

UROLOGIC DISEASES IN AMERICA PROJECT: URINARY INCONTINENCE IN WOMEN—NATIONAL TRENDS IN HOSPITALIZATIONS, OFFICE VISITS, TREATMENT AND ECONOMIC IMPACT

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ABSTRACT

Purpose: We describe temporal trends in hospitalizations, outpatient visits and the treatment of female urinary incontinence (UI), and estimated the costs of incontinence using national databases.

Materials and Methods: The analytic methods used to generate these results have been described previously.

Results: The rate of hospitalization with a primary diagnosis of UI decreased from 51/100,000 women in 1994 to 44/100,000 in 2000 and mean length of stay decreased from 3.1 days to 2.1. In contrast, outpatient visits for UI more than doubled during the same period from 845/100,000 women to 1,845/100,000. Rates of inpatient surgical treatment for UI decreased slightly from 1994 to 2000, while ambulatory surgical center visit rates for Medicare beneficiaries 65 years or older more than doubled from 60/100,000 in 1992 to 142/100,000 in 1998. Medical expenditures for UI increased substantially during the 1990s, almost doubling from \$128.1 million in 1992 to \$234.4 million in 1998 for Medicare beneficiaries 65 years or older. This increase was due almost entirely to increased outpatient costs, which increased from \$25.4 million or 9.1% of total costs in 1992 to \$329 million or 27.3% of total costs in 2000 in this group.

Conclusions: While existing national databases generally capture only the minority of incontinent women with UI who seek and receive care for UI, they are useful for documenting trends in service use and surgical treatments, and estimating economic impact. This data can be helpful when formulating public policy and designing observational and clinical studies.

KEY WORDS: urinary tract; urinary incontinence; economics, medical; epidemiology; women

Population based studies estimate as many as three-fourths of women in the United States report at least some urinary leakage with 20% to 50% reporting current leakage.¹ While some groups have interpreted this to mean that almost half of American women experience urinary incontinence (UI), others point out that many women with occasional incontinence are not sufficiently bothered by it to seek care. Of greater clinical relevance is an improved understanding of the number of women with severe or more frequent leakage, estimated fairly uniformly at 7% to 10% by various researchers.² While the prevalence of urge incontinence increases steadily with age, stress incontinence appears to plateau or even decrease slightly after approximately age 50 years (fig. 1).^{3,4}

Studies that inquire about the presence of any or occasional incontinence may overestimate the actual burden of incontinence on the health care system but data based on incontinence treatment underestimate the actual burden, given that many women with bothersome leakage do not seek care. Therefore, information about incontinence treatment in women in the United States reported herein reflects only the portion of the burden of incontinence seen by the American health care system. However, these data provide an estimate of the impact of incontinence on the health care system, including inpatient and outpatient visits, hospital stays, surgical procedures and the prevalence of UI in nursing homes.

These data combined with existing cost estimates provide a measure of the economic impact of UI in women.

MATERIAL AND METHODS

The analytical methods used to generate these results have been described previously.^{5,6}

RESULTS

Prevalence. The National Health and Nutrition Examination Survey (NHANES) showed that the overall prevalence of UI in women 60 years or older was 38% in 1999 to 2000 (table 1). Incontinence was defined by a positive answer to the question, "In the past 12 months, have you had difficulty controlling your bladder, including leaking small amounts of urine when you cough or sneeze (exclusive of pregnancy or recovery from childbirth)?" When broken down by frequency of episodes, 13.7% of all women in NHANES reported daily incontinence and an additional 10.3% reported weekly incontinence (table 2). The prevalence of daily incontinence increased with age, ranging from 12.2% in all women 60 to 64 years old to 19.4% in those 85 years or older. Women with less than a high school education reported incontinence less often than those with at least a high school education. Prevalence was higher in nonHispanic white women (41%) than in nonHispanic black (20%) or Mexican American (36%) women. Other large, population based studies have also shown a higher prevalence of UI in nonHispanic white women than in other ethnic or racial groups.^{7–9}

Health care resource use. Hospitalizations: Data from the Healthcare Cost and Utilization Project (HCUP) indicated

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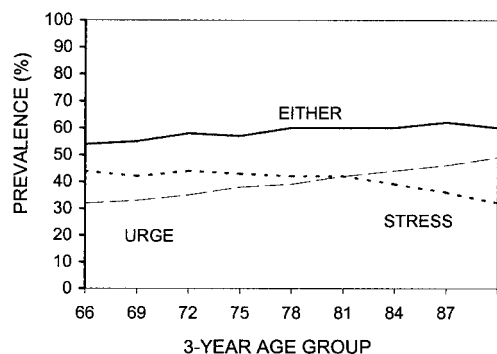


FIG. 1. Prevalence of incontinence by age groups at baseline.⁴ Each age represents midpoint of 3-year age range. Because of small number of women older than 90 years, graph ends with age range 86 to 88 years. Urge and stress refer to women who answered affirmatively to urge and stress incontinence questions, respectively. Either refers to women who reported any urge or stress incontinence. Reprinted with permission from American Geriatrics Society.

that the annual rate of hospitalizations for a primary diagnosis of UI, of which most would be for incontinence surgery, remained stable at 51 to 54/100,000 between 1994 and 1998 before decreasing to 44/100,000 in 2000 (data not shown). The annual rate of hospitalizations was higher in women 45 to 84 years old, peaking in the 65 to 74-year-old age group at 108/100,000 (fig. 2).

Hospitalizations were most common in women residing in the South and West and least common in women living in the Northeast. Women living in urban areas had a higher rate of hospitalizations than those in rural areas. Similar trends were found for Medicare beneficiaries 65 years or older (table 3). Mean length of stay in women with UI as the primary discharge diagnosis decreased steadily from 3.1 days in 1994 to 2.1 in 2000 (table 4). Women in the oldest age groups were hospitalized longer on average than younger women.

Outpatient Visits: In contrast to the decrease in the rate of hospitalizations for incontinence from 1992 to 2000 outpa-

tient visits for UI more than doubled during the same period. Physician visits for which UI was listed as a reason for the visit increased from 845/100,000 women in 1992 to 1,845/100,000 in 2000 (table 5). Similarly visits for which incontinence was the primary condition increased from 468/100,000 in 1992 to 1,107/100,000 in 2000. Office visits for incontinence by women 65 years or older who were enrolled in Medicare increased from 1,371/100,000 in 1992 to 2,937/100,000 in 1998 with the rate in white women approximately double that in black and Asian women, and 50% higher than in Hispanic women (table 6). While the reason for this increase from 1992 to 2000 is unknown, at least 2 potentially related events occurred. 1) The Agency for Healthcare Research and Quality published its first clinical practice guidelines on UI in 1992. These guidelines were widely promulgated and may have led to more visits. 2) Several new anticholinergic medications for urge incontinence were approved during the late 1990s. Releases of the first new medications for incontinence in several decades were accompanied by major direct to consumer advertising campaigns. Thus, visits may also have increased because more women became aware that treatment existed.

In all women receiving outpatient care in the Veterans Affairs system UI was listed as a diagnosis for 2.7% of all visits in 1999, 3.6% in 2000 and 3.8% in 2001 (data not shown). These proportions are substantially lower than the prevalence of daily incontinence reported in population based surveys, consistent with previous studies showing that the majority of women with incontinence do not seek or receive medical care for it. As expected, the proportion of visits coded for UI increased with age with the most marked increase occurring between 25 to 34 and the 45 to 54-year-old women. Visits for incontinence represented a higher proportion of visits for nonHispanic white women compared to black and Hispanic women.

Not surprisingly, given the nonemergency nature of UI, few women seek emergency room care for it. Only 11/100,000 women 65 years or older who were enrolled in Medicare were

TABLE 1. Prevalence of difficulty with controlling bladder in women (NHANES, 1999 to 2000)

| | Total No. | No. Difficulty (%) | No. No Difficulty (%) | No. Refused to Answer or Do Not Know (%) |
|------------------------|------------|--------------------|-----------------------|--|
| All | 23,477,726 | 8,929,543 (38) | 14,449,905 (62) | 98,278 (0) |
| Age at screening: | | | | |
| 60-64 | 5,699,785 | 2,168,863 (38) | 3,530,922 (62) | 0 |
| 65-69 | 4,895,878 | 1,785,380 (36) | 3,110,498 (64) | 0 |
| 70-74 | 4,505,164 | 1,683,804 (37) | 2,818,651 (63) | 2,709 (0) |
| 75-79 | 3,453,472 | 1,515,900 (44) | 1,873,616 (54) | 63,956 (2) |
| 80-84 | 2,981,558 | 989,003 (33) | 1,967,390 (66) | 25,165 (1) |
| 85 or Older | 1,941,869 | 786,593 (41) | 1,148,828 (59) | 6,448 (0) |
| Race/ethnicity: | | | | |
| NonHispanic white | 18,729,539 | 7,662,444 (41) | 11,041,930 (59) | 25,165 (0) |
| NonHispanic black | 1,941,269 | 386,480 (20) | 1,554,789 (80) | 0 |
| Mexican American | 649,003 | 230,567 (36) | 409,279 (63) | 9,157 (1) |
| Other Hispanic | 1,576,419 | 468,823 (30) | 1,107,596 (70) | 0 |
| Other race | 581,496 | 181,229 (31) | 336,311 (58) | 63,956 (11) |
| Education: | | | | |
| Less than high school: | 8,374,762 | 2,692,649 (32) | 5,682,113 (68) | 0 |
| High school | 7,692,149 | 3,484,970 (45) | 4,207,179 (55) | 0 |
| High school or greater | 7,212,158 | 2,725,611 (38) | 4,461,382 (62) | 25,165 (0) |
| Refused | 103,678 | 26,313 (25) | 13,409 (13) | 63,956 (62) |
| Do not know | 87,647 | 0 | 85,822 (98) | 1,825 (2) |
| Missing | 7,332 | 0 | 0 | 7,332 (100) |
| Poverty income ratio: | | | | |
| 0 | 111,440 | 31,876 (29) | 79,564 (71) | 0 |
| Less than 1 | 3,145,548 | 1,116,508 (35) | 2,026,331 (64) | 2,709 (0) |
| 1.00-1.84 | 5,520,548 | 2,193,641 (40) | 3,326,907 (60) | 0 |
| Greater than 1.84 | 9,649,331 | 3,538,606 (37) | 6,085,560 (63) | 25,165 (0) |
| Refused | 2,090,410 | 759,112 (36) | 1,331,298 (64) | 0 |
| Do not know | 1,560,474 | 741,618 (48) | 817,031 (52) | 1,825 (0) |
| Missing | 1,399,975 | 548,182 (39) | 783,214 (56) | 68,579 (5) |

Based on question KI.Q.040, "In the past 12 months, have you had difficulty controlling your bladder, including leaking small amounts of urine when you cough or sneeze?" (do not include bladder control difficulties during pregnancy or recovery from childbirth).

TABLE 2. Frequency of bladder control problems in women who responded yes to difficulty with controlling bladder (NHANES, 1999 to 2000)

| | No. Bladder Control Problems (%) | | | | | |
|------------------------|----------------------------------|----------------|----------------|----------------|----------------|-------------|
| | Total No. | Daily | Few/Wk | Few/Mo | Few/Yr | Do Not Know |
| All | 8,929,543 | 3,255,587 (36) | 2,408,421 (27) | 2,016,715 (23) | 1,082,624 (12) | 166,196 (2) |
| Age at screening: | | | | | | |
| 60-64 | 2,168,863 | 686,213 (32) | 429,351 (20) | 563,017 (26) | 490,282 (23) | 0 |
| 65-69 | 1,785,380 | 475,030 (27) | 511,356 (29) | 479,229 (27) | 172,781 (10) | 146,984 (8) |
| 70-79 | 1,683,804 | 663,681 (39) | 536,511 (32) | 338,233 (20) | 145,379 (9) | 0 |
| 75-79 | 1,515,900 | 575,823 (38) | 448,955 (30) | 286,739 (19) | 204,383 (13) | 0 |
| 80-84 | 989,003 | 456,355 (46) | 233,503 (24) | 258,379 (26) | 21,554 (2) | 19,212 (2) |
| 85 or Older | 786,593 | 398,485 (51) | 248,745 (32) | 91,118 (12) | 48,245 (6) | 0 |
| Race/ethnicity: | | | | | | |
| NonHispanic white | 7,662,444 | 2,759,807 (36) | 1,914,582 (25) | 1,909,818 (25) | 912,041 (12) | 166,196 (2) |
| NonHispanic black | 386,480 | 212,544 (55) | 74,408 (19) | 45,752 (12) | 53,776 (14) | 0 |
| Mexican American | 230,567 | 89,173 (39) | 73,734 (32) | 26,952 (12) | 40,708 (18) | 0 |
| Other Hispanic | 468,823 | 77,927 (17) | 315,040 (67) | 7,880 (2) | 67,976 (14) | 0 |
| Other race | 181,229 | 116,136 (64) | 30,657 (17) | 26,313 (15) | 8,123 (4) | 0 |
| Education: | | | | | | |
| Less than high school | 2,692,649 | 1,381,281 (51) | 566,047 (21) | 463,584 (17) | 281,737 (10) | 0 |
| High school | 3,484,970 | 1,104,097 (32) | 730,106 (21) | 1,040,720 (30) | 510,224 (15) | 99,823 (3) |
| High school or greater | 2,725,611 | 770,209 (28) | 1,112,268 (41) | 486,098 (18) | 290,663 (11) | 66,373 (2) |
| Refused | 26,313 | 0 | 0 | 26,313 (100) | 0 | 0 |
| Poverty income ratio: | | | | | | |
| 0 | 31,876 | 0 | 0 | 31,876 (100) | 0 | 0 |
| Less than 1 | 1,116,508 | 541,675 (49) | 182,029 (16) | 241,012 (22) | 151,792 (14) | 0 |
| 1.00-1.84 | 2,193,641 | 810,902 (37) | 668,567 (30) | 394,473 (18) | 265,876 (12) | 53,823 (2) |
| Greater than 1.84 | 3,538,606 | 988,094 (28) | 1,110,863 (31) | 952,372 (27) | 374,904 (11) | 112,373 (3) |
| Refused | 759,112 | 274,391 (36) | 150,098 (20) | 143,238 (19) | 191,385 (25) | 0 |
| Do not know | 741,618 | 325,985 (44) | 140,318 (19) | 186,751 (25) | 88,564 (12) | 0 |
| Missing | 548,182 | 314,540 (57) | 156,546 (29) | 66,993 (12) | 10,103 (2) | 0 |

Based on question KI.Q.060, "How frequently does this (referring to KI.Q.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?"

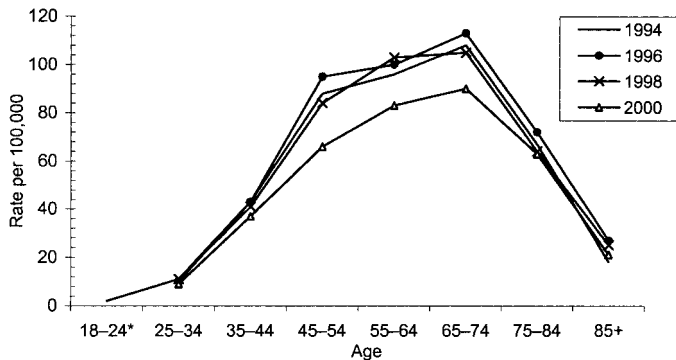


FIG. 2. National inpatient hospital stays by females with UI listed as primary diagnosis by age and year according to HCUP, 1994, 1996, 1998 and 2000. Asterisk indicates that 1996, 1998 and 2000 values do not meet standards of reliability or precision.

evaluated in emergency room settings for this disorder in 1998.

Treatment. Nonsurgical: Fewer than half of the women with UI seek medical care. Johnson et al found that people were most likely to contact a physician if they used pads or had large volume accidents or impairment in daily living activities.¹⁰ Many incontinent people practice behavioral modifications, such as limiting trips, fluids and routine activities. These restrictions are particularly striking in women with concomitant fecal incontinence (table 7).

In women who do seek care for incontinence nonsurgical therapies, primarily for stress incontinence, include pelvic muscle rehabilitation (Kegel exercise), biofeedback, physiotherapy, biofeedback, bladder retraining, electrical stimulation, and vaginal and urethral devices. Pharmacotherapy is available for urge incontinence and new pharmacological agents for stress incontinence will be available in the near future. In women with intractable, severe urge incontinence

direct neuromodulation of the sacral spinal cord is an increasingly popular option.

Surgical: Surgical treatment for UI can be more easily tracked in existing databases than nonsurgical management. Surgical therapy accounts for a considerable proportion of the cost related to incontinence. Although only a small fraction of all women with UI seek surgical intervention, the number of women treated with surgery is substantial. Using a large, managed care database Olsen et al reported an 11.1% lifetime risk of a single operation for UI or pelvic organ prolapse by age 80 years.¹¹ Using data from the 1998 National Hospital Discharge Survey and the 1998 National Census Waetjen et al calculated that approximately 135,000 women in the United States underwent inpatient surgery for stress UI in 1998.¹²

In women with commercial health insurance the rate of inpatient hospitalizations for incontinence procedures (primary or any procedure) ranged from 123/100,000 in 1994 to 114/100,000 in 2000 (data not shown). Hospitalizations for incontinence surgeries as primary procedures decreased from 59/100,000 women in 1994 to 33/100,000 in 2000. There was substantial geographic variation in the rates of incontinence surgery for all of the years sampled between, ranging from 74 to 114/100,000 women in the Northeast to 217 to 306/100,000 in the West.

In 1998 the most commonly performed surgical procedures for female UI were collagen injections, pubovaginal slings and anterior urethropexies (fig. 3). Because anterior colporrhaphies may be performed for UI (a condition for which they are not a currently recommended treatment) or anterior pelvic organ prolapse (cystocele), the rates of this procedure are not described. A striking decrease was seen in Raz and Peyrera needle suspension procedures between 1992 and 1998. Raz procedures decreased from 4,364/100,000 women with a diagnosis of incontinence in 1992 to 1,564/100,000 in 1998, while Peyrera procedures were done too infrequently by 1998 to be detected in the data. Concomitantly pubovaginal slings increased from 621/100,000 women with diagnosed

TABLE 3. Inpatient stays by female Medicare beneficiaries with UI listed as primary diagnosis (Centers for Medicare and Medicaid Services, MedPAR and 5% Carrier File, 1992, 1995 and 1998)

| | 1992 | | 1995 | | 1998 | |
|-----------------|--------|---------------|--------|---------------|--------|---------------|
| | Count | Rate (95% CI) | Count | Rate (95% CI) | Count | Rate (95% CI) |
| Age: | | | | | | |
| All | 16,160 | 82 (80–83) | 19,840 | 98 (97–100) | 17,700 | 93 (92–94) |
| Younger than 65 | 1,240 | 52 (49–55) | 2,520 | 94 (90–97) | 2,520 | 91 (87–94) |
| 65 or Older | 14,920 | 86 (84–87) | 17,320 | 99 (98–100) | 15,180 | 93 (92–95) |
| 65–74 | 9,780 | 106 (104–109) | 11,300 | 126 (123–128) | 9,320 | 118 (116–120) |
| 75–84 | 4,380 | 74 (72–76) | 5,220 | 87 (85–90) | 5,100 | 87 (85–90) |
| 85–94 | 760 | 37 (34–39) | 740 | 33 (31–36) | 700 | 31 (29–34) |
| 95 or Older | 0 | | 60 | 21 (16–26) | 60 | 19 (15–24) |
| Region: | | | | | | |
| Midwest | 4,940 | 98 (96–101) | 5,200 | 101 (98–104) | 4,780 | 97 (94–100) |
| Northeast | 2,020 | 45 (43–47) | 2,640 | 59 (57–61) | 2,340 | 60 (57–62) |
| South | 5,840 | 84 (81–86) | 7,880 | 109 (107–111) | 7,540 | 107 (105–110) |
| West | 3,300 | 116 (112–120) | 3,880 | 136 (131–140) | 2,980 | 110 (106–114) |

Unweighted counts multiplied by 20 to arrive at values and rate per 100,000 Medicare beneficiaries in same demographic stratum with persons of other races, unknown race and ethnicity, and other region are included in totals (counts less than 600 should be interpreted with caution).

TABLE 4. Trends in mean inpatient length of stay in adult females hospitalized with UI listed as primary diagnosis (HCUP Nationwide Inpatient Sample, 1994, 1996, 1998 and 2000)

| | Length of Stay (days) | | | |
|--------------------------------|-----------------------|------|------|------|
| | 1994 | 1996 | 1998 | 2000 |
| All | 3.1 | 2.6 | 2.4 | 2.1 |
| Age: | | | | |
| 18–24 | 2.7 | * | * | * |
| 25–34 | 2.9 | 2.5 | 2.2 | 2.1 |
| 35–44 | 3.0 | 2.4 | 2.3 | 2.1 |
| 45–54 | 3.1 | 2.5 | 2.3 | 2.1 |
| 55–64 | 3.0 | 2.5 | 2.3 | 2.1 |
| 65–74 | 3.3 | 2.7 | 2.5 | 2.1 |
| 75–84 | 3.7 | 2.9 | 2.7 | 2.7 |
| 85 or Older | 3.9 | 3.5 | 2.7 | 2.9 |
| Race/ethnicity: | | | | |
| White | 3.2 | 2.6 | 2.3 | 2.1 |
| Black | 3.2 | 2.7 | 2.5 | 2.3 |
| Asian/Pacific Islander | 2.7 | 2.7 | 2.1 | 2.2 |
| Hispanic | 3.1 | 2.6 | 2.5 | 2.4 |
| Other | 3.3 | 2.5 | 2.5 | 2.1 |
| Region: | | | | |
| Midwest | 3.1 | 2.6 | 2.4 | 2.1 |
| Northeast | 3.7 | 2.8 | 2.3 | 2.0 |
| South | 3.2 | 2.6 | 2.4 | 2.2 |
| West | 2.7 | 2.3 | 2.4 | 2.2 |
| Metropolitan statistical area: | | | | |
| Rural | 3.4 | 2.6 | 2.3 | 2.4 |
| Urban | 3.1 | 2.5 | 2.4 | 2.1 |

* Value does not meet standard for reliability or precision.

TABLE 5. Total national physician office visits by adult females with UI (National Ambulatory Medical Care Survey, 1992, 1994, 1996, 1998 and 2000)

| Yr | Primary Diagnosis | | Any Diagnosis | |
|------|-------------------|-------------------|---------------|---------------------|
| | Count | Rate (95% CI) | Count | Rate (95% CI) |
| 1992 | 451,704 | 468 (252–683) | 815,832 | 845 (480–1,210) |
| 1994 | 549,827 | 571 (388–753) | 1,048,115 | 1,088 (791–1,384) |
| 1996 | 937,275 | 934 (600–1,267) | 1,402,830 | 1,398 (992–1,803) |
| 1998 | 1,332,053 | 1,302 (899–1,705) | 2,004,851 | 1,960 (1,424–2,495) |
| 2000 | 1,159,877 | 1,107 (722–1,490) | 1,932,768 | 1,845 (1,313–2,375) |

Rate per 100,000 based on 1994, 1996, 1998 and 2000 population estimates from Current Population Survey (CPS Utilities, Unicon Research Corp., College Station, Texas) for relevant demographic categories of American female adult civilian noninstitutionalized population.

incontinence in 1995 to 2,776/100,000 in 1998. This shift may have been due to the fact that the pubovaginal sling is effective and causes less morbidity.¹³ The number of women undergoing anterior urethropexy decreased, although less dramatically, from 3,941/100,000 in 1992 to 2,364/100,000 in 1998.

Despite an increase in cesarean deliveries and complex laparoscopic pelvic surgeries, which are 2 major sources of urogenital fistula, during the time frame studied the data showed no increase in hospitalizations for UI due to fistulas (data not shown). This rate remained steady at 6.7 to 7.6/100,000 women between 1994 and 2000. However, although the rate is low, 7,000 hospitalizations for incontinence due to fistula are estimated to occur each year nationwide, suggesting that further attention should be given to prevention.

Ambulatory surgical center visits for female UI also increased, particularly in women younger than 65 years. In those with commercial health insurance the rate of such visits increased from 15/100,000 in 1994 to 34/100,000 in 2000 (data not shown). The rate of ambulatory surgical center visits by women 65 years or older who were enrolled in Medicare and diagnosed with UI increased from 60/100,000 in 1992 to 142/100,000 in 1998 (table 8). The increased rate of ambulatory surgery was probably due to the wider use of endoscopic injections, such as collagen, to treat UI in women. Collagen for this purpose was not available in 1992 but by 1995 3,704/100,000 women enrolled in Medicare who had a diagnosis of UI were undergoing this therapy. This rate has since plateaued (fig. 3).

Nursing home care. According to data collected by the National Nursing Home Survey (NNHS) more than half of all female nursing home residents (58.6% in 1999) were reported to have "difficulty controlling urine" and more than half (57.2% in 1999) need assistance with using the toilet (table 9). These rates have remained essentially stable with time. In contrast, only 1% to 2% of nursing home patients have an admitting or current diagnosis of UI, illustrating the importance of the definition of incontinence used to determine prevalence.

Economic impact. Inpatient costs for UI increased only modestly from \$90.5 million in 1992 to \$110.9 million in 1995 and they remained essentially unchanged at \$110.1 million in 1999 (table 10). Medical expenditures for UI in Medicare beneficiaries 65 years or older almost doubled from \$128.1 million in 1992 to \$234.4 million in 1998, primarily due to increased costs for physician office visits and ambulatory surgery as expenditures shifted to the outpatient setting during the 1990s. This change in venue probably reflects the general shift of surgical procedures to the outpatient setting as well as the advent of new procedures, such as periurethral collagen injections, which do not require hospital admission. In addition, increased awareness of incontinence and the marketing of new drugs for its treatment may have increased the number of office visits.

On multivariate analysis controlling for age, sex, work status, median household income, urban vs rural residence, medical and drug plan characteristics, and comorbid conditions, having

TABLE 6. Physician office visits by female Medicare beneficiaries with UI listed as primary diagnosis (Centers for Medicare and Medicaid Services, 5% Carrier and Outpatient Files, 1992, 1995 and 1998)

| | 1992 | | 1995 | | 1998 | |
|------------------------|---------------|---------------------|---------|---------------------|---------|---------------------|
| | Count | Rate (95% CI) | Count | Rate (95% CI) | Count | Rate (95% CI) |
| Age: | | | | | | |
| Totals | 257,740 | 1,301 (1,296–1,306) | 393,680 | 1,951 (1,945–1,957) | 522,240 | 2,741 (2,733–2,748) |
| Younger than 65 | 18,780 | 786 (775–797) | 32,280 | 1,201 (1,188–1,214) | 44,200 | 1,591 (1,577–1,606) |
| 65 or Older | 238,960 | 1,371 (1,366–1,377) | 361,400 | 2,066 (2,059–2,073) | 478,040 | 2,937 (2,928–2,945) |
| 65–74 | 118,140 | 1,285 (1,278–1,293) | 177,840 | 1,976 (1,967–1,985) | 214,960 | 2,720 (2,709–2,732) |
| 75–84 | 93,340 | 1,583 (1,572–1,593) | 139,240 | 2,326 (2,314–2,338) | 200,720 | 3,436 (3,421–3,451) |
| 85–94 | 26,640 | 1,283 (1,268–1,299) | 42,260 | 1,901 (1,883–1,918) | 59,820 | 2,689 (2,668–2,710) |
| 95 or Older | 840 | 326 (304–348) | 2,060 | 728 (696–759) | 2,540 | 819 (787–850) |
| Race/ethnicity: | | | | | | |
| White | 236,320 | 1,408 (1,402–1,414) | 363,440 | 2,094 (2,088–2,101) | 480,900 | 2,972 (2,964–2,981) |
| Black | 11,020 | 654 (641–666) | 16,520 | 898 (884–912) | 23,040 | 1,306 (1,289–1,323) |
| Asian | Not available | Not available | 1,260 | 1,335 (1,262–1,408) | 2,660 | 1,503 (1,447–1,560) |
| Hispanic | Not available | Not available | 3,120 | 1,553 (1,499–1,607) | 7,160 | 1,948 (1,903–1,993) |
| North American native | Not available | Not available | 320 | 1,980 (1,764–2,197) | 300 | 1,150 (1,020–1,281) |
| Region: | | | | | | |
| Midwest | 66,100 | 1,317 (1,307–1,327) | 99,840 | 1,936 (1,924–1,948) | 134,480 | 2,726 (2,712–2,740) |
| Northeast | 50,440 | 1,113 (1,103–1,123) | 74,920 | 1,667 (1,655–1,679) | 89,600 | 2,287 (2,272–2,302) |
| South | 94,740 | 1,356 (1,347–1,364) | 149,500 | 2,069 (2,059–2,080) | 206,340 | 2,940 (2,928–2,953) |
| West | 45,000 | 1,578 (1,564–1,593) | 66,900 | 2,336 (2,319–2,354) | 88,700 | 3,264 (3,243–3,285) |

Unweighted counts multiplied by 20 to arrive at values and rate per 100,000 Medicare beneficiaries in same demographic stratum with persons of other races, unknown race and ethnicity, and other region are included in totals (counts less than 600 should be interpreted with caution).

TABLE 7. National estimates of self-care practice in those with UI by fecal incontinence, UI severity and sex¹⁰

| | % All UI (95% CI) | % UI, No Fecal Incontinence (95% CI)* | % UI Fecal Incontinence (95% CI) | % Mild or Moderate UI (95% CI) | % Severe UI (95% CI) | % Women With UI (95% CI) | % Men With UI (95% CI) |
|--|-------------------|---------------------------------------|----------------------------------|--------------------------------|----------------------|--------------------------|------------------------|
| In last 12 mos have you used: | | | | | | | |
| Disposable pads | 36.8 (31.0–42.7) | 33.6 (28.2–38.9) | 45.2 (19.6–70.9) | 27.7 (22.4–32.9) | 60.1 (45.9–74.3) | 44.5 (36.9–52.1) | 15.1 (8.1–22.1) |
| Laundry service | 2.3 (0.8–3.8) | 2.5 (0.7–4.1) | 1.7 (0.0–4.4) | 1.7 (0.4–3.1) | 3.9 (0.0–8.5) | 1.6 (0.4–2.8) | 4.2 (0.0–8.8) |
| Plastic sheets | 11.2 (7.3–15.1) | 9.5 (6.1–12.8) | 39.6 (19.3–59.9) | 7.1 (3.0–11.2) | 20.6 (10.4–30.8) | 11.3 (7.1–15.4) | 11.0 (5.0–17.0) |
| Changed daily routine activities: | | | | | | | |
| Limited trips | 27.6 (19.6–35.5) | 21.4 (16.7–26.0) | 56.2 (37.5–74.9) | 15.2 (10.6–19.9) | 55.8 (40.4–71.2) | 25.6 (17.0–34.2) | 33.0 (22.4–43.7) |
| Limited fluids | 36.6 (30.3–43.0) | 32.6 (27.9–37.2) | 57.6 (40.3–74.9) | 29.3 (24.2–34.4) | 55.3 (39.6–71.0) | 39.4 (31.7–47.0) | 28.5 (19.5–37.6) |
| Bladder exercise | 11.7 (7.8–15.5) | 12.5 (8.7–16.3) | 8.1 (0.0–20.0) | 10.4 (7.0–13.9) | 15.9 (6.1–25.8) | 14.2 (9.7–18.9) | 4.3 (1.0–7.7) |
| Contacted M. D. | 39.8 (32.2–47.4) | 34.5 (29.0–40.2) | 62.9 (43.6–82.2) | 31.2 (25.3–37.0) | 59.2 (44.8–73.6) | 37.1 (28.9–45.6) | 47.4 (35.8–59.0) |
| Has someone helped you manage by: | | | | | | | |
| Changing disposable pads | 15.3 (8.3–22.3) | 11.3 (5.0–17.7) | 60.1 (26.2–93.9) | 12.9 (5.0–20.8) | 16.4 (3.1–29.7) | 11.4 (4.8–18.0) | 47.6 (20.8–74.3) |
| Any assistance† | 23.2 (18.4–28.0) | 21.2 (17.1–25.4) | 63.8 (43.6–84.2) | 18.8 (13.7–24.0) | 34.3 (20.6–47.9) | 21.1 (15.6–26.7) | 31.7 (22.7–40.6) |

* Excludes all subjects reporting fecal incontinence but all other categories may include dual incontinence (maximum 8% of total sample).

† Includes receiving diet and exercise advice, help with changing bedding or doing laundry, assistance with using bathroom, or help with bedpan or urinal.

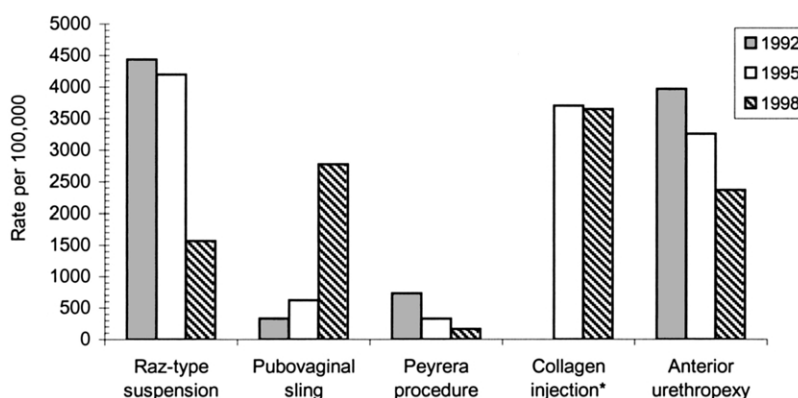


FIG. 3. Rate of surgical procedures used to treat UI in female Medicare beneficiaries according to Centers for Medicare and Medicaid Services, 1992, 1995 and 1998. Asterisk indicates introduced in 1993.

a medical claim for UI was associated with more than twice the annual expenditures per person compared to those without this condition (\$7,702 vs \$3,204, data not shown).

Of all workers treated for UI 23% of women missed work, while only 8% of men did so (data not shown). The average total annual work absence in these women was 28.7 hours for inpatient (7.1 hours) and outpatient (21.6 hours) services. The average work loss associated with an outpatient visit for

incontinence was 11.0 hours in women compared to only 1.4 hours for men, probably because of the availability of outpatient procedures for women.

Using diagnostic algorithms, disease prevalence data, reimbursement costs and sensitivity analyses Wilson et al estimated the annual direct cost of UI in women to be \$12.4 billion in 1995.¹⁴ The largest cost category was routine care, which accounted for 70% of all costs.

TABLE 8. Visits to ambulatory surgery centers by female Medicare beneficiaries with UI listed as primary diagnosis (Centers for Medicare and Medicaid Services, 5% Carrier and Outpatient Files, 1992, 1995 and 1998)

| | 1992 | | 1995 | | 1998 | |
|-----------------------|---------------|---------------|--------|---------------|---------------|---------------|
| | Count | Rate (95% CI) | Count | Rate (95% CI) | Count | Rate (95% CI) |
| Age: | | | | | | |
| Totals | 11,580 | 58 (57–60) | 24,680 | 122 (121–124) | 25,820 | 135 (134–137) |
| Younger than 65 | 1,140 | 48 (45–50) | 2,260 | 84 (81–88) | 2,740 | 99 (95–102) |
| 65 or Older | 10,440 | 60 (59–61) | 22,420 | 128 (126–130) | 23,080 | 142 (140–144) |
| 65–74 | 5,900 | 64 (63–66) | 11,880 | 132 (130–134) | 10,780 | 136 (134–139) |
| 75–84 | 3,800 | 64 (62–66) | 8,420 | 141 (138–144) | 9,680 | 166 (162–169) |
| 85–94 | 720 | 35 (32–37) | 2,080 | 94 (90–98) | 2,500 | 112 (108–117) |
| 95 or Older | 20 | 7.8 (4.3–11) | 40 | 14 (9.9–18) | 120 | 39 (32–45) |
| Race/ethnicity: | | | | | | |
| White | 10,460 | 62 (61–64) | 23,120 | 133 (132–135) | 24,480 | 151 (149–153) |
| Black | 600 | 36 (33–38) | 900 | 49 (46–52) | 860 | 49 (46–52) |
| Asian | Not available | Not available | 60 | 64 (48–79) | 80 | 45 (35–55) |
| Hispanic | Not available | Not available | 60 | 30 (22–37) | 240 | 65 (57–73) |
| North American native | Not available | Not available | 40 | 248 (173–322) | Not available | Not available |
| Region: | | | | | | |
| Midwest | 4,100 | 82 (79–84) | 8,620 | 167 (164–171) | 8,360 | 169 (166–173) |
| Northeast | 2,400 | 53 (51–55) | 4,500 | 100 (97–103) | 4,820 | 123 (120–126) |
| South | 4,120 | 59 (57–61) | 9,580 | 133 (130–135) | 10,160 | 145 (142–148) |
| West | 960 | 34 (32–36) | 1,960 | 68 (65–71) | 2,480 | 91 (88–95) |

Unweighted counts multiplied by 20 to arrive at values and rate per 100,000 Medicare beneficiaries in same demographic stratum with persons of other races, unknown race and ethnicity, and other region included in totals (counts less than 600 should be interpreted with caution).

TABLE 9. Special needs of female nursing home residents regardless of continence status (NNHS, 1995, 1997 and 1999)

| Category | 1995 | | 1997 | | 1999 | |
|--|-----------|------------------------|-----------|------------------------|-----------|------------------------|
| | Count | Rate (95% CI) | Count | Rate (95% CI) | Count | Rate (95% CI) |
| Has indwelling Foley catheter or ostomy: | | | | | | |
| Yes | 101,827 | 9,050 (8,281–9,819) | 90,855 | 7,859 (7,151–8,566) | 96,151 | 8,218 (7,484–8,951) |
| No | 1,020,886 | 90,732 (89,954–91,510) | 1,061,282 | 91,796 (91,072–92,520) | 1,064,024 | 90,937 (90,162–91,712) |
| Question left blank | 2,450 | 218 (89–347) | 3,997 | 346 (182–510) | 9,890 | 845 (571–1,120) |
| Requires assistance using toilet: | | | | | | |
| Yes | 659,035 | 58,572 (57,256–59,888) | 652,615 | 56,448 (55,131–57,765) | 670,006 | 57,262 (55,935–58,590) |
| No | 286,946 | 25,503 (24,334–26,671) | 280,242 | 24,240 (23,104–25,375) | 273,104 | 23,341 (22,202–24,480) |
| Question skipped for allowed reason | 173,839 | 15,450 (14,484–16,417) | 216,408 | 18,718 (17,680–19,756) | 218,971 | 18,714 (17,670–19,759) |
| Question left blank | 5,343 | 475 (297–652) | 6,870 | 594 (394–794) | 7,983 | 682 (430–935) |
| Requires assistance from equipment when using toilet: | | | | | | |
| Yes | 182,812 | 16,248 (15,274–17,221) | 180,518 | 15,614 (14,659–16,569) | 178,305 | 15,239 (14,293–16,185) |
| No | 460,230 | 40,903 (39,592–42,215) | 433,640 | 37,508 (36,220–38,795) | 467,351 | 39,942 (38,631–41,254) |
| Question skipped for allowed reason | 460,785 | 40,953 (39,639–42,267) | 496,649 | 42,958 (41,643–44,272) | 492,075 | 42,055 (40,732–43,379) |
| Question left blank | 21,336 | 1,896 (1,536–2,257) | 45,327 | 3,921 (3,391–4,450) | 32,334 | 2,763 (2,303–3,224) |
| Requires assistance from another person when using toilet: | | | | | | |
| Yes | 652,088 | 57,955 (56,636–59,274) | 640,137 | 55,369 (54,048–56,689) | 661,927 | 56,572 (55,242–57,901) |
| No | 6,109 | 543 (345–741) | 8,603 | 744 (511–977) | 6,800 | 581 (384–779) |
| Question skipped for allowed reason | 460,785 | 40,953 (39,639–42,267) | 496,649 | 42,958 (41,643–44,272) | 492,075 | 42,055 (40,732–43,379) |
| Question left blank | 6,180 | 549 (357–741) | 10,745 | 929 (681–1,178) | 9,263 | 792 (527–1,056) |
| Has difficulty controlling urine: | | | | | | |
| Yes | 633,123 | 56,269 (54,943–57,596) | 672,699 | 58,185 (56,875–59,496) | 685,747 | 58,608 (57,288–59,927) |
| No | 424,287 | 37,709 (36,411–39,006) | 422,839 | 36,574 (35,293–37,854) | 422,162 | 36,080 (34,793–37,367) |
| Question skipped for allowed reason | 64,822 | 5,761 (5,124–6,398) | 57,080 | 4,937 (4,370–5,504) | 55,713 | 4,761 (4,201–5,322) |
| Question left blank | 2,931 | 260 (114–407) | 3,517 | 304 (154–454) | 6,444 | 551 (323–778) |

Rate per 100,000 adult female nursing home residents in NNHS for that year.

DISCUSSION

Limitations of administrative databases. Existing databases allow researchers to describe trends in incontinence surgery and hospitalization more accurately than trends in outpatient care or treatment in nursing homes. UI may be coded as stress incontinence, urge incontinence, mixed incontinence, intrinsic sphincter deficiency, frequency, nocturia or other terms. Visits during which patients return for followup after treatment are also often coded as visits for incontinence even if the symptom has resolved. While providers can be urged to code more diligently, administrative databases alone will never yield the degree of clinical accuracy needed to create a comprehensive picture of UI and its impact on women in the United States. Although hospitalizations are more rigorously coded, there is often substantial lag time between the adoption of new surgical procedures and the

establishment of new reimbursement codes, making tracking of trends difficult. Furthermore, surgical codes are often not specific enough to use in health services or clinical research. For example, many types of pubovaginal slings are represented by 1 code. Despite these limitations administrative databases allow investigators to paint broad pictures of the overall picture of UI in American women. More specific cohort studies are essential to provide the details.

CONCLUSIONS

Future studies. Given the large number of women affected by UI, future studies focusing on prevention and treatment are vital. Longitudinal studies are needed to delineate risk factors for UI in women in different age groups. Such long-term prospective cohort studies as well as randomized trials

TABLE 10. Expenditures for female Medicare beneficiaries 65 years or older for UI treatment (Centers for Medicare and Medicaid Services Claims, 1992, 1995 and 1998)

| | \$ Million/Yr (% total) | | |
|--------------------|-------------------------|--------------|--------------|
| | 1992 | 1995 | 1998 |
| Total | 128.1 | 198.7 | 234.4 |
| Inpt | 90.5 (70.6) | 110.9 (55.8) | 110.1 (47.0) |
| Outpt: | | | |
| Physician office | 25.7 (20.1) | 46.4 (23.4) | 75.9 (32.4) |
| Hospital outpt | 2.2 (1.7) | 3.5 (1.8) | 5.0 (2.1) |
| Ambulatory surgery | 9.3 (7.2) | 36.8 (18.5) | 42.8 (18.2) |
| Emergency room | 0.4 (0.3) | 1.1 (0.6) | 0.6 (0.2) |

Percents may not total 100% because of rounding.

can help determine which factors are amenable to intervention and whether such intervention can change continence status. Well designed studies are needed to evaluate the effect of childbearing practices on UI and other pelvic floor disorders, particularly in younger women. Studies of UI treatment with broader inclusion criteria that reflect the general population of incontinent women are needed. Long-term followup studies are needed to improve understanding of the longevity of therapeutic effectiveness for incontinence, particularly in patients who have undergone surgery.

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