Preventing Healthcare-Associated Infections:

Do You Know if Your Health Care Providers are Doing the Most Important Things Consistently?

20-CITY EDUCATIONAL ROADSHOW
APRIL-MAY, 2018

Healthcare-Associated Infections Program
Center for Health Care Quality
California Department of Public Health

California Department of PublicHealth

Objectives

- Review evidence-based practices known to prevent healthcare-associated infections (HAI)
- Discuss observed gaps in infection prevention practices
- Review recommendations for monitoring adherence to infection prevention practices
- Review CDPH Adherence Monitoring Tools
- Discuss how to establish a facility-wide adherence monitoring program

HAI Prevention – What works?

"If everything is important, then nothing is"

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HAI Prevention – What works?

- **Evidence-based practice recommendations** are based on science
  - If studied systematically, does a practice result in reduced infection rates?
  - To be considered an infection prevention "best practice," is the practice associated with sustained low HAI rates?
  - Careful evaluation of available studies, including risk/benefit, determines recommended practices
  - Where scientifically valid studies are lacking, consensus expert opinion also considered but never alone

HAI Prevention – What works?

- Best sources for evidence-based HAI prevention practice recommendations
  - **Centers for Disease Control and Prevention (CDC)**
  - **Healthcare Infection Control Practices Advisory Committee (HICPAC)**
  - **Infectious Diseases Society of America (IDSA) / Society for Healthcare Epidemiology of America (SHEA)**

HAI Prevention Practice Terms

Core / Basic Care Practices

- **Standard of practice**
- Based on higher levels of scientific evidence
- Demonstrated feasibility
- **Effectiveness depends on consistency**

Special Approaches

- Used **in addition to Core/Basic** care practices when HAI rates remain high or during outbreaks
- Based on some scientific evidence
- May not be feasible in all settings

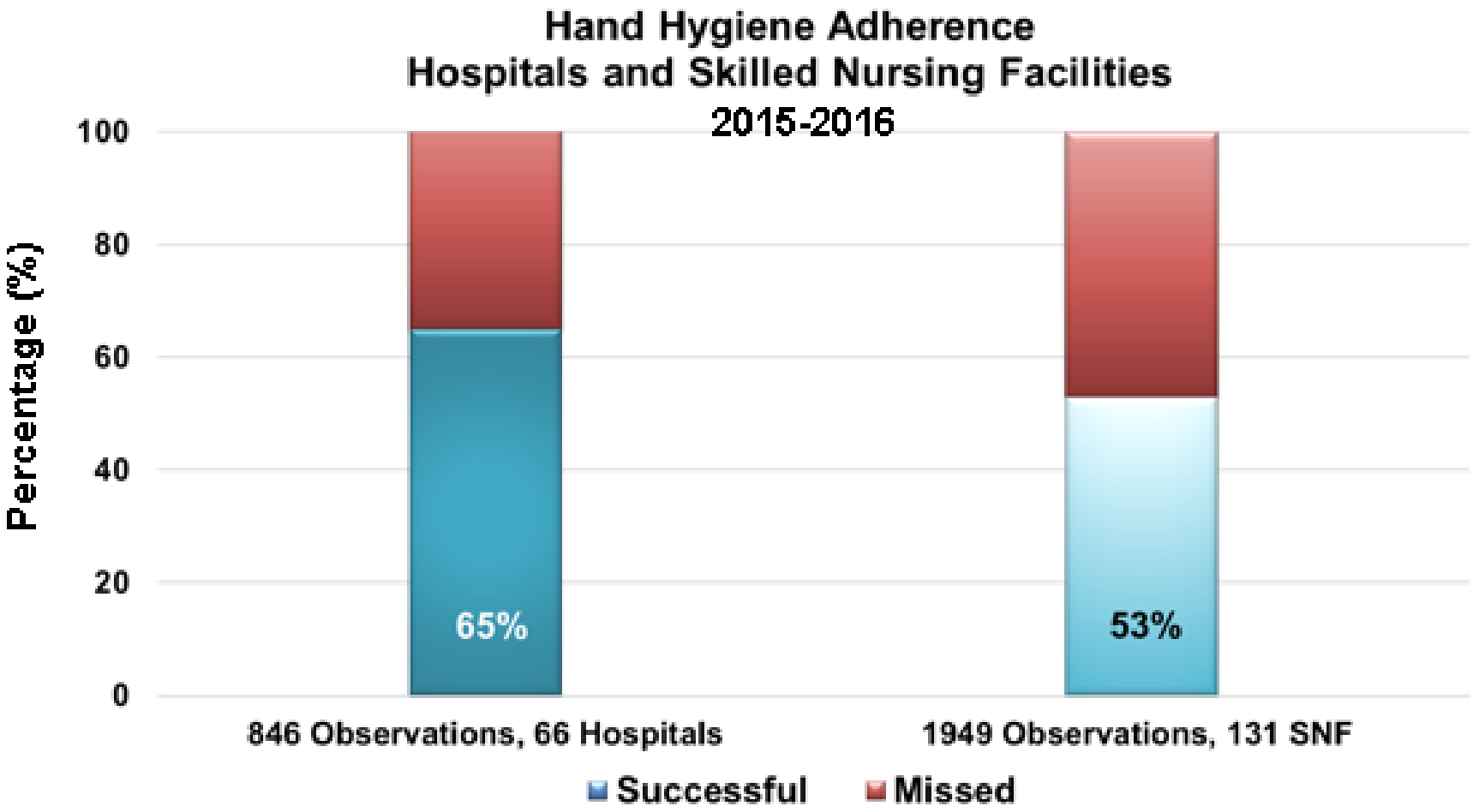
Core Infection Prevention Practices

For Use in All Health Care Settings at All Times

- Visible, tangible leadership support for infection control
- Infection prevention training for all HCP
- Patient, family, caregiver HAI prevention education
- Performance monitoring and feedback
- Early, prompt removal of invasive devices
- Occupational health
- Standard precautions
  - Hand hygiene
  - Environmental cleaning and disinfection
  - Injection safety, medication safety
  - Assess risk, use PPE appropriately
  - Minimize potential exposures
  - Clean and reprocess reusable medical equipment
- Transmission-based precautions as necessary

Are Core Infection Prevention Care Practices Performed Routinely?

Results of CDPH HAI Program Liaison IP Observations


Hand Hygiene Adherence
Hospitals and Skilled Nursing Facilities
2015-2016
Percentage (%)
100
80
60
40
20
0
65%
53%
846 Observations, 66 Hospitals
1949 Observations, 131 SNF
Successful
Missed

Are Core Infection Prevention Care Practices Used Routinely in YOUR facility?

You won't know if you don't monitor!

Monitoring Hand Hygiene

Discip line	What type of HH opportunity was observed? (select/ ☑ 1 per line) *Remember: Hand hygiene should be performed before and after glove use	✔ Successful ⃠ Missed
N	☐ entering room* ☐ before task ☐ after body fluids ☐ after care* ☑ leaving room	✔
N	☑ entering room* ☐ before task ☐ after body fluids ☐ after care* ☐ leaving room	⃠
CNA	☐ entering room* ☐ before task ☐ after body fluids ☐ after care* ☑ leaving room	✔
CNA	☑ entering room* ☐ before task ☐ after body fluids ☐ after care* ☐ leaving room	⃠
CNA	☑ entering room* ☐ before task ☐ after body fluids ☐ after care* ☐ leaving room	⃠
CNA	☐ entering room* ☐ before task ☐ after body fluids ☐ after care* ☑ leaving room	✔
MD	☑ entering room* ☐ before task ☐ after body fluids ☐ after care* ☐ leaving room	⃠
MD	☑ entering room* ☐ before task ☐ after body fluids ☐ after care* ☐ leaving room	⃠
N	☑ entering room* ☐ before task ☐ after body fluids ☐ after care* ☐ leaving room	✔
N	☑ entering room* ☐ before task ☐ after body fluids ☐ after care* ☐ leaving room	⃠

Total # HH Successful ("# ✔ "): 4	Total # HH Opportunities Observed: 10	Adherence: __40_____% (Total # HH Successful ÷Total # HH Opportunities Observed x 100)

Adherence Monitoring Tools for Core Practices

- Hand hygiene
- Safe injection practices
- Blood glucose meter
- Environmental cleaning and disinfection
- Device reprocessing
- High level disinfection of reusable devices
- Contact precautions

Reducing *Clostridium difficile* Infection (CDI) Rates

2020 CDI Prevention Goal

- Target set by National Action Plan to Prevent HAI
  - Recommended by the CDPH HAI Advisory Committee for all California hospitals
- **30% CDI reduction** from 2015 baseline **=** Standardized Infection Ratio (**SIR**) of **0.70** in **2020**
  - On track to achieve 2020 target if **SIR 0.88** in **2017**

    →SIR 0.82 in 2018

    →SIR 0.76 in 2019

Healthcare-Associated CDI in California

- CDI reported frequently by California hospitals

2016

- Over 10,000 hospital-onset CDI (**60%** of reported HAI)
- 40 hospitals high CDI for 3-4 years, 2013-2016

2017 *(unpublished data)*

- **59%** of hospitals **on track** to reach 2020 goal, SIR $\leq$ 0.88 (41% not on track)
- 26 hospitals still significantly higher than 2015 baseline

Ask these questions about CDI incidence in your hospital:

Do the numbers of CDI reported represent true infection or asymptomatic colonization?

Are our providers testing only those patients with signs and symptoms of CDI?

Accuracy of CDI Diagnosis / Surveillance Data

- Sensitive diagnostic testing methods allow for rapid identification of patients with CDI
  - Prompt initiation of CDI therapy improves patient outcomes
  - Prompt initiation of Contact precautions minimizes transmission risk to others
- Sensitive diagnostic tests sometimes used inappropriately
  - Detect asymptomatic *C. difficile* colonization
  - Initiate unnecessary CDI therapy
  - **Report inaccurate surveillance data**

CDI Testing

- **CDI testing** should be limited to symptomatic patients with unformed stool
  - Presence of unexplained and new-onset diarrhea
  - ≥3 unformed stools over 24 hours
- Implement pre-agreed hospital-wide **criteria** for CDI testing
  - Algorithm to direct proper testing
  - Discontinue laxatives 24-48 hours prior to testing
  - Laboratory rejects testing if formed stool (does not conform to shape of container)

CDI Testing

- If no pre-agreed institutional criteria for CDI testing, perform positive stool toxin test as part of a multi-step algorithm*
  - Glutamate dehydrogenase (GDH) plus toxin, or
  - GDH plus toxin arbitrated by nucleic acid amplification test (NAAT) such as polymerase chair reaction (PCR), or
  - NAAT plus toxin

CDI Testing

- Use laboratory-based system for **immediate notification** of positive CDI test results
- Do not repeat testing within 7 days during same episode of diarrhea
  - "Test of cure" **not** recommended

CDI Testing in Children

- Do not test neonates or infants ≤12 months of age
- Do not test children 1-2 years of age unless other infectious or non infectious causes have been excluded
- Test children ≥2 years of age only if prolonged or worsening diarrhea and risk factors or relevant exposures (exposure to healthcare system or recent antibiotics)

Reducing CDI Rate/SIR: The Most Important Things

Improve CDI Surveillance – Improve Diagnosis/Treatment

- ❑ Initiate institutional criteria for optimal CDI testing
  -OR-
- ❑ Perform toxin-test as part of multi-step algorithm

- ❑ Test only symptomatic patients
- ❑ Do not repeat testing within 7 days of same diarrhea episode
- ❑ Do not test for cure

Clostridium difficile Infection (CDI) Prevention

CDI Prevention – What works?

Best sources for **evidence-based CDI prevention practice** recommendations

- **CDC** CDI Prevention Primer
  - Slide set
  - Summarizes CDC guideline recommendations
- **IDSA/SHEA** Clinical Practice Guidelines for *Clostridium difficile*
  - **NEW**, Feb 2018
  - Lead author, Cliff McDonald /CDC

CDI is a 2-Step Process

The following events may occur separately and in any order, but **both are required for infection to occur:**

1. The normal **intestinal flora must be compromised** (primarily due to antibiotics) allowing for *C.difficile* to establish itself and proliferate

2. ***C.difficile* bacteria or spores must be ingested**

CDI Risk Factors

- Antimicrobial exposure ***(Modifiable risk factor)***
- Acquisition of *C. difficile* bacteria ***(Modifiable risk factor)***
- Advanced age
- Immunosuppression
- Tube feedings
- Gastric acid suppression
- Prolonged stay in healthcare facility
- Inflammatory bowel disease
- GI surgery

CDI-Targeted Antimicrobial Stewardship

- Implement an **antimicrobial stewardship program**
  - Minimize **frequency** and **duration** of high-risk antimicrobials and **numbers** of antimicrobials prescribed
- Target antimicrobials based on local epidemiology
  - Restricting fluoroquinolones, cephalosporin, and clindamycin found most useful (may still be used for surgical prophylaxis)
- Reduce use of broad-spectrum antibiotics
  - Enforcing narrow-spectrum antibiotic policy with feedback to prescribing physicians resulted in significant CDI reduction in 3 hospital geriatric medical wards *(Fowler, 2007)*

CDI-Targeted Antimicrobial Stewardship

- When patient diagnosed with CDI, review recent and current antimicrobials
  - Stop the inciting antibiotic ASAP
- Start CDI antibiotic therapy empirically for lab delay or fulminant CDI

CDPH Antimicrobial Stewardship Interventions for CDI Prevention

- **Improve overall antimicrobial prescribing** →
  Fewer patients on antimicrobials →
  Fewer patients develop CDI →
  Fewer CDI patients contribute to transmission

- **Stop unnecessary antibiotics** in patients with new CDI diagnoses →
  Improve clinical response to treatment and reduce risk of recurrent CDI →
  Fewer CDI patients contribute to transmission

CDPH Antimicrobial Stewardship Interventions for CDI Prevention

- **Restrict antimicrobials with high risk for CDI →**

  Promote use of lower risk antimicrobials →

  Fewer patients susceptible for CDI

High Risk	Medium Risk	Low Risk
Aminopenicillins	Beta-lactam/beta-lactamase inhibitors	Macrolides
Clindamycin	Carbapenems	Trimethoprim/ sulfamethoxazole
Cephalosporins		Tetracyclines
Fluoroquinolones		

Examples of CDI-Targeted ASP Interventions

- Formulary restriction and prospective audit with feedback
  - Target antibiotic(s) most associated with CDI at **your** facility
  - Recommend lower-risk alternatives, and optimizing dosing, route and duration of therapy
- Target patients with CDI diagnoses for medication review to identify and discontinue unnecessary antibiotics

See CDPH HAI Program **Antimicrobial Stewardship Program Initiative** for more examples and toolkits at www.cdph.ca.gov/HAI

Contact Precautions for CDI

- Assign **private room with dedicated toilet**
  - Cohort only with other CDI colonized or infected patients
- Place on **Contact Precautions** for duration of diarrhea
- Continue Contact precautions for at least 48 hours after diarrhea resolved

Contact Precautions for CDI

- Use **gloves** and gowns upon room entry and for patient care
  - Gloves are effective at preventing *C. difficile* contamination of hands *(Dubberke, 2014)*
  - **Adherence** to glove use critical to preventing *C. difficile* transmission **via hands** of HCP
- Remove gloves **prior to exiting** room
  - Emphasize **hand hygiene compliance**

Contact Precautions Special Approaches

When CDI rates remain high or during outbreak

- Place patients with diarrhea on Contact precautions **pending CDI confirmation**
  - Also called "preemptive" Contact precautions
  - Rationale: Patients with CDI may contaminate environment and hands of healthcare personnel before results of testing known
- For patient with possible recurrent CDI, isolate and test following first unformed stool

Hand Hygiene for CDI

- Perform hand hygiene before and after contact with CDI patient **and after removing gloves**
  - Follow CDC or WHO guidelines
- Routinely use alcohol hand rub **or** soap and water
  - *C. difficile* spores are resistant to alcohol However, clinical studies have not found increase in CDI with alcohol-based hand hygiene products, but several did find reductions in MRSA or VRE
- Use soap and water during CDI outbreak, “hyper-endemic setting,” or fecal hand contamination
- Encourage **patient** hand hygiene

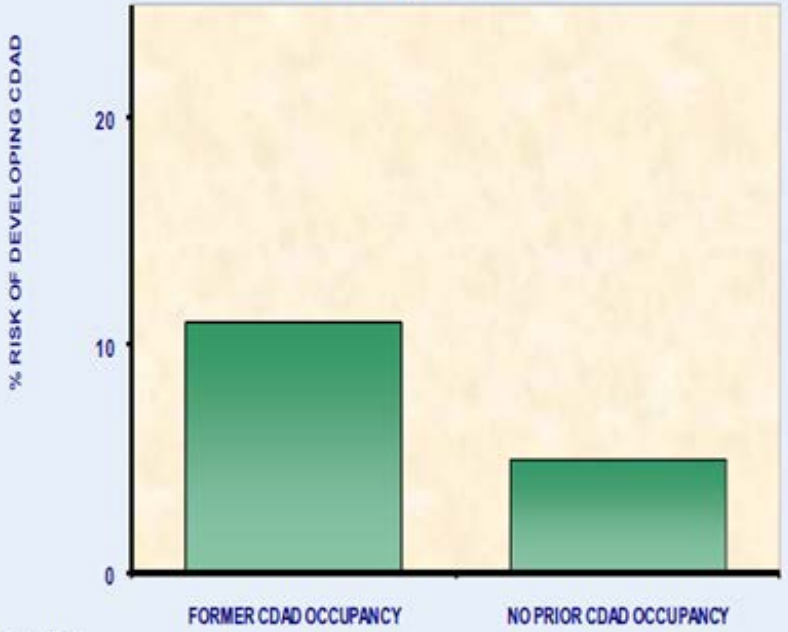
Hand Washing and Gloves Special Approaches

When CDI rates remain high or during outbreak

- Hand hygiene with **soap and water**
  - Be aware: Hand hygiene adherence **may decrease** when soap and water is only option provided
- **Universal glove use**
  - Asymptomatic carriers play a role in transmission (though magnitude of contribution unknown)
  - Practical CDI screening tests not available

CDI in the Hospital Environment

C. difficile Transmission from Prior Room Occupants



110% Increased risk

Shaugnessey etal. Abstract K-4194
IDSA / ICAAC. October 2008

SHEA The Society for Healthcare Epidemiology of America

August 2, 2011

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Equipment

- Use **disposable** equipment when possible
  - Replace electronic thermometers with single use disposable
- Identify and **remove unnecessary** equipment that can be environmental sources of *C. difficile* transmission
- Ensure **reusable equipment** is cleaned with a **sporicidal disinfectant**

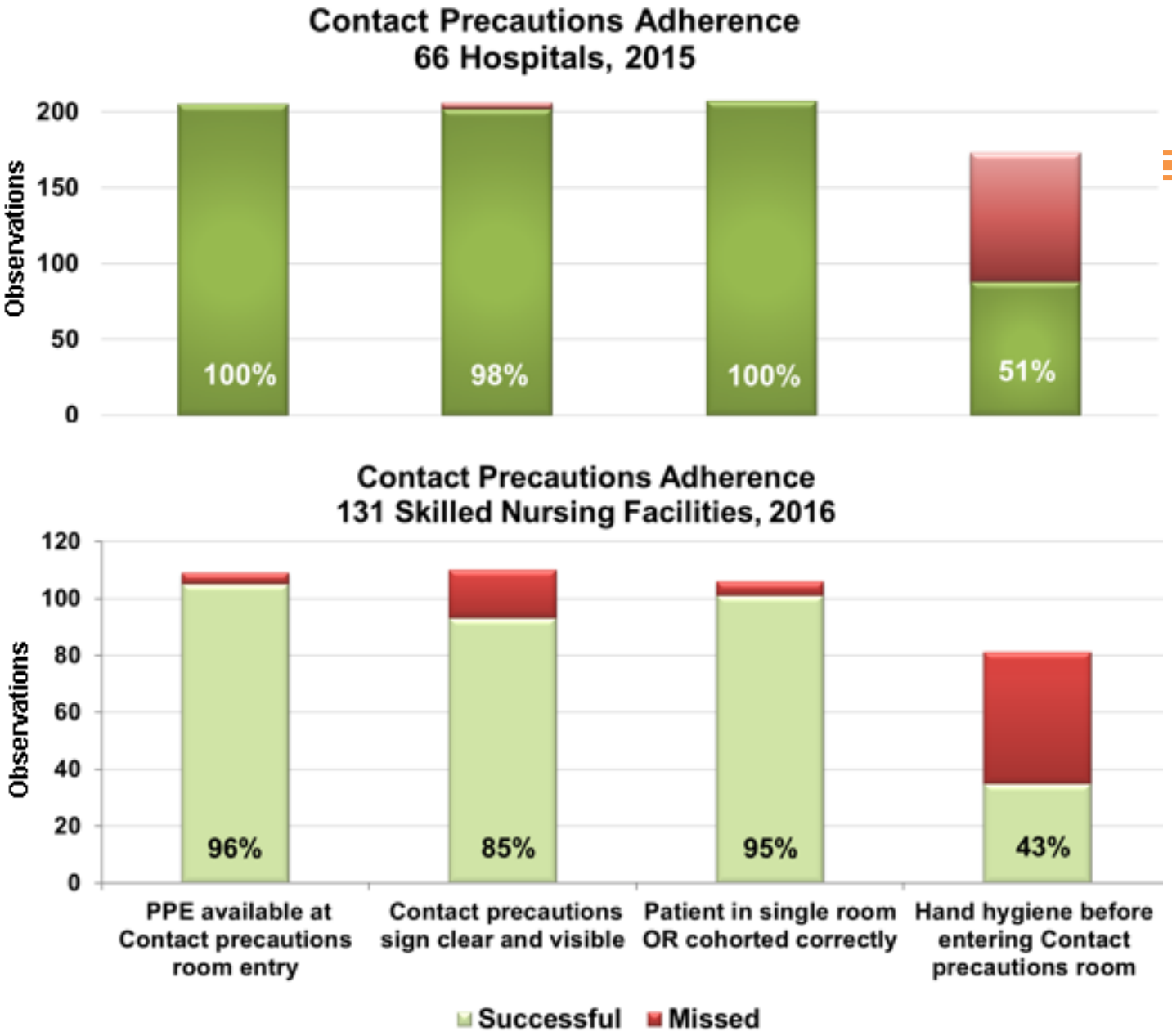
Preventing CDI: The MOST Important Things

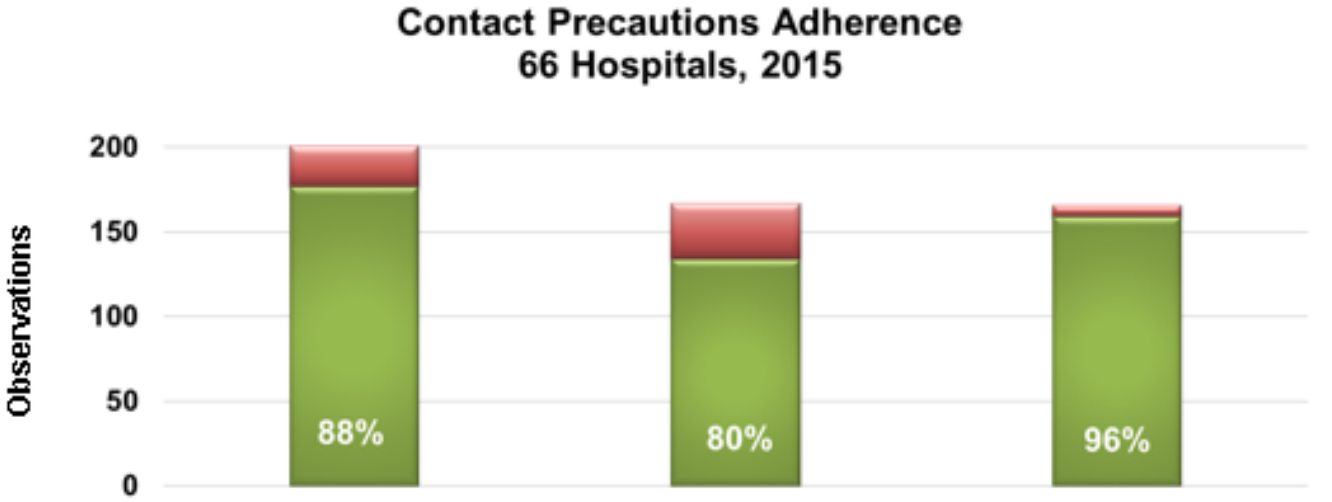
Prevent C. difficile Acquisition / Reduce Antimicrobial Exposure

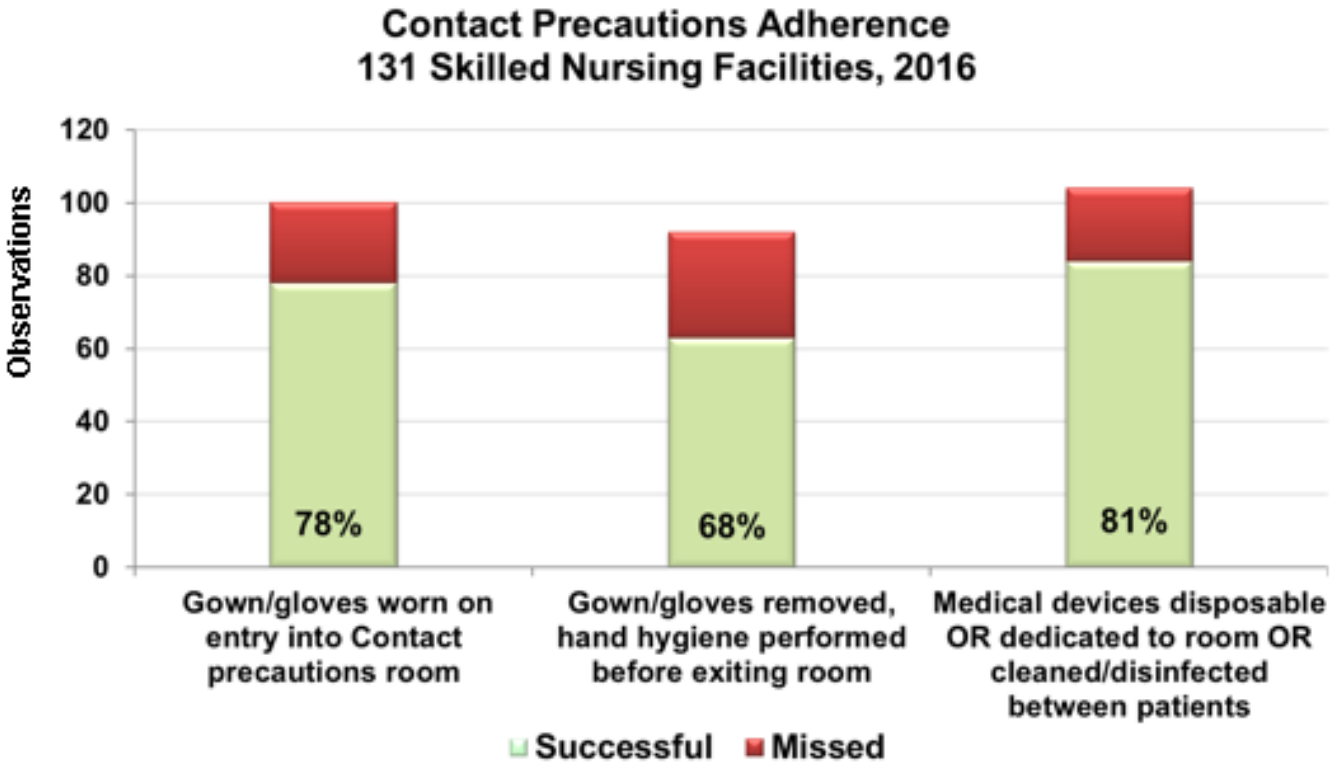
- ❑ Isolate patients with diarrhea pending CDI confirmation
- ❑ **Lab alert system** for immediate notification of positive CDI tests
- ❑ **Contact precautions** for duration of diarrhea plus 48 hours
  - ❑ Private room, dedicated toilet
  - ❑ Gloves/gown to enter room
  - ❑ Remove gloves, perform hand hygiene prior to room exit
- ❑ **Hand hygiene** before/after patient contact & after glove removal
  - ❑ Patient hand hygiene
- ❑ **Disposable equipment**
- ❑ **Sporicidal disinfectant** for cleaning reusable equipment
- ❑ Sporicidal disinfectant for **terminal** cleaning
- ❑ **Quality cleaning,** daily & terminal
- ❑ CDI-targeted **antimicrobial stewardship program**
  - ❑ Improve overall prescribing, stop unnecessary antibiotics
  - ❑ Restrict high-risk antibiotics based on local epidemiology
  - ❑ Stop inciting antibiotic

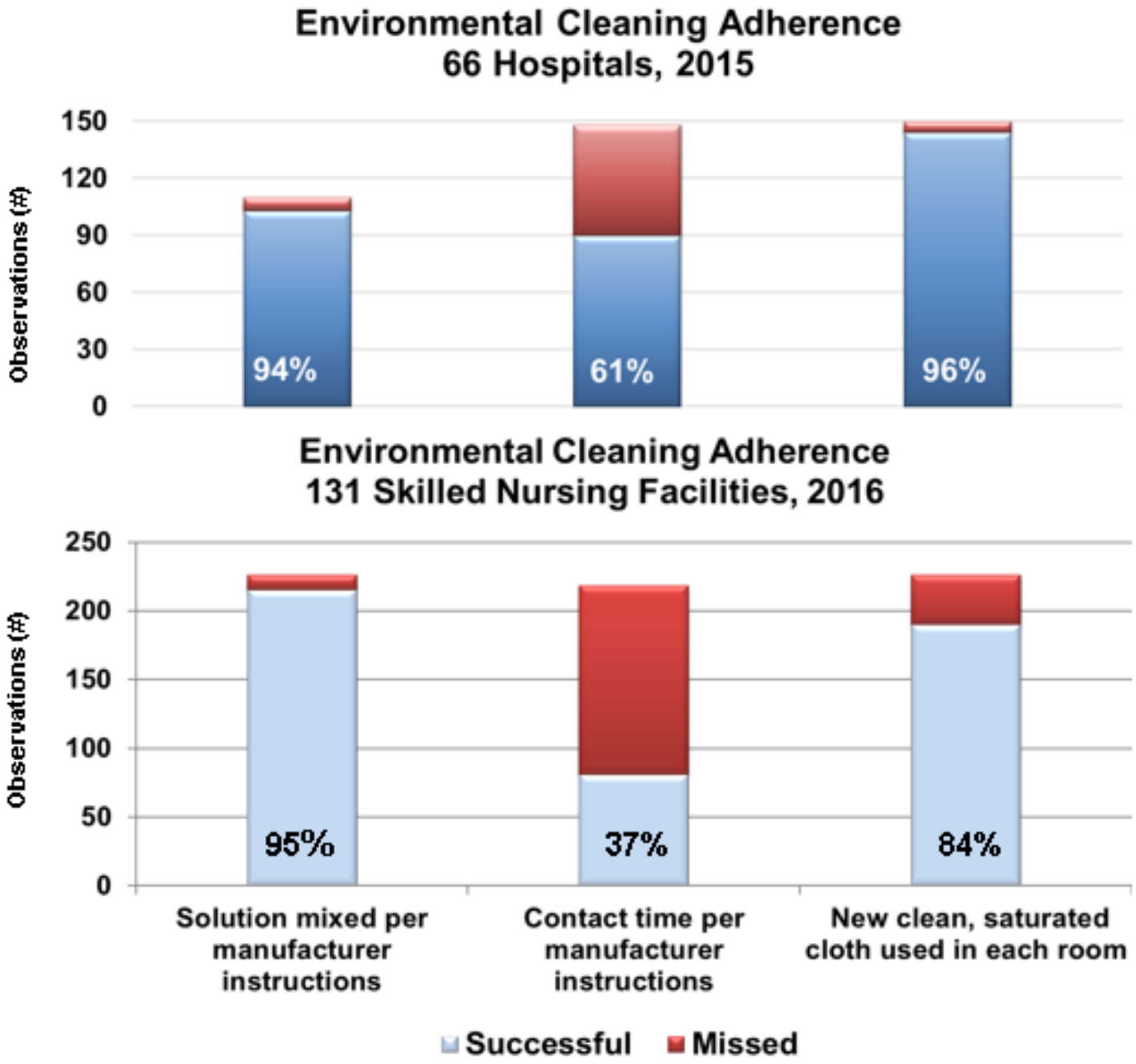
Are CDI Prevention Care Practices Performed Routinely?

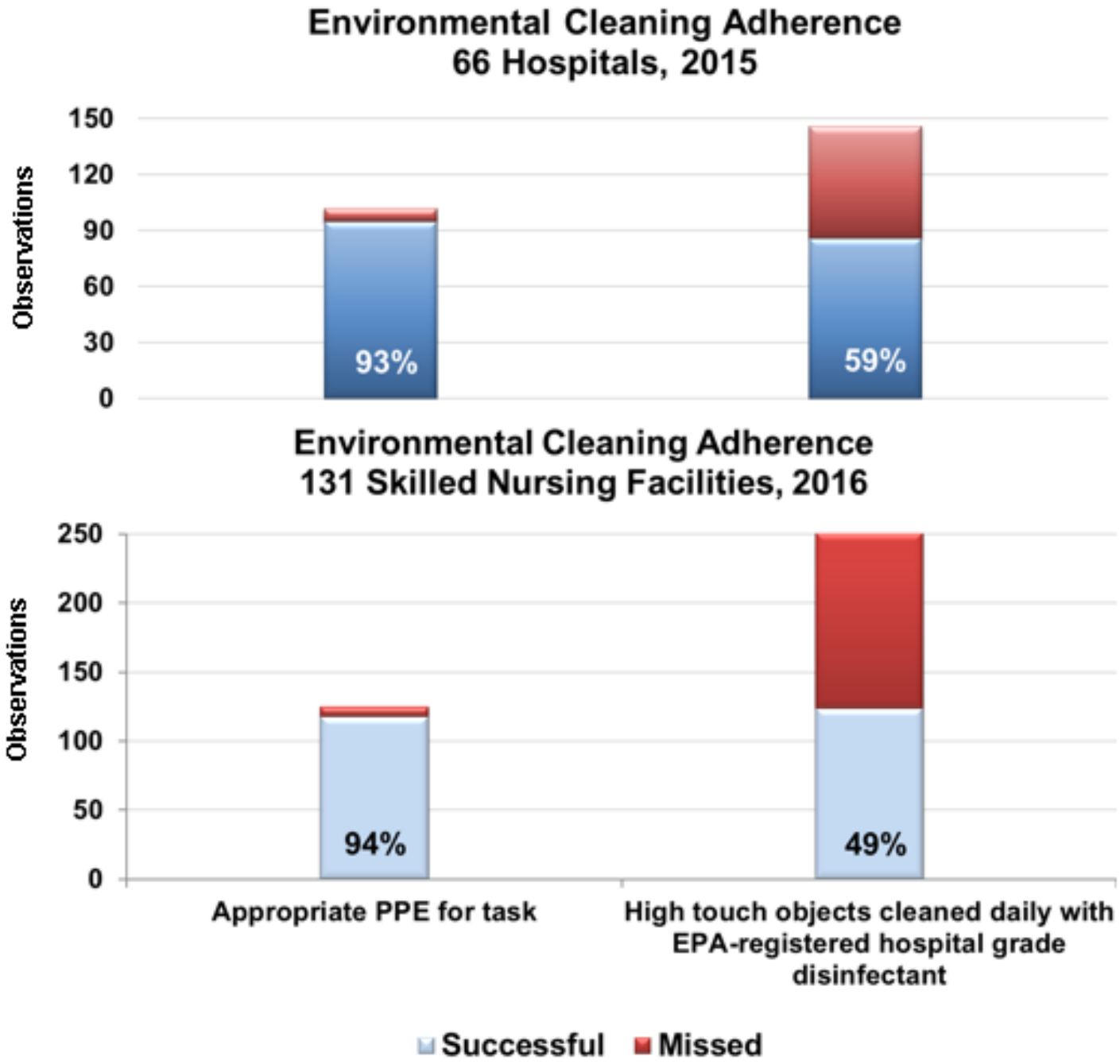
Results of CDPH HAI Program Liaison IP Observations

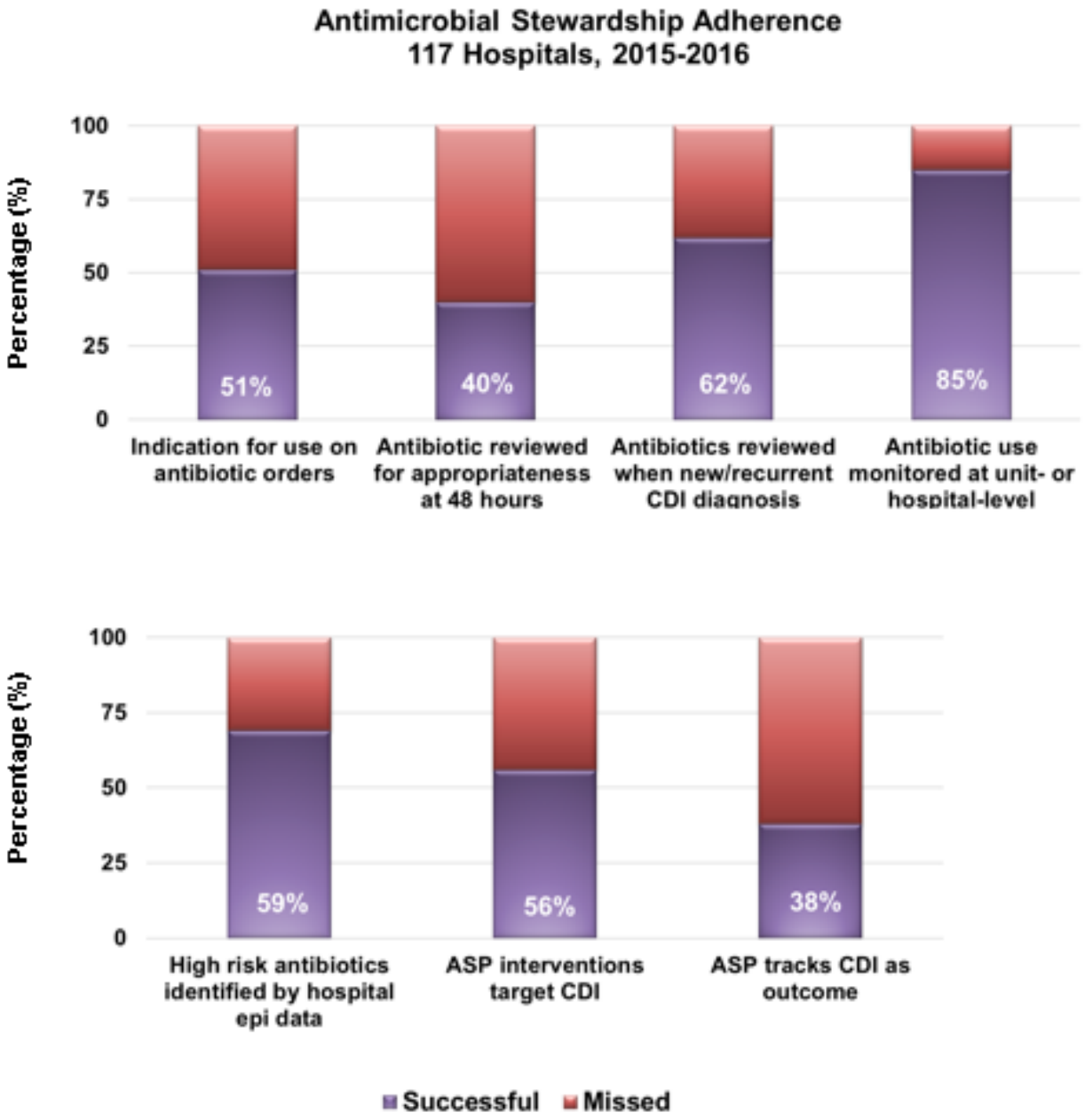

Contact Precautions Adherence
66 Hospitals, 2015
Observations
200
150
100
50
0
100%
98%
100%
51%
Contact Precautions Adherence
131 Skilled Nursing Facilities, 2016
Observations
120
100
80
60
40
20
0
96%
85%
95%
43%
PPE available at Contact precautions room entry
Contact precautions sign clear and visible
Patient in single room OR cohorted correctly
Hand hygiene before entering Contact precautions room
Successful
Missed


Contact Precautions Adherence
66 Hospitals, 2015
Observations
200
150
100
50
0
88%
80%
96%


Contact Precautions Adherence
131 Skilled Nursing Facilities, 2016
Observations
120
100
80
60
40
20
0
78%
68%
81%
Gown/gloves worn on entry into Contact precautions room
Gown/gloves removed, hand hygiene performed before exiting room
Medical devices disposable OR dedicated to room OR cleaned/disinfected between patients
Successful
Missed


Environmental Cleaning Adherence
66 Hospitals, 2015
Observations (#)
150
120
90
60
30
0
94%
61%
96%
Environmental Cleaning Adherence
131 Skilled Nursing Facilities, 2016
Observations (#)
250
200
150
100
50
0
95%
37%
84%
Solution mixed per manufacturer instructions
Contact time per manufacturer instructions
New clean, saturated cloth used in each room
Successful
Missed


Environmental Cleaning Adherence
66 Hospitals, 2015
Observations
150
120
90
60
30
0
93%
59%
Environmental Cleaning Adherence
131 Skilled Nursing Facilities, 2016
Observations
250
200
150
100
50
0
94%
49%
Appropriate PPE for task
High touch objects cleaned daily with EPA-registered hospital grade disinfectant
Successful
Missed


Antimicrobial Stewardship Adherence
117 Hospitals, 2015-2016
Percentage (%)
100
75
50
25
0
51%
40%
62%
85%
Indication for use on antibiotic orders
Antibiotic reviewed for appropriateness at 48 hours
Antibiotics reviewed when new/recurrent CDI diagnosis
Antibiotic use monitored at unit- or hospital-level
Percentage (%)
100
75
50
25
0
59%
56%
38%
High risk antibiotics identified by hospital epi data
ASP interventions target CDI
ASP tracks CDI as outcome
Successful
Missed

Are CDI Prevention Care Practices Used Routinely in YOUR facility?

You won't know if you don't monitor!

Monitoring Contact Precautions

Contact Precautions Practices	Pt/Res 1	Pt/Res 2	Adherence by Task	
			#Yes	#Obs
Gloves and gowns are available near point of use.	(Yes) No	(Yes) No	2	2
Signs indicating the patient/resident is on contact precautions are clear and visible.	(Yes) No	(Yes) No	2	2
The patient/resident housed in single-room or cohorted based on a clinical risk assessment.	(Yes) No	(Yes) No	2	2
Hand hygiene is performed before entering the patient/resident care environment.	(Yes) No	Yes (No)	1	2
Gloves and gowns are donned before entering the patient/resident care environment.	(Yes) No	(Yes) No	2	2
Gloves and gowns are removed and discarded, **and** hand hygiene is performed before leaving the patient/resident care environment. *Soap & water if C. difficile* infection.	Yes (No)	Yes (No)	0	2
Dedicated or disposable noncritical patient-care equipment (e.g. blood pressure cuffs) is used	(Yes) No	(Yes) No	2	2
Total #Yes 11 Total #Observed 14 Total #Yes/Total #Observed = % Adherence 79 %				

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Monitoring Environmental Cleaning

Environmental Cleaning Practices	EVS Staff 1		EVS Staff 2		Adherence by Task	
					# Yes	# Obs
Detergent/disinfectant solution is mixed according to manufacturer's instructions.	Yes	No	Yes	No		
Solution remains in wet contact with surfaces according to manufacturer's instructions.	Yes	No	Yes	No		
A new clean, saturated cloth is used in each room. The cloth is also changed when visibly soiled and after cleaning the bathroom.	Yes	No	Yes	No		
Environmental Services staff use appropriate personal protective equipment (*e.g. Gowns and gloves are used for patients/residents on contact precautions upon entry to the contact precautions room.*)	Yes	No	Yes	No		
Objects and environmental surfaces in patient care areas that are touched frequently* are cleaned and then disinfected when visibly contaminated or at least daily with an EPA-registered disinfectant.	Yes	No	Yes	No		
# Yes_____ # Observed _____ #Yes/#Observed = % Adherence _____%						

Adherence Monitoring Tools for CDI Prevention

- Contact precautions
- Environmental cleaning and disinfection
- Hand hygiene
- Device reprocessing
- High level disinfection of reusable devices
- CDI-targeted ASP practices *(coming soon)*

Central Line Associated Blood Stream Infection (CLABSI) Prevention

CLABSI Prevention – What works?

Best sources for **evidence-based CLABSI prevention practice** recommendations

- **CDC Guidelines** for the Prevention of Intravascular Catheter-Related Infections, **2011**
- CDC **Checklist** for CLABSI Prevention of CLABSI
- **SHEA/IDSA** Strategies to Prevent Central Line-Associated BSI Acute Care Hospitals, **2014**

2020 CLABSI Prevention Goal

- Target set by National Action Plan to Prevent HAI
  - Recommended by the CDPH HAI Advisory Committee for California hospitals
- 50% CLABSI reduction from 2015 baseline = **SIR 0.50** in 2020
  - On track if **SIR 0.80** in **2017**
    - →SIR 0.70 in 2018
    - →SIR 0.60 in 2019

CLABSI in California

- CLABSI continues to be a prevention priority

2016

- 2,594 reported in 2016
- Need to prevent ~1,200 annually to meet 2020 goal

2017 *(unpublished data)*

- **62%** of hospitals **on track** to reach 2020 goal, SIR $\leq$ 0.80 (38% not on track)
- 20 hospitals still significantly higher than 2015 baseline

CLABSI Pathogenesis

Common mechanisms

- Pathogens migrate on **external surface** of catheter
  - CLABSI in early period following insertion (less than 7 days)
- Pathogens migrate along **internal surface** of catheter
  - CLABSI more common after 7 days
  - Access port contamination

Less common mechanisms

- Seeding from another source
- Example: contaminated infusates

CLABSI Risk Factors

- Multiple catheters
- Catheters with multiple lumens
- Emergency insertion
- Prolonged duration
- Prolonged hospital stay prior to line insertion
- Excessive line manipulation
- Neutropenia
- Prematurity
- Total parenteral nutrition
- **Hemodialysis**

Hemodialysis

- Catheters (specifically, central lines) are the most common cause of BSI in dialysis patients
  - 7X higher CLABSI risk than arteriovenous fistulas or grafts

Vascular Access Type	Rate (per 100 patient-months)
AV fistula	0.26
AV graft	0.39
Other vascular access type	0.67
Central venous catheter	2.16

- Include hemodialysis providers **and contractors** in CLABSI prevention education and competency programs

Can You Modify CLABSI Risk?

Modifiable Risk Factors	Higher CLABSI Risk	Lower CLABSI Risk
Insertion circumstances	Emergency insertion	Elective insertion
Skill of inserter	General clinician	Specialized (e.g., PICC team)
Insertion site	Femoral	Subclavian
Skin antisepsis	Alcohol (and povidone iodine)	Chlorhexidine (lowest risk)
Catheter lumens	Multilumen	Single lumen
Duration of use	Temporary (non-tunneled) catheters (including PICC) left in place long-term	Dialysis fistula (lowest risk) or permanent (tunneled) catheter when long-term use expected
Barriers for insertion	Anything less than maximal	Maximal

Central Line Insertion Practices (CLIP)

Prepare

- All-inclusive **catheter cart/kit**
- Choose low risk insertion site – **avoid femoral**
- **Ultrasound guidance** for insertion

Insert

- **Hand hygiene**
- Maximal **sterile barriers**
  - Mask, cap, gown, sterile gloves on HCP
  - Sterile full body drape on patient
- Prepare insertion site with **alcoholic CHG**

Central Line Insertion Practice (CLIP)

Cover

- **Sterile** gauze or transparent, semipermeable dressing
  - **CHG-impregnated dressing** for patients >18 years old

Handle and Maintain Central Lines

- **Hand hygiene compliance**
- **Bathe** ICU patients daily with CHG daily
  - Unless younger than 2 months
- Scrub access port **prior to each access** with antiseptic
  - Use CHG, providone iodine, iodophor, or 70% alcohol
- Use only **sterile devices** to access catheters
- Apply **antimicrobial ointment** to hemodialysis catheter insertion sites

Handle and Maintain Central Lines

- Immediately **replace dressings** that are soiled or dislodged
- **Change dressings** regularly
  - Gauze dressings every **2** days
  - Semipermeable dressings at least every **7** days
- Use **CHG-impregnated dressing** if >18 years of age
- Change **administration sets**
  - Not more frequently than every **4** days
  - At least every **7** days
  - If blood or fat emulsion, change every 24 hours

Minimize Line Duration

- Perform **daily audits** to assess line necessity
- **Promptly remove** unnecessary central lines

Hand Hygiene

- **Before and after**
  - **Palpating** catheter insertion site
    - Do not palpate insertion site after applying antiseptic unless aseptic technique maintained
  - **Inserting** catheter
  - **Accessing** catheter
  - Repairing or replacing dressing
  - Invasive procedures
- **Before donning** and **after removing** gloves
- Between patients
- When hands obviously **soiled** or contamination suspected

Organizational Prevention Practices

- **Educate HCP** on line indications, insertion, maintenance
  - Reeducate at regular intervals
- Document **competency** for line insertion and maintenance
  - Periodically assess knowledge and competency of line care
- Provide line insertion **checklist** to ensure adherence
- **Empower** staff to stop insertion for improper technique
- Provide efficient access to supplies (cart or kit)
- **Measure** performance
  - Including adherence monitoring, feedback)
- Ensure appropriate **nurse-patient ratio**

Special Approaches

When CLABSI rates remain high

- **Use antiseptic** or antimicrobial impregnated catheters
- **Use CHG containing dressings** in patients over 2 months of age
- **Use antiseptic containing** hub/connector cap
- **Use silver zeolite-impregnated** umbilical catheter in pre-term infants
- **Use antimicrobial** locks for central lines
- **Use recombinant tissue plasminogen** activating factor once weekly after hemodialysis

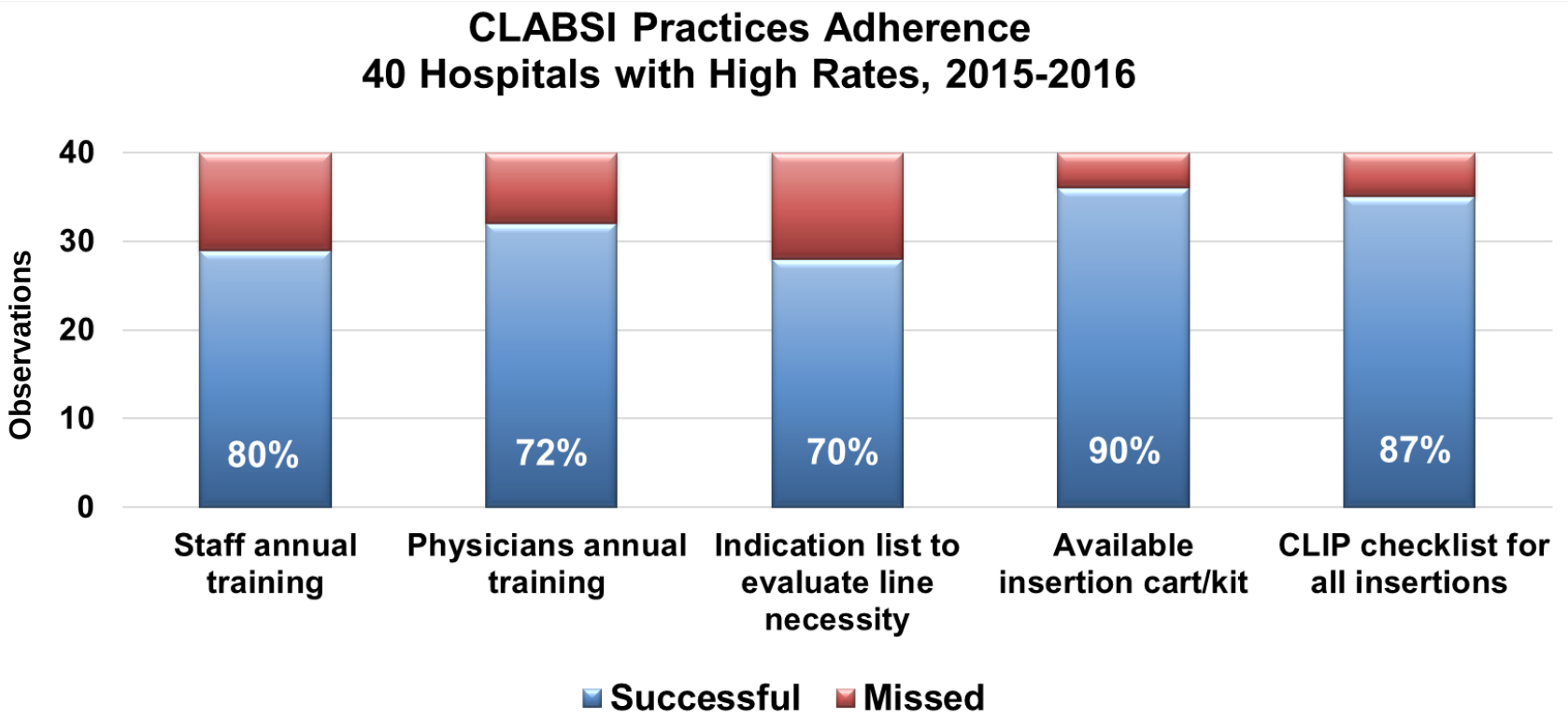
Preventing CLABSI: The MOST Important Things

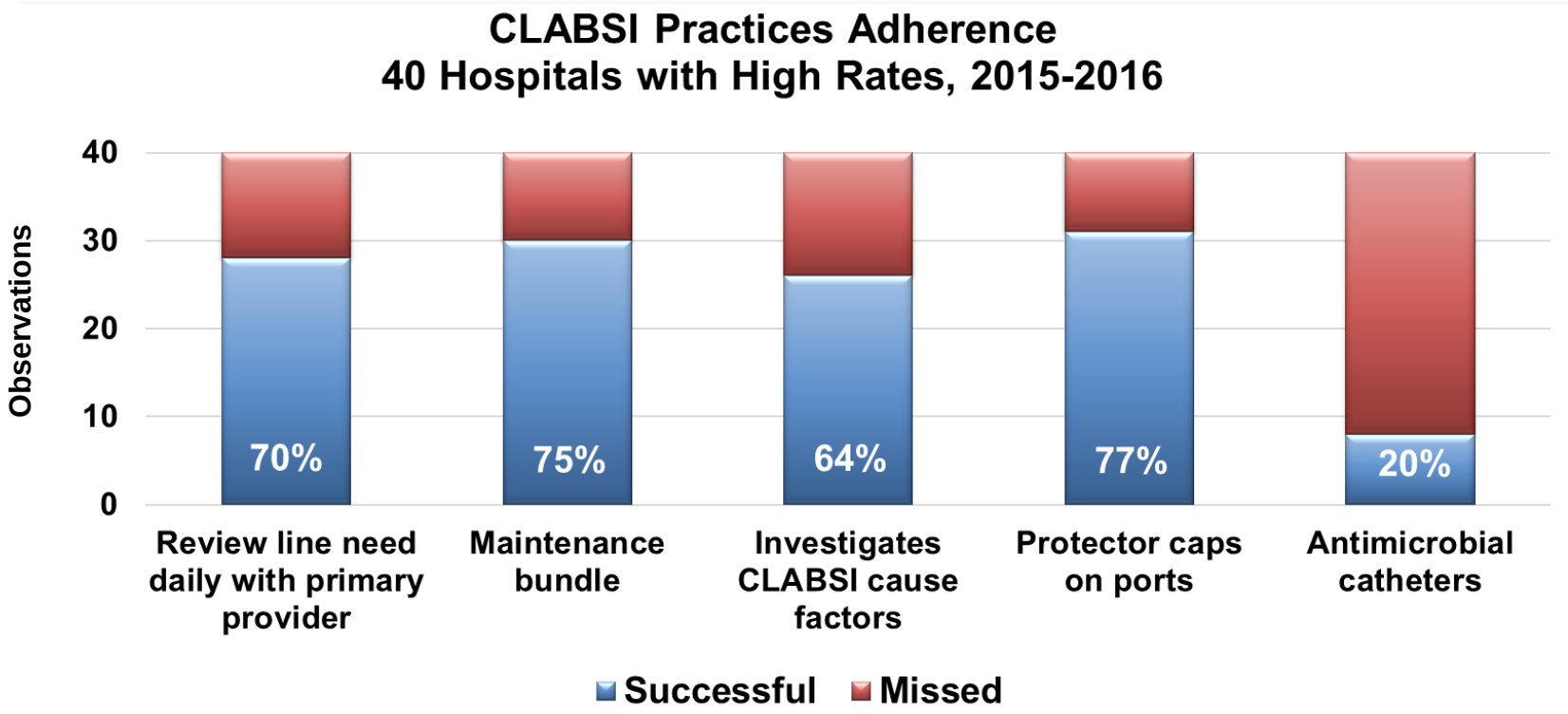
Prevent Early- and Late-Onset CLABSI

- ❑ **Provide list of indications** for central line
- ❑ **Education** of HCP inserting or caring for central line
- ❑ **Bathe** ICU patients with CHG daily
- ❑ **Adhere** to infection prevention practices at insertion (CLIP)
- ❑ **Use all-inclusive** catheter cart/kit
- ❑ **Use Ultrasound** guidance for insertion
- ❑ Use **alcoholic CHG skin prep**
- ❑ **Ensure appropriate nurse patient ratio**
- ❑ **Disinfect hub** before accessing central line
- ❑ **Remove** nonessential catheters
- ❑ **Change** transparent dressings and site care with CHG every 5-7 days or if soiled
- ❑ **Replace** administration sets not used for blood product or lipids no longer than every 4 days (96 hours)
- ❑ **Use antimicrobial ointment** for hemodialysis catheter insertion sites
- ❑ **Perform CLABSI surveillance**

Are CLABSI Prevention Care Practices Performed Routinely?

Results of CDPH HAI Program Liaison IP Observations


CLABSI Practices Adherence
40 Hospitals with High Rates, 2015-2016
Observations
40
30
20
10
0
80%
72%
70%
90%
87%
Staff annual training
Physicians annual training
Indication list to evaluate line necessity
Available insertion cart/kit
CLIP checklist for all insertions
Successful
Missed


CLABSI Practices Adherence
40 Hospitals with High Rates, 2015-2016
Observations
40
30
20
10
0
70%
75%
64%
77%
20%
Review line need daily with primary provider
Maintenance bundle
Investigates CLABSI cause factors
Protector caps on ports
Antimicrobial catheters
Successful
Missed

CLABSI Practice Observations
40 Hospitals with High Rates, 2015-2016

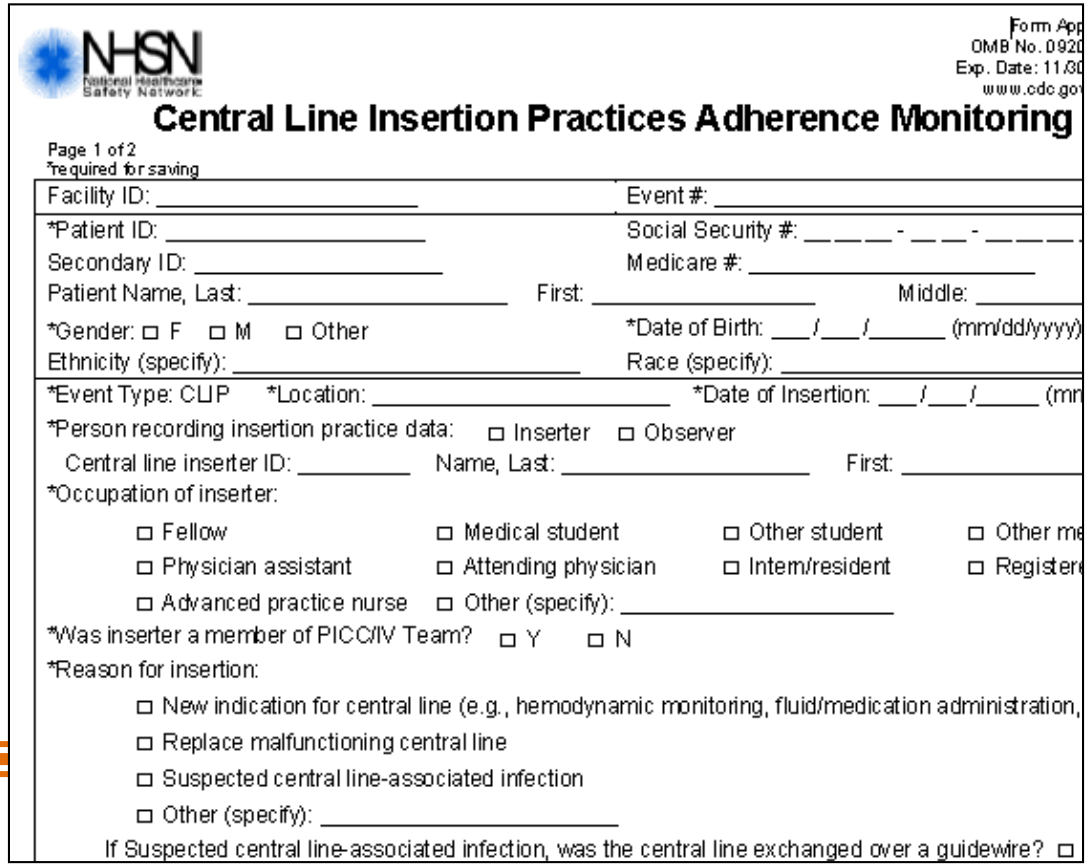
	# Observations	Adherence
Line insertion	8	93%
Line maintenance	**206**	
Insertion date documented		81%
Hand hygiene before/after even if gloves worn		70%
Clean, dry, intact dressing		93%
Daily line assessment, prompt removal		99%
Avoid femoral site		95%
CHG sponge at insertion site		96%
Daily CHG bath if hospital policy		55%

Are CLABSI Prevention Care Practices Used Routinely in YOUR facility?

You won't know if you don't monitor!

Monitoring Central Line Insertion

- Assess CLIP adherence for early-onset CLABSI (≤7 days)
- If CLABSI rates remain high, monitor CLIP in all locations where lines are inserted, including OR and interventional radiology



NHSN National Healthcare Safety Network

Form App
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Central Line Insertion Practices Adherence Monitoring

Page 1 of 2
*required for saving

Facility ID: _____ Event #: _____

*Patient ID: _____ Social Security #: ___-___-____

Secondary ID: _____ Medicare #: _____

Patient Name, Last: _____ First: _____ Middle: _____

*Gender: ☐ F ☐ M ☐ Other *Date of Birth: ___/___/_____ (mm/dd/yyyy)

Ethnicity (specify): _____ Race (specify): _____

*Event Type: CLIP *Location: _____ *Date of Insertion: ___/___/_____ (mm

*Person recording insertion practice data: ☐ Inserter ☐ Observer

Central line inserter ID: _____ Name, Last: _____ First: _____

*Occupation of inserter:

☐ Fellow ☐ Medical student ☐ Other student ☐ Other me

☐ Physician assistant ☐ Attending physician ☐ Intern/resident ☐ Register

☐ Advanced practice nurse ☐ Other (specify): _____

*Was inserter a member of PICC/IV Team? ☐ Y ☐ N

*Reason for insertion:

☐ New indication for central line (e.g., hemodynamic monitoring, fluid/medication administration,

☐ Replace malfunctioning central line

☐ Suspected central line-associated infection

☐ Other (specify): _____

If Suspected central line-associated infection, was the central line exchanged over a guidewire? ☐

California Department of PublicHealth

Monitoring Central Line Access Maintenance

Observation	Patient 1		Patient 2		Adherence by Task # Yes	Adherence by Task # Obs
Supply kit is used for central line dressing changes.	(Yes)	No	(Yes)	No	2	2
Hand hygiene performed before **and** after manipulating the catheter (regardless of glove use).	Yes	(No)	Yes	(No)	0	2
Wet, soiled, or dislodged dressings are changed promptly.	(Yes)	No	(Yes)	No	2	2
Need for line assessed daily by a practitioner, with prompt removal of unnecessary lines.	(Yes)	No	Yes	(No)	1	2
Scrubbing method is used during dressing change when applying CHG to the insertion site.	(Yes)	No	Yes	No	1	1
Dressing is changed with aseptic technique, using clean gloves to remove the old dressing and sterile gloves when applying the new dressing.	(Yes)	No	Yes	No	1	1
The access port or hub is scrubbed immediately prior to each use with the appropriate antiseptic.	Yes	No	(Yes)	No	1	1
Antiseptic-containing protector caps are utilized for all line connectors if it is facility policy.	Yes	No	Yes	No	Not Policy	
The catheter is accessed with only sterile devices.	Yes	No	(Yes)	No	1	1
Daily bathing with a 2% CHG solution is done if facility policy.	(Yes)	No	(Yes)	No	2	2

Total # Yes 11 Total # Observations 14 #Yes/#observations x 100= 79% Adherence

Monitoring Central Line Dressing Maintenance

Central Line Maintenance Practices	Patient 1		Patient 2		Adherence by Task	
					# Yes	# Observed
Central line insertion date is documented.	Yes	No	Yes	No	2	2
Dressings wet, soiled, or dislodged are changed promptly.	Yes	No	Yes	No	2	2
Need for the line assessed daily by a practitioner, with prompt removal of unnecessary lines	Yes	No	Yes	No	0	2
Optimal site selected, avoid femoral site in adult patients.	Yes	No	Yes	No	2	2
Sterile gauze, sterile transparent or sterile semi-permeable dressing used to cover the catheter site is in place for ≤ 7 days (Mark "No" if no date on the dressing.)	Yes	No	Yes	No	0	2
Antiseptic-containing protector caps are utilized for all line connectors if facility policy.	Yes	No	Yes	No	2	2
A CHG-impregnated sponge applied at insertion site	Yes	No	Yes	No	2	2
Tubing and administration set have been in place for ≤ 7 days. (Mark "No" if no date on dressing.)	Yes	No	Yes	No	0	2
TPN/Lipids: tubing dated to ensure change every 24 hours.	Yes	No	Yes	No	None	Today
Daily bathing with a 2% CHG solution is done if facility policy.	Yes	No	Yes	No	1	2

Total # Yes 11 Total # Observations 18 #Yes/#observations x 100= 61 % Adherence

Adherence Monitoring Tools for CLABSI Prevention

- Central line insertion practices (CLIP)
- Central line maintenance
- Central line access and dressing changes
- Hand hygiene

Surgical Site Infection (SSI) Prevention

SSI Prevention – What works?

Best sources for **evidence-based SSI prevention practice** recommendations

- **CDC/HICPAC** SSI Prevention Guideline**, 2017**
- **CDC SSI** Prevention Guideline**, 1999**

2020 SSI Prevention Goal

- Target set by National Action Plan to Prevent HAI
  - Recommended by the CDPH HAI Advisory Committee for California hospitals
- 30% SSI reduction from 2015 baseline = **SIR 0.70** in 2020
  - On track if **SIR 0.88** in **2017**

    →SIR 0.82 in 2018

    →SIR 0.76 in 2019

SSI in California

- SSI can be **devastating**

2016

- 3,788 deep incisional and organ space SSI reported by California hospitals

2017 *(unpublished data)*

- **64** hospitals had SSI SIR >2.0 for one or more procedures (**double** the number predicted)
  - 9 of those hospitals had SIR >4.0 (**4x** the number predicted)

SSI Epidemiology

- SSI generally occur within 30 days following surgery
  - 8 California-mandated procedures monitored to 90 days
- 2% of hospitalized surgical patients acquire SSI
  - 3% die (75% attributable to the SSI)
  - Many result in long term disability
- SSI increase hospital length of stay by 7-10 days

Source of SSI Pathogens

- Patient's flora
  - From skin, GI tract, mucous membranes
  - Due to inadequate skip prep
  - Seeding from pre-existing sites of infection
- Surgical personnel flora
  - Inadequate hand hygiene
  - Breaks in aseptic techniques
- Contaminated equipment *(less common)*
  - Surgical instruments
  - Medical devices in operating room
  - Ventilation

Antimicrobial Prophylaxis

- Administer antimicrobial prophylaxis in accordance with evidence-based standards and guidelines
  - Administer such that bactericidal concentration is highest in serum and tissues at time of incision
  - Administer before skin incision in all **Cesarean sections**
  - For all clean and clean/contaminated procedures, **STOP antibiotics** after incision is closed in the OR, even in the presence of a drain
- Topical antimicrobial agents (such as ointments, solutions, or powders) should not be applied to the surgical incision

Antiseptic Prophylaxis

- Before surgery, patients should shower/bathe (full body)
  - Soap **or** an antiseptic agent
  - At least the night before the operative day
- Skin preparation in the operating room should be performed with an **alcohol-based** antiseptic

Perioperative Care

- **During surgery**, control **blood glucose** level in **all patients (<200mg/dl**)
- Maintain perioperative **normothermia** in **all patients**
- Administer increased fraction of inspired oxygen (**FiO_2**)
  during surgery and **after extubation** in the immediate postoperative period
  for patients with **normal pulmonary function** undergoing anesthesia with endotracheal intubation

Prosthetic Joint Arthroplasty

- Transfusion of blood products should not be withheld from surgical patients as a means to prevent SSI
- For prosthetic joint patients receiving systemic corticosteroid or other immunosuppressive therapy,
  in clean and clean-contaminated procedures,
  do not administer additional antimicrobial prophylaxis doses after the surgical incision is closed in the operating room,
  even in the presence of a drain

Preparation of Surgical Patient

- Identify and treat remote infections before elective operation
  - Postpone elective operation until infection resolved
- **Do not remove hair** unless will interfere with the operation
  - If necessary, remove hair immediately before the operation with **clippers** immediately prior to procedure
- Encourage tobacco cessation for minimum of 30 days prior to surgery
- Ensure skin around incision site is free of gross contamination prior to antiseptic skin preparation

Hand and Forearm Antisepsis for Surgical Team

- Perform preoperative hand and forearm antisepsis according to manufacturer's recommendations for the product being used
- Refer to additional recommendations in CDC Guidelines for Hand Hygiene in Healthcare Setting, 2002 *(summarized on next slide)*

Surgical Hand Antisepsis

- Remove rings, watches, and bracelets before beginning the surgical hand scrub
- Remove debris from underneath fingernails using a nail cleaner under running water
- Perform surgical hand antisepsis using either an antimicrobial soap or an alcohol-based hand rub with persistent activity before donning sterile gloves
- When using an alcohol-based surgical hand-scrub product with persistent activity, allow hands and forearms to dry thoroughly before donning sterile gloves

Operating Room Ventilation

- Maintain positive pressure ventilation in the operating room and adjoining spaces
- Maintain the number of air exchanges, airflow patterns, temperature, humidity, location of vents, and use of filters in accordance with recommendations from the most recent version of the Facilities Guidelines Institute – Guidelines for Design and Construction of Hospitals and Outpatient Facilities (current version – 2014)

Cleaning and Disinfection of Environmental Surfaces

- Do not perform special cleaning or closing of OR after contaminated or dirty operations

Reprocessing Surgical Instruments

- Sterilize all surgical instruments according to published guidelines and manufacturer's recommendations
- Immediate-use steam sterilization should never be used for reasons of convenience, as an alternative to purchasing additional instrument sets, or to save time.
  - This practice should be **reserved only for** patient care **items that will be used immediately** in emergency situations when no other options are available.
- Refer to CDC HICPAC 2008 Guideline for Disinfection and Sterilization in Healthcare Facilities for additional recommendations.

Surgical Attire and Drapes

- Wear a **surgical mask** that fully covers the mouth and nose
  - When entering the operating room if an operation is about to begin or already under way
  - If sterile instruments are exposed
  - Wear the mask throughout the operation
- Wear a new disposable or hospital-laundered **head covering** for **each case**
  - Whenever entering the operating room
  - Ensure it fully covers all hair on the head and all facial hair not covered by the surgical mask
- Wear **sterile gloves** if serving as a member of the scrubbed surgical team
  - Put on sterile gloves after donning a sterile gown

Surgical Attire and Drapes

- Use surgical gowns and drapes that are effective barriers when wet
  - Materials that resist liquid penetration
- Change scrub suits that are visibly soiled, contaminated, and/or penetrated by blood or other potentially infectious materials

Post-Op Incision Care

- Protect primarily closed incisions with a sterile dressing for 24-48 hours postoperatively

Sterile and Surgical Technique

- Adhere to principles of sterile technique when performing all invasive procedures
- If drainage is necessary, use a closed suction drain
  - Place drain in a separate incision distant from the operative incision
  - Remove drain as soon as possible

Preventing SSI: The MOST Important Things

Prevent the Devastating Effects of Deep/Organ Space SSI

- ❑ **Prophylactic antibiotics**
  - *Right drug, right dose, right time*
  - ❑ No doses after incision closed
- ❑ **Alcohol-based** skin prep
- ❑ Blood glucose control, all patients
- ❑ Normothermia, all patients
- ❑ Increased Fi02, if normal function
- ❑ Pre-night shower or bath
- ❑ Treat other infections
- ❑ Smoking cessation at least 30 days
- ❑ No hair removal; if must, clippers
- ❑ Maintain positive pressure ventilation
- ❑ Hand hygiene
- ❑ Surgical attire worn entire time including mask and head cover (covering all head and facial hair)
- ❑ Clean and disinfect all surfaces between cases
- ❑ Flash sterilization only if emergency
- ❑ Sterile dressing for 24-48 hours

Are SSI Prevention Care Practices Performed Routinely?

Results of CDPH HAI Program Liaison IP Observations

SSI Prevention Practice Observations
41 hospitals with High SSI, 2015-16

	# Observations	Adherence
62 Operating Rooms (OR)	**641**	**72%**
OR clean		**69%**
Appropriate surgical attire		**48%**
Timely, appropriate antibiotic administration		**94%**
Alcohol-based skin prep		**91%**
Door closed to maintain positive air pressure		**72%**
Safe injection practices observed		**72%**
Hand hygiene adherence		**48%**

Are SSI Prevention Care Practices Used Routinely in YOUR facility?

You won't know if you don't monitor!

Monitoring in the Operating Room

CDPH California Department of PublicHealth

Healthcare-Associated Infections Program Adherence Monitoring

Operating Room Observations

Regular monitoring with feedback of results to staff can maintain or improve adherence to SSI preve tool to identify gaps and opportunities for improvement. Monitoring may be performed in any type

Instructions: Observe each practice in the operating room and check a box if adherent, Yes or No. In t of "Yes" for adherent practices observed and the total number of observations ("Yes" + "No"). Calculat

Surgical Site Practice		OR Observations 1	OR Observation 2	OR Observation 3
SS1.	Pre-operative hand antisepsis following manufacturer's recommendations. No long or artificial nails, no jewelry worn.	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
SS2.	Hair not removed. If necessary, removed just prior to surgery with clippers.	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
SS3.	Skin prep in OR with alcohol-based agent	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

Monitoring Device Reprocessing

CDPH California Department of PublicHealth

Healthcare-Associated Infections Program Adherence Monitoring
Device Reprocessing

Regular monitoring with feedback of results to staff can maintain or improve adherence to device repro
opportunities for improvement. Monitoring may be performed in any type of location where device rep

Instructions: Observe each practice in the reprocessing area and check a box if adherent, Yes or No. In th
for adherent practices observed and the total number of observations ("Yes" + "No"). Calculate adherence

Device Reprocessing Practices		Procedure 1
DR1.	Policies, procedures, and manufacturer reprocessing instructions for reusable medical devices used in the facility are available in the reprocessing area(s).	☐ Yes ☐ No
DR2.	Reusable medical devices are cleaned, reprocessed (disinfection or sterilization) and maintained according to the manufacturer instructions. *Note: If the manufacturer does not provide such instructions, the device may not be suitable for multi-patient use.*	☐ Yes ☐ No
DR3.	Single-use devices are discarded after use and not used for more than one patient. *Note: If the facility elects to reuse single-use devices, these devices must be reprocessed prior to reuse by a third-party reprocessor that it is registered with the FDA as a third-party reprocessor and cleared by the FDA to reprocess the specific device in question. The facility should have documentation from the third party reprocessor confirming this is the case.*	☐ Yes ☐ No

Monitoring High Level Disinfection

Healthcare-Associated Infections Program Adherence Monitoring
High-Level Disinfection of Reusable Devices

Regular monitoring with feedback of results to staff can maintain or improve adherence to high-level di opportunities for improvement. Monitoring may be performed in any type of location where high-level

Instructions: Observe each practice in the high-level disinfection area and check a box if adherent, Yes or number of "Yes" for adherent practices observed and the total number of observations ("Yes" + "No"). Ca

High-Level Disinfection Practices		Device Observation 1
HL1.	Pre-cleaning is performed at the point of use to prevent the bioburden from drying and then the soiled endoscope is promptly transported to the reprocessing area.	☐ Yes ☐ No
HL2.	Flexible endoscopes are inspected for damage and leak tested as part of each reprocessing cycle. Any device that fails the leak test is removed from clinical use and repaired.	☐ Yes ☐ No
HL3.	Devices are thoroughly cleaned according to manufacturer instructions and visually inspected for residual soil prior to high-level disinfection. *Note: Cleaning may be manual or automated. Ensure model specific cleaning*	☐ Yes ☐ No

Monitoring Sterilization

CDPH California Department of PublicHealth

Healthcare-Associated Infections Program Adherence Monitoring
Sterilization of Reusable Devices

Regular monitoring with feedback of results to staff can maintain or improve adherence to sterilizatio gaps and opportunities for improvement. Monitoring may be performed in any type of location where

Instructions: Observe each practice in the sterilization area and check a box if adherent, Yes or No. In th for adherent practices observed and the total number of observations ("Yes" + "No"). Calculate adherer

	Sterilization Practices	Observation 1
RD1.	Devices are thoroughly cleaned according to manufacturer instructions and visually inspected for residual soil prior to sterilization. *Note: Cleaning may be manual (i.e., using friction) and/or mechanical (e.g., with ultrasonic cleaners, washer-disinfector, washer-sterilizers). Ensure appropriately sized cleaning brushes are selected for cleaning device channels and lumens.*	☐ Yes ☐ No
RD2.	Cleaning is performed as soon as practical after use (e.g., at the point of use) to prevent soiled materials from becoming dried onto devices.	☐ Yes ☐ No
RD3.	Enzymatic cleaner or detergent is used for cleaning and discarded according to manufacturer's instructions (typically after each use)	☐ Yes ☐ No

Adherence Monitoring Tools for SSI Prevention

- OR observations
- Hand hygiene
- Safe injection practices
- Environmental cleaning and disinfection
- Device reprocessing
- High level disinfection of reusable devices
- Sterilization of reusable devices

Facility-wide Adherence Monitoring Program

Who, What, When, Where, Why, and How?

Who Recommends Adherence Monitoring?

- Society of Healthcare Epidemiologists of America (SHEA)
- Centers for Disease Control and Epidemiology (CDC)
- Healthcare Infection Control Practices Advisory Committee (HICPAC)
- The Joint Commission (TJC)
- Institute for Healthcare Improvement (IHI)

SHEA Compendium of Strategies to Prevent HAI in Acute Care Hospitals, 2014 Updates

"Continued progress in healthcare epidemiology and implementation science research has led to improvements in our understanding of effective HAI prevention strategies.

Despite these advancements, HAIs continue to affect about 1 out of every 25 hospitalized patients, leading to substantial morbidity, mortality, and excess healthcare expenditures, and ***there are persistent gaps between recommendations and practice."*** *(Magill, 2014)*

CDC/HICPAC Core Practices, 2017

- Monitor adherence to infection prevention practices and infection control requirements
- Provide prompt, regular feedback on adherence and related outcomes to healthcare personnel and facility leadership
- Train performance monitoring personnel and use standardized tools and definitions

HICPAC
HEALTHCARE INFECTION CONTROL PRACTICES ADVISORY COMMITTEE

CDC

California Department of PublicHealth

TJC National Patient Safety Goals (NPSG)

Goal 7 - Reduce the risk of healthcare–associated infections

- **Monitor compliance with best practices or evidence-based guidelines**
  - NPSG 07.03.01 – MDRO
  - NPSG 07.04.01 – CLABSI
  - NPSG 07.05.01 – SSI
  - NPSG 07.06.01 - CAUTI

The Joint Commission

California Department of PublicHealth

Institute for Healthcare Improvement

*"**Measuring the results of process** changes will tell you if the changes are leading to an improved, safer system. Examples include percent of patient encounters in compliance with hand **hygiene procedure** and percent of **environmental cleanings** completed appropriately."*

Institute *for* Healthcare Improvement

California Department of PublicHealth

CDC Elements of Infection Prevention Programs

*"The **basic elements of an infection prevention program** are designed to prevent the spread of infection in healthcare settings. When these elements are present and practiced consistently, **the risk of infection among patients and healthcare personnel is reduced.**"*

What is Adherence Monitoring?

CDC definition

- Audit tools may be used by healthcare facilities to conduct internal quality improvement audits
  - **Audit (adherence monitoring):** Direct observation or monitoring of healthcare personnel adherence to job-specific infection prevention measures
  - **Feedback:** A summary of audit findings that is used to target performance improvement

Feedback Results

- Share with unit staff
  - Adherence monitoring results
  - HAI incidence (rates or SIR)
- Present to managers and leadership
  - Use data to focus prevention efforts
  - Use data to get needed resources

When Should Adherence Monitoring Be Performed?

- Decide how often to **regularly** conduct adherence monitoring as an Adherence Monitoring Program
- Consider monthly adherence monitoring or more often if a unit has high HAI incidence
- Decrease adherence monitoring to quarterly if HAI are low and previous adherence results were high
- Include all shifts

Where is the Best Place to Begin?

- Review Targeted Assessment for Prevention (TAP) reports to focus on units with higher incidence of HAI (CLABSI, CDI)
  - Engage/train staff on these units to use adherence monitoring tools
- Analyze quarterly SSI data and focus on specific procedures with high SSI incidence (such as hip prosthesis, colon surgery, C-section, abdominal hysterectomy, or appendectomy)
  - Include perioperative staff in the Adherence Monitoring Program

Why is Adherence Monitoring Important?

- Infection prevention policies are most likely in place
- Preventable HAI continue to occur in hospitals
- Even if you have implemented evidence-based recommendations, **start monitoring infection prevention care practices to assess if adherence is consistent**

You won't know if you don't monitor!

How to Establish an Adherence Monitoring Program

- Engage leadership at the beginning
  - Administration champion and physician champion
- Establish the Adherence Monitoring Program as a hospital policy – not an IP Policy
  - NOT the responsibility of the IP or IP department alone
  - Multidisciplinary buy-in and involvement necessary for success
    - Education department, nursing, respiratory therapists, physical therapists, radiology department
  - Make it part of the hospital culture

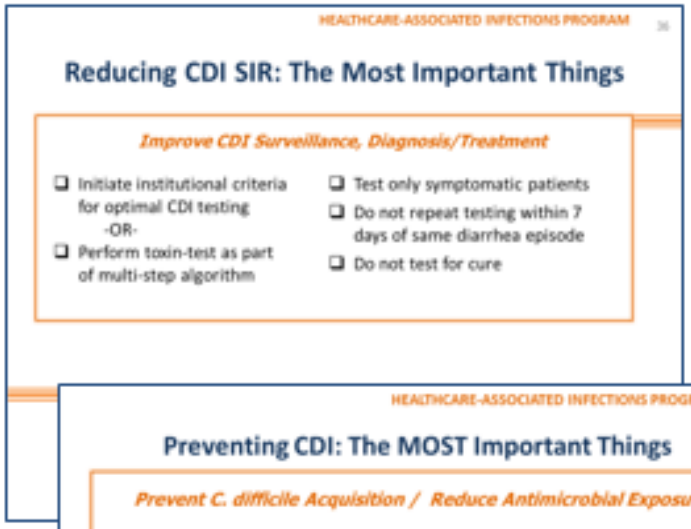
How to Establish an Adherence Monitoring Program

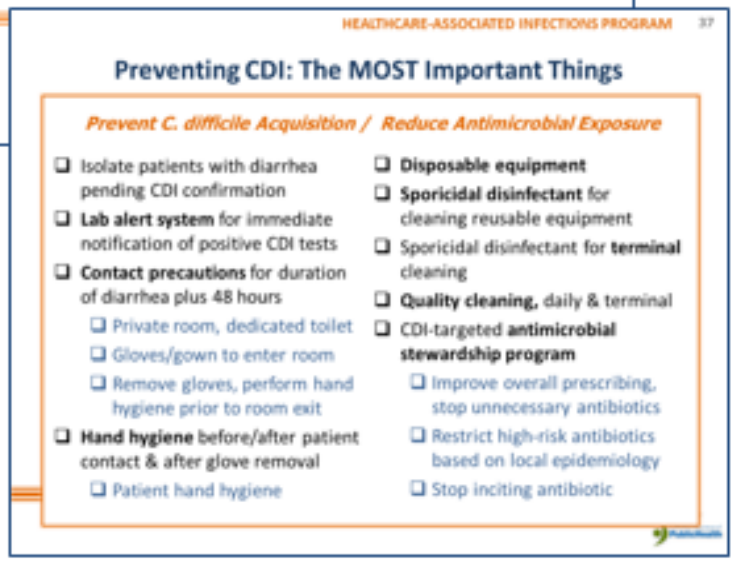
- Include adherence monitoring in manager performance evaluations
- Train all staff performing adherence monitoring using consistent training materials
- Make the Adherence Monitoring Program sustainable by
  - Training staff from every department
  - Require pre-determined scheduled adherence monitoring
  - Feedback results to staff, leadership, and committees
- Validate the adherence monitoring program by having different departments periodically monitor each other

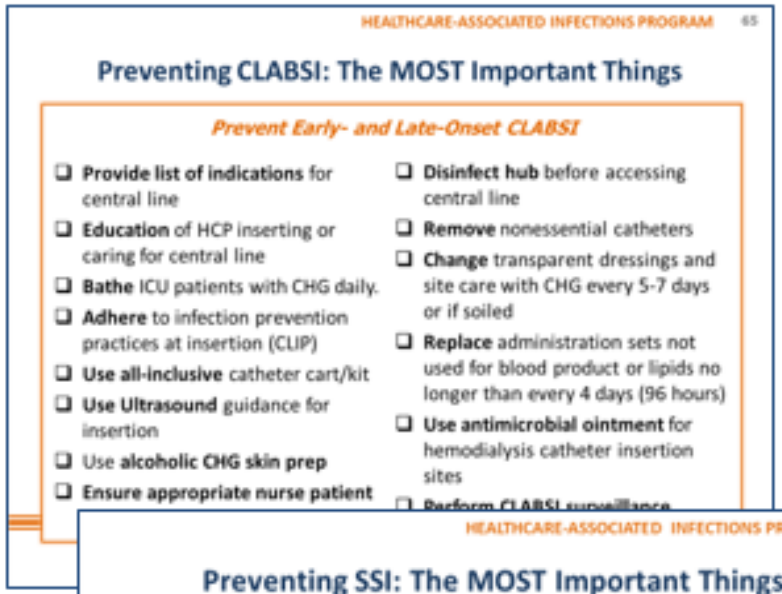
Adherence Monitoring Program Checklist

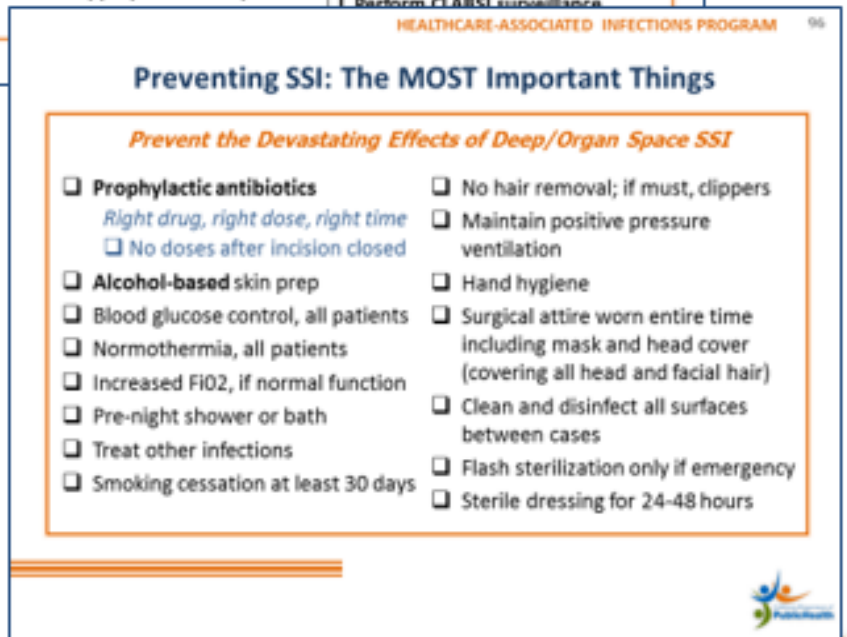
- ❑ Initiate meeting for ongoing participation and support
  - ❑ Include chief-level executives and multidisciplinary team members
- ❑ Establish as a hospital-wide program
- ❑ Develop the hospital Adherence Monitoring Program policy
  - ❑ Include all patient care departments
  - ❑ Decide where and how often to be performed
  - ❑ Compile adherence monitoring tools to be used*
  - ❑ Decide how feedback of results will be delivered to staff
- ❑ Develop formal training for staff performing adherence monitoring
- ❑ Hold a kick-off event to inform staff of program
- ❑ Develop a plan for feedback and remediation of identified practice gaps
- ❑ Develop a plan to celebrate successes

Simplify the Message – Focus on the Most Important Things









Summary

HAI can only be prevented if every HCP adheres to evidence-based practices

You need to know the gaps to correct the gaps

Every care giver needs to own HAI, know how to prevent them, and practice consistently

Questions?

For more information,
please contact any
HAI Liaison IP Team member

Or email
HAIProgram@cdph.ca.gov