

University of Rochester Medical Center Central Line Improvement Project (CLIIP)

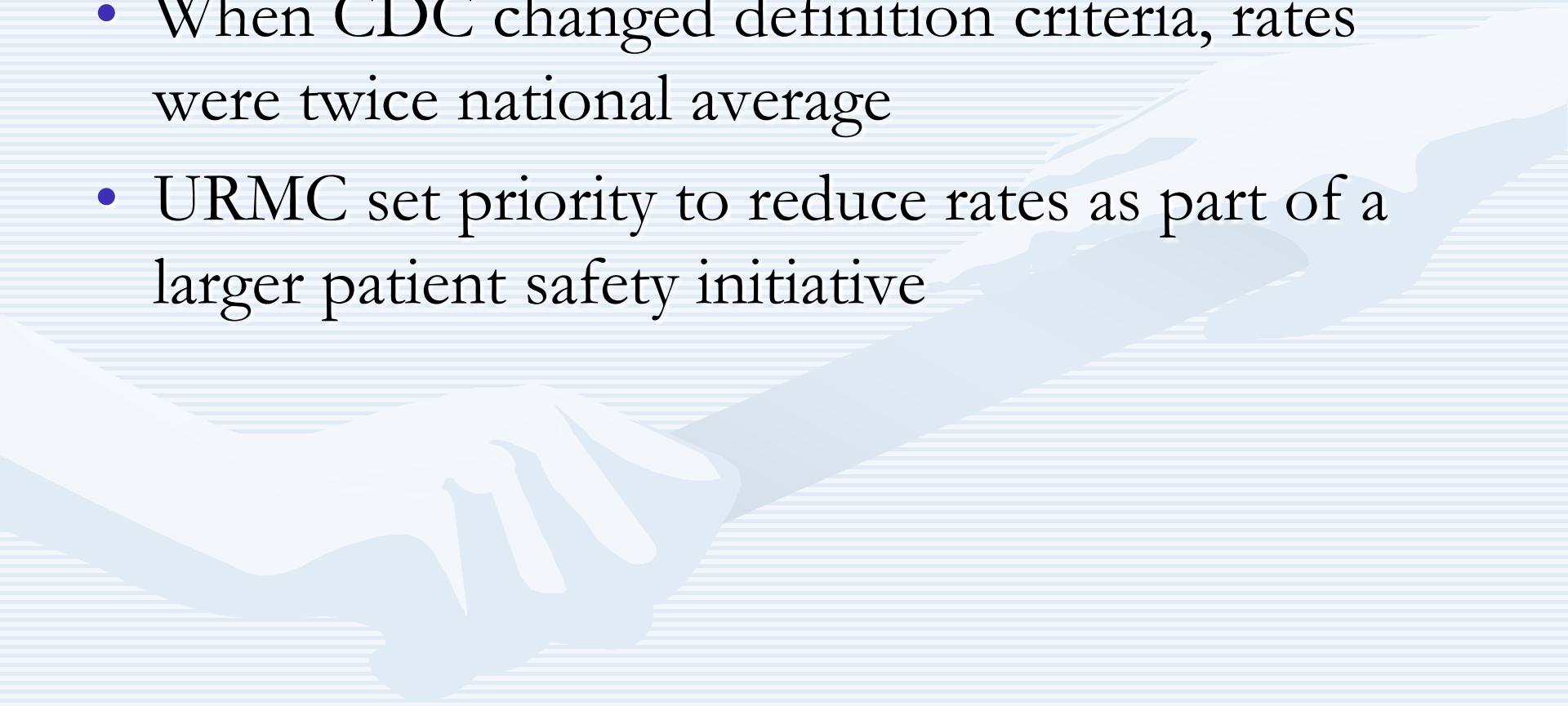
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University of Rochester Medical Center

Line Related Infections: Are They Important?

- 80,000 catheter related blood stream infections every year in US
- Up to 28,000 associated deaths/year
- Average cost/infection ~ \$45,000
- Estimated \$2.3 billion/year in US
- Median rate 1.8- 5.2 catheter related infections per 1,000 catheter days

URMC: Scope of the problem

- For years, at or below National CLABSI rate
- When CDC changed definition criteria, rates were twice national average
- URMC set priority to reduce rates as part of a larger patient safety initiative



CLIIP Committee

- **Made up of representatives from all areas of the hospital**
 - Emergency Room
 - Operating room
 - Interventional radiology
 - Intensive care units
 - PICC service
- **Identified four subgroups**
 - CL Insertion Group (Mike Apostolakos)
 - CL Maintenance Group (Mary Wicks)
 - Education Group (Tom Brewer and Kate Ireland)
 - Data Reporting Group (Bob Panzer and Pat Reagan)

Central Line Infection Improvement Project (CLIIP)

- Composed of several initiatives aimed at reducing the infection rate related to central lines
- Use of the central line bundle
- Education of housestaff and nursing regarding proper placement technique
- Standardization of the maintenance of central lines
- Authorization and requirement of all providers, most importantly nurses, to **stop** a catheter insertion in a non-emergent situation if proper sterile technique has been compromised

An Intervention to Decrease Catheter-Related Bloodstream Infections in the ICU

- Evidence based intervention in 108 ICUs in Michigan
- Interventions targeted:
 - 1) hand washing,
 - 2) use of full barrier precautions,
 - 3) cleaning the skin with chlorhexidine,
 - 4) avoiding the femoral site if possible,
 - 5) removing unnecessary catheters
- Combined with implementation of daily goal sheets, an intervention to reduce ventilator associated pneumonia, and a comprehensive unit based safety program

• Pronovost et al, N Engl J Med 2006;355:2725-32

An Intervention to Decrease Catheter-Related Bloodstream Infections in the ICU

- Strategies to increase utilization of these procedures:
 - Clinician education
 - Central line cart with necessary supplies
 - A checklist was used to ensure compliance
 - Providers were STOPPED in non-emergent situations if these practices were not followed
 - Removal of catheters was discussed on daily rounds
 - Teams received feedback regarding the number and rates of CRBSIs

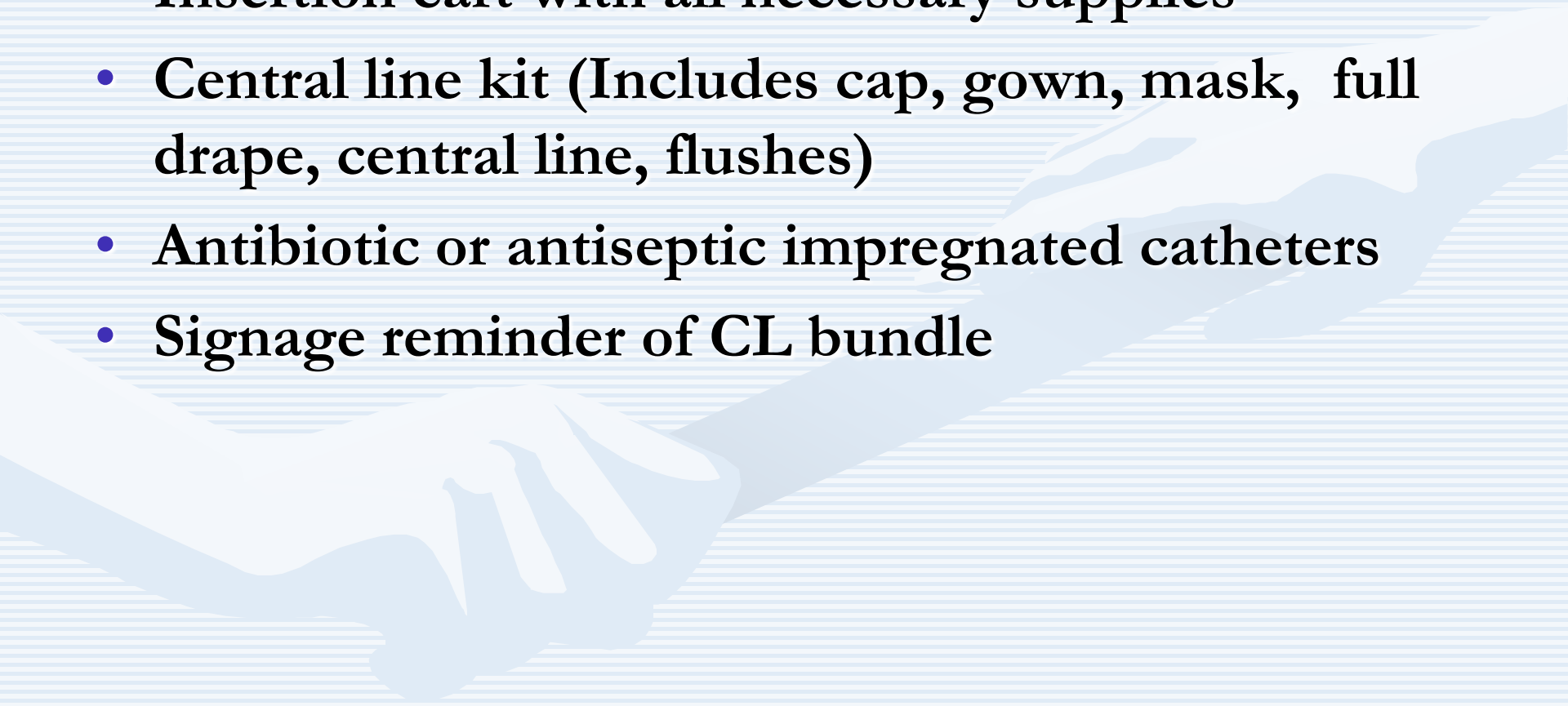
An Intervention to Decrease Catheter-Related Bloodstream Infections in the ICU

- Results:
 - The mean rate of CRBSI decreased from 7.7 to 1.4 at 16-18 month follow-up ($p < 0.002$)
- Conclusion:
 - An evidence-based intervention resulted in a large and sustained reduction (up to 66%) in rates of catheter-related bloodstream infection that was maintained throughout the 18 month study period
 - Pronovost et al, N Engl J Med 200;355:2725-32

URMC Central Line Insertion Bundle

- Hand hygiene
- Full barrier precautions (gown, head cover, sterile gloves, face mask, full sterile drape)
- Skin prep (chlorhexidine dried appropriate amount of time for insertion site)
- Femoral site least desirable from infection standpoint
- Staff **REQUIRED** to stop non-emergent procedure if protocol (critical steps) not followed
- Universal Precaution Procedure Form SMH 10909 (or equivalent) completed
- Daily rounds assessment for necessity/removal central line **ASAP**
- No routine replacement of lines/avoidance of guide wire changes
- Need to document if line not placed according to protocol (i.e. emergency)

URMC Central Line Insertion Bundle: (Helpful Adjuncts)

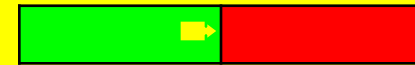
- **Insertion cart with all necessary supplies**
 - **Central line kit (Includes cap, gown, mask, full drape, central line, flushes)**
 - **Antibiotic or antiseptic impregnated catheters**
 - **Signage reminder of CL bundle**
- 

CENTRAL LINE BOARD

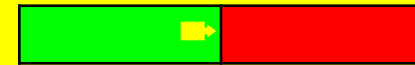
STOP:

STOP: PROCEED WHEN ALL GREEN

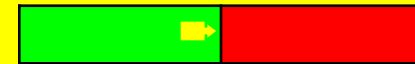
Hand Wash



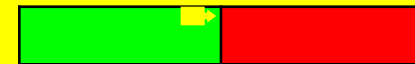
Patient Identified (with 2 identifiers)



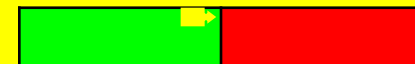
Consent obtained (SMH Form 419)



Allergies Checked



State Procedure



Correct Catheter



Patient Positioned Properly



Time Out Section (SMH 10909) Filled Out



Full Barrier Precautions (Sterile Gown, Gloves,
Face Mask, Head Cover, Sterile Drape)



PROCEED



Complete SMH 10909 (done after procedure)



CENTRAL LINE CHECKLIST

University of Rochester Medical Center

Proceed When All Boxes Are Checked

Wash Hands

Stamp All Forms (use 2 identifiers)

Consent Obtained (SMH Form 419)

Allergies Noted

State Procedure

Correct Catheter

Patient Positioned Properly

Time Out Section Filled Out (SMH 10909)

**Full Barrier Precautions
(Sterile Field, Sterile Attire)**

PROCEED

Complete Form After Procedure (SMH 10909)

STERILE FIELD

**PROCEDURE
in PROGRESS**

**NO ENTRY WITHOUT
HAT and MASK**



Worth1000.com

when greek salad goes bad...

Central Venous Catheter Placement: Education

- Traditional teaching
 - Supervised five times at each site and you're "signed off"
 - No uniform approach
 - Leads to variation and technique and skill level
- Current teaching
 - Mandated lecture on central insertion with viewing of video emphasizing proper technique and bundle practice
 - U/S training for each resident/fellow
 - Central line kit
 - Still requires 5 supervised placements at each site for credentialing

MICU Progress Note (con't)

A/P

Pulm

CVS

Renal/E/F

GI/Nutrition

ID

Heme

Endo

Neuro/Pain

GOALS

Pain/Sedation reduction?
yes
no
comment:

Can Propofol be d/c'ed?
yes
no
N/A

**Pulmonary/Ventilator
Decrease PEEP?**

Decrease FiO2?
yes
no
N/A

DVT/PUD prophylaxis?

Can activity be advanced?
yes
no
comment:

Can catheters/tubes be d/c'ed?
yes
no

HOB elevated? yes no

Volume goal for next 24hrs:

Is patient at goal for nutrition? yes no

Transfusion? Is Hct <21? yes no

**Medication reconciliation: Can any home meds be restarted? yes no
Comment:**

**Can any drugs be d/c'ed? yes no
Comment:**

Are labs and CXR needed? yes no

Central Line Maintenance

- Multiple components involved in line maintenance require consistent application of best practices
 - Dressing changes
 - Site assessment and care
 - Documentation
 - Tubing changes
 - Lab draws
 - Accessing lines to administer medications
 - Administering multiple medications per port
 - Caring for lines placed in other clinical areas

Central Venous Catheter Maintenance Bundle

- Scrupulous hand hygiene
- Aseptic Technique with dressing change and site care
 - Assess site q24 hours and prn/document
 - Cleanse site with 2% chlorhexidine (30 sec scrubbing motion 30 sec air dry) unless contraindicated or infant under 2 months
 - Occlusive transparent semi-permeable dressing; gauze dressing if bleeding/oozing
 - Dressing change; transparent semi-permeable dsq q7d & prn; Gauze q24h/prn, change to transparent semi-permeable as soon as possible
 - Replace dressing if damp, loosened or visibly soiled – dressing must be 100% intact @ all times
- Vigorous cleansing friction with alcohol to hubs/needleless entry ports whenever you make or break a connection (10 sec scrub & 10 sec air dry)
- Use sterile dead-end cap to cover end of sterile tubing
- Tubing change including all access devices q96 hrs or per policy for the fluid/medication infusing
- Cover dressing with plastic when patient showers
- Flush all lumens per policy to maintain patency

Central Line Education

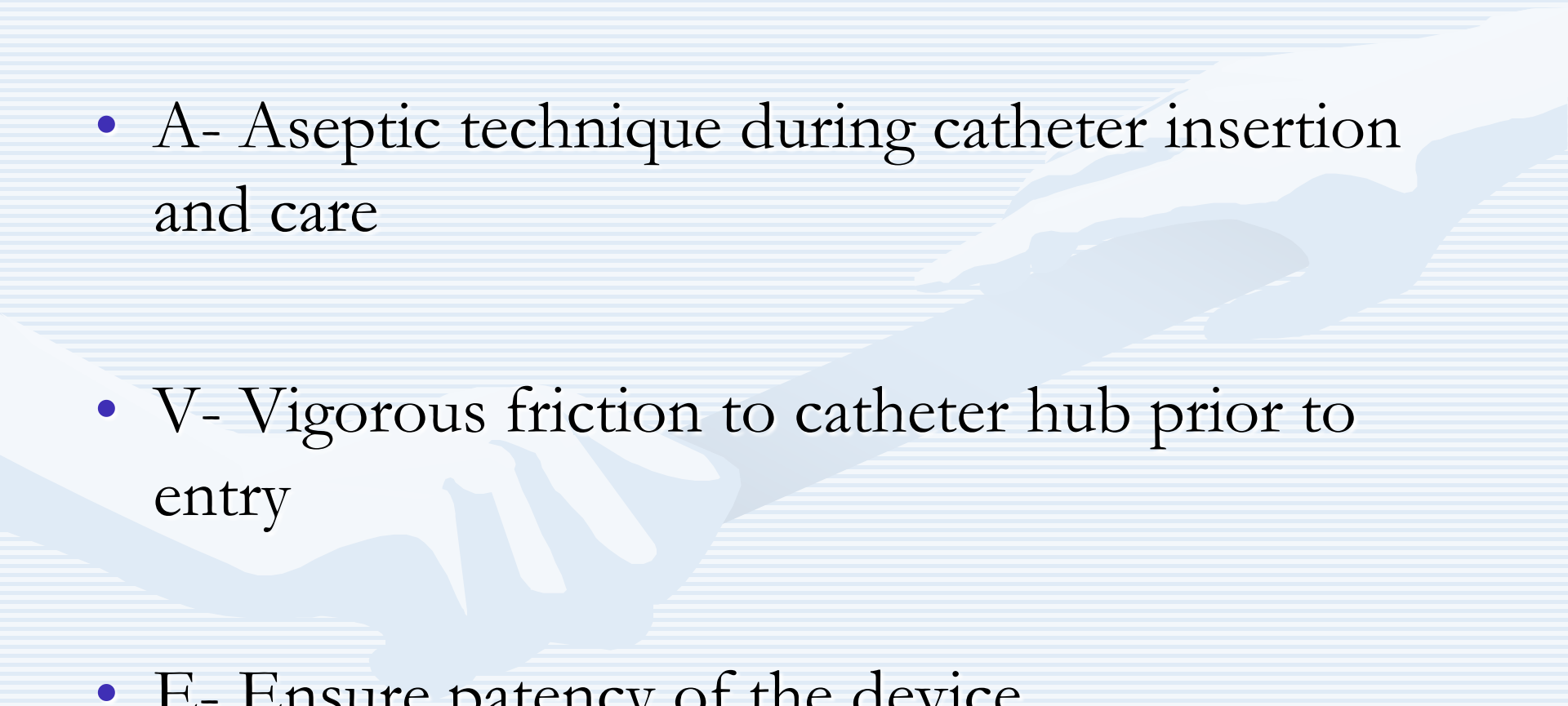
- All Adult ICU's, 8-1400 and 8-3400 received education related to CVC infection, number per year, cost to health care system and Insertion Bundle @ Critical Care Retreats in the Spring of 2008.
- All RNs will complete the mandatory self learning module which covers:
 - Facts of CVC Infections
 - Empowered staff
 - Insertion Bundle
 - Maintenance Bundle
 - Drawing Blood Cultures from Central Lines
- Adult Service RN mandatory self learning module complete by end of August 2008
- Pediatric Service RN mandatory self learning module completed by end of September 2008

STOP THE LINE

- ANYONE SEEING NON STERILE PRACTICE IS AUTHORIZED/MANDATED TO STOP THE LINE
- CMO, CQO AND DIRECTOR OF ADULT CCM MAY BE NOTIFIED 24/7 WITH ANY TRANSGRESSIONS

Association for Vascular Access

Recommendations for Line Maintenance

- S- Scrupulous hand hygiene
 - A- Aseptic technique during catheter insertion and care
 - V- Vigorous friction to catheter hub prior to entry
 - E- Ensure patency of the device
- 

PATIENT SAFETY IS A TOP PRIORITY

ALL Staff can help to prevent
Catheter Related Bloodstream Infections
(CR-BSI) by using the bundle of 5 “care steps.”

THE 5 D'S OF PREVENTION

DECONTAMINATE your Hands

DRESS for Success

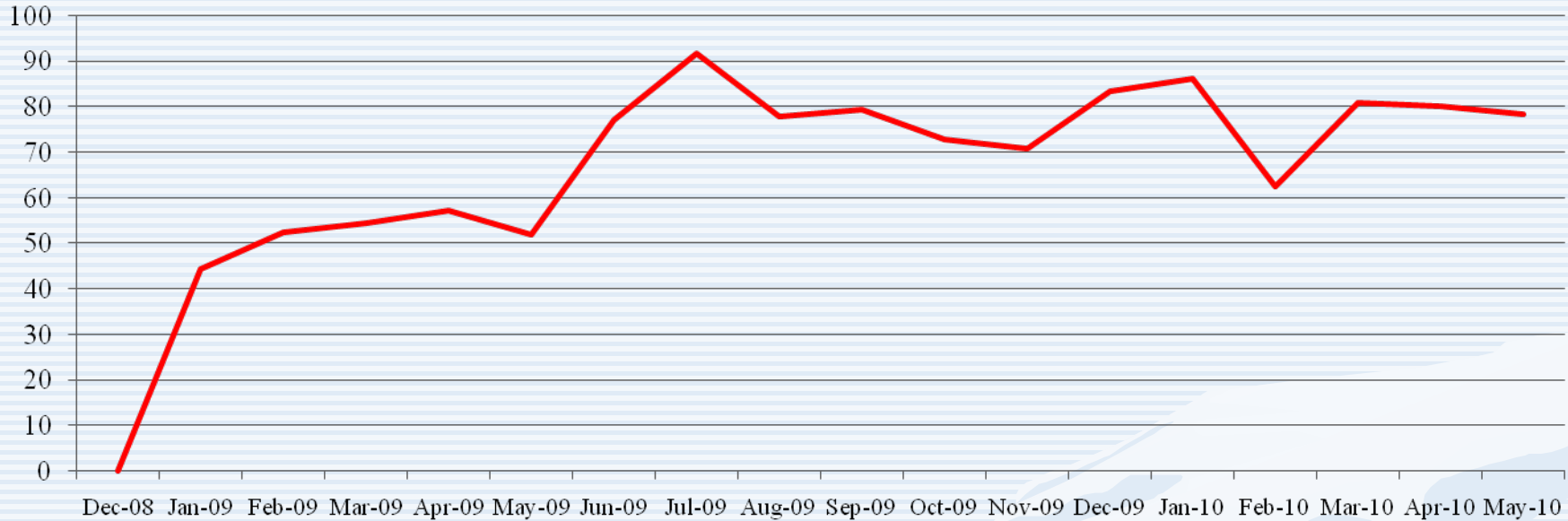
DISINFECT with Chlorhexidine

DETERMINE the Best Insertion Site

DAILY Review of Line Necessity

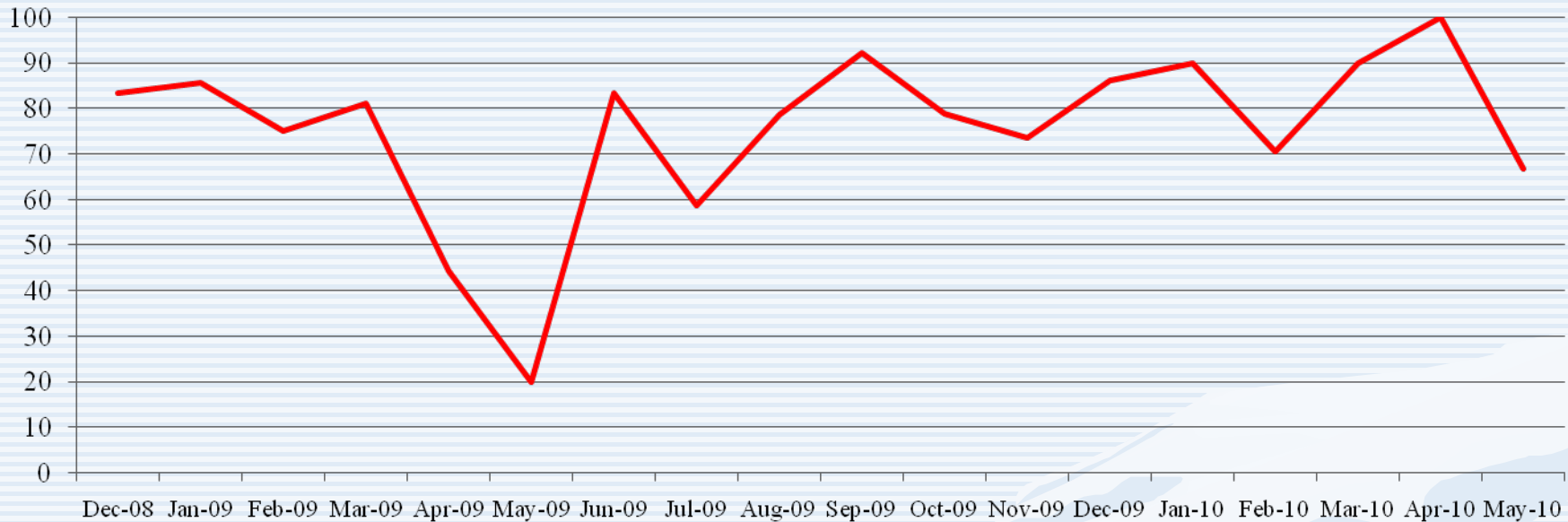
Working as a TEAM for
PATIENT SAFETY!

MICU Central Line Maintenance Bundle Compliance



Overall Compliance	0	44.44	52.38	54.29	57.14	51.85	77.08	91.67	77.78	79.31	72.72	70.83	83.33	86.21	62.5	80.76	80	78.26
Dressing Intact	33.3	75	95.2	100	100	100	95.8	100	91.7	100	100	87.5	95.83	96.6	90.1	100	100	95.65
Dressing Dated	75	100	95.2	97.1	100	100	100	95.8	100	96.6	100	91.67	100	100	96.9	96.2	100	82.61
Dressing Initialed	66.7	75	95.2	97.1	100	92.3	100	95.8	100	96.6	96.9	95.83	100	100	96.9	96.2	100	82.61
Dressing < 7 Days old	75	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	95.65
Assessment Q 24 hrs	100	100	100	100	100	100	100	100	100	100	100	91.67	100	100	100	100	100	100
IV Tubing Labeled	50	62.5	66.7	62.9	66.7	53.8	74.4	100	77.8	86.2	78.8	87.5	87.5	96.3	71.9	87.5	80	86.36
IV Tubing Chg Q 96 hrs	100	93.8	100	94.3	100	100	100	100	100	96.6	96.6	100	100	100	93.3	95.8	100	100
Sterile caps on unused tubing	100	100	100	100	100	100	100	100	100	100	75	100	100	100	100	100	100	100
Caps on unused stopcocks	100	100	100							100	100			33				100

MICU Central Line Insertion Bundle Compliance



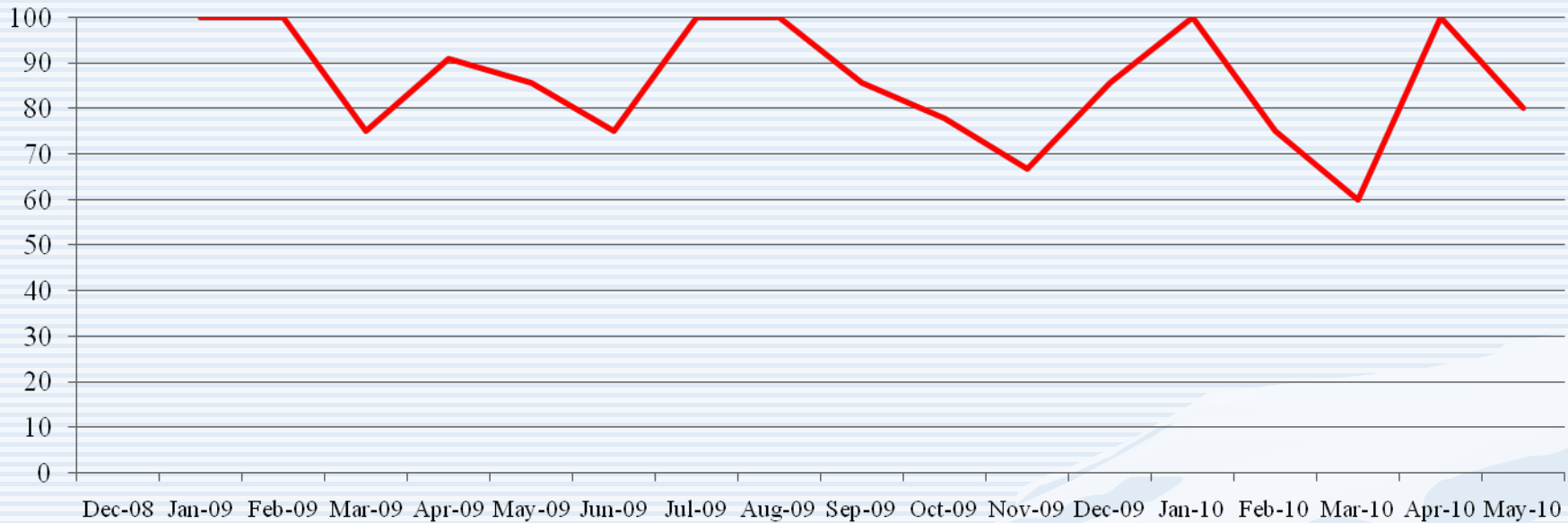
Overall Compliance	83.3	85.71	75	81.25	44.44	20	83.33	58.82	78.57	92.31	78.95	73.68	86.20	90	70.59	90	100	66.67
Handwashing	88.9	90.9	93.8	81.3	77.8	50	83.3	80	85.7	100	94.7	84.21	96.55	100	70.6	90	100	83.33
Full Sterile Drape	88.9	90.9	93.8	87.5	83.3	80	100	100	85.7	100	100	89.47	89.66	100	88.2	95	100	83.33
Full Barrier Precautions	88.9	90.9	93.8	87.5	77.8	40	83.3	80	78.6	92.3	94.7	84.21	89.66	100	88.2	90	100	75
Skin Prep	88.9	90.9	93.8	75	77.8	50	83.3	80	85.7	100	94.7	84.21	96.55	100	88.2	95	100	75
Pt. Consent	88.9	90.9	93.8	93.8	72.2	90	100	100	92.9	100	89.5	100	100	90	70.6	100	100	75
SMH 10909	88.9	90.9	93.8	81.3	88.9	90	88.9	100	85.7	100	100	89.47	96.55	100	70.6	100	100	83.33
Time-out Signed	88.9	81.8	81.3	93.8	55.6	90	100	100	92.9	100	94.7	89.47	93.1	100	70.6	100	100	83.33

SICU Central Line Insertion Bundle Compliance



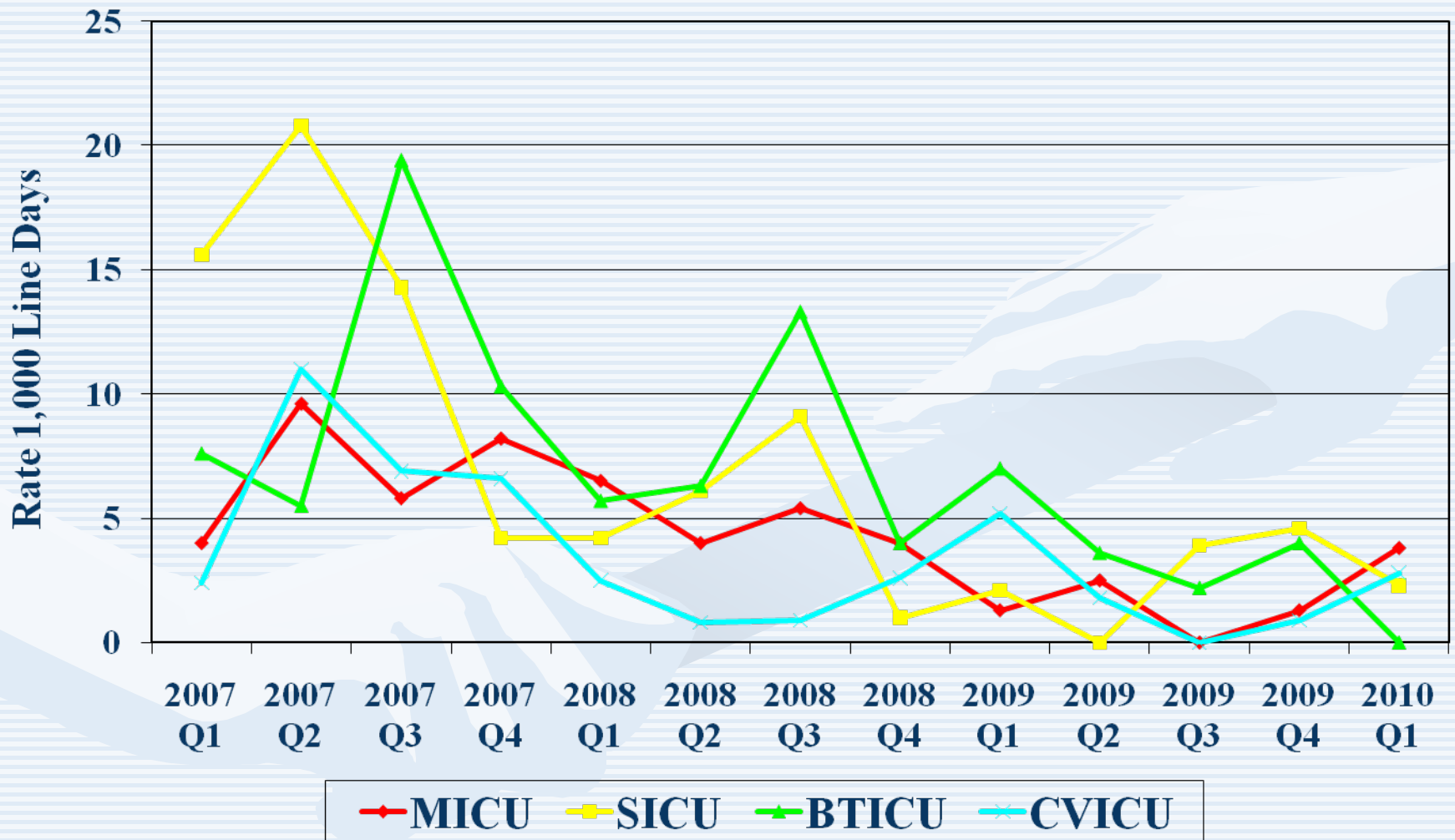
Overall Compliance		57.14	100	100	40		100								100	75	60	100	100
Handwashing		85.7	100	100	60		100								100	100	90	100	100
Full Sterile Drape		100	100	100	80		100								100	100	90	100	100
Full Barrier Precautions		100	100	100	80		100								100	100	90	100	100
Skin Prep		100	100	100	80		100								100	100	90	100	100
Pt. Consent		85.7	100	100	60		100								100	100	70	100	100
SMH 10909		85.7	100	100	80		100								100	100	100	100	100
Time-out Signed		100	100	100	80		100								100	75	80	100	100

BTICU Central Line Insertion Bundle Compliance

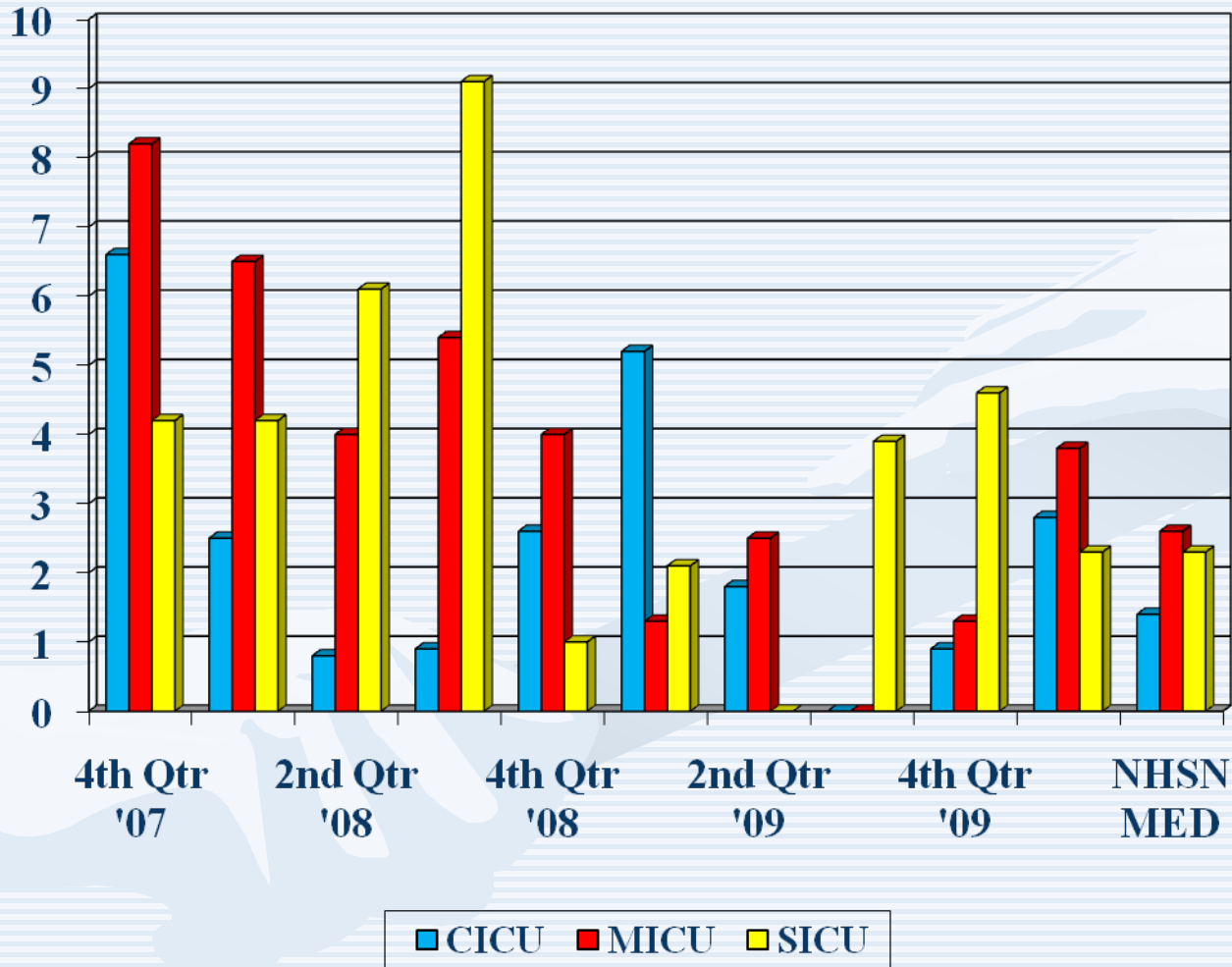


Overall Compliance		100	100	75	90.91	85.71	75	100	100	85.71	77.78	66.67	85.71	100	75	60	100	80
Handwashing		100	100	75	100	100	87.5	100	100	100	100	88.89	100	100	100	90	100	100
Full Sterile Drape		100	100	100	100	100	87.5	100	100	100	100	88.89	100	100	100	90	100	100
Full Barrier Precautions		100	100	100	100	100	87.5	100	100	100	100	88.89	100	100	100	90	100	100
Skin Prep		100	100	75	100	100	87.5	100	100	100	100	88.89	100	100	100	90	100	100
Pt. Consent		100	100	75	100	100	87.5	100	100	100	77.8	88.89	100	100	100	70	100	80
SMH 10909		100	100	100	100	85.7	87.5	100	100	100	100	88.89	85.71	100	100	100	100	100
Time-out Signed		100	100	100	100	85.7	87.5	100	100	100	100	77.78		100	75	80	100	80

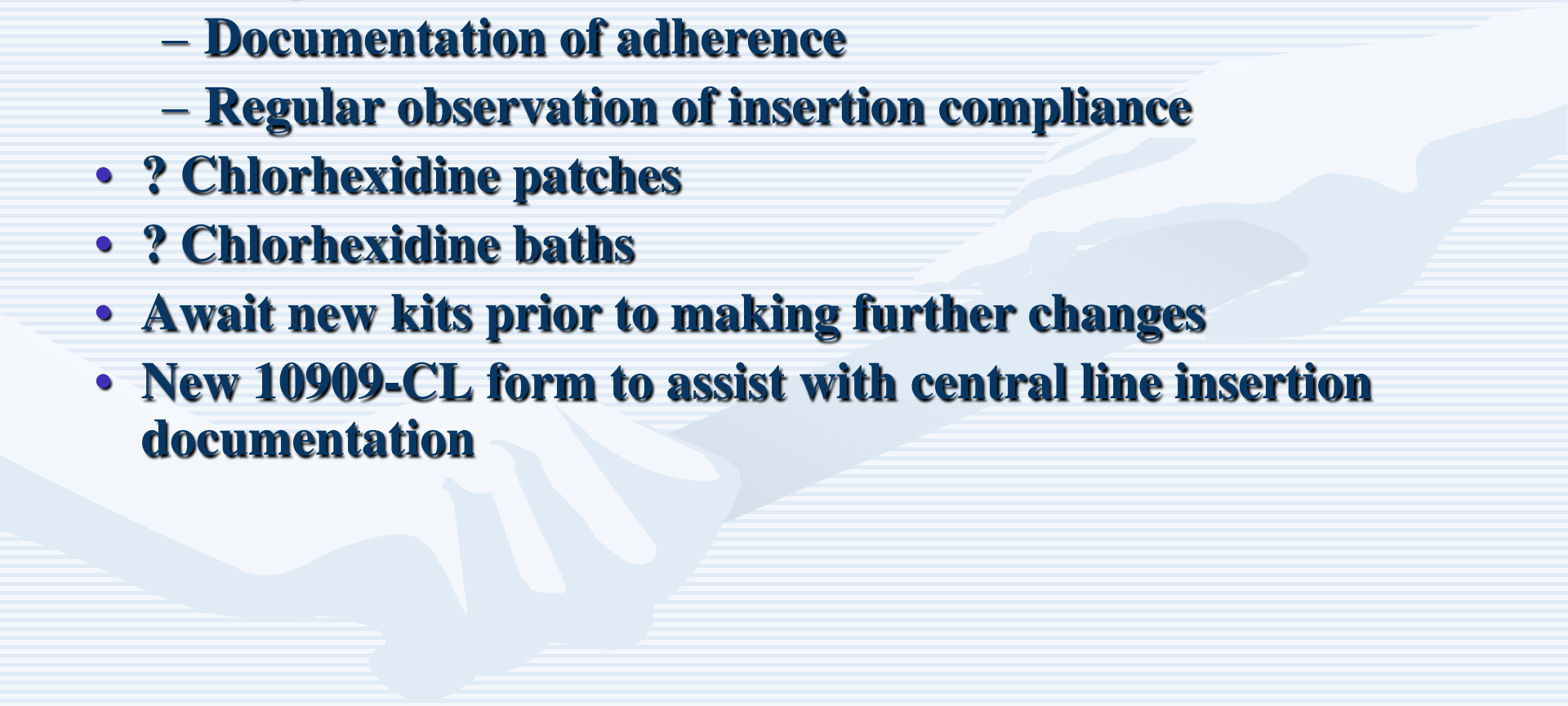
Adult Critical Care CRBSI Rate Q1 2007- Q1 2010



Adult ICU Central Line Infection Rates per 1000 line days



New Strategies

- **Review of each case**
 - **Origin of insertion**
 - **Documentation of adherence**
 - **Regular observation of insertion compliance**
 - **? Chlorhexidine patches**
 - **? Chlorhexidine baths**
 - **Await new kits prior to making further changes**
 - **New 10909-CL form to assist with central line insertion documentation**
- 

Lessons Learned

- Need physician and nursing champion
- Everyone needs to feel invested (From senior leadership to front line staff)
- Infections NOT cost of doing business
- Central lines need to be appreciated as dangerous
 - We have decreased use from ~85% MICU patients to ~65%. National average ~60%
 - Recognition it CVCs only used if better for patient not for provider/staff
- Education, education, education
- Central line kit helpful
- Checklists helpful
- Feedback data to staff (process data vitally important!)
- Review of each infection important for improvement

CLABSIs: Conclusions

- SMH has significantly reduced CLABSI rates in the Adult, Pediatric, and Neonatal ICUs
- Goal is to improve/maintain performance
- Need continued education and focus on problem
- Continued feedback/data to staff
- Review of each CLABSI with feedback to providers
- Kit with new catheter in production

Finally

- “If at first you don’t succeed, keep on sucking until you do suck seed”
 - Curley (of the Three Stooges)

