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ANNUAL DATA REPORT

Chapter 4: Urinary Incontinence

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Note

This chapter is the last of four chapters in the *2023 Urologic Diseases in America: Annual Data Report (ADR)*. It reports and discusses findings on urinary incontinence (UI). Other chapters in the 2023 ADR are Chapter 1: Introduction and Methods; Chapter 2: Benign Prostatic Hyperplasia and Associated Lower Urinary Tract Symptoms (BPH/LUTS) in Men; and Chapter 3: Urinary Stone Disease (USD). These chapters are available under separate links on the UDA website. Chapter 1 introduces the 2023 ADR and describes the methodology underlying this chapter. Additional details on the methodology and data sources are provided in Appendices A and B, respectively, that accompany Chapter 1.

Suggested citation

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4 Urinary Incontinence

Main Takeaways

- The claims-based prevalence of UI among persons aged 65 and older was estimated at 5.6-6.1% annually from 2012 to 2021, which suggests that healthcare providers and patients may underreport UI.
- UI frequently co-occurred with hypertension, obesity, diabetes, urinary tract infections, and for men, BPH and prostate cancer; with the rates of these comorbidities being higher than those observed in the overall study population.
- During 2012-2021, the percentage of patients with urgency UI filling antimuscarinic prescriptions decreased from 49% to 34%, while that for beta-3 adrenergic agonists increased from 0.2% to 17%. Antimuscarinics remain the most commonly prescribed medication for this condition.
- From 2012 to 2021, there was a decline in the percentage of patients aged 65 and above with stress UI who underwent sling procedures, from 4.2% to 2.0%.
- From 2012 to 2021, the utilization of BoNTA increased among patients aged 65 and above with urgency UI, rising from 0.5% to 2.5%.

4.1 Overview

Urinary incontinence (UI) is a common condition defined by the involuntary loss of urine during the bladder storage phase.[1] The International Continence Society expands on this definition as the "involuntarily loss of urine that is a social or hygienic problem and is objectively demonstrable."[2] This section presents an overview of the evaluation and management of UI. Section 4.2 shows results on prevalence, incidence, comorbidities, and diagnostic testing; prescription drugs filled and procedure use; and resource use, based on contemporary data on the two age cohorts (see Chapter 1 for details on databases and related methods). Section 4.3 discusses these results relative to the literature.

Depending on the etiology, UI can be acute or chronic. Acute and mostly temporary UI can be related to delirium, infection, pharmaceuticals, restricted mobility, and stool impaction. Chronic UI is usually classified as stress urinary incontinence (SUI), urgency urinary incontinence (UUI), mixed urinary incontinence (MUI), overflow, functional, or continuous (such as in the case of a vesical fistula) incontinence. Chronic UI is associated with pregnancy, childbirth, diabetes, pelvic organ prolapse, prostate surgery, and increased body mass index.[3]

As the severity of UI increases, quality of life tends to decline significantly. UI can trigger social isolation, embarrassment, and depression. Fortunately, treating UI can yield positive results such as improved depression symptoms and reduced social isolation.[4]

For the majority of patients, diagnosing UI involves only a medical history, physical examination, and urinalysis. If this initial workup is unremarkable, if conservative treatment is not working, or there is concern for neurological diseases, urodynamics may be performed to determine bladder function. Urodynamics is not specifically required prior to intervention for uncomplicated stress incontinence.

The treatment of urinary incontinence depends on the type of incontinence and may encompass behavioral modifications, physical therapy, medications, and surgical options. For example, for patients with UUI, a step-by-step approach is often recommended, beginning with avoiding bladder irritants, implementing bladder training and control techniques, and undergoing pelvic floor muscle therapy. If these measures are ineffective, antimuscarinic or beta 3 agonist medications can be tried, with regular monitoring of their effectiveness and potential side effects. If these medications do not work, neuromodulation options such as posterior tibial nerve stimulation or sacral neuromodulation may be considered. Alternatively, botulinum toxin A (BoNTA) injections may be used to calm an overactive bladder through chemodenervation. In extreme cases, chronic catheterization, urinary diversion, or bladder augmentation may be necessary, but these are considered last resorts.

For SUI, medications such as duloxetine and imipramine, which are not FDA-approved for incontinence, have been used. In women, surgical treatment of SUI should involve a physical evaluation of the pelvic floor to assess for conditions such as prolapse and urethral diverticulum. Common surgical options include mid-urethral slings, autologous fascial pubo-vaginal slings, Burch colposuspension, and bulking agents. Other procedures for pelvic floor prolapse may also be necessary. In men, mild or moderate post-prostatectomy incontinence is typically treated with a male pelvic sling, and with artificial urinary sphincter placement if UI is severe.

Procedures and pharmacological classes considered for UI analysis are shown in Table 4.1 below.

Table 4.1. Procedures and pharmacological classes considered for UI analysis

Procedures	Pharmacological Classes
• Artificial urinary sphincter • BoNTA injections • Injectable procedures • Neuromodulation • Reconstruction • Sling • Suspension	• Antimuscarinic • Antispasmodic • Beta-3 adrenergic agonist • BoNTA • Opioid / Antimuscarinic • Tricyclic antidepressant

4.2 Results

➔ Study population

Table 4.2 shows the total number of patients with any UI as well as the total population in each cohort in 2021.

Table 4.2. Total number of patients with any UI, 2021

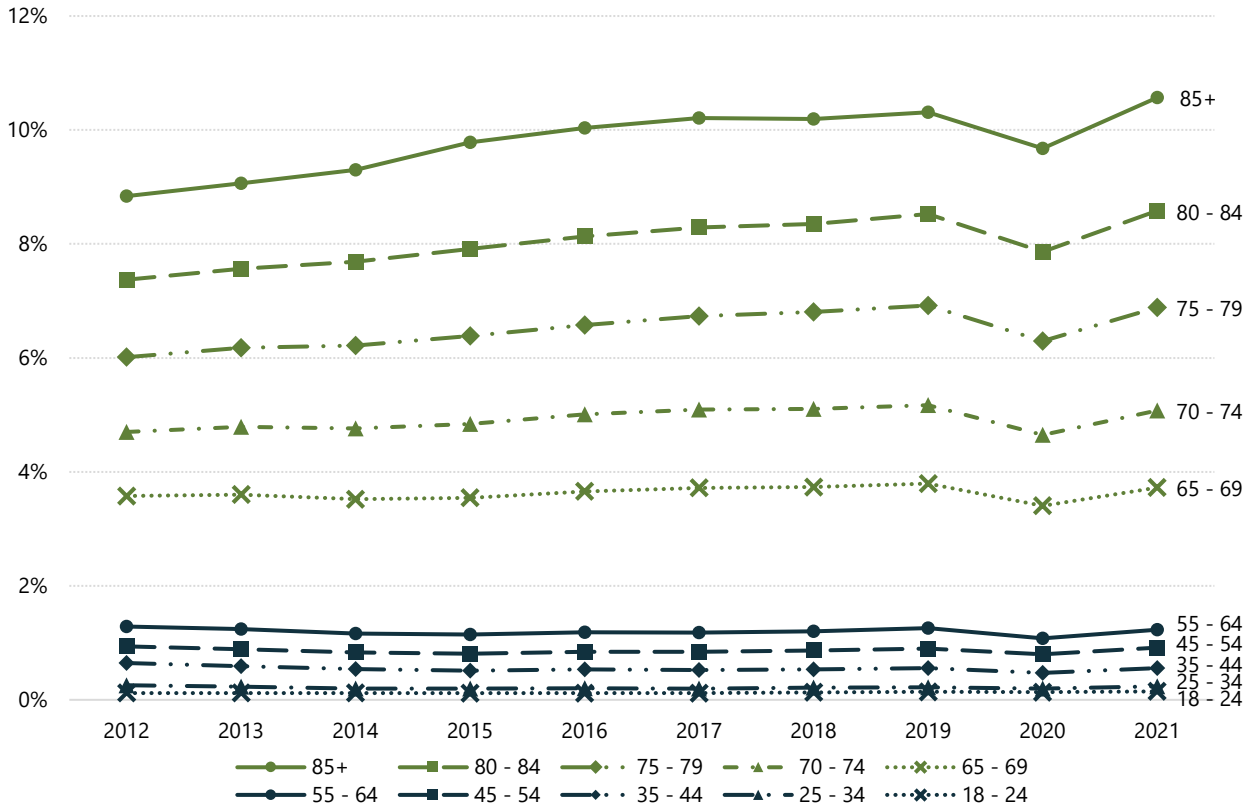
	Age 18-64		Age 65+	
	Male	Female	Male	Female
Total Population	2,865,943	2,776,873	10,779,115	13,694,802
Patients with Any UI	6,432	30,405	428,214	1,056,022

➔ Prevalence

The overall claims-based period prevalence of any UI ranged from 0.6% to 0.7% annually during 2012-2021 among persons aged 18-64 and from 5.6% to 6.1% annually among persons aged 65 and older. Prevalence of UI was substantially higher for women compared to men. For women, it ranged from 7.0% to 7.8% for those aged 65 and older and from 0.9% to 1.2% for those aged 18-64; for men, it ranged from 3.6% to 4.0% among those aged 65 and older and was 0.2% each year for those aged 18-64.

Prevalence of UI increased in persons aged 65 and older, from 5.6% in 2012 to 6.1% in 2019. Lower prevalence in 2020-2021 compared to 2019 was likely due to patients seeking less urologic care due to the COVID-19 pandemic. The prevalence of UI was associated with age (e.g., 3.7% for ages 65-69 and 10.6% for ages 85 and older in 2021) (Figure 4.1a). Between 2012 and 2021, we observed a higher prevalence rate of UI in patients aged 65 and older who were eligible for both Medicare and Medicaid compared to those who were not. Specifically, prevalence ranged from 8.3% to 9.4% in the former group, while it ranged from 5.1% to 5.7% in the latter group.

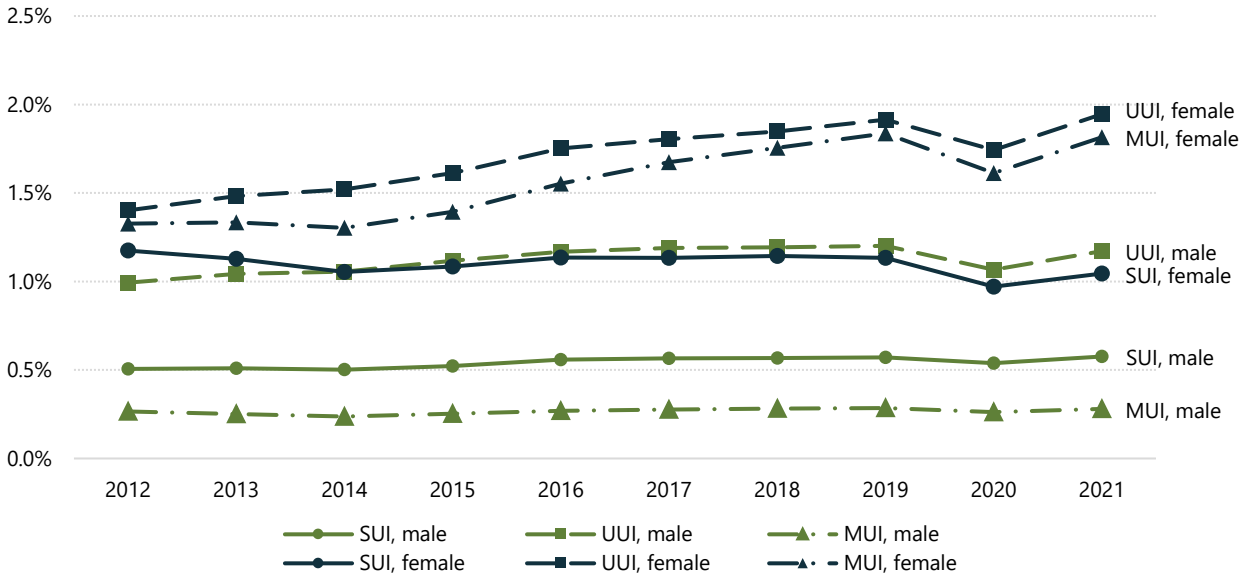
Figure 4.1a. Claims-based prevalence of any UI, by year and age (2012-2021)



Note: For ages 65 and older, denominator denotes number of restricted Medicare FFS beneficiaries in each age bracket. For ages 18-64, denominator denotes number of restricted privately insured CDM enrollees in each age bracket.

The annual prevalence of SUI ranged from 0.5% to 0.6% among men aged 65 and older and 1.0% to 1.2% among women aged 65 and older during 2012-2021 (Figure 4.1b). The prevalence of UUI ranged from 1.0% to 1.2% among men aged 65 and older and 1.4% to 1.9% among women aged 65 and older. The prevalence of MUI ranged from 0.2% to 0.3% among men aged 65 and older and 1.3% to 1.8% among women aged 65 and older. The prevalence of other UI ranged from 1.7% to 1.8% among men aged 65 and older and from 2.6% to 3.1% among women aged 65 and older. Overflow UI and UI due to fistula were less common, with prevalence less than 0.2% for the aged 65 and older cohort.

Figure 4.1b. Claims-based prevalence of UI by type and gender, patients aged 65+ (2012-2021)



Notes: Denominator denotes number of restricted Medicare FFS beneficiaries in each gender-UI type combination.

➔ Incidence

The annual incidence of any UI was 290 per 10,000 persons (2.9%) among persons aged 65 and older during 2015-2021. Among this age cohort, annual incidence was 210 and 340 per 10,000 persons (2.1% and 3.4%) in men and women, respectively. On average annually, 651,446 persons aged 65 and older (212,875 men and 438,572 women) were newly identified with any UI.

➔ Comorbidities

For patients with any UI aged 18-64, common comorbidities were hypertension (37%), obesity (34%), and UTI (26%). For patients with any UI aged 65 and above, common comorbidities were hypertension (83%), UTI (41%), and diabetes (36%). Among both age groups for men, BPH and prostate cancer were also common comorbidities (58% and 28%, respectively, of men aged 18-64, 73% and 34% of men aged 65+). Compared to the entire study population, patients with UI exhibited a higher prevalence of the common comorbidities observed (Figures 4.2a,b).

Among all patients with UUI, common comorbidities were hypertension (42%), obesity (36%), and UTI (30%) for those aged 18-64; and hypertension (82%), UTI (40%), and diabetes (35%) for those aged 65 and older. This pattern held across both men and women.

Among men with SUI, common comorbidities for men were prostate cancer (90%), hypertension (58%), and BPH (37%) for those aged 18-64, as well as for those aged 65 and older (at 87%, 79%, and 46%, respectively). For women, common comorbidities were obesity (31%), hypertension (28%), and UTI (24%), for those aged 18-64, as well as for those aged 65 and older (at 28%, 76%, and 36%, respectively).

Figure 4.2a. Common comorbidities for any UI by gender, age 18-64 (2021)

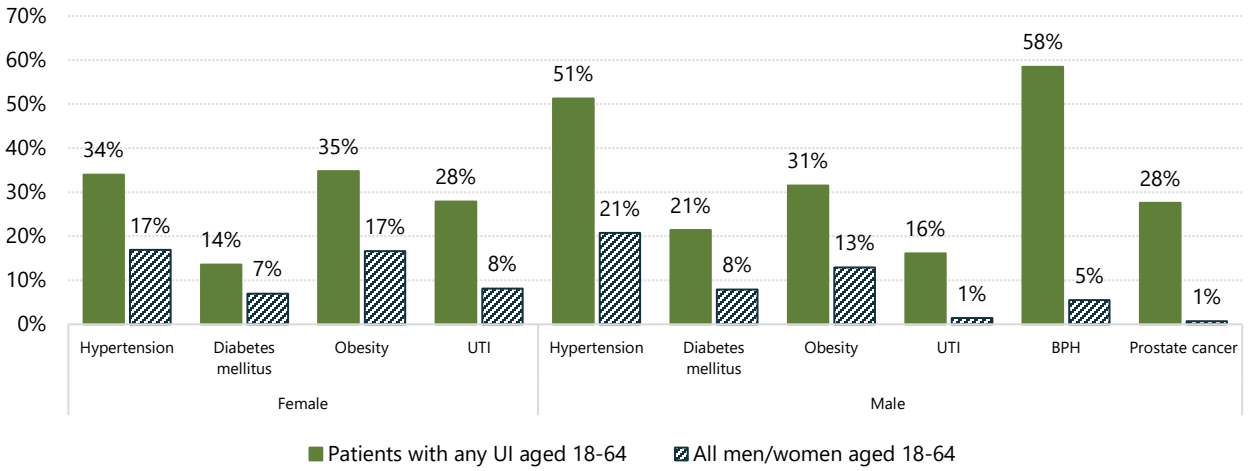
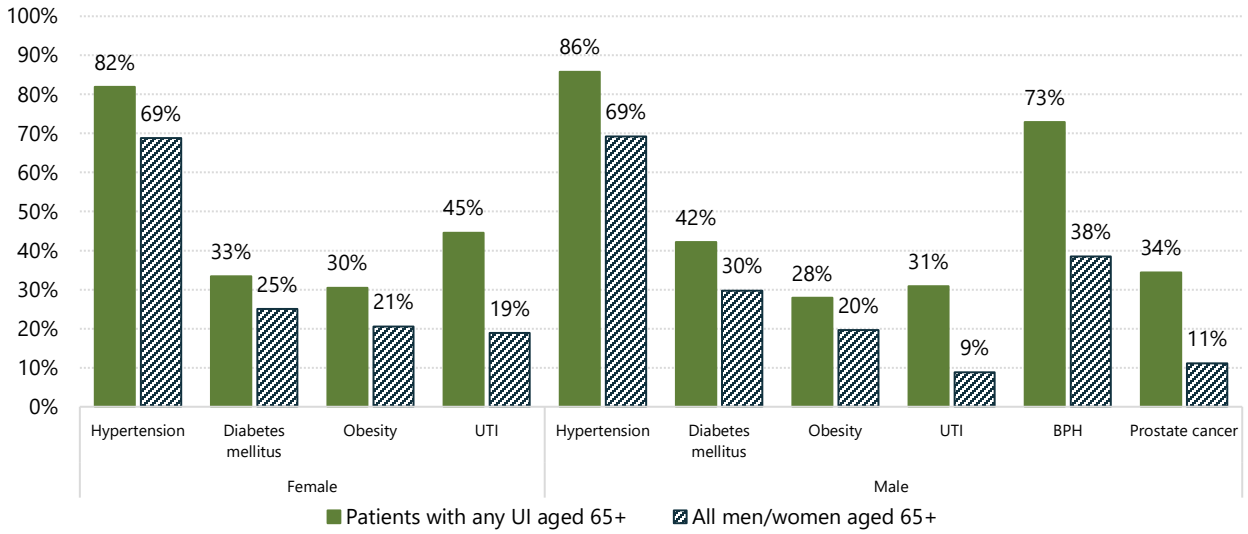


Figure 4.2b. Common comorbidities for any UI by gender, age 65+ (2021)



Notes: Columns in solid denote percentage of patients with any UI who are also identified with the comorbidity referenced. Columns in patterns denote the analogous metric for all men or women (including those without UI) in each referenced age cohort.

➔ Diagnostic tests

We evaluated the rates of diagnostic testing conducted for patients aged 65 years and above from three months prior to the first diagnosis of UI to 12 months after the diagnosis. We found that 97% of patients received at least one diagnostic test during this 15-month window, and this rate did not vary substantially from 2015 to 2020.

From 2015 to 2020, the most commonly ordered diagnostic test for UI was serum creatinine, which was ordered annually at a rate of 96%. During this same period, an average of 80% received a

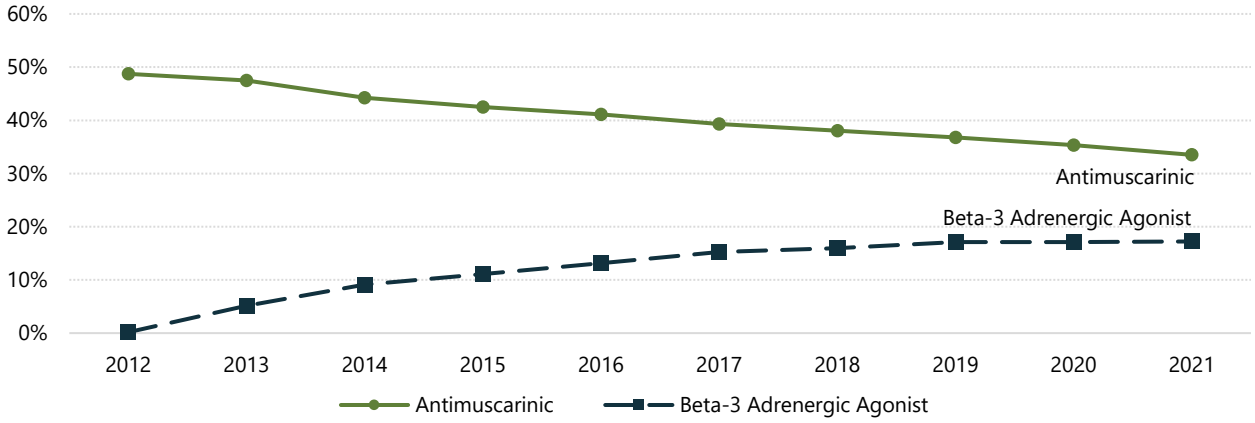
urinalysis, while 27% had a post-void residual urine test. The corresponding percentages for cystoscopy and urodynamics were 13% and 7%, respectively, and less than 1% of patients received an intravenous pyelogram or fluorodynamics.

➔ Prescription drugs

Overall, the percentage of patients with any UI who filled a prescription with labelled indication for any UI decreased from 25% in 2012 to 23% in 2021 for those aged 18-64 and from 36% to 32% for those aged 65 and older. This decline was steeper among women (from 38% to 34% for those aged 65 and older) than men (from 28% to 26%).

Among patients with UUI aged 65 and older with full-time Part D enrollment, the most commonly filled prescriptions were antimuscarinics and beta-3 adrenergic agonists, which were filled by 34% and 17% of patients in 2021, respectively. However, the percentage of patients filling prescriptions for antimuscarinics declined from 49% in 2012 to 34% in 2021, while that for beta-3 adrenergic agonists increased from 0.2% in 2012 to 17% in 2021 (Figure 4.3). These patterns were similar between men and women but antimuscarinics were more commonly filled for women (35% in 2021) than men (30% in 2021).

Figure 4.3. Prescriptions filled among patients with UUI aged 65+ (2012-2021)



Notes: Figure shows the percent of patients with UUI aged 65+ who filled a prescription for each referenced drug in each year. Denominator denotes number of patients with UUI who are aged 65 years and older and have full-time Part D enrollment in each year (Medicare FFS). The number of patients with UUI and full-time part-D enrollment was 291,628 in 2021.

Among patients aged 65 and older newly identified with any UI, 43% filled a prescription for a disease-related medication within five years. 83% of first prescriptions filled were for antimuscarinics and 16% were for beta-3 adrenergic agonists. On average, patients took 11 months to fill their first prescription for any UI.

➔ Procedures

The percentage of women aged 18-64 with any UI who underwent related procedure decreased from 11% in 2012 to 7.4% in 2021, while for men of the same age group, there was a slight decrease from 2.1% to 1.6% during the same period. Among those aged 65 and older, there was a slight increase in this percentage from 1.9% to 2.2% for men and from 3.5% to 4.0% for women during the same period. These percentages were slightly lower in 2020, which can be attributed to patients seeking less urologic care due to the COVID-19 pandemic.

Among patients aged 65 and older with UUI, the most common procedures used were neuromodulation and BoNTA. The percentage of patients in this age group who underwent neuromodulation increased slightly from 2.3% to 3.2% between 2012 and 2021, with similar trends observed in both men and women (Figure 4.4a). Since 2013, there has been a rise in the use of BoNTA. The percentage of patients aged 65 and older with UUI who underwent BoNTA increased from 0.5% to 2.5%. In 2021, the use of BoNTA was more common in women than in men, with percentages of 3.0% and 1.4%, respectively.

The sling procedure was the most frequently performed procedure among patients aged 65 and older with SUI. The percentage of patients with SUI who underwent a sling procedure decreased from 4.2% to 2.5% from 2012 to 2015 (Figure 4.4b), and the decline continued at a slower rate from 2.3% to 2.0% from 2016 through 2021. In 2021, sling procedures were more commonly performed on women than men, with percentages of 2.3% and 1.1%, respectively. In 2021, less than 1% of patients with SUI underwent other procedures.

Figure 4.4a. BoNTA and neuromodulation for patients with UUI aged 65+ (2012-2021)

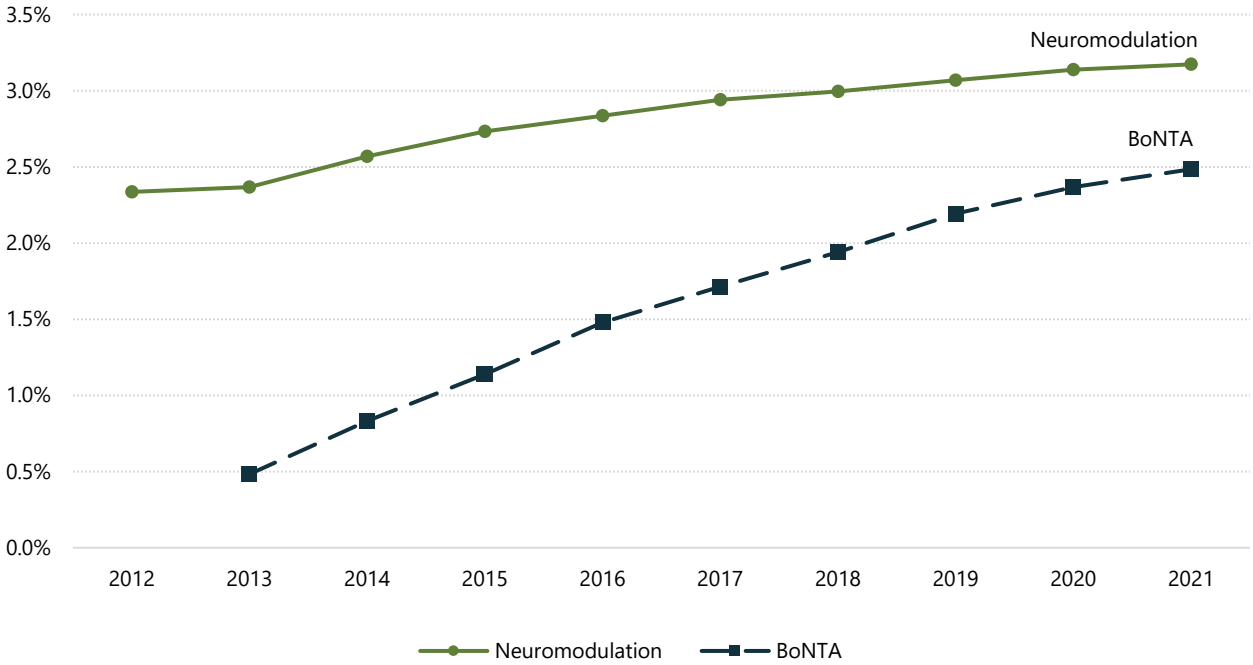
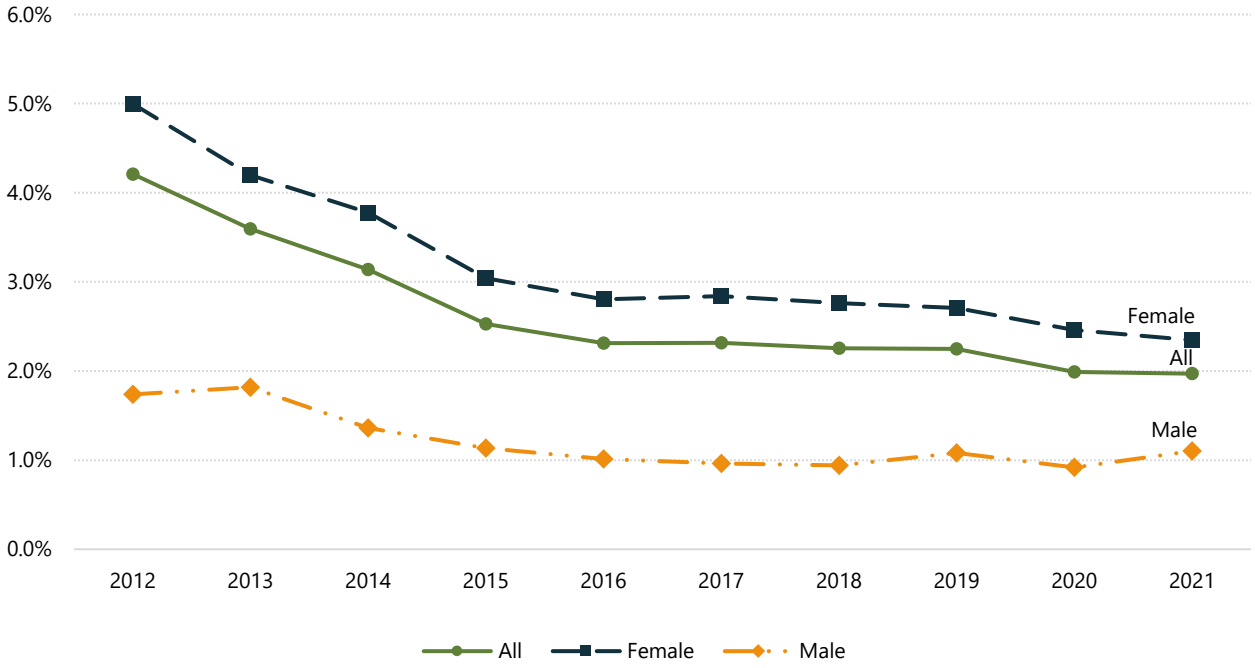


Figure 4.4b. Sling procedures for patients with SUI aged 65+, by gender (2012-2021)



Notes: This figure shows the percent of patients aged 65 and older with each referenced UI type who underwent each referenced procedure during 2012-2021. The number of patients with UUI was 392,735 in 2021. The number of female and male patients with SUI in 2021 was 142,996 and 62,101, respectively.

Among the incident cohort aged 65 and older, 8.4% of patients with any UI underwent a UI-related procedure within 5 years after initial diagnosis. 42% of first procedures during this period were sling, while neuromodulation and BoNTA accounted for 31% and 16%, respectively. The average time to first procedure within 5 years after initial diagnosis in 2015 was 16 months. This metric for sling, neuromodulation, and BoNTA was 11, 19, and 25 months, respectively.

➔ Service utilization

On average, patients aged 65 and older who received an incident diagnosis of any UI between 2015 and 2020 had 1.6 E&M visits within 12 months. During the same period, 0.04% of the same group had an inpatient hospitalization, 0.06% had an observation stay, and 0.2% had an emergency department visit with a primary diagnosis of urinary incontinence within 12 months after their initial diagnosis.

➔ Expenditure

For patients aged 65 and older with an incident diagnosis of UI, the total expenditures (in nominal dollars) associated with services that were submitted with a primary diagnosis of UI within 12 months after initial diagnosis amounted to approximately $100 million annually from 2015 to 2020. The expenditure per patient with incident UI remained stable during this period, averaging $188 annually.

4.3 Discussion

Our analysis of UI yielded several noteworthy results. First, the claims-based prevalence of UI among persons 65 and over was approximately 5.6-6.1% from 2012 to 2021, with women showing higher rates than men. Second, the use of diagnostic tests like urinalysis and post-void residual urine measurement were relatively low for this population. Third, among patients with UUI, prescriptions filled for antimuscarinics remained the most common but declined during 2012-2021, while prescriptions filled for beta-3 adrenergic agonists increased during the same period. Lastly, we observed a decrease in the use of sling procedures for patients with SUI, and an increase in the use of BoNTA and neuromodulation for patients with UUI.

Our estimate of the annual prevalence of any UI at 5.6-6.1% likely underestimated the true extent of the condition.[5] UI is stigmatized, which may discourage some patients from seeking treatment, leading to lower reported prevalence rates. In fact, less than 40% of adults with self-reported incontinence inform their physicians.[6] The reported prevalence of incontinence varies greatly across studies. In women, the 1-year prevalence of incontinence has been reported to be between 5% and 70%, and UI is estimated to occur in 25-45% of women.[7] A study based on NHANES found that 49.6% of women reported UI.[8] Cultural differences in the perception and reporting of UI across countries, as well as differences in data collection and reporting definitions, may account for significant disparities between the true and reported prevalence of UI.

Like prevalence rates, our incidence rates may also have been low due to patients' reluctance to disclose their diagnosis to healthcare providers. The incidence rate changed little over time, suggesting that the stigma surrounding UI has not changed.

In regard to diagnostic testing for UI, we found that rates of urinalysis and post-void residual measurement were lower than expected. The AUA Guidelines on Overactive Bladder and the AUA/Society of Urodynamics, Female Pelvic Medicine & Urogenital Reconstruction (SUFU) Guidelines on Surgical Treatment of Female Stress Urinary Incontinence recommend obtaining a urinalysis as part of initial diagnostic process. Our lower-than-expected rate of urinalysis tests may indicate that the majority of patients had uncomplicated symptoms that did not necessitate additional investigations, or the tests were performed outside of the time frame we examined. Furthermore, we may observe differences in diagnostic testing conducted by urologists and primary care physicians, which can be explored in future ADRs.

Regarding procedures for SUI, our findings indicate that sling placement was the most common procedure. However, we observed a sharp decline in its use from 2012 to 2015, which then decreased at a slower rate from 2016 to 2021. These results are consistent with another report that suggests the percentage of patients undergoing a sling procedure was stable at 4% from 2004 to 2011, but then sharply declined from 2011 to 2013, presumably due to a 2011 FDA notification regarding complications associated with the mesh used for prolapse repair and SUI.[9] According to a separate study with data through 2015, there was a 43% drop in sling placement for SUI from 2011 to 2015.[10]

Regarding the management of UUI, we found a significant increase in the use of beta-3 agonists, accompanied by a decline in the use of antimuscarinics. This trend aligns with published literature on the topic.[11] Despite this, antimuscarinics remained the most commonly used prescription for patients with UUI. Neuromodulation and BoNTA increased from 2012 to 2021; however, by 2021, both were still used in less than 4% of patients with UUI. This finding is also consistent with the literature on the utilization of third-line therapies for overactive bladder.[12]

There are several important limitations to our analysis. First, our reliance on claims-based diagnosis of UI may result in underreporting and limits our ability to classify the types of incontinence. For instance, a patient who is diagnosed with SUI may also have some degree of UUI that is not captured in the claims as MUI. Secondly, we cannot assess the severity of symptoms using standard measures such as voiding diaries or the number of pads used per day. Lastly, we did not evaluate the primary drivers of incontinence, such as childbirth, diabetes, or prostate surgery, which would impact several of our outcomes, including the use of diagnostic testing and treatments.

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