Sustained CAUTI and CLABSI Improvements Using a Bundled Approach

Experiences of a Level 1 Trauma Center

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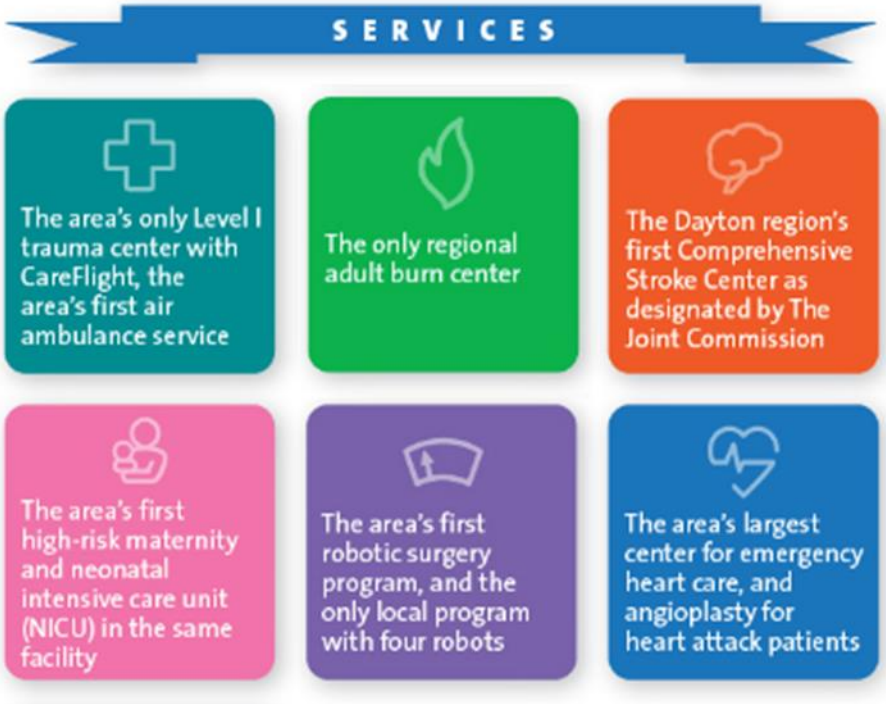


Objectives

Describe health impact of bloodstream and urinary tract infection for the hospitalized patients	• Historical and current epidemiology of HAIs • Current surveillance definitions
Discuss improvement efforts on prevention of central line-associated related bloodstream (CLABSI) and catheter-associated urinary tract infections(CAUTI)	• Bundled practices for CLABSI improvement • Bundled practices for CAUTI improvement • Patient care improvement as a result of CAUTI and CLABSI efforts
Describe measurement impact of CLABSI and CAUTI improvements	• Historical SIR data • Current SIR data • Impact of targeted-assessment prevention for prioritizing focus

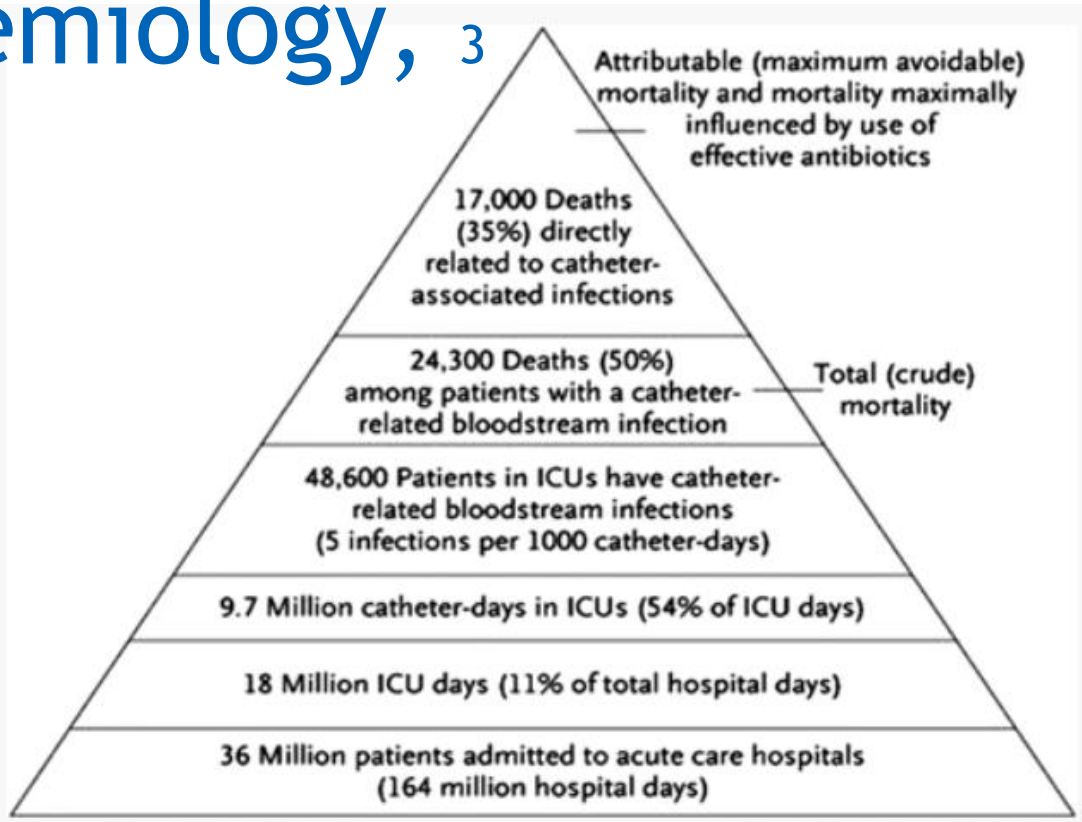
Epidemiology

- Although a 46% decrease in CLABSIs has occurred in hospitals across the U.S. from 2008-2013, an estimated 30,100 central line-associated bloodstream infections (CLABSI) still occur in intensive care units and wards of U.S. acute care facilities each year.[1] CLABSIs are serious infections typically causing a prolongation of hospital stay and increased cost and risk of mortality.
- CLABSI can be prevented through proper insertion techniques and management of the central line. These techniques are addressed in the CDC's Healthcare Infection Control Practices Advisory Committee (CDC/HIPAC) *Guidelines for the Prevention of Intravascular Catheter-Related Infections, 2011.*[2]

Epidemiology, 2

- In the USA, it is estimated that up to 150 million intravascular devices are inserted annually in hospitalized patients, and that more than 200,000 nosocomial bloodstream infections occur each year [1, 4, 5].
- There are an estimated 17,000 deaths annually in the USA directly related to catheter-associated infections.

Epidemiology, [3]



Summary of the epidemiology of catheter-associated infections and outcomes in the United States. From Wenzel RP, Edmond MB. Team-based prevention of catheter-related infections. N Engl J Med 2006;355(26):2781–2783 [6]

Mechanism of Colonization & Infection

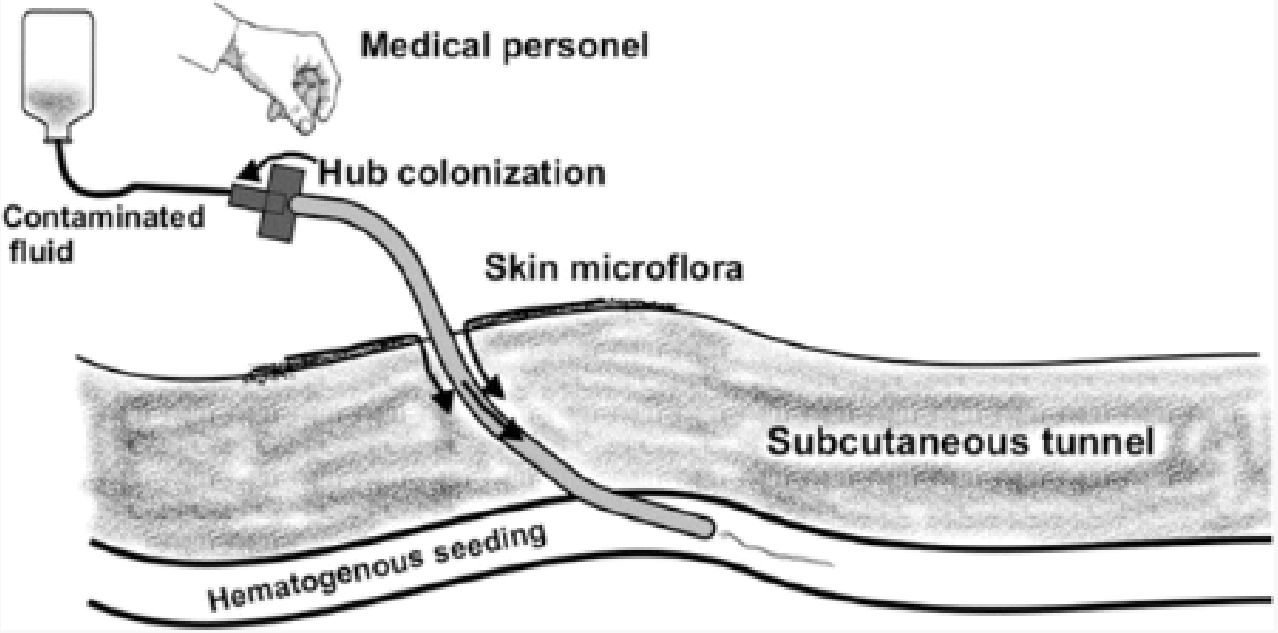


Fig. 29.3

Mechanisms for intravenous catheter colonization and infection: extraluminal from skin microflora, intraluminal from hub colonization and less commonly from hematogenous spread or contaminated intravenous fluids. Each of these mechanisms is a target for prevention strategies

Central line-associated BSI (CLABSI):

- A laboratory-confirmed bloodstream infection (LCBI) where central line (CL) or umbilical catheter (UC) was in place for >2 calendar days on the date of event, with day of device placement being Day 1,

  AND

- the line was also in place on the date of event or the day before. If a CL or UC was in place for >2 calendar days and then removed, the date of event of the LCBI must be the day of discontinuation or the next day to be a CLABSI.
- LCBI1 (also refer t definition for LCBI2 and LCBI3 for infants)
  - Patient of any age has a recognized pathogen identified (i.e., an organism which is not on the NHSN common commensal list) from one or more blood specimens by a culture or non-culture based microbiologic testing method
  - **AND**
  - Organism(s) identified in blood is not related to an infection at another site

Appropriate PICC Use

Annals of Internal Medicine SUPPLEMENT

The Michigan Appropriateness Guide for Intravenous Catheters (MAGIC): Results From a Multispecialty Panel Using the RAND/UCLA Appropriateness Method

Vineet Chopra, MD, MSc; Scott A. Flanders, MD; Sanjay Saint, MD, MPH; Scott C. Woller, MD; Naomi P. O'Grady, MD; Nasia Safdar, MD, PhD; Scott O. Trerotola, MD; Rajiv Saran, MD, PhD; Nancy Moureau, BSN, RN; Stephen Wiseman, PharmD; Mauro Pittiruti, MD; Elie A. Akl, MD, MPH, PhD; Agnes Y. Lee, MD, MSc; Anthony Courey, MD; Lakshmi Swaminathan, MD; Jack LeDonne, MD; Carol Becker, MHSA; Sarah L. Krein, PhD, RN; and Steven J. Bernstein, MD, MPH

Use of peripherally inserted central catheters (PICCs) has grown substantially in recent years. Increasing use has led to the realization that PICCs are associated with important complications, including thrombosis and infection. Moreover, some PICCs may not be placed for clinically valid reasons. Defining appropriate indications for insertion, maintenance, and care of PICCs is thus important for patient safety.

An international panel was convened that applied the RAND/UCLA Appropriateness Method to develop criteria for use of PICCs. After systematic reviews of the literature, scenarios related to PICC use, care, and maintenance were developed as

After review of 665 scenarios, 253 (38%) were rated as appropriate, 124 (19%) as neutral/uncertain, and 288 (43%) as inappropriate. For peripherally compatible infusions, PICC use was rated as inappropriate when the proposed duration of use was 5 or fewer days. Midline catheters and ultrasonography-guided peripheral intravenous catheters were preferred to PICCs for use between 6 and 14 days. In critically ill patients, nontunneled central venous catheters were preferred over PICCs when 14 or fewer days of use were likely. In patients with cancer, PICCs were rated as appropriate for irritant or vesicant infusion, regardless of duration.

Health Care-Associated Infections

- NPSG.07.04.01: Implement evidence-based practices for preventing central line-associated blood stream infections

Follow CDC Evidence-based Standards (CHG prep, aseptic technique, dressing changes)	**Document Central Line Insertion Practices (CLIP) in EPIC**	**Use Central Line Insertion Kits**
Always Follow Good Hand Hygiene Prior To Insertion Or Manipulation	**Patient Education Prior to Insertion**	**Coordinated Education for Physicians and Staff**
Always Remove Central Line When no Longer Needed	**Use Of Multidisciplinary Teams To Create Prevention Strategies**	

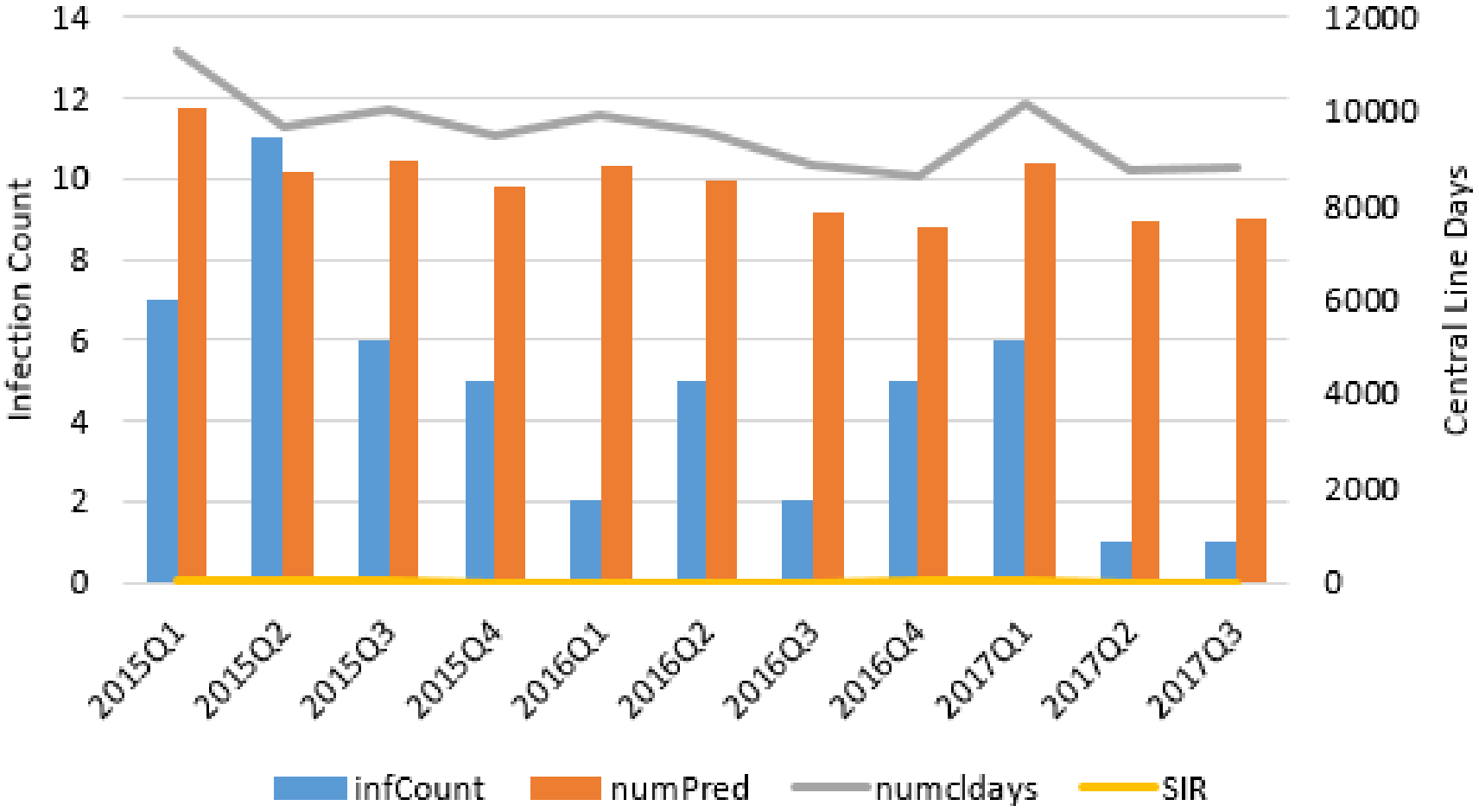
Prevention Bundles-Device Related Infections (CLABSI)

- Central line insertion practices (CLIP)
  - Maximum barrier precautions
  - Hand hygiene
  - Prep site with CHG
  - Use of CHG dressing
- Daily Chlorhexidine Bathing begun in the ICU; now expanded to other areas(includes any patient with a central line).
- Daily assessment of central line; discontinue as soon as possible—no line---no infection!!!

Prevention Bundles-Device Related Infections (CLABSI), cont'd

- Standardization of dressing changes Dressing changes occur on Wednesdays and when wet or soiled.
- Use alcohol impregnated caps for **All** patients, **All** lines, **All** the time.
  - Do not reuse
  - Can remain in place for 7 days

Central Line Associated Bloodstream Infections 2015-present



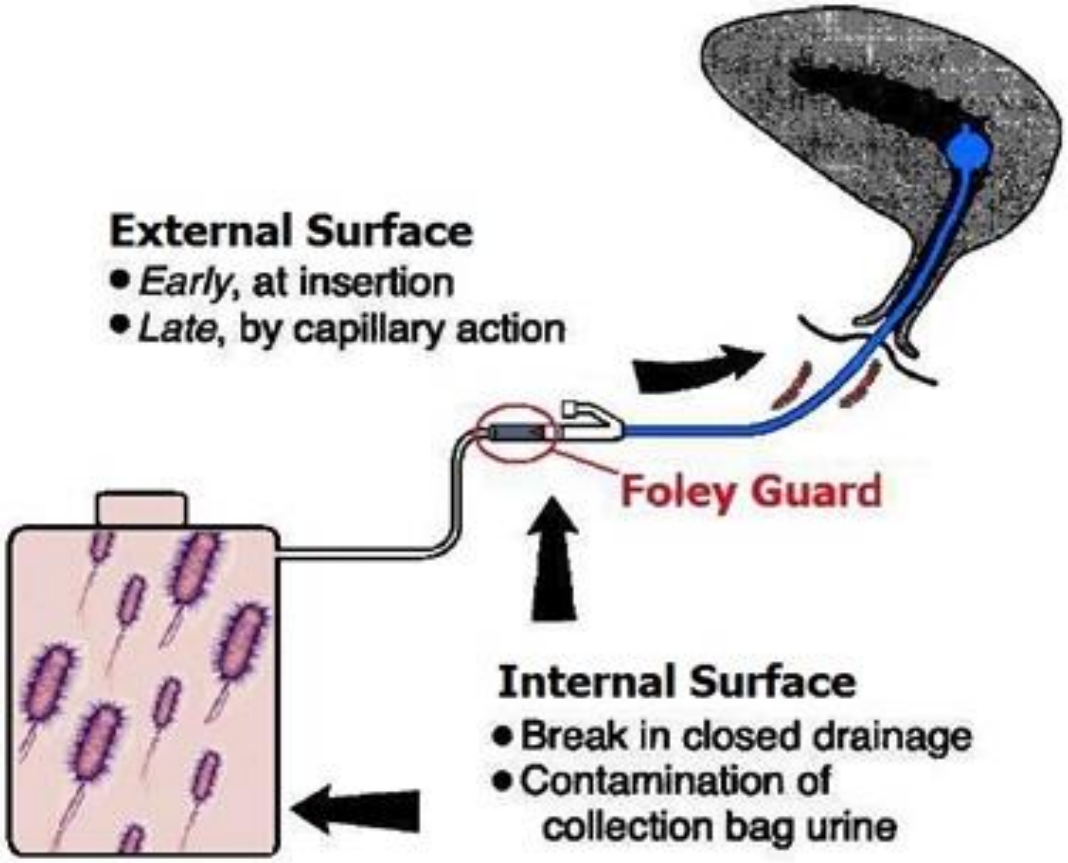
CLABSI CAD, 3 year Trend

facCAD	locRank	location	infCount	numucathdays	locDUR	locCAD	locSIR	
15.9	1	Unit A	6	3324	58	4.12	1.6	2015
	2	Unit B	6	4245	58	3.61	1.25	
	3	Unit C	4	1569	16	3.21	2.52	
	4	Unit D	4	3667	32	2.15	1.08	
	5	Unit E	3	1927	17	2.03	1.54	
-2.46	1	Unit F	2	1274	49	1.48	1.93	2016
	2	Unit B	3	3502	55	1.02	0.76	
	3	Unit G	2	2599	34	0.73	0.79	
	4	Unit H	2	2442	43	0.62	0.73	
	5	Unit A	2	2716	50	0.47	0.65	
-2.94	1	Unit G	2	1921	33	1.06	1.07	2017
	2	Unit I	1	191	22	0.91	.	
	3	Unit J	1	889	19	0.57	.	
	4	Unit K	1	962	15	0.53	.	
	5	Unit E	1	1090	12	0.45	0.91	

Epidemiology: Urinary tract infections (UTIs)

- UTIs are the fourth most common type of healthcare-associated infection, with an estimated 93,300 UTIs in acute care hospitals in 2011. UTIs additionally account for more than 12% of infections reported by acute care hospitals[1]. Virtually all healthcare-associated UTIs are caused by instrumentation of the urinary tract.
- Approximately 12%-16% of adult hospital inpatients will have an indwelling urinary catheter at some time during their hospitalization, and each day the indwelling urinary catheter remains, a patient has a 3%-7% increased risk of acquiring a catheter-associated urinary tract infection (CAUTI).[2-3]

Mechanism of Colonization & Infection, cont'd



Catheter-associated UTI (CAUTI)

- A UTI where an indwelling urinary catheter was in place for >2 calendar days on the date of event, with day of device placement being Day 1,

  AND

- an indwelling urinary catheter was in place on the date of event or the day before. If an indwelling urinary catheter was in place for > 2 calendar days and then removed, the date of event for the UTI must be the day of discontinuation or the next day for the UTI to be catheter-associated.

Symptomatic UTI (SUTI)*

Catheter-associated Urinary Tract Infection (CAUTI)

Must meet at least ***one*** of the following criteria:

1. Patient had an indwelling urinary catheter that had been in place for > 2 days on the date of event (day of device placement = Day 1) AND was either:

 Present for any portion of the calendar day on the date of event†,

OR

 Removed the day before the date of event‡

2. Patient has at least ***one*** of the following signs or symptoms:

- fever (>38.0° C)
- suprapubic tenderness*****
- costovertebral angle pain or tenderness*
- urinary urgency ^
- urinary frequency ^
- dysuria ^

3. Patient has a urine culture with no more than two species of organisms identified, at least one of which is a bacterium of ≥105 CFU/ml (See Comments).

*Consideration for pateints <1 yr of age

Non-Catheter-associated Urinary Tract Infection (Non-CAUTI) Patient must meet 1, 2, and 3 below:

1. One of the following is true:

 Patient has/had an indwelling urinary catheter but it has/had not been in place >2 calendar days on the date of event†

OR

 Patient did not have a urinary catheter in place on the date of event nor the day before the date of event †

2. Patient has at least ***one*** of the following signs or symptoms:

- fever (>38° C) in a patient that is ≤ 65 years of age
- suprapubic tenderness*****
- costovertebral angle pain or tenderness*****
- urinary frequency ^
- urinary urgency ^
- dysuria ^

3. Patient has a urine culture with no more than two species of organisms identified, at least one of which is a bacterium of ≥105 CFU/ml.

Appropriate Catheter Use

Annals of Internal Medicine SUPPLEMENT

The Ann Arbor Criteria for Appropriate Urinary Catheter Use in Hospitalized Medical Patients: Results Obtained by Using the RAND/UCLA Appropriateness Method

Jennifer Meddings, MD, MSc; Sanjay Saint, MD, MPH; Karen E. Fowler, MPH; Elissa Gaies, MD, MPH; Andrew Hickner, MSI; Sarah L. Krein, PhD, RN; and Steven J. Bernstein, MD, MPH

Interventions to reduce urinary catheter use involve lists of "appropriate" indications developed from limited evidence without substantial multidisciplinary input. Implementing these lists, however, is challenging given broad interpretation of indications, such as "critical illness." To refine criteria for appropriate catheter use—defined as use in which benefits outweigh risks—the RAND/UCLA Appropriateness Method was applied. After reviewing the literature, a 15-member multidisciplinary panel of physicians, nurses, and specialists in infection prevention rated scenarios for catheter use as appropriate, inappropriate, or of ing and catheter placement challenges. The panel rated 105 Foley scenarios (43 appropriate, 48 inappropriate, 14 uncertain), 97 ISC scenarios (15 appropriate, 66 inappropriate, 16 uncertain), and 97 external catheter scenarios (30 appropriate, 51 inappropriate, 16 uncertain). The refined criteria clarify that Foley catheters are appropriate for measuring and collecting urine only when fluid status or urine cannot be assessed by other means; specify that patients in the intensive care unit (ICU) need specific medical indications for catheters because ICU location alone is not an appropriate indication; and recognize that Foley

Health Care-Associated Infections, cont'd

- NPSG.07.06.01: Implement evidence-based practices to prevent indwelling catheter-associated urinary tract infections (CAUTI)

Perform peri-care Prior to Inserting Indwelling Urinary Catheters	Secure Indwelling Urinary Catheter	Maintain Sterility of Urine Collection System
Assess Daily the Need for Indwelling Urinary Catheter	Remove Indwelling Urinary Catheter According to Nurse Protocol	Coordinated Education for Physicians and Staff

Use Of Multidisciplinary Teams To Create Prevention Strategies

Prevention Bundles-Device Related Infections (CAUTI)

- After careful consideration of indwelling catheter need, we MUST:
  - Use aseptic technique for insertion
  - Perineal care prior to insertion
  - Use items as provided in the insertion tray (i.e. fenestrated drape, forceps, povidone iodine, etc.)
- Document insertion in EPIC

Prevention Bundles-Device Related Infections (CAUTI), cont'd

- Daily Chlorhexidine Bathing in the ICU
- Daily assessment of Foley Catheter; discontinue as soon as possible—no Foley--no infection!!!
- Prompt urinary catheter removal on postoperative day 1 or 2 with day of surgery being day zero.

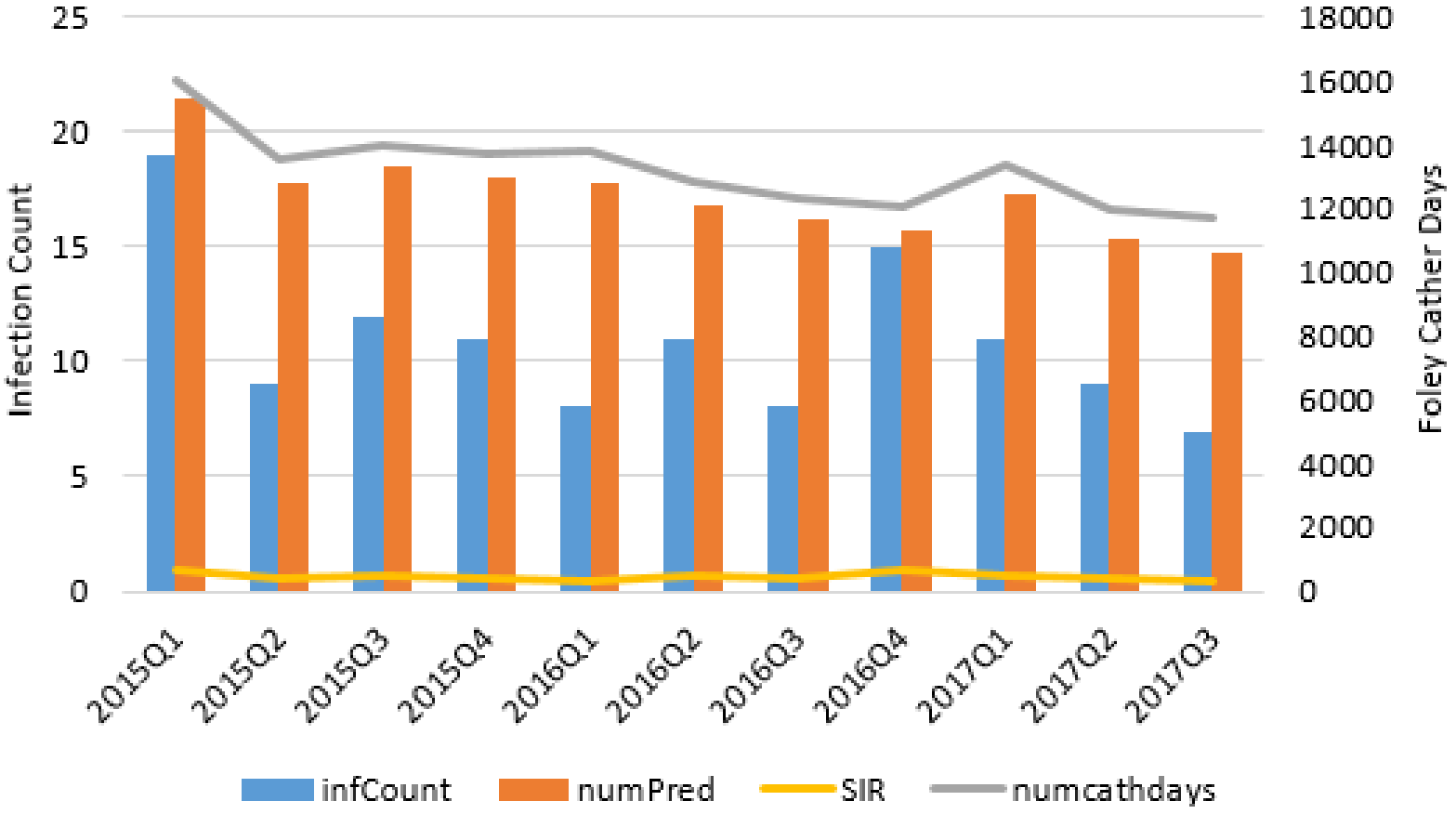
Appropriate Indications for Indwelling Urinary Catheter

- Acute urinary retention or bladder outlet obstruction
- Need for accurate urine output measurement in critically ill patients
- Perioperative use for selected surgical populations such as:
  - Patients undergoing GU surgery or other surgery on contiguous structures of the GU tract.
  - Anticipated prolonged duration of surgery (if inserted for this reason, should be removed in PACU)
  - Patients anticipated to receive large-volume fluid infusions or diuretics during surgery
  - Need for intraoperative monitoring of urine output

Appropriate Indications for Indwelling Urinary Catheter, cont'd

- To assist in healing of open sacral or perineal wounds in incontinent patients
- Patient requires prolonged immobilization (e.g. potentially unstable thoracic or lumbar spine, multiple trauma injuries such as pelvic fractures)
- For comfort in end-of-life care situations

Catheter Associated Urinary Tract Infections 2015 to Present



CAUTI CAD, 3 year Trend

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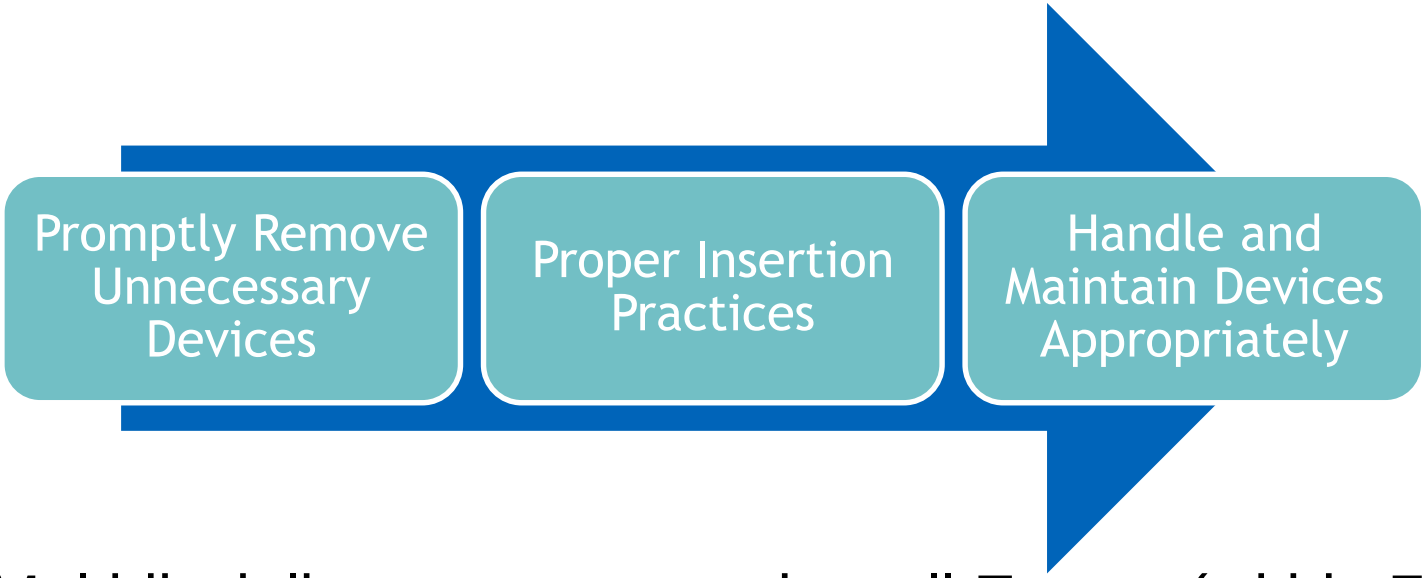
-2.69	1	Unit A	10	3941	69	4.61	1.39	2015
	2	Unit B	5	3180	63	1.84	1.19	
	3	Unit C	2	844	13	1.43	.	
	4	Unit D	1	504	7	0.56	.	
	5	Unit E	2	1741	16	0.48	0.99	
-2.13	1	Unit F	8	2222	39	2.09	1.02	2016
	2	Unit G	3	1854	16	0.97	1.11	
	3	Unit H	2	1030	10	0.87	1.33	
	4	Unit A	5	3151	58	0.69	0.87	
	5	Unit E	2	1624	17	0.58	1.06	
-2.31	1	Unit I	3	806	37	2.23	2.94	2017
	2	Unit G	3	1049	12	1.85	1.96	
	3	Unit D	1	452	10	0.61	.	
	4	Unit J	1	596	6	0.35	.	
	5	Unit H	1	670	9	0.27	.	

Culture of Culturing

1. Local signs and symptoms of infection (supra-pubic tenderness, CVA tenderness etc.)
2. Fever and neutropenia
3. Fever and kidney transplant
4. Fever and recent urogenital procedure
5. Fever and obstructed catheter
6. Other: document rationale for ordering the culture (EMR will force provider to document reasons in EPIC and/or progress note)

Defects analysis for all HAIs



- Multidisciplinary team to review all Events (within 7 days)
- Identify Potential Defects
- Improvements around Process measures (i.e. patient bathing, culturing, timeliness of cultures, and staff practices)

Conclusions

- Demonstrated improvements since 2015 with CAUTI and CLABSI.
- Adherence to recommended standards and guidelines of CDC, IDSA, SHEA for bundled practices.
- Value of recognizing importance of prevention and setting priorities with TAP.
- Our improvements have been sustained.