reduction
- b) CLABSI Reduction
- c) Reducing Patient Falls
- d) Reducing Hospital Acquired Pressure Ulcers
- e) Improving Hand Hygiene
- f) ... etc.

System targets utilized when available; if no system target then outperform NDNQI mean for three out of four quarters.

2017 Goal #1 performance will be measured based off the percentage of ALL departments that reach high reliability 10^{-3} (control phase)

Purpose and Objectives

- **Continuing focus around performance improvement, with emphasis on high reliability**
 - Ensuring project interventions are effective and performance is sustained
 - Continuing to apply PDSA cycles and incorporating five themes of high reliability
 - Developing a control plan to ensure new standards and interventions are adhered to and consistently followed
- **Many projects are continuations from those started in 2016*

2017 Goal #1 Performance will be determined by the following:

Meets Expectations

- **50% of ALL department performance projects for 2017 reach high reliability (10^{-3}) control phase before December 31st, 2017.**

Exceeds Expectations

- **65% of ALL department performance projects for 2017 reach high reliability (10^{-3}) control phase before December 31st, 2017.**



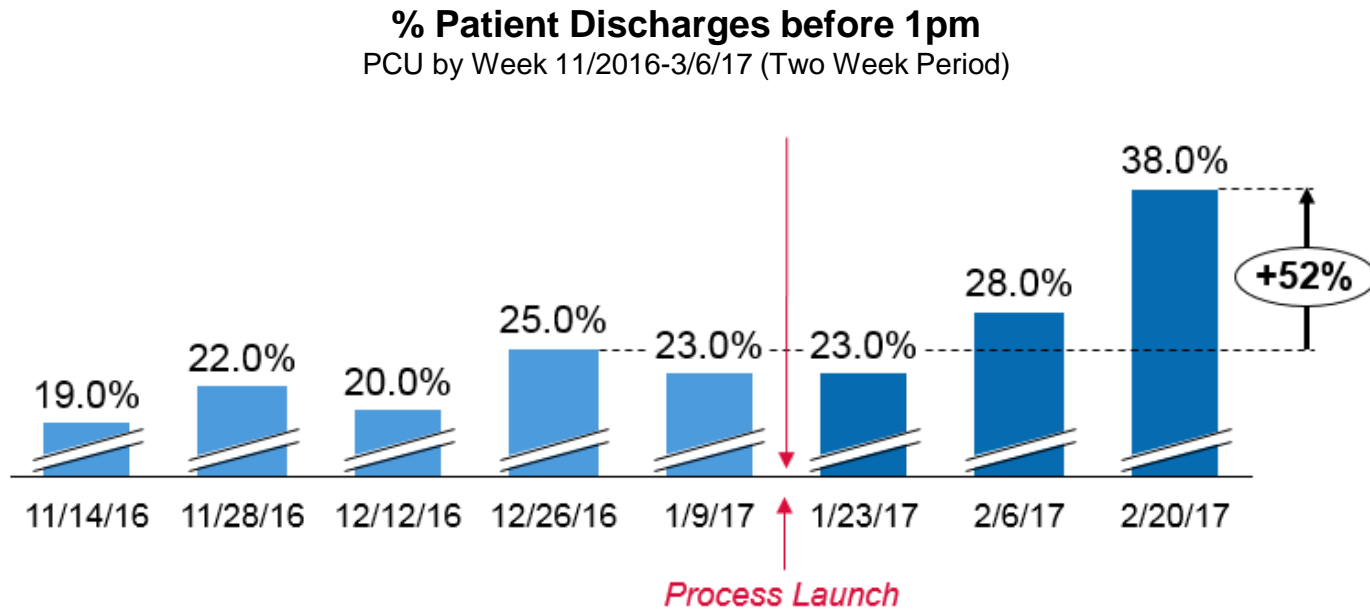
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Foundation for Clinical Process Redesign

A highly reliable Hospitalist Model



PCU Geographic Hospitalist rounds have demonstrated early success...



Discussion

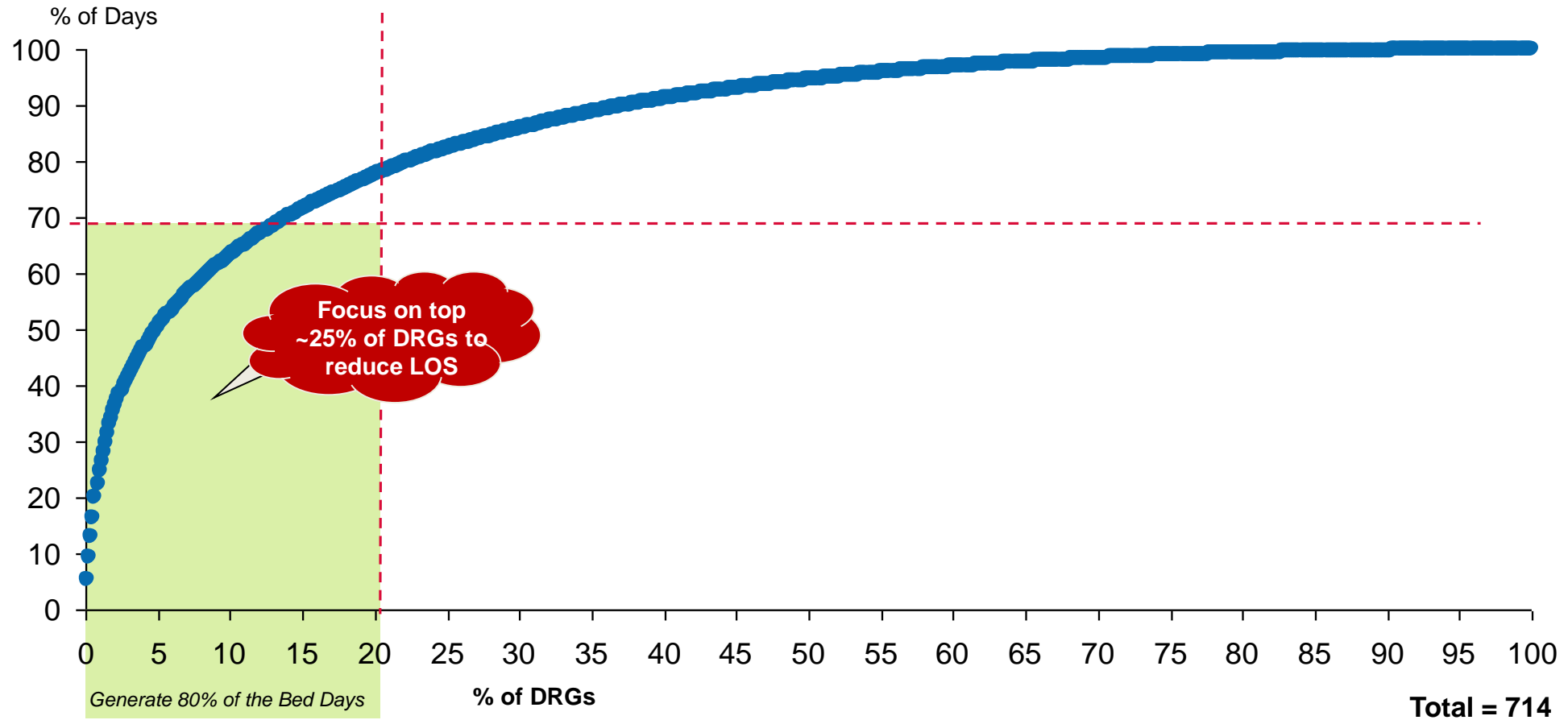
- Since launch of BUMG geographic Hospitalist assignments in PCU (Week of 1/16), discharge timeliness and efficiency have significantly improved.
 - Two Hospitalists assigned to floor 01ABCD.
 - Two Hospitalist assigned to floor 05BCD.
- Multidisciplinary and discharge rounds occur daily at 1:00 PM with participation from all stakeholders: physicians, nurses, and dedicated case management staff.
 - Discharge needs proactively identified for next day.
 - Strong engagement and participation from all.
- Continue to pilot test of change with intentions of scaling similar model throughout the house.

**Clinical Process Redesign (CPR) to
Reduce the Milliman Index
(observed/expected LOS for key /DRGs)**

The top ~25% of the DRGs (by total bed days) account for ~80% of the total bed days at BUMCP

Concentration of Bed Days
Cumulative Percentage of Bed Days vs. Percentage of DRGs

Total = 182k Days



Total = 714
DRGs

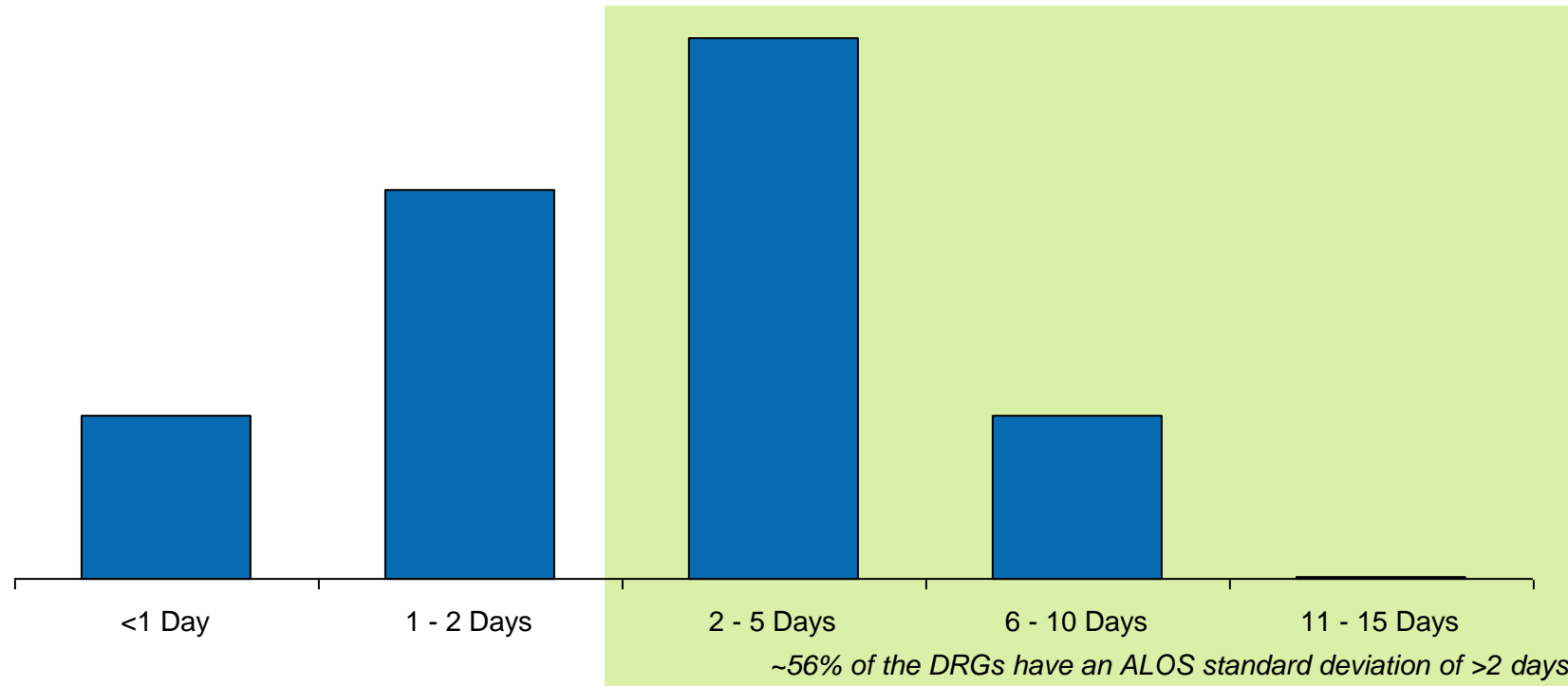


There is significant variation in Average Length of Stay; ~56% of DRGs have a standard deviation of more than 2 days

Variation in Average Length of Stay (ALOS)

Distribution of DRGs by Standard Deviation in Days

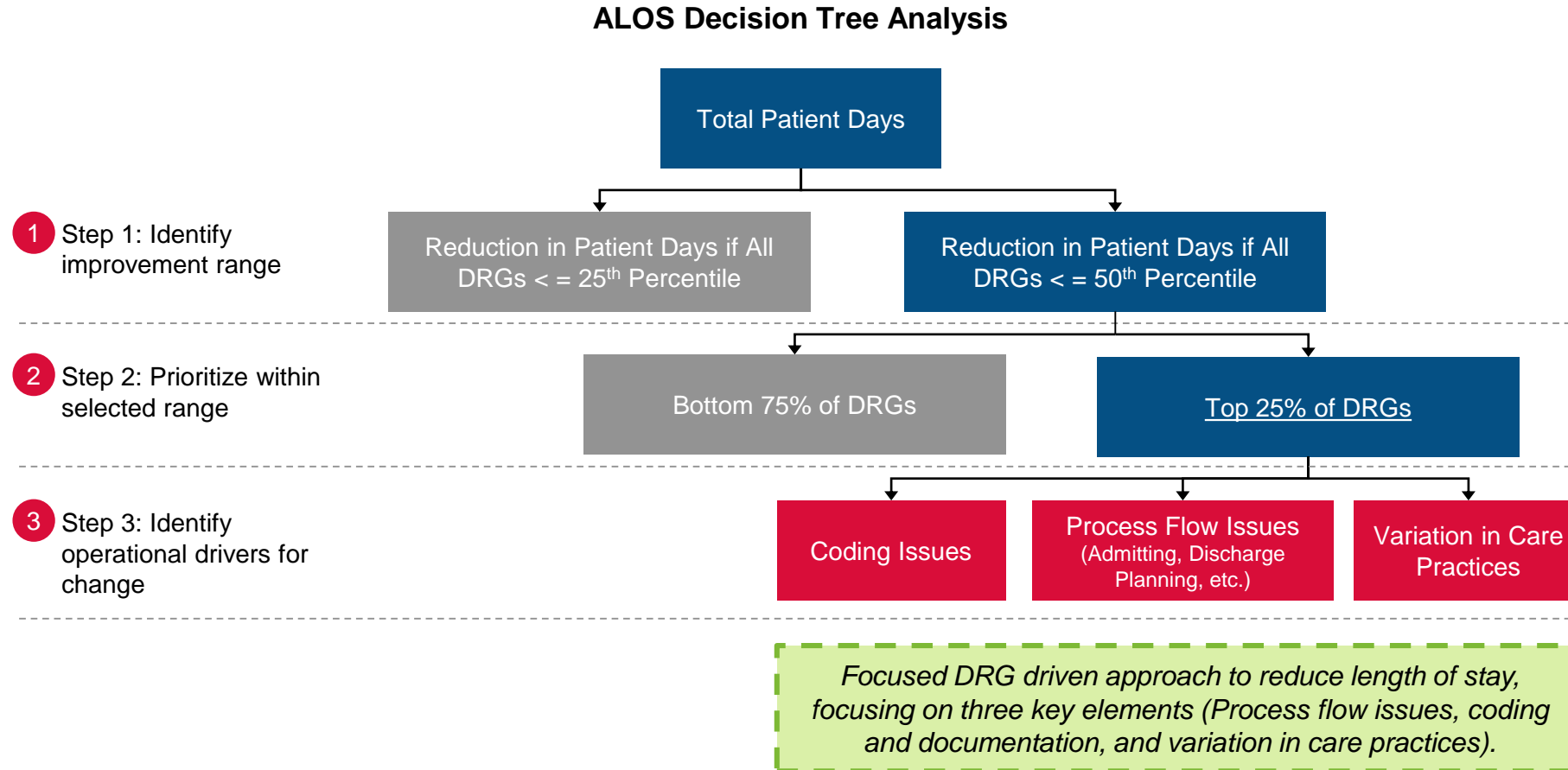
Total = 424 DRGs¹



1. DRGs with less than 10 cases have been excluded
Source: Banner – University Medical Center Phoenix Finance

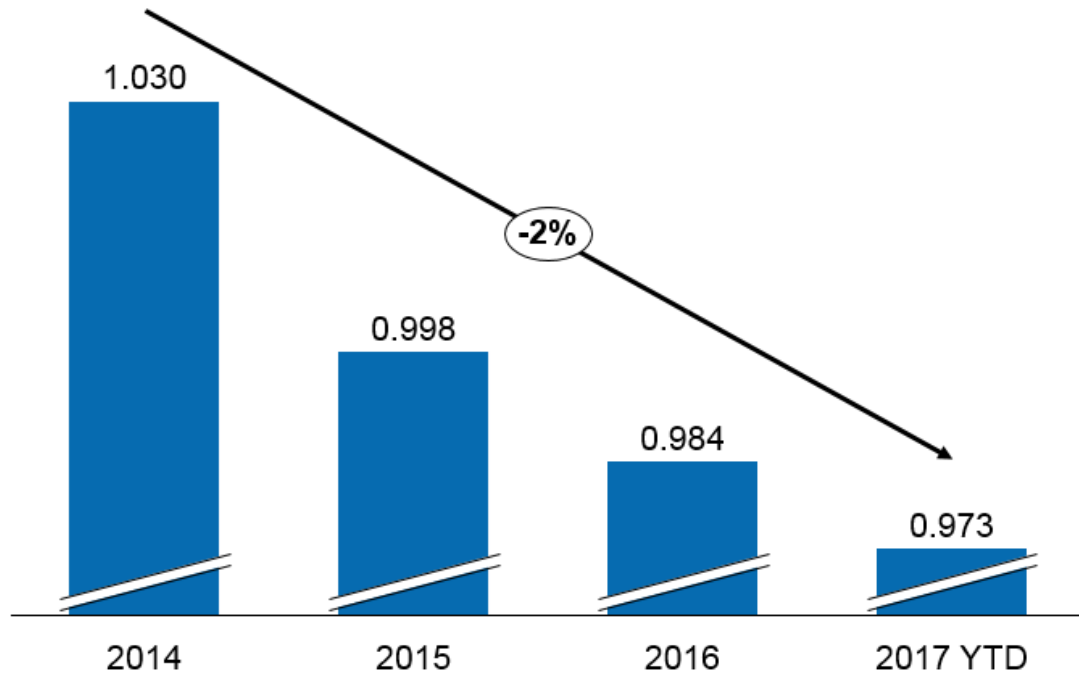


We utilized a decision tree analysis to estimate potential savings through reduced patient days



Care Transformation and Clinical Process Redesign teams have significantly reduced overall length of stay for the medical center...

BUMCP Milliman's Index LOS Overall Facility
2014 – 2017 YTD



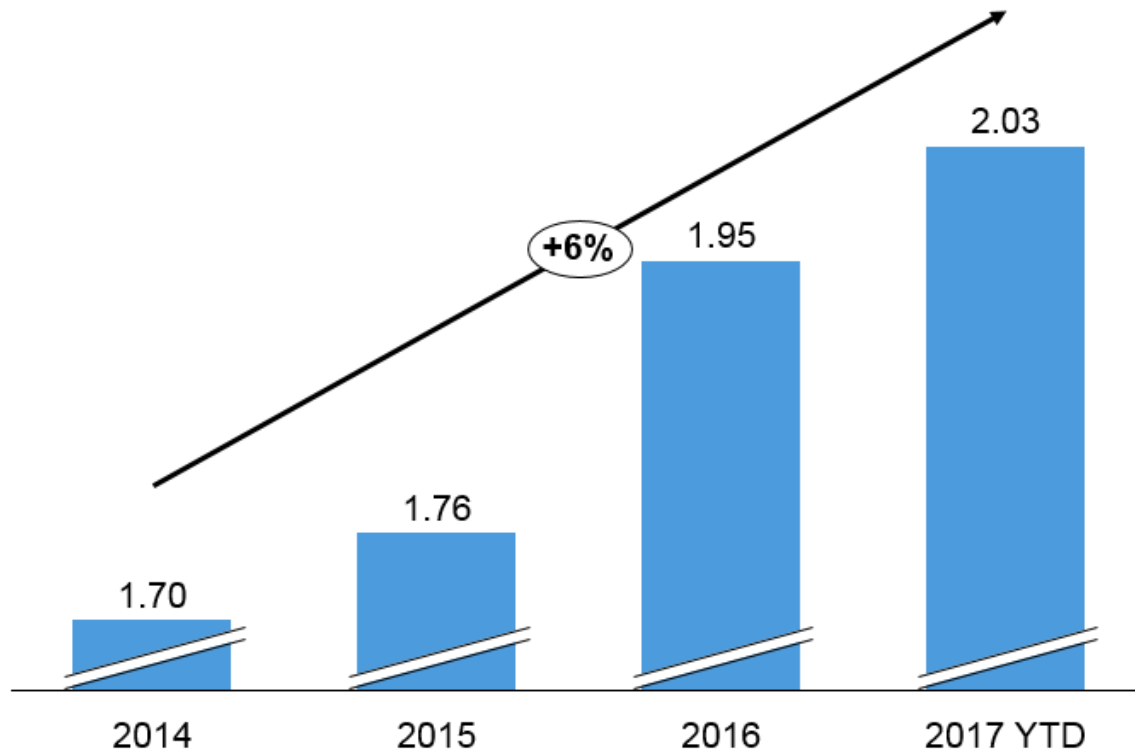
2016: 1,765 patient days better than expected LOS
~\$1M in cost avoidance

Discussion

- Continued improvements seen in Milliman's Index with 2% reduction year-over-year.
- In 2016, over 1,765 patient days better than expected length of stay
- Continued focus with Clinical Process Redesign (CPR) steering committees
- Focus on areas with largest length of stay opportunities:
 - Variation in care practices
 - Process flow issues
 - Coding and documentation opportunities

Through Care Transformation teams, BUMCP has seen a significant increase in Case Mix Index (CMI) year over year

BUMCP Case Mix Index (CMI)
2014 – 2017 YTD



Discussion

- Over 6% increase in Case Mix Index year over year.
- In 2016, CMI at 1.95 with continued upward trend throughout 2017.
- CMI interventions implemented in 2016:
 - Partnership between CDS/Coding/Care Transformation – Weekly LOS Steering Committee
 - Creation of provider documentation tip sheets and focused physician education
 - Development of real-time algorithms to identify documentation and coding opportunities (\$375K identified in Q4 2016).

Physician-Led Clinical Process Redesign teams currently assessing and redesigning practices in key clinical areas

- **Heart Institute**
 - Heart Failure
 - Acute Coronary Syndrome
 - TAVR
 - LVAD
- **Digestive Institute**
 - Hepatobiliary Surgery
- **Endocrine and Diabetes Institute**
 - Hypoglycemic Management
- **Musculoskeletal**
 - Hip Fracture Pathways
- **Neurosciences Institute**
 - Spinal Fusion Care Pathway
 - Craniotomy/Q 1 hour neuro check
- **Women's Health Institute**
 - Vag/C-Section/Normal Newborn
- **Wound & Reconstruction Institute**
 - Cellulitis Care Pathway
- **Transplant**
 - Kidney Transplant Rejection Care Pathway

Heart Institute

Trans-catheter Aortic Valve Replacement (TAVR)

Clinical Process Redesign



TAVR Clinical Process Redesign

Project Overview

Background

- BUMCP has built one of the largest TAVR programs in the US
- Over 700 TAVRs performed since beginning of program in 2012
- Clinical Trials including Partners 3

Program Strengths

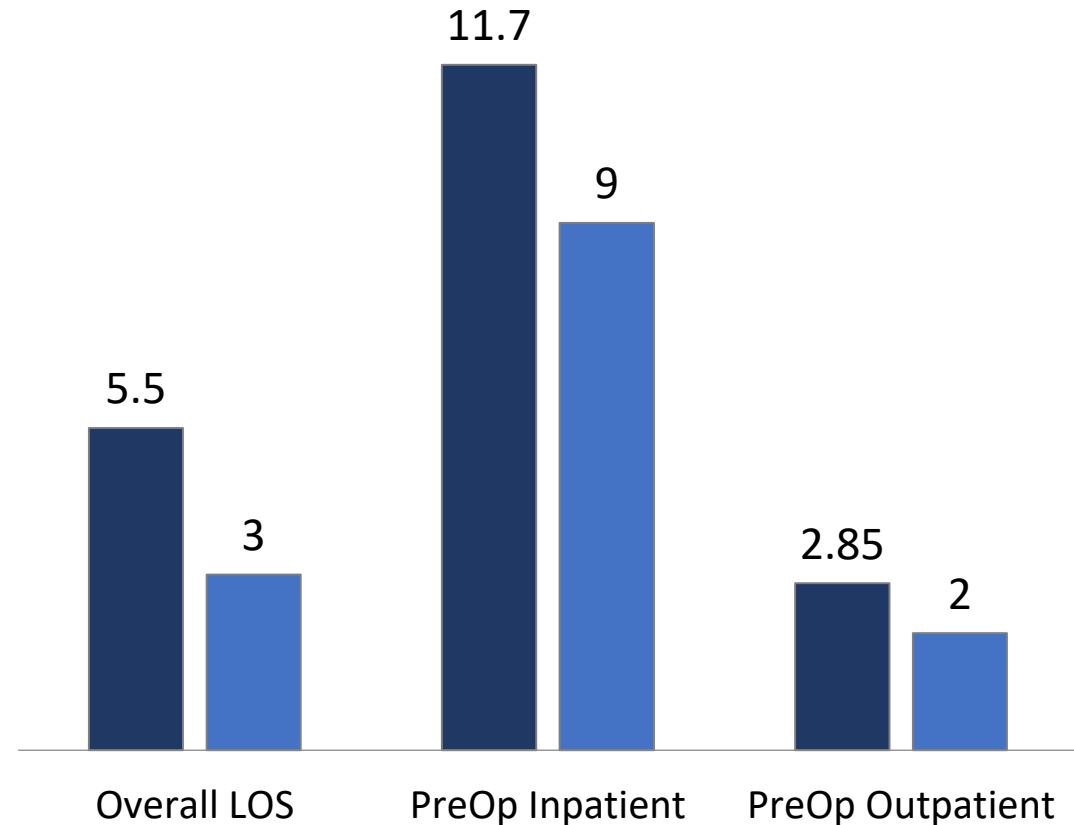
- Clinical expertise
- Dedicated physicians
- Capacity to treat and manage high complexity and acuity

Program Challenges

- Long average length of stay, esp. preoperative
- Cost of valve (Avg. \$32 K)
- Independent and employed physicians
- Documentation capturing severity of illness

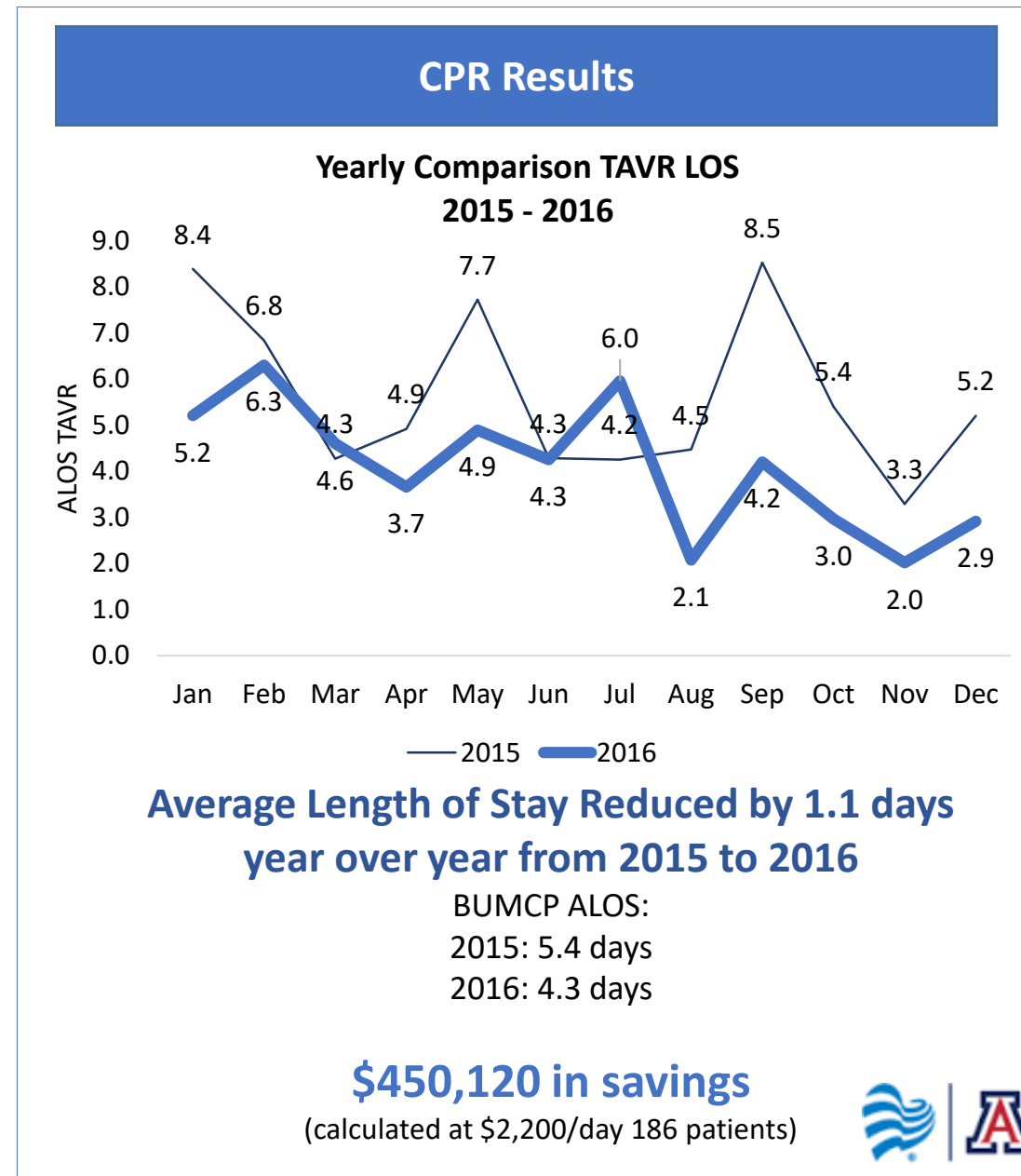
June 2015 – Project Kick-off
LOS data for previous 12 months

■ Mean LOS ■ Median LOS



TAVR Clinical Process Redesign

Actions & Interventions	Description
Dedicated team brought together	<ul style="list-style-type: none"> Cardiology, CT Surgery, Anesthesia, Radiology Scheduler, clinical managers, case managers, RN navigators
RCA and data dive	<ul style="list-style-type: none"> Key findings contributing to ALOS <ul style="list-style-type: none"> Long time to get on schedule if inpatient prior to surgery Hospitalists defer to specialists delaying discharge
Clinical documentation	<ul style="list-style-type: none"> Created Clinical Documentation tip sheets and provided training to ensure all existing CCs and MCCs were being captured.
Admit & discharge from structural heart	<ul style="list-style-type: none"> Increased efficiency from admitting and discharging by specialists and not hospitalists
Process redesign	<ul style="list-style-type: none"> Redesigned the process to expedite inpatient TAVR workup
Patient Selection Team	<ul style="list-style-type: none"> TAVR CPR team expanded to include patient selection committee Tied into entire Banner System including system peer discussion and metrics tracking



Heart Institute

Congestive Heart Failure

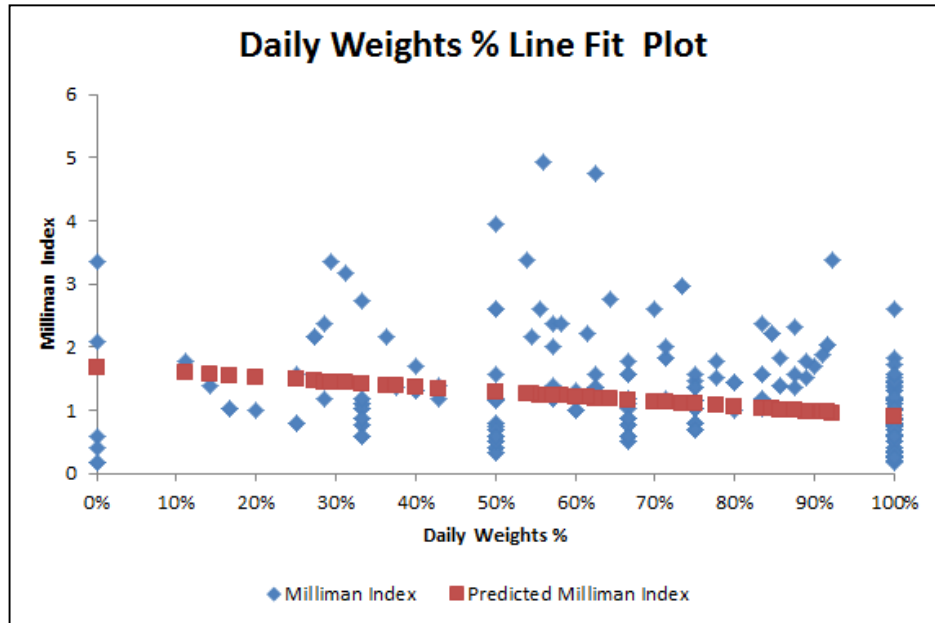
Clinical Process Redesign



We have identified two significant drivers of length of stay management for heart failure patients

Daily Weight & Milliman's Index

BUMCP Heart Failure Patients DRG: 291- 293

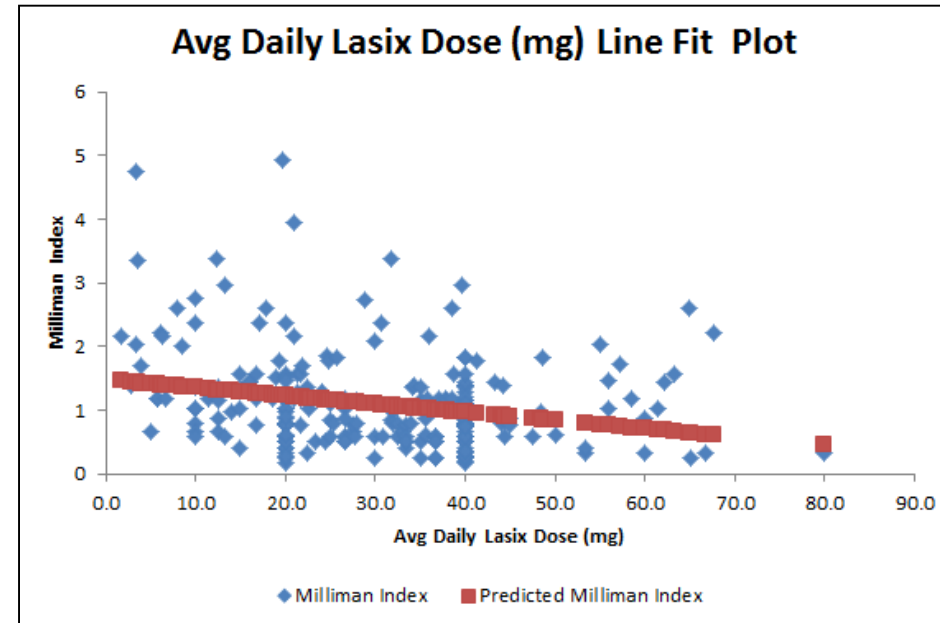


Discussion

- Obtaining an accurate daily weight is negatively correlated to length of stay. That is, patients who are weighed daily are more likely to have a lower length of stay (Milliman < 1.000).
- **Accurate, daily standing weight measurements are important for length of stay management**

Avg. Daily Lasix Dosage (mg) & Milliman's Index

BUMCP Heart Failure Patients DRG: 291- 293



Discussion

- Average daily Lasix dosage is negatively correlated to length of stay. That is, patients with higher daily dosages of Lasix are more likely to have a lower length of stay (Milliman < 1.000).
- **Aggressive Lasix dosing is critical to managing patient length of stay.**

The team developed a standardized care pathway for treatment of heart failure patients

Define
<ul style="list-style-type: none"> Identify best practices supported by evidenced based research and literature Draft standardized clinical pathway to share with other stakeholders
Design
<ul style="list-style-type: none"> Create strong implementation toolkit to share knowledge with stakeholders (Providers, nursing, ancillary, case management, etc.) Operationalize design work of the team
Implement
<ul style="list-style-type: none"> Implement the care pathway; monitor performance; establish accountability for results

BUMCP Heart Failure Clinical Pathway

HF care pathway				
Banner University Medical Center Process Category				
Stage	Admission	Progress stage I	Progress stage II	Discharge
Expected outcomes (Nursing + Physician + NP)	-Patient Starting to Diurese -Improved lung sounds -Documented dry/ideal weight at admission -Room air sits at rest and on ambulation documented	-Weight/edema down -Respiratory status improves	-Weight/edema down -Respiratory status improves	-Total weight down (5-10 lbs/provider goals) -Crackles resolved -FU appointment fixed
Nutrition (Dietitian + Nursing)	2 gm Na ⁺ Diet -Fluid Restriction	2 gm Na ⁺ Diet -Fluid Restriction	2 gm Na ⁺ Diet -Fluid Restriction	2 gm Na ⁺ Diet
Test (Physician + Nursing)	-Admit Weight -Accurate I/O charting -Foley's needed? -BNP, BNP, CBC -Dig level if on Digoxin -Lipid profile, TSH (if not done in an year) -ECHO---%, date----	-Accurate Weights recorded (early morning post void) -May discontinue Foley if diuresis decreased -BNP	-Accurate Weights recorded -BNP	-Accurate Weights recorded -BNP -if ECHO not documented this admission, why not?
Medications (Pharmacy + Physician + NP)	-Pharmacy to assist in home med rec with NP -IV Lasix (Double the Home PO dose) -Look IV (Use rapid diuresis protocol on Corner) -Pharmacy to assist with review of NaCl containing fluids/IV medications	-Rapid Diuresis protocol completed -Expect increase in Cr Levels -Monitor K ⁺ -Continue diuresis until Cr > double of presentation	-Change Lasix to PO -Start Depart process	-Reconcile discharge meds with physician -Reconcile Discharge

KEY TAKAWAYS:

1. Use the order sets: 'Rapid Diuresis' and 'CHF Admit'
2. Daily Lasix Dosing

A real-time report has been created to address accountability to the care pathway and provide a daily weight and Lasix trend for heart failure patients

BUMCP Current Patients in House – Daily Weights Trend by Day

BUMCP Daily Weight (kg.) Trend

	03/08 Tue	03/09 Wed	03/10 Thu	03/11 Fri	03/12 Sat	03/13 Sun	03/14 Mon	03/15 Tue	03/16 Wed	03/17 Thu	03/18 Fri	03/19 Sat	Daily Trend
01A 0104-02	83.50	88.85	88.60	89.75	87.93			83.90	84.20		94.10		
01A 0106-01										84.10	83.40	83.30	
01A 0107-01										123.90		125.40	
01A 0108-01								62.00	62.00	60.20	59.80	59.70	
01A 0110-01							97.00	95.60	95.80	92.90	92.90	90.50	
01B 0111-01			63.20		63.40	64.20	64.20	64.70	63.60	57.60		54.30	
01B 0114-01	78.00		78.40	77.30	75.60	76.30	75.40	73.90	71.50	70.90	71.20		
01C 0124-02					67.90	68.80	69.20	70.20	69.30	67.50	65.10	63.20	
01C 0127-02		75.60		72.60	71.60	72.30	73.40	74.20	72.30	71.90	70.30	70.90	
01D 0137-02					100.23	102.70	99.00	90.50	87.30	85.50	85.10	87.40	
05B 0511-01										72.30		71.30	
05B 0512-01								117.70	116.90	117.40	118.20		
05B 0513-										66.10		62.50	
05C 0524-02											98.85	99.40	
05C 0527-02									107.10	105.80	104.80	104.30	
05D 0531-01					94.00	99.50	98.60	95.40	94.30	93.30	85.10	92.00	
05D 0533-02											57.25	57.30	
05D 0538-01								95.90				89.20	
05D 0539-01	91.00	90.80				88.20		93.40	87.80	88.00	77.50	87.80	
05D 0540-02											101.20	100.40	
ERP PHB-. M													

Daily weight not recorded

BUMCP Current Patients in House – Total Lasix Administered Trend by Day

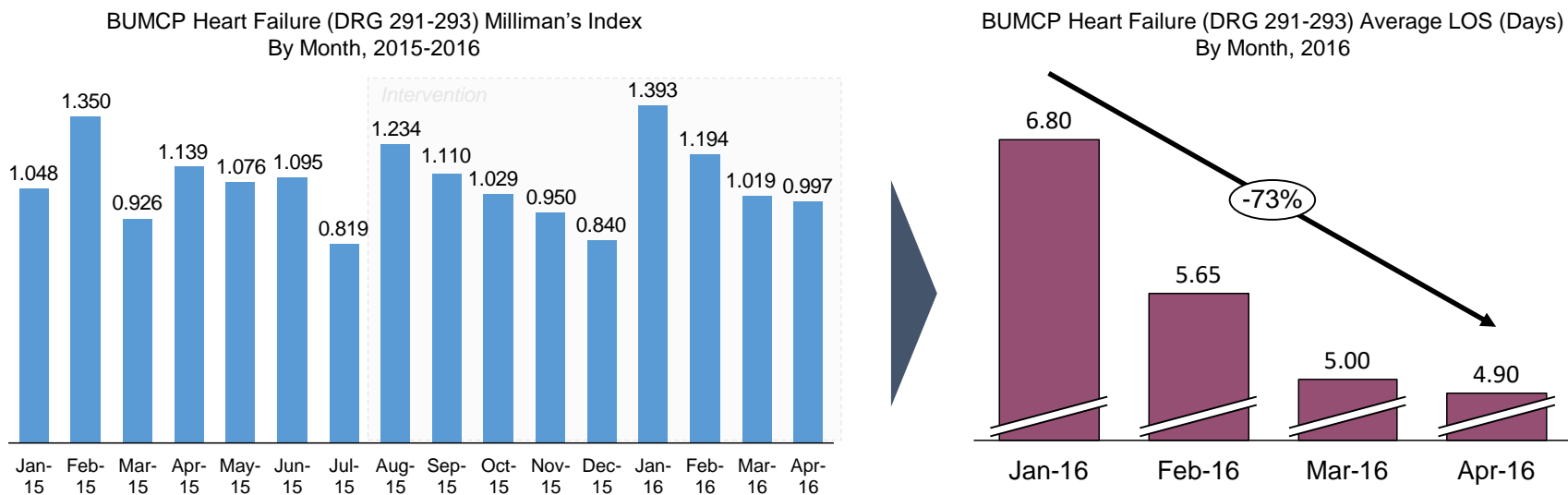
BUMCP Total Daily Lasix (mg) -- CHF Patients

	03/07/2016	03/08/2016	03/09/2016	03/10/2016	03/11/2016	03/12/2016	03/13/2016	03/14/2016	03/15/2016
01A 0102-01					100	80	140	80	40
01A 0103-01	40			40	40	40	120		
01A 0104-02									
01A 0110-01								60	100
01B 0111-01				20	80	80	160	40	40
01B 0114-01	40	120	120	180	240	240	240	240	160
01B 0119-01									
01C 0124-02				40	100	120	120	120	120
01C 0127-02		40	240						
01D 0137-02						120	200		
05B 0511-01			40	120	40	80	80	80	80
05B 0512-01							240		
05D 0531-01									
05D 0538-01									80
05D 0538-02	20	40	40	40	40	40	40	40	40
05D 0539-01		40	40	0	0	0	80	80	80
05D 0540-02			120	80	40	40		80	80

Lasix dosage not appropriate



Milliman's Index has improved for *Heart Failure* patients during 2016 with our refocus with a 73% reduction in average patient length of stay days



Discussion

- Length of stay for heart failure has improved during 2016YTD with a 73% reduction in overall average length of stay
- Significant predictors for LOS include daily weight accuracy/timeliness and appropriate diuretic dosing; performance for both measures declined in 2016 causing longer patient length of stays for these months. Patient acuity also a causal factor as CMI was all time highest in Jan of 2016 for this population.

Orthopedic and Spine Institute

Fractures

Clinical Process Redesign



Orthopedic Institute – Fracture Patient CPR

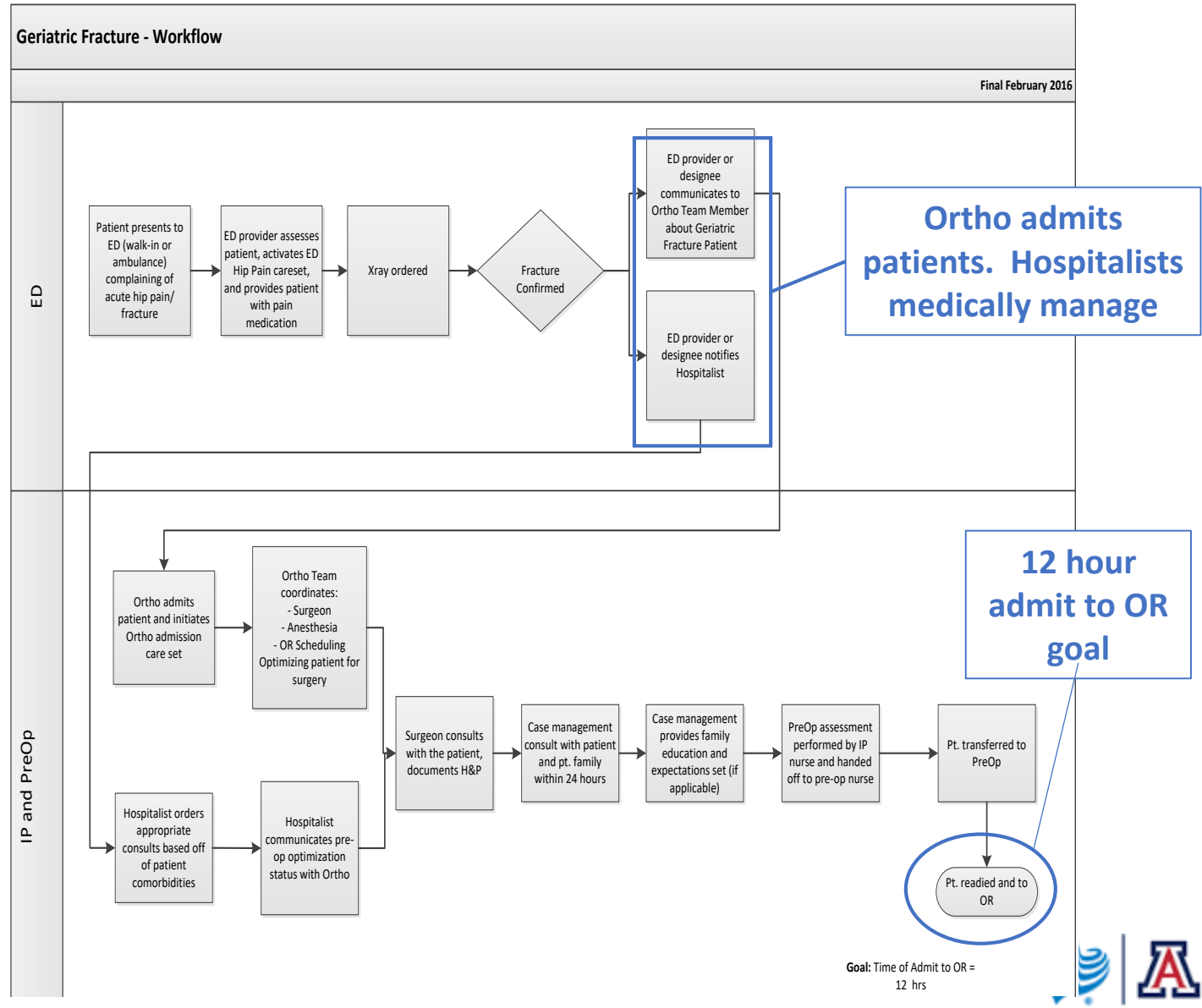
Project Overview

Background

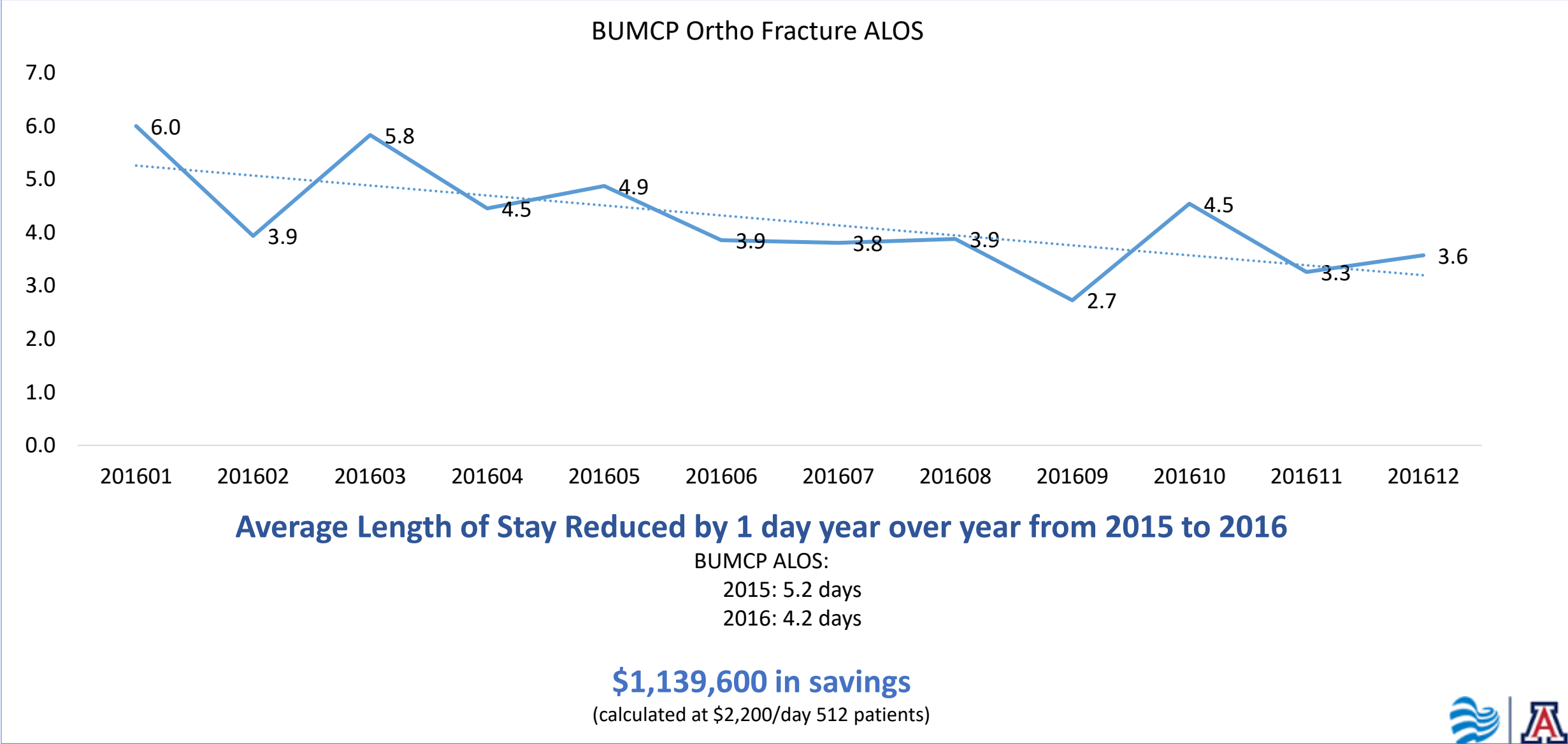
- Created a fracture care pathway to ensure timely arrival and Surgery for orthopedic fracture patients
- Added a special focus on geriatric patients timeliness to OR within 12 hours of diagnosis

Key Interventions

- Created a Process flow to expedite time to OR
- Implemented RN navigators on ED/Ortho Service line
- Admit and discharge directly from Orthopedics



Orthopedic Institute – Fracture Patient CPR



Digestive Institute

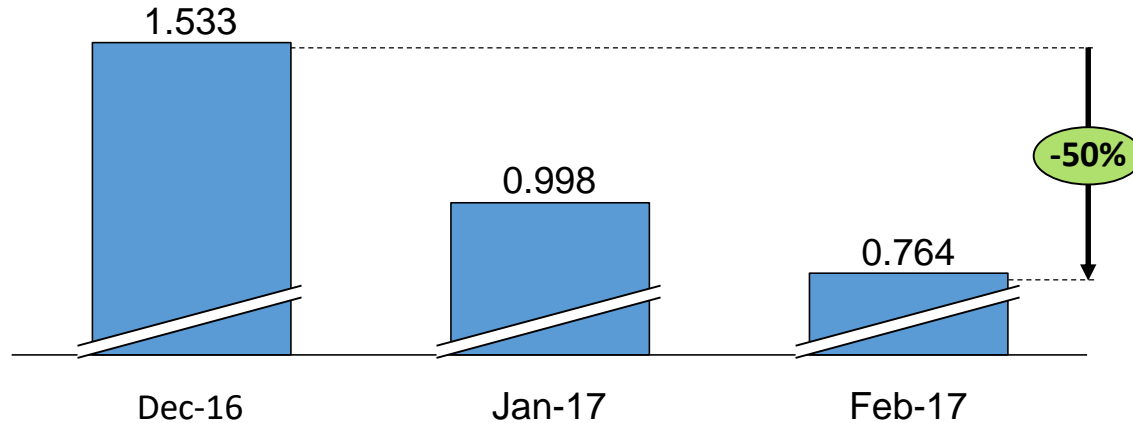
Hepatobiliary Disease

Clinical Process Redesign



Hepatobiliary Clinical Process Redesign

Pancreas, Liver, Shunt Procedures Milliman's Index
Dec 2016 – Feb 2017



Discussion

- **Background:** Milliman's Index was high for Whipple Procedures and Liver Resection. Key drivers included:
 - Increased Volume in Service Line
 - Pain Management
- **Key Accomplishments:**
 - Redesign of admit and discharge process by surgeons
 - Support of NP redefined, adding a second NP
 - Reduced Milliman's Index
 - Documentation improvement
- **Next Steps:**
 - Continued support as volume grows.

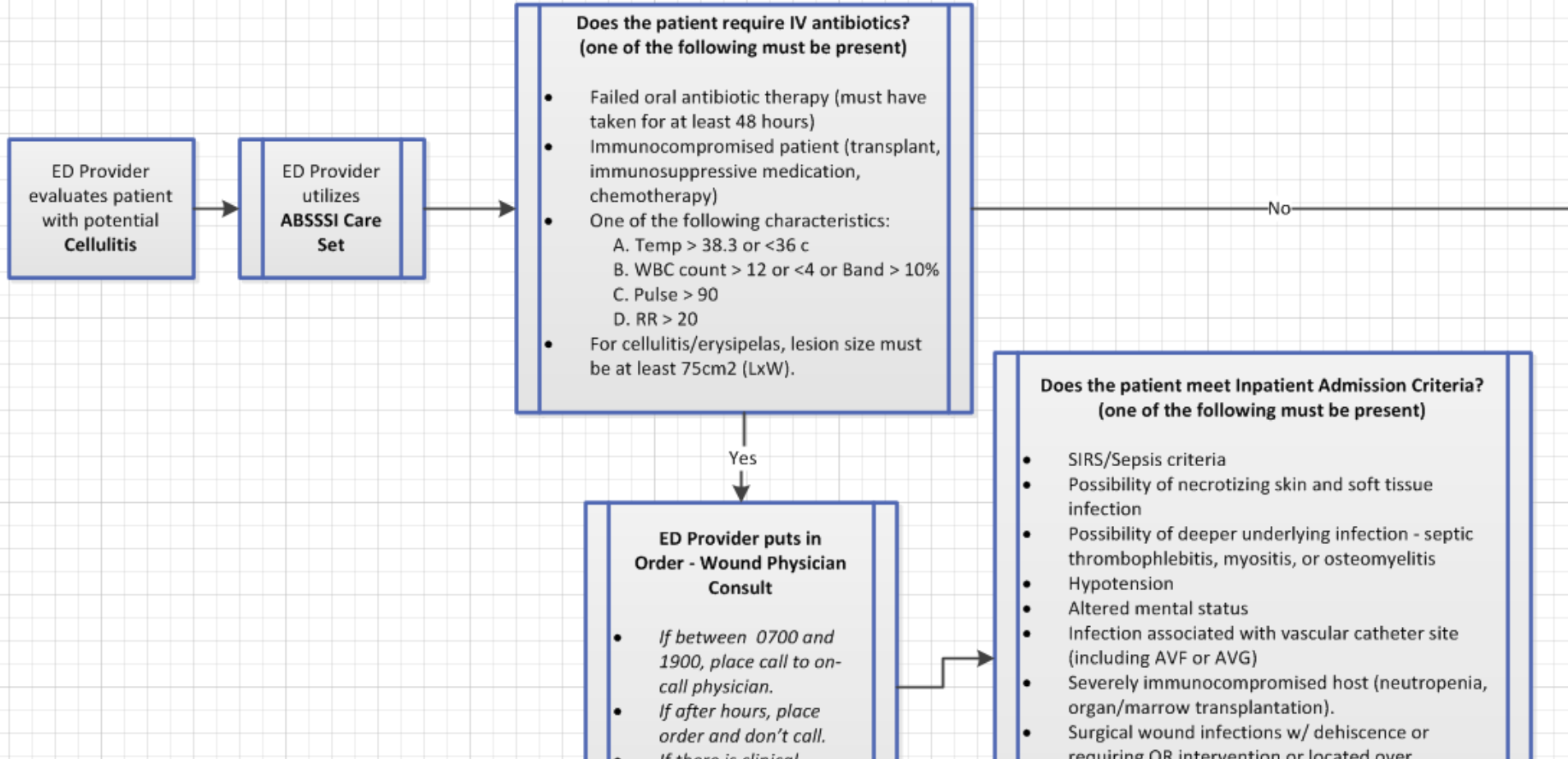
Wound and Reconstructive Institute

Cellulitis

Clinical Process Redesign

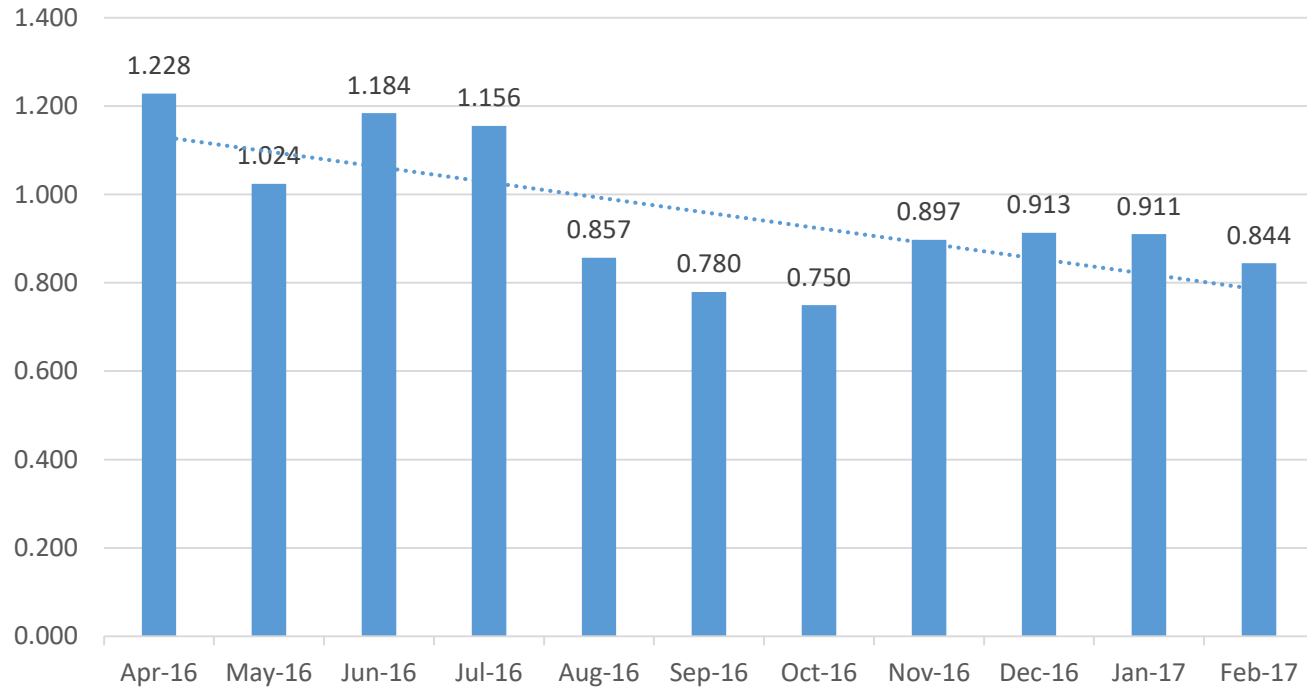
Cellulitis Clinical Process Redesign

Cellulitis Diversion Protocol – Emergency Department



Cellulitis Clinical Process Redesign

Cellulitis Milliman's Index DRG 602 - 603
April 2016 – Feb 2017



Discussion

- **Background:** Cellulitis LOS was high due to late involvement from Wound Physicians. Further, we had inappropriate admissions for cellulitis.
- **Key Accomplishments:**
 - Created opportunity to treat cellulitis through infusion center
 - Education and protocol for ED providers
 - Outreach and education to hospitalists
 - Reduced Milliman's Index
- **Next Steps:**
 - Continued support as volume grows.



Neuroscience Institute

Cervical and Lumbar Spinal Fusion

Clinical Process Redesign



Neurosurgery Clinical Process Redesign (cont.)



Elective Lumbar Spinal Fusion Care Pathway Updated 02/15/16

	Outcomes	Assessment	Diagnostic tests	Treatment	Nutrition
Pre-Operative Assessment	<input type="checkbox"/> Patient verbalizes understanding of surgical procedure, post op pain control and ambulation goals	<input type="checkbox"/> Assess need for IV steroids in outpatient setting before surgery <input type="checkbox"/> If TLSO brace needed, brace fitted and ordered prior to DOS	<input type="checkbox"/> CBC <input type="checkbox"/> On a patient specific basis, chest X-ray, CMP, PT/INR		<input type="checkbox"/> NPO night before surgery <input type="checkbox"/> Bath, per surgeons orders
Day of Surgery		<input type="checkbox"/> Post op Vitals q1 Hr x 4, then q2Hr x 2, then q4 Hr <input type="checkbox"/> Strict I&O QID <input type="checkbox"/> In case of Intra-op CSF leak, please discontinue use of care pathway and follow surgeon specific orders	<input type="checkbox"/> CBC, BMP	<input type="checkbox"/> IV antibiotics <input type="checkbox"/> PCA per guideline, if needed <input type="checkbox"/> Pharmacy Consult for Pain Management	<input type="checkbox"/> NPO in PACU <input type="checkbox"/> Clears/Soft diet as tolerated on floor
POD #1	<input type="checkbox"/> Patient meets ambulatory goals <input type="checkbox"/> Pt. verbalizes adequate pain control <input type="checkbox"/> Adequate urine output <input type="checkbox"/> No respiratory complications	<input type="checkbox"/> Vitals per protocol <input type="checkbox"/> I & O q6 Hrs <input type="checkbox"/> Need for walker identified by PT <input type="checkbox"/> Assess removal of JP drain if output <30ml over 8 Hrs <input type="checkbox"/> Surgeon discharge goals set <input type="checkbox"/> Assess for Neurogenic bladder <input type="checkbox"/> PT recommendations for discharge set	<input type="checkbox"/> CBC, BMP	<input type="checkbox"/> Wean off PCA or IV pain meds <input type="checkbox"/> Saline IV lock <input type="checkbox"/> Foley Out <input type="checkbox"/> Start Home medications PO <input type="checkbox"/> Tylenol 975 mg 4 times a day PO	<input type="checkbox"/> Soft/Regular diet, advance as tolerated



Spinal Surgery Patient Information

Welcome to the Banner University Medical Center Phoenix. Thank you for putting your trust in us for your spine surgery. This information will explain what you should expect before, during and after your hospital stay. We are committed to ensuring you have an excellent patient experience by providing you with outstanding care.

Prior to Surgery

Please review the checklist below in preparation for your surgery:

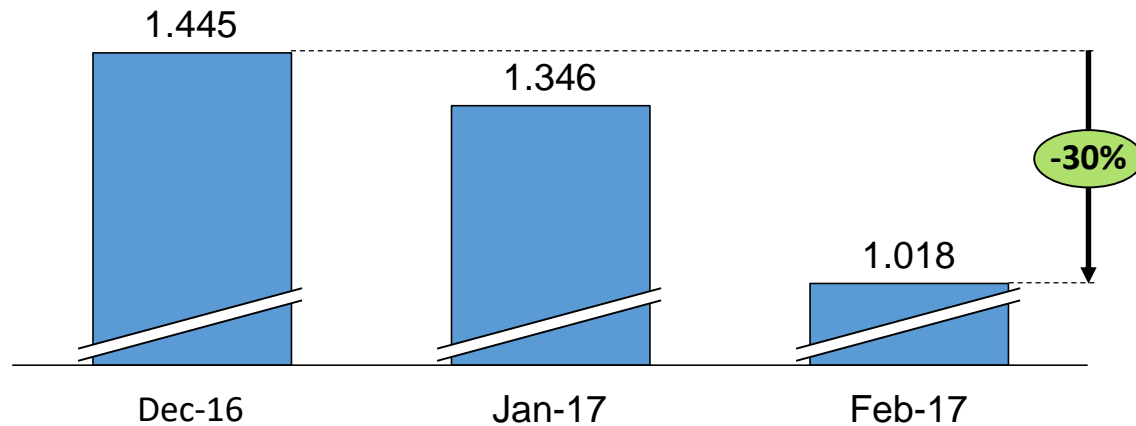
- Medical clearance** – your surgeon may recommend a general medical evaluation by your primary care physician to make sure you are healthy enough for surgery.
- Tests** – blood samples and other tests may be required as part of your routine pre-operative evaluation.
- Medications** – make a list of your medications and have it ready 3 days prior to surgery. A Registered Nurse from our Surgery Department will call you to review medications prior to surgery.
- Tetanus Shot** – if you have not had a tetanus shot in the past 10 years, you should consider getting a shot a few weeks prior to surgery.
- Smoking** – Smoking increases your risk of problems during and after your operation. Quitting 4 to 6 weeks before your operation and staying smoke-free 4 weeks after it can decrease your rate of wound complications by 50 percent. Quitting permanently can add years to your life. - See more at: <https://www.facs.org/education/patient-education/patient-resources/prepare/quit-smoking#sthash.kHfa5jSH.dpuf> (Link to the American College of Surgeons – Quite Smoking Before Your Operation)
- Packing** – Please leave all valuables at home.
 - You will need to bring any personal toiletry items you feel you will need during your hospital stay (toothbrush, toothpaste, a comb, brush, deodorant, lotions, etc.).



Neurosurgery Clinical Process Redesign

Cervical and Lumbar Spinal Fusion Milliman's Index

Dec 2016 – Feb 2017



Discussion

- **Background:** Milliman's Index was high for Lumbar and Cervical Spinal Fusion. Key drivers included:
 - Patient Expectation on LOS
 - Pain Management
 - Rounding times and patterns for discharging patients
- **Key Accomplishments:** Significant engagement from neurosurgery
 - Ownership by surgeons of process
 - Created Complete Care Pathway and Patient Education
 - Restructured workflows to increase discharge timeliness
 - Reduced Milliman's Index
- **Next Steps:**
 - Continue documentation education
 - Monthly data/performance sharing with neurosurgeons.

Women's Institute

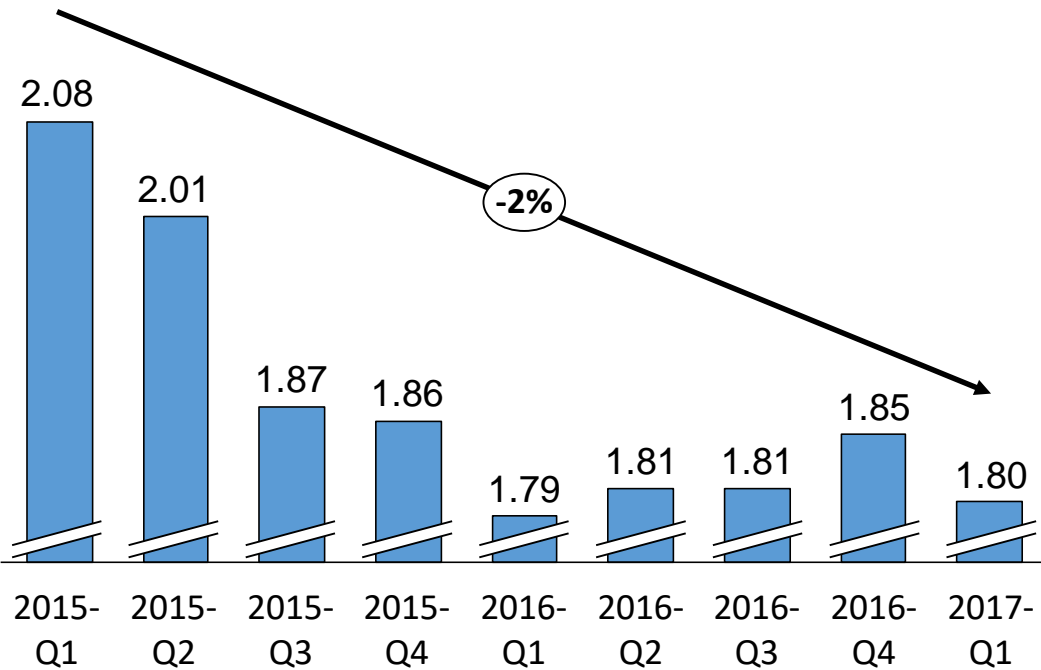
Length of Stay Post-Delivery

Clinical Process Redesign



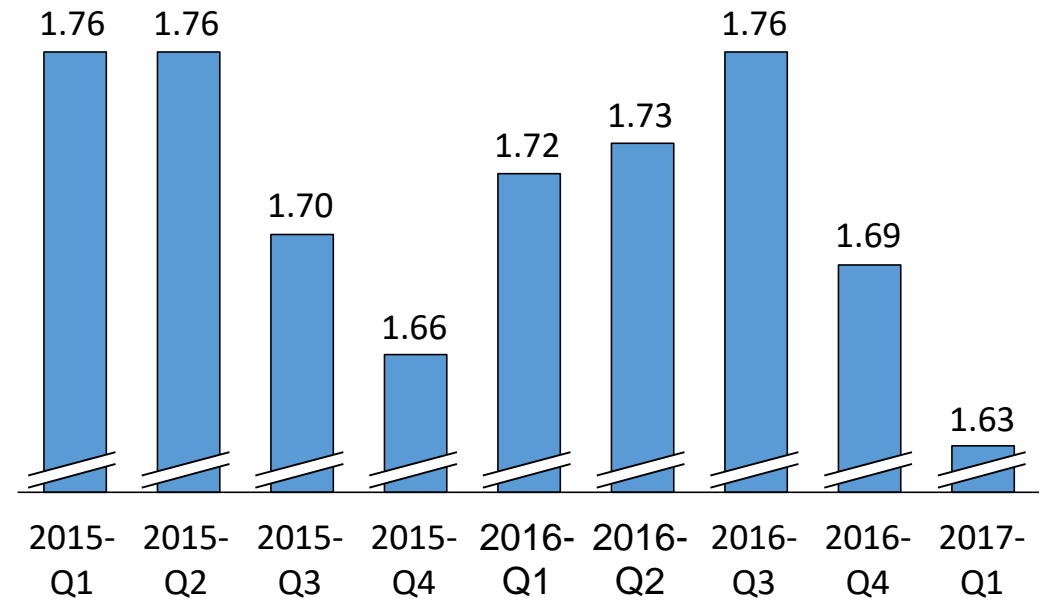
Clinical Process Redesign teams continue focused efforts to reduce vaginal delivery and normal newborn patient length of stay through standardized clinical pathway development

BUMCP DRG 775: Vaginal Delivery w/o Complications LOS
2015 – 2017YTD – LOS in Days



Expected LOS is 1.84 days

BUMCP DRG 795: Normal Newborn LOS
2015 – 2017YTD – LOS in Days



Expected LOS is 1.79 days



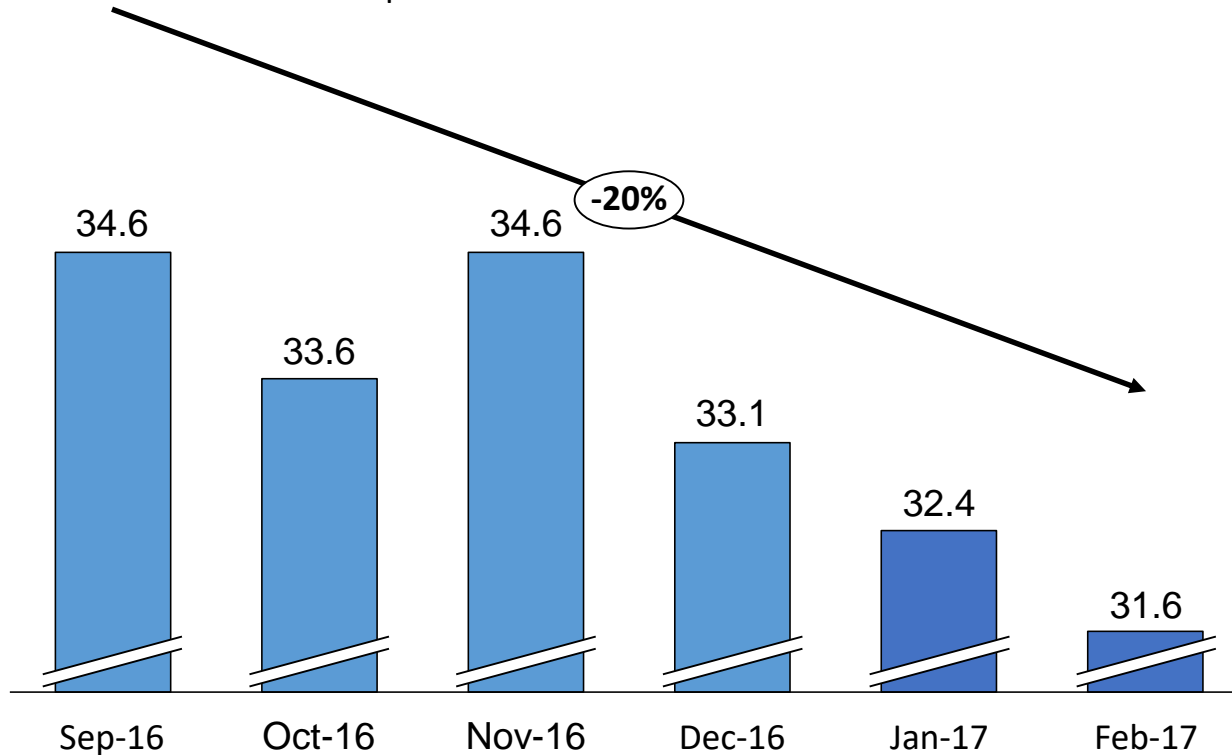
Center for Observation Medicine



Overall observation patient length of stays have reduced by 20% since Sep 2016

BUMCP Overall Observation Length of Stay

Sep 2016 – Feb 2017 – Time in Hours



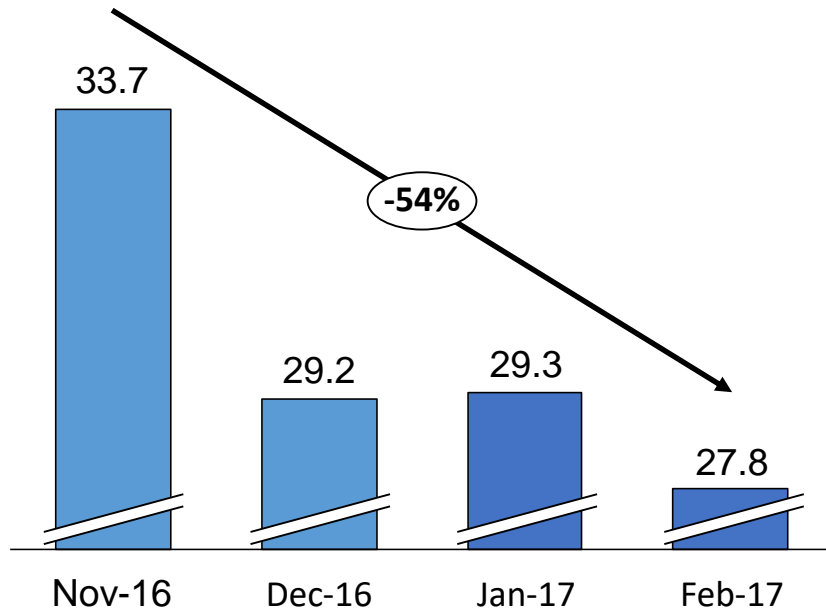
Length of Stay Reduction Strategies

- **Patient Stating:**
 - Appropriate patient status determinations.
 - Focus on patients with high conversion percentages – can we automatically send these patients to the tower with intentions they will later convert?
- **Cohorting:**
 - Dedicated group of providers to manage OBS patients with rounding tool; standardized rounding process (Physician, MDCC, RN, CM); and proactive discharge planning.
- **Workflow:**
 - Improve RN process flows and intake-discharge management within nursing.
 - Streamline coordination of care between key service and ancillary areas including imaging, lab, surgery, echo, and RN transport.
- **Caresets:**
 - Orderset utilization for chest pain, syncope, TIA, and lap appy/chole.

Care pathways have been developed to standardize treatment of specific patient populations (chest pain, syncope, TIA, and lap appy/chole).

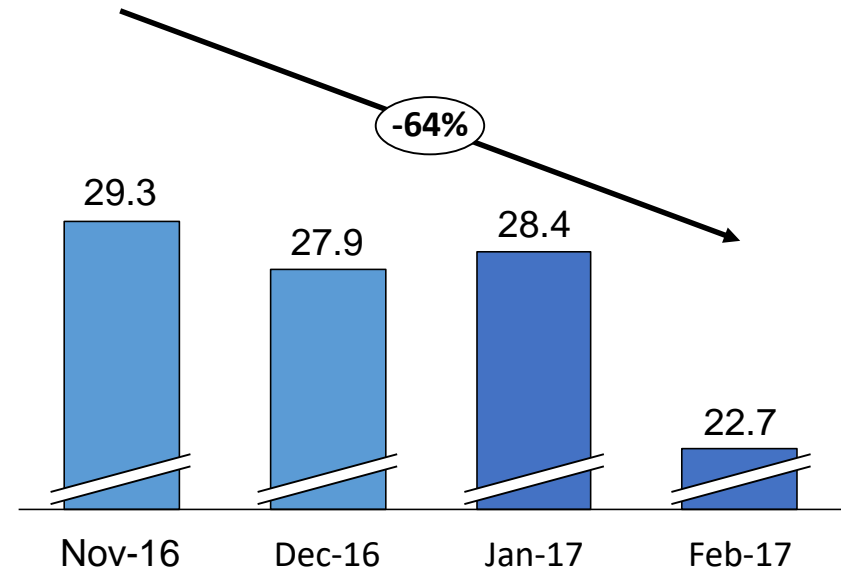
BUMCP Overall Observation Length of Stay – CHEST PAIN

Nov 2016 – Feb 2017 – Time in Hours



BUMCP Overall Observation Length of Stay – APPY/CHOLE

Nov 2016 – Feb 2017 – Time in Hours





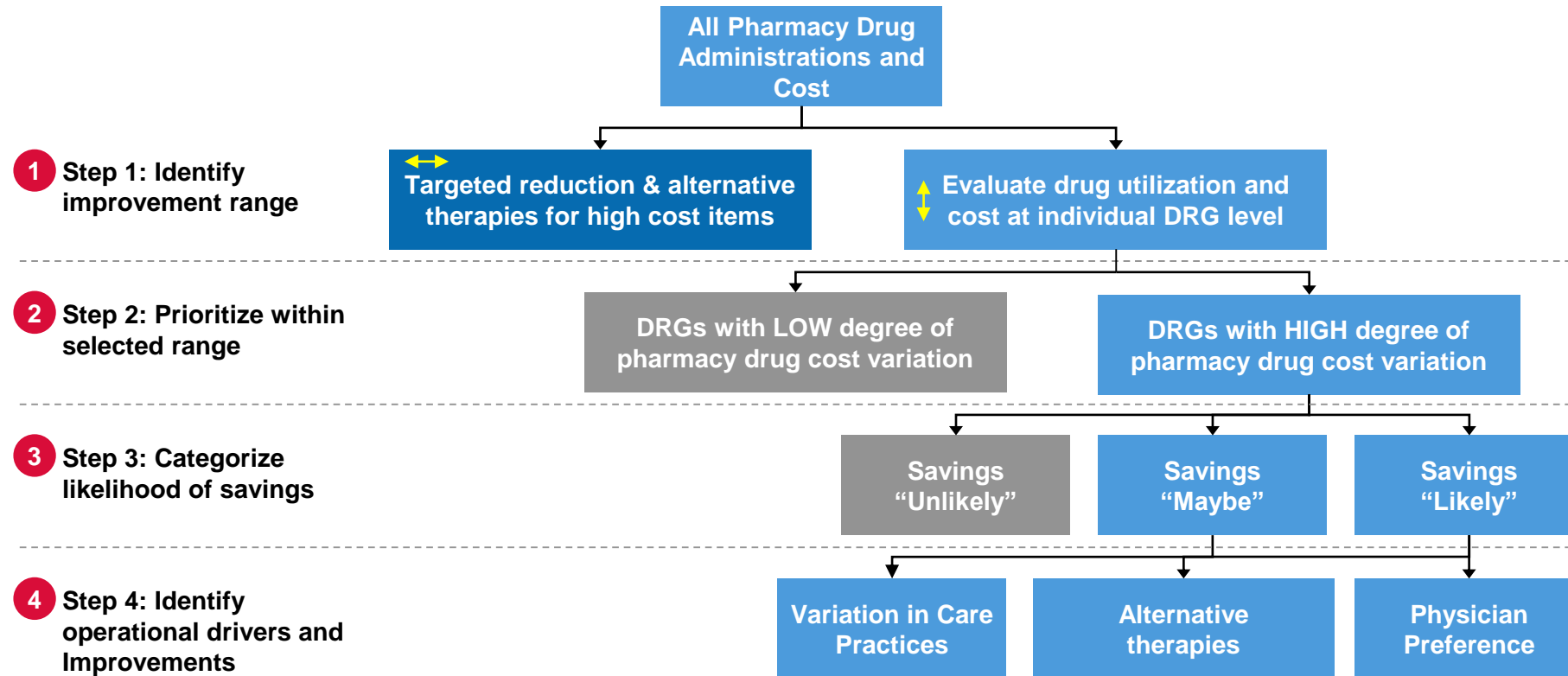
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Clinical Process Redesign to....

Reduce the Misuse and Overuse of
Pharmaceuticals in the Management of Clinical
Conditions

We developed a decision tree analysis to address potential pharmacy savings through clinical process redesign

Pharmacy Clinical Process Redesign Process and Scope



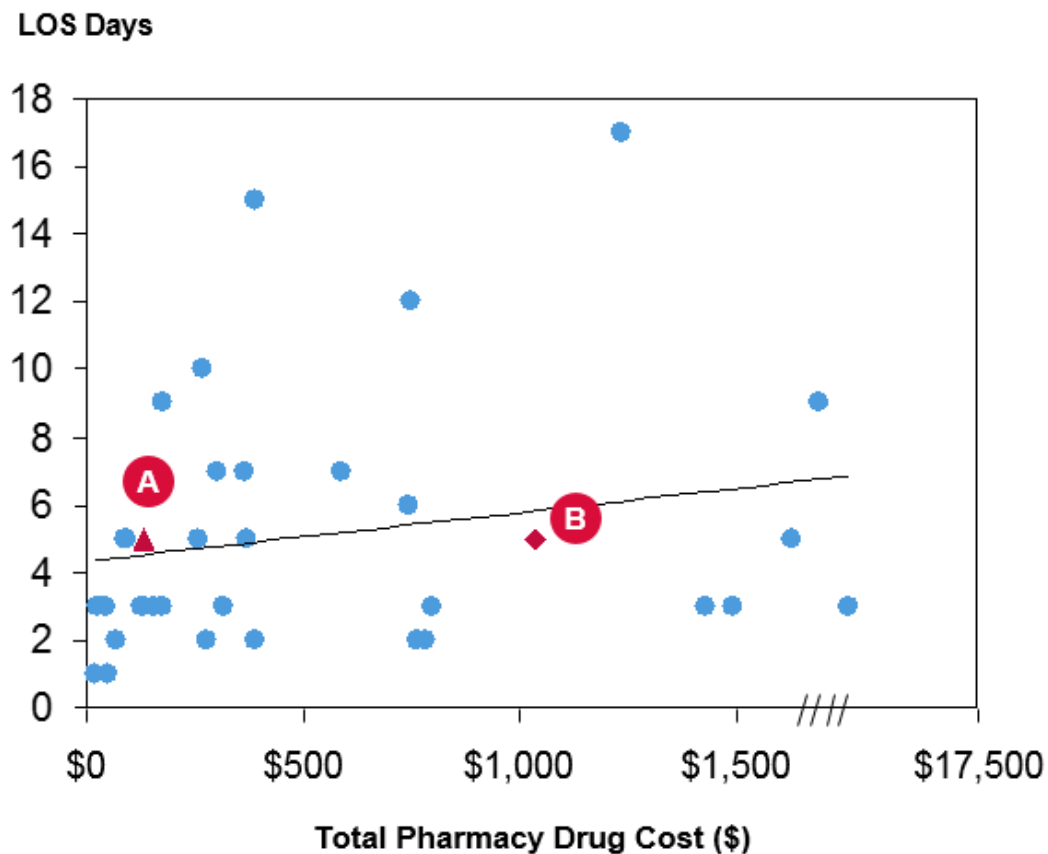
Note: "Unlikely savings" includes DRG's with proportional drug spend to length of stay in days



The team evaluated pharmacy drug cost variation at the patient and DRG level to identify improvement opportunities

Total Pharmacy Drug Cost for CHF Patients

DRG: 291 – Drug Administrations during Oct 2016



Discussion
<ul style="list-style-type: none"> Example shown for DRG: 291 “Heart Failure & Shock W/ MCC” Evaluate pharmacy cost drug utilization cost and variation at the individual DRG level Identify cost drivers controlling for length of stay in days and patient acuity: <ul style="list-style-type: none"> – Patient A: 5 day LOS; \$133 in drug cost – Patient B: 5 day LOS; \$1,499 in drug cost

Engage providers through existing Clinical Process Redesign and Institute Quality and Safety Committees

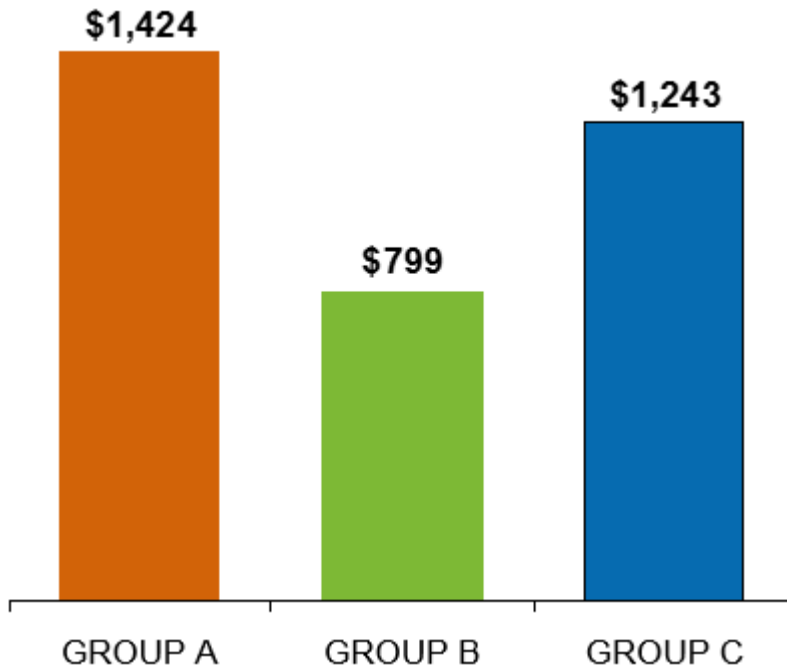
Note: Excludes INFLUENZA VIRUS (AFLURIA-PF) 0.5 ML INJ; IPRAtronium 0.5 MG/2.5ML UD INH SOLN



We have identified cost baselines for each Hospitalist group and individual ordering providers

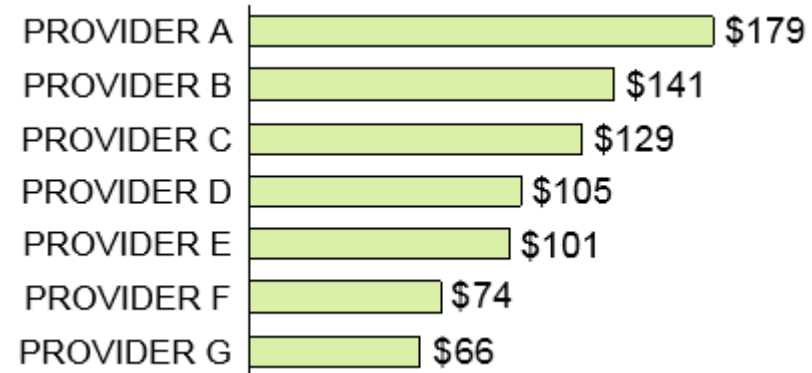
Average Pharmacy Drug Cost per Patient by Hospitalist Group

Drug Administrations during Oct 2016



Average Pharmacy Drug Cost per Patient by Ordering Provider

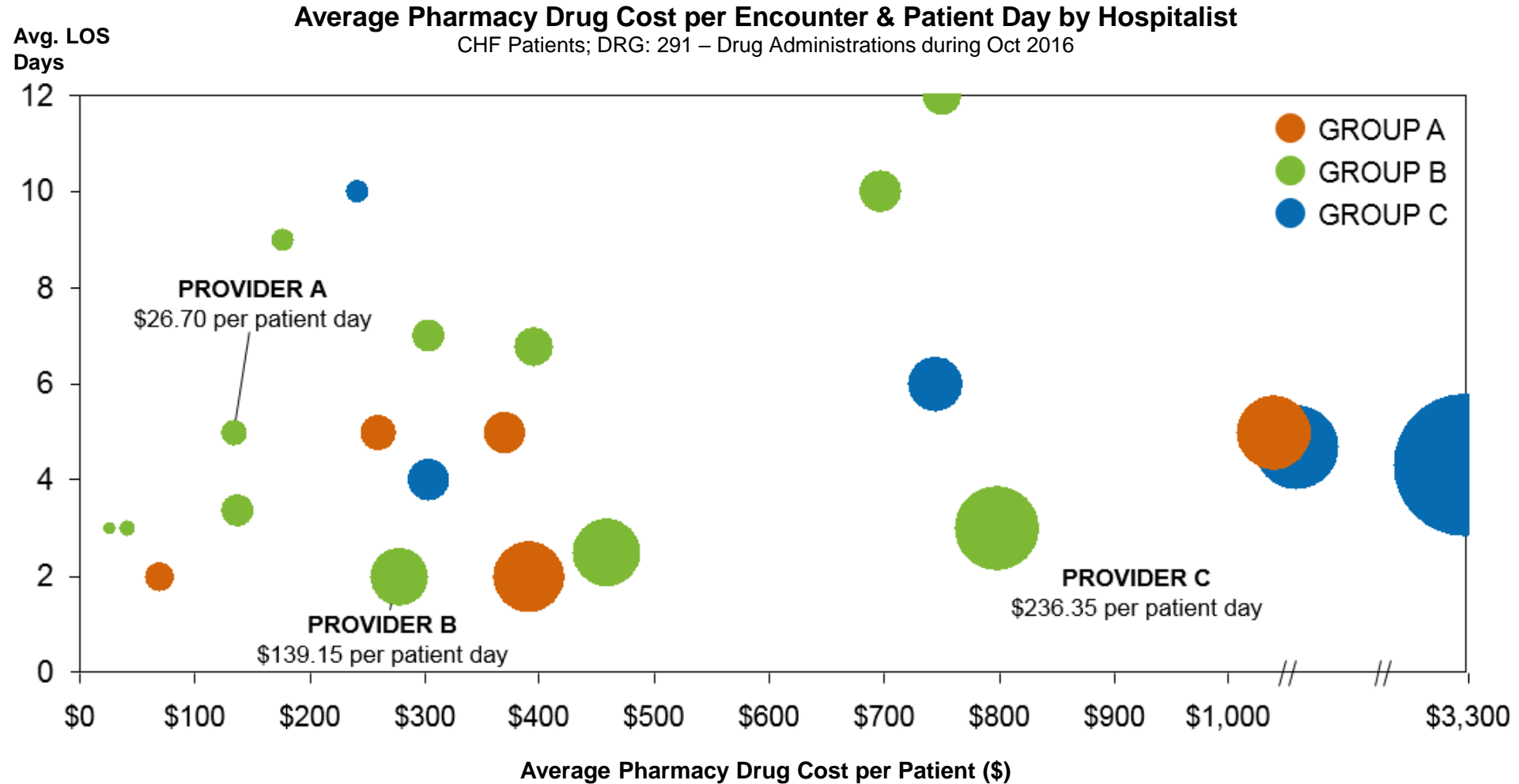
Drug Administrations during Oct 2015



Discussion

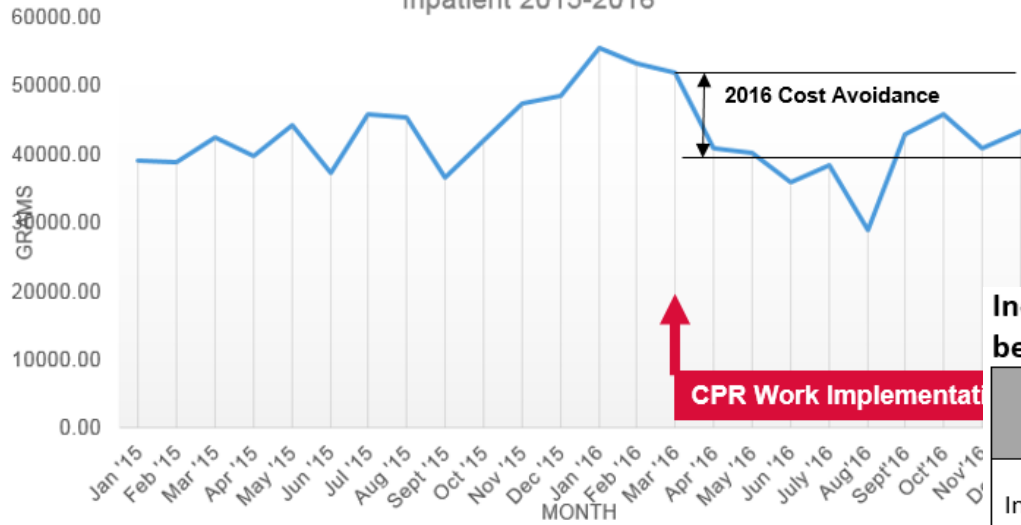
- Continue to drill down to provider level ordering behavior with cost baselining by physician:
 - Reducing provider variation through over/misuse
 - Identify lower cost alternative therapies
 - Engage providers in identification of opportunities

The team analyzed individual provider variation by calculating pharmacy cost per patient day for selected DRGs



The pharmacy CPR team created appropriate use guidelines and indications for Albumin, reducing provider ordering variation with a savings of over \$90K per year...

BUMCP Total Administered Albumin by Gram Inpatient 2015-2016



Appropriate Indications	Recommended Dosing	Comments
Paracentesis (Large Volume >5 Liters)	25% albumin 6-8 g for each liter of ascitic fluid removed OR 50g total	<ul style="list-style-type: none"> Crystalloids should be considered as the solution of choice in small volume paracentesis (≤5 Liters)
Spontaneous bacterial peritonitis (SBP)	1.5 g/kg (max 150 g) on day 1 followed by 1 g/kg (max 100 g) on day 3 (25% albumin)	<ul style="list-style-type: none"> Albumin may be considered in patients with known SBP
	Diagnosis: 1 g/kg (max 100 g) daily x 2 consecutive days	<ul style="list-style-type: none"> Albumin use may be considered as part of

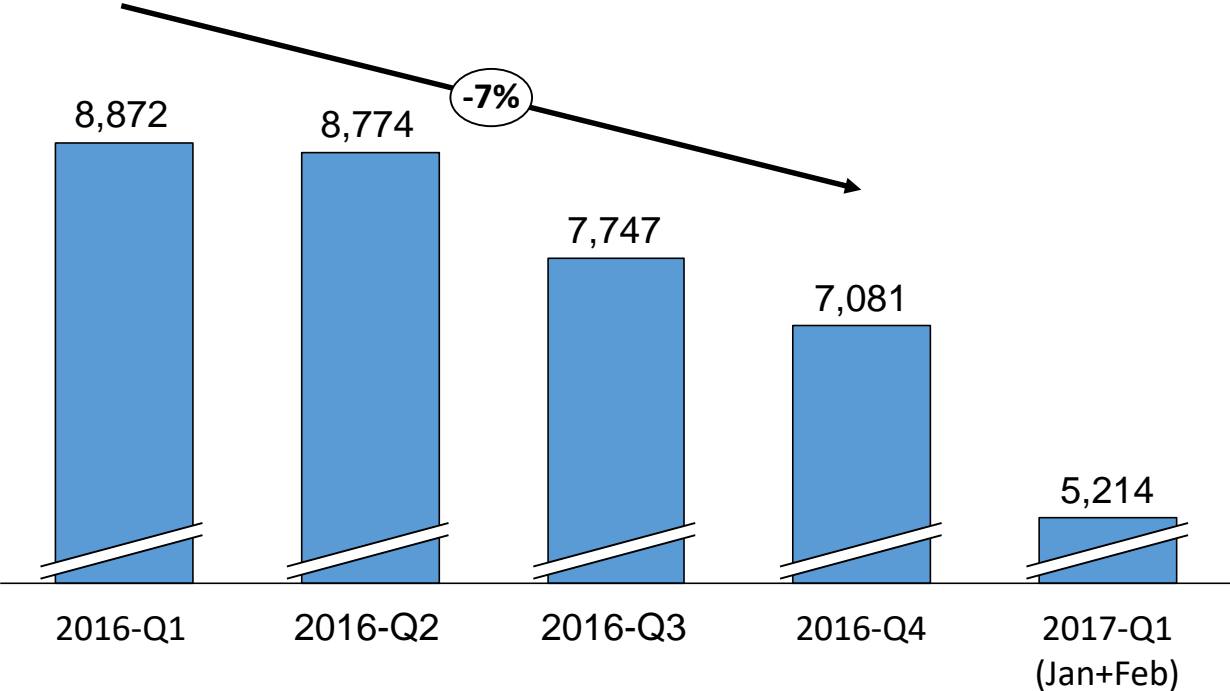
Indications considered ***inappropriate*** use of Albumin based on data showing lack of clinical benefit or inconclusive evidence:

Inappropriate Indications	Comments
Intradialytic Hypotension	<ul style="list-style-type: none"> Crystalloids have been shown to be equally efficacious when compared to albumin for managing hypotension during hemodialysis or pre-emptively prevent hypotension
Renal Replacement Therapy Ultrafiltration	<ul style="list-style-type: none"> No data available to support albumin administration during hemodialysis or continuous renal replacement therapy to increase ultrafiltration
Hypoalbuminemia	<ul style="list-style-type: none"> Albumin administration to increase serum albumin concentrations has not been shown to impact clinical outcomes
Nutrition	<ul style="list-style-type: none"> Albumin administered for nutritional status is not supported by published evidence No nutritional clinical benefit has been shown with albumin

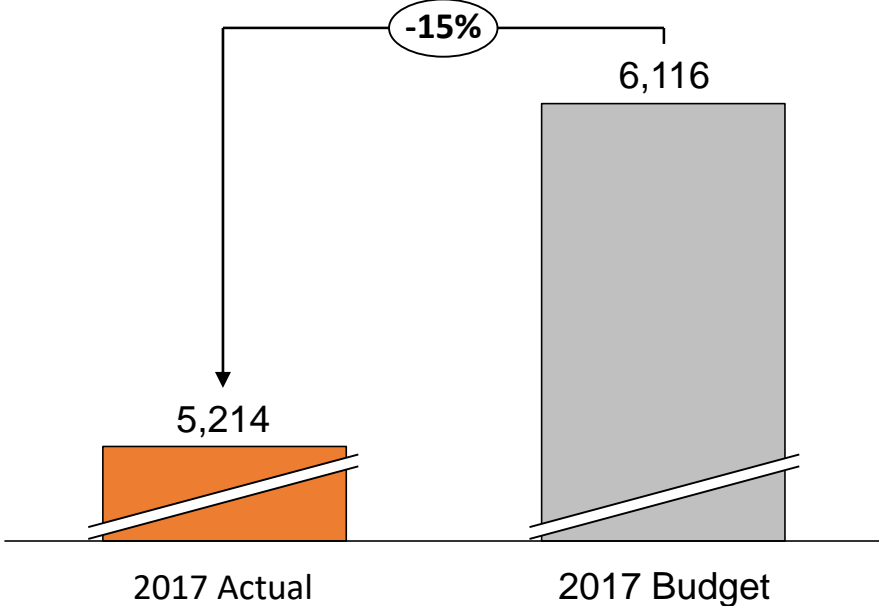


Pharmacy clinical process redesign efforts have reduced overall pharmacy drug expenses by 7% representing over \$3M in cost savings

BUMCP Inpatient Total Pharmacy Drug Expense by Quarter
2016 – 2017 (Jan + Feb) – \$ in Thousands



Total Pharmacy Drug Expense by Quarter
Actual vs. Budget 2017YTD – \$ in Thousands



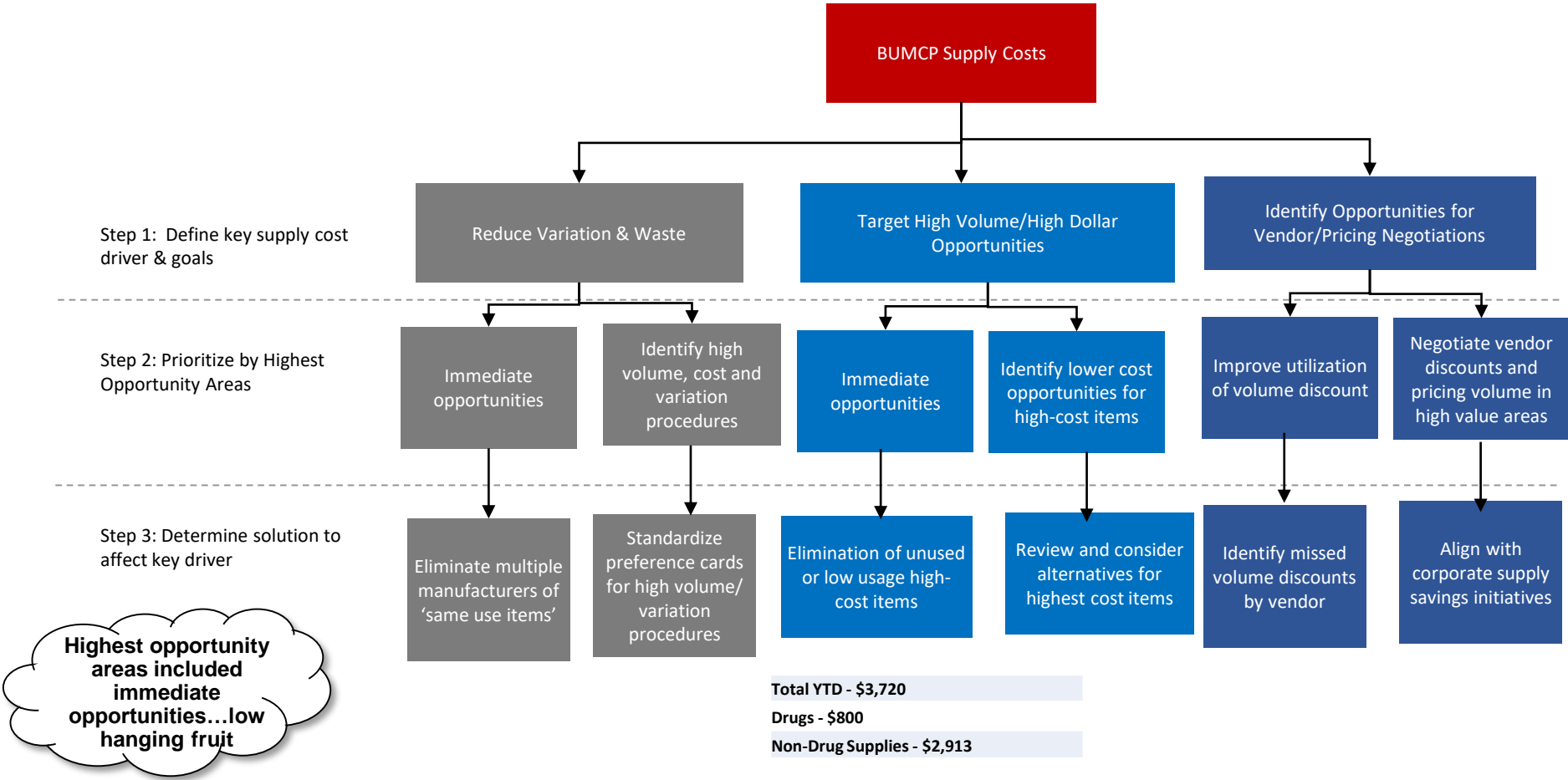


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Clinical Process Redesign to...

Reduce the Misuse and Overuse of Supplies in
the Management of Clinical Conditions

Goal - Utilize a three prong approach – Reduce Variation and Waste; Target High Dollar/High Value Opportunities; and Identify Vendor/Price Negotiations to achieve a Average Supply Cost per Adjusted Admission below \$3,000



We created a Supply CPR Toolkit for our OR Clinical Managers to use to Update Preference Cards

Goals

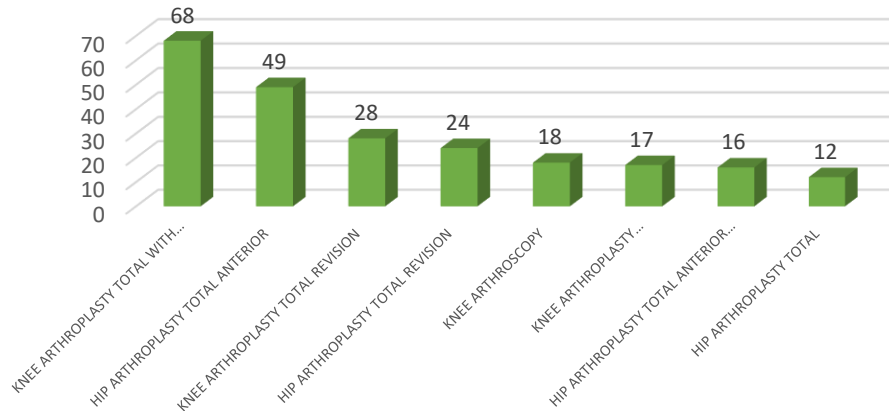
1. Improve efficiency and predictability of OR through cleaned-up, correct preference cards
2. Ensure reliability of information on preference cards
3. Decrease stress among staff members and physicians
4. Improve cost awareness among physicians about supply costs
5. Improve management of supplies
6. Standardize open and hold items

Process		
Process Step	Responsible	Time Frame
1. Identify core project team for each service line: Clinical Manager, Scrub Tech, Physician Champion, Circulator, Resident (if applicable)	OR Clinical Managers	
2. Prioritization Criteria: <ul style="list-style-type: none"> <input type="checkbox"/> Most frequently done cases by Surgeon (see attached document) <input type="checkbox"/> Non-trauma possibly because more variability in that area 	OR Clinical Managers	
3. Notify Preference Card Data team of the specific cards to price out. Supply chain will prepare a supply card for each surgeon <ul style="list-style-type: none"> <input type="checkbox"/> Compare and price out cards for each surgeon as well as average cost per case. 	Preference Card Data Team	
4. Eliminate all cards that are <u>not</u> used.	Surgeon/Clinical Manager	
5. Create draft card <ul style="list-style-type: none"> <input type="checkbox"/> Likelihood to accept <input type="checkbox"/> Cost-effective <input type="checkbox"/> Clearly describe item type so easy to understand <input type="checkbox"/> The goal is the 90/10 or 80/20 rule. All cards won't be exactly the same. 	Core Project Team	
6. Meet and compare differences with each surgeon	Surgeon	

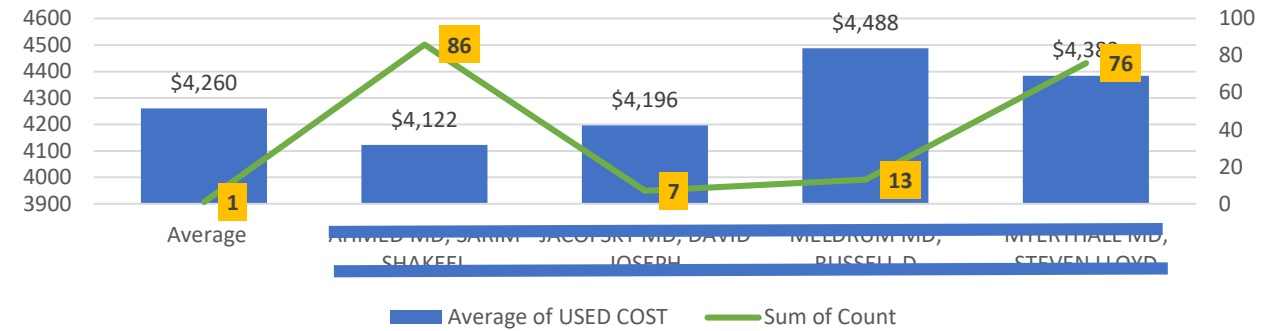


Shared Volume, Supply and Surgical Cost Comparison with Surgeons

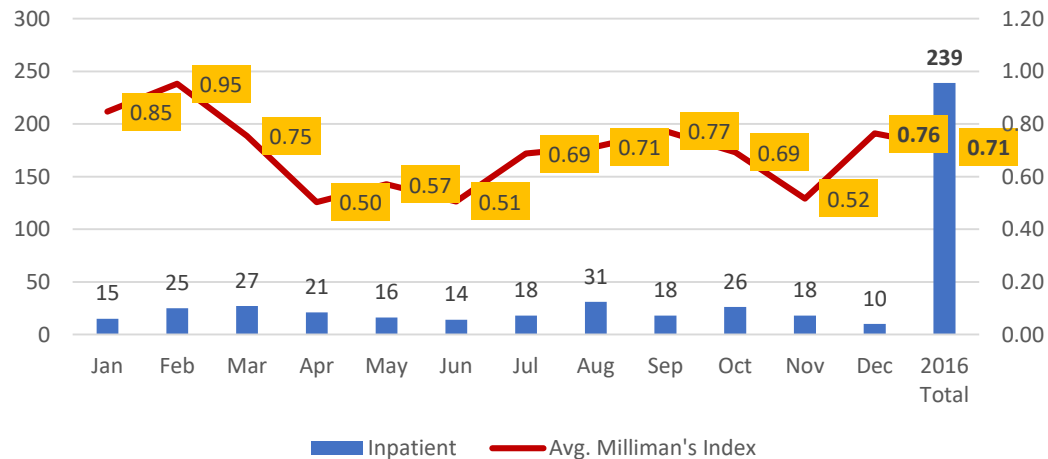
Dr. M Main OR Volumes - 2016
(excluded cases <10)



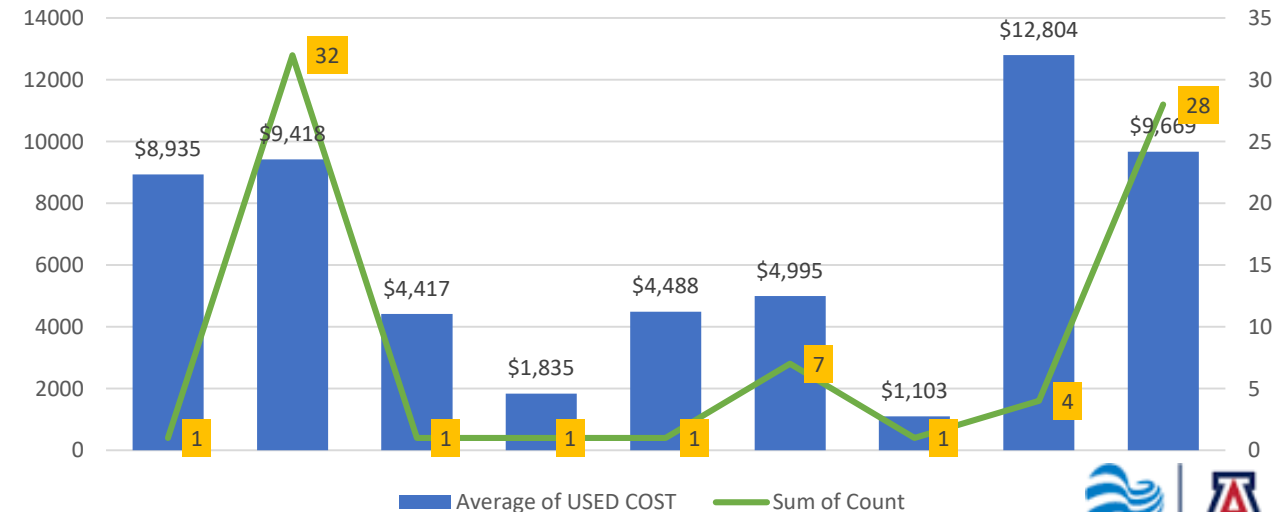
Knee Arthroplasty with Nav



Dr. M Inpatient Admissions & Milliman's Index - 2016



Knee Arthroplasty Total Revision



Provided a Detailed Breakdown for each Surgeon on Preference Card Costs

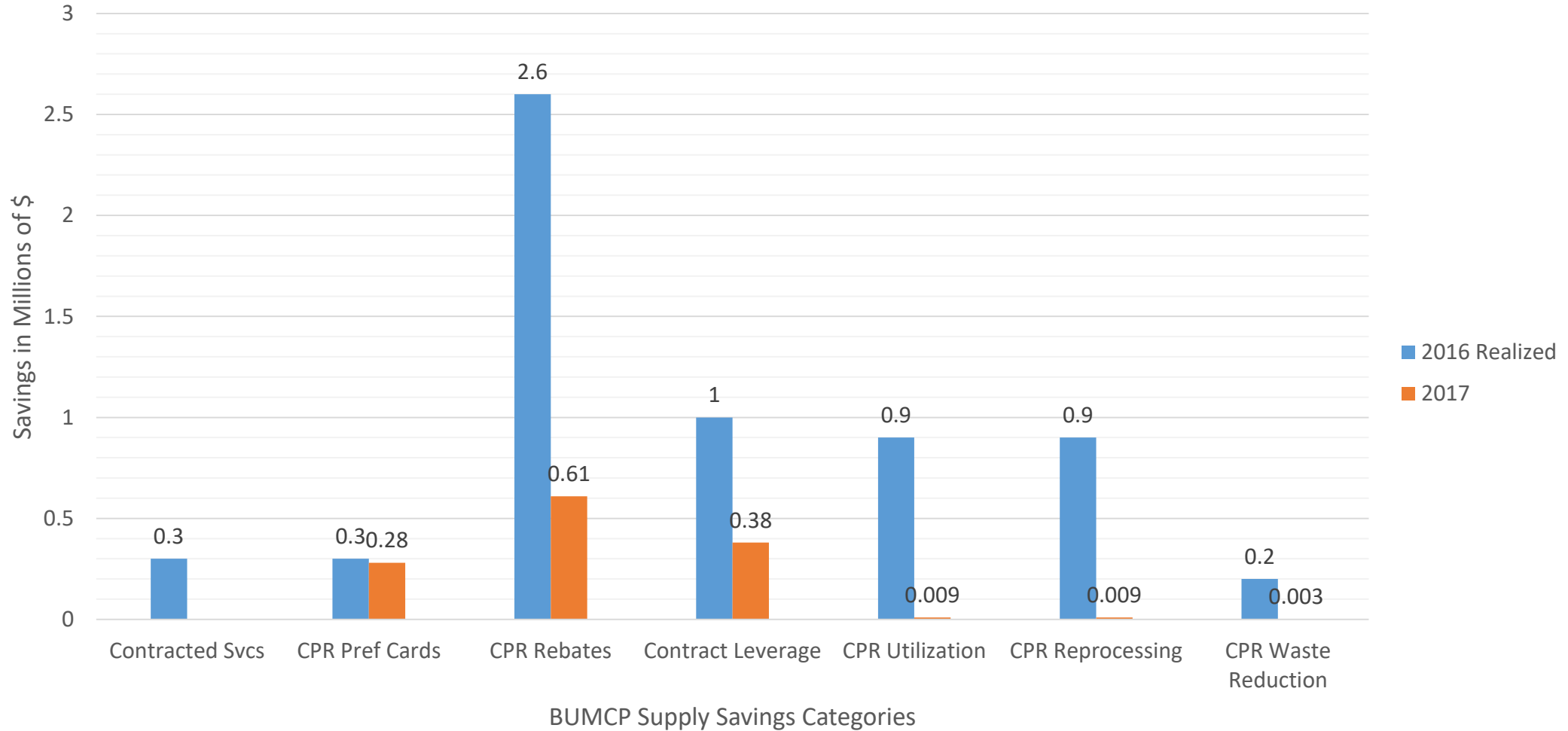
Hip Total Anterior - Dr. M							
2016 Total Performed - 68							
Category	ITEM NUMBE	ITEM DESC	OPEN QT	HOLD QT	UNIT COST	HOLD COS	OPEN COST
Non-Classified	194886	COVER CAMERA OR STRL	1	0	\$ 3.29	\$ -	\$ 3.29
Custom Packs	170309	PACK LATERAL HIP BHS	1	0	\$ 65.68	\$ -	\$ 65.68
Drapes/Gowns	171105	COVER TBL 2TIER PADDED STRL 6'	1	0	\$ 29.86	\$ -	\$ 29.86
Drapes/Gowns	33025	DRAPE BAR ORTHO 100X60 STRL	2	0	\$ 3.88	\$ -	\$ 7.76
Drapes/Gowns	49244	DRAPE IMPERV SPLIT STRL 76X100	1	0	\$ 1.85	\$ -	\$ 1.85
Drapes/Gowns	33165	DRAPE STERI 48X50 UDRAPE	1	0	\$ 2.77	\$ -	\$ 2.77
Drapes/Gowns	24498	DRAPE X-RAY C-ARM 27X70IN	1	0	\$ 2.99	\$ -	\$ 2.99
Drapes/Gowns	115454	HOOD FLYTE PEELAWAY	2	1	\$ 41.67	\$ 41.67	\$ 83.33
Drapes/Gowns	22540	POUCH INSTR STER DRAPE 1018	1	0	\$ 1.05	\$ -	\$ 1.05
Drapes/Gowns	64675	SHIELD PEEL AWAY T5	0	2	\$ 35.15	\$ 70.29	\$ -
Dressings	23326	BANDAGE COBAN 4INX5 STRL N/LTX	1	0	\$ 37.74	\$ -	\$ 37.74
Dressings	174399	BANDAGE COES LF TAN STRL 6INX5	1	0	\$ 19.50	\$ -	\$ 19.50
Dressings	138849	DRESSING FM STRL MEPILEX 4X8IN	1	0	\$ 19.51	\$ -	\$ 19.51
Dressings	171387	PADDING CAST SPECIALIST 6INX4Y	2	0	\$ 0.83	\$ -	\$ 1.66
Gloves	17995	GLOVE INDIC 8.0 REVEAL GRN	1	0	\$ 0.46	\$ -	\$ 0.46
Gloves	42380	GLOVE SURG PROTEXIS PF SYN 6.5	2	0	\$ 0.73	\$ -	\$ 1.46
Gloves	27000	GLOVE SURG TRIPLE X	1	0	\$ 0.17	\$ -	\$ 0.17

Results

1. Reduction in 'open' items
2. Increased cost awareness
3. Savings in replacement of lower cost and lower volume
4. Expected to save nearly \$400,000 in Supply savings with card-clean-up in 2017



Supply CPR combined with Supply Initiatives have resulted in \$6.2M in 2016 and \$1.48 YTD in 2017



Return on Investment...?

- The CPR Team 600k Investment
 - 2 FTEs (Senior Directors- Clinical Transformation)
 - 3 Data Analysts
 - 10 Physician leaders each paid at .1 FTE

- 2016 vs 2013-2014 - Operating Margin increased from 2 % to 6%

- **The Real Return on Investment... Physician Engagement**
 - **Priceless**

Questions?

“Better is possible. It does not take genius. It takes diligence. It takes moral clarity. It takes ingenuity. And above all, it takes a willingness to try”

— Atul Gawande, Better: A Surgeon's Notes on Performance