Slashing SSI – Raising the Bar to Lower the Rate

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Surgical Site Infection (SSI): A Few Facts

- Second most common type of healthcare-associated infection (HAI) in U.S. hospitals (290,000 per year)
- Estimated cost: $3.5 – 10 billion per year
- 40-60% considered preventable with appropriate interventions
- A patient with an SSI is:
  - 5 times more likely to be readmitted after discharge
  - 2 times more likely to spend time in intensive care
  - 2 times more likely to die after surgery

Kirkland KB, Briggs JP, Trivette SL, et al. The impact of surgical-site infections in the 1990s: attributable mortality, excess length of hospitalization, and extra costs. *Infection Control and Hospital Epidemiology*. 1999;20:725-30.

Surgery in the U.S.: A Few Facts

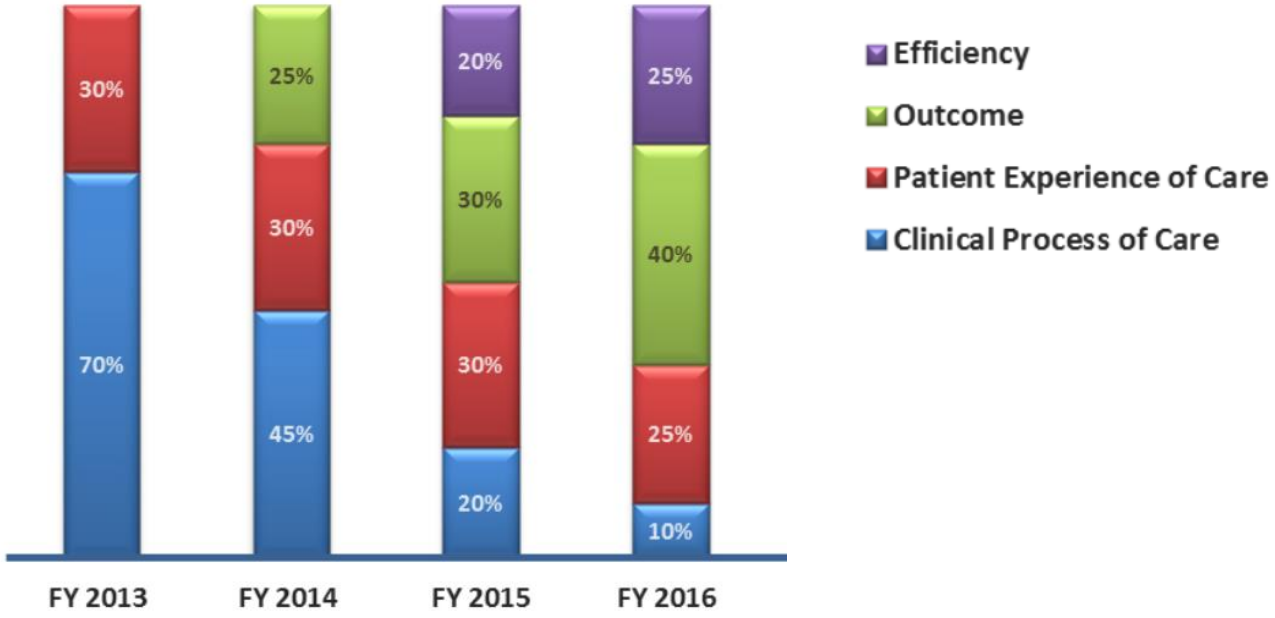
- > 15 million surgeries are performed every year [1]
- SSI patient risk factors
  - Obesity
    - 34.9% (78.6 million) of the U.S. population was obese in 2012 (BMI: 30-40) [2]
  - Diabetes
    - 9.3% (29.1 million) of the U.S. population has diabetes[3]
      - Undiagnosed: 8.1 million (27.8% of people with diabetes are undiagnosed)
    - Pre-diabetic: estimated 86 million
  - Age
    - By 2020: estimated 25% of the working population will be age 55 or older

Prevention of SSI must be a top priority

1. AHA/HRET. Surgical Site Infection (SSI) Change Package.
2. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of Childhood and Adult Obesity in the United States, 2011-2012. *JAMA*. 2014;311(8):806-814.
3. CDC. 2014 National Diabetes Statistics Report. Available at: http://www.cdc.gov/diabetes/data/statistics/2014StatisticsReport.html

Federal Interest in HAI

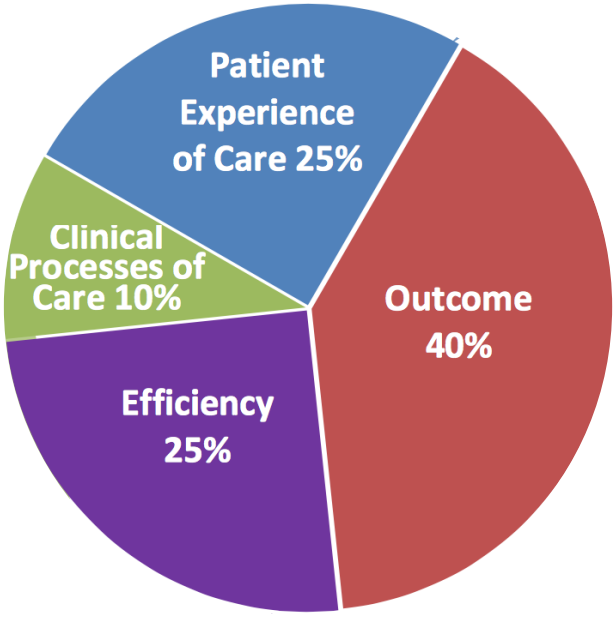
CMS Value-based Purchasing (VBP): Domain Weights, 2013-2016



http://www.hqinstitute.org/post/value-based-purchasing

Federal Interest in HAI (cont.)

2016 VBP Domain Weighting

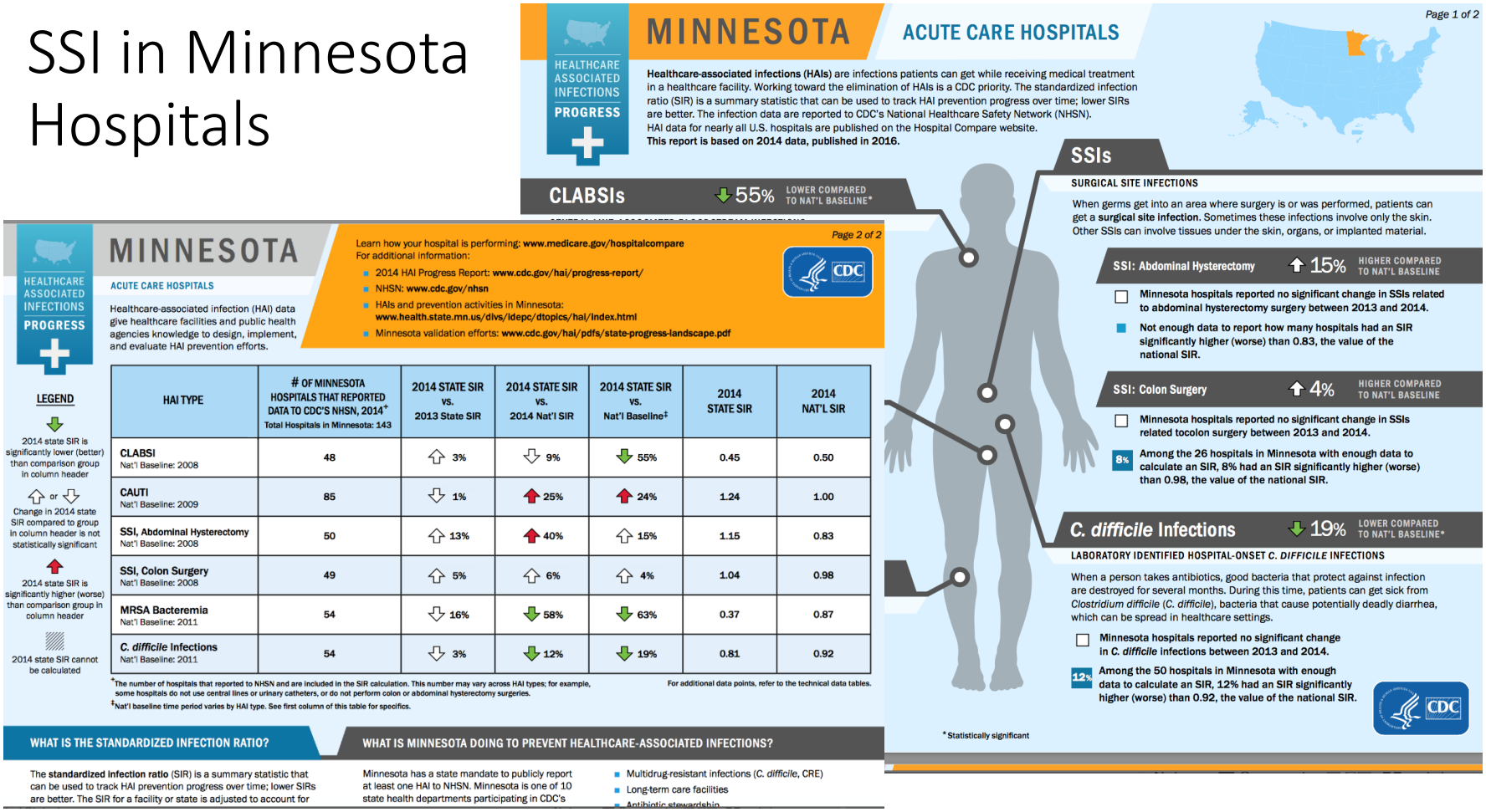


http://www.stratishealth.org/documents/FY2017-VBP-fact-sheet.pdf

OUTCOME		
Mortality		
Baseline Period	**Performance Period**	
October 1, 2010 – June 30, 2011	October 1, 2012 – June 30, 2014	
Measure (Displayed as survival rate)	**Threshold (%)**	***Benchmark (%)***
30-day mortality, AMI	84.7472	86.2371
30-day mortality, heart failure	88.1510	90.0315
30-day mortality, pneumonia	88.2651	90.4181
Complication/Patient Safety for Selected Indicators		
Baseline Period	**Performance Period**	
October 15, 2010 – June 30, 2011	October 15, 2012 – June 30, 2014	
Measure	**Threshold (%)**	**Benchmark (%)**
AHRQ PSI 90 composite	.616248	.449988
Healthcare-Associated Infections		
Baseline Period	**Performance Period**	
January 1, 2012 – December 31, 2012	February 1, 2014 – December 31, 2014	
Measure	**Threshold (†)**	**Benchmark (†)**
CLABSI	.465	0.000
New! CAUTI	.801	0.000
New! SSI Colon‡	.668	0.000
SSI Abdominal Hysterectomy‡	.752	0.000

†Standardized infection ratio.
‡There will be one SSI measure score that will be a weighted average based on predicted infections for both procedures.

SSI in Minnesota Hospitals



HEALTHCARE ASSOCIATED INFECTIONS PROGRESS

MINNESOTA

ACUTE CARE HOSPITALS

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Healthcare-associated infections (HAIs) are infections patients can get while receiving medical treatment in a healthcare facility. Working toward the elimination of HAIs is a CDC priority. The standardized infection ratio (SIR) is a summary statistic that can be used to track HAI prevention progress over time; lower SIRs are better. The infection data are reported to CDC's National Healthcare Safety Network (NHSN). HAI data for nearly all U.S. hospitals are published on the Hospital Compare website.
This report is based on 2014 data, published in 2016.

CLABSIs

55% LOWER COMPARED TO NAT'L BASELINE*

SSIs

SURGICAL SITE INFECTIONS

When germs get into an area where surgery is or was performed, patients can get a **surgical site infection**. Sometimes these infections involve only the skin. Other SSIs can involve tissues under the skin, organs, or implanted material.

SSI: Abdominal Hysterectomy — 15% HIGHER COMPARED TO NAT'L BASELINE

- ☐ Minnesota hospitals reported no significant change in SSIs related to abdominal hysterectomy surgery between 2013 and 2014.
- ■ Not enough data to report how many hospitals had an SIR significantly higher (worse) than 0.83, the value of the national SIR.

SSI: Colon Surgery — 4% HIGHER COMPARED TO NAT'L BASELINE

- ☐ Minnesota hospitals reported no significant change in SSIs related tocolon surgery between 2013 and 2014.
- 8% Among the 26 hospitals in Minnesota with enough data to calculate an SIR, 8% had an SIR significantly higher (worse) than 0.98, the value of the national SIR.

C. difficile Infections

19% LOWER COMPARED TO NAT'L BASELINE*

LABORATORY IDENTIFIED HOSPITAL-ONSET *C. DIFFICILE* INFECTIONS

When a person takes antibiotics, good bacteria that protect against infection are destroyed for several months. During this time, patients can get sick from *Clostridium difficile* (*C. difficile*), bacteria that cause potentially deadly diarrhea, which can be spread in healthcare settings.

- ☐ Minnesota hospitals reported no significant change in *C. difficile* infections between 2013 and 2014.
- 12% Among the 50 hospitals in Minnesota with enough data to calculate an SIR, 12% had an SIR significantly higher (worse) than 0.92, the value of the national SIR.

*Statistically significant

HEALTHCARE ASSOCIATED INFECTIONS PROGRESS

MINNESOTA

ACUTE CARE HOSPITALS

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Healthcare-associated infection (HAI) data give healthcare facilities and public health agencies knowledge to design, implement, and evaluate HAI prevention efforts.

Learn how your hospital is performing: **www.medicare.gov/hospitalcompare**
For additional information:

- 2014 HAI Progress Report: **www.cdc.gov/hai/progress-report/**
- NHSN: **www.cdc.gov/nhsn**
- HAIs and prevention activities in Minnesota: **www.health.state.mn.us/divs/idepc/dtopics/hai/index.html**
- Minnesota validation efforts: **www.cdc.gov/hai/pdfs/state-progress-landscape.pdf**

LEGEND

- ↓ 2014 state SIR is significantly lower (better) than comparison group in column header
- ↑ or ↓ Change in 2014 state SIR compared to group in column header is not statistically significant
- ↑ 2014 state SIR is significantly higher (worse) than comparison group in column header
- ▨ 2014 state SIR cannot be calculated

HAI TYPE	# OF MINNESOTA HOSPITALS THAT REPORTED DATA TO CDC'S NHSN, 2014* Total Hospitals in Minnesota: 143	2014 STATE SIR vs. 2013 State SIR	2014 STATE SIR vs. 2014 Nat'l SIR	2014 STATE SIR vs. Nat'l Baseline‡	2014 STATE SIR	2014 NAT'L SIR
CLABSI Nat'l Baseline: 2008	48	↑ 3%	↓ 9%	↓ 55%	0.45	0.50
CAUTI Nat'l Baseline: 2009	85	↓ 1%	↑ 25%	↑ 24%	1.24	1.00
SSI, Abdominal Hysterectomy Nat'l Baseline: 2008	50	↑ 13%	↑ 40%	↑ 15%	1.15	0.83
SSI, Colon Surgery Nat'l Baseline: 2008	49	↑ 5%	↑ 6%	↑ 4%	1.04	0.98
MRSA Bacteremia Nat'l Baseline: 2011	54	↓ 16%	↓ 58%	↓ 63%	0.37	0.87
***C. difficile* Infections** Nat'l Baseline: 2011	54	↓ 3%	↓ 12%	↓ 19%	0.81	0.92

*The number of hospitals that reported to NHSN and are included in the SIR calculation. This number may vary across HAI types; for example, some hospitals do not use central lines or urinary catheters, or do not perform colon or abdominal hysterectomy surgeries.

‡Nat'l baseline time period varies by HAI type. See first column of this table for specifics.

For additional data points, refer to the technical data tables.

WHAT IS THE STANDARDIZED INFECTION RATIO?

The **standardized infection ratio** (SIR) is a summary statistic that can be used to track HAI prevention progress over time; lower SIRs are better. The SIR for a facility or state is adjusted to account for

WHAT IS MINNESOTA DOING TO PREVENT HEALTHCARE-ASSOCIATED INFECTIONS?

Minnesota has a state mandate to publicly report at least one HAI to NHSN. Minnesota is one of 10 state health departments participating in CDC's

- Multidrug-resistant infections (*C. difficile*, CRE)
- Long-term care facilities
- Antibiotic stewardship

SSI in Minnesota Hospitals (cont.)

HAI TYPE	# OF MINNESOTA HOSPITALS THAT REPORTED DATA TO CDC'S NHSN, 2014+ Total Hospitals in Minnesota: 143	2014 STATE SIR vs. 2013 State SIR	2014 STATE SIR vs. 2014 Nat'l SIR	2014 STATE SIR vs. Nat'l Baseline‡	2014 STATE SIR	2014 NAT'L SIR
SSI, Abdominal Hysterectomy Nat'l Baseline: 2008	50	⇧ 13%	⇧ 40%	⇧ 15%	1.15	0.83
SSI, Colon Surgery Nat'l Baseline: 2008	49	⇧ 5%	⇧ 6%	⇧ 4%	1.04	0.98

http://www.cdc.gov/hai/pdfs/stateplans/factsheets/mn.pdf

Slashing SSI Bundle

Slashing SSI Bundle
Summary of recommendations for patients of all ages having surgery in the OR that involves a skin incision

1. Showering/bathing

- Patients are to be advised to shower or bathe (full body) with either soap (antimicrobial or non-antimicrobial) or an antiseptic agent once the evening before [1-6] and once the morning of the surgical procedure [1].
- Upon admission to the preoperative area, an FDA approved antiseptic solution is to be applied in full strength to the operative site [1, 2, 7].
- Adherence to instructions for preoperative antiseptic showering or bathing at home is to be assessed upon admission to the preoperative area as a part of a preoperative bundle/checklist. If a patient reports that he or she was unable, an antiseptic shower, bath or full body wipe is to be completed pre-operatively.
- Hospital inpatients requiring surgery are to receive an antiseptic shower, bath, or full body wipe prior to surgery whenever possible.

2. Postoperative wound care

- Surgical sterile dressings are to be left intact 24–48 hours unless there is bleeding or a reason to suspect early infection [2, 8].
- Where postoperative dressing changes are necessary, sterile gloves and dressings should be used [2, 8].
- Patient education on the importance of hand hygiene in preventing SSI is to be provided preoperatively [8, 9].
- Hand hygiene products are provided at the patient bedside [8, 9].

3. Closing trays for class II and higher open surgeries

- For all bowel procedures, clean instruments, water, and gloves/gowns are to be utilized for wound closure [8, 10].
- For all class II and higher clean/contaminated open laparotomies, including extracorporeal bowel anastomoses, clean instruments, water, and gloves/gowns are to be considered for wound closure.
- The need for closing trays is to be added to the preoperative briefing or timeout script.

4. Antibiotic dosing

- Intra-operative re-dosing of surgical prophylactic antibiotics is to be performed for procedures that last longer than two half-lives of the drug [11-14].
- Intra-operative re-dosing of surgical prophylactic antibiotics is to be performed for procedures involving blood loss >1500mL [11, 14].
- A weight based dosing protocol is to be implemented per guidelines by the American Society of Health-System Pharmacists (ASHP), the Infectious Diseases Society of America (IDSA), the Surgical Infection Society (SIS), and Society for Healthcare Epidemiology of America (SHEA) [7, 11, 12, 14, 15].

5. Glycemic control

- Implement perioperative glycemic control and use blood glucose target levels <200mg/dL for diabetic and non-diabetic patients [1, 16-19].

6. Normothermia

- Maintain normothermia (body temperature ≥ 36°C or 96.8° F) preoperatively, intraoperatively and postoperatively [1, 7, 20-22].

7. OR traffic

- An assessment of OR traffic, with the intent to reduce unnecessary traffic, is performed upon implementation of SSI bundle and periodically thereafter [1, 7, 23-29].

www.mnhospitals.org/patient-safety/current-safety-quality-initiatives/health-care-associated-infections/surgical-site-infections

MHA Slashing SSI Bundle

- Bundle elements
  1. Showering/bathing recommendation
  2. Postoperative wound care
  3. Closing trays for class II and higher open surgeries
  4. Antibiotic dosing recommendations
  5. Glycemic control
  6. Normothermia
  7. OR traffic

Concept of the Care Bundle

- What is a bundle?
  - Structured way of improving care processes and patient outcomes
  - Designed around specific set of evidence-based, generally accepted practices
- Why is it important in healthcare?
  - Improves consistency, reliability of care practices
  - Promotes awareness that entire care team must work together
  - Promotes the use of improvement methods to redesign care processes
- How do you do implement it?
  - Redesign of work processes, communication strategies, infrastructure
  - Sustained measurement, vigilance

Institute of Healthcare Improvement (IHI)]

Presenters

- Kathleen Steinmann, MT (ASCP), CIC
  - Infection Preventionist
  - Hennepin County Medical Center
- Patricia Dumonceaux, MSN, RN PHN, CIC
  - Infection Prevention and Control
  - CentraCare Health St. Cloud Hospital
- Sharon Kim
  - 4th year Medical Student, joining Mayo's OB/GYN residency program in 2016
  - Mayo Clinic

Hennepin County Medical Center

SSI Prevention

May 3, 2016

Kathleen Steinmann MT(ASCP), CIC

Why Build a Bundle?

Deep and Organ Space SSI have a technical process review

Hennepin County **Medical Center**

*	Patient Summary Information
1.	Patient Age/sex
2.	Admission Date
3.	Admit diagnosis
4.	Procedure Date/Time
5.	Total procedure time (cut to close in minutes)
	NHSN 75th Percentile for cut time
6.	Procedure Performed
7.	Was procedure elective or urgent/emergent? (per OR Policy)
8.	Was procedure non-emergent per NHSN
9.	Was the procedure performed as a direct result of trauma?
10.	Any additional surgeries during same admission
11.	BMI
12.	Patient weight (for abx dosing purposes)
13.	MRSA /SA status
14.	Diabetic? (medication management, not diet only)
15.	ICU/CMIC days

SSI Review

	Question
18.	Date of SSI
19.	Days from surgery to event
20.	Did SSI occur during primary admission or was patient readmitted?
21.	NHSN Type of SSI (superficial/deep/organ space)
22.	NHSN Closure Type
23.	PATOS (Y/N) (NHSN definition)
24.	Fever
25.	WBC
26.	Wound characteristics (erythema, warmth, swelling, drainage, dehiscence, etc)
27.	Other S/S
28.	Microbiology culturing results
29.	Imaging or other diagnostic testing
30.	Anastomotic Leak and how noted? (CT, intraop)
31.	Back to OR?
32.	ID consults
33.	Abx used and dates
34.	Patient >18 y/o had FBG day of surgery prior to incision
35.	If FBG >180 mg/dl, was treatment initiated intraoperatively?
36.	Was a forced air warming device placed on the patient prior to entering the OR
37.	Was the patient temp >36° =>80% of the case
38.	Were add'l warming interventions applied in the OR?
39.	Was the recorded intraoperative Fi02 rate > or = to .75?
40.	Was the debrief performed by the attending?

Pre-Op Management

#	Question
41.	Did the patient have any co-existing infections at the time surgery?
42.	Did the patient have any skin conditions (ex dermatitis, et remote to the surgical site before the surgery?
43.	Patient smoking status? If yes, did pt stop prior to surgery and [illegible] prior?
44.	What is the [illegible]
45.	Does the patient have mental health issues?
46.	Was the patient educated and provided with CHG bathing materials and instructions?
47.	Was bowel prep ordered? (colon cases only)
48.	Was Flagyl prophylaxis ordered (hysterectomy only)

Post-Op Management

#	Question
83.	Sternal Precautions ordered (CV only)
84.	Was blood glucose maintained <180mg/dL 24 ho[illegible] [illegible]
85.	Was the incision covered with a sterile dressing f[illegible] 24 hours?
86.	Was the incision assessed, documented daily?
87.	Prior to d/c were post-op bathing instructions fol[illegible]
88.	Was nursing given direction on how to manage th[illegible] and who would be responsible for the dressing?
89.	Were the patient and family educated on proper care, symptoms of surgical site infection, and the [illegible] report such symptoms? Was the education docu[illegible]
90.	Were there any non-infectious post op surgical w[illegible] complications? (ie seroma)
91.	Were there any additional patient issues
92.	Was a post op appointment scheduled before pa[illegible] discharged
93.	Did the patient keep their post-op appointments
94.	Post discharge, is there documentation of how th[illegible] managed the wound?

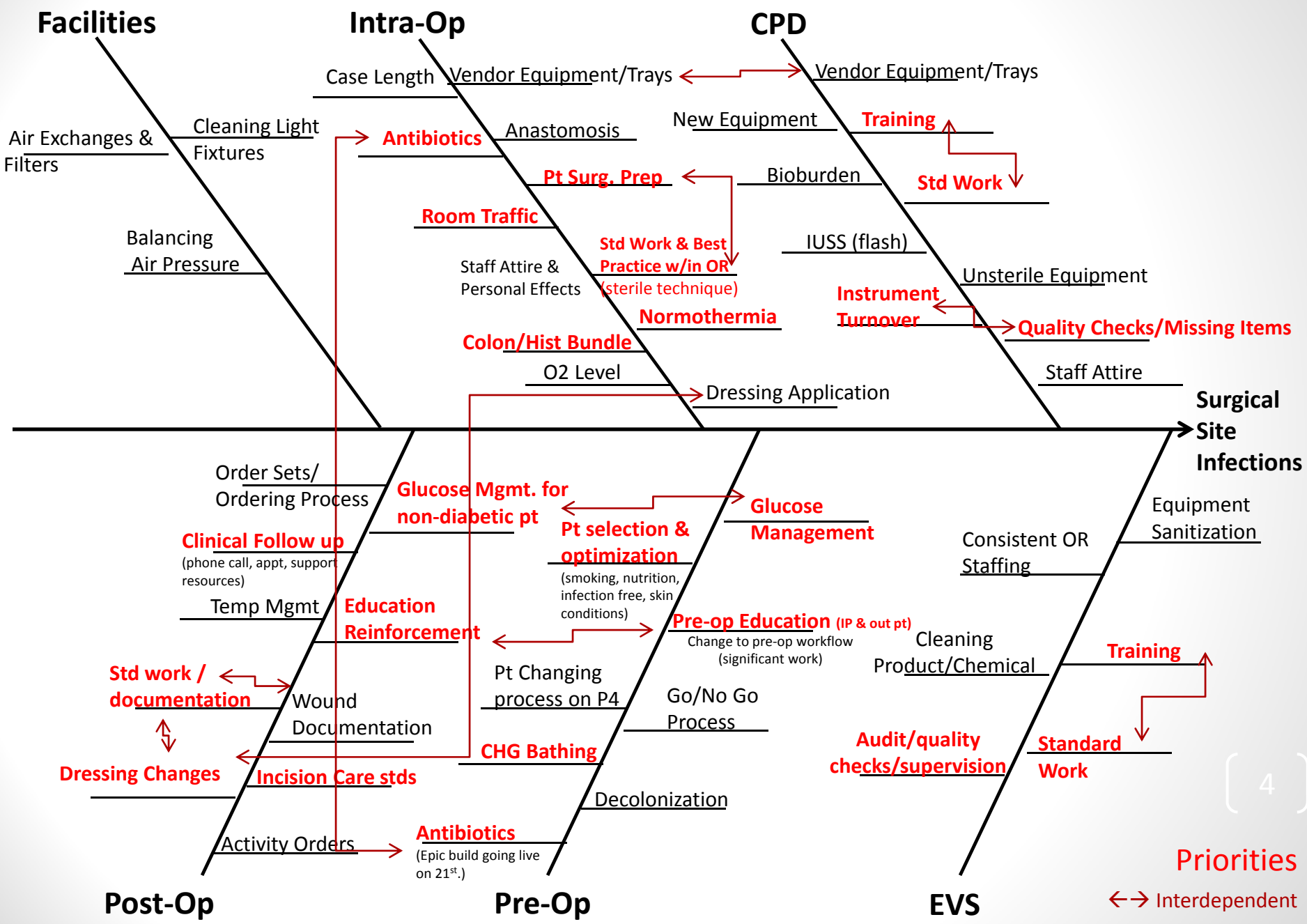
Surgical Services Management (Surgical Admissions,

#	Question
49.	OR Room
50.	Surgeon (list all)
51.	Residents/PA/ Assist (list all)
52.	MDA and CRNA (list all)
53.	Scrub Techs (list all)
54.	Circulator (list all)
55.	Other/Visitors(list all)
56.	Perfusionist/Cell Saver
57.	Did the patient shower with CHG the night before and day of surgery and was it documented?
58.	Was the area of the incision washed and cleaned prior to antiseptic skin prep?

Surgical Services Management (Surgical Admissions,

#	Question
61.	Was redosing managed per HCMC protocol?
62.	If intentional hypothermia during the surgical procedure, how/when patient rewarmed
[illegible]	Surgery delays (after prep or after packs open, etc)
64.	Patient post-Op temp >36 w/in 15 minutes of anesthesia stop
65.	Was any new equipment used?
66.	Was any vendor related equipment used? If so, how was it disinfected? How were staff trained for use?
67.	Was the procedure performed using an endoscope?
68.	Breaks in sterile technique?
69.	Any gross contam due to disease/patient condition?
70.	How many chest tubes did the patient have?
71.	Where there any implants (including mesh)?
72.	Type of irrigations
73.	Blood loss (mL)
[illegible]	[illegible]
[illegible]	How was the surgical site closed (skin sutured, packed, fascia closed but skin left open to close 2ndary, etc)?
76.	Who performed the closure (Attending/Resident/PA)
77.	Was a fresh closing tray used? (colon and abdominal hysterectomies)
78.	Describe the type of surgical anastomosis (colon only)
79.	Was the bowel prep performed (colon only)? If no, why?
80.	Was the patient given nasal antisepsis for Staph aureus? (CV and joint arthroplasty only)
81.	Was bone wax used? (CV only)
82.	Were there sternal wires used? Were these the same as used historically? (CV only)

Surgical Site Infections Contributing Factor Analysis



Slashing SSI Bundle

1. **Showering/Bathing**

2. **Postoperative wound**

3. Closing instrumentation trays for class II open

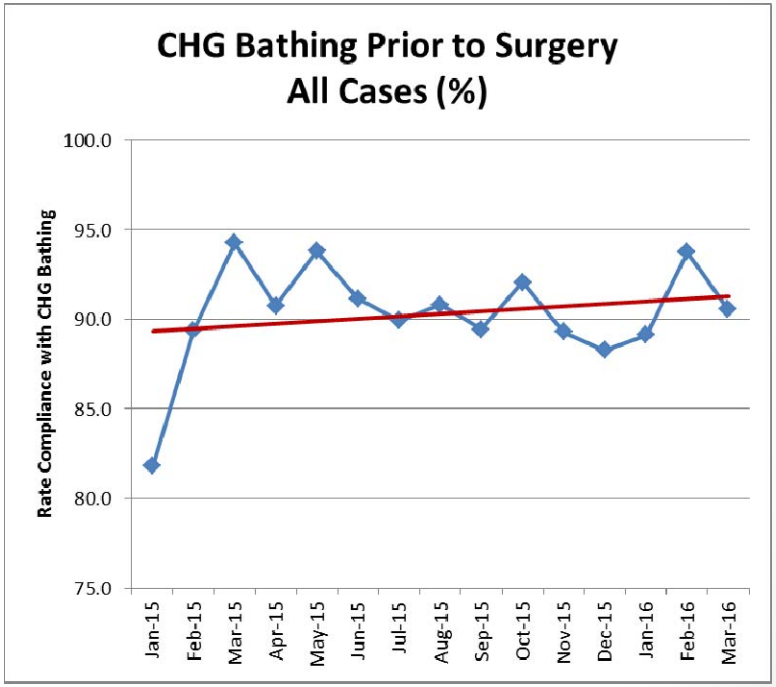
4. Antibiotic dosing
   - Management of known MRSA patients
   - Pre-op oral abx for bowel surgeries

5. **Glycemic Control**

6. **Normothermia**

Process Measure: Shower/Bath

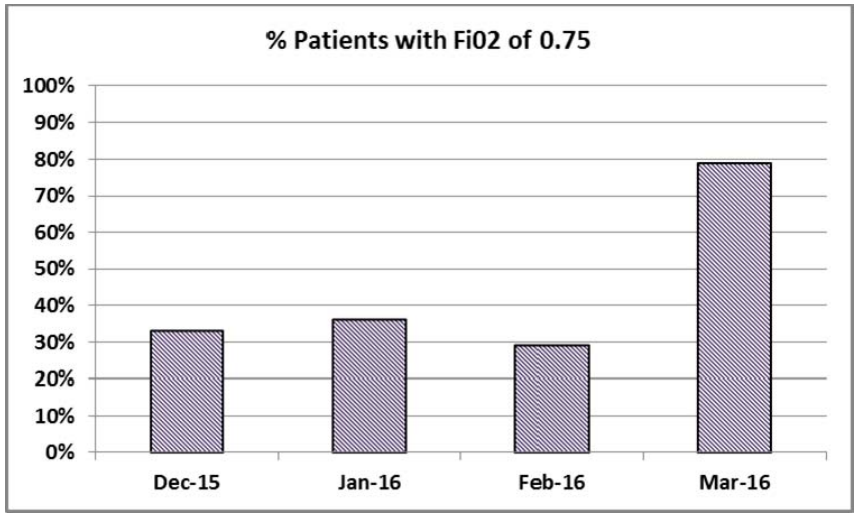
- **N= All elective and scheduled surgery cases**
- 2 full CHG bundles given in clinic during pre-op appointment for full body baths
  (6 wipes each)
- Part of the inpatient surgery checklist



Process Measure: Oxygen

- **N = All eligible patients**

- Average Fi02 rates of ≥ 0.75 when 0.80 is administered (excluding spontaneous breathing rates)

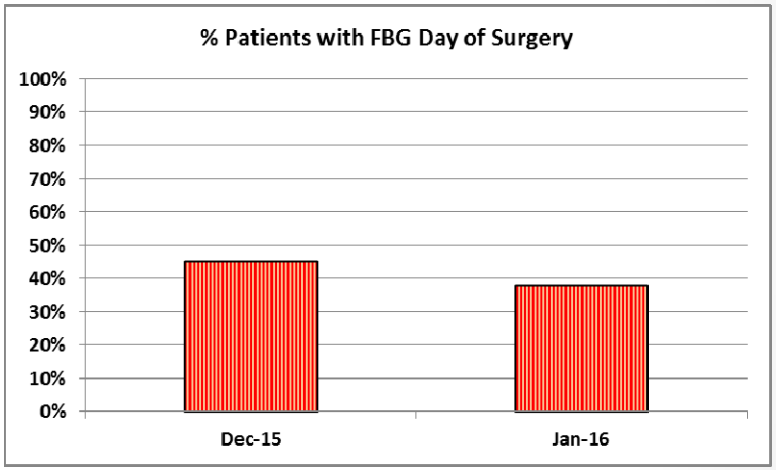


Exclusions:

- Hx of/on bleomycin
- Open trachea/ potential surgical fire
- Neonates
- Select minor procedures

Process Measure: Glycemic Control

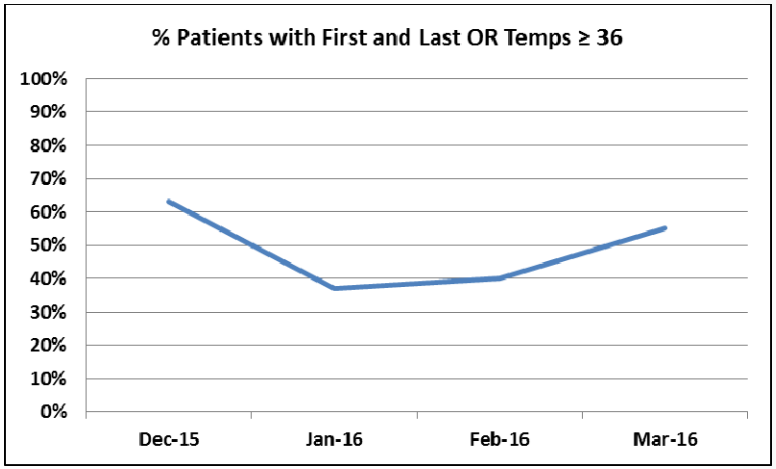
- **N= % eligible patients w/FBG day of surgery**
- **N =% FBG > 180 mg/dl and treated per protocol**



Exclusions: Dental, trauma, non-diabetic peds, cases added after 3:00 pm

Process Measure: Normothermia

- N= All >18 y/o eligible patients
- Measure: Pre-warming all patients 30 minutes prior to surgery and maintaining >36 intraoperatively

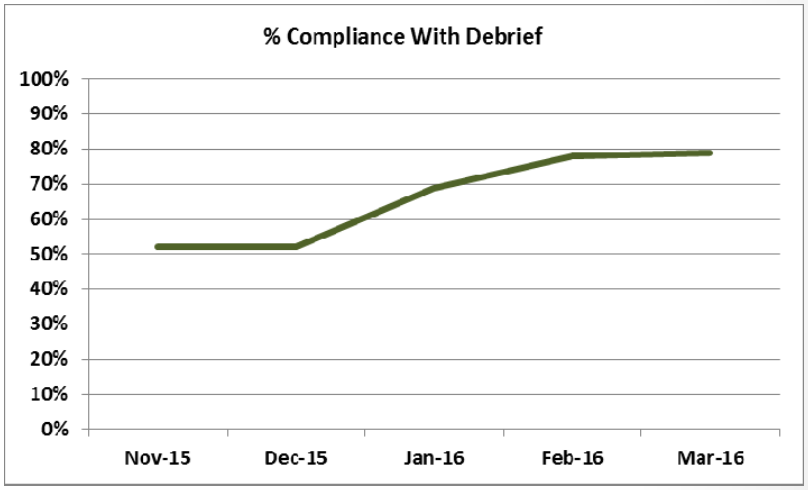


Exclusions: Dental, eye, trauma, peds, intentional hypothermia pts, select minor procedures

Process Measure: Debrief

N = All surgery cases

- Must be completed by surgeon (not resident)
- Includes review/verification of wound class
- Quality of Debrief Process observation: 20/month by OR Chief



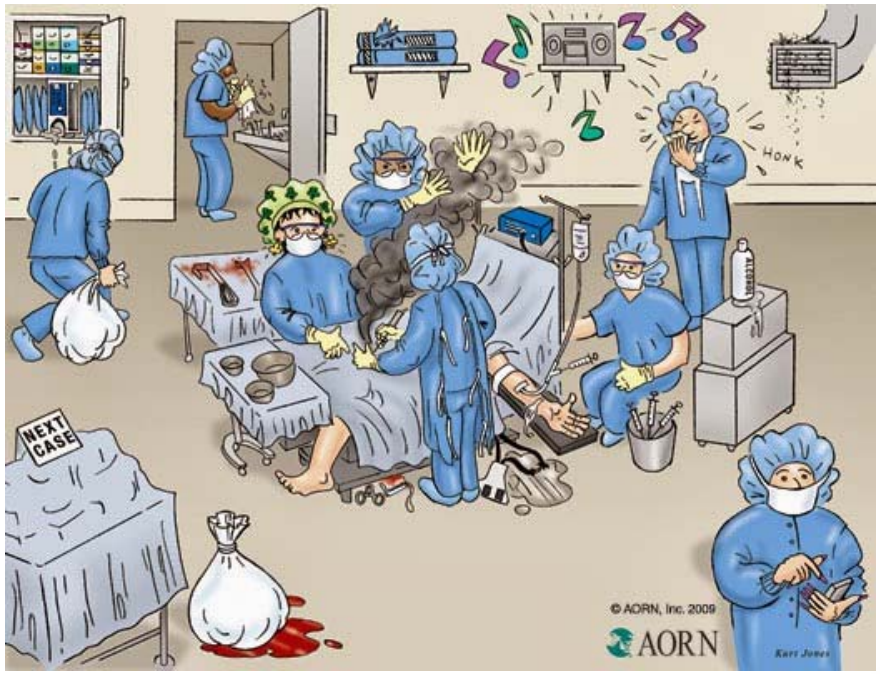
MHA Roadmap: Post Op Wound Care

- Standardizing who does the dressing change (nursing vs surgeon) and when

- Post-Op and Discharge Orders
  - Wound cares
  - Bathing instructions
  - Diet
  - Activity

MHA Roadmap: Equipment/Environment

- Environmental Services
- CPD
- OR traffic
- OR Attire



7 Habits: OR Attire

1. Surgical mask tied properly when in the room.
2. Surgical mask off when outside the room (not worn around the neck).
3. Hand Hygiene in and out of the room
4. Wear gowns and gloves for isolation rooms. Gowns must be tied at neck and waist.
5. All head hair appropriately covered.
6. Wear proper eye protection in the sterile field and whenever there is a risk for splashing.
7. Jewelry must be removed per the Surgical Services Attire policy

St. Cloud Hospital

Our Journey to reduction of SSI's in the Family Birthing Unit

CentraCare
St. Cloud Hospital

MAGNET RECOGNIZED
AMERICAN NURSES CREDENTIALING CENTER

Presenters:

- Patricia L. Dumonceaux, MSN, RN, CIC, PHN. Infection Prevention and Control Nurse, St. Cloud Hospital, CentraCare.

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- Melissa C. Erickson, MSN Ed., BSN, RNC-MNN, PHN. Nurse Clinician Family Birthing Center, St. Cloud Hospital, CentraCare.

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MAGNET RECOGNIZED
AMERICAN NURSES CREDENTIALING CENTER

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- Joanie Nei, RN, BSN, CMRP
- Liz Kiffmeyer BSN, RN
- Ellen Simonson BSN, RN, CIC
- Millie Vadnais – Environmental Services
- Dr. Stacia Anderson, OB/Gyn
- Dr. Eric Thompson, OB/Gyn
- WOC Nurse Team
- CHAIN-SCH
- Patient Safety Committee
- MHA for the Grant as well as invite to speak and share

St. Cloud Hospital

Regional Hospital Serving Central Minnesota
A part of CentraCare Health System

- Regional facility serving Central Minnesota
- 489 licensed bed regional medical center
- Three time Magnet hospital (2014)

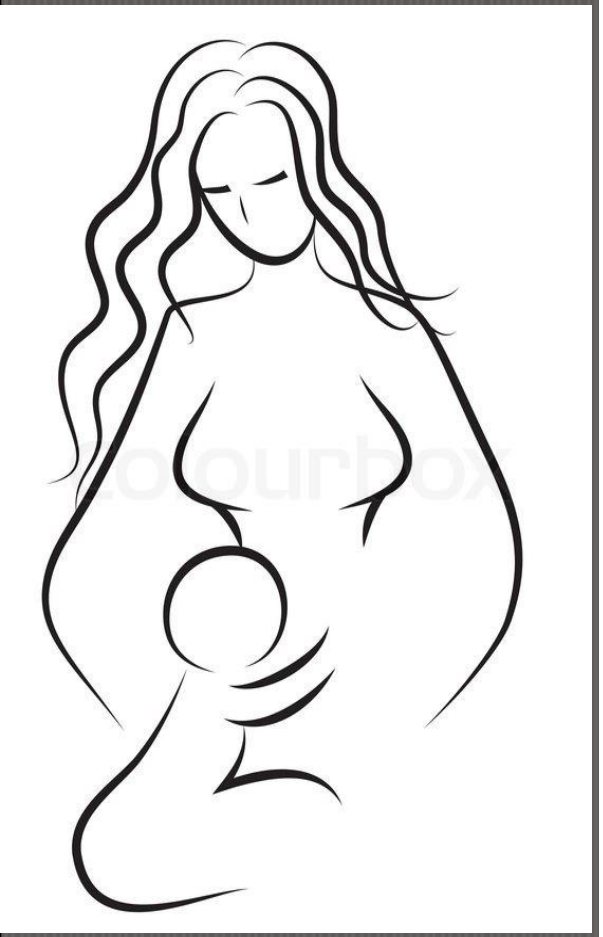
Family Birthing Center :

- 6-bed private room OB triage unit
- 11 labor/delivery/recovery beds
- 6 antepartum (high risk) beds
- 27 postpartum (mother/baby) beds
- 2 operating rooms
- Approximately 3,000 births per year

- 18 OB/Gyn's
- 5 delivering Family Practice Providers
- 3 Perinatologists

CentraCare St. Cloud Hospital

Why we began this journey…

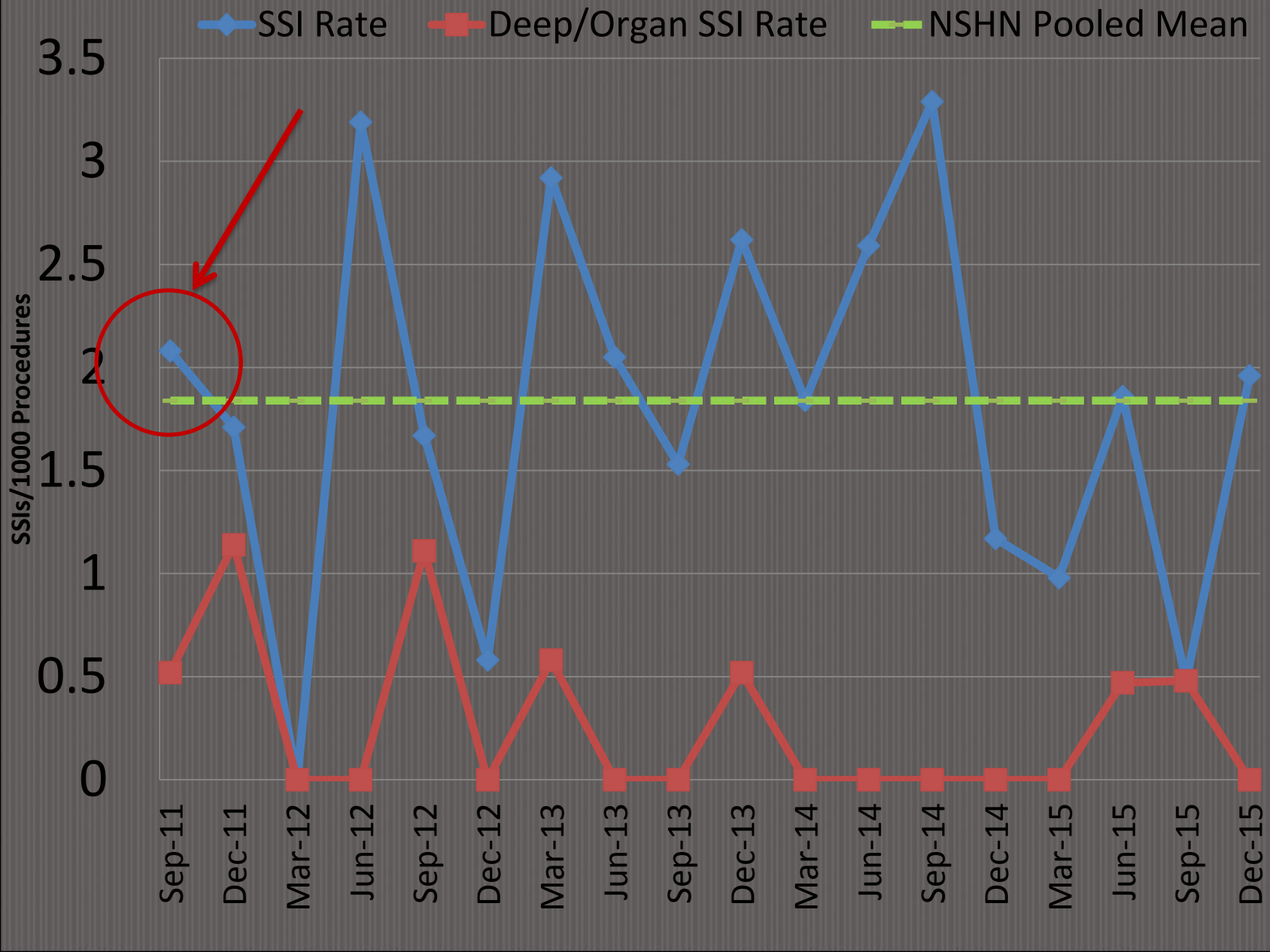


- In 2011-2012, the FBC cesarean infection rate was noted to be over the NHSN mean. Infection Prevention and Control were concerned enough to consider removing the OR suites from the FBC and only performing cesareans in the main OR.

- The goal was to reduce the SSI rates in cesarean sections
- Keep mothers and infants together after surgical delivery
- Improve Patient Experience
- Mitigate the emotional, social, and/or physical consequences to the families
- Promote bonding of mother and child within the first one to two hours after delivery
- Repair relationships between surgeons, nursing, and administration

CentraCare
St. Cloud Hospital

Total CSEC SSI Rate



Purpose statement

- To improve cesarean section patient experience by reduction of postoperative SSI

Why we do what we do…

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What we had already done…

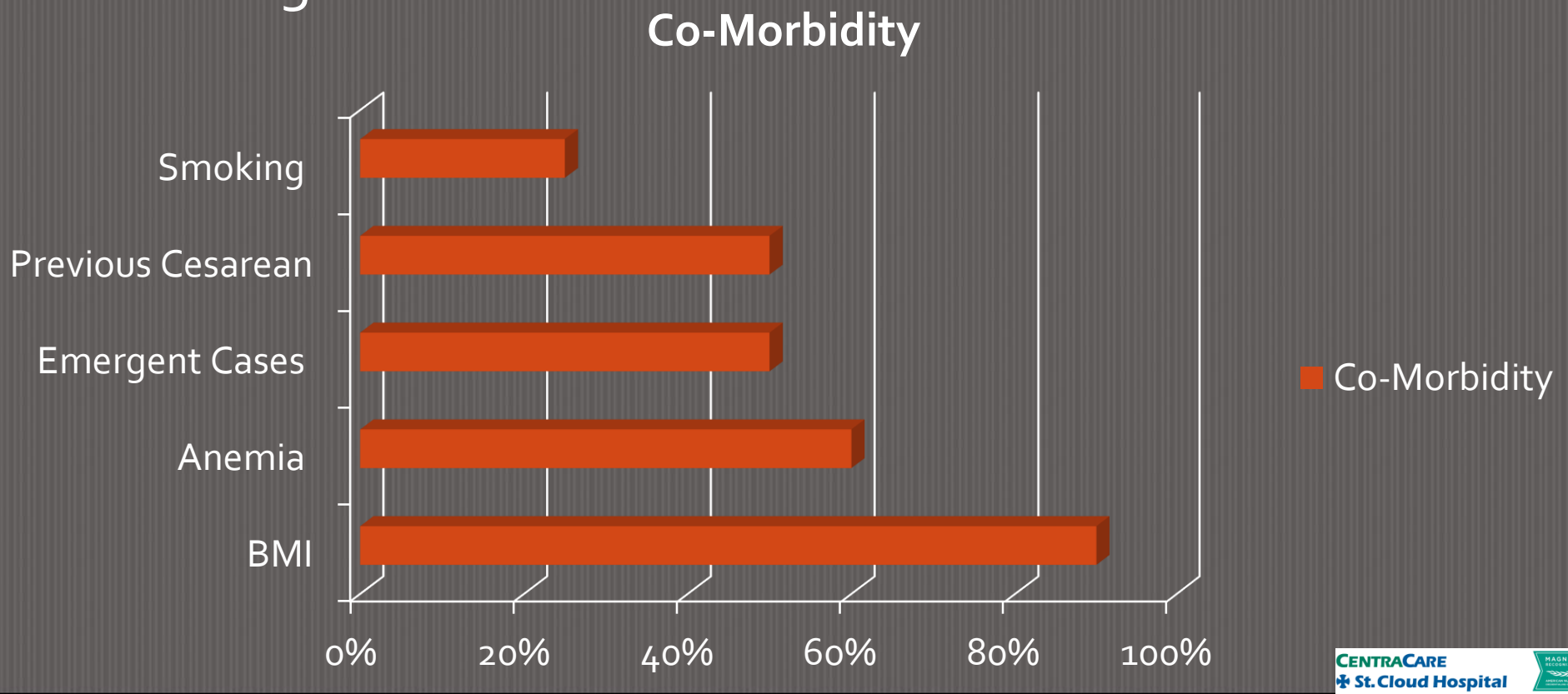
- All SCIP Measures were implemented and reviewed to be compliant *until retirement of the measure*
- CHG Wipes at home and at the hospital admission - *5-2011 – CentraCare providers; remaining providers in 2012*
- Antibiotics within 60 minutes prior to incision – *9-2011*
- Antibiotics after the clamping of the cord – *Late 2012*
- Iodine Paint in the OR – *Prior to 2012*
- Attire – Policy and Compliance *Ongoing, with last edits in 2014*
- Glycemic control of diabetic patients – *On-going*
- Traffic Control (added printers to the OR for bands and labels) *Spring 2014*

Results:

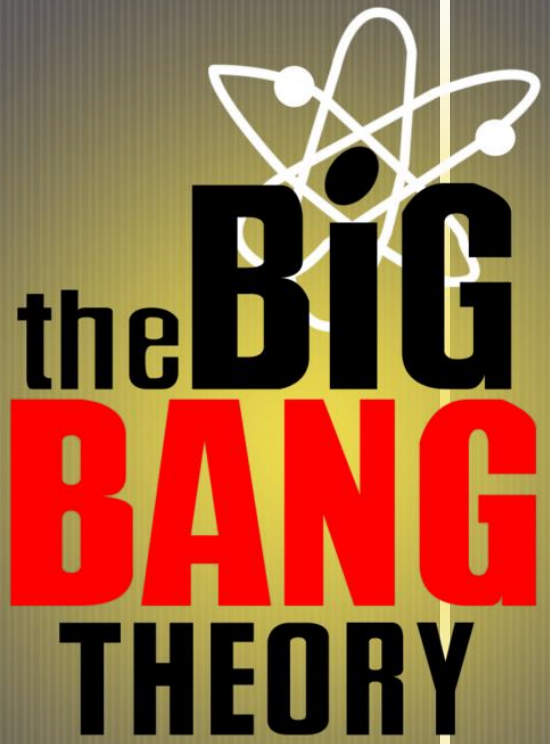
- Little to no change or improvement in our outcomes

Case Review Data FY14

- What our unit data showed of all our SSI's
  - No other commonalities of OR location, Staff or surgeon were identified



Summer 2014
Theories and beliefs



Incision Care

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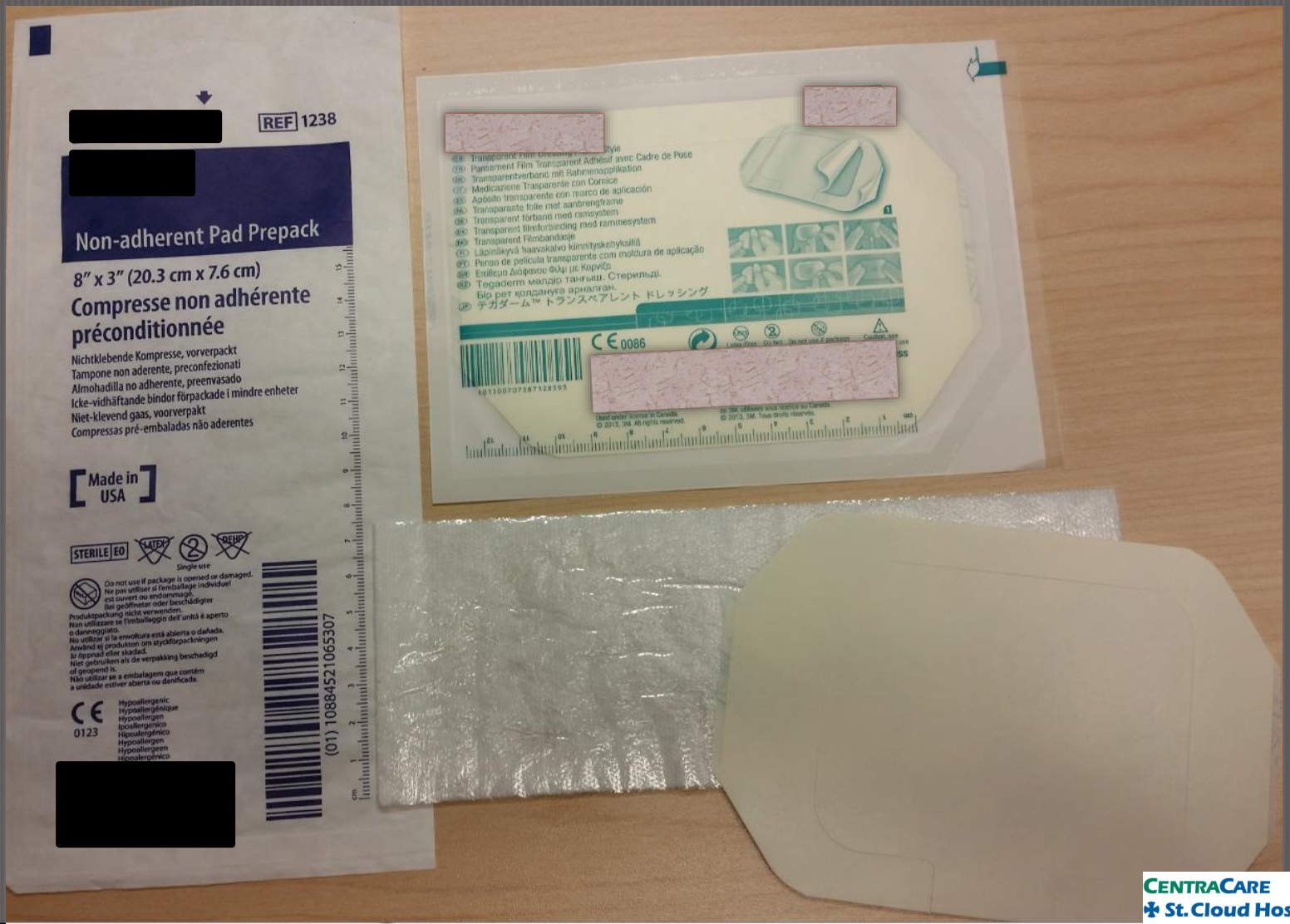
The dressing being pieced together did not create a positive healing environment for the incision and allowed pathogens to enter



Theory that providers were continuing to perform non-best practices post operatively such as:

- Peroxide wash on day 1 or 2 post op
- Dressing removals too soon or too late
- Aseptic technique not used when performing dressing changes and incision care
- No standardized care
- Showers with or without the dressing

Our proposal to providers:

Change our dressing types to be two options. Go-Live=10-21-14

- All in one clear island dressing
  - For everyone else who has not met criteria
  - Removed at 24 -48 hours post op

Our proposal to providers cont.:

Change our dressing types to be two options. Go-Live=10-21-14

Silver silicone foam boarder re-sealable dressing (foam Ag dressing) for patients who meet high risk for SSI

Criteria-

- Uncontrolled Diabetes
- Anemia (Hgb <12), Blood or Hematological Disorders – Severe anemia, Antithrombin C, Protein S, Anticardiolipin, Sickle Cell, etc.
- Body Mass index of 30 or greater
- Smoker
- Multiple Cesareans – History of 2 or greater
- History of wound infections/healing problems – i.e. Seroma and or hematoma formation, infections, dehiscence, etc.
- Oozing incision
- Emergent/Urgent cesarean with ANY of the following:
  - Prolonged rupture of membranes
  - Preterm Premature Rupture of Membranes
  - Diagnosis of Chorio
  - Prolonged labor with ROM and internal monitors
  - Remains in place for up to 7 days

Standardize the care and handling of post-op incision care on FBC

Dressings and After care

- Aseptic technique only
- Removal only done as the product manufacturer recommends

Patient Education

[redacted] Border Ag Dressing

[redacted] Ag is a dressing that has been ordered by your healthcare provider to promote wound healing. This dressing will not stick to your wound.

- You may shower with this dressing in place

Removing your soiled dressing:

- You may remove the dressing on the 7th day
- Remove dressing by gently lifting a corner and then peeling away from your wound

When to call the health care provider

- If any change in the wound is a concern
- If the drainage from the wound increases
- If you have a sudden increase in pain, or new pain in your wound
- If the area around the wound gets red, swollen or painful to touch
- If the wound color changes from pink or red to a tan, brown or black color
- If you get a fever, or if the wound odor gets worse
- If you have questions

POLICY

TITLE: Cesarean Section Incision Dressings

Original: 10/14 Minor Revision(s): 11/14 Full Review:
Replaces: 10/14
Responsible Person: Chair, WCC Clinical Practice Council
Approving Committees: SCH Women and Children's Clinical Practice Council
FBC Medical Director
Department of OB/GYN
Type: Protocol

I. **PURPOSE:**
To implement dressing based on patient risk factors, standardize incision care, and decrease/eliminate post-op cesarean infections.

II. **POLICY:** Dressings used for cesarean section incisions, with and without risk factors.

III. **DEFINITIONS:**
Aseptic Technique: The use of surgical practices that restrict microorganisms in the environment and prevent contamination of the surgical wound.
Aseptic technique is employed to maximize and maintain asepsis, the absence of pathogenic organisms, in the clinical setting. The goals of aseptic technique are to protect the patient from infection and to prevent the spread of pathogens.

IV. **GUIDELINES:**
A. Use [redacted] (transparent island dressing) on patients without risk factors.
1. Transparent Island dressing to remain in place for a minimum of 24 hours, with a goal of attaining 48 hours.
2. Remove and replace dressing if less than 24 hours since surgery and dressing is saturated 75% or more; OR if the edges of the dressing are no longer adhered; OR there is fluid/blood leaking.
3. Change the dressing using aseptic technique
4. Patient may shower after 24 hours while the dressing is on and intact.
5. Do not use any other tapes or adhesives on the original dressing except prescribed pressure dressing.
6. For oozing or actively bleeding incision: Apply pressure dressing.
7. Once dressing is removed, if there is a skin fold or moisture is collecting in the incision area, use wicking material.
8. **Once dressing is removed observe incision twice daily.**
9. Call physician if: redness at or around incision site; swelling; drainage; foul odor; fever; pain.

B. Use ([redacted]) Foam with Ag (silver) for patients with any of the following criteria:
1. Uncontrolled Diabetes
2. Anemia (hgb <12), Blood or Hematological Disorders – Severe anemia, Antithrombin C, Protein S, Anticardiolipin, Sickle Cell, etc.
3. Body Mass index of 30 or greater
4. Smoker
5. Multiple Cesareans – History of 2 or greater 2 previous cesareans, prior to the upcoming or present
6. History of wound infections/healing problems – i.e. Seroma and or hematoma formation, infections, dehiscence, etc.
7. Emergent/Urgent cesarean with ANY of the following:
   a. Prolonged rupture of membranes
   b. Preterm Premature Rupture of Membranes
   c. Diagnosis of Chorio
   d. Prolonged labor with ROM and internal monitors
   e. Oozing incision

Contraindications for [redacted] Use:
1. **Do not use if you have known sensitivity to silver.**
2. **Do not use [redacted] Ag during radiation treatment or examinations e.g. X-ray, ultrasound, diathermy or Magnetic Resonance Imaging.**
3. **Do not use [redacted] Ag together with oxidizing agents such as hypochlorite solutions or hydrogen peroxide.**

Care of the Dressing and Incision:
1. **[redacted] with Silver Island Dressing to remain in place for 7 days.**
2. **Lift dressing as needed based on abnormal symptoms or physician request to observe incision.**
   a. **This is done by gently rolling the dressing back on itself from top toward bottom to peel back the upper 50% of the dressing,**
   b. **Once you have visualized the incision, gently unroll the dressing back into place.**
3. **Remove and replace dressing any time during hospitalization:**
   a. **If dressing is saturated 75% or more with blood or body fluid**
   b. **If the dressing completely falls off**
   c. **There is blood or body fluid leaking from edges**
4. **Change the dressing using aseptic technique, when changing is required.**
5. **Patient may shower any time while the dressing is on and intact.**
   a. **Assess dressing prior to shower.**
   b. **Instruct patient to not have the shower stream in direct contact with the dressing / incision as they cleanse themselves.**
   c. **If the dressing becomes wet during a shower it will dry out within 30 minutes if left intact. If the patient is uncomfortable with moisture apply Interdry over the dressing to further absorb the moisture to the external portion of the dressing.**
6. **May use other tapes or adhesives on the original dressing to re-adhere corners if they become loose.**
7. **For oozing or actively bleeding incision: Apply pressure dressing.**
8. **Wicking material may be used over and in addition to the foam dressing with Ag (silver) for moisture**
9. **If the following symptoms are present: redness at or around dressing; swelling; drainage; foul odor; fever; pain, lift [redacted] dressing per policy recommendations, observe incision and call physician with findings.**
10. **Nurse to provide education on wound care, dressing removal on day 7 with patient instruction sheet.**

Pressure dressing for oozing or actively bleeding incision:
1. Apply 2 ABD's to and over the intact dressing. If the dressing is >75% saturated,
3. Check skin integrity every 4 hours

2

V. **REFERENCES:**

Literature
Truchetet, F., Guibon, O., & Meaume, S. (2012). Clinicians' rationale for using a silver dressing: The French OMAg+E observational study. *Journal of Wound Care, 21*(12), 620-625.

Schneid-Kofman, N., Sheiner, E., Levy, A., & Holcberg, G. (2005). Risk factors for wound infection following cesarean deliveries. *International Journal of Gynecology and Obstetrics, 90*, 10-15. Retrieved from doi: 10.1016/j.ijgo.2005.02.020

http://medical-dictionary.thefreedictionary.com/aseptic+technique
http://www.surgeryencyclopedia.com/A-Ce/Aseptic-Technique.html

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May use a Pressure Dressing over the either dressing when needed

Concerns raised:

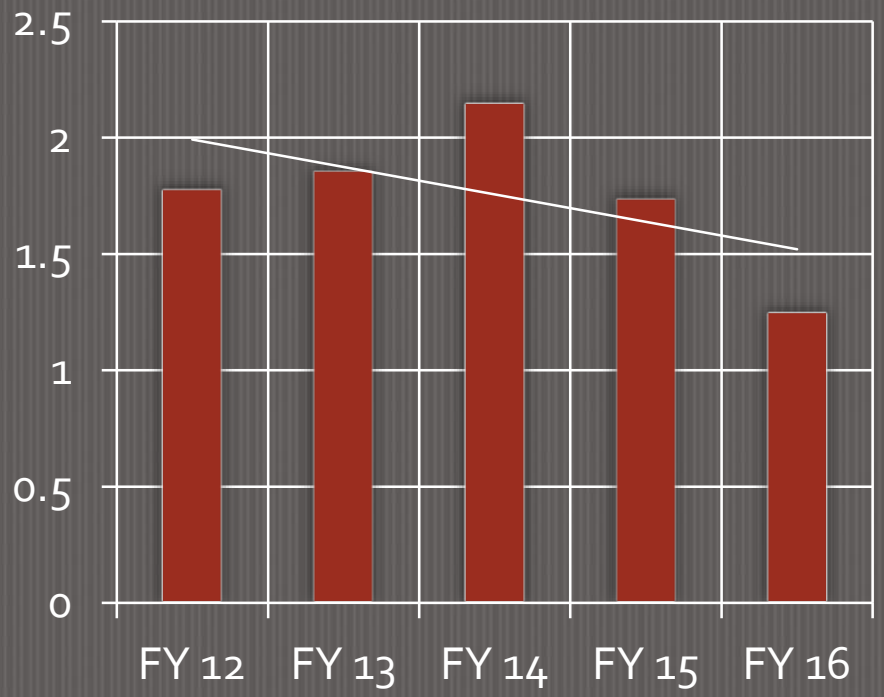
- The cost of the foam Ag dressing at that time was 2394% more in cost / each dressing
- The cost of the all in one island dressing was about 175% more in cost
- The cost of the pieced together dressing was very minimal

The business argument:

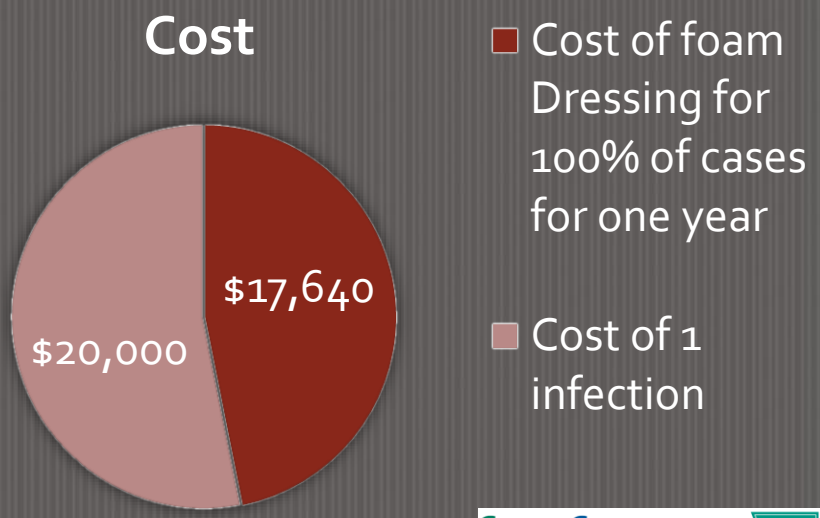
- "SSI extended length of stay by 9.7 days while increasing cost by $20,842 per admission these cases of SSI were associated with an additional 406,730 hospital-days and hospital costs exceeding $900 million nationally" (de Lissovy et al., 2009, p. 387).
- Nationally "Surgical site infections (SSIs) are serious operative complications that occur in approximately 2% of surgical procedures and account for some 20% of health care-associated infections". http://www.ncbi.nlm.nih.gov/pubmed/19398246
- Median 30-day SSI costs; hysterectomy for endometrial cancer
  - Any SSI $5500/SSI
  - Superficial incisional SSI $9500/SSI
  - Organ/space $20,000/SSI

Anderson, et al. (2007). Inf Control Hosp Epi.
Centers for Disease Control and Prev. www.cdc.gov/hai.
Stone, et al. (2015). Am J Inf Control.
Umscheid, et al. (2011) Inf Control Hosp Epi.
Bakkum-Gamez, et al. (2013). Gynecol Oncol.
de Lissovoy G[1], et al. (2009). Am J Infect Control.

Our SSI data



- The cost of the more expensive dressing if used on every cesarean we perform= $17,640.24 in 2014 prices.



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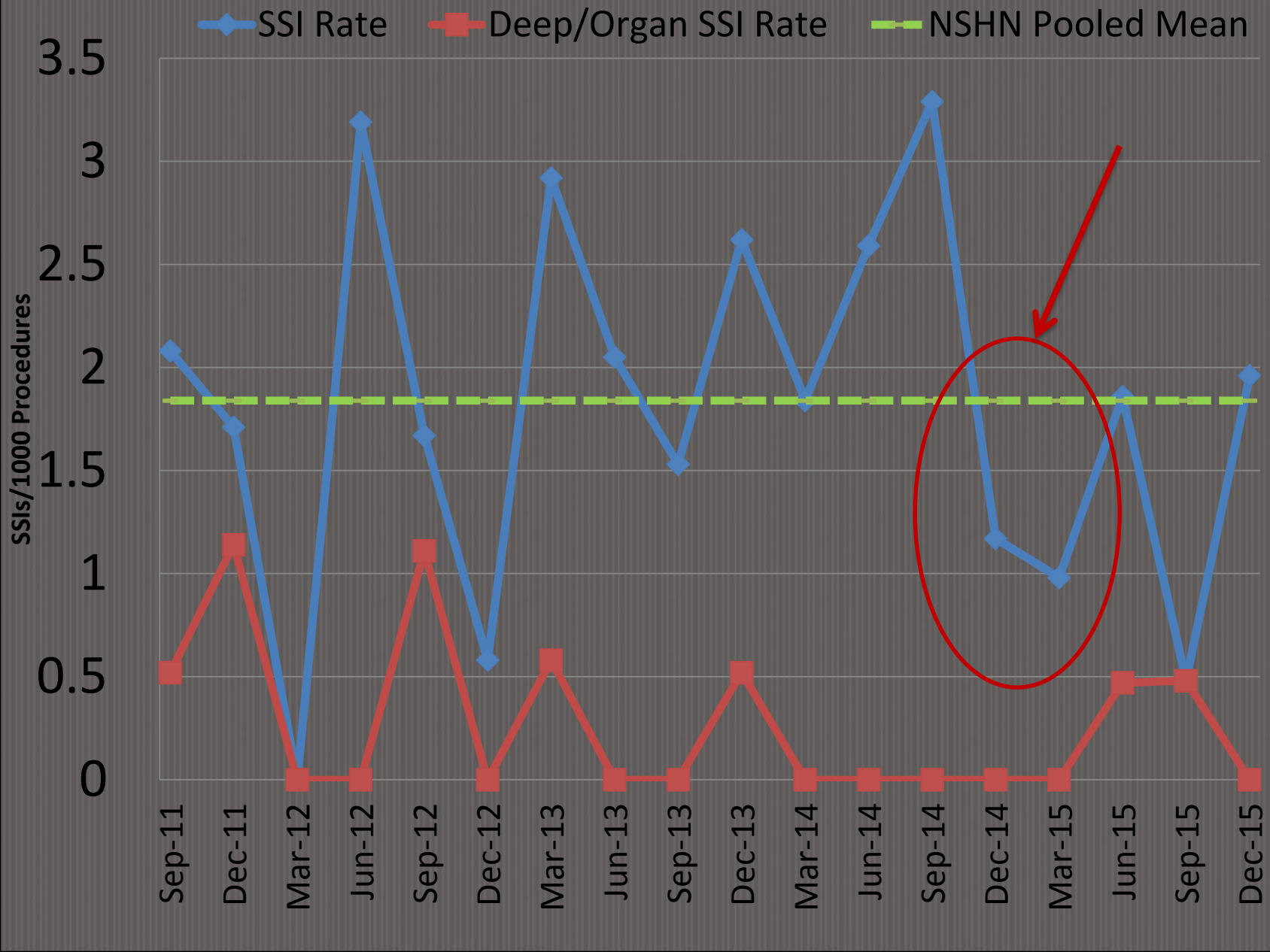
Total CSEC SSI Rate



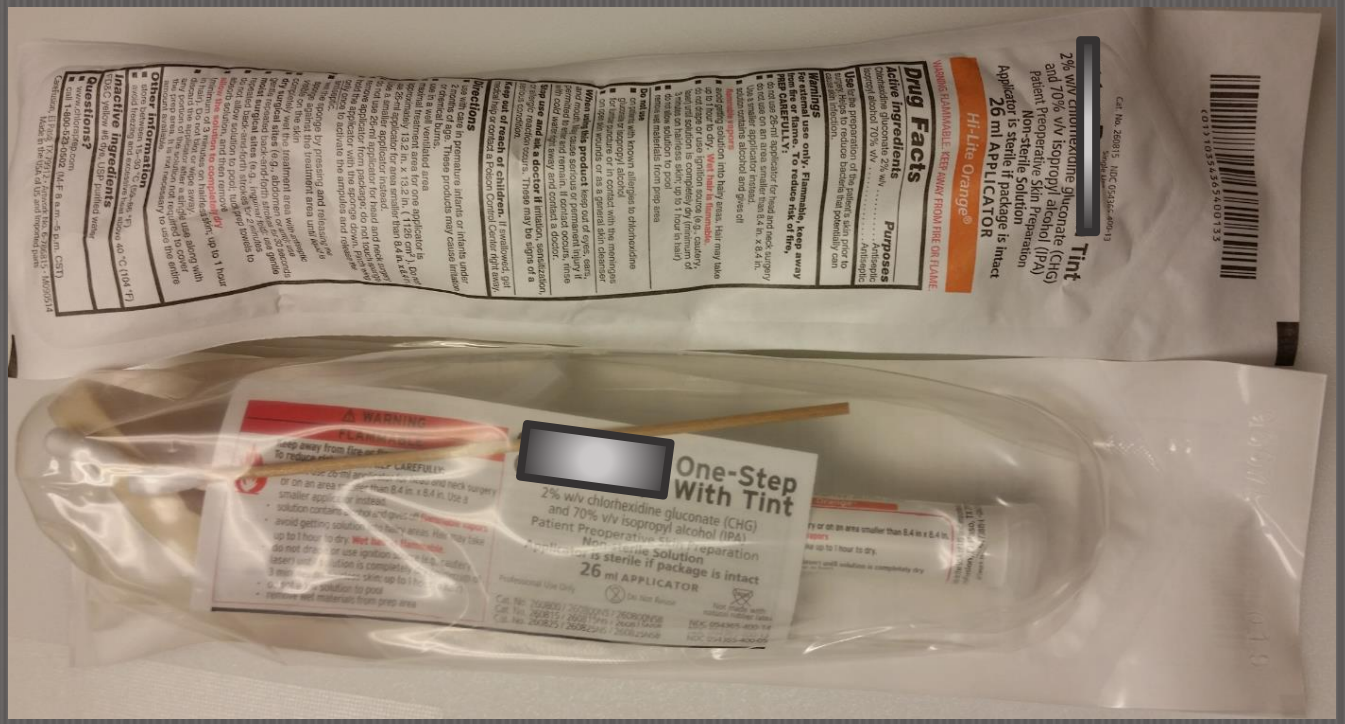
One year later…

After noting a >50% reduction in SSI after dressing changes and standardization of incision care…

- It was noted that 85% of our patients met criteria for the foam Ag dressing
- Only 15% had the all in one island dressing
- 200 patients were called to verify compliance and how they liked the dressing, with a positive response from patients
  - A motion was made to use the foam Ag dressing for 100% of our patients and was approved. Go-live July 2015
  - Based on that we changed to using it exclusively, with the exception of a silver allergy.

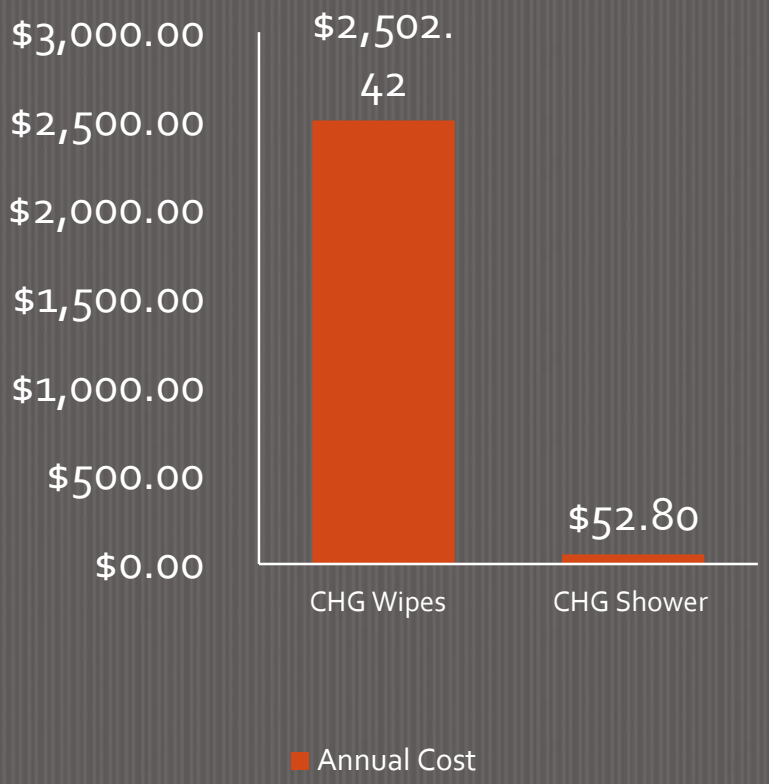
Our next steps were

- Change Iodine Paint out for Chlorhexidine scrub in the OR pre-op phase.



Change from the CHG wipes to the pre-op CHG Shower for the following reasons:

- The wipes are 2% CHG and the shower bottles are 4% CHG
- The cost of the wipes
  - Inpatient unit was supplying and paying for the cost of the wipes for all the clinics as well as the inpatient population
  - Savings of about $2500.00
- The CHG shower is just as effective and less expensive than the wipes
- The evidence shows that patient pre-op education on taking a good shower, wearing clean clothes, and sleeping on clean sheets also helps.



Go-live May 2015

Edmiston et.al.,(2008). *Journal of the American College of Surgeons*

Edmiston et.al., (2010). *The Association of Perioperative Registered Nurses*

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Concerns about Chlorhexidine use and patient compliance

- Cost of CHG shower bottles– Insurance does not cover this.
- The cost is anywhere from $4-$7.00 for a bottle that will provide enough for two showers.
- Will the patient actually go out and purchase this?
- If the patient chooses to not use the CHG shower, they will be cleansed the CHG wipes when they are admitted.
- For patients visibly soiled a shower will be requested.
- For inpatients scheduled to have a cesarean, the CHG showers will be done based on their condition and ability to shower. Otherwise the CHG wipes will be used.
- Patient education sheet created

Showering To Reduce Germs On Your Skin Before Surgery

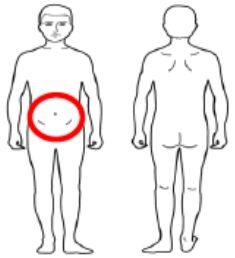
Wash with antiseptic solution

Washing your skin with 4% Chlorhexidine Gluconate (CHG) solution will reduce the number of germs on your skin and decrease the chance of infection. Please follow the instructions below to clean your skin before surgery.

- DO NOT SHAVE any part of the body (except men can shave their faces) for at least two days prior to surgery.
- Purchase two 4-ounce bottles* of Chlorhexidine Gluconate (CHG) antiseptic soap, also calle[redacted]," at your local pharmacy. DO NOT use this product if you are allergic to CHG.
- Shower the night before AND the morning of surgery with CHG antiseptic soap.
- **DO NOT use CHG soap near your eyes, ears, mouth or vagina.**
- **This product may cause discoloration of towels/washcloths.**

The night before surgery

- In the shower, wash your body with your regular soap first. Wash and rinse your hair using your normal shampoo and conditioner.
- Make sure you **completely rinse the soap, shampoo and conditioner** from your hair and body.
- Now **wet your entire body**. Then turn the water off in the shower or **move away from the water** spray.
- **You will use 1 bottle (4 ounces) for each shower. With a clean wash cloth, apply the antiseptic CHG soap solution** to your body starting at the neck. Lather your entire body from the neck down. Continue to stay out of the water spray as you lather. Gently wash your body with the lather.
- Then gently **scrub the areas where the incision(s) will be located for about 5 minutes**. See diagram for location.



- Once you have completed the scrub, **rinse the CHG soap off your body completely** using shower water.
- **If you have burning, redness or itching that does not stop, rinse immediately and do not reapply.**
- DO NOT wash with regular soap or shampoo and conditioner after you have used the antiseptic CHG soap solution. DO NOT apply deodorants, lotions, moisturizers, makeup, powders or sprays. Doing so would decrease the effectiveness of the CHG soap.
- Pat yourself dry with a clean, freshly washed towel.
- Dress in clean, freshly washed clothes.
- Sleep on freshly washed sheets.

*It is OK to buy one 8-ounce bottle and use half the bottle for each shower.

INSTRUCTIONS FOR THE MORNING OF SURGERY ARE ON THE BACK OF THIS SHEET

CENTRACARE Health

The morning of surgery

- **DO NOT** wash with regular soap or shampoo and conditioner during this shower. Doing so would decrease the effectiveness of the CHG soap.
- Wet your entire body in the shower, then **turn the water off or move away from the water** spray.
- **You will use 1 bottle (4 ounces) of CHG soap for this shower. With a clean wash cloth, apply the antiseptic CHG soap solution** to your body starting at the neck. Lather your entire body from the neck down. Continue to stay out of the water spray as you lather. Gently wash your body with the lather.
- **DO NOT use CHG soap near your eyes, ears, mouth or vagina.**
- Gently **scrub the areas where the incision(s) will be located for about 5 minutes.**
- Once you have completed the scrub, **rinse the CHG soap off your body completely** using shower water.
- Pat yourself dry with a clean, freshly washed towel.
- DO NOT apply deodorants, lotions, moisturizers, makeup, powders or sprays.
- Dress in clean, freshly washed clothes.

What were some of the problems we experienced?

- CHG Scrub did not allow the previous fenestrated drape to seal.
- During the month this occurred May 2015, we saw a sharp spike in our SSI's which is directly attributed to the sterile field being broken.
- We tested many drapes after that and ended up replacing that drape with a iodine infused incise drape and the same drape without iodine for those with allergy.
- The iodine infused drape does adhere better than the clear.

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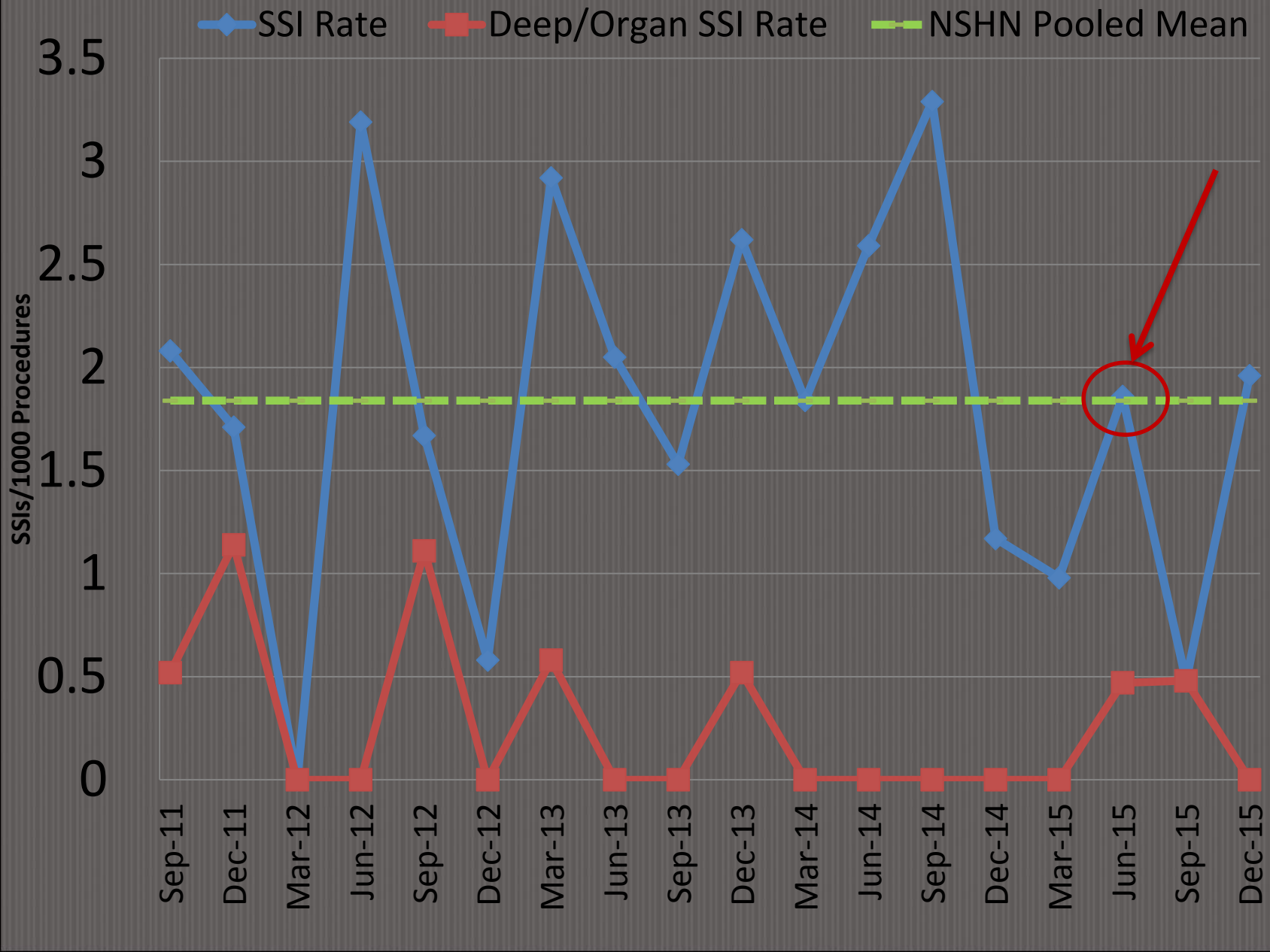
Total CSEC SSI Rate



Antibiotics

- Pre-op antibiotics (Before 2011)
  - Cefazolin 1 gram or if allergy:
    - clindamycin 900mg and gentamicin 5mg/kg
- Antibiotics at cord clamping (fall 2012)
  - Azthromycin 500mg
- Weight based dosing (January 2014)
  - Ancef 2 gram <120kg
  - Ancef 3 gram >120kg
- Re-dose antibiotics if blood loss greater or equal to 1500mL, or case longer than the half life of the antibiotic given pre-op. (August 2015)

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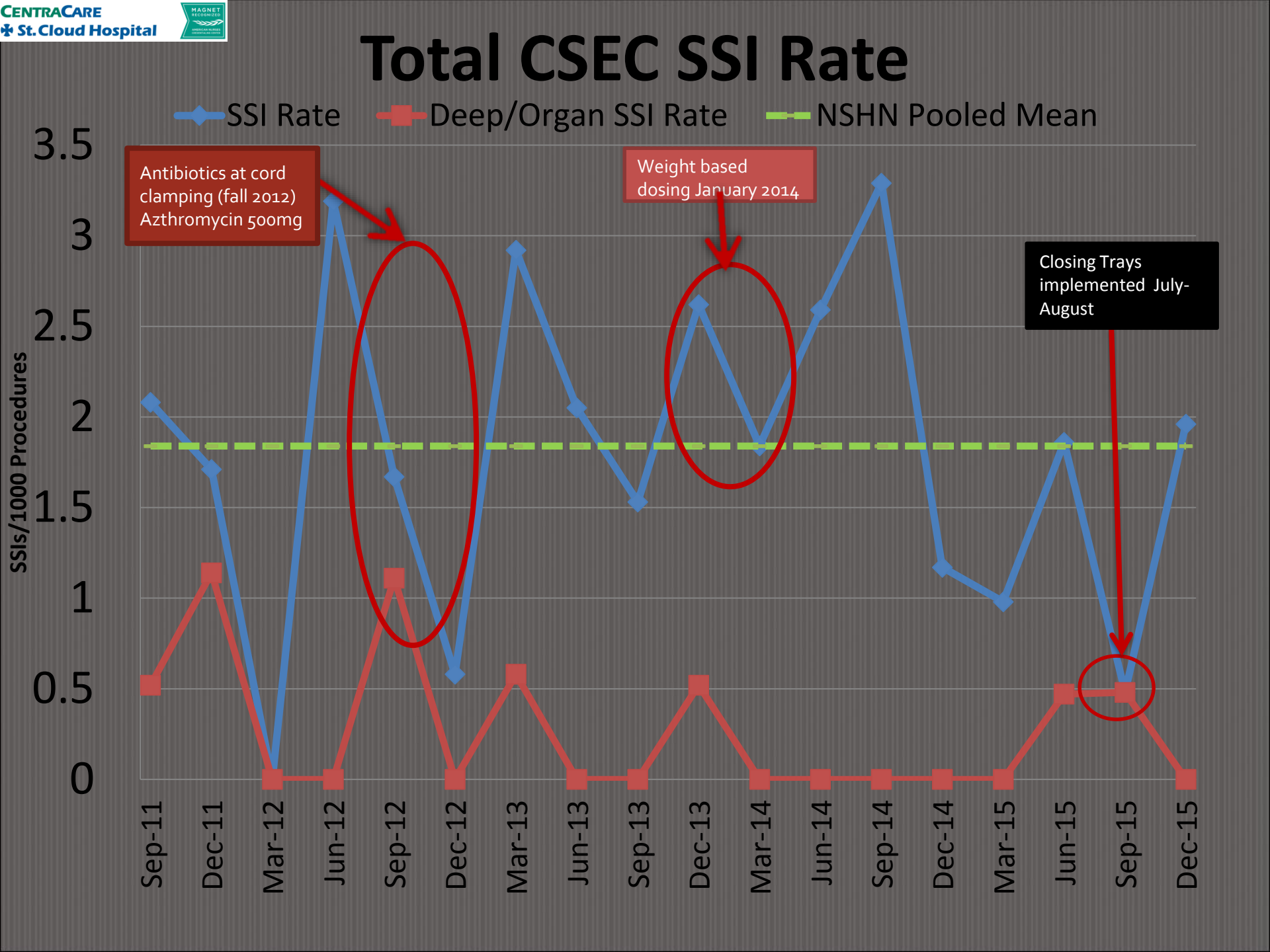
Total CSEC SSI Rate



Closing trays

What is the closing tray process?

- Prior to fascia closure, the case stops for a change out for all at the table of:
  - Gowns
  - Gloves
  - Instruments
  - Sutures
  - Drapes (we use a all in one pediatric drape)
  - Laps/soft goods
  - Light handles
  - Cautery
  - Suction
  - Sterile/warm/ normal saline/water

Implementation and Education:

- During the trial prior to full implementation the Nurse Clinician utilized the PDSA model
- Present for every case that the trial was performed on
- Everyday slight adjustments were made to steps, equipment and technique
- Every circulator either performed a live case with the new process or had a 30-60 minute training session on the process

Costs of Closing trays:

- How Much did all of that COST?

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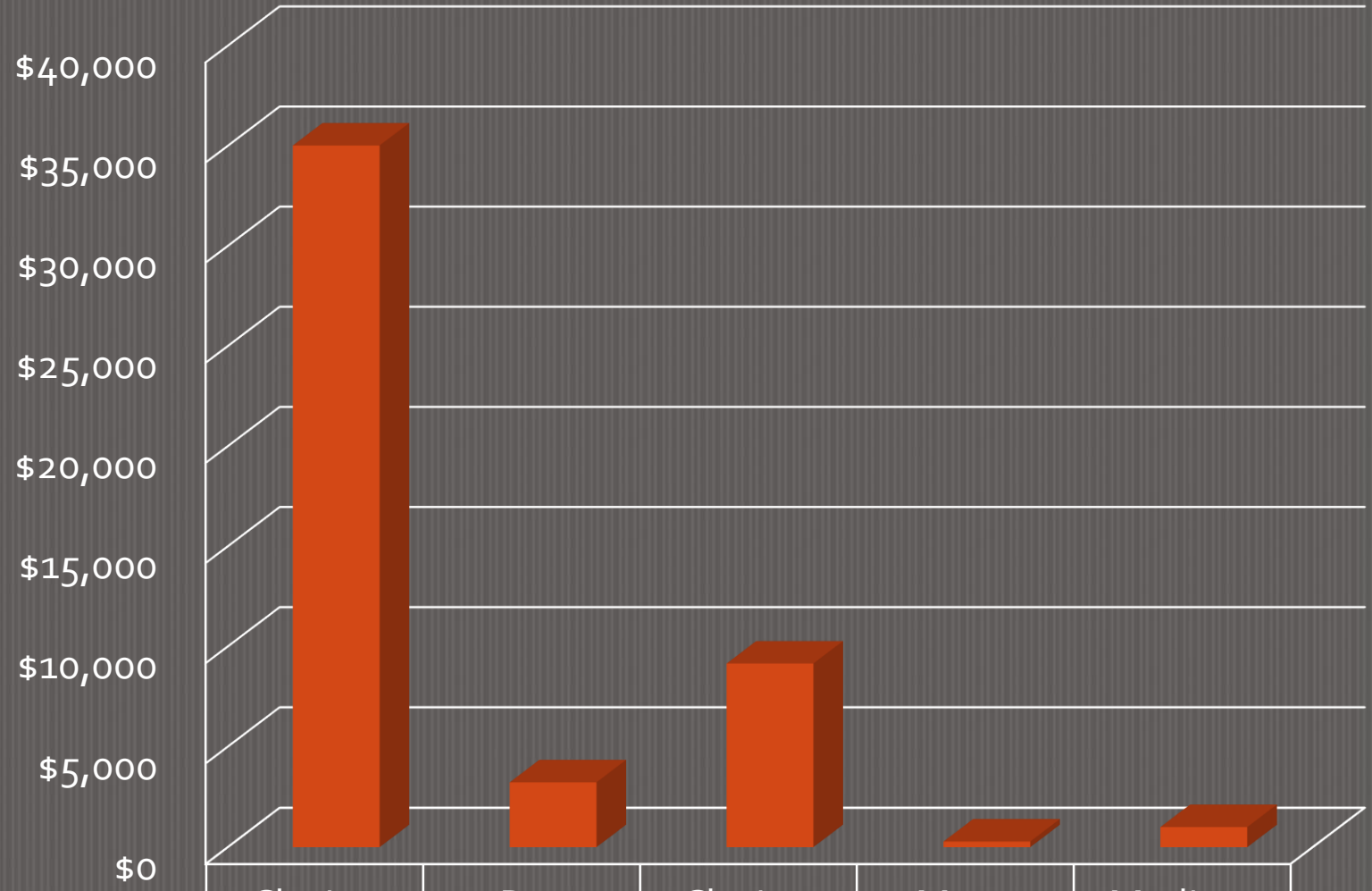
Actual Cost for 2 OR's



	Closing Dry Goods	Dry Goods Pack adjustments	Closing Tray Instruments	Mayo stands	Medium Tables
Actual Cost for 2 OR's	$35,016	$3,224	$9,148	$280	$1,000

Closing Dry Goods

- BAG BEDSIDE 12X18 PLASTIC
- COVER MAYO STAND 23X53
- TOWEL OR 17X26 XR BLUE
- GOWN MICROCOOL L
- CAUTERY PUSH BTN EDGE HLST
- CVR LIGHT HNDL SOFT
- NDL CNTR 20CT DBL MAG
- SPNG LAP 18X18 XR PW 5/PK
- Pediatric Laparatomy Drape with adhesive
- DRAPE 44X60

Opening Dry Goods:

- BAG BEDSIDE 12X18 PLASTIC
- BAG POLY 8X10 PIGGYBACK
- CHLORAPREP 26ML ORANGE
- COVER MAYO STAND 23X53
- CVR TBL 50X90
- DRAPE C-SECT PCH FEN
- ORGANIZER TBG/CORD
- TBG SUCT 5MMX12FT W/CONN
- TOWEL OR 17X26 XR BLUE
- GOWN MICROCOOL L
- TOWEL ABS 17X20 WHITE
- WRAP CSR 25X25 2PP WHITE
- BASIN PLACENTA BLUE
- BLADE NO.10 CS RIB
- CAUTERY PUSH BTN EDGE HLST
- CUP URINE COLLECTION
- CVR LIGHT HNDL SOFT
- DRAPE 44X60
- LABEL SHEET CSTM-C SECTION
- MARKER SKIN REG TIP LBL RULER
- NDL CNTR 20CT DBL MAG
- PITCHER 1200CC W/HANDLE
- 3 SPNG LAP 18X18 XR PW 5/PK
- SUCTION TIP POOLE
- SYR EAR/ULCER 2OZ RED

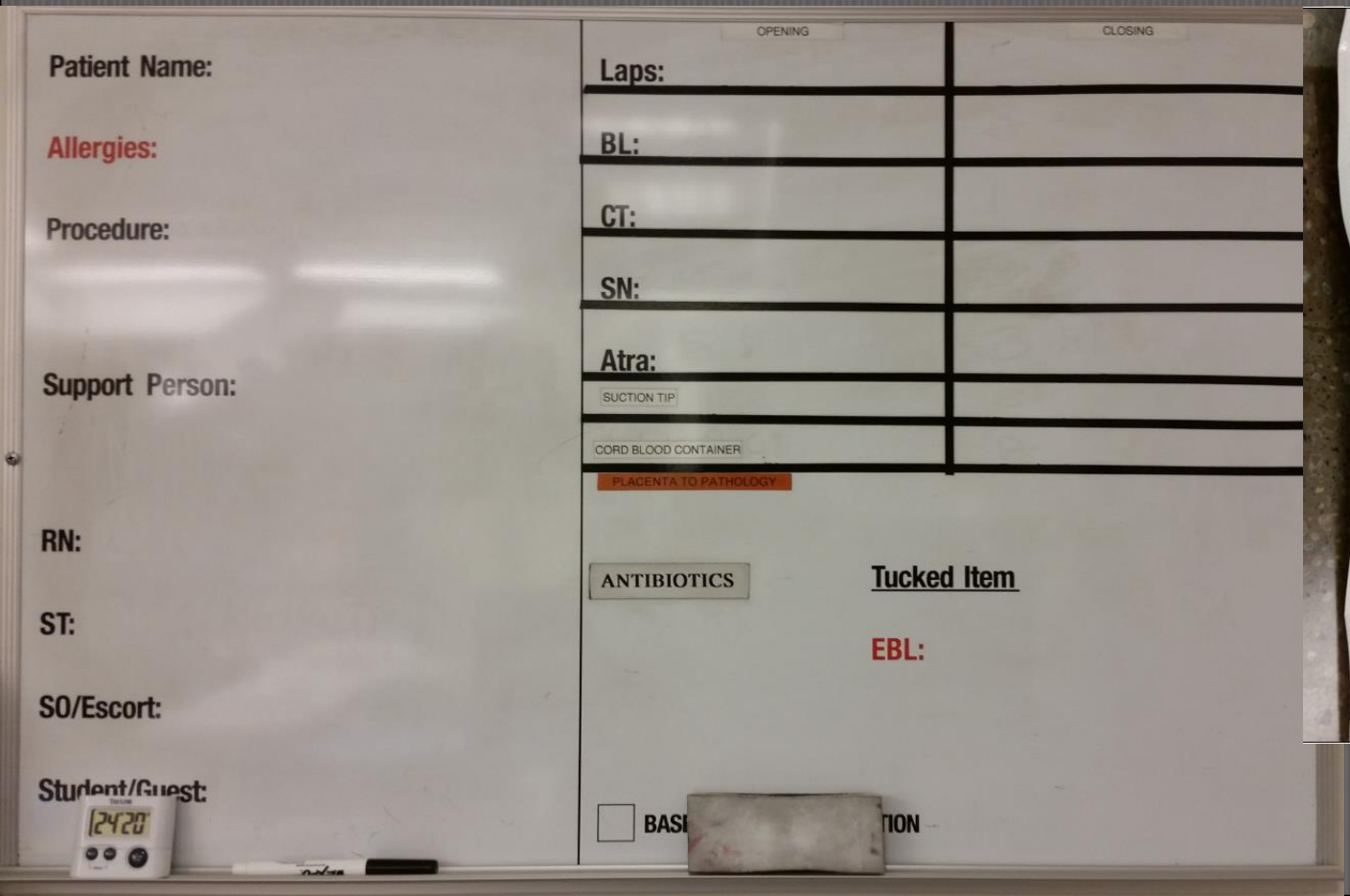
Closing Tray Instruments

- 4 CLAMP CRILE CURVED 5 ½"
- 2 CLAMP CARMALT
- 4 CLAMP KOCKER STRAIGHT
- 1 NEEDLE HOLDER SMALL
- 2 NEEDLE HOLDER MAYO-HEGAR 7 ¼"
- 2 NEEDLE HOLDER HEANEY 8"
- 1 SCISSOR MAY STRAIGHT 6 ¾"
- 1 SCISSOR METZ CURVED 7"
- 2 FORCEP ADSON TISSUE W/TEETH
- 1 FORCEP TISSUE W/TEETH 6" SMALL
- 1 FORCEP RUSSIAN SMALL
- 1 FORCEP RUSSIAN MEDIUM
- 1 FORCEP BICKLE
- 1 RETRACTOR ROUX MEDIUM #2
- 2 RETRACTOR ARMY NAVY
- 1 RETRACTOR RICHARDSON 1 ½" X 2"FBC
- 1 RETRACTOR RICHARDSON 2 X 2 ½"
- 1 RETRACTOR RICHARDSON 2 ½" X 3"
- 1 TOWEL CLIP
- 1 GRADUATE 500CC

Cesarean Opening Instruments

- 4 CLAMP CRILE CURVED 5 ½"
- 2 CLAMP ALLIS
- 4 CLAMP CARMALT
- 4 CLAMP KOCKER STRAIGHT
- 2 CLAMP BABCOCK
- 4 CLAMP SPONGE FORCEP SHORT/SMALL
- 4 CLAMP SPONGE FORCEP
- 2 NEED HOLDER HEANEY 8"
- 2 NEEDLE HOLDER MAYO-HEGAR 7 ¼"
- 1 SCISSOR MAY STRAIGHT 6 ¾"
- 1 SCISSOR MAY CURVED 6 ¾"
- 1 SCISSOR BANDAGE
- 1 SCISSOR METZ CURVED 7"
- 2 HANDLE SCALPEL #3
- 2 TOWEL CLIP
- 2 FORCEP TISSUE W/TEETH 6" SMALL
- 1 FORCEP DEBAKEY TISSUE MEDIUM
- 1 FORCEP RUSSIAN SMALL
- 1 FORCEP RUSSIAN MEDIUM
- 1 RETRACTOR ROUX MEDIUM #2
- 2 RETRACTOR ARMY NAVY
- 1 RETRACTOR RICHARDSON 1 ½" X 2" SMALL
- 1 RETRACTOR RICHARDSON 2 X 2 ½"
- 1 RETRACTOR RICHARDSON 2 ½" X 3"
- 1 RETRACTOR MALLEABLE MEDIUM 2" WIDE
- 1 RETRACTOR DELEE
- 1 TIME OUT HOOD

Other Changes we had to make:



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Time:

- The closing trays add anywhere from 60-120 seconds to each case. 
- Is there value in giving each surgical patient another minute or two to keep them safe and free of infection? 
- The overall outcome is about patient safety and experience
- Doing the right thing, for everyone, every time

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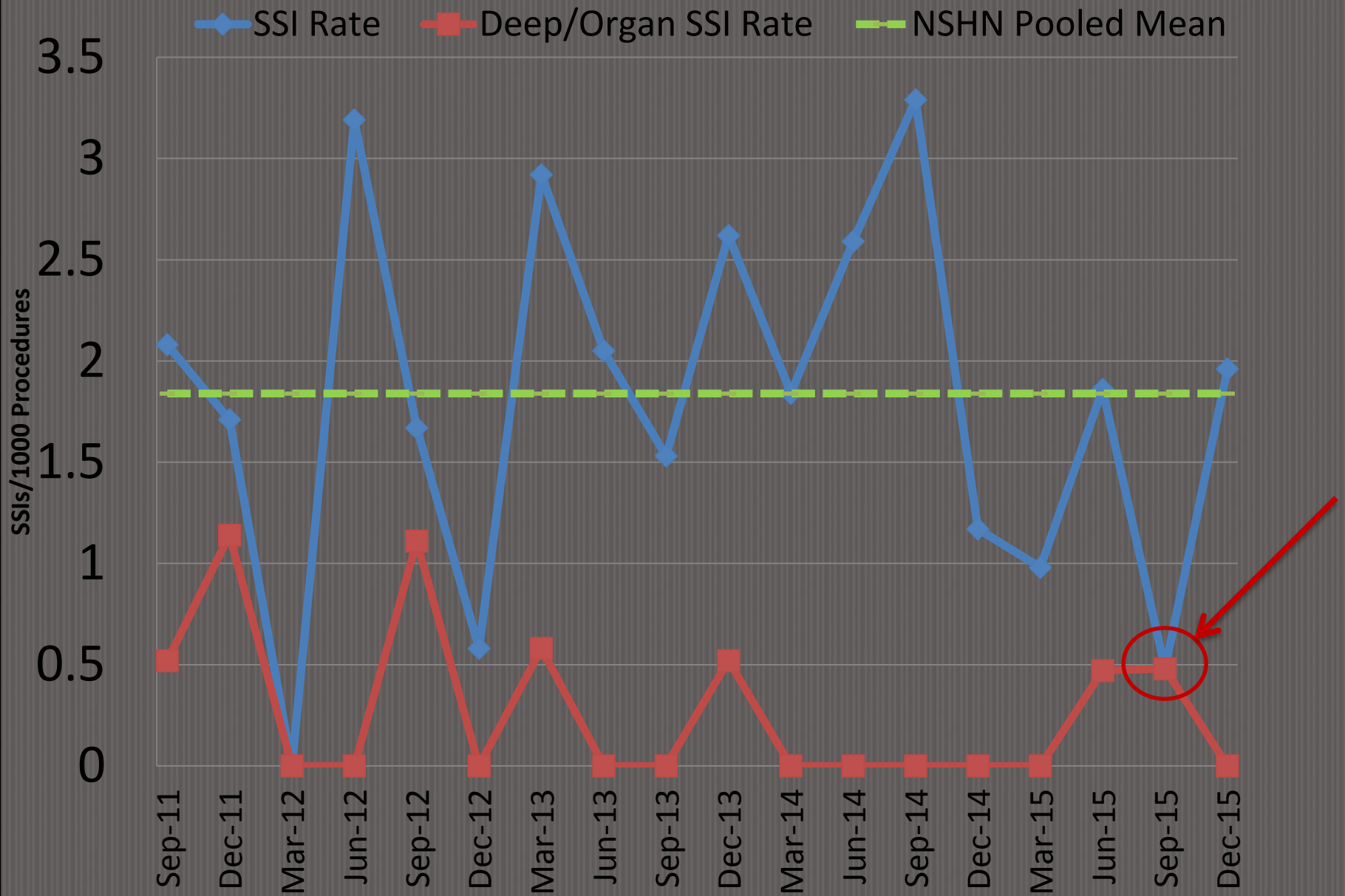
Total CSEC SSI Rate

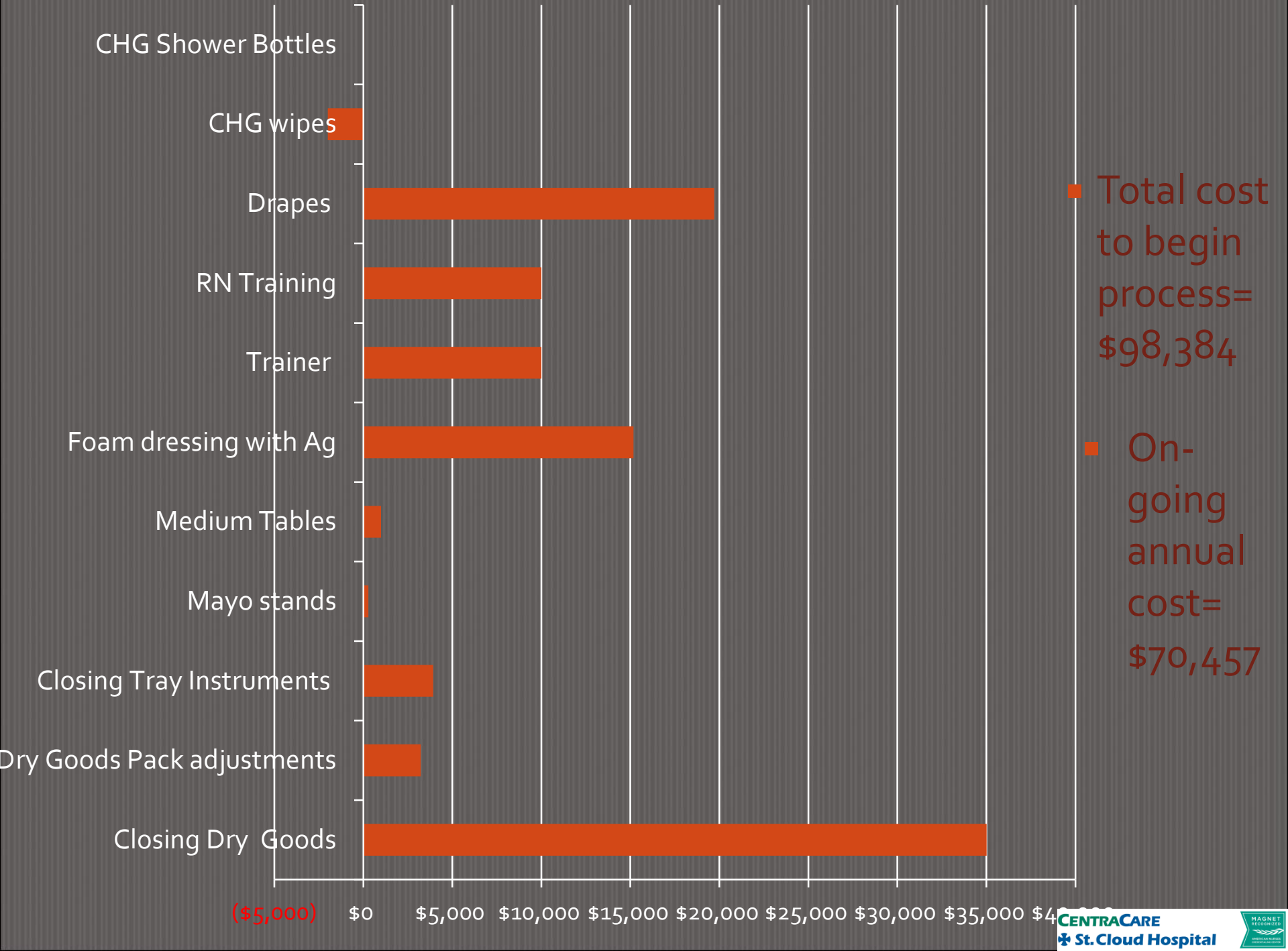


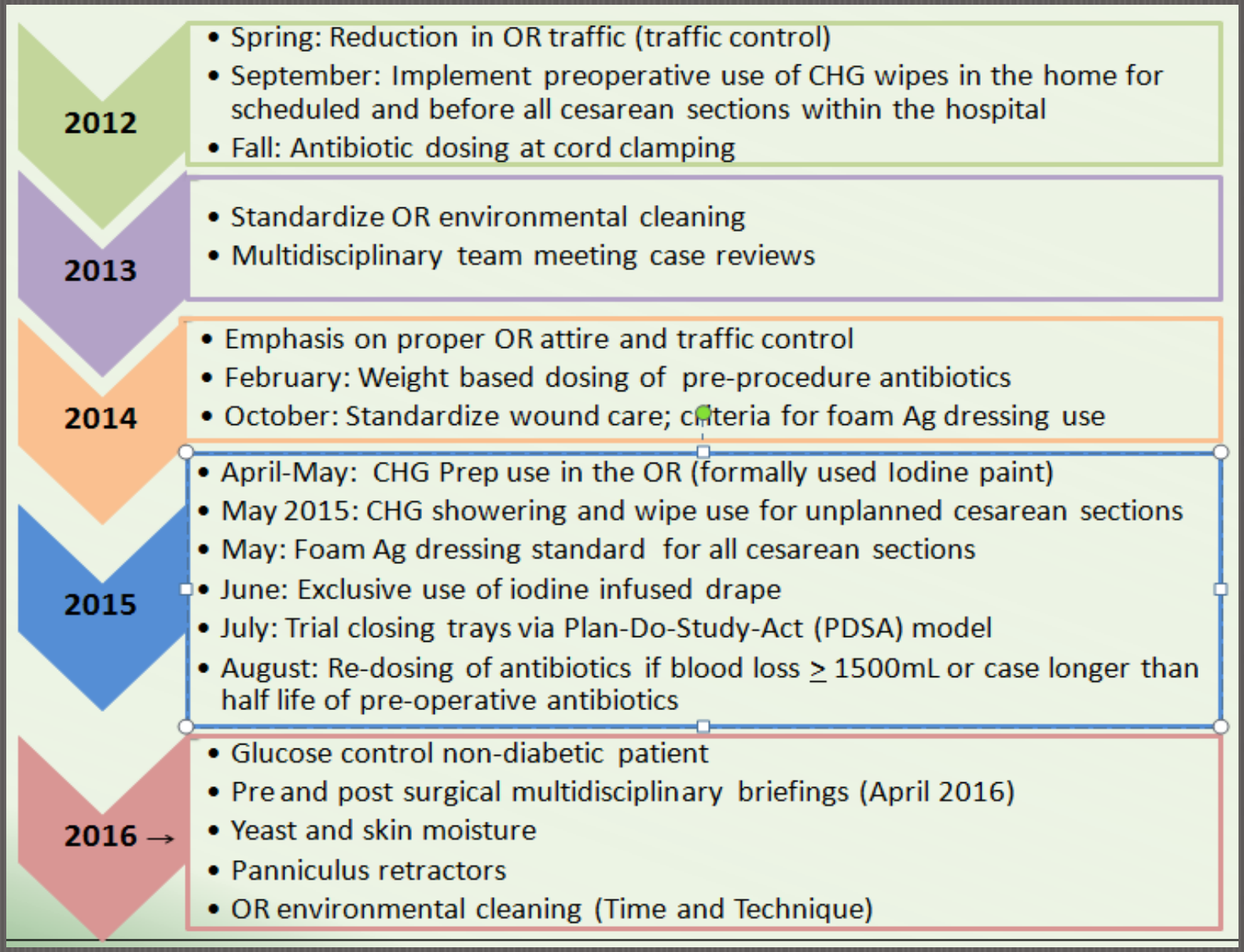
Results:

- A pleasant and unexpected surprise – Increased traffic during the 2 month trial did not increase infection rates.
- After our first quarter of closing tray use we achieved a SSI rate of 0.5%.

Consider Future Practice Improvements and Study:

- Glycemic testing and control in Non-diabetic patients – It is unclear if this will beneficial in this population
- YEAST
- Panniculus Retractors
- Standardization of OR cleaning
  - Technique
  - Time to turn over
- Standardization of Provider diagnosis and treatment of post op issues


CHG Shower Bottles
CHG wipes
Drapes
RN Training
Trainer
Foam dressing with Ag
Medium Tables
Mayo stands
Closing Tray Instruments
Dry Goods Pack adjustments
Closing Dry Goods
($5,000)
$0
$5,000
$10,000
$15,000
$20,000
$25,000
$30,000
$35,000
Total cost to begin process= $98,384
On-going annual cost= $70,457


2012
• Spring: Reduction in OR traffic (traffic control)
• September: Implement preoperative use of CHG wipes in the home for scheduled and before all cesarean sections within the hospital
• Fall: Antibiotic dosing at cord clamping
2013
• Standardize OR environmental cleaning
• Multidisciplinary team meeting case reviews
2014
• Emphasis on proper OR attire and traffic control
• February: Weight based dosing of pre-procedure antibiotics
• October: Standardize wound care; criteria for foam Ag dressing use
2015
• April-May: CHG Prep use in the OR (formally used Iodine paint)
• May 2015: CHG showering and wipe use for unplanned cesarean sections
• May: Foam Ag dressing standard for all cesarean sections
• June: Exclusive use of iodine infused drape
• July: Trial closing trays via Plan-Do-Study-Act (PDSA) model
• August: Re-dosing of antibiotics if blood loss ≥ 1500mL or case longer than half life of pre-operative antibiotics
2016 →
• Glucose control non-diabetic patient
• Pre and post surgical multidisciplinary briefings (April 2016)
• Yeast and skin moisture
• Panniculus retractors
• OR environmental cleaning (Time and Technique)

Thank you!

Questions?

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MAYO CLINIC

Using Bundled Interventions to Reduce Surgical Site Infection after Major Gynecologic Cancer Surgery

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Megan Johnson, PA-C
Jamie Bakkum-Gamez, MD

Stratis Health & MHA Quality and Patient Safety
May 3, 2016

Disclosures

- None

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SSI
after Gynecologic Cancer Surgery

- **Morbidity & Mortality** in Ovarian Cancer
  - Organ/Space SSI
    - 1.5-fold increased risk of death
  - Superficial SSI
    - 1.7-fold increased risk of death
- **Cost** in Endometrial Cancer
  - $9,500 per Superficial, $20,000 per Organ/space
- **Pay for Performance** CMS reports institutional data and allows patients to compare hospital performance

Bakkum-Gamez, et al. Gynecologic Oncology. 2013.
Tran, et al. Gynecologic Oncology. 2014.
Anderson, et al. Inf Control Hosp Epi. 2007.

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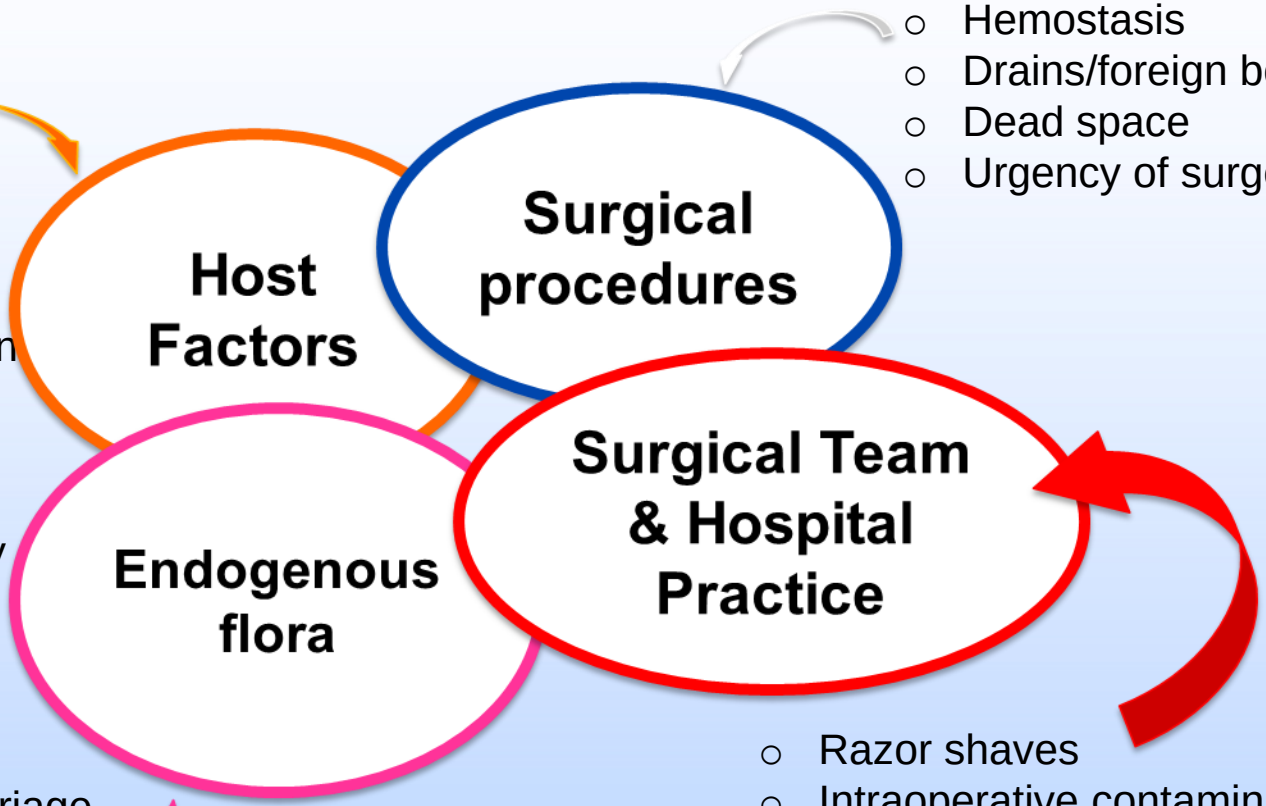
SSI
causes are multifactorial

- Incision site
- Wound classification
- Procedure duration
- Hemostasis
- Drains/foreign bodies
- Dead space
- Urgency of surgery

- Age
- Obesity
- Malnutrition
- Cancer
- Diabetes
- Immunosuppression
- ASA score
- Disease severity
- Prior operations
- Prior chemotherapy
- Prior radiation
- Biologics



- Nasal/skin carriage
- Virulence
- Adherence
- Inoculum

- Razor shaves
- Intraoperative contamination
- Prophylactic antibiotics
- Preoperative cleansing
- Surgeon skill
- Surgical volume

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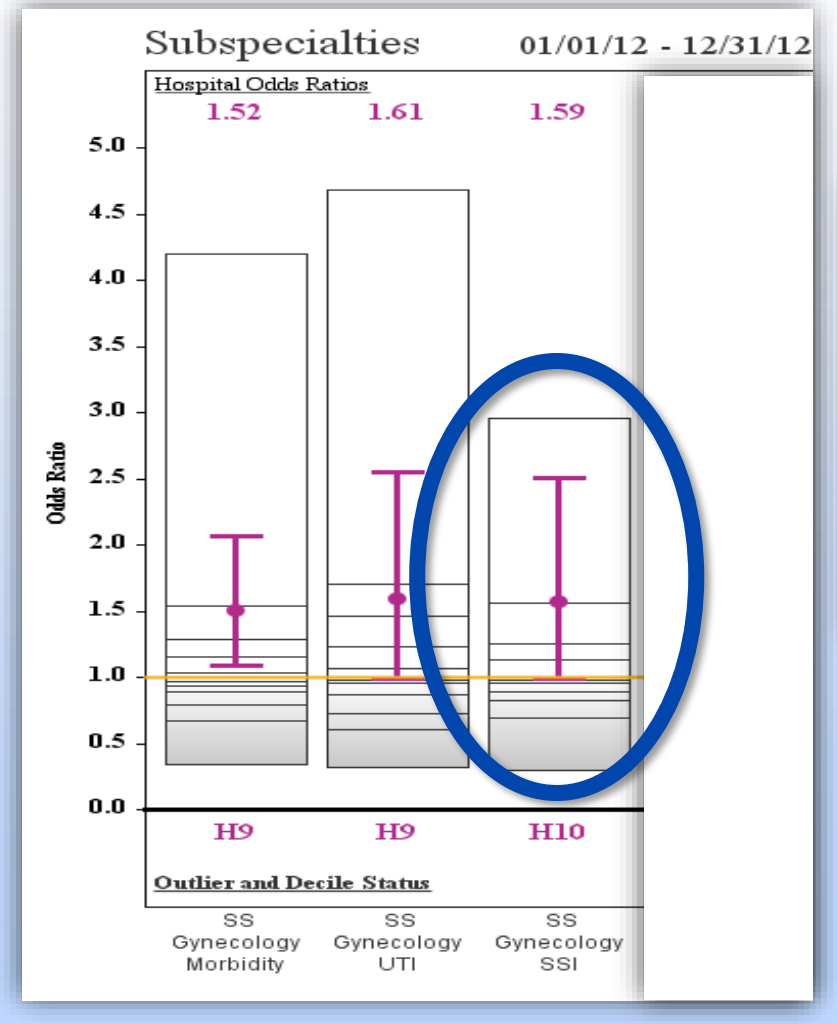
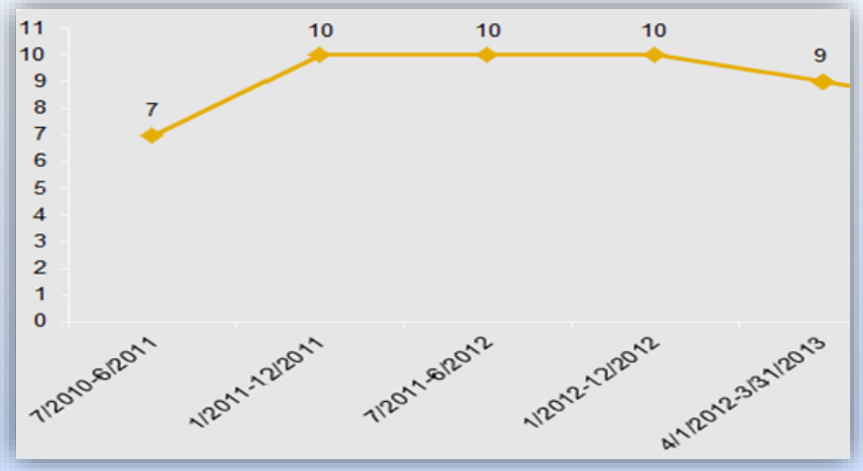
Mayo Clinic GYN Surgery NSQIP Data

Improvement needed





All gynecologic surgery cases included, regardless of wound type.

Unpublished data

SSI Reduction Bundle

- Surgical Care Improvement Project (SCIP)
  - Not shown to effectively lower SSI rates
- Bundle
  - “A set of evidence-based practices that, when performed collectively and reliably, have been proven to improve patient outcomes”
- Common elements
  - Hair removal
  - Normothermia
  - Glycemic control
  - Gown & Glove change

www.ihi.org
Hawn, et al. Ann Surgery. 2011.

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SSI Reduction Bundle

- Several small scale studies have shown SSI reduction with the synergistic effect of a bundle
  - Most yielded ~50% SSI reduction
- Colorectal Surgery at Mayo
  - SSI reduction bundle for entire surgical episode
    - **Overall** SSI rate
      - 9.8% → 4% ($p < 0.05$)
    - **Superficial** SSI rate
      - 4.9% → 1.5% ($p < 0.05$)

Revolus, et al. Obstet Gynecol. 2014.
Waits, et al. Surgery. 2014.
Cima, et al. JACS. 2013.

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Quality Improvement Project
Design

- Multidisciplinary Approach
- Inclusion Criteria
  - Laparotomy for Ovarian Cancer with bowel resection
  - Laparotomy for Ovarian Cancer without bowel resection
  - Open Hysterectomy for Uterine Cancer
- Data Sources
  - Mayo Infection Prevention & Control (IPAC)
  - CPT & ICD-9 Codes
  - NSQIP

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Goal

Reduce SSI rates by 50%

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Mayo Clinic SSI Reduction Bundle

Pre-operative Processes	"Preventing SSI" pamphlet for patient education
	Hibiclens® shower night before and day of surgery
	Chlorhexidine cloths at morning admission
Intra-operative Processes	SCIP compliance with antibiotics administration
	Complete coverage of incisional area with Chloraprep
	Re-dose of cefazolin within 3 - 4 hours after incision
	Sterile closing tray for fascia and skin closure
	Staff glove change before fascia closure, gown change if soiled
Post-operative Processes	Practice good hand hygiene
	Hand cleansing agent readily available
	Ensure dressing removal within 24 - 48 hours
	Patient shower with Hibiclens® after dressing removal
	Patient education on wound care and infection symptoms
Post-dismissal Processes	Dismiss patient with 4 oz bottle of Hibiclens®
	Follow-up phone call from nurses

Adapted with permission from Cima, et al. JACS. 2013.
Johnson, et al. in press *Obstetrics & Gynecology*. June 2016.

Closing Protocol
(all members of the scrubbed OR team)

- Discuss in preop briefing
- Steps to assure hemostasis, abdominal irrigation, etc completed with instruments from original surgical pan
- When ready to close fascia, all instruments from original surgical pan removed from field
- If drains to be placed, place AFTER opening the closing pan
- All scrubbed change gloves
- If gowns soiled, change gowns as well
- Closing pan opened
- New electrocautery opened (if cautery needed during closure)
- Field re-blocked/toweled off with new towels

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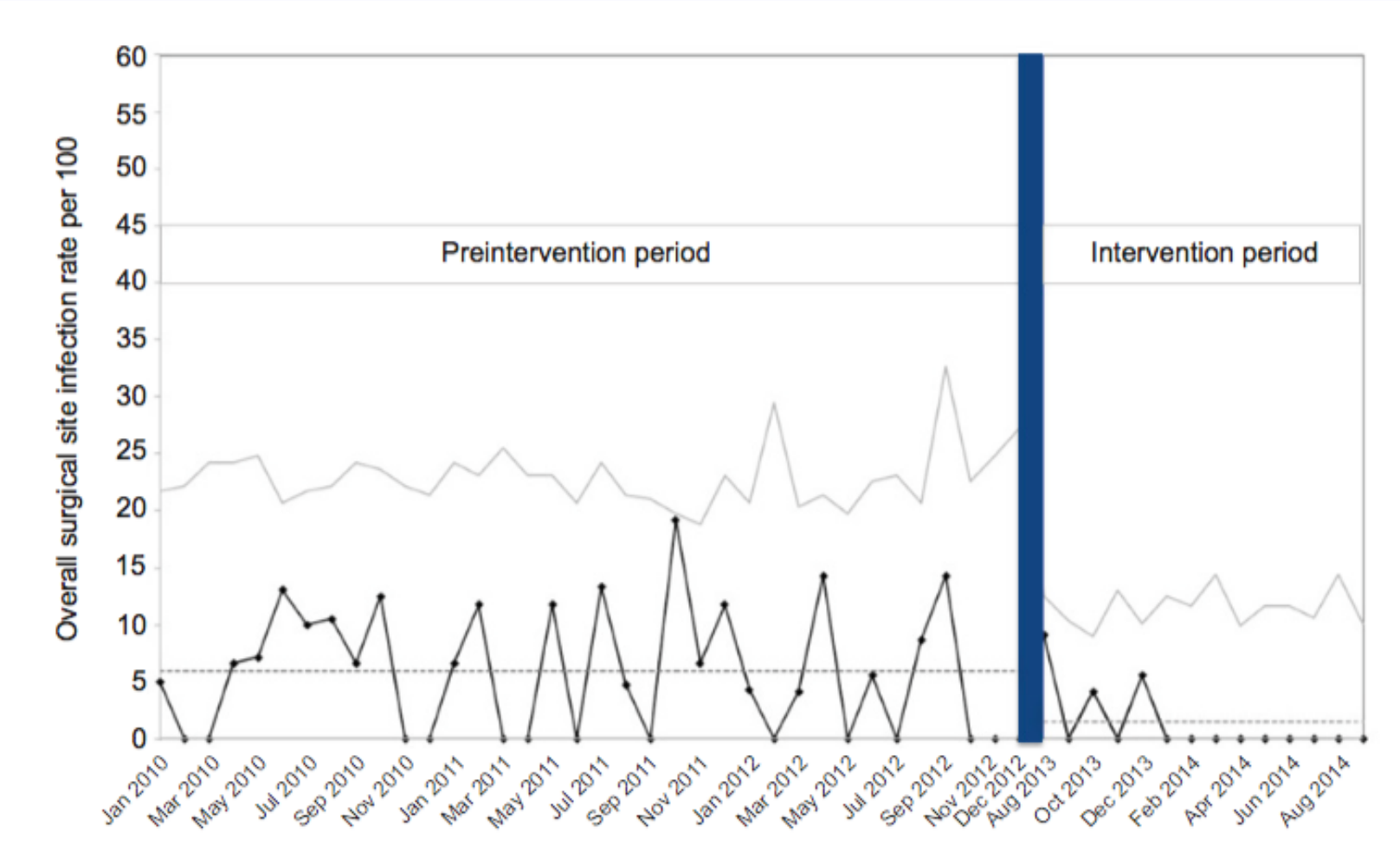
Overall SSI Rates
By Month



Johnson, et al. in press *Obstetrics & Gynecology*. June 2016.

Results
Overall SSI Rates by Procedure

Procedure	Pre-Intervention	Intervention	P	Reduction
Ovarian Cancer without BR	13/269 (4.8%)	1/100 (1.0%)	0.12	79.3%
Ovarian Cancer with BR	12/113 (10.6%)	1/42 (2.4%)	0.19	77.6%
Uterine Cancer	13/253 (5.1%)	0/48 (0%)	0.23	100%
All	**38/635 (6.0%)**	**2/190 (1.1%)**	**0.01**	**82.4%**

BR = Bowel Resection

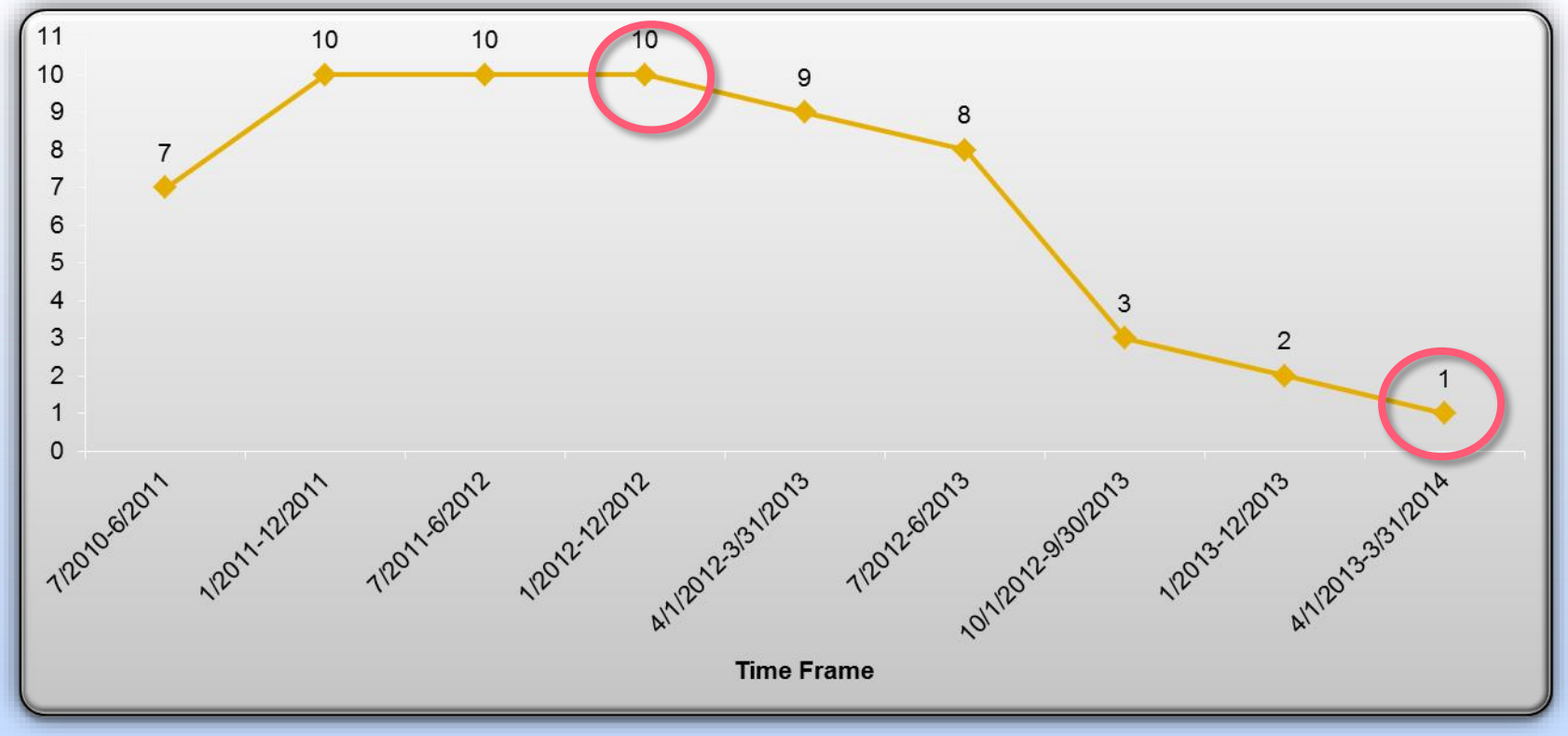
Johnson, et al. in press *Obstetrics & Gynecology*. June 2016.

Results
Overall SSI Rates by Infection Type

Type	Pre-Intervention N = 635	Intervention N = 190	P	Reduction
Superficial Incisional	11 (1.7%)	0 (0%)	0.08	100%
Deep Incisional	2 (0.3%)	0 (0%)	0.99	100%
Organ/Space	25 (3.9%)	2 (1.1%)	0.05	73.3%

Johnson, et al. in press *Obstetrics & Gynecology*. June 2016.

Mayo Clinic Gyn NSQIP Decile Ranking



- Odds ratio declined from 1.6 to 0.6

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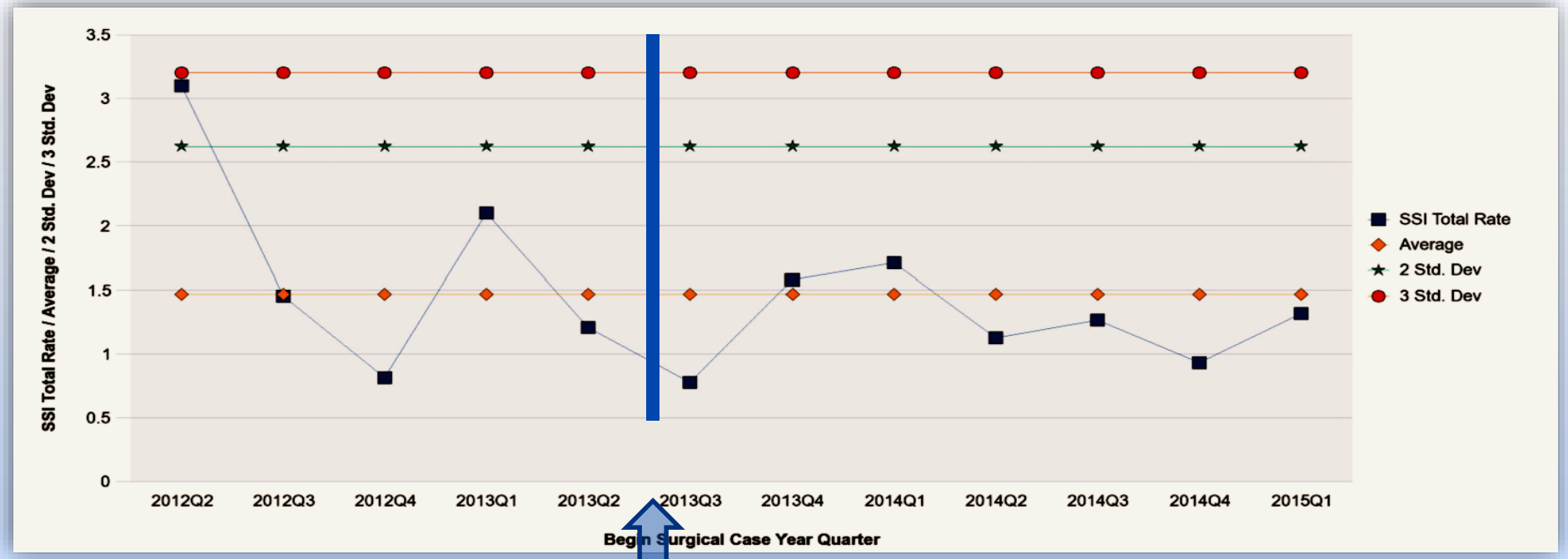
30-Day SSI Rates in Gynecologic Surgery



Implementation of full bundle

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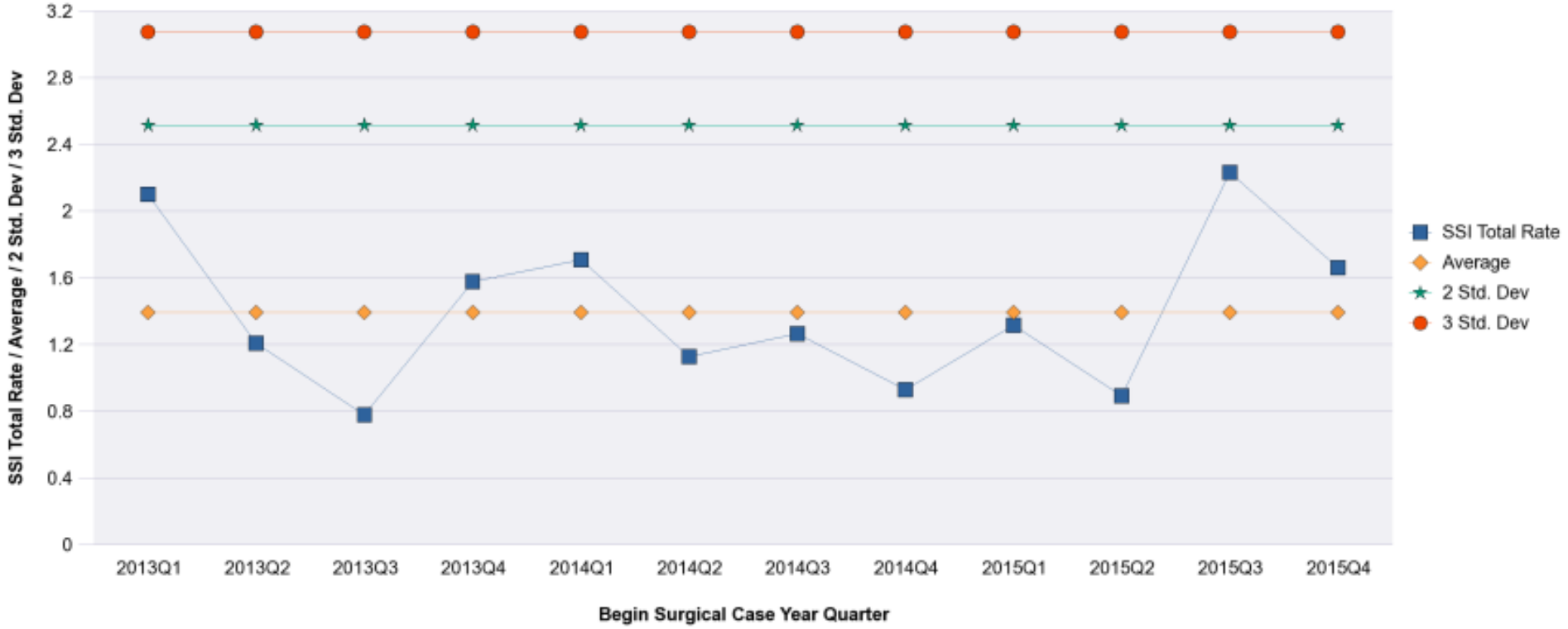
30-Day SSI Rates in Gynecologic Surgery



Limitations & Strengths

- Element driving risk reduction in bundle is unknown
- Independent audit of SSI by IPAC
- Strong team champions from each specialty

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Future Interventions

- Practice-gap analysis to identify other areas of improvement
- MIS Cases: consider betadine vaginal swab after removing uterus and Ioban use?
- Preoperative oral antibiotics in bowel resection?
- Nasal MRSA screening?

Hendren, et al. Annals of Surgery. 2013.
Cannon, et al. Diseases of the Colon & Rectum. 2012.
Lewis, et al. Gynecol Oncol. 2014.
Matsubara, et al. Surgery Today. 2014.

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Rollout to Obstetrics & Mayo Clinic Hospital System

- CPC requested the development and implementation of standardized enterprise-wide efforts to reduce SSI
- Roll out date: March 1, 2016
- Prelim Sites: Mayo Clinic enterprise-wide
- Planned first analyses:
  - C-section SSI rates at 3 months
  - Type II wound NSQIP SSI deciles after 6 months (gyn surg)

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Summary

- Risk factors for SSI are multifactorial and often non-modifiable
- Implementing a bundle of evidence-based practices resulted in significant and sustained SSI reduction
- Future study necessary to analyze cost:benefit
- Continue to explore areas for future improvement

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Acknowledgements

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Michaela E. McGree, BS Division of Biomedical Statistics & Informatics
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Questions & Discussion