Improving Perioperative Efficiency

• *Tray Optimization – Knee/Hip*

Richard Capra- President AOC, CAO at UCSF
Agenda

• Why Peri-Operative Efficiency?

• Working Together: AOC, UCSF, and Johnson & Johnson Medical Devices Companies (JJMDC)
  • Project Overview
  • The Process
  • Custom Implementation
  • Results

• Lessons Learned/Considerations
UCSF Orthopaedic Surgery Goals:

1. Reduction in tray expenses
2. Reduction in overall resource handling of trays
3. 20% more cases through block time

Start with arthroplasty…future work in Spine
**Workshop Name:** Orthopaedics Integrated Care - Room Turnover  
**Workshop Date:** July 29 – Aug. 2, 2013

<table>
<thead>
<tr>
<th>A3-T this workshop ties with:</th>
<th>Arthroplasty  VSM - Prepare and Day of Surgery</th>
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</table>

| A3-T target metrics: |  
Reduce non-value added time from hospital admission to patient ready for PACU discharge by 45% (43 minutes)  
Reduce room turnover time by 45% (12 minutes)  
Add 1 additional arthroplasty case per OR day |
|----------------------|------------------------------------------------|

<table>
<thead>
<tr>
<th>Process boundaries:</th>
<th>Wheels out to wheels in</th>
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**Improvement request:**  
1) Reducing length of and variability in room turnover time

**Key features of improvement request:**  
(What would success look like?)  
- Standard work for room turnover process, including triggers  
- Move tasks from internal to external setup

**Workshop includes:** (what is in scope)  
- Intraoperative notification of expected case end  
- Room clean  
- Anesthesia materials replenishment  
- Case cart accuracy and delivery times  
- Materials replenishment  
- Anesthesia machine check  
- Pre-op communication  
- Procedure scheduling/preference cards

**Workshop excludes:** (what is out of scope)  
- Pre-op activities  
- Surgical & inpatient activities  
- PACU activities  
- Room turns from arthroplasty to a non-Orthopaedic case and vice-versa

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**Departments / processes that may be affected by this workshop:**  
- **Upstream:** Pre-Op, SWA  
- **Downstream:** PACU, next surgical case
Thomas Vail, MD
Chair of Orthopaedic Surgery, UCSF
UCSF Orthopaedic Surgery
Strategic Initiatives - 2017

New Programs
- Outside clinics
- O&P expansion
- New Affiliations
- HPC Research
- Market Intelligence

Clinical Care
- Scribes
- Analytics
- Call center
- PROS
- MD communication

Quality Improvement
- Pt sat
- Payor mix
- Bundled Payment
- LOS
- Readmissions
- Post-Discharge

Cost Reduction
- Staffing compliment
- OR Efficiency
- AA’s/MD
- Resource time/pt
- Drug use
- Workflow redesign

Tray Utilization/Reduction

Strategic Growth - Financial Strength - Our People - Quality & Safety - Pt Experience
Costs, Efficiency and Duplication* Prim Hip/Knee

Direct Cost Per Case

- Medication Management
- Length of Stay
- OR Costs 23%
- Implant Costs

*UCSF Data, 2017
Costs, Efficiency and Duplication* - Spine

*UCSF Data, 2017
It Takes a Team

- MD Champion
- Chief Administrative Officer (CAO)
- Sterile Processing Rep

Survey Feedback
- Surgical Techs
- Surgical RNs
- Decon/Loaners Reps

Initial feedback when presenting – “can’t wait”, “excited about this project”
Program Overview
Perioperative Efficiency

Reduce variation in clinical processes and operational costs by streamlining the movement of JJMDC devices through the surgical services and sterile processing departments.

Attributes

• Tailored approaches to help reduce variation in planning and preparing for surgical procedures
• Proprietary tools and clinical specialists to streamline utilization of JJMDC devices
• Programs to manage JJMDC devices in the operating room and sterile processing department

Benefits

• Standardize surgical scheduling, optimizing the processes to procure and use JJMDC products in the operative environment
• Lower carrying cost and physical footprint of inventory through product standardization
• Improve labor productivity by reducing the number of JJMDC products and instrument trays that need to be tracked, cleaned, or managed
The Process
Project & Study Timeline

UCSF – Tray Efficiency

- **Q4, 2016**
  - The Field Capabilities Implementation Plan was deployed
  - New tray/instrument configurations defined
  - The HEMA Evidence Generation Process was deployed

- **February, 2017**
  - Baseline data collected
  - Pre-implementation survey completed
  - Baseline data and project approach presented at AOC webinar

- **February – May 2017**
  - Tray configuration optimized and deployed

- **June 2017**
  - Settle Down/Wash Out Period

- **July – August 2017**
  - Post-Deployment Data Collection completed

- **September 2017**
  - Post-Deployment survey completed
  - Additional 10 procedures collected for back-table breakdown
  - Data Analytics completed
  - Program Metrics Report completed
# Primary & Secondary Objectives

## CareAdvantage Tray Efficiency

### Project Aim

- Drive efficiency through a patient specific single tray instrument set that will: decrease time, reduce cost, and reduce waste.
- Improving OR efficiency is a key contributor to delivering on the Triple Aim objectives. As part of our strategic relationship, we will reduce JJMDC trays and instruments and develop customized trays to help drive efficiencies at UCSF.

### Primary Objective

- **Set Up Time**
  
  *Definition: Starts when first instruments are wheeled into the room and ends when all items are on back table ready for surgery*

### Secondary Objectives

- **Clean Down Time**
  
  *Starts when the first instrument used is put away following definitive implantation and ends when the room is clean and ready for the next procedure*

  - Number of Instruments being processed
  - Number of Trays being processed
  - Number of Trays per procedure
  - Number of Trays in blue wrap
  - Tray Weight

- **Quantify the economic savings/impact of the efficiency**
  - Cost – Sterilization per tray (average tray cost * # of trays) pre/post
  - Cost – OR Time by procedure (average procedure time * OR cost/minute) pre/post
  - Cost – Blue Wrap vs. Rigid Sterile Containers pre/post

### Exploratory Objectives

- Evaluate pre/post Tray Efficiency Turnover Time
- Surgeon/Staff Satisfaction: Improve surgeon/staff satisfaction – Surgeons, OR team and SPD
- Day Plan Tracking - Adding a case or same amount in less time: Explore how optimized trays can impact surgical flow and ongoing efficiency efforts.
- Frequency of lost or missing instruments
- Break Down Time: Back table breakdown start, back table breakdown finish
Tailored Implementation
Perioperative Efficiency

Original TKA Tray Configuration

- 8 Trays
- 214 Instruments

Optimized TKA Tray Configuration

- 2 1/2 Trays
- 70 Instruments (144 eliminated)
Perioperative Efficiency Project

Original Total Hip Tray Configuration

- 14 Trays
- 143 Instruments

Optimized Total Hip Tray Configuration

- 6 Trays
- 118 Instruments (25 eliminated)
Results
Post-Deployment Data Collection
Summary of Results

<table>
<thead>
<tr>
<th></th>
<th>Result Description</th>
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<tbody>
<tr>
<td>Number of Trays</td>
<td>Over 57% reduction in # of trays</td>
</tr>
<tr>
<td>Number of Instruments</td>
<td>29.59% decrease across Hip &amp; Knee Procedures</td>
</tr>
<tr>
<td>Number of Trays Opened</td>
<td>46% reduction in average number of opened trays</td>
</tr>
<tr>
<td>Setup Time</td>
<td>3 minute reduction overall; 6 minute reduction for Knee procedures</td>
</tr>
<tr>
<td>Clean Down Time</td>
<td>No significant change</td>
</tr>
</tbody>
</table>

These Results apply to JJMDC products and UCSF project results.
Post-Deployment Data Collection

- Primary Total Knee Impacts

National Procedure Time\(^1\)

100.0 min

UCSF Procedure Time

88.6 min

- Setup Time Decrease of 6 minutes
  \- \( P = 0.058 \)

- Tray reduction:
  \- 8 to 3

- Instrument reduction:
  \- 124 to 70

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Pre/Post Comparisons: Number of Trays

- Knee: 5 tray reduction (62.5%)
- Hip: 8 tray reduction (57.14%)
Pre/Post Comparisons: Average Number of Instruments

- Knee: 124 instruments reduced to 70 (43.55%)
- Hip: 143 instruments reduced to 118 (17.48%)
**Pre/Post Comparisons: Average Number of Trays Opened**

- Overall, average of 3.58 trays opened  (46% reduction, p<0.0001)
- Consistent tray usage may aid in OR planning

![Average Trays Opened Pre/Post](image)

- **Pre**:
  - All: 7.5
  - Knee: 6
  - Hip: 5

- **Post**:
  - All: 1.5
  - Knee: 2
  - Hip: 3

**Legend**:
- All
- Knee
- Hip
Pre/Post Comparisons: Average Setup Time

- Knee procedures saw greatest improvement (avg. 6 min)
- Overall, on average 3 min reduction across all procedures
  - \( p=0.058 \)
Pre/Post Comparisons: Average Clean Down Time

- Average increase of 2 mins
- Measure may not discern direct impact on tray and instrument consolidations
  - Clean Down Time includes multiple processes

![Average Clean Down Time Pre/Post](chart.png)
## Perioperative Efficiency Project

### Cost Impacts

- **Sterilization Cost Savings**
  - 700 annual procedures
  - Pre Sterilization Cost: $348,075
  - Post Sterilization Cost: $188,475

- **OR Setup Time Reduction**
  - 6 minute reduction in Knee procedures
  - 3 minute reduction in Hip procedures

- **Environmental Impact**
  - Direct Annual savings due to reduced use of Natural Gas, Electricity, Water, and Blue Wrap
  - 300 annual procedures
  - Annual Sterilization Cost Savings: $98,400
  - Annual OR Setup Time Savings: $42,525

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$160K

$99K

$3K

### Estimated Annual Cost Savings Per Surgeon

1. UCSF-specified Assumption: $75/tray; American Association of Orthopaedic Executives
2. Premier database 2016Q1-2016Q4, Created on 6-12-17, updated 8-9-17; Premier Research Services, Premier Perspective Database, Charlotte, N.C.: 2016.
3. Environmental impact estimates approved by UCSF
4. Estimate based on 300 annual procedure surgeon example, using UCSF data assumptions/results

These Results apply to JJMDC products and UCSF project results.
Stefano Bini, MD
Chief of Orthopaedic Surgery, USCF
Lessons Learned/Considerations
Considerations & Lessons Learned

• Assessment conducted with **highly skilled and efficient surgeons and OR Staff**. Baseline timestamps were above average (Premier database¹).

• **Perioperative and SPD efficiency problems and solutions will be unique** to each institution but commonalities exist.

• EMR may contain some relevant data, but often doesn’t capture **granularity needed** for accurate decision making.

• As with any process improvement initiative, a **committed change management team**, often with surgeon leadership is a must.

• Need for **detailed process definition prior to implementation**. (e.g. Back Table Breakdown Time was a segment of the overall Clean Down Time)

• **Likelihood of a dosage response**. There was a greater reduction in trays and instruments for knee procedures vs. hip procedures and the subgroup analytics showed greater impact with the endpoints related to knee procedures.

• Need **greater specificity on the processes within Clean Down**, specifically Back Table Breakdown

• **Review of data collection granularity** (e.g. minutes vs. seconds; clinical relevance vs. statistical significance)

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Key Questions To Ask of Your Data and Staff

• Incidence and impact of holes in blue wrap?
• Frequency of lost or missing instruments?
• Average number of trays per procedure?
  • Sterilization cost per tray?
  • Total environmental impact potential?
  • Overall weight savings potential?
• Impact of tray and instrument volume on room clean down, turnover times, SPD?
• Staff satisfaction? (Scrub techs?)
• Correlation between back table complexity and set up time/surgical time?
• Is there opportunity for industry collaboration?
The Invisible Worker
from VM

“we can’t forget about the invisible workers (SPD)
“we can’t forget about the invisible workers (SPD)

“at Virginia Mason, 60 to 70% of the 52,000 instruments cleaned each day are never used....

We believe it is disrespectful to have our staff cleaning and assembling instruments that were never used in the operating room”
Tray Efficiency Post-Deployment OR Team Survey Results

60%
Respondents think that the program offered additional value over other facility-led programs

80%
Respondents feel the program will add some or a good deal of additional value for other specialties (e.g. Spine)

80%
Respondents think that a reduction in number, size, and/or weight of the instrument trays had a positive impact on patient care

Care Impacts Identified
Fewer possible complications and missed instruments
Efficiency in the OR

* UCSF Tray Efficiency Post-Deployment Survey Results (Data pulled 9/18/17)