CHAPTER 6

Urinary Incontinence in Men

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INTRODUCTION

While urinary incontinence (UI) is widely thought of as a condition affecting women, it also affects men of all ages, including 17% of an estimated 3.4 million men over the age of 60 in the United States. The prevalence of UI increases with advancing male age, and rose over time during the 1990s. Ethnicity plays less of a role in UI prevalence estimates for men than it does for women.

Risk factors for UI in both men and women include stroke, dementia, recurrent cystitis, bladder cancer, stool impaction, reduced mobility, diabetes, chronic cough, medications, and aging. However, specific to men is incontinence secondary to benign and malignant prostatic diseases and their treatments. Up to 30% of patients who have had a radical prostatectomy experience some degree of incontinence afterwards.

UI in elderly men creates a substantial burden on healthcare resources, the largest impact being felt in doctors' offices, followed by outpatient services and surgeries. During the 1990s, rates of physician office visits increased, but the burden of male UI is greatest in nursing homes, where more than half of the male residents report difficulty controlling their urine and require assistance using the toilet, either from equipment (14.8%) or from another person (52%).

The direct economic burden for UI in men is estimated to be $3.8 billion per year (1). The annual medical expenditures of persons with UI are more than twice those of persons without UI, $7,702 vs $3,204. Patients themselves bear a significant proportion of the direct costs of incontinence, including the costs of pads, condom drainage catheters, indwelling foley catheters, and external devices such as Cunningham clamps. Annual costs to all individuals living at home have been estimated to be $7.1 billion (2).

DEFINITION AND DIAGNOSIS

Urinary incontinence is defined as the complaint of any involuntary leakage of urine (3). It is sometimes grouped with other voiding complaints known collectively as lower urinary tract symptoms (LUTS). LUTS are subjective in nature and hence can be voluntarily self-reported or elicited during a medical history.

Recognized clinical subtypes of UI are defined on the basis of their presumed underlying etiology. An international standard for definitions of incontinence subtypes was set by the International Continence Society (ICS) in 1990 (4) and was updated in 2003 (3).

Stress incontinence is the involuntary leakage of urine on effort or exertion, sneezing, or coughing. *Urge incontinence* is the involuntary leakage of urine accompanied by, or immediately preceded by, urgency. Patients describe this type of incontinence as difficulty in holding their urine until they are able to reach a toilet. *Mixed incontinence* involves components of both stress- and urgency-related leakage. *Continuous incontinence* is constant leakage, usually associated with a fistula; it occurs only rarely in males. *Enuresis* refers to any involuntary loss of urine and should be distinguished from *nocturnal enuresis,* or urinary loss during sleep.

Table 1. Codes used in the diagnosis and management of male urinary incontinence

Males 18 years or older, with any one of the following ICD-9 codes, but not a coexisting 952.XX or 953.XX code:

788.3	Urinary incontinence
788.3	Urinary incontinence unspecified
788.33	Mixed incontinence, male and female
788.34	Incontinence without sensory awareness
788.37	Continuous leakage
599.8	Other specified disorders of urethra and urinary tract
599.81	Urethral hypermobility
599.82	Intrinsic (urethral) sphincter deficiency (ISD)
599.83	Urethral instability
599.84	Other specified disorders of urethra
788.31	Urge incontinence
596.59	Other functional disorder of bladder
596.52	Low bladder compliance
596.51	Hypertonicity of bladder

Post-radical prostatectomy incontinence

Males 18 years or older, with at least one of the above codes and at least one of the following prostatectomy codes:

ICD-9 Procedure Codes

60.5	Radical prostatectomy

CPT Codes

55840	Prostatectomy, retropubic radical, with or without nerve sparing
55842	Prostatectomy, retropubic radical, with or without nerve sparing
55845	Prostatectomy, retropubic radical, with or without nerve sparing

Spinal cord injury-related incontinence

Males 18 years or older, with a diagnosis code for spinal cord injury 952.XX or 953.XX and at least one of the following ICD-9 codes

344.61	Cauda equina syndrome with neurogenic bladder
596.51	Hypertonicity of bladder (specified as overactive bladder in 2001; included if associated with diagnosis code 952.XX)
596.52	Low compliance bladder
596.54	Neurogenic bladder, NOS
596.55	Detrusor sphincter dyssynergia
596.59	Other functional disorder of bladder
599.8	Other specified disorders of urethra and urinary tract
599.84	Other specified disorders of urethra
625.6	Stress incontinence, female
788.3	Urinary incontinence
788.31	Urge incontinence
788.32	Stress incontinence, male
788.33	Mixed incontinence, male and female
788.34	Incontinence without sensory awareness
788.37	Continuous leakage
788.39	Other urinary incontinence

Some of the 5-digit ICD-9 codes (Table 1) related to incontinence are based on the underlying mechanisms as demonstrated during urodynamic testing. In general, definitions are divided into those seen during filling and those seen during emptying, the two phases of the bladder cycle. Abnormalities during the filling phase include detrusor instability, detrusor hyperreflexia, and abnormalities of bladder compliance. The observation of involuntary detrusor contractions during filling cystometry is called *detrusor instability* in the absence of a neurologic lesion and *detrusor hyperreflexia* in the presence of a neurologic lesion. *Detrusor sphincter dyssynergia* (DSD), an abnormality during the emptying phase of the bladder, refers to simultaneous contraction of the detrusor and involuntary contraction of the urethral and/or periurethral striated muscle in a patient with neurologic disease.

Recently, the terminology for urodynamic definitions associated with incontinence was modified to conform to the International Classification of Functioning, Disability and Health (ICFDH-2) and the ICD-10 (5). The terms *detrusor instability* and *detrusor hyperreflexia* were replaced. When involuntary detrusor contractions occur during filling cystometry, they are classified as *detrusor overactivity*. If the patient has incontinence at the time of the detrusor overactivity, the term *detrusor overactivity incontinence* is used. If a relevant neurogenic condition is present, the more specific term neurogenic detrusor overactivity is used; otherwise, *idiopathic detrusor overactivity* is used.

Urinary incontinence may be a sign or a symptom. As a symptom, UI may be self-reported or recorded by a third party such as a healthcare professional or researcher. On rare occasions, patients who report UI as a symptom do not actually have the condition. Perspiration, for example, may mimic UI in men. As such, determining the presence of incontinence by questioning alone is inherently problematical. Because patient reports of severity are subjective, the disorder is difficult to quantify unless specific, standardized questions are posed.

As a clinical sign, UI may be demonstrated during physical examination, cystoscopy, urodynamics, or videourodynamics, or by pad testing. In males, physical examination may reveal clues to the etiology of the underlying condition, but only rarely is the actual sign of incontinence seen. Indirect indicators include soiled clothing, the use of a variety of types of incontinence protection devices, and abnormalities presenting during the neurologic examination, which should include a careful digital rectal examination and assessment of anal sphincter tone. At the time of cystoscopy, abnormalities of the urethral sphincter may be seen in men who have previously undergone prostatectomy, but these abnormalities are not definitive for the diagnosis. Rarely, a urethrocutaneous or rectourethral fistula is observed. Both urodynamics and videourodynamics can provide definitive diagnoses and quantitative measures of the amount of urinary loss under standardized conditions, including volume of urine in the bladder, physical posture, and physical activity. Pad testing is performed by instilling a standardized volume of liquid into the bladder, placing an incontinence pad in the patient's undergarments, and having the patient undergo a standardized sequence of physical activities. The pad is then weighed to quantify the leakage.

A wide range of survey questions can be used to collect data concerning UI. General questions may be as simple as, "Do you have or have you ever had loss of urinary control?" More specific questions are used to elicit the underlying etiology of UI. An affirmative answer to the question, "Do you ever leak or lose urine when you cough, laugh, or sneeze?" may indicate stress incontinence; the answer to, "How often do you have difficulty holding your urine until you can get to a toilet?" may indicate urge incontinence (6).

PREVALENCE AND INCIDENCE

Although the epidemiology of UI has not been investigated in men as thoroughly as in women, most studies show that the male-to-female ratio is about 1:2. The type, age distribution, and risk factors differ greatly between the genders (7). Estimates of UI prevalence are obtained primarily from responses to survey questions, and the way the questions are worded affects the prevalence estimate (see above). Because UI can be an intermittent condition, the length of time the patient is asked to consider may alter response rates. For example, "Do you have or have you ever had UI?" may elicit a different response than "Over the last 12 months have you experienced loss of urinary control?" In-person interviews tend to yield higher prevalence rates than do self-reported

questionnaires. The prevalence of UI varies by patient age, gender, and language.

When UI prevalence is estimated using ICD-9 codes, several additional issues should be kept in mind. The 5-digit ICD-9 codes used for the National Ambulatory Medical Care Survey (NAMCS), Medstat, Healthcare Care Utilization Project (HCUP), Medicare, and Ingenix datasets may be used to divide incontinence into five groups: tologic BPH;

- detrusor instability/overactive bladder/ urge incontinence,
- traumatic/iatrogenic incontinence (e.g., following radical prostatectomy),
- spinal-cord-related incontinence,
- nocturnal enuresis, and
- other (fistula, neuropathic bladder, nonorganic causes).

In addition, the following caveats should be noted when considering the data presented in this chapter:

- There is no specific category for overflow incontinence secondary to outlet obstruction in men, related to prostate or urethral disease. The closest match for this subtype is 788.39 (overflow neurogenic, paradoxical).
- To identify males with post-radical prostatectomy incontinence, one needs to use codes for incontinence and prostatectomy. In addition, a man may have stress incontinence due to traumatic injury or to prostatectomy for benign prostate disease. There is no specific code for these rare conditions.
- Urodynamic testing would be required for certain 5-digit codes (e.g., 596.59 for detrusor instability); however, the clinical management of individual patients may not involve urodynamic testing.
- Because the Medical Expenditure Panel Survey (MEPS) database uses only 3-digit ICD-9 codes, it lacks the specificity necessary to stratify by subtypes of UI.
- Of all the urological conditions examined in this project, UI is among the least likely to result in a contact with the medical community. While 17% of aged men report some UI, medical care utilization rates are typically less than 1%.

Pooled data from 21 international population-based surveys (Table 2), stratified for age, gender, and frequency of incontinence, indicate that the prevalence of lifetime incontinence among older men is 11% to 34% (median 17%, pooled mean 22%), while the prevalence of daily incontinence is 2% to 11% (median 4%, pooled mean 5%). The prevalence of lifetime incontinence was significantly lower among middle-aged and younger men, ranging from 3% to 5% (median 4%, pooled mean, 5%) (8).

Langa et al. reported a prevalence of 13% in community-dwelling older people (9). These people responded affirmatively when asked, "During the last 12 months, have you lost any amount of urine beyond your control?" This time frame is similar to that in the NHANES question.

As in Thom's study, National Health and Nutrition Examination Survey (NHANES) data

Table 2. Summary prevalences of urinary incontinence (UI) by age, gender, and frequency

	Ever UI			Daily UI		
	Range	Median	Mean[a]	Range	Median	Mean[a]
Group	%	%	%	%	%	%
Older women	17–55	35	34	3–7	14	12
Older men	11–34	17	22	2 –11	4	5
Younger women	12–42	28	25	...	...	...
Younger men	3–5	4	5	...	...	...

...data not available.

[a]Calculated using numerator and denominator data from each available study.

SOURCE: Reprinted from Thom D, Variation in estimates of urinary incontinence prevalence in the community: effects of differences in definition, population characteristics, and study type, Journal of American Geriatrics Society, 46, 473-480, Copyright 1998, with permission from the American Geriatrics Society.

Table 3. Prevalence of difficulty controlling bladder among adult men

		Difficulty Controlling Bladder		
	Total	Yes	No	Refused to Answer or Don't Know
Total	18,231,934	3,131,814 (17%)	15,054,506 (83%)	45,614 (0%)
Age at screening				
60–64	5,037,678	546,559 (11%)	4,491,119 (89%)	0 (0%)
65–69	4,731,187	518,157 (11%)	4,213,030 (89%)	0 (0%)
70–74	3,320,840	630,898 (19%)	2,675,986 (81%)	13,956 (0%)
75–79	2,748,396	750,478 (27%)	1,988,932 (72%)	8,986 (0%)
80–84	1,478,414	399,774 (27%)	1,078,640 (73%)	0 (0%)
85+	915,419	285,948 (31%)	606,799 (66%)	22,672 (2%)
Race/ethnicity				
Non-Hispanic white	14,790,935	2,395,212 (16%)	12,395,723 (84%)	0 (0%)
Non-Hispanic black	1,436,582	296,022 (21%)	1,122,588 (78%)	17,972 (1%)
Mexican American	559,680	81,134 (14%)	478,546 (86%)	0 (0%)
Other race	429,299	142,015 (33%)	273,598 (64%)	13,686 (3%)
Other Hispanic	1,015,438	217,431 (21%)	784,051 (77%)	13,956 (1%)
Education				
Less than high school	6,072,264	1,214,224 (20%)	4,840,068 (80%)	17,972 (0%)
High school	4,516,092	698,919 (15%)	3,817,173 (85%)	0 (0%)
High school+	7,572,244	1,198,317 (16%)	6,373,927 (84%)	0 (0%)
Refused	25,054	11,368 (45%)	0 (0%)	13,686 (55%)
Don't know	46,280	8,986 (19%)	23,338 (50%)	13,956 (30%)
Poverty income ratio[a]				
Missing	631,305	111,353 (18%)	505,996 (80%)	13,956 (2%)
PIR=0	22,159	12,082 (55%)	10,077 (45%)	0 (0%)
PIR<1	1,806,996	440,261 (24%)	1,366,735 (76%)	0 (0%)
1.00<=PIR<=1.84	3,408,381	653,095 (19%)	2,755,286 (81%)	0 (0%)
PIR>1.84	9,404,848	1,458,110 (16%)	7,946,738 (84%)	0 (0%)
Refused	1,858,169	324,042 (17%)	1,511,455 (81%)	22,672 (1%)
Don't know	1,100,076	132,871 (12%)	958,219 (87%)	8,986 (1%)

[a]See glossary for definition of poverty income ratio.

The data in this table are based on question KIQ.040: "In the past 12 months, have you had difficulty controlling your bladder, including leaking small amounts of urine when you cough or sneeze?"

SOURCE: National Health and Nutrition Examination Survey, 1999–2000.

Table 4. Frequency of bladder control problems among those who responded "yes" to difficulty controlling bladder

	Total	Every Day	Few per Week	Few per Month	Few per Year	Don't Know
Total	3,131,814	1,307,755 (42%)	747,906 (24%)	577,835 (18%)	459,015 (15%)	39,303 (1%)
Age at screening						
60–64	546,559	187,452 (34%)	204,858 (37%)	48,555 (9%)	105,694 (19%)	0 (0%)
65–69	518,157	172,945 (33%)	153,221 (30%)	104,208 (20%)	87,783 (17%)	0 (0%)
70–74	630,898	299,011 (47%)	111,501 (18%)	118,464 (19%)	100,100 (16%)	1,822 (0%)
75–79	750,478	377,370 (50%)	101,664 (14%)	176,165 (23%)	86,293 (11%)	8,986 (1%)
80–84	399,774	137,186 (34%)	134,527 (34%)	60,591 (15%)	54,106 (14%)	13,364 (3%)
85+	285,948	133,791 (47%)	42,135 (15%)	69,852 (24%)	25,039 (9%)	15,131 (5%)
Race/ethnicity						
Non-Hispanic white	2,395,212	1,039,490 (43%)	505,540 (21%)	418,365 (17%)	403,322 (17%)	28,495 (1%)
Non-Hispanic black	296,022	111,731 (38%)	106,168 (36%)	35,532 (12%)	33,605 (11%)	8,986 (3%)
Mexican American	81,134	47,757 (59%)	17,210 (21%)	6,213 (8%)	8,132 (10%)	1,822 (2%)
Other race	142,015	37,697 (27%)	63,131 (44%)	41,187 (29%)	0 (0%)	0 (0%)
Other Hispanic	217,431	71,080 (33%)	55,857 (26%)	76,538 (35%)	13,956 (6%)	0 (0%)
Education						
Less than high school	1,214,224	423,490 (35%)	386,717 (32%)	244,357 (20%)	157,838 (13%)	1,822 (0%)
High school	698,919	245,562 (35%)	137,414 (20%)	184,242 (26%)	118,337 (17%)	13,364 (2%)
High school+	1,198,317	627,335 (52%)	223,775 (19%)	149,236 (12%)	182,840 (15%)	15,131 (1%)
Refused	11,368	11,368 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Don't know	8,986	0 (0%)	0 (0%)	0 (0%)	0 (0%)	8,986 (100%)
Poverty income ratio[a]						
PIR=0	12,082	0 (0%)	0 (0%)	12,082 (100%)	0 (0%)	0 (0%)
PIR<1	440,261	144,297 (33%)	112,216 (25%)	123,240 (28%)	58,686 (13%)	1,822 (0%)
1.00<=PIR<=1.84	653,095	262,660 (40%)	170,625 (26%)	116,420 (18%)	88,259 (14%)	15,131 (2%)
PIR>1.84	1,458,110	640,720 (44%)	356,276 (24%)	193,356 (13%)	254,394 (17%)	13,364 (1%)
Refused	324,042	156,956 (48%)	47,695 (15%)	72,079 (22%)	47,312 (15%)	0 (0%)
Don't know	132,871	86,722 (65%)	11,890 (9%)	14,909 (11%)	10,364 (8%)	8,986 (7%)
Missing	111,353	16,400 (15%)	49,204 (44%)	45,749 (41%)	0 (0%)	0 (0%)

[a]See glossary for definition of poverty income ratio.

The data in this table are based on question KIQ.060: "How frequently does this (referring to KIQ.040) occur? Would you say this occurs…every day, a few times a week, a few times a month, or a few times a year?"

SOURCE: National Health and Nutrition Examination Survey, 1999–2000.

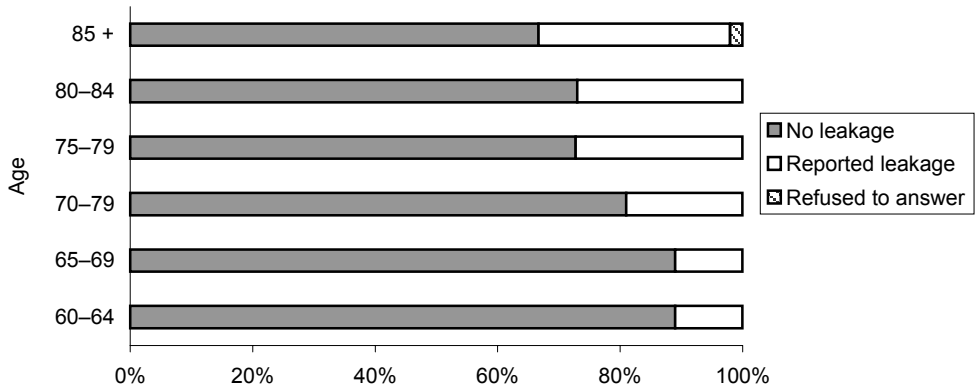

Figure 1a. Difficulty controlling bladder among male responders.

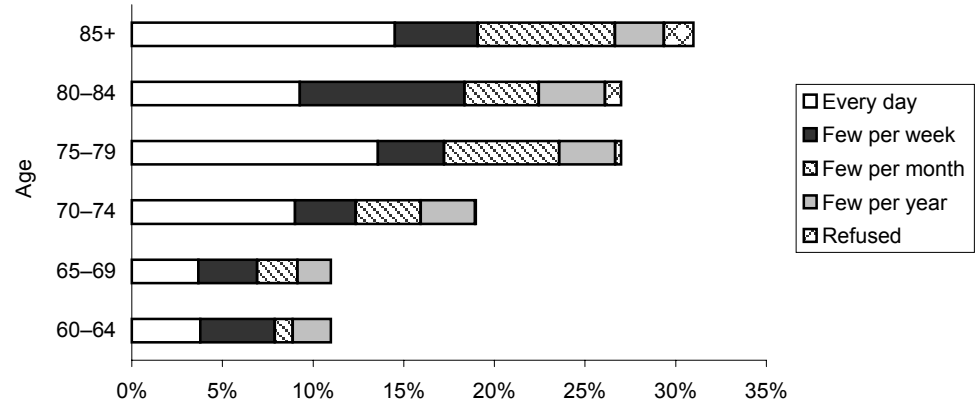

Figure 1b. Frequency of bladder control problems among male responders who answered "yes" to difficulty controlling bladder.

SOURCE: National Health and Nutrition Examination Survey, 1999–2001.

suggest that 17% of males older than 60 experience UI (Table 3 and Figure 1a). These men answered affirmatively when asked, "In the past 12 months, have you had difficulty controlling your bladder, including leaking small amounts of urine when you cough or sneeze?" NHANES data indicate a trend of increasing prevalence of UI with increasing age in males. Of the 17% of men reporting UI, 42% indicated that it occurred on a daily basis, while 24% indicated that it occurred weekly (Table 4 and Figure 1b). The 7% prevalence of daily UI in men over 60 (17% of 42%) is similar to the 4% of older men who reported daily episodes in the pooled data reported by Thom (8). The severity of UI based on the frequency of incontinence episodes among younger males is not well documented. The utilization data in this chapter are not entirely consistent with this citation.

Based on a prevalence rate of 17% (Table 3) and data from the 2001 US Census Bureau's intercensal population estimates, it is estimated that almost 3.4 million American men over the age of 60 have UI (US Census).

MORTALITY

In univariate analyses without adjustment for comorbidities or other potential confounding factors, UI is associated with an increased risk of death among elderly men living in both community and nursing home settings (10, 11). The magnitude of increased

relative risk of death is variable and is related to the severity of the incontinence and the overall health and functional status of the patient. Applying univariate hazard ratios for mortality in large population studies revealed an increased risk of mortality in the elderly associated with the degree of incontinence: the relative risk of dying is 2.27 for mild UI, 2.96 for moderate UI, and 5.94 for severe UI, compared with continent controls over a 42-month period (11).

The association observed between UI and death is not likely to be causal because of the impact of advanced age, poor general health, and psychosocial factors. When population studies are subjected to more rigorous multivariate analysis and confounders are taken into consideration, the impact of mild to moderate incontinence on mortality is greatly reduced—in fact, it is statistically insignificant in some studies. However, severe incontinence remains as an independent risk factor for mortality. Specifically, elderly men with incontinence had 50% greater mortality than continent men after adjustment for age alone, but only a 20% greater risk of mortality after additional adjustment for comorbid conditions (12). Therefore, the relationship between mortality and UI is thought to be due in large part to a reduction in general health and increased frailty in the elderly. Daily preventive health measures and the use of routine health screenings are independent predictors of survival in elderly incontinent individuals after age, health status, and psychosocial factors have been controlled for (6).

While epidemiologic studies of mortality in the incontinent have focused on the elderly population, an important consideration is the relative overrepresentation in the younger male population of individuals with neurogenic bladders due to spinal cord injury. The relative risk of mortality in incontinent vs continent younger men is not well documented.

RISK FACTORS

Continence in males results from a combination of factors, including appropriate function of the bladder and sphincter mechanisms. Since the function of these anatomic structures is neurologically regulated, diseases that affect the central or peripheral nervous systems may increase the risk of UI. Environmental factors, cognitive status, mobility, medications and social habits can also influence continence status. Risk factors for UI can be categorized as physical attributes, pharmaceutical agents, social habits, and reversible factors.

Risk Factors for Urinary Incontinence in Men

Physical Attributes	Pharmaceutical Agents
Age	Benzodiazepines
Obesity	Antidepressants
Race	Antipsychotics
Immobility	Diuretics
Previous transurethral surgery	Antiparkinsonian medications
Previous radical prostatectomy	Narcotic analgesics
	Alpha antagonists
Neurologic disease (e.g., stroke)	Alpha agonists
	Calcium channel blockers
Spinal cord injury	ACE inhibitors
Cognitive impairment	Antianxiety/hypnotics

Social Habits	Reversible Factors
Smoking	Urinary tract infection
Alcohol	Pharmaceuticals
Caffeine	Psychological
	Exessive urine production (polyuria or nocturia)
	Stool impaction

As noted above, the prevalence of UI increases with *increasing age*, particularly in those over 65. Age-related physical changes within the detrusor itself include more unstable bladder contractions, more residual urine, and less bladder contractility (13). Overall, the multifactorial elements of aging, including modified pharmacokinetics and associated physical comorbidities, may convert a continent patient to an incontinent one. For example, as men age, the prostate gland enlarges due to benign or malignant disease. Additional physical attributes such as age, mobility, previous prostatic surgery, neurologic disease, spinal cord injury, and delirium may also contribute to loss of continence. Obesity and race are cited as risk factors for UI in women, but data on these factors specific to men are lacking.

A history of prostate cancer treatment, including radiation or radical prostatectomy, is known to confer an increased risk of incontinence, as has been reported by many researchers since the mid-1990s. Radical prostatectomy involves extensive dissection near the bladder neck and external sphincter, both of which contribute to continence in men. Prostate radiation (external beam or brachytherapy) may affect the same structures and may also cause damage to the bladder itself, leading to incontinence from an overactive detrusor.

Restricted mobility (due, e.g., to bedrails, trunk restraints, or chair restraints) limits access to toilet facilities and hence increases the risk of UI (14).

Because the central nervous system has both excitatory and inhibitory effects on the bladder, a variety of central neurological diseases can cause incontinence. Most notably, stroke confers an increased risk of UI. In one large population-based study, nearly 50% of stroke patients had UI. This proportion falls to about 20% in patients surviving for at least six months after a stroke (15).

While somewhat controversial, alcohol and caffeine intake have been implicated as risk factors for UI, although almost no data on male subjects are available.

Because elderly patients have altered pharmacodynamics and pharmacokinetics, certain drugs that affect cognition may impact bladder function primarily or may lead to increased urine output, thus contributing to the risk of UI (14). For example, benzodiazepine use has been reported to increase the risk of UI by 45% (OR, 1.44; 95% CI, 1.12–1.83) (16). Selective serotonin reuptake inhibitors have been similarly implicated (17).

NATURAL HISTORY

Cross-sectional studies have found that the prevalence of UI in men increases with age in a roughly linear fashion. Most studies have found a predominance of urge incontinence (40%–80%), followed by mixed incontinence (10%–30%) and stress incontinence (<10%). Stress incontinence becomes more common as men age, probably as a result of surgery for prostate enlargement and prostate cancer. For example, up to 34% of men report persistent UI following a radical prostatectomy (18).

Relatively little information is available on the incidence of UI in men, but what there is suggests that it is a surprisingly dynamic condition. One population-based study of men and women 60 and older found the one-year incidence of new UI in men (most of which was classified as mild) to be 10%, (19). The annual rate of remission was about 30%. These figures probably reflect the important role of reversible causes of male UI, including benign prostatic hyperplasia, urinary tract infections, and constipation.

Table 5. Inpatient hospital stays by males with urinary incontinence listed as primary diagnosis, count, rate[a] (95% CI)

	1994		1996		1998		2000	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate
Total	1,431	2.1 (1.4–1.9)	1,529	1.7 (1.4–2.0)	1,490	1.6 (1.4–1.8)	1,332	1.4 (1.2–1.6)
Region								
Midwest	397	2.1 (1.4–2.4)	285	1.3 (0.6–2.0)	435	2.0 (1.4–2.6)	334	1.5 (1.0–1.9)
Northeast	338	2.1 (1.3–2.5)	366	2.0 (1.4–2.6)	304	1.7 (1.2–2.2)	324	1.8 (1.2–2.4)
South	393	1.1 (0.9–1.7)	640	2.0 (1.4–2.6)	527	1.6 (1.2–1.9)	459	1.4 (1.0–1.7)
West	302	2.1 (0.8–2.3)	238	1.2 (0.8–1.6)	225	1.1 (0.8–1.4)	215	1.0 (0.6–1.4)

[a]Rate per 100,000 based on 1994, 1996, 1998, 2000 population estimates from Current Population Survey (CPS), CPS Utilities, Unicon Research Corporation, for relevant demographic categories of US male civilian non-institutionalized population.
NOTE: Counts may not sum to totals due to rounding.
SOURCE: Healthcare Cost and Utilization Project Nationwide Inpatient Sample, 1994, 1996, 1998, 2000.

Table 6. Inpatient stays by male Medicare beneficiaries with urinary incontinence listed as primary diagnosis, count[a], rate[b] (95% CI)

	1992		1995		1998	
	Count	Rate	Count	Rate	Count	Rate
Total[c]	1,520	10 (9.8–11)	1,680	11 (11–12)	1,620	11 (11–12)
Total < 65	60	1.9 (1.5–2.4)	160	4.6 (3.9–5.4)	140	4.1 (3.4–4.7)
Total 65+	1,460	13 (12–13)	1,520	13 (12–14)	1,480	13 (13–14)
Age						
65–74	700	9.7 (9.0–10)	640	8.9 (8.2–9.6)	620	9.6 (8.9–10)
75–84	580	16 (15–18)	640	17 (16–19)	760	21 (19–22)
85–94	160	20 (17–23)	200	24 (20–27)	100	12 (9.2–14)
95+	20	26 (14–37)	40	49 (34–63)	0	0
Race/ethnicity						
White	1,320	11 (10–11)	1,480	11 (11–12)	1,440	12 (11–12)
Black	120	9.4 (7.8–11)	80	5.8 (4.5–7.1)	120	9.0 (7.4–11)
Asian	…	…	0	0	0	0
Hispanic	…	…	60	30 (23–38)	40	12 (8.3–16)
N. American Native	…	…	0	0	0	0
Region						
Midwest	420	11 (10–12)	620	16 (15–17)	660	18 (16–19)
Northeast	320	10 (9.0–11)	120	3.8 (3.1–4.4)	280	10 (8.9–11)
South	420	8.0 (7.3–8.8)	700	13 (12–14)	500	9.3 (8.5–10)
West	340	15 (14–17)	200	8.6 (7.4–9.8)	160	7.2 (6.0–8.3)

… data not available.

[a]Unweighted counts multiplied by 20 to arrive at values in the table.

[b]Rate per 100,000 Medicare beneficiaries in the same demographic stratum.

[c]Persons of other race, unknown race and ethnicity, and other region are included in the totals.

NOTE: Counts less than 600 should be interpreted with caution.

SOURCE: Centers for Medicare and Medicaid Services, MedPAR and 5% Carrier File, 1992, 1995, 1998.

TRENDS IN HEALTHCARE RESOURCE UTILIZATION

Inpatient Care

Table 5 shows rates of inpatient hospitalizations among men having UI as the primary diagnosis. Data from the HCUP inpatient sample indicate that the overall rate was steady at 1.4 to 2.1 per 100,000, with no meaningful change from 1994 through 2000. The rate remained low across all geographic regions. This is consistent with clinical experience that UI does not typically lead to hospital admission, except for surgical correction of the condition. Estimates of inpatient hospitalizations through the 1990s in the Medicare (CMS) population are presented in Table 6. The overall rate of inpatient hospital stays for men ≥65 years of age with UI was stable at 13 per 100,000 male Medicare beneficiaries. The rate for men <65 years of age in the Medicare population fluctuated more, probably as a result of peculiarities of data on the disabled population. Caucasian males had higher inpatient hospitalization rates than did African American males. Asian and Hispanic men were not identified as specific populations until 1995, and their relatively low counts make interpretation of the corresponding rates difficult.

Consistent with larger secular trends, lengths of stay (LOS) of men with UI as a primary diagnosis decreased between 1994 and 2000 (Table 7). Sample sizes for the non-whites and those younger than 55 were too small to produce reliable estimates for those demographic categories. LOS declined across all regions from 1994 to 1996, the shortest mean LOS being 2.0 days in the West. Increasing market pressure from managed care during that time may have contributed to this trend. There was wide variation in inpatient

Table 7. Trends in mean inpatient length of stay (days) for adult males hospitalized with urinary incontinence listed as primary diagnosis

	Length of Stay			
	1994	1996	1998	2000
Total	3.7	2.8	3.0	3.2
Age				
18–24	*	*	*	*
25–34	*	*	*	*
35–44	*	*	*	*
45–54	*	*	*	*
55–64	2.8	2.1	3.0	2.8
65–74	3.3	2.3	2.0	2.9
75–84	4.3	3.6	3.4	3.2
85+	*	*	*	*
Race/ethnicity				
White	3.9	2.9	3.2	3.1
Black	*	*	*	*
Hispanic	*	*	*	*
Asian/Pacific Islander	*	*	*	*
Other	*	*	*	…
Region				
Midwest	3.2	2.2	3.1	3.3
Northeast	5.1	2.8	4.0	2.5
South	3.8	3.5	2.6	2.9
West	2.7	2.0	2.5	4.5
MSA				
Rural	3.8	4.2	2.3	4.3
Urban	3.7	2.7	3.2	3.0
Discharge status				
Routine	3.0	2.5	2.5	2.6
Skilled nursing facility	*	*	…	…
Intermediate care	*	*	…	…
Other facility	*	*	6.2	*
Home health	*	*	*	*
Against medical advice	*	*	*	*
Died	*	*	*	*

… data not available.

*Figure does not meet standard for reliability or precision.

MSA, metropolitan statistical area.

SOURCE: Healthcare Cost and Utilization Project Nationwide Inpatient Sample, 1994, 1996, 1998, 2000.

LOS for men with UI in rural areas. In 1994, mean LOS in rural hospitals (3.8 days) was similar to that in urban hospitals; in 1996, it increased to 4.2 days, then it declined to 2.3 days in 1998; it then increased to a high of 4.3 days in 2000, 1.3 days longer than for urban sites. In urban hospitals, there was a general downward trend in LOS, to 3.0 days in 2000. The diffusion of managed care from urban to rural areas through the 1990s may explain these observations.

Outpatient Care

According to data from the National Hospital Ambulatory Medical Care Survey (NHAMCS) for 1994, 1996, 1998, and 2000 (Table 8), 0.1% of all hospital outpatient visits by men over the age of 18 were associated with UI as any listed diagnosis. Because the counts for this diagnosis were so low, the 1994, 1996, 1998, and 2000 data were collapsed to yield a rate of 90 per 100,000 for the four years combined (or 22.5 per 100,000 annually). Hospital outpatient visit rates for men with UI listed as the primary diagnosis were about 10 per 100,000 annually.

As expected, the rate of outpatient visits for men with UI (Table 9) is far greater than that for inpatient visits by men (Table 6) both under and over age 65. The rates increased for men in all groups from 1992 to 1998. Outpatient visits by men over age 65 with UI were 2.8 times more frequent than inpatient visits (hospitalizations) in 1992 and were 5.2 times more frequent by 1998. Men 75 to 84 years of age had the highest outpatient visit rates, 59 per 100,000 in 1992 and 85 per 100,000 in 1995. The difference in Medicare outpatient vs inpatient services for men with UI under age 65 is even more striking. Outpatient visits were 10 times more frequent than inpatient visits in 1992 and 11.4 times more frequent in 1998. Regional Medicare data indicate that outpatient visit rates in 1992 ranged from 2.9 to 4.4 times the rate of inpatient visits. By 1998, outpatient visit rates were 4.1 to 9.6 times higher than inpatient visit rates for all regions. In 1998 (the most recent year for which data are available), the South had the lowest rate of inpatient visits, 42 per 100,000. In the Midwest, both outpatient and inpatient visit rates increased to a high of 98 per 100,000 in 1998, more than double the rate in the South.

Interestingly, there was an inverse relationship between the rate of outpatient and inpatient services for African American males and that for Caucasian

Table 8. Hospital outpatient visits by adult males with urinary incontinence, (1994–2000) merged, count (95% CI), number of visits, percentage of visits, rate (95% CI)

	4-Year Count (95% CI)	Total No. Visits by Men 18+ 1994–2000	Percent of Visits	4-Year Rate (95% CI)
Primary diagnosis	38,629 (3,361–73,897)	78,399,663	0%	42 (4–80)
Any diagnosis	83,762 (29,850–137,674)	78,399,663	0.1%	90 (32–149)

[a]Rate per 100,000 based on the sum of weighted counts in 1994, 1996, 1998, 2000 over the mean estimated base population across those four years. Population estimates from Current Population Survey (CPS), CPS Utilities, Unicon Research Corporation, for relevant demographic categories of US male adult civilian non-institutionalized population.
SOURCE: National Hospital Ambulatory Medical Care Survey, 1994, 1996, 1998, 2000.

Table 9. Hospital outpatient visits by male Medicare beneficiaries with urinary incontinence listed as primary diagnosis, count[a], rate[b] (95% CI)

	1992		1995		1998	
	Count	Rate	Count	Rate	Count	Rate
Total[c]	5,080	34 (34–35)	8,300	55 (53–56)	9,420	65 (64–66)
Total < 65	900	29 (27–31)	1,620	47 (45–49)	2,040	59 (57–62)
Total 65+	4,180	36 (35–37)	6,680	57 (55–58)	7,380	67 (65–68)
Age						
65–74	1,840	25 (24–27)	2,900	40 (39–42)	2,960	46 (44–48)
75–84	2,080	59 (56–61)	3,120	85 (82–88)	3,080	84 (81–87)
85–94	240	30 (27–34)	620	73 (67–79)	1,300	150 (142–158)
95+	20	26 (14–37)	40	49 (34–63)	40	46 (32–59)
Race/ethnicity						
White	3,840	31 (30–32)	6,200	48 (47–49)	7,320	60 (58–61)
Black	900	71 (66–75)	1,580	114 (108–120)	1,160	87 (82–92)
Asian	…	…	20	27 (15–40)	100	73 (58–88)
Hispanic	…	…	240	121 (106–136)	600	179 (164–193)
N. American Native	…	…	40	199 (139–258)	0	0
Region						
Midwest	1,780	48 (46–50)	2,280	59 (57–62)	3,620	98 (95–101)
Northeast	1,260	40 (38–42)	1,880	59 (56–62)	1,920	69 (66–72)
South	1,060	20 (19–21)	2,260	41 (40–43)	2,280	42 (41–44)
West	980	44 (41–46)	1,880	81 (77–85)	1,580	71 (67–74)

… data not available.
[a]Unweighted counts multiplied by 20 to arrive at values in the table.
[b]Rate per 100,000 Medicare beneficiaries in the same demographic stratum.
[c]Persons of other races, unknown race and ethnicity, and other region are included in the totals.
NOTE: Counts less than 600 should be interpreted with caution.
SOURCE: Centers for Medicare and Medicaid Services, MedPAR and 5% Carrier File, 1992, 1995, 1998.

males. From 1992 to 1998, rates of inpatient visits were consistently higher for Caucasians, while rates of outpatient services were consistently higher for African Americans. The difference was greatest in 1995, when the ratio of outpatient visits for African American males was 2.4 times that for Caucasian males, narrowing to 1.5 in 1998. As with inpatient visits, Hispanic men had a markedly higher rate of outpatient visits—179 per 100,000 in 1998, twice that of African Americans and three times that of Caucasians. These differences may follow from differences in the types of services provided. Surgical therapy for UI in the 1990s was typically provided on an inpatient basis, while nonsurgical therapy was provided on an outpatient basis. Further study is needed to clarify these trends.

Veterans Health Affairs (VA) data, which are based on outpatient medical records rather than population survey data, show a strong trend toward increasing prevalence of medically recognized UI with increasing age in males; the prevalence in men 85 years of age and older is approximately ten times that in men 35 to 44 years of age. Table 10 also demonstrates an increase over time in the prevalence of medically recognized UI in men, from 717 per 100,000 in 1999 to 975 per 100,000 in 2001 (all diagnoses of UI). As expected, the prevalence of medically recognized UI based on ICD-9 codes from office visits is substantially less than that found in the NHANES study, which is population-based. The increase in medically recognized UI between 1999 and 2001 likely reflects an increase in clinical ascertainment of UI, rather than an increase in underlying prevalence. Racial/ethnic differences in prevalence among men are modest compared to the differences among women, although African American men consistently have a slightly higher prevalence than do Caucasians. Racial differences in care-seeking behavior and perceptions of the healthcare system make these data difficult to interpret. Regional differences are slight and vary from year to year without a consistent pattern.

According to Medicare data (Table 11), the rates of physician office visits for male UI increased by 77% between 1992 and 1998, from 395 per 100,000 to 698 per 100,00, for all age groups. Visit rates for men 65 years of age and older increased from 457 per 100,000 to 818 per 100,000, and rates for those under 65 increased from 164 per 100,000 to 314 per 100,000. More detailed examination reveals that there is a trend of increasing rates of physician office visits for each age category in the 65 and older group up to and including the 85 to 94 age group, which had a rate of 1,721 per 100,000 in 1998 (Table 11 and Figure 2). Regionally, physician office visit rates varied less than hospitalization rates, which ranged widely from year to year, even within individual geographic areas.

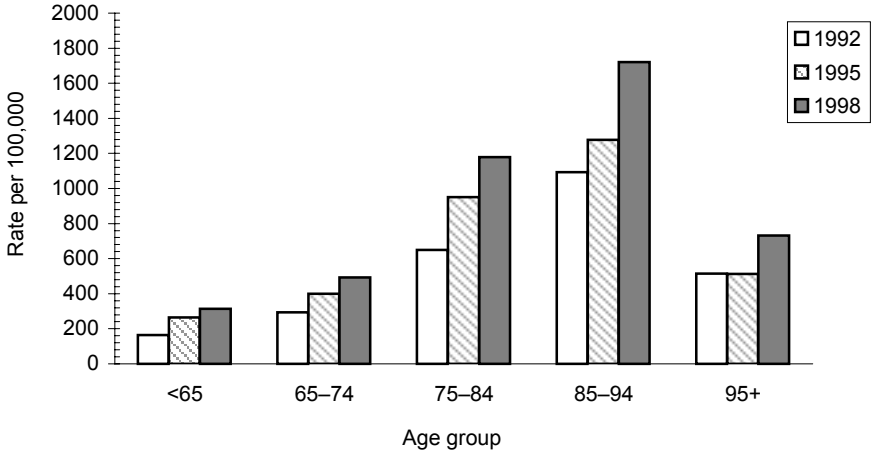

Figure 2. Physician office visits by male Medicare beneficiaries for urinary incontinence, by patient age and year.

SOURCE: Centers for Medicaid and Medicare Serivces, MedPAR, and 5% Carrier File, 1992, 1995, 1998.

Table 10. Frequency of urinary incontinence[a] in male VA patients seeking outpatient care, rate[b]

	1999		2000		2001	
	Primary Diagnosis	Any Diagnosis	Primary Diagnosis	Any Diagnosis	Primary Diagnosis	Any Diagnosis
Total	437	717	525	914	515	975
Age						
18–24	62	77	79	113	87	99
25–34	103	146	117	169	133	178
35–44	148	216	183	275	196	290
45–54	228	336	273	411	280	444
55–64	363	570	416	677	422	707
65–74	538	886	596	1,058	558	1,076
75–84	812	1,400	950	1,748	836	1,723
85+	1,227	2,243	1,489	2,792	1,365	2,908
Race/ethnicity						
White	597	963	696	1,197	688	1,264
Black	691	1,068	833	1,296	876	1,382
Hispanic	492	891	678	1,075	571	1,004
Other	549	899	634	1,129	536	894
Unknown	177	319	237	479	251	586
Region						
Midwest	398	693	484	928	459	937
Northeast	557	874	628	1,006	563	998
South	343	591	450	806	480	930
West	494	767	578	973	584	1,075
Insurance status						
No insurance/self-pay	344	541	408	660	394	690
Medicare/Medicare supplemental	679	1162	768	1,449	726	1,482
Medicaid	538	926	671	1,128	581	1,019
Private insurance/HMO/PPO	432	722	491	828	467	853
Other insurance	322	574	401	699	388	680
Unknown	1,244	2,035	1,076	1,937	416	648

HMO, health maintenance organization; PPO, preferred provider organization.

[a]Represents diagnosis codes for male urinary incontinence.

[b]Rate is defined as the number of unique patients with each condition divided by the base population in the same fiscal year x 100,000 to calculate the rate per 100,000 unique outpatients.

NOTE: Race/ethnicity data from clinical observation only, not self-report; note large number of unknown values.

SOURCE: Outpatient Clinic File (OPC), VA Austin Automation Center, 1999–2001.

Table 11. Physician office visits by male Medicare beneficiaries with urinary incontinence listed as primary diagnosis, count[a], rate[b] (95% CI)

	1992		1995		1998	
	Count	Rate	Count	Rate	Count	Rate
Total[c]	58,240	395 (392–399)	83,800	551 (547–554)	101,080	698 (694–702)
Total < 65	5,080	164 (160–169)	9,080	264 (258–269)	10,780	314 (308–320)
Total 65+	53,160	457 (453–461)	74,720	635 (630–639)	90,300	818 (812–823)
Age						
65–74	21,200	293 (289–297)	28,720	400 (395–404)	31,600	492 (486–497)
75–84	22,920	649 (641–657)	34,740	950 (940–960)	43,160	1,179 (1,168–1,190)
85–94	8,640	1,093 (1,070–1,116)	10,840	1,278 (1,254–1,302)	14,900	1,721 (1,694–1,748)
95+	400	515 (465–565)	420	512 (463–561)	640	732 (676–788)
Race/ethnicity						
White	50,280	405 (402–409)	74,320	572 (568–576)	88,900	727 (722–732)
Black	4,120	323 (313–333)	6,380	461 (449–472)	7,020	526 (514–538)
Asian	…	…	740	1,015 (943–1,088)	940	685 (642–729)
Hispanic	…	…	940	473 (443–504)	2,260	673 (646–701)
N. American Native	…	…	20	99 (55–144)	40	143 (100–186)
Region						
Midwest	15,480	417 (411–424)	20,540	533 (526–540)	23,880	646 (638–654)
Northeast	11,840	373 (367–380)	17,880	562 (554–570)	19,660	707 (698–717)
South	21,180	404 (399–410)	30,440	555 (549–561)	39,760	741 (734–748)
West	8,900	396 (388–404)	13,900	599 (589–609)	16,680	746 (735–757)

… data not available.

[a]Unweighted counts multiplied by 20 to arrive at values in the table.

[b]Rate per 100,000 Medicare beneficiaries in the same demographic stratum.

[c]Persons of other races, unknown race and ethnicity, and other region are included in the totals.

NOTE: Counts less than 600 should be interpreted with caution.

SOURCE: Centers for Medicare and Medicaid Services, MedPAR and 5% Carrier File, 1992, 1995, 1998.

Table 12. Physician office visits by adult males with urinary incontinence, 1992–2000 (merged), count (95% CI), number of visits, percentage of visits, rate (95% CI)

	5-Year Count (95% CI)	Total No. Visits by Men 18+, 1992–2000	% of Visits	5-Year Rate (95% CI)
Primary diagnosis	989,688 (665,142–1,314,234)	1,122,162,099	0.1	1,079 (725–1,433)
Any diagnosis	1,660,627 (1,245,549–2,075,705)	1,122,162,099	0.1	1,811 (1,358–2,263)

[a]Rate per 100,000 based on the sum of weighted counts in 1992, 1994, 1996, 1998, 2000 over the mean estimated base population across those five years. Population estimates from Current Population Survey (CPS), CPS Utilities, Unicon Research Corporation, for relevant demographic categories of US male adult civilian non-institutionalized population.

SOURCE: National Ambulatory Medical Care Survey, 1992, 1994, 1996, 1998, 2000.

Table 13. Visits to ambulatory surgery centers by male Medicare beneficiaries with urinary incontinence listed as primary diagnosis, count[a], rate[b] (95% CI)

	1992		1995		1998	
	Count	Rate	Count	Rate	Count	Rate
Total[c]	3,140	21 (21–22)	7,340	48 (47–49)	5,480	38 (37–39)
Total < 65	340	11 (9.8–12)	680	20 (18–21)	600	17 (16–19)
Total 65+	2,800	24 (23–25)	6,660	57 (55–58)	4,880	44 (43–45)
Age						
65–74	1,320	18 (17–19)	3,680	51 (50–53)	2,460	38 (37–40)
75–84	1,040	29 (28–31)	2,460	67 (65–70)	1,980	54 (52–56)
85–94	440	56 (50–61)	500	59 (54–64)	420	49 (44–53)
95+	0	0	20	24 (13–35)	20	23 (13–33)
Race/ethnicity						
White	2,700	22 (21–23)	6,800	52 (51–54)	4,820	39 (38–41)
Black	200	16 (13–18)	320	23 (21–26)	480	36 (33–39)
Asian	…	…	0	0	60	44 (33–55)
Hispanic	…	…	40	20 (14–26)	20	6.0 (3.3–8.6)
N. American Native	…	…	0	0	0	0
Region						
Midwest	1,280	35 (33–36)	2,200	57 (55–59)	1,720	47 (44–49)
Northeast	640	20 (19–22)	1,700	53 (51–56)	1,140	41 (39–43)
South	960	18 (17–19)	2,880	52 (51–54)	1,860	35 (33–36)
West	260	12 (10–13)	560	24 (22–26)	740	33 (31–35)

… data not available.
[a]Unweighted counts multiplied by 20 to arrive at values in the table.
[b]Rate per 100,000 Medicare beneficiaries in the same demographic stratum.
[c]Persons of other races, unknown race and ethnicity, and other region are included in the totals.
NOTE: Counts less than 600 should be interpreted with caution.
SOURCE: Centers for Medicare and Medicaid Services, MedPAR and 5% Carrier File, 1992, 1995, 1998.

The trend to increasing physician visits was consistent across all geographic regions. In 1998, the highest rate occurred in the West, 746 per 100,000, but this was only 10% higher than the lowest rate, seen in the Midwest. In 1998, the highest utilization of physician office services was for Caucasian males, followed by Asians, Hispanics, and African Americans. According to data from NAMCS for 1992–2000, 0.1% of all office visits to physician offices by males were for UI as the primary diagnosis (Table 12). Because the counts were so low for this diagnosis, the five even years between 1992 and 2000 were collapsed to yield a physician rate of 1,079 per 100,000 for the five years combined (or 216 per 100,000 annually). When the scope of the definition was broadened to include UI as any diagnosis, the proportion remained unchanged, but the visit rate increased to 1,811 per 100,000 for the five years combined (or 362 per 100,000 annually).

Ambulatory surgery visits for men with UI (Table 13) were far less frequent than were physician office visits (Table 11). For men under 65, the rate increased between 1992 and 1995, then decreased to the 1998 level of 17 per 100,000. Likewise, the rate for men over 65 increased between 1992 and 1995, then fell slightly to the 1998 level of 44 per 100,000. This pattern of increasing rates followed by a slight decline was seen across all age groups for men 65 and over.

The pattern of change in rates of ambulatory surgery visits for regions mirrors the trend for age. That is, rates increased across all geographic regions between 1992 and 1995, then decreased for 1998, where the lowest rate, 33 per 100,00, was seen in the West.

Table 14. Special needs of male nursing home residents regardless of continence status, count, rate[a] (95% CI)

	1995		1997		1999	
	Count	Rate	Count	Rate	Count	Rate
Has indwelling foley catheter or ostomy						
Yes	50,298	11,961 (10,569–13,352)	53,938	12,141 (10,731–13,552)	51,457	11,266 (9,941–12,591)
No	369,452	87,854 (86,453–89,254)	389,880	87,762 (86,348–89,176)	401,402	87,884 (86,497–89,271)
Question left blank	781	186 (3–368)	430	97 (0–210)	3,883	850 (385–1,315)
Requires assistance using the toilet						
Yes	207,587	49,363 (47,203–51,523)	221,599	49,882 (47,736–52,028)	241,558	52,887 (50,755–55,020)
No	141,870	33,736 (31,689–35,783)	133,378	30,023 (28,069–31,977)	128,251	28,080 (26,154–30,005)
Question skipped for allowed reason	69,267	16,471 (14,863–18,080)	86,814	19,542 (17,809–21,275)	81,977	17,948 (16,308–19,588)
Question left blank	1,807	430 (146–714)	2,459	553 (238–869)	4,956	1,085 (571–1,599)
Requires assistance from equipment when using the toilet						
Yes	57,463	13,664 (12,183–15,145)	59,329	13,355 (11,901–14,809)	67,782	14,840 (13,323–16,357)
No	143,213	34,055 (32,011–36,100)	149,218	33,589 (31,564–35,614)	162,895	35,665 (33,630–37,699)
Question skipped for allowed reason	211,137	50,207 (48,047–52,368)	220,191	49,565 (47,419–51,711)	210,228	46,028 (43,899–48,156)
Question left blank	8,719	2,073 (1,466–2,680)	15,510	3,491 (2,702–4,281)	15,837	3,467 (2,650–4,285)
Requires assistance from another person when using the toilet						
Yes	203,490	48,389 (46,230–50,548)	217,556	48,972 (46,827–51,117)	238,252	52,163 (50,029–54,297)
No	2,350	559 (237–881)	2,571	579 (234–924)	2,690	589 (237–941)
Question skipped for allowed reason	211,137	50,207 (48,047–52,368)	220,191	49,565 (47,419–51,711)	210,228	46,028 (43,899–48,156)
Question left blank	3,554	845 (451–1,239)	3,930	885 (482–1,287)	5,573	1,220 (681–1,759)
Has difficulty controlling urine						
Yes	218,491	51,956 (49,797–54,115)	232,536	52,344 (50,203–54,485)	242,189	53,025 (50,898–55,153)
No	170,988	40,660 (38,537–42,783)	175,090	39,413 (37,325–41,500)	177,128	38,781 (36,709–40,852)
Question skipped for allowed reason	29,338	6,976 (5,881–8,072)	36,416	8,197 (7,028–9,366)	34,206	7,489 (6,406–8,572)
Question left blank	1,715	408 (110–705)	207	47 (0–138)	3,220	705 (255–1,155)

[a]Rate per 100,000 adult male nursing home residents in the NNHS for that year.

SOURCE: National Nursing Home Survey, 1995, 1997, 1999.

It was not possible to calculate trends in outpatient UI surgery visit rates among ethnic groups because counts were too small to produce reliable estimates. The exception was the rate for Caucasian males, who showed an increase in outpatient surgical visits in 1995, with a subsequent reduction in 1998.

Nursing Home Care

Data from the National Nursing Home Survey (NNHS) for 1995, 1997, and 1999 are shown in Table 14. The burden of UI in the nursing home setting is clear when activities of daily living are considered. In 1999, more than half of the men in nursing homes were reported to have difficulty controlling their urine and required assistance using the toilet; 14.8% required assistance from equipment and 52% required assistance from another person. Eleven percent had either an indwelling foley or an ostomy. There was little change in these parameters over the years studied. In fact, from 1997 to 1999, there was a small increase in the rate of patients requiring assistance from another person to use the toilet.

TREATMENT

In general, treatment options for incontinence are based on the type of incontinence rather than the gender of the patient. For this reason, many studies and reviews include case mixes of men and women (20). The exceptions are in the management of issues related to the prostate gland (e.g., post-radical prostatectomy) and male neurogenic bladder, where treatment addresses the male sphincter. In these areas, where large groups of men have been studied, gender-specific treatment effects are apparent.

Nonpharmaceutical / Nonsurgical

Behavioral therapies, including pelvic floor muscle (PFM) exercises, biofeedback, and bladder training, are the least invasive options and have a low rate of side effects. They may be used both for cognitively impaired/institutionalized patients and for independently living, cognitively aware geriatric patients able to participate in learning new skills. There is a considerable body of scientific evidence supporting the effectiveness of behavioral therapy, but most subjects in those reports are women. Most of the research on conservative treatment of UI in men focuses on post-prostatectomy incontinence.

A recent review of the Cochrane database found only 6 randomized controlled trials of conservative approaches to management of post-prostatectomy incontinence. Studies were moderate in quality, and the authors concluded, "Men's symptoms tend to improve over time, irrespective of management. The value of the various approaches to conservative management of post-prostatectomy incontinence remains uncertain" (21).

PFM exercises, often attributed to Dr Kegel, refer primarily to pelvic muscle training as a means of reducing stress incontinence in women (22). In a randomized controlled trial of PFM exercises in 58 consecutive post-prostatectomy patients with a four-week follow-up, Porru et al. (23) reported more rapid resolution of UI symptoms and significantly better quality of life in the treatment group. A Cochrane review of PFM exercises reported no difference in the occurrence of post-operative UI between patients who had pre-prostate-surgery PFM training and the control group (24, 25). There are no randomized controlled trials in the literature concerning PFM exercises for non-post-operative men (26).

Biofeedback affords patients immediate observed information on performance of muscle contraction, allowing them to adjust their voiding technique accordingly to achieve maximum effect. A randomized, comparative study of biofeedback vs verbal feedback for learning PFM exercises after radical prostatectomy showed no difference in measures of UI at six-month follow-up (27).

Bladder training (a systematic approach to modifying voiding patterns) and prompted voiding (timely reminders to void for people with or without dementia) have also been the subject of Cochrane reviews. Most studies that met review criteria were in women, and no conclusions have been drawn about the benefit of these approaches for men (28, 29).

Results of combinations of strategies in men following prostatectomy are contradictory. Moore et al. (30) studied PFM exercises alone and in combination with electrical stimulation vs no treatment following prostatectomy and found no difference in UI among groups. Van Kampen et al. (31) compared combinations of PFM exercises with initial electrical stimulation and biofeedback vs sham

electrical stimulation post-prostatectomy. Patients with urge incontinence also received bladder training. The active treatment group fared better in terms of duration and degree of continence and quality of life. Data for urge incontinence patients were not analyzed separately. In a randomized controlled trial by Vahtera et al. (32) of electrical stimulation followed by biofeedback and PFM exercises vs no treatment in 30 men and 50 women with detrusor hyperreflexia associated with multiple sclerosis, there was a significant improvement in subjective symptoms in the male group only.

Pharmacological

The use of medications for the treatment of stress incontinence in males is anecdotal. Anticholinergic drugs (e.g., oxybutynin and tolterodine) are more effective than placebo in treating overactive bladder syndrome, which may include urgency incontinence. Systematic literature reviews concerning pharmacological treatment of urge incontinence (20) and overactive bladder syndrome with anticholinergic drugs (33, 34) reveal significant symptom improvement. Although these studies involved male subjects, the men were not analyzed separately.

Surgical

Inpatient surgical procedures for male Medicare patients diagnosed with UI decreased from 1,804 per 100,000 men with UI in 1992 to 1,751 per 100,000 in 1995 and then to 1,337 per 100,000 men with UI in 1998. The counts of procedures performed in ambulatory surgical centers more than quadrupled during this same period (Table 15); however, this trend should be interpreted with caution, given the small numbers.

According to data from the Center for Health Care Policy and Evaluation, the rate of surgical correction of UI (including revision or repair of an artificial sphincter) was 4.8 per 100,000 males having commercial health insurance in 2000 (Table 16). Rates for prior years did not reveal counts high enough to make reliable estimates about trends in this population, nor do the data reveal the specific types of surgery done.

Urgency Incontinence/Neurogenic Bladder

Augmentation cystoplasty is performed primarily for neurogenic bladder. Although many subjects in studies of this treatment are male, results are rarely reported by gender (35). There are no randomized controlled trials of augmentation cystoplasty in the literature. Electrostimulation (sacral nerve stimulation, neuromodulation) in men sends sensory

Table 15. Urinary incontinence procedures for male Medicare beneficiaries, count[a], rate[b]

	1992		1995		1998	
	Count	Rate	Count	Rate	Count	Rate
Total	1,100	2,363	1,640	2,563	1,700	2,274
Operation for correction of incontinence	980	2,105	1,420	2,219	1,440	1,926
Ambulatory surgery center	140	301	280	438	420	562
Inpatient	840	1,804	1,120	1,751	1,000	1,337
Hospital outpatient	0	0	20	31	20	27
Physician office	0	0	0	0	0	0
Revision or repair of prosthetic	120	258	220	344	260	348
Ambulatory surgery center	0	0	40	63	40	53
Inpatient	100	215	160	250	220	294
Hospital outpatient	0	0	20	31	0	0
Physician office	20	43	0	0	0	0

[a]Unweighted counts multiplied by 20 to arrive at values in the table.

[b]Rate per 100,000 Medicare beneficiaries diagnosed with urinary incontinence in the same demographic stratum.

NOTE: Counts less than 600 should be interpreted with caution.

SOURCE: Centers for Medicare and Medicaid Services, MedPAR and 5% Carrier File, 1992, 1995, 1998.

Table 16. Urinary incontinence procedures for males having commercial health insurance in 2000, count[a], rate[b]

	Count	Rate
Total		
Operation for correction of incontinence	48	4.8
Ambulatory surgery	12	*
Inpatient	12	*
Revision/repair of prosthetic		
Ambulatory surgery	21	*
Inpatient	3	*

*Figure does not meet standard for reliability or precision.
[a]Counts less than 30 should be interpreted with caution.
[b]Rate per 100,000 based on member months of enrollment in calendar year.
SOURCE: Center for Health Care Policy and Evaluation, 2000.

input through the pudendal nerve to inhibit detrusor activity (36). Electrodes can be placed externally (in the rectum) or can be internally implanted. A review of the literature (5) reported improvement in urge incontinence in as many as 82.5% of subjects, but men and women were not reported separately.

Prevention

Prevention is typically divided into three types of measures: primary (those that prevent onset of a condition), secondary (those that prevent progression of the condition from its preclinical or asymptomatic state to its clinical or symptomatic state), and tertiary (those that impede the progression of a condition or its complications once it is clinically manifest). Primary prevention is most germane to UI. The principal potentially modifiable risk factors for UI in men are prostatectomy (transurethral or radical) and other medical conditions, including stroke, dementia, recurrent cystitis, bladder cancer, stool impaction, reduced mobility, diabetes, chronic cough, and medications (e.g., diuretics and hypnotics) (37).

Because as many as 30% of patients experience some degree of incontinence following radical prostatectomy (18), techniques to minimize the risk of postoperative incontinence are relevant to prevention of the disorder. Physical therapy to strengthen the pelvic floor musculature has been evaluated as primary prevention for patients undergoing prostate cancer in at least two randomized controlled trials, neither of which found a benefit (23, 24). Various surgical and perioperative techniques have also been suggested to reduce the risk of post-prostatectomy UI, including modified apical dissection and construction of a tubularized neourethra (18). Using the SEER-Medicare linked database, Begg et al. (38) described significantly lower rates of UI among men undergoing radical prostatectomy when the procedures were done in high-volume hospitals by high-volume surgeons. Of course, effective efforts to prevent prostate cancer would also decrease the incidence of male incontinence.

The goal of primary prevention for incontinence not associated with prostatectomy is to prevent the conditions believed to increase the risk of UI, including stroke, dementia, diabetes, and chronic lung disease. Modification of additional risk factors may in turn reduce the incidence of UI. Such preventive measures include controlling diabetes, preventing or treating constipation, maximizing mobility, treating symptomatic urinary tract infections, and avoiding medications that contribute to incontinence. There are apparently no studies evaluating such measures; nonetheless, it is logical to recommend them, as they are consistent with good clinical care.

ECONOMIC IMPACT

As baby boomers age, the number of individuals with incontinence rises and the heavy economic burden of UI on society grows. Governments and healthcare institutions are increasingly concerned about the burden of this disease, particularly since UI is one of the leading causes of individuals losing the ability to live independently and having to enter a care facility.

Direct costs of UI are borne by both the health sector and individual patients and their families. Direct costs related to operating costs for the health sector include those of both inpatient and outpatient services, particularly in the areas of supplies, equipment, and health professionals. Some direct health sector costs, such as the cost of supplies and health professionals' time, are *variable*, while others, such as the overhead incurred in running a hospital or clinic, are *fixed*. The vast majority of patients do not seek medical care; it has been estimated that only 2% of individuals living in the community and 5% of those living in institutions

sought treatment for UI each year (2). Direct costs borne by the patient include the costs of medication and supplies to protect against incontinence. Padding and incontinence protection devices for men are somewhat different from those for women. Some men use gender-specific protective undergarments, which are often more costly than female garments, and some choose to use condom drainage or an external device such as a penile clamp.

Indirect costs include lost earnings for both the patient and family or friends who provide care. Since the prevalence of UI increases dramatically with age, the working status of the 60+ age group is of particular importance.

Estimating the economic burden of UI is complicated by two factors. First, UI is often not coded as the primary diagnosis, making it difficult to quantify the incremental costs of a hospitalization or ambulatory visit attributable to UI. For example, complications of UI such as skin irritation, urinary tract infections, nursing home placements, and fractures incurred when rushing to the toilet may easily be overlooked in claims-based analyses. Second, relatively few individuals with incontinence receive medical treatment for the condition. As a result, even the most rigorous attempts to quantify the economic costs of UI underestimate the true burden. In this section, we estimate the costs of UI, using claims-based data, supplemented by findings from published studies, recent national surveys, and employer data. Because UI is uncommon in men, costs will be proportionately low compared to UI in women.

Published estimates of national annual expenditures for UI vary widely. One study found that the costs of UI-related conditions for persons age 15 and older exceeded $16.3 billion in 1995 dollars (39). Another study considered only adults 65 and over and reported that UI treatment cost $26.3 billion (2). Both studies included estimates of costs for UI-related medical complications, nursing home stays, and supplies such as pads and laundry, as well as the indirect costs of UI. Although the reasons for this wide discrepancy are not entirely clear, both estimates indicate a substantial economic burden on the American public. The data presented in this chapter address individual components of UI-related costs; hence, they may not be directly comparable to aggregate estimates drawn from the literature.

Table 17. Expenditures for male Medicare beneficiaries for the treatment of urinary incontinence, by site of service, 1998

	Total Annual Expenditures	
Site of Service	**Age < 65**	**Age 65+**
Inpatient	*	$11,300,000
Outpatient		
Physician Office	$1,700,000	$15,200,000
Hospital Outpatient	$300,000	$1,300,000
Ambulatory Surgery	$1,300,000	$10,600,000
Emergency Room	$100,000	$600,000
Total	$3,400,000	$39,000,000

*Figure does not meet standard for reliability or precision.

SOURCE: Centers for Medicare and Medicaid Services, 1998.

Direct Costs

A small, but notable, proportion of Medicare expenditures for male UI is accounted for by males under age 65, that is, disabled individuals (Table 17). This is consistent with clinical experience among younger men with spinal cord injury and other neurological disorders that can affect the urinary tract. Among male Medicare beneficiaries age 65 and over, total costs doubled between 1992 and 1995, from $19.1 million to $38.1 million, then remained stable in 1998 (Table 18). Most of the increase occurred in the ambulatory surgery setting, although expenditures for physician office visits also rose substantially. While the amount spent in the inpatient setting rose in absolute terms, it declined from 44% to 29%, consistent with secular trends toward outpatient care in the 1990s (Figure 3).

Given the inherent limitations in deriving treatment costs from claims data, the Urologic Diseases in America analyses used multivariate regression models to estimate the incremental costs associated with a primary diagnosis of UI (Table 19). The study sample consisted of nearly 280,000 primary beneficiaries age 18 to 64 who had employer-provided coverage throughout 1999. Regression models were estimated for annual medical and pharmacy costs per person. The main independent variables included a set of measures to describe medical and drug benefits

Table 18. Expenditures for male Medicare beneficiaries age 65 and over for treatment of urinary incontinence, by site of service (% of total)

	Year		
	1992	1995	1998
Total	19,100,000	38,100,000	39,000,000
Inpatient	8,400,000 (43.9%)	10,300,000 (27.0%)	11,300,000 (29.0%)
Outpatient			
Physician Office	6,200,000 (32.5%)	11,000,000 (28.9%)	15,200,000 (39.0%)
Hospital Outpatient	600,000 (3.1%)	2,000,000 (5.2%)	1,300,000 (3.3%)
Ambulatory Surgery	3,300,000 (17.3%)	13,900,000 (36.5%)	10,600,000 (27.2%)
Emergency Room	600,000 (3.1%)	900,000 (2.4%)	600,000 (1.5%)

NOTE: Percentages may not add to 100% because of rounding.

SOURCE: Centers for Medicaid and Medicare Services, 1992, 1995, 1998.

(such as deductibles, co-insurance, and co-payments), patient demographics (age, gender, work status), area characteristics (urban residence, median household income in zip code), and a set of comorbidities derived from the medical claims (binary indicators of 26 disease conditions such as diabetes, asthma, and hypertension). The regression results were used to predict average medical and pharmacy costs for persons with and without a primary diagnosis of UI. Total annual expenditures in 1999 for privately insured adults age 18 to 64 with a primary diagnosis of UI were $7,702, nearly $4,500 more than those for similar individuals without a diagnosis of UI. Nonetheless, the aggregate cost is low, given the relative infrequency of urinary incontinence claims in men.

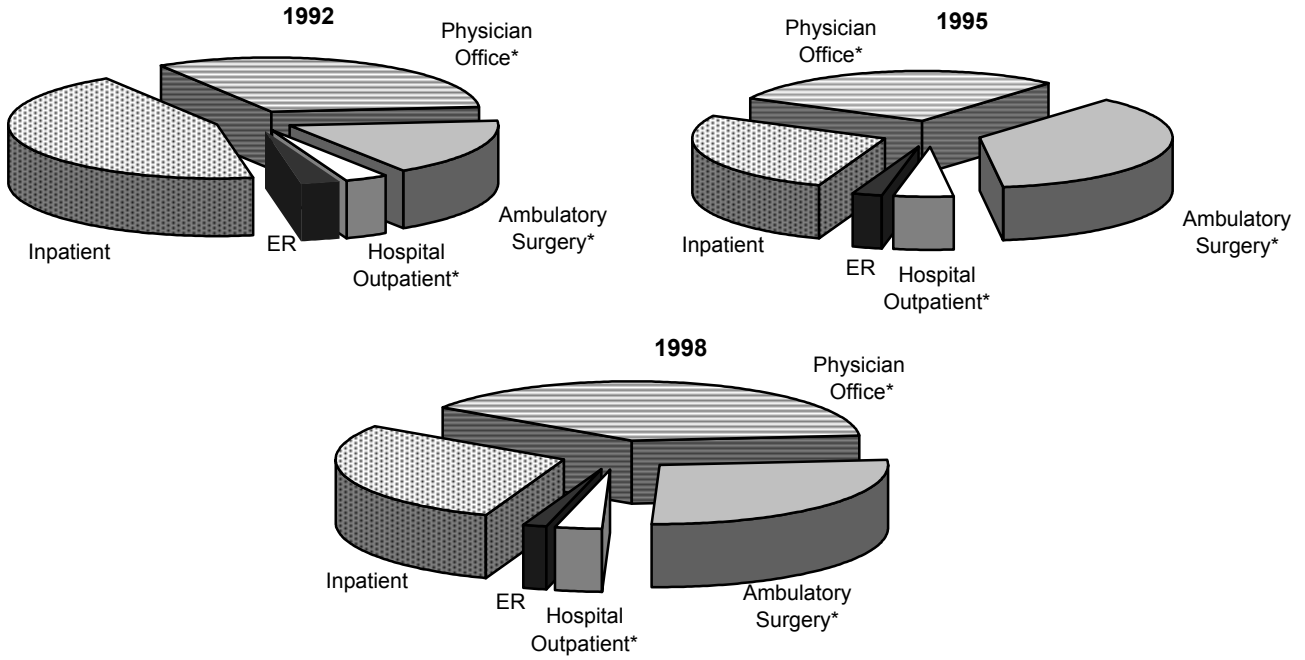

Figure 3. Expenditures of male Medicare beneficiaries age 65 and over for treatment of urinary incontinence (in millions of $).

***Constitute outpatient services.**

SOURCE: Centers for Medicaid and Medicare Serivces, 1992, 1995, 1998.

Table 19. Estimated annual expenditures of privately insured employees with and without a medical claim for urinary incontinence (UI) in 1999[a]

	Annual Expenditures (per person)			
	Persons without UI (N=277,803)	Persons with UI (N=1,147)		
	Total	Total	Medical	Rx Drugs
Total	$3,204	$7,702	$6,099	$1,604
Age				
18–44	$2,836	$7,361	$5,993	$1,369
45–54	$3,305	$8,442	$6,695	$1,747
55–64	$3,288	$7,247	$5,623	$1,623
Gender				
Male	$2,813	*	*	*
Female	$3,933	*	*	*
Region				
Midwest	$3,086	$8,500	$6,861	$1,639
Northeast	$3,085	$7,236	$5,502	$1,734
South	$3,416	$8,329	$6,851	$1,477
West	$3,237	$8,082	$7,118	$964

Rx, prescription.

*Figure does not meet standard for reliability or precision.

[a]The sample consists of primary beneficiaries ages 18 to 64 having employer-provided insurance who were continuously enrolled in 1999. Estimated annual expenditures were derived from multivariate models that control for age, gender, work status (active/retired), median household income (based on zip code), urban/rural residence, medical and drug plan characteristics (managed care, deductible, co-insurance/co-payments), and 26 disease conditions.

SOURCE: Ingenix, 1999.

Table 20. Average annual spending and use of outpatient prescription drugs for treatment of urinary incontinence (both male and female), 1996–1998[a]

Drug Name	Number of Rx Claims	Mean Price	Total Expenditures
Alpha-blocker			
Cardura™	378,895	$43.71	
Anticholinergics			
Oxybutynin	485,044	$19.79	$9,599,027
Imipramine (brand)	247,249	$13.13	$3,246,379
Imipramine (generic)	162,184	$6.59	$1,068,790
Ditropan™	130,390	$32.91	$4,291,146
TOTAL	1,403,762		$34,766,829

Rx, prescription.

[a]Estimates include prescription drug claims with a corresponding diagnosis of urinary incontinence and exclude drugs with fewer than 30 claims. Including expenditures on prescription drugs with fewer than 30 claims (unweighted) would increase total drug spending by approximately 83%, to $63.7 million.

SOURCE: Medical Expenditure Panel Survey, 1996–1998.

Although data on pharmaceutical costs are not available by gender, Table 20 presents the relative expenditures for the medications most often used to treat patients with UI. Almost half of the expenditures in 1996–1998 were for alpha-blockers, generally prescribed to older men with bladder outlet obstruction; this suggests that prostate enlargement contributes to both the human and the financial cost of UI. Not surprisingly, most of the actual prescriptions for UI were written for anticholinergic agents. Because these were predominantly generics, they represent a disproportionately small fraction of total drug expenditures in this period. Since 1998, new long-acting agents in this class have been developed and marketed, altering the economic landscape for the pharmaceutical management of individuals with UI.

Additional direct patient costs include those of pads, diapers, condom catheters, indwelling catheters, and penile clamps. Little detailed information on these costs is available; however, they are thought to be substantial, owing in large part to out-of-pocket outlays that aggregate over many years. Wagner and Hu estimated the annual cost of UI-related supplies to be $7.1 billion for individuals in the home setting and $4.3 billion for those in the institutional setting; supplies related to catheterization accounted for $224 million of the total expenditures (2).

Indirect Costs

The indirect financial burden of incontinence also falls on "informal caregivers," i.e., family and friends. Data from the 1993 Asset and Health Dynamics Study of persons over the age of 70 indicate that continent men received 7.4 hours of care per week, increasing to 11.3 hours and 16.6 hours for men with incontinence who did not and did use pads for protection, respectively. The cost of this care was an additional $1,700 per man without pads and $4,000 per man with pads (40).

Relatively little work loss is associated with UI among men, as indicated in 1999 data from Marketscan (Table 21). In fact, of the 51 men in this dataset with claims for UI, only 8% missed work because of it, about three times lower than the rate for women. Because these 51 men represent only 0.4% of the men in the sample, the proportion of men missing work for claims related to UI is only 0.03%. Among those men who missed work, the average annual work absence was only 2.3 hours, all for outpatient services,

Table 21. Average annual work loss of persons treated for urinary incontinence (95% CI)

			Average Work Absence (hrs)		
Gender	Number of Workers[a]	% Missing Work	Inpatient[b]	Outpatient[b]	Total
Male	51	8%	0	2.3 (0–5.0)	2.3 (0–5.0)
Female	319	23%	7.1 (1.7–12.6)	21.6 (11.3–31.9)	28.7 (14.9–42.5)

[a]Individuals with an inpatient or outpatient claim for urinary incontinence and for whom absence data were collected. Work loss is based on reported absences contiguous to the admission and discharge dates of each hospitalization or the date of the outpatient visit.

[b]Inpatient and outpatient include absences that start or stop the day before or after a visit.

SOURCE: MarketScan, 1999.

Table 22. Average work loss associated with a hospitalization or an ambulatory care visit for treatment of urinary incontinence (95% CI)

	Inpatient Care		Outpatient Care	
Gender	Number of Hospitalizations[a]	Average Work Absence (hrs)	Number of Outpatient Visits	Average Work Absence (hrs)
Male	*	*	82	1.4 (0.1–2.7)
Female	*	*	625	11.0 (7.5–14.6)

*Figure does not meet standard for reliability or precision.

[a]Unit of observation is an episode of treatment. Work loss is based on reported absences contiguous to the admission and discharge dates of each hospitalization or the date of the outpatient visit.

SOURCE: MarketScan, 1999.

less than one-tenth the number for women. Men had much less time away from work for each outpatient visit than did women (Table 22).

RECOMMENDATIONS

The newly recommended changes in the definition of UI and its subtypes will conform better to the new ICD-10 classification, which should improve the accuracy of coding for UI. Studies are needed on the outcome of UI treatment specifically for men and on the role of ethnicity in both prevalence and the likelihood of seeking treatment. Given the aging population, the impact of UI within nursing home settings calls for further research into prevention, treatment, and management practices that could lessen the impact of UI on both the patients and the healthcare system.

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