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

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Interventions to reduce urinary catheter use involve lists of "appropriate" indications developed from limited evidence without substantial multidisciplinary input. Implementing these lists, however, is challenging given broad interpretation of indications, such as "critical illness." To refine criteria for appropriate catheter use—defined as use in which benefits outweigh risks—the RAND/UCLA Appropriateness Method was applied. After reviewing the literature, a 15-member multidisciplinary panel of physicians, nurses, and specialists in infection prevention rated scenarios for catheter use as appropriate, inappropriate, or of uncertain appropriateness by using a standardized, multiround rating process. The appropriateness of Foley catheters, intermittent straight catheters (ISCs), and external condom catheters for hospitalized adults on medical services was assessed in 299 scenarios, including urinary retention, incontinence, wounds, urine volume measurement, urine sample collection, and comfort. The scenarios included patient-specific issues, such as difficulty turning and catheter placement challenges. The panel rated 105 Foley scenarios (43 appropriate, 48 inappropriate, 14 uncertain), 97 ISC scenarios (15 appropriate, 66 inappropriate, 16 uncertain), and 97 external catheter scenarios (30 appropriate, 51 inappropriate, 16 uncertain). The refined criteria clarify that Foley catheters are appropriate for measuring and collecting urine only when fluid status or urine cannot be assessed by other means; specify that patients in the intensive care unit (ICU) need specific medical indications for catheters because ICU location alone is not an appropriate indication; and recognize that Foley and external catheters may be pragmatically appropriate to manage urinary incontinence in select patients. These new appropriateness criteria can inform large-scale collaborative and bedside efforts to reduce inappropriate urinary catheter use.

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Catheter-associated urinary tract infection (CAUTI) and unnecessary urinary catheter use remain important patient safety problems in 2015, despite nonpayment for hospital-acquired CAUTI since 2008, nationwide public reporting of CAUTIs since 2011, and increasing adoption of interventions to reduce catheter use (1–4). National reports of urinary catheter use have remained relatively unchanged since 2009, with catheter utilization ratios (catheter-days/patient-days) in 2013 reported as 0.60 for intensive care units (ICUs) and 0.17 for non-ICU wards (5). Even within the large "On the CUSP: Stop CAUTI" collaborative funded by the Agency for Healthcare Research and Quality (AHRQ), which uses many interventions to remove unnecessary urinary catheters, the catheter use ratios from June 2014 were 0.56 for ICUs and 0.18 for non-ICUs (6, 7).

Key tools for reducing urinary catheter use are lists of appropriate and inappropriate catheter indications, which restrict use to appropriate indications and prompt catheter removal when catheters are no longer appropriate. In the United States, hospitals implementing interventions to prevent CAUTI and reduce catheter use, including hospitals in the "On the CUSP" project, generally rely on the 2009 Guideline for Prevention of Catheter-Associated Urinary Tract Infections from the Healthcare Infection Control Practices Advisory Committee (HICPAC) for guidance regarding appropriate and inappropriate catheter indications (8).

In our experience as team members of the "On the CUSP" project and bedside clinicians caring for medical patients in university and Department of Veterans Affairs (VA) hospitals, urinary catheter use varies widely, even among clinicians and hospitals trying to implement similar appropriateness criteria (9). Specifically, in the "On the CUSP" project, urinary catheter use appears highest among hospitals in the Western United States (10). Hospitals in this region used "accurate measurement of urinary output in critically ill patients" outside of the ICU setting and "urinary incontinence without a sacral or perineal pressure ulcer" as indications for urinary catheter use more than did hospitals in other regions (10). Hospitals in the Midwestern United States had the highest rates for using other conditions, such as morbid obesity, transfer from the ICU, immobility, dementia, and patient request, as indications for use (10). A recent national survey of catheter placement practices in acute care hospitals demonstrated that many hospitals reported placing catheters for reasons beyond the HICPAC list of appropriate indications, including for patient request and urinary incontinence without obstruction (9).

In summary, although the 2009 HICPAC CAUTI guideline about appropriate catheter indications was instrumental for informing many interventions to re-

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duce catheter use, implementation of appropriate and inappropriate indication lists has been challenging for 3 reasons: 1) broad interpretation of such indications as "critical illness"; 2) bedside clinician concerns that pragmatic patient-specific issues, such as incontinent patients who are very difficult to turn for skin care, are not addressed; and 3) the need for more specific guidance on use of alternatives to indwelling catheters, such as external condom catheters and intermittent straight catheters (ISCs).

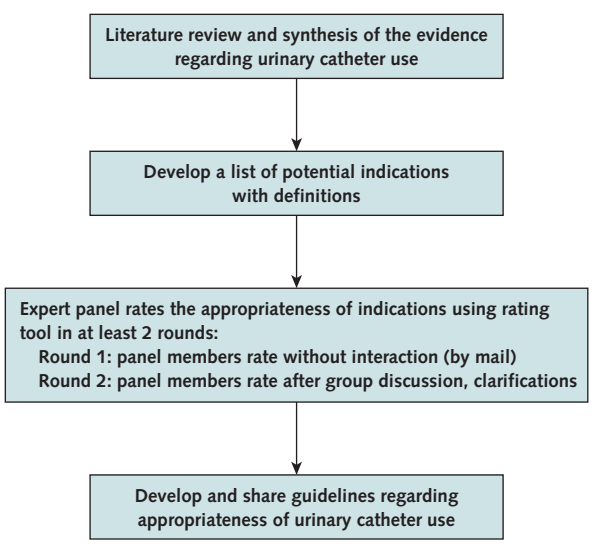
To address these concerns, we applied a well-established method for evaluating appropriateness of medical technology—the RAND/UCLA Appropriateness Method—to more rigorously define the appropriateness of 3 types of urinary catheters (indwelling Foley catheter, ISC, and external condom catheter). Our objective was to develop a list of catheter indications assessed as appropriate, inappropriate, or of uncertain appropriateness for these urinary catheter types that can guide nurses and physicians considering catheters in hospitalized medical patients. We focused on indications for urinary catheters most commonly considered on medicine services and excluded perioperative care because we expected the literature review and clinical expertise required for perioperative indications to be different.

METHODS

Overview of the RAND/UCLA Appropriateness Method

The RAND/UCLA Appropriateness Method was developed to enable measuring the overuse of medical and surgical procedures in the RAND Corporation/University of California, Los Angeles, Health Services Utilization Study (11). For procedures that may be overused, this method assesses the procedure as "appropriate" when the "expected health benefit (e.g., increased life expectancy, relief of pain, reduction in anxiety, improved functional capacity) exceeds the expected negative consequences (e.g., mortality, morbidity, anxiety, pain, time lost from work) by a sufficiently wide margin that the procedure is worth doing, exclusive of cost" (12, 13). The goal of the method is to combine the best available scientific literature with the collective judgment of experts to yield a statement on the appropriateness of a procedure with regard to specific patient characteristics, such as symptoms, medical history, or test results. This list of indications may be used retrospectively to assess the appropriateness of procedures received or prospectively as a clinical decision aid for improving the use of the procedure.

Figure 1. Overview of the RAND/UCLA Appropriateness Method.



As illustrated in Figure 1, the first step of the RAND/UCLA Appropriateness Method is a literature review to synthesize the latest available scientific evidence on the procedure to be rated. From the literature search, a list of specific clinical scenarios or indications is produced, from which a rating document for assessing appropriateness is generated. A panel of experts is identified, often on the basis of participation in or recommendation by various relevant medical societies. In a modified Delphi process, the panelists assess the benefit-to-harm ratio of the procedure for each indication in the rating document on a 1 to 9 scale; 1 means the expected harm greatly exceeds the expected benefit, and 9 means the expected benefit greatly outweighs the expected harms. Panelists perform the first round of ratings independently without interaction with other panelists.

For the next round or rounds of rating, panelists meet at a conference led by a moderator experienced in the method. During the conference the panelists discuss the ratings, focusing on areas of disagreement or uncertainty, and have the opportunity to modify the indication list as needed. No attempt is made to force consensus. Following the discussion at the conference, the panelists individually re-rate the appropriateness of the indications by using the same 1 to 9 scale. Each indication's final assessment is classified by the RAND /UCLA Appropriateness Method according to the panel's median score and level of disagreement among panelists. Disagreement represents a wide difference of opinion by the panelists. For our panel of 15 members, disagreement existed if at least 5 panelists rated the appropriateness of an indication from 1 to 3 and at least 5 panelists rated the appropriateness from 7 to 9. If disagreement is found, those indications are considered to be of "uncertain" appropriateness. For indications without disagreement, median panel score ranges are used to classify indications as follows: 1 to 3, inappropriate; 4 to 6, uncertain appropriateness; and 7 to 9, appropriate.

RAND/UCLA Appropriateness Method Versus the Method Used for the 2009 HICPAC CAUTI Guideline

Literature Search

Similar to the method used to generate the 2009 HICPAC guideline, the RAND/UCLA Appropriateness

Method began with a literature search for guidance regarding urinary catheter use. The literature search was used to generate a list of potentially appropriate indications for indwelling urinary catheters for consideration by experts with diverse clinical and research expertise. However, both the HICPAC team and our team found very little in the literature with which to estimate risks and benefits of urinary bladder drainage strategies by clinical indication in order to guide development of an appropriate indications list. As a consequence, both the HICPAC team and our team reviewed the literature for other types of guidance on appropriate and inappropriate uses of catheters. The HICPAC CAUTI working group started with the indications discussed in the original 1981 Centers for Disease Control and Prevention CAUTI prevention guideline (14) and consulted other major CAUTI guidelines being developed around the same time (15, 16) to develop a draft list of indications (Gould C. Personal communication. 12 September 2014).

Similarly, because our team's initial systematic search of the literature (**Figure 2**, Strategy 1) did not yield articles quantifying risks and benefits of urinary catheters by clinical indication (although it did yield 9 articles discussing indications), we also reviewed CAUTI guidelines (**Figure 2**, Strategy 2), including the HICPAC guideline and guidelines focused on clinical conditions for which urinary catheters are commonly considered, such as pressure ulcers, paralysis or neurologic bladder issues, and urologic diagnoses (including incontinence) (8, 14–29). In addition, because we had recently performed 2 systematic reviews of controlled intervention studies to reduce CAUTI or urinary catheter use (30, 31), we reviewed the 30 studies and the references (**Figure 2**, Strategy 3) yielded by these systematic reviews. We sought guidance from these studies because implementation of many interventions required a list of appropriate and inappropriate urinary catheter indications.

From the articles identified through the search strategies listed in **Figure 2**, a comprehensive table of indications by article (8, 14, 32–108, 115–120) was developed and categorized by themes (such as "urinary retention and/or obstruction"), as detailed in the **Appendix Table** (available at the end of this article). This table of indications was used to develop clinical scenarios for the rating document. The rating document was first refined by additional multidisciplinary input from other clinicians before being sent to panelists to rate the appropriateness of urinary catheters for each scenario.

Generating Recommendations for Appropriate Urinary Catheter Use

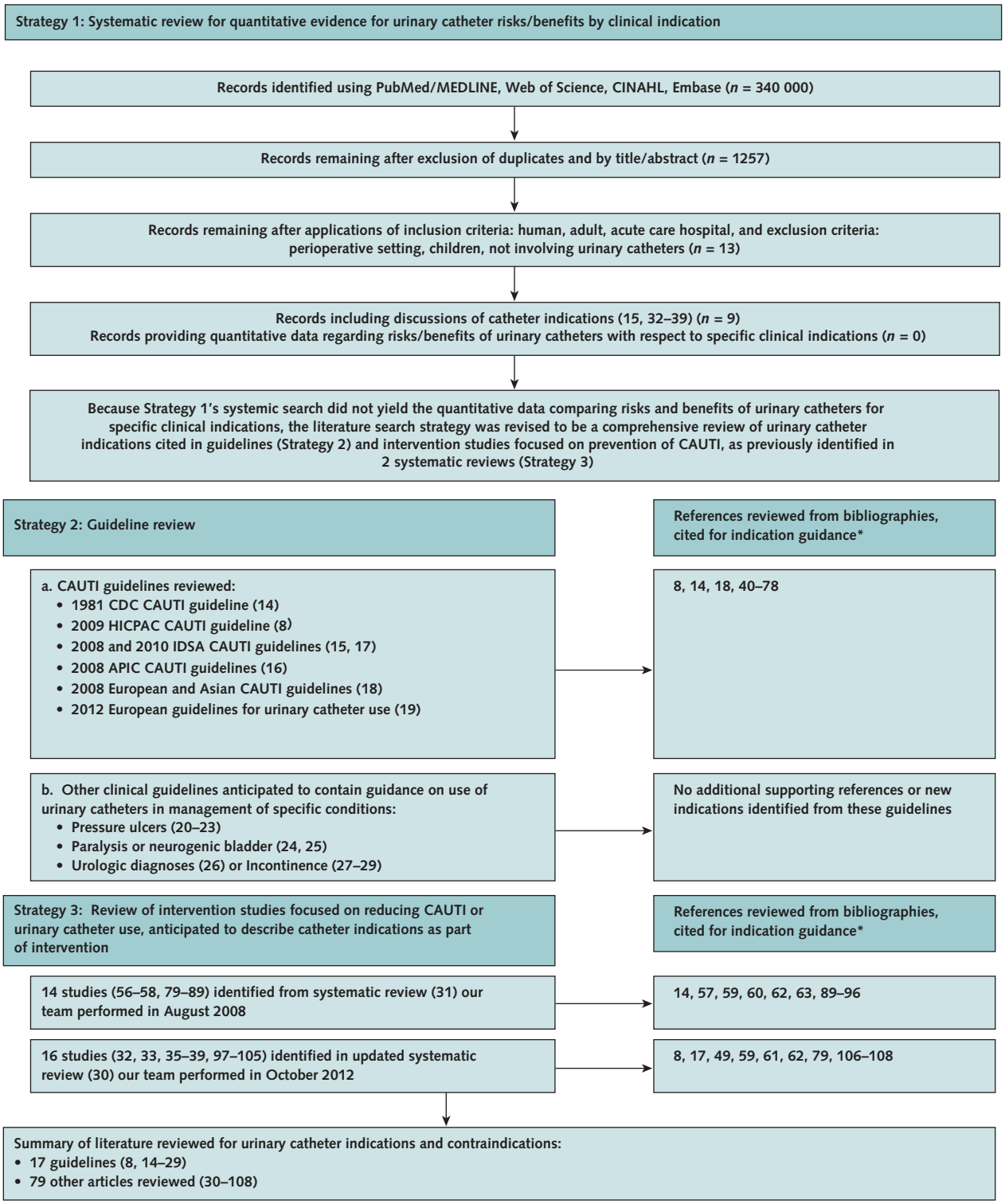
A key difference between the HICPAC method and the method used for this study is how the recommendations were generated regarding the indications. The initial HICPAC appropriate indications went through several levels of review and refinement, starting with the 4-member HICPAC CAUTI subcommittee and a 4-member external expert group. The HICPAC method applied a grade for level of evidence and strength of recommendation for individual recommendations provided in the guideline text regarding appropriate urinary catheter use and catheter alternatives (HICPAC guideline pages 10 to 11, 34 to 35, and 37 to 38). The quality of evidence cited was graded as "low" and "very low"; the strength of recommendations ranged from "strong" (for using catheters only as necessary instead of routinely for operative patients and avoiding catheters to manage incontinence) to "weak" (for use of alternatives to indwelling catheters for some neurogenic bladder conditions). The table of appropriate and inappropriate indications for indwelling catheters was provided and cited as primarily selected by expert consensus; this is the table of general indications used currently by most interventions for reducing catheter use. No systematic scoring system was applied for rating and selecting the indications for this table (Gould C. Personal communication. 12 September 2014). The entire HICPAC CAUTI guideline went through several levels of review, including by the larger HICPAC committee, which discussed the available data and recommendations in the entire guideline for approval before sending it to the Centers for Disease Control and Prevention with a prepublication period of public comment review (109).

In summary, the HICPAC method clearly has substantial strengths, including multiple levels of review, and yielded an important general list of appropriate and inappropriate indications that are guiding catheter use in hospitals nationwide. However, the list does not account for common clinical patient characteristics that make the current list incomplete and difficult to implement. The need for a more critical review of how clinical characteristics affect the appropriateness prompted our selection of the RAND/UCLA Appropriateness Method.

The strengths of the RAND/UCLA Appropriateness Method for this project are derived from the methodical review of detailed clinical patient characteristics that affect urinary catheter benefits, risks, and the potential to use alternatives. For example, the HICPAC table indicates that indwelling catheters are inappropriate "as a substitute for nursing care of the patient or resident with incontinence," which is certainly sound general advice. However, this recommendation can be frustrating for bedside clinicians. These practitioners are tasked with managing incontinence without catheters when caring for patients for whom providing routine, frequent skin care is challenging, such as patients who are difficult to lift and turn because of severe edema, morbid obesity, or pain.

For these reasons, the detailed rating document of indications used in our study asked clinicians to consider the appropriateness of catheter use for incontinence in multiple clinical scenarios, including patients with and without common clinical characteristics that affect the ability and resources required for nurses to provide skin care for incontinence. Our list of indications for evaluation was generated by the detailed liter-

Figure 2. Summary of evidence search and selection.



APIC = Association for Professionals in Infection Control and Epidemiology; CAUTI = catheter-associated urinary tract infection; CDC = Centers for Disease Control and Prevention; HICPAC = Healthcare Infection Control Practices Advisory Committee; IDSA = Infectious Diseases Society of America.

* Some references cited as references for indication lists and reviewed from bibliographies were noted to be guidelines or intervention articles already reviewed.

ature review as well as other indications suggested by members of our research team and other clinicians representing hospital medicine, internal medicine, neurology, urology, other surgical specialties, and nursing.

Also in contrast to the methods used for generating the indications in the 2009 HICPAC guideline, the RAND/UCLA Appropriateness Method applies systematic, reliable, and reproducible rating and scoring of appropriateness for individual clinical indications (11, 110, 111). The rating documents are generated in a standard fashion that requires clear instructions, readability, and clinical definitions. This process also prompts clinician input to improve and expand the scenarios being considered on the basis of clinical experience, including pragmatic challenges. Figure 3 illustrates the format, instructions, definitions, and clinical examples provided to panel members to query the appropriateness of each catheter type for specific clinical scenarios.

The panel discussion focused on the single task of assessing appropriateness of urinary catheter use and took place with all 15 expert panelists (nurses, physicians, and an infection preventionist) from 7 facilities (most in the metro Detroit area in Michigan) in 4 states in the same room. As detailed in Table 1, the panel's nurses had expertise in wound care, medical-surgical ward care, critical care, and emergency medicine. The physicians' expertise included cardiology, neurology, hospital medicine, geriatrics, infectious disease, physical medicine and rehabilitation, critical care medicine, pulmonary, anesthesia, emergency medicine, urology, and epidemiology. Several panelists worked in infection control.

The panel discussion was facilitated by method and clinical content experts who focused on areas of disagreement or uncertainty in order to clarify whether the disagreement or uncertainty could be resolved by clarifying the clinical scenario or resulted from clinical uncertainty due to insufficient research. Of note, the RAND/UCLA Appropriateness Method does not require or aim for consensus; there is no voting, and the ratings are done independently and submitted privately in writing. The method for scoring the ratings as appropriate, inappropriate, or uncertain is standardized (11).

In summary, our study used the RAND/UCLA Appropriateness Method to begin where the HICPAC 2009 guidance for catheters left off. We recognized that the literature available for informing risks and benefits for urinary catheter use is limited; therefore, the previously applied HICPAC method for grading the evidence to inform the strength of recommendations had limited potential to differentiate appropriateness of catheter use for common clinical scenarios not yet studied. In addition to considering available quantitative evidence from the literature, the RAND/UCLA Appropriateness Method used a standard method for rigorously applying clinical expertise to rate "appropriateness" for detailed clinical indications beyond grading the quality of evidence in the literature.

Table 1. Characteristics of Urinary Catheter Appropriateness Panelists

Name	Title	Affiliation*	Specialty
Keith Aaronson, MD, MS	Medical Director, Heart Transplant Program	University of Michigan (UM), Ann Arbor, MI	Cardiology
Crystal Bye, BSN, RN	Wound Care Nurse	VA Ann Arbor Healthcare System (VAAAHS), Ann Arbor, MI	Wound care nursing
Vineet Chopra, MD, MSc	Clinical Assistant Professor, Internal Medicine	VAAAHS; UM; Ann Arbor, MI	Hospital medicine
Joseph Corey, MD, PhD	Assistant Professor, Neurology and Biomedical Engineering	VAAAHS, Geriatric Research, Education, and Clinical Center; UM, Ann Arbor, MI	Neurology
Heidi Haapala, MD	Instructor, Physical Medicine and Rehabilitation	VAAAHS; UM, Ann Arbor, MI	Physical medicine and rehabilitation
Theodore J. Iwashyna, MD, PhD	Associate Professor, Internal Medicine	VAAAHS; UM, Ann Arbor, MI	Pulmonary and critical care medicine
Karen Jones, RN, BSN	Project Coordinator, Infection Prevention and Control	St. John Hospital and Medical Center, Detroit, MI	Emergency medicine nursing
Preeti Malani, MD, MSJ	Associate Professor, Internal Medicine	VAAAHS, Geriatric Research, Education, and Clinical Center; UM, Ann Arbor, MI	Infectious diseases and geriatric medicine
Russell Olmsted, MPH, CIC	Director, Infection Prevention and Control Services	St. Joseph Mercy Healthcare System, Ann Arbor, MI	Infection prevention
David Pegues, MD	Professor of Medicine; Medical Director, Healthcare Epidemiology, Infection Prevention and Control	Hospital of the University of Pennsylvania, Philadelphia, PA	Healthcare epidemiology and infectious diseases
Margarita E. Pena, MD, FACEP	Medical Director, Clinical Decision Unit, Assistant Program Director, Emergency Medicine	St. John Hospital and Medical Center, Detroit, MI	Emergency medicine
Aleksandra Radovanovich, MSN, RN, CCRN, CCNS	Clinical Nurse Specialist Critical Care	Richard L. Roudebush VA Medical Center, Indianapolis, IN	Critical care nursing
Ted Skolarus, MD, MPH	Assistant Professor, Urology	VAAAHS; UM, Ann Arbor, MI	Urology
Andrea Starnes, RN	Charge Nurse	VAAAHS, Ann Arbor, MI	Medical-surgical nursing
Hannah Wunsch, MD, MSc	Herbert Irving Assistant Professor, Anesthesiology and Epidemiology	Columbia University, New York, NY	Critical care medicine

* Affiliation at time of panel participation.

Figure 3. Example of clinical scenarios from the round 1 rating document.

Instructions: Please circle your rating of the appropriateness of using an indwelling urinary catheter (Foley), an intermittent straight catheter (ISC), or an external catheter (condom) for each scenario on a scale of 1 to 9. 1 = highly inappropriate; 5 = neutral or uncertain; 9 = highly appropriate.

A: Acute urinary retention			
Reminder **1. Assume patients do not have any other indication for requiring a urinary catheter other than what is described in the scenario.** **2. Assume patients would have no difficulty with catheter placement, meaning that a nurse could place an indwelling catheter, ISC, or external catheter without difficulty in the patient unless otherwise stated.**	**Appropriateness of Indwelling Urinary Catheter (Foley) Use**	**Appropriateness of Intermittent Straight Catheter (ISC) Use**	**If Male Patient: Appropriateness of External Catheter (Condom) Use**
Acute urinary retention is defined as "the inability to urinate despite a full bladder. This is defined by clinical exam as 'painful, palpable or percussable bladder, when the patient is unable to pass any urine.'" (126).			
A1. How appropriate is use of this catheter because a hospitalized patient has **acute** urinary retention, **without bladder outlet obstruction**, for…	**Some causes of acute urinary retention include:** medication adverse effects (anticholinergics, opioids, paralytics), acute neurologic injuries or inflammatory conditions of the spinal cord (trauma, disc compressions or transverse myelitis), and some cases of bladder infection. Also, **acute urinary retention** can occur as exacerbations of chronic conditions associated with difficulty emptying the bladder (addressed in scenarios B1 and B2).		
a. less than 24 hours?	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9
b. 24–48 hours?	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9
c. greater than 48 hours?	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9
A2. How appropriate is use of this catheter because a hospitalized patient has **acute** urinary retention, **due to bladder outlet obstruction**, for…	**Some conditions that cause acute urinary retention due to bladder outlet obstruction include:** acute prostatic hyperplasia, prostate inflammation/infection (e.g., prostatitis); newly diagnosed urethral stricture; urethrocele; newly diagnosed bladder stones; bladder or prostatic masses; and temporary obstruction, such as edema from a recent urologic procedure (addressed in scenarios B1 and B2).		
a. less than 24 hours?	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9
b. 24–48 hours?	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9
c. greater than 48 hours?	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9

Scenarios B1 and B2, mentioned in figure, can be found in Supplement 3 (available at www.annals.org).

Rating of the Urinary Catheter Indications

To facilitate round 1 of the ratings, panelists were mailed a packet of preconference materials in April 2013 (Supplement 1, available at www.annals.org), including an introductory letter, an overview of the RAND/UCLA Appropriateness Method, a summary of the literature review (including a review of urinary catheter types), the 2009 HICPAC list of appropriate and inappropriate indications for indwelling catheters, the Braden Scale for Predicting Pressure Sore Risk (112), and the round 1 rating document with instructions on how to complete it. Panelists' disclosures of interest are available in Supplement 2 (available at www.annals.org).

The Ann Arbor Panel of Urinary Catheter Appropriateness met on 18 and 19 June 2013. The 15 panelists were provided summary round 1 rating documents, including their own individual ratings from round 1 and the median ratings of the panel for each catheter indication. After panelist introductions, an overview of the conference schedule was provided, along with a brief clinical review of the function and infectious and noninfectious risks of the 3 types of urinary catheters of interest. Panelists were oriented to the round 2 rating document and reminded of the definition of appropriateness; rating instructions were reviewed.

The panel discussion for each catheter indication was moderated by a methods expert (S.J.B.) and a CAUTI clinical content expert (J.M.). The catheter indication list and associated definitions were modified during the conference on the basis of discussion by using a standard method in the RAND/UCLA Appropriateness Method for annotating the revised indications and ratings. For example, when it became apparent that panelists had disagreed on an indication's appropriateness because they were considering 2 distinct patient populations, the clinical indication was revised to allow the panelists to assess appropriateness for patient population "X" (by marking an "X" on the rating for that population) and to separately assess appropriateness for patient population "O" (by marking an "O" on the rating for that population).

For the round 2 ratings, panelists were asked to re-rate the appropriateness of each catheter indication using the same 1 to 9 scale after discussing each catheter indication. Because of the many modifications to the catheter indications made during round 2, revised rating documents incorporated the revised catheter indication text for panelists to use in a confirmatory round 3. During the round 3, panelists were simply led by the moderator (J.M.) through a quick review of the catheter indications in order to confirm panelists' un-

derstanding of the revisions made to the rating document in round 2.

Data Processing and Statistical Analyses

Data from the rating documents from each round were entered into a Microsoft Access Database in duplicate and checked for discrepancies. Analyses were conducted by using SAS software, version 9.3 (SAS Institute). Descriptive statistics were calculated for all variables. Summary result documents listing the frequency of responses, median response, and each individual panelist's response were created. Each indication was classified as "appropriate," "uncertain," or "inappropriate" in accordance with the panelists' median score and the level of disagreement among them, as described in the overview of the RAND/UCLA Appropriateness Method.

Role of the Funding Source

This study was funded by the Veterans Affairs National Center for Patient Safety and through a contract from AHRQ. The funding sources were not involved in the conduct, interpretation, or reporting of the results or the decision to submit the manuscript for publication.

RESULTS

Overall Results, by Catheter Type

Overall, in round 3, the panel rated catheter appropriateness for a total of 299 scenarios. This included 97 clinical scenarios rated for appropriateness of each of the 3 urinary catheter types (Foley, ISC, external) and 8 clinical scenarios rated for the appropriateness of Foley catheters instead of ISCs or external catheters due to common issues, such as a patient's request to use a Foley catheter while admitted instead of the ISC used at home. Of the 299 scenarios, 88 (29.4%) were rated as appropriate, 165 (55.2%) were rated as inappropriate, and 46 (15.4%) were rated as uncertain (14 because of disagreement).

Of the 105 clinical scenarios for which the panel was asked to rate appropriateness of Foley catheter use, 43 were rated as appropriate, 48 were rated as inappropriate, and 14 were rated as uncertain (4 because of disagreement). Of the 97 clinical scenarios for which panelists rated appropriateness of ISCs, 15 were rated as appropriate, 66 as inappropriate, and 16 as uncertain (2 because of disagreement). Of the 97 clinical scenarios for which panelists rated appropriateness of external catheters, 30 were rated as appropriate, 51 as inappropriate, and 16 as uncertain (8 because of disagreement). Many of the evaluated clinical scenarios included common patient characteristics, which allowed us to consolidate the appropriateness recommendations into fewer clinical scenarios. For example, we found that it was a specific patient characteristic (such as a nurse's inability to turn the patient in order to provide skin care) that influenced the panelist decision rather than the broader clinical scenario.

Catheter Appropriateness, by Clinical Indication

Tables 2 to 4 summarize appropriate and inappropriate uses of Foley catheters, ISCs, and external condom catheters, respectively. Table 5 provides side-by-side summaries of the appropriateness of each catheter for the 5 most common clinical reasons to consider a urinary catheter: urinary retention, incontinence, measuring volume, specimen collection, and comfort or convenience. Detailed results summarizing the median scores and frequencies of the panel ratings for each clinical scenario for round 3 are provided in Supplement 3 (available at www.annals.org) as an example of the raw data yielded by this type of method; these dense tables are not intended as clinical references.

Highlights of Important Discussion Points From the Panel Conference

Urinary Retention or Obstruction

The HICPAC guideline states that indwelling catheter use is appropriate for "acute urinary retention or bladder outlet obstruction" and that "intermittent catheterization is preferable to indwelling urethral or suprapubic catheters in patients with bladder emptying dysfunction." Overall, panelist ratings for appropriateness of Foley catheters or ISCs did not vary by duration of urinary retention (<24 hours, 24 to 48 hours, or >48 hours). Some individual panelists rated Foley catheters with higher appropriateness for short time frames and ISCs for longer time frames, whereas other panelists rated ISCs with higher appropriateness for shorter time frames and Foley catheters for longer time frames. Three issues discussed reflected concern that 1) performing ISC multiple times may be uncomfortable for patients with no experience with ISCs; 2) an indwelling Foley catheter poses an increased risk for CAUTI over time; and 3) the risk for infection with repeated ISC use may be similar to that with indwelling catheters, particularly for short time periods or with suboptimal ISC sterile technique by nurses without much experience using ISCs. Of note, even in our panel of experienced clinicians, not all recognized that external catheters are absolutely inappropriate for management of urinary retention because this type of catheter simply collects urine that is spontaneously voided by the bladder.

Scenarios of acute urinary retention with bladder outlet obstruction prompted much discussion among the panelists. The appropriateness of Foley catheters or ISCs varied according to the reason for the obstruction. Examples discussed included bladder outlet obstruction without inflammation or infection, such as acute prostatic hyperplasia, newly diagnosed urethral strictures, urethroceles, bladder stones, or bladder or prostatic masses. Examples of bladder outlet obstruction with inflammation or infection included urethral inflammation in the setting of urinary tract infection, recent urethral trauma, or prostatitis. The urologist on the panel felt strongly that recommendations regarding catheter placement and removal in the setting of acute prostatitis were beyond the scope of this panel, given both the potential for catheterization to cause complications in prostatitis (such as sepsis) and the fact that

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
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

ICU = intensive care unit; ISC = intermittent straight catheter; IV = intravenous.
* This table provides guidance for Foley catheter use in the medical patient, excluding both appropriate and inappropriate uses in the perioperative setting.
† It is unclear whether a Foley catheter is appropriate for chronic urinary retention without bladder outlet obstruction (e.g., neurogenic bladder) when an ISC is feasible and adequate; appropriateness may vary according to reason for urinary retention and level of difficulty or discomfort inserting an ISC.
‡ Other urinary management strategies: barrier creams, absorbent pads, prompted toileting, nonindwelling catheters.
§ Other volume assessment strategies: physical examination, daily weighing.
‖ Other urine collection strategies: urinal, bedside commode, bedpan, external catheter, ISC.
¶ It is unclear whether a Foley catheter is appropriate for a patient with long-term ISC use who requests a "break" from the ISC by using a Foley catheter while admitted; transition to Foley catheter may lead to difficulties returning to an outpatient ISC regimen, but a patient's clinical capabilities to perform self-catheterization may be reduced depending on the reason for admission. In addition, a patient with self-catheterization history may prefer to avoid catheterization by others.

prostatitis can be a complication of catheterization. Although Foley catheter insertion and use may be appropriate for prostatitis with acute urinary retention, the decision to use a catheter for prostatitis (or suspected prostatitis) needs to be highly individualized for the patient; consultation with a urologist should be considered to guide catheter use (which may include a Foley catheter or suprapubic drainage). In addition, the decision to place or remove urinary catheters for a patient with urinary retention who has recently had a urologic procedure or urethral trauma should be made only in consultation with the urologist. Foley catheters can be used therapeutically to address hematuria in patients with urethral trauma (for example, due to accidental removal of the Foley catheter with the balloon inflated), yet replacement of a Foley catheter after urethral trauma may require expert placement. Panelists agreed that ISCs and Foley catheters were both appropriate for chronic urinary retention *with* bladder outlet obstruction but were uncertain by disagreement about the appropriateness of a Foley catheter for chronic retention *without* bladder outlet obstruction when an ISC was feasible; discussion focused on concerns for risks of long-term indwelling catheters and the potential discomfort or caregiver burden of long-term ISC use.

Urinary Incontinence or Skin Issues

The HICPAC guideline states that indwelling catheter use is appropriate to "assist in the healing of open sacral or perineal wounds in incontinent patients" but is inappropriate "as a substitute for nursing care of the patient or resident with incontinence." Panelists expressed the challenges of balancing the risks of cathe-

Table 3. Guide for Intermittent Straight Catheterization in Hospitalized Medical Patients*

Appropriate indications†
Acute urinary retention without bladder outlet obstruction, if bladder can be emptied adequately by a maximum frequency of ISC every 4 h *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 such conditions as acute prostatitis or urethral trauma*
Chronic urinary retention with or without 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‡ if ISC is adequate to manage the type of incontinence (i.e., overflow)
Urinary incontinence that is treated and can be managed by ISC (i.e., overflow incontinence)
Urine volume measurements (not hourly) or sample collections in patients using ISC for urinary retention/obstruction or overflow incontinence
Random urine sample collection for sterile or nonsterile specimens if impossible by other collection strategies§
Management of urine in patients with strict temporary immobility if ISC does not require excessive movement
Post-void residual urine volume assessment if bladder scanner is unavailable or inadequate and more detail than suprapubic fullness is needed
Inappropriate uses
Hourly measurement of urine volume required to provide treatment
Random urine sample collection for sterile or nonsterile samples if possible by other strategies‡

ISC = intermittent straight catheter.
* This table provides guidance for ISC use in the medical patient, excluding both appropriate and inappropriate uses in the perioperative setting.
† It is unclear whether ISC is an appropriate option for urinary management in distressed patients, such as those with dyspnea or those at the end of life, because of concerns that potential discomfort from an ISC could add to distress.
‡ Other urinary management strategies: barrier creams, absorbent pads, prompted toileting, external catheters.
§ Other urine collection strategies: urinal, bedside commode, bedpan, external catheter.

Table 4. Guide for External Catheter Use in Hospitalized Medical Patients*

Appropriate indications
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†‡
Moderate to severe incontinence-associated dermatitis‡ that cannot be kept clear of urine despite other urinary management strategies†
Urinary incontinence in patients for whom nurses find 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 procedure, such as after vascular catheterization; or excess weight (>300 lb) from severe edema or obesity*
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, of IV fluid management in respiratory or heart failure*
Single 24-h or random sterile¶ or nonsterile urine sample for diagnostic test that cannot be obtained by other urine collection strategies‖
Reduction in acute, severe pain with movement when other urine management strategies are difficult† *Example: acute unrepaired fracture*
Patient request for external catheter to manage urinary incontinence while hospitalized
Improvement in comfort when urine collection by catheter addresses patient and family goals in a dying patient
Inappropriate uses
Any use in an uncooperative patient expected to frequently manipulate catheters because of such behavior issues as delirium and dementia
Any type of urinary retention (acute or chronic, with or without bladder outlet obstruction)
Hourly measurement of urine volume required to provide treatment
Urinary incontinence in patients with intact skin when nurses can turn/provide skin care with available resources when the patient has not requested the external catheter
Routine use in ICU without an appropriate indication
External catheter placement to reduce risk for falls by minimizing the need to get up to urinate
Post-void residual urine volume assessment
24-h or random sample collection for sterile¶ or nonsterile specimens if possible by noncatheter collection strategies‖
Foley catheter placement for convenience of urinary management in patient during transport for tests and procedures
Patient or family request when there are no expected difficulties managing urine by commode, urinal, or bedpan in nondying patient
To prevent urinary tract infection in patient with fecal incontinence or diarrhea or to manage frequent, painful urination in patients with urinary tract infection

ICU = intensive care unit; IV = intravenous.
* At time of this publication, external catheters are primarily developed and used for male patients in the form of condom catheters. However, these indications would also apply to female patients after development of external catheters appropriate and adequate for such patients.
† Other urinary management strategies: barrier creams, absorbent pads, prompted toileting.
‡ It is unclear whether external catheters are appropriate for early/mild incontinence-associated dermatitis or incontinence with early-stage pressure ulcers (stage I or II ulcers or closed deep-tissue injury) because of the increased risk for infection even with external catheters and availability of noncatheter strategies to manage urinary incontinence.
§ Other volume assessment strategies: physical examination, daily weighing.
‖ Other urine collection strategies: urinal, bedside commode, bedpan.
¶ Sterile sample collection that involves external catheter is feasible and appropriate, but ability to perform depends on clinician experience.

Table 5. Summary for Most Common Uses of Foley Catheters, ISCs, and External Catheters

Is This Reason an Appropriate Clinical Indication for Catheter Use?	Foley Indwelling Urinary Catheter	ISC	External Condom Catheter	Noncatheter Options
1. Patient cannot urinate due to urinary retention				
Acute retention WITHOUT bladder outlet obstruction *Examples: medication-related (opioids, anticholinergics, paralytics)*	Yes	Yes, if bladder can be emptied by 4- to 6-h ISC	No, cannot address urinary retention	Bladder scanner, to avoid catheterizing when no or little urine seen in bladder
Acute retention WITH bladder outlet obstruction	Foley/ISC appropriateness vary by obstruction type *Consider urology consultation for prostatitis, urethral trauma.*		No, cannot address urinary retention	Bladder scanner, to avoid catheterizing when no or little urine seen in bladder
Chronic urinary retention WITHOUT bladder outlet obstruction	Uncertain*	Yes	No, cannot address urinary retention	Bladder scanner, to avoid catheterizing when no or little urine seen in bladder
Chronic urinary retention WITH bladder outlet obstruction	Yes	Yes	No, cannot address urinary retention	Bladder scanner, to avoid catheterizing when no or little urine seen in bladder
2. Patient cannot stop or control urination due to incontinence				
Incontinence (no skin issue), nurses can turn/provide skin care	No	No	No	Barrier creams, prompted toileting, garments can often manage incontinence-related skin issues
Incontinence (no skin issues), nurses can turn but patient requests catheter	No	No	Yes	Barrier creams, prompted toileting, garments can often manage incontinence-related skin issues
Incontinence (no skin issues), difficulty turning due to: *Excess weight (>300 lb) from obesity or edema*	Yes	No	Yes	Barrier creams, prompted toileting, garments can often manage incontinence-related skin issues
Turning causes hemodynamic or respiratory instability	Yes	No, because of concerns that ISC may add unnecessary distress to an unstable	Yes	Barrier creams, prompted toileting, garments can often manage incontinence-related skin issues
Strict temporary immobility after vascular procedure	Yes. All catheters appropriate if cannot manage urine otherwise.			Barrier creams, prompted toileting, garments can often manage incontinence-related skin issues
Incontinence with mild/early incontinence-associated dermatitis	No	No	Uncertain*	Barrier creams, prompted toileting, garments can often manage incontinence-related skin issues
Incontinence with moderate/severe incontinence-associated dermatitis	No	No	Yes	Barrier creams, prompted toileting, garments can often manage incontinence-related skin issues
Incontinence with closed pressure ulcer: stage I, deep tissue injury	No	No	Uncertain*	Yes, if use of noncatheter options would not worsen ulcer
Incontinence with open pressure ulcer: stage II	No	Yes, if ISC is adequate to manage the incontinence	Uncertain*	Yes, if use of noncatheter options would not worsen ulcer
Incontinence with open pressure ulcer: stage III, stage IV, or unstageable	Yes	Yes, if ISC is adequate to manage the incontinence	Yes	Yes, if use of noncatheter options would not worsen ulcer

Continued on following page

Table 5–Continued

Is This Reason an Appropriate Clinical Indication for Catheter Use?	Foley Indwelling Urinary Catheter	ISC	External Condom Catheter	Noncatheter Options
3. Clinician requests catheter to measure urine volume†				
Hourly urine volume is required to provide treatment. *Example: manage hemodynamic instability, hourly titrate IVF, drips*	Yes	No	No	No
Daily (not hourly) urine volume required to guide treatment. *Examples: acute renal failure work-up, IVF or oral/IV bolus diuretics, fluid management in respiratory failure*	Yes, if cannot be collected/assessed without catheter	Uncertain*‖	Yes, if cannot assess without catheter	Exam/daily weight, urinal, bedpan, etc.
Post-void residual urine volume	No	Yes, if no bladder scanner	No	Bladder scanner
4. Urine specimen collection is needed to perform a diagnostic test‡				
Sterile sample for urine culture	No	Yes	Uncertain*¶	No
Nonsterile random urine sample	No	Yes	Yes	No
24-hour urine sample	Yes	Uncertain§‖	Yes	No
5. Urine catheter is requested to provide comfort and/or convenience				
Improve comfort (address patient/family goals) in dying patient	Yes	Uncertain§	Yes	Yes, for all options
Family or patient request in nondying patient with no incontinence or difficulties using commode, urinal, or bedpan	No	No	No	Yes, for all options
Chronic ISC patient requests a "break" from ISC while admitted	Uncertain§	Yes	No	Bladder scanner to reduce frequency of ISC by avoiding if no or little urine in bladder

ISC = intermittent straight catheter; IV = intravenous; IVF = intravenous fluid.
* Uncertain due to disagreement between panelist ratings.
§ Uncertain due to panelist ratings having median score of 4–6.
† It is inappropriate to use a urinary catheter simply because the patient is being cared for in an intensive care unit; an appropriate medical indication is required.
‡ When cannot be collected by noncatheter means.
‖ ISC can be appropriate for daily/24-h urine volume collections if all the urine can be obtained using ISC, such as patient using for urinary retention or obstruction.
¶ External catheters can be used to collect sterile samples if the staff has been trained for applying external catheters for this purpose.

ters with the desire to address how incontinence and catheters affect patient dignity. The use of urinary catheters to manage urinary incontinence when nurses had difficulty turning a patient due to morbid obesity or severe edema prompted much discussion. Panelists agreed that ambulatory obese or edematous patients who did not require catheters before hospitalization should have noncatheter strategies prioritized. However, the panelists recognized that the functional status of patients can change when they are ill enough to be hospitalized, and they may not be able to assist with turning in bed or with noncatheter strategies.

Different options or thresholds were proposed to describe morbid obesity or edema severe enough to make turning too difficult; these options included body mass index and different weight thresholds. In the end, panelists agreed that 300 pounds was a reasonable weight threshold because this weight may increase the risk for injury to nurses trying to turn the patient. Such resources as mechanical lifts and lift teams were noted to be important resources in providing care to patients who are challenging to turn. These resources can, in turn, facilitate skin care and reduce pressure ulcer risks by position changes. However, panelists also recognized that because not all hospitals have these types of resources readily available, pragmatic challenges should be acknowledged in providing incontinence care for patients who are difficult to turn. Some panelists expressed concern that encouraging catheter use to manage incontinent obese patients could be harmful because patients with catheters may not have their positions changed, which could place them at risk for pressure ulcers. Other panelists, however, felt that inadequate management of incontinence in patients who are difficult to turn can also be harmful as a risk factor for skin breakdown.

In conclusion, use of a Foley or external catheter was assessed as appropriate to manage incontinence in a patient difficult for nurses to turn with their available resources because of morbid obesity or severe edema.

More discussion than was anticipated occurred for use of catheters to address incontinence-associated dermatitis, defined as "irritation and inflammation of the skin from prolonged exposure to urine or stool; skin erosion is common in this condition; this condition

is different than a pressure ulcer because it not related to pressure, but can increase a patient's risk for developing pressure ulcers" (27). Definitions of mild, moderate, and severe dermatitis were provided verbally and in the rating document. Panel discussion was led by nurses explaining that noncatheter strategies can be effective for prevention and management of incontinence-associated dermatitis. For patients with incontinence-associated dermatitis, neither Foley catheters nor ISCs were assessed as appropriate to manage incontinence regardless of severity; panelists were uncertain by disagreement about external catheters for mild dermatitis but assessed external catheters as appropriate for moderate or severe dermatitis.

Pressure ulcer was defined as "a localized injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear" (27). Definitions for pressure ulcers by stage as defined by the National Pressure Ulcer Advisory Panel were provided in the rating document (113). Routine tools for assessing pressure ulcer risk were also discussed, with a copy of the Braden Scale provided as an example (112). Panelists rated all catheter types as inappropriate (median scores, 1 to 2) for preventing pressure ulcer development in an incontinent patient for whom nurses had no difficulty turning to provide skin care, regardless of the patient's assessed risk for pressure ulcers by a risk-assessment tool, such as the Braden Scale. Catheter appropriateness for incontinent patients with pressure ulcers varied by ulcer stage, as detailed in Tables 2 and 4.

Measuring Urine Volume

The HICPAC guideline states that an appropriate use of an indwelling catheter is "for accurate measurements of urinary output in critically ill patients." Our panel assessed multiple scenarios to clarify when urine output volume measurement by a urinary catheter is appropriate to deliver care to ICU and non-ICU patients. As summarized in Tables 2 to 4, when *hourly* urine volumes are required to provide treatment, the Foley catheter is appropriate because it is the only method that can provide hourly measurements. Of note, even among our panel of experienced clinicians, not all recognized that external catheters cannot be used to assess hourly urine production because this type of catheter simply collects urine that is spontaneously voided by the bladder. The panel discussed the following examples of scenarios requiring hourly urine output: 1) management of hemodynamic instability requiring hourly titrations of medications, such as vasopressors, inotropes, diuretics, and intravenous fluid boluses; 2) acute respiratory failure requiring invasive ventilation with hourly titrations of medical and respiratory therapies; and 3) hourly measurement for urine studies or urine volumes to manage life-threatening laboratory abnormalities (for example, critical hyperglycemia or abnormal levels of electrolytes, such as calcium, potassium, and sodium).

When the panel discussed use of catheters for repeated *daily* urine volumes, it recommended that urinary catheters should be considered only if the daily urine volume (or patient's overall volume status) could not be assessed adequately by noncatheter methods, such as daily weighing; physical examination; and urine collection by urinal, bedpan, hat, or commode. Panelists also discussed examples of when it is clinically sufficient to know that the patient is making large amounts of urine (such as noted by incontinence with large amounts of urine) but the exact volume of urine is not needed. Yet if these noncatheter methods to collect or assess urine production do not address the need, both Foley and external catheters were assessed as appropriate; ISC appropriateness was uncertain by disagreement. Panelists expressed concerns that ISCs may be inadequate to assess an accurate daily urine volume in most patients in whom urine collection by other means is difficult.

Of note, panelists uniformly rated urinary catheters for urine volume monitoring simply because the patient is located in an ICU as inappropriate (median score, 1); even patients in an ICU require an appropriate medical indication given the risks associated with any urinary catheter use.

Urine Specimen Collection

The HICPAC guideline states that indwelling catheter use is inappropriate "as a means of obtaining urine for culture or other diagnostic tests when the patient can voluntarily void." Consistent with this guidance, as summarized in Tables 2 to 4, panelists rated catheters as inappropriate if urine could be obtained by other means. However, they also rated scenarios providing guidance as to which catheter types may be appropriate for specific urine sample types when urine collection is difficult, based on the type of urine specimen needed (random versus 24-hour sample, sterile versus nonsterile).

Urinary Catheter Use for Comfort

The HICPAC guideline states that indwelling catheter use is appropriate "to improve comfort for end of life care if needed." Panelists agreed with this indication, rating Foley and external catheters as appropriate when the catheter addressed the goals of the dying patient and the family. Panelists noted that catheters can both address incontinence and preserve precious time that would be needed for incontinence care. However, catheters may be uncomfortable, hazardous, and embarrassing for patients and thus are not always helpful or desired.

The panel addressed several scenarios of patient and family requests for urinary catheters. In brief, all catheters were assessed as inappropriate when requested for a patient with no incontinence and no difficulties using the commode, urinal, or bedpan; in fact,

the particular hazard of Foley catheters and external catheters as the "one-point restraint" (114), with increased potential harms related to falls and immobility, informed the panel's decision.

Panelists were uncertain by disagreement regarding the use of a Foley catheter instead of an ISC as a requested "break" from ISCs for patients with long-term ISC use at home during their hospitalization. Some panelists acknowledged that patients with long-term ISC may be unable to perform their usual ISC while admitted and may prefer to avoid insertion of an ISC by others. Other panelists noted that use of a Foley catheter in a patient managed by long-term ISC use can impair the patient's long-term bladder function, leading to difficulties transitioning back to an ISC after discharge, particularly if use of a Foley catheter is prolonged.

Panelists considered catheter use as a means to avoid pain-provoking movements and discussed that using a catheter to avoid movement is associated with immobility hazards. In brief, panelists rated Foley catheters (median score, 7) and external catheters (median score, 8) as appropriate for urine management to minimize acute severe pain associated with movement. Examples included a severe unrepaired fracture and a joint infection. All catheters were assessed as inappropriate (median score, 1 to 3) for avoiding movement to avert an exacerbation of chronic pain given the anticipated duration or frequency of catheter use that would be needed for this purpose.

Panelists rated all urinary catheters as inappropriate (median score, 1 to 2) for decreasing the need to get out of bed in order to prevent falls in patients at increased risk for falls. All catheter types were assessed as inappropriate to manage incontinence for combative patients. This assessment stems from the risk for catheter-related harm associated with an inability to safely place a catheter in an uncooperative patient and excessive manipulation or accidental removal of the catheter by the patient.

The panel also assessed the appropriateness of Foley catheters for patients for whom other catheters would be appropriate but are anticipated to be difficult to place. Panelists assessed Foley catheters as appropriate instead of ISC when an experienced nurse or physician has difficulty with ISC insertion during the hospitalization or when there is a documented history of difficult placement due to genitourinary tract anomalies. Panelists were uncertain regarding appropriateness of using a Foley catheter when the patient reported previous difficulty with ISCs. Panelists noted that a single painful ISC experience should not preclude use of an ISC in the future because it may be the most appropriate and safest method for the patient's urinary problem. Panelists did discuss the importance of recognizing the patient's anxiety and choosing experienced clinicians to attempt the ISC with all comfort precautions, such as lidocaine gel and a size and style of straight catheter appropriate for the patient's clinical situation.

DISCUSSION

Our 15-member multidisciplinary panel of experts applied the RAND/UCLA Appropriateness Method to generate refined appropriateness criteria for Foley catheters, as well as new criteria for appropriateness of ISC and external catheters for hospitalized adult medical patients. Tables 2 to 4 summarize the refined appropriate and inappropriate indications for Foley catheters, ISCs, and external condom catheters, respectively. We believe these tables will be useful as guides for clinical selection of urinary catheters. We believe that, similar to the widely used table of indwelling urinary catheter indications from the 2009 HICPAC CAUTI guideline, these tables will also be useful in adapting, implementing, and assessing interventions to reduce Foley catheter use. For example, many hospitals currently use the 2009 HICPAC example list of appropriate indications as pull-down options in electronic orders for urinary catheters; our refined list can be implemented in a similar way. Likewise, the 2009 HICPAC list of example appropriate indications for indwelling urinary catheters has been used in retrospective medical record reviews and practice surveys to assess and provide feedback on appropriateness of Foley catheter use; our refined indication list can be used in the same manner. Tables 3 and 4 are new resources to guide appropriate use of ISC and external catheters, similar to how the 2009 HICPAC guideline has been used for guiding Foley catheter use.

Compared with the HICPAC examples of catheter indications, panelists agreed that Foley catheters were appropriate for many scenarios that could be generically described by the HICPAC terminology. Yet panelists also often assessed ISC or external catheters as appropriate or requested more detailed clinical criteria, such as severity of illness and challenges with using noncatheter means to justify using a Foley catheter. We anticipate that these refined urinary catheter criteria will allow physicians and nurses to feel more comfortable implementing interventions to restrict catheter use because the criteria address practical challenges regarding catheter use and urinary management.

Panel discussions revealed unexpected but important key issues involving selection of different types of urinary catheters. Even experienced clinicians may not be aware that external catheters are inappropriate for urinary retention or measurement of hourly urine output and are associated with an increased risk for infection (although lower than that seen with a Foley catheter). The development of an external catheter for female patients is also critically needed to reduce use of Foley catheter use in these patients. Clinicians often worry about the discomfort ISC may cause some patients and expressed uncertainty about deciding when an ISC is adequate for managing urinary issues. Despite the first HICPAC indication of Foley catheters to manage "acute urinary retention or bladder outlet obstruction," our panel's urologist clarified that the appropriateness of Foley catheter, ISC, or suprapubic catheter for acute retention with bladder outlet obstruction var-

Figure 4. ICU daily checklist for appropriateness of Foley catheter.

Is the Foley catheter still appropriate for your ICU patient? If your patient does not have one of the following criteria, remove Foley catheter.

1. Urine volume measurement:

a. Is HOURLY urine volume measurement being used to inform and provide treatment?

Examples: Hemodynamic instability requiring hourly or multiple daily titrations per day of ongoing bolus fluid resuscitation, vasopressors, inotropes, or diuretics

Acute respiratory failure requiring invasive ventilation with hourly titrations of diuretics

Hourly measurement of urine studies or urine volumes to manage life-threatening laboratory abnormalities

b. Is DAILY urine volume measurement being used to provide treatment AND volume status CANNOT be adequately or reliably assessed without a Foley catheter, such as by daily weight or urine collection by urinal, commode, bedpan, or external catheter?

Examples: Management of acute renal failure, IV fluids, or IV or oral bolus diuretics

Fluid management in acute respiratory failure requiring large volumes of oxygen (≥5 L/min or >50%)

2. Does patient have a urologic problem that is being treated with a Foley catheter?

Examples: Urinary retention that cannot be adequately monitored or addressed by bladder scanner or ISC

Urinary retention anticipated because of treatment with paralytic medications

Recent urologic or gynecologic evaluation or procedure with Foley catheter not recommended to be removed yet, such as:

– Acute urinary retention with bladder outlet obstruction due to acute prostatitis or urethral edema

– Gross hematuria with blood clots in the urine

– Hematuria suspected to be prostatic or urethral bleeding being managed with Foley catheter

3. Urine sample collection for a laboratory test when CANNOT be collected by non catheter method

What type of sample is needed?	Use Foley Catheter?	Use ISC?	Use External Catheter?
Sterile sample for urine culture	No	Yes	Yes, if staff trained for sterile application
Nonsterile random urine sample	No	Yes	Yes
24-hour urine sample	Yes	If all urine can be collected by ISC	Yes, preferred option in cooperative males

4. Does the patient have urinary incontinence that cannot be addressed by noncatheter methods (barrier creams, incontinence garments and absorbent pads, prompted toileting, straight catheterization if overflow incontinence) because nurses cannot turn and provide skin care with specialty resources (such as lift teams and lift machines) or transition to external catheter (for cooperative males)?

Examples: Turning causes hemodynamic or respiratory instability

Strict temporary immobility postprocedure, such as from a vascular procedure if patient cannot manage urine otherwise

Incontinence with open pressure ulcers (stage III or IV) or "unstageable" ulcers

5. Foley catheter is providing comfort from severe distress related to urinary management that cannot be addressed by noncatheter options, ISC, or external catheter.

Examples: Difficulty voiding due to severe dyspnea with position changes required for managing urine without an indwelling catheter

Address patient and family goals in a dying patient

Acute, severe pain upon movement (e.g., unrepaired fracture) WITH demonstrated difficulties using noncatheter options or external catheter

ICU = intensive care unit; ISC = intermittent straight catheter; IV = intravenous.

ies by the reason for obstruction, such as prostatitis or urethral injury; other panelists agreed with this caution.

Given the persistently high rate of Foley catheter use in the ICU, along with the growing hazard of multidrug-resistant organisms in nosocomial urinary tract infections and increasing rates and morbidity of *Clostridium difficile* infection, we hope our results will encourage decreased placement and earlier removal of Foley catheters in the ICU. Perhaps the simplest but potentially most powerful panel assessment was that urinary catheters are inappropriate for monitoring urine solely because the patient is in an ICU; even ICU patients should have an appropriate medical reason to justify the risk for a urinary catheter.

We developed a daily checklist as a potential tool for reviewing Foley catheter appropriateness for ICU patients (Figure 4). This checklist focuses on Foley catheter use rather than all catheters because Foley catheters remain the most commonly used and pose the highest risk to ICU patients. Although this tool certainly cannot address all medical indications for Foley catheters (and is undergoing refinement by clinical testing), it focuses on the most common requests for Foley catheters, provides examples tailored to the ICU, and includes alternatives to consider, with the goal of decreasing the risk for infectious and noninfectious complications of Foley catheters.

Our study has several limitations. Nine of our 15 experts came from the University of Michigan, Ann Arbor Veterans Affairs Medical Center, or both; 3 other experts came from the Ann Arbor or Detroit area. Therefore the appropriateness ratings may better reflect institutional or regional views than national expertise. Although we sought a broader representation of experts across the United States, our selection of panelists was limited by availability for a 2-day meeting (which is easier to obtain for local panelists) and the need to replace 2 nonlocal panelists with local panelists because of last-minute emergencies limiting their availability. Our panel was diverse, but we could not include all specialists who use urinary catheters to manage medical patients. However, although the panel did not include nephrologists or bariatric specialists, it did include many clinicians who routinely evaluate and manage acute renal insufficiency and obese patients.

Our panel's recommendations regarding the use of catheters in morbid obesity also reflects the reality that not all hospitals in the United States have specialized resources for caring for morbidly obese patients, such as lift teams and mechanical lifts. Issues in the care of bariatric patients also included anatomical challenges with placement of all urinary catheter types for patients with severe adiposity; in such patients, clinicians cannot visualize the urethral meatus to safely place or secure catheters.

This project's findings are also limited to indications for urinary catheters most commonly considered on medicine services and not for perioperative indications because the literature review and clinical expertise required for perioperative indications were expected to be different.

Despite these limitations, we believe the Ann Arbor Criteria for Appropriate Urinary Catheter Use in Hospitalized Medical Patients will inform both small- and large-scale interventions for avoiding placement and prompting removal of unnecessary urinary catheters. They may be particularly helpful for units, such as ICUs, that have not seen a meaningful reduction in urinary catheter use, possibly related to broad and varied interpretation of the 2009 HICPAC criteria. National surveillance measures of "appropriate" urinary catheter use are needed as a next step for comparing and motivating safer catheter use. The detailed criteria involve the identification of patients for whom catheter use is appropriate, taking into account patient-specific challenges, and can aid in developing a standardized device use ratio for comparing hospital performance. Although the criteria developed by this method are more complex and will be more challenging to implement and monitor, the complexity mirrors the hard decisions that clinicians are already making each day when deciding to place or remove Foley catheters.

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Appendix Table. Synthesis of Urinary Catheter Indications From the Literature

Reference: First Author: Title of Guideline, Other References If Cited for Catheter Indications	Indication for Indwelling Urinary Catheter Use	Type of Material Cited
Theme 1: Urinary retention and/or obstruction		
Adams et al (32); additional references: (17, 106)	Obstruction	Original research report
Apisarnthanarak et al (79); additional references: (57, 59, 62, 90–92)	Urinary retention due to obstructive uropathy or drugs Obstruction to the urinary tract distal to the bladder	Original research report
Bruminhent et al (33); additional references: (8, 17, 79)	Urinary tract obstruction Neurogenic bladder or urinary retention	Original research report
Dumigan et al (81); additional reference: (93)	Any patient with inability to void for relief of urinary obstruction when intermittent catheterization is difficult	Original research report
Elpern et al (98)	Urinary tract obstruction Urinary retention Neurogenic bladder dysfunction	Original research report
Fakih et al (34, 82); additional reference: (14)	Urinary tract obstruction Neurogenic bladder dysfunction Urinary retention	Original research report
Fakih (115); additional references: (14, 17)	In ED setting: Neurogenic bladder Urinary obstruction	Original research report
Fuchs et al (35)	Inability to void as documented by bladder scanning Long-term catheterization (>28 d) has already been initiated	Original research report
Gardam et al (94); additional reference: (116)	Obstruction of urinary tract distal to the bladder	Original research report
Geng et al (19); additional references: (8, 18, 60, 63–78)	Relief of acute or chronic retention Long-term indwelling catheterization may be needed for: 1) bladder outlet obstruction when unsuitable for surgical relief, 2) chronic retention (often as a result of neurologic injury or disease) where intermittent catheterization is not possible Bladder outlet obstruction, in patients who are unsuitable for surgical relief	Evidence-based guidelines
Gokula et al (59); additional references: (92, 93, 117)	Obstruction of the urinary tract distal to the bladder To permit urinary drainage in patients with neurogenic bladder dysfunction and urinary retention	Original research report
Gotelli et al (99)	Relief of urinary retention not managed with intermittent catheterization	Original research report
Gould et al: 2009 Healthcare Infection Control Practices Advisory Committee Guideline to Prevent Catheter-Associated Urinary Tract Infection (8); additional references: (14, 17, 40–58, 87, 118)	Acute urinary retention or bladder outlet obstruction	Evidence-based guidelines
Hooton et al: Diagnosis, Prevention, and Treatment of Catheter-Associated Urinary Tract Infection in Adults: 2009 International Clinical Practice Guidelines from the Infectious Diseases Society of America (14); additional references: (15, 61, 62)	Clinically significant urinary retention if medical therapy is not effective and surgical correction is not indicated	Evidence-based guidelines
Huang et al (57); additional reference: (62)	Urinary retention that could not be relieved by alternate measures	Original research report
Jain et al (62)	Managing urinary retention due to obstructive uropathy or drugs	Original research report
Knoll et al (36); additional reference: (61)	Urinary retention	Original research report
Lo et al: Strategies to Prevent Catheter-Associated Urinary Tract Infections in Acute Care Hospitals (17); additional references: (59, 60)	Acute urinary retention and urinary obstruction	Evidence-based guidelines
Loeb et al (84); additional references: (62, 91, 94)	Urinary tract obstruction Neurogenic bladder Urinary retention	Original research report
Reilly et al (86); additional references: (59, 60, 63)	Acute neurogenic bladder Inability to void	Original research report
Robinson et al (100); additional references: (59, 61, 62, 107, 119)	Provide relief of urinary tract obstruction not manageable by other means Permit drainage in patients with neurogenic bladder dysfunction and urinary retention that is not manageable by other means (with clean intermittent catheterization)	Original research report
Roser et al (37)	Acute urinary retention or obstruction	Original research report
Rothfeld and Stickley (38)	Inability to void spontaneously (usually because of obstruction)	Original research report
Saint et al (56); additional references: (62, 95)	Urinary retention	Original research report
Titsworth et al (39); additional reference: (120)	Neurogenic bladder or retention only if I&O catheterization fails	Original research report

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Appendix Table–Continued

Reference: First Author: Title of Guideline, Other References If Cited for Catheter Indications	Indication for Indwelling Urinary Catheter Use	Type of Material Cited
Topal et al (88); additional references: (14, 96)	Bladder outlet obstruction Acute urinary retention	Original research report
Voss (104); additional references: (49, 108)	Chronic history of prolonged catheterization or suprapubic catheter	Original research report
Weitzel (89)	To relieve urinary tract obstruction, neurogenic bladder, hydronephrosis, urinary retention that cannot be drained by other means such as ISC	Original research report
Wong: Guideline for prevention of catheter-associated urinary tract infections (14)	To relieve urinary tract obstruction To permit urinary drainage in patients with neurogenic bladder dysfunction and urinary retention	Evidence-based guideline
Theme 2: Accurate measurement of urinary output		
Adams et al (32); additional references: (17, 106)	Input and output measurement	Original research report
Apisarnthanarak et al (79); additional references: (57, 59, 62, 90–92)	Fluid challenge in patient with acute renal insufficiency Close monitoring of urine output as indicated for incontinent patients, uncooperative patients (e.g., because of intoxication), or critically ill patients. Critical illness was defined as hypoxemia, hypotension, or congestive heart failure, need for inotropic support, repeated administration of diuretics, suggesting need to closely monitor urine output on an hourly basis	Original research report
Bruminhent et al (33); additional references: (8, 17, 79)	Urinary output measurement in critical patients	Original research report
Dumigan et al (81); additional reference: (93)	Any patient requiring monitoring of acute renal insufficiency or failure Patient requiring strict I&O and is unable to cooperate with bathroom, bedpan, or urinal use. Need for strict I&O should be assessed after 72 h, and documentation should include reason for strict I&O after 72 h Any neurosurgery patient being monitored for syndrome of inappropriate antidiuretic hormone secretion	Original research report
Elpern et al (98)	Frequent monitoring (every 1-2 h) of urinary output required Need to obtain accurate measurements of urinary output in critical illness	Original research report
Fakih et al (115); additional references: (14, 17)	In ED setting: Output monitoring in intensive care Non-intensive care with ≥6 L/min oxygen Intubated	Original research report
Fuchs et al (35)	Urinary incontinence and strict fluid input/output monitoring required Monitoring of urinary output because of hemodynamic instability	Original research report
Gardam et al (94); additional reference: (116)	Alteration in BP or volume status requiring continuous, accurate urine volume measurement Need to measure urine output accurately in uncooperative patient (e.g., intoxication)	Original research report
Geng et al (19); additional references: (8, 18, 60, 63–78)	Need for accurate measurements of urinary output in critically ill patients	Evidence-based guidelines
Gokula et al (59); additional references: (92, 93, 117)	Alteration in the blood pressure or volume status requiring continuous, accurate urine volume measurement A need to measure urine output accurately in an uncooperative patient (e.g., intoxication)	Original research report
Gotelli et al (99)	Aggressive treatment with diuretics or fluids Accurate monitoring of intake and output	Original research report
Gould et al: 2009 Healthcare Infection Control Practices Advisory Committee Guideline to Prevent Catheter-Associated Urinary Tract Infection (8); additional references: (14, 17, 40–58, 87, 118)	Need for accurate measurements of urinary output in critically ill patients	Evidence-based guidelines
Hooton et al: Diagnosis, Prevention, and Treatment of Catheter-Associated Urinary Tract Infection in Adults: 2009 International Clinical Practice Guidelines from the Infectious Diseases Society of America (15); additional references: (14, 61, 62)	Accurate urine output monitoring required, when frequent or urgent monitoring needed, such as with critically ill patients, when patient unable or unwilling to collect urine	Evidence-based guidelines
Huang et al (57); additional reference: (62)	Need for precise monitoring of urine output Fluid challenge in patient with acute renal insufficiency	Original research report

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Appendix Table–Continued

Reference: First Author: Title of Guideline, Other References If Cited for Catheter Indications	Indication for Indwelling Urinary Catheter Use	Type of Material Cited
Jain et al (62)	Close monitoring of urine output in the critically ill patient needing intensive monitoring. The presence of hypoxemia, hypotension, congestive heart failure, and the need for inotropic support or repeated administration of diuretics suggested the need for close monitoring or urine output on an hourly basis. Close monitoring of urine output in the patient no longer critically ill and in whom hourly urine record of urine output did not prompt any change in therapy only when a reasonable record of urine output could not be maintained due to urinary incontinence or lack of patient cooperation	Original research report
Knoll et al (36); additional reference: (61)	Fluid challenge in acute renal insufficiency Intake and output monitoring and patient critically ill or unwilling/unable to collect urine	Original research report
Lo et al: Strategies to Prevent Catheter-Associated Urinary Tract Infections in Acute Care Hospitals (17); additional references: (59, 60)	Urine output monitoring in critically ill	Evidence-based guidelines
Loeb et al (84); additional references: (62, 91, 94)	Fluid challenge in patient with acute renal failure	Original research report
Patrizzi et al (68)	Hemodynamic instability	Original research report
Reilly et al (86); additional references: (65, 60, 63)	24-h urine collection in an ICU Hourly intake and output monitoring in an ICU Hemodynamically unstable needing accurate I&O monitoring in an ICU Strict I&O monitoring required and patient incontinent in an ICU	Original research report
Robinson et al (100); additional references: (59, 60, 62, 107, 119)	Obtain accurate intake and output in critically ill patients	Original research report
Roser et al (37)	Critically ill patient requiring strict output monitoring (ICU)	Original research report
Rothfeld and Stickley (38)	Physician order for hourly urine output reporting	Original research report
Saint et al (56); additional references: (62, 95)	Very close monitoring of urine output and patient unable to use urinal or bedpan	Original research report
Titsworth et al (39); additional reference: (120)	Urine output monitoring in critically ill patients for a finite period	Original research report
Topal et al (88); additional references: (14, 96)	Urinary output monitoring if the patient was unable to collect urine	Original research report
Voss (110); additional references: (49, 108)	Aggressive treatment with diuretic medications or fluids	Original research report
Weitzel (89)	To measure accurate intake and output in critically ill patients	Original research report
Wenger (105)	The patient has received IV inotropic agents within the last 24 h There is an order for IV diuretics to be given every 6 or fewer hours The patient is undergoing ultrafiltration Acute or worsening renal failure is evident (that is, there has been a creatinine level increase of 1 mg/dL or more above the admission or baseline level)	Original research report
Wong: Guideline for prevention of catheter-associated urinary tract infections (14)	To obtain accurate measurements of urinary output in critically ill patients	Evidence-based guideline
Theme 3: Peri-procedural		
Adams (32); additional references: (17, 106)	Urologic surgery	Original research report
Apisarnthanarak et al (79); additional references: (57, 59, 62, 90–92)	Patient at risk of contaminating the site of a recent surgical procedure Preoperative insertion for patients going direction to the operation room	Original research report
Bruminhent et al (33); additional references: (8, 17, 79)	Urologic surgery or other surgery on contiguous structures	Original research report

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Appendix Table–Continued

Reference: First Author: Title of Guideline, Other References If Cited for Catheter Indications	Indication for Indwelling Urinary Catheter Use	Type of Material Cited
Dumigan et al (81); additional reference: (93)	Any patient undergoing a urologic procedure, until blood clears from urine Plastic surgery procedure for repair of pressure ulcer until flap is healed Any gynecologic procedure, usually for duration of surgery but no more than 24 h postoperative (72 h if vesicourethral suspension) Patient with prolonged cardiac procedure anticipated (e.g., complex angioplasty). Discontinue immediately postoperative. Any patient undergoing a prolonged (>2 h) surgical procedure (e.g., vascular, cardiac, or extensive bowel procedures). Orders for catheter discontinuation should be written when orders are written for the patient to be allowed out of bed. Any obstetrics patient with postpartum vulvar edema until resolution, or receiving magnesium sulfate for pre-eclampsia	Original research report
Elpern et al (98)	Patient to undergo prolonged (>2 h) procedure Epidural catheter in place Recently underwent surgical/invasive procedures Urologic surgeries	Original research report
Fakih et al (37, 82); additional reference: (14)	Need to undergo urologic procedures, or urologic surgery or surgery on contiguous structures	Original research report
Fakih et al (115); additional references: (14, 17)	In ED setting: Emergent pelvic ultrasound Acute hip fracture until surgical correction Patients undergoing emergency surgery Urologic procedures	Original research report
Fuchs et al (35)	Immobilization due to surgical procedure such as pelvic/hip fracture necessitating immobilization Pre- or postoperative order according to surgical protocols Long-term epidural catheter in place	Original research report
Gardam et al (94); additional reference (116)	Preoperative catheter insertion for patients going directly to the operating room	Original research report
Geng et al (19); additional references: (8, 18, 60, 63–78)	Perioperative use for selected surgical procedures Need for intraoperative monitoring or urinary output Urologic surgery or other surgery on contiguous structures of genitourinary tract Anticipated prolonged duration of surgery	Evidence-based guidelines
Gokula et al (59); additional references: (92, 93, 117)	Preoperative catheter insertion for patients going directly to the operating department	Original research report
Gotelli et al (99)	Catheter placed by urology for procedure/surgery	Original research report
Gould et al: 2009 Healthcare Infection Control Practices Advisory Committee Guideline to Prevent Catheter-Associated Urinary Tract Infection (8); additional references: (14, 17, 40–58, 87, 118)	Patients undergoing urologic surgery or other surgery on contiguous structures of genitourinary tract Anticipated prolonged duration of surgery (catheters inserted for this reason should be removed in the PACU) Patients anticipated to receive large-volume infusions or diuretics during surgery Need for intraoperative monitoring or urinary output	Evidence-based guidelines
Hooton et al: Diagnosis, Prevention, and Treatment of Catheter-Associated Urinary Tract Infection in Adults: 2009 International Clinical Practice Guidelines from the Infectious Diseases Society of America (15); additional references: (14, 61, 62)	During prolonged surgical procedure with general or spinal anesthesia Selected urologic and gynecologic procedures in the perioperative period	Evidence-based guidelines
Huang et al (57); additional reference: (62)	Recent abdominal or pelvic surgery	Original research report
Knoll et al (37); additional reference: (61)	Prolonged surgery with general or spinal anesthesia	Original research report
Lo et al: Strategies to Prevent Catheter-Associated Urinary Tract Infections in Acute Care Hospitals (17); additional references: (59, 60)	Perioperative use for selected surgical procedures	Evidence-based guidelines
Loeb et al (84) ; additional references: (62, 91, 94)	Urologic surgery	Original research report
Reilly et al (86); additional references: (59, 60, 63)	Gastric bypass surgery Renal surgery Crush injury Pelvic fracture Spine radiography not cleared Epidural catheter	Original research report

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Appendix Table–Continued

Reference: First Author: Title of Guideline, Other References If Cited for Catheter Indications	Indication for Indwelling Urinary Catheter Use	Type of Material Cited
Robinson et al (100); additional references: (59, 61, 62, 107, 119)	Within 48 h after surgery Aid in urologic surgery or other surgery on contiguous structures	Original research report
Roser et al (37)	Selected surgeries: genitourinary tract, abdomen	Original research report
Saint (56); additional references: (62, 95)	Perioperative use recent surgery	Original research report
Stéphan et al (87); additional references: (14, 92)	Perioperative use for patients in OR getting total knee replacement, if patient met at least 1 of following conditions: 1) age >80 y; 2) obesity; 3) urinary incontinence On the wards: catheter was removed on postoperative day 1 (2nd day of catheterization) after total knee replacement Perioperative use in PACU: catheter could be placed by the following criteria: 1) decision required clinical judgment by a physician; 2) no routine use of urination before discharge; 3) no routine determination of bladder volume by ultrasound and no decision for catheterization based on bladder volume measurement; 4) urinary catheter inserted because of long duration must be removed before discharge from unit Perioperative use for patients in OR getting total hip replacement or related surgery if patient meets at least one of following conditions: 1) age >75 y; 2) ASA class ≥3; 3) obesity; 4) urinary incontinence On the wards: catheter was removed on postoperative day 2 (3rd day of catheterization) after total hip replacement or related surgery Perioperative use for patients in OR with interventions with expected surgery duration >5 h Note: urinary catheter placed because of long-duration surgery must be removed before discharge from the unit	Original research report
Titsworth et al (39); additional reference: (120)	Perioperative use for selected surgical procedures >3 h	Original research report
Topal et al (88); additional references: (14, 96)	Postoperative requirements in specific urologic or gynecologic procedures or on contiguous structures of the genitourinary tract	Original research report
Weitzel (89)	To aid in urologic surgery or other surgery in contiguous structures For the first 48 h after surgery	Original research report
Wenger (105)	Surgery performed within last 24 h	Original research report
Wong: Guideline for prevention of catheter-associated urinary tract infections (14)	To aid in urologic surgery or other surgery on contiguous structures	Evidence-based guideline
Theme 4: Urology: for diagnosing or delivering treatment for urologic issues		
Adams et al (32); additional references: (17, 106)	Hematuria	Original research report
Bruminhent et al (33); additional references: (8, 17, 79)	Gross hematuria with clots	Original research report
Fuchs et al (35)	Bladder irrigation is required (e.g., for chemotherapy or blood clots)	Original research report
Gardam et al (94); additional reference: (116)	Continuous bladder irrigation for urinary tract hemorrhage	Original research report
Geng et al (19); additional references: (8, 18, 60, 63–78)	Allow bladder irrigation/lavage Instillation of medication directly in the bladder	Evidence-based guidelines
Gokula et al (59); additional references: (92, 93, 117)	Continuous bladder irrigation for urinary tract hemorrhage	Original research report
Gotelli et al (99)	History of being difficult to catheterize Hematuria within the prior 24 h	Original research report
Knoll et al (36); additional reference: (61)	Trauma, to allow for urethral or bladder healing	Original research report
Patrizzi et al (68)	Urinary requirement for indwelling catheter	Original research report
Robinson et al (100); additional references: (59, 67, 62, 107, 119)	Following prescription of urologist for special purpose or difficult insertion Bladder irrigation and/or instillation of medication	Original research report
Titsworth et al (39); additional reference: (120)	Management of acute urologic conditions when I&O catheterization is not prudent	Original research report
Topal et al (88); additional references: (14, 96)	Clinically significant hematuria	Original research report
Voss (104); additional references: (49, 108)	History of being difficult to catheterize Having a Foley catheter placed by urologist	Original research report

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Appendix Table–Continued

Reference: First Author: Title of Guideline, Other References If Cited for Catheter Indications	Indication for Indwelling Urinary Catheter Use	Type of Material Cited
Wenger (105)	A urologist is on the case; the catheter cannot be removed without the urologist's approval	Original research report
Weitzel (89)	For special purpose or difficult insertion To irrigate bladder or instill medication	Original research report
Theme 5: Perineal wounds including pressure ulcers and/or incontinence as indication		
Adams et al (32); additional references: (17, 106)	Decubitus ulcer	Original research report
Apisarnthanarak et al (79); additional references: (57, 59, 62, 90–92)	Manage incontinence that poses a risk to the patient (e.g., because of major skin breakdown such as sacral or perineal wounds or a nearby surgical site)	Original research report
Bruminhent et al (33); additional references: (8, 17, 79)	Stage III or IV sacral decubitus in incontinent patients	Original research report
Dumigan et al (79); additional reference: (93)	Perioperative use for plastic surgery procedure for repair of pressure ulcer until flap is healed	Original research report
Elpern et al (98)	Stage III or IV skin ulcers Surgical repair of decubitus ulcer	Original research report
Fakih et al (34, 82); additional reference: (14)	Incontinent patients with stage III or IV sacral pressure ulcers	Original research report
Fakih et al (115); additional references: (14, 17)	In ED setting: Stage III or IV sacral decubitus ulcers with incontinence	Original research report
Fuchs et al (35)	Incontinence with skin breakdown in the sacral/groin area	Original research report
Gardam et al (94); additional reference: (116)	Urinary incontinence posing a risk to the patient (e.g., major skin breakdown or protection of nearby operative site)	Original research report
Geng et al (19); additional references: (8, 18, 60, 63–78)	To assist in healing of open sacral or perineal wounds in incontinent patients Management of intractable incontinence Facilitate continence and maintain skin integrity (when conservative treatment methods have been unsuccessful) Long-term catheterization may be necessary in debilitated, paralysed, or comatose patients in presence of skin breakdown and infected pressure ulcers–only as a last resort when alternative noninvasive approaches are unsatisfactory or unsuccessful	Evidence-based guidelines
Gokula et al (59); additional references: (92, 93, 117)	Urinary incontinence posing a risk to the patient (e.g., major skin breakdown or protection of nearby operative site)	Original research report
Gotelli et al (99)	Management of urinary incontinence with stage III or greater pressure ulcerations	Original research report
Gould et al: 2009 Healthcare Infection Control Practices Advisory Committee Guideline to Prevent Catheter-Associated Urinary Tract Infection (8); additional references: (14, 17, 40–58, 87, 118)	To assist in healing of open sacral or perineal wounds in incontinent patients	Evidence-based guidelines
Huang et al (57); additional reference: (62)	Open wounds in the sacral or perineal areas Management of urinary incontinence	Original research report
Jain et al (62)	Management of urinary incontinence in patients with sacral or perineal decubitus ulcers Management of urinary incontinence at patient's request Management of urinary incontinence in terminally ill patients	Original research report
Knoll et al (36); additional reference: (61)	Incontinence AND either open sacral or perineal wound or patient request	Original research report
Lo et al: Strategies to Prevent Catheter-Associated Urinary Tract Infections in Acute Care Hospitals (17); additional references: (59, 60)	Assistance in pressure ulcer healing in incontinent residents	Evidence-based guidelines
Loeb et al (84); additional references: (62, 91, 94)	Open sacral wound care for incontinent patients	Original research report
Patrizzi et al (68)	Incontinence with skin breakdown	Original research report
Reilly et al (86); additional references: (59, 60, 63)	Skin breakdown in sacral area	Original research report
Robinson et al (100); additional references: (59, 61, 62, 107, 119)	Management of urinary incontinence in persons with stage III or IV pressure ulcer	Original research report
Roser et al (37)	Healing of sacral/perineal wound (stage III or IV)	Original research report
Rothfeld and Stickley (38)	Active UTI in patients with stage III or IV sacral decubitus ulcer Obvious inflammation of the perineum unlikely to respond to barrier precautions as determined by the wound care nurse	Original research report

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Appendix Table–Continued

Reference: First Author: Title of Guideline, Other References If Cited for Catheter Indications	Indication for Indwelling Urinary Catheter Use	Type of Material Cited
Saint et al (56); additional references: (62, 95)	To assist in healing of open sacral or perineal wounds in incontinent patients	Original research report
Titsworth et al (39); additional reference: (120)	Assistance in severe pressure ulcer healing (non healing stage III or IV	Original research report
Topal et al (88); additional references: (14, 96)	Urinary incontinence with open sacral or perineal wounds	Original research report
Voss (104); additional references: (49, 108)	Wound care management with incontinence	Original research report
Weitzel (89)	To manage incontinence in a patient with a stage III or IV pressure ulcer	Original research report
Wenger (105)	A pressure ulcer might be soiled if the catheter is removed and the patient is incontinent	Original research report
Theme 6: Immobility-related issues		
Adams et al (32); additional reference: (17, 106)	Immobility	Original research report
Fuchs et al (35)	Immobilization due to 1 or more of the following: Surgical procedure such as pelvic/hip fracture necessitating immobilization Sedation/paralysis/decreased level of consciousness	Original research report
Geng et al (19); additional references: (8, 18, 60, 63–78)	Patient requires prolonged immobilization (e.g., potentially unstable thoracic or lumbar spine, multiple traumatic injuries such as pelvic fractures)	Evidence-based guidelines
Gould et al: 2009 Healthcare Infection Control Practices Advisory Committee Guideline to Prevent Catheter-Associated Urinary Tract Infection (8); additional references: (14, 17, 40–58, 87, 118)	Patient requires prolonged immobilization (e.g., potentially unstable thoracic or lumbar spine, multiple traumatic injuries such as pelvic fractures)	Evidence-based guidelines
Jain et al (62)	Difficulty in voiding due to bed rest	Original research report
Patrizzi et al (68)	Uncleared spinal radiographs in female patients only	Original research report
Reilly et al (86); additional references: (59, 60, 63)	Spine x-rays not cleared, crush injury, pelvic fracture	Original research report
Roser et al (37)	Required activity restriction from trauma, surgery, or other physical condition (i.e., unstable spine, fracture, and hemodynamics)	Original research report
Theme 7: Comfort, end of life, patient request, sedated		
Adams et al (32); additional reference: (17, 106)	Nursing end-of-life care	Original research report
Apisarnthanarak et al (79); additional references: (57, 59, 62, 90–92)	Comfort care in terminally ill patient To manage difficulty voiding in patients for whom bed rest has been ordered	Original research report
Bruminhent et al (33); additional references: (8, 17, 79)	Hospice care	Original research report
Dumigan et al (81); additional reference: (93)	Any patient who is chemically paralyzed	Original research report
Elpern et al (98)	Deep sedation/paralysis Movement intolerance due to terminal illness or severe impairment	Original research report
Fakih et al (34, 82); additional reference: (14)	To improve comfort for end-of-life care if needed	Original research report
Fuchs et al (35)	Sedation/paralysis/decreased level of consciousness	Original research report
Geng et al (19); additional references: (8, 18, 60, 63–78)	Intractable urinary incontinence where catheterization enhances the patient's quality of life, only as a last resort when alternative noninvasive approaches are unsatisfactory or unsuccessful To improve comfort for end-of-life care if needed Cases where patient insists on this form of management after discussion of the risks	Evidence-based guidelines
Fakih et al (34, 82); additional reference: (14)	End-of-life care, hospice	Original research report
Gokula et al (59); additional references: (92, 93, 117)	Palliative care for terminally ill	Original research report
Gotelli et al (99)	Management of incontinence in those with conditions that would experience clinically significant pain with frequent movement Management of incontinence in the terminally ill	Original research report
Gould et al: 2009 Healthcare Infection Control Practices Advisory Committee Guideline to Prevent Catheter-Associated Urinary Tract Infection (8); additional references: (14, 17, 40–58, 87, 118)	To improve comfort for end-of-life care if needed	Evidence-based guidelines
Hooton et al: Diagnosis, Prevention, and Treatment of Catheter-Associated Urinary Tract Infection in Adults: 2009 International Clinical Practice Guidelines from the Infectious Diseases Society of America (15); additional references: (14, 61, 62)	For comfort in a terminally ill patients; if less invasive measures (e.g., behavioral and pharmacologic interventions or incontinence pads) fail and external collecting devices are not an acceptable alternative	Evidence-based guidelines
Huang et al (57); additional reference: (62)	Chemical paralysis Terminal comfort care	Original research report

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Appendix Table–Continued

Reference: First Author: Title of Guideline, Other References If Cited for Catheter Indications	Indication for Indwelling Urinary Catheter Use	Type of Material Cited
Jain et al (62)	Management of urinary incontinence at patient's request Management of urinary incontinence in terminally ill patients	Original research report
Knoll et al (36); additional reference: (61)	Palliative care for terminally ill	Original research report
Lo et al: Strategies to Prevent Catheter-Associated Urinary Tract Infections in Acute Care Hospitals (17); additional references: (59, 60)	As an exception, at patient request to improve comfort	Evidence-based guidelines
Knoll et al (36); additional reference: (61)	Incontinence AND patient request Comfort care for the terminally ill	Original research report
Loeb et al (84); additional references: (62, 91, 94)	Comfort care for urinary incontinence in terminal illness	Original research report
Patrizzi et al (68)	Deep sedation Intubated and deeply sedated	Original research report
Reilly et al (86); additional references: (59, 60, 63)	Any patient who is chemically paralyzed and sedated Neurological head injury	Original research report
Robinson et al (100); additional references: (59, 61, 62, 107, 119)	Comfort care in terminally ill patients	Original research report
Roser et al (37)	End-of-life care	Original research report
Saint et al (56); additional references: (62, 95)	Patient too ill or fatigued to use any other type of urinary collection strategy Management of urinary incontinence on patient request	Original research report
Titsworth et al (39); additional reference: (120)	Comfort during end of life	Original research report
Topal (88); additional references: (14, 96)	End-of-life care	Original research report
Voss (104); additional references: (49, 108)	End-of-life care	Original research report
Weitzel (89)	To provide comfort care in terminally ill patients	Original research report
Wenger (105)	The patient is receiving palliative or hospice care The patient is unresponsive or comatose The patient has received IV sedation within the last 12 h	Original research report
Theme 8: Miscellaneous: Decreased level of consciousness, chronic Foley use, etc.		
Fakih et al (115); additional references: (14, 17)	In ED setting: Short-term use for unresponsive or severely agitated patients Severe hypoxia requiring ≥ 6 L/min oxygen (or 40% O_2)	Original research report
Voss (104); additional references: (55, 108)	Chronic history of prolonged catheterization or suprapubic catheterization	Original research report
Wenger (105)	A physician has ordered that the catheter not be removed (the medical reason to continue or criteria for removal should be documented) A physician has documented "medical necessity" within the last 24 h	Original research report
Theme 9: Inappropriate indications for using indwelling catheters from the literature		
Apisarnthanarak et al (79); additional references: (57, 59, 62, 90–92)	No longer needed for monitoring of urine output: patient no longer critically ill or when hourly record of urine output did not prompt any change in therapy Unclear indication in patients for whom catheter serves no useful purposes Urinary incontinence without clinically significant skin breakdown Neurogenic bladder for which intermittent self-catheterization is possible Convenience of care For administration of amphotericin B bladder irrigation Staff are too busy to remove catheter Staff forgot to remove catheter	Original research report

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Appendix Table–Continued

Reference: First Author: Title of Guideline, Other References If Cited for Catheter Indications	Indication for Indwelling Urinary Catheter Use	Type of Material Cited
Dumigan et al (81); additional reference: (93)	Any incontinent patient if no other indications for catheter are present. Any patient with diarrhea if no other indications for catheter are present. The administration of a diuretic, as this does not necessarily require strict monitoring of I&O Catheters are inappropriate if used for any invasive cardiac procedure anticipated to be of average duration, such as elective or routine angioplasty or intracoronary stent procedure Any presence of a decubitus ulcer unless in immediate postprocedure period of a surgically repaired site. Diapers and routine care are adequate.	Original research report
Elpern et al (98)	Incontinence without any of the appropriate indications As a substitute for nursing care of the incontinent patient Incontinence without clinically significant loss of skin integrity ICU patients without sufficient justification; review and define daily purpose for catheter continuation Convenience of the personnel providing patient care Diuresis Frequent, but nonessential, determination of urinary output Nurse's concern about patient's discomfort Diarrhea, without any of the appropriate indications Patient's preference	Original research report
Fakih et al (34, 82); additional reference: (14)	Nonobstructive renal insufficiency Transferred from intensive care Patient request Confusion Incontinence Postoperative day 2 or later Morbid obesity Immobility Urine specimen collection when patient able to void No clear reasons	Original research report
Fakih et al (115); additional references: (14, 17)	In ED setting: No clear reason for urinary catheter Oxygen supplementation <6 L/min Dementia Urine specimen collection Incontinence Patient request Output monitoring outside intensive care	Original research report
Gardam et al (94); additional reference (116)	New onset or worsening renal failure (unless obstruction distal to the bladder) Pelvic or hip fractures (unless stable fracture or pain precludes use of diapers or bedpan) Mild congestive heart failure, cerebral vascular accidents or abdominal pain (unless other appropriate indications are present)	Original research report
Geng et al (19); additional references: (8, 18, 60, 63–78)	To insert a catheter only for the comfort of the nursing personnel is irresponsible Avoid use of urinary catheters in patients and nursing home residents for management of urinary incontinence Contraindicated use of catheters: acute prostatitis, suspicion of urethral trauma	Evidence-based guidelines
Gould et al: 2009 Healthcare Infection Control Practices Advisory Committee Guideline to Prevent Catheter-Associated Urinary Tract Infection (8); additional references: (14, 17, 40–58, 87, 118)	As a substitute for nursing care of patient or resident with incontinence As a means of obtaining urine for culture or other diagnostic tests when patient can voluntarily void For prolonged postoperative duration without appropriate indications (e.g., structural repair of urethra or contiguous structures, prolonged effect of epidural anesthesia, etc.)	Evidence-based guidelines
Hooton et al: Diagnosis, Prevention, and Treatment of Catheter-Associated Urinary Tract Infection in Adults: 2009 International Clinical Practice Guidelines from the Infectious Diseases Society of America (15); additional references: (14, 61, 62)	Indwelling catheters should not be used for urinary incontinence except in exceptional cases when all over approaches have not been effective and may be considered at patient request	Evidence-based guidelines

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Appendix Table–Continued

Reference: First Author: Title of Guideline, Other References If Cited for Catheter Indications	Indication for Indwelling Urinary Catheter Use	Type of Material Cited
Jain et al (62)	Close monitoring of urine output when patient was no longer critically ill and in whom the hourly record of urine output did not prompt any change in the therapy unless cannot obtain reasonable record of urine output due to incontinence or lack of patient cooperation Urinary incontinence without open sacral/perineal wound, terminal illness, or patient request Neurogenic bladder where intermittent self-catheterization is possible Nursing staff convenience is not an acceptable indication	Original research report
Patrizzi et al (68)	Convenience to avoid frequent transfers to a bedpan or a bedside commode Convenience to accurately measure a patient's urine output	Original research report
Robinson et al (100); additional references: (59, 61, 62, 107, 119)	Those who cannot communicate their need to void Those who are hemodynamically stable Those who are incontinent Those who have urinary retention that can be managed by other means	Original research report
Roser et al (37)	Chronic Foley use	Original research report
Topal et al (88); additional references: (14, 96)	Order to maintain chronic catheter	Original research report
Wong: Guideline for prevention of catheter-associated urinary tract infections (14)	Should not be used solely for the convenience of patient care personnel Discouraged as a means of obtaining urine for culture or certain diagnostic tests, such as urinary electrolytes, when the patient can voluntarily void	Evidence-based guideline
van den Broek (103); additional references: (59, 62, 91, 94)	Monitoring of urine production in patients who can micturate on request Incontinence of urine unless open perineal or sacral wounds are present or patients are immobile with enhanced risk of getting bed sores	Original research report
Weitzel (89)	Collecting output if patient capable of using bedpan, commode, or toilet Managing incontinence Efficiency (such as urinalysis collection in emergency department) Automatic use by diagnosis (such as always inserting Foley for worsening heart failure)	Original research report
Wenger (105)	Convenience of either nurses or patients	Original research report
Theme 10: Indications in the literature for use of other types of urinary catheters		
Apisarnthanarak et al (79); additional references: (57, 59, 62, 90–92)	ISCs as preferable to chronic indwelling urethral or suprapubic, in patients with bladder emptying dysfunction	Original research report

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Appendix Table–Continued

Reference: First Author: Title of Guideline, Other References If Cited for Catheter Indications	Indication for Indwelling Urinary Catheter Use	Type of Material Cited
Geng et al (19); additional references: (8, 18, 60, 63–78)	Use of a male external catheter in cooperative male patients without urinary retention or bladder outlet obstruction Intermittent catheterization is preferable in patients with bladder emptying dysfunction Suprapubic catheterization: Acute and chronic urine retention that is not able to be adequately drained with a urethral catheter Preferred by patient due to patient needs (e.g., wheelchair user, sexual issues) Acute prostatitis Obstruction, stricture, abnormal urethral anatomy Pelvic trauma Complications of long-term urethral catheterization When long-term catheterization is used to manage incontinence Complex urethral or abdominal surgery Fecally incontinent patients who are constantly soiling urethral catheter Contraindications suprapubic catheterization: Known or suspected carcinoma of the bladder Absolutely contraindicated in the absence of an easily palpable or ultrasonographically localized distended urinary bladder Previous lower abdominal surgery Coagulopathy (until the abnormality is corrected) Ascites Prosthetic devices in lower abdomen (e.g., hernia mesh)	Evidence-based guidelines
Gould et al: 2009 Healthcare Infection Control Practices Advisory Committee Guideline to Prevent Catheter-Associated Urinary Tract Infection (8); additional references: (14, 17, 40–58, 87, 118)	Consider using external catheters as an alternative to indwelling urethral catheters in cooperative male patients without urinary retention or bladder outlet obstruction Consider alternatives to chronic indwelling catheters, such as intermittent catheterization, in spinal cord injury patients ISCs are preferable to indwelling urethral or suprapubic catheters in patients with bladder emptying dysfunction Consider ISCs in children with myelomeningocele and neurogenic bladder, to reduce risk of urinary tract deterioration	Evidence-based guidelines
Hooton et al: Diagnosis, Prevention, and Treatment of Catheter-Associated Urinary Tract Infection in Adults: 2009 International Clinical Practice Guidelines from the Infectious Diseases Society of America (15); additional references: (14, 61, 62)	External catheters in cooperative male patients without urinary retention or bladder outlet obstruction ISCs as preferable to chronic indwelling, in spinal cord injury patients ISCs as preferable to chronic indwelling urethral or suprapubic, in patients with bladder emptying dysfunction Mentions challenges of ISC in patients with upper extremity weakness in cervical spinal cord or other abnormality, obesity, spasticity, and discomfort in sensate patients, and unwillingness of patients to perform frequent ISC due to comorbid conditions or urethral anatomy	Evidence-based guidelines
Titsworth et al (39); additional reference: (120)	Routine bladder scanning and I&O catheterization are preferred over indwelling catheters for treatment of failure to void due to lower UTI risk	Original research report
Topal et al (88); additional references: (14, 96)	Initiate straight catheterization if spontaneously voids in 2–4 h and PVR >250 mL Initiate straight catheterization if no void in 4-6 h and total bladder volume is >400 mL	Original research report
Wong: Guideline for prevention of catheter-associated urinary tract infections (14)	Condom catheter drainage may be useful for incontinent male patients without outlet obstruction and with an intact voiding reflex ISCs in patients with bladder emptying dysfunction, such as those with spinal cord injuries	Evidence-based guideline

ASA = American Society of Anesthesiologists; BP = blood pressure; ED = emergency department; I&O = in-and-out; ICU = intensive care unit; ISC = intermittent straight catheter; IV = intravenous; OR = operating room; PACU = postanesthesia care unit; PVR = post-void residual; UTI = urinary tract infection.

Continuing Medical Education/Maintenance of Certification Activity

In addition to CME credit, physicians enrolled in the American Board of Internal Medicine's (ABIM) Maintenance of Certification (MOC) program can earn 8 medical knowledge self-assessment points for successful completing the following module online. To earn 5 CME credits, please take this quiz at www.annals.org/article.aspx?doi=10.7326/M14-1304. To earn MOC points, you must take the MOC quiz at www.acponline.org/urinarycathetermoc; successful completion qualifies for 8 MOC points, and this information will be transferred to the ABIM.

These CME and MOC activities are free to ACP members and individual subscribers to *Annals of Internal Medicine*. Others who are interested in completing this MOC activity can learn more about ACP membership and individual subscriptions to *Annals of Internal Medicine* at www.acponline.org.

Question 1: In this project, a multidisciplinary panel of experts rated the appropriateness of indwelling Foley catheters for 105 clinical scenarios. Which of the following clinical indications were rated as appropriate uses for Foley catheters?

A: Post-void residual volume assessment
B: Collection of urinalysis sample to expedite work-up and treatment
C: Hourly measurement of urine volume is required to provide treatment
D: Foley placement to reduce risk for falls by minimizing the need to get up to urinate
E: Measurement of urine output in a patient after admission to the ICU

Question 2: In this project, a multidisciplinary panel of experts rated the appropriateness of external condom catheters for 97 clinical scenarios. Which of the following clinical indications were rated as appropriate uses for external catheters?

A: Manage urinary incontinence in a delirious, uncooperative elderly male
B: Single 24-hour or random urine sample for diagnostic test when cannot be obtained by other urine collection strategies
C: Chronic urinary retention without bladder outlet obstruction
D: External catheter placement to reduce risk for falls by minimizing the need to get up to urinate
E: Hourly measurement of urine volume is needed to provide treatment

Question 3: In this project, a multidisciplinary panel of experts rated the appropriateness of intermittent straight catheterization (ISC) for 97 clinical scenarios. Which of the following clinical indications were rated as appropriate uses for ISC?

A: Management of overflow urinary incontinence
B: Hourly measurement of urine volume is needed to provide treatment
C: Random urine sample collection for sterile or nonsterile samples if possible by other strategies
D: Acute urinary retention with bladder outlet obstruction due to acute bacterial prostatitis
E: Management of gross hematuria with blood clots in the urine

Question 4: Which of the following skin issues are appropriate uses for Foley catheters?

A: Management of incontinence-associated dermatitis
B: Stage II sacral pressure ulcer
C: Stage III, stage IV, or unstageable pressure ulcers or similarly severe wounds of other types that cannot be kept clear of urinary incontinence despite other urinary management strategies
D: Prevention of pressure ulcer in patients assessed to be at high risk for pressure ulcers by the Braden Scale.
E: Prevention of incontinence-associated dermatitis in an elderly patient immobilized due to weakness

Question 5: Which of the following catheters increase a patient's risk for urinary tract infection?

A: External condom catheter
B: Intermittent straight catheter
C: Suprapubic catheter
D: Foley catheter
E: All urinary catheters are associated with an increased risk for urinary tract infection

Question 6: Which of the following are infectious complications of Foley catheters?

A: Cystitis
B: Bacteremia
C: Septic arthritis
D: *Clostridium difficile* infection
E: All of the above are infectious complications that can occur due to urinary catheters

Question 7: What of the following conditions would be anticipated to cause acute urinary retention without bladder outlet obstruction?

A: Exacerbation of benign prostatic hypertrophy
B: IV infusion with paralytic medication, such as cisatracurium, for patient on a mechanical ventilator
C: Inability to urinate after a urologic procedure
D: Bladder stones
E: Acute prostatitis

Question 8: What of the following are noninfectious complications of Foley catheters?

A: Accidental removal
B: Hematuria
C: Urethral stricture
D: False passage
E: All of the above are noninfectious complications that can occur with Foley catheters

Question 9: What is the relationship between incontinence-associated dermatitis and pressure ulcers?

A: Incontinence-associated dermatitis is a type of pressure ulcer
B: Incontinence-associated dermatitis that is considered moderate or severe has eroded skin, and thus is considered an open pressure ulcer
C: Incontinence-associated dermatitis can increase a patient's risk for developing pressure ulcers
D: Incontinence-associated dermatitis in the sacrum is a "localized injury to the skin and/or tissue usually over a body prominence"
E: Because a Foley catheter can prevent incontinence-associated dermatitis, Foley catheters are effective and appropriate for prevention of pressure ulcers

Question 10: Which of the following statements are true regarding payment and/or public reporting for catheter-associated urinary tract infections (CAUTIs)?

A: U.S. hospitals receive a fine for each hospital-acquired CAUTI that occurs
B: Hospital rates of CAUTI that are reported on Medicare's Hospital Compare Web site are from diagnoses submitted by physicians for billing in administrative discharge data
C: Removal of payment for hospital-acquired CAUTI as a payable comorbidity in October 2008 resulted in large reductions in hospital payment
D: Nonpayment and public reporting of CAUTIs has successfully eliminated CAUTI as an important patient safety problem
E: Hospital rates of CAUTI from the National Healthcare Safety Network are reported on Medicare's Hospital Compare Web site

Question 11: Which of the following is an appropriate indication for using a Foley catheter for a patient located in the ICU?

A: Monitoring of urine output because the patient was transferred to the ICU
B: Monitoring of hourly urine output is required to guide the titration of vasopressor intravenous medication for a patient with sepsis
C: Prevention of hospital-acquired pressure ulcers because ICU patients are often at increased risk for pressure ulcers
D: All dying patients receiving "comfort care" need a Foley catheter
E: Convenience to manage urine during patient transport for tests

Question 12: Which of the following statements are true regarding catheter-associated complications?

A: Many noninfectious complications of short-term Foley catheterization are at least as common as clinically significant urinary tract infections
B: CAUTIs are common but are easily treated with antibiotics
C: Dysuria in a catheterized patient is a symptom of urinary tract infection
D: External urinary catheters are not associated with any noninfectious complications
E: Patients with urinary catheters should be screened regularly with urine tests to detect and prompt early treatment of CAUTI

Question 13: Which of the following is a strategy to reduce unnecessary placement of Foley catheters?

A: Nurse-empowered catheter removal protocols
B: Removing payment for placement of Foley catheters as a procedure
C: Restrict Foley catheter ordering by requiring physicians to identify the indication for placement from a list of appropriate indications
D: Require documentation of the reason for Foley placement
E: Placing catheter orders in admission order sets for patients admitted to the ICU

Question 14: A patient with a history of spinal cord injury 10 years ago is admitted to the hospital for treatment of osteomyelitis in the setting of a pressure ulcer. He performed self-catheterization at home and is unable to void without catheterization. Which of the following are appropriate strategies for urinary management while he is admitted?

A: Place an external catheter because he has a pressure ulcer
B: Place a Foley catheter because he has a pressure ulcer
C: Place a Foley catheter after first ISC attempt is noted to be difficult
D: Continue intermittent straight catheterization while admitted unless he develops a condition that requires hourly urine output measurements to guide treatment (such as hypotensive sepsis)
E: External catheter because it will allow for more complete monitoring of urine output, but has a lower risk for infection than a Foley catheter

Question 15: A patient with a history of urinary incontinence and dementia is admitted to the hospital for influenza and dehydration. At home, his wife manages his urinary incontinence using incontinence garments ("adult diapers") and absorbent bed pads. His skin is in good condition, and he is admitted to a non-ICU bed. Which of the following are appropriate strategies for urinary management while he is admitted?

A: Noncatheter strategies, such as barrier creams, incontinence garments, absorbent bed pads
B: Foley catheter to manage urinary incontinence while admitted
C: External catheter to manage urinary incontinence while admitted
D: Bladder scanner and ISC protocol
E: Foley catheter to manage urine while being transported for tests

Question 16: A patient is admitted for surgery on a chronic heel wound to the ICU because he has a tracheostomy and requires chronic mechanical ventilation that cannot be provided in a non-ICU unit in this hospital. He lives in a long-term acute care hospital, and his urine management plan includes adult diapers and careful attention to skin care. What is the most appropriate urinary management strategy for this patient during his ICU stay?

A: Foley catheter
B: External catheter
C: Incontinence garments ("adult diapers") with careful attention to skin care
D: Intermittent straight catheterization
E: Suprapubic catheter

Question 17: A patient admitted to the ICU for the acute respiratory distress syndrome (ARDS) requires mechanical ventilation and paralytic medications. What is the most appropriate urinary management plan?

A: External catheter
B: Catheter-free strategies, such as incontinence garments
C: Foley catheter
D: Intermittent straight catheterization

Question 18: A man with a history of benign prostatic hyperplasia is admitted for surgical repair of broken tibia and is noted to have urinary retention. Which of the following is the most appropriate strategy to address the urinary retention?

A: Monitoring for retention with bladder scanner protocol and use of ISC or Foley catheter as needed to address retention
B: External catheter
C: Bedside urinal
D: Prompted toileting
E: Suprapubic catheter

Question 19: A female patient is admitted with end-stage cancer and urinary incontinence and is transitioned to a palliative care plan, including hospice care, during admission. Which urinary management strategy is most appropriate?

A: Foley catheter is appropriate because the patient's status has been changed to "comfort care"
B: External catheter
C: Intermittent straight catheterization
D: Foley catheter is appropriate when consistent with the patient's goal of care of minimizing position changes needed for urination and linen changes, which are uncomfortable for the patient
E: Foley catheter in order to provide hourly urine measurements

Question 20: A thin elderly man with dementia and dehydration is admitted to a non-ICU bed while awaiting placement in a nursing home. He has urinary incontinence, and his nurses are frustrated because he keeps pulling his IVs and is not the easiest person to turn for skin care because he is confused. Which urinary management strategy is most appropriate?

A: Foley catheter
B: External catheter
C: Intermittent straight catheter
D: Noncatheter strategies, such as prompted toileting and incontinence garments or pads

Question 21: A patient is going to be transported to radiology for a chest CT scan, and the nurse requests a Foley to prevent urinary incontinence while away from his room. Which of the following statements regarding urinary management strategies is NOT appropriate to address the concern for urinary incontinence while transporting for a radiology test?

A: Foley catheters are appropriate to improve convenience of the patient and/or transport staff when off the floor for radiology tests, even when the patient does not require a Foley catheter while in their patient room
B: Incontinence garment or pads
C: Prompted toileting using urinal, bedpan, or commode
D: External catheter

Question 22: Mrs. Smith is admitted for a work-up for syncope. She assessed to be at increased risk for falls based on unsteady gait and recent syncope. A Foley catheter is requested by her nursing team to reduce her risk for falls by minimizing the need for the patient to get out of bed to urinate. Which of the following statements correctly describe a potential risk and/or benefits of the Foley to the patient?

A: Foley catheter placement would be beneficial because patients with urinary catheters are less likely to fall than patients without urinary catheters
B: Foley catheters are important patient safety devices because they keep patients in bed that should stay in bed
C: Foley catheters can increase the patient's risk of falling (by tripping over the catheter), and other risks of immobility, such as venous thromboembolism and pressure ulcers, because the catheter can serve as a "one-point restraint"
D: Foley catheter–associated UTIs are not serious compared with the risk for a fall, so Foley catheter placement is appropriate
E: Males are at increased risk from mechanical injury related to placement of a urinary catheter, unlike females

Question 23: Mr. Williams is admitted for sepsis, and is being treated with large quantities of IV fluids, vasopressors, and antibiotics. He has not voided since admission and has no history of renal failure or anuria. Which of the following are appropriate urinary management strategies?

A: External catheter
B: Intermittent straight catheter
C: Noncatheter strategies, such as urinals, bedside commodes, and prompted toileting
D: Foley catheter

Question 24: Which of the following is NOT a possible complication from use of an external urinary catheter?

A: Urinary tract infection
B: Skin irritation
C: Urethral stricture
D: Allergic reaction
E: Skin necrosis, penile strangulation, and urethrocutaneous fistula