Process of Quality Improvement—
The Colorado Experience

Leslie Jameson MD
University of Colorado
Department of Anesthesiology

Why?

PUBLIC →Regulators→ Medical Community

Want to create change in medical practice

+ **Result** in improved <u>measured</u> outcome

  + Patient satisfaction (high hospital ratings)
  + Lower morbidity (eg, infection, readmission, LOS)
  + *Reduced medical costs (no morbidity)*

+ Motivator

  + Personal satisfaction (the most effective motivator)
  + Money (2015 CMS → QCDR)
  + Money (Credentials)
  + Money (Highly rated hospital-Patients)
  + Money (Licensure, ABA certification)

How?

MEASURE discrete a selected medical process (eg, SCIP, PQRI requirements)

- Assess DOCUMENTED Care that is important
- EDUCATE participants
    - Make a group process or an individual one
- MEASURE for Change in Practices
    - Maintain gains
- *PROVIDE CONTINOUS PERFORMANCE REASSESSMENT– Medicine and public*

Lucian Leap's Statement on Change

(Author of Too Err is Human IOM Report)

1. Errors & Failure are caused by system breakdowns not individual carelessness.

2. Changing systems (clinical actions) is hard work and requires serious commitment, leadership and

ASPIRE

3. *Most powerful method for reducing harm is feed back, learning from the best, and working in collaboration .*

Adapted from JAMA FEB 3 2015; 313(5):467-8

Here is how my department approached change and quality improvement for the last 8 years.

Use objective data

- 2006 –AIMS

- **2009 – S**

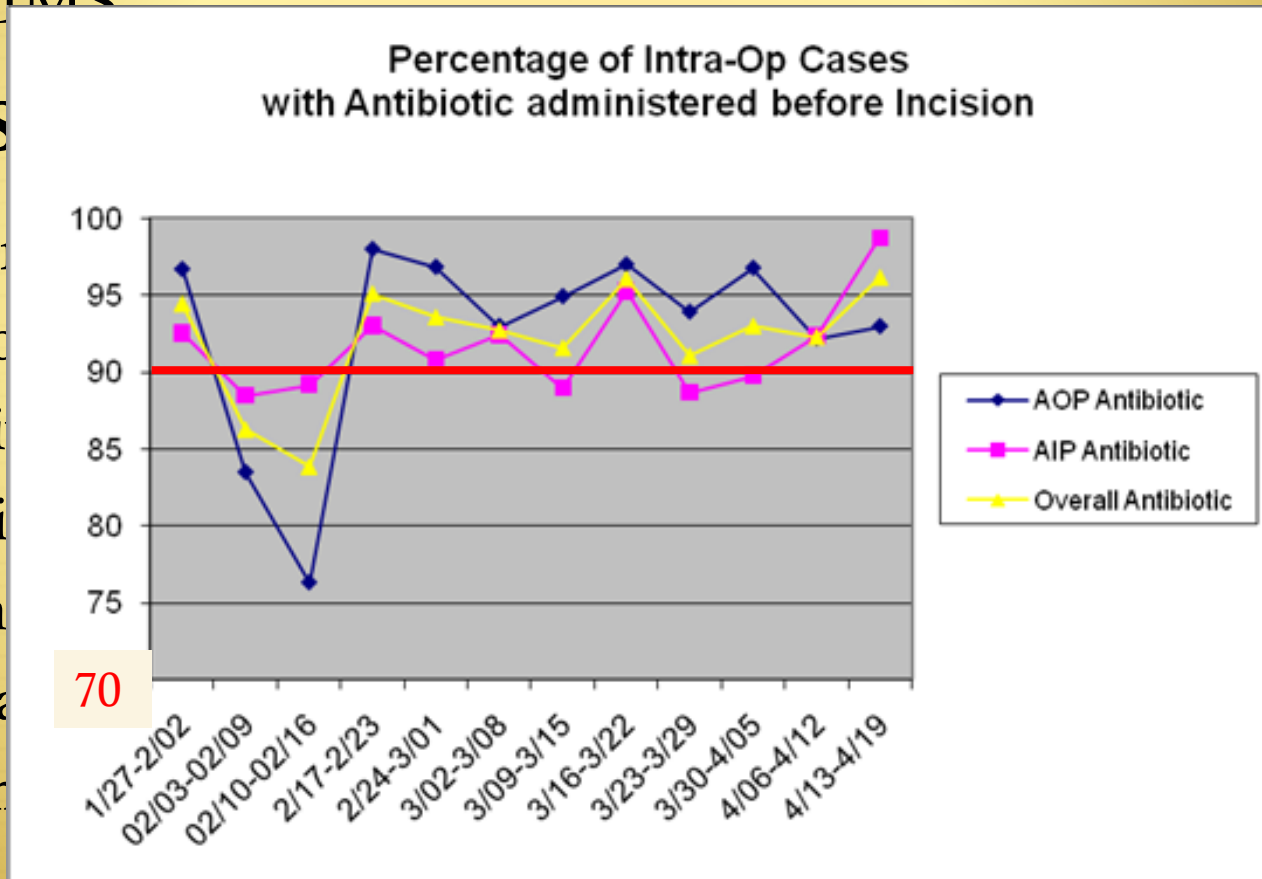 - Gener
  - By Lo

  SCIP acti

  - Admi
  - Anon
  - Educa
  - Wher

WEEKLY EMAIL

Percentage of Intra-Op Cases with Antibiotic administered before Incision

70

(Legend: AOP Antibiotic, AIP Antibiotic, Overall Antibiotic)

Issues with Generic

- Faculty were accountable and not accountable

- Non-physician caregivers had variable buy in and no responsibility except a conversation with ???

- Residents were too busy and came from so many locations, they just forgot or could not remember how to do some of the obscure charting.

2010--Provider and Location Report

✦ LIST of measures for this year

✦ Preop antibiotics, Normothermia

Group	Preop ABX	Normothermia
Attending (Supervisory)	92±17%	98±4%
Attending (In Room)	77±41%	96±14%
CRNA/AA	97±8%	99±4%
Resident	87±23%	93±21%
AIP	92.34	97.58
AOP	96.86	100
Other	96.23	96.43

2011--Issue was what we measured

- The Measures were not ours.

- Measures seemed to not matter

- More pressure to use administrative measures

  - In room time, turnover time,

  - "fast" 3 seconds late too bad

Assumption: Our measures
Our commitment

- INSIDE--Social pressure to perform within a standard was being diluted by growth

  - Needed to be explicit

- OUTSIDE—Increased pressure for more measures—

  - Hospital requests all financial (time related),

  - Departmental wanted to improve the bottom line with clinical care

New Measures-1ˢᵗ Rule

- CURRENT Measurable ACTIVITY

- Example

  - Measure: Lung protective ventilation practices expected

    - Automatic tidal volume, PEEP and RR recorded

  - Action:

    - Values must be ADJUSTED based on patient characteristics

New Measures--2ⁿᵈ Rule

2

YES!!!!!

There must be some evidence about best practices

- ✦ Meta analysis, several review articles, best practice guidelines which rates the evidence

NO!!!!!

- ✦ *One of my partners like to do it that way*

- ✦ *When I was a resident that's what they taught me*

TRADITION, TRADITION

Process

- *ALL* members submitted suggestions

- Applied 85% rule-- 85% group could participate 50% of the time.

- Measures could be administrative but with agreed clinical consequences.

- EXPECTED outcome goal or consequence

- Anticipated as actions became habits would change actions (eg, reversal of nondepolarizing muscle relaxants)

- Consensus won

measure what matters

Our List—1.0

- **Antibiotics**—stayed by popular (hospital?) demand

- **Temperature**—Good evidence on SSI and we would no longer freeze in the OR.

- **Ultrasound for Central Line Placement**—good evidence for line infection and sepsis.

  - Plus the hospital would have to provide more devices

- **Reversal of Nondepolarizing Muscle Relaxants**—increased frequency of re-intubations in PACU and floor

Start with Education

Department of Anesthesiology
Senior Resident Lecture
University of Colorado
School of Medicine

Tuesday, September 24, 2013
Time: 3:30 P.M.
Location: AIP 2007
Televised: VA 4B105 &
DHMC – OR pavilion A #2-837

"Post-Operative Nausea and Vomiting"

Presenter: Sukhbir Walha, M.D.

Rubber hits the Road

Will we comply with our own measures????

Well sort of

Now had a Director of Perioperative Services saying we would have 100% compliance on clinical measures and 80% compliance on time measures (another story).

AT 8 Months
Still well, not exactly

✦ Added a few more measures -- v. 2.0

  ✦ PONV—hospital metric we agreed with

  ✦ Epic Quality reporting available so now but not yet mandatory.

Group	Preop ABX	PONV Multimodal Therapy	Normothermia	U/S use for IJ CVC	NDMR
Attending (Supervisory)	95±8%	71±31%	92±13%	90±32%	77±27%
Attending (In Room)	82±34%	73±39%	90±32%	0±0%	43±53%
CRNA/AA	96±15%	74±28%	93±21%	100±0%	78±37%
Resident	91±16%	61±30%	87±31%	94±18%	81±25%
AIP	95.22	70.56	99.12	92.86	72.17
AOP	95.28	92.94	99.22	N/A	78.79
Other	92.37	58.82	76.92	N/A	92.31

Impact of CHANGE

✦ 2010—New EMR

✦ 2014 Quadrupled faculty and mid-level provider numbers

✦ Doubled anesthetizing locations

✦ UCH grew 20%-30% each year since 2011

✦ Hey, we're a "System" with 2 large Independent Hospital Organization with all private practice physicians

"What if we don't change at all ... and something magical just happens?"

November 2011 --- Radical Change

- Public *individually identified reporting on compliance begins*

  - Used public accountability on the web for everything about us soooooo why not.

  - Weekly public list (email) with names and values

    - Performance level established for hospital credentialing

    - Hospital quality monitoring is public--(really public) all measures were departmentally reported.

- A fire storm of ANGST
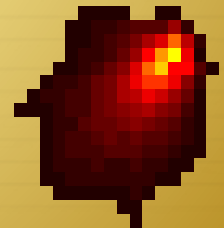
✦ *__More Success with new format???__*

✦ *__Theory—people noticed low performance and helped each other technically so it became "oh, you just didn't know how to chart this."__*

✦ *__Activate competitive spirit__*

✦ *__????????? (humiliation works)__*

Criticism

 Don't know the "rules"

 I did it and you made a mistake

 I'll just go and change it

 Doesn't matter anyway.

 I'm Mad!!!

Criteria for compliance

Legend

- Preop ABX: Percent of Cases where Preop ABX were documented correctly, either given in a timely manner or a reason why ABX were not given was documented.
  - First signed in Providers during the case are counted.
- PONV: A Multimodal PONV Therapy is administered
  - Only cases with "General" checked in the Preop Plan are counted.

Definitions of Each Measure
Anesthesiology QI Charting Report for
2/8/2015 - 2/14/2015

Group	Preop ABX	PONV Multimodal Therapy	Normot
CRNA/AA	97±9%	77±25%	94±1

- Cases with Cardio-pulmonary bypass are skipped
- Cases >= 60 minutes need one of the following
  - Documented use of Bair Hugger
  - Temp >=36 during last 30 minutes of the case
  - Temp >=36 in PACU
- LAST signed in Providers during the case are counted.
- U/S use for IJ CVC Placement: Ultrasound Guidance is used and documented for Internal Jugular CVC Placement
  - Providers signed in during the placement are counted.
- Non-Depolarizing Muscle Relaxant Reversal Use
  - When more than 10 mg Rocuronium or more than 1 mg Vecuronium or more than 2 mg Cisatracurium is administered, Neostigmine must aslo be administered
  - If the case ends before 4 hours from the last dose of relaxant, Neostigmine must be administered before Extubation
  - Neostigmine is not required if the case runs longer than 4 hours after the last dose of

- Used KISS principles

- 2-3 months of "learning" before new criteria "counted"

- Time included education at grand rounds or in Resident Senior Lecture

- Today you can "hover" over each measure and get the criteria

I did it and you made a mistake

✦ Data integrity:
Learning where or who or if there was an error with a list of noncompliant/compliant patients

What it looks like at 3 months

Group	Preop ABX	PONV Multimodal Therapy	Normothermia	U/S use for IJ CVC	NDMR	QI Data Entry
Attending (Supervisory)	92±17%	75±25%	98±4%	96±11%	73±27%	83±17%
Attending (In Room)	77±41%	91±19%	96±14%	0±0%	62±52%	64±50%
CRNA/AA	97±8%	78±28%	99±4%	0±0%	71±35%	92±17%
Resident	87±23%	61±35%	93±21%	89±33%	66±42%	59±40%
AIP	92.34	78.6	97.58	85.71	76.92	86.45
AOP	96.86	90.24	100	N/A	62.79	86.16
Other	96.23	63.49	96.43	N/A	70	79.55

Individual	Preop ABX	PONV Multimodal Therapy	Normothermia	U/S use for IJ CVC	NDMR	QI Data Entry
All	92±17%	75±25%	98±4%	96±11%	73±27%	83±17%
	100%	50%	100%	100%	100%	100%
	100%	100%	100%	N/A	66.67%	62.5%
	94.74%	100%	100%	100%	100%	93.75%
	91.67%	100%	** 88.89% **	100%	42.86%	77.78%
	100%	100%	100%	N/A	100%	80%
	66.67%	100%	100%	N/A	33.33%	100%
	100%	100%	100%	N/A	N/A	66.67%
	100%	76.92%	100%	N/A	100%	63.64%
	75%	33.33%	100%	N/A	75%	57.14%
	94.12%	72.22%	92.86%	N/A	83.33%	92.86%
	100%	75%	100%	N/A	85.71%	95%
	100%	90%	100%	N/A	54.55%	100%
	95.83%	86.36%	100%	N/A	100%	69.57%
	100%	100%	100%	N/A	100%	75%

"And that is what happens when we resist change."

Credentialing Form

- Filed automatically from *our* IT every 4-6 months

- Available to public as in the internet

Ongoing Professional Practice Evaluation
Department of Anesthesiology

12/1/2012 - 7/31/2013

General Volumes

Area	Volume
AIP	352
AOP	1
Other	73
ICU	0

Case Quality Assessment Participation

Number of Cases	Participation
76	68%
Goal = 100% Participation	

Specialty Specific Indicators

Specialty Specific Indicators

	Cases	Performance
Timely Administration of Surgical Antibiotic Prophylaxis		
Attending (Supervisory) Individual Performance	339	97.6%
Attending (Supervisory) Group Performance		96±5%
Attending (In Room) Individual Performance	4	100%
Attending (In Room) Group Performance		90±23%
Overall Goal		85%
Perioperative Normothermia		
Attending (Supervisory) Individual Performance	291	97.7%
Attending (Supervisory) Group Performance		98±3%
Attending (In Room) Individual Performance	3	100%
Attending (In Room) Group Performance		99±3%
Overall Goal		85%
Ultrasound Use for Internal Jugular Central Venous Catheter Placement		
Attending (Supervisory) Individual Performance	10	100%
Attending (Supervisory) Group Performance		93±20%
Attending (In Room) Individual Performance	0	N/A
Attending (In Room) Group Performance		69±18%
Overall Goal		85%

2 SD Below Group | Below Goal

Added stress but not better performance

Final Act—Be CMS and Pay people

AA/CRNA-- Monthly Incentive May 2014

- ✦ Payout is based on total $$ available for month/# of CRNA/AA FTE.
- ✦ Your payment based FTE

Criteria

I. ELIGIBLE--100% Antibiotic *charting*

II. 50% PAYOUT if

    I. **80%** of *AIP Goal for On-Time* AND 80% of AOP Goal for On-Time

III. Full Payout if

    I. **90%** of *AIP Goal for On-Time* AND 90% of Goal for On-Time

The 65% & 70% are UCH Goals for On-Time Starts

Effect—better charting but different care?

CRNA's & AA's						
Individual	**Preop ABX**	**PONV Multimodal Therapy**	**Normothermia**	**U/S use for IJ CVC**	**NDMR**	**QI Data Entry**
All	97±9%	77±25%	94±19%	100±0%	75±37%	11±19%
	100%	100%	100%	N/A	100%	16.67%

THIS IS ABOUT AN IMAGE NOT AN OUTCOME

	N/A	N/A	N/A	N/A	N/A	N/A
	100%	100%	100%	N/A	75%	0%
	100%	84.62%	100%	100%	83.33%	0%
	100%	100%	100%	N/A	100%	0%
	100%	66.67%	100%	N/A	100%	0%
	N/A	N/A	N/A	N/A	N/A	N/A
	100%	80%	100%	N/A	100%	0%
	80%	100%	100%	N/A	60%	50%
	N/A	N/A	N/A	N/A	N/A	N/A
	100%	83.33%	100%	N/A	** 0%	0%

The TRAP

Why does it matter?

MONEY
FAME
MONEY
PRESTIGE
MONEY
MORE FAME
MONEY
LOWER BILLS
LOWER COSTS
FAME

CAN WE TELL IF THIS MATTERS?

CLABSI Rates - Neonatal Critical Care Unit: August 2012 - July 2013

Hospital	City	CLABSI Rate	National Comparison
Avista Adventist Hospital	Louisville	0	SAME
Childrens Hospital Colorado	Aurora	1.1	SAME
Denver Health	Denver	0	SAME
Littleton Adventist Hospital			
Lutheran Medical Center			
Memorial Hospital Central			
Parker Adventist Hospital			
Penrose-St. Francis Health Se			
Poudre Valley Hospital			
Presbyterian/St. Lukes Medic			
Rose Medical Center			
Saint Joseph Hospital	Denver	0	SAME
Sky Ridge Medical Center	Lone Tree	0	SAME
St. Marys Hospital & Center, Inc.	Grand Junction	2.4	SAME
Swedish Medical Center	Englewood	0	SAME
The Medical Center of Aurora	Aurora	0	SAME
University of Colorado Hospital	Aurora	4.5	SAME

Patient Safety Detail

Bloodstream Infection (Sepsis Post Surgery) - 2013 »VIE

Hospital	Safety Rating	Cases	Complications
Castle Rock Adventist Hospital	TOO FEW CASES	18	0
Denver Health	AVERAGE	211	4
		346	6
		190	1
		243	4
		129	1
		40	0
		237	5
		559	6
		588	5
Rose Medical Center	AVERAGE	272	2
Saint Joseph Hospital	AVERAGE	1,071	8
Sky Ridge Medical Center	AVERAGE	614	6
St. Anthony Hospital	AVERAGE	410	6
St. Anthony North Hospital	AVERAGE	63	0

NOPE— NOT YET

HOW ABOUT CLOSER TO HOME?
THE QUEST
Did our efforts work?

Our process measure	Outcome
Reversing muscle relaxant	Postoperative intubations (we will have the number of surgeries) Post op Pneumonia or sepsis
Nausea and Vomiting Prophlaxis	Nursing postoperative phone follow up Yes for
Antibiotic administration	SSI rate, sepsis
Temperature 36^{0}C arrival in PACU or ICU	SSI rate, pneumonia diagnosis
Central line infection	Central line infection, sepsis,
Hyperglycemia	SSI, pneumonia, sepsis Rate of hospital goal compliance (I know this exists since I have seen it)

NOPE—No one in the hospital follows this but it is recorded on every patient (since 2010).
We can know what works
It matters to us

Did anyone in the hospital keep track or know what we
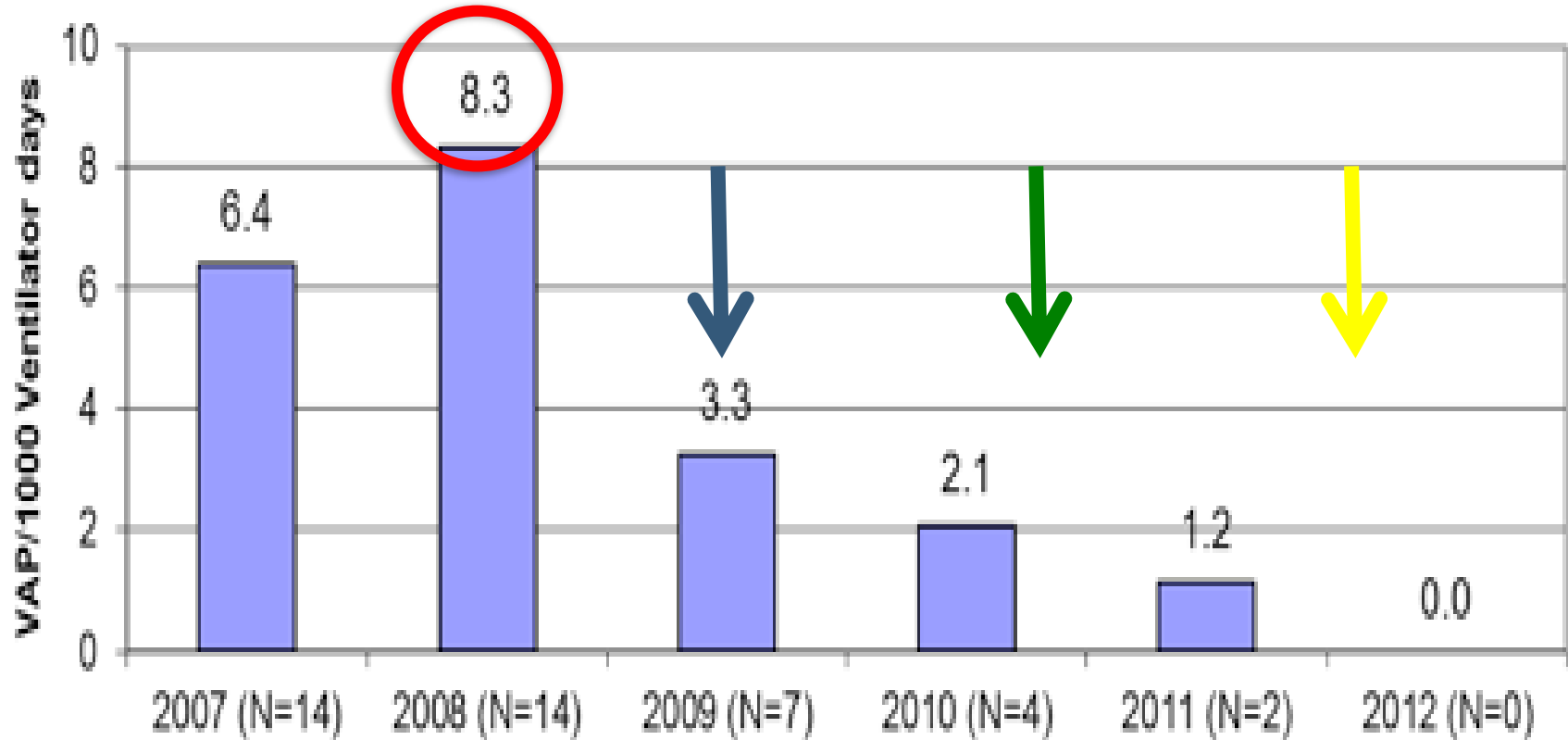
NOPE— NOT YET

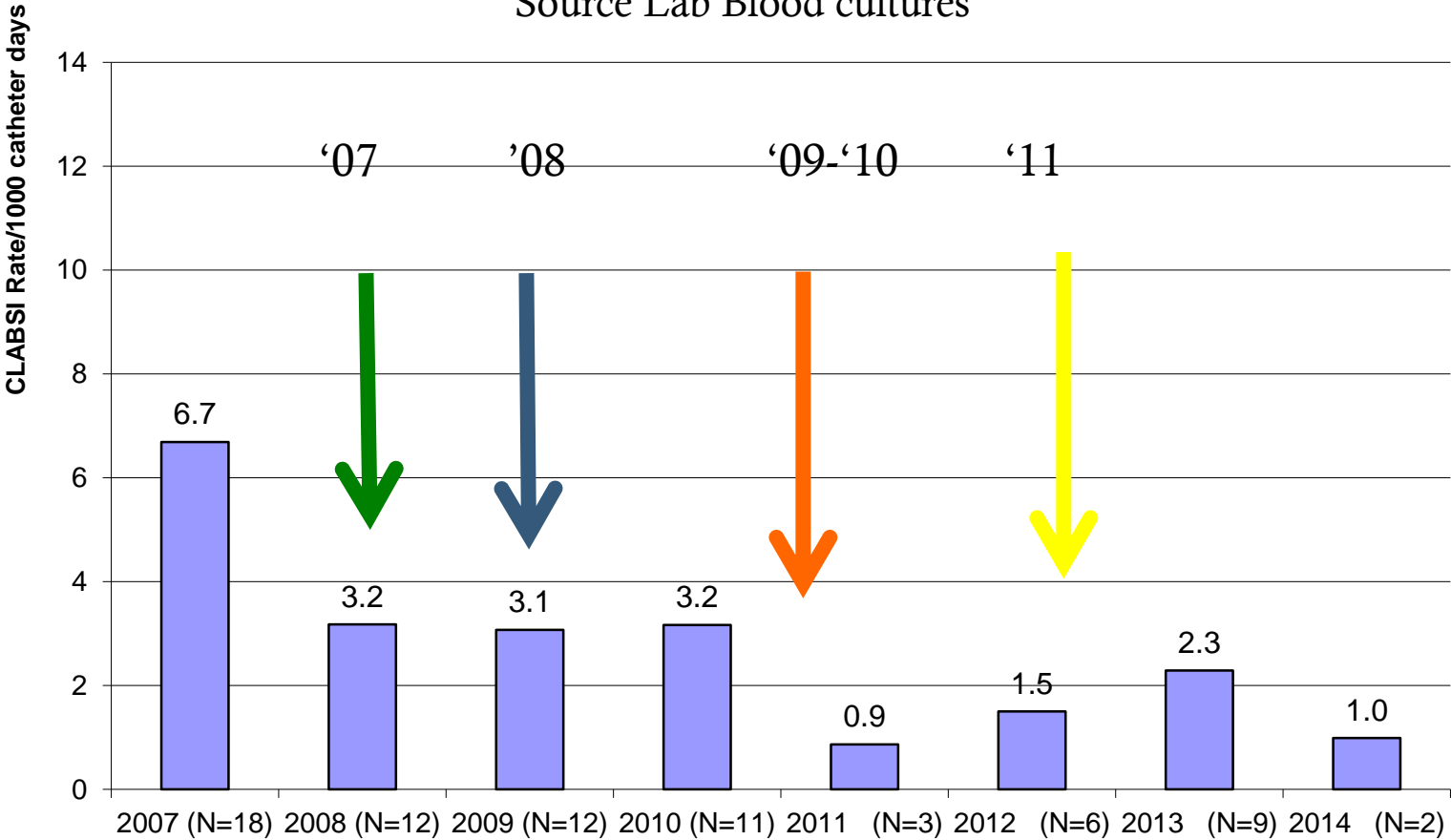c_____ot everyone together?

Ventilator Associated Pneumonia

SICU VAP Rates 2007-2012

Surgical ICU Sepsis Rates 2007-2014
Source Lab Blood cultures

What else?

	2007	2008	2009	2010	2011	2012	2013	2014	2015
			atb, temp			PONV, public report		quality reporting	
Central line infection --SICU	4	7.8	2.65	3.07	3.2	0.9	1.5	2.3	1
Benchmark Central line	2.7	2.7	2.3		2.3	2.3	2.3	1.2	1.1
Pneumonia	5.2	6.4	6.4	3.3	2.1	1.2	0	0	
Benchmark Pneumonia	5.2	5.2	5.3	4.9	4.9	4.9	4.9		
Sepsis ICU									
SSI-colon							1.27	2.22	
Benchmark ssi colon							7.06	7.06	
SSI joint			4	2.33	0.73	2.47	4.08	1.6	
Benchmark Joint			1.82	0.99	0.99	0.99	0.58	0.99	
SSI Abdominal Hysterectomy				2.38	4.49	2.38	0.75	0.99	
				2.2	2.2	2.2	2.2	4.05	

Sometimes things just get worse
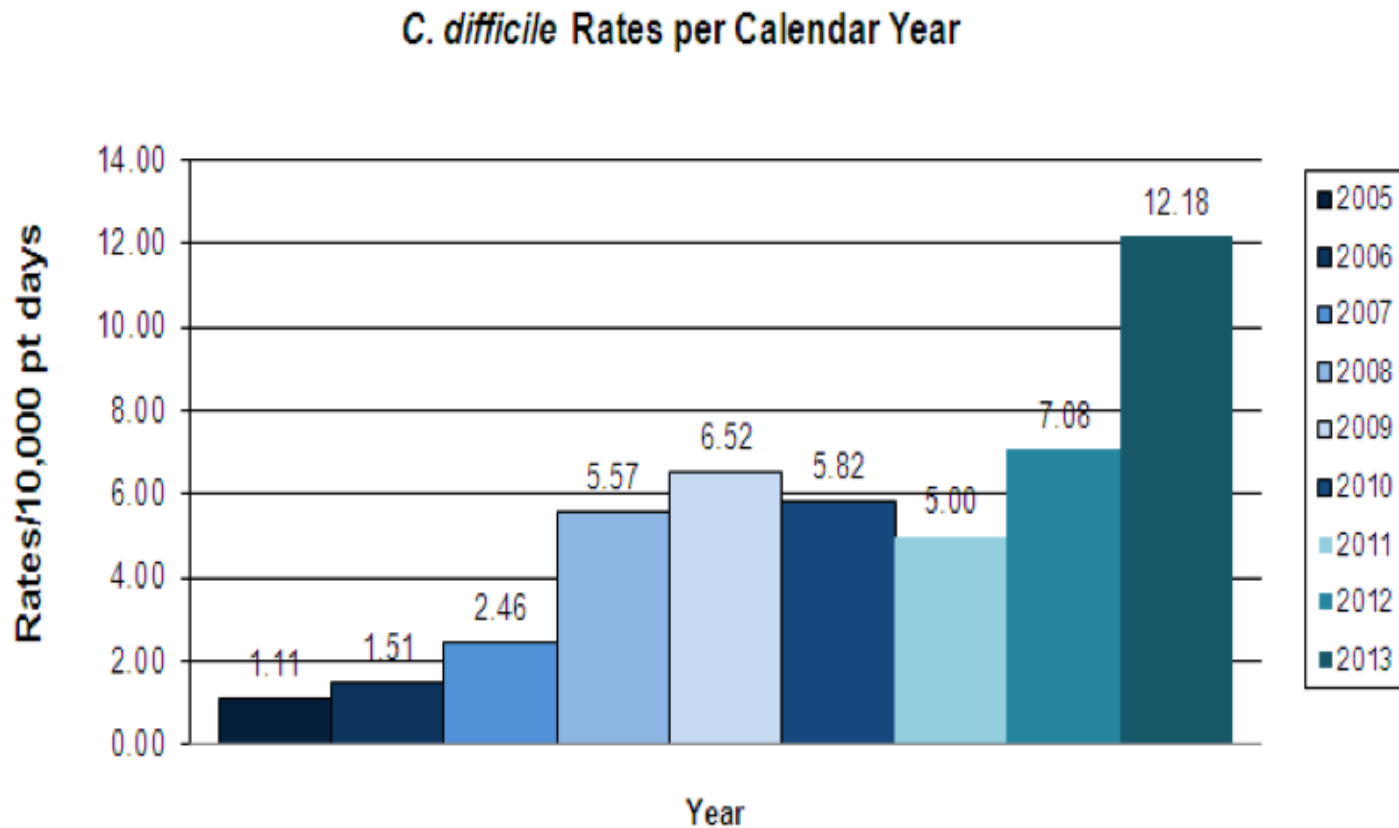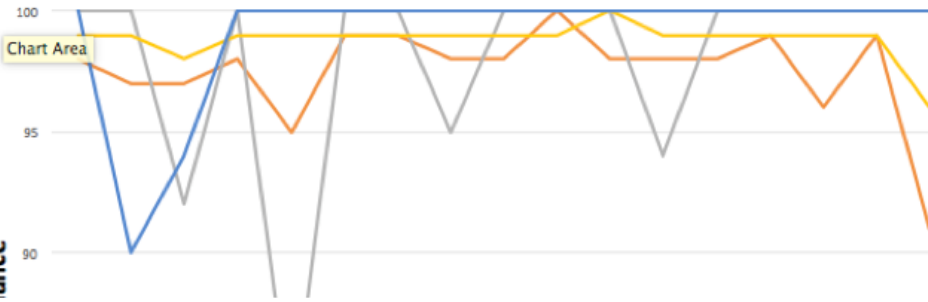
C. *difficile* Rates per Calendar Year

Random numbers?
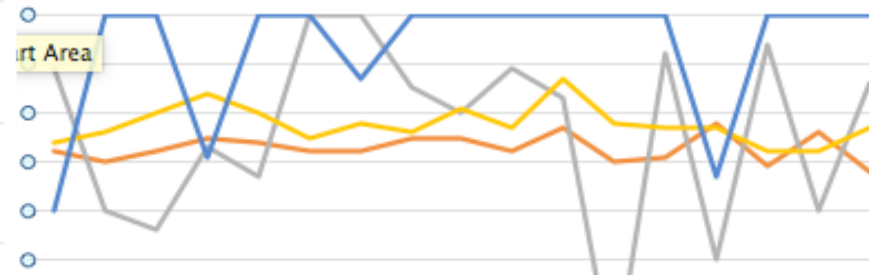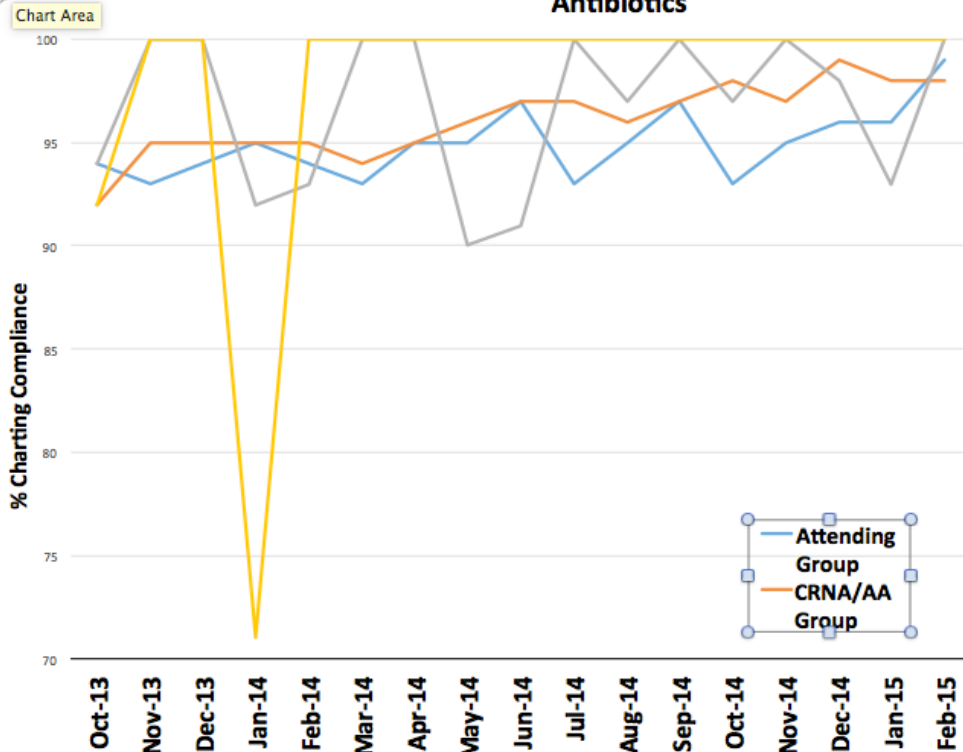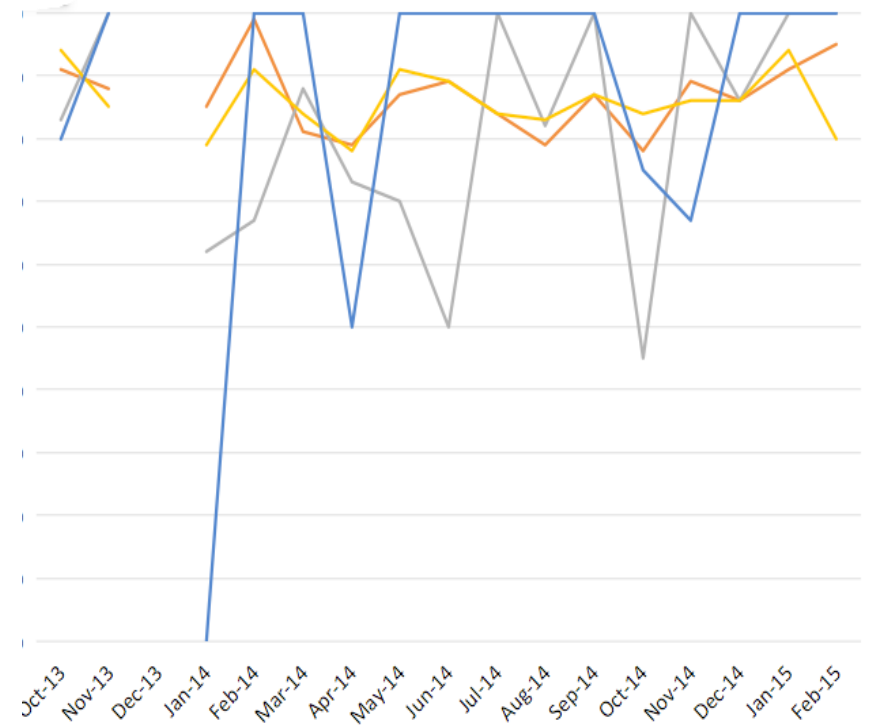
Dr. Leape again--

✦ The best way to get change

✦ is to make it personal—

✦ your patient,

✦ your friend,

✦ your family

Central line—No infections from OR for 18 months

- NDMR-REVERSAL
  - Re--intubations in PACU 3/week to 6/year
  - Pneumonia rate down 50%
- PONV
  - Subjective—much lower N & V
    - Preemptive treatment much more likely (eg. Propofol infusion)
- *Ventilation changes*
  - No real measure but rate of unexpected admit to ICU in OSA patients lower than non OSA patients.

Conclusion from all this

The final step toward success

Pragmatic Collaboration

We need to recognize the trap (fallacy) that recording numbers is fraught with human error

Actions

Doing deeds is a celebration of success and uses numbers as the reminder

Nothing is 100% or 0%--Surgery causes injury. Actions that contribute to reducing injury matters

Reality – Consolidate your gains

Finally Finally Finally

Plan your outcome goal first!

and measure it yourself

Maintain enthusiasm by seeing success

in your patients

Recommended Reading

JAMA Volume 313(5) 2015

Hospital Readmissions Following Surgery Turning Complications Into "Treasures" Lucian L. Leape,MD p 467

Underlying Reasons Associated With Hospital Readmission Following Surgery in the United States RP Merkow. ….. KY Bilimoria p. 483

National Hospital Ratings Systems Share Few Common Scores And May Generate Confusion Instead Of Clarity JM Austin…..PJ Pronovost
http://content.healthaffairs.org/content/34/3/423.full.html

Pick an outcome then an agent of change

Weekly report from IT 2015

Attending (Supervisory)

Individual	Preop ABX	PONV Multimodal Therapy	Normothermia	U/S use for IJ CVC	NDMR	QI Data Entry
All	97±5%	75±20%	97±8%	100±0%	88±19%	73±20%
	100%	55.56%	100%	100%	100%	54.55%
	97.67%	88.89%	100%	N/A	100%	91.3%

Attendings (In Room)

Individual	Preop ABX	PONV Multimodal Therapy	Normothermia	U/S use for IJ CVC	NDMR	QI Data Entry
All	100±0%	50±71%	100±0%	0±0%	100±NaN%	75±50%
	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A	N/A

CRNA's & AA's

Individual	Preop ABX	PONV Multimodal Therapy	Normothermia	U/S use for IJ CVC	NDMR	QI Data Entry
All	97±7%	74±30%	98±7%	0±0%	85±24%	78±29%
	100%	66.67%	100%	N/A	100%	100%

Residents

Individual	Preop ABX	PONV Multimodal Therapy	Normothermia	U/S use for IJ CVC	NDMR	QI Data Entry
All	97±7%	66±31%	91±24%	100±0%	93±9%	71±38%
	88.89%	12.5%	85.71%	100%	100%	85.71%
	100%	85.71%	100%	N/A	83.33%	100%
	100%	77.78%	100%	100%	85.71%	88.89%

What it looks like at 3 weeks

Group	Preop ABX	PONV Multimodal Therapy	Normothermia	U/S use for IJ CVC	NDMR	QI Data Entry
Attending (Supervisory)	92±17%	75±25%	98±4%	96±11%	73±27%	83±17%
Attending (In Room)	77±41%	91±19%	96±14%	0±0%	62±52%	64±50%
CRNA/AA	97±8%	78±28%	99±4%	0±0%	71±35%	92±17%
Resident	87±23%	61±35%	93±21%	89±33%	66±42%	59±40%
AIP	92.34	78.6	97.58	85.71	76.92	86.45
AOP	96.86	90.24	100	N/A	62.79	86.16
Other	96.23	63.49	96.43	N/A	70	79.55

Individual	Preop ABX	PONV Multimodal Therapy	Normothermia	U/S use for IJ CVC	NDMR	QI Data Entry
All	92±17%	75±25%	98±4%	96±11%	73±27%	83±17%
	100%	50%	100%	100%	100%	100%
	100%	100%	100%	N/A	66.67%	62.5%
	94.74%	100%	100%	100%	100%	93.75%
	91.67%	100%	** 88.89% **	100%	42.86%	77.78%
	100%	100%	100%	N/A	100%	80%
	66.67%	100%	100%	N/A	33.33%	100%
	100%	100%	100%	N/A	N/A	66.67%
	100%	76.92%	100%	N/A	100%	63.64%
	75%	33.33%	100%	N/A	75%	57.14%
	94.12%	72.22%	92.86%	N/A	83.33%	92.86%
	100%	75%	100%	N/A	85.71%	95%
	100%	90%	100%	N/A	54.55%	100%
	95.83%	86.36%	100%	N/A	100%	69.57%
	100%	100%	100%	N/A	100%	75%