APIC Grand Canyon 088

May 2026 CHAPTER MEETING

Agenda

- President's Update
- Webmaster Update
- Education Update
- CAUTI: Prevention and Management Dr. Jonas Marschall, MD
- Healthcare Supply Chain 101: Suzi Collins, FAHRMM, CMRP

President’s Update

🗓️ Upcoming Education

- **APIC National Conference** | June 15–18 | Nashville
- **APIC GC Mini-Conference** | Aug. 28, 2026 | Flagstaff
- **SSI Journal Club with Dr. Edmiston** (Google Meets)
- **APIC GC Fall Conference** | Oct. 16, 2026 | Phoenix

📰 National APIC News

- New MIFU toolkit released
- CBIC board position open

📣 Grand Canyon Chapter News/Communication Updates

- Chapter updates sent on the 6th & 20th
- Q2 Newsletter coming June 2026

🤝 Volunteers Needed

- Northern Mini-Conference
- Fall Conference
- Special Election Opportunities

Webmaster Update

New Chapter Email Address

- New support email: info@apicgrandcanyon.org
- use for all chapter communications going forward

Chapter Website

- temporary website live at www.apicgrandcanyon.org
- main page redirects to our official chapter website
- continue to using chapter website for all updates still

Nominating and Awards Update

Special Election Announcement

- Nomination period: May 25th - June 5th
- open to all eligible chapter members

Open Positions

- Member at Large
- Recording Secretary
- Membership Secretary

Communication will be sent on May 25th.

Education Update

- Q2 Newsletter coming in June
- July Webinar hosted by UVDI- July 17th

Membership Committee Update

- Outreach and Recruitment
- Brochures are now available!

CAUTI
prevention and management

Jonas Marschall, MD
Division of Infectious Diseases
May 22, 2026
AZ APIC Chapter

Banner
University Medical Center
Phoenix

No conflicts of interest to declare

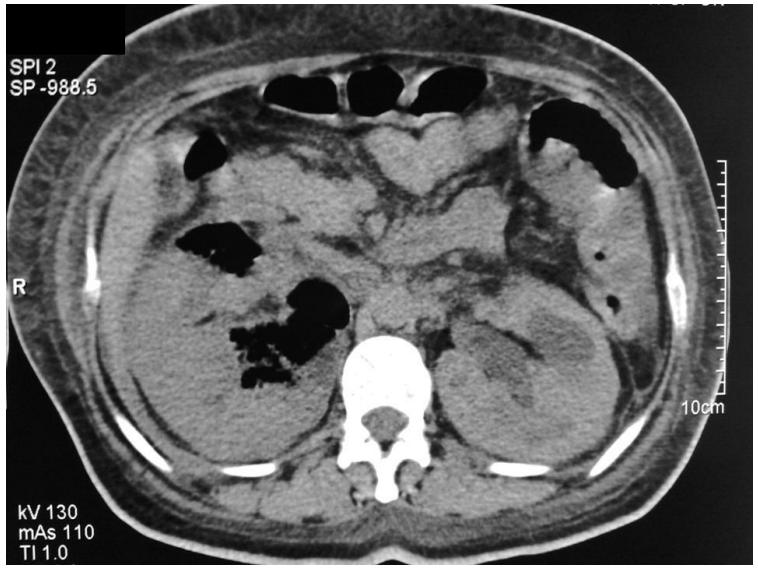
THE UNIVERSITY OF ARIZONA
College of Medicine
Phoenix

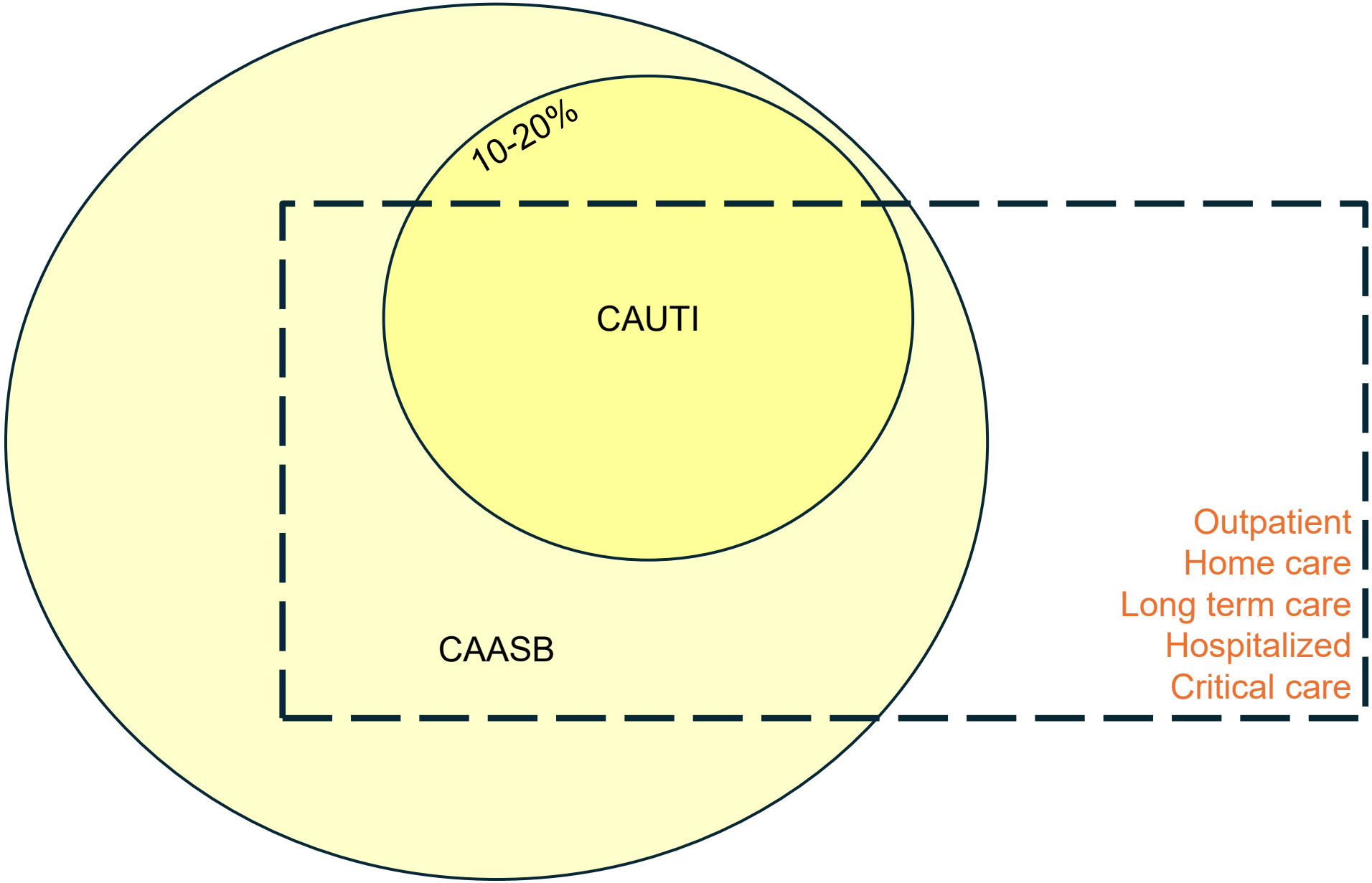
Diagnosis? Cause?

- 59-yo obese F with poorly controlled diabetes and chronic renal insufficiency, with hematopyuria x weeks
- Got 1 week of ciprofloxacin, then 10 days of Bactrim
- Cystoscopy, coagula seen, catheter placement
- The next day, fever, nausea, abdominal pain
- CT: gas, left kidney

our patient

textbook





Bacteriuria in a catheterized individual

Risk factors for CAUTI – modifiable or not?

- The catheter
  - Unnecessary placement
  - Prolonged catheterization
- Improper insertion
  - Lack of hand hygiene
  - Incorrect technique
- Improper maintenance
  - Not keeping a closed system
  - Not securing the catheter

- Older age
- Diabetes
- Female sex
- Structural urological abnormalities

Surveillance - a key CAUTI metric

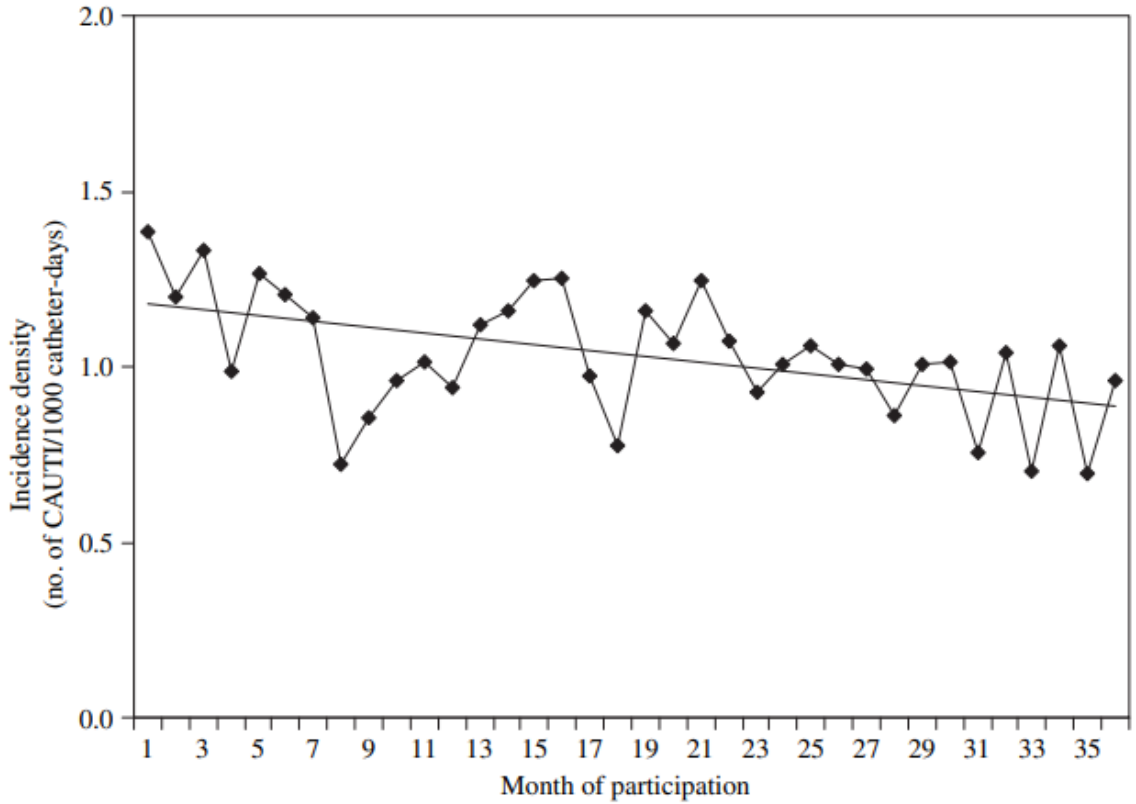


Figure 1. Results of linear regression analysis for symptomatic catheter-associated urinary tract infection (CAUTI) (all three periods). The linear regression coefficient was −0.008 CAUTI/1000 urinary catheter-days per month ($P = 0.002$; $R^2 = 0.246$).

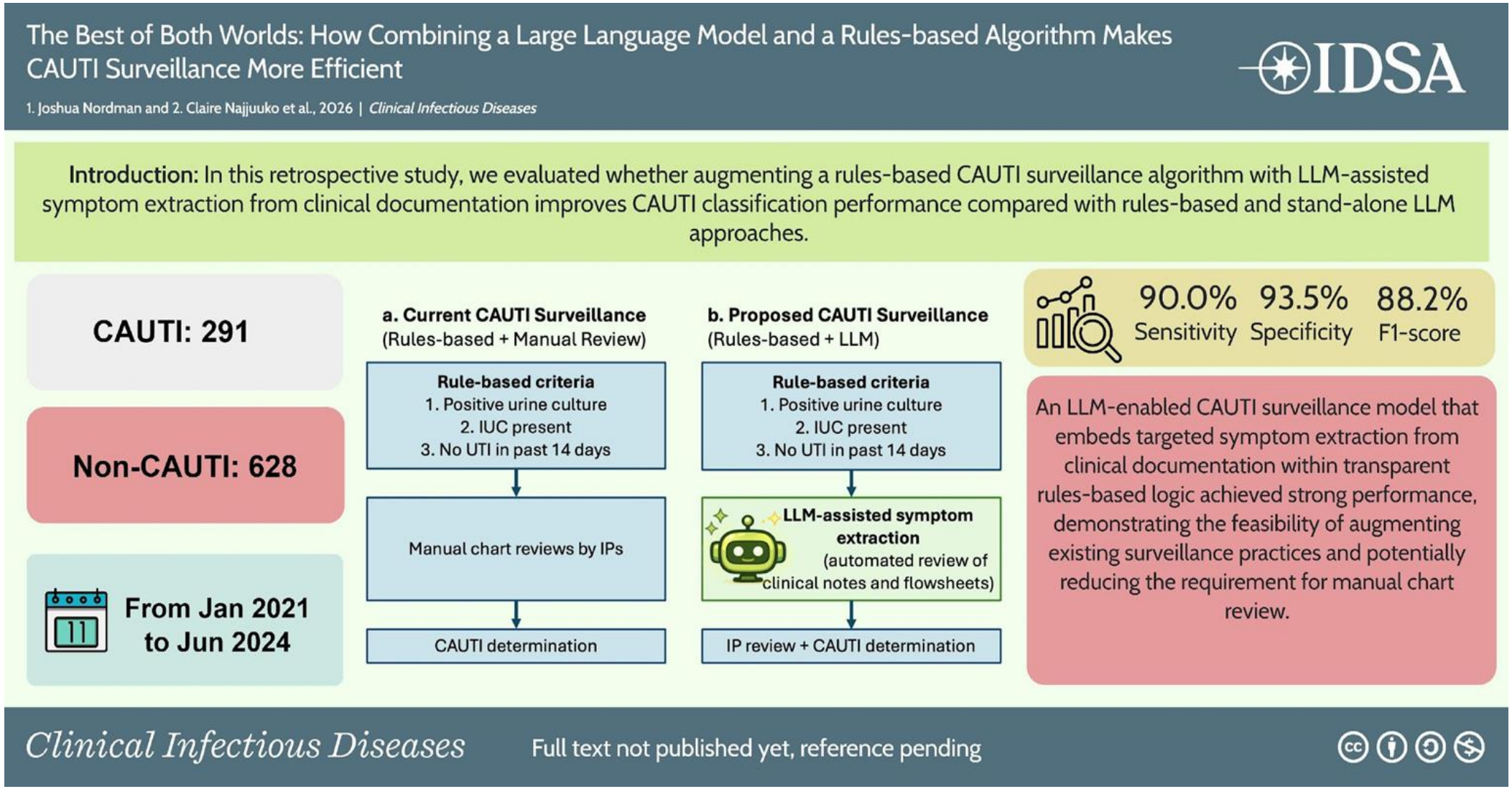
- Requires standard definition (eg, CDC NHSN)
- Measurement over time
- Basis for benchmarking

- *Figure shows CAUTI surveillance curve based on 267 ICUs in Germany*

Gastmeier et al, J Hosp Infect 2011; 78:41-44.

https://www.cdc.gov/nhsn/pdfs/pscmanual/7psccauticurrent.pdf

“Next generation surveillance”



The preventable proportion of healthcare-associated infections 2005–2016: Systematic review and meta-analysis

Peter W. Schreiber MD[1], Hugo Sax MD Prof[1,2], Aline Wolfensberger MD[1], Lauren Clack PhD[1], Stefan P. Kuster MD, MSc[1,2] and Swissnoso[a]

[1]Division of Infectious Diseases and Hospital Epidemiology, University and University Hospital of Zurich, Zurich, Switzerland and [2]Swissnoso, National Center for Infection Control, Bern, Switzerland

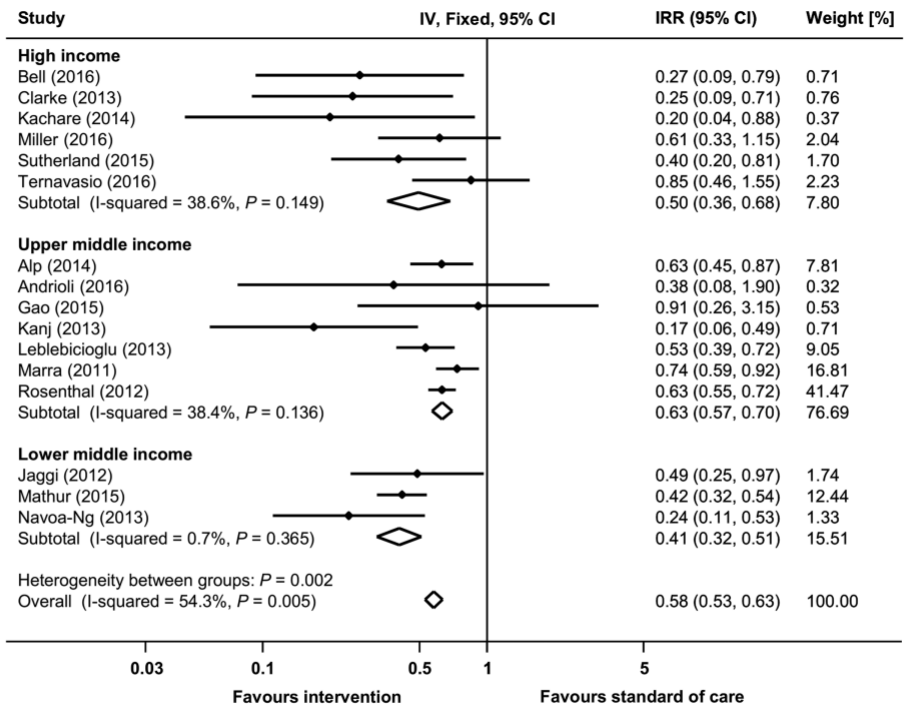
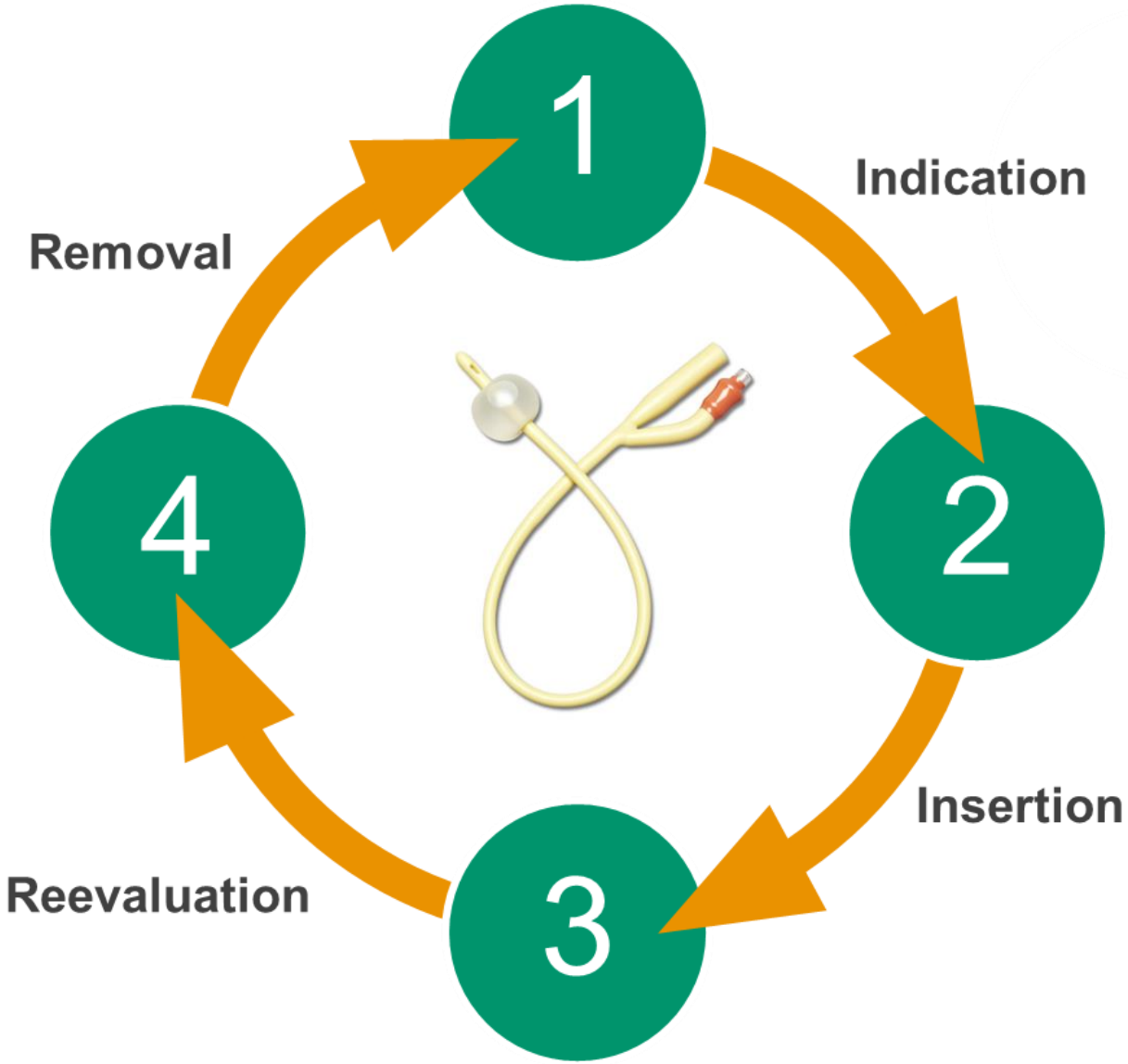


Fig. 2. Incidence rate ratios (IRRs) from fixed effects models for catheter-associated urinary tract infection (CAUTI) in uncontrolled before-and-after studies stratified by country economic income status. Data markers indicate IRRs and error bars indicate 95% confidence intervals (95% CI). Note. IV, inverse variance.

- Before/after prevention studies
- Stratified by countries' economic status
  - 42% of CAUTI "preventable"

Schreiber et al, Infect Control Hosp Epidemiol 2018:39:1277–1295

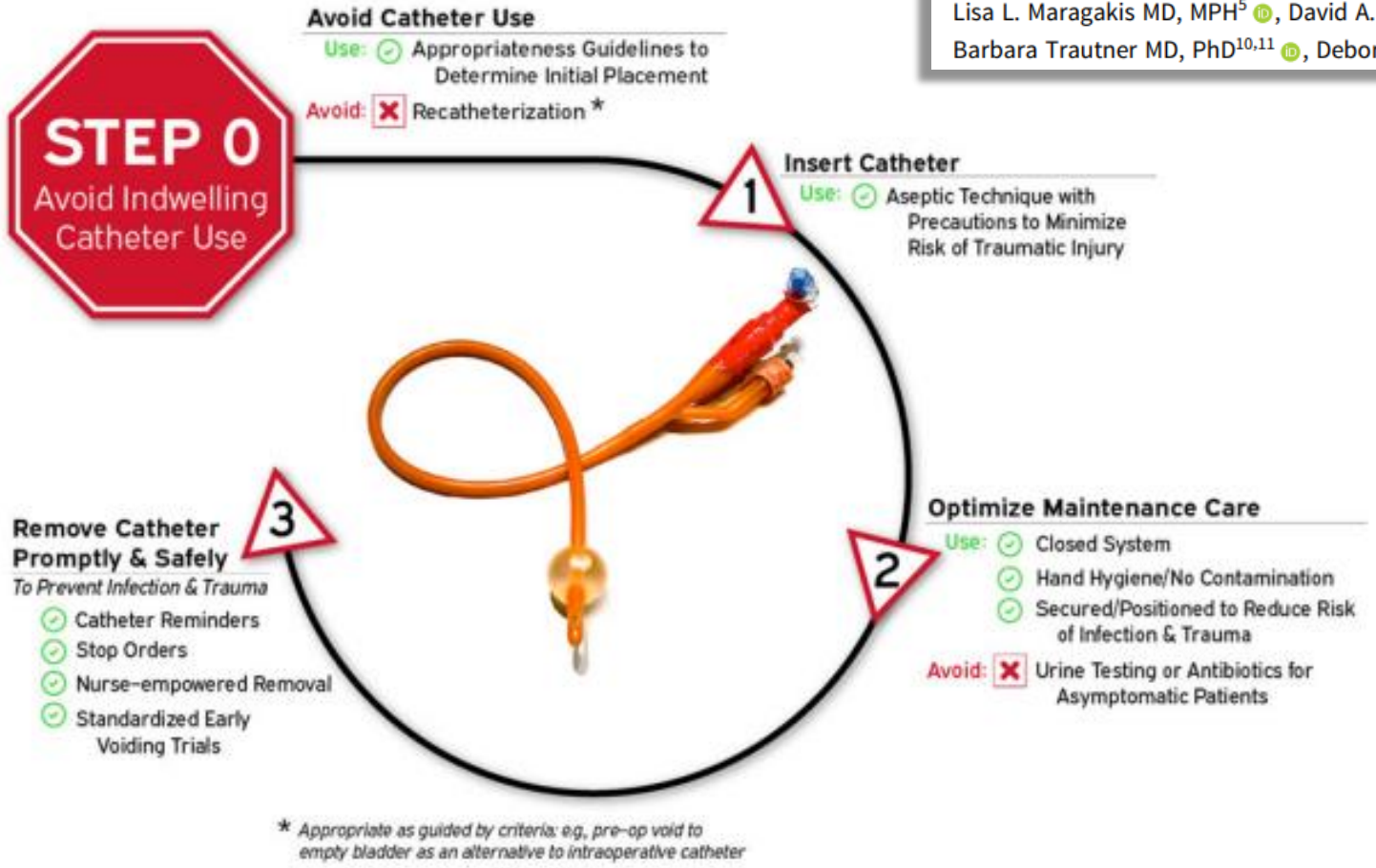
The life cycle of the urinary catheter …and how to disrupt it



SHEA/IDSA/APIC Practice Recommendation

Strategies to prevent catheter-associated urinary tract infections in acute-care hospitals: 2022 Update

Payal K. Patel MD, MPH[1], Sonali D. Advani MBBS, MPH[2], Aaron D. Kofman MD[3], Evelyn Lo MD[4], Lisa L. Maragakis MD, MPH[5], David A. Pegues MD[6], Ann Marie Pettis RN, BSN[7], Sanjay Saint MD, MPH[8,9], Barbara Trautner MD, PhD[10,11], Deborah S. Yokoe MD, MPH[12] and Jennifer Meddings MD, MSc[8,9,13]



- Part of the SHEA/IDSA/APIC compendium of prevention strategies
- Succinct source of guidance on preventive measures

Patel et al, Infect Control Hosp Epidemiol 2023; 44: 1209

One of the earliest **indication lists**, in an ED

Indication Sheet for ordering a Foley Catheter

Name of the patient: Please stamp or stick here the name plate

Gender: M / F

Admitting diagnosis:

Please read the following criteria for appropriate use of Foley catheters and circle your reason for ordering the Foley catheter for this patient.

1. Obstruction of the urinary tract distal to the bladder
2. Alteration in the blood pressure or volume status requiring continuous, accurate urine volume measurement
3. A need to measure urine output accurately in an uncooperative patient (e.g., Intoxication).
4. Preoperative catheter insertion for patients going directly to the operating room
5. Continuous bladder irrigation for urinary tract hemorrhage
6. Urinary incontinence posing a risk to the patient (e.g., major skin breakdown or protection of nearby operative site)
7. To permit urinary drainage in patients with neurogenic bladder dysfunction and urinary retention
8. Palliative care for terminally ill

IF YOUR REASON FOR ORDERING A FOLEY IS NOT LISTED ABOVE, A FOLEY CATHETER MAY NOT BE INDICATED FOR THIS PATIENT.

The reason I think this patient needs a Foley catheter is: .....

- Why? Because up to 50% have no

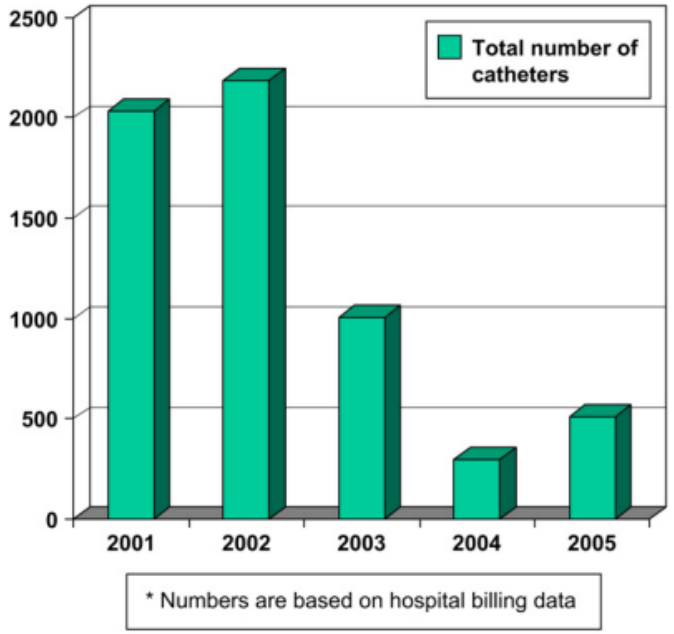


Fig 2. Total number of urinary catheters* placed in the emergency room prior to the intervention (2001–2002), during the intervention (2003), and following the intervention (2004–2005).

intervention

Gokula et al, AJIC 2007; 35: 589.

Inappropriate uses

Urinary incontinence when nurses can turn/provide skin care with available resources, including patients with intact skin, incontinence-associated dermatitis, pressure ulcers stages I and II, and closed deep-tissue injury
Routine use of Foley catheter in ICU without an appropriate indication
Foley placement to reduce risk for falls by minimizing the need to get up to urinate
Post-void residual urine volume assessment
Random or 24-h urine sample collection for sterile or nonsterile specimens if possible by other collection strategies‖
Patient¶ or family request when no expected difficulties managing urine otherwise in nondying patient, including during patient transport
Patient ordered for "bed rest" without strict immobility requirement *Example: lower-extremity cellulitis*
Preventing urinary tract infection in patient with fecal incontinence or diarrhea or management of frequent, painful urination in patients with urinary tract infection

se...

Table 2. Guide for Foley Catheter Use in Hospitalized Medical Patients*

Appropriate indications

Acute urinary retention without bladder outlet obstruction *Example: medication-related urinary retention*
Acute urinary retention with bladder outlet obstruction due to noninfectious, nontraumatic diagnosis *Example: exacerbation of benign prostatic hyperplasia* *Caution: consider urology consultation for catheter type and/or placement for conditions, such as acute prostatitis and urethral trauma*
Chronic urinary retention with bladder outlet obstruction†
Stage III or IV or unstageable pressure ulcers or similarly severe wounds of other types that cannot be kept clear of urinary incontinence despite wound care and other urinary management strategies‡
Urinary incontinence in patients for whom nurses find it difficult to provide skin care despite other urinary management strategies‡ and available resources, such as lift teams and mechanical lift devices *Examples: turning causes hemodynamic or respiratory instability, strict prolonged immobility (such as in unstable spine or pelvic fractures), strict temporary immobility after a procedure (such as after vascular catheterization), or excess weight (>300 lb) from severe edema or obesity*
Hourly measurement of urine volume required to provide treatment *Examples: management of hemodynamic instability, hourly titration of fluids, drips (e.g., vasopressors, inotropes), or life-supportive therapy*
Daily (not hourly) measurement of urine volume that is required to provide treatment and cannot be assessed by other volume§ and urine collection strategies‖ *Examples: acute renal failure work-up, or acute IV or oral diuretic management, IV fluid management in respiratory or heart failure*
Single 24-h urine sample for diagnostic test that cannot be obtained by other urine collection strategies‖
Reduce *acute*, severe pain with movement when other urine management strategies are difficult‡ *Example: acute unrepaired fracture*
Improvement in comfort when urine collection by catheter addresses patient and family goals in a dying patient
Management of gross hematuria with blood clots in urine
Clinical condition for which ISC or external catheter would be appropriate but placement by experienced nurse or physician was difficult or patient for whom bladder emptying was inadequate with nonindwelling strategies during this admission

Meddings et al, Ann Arbor criteria for appropriate urinary catheter use in hospitalized medical patients, Ann Intern Med 2015.

Houdini criteria for justified urinary catheterization

- ✓ Gross Hematuria
- ✓ Urinary Obstruction
- ✓ Urologic surgery
- ✓ Open sacral Decubitus ulcers in incontinent patients
- ✓ Need for tracking Ins & outs (I&O) for instability
- ✓ "No code"/comfort care/hospice care
- ✓ Immobility due to physical constraints

(a **nurse-driven** intervention)

Trovillion et al, SHEA Spring Meeting 2011, Dallas TX (abstract #592)

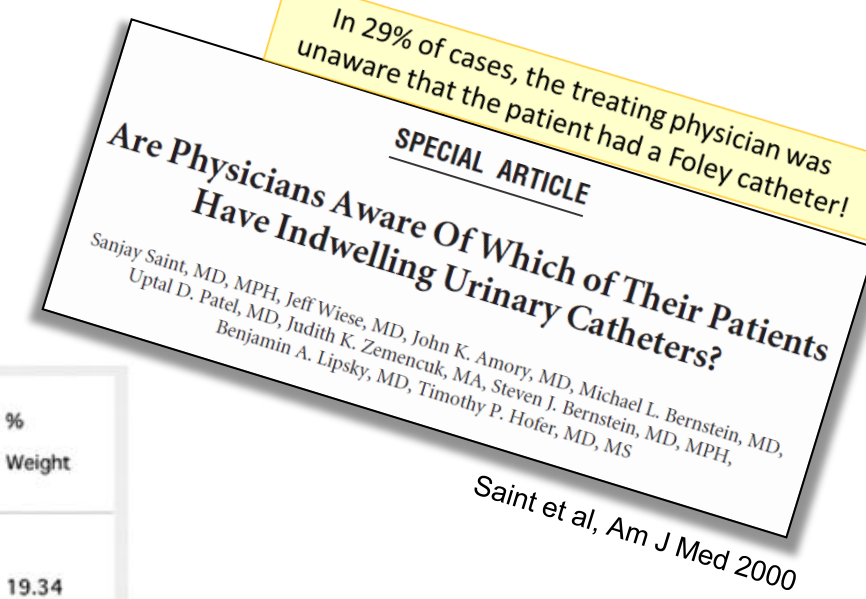
Teaching the right **insertion technique**

- Key points:

1. **Gather supplies** – sterile gloves, catheter kit, lubricant, antiseptic solution, and drainage bag.
2. **Position the patient** – supine with legs apart (for females) or straight (for males).
3. **Perform hand hygiene** and wear sterile gloves.
4. **Prepare the catheter** – lubricate the tip and ensure the drainage bag is ready.
5. **Clean the urethral area** with antiseptic solution.
6. **Insert the catheter** gently until urine flows, then advance slightly more.
7. **Inflate the balloon** with sterile water to secure placement.
8. **Attach the drainage bag** and secure the catheter to the patient's leg.
9. **Monitor for complications** and ensure proper drainage.

- Educational videoclips: Available from *Youtube et al*

Evaluating the catheter: Reminders & stop orders



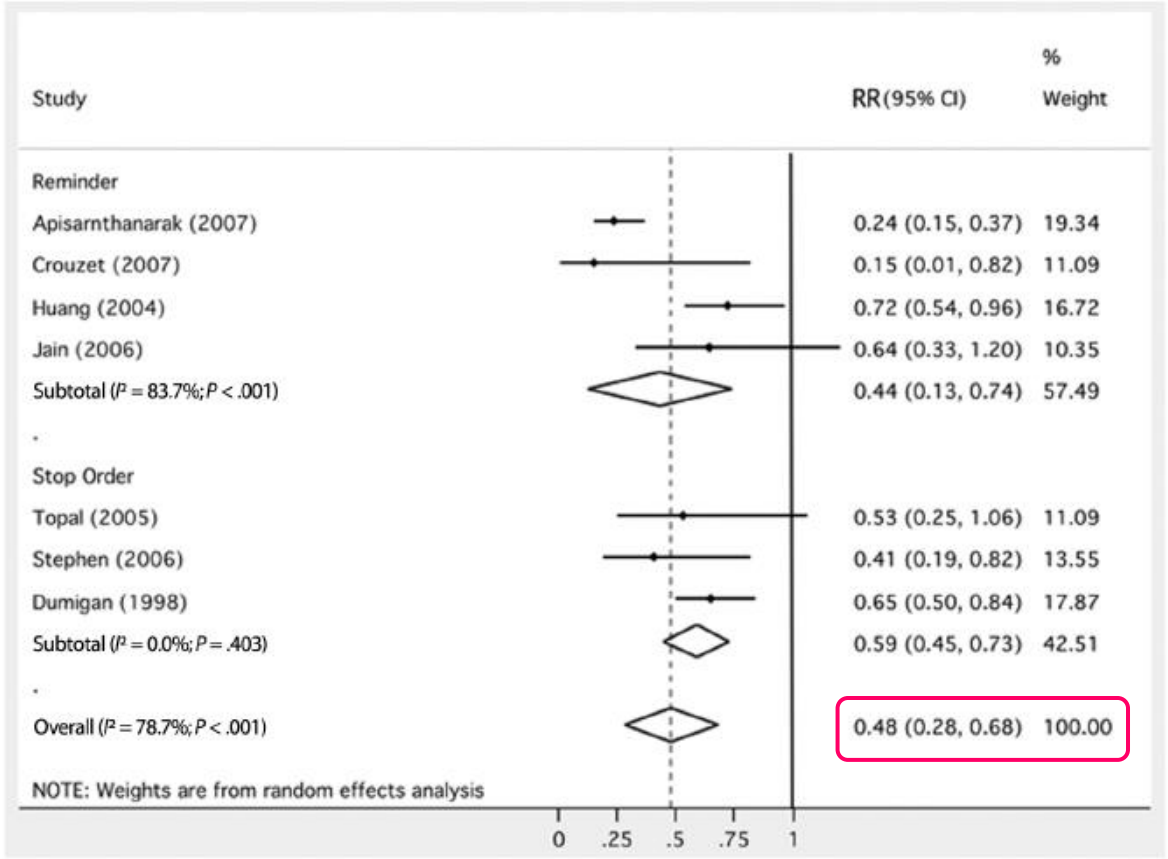


Figure 3. Meta-analysis of rate ratios (RRs) for catheter-associated urinary tract infection (CAUTI) episodes per 1000 catheter-days, for intervention versus control groups. CI, confidence interval.

(Re-catheterization rates similar across groups)

Meddings et al, Clin Infect Dis 2010;51:550

Impact of Rounding Checklists on the Outcomes of Patients Admitted to ICUs: A Systematic Review and Meta-Analysis

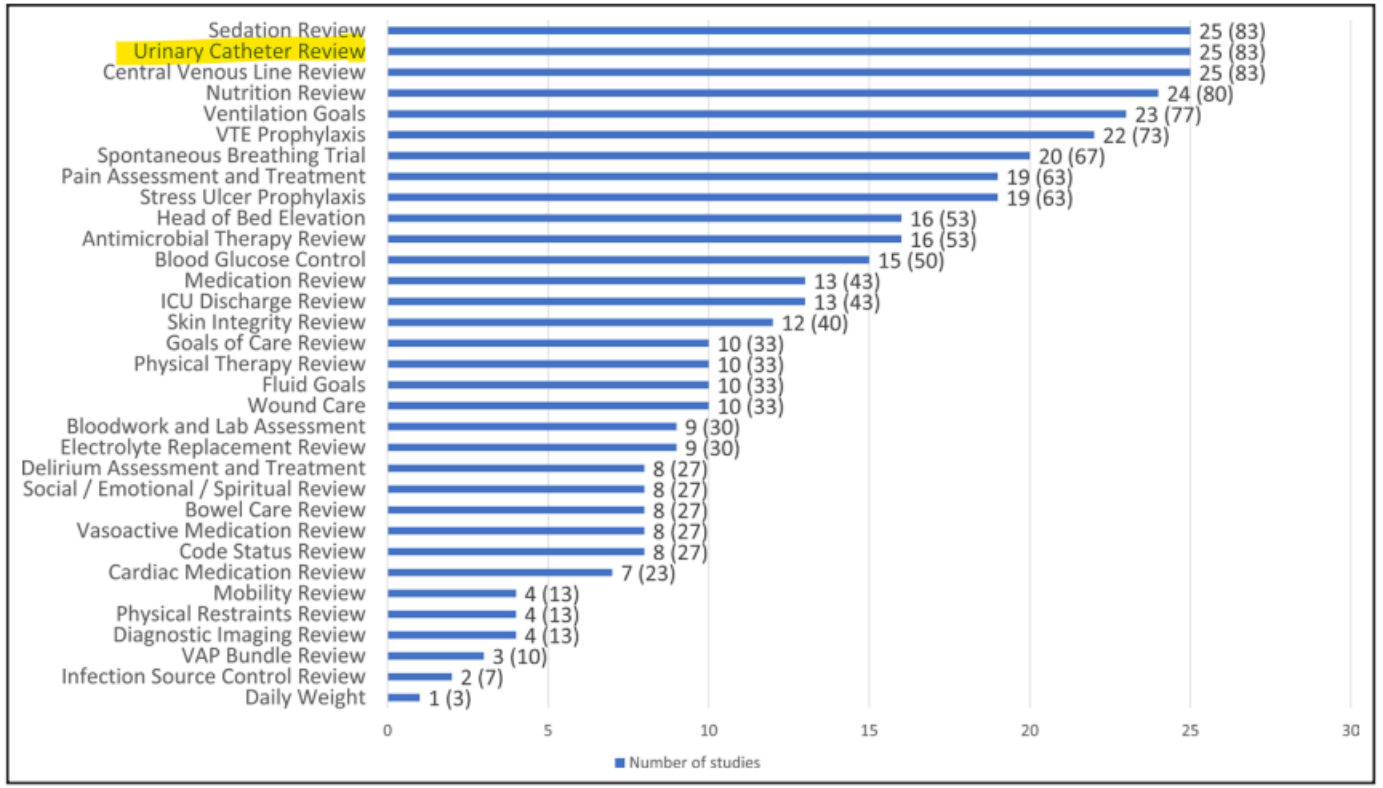


Figure 2. Checklist items that were included in the included studies. VAP = ventilator-associated pneumonia; VTE = venous thromboembolism.

30 included studies

Effect of ICU rounds:

↓ in-hospital mortality

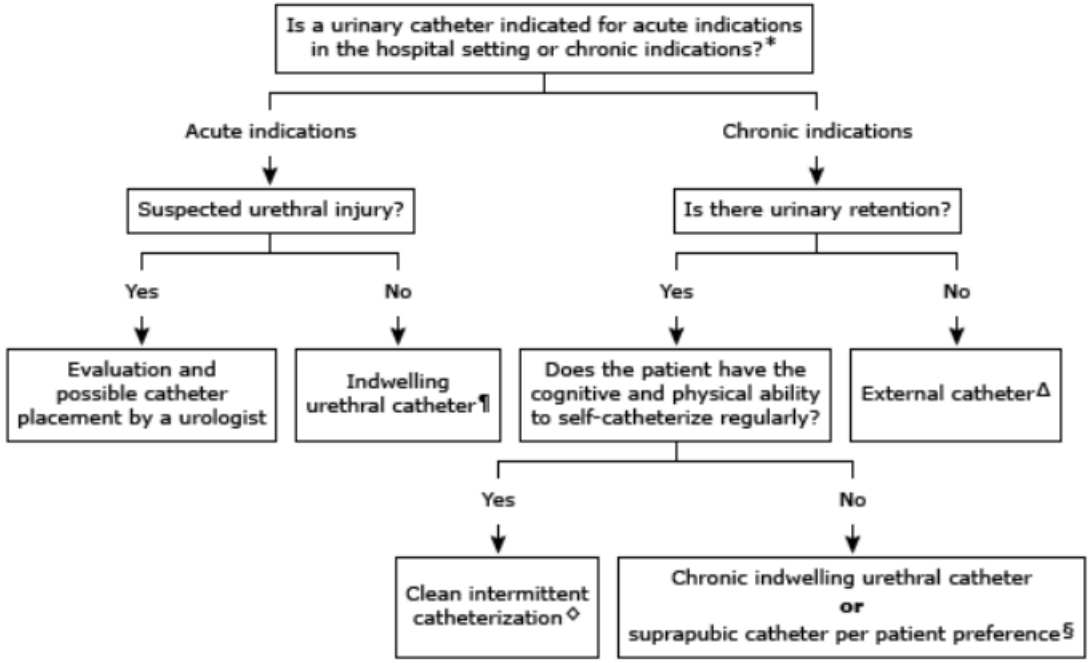
↓ LOS

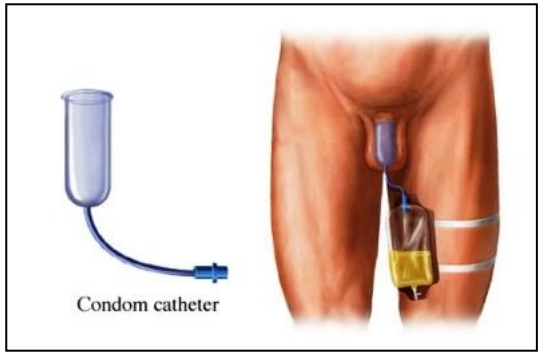
↓ 30-day mortality

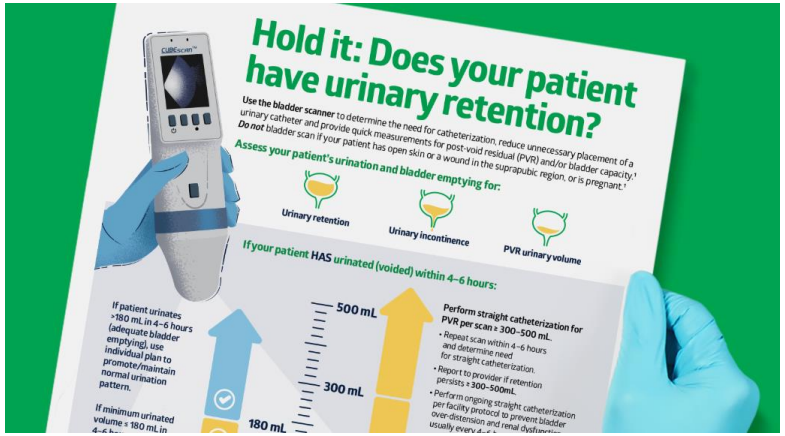
↓ **CAUTI rate**

↓ CLABSI rate

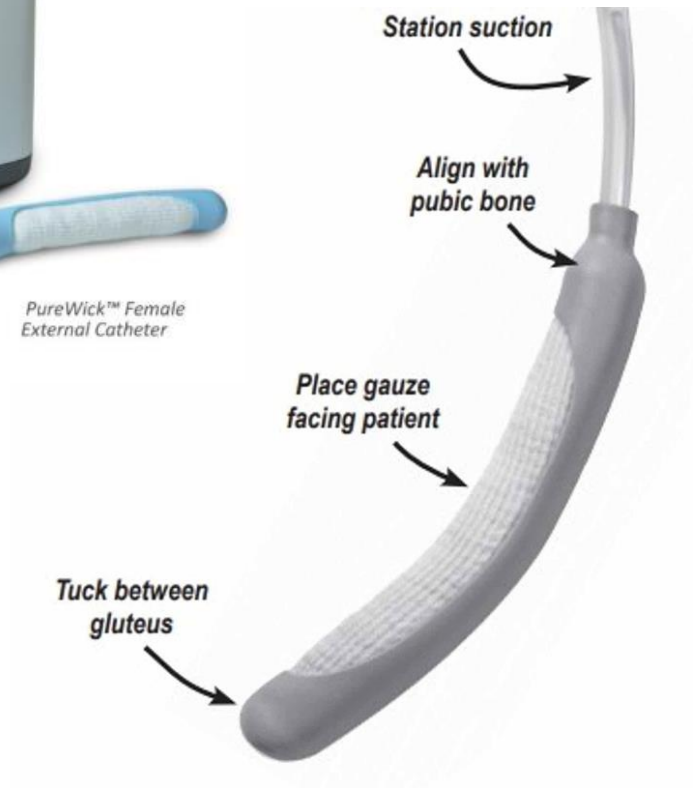
MacKinnon et al, Crit Care Explorations 2024.


Is a urinary catheter indicated for acute indications in the hospital setting or chronic indications?*
Acute indications
Chronic indications
Suspected urethral injury?
Is there urinary retention?
Yes
No
Yes
No
Evaluation and possible catheter placement by a urologist
Indwelling urethral catheter¶
Does the patient have the cognitive and physical ability to self-catheterize regularly?
External catheterΔ
Yes
No
Clean intermittent catheterization◇
Chronic indwelling urethral catheter
or
suprapubic catheter per patient preference§


Condom catheter


Hold it: Does your patient have urinary retention?
Use the bladder scanner to determine the need for catheterization, reduce unnecessary placement of a urinary catheter and provide quick measurements for post-void residual (PVR) and/or bladder capacity.
Do not bladder scan if your patient has open skin or a wound in the suprapubic region, or is pregnant.
Assess your patient's urination and bladder emptying for:
Urinary retention
Urinary incontinence
PVR urinary volume
If your patient HAS urinated (voided) within 4–6 hours:
500 mL
300 mL
180 mL
Perform straight catheterization for PVR per scan ≥ 300–500 mL.
• Repeat scan within 4–6 hours and determine need for straight catheterization.
• Report to provider if retention persists ≥ 300–500mL.
• Perform ongoing straight catheterization per facility protocol to prevent bladder over-distension and renal dysfunction

A new alternative to Foleys



How I Do It: PureWick female external catheter: a non-invasive urine management system for incontinent women

Alex Uhr, MD,[1] Lydia Glick, BS,[1] Suzanne Barron, CRNP,[1] Jillian Zavodnick, MD,[2] James R. Mark, MD,[1] Patrick Shenot, MD,[1] Alana Murphy, MD[1]

[1]Department of Urology, Thomas Jefferson University Hospital, Philadelphia, Pennsylvania, USA

[2]Department of Internal Medicine, Thomas Jefferson University Hospital, Philadelphia, Pennsylvania, USA

UHR A, GLICK L, BARRON S, ZAVODNICK J, MARK JR, SHENOT P, MURPHY A. How I Do It: PureWick female external catheter: a non-invasive urine management system for incontinent women. *Can J Urol* 2021;28(3):10669-10672.

Catheter associated urinary tract infections (CAUTIs) are common hospital-acquired infections and remain a significant medical and financial challenge to the healthcare system. Despite this risk, incontinent women may require prolonged catheterization to accurately monitor urine output and prevent skin breakdown. The PureWick Female External Urinary Catheter is a promising non-invasive urine collection system for use in incontinent women that may help reduce CAUTI rates, maintain skin integrity, accurately quantify urine output, and avoid extra healthcare costs.

Key Words: catheter associated UTI (CAUTI), urinary incontinence, female external collection device

Uhr et al, Can J Urol 2021;26(3):10670.

Not recommended: coated catheters

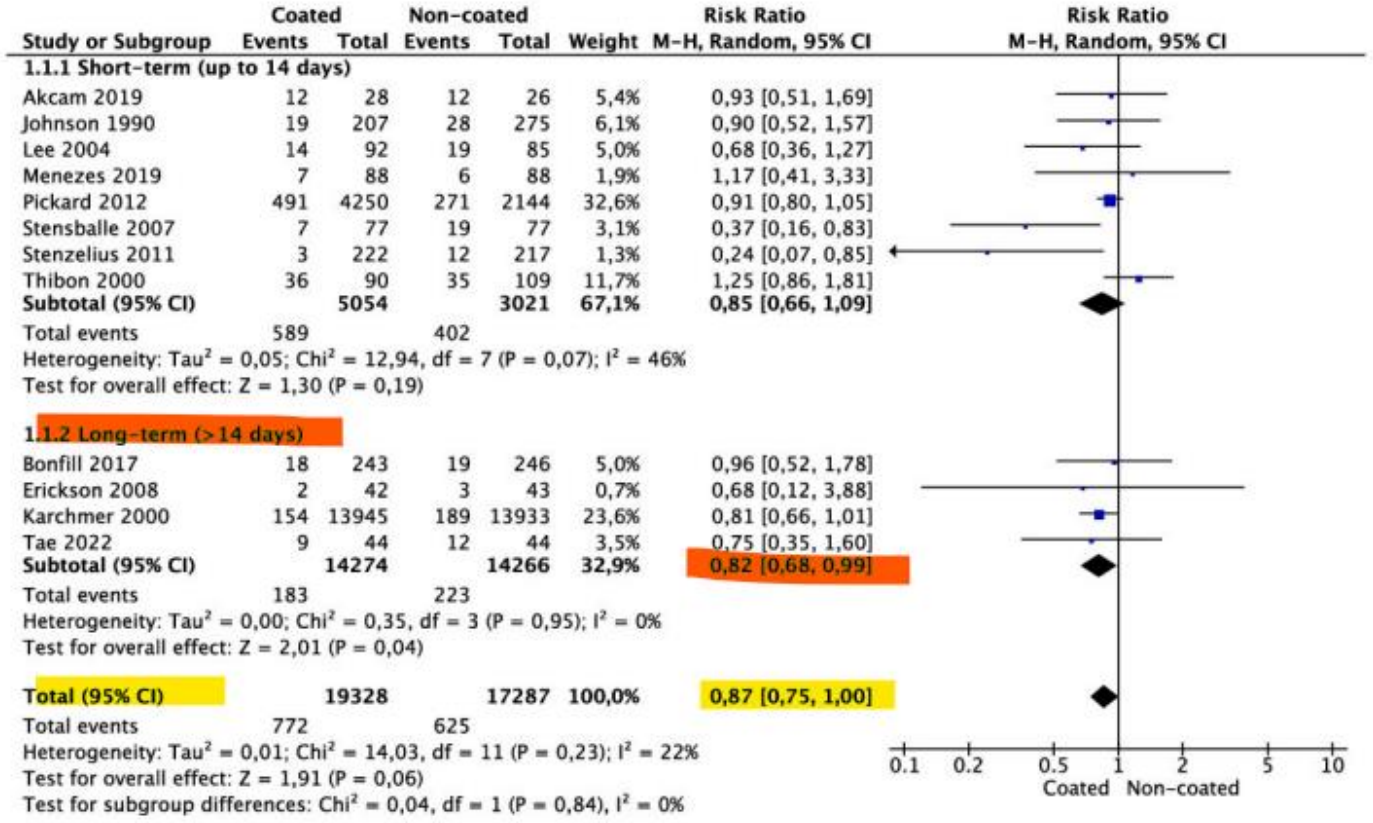


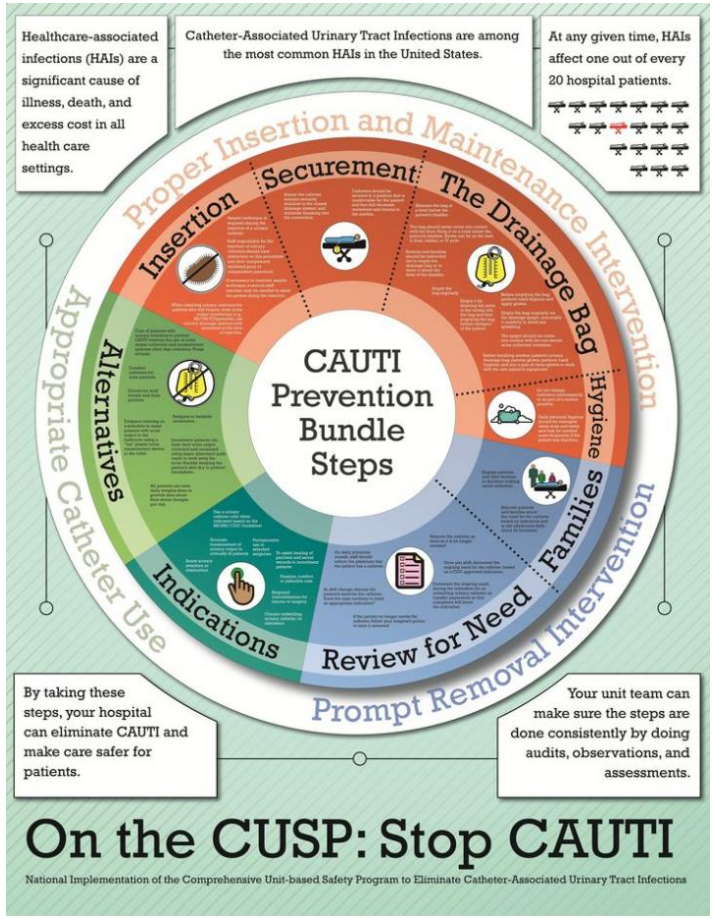
Figure 3. Meta-analysis of CAUTI incidence.

- Antibiotic prophylaxis at catheter insertion
- Catheter irrigation
- Routine catheter exchange

Gauhar et al, J Clin Med 2022;11:4463.

Pickard et al, Lancet 2012 (no difference with silver coating, slight but not clinically meaningful difference with

CAUTI bundles



Saint et al, NEJM 2016;374:2111-9.

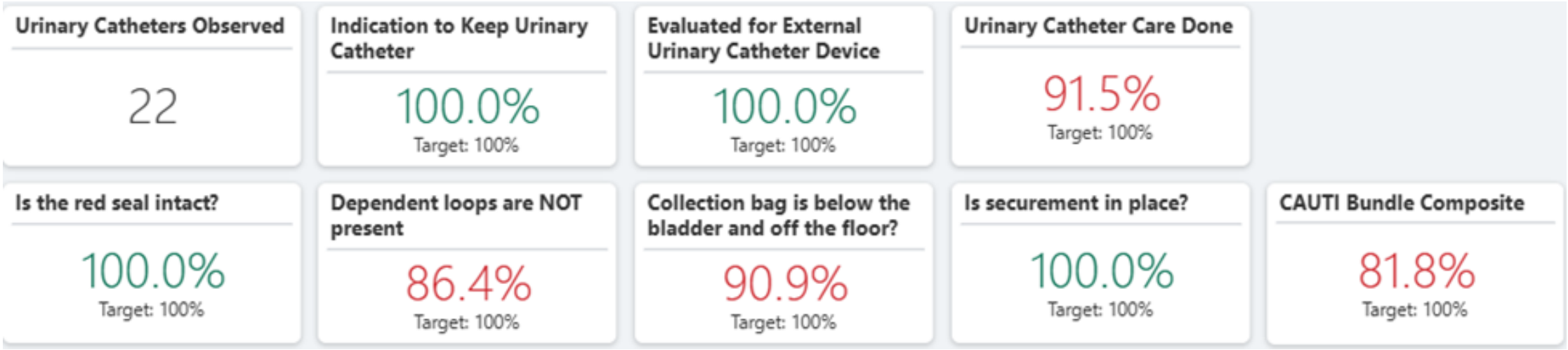
A Program to Prevent Catheter-Associated Urinary Tract Infection in Acute Care

Sanjay Saint, M.D., M.P.H., M. Todd Greene, Ph.D., M.P.H., Sarah L. Krein, Ph.D., R.N., Mary A.M. Rogers, Ph.D., David Ratz, M.S., Karen E. Fowler, M.P.H., Barbara S. Edson, R.N., M.B.A., M.H.A., Sam R. Watson, M.S.A., C.P.P.S., Barbara Meyer-Lucas, M.D., M.H.S.A., Marie Masuga, R.N., M.S.N., Kelly Faulkner, M.S.P.A., Carolyn V. Gould, M.D., M.S.C.R., James Battles, Ph.D., and Mohamad G. Fakih, M.D., M.P.H.

- Avoid unnecessary catheterization
- Aseptic insertion technique
- Proper catheter maintenance
- Daily catheter assessment

Meddings et al: Systematic Review of Interventions to Reduce Urinary Tract Infection in Nursing Home Residents. J Hosp Med 2017;12(5):356-368.

At BUMCP, HAI dashboard:



RESEARCH Open Access

Reducing urinary catheter use in geriatric patients - results of a single-center champion-led intervention

L Mrziglod[1,2], S Saydan[3,4], F Schwab[3,4], D Zohlnhöfer-Momm[2], P Gastmeier[3,4] and S Hansen[3,4*]

- Geriatric patient population in a Berlin medical center, part of the German KISS system
- Champion-led intervention
  - Feedback of surveillance
  - Training in aseptic insertion & maintenance
  - Daily assessment and timely removal
- Catheter utilization dropped by 20%

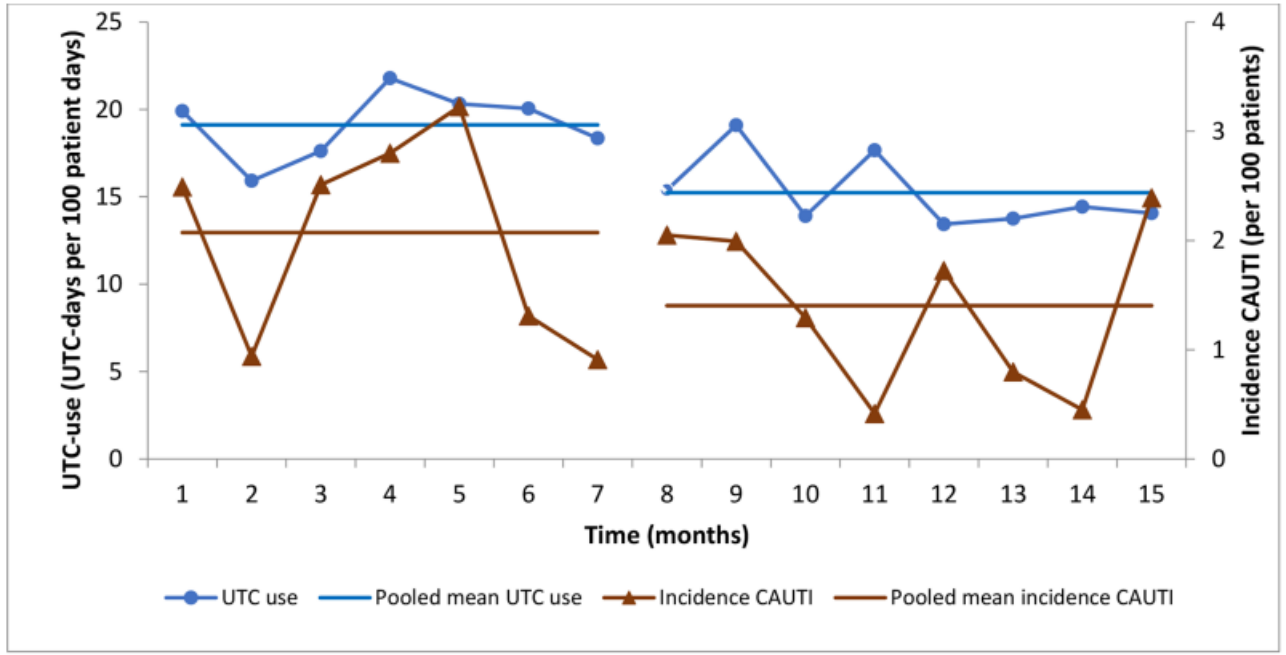
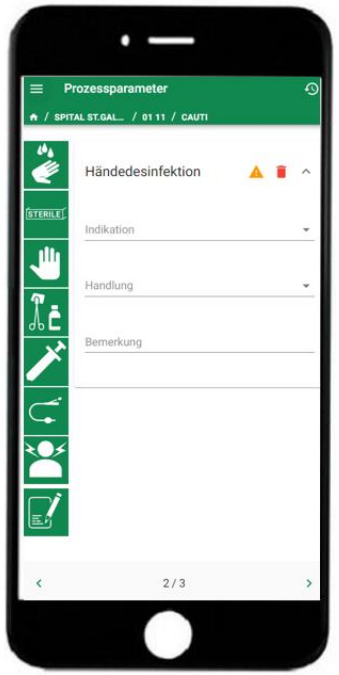


Fig. 1 UTC use and CAUTI incidence before (11/2018-5/2019, surveillance phase 1) and during (6/2019-1/2020, surveillance phase 2). (UTC: Urinary tract catheter; CAUTI: Catheter-associated urinary tract infection)

Mrziglod et al, BMC ID 2023;23:94.

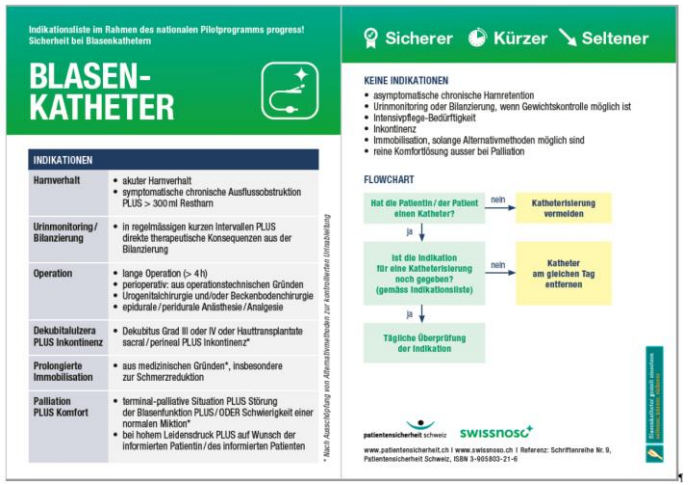
CAUTI intervention tools – Switzerland

Intervention manual
Materials: Indication list, pocket card, eye catcher, training video
Application (“CCM-CAUTI”) for observation of catheter insertion
Train-the-trainer workshops, group coachings



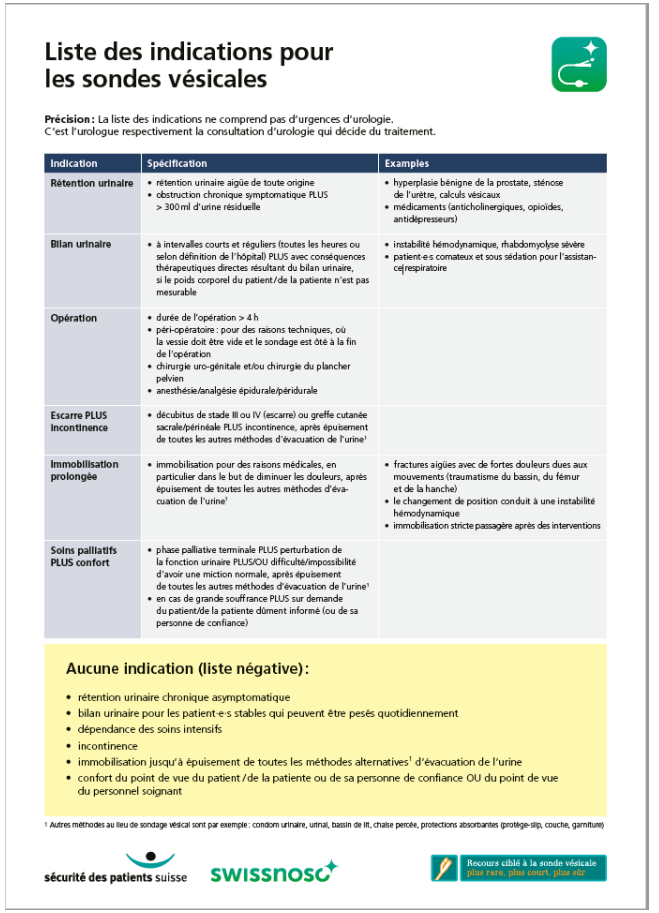
smartphone app CCM-CAUTI

eye catcher



pocket card

training video



Liste des indications pour les sondes vésicales

Précision : La liste des indications ne comprend pas d'urgences d'urologie. C'est l'urologue respectivement la consultation d'urologie qui décide du traitement.

Indication	Spécification	Examples
Rétention urinaire	• rétention urinaire aigüe de toute origine • obstruction chronique symptomatique PLUS > 300 ml d'urine résiduelle	• hyperplasie bénigne de la prostate, sténose de l'urètre, calculs vésicaux • médicaments (anticholinergiques, opioïdes, antidépresseurs)
Bilan urinaire	• à intervalles courts et réguliers (toutes les heures ou selon définition de l'hôpital) PLUS avec conséquences thérapeutiques directes résultant du bilan urinaire, si le poids corporel du patient / de la patiente n'est pas mesurable	• instabilité hémodynamique, rhabdomyolyse sévère • patient·e·s comateux et sous sédation pour l'assistance respiratoire
Opération	• durée de l'opération > 4 h • péri-opératoire : pour des raisons techniques, où la vessie doit être vide et le sondage est ôté à la fin de l'opération • chirurgie uro-génitale et/ou chirurgie du plancher pelvien • anesthésie/analgésie épidurale/péridurale	
Escarre PLUS Incontinence	• décubitus de stade III ou IV (escarre) ou greffe cutanée sacrale/périnéale PLUS incontinence, après épuisement de toutes les autres méthodes d'évacuation de l'urine[1]	
Immobilisation prolongée	• immobilisation pour des raisons médicales, en particulier dans le but de diminuer les douleurs, après épuisement de toutes les autres méthodes d'évacuation de l'urine[1]	• fractures aigües avec de fortes douleurs dues aux mouvements (traumatisme du bassin, du fémur et de la hanche) • le changement de position conduit à une instabilité hémodynamique • immobilisation stricte passagère après des interventions
Soins palliatifs PLUS confort	• phase palliative terminale PLUS perturbation de la fonction urinaire PLUS/OU difficulté/impossibilité d'avoir une miction normale, après épuisement de toutes les autres méthodes d'évacuation de l'urine[1] • en cas de grande souffrance PLUS sur demande du patient/de la patiente dûment informé (ou de sa personne de confiance)	

Aucune indication (liste négative):

- rétention urinaire chronique asymptomatique
- bilan urinaire pour les patient·e·s stables qui peuvent être pesés quotidiennement
- dépendance des soins intensifs
- incontinence
- immobilisation jusqu'à épuisement de toutes les méthodes alternatives[1] d'évacuation de l'urine
- confort du point de vue du patient / de la patiente ou de sa personne de confiance OU du point de vue du personnel soignant

[1] Autres méthodes au lieu de sondage vésical sont par exemple : condom urinaire, urinal, bassin de lit, chaise percée, protections absorbantes (protège-slip, couche, garniture)

sécurité des patients suisse SWISSNOSO Recours ciblé à la sonde vésicale plus rare, plus court, plus sûr

indication list

www.swissnoso.ch/module/

Incentiziving preventive measures

- Centers for Medicare and Medicaid Services (CMS.gov) changed their approach in 2008
- Reduction in reimbursement to hospitals depending on their reported CAUTI rate
- Triggered more systemic quality improvement initiatives

Hospital-Acquired Condition Reduction Program

What is the Hospital-Acquired Condition (HAC) Reduction Program?

The HAC Reduction Program is a Medicare value-based purchasing program that reduces payments to hospitals based on their performance on measures of hospital-acquired conditions (HACs). The HAC Reduction Program encourages hospitals to improve patients' safety and implement best practices to reduce their rates of infections associated with health care.

Which hospitals does the HAC Reduction Program apply to?

As set forth under Section 1886(p) of the Social Security Act, the HAC Reduction Program applies to all subsection (d) hospitals (that is, general acute care hospitals).

Centers for Disease Control and Prevention's National Healthcare Safety Network healthcare-associated infection (HAI) measures

We calculate the following HAI measures using data on infections taken from charts, reports, and other sources and reported to the National Healthcare Safety Network:

- Central Line-Associated Bloodstream Infection (CLABSI)
- Catheter-Associated Urinary Tract Infection (CAUTI)
- Colon and Abdominal Hysterectomy Surgical Site Infection (SSI)
- Methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia
- *Clostridium difficile* Infection (CDI)

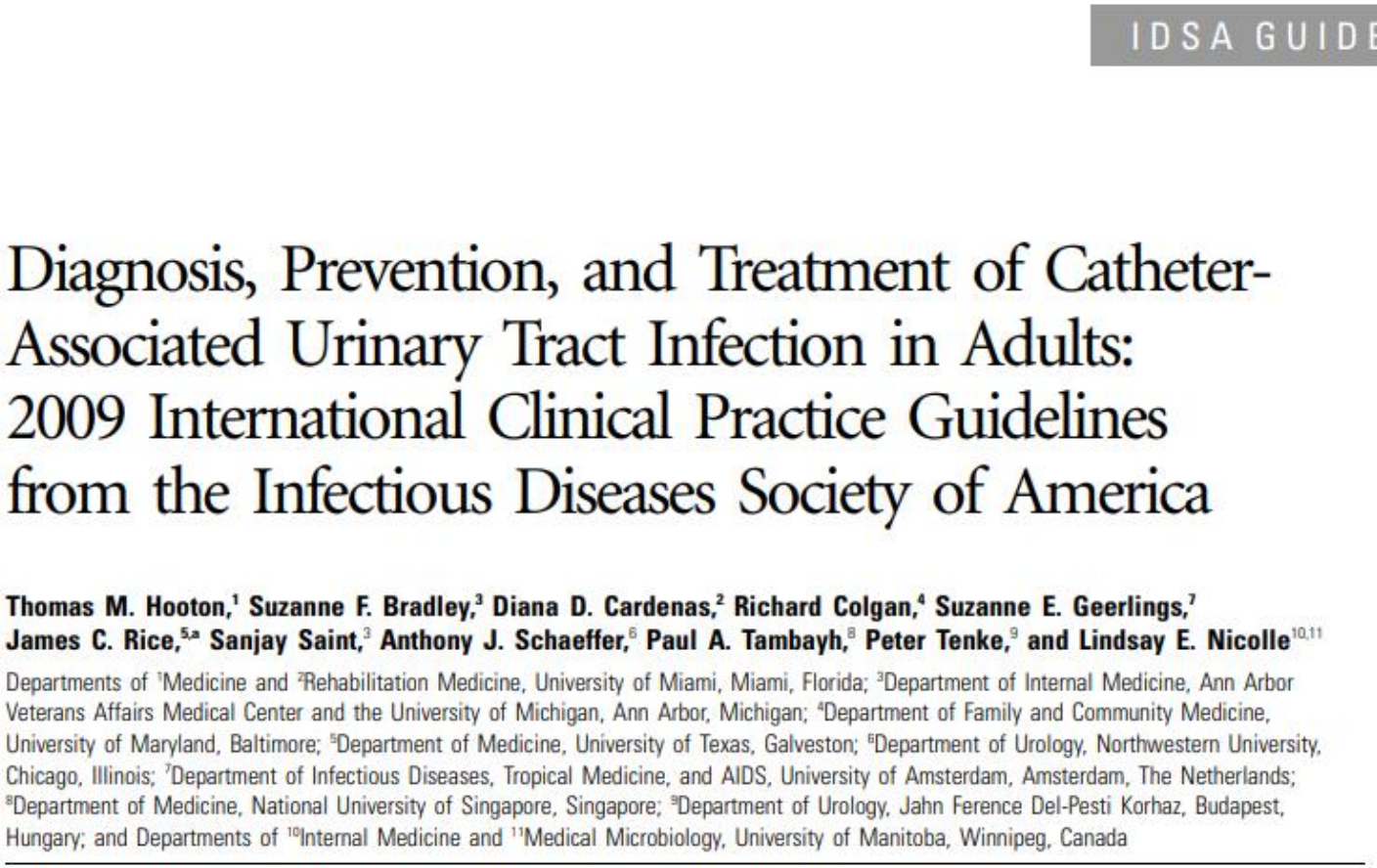
https://www.cms.gov/medicare/quality/value-based-programs/hospital-acquired-conditions

Device stewardship

Antimicrobial stewardship

Diagnostic stewardship

CAUTI: Management


IDSA GUIDELINES

Diagnosis, Prevention, and Treatment of Catheter-Associated Urinary Tract Infection in Adults: 2009 International Clinical Practice Guidelines from the Infectious Diseases Society of America

Thomas M. Hooton,[1] Suzanne F. Bradley,[3] Diana D. Cardenas,[2] Richard Colgan,[4] Suzanne E. Geerlings,[7] James C. Rice,[5,a] Sanjay Saint,[3] Anthony J. Schaeffer,[6] Paul A. Tambayh,[8] Peter Tenke,[9] and Lindsay E. Nicolle[10,11]

Departments of [1]Medicine and [2]Rehabilitation Medicine, University of Miami, Miami, Florida; [3]Department of Internal Medicine, Ann Arbor Veterans Affairs Medical Center and the University of Michigan, Ann Arbor, Michigan; [4]Department of Family and Community Medicine, University of Maryland, Baltimore; [5]Department of Medicine, University of Texas, Galveston; [6]Department of Urology, Northwestern University, Chicago, Illinois; [7]Department of Infectious Diseases, Tropical Medicine, and AIDS, University of Amsterdam, Amsterdam, The Netherlands; [8]Department of Medicine, National University of Singapore, Singapore; [9]Department of Urology, Jahn Ference Del-Pesti Korhaz, Budapest, Hungary; and Departments of [10]Internal Medicine and [11]Medical Microbiology, University of Manitoba, Winnipeg, Canada

- Urine culture
- Treat if significant bacteriuria & signs/symptoms present
- Don’t treat CAASB
- Treat for 7-14 days
- Remove the catheter (and replace if needed)

https://www.ecdc.europa.eu/en/publications-data/directory-guidance-prevention-and-control/healthcare-associated-infections-2

How Often Do Clinically Diagnosed Catheter-Associated Urinary Tract Infections in Nursing Homes Meet Standardized Criteria?

Chelsie E. Armbruster, PhD, Katherine Prenovost, PhD,† Harry L.T. Mobley, PhD,* and Lona Mody, MD, MS†‡*

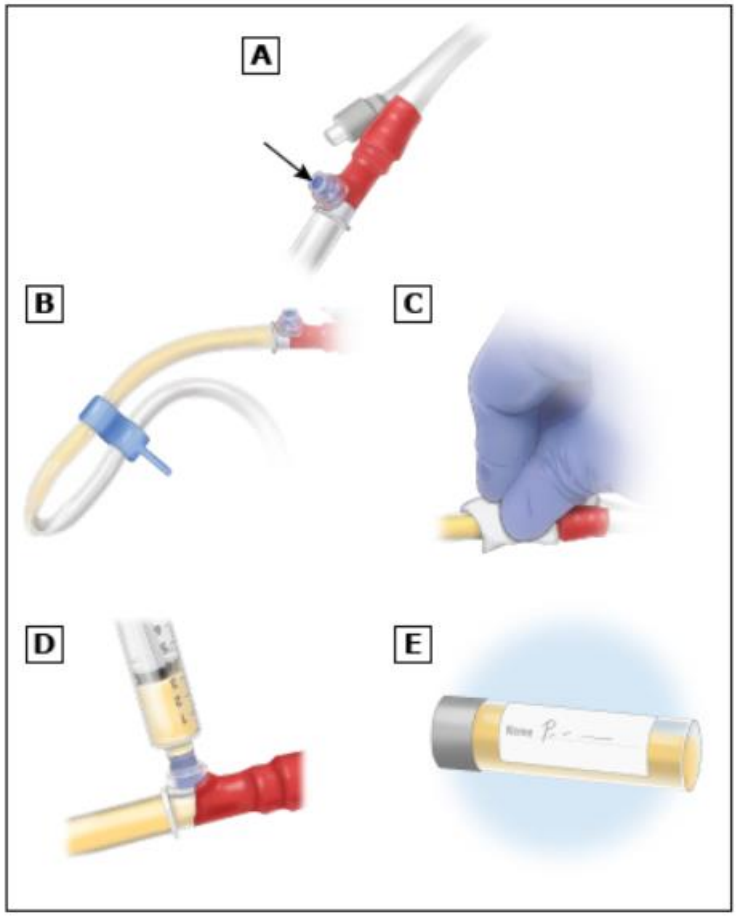
- Prospective study in 12 Michigan nursing homes
- 182 clinically diagnosed CAUTIs
  - 28% mental status changes
  - 21% febrile
  - 13% leukocytosis
- Only 32% met NHSN criteria (fever >38.0°C, suprapubic tenderness, costovertebral angle pain or tenderness, urinary urgency, frequency, or dysuria)

Armbruster et al, J Am Geriatr Soc 2017;65:395–401

Presentation in critically ill patients…

- Dysuria, hesitancy, urgency cannot be used with catheter in place
- Suprapubic tenderness able to report?
- Flank pain able to report?
- **Fever**
- **Hypotension**

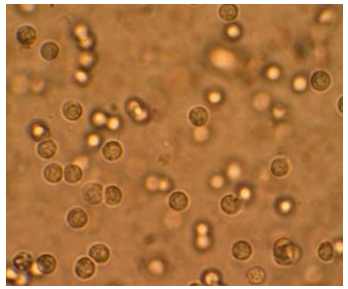
Getting a sample (if symptoms c/w UTI)



Courtesy of uptodate.com

- Aspect of sample

- Microscopy



- Dipstick test

NHSN surveillance definition, simplified

- Catheter: placement is day 1, earliest CAUTI event on day 3 (if catheter removed, event can be day after removal)
- Clinical: fever, (dysuria/urgency/hesitancy), flank pain, suprapubic tenderness
- Microbiological: 1-2 bacteria, at 10^5 cfu/ml each

https://www.cdc.gov/nhsn/pdfs/pscmanual/7psccauticurrent.pdf

Urine culture: The “uropathogens”

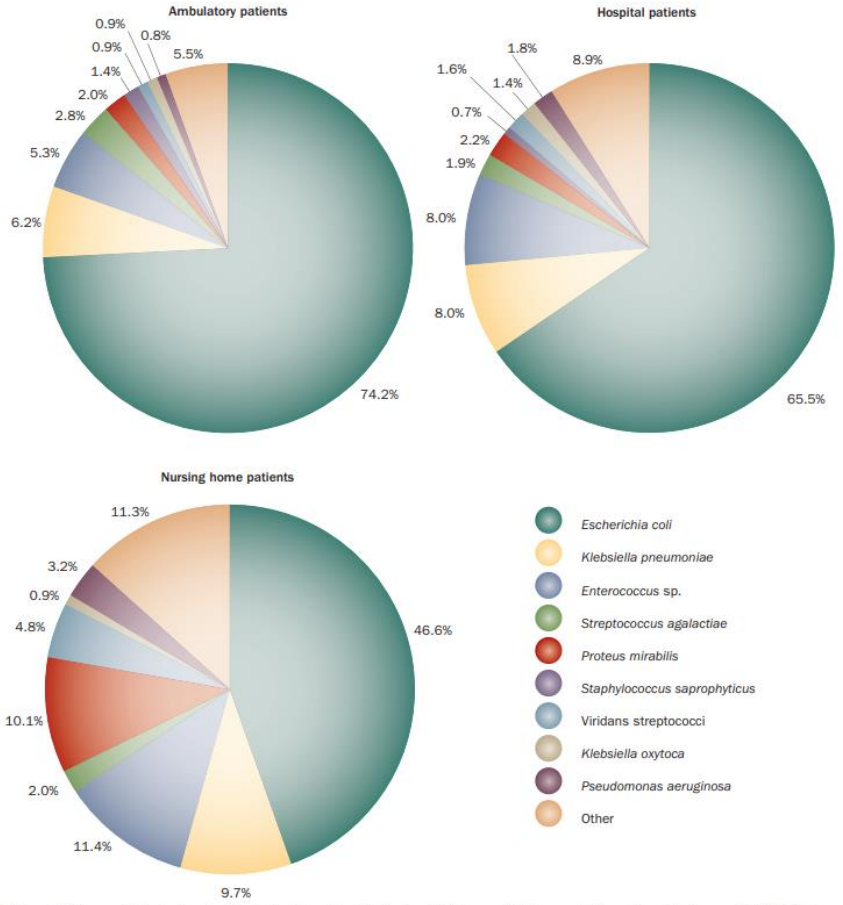


Figure 1 | The variation in bacteriology of urinary tract infection (UTI) according to population. Results from a 2004–2005 laboratory-based surveillance study of all community-acquired UTI in the Calgary Health Region of Canada.[18] The annual incidence of UTI in this region (based on positive urine cultures) was 1.75%.

Foxman B. The epidemiology of urinary tract infections. Nature Rev Urol 2010; 7:653–660.

NHSN, 2011-14

TABLE 4. Distribution and Rank Order of Pathogens Frequently Reported to the National Healthcare Safety Network (NHSN 2011–2014

	Overall		CLABSI		CAUTI	
Pathogen	No. (%) of pathogens	Rank[b]	No. (%) of pathogens	Rank[b]	No. (%) of pathogens	Rank[b]
Escherichia coli	62,904 (15.4)	1	5,193 (5.4)	7	36,806 (23.9)	1
Staphylococcus aureus	48,302 (11.8)	2	12,706 (13.2)	2	2,515 (1.6)	14
Klebsiella (pneumoniae/oxytoca)	31,498 (7.7)	3	8,062 (8.4)	4	15,471 (10.1)	4
Coagulase-negative staphylococci[c]	31,361 (7.7)	4	15,794 (16.4)	1	3,696 (2.4)	13
Enterococcus faecalis[d]	30,034 (7.4)	5	8,118 (8.4)	3	10,728 (7.0)	5
Pseudomonas aeruginosa	29,636 (7.3)	6	3,881 (4.0)	10	15,848 (10.3)	3
Candida albicans[d]	27,231 (6.7)	7	5,761 (6.0)	6	17,926 (11.7)	2
Enterobacter spp[c]	17,235 (4.2)	8	4,204 (4.4)	9	5,689 (3.7)	9
Enterococcus faecium[d]	14,942 (3.7)	9	6,567 (6.8)	5	4,212 (2.7)	11
Other *Enterococcus* spp.[d]	14,694 (3.6)	10	1,974 (2.0)	14	6,291 (4.1)	7
Proteus spp.[c]	11,249 (2.8)	11	820 (0.8)	17	6,108 (4.0)	8
Yeast NOS[e]	10,811 (2.6)	12	763 (0.8)	18	9,443 (6.1)	6
Other *Candida* spp.[d]	10,641 (2.6)	13	4,730 (4.9)	8	5,178 (3.4)	10
Candida glabrata[d]	8,121 (2.0)	14	3,314 (3.4)	11	4,121 (2.7)	12
Bacteroides spp.	7,560 (1.9)	15	515 (0.5)	19	2 (<0.1)	130
Other pathogen	51,932 (12.7)		14,130 (14.6)		9,771 (6.4)	
Total	408,151 (100)		96,532 (100)		153,805 (100)	

Weiner et al, Infect Control Hosp Epidemiol 2016;37:11.

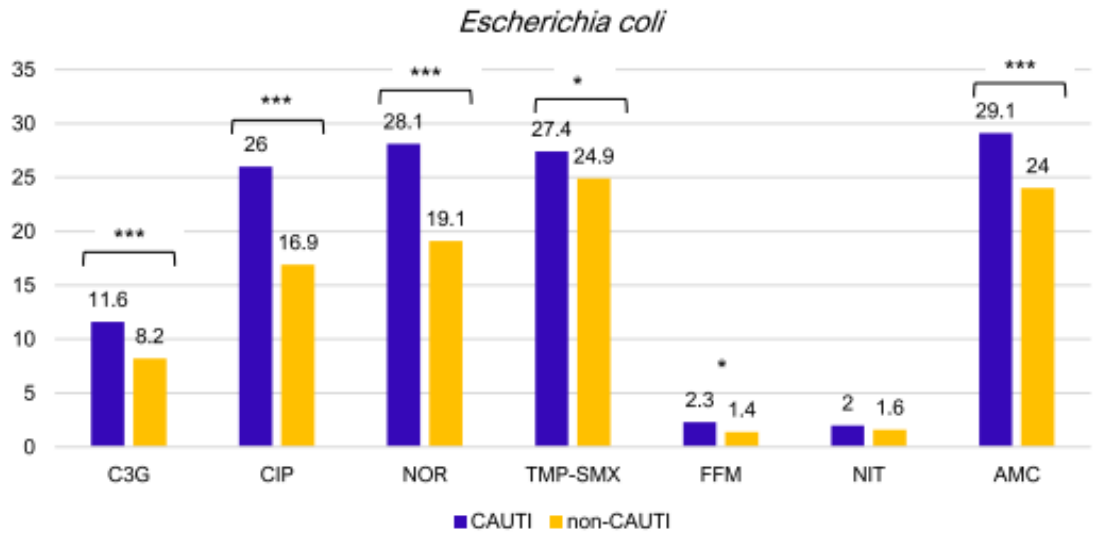
National data, Switzerland 2019

Table 2. Identified Bacteria Species in CAUTI Versus Non-CAUTI Samples

Species	CAUTI	Non-CAUTI	*P* Value
No.	5,317	21,841	
Bacteria, no. (%)			<.001
Escherichia coli	1,694 (31.9)	11,960 (54.8)	<.001
Enterococcus faecalis	632 (11.9)	1,972 (9.0)	<.001
Klebsiella pneumoniae	591 (11.1)	2,162 (9.9)	.008
Pseudomonas aeruginosa	535 (10.1)	711 (3.3)	<.001
Proteus mirabilis	283 (5.3)	870 (4.0)	<.001
Citrobacter spp	198 (3.7)	559 (2.6)	<.001
Enterobacter spp	183 (3.4)	453 (2.1)	<.001
Klebsiella oxytoca	146 (2.7)	413 (1.9)	<.001

Note: CAUTI, catheter-associated urinary tract infection.

- National antibiotic resistance center, one calendar year
- CAUTI=urine culture from patient with catheter in place



D'Incau et al, Antimicrob Steward Healthc Epidemiol 2023;3:e55.

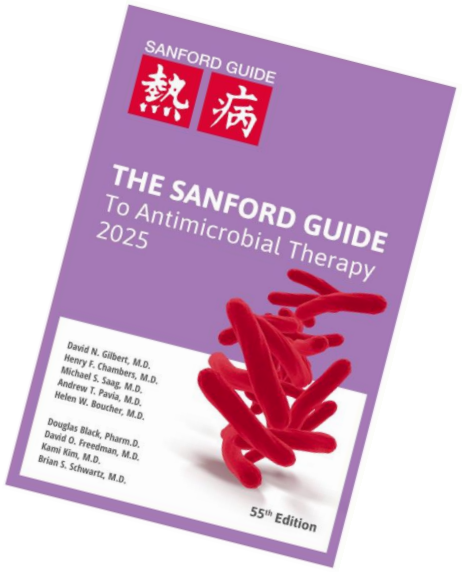
Clinical manifestations of urogenital infections

Urethritis **Cystitis** **Prostatitis** **Pyelonephritis** **Abscess** **Urosepsis**

Increasing severity



What treatment to start empirically?



- Recommendations for CAUTI usually follow those for “complicated UTI”
- **No** systemic illness: Ciprofloxacin, levofloxacin; alternatives are nitrofurantoin or TMP-SMZ; ceftriaxone if no oral intake
- **Systemic illness:** ceftriaxone, piperacillin-tazobactam, cefepime, ertapenem/meropenem, ceftazidime-avibactam
- Know your local resistance epidemiology!

NICE guidelines, UK: Urinary tract infection (catheter-associated) – antimicrobial prescribing, 2018.
EAU guidelines: Urological infections, 2017. Many other sources of guidance….!

Consult Banner antibiograms! (here, BUMCP)

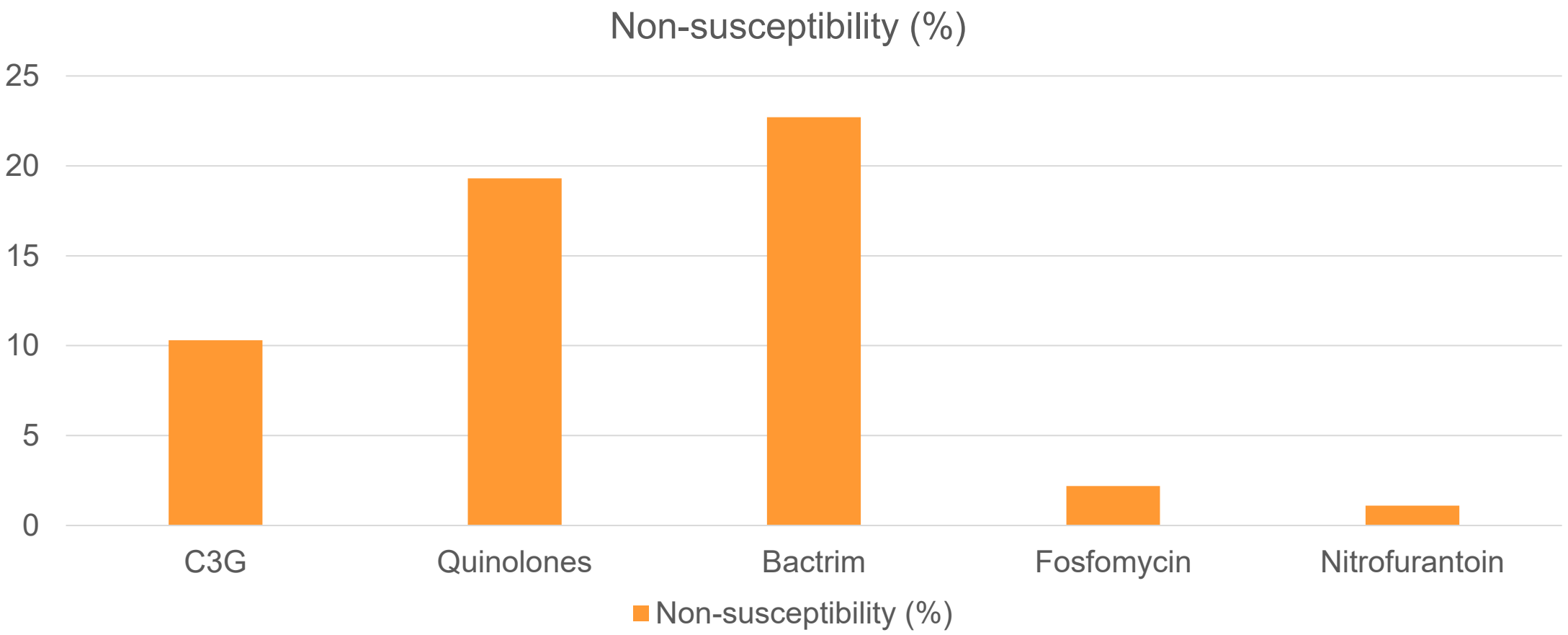
- Educates on local resistance epidemiology
- Can inform empiric treatment

Banner - University Medical Center Phoenix
ANTIBIOGRAM - Full Year 2024 (% susceptible)

Banner - University Medical Center Phoenix 2024 - All patients		Penicillins				Cephalosporins					Carbapenems			Aminoglycosides			Fluoroquinolones		Others				
Gram-negative Bacilli	**# Strains Tested**	**Amoxicillin-Clavulanic Acid**	**Ampicillin**	**Ampicillin-Sulbactam**	**Piperacillin-Tazobactam**	**Cefazolin**	**Cefuroxime**	**Ceftazidime**	**Ceftriaxone**	**Cefepime SDD + %S**	**Ertapenem**	**Imipenem**	**Meropenem**	**Amikacin**	**Gentamicin**	**Tobramycin**	**Ciprofloxacin**	**Levofloxacin**	**Nitrofurantoin†**	**Trimethoprim-Sulfamethoxazole**	**Minocycline**	**Tetracycline**	**Tigecycline**
Achromobacter spp. *	20																						
Acinetobacter baumannii complex	52	R	R	62					42	40	R	56	44	63	50	60	38	44		40	73		
Citrobacter freundii complex *	27	R	R	R		R	R	R	R														
Citrobacter koseri	31	100	R			100			100	100	100	100	100		100	100	97	97	94	100			
Enterobacter cloacae complex	164	R	R	R	82 ˇ	R	R	R	R	93	88	96	96		98	97	88	92		88			99
E. cloacae complex - NON-URINE	99	R	R	R	83 ˇ	R	R	R	R	95	91	96	97		98	97	91	97		93			99
E. cloacae complex - URINE ONLY	65	R	R	R	80 ˇ	R	R	R	R	91	83	95	94		97	97	83	85	46	82			98
Escherichia coli	1781	82	44		95	74	83		84	89	100	100	100		86	84	67	61		66		69	
E. coli - NON-URINE	354	75	32		93	63	77		78	83	99	100	99		83	83	64	59		60		64	
E. coli - URINE ONLY	1427	84	47		96	77	84		86	90	100	100	100		86	85	67	61	96	68		70	
Klebsiella (Enterobacter) aerogenes	61	R	R	R	73 ˇ	R	R	R	R	97	90		97		100	98	93	93	49	95			100
K. aerogenes - NON-URINE	32	R	R	R		R	R	R	R	97	88		94		100	100	97	94		97			100
K. aerogenes - URINE ONLY	29	R	R	R		R	R	R	R														
Klebsiella oxytoca	76	91	R		96	56	93		96	97	99	99	99		96	97	96	97		91		94	
K. oxytoca - NON-URINE	38	92	R		97	53	95		95	95	97	97	97		97	97	97	100		95		94	
K. oxytoca - URINE ONLY	38	91	R		94	59	92		97	100	100	100	100		95	97	95	95	97	86		94	
Klebsiella pneumoniae	711	75	R		77	68	71		72	74	88	88	88		87	83	70	69		71		68	
K. pneumoniae - NON-URINE	230	69	R		73	60	63		65	69	83	82	83		83	79	66	66		67		65	
K. pneumoniae - URINE ONLY	481	78	R		80	72	74		75	77	90	90	91		89	86	73	71	28	73		69	
Morganella morganii	35	R	R		97	R	R		91	94	100		100		89	91	71	74	R	71			R
Proteus mirabilis	258	92	61		99	53	89		82	84	100		100		88	85	73	79	R	65	R	R	R
P. mirabilis - NON-URINE	87	90	61		99	49	86		78	82	100		100		86	83	69	73	R	64	R	R	R
P. mirabilis - URINE ONLY	171	93	62		99	55	91		84	85	99		100		89	86	75	82	R	66	R	R	R
Proteus vulgaris *	8		R			R	R												R		R	R	R
Providencia rettgeri *	8	R	R			R													R		R	R	R
Providencia stuartii *	16	R	R			R									R	R			R		R	R	R
Pseudomonas aeruginosa (including mucoid)	473	R	R	R	85	R	R		R	82	R	88	90			90	85	65		R	R	R	R
Salmonella spp. (non-stool isolates) *	12					R	R							R	R	R							
Serratia marcescens	53	R	R	R	92	R	R	R	72	94	94	86	94		91	61	85	91	R	92			98
Stenotrophomonas maltophilia	73	R	R	R	R	R	R		R	R	R	R	R	R	R	R		90		93		R	

† Only indicated for uncomplicated cystitis.
R Indicates intrinsic resistance to the antimicrobial listed.
Data based on first isolate per patient.
GREY shaded boxes indicate no data available
GREEN shading indicates ≥85% susceptibility for that specific organism-antimicrobial combination.
YELLOW shading indicates ≥51% but <85% susceptibility for that specific organism-antimicrobial combination.
RED shading indicates <50% susceptibility for that specific organism-antimicrobial combination.
Below Statistical significant level of 30 isolates 29

Resistance, urinary *E. coli* isolates among adult inpatients – Switzerland, 2024



www.anresis.ch

Comparative effectiveness of antibiotics for uncomplicated UTI: A network meta-analysis

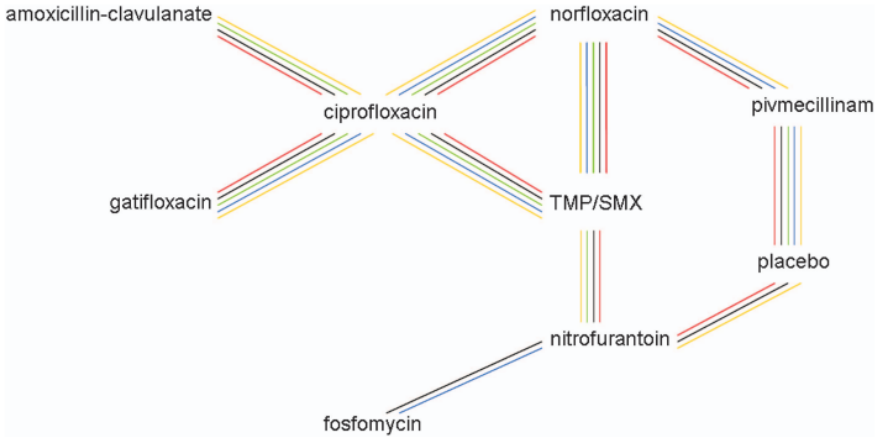
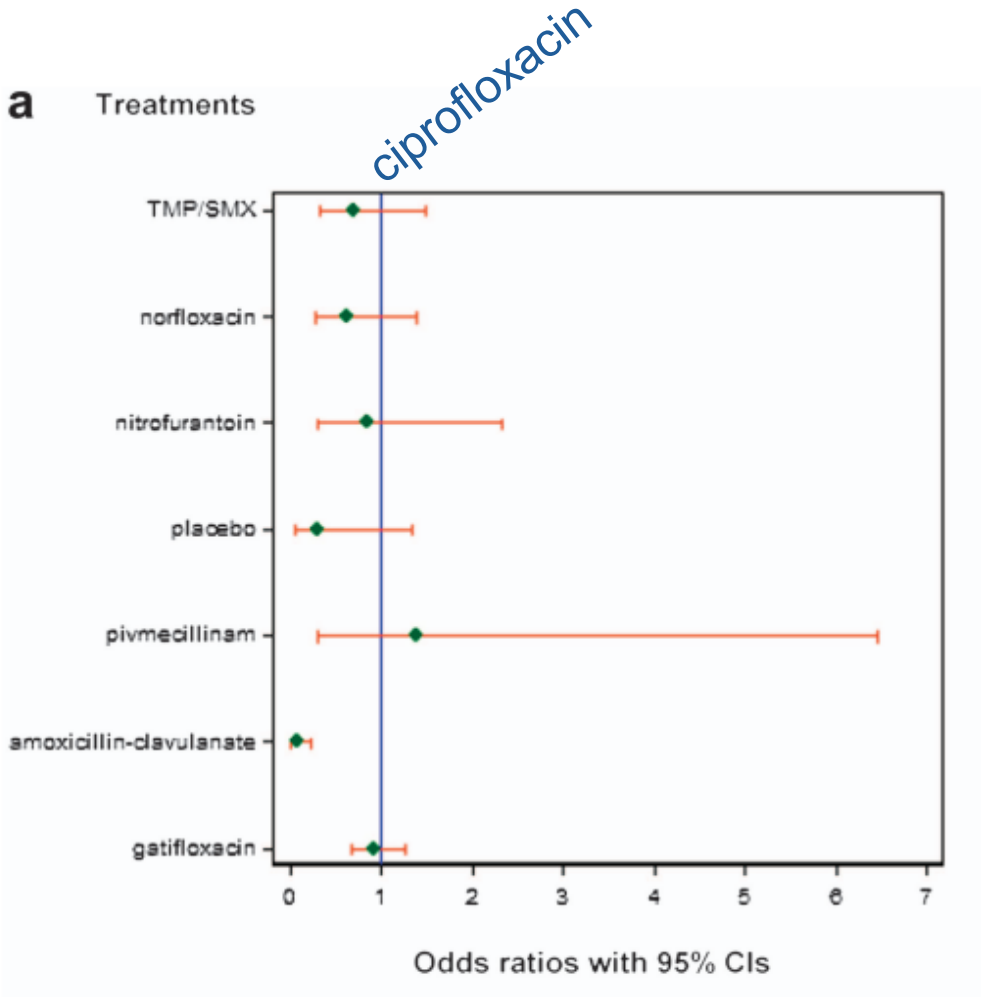


FIGURE 2 *Connections between treatment arms: network construction.*
The figure shows the network that could be composed for each of the five outcomes. Head-to-head comparisons are shown as lin
Each line colour represents an outcome: red = short-term clinical outcome, black = short-term bacteriological outcome, green = long-term clinical outcome, blue = long-term bacteriological outcome and orange = adverse effects. Only for short-ter bacteriological outcome (black lines), all nine treatments could be connected



Knottnerus et al, Family Practice 2012; 29:659-670.

ACRM
AMERICAN CONGRESS OF REHABILITATION MEDICINE

Archives of Physical Medicine and Rehabilitation
journal homepage: www.archives-pmr.org
Archives of Physical Medicine and Rehabilitation 2013;■:■■■-■■■

One of very few RCTs…

ORIGINAL ARTICLE

Short Versus Long Course of Antibiotics for Catheter-Associated Urinary Tract Infections in Patients With Spinal Cord Injury: A Randomized Controlled Noninferiority Trial

Rabih O. Darouiche, MD,[a,b,c,d] Mayar Al Mohajer, MD,[e] Danish M. Siddiq, MD,[b,d] Charles G. Minard, PhD[f]

From the [a]Spinal Cord Injury Care Line, Michael E. DeBakey Veterans Affairs Medical Center, Houston, TX; [b]Section of Infectious Diseases, Michael E. DeBakey Veterans Affairs Medical Center, Houston, TX; [c]Department of Physica Medicine, Houston, TX; [d]Department of Medicine, Baylor College of Medicine, Houston, T Tucson, AZ; and [f]Dan L. Duncan Institute for Clinical and Translational Research, Baylor

Darouiche et al, Arch Phys Med Rehabil 2014;95:290.

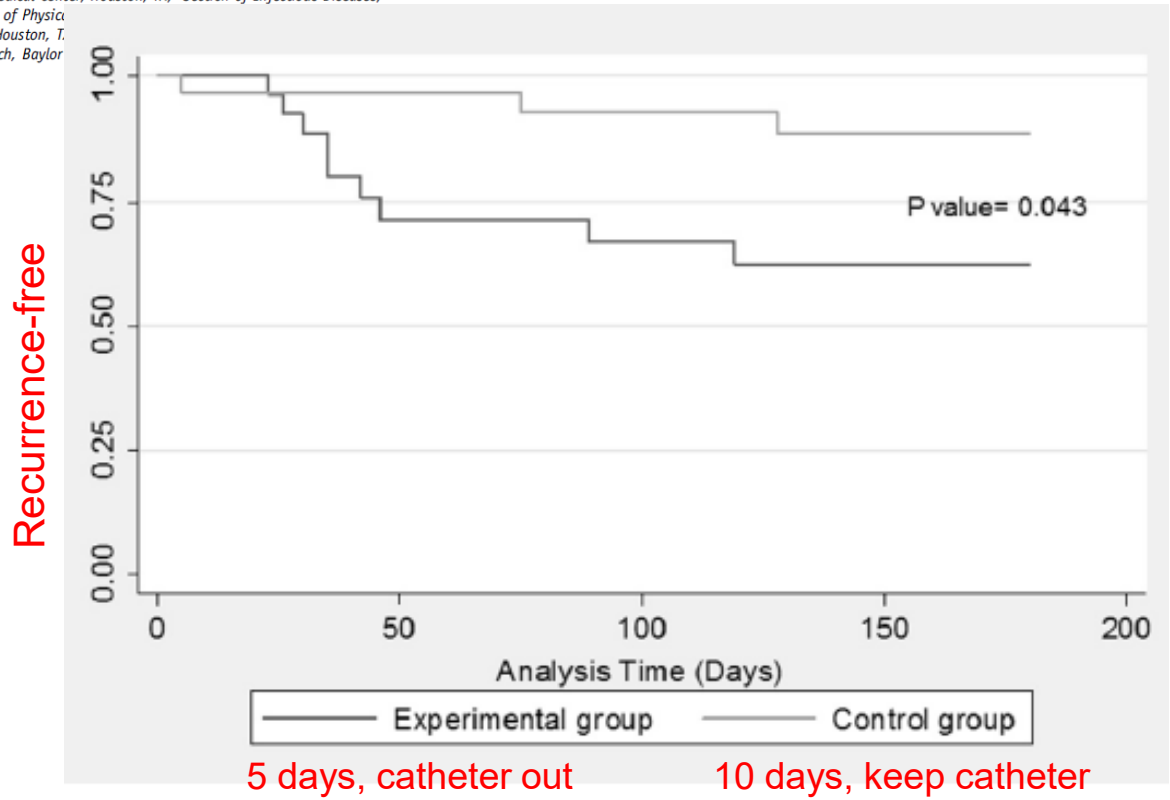


Fig 3 Kaplan-Meier survival curve for recurrent CA-UTIs.

- Small (n=55) non-inferiority trial, 10% margin
- All achieved clinical cure
- More recurrences in those with short treatment & catheter exchange

Does the Foley need to be removed/exchanged?

- Prospective, non-interventional study
- 315 patients, average age 79
- Indwelling catheter for min 7 days and diagnosis of symptomatic UTI
- 98 had catheter replaced - 217 did not

Table 3. Propensity-Matched Risk Factors for Clinical Failure, Univariate and Multivariate Analysis

	Odds Ratio (95% Confidence Interval)	
Risk Factor	Univariate Analysis	Multivariate Analysis
Catheter replacement	0.90 (0.52–1.55)	0.90 (0.50–1.63)
Sepsis-related Organ Failure Assessment score on index day	1.33 (1.17–1.50)	1.26 (1.10–1.44)
Nasogastric tube	3.11 (1.75–5.52)	1.81 (0.92–3.55)
Multidrug-resistant Gram-negative rod	1.75 (1.03–2.97)	1.53 (0.86–2.72)
Permanent foreign bodies	2.34 (1.2–4.57)	1.43 (0.67–3.04)
Antibiotic treatment in last 30 days	1.55 (0.91–2.63)	1.10 (0.60–2.02)

Babich et al, J Am Geriatr Soc 2018;66:1779-84. (recommendation to exchange based on Raz et al, 2000)

Head-to-head trials in CAUTI? None

- Data from a population-based cohort of non-hospitalized adults

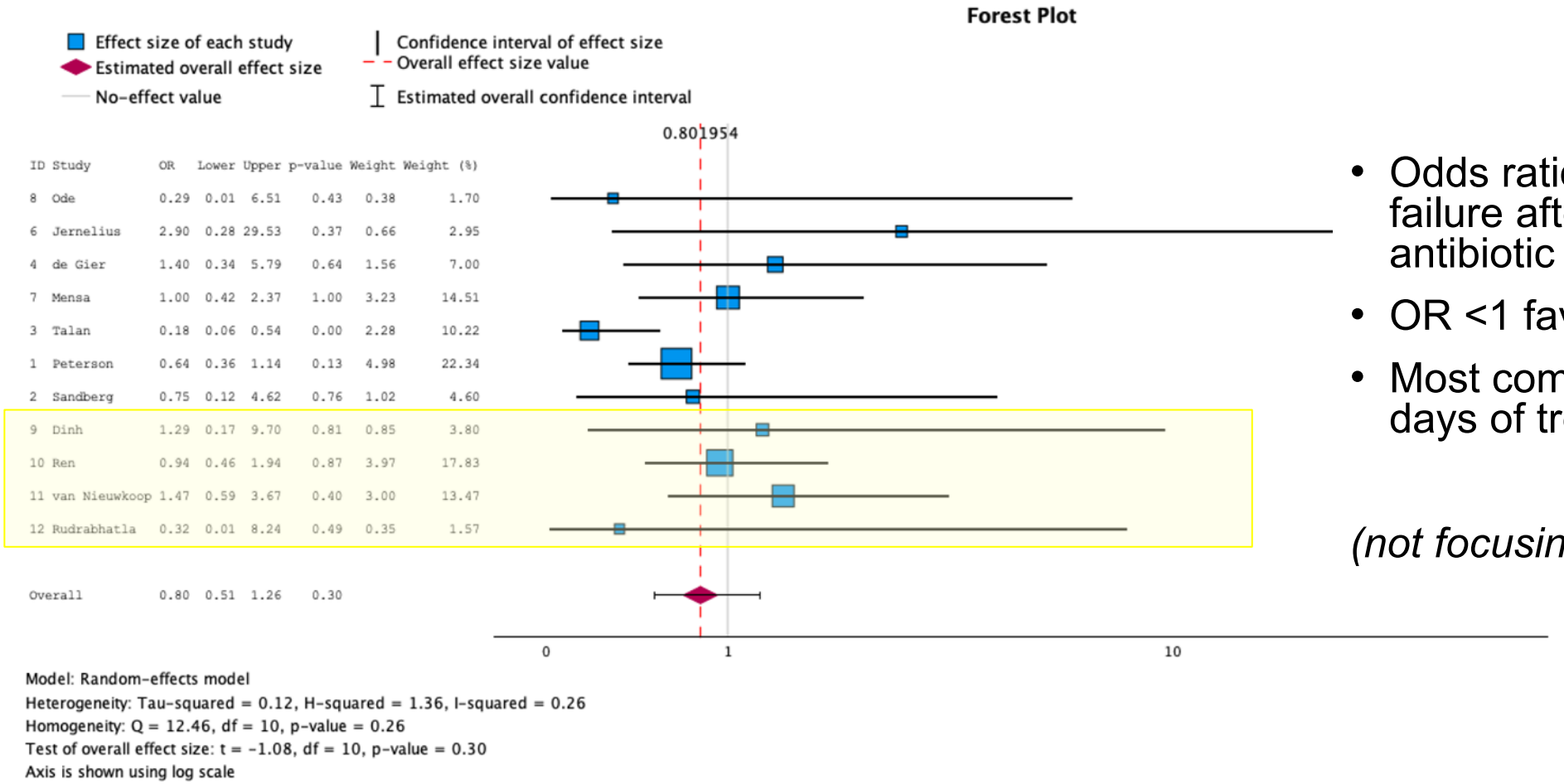
Table 3. Treatment Failure for CA-UTI Patients Based on Antibiotic Selection and Duration

	Unadjusted		Adjusted*	
Antibiotic selection	RR (95% CI)	*P*-value	RR (95% CI)	*P*-value
Amoxicillin-clavulanate	1.09 (0.99, 1.21)	0.08	1.08 (0.98, 1.19)	0.12
Amoxicillin	0.93 (0.83, 1.04)	0.21	0.94 (0.84, 1.05)	0.27
Cefadroxil, Cephalexin	1.09 (1.00, 1.19)	0.06	1.09 (1.00, 1.19)	0.05
Nitrofurantoin	0.99 (0.92, 1.07)	0.84	1.02 (0.94, 1.10)	0.65
Trimethoprim-sulfamethoxazole	referent	.	referent	.
Ciprofloxacin, Levofloxacin	0.91 (0.84, 0.98)	0.01	0.91 (0.85, 0.98)	0.02
Fosfomycin	1.05 (0.92, 1.19)	0.46	1.04 (0.92, 1.18)	0.51
Antibiotic duration	RR (95% CI)	*P*-value	RR (95% CI)	*P*-value
1–4 d	1.14 (1.03, 1.26)	0.01	1.15 (1.05, 1.27)	< 0.01
5–7 d	referent	.	referent	.
8–14 d	1.05 (0.99, 1.12)	0.08	1.05 (0.99, 1.11)	0.12

* Adjusted for age, sex, Charlson comorbidity score, acute care, and long-term care days in the past 12 months.

Langford et al, Antimicrob Stewardship & Healthc Epidemiol 2023;3: e132, 1–8

Duration of treatment for febrile UTI and pyelonephritis



- Odds ratio of treatment failure after short vs long antibiotic course
- OR <1 favors short course
- Most compared 7 to 14 days of treatment

(not focusing on CAUTI)

Schneider-Smith et al, IDweek Boston 2023 (poster 1214). Eliakim-Raz et al, JAC 2013;68:2183.

ORIGINAL ARTICLE

Antibiotic Treatment for 7 versus 14 Days in Patients with Bloodstream Infections

The BALANCE Investigators, for the Canadian Critical Care Trials Group, the Association of Medical Microbiology and Infectious Disease Canada Clinical Research Network, the Australian and New Zealand Intensive Care Society Clinical Trials Group, and the Australasian Society for Infectious Diseases Clinical Research Network

7 days of treatment for BSI is non-inferior to 14

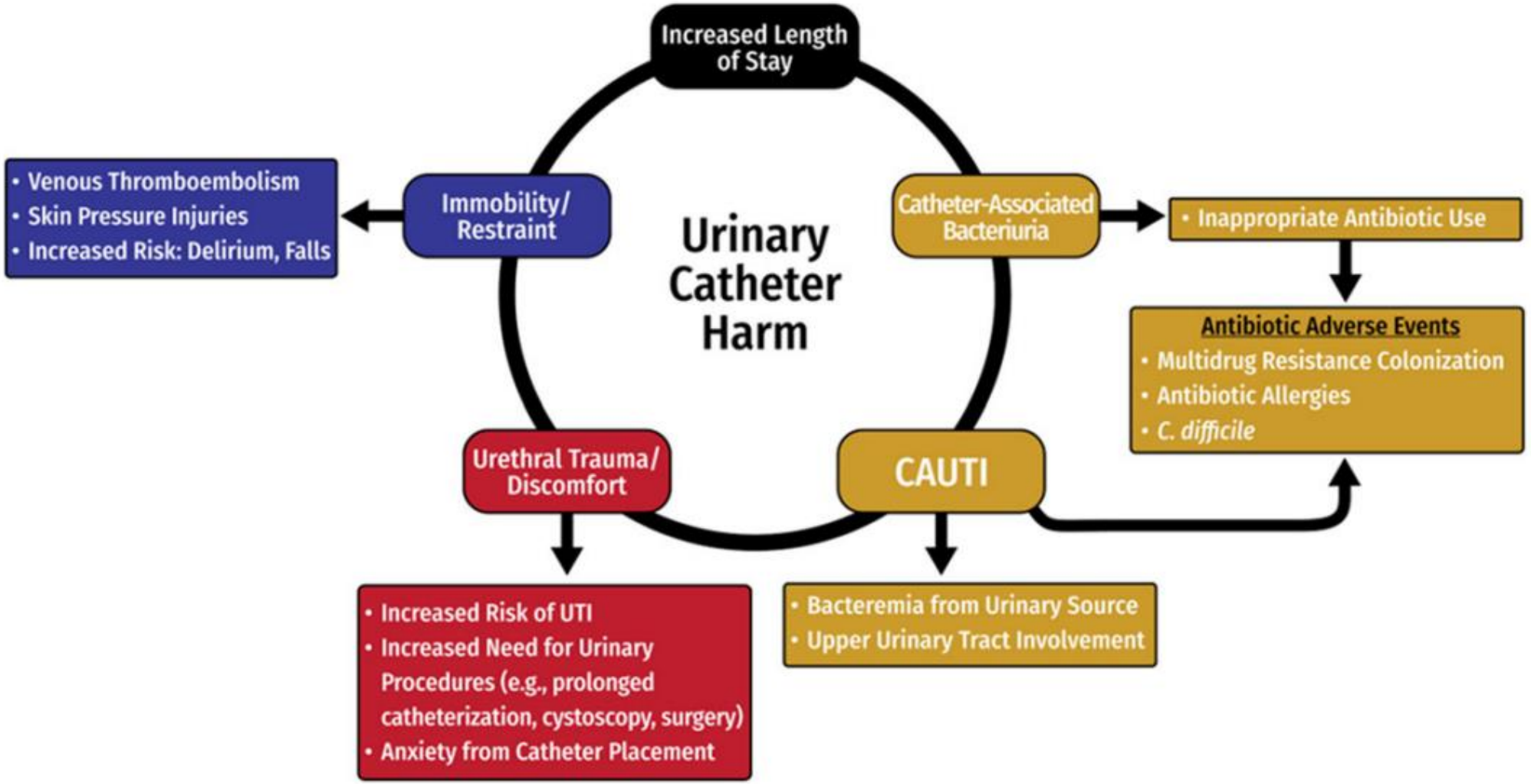
- Multicenter, non-inferiority trial
- 74 hospitals, 3,608 patients
- 55% in critical care units
- Urogenital source in 1,523 (42.2%)
- E. coli and Klebsiella responsible for 60%
- 7 vs 14 days

Table 2. Primary and Secondary Outcomes.

	7-Day Group (N=1814)	14-Day Group (N=1794)	Difference (95% CI)*
			percentage points
Primary outcome, death from any cause by 90 days — no./total no. (%)			
Primary analysis, intention-to-treat population	261/1802 (14.5)	286/1779 (16.1)	−1.6 (−4.0 to 0.8)
Secondary analysis, per-protocol population	178/1370 (13.0)	222/1483 (15.0)	−2.0 (−4.5 to 0.6)
Modified intention-to-treat analysis, survival ≥7 days	247/1788 (13.8)	272/1765 (15.4)	−1.6 (−3.9 to 0.7)
Secondary outcomes			
Death in hospital — no. (%)†	168 (9.3)	184 (10.3)	−1.0 (−2.9 to 0.9)
Death in ICU — no./total no. (%)‡	91/1014 (9.0)	97/1008 (9.6)	−0.6 (−3.2 to 1.9)

Daneman et al, N Engl J Med 2025;392(11):1065-1078..

Just infection?



Advani et al, ICHE 2024. Schweiger et al, J Hosp Infect 2020.

Take home messages

- The topic CAUTI combines opportunities for diagnostic, device and antimicrobial stewardship
- Preventive measures can be bundled and often address 1) catheter indication, 2) proper technique, and 3) daily reevaluation
- Treatment includes urine culturing, catheter removal and empiric antibiotics for UTI – with a duration as short as 7 days if prompt clinical response
- It’s time to get familiar with AI in infection prevention ☺

Trautner and Gupta. CAUTI in adults. Uptodate.com.
Scruggs-Wodkowski E, Kidder I, Meddings J, Patel PK. Urinary catheter-associated infections. Infect Dis Clin N Am 2024; 38:713-729.

Thanks!

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Presenter Evaluation

APIC GRAND CANYON

Healthcare Supply Chain 101

Suzi Collins, FAHRMM, CMRP

What is Supply Chain?

Merrium-Webster defines it as: the chain of processes, businesses, etc. by which a commodity is produced and distributed : the companies, materials, and systems involved in manufacturing and delivering goods

Who are all the players?

Supply Chain is a team sport!

The collaboration between all the different players is critical for success in supply logistics, sourcing, procurement and contracting.

Supply Chain Site Leader(s)

Corporate Supply Chain – Senior Leaders
Value Analysis

Physicians

Manufacturer Representative

Where does it begin?

This is a chicken and the egg situation.

It truly begins with collaboration, then product arrives at the hospital and then supply chain team associates get those products to where they are needed.

Where does it all come from?

Distribution
OEM- Original Equipment Manufacturer
Self Distribution

Warehouse/Stock items- 90% come from distribution partner such as Medline or Cardinal.

- May have daily deliveries
- Carry the commonly used items stocked everywhere in pars
- Stocked and delivered inside the hospital
- Norm is a 2 week on hand level

"Non-Stock"- just like it sounds; items that come from the outside and directly to the department

- Physician preference
- Higher dollar
- Can have several sizes of the same products and all sizes are "needed"
- Often left to the departments to manager but not their expertise

How do we contract?

GPO
Contracting Team
Collaborate with others

- **GPO (Group Purchasing Organization)**
  - ***Hospitals have a cost in working with a GPO***
  - *Saves hospitals from negotiating everything from gauze to $12,000 mesh*
  - *Includes capital and purchased services*
  - *HSCA, Healthcare Supply Chain Association suggests they decrease spend by $55B a year*
  - *Compliance is the only thing that makes this work because without compliance the wheels come off the bus*

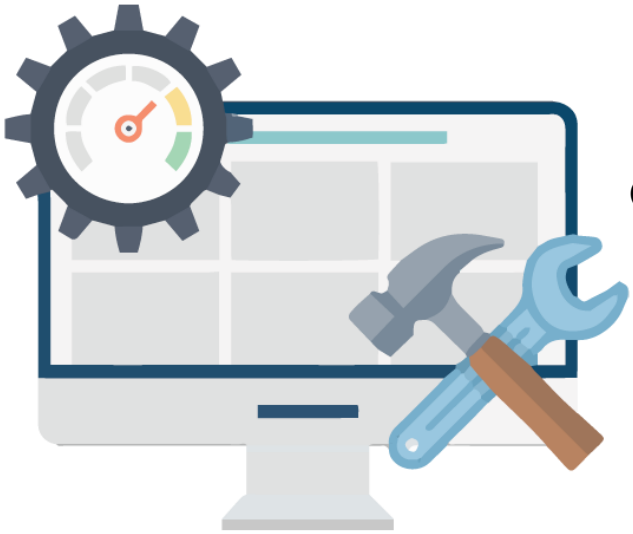
vizient

PREMIER

HEALTHTRUST

How do we operate?

- Most Supply Chains report up through finance
- Understanding budgets for departments is key
- Managing the vendor relationships
- Knowing our physicians and collaborating with them



Operational

Supply Costs

Many different types of budgets.

Capital Needs

- Must be planned and budgeted
- Follow policy to avoid missing the opportunity for amortization of assets
- Coordination with finance and C-Suite
- Need to understand cost of the disposibles

Q1 Q2 Q3 Q4

The Details Matter!

- Total cost of ownership
- Support
- Potential negative revenue
- FDA compliance does NOT equal insurance companies approving/paying for use

- Get the true total cost of ownership from the vendor
  - Service agreements
  - Ongoing support costs
  - Disposables and/or consumption agreements
- Understand how often the supply will be used and will it generate new revenue?
  - Do your own research and not just marketing information from vendor
- Is this net new or replacing something. If net new and something isn't leaving the shelf; it is adding "cost" to that service line
- Are there additional needs after the use?
  - Example- Patient wound vac used in the OR case only to then convert patient to "at home" wound vac. Adds cost of the internal rental which could have been avoided with going directly to "at home" vac.
  - Example- During value analysis; it is only going to be used with knees cases and then scope creep happens with other types of orthopedic cases. Usages goes beyond planned use and coding may not get done accurately
- Focus on the pillars of telling the story or the want. Did they answer the people, problem/solution, purpose and payoff. Must be more than "Dr. Jones wants to use this…"

Low hanging fruit…

Savings opportunities!

- Linen
- Trash
- RT products
- Stored records past their holding time
- Review of slow turning inventory

Why should Supply Chain be involved in your clinical care?

- We know the processes that help support lowering cots
- Systems and technology to support inventory management
- We can be gatekeepers
- Our teams do supply chain everyday and just like physicians have specialties it is we are the best at management of logistics

- Waste is prevalent when you don't have dedicated processes
  - Lack of time may add to over ordering
  - Expiration management isn't proactive
- Let us be your partner in improving outcomes!
  - Collaborate with the Value Analysis team so we don't bring in products that impact infection control but also you ensure vendors know to follow the process for bringing in new items
- Gatekeepers
  - None of us want vendors bringing in products that are not approved or using non-approved products in cases

Partnering with Supply Chain

- Schedule quarterly meetings with your supply chain team
- Help educate supply chain team members when new products are coming in and not just the clinicians
- Celebrate wins on product conversions
- Create an environment of supporting the goals of both patient care as well as financial outcomes.

The CQO Movement looks at the intersection of, and the relationship between:

Cost: all costs associated with caring for individuals and communities

Quality: care aimed at achieving the best possible health

Outcomes: financial results driven by exceptional patient outcomes

How can you learn more?

- Podcasts about Supply Chain
- LinkedIn groups
- Follow me!
- Google alerts
- Local chapter of supply chain professionals

- Local AHRMM chapter
  - AHRMM Affiliated Chapters | AHRMM
  - WAHRMM - Arizona
- Follow folks on social media like Power Supply, Beyond Clean and First Case
- Listen to podcasts on Power Supply- great conversations
- Look for groups on LinkedIn focused on Supply Chain
- Educate yourself and understand healthcare supply chain
- Google alerts for healthcare supply chain and/or vendors
- Follow me! Suzi Collins, CMRP or #suzidoessupplychain

Q & A

Presenter Evaluation

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SSI Questions for Dr. Edmiston

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Closing