

Bladder and Upper Tract Urothelial Cancer

Badrinath R. Konety, MD, MBA

*Associate Professor of Urology and Epidemiology & Biostatistics
University of California, San Francisco
San Francisco, California*

Geoffrey F. Joyce, PhD

*Economist
RAND Health, Santa Monica, California*

Matthew Wise, MPH

*Epidemiology Consultant
RAND Health, Santa Monica, California*

Contents

INTRODUCTION.....	225
DEFINITION AND DIAGNOSIS.....	225
RISK FACTORS	227
TREATMENT	227
PREVALENCE AND INCIDENCE.....	230
LOWER TRACT UROTHELIAL CANCER	
TRENDS IN HEALTHCARE RESOURCE UTILIZATION	240
Inpatient Care.....	240
Outpatient Care	240
Emergency Room Care	251
UPPER TRACT UROTHELIAL CANCER	
TRENDS IN HEALTHCARE RESOURCE UTILIZATION	270
Inpatient Care.....	270
Outpatient Care	270
ECONOMIC IMPACT.....	276
OVERALL BURDEN	276
CONCLUSIONS.....	277
RECOMMENDATIONS	277

Bladder and Upper Tract Urothelial Cancer

Badrinath R. Konety, MD, MBA
Geoffrey F. Joyce, PhD
Matthew Wise, MPH

INTRODUCTION

Urothelial cancers of the urinary tract consist of tumors of the bladder and of the renal pelvis and ureters (upper tracts). Bladder cancer is far more common than upper tract cancers. For purposes of this chapter, we distinguish upper tract urothelial cancers from those of the lower tract. The ICD-9 and CPT codes used for identifying the conditions and related procedures are described in Table 1.

DEFINITION AND DIAGNOSIS

Urothelial malignancies, i.e., transitional cell carcinomas, are believed to represent a field change phenomenon with the possibility of multiple synchronous or metachronous tumors occurring at any point along the urinary tract that is lined by transitional epithelium. Most patients with urothelial cancer present with either microscopic or macroscopic hematuria. Some patients, particularly those with carcinoma *in situ* (CIS), may present with irritative voiding symptoms such as urgency, frequency, and dysuria. On occasion, ureteric obstruction by an upper tract tumor or a bladder tumor may result in flank pain. Tumors arising near the bladder outlet or in the prostatic urethra may present with urinary retention.

Diagnostic evaluation of the upper tracts is typically performed using an intravenous pyelogram, retrograde pyelogram, ultrasound, computed tomography (CT) scan, CT urogram, or some combination thereof. Evaluation of the lower urinary tract is performed by cystoscopy. Voided urine and/

or saline bladder wash is performed for cytology. A number of newer tests, including fluorescent *in situ* hybridization (FISH), NMP22, and BTA stat, are now available to augment the diagnostic ability of urine/bladder wash cytology. Many of these newer tests have higher sensitivity but lower specificity than routine cytology and are not universally employed. Once a tumor is visualized in the lower or upper urinary tract, a biopsy is performed to allow evaluation of the grade and extent of tumor (1). Tumors are graded as low or high, while staging is according to the TNM system (Table 2). Bladder tumors that do not clearly invade the muscularis propria (Ta, TIS, T1) are considered “superficial,” while those that do invade the muscularis (T2, T3, T4) are considered “invasive,” however this classification may be a misleading oversimplification as it implies that superficial tumors are not potentially life-threatening (2). A comparable staging system exists for upper tract tumors. Ureteric tumors are more likely to be invasive and to extend beyond the ureter because of the ureter’s thin muscular envelope.

Approximately 90% of all bladder cancers are transitional cell carcinomas (TCCs); the remainder includes squamous cell carcinomas (SCCs) and adenocarcinomas (3). In contrast to TCC, squamous cell carcinoma of the bladder appears to have a higher incidence in African Americans than in Caucasians (4). About 75% of all TCCs of the bladder are stage Ta, TIS, or T1 and have a predilection for local recurrence. Progressive disease develops in about 15% to 25% of patients who initially present with stage Ta, TIS, or T1 TCC of the bladder (3). One in four patients with

Table 1. Codes used in the diagnosis and management of transitional cell carcinoma (TCC)**Upper Tract****Individuals 40 years or older, with one or more of the following:****ICD-9 diagnosis codes**

- 189.1 Malignant neoplasm of renal pelvis
- 189.2 Malignant neoplasm of ureter

CPT procedure codes

- 50234 Nephrectomy with total ureterectomy and bladder cuff; through same incision
- 50236 Nephrectomy with total ureterectomy and bladder cuff; through separate incision
- 50548 Laparoscopy, surgical; nephrectomy with total ureterectomy

Lower Tract**Individuals 40 years or older, with one or more of the following:****ICD-9 diagnosis codes**

- 188 Malignant neoplasm of bladder
- 188.0 Malignant neoplasm of trigone of urinary bladder
- 188.1 Malignant neoplasm of dome of urinary bladder
- 188.2 Malignant neoplasm of lateral wall of urinary bladder
- 188.3 Malignant neoplasm of anterior wall of urinary bladder
- 188.4 Malignant neoplasm of posterior wall of urinary bladder
- 188.5 Malignant neoplasm of bladder neck
- 188.6 Malignant neoplasm of ureteric orifice
- 188.7 Malignant neoplasm of urachus
- 188.8 Malignant neoplasm of other specified sites of bladder
- 188.9 Malignant neoplasm of bladder part, unspecified
- 189.3 Malignant neoplasm of urethra
- 233.7 Carcinoma in situ of bladder

ICD-9 procedure codes

- 57.4 Transurethral excision or destruction of bladder cancer
- 57.49 Other transurethral excision or destruction of lesion or tissue of bladder
- 57.5 Other excision or destruction of bladder tissue
- 57.59 Open excision or destruction of other lesion or tissue of bladder
- 57.6 Partial cystectomy
- 57.71 Radical cystectomy
- 57.87 Reconstruction of urinary bladder

CPT procedure codes

- 51020 Cystotomy or cystostomy; with fulguration and/or insertion of radioactive material
- 51530 Cystotomy; for excision of bladder tumor
- 51570 Cystectomy, complete
- 51575 Cystectomy, complete; with bilateral pelvic lymphadenectomy, including external iliac, hypogastric, and obturator nodes
- 51580 Cystectomy, complete, with uretereosigmoidostomy or ureterocutaneous transplantations
- 51585 Cystectomy, complete, with uretereosigmoidostomy or ureterocutaneous transplantations; with bilateral pelvic lymphadenectomy, including external iliac, hypogastric, and obturator nodes
- 51590 Cystectomy, complete, with ureteroileal conduit or sigmoid bladder, including intestine anastomosis
- 51595 Cystectomy, complete, with ureteroileal conduit or sigmoid bladder, including intestine anastomosis; with bilateral pelvic lymphadenectomy, including external iliac, hypogastric, and obturator nodes
- 51596 Cystectomy, complete, with continent diversion, any open technique, using any segment of small and/or large intestine to construct neobladder
- 51720 Bladder instillation of anticarcinogenic agent (including detention time)
- 52224 Cystourethroscopy, with fulguration (including cryosurgery or laser surgery) or treatment of MINOR (less than 0.5 cm) lesion(s) with or without biopsy
- 52234 Cystourethroscopy, with fulguration (including cryosurgery or laser surgery) and/or resection of; SMALL bladder tumor(s) (0.5 to 2.0 cm)
- 52235 Cystourethroscopy, with fulguration (including cryosurgery or laser surgery) and/or resection of; MEDIUM bladder tumor(s) (2.0 to 5.0 cm)
- 52240 Cystourethroscopy, with fulguration (including cryosurgery or laser surgery) and/or resection of; LARGE bladder tumor(s)
- 52250 Cystourethroscopy with insertion of radioactive substance, with or without biopsy or fulguration

bladder cancer presents with invasive TCC, and of these patients, from 20% to 40% may already have lymph node metastases at the time of presentation (3, 5).

RISK FACTORS

The single most important risk factor for urothelial cancers, particularly TCC, is smoking. Other well-described factors include exposure to aniline dyes used in coloring, printing, and rubber industries. Balkan nephropathy, frequent in the Balkan countries, is a known risk factor for upper tract urothelial tumors. A history of radiation or cyclophosphamide chemotherapy can increase the risk of developing bladder cancer, and overuse of the analgesic phenacetin has also been associated with increased risk. Chronic irritation in the form of indwelling foreign bodies such as urethral catheters, recurrent infections, or stones can also increase the risk of squamous cell carcinoma of the bladder. Most of these risk factors

hold true for upper tract tumors as well. Prior history or the presence of lower tract TCC is also a risk factor for development of upper tract TCC. Infection with *Schistosoma hematobium*, which results in the deposition of parasitic ova in the bladder mucosa, is well known to be associated with squamous cell carcinoma of the bladder and is particularly common in the Nile delta and other regions of Africa. Pelvic lipomatosis and cystitis glandularis have been associated with adenocarcinoma of the bladder.

TREATMENT

Initial treatment of bladder tumors involves excisional biopsy in the form of a transurethral resection (TURBT). This may require more than one sitting in cases where the tumor is large or the initial sampling is found to be incomplete. In the case of stage Ta but high-grade TCC or of stage TIS or T1, intravesical chemo/immunotherapy is often warranted. This involves placing an agent directly

Table 2. TNM staging system for bladder cancer

Primary tumor (T)

TX:	Primary tumor cannot be assessed
T0:	No evidence of primary tumor
Ta:	Noninvasive papillary carcinoma
Tis:	Carcinoma in situ (i.e., flat tumor)
T1:	Tumor invades subepithelial connective tissue
T2:	Tumor invades muscle
pT2a:	Tumor invades superficial muscle (inner half)
pT2b:	Tumor invades deep muscle (outer half)
T3:	Tumor invades perivesical tissue
pT3a:	Microscopically
pT3b:	Macroscopically (extravesical mass)
T4:	Tumor invades any of the following: prostate, uterus, vagina, pelvic wall, or abdominal wall
T4a:	Tumor invades the prostate, uterus, vagina
T4b:	Tumor invades the pelvic wall, abdominal wall

Regional lymph nodes (N)

NX:	Regional lymph nodes cannot be assessed
N0:	No regional lymph node metastasis
N1:	Metastasis in a single lymph node, ≤ 2 cm in greatest dimension
N2:	Metastasis in a single lymph node, > 2 cm but ≤ 5 cm in greatest dimension; or multiple lymph nodes, ≤ 5 cm in greatest dimension
N3:	Metastasis in a lymph node, > 5 cm in greatest dimension

Distant metastasis (M)

MX:	Distant metastasis cannot be assessed
M0:	No distant metastasis
M1:	No distant metastasis

SOURCE: Adapted from Urinary bladder. In: American Joint Committee on Cancer.: AJCC Cancer Staging Manual. 6th ed. New York, NY: Springer, Copyright 2002, 335–340.

Table 3. Estimated new bladder cancer cases in the United States, count, percentage of all new cancers

	1996		1998		2000		2002		2004	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Total	52,900	(3.9%)	54,400	(4.4%)	53,200	(4.4%)	56,500	(4.4%)	60,240	(4.4%)
Male	38,300	(5.0%)	39,500	(6.3%)	38,300	(6.2%)	41,500	(6.5%)	44,640	(6.4%)
Female	14,600	(2.5%)	14,900	(2.5%)	14,900	(2.5%)	15,000	(2.3%)	15,600	(2.3%)

SOURCE: Cancer Statistics, 1996, 1998, 2000, 2004. American Cancer Society Surveillance Research.

into the bladder through a urethral catheter. The agents most commonly utilized for chemotherapy are Mitomycin, Doxorubicin, and Epirubicin. Bacillus Calmette-Guerin (BCG) is the most frequently used intravesical agent for immunotherapy, with the addition of Interferon in some cases to treat refractory disease (6). BCG is the agent of choice for intravesical therapy in patients with high-grade tumors. In the less common case of tumor invasion into the muscularis propria (stage T2 or T3), patients typically require a radical cystectomy with urinary diversion and regional lymphadenectomy. Cystectomy is the surgical removal of the entire urinary bladder. An ileal conduit involves repurposing a segment of the ileum

to divert urine from the ureters to the skin, where it is collected with an external bag. A neobladder, a much more complex form of urinary reconstruction after cystectomy, involves reconfiguring a segment of small and/or large intestine as a continent internal storage pouch for urine. Urethrectomy, surgical removal of the urethra, may also be required.

In males, simultaneous urethrectomy is not routinely performed unless the tumor involves

Table 4. Age-adjusted incidence rates^a for bladder cancer, 1997–2001, by race/ethnicity, and gender

Race/ethnicity	Total	Males	Females
All	20.4	36.1	9.1
White	22.5	39.9	9.8
White Hispanic ^b	10.8	19.1	5.1
White Non-Hispanic ^b	23.4	41.3	10.2
Black	12.6	20.4	7.7
Asian/Pacific Islander	9.6	16.3	4.5
Hispanic	10.5	18.6	5
N. American Native/ Alaska Native	5.6	9.5	...

...data not available

^aRates per 100,000 from the 12 SEER areas (San Francisco, Connecticut, Detroit, Hawaii, Iowa, New Mexico, Seattle, Utah, Atlanta, San Jose-Monterey, Los Angeles, and Alaska Native Registry).

^bHispanic and Non-Hispanic are not mutually exclusive from Whites, Blacks, Asian Pacific Islanders, and American Indians/Alaska Natives. Incidence for Hispanics and Non-Hispanics do not include cases from Detroit, Hawaii, and Alaska Native Registry.

SOURCE: Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Mariotto A, Feuer EJ, Edwards BK (eds). SEER Cancer Statistics Review, 1975–2001, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2001/, 2004.

Table 5. Estimated bladder cancer prevalence counts^a and rates^b in the United States in 2001

	Count	Rate
All ^c	490,458	173
Males	361,471	260
Females	128,987	89
White ^c	458,586	200
Males	339,089	299
Females	119,497	103
Black ^c	16,563	47
Males	11,239	66
Females	5,324	28
Asian/Pacific Islander ^d	...	...
Males	...	...
Females	...	...
Hispanic ^e	...	...
Males	...	...
Females	...	...

...data not available.

^aUS 2001 cancer prevalence counts are based on 2001 cancer prevalence proportions from the SEER registries and 1/1/2001 US population estimates based on the average of 2000 and 2001 population estimates from the US Bureau of the Census.

^bRate per 100,000 based on 2001 cancer prevalence proportions from the SEER registries and 1/1/2001 US population estimates based on the average of 2000 and 2001 population estimates from the US Bureau of the Census.

^{c,d,e}Statistics based on b) SEER 9 areas, c) SEER 11 areas, or d) SEER 11 areas excluding Hawaii and Detroit.

SOURCE: Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Mariotto A, Feuer EJ, Edwards BK (eds). SEER Cancer Statistics Review, 1975–2001, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2001/, 2004.

Table 6. Survival rates (%) for bladder cancer (invasive and *in situ*), by race/ethnicity, gender, diagnosis year, stage, and age

	All			Whites			Blacks		
	Total	Males	Females	Total	Males	Females	Total	Males	Females
5-Yr Survival Rates									
Year of Diagnosis									
1960–1963 ^a	...	...	...	53	53	53	24	24	24
1970–1973 ^a	...	...	...	61	61	60	36	38	27
1974–1976 ^b	73	74	70	74	75	72	48	55	37 ^d
1977–1979 ^b	75	77	71	76	77	73	55	63	39 ^d
1980–1982 ^b	78	79	75	79	80	76	59	63	49 ^d
1983–1985 ^b	78	79	73	78	80	75	60	65	51 ^d
1986–1988 ^b	80	82	75	81	82	76	63	68	52 ^d
1989–1991 ^b	81	84	74	82	84	76	62	66	56
1992–1994 ^b	82	84	75	82	85	76	64	69	55
1995–2000 ^b	82 ^c	84 ^c	76 ^c	83 ^c	85 ^c	77 ^c	62 ^c	68 ^c	52 ^c
1995–2000 ^b									
All stages	82	84	76	82	85	77	62	68	52
Localized	94	95	91	95	96	92	82	86	75 ^d
Regional	49	51	44	50	52	44	39	43 ^d	34 ^d
Distant	5.5	6.8	3.2	5	5.8	3.7	5.3	7.0 ^d	...
Unstaged	60	64	50	62	65	51 ^d	37 ^d	46 ^d	19 ^d
5-Yr Survival Rates, 1995–2000 ^b									
Age at Diagnosis									
< 45	90	91	87	92	93	90	76 ^d	81 ^d	...
45–54	87	88	83	88	89	84	71 ^d	73 ^d	67 ^d
55–64	85	86	80	86	87	82	63 ^d	71 ^d	47 ^d
65–74	82	84	77	83	85	79	58	67 ^d	43 ^d
75+	75	78	70	76	79	70	56 ^d	54 ^d	58 ^d
< 65	86	87	82	87	88	84	68	73	54 ^d
65+	79	82	73	80	83	74	57	62	51 ^d

...data not available.

^aRates are based on End Results data from a series of hospital registries and one population-based registry.

^bRates are from the SEER 9 areas. They are based on data from population-based registries in Connecticut, New Mexico, Utah, Iowa, Hawaii, Atlanta, Detroit, Seattle-Puget Sound and San Francisco-Oakland. Rates are based on follow-up of patients into 2001.

^cThe difference in rates between 1974–1976 and 1995–2000 is statistically significant ($p < .05$).

^dThe standard error of the survival rate is between 5 and 10 percentage points.

^eThe standard error of the survival rate is greater than 10 percentage points.

SOURCE: Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Mariotto A, Feuer EJ, Edwards BK (eds). SEER Cancer Statistics Review, 1975–2001, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2001/, 2004.

the urethra. In females, urethrectomy is typically performed concomitantly, unless a neobladder is planned. In select cases of muscle-invasive disease, a bladder-preserving approach employing systemic chemotherapy and radiation may be therapeutic. Management of metastatic bladder cancer typically relies on systemic combination chemotherapy with any of several common regimens, most frequently Gemcitabine and Cisplatin (GC) or Methotrexate, Vinblastine, Adriamycin, and Cisplatin (MVAC). The former regimen is less toxic, but both appear to have similar efficacy in the metastatic setting.

Treatment of upper tract TCC relies on local resection of stage Ta, TIS, or T1 disease in the form of either a biopsy or a curative resection, particularly for low-grade/stage tumors. On occasion, laser fulguration of a biopsy-confirmed, stage Ta, or T1 TCC of the ureter or renal pelvis may be performed. Ureteric tumors can effectively be treated with excision of a segment of the diseased ureter, particularly if the tumor is situated in the distal third. More proximally located tumors may require excision of the kidney and ureter. Excision of tumors of the renal pelvis routinely requires a nephroureterectomy. Locally extensive or

Table 7. Age-adjusted death rates^a for bladder cancer, by year, race/ethnicity, and gender

Year of Death	All			Whites			Blacks		
	Total	Males	Females	Total	Males	Females	Total	Males	Females
1975	5.5	9.8	2.8	5.6	10.1	2.7	5.0	6.9	3.6
1976	5.6	9.8	2.9	5.6	10.0	2.8	5.3	7.8	3.5
1977	5.5	9.7	2.9	5.6	9.9	2.8	5.2	7.6	3.6
1978	5.4	9.5	2.9	5.5	9.8	2.8	4.9	7.2	3.4
1979	5.2	9.3	2.7	5.3	9.6	2.7	5.0	7.6	3.3
1980	5.2	9.2	2.7	5.2	9.5	2.7	4.7	6.2	3.7
1981	5.1	9.0	2.7	5.1	9.3	2.6	4.9	7.2	3.4
1982	5.0	8.9	2.6	5.0	9.2	2.5	4.9	6.8	3.6
1983	4.9	8.8	2.5	4.9	9.0	2.5	4.7	7.2	3.2
1984	4.7	8.5	2.5	4.8	8.7	2.4	4.7	6.9	3.4
1985	4.7	8.4	2.4	4.7	8.7	2.4	4.5	6.9	3.0
1986	4.5	8.1	2.4	4.6	8.4	2.3	4.2	5.8	3.3
1987	4.4	7.9	2.3	4.5	8.1	2.3	4.4	6.5	3.1
1988	4.4	7.8	2.4	4.5	8.0	2.3	4.3	5.9	3.3
1989	4.5	8.0	2.4	4.5	8.2	2.3	4.6	7.0	3.2
1990	4.5	8.0	2.4	4.6	8.2	2.4	4.4	6.4	3.2
1991	4.4	7.9	2.3	4.5	8.1	2.3	4.4	6.6	3.1
1992	4.5	7.9	2.4	4.5	8.1	2.4	4.3	6.7	3.1
1993	4.5	8.1	2.3	4.5	8.3	2.3	4.2	6.4	2.9
1994	4.5	7.9	2.4	4.5	8.1	2.4	4.3	6.4	3.2
1995	4.4	7.8	2.3	4.4	8.1	2.2	4.0	5.8	3.1
1996	4.4	7.8	2.4	4.5	8.1	2.3	4.2	5.9	3.1
1997	4.4	7.6	2.4	4.5	7.9	2.4	4.0	5.9	3.0
1998	4.4	7.7	2.3	4.5	8.0	2.3	3.9	5.6	3.0
1999	4.4	7.7	2.3	4.5	7.9	2.2	4.0	5.8	3.0
2000	4.3	7.6	2.3	4.5	7.9	2.3	3.7	5.7	2.7
2001	4.3	7.5	2.2	4.5	7.9	2.2	3.7	5.1	2.9

^aRates are per 100,000 and are age-adjusted to the 2000 United States standard population.

SOURCE: Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence-SEER 9 Regs Public-Use (1973–2002), National Cancer Institute, DCCPS, Surveillance Research Program, Cancer Statistics Branch, released April 2005, based on the November 2004 submission.

metastatic upper tract tumors also routinely require systemic combination chemotherapy using regimens similar to those employed for TCC of the bladder.

The management approach to squamous cell carcinoma arising in the bladder or upper tracts is similar to that described for TCC. Adenocarcinomas and squamous cell carcinomas are less responsive to chemotherapy than TCCs and are more likely to present with invasive or extensive disease. Hence, prognosis following treatment of these tumors is typically not as good as that following treatment of TCC. Some patients develop adenocarcinomas arising from the urachus at the dome of the bladder. These tumors can be treated with partial cystectomy, thereby preserving the bladder and promising a reasonably good outcome (7).

PREVALENCE AND INCIDENCE

Bladder cancer is the fourth most common cancer in men and the eighth most common cancer in women in the United States (8). It was estimated that in 2006, 64,420 new cases of bladder cancer would be diagnosed, and 13,060 people would die of the disease (8). The number of newly diagnosed cases of bladder cancer in both sexes has been steadily increasing over the past decade (Table 3). The observed increase in incidence could be due to more assiduous diagnostic workup of individuals who present with hematuria and irritative voiding symptoms. Development of guidelines for workup of microhematuria and for improved physician and patient education has also probably contributed to observed increases in detection rates.

Table 8. Inpatient stays by Medicare beneficiaries with lower tract transitional cell carcinoma listed as primary diagnosis, count^a, rate^b (95% CI), age-adjusted rate^c

	1992			1995			1998			2001		
	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate
Total ^d	68,980	198 (191–204)	198	55,720	157 (152–163)	157	47,400	141 (136–147)	141	49,260	140 (134–145)	140
Total < 65	2,620	47 (39–55)	...	2,020	33 (27–39)	...	2,520	41 (33–48)	...	2,440	35 (28–41)	...
Total 65+	66,360	226 (218–234)	...	53,700	183 (177–190)	...	44,880	164 (157–171)	...	46,820	166 (159–173)	...
Age												
65–69	12,940	143 (132–155)	...	8,220	97 (88–107)	...	6,280	86 (76–95)	...	6,940	92 (83–102)	...
70–74	15,820	208 (194–223)	...	12,900	167 (154–180)	...	10,220	146 (133–159)	...	8,460	122 (110–133)	...
75–79	15,420	269 (250–288)	...	12,540	220 (203–237)	...	10,580	187 (171–203)	...	11,340	190 (174–205)	...
80–84	11,980	316 (291–341)	...	9,700	246 (224–267)	...	9,460	246 (224–268)	...	10,140	250 (228–271)	...
85–89	6,800	330 (295–365)	...	6,680	307 (275–340)	...	5,380	246 (217–276)	...	7,080	304 (272–336)	...
90–94	2,620	314 (260–368)	...	2,920	325 (272–377)	...	2,300	254 (207–300)	...	2,220	233 (189–276)	...
95–97	560	297 (187–407)	...	500	263 (160–367)	...	460	227 (134–320)	...	400	205 (115–294)	...
98+	220	146 (60–233)	...	240	137 (59–214)	...	200	102 (39–166)	...	240	111 (48–173)	...
Gender												
Male	52,020	349 (336–363)	357	41,420	272 (260–284)	277	35,200	243 (232–254)	248	37,280	242 (231–253)	247
Female	16,960	85 (79–90)	79	14,300	71 (66–76)	67	12,200	64 (59–69)	60	11,980	60 (56–65)	56
Race/ethnicity												
White	61,240	207 (200–215)	207	50,320	166 (159–172)	166	42,280	149 (142–155)	148	44,540	149 (142–155)	148
Black	4,100	138 (119–157)	132	3,580	111 (95–127)	109	3,400	110 (93–126)	108	3,020	89 (74–103)	93
Asian	...	...	...	40	24 (0–57)	12	280	89 (42–136)	102	260	55 (25–84)	55
Hispanic	...	...	...	320	80 (41–119)	85	640	91 (59–123)	94	660	83 (55–111)	91
N. American	...	...	...	...	...	...	...	...	...	...	...	...
Native	...	...	...	20	55 (0–163)	110	20	37 (0–109)	37	80	120 (3.0–237)	120
Region												
Midwest	15,780	181 (168–193)	179	12,700	141 (130–152)	138	11,780	136 (125–147)	138	12,600	143 (132–155)	144
Northeast	21,840	284 (267–300)	277	17,700	231 (215–246)	228	13,080	195 (180–210)	190	12,220	177 (163–191)	172
South	22,160	181 (171–192)	185	17,720	139 (130–149)	140	16,460	133 (124–142)	135	17,660	133 (124–142)	137
West	8,520	156 (141–170)	158	7,180	139 (124–153)	144	5,500	111 (98–124)	109	6,340	117 (104–130)	114

...data not available.

^aUnweighted counts multiplied by 20 to arrive at values in the table.^bRate per 100,000 Medicare beneficiaries in the same demographic stratum.^cAge-adjusted to the US Census-derived age distribution of the year under analysis.^dPersons 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 Files, 1992, 1995, 1998, 2001.

Table 9. Inpatient hospital stays for lower tract transitional cell carcinoma listed as primary diagnosis, count, rate^a (95% CI), age-adjusted rate^b

	1994			1996			1998			2000		
	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate
Total ^c	95,972	98 (93-103)	98	85,057	81 (77-85)	81	76,720	70 (65-74)	70	72,776	63 (60-66)	63
Age												
40-54	7,120	15 (14-16)		6,450	12 (11-13)		6,269	11 (10-13)		6,497	11 (10-12)	
55-64	13,250	66 (61-70)		10,895	52 (48-56)		10,326	47 (42-51)		9,780	42 (39-45)	
65-74	31,002	175 (165-184)		26,075	143 (135-151)		22,887	128 (117-138)		20,601	116 (109-122)	
75-84	32,175	333 (314-352)		29,564	278 (265-292)		26,015	230 (217-244)		24,877	212 (201-223)	
85+	12,425	447 (418-476)		12,075	431 (404-459)		11,224	387 (359-414)		11,021	353 (332-374)	
Gender												
Male	70,750	155 (147-164)	174	62,376	128 (121-134)	145	55,792	108 (101-116)	121	52,618	98 (93-102)	109
Female	25,223	48 (45-51)	44	22,665	40 (38-43)	37	20,928	36 (33-38)	33	20,149	33 (31-35)	31
Region												
Midwest	20,664	89 (80-98)	89	18,997	16 (70-82)	75	17,465	68 (64-73)	66	16,734	63 (58-68)	64
Northeast	28,572	135 (120-149)	131	25,560	119 (106-132)	115	22,495	101 (81-121)	98	20,110	88 (80-96)	82
South	32,911	99 (91-107)	99	28,012	76 (71-81)	76	25,131	64 (60-69)	65	24,849	60 (55-66)	60
West	13,825	68 (60-75)	70	12,489	58 (53-63)	61	11,629	50 (45-55)	53	11,083	45 (41-50)	48
MSA												
Rural	14,385	54 (47-61)	50	12,323	49 (44-54)	47	10,206	39 (35-43)	36	10,564	39 (35-43)	36
Urban	81,332	114 (107-120)	117	72,578	91 (86-96)	93	66,243	79 (73-85)	81	62,162	71 (67-74)	72

MSA, metropolitan statistical area.

^aRate per 100,000 is based on 1994, 1996, 1998, 2000 population estimates from Current Population Survey (CPS), CPS Utilities, Unicon Research Corporation, for relevant demographic categories of US adult civilian non-institutionalized population, 40 years and older.

^bAge-adjusted to the US Census-derived age distribution of the year under analysis.

^cPersons of missing MSA are included in the totals.

NOTE: Counts may not sum to totals due to rounding.

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

Table 10. Visits to ambulatory surgery centers by Medicare beneficiaries with lower tract transitional cell carcinoma listed as primary diagnosis, count^a, rate^b (95% CI), age-adjusted rate^c

	1992			1995			1998			2001		
	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate
Total ^d	67,320	193 (186–199)	193	85,820	242 (235–250)	242	84,820	253 (245–261)	253	90,820	257 (250–265)	257
Total < 65	1,440	26 (20–32)	...	2,580	42 (35–49)	...	3,640	59 (50–67)	...	3,620	51 (44–59)	...
Total 65+	65,880	224 (217–232)	...	83,240	284 (276–293)	...	81,180	297 (288–306)	...	87,200	309 (300–318)	...
Age												
65–69	15,400	171 (159–183)	...	15,820	187 (174–200)	...	15,260	208 (193–223)	...	13,820	184 (170–197)	...
70–74	18,100	238 (223–254)	...	23,380	303 (285–320)	...	20,280	290 (272–307)	...	23,080	332 (313–351)	...
75–79	15,820	276 (256–295)	...	18,740	329 (308–350)	...	20,780	367 (345–389)	...	24,540	411 (388–434)	...
80–84	10,000	264 (241–287)	...	16,340	414 (385–442)	...	15,240	396 (368–425)	...	15,480	381 (354–408)	...
85–89	4,500	218 (190–247)	...	7,080	326 (292–360)	...	7,520	344 (310–379)	...	8,000	343 (310–377)	...
90–94	1,500	180 (139–220)	...	1,620	180 (141–219)	...	1,760	194 (154–235)	...	1,960	205 (165–246)	...
95–97	360	191 (103–279)	...	180	95 (33–157)	...	320	158 (81–236)	...	220	113 (46–179)	...
98+	200	133 (51–216)	...	80	46 (1.1–90)	...	20	10 (0–30)	...	100	46 (5.5–87)	...
Gender												
Male	47,740	320 (308–333)	322	60,740	399 (385–413)	406	60,280	416 (402–431)	422	65,700	426 (412–441)	431
Female	19,580	98 (92–104)	97	25,080	124 (117–131)	119	24,540	129 (122–136)	124	25,120	127 (120–134)	123
Race/ethnicity												
White	62,120	210 (203–218)	210	80,820	266 (258–274)	266	79,640	280 (272–289)	280	84,620	282 (274–291)	282
Black	2,000	67 (54–81)	64	3,060	95 (80–110)	96	2,940	95 (80–110)	97	3,740	110 (94–125)	113
Asian	...	...	...	180	108 (37–178)	132	400	127 (72–183)	121	440	93 (54–131)	97
Hispanic	...	...	...	280	70 (33–107)	75	540	77 (48–106)	82	640	81 (53–108)	83
N. American	...	...	...	...	...	...	...	...	...	...	...	...
Native	...	...	...	40	110 (0–262)	110	20	37 (0–109)	37	20	30 (0–88)	30
Region												
Midwest	21,200	243 (228–258)	235	28,020	311 (295–327)	304	25,940	301 (284–317)	302	27,900	317 (301–334)	320
Northeast	16,140	210 (195–224)	212	21,620	282 (265–298)	281	22,380	334 (315–354)	337	22,100	320 (301–339)	317
South	22,120	181 (170–192)	183	26,900	212 (200–223)	215	27,760	224 (212–236)	224	30,940	233 (222–245)	235
West	7,820	143 (129–157)	146	9,220	178 (162–194)	183	8,620	174 (158–190)	168	9,520	176 (160–192)	171

...data not available.

^aUnweighted counts multiplied by 20 to arrive at values in the table.^bRate per 100,000 Medicare beneficiaries in the same demographic stratum.^cAge-adjusted to the US Census-derived age distribution of the year under analysis.^dPersons 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, 5% Carrier and Outpatient Files, 1992, 1995, 1998, 2001.

Table 11. Physician office visits by Medicare beneficiaries with lower tract transitional cell carcinoma listed as primary diagnosis, count^a, rate^b (95% CI), age-adjusted rate^c

	1992			1995		
	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate
Total ^d	249,920	716 (703–728)	716	327,240	924 (910–938)	924
Total < 65	6,740	122 (109–135)		9,320	152 (138–166)	
Total 65+	243,180	828 (813–842)		317,920	1.086 (1,069–1,103)	
Age						
65–69	49,720	551 (530–573)		63,080	746 (720–772)	
70–74	66,620	877 (848–907)		84,000	1,087 (1,054–1,120)	
75–79	60,460	1,053 (1,016–1,091)		75,820	1,331 (1,289–1,374)	
80–84	42,200	1,113 (1,066–1,160)		58,360	1,478 (1,425–1,531)	
85–89	18,160	881 (824–938)		28,500	1,312 (1,244–1,379)	
90–94	5,060	606 (532–681)		7,060	785 (704–867)	
95–97	820	435 (302–567)		800	422 (291–552)	
98+	140	93 (24–162)		300	171 (84–258)	
Gender						
Male	181,740	1,220 (1,195–1,245)	1,233	241,280	1,585 (1,557–1,613)	1,609
Female	68,180	341 (329–352)	331	85,960	426 (413–439)	408
Race/ethnicity						
White	229,760	778 (764–792)	774	303,740	1,001 (985–1,017)	1,004
Black	9,220	311 (283–339)	302	11,360	352 (323–381)	359
Asian	...	...	...	1,580	945 (737–1,152)	1,124
Hispanic	...	...	...	2,960	741 (622–860)	666
N. American Native	...	...	...	40	110 (0–262)	165
Region						
Midwest	57,880	663 (639–687)	661	73,120	811 (785–838)	824
Northeast	66,320	861 (832–890)	868	87,680	1,143 (1,109–1,176)	1,124
South	89,680	734 (712–755)	730	114,360	900 (876–923)	897
West	33,540	613 (584–642)	613	49,380	953 (915–990)	964

Continued on next page

Table 11 (continued). Physician office visits by Medicare beneficiaries with lower tract transitional cell carcinoma listed as primary diagnosis, count^a, rate^b (95% CI), age-adjusted rate^c

	1998			2001		
	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate
Total ^d	323,140	964 (949–978)	964	368,200	1,044 (1,029–1,059)	1,044
Total < 65	11,200	180 (165–195)		11,520	163 (150–177)	
Total 65+	311,940	1,142 (1,124–1,160)		356,680	1,264 (1,246–1,283)	
Age						
65–69	57,120	780 (751–808)		58,960	783 (755–811)	
70–74	82,980	1,185 (1,149–1,221)		89,680	1,289 (1,252–1,327)	
75–79	75,640	1,136 (1,294–1,379)		98,020	1,640 (1,595–1,686)	
80–84	57,400	1,493 (1,439–1,547)		62,300	1,534 (1,480–1,587)	
85–89	29,540	1,353 (1,284–1,421)		36,200	1,554 (1,483–1,625)	
90–94	8,060	889 (802–975)		9,200	964 (876–1,052)	
95–97	1,040	514 (375–653)		1,680	859 (676–1,043)	
98+	160	82 (25–139)		640	295 (193–397)	
Gender						
Male	235,860	1,629 (1,600–1,658)	1,656	268,560	1,742 (1,712–1,771)	
Female	87,280	458 (444–472)	437	99,640	502 (488–516)	
Race/ethnicity						
White	300,860	1,059 (1,042–1,076)	1,060	341,640	1,140 (1,123–1,157)	1,136
Black	10,380	335 (306–364)	331	13,040	383 (353–412)	380
Asian	2,540	809 (669–949)	643	2,040	430 (346–513)	463
Hispanic	3,520	501 (427–574)	549	3,040	382 (322–443)	393
N. American Native	40	74 (0–176)	74	360	540 (291–789)	630
Region						
Midwest	75,400	874 (846–901)	900	85,640	974 (945–1,003)	991
Northeast	82,480	1,232 (1,194–1,269)	1,221	90,880	1,315 (1,277–1,353)	1,283
South	118,740	959 (934–983)	967	133,140	1,004 (980–1,028)	1,005
West	42,980	868 (831–904)	810	55,140	1,021 (983–1,059)	1,029

... data not available.

^aUnweighted counts multiplied by 20 to arrive at values in the table.

^bRate per 100,000 Medicare beneficiaries in the same demographic stratum.

^cAge-adjusted to the US Census-derived age distribution of the year under analysis.

^dPersons 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, 5% Carrier and Outpatient Files, 1992, 1995, 1998, 2001.

Table 12. Hospital outpatient visits by Medicare beneficiaries with lower tract transitional cell carcinoma listed as primary diagnosis, count^a, rate^b (95% CI), age-adjusted rate^c

	1992			1995		
	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate
Total ^a	32,860	94 (90–99)	94	36,720	104 (99–108)	104
Total < 65	1,160	21 (16–26)		1,680	27 (22–33)	
Total 65+	31,700	108 (103–113)		35,040	120 (114–125)	
Age						
65–69	7,320	81 (73–89)		5,720	68 (60–75)	
70–74	7,780	102 (92–113)		10,640	138 (126–149)	
75–79	7,720	135 (121–148)		9,100	160 (145–174)	
80–84	5,380	142 (125–159)		5,540	140 (124–157)	
85–89	2,160	105 (85–125)		2,980	137 (115–159)	
90–94	1,000	120 (87–153)		960	107 (77–137)	
95–97	180	95 (33–158)		60	32 (0–67)	
98+	160	106 (33–180)		40	23 (0–54)	
Gender						
Male	23,800	160 (151–169)	163	26,780	176 (167–185)	177
Female	9,060	45 (41–49)	43	9,940	49 (45–54)	48
Race/ethnicity						
White	30,320	103 (97–108)	102	33,280	110 (104–115)	109
Black	1,760	59 (47–72)	60	1,920	60 (48–71)	63
Asian	...	...	...	40	24 (0–57)	24
Hispanic	...	...	...	360	90 (49–132)	65
N. American Native	...	...	...	0	0	0
Region						
Midwest	11,720	134 (123–145)	119	11,540	128 (118–139)	125
Northeast	9,340	121 (110–132)	131	12,700	165 (153–178)	177
South	6,800	56 (50–62)	58	7,660	60 (54–66)	57
West	4,440	81 (70–92)	87	4,640	90 (78–101)	87

Continued on next page

Table 12 (continued). Hospital outpatient visits by Medicare beneficiaries with lower tract transitional cell carcinoma listed as primary diagnosis, count^a, rate^b (95% CI), age-adjusted rate^c

	1998			2001		
	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate
Total ^d	31,460	94 (89–98)	94	32,700	93 (88–97)	93
Total < 65	2,100	34 (27–40)		1,380	20 (15–24)	
Total 65+	29,360	107 (102–113)		31,320	111 (106–116)	
Age						
65–69	5,400	74 (65–82)		6,020	80 (71–89)	
70–74	8,840	126 (114–138)		6,880	99 (88–109)	
75–79	6,480	114 (102–127)		8,440	141 (128–155)	
80–84	5,360	139 (123–156)		6,280	155 (138–172)	
85–89	2,920	134 (112–155)		3,100	133 (112–154)	
90–94	200	22 (8–36)		400	42 (24–60)	
95–97	160	79 (24–134)		180	92 (32–152)	
98+	0	0		20	9 (0–27)	
Gender						
Male	23,660	163 (154–173)	167	22,640	147 (138–155)	149
Female	7,800	41 (37–45)	38	10,060	51 (46–55)	49
Race/ethnicity						
White	27,120	95 (90–101)	95	28,960	97 (92–102)	97
Black	2,300	74 (61–88)	72	2,520	74 (61–87)	77
Asian	360	115 (62–167)	89	20	4 (0–12)	4.2
Hispanic	840	119 (83–156)	122	460	58 (34–82)	55
N. American Native	20	37 (0–109)	0	0	0	0
Region						
Midwest	10,120	117 (107–127)	118	11,720	133 (123–144)	133
Northeast	8,460	126 (114–138)	129	7,140	103 (93–114)	100
South	7,300	59 (53–65)	57	7,380	56 (50–61)	57
West	5,040	102 (93–114)	99	6,260	116 (103–129)	116

... data not available.

^aUnweighted counts multiplied by 20 to arrive at values in the table.

^bRate per 100,000 Medicare beneficiaries in the same demographic stratum.

^cAge-adjusted to the US Census-derived age distribution of the year under analysis.

^dPersons 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, 5% Carrier and Outpatient Files, 1992, 1995, 1998, 2001.

The incidence of bladder cancer is higher in individuals over 65 years of age; it is higher in Caucasians than in African Americans, and it is lowest among Native Americans (Table 4). Based on analysis of data from the Surveillance, Epidemiology, and End Results Program (SEER), 490,458 cases of bladder cancer were recorded in 2001 (Table 5). The lifetime risk of bladder cancer is 3.5% for males and 1.13% for females (9). There appears to be regional variation in the incidence of bladder cancer, with the highest rates in the United States being observed in the Northeast (10). There are also variations in stage, grade, age at diagnosis, insurance status, and duration of symptoms between Caucasians and African Americans (11).

When considering epidemiologic data, it is important to recognize the difference between

mortality, the deaths in the general population due to the specific disease, and survival, which is limited to the patient cohort with the disease. Overall, survival of patients with bladder cancer has been steadily improving over the past four decades. While much of this gain could be the result of improvements in treating low-grade/stage disease and CIS, it appears that age-adjusted death rates have declined even in patients with invasive disease. Recent estimates indicate an overall five-year survival rate of 82% for all stages combined (Table 6). Survival rates are lower in those with metastatic disease, with only 6% of patients with distant disease surviving five years. The mortality rate decreased slightly from 5.5 to 4.3 per 100,000 persons between 1975 and 2001 (Table 7). Survival is highest among Caucasian males with

Table 13. Physician office visits for lower transitional cell carcinoma listed as any diagnosis, 1992–2000 (merged), count, rate^a (95% CI), annualized rate^b, age-adjusted rate^c

	1992–2000			
	Count	5-Year Rate	Annualized Rate	5-Year Age-Adjusted Rate
Total ^d	3,470,336	3,303 (2,767–3,840)	661	3,307
Age				
40–54	*	*	*	
55–64	483,264	2,240 (1,395–3,085)	448	
65–74	1,288,579	7,146 (5,145–9,147)	1,429	
75+	1,499,740	11,185 (8,381–13,989)	2237	
Gender				
Male	2,426,291	4,958 (4,000–5,915)	992	5,511
Female	1,044,045	1,860 (1,301–2,419)	372	1,740
Race/ethnicity				
White	3,272,437	3,899 (3,243–4,556)	780	3,712
Other	*	*	*	*
Region				
Midwest	886,818	3,597 (2,379–4,816)	719	3,526
Northeast	1,124,935	5,174 (3,741–6,608)	1,035	5,087
South	1,002,385	2,724 (1,906–3,542)	545	2,702
West	456,198	2,086 (1,171–3,001)	417	2,251
MSA				
MSA	2,930,282	3,727 (3,075–4,379)	745	3,744
Non-MSA	540,054	2,043 (1,153–2,932)	409	2,019

*Figure does not meet standard for reliability or precision.

MSA, metropolitan statistical area.

^aRate per 100,000 is based on 1992, 1994, 1996, 1998, 2000 population estimates from Current Population Survey (CPS), CPS Utilities, Unicon Research Corporation, for relevant demographic categories of US adult civilian non-institutionalized population, 40 years and older.

^bAverage annualized rate per year.

^cAge-adjusted to the US Census-derived age distribution of the midpoint of years.

^dPersons of missing or unavailable race and ethnicity, and missing MSA are included in the total.

NOTE: Counts may not sum to total due to rounding.

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

Table 14. Physician office visits for lower transitional cell carcinoma listed as any diagnosis, count, rate^a (95% CI), age-adjusted rate^b

	Count	Rate	Age-Adjusted Rate
Total			
1992	797,128	820 (552–1,088)	820
1994	554,627	565 (385–746)	565
1996	746,759	712 (437–987)	712
1998	607,555	552 (302–802)	552
2000	764,267	665 (452–877)	665

^aRate per 100,000 is based on 1992, 1994, 1996, 1998, 2000 population estimates from Current Population Survey (CPS), CPS Utilities, Unicon Research Corporation, for relevant demographic categories of US adult civilian non-institutionalized population, 40 years and older.

^bAge-adjusted to the US Census-derived age distribution of the year under analysis.

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

Table 15. Physician office visits for lower tract transitional cell carcinoma listed as any diagnosis, 1992–2000 (merged), count, rate^a (95% CI), annualized rate^b, rate per visits^c (95% CI)

Physician Specialty	1992–2000			
	Count	5-Year Rate	Annualized Rate	Rate
Total	3,470,336	3,303 (2,767–3,840)	661	100,000 (83,751–116,249)
Urology	2,385,136	2,270 (1,936–2,605)	454	68,729 (58,605–78,854)
All Other	1,085,200	1,033 (618–1,448)	207	31,271 (18,707–43,835)

^aRate per 100,000 is based on 1992, 1994, 1996, 1998, 2000 population estimates from Current Population Survey (CPS), CPS Utilities, Unicon Research Corporation, for relevant demographic categories of US 40 years of age and above civilian non-institutionalized population.

^bAverage annualized rate per year.

^cRate per 100,000 adults 40+ years visits is based on estimated number of visits for lower tract TCC in NAMCS 1992–2000.

NOTE: Counts may not sum to total due to rounding.

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

localized disease (Table 6). This may be due to earlier presentation, better access to care, or better post-intervention social support for Caucasian patients. Currently available data are insufficient to support any conclusions in this regard. Bladder cancer patients younger than 65 years of age also tend to have better five-year survival rates, while those older than 75 tend to have the lowest survival rates. Survival rates for upper tract cancers have also been improving (12), but precise population-based estimates are not available because these cancers are often grouped with tumors of the renal parenchyma (kidney cancer).

LOWER TRACT UROTHELIAL CANCER

TRENDS IN HEALTHCARE RESOURCE UTILIZATION

Inpatient Care

The frequency of inpatient care for lower tract urothelial cancer has decreased in both Medicare and non-Medicare populations. The decrease has been observed in both genders and in Caucasians and African Americans. The rate of inpatient stays is highest in the Northeast and among patients 80 to 89 years of age (Table 8). According to data from the Healthcare Cost and Utilization Project (HCUP), the rate of inpatient stays is also higher in urban areas (Table 9).

Outpatient Care

Ambulatory Surgery

Medicare and non-Medicare data indicate an increasing frequency of ambulatory surgical and outpatient care for patients with bladder cancer, while the frequency of inpatient care is declining correspondingly (Tables 10 and 11). The overall rate of ambulatory surgery visits by Medicare patients increased for the entire population (Table 10) and for individuals of all races with sufficient counts from which to draw conclusions. Hospital outpatient visits by Medicare patients increased from 1992 to 1995 and then began to decline (Table 12). This pattern was observed in males and in all racial groups except African Americans.

Physician Office Visits

Physician office visit rates for non-Medicare patients appear to vary by region and are higher in males and in older patients (Table 13). Nationwide, patients of all ages with bladder cancer made 764,267 visits to physicians' offices in 2000; Medicare beneficiaries made 368,200 office visits in 2001 (Tables 14 and 11). A majority of these visits (68%) were to urologists (Tables 15 and 16). SEER data suggest that the largest proportion of office visits within 12 months following diagnosis were made by patients with stage I disease, though the actual rate of visits increased concomitantly with disease stage (Table 17). There were no gender- or race-based differences in the rate of office visits, but patients 65 to 75 years of age had significantly higher rates of visits than did older individuals. Among patients with a specific bladder-cancer-related office visit within 12 months of diagnosis, 92% went to urologists, 8% went to medical oncologists, and 18% went to internists (Table 16). The proportion of patients visiting a medical oncologist increased appropriately with increasing disease stage, although only 36% of those with stage IV disease did so (Table 16). Even if it is assumed that visits to internists and physicians of unlisted specialty were visits to medical oncologists, a substantial fraction of patients with stage III and IV disease would not have visited a physician who could treat them with potentially beneficial combination systemic chemotherapy. The pattern of distribution of office visits between urologists, medical oncologists, internists, and other specialists remained fairly similar across age, gender, and racial groups (Table 16).

Physician Office-Based Diagnostic Testing/ Procedures

Commonly performed office-based procedures for the evaluation and surveillance of bladder cancer include urinalysis to identify hematuria, urine cytology, and office cystoscopy. With improved instrumentation and easier availability of flexible cystoscopes, cystoscopy is now routinely performed under local anesthesia in the office. Patients with low-stage bladder cancer (Ta, T1S, T1) require an intensive surveillance regimen that typically consists of office urinalysis, cytology, and cystoscopy at three-month intervals for the first two years, six-month intervals for the next three years, and yearly thereafter. According

Table 16. Distribution of outpatient visits for lower tract transitional cell carcinoma in the year following diagnosis, by physician specialty

	Number of patients with Lower Tract TCC**	% of patients with urology office visit	% of patients with oncology office visit	% of patients with internal medicine office visit	% of patients with radiation oncology office visit	% of patients with other specialty office visit	% of patients with unknown specialty office visit
Total	23,588	92% (92%-92%)	8% (8%-9%)	18% (18%-19%)	1% (1%-1%)	4% (4%-5%)	10% (9%-10%)
Gender							
Male	16,921	93% (92%-93%)	8% (8%-8%)	17% (16%-18%)	1% (1%-1%)	4% (4%-5%)	10% (9%-10%)
Female	6,667	91% (90%-91%)	10% (9%-10%)	21% (20%-22%)	1% (1%-2%)	5% (5%-6%)	9% (9%-10%)
Age							
65-75	11,876	93% (92%-93%)	9% (8%-9%)	18% (17%-18%)	1% (1%-1%)	5% (4%-5%)	10% (9%-10%)
76-85	9,263	92% (91%-93%)	9% (8%-9%)	18% (17%-19%)	1% (1%-2%)	5% (4%-5%)	10% (9%-10%)
86-95	2,358	90% (89%-91%)	6% (5%-7%)	19% (18%-21%)	2% (1%-2%)	4% (3%-5%)	9% (8%-11%)
96+	91	88% (81%-95%)	*	16% (9%-24%)	*	*	*
Race/ethnicity							
White	21,699	92% (92%-93%)	8% (8%-9%)	18% (17%-18%)	1% (1%-1%)	4% (4%-5%)	9% (9%-10%)
Black	883	87% (85%-89%)	11% (9%-13%)	22% (20%-25%)	1% (1%-2%)	5% (4%-7%)	17% (14%-19%)
Hispanic	164	93% (89%-97%)	*	17% (11%-23%)	*	*	13% (8%-18%)
Asian	409	92% (89%-94%)	8% (5%-10%)	24% (20%-28%)	*	5% (3%-8%)	11% (8%-14%)
N. American Native	20	*	*	*	*	*	*
Other	315	88% (84%-91%)	10% (7%-13%)	24% (19%-29%)	3% (1%-6%)	7% (4%-10%)	8% (5%-11%)
Unknown	98	85% (78%-92%)	*	22% (14%-31%)	0%	*	*
Stage							
Stage 1	17,164	94% (94%-95%)	3% (3%-3%)	14% (13%-15%)	0%	3% (2%-3%)	7% (7%-8%)
Stage 2	2,296	88% (87%-90%)	20% (18%-22%)	28% (27%-30%)	3% (3%-4%)	10% (8%-11%)	15% (13%-16%)
Stage 3	1,366	88% (86%-89%)	25% (23%-28%)	30% (28%-32%)	4% (3%-5%)	10% (8%-11%)	18% (16%-20%)
Stage 4	1,749	79% (77%-81%)	36% (34%-38%)	34% (32%-37%)	4% (3%-5%)	11% (10%-13%)	21% (19%-22%)
Unknown	1,013	88% (86%-90%)	8% (6%-10%)	18% (16%-21%)	1% (1%-2%)	4% (3%-5%)	10% (8%-12%)

*Figure does not meet standard for reliability or precision.

**Excludes 10,254 patients with no lower tract TCC related office visits in the 12 months following diagnosis.

Bladder Cancer patients 65 and older, diagnosed in 1991 through 1999, with at least 1 lower tract TCC related outpatient visit.

SOURCE: SEER, 1991-2000.

Table 17. Physician office visits for lower tract transitional cell carcinoma in the 12 months following diagnosis

	Base Population	Count of Visits	Rate per 100,000 patients with lower tract TCC
Total	33,842	141,748	418,852 (412,261–425,444)
Gender			
Male	24,492	103,481	422,509 (414,725–430,294)
Female	9,350	38,267	409,273 (396,890–421,656)
Age			
65–75	16,412	77,231	470,576 (460,215–480,938)
76–85	13,353	53,821	403,063 (393,165–412,961)
86–95	3,864	10,387	268,815 (255,314–282,316)
96+	213	309	145,070 (103,165–186,976)
Race/ethnicity			
White	30,786	129,425	420,402 (413,506–427,298)
Black	1,456	5,877	403,640 (368,101–439,179)
Hispanic	279	922	330,466 (275,938–384,994)
Asian	593	2,859	482,125 (436,469–527,780)
N. American Native	30	114	380,000 (186,494–573,506)
Other	534	2,106	394,382 (338,106–450,658)
Unknown	164	445	271,341 (210,169–332,514)
AJCC Stage			
Stage 1	23,687	95,046	401,258 (394,582–407,935)
Stage 2	3,212	15,755	490,504 (465,765–515,244)
Stage 3	1,850	9,498	513,405 (478,590–548,221)
Stage 4	2,725	16,242	596,037 (556,836–635,238)
Unknown	2,368	5,207	219,890 (200,731–239,050)

Lower tract TCC patients 65 and older, diagnosed in 1991 through 1999, with at least one CMS claim in the 12 months after diagnosis.

SOURCE: Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Mariotto A, Feuer EJ, Edwards BK (eds). SEER Cancer Statistics Review, 1975–2001, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2001/, 2004.

to data from the National Ambulatory Medical Care Survey (NAMCS), 54% of patients with a diagnosis of lower tract TCC underwent urinalysis during their office visits, while 21% underwent cystoscopy (Table 18).

Data regarding urine cytology were not available in NAMCS, but cytology testing was used very

infrequently in Medicare beneficiaries with bladder cancer. Although the rate of use of such testing has increased steadily over the past decade, only 3.3% of patients underwent cytology in 2001 (Table 19). The rate did not vary significantly among age groups, genders, or racial groups. There was some variation by geographic region, with the highest rates observed

Table 18. Use of specific investigations at physician office visits for lower tract transitional cell carcinoma listed as any diagnosis, 1992–2000 (merged), count, rate^a (95% CI), annualized rate^b, rate per visits^c (95% CI)

	1992–2000			
	Count	5-Year Rate	Annualized Rate	Rate
Total	3,470,336	3,303 (2,767–3,840)	661	100,000 (83,751–116,249)
with urinalysis performed	1,860,763	1,771 (1,423–2,119)	354	53,619 (43,075–64,163)
with cystoscopy performed	724,041	689 (515–863)	138	20,864 (15,594–26,134)

^aRate per 100,000 is based on 1992–2000 population estimates from Current Population Survey (CPS), CPS Utilities, Unicon Research Corporation, demographic for relevant categories of US adult 40+ civilian non-institutionalized population.

^bAverage annualized rate per year.

^cRate per 100,000 adult 40+ visits is based on estimated number of visits for lower tract TCC in NAMCS 1992–2000.

NOTE: Counts may not sum to total due to rounding.

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

in the West and the lowest rates observed in the Northeast in 2001. Until 2001, the highest rates of urine cytology were observed in the Midwest, where rates were almost twice those of the next highest region, the South. Regional variations have not been consistent over the years. The very low frequency of cytology testing may reflect a lack of accurate documentation, the use of bladder washing as opposed to routine voided cytology, or billing to non-Medicare insurers. Regional variations may be due to differences in availability of cytopathologists and other resources or differential use of testing resources (cytology) by physicians in general as opposed to those used only by urologists (cystoscopy). In 2001, cytology rates were also lowest among African Americans.

Cystoscopy is by far the most common procedure in patients with bladder cancer. The use of cystoscopy concomitantly with an office visit by bladder cancer patients appears to be steadily increasing over time (Table 20). The rates of cystoscopy were lower among African Americans than among Caucasians, although this gap gradually narrowed over the time period analyzed. These data are consistent with those reported by Schrag et al. (13) using SEER-Medicare data. Schrag et al. observed that only 40% of all patients with non-muscle-invasive bladder cancer underwent surveillance at a frequency they considered standard, i.e., cystoscopy at each six-month interval in the first three years following initial diagnosis. They also observed that reaching 75 years of age, living in a low-income area, low-grade tumor, and higher comorbidity level were associated with less-intense surveillance. The increase in cystoscopy use has been facilitated by increased availability of flexible cystoscopic equipment. Retrograde pyelography is very infrequently performed in the office setting; rates of 436 to 663 per 100,000 Medicare patients with a bladder cancer diagnosis were noted over a 10-year period (Table 21). In the most recent three years for which data were available, there was actually a steady decline in office-performed retrograde pyelograms. This may reflect increased use of ambulatory surgery centers or hospitals for performing this procedure. The observed regional variations in the frequency of office-based ancillary diagnostic tests may also be affected by reimbursement rates, insurance payor mix, and patient demographics.

Physician Office Tests Used for Staging Evaluation

While the standard staging algorithm to evaluate extent of disease is as described earlier in this chapter, various combinations of tests can be utilized to assess stage. Evolving technology and test availability may influence the rate of usage of a particular test. The number of patients undergoing CT scanning prior to radical cystectomy has increased among Medicare beneficiaries over the four index years of observation, which span the decade from 1992 to 2001. Most of this increase was observed among Caucasians; almost no change was seen in African Americans (Table 22). Although CT is commonly used prior to surgery in those with muscle-invasive disease, the rates in Table 22 were computed per 100,000 patients with a diagnosis of bladder cancer, not just in those with invasive disease who would require additional imaging to assess disease stage. Racial variations in stage at presentation may explain variations in utilization of staging modalities. The increase in the use of CT scanning over the observation period, accompanied by a corresponding decline in the use of intravenous pyelogram after a peak in 1995, suggests that intravenous pyelograms (IVPs) may be largely being replaced by CT scans for upper tract evaluation in these patients. Medicare data indicate that magnetic resonance imaging (MRI) scanning is utilized very infrequently in staging patients with bladder cancer. While the rate of MRI scanning in patients with bladder cancer was 157 per 100,000 in 2001, the rate for CT scanning was 8,955 per 100,000. The MRI utilization rate gradually declined after a sharp increase in 1995. The frequency of utilization of bone scanning in patients with bladder cancer increased from 2.9% (2,922 per 100,000) in 1992 to 3.9% (3,928 per 100,000) in 2001. The absolute count of bone scans only in patients prior to cystectomy has also shown a gradual increase across all age groups except those 70 to 74 years of age and in all regions and all racial groups.

Outpatient VA Care

Data from the VA system indicate a decrease in the rate of affected patients from 1998 to 2003 (Table 23). More males than females with a diagnosis of lower tract were seen at VA facilities.

Table 19. Use of urine cytology in the physician office setting among Medicare beneficiaries with bladder cancer, count^a, rate^b (95% CI), age-adjusted rate^c

	1992			1995		
	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate
Total ^a	3,540	1,396 (1,110–1,682)		5,640	2,198 (1,858–2,537)	
Age						
65–69	740	1,508 (897–2,119)		1,440	3,216 (2,250–4,182)	
70–74	940	1,448 (913–1,982)		1,300	1,984 (1,340–2,628)	
75–79	980	1,578 (852–2,303)		1,220	1,976 (1,355–2,598)	
80–84	580	1,302 (664–1,941)		940	1,952 (1,214–2,689)	
85–89	200	865 (232–1,498)		680	2,589 (1,313–3,866)	
90–94	100	1,266 (0–2,574)		60	741 (0–1,822)	
95+	0	0		0	0	
Gender						
Male	2,780	1,542 (1,191–1,894)	1,565	4,100	2,241 (1,834–2,648)	2,252
Female	760	1,035 (553–1,518)	954	1,540	2,091 (1,476–2,706)	2,064
Race/ethnicity						
White	3,380	1,454 (1,146–1,762)	1,454	5,520	2,297 (1,937–2,658)	2,289
Black	40	402 (0–958)	201	80	846 (20–1,672)	1,057
Asian	...	...	...	0	0	0
Hispanic	...	...	...	0	0	0
N. American Native	...	...	...	0	0	0
Region						
Midwest	1,900	3,857 (2,797–4,917)	3,898	3,140	5,747 (4,516–6,977)	5,820
Northeast	240	473 (184–762)	473	380	707 (329–1,086)	782
South	1,120	1,707 (1,044–2,370)	1,646	1,340	1,906 (1,366–2,446)	1,935
West	280	959 (276–1,642)	1,027	780	2,566 (1,456–3,675)	2,237

Continued on next page.

Table 19 (continued). Use of urine cytology in the physician office setting among Medicare beneficiaries with bladder cancer, count^a, rate^b (95% CI), age-adjusted rate^c

	1998			2001		
	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate
Total ^d	7,920	3,117 (2,696–3,537)		8,920	3,293 (2,896–3,690)	
Age						
65–69	1,740	4,378 (3,103–5,654)		1,740	4,296 (3,037–5,556)	
70–74	2,000	3,206 (2,251–4,161)		2,060	3,318 (2,516–4,121)	
75–79	1,960	3,112 (2,322–3,902)		2,540	0	
80–84	1,420	2,878 (2,011–3,745)		1,580	2,897 (2,020–3,774)	
85–89	660	2,354 (1,324–3,384)		720	2,351 (1,334–3,369)	
90–94	120	1,263 (0–2,564)		260	2,554 (802–4,306)	
95+	20	1,266 (0–3,747)		20	1,282 (0–3,795)	
Gender						
Male	5,860	3,252 (2,743–3,761)	3,307	6,520	3,346 (2,871–3,821)	3,295
Female	2,060	2,788 (2,045–3,531)	2,625	2,400	3,157 (2,435–3,879)	3,289
Race/ethnicity						
White	7,800	3,293 (2,844–3,742)	3,301	8,540	3,383 (2,965–3,801)	3,375
Black	40	287 (0–948)	199	200	2,000 (652–3,348)	1,800
Asian	0	0	0	60	3,846 (0–9,436)	2,564
Hispanic	20	909 (0–2,691)	0	80	3,333 (0–8,485)	3,333
N. American Native	0	0	0	20	7,692 (0–22,769)	7,692
Region						
Midwest	3,280	5,793 (4,565–7,021)	5,934	2,120	3,563 (2,719–4,407)	3,496
Northeast	1,000	1,940 (1,199–2,682)	2,018	1,200	2,181 (1,418–2,944)	2,290
South	2,820	3,759 (2,894–4,624)	3,626	3,600	4,414 (3,562–5,266)	4,414
West	660	2,170 (1,351–2,988)	2,104	1,920	5,811 (4,375–7,247)	5,751

...data not available.

Based on CPT codes 88104 (cytopathology, non-OB fluids, washing/brushings, except cervical/vaginal smears with interpretation), 88106 (cytopathology, non-OB fluids, washing/brushings, filter only with interpretation), 88107 (cytopathology, non-OB fluids, washing/brushings, smear & filter with interpretation), 88108 (cytopathology, concentration technique, smears & interpretation), 88112 (cytopathology, selective cellular enhancement technique with interpretation (e.g., liquid-based slide method), except cervical or vaginal).

^aUnweighted counts multiplied by 20 to arrive at values in the table.

^bRate per 100,000 Medicare beneficiaries 65 years and older with a bladder cancer diagnosis on the same claim as the procedure.

^cAge-adjusted to the US Census-derived age distribution of the year under analysis.

^dPersons 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, 1992, 1995, 1998, 2001.

Table 20. Use of cystoscopy in the physician office setting among Medicare beneficiaries with bladder cancer, count^a, rate^b (95% CI), age-adjusted rate^c

	1992			1995		
	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate
Total ^d	125,940	48,401 (46,907–49,895)		145,820	55,105 (53,557–56,654)	
Age						
65–69	26,840	52,814 (49,269–56,359)		27,820	59,623 (55,832–63,414)	
70–74	31,800	47,605 (44,712–50,497)		37,820	55,683 (52,605–58,762)	
75–79	31,800	49,922 (46,882–52,961)		35,940	56,634 (53,437–59,831)	
80–84	22,560	49,670 (45,971–53,368)		28,420		
85–89	9,700	41,382 (36,911–45,854)		11,800	44,162 (39,731–48,592)	
90–94	2,860	35,572 (27,882–43,262)		3,400	41,063 (32,878–49,248)	
95–97	300	19,481 (7,442–31,519)		380	25,676 (13,713–37,638)	
98+	80	18,182 (0–39,121)		240	40,000 (17,762–62,238)	
Gender						
Male	86,080	46,610 (44,877–48,344)	47,293	101,700	53,867 (52,057–55,676)	54,492
Female	39,860	52,781 (49,866–55,696)	51,086	44,120	58,190 (55,206–61,174)	56,634
Race/ethnicity						
White	119,040	49,862 (48,286–51,438)	49,820	139,840	56,392 (54,778–58,005)	56,424
Black	2,080	20,635 (15,262–26,008)	19,643	2,800	29,167 (22,898–35,435)	29,375
Asian	...	...	...	320	51,613 (20,296–82,929)	51,613
Hispanic	...	...	...	400	37,736 (19,274–56,198)	37,736
N. American Native	...	...	...	0	0	0
Region						
Midwest	30,380	59,897 (56,261–63,534)	60,055	36,080	64,108 (60,608–67,608)	63,753
Northeast	34,300	65,358 (61,732–68,985)	65,739	37,760	67,573 (63,987–71,159)	66,786
South	40,060	59,190 (56,011–62,369)	59,338	47,540	64,999 (61,889–68,109)	65,819
West	20,620	67,740 (63,030–72,449)	66,294	23,900	75,347 (70,510–80,183)	75,284

Continued on next page

Table 20 (continued). Use of cystoscopy in the physician office setting among Medicare beneficiaries with bladder cancer, count^a, rate^b (95% CI), age-adjusted rate^c

	1998			2001		
	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate
Total ^d	151,460	57,541 (55,987–59,095)		177,100	62,815 (61,266–64,364)	
Age						
65–69	25,160	60,539 (56,531–64,547)		27,720	65,132 (61,056–69,207)	
70–74	37,500	57,853 (54,696–61,009)		41,800	64,586 (61,355–67,817)	
75–79	39,600	60,662 (57,435–63,889)		47,920	64,897 (61,836–67,958)	
80–84	30,700	60,172 (56,600–63,745)		35,340	62,527 (59,029–66,024)	
85–89	13,820	48,086 (43,915–52,258)		18,140	57,369 (53,011–61,726)	
90–94	3,940	40,871 (34,030–47,713)		5,200	49,904 (42,111–57,697)	
95–97	540	33,750 (18,179–49,321)		700	44,304 (28,612–59,995)	
98+	200	35,714 (10,584–60,845)		280	41,176 (17,599–64,754)	
Gender						
Male	105,840	56,629 (54,789–58,470)	57,432	126,100	62,167 (60,345–63,990)	62,956
Female	45,620	59,775 (56,877–62,672)	57,809	51,000	64,475 (61,537–67,413)	62,427
Race/ethnicity						
White	145,040	59,041 (57,422–60,660)	59,057	168,440	64,016 (62,405–65,628)	
Black	3,020	29,666 (23,521–35,812)	29,273	4,120	40,392 (33,353–47,431)	
Asian	520	37,143 (20,616–53,670)	31,429	680	43,590 (25,147–62,033)	
Hispanic	820	36,937 (21,901–51,973)	36,937	1,000	40,323 (26,502–54,144)	
N. American Native	20	33,333 (0–98,667)	33,333	200	83,333 (7,679–158,988)	
Region						
Midwest	37,680	63,973 (60,639–67,307)	63,803	42,620	68,411 (65,058–71,764)	68,796
Northeast	36,820	68,515 (64,913–72,117)	68,478	42,100	72,486 (68,979–75,993)	71,109
South	52,380	67,016 (63,985–70,048)	68,270	63,400	74,466 (71,522–77,410)	75,100
West	23,940	75,094 (70,391–79,797)	72,083	28,160	81,340 (76,574–86,106)	81,225

...data not available.

Based on CPT codes 52000 (cystoscopy) and 52001(cystoscopy, removal of clots).

^aUnweighted counts multiplied by 20 to arrive at values in the table.

^bRate per 100,000 Medicare beneficiaries 65 years and older with a bladder cancer diagnosis on the same claim as the procedure.

^cAge-adjusted to the US Census-derived age distribution of the year under analysis.

^dPersons 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, 1992, 1995, 1998, 2001.

Table 21. Use of retrograde pyelogram in the physician office setting among Medicare beneficiaries with bladder cancer, count^a, rate^b (95% CI), age-adjusted rate^c

	1992			1995			1998			2001		
	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate
Total ^d	1,340	528 (378-679)	...	1,700	663 (498-828)	...	1,340	528 (375-681)	...	1,180	436 (289-583)	...
Age												
65-69	140	285 (74-497)	...	340	760 (306-1,214)	...	260	656 (249-1,062)	...	240	593 (119-1,067)	...
70-74	460	709 (313-1,104)	...	300	485 (197-718)	...	300	481 (222-740)	...	320	517 (170-863)	...
75-79	300	483 (223-742)	...	440	714 (366-1,061)	...	320	509 (217-801)	...	320	454 (160-747)	...
80-84	300	674 (271-1,076)	...	320	664 (320-1,008)	...	380	772 (275-1,268)	...	180	330 (52-609)	...
85-89	100	433 (54-812)	...	200	762 (166-1,359)	...	60	214 (0-456)	...	40	131 (0-312)	...
90-94	40	506 (0-1,207)	...	80	988 (0-2,171)	...	20	211 (0-623)	...	80	786 (18-1,554)	...
95+	0	0	...	20	1,370 (0-4,055)	...	0	0	...	0	0	...
Gender												
Male	700	388 (243-534)	377	1,000	547 (360-733)	558	980	544 (364-725)	555	740	380 (231-530)	370
Female	640	872 (495-1,248)	899	700	950 (611-1,290)	896	360	488 (197-779)	434	440	580 (222-937)	606
Race/ethnicity												
White	1,300	559 (397-722)	568	1,640	683 (509-857)	674	1,260	533 (373-692)	533	1,080	428 (284-572)	428
Black	40	402 (0-958)	201	60	634 (0-1,350)	846	20	199 (0-586)	0	0	0	0
Asian	...	...	...	0	0	0	40	2,985 (0-8,836)	4,478	0	0	0
Hispanic	...	...	...	0	0	0	0	0	0	100	4,202 (0-10,979)	4,202
N. American Native	...	...	...	0	0	0	0	0	0	0	0	0
Region												
Midwest	440	894 (459-1,329)	772	580	1,063 (572-1,554)	1,026	300	532 (199-864)	496	220	370 (99-642)	404
Northeast	140	276 (44-507)	315	420	782 (390-1,173)	707	240	466 (144-789)	427	40	73 (0-173.6)	73
South	580	883 (475-1,292)	1,005	600	853 (520-1,187)	882	660	880 (523-1,238)	854	720	885 (507-1,263)	860
West	160	548 (169-927)	479	100	329 (41-617)	329	140	461 (33-888)	592	160	485 (0-1,017)	425

...data not available.

Based on CPT codes 52005 (cystourethroscopy, with ureteral catheterization, with or without irrigation, instillation, or ureteropyelography, exclusive of radiological service) and 74420 (urography, retrograde, with or without KUB (retrograde pyelogram)).

^aUnweighted counts multiplied by 20 to arrive at values in the table.

^bRate per 100,000 Medicare beneficiaries 65 years and older with a bladder cancer diagnosis on the same claim as the procedure.

^cAge-adjusted to the US Census-derived age distribution of the year under analysis.

^dPersons 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, 1992, 1995, 1998, 2001.

Table 22. Staging evaluation within 4 months prior to cystectomy for Medicare beneficiaries with bladder cancer, count^{a,b}, rate^c

	1992		1995		1998		2001	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate
Bone Scan								
Total ^d	620	2,922	880	3,478	960	3,954	1,000	3,928
Age								
65–69	160	1,951	300	4,087	140	2,564	200	3,300
70–74	240	4,743	360	3,797	520	5,169	280	3,955
75–79	80	1,667	180	3,600	220	3,780	240	3,593
80–84	120	5,128	20	800	60	2,564	240	4,898
85–89	0	0	20	2,041	20	5,000	40	5,405
90–94	20	3,571	0	0	0	0	0	0
95–97								
Gender								
Male	460	2,904	680	3,640	740	4,066	800	3,817
Female	160	2,974	200	3,021	220	3,618	200	4,444
Race/ethnicity								
Asian	...	...	0	0	0	0	0	0
Black	0	0	20	3,448	20	3,030	40	3,846
Hispanic	...	...	0	0	40	8,000	0	0
White	500	2,572	860	3,493	900	3,954	960	4,000
Region								
Midwest	40	635	220	2,918	320	5,096	300	3,456
Northeast	260	5,350	160	2,952	220	4,000	240	5,240
South	160	2,640	320	4,360	360	3,782	380	4,051
West	160	4,233	180	3,750	40	1,527	80	2,837
Computed Tomography Scan								
Total ^d	880	4,147	1,720	6,798	1,740	7,166	2,280	8,955
Age								
65–69	320	3,902	440	5,995	400	7,326	500	8,251
70–74	240	4,743	720	7,595	720	7,157	560	7,910
75–79	140	2,917	360	7,200	400	6,873	660	9,880
80–84	140	5,983	200	8,000	180	7,692	500	10,204
85–89	0	0	0	0	20	5,000	60	8,108
90–94	40	7,143	0	0	20	10,000	0	0
Gender								
Male	740	4,672	1,280	6,852	1,320	7,253	1,800	8,588
Female	140	2,602	440	6,647	420	6,908	480	10,667
Race/ethnicity								
Asian	...	...	0	0	20	9,091	0	0
Black	20	4,000	100	17,241	40	6,061	60	5,769
Hispanic	...	...	0	0	80	16,000	40	33,333
White	780	4,012	1,620	6,580	1,580	6,942	2,080	8,667
Region								
Midwest	160	2,540	420	5,570	480	7,643	740	8,525
Northeast	320	6,584	340	6,273	240	4,364	460	10,044
South	320	5,281	600	8,174	780	8,193	820	8,742
West	80	2,116	360	7,500	180	6,870	260	9,220

Continued on next page

Table 22 (continued). Staging evaluation within 4 months prior to cystectomy for Medicare beneficiaries with bladder cancer, count^{a,b}, rate^c

	1992		1995		1998		2001	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate
Intravenous Pyelogram								
Total ^d	280	1,320	460	1,818	240	988	220	864
Age								
65–69	100	1,220	160	2,180	40	733	60	990
70–74	100	1,976	160	1,688	100	994	60	847
75–79	80	1,667	100	2,000	80	1,375	40	599
80–84	0	0	40	1,600	20	855	20	408
85–89	0	0	0	0	0	0	40	5,405
90–94	0	0	0	0	0	0	0	0
Gender								
Male	240	1,515	380	2,034	180	989	200	954
Female	40	743	80	1,208	60	987	20	444
Race/ethnicity								
Asian	...	...	0	0	0	0	0	0
Black	0	0	20	3,448	20	3,030	20	1,923
Hispanic	...	...	0	0	0	0	0	0
White	280	1,440	440	1,787	220	967	200	833
Region								
Midwest	40	635	120	1,592	80	1,274	40	461
Northeast	40	823	80	1,476	40	727	60	1,310
South	140	2,310	160	2,180	120	1,261	100	1,066
West	60	1,587	100	2,083	0	0	20	709
Magnetic Resonance Imaging								
Total ^d	40	189	100	395	40	165	40	157
Age								
65–69	40	488	0	0	20	366	0	0
70–74	0	0	20	211	0	0	20	282
75–79	0	0	20	400	20	344	0	0
80–84	0	0	0	0	0	0	20	408
85–89	0	0	60	6,122	0	0	0	0
90–94	0	0	0	0	0	0	0	0
Gender								
Male	40	253	100	535	20	110	40	191
Female	0	0	0	0	20	329	0	0
Race/ethnicity								
Asian	...	...	0	0	0	0	0	0
Black	0	0	0	0	0	0	0	0
Hispanic	...	...	0	0	20	4,000	0	0
White	20	103	100	406	20	88	40	167
Region								
Midwest	0	0	20	265	0	0	0	0
Northeast	0	0	20	369	0	0	20	437
South	40	660	60	817	20	210	0	0
West	0	0	0	0	0	0	20	709

...data not available.

^aUnweighted counts multiplied by 20 to arrive at values in the table. Counts were too low to produce reliable CIs.^bIncludes cystectomies performed in May–December of each year.^cRate per 100,000 person months (persons are Medicare beneficiaries 65+ years with bladder cancer).^dPersons 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, 1992, 1995, 1998, 2001.

Table 23. VA users with a diagnosis of transitional cell carcinoma, 1998–2003, count, rate^a

	1998		1999		2000		2001		2002		2003	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate
Total	13,752	460	14,014	431	14,128	404	14,749	378	15,189	351	15,958	345
Age												
40–44	142	55	122	47	137	53	98	38	88	34	84	32
45–54	1,278	149	1,195	140	1,152	135	1,122	131	981	115	965	113
55–64	2,816	442	2,607	409	2,410	378	2,184	342	2,021	317	1,910	299
65–74	6,563	674	5,973	613	5,299	544	4,751	488	4,317	443	4,219	433
75–84	5,575	794	5,103	727	4,671	665	4,191	597	3,812	543	3,691	526
85+	458	717	461	721	459	719	410	643	368	577	332	520
Gender												
Male	13,629	469	13,883	441	13,994	414	14,601	386	15,048	360	15,820	354
Female	123	140	131	133	134	123	148	120	141	102	138	92
Race/Ethnicity												
White	11,865	584	12,223	546	12,311	502	12,836	463	13,025	430	13,253	428
Black	1,294	307	1,262	287	1,245	275	1,217	263	1,219	259	1,210	259
Hispanic	204	257	185	222	195	225	210	228	240	251	235	248
Other	94	235	106	249	105	235	110	232	127	260	108	224
Unknown	295	70	238	53	272	60	376	71	578	86	1,152	126
Insurance Status												
No insurance/ self-pay	8,183	387	8,162	360	7,566	337	7,044	309	6,947	293	6,805	288
Medicare	1,914	738	2,694	677	4,020	607	5,628	560	6,326	498	7,325	482
Medicaid	9	447	11	427	14	380	23	376	29	334	29	300
Private												
Insurance/HMO	3,601	597	3,090	548	2,459	442	1,978	339	1,807	282	1,713	248
Other Insurance	45	412	57	333	69	295	72	265	73	236	85	233
Unknown	0	0	0	0	0	0	4	223	7	258	1	61
Region												
Eastern	2,122	478	2,160	447	2,260	426	2,442	372	2,744	363	2,788	357
Central	2,506	482	2,465	428	2,372	391	2,413	348	2,702	312	3,151	308
Southern	5,258	463	5,337	432	5,617	413	6,021	388	6,130	351	6,499	344
Western	3,866	433	4,052	425	3,879	389	3,873	385	3,613	377	3,520	378

^aRate per 100,000 veterans using the VA system, age-adjusted to 2000.

SOURCE: Inpatient and Outpatient Files, VA Information Resource Center (VIREC), Veterans Affairs Health Services Research and Development Service Resource Center.

Emergency Room Care

The rate of emergency room care for bladder cancer patients has declined in all regions, for all races, and for both genders. The decline has been steady in those over 65 years of age, but it has not been consistent for those under 65. The rate of emergency room care is higher for individuals over 80 years of age (Table 24).

Treatment of Bladder Cancer and Additional Procedures Accompanying Tumor Resection

The average annualized rate of transurethral surgery in Medicare patients with a diagnosis of bladder cancer is 51% (Table 25). This rate is consistent across genders, geographic regions, and races. It

varies between 46% in the youngest age group (65–69 years of age) and 60% in those 90 to 94. The rate was fairly constant over the four years studied. Data from the SEER program indicate that a majority of patients undergo transurethral resection following their initial diagnosis of bladder cancer. This could be a repeat primary resection or resection of recurrent tumors (Table 26). About 20% of patients do not undergo any further surgery, while 8% go on to receive cystectomy. Rates of no further surgery were higher in men, in individuals under 65 years of age, in non-Caucasians, and in those with stage I and stage IV disease.

An annual average of 18,607 per 100,000 Medicare patients with a bladder cancer diagnosis underwent

Table 24. Emergency room visits by Medicare beneficiaries with lower tract transitional cell carcinoma listed as primary diagnosis, count^a, rate^b (95% CI), age-adjusted rate^c

	1992			1995			1998			2001		
	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate
Total ^d	3,860	11 (9-13)	11	2,800	7.9 (7-9)	7.9	2,520	7.5 (6-9)	7.5	1,700	4.8 (4-6)	4.8
Total < 65	80	1.4 (0-2.9)		200	3.3 (1-5)		80	1.3 (0-3)		220	3.1 (1-5)	
Total 65+	3,780	13 (11-15)		2,600	8.9 (7-10)		2,440	8.9 (7-10)		1,480	5.2 (4-6)	
Age												
65-69	1,140	13 (9-16)		660	7.8 (5-10)		480	6.6 (4-9)		360	4.8 (3-7)	
70-74	600	7.9 (5-11)		680	8.8 (6-12)		440	6.3 (4-9)		300	4.3 (2-7)	
75-79	660	11 (8-15)		540	9.5 (6-13)		520	9.2 (6-13)		300	5.0 (3-8)	
80-84	840	22 (15-29)		480	12 (7-17)		480	12 (8-18)		300	7.4 (4-11)	
85-89	420	20 (12-29)		200	9.2 (4-15)		320	15 (8-22)		160	6.9 (2-12)	
90-94	120	14 (3-26)		40	4.4 (0-11)		160	18 (5-30)		40	4.2 (0-10)	
95-97	0	0		0	0		20	9.9 (0-29)		0	0	
98+	0	0		0	0		20	10 (0-30)		20	9.2 (0-27)	
Gender												
Male	2,660	18 (15-21)	20	1,900	12 (10-15)	12	1,740	12 (10-14)	13	1,320	8.6 (7-11)	8.6
Female	1,200	6.0 (5-8)	4.5	900	4.5 (3-6)	4.5	780	4.1 (3-5)	3.3	380	1.9 (1-3)	1.9
Race/ethnicity												
White	3,520	12 (10-14)	12	2,540	8.4 (7-10)	8.2	2,380	8.4 (7-10)	8.2	1,540	5.1 (4-6)	5.1
Black	300	10 (5-15)	8.8	220	6.8 (3-11)	8.1	100	3.2 (0-6)	3.9	100	2.9 (0-6)	2.9
Asian	...	...	...	20	12 (0-35)	12	0	0	0	0	0	0
Hispanic	...	...	...	0	0	0	20	2.8 (0-8)	5.7	20	2.5 (0-7)	2.5
N. American Native	...	...	...	0	0	0	0	0	0	0	0	0
Region												
Midwest	1,400	16 (12-20)	13	660	7.3 (5-10)	6.9	1,060	12 (9-16)	13	560	6.4 (4-9)	6.6
Northeast	600	7.8 (5-11)	8.0	800	10 (7-14)	10	580	8.7 (6-12)	6.6	380	5.5 (3-8)	4.9
South	1,640	13 (11-16)	16	1,080	8.5 (6-11)	9.0	620	5.0 (3-7)	5.3	620	4.7 (3-6)	4.8
West	220	4.0 (2-6)	2.2	260	5.0 (2-8)	5.0	240	4.8 (2-8)	5.2	140	2.6 (1-5)	1.9

...data not available.

^aUnweighted counts multiplied by 20 to arrive at values in the table.

^bRate per 100,000 Medicare beneficiaries in the same demographic stratum.

^cAge-adjusted to the US Census-derived age distribution of the year under analysis.

^dPersons 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, 5% Carrier and Outpatient Files, 1992, 1995, 1998, 2001.

Table 25. Use of transurethral surgery by Medicare beneficiaries with bladder cancer, 1992–2001 (merged), count^a, rate^b, annualized rate^c, age-adjusted rate^d

	1992–2001			
	Count	4-Year Rate	Annualized Rate	4-Year Age-Adjusted Rate
Total ^e	408,460	202,589	50,647	
Gender				
Male	292,580	201,197	50,299	204,085
Female	115,880	206,192	51,548	198,683
Age				
65–69	65,800	185,144	46,286	
70–74	98,060	188,504	47,126	
75–79	99,720	210,557	52,639	
80–84	79,020	211,396	52,849	
85–89	45,380	216,095	54,024	
90–94	16,000	240,240	60,060	
95–97	2,740	232,203	58,051	
98+	1,100	229,167	57,292	
Race/ethnicity				
White	376,640	200,960	50,240	200,384
Black	18,440	222,169	55,542	224,096
Asian	1,180	218,519	54,630	218,519
Hispanic	2,200	239,130	59,783	239,130
Region				
Midwest	109,900	271,492	67,873	268,923
Northeast	107,040	266,401	66,600	264,759
South	138,460	263,132	65,783	266,743
West	51,160	245,019	61,255	243,966

Based on CPT codes 52224, 52234, 52235, 52240 (cystourethroscopy, with fulguration (including cryosurgery or laser surgery) or treatment of minor, small, medium or large lesion(s) with or without biopsy and ICD-9 codes 57.4 (transurethral) excision or destruction of bladder cancer, 57.49 (other transurethral excision or destruction of lesion or tissue of bladder).

^aUnweighted counts multiplied by 20 to arrive at values in the table.

^bRate per 100,000 Medicare beneficiaries with bladder cancer.

^cAverage annualized rate per year.

^dAge-adjusted to year 1995.

^ePersons of other races, unknown race and ethnicity, and other region are included in the total.

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

SOURCE: Centers for Medicare and Medicaid Services, 1992, 1995, 1998, 2001.

intravesical therapy (Table 27). The annualized rates were higher in Caucasians and Asians and lowest among African Americans and Hispanics. Rates of intravesical therapy did not vary greatly by age or region but were lower in the Midwest and Northeast. Over the four years studied, the rate of intravesical therapy ranged from 17,434 to 20,915 per 100,000 Medicare patients with bladder cancer, with the highest rate observed in the most recent year analyzed (2001) (Table 28). Prior reports indicate that several factors influence the use of intravesical therapy, including disease stage and grade, year of physician

training, age of patient, lack of comorbidity, and low or intermediate disease risk category (14, 15).

SEER data indicate that the rate of cystectomy in patients with newly diagnosed bladder cancer has not changed significantly over the 10-year period from 1990 to 1999 (Table 29), ranging from 67 to 91 per 1,000 per year. The cystectomy rate is age-sensitive, with the lowest rates consistently being observed in those over 80 years of age. Although the rate of cystectomy in some years is lower among African Americans, the difference is not significant, and the trend is not consistent. The highest rates were observed among

patients with stage III and IV disease, but this may be due to the SEER's use of pathologic rather than clinical staging. Many of the individuals with high-stage disease could have undergone a radical cystectomy if they had been at a lower clinical stage and had muscle-invasive disease (stage II). This is often the case in bladder cancer: clinical staging is notorious for underestimation of disease extent. Independent analysis of SEER data suggests that age, stage, and geographic region are the most influential factors dictating whether a patient is a candidate for cystectomy (16).

Historically, radical cystectomy entailed removal of the urethra during the same procedure or in a staged procedure which shortly followed it. However, perhaps in response to data demonstrating low rates of urethral recurrence, urethrectomy is becoming an infrequent procedure in male patients undergoing radical cystectomy. SEER data suggests that urethrectomy is performed in approximately 3% of men who undergo radical cystectomy as a

presumed planned procedure (defined as performed within 6 weeks of the date of the radical cystectomy). A further 3% of these men undergo urethrectomy 6 weeks or later, possibly due to detection of recurrence (Table 30).

Types of Urinary Diversion

The frequency of ileal conduit urinary diversion over the 10-year period from 1992 to 2001 averaged 2,433 per 100,000 Medicare patients with bladder cancer per year (Table 31). These data suggest that the rate has not changed greatly, although a slight upturn was observed in the most recent two years studied, when the highest rates were recorded (2,544 and 2,554 per 100,000 in 1998 and 2001) (Table 32). Rates of ileal conduit use did not differ significantly by gender. A decline in ileal conduit usage was also noted in patients 70 to 74 years of age in 2001 compared with prior years and other age groups. While the overall rate of ileal conduit usage per 100,000 patients with bladder cancer has not changed dramatically, there

Table 26. Use of treatments in patients newly diagnosed with bladder cancer within 12 months of diagnosis, 1990–1999, rate^a

	Cystectomy		Transurethral Surgery		No Surgery	
	Count	Rate	Count	Rate	Count	Rate
Total	3,051	80 (78–83)	48,305	1,272 (1,262–1,283)	7,577	200 (196–204)
Age						
Under 65	99	89 (72–105)	1,167	1,046 (985–1,106)	352	315 (288–343)
65–69	861	117 (110–124)	9,151	1,242 (1,218–1,267)	1,612	219 (209–228)
70–74	932	101 (95–107)	11,637	1,261 (1,240–1,282)	1,907	207 (198–215)
75–79	767	87 (81–93)	11,339	1,281 (1,260–1,303)	1,758	199 (190–207)
80+	392	34 (31–38)	15,011	1,316 (1,297–1,335)	1,948	171 (164–178)
Gender						
Male	2,291	82 (79–85)	35,451	1,266 (1,254–1,279)	5,789	207 (202–212)
Female	760	76 (71–81)	12,854	1,289 (1,269–1,309)	1,788	179 (172–187)
Race/ethnicity						
White	2,700	80 (77–82)	43,841	1,292 (1,281–1,303)	6,451	190 (186–194)
Black	136	91 (76–106)	1,824	1,222 (1,167–1,277)	363	243 (221–265)
Hispanic	88	75 (60–90)	1,217	1,036 (977–1,094)	362	308 (282–335)
Other	127	93 (77–108)	1,423	1,039 (990–1,089)	401	293 (269–317)
Stage						
Localized	722	24 (22–26)	38,673	1,295 (1,283–1,307)	6,150	206 (201–211)
Regional	2,329	287 (277–297)	9,632	1,188 (1,166–1,209)	1,427	176 (168–184)
AJCC Stage						
Stage 1	722	24 (22–26)	38,673	1,295 (1,283–1,307)	6,150	206 (201–211)
Stage 2	746	194 (181–206)	5,130	1,333 (1,300–1,366)	610	158 (147–170)
Stage 3	857	380 (360–400)	2,424	1,075 (1,040–1,111)	394	175 (193–190)
Stage 4	726	362 (341–383)	2,078	1,035 (995–1,075)	423	211 (193–229)

^aRate per 1,000 bladder cancer patients. Rates > 1,000 denote > 1 procedure per patient.

SOURCE: Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Mariotto A, Feuer EJ, Edwards BK (eds). SEER Cancer Statistics Review, 1975–2001, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2001/, 2004.

Table 27. Use of bladder instillation of anticarcinogenic agent in Medicare beneficiaries with bladder cancer, 1992–2001 (merged), count^a, rate^b, annualized rate^c, age-adjusted rate^d

	1992–2001			
	Count	4-Year Rate	Annualized Rate	4-Year Age-Adjusted Rate
Total ^e	150,060	74,427	18,607	
Gender				
Male	105,220	72,356	18,089	72,810
Female	44,840	79,786	19,947	78,612
Age				
65–69	25,340	71,300	17,825	
70–74	38,420	73,856	18,464	
75–79	39,200	82,770	20,693	
80–84	27,880	74,585	18,646	
85–89	14,120	67,238	16,810	
90–94	4,000	60,060	15,015	
95–97	460	38,983	9,746	
98+	280	58,333	14,583	
Race/ethnicity				
White	141,140	75,307	18,827	74,912
Black	4,920	59,277	14,819	62,410
Asian	460	85,185	21,296	85,185
Hispanic	520	56,522	14,131	54,348
Region				
Midwest	36,040	89,032	22,258	89,081
Northeast	37,220	92,633	23,158	92,982
South	55,240	104,979	26,245	105,929
West	20,940	100,287	25,072	97,126

Based on CPT code 51720 (bladder instillation of anticarcinogenic agent).

^aUnweighted counts multiplied by 20 to arrive at values in the table.

^bRate per 100,000 Medicare beneficiaries with bladder cancer.

^cAverage annualized rate per year.

^dAge-adjusted to year 1995.

^ePersons of other races, unknown race and ethnicity, and other region are included in the total.

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

SOURCE: Centers for Medicare and Medicaid Services, 1992, 1995, 1998, 2001.

has been a steady increase in the actual number of ileal conduits used—from 4,520 in 1992 to 5,260 in 2001. This may be an indirect indicator of an increase in the actual number of cystectomies being performed in bladder cancer patients.

The annualized rate of neobladder or continent diversion was 370 per 100,000 Medicare patients with a diagnosis of bladder cancer (Table 33). This is about 85% lower than the usage rate of ileal conduits in this population. To ensure that all types of continent diversions and neobladders were captured in this analysis, an exhaustive set of CPT and ICD codes was used to identify such procedures. While a small increase was observed in the rate of neobladder/continent diversions in 1998, the rate in 2001 had returned to

levels comparable to those observed in prior years (Table 34). As expected, the rate is highest among the younger patients in the Medicare population. The rate of neobladder/continent diversions was consistently lowest in the Northeast, and no change was evident in regional variation over the years studied (Table 34). No significant differences by gender or race were observed. A multivariate analysis of SEER data suggested that several factors affect the decision to use diversion, particularly neobladder reconstruction (17). These factors included patient age, geographic region, patient education level, and year of surgery (Table 35). Interestingly, patient comorbidity and race/ethnicity were not predictive of neobladder diversion.

Table 28. Use of bladder instillation of anticarcinogenic agent in Medicare beneficiaries with bladder cancer, count^a, rate^b (95% CI), age-adjusted rate^c

Group	1992			1995		
	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate
Total ^d	34,240	17,434 (16,683–18,184)		37,680	18,689 (17,928–19,449)	
Gender						
Male	23,140	16,300 (15,441–17,160)	16,427	25,060	17,233 (16,365–18,101)	17,439
Female	11,100	20,389 (18,876–21,903)	20,022	12,620	22,456 (20,913–23,998)	21,922
Age						
65–69	6,980	18,349 (16,609–20,089)		6,680	18,796 (16,978–20,613)	
70–74	8,660	17,404 (15,914–18,893)		10,700	20,569 (19,016–22,122)	
75–79	8,640	18,023 (16,483–19,562)		9,080	19,172 (17,587–20,758)	
80–84	5,600	16,064 (14,340–17,788)		6,960	18,620 (16,854–20,385)	
85–89	3,100	17,299 (14,821–19,777)		3,220	15,333 (13,152–17,514)	
90–94	980	15,170 (11,254–19,087)		760	11,411 (8,003–14,820)	
95–97	160	14,035 (5,000–23,070)		60	5,085 (0–10,678)	
98+	40	14,286 (0–32,500)		100	20,833 (4,583–37,083)	
Race/ethnicity						
White	32,080	17,900 (17,106–18,694)	17,799	35,500	18,941 (18,148–19,735)	18,867
Black	1,020	12,028 (8,927–15,130)	12,972	1,240	14,940 (11,506–18,373)	16,627
Asian	...	...	...	140	25,926 (9,444–42,407)	25,926
Hispanic	...	...	...	180	19,565 (8,152–30,978)	15,217
N. American Native	...	...	...	0	0	0
Region						
Midwest	8,280	22,785 (20,856–24,714)	23,060	8,720	21,542 (19,750–23,333)	21,196
Northeast	8,640	24,215 (22,228–26,202)	24,215	9,900	24,639 (22,755–26,523)	24,788
South	12,960	27,955 (26,128–29,782)	28,343	13,220	25,124 (23,466–26,781)	25,428
West	4,220	21,865 (19,259–24,472)	20,622	5,760	27,586 (24,875–30,297)	27,011

Continued on next page

Table 28 (continued). Use of bladder instillation of anticarcinogenic agent in Medicare beneficiaries with bladder cancer, count^a, rate^b (95% CI), age-adjusted rate^c

Group	1998			2001		
	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate
Total ^d	35,060	17,910 (17,150–18,669)		43,080	20,915 (20,129–21,700)	
Gender						
Male	25,380	18,139 (17,236–19,042)	18,096	31,640	21,076 (20,154–21,999)	21,316
Female	9,680	17,335 (15,931–18,739)	17,443	11,440	20,480 (18,983–21,976)	19,835
Age						
65–69	5,360	17,335 (15,450–19,221)		6,320	20,295 (18,298–22,293)	
70–74	8,880	18,309 (16,769–19,849)		10,180	21,378 (19,731–23,024)	
75–79	9,540	19,933 (18,333–21,534)		11,940	22,326 (20,748–23,904)	
80–84	6,760	17,922 (16,190–19,653)		8,560	20,767 (19,015–22,518)	
85–89	3,200	14,815 (12,694–16,935)		4,600	19,726 (17,440–22,011)	
90–94	1,060	14,286 (10,728–17,844)		1,200	16,129 (12,392–19,866)	
95–97	140	10,769 (3,231–18,308)		100	8,475 (1,356–15,593)	
98+	60	13,636 (0–27,954)		80	13,793 (1,207–26,379)	
Race/ethnicity						
White	33,080	18,256 (17,461–19,051)	18,212	40,480	21,178 (20,359–21,997)	21,105
Black	1,360	15,668 (12,247–19,090)	15,899	1,300	15,550 (12,081–19,019)	15,311
Asian	80	6,667 (333–13,000)	6,667	240	21,429 (10,714–32,143)	19,643
Hispanic	140	8,140 (2,384–13,895)	8,140	200	10,638 (4,415–16,862)	11,702
N. American Native	0	0	0	0	0	0
Region						
Midwest	8,300	19,933 (18,216–21,650)	19,741	10,740	24,712 (22,899–26,526)	25,173
Northeast	9,040	23,132 (21,262–25,003)	23,234	9,640	23,861 (22,002–25,720)	23,960
South	12,900	23,696 (22,098–25,294)	23,953	16,160	27,474 (25,860–29,087)	27,236
West	4,700	23,039 (20,456–25,623)	22,745	6,260	28,663 (25,980–31,346)	28,114

... data not available.

^aUnweighted counts multiplied by 20 to arrive at values in the table.^bRate per 100,000 Medicare beneficiaries 65 years and older with bladder cancer.^cAge-adjusted to year 2001.^dPersons 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, 1992, 1995, 1998, 2001.

Table 29. Use of cystectomy in patients newly diagnosed with bladder cancer within 12 months of diagnosis, count, rate^a

	1990		1991		1992		1993		1994	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate
Total	206	74 (64-83)	249	84 (74-94)	338	87 (79-96)	336	86 (77-95)	354	91 (82-100)
Age										
Under 65	4	56 (1-111)	10	105 (42-168)	12	109 (50-168)	12	104 (48-161)	14	131 (66-196)
65-69	61	98 (75-122)	73	113 (89-138)	109	132 (109-155)	112	134 (111-157)	103	129 (106-153)
70-74	64	95 (73-117)	81	111 (88-133)	104	108 (88-128)	87	91 (73-110)	112	115 (95-135)
75-79	50	79 (58-100)	61	87 (66-108)	80	89 (70-128)	85	99 (79-119)	80	91 (72-110)
80+	27	34 (21-46)	24	30 (18-42)	33	31 (21-41)	40	35 (25-46)	45	40 (28-51)
Gender										
Male	162	78 (66-89)	183	82 (71-93)	254	89 (79-100)	249	87 (77-98)	266	92 (82-103)
Female	44	61 (44-79)	66	89 (68-109)	84	83 (66-100)	87	84 (67-101)	88	87 (70-105)
Race/ethnicity										
White	190	74 (64-84)	227	82 (72-93)	304	87 (78-96)	294	84 (75-94)	316	91 (81-101)
Black	9	90 (33-147)	9	86 (31-140)	11	83 (36-131)	16	102 (54-150)	12	83 (38-129)
Hispanic	1	16 (0-47)	2	38 (0-93)	8	63 (20-107)	13	103 (49-157)	13	94 (45-143)
Other	6	86 (18-153)	11	164 (73-255)	15	130 (68-193)	13	102 (49-156)	13	96 (46-146)
Stage										
Localized	53	24 (18-30)	65	27 (21-34)	78	26 (20-32)	85	28 (22-34)	71	24 (18-29)
Regional	153	260 (225-296)	184	303 (266-339)	260	304 (273-335)	251	297 (266-328)	283	324 (293-355)
AJCC Stage										
Stage 1	53	24 (18-30)	65	27 (21-34)	78	26 (20-32)	85	28 (22-34)	71	24 (18-29)
Stage 2	41	161 (115-206)	62	210 (163-257)	87	215 (175-256)	86	203 (164-241)	96	229 (189-270)
Stage 3	65	365 (294-437)	57	396 (315-477)	94	387 (325-449)	82	404 (336-472)	105	432 (369-495)
Stage 4	47	303 (230-376)	65	385 (311-459)	79	380 (313-446)	83	381 (316-446)	82	389 (322-455)

Continued on next page

Table 29 (continued). Use of cystectomy in patients newly diagnosed with bladder cancer within 12 months of diagnosis, count, rate^a

	1995			1996			1997			1998			1999		
	Count	Rate	(81-98)	Count	Rate	(69-86)	Count	Rate	(71-87)	Count	Rate	(60-75)	Count	Rate	(62-77)
Total	359	89	(81-98)	311	77	(69-86)	324	79	(71-87)	283	67	(60-75)	291	69	(62-77)
Age															
Under 65	12	90	(41-139)	7	61	(17-105)	11	89	(38-141)	7	63	(17-109)	10	74	(29-119)
65-69	113	141	(117-165)	91	116	(94-138)	81	115	(91-138)	58	62	(62-102)	60	93	(71-116)
70-74	113	112	(93-132)	88	94	(75-112)	105	103	(84-121)	96	96	(78-115)	82	85	(67-103)
75-79	75	85	(67-104)	92	97	(78-116)	80	85	(67-103)	76	73	(57-89)	88	82	(65-98)
80+	46	38	(28-49)	33	27	(18-36)	47	36	(26-46)	46	34	(24-43)	51	37	(27-47)
Gender															
Male	274	94	(84-105)	230	78	(68-87)	244	81	(72-91)	216	69	(60-78)	213	69	(60-78)
Female	85	77	(61-92)	81	76	(60-92)	80	73	(58-89)	67	62	(48-76)	78	71	(56-86)
Race/ethnicity															
White	323	90	(81-99)	267	75	(60-83)	286	79	(70-88)	242	65	(57-73)	251	69	(61-77)
Black	12	78	(35-122)	21	128	(76-180)	19	104	(60-149)	16	99	(52-145)	11	57	(24-90)
Hispanic	11	87	(37-137)	11	83	(36-131)	9	66	(24-108)	11	83	(35-130)	9	64	(23-105)
Other	13	86	(41-131)	12	82	(37-127)	10	66	(26-106)	14	74	(36-111)	20	93	(54-132)
Stage															
Local	86	27	(22-33)	87	27	(21-33)	69	22	(17-27)	69	21	(16-25)	59	18	(13-22)
Regional	273	320	(288-351)	224	282	(251-313)	255	274	(246-303)	214	248	(219-277)	232	257	(229-286)
AJCC Stage															
Stage 1	86	27	(22-33)	87	27	(21-33)	69	22	(17-27)	69	21	(16-25)	59	18	(13-22)
Stage 2	92	215	(176-254)	73	192	(152-232)	91	207	(169-245)	56	146	(110-181)	62	148	(114-182)
Stage 3	97	441	(375-507)	80	376	(310-441)	91	345	(287-402)	88	327	(271-384)	98	354	(297-410)
Stage 4	84	408	(340-475)	71	353	(287-420)	73	324	(263-386)	70	332	(268-396)	72	353	(287-419)

^aRate per 1,000 patients with bladder cancer.

SOURCE: SEER, 1990-1999.

Table 30. Frequency and timing of urethrectomy in male SEER registry-identified Medicare beneficiaries undergoing radical cystectomy

Radical Cystectomy only	2,957
Radical Cystectomy and urethrectomy within 6 weeks	103
Radical Cystectomy and late urethrectomy (6 weeks or later)	92

Source: SEER-Medicare database, 1991–2002.

Table 31. Use of ileal conduit in Medicare beneficiaries with bladder cancer, 1992–2001 (merged), count^a, rate^b, annualized rate^c, age-adjusted rate^d

	1992–2001			
	Count	4-Year Rate	Annualized Rate	4-Year Age-Adjusted Rate
Total ^e	19,620	9,731	2,433	
Age				
65–69	4,600	12,943	3,236	
70–74	6,000	11,534	2,884	
75–79	5,100	10,769	2,692	
80–84	2,980	7,972	1,993	
85–89	740	3,524	881	
90–94	140	2,102	526	
95–97	0	0	0	
98+	0	0	0	
Gender				
Male	13,640	9,380	2,345	9,641
Female	5,980	10,641	2,660	9,929
Race/ethnicity				
White	17,860	9,529	2,382	9,508
Black	920	11,084	2,771	10,843
Asian	120	22,222	5,556	22,222
Hispanic	140	15,217	3,804	13,043
Region				
Midwest	5,720	14,130	3,533	13,933
Northeast	4,540	11,299	2,825	11,000
South	6,560	12,467	3,117	12,923
West	2,700	12,931	3,233	12,548

Based on CPT codes 51590 (Cystectomy, complete, with ureteroileal conduit or sigmoid bladder, including intestine anastomosis), 51595 (Cystectomy, complete, with ureteroileal conduit or sigmoid bladder, including intestine anastomosis; with bilateral pelvic lymphadenectomy, including external iliac, hypogastric, and obturator nodes), ICD-9 codes 56.5 (cutaneous uretero-ileostomy), and 56.51 (formation of cutaneous uretero-ileostomy).

^aUnweighted counts multiplied by 20 to arrive at values in the table.

^bRate per 100,000 Medicare beneficiaries with bladder cancer.

^cAverage annualized rate per year.

^dAge-adjusted to year 1995.

^ePersons of other races, unknown race and ethnicity, and other region are included in the total.

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

SOURCE: Centers for Medicare and Medicaid Services, 1992, 1995, 1998, 2001.

Table 33. Use of neobladder/continent diversion in Medicare beneficiaries with bladder cancer, 1992–2001 (merged), count^a, rate^b, annualized rate^c, age-adjusted rate^d

	1992–2001		
	4-Year Rate	Annualized Rate	4-Year Age-Adjusted Rate
Total ^e	1,478	370	
Age			
65–69	2,589	647	
70–74	1,769	442	
75–79	1,605	401	
80–84	803	201	
85–89	190	48	
90–94	300	75	
Gender			
Male	1,417	354	1,403
Female	1,637	409	1,637
Race/ethnicity			
White	1,441	360	1,451
Black	1,687	422	1,205
Asian	3,704	926	3,704
Hispanic	4,348	1,087	4,348
Region			
Midwest	2,026	507	2,174
Northeast	1,045	261	1,045
South	1,786	447	1,786
West	3,640	910	3,352

Based on CPT code 51596, ICD-9 code 57.87

^aUnweighted counts multiplied by 20 to arrive at values in the table.

^bRate per 100,000 Medicare beneficiaries with bladder cancer. Not required to have bladder cancer diagnosis to be counted except for ICD-9 code 57.87.

^cAverage annualized rate per year.

^dAge-adjusted to year 1995.

^ePersons of other races, unknown race and ethnicity, and other region are included in the total.

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

SOURCE: Centers for Medicare and Medicaid Services, 1992, 1995, 1998, 2001.

chemotherapy and cystectomy, for advanced bladder cancer than are individuals older than 75 (16) (Table 36).

Complications

The Veterans Affairs (VA) National Surgical Quality Improvement Program (NSQIP) records pre-, intra-, and 30-day post-operative data for all patients undergoing major surgical procedures at VA facilities. The rates of occurrence of bladder cancer as a primary diagnosis among veterans seeking care were from 345 to 460 per 100,000 between 1998 and 2003 (Table 23). These rates have steadily decreased each year during this period, across genders and regions and in both Caucasians and African Americans.

Complications following any bladder cancer surgery occurred in 5.4% to 6.2% of patients over the six years of study (Table 37). The most frequent complications were urinary tract infections (UTIs) or other renal complications, which were observed in 2.4% to 3.4% of patients. The mortality rate was consistently around 1%. The average operative time was 1.3 ± 1.8 hours, and the length of post-operative stay was 5.3 ± 8.5 days.

Data regarding complications following cystectomy and urinary diversion were obtained for 1998 through 2003 by complication type. In the NSQIP dataset, postoperative complications are categorized as wound complications, respiratory complications, urinary tract complications, CNS complications, cardiac complications, or other complications, including excessive bleeding, deep vein thrombosis/thrombophlebitis, sepsis, and graft/prosthesis failure. The data were also stratified by age, race, and geographic region.

One or more complications occurred following cystectomy in 29.1% to 39.1% of patients during the data collection period (Table 38). Complications were consistently maintained below 30% for the latest three years. A majority of the complications occurred in Caucasians and in patients 65 to 74 years of age. There were regional variations in complication rates, with higher rates observed in the South. Wound-related complications were the most frequent, occurring in 10.1% to 15% of patients undergoing cystectomy. Mortality rates were 1.8% to 4.1%, which are in the range of other reported data (18, 19). Re-operation was required in 12% to 20% of patients; no trends were

Chemotherapy

Little data exist regarding the factors affecting the use of systemic chemotherapy for bladder cancer. There are many well-established regimens of combination chemotherapy for the treatment of advanced bladder cancer, but overall survival is still limited in the presence of metastatic disease. Published data suggest that younger individuals are more likely to receive aggressive treatments, including systemic

Table 34. Use of neobladder/continent diversion in Medicare beneficiaries with bladder cancer, count^a, rate^b (95% CI), age-adjusted rate^c

	1992			1995		
	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate
Total ^d	640	326 (213–438)		660	327 (216–439)	
Age						
65–69	200	526 (200–852)		220	619 (253–985)	
70–74	180	362 (127–597)		240	461 (202–721)	
75–79	180	375 (131–620)		160	338 (103–572)	
80–84	40	115 (0–272)		20	54 (0–158)	
85–89	20	112 (0–329)		0	0	
90+	20	310 (0–913)		0	0	
Gender						
Male	420	296 (170–422)	296	480	330 (198–462)	330
Female	220	404 (165–643)	404	180	320 (112–528)	320
Race/ethnicity						
White	520	290 (179–402)	290	620	331 (214–447)	331
Black	80	943 (24–1,863)	943	20	241 (0–711)	241
Asian	...	...	...	0	0	0
Hispanic	...	...	...	20	2,174 (0–6,413)	2,174
N. American Native	...	...	...	0	0	0
Region						
Midwest	160	440 (135–746)	385	100	247 (30–464)	247
Northeast	120	336 (67–605)	336	60	149 (0–319)	149
South	180	388 (136–641)	431	160	304 (93–515)	304
West	160	829 (259–1,399)	829	320	1,533 (785–2,280)	1,533

	1998			2001		
	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate
Total ^d	960	490 (352–629)		720	350 (235–464)	
Age						
65–69	300	970 (482–1,459)		200	642 (244–1,040)	
70–74	320	660 (338–981)		180	378 (132–624)	
75–79	220	460 (188–731)		200	374 (142–606)	
80–84	100	265 (32–498)		140	340 (87–592)	
85–89	20	96 (0–273)		0	0	
90+	0	0		0	0	
Gender						
Male	660	472 (311–633)	457	500	333 (203–464)	333
Female	300	537 (267–808)	573	220	394 (161–627)	394
Race/ethnicity						
White	880	486 (343–629)	475	680	356 (236–475)	356
Black	20	230 (0–680)	230	20	239 (0–706)	239
Asian	20	1,667 (0–4,917)	1,667	0	0	0
Hispanic	0	0	0	20	1,064 (0–3,138)	1,064
N. American Native	0	0	0	0	0	0
Region						
Midwest	300	720 (358–1,083)	768	260	598 (274–923)	644
Northeast	140	358 (92–624)	358	100	248 (30–465)	198
South	320	588 (301–874)	625	280	476 (228–724)	476
West	200	980 (377–1,583)	784	80	366 (9–723)	366

... data not available.

^aUnweighted counts multiplied by 20 to arrive at values in the table.^bRate per 100,000 Medicare beneficiaries 65 years and older with bladder cancer.^cAge-adjusted to year 2001.^dPersons 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, 1992, 1995, 1998, 2001.

Table 35. Multivariate analysis of factors associated with continent reconstruction

	OR (95% CI)
Age (vs 65–69)	
70–74	0.68 (0.54–0.87)
75–79	0.43 (0.33–0.55)
Gender (vs female)	
Male	1.45 (1.15–1.84)
Race/ethnicity (vs white)	
African American	0.43 (0.25–.76)
Hispanic	0.92 (0.55–1.53)
Other	1.09 (0.66–1.80)
Marital Status (vs not married)	1.13 (0.90–1.41)
Median Income(vs ≥ \$75,000)	
< \$20,000	0.70 (0.16–3.07)
\$20,000–\$50,000	1.22 (0.81–1.84)
\$50,000–75,000	1.43 (1.01–2.01)
College Educated (vs less than 25%)	
25–40%	1.14 (0.81–1.61)
At least 40%	1.54 (1.06–2.23)
Charlson Score >(vs 0)	
1–2	0.97 (0.79–1.19)
At least 3	0.71 (0.51–0.97)
SEER Registry (vs. Los Angeles)	
San Francisco	0.38 (0.26–0.56)
Connecticut	0.15 (0.11–0.22)
Detroit	0.16 (0.11–0.24)
Hawaii	0.10 (0.03–0.29)
Iowa	0.11 (0.07–0.17)
New Mexico	0.39 (0.23–0.66)
Seattle	1.22 (0.88–1.68)
Utah	0.22 (0.12–0.40)
Atlanta	1.17 (0.74–1.86)
San Jose	0.74 (0.48–1.13)
Year of Surgery (vs 1992–1994)	
1995–1997	1.56 (1.23–1.97)
1998–2000	1.98 (1.53–2.54)
Stage at least III (vs I)	0.85 (0.70–1.03)
Lymph nodes negative	1.04 (0.84–1.28)
Hospital Type	
Academic (vs non)	1.43 (1.14–1.81)
NCI Cancer Center (vs non)	5.50 (4.20–7.22)
High Volume Hospital (vs low)	1.49 (1.19–1.86)

SOURCE: Reprinted from Cancer, 107, Gore JL, Saigal CS, Hanley MM, Schonlau M, Litwin MS, and the Urologic Diseases in America Project, Variations in diversion after radical cystectomy, 729–737, Copyright 2006.

Table 36. Logistic regression analysis of use of systemic chemotherapy or cystectomy for muscle invasive tumors

Characteristic	Unadjusted Weighted (%)	Adjusted Weighted (%)	Adjusted OR (95% CI)
Total	42	...	...
Age			
< 65	43	49	4.3 (1.0–18.3)
65–74	59	61	8.3 (2.3–30.5)
75+	24	23	1.0
Gender			
Male	39	40	0.6 (0.2–2.5)
Female	49	49	1.0
Race/ethnicity			
White Non-Hispanic	43	44	2.3 (0.5–10.9)
Black Non-Hispanic	34	37	1.5 (0.3–7.8)
Hispanic	31	30	1.0
Marital Status			
Married	48	50	2.4 (0.1–4.1)
Other	34	35	1.0
% Residents with high school education			
1st Quartile (18.66–65.63)	32	33	0.7 (0.1–4.1)
2nd Quartile (65.64–78.11)	56	55	2.5 (0.3–19.0)
3rd Quartile (78.12–86.92)	50	49	1.8 (0.3–11.9)
4th Quartile (86.93–98.70)	36	39	1.0
Insurance type			
Private	43	41	0.8 (0.2–2.7)
Public or none	40	46	1.0
Co-morbidities			
None	41	46	1.6 (0.3–8.2)
Any	42	38	1.0

...data not available.

SOURCE: Reprinted from Journal of Urology, 169, Snyder C, Harlan L, Knopf K, Potosky A, Kaplan R. Patterns of care for the treatment of bladder cancer, 1,607–1,701, Copyright 2003, with permission from American Urological Association.

observed over the time period studied. Operative time remained quite stable over the period of analysis at an average of about 6.5 ± 2.1 hours. The length of post-operative hospital stay at the VA also remained fairly stable at an average of 12.8 ± 12.6 days.

ECONOMIC IMPACT

Analysis of Medicare costs from diagnosis to death reveals that bladder cancer is the most expensive cancer (20). Total expenditures for lower tract TCC in the United States were more than \$1 billion in 2000, an increase of more than \$160 million since 1994 (Table 39). Annual expenditures for physician office visits accounted for the majority of the increase, growing from \$55 million in 1994 to \$188 million in 2000, an increase of 239%, substantially outpacing inflation. All other services for treatment of lower tract TCC increased slightly but did so at a rate far less than

what would be expected based on inflation, indicating a decrease in real expenditures over the study period. Inpatient services accounted for a progressively smaller proportion of total expenditures over time but were still important, accounting for more than half of total expenditures in 2000. Ambulatory surgery was also an important source of expenditures in 2000, accounting for over 20% of total costs for lower tract TCC.

Lower tract TCC was also an important source of expenditures for Medicare enrollees aged 65 and over. These expenditures totaled \$643 million in 2001, an increase of more than 33% since 1992 (Table 40). Similar to those of the general population, Medicare inpatient services accounted for the greatest proportion of expenditures over the study period, but physician office visits were the major driving force behind the increase. Inpatient services and ambulatory surgery also contributed substantially to

Table 37. Complications, by age, race/ethnicity, region, and type, within 30 days following any surgery for lower or upper tract transitional cell carcinoma among VA users

	1998	1999	2000	2001	2002	2003
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Total	1,929	2,275	2,600	2,691	2,672	3,095
Age						
≤ 39	2 (0.1)	6 (0.3)	5 (0.2)	3 (0.1)	2 (0.1)	4 (0.1)
40–44	14 (0.7)	15 (0.7)	22 (0.9)	16 (0.6)	5 (0.2)	4 (0.1)
45–54	148 (7.7)	196 (8.6)	197 (7.6)	201 (7.5)	169 (6.3)	185 (6.0)
55–64	355 (18)	427 (19)	501 (19.)	503 (19)	564 (21)	717 (23)
65–74	796 (41)	862 (38)	918 (35)	961 (36)	848 (32)	954 (30)
75–84	548 (28)	688 (30)	871 (34)	909 (34)	953 (36)	1,059 (34)
≥ 85	66 (3.4)	81 (3.6)	86 (3.3)	98 (3.6)	131 (4.9)	172 (5.6)
Race/ethnicity						
White	1,572 (82)	1,863 (82)	2,188 (82)	2,205 (82)	2,116 (79)	2,018 (65)
Black	170 (8.8)	218 (9.6)	206 (7.9)	180 (6.7)	206 (7.7)	176 (5.6)
Hispanic	58 (3.0)	55 (2.4)	84 (3.2)	75 (2.8)	77 (2.9)	89 (2.9)
Asian	4 (0.2)	2 (0.1)	4 (0.2)	6 (0.2)	4 (0.2)	3 (0.1)
N. American Native	1 (0.1)	6 (0.3)	5 (0.2)	4 (0.2)	4 (0.2)	7 (0.2)
Unknown	124 (6.4)	131 (5.8)	183 (7.0)	221 (8.2)	265 (9.8)	802 (26)
Region						
East	481 (25)	558 (25)	571 (22)	576 (21)	636 (24)	689 (22)
Central	440 (23)	493 (22)	654 (25)	649 (24)	701 (26)	784 (25)
South	680 (35)	726 (32)	848 (33)	926 (34)	848 (32)	995 (32)
West	328 (17)	498 (22)	527 (20)	540 (20)	487 (18)	627 (20)
30-Day Complications (%), age-adjusted to 2000						
1 or More Complications	5.7%	6.2%	6.1%	5.5%	6.2%	5.4%
Wound Events	1.0%	0.8%	0.9%	1.0%	1.3%	1.3%
Respiratory Events	1.4%	1.7%	1.0%	1.4%	1.3%	0.9%
Renal Events	2.4%	2.8%	3.0%	2.7%	3.4%	3.0%
Urinary Tract Infection	2.1%	2.3%	2.6%	2.5%	2.9%	2.7%
Central Nervous System Events	0.3%	0.2%	0.2%	0.3%	0.1%	0.1%
Cardiac Events	0.6%	0.5%	0.3%	0.4%	0.5%	0.5%
Other Complications	0.9%	0.7%	1.3%	0.5%	0.9%	0.9%
Deaths within 30 Days	1.0%	1.1%	1.0%	1.1%	1.0%	1.0%
Returns to the OR	9.4%	10.7%	10.1%	9.5%	9.3%	8.9
Operative Time (hrs), mean ± SD	1.3 ± 1.9	1.3 ± 1.9	1.3 ± 1.8	1.3 ± 1.8	1.3 ± 1.8	1.2 ± 1.8
Postoperative Length of Stay (days), mean ± SD	5.3 ± 8.6	6.0 ± 11.1	4.7 ± 6.7	5.5 ± 7.8	5.2 ± 7.6	5.1 ± 8.4
SOURCE: VA National Surgical Quality Improvement Program (NSQIP), 1998–2003.						

Table 38. Complications, by age, race/ethnicity, region, and type, within 30 days following cystectomy among VA users

	1998		1999		2000		2001		2002		2003	
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Total	197	203	230	286	267	272						
Age												
≤39	1 (0.5)	1 (0.5)	1 (0.4)	2 (0.7)	2 (0.8)	1 (0.4)						
40–44	3 (1.5)	2 (1.0)	4 (1.7)	4 (1.4)	1 (0.4)	1 (0.4)						
45–54	27 (14)	29 (14)	31 (14)	50 (18)	26 (10)	25 (9.2)						
55–64	43 (22)	45 (22)	52 (23)	81 (28)	88 (33)	90 (33)						
65–74	75 (38)	79 (39)	84 (37)	94 (33)	95 (36)	97 (36)						
75–84	48 (24)	46 (23)	57 (25)	53 (19)	53 (20)	56 (21)						
≥ 85	0	1 (0.5)	1 (0.4)	2 (0.7)	2 (0.8)	2 (0.7)						
Race/ethnicity												
White	157 (80)	164 (82)	212 (74)	212 (74)	195 (73)	144 (53)						
Black	24 (12)	23 (11)	27 (12)	5,496 (17)	45 (17)	28 (10)						
Asian	1 (0.5)	0	2 (0.9)	0	1 (0.3)	0						
Hispanic	8 (4.1)	5 (2.5)	15 (6.5)	7 (2.5)	7 (2.6)	9 (3.3)						
N. American Native	1 (0.5)	1 (0.5)	1 (0.4)	0	0	0						
Unknown	6 (3.1)	10 (4.0)	15 (6.5)	18 (6.3)	20 (7.5)	91 (34)						
Region												
East	49 (25)	39 (19)	44 (19)	35 (12)	60 (23)	35 (13)						
Central	50 (25)	47 (23)	66 (29)	95 (33)	74 (28)	86 (32)						
South	61 (31)	59 (29)	70 (30)	100 (35)	86 (32)	83 (31)						
West	37 (19)	58 (29)	50 (22)	56 (20)	47 (18)	68 (25)						
30-Day Complications (%), age-adjusted to 2000												
1 or More Complications	35.4%	39.1%	36.1%	29.1%	29.6%	29.1%						
Wound Events	11.6%	10.1%	10.4%	12.3%	11.3%	15.0%						
Respiratory Events	7.1%	12.6%	8.3%	9.4%	7.8%	5.9%						
Renal Events	10.5%	11.2%	10.4%	6.8%	10.0%	9.9%						
Urinary Tract Infections	8.0%	9.8%	8.7%	6.3%	8.9%	7.0%						
Central Nervous System Events	2.1%	0.9%	0.9%	2.3%	0.5%	1.3%						
Cardiac Events	2.1%	1.9%	3.0%	1.8%	1.9%	3.6%						
Other Complications	5.1%	5.2%	9.1%	3.4%	6.2%	6.1%						
Deaths within 30 Days	2.5%	3.4%	3.0%	4.1%	1.8%	3.5%						
Returns to the OR	14.3%	12.0%	20.0%	19.3%	19.6%	17.5%						
Operative Time (hrs), mean ± SD	6.8 ± 2.1	6.8 ± 2.0	6.5 ± 2.0	6.2 ± 2.1	6.4 ± 2.1	6.3 ± 2.0						
Postoperative Length of Stay (days), mean ± SD	13.1 ± 12.1	16.5 ± 18.7	12.4 ± 11.7	11.3 ± 9.7	12.0 ± 10.3	12.8 ± 12.6						

SOURCE: VA National Surgical Quality Improvement Program (NSQIP), 1998–2003.

Table 39. Expenditures for lower tract transitional cell carcinoma, by site of service (% of total)

Service Type	1994		1996		1998		2000	
Hospital Outpatient	\$40,041,129	4.4%	\$37,564,046	3.9%	\$53,019,533	5.1%	\$51,105,509	4.8%
Physician Office	\$55,430,541	6.1%	\$81,277,489	8.5%	\$99,639,020	9.6%	\$188,128,105	17.5%
Ambulatory Surgery	\$220,270,787	24.1%	\$262,130,470	27.4%	\$279,538,480	26.9%	\$226,320,829	21.1%
Emergency Room	---	0.0%	---	0.0%	---	0.0%	---	0.0%
Inpatient	\$596,873,754	65.4%	\$576,089,164	60.2%	\$607,468,960	58.4%	\$608,248,652	56.6%
TOTAL	\$912,616,211		\$957,061,169		\$1,039,665,993		\$1,073,803,094	

SOURCE: National Ambulatory and Medical Care Survey; National Hospital and Ambulatory Medical Care Survey; Healthcare Cost and Utilization Project; Medical Expenditure Panel Survey, 1994, 1996, 1998, 2000.

the observed expenditure increases over time. Hospital outpatient services and emergency room visits were an insignificant source of costs for treatment of lower tract TCC in the Medicare population over the age of 64.

Expenditures for Medicare enrollees under the age of 65 were substantially lower, amounting to only \$44 million in 2001. Nevertheless, increases over time were dramatic, more than doubling since 1995. Inpatient services accounted for more than 80% of these expenditures in 2001 and were responsible for the majority of increases in expenditures over time. While expenditures for physician office visits made up only about 7% of all expenditures in this population in 2001, they more than quadrupled between 1992 and 2001.

Individual-level expenditures for treatment of lower tract TCC were estimated using risk-adjusted regression models controlling for age, sex, work status, income, urban or rural residence, and health plan characteristics (Table 41). Among 18- to 64-year-olds with employer-provided insurance, average annual expenditures for those treated for lower tract TCC were \$14,458, compared with \$4,873 for similar individuals not treated for this condition, an incremental cost of \$9,585. The higher costs associated with diagnosis of lower tract TCC are expected, as the condition is typically treated surgically and is associated with intensive follow up. About 16% of individual-level expenditures went toward pharmaceuticals. Incremental costs associated with lower tract TCC were greatest among individuals 55

Table 40. Expenditures for Medicare beneficiaries for lower tract transitional cell carcinoma, by site of service (% of total)

Service Type	Age 65 and over							
	1992		1995		1998		2001	
Hospital Outpatient	\$16,832,700	3.5%	\$24,037,440	4.6%	\$22,842,080	4.1%	\$24,617,520	3.8%
Physician Office	\$21,156,660	4.4%	\$33,381,600	6.3%	\$51,158,160	9.2%	\$92,023,440	14.3%
Ambulatory Surgery	\$75,498,480	15.7%	\$116,868,960	22.2%	\$125,991,360	22.6%	\$114,842,400	17.9%
Emergency Room	\$1,459,080	0.3%	\$1,599,000	0.3%	\$2,247,240	0.4%	\$1,139,600	0.2%
Inpatient	\$365,577,240	76.1%	\$350,875,800	66.6%	\$355,359,840	63.7%	\$410,143,200	63.8%
TOTAL	\$480,524,160		\$526,762,800		\$557,598,680		\$642,766,160	
Service Type	Under 65							
	1992		1995		1998		2001	
Hospital Outpatient	\$464,000	2.0%	\$913,920	4.4%	\$1,106,700	3.4%	\$816,960	1.8%
Physician Office	\$559,420	2.4%	\$782,880	3.7%	\$1,702,400	5.3%	\$2,926,080	6.6%
Ambulatory Surgery	\$1,542,240	6.7%	\$3,867,420	18.5%	\$5,470,920	16.9%	\$4,575,680	10.3%
Emergency Room	---	0.0%	---	0.0%	---	0.0%	---	0.0%
Inpatient	\$20,297,140	88.8%	\$15,376,240	73.4%	\$24,058,440	74.4%	\$35,919,240	81.2%
TOTAL	\$22,862,800		\$20,940,460		\$32,338,460		\$44,237,960	

SOURCE: Centers for Medicare and Medicaid Services, 1992, 1995, 1998, 2001.

Table 41. Estimated annual expenditures of privately insured employees with and without a medical claim for lower tract transitional cell carcinoma, 2002^a

	Annual Expenditures (per person)					
	Persons Age 40–64 without Lower Bladder Cancer (N=342,771)			Persons Age 40–64 with Lower Bladder Cancer (N=615)		
	Medical	Rx Drugs	Total	Medical	Rx Drugs	Total
Total	\$3,469	\$1,404	\$4,873	\$12,109	\$2,349	\$14,458
Age						
50–54	\$3,637	\$1,482	\$5,119	\$7,743	\$2,258	\$10,001
55–59	\$3,718	\$1,462	\$5,180	\$9,570	\$2,218	\$11,788
60–64	\$3,569	\$1,397	\$4,966	\$8,268	\$2,191	\$10,459
Gender						
Male	\$3,428	\$1,334	\$4,762	\$10,633	\$2,151	\$12,784
Female	\$3,527	\$1,503	\$5,030	\$14,178	\$2,625	\$16,803
Region						
Midwest	\$3,461	\$1,341	\$4,802	\$12,093	\$2,261	\$14,354
Northeast	\$3,251	\$1,493	\$4,744	\$11,356	\$2,499	\$13,855
South	\$3,646	\$1,380	\$5,026	\$12,737	\$2,292	\$15,029
West	\$3,470	\$1,371	\$4,841	\$12,123	\$2,311	\$14,434

Rx, Prescription.

^aThe sample consists of primary beneficiaries ages 40 to 64 having employer-provided insurance who were continuously enrolled in 2002. 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 binary indicators for 28 chronic disease conditions. Predicted expenditures for persons age 40 to 49 are omitted due to small sample size.

SOURCE: Ingenix, 2002.

to 59 years of age, apparently reflecting differences in medical expenditures rather than pharmaceutical costs, which were similar across age groups. Medical and pharmaceutical costs associated with a diagnosis of lower tract TCC were higher in women (\$16,803)

than in men (\$12,784) but did not vary substantially by region.

Overall 29% of individuals with employer-provided health insurance and a claim for lower tract TCC missed work; almost four days of work, on

Table 42. Average annual work loss of persons treated for bladder cancer, 1999 (95%CI)

	Number of Workers ^a	% Missing Work	Average Work Absence (hrs)		
			Inpatient ^b	Outpatient ^b	Total
Total	92	29%	13.9 (1–27)	18.6 (3–34)	32.4 (12–53)
Age					
30–39	6	50%	54.7 (0–195)	12.3 (0–34)	66.9 (0–202)
40–49	19	47%	10.7 (0–24)	15.8 (3–29)	26.6 (8–45)
50–64	67	22%	11.1 (0–26)	19.9 (0–40)	31 (5–57)
Gender					
Male	70	29%	13.4 (0–28)	23 (3–43)	36.5 (11–62)
Female	22	32%	15.3 (0–46)	4.3 (0–9)	19.6 (0–50)
Region					
Northeast	18	28%	27.6 (0–84)	5 (0–11)	32.6 (0–89)
Midwest	23	35%	9.4 (0–19)	44 (0–94)	53.4 (0–110)
South	32	22%	7.4 (0–16)	15 (0–41)	22.4 (0–49)
West	8	50%	41 (0–138)	9.6 (0–24)	50.6 (0–145)
Unknown	11	27%	0	4.4 (0–11)	4.4 (0–11)

^aIndividuals with an inpatient or outpatient claim for bladder cancer and for whom absence data were collected. Work loss is based on reported absences contiguous to admission and discharge dates of each hospitalization or the date of the outpatient visit.

^bInpatient and outpatient include absences that start or stop the day before or after a visit.

SOURCE: Marketscan Health and Productivity Management, 1999.

average, were missed per person diagnosed with TCC (Table 42). The proportion was similar for men and women. An average of just under three days of work were missed for outpatient visits, with men appearing to miss more work for such visits than women. Lower tract TCC patients in the Midwest region missed more hours per outpatient visit than did those in the Northeast region.

UPPER TRACT UROTHELIAL CANCER

TRENDS IN HEALTHCARE RESOURCE UTILIZATION

Inpatient Care

Inpatient care for upper tract urothelial cancer has remained stable over the decade of the four index years (1992–2001). While there were no significant differences between age groups or by race, women had a lower rate of inpatient stays than did men, reflecting the demographics of the disease. Rates of inpatient admission varied significantly, being highest in the South most recently and highest in the Northeast and Midwest in previous years (Table 43). HCUP data indicate similar trends, although the overall rate of inpatient admissions for a diagnosis of upper tract TCC declined from 5.8 per 100,000 to 4.5 per 100,000 (Table 44). A majority of the care for upper tract TCC is delivered at urban locations, and this rate is also gradually rising.

Outpatient Care

Ambulatory Surgery

The annualized ambulatory surgery visit rate of occurrence of upper tract TCC is 2.2 per 100,000, according to data from the National Survey of Ambulatory Surgery (Table 45). The rate of visits to ambulatory surgery centers for upper tract TCC increased consistently, from 2.7 per 100,000 in 1992 to 4.8 per 100,000 in 2001 (Table 46). There was significant variation by gender, which can be explained at least in part by the demographics of the disease. Racial and age trends were unclear given the small sample size and the small number of non-Caucasian patients.

Physician Office Visits

Physician office visits have not shown any consistent trends. The highest rate in the most recent data occurred in the Midwest. There were also no specific trends in office visit frequency relating to age and gender (Table 47). Outpatient hospital visits have remained steady over a 10-year period, as have the numbers of visits by gender, except in the Northeast, where they declined.

Table 43. Inpatient stays by Medicare beneficiaries with upper tract transitional cell carcinoma listed as primary diagnosis, count^a, rate^b (95% CI), age-adjusted rate^c

	1992			1995			1998			2001		
	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate
Total ^d	2,240	6.4 (5.2-7.6)	6.4	2,280	6.4 (5.3-7.6)	6.4	1,900	5.7 (4.5-6.8)	5.7	2,180	6.2 (5.0-7.3)	6.2
Total < 65	80	1.4 (0-2.9)		40	0.7 (0-1.5)		40	0.6 (0-1.5)		100	1.4 (0.2-2.7)	
Total 65+	2,160	7.4 (6.0-8.7)		2,240	7.7 (6.2-9.1)		1,860	6.8 (5.4-8.2)		2,080	7.4 (6.0-8.8)	
Age												
65-69	520	5.8 (3.5-8.0)		480	5.7 (3.4-7.9)		180	2.5 (0.8-4.1)		240	3.2 (1.4-5.0)	
70-74	540	7.1 (4.4-9.8)		660	8.5 (5.6-12)		460	6.6 (3.9-9.3)		560	8.1 (5.1-11)	
75-79	380	6.6 (3.6-9.6)		560	9.8 (6.2-14)		520	9.2 (5.7-13)		500	8.4 (5.1-12)	
80-84	320	8.4 (4.3-13)		420	11 (6.1-15)		440	11 (6.7-16)		520	13 (7.9-18)	
85-89	320	16 (7.9-23)		120	5.5 (1.1-9.9)		180	8.2 (2.8-14)		200	8.6 (3.3-14)	
90+	60	7.2 (0-15)		0	0		80	8.8 (0.2-17)		60	6.3 (0-13)	
Gender												
Male	1,320	8.9 (6.7-11)	9.7	1,440	9.5 (7.3-12)	9.9	1,140	7.9 (5.8-9.9)	7.6	1,260	8.2 (6.2-10)	
Female	920	4.6 (3.3-5.9)	3.8	840	4.2 (2.9-5.4)	3.9	760	4.0 (2.7-5.3)	4.2	920	4.6 (3.3-6.0)	
Race/ethnicity												
White	2,060	7.0 (5.6-8.3)	6.8	2,200	7.2 (5.9-8.6)	7.2	1,760	6.2 (4.9-7.5)	6.3	2,000	6.7 (5.4-8.0)	6.5
Black	60	2.0 (0-4.3)	2.7	40	1.2 (0-2.9)	1.2	60	1.9 (0-4.1)	1.9	40	1.2 (0-2.8)	1.2
Asian	...	...	...	0	0	0	20	6.4 (0-19)	6.4	0	0	0
Hispanic	...	...	...	20	5.0 (0-15)	5.0	20	2.8 (0-8.4)	0	40	5.0 (0-12)	2.5
N. American Native	...	...	...	0	0	0	0	0	0	0	0	0
Region												
Midwest	700	8.0 (5.4-11)	7.8	460	5.1 (3.0-7.2)	4.9	620	7.2 (4.7-9.7)	7.6	420	4.8 (2.7-6.8)	5.7
Northeast	400	5.2 (2.9-7.5)	5.5	780	10 (7.0-13)	11	360	5.4 (2.9-7.9)	5.1	460	6.7 (3.9-9.4)	6.1
South	720	5.9 (4.0-7.8)	6.4	760	6.0 (4.1-7.9)	6.1	640	5.2 (3.4-7.0)	5.2	920	6.9 (4.9-8.9)	6.6
West	420	7.7 (4.4-11)	5.8	280	5.4 (2.6-8.2)	3.9	280	5.7 (2.7-8.6)	5.2	340	6.3 (3.3-9.3)	6.3

...data not available.

^aUnweighted counts multiplied by 20 to arrive at values in the table.^bRate per 100,000 Medicare beneficiaries in the same demographic stratum.^cAge-adjusted to the US Census-derived age distribution of the year under analysis.^dPersons 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 Files, 1992, 1995, 1998, 2001.

Table 44. Inpatient hospital stays for upper transitional cell carcinoma listed as primary diagnosis, count, rate^a (95% CI), age-adjusted rate^b

	1994			1996			1998			2000		
	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate
Total ^c	5,651	5.8 (5.2-6.3)	5.8	6,106	5.8 (5.3-6.4)	5.8	5,402	4.9 (4.5-5.3)	4.9	5,184	4.5 (4.1-4.9)	4.5
Age												
40-54	461	1.0 (0.8-1.2)		508	1.0 (0.7-1.2)		392	0.7 (0.6-0.9)		503	0.8 (0.7-1.0)	
55-64	1,047	5.2 (4.2-6.2)		1,035	4.9 (4.1-5.8)		805	3.6 (3.0-4.3)		917	3.9 (3.3-4.6)	
65-74	2,055	12 (9.9-13)		2,116	12 (10-13)		1,898	11 (9.3-12)		1,694	9.5 (8.3-11)	
75-84	1,704	18 (15-20)		1,955	18 (16-21)		1,921	17 (15-19)		1,595	14 (12-15)	
85+	384	14 (10-17)		492	18 (13-22)		386	13 (10-16)		475	15 (12-19)	
Gender												
Male	3,446	7.6 (6.7-8.4)	8.2	3,678	7.5 (6.7-8.4)	8.2	3,200	6.2 (5.6-6.8)	6.7	3,051	5.7 (5.1-6.2)	6.1
Female	2,205	4.2 (3.6-4.8)	3.9	2,428	4.3 (3.8-4.8)	4.0	2,202	3.8 (3.3-4.2)	3.5	2,133	3.5 (3.1-3.9)	3.3
Region												
Northeast	1,263	6.0 (4.5-7.4)	5.8	1,402	6.5 (5.3-7.8)	6.3	1,174	5.3 (4.2-6.4)	5.2	1,267	5.5 (4.4-6.6)	5.3
Midwest	1,245	5.4 (4.2-6.6)	5.4	1,724	6.9 (5.4-8.4)	6.9	1,359	5.3 (4.5-6.2)	5.2	1,244	4.7 (3.8-5.6)	4.8
South	2,032	6.1 (5.1-7.0)	6.1	1,969	5.3 (4.6-6.1)	5.3	1,873	4.8 (4.2-5.4)	4.8	1,806	4.4 (3.8-4.9)	4.3
West	1,111	5.4 (4.4-6.4)	5.6	1,009	4.7 (4.0-5.4)	4.9	996	4.3 (3.4-5.1)	4.5	868	3.6 (2.9-4.2)	3.7
MSA												
Rural	708	2.7 (2.1-3.2)	2.5	783	3.1 (2.4-3.8)	3.0	723	2.8 (2.2-3.3)	2.6	680	2.5 (2.0-3.0)	2.4
Urban	4,839	6.8 (6.1-7.5)	7.0	5,308	6.7 (6.0-7.3)	6.8	4,660	5.6 (5.1-6.1)	5.7	4,499	5.1 (4.7-5.6)	5.2

MSA, metropolitan statistical area.

^aRate per 100,000 is based on 1994, 1996, 1998, 2000 population estimates from Current Population Survey (CPS), CPS Utilities, Unicon Research Corporation, for relevant demographic categories of US adult civilian non-institutionalized population, 40 years and older.

^bAge-adjusted to the US Census-derived age distribution of the year under analysis.

^cPersons of missing MSA are included in the total.

NOTE: Counts may not sum to totals due to rounding.

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

Table 45. Ambulatory surgery visits for upper tract transitional cell carcinoma listed as any diagnosis, 1994-1996 (merged), count, rate^a (95% CI), annualized rate^b, age-adjusted rate^c

	1994-1996		
	Count	3-Year Rate	Annualized Rate
Total	6,838	6.7 (2.9-10)	2.2
			Age-adjusted Rate
			6.7

^aRate per 100,000 is based on 1994, 1995, 1996 population estimates from Current Population Survey (CPS), CPS Utilities, Unicon Research Corporation, for relevant demographic categories of US adult civilian non-institutionalized population, 40 years and older.

^bAge-adjusted to the US Census-derived age distribution of the midpoint of years.

^cAverage annualized rate per year.

SOURCE: National Survey of Ambulatory Surgery, 1994, 1995, 1996.

Table 46. Visits to ambulatory surgery centers by Medicare beneficiaries with upper tract transitional cell carcinoma listed as primary diagnosis, count^a, rate^b (95% CI), age-adjusted rate^c

	1992			1995			1998			2001		
	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate
Total ^d	940	2.7 (1.9–3.5)	2.7	1,080	3.1 (2.2–3.9)	3.1	1,360	4.1 (3.1–5.0)	4.1	1,700	4.8 (3.8–5.8)	4.8
Total < 65	20	0.4 (0–1.1)		80	1.3 (0–2.6)		40	0.6 (0–1.5)		60	0.9 (0–1.8)	
Total 65+	920	3.1 (2.2–4.0)		1,000	3.4 (2.5–4.4)		1,320	4.8 (3.7–6.0)		1,640	5.8 (4.6–7.1)	
Age												
65–69	160	1.8 (0.5–3.0)		340	4.0 (2.1–5.9)		220	3.0 (1.2–4.8)		180	2.4 (0.8–4.0)	
70–74	180	2.4 (0.8–3.9)		300	3.9 (1.9–5.8)		380	5.4 (3.0–7.9)		480	6.9 (4.1–9.7)	
75–79	200	3.5 (1.3–5.6)		180	3.2 (1.1–5.2)		340	6.0 (3.1–8.9)		560	9.4 (5.9–13)	
80–84	200	5.3 (2.0–8.5)		140	3.5 (0.9–6.2)		180	4.7 (1.6–7.8)		200	4.9 (1.9–8.0)	
85–89	160	7.8 (2.4–13)		20	0.9 (0–2.7)		140	6.4 (1.6–11)		220	9.4 (3.9–15)	
90+	20	2.4 (0–7.1)		0	0		60	6.6 (0–14)		0	0	
Gender												
Male	580	3.9 (2.5–5.3)	4.0	700	4.6 (3.1–6.1)	4.6	820	5.7 (3.9–7.4)	5.4	1,120	7.3 (5.4–9.2)	7.3
Female	360	1.8 (1.0–2.6)	1.7	380	1.9 (1.0–2.7)	1.9	540	2.8 (1.8–3.9)	3.0	580	2.9 (1.9–4.0)	2.9
Race/ethnicity												
White	820	2.8 (1.9–3.6)	2.7	1,020	3.4 (2.4–4.3)	3.4	1,320	4.6 (3.5–5.8)	4.8	1,620	5.4 (4.2–6.6)	5.4
Black	80	2.7 (0.1–5.3)	2.0	40	1.2 (0–2.9)	1.2	20	0.6 (0–1.9)	0	20	0.6 (0–1.7)	0.6
Asian	...	...	...	0	0	0	0	0	0	20	4.2 (0–12)	4.2
Hispanic	...	...	...	0	0	0	20	2.8 (0–8.4)	0	0	0	0
N. American	...	...	...	0	0	0	0	0	0	0	0	0
Native	...	...	...	0	0	0	0	0	0	20	30 (0–88)	30
Region												
Midwest	240	2.7 (1.2–4.3)	3.2	240	2.7 (1.2–4.2)	2.7	580	6.7 (4.3–9.2)	7.4	360	4.1 (2.2–6.0)	4.1
Northeast	140	1.8 (0.5–3.2)	2.1	240	3.1 (1.4–4.9)	3.1	180	2.7 (0.9–4.4)	2.7	580	8.4 (5.3–11)	8.4
South	280	2.3 (1.1–3.5)	2.3	460	3.6 (2.1–5.1)	3.5	360	2.9 (1.6–4.2)	2.7	560	4.2 (2.7–5.8)	4.4
West	280	5.1 (2.4–7.8)	3.7	120	2.3 (0.5–4.2)	2.7	240	4.8 (2.1–7.6)	4.0	200	3.7 (1.4–6.0)	3.0

...data not available.

^aUnweighted counts multiplied by 20 to arrive at values in the table.^bRate per 100,000 Medicare beneficiaries in the same demographic stratum.^cAge-adjusted to the US Census-derived age distribution of the year under analysis.^dPersons 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, 5% Carrier and Outpatient Files, 1992, 1995, 1998, 2001.

Table 47. Physician office visits by Medicare beneficiaries with upper tract transitional cell carcinoma listed as primary diagnosis, count^a, rate^b (95% CI), age-adjusted rate^c

	1992			1995			1998			2001		
	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate	Count	Rate	Age-Adjusted Rate
Total ^d	10,640	30 (28–33)	30	15,380	43 (40–47)	43	13,120	39 (36–42)	39	16,380	46 (43–50)	46
Total < 65	300	5.4 (2.7–8.2)		920	15 (11–19)		740	12 (8.1–16)		520	7.4 (4.5–10)	
Total 65+	10,340	35 (32–38)		14,460	49 (46–53)		12,380	45 (42–49)		15,860	56 (52–60)	
Age												
65–69	2,780	31 (26–36)		5,720	68 (60–75)		2,600	35 (29–42)		6,380	85 (75–94)	
70–74	2,340	31 (25–36)		2,680	35 (29–41)		3,220	46 (39–53)		3,800	55 (47–62)	
75–79	3,320	58 (49–67)		3,620	64 (54–73)		3,540	63 (53–72)		2,740	46 (38–54)	
80–84	1,240	33 (25–41)		1,500	38 (29–47)		2,100	55 (44–65)		1,900	47 (37–56)	
85–89	560	27 (17–37)		680	31 (21–42)		760	35 (24–46)		860	37 (26–48)	
90–94	80	9.6 (0.2–19)		100	11 (1.3–21)		140	15 (4.0–27)		120	13 (2.5–23)	
95–97	20	11 (0–31)		80	42 (1.1–83)		20	9.9 (0–29)		40	20 (0–49)	
98+	0	0		80	46 (1.1–90)		0	0		20	9.2 (0–27)	
Gender												
Male	6,520	44 (39–49)	45	8,580	56 (51–62)	58	6,880	48 (42–53)	49	10,980	71 (65–77)	74
Female	4,120	21 (18–23)	20	6,800	34 (30–37)	33	6,240	33 (29–36)	32	5,400	27 (24–30)	25
Race/ethnicity												
White	9,880	33 (31–36)	34	14,140	47 (43–50)	47	12,100	43 (39–46)	43	15,060	50 (47–54)	51
Black	380	13 (7.1–19)	11	460	14 (8.4–20)	16	580	19 (12–26)	21	360	11 (5.7–15)	8.2
Asian	...	...	...	100	60 (7.2–112)	72	160	51 (16–86)	45	100	21 (2.5–40)	21
Hispanic	...	...	...	200	50 (19–81)	65	80	11 (0.3–22)	5.7	140	18 (4.5–31)	18
N. American	...	...	...	0	0	0	0	0	0	140	210 (54–366)	240
Native	...	...	...	0	0	0	0	0	0	0	0	0
Region												
Midwest	2,520	29 (24–34)	30	4,120	46 (39–52)	44	3,320	38 (33–44)	38	5,460	62 (55–69)	67
Northeast	3,280	43 (36–49)	39	3,320	43 (37–50)	37	2,420	36 (30–43)	36	2,940	43 (36–49)	38
South	3,660	30 (26–34)	31	5,320	42 (37–47)	45	5,120	41 (36–46)	43	5,500	41 (37–46)	42
West	1,140	21 (15–26)	20	2,620	51 (42–59)	54	2,160	44 (35–52)	40	2,400	44 (36–52)	40

...data not available.

^aUnweighted counts multiplied by 20 to arrive at values in the table.

^bRate per 100,000 Medicare beneficiaries in the same demographic stratum.

^cAge-adjusted to the US Census-derived age distribution of the year under analysis.

^dPersons 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, 5% Carrier and Outpatient Files, 1992, 1995, 1998, 2001.

Table 48. VA users with a primary diagnosis of upper tract transitional cell carcinoma, 1998–2003, age-adjusted rate^a

	1998		1999		2000		2001		2002		2003	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate
Total	754	25	822	25	775	22	723	19	713	16	743	16
Age												
40–44	13	5	18	7	14	5	10	4	4	2	11	4
45–54	103	12	129	15	113	13	100	12	90	11	89	10
55–64	221	35	200	31	179	28	139	22	135	21	114	18
65–74	320	33	311	32	251	26	225	23	192	20	193	20
75–84	239	34	225	32	203	29	149	21	126	18	125	18
85 +	11	17	12	19	15	23	13	20	10	16	8	13
Gender												
Male	744	26	813	26	763	23	714	19	706	17	730	16
Female	10	11	9	9	12	11	9	7	7	5	13	9
Race/ethnicity												
White	569	28	626	28	613	25	565	20	557	18	533	17
Black	130	31	138	31	116	26	109	24	101	21	105	23
Hispanic	18	23	22	26	19	22	17	18	12	13	14	15
Other	10	25	14	33	11	25	7	15	10	20	5	10
Unknown	27	6	22	5	16	4	25	5	33	5	86	9
Insurance Status												
No insurance/self-pay	496	23	521	23	479	21	400	18	368	16	378	16
Medicare	83	32	133	33	172	26	239	24	248	20	293	19
Medicaid	0	0	0	0	1	27	0	0	2	23	5	52
Private Insurance/HMO	174	29	167	30	118	21	82	14	93	15	65	9
Other Insurance	1	9	1	6	5	21	2	7	2	6	2	5
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Region												
Eastern	103	23	125	26	110	21	104	16	139	18	116	15
Central	119	23	151	26	130	21	121	17	126	15	176	17
Southern	305	27	316	26	320	24	300	19	284	16	287	15
Western	227	25	230	24	215	22	198	20	164	17	164	18

^aRate per 100,000 veterans using the VA system.

SOURCE: Inpatient and Outpatient Files, VA Information Resource Center (VIREC), Veterans Affairs Health Services Research and Development Service Resource Center.

Table 49. Expenditures for upper tract transitional cell carcinoma, by site of service (% of total)

Service Type	1994		1996		1998		2000	
Hospital Outpatient	---	0.0%	---	0.0%	---	0.0%	---	0.0%
Physician Office	---	0.0%	---	0.0%	---	0.0%	---	0.0%
Ambulatory Surgery	\$7,058,582	11.3%	\$7,687,040	10.5%	\$6,639,698	8.7%	\$5,304,061	8.2%
Emergency Room	---	0.0%	---	0.0%	---	0.0%	---	0.0%
Inpatient	\$55,396,098	88.7%	\$65,185,706	89.5%	\$70,112,558	91.3%	\$59,005,746	91.8%
TOTAL	\$62,454,680		\$72,872,746		\$76,752,256		\$64,309,807	

SOURCE: National Ambulatory and Medical Care Survey; National Hospital and Ambulatory Medical Care Survey; Healthcare Cost and Utilization Project; Medical Expenditure Panel Survey, 1994, 1996, 1998, 2000.

Table 50. Expenditures for Medicare beneficiaries for treatment of upper tract transitional cell carcinoma, by site of service (% of total)

Service Type	Age 65 and over							
	1992		1995		1998		2001	
Hospital Outpatient	\$636,000	2.5%	\$366,600	1.4%	\$643,080	2.2%	\$851,520	2.6%
Physician Office	\$785,840	3.1%	\$1,286,940	4.8%	\$2,154,120	7.3%	\$4,107,740	12.7%
Ambulatory Surgery	\$1,375,400	5.5%	\$2,169,000	8.1%	\$2,563,440	8.7%	\$2,666,640	8.2%
Emergency Room	---	0.0%	---	0.0%	---	0.0%	---	0.0%
Inpatient	\$22,332,240	88.9%	\$23,069,760	85.8%	\$24,140,940	81.8%	\$24,814,400	76.5%
TOTAL	\$25,129,480		\$26,892,300		\$29,501,580		\$32,440,300	
Service Type	Under 65							
	1992		1995		1998		2001	
Hospital Outpatient	---	0.0%	---	0.0%	---	0.0%	---	0.0%
Physician Office	---	0.0%	\$49,680	100.0%	\$60,680	100.0%	---	0.0%
Ambulatory Surgery	---	0.0%	---	0.0%	---	0.0%	---	0.0%
Emergency Room	---	0.0%	---	0.0%	---	0.0%	---	0.0%
Inpatient	---	0.0%	---	0.0%	---	0.0%	---	0.0%
TOTAL	\$0		\$49,680		\$60,680		\$0	

SOURCE: Centers for Medicare and Medicaid Services, 1992, 1995, 1998, 2001.

Outpatient VA Care

Data from the VA system also indicate a gradual decrease in the rate of affected patients in each year up to 2003. A greater number of African Americans sought care in the VA system for upper tract TCC in 1998, and this relationship remained constant through 2003. More males than females with a diagnosis of upper tract TCC were seen at VA facilities; regional differences were not significant (Table 48).

ECONOMIC IMPACT

Total expenditures for upper tract TCC were \$64 million in 2000. They peaked in 1998 at \$77 million, but no clear trend was observed for total expenditures over time (Table 49). Expenditures related to ambulatory surgery have decreased since 1996 and made up only 8% of total expenditures in year 2000. Inpatient services consistently accounted for about 90% of total expenditures throughout the study period.

Expenditures for upper tract TCC among Medicare enrollees 65 years of age and older increased consistently, from \$25 million in 1992 to \$32 million in 2001 (Table 50). Increases in expenditures were driven primarily by increases in inpatient services and physician office visits. Expenditures for physician office visits more than quadrupled from 1992 to 2001, and expenditures for ambulatory surgery almost doubled. While inpatient services have accounted for a smaller proportion of total expenditures over time

in this population, they still accounted for over 75% of expenditures in year 2001. Expenditures in the Medicare population under the age of 65 were small.

In most years, charges for male patients appeared to be much higher than those for female patients. The largest proportion of the charges was generated by inpatient care, followed by ambulatory surgery care (Tables 49 and 51). Individual-level expenditures associated with a diagnosis of upper tract TCC could not be estimated reliably due to small sample size.

OVERALL BURDEN OF TRANSITIONAL CELL CARCINOMA

The economic impact of TCC in the United States is substantial: expenditures of over \$1 billion were attributed to lower tract TCC, and \$64 million was attributed to upper tract TCC in year 2000. Bladder cancer was also an important source of healthcare costs among Medicare enrollees, especially those 65 and older. While the impact of upper tract TCC was small relative to that of lower tract disease, it was not insignificant relative to other urologic conditions. Diagnosis of lower tract TCC was associated with enormous personal costs for both men and women. In addition, not only did a substantial proportion of the people with lower tract TCC miss work, an average of almost four days of work were missed per outpatient visit.

Table 51. Visits for individuals with upper tract transitional cell carcinoma having commercial health insurance, primary diagnosis, 1994–2002

	Inpatient		Hospital Outpatient		Ambulatory Surgery		Physician Outpatient		Emergency Room	
	Count	Mean Total Payment	Count	Mean Cost	Count	Mean Cost	Count	Mean Cost	Count	Mean Cost
Total	82	\$6,935	13	\$143	43	\$375	134	\$98	1	\$170
Year										
1994	8	\$4,652	1	\$165	4	\$187	12	\$71	0	\$0
Gender										
Male	6	\$5,231	1	\$165	4	\$187	7	\$96	0	\$0
Female	2	\$2,917	0	\$0	0	\$0	5	\$36	0	\$0
1996	12	\$5,401	1	\$153	2	\$145	20	\$87	0	\$0
Gender										
Male	8	\$6,559	1	\$153	1	\$142	14	\$105	0	\$0
Female	4	\$3,087	0	\$0	1	\$147	6	\$46	0	\$0
1998	20	\$7,556	2	\$74	12	\$703	32	\$92	0	\$0
Gender										
Male	13	\$6,901	1	\$33	11	\$709	21	\$73	0	\$0
Female	7	\$8,773	1	\$114	1	\$636	11	\$128	0	\$0
2000	22	\$8,363	3	\$145	12	\$219	41	\$96	0	\$0
Gender										
Male	14	\$8,703	3	\$145	9	\$237	23	\$110	0	\$0
Female	8	\$7,768	0	\$0	3	\$164	18	\$78	0	\$0
2002	20	\$6,575	6	\$159	13	\$309	29	\$124	1	\$170
Gender										
Male	14	\$7,334	4	\$205	10	\$374	24	\$129	1	\$170
Female	6	\$4,804	2	\$67	3	\$93	5	\$102	0	\$0

SOURCE: Center for Health Care Policy and Evaluation, 1994, 1996, 1998, 2000, 2002.

CONCLUSIONS

The available data suggest that bladder cancer is a prevalent disease, with the incidence of new cases holding steady over the past 20 years. The frequency of upper tract tumors is less than that of bladder cancer. The rate of inpatient care is decreasing for both upper and lower tract cancers, while the use of outpatient care venues such as office visits and ambulatory surgery centers is increasing. The use of emergency room care does not appear to be high for this disease and is limited to elderly patients. Office procedures such as urinalysis and cystoscopy are common, but urine cytology seems to be used relatively infrequently. CT scanning is increasingly utilized as a staging modality prior to invasive therapy such as cystectomy. Transurethral resection of the tumor is the most frequently utilized treatment approach, typically followed by no additional surgery in the 12 months after initial diagnosis. Cystectomy for bladder cancer is performed in a few individuals,

primarily those with higher-stage disease. Ileal conduit urinary diversion is the most frequent diversion utilized following cystectomy. A course of adjuvant intravesical therapy is not commonly used after transurethral resection of bladder tumors. Mortality following radical cystectomy appears to be low and in keeping with that reported in the literature from several institutional series. Complications following cystectomy are on the order of 30%. The use of additional specialists such as medical oncologists to deliver chemotherapy, particularly in patients with advanced disease, is lower than expected. Almost all of these conclusions hold true for upper tract urothelial malignancies as well as lower tract malignancies.

RECOMMENDATIONS

It would be useful to develop ICD and CPT codes to distinguish upper tract TCC from kidney cancer. This would allow a more clear determination of outcomes specific to upper tract TCC, which is known

to be uncommon. Because of its low prevalence, we have to rely on analysis of combined data from multiple sources to yield statistically meaningful outcomes information for patients with the disease.

It may be possible to establish benchmarks for surgical complications, operating room procedure times, and lengths of stay, using data from the VA NSQIP to further quality improvement initiatives.

Data sources such as the NSQIP should be combined with pathologic staging information and pharmacy utilization data to allow interpretation of outcomes after adjustment for disease stage and use of adjuvant therapy.

Further investigation is needed in the following areas.

Risk factors and prevalence

- Evaluate secondhand smoke as a risk factor for urothelial malignancies.
- Evaluate the impact of smoking cessation programs on incidence and prevalence of bladder cancer.
- Identify hereditary and genetic risk factors for urothelial cancers.
- Study the cost-effectiveness of bladder cancer screening.

Diagnosis and staging

- Evaluate costs of various diagnostic and staging algorithms for bladder cancer to identify the least expensive and most efficient approach.
- Evaluate the prevalence of different staging algorithms and their impact on outcomes from urothelial cancers.
- Evaluate the prevalence of various surveillance regimens for follow-up of upper and lower tract TCC; this would help to identify the most cost-effective surveillance regimen.

Treatment

- Evaluate costs and prevalence of use of various first- and second-line intravesical therapy regimens.
- Identify reasons for the observed low utilization of intravesical therapy for bladder cancer, particularly immediate post-resection instillation of chemotherapeutic agents shown to decrease recurrence rates.

- Identify the prevalence of maintenance intravesical therapy and second-line regimens.
- Determine the prevalence of use of bladder-sparing therapy (Chemotherapy and/or radiation therapy) and associated outcomes.

REFERENCES

1. Epstein JI, Amin MB, Reuter VR, Mostofi FK. The World Health Organization/International Society of Urological Pathology consensus classification of urothelial (transitional cell) neoplasms of the urinary bladder. Bladder Consensus Conference Committee. *Am J Surg Pathol* 1998;22:1435-48.
2. Nieder A, Soloway M. Eliminate the term "superficial" bladder cancer. *J Urol* 2006 Feb;175(2):417-8.
3. Messing EM. Urothelial tumors of the urinary tract. In: *Campbells Urology* 8th edition, Walsh PC, Retik AB, Darracott Vaughan Jr. E, Wein AJ. Saunders, Philadelphia 2002. 2732-84.
4. Porter MP, Voigt LF, Penson DF, Weiss NS. Racial variation in the incidence of squamous cell carcinoma of the bladder in the US. *J Urol* 2002;168:1960.
5. Leissner J, Ghoneim MA, Abol-Enein H, Thuroff JW, Franzaring L, Fisch M, Shculze H, Managadze G, Allhoff EP, el-Baz MA, Kastendieck H, Buhtz P, Kropf S, Hohenfellner R, Wolf HK. Extended radical lymphadenectomy in patients with urothelial bladder cancer: results of a prospective multicenter study. *J Urol* 2004;171:139-44
6. O'Donnell MA, Lilli K, Leopold C, National Bacillus Calmette-Guerin/Interferon Phase 2 Investigator Group. Interim results from a national multicenter phase II trial of combination bacillus Calmette-Guerin plus interferon alfa-2b for superficial bladder cancer. *J Urol* 2004;172:888-93.
7. Herr HW. Urachal carcinoma: the case for extended partial cystectomy. *J Urol* 1994;151:365-66.
8. Jemal A, Siegel R, Ward E, et al. Cancer statistics, 2006. *CA Cancer J Clin.* 2006;56(2):106-30.
9. Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Mariotto A, Feuer EJ, Edwards BK (eds.). *SEER Cancer Statistics Review, 1975-2001*, National Cancer Institute, Bethesda, MD. Available at http://seer.cancer.gov/csr/1975_2001. 2004.
10. Michaud DS, Clinton SK, Rimm EB, Willet WC, Giovannucci E. Risk of bladder cancer by geographic region in a US cohort of male health professionals. *Epidemiology* 2001;12:719.
11. Prout GR Jr, Wesley MN, Greenberg RS, Chen VW, Brown CC, Miller AW, Weinstien RS, Robboy SJ, Haynes MA, Blacklow RS, Edwards BK. Bladder cancer: race differences in extent of disease at diagnosis. *Cancer* 2000;89:1349-58.
12. Hall MC, Womack S, Sagalowsky AI, Carmody T, Erickstad MD, Roehrborn CG. Prognostic factors, recurrence, and survival in transitional cell carcinoma of the upper urinary tract: a 30-year experience in 252 patients. *Urology* 1998;52:594-601.
13. Schrag D, Hsieh LJ, Rabbani F, Bach PB, Herr H, Begg CB. Adherence to surveillance among patients with superficial bladder cancer. *J Natl Cancer Inst* 2003;95:588-97.
14. Joudi FN, Smith BR, O'Donnell MA, Konety BR. Contemporary management of superficial bladder cancer in the United States: a pattern of care analysis. *Urology* 2003;63:1083-88.
15. Snyder C, Harlan L, Knopf K, Potosky A, Kapln R. Patterns of care for the treatment of bladder cancer. *J Urol* 2003;169: 1607-1701.
16. Konety BR, Joslyn SA. Factors influencing aggressive therapy for bladder cancer: an analysis of data from the SEER program. *J Urol* 2003;170:1765-71.
17. Gore JL, Saigal CS, Hanley JM, Schonlau M, Litwin MS, and the Urologic Diseases in America Project. Variations in reconstruction after radical cystectomy. *Cancer* 2006;729-737.
18. Stein JP, Lieskovksy G, Cote R, Groshen S, Feng AC, Boyd S, Skinner E, Bochner B, Thangathurai D, Mikhail M, Raghavan D, Skinner DG. Radical cystectomy in the treatment of invasive bladder cancer: long-term results in 1,054 patients. *J Clin Oncol* 2001;19:666-75.
19. Konety BR, Dhawan V, Allareddy V, Joslyn SA. Impact of hospital and surgeon volume on in-hospital mortality from radical cystectomy: data from the health care utilization project. *J Urol* 2005;173:1695-1700.
20. Riley GF, Potosky AL, Lubitz JD, Kessler LG. Medicare payments from diagnosis to death for elderly cancer patients by stage at diagnosis. *Med Care* 1995;33:828-41.

