



AT THE FOREFRONT

UChicago
Medicine

Innovations in Surgical Workflow Management and Intraoperative Data Collection

10/28/2017

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Presentation Objectives

- What have we done to innovate in workflow management and data collection?
- How has it helped us improve performance?
- What future opportunities exist to innovate further?
- How would we collect this data?
- What could we learn and how might this create value?

Daily Dashboards- Periop

Perioperative Services Daily Dashboard

Dashboard defaults to prior business day. To change date, choose date type *calendar* and then change date select field.

All - First Case Start

	2017-09-28	Thirty Day Avg.
First Case On Time "O"	74%	81%
First Case On Time Starts	81%	81%
First Case On Time "S"	67%	61%
First Case On Time "D"	44%	40%
First Case On Time "A"	92%	86%
Avg First Case Start	07:31 AM	07:47 AM
Avg First Case "O"	07:21 AM	07:20 AM
Case Count	90	79

All - Turnover

	2017-09-28	Thirty Day Avg.
Avg. Wheels Out to O	23	22
Avg. Wheels Out to Wheels In	32	33
Wheels Out to Wheels In Under Goal Met	58%	46%
Wheels Out to O Under Goal Met	62%	60%
Avg. SANDPO to Wheels In	5	7
Count of ICU Bed Unavailable Delays	0.0	3.0

Choose Date Type

Prior Business Day

Date Select

4/26/2017

Location

(All)

OR

(All)

Service

(All)

Primary Surgeon

(All)

Procedure

(Multiple values)

Add on Case Y/N

(All)

N

Y

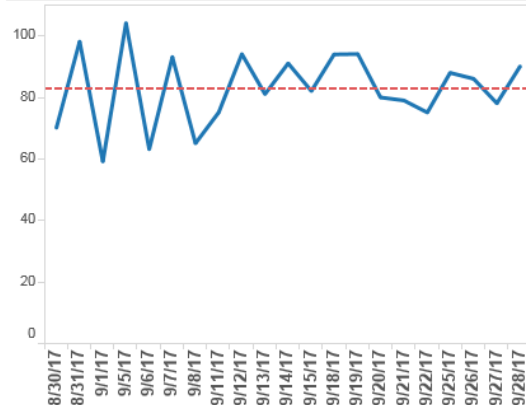
Wheels Out to In cutoff

60

Wheels to O cutoff

60

All - Case Count



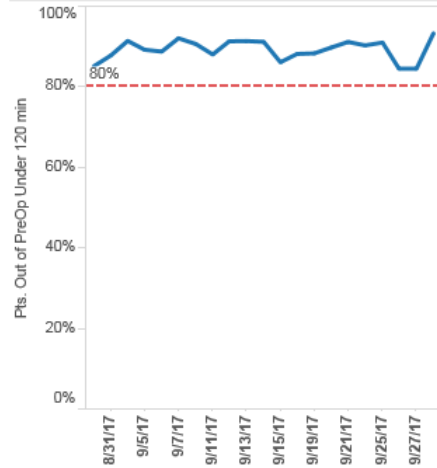
All - PreOp Pacu

	2017-09-28	Thirty Day Avg.
First Case Avg. Time in Pre-Op	06:16 AM	06:26 AM
Avg. INPT/ED PreReady to SentFor	28	20
Avg. OPD/SDA PreReady to SentFor	17	13
Pts. Out of PreOp Under 120 min	93%	89%
Pts. Out of PACU Under 150 min	80%	70%
Pts. Over 120 min in PreOp	6	6
Pts. Over 150 min in PACU	16	16

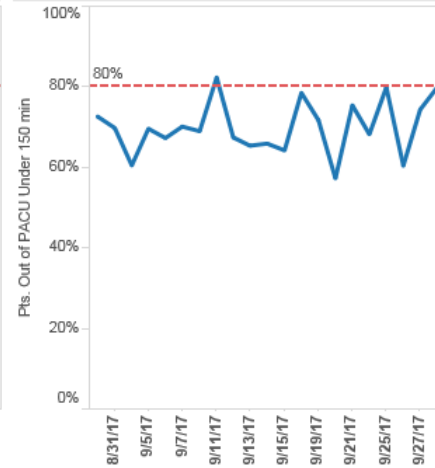
Daily Dashboard- PACU

Perioperative Services Daily Dashboard

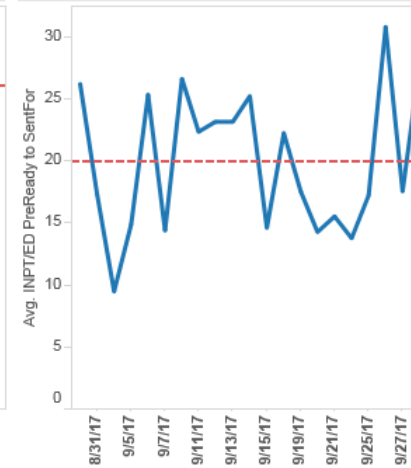
All - Pts. Out of PreOp Under 120 min



All - Pts. Out of PACU Under 150 min



All - INPT/ED PreReady to Sent For



Location: (All)

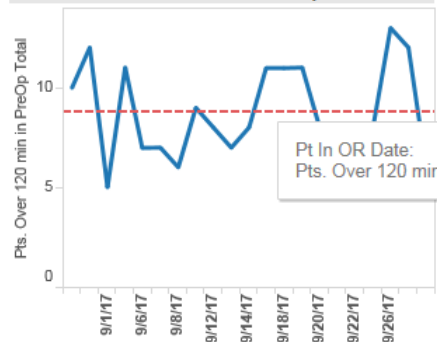
OR: (All)

Service: (All)

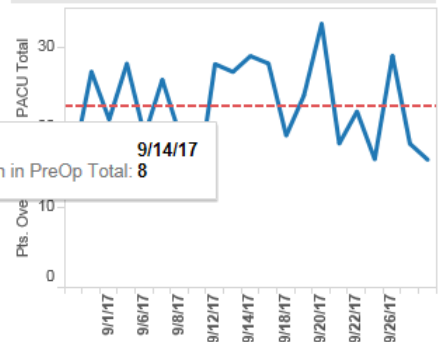
Primary Surgeon: (All)

Procedure: (Multiple values)

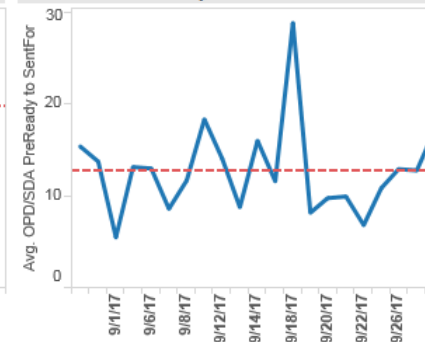
All - Pts. Over 120 min in PreOp



All - Pts. Over 150 min in PACU



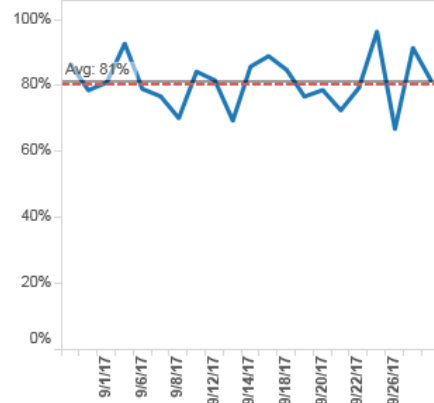
All - OPD PreReady to Sent For



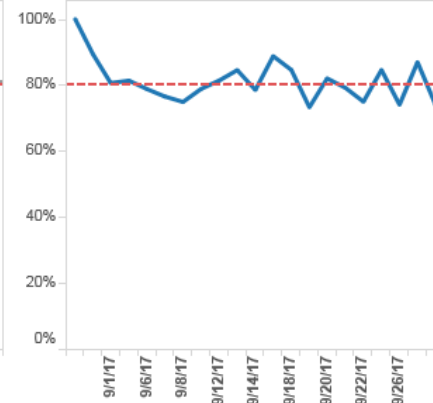
Daily Dashboard- On Time Start

Perioperative Services Daily Dashboard

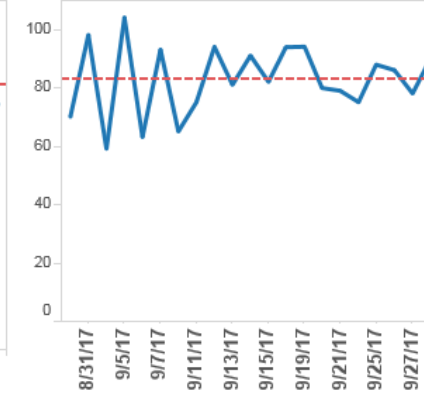
All - First Case On Time Start



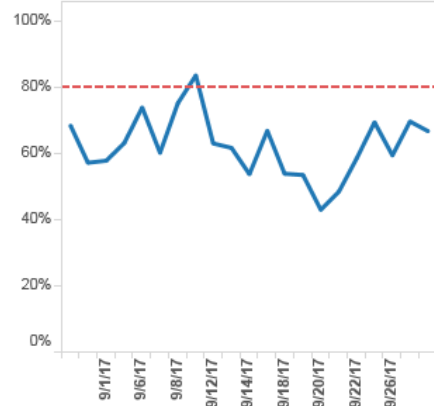
All - First Case On Time O



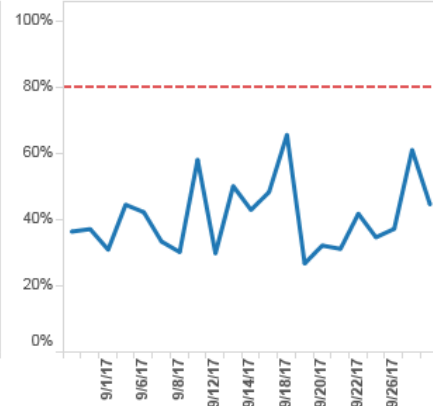
All - Case Count



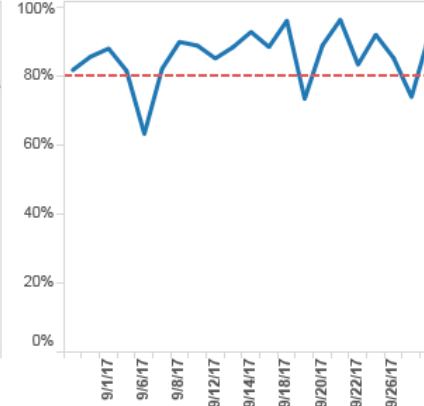
All - First Case on Time S



All - First Case on Time D



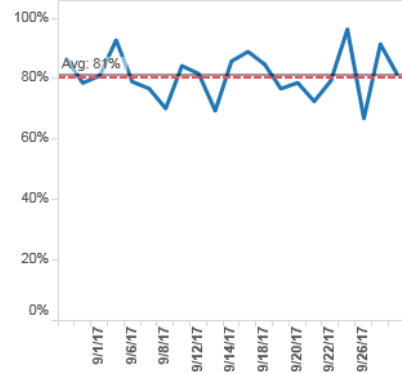
All - First Case on Time A



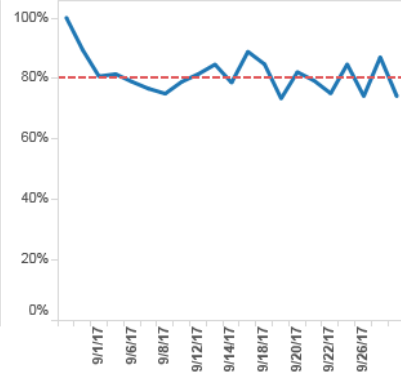
Daily Dashboard- On Time Starts

Perioperative Services Daily Dashboard

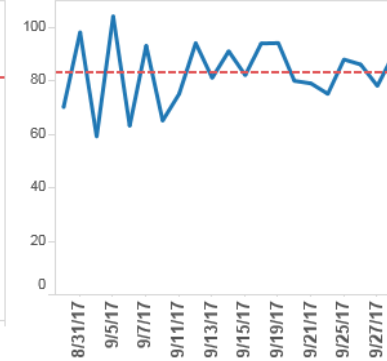
All - First Case On Time Start



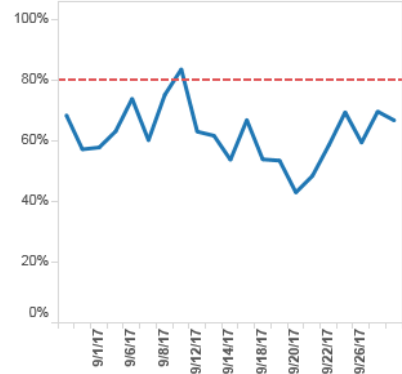
All - First Case On Time O



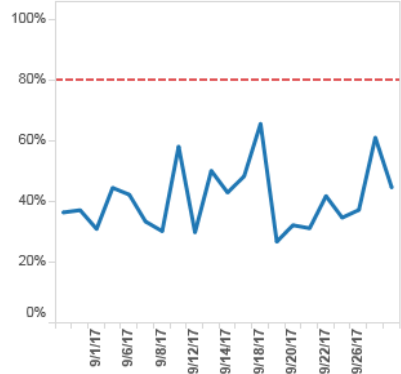
All - Case Count



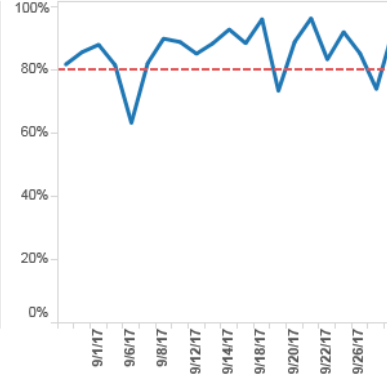
All - First Case on Time S



All - First Case on Time D



All - First Case on Time A



OR Block Utilization

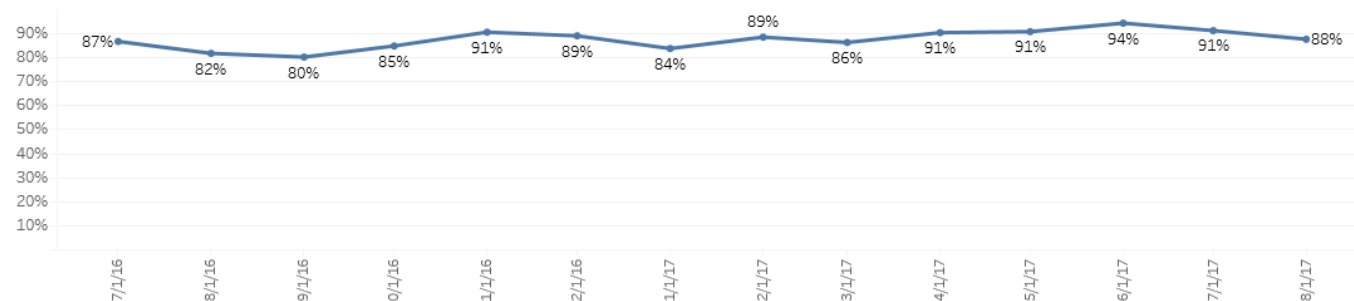
Block Utilization Month Ending: August 2017

Location (All)

Utilization Select Utilization after Release

Utilization Definition:
 (In Own Block + Turnover + Overbook) / (Available Block - Manual Release)

Service	Mon			Tue			Wed			Thu			Fri		
	Jun	Jul	Aug	Jun	Jul	Aug	Jun	Jul	Aug	Jun	Jul	Aug	Jun	Jul	Aug
Cardiothoracic	74%	202%	149%	94%	112%	85%	93%	71%	100%	64%	110%	87%	97%	133%	106%
Colon&Rectal	134%	84%	168%	128%	75%	68%	170%	112%	105%	66%	96%	143%	87%	61%	75%
General	119%	109%	73%	77%	110%	73%	84%	73%	76%	92%	101%	87%	79%	68%	81%
Gyne	102%	87%	68%	100%	139%	85%	71%	85%	78%	98%	90%	93%			
Neuro	133%	92%	91%	114%	64%	94%	56%	66%	81%	165%	81%	55%	91%	76%	85%
OHNS	73%	74%	96%	118%	97%	106%	54%	90%	84%	122%	84%	61%	93%	116%	119%
Ortho	83%	101%	97%	94%	105%	88%	110%	85%	80%	114%	100%	91%	83%	77%	65%
OVS	87%	108%	82%	90%	85%	104%	62%	122%	81%	78%	93%	74%			58%
Peds General	47%	109%	107%				105%	92%	80%	79%	72%	64%	66%	38%	61%
Plastic	88%	77%	98%	147%	83%	94%	84%	90%	89%	164%	120%	137%	123%	114%	95%
Transplant				80%	120%	85%	156%	110%	52%						
Uro	90%	83%	107%	108%	70%	106%	129%	85%	95%	77%	100%	111%	107%	82%	64%
Vascular	114%	111%	93%	107%	115%	77%	132%	111%	107%	139%	111%	99%	122%	69%	118%
Grand Total	93%	97%	94%	99%	94%	90%	93%	86%	84%	96%	95%	86%	91%	83%	85%



OR Block utilization- Minute Detail

Block Utilization Month Ending: August 2017

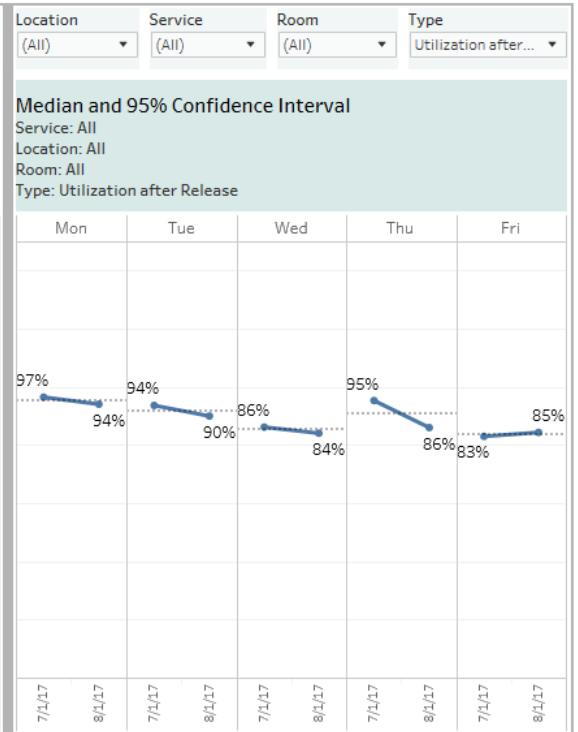
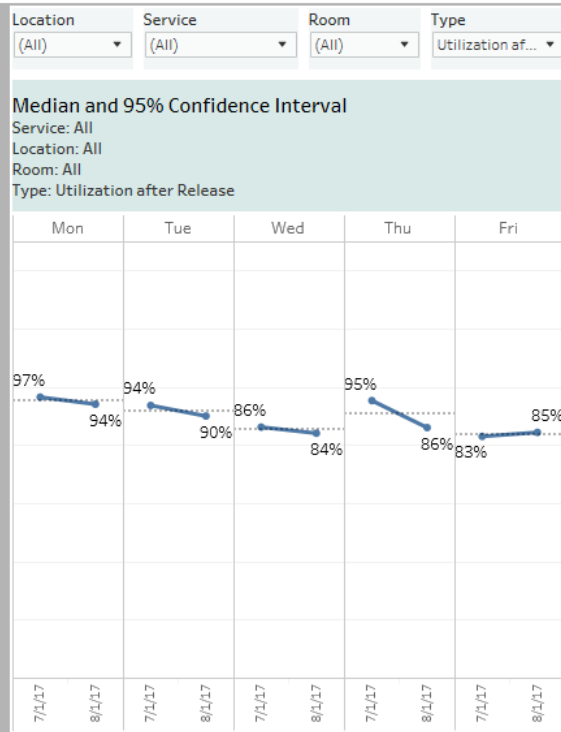
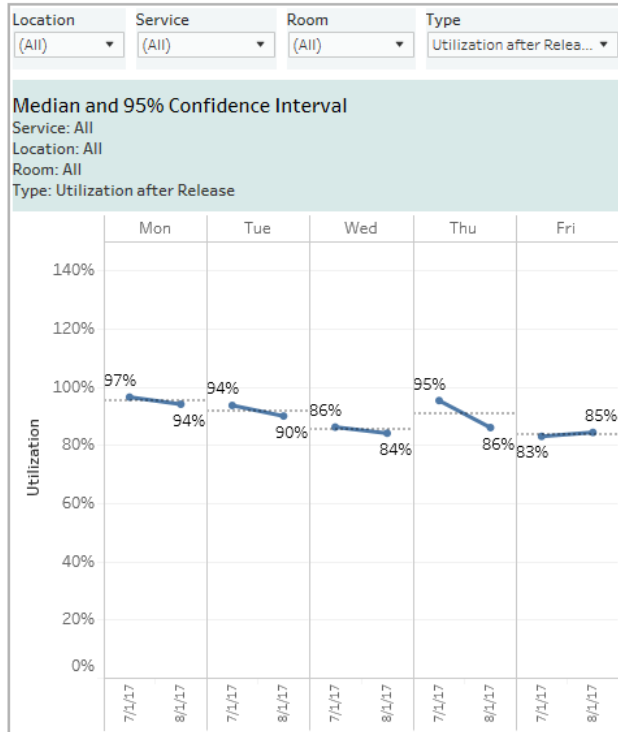
Location: (All) |
 Service: (All) |
 Surgery Date: Previous month |
 Utilization Type: Utilization after Release

		Cardiothoracic	Colon&Rectal	General	Gyne	Neuro	OHNS	Ortho	OVS	Peds General	Plastic	Transplant	Uro	Vascular	Grand Total
Monday	Block Minutes	5,400	1,800	5,700	9,000	4,800	6,000	9,600	3,000	2,400	5,070		7,200	2,400	62,370
	Manual Release	1,800	1,200	300	0	0	0	0	0	0	900		600	0	4,800
	In Own Block Minutes	4,390	836	3,202	4,692	2,781	4,069	5,841	1,646	1,811	2,928		5,393	1,291	38,880
	Outside Own Block Minutes	331	0	568	973	798	215	827	0	80	677		63	75	4,607
	Overbook Minutes	841	0	117	604	1,014	510	2,188	94	490	646		630	567	7,701
	Turnover Minutes	147	170	641	841	556	1,176	1,264	705	271	522		1,014	368	7,675
	Off Hours Case Minutes	331	0	568	973	798	215	827	0	80	677		63	75	4,607
Tuesday	Block Minutes	8,400	2,400	11,400	3,600	9,240	5,100	14,400	5,400		7,500	3,000	12,870	3,000	86,310
	Manual Release	600	0	0	0	810	300	600	0		900	0	900	0	4,110
	In Own Block Minutes	4,706	1,317	6,547	2,184	6,372	3,026	9,911	3,659		4,702	1,616	9,782	1,898	55,720
	Outside Own Block Minutes	829	554	858	431	83	98	413	157		767	408	64	126	4,788
	Overbook Minutes	1,502	100	571	226	456	1,269	467	83		578	593	324	0	6,169
	Turnover Minutes	439	220	1,231	659	1,083	790	1,743	1,856		911	351	2,527	422	12,232
	Off Hours Case Minutes	829	554	858	431	83	98	413	157		767	408	64	126	4,788
Wednesday	Block Minutes	6,480	2,700	11,340	8,580	1,500	6,780	11,760	1,620	2,700	7,380	2,700	8,580	2,700	74,820
	Manual Release	1,080	0	540	0	0	0	300	0	0	300	0	1,500	0	3,720
	In Own Block Minutes	3,797	2,019	7,051	4,904	857	4,611	7,437	946	1,443	4,863	1,101	5,360	2,256	46,645
	Outside Own Block Minutes	1,241	482	516	299	863	711	440	0	71	100	0	0	435	5,158
	Overbook Minutes	1,350	425	97	652	297	315	237	5	324	760	173	500	179	5,314
	Turnover Minutes	270	391	1,038	1,113	66	742	1,438	354	393	690	117	897	445	7,954
	Off Hours Case Minutes	1,241	482	516	299	863	711	440	0	71	100	0	0	435	5,158
Thursday	Block Minutes	9,000	900	12,600	10,800	7,800	6,000	19,200	3,000	6,000	3,300		7,200	1,800	87,600
	Manual Release	0	300	600	0	0	0	1,800	0	0	0		600	0	3,300
	In Own Block Minutes	6,952	726	9,447	7,816	2,826	2,846	12,097	1,529	2,970	2,248		5,814	999	57,499

OR Block Utilization- Daily Comparison

Block Utilization Month Ending: August 2017

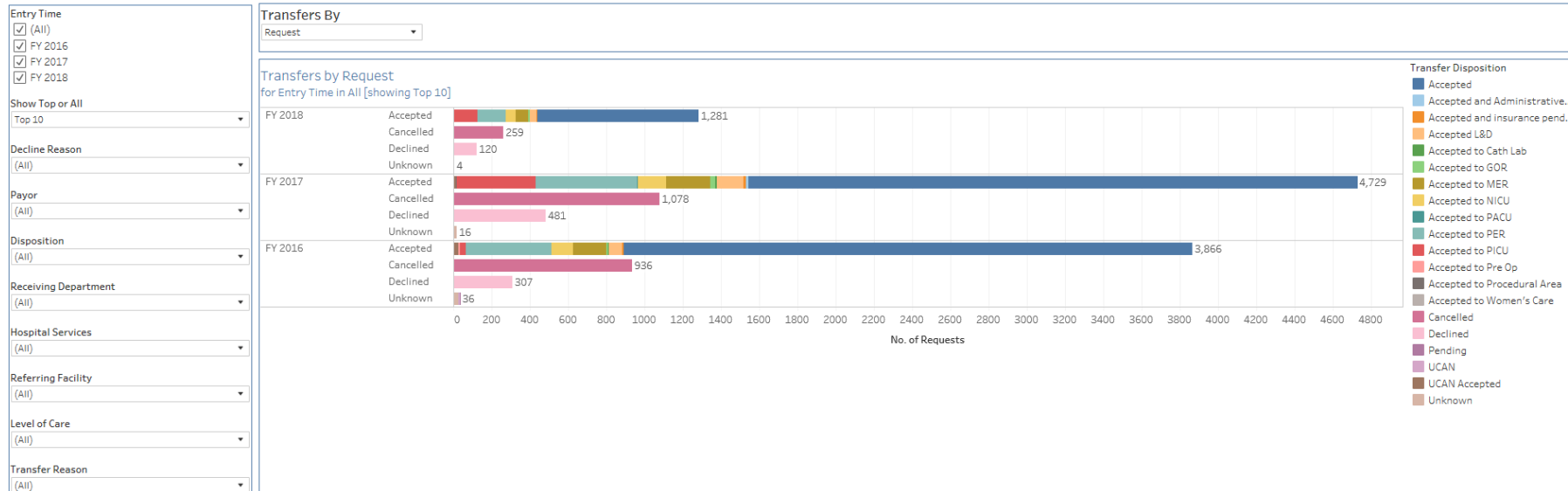
Surgery Date
This year



Patient Transfer Center Requests

Transfer Center Requests Dashboard

Report Run: 9/29/2017 2:22 PM : Data as of: 9/28/2017

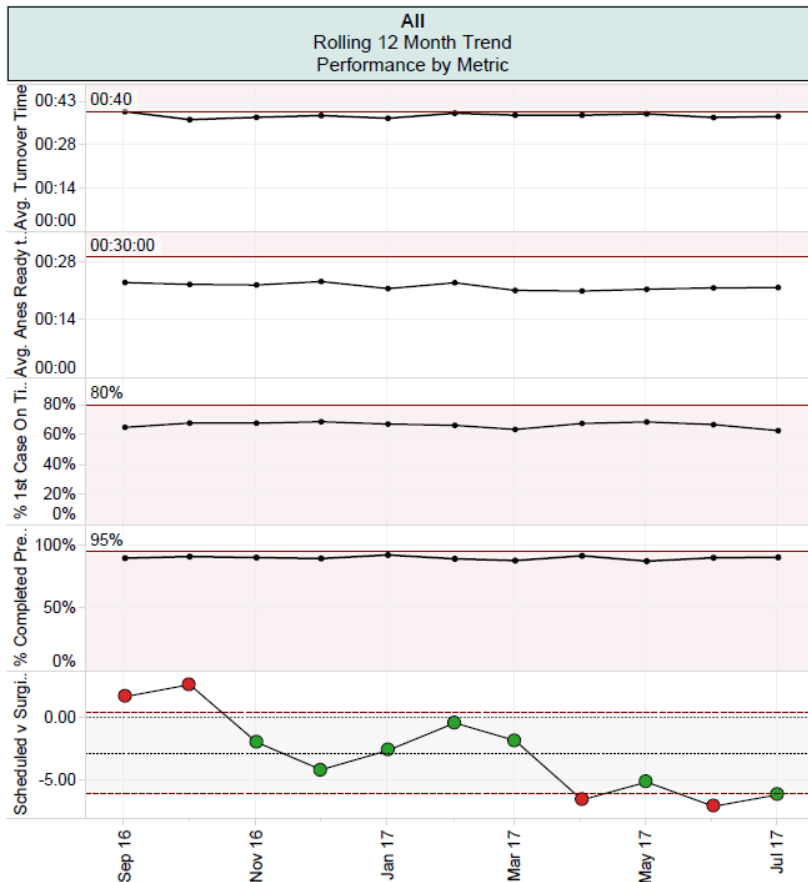


- Transfer Disposition**
- Accepted
 - Accepted and Administrative...
 - Accepted and insurance pend...
 - Accepted L&D
 - Accepted to Cath Lab
 - Accepted to GOR
 - Accepted to MER
 - Accepted to NICU
 - Accepted to PACU
 - Accepted to PER
 - Accepted to PICU
 - Accepted to Pre Op
 - Accepted to Procedural Area
 - Accepted to Women's Care
 - Cancelled
 - Declined
 - Pending
 - UCAN
 - UCAN Accepted
 - Unknown

Provider Scorecard- All

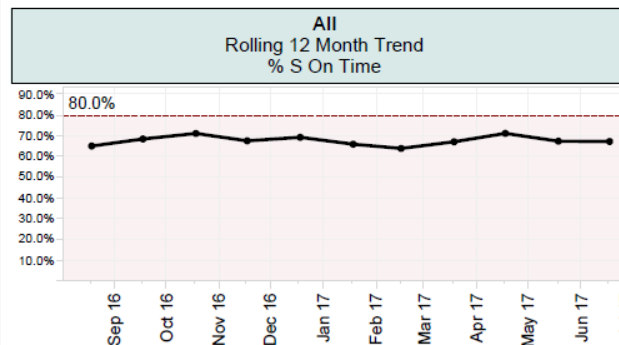


Perioperative Services Provider Scorecard Period Ending: July 2017



All
Fiscal YTD
Performance by Metric

Avg. Turnover Time	00:38
Avg. Anes Ready to Incision	00:22:32
% 1st Case On Time Start	63%
% Completed Preop Orders	91%
Scheduled v Surgical Minutes	(6.13)



All
Top Delay Codes YTD
1st cases & did not start on time

Delay Reason	
MISC-MISC DELAY	38
SURG-LATE/UNAVAILABLE	12
PT-LATE	8
MISC-EQUIPMENT BROKEN/UNAVAILABLE	7
MISC-MULTIPLE SERVICE/COMPLEX SETUP CASE	6
SURG-MISC DELAY	5
SURG-PRE PROCEDURE DOCUMENTATION INCORRECT/N..	5
MISC-MAMMO/NUCLEAR MED/DIALYSIS/RADIOLOGY	4
SURG-PATIENT WANTED TO TALK TO SURGEON	4
MISC-INSTRUMENT DELAY	3



Provider Scorecard- cont.

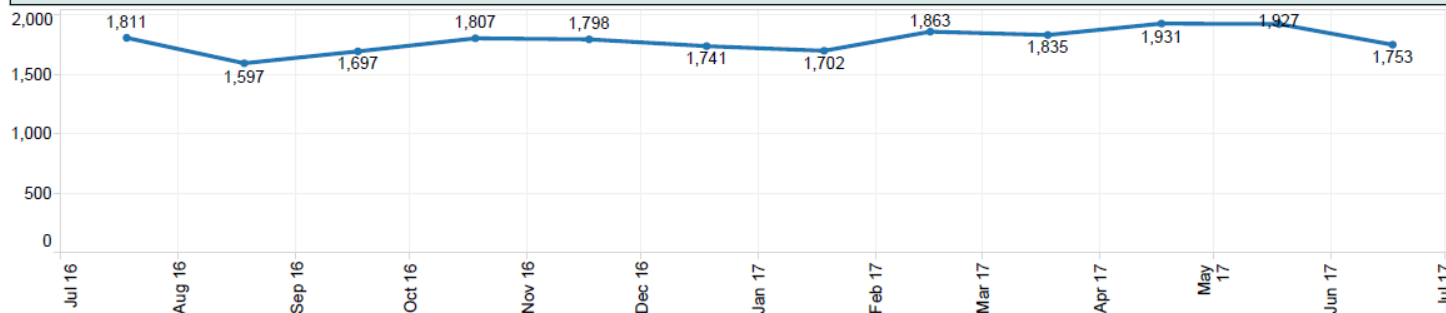


Perioperative Services Provider Scorecard Period Ending: July 2017

All Fiscal YTD Performance by Metric

Service Group Abbrev	Avg. Turnover Time	% 1st Case On Time Start	% Completed Preop Orders	Avg. Anes Ready to Incision	Scheduled v Surgical Minutes	% S On Time	CaseCount
CARDIAC	00:55	74%	86%	00:34:43	12.18	94.6%	71
COLON & RECTAL	00:47	75%	93%	00:23:40	(20.66)	68.4%	58
GENERAL	00:43	76%	94%	00:26:26	4.41	58.3%	183
GYNE	00:43	50%	92%	00:21:30	1.91	29.5%	148
NEURO	00:56	31%	92%	00:40:18	(1.13)	35.7%	75
OHNS	00:37	67%	90%	00:13:25	(13.05)	91.2%	208
ORTHO	00:36	51%	90%	00:24:00	(5.45)	75.3%	329
OTHER	00:50	38%	45%	00:22:34	(0.84)	28.6%	32
OVS	00:28	40%	100%	00:12:39	(5.01)	36.4%	139
PEDS GENERAL	00:37	63%		00:15:36	2.11	83.3%	73
PEDS SURGERY				00:23:00	(11.00)		1
PLASTICS	00:45	75%	90%	00:27:13	(30.91)	83.7%	125
THORACIC	00:49	78%	100%	00:27:03	(21.83)	44.4%	23
TRANSPLANT	01:11	64%	100%	00:31:12	(0.31)	7.1%	32
UROLOGY	00:35	74%	96%	00:18:05	(4.01)	85.9%	184
VASCULAR	00:47	84%	81%	00:28:08	(16.68)	68.4%	72
Grand Total	00:38	63%	91%	00:22:32	(6.13)	67.4%	1,753

All Case Volume Trend

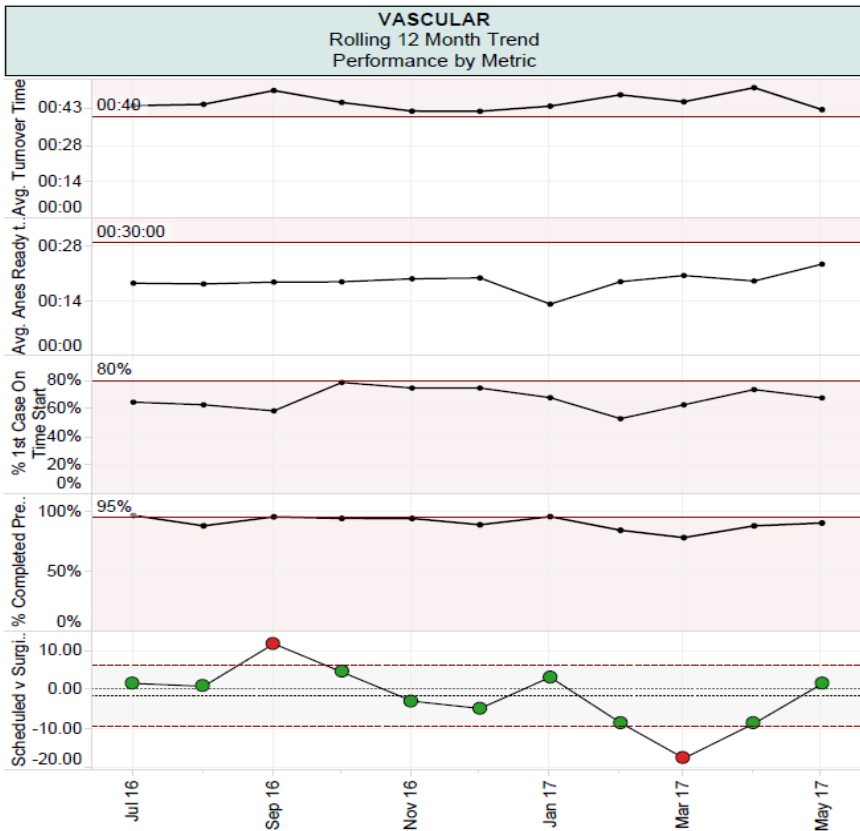


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Service Scorecard- Vascular

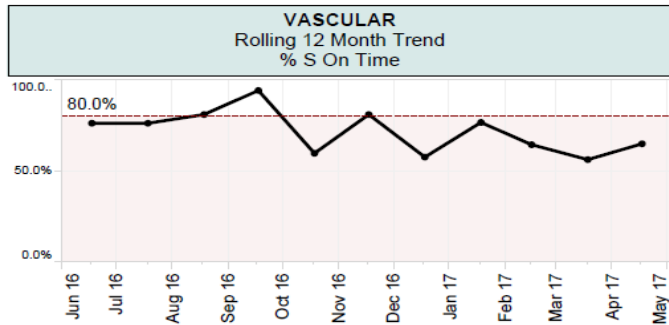


Perioperative Services Provider Scorecard Period Ending: May 2017



VASCULAR Fiscal YTD Performance by Metric

Avg. Turnover Time	00:45
Avg. Anes Ready to Incision	00:19:59
% 1st Case On Time Start	68%
% Completed Preop Orders Scheduled v Surgical Minutes	91%
	(1.95)



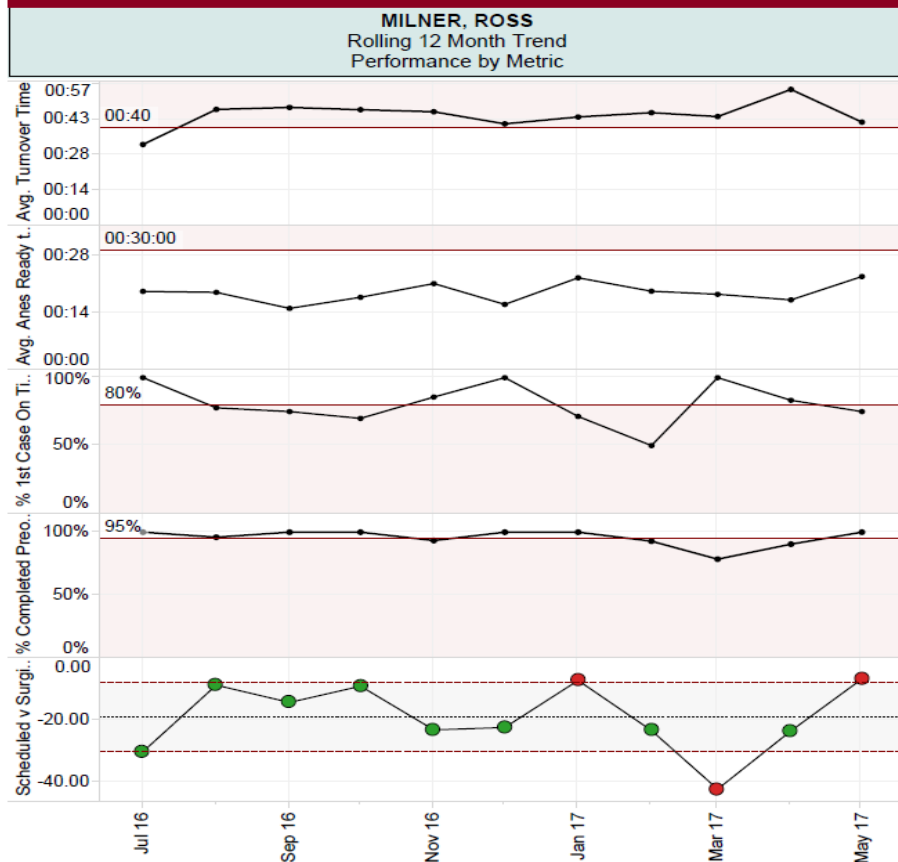
VASCULAR Top Delay Codes YTD *1st cases & did not start on time*

Delay Reason	Count
MISC-MISC DELAY	9
MISC-LABS DELAYED	6
RN OR-MISC DELAY	3
SURG-PRE PROCEDURE DOCUMENTATION INCORRECT/N..	3
MISC-INSTRUMENT DELAY	2
MISC-SCHEDULE CHANGE	2
PT-ABNORMAL LABS/LABS ARE BEING REPEATED	2
PT-LATE	2
SURG-MISC DELAY	2
MISC-ADD-ON CASE NOT PICKED	1



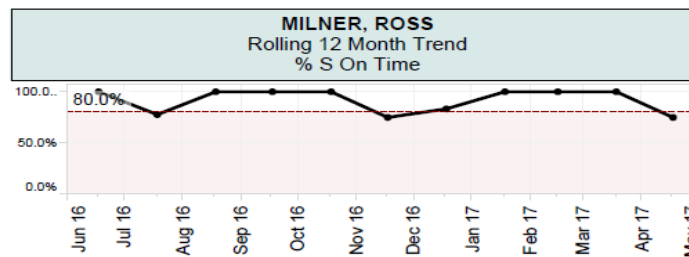
Surgeon Scorecard

Perioperative Services Provider Scorecard Period Ending: May 2017



MILNER, ROSS
Fiscal YTD
Performance by Metric

Avg. Turnover Time	00:46
Avg. Anes Ready to Incision	00:19:48
% 1st Case On Time Start	78%
% Completed Preop Orders	96%
Scheduled v Surgical Minutes	(17.11)



MILNER, ROSS
Top Delay Codes YTD
1st cases & did not start on time

Delay Reason	Count
MISC-LABS DELAYED	2
SURG-MISC DELAY	2
MISC-ADD-ON CASE NOT PICKED	1
MISC-INSTRUMENT DELAY	1
MISC-MISC DELAY	1
PT-ABNORMAL LABS/LABS ARE BEING REPEATED	1

Opportunities to Innovate Further

1. Increasing surgical team's procedural knowledge, readiness, and efficiency
2. Collecting more granular data on operative time and sources of delay
3. Identifying opportunities to standardize supplies and instruments
4. Analyzing procedural variability

Unlocking these Opportunities Requires New Tools...



Routing Images to Wall Monitors in OR's 6 & 8

Sterilization Indicators

Type	Unsterile	Sterile
Steam		
Gas		
Sterrad		

O.H. PREP TABLE

DRAPAGE PACK **PROCEDURE PACK** **OH RET.**

RULTRAK RET. **SLUSH** **VALVE**

RADIAL ART. **SAW/PADDLE**

O.H. CHISEL TRAY ↓

POST OP BLEED TRAY ↓

RADIAL ARTERY TRAY ↓

RULTRAK RETRACTOR ↓

COSGROVE RETRACTOR ↑

FANCY CLAMP TRAY ↑

CYGNET CLAMP ↑

VALVE SIZERS ↑

ALL SEPARATE WRAPPED ↑

HEART INST. ↑

RE-DO SAW ↑

LAMINA RETRACTOR TRAY ↑

CORONARY TRAY ↑

GRUNWALD SUTURE RING ↑

MONSTER BAR ↑

Paul Pearson

Aortic purse string: 3-0 eth. rb (FP)

Venous purse string: 3-0 eth. rd (FP)

Antegrade: 4-0 pro. rd (FP) (super. vena cava)

Retrograde: 4-0 pro. rd (BB), put air in syringe

Vent: 4-0 pro. rd (FS)

AVR closure: 4-0 pro. rd (art), an. plug.

MVR closure: 4-0 pro. an x1 (FP)

Sternal wires: #3, pb double (2,3,2)

Subj: 2-0 PDS 2 (ant)

Skln: 4-0 mono (ant)

Revs: 40, 120, 200

Plus vascos & bone force

Saw blade: ↑

Heart support: cut string off, use ant. holding, clamp, carmine x2, lg. 4 clips x2

Retractor: Sm. bucho. & morée, Rultrak (Luna)

Head ring: 2-0 eth. double

Strong pagamine: 2-0 eth. syringe & 1/2 in. 25g. hypo

BB: 2 chest tube p. lines

Sm. steel: 2 vial, 400 commutation & rep. 1000

Lines: 8 in. 1000

Coronary: 2 vial, 400 commutation & rep. 1000

Coronary: 2 vial, 400 commutation & rep. 1000

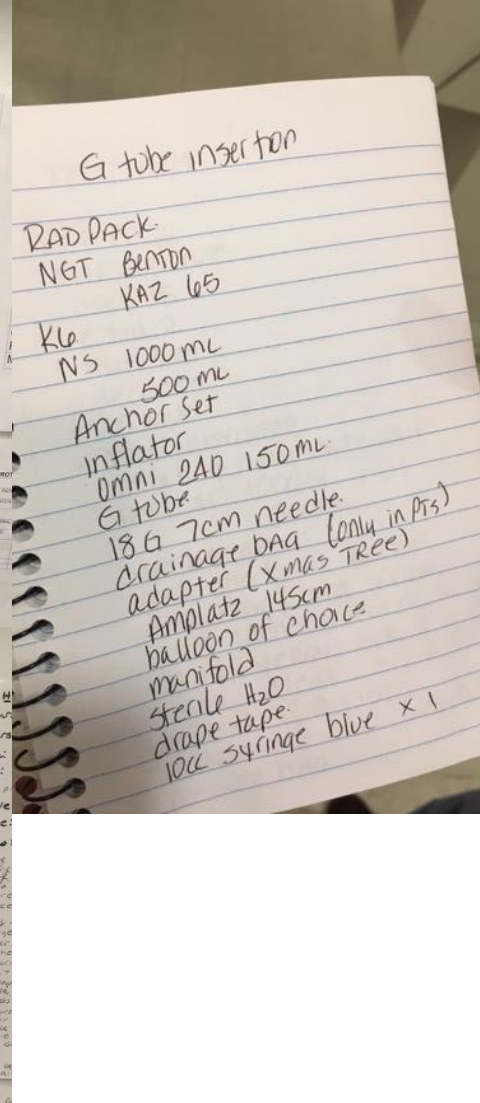
Clamp: 8 in. 1000

Revised: 2 vial, 400 commutation & rep. 1000

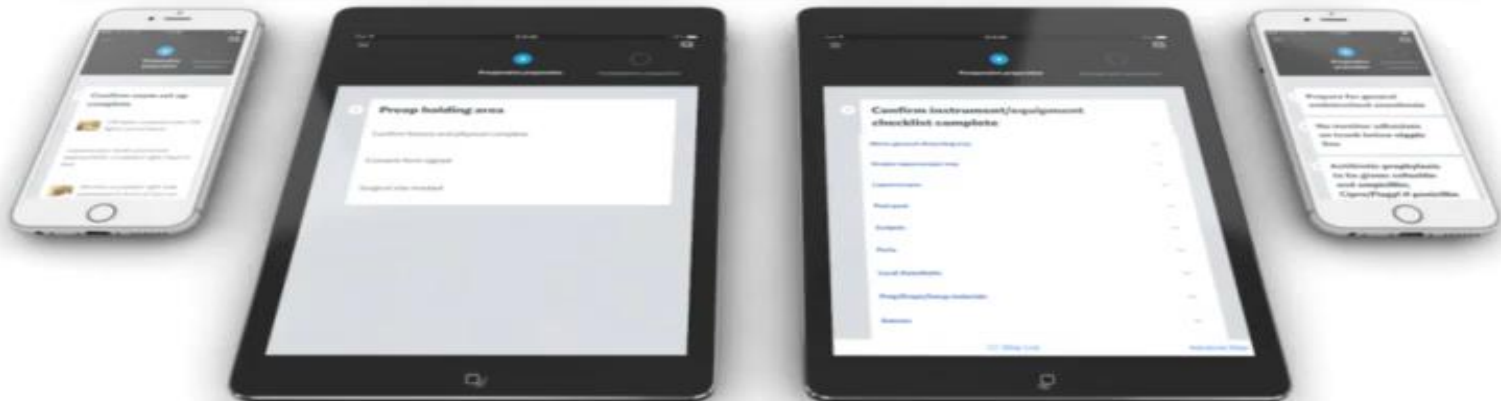
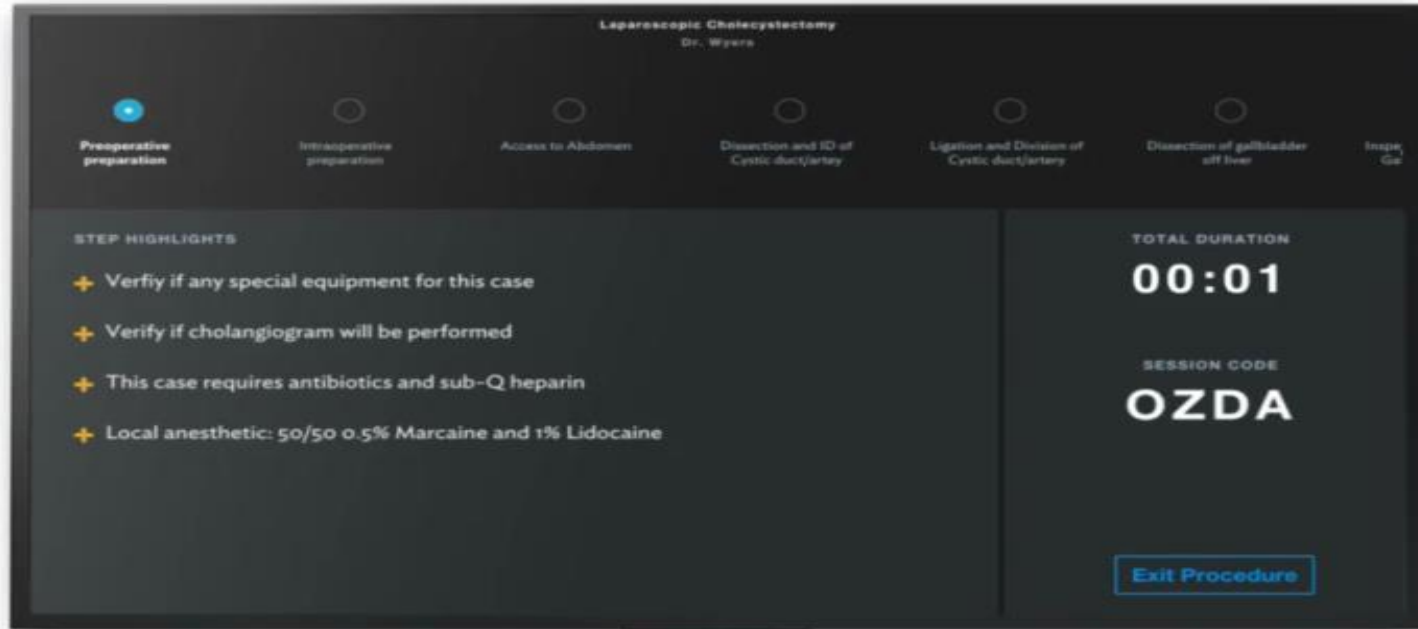
1000: 2 vial, 400 commutation & rep. 1000

1000: 2 vial, 400 commutation & rep. 1000

1000: 2 vial, 400 commutation & rep. 1000



Tools Like ExplORer Surgical...



Providing New Capabilities

- ✓ Real-time “surgeon specific” workflow reference for each role
- ✓ Optimized picklists and pre-op setup
- ✓ Post-case audits of opened and unused supplies
- ✓ Step-by-step collection of time data
- ✓ Analysis of procedural variation
- ✓ Historical database and real-time comparative analytics


Scrub Workflow View – Pre-op Setup

CASE CETL IN PROGRESS

Preoperative Preparation Intraoperative Preparation

- Tray A
- Tray B
- Epstein Cigarettes 538
- McCulloch Retractor Tray
- Stryker Sumex
- Prep and Draping Supplies
- Peel Pack or Single Use Instruments
- Hemostasis Supplies
- Sutures and Closure

Polysorb D-Tach Absorbable 0 GS-21 18in, Braided 5 Strand, Coated, Violet x1




2-0 Polysorb undyed 5 x 18" GS-10 cutting D-TACH x1

CASE CETL IN PROGRESS


Preoperative Preparation Intraoperative Preparation

Peel Pack or Single Use Instruments


Symmetry Olsen Bayonet Bipolar Forceps, 0.75mm tip x1



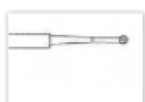
Aquamantys Bipolar Vessel Sealer, 2.3mm x1



Stryker 3.0mm Round Fluted Bur, Soft Touch x1



Stryker 3.0mm Round Diamond Bur, Coarse x1



Hemostasis Supplies

Circulator Workflow View - Positioning

☰ CASE CETL IN PROGRESS

○ Preoperative preparation ● Intraoperative preparation ○ Access to Abdomen

1 Patient setup

Sequential compression devices to both legs: confirm SCD pump is on, perform prior to anesthesia induction

Pillow under knees & Safety belts (x2) across lower thighs **SAFETY TIP**

Bear hugger warming pad: nipple line and above, thighs and below

Bovie pad to posterior thigh

Insert Foley catheter

2 Place cautery foot pedal


Place on patient left side near head of the bed

☰ CASE CETL IN PROGRESS


○ Preoperative Holding Area ● Intraoperative Pre-Timeout Setup, Draping, Tube & Scop... ○ Time Out Checkpoint, Attention All In Room

1 Patient Position and Prep


Draping from base of breast crease to pubic ramus; duraprep



Patient setup



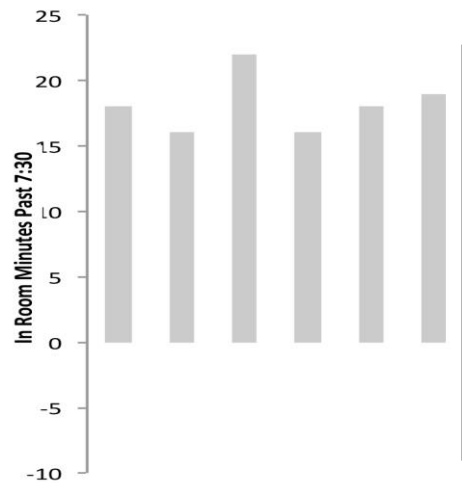
Note position of tower and slave



Patient supine with arms out

2 Scope Tower on patients right head of bed; Slave on left at same level

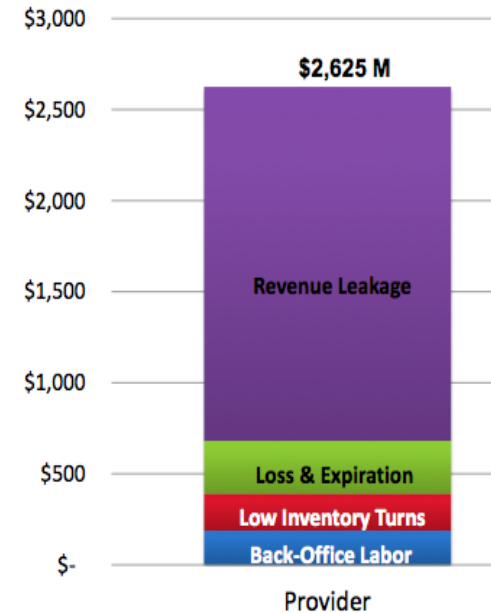
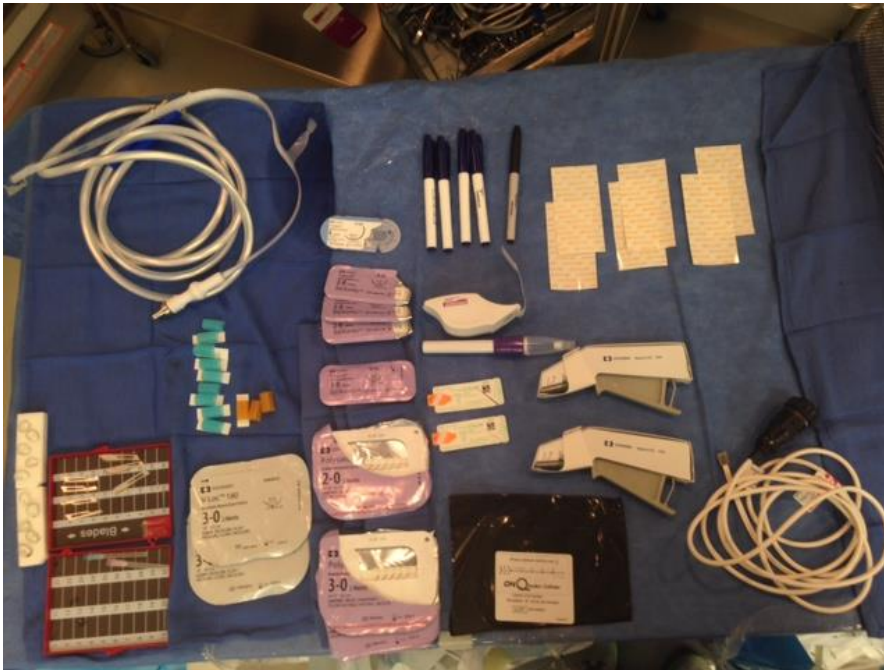
Cognitive Overload is Reduced



Supply
Reduction

First case starts go from very late to early!

Supply Waste is Eliminated



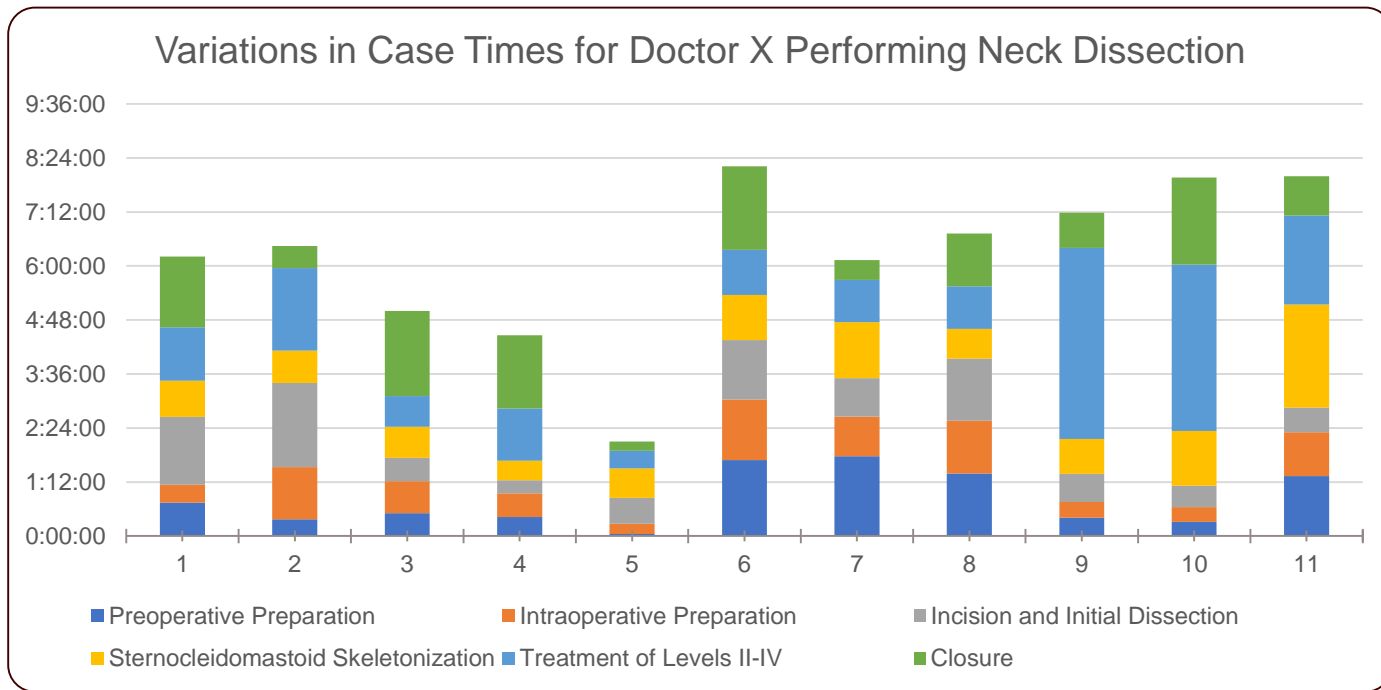
ces: PNC Healthcare; GHX Quantitative Research Study (Aug 2010);

OPRI Lab 2013: \$20-\$600 per case (PRS, Neuro, ENT, General)

Zygorakis 2017: ~\$1000 per case (Neuro)

ES 2017: \$200-\$300 per case (ENT-HNS)

Detailed Time Data



	1	2	3	4	5	6	7	8	9	10	11
Preoperative Preparation	0:44:21	0:22:08	0:30:32	0:25:11	0:02:46	1:41:01	1:46:32	1:23:30	0:24:33	0:18:44	1:19:53
Intraoperative Preparation	0:23:54	1:09:52	0:42:32	0:31:50	0:13:35	1:20:40	0:52:40	1:10:04	0:20:53	0:19:50	0:58:40
Incision and Initial Dissection	1:30:30	1:52:15	0:30:59	0:17:26	0:34:41	1:19:44	0:51:10	1:22:45	0:37:34	0:28:40	0:32:37
Sternocleidomastoid Skeletonization	0:48:08	0:42:56	0:41:33	0:25:44	0:39:17	0:59:53	1:14:40	0:39:49	0:46:16	1:12:41	2:17:20
Treatment of Levels II-IV	1:11:32	1:49:57	0:40:47	1:09:33	0:23:13	1:00:22	0:56:20	0:56:52	4:14:46	3:41:54	1:58:46
Closure	1:34:13	0:29:42	1:53:48	1:37:51	0:12:25	1:51:12	0:26:17	1:10:20	0:46:46	1:56:11	0:52:16

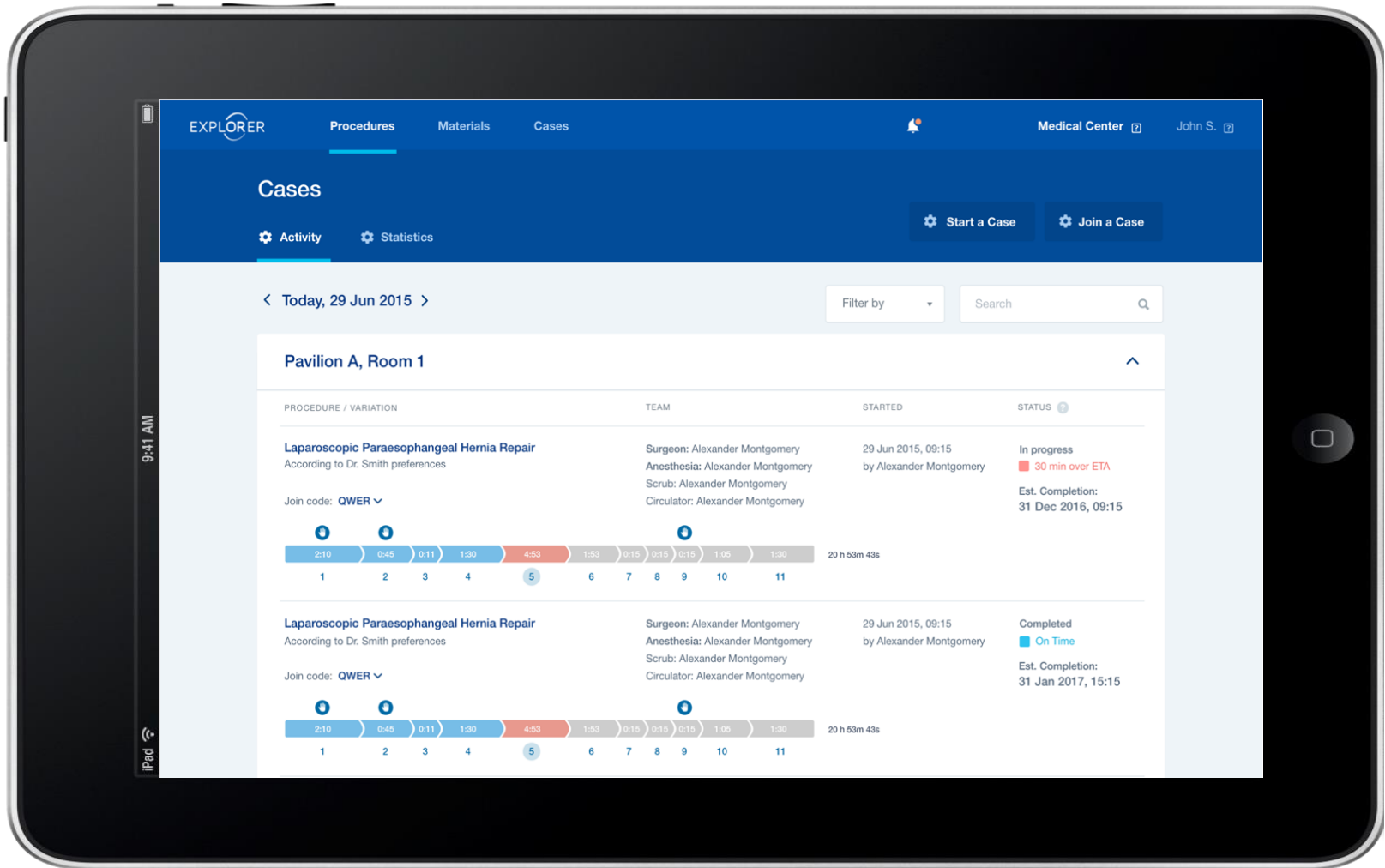
Combined with Data on Causes, Enable Improvement

Step Name	Delay Type and Percentage Occurrence
Preoperative Preparation	
Intraoperative Preparation	Improper Patient Draping (45% of the time)
Incision and Initial Dissection	
Sternocleidomastoid Skeletonization	Malfunctions or Accidents/Dropped Instruments or Supply (45% of the time)
Treatment of Levels II-IV	Instruments/Supplies Not in Room (81% of the time)
Closure	Anesthesia Delays (36% of the time)

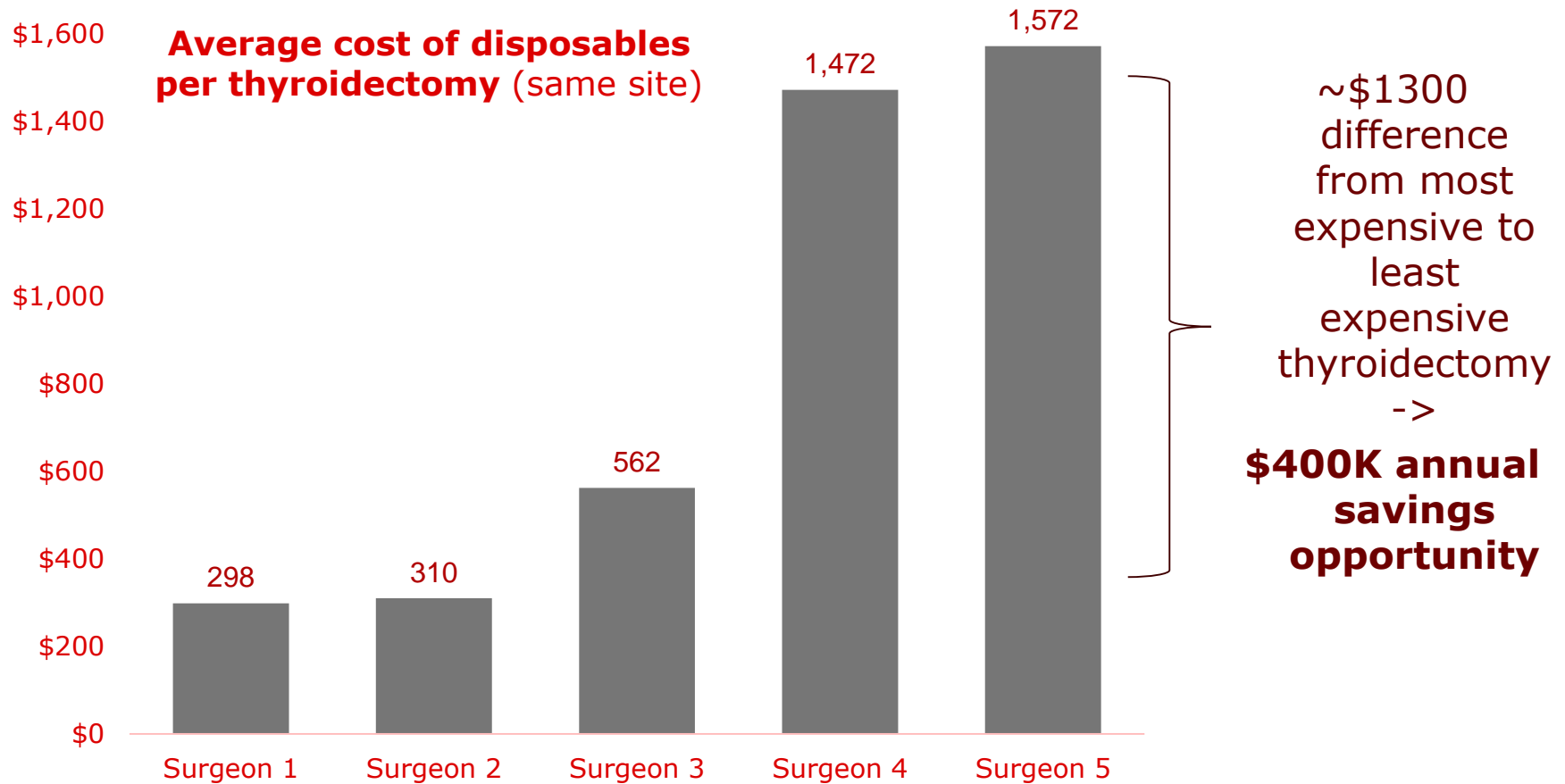
8% of case time is spent in delay (often **20 minutes or more**); presenting a significant opportunity to improve patient safety and recovery

The majority of that delay is due to **instruments/supplies not being in the operating room despite being listed on the preference card.**

Real-Time Reporting Provides Early Warning of Over-runs and Overtime



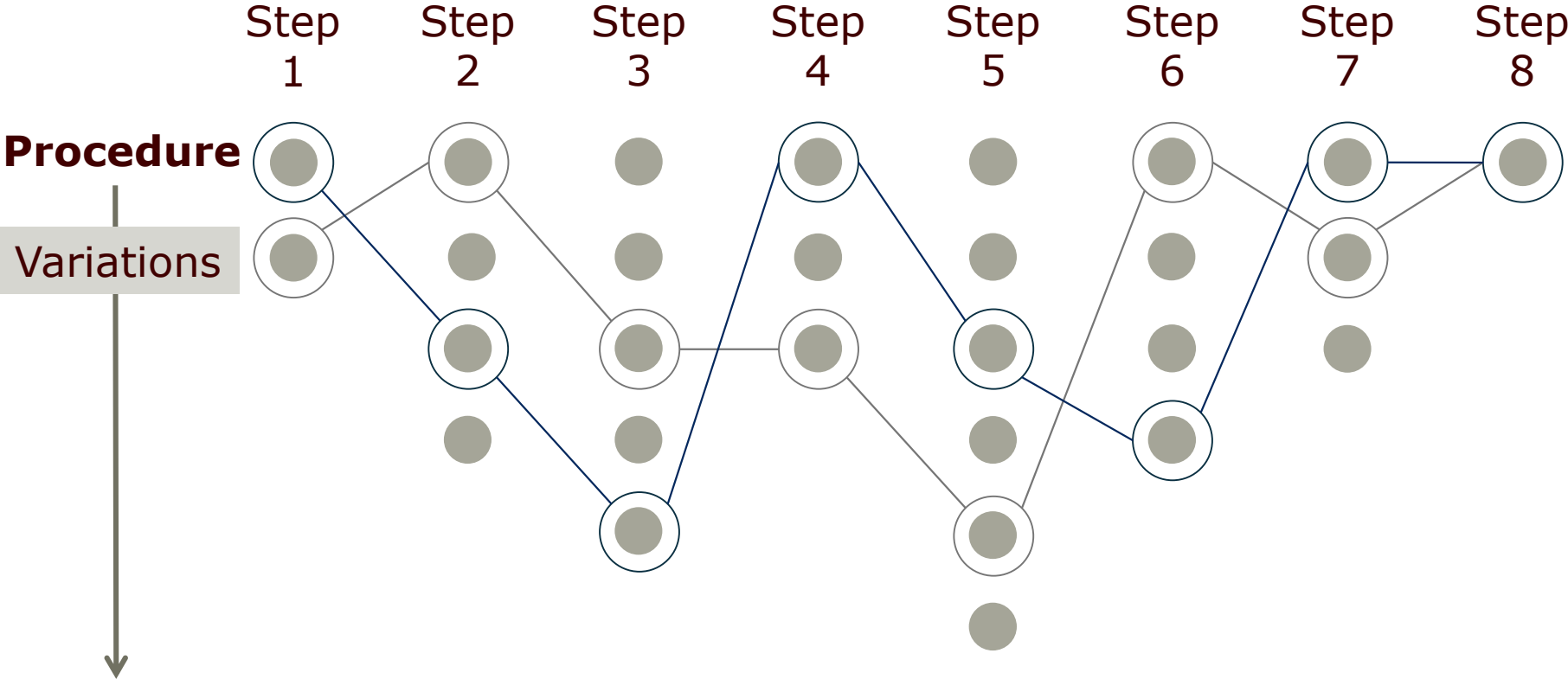
Substantial Variation in Simple Procedures = Large Profit Leakage



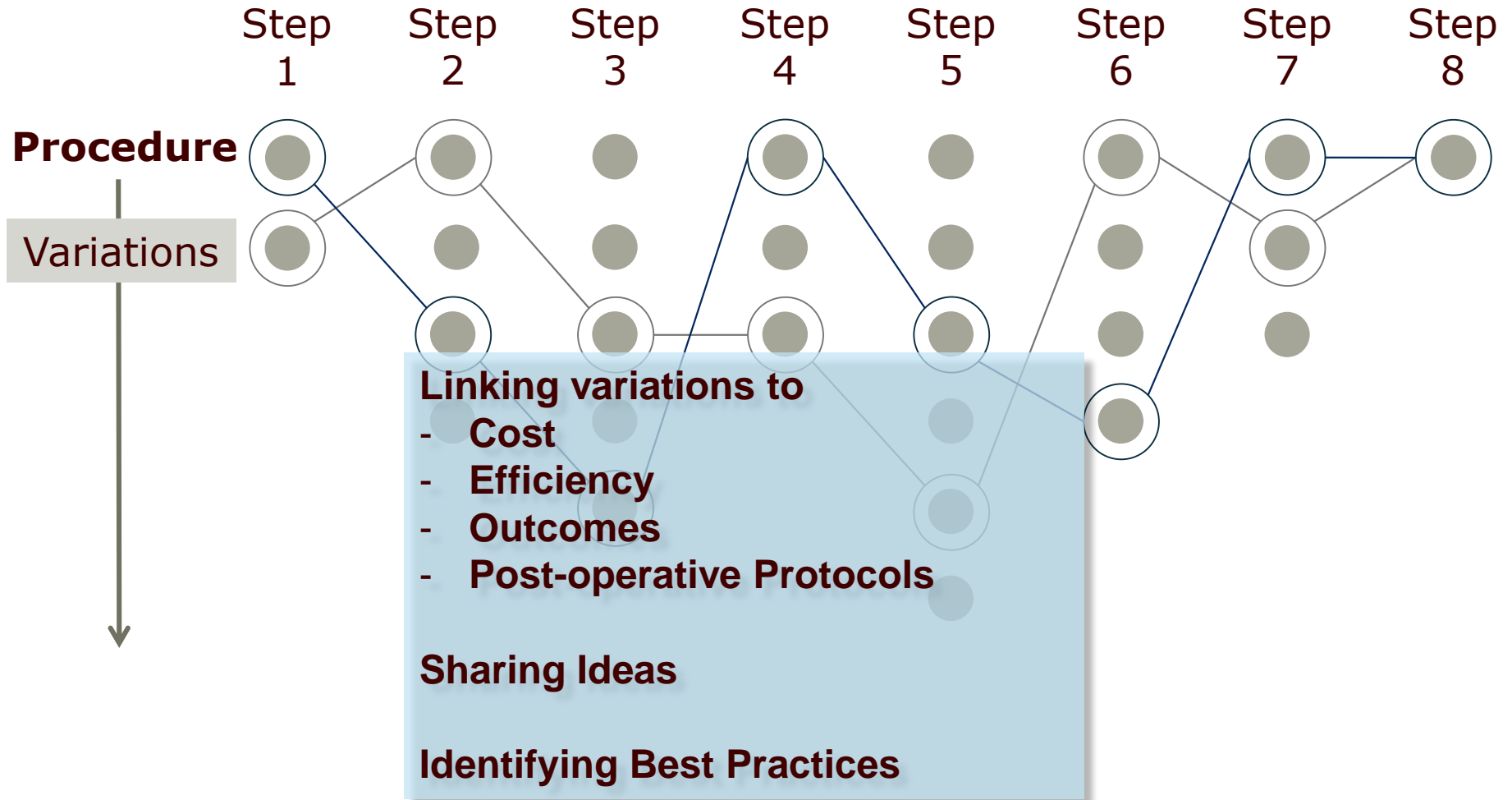
136,000 surgeons working in 45,000 operating rooms, each doing it differently

Source: *Financial Impact of Physicians on Supply Costs for Thyroidectomy*, study by Ashley Nassiri and Alex Langerman, delivered at International Federation of Head and Neck Oncologic Societies World Congress and American Head & Neck Society Annual Meeting in July 2014

Variability in Operative Method is Easily Identified and...



Linked to Critical Success Factors



Thank You!