

Chapter 23

Cancer of the Urinary Bladder

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INTRODUCTION

Cancer of the urinary bladder most commonly originates in the urothelium, the epithelium that lines the bladder. During 2006, this is reported as the 4th most common incident cancer among males (estimated 44,690 new cases) and the 9th most common incident cancer among females (estimated 16,730 new cases) (1).

Racial and sex variation in the incidence and mortality for urinary bladder cancer has been observed previously using SEER data (2-4). Bladder cancer incidence is significantly higher in males than females, and in whites compared with blacks. However, the incidence in white females has been steadily increasing, while no significant changes have occurred in white males, black males, or black females (3).

In addition, average annual mortality rates for urinary bladder cancer are higher in white males compared with black males, white females, and black females (3,4). Secular trends in mortality rates have been decreasing for black males, black females, and white males and have been flat for white females (3).

Five-year relative survival rates are generally higher for males than females, regardless of stage of disease. Blacks diagnosed with bladder cancer have consistently lower survival than whites (5). Extent of disease at time of diagnosis has been found to be significantly greater for blacks than whites and helps to explain the lower survival that persists among blacks (6).

There are three major histologic types of urinary bladder cancer: transitional cell carcinoma, squamous cell carcinoma, and adenocarcinoma. Overwhelmingly, the most common type is transitional cell carcinoma. There are two common histologic subtypes of early, noninvasive transitional cell carcinoma, papillary and nonpapillary (flat), terms that describe both the gross and histologic

appearances of these cancers (7). Nonpapillary (flat) carcinoma in situ lesions are by definition high-grade. Papillary lesions, which are also “in situ” though not specifically designated as such, can be low-grade or high-grade. High grade lesions are comprised of cells with large, irregular hyperchromatic nuclei that are present over the entire thickness of the epithelium, while low grade lesions are comprised of cells with nuclei that more closely resemble the nuclei seen in normal urothelial cells. High grade lesions are typically associated with more aggressive tumor behavior.

MATERIALS AND METHODS

The materials and methods are those provided in the introductory chapter with one noteworthy exception, the inclusion of in situ cancers. Since the 1985 Annual Cancer Statistics Review, the SEER Program has combined in situ and invasive bladder cancers when reporting incidence and survival rates, because of a perceived difficulty in identifying the presence or absence of superficial or early invasion in pathology reports (8). In great part this occurred because urologists and pathologists understood the term papillary transitional carcinoma to mean a non-invasive process unless invasion was specifically stated, in contrast to the conventional terminology understood for most sites (9). Incidence trends for this group of tumors were based on information obtained primarily from the hospital medical record, and were not subjected to secondary pathology review, and varied significantly from one SEER area to another (9). This practice of combining in situ and invasive bladder cancers has persisted to the present. Nevertheless, we will separate them in this report by including stage 0 cases (which include both Ta and Tis non-invasive cases) in the tables and discussion.

The number of persons with cancers of the urinary bladder from this population for the period from 1988 to 2001 is provided in Table 23.1, accompanied by the numbers and reasons for those excluded for this survival analysis.

Staging is based on American Joint Committee on Cancer Staging, Fifth Edition (10).

RESULTS

All Bladder Cancers

Distribution and survival by age, sex, and race

Of the 67,528 adult bladder cancers, 79.3% were diagnosed at 60 years of age or older (Table 23.2). The greatest frequency occurred in the 70-79 age group, and 59.4% were between the ages of 60-79 years. Most were male and the overwhelming majority (> 90%) were white.

Overall, males had greater relative survival rates compared with females, while whites had greater relative survival rates than blacks. White males had the greatest 5-year relative survival rate (85%), followed in order by white females (77%), black males (69%), and black females (55%). The median survival times were 103 months for white males and 102 for white females compared with 67 months for black males and 40 months for black females (Table 23.3, Figure 23.1).

White males and females diagnosed between the ages of 20 and 49 years had the greatest observed and relative survival percentages compared with blacks (Table 23.3). The median survival time was greater than 10 years for white males and females and black males and females.

For persons over age 50, white males had the greatest observed and relative 5-year survival rate, while black females had the lowest. As anticipated, differences between observed and relative survival percentages were greatest in the 50+ age group.

Survival by histology

Of the 67,528 cases, over 95% were diagnosed with transitional cell carcinoma (Table 23.4). Among transitional cell carcinomas, papillary neoplasms accounted for a much higher percentage (73.4%) than nonpapillary neoplasms (26.6%). The second most common histologic type was squamous cell carcinoma, diagnosed in only 1.4%. Adenocarcinoma accounted for only 1.2%. Small cell carcinoma and related neuroendocrine tumor histologic types were very rarely diagnosed, together accounting for only 0.2% of observed histologies. In the “other” histology category, malignant neoplasm (ICD-O M-8000) (112 cases), carcinoma, not otherwise specified (NOS) (ICD-O M-8010) (705 cases), and undifferentiated carcinoma (ICD-O M-8020) (39) accounted for 85% of all the 1,004 “other” cancers (Table 23.4).

Figure 23.1: Cancer of the Urinary Bladder: Relative Survival Rates (%) by Race and Sex, Ages 20+, 12 SEER Areas, 1988-2001

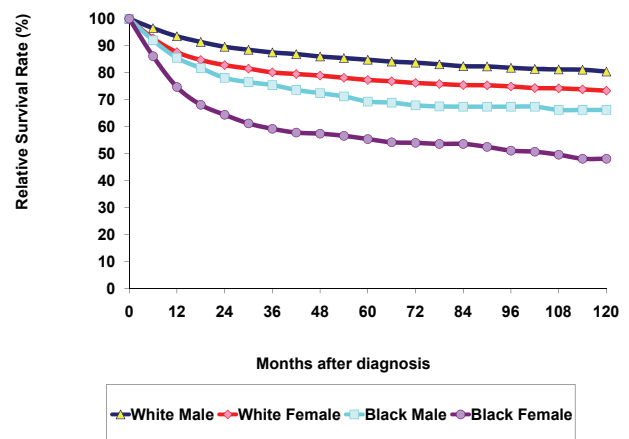


Table 23.1: Cancer of the Urinary Bladder: Number of Cases and Exclusions by Reason, 12 SEER Areas, 1988-2001

| Number Selected/Remaining | Number Excluded | Reason for Exclusion/Selection |
|---------------------------|-----------------|---|
| 86,187 | 0 | Select 1988-2001 diagnosis (Los Angeles for 1992-2001 only) |
| 69,302 | 16,885 | Select first primary only |
| 68,934 | 368 | Exclude death certificate only or at autopsy |
| 68,475 | 459 | Exclude unknown race |
| 68,409 | 66 | Exclude alive with no survival time |
| 68,344 | 65 | Exclude children (Ages 0-19) |
| 67,746 | 598 | Exclude no or unknown microscopic confirmation |
| 67,581 | 165 | Exclude sarcomas |
| 67,528 | 53 | Exclude carcinoids |

Table 23.2: Cancer of the Urinary Bladder: Number and Distribution of Cases by Age (20+), Race, and Sex, 12 SEER Areas, 1988-2001

| Age Group (Years) | Total | | Race/Sex | | | | | | | |
|-------------------|--------|---------|----------|---------|--------|---------|-------|---------|--------|---------|
| | | | White | | | | Black | | | |
| | | | Male | | Female | | Male | | Female | |
| | Cases | Percent | Cases | Percent | Cases | Percent | Cases | Percent | Cases | Percent |
| Total | 67,528 | 100.0 | 46,342 | 100.0 | 15,296 | 100.0 | 1,960 | 100.0 | 1,085 | 100.0 |
| 20-39 | 1,318 | 2.0 | 846 | 1.8 | 322 | 2.1 | 60 | 3.1 | 21 | 1.9 |
| 40-49 | 3,661 | 5.4 | 2,550 | 5.5 | 723 | 4.7 | 179 | 9.1 | 52 | 4.8 |
| 50-59 | 9,059 | 13.4 | 6,388 | 13.8 | 1,840 | 12.0 | 352 | 18.0 | 118 | 10.9 |
| 60-69 | 17,864 | 26.5 | 12,840 | 27.7 | 3,519 | 23.0 | 530 | 27.0 | 255 | 23.5 |
| 70-79 | 22,198 | 32.9 | 15,466 | 33.4 | 4,853 | 31.7 | 560 | 28.6 | 357 | 32.9 |
| 80+ | 13,428 | 19.9 | 8,252 | 17.8 | 4,039 | 26.4 | 279 | 14.2 | 282 | 26.0 |

Table 23.3: Cancer of the Urinary Bladder: Number of Cases, Median Survival Time (Months) and 5-Year Survival Rates (%) by Race, Sex, and Age Group, Ages 20+, 12 SEER Areas, 1988-2001

| Race, Sex, and Age Group (Years) | Cases | Median Survival Time (Months) | 5-Year Survival Rate (%) | | |
|----------------------------------|--------|-------------------------------|--------------------------|------|------|
| | | | Obs | Exp | Rel |
| White Females, 20-49 | 1,045 | > 120 | 88.9 | 99.0 | 89.8 |
| White Males, 20-49 | 3,396 | > 120 | 89.4 | 97.9 | 91.2 |
| Black Females, 20-49 | 73 | > 120 | 58.5 | 97.7 | 59.7 |
| Black Males, 20-49 | 239 | > 120 | 72.9 | 95.1 | 76.6 |
| White Females, 50+ | 14,251 | 93.0 | 60.3 | 79.1 | 76.2 |
| White Males, 50+ | 42,946 | 94.8 | 63.1 | 75.0 | 84.2 |
| Black Females, 50+ | 1,012 | 36.9 | 42.1 | 76.5 | 55.0 |
| Black Males, 50+ | 1,721 | 58.0 | 49.5 | 72.6 | 68.0 |
| White Females, 20+ | 15,296 | 101.7 | 62.2 | 80.4 | 77.3 |
| White Males, 20+ | 46,342 | 102.8 | 65.1 | 76.7 | 84.8 |
| Black Females, 20+ | 1,085 | 39.5 | 43.2 | 77.9 | 55.4 |
| Black Males, 20+ | 1,960 | 66.7 | 52.4 | 75.3 | 69.3 |

Table 23.4: Cancer of the Urinary Bladder: Number and Distribution of Cases by Histology, Ages 20+, 12 SEER Areas, 1988-2001

| ICD-O-3 Histology | Cases | Pct |
|--|--------|-------|
| Total | 67,528 | 100.0 |
| Papillary transitional cell carcinoma | 47,399 | 70.2 |
| Papillary carcinoma, NOS (8050) | 610 | 0.9 |
| Papillary trans. cell carcinoma (8130) | 46,779 | 69.3 |
| Other Pap. Trans. (8121,8131) | 10 | 0.0 |
| Nonpapillary transitional cell carcinoma | 17,211 | 25.5 |
| Transitional cell carcinoma, NOS (8120) | 17,167 | 25.4 |
| Trans. cell carcinoma, spindle cell (8122) | 44 | 0.1 |
| Squamous cell carcinoma | 918 | 1.4 |
| Squamous cell carcinoma, NOS (8070) | 697 | 1.0 |
| Sq. cell carcinoma, keratinizing, NOS (8071) | 193 | 0.3 |
| Other Sq. Cell (8051-8052,8072,8074,8076) | 28 | 0.0 |
| Adenocarcinoma | 838 | 1.2 |
| Adenocarcinoma, NOS (8140) | 480 | 0.7 |
| Mucinous adenocarcinoma (8480) | 89 | 0.1 |
| Mucin-producing adenocarcinoma (8481) | 80 | 0.1 |
| Signet ring cell carcinoma (8490) | 94 | 0.1 |
| Other Adeno (8141,8144,8255,8260,8310, 8320,8323,8440,8470,8472,8570) | 95 | 0.1 |
| Small cell carcinoma and related neuroendocrine tumors (8041-8042) | 158 | 0.2 |
| Other | 1,004 | 1.5 |
| Neoplasm, malignant (8000) | 112 | 0.2 |
| Carcinoma, NOS (8010) | 705 | 1.0 |
| Carcinoma, undifferentiated type, NOS (8020) | 39 | 0.1 |
| Other (8001-8002,8004,8012,8021-8022, 8030,8032-8033,8044,8046,8082-8083, 8230,8262,8560,8700,8720,8933,8935,8940, 8950-8951,9064,9100,9364) | 148 | 0.2 |

Table 23.5: Cancer of the Urinary Bladder: Number and Distribution of Cases, Median Survival Time (Months) and 5-Year Survival Rates (%) by Histology, Ages 20+, 12 SEER Areas, 1988-2001

| Histology | Cases | Percent | Median Survival Time (Months) | 5-Year Survival Rate (%) | | |
|--|--------|---------|-------------------------------|--------------------------|----------|----------|
| | | | | Observed | Expected | Relative |
| Total | 67,528 | 100.0 | 101.1 | 63.7 | 77.8 | 81.9 |
| Papillary transitional cell carcinoma | 47,399 | 70.2 | > 120 | 71.8 | 78.5 | 91.5 |
| Nonpapillary transitional cell carcinoma | 17,211 | 25.5 | 50.3 | 46.6 | 76.1 | 61.2 |
| Squamous cell carcinoma | 918 | 1.4 | 9.5 | 23.7 | 76.7 | 30.9 |
| Adenocarcinoma | 838 | 1.2 | 31.3 | 34.5 | 79.7 | 43.3 |
| Small cell carcinoma and related neuroendocrine tumors | 158 | 0.2 | 13.3 | 21.8 | 77.9 | 26.2 |

Table 23.6: Cancer of the Urinary Bladder: Number and Distribution of Cases, Median Survival Time (Months) and 5-Year Survival Rates (%) by AJCC Stage (5th Edition), 12 SEER Areas, 1988-2001

| AJCC Stage (5th Edition) | Cases | Percent | Median Survival Time (Months) | 5-Year Relative Survival Rate (%) | | |
|--------------------------|--------|---------|-------------------------------|-----------------------------------|------|------|
| | | | | Obs | Exp | Rel |
| Total | 67,528 | 100.0 | 101.1 | 63.7 | 77.8 | 81.9 |
| Stage 0 | 29,638 | 43.9 | > 120 | 78.0 | 79.3 | 98.4 |
| Stage I | 8,611 | 12.8 | 108.3 | 68.1 | 77.7 | 87.7 |
| Stage II | 4,541 | 6.7 | 54.6 | 47.7 | 76.2 | 62.6 |
| Stage III | 2,496 | 3.7 | 28.3 | 35.8 | 78.7 | 45.5 |
| Stage IV | 3,775 | 5.6 | 9.7 | 11.8 | 79.9 | 14.8 |
| Unknown | 18,467 | 27.3 | 80.6 | 57.4 | 75.3 | 76.3 |

Five-year observed and relative survival rates and median survival time were greatest for papillary transitional cell carcinoma compared with other histologic types (Table 23.5). Squamous cell carcinoma had the lowest median survival time, of 9.5 months.

Survival by stage

Observed and relative 5-year survival rates decreased through the progression of urinary bladder cancer to later stages (Table 23.6). Median survival times were greater than 10 years for stage 0 but less than 5 years for all other stages except stage I. Patients with unknown stage of disease had observed and relative 5-year survival rates and a median survival time that was higher than all other stages, except stages 0 and I. This finding suggests that a substantial proportion of patients with unknown stage had in situ (stage 0) or superficially invasive (stage I) disease.

Transitional Cell Carcinoma

Survival by histology, age, sex, and race

Of those diagnosed with transitional cell carcinoma, the male to female ratio for whites was 3.2:1 and for blacks was 2.3:1. Seventy-eight percent of the cases occurred after 60 years and older (Table 23.7). Persons in the 60-79 age groups alone accounted for 59% of all these cancers. The greatest percent of 60-79 year olds occurred in white males (69.3%). The 20-59 age group accounted for 22.1% of all papillary transitional cell carcinomas, but only 17.1% of the nonpapillary transitional cell carcinomas. Black males and females accounted for 6.0% of all nonpapillary transitional cell carcinomas, but only 3.6% of papillary transitional cell carcinomas.

Figure 23.2: Transitional Cell Carcinoma of the Urinary Bladder: Relative Survival Rates (%) by Histology, Race and Sex, Ages 20+, 12 SEER Areas, 1988-2001

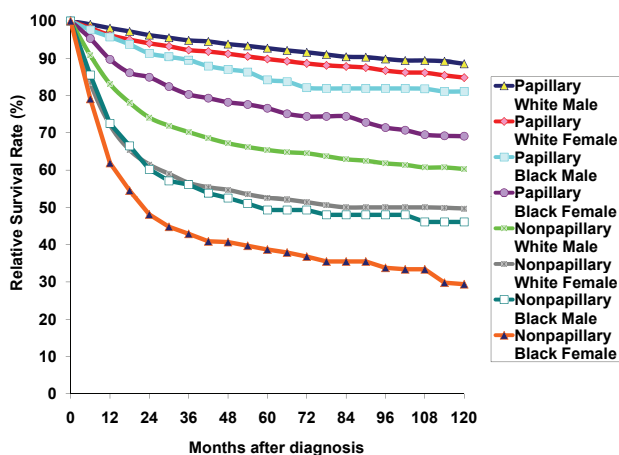


Table 23.7: Transitional Cell Carcinoma of the Urinary Bladder: Number and Distribution of Cases by Histology, Age (20+), Race and Sex, 12 SEER Areas, 1988-2001

| Histology | Age Group (Years) | Total | | Race/Sex | | | | | | | |
|--------------|-------------------|--------|-------|----------|---------|--------|---------|-------|---------|--------|---------|
| | | | | White | | | | Black | | | |
| | | | | Male | | Female | | Male | | Female | |
| | | | | Cases | Percent | Cases | Percent | Cases | Percent | Cases | Percent |
| Papillary | Total | 47,399 | 100.0 | 33,465 | 100.0 | 10,427 | 100.0 | 1,188 | 100.0 | 527 | 100.0 |
| | 20-39 | 1,071 | 2.3 | 711 | 2.1 | 262 | 2.5 | 39 | 3.3 | 11 | 2.1 |
| | 40-49 | 2,754 | 5.8 | 2,001 | 6.0 | 533 | 5.1 | 103 | 8.7 | 19 | 3.6 |
| | 50-59 | 6,648 | 14.0 | 4,753 | 14.2 | 1,363 | 13.1 | 217 | 18.3 | 65 | 12.3 |
| | 60-69 | 12,708 | 26.8 | 9,355 | 28.0 | 2,461 | 23.6 | 321 | 27.0 | 122 | 23.1 |
| | 70-79 | 15,466 | 32.6 | 11,043 | 33.0 | 3,285 | 31.5 | 347 | 29.2 | 178 | 33.8 |
| | 80+ | 8,752 | 18.5 | 5,602 | 16.7 | 2,523 | 24.2 | 161 | 13.6 | 132 | 25.0 |
| Nonpapillary | Total | 17,211 | 100.0 | 11,320 | 100.0 | 3,940 | 100.0 | 604 | 100.0 | 423 | 100.0 |
| | 20-39 | 177 | 1.0 | 100 | 0.9 | 45 | 1.1 | 13 | 2.2 | 6 | 1.4 |
| | 40-49 | 715 | 4.2 | 460 | 4.1 | 134 | 3.4 | 52 | 8.6 | 23 | 5.4 |
| | 50-59 | 2,055 | 11.9 | 1,434 | 12.7 | 389 | 9.9 | 102 | 16.9 | 36 | 8.5 |
| | 60-69 | 4,456 | 25.9 | 3,086 | 27.3 | 863 | 21.9 | 166 | 27.5 | 95 | 22.5 |
| | 70-79 | 5,851 | 34.0 | 3,929 | 34.7 | 1,291 | 32.8 | 173 | 28.6 | 153 | 36.2 |
| | 80+ | 3,957 | 23.0 | 2,311 | 20.4 | 1,218 | 30.9 | 98 | 16.2 | 110 | 26.0 |

For papillary transitional cell carcinoma, relative survival rates for both males and females were higher for white than black adults (Figure 23.2). Between the ages of 20 and 49 years, white males and females had the highest five-year relative survival rates (Table 23.8). In this age range, median survival times were greater than 10 years for males and females and both races. For persons 50 and older, white males had the highest 5-year relative survival rate of 92%, while black females had the lowest percentage (76%). The median survival times were higher for whites than blacks in both sexes.

For nonpapillary transitional cell carcinoma, relative survival rates were highest for white males, followed by white females and black males with black females having the lowest rates (Figure 23.2). Between the ages of 20 and 49 years, whites had the highest five-year relative survival rates (Table 23.8). Black females in this age group had a very low median survival time of 33 months, but this should be interpreted with caution since there were only 29 cases. For persons 50 and older, white males had the highest 5-year relative survival rate of 65%, while black females had the lowest rate (38%). For ages 20+, the median survival times were higher for whites than blacks in both sexes and were three times as long in white males than black females.

Survival rates in adults were substantially higher in both races and sexes for papillary transitional cell carcinoma

compared with nonpapillary transitional cell carcinoma. This was especially true for the 50+ age group.

Survival by histology, stage, and grade

For papillary transitional cell carcinoma in each race and sex group, the greatest number of cases was diagnosed at stage 0 and accounted for 57% among white females, 56% among white males, 46% among black males, and 44% among black females (Table 23.9). The percentage of stage IV papillary transitional cell carcinomas was highest among black females (5.1%) followed by black males (2.4%), white females (2.1%), and white males (1.5%). Blacks and whites with stage 0 disease had median survival times greater than 10 years. However, for stage I disease, the median survival time for black males and females was lower than for whites. For stages II, III, and IV, median survival times were higher among males compared with females in each race group (Table 23.9).

Relative survival curves for papillary transitional cell carcinoma by stage and sex were generally higher in whites than blacks. This was particularly so for stage III and stage IV (Figures 23.3 (males) and 23.4 (females)). In Figure 23.4, the survival curve for stage III black females is not shown due to insufficient case numbers.

For nonpapillary transitional cell carcinoma in each race and sex group, the greatest number of cases was diagnosed

Table 23.8: Transitional Cell Carcinoma of the Urinary Bladder: Number of Cases, Median Survival Time (Months) and 5-Year Survival Rates (%) by Histology, Race, Sex, and Age (20+), 12 SEER Areas, 1988-2001

| Histology | Race, Sex, and Age Group (Years) | Cases | Median Survival Time (Months) | 5-Year Survival Rate (%) | | |
|----------------------|----------------------------------|--------|-------------------------------|--------------------------|----------|----------|
| | | | | Observed | Expected | Relative |
| Papillary | All | 47,399 | > 120 | 71.8 | 78.5 | 91.5 |
| | White Females, 20-49 | 795 | > 120 | 97.0 | 99.0 | 98.0 |
| | White Males, 20-49 | 2,712 | > 120 | 94.7 | 98.0 | 96.7 |
| | Black Females, 20-49 | 30 | > 120 | 88.7 | 97.9 | 90.2 |
| | Black Males, 20-49 | 142 | > 120 | 85.7 | 95.1 | 89.4 |
| | White Females, 50+ | 9,632 | > 120 | 71.2 | 80.0 | 89.0 |
| | White Males, 50+ | 30,753 | 111.7 | 69.7 | 75.5 | 92.3 |
| | Black Females, 50+ | 497 | 85.2 | 58.5 | 77.1 | 75.5 |
| | Black Males, 50+ | 1,046 | 87.0 | 61.0 | 72.9 | 83.4 |
| | White Females, 20+ | 10,427 | > 120 | 73.2 | 81.5 | 89.8 |
| | White Males, 20+ | 33,465 | > 120 | 71.7 | 77.3 | 92.7 |
| | Black Females, 20+ | 527 | 88.6 | 60.2 | 78.3 | 76.6 |
| | Black Males, 20+ | 1,188 | 102.4 | 63.9 | 75.6 | 84.2 |
| | Nonpapillary | All | 17,211 | 50.3 | 46.6 | 76.1 |
| White Females, 20-49 | | 179 | > 120 | 69.7 | 98.9 | 70.4 |
| White Males, 20-49 | | 560 | > 120 | 72.5 | 97.8 | 74.1 |
| Black Females, 20-49 | | 29 | 32.9 | 43.3 | 97.5 | 44.2 |
| Black Males, 20-49 | | 65 | > 120 | 55.9 | 95.0 | 58.5 |
| White Females, 50+ | | 3,761 | 32.6 | 39.8 | 77.2 | 51.5 |
| White Males, 50+ | | 10,760 | 54.3 | 47.9 | 73.8 | 64.9 |
| Black Females, 50+ | | 394 | 17.8 | 29.1 | 76.2 | 38.2 |
| Black Males, 50+ | | 539 | 27.0 | 34.6 | 71.7 | 47.7 |
| White Females, 20+ | | 3,940 | 34.7 | 41.1 | 78.2 | 52.6 |
| White Males, 20+ | | 11,320 | 57.2 | 49.1 | 75.0 | 65.4 |
| Black Females, 20+ | | 423 | 19.0 | 30.1 | 77.6 | 38.7 |
| Black Males, 20+ | | 604 | 29.2 | 37.0 | 74.2 | 49.3 |

Table 23.9: Papillary Transitional Cell Carcinoma of the Urinary Bladder: Number and Distribution of Cases and Median Survival Time (Months) by AJCC Stage (5th Edition), Race, and Sex, Ages 20+, 12 SEER Areas, 1988-2001

| AJCC Stage (5th Edition) | Race/Sex | | | | | | | | | | | |
|--------------------------|----------|---------|-------------------------------|--------|---------|-------------------------------|-------|---------|-------------------------------|--------|---------|-------------------------------|
| | White | | | | | | Black | | | | | |
| | Male | | | Female | | | Male | | | Female | | |
| | Cases | Percent | Median Survival Time (Months) | Cases | Percent | Median Survival Time (Months) | Cases | Percent | Median Survival Time (Months) | Cases | Percent | Median Survival Time (Months) |
| Total | 33,465 | 100.0 | > 120 | 10,427 | 100.0 | > 120 | 1,188 | 100.0 | 102.4 | 527 | 100.0 | 88.6 |
| Stage 0 | 18,628 | 55.7 | > 120 | 5,997 | 57.5 | > 120 | 551 | 46.4 | > 120 | 233 | 44.2 | > 120 |
| Stage I | 4,655 | 13.9 | 112.8 | 1,322 | 12.7 | 110.4 | 186 | 15.7 | 90.3 | 79 | 15.0 | 94.6 |
| Stage II | 1,174 | 3.5 | 65.2 | 371 | 3.6 | 58.9 | 60 | 5.1 | 67.6 | 40 | 7.6 | 33.3 |
| Stage III | 502 | 1.5 | 34.5 | 93 | 0.9 | 22.3 | 36 | 3.0 | 14.8 | 10 | 1.9 | ~ |
| Stage IV | 514 | 1.5 | 14.0 | 223 | 2.1 | 10.6 | 28 | 2.4 | 14.0 | 27 | 5.1 | 9.2 |
| Unknown | 7,992 | 23.9 | 105.1 | 2,421 | 23.2 | 114.1 | 327 | 27.5 | 81.5 | 138 | 26.2 | 78.5 |

~ Statistic not displayed due to less than 25 cases.

as unstaged. Among those with known stage, the greatest number was stage IV for white females, black males, and black females and stage 0 for white males (Table 23.10). Stage I accounted for approximately 10% of all cancers in each race and sex group (Table 23.10). The percentage of stage IV nonpapillary transitional cell carcinomas was highest among black females (21.7%) compared with black males (16.7%), white females (16.3%) or white males (11.5%). Median survival times were higher among males compared with females in each race group, except for stage 0 in whites where they were both >10 years and stage IV for blacks (Table 23.10).

Relative survival curves for nonpapillary transitional cell carcinoma by stage and sex were also higher for whites

than blacks in each sex (Figures 23.5 (males) and 23.6 (females)). Among males at each stage, white males had better survival than black males (Figure 23.5). The rates for black females were lower than those for white females except for stage IV after 7 years (Figure 23.6). Note, that the rates for blacks are based on small numbers of cases and therefore, have more variability.

Among males at each stage, the papillary subtype had better relative survival rate than the nonpapillary subtype in each race; however, in females this was less apparent for stage II disease and higher.

When histologic subtypes of transitional cell carcinoma were stratified by tumor grade, 5-year relative survival

Figure 23.3: Male Papillary Transitional Cell Carcinoma of the Urinary Bladder: Relative Survival Rates (%) by AJCC Stage (5th Edition) and Race, Ages 20+, 12 SEER Areas, 1988-2001

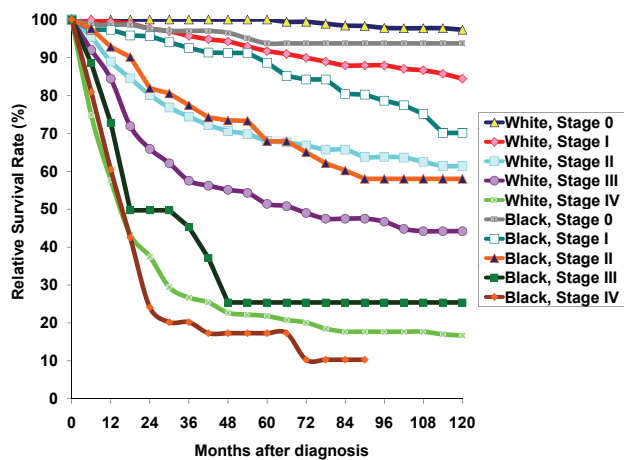


Figure 23.4: Female Papillary Transitional Cell Carcinoma of the Urinary Bladder: Relative Survival Rates (%) by AJCC Stage (5th Edition) and Race, Ages 20+, 12 SEER Areas, 1988-2001

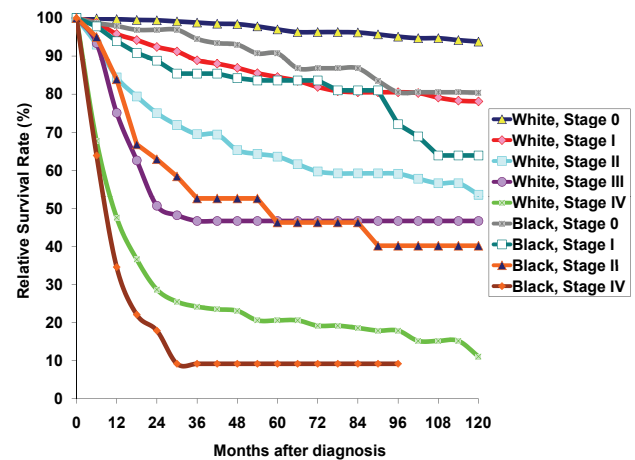


Table 23.10: Nonpapillary Transitional Cell Carcinoma of the Urinary Bladder: Number and Distribution of Cases and Median Survival Time (Months) by AJCC Stage (5th edition), Race, and Sex, Ages 20+, 12 SEER Areas, 1988-2001

| AJCC Stage (5th Edition) | Race/Sex | | | | | | | | | | | |
|--------------------------|----------|---------|-------------------------------|--------|---------|-------------------------------|-------|---------|-------------------------------|--------|---------|-------------------------------|
| | White | | | | | | Black | | | | | |
| | Male | | | Female | | | Male | | | Female | | |
| | Cases | Percent | Median Survival Time (Months) | Cases | Percent | Median Survival Time (Months) | Cases | Percent | Median Survival Time (Months) | Cases | Percent | Median Survival Time (Months) |
| Total | 11,320 | 100.0 | 57.2 | 3,940 | 100.0 | 34.7 | 604 | 100.0 | 29.2 | 423 | 100.0 | 19.0 |
| Stage 0 | 2,138 | 18.9 | > 120 | 540 | 13.7 | > 120 | 74 | 12.3 | > 120 | 34 | 8.0 | 76.3 |
| Stage I | 1,303 | 11.5 | 93.1 | 385 | 9.8 | 85.6 | 54 | 8.9 | 96.9 | 45 | 10.6 | 57.0 |
| Stage II | 1,606 | 14.2 | 53.3 | 620 | 15.7 | 40.0 | 80 | 13.2 | 32.8 | 66 | 15.6 | 23.5 |
| Stage III | 988 | 8.7 | 28.2 | 319 | 8.1 | 23.4 | 53 | 8.8 | 18.9 | 37 | 8.7 | 11.1 |
| Stage IV | 1,303 | 11.5 | 10.6 | 642 | 16.3 | 8.6 | 101 | 16.7 | 7.4 | 92 | 21.7 | 8.0 |
| Unknown | 3,982 | 35.2 | 54.1 | 1,434 | 36.4 | 28.5 | 242 | 40.1 | 35.6 | 149 | 35.2 | 20.1 |

rates were higher for papillary carcinomas than nonpapillary at each stage and grade (Table 23.11). In general for each histologic subtype within each stage, survival decreased as tumor grade increased except grade IV where survival was similar to grade III and sometimes slightly higher by stage.

When early stage transitional cell carcinomas were separated into papillary and nonpapillary histologic subtypes by tumor grade, 5-year relative survival rates were lower among the high-grade nonpapillary carcinomas for each race and sex group (Table 23.12). Although these high-grade nonpapillary carcinomas comprised a small proportion of very early transitional cell carcinomas in whites, they comprised a higher percentage for black males and black females which contributed to the lower survival rates

Figure 23.5: Male Nonpapillary Transitional Cell Carcinoma of the Urinary Bladder: Relative Survival Rates (%) by AJCC Stage (5th Edition) and Race, Ages 20+, 12 SEER Areas, 1988-2001

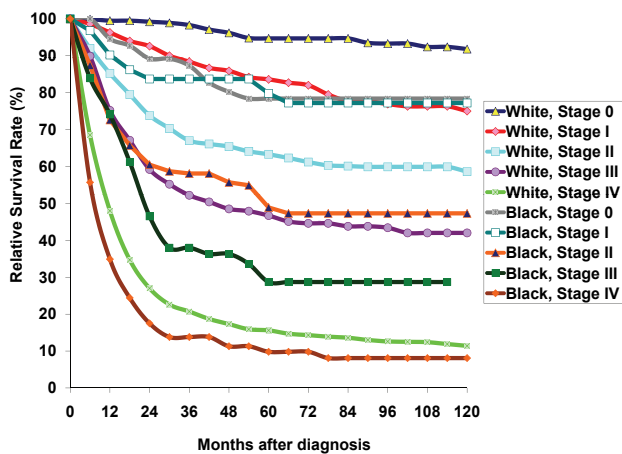
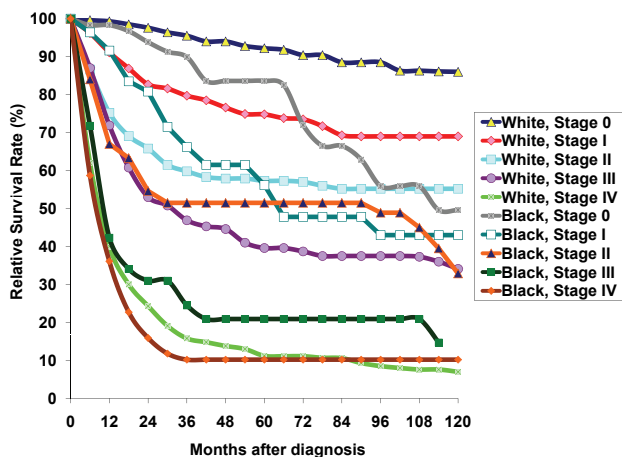


Figure 23.6: Female Nonpapillary Transitional Cell Carcinoma of the Urinary Bladder: Relative Survival Rates (%) by AJCC Stage (5th Edition) and Race, Ages 20+, 12 SEER Areas, 1988-2001



seen in Figures 23.3 through 23.6 for blacks compared with whites at early stages.

Survival curves for early stage transitional cell carcinoma showed all stage 0 and stage I and low grade, papillary, lesions with 10-year relative survival rates above 85%. In contrast, high grade, nonpapillary, stage I lesions had a 10-year relative survival rate of only 67% (Figure 23.7).

Squamous Cell Carcinoma

Survival by age, sex, and race

Over 80% of the squamous cell carcinomas were diagnosed in persons at least 60 years of age or older (Table 23.13). The male to female ratio for all races was 1.1:1 for whites and 1.0:1 for blacks. White females had the highest proportion of 80+ year olds (32.1%).

Relative survival curves were similar for males and females (Figure 23.8). A significant decline in survival was observed within the first 12 months after diagnosis.

Survival by stage

The stage distribution for squamous cell carcinoma was similar for males and females (Table 23.14). For stage 0/I disease, males had a much higher median survival time than females. For females, stage 0/I had low median survival time but it was based on a small number of cases. Overall, median survival times were relatively low for squamous cell stages II-IV compared with other histologies.

Figure 23.7: Early Stage Transitional Cell Carcinoma of the Urinary Bladder: Relative Survival Rates (%) by AJCC Stage 0 and I, Histology, and Grade, Ages 20+, 12 SEER Areas, 1988-2001

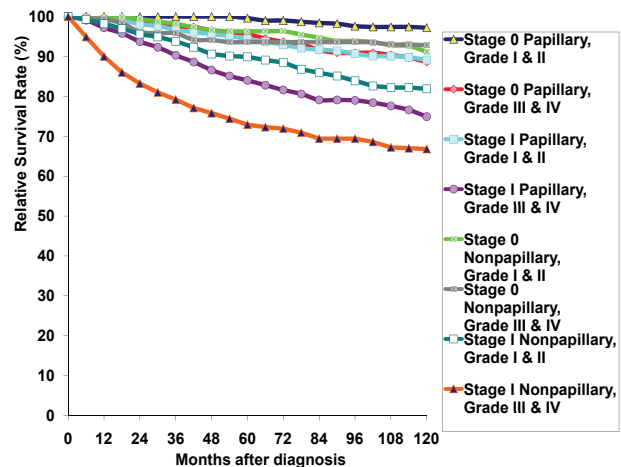


Table 23.11: Transitional Cell Carcinoma of the Urinary Bladder: Number of Cases and 5-Year Relative Survival Rates (RSR) (%) of White and Blacks by Histology, AJCC Stage (5th Edition) and Tumor Grade, Ages 20+, 12 SEER Areas, 1988-2001

| Histology | AJCC Stage (5th Edition) | Tumor Grade | | | | | | | | | | | |
|--------------|--------------------------|-------------|--------------|-------|--------------|--------|--------------|--------|--------------|-------|--------------|---------|--------------|
| | | Total | | I | | II | | III | | IV | | Unknown | |
| | | Cases | 5-Yr RSR (%) | Cases | 5-Yr RSR (%) | Cases | 5-Yr RSR (%) | Cases | 5-Yr RSR (%) | Cases | 5-Yr RSR (%) | Cases | 5-Yr RSR (%) |
| Papillary | Total | 45,607 | 91.6 | 9,553 | 99.3 | 21,410 | 95.5 | 10,329 | 79.0 | 2,437 | 71.6 | 1,878 | 93.5 |
| | Stage 0 | 25,409 | 99.1 | 7,036 | 100.0 | 13,500 | 98.7 | 3,249 | 95.9 | 535 | 91.5 | 1,089 | 98.7 |
| | Stage I | 6,242 | 90.0 | 757 | 96.2 | 2,737 | 92.2 | 2,101 | 84.7 | 464 | 84.0 | 183 | 94.9 |
| | Stage II | 1,645 | 66.5 | 25 | 81.2 | 318 | 72.1 | 916 | 63.2 | 357 | 67.5 | 29 | 61.0 |
| | Stage III | 641 | 49.1 | 10 | ~ | 122 | 57.6 | 348 | 43.1 | 149 | 49.2 | 12 | ~ |
| | Stage IV | 792 | 21.1 | 13 | ~ | 116 | 24.0 | 452 | 19.6 | 193 | 22.8 | 18 | ~ |
| | Unknown | 10,878 | 86.9 | 1,712 | 95.2 | 4,617 | 92.7 | 3,263 | 76.0 | 739 | 70.2 | 547 | 85.9 |
| Nonpapillary | Total | 16,287 | 60.9 | 970 | 95.1 | 2,589 | 83.4 | 7,245 | 49.6 | 3,367 | 48.0 | 2,116 | 74.8 |
| | Stage 0 | 2,786 | 93.9 | 526 | 97.5 | 820 | 94.5 | 344 | 92.3 | 131 | 90.6 | 965 | 90.1 |
| | Stage I | 1,787 | 80.9 | 129 | 91.9 | 485 | 87.4 | 766 | 74.8 | 295 | 75.8 | 112 | 82.6 |
| | Stage II | 2,372 | 61.1 | 11 | ~ | 161 | 68.0 | 1,404 | 59.7 | 744 | 61.7 | 52 | 68.0 |
| | Stage III | 1,397 | 43.8 | 7 | ~ | 78 | 45.4 | 840 | 40.9 | 433 | 50.1 | 39 | 35.2 |
| | Stage IV | 2,138 | 13.7 | 7 | ~ | 89 | 16.3 | 1,218 | 12.7 | 698 | 16.4 | 126 | 7.3 |
| | Unknown | 5,807 | 60.8 | 290 | 92.2 | 956 | 83.3 | 2,673 | 51.9 | 1,066 | 45.4 | 822 | 67.9 |

~ Statistic not displayed due to less than 25 cases.

Table 23.12: Stage 0 & I Transitional Cell Carcinoma of the Urinary Bladder (with Known Grade): Number of Cases and 5-Year Relative Survival Rates (%) by Race, Sex, Histology, and Grade, Ages 20+, 12 SEER Areas, 1988-2001

| Race/Sex | Histology | | | | | | | |
|-----------------------|--------------------|-----------------------------------|-----------------------|-----------------------------------|--------------------|-----------------------------------|-----------------------|-----------------------------------|
| | Papillary | | | | Nonpapillary | | | |
| | Grade | | | | Grade | | | |
| | Low-Grade (I & II) | | High-Grade (III & IV) | | Low-Grade (I & II) | | High-Grade (III & IV) | |
| | Cases | 5-Year Relative Survival Rate (%) | Cases | 5-Year Relative Survival Rate (%) | Cases | 5-Year Relative Survival Rate (%) | Cases | 5-Year Relative Survival Rate (%) |
| Total (White & Black) | 24,030 | 98.6 | 6,349 | 91.1 | 1,960 | 93.9 | 1,536 | 81.2 |
| White Male | 17,472 | 99.5 | 4,870 | 93.3 | 1,452 | 94.2 | 1,153 | 83.7 |
| White Female | 5,774 | 96.9 | 1,256 | 83.7 | 440 | 92.9 | 300 | 74.3 |
| Black Male | 555 | 92.8 | 155 | 88.8 | 43 | 87.5 | 47 | 76.4 |
| Black Female | 229 | 92.4 | 68 | 74.8 | 25 | 72.8 | 36 | 56.9 |

Table 23.13: Squamous Cell Carcinoma of the Urinary Bladder: Number and Distribution of Cases by Age (20+), Race, and Sex, 12 SEER Areas, 1988-2001

| Age Group (Years) | Race/Sex | | | | | | | | | |
|-------------------|----------|---------|-------|---------|--------|---------|-------|---------|--------|---------|
| | Total | | White | | | | Black | | | |
| | | | Male | | Female | | Male | | Female | |
| | Cases | Percent | Cases | Percent | Cases | Percent | Cases | Percent | Cases | Percent |
| Total | 918 | 100.0 | 398 | 100.0 | 377 | 100.0 | 56 | 100.0 | 55 | 100.0 |
| 20-59 | 176 | 19.2 | 83 | 20.9 | 55 | 14.6 | 17 | 30.4 | 11 | 20.0 |
| 60-69 | 220 | 24.0 | 92 | 23.1 | 85 | 22.5 | 14 | 25.0 | 19 | 34.5 |
| 70-79 | 278 | 30.3 | 127 | 31.9 | 116 | 30.8 | 16 | 28.6 | 10 | 18.2 |
| 80+ | 244 | 26.6 | 96 | 24.1 | 121 | 32.1 | 9 | 16.1 | 15 | 27.3 |

Survival curves for males were higher than females for stages 0/I and II squamous cell carcinoma (Figure 23.9). In contrast, for stages III and IV, females had higher survival for most years.

Adenocarcinoma

Survival by age, sex, and race

Overall, less than 30% of all cases were diagnosed when younger than 60 years (Table 23.15). Black males and females had a younger age distribution than white males and females. The male to female ratio for whites was 1.9 and for blacks was 1.5.

Overall, males had a slightly higher 5-year relative survival rate (48%) compared with females (36%) diagnosed with adenocarcinoma (Figure 23.10).

Survival by stage

Later stage (III and IV) adenocarcinoma was more frequent in females compared with males (Table 23.16), which contributed to an all stage median survival time that was higher in males compared with females. The survival curves, however, were not consistently higher for males compared to females within stage (Figure 23.11).

DISCUSSION

For the 67,528 cases presented herein, the greatest number of bladder cancers was diagnosed between the ages of 60 and 79 years of age. Among adults, the 5-year relative survival rate was greatest for white males (85%) followed by white females (77%), black males (69%), and black females (55%). Transitional cell carcinoma was the most common histologic type, accounting for over 95% of all bladder cancers. Within this type, papillary transitional cell carcinoma was the most common subtype, accounting for 70.2% of all bladder cancers and nonpapillary transitional cell carcinoma accounting for an additional 25.5% of the bladder cases. The next most frequent histologic type was squamous cell carcinoma, which comprised 1.4% of all urinary bladder cancers, followed by adenocarcinoma, which accounted for 1.2%. Papillary transitional cell carcinoma had the highest median survival time (> 10 years) followed by nonpapillary transitional cell carcinoma, adenocarcinoma, and squamous cell carcinoma. The male to female ratio was greatest for transitional cell carcinoma and least for squamous cell carcinoma. For papillary transitional cell carcinoma, most were diagnosed at stages 0 and I. When early stage transitional cell carcinomas were stratified by histologic subtype and tumor grade, high-grade nonpapillary lesions had the poorest survival.

We know there is inherent misclassification in the SEER data involving separation of in situ/noninvasive and superficially invasive carcinomas as well as papillary and nonpapillary lesions (9). Because of this, it is likely the differences we have reported here are somewhat inaccurate. For example, the number of low grade nonpapillary transitional cell carcinomas probably includes misclassifications since the usual histologic criteria for nonpapillary carcinoma in situ are flat, noninvasive, high grade lesions. In fact the low grade stage 0 nonpapillary transitional cell carcinomas likely consist of low grade stage 0 papillary carcinomas in which the papillary component was not clearly defined in the pathology report. In addition, the percentage of stage 0 may be under-reported since additional terms to determine non-invasion based on the study (9) were not added to the extent of disease coding systems until 1991. The pathology community recognizes the need to more consistently specify grade, level of invasion, and histologic type (7,11) and this continues to be a challenge (12). Registry abstractors need to record findings from the pathology report correctly and coders need to classify this information accurately. This can be accomplished in part by recognizing that, in contrast to many other tumor sites, the absence of a statement of invasion is taken to indicate a noninvasive process by pathologists and urologists, and should be done so by abstractors and coders as well. As these deficiencies are addressed, SEER data will be able to delineate survival differences better within the common subtypes of transitional cell carcinoma.

The median survival times presented are based on the observed survival rate. Any characteristic that implies better survival in the general population such as young age will influence the median survival time. If the relative survival rates were similar between males and females and they

Table 23.14: Squamous Cell Carcinoma of the Urinary Bladder: Number and Distribution of Cases and Median Survival Time (Months) by AJCC Stage (5th Edition) and Sex, Ages 20+, 12 SEER Areas, 1988-2001

| AJCC Stage (5th Edition) | Male | | | Female | | |
|--------------------------|-------|-------|-------------------------------|--------|-------|-------------------------------|
| | Cases | % | Median Survival Time (Months) | Cases | % | Median Survival Time (Months) |
| Total | 470 | 100.0 | 10.0 | 448 | 100.0 | 9.1 |
| Stage 0/I | 29 | 6.2 | > 120 | 35 | 7.8 | 24.4 |
| Stage II | 87 | 18.5 | 46.4 | 72 | 16.1 | 30.4 |
| Stage III | 86 | 18.3 | 16.9 | 73 | 16.3 | 23.6 |
| Stage IV | 130 | 27.7 | 4.8 | 129 | 28.8 | 5.3 |
| Unknown | 138 | 29.4 | 7.3 | 139 | 31.0 | 6.6 |

Figure 23.8: Squamous Cell Carcinoma of the Urinary Bladder: Relative Survival Rates (%) by Sex, Ages 20+, 12 SEER Areas, 1988-2001

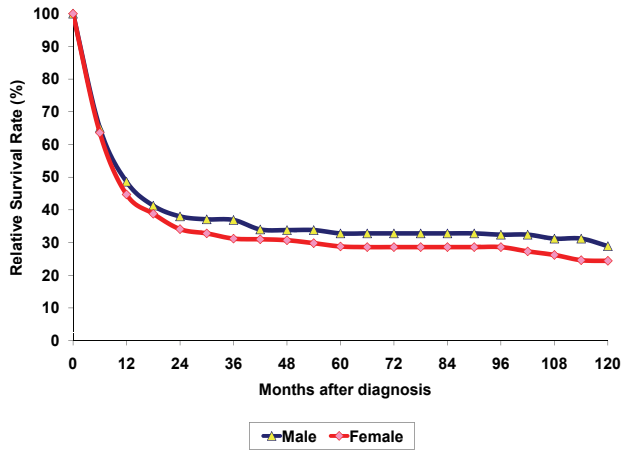


Figure 23.9: Squamous Cell Carcinoma of the Urinary Bladder: Relative Survival Rates (%) by Sex and AJCC Stage (5th Edition), Ages 20+, 12 SEER Areas, 1988-2001

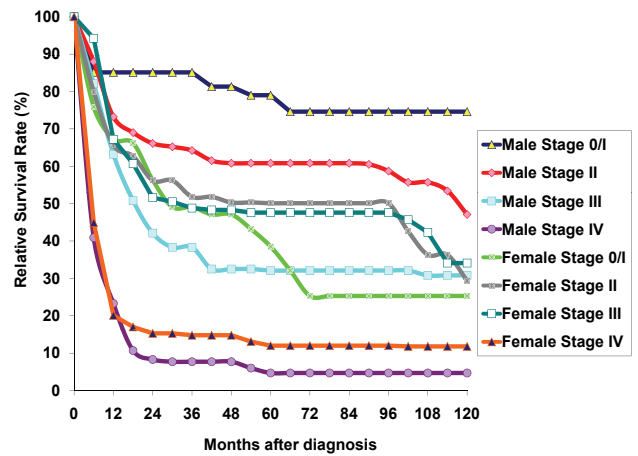


Figure 23.10: Adenocarcinoma of the Urinary Bladder: Relative Survival Rates (%) by Sex, Ages 20+, 12 SEER Areas, 1988-2001

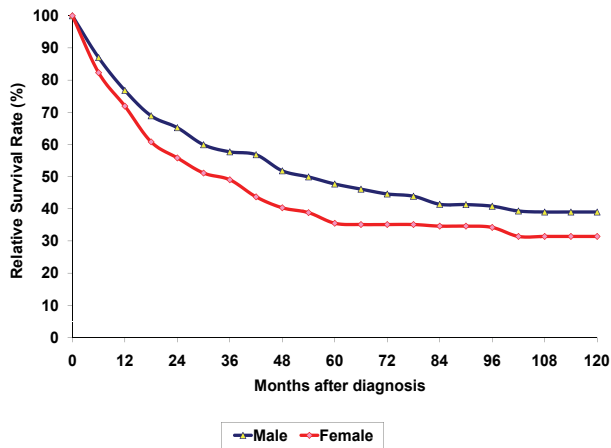


Figure 23.11: Adenocarcinoma of the Urinary Bladder: Relative Survival Rates (%) by Sex and AJCC Stage (5th Edition), 12 SEER Areas, 1988-2001

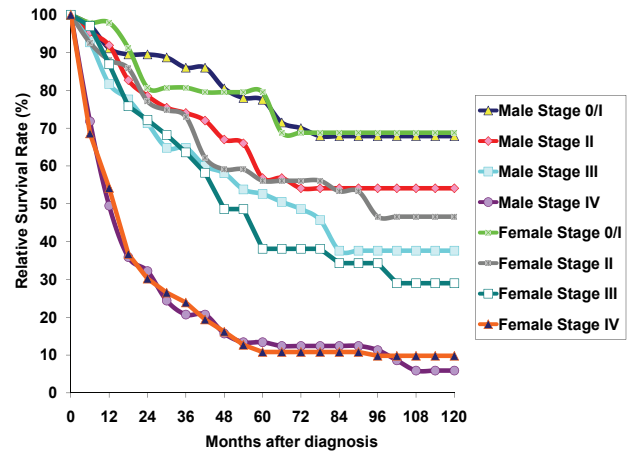


Table 23.15: Adenocarcinoma of the Urinary Bladder: Number and Distribution of Cases by Age (20+), Race, and Sex, 12 SEER Areas, 1988-2001

| Age Group (Years) | Total | | Race/Sex | | | | | | | |
|-------------------|---------|-------|----------|-------|---------|-------|---------|-------|---------|-------|
| | | | White | | | | Black | | | |
| | | | Male | | Female | | Male | | Female | |
| Cases | Percent | Cases | Percent | Cases | Percent | Cases | Percent | Cases | Percent | |
| Total | 838 | 100.0 | 454 | 100.0 | 242 | 100.0 | 60 | 100.0 | 41 | 100.0 |
| 20-59 | 244 | 29.1 | 120 | 26.4 | 61 | 25.2 | 29 | 48.3 | 15 | 36.6 |
| 60-69 | 203 | 24.2 | 122 | 26.9 | 47 | 19.4 | 16 | 26.7 | 10 | 24.4 |
| 70+ | 391 | 46.7 | 212 | 46.7 | 134 | 55.4 | 15 | 25.0 | 16 | 39.0 |

Table 23.16: Adenocarcinoma of the Urinary Bladder: Number and Distribution of Cases and Median Survival Time (Months) by AJCC Stage (5th Edition) and Sex, Ages 20+, 12 SEER Areas, 1988-2001

| AJCC Stage (5th Edition) | Male | | | Female | | |
|--------------------------|------------|--------------|-------------------------------|------------|--------------|-------------------------------|
| | Cases | % | Median Survival Time (Months) | Cases | % | Median Survival Time (Months) |
| Total | 540 | 100.0 | 36.1 | 298 | 100.0 | 24.9 |
| Stage 0/I | 78 | 14.4 | 75.4 | 30 | 10.1 | > 120 |
| Stage II | 77 | 14.3 | 57.3 | 34 | 11.4 | 56.4 |
| Stage III | 63 | 11.7 | 48.4 | 53 | 17.8 | 43.2 |
| Stage IV | 132 | 24.4 | 11.6 | 80 | 26.8 | 12.7 |
| Unknown | 190 | 35.2 | 43.4 | 101 | 33.9 | 18.4 |

had approximately the same age distribution, the median survival times may be longer for the females since women have longer life expectancy than men.

Squamous cell carcinomas and adenocarcinomas were rare. Overall survival rates among males for adenocarcinoma were 3 times higher than for squamous cell carcinoma, while among females it was 2.5 times higher. The survival advantage typically associated with early stage disease was less apparent for squamous cell carcinoma.

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