Urinary Incontinence in Women: Evaluation and Management

Jocelyn S. Hu, MD, Bayne-Jones Army Community Hospital, Fort Polk, Louisiana
Elyse Fiore Pierre, MD, Winn Army Community Hospital, Fort Stewart, Georgia

Urinary incontinence is a common problem among women worldwide, resulting in a substantial economic burden and decreased quality of life. The Women's Preventive Services Initiative is the only major organization that recommends annual screening for urinary incontinence in all women despite low to insufficient evidence regarding effectiveness and accuracy of methods. No other major organization endorses screening. Initial evaluation should include determining whether incontinence is transient or chronic; the subtype of incontinence; and identifying any red flag findings that warrant subspecialist referral such as significant pelvic organ prolapse or suspected fistula. Helpful tools during initial evaluation include incontinence screening questionnaires, a three-day voiding diary, the cough stress test, and measurement of postvoid residual. Urinalysis should be ordered for all patients. A step-wise approach to treatment is directed at the urinary incontinence subtype, starting with conservative management, escalating to physical devices and medications, and ultimately referring for surgical intervention. Pelvic floor strengthening and lifestyle modifications, including appropriate fluid intake, smoking cessation, and weight loss, are first-line recommendations for all urinary incontinence subtypes. No medications are approved by the U.S. Food and Drug Administration for treatment of stress incontinence. Pharmacologic therapy for urge incontinence includes antimuscarinic medications and mirabegron. Patients with refractory symptoms should be referred for more invasive management such as mechanical devices, injections of bulking agents, onabotulinumtoxinA injections, neuromodulation, sling procedures, or urethropexy. (*Am Fam Physician*. 2019;100(6):339-348. Copyright © 2019 American Academy of Family Physicians.)

Illustration by Scott Bodell

Urinary incontinence (UI), defined as any complaint of involuntary loss of urine,[1] is a common issue, with a prevalence of 51% among adult women in the United States.[2] Over half of affected women report that their UI symptoms are bothersome.[3] This results in a substantial economic burden, up to $65 billion annually.[4] Comorbidities include decreased quality of life (QOL) and productivity; increased anxiety and depression; increased urinary tract and skin infections; increased risk for falls and nonspine, nontraumatic fractures in older women; and increased caregiver burden.[5-9] A large meta-analysis of the relationship of UI to mortality found that UI is associated with a pooled, adjusted hazard ratio of 1.27 (95% CI, 1.13 to 1.42).[10] Another study found that UI was associated with a 24% increased risk of all-cause mortality among older institutionalized adults.[11]

CME **This clinical content** conforms to AAFP criteria for continuing medical education (CME). See CME Quiz on page 336.

Author disclosure: No relevant financial affiliations.

Patient information: A handout on this topic is available at https://familydoctor.org/condition/urinary-incontinence/.

Classification

UI can be transient or chronic. Transient UI arises suddenly, lasts less than six months, and can be reversed if the underlying cause is addressed.[12] Chronic UI is differentiated into stress, urge, mixed, overflow, or functional subtypes. Stress UI caused by urethral sphincter weakness or urethral hypermobility results in predictable loss of urine with activities that increase intra-abdominal pressure (e.g., exercising, sneezing, laughing). Stress UI affects 25% to 45% of women older than 30 years.[13]

Urge UI related to detrusor overactivity causes involuntary loss of urine associated with urgency as well as increased urinary frequency or nocturia. Patients typically lose urine on the way to the toilet. Prevalence ranges from 9% of women in their forties to 31% of women in their seventies.[13]

FIGURE 1

1. During the past three months, have you leaked urine (even a small amount)?

☐ Yes

☐ No (questionnaire completed)

2. During the past three months, when did you leak urine? *(choose all that apply)*

☐ A. When you were engaged in physical activity (e.g., coughing, sneezing, lifting, exercising)

☐ B. When you had the urge or feeling that you needed to empty your bladder but you could not get to the toilet fast enough

☐ C. Without physical activity and without a sense of urgency

3. During the past three months, when did you leak urine most often? *(choose only one)*

☐ A. When you were engaged in physical activity (e.g., coughing, sneezing, lifting, exercising)

☐ B. When you had the urge or feeling that you needed to empty your bladder but you could not get to the toilet fast enough

☐ C. Without physical activity and without a sense of urgency

☐ D. About equally as often with physical activity as with a sense of urgency

Definitions of the type of urinary incontinence are based on responses to question three.

Response to question three	*Type of incontinence*
A. Most often with physical activity	Stress only or stress predominant
B. Most often with the urge to empty the bladder	Urge only or urge predominant
C. Without physical activity or sense of urgency	Other cause only or other cause predominant
D. About equally as often with physical activity and sense of urgency	Mixed

The 3 Incontinence Questions.

Adapted with permission from Brown JS, Bradley CS, Subak LL, et al.; Diagnostic Aspects of Incontinence Study Research Group. The sensitivity and specificity of a simple test to distinguish between urge and stress urinary incontinence. Ann Intern Med. *2006;144(10):716, with additional information from reference 13.*

Mixed UI has components of stress and urge UI and has a prevalence of 20% to 30%. Overflow UI accounts for 5% of chronic UI because of detrusor underactivity or bladder outlet obstruction, which leads to urinary retention and subsequent leakage.[13] Patients may strain to pass urine or have a sensation of incomplete emptying. Functional UI occurs when there are barriers to toileting, such as cognitive impairment, physical frailty, or immobility. The number of patients affected by functional UI is unclear.[1,13]

Risk Factors

Well-established risk factors for UI include increasing age, parity, obesity, history of hysterectomy, and increasing medical comorbidity. Other risk factors include diuretic use, poor overall health, and high impact exercise.[14-16] Vaginal deliveries are associated with an increased risk of UI, but evidence is mixed regarding whether cesarean deliveries have a prolonged protective effect.[17,18]

Screening

The Women's Preventive Services Initiative recommends annually screening for women of all ages, including adolescents, for UI despite low-quality evidence for accuracy of screening methods and insufficient evidence regarding the effectiveness of screening in improving symptoms, QOL, and function.[19] No other major organization recommends screening for UI. The National Committee for Quality Assurance lists Management of Urinary Incontinence in Older Adults as a Healthcare Effectiveness Data and Information Set measure based on responses to the Medicare Health Outcomes Survey. The measure does not require universal screening; it is scored on the percentage of members who reported having urine leakage in the past six months and have discussed their symptoms and treatment options with a health care professional.[20] The 3 Incontinence Questions *(Figure 1*[13,21]*)*, the International Consultation on Incontinence Questionnaire Urinary Incontinence Short Form *(Figure 2*[22]*)*,[23,24] and the Revised Urinary Incontinence Scale (available at www.mdcalc.com/revised-urinary-incontinence-scale-ruis)[25] have good sensitivity, validity, and are easily completed in a primary care setting to screen for UI symptoms and the effect that UI has on QOL.

History

A thorough history can often distinguish between transient and chronic UI, as well as the subtype of chronic UI. The mnemonic TOILETED (thin, dry vaginal and urethral epithelium; obstruction [stool impaction/constipation]; infection; limited mobility; emotional [psychological disorders]; therapeutic medications; endocrine disorders;

SORT: KEY RECOMMENDATIONS FOR PRACTICE

Clinical recommendation	Evidence rating	Comments
A validated incontinence screening questionnaire should be used to help categorize the type of UI.[21]	C	Expert opinion and consensus guidelines
The cough stress test has excellent intertest reliability, sensitivity, and specificity and should be used to confirm stress UI.[24,28,29]	C	Expert opinion and consensus guidelines
Pharmacologic interventions should be selectively used as an adjunct to behavior therapies for urge UI.[38,48]	C	Expert opinion and consensus guidelines
Conservative management should be the first-line treatment for stress and urge UI.[32,42,45,47]	C	Expert opinion and consensus guidelines
Surgical therapy should be considered for patients with refractory UI.[39,45,48]	C	Expert opinion and consensus guidelines

UI = urinary incontinence.

A = consistent, good-quality patient-oriented evidence; **B** = inconsistent or limited-quality patient-oriented evidence; **C** = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to https://www.aafp.org/afpsort.

FIGURE 2

Initial number: _____ **CONFIDENTIAL** Today's date: _____

Many people leak urine some of the time. We are trying to determine how many people leak urine and how much it bothers them. Please answer these questions regarding how urine leakage has affected you, on average, during the past four weeks.

1. Date of birth: _____

2. Are you:

- ☐ Female
- ☐ Male

3. How often do you leak urine? *(choose one)*

0 ☐ Never
1 ☐ About once a week or less often
2 ☐ Two or three times a week
3 ☐ About once a day
4 ☐ Several times a day
5 ☐ All the time

4. How much urine do you think you usually leak (whether you wear protection or not)? *(choose one)*

0 ☐ None
2 ☐ A small amount
4 ☐ A moderate amount
6 ☐ A large amount

5. How much does urine leakage interfere with your overall daily life?

Circle a number from 0 to 10, with 0 indicating not at all and 10 indicating a great deal.

0 1 2 3 4 5 6 7 8 9 10

Not at all A great deal

International Consultation on Incontinence Questionnaire score (sum scores 3+4+5): _____*

6. When do you have urine leakage? *(choose all that apply)*

- ☐ Never – urine does not leak
- ☐ Leaks before you can get to the toilet
- ☐ Leaks when you cough or sneeze
- ☐ Leaks when you are asleep
- ☐ Leaks when you are physically active or exercising
- ☐ Leaks when you have finished urinating and are dressed
- ☐ Leaks for no obvious reason
- ☐ Leaks all the time

Thank you for answering these questions.

*—The International Consultation on Incontinence Questionnaire Short Form has a maximum score of 21; the higher the score, the more severe the urinary incontinence symptoms and/or effect of symptoms on quality of life.

International Consultation on Incontinence Questionnaire Urinary Incontinence Short Form.

Adapted with permission from Avery K, Donovan J, Peters TJ, et al. ICIQ: a brief and robust measure for evaluating the symptoms and impact of urinary incontinence. Neurourol Urodyn. *2004;23(4):326.*

TABLE 1

Medications and Substances That Affect Urinary Incontinence

Effect	Medication or substance
Decrease bladder contractility (retention and overflow UI)	Angiotensin-converting enzyme inhibitors (may also cause chronic cough)
	Antidepressants
	Antihistamines
	Antimuscarinics
	Antiparkinsonian agents
	Antipsychotics
	Beta-adrenergic agonists
	Calcium channel blockers
	Opioids
	Sedatives, hypnotics
	Skeletal muscle relaxants
Increase detrusor irritability or creatinine clearance (urge UI)	Alcohol
	Caffeine
	Diuretics
Increase urethral sphincter tone (retention and overflow UI)	Alpha-adrenergic agonists
	Amphetamines
	Tricyclic antidepressants
Decrease urethral sphincter tone (stress UI)	Alpha-adrenergic antagonists

UI = urinary incontinence.

Information from reference 13.

BEST PRACTICES IN UROLOGY

Recommendation from the Choosing Wisely Campaign

Recommendation	Sponsoring organization
Do not perform cystoscopy, urodynamics, or diagnostic renal and bladder ultrasonography in the initial workup of an uncomplicated overactive bladder patient.	American Urogynecologic Society

Source: For more information on the Choosing Wisely Campaign, see https://www.choosingwisely.org. For supporting citations and to search Choosing Wisely recommendations relevant to primary care, see https://www.aafp.org/afp/recommendations/search.htm.

delirium) is helpful to identify causes for transient UI.[12] *Table 1* lists medications that frequently cause or exacerbate UI.[13] Physicians should inquire about the nature and duration of urinary symptoms; gynecologic history; and comorbidities such as tobacco use, diabetes mellitus, or congestive heart failure. Physicians should also assess the patient's cognitive and functional status. A three-day voiding diary may be helpful in clarifying fluid intake, symptoms, and situations in which UI occurs.[26,27] A sample bladder voiding diary is available at www.niddk.nih.gov/-/media/Files/Urologic-Diseases/diary_508.pdf.

Physical Examination

Physical examination should be guided by the patient's history and may include pelvic and neurologic examinations with cognitive and functional assessments. The cough stress test should be included in the initial evaluation of women with stress UI symptoms.[24] It has excellent reliability, sensitivity, and specificity for identifying stress UI when compared with urodynamic testing.[28,29] The patient's bladder should have at least 200 to 300 mL of urine or be at symptomatic fullness. The patient is then asked to cough while the physician observes for urine leakage. Immediate leakage is consistent with stress UI. The test can be performed in the supine or standing position but is more sensitive in the standing position.[30] If the test is initially performed in the supine position with a negative result, it should be repeated in the standing position if possible.

The cotton swab test can be performed to evaluate for urethral hypermobility. After lubrication or application of intraurethral lidocaine jelly, the swab is inserted into the bladder through the urethra. The patient is asked to do the Valsalva maneuver. A change in cotton swab angle more than 30 degrees from resting position is considered positive, indicating urethral hypermobility.[24]

Measurement of postvoid residual is traditionally part of the initial evaluation but is not necessary in all patients with uncomplicated UI. If performed, ultrasonography should be used if available because it is as accurate and less invasive than catheterization. Postvoid residual can be measured as a precaution to exclude significant urinary retention; it should be measured in patients being considered for subspecialty referral or those receiving treatments that may cause or worsen voiding dysfunction.[31,32] Urodynamic testing is rarely needed in a primary care setting and should not routinely be performed in the initial workup for uncomplicated UI.[33-35]

Laboratory Tests and Imaging

Urinalysis should be ordered on all patients to evaluate for urinary tract infection and to exclude hematuria, proteinuria,

and glycosuria.[23,24,32,36] Renal function should be assessed if there is concern for obstruction. Routine imaging should not be performed in the initial assessment of uncomplicated UI other than the use of ultrasonography to assess postvoid residual.[32,36]

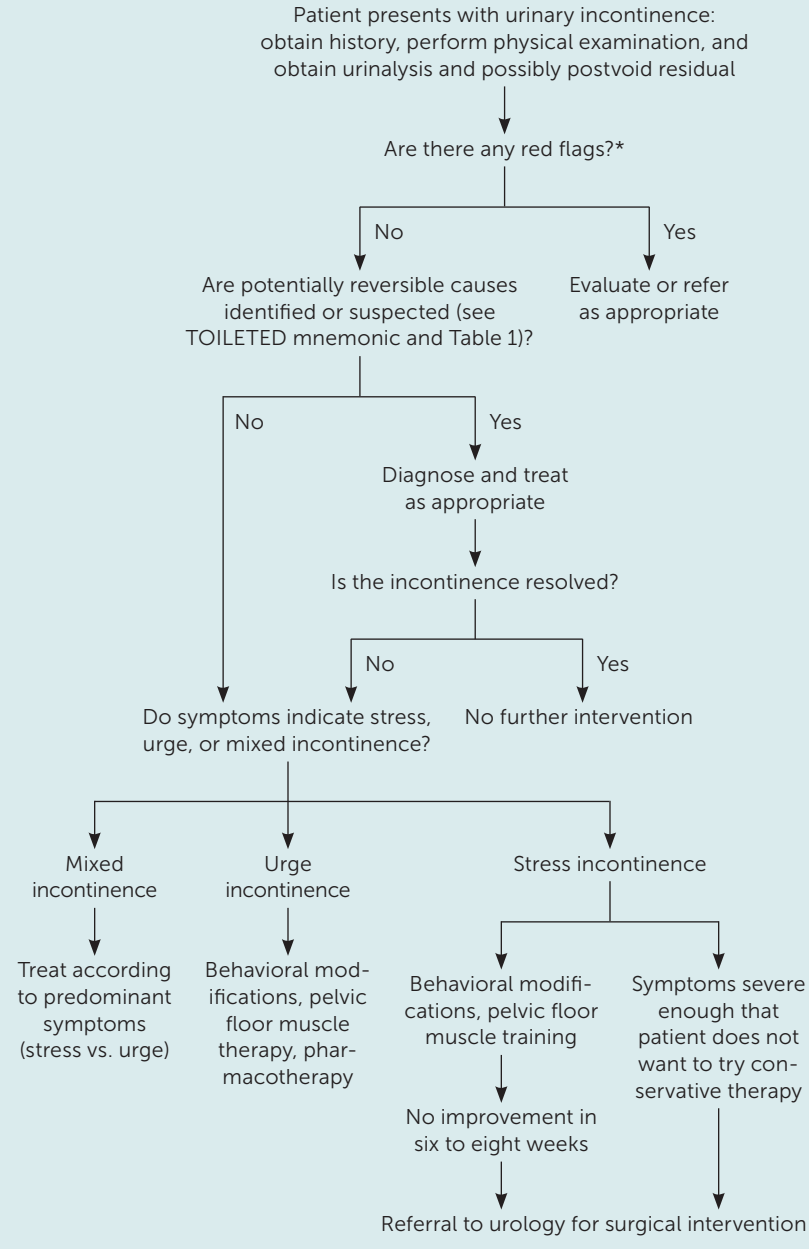
General Approach to Management

Intervention should be considered in patients with bothersome UI symptoms who desire treatment. The American Academy of Family Physicians endorses the evidence-based guidelines for management of UI published in 2014 by the American College of Physicians; the recommendations within this article are generally consistent with these guidelines.[37] A step-wise approach to treatment is directed at the UI subtype, starting with conservative management, escalating to physical devices and medications, and ultimately referring for surgical intervention *(Figure 3)*.[38] Initiating treatment with surgical intervention can be considered after appropriate counseling if the patient prefers a surgical approach or if medications are contraindicated.[32,37,39] *Table 2* summarizes treatment options for UI[40]; *Table 3* lists pharmacologic therapies. Concurrent behavior and pharmacologic therapy is more effective than pharmacologic therapy alone.[32,41]

CONSERVATIVE MANAGEMENT

Despite low-quality evidence to suggest that lifestyle interventions improve UI, these interventions are inexpensive with low risk of side effects. It is reasonable for physicians to counsel patients on appropriate fluid intake,[32,40,42,43] timed voiding,[32,44] reduction of caffeinated and carbonated beverages,[32,40,44,45] smoking cessation,[32,44] regular moderate physical activity,[32] and weight loss if patient is overweight or obese.[32,45] Overly aggressive fluid restriction should be

FIGURE 3



*—Red flags: conditions indicating need for further evaluation or referral for specialty care include associated pain, persistent hematuria or proteinuria, significant pelvic organ prolapse, previous pelvic surgery or radiation, suspected fistula, elevated postvoid residual.

Management of urinary incontinence.

Adapted with permission from Weiss BD. Selecting medications for the treatment of urinary incontinence. Am Fam Physician. *2005;71(2):316. Accessed July 16, 2019. https://www.aafp.org/afp/2005/0115/p315.html*

avoided because of potential adverse effects of headaches, constipation, and thirst.[43] Optimized management of medications and comorbidities, especially in geriatric patients, may reverse transient UI or improve chronic UI.[32] Pelvic floor muscle strengthening exercises, such as Kegel exercises, are the mainstay of behavior therapy for stress UI, with cure rates varying from 29% to 59% in systematic reviews[46-48]; when compared with no treatment, the number needed to treat for benefit is three patients (95% CI, 2 to 5).[48] A referral for clinically guided pelvic floor muscle training, including manual feedback, biofeedback, and weighted intravaginal cones, may be more effective if the patient has difficulty contracting her pelvic floor muscles voluntarily.[40,44] *Table 4* provides examples of interventions that may reduce UI symptoms.[40,42]

STRESS UI

Mechanical devices for stress UI management include vaginal inserts (cones, pessaries) and urethral plugs. These devices frequently require intravaginal estrogen before use and are most often discontinued because of poor fit[48]; however, they may be effective in patients with predictable, episodic symptoms (e.g., during exercise, pregnancy), in nonsurgical candidates, or in those awaiting surgery. Up to one-third of patients who use urethral plugs develop urinary tract infections in a two-year period, but patient satisfaction remains high with this device.[40]

No medications are approved by the U.S. Food and Drug Administration (FDA) for treatment of stress UI[40]; the American College of Physicians recommends against systemic pharmacotherapy.[37] Alpha-adrenergic agonists (e.g., pseudoephedrine, phenylephrine) have previously been prescribed as adjunct therapy because they act on receptors in the proximal urethra and bladder neck. Significant adverse effects include palpitations and headache.[47] Behavior therapy has significantly improved outcomes when compared with alpha agonists,[47] and alpha agonists are no longer recommended for stress UI.[24,39,40] Duloxetine (Cymbalta) has alpha-agonist properties with low strength of evidence regarding effectiveness or improved QOL.[40,47] No strong evidence supports the use of tricyclic antidepressants or hormone therapy.[47]

The injection of trans- or periurethral bulking agents can be considered for treatment of stress UI, although

TABLE 2

Treatment Options for Chronic Urinary Incontinence

Type	Conservative management	Pharmacologic	Surgical
Stress	Appropriate fluid intake Constipation management Electrical stimulation (home electrode-stimulation therapy of the vagina or anus) Mechanical devices (vaginal inserts, urethral plugs) Pelvic floor muscle strengthening (Kegel exercises, pelvic floor muscle training) Smoking cessation Weight loss	Alpha-adrenergic agonists* Duloxetine (Cymbalta)*	Intravesical balloons Periurethral injections of bulking agents Sling procedures Urethropexy
Urge	Appropriate fluid intake Bladder training Constipation management Electrical stimulation (percutaneous tibial nerve stimulation) Pelvic floor muscle strengthening (Kegel exercises, pelvic floor muscle training) Weight loss	Antimuscarinics Intravaginal estrogen* Mirabegron	Neuromodulation OnabotulinumtoxinA (Botox)
Mixed	Combination of above treatments with focus on dominant symptoms		
Overflow	Clean intermittent catheterization Indwelling urethral catheter Relief of obstruction	Alpha-adrenergic antagonists	Suprapubic catheter

*—Not approved by the U.S. Food and Drug Administration for treatment of urinary incontinence.

Adapted with permission from Hersh L, Salzman B. Clinical management of urinary incontinence in women [published correction appears in Am Fam Physician. *2013;88(7):427].* Am Fam Physician. *2013;87(9):634-640. Accessed July 16, 2019. https://www.aafp.org/afp/2013/0501/p634.html*

there is low-quality evidence to show improved outcomes compared with no treatment.[47] Adverse effects include urinary retention, urgency, dysuria, and infection; repeat injections are often needed.[40,47] Intravesical balloons are more effective than sham therapy and, by indirect comparison, more effective than behavior therapy combined with neuromodulation.[47] Home electrode-stimulation therapy of the vagina or anus is a Medicare-covered option for patients who cannot voluntarily contract their pelvic floor muscles.[40] Urologic surgery for stress UI includes sling procedures and urethropexy to support urethral constriction or to stabilize the bladder neck and urethra. There is no consensus on the best surgical approach; obesity, diabetes, age, and desire for future fertility are not absolute contraindications to surgery.[39,40]

URGE UI

Antimuscarinics and beta-adrenergic agonists are FDA-approved oral medications for urge UI. Antimuscarinics prevent recurrent spasm of the detrusor muscle, but side effects include tachycardia, edema, confusion, constipation, and blurry vision.[40] Selective antimuscarinic agents (darifenacin [Enablex], solifenacin [Vesicare]) are preferred over nonselective agents (oxybutynin, tolterodine [Detrol]) to reduce cognitive side effects.[40,47] Antimuscarinics are not recommended as first-line pharmacotherapy in older adults.[49] Mirabegron is a beta-adrenergic agonist that relaxes the detrusor muscle via beta-3 receptors.[47] Adverse effects include gastrointestinal upset, dizziness, headache, and increased blood pressure. Concurrent use with antimuscarinics increases the risk of urinary retention.[40] Intravaginal estrogen may improve urge UI symptoms but is not approved by the FDA for this indication; systemic estrogen exacerbates incontinence.[40,44,47]

Percutaneous tibial nerve stimulation requires weekly procedures for the initial three months and subsequent monthly maintenance treatments. It has similar effectiveness as antimuscarinic medications.[44,47] Intravesical onabotulinumtoxinA (Botox) injection delivered via cystoscopy is approved by the FDA and results in flaccid paralysis of the detrusor muscle; studies show consistent improvement in UI and QOL. The procedure can be repeated every six months as symptoms recur.[40,44,47] Sacral, pudendal, and paraurethral nerve stimulators can be surgically implanted; 60% to 90% of patients with sacral neuromodulators report improvement in symptoms. These devices are expensive and are indicated only for patients with refractory symptoms because of the risk of surgical complications.[40,44] A 2016 study showed that onabotulinumtoxinA was superior to neuromodulation devices for reduction of UI.[47]

TABLE 3

Medications for Treatment of Urinary Incontinence

Agent	Dosage	Cost*
Oral agents		
Antimuscarinic (selective)		
Darifenacin ER (Enablex): low dosage	7.5 mg daily	$90 to $145
Darifenacin ER: maximum dosage	15 mg daily	$90 to $110
Solifenacin (Vesicare): low dosage	5 mg daily	$135 to $145
Solifenacin: maximum dosage	10 mg daily	$135 to $145
Antimuscarinic (nonselective)		
Oxybutynin: low dosage	5 mg daily	$10 to $12
Oxybutynin: intermediate dosage	10 mg daily	$15 to $20
Oxybutynin: maximum dosage	30 mg daily	$30 to $45
Tolterodine (Detrol): low dosage	2 mg daily	$25 to $40
Tolterodine: maximum dosage	4 mg daily	$40 to $70
Beta-adrenergic		
Mirabegron†: low dosage	25 mg daily	$385 to $410
Mirabegron†: maximum dosage	50 mg daily	$385 to $410
Selective serotonin reuptake inhibitor		
Duloxetine (Cymbalta)‡	40 mg twice daily	$140 to $190
Intravesicular injection		
Neuromuscular blocker		
OnabotulinumtoxinA (Botox)†	100 units/1 mL every 6 months	$600 to $630
Transdermal agents		
Antimuscarinic (nonselective)		
Oxybutynin†	One patch twice weekly	$30
Estrogen derivative		
Vaginal estrogen (estradiol [Estrace], estrogen [Premarin])‡	0.5 to 2 g twice weekly	$95 to $350

*—Estimated retail price for one month's treatment based on information obtained at http://www.goodrx.com (accessed June 24, 2019). Actual cost will vary with insurance and by region.
†—Not available in generic form.
‡—Not approved by the U.S. Food and Drug Administration for treatment of urinary incontinence.

TABLE 4

Common Behavior Therapies for Urinary Incontinence

Intervention	Description	Indication	Guidance
Appropriate fluid intake	Reminder to avoid excessive fluid intake, especially late at night	Urge incontinence in patients without cognitive impairment	Recommend appropriate fluid intake (50 to 70 oz daily) in smaller increments (e.g., 10 to 12 five-oz glasses daily) Avoid fluids several hours before bedtime and overnight Ideal 24-hour voiding volume is 40 to 50 oz If 24-hour voiding volume is less than 40 oz (and no additional volume attributable to urine leakage), increase fluid intake
Bladder training	Retrain pelvic mechanisms and the central nervous system to inhibit urge sensation between voids	Urge incontinence in patients without cognitive impairment	Instruct the patient as follows: Remain stationary when urgency occurs Concentrate on decreasing the sense of urgency through rapid successive pelvic muscle contractions, mental distraction, and relaxation techniques After controlling the sense of urgency, walk slowly to the bathroom and void After mastering this, attempt to extend the time that urination can be postponed; aim to extend the interval by 30 to 60 minutes Continue this process until voiding occurs every three to four hours without incontinence
Habit training	Individualized toileting scheduled to preempt involuntary voiding	Urge incontinence in patients with cognitive impairment	Check for wetness at intervals to determine when the patient urinates Take the patient to the toilet or provide bedside commode or bedpan at intervals slightly shorter than the patient's normal voiding interval
Pelvic floor muscle exercises (Kegel exercises)	Muscle contraction and relaxation to reduce incontinence by producing urethral closure and decreasing central nervous system stimulation of detrusor muscle	Urge and/or stress incontinence in patients without cognitive impairment	Assist the patient in isolating pelvic floor muscles by instructing her to hold urine during urination and to feel pelvic muscle floor contraction (while avoiding buttock, abdomen, or thigh muscle contraction) Ask the patient to perform three sets of eight to 10 contractions (held for six to eight seconds) three to four times weekly; extend contraction time to 10 seconds, if possible Continue regimen for at least 15 to 20 weeks
Prompted voiding	Reminder to urinate on a regular schedule	Urge incontinence in patients with cognitive impairment	Remind the patient to use the toilet at regular intervals, ideally timed to the patient's normal voiding intervals
Scheduled voiding	Voiding on a regular schedule	Urge incontinence in patients with cognitive impairment	Take the patient to the toilet at regular intervals (e.g., every two to three hours)

Adapted with permission from Hersh L, Salzman B. Clinical management of urinary incontinence in women [published correction appears in Am Fam Physician. *2013;88(7):427].* Am Fam Physician. *2013;87(9):634-640. Accessed July 16, 2019. https://www.aafp.org/afp/2013/0501/p634.html, with additional information from reference 42.*

MIXED, OVERFLOW, AND FUNCTIONAL UI

Management of mixed UI should be directed toward treating predominant symptoms. Reversible causes of overflow UI should be identified (e.g., stopping medications that cause urinary retention; see *Table 1*[13]). Intermittent or indwelling catheterization is often required if the etiology is irreversible (e.g., neurologic dysfunction because of stroke).[40] Behavior therapies, such as assisted and timed toileting, are the primary treatment for functional incontinence.[40]

Indications for Referral

Subspecialist referral should be considered for complicated UI to include associated pain, persistent hematuria

or proteinuria, significant pelvic organ prolapse, previous pelvic surgery or radiation, suspected fistula, or elevated postvoid residual.[13,23]

Data Sources: An evidence summary generated from Essential Evidence Plus was reviewed and relevant studies referenced. A PubMed search was completed using the following key terms: prevalence of urinary incontinence, risk factors for urinary incontinence, screening for urinary incontinence, cough stress test for urinary incontinence, nonsurgical management of urinary incontinence, pharmacologic management of urinary incontinence. The searches included meta-analyses, randomized controlled trials, clinical trials, and reviews. Pertinent United States, European, and international society guidelines were also reviewed. Search dates: September 2018 through December 2018 and June 2019.

This article updates previous articles on this topic by Khandelwal and Kistler,[13] Weiss,[38] Hersh and Salzman,[40] and Culligan and Heit.[50]

The opinions or assertions contained herein are the private views of the authors and are not to be construed as official or as reflecting the views of the Department of Defense, the U.S. Army Medical Corps, or the U.S. Army at large.

The Authors

JOCELYN S. HU, MD, is a staff family medicine physician at Bayne-Jones Army Community Hospital, Fort Polk, La.

ELYSE FIORE PIERRE, MD, is a staff family medicine physician at Winn Army Community Hospital, Fort Stewart, Ga.

Address correspondence to Jocelyn S. Hu, MD, 1585 Third St., Fort Polk, LA 71459 (email: jocelyn.s.hu.mil@mail.mil). Reprints are not available from the authors.

References

1. Haylen BT, de Ridder D, Freeman RM, et al. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic floor dysfunction. *Neurourol Urodyn*. 2010;29(1):4-20.
2. Markland AD, Richter HE, Fwu CW, et al. Prevalence and trends of urinary incontinence in adults in the United States, 2001 to 2008. *J Urol*. 2011;186(2):589-593.
3. Kinchen KS, Lee J, Fireman B, et al. The prevalence, burden, and treatment of urinary incontinence among women in a managed care plan. *J Womens Health (Larchmt)*. 2007;16(3):415-422.
4. Ganz ML, Smalarz AM, Krupski TL, et al. Economic costs of overactive bladder in the United States. *Urology*. 2010;75(3):526-532.e18.
5. Kwak Y, Kwon H, Kim Y. Health-related quality of life and mental health in older women with urinary incontinence. *Aging Ment Health*. 2016;20(7):719-726.
6. Tang DH, Colayco DC, Khalaf KM, et al. Impact of urinary incontinence on healthcare resource utilization, health-related quality of life and productivity in patients with overactive bladder. *BJU Int*. 2014;113(3):484-491.
7. Brown JS, McGhan WF, Chokroverty S. Comorbidities associated with overactive bladder. *Am J Manag Care*. 2000;6(11 suppl):S574-S579.
8. Brown JS, Vittinghoff E, Wyman JF, et al. Urinary incontinence: does it increase risk for falls and fractures? Study of Osteoporotic Fractures Research Group. *J Am Geriatr Soc*. 2000;48(7):721-725.
9. Gotoh M, Matsukawa Y, Yoshikawa Y, et al. Impact of urinary incontinence on the psychological burden of family caregivers. *Neurourol Urodyn*. 2009;28(6):492-496.
10. John G, Bardini C, Combescure C, et al. Urinary incontinence as a predictor of death. *PLoS One*. 2016;11(7):e0158992.
11. Damián J, Pastor-Barriuso R, García López FJ, et al. Urinary incontinence and mortality among older adults residing in care homes. *J Adv Nurs*. 2017;73(3):688-699.
12. Dowling-Castronovo A, Specht JK. How to try this: assessment of transient urinary incontinence in older adults. *Am J Nurs*. 2009;109(2):62-71, quiz 72.
13. Khandelwal C, Kistler C. Diagnosis of urinary incontinence. *Am Fam Physician*. 2013;87(8):543-550. Accessed July 16, 2019. https://www.aafp.org/afp/2013/0415/p543.html
14. Alling Møller L, Lose G, Jørgensen T. Risk factors for lower urinary tract symptoms in women 40 to 60 years of age. *Obstet Gynecol*. 2000;96(3):446-451.
15. Brown JS, Seeley DG, Fong J, et al. Urinary incontinence in older women: who is at risk? Study of Osteoporotic Fractures Research Group. *Obstet Gynecol*. 1996;87(5 pt 1):715-721.
16. Teixeira RV, Colla C, Sbruzzi G, et al. Prevalence of urinary incontinence in female athletes: a systematic review with meta-analysis. *Int Urogynecol J*. 2018;29(12):1717-1725.
17. Gyhagen M, Bullarbo M, Nielsen TF, et al. The prevalence of urinary incontinence 20 years after childbirth: a national cohort study in singleton primiparae after vaginal or caesarean delivery. *BJOG*. 2013;120(2):144-151.
18. Lukacz ES, Lawrence JM, Contreras R, et al. Parity, mode of delivery, and pelvic floor disorders. *Obstet Gynecol*. 2006;107(6):1253-1260.
19. O'Reilly N, Nelson HD, Conry JM, et al. Screening for urinary incontinence in women: a recommendation from the Women's Preventive Services Initiative. *Ann Intern Med*. 2018;169(5):320-328.
20. National Committee for Quality Assurance. Management of urinary incontinence in older adults (MUI). Accessed July 16, 2018. https://www.ncqa.org/hedis/measures/management-of-urinary-incontinence-in-older-adults/
21. Brown JS, Bradley CS, Subak LL, et al.; Diagnostic Aspects of Incontinence Study Research Group. The sensitivity and specificity of a simple test to distinguish between urge and stress urinary incontinence. *Ann Intern Med*. 2006;144(10):715-723.
22. Avery K, Donovan J, Peters TJ, et al. ICIQ: a brief and robust measure for evaluating the symptoms and impact of urinary incontinence. *Neurourol Urodyn*. 2004;23(4):322-330.
23. Abrams P, Andersson KE, Birder L, et al.; Members of Committees. Fourth International Consultation on Incontinence Recommendations of the International Scientific Committee: evaluation and treatment of urinary incontinence, pelvic organ prolapse, and fecal incontinence. *Neurourol Urodyn*. 2010;29(1):213-240.
24. Committee on Practice Bulletins—Gynecology and the American Urogynecologic Society. ACOG Practice Bulletin No. 155: urinary incontinence in women. *Obstet Gynecol*. 2015;126(5):e66-e81.
25. Sansoni J, Hawthorne G, Marosszeky N, et al. *Validation and Clinical Translation of the Revised Continence and Patient Satisfaction Tools: Final Report*. Centre for Health Service Development, University of Wollongong; 2011.
26. Nygaard I, Holcomb R. Reproducibility of the seven-day voiding diary in women with stress urinary incontinence. *Int Urogynecol J Pelvic Floor Dysfunct*. 2000;11(1):15-17.
27. Yap TL, Cromwell DC, Emberton M. A systematic review of the reliability of frequency-volume charts in urological research and its implications for the optimum chart duration. *BJU Int*. 2007;99(1):9-16.
28. Swift SE, Yoon EA. Test-retest reliability of the cough stress test in the evaluation of urinary incontinence. *Obstet Gynecol*. 1999;94(1):99-102.

29. Videla FL, Wall LL. Stress incontinence diagnosed without multichannel urodynamic studies. *Obstet Gynecol*. 1998;91(6):965-968.
30. Patnam R, Edenfield AL, Swift SE. Standing vs supine; does it matter in cough stress testing? *Female Pelvic Med Reconstr Surg*. 2017;23(5): 315-317.
31. Winters JC, Dmochowski RR, Goldman HB, et al.; American Urological Association; Society of Urodynamics, Female Pelvic Medicine & Urogenital Reconstruction. Urodynamic studies in adults: AUA/SUFU guideline. *J Urol*. 2012;188(6 suppl):2464-2472.
32. Nambiar AK, Bosch R, Cruz F, et al. EAU guidelines on assessment and nonsurgical management of urinary incontinence. *Eur Urol*. 2018;73(4): 596-609.
33. Choosing Wisely: An Initiative of the ABIM Foundation. American Urogynecologic Society: five things physicians and patients should question; May 5, 2015. Accessed November 16, 2018. http://www.choosingwisely.org/societies/american-urogynecologic-society
34. Rosier PF, Gajewski JB, Sand PK, et al. Executive summary: The International Consultation on Incontinence 2008—Committee on: "Dynamic Testing"; for urinary incontinence and for fecal incontinence. Part 1: innovations in urodynamic techniques and urodynamic testing for signs and symptoms of urinary incontinence in female patients. *Neurourol Urodyn*. 2010;29(1):140-145.
35. Nager CW, Brubaker L, Litman HJ, et al.; Urinary Incontinence Treatment Network. A randomized trial of urodynamic testing before stress-incontinence surgery. *N Engl J Med*. 2012;366(21):1987-1997.
36. Ghoniem G, Stanford E, Kenton K, et al. Evaluation and outcome measures in the treatment of female urinary stress incontinence: International Urogynecological Association (IUGA) guidelines for research and clinical practice. *Int Urogynecol J Pelvic Floor Dysfunct*. 2008;19(1):5-33.
37. Qaseem A, Dallas P, Forciea MA, et al.; Clinical Guidelines Committee of the American College of Physicians. Nonsurgical management of urinary incontinence in women: a clinical practice guideline from the American College of Physicians [published correction appears in *Ann Intern Med*. 2014;161(10):764]. *Ann Intern Med*. 2014;161(6):429-440.
38. Weiss, BD. Selecting medications for the treatment of urinary incontinence. *Am Fam Physician*. 2005;71(2):315-322. Accessed July 16, 2019. https://www.aafp.org/afp/2005/0115/p315.html
39. Kobashi KC, Albo ME, Dmochowski RR, et al. Surgical treatment of female stress urinary incontinence: AUA/SUFU guideline. *J Urol*. 2017; 198(4):875-883.
40. Hersh L, Salzman B. Clinical management of urinary incontinence in women [published correction appears in *Am Fam Physician*. 2013;88(7): 427]. *Am Fam Physician*. 2013;87(9):634-640. Accessed July 16, 2019. https://www.aafp.org/afp/2013/0501/p634.html
41. Burgio KL, Kraus SR, Menefee S, et al.; Urinary Incontinence Treatment Network. Behavioral therapy to enable women with urge incontinence to discontinue drug treatment: a randomized trial. *Ann Intern Med*. 2008;149(3):161-169.
42. Zimmern P, Litman HJ, Mueller E, et al.; Urinary Incontinence Treatment Network. Effect of fluid management on fluid intake and urge incontinence in a trial for overactive bladder in women. *BJU Int*. 2010;105(12): 1680-1685.
43. Imamura M, Williams K, Wells M, et al. Lifestyle interventions for the treatment of urinary incontinence in adults. *Cochrane Database Syst Rev*. 2015;(12):CD003505.
44. Lukacz ES, Santiago-Lastra Y, Albo ME, et al. Urinary incontinence in women: a review. *JAMA*. 2017;318(16):1592-1604.
45. Dallosso HM, McGrother CW, Matthews RJ, et al.; Leicestershire MRC Incontinence Study Group. The association of diet and other lifestyle factors with overactive bladder and stress incontinence: a longitudinal study in women. *BJU Int*. 2003;92(1):69-77.
46. Riemsma R, Hagen S, Kirschner-Hermanns R, et al. Can incontinence be cured? A systematic review of cure rates. *BMC Med*. 2017;15(1):63.
47. Balk E, Adam GP, Kimmel H, et al. Nonsurgical treatments for urinary incontinence in women: a systematic review update. Report no. 18-EHC016-EF. Rockville, Md.: Agency for Healthcare Research and Quality; 2018.
48. Shamliyan T, Wyman J, Kane RL. Nonsurgical treatments for urinary incontinence in adult women: diagnosis and comparative effectiveness. Comparative effectiveness review no. 36. AHRQ publication no. 11(12)-EHC074-EF. Rockville, Md.: Agency for Healthcare Research and Quality; 2012.
49. American Geriatrics Society 2019 Beers Criteria Update Expert Panel. American Geriatrics Society 2019 updated AGS Beers Criteria for potentially inappropriate medication use in older adults. *J Am Geriatr Soc*. 2019;67:674-694.
50. Culligan PJ, Heit M. Urinary incontinence in women: evaluation and management. *Am Fam Physician*. 2000;62(11):2433-2444. Accessed July 16, 2019. https://www.aafp.org/afp/2000/1201/p2433.html