

Successful Implementation of Catheter-Associated Urinary Tract Infection Prevention Bundles
Prof. Sarah L. Krein, University of Michigan
A Webber Training Teleclass



**Successful Implementation of Catheter-Associated
Urinary Tract Infection Prevention Bundles:
Lessons Learned**

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(Nothing to Disclose)

Hosted by Martin Kiernan
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- The views expressed are those of the presenter and do not necessarily reflect the position or policy of the Department of Veterans Affairs or University of Michigan

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Overview

- Catheter-Associated Urinary Tract Infection (CAUTI) and indwelling catheter use
- Technical components of a CAUTI prevention bundle
- Common socio-adaptive (behavioral) challenges when implementing prevention practices
- CAUTI Guide to Patient Safety (GPS) tool

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Philadelphia, December 8, 1752.

To John Franklin,
Dear Brother:

Reflecting yesterday on your desire to have a flexible catheter, a thought struck into my mind, how one might probably be made, and lest you should not readily conceive it by any description of mine, I went immediately to the silver-smith's and gave directions for making one (sitting by till it was finished), that it might be ready for this post. But now it is done I have some apprehensions that it may be too large to be easy; if so, a silver-smith can easily make it less by twisting or turning it on a smaller wire, and putting a smaller pipe to the end, if the pipe is really necessary. This machine may either be covered with small fine gut, first cleaned and soaked a night in a solution of alum and salt and water, then rubbed dry, which will preserve it longer from putrefaction; then wet again and drawn on and tied to the pipes at each end, where little hollows are made for the thread to bind in and the surface greased. Or perhaps, it may be used without the gut, having only a little tallow rubbed over it, to smooth it and fill the joints. I think it is as flexible as would be expected in a thing of the kind, and I imagine will readily comply with the turns of the passage, yet has stiffness enough to be protruded; if not, the enclosed wire may be used to stiffen the hinder part of the pipe while the forepart is pushed forward, and as it proceeds the wire may be gradually withdrawn. The tube is of such a nature, that

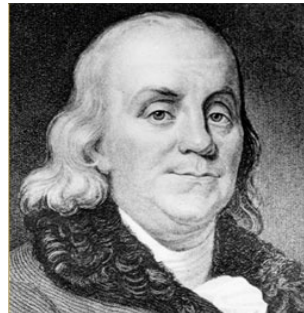
when you occasion to withdraw it its diameter will lessen, whereby it will move more easily. It is a kind of screw and may be both withdrawn and introduced by turning. Experience is necessary for the right using of all new tools or instruments, and that will perhaps suggest some improvements to this instrument as well as better direct the manner of using it.

I have read Whytt' on Lime-Water. You desire my thought on what he says. But what can I say? He relates facts and experiments, and they must be allowed good, if not contradicted by other facts and experiments. May not one guess, by holding limewater some time in one's mouth whether it is likely to injure the bladder?

I know not what to advise, either as to the injection or the operation I can only pray to God to direct you for the best and to grant success.

I am, my dear brother, yours most affectionately,

B. Franklin.



The Medical Side Of Benjamin Franklin (1911)
by William Pepper

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Catheter-Associated Urinary Tract Infection (CAUTI)



- UTI is a common hospital-acquired infection
- Most due to urinary catheters
- Up to 20 percent of inpatients are catheterized
- Leads to increased morbidity and health care costs

Magill, NEJM, 2014; Weber, ICHE, 2011; Umscheid, ICHE, 2011, Rosenthal, Journal Infect, 2011; Ling, CID, 2015; Rosenthal, Infection, 2012; Tao, Int J of Infect Dis, 2011

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Policy and Practice Considerations

- Centers for Medicare and Medicaid Services (CMS) no longer reimburses U.S. hospitals for the additional costs of certain infections as of October 1, 2008
- Reduction of HAIs is a Department of Health & Human Services Agency Priority Goal
- Public reporting of infection rates
- Joint Commission 2016 National Patient Safety Goals

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**The Indwelling Urinary Catheter:
A “1-Point” Restraint?**

Satisfaction survey of 100 catheterized VA patients:

- 42% found the indwelling catheter to be uncomfortable
- 48% stated that it was painful
- 61% noted that it restricted their ADLs
- 2 patients provided unsolicited comments that their catheter “hurt like hell”

Saint, JAGS,
1999

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Annals of Internal Medicine

ESTABLISHED IN 1927 BY THE AMERICAN COLLEGE OF PHYSICIANS

SEPTEMBER 17, 2013

**Determining the Noninfectious Complications of Indwelling
Urethral Catheters**

A Systematic Review and Meta-analysis

John M. Hollingsworth, MD, MS; Mary A.M. Rogers, PhD; Sarah L. Krein, PhD, RN; Andrew Hickner, MSI; Latoya Kuhn, MPH;
Alex Cheng, MD; Robert Chang, MD; and Sanjay Saint, MD, MPH

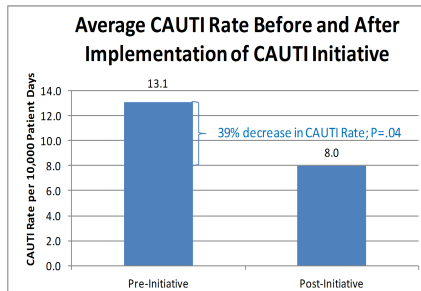
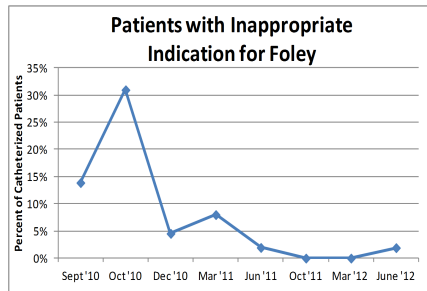
“Many noninfectious catheter-associated complications are at least as common as clinically significant urinary tract infections.”

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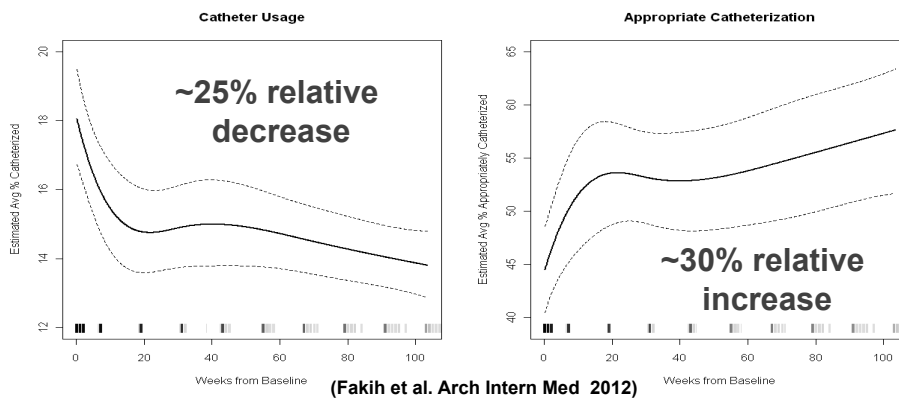
Successful CAUTI Prevention Bundle at a Single Hospital



Miller, ICHE, 2013

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Successful CAUTI Prevention Bundle in Michigan, 2007-2010



CAUTI ↓ by 25% in Michigan hospitals (95% CI: 13 to 37% ↓)

CAUTI ↓ by 6% in non-Michigan hospitals (95% CI: 4 to 8% ↓)

Saint, JAMA Intern Med, 2013

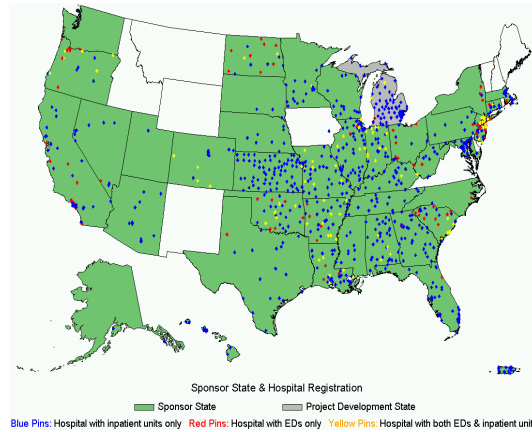
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CAUTI Prevention Bundle Spread Throughout the U.S.

- Reduction in CAUTI rates and a smaller reduction in catheter use in non-ICUs
- No improvement in ICUs



<http://www.ahrq.gov/sites/default/files/publications/files/cauti-interim.pdf>

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What is a Bundle?

- Care Bundles were first developed over 20 years ago. They were used in medical and surgical specialties. One of the first care bundles was fueled by early goal-directed treatment of sepsis.

(Horner and Bellamy. Contin Educ Anaesth Crit Care Pain (2012))

- A care bundle is a set of evidence based interventions which, when performed together, have a better outcome than if performed individually.

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Implementing a CAUTI Prevention (aka Bladder) Bundle



Technical



Socio-adaptive

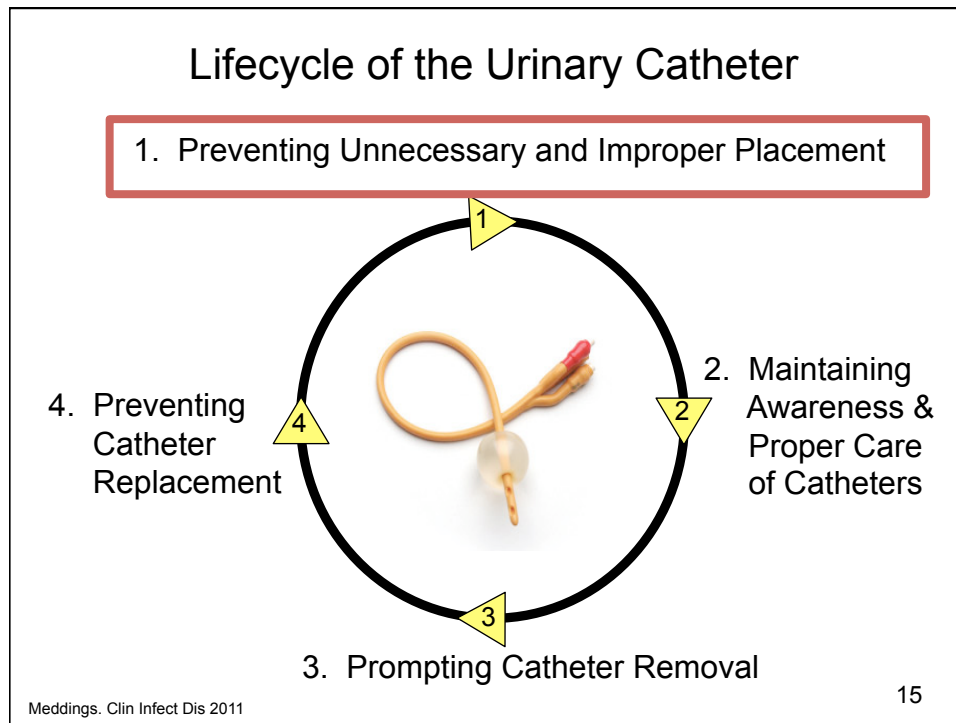
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Technical Elements of the CAUTI/ Bladder Bundle

- Reducing indwelling catheter use
- Proper insertion technique
- Proper maintenance
- Prompt removal of non-indicated catheters

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2009 HICPAC Urinary Catheter Indication

A. Examples of Appropriate Indications for Indwelling Urethral Catheters

Patient has acute urinary retention or obstruction
Need for accurate measurements of urinary output in critically ill patients
Perioperative use for selected procedures: <ul style="list-style-type: none"> • urologic surgery or other surgery on contiguous structures of genitourinary tract • anticipated prolonged surgery duration (removed in post-anesthesia unit) • anticipated to receive large-volume infusions or diuretics in surgery • operative patients with urinary incontinence • need for intraoperative monitoring of urinary output
To assist in healing of open sacral or perineal wounds in incontinent patients
Requires prolonged immobilization (e.g., potentially unstable spine)
To improve comfort for end of life care if needed

Gould, ICHE, 2010 16

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Ann Arbor Appropriateness Criteria
(Meddings, Annals of Internal Medicine, May 2015)

Annals of Internal Medicine[®]
9 May 2015 • Volume 163 • Number 5 (Supplement) Established in 1927 by the American College of Physicians

Supplement
to Annals of Internal Medicine

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; Craigje Gault, MD, MPH; Karen E. Fowler, MPH;
Elisa Gates, MD, MPH; Andrew Hickert, MEd; Sarah L. Krein, PhD, RN; and
Steven J. Benoit, MD, MPH

In Pursuit of Appropriate
Urinary Catheter
Indications: Details Matter

Craigje V. Gault, MD, MCR

 **ACP** American College of Physicians[®]
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Just because a patient is in the
ICU does NOT mean that the
patient needs a Foley...

The Key Question is this:

Are hourly assessments
of urine output required?

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Consider Alternatives

- 1) Accurate daily weights
- 2) Urinal/commode/bedpan
- 3) Condom catheters
- 4) Intermittent catheterization with bladder scanning

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But if the patient really, really
needs a Foley...

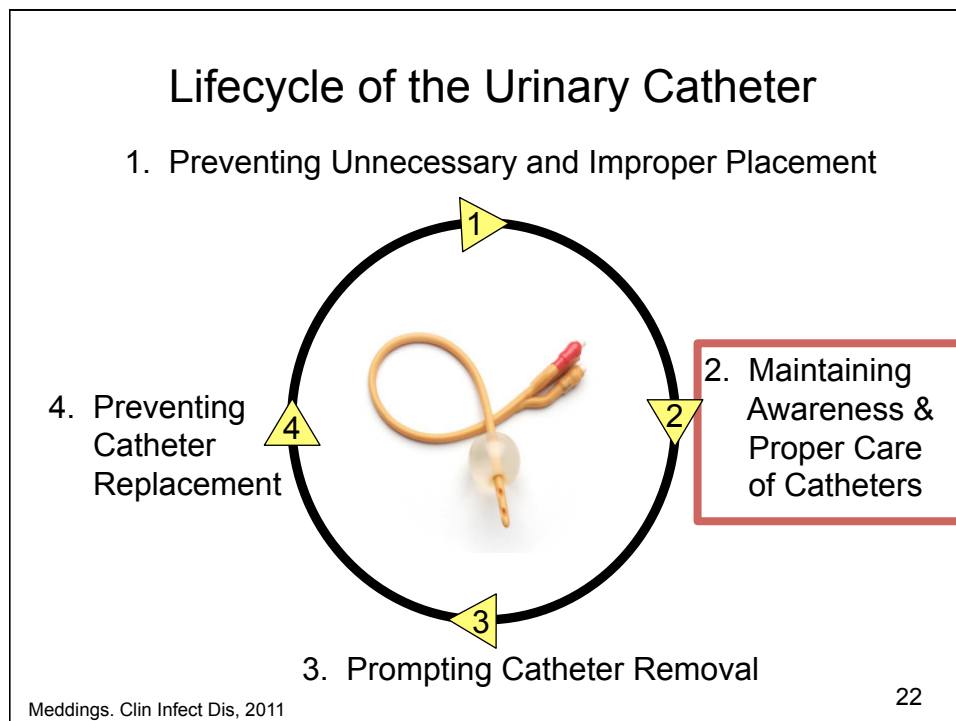
Ensure proper aseptic technique
is used during insertion

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Category	Frequency as a proportion of major breaches (%)	Frequency as a proportion of all insertions (%)	Examples
At least one major breach		48/81 (59%)	
Contamination of sterile field	22/48 (46%)	22/81 (27%)	<ul style="list-style-type: none"> Nurse touched items on sterile field with bare non-sterile hands. Stethoscope/garment/torso touched sterile field.
Contamination of the catheter	25/48 (52%)	25/81 (31%)	<ul style="list-style-type: none"> Patient's labia closed over the catheter during insertion and contaminated the catheter; nurse did not get a new one. Catheter tip touched genitalia before being introduced into urethra.
Breach of sterile barrier	31/48 (65%)	31/81 (38%)	<ul style="list-style-type: none"> Sterile gloved hand used to swab genitalia (without tongs); same hand used to insert catheter. Nurse inserting catheter ripped her sterile gloves, did not get new ones.

Manojlovich, ICHE, 2016 21



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Urethral Catheters: Lost in Place

Training Level	Proportion Unaware
Medical Student	18%
Intern	22%
Resident	28%
Attending	38%

Saint, Am J Med, 2000

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Proper Maintenance

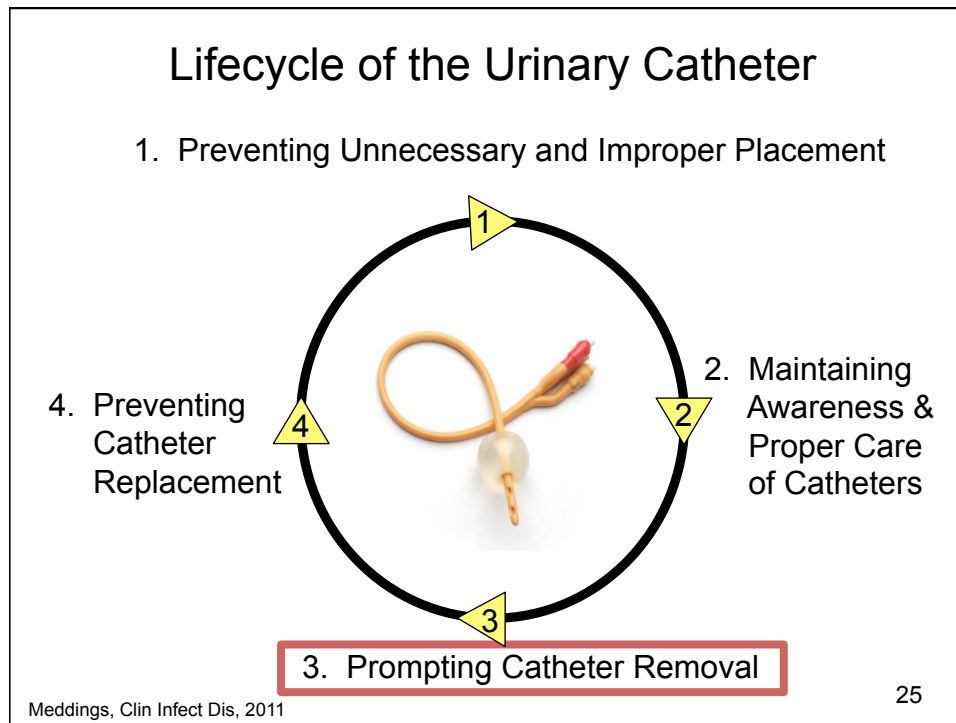


- Maintain a closed drainage system
- Maintain unobstructed urine flow
 - Free of kinks
 - Collecting bag below the bladder
 - Empty the bag regularly
- Use routine hygiene, i.e., do not clean the periurethral area with antiseptics

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Nursing Template for Removal

Indwelling Catheter Required

INSERTION:

MAINTENANCE:

For admits from outside facility, most recent insertion/change date if known.

Catheter Indications:

- Acute urinary retention or bladder obstruction
- Need for accurate measurement of urinary output in critically ill patient
- To assist in healing of open sacral or perineal wounds in urinary incontinent patient
- Patient requires prolonged immobilization
- To improve comfort for end of life care
- Long-term indwelling catheter (includes suprapubic) or post-operative procedure

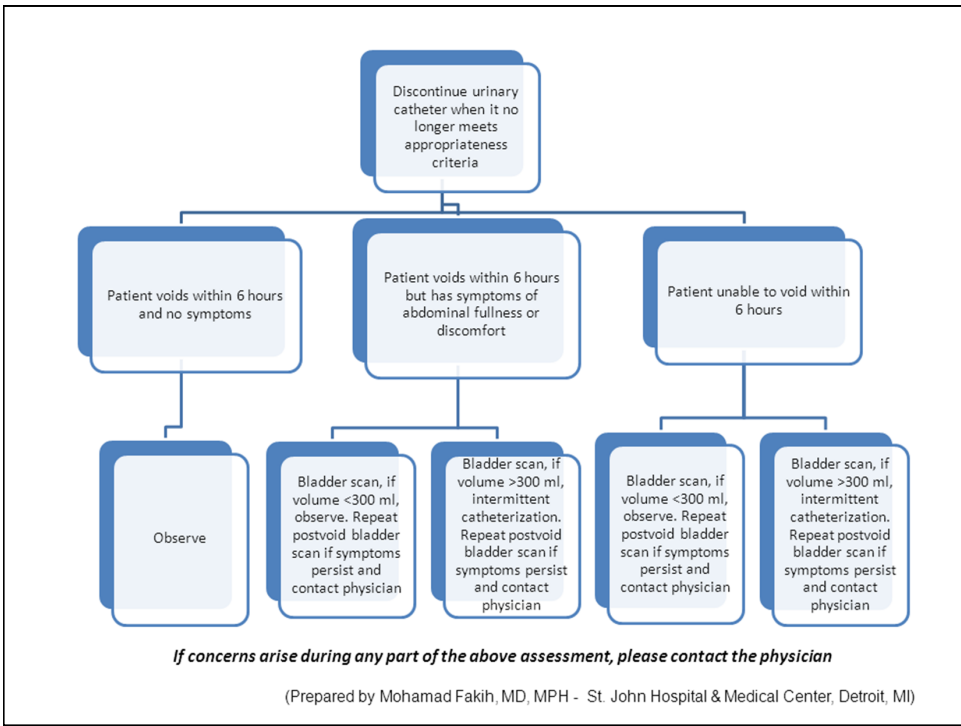
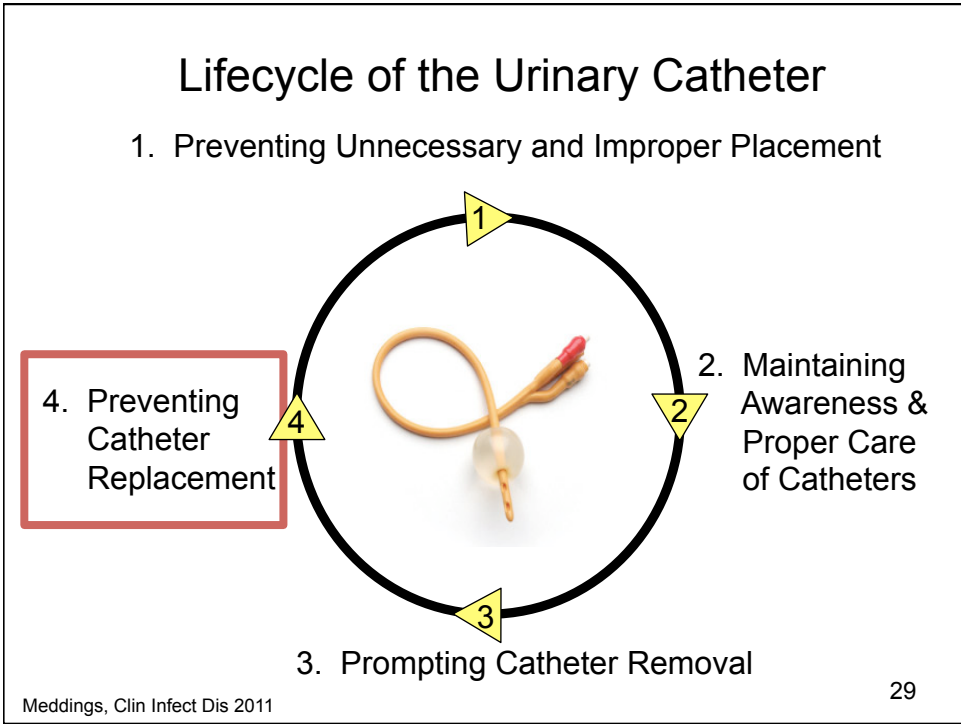
If urinary catheter is non-indicated the physician should be contacted to obtain an order to discontinue catheter.

Physician contacted and physician provided rationale for continuing indwelling urinary catheter

Catheter Discontinued

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Primary Technical Components

1. Avoiding the use of the indwelling urinary catheter
2. Aseptic insertion technique and proper maintenance
3. Daily assessment and timely removal of the indwelling urinary catheter

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Implementing a CAUTI Prevention (aka Bladder) Bundle



Technical



Socio-adaptive

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Understanding why some hospitals are better
than others in preventing infection

- Mixed-methods national studies focusing on three device-related infections: CAUTI, CLABSI and VAP
- Funded by VA, NIH and AHRQ
- interviews and site visits to ~50 facilities across the U.S.
- Interviews with over 450 people at various levels

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Implementation challenges

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**Primary Socio-adaptive Challenge with
CAUTI Prevention and Bundle
Implementation**

Infection Preventionist: “I would say there’s a general perception in the field that urinary tract infections don’t cause a lot of morbidity and mortality compared to the quote, sexy topics such as blood stream infection or surgical site infection or VAP.” (Saint, ICHE, 2008)

Hospital Epidemiologist: “I [nor] anyone else has really been able to get ourselves that excited about trying to prevent bladder colonization.” (Saint, ICHE, 2008)

Director of Nursing, described Foleys as “low tech, low glamour”, noted: “...if we get a Foley infection nobody says, ‘...let’s have a huddle and see how it happened’.” (Krein, JAMA Int Med, 2013)

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**Primary Socio-adaptive Challenge with
CAUTI Prevention and Bundle
Implementation**



Lack of physician and nurse engagement

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Lack of Physician Engagement

- Often physicians are unaware or only passively involved in CAUTI prevention efforts

As a charge nurse explained: “If you don’t have the doctors on board you’re just going to be beating your head against the wall. . . .”

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How to Engage Physicians?

(James Reinertsen, IHI innovation Series White Paper, 2007)

1. Develop a common purpose (patient safety, efficiency)
2. View physicians as partners (not barriers)
3. Identify physician champions early
4. Standardize evidence-based processes
5. Provide support from leadership for the efforts of the physician champion

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Use of data to engage physicians

Director of an intensive care unit:

“Data seems to be the best motivation for physicians... [they] compare rates it is sort of an incentive . . .”

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Reasons for physicians to be engaged or to care about CAUTI prevention and urinary catheter use

Infectious Disease Specialists	Urologists
<ul style="list-style-type: none"> • Reduce CAUTI • Reduce antibiotic use • Reduce potential of increased resistance and <i>Clostridium difficile</i> disease 	<ul style="list-style-type: none"> • Reduce trauma (mechanical complications): <ol style="list-style-type: none"> 1. Meatal and urethral injury 2. Hematuria
Hospitalists	Geriatricians
<ul style="list-style-type: none"> • Infectious and mechanical complications • Potential catheter complications prolonging length of stay • Often salaried physicians with incentives based on hospital-based quality and efficiency 	<ul style="list-style-type: none"> • Many elderly are frail • Urinary catheters are placed more commonly in elderly inappropriately • Urinary catheters increase immobility and deconditioning

Fakih, AJIC, 2014

Lack of Nursing Engagement

Concerns about nursing workload/convenience are common

Clinical Nurse Specialist “I think nurses are so busy . . . They have a lot of things they’re dealing with and trying to keep track of and if a patient has a catheter, it’s almost easier for them.”

BUT that may not be the only issue

Infection Preventionist “I think it’s not just that it’s easier. It’s that nurses are worried, ‘Well do I really want this person hopping out of bed and can I really be sure that they’re going to call me to help them?’ We don’t want there to be any falls. That’s considered to be a never-event in a hospital . . .”

Krein, JAMA Intern Med, 2013

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How to Engage Nurses?

1. Develop a common purpose (patient safety)
2. View nurses as partners (not barriers)
3. Identify nurse champions early
4. Standardize evidence-based processes (and make the right thing to do, the easy thing to do)
5. Provide support from leadership for the efforts of the nurse champion

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Getting Nurses Involved

- Ensuring proper staffing and equipment

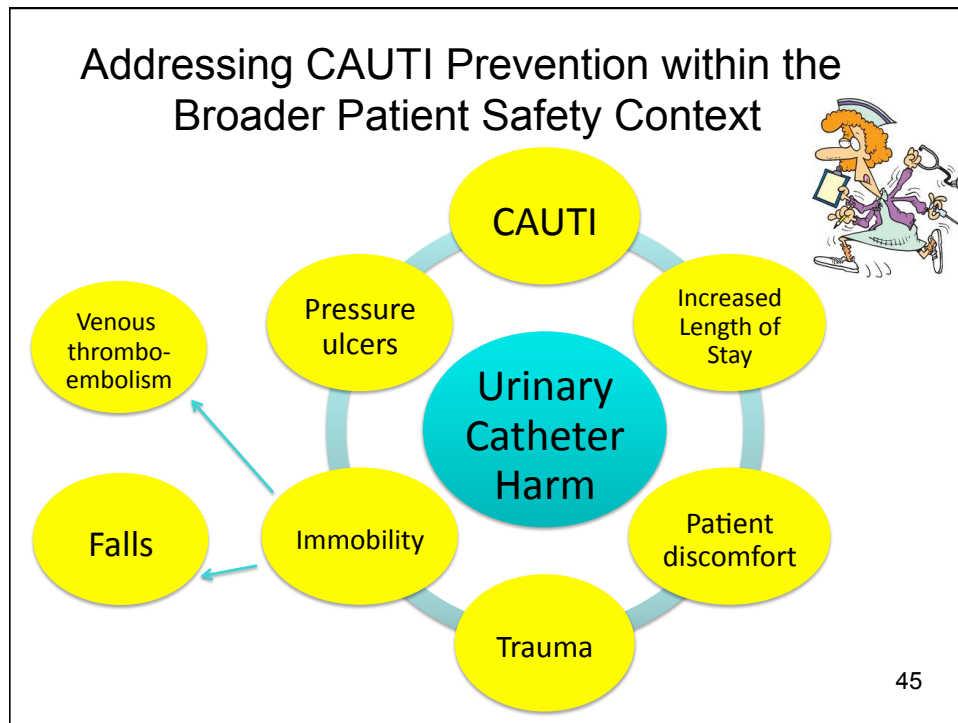


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Capitalizing on Nurses Priorities

- A physician administrator: “Because the nurses on the geriatrics unit wanted to have their patients regain mobility...they viewed mobility as very important ...versus the other units where the nurses didn’t necessarily feel that was a real goal..”

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Champions

- True champions tend to be intrinsically motivated and passionate about the practices they promote

- Keep the effort a priority
- Provide expertise
- Serve as liaison with their peers

Damschroder, Qual Saf Health Care, 2009

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First they ignore you, then
they laugh at you, then they
fight you, then you win.

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But, also remember



Preventing CAUTI is a team sport

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**CAUTI Prevention Team:
Key Roles and Responsibilities**

Role or Responsibility	Example of Personnel to Consider
Project coordinator	Infection preventionist, quality manager, nurse manager
Nurse champion (engage nursing personnel)	Nurse educator, unit manager, charge nurse, staff nurse
Physician champion (engage medical personnel)	ID physician, hospitalist, hospital epidemiologist, urologist
Data collection, monitoring, reporting	Infection preventionist, quality manager, utilization manager

(Modified from www.catheterout.org)

Putting our Findings to Work

Identifying and Addressing Common CAUTI Prevention Implementation Challenges

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CAUTI Guide to Patient Safety (GPS)

- Brief, trouble-shooting guide
- Help hospitals or units identify key challenges in their CAUTI prevention efforts
- Once the barriers are identified, can then help identify possible solutions

Saint, AJIC, 2014

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CAUTI Guide to Patient Safety (GPS)

- Online tool
- Each question linked to trouble-shooting tips



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CAUTI GUIDE TO PATIENT SAFETY (GPS)

Question 1:
Do you currently have a well-functioning team (or work group) focusing on CAUTI prevention?
 Yes No

Question 2:
Do you have a project manager with dedicated time to coordinate your CAUTI prevention activities?
 Yes No

Question 3:
Do you have an effective nurse champion for your CAUTI prevention activities?
 Yes No

Question 4:
Do bedside nurses assess, at least daily, whether their catheterized patients still need a urinary catheter?
 Yes No

Question 5:
Do bedside nurses take initiative to ensure the indwelling urinary catheter is removed when the catheter is no longer needed (e.g., by contacting the physician)?
 Yes No

Question 6:
Do you have an effective physician champion for your CAUTI prevention activities?
 Yes No

Question 7:
Is senior leadership supportive of CAUTI prevention activities?
 Yes No

Question 8:
Do you currently collect CAUTI-related data (e.g., urinary catheter prevalence, urinary catheter appropriateness, and infection rates) in the unit(s) in which you are intervening?
 Yes No

Question 9:
Do you routinely feedback CAUTI-related data to frontline staff (e.g., urinary catheter prevalence, urinary catheter appropriateness, and infection rates)?
 Yes No

Question 10:
Have you experienced any of the following barriers?
A. Substantial nursing resistance
 Yes No
B. Substantial physician resistance
 Yes No
C. Patient and family requests for an indwelling urinary catheter
 Yes No
D. Indwelling urinary catheters commonly being inserted in the emergency department without an appropriate indication
 Yes No

Question 2: Do you have a project manager with dedicated time to coordinate your CAUTI prevention activities?
You indicated that you have a project manager who has dedicated time to work on the CAUTI prevention efforts. This is important to keep the project moving forward in a timely manner and to recognize and address barriers and challenges as they come up. As s/he becomes involved with other projects make sure that time on this project remains protected.

Question 3: Do you have an effective nurse champion for your CAUTI prevention activities?
You indicated that you have an effective nurse champion. This is key to the success of the initiative because it depends heavily on the nursing staff, especially those on the frontline. It is important that s/he remains engaged with the project as other projects come along, and if expanding the CAUTI prevention initiative to other units it is important to reassess if the current nurse champion is the best fit for these other units.

Question 4: Do bedside nurses assess, at least daily, whether their catheterized patients still need a urinary catheter?
You indicated that nurses do not assess, at least daily, the continued appropriateness of the indwelling urinary catheter. Throughout a patient's stay their need for the indwelling catheter is likely to change. Without continual reassessment for appropriateness, the catheter is likely to stay in beyond its necessity, the greatest risk for infection. For more specifics, please follow [this link](#).

Question 5: Do bedside nurses take initiative to ensure the indwelling urinary catheter is removed when the catheter is no longer needed (e.g., by contacting the physician or removing the catheter per protocol)?
You indicated that bedside nurses do not take initiative to remove catheters when they are no longer appropriate. The number one risk factor for CAUTI is leaving the indwelling catheter in too long. If a nurse determines that a catheter is no longer appropriate, there must be a procedure in place to have it removed in a timely manner. Depending on the unit and hospital there are a variety of ways this can be accomplished. For more specifics, please follow [this link](#).

Question 6: Do you have an effective physician champion for your CAUTI prevention activities?
You indicated that you either do not have a physician champion or that the one you have is not effective. A successful CAUTI prevention initiative usually requires collaboration and cooperation between nurses and physicians. A physician champion is needed to bring the program to the other physicians, to help engage them, and to be a part of problem-solving when there is resistance or another challenge from this group of healthcare providers. For more specifics, please follow [this link](#).

Question 7: Is senior leadership supportive of CAUTI prevention activities?
You indicated that senior leadership is supportive of the CAUTI initiative. It is important to occasionally reassess this as new initiatives and priorities are constantly being introduced.

Question 8: Do you currently collect CAUTI-related data (e.g., urinary catheter prevalence, urinary catheter appropriateness, and infection rates) in the unit(s) in which you are intervening?
You indicated that you currently collect CAUTI-related data. It is important to collect these measures as the project continues and once you have entered in to the sustainability phase. Discuss with the CAUTI prevention team if there are other measures that would be helpful to collect.

Question 9: Do you routinely feedback CAUTI-related data to frontline staff (e.g., urinary catheter prevalence, urinary catheter appropriateness, and infection rates)?
You indicated that you do not routinely feedback CAUTI-related data to frontline staff. While collecting CAUTI-related data is key to measuring the success of the intervention, it is imperative that the staff, especially those on the frontline are aware of it. The data can help motivate and engage the staff at all stages of the project, as well as encourage them to continue the changes for sustainability. For more specifics, please follow [this link](#).

Question 10A: Have you experienced substantial nursing resistance?
You indicated that nursing resistance is a barrier that you face. Because the CAUTI prevention initiative relies heavily on their engagement it is imperative that you overcome this challenge. This is where an effective nurse champion is especially key. For more specifics, please follow [this link](#).

Question 10B: Have you experienced substantial physician resistance?
You have indicated that you have not experienced significant resistance from the physicians in your unit/at your hospital. Despite the fact that the initiative relies heavily on nursing, resistance from physicians can be challenging, particularly in the decisions for insertion and the timely order for removal. As there are changes to staffing and the spread of the initiative beyond one unit, it is key to keep ongoing communication with physicians.

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CAUTI Guide to Patient Safety (GPS) Q5

www.catheterout.org

Because timely removal of the indwelling urinary catheter is crucial for reducing catheter-associated urinary tract infection (CAUTI), nurses should be empowered and supported to take the initiative to remove the catheter when it is no longer appropriate (e.g., by contacting the physician or removing the catheter per approved protocol).

1. Policy to trigger prompt removal is key

- **Stop orders** which prompt the clinician to remove the catheter by default after a certain time period or a set of clinical conditions has occurred (such as 24 or 48 hours post-operative) unless the catheter remains clinically appropriate.
 - Stop orders “expire” in the same fashion as restraint orders or antibiotic orders, unless action is taken by physicians.
- **Urinary catheter reminders** simply alert doctors and bedside nurses to the fact that a Foley is being used by a patient and provide a list of the appropriate reasons to continue or discontinue the indwelling catheter.
 - Reminders are generally dispatched as a hospital unit eases into an infection prevention initiative.
 - The reminder is included in the patient’s chart or is part of the patient’s electronic record.
- The use of **daily appropriateness tracking** can be helpful for decreasing unnecessary indwelling urinary catheters. Bedside nurses make a daily entry indicating whether any given Foley meets one or more of the appropriate indications for catheter use. If an in-place catheter fails that test, the nurse is to alert the appropriate physician caring for the patient and recommend the catheter’s removal.
- Some hospitals have had great success with a **nurse-initiated removal protocol** whereby a bedside nurse can initiate the removal of the indwelling urinary catheter without an attending physician order; however, this usually needs to be approved by a Medical Executive Committee first, and should be presented by a physician.

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CAUTI Guide to Patient Safety (GPS) Q10A

www.catheterout.org

In a catheter-associated urinary tract infection (CAUTI) prevention program, the nursing staff, especially frontline staff, are central to the success of the initiative. Because they are the staff whose day-to-day activities are most affected by the changes, they may present the greatest resistance.

1. Reason for the resistance

- Because resistance can occur for a number of different reasons, as a first step we suggest interviewing front-line staff to learn why they are resistant to implementing a CAUTI prevention program and what, in the opinion of staff, is needed before acceptance of the program can occur.

2. Strategies for enhancing nursing engagement and decreasing potential resistance

- Get a volunteer from the nursing staff to be a change champion for each shift—someone who other staff respect and who is committed to the process (examples include a front line nurse or a nurse educator).
- Get buy-in before implementation. For example, ask, “Whom do we have to convince on this floor?” Have that person help to develop the plan and/or participate in the education for that unit.
- Provide regular feedback on progress, as well as monthly reports on urinary catheter prevalence, and CAUTI rates.
- Encourage nurses to be creative, developing visual cues to stimulate interest and keep the CAUTI initiative a top priority.
 - One site posted flyers/banners on the unit, such as “This is a catheter out zone.”
- Make sure to listen and clearly understand nurses’ concerns and address them to the nurses’ satisfaction. This may require some education of the staff, creativity, or reallocation of resources.
- Consider changes to (or redistribution of) workload.
 - For example one site instituted a “small zone” so that nurses could be given a

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Successful Implementation of Catheter-Associated Urinary Tract Infection Prevention Bundles
Prof. Sarah L. Krein, University of Michigan
A Webber Training Teleclass

- ✓ Catheter-Associated Urinary Tract Infection (CAUTI) and indwelling catheter use
- ✓ Technical components of a CAUTI prevention bundle
- ✓ Common Socio-adaptive (behavioral) implementation challenges
- ✓ CAUTI GPS



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Conclusions

- CAUTI and indwelling catheter use are important patient safety issues
- Proven approaches to reduce catheter use and prevent CAUTI but implementation requires attention to technical and socio-adaptive issues
- Preventing CAUTI is everyone's responsibility but takes courage, compassion and conviction

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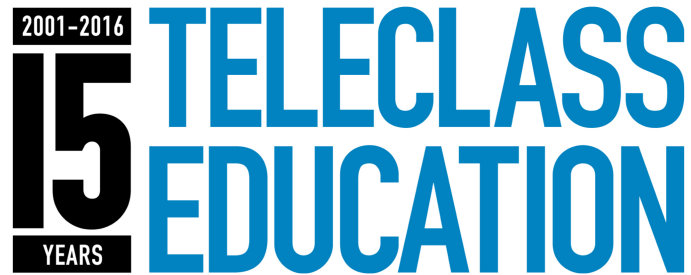
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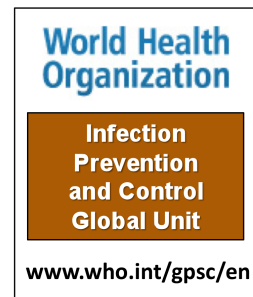
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