

Urologic Diseases in America Project

Kidney Cancer

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Purpose: We quantified the burden of kidney cancer in the United States by identifying trends in the use of health care resources and estimating the economic impact of the disease.

Materials and Methods: The analytical methods used to generate these results were described previously.

Results: The incidence of all stages of kidney cancer is increasing in America, particularly T1 disease. Rates are increasing more rapidly in the black than in the white population and survival is worse for black individuals at all stages of diagnosis. Total expenditures for kidney cancer were \$401 million in 2000, representing a 46% increase from 1994. Approximately 85% of health care dollars spent on kidney cancer were for inpatient care with steady increases through the 1990s. Regarding treatment, more partial nephrectomies were performed in Medicare patients as the 1990s progressed. Health Care Cost and Utilization Project data showed an increase in the number of inpatient hospitalizations but this trend was not seen in the Centers for Medicare and Medicaid Services data set. Length of stay decreased from 1994 to 2000 in the Health Care Cost and Utilization Project database. The adoption of laparoscopic techniques began to appear in the Veterans Affairs data set in 2001 and it increased thereafter.

Conclusions: Increasing trends in the incidence of and costs associated with kidney cancer have been apparent for more than 10 years. As the population ages and the prevalence of risk factors such as obesity and hypertension increases, the burden of disease will increase significantly. Consideration should be given to expanding tumor registries such as Surveillance, Epidemiology and End Results. Treatment databases could better characterize the cost and effectiveness of treatment for metastatic disease and of trends in the adoption of laparoscopy.

Key Words: kidney, kidney neoplasms, carcinoma, mortality, health care costs

Kidney cancer, the third most common urological malignancy and the seventh most common cancer overall, was diagnosed in an estimated 35,000 Americans in 2005 and almost 13,000 died of it.¹ That year kidney cancer represented 3% of new cancer cases and 3% of all cancer deaths in men. Kidney cancer occurs about half as often in women and it represents less than 2% of female cancer cases and deaths.¹ When discovered in its early stages, the disease is curable, but advanced or metastatic kidney cancer is usually fatal. Fortunately the recent increase in the kidney cancer incidence reflects primarily small tumors discovered incidentally during abdominal imaging.

Kidney cancer imposes a significant burden on the health care system in the United States because its diagnosis involves advanced radiological testing and its treatment often involves surgery, hospitalization and regular surveillance visits to assess recurrence. These interventions result in loss of work time and regular activity not only for the patient, but also for family members providing support. Currently an

estimated 1% of visits to urologists are for kidney cancer treatment. We explored the burden of kidney cancer in the United States by quantifying and identifying trends in the use of health care resources and estimating the economic impact of the disease. Results of the Urologic Diseases in America Project can be used to help allocate research and clinical resources, and determine future research needs.

MATERIALS AND METHODS

The analytical methods used to generate these results were described previously.^{2,3}

RESULTS

Incidence and Survival

The incidence of kidney cancer increased slowly in the last 3 decades according to the SEER database and American Cancer Society Surveillance Research Cancer Statistics.^{1,4} While most of the increased incidence was seen in small, organ confined disease, there was also a significant increase in the incidence of locally advanced and metastatic disease. The increase in incidence was likely due to 2 phenomena, including 1) a true increase in incidence and increased detection due to increasing rates of abdominal imaging and 2) most of the increased incidence was that of small, low stage tumors.^{5,6}

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TABLE 1. Age adjusted renal carcinoma incidence rates by race/ethnicity and gender

	All			Whites			Blacks		
	Totals	Males	Females	Totals	Males	Females	Totals	Males	Females
Diagnosis yr:									
1975	7.1	10.3	4.5	7.3	10.8	4.6	6.2	8.2	4.3
1976	8.0	11.2	5.5	8.1	11.5	5.6	7.8	11.6	4.8
1977	8.1	11.4	5.5	8.1	11.7	5.5	8.5	11.1	6.4
1978	7.8	11.8	4.8	8.0	12.1	4.9	8.0	11.0	5.7
1979	7.6	11.1	5.0	7.8	11.6	5.1	7.3	8.2	6.3
1980	8.1	11.7	5.4	8.4	12.2	5.6	6.0	8.0	4.4
1981	8.5	12.8	5.3	8.6	13.0	5.3	10.0	15.8	5.8
1982	8.3	11.8	5.7	8.5	12.0	5.8	7.6	11.2	4.9
1983	8.9	13.2	5.7	9.2	13.8	5.8	8.8	13.5	5.5
1984	9.2	13.1	6.2	9.5	13.6	6.3	9.0	12.0	6.8
1985	8.9	13.1	6.8	9.2	13.6	5.9	8.6	11.6	6.2
1986	9.7	13.8	6.6	9.8	14.1	6.7	10.1	15.0	6.6
1987	9.9	14.1	6.7	10.1	14.4	6.9	11.1	15.6	7.8
1988	9.9	14.0	7.0	10.1	14.3	7.0	11.5	15.2	8.8
1989	10.3	14.5	7.1	10.6	15.0	7.2	10.8	15.1	7.8
1990	10.4	14.7	7.1	10.7	15.0	7.4	10.6	16.1	6.6
1991	10.6	15.0	7.2	10.8	15.2	7.4	12.2	18.3	7.5
1992	10.7	15.2	7.4	11.1	16.6	7.7	10.9	16.3	7.2
1993	10.7	14.6	7.6	10.8	14.7	7.7	12.7	17.3	9.4
1994	11.3	15.6	7.8	11.5	19.9	8.0	12.7	18.0	8.6
1995	11.1	15.5	7.6	11.1	15.4	7.7	14.4	21.7	9.3
1996	11.3	15.8	7.9	11.4	16.1	7.8	13.5	17.0	10.9
1997	10.9	15.0	7.6	11.0	15.0	7.7	13.4	19.2	9.2
1998	11.8	16.4	8.2	12.1	16.8	8.4	12.6	16.9	9.2
1999	11.4	15.8	7.8	11.6	16.1	8.0	13.5	18.5	9.9
2000	12.3	17.1	8.4	12.5	17.7	8.3	14.6	19.0	11.8
2001	12.0	16.7	8.3	12.2	16.9	8.5	14.5	20.9	9.9
Diagnosis age:									
All ages	11.7	16.2	8.1	11.9	16.5	8.2	13.7	18.9	10.0
Younger than 65	6.1	8.2	4.2	6.2	8.2	4.2	7.5	9.8	5.5
Older than 65	50.0	71.8	34.8	51.2	73.5	35.6	56.9	81.7	41.0
All ages	8.2	11.2	5.7	8.4	11.4	5.8	9.8	13.3	7.2

SEER 9 areas for all ages, rates per 100,000 and age adjusted to the International Agency for Research on Cancer world standard population, and approximately 12% renal pelvis cancer (source: SEER Program [www.seer.cancer.gov] SEER*Stat Database: Incidence-SEER 9 Regs Public Use, November 2004 Sub [1973 to 2002]. National Cancer Institute, DCCPS, Surveillance Research Program, Cancer Statistics Branch, released April 2005, based on the November 2004 submission).

SEER data showed that kidney cancer incidence increased with age, in that most disease was diagnosed in patients older than 65 years (table 1). SEER data also showed that in men and women younger than 65 years the incidence was higher in black than in white individuals. The reasons for this are unclear and may be related to comorbid conditions such as hypertension, which is more common in black individuals, or to genetic variations that have not yet been defined. In all groups the incidence increased with age up to the ninth decade of life (table 2). Further analysis of SEER data showed that, while kidney cancer occurred approximately twice as often in men as in women, its rate was also increasing in women. In addition, the incidence was increasing more rapidly in black than in white individuals and most rapidly in black women.⁶ When age and race were considered together, black American men younger than 60 years had the most rapid increase in the incidence of RCC.⁷ SEER data also indicated an increasing incidence in Asian/Pacific Islander and Hispanic individuals, while the incidence in Native American/Alaskan native individuals was stable.

Overall survival rates for patients with kidney cancer increased from 1992 to 2001, possibly reflecting that treatment was more effective or more likely that more low stage tumors were being diagnosed (table 3). However, racial and gender disparities in survival were apparent in these data, which showed that black individuals and women had a lower survival rate than the white population, although survival improved in all groups. It is not clear whether this disparity

was due to a different biology of disease or to varying rates of comorbidities among racial groups.⁷

Trends in Health Care Resource Use

Inpatient care. Most adult inpatient hospitalizations for kidney cancer were for surgery. CMS data on 1992, 1995, 1998 and 2001 showed a relatively stable number of inpatient hospitalizations for kidney cancer for Medicare beneficiaries at approximately 25/100,000 (table 4). In contrast, HCUP data on 1994, 1996, 1998 and 2000 indicated that admissions for kidney cancer as the primary diagnosis increased slightly from 19/100,000 to 22/100,000 population (table 5). The 2 data sets revealed almost double the number of admissions for men than for women, reflecting the gender distribution of the disease. Also consistent was the increased rate of admissions with advancing age. It is difficult to identify trends in the rates of inpatient care for minority groups in the 2 data sets due to the small number of cases but the HCUP data set revealed a significant increase in inpatient care for Hispanic individuals. HCUP data also showed that a preponderance of inpatient care was delivered at urban centers.

Decreases in hospital length of stay were seen in HCUP data (table 6), likely a reflection of improvements in perioperative and post-hospitalization care, which were witnessed across all surgical specialties. From 1994 to 2000 mean and median hospital stay decreased by 1 or 2 days, or approximately 25%. As laparoscopic techniques are adopted more widely, length of stay should decrease further.

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