

# Dissecting the CDC Guidelines for the Prevention of CRBSI (2011)

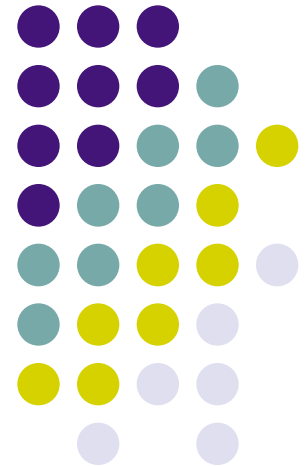
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Shilla Patel OD, CIC

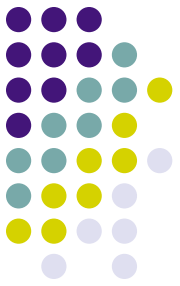
Epidemiologist/Infection Control Coordinator

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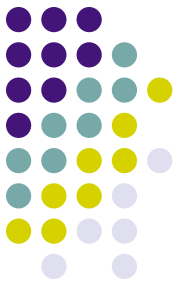
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# Disclosures

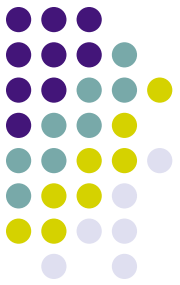


- Honorarium from ICU Medical



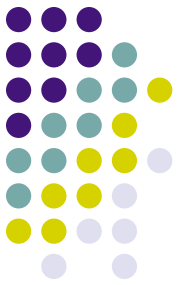
# Objectives

- Understand how CDC guidelines were created
- Understand the different CDC recommendation categories
- Name 3 CDC IA recommendations
- Identify 1 CDC category II recommendation that you use at your hospital



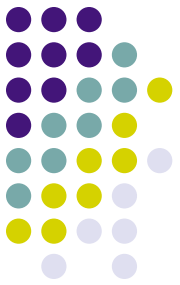
# CDC Guidelines

- CDC HICPAC committee has 15 members
- Also work with 18 members from various related organizations
- Review all literature (370 references!)
- Use standard methodology to create guidelines
- They do all the work for us!!!!



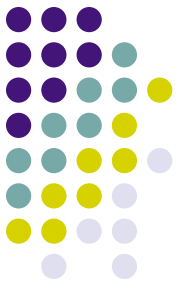
# CDC Recommendation Categories

- **Category IA.** Strongly recommended for implementation and strongly supported by well-designed experimental, clinical, or epidemiologic studies.
- **Category IB.** Strongly recommended for implementation and supported by some experimental, clinical, or epidemiologic studies and a strong theoretical rationale; or an accepted practice (e.g., aseptic technique) supported by limited evidence.
- **Category IC.** Required by state or federal regulations, rules, or standards.
- **Category II.** Suggested for implementation and supported by suggestive clinical or epidemiologic studies or a theoretical rationale.
- **Unresolved issue.** Represents an unresolved issue for which evidence is insufficient or no consensus regarding efficacy exists.

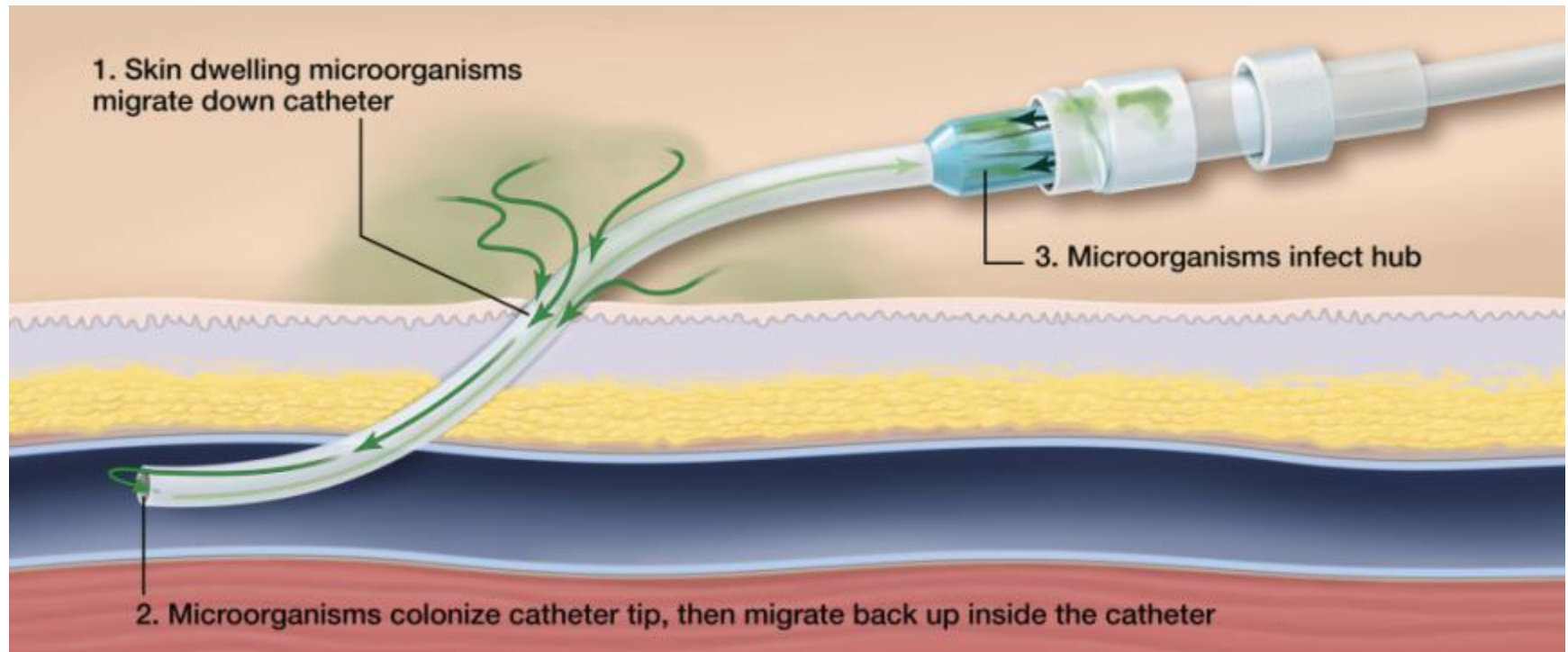


# What I left out

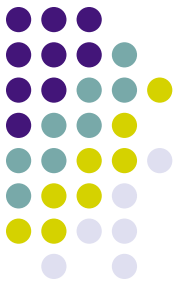
- Recommendations on Peripheral and Midline catheters
- Shortened the language
- Obvious stuff
  - Pulling the line out asap
  - Not inserting a line if its not necessary



# MICROBIAL MIGRATION

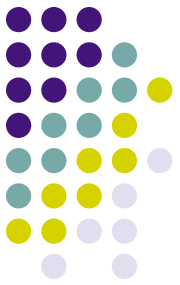


# Education, Training and Staffing



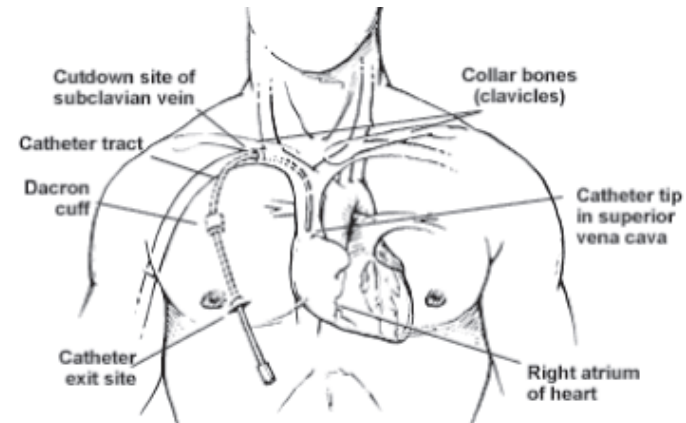
- Educate HCW on the use, insertion, maintenance and IC prevention measures [7–15]. Category IA
- Periodically assess knowledge and adherence to guidelines for all HCW involved in the insertion/ maintenance of IV catheters [7–15]. Category IA
- Designate only trained HCW for the insertion and maintenance of peripheral and central intravascular catheters. [14–28]. Category IA
  - IV team
  - Central line insertion in IR



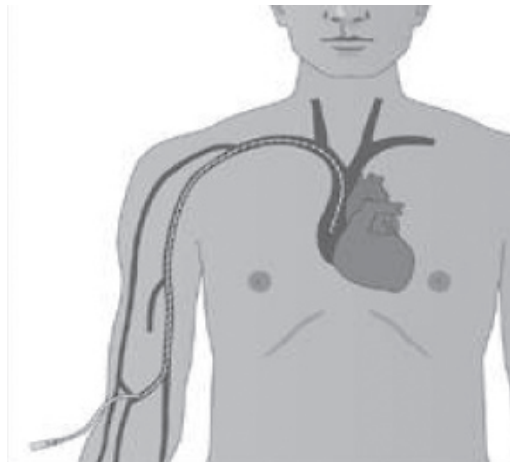


# Types of Central Lines

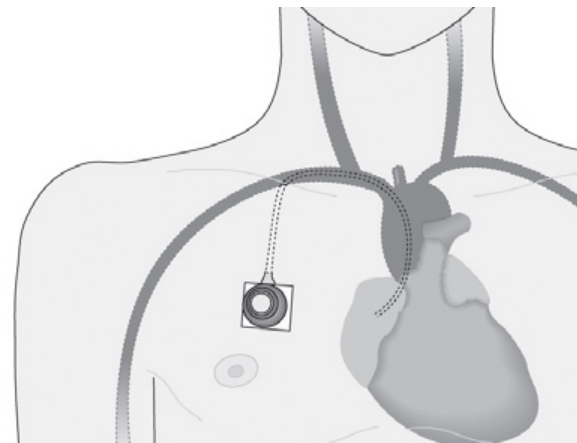
- Nontunneled CVCs
- Tunneled CVCs



- PICC



- Implanted ports

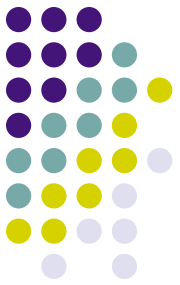


# Selection of Catheters and Sites



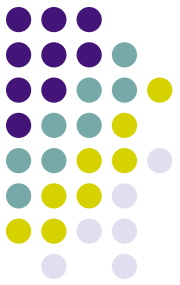
- Avoid using the femoral vein **in adult** patients [38, 50, 51, 54]. Category 1A
- Use a subclavian site, rather than a jugular or a femoral site, in adult patients for nontunneled CVC placement [50–52]. Category IB
  - **Stay away from open wounds!**
- No recommendation can be made for a preferred site of insertion for a tunneled CVC. Unresolved issue
- Avoid the subclavian site in hemodialysis patients and patients with advanced kidney disease, to avoid subclavian vein stenosis [53,55–58]. Category IA
  - **Barret et al (1998) found 50% subclavian vein stenosis in group of 36 pts**

# Selection of Catheters and Sites Cont



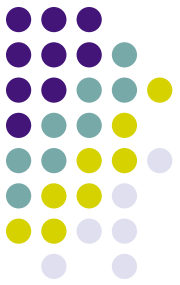
- Use a fistula or graft in patients with chronic renal failure instead of a CVC<sup>[59]</sup>. Category 1A
- Use ultrasound guidance to place CVCs <sup>[60–64]</sup>. Category 1B
  - reduce the number of cannulation attempts
  - mechanical complications.
- Use a CVC with the minimum number of ports or lumens essential for the management of the patient <sup>[65–68]</sup>. Category IB
  - Study compared single lumen vs triple lumen pt groups and triple lumen had greater rate of infection esp with TPN

# Selection of Catheters and Sites Cont



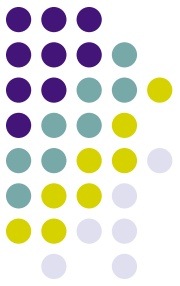
- No recommendation can be made regarding the use of a designated lumen for TPN.  
Unresolved issue
- When adherence to aseptic technique cannot be ensured (i.e medical emergency), replace the catheter as soon as possible, i.e, within 48 hours [37,73–76]. Category IB

# Hand Hygiene and Aseptic Technique

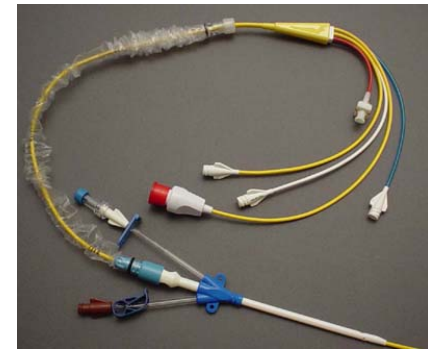


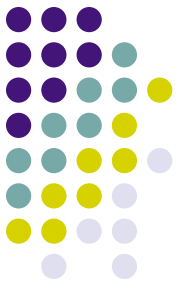
- Hand hygiene should be performed before/after palpating catheter insertion sites and before/after inserting, replacing, accessing, repairing, or dressing an IV catheter [12, 77–79]. Category IB
- Sterile gloves should be worn for the insertion of arterial, central, and midline catheters [37, 73, 74, 76]. Category IA
- Use new sterile gloves before handling the new catheter when guidewire exchanges are performed. Category II

# Maximal Sterile Barrier Precautions



- Use maximal sterile barrier precautions for the insertion of CVCs, PICCs, or guidewire exchange [14, 75, 76, 80]. Category IB
  - MSB (mask, cap, sterile gloves, gown, large drape) better than sterile gloves and small drape
- Use a sterile sleeve to protect pulmonary artery catheters during insertion [81]. Category IB

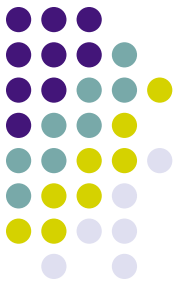




# Skin Preparation

- Prepare clean skin with a **>0.5%** chlorhexidine preparation with alcohol before insertion and during dressing changes.
  - If there is a contraindication to chlorhexidine, tincture of iodine, an iodophor, or 70% alcohol can be used as alternatives [82, 83]. Category IA
  - **How about CHG in alcohol vs Povidone-iodine in alcohol?**
- No recommendation can be made for the safety or efficacy of chlorhexidine in infants aged <2 months. Unresolved issue
- Antiseptics should be allowed to dry [82, 83]. Category IB

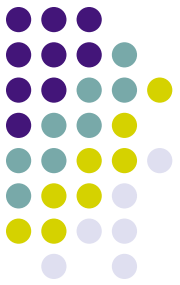
# Catheter Site Dressing Regimens



- Use either sterile gauze or sterile, transparent, semi permeable dressing to cover the catheter site [84–87]. Category IA
- If the site is bleeding or oozing, use a gauze dressing until this is resolved [84–87]. Category II
- Replace gauze dressings every 2 days. Category II
- Replace transparent dressings at least every 7 days, except in those pediatric patients. Category IB
  - In peds risk for dislodging the catheter may outweigh the benefit of changing the dressing [87, 93].



# Catheter Site Dressing Regimens Cont



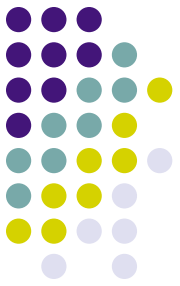
- Replace catheter site dressing if the dressing becomes damp, loosened, or visibly soiled [84, 85]. Category IB
- Do not use topical antibiotic ointment/creams on insertion sites, **except for dialysis catheters**, because of their potential to promote fungal infections and antimicrobial resistance [88, 89]. Category IB
  - After 5 yrs of mupirocin use in NICU, 42% of CNS became resistant
  - Promote Candida growth

# Catheter Site Dressing Regimens Cont



- No recommendation can be made regarding the necessity for any dressing on well-healed exit sites of long-term cuffed and tunneled CVCs. Unresolved issue
- Ensure that catheter site care is compatible with the catheter material [94, 95]. Category IB

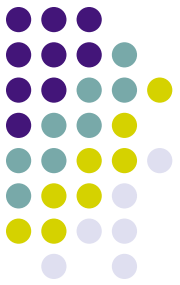
# Catheter Site Dressing Regimens Cont



- Use a chlorhexidine-impregnated **sponge** dressing in patients > 2 months of age. Category 1B
  - Recommended if the CLABSI rate is not decreasing despite adherence to education/training, chlorhexidine for skin antisepsis, and MSB [93, 96–98].
  - Why did they use the term “sponge” dressing?



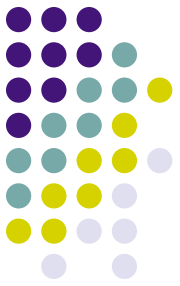
- No recommendation is made for other types of chlorhexidine dressings. Unresolved issue



# Patient Cleansing

- Use a 2% chlorhexidine wash for daily skin cleansing [102–104]. Category II
  - Studies show it is better than soap and water
  - Reduces skin flora

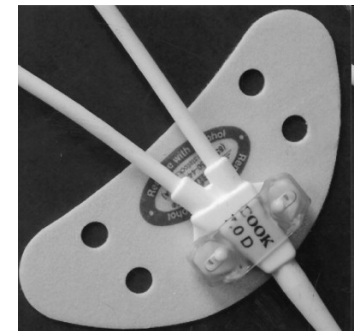
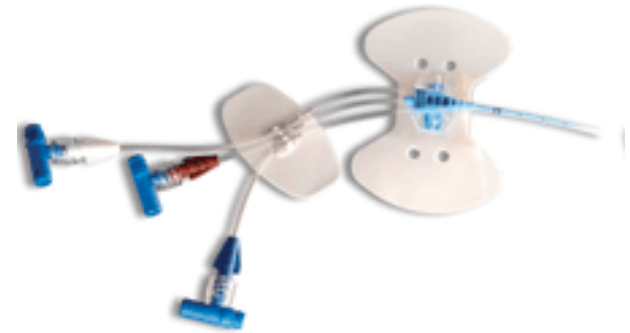
# Catheter Securement Devices



- Use a sutureless securement device [105].

## Category II

- Decrease disruption
- Decrease colonization
- Decrease sharp injuries

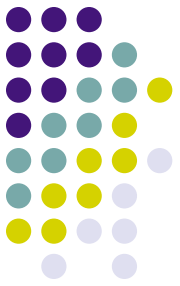




# Antimicrobial/Antiseptic Impregnated Catheters and Cuffs:

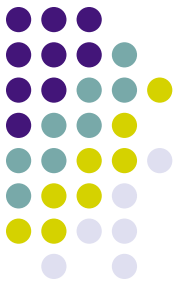
- Use a chlorhexidine/silver sulfadiazine or minocycline/rifampin -impregnated CVC in patients whose catheter is expected to remain in place >5 days. Category IA
  - Use if all else fails (education, MSB, CHG)
  - Studies done on pts show less colonization and lower CRBSI rate

# Systemic Antibiotic Prophylaxis



- Do not administer systemic antimicrobial prophylaxis routinely before/during insertion [114]. Category IB
  - Has not been shown to reduce infection consistently
  - Risk of Antimicrobial resistance

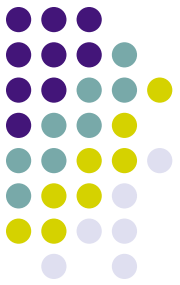
# Antibiotic/Antiseptic Ointments



- Use povidone iodine antiseptic ointment or bacitracin/gramicidin/ polymyxin B ointment at the hemodialysis catheter exit site after insertion and at the end of each dialysis session
- Make sure ointment does not interact with the material of the hemodialysis catheter! \*59, 115–119]. Category IB
  - Mupirocin and polyurethane PD cath

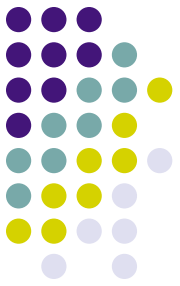


# Antibiotic Lock Prophylaxis, Antimicrobial Catheter Flush and Catheter Lock Prophylaxis



- May use prophylactic antimicrobial lock solution in some patients [120– 138].  
Category II
  - Pts with long term catheters
  - Pts who have a history of multiple CRBSI despite optimal maximal adherence to aseptic technique
  - No current FDA approved formulations

# Anticoagulants

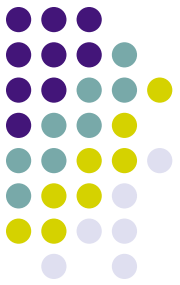


- Do not routinely use anticoagulant therapy [139]. Category II
  - Heparin induced thrombocytopenia can occur
  - Warfarin not been shown to reduce CLABSI

# Replacement of CVCs, PICCs and HD Catheters

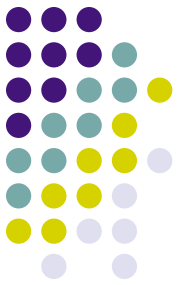


- Do not routinely replace catheters. Category IB
- Do not use guidewire exchanges routinely for non-tunneled catheters to prevent infection. Category IB
- Do not use guidewire exchanges to replace a non-tunneled catheter suspected of infection. Category IB
- Use a guidewire exchange to replace a malfunctioning non-tunneled catheter if no evidence of infection is present. Category IB



# Umbilical Catheters

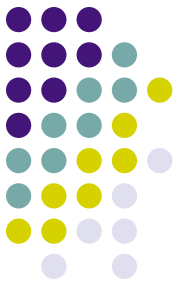
- Cleanse the umbilical insertion site with an antiseptic before catheter insertion. Other iodine-containing products (e.g., povidone iodine) can be used [146–150]. Category IB
  - Avoid tincture of iodine because of the potential effect on the neonatal thyroid.
- Do not use topical antibiotic ointment or creams on umbilical catheter insertion sites [88, 89]. Category IA
  - Promote Candida growth
  - Mupirocin resistance



# Umbilical Catheters, Cont

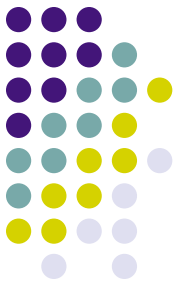
- Add low-doses of heparin (0.25—1.0 U/ml) to the fluid infused through umbilical arterial catheters [151–153]. Category IB
- Total duration of catheterization should not exceeded **5 days** for an umbilical artery catheter or **14 days** for an umbilical vein catheter. Category II

# Replacement of Administration Sets



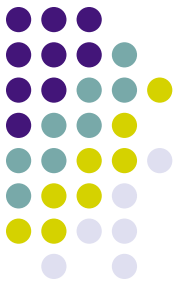
- Replace administration sets that are continuously used, no more frequently than at 96-hour intervals, [177] but at least every 7 days [178–181]. Category IA
  - In patients not receiving blood, blood products or fat emulsions
- Replace tubing used to administer blood, blood products, or fat emulsions within 24 hours of initiating the infusion [182–185]. Category IB
- Replace tubing used to administer propofol infusions every 6 or 12 hours, when the vial is changed, per the manufacturer's recommendation (FDA website Medwatch) \*186+. Category IA
- No recommendation can be made regarding the length of time a needle used to access implanted ports can remain in place. Unresolved issue

# Needleless Intravascular Catheter Systems



- Use a needleless system to access IV tubing. Category IC
  - Helps prevent sharps injuries
- Change the needleless components at least as frequently as the administration set. [39, 187–193]. Category II
  - There is no benefit to changing these more frequently than every 72 hours.

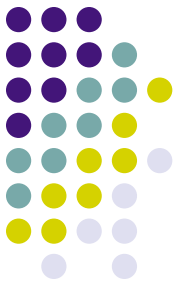
# Needleless Intravascular Catheter Systems



- Scrub the access port with an appropriate antiseptic (chlorhexidine, povidone iodine, an iodophor, or 70% alcohol) and accessing the port only with sterile devices [189, 192, 194–196]. Category IA
- When needleless systems are used, a split septum valve may be preferred over some mechanical valves [197–200]. Category II

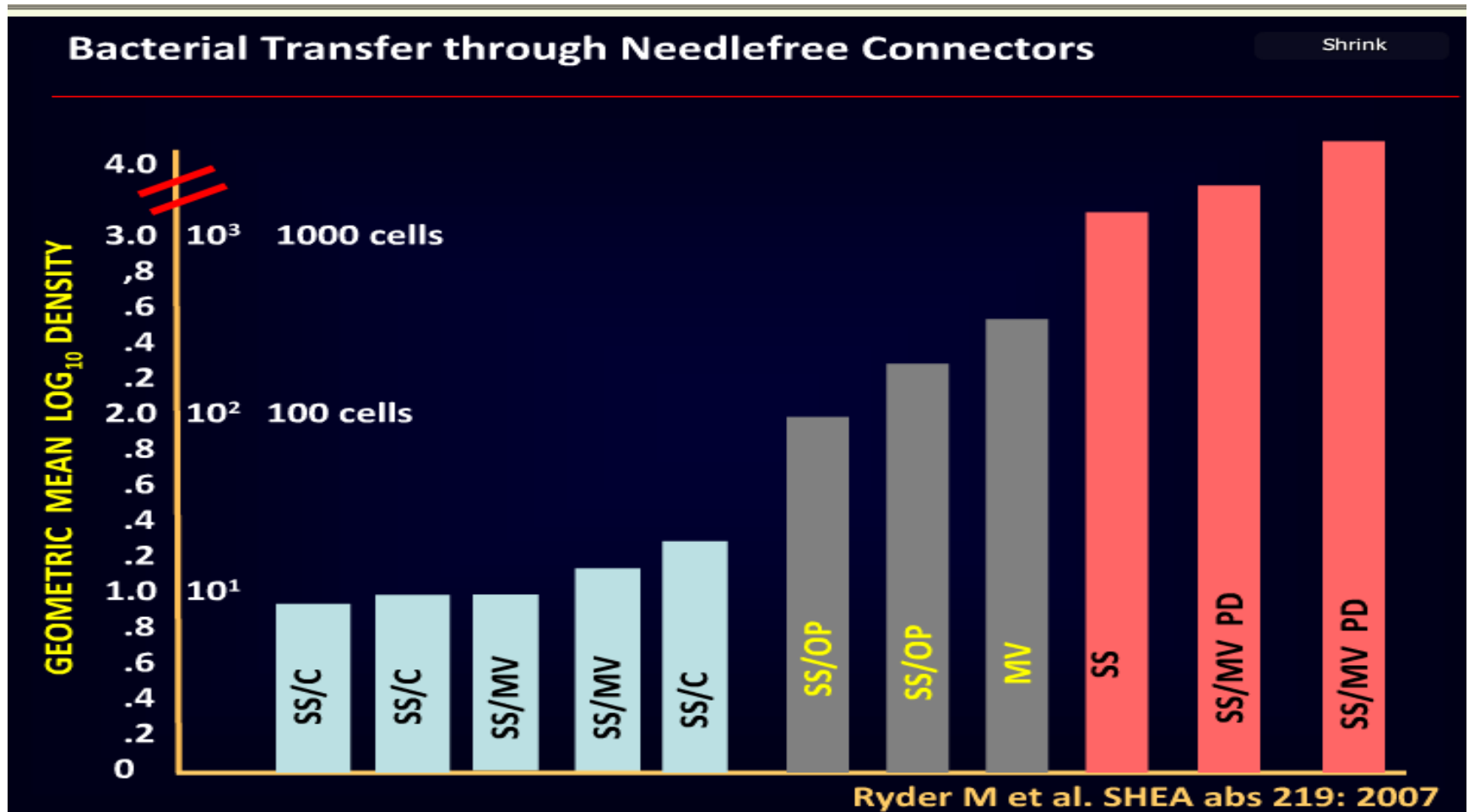


# Various Designs of Needleless Connectors

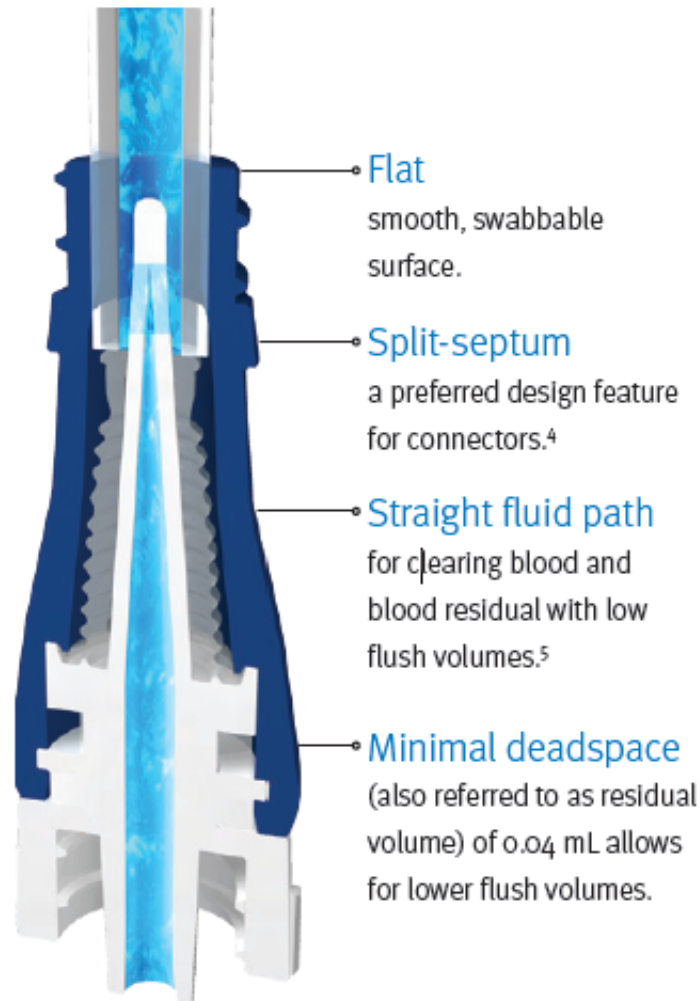
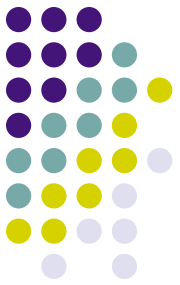


- Split Septum/Cannula
- Split Septum/Mechanical Valve
- Split Septum/Open path
- Mechanical Valve

# Ryder M et al, SHEA abs 219:2007



# Split Septum Connectors



- **Flat**

smooth, swabbable surface.

- **Split-septum**

a preferred design feature for connectors.<sup>4</sup>

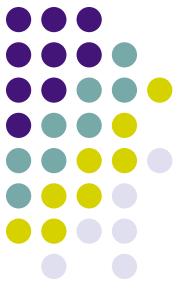
- **Straight fluid path**

for clearing blood and blood residual with low flush volumes.<sup>5</sup>

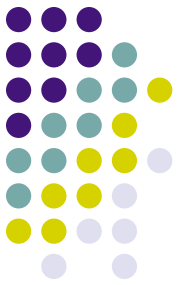
- **Minimal deadspace**

(also referred to as residual volume) of 0.04 mL allows for lower flush volumes.

# Split septum vs Mechanical Valves



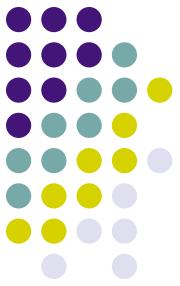
- A number of outbreak investigations have reported increases in CRBSIs associated with a switch from external cannulae activated split septum needleless devices to mechanical valve devices. (197,198,200,359)



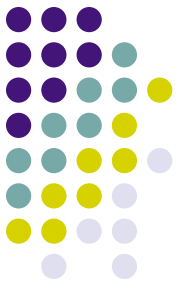
# Performance Improvement

- Use performance improvement initiatives in which strategies are "bundled" together to improve compliance with evidence-based recommended practices [15, 69, 70, 201–205].

Category IB



# CRBSI vs CLABSI



# AJIC Article Dec 2010

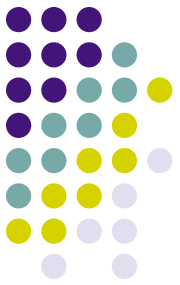
- *Validation of the surveillance and reporting of central line-associated bloodstream infection data to a state health department*
- Audited 30 hospitals in Connecticut (data from Oct 08–Dec 08)
- Findings: 48/476 BC were CLABSI, only 23 were reported
- >50% underreporting of CLABSI !

# CMS to begin CLABSI validation under the Inpatient Quality Reporting (IQR) Program



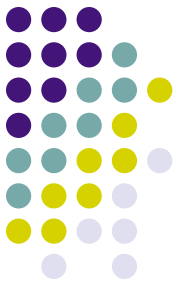
- On April 6, quality improvement programs received notice via QualityNet of the process and submission requirements for FY2014 validation of the central line-associated bloodstream infection (CLABSI) measure.
- Hospitals selected for validation will need to fill out a spreadsheet with requested data by August 1, 2012.





# Summary

- Many ways to prevent CRBSI
- CDC guidelines give you the information you need to protect your pts
- References in the document are good ways to begin the discussion with your staff
- More and more pressure will be put on IC to lower rates due to public reporting



**Thanks!**

**Questions?  
Comments?**

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