SNI Sepsis & CLABSI Collaborative

Learning Session 3
August 15, 2012
Oakland, CA
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
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

DENIAL

ANGER

BARGAINING

DEPRESSION

ACCEPTANCE

DENIAL
Why Measure?

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

<table>
<thead>
<tr>
<th>Improvement</th>
<th>Reporting</th>
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<tbody>
<tr>
<td>• Used for learning</td>
<td>• Used to judge</td>
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</tbody>
</table>
Our Question?

- ADAPT
- ADOPT
- ABANDON
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)
CLIP BUNDLE ADHERANCE RATE
1/2011-3/2012
Source: NSHN (abstracted 07/25/2012)
CLIP BUNDLE ADHERANCE RATE
1/2011-3/2012
Source: NSHN (abstracted 07/25/2012)
Count Out

1 + 4 = 5
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
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.

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

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.
• 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

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 0.5 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

- **RENAI DOING 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 x 1, then 2.25 gram IVPB q 6 hrs (if CrCl < 20 ml/min)
    - □ 4.5 gram IVPB x 1, 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 x 1, 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 0.5 gram per dose)

  - **Levofloxacin**
    - □ 750 mg IVPB q 48 hrs (if CrCl = 20-49 ml/min)
    - □ 750 mg IVPB x 1, then 500 mg IVPB q 48 hrs (if CrCl < 20 ml/min or on hemodialysis)

  - **Aztreonam**
    - □ 2 gram IVPB x 1, then 1 gram IVPB q 8 hrs (if CrCl = 10-30 ml/min)
    - □ 2 gram IVPB x 1, then 500 mg IVPB q 8 hrs (if CrCl < 10 ml/min)
    - □ 2 gram IVPB x 1, 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**

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
  - Lactate decreased under 2 mmol/L (if applicable)
  - Time CVP goal achieved: _______ (RN fill in)
  - 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):**
    - [ ] Phenytoin (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) _______

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Physician Signature/date: ________________________________
Severe Sepsis Orders and Protocol
Pilot

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/s 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)

Page 3 of 3

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: 7/17/2012

Severe Sepsis - ICD-9 Coded Data At Highland Hospital

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

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

- Split-septum: a preferred design feature for connectors.
- Straight fluid path: for clearing blood and blood residual with low flush volumes.
- Minimal deadspace: of 0.04 mL allows for lower flush volumes.
- Clear housing: permits visual confirmation of flush after use with medications or blood.
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
• 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

<table>
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<th>Infection Type</th>
<th>Fiscal Year</th>
<th>Cases</th>
<th>Rate (cases/1000 Device Days)</th>
<th>% Reduction from 2008</th>
<th>% Reduction from Previous Year</th>
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<td>FY08</td>
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<td>32</td>
<td>1.5</td>
<td>69%</td>
<td>17%</td>
</tr>
<tr>
<td>FY12 target rate =1.25</td>
<td>FY12</td>
<td>31</td>
<td>1.5</td>
<td>69%</td>
<td>0%</td>
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For comparison, NHSN 25th percentile = 0.5
## CLABSI rates in critical care

### Central Line Associated Blood Stream Infection Rates (CLABSI) Rates

#### 9 and 13 ICU

<table>
<thead>
<tr>
<th>Patient Days</th>
<th>FY11</th>
<th>JUL1</th>
<th>AUG11</th>
<th>SEP11</th>
<th>OCT11</th>
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<th>MAY12</th>
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<th>FYTD</th>
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<tbody>
<tr>
<td>Line Days</td>
<td>9167</td>
<td>770</td>
<td>895</td>
<td>866</td>
<td>843</td>
<td>830</td>
<td>743</td>
<td>714</td>
<td>707</td>
<td>831</td>
<td>792</td>
<td>832</td>
<td>739</td>
<td>9117</td>
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<tr>
<td>Central Line Utilization Ratio</td>
<td>0.97</td>
<td>0.73</td>
<td>0.59</td>
<td>0.95</td>
<td>0.72</td>
<td>0.74</td>
<td>0.72</td>
<td>0.88</td>
<td>0.69</td>
<td>0.72</td>
<td>0.88</td>
<td>0.74</td>
<td>0.72</td>
<td>0.72</td>
</tr>
<tr>
<td>CLABSI RATE per 1000 Device Days</td>
<td>1.1(24107)</td>
<td>2(2050)</td>
<td>2(5050)</td>
<td>2(4256)</td>
<td>2(0426)</td>
<td>3.3(29164)</td>
<td>1.8(26253)</td>
<td>1.7(20461)</td>
<td>2(24407)</td>
<td>3.4(25596)</td>
<td>1.8(24153)</td>
<td>1.4(2467)</td>
<td>1.3(26332)</td>
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#### 10 ICC

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<th>NOV11</th>
<th>DEC11</th>
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<tr>
<td>Line Days</td>
<td>3224</td>
<td>219</td>
<td>295</td>
<td>261</td>
<td>267</td>
<td>267</td>
<td>251</td>
<td>277</td>
<td>232</td>
<td>296</td>
<td>200</td>
<td>328</td>
<td>250</td>
<td>3059</td>
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<tr>
<td>Central Line Utilization Ratio</td>
<td>0.7</td>
<td>0.63</td>
<td>0.71</td>
<td>0.65</td>
<td>0.72</td>
<td>0.68</td>
<td>0.77</td>
<td>0.7</td>
<td>0.46</td>
<td>0.82</td>
<td>0.57</td>
<td>0.71</td>
<td>0.7</td>
<td>0.45</td>
</tr>
<tr>
<td>CLABSI RATE per 1000 Device Days</td>
<td>0.9(29254)</td>
<td>5(12059)</td>
<td>3.4(25953)</td>
<td>5(12051)</td>
<td>3(20557)</td>
<td>3(20557)</td>
<td>3(20551)</td>
<td>4(2077)</td>
<td>3(2077)</td>
<td>4(2077)</td>
<td>3(2077)</td>
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#### 11 & NICU

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<th>DEC11</th>
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<th>MAY12</th>
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<tr>
<td>Line Days</td>
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<td>242</td>
<td>237</td>
<td>283</td>
<td>283</td>
<td>278</td>
<td>340</td>
<td>385</td>
<td>272</td>
<td>353</td>
<td>229</td>
<td>308</td>
<td>284</td>
<td>3416</td>
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<td>Central Line Utilization Ratio</td>
<td>0.41</td>
<td>0.39</td>
<td>0.46</td>
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<td>0.46</td>
<td>0.41</td>
<td>0.54</td>
<td>0.41</td>
<td>0.37</td>
<td>0.4</td>
<td>0.45</td>
<td>0.47</td>
<td>0.43</td>
<td>0.44</td>
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<tr>
<td>CLABSI RATE per 1000 Device Days</td>
<td>0.9(29363)</td>
<td>5(12042)</td>
<td>3(20587)</td>
<td>3(20587)</td>
<td>3(20583)</td>
<td>3(20583)</td>
<td>3(20583)</td>
<td>4(2077)</td>
<td>3(2077)</td>
<td>3(2077)</td>
<td>4(2077)</td>
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#### Mt Zion ICU

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<th>FEB12</th>
<th>MAR12</th>
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<th>MAY12</th>
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</thead>
<tbody>
<tr>
<td>Line Days</td>
<td>1016</td>
<td>108</td>
<td>86</td>
<td>81</td>
<td>417</td>
<td>103</td>
<td>75</td>
<td>88</td>
<td>79</td>
<td>90</td>
<td>80</td>
<td>77</td>
<td>87</td>
<td>1329</td>
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<tr>
<td>Central Line Utilization Ratio</td>
<td>0.54</td>
<td>0.31</td>
<td>0.36</td>
<td>0.34</td>
<td>0.97</td>
<td>0.97</td>
<td>0.79</td>
<td>0.79</td>
<td>0.41</td>
<td>0.79</td>
<td>0.79</td>
<td>0.79</td>
<td>0.79</td>
<td>0.79</td>
</tr>
<tr>
<td>CLABSI RATE per 1000 Device Days</td>
<td>2.6(33368)</td>
<td>0(02058)</td>
<td>0(02058)</td>
<td>0(02052)</td>
<td>0(02052)</td>
<td>0(02052)</td>
<td>0(02052)</td>
<td>0(02052)</td>
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<td>0(02052)</td>
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#### Adult Composite

<table>
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<tr>
<th>Patient Days</th>
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<th>SEP11</th>
<th>OCT11</th>
<th>NOV11</th>
<th>DEC11</th>
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<th>FEB12</th>
<th>MAR12</th>
<th>APR12</th>
<th>MAY12</th>
<th>JUN12</th>
<th>FYTD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line Days</td>
<td>12069</td>
<td>1064</td>
<td>999</td>
<td>1026</td>
<td>1180</td>
<td>1156</td>
<td>1132</td>
<td>1042</td>
<td>1015</td>
<td>1232</td>
<td>998</td>
<td>1257</td>
<td>1090</td>
<td>13226</td>
</tr>
<tr>
<td>Central Line Utilization Ratio</td>
<td>0.57</td>
<td>0.58</td>
<td>0.58</td>
<td>0.59</td>
<td>0.59</td>
<td>0.59</td>
<td>0.57</td>
<td>0.59</td>
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<td>0.59</td>
<td>0.61</td>
<td>0.61</td>
<td>0.61</td>
<td>0.58</td>
</tr>
<tr>
<td>CLABSI RATE per 1000 Device Days</td>
<td>1.1(4113059)</td>
<td>1(01064)</td>
<td>0(01064)</td>
<td>0(01064)</td>
<td>0(01064)</td>
<td>0(01064)</td>
<td>0(01064)</td>
<td>0(01064)</td>
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<td>0(01064)</td>
<td>0(01064)</td>
<td>0(01064)</td>
<td>0(01064)</td>
</tr>
</tbody>
</table>

#### Overall UCSF

| CLABSI RATE per 1000 Device Days | 1.3(320596) | 1.7(131811) | 2.2(141597) | 1.8(21586) | 0.9(18369) | 1.7(21718) | 2.4(24161) | 2.3(21583) | 1.2(21811) | 2.2(21515) | 1.8(16225) | 0.8(14836) | 2.3(15321) | 1.5(210596) |

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Page 1
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

<table>
<thead>
<tr>
<th>FY</th>
<th># Cases</th>
<th>CLABSI Costs*</th>
<th>Cost Avoidance from Last FY</th>
<th>Cumulative Total Cost Avoidance **</th>
<th>Cumulative Available Bed Days</th>
<th>UCSF 2005 Study***</th>
<th>Cumulative Savings from Avoided CLABSI UCSF Study***</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>88</td>
<td>$1,622,016</td>
<td>1056</td>
<td>n/a</td>
<td>n/a</td>
<td>$7,301,536</td>
<td>2693</td>
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<tr>
<td>2009</td>
<td>55</td>
<td>$1,013,760</td>
<td>660</td>
<td>$608,256</td>
<td>$608,256</td>
<td>$4,563,460</td>
<td>1683</td>
</tr>
<tr>
<td>2010</td>
<td>38</td>
<td>$700,416</td>
<td>456</td>
<td>$313,344</td>
<td>$921,600</td>
<td>$3,152,936</td>
<td>1163</td>
</tr>
<tr>
<td>2011</td>
<td>32</td>
<td>$589,824</td>
<td>384</td>
<td>$110,592</td>
<td>$1,032,192</td>
<td>$2,655,104</td>
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<td>2012</td>
<td>31</td>
<td>$572,392</td>
<td>372</td>
<td>$18,432</td>
<td>$1,050,624</td>
<td>$2,572,132</td>
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</table>


**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.
Central Venous Catheter Maintenance Bundle

- Hand Hygiene
- Daily Screen for CVC Need
- Maintain a Closed System
- Scrub the Hub
- Assess Site
- Site Care
- BioPatch
References

- http://www.ihi.org/IHI/topics/criticalcare/intensivecare/changes/implementthecentrallinebundle.htm
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