

CAUTI Care and Removal Program

Preventing Catheter Associated Urinary Tract Infections: What You Need to Know

Mohamad Fakh, MD, MPH

Associate Professor of Medicine

Wayne State University School of Medicine

St John Hospital and Medical Center, Detroit, MI



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An 82 year old woman was admitted for congestive heart failure...

- She had a urinary catheter placed and was started on diuretics. She looked frail; her physician and the nurses felt it was easier to keep the catheter in so she will be more comfortable.
- On the 5th day of admission, she started complaining of chills and had a fever of 102°F and her BP dropped to 90 systolic. Blood cultures and urine cultures grew *Escherichia coli*. She was diagnosed with symptomatic CAUTI and had to be treated with intravenous antibiotics.

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78 year old nursing home resident with admitted to change his gastrostomy tube...

- The ED nurse noted that he was incontinent. The male patient was confused because of long-standing dementia. Although a bladder scan did not show any urinary retention, she spoke to the ED physician about placing a catheter. Few hours after the catheter was placed, the patient pulled the catheter out leading to a urethral injury and hematuria.
- This required a urology evaluation.

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76 year old woman admitted for congestive heart failure...

- She had a urinary catheter placed and was started on diuretics. Her condition improved and on the 3rd day she was ready to be discharged. The catheter was removed and the nurse checked on the patient if she urinated. The patient did not have any urinary output for 5 hours after catheter removal. A bladder scan showed 500 ml of urine. Straight catheterization was done and the patient was watched overnight to make sure that her symptoms resolved.

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Objectives

- Describe the epidemiology of urinary catheter use and CAUTI
- Explain what CMS and HHS have done
- Review how to reduce CAUTI risk (proper insertion technique, appropriate use)
- Discuss how to sustain improvement
- Additional tools to avoid urinary catheter placement, and metrics to use

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Epidemiology

- Urinary catheters are frequently used in the hospital setting
- The presence of the indwelling urinary catheter increases the risk of urinary tract infections

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Urinary Catheter Utilization

- About 15 - 25% of patients will have a urinary catheter placed during their hospitalization
- Many are placed either in the intensive care unit, emergency department or the operating room

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NHSN Data: Intensive Care vs. General Wards

(Edwards, *Am J Infect Control* 2009; 37:783-805, Dudeck, *Am J Infect Control*. 2011;39(5):349-367)

- Urinary Catheter Use:
ICU > General Units

Unit	2006-8 Urinary Catheter Utilization Ratio	2009 Urinary Catheter Utilization Ratio
ICU (med-surg)	0.79	0.72
General Wards (med-surg)	0.22	0.19

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Inappropriate Use

- 40% - 50% of patients from non-intensive medical and surgical units may not have a valid indication for urinary catheter placement
- This can occur:
 1. At the time of placement
 2. With continued use

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Inappropriate Use in non-ICU: MHA Experience 2007-10 (Under Review)

	% of all patients with catheters (57.6%)	% of patients with catheters without appropriate indications*
Non-obstructive renal insufficiency	2.2	3.8
Transferred from intensive care	4.2	7.3
Patient request	1.5	2.6
Confusion	4.6	8.0
Incontinence	6.5	11.3
Other or no clear reasons	38.6	67.0

*Based on the 1983 CDC recommendations

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Very Elderly Women Are at High Risk for Unnecessary Utilization

(Fakih et al, Am J Infect Control 2010;38:683-8)

- Evaluated urinary catheter (UC) placement for all admissions from the emergency department (ED).
- 532 (11.8%) of 4521 patients had a UC placed. Of those, 69.7% were indicated, and 58.6% had a physician order documented
- Inappropriate placement: **older** (mean age 71.3 vs. those with indication 60.0 years, $p < 0.0001$, and patients with no UC placed 56.2, $p < 0.0001$)
- Half of women ≥ 80 years with a UC placed did not have an indication
- Independent factors: **women** were twice more likely than men, and very elderly (≥ 80 years) were 3 times more likely than those 50 or younger, to have UC placed without indication

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Urinary Catheters Are Not Harmless

- Urinary tract infection
- Mechanical trauma to urethra and bladder
- Immobility (restraining patient)
 - Pressure Ulcers?
 - Falls?
 - Prolonged Stay?

Saint S, Ann Intern Med 2002; 137: 125-7

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Catheter-Associated UTIs (CAUTIs)

(Tambyah, *Infect Control Hosp Epidemiol* 2002;23:27-31; Saint S, *Am J Infect Control* 2000;28:68-75 ; Dudeck, *Am J Infect Control*. 2011;39(5):349-367)

- Hospital-acquired bacteriuria and candiduria in 25% of those with urinary catheters placed for a week
- Risk of bacteriuria: about 5% per day
- Symptomatic UTI: 16-32% of those bacteriuric

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NHSN Data: Intensive Care vs. General Wards

(Edwards, *Am J Infect Control* 2009; 37:783-805; Dudeck, *Am J Infect Control*. 2011;39(5):349-367)

- CAUTI: General Units > ICU

Unit	NHSN CAUTI Rate* (per 1,000 catheter days)	NHSN S-CAUTI Rate (per 1,000 catheter days)
ICU (med-surg)	3.4	1.3
General wards (med-surg)	5.9	1.6

*Prior to the new SUTI definition

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CMS and Hospital-Acquired Conditions

- High cost, high volume or both
- Result in the assignment of a case to an MS-DRG that has a higher payment when present as a secondary diagnosis
- Could reasonably have been prevented through the application of evidence-based guidelines

<http://www.cms.hhs.gov/HospitalAcqCond/>

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Ten Non-Reimbursable Selected Conditions by CMS

(October 2008)

1. Foreign Object Retained After Surgery
2. Air Embolism
3. Blood Incompatibility
4. Stage III and IV Pressure Ulcers
5. Falls and Trauma
6. Manifestations of poor glycemic control
7. Catheter-Associated Urinary Tract Infection
8. Vascular Catheter-Associated Infection
9. Surgical Site Infection-Mediastinitis, bariatric, some ortho
10. DVT/ PE post orthopedic cases

More pressure
ulcers with
immobility?

More falls with UCs?

<http://www.cms.hhs.gov/HospitalAcqCond/>

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Health and Human Services Targets

(<http://www.hhs.gov/ash/initiatives/hai/prevtargets.html>)

Metrics and National 5-Year Prevention Targets			
Metric Label	Metric	Measurement System	National 5-Year Prevention Target
CAUTI	# of symptomatic UTI / 1,000 urinary catheter days	CDC NHSN	25% reduction in the number of symptomatic UTI / 1,000 urinary catheter days
CAUTI	[Number of UTIs (ICD-9-CM +not present on admission) / (# major surgery ICD-9-CM + urinary catheter ICD-9CM)]*100 discharges	Administrative discharge data	25% reduction in the [Number of UTIs (ICD-9-CM+not present on admission) / (# major surgery ICD-9-CM + urinary catheter ICD-9-CM)]*100 discharges

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Health and Human Services Targets

(<http://www.hhs.gov/ash/initiatives/hai/prevtargets.html>)

- “Several challenges and needs related to the measurement of CAUTIs were identified.”
- “Many experts pointed out current limitations of the UTI definition ...”
- “...participants suggested that strategies to widely implement ‘best practices’ in the prevention of CAUTIs in a range of settings be developed.”

What Is Our Goal?

- To reduce the number of CAUTIs
- To provide tools for hospitals to reduce the risk for CAUTI.

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Avoid Having a Pseudoepidemic of CAUTI

- Do not over-diagnose: obtaining urine cultures without an indication may result in inappropriate antibiotic use and mislabeling a patient for having CAUTI
- Only culture the urine if the patient has symptoms of a UTI such as fever, chills, and abdominal pain
- Cloudy urine \neq infection
- Sediment in urine \neq infection
- Smelly urine \neq infection

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Reducing Risk of UTI

- Use proper insertion technique
- Take appropriate care of catheter
- Limit the use to indications

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Proper Insertion Technique

- Hand hygiene before and after placement
- Aseptic technique and use of sterile equipment
- Sterile gloves, drape, an antiseptic solution for periurethral cleaning, and a single packet of lubricant for insertion
- Use the appropriate catheter size



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Maintenance of Urinary Catheters

- Keep a closed system for the urinary drainage system
- Make sure urinary flow is not obstructed:
 1. No kinks of the catheter
 2. Urinary bag should always be lower than the bladder
 3. Regular emptying of urinary bag



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Limit Use to Indications

- Prompt removal of catheter when no longer indicated
- Avoid use unless appropriate indication

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Removal of No-Longer Indicated Catheters

- Nurse-driven removal of no longer needed catheters
 - Pilot study: 45% reduction in unnecessary catheter utilization (Fakih et al, Infect Control Hosp Epidemiol 2008; 29: 815-9)
- Identify appropriate indications based on HICPAC guidelines (Gould et al, Infect Control Hosp Epidemiol 2010; 31: 319-326)
- May consider including certain institutionally-acceptable reasons for utilization

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2009 Prevention of CAUTI HICPAC Guidelines

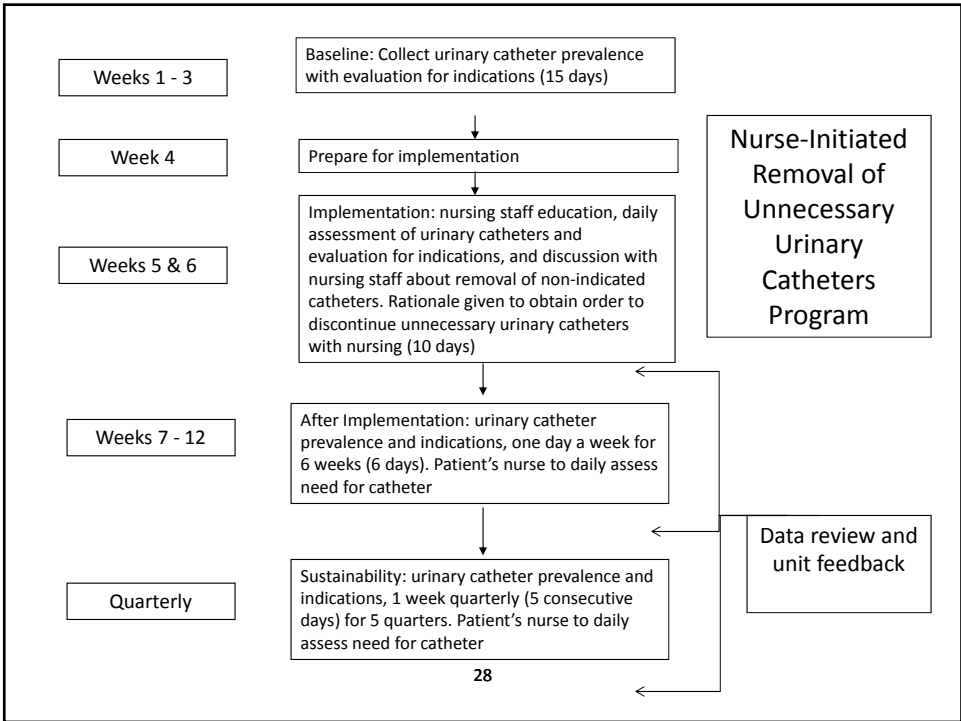
(Gould et al, Infect Control Hosp Epidemiol 2010; 31: 319-326)

Table 2.
A. Examples of Appropriate Indications for Indwelling Urethral Catheter Use ¹⁻⁴
Patient has acute urinary retention or bladder outlet obstruction
Need for accurate measurements of urinary output in critically ill patients
Perioperative use for selected surgical procedures: <ul style="list-style-type: none"> • Patients undergoing urologic surgery or other surgery on contiguous structures of the genitourinary tract • Anticipated prolonged duration of surgery (catheters inserted for this reason should be removed in PACU) • Patients anticipated to receive large-volume infusions or diuretics during surgery • Need for intraoperative monitoring of urinary output
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 traumatic injuries such as pelvic fractures)
To improve comfort for end of life care if needed
B. Examples of Inappropriate Uses of Indwelling Catheters
As a substitute for nursing care of the patient or resident with incontinence
As a means of obtaining urine for culture or other diagnostic tests when the patient can voluntarily void
For prolonged postoperative duration without appropriate indications (e.g., structural repair of urethra or contiguous structures, prolonged effect of epidural anaesthesia, etc.)
Note: These indications are based primarily on expert consensus.

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Main Elements of Program

- Education of nurses on:
 1. Appropriate indications
 2. Ways to avoid urinary catheter placement
- Evaluation of urinary catheter utilization and compliance with appropriate indications
- Sustainability: nurses own the process of evaluating for catheter appropriateness of use daily



Tools Used with Intervention

- Lecture for nurses
- Pocket cards, posters

REMOVE THAT URINARY CATHETER!

Urinary Catheters Increase:

- Length of stay
- Patient Discomfort
- Antibiotic Use
- Length of Day
- Cost

** Patients with urinary catheters tend to stay in bed longer than non-catheterized and increasing their risk of infection.*

Urinary Catheters ARE Indicated for:

- Acute urinary retention or obstruction
- Perioperative use in selected surgeries
- Assist healing of perineal and sacral wounds in incontinent patients
- Single voided urine catheter use
- Required immobilization for trauma or surgery
- Chronic indwelling urinary catheter on admission

Urinary Catheters are NOT Indicated for:

- Urine output monitoring/OUTICE catheter use
- Long-term catheter use in nursing home or long-term care
- Hospital ambulation use
- Patients transferred from intensive care to general units
- Patient mobility
- Catheters that cannot be 2 hours up at a time
- Catheters in patients

Questions?
Contact (Insert info)

STOP

DOES YOUR PATIENT REALLY NEED A URINARY CATHETER?

INDICATIONS FOR URINARY CATHETER USE INCLUDE:

- Acute urinary retention or obstruction
- Perioperative use in selected surgeries
- Assist healing of perineal and sacral wounds in incontinent patients
- Hospital/comfort care/palliative care
- Required immobilization for trauma or surgery
- Chronic indwelling urinary catheter on admission

ANY QUESTIONS, PLEASE CALL (INSERT CONTACT INFO)

REMOVE UNNECESSARY URINARY CATHETERS!

Urinary Catheter Protocol:

Goal:
To remove urinary catheters as soon as possible.

Indications for use only:
1. Acute urinary retention or obstruction
2. Perioperative use in selected surgeries
3. Assist healing of perineal and sacral wounds in incontinent patients

Contraindications:
1. Urinary catheter use in nursing home or long-term care
2. Hospital ambulation use
3. Patients transferred from intensive care to general units
4. Patient mobility
5. Catheters that cannot be 2 hours up at a time
6. Catheters in patients

Prevention Key:
1. Urine output monitoring/OUTICE catheter use
2. Long-term catheter use in nursing home or long-term care
3. Hospital ambulation use
4. Patients transferred from intensive care to general units
5. Patient mobility
6. Catheters that cannot be 2 hours up at a time
7. Catheters in patients

Back

Remove That Urinary Catheter!

Stop Urinary Catheter Use:

- Indications
- Length of Stay
- Cost
- Patient Discomfort
- Antibiotic Use

Urinary Catheters continue patients to bed, making them more immobile and thus increasing their risk for bed sores/infections.

Remove That Urinary Catheter!

Indications for Urinary Catheter Use:

- Acute urinary retention or obstruction
- Perioperative use in selected surgeries
- Assist healing of perineal and sacral wounds in incontinent patients
- Hospital/comfort care/palliative care
- Required immobilization for trauma or surgery
- Chronic indwelling urinary catheter on admission

Contraindications:

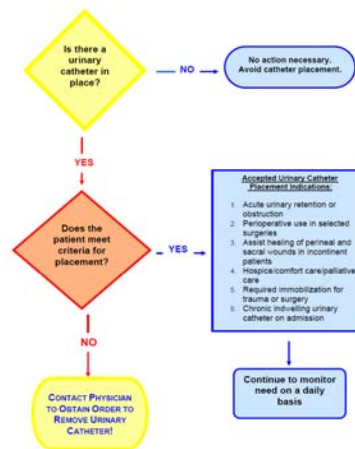
- Urine output monitoring/OUTICE catheter use
- Long-term catheter use in nursing home or long-term care
- Hospital ambulation use
- Patients transferred from intensive care to general units
- Patient mobility
- Catheters that cannot be 2 hours up at a time
- Catheters in patients

Back

Main Education is Performed During Nursing Rounds

- Does the patient have a urinary catheter?
- Reason for catheter use
- If no appropriate indication, the patient nurse will contact the physician to discontinue the urinary catheter
- This process will be continued after implementation with the patient's nurse owning the process

GUIDELINES FOR URINARY CATHETER NEED IN NON-INTENSIVE CARE UNITS



Removing the Urinary Catheter...

- Should not be looked at as an increase in the workload for either the nurse or nurse aide
- Alternatives to the urinary catheter need to be promoted
- Risks associated with having the urinary catheter need to be highlighted

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Following Implementation

- Evaluation of catheter need is incorporated into the patient's nurse daily assessment
- A champion from the unit will promote appropriate urinary catheter utilization on the unit; this will be encouraged through daily nursing rounds
- Units involved will receive feedback on the results of program implementation

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Partnering with Residents, PAs, NPs

- Resident physicians are responsible for a large number of patients in teaching hospitals and may have a significant effect on utilization if engaged
- PAs and NPs are responsible for a substantial part of the care rendered in some hospitals.
- Residents, PAs, and NPs may help in 2 ways:
 1. Evaluate the need for the catheter and discontinue if no longer needed
 2. Serve as an easier access to nurses to obtain order for discontinuation of no longer needed catheters

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Physicians

- Physicians should evaluate the need for the catheter daily
- High volume physicians (hospitalists) may be selected to champion the effort
- Physicians who are considered leaders and whose practice is followed by others may also be instrumental in changing behaviors (eg, cardiology, nephrology and monitoring of urine output in non-ICU)

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Avoiding Inappropriate Placement

- May have a substantial effect on utilization
- May consider in areas of high placement (e.g., emergency department)

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Table 1
Reasons for UC Utilization in ED During the Study Including Those Compliant and Noncompliant With the Institutional Guidelines

Reasons for UC Utilization (n = 322)	Number (% of Total Catheters Used)
Compliant with guidelines (n = 203, 63.0%)	
Non-intensive care	40 (12.4)
≥6 L/min oxygen	39 (12.1)
Output monitoring in intensive care	33 (10.2)
Emergent pelvic ultrasound	32 (9.9)
Intubated	14 (4.3)
Neurogenic bladder	12 (3.7)
Emergency surgery	10 (3.1)
Urinary obstruction	7 (2.2)
Unresponsive	6 (1.9)
Acute hip fracture	4 (1.2)
Urologic procedures	4 (1.2)
Acute mental status changes with agitation	1 (0.3)
Stage 3 or 4 sacral decubitus ulcers with incontinence	1 (0.3)
Hospice or palliative care	1 (0.3)
Noncompliant with guidelines (n = 119, 37.0%)	
No clear reason	64 (19.9)
Oxygen supplementation <6 L/min	26 (8.1)
Dementia	16 (5.0)
Urine specimen collection	5 (1.6)
Incontinence	3 (0.9)
Patient request	3 (0.9)
Output monitoring outside intensive care	2 (0.6)

UC = urinary catheter.

ED Compliance with Institutional Guidelines

(Fakih et al, Acad Emerg Med 2010; 17:337–340)

- Established institutional guidelines for UC placement in ED
- Compared the rate of placement before and after guidelines
- ED physician champion involved

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Physician Intervention in the ED

(Fakih et al, Acad Emerg Med, 2010; 17:337–340)

- UC utilization dropped significantly after starting the physician intervention from 212 of 1421 (14.9%) pre-intervention to 110 of 1041 (10.6%) post-intervention ($p = 0.002$)
- Physicians ordered fewer UCs post-intervention (45 of 1041, 4.3%), compared to pre-intervention (106 of 1421, 7.5%), ($p = 0.002$)
- Only 151 of 322 (47.0%) of UCs initially placed in the ED had a physician order documented

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Avoiding Urinary Catheter Placement: Emergency Department-Specific

- Addressing both nurses and physicians is important
- Consider agreed-upon institutional guidelines for urinary catheter placement in the emergency department (ED)
- Identify nurse and physician champions for the ED

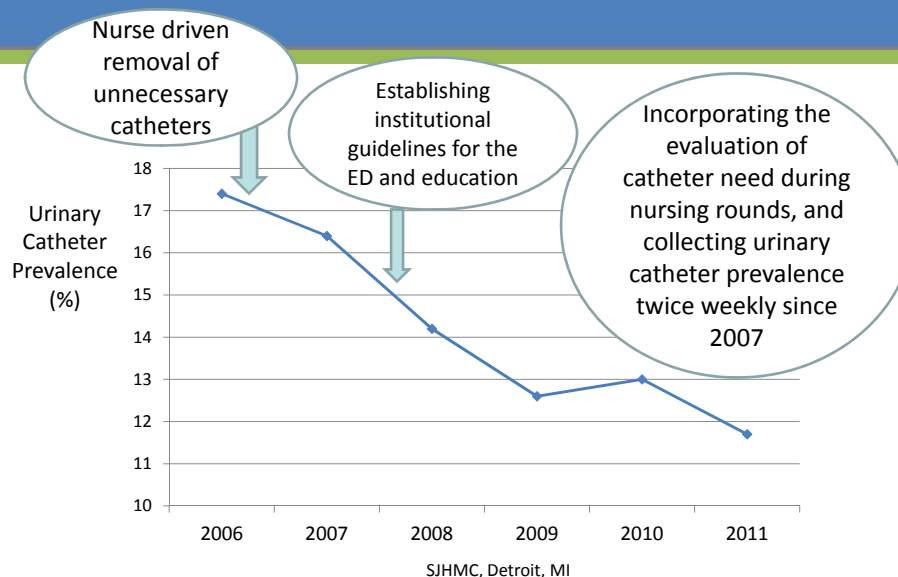
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How to Sustain Improvement

- Make sure that the process is part of the daily nursing assessment
- Provide feedback on urinary catheter use over time to the units involved
- Evaluating compliance with appropriate urinary catheter use may be helpful if no significant drop in utilization occurs
- Example: SJHMC, Detroit: 5 years of the intervention, the prevalence of UC utilization on inpatient wards is 12-13% (down from 18%)

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Does the Effect Persist?



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What Did We Do to Keep the Rates Down?

- Provided knowledge on appropriate indications
- Linked the target (appropriate utilization) to certain stakeholders' interests (case management), regarding LOS and complications
- Intervened in the ED to reduce inappropriate placement from the 1st step reaching the hospital
- Built a structure to evaluate the catheters at least twice weekly
- Provided periodic feedback of rates

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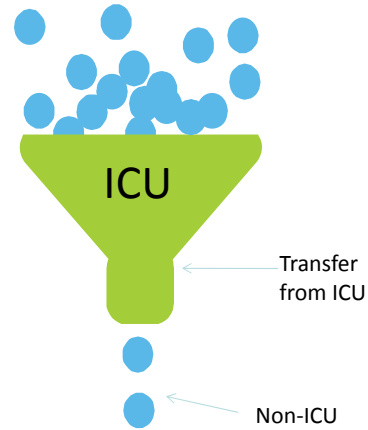
Potential Questions

- What are some tools to avoid placing/using the catheter inappropriately?
- What are the best metrics to evaluate improvement? Process or outcome measures?

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ICU Intervention

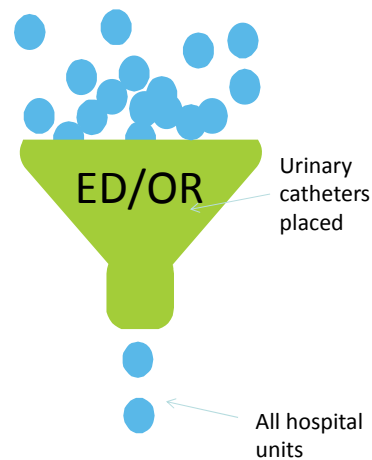
- ICUs have a high prevalence of urinary catheter utilization
- Utilization may be significantly reduced in the non-ICU if patients transferred out of the intensive care units are evaluated for catheter necessity



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Intervening in ED and OR

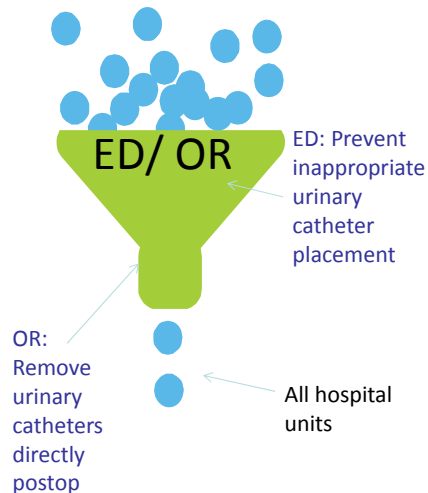
- The emergency department and the operating room are areas where a large number of urinary catheters are placed



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Intervening in ED and OR

- Addressing the appropriateness of placement of urinary catheters in the ED and promoting removal of the urinary catheters post-operatively in the recovery area may also help reduce unnecessary urinary catheter use



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Alternatives to Indwelling Urinary Catheterization

- Bladder scanners may be used in cases where urinary retention is suspected, or when the patient did not have any witnessed urine output and the clinician needs to evaluate for obstruction. Consider having bladder scanners available.
- Condom catheters may be considered in men that require fluid monitoring. Their use reduces the risk of urethral trauma (compared to indwelling urinary catheter). Condom catheters are not used in cases of urinary retention.

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Alternatives to Indwelling Urinary Catheterization

Intermittent catheterization may be considered in patients with non-obstructive urinary retention (e.g., patients with neurogenic bladder).

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Metrics to Evaluate Improvement

- Process
- Outcome

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Process Measures

1. Urinary catheter utilization (number of urinary catheters/ number of patients)
2. Compliance with appropriateness of use (number of appropriately used catheters/ total number of catheters used)
 - May be less labor intensive than outcome measures

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Outcome Measures

1. Number of CAUTIs (collected by infection preventionists)
2. NHSN CAUTI rate (requires accurate collection of catheter-days): important to measure risk with insertion and maintenance
3. Population CAUTI rate (uses patient-days in the denominator-easier to calculate): provides important assessment of improvement over time

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Population CAUTI rate

(Fakih et al, Am J Infect Control, in press)

- Accounts for both process and outcome
- Population CAUTI rate= NHSN rate x UR x 10

Table 2
Relationships of catheter utilization ratio, NHSN CAUTI rate, and proposed population CAUTI rate

Metric	Calculation
NHSN CAUTI rate	$(\text{Total number of CAUTIs} / \text{total catheter-days}) \times 1,000$
Catheter utilization ratio	$\text{Total catheter-days} / \text{total patient-days}$
Total patient-days	$\text{Total catheter-days} / \text{catheter utilization ratio}$
Population CAUTI rate	$(\text{Total number of CAUTIs} / \text{total patient-days}) \times 10,000 = (\text{Total number of CAUTIs} / \text{total catheter-days}) \times \text{catheter utilization ratio} \times 10,000 = \text{NHSN CAUTI rate} \times \text{catheter utilization ratio} \times 10$

Assessment of Cost Savings

- Is it only CAUTIs prevented?
- Other factors:
 1. patient discomfort and dignity (Saint, Ann Intern Med 2002; 137: 125-127)
 2. restricted activity (increasing immobility) with catheter presence
 3. Urethral trauma
 4. Increase length of stay (LOS): keeping the urinary catheter (UC) until the day of discharge may increase LOS due to the need to evaluate the patient for urinary retention post UC removal.

Summary

- **Leadership support**
 - Administration
 - Nursing
 - Physician
- **Units involved**
 - Safety culture
 - Program-supportive unit manager
- **Plan to have a process to sustain your success**

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Summary

- Both nurses and physicians should evaluate the indications for urinary catheter utilization
- Physicians should promptly discontinue catheters when no longer needed
- Nurses evaluating catheters and finding no indication should contact the physician to promptly discontinue the catheter
- Partner with different disciplines (e.g., case management, nursing, infection prevention) to successfully achieve your goals

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Summary

- A continued reduction in urinary catheter utilization may be a marker of the program's success
- If no significant improvement is noted after implementation, you may need to reexamine the process for barriers or problems in implementation

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Thank you!

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