CALIFORNIA ASSOCIATION OF
PUBLIC HOSPITALS AND HEALTH SYSTEMS

SNI Sepsis & CLABSI Collaborative

Learning Session 3

August 15, 2012

Oakland, CA

Cynosure HEALTH

California Health Care Safety Net Institute

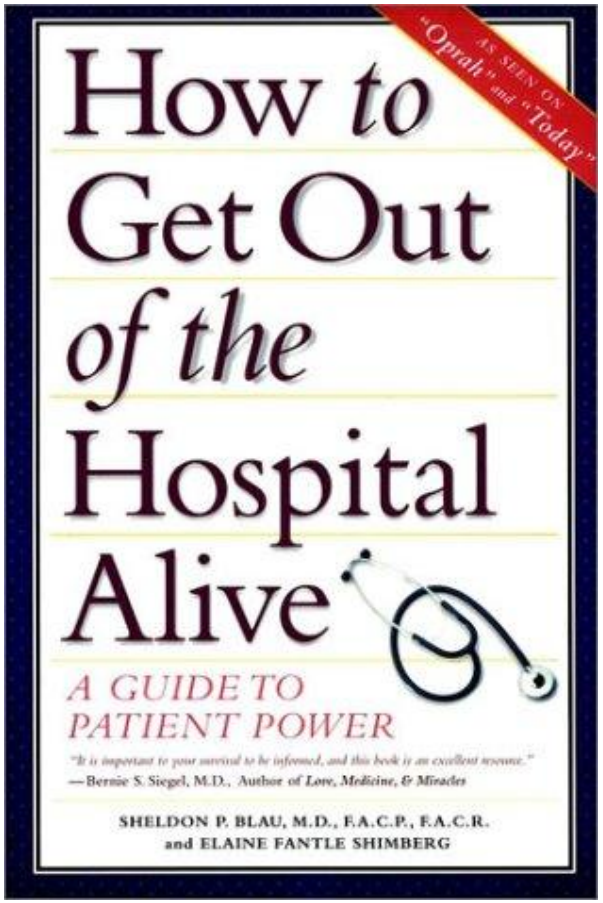
Welcome and Overview of Day

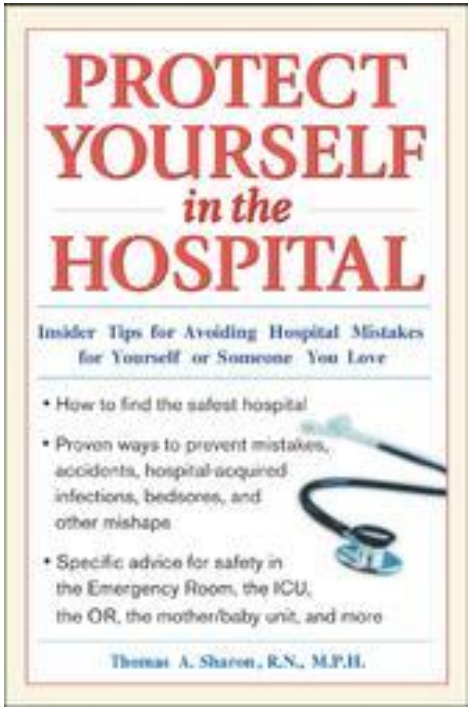
Learning Objectives

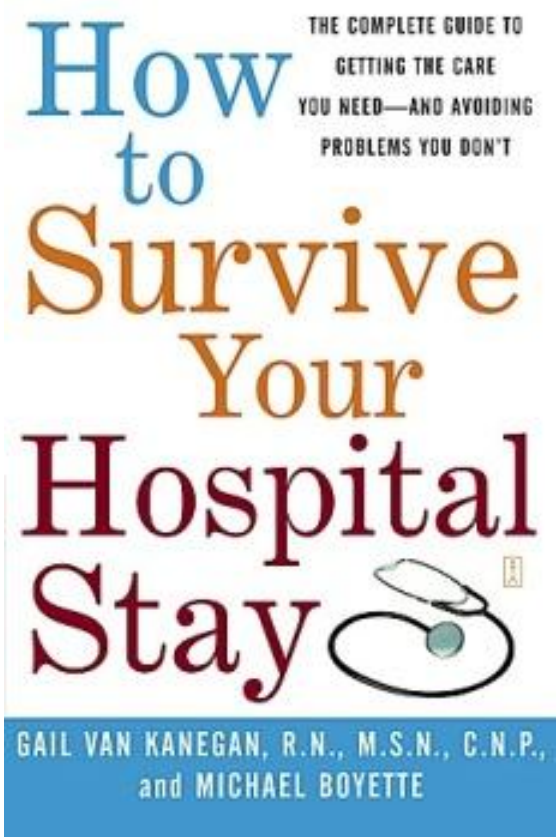
- Describe 2 key components of team development and team work
- Identify 2 techniques designed to enhance transparency of clinical data
- Demonstrate ability to describe process design and how it impacts clinical performance improvement

Learning Objectives

- Describe barriers to implementing facility-wide strategies to prevent CLABSIs and/or sepsis mortality
- Identify at least 2 strategies that you can implement in your facility to 'target zero' CLABSIs and/or significantly reduce sepsis mortality
- Demonstrate ability to execute brainstorming to identify key components of a PI process


AS SEEN ON "Oprah" and "Today"
How to Get Out of the Hospital Alive
A GUIDE TO PATIENT POWER
"It is important to your survival to be informed, and this book is an excellent resource."
—Bernie S. Siegel, M.D., Author of Love, Medicine, & Miracles
SHELDON P. BLAU, M.D., F.A.C.P., F.A.C.R.
and ELAINE FANTLE SHIMBERG


PROTECT YOURSELF in the HOSPITAL
Insider Tips for Avoiding Hospital Mistakes for Yourself or Someone You Love
• How to find the safest hospital
• Proven ways to prevent mistakes, accidents, hospital-acquired infections, bedsores, and other mishaps
• Specific advice for safety in the Emergency Room, the ICU, the OR, the mother/baby unit, and more
Thomas A. Sharon, R.N., M.P.H.


THE COMPLETE GUIDE TO GETTING THE CARE YOU NEED—AND AVOIDING PROBLEMS YOU DON'T
How to Survive Your Hospital Stay
GAIL VAN KANEGAN, R.N., M.S.N., C.N.P.,
and MICHAEL BOYETTE

Let’s Break the Ice

I can best describe my quality improvement experience with the title of a book, movie, or television series

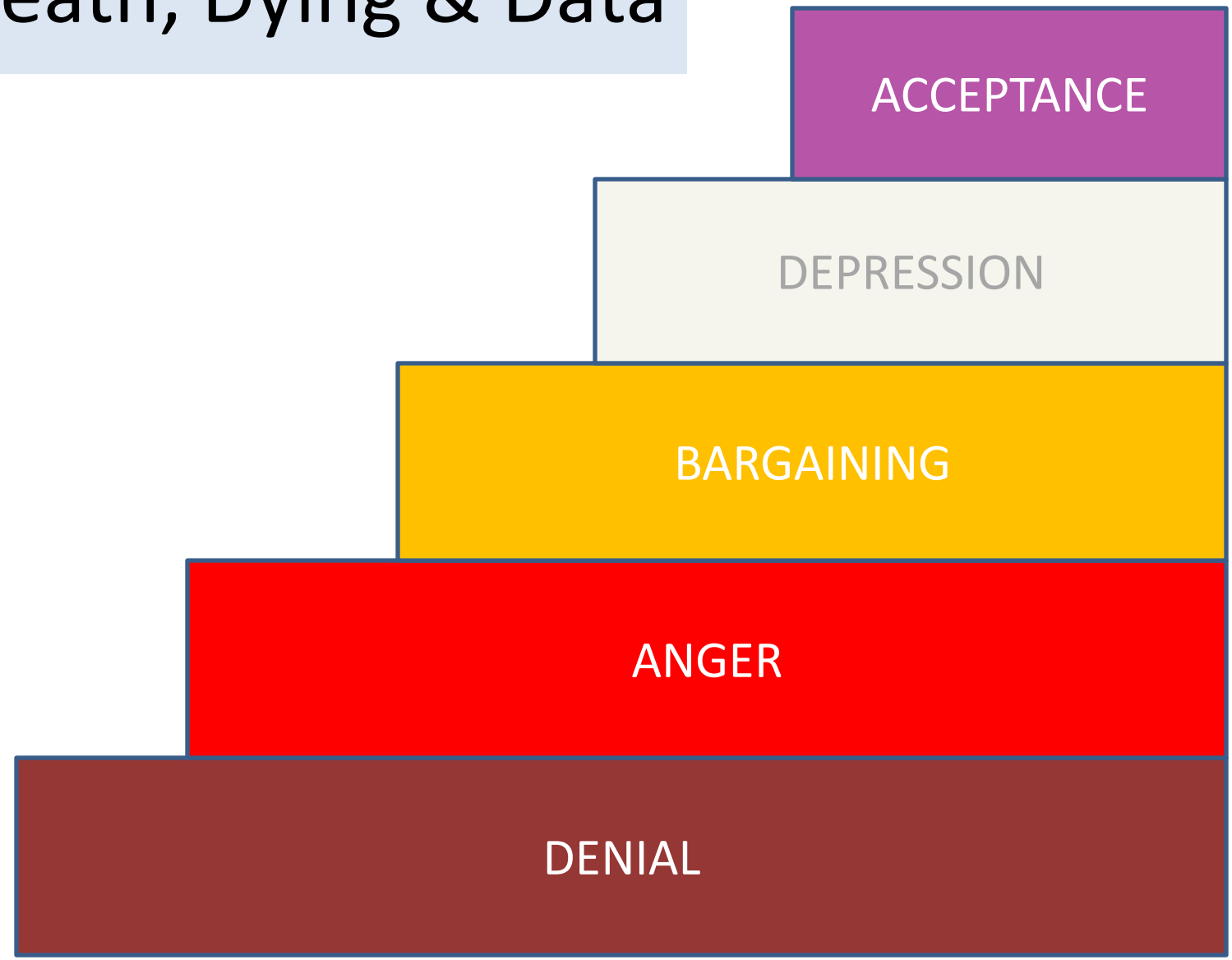
Many Questions Exercise

I Like It….let’s try it

Death, Dying and Data

The Measurement Conundrum

On Death, Dying & Data

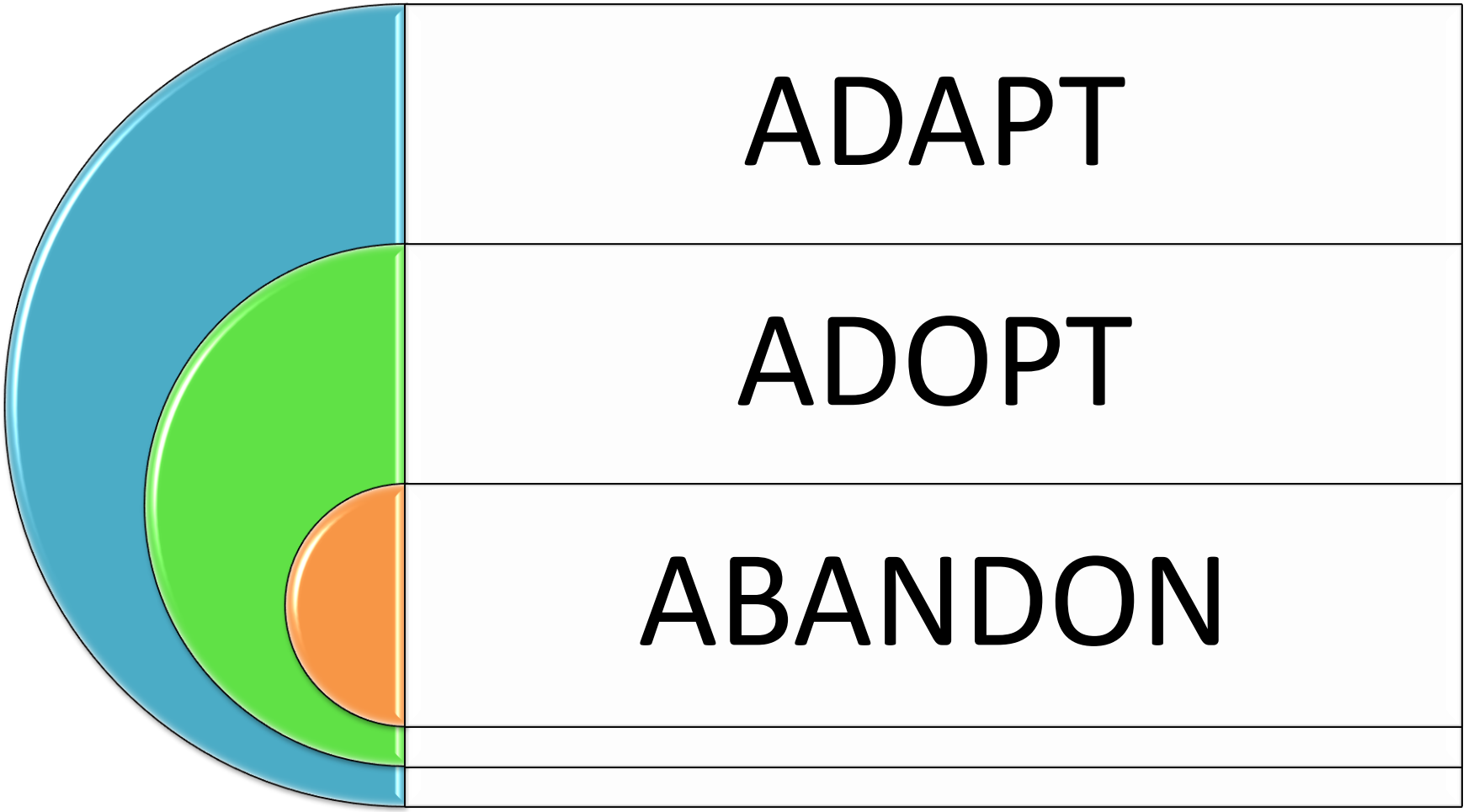


Why Measure?

- How else will you know that the change(s) you made resulted in improvement?

Improvement	Reporting
• Used for learning	• Used to judge

Our Question?



Measure Types

Outcome

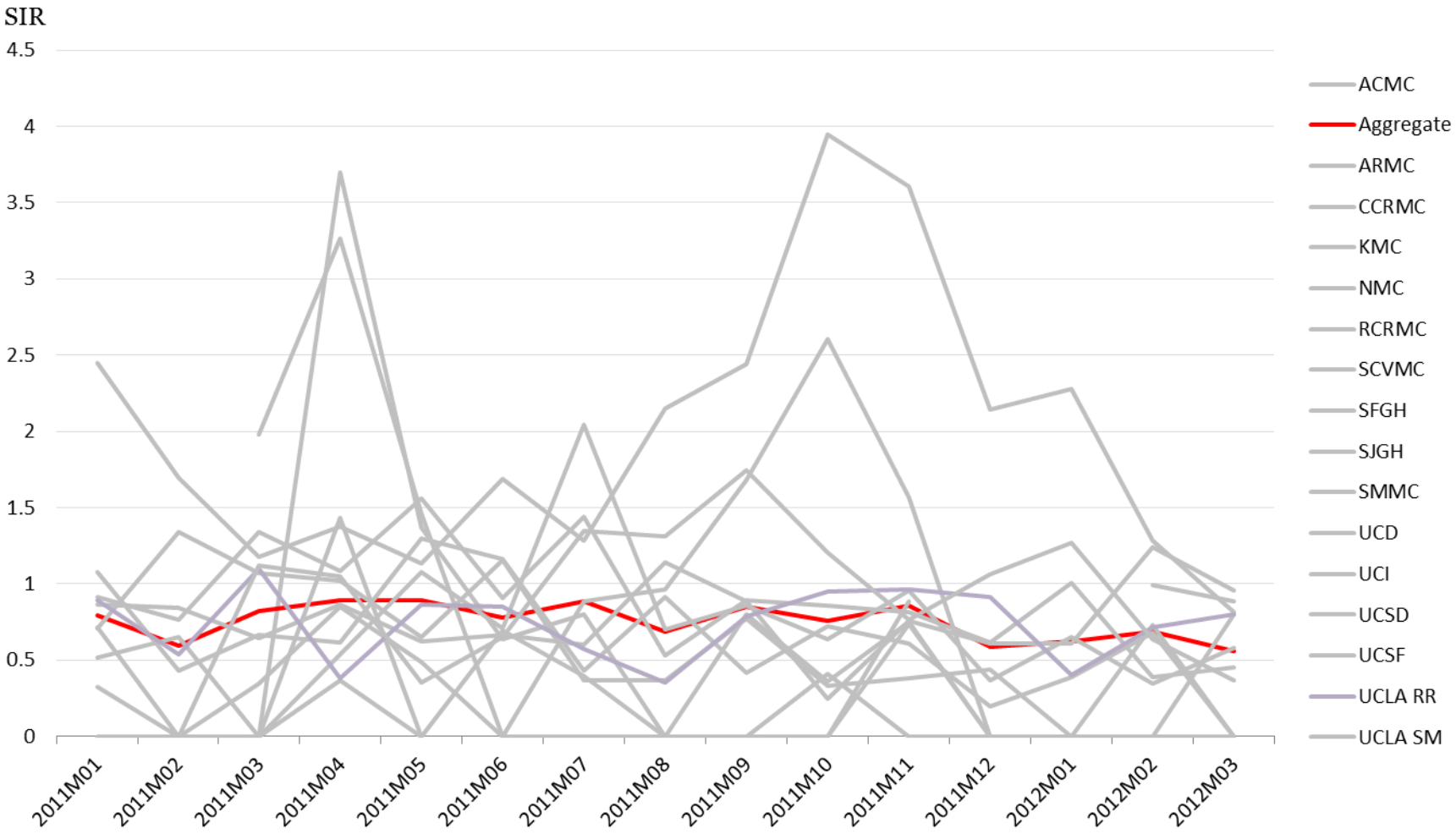
- Example:
  - Mortality
- Want rates to go **down!**
- **What you get**

Process

- Example:
  - Bundle compliance
- Want rates to go **up!**
- **What you do**

Balance Measures

CLABSI - STANDARDIZED INFECTION RATIO (SIR)
1/2011-3/2012
Source: NSHN (abstracted 07/25/12)



CLABSI - STANDARDIZED INFECTION RATIO (SIR)
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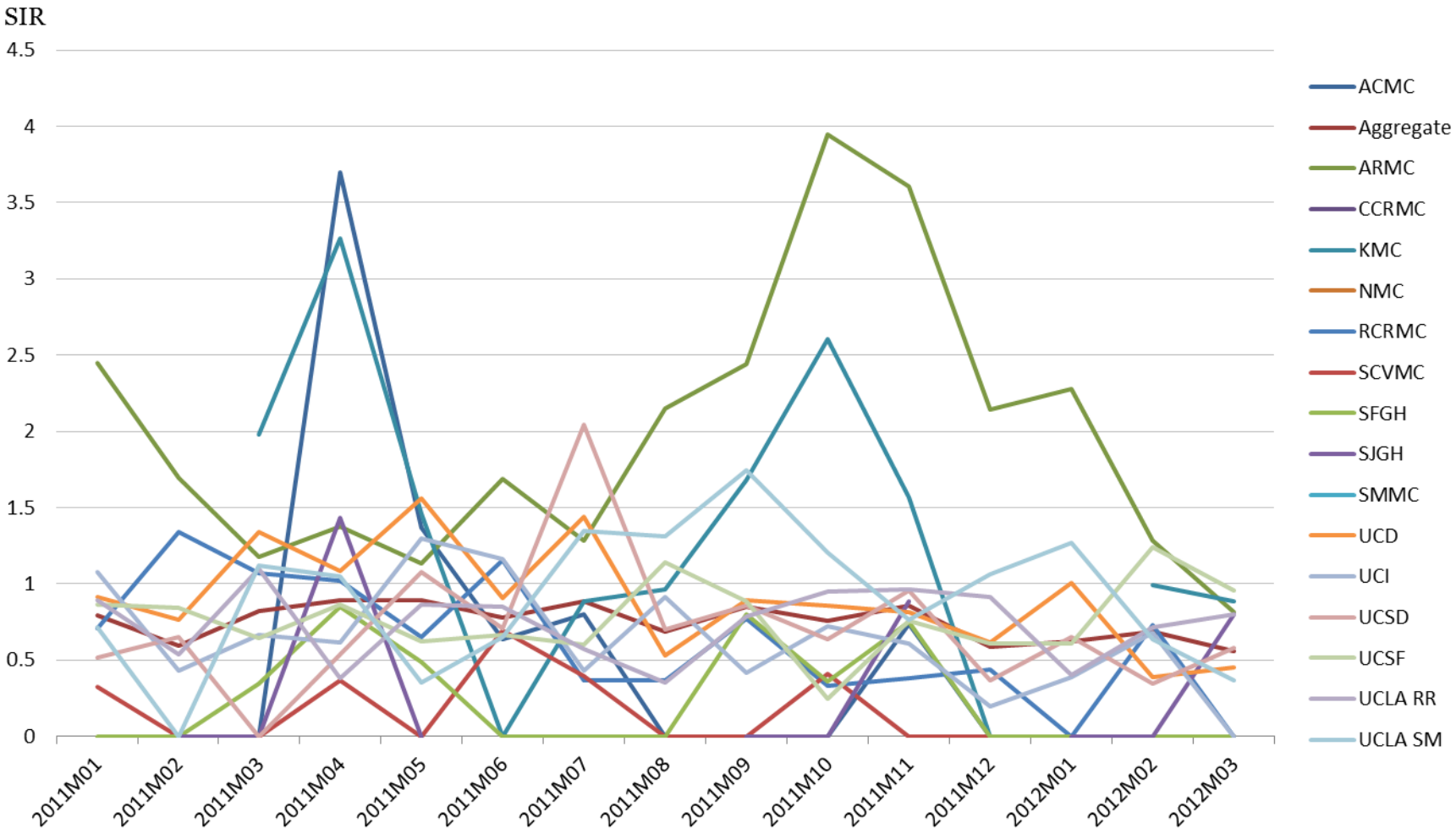
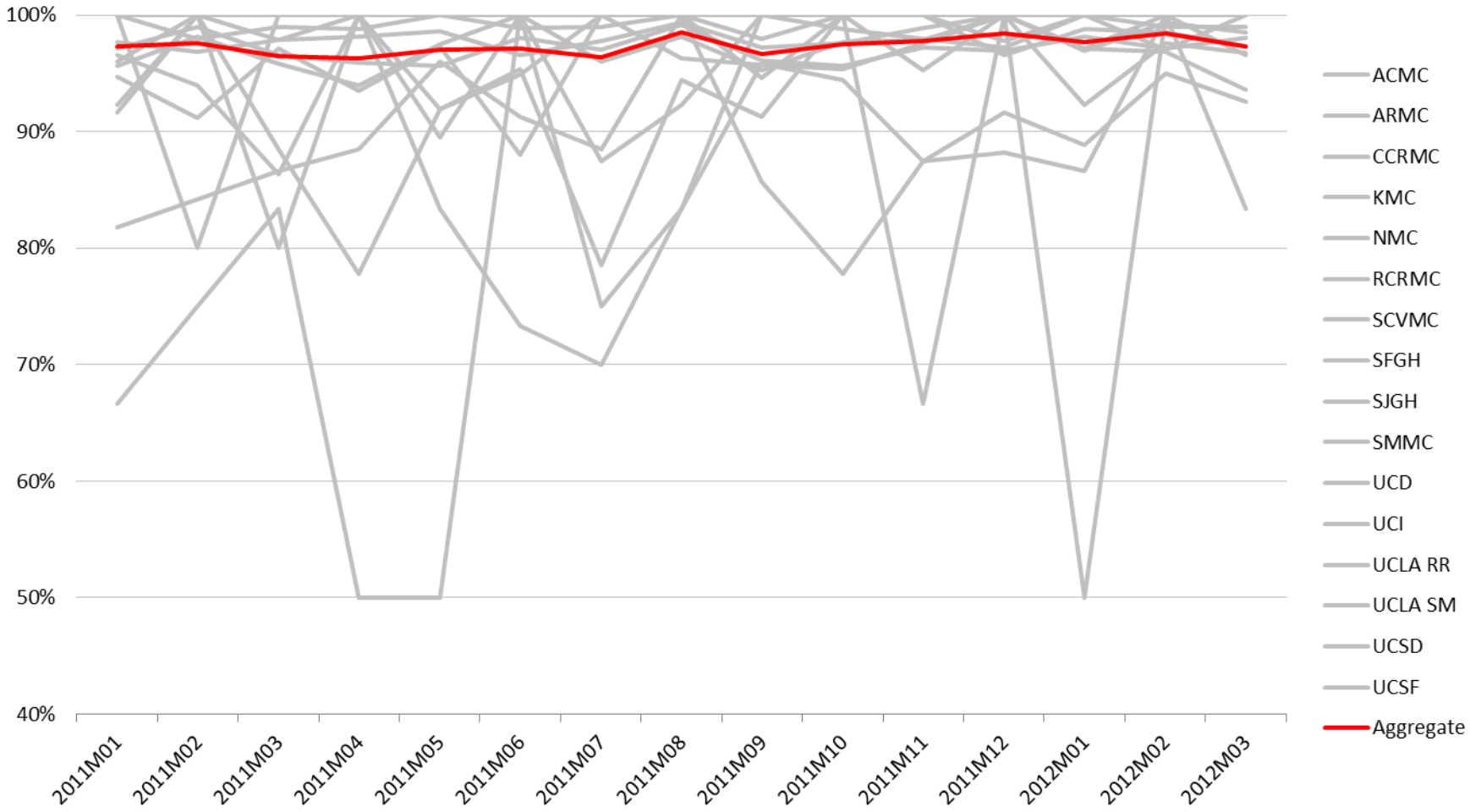


CLIP BUNDLE ADHERANCE RATE
1/2011-3/2012
Source: NSHN (abstracted 07/25/2012)



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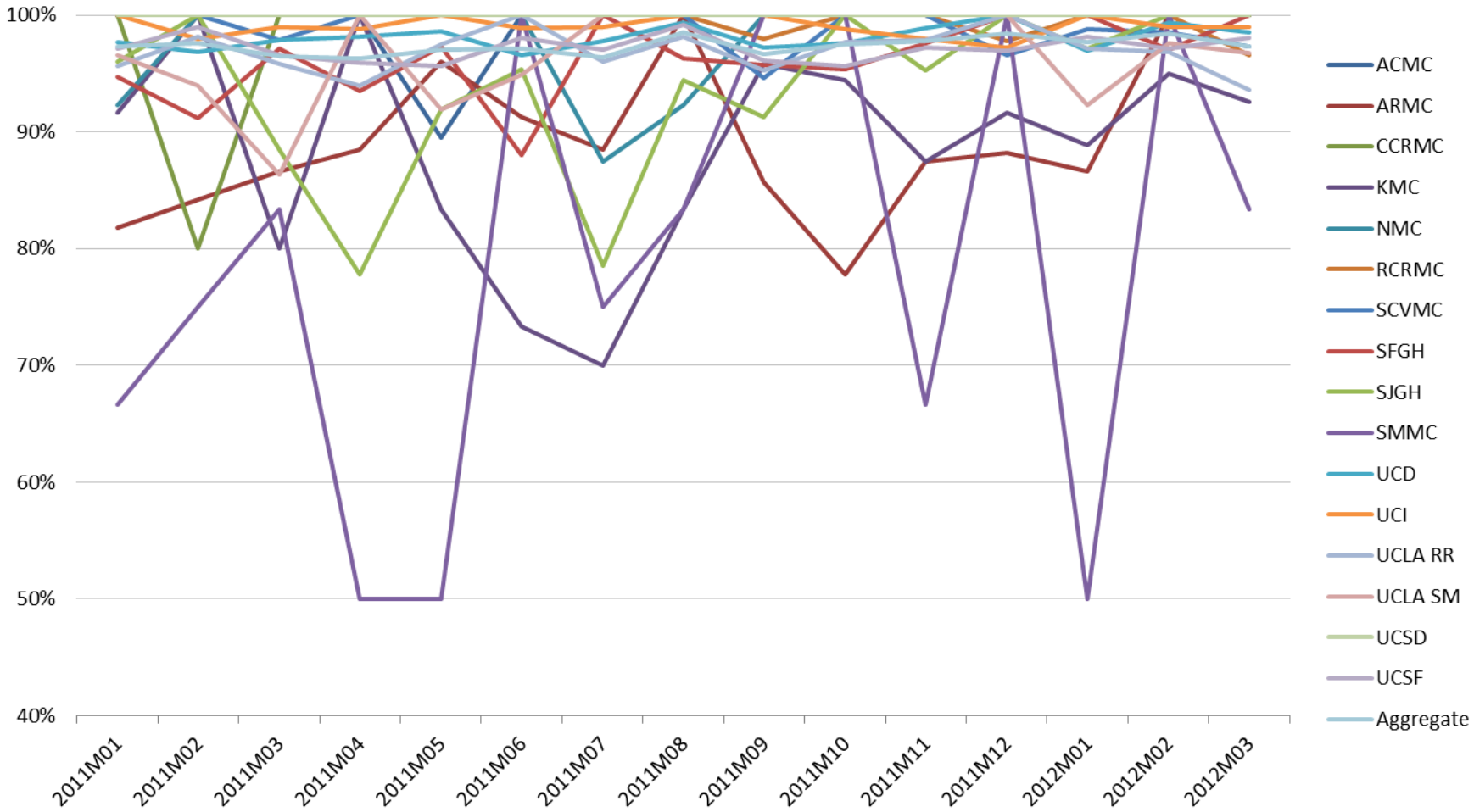

Count Out

Data Table Talk

- What are these data telling you?
- How are you using these and other data?
- What are the next steps for you regarding data?

CLIP Update

The language around CLIP in the Superset will be amended to reflect the intent to have the DSRIP definition for CLIP compliance mirror SB1058 and eliminate ambiguities in the current language.

Revised language will read:

Metric:

Numerator: Number of CLIP forms with all required elements of the CLIP bundle are completed and reported in NHSN for all adult critical care units

Denominator: Number of CLIP forms reported in NHSN all adult critical care units.

Note: One CLIP form is completed per central line infection

Per NHSN, adherence to the bundle requires a "Yes" to all of the following:

1. Hand hygiene performed
2. Appropriate skin prep
3. Chlorhexidine gluconate (CHG) for patients ≥ 2 months old
4. Povidone iodine, alcohol, CHG, or other specified for children < 2 months old
5. Skin prep agent has completely dried before insertion
6. All 5 maximal sterile barriers used
    i. Sterile gloves
    ii. Sterile gown
    iii. Cap
    iv. Mask worn
    v. Large sterile drape

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CLABSI Update

The DSRIP currently requires DPHs to report an average for all central line infections in a hospital. Given that DPHs will be required to set improvement targets to reduce CLABSIs, DHCS has agreed to disaggregate and measure CLABSI in ICU and acute care units. This will allow DPHs to set improvement targets based upon area but they are still requiring an average to reported for hospital-wide CLABSI rates.

Specialty care areas are excluded from both the aggregated and disaggregated calculations.

Critical Care	General Care	Specialty Care – EXCLUDED!
Medical – Major Teaching	Step down – adult	Bone Marrow Transplant
Medical/Surgical – Major Teaching	Step down – neonatal	Bone Marrow Transplant – Peds
Medical – All Others	Step down – pediatric	Oncology
Surgical	Medical	Oncology – Peds
Long Term Acute Critical Care	Long Term Acute Care	
Burn	Medical/Surgical	Solid Organ Transplant
Trauma	Surgical	
Pediatric	Rehabilitation – Adults	
Neonates ≤ 750 grams	Labor, Delivery, Post Partum	
Neonates 751 - 1000 grams	Behavioral	
Neonates 1001 – 1500 grams	Jail	
Neonates 1501 – 2500 grams	Pediatric	
Neonates ≥ 2500 grams	Rehabilitation - Peds	

Sepsis Update

All public hospitals will report sepsis data in 2 ways:

Reporting Requirement #1

Hospitals will report sepsis mortality **and** resuscitation bundle compliance using the following ICD-9 codes:

a) **995.92** – Systemic Inflammatory Response Syndrome with organ dysfunction
b) **785.52** – Septic Shock

Exclusions:

• Any patient who elects palliative care or is designated DNR or DNI prior to or within 24 hours of admission or diagnosis
• Any patient who refuses care
• Any patient transferred to a DPH with a diagnosis of sepsis, severe sepsis or septic shock upon admission or becomes septic within 24 hours of admission
•Patients ≤ 18 years old

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Sepsis Update, cont.

Reporting Requirement #2

In addition to reporting on sepsis mortality and bundle compliance as described in Reporting Requirement #1, DPHs will be allowed to continue their work in sepsis using their own internal operational definitions and data collection methodologies (within the framework of the superset). Hospitals will be required to provide a detailed narrative on how their health system defines its sepsis protocols and procedures. This will allow your hospital to maintain the baseline data you've already submitted as well as monitor your own progress against self.

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Sepsis Update, cont.

Clinically Defining Sepsis

All DPHs agree to clinically define sepsis using **only** the parameters as outlined in the 2001 SCCM/ESICM/ACCP/ATS/SIS International Sepsis Definitions Conference.

Levy MM, Fink MP, Marshall JC, Abraham E, Angus D, Cook D, Cohen J, Opal SM, Vincent JL, Ramsay G; SCCM/ESICM/ACCP/ATS/SIS (2003) 2001 SCCM/ESICM/ACCP/ATS/SIS International Sepsis Definitions Conference. Crit Care Med 31:1250–1256

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Sepsis Update, cont.

Q: **Why isn't ICD-9 code 995.91 (SIRS w/o organ infection) included in Reporting Requirement #1?**

A: Since DHCS wanted the same ICD-9 codes used to pull sepsis mortality and sepsis resuscitation bundle compliance, ICD-9 code 995.91 was excluded because the sepsis resuscitation bundle is only intended to be applied to patients with severe sepsis or septic shock. Nearly all DPHs agreed.

Q: How do I report this data on the DSRIP standardized reporting form?

A: DPHs can insert the coded data in the narrative box on the reporting form.

Q: Help! We have a lot of charts to review. May we sample?

A: Yes, DHCS agrees that sampling is permissible and SNI will work on developing a sampling methodology for DPHs to use.

Q: If we are reporting sepsis data using 2 different methods, which one will be used as the baseline for setting the improvement target for the resuscitation bundle compliance?

A: DPHs improvement targets will be based upon Reporting Requirement #2.

Q: Will we need to submit data for previous DY years using Reporting Requirement #1?

A: No, reporting by the two ICD-9 codes will only be used moving forward. SNI is still working with the State to determine which reporting period this requirement will take effect.

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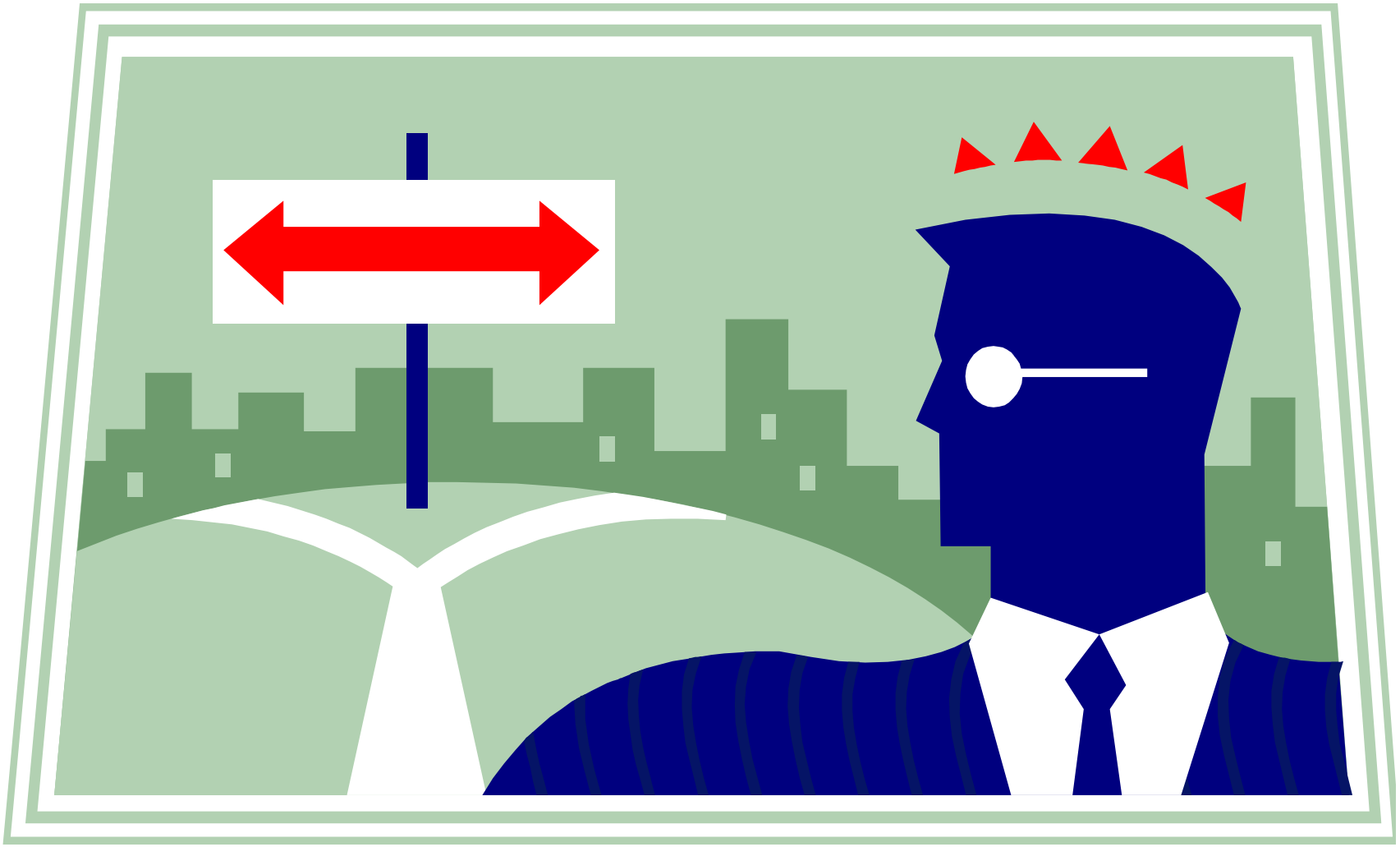
More Table Talk

- What have you tested since the last Learning Session?
- What did you learn?
- If you could solve one problem today, what would it be?

Time to Stretch

After Lunch Decision



Lunch Time

Return from breakout sessions and lunch

Hospital Improvement Stories

Sepsis: Our Improvement Story

Karen Young, RN, MSN
Alameda County Medical Center
August 15, 2012

Core team members

- Indhu Subramanian, MD
- Andria Sievers, RN
- Karen Young, RN, MSN
- Shareen Cronin, RN, MSN
- Theresa Cooper, RN

Goal: Reduce Sepsis Deaths by 15% by April 2011

Where we started/changes implemented

- Baseline data
- Daily screening for sepsis at 08:00, 16:00, and 24:00; initially on paper, now electronic charting
- Multidisciplinary education
- Development of sepsis protocol
- Standardized procedure for nursing
- Sepsis video

Moving along….

- Lactate not coming back quickly…POC testing
- Lactate as critical value
- Rapid response nurse to be notified for all positive screens
- Standing orders/”smart” set orders for MD’s for 6 and 24 hour bundle

Severe Sepsis Orders and Protocol
Pilot

Patient Label

6 HOUR BUNDLE

Time of Presentation: (lactic acid>4 or hypotensive) **Time _____:_____(RN fill in) Date: _____/_____/_____**

Start Time for 6 Hour Bundle: Date: _____/_____/_____ (MD fill in) Time _____:_____ (24 Hr clock)
Immediately request transfer of patient to the ICU or SDU (if appropriate) and begin 6 hour bundle.
(*Document start times on flow sheet. Note sequence in no particular order).*

Height _____ (feet)_____(inches) Weight _____(kg)

DRUG ALLERGY: _____ (reaction: _____)

- **Draw labs:**
  - □ Blood cultures x2, CMP, CBC, PT/PTT/INR, U/A, Lactic acid

- **Administer Antibiotic within one hour of diagnosis.** Please check box and fill in space(s) if needed
  - □ *Piperacillin/Tazobactam (Zosyn®) 4.5 gram IVPB q 6 hrs **(Do Not Use in PCN allergy)**
  - □ *Vancomycin _____ (15 mg/kg) (actual dry body wt) IVPB q 12 hrs
    (Each vancomycin dose should NOT exceed 1500 mg per dose or 1.5 gram per dose)
  - □ *Aztreonam 2 gram IVPB q 8 hrs (Typical, use in penicillin allergic patient)
  - □ Metronidazole 500 mg IVPB q 6 hrs
  - □ Clindamycin 900 mg IVPB q 8 hrs
  - □ Doxycycline 100 mg IVPB q 12 hrs
  - □ *Levofloxacin 750 mg IVPB q 24 hrs **(Do Not Use in patients concerned for MTB)**
  - □ Linezolid (Zyvox®) 600 mg IVPB q 12 hrs
  - □ *Amikacin _____ (15 mg/kg) (adjusted body wt if obese) IVPB q 24 hrs
    (Adjusted body wt= Ideal body wt + 0.4 x (Total body wt – Ideal body wt)
  - □ *Amikacin _____ (15 mg/kg) (adjusted body wt if obese) IVPB x 1
  - □ Ceftriaxone 2 gram IVPB q 12 hrs
  - □ Other _____
  - □ Other _____

* **RENAL DOSING** for Zosyn, Levofloxacin, Vancomycin, Amikacin, please check appropriate box(es) and fill in space(s) if needed. *(CrCl = "creatinine clearance")*

Piperacillin/Tazobactam (Zosyn®)
- □ *4.5 gram IVPB q 8 hrs* *(if CrCl= 20-40 ml/min)*
- □ *4.5 gram IVPB x1, then 2.25 gram IVPB q 6 hrs* *(if CrCl< 20 ml/min)*
- □ *4.5 gram IVPB x1, then 2.25 gram IVPB q 8 hrs plus additional 0.75 gram IVPB after each hemodialysis session* *(if on hemodialysis)*

Vancomycin
- □ _____ *(15 mg/kg) IVPB q 24 hrs* *(if CrCl= 20-49 ml/min)*
- □ _____ *(15 mg/kg) IVPB x1, then check Vancomycin random level 24 hrs after dose, redose with same dose when level < 15 mcg/ml* *(if CrCl< 20 ml/min, or on hemodialysis)*

(Each Vancomycin dose should NOT exceed 1500 mg per dose or 1.5 gram per dose)

Levofloxacin
- □ *750 mg IVPB q 48 hrs* *(if CrCl= 20-49 ml/min)*
- □ *750 mg IVPB x1, then 500 mg IVPB q 48 hrs* *(if CrCl< 20 ml/min or on hemodialysis*

Aztreonam
- □ *2 gram IVPB x1, then 1 gram IVPB q 8 hrs* *(if CrCl= 10-30 ml/min)*
- □ *2 gram IVPB x1, then 500 mg IVPB q 8 hrs* *(if CrCl< 10 ml/min)*
- □ *2 gram IVPB x1, then 500 mg IVPB q 8 hrs plus additional 250 mg IVPB after each hemodialysis session (if on hemodialysis)*

Severe Sepsis Orders and Protocol
Pilot

Patient label

Amikacin
(Use adjusted body wt for obese patient= Ideal body wt + 0.4 x (Total body wt – Ideal body wt)

- □ _____ *(7.5 mg/kg) IVPB q12* *(if CrCl= 50-80 ml/min)*
- □ _____ *(7.5 mg/kg) IVPB q24h* *(if CrCl= 30-50 ml/min)*
- □ _____ *(7.5 mg/kg) IVPB q48h* *(if CrCl= 10-30 ml/min)*
- □ _____ *(7.5 mg/kg) IVPB x1, then* check Amikacin random level 48 hours after dose or check level before next hemodialysis, redose with _____ (5 mg/kg) IVPB when level <10 mcg/ml. (if CrCl< 10 ml/min or on hemodialysis)

Time ordered _____ Time administered _____

➢ **Start intravenous fluid bolus of Normal Saline 0.9% (20 to 40 ml/kg) (RN fill in times)**

□ Amount of NS to be administered _____ Patient weight in kg _____
Time started _____ Time completed _____
□ Lactate every_____ hours (Consider serial lactates until lactate decreased to ≤ 2mmol/L.)

➢ **Place Central Venous Line and obtain CVP.**
Time central line placed _____(RN fill in)
Document baseline CVP with goal of 8-12 mmHg. Initial CVP=_____(RN fill in)
Continue to bolus with Normal Saline 0.9% until CVP goal achieved.
Draw and record CVO2 Initial CVO2_____(RN fill in)

➢ **After initial bolus of Normal Saline 0.9% continue to bolus every 30 minutes at 20ml/kg to maintain:**
UOP > 0.5ml/kg/hour
CVP goal of 8-12 mmHg Time CVP goal achieved _____(RN fill In)_
Lactate decreased under 2 mmol/L (if applicable) Time Lactate goal achieved_____(RN fill in)_

➢ **Obtain CVO2 Saturation every _____ hours: treat if <70% and CVP goal achieved (8-12 mmhg):**
- □ If CVO2 saturation < 70%, administer Packed RBC to achieve Hemoglobin goal of 10 g/dL
- □ Repeat CVO2 saturation and if < 70% with Hemoglobin goal of 10 then consider:
- □ Dobutamine infusion *(conc= 2000 mcg/ml)* (Range= 5-20 mcg/kg/min)

(Dobutamine is compatible with Norepinephrine, Dopamine, Phenylephrine or Epinephrine.).

□ Place Foley Time _____ □ N/A Foley in place

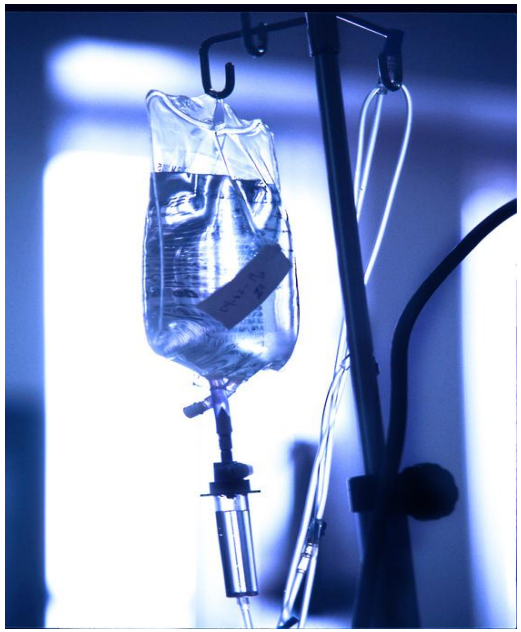
➢ **IF MAP<65 start vasopressors:**

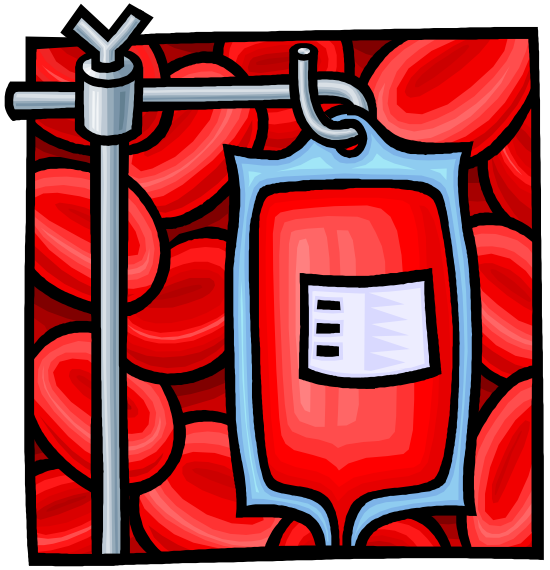
First Line Vasopressors:
□ Norepinephrine (Levophed®) drip *(conc= 16 mcg/ml)* (Range= 8-70 mcg/min)
(Acceptable maximum dose is 1 mcg/kg/.min)
□ Dopamine drip *(concentration= 1600 mcg/ml)* (Range= 5-20 mcg/kg/min)

Second Line Vasopressors (Maximize first line pressors):
□ Phenylephrine (Neosynephrine®) drip *(conc= 240 mcg/ml)* (Range= 40-360 mcg/min) – Only use when having tachy arrhythmia's from norepinephrine and dopamine.
□ Vasopressin drip *(concentration= 0.4 units/ml)* (Range 0.01 – 0.04 units/min in addition to other vasopressors)
□ Epinephrine drip *(concentration= 4 mcg/ml)* (Range= 2-10 mcg/min) – use when poorly responsive to norepinephrine or dopamine

Completion of 6 Hour Bundle: Date: _____/_____ Time (RN fill in)_____

Physician Signature/date_____





Severe Sepsis Orders and Protocol
Pilot

Patient label

The Twenty-Four (24) Hour Bundle.

(Within the first 24 hours initiate the following therapies)

- **Identify drainable sources of infections:**
  - □ CT scan _____ body part
  - □ MRI, if CT unavailable or clinically indicated, _____body part
  - □ Ultrasound, if clinically indicated, _____body part
- **Drain any appropriate sources of infections:** *(document source and procedure in progress notes)*
- **Lung protective strategy with plateau pressures < 30cm H2O for mechanically ventilated patients.** *(Recommend using ARDS Net protocol)*
- **Consider steroids for blood pressure unresponsive to fluids and vasopressors or increasing vasopressor requirements.**
  - □ Hydrocortisone 50mg IV every 6 hours
  - □ Fludrocortisone (Florinef) 50mcg PO every day (optional)
- **Consider glucose control to keep glucose < 180 mmol/L**
  - □ Start Hyperglycemic protocol
- **Start DVT prophylaxis:**
  - □ Enoxaparin 40 mg SQ every day *(for patient with platelet count >100k, CrCl >30 ml/min, no s/sx of bleeding and NOT on recent/anticipated epidural/spinal anesthesia)*
  - □ Heparin 5000 units SQ Q12hrs
  - □ Heparin 5000 units SQ Q8hrs (for patient at high risk for DVT or obese patient)
  (Heparin is for patient with platelet count >100k, no s/s of bleeding and NOT on recent/anticipated epidural/spinal anesthesia)
  - □ Sequential Compression Device (SCD)
- **Start stress ulcer prophylaxis**
  - □ Famotidine (Pepcid) 20 mg PO/IV Q12hrs
  - □ Renal dosing Famotidine (Pepcid) 20 mg PO/IV every day (if CrCl < 50 ml/min)
  - □ Esomeprazole (Nexium) 40 mg PO every day
- **Consider Activated Protein C (Xigris) per ACMC guidelines:**
  - □ APACHE II score _____
- **Consider serial lactates to document improvement.**
  - □ Lactate every ____ hours until ≤ 2 mmol/L.

Completion of 24 hour bundle

Date _____ **Time**_____ **(24 hour clock)**

Physician Signature/date_____

Barriers

- Surgical patients don’t get septic
- Resistance to standing orders
- Lack of time provided to clinical staff for data collection
- Doubts re: use of sepsis bundle elements

Overcoming Barriers

- Grand rounds/case study presentations of "missed opportunities" Examining what went wrong
- Mapping….breaking down the elements to see where delays occur…antibiotics to the pyxis
- Lactates as critical value/panic value: missed/delayed result in ER patient

Overcoming Barriers

- Adding new physician champions
- Embedding sepsis education into all unit competencies and nursing orientation
- Proactive Rapid Response…trolling for trouble…
- Timely chart pulls and reviews…not waiting for quarterly reviews if problem perceived

Overcoming Barriers

- Continuing education and updates for nursing staff…positive results
- New travel RN's educated on sepsis screening during computer charting in service

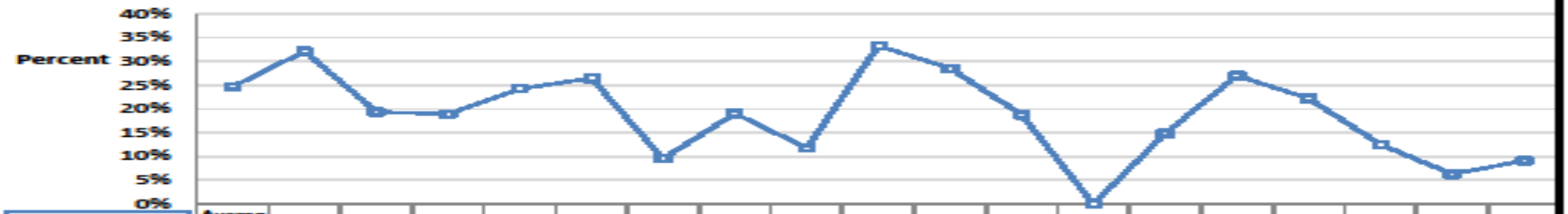
Results!

- Since 2009, ACMC has seen a 56% reduction in sepsis mortality
- We still have far to go!

Severe Sepsis Team Report
Report Date: 7/27/2012

Severe Sepsis - ICD-9 Coded Data At Highland Hospital

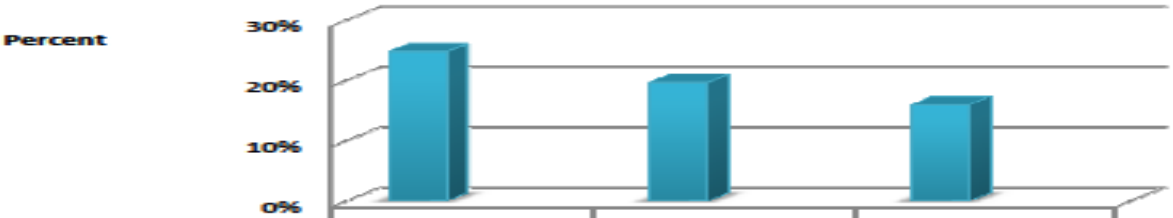
Graph 1: Severe Sepsis Mortality Percentage – ICD-9 Code Criteria



Baseline 2009: 32%

	Average 2010	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
		2011												2012					
% Mortality	24.8%	32.1%	19.4%	18.9%	24.2%	26.5%	9.5%	19.0%	11.8%	33.3%	28.6%	18.8%	0.0%	14.8%	27.0%	22.2%	12.5%	6.3%	9.1%
Death	7	9	6	7	8	9	4	4	4	6	6	6	0	4	10	8	5	2	2
Total Sepsis	27	28	31	37	33	34	42	21	34	18	21	32	19	27	37	36	40	32	22

Graph 2: Severe Sepsis Mortality Percentage – ICD-9 Code Criteria



Baseline 2009: 32%

	2010	2011	Jan - Jun/ 2012
% Mortality	24.8%	19.7%	16.0%
Death	80	69	31
Total	323	350	194

Where We Want To Go

- Improved bundle compliance…last month's bundle compliance was about 55%
- Need to deliver antibiotics more quickly
- Funding and trialing of "sepsis nurse" /code sepsis response
- Real time case reviews
- Critical Care Nurse Coordinator

Where We Want To Go

- Re-energize the sepsis team…Now part of HRT with increased administration involvement and support
- Reach a consensus on the controversial components of the 6 hour treatment bundle and revise standing orders as needed
- Continued ongoing hospital wide education
- Continued support with data collection

Where We Plan To Be

- Goal setting for the future: Another 10% reduction in mortality over the next year
- Bundle compliance of greater than 70%
- Weekly feedback for team members, with more timely reports to all clinical staff

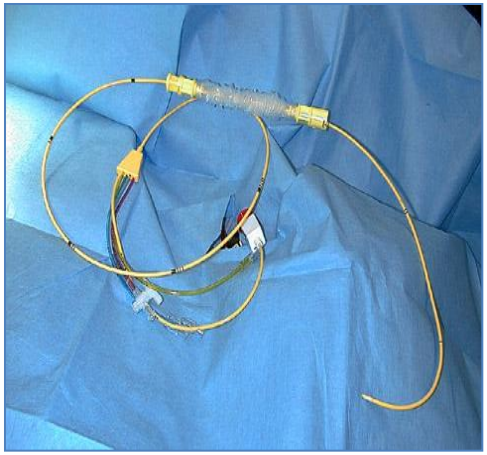
Remember: You have to run the race to win the prize!

CLABSI Reduction at UCSF

Cass Piper
Clinical Nurse Specialist
Adult Cardiovascular Critical Care

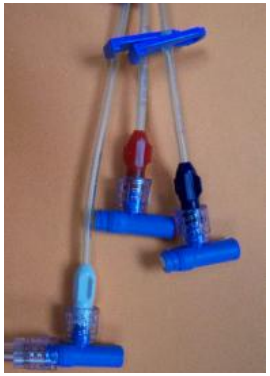
Risk factors for CLABSI during insertion

- Clinician knowledge of patient risk factors
- Selection of insertion site
- Type of catheter
- Clinician experience
- Hand hygiene
- Skin antisepsis
- Use of maximal sterile barrier
- Number of needle sticks
- Number of catheter lumens
- Securement of catheter
- Catheter dressing



Risk factors for CLABSI during CVC maintenance

- Clinician knowledge of patient risk factors
- CVC manipulations
- Hand hygiene
- Daily inspection of dressing/site
- Technique for catheter entry (scrubbing hub, consolidating labs, closed sampling systems)
- Infusates (TPN and lipid containing products)
- Daily assessment for CVC necessity
- Flushing, cap and dressing change procedures



Institute for Healthcare Improvement

- Bundle – grouping of best practices that individually improve care, but when applied together result in substantially greater improvement
- IHI bundle focused more on practices related to insertion of central lines
  - Hand hygiene
  - Maximal barrier precautions upon insertion
  - Chlorhexidine skin antisepsis
  - Optimal catheter site selection
  - Daily review of line necessity with prompt removal of unnecessary lines

Original UCSF CLABSI prevention bundle

- IV tubing dated and current
- Flow sheet documents date of dressing and tubing changes
- Before insertion, did clinician clean hands?
- Before insertion, did clinician perform aseptic prep and allow to air dry?
- Before insertion, did clinician sterile drape entire patient?
- During insertion, did clinician wear hat, mask and sterile gloves and gown?
- During insertion, did clinician maintain sterile field?
- After insertion, was sterile dressing applied to site?
- Was an optimal insertion site used?
- Was CVC placed in a critical care unit?

CLABSI reduction plan – 2008 to date

- CVC insertion techniques
- Daily assessment for CVC necessity
- CVC maintenance
- CVC site care & dressing maintenance

CVC insertion techniques

- Standard insertion checklist that mirrors IHI bundle – conversion to electronic CLIP note
- Training module to be completed by all providers that insert lines
- Required number of supervised line insertions before competent to perform independently
- Daily assessment for potential CVC removal during rounds

Daily assessment for CVC necessity

- Critical Care RNs are responsible for assessing if indication for CVC falls into these criteria:
  - Hemodynamic monitoring (i.e. CVP, femoral ABP)
  - IV therapies (medications requiring CVC or long term administration >14 days, TPN, dialysis/pheresis)
  - Rapid infusion of large volumes of fluid/blood
  - Inability to obtain alternate IV access
- If none of the above criteria is present, RN should contact team to discuss possibility of central line removal
- Thus far, CVC utilization rates have not decreased

CVC maintenance

- Hand hygiene
- Accessing CVCs
- Continuous vs. intermittent infusions
- Maintaining closed system

Hand hygiene

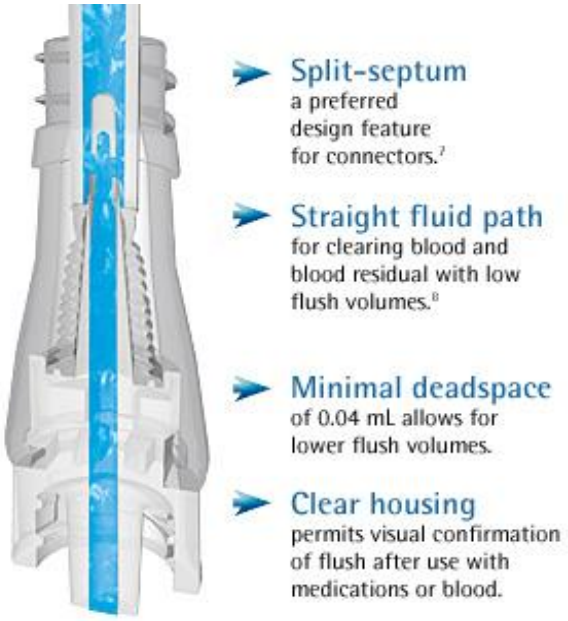
- Single most important strategy to reduce transmission of pathogenic organisms
- Cleaning hands between patient contact and after contact with blood, body fluids, secretions, excretions, equipment, and potentially contaminated surfaces is an essential strategy for preventing healthcare-associated infections

Accessing CVCs

- Scrub injection cap, positive pressure cap, or catheter lumen hub using an alcohol wipe to a count of ten before accessing
- Use Curos port protectors on all CVC IV injectable ports and caps that do not have IV tubing already attached and infusing. If Curos cap has been attached for ≥ 3 minutes, then you do not need to scrub with alcohol for a count of 10 before accessing.
- Scrub junction of cap/tubing and hub before opening system or changing tubing
- Change cap if there is visible blood

Accessing CVCs

- Recent change to neutral displacement cap – MicroCLAVE Clear

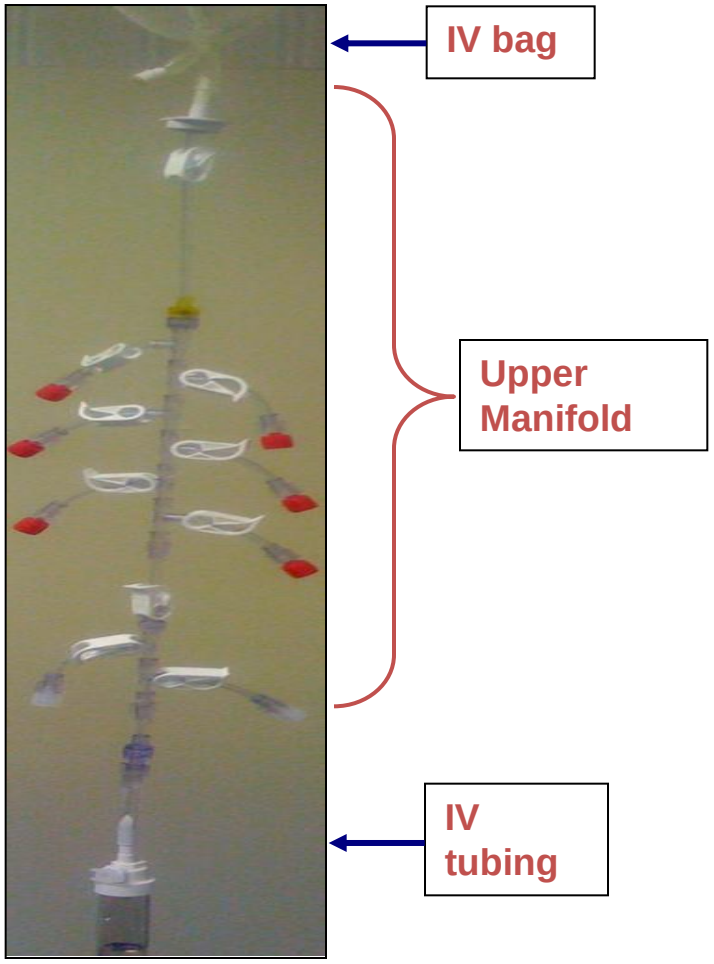


Continuous vs. intermittent infusions

- During continuous infusions, use of injection cap between the central line port and IV line may result in colonization
- Critical care - use hub-to-hub connection
- Acute care - injection cap required for all CVC lumens due to risk for air embolism if tubing disconnects
- All intermittently used central line ports must have occlusive caps (injection caps or dead-end/non-injectable caps) that ensure a closed system

Maintaining a closed system

- If CVC accessed more than 2x/day, set up maintenance infusion (if not contraindicated and with provider order)
- If 2 or more intermittent infusions ordered, use upper manifold to avoid disconnecting lines repeatedly
- Piggyback tubing not continuously connected to main IV tubing should be changed daily



CVC site care & dressing maintenance

- CVC dressing kits
  - BioPatch – CHG sponge
  - More adherent transparent dressing
  - Triple CHG swabs

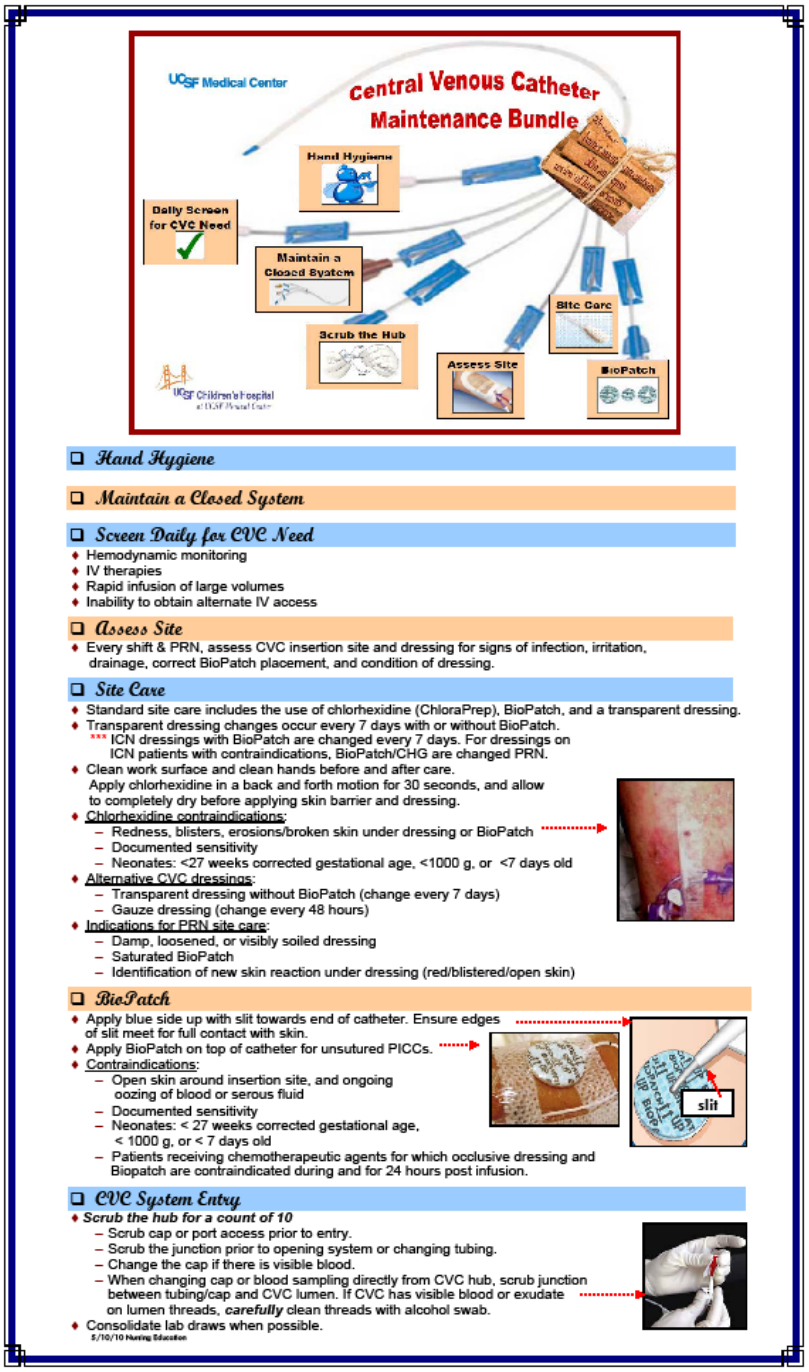
BioPatch Tips

- Apply blue side up with slit toward end of catheter

- Ensure edges meet for full skin contact

CVC site care & dressing maintenance

- Standard site care includes use of Chloroprep, BioPatch and transparent dressing
- Transparent dressing changes occur every 7 days, with or without BioPatch
- Work surface and hands should be cleaned before and after site care
- In addition to scheduled dressing changes, the dressing should be changed if:
  - Damp, loosened or visibly soiled
  - BioPatch saturated
  - Identification of new skin reaction under dressing (red, blistered, open skin)



- CVC maintenance bundle
  - Hand hygiene
  - Closed system
  - Assess site
  - Site care
  - BioPatch
  - CVC system entry

- New in 2012 – Curos port protectors

Blood culture technique - peripheral

- Peripheral culture
  - Clean venipuncture site with 70 % isopropyl alcohol by scrubbing vigorously
  - Cleanse the venipuncture site with Chloraprep Single Swabstick using a back and forth motion for **30 seconds**. Allow it to **air dry**.
  - Do not palpate venipuncture site after cleaning unless wearing sterile gloves
  - Ideal blood volume is 20 mL (10 mL for each culture bottle)
  - Instill into aerobic bottle first, then anaerobic

Blood culture technique - CVC

- CVC culture
  - Do not draw from lumen used for antimicrobial within the last hour
  - Avoid drawing from lumens with vasoactive infusions for safety reasons
  - Scrub distal lumen connection or cap with 70% isopropyl alcohol to a count of 10
  - Clamp catheter, disconnect tubing/cap and attach syringe directly to catheter hub
  - Do not aspirate a discard volume
  - Draw the same volume obtained in peripheral culture

Identifying CLABSI – Differential time to positivity (DTTP)

- DTTP is done to confirm CLABSI diagnosis
  - Requires order and must specify CVC if more than one are present
  - Peripheral vein blood culture and central line blood culture must be drawn within 15 minutes of each other
  - Volumes from peripheral and CVC cultures must match for accurate results
  - If CVC culture turns positive more than 2 hours faster than peripheral vein culture, it strongly suggests CVC as source of bloodstream infection
  - Remind providers to order DTTP (or time to positivity) if CVC is suspected source

CLABSI measurement at UCSF

- Measurement Elements—Processes
  - CLIP note “bundle” compliance
    - Physician self-report
  - Care and Maintenance “bundle” compliance
    - Periodic observational studies
- Measurement Elements—Outcomes
  - Infection rates
    - Critical care
    - Acute care

CLABSI rates at UCSF

- At the start, incidence for 2008 fiscal year was 4.88 CLABSI per 1000 device days (88 infections)
- More useful to express as # CLABSI per 1000 device days
  - Accounts for CLABSI over time and adjusts risk for # of days catheter is in place
  - Allows benchmarking / comparison between units and institutions
- Goal for 2009, ↓ CLABSI by 5 % to 4.56
  - **Actual rate FY 2009 = 2.3 (more than 50% decrease)**

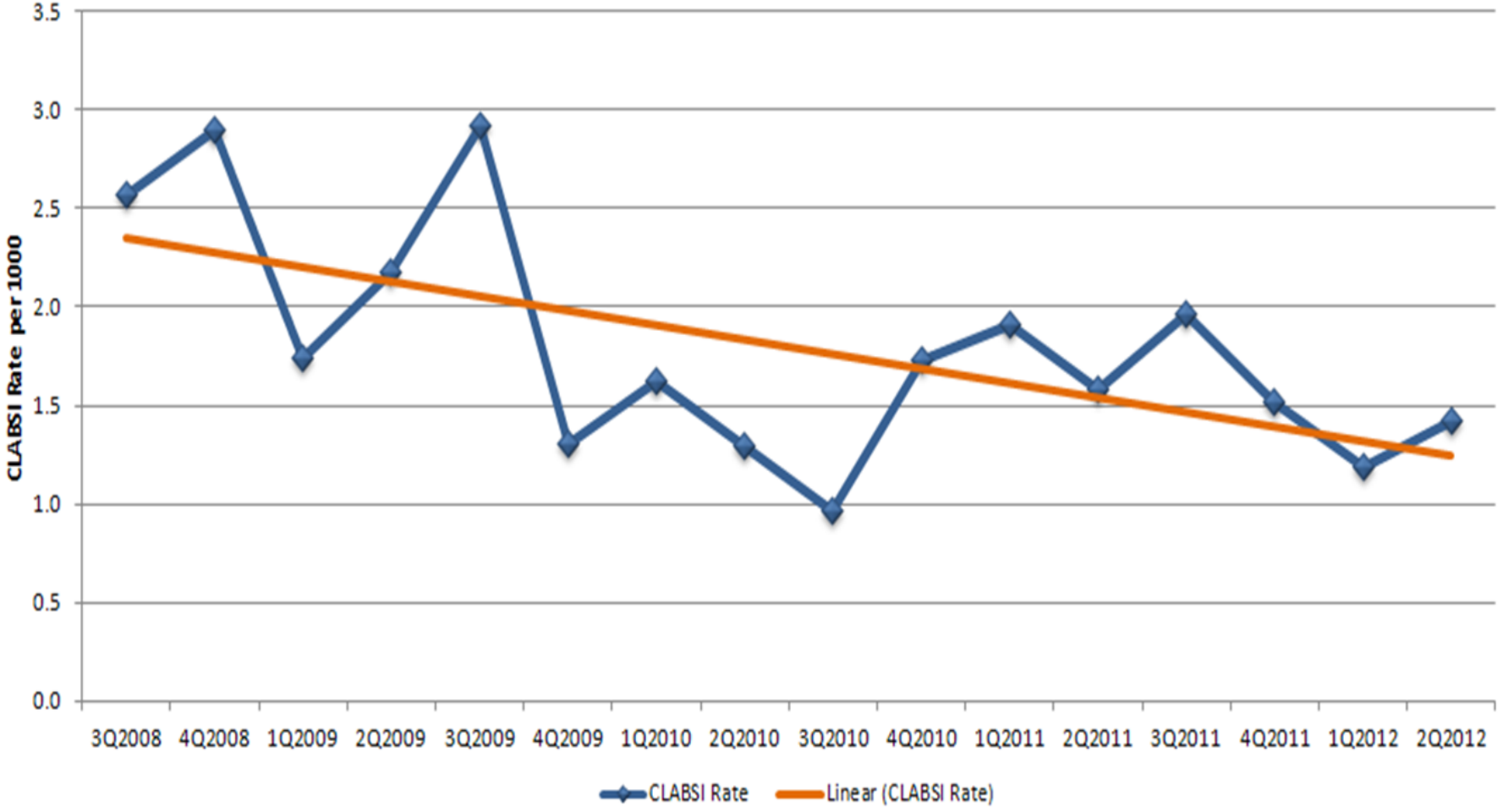
CLABSI Counts and Rates

Infection Type	Fiscal Year	Cases	Rate (cases/1000 Device Days)	% Reduction from 2008	% Reduction from Previous Year
CLABSI	FY08	88	4.88	n/a	n/a
	FY09	55	2.3	53%	53%
	FY10	38	1.8	63%	22%
	FY11	32	1.5	69%	17%
FY12 target rate =1.25	FY12	31	1.5	69%	0%

For comparison, NHSN 25th percentile = 0.5

Device Related Infections
CLABSI Rare Per 1000 Line Days
3Q2008-2Q2012

FY12 CLABSI Rate=1.5 Workplan Goal 1.25
FY11 CLABSI Rate=1.5
FY10 CLABSI Rate=1.8



Quarter	3Q2008	4Q2008	1Q2009	3Q2009	4Q2009	1Q2010	2Q2010	3Q2010	4Q2010	1Q2011	2Q2011	3Q2011	4Q2011	1Q2012	2Q2012
# CRBSI	14	17	11	16	7	8	7	5	9	10	8	10	8	6	7
# Line Days	5444	5858	6339	5475	5360	4914	5411	5166	5209	5245	5069	5104	5268	5054	4940
CLABSI Rate	2.6	2.9	1.7	2.9	1.3	1.6	1.3	1.0	1.7	1.9	1.6	2.0	1.5	1.2	1.4

CLABSI rates in critical care

UCSF Medical Center

UCSF Benioff Children's Hospital

Department of Hospital Epidemiology and Infection Control
Prepared for A. Nichols, RN, MBA, CIC

Central Line Associated Blood Stream Infection Rates (CLABSI) Rates

		FY11	JUL11	AUG11	SEP11	OCT11	NOV11	DEC11	JAN12	FEB12	MAR12	APR12	MAY12	JUN12	FYTD
9 and 13 ICU	Patient Days	9157	776	883	855	843	830	743	714	707	831	792	820	739	9113
	Line Days	8107	570	390	428	809	814	535	491	487	596	536	807	529	6392
	Central Line Utilization Ratio	0.87	0.73	0.59	0.65	0.72	0.74	0.72	0.69	0.69	0.72	0.68	0.74	0.72	0.7
	CLABSI RATE per 1000 Device Days	1.1(7/6107)	0(0/570)	0(0/390)	0(0/428)	0(0/809)	3.3(2/614)	1.9(1/535)	3(0/491)	0(0/487)	3.4(2/596)	1.9(1/536)	1.6(1/607)	1.9(1/529)	1.3(8/6392)
10 ICC	Patient Days	4622	349	379	386	359	370	336	396	377	427	351	445	357	4531
	Line Days	3234	219	293	251	257	207	251	277	232	296	200	326	250	3059
	Central Line Utilization Ratio	0.7	0.63	0.77	0.65	0.72	0.56	0.75	0.7	0.62	0.69	0.57	0.73	0.7	0.68
	CLABSI RATE per 1000 Device Days	0.9(3/3234)	0(0/219)	3.4(1/293)	0(0/251)	0(0/257)	0(0/207)	3(0/251)	3(0/277)	4.3(1/232)	0(0/296)	0(0/200)	0(0/326)	8(2/250)	1.3(4/3059)
11 & 8 NICU	Patient Days	8254	821	837	888	809	868	831	703	737	757	511	849	814	7823
	Line Days	3383	242	287	328	283	276	340	285	272	303	229	308	264	3415
	Central Line Utilization Ratio	0.41	0.39	0.45	0.47	0.46	0.41	0.54	0.41	0.37	0.4	0.45	0.47	0.43	0.44
	CLABSI RATE per 1000 Device Days	0.9(3/3383)	0(0/242)	0(0/287)	0(0/328)	0(0/283)	0(0/276)	3(0/340)	3(0/285)	0(0/272)	0(0/303)	0(0/229)	3(0/308)	0(0/264)	0(0/3415)
Mt Zion ICU	Patient Days	1005	105	86	81	417	103	75	85	79	90	80	77	87	1329
	Line Days	385	33	26	21	31	59	5	29	24	37	31	16	47	360
	Central Line Utilization Ratio	0.38	0.31	0.3	0.26	0.07	0.57	0.06	0.43	0.3	0.41	0.39	0.21	0.7	0.27
	CLABSI RATE per 1000 Device Days	2.6(1/385)	0(0/33)	0(0/26)	0(0/21)	32.3(1/31)	0(0/59)	3(0/5)	3(0/29)	0(0/24)	0(0/37)	0(0/31)	0(0/16)	0(0/47)	2.8(1/360)
Adult Composite	Patient Days	23038	1852	1765	1810	2226	1969	1784	1681	1900	2105	1734	1991	1777	22796
	Line Days	13089	1064	995	1026	1180	1156	1132	1082	1015	1232	995	1257	1090	13226
	Central Line Utilization Ratio	0.57	0.57	0.56	0.57	0.53	0.59	0.63	0.64	0.53	0.59	0.57	0.63	0.61	0.58
	CLABSI RATE per 1000 Device Days	1.1(14/13089)	0(0/1064)	1(1/995)	0(0/1026)	0.8(1/1180)	1.7(2/1156)	3.9(1/1132)	3(0/1082)	1(1/1015)	1.6(2/1232)	1(1/995)	0.8(1/1257)	2.8(3/1090)	1(13/13226)
Overall UCSF	CLABSI RATE per 1000 Device Days	1.5(32/20658)	1.7(3/1811)	2.4(4/1637)	1.8(3/1656)	0.5(1/1839)	1.7(3/1738)	2.4(4/1691)	3(0/1628)	1.2(2/1811)	2.2(4/1815)	1.8(3/1623)	0.6(1/1805)	2(3/1512)	1.5(31/20368)

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Recent CLABSI prevention efforts

- Reviewed current CDC Guidelines
- Monitored transition and training issues related to Microclave Cap adoption in FY2011
- Implemented unit-level individual case review
- Developed and implemented care and maintenance audit tools, data entry, and reports
- Targeted lab testing and improved documentation (Documentation Decision Tree) to support “infection at another site” to rule out CLABSI
- Expanded CLABSI case notification, committee membership, and education to acute care nursing staff
- Pilot-tested and rolled-out Curos Port Protectors in Adult hospital (March)
- Completed literature review of CHG bathing to reduce CLABSI

CLABSI Costs and Savings Analysis

FY	# Cases	CLABSI Costs*		Cost Avoidance from Last FY	Cumulative Total Cost Avoidance **	Cumulative Available Bed Days	UCSF 2005 Study***		Cumulative Savings from Avoided CLABSI UCSF Study***
		$18,432 (Mean Cost)	12 Days Excess LOS				$82,972 Per CLABSI	30.6 Days Excess LOS	
2008	88	$1,622,016	1056	n/a	n/a	n/a	$7,301,536	2693	n/a
2009	55	$1,013,760	660	$608,256	$608,256	396	$4,563,460	1683	$2,738,076
2010	38	$700,416	456	$313,344	$921,600	600	$3,152,936	1163	$1,410,524
2011	32	$589,824	384	$110,592	$1,032,192	672	$2,655,104	979	$497,832
2012	31	$572,392	372	$18, 432	$1,050,624	684	$2,572,132	949	$82,972

*Perencevich, E., et al. Attributable Costs and Lengths of Stay Associated with HAI. Infect Control Hosp Epidemiol 2007;28:1121-1133

**Does not take into account opportunity costs or cost of resources invested

***2005 Case-control UCSF analysis: 10 infected cases, 881 uninfected cases.

FY10 analysis assumes similar case complexity as in 2005 analysis, no adjustment for inflation.

UCSF Medical Center

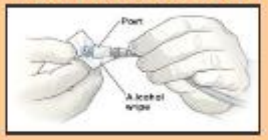
Central Venous Catheter Maintenance Bundle

Hand Hygiene

Daily Screen for CVC Need

Maintain a Closed System

Scrub the Hub



Site Care

Assess Site

BioPatch

UCSF Children's Hospital
at UCSF Medical Center

References

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- http://www.ihi.org/IHI/topics/criticalcare/intensivecare/changes/implementthecentrallinebundle.htm
- Kline, A. (2005). Pediatric catheter-related bloodstream infections: Latest strategies to decrease risk. *AACN Clinical Issues, 16(2):* 185-198.
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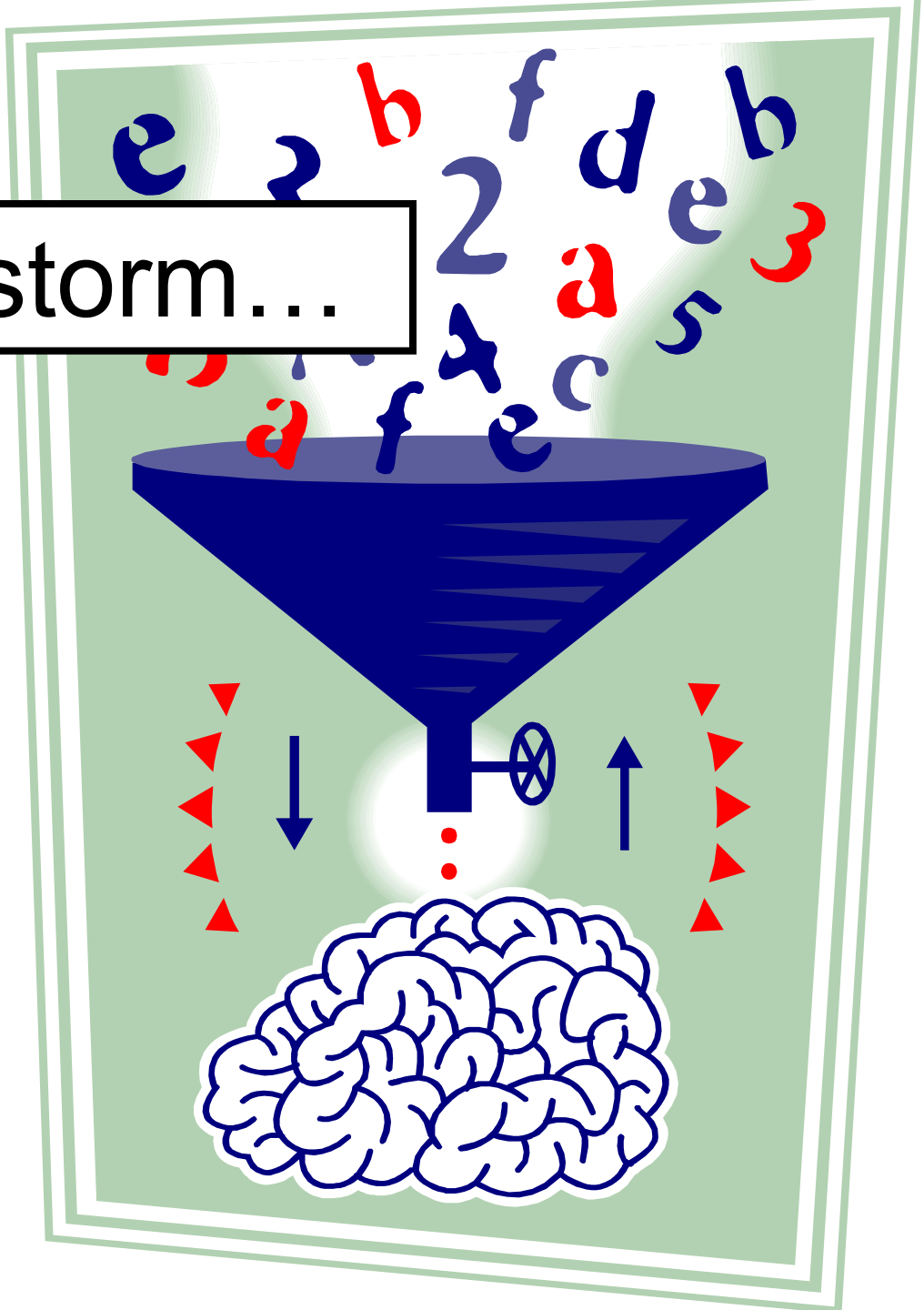
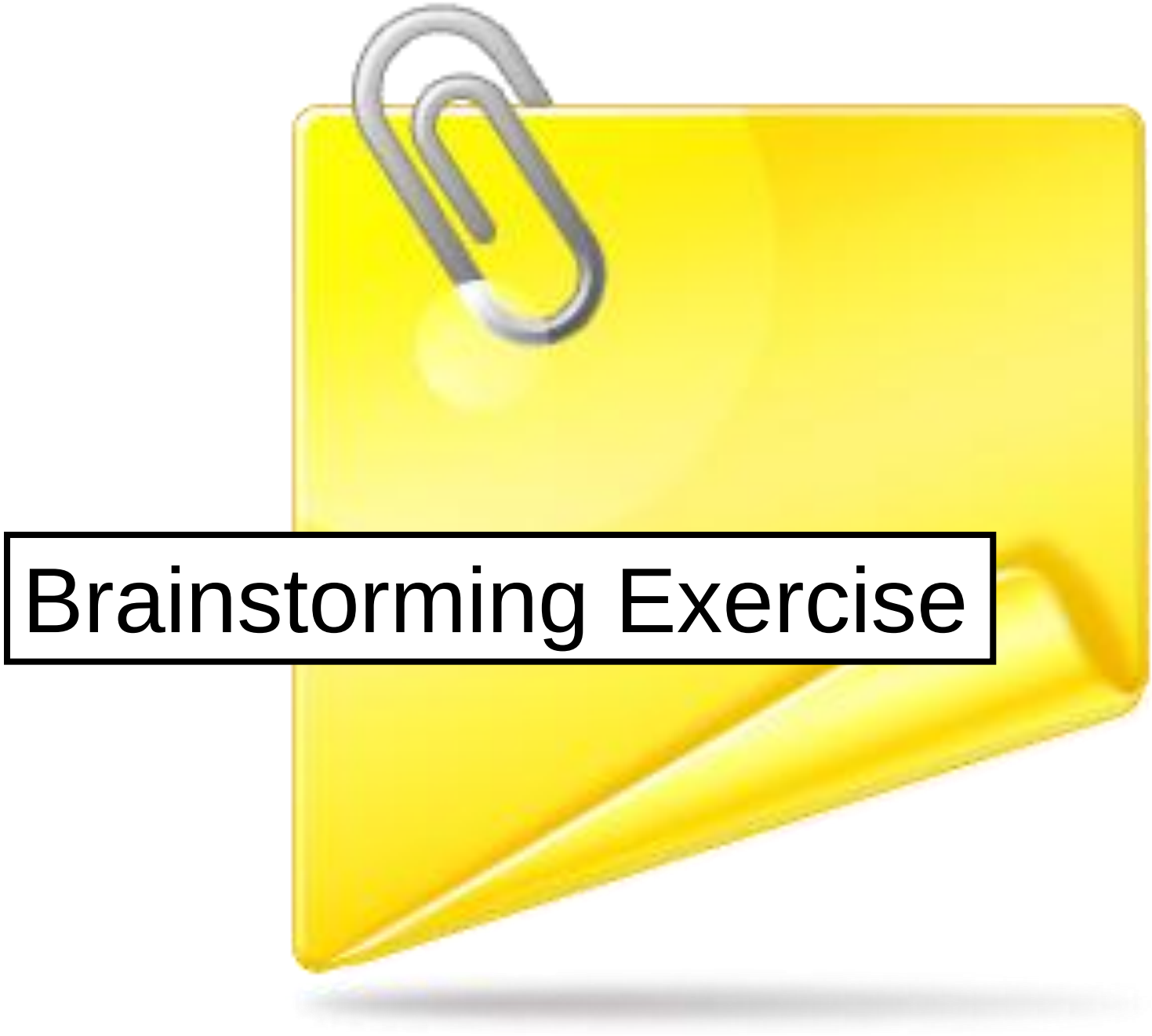
- Soufir, L et al. (1999). Attributable morbidity and mortality of catheter-related septicemia in critically ill patients: A matched, risk-adjusted, cohort study. *Infection Control and Hospital Epidemiology, 20(6):* 396-401.

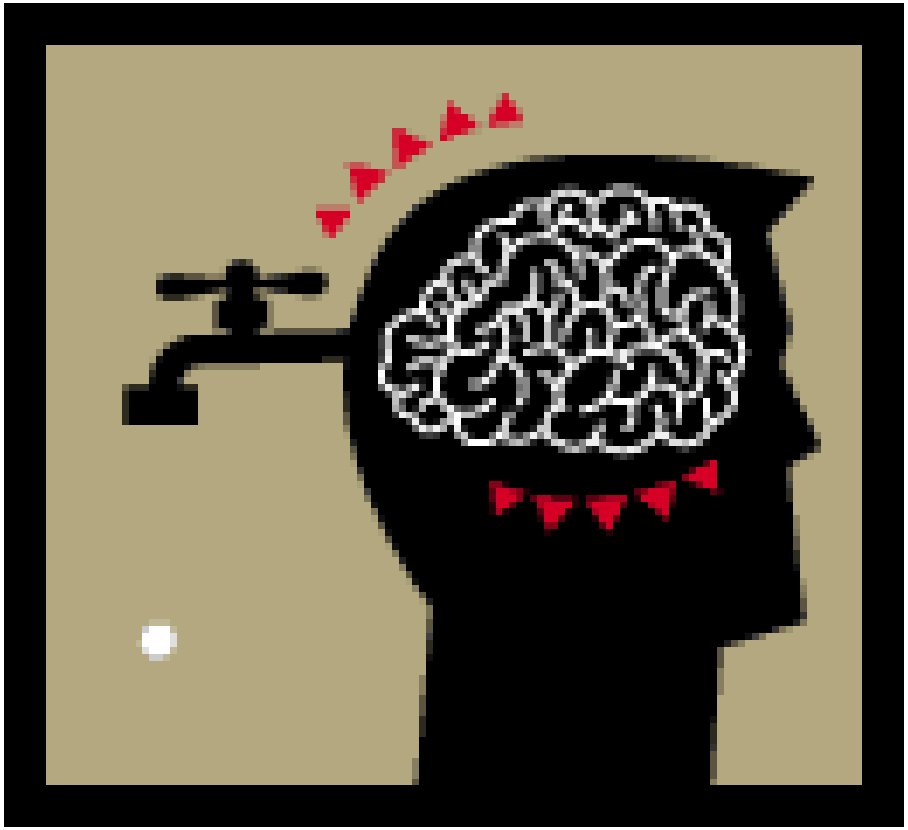
What changes can we make
that will result in an improvement?

Time to Brainstorm…




Brainstorming Exercise

Rules for Brainstorming Exercise



- Brainstorm
  - Each team member gives an idea
  - No debate of value
  - Continue until there are no more ideas

Select One of the Following:

- What are the reasons why our patients continue to develop CLABSI's?
- What are the reasons why our patients continue to die from sepsis?

Organize ‘thoughts’

Time to Vote

Multi-Voting

- Typically, 3-6 ‘ideas’ will get the most votes
- Remove the post-its that received no or very few votes
- Line up the ‘highest vote issues’
- Give everyone one dot and have them vote again for the ONE issue they would like to work on first

Planning Next Steps

Summary and Next Steps


Hang in there