

## RISK FACTOR INFORMATION FOR SELECTED CANCER TYPES

---

### **Kidney cancer**

Kidney cancer involves a number of tumor types located in various areas of the kidney and renal system. Renal cell cancer (which affects the main area of the kidney) accounts for over 90% of all malignant kidney tumors (ACS, 2001). The American Cancer Society estimates that there will be approximately 36,160 cases of kidney and upper urinary tract cancer, resulting in more than 12,660 deaths in 2005 (ACS, 2004). The incidence and mortality from kidney cancer is higher in urban areas, which may be due to increased access to diagnostic services and other factors such as smoking. Kidney cancer is twice as common in males as it is in females and the incidence most often occurs in the fifth and sixth decades of life (50-70 year age group) (ACS, 2001). The gender distribution of this disease may be attributed to the fact that men are more likely to smoke and are more likely to be exposed to potentially carcinogenic chemicals at work.

Since 1970, U.S. incidence rates for renal cell cancer have risen between 2 and 4% annually among the four major race and gender groups (i.e., white males, white females, black males, and black females) (Chow et al., 1999; McLaughlin et al., 1996). Rapid increases in incidence among blacks as compared to among whites have resulted in an excess of the disease among blacks; age-adjusted incidence rates between 1975 and 1995 for white men, white women, black men, and black women were 9.6, 4.4, 11.1, and 4.9 per 100,000 person-years, respectively (Chow et al., 1999). Rising incidence rates may be partially due to the increased availability of screening for kidney cancer.

The etiology of kidney cancer is not fully understood. However, a number of environmental, hormonal, cellular, and genetic factors have been studied as possible causal factors in the development of renal cell carcinoma. Cigarette smoking is the most important known risk factor for renal cell cancer. Smoking increases the risk of developing renal cell cancer by 30% to 100% (ACS, 2001). In both males and females, a statistically significant dose-response relationship between smoking and this cancer has been observed. Approximately one-third of renal cell cancers in men and one-quarter of those in women may be caused by cigarette smoking (ACS, 2001).

Virtually every study that has examined body weight and renal cell cancer has observed a positive association. Some studies suggest that obesity is a factor in 20% of people who develop kidney cancer (ACS, 2001). This is especially true among women and researchers suspect that this may be related to changes in certain hormones, such as estrogen in women (ACS, 2001; McLaughlin et al., 1996). A diet high in protein (meat, animal fats, milk products, margarine and oils) has been implicated in epidemiological studies as a risk factor for renal cell carcinoma (ACS, 2001; McLaughlin et al., 1996). Consumption of adequate amounts of fruits and vegetables lowers the risk of renal cell cancer. In addition, use of diuretics and antihypertensive medications are associated with increased risk of renal cell carcinoma. However, hypertension has also been linked to kidney cancer and it is not clear whether the disease or the medications used to treat them is the cause (ACS, 2001). Long-term use of pain relievers such as phenacetin (and possibly acetaminophen and aspirin) increases the risk for cancer of the renal pelvis and renal cell carcinoma (ACS, 2001).

Certain medical conditions that affect the kidneys have also been shown to increase kidney cancer risk. There is an increased incidence of renal carcinoma in patients with end-stage renal disease who develop acquired cystic disease of the kidney. This phenomenon is seen among patients on long-term dialysis for renal failure (Linehan et al., 1997). In addition, an association has been established between the incidence of von Hippel-Lindau disease and certain other inherited conditions in families and renal cell carcinoma, suggesting that genetic and hereditary risk factors may be important in the development of kidney cancer (ACS, 2001; McLaughlin et al., 1996).

## **RISK FACTOR INFORMATION FOR SELECTED CANCER TYPES**

---

Environmental and occupational factors have also been associated with the development of kidney cancer. Some studies have shown an increased incidence of this cancer type among leather tanners, shoe workers, and workers exposed to asbestos. Exposure to cadmium is associated with an increased incidence of kidney cancer, particularly in men who smoke (ACS, 2001; Linehan et al., 1997). In addition, workplace exposure to organic solvents, particularly trichloroethylene, may increase the risk of this cancer (ACS, 2001). Although occupational exposure to petroleum, tar, and pitch products has been implicated in the development of kidney cancer, most studies of oil refinery workers and petroleum products distribution workers have not identified a definitive relationship between gasoline exposure and renal cancer (Linehan et al., 1997; McLaughlin et al., 1996).

Wilms' tumor is the most common type of kidney cancer affecting children and accounts for approximately 5% to 6% of all kidney cancers and about 6% of all childhood cancers. This cancer is more common among African Americans than other races and among females than males. Wilms' tumor most often occurs in children under the age of 5 years. The causes of Wilms' tumor are not known, but certain birth defect syndromes and other genetic risk factors (such as family history or genetic mutations) are connected with this cancer. However, most children who develop Wilms' tumor do not have any known birth defects or inherited gene changes. No environmental risk factors, either before or after a child's birth, have been shown to be associated with the development of Wilms' tumor (ACS, 1999).

### **References**

- American Cancer Society. 2005. *Cancer Facts and Figures 2005*. Atlanta: American Cancer Society, Inc.
- American Cancer Society. 2001. *Kidney Cancer (Adult) – Renal Cell Carcinoma*. Available at: <http://www3.cancer.org/cancerinfo/>.
- American Cancer Society. 1999. *Wilms' Tumor*. Available at: <http://www3.cancer.org/cancerinfo/>.
- Chow WH, Devesa SS, Warren JL, Fraumeni JF Jr. 1999. Rising incidence of renal cell cancer in the United States. *JAMA* 281(17):1628-31.
- Linehan WM, Shipley WU, Parkinson DR. *Cancer of the Kidney and Ureter*. In: *Cancer: Principles and Practice of Oncology*, Fifth Edition, edited by Devita V, Hellman S, Rosenberg S. Lippincott-Raven Publishers, Philadelphia 1997. P. 1271-1297.
- McLaughlin JK, Blot WJ, Devesa SS, Fraumeni JF. *Renal Cancer*. In: *Cancer Epidemiology and Prevention*. 2<sup>nd</sup> Ed, edited by Schottenfeld D, Fraumeni. JF. New York: Oxford University Press: 1996. P. 1142-1155.